

Urban Freight, City Servicing, Waste Transport and Deliveries Discussion Paper



Introduction

This discussion paper is to inform a new City of Adelaide Integrated Transport Strategy to 2036. We are seeking views on these issues and ideas with you during engagement in 2024.

Urban freight and deliveries are vital to the City of Adelaide functioning effectively, supplying the city with everything it needs to thrive. From stocking shelves in shops to ensuring restaurants have fresh food, efficient logistics systems enable businesses to operate smoothly and meet consumer demands. They support the daily influx of goods that residents and visitors rely on, from essential groceries to retail products and dining experiences. This supply chain sustains the local economy and enhances the city's attractiveness as a vibrant urban centre.

Efficient urban freight and city servicing supports economic activities in the City of Adelaide while minimising environmental impacts. Opportunities to improve this for Adelaide involve dynamic kerbside management, technological innovations, freight consolidation hubs, and sustainable waste practices.

Adelaide's transport logistics network is integral to its functioning as a thriving metropolitan area. Efficient urban freight, delivery, city servicing and waste transport movements are important to support economic activities while minimising environmental impacts. City servicing, waste management, and deliveries are critical components of Adelaide's urban infrastructure and city operations. The overarching goal is to create a connected city where goods and services are transported promptly, sustainably and access the parts of the city they need to efficiently.

Strategic Context and Current Situation

Adelaide's transport policies related to urban freight and deliveries have evolved over recent decades. In the past the focus has been on expanding road capacity and increasing loading zone availability to support the growing number of delivery and service vehicles. There is a need to shift towards a more integrated strategy that addresses the needs of urban freight, city servicing, waste transport, and deliveries. This new direction aims to enhance the efficiency and sustainability of these logistics functions while reducing their environmental impact and improving the overall quality of urban life.

There are approximately 620 loading points in the City of Adelaide, with 88% located in the CBD and 12% in North Adelaide. A number of time restrictions are in place for these zones, with majority for use during weekdays.

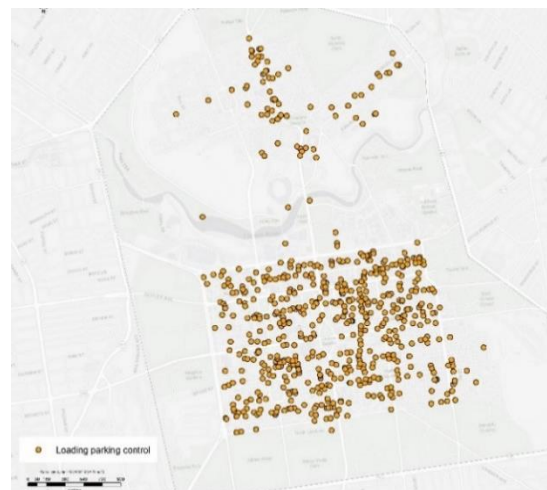


Figure 1 Loading Zones in the City of Adelaide

Source: City of Adelaide

Engagement: What We've Heard

Based on community engagement undertaken previously on a number of City of Adelaide projects, we have heard the following from you:

- Consider opportunities for off-peak deliveries with service access to higher place value streets.

In the development of this paper, a number of stakeholders have been consulted with, including the City's Access & Inclusion Panel and the Project Steering Group. Key inputs from these forums include:

- Implement street space optimisation and traffic calming strategies to create environments for people, and consider the role of future servicing technologies in this.
- The role the City of Adelaide's street network plays in supporting the State's economy and resulting freight task.

Summary of Issues, Barriers and Opportunities

The management of urban freight, city servicing, waste transport, and deliveries in Adelaide involves a range of stakeholders, each playing a different role in the operation of urban logistics. These include local and state government agencies, private sector logistics providers, and various businesses that depend on efficient delivery and waste management systems.

The City of Adelaide holds a pivotal position in this complex network, regulating and facilitating parts of these activities through leadership, policy development, infrastructure planning, and collaboration with key stakeholders. Local and state government agencies are responsible for creating and enforcing regulations that govern urban logistics, overseeing planning regulations, traffic laws, and environmental policies that impact how freight, servicing, and waste management are conducted.

Issue	Theme (Factor)	Responsibility (State or CoA)	Issue / Barrier	Opportunity Potential Removal/Mitigation of Barrier
Kerbside space underutilisation	Kerbside management	CoA	Kerbside space primarily used for parking at low cost	• Reallocate space for higher-value uses like delivery hubs or cargo bike access. • Use dynamic kerbside management to adjust based on demand
Freight congestion in urban areas	Freight traffic management	State and CoA	Congestion due to freight vehicles on narrow urban roads	• Redirect heavy vehicles to ring roads • Encourage use of smaller, space-efficient delivery vehicles within the city • Promote off-peak deliveries to reduce daytime congestion.
Environmental impact of freight	Sustainability	CoA	Diesel freight vehicles contribute to emissions and poor air quality	• Promote electric or low-emission vehicles • Implement green delivery zones within city limits • Adopt freight consolidation hubs to distribute goods via smaller, low-emission vehicles.
Increase in delivery demand	Growing delivery activity	CoA	Growth in parcel and food delivery has overloaded logistics systems	• Implement smart locker systems to reduce multiple delivery attempts • Encourage use of micromobility for last-mile deliveries
Complex regulatory framework	Governance	State	Fragmented regulations hinder local government from managing freight effectively	• Streamline regulatory compliance between state and local levels • Enhance local government input into freight-related decisions
Limited data on last-kilometre logistics	Data availability	CoA	Lack of comprehensive data on delivery and freight systems	• Conduct detailed traffic and logistics surveys • Use real-time data to optimise freight and delivery routes

What are the current issues and barriers?

Governance and responsibilities

The management of freight, servicing, waste, and deliveries in Adelaide involves a diverse array of stakeholders, each playing an important role in ensuring the smooth operation of urban logistics. While the state government primarily creates the regulations governing these activities, local councils, including the City of Adelaide, have some input in the process, particularly following planning reforms. The City of Adelaide holds a key position in this network, overseeing and facilitating parts of these activities through leadership, policy development, infrastructure planning, and collaboration with stakeholders such as private sector logistics providers and businesses reliant on efficient delivery and waste management systems.

Local and State Government Regulations

Local and state government agencies are responsible for creating and enforcing regulations that govern urban logistics. They oversee planning regulations laws, traffic regulations, and environmental policies that impact how freight, servicing, and waste management are conducted. These agencies also play a crucial role in infrastructure development, such as maintaining roads, bridges, and kerbside facilities that are essential for logistics operations. By setting the regulatory framework and providing the necessary infrastructure, government agencies ensure that logistics activities are carried out safely, efficiently, and sustainably.

Industry

Large freight forwarders are key players in urban logistics, handling significant volumes of goods that need to be transported within and through the city. These companies often have sophisticated operational processes, including advanced routing algorithms, large fleets of delivery vehicles, and robust logistics management systems. They rely on real-time data and predictive analytics to optimise delivery routes, reduce fuel consumption, and ensure timely deliveries. The City of Adelaide must work closely with these large freight forwarders to influence and align their operations with urban planning goals and sustainability targets. This collaboration can include sharing traffic data, coordinating delivery schedules to avoid peak traffic times, and encouraging the adoption of low-emission vehicles.

Smaller independent logistics providers and businesses with less evolved operational processes also play a crucial role in urban logistics. These entities may not have the same level of technological sophistication as larger freight forwarders but are equally important in maintaining the city's supply chain. They often face unique challenges, such as limited resources for implementing advanced logistics technologies and difficulty in adapting to regulatory changes. The City of Adelaide can support smaller companies by facilitating connections to training and resources to improve their operational efficiency, and creating policies that accommodate their specific needs. This support can help smaller businesses remain competitive while contributing to the overall efficiency and sustainability of the urban logistics system.

Private sector logistics providers, including third-party logistics companies and specialised delivery services, offer a range of solutions tailored to the needs of businesses in Adelaide. These providers often operate at the intersection of technology and logistics, leveraging innovations such as automated warehouses, drone deliveries, and smart lockers. The City of Adelaide's role involves facilitating the integration of these advanced logistics solutions into the urban environment. This can be achieved by developing supportive policies, investing in necessary infrastructure, and fostering a regulatory environment that encourages innovation.



Figure 2 There are a range of stakeholders and roles in urban freight, delivery and city servicing.

Business and Consumer Needs

Ultimately, the success of urban logistics depends on the collaboration between all stakeholders, including the businesses that rely on timely deliveries and the consumers who benefit from efficient logistics services. Businesses in various sectors, from retail to hospitality, depend on reliable logistics to maintain their operations and meet customer demands. Consumers, on the other hand, expect quick and reliable delivery of goods, particularly in the age of e-commerce. The City of Adelaide can facilitate this by engaging with businesses and consumers to understand their needs and challenges, and by implementing policies that promote efficient and sustainable logistics practices.

Data availability

A significant challenge is the lack of comprehensive data and understanding regarding the efficiency and operation of the current urban logistics system, particularly concerning last kilometre deliveries. This gap in knowledge makes it difficult to identify inefficiencies, measure performance, and implement improvements effectively. Despite the critical role that last kilometre logistics play in the city's overall transport network, there remains a substantial need for detailed information about how the system functions on a day-to-day basis.

Without accurate data on the number of delivery vehicles, their routes, delivery times, and the specific challenges they encounter, it is challenging to assess whether existing logistics practices are operating optimally. This information is crucial for identifying bottlenecks, areas of congestion, and the environmental impact of delivery operations. Furthermore, understanding these dynamics is essential for developing strategies that can enhance the efficiency of last kilometre logistics, reduce traffic congestion, and minimise emissions.

The City of Adelaide could gain a clearer picture of the current state of its logistics system and identify practical solutions for improvement. This may involve conducting comprehensive traffic and logistics surveys, engaging with stakeholders, and leveraging advanced data collection technologies. Using real world data will enable the city to optimise delivery routes, improve the utilisation of delivery vehicles, and implement effective kerbside management practices.

Kerbside space availability

Managing kerbside space in a way that balances the needs of parking, freight deliveries, public transport, bike riding, and pedestrian access is a complex task. The demand for kerbside space varies throughout the day, requiring flexible principle-based management strategies to ensure accessibility and efficiency. Currently loading zones are the key mechanism that the City of Adelaide uses to facilitate deliveries and commercial vehicle needs across the city.

Adelaide can benefit from adopting real-time data collection and dynamic kerbside management to optimise kerbside space usage, balancing the needs of freight, public transport, cycling, and pedestrian access. Adelaide's approach could be informed by detailed traffic surveys and the application of dynamic kerbside management strategies.

Freight traffic

The City of Adelaide faces several challenges related to freight traffic, including congestion on key transport corridors, narrow roadways in urban areas, and the environmental impact of heavy diesel vehicles on air quality and greenhouse gas emissions. In recent years, due to structural concerns with the King William Street Bridge, the City has had to reroute heavy trucks onto the ring route, limiting freight traffic entering the council boundary. This redirection has helped alleviate pressure on city infrastructure. Additionally, reduced local government authority and complex regulatory frameworks further hinder the city's ability to effectively manage freight traffic and mitigate its impacts. These issues highlight the need for continued infrastructure improvements and regulatory coordination to balance the demands of freight with urban sustainability goals.

Growing delivery activity

There has been a significant increase in takeaway food and parcel delivery, especially since COVID-19. While the growth in food delivery has mostly occurred by space efficient modes of transport, particularly e-bikes, consumer expectations for same-day parcel delivery has overloaded logistics networks and led to double-handling, load zone congestion, and less efficient trips.

The employment circumstances of delivery workers have evolved in response to this surge in demand. Many delivery workers are now engaged in gig economy roles, often working as independent contractors for multiple delivery platforms. This shift has brought about flexibility in working hours but has also introduced challenges related to job security, benefits, and income stability. Workers often face high competition, fluctuating earnings, and a lack of traditional employee protections such as health insurance and paid leave. This also had adverse safety impacts on the delivery task. As the demand for delivery services continues to grow, addressing these employment challenges through better regulation and support mechanisms will be crucial for ensuring sustainable and fair working conditions for delivery personnel.

Technological advancements

The rapid pace of technological change presents both opportunities and challenges for freight, servicing, waste and deliveries. Innovations such as autonomous vehicles, drones, and smart logistics platforms are already being developed and implemented by industry. This presents both risks and opportunities for the City of Adelaide. These innovations must be assessed against their overall effect on the City of Adelaide, otherwise, they may not deliver a net community benefit. Technology can enhance efficiency but will require agile regulatory adaptation on the part of the city to protect liveability and the public interest.

City servicing

City servicing includes the variety of operational and maintenance functions that are required to keep a city functioning. It includes trades such as air conditioning or elevator repair or maintenance. These are often city functions that require vehicle access and parking across all times that is not necessarily suited to loading zones. Therefore, reliable access to suitable parking nearby respective work locations is important.

Waste management

Urban waste processing has advanced significantly in recent years, incorporating innovative technologies and practices aimed at improving efficiency and sustainability. Despite these advancements, kerbside collection in Adelaide continues to follow a traditional model where bins for different types of waste—such as general waste, recyclables, and organic matter—are placed on the kerb for collection by trucks. This system, while familiar and relatively straightforward, faces increasing pressure due to the growing demands on kerbside space and footpaths.

Challenges of traditional kerbside collection

The traditional kerbside collection model is being tested as urban populations grow and waste generation rises. More bins on the kerbside lead to cluttered streetscapes, impeding pedestrian movement and reducing the aesthetic appeal of urban areas. The collection process itself can cause disruptions, as waste trucks occupy kerbside space, sometimes blocking traffic lanes and creating noise and air pollution. The increased frequency and volume of collections required to manage the rising amounts of waste further exacerbate these issues. The City of Adelaide is working with apartment buildings and larger commercial properties to consolidate bin collections. This approach aims to streamline waste management by reducing the number of individual bin services, improving kerbside efficiency, and addressing space constraints.

Innovative solutions for waste collection

To address these challenges, Adelaide can explore and implement innovative waste collection solutions that optimise kerbside space usage and enhance efficiency. These solutions could be applied to general waste bins, or more tailored solutions could be directed at areas like the Central Markets where more waste management activities occur on certain days. One such solution for general streets is the deployment of smart waste bins equipped with sensors that monitor fill levels in real-time. These smart bins can signal when they need to be emptied, allowing waste collection to be scheduled more efficiently and reducing the number of collection trips required. This not only decreases traffic congestion but also lowers emissions from waste collection vehicles.

Underground waste collection systems are another innovative solution that involve installing underground containers that can store larger volumes of waste, with only small, discreet access points

visible at street level¹². Waste is deposited into these access points and stored underground until collected by specialised vehicles. This reduces the visual and physical footprint of waste bins on the streets, and the number of trips required to empty bins. This frees up kerbside space for other uses and enhances the urban environment. In Stockholm Sweden waste is transported by pneumatic tubes to central collection points. This even further improves the efficiency of underground waste systems³.

Transition to low-emission waste collection vehicles

Reducing the environmental impact of freight and waste management is a significant challenge. The City of Adelaide's Integrated Climate Strategy 2030 sets the goal to halve the City's climate impact by 2030 and make it nil by 2035. This requires a 50% emission reduction from 2020 levels by 2030.

The transport sector is a major contributor to greenhouse gas emissions, and there is a need to adopt cleaner technologies and practices. Initiatives such as electric delivery vehicles, cargo bikes, and low-emission zones are critical to achieving sustainability goals. The City of Adelaide is already doing some of these things.

Adopting low-emission or electric waste collection vehicles is another crucial step towards more sustainable waste management. These vehicles produce fewer pollutants compared to traditional diesel-powered trucks, contributing to improved air quality and reduced greenhouse gas emissions. By transitioning to a fleet of low-emission collection vehicles, Adelaide can minimise the environmental impact of its waste management operations, aligning with broader sustainability goals.

Integration with urban planning

Integrating waste management with urban planning is essential to create a holistic approach to city infrastructure. This involves designing buildings and public spaces with dedicated waste collection points that are easily accessible for both users and collection vehicles. Improved and more detailed waste management policies in the Planning and Design Code would assist planners to better assess waste management for developments. Urban planners can also incorporate waste management considerations into the layout of new developments, ensuring that adequate space and facilities are provided for efficient waste collection and processing.

Community engagement and education

Effective waste management also relies on active participation from the community. The City of Adelaide regularly engages residents and businesses through education campaigns promotes better waste sorting practices, reducing contamination rates and improving the efficiency of recycling processes. Providing clear information on how to separate waste and the benefits of doing so can encourage more responsible waste disposal behaviour, easing the burden on collection and processing systems.

Collaboration between the City of Adelaide, waste management companies, technology providers, and the community is key to implementing these innovative solutions effectively. By working together, stakeholders can share knowledge, resources, and expertise to develop and deploy advanced waste management systems that meet the city's needs. Public-private partnerships can also facilitate investment in new technologies and infrastructure, accelerating the transition towards more efficient and sustainable waste management practices.

¹ Monk, D. (2013). Underground Waste Collection. *EconSpire*. Retrieved from <https://www.econspire.com/waste/underground-waste-collection>

² Liu, Q., Chen, Y., Hu, W., Dong, J., Sun, B., & Cheng, H. (2023). Underground Logistics Network Design for Large-Scale Municipal Solid Waste Collection: A Case Study of Nanjing, China. *Sustainability*, 15(23), 16392. <https://doi.org/10.3390/su152316392>

³ Heller, N. (2020). The future of garbage collection is pneumatic tubes. *Quartz*. Retrieved from <https://qz.com/1909600/the-future-of-garbage-collection-is-pneumatic-tubes>

What are other cities doing?

Melbourne and Hobart, Australia

Managing kerbside space in a way that balances the needs of freight deliveries, public transport, cycling, and pedestrian access is a complex task. The demand for kerbside space varies throughout the day, requiring dynamic management strategies to ensure accessibility and efficiency. Cities such as *Melbourne*⁴ and *Hobart*⁵ have developed Parking & Kerbside Management Plans that take delivery and city servicing needs into account to inform decision-making in this space.

A Melbourne study⁶ also identified that a significant portion of vehicles entering Melbourne's CBD are delivery vehicles, but only a small fraction is involved in actual last kilometre deliveries. This insight highlights the importance of distinguishing between vehicles merely passing through and those actively engaged in deliveries. Adelaide could implement similar studies to better understand and manage its delivery vehicle traffic.

London, UK

London has implemented a network of urban consolidation centres where goods are consolidated before being delivered into the city using low-emission vehicles such as electric vans and cargo bikes⁷. This reduces the number of large trucks entering the city centre, easing congestion and lowering emissions. Additionally, London encourages off-peak deliveries to reduce traffic during peak hours.

London is also trialling a Virtual Loading Bay on Watling Street as part of the Smarter Greener Logistics Trial. This initiative allows registered delivery drivers to book specific time slots for loading and unloading in pedestrian areas. This system reduces conflict in confined areas and optimises kerbside space, minimises idle time for delivery vehicles, and ensures more efficient use of urban space. By implementing this

innovative solution, the City of London seeks to enhance urban logistics efficiency while promoting cleaner air and less congested streets.



Figure 3 Virtual loading bay

Source: City of London

New York, USA

New York has adopted a comprehensive approach to manage urban freight, including the use of micro-distribution hubs⁸ and implementing a "Clean Trucks Program"⁹ to replace older, polluting trucks with newer, cleaner models. The city also uses data analytics to optimise delivery routes and times, minimising traffic disruption and improving delivery efficiency.

Singapore

Singapore uses an advanced dynamic kerbside management system that adjusts loading and unloading zones in real-time based on demand¹⁰. This system is integrated with smart parking solutions that provide real-time data on parking availability and allow reservations, ensuring service vehicles can efficiently access necessary areas without causing traffic disruptions.

The system uses various sensors and cameras to detect parking space occupancy and communicate this information to drivers, enabling them to find available spots quickly. Additionally, the integration with payment systems allows for seamless transactions using

⁴ City of Melbourne. (2023). *Parking and Kerbside Management Plan*. City of Melbourne.

⁵ City of Hobart. (2024). *Parking and Kerbside Management Plan*. City of Hobart.

⁶ Casey, N., Rao, D., Mantilla, J., Pelosi, S., & Thompson, R. G. (2014). Understanding Last Kilometre Freight Delivery in Melbourne's Central Business District. *Procedia - Social and Behavioral Sciences*, 125, 326-333. doi: 10.1016/j.sbspro.2014.01.1477

⁷ Allen, J., Browne, M., & Leonardi, J. (2011). Evaluating the use of an urban consolidation centre and electric vehicles in central London. *IATSS Research*, 35(1), 1-6. <https://doi.org/10.1016/j.iatssr.2011.06.002>

⁸ New York City Department of Transportation. (2024). NYC DOT to Launch Local Delivery Hub Pilot to Reduce Negative Environmental and Safety Effects of Truck Deliveries. Retrieved from nyc.gov

⁹ New York City Department of Transportation. (2024). NYCDOT Freight Programs & Initiatives. Retrieved from nycdotprojects.info

¹⁰ Citti Magazine. (2021). Dynamic kerbside management - the key to unlocking a greener, smarter city future. Retrieved from: <https://www.cittimagazine.co.uk/corporate-insight/dynamic-kerbside-management-the-key-to-unlocking-a-greener-smarter-city-future.html>

credit cards, mobile payments, and other digital methods. The overall goal is to enhance traffic flow, reduce congestion, and improve urban air quality by optimizing the use of kerbside spaces and parking facilities.

Amsterdam, Netherlands

Amsterdam has integrated smart technology into its urban servicing strategy. The city uses a combination of real-time data and automated systems to manage kerbside space, ensuring service vehicles can operate efficiently¹¹. Amsterdam also promotes the use of electric service vehicles to reduce the environmental impact of urban servicing.

Amsterdam also promotes the use of electric service vehicles as part of its broader commitment to reducing the environmental impact of urban servicing. The city's smart grid infrastructure supports the efficient distribution and consumption of energy, further enhancing its sustainability goals.

San Francisco, USA

San Francisco has implemented an ambitious zero-waste policy, aiming to divert all waste from landfills. The city employs comprehensive recycling and composting programs and uses smart waste collection systems with sensors to monitor bin fill levels. These systems optimise collection routes and schedules, improving efficiency and reducing fuel consumption.



Figure 4 San Francisco Smart Bin sensor installation
Source: Nordsense

Tokyo, Japan

Tokyo employs an advanced waste management system that includes meticulous waste sorting and recycling processes. The city uses an efficient collection system with electric and hybrid vehicles to minimise emissions. Tokyo's approach ensures high levels of

recycling and reduces the environmental impact of waste transport.

Melbourne, Australia

The City of Melbourne has provided safe spaces for gig delivery workers (including micromobility delivery drivers and riders), particularly through initiatives like the Gig Workers Hub¹². This hub, located at the Melbourne Multicultural Hub, offers essential amenities such as food, drinks, phone charging stations, and rest areas for micromobility delivery riders and drivers. The space was developed to address the challenges gig workers face, including exposure to harsh weather, lack of access to safe resting spaces, and isolation. By creating this dedicated area, the City of Melbourne has supported worker well-being, provided a sense of community, and contributed to the safety and dignity of gig workers.



Figure 5 Source: AMES Australia and the City of Melbourne

The benefits of this initiative are numerous. It offers a much-needed space where workers can rest and recharge between deliveries, thereby improving their overall work experience. Additionally, the hub promotes a safer working environment by providing shelter and resources. The city's involvement in this initiative also reflects its commitment to inclusivity and support for the growing gig economy, ensuring that delivery workers—many of whom are migrants—are not overlooked. This effort aligns with the city's broader goals of enhancing public safety and fostering an equitable urban environment

Paris, France

Paris, France has established a network of urban logistics spaces for last-mile deliveries.

¹¹ MIT Sloan Management Review. (2016). Six Lessons From Amsterdam's Smart City Initiative. Retrieved from [MIT Sloan Management Review](https://mitsloanmanagementreview.com/six-lessons-from-amsterdams-smart-city-initiative/)

¹² AMES Australia. (2024, May 1). *Safe space created for Melbourne's gig workers*. AMES News. <https://amesnews.com.au/lead-story/safe-space-created-for-melbournes-gig-workers/>

These micro-distribution hubs facilitate the use of cargo bikes and electric vehicles (EV) for deliveries within the city centre. Paris also uses smart locker systems to reduce multiple delivery attempts, improving efficiency and customer satisfaction.



Figure 6 EV and Cargo Bike micro-distribution hub

Source: Sogaris

Copenhagen, Denmark

Copenhagen promotes sustainable delivery solutions by encouraging the use of cargo bikes and electric vehicles for last-mile deliveries. The city has implemented a green logistics program that includes incentives for businesses to adopt environmentally friendly delivery practices. Route optimisation software is widely used to plan efficient delivery routes, reducing travel time and emissions.



Figure 7 Cargo bike deliveries in Copenhagen

Source: Bicycle-Riding Motorist

How can Adelaide benefit?

There is significant potential benefit to revise vehicle and parking policies to enhance efficient freight and servicing operations, supporting economic activities while minimising environmental impacts. Addressing these issues through dynamic kerbside management, technological innovations, freight consolidation hubs, and sustainable waste practices can help Adelaide improve its transport logistics network and achieve its sustainability goals.

Opportunities

How can Adelaide benefit?

There is a significant opportunity to enhance the efficiency of the kerbside through the use of dynamic systems and emerging technologies.

Kerbside management principles

through integrated planning and collaboration among stakeholders. By fostering partnerships between government, industry, and the community, Adelaide can develop more effective solutions for managing valuable kerbside space to facilitate deliveries, servicing, and waste management alongside other competing needs for the kerbside.

City servicing

Use of dynamic kerbside management systems for real-time loading zone adjustments based on demand, ensuring service vehicles access necessary areas without disrupting traffic. Integrating smart parking solutions with real-time availability and reservation capabilities can streamline servicing operations, reducing search time and traffic impact.

Technological innovation

Embracing technological innovation can transform Adelaide's freight and delivery landscape. Smart logistics platforms, real-time tracking systems, cleaner and smaller vehicles like micromobility freight and automated delivery solutions can enhance efficiency and reduce operational costs.

Urban freight consolidation hubs

Consolidated urban distribution centres can aggregate goods and distribute them via smaller, efficient vehicles like electric vans or e-cargo bikes. Freight consolidation hubs do however add an extra layer of complexity in the supply chain which can be unappealing to delivery and customers. Because of this they are generally only successful when more direct deliveries become highly uneconomical due to congestion, regulatory or other constraints. Consolidation hubs have the potential to reduce the amount of large delivery trucks in city centres, especially when they are coordinated with micromobility freight options for the last km. This can ease congestion and emissions in the city centre. Implementing off-peak delivery times can further alleviate daytime traffic, making operations smoother and more efficient.

Waste transport

Adopt holistic and sustainable waste management approaches with comprehensive recycling and composting programs to reduce landfill waste. Implement smart waste collection systems such as smart bins, sensors to monitor bin levels, and optimising routes and schedules. Use electric or hybrid collection vehicles to minimise environmental impact.

Smart bins require emptying by a truck when full instead of regular inspection. Smart bins also include compactors which can significantly reduce the number of truck trips in busy city streets required to keep them from overflowing.

Low-emission delivery vehicles

Promoting the use of low-emission delivery vehicles is essential for reducing the environmental impact of urban logistics. There are many initiatives that can be implemented to achieve more sustainable delivery operations. Responsibilities for these varies, as does the role that the City of Adelaide could play in implementation.

Electric and hybrid vehicles, and active transport solutions such as cargo cycles, offer significant benefits by producing fewer emissions compared to traditional fossil-fuel-powered vehicles. Encouraging businesses in Adelaide to adopt low-emission delivery vehicles can play a crucial role in cutting down on air pollution and greenhouse gas emissions. This can be achieved through incentives such as tax incentives, grants, or subsidies for businesses that invest in cleaner vehicle technologies. Furthermore, the city can establish low-emission zones where only vehicles that meet certain environmental standards are allowed to operate, thus promoting the adoption of greener technologies. By transitioning to a fleet of low-emission delivery vehicles, Adelaide can make substantial progress towards its sustainability and climate goals. Additionally, the use of low-emission vehicles can improve public health by reducing the concentration of harmful pollutants in the urban environment.

Greener and more space efficient deliveries

There is an opportunity for the City of Adelaide to advocate and collaborate with industry to support more space efficient deliveries and greener servicing. This may include supporting:

- Smart locker systems to reduce multiple delivery attempts and improve efficiency.

- Using electric cargo bikes and other electric vehicle types can also increase the space and carbon efficiency of deliveries.
- Route optimisation software can also plan more efficient routes, reducing travel time and emissions.

Key Strategic Moves

Urban freight and deliveries are vital to the functioning and liveability of Adelaide. To support the growth of the city and our future strategic objectives, key strategic moves have been identified for the City of Adelaide:

- Promote the adoption of **low-emission delivery vehicles** within the urban logistics network, and integrate **Intelligent Transport Systems (ITS)** to enhance the efficiency and coordination of urban freight movements.
- Foster **partnerships among local businesses** to create collaborative delivery systems that share resources, optimise vehicle / freight hubs use, and enhance stakeholder engagement by organising regular forums and workshops with key stakeholders to foster a collaborative approach towards logistics improvements.
- Develop a **traffic circulation plan** to maintain access to properties while discouraging through traffic so essential deliveries and servicing are not impacted by vehicle congestion.
- Develop and apply **flexible kerbside management systems** that adjust loading zones and parking based on real-time demand to optimise space usage and reduce congestion.

Conclusion

As Adelaide continues to grow as a city, so too does the urban freight task. There are a number of opportunities to enhance Adelaide's urban logistics network to support a more liveable and sustainable city into the future.

Key strategic moves have been identified to support the optimisation of urban logistics, and subsequent reduction in congestion, emissions, and other environmental impacts:

- Promote low-emission vehicles
- Foster collaborative delivery systems and hubs
- Develop a traffic circulation plan
- Develop and apply flexible kerbside management.