Appendix B: Road Safety Audit Presentation

W 38th Avenue

Sheridan to Fox

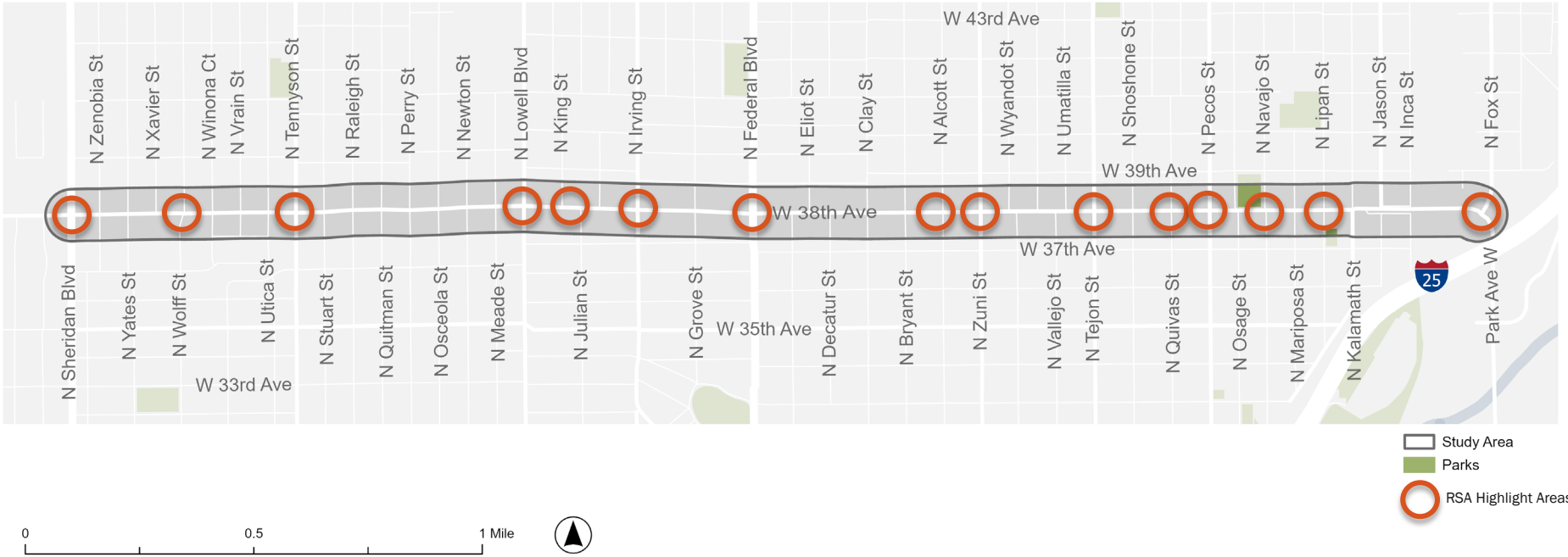
Road Safety Audit Findings
April 3rd, 2024

Scope & Purpose

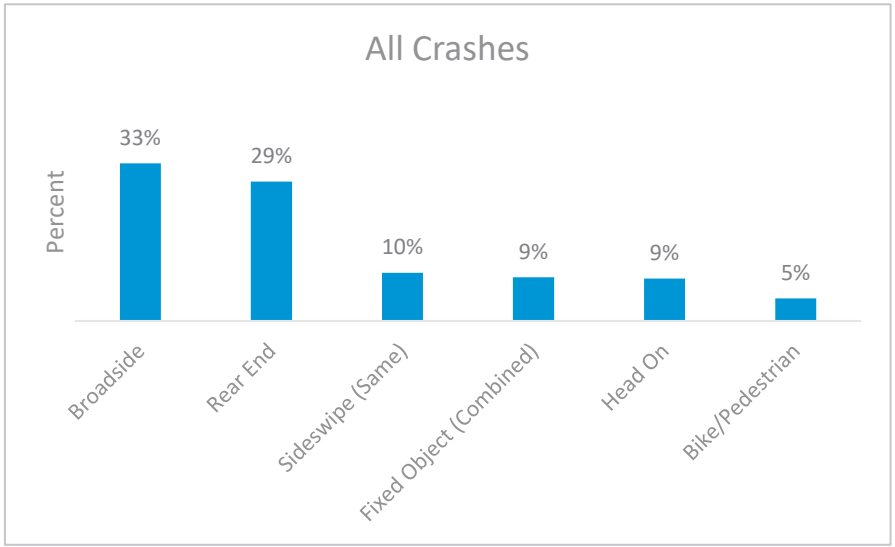
Complete Road Safety Audit (RSA) on W 38th Avenue between Sheridan Blvd and Fox St

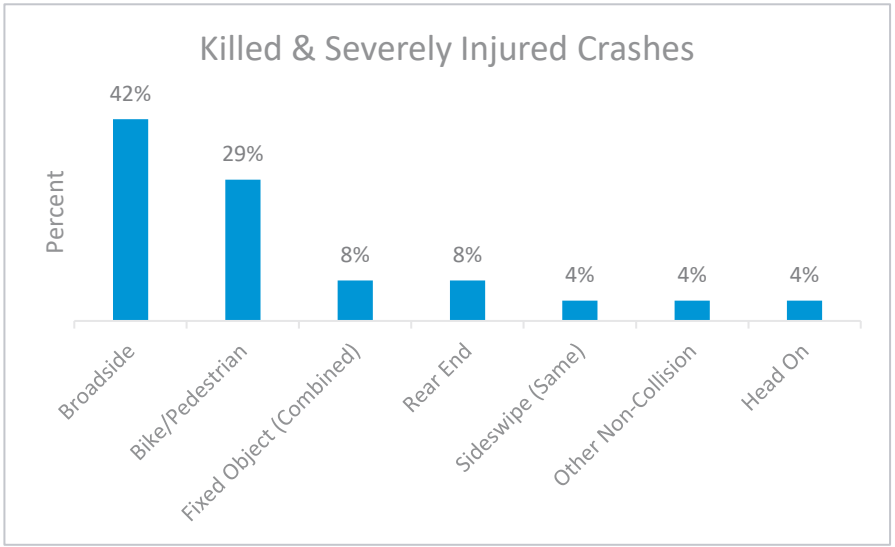
1. Analyze crash data and trends, signal operations, access to transit stops, and adjacent land uses
2. Perform field reviews
3. Provide recommendations to improve safety

RSA Highlight Areas



Top Harmful Events Corridor-Wide





Corridor-Wide Observations

BROADSIDE CRASHES

42% of killed/severely injured crashes
32% of all crashes

BIKE/PEDESTRIAN CRASHES

29% of killed/severely injured crashes
5% of all crashes

Broadside and Bike/Ped crashes are typically…

1. Left turn movements
2. Failing to yield ROW
3. Failing to stop at signal/stop sign.

Addressing these two crash types could address up to 71% of KSI crashes on W 38th Avenue.

Corridor-Wide Observations

BROADSIDE CRASHES

1. Abundant unprotected left turn movements coupled with very few gaps in traffic to make permitted left turns
2. Congestion on minor streets leading to driver impatience and unpredictable behavior
3. High speeds throughout the corridor
4. Sun glare makes signals hard to see
5. Red-light running

BIKE/PED CRASHES

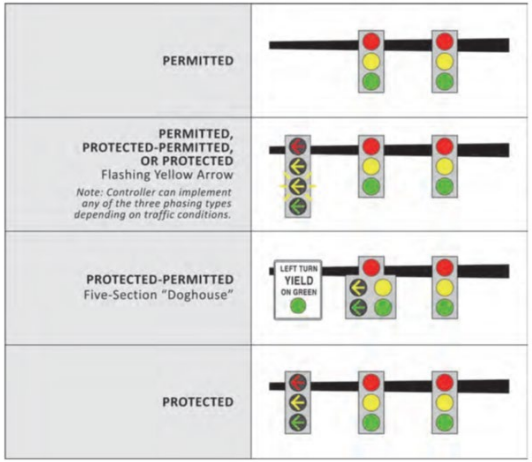
1. Drivers making left turn movements failing to yield to pedestrians in crosswalks
2. Bikes and scooters unpredictably maneuver between roadway and sidewalk
3. Sun glare makes it hard to see pedestrians in crosswalk
4. Pedestrians crossing against the signal or midblock
5. Bus stops are not consistently located at signals and are not always paired with opposing stops
6. Deficient pedestrian infrastructure puts pedestrians in unpredictable places

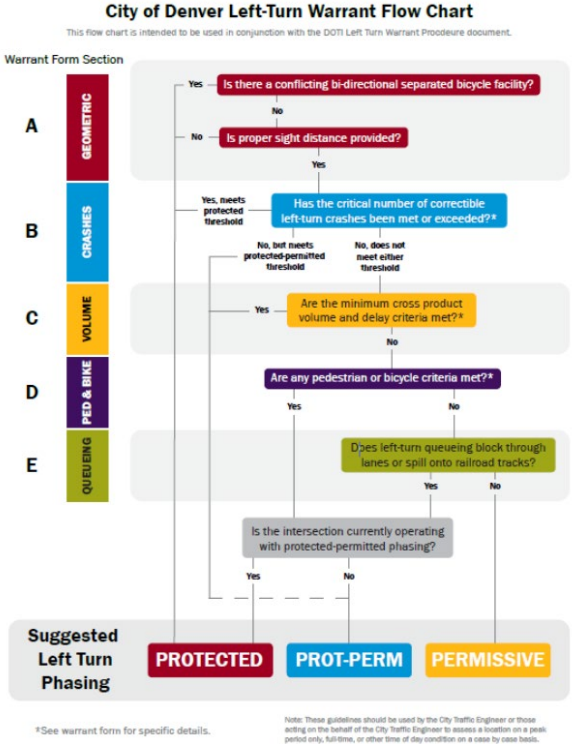
Corridor-Wide Recommendations

ISSUE: Abundant unprotected left turn movements coupled with very few gaps in traffic to make permitted left turns

RECOMMENDATIONS:

- Protected left turns
- Center medians/access control at unsignalized intersections





Protected Left Turn Analysis

Cross Street	Northbound Movement	Eastbound Movement	Southbound Movement	Westbound Movement	Current Operation - Permissive	Current Operation - Protected-Permissive	Crash Count (2018-2022)	DOTI Criteria Met?	Recommended Operation - Protected-Permissive	Recommended Operation - Protected	Infrastructure Requirements
Sheridan	-	X	-	-	-	X	0	X	-	X	None
Sheridan	-	-	-	X	-	X	3	X	-	X	None
Wolff	-	-	X	-	X	-	3	-	X	-	1 Signal Head
Tennyson	-	X	-	-	X	-	4	-	X	-	1 Signal Head
Lowell	X	-	-	-	X	-	5	-	X	-	1 Signal Head
Lowell	-	X	-	-	X	-	4	X	X	-	1 Signal Head
Lowell	-	-	X	-	X	-	2	X	X	-	1 Signal Head
Irving	X	-	-	-	X	-	2	X	X	-	2 Signal Heads
Irving	-	-	X	-	X	-	1	X	X	-	2 Signal Heads
Irving	-	-	-	X	X	-	4	-	X	-	Mast Arm & Signals
Federal	X	-	-	-	-	X	6	X	-	X	1 Signal Head
Federal	-	X	-	-	-	X	2	X	-	X	1 Signal Head
Federal	-	-	X	-	-	X	9	X	-	X	1 Signal Head
Federal	-	-	-	X	-	X	5	X	-	X	1 Signal Head
Zuni	X	-	-	-	X	-	3	-	X	-	Lane Striping, Mast Arm, & Signals
Tejon	-	X	-	-	X	-	7	X	X	-	1 Signal Head
Tejon	-	-	X	-	X	-	3	-	X	-	Lane Striping & 2 Signal Heads
Tejon	-	-	-	X	X	-	1	X	X	-	1 Signal Head
Pecos	-	X	-	-	X	-	3	X	X	-	1 Signal Head
Pecos	-	-	X	-	X	-	6	X	X	-	1 Signal Head
Navajo	-	-	-	X	X	-	3	-	X	-	1 Signal Head
Lipan	-	X	-	-	X	-	4	-	X	-	1 Signal Head
Lipan	-	-	X	-	X	-	3	X	X	-	1 Signal Head

Protected Left Turn Recommendations

Legend:
- Protected
- Protected-Permissive
- Permissive

Current Operation

Cross Street	North	East	South	West
Sheridan				
Wolff				
Tennyson				
Perry				
Lowell				
Irving				
Federal				
Clay				
Zuni				
Tejon				
Quivas				
Pecos				
Navajo				
Lipan				

102 crashes/5 years

DOTI Warrant Results

Cross Street	North	East	South	West
Sheridan				
Wolff				
Tennyson				
Perry				
Lowell				
Irving				
Federal				
Clay				
Zuni				
Tejon				
Quivas				
Pecos				
Navajo				
Lipan				

Addresses 49% of signalized left-turn crashes

Recommended Operation

Cross Street	North	East	South	West
Sheridan				
Wolff				
Tennyson				
Perry				
Lowell				
Irving				
Federal				
Clay				
Zuni				
Tejon				
Quivas				
Pecos				
Navajo				
Lipan				

Addresses 76% of signalized left-turn crashes

Corridor Wide Recommendations

ISSUE: Congestion on minor streets leading to driver impatience and unpredictable behavior

RECOMMENDATIONS:

- Adjusting signal timing to better serve the minor street movements (may involve a longer cycle length)
- Incorporating detection-based red clearance extension in the signal timing
- Red light cameras
- Creating three lanes on minor approaches wherever possible within the existing roadway

A southbound vehicle using the yellow phase to turn left at W 38th Ave & Irving St

Example of Three Lanes on a Minor Approach at W 38th Ave & Julian St

Source: Google Earth

ISSUE: High speeds throughout the corridor

RECOMMENDATIONS:

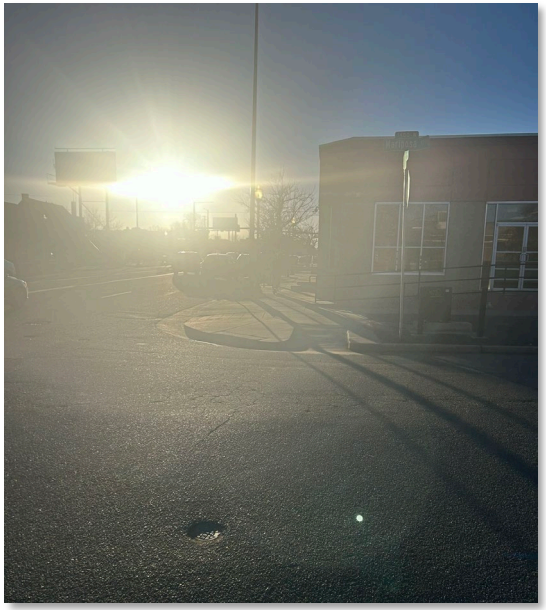
- Retiming signals along the corridor at a slower speed
- Adjusting the speed limit to 30 mph per Blueprint Denver
- Meandering horizontal alignment, incorporating a center median at unsignalized intersections and bus pull outs (similar to a potential proposal on 17th and 18th Ave)
- Narrowing travel lanes
- Reducing number of travel lanes
- Delineate parking lane from travel lane to keep travel lane narrow when parking is unused

Example of parking lane delineation on W 46th Ave

ISSUE: Glare makes signals hard to see

RECOMMENDATIONS:

- Retroreflective backplates on signal heads
- Prompt maintenance work to ensure all signal heads are working
- Protected left-turn phasing



West-facing glare on W 38th Ave

ISSUE: Drivers making left turns failing to yield to pedestrians in crosswalks

RECOMMENDATIONS:

- Protected left turns
- Leading pedestrian intervals
- Include ped recall on every cycle for North/South crossings during peak hours

Pedestrian looks over their shoulder while crossing W 38th Ave at Tejon St

ISSUE: Bikes and scooters unpredictably maneuver between roadway and sidewalk

RECOMMENDATIONS:

- Daylighting parking on side streets
- Bulb outs on side streets where there is a parking lane
- Introduce a bikeway on a nearby parallel street

A scooter in the travel lane at W 38th Ave & Zuni St

ISSUE: Glare makes it hard to see pedestrians in crosswalk

RECOMMENDATIONS:

- Leading pedestrian interval
- Protected-left turn phasing

West-facing glare while two pedestrians cross at W 38th Ave & Navajo St

ISSUE: Pedestrians crossing against the signal or midblock

RECOMMENDATIONS:

- Include ped recall on every cycle for North/South crossings during peak hours
- Introduce new pedestrian crosswalks at intersections where mid-block crossings are frequent
- Install a center median as a refuge for mid-block crossings

A motorized wheelchair user crosses against the signal at W 38th Ave & Fox St

ISSUE: Some bus stops east of Federal Blvd are not located at signalized crossings

RECOMMENDATIONS:

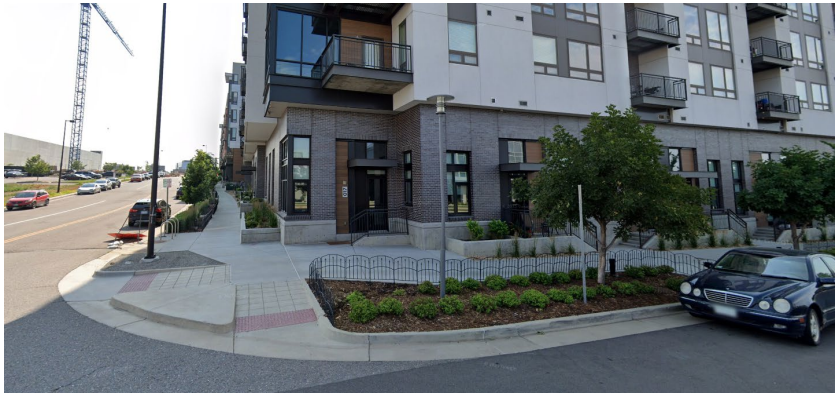
- Consider relocation of bus stops in corridor alternatives analysis to be adjacent to a signalized crossing

A bus stops for loading at W 38th Ave & Pecos St

ISSUE: Deficient pedestrian infrastructure puts pedestrians in unpredictable places

RECOMMENDATIONS:

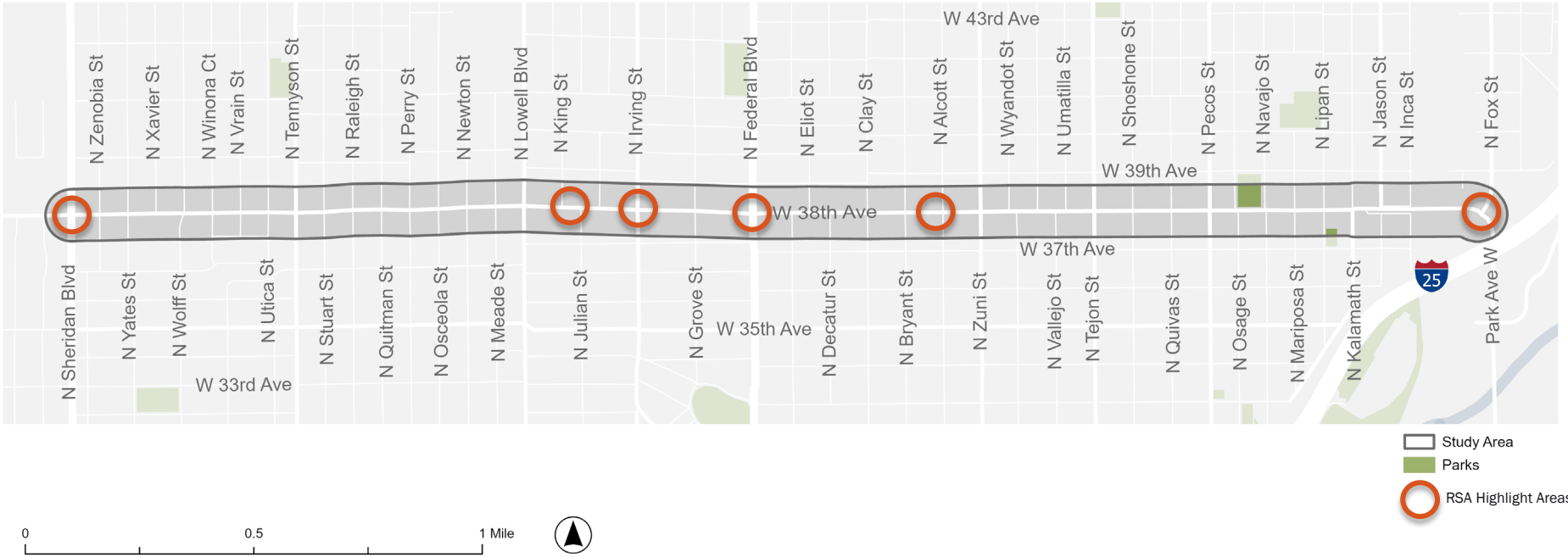
- Include standard sidewalks and buffers in corridor alternatives analysis



An example streetscape in Denver showing accessible sidewalks and landscaping buffers

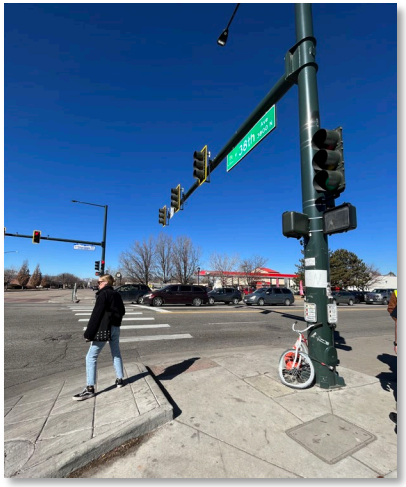
A trash can impedes pedestrian access on an already sub-standard sidewalk on W 38th Ave

Location-Specific Recommendations



W 38th Ave & Sheridan Blvd

- 54 crashes (10.8 per year), 1 serious pedestrian injury, 1 bicyclist fatality
- Most common crash type: rear end
- Protected left turns on N/S approaches, protected-permitted left turns on E/W approaches



A pedestrian waits to cross at W 38th Ave & Sheridan Blvd

OBSERVATIONS

1. Red light running
2. Right turn on red conflicts
3. Illegal left turning into shopping plaza

RECOMMENDATIONS

1. Adjust yellow and red signal times
   Install red light camera
2. Repaint crosswalks
   Prevent right turn on red
3. Install center median on Sheridan

W 38th Ave near King St & Julian St

A pedestrian crosses mid-block between two vehicles near W 38th Ave & King St

Highly occupied parking on the north side due to many businesses in the area, resultant heavy pedestrian traffic

OBSERVATIONS

1 Frequent mid-block crossings

RECOMMENDATIONS

1

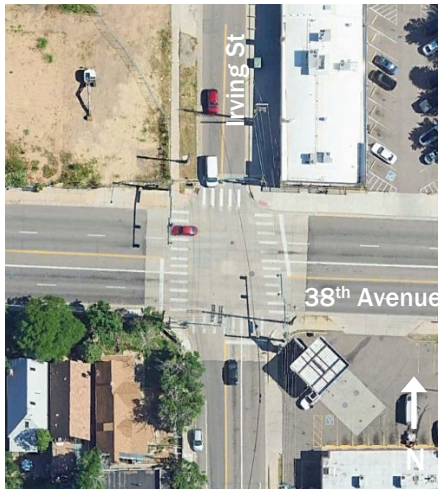
Add parking lane on south side of W 38th Ave

Add signalized crosswalk at Julian St or King St intersection

Add a center median for pedestrian refuge

W 38th Ave & Irving St

- 34 crashes (6.8 per year), 1 serious injury
- Most common crash type is broadside
- Signal currently operates as split phasing
- Southbound approach will soon have an additional lane



OBSERVATIONS

1 High E/W broadside crashes

RECOMMENDATIONS

1 With new southbound lane, install signal infrastructure that n accommodate flexible phasing types, and ısider keeping protected left-turn phasing.

W 38th Ave & Federal Blvd

- 71 crashes (14.2 per year), 1 pedestrian serious injury, 1 vehicular serious injury
- Highest crash type is rear end, followed closely by broadside
- All left turns are currently protected-permissive

A westbound vehicle runs a red light at W 38th & Federal Blvd

OBSERVATIONS

1. Red light running
2. Pedestrians crossing against signal

RECOMMENDATIONS

1. Increase left turn green time
2. Decrease cycle length

W 38th Ave & Alcott St

- 9 crashes total, 2 pedestrian fatalities

Signalized crosswalk near W 38th Ave & Alcott St, offset from the intersection

OBSERVATIONS

1. Heavy pedestrian crossings associated witl multi-family housing on northeast corner and 7-11 on southwest corne
2. Pedestrians frequently crossing at the intersection or at the bus stops instead of usin the mid-block signal

RECOMMENDATIONS

1. Increase physical presence of signal infrastructure with mast arms and signage
2. Relocate signal to the 38th/Alcott St intersection onsider access control at the 7-11 to reduce potential conflict points

W 38th Ave & Fox St

- 51 crashes (10.2 per year), 1 DUI fatality, 2 motorcycle serious injuries, 1 vehicular serious injury
- Most common crash type is rear end, followed closely by fixed object crashes

A northbound vehicle crosses the solid white line on Fox St just north of W 38th Ave

OBSERVATIONS

1. High speeds approaching the intersection
2. Low signal visibility on the eastbound approach
3. On the northbound leg, frequent unnecessary crossings of the solid white line
4. Frequent fixed object crashes especially at night

RECOMMENDATIONS

1. Reduce number and or width of lanes
2. Add signal head on northwest corner pole to serve eastbound traffic
3. Improve signage for northbound wayfinding
4. Improve lighting in both underpasses