

# EFFECTIVE CAR PARK DESIGN FOR TOMORROW'S DENSE CITIES



**LOCKER**

A **valmont** COMPANY

## INTRODUCTION

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The multi-storey car park has become a fixture of the Australian urban landscape. Across the country, the number of such car parks is growing in line with burgeoning urban populations as well as increasing car ownership, a trend in stark opposition with global figures. Australian cities are now more densely populated than they were 30 years ago, and Australian residents are more likely to live in inner-city areas than ever before.<sup>1</sup> Furthermore, the Urban Developer reports that according to the 2017 Motor Vehicle Census, the number of registered vehicles has grown in every state and territory except for the Northern Territory by an average of 2.1 per cent up from 2016 figures.<sup>2</sup>

The growing demand for car parks can also be attributed to the popularity of multi-residential urban developments with limited, if any, access to street parking, and the fact that the average car is parked 95 per cent of the time.<sup>3</sup> This information necessitates adequate parking provisions, particularly in dense urban environments, where demand is often concentrated in locations close to other transport amenities and infrastructure such as train and bus stations.

In light of this growing demand, it is critical that today's designers are equipped with the knowledge and skills that enable effective car park design. Namely, they need to understand a number of key issues: safety, ventilation, and aesthetics and respect for the existing urban environment. In this whitepaper, we explore what each of the above factors mean for designers and specifiers, and examine how design solutions can be used to ensure the adequate delivery of each of these in turn.

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## SAFETY

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Though both implicit and explicit understanding and physical thresholds define the respective spaces of pedestrians and vehicles at street level, this understanding is often lost in poorly designed car parks. Paired with a lack of adequate safety measures and a common perception that lower speeds always equate to safer environments, the danger of car parks is often underestimated. In the United States, over 50,000 crashes occur within parking lots each year, causing over 500 deaths and 60,000 injuries.<sup>4</sup> The close proximity of pedestrians and vehicles, together with the size, weight and power of modern vehicles, makes extra precautions necessary to avoid potentially catastrophic car park accidents.

In Australia, a number of measures can be taken to ensure that maximum levels of safety are achieved. AS 1170.1 and AS/NZS 2890.1 are both relevant in such circumstances, and require barriers or fences wherever there are drops of 600mm or more adjacent to stationary or moving vehicles and wherever pedestrians are at risk of falling from heights of 1m or more. The standards also dictate the need for anti-climb barriers wherever the car park is at a height of 4m or greater.

Outside of the Standards, safety barriers between pedestrian and vehicle areas are able to clearly define users' respective zones; in a 2009 circular, the NSW Department of Planning recommended against wheel stops and similar devices as the primary safety barrier.<sup>5</sup> A durable enclosure system can offer pedestrian anti-fall protection wherever there is a height difference, as well as prevent cars from intentionally or accidentally driving off of the edge of the car park floor plate. Furthermore, crash rail systems may be mounted onto that enclosure, distributing the impact in the event of a collision to prevent a rupture or other damage.

## VENTILATION

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It is a known fact that cars emit both toxic and non-toxic gases during operation, making it critical for car park designers to make allowances for adequate ventilation.

Crucially, vehicles are emitters of carbon monoxide (CO): a colourless, tasteless, odourless gas that poses a major health risk to those who are exposed. Symptoms of mild exposure can include headaches and drowsiness, while higher levels of exposure CO can lead to unconsciousness, coma, and even death.<sup>6</sup>

Enclosed car parks can become death traps as toxic gases build up, and from multiple standpoints mechanical ventilation is not always an adequate means of alleviating the situation. As it is wholly reliant on electricity, the operation of mechanical ventilation can be expensive, particularly in multi-storey car parks.

Furthermore, this dependency upon electricity is a sustainability issue in the long term and can be potentially problematic should the system fail due to a power outage, mismanagement, or poor maintenance.

Where possible, designers should attempt to incorporate passive or natural means of ventilation, such as through the specification of breathable enclosures that permit airflow in and out of the car park. Doing so provides a simple yet effective method for allowing adequate ventilation, without additional operating cost or risk of unexpected failure.





## PUBLIC AMENITY

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### **AESTHETICS**

As they are such prominent features of Australia's urban landscape, it is important that designers consider not only the functionality and safety of car parks, but also their aesthetics. Properly designed car parks provide a service and directly tackle densification by integrating vital transport infrastructure into the urban environment.

However, this is no reason to adopt a solely utilitarian design, as is often the case. Rather, designers should aim to create car parks that are both contemporary and complementary to the surrounding streetscape by responding to the existing context and taking into account how this may evolve in the future. Finding materials that will age well is critical in this effort, as is careful consideration of the finishes of the enclosure, which essentially forms the car park's façade.

Specifiers and designers should consider screens that are capable of acting as "blank canvases" for creative expression.

Customisable enclosures and façades allow designers to explore innumerable paths for creativity, creating the opportunity to incorporate local artists' imagery, or explore the historical and Indigenous heritage of the area. As such, car parks need not be limited to a single utilitarian purpose.

### **ENVIRONMENTAL OUTCOMES**

Respect for the urban environment also encompasses limiting any negative impact of car parks upon the surrounding context. Effective car park design incorporates screens or other enclosures that limit the amount of light pollution emitted from facility lighting and car headlights.

However, the permeability of these enclosures is still important, allowing for visibility into the car park and the added security of 'eyes on the street', or passive observation.<sup>7</sup> The same trait also allows for the entry of natural light, thus reducing reliance on artificial lighting.



## LOCKER GROUP

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Since 1956, Locker Group has led the Australasian market in innovative and high performance perforated and expanded metal, wire mesh, and conveyor belts. Thanks to an extensive product range, the company caters for a broad audience spanning the architectural, engineering, and construction industries.

Furthermore, Locker Group is capable of creating bespoke solutions that meet the specific needs of any client. Custom solutions including custom imagery or colours are bolstered by an in-house design and production team trained in cutting edge VR technology, which allows clients to visualise a product in situ prior to committing.







## AURORA SYSTEM

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Locker Group's Aurora System is a unique cassetted system that is compatible with any substrate of the company's two principal materials: expanded metal, or perforated metal. The Aurora System allows for these substrates to be integrated into a car parking application or façade, and is the only system of its kind on the market that is capable of integration with a crash rail system. Its permeable surface allows for optimum airflow, safety, and build-ability, balancing high functionality with an outstanding aesthetic outcome.

Aurora is a highly customisable system that can be adjusted to meet any specific requirement, allowing an unrivalled ability to successfully integrate a project into its context. Custom design options allow designers to tailor the façade to connect with local artists or explore the local and Indigenous history of the area whilst simultaneously reducing light pollution, thus contributing to improved public amenity beyond the scope of a standard multi-storey car park.

## ATMOSPHERE SYSTEM

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The Atmosphere System is a lightweight, sustainable façade system that is ideal for retrofitting and new construction alike. Atmosphere features perforated elements that attach to the external building envelope, and utilises a patented tension cable fixing system to enable simple, fast installation.

The design and engineering of each Atmosphere system is tailored to meet the bespoke needs of every project, thanks to a highly customisable textural element that can be tailored to match the specific requirements of each orientation. Furthermore, the system's modular nature allows components to be interchanged to best suit the base building's engineering, wind and climatic features, and the distance between the façade and existing building envelope.

**For more information, visit Locker Group's website via the link below. [www.locker.com.au](http://www.locker.com.au)**

## REFERENCES

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