One-Way and Two-Way Street Conversions

Executive Summary

This supplemental backup provides a comprehensive comparison between one-way and two-way streets in urban areas, focusing on their technical, operational, and multimodal impacts. As cities increasingly re-evaluate legacy one-way systems, this paper analyzes the challenges and benefits of converting one-way corridors to two-way operations, particularly in dense downtown environments where space for dedicated transit and bicycle facilities is limited.

A case study of Austin's 5th and 6th Streets highlights the trade-offs associated with such conversions. While two-way operations may offer improved local access and connectivity, they often require additional turn lanes and intersection modifications, which can constrain space needed for transit-only lanes, protected bicycle infrastructure, and pedestrian improvements.

The Austin Core Transportation (ACT) Plan prioritizes reliable transit service and safe, comfortable active transportation facilities. Preserving one-way configurations on key corridors like 5th and 6th Streets enables the City to meet these goals more effectively by maintaining operational efficiency, reducing intersection conflicts, and allocating sufficient right-of-way to multimodal elements.

Two-way street conversions remain a valuable tool in certain contexts; however, constrained ROW along downtown corridors that serve as priority transit and active transportation routes demand a more strategic approach. Future feasibility studies should continue to weigh trade-offs carefully to ensure the City can meet its multimodal goals while maintaining efficient operations.

1. Overview and purpose

Urban street directionality is foundational to the functionality of city transportation networks. Among the key decisions in urban design is the choice between implementing one-way or two-way streets. While both systems aim to facilitate movement, they possess distinct characteristics that influence traffic patterns, accessibility, safety, and the overall urban experience. This paper provides a detailed comparison of these two street configurations, considering their advantages and disadvantages across various critical aspects. Moreover, it addresses the increasingly relevant topic of converting one-way streets to two-way operation, examining the motivations, processes, and potential impacts of such transformations on diverse user groups.

2. Comparative Evaluation: One-Way vs. Two-Way Streets

One-way and two-way street configurations each offer distinct operational and design trade-offs that influence multimodal mobility, safety, access, and signal operations within urban environments. One-way streets can simplify intersection design, improve vehicular flow, and provide space for dedicated facilities like protected bike lanes and transit-only lanes, particularly in constrained rights-of-way. Conversely, two-way streets support more intuitive navigation, enhance business visibility, and enable more direct access for all users. The choice between these configurations is context-dependent, especially in dense urban grids where multimodal demands compete for limited space.

In downtown Austin, targeted conversions from one-way to two-way streets have been strategically implemented to improve multimodal access, wayfinding, and business frontage. Examples include 7th, 9th, and 10th Streets, as well as Brazos Street, where conversion supports better local circulation, simplifies navigation, and improves connectivity for pedestrians, cyclists, and transit users. These conversions demonstrate how two-way operations can be effectively integrated into the existing grid to address specific corridor needs. However, not all streets are candidates for two-way; each corridor requires careful evaluation to determine whether the benefits of two-way operation align with mobility goals, spatial constraints, and operational feasibility.

3. Impacts of One-Way to Two-Way Conversions on Transit-Only Lanes and Bicycle Facilities

Converting one-way streets to two-way operation has the potential to improve multimodal circulation, enhance local accessibility, and reduce out-of-direction travel, particularly for pedestrians, cyclists, and local vehicular traffic. However, as highlighted in prior discussions, such conversions come with notable trade-offs, especially in dense urban environments where right-of-way is limited and the allocation of space for dedicated facilities is highly competitive. These trade-offs are further complicated by varying user needs and safety outcomes; while two-way streets may offer benefits such as intuitive navigation and balanced traffic distribution, they can also introduce new challenges in terms of intersection complexity and potential conflicts between modes.

In corridors where transit-only lanes and protected bicycle facilities are a priority, the transition from one-way to two-way operation requires careful analysis of how space can be reallocated without compromising safety, efficiency, or accessibility. The following technical considerations highlight how such conversions may impact the feasibility and effectiveness of implementing dedicated infrastructure for transit and bicycles, particularly within constrained downtown rights-of-way:

3.1. Space Constraints and Lane Allocation

- **One-way streets** offer greater flexibility in lane allocation, particularly in constrained downtown environments. Because vehicles travel in a single direction, there is no need to accommodate left-turn lanes for opposing traffic at intersections. This simplification frees up valuable space within the existing right-of-way, allowing for the integration of dedicated transit-only lanes, protected bicycle facilities, or wider pedestrian zones without significantly disrupting general traffic flow. In many cases, one-way streets also enable more efficient curbside transit stop placement and the potential for buffered or raised bike lanes, which can enhance safety and comfort for non-motorized users. The absence of conflicting turn movements at intersections can also improve signal timing efficiency and reduce delays, further supporting the operational effectiveness of dedicated multimodal facilities.
- **Two-way streets,** while offering benefits in terms of network connectivity and navigation, introduce more complex space demands. To maintain efficient traffic flow and prevent congestion, left-turn lanes are often required at major intersections to accommodate vehicles turning across opposing traffic. These turning movements consume significant space and can reduce the availability of right-of-way for other uses. As a result, cities may be forced to make compromises such as removing or reducing the physical protection or width of bicycle facilities, combining or sharing transit lanes with general traffic, or narrowing travel lanes to fit all necessary functions within the constrained cross-section. These trade-offs can limit the effectiveness and safety of multimodal infrastructure and may reduce the attractiveness of transit and cycling as viable alternatives to car travel. Furthermore, the presence of opposing traffic increases the number of conflict points at intersections, compounding the challenges of designing safe and efficient streets for all users. In such contexts, implementing high-quality dedicated facilities on two-way streets often requires more extensive design interventions and, in some cases, policy decisions regarding modal prioritization.

Figure 1 presents one-way and two-way streets with Transit-only Lane and bicycle facilities at an intersection. The figure includes with and without a left turn lane.

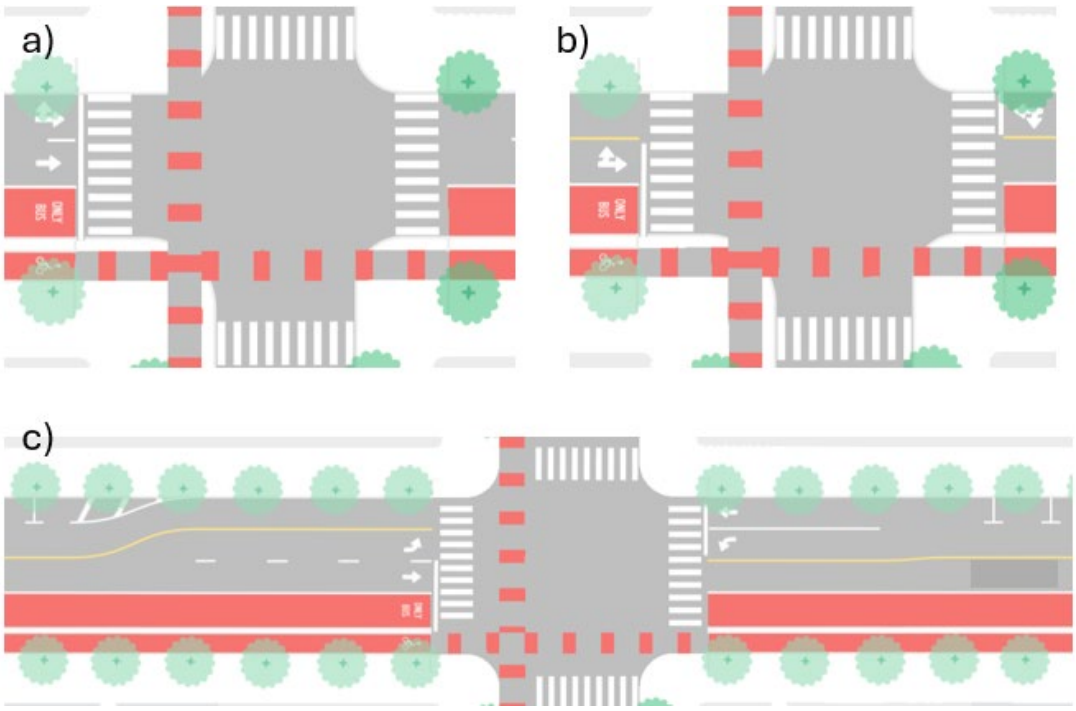

Figure 1 - One-way and Two-way Streets with Transit-only Lane and Bicycle Facilities a) One-way without Left-Turn Lane b) Two-way without Left-Turn Lane c) Two-way with Left-Turn Lane requiring a wider distance between the curbs and less space behind the curbs.

3.2. Transit-Only Lane Considerations

This section provides a more detailed comparison of transit-only lanes on one-way and two-way streets. Figure 2 illustrates a two-way street configuration featuring a transit-only lane and bicycle facilities at an intersection with a dedicated left-turn lane. As shown, transit vehicles must merge with general traffic in a shared through lane, which can affect service reliability, if the intersection is not expanded to four travel lanes. Cyclists using the bike lane also encounter multiple conflict points, particularly near intersections and turning vehicles. A comparison across key criteria is presented following the figure.

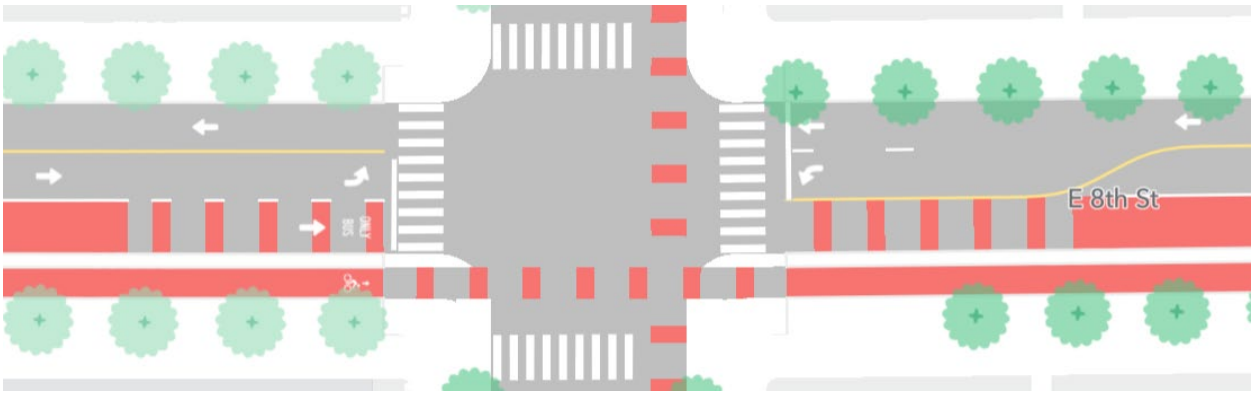

Figure 2 - Two-way street configuration featuring a transit-only lane and bicycle facility at an intersection with a dedicated left-turn lane

3.2.1. Transit Route Efficiency

- **On one-way streets**, routes are streamlined in the direction of traffic, reducing turns and congestion.
- **On two-way streets**, careful planning is required to avoid conflicts with opposing traffic and turning vehicles. Signal timing optimization should be considered to maximize efficiency.

3.2.2. Transit Travel Times

- **On one-way streets**, potentially faster travel times are possible due to optimized signal timing and reduced conflicts.
- **On two-way streets**, there is potential for slower travel times if lanes are affected by general traffic congestion or turning movements. Implementing transit signal priority can help reduce delays.

3.2.3. Turning Movements

- **On one-way streets**, transit-only lanes can be implemented in either the rightmost or leftmost lane, ensuring faster and more reliable service. This configuration also allows easier and quicker turning movements for buses, especially at intersections with fewer conflict points.
- **On two-way streets**, turning movements for buses may be more restricted or harder to perform, particularly when turning across opposing traffic, due to limitations on transit-only lane placement.

3.2.4. Accessibility

- **On one-way streets,** accessing stops on the opposite side may require longer walks.
- **On two-way streets,** more direct access to stops on both sides of the street improves convenience.

3.2.5. Transfer Points

- **On one-way streets**, transfer points may be concentrated in specific areas, potentially increasing congestion at those locations.
- **On two-way streets,** transfer points can be more evenly distributed across the network.

3.2.6. Service Frequency

- **On one-way streets**, operational efficiency may support higher service frequencies, as buses can complete routes more quickly.
- **On two-way streets**, longer travel times may result in lower service frequency.

3.2.7. Safety

- **On one-way streets,** certain types of collisions may be reduced by eliminating opposing traffic.
- **On two-way streets,** collision risks may increase if drivers are unaccustomed to the lane configuration or if pedestrian crossings are frequent. Two-way street configurations increase the number of conflict points, thereby raising the potential for collisions. Traffic calming measures and pedestrian safety enhancements are recommended.

3.2.8. Enforcement

- **On one-way streets**, it is easier to enforce lane restrictions due to uniform traffic flow in one direction.
- **On two-way streets**, enforcement is more challenging due to opposing traffic. Automated enforcement systems and increased police presence may be needed.

3.2.9. Cost

- **On one-way streets**, infrastructure costs may be lower due to simpler design and implementation.
- **On two-way streets**, costs may be higher due to the need for more complex traffic management systems.

3.3. Bicycle Facility Considerations

This section provides a more detailed comparison of Bicycle Facilities on one-way and two-way streets.

3.3.1. Safety

- **On one-way streets,** eliminating opposing traffic can reduce certain collisions but may increase others due to higher vehicle speeds.
- **On two-way streets,** risks may increase due to conflicts from opposing traffic and turning movements.

3.3.2. Facility Placement Flexibility

- **On one-way streets**, configurations allow more flexibility for protected bicycle lane placement, either on one or both sides of the street, without disruption from turn lanes at every intersection.
- **On two-way streets**, turn lanes and opposing traffic limit protected bicycle lane placement, often resulting in constrained facilities.

3.3.3. Navigation and Route Options

- **On one-way streets**, cyclists may need to take indirect routes to reach their destinations. Contraflow lanes can help address this issue.
- **On two-way streets**, cyclists generally have more direct route options, making travel more convenient.

3.3.4. Traffic Speed

- **On one-way streets**, higher traffic speeds can be intimidating for cyclists. Traffic calming through speed management strategies, and reducing speed limits and enforcing traffic laws can improve safety.
- **On two-way streets**, generally lower speeds and lower traffic volumes create a more comfortable cycling environment.

3.3.5. Intersection Design

- **On one-way streets,** some intersections may be simplified, though others can be complicated by turn patterns and lane configurations.
- **On two-way streets,** intersection crossings are often more complex due to additional conflict points from opposing traffic.

In two-way conversions, right-of-way (ROW) constraints often create challenges for implementing continuous, protected bicycle facilities. To accommodate multiple user needs, including vehicular traffic, turning movements, parking, and loading, compromises are frequently necessary. These may include narrower bicycle lanes or the use of shared travel lanes where space is limited. In some cases, bicycle facilities may become discontinuous or lose physical protection, especially near intersections or curb access zones.
Additionally, the reduced ability to maintain adequate separation between cyclists and moving vehicles on two-way streets can elevate safety concerns. Where sufficient ROW is not available, designers may be forced to choose between reducing lane widths, or compromising the quality and safety of the bicycle facility. These trade-offs should be carefully evaluated on a corridor-by-corridor basis to balance multimodal needs.

4. 5th and 6th Streets in the ACT Plan

The ACT Plan identifies 5th and 6th Streets as critical multimodal corridors in Downtown Austin, prioritizing dedicated transit lanes and protected bicycle infrastructure. These corridors are key east-west connections serving both local and regional travel demand.
Maintaining one-way operation on 5th and 6th Streets aligns with the Plan's objectives and offers several design and operational advantages:

- Transit Priority: One-way configuration enables the integration of transit-only lanes in the direction of flow, reducing delays and improving reliability for transit services.
- Bicycle Infrastructure: One-way allows for the inclusion of protected bicycle lanes with adequate buffer zones, improving safety and comfort for cyclists without competing with general traffic or left-turn lanes.
- Pedestrian realm: One-way streets allow more space for street trees and wide sidewalks.
- Intersection Efficiency: One-way streets reduce intersection complexity, limiting the number of turning movements and minimizing conflicts among users. This supports smoother operations at high-volume junctions.

Conversely, converting these corridors to two-way operation would require the introduction of new turn lanes and signal phases, reducing the curb-to-curb space available for dedicated transit and bicycle infrastructure. This would undermine the key goals of the ACT Plan and risk diminishing the quality of service for non-automobile modes. Figure 3 depicts a typical section consisting of Transit-only Lane Bicycle facilities, two travel lanes, parking and loading, and wide sidewalks with trees.

Figure 3 -Example of Typical Section on 5th St - Transit-only Lane Bicycle facilities, two travel lanes, parking and loading, and wide sidewalks with trees.

5. Conclusion

While two-way street conversions can offer improved navigability and more direct access, they also introduce significant design challenges in multimodal corridors. These challenges are particularly critical in constrained downtown environments, where constrained space must be carefully balanced among all users.

The ACT Plan places strong emphasis on enhancing transit reliability and expanding protected infrastructure for pedestrians, cyclists, and other active transportation users. Maintaining one-way configurations on key corridors like 5th and 6th Streets enables the City to implement these improvements more effectively, without compromising safety or operational efficiency within constrained rights-of-way.

Future feasibility studies should assess each conversion proposal with a clear understanding of these trade-offs. In locations where transit and active transportation are prioritized, one-way street operations may remain the most practical and impactful design solution.