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How new building projects are creating smarter loading docks

Top trends and ideas

Sustainability and design

Case study: New Sydney Fish Market

We examine how new building projects are taking up the notion of creating smarter loading docks – starting with a holistic approach to demand planning, civil design, traffic engineering, and building or asset value creation.

In many busy facilities, the loading dock door is rarely shut. As a high traffic location for heavy vehicles to load and unload their deliveries throughout the day (and night), it represents a commercial hub that many do not see.

Yet the loading dock should be one of the first places management looks at to future proof a building against the growing pressures of daily operational requirements, including supply chain disruption, and offer opportunities to improve air quality and carbon footprint.

In any commercial, manufacturing or distribution facility, one of the challenges of loading dock planning and design is to minimise the damaging force and compression from vehicle movements. The effect of noise and reverberation is also a critical consideration (where reflected sound in big spaces lingers long after) and is often caused by the generally flat concrete walls.

External loading bays also require a custom design to help prevent damage to the building's façade and better manage site safety and transport risks.

The latest technology ideas and trends affecting delivery / supply chain needs are also important (e.g. cold supply chain, bulky warehouses, office buildings or mixed use precincts). Alongside other top drivers of loading dock design and operations including those outlined in this article.

Top trends affecting loading dock design and operations

1 Freight and servicing volume

Domestic freight volumes impacted by COVID-19 have seen an increasing trend towards online shopping and home deliveries with Australia Post establishing 16 new or recommissioned processing facilities 24/7 ([1]source: Freight Australia).

Service delivery to restaurants, offices, shopping centres has also quickly adapted and prompted fresh thinking on how to encourage a new 'normal' with contactless options like Click & Collect and drive through options in suburban areas versus high density or metro areas. Monitoring changes in consumer behaviour is important as they affect the volume and nature of deliveries made in loading docks and car park usage.

2 Shifting retail formats

A new challenge for land owners is the demand for supermarkets and large format retailers to develop outside loading areas for rear access to each floor of the building. In conjunction with existing challenges of managing any end-of-trip facilities, onsite parking and co-location with public transport facilities.

Inner city renovation projects are also affecting smaller formats in CBD areas and delivery trip planners. This is influenced by the reduced amount of 'off-street' loading zones from the rise of parklets, pedestrian malls, pad sites and other kerbside changes.

3 Airports and Retail projects

Development of new flagship centres or experience centres (or existing retail expansion) are creating precincts that require a tailored approach to deliver ideas that will meet future needs while meeting standards and strict compliance requirements.

When designing loading docks, managing the competing needs of stakeholders (e.g. retail centre owner and the major tenants) is paramount.

This starts with separating differing user requirements, and giving a high priority to the provision of designated loading, patron vehicular and pedestrian areas to ensure safety for all users.

A review of existing layouts and the interaction between the loading dock location(s) and car park areas should also be warranted in situations where an overall shortage of parking exists. This is due to potential safety issues in customers and staff parking in or near loading docks.

Aviation developments in Sydney like the Western Sydney Airport are expected to be a hub of thriving business and proudly cater to the needs of international visitors. This presents challenges in ground support, cargo handling facilities and freight delivery docks, to name just a few.

Our specialty as traffic engineering consultants means **ptc.** is well placed to help with your next project. Wayfinding for a positive car park and precinct experience for visitors could also be an ideal conversation starter for your next development to attract the right tenant anchor.

[1] Freight Australia website: 2019-2020 Annual Report; COVID-19 impacts on freight

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4 Vehicle specifications

The provision of turn tables, for example, can reduce the footprint required for loading docks by eliminating designated turn areas. The extra space can then be used for other activities required within the development. The specifications of vehicles such as waste disposal trucks with front lift or rear lift functionality, also needs to be taken into account, especially in underground loading docks.

The design of modern loading docks for B-doubles, with overhead doors, temperature seals, dock levellers, bumper systems and dock shelters, may also require a whole of building view to accommodate an efficient drive-through concept.

Despite the larger areas afforded by warehouses or industrial sites, they still face demanding challenges in providing the required turning circles for vehicles up to B-doubles (as calculated by a swept path analysis performed by a traffic engineer) to specifically accommodate the land area, site constraints, exclusion zones, compliant operations and safety limitations.

These are just a few considerations that can affect serviceability of the building or site development.

5 Road network changes

In a city experiencing the largest transport infrastructure Australia has seen, with $41.1 billion of investment over the next four years ([2]source: TfNSW), Sydney is a hive for major transport projects affecting our road networks. These are attributed to project delivery in:

- **Light Rail** (Sydney, Parramatta and Newcastle)
- **Metro** (Sydney North West, City & South West, and West)
- **Fleet** (new intercity trains from Sydney to Central Coast, Newcastle, Blue Mountains and South Coast)
- **Regional Rail** (replacement of entire NSW fleet including 60 XPTs and 50 Xplorer and Endeavour cars)
- **Roads** (Easing Sydney's Congestion Program Office, Pacific Highway Upgrade (Sydney to Brisbane), and Princes Highway Upgrade)

These changes have a direct impact on future loading dock design with planning required to minimise traffic congestion through entry and exits, improve flexibility of dock scheduling, and enhance prevention systems (to avoid prematurely entering or leaving). Wayfinding advancements in low light conditions are also important (for example, low power/ LED signs, ramp improvements and traffic sensors to minimise accidents or blind spots).

All while meeting requirements of council (in some cases with DA approval or consent), relevant stakeholders for building operations through to providing a positive tenant customer experience.

6 New technology

Relative improvements in safety and technology have elevated the loading dock from a relatively low-tech area to a safer, easier workplace for employees.

Dock safety communications and visuals have been well utilised for warehouses (for example, green and red lights/visuals for vehicle restraint), while those focused on developing a smart loading dock, are creating greater flexibility for delivery bookings and dock management.

[2] Transport for NSW website (nsw.gov.au): Major projects hub

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While poor internet access has previously been a major hurdle in underground areas, this has been greatly improved with in-building coverage and distributed antenna systems (DAS). Loading Dock Managers can potentially now base decisions about their loading docks and influence peak efficiency with API-enabled real-time communications.

Smart scheduling technology is a growing trend as automation, robotics and artificial intelligence contributes to loading dock connectivity and efficiency. Product features and offerings like MobileDOCK are breaking new ground among premium buildings. What exciting new idea will be next in the Internet of Things (IOT) or the digital-twin built environment?

7 Carbon footprint

With the exception of recessed bays and hardstand areas, you will rarely see an open-air loading dock as most loading docks are closed-in areas. This means they can trap the emissions from running trucks and workers may not take adequate protective measures to protect against exposure to carbon monoxide. While not a common topic, it is something that matters to transport and civil engineers in terms of the number of vehicles in operation, length and time they spend idling, size and shape of the building, natural ventilation and mechanical ventilation.

Reducing pollution in our environment, including the loading dock, requires a combination of good work practices (including maintenance), up-to-date dock management plans, and training for staff engagement and consideration of alternate routes for delivery drivers.

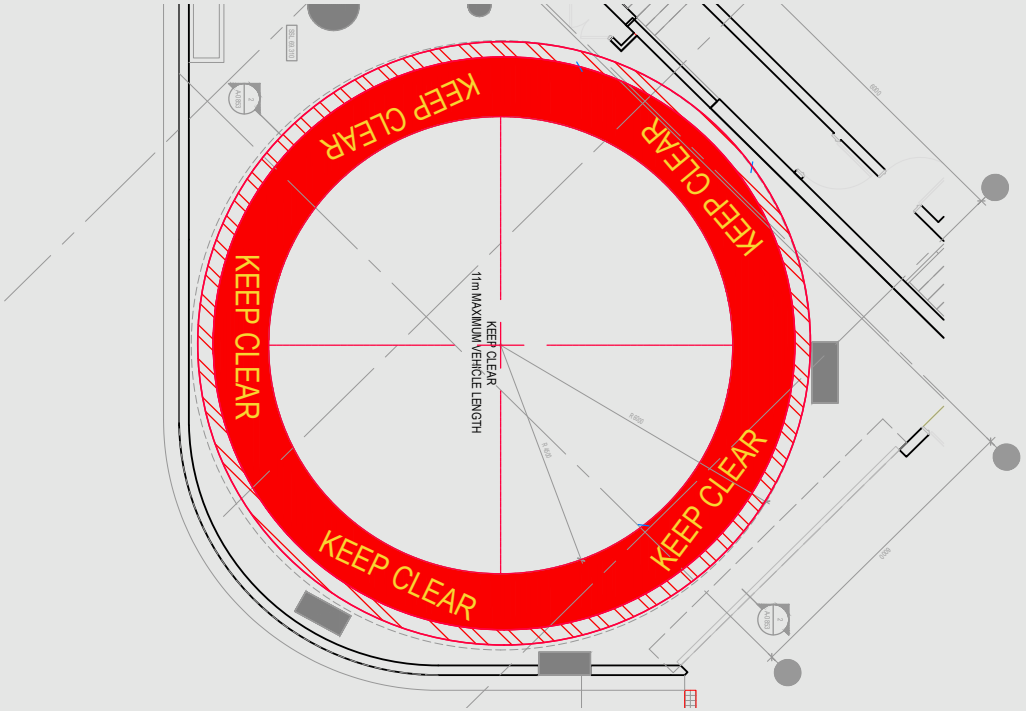
Construction activity

On-time project delivery is a constant focus for developers and builders. Innovative use of rotating turn tables on construction sites is one way to handle narrow site access for concrete trucks, materials delivery and waste removal. They allow forward entry and exit of the loading dock which increases safety and reduces risk of property damage.

Steve Wellman, Project Director at **ptc.** highlights the practical application of turn tables:

"Similar to a 'lazy susan' on the kitchen table, mechanical turn tables offer a solution for tight spaces and help to minimise the risk for on-site workers and surrounding pedestrian safety," he says.

"In some settings, such as a loading dock inside a commercial building, the turn table may also allow more than one vehicle to rotate, creating time efficiencies for smaller sized vehicles."



Can a loading dock be green?

A recent article published by The Guardian (April 2021), highlights how 'an Australian company is planning to trial electric trucks with swappable batteries allowing non-stop travel for heavy vehicles between Sydney and Brisbane' ([3]source: The Guardian website). Until electronic trucks are made feasible, we need to pair innovative ideas with a practical solution.

Often environmental liabilities may occur over long periods of time. The loading dock is a clear example, with ground damage caused by truck and equipment contaminants (e.g. hydraulic fluids, cargo loading/unloading), weak or badly designed floor structures that may lead to integrity issues with cracking, uneven surfaces, seepage and expensive/ongoing upkeep.

The civil design component is an important area to help avoid future pain points in site developments. This also applies to any above ground car park design and projects involving lots of traffic movement, both vehicular and people. So, can a loading dock be green? Yes, as long as we consider a wholistic approach to environment, safety and wellbeing.

Giving back time to the busy dock manager

Loading Dock Managers and Dock Traffic Controllers are primarily responsible for dock operations, security & safety through to keeping abreast of latest regulations and dock rules.

However, those in middle and higher management should also be concerned with loading dock operations given how the above themes can tangibly influence the overall performance and value of a building.

Defending the bottom line for your building

Listed below is a sample of who should be engaged for your next project for a whole of building approach or viewpoint:

- Building Management / Stakeholders
- Facilities Manager, Property Manager, Capital Works Manager
- Tenant Representative, Leasing Manager, WHS Manager
- Sustainability Manager, Procurement Manager, Compliance & Risk Manager
- Asset Manager, Development Manager (and Tenant Relations).

[3] The Guardian website: Swap and go: electric trucks to run between Sydney and Brisbane using exchangeable batteries (29 April 2021)

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Case study

New Sydney Fish Market

The $750 million new Sydney Fish Market is set to create a new icon in the city. This commitment by the NSW Government will create a world class attraction at the head of Blackwattle Bay. The current Sydney Fish Market will remain fully operational while the new site is being built.

The new design delivers more than 6,000 square metres of new public open space and paves the way for a future shared pedestrian and cycle path that will provide waterfront access from the Sydney Fish Market to Woolloomooloo ([4]source: Sydney Fish Market).

Spatial optimisation

Segregated loading dock and dual use public car park

The **ptc.** team was engaged, initially by Infrastructure NSW and by the building contractor Multiplex to assist with safely accommodating suppliers and customer's vehicles within the site and deliver:

- optimal layouts for a segregated loading dock for articulated vehicles and large rigid vehicles
- a dual use public car park and,
- small rigid vehicle service area.

Whilst the master planning stage assisted with site selection, design ideals and access point locations, **ptc.** were able to come up with a final design after analysing the site layout, vehicular movements, user's needs and extensive liaison with stakeholders.

While suppliers and wholesalers usually use the service area in the mornings, and patrons visit during the market's opening hours, a key challenge was to cater for the different needs of user groups sharing the same space. Our solution led to :

- the design of a ground level loading dock, with 18 loading bays dedicated for articulated and large rigid vehicles
- a design for the underground car park/ service area, that provides the required aisle width and spaces for both small rigid vehicles (approximately 145), and 400 public car parking spaces
- the underground car park/service area has been designed to operate in a 'dual mode' with small rigid vehicles using the area during wholesale operating hours and customer car use during the other times.

400
car parking spaces

145
dual use loading bays

20
exclusive loading bays

50
staff bike parking

*above numbers are approximately

Image Credit: Infrastructure NSW

[4] Sydney Fish Market website/Corporate Redevelopment: The New Sydney Fish Market

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Connect with us

We provide independent parking, traffic and civil engineering advice to property owners, developers and managers. Our industry experience includes commercial, retail, residential, health, education and government.

If you are interested in finding out more or have questions about your next project, please contact one of our parking, traffic and civil design professionals.

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Our services

- Car Park Management Plan
- Concept Design (Civil and Traffic)
- Construction Traffic Management Plan
- Cyclist Facility Design
- Demand Assessment (Parking)
- Detailed Design (Civil and Traffic)
- Green Travel Plan
- Loading Dock Management Plan
- Master Planning Submissions
- Parking Strategy
- Regulatory Signage
- Technology & Operational Tenders
- Transport Impact Assessment
- Transport Strategy
- Wayfinding Design

Steve Wellman, Project Director

'I work with clients in public and private sectors to oversee the design and management of civil and traffic projects, including major urban motorway and intersection upgrades. I have an in-depth knowledge of the project life cycle and understand our client's needs to deliver the required project outcomes.'

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