Park Avenue Bicycle Lanes Report

The report discusses the evaluation and recommendations for the bicycle lanes on Park Avenue. The Waterloo Complete Streets Advisory Committee (CSAC) and staff from INRCOG, which serves as the Black Hawk County Metropolitan Planning Organization (MPO), recommended that city staff evaluate the current design of the bicycle lanes. The overall goal is to create a safer and more appealing biking environment, promoting active and sustainable transportation in Waterloo. This report contains a project background, identified alternatives, and a staff recommendation. The report presents four design alternatives with the preferred alternatives involving redesign, adding curb extensions, and removing right turn lanes; and completing the changes in two phases. This option aims to make cycling safer and more comfortable while addressing road issues. The report also suggests post implementation actions including public outreach, education, and law enforcement efforts.

PROJECT HISTORY

Park Avenue from Washington Street to Franklin Street was a four-lane roadway with a speed limit of 30 MPH and low traffic volumes (3200-5800 AADT in 2017). The roadway width, measured from the back of the curb, ranges from 44 to 62 feet with the section northeast of the Cedar River having the widest pavement. The road featured sidewalks on both sides of the road with no dedicated facilities for bicyclists. Most of the pavement southwest of the Cedar River is in poor condition.

Park Ave Bike Lanes provide a critical connection in the citywide bike network

Approximately 10 years ago, an architect consultant employed by the city suggested the city implement a roadway reconfiguration (commonly referred to as a “Road Diet”) on Park Avenue to add bicycle lanes along the corridor. Introducing a road diet to incorporate bike lanes on low volume four-lane roadways offers numerous benefits to the community and road users alike. Firstly, road diets enhance safety by providing dedicated spaces for cyclists, separating them from vehicular traffic and reducing the potential for accidents. With the reduction of vehicle lanes, drivers tend to lower their speeds, further contributing to a safer environment for all users. Furthermore, the addition of bike lanes promotes active transportation, encouraging more people to use bicycles as a mode of commuting and transportation, thus reducing carbon emissions. Additionally, the presence of bike lanes can foster a sense of community, encouraging social interaction among cyclists and pedestrians, while also making the roadway more attractive and inviting.

Bike lanes play a crucial role in the citywide bikeway network, as they serve as essential arteries for promoting sustainable and efficient transportation options. From US 63 to 11th Street, there were no dedicated facilities for bicyclists to travel north and south, limiting connectivity and mobility. The addition of dedicated bike lanes would improve the connectivity, enhance safety, and encourage more people to choose biking as a viable mode of transportation. Bike lanes create a sense of security for cyclists, separating them from vehicular traffic and reducing the risk of accidents. A well-connected network of bike lanes also improves accessibility, enabling cyclists to travel efficiently to various parts of the city, connecting neighborhoods, workplaces, educational institutions, and recreational areas.

Waterloo staff moved forward with the concept of bicycle accommodations on Park Avenue due to the pressing need for enhanced cycling infrastructure and the advantageous opportunity presented by the excess capacity and width of the road. City staff evaluated the following bicycle accommodation types on Park Avenue:

1. Shared Use Path (Off-Road Trail): Constructing a shared used path along the corridor would be expensive. Shared use paths, while designed to accommodate both cyclists and pedestrians, can sometimes be less safe than bike lanes due to several factors. Firstly, the presence of mixed traffic, including cyclists, joggers, skaters, and pedestrians, can lead to conflicts and collisions between users with varying speeds and unpredictable movements. Moreover, pedestrians may not always be aware of approaching cyclists or follow proper etiquette, further adding to potential hazards.
2. Shared Lane Markings (Sharrow, Share the Road): Sharrows are road markings used to indicate a shared lane environment for bicycles and automobiles. According to the National Association of City Transportation Officials (NACTO) *Urban Bikeway Design Guide*, shared lane markings are not a dedicated facility type and should not be considered a substitute for bike lanes, cycle, tracks, or other separation treatments where these types of facilities are otherwise warranted or space permits. Given the ample roadway capacity, the city eliminated shared lane markings from consideration.
3. Cycle Track: A cycle track is an exclusive bike facility that combines the user experience of a separated path (i.e., shared use path or trail) with the on-street infrastructure of a conventional bike lane. A cycle track is distinguished from a bike lane in that it has physical barriers (bollards, medians, raised curbs, etc.) that restrict the encroachment of motorized traffic. Constructing a cycle track would be expensive. Furthermore, snow removal would be difficult along the raised facility.
4. Bike Lanes: Defined as a portion of the roadway that has been designated by striping, signage, and pavement markings for the preferential or exclusive use of bicyclists. A conventional bike lane designates an exclusive space for bicyclists using pavement markings and signage. Buffered bike plans are conventional bike lanes paired with a designated buffer space separating the bicycle lane from the adjacent motor vehicle travel and/or parking lane.

Based on the cost, road space available, and safety benefits, city staff recommended incorporating bike lanes along Park Avenue. City staff further evaluated the following design alternatives

A. Buffered Bike Lanes protected by Parking (bike lanes adjacent to the curb): Parked cars would provide a buffer between bicyclists and motorized traffic. Motorists parking their cars would not cross over the bike lanes, potentially reducing conflict points between bicyclists.
B. Buffered Bike Lanes protected by Parking, with Right Turn Lanes (bike lanes adjacent to the curb) **(Preferred Alternative)**: This alternative would help address potential conflict points between right turning vehicles and bicyclists. To improve the line of sight between motorists and bicyclists, city staff recommended removing a couple of parking spots close to the bicycle lane diversion point (*Exhibit 1*).
C. Buffered Bike Lanes (parking adjacent to the curb): The more commonly used design places bike lanes adjacent to the traveling lane with parking along the curb. If designed improperly, bicyclists may be prone to car door accidents ("dooring") where a person opens their car door in the bike lane and hits a cyclist. This design does not address right hook conflict points.

Exhibit 1: Parking Spots Do Not Extend to Bike Lane Divergence Point.

MPO staff developed a visual concept of the selected alternative. The concept was presented to the Waterloo Complete Streets Advisory Committee. The Traffic Operations Department produced final design plans, and the Engineering Department surveyed the corridor for design and then marked the required points along the road for transformation by Traffic Operations staff. The final design included the elimination of several parking stalls at approaches to crossover points to increase the line of sight between motorists and bicyclists. The speed limit was also reduced to 20 MPH to improve safety for bicyclists and pedestrians. The bike lanes were opened in 2017.

In 2021, the Traffic Operations Department added bicycle signals along the Park Avenue bike lane corridor. Bicycle signals make crossing intersections safer for bicyclists by clarifying when to enter an intersection and by restricting conflicting vehicle movements. The bike signals give a bicyclist a seven second green traffic signal lead time. In 2022, the city was awarded a grant to add green color to the bike lanes for one block between Franklin Street and Mulberry Street. Colored pavement within a bicycle lane increases the visibility of the facility, identifies potential areas of conflict, and reinforces priority to bicyclists in conflict areas and in areas with pressure for illegal parking. Traffic delineators were later added at each intersection to prevent traffic from driving on the bike lanes or parking areas.

Public Outreach: Traffic Operations staff, with the help of MPO staff, produced several demonstration videos to educate the public about the bicycle lanes and how to navigate them[1]. The city also created "What Cyclists Should Know", "What Motorists Should Know", and "Parking Along Park Avenue Bike Friendly Corridor" informational handouts.

ORIGINAL DESIGN ANALYSIS

The Park Avenue bike lanes have been open for six years (2016-2023), though the road has been disconnected over the past two years due to the Park Avenue Bridge Replacement project. City and MPO staff have received numerous comments from the public and stakeholder committees, including the Waterloo Complete Streets Advisory Committee and Cedar Valley Cyclists, regarding the Park Avenue Bike Lanes. Comments have included the following:

- The design is uncommon and confusing for both bicyclists and motorized vehicles. The bicycle lane diversion close to intersections creates an uneasy situation for bicyclists and drivers. *Exhibit 2* shows the existing pavement markings and a rudimentary sketch of more definitive pavement markings.
- Due to the unfamiliar design, people often park their cars in the bike lane along the curb instead of in designated parking spaces.
- Pavement conditions are poor, particularly between the Cedar River and South Street, causing bicyclists to completely avoid the street.
- Road debris and rock/sand are often pushed to the side of the road, creating a safety hazard for bicyclists.
- Storm drainage grates and uneven pavement/overlays surrounding the grates create safety hazards for bicyclists.
- The bike lanes terminate a few blocks out of the Central Business District with no additional accommodations or direction, leaving bicyclists to decide on which direction to travel and disrupting travel flow and efficiency[2].

[1] https://www.cityofwaterlooiowa.com/BikeFriendlyWaterloo/demonstration_videos.php#prettyPhoto

[2] There are no bikeways perpendicular to Park Avenue, further limiting the connectivity of the bikeway network. Commercial and Jefferson Streets are ideal for a Road Diet with bike lanes. The roads are wide with ample capacity, and there are numerous destinations along the corridor that people want to bike to (Waterloo Center for the Arts, Phelps Youth Pavilion, Art Bloc Apartments, Public Library, Convention Center and Hotel, Mark's Park, 4th Street Bridge and Lighting, Cedar Valley SportsPlex, SingleSpeed Brewing, and numerous food and beverage establishments).

Additional Observations: Bicyclists have been observed riding on the sidewalks in lieu of using the bike lanes on Park Avenue. There are several reasons why a bicyclist may choose to use a sidewalk over a bike lane, including the following:

- Avoiding difficult road conditions: If a roadway is poorly maintained or obstructed, bicyclists may find it easier and more comfortable to use the sidewalk to avoid hazards like potholes and debris.
- Comfort for beginners: Novice cyclists or those with limited experience and bicycle education may prefer the slower pace and reduced exposure to traffic on sidewalks, especially when navigating complex roadways.
- Safety concerns: Riding on a sidewalk, which is separated from vehicular traffic, can provide a sense of security. Cyclists may also choose to use the sidewalk to avoid confrontations with aggressive or impatient drivers who may not respect their space on the road.

Drivers continued to drive at speeds of around 30 MPH, though police enforcement managed to alleviate the issue temporarily using speed cameras and increased presence. It is estimated that traffic volumes decreased by approximately 25% as many drivers opted for alternative routes to completely avoid Park Avenue. The one-way combination of 5th and 6th Streets, along with their well-coordinated traffic signals, presumably served as alternatives for commuters.

ALTERNATIVES

In this comprehensive report, comprehensive solutions have been thoughtfully identified though a meticulous process of researching nationwide best practices, as well as gathering valuable insights from dedicated stakeholder committees and public comments. This collaborative approach helps address concerns and ensures that the proposed solution would meet community needs. A redesign of the bike lanes on Park Avenue would provide a safer and more attractive bicycling environment, ultimately encouraging more cyclists to use them and visit the downtown area.

Alternative 1: Improve the Existing Design

1. Pavement Markings: Modify the existing pavement markings to improve the delineation of the bike lanes and restricted areas and increase the visibility of the bike lanes. Use green paint along the entire bike lane corridor.

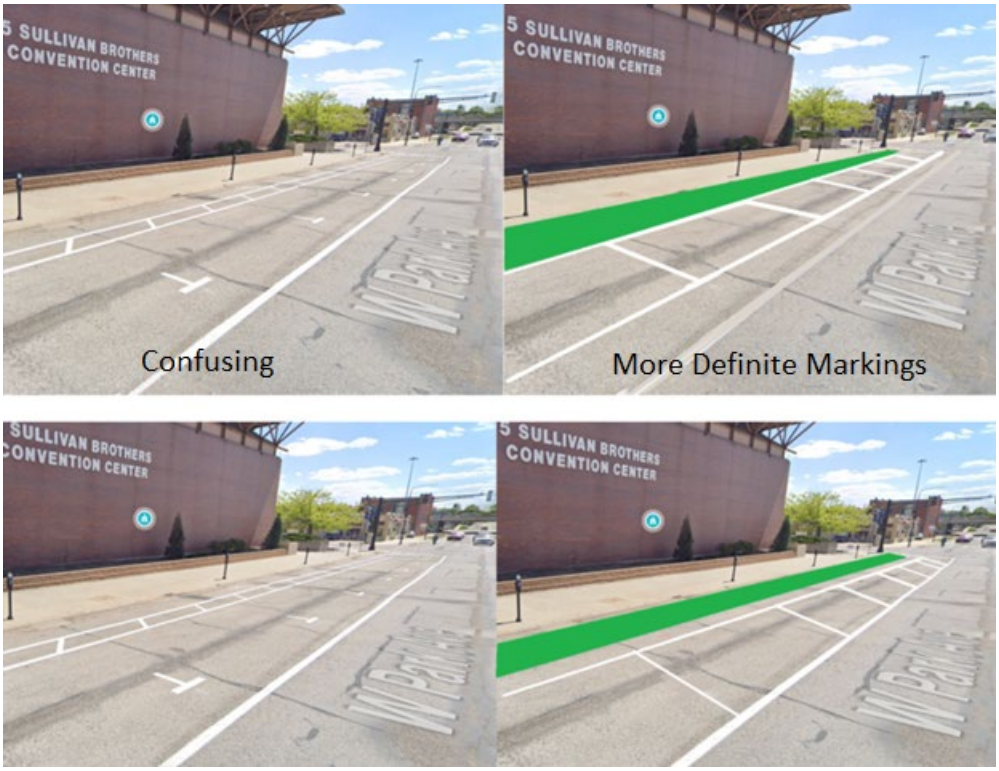

Exhibit 2: Confusing Pavement Markings on the Left and More Definite Pavement Markings on the Right

2. Pavement Maintenance: The rough pavement condition should be addressed to create a smoother and safer riding experience for bicyclists. Repairs and resurfacing should be conducted to eliminate hazards and improve the overall quality of the road surface.
3. Debris and Rock Removal: Regular maintenance should be implemented to clear debris and rocks from the bicycle lanes. This will prevent hazards and ensure a safer environment for bicyclists.
4. Redesign Bicycle Path Diversion (Weaving Point): The bicycle path diversion close to intersections should be reassessed to ensure it does not create an uneasy situation for bicyclists. If necessary, remove additional parking stalls to improve safety at these locations.
5. Address Parking Issues: Measures should be taken to prevent people from parking on bike lanes. Clear signage and increased enforcement can help mitigate this issue and maintain the accessibility of the bike lanes.
6. Increase Bike Lane Width: When possible, widen the bike lanes to exceed the minimum width of 5 feet to provide adequate space for cyclists. This will improve comfort and safety for riders. A possible solution is to reduce the parked car passenger side buffer and add it to the bike lane.

Alternative 2: Redesign the Bike Lanes

1. Pavement Markings: Move the bike lanes next to the traffic, with parking spaces located between the bike lane and the curb. This design helps eliminate parked cars blocking the bike lanes. *Exhibit 3* shows this concept where bicycle lanes are shown in green color and parked cars are shown in grey color.

Exhibit 3: Redesigned Bicycle Lanes

2. Pavement Maintenance: The rough pavement condition should be addressed to create a smoother and safer riding experience for bicyclists. Repairs and resurfacing should be conducted to eliminate hazards and improve the overall quality of the road surface.
3. Debris and Rock/Sand Removal: Regular maintenance should be implemented to clear debris and rocks from the bicycle lanes. This will prevent hazards and ensure a safer environment for bicyclists.
4. Enhance Signage and Pavement Markings: Install clear and consistent signage to indicate the presence of bike lanes and guide both cyclists and drivers on how to navigate them. Revise the existing confusing pavement markings to create a definitive and easily understandable design that clearly separates the bike lane from other traffic lanes.
5. Increase Bike Lane Width: When possible, widen the bike lanes to exceed the minimum width of 5 feet to provide adequate space for cyclists. This will improve comfort and safety for riders.

Alternative 3: Redesign the Bike Lanes, Add Curb Extensions, Remove Right Turn Lanes (PREFERRED ALTERNATIVE)

1. Pavement Markings: Move the bike lanes next to the traffic, with parking spaces located between the bike lane and the curb. This design helps eliminate parked cars blocking the bike lanes. *Exhibit 3* shows this concept where bicycle lanes are shown in green color and parked cars are shown in grey color.

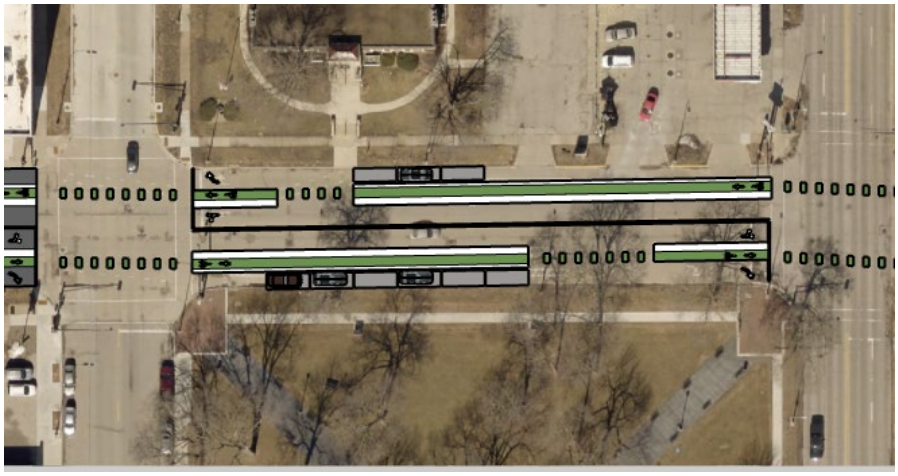

Exhibit 4: Redesigned Bicycle Lanes

2. Pavement Maintenance: The rough pavement condition should be addressed to create a smoother and safer riding experience for bicyclists. Repairs and resurfacing should be conducted to eliminate hazards and improve the overall quality of the road surface.
3. Debris and Rock/Sand Removal: Regular maintenance should be implemented to clear debris and rocks from the bicycle lanes. This will prevent hazards and ensure a safer environment for bicyclists.
4. Enhance Signage and Pavement Markings: Install clear and consistent signage to indicate the presence of bike lanes and guide both cyclists and drivers on how to navigate them. Revise the existing confusing pavement markings to create a definitive and easily understandable design that clearly separates the bike lane from other traffic lanes.
5. Increase Bike Lane Width: When possible, widen the bike lanes to exceed the minimum width of 5 feet to provide adequate space for cyclists. This will improve comfort and safety for riders.
6. Remove Right Turn Lanes: Removing the right turn lanes for cars eliminates the risk of crashes at weaving/crossover points. The bicycle lead green signal timing has reduced the risk of right hook crashes, making dedicated right turn lanes less necessary. The weaving maneuver between bicycles and cars, which is uncommon, could be eliminated to enhance the comfort and safety of both cyclists and drivers. Removing this maneuver could contribute to a more expected interaction between bicycles and cars on the road.
7. Add Curb Extensions: Curb extensions (bulb outs) visually and physically narrow the roadway, creating safer and shorter crossings for pedestrians. Curb extensions could be added using paint and traffic delineators/bollards. Permanently constructed curb extensions could be added when street reconstruction occurs.

Alternative 4: Redesign the Bike Lanes, Add Curb Extensions, Remove Right Turn Lanes (Alternative 3), Completed in Two Stages

Stage 1: Implement Alternative 3 north of the new Park Avenue Bridge as the pavement is in better condition.

Stage 2: Due to the current poor pavement conditions, maintain the current design of the bicycle lanes south of the Cedar River until Park Avenue is resurfaced or reconstructed. Add green paint to the existing bike lanes south of the Cedar River and improve the pavement markings for parking spaces.

The preferred alternative has the following benefits:

- Increased visibility of bicyclists
- Increased bicyclist comfort through clearly delineated space
- Increased motorist yielding behavior
- Reduced confusion with turning movements for all users
- Improved pedestrian crossings
- Discouraged illegal parking in the bike lanes
- Improved safety
    - Keeps bicyclists away from the gutter area where debris and rocks/sand accumulate
    - Bicyclists would remain in driver's vision
    - Bicyclists will not appear unexpectedly from behind a parked car to perform weaving maneuver at intersections, greatly improving safety
- Little or no change required to existing bicycle signals

ADDITIONAL RECOMMENDATIONS & ACTIONS

Additional public outreach and education efforts are strongly recommended. Education efforts should focus on informing cyclists about the safest and most responsible choices while riding, and encouraging collaboration and understanding between cyclists, pedestrians, and motorists for harmonious road-sharing. Additionally, enforcement efforts by the police and parking enforcement should be strengthened to ensure compliance with the reduced speed limit and parking regulations. Smart technologies should be considered for future planning to further enhance the bicycling experience.

Ongoing monitoring of bike lane usage should be conducted to identify patterns and areas for improvement. Feedback from bicyclists and the public should be actively collected and considered.

A lane reconfiguration is recommended on Commercial Street from Mullan Avenue (US 63 southbound) to West 7th Street. By incorporating dedicated cycling lanes, the street becomes more accessible and inviting for cyclists, encouraging active transportation and reducing reliance on motor vehicles. This improved connectivity not only fosters a healthier lifestyle but also bolsters local businesses as more people are enticed to explore the area by bike. Additionally, the presence of additional bike lanes enhances overall safety, providing a designated space for cyclists to navigate without interference from motorized traffic. The reduced risk of accidents and conflicts between road users contributes to a safer and more harmonious urban environment, making Commercial Street a model of sustainable urban design for Waterloo.