

# CITY OF FREDERICK, MD

## JEFFERSON STREET REDESIGN

### REGIONAL ROADWAY SAFETY PROGRAM

METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS

JULY 2024



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## EXECUTIVE SUMMARY

South Jefferson Street, an extension of US 340, is the southern gateway to Frederick and carries more than 11,000 vehicles per day. Unfortunately, the average motorist carries their freeway speed well into the residential/commercial corridor. The average speed inbound Jefferson Street is 34 mph, well above the posted 25 mph speed limit. Drivers headed outbound to US 340 behave similarly with an average speed of 32 mph.

Speeding is a significant contributing factor to many of the 47 crashes reported in the past five years of which 68% have resulted in serious injury or fatality. The design of several intersections - Pearl Street/Prospect Boulevard, Catocin Avenue/Braddock Avenue, and W. Patrick Street – also contributes to the significant number of crashes. Although patterns of city developments have dictated them, multi-legged intersections, skewed angles, and long crossing distances for pedestrians have made for poor safety outcomes.

This study provides a starting point for that plan with recommendations to realign certain intersections, reduce the number of travel lanes and add bicycle lanes to lower speeds, and limit left turns in certain area. As the City of Frederick will soon develop a new vision for Jefferson Street corridor through a small area planning process, these recommendations should be given due consideration. While that planning process is underway, the City can test the intersection realignments through “quick-build” strategies that use paint, flexposts, and other temporary means. If successful at reducing roadway speed and therefore the risk of serious injuries and fatalities, then the City should make them permanent as an outcome of the Jefferson Street small area plan.



## Part 1

### The Jefferson Street Corridor Today

Jefferson Street runs for just less than one mile from US 340 at the City of Frederick’s southwestern boundary to Carroll Parkway at Baker Park. As Jefferson Street approaches the city, it transitions from a 40 MPH, four-lane divided highway to a more traditional four-lane suburban arterial roadway with a 25 MPH speed limit. Lined by commercial and residential driveways between the five-legged intersection at Prospect Boulevard and Pearl Street, and Columbus Avenue opposite McCurdy Field, Jefferson Street further transitions between one or two- through lanes in either direction. Between South Street and Carroll Parkway, Jefferson Street is at its narrowest and by its nature carries traffic bound for local destinations at relatively slow speeds.

**Traffic Speed**

As a function of low congestion and wide travel lanes, speeding is a significant and well-documented problem along Jefferson Street. A speed traffic study was conducted on Jefferson Street between Prospect Boulevard and Catoctin Avenue, see Table 1-1. Despite the 25 MPH speed limit, the average speed along Jefferson Street is 34 MPH inbound and 32 MPH southbound. Nearly 10% of motorists exceeded 40 MPH. Law enforcement typically issues citations for cars traveling at least 10 MPH over the speed limit. By this standard, 32% of all vehicles traveling northbound would be issued a citation.

Table 1-1: Summary of Speed Study

DIRECTION	POSTED SPEED LIMIT	AVERAGE SPEED	85TH PERCENTILE SPEED <sup>1</sup>
NB Jefferson Street	25 MPH	34 MPH	37 MPH
SB Jefferson Street	25 MPH	32 MPH	34 MPH

<sup>1</sup> The 85th percentile speed is the speed at or below which 85 percent of the drivers travel on a road segment, which has historically been considered safe and reasonable for the road and traffic conditions.



Figure 1-1: Jefferson Street Typical Section

### **Traffic Volume and Congestion**

On average, 11,000 vehicles travel Jefferson Street each day – volume which has remained consistent for the past 10+ years. Observations of traffic indicate relatively little congestion during the day, though at peak periods there can be some delay approaching Prospect Boulevard/Pearl Street from US 340 in the morning or departing the city afternoon.

### **Bicycle Facilities**

There are no dedicated bicycle facilities along Jefferson Street nor any dedicated facilities that cross Jefferson Street. At the northern edge of the corridor, a shared use path runs along Carroll Creek in Baker Park. Very few bicyclists were observed on Jefferson Street during the site visits.

### **Pedestrian Facilities**

Sidewalks line both sides of Jefferson Street, but crossing the roadway can be hazardous. Crosswalks are marked but little other protection is provided for pedestrians. Observations indicated a substantial amount of pedestrian activity along the corridor which has community facilities and residences interspersed. Observations also indicated significant risky activity by pedestrians, including walking in the roadway, crossing against traffic signals, and crossing in between signalized intersections.

### **Parking**

On-street parking is allowed in certain areas but gives way to dedicated left turn lanes in other areas; nearly all residences and commercial buildings south of South Street have off-street parking. Observations indicate relatively low usage of on-street parking in this section, but it is understandable that many residents would rather parallel park than back out of their driveway onto a busy road. Dense on-street parking exists between South Street and West Patrick Street.

## CRASH HISTORY

As an outcome of speeding, suboptimal intersection design, poor driver behaviors, and insufficient accommodation for bicyclists and pedestrians, Jefferson Street has developed a history of crashes resulting in serious injuries and death.

Between 2018 and 2022, there were 47 reported crashes along Jefferson Street; 30 resulted in injury and two resulted in fatality. Both fatalities occurred when the vehicle departed the roadway. The crash reports indicate speed, possible inebriation, and loss of driver control as contributing circumstances.

The greatest number of crashes occurred where Jefferson Street intersects with Prospect Boulevard and Pearl Street. This is not surprising given the speed transition approaching or departing US 340 and the complex five-legged intersection configuration. Three of the injury crashes at this location involved pedestrians or bicyclists.

Jefferson Street at West Patrick Street experienced a similar number of crashes and outcomes; the offset Jefferson Street legs and horizontal curve on West Patrick Street obscures sight lines in all directions. The types and causes of crashes along Jefferson Street are not typical of suburban arterial roads. Solving for the challenges along Jefferson Street is more difficult.

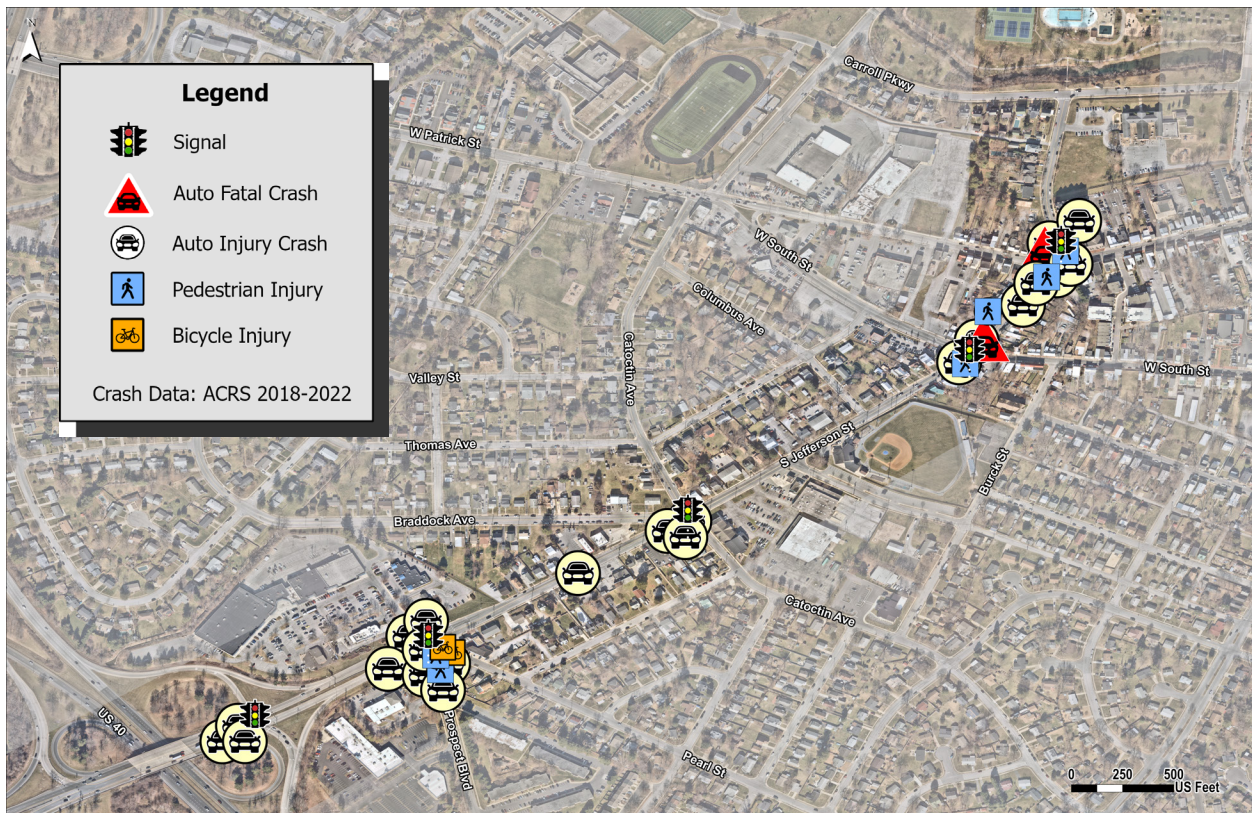


Figure 1-2: Jefferson Street Injury Crash Map

## SAFETY RISKS

Nearly all the corridor intersections are complex due to the number of legs, askew approach and departure angles and limited or obstructed sight distances. Of the 47 reported crashes<sup>2</sup> along Jefferson Street, 79% occurred at intersections. The general issues at these intersections relate to the number of conflict points among vehicles and pedestrians and the complex phasing of traffic signals required to move travelers efficiently through them.

The City of Frederick’s citywide transportation policy goal is to create communities that are safer for pedestrians in order to improve health and environmental outcomes. Unfortunately, Jefferson Street in its current form does not meet this goal. Of the 47 reported crashes, at least 15% involved pedestrians or bicyclists – the most vulnerable roadway users. The general pedestrian safety issues along Jefferson Street relate to exposure, visibility, and speed.

### Traffic Speed

A pedestrian hit by a car traveling above 30 miles per hour is nine times more likely to die as a result of a collision than if hit by a car traveling at 20 miles per hour. Given the prevalence of speeding along Jefferson Street, every effort must be made to slow traffic through engineering and enforcement measures.

<sup>2</sup> The total crashes is likely higher than 47 since many low speed crashes go unreported.

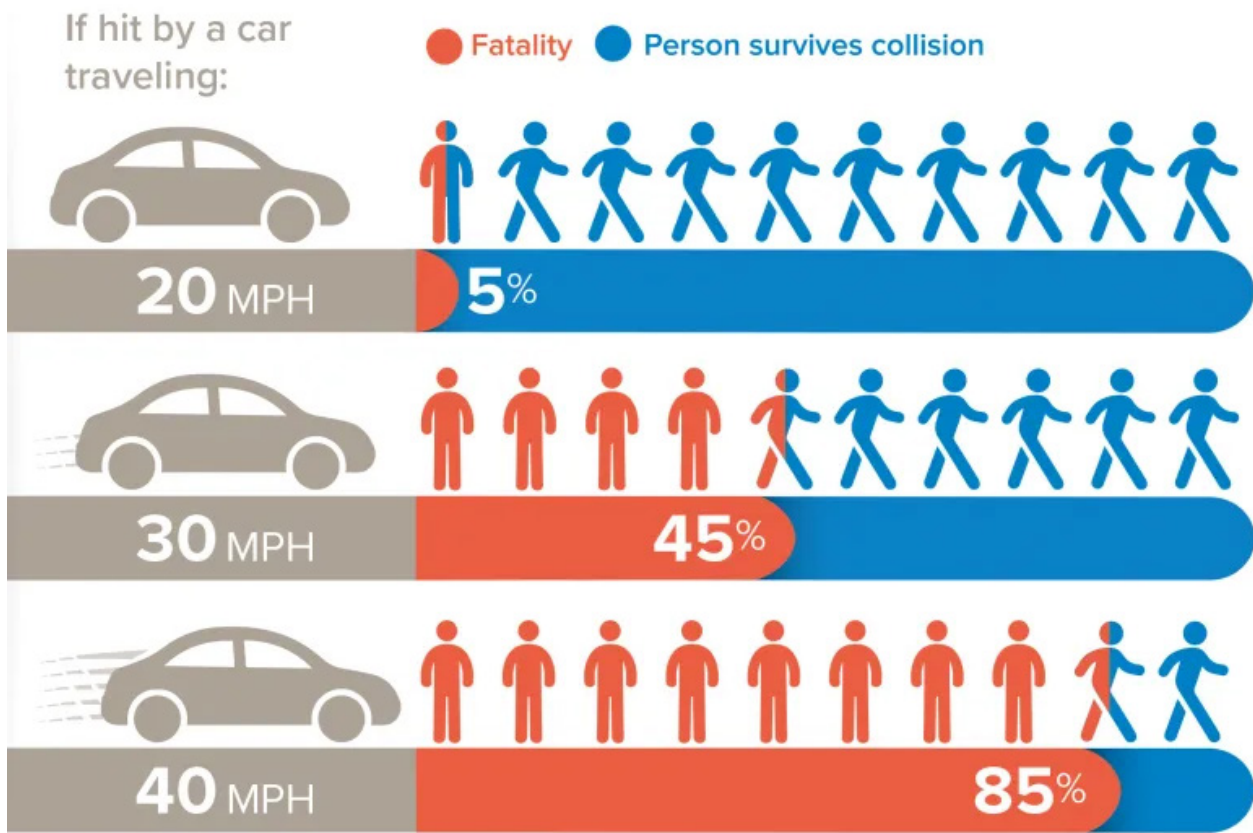


Figure 1-3: Reducing Speeding Related Crashes Involving Passenger Vehicles, NTSB



### Intersection Conflict Points

A standard four-way intersection has 32 points of potential conflict. When the four legs come together at standard right angles, conflicts can be more easily managed than when an intersection is skewed like they are along Jefferson Street. The intersection skew results in challenging sight lines and more complex turning movements. The five-legged intersection, which occurs at both Prospect Boulevard/Pearl Street and at Catoctin Avenue/Braddock Avenue creates nearly 100 potential conflict points.

### Complex Intersection Signal Phasing

Each time that a traffic signal changes to allow for a movement by cars or pedestrians, a new “signal phase” is created. The total time it takes for all phases to be served is referred to as the “cycle length”. When an intersection has more than four legs, allows for movements at skewed angles, requires a protected phase to allow left turns, or other unique situations, the signal requires more phases and the cycle length is increased. This can lead to more impatient drivers and pedestrians taking more risks like accelerating when the signal is yellow; crossing on foot when the “don’t walk” signal is lit; making left or right turns without properly judging oncoming traffic.

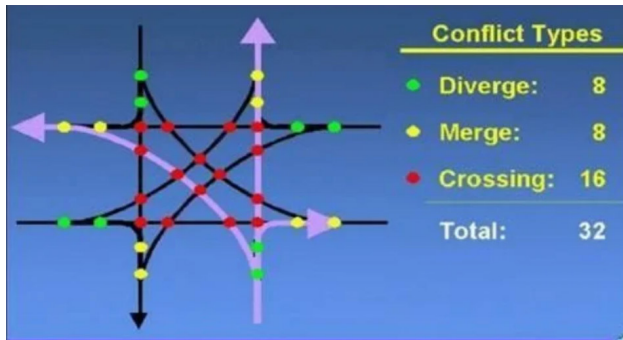


Figure 1-4: Vehicle Conflict Points - Conventional Intersection



Figure 1-5: Jefferson St at Braddock Ave/Catoctin Ave is a five-legged intersection with more conflict points & complex phasing

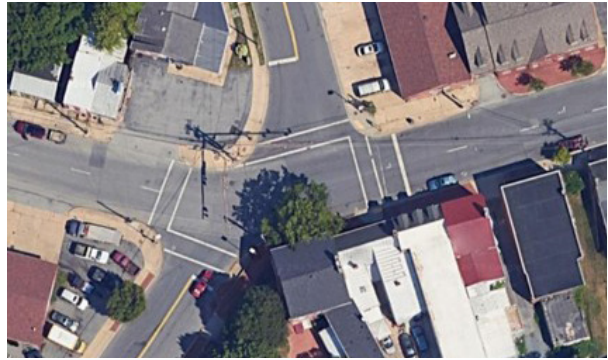


Figure 1-6: Jefferson St at W. Patrick St is a skewed intersection with awkward approach/departure angles



Figure 1-7: Jefferson St at Prospect Blvd/Pearl St is a five-legged intersection with more conflict points & complex phasing

### Mitigating Intersection Crash Risk to Reduce Serious Injuries and Fatalities

The broad strategy to reduce crashes at intersections is to minimize the number of conflict points, simplify the number of signal phases, and reduce the overall signal cycle, especially when there are left turns or significant pedestrian activity. The trade-off may be prohibiting certain turning movements or creating greater delays for through traffic.

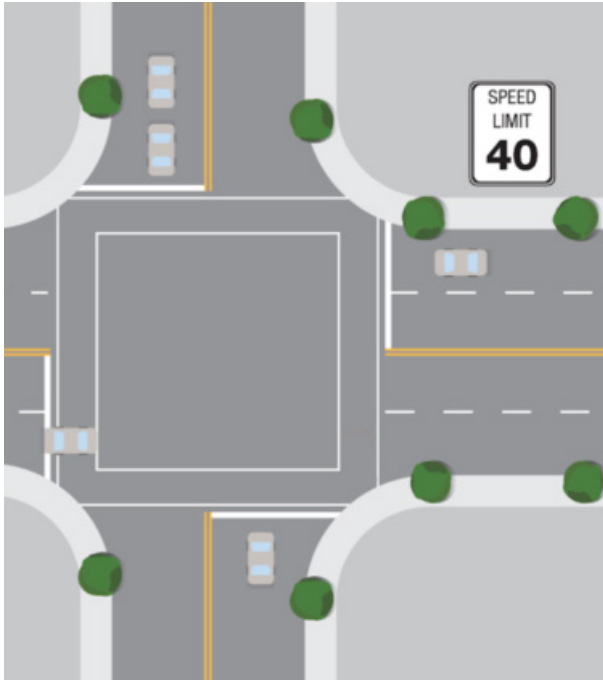


Figure 1-8: Intersection with increased pedestrian exposure, Smart Growth America

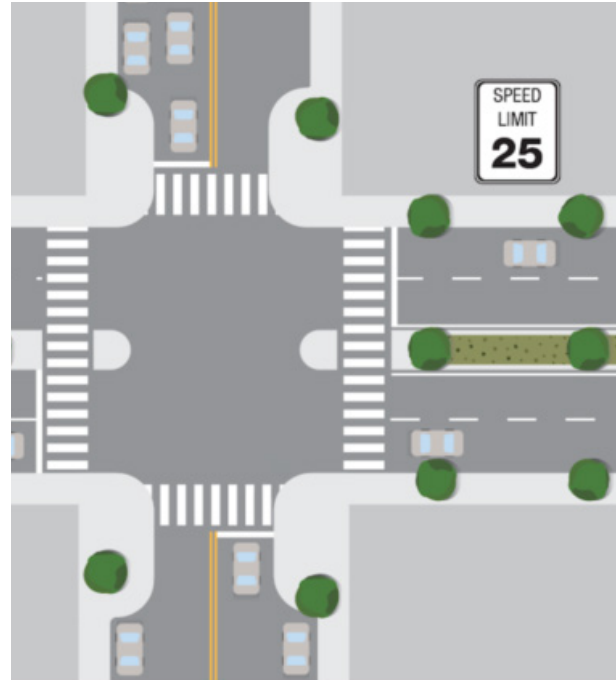


Figure 1-9: Intersection reduces pedestrian exposure with curb bump outs and pedestrian refuge, Smart Growth America

### **Pedestrian Visibility**

The best place for a crosswalk is where it is best seen in advance by drivers. When crosswalks are placed around an intersection corner or pedestrians must enter the crosswalk from behind an obstruction, crash risk is increased. Strategies to increase pedestrian visibility include:

- *Changing the style of crosswalks to a higher visibility*
- *Relocating or realigning crossing locations to be most visible to the highest speed vehicles*
- *Adding street lighting at select locations*
- *Providing dedicated signal phases for pedestrians.*

### **Pedestrian Exposure**

The more time spent crossing a roadway, the greater the risk of harm to the pedestrian. Pedestrian crossing distances can be reduced by tightening the turning radii at intersections, providing for curb extensions where parking is allowed or reducing a travel lane, and adding refuge islands in the middle of multilane roads.

### **Mitigating Pedestrian Crash Risk to Reduce Serious Injuries and Fatalities**

The broad strategy to reduce crashes involving pedestrians is to increase their visibility, provide the shortest practical and protected walking distance for crossing a roadway, and slowing traffic so that if a collision does occur, the risk of serious injury is minimized. The trade-off to reducing risks to pedestrians may be fewer travel lanes for through traffic, increasing intersection delay by providing dedicated signal phases for pedestrians, and the cost of increasing visibility by adding street lighting or relocating curbs, curb ramps and crosswalks.

## Part 2

### Promising Potential Road Safety Improvements for Jefferson Street

Jefferson Street might be said to lack an “organizing principle” as alluded to in the City’s 2020 comprehensive plan. The road serves dual purposes as a principal transportation corridor and as a concentrated commercial area serving adjacent neighborhoods. As a southern gateway to the City which begins where the US 340 highway ends, Jefferson Street will continue to serve dual purposes. However, an upcoming small area planning process is intended to provide defining character for the area (see small area overview map from Comprehensive Plan).

**Planning Approach**

The small area plan will advance the comprehensive plan’s vision of providing opportunities for more substantial levels of redevelopment in strategic locations. This study informs the small area plan by identifying and recommending an approach to critical roadway design issues that stand in the way of a future corridor that is vibrant, safe, healthy, and equitable.

One “organizing principle” for Jefferson Street is that the roadway must be made compatible for a variety of users especially as land uses change based on the small area plan. Although 11,000 vehicles travel Jefferson Street each day, there is ample capacity to repurpose much of the roadway section to more safely and equitably serve all potential users. Narrowing travel lanes and reducing the number of lanes can slow traffic to create safer spaces for bicycles and pedestrians; curb extensions and street lighting can reduce pedestrian exposure and increase visibility. Realigning intersections and restricting turning movements can reduce the number of conflict points.

The plan provides several promising improvements at key intersections along Jefferson Street. In between these nodes, the “complete streets” decision will need to be made. There are two general concepts for how to structure the roadway. One concept allows parking throughout the corridor and maintains the existing number of travel lanes although slightly narrower to provide a buffer from parked cars. The other concept generally eliminates on-street parking, narrows the travel lanes, and provides for bike lanes in both directions.

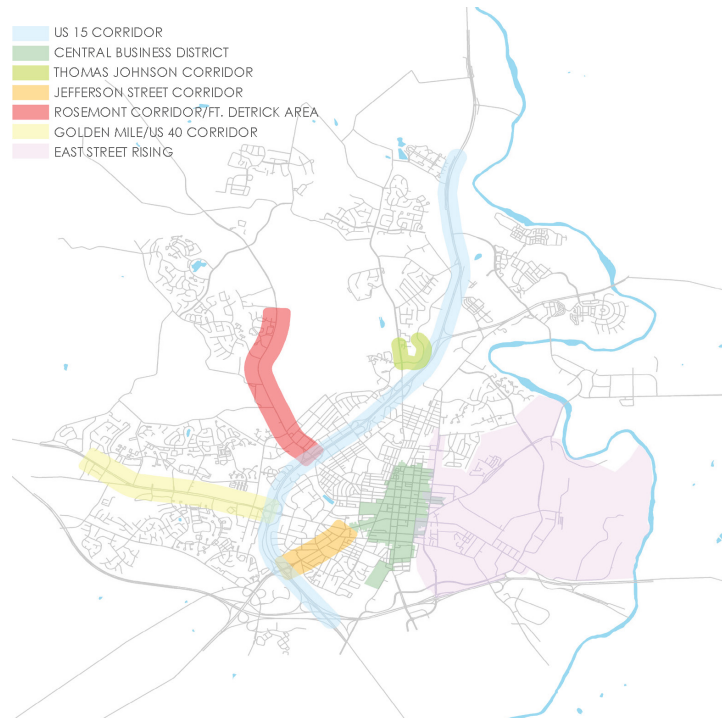


Figure 2-1: The Department of Planning is working on small area plans in five communities.

## CORRIDOR IMPROVEMENT CONCEPTS

In between the major intersections along S Jefferson Street, there are two primary concepts to incorporate bicycle lanes and narrow the travel lanes to encourage slower auto speeds. While community participants in this planning process strongly favored the recommended intersection improvements, they were divided as to whether and how to incorporate bicycle facilities.

This study offers potential concepts for roadway cross-sections for further community engagement. Additionally, further technical details need to be assessed. Considerations should include possible alternative bike-focused routes to and from downtown such as Center Street which is proposed for a buffered bikeway in the City’s proposed bicycle network.

### Bike Lane Concept

By repurposing the existing 8-ft parking lanes along Jefferson Street, a 5-ft bike lane with a 3-ft buffer area can be provided from Prospect Boulevard & Pearl St to South Street. The bike lane will provide additional separation for pedestrians utilizing the adjacent sidewalk creating a more comfortable multimodal environment.



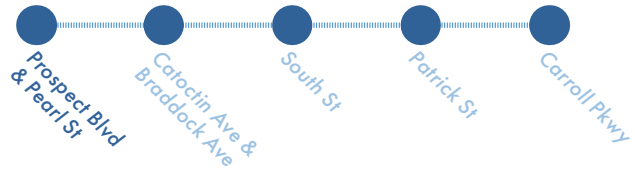
Figure 2-2: Bike Lane Concept for Jefferson Street

### Two-Way Cycle Track Concept

This concept would shift vehicle traffic to either side of Jefferson Street allowing for a 10.5 foot two-way bicycle facility with a 3-ft buffer to be installed with a mountable curb in between. (Breaks in the curb would allow driveway access where necessary). Typically, cycle tracks are physically separated from the vehicular traffic, creating a more accommodating environment for even the most inexperienced riders.



Figure 2-3: Two-Way Cycle Track Concept for Jefferson Street



# PROSPECT BOULEVARD & PEARL STREET

## Existing Conditions

The intersection of Jefferson Street at Prospect Boulevard and Pearl Street sits approximately 300 feet from ramps providing access to US 15 and US 40. The ramps are controlled by the State Highway Administration and sit entirely outside the municipal boundary of Frederick. With turn lanes included, southbound Jefferson Street is six lanes wide approaching from the north, and seven lanes approaching from the south.

Prospect Boulevard and Pearl Street provide access to a mix of land uses east of Jefferson Street including two strip shopping centers set into the neighborhood, garden style apartments, and single-family homes. Adjoining streets form a loose grid network that extends north towards Carroll Creek Park and the downtown core. Opposite Prospect Boulevard and Pearl Street on the west side of Jefferson Street is Prospect Plaza, also a suburban-style strip shopping center. A rear entrance to the Prospect Plaza allows some traffic from the Wyngate and Brigadoon communities to cut through to Jefferson Street.

The infrastructure of the intersection shows signs of disrepair: There is significant longitudinal asphalt cracking and some rutting through the intersection; pavement markings are faded or altogether missing; and none of the curb ramps for pedestrians are ADA compliant. Storm drain inlets are present on most legs of the intersection; utility poles and boxes, traffic signals and control cabinets, and other appurtenances are within the roadway clear zone. Vehicles being repaired at the Citgo station on the northeast corner of the intersection are often parked in a manner that encroaches on the public right of way and creates hazards for pedestrians.



Figure 2-4: Existing Conditions for Jefferson St, Prospect Blvd, and Pearl St Intersection

### Crash History and Safety Concerns

Ten crashes occurred at or approaching the intersection of Jefferson Street at Prospect Boulevard and Pearl Street between 2017 and 2021. Most concerning are three crashes involving vulnerable roadway users: two pedestrians were struck by northbound vehicles turning east from Jefferson to Prospect Boulevard or Pearl Street. A third crash involved a pedestrian still in the south leg crosswalk at the start of green signal phase for NB Jefferson Street.

Any improvements to this intersection must consider:

- The **intersection's proximity to US 15/40** on- and off-ramps. Data and field observations indicate that vehicles southbound Jefferson Street accelerate approaching the intersection so as to more quickly transition to the freeway or may not decelerate quickly enough in the northbound direction. This places all roadway users at increased risk when crossing and reduces the clear time for vehicles turning from S Jefferson Street into the shopping center. In addition any changes to the intersection should consider the affect on US 15 operations.
- The **visibility and exposure of pedestrians** crossing Jefferson Street. Due to the large intersection, pedestrian crossings range from 80 – 100 feet which leaves pedestrians exposed to potential conflicts. The east side Prospect Blvd and Pearl Street approaches include crosswalks set back from the intersection, obstructing northbound Jefferson Street sight lines of pedestrians within the crosswalks.
- The **potential impacts to utilities**, right of way constraints and access management to properties fronting Jefferson or Pearl Streets, especially near the Citgo station.
- The **diverse mix of vehicles** coming through the intersection, especially freight being trucked along the corridor to and from downtown; and accessing the shopping centers on either side of Jefferson Street.

Table 2-1: Crash Table for Jefferson St, Prospect Blvd, and Pearl St Intersection

CRASH SEVERITY	NUMBER OF CRASHES	CRASH TYPE	NUMBER OF CRASHES
Fatal	0	Rear End	6
Injury	8	Pedestrian/Bicycle	3
Property Damage	2	Run Off Road	1
<b>Total</b>	<b>10</b>		

### Alternatives Considered

The study considered several alternatives to address crashes of all types with an emphasis on reducing speed and protecting pedestrians:

- A single lane roundabout to reinforce the urban context of Jefferson Street for inbound traffic and minimize crashes associated with left turn movements.
- A roundabout with two exit lanes southbound to preserve reasonably capacity for traffic departing the core of Frederick and onto US 15 and ramps,
- Various curb extensions, and auxiliary/turn lane removals to provide additional visibility to pedestrians, reducing their distance to cross Jefferson Street, and generally calm traffic as it proceeds through the area.
- Closure or realignment of Pearl Street to simplify turning movements and to achieve a more standard intersection design that meets driver expectations.

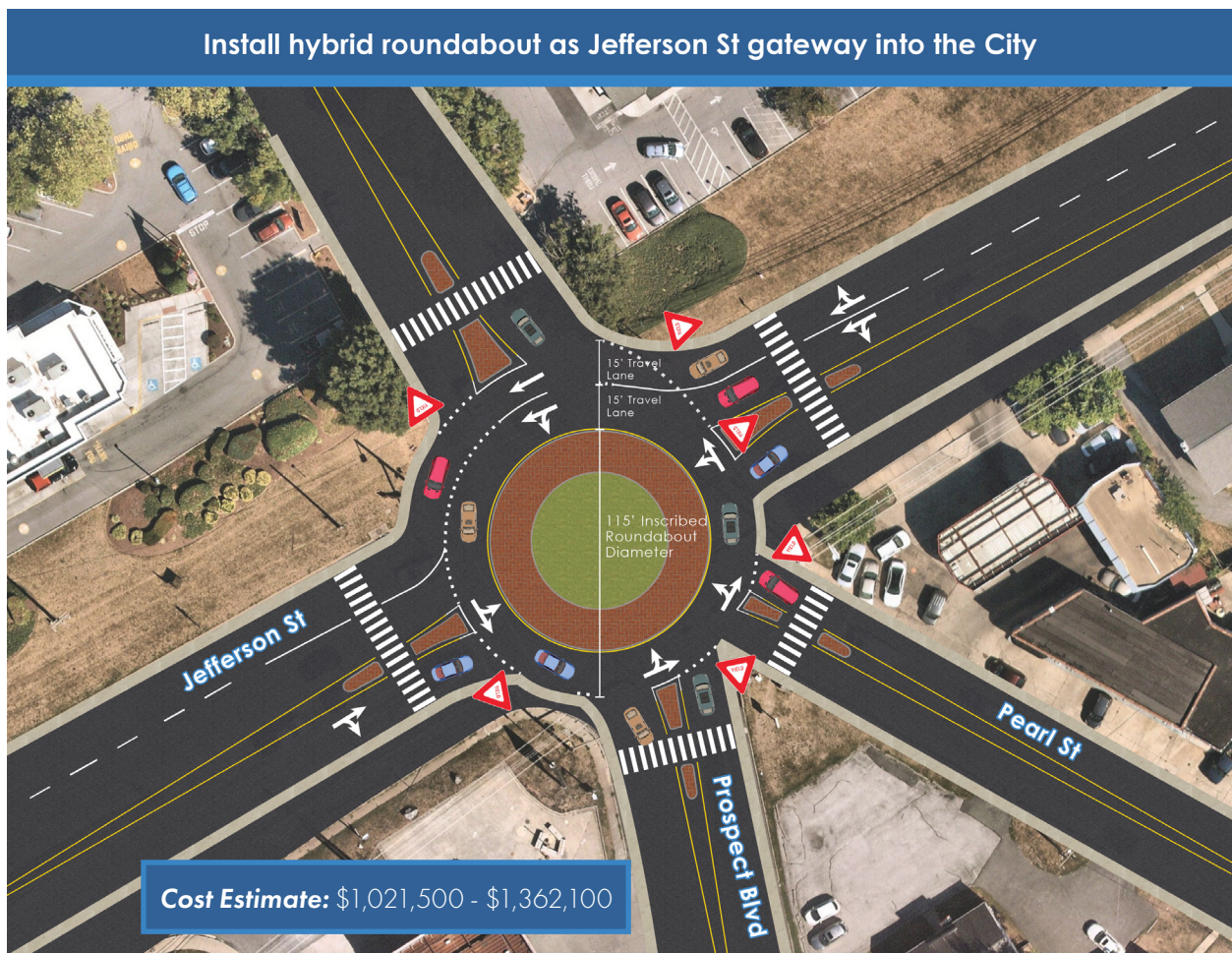


Figure 2-5: Proposed Improvements for Jefferson St, Prospect Blvd, and Pearl St Intersection



### Most Promising Potential Improvements

There are two recommendations for Jefferson Street at Prospect Boulevard and Pearl Street:

In the long-term, a roundabout will have the greatest benefit in slowing traffic as it enters and exits the S Jefferson Street corridor from the freeway; reducing the potential for left-turn crashes; and creating shorter, safer paths for pedestrians. A roundabout also provides a gateway feature to improve community identity. A concept for the roundabout is shown in Figure 2-5.

Traffic operations analysis indicates that a hybrid roundabout design best accommodates traffic traveling outbound towards US 15. A five-legged roundabout maintains access to Pearl Street and Prospect Boulevard for local access. US 15 NB Off-Ramp adjustments may be needed to address any roundabout queuing or weave issues. A SIDRA roundabout analyses showed that the two-lane hybrid configuration operates at LOS 'C' or better during the peak periods. Recognizing the potential for traffic growth, the roundabout continues to operate acceptably (LOS 'C' or better) with a 10% traffic growth. Additional technical details on traffic modeling and design considerations can be found in Appendix C.



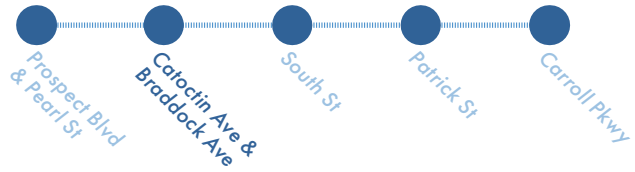
Figure 2-6: Proposed Improvements for Jefferson St, Prospect Blvd, and Pearl St Intersection

While the engineering work is being performed for the roundabout, a low cost, “quick-build” solution that reduces the number of lanes on Jefferson Street is recommended for installation. This is primarily achieved by combining the outbound right turn lane into the shopping center with the through lane that essentially funnels traffic onto US 15. On the east side of Jefferson Street, it is important to provide additional space and definition to the area where Pearl Street and Prospect Boulevard come together as show in Figure 2-6. This improvement would also add crosswalk on the north leg of the intersection crosswalk for full pedestrian accessibility.

The benefit of a quick-build, low cost short-term alternative is that it can easily be adjusted or removed if not achieving intended outcomes. Under a quick-build scenario, no curbs are moved and no drainage altered. No asphalt needs to be reconstructed, utilities adjusted or property acquired. The quick-build project would likely cost less than \$50,000 to design and install.



Figure 2-7: Quick Build Improvements that Could Be Installed on South Jefferson Street



# CATOCTIN AVENUE & BRADDOCK AVENUE

## Existing Conditions

The intersection of Jefferson St at Catoctin Avenue and Braddock Avenue is a five-legged intersection with a separate left-turn lane on northbound Jefferson Street. Due to the tight intersection radii, the stoplines are pulled back, requiring longer clearance intervals (yellow + all red signal phase).

Both Catoctin Avenue and Braddock Avenue are local roadways that serve the surrounding residential communities, commercial developments on Jefferson St, including the 7-11 on the southwest corner. The 7-11 includes access to both Braddock Avenue and Jefferson St.

The internal roadway network on the west side also provides access to West Patrick Street beyond the historic district. Catoctin Avenue connects to Maryvale Park and West Frederick Middle School and Frederick High School, increasing the volume of student pedestrians crossing at Jefferson Street.

Construction challenges at this intersection include utility poles located just behind the curb and within the channelizing island in the southwest corner. Storm drain inlets are present on the northeast corner.



Figure 2-8: Existing Conditions for Jefferson St, Catoctin Ave, and Braddock Ave Intersection

### Crash History and Safety Concerns

Six crashes occurred at or approaching the intersection of Jefferson Street at Braddock Avenue/Catoctin Avenue between 2018 and 2022.

Any improvements to this intersection must consider:

- The **pedestrian access** because currently pedestrians traveling along the west side of Jefferson Avenue cannot cross the intersection and continue along Jefferson Avenue. The existing channelizing island does not include curb ramps or a pedestrian path.
- The **vehicle approach speeds** exceed the posted speed limit due to underutilized parking and the gentle travel path on southbound Jefferson St to Braddock Avenue.
- The **complex intersection phasing** as well as the additional conflict points created by the fifth leg and the longer pedestrian wait/delay times.
- The **potential impacts to utilities**, right of way constraints and access management to properties fronting Jefferson Street and Catoctin Avenue, especially 7-11.

Table 2-2: Crash Table for Jefferson St, Catoctin Ave, and Braddock Ave Intersection

CRASH SEVERITY	NUMBER OF CRASHES	CRASH TYPE	NUMBER OF CRASHES
Fatal	0	Rear End	2
Injury	3	Pedestrian/Bicycle	1
Property Damage	3	Run Off Road	1
<b>Total</b>	<b>6</b>	<b>Other</b>	<b>2</b>

### Alternatives Considered

The alternatives developed for this intersection include:

- A single lane roundabout to reinforce the urban context of Jefferson Street and slow vehicles.
- A single lane mini roundabout to minimize impacts on adjacent properties while reinforcing the urban context.
- Various curb realignments to convert Braddock Avenue to right-in/right-out (RIRO) to simplify traffic signal phasing, provide typical pedestrian crossing and provide continuous pedestrian route along the west side of Jefferson St.

### Most Promising Potential Improvements

The recommendation for Jefferson Street at Braddock Avenue & Catoctin Avenue is to convert Braddock Avenue to RIRO through bumping out the west side curbing to connect with the existing channelizing island. Additionally, a small raised median should run along the Jefferson Street centerline from just south of 7-11 driveway to Catoctin Avenue intersection thereby prohibiting left-turn movements to and from Braddock Avenue. The improvement includes a sidewalk within this section to allow pedestrians to continue along the west side of Jefferson St, see Figure 2-9.

In the short-term, most of the improvement could be accomplished through “quick-build” methods involving flexposts, paint, and other low-cost, low impact materials. No curbs are moved and no drainage altered; however, the existing circuitous pedestrian path would remain. The quick-build approach allows the City to get an immediate safety benefit, assess impacts and prepare engineering plans for construction of the permanent improvement. City staff and residents would have an opportunity to assess traffic circulation impacts.

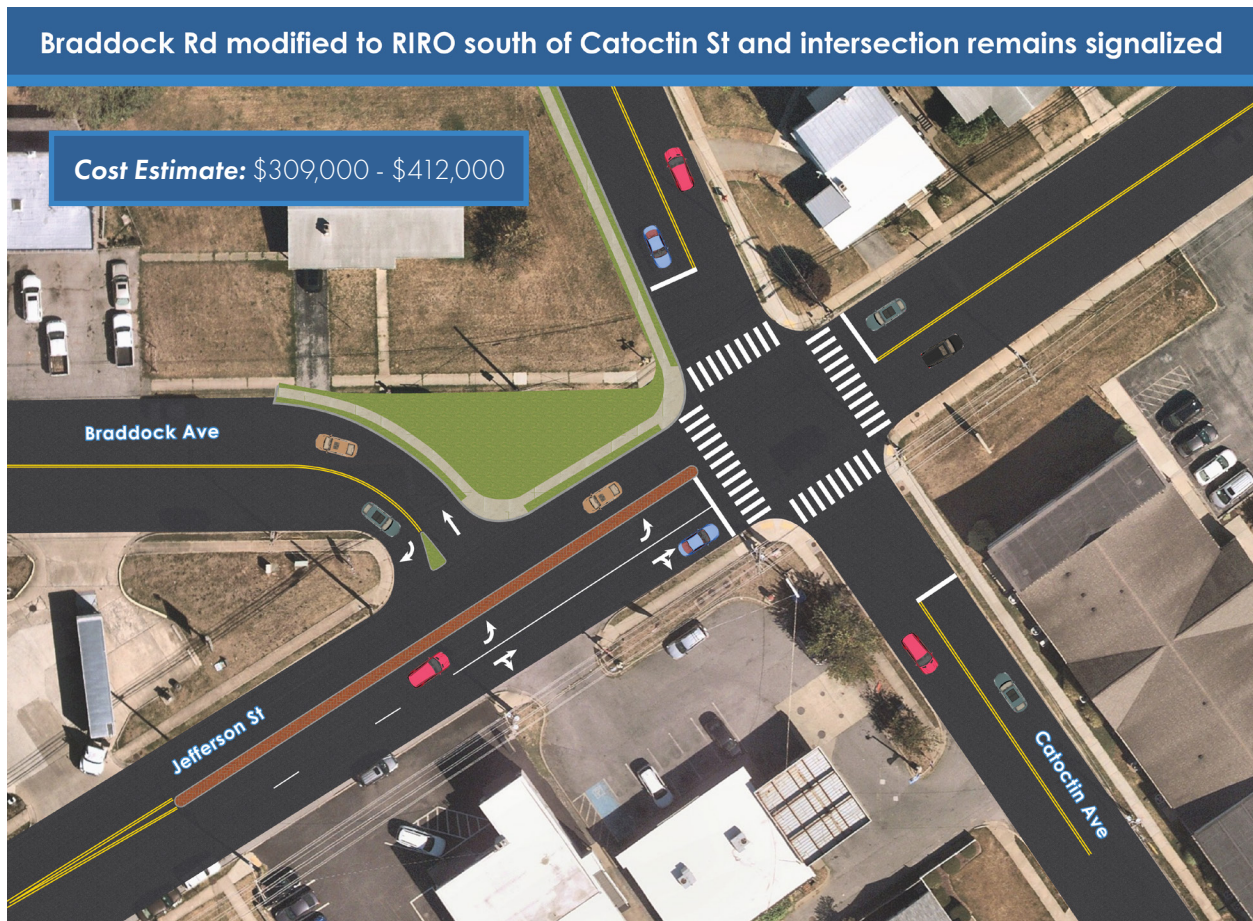
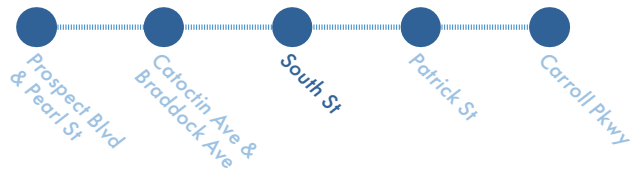


Figure 2-9: Proposed Improvements for Jefferson St, Catoctin Ave and Braddock Ave Intersection



## W. SOUTH STREET

### Existing Conditions

The intersection of Jefferson Street at W. South Street sits on the west side of the City of Frederick’s Historic District and is a one-way, eastbound, two lane, minor arterial with on-street parking. At the Jefferson Street intersection, eastbound W. South Street includes a shared through/left-turn lane, a separate through lane and a separate right-turn lane. On-street parking is permitted on the north side of South Street’s west leg. Jefferson Street is a two-lane street with on-street parking. The Jefferson Street north leg is considerably narrower than the south leg. Where they intersect, both Jefferson Street and W. South Street curve through the intersection.

The Jefferson Street and W. South Street intersection provides access to a mix of land uses including residential and commercial with a liquor store on the southeast corner, an auto dealer on the southwest and a laundromat on the northwest corner. Cars parked beyond the paved lot obstruct eastbound right-turn sight distance to the south leg crossing. The liquor store and laundromat on the southeast and northwest corners, respectively, have multiple access points with nearly the entire southeast corner allowing for access to and from the site. The wide access drive pushes the W. South Street east leg crossing further eastward creating sight distance challenges for northbound Jefferson Street right-turning motorists.



Figure 2-10: Existing Conditions for Jefferson St and South St Intersection



Figure 2-11: South Street at Jefferson Street looking east – Note: Utility poles on the southeast curb radius

### Crash History and Safety Concerns

Seven (7) crashes occurred at or approaching the intersection of Jefferson Street at W. South Street between 2018 and 2022. The most serious vehicular crashes have occurred when drivers’ misjudge the turns at the intersection; Jefferson Street. A fatality occurred in early 2024 when a motorist traveling northbound on Jefferson Street failed to bend left through the South Street intersection and crashed into the house on the northeast corner. In addition, a serious pedestrian injury occurred when a driver did not see a pedestrian crossing Jefferson Street at the east leg of W. South Street. Due to the large curb radius and location of the east leg crosswalk, motorists traveling northbound and turning right onto South Street are able to turn at higher speeds; sight lines to the south leg of the crosswalk are often impaired by illegally parked vehicles.

Table 2-3: Crash Table for Jefferson St and South St Intersection

CRASH SEVERITY	NUMBER OF CRASHES	CRASH TYPE	NUMBER OF CRASHES
Fatal	1	Rear End	2
Injury	3	Pedestrian/Bicycle	1
Property Damage	3	Run Off Road	4
<b>Total</b>	<b>7</b>		

### Recent Improvements & Other Potential Safety Measures

In spring 2024, the City of Frederick repaved the intersection and installed curb bump outs, new curb ramps, and continental crosswalks to slow motorists through the intersection and increase pedestrian visibility to approaching motorists, as shown in Figure 2-12. The dedicated lane for eastbound cars turning south on Jefferson Street can be removed without significant operational impact. Additional improvements that slow vehicles entering the intersection and provide greater visibility for pedestrians should be considered. This could include installing additional bump-outs and adjusting stop line and crosswalk locations as shown in Figure 2-13. Construction may be cost-prohibitive if utilities must be relocated to accommodate the improvements, as utility poles sit just behind the curb.



Figure 2-12: Recent Improvements to Jefferson St and South St Intersection

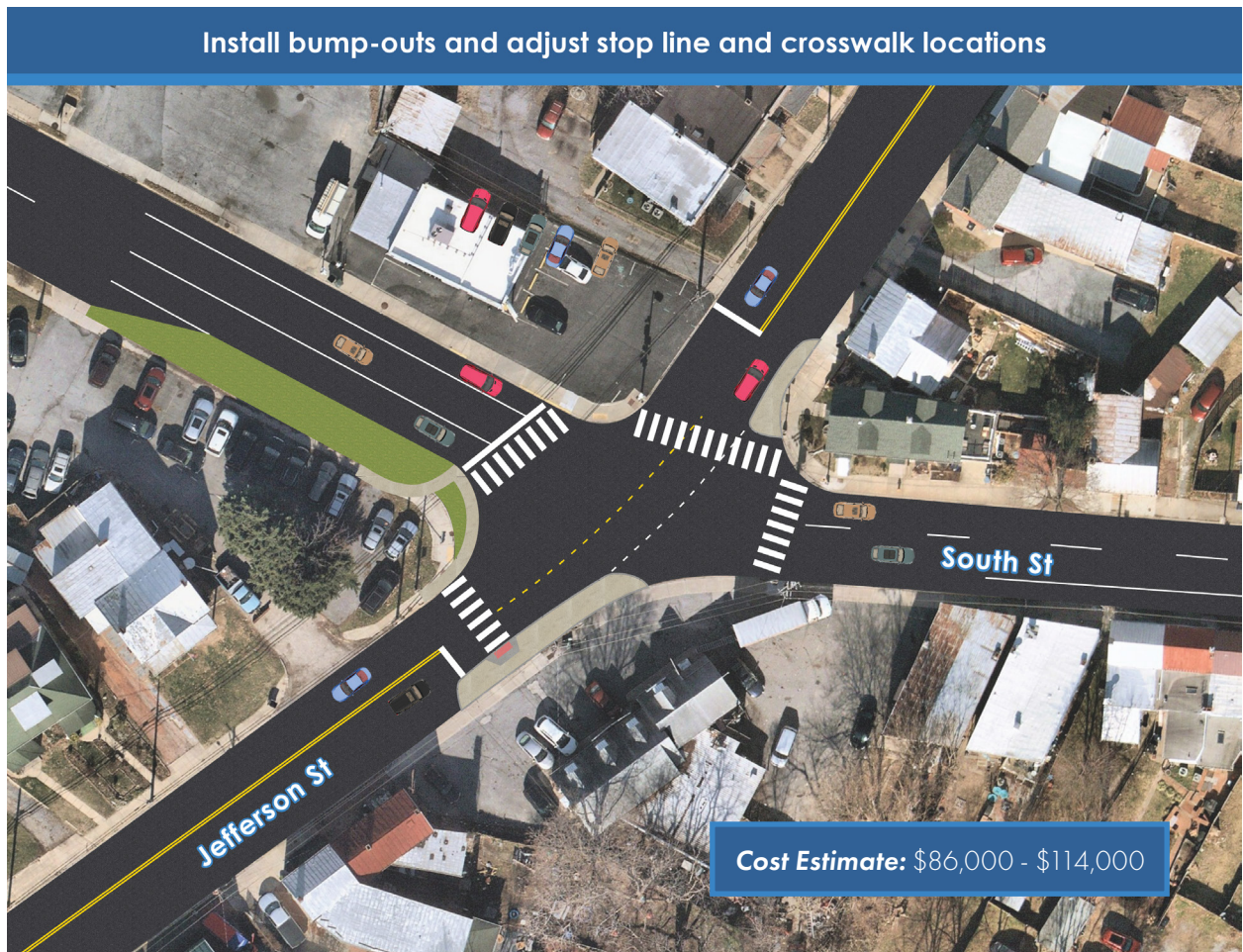
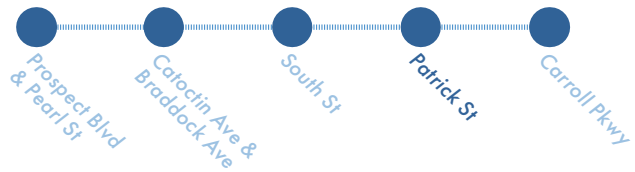


Figure 2-13: Proposed Improvements for Jefferson St and South St Intersection





## W. PATRICK STREET

### Existing Conditions

The intersection of Jefferson Street at W. Patrick Street is on west side of the City of Frederick’s Historic District. Between South Street and W. Patrick Street, Jefferson Street has a narrow footprint (38-feet) that includes two travel lanes and on-street parking on both sides, which is heavily used throughout the day. North of W. Patrick Street, Jefferson Street primarily serves as access to residential and institutional properties. W. Patrick Street provides access to a mix of land uses including residences, offices, and Ken’s Automotive Transmissions on both the southwest and northeast corners.

W. Patrick Street is a one-way, westbound, two lane, minor arterial with on-street parking. At the intersection with Jefferson Street, W. Patrick Street bends to the right. Jefferson Street is a two-lane street with on-street parking. The Jefferson Street north and south legs are off-set at the intersection, creating a complicated pedestrian crossing. Recently, the City of Frederick upgraded the curb ramps and pedestrian crosswalks to continental striping, increasing their visibility to approaching motorists.

Due to the topography and downward slope of W. Patrick Street to the west, the southeast corner includes a pedestrian switchback to access the curb ramp. Many pedestrians choose to cross Jefferson Street outside of the south leg crosswalk, which increases their exposure to oncoming traffic and impedes sight distance for westbound West Patrick motorists turning left.

Truck traffic on Jefferson Street between W. Patrick Street and South Street is unnecessary and should be reconsidered due to the tight roadway section, residential nature, and alternative routes available.



Figure 2-14: Existing Conditions for Jefferson St and Patrick St Intersection

### Crash History and Safety Concerns

Ten crashes occurred at or approaching the intersection of Jefferson Street at W. Patrick Street between 2018 and 2022. Most concerning are the two crashes involving pedestrians.

One such crash occurred when a pedestrian was crossing the Jefferson Street south leg out of the crosswalk and was struck by a westbound W. Patrick Street left-turning motorist who could not see the pedestrian. The other pedestrian crash occurred when a northbound Jefferson Street left-turn motorist failed to yield right-of-way to the pedestrian in the crosswalk. The pedestrian was traveling from the southwest corner to the northwest corner and had their back to approaching traffic.

A fatality occurred when a westbound motorcyclist failed to navigate the curve through the intersection, struck a curb and utility pole support cable, ejecting both riders.

Improvements considered at the intersection of Jefferson Street and W. Patrick Street must focus on:

- The **visibility and exposure of pedestrians** crossing Jefferson Street and the west leg of W. Patrick Street. The intersection slope, offset and buildings on the southeast corner obstruct sight lines to the pedestrian South leg Jefferson Street crosswalk.
- The **heavy presence of utilities** which may complicate potential improvements.
- The potential loss of **on-street parking**

Table 2-4: Crash Table for Jefferson St and Patrick St Intersection

CRASH SEVERITY	NUMBER OF CRASHES	CRASH TYPE	NUMBER OF CRASHES
Fatal	1	Rear End	6
Injury	8	Pedestrian/Bicycle	2
Property Damage	1	Run Off Road	2
<b>Total</b>	<b>10</b>	Other	1

### Alternatives Considered

The study considered several alternatives to address crashes of all types with an emphasis on protecting pedestrians and improving sight lines:

- A pedestrian refuge on the Jefferson Street south leg reduces turning vehicular speeds and minimize crashes associated with left turn movements, see Figure 2-15.
- A sidewalk bumpout extended along the southside of W. Patrick Street to the Jefferson Street south leg crossing provides additional visibility to pedestrians, reducing their distance to cross W. Patrick Street, and generally calm traffic as it proceeds through the intersection, see Figure 2-16.

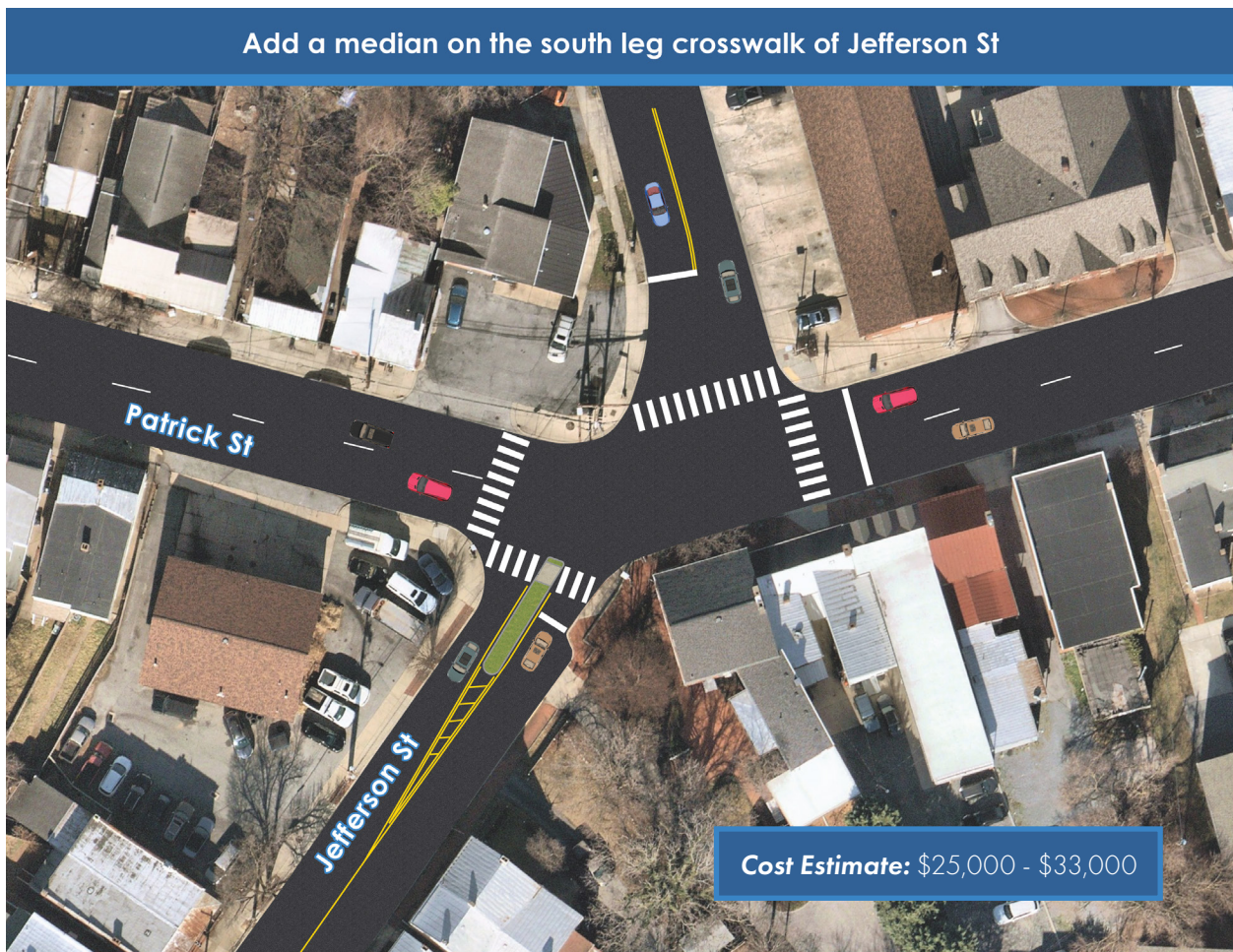


Figure 2-15: Proposed Improvements for Jefferson St and Patrick St Intersection

### Most Promising Potential Improvements

The most promising improvements for Jefferson Street at W. Patrick Street:

- A **sidewalk bumpout** along W. Patrick Street creates a new, more visible pedestrian landing area on the southeast corner and adjusts the crosswalk alignment, providing the greatest possible pedestrian visibility while minimizing pedestrian exposure along the south leg, as shown in Figure 2-16.
- **Restricting truck access** along Jefferson Street between South Street and W. Patrick Street either in conjunction with pedestrian improvements or as stand alone improvement should be considered due to the tight turning radius, narrow street width and heavy on-street parking in this section. Trucks can continue westbound on West Patrick Street either to US 15 or to a formal u-turn slip ramp located just west of the Jefferson Street & West Patrick Street intersection to access South Street.

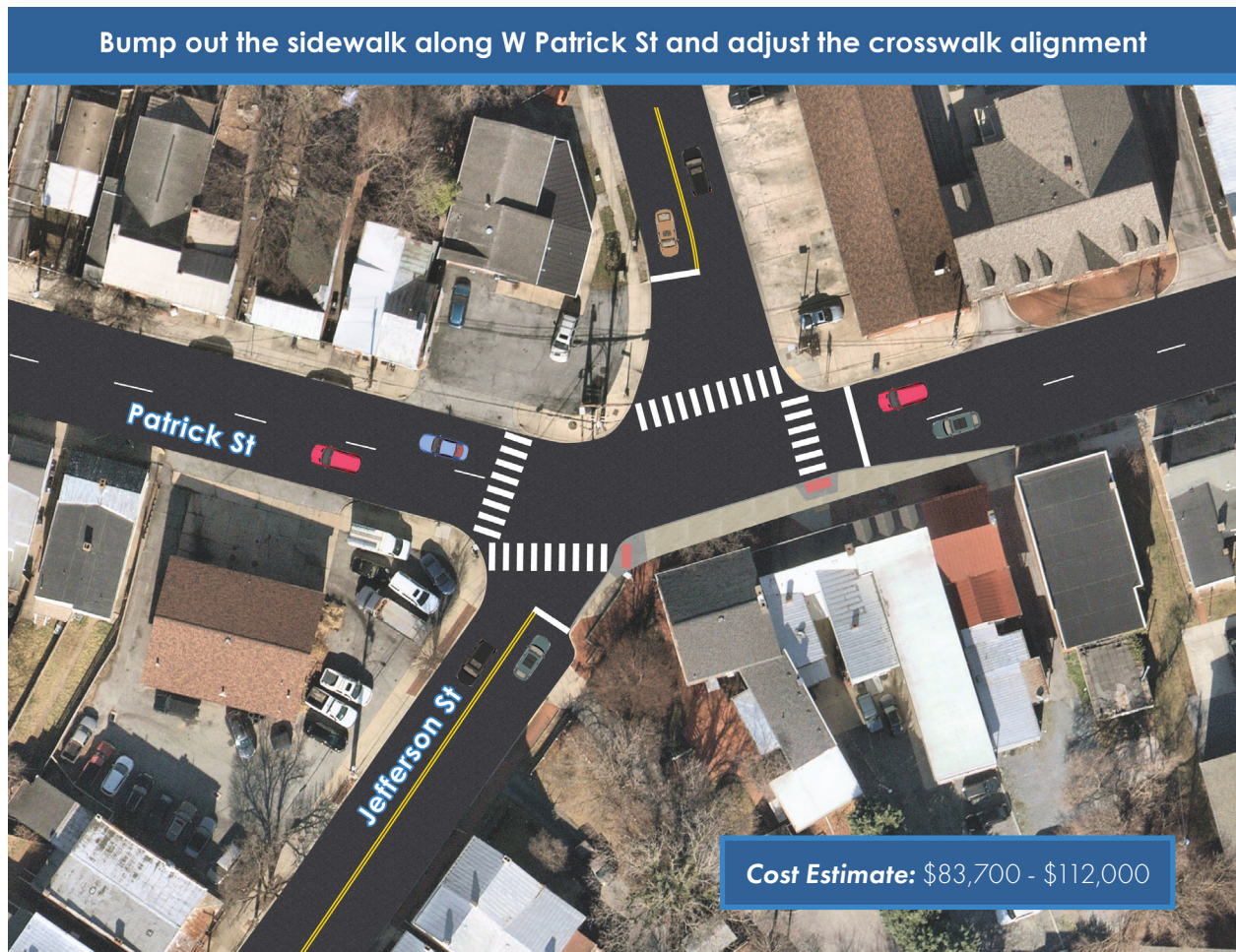
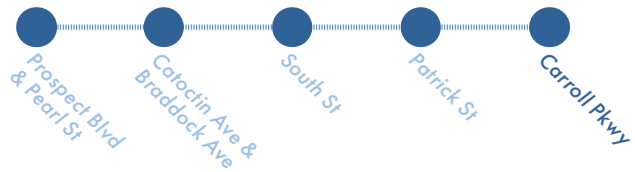


Figure 2-16: Proposed Improvements for Jefferson St and Patrick St Intersection



## CARROLL PARKWAY

### Existing Conditions

Jefferson Street terminates at Carroll Parkway with the City’s renowned Baker Park on the north side of the intersection. A local roadway, Carroll Parkway primarily serves to connect residences with Baker Park, the historic downtown, and Frederick High School and West Frederick Middle School. Sidewalks line both sides of Carroll Parkway and pedestrian traffic is significant both along and across

Generally, Carroll Parkway is an unmarked, two-way local road with on-street parking on both sides. Parkway Elementary School sits on the southeast corner of Jefferson Street and Carroll Parkway. The on-street parking adjacent to the elementary school is restricted to bus use only during drop-off and pick-up. Carroll Pkwy currently permits parking along both sides of the roadway, which is underutilized during the day. The straight, level roadway alignment and parking lane underutilization leads to higher speeds.

The Jefferson Street and Carroll Parkway south and east legs include continental crosswalks signed as school crossings. Jefferson Street operates under stop control.

### Crash History and Safety Concerns

There were no crashes at or approaching the intersection of Jefferson Street at Carroll Parkway between 2018 and 2022; however, residents have reported feeling uncomfortable crossing Carroll Parkway at times because of speeding and non-compliance with the stop sign.



Figure 2-17: Existing Conditions for Jefferson St and Carrol Pkwy Intersection

Any improvements to this intersection must consider:

- The **visibility and exposure of pedestrians** crossing Carroll Parkway and Jefferson St, especially for the vulnerable population potentially crossing to and from the elementary school.
- The **right of way and environmental** constraints.
- The potential for loss of **on-street parking impacts**

### Alternatives Considered

The study considered several alternatives to address potential crashes of all types with an emphasis on protecting pedestrians and improving sight lines:

- A single lane mini roundabout to slow motorists approaching and through the intersection
- A single lane striped roundabout to minimize footprint while slowing approaching motorists.
- Curb bumpouts with enhanced signing, striping and flexposts to narrow the approach lanes, slow traffic and provide additional visibility to pedestrians, and generally calm traffic as it proceeds through the intersection.

### Most Promising Potential Improvement

Given right of way constraints and low roadway volumes, the most promising improvement for Jefferson Street at Carroll Parkway is a striped curb bumpout with flexposts and enhanced signing, see Figure 2-18. This creates a more visible intersection stop control for cars, provides additional space for pedestrians to cross Carroll Parkway, and will encourage slower speeds approaching the school crossing.

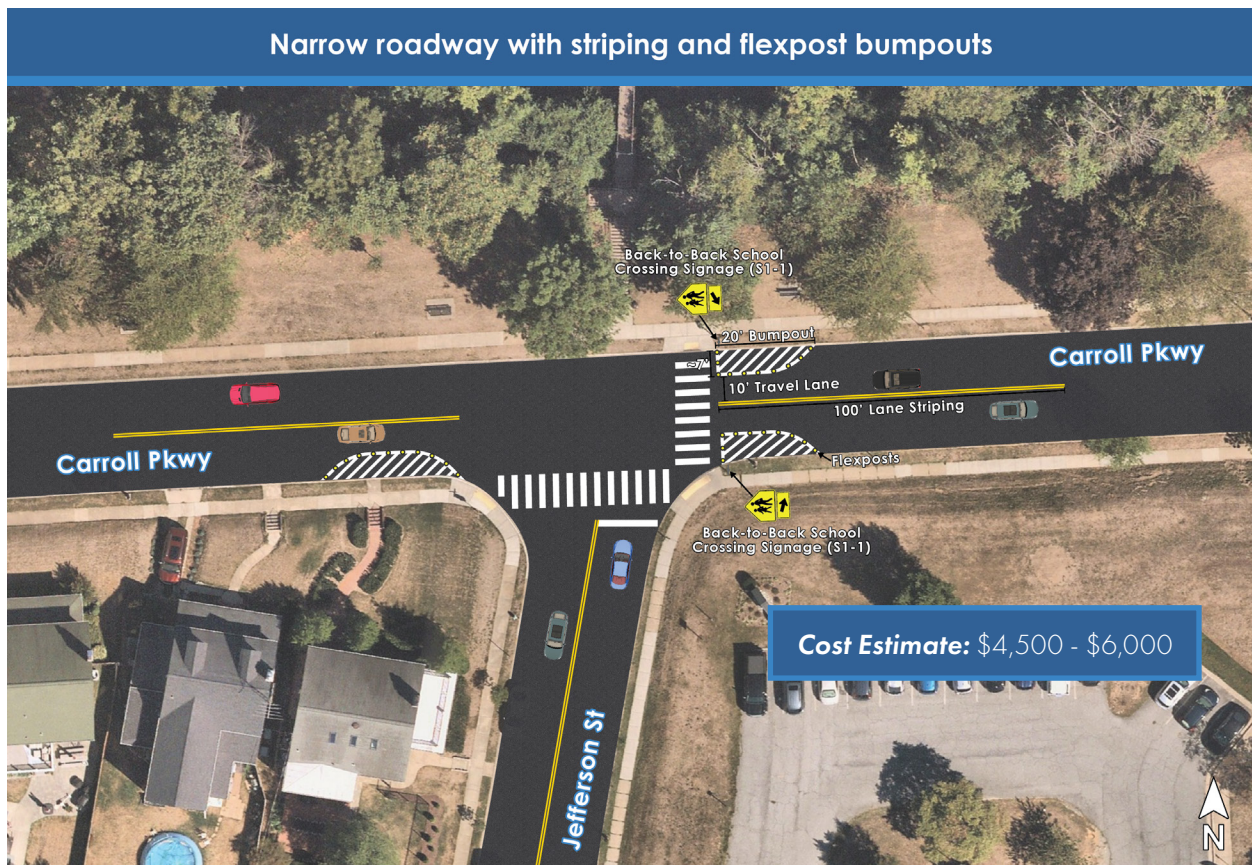


Figure 2-18: Proposed Improvements for Jefferson St and Carroll Pkwy Intersection

## ALTERNATIVE SAFETY BENEFIT SUMMARY

The summary table below identifies the expected benefits each alternative would provide with respect to intersection signal phasing, conflicts points, pedestrian exposure, vehicle speeds, and pedestrian visibility.

INTERSECTION/ SAFETY ISSUES	SIMPLIFIES INTERSECTION PHASING	REDUCES NUMBER OF CONFLICT POINTS	DECREASES PEDESTRIAN EXPOSURE	LOWERS VEHICULAR SPEEDS	IMPROVES PEDESTRIAN VISIBILITY
PROSPECT BLVD & PEARL ST ROUNDBOUT	✓	✓		✓	
PROSPECT BLVD & PEARL ST CURB ADJUSTMENTS			✓	✓	✓
CATOCTIN AVE & BRADDOCK AVE RIGHT-IN / RIGHT-OUT	✓	✓	✓	✓	
SOUTH ST CURB BUMP OUTS			✓	✓	✓
PATRICK ST PEDESTRIAN MEDIAN REFUGE			✓	✓	✓
PATRICK ST SIDEWALK EXTENSION			✓	✓	✓
CARROLL PKWY PAVEMENT MARKING BUMP OUTS			✓	✓	✓

## Part 3

### The Path Forward



## CONCLUSION

### *Choices and Trade-Offs*

The vision and goals of small area plans are realized by making deliberate choices that weigh the trade-offs of each alternative. To achieve the vision of a safer Jefferson Street for all, stakeholders may be asked to consider:

- *Restricting left turns that provide direct access to neighborhoods or community facilities*
- *Doing away with on-street parking*
- *Reducing the number of travel lanes in each direction*
- *Widening sidewalks to allow for more pedestrians to pass through the area*

Can the community accept these trade-offs to significantly reduce the risk of serious injury or death to drivers and pedestrians?

### *Investment Decisions & Pilot Projects*

Small area plans are implemented largely through private investment and development; however, they also guide City's capital improvements and facilities.

This study recommends mid- to long-term investments that can be programmed with or tied to development approvals.

With so many competing infrastructure needs in Frederick, communities that can build consensus quickly and thoughtfully are more likely to see projects designed and constructed to achieve the vision and goals of their small area plans. For this reason, it is strongly recommended that the City move forward with short-term, "quick-build" improvements that can be rolled out to address urgent safety issues along Jefferson Street and test the effectiveness of mid- and long-term concepts before they are made permanent.



Figure 3-1: Google Earth Screenshot of Jefferson St, Prospect Blvd, and Pearl St Intersection

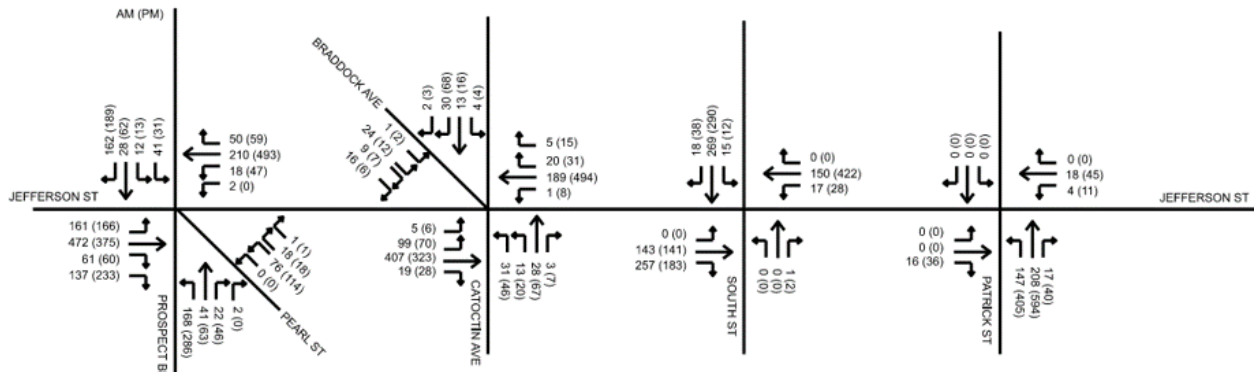
# Appendix A

## Corridor Traffic Volumes

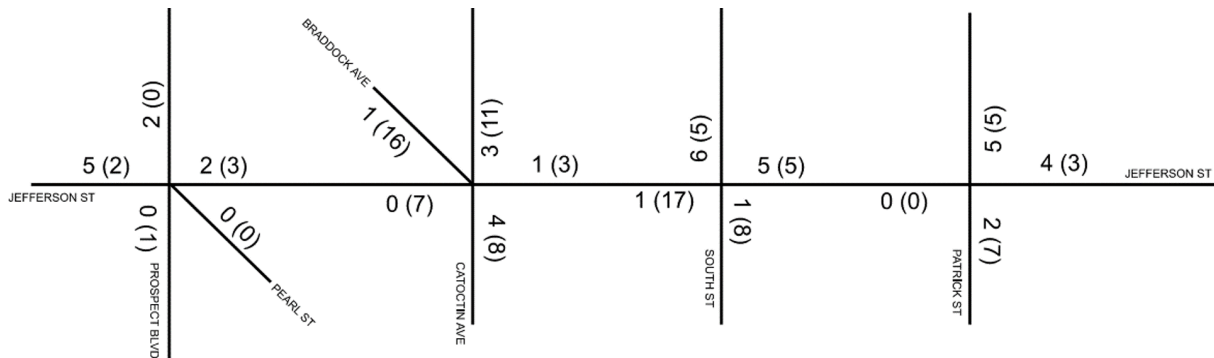
## TRAFFIC COUNT DATA

Traffic counts were conducted on Wednesday November 8, 2023 for the signalized intersections. Typically, the AM peak occurred from 8AM – 9AM with the PM peak from 4:15 – 5:15PM.

The diagram below includes vehicular turning movements at each signalized intersection.



The diagram below indicates the number of pedestrians crossing at the intersection. However, during field visits, many pedestrians were observed crossing outside of the crosswalks.



# Appendix B

## Public Outreach

## PUBLIC OUTREACH

A public workshop was held on March 26, 2024, at Talley Center from 7 PM to 9 PM. The workshop included a summary on the study purpose, existing data and conditions, plus alternatives under consideration, followed by an open house with roll plans and poster boards of the study area, transportation data, and intersection alternatives. Approximately 30 people attended. The attendees were asked to provide feedback on the existing corridor safety issues and “rate” the alternatives.



Public input was specifically sought for the following alternatives:

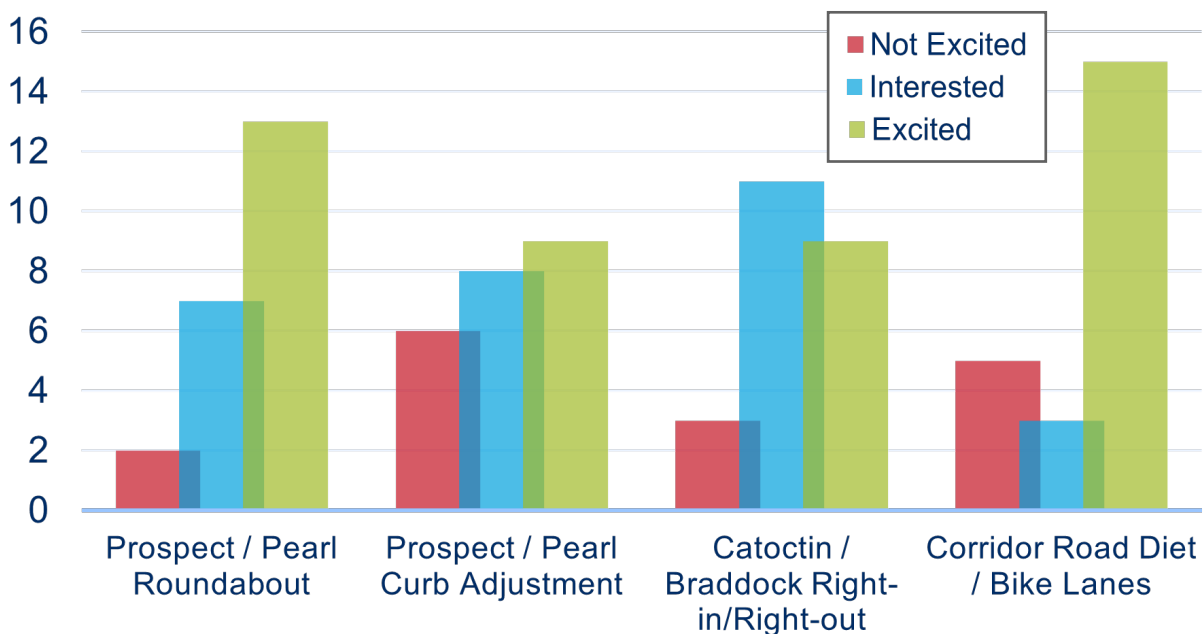
- Prospect Boulevard/Pearl Street Roundabout
- Prospect Boulevard/Pearl Street Curb Adjustments – shortening the crossing distance
- Catoctin Avenue/Braddock Avenue Right-in/Right-out
- Jefferson Street corridor “road diet” to add bike lanes, narrow travel lanes and remove most parking

The public rated each alternative from “No excited/optimistic this could solve a safety concern” to “Interested but have questions/concerns” to “excited/optimistic this could solve a safety concern.” The overall results by identified alternative are shown in figure at right. **Many expressed concern with how bike lanes would integrate with the roundabout but generally liked both alternatives.**

Additionally, when asked to describe the most serious safety issue(s) along the corridor, the following issues were repeated:

- High speeds – going well beyond speed limit
- Unsafe pedestrian crossings, especially at South Street and at West Patrick Street

### Public Input Ranking



# Appendix C

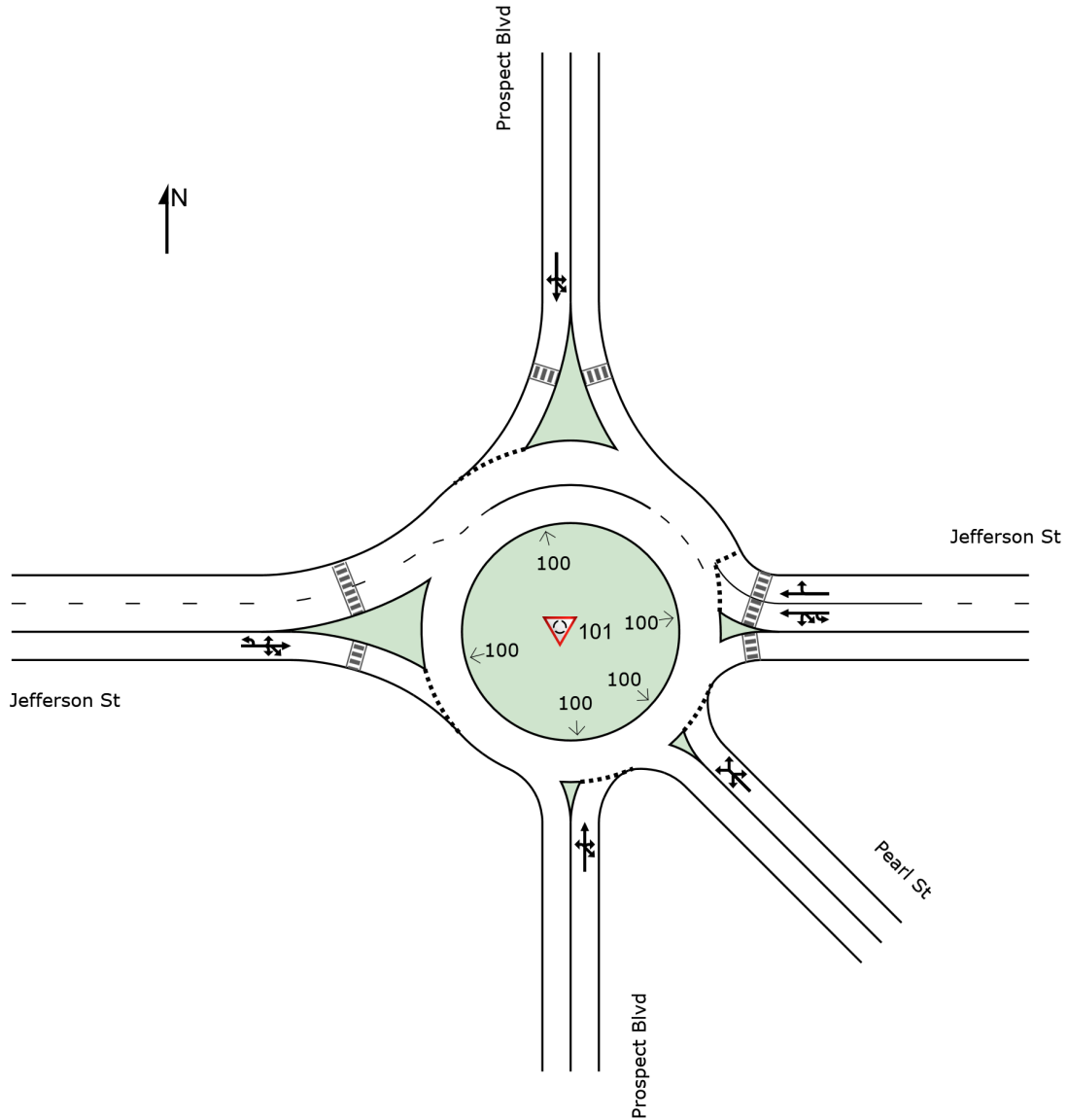
## Roundabout Analyses

## SITE LAYOUT

▼ Site: 101 [Traffic Volumes 2024\_AM\_Jefferson St at Prospect Blvd/Pearl St.\_Hybrid Roundabout (Site Folder: General)]

Jefferson St at Prospect Blvd/Pearl St.\_Two Lanes\_AM  
Site Category: Two Lanes Roundabout  
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Organisation: MEAD & HUNT | Licence: PLUS / 1PC | Created: Friday, March 15, 2024 11:42:02 AM  
Project: \\corp.meadhunt.com\sharedfolders\entp\4664221\240026.01\TECH\Traffic Analysis\Sidra\Jefferson St at Prospect Blvd.sip9

## MOVEMENT SUMMARY

Site: 101 [Projected 10% Traffic Volumes Growth\_PM\_Jefferson St at Prospect Blvd/Pearl St.\_Hybrid Roundabout (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Jefferson St at Prospect Blvd/Pearl St.\_Two Lanes\_PM  
 Site Category: Two Lanes Roundabout  
 Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[ Total HV ]	%	[ Total HV ]	%	v/c	sec		[ Veh. veh	Dist ]				mph
			veh/h		veh/h					ft					
South: Prospect Blvd															
3	L2	All MCs	321	3.0	321	3.0	0.939	55.0	LOS E	14.1	359.8	1.00	1.75	2.76	14.6
8	T1	All MCs	70	3.0	70	3.0	0.939	55.0	LOS E	14.1	359.8	1.00	1.75	2.76	17.4
18	R2	All MCs	52	3.0	52	3.0	0.939	55.0	LOS E	14.1	359.8	1.00	1.75	2.76	14.6
18b	R3	All MCs	1	0.0	1	0.0	0.939	54.0	LOS E	14.1	359.8	1.00	1.75	2.76	14.5
Approach			445	3.0	445	3.0	0.939	55.0	LOS E	14.1	359.8	1.00	1.75	2.76	15.0
SouthEast: Pearl St															
3bx	L3	All MCs	1	0.0	1	0.0	0.445	21.0	LOS C	2.2	55.1	0.85	0.95	1.10	18.0
3ax	L1	All MCs	128	0.0	128	0.0	0.445	21.0	LOS C	2.2	55.1	0.85	0.95	1.10	18.0
18ax	R1	All MCs	20	0.0	20	0.0	0.445	21.0	LOS C	2.2	55.1	0.85	0.95	1.10	18.0
18bx	R3	All MCs	1	0.0	1	0.0	0.445	21.0	LOS C	2.2	55.1	0.85	0.95	1.10	18.0
Approach			150	0.0	150	0.0	0.445	21.0	LOS C	2.2	55.1	0.85	0.95	1.10	18.0
East: Jefferson St															
1u	U	All MCs	1	3.0	1	3.0	0.570	16.6	LOS B	3.9	98.6	0.83	0.95	1.25	23.7
1b	L3	All MCs	1	0.0	1	0.0	0.570	15.7	LOS B	3.9	98.6	0.83	0.95	1.25	18.9
1	L2	All MCs	53	3.0	53	3.0	0.570	16.6	LOS B	3.9	98.6	0.83	0.95	1.25	18.9
6	T1	All MCs	553	3.0	553	3.0	0.570	16.6	LOS B	3.9	99.4	0.83	0.95	1.25	18.9
16	R2	All MCs	66	0.0	66	0.0	0.570	15.7	LOS B	3.9	99.4	0.83	0.95	1.25	18.9
Approach			674	2.7	674	2.7	0.570	16.5	LOS B	3.9	99.4	0.83	0.95	1.25	18.9
North: Prospect Blvd															
7	L2	All MCs	35	3.0	35	3.0	0.758	33.1	LOS C	5.3	135.6	0.89	1.25	1.79	17.1
7a	L1	All MCs	14	0.0	14	0.0	0.758	31.4	LOS C	5.3	135.6	0.89	1.25	1.79	17.0
4	T1	All MCs	69	3.0	69	3.0	0.758	33.1	LOS C	5.3	135.6	0.89	1.25	1.79	21.2
14	R2	All MCs	212	3.0	212	3.0	0.758	33.1	LOS C	5.3	135.6	0.89	1.25	1.79	17.1
Approach			331	2.9	331	2.9	0.758	33.1	LOS C	5.3	135.6	0.89	1.25	1.79	17.9
West: Jefferson St															
5u	U	All MCs	1	3.0	1	3.0	0.857	21.9	LOS C	28.0	710.4	1.00	1.17	1.68	22.5
5	L2	All MCs	187	3.0	187	3.0	0.857	21.9	LOS C	28.0	710.4	1.00	1.17	1.68	18.1
2	T1	All MCs	421	3.0	421	3.0	0.857	21.9	LOS C	28.0	710.4	1.00	1.17	1.68	18.1
12a	R1	All MCs	67	0.0	67	0.0	0.857	21.5	LOS C	28.0	710.4	1.00	1.17	1.68	18.1
12	R2	All MCs	261	0.0	261	0.0	0.857	21.5	LOS C	28.0	710.4	1.00	1.17	1.68	18.1
Approach			938	1.9	938	1.9	0.857	21.8	LOS C	28.0	710.4	1.00	1.17	1.68	18.1



## MOVEMENT SUMMARY

Site: 101 [Traffic Volumes 2024\_AM\_Jefferson St at Prospect Blvd/Pearl St.\_Hybrid Roundabout (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Jefferson St at Prospect Blvd/Pearl St.\_Two Lanes\_AM  
 Site Category: Two Lanes Roundabout  
 Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[ Total HV ] veh/h	%	[ Total HV ] veh/h	%				[ Veh. veh	[ Dist ] ft				
South: Prospect Blvd															
3	L2	All MCs	187	3.0	187	3.0	0.476	14.8	LOS B	2.5	63.1	0.76	0.85	1.04	19.1
8	T1	All MCs	46	3.0	46	3.0	0.476	14.8	LOS B	2.5	63.1	0.76	0.85	1.04	19.1
18	R2	All MCs	24	3.0	24	3.0	0.476	14.8	LOS B	2.5	63.1	0.76	0.85	1.04	19.1
18b	R3	All MCs	2	0.0	2	0.0	0.476	13.9	LOS B	2.5	63.1	0.76	0.85	1.04	19.0
Approach			259	3.0	259	3.0	0.476	14.7	LOS B	2.5	63.1	0.76	0.85	1.04	19.1
SouthEast: Pearl St															
3bx	L3	All MCs	1	0.0	1	0.0	0.223	10.7	LOS B	0.9	21.5	0.71	0.71	0.71	19.6
3ax	L1	All MCs	84	0.0	84	0.0	0.223	10.7	LOS B	0.9	21.5	0.71	0.71	0.71	19.6
18ax	R1	All MCs	20	0.0	20	0.0	0.223	10.7	LOS B	0.9	21.5	0.71	0.71	0.71	19.6
18bx	R3	All MCs	1	0.0	1	0.0	0.223	10.7	LOS B	0.9	21.5	0.71	0.71	0.71	19.6
Approach			107	0.0	107	0.0	0.223	10.7	LOS B	0.9	21.5	0.71	0.71	0.71	19.6
East: Jefferson St															
1u	U	All MCs	1	3.0	1	3.0	0.186	6.2	LOS A	0.7	18.5	0.54	0.43	0.54	26.6
1b	L3	All MCs	2	0.0	2	0.0	0.186	5.8	LOS A	0.7	18.5	0.54	0.43	0.54	20.6
1	L2	All MCs	20	3.0	20	3.0	0.186	6.2	LOS A	0.7	18.5	0.54	0.43	0.54	20.7
6	T1	All MCs	233	3.0	233	3.0	0.186	6.3	LOS A	0.7	18.7	0.54	0.43	0.54	20.7
16	R2	All MCs	56	0.0	56	0.0	0.186	5.8	LOS A	0.7	18.7	0.54	0.43	0.54	20.7
Approach			312	2.4	312	2.4	0.186	6.2	LOS A	0.7	18.7	0.54	0.43	0.54	20.7
North: Prospect Blvd															
7	L2	All MCs	46	3.0	46	3.0	0.318	7.8	LOS A	1.3	33.1	0.57	0.46	0.57	17.6
7a	L1	All MCs	13	0.0	13	0.0	0.318	7.3	LOS A	1.3	33.1	0.57	0.46	0.57	17.5
4	T1	All MCs	31	3.0	31	3.0	0.318	7.8	LOS A	1.3	33.1	0.57	0.46	0.57	17.4
14	R2	All MCs	180	3.0	180	3.0	0.318	7.8	LOS A	1.3	33.1	0.57	0.46	0.57	17.6
Approach			270	2.9	270	2.9	0.318	7.7	LOS A	1.3	33.1	0.57	0.46	0.57	17.6
West: Jefferson St															
5u	U	All MCs	1	3.0	1	3.0	0.774	15.2	LOS C	9.9	252.7	0.76	0.36	0.76	24.1
5	L2	All MCs	179	3.0	179	3.0	0.774	15.2	LOS C	9.9	252.7	0.76	0.36	0.76	19.2
2	T1	All MCs	524	3.0	524	3.0	0.774	15.2	LOS C	9.9	252.7	0.76	0.36	0.76	19.1
12a	R1	All MCs	68	0.0	68	0.0	0.774	14.9	LOS B	9.9	252.7	0.76	0.36	0.76	19.1
12	R2	All MCs	152	0.0	152	0.0	0.774	14.9	LOS B	9.9	252.7	0.76	0.36	0.76	19.1
Approach			924	2.3	924	2.3	0.774	15.1	LOS C	9.9	252.7	0.76	0.36	0.76	19.1
All Vehicles			1872	2.4	1872	2.4	0.774	12.3	LOS B	9.9	252.7	0.69	0.47	0.73	19.1

## MOVEMENT SUMMARY

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Jefferson St at Prospect Blvd/Pearl St.\_Two Lanes\_AM  
 Site Category: Two Lanes Roundabout  
 Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[ Total HV ]	%	[ Total HV ]	%	v/c	sec		[ Veh. veh	Dist ]				mph
			veh/h		veh/h					ft					
South: Prospect Blvd															
3	L2	All MCs	206	3.0	206	3.0	0.572	19.2	LOS C	3.1	79.6	0.81	0.95	1.17	18.4
8	T1	All MCs	50	3.0	50	3.0	0.572	19.2	LOS C	3.1	79.6	0.81	0.95	1.17	18.5
18	R2	All MCs	27	3.0	27	3.0	0.572	19.2	LOS C	3.1	79.6	0.81	0.95	1.17	18.5
18b	R3	All MCs	2	0.0	2	0.0	0.572	18.2	LOS C	3.1	79.6	0.81	0.95	1.17	18.4
Approach			284	3.0	284	3.0	0.572	19.2	LOS C	3.1	79.6	0.81	0.95	1.17	18.4
SouthEast: Pearl St															
3bx	L3	All MCs	1	0.0	1	0.0	0.273	12.8	LOS B	1.1	26.7	0.75	0.77	0.79	19.2
3ax	L1	All MCs	93	0.0	93	0.0	0.273	12.8	LOS B	1.1	26.7	0.75	0.77	0.79	19.2
18ax	R1	All MCs	22	0.0	22	0.0	0.273	12.8	LOS B	1.1	26.7	0.75	0.77	0.79	19.2
18bx	R3	All MCs	1	0.0	1	0.0	0.273	12.8	LOS B	1.1	26.7	0.75	0.77	0.79	19.2
Approach			118	0.0	118	0.0	0.273	12.8	LOS B	1.1	26.7	0.75	0.77	0.79	19.2
East: Jefferson St															
1u	U	All MCs	1	3.0	1	3.0	0.215	6.8	LOS A	0.8	21.5	0.57	0.47	0.57	26.4
1b	L3	All MCs	2	0.0	2	0.0	0.215	6.3	LOS A	0.8	21.5	0.57	0.47	0.57	20.5
1	L2	All MCs	22	3.0	22	3.0	0.215	6.8	LOS A	0.8	21.5	0.57	0.47	0.57	20.6
6	T1	All MCs	257	3.0	257	3.0	0.215	6.9	LOS A	0.9	21.7	0.57	0.47	0.57	20.6
16	R2	All MCs	61	0.0	61	0.0	0.215	6.4	LOS A	0.9	21.7	0.57	0.47	0.57	20.6
Approach			343	2.4	343	2.4	0.215	6.8	LOS A	0.9	21.7	0.57	0.47	0.57	20.6
North: Prospect Blvd															
7	L2	All MCs	50	3.0	50	3.0	0.367	8.8	LOS A	1.6	42.2	0.61	0.56	0.68	17.5
7a	L1	All MCs	14	0.0	14	0.0	0.367	8.2	LOS A	1.6	42.2	0.61	0.56	0.68	17.4
4	T1	All MCs	34	3.0	34	3.0	0.367	8.8	LOS A	1.6	42.2	0.61	0.56	0.68	17.3
14	R2	All MCs	198	3.0	198	3.0	0.367	8.8	LOS A	1.6	42.2	0.61	0.56	0.68	17.4
Approach			297	2.9	297	2.9	0.367	8.8	LOS A	1.6	42.2	0.61	0.56	0.68	17.4
West: Jefferson St															
5u	U	All MCs	1	3.0	1	3.0	0.861	20.5	LOS C	25.1	638.4	1.00	0.77	1.34	22.8
5	L2	All MCs	197	3.0	197	3.0	0.861	20.5	LOS C	25.1	638.4	1.00	0.77	1.34	18.4
2	T1	All MCs	577	3.0	577	3.0	0.861	20.5	LOS C	25.1	638.4	1.00	0.77	1.34	18.3
12a	R1	All MCs	74	0.0	74	0.0	0.861	20.1	LOS C	25.1	638.4	1.00	0.77	1.34	18.3
12	R2	All MCs	168	0.0	168	0.0	0.861	20.1	LOS C	25.1	638.4	1.00	0.77	1.34	18.3
Approach			1017	2.3	1017	2.3	0.861	20.4	LOS C	25.1	638.4	1.00	0.77	1.34	18.3
All Vehicles			2059	2.4	2059	2.4	0.861	15.8	LOS C	25.1	638.4	0.83	0.72	1.06	18.6

## MOVEMENT SUMMARY

Site: 101 [Traffic Volumes 2024\_PM\_Jefferson St at Prospect Blvd/Pearl St\_Hybrid Roundabout (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Jefferson St at Prospect Blvd/Pearl St\_Two Lanes\_PM  
 Site Category: Two Lanes Roundabout  
 Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[ Total HV ] veh/h	%	[ Total HV ] veh/h	%				[ Veh. ] veh	[ Dist ] ft				
South: Prospect Blvd															
3	L2	All MCs	292	3.0	292	3.0	0.740	26.2	LOS C	7.2	185.3	0.96	1.20	1.71	17.8
8	T1	All MCs	64	3.0	64	3.0	0.740	26.2	LOS C	7.2	185.3	0.96	1.20	1.71	22.1
18	R2	All MCs	47	3.0	47	3.0	0.740	26.2	LOS C	7.2	185.3	0.96	1.20	1.71	17.8
18b	R3	All MCs	1	0.0	1	0.0	0.740	25.4	LOS C	7.2	185.3	0.96	1.20	1.71	17.7
Approach			404	3.0	404	3.0	0.740	26.2	LOS C	7.2	185.3	0.96	1.20	1.71	18.4
SouthEast: Pearl St															
3bx	L3	All MCs	1	0.0	1	0.0	0.343	15.3	LOS B	1.6	40.3	0.79	0.84	0.92	18.8
3ax	L1	All MCs	116	0.0	116	0.0	0.343	15.3	LOS B	1.6	40.3	0.79	0.84	0.92	18.8
18ax	R1	All MCs	18	0.0	18	0.0	0.343	15.3	LOS B	1.6	40.3	0.79	0.84	0.92	18.8
18bx	R3	All MCs	1	0.0	1	0.0	0.343	15.3	LOS B	1.6	40.3	0.79	0.84	0.92	18.8
Approach			137	0.0	137	0.0	0.343	15.3	LOS B	1.6	40.3	0.79	0.84	0.92	18.8
East: Jefferson St															
1u	U	All MCs	1	3.0	1	3.0	0.473	12.8	LOS B	2.9	73.0	0.77	0.80	1.03	24.7
1b	L3	All MCs	1	0.0	1	0.0	0.473	12.0	LOS B	2.9	73.0	0.77	0.80	1.03	19.5
1	L2	All MCs	48	3.0	48	3.0	0.473	12.8	LOS B	2.9	73.0	0.77	0.80	1.03	19.6
6	T1	All MCs	503	3.0	503	3.0	0.473	12.8	LOS B	2.9	73.5	0.77	0.80	1.03	19.5
16	R2	All MCs	60	0.0	60	0.0	0.473	12.0	LOS B	2.9	73.5	0.77	0.80	1.03	19.6
Approach			613	2.7	613	2.7	0.473	12.7	LOS B	2.9	73.5	0.77	0.80	1.03	19.5
North: Prospect Blvd															
7	L2	All MCs	32	3.0	32	3.0	0.611	21.0	LOS C	3.6	92.6	0.82	1.03	1.36	18.8
7a	L1	All MCs	13	0.0	13	0.0	0.611	19.6	LOS B	3.6	92.6	0.82	1.03	1.36	18.8
4	T1	All MCs	63	3.0	63	3.0	0.611	21.0	LOS C	3.6	92.6	0.82	1.03	1.36	24.0
14	R2	All MCs	193	3.0	193	3.0	0.611	21.0	LOS C	3.6	92.6	0.82	1.03	1.36	18.9
Approach			301	2.9	301	2.9	0.611	20.9	LOS C	3.6	92.6	0.82	1.03	1.36	19.7
West: Jefferson St															
5u	U	All MCs	1	3.0	1	3.0	0.763	15.8	LOS B	15.1	382.5	0.88	0.68	1.14	23.9
5	L2	All MCs	169	3.0	169	3.0	0.763	15.8	LOS B	15.1	382.5	0.88	0.68	1.14	19.1
2	T1	All MCs	383	3.0	383	3.0	0.763	15.8	LOS B	15.1	382.5	0.88	0.68	1.14	19.0
12a	R1	All MCs	61	0.0	61	0.0	0.763	15.5	LOS B	15.1	382.5	0.88	0.68	1.14	19.0
12	R2	All MCs	238	0.0	238	0.0	0.763	15.5	LOS B	15.1	382.5	0.88	0.68	1.14	19.0
Approach			852	1.9	852	1.9	0.763	15.7	LOS B	15.1	382.5	0.88	0.68	1.14	19.0
All Vehicles			2307	2.3	2307	2.3	0.763	17.4	LOS B	15.1	382.5	0.85	0.86	1.23	19.1