

APPENDIX 1: TRAFFIC ANALYSES



Spokane Traffic Calming Master Plan

District:	1
Neighborhood:	Bemiss
Project Extent:	Euclid Avenue from Market Street to Crestline Street

Problem Statement: Residents of the Bemiss neighborhood raised concerns over speeding and traffic volumes on Euclid Avenue from Crestline Street to Market Street (0.6 miles). Euclid Avenue is classified as a minor arterial through the project area with a speed limit of 30 mph.

Traffic Analysis

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Euclid Avenue (east of Cook Street). As shown in the table, there are about 12,400 vehicles per day on Euclid Avenue with an 85th percentile speed of 38 mph (8 mph higher than the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Euclid Avenue (East of Cook Street)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
EB	2	6,439		
WB	2	5,984		
Both Dir.	4	12,423	38	30

^a Traffic data collected on March 21, 2019. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor of 1.02 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

The table below shows the severity and types of crashes occurring on Euclid Avenue between Crestline Street and Market Street over the last five-years (excluding intersection crashes at the east and west ends). As shown in the table, there were a total of 35 crashes, including 11 injury crashes. Angle collisions were the most common crash type (representing 57% of all crashes).

Crashes on Euclid Avenue, between Crestline Street and Market Street (2017 to 2021)

Crash Type	Crash Severity				Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	
From Opposite Direction	-	-	-	1	1
Rear End	-	-	1	3	4
Angle	-	1	7	12	20
Left Turn	-	-	1	2	3
Sideswipe	-	-	1	1	2
Stationary Object or Car	-	-	-	5	5
Total	0	1	10	24	35

Given the relatively high 85th percentile speed and the high number of angle crashes, a road diet was considered as means to reduce travel speeds and enhance safety on the Euclid Avenue corridor. With an estimated 12,400 vehicles per day, Euclid Avenue could be reduced to a three-lane cross section with a center two-way left-turn lane. As a point of reference, the planning level capacity of a two-lane urban

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arterial is 18,300 vehicles per day (assuming left-turn lanes are provided on the mainline at signalized intersections).¹

A road diet is expected to reduce crashes by 29%, per the Crash Modification Factors Clearinghouse.² A road diet on Euclid Avenue may also result in more uniform travel speeds on the corridor and is expected to reduce the average travel speed by 3 mph.³ Road diets are more successful when implemented on longer stretches of roadway, therefore this lane reduction should continue outside the project extents, to both the west and east (west of Crestline Street, the street name changes from Euclid Avenue to North Foothills Drive). When analyzing the cross section and daily traffic volumes east and west of the study area, it is recommended that the road diet extend 2.6 miles, from North Foothills Drive and Division Street (at the west end) to Euclid Avenue and Freya Street (at the east end). Freya Street is a logical terminus on the east end because Euclid Avenue transitions to a two-lane cross section east of this intersection. Division Street was recommended as the western terminus because North Foothills Drive transitions to a three-lane cross section west of this intersection.

Recommended Solution:

It is recommended that a road diet be considered on Euclid Avenue, reducing the current four-lane cross section to a three-lane cross section with a center turn-lane and bike lanes. The addition of a center turn-lane is expected to reduce crashes, while the lane reduction is expected to reduce vehicle speeds on Euclid Avenue. It is recommended that the City of Spokane further study the expected impacts of the road diet. The road diet can be considered along the 2.6 mile segment from North Foothills Drive and Division Street (at the west end) to Euclid Avenue and Freya Street (at the east end).

¹ *Highway Capacity Manual 6th Edition: A Guide for Multimodal Mobility Analysis*. Page 16-30, Exhibit 16-16. Washington, DC: The National Academies Press.

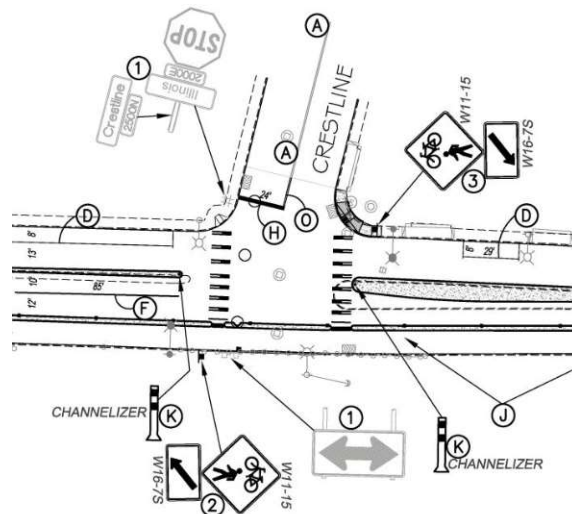
² *Crash Modification Factors Clearinghouse*, <https://www.cmfclearinghouse.org/detail.cfm?facid=199>

³ *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed*. Federal Highway Administration. July 2014.

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District: 1
Neighborhood: Bemiss
Project Extent: Illinois Avenue and Crestline Street Intersection

Problem Statement: Residents of the Bemiss neighborhood raised concerns over vehicle and pedestrian safety at the Illinois Avenue and Crestline Street intersection. The main intersection concern was related to the need for enhanced pedestrian crossings treatments across Illinois Avenue. The intersection is currently stop-controlled on Crestline Street, with free-flowing traffic on Illinois Avenue. Both Illinois Avenue and Crestline Street are two-lane facilities, classified as minor arterials, with 30 mph speed limits. The intersection was upgraded in the fall of 2022 through a city project, adding a shared use path on the south side of Illinois Ave and crosswalks and warning signs on the east and west legs (as shown in the figure below).



Illinois Avenue and Crestline Street Intersection (Plans from Recent Upgrade)

Traffic Analysis

The table below shows daily traffic volumes and 85th percentile vehicle speeds on Illinois Avenue at Madella Street and Cook Street (west and east of Crestline Street). This data was collected in 2019, prior to the city intersection upgrade project. The 85th percentile vehicle speeds on Illinois Avenue in 2019 are 39 to 42 mph (9 to 12 mph higher than the 30 mph posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Illinois Avenue

Location	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Illinois Avenue at Madella Street	6,913	42	30
Illinois Avenue at Cook Street	4,450	39	30

^a Traffic data collected on May 2, 2019. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor of 0.96 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

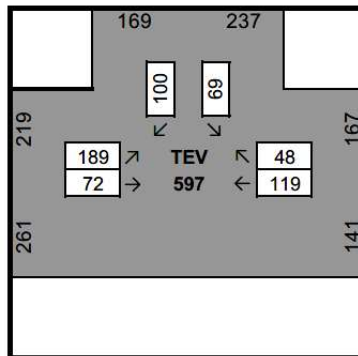
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The table below shows the severity and types of crashes occurring at the Illinois Avenue and Crestline Street intersection from 2017 through 2021 (prior to the city intersection upgrade project in 2022). There were seven total crashes, with sideswipes representing the most common crash type.

Crashes at Illinois Avenue and Crestline Street Intersection (2017 to 2021)

Crash Type	Crash Severity				Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	
Rear End	-	-	-	1	1
Left Turn	-	-	1	-	1
Sideswipe	-	-	-	4	4
Guardrail	-	-	1	-	1
Total	-	-	2	5	7

The figure below shows the existing PM peak hour traffic volumes at the Illinois Avenue and Crestline Street intersection, based on a traffic count from November 16, 2022 (after the city upgrade project had been completed). These volumes were adjusted with a seasonal adjustment factor of 1.05, based on historical traffic data from the city to estimate the 30th highest hour.



PM Peak Hour Traffic at Illinois Avenue and Crestline Street

The need for enhanced pedestrian crossing treatments (across Illinois Avenue) was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.¹ This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed. No pedestrians were observed crossing Illinois Avenue during the traffic count (data collected between 4:00 and 6:00 PM on November 16, 2022). However, it's worth noting that pedestrian volumes are likely higher during the warmer summer months. Based on NCHRP 562 using volumes and speeds collected from the 2019 counts, rapid rectangular flashing beacons would be recommended if there are 20 or more pedestrian crossings during the peak hour. This recommendation is based primarily due to the high speeds that were observed prior to implementation of the intersection upgrade. If this crossing was evaluated with the posted speeds or speeds below 35 mph the recommendation would be a signed and

¹ NCHRP Report 562: *Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

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striped crosswalk. It is recommended that pedestrians and vehicle volume and speed data be collected now that treatment has been installed to determine proper crossing treatment.

The crosswalks on the east and west legs currently have only a single pedestrian crossing warning sign (on the right side of the roadway). A second warning sign could be considered on the left side of the roadway (at each crossing), to alert drivers in the opposing direction. Additionally, bumpouts on the north corners should be considered as a mean to additionally lower speeds on Illinois Avenue. However, these upgrades cannot be installed until after the pavement moratorium is up at these corners in November 2025 due to their recent upgrades.

Recommended Solution:

The Illinois Avenue and Crestline intersection was recently upgraded through a city project, adding crosswalks on the east and west legs. These crosswalks currently have only a single pedestrian crossing warning sign (on the right side of the roadway). A second warning sign could be considered on the left side of the roadway (at each crossing), to alert drivers in the opposing direction. It is also recommended that pedestrian volumes as well as vehicle speeds and volumes be recollected now that intersection upgrades have been completed to determine the appropriate crossing treatment.

Curb extensions on the north corners on the intersection should also be considered to lower speeds on Illinois Avenue. These cannot be constructed until November 2025 due to the pavement moratorium.

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District:	1
Neighborhood:	Bemiss
Project Extent:	Market Street from Garland Avenue to Illinois Avenue

Problem Statement: Residents of the Bemiss neighborhood raised particular concern regarding sight distance and safety at the Illinois Avenue/Market Street/Greene Street intersection at the south end of the study area. Additionally, residents had concerns over speeding and traffic volumes on Market Street from Garland Avenue to Illinois Avenue (0.7 miles). Market Street is classified as a major arterial through the project area with a speed limit of 35 miles per hour. Southwest of the Market Street intersection, Illinois Avenue is classified as a minor arterial with a 30 mph speed limit, while Greene Street is a major arterial with a 35 mph speed limit. Market Street is currently serving as the primary detour route for north-south traffic from Interstate 90 to US 2 and will continue to have higher than usual traffic volumes until the completion of the North Spokane Corridor project (expected in 2029). There are two traffic signals on the corridor, located at Garland Avenue and Euclid Avenue (0.5 mile spacing).

Traffic Analysis

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Market Street (north of Cleveland Avenue). As shown in the table, there are about 31,000 vehicles per day on Market Street with an 85th percentile speed of 34 mph (1 mph below the speed limit). This is a relatively high daily traffic volume; as a point of reference, the planning level capacity of a four-lane urban arterial is 36,800 vehicles per day (assuming left-turn lanes are provided on the mainline at signalized intersections).¹

2022 Daily Traffic and 85th Percentile Speeds on Market Street (North of Cleveland Avenue)

Direction	# Lanes	Estimated 2022 Daily Traffic (vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
NB	2	13,949	34	35
SB	2	16,839	33	35
Both Dir.	4	30,788		

^a Traffic data collected on March 21, 2019. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor of 1.02 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

Particular concerns were identified regarding sight distance and safety at the Illinois Avenue/Market Street/Greene Street intersection at the south end of the corridor. The table below shows the most recent five years of crash data at this intersection. Turning-related crashes represent the most common crash type (40% of all crashes).

¹ Highway Capacity Manual 6th Edition: A Guide for Multimodal Mobility Analysis. Page 16-30, Exhibit 16-16. Washington, DC: The National Academies Press.

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Crashes at Market Street / Illinois Avenue / Greene Street Intersection (2017 to 2021)

Crash Type	Crash Severity				Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	
Rear End	-	-	2	1	3
Turning	-	-	1	7	8
Sideswipe	-	-	-	4	4
Fixed Object	-	-	2	2	4
Overtaken	-	-	-	1	1
Total	-	-	5	15	20

A roundabout at the Illinois Avenue/Market Street/Greene Street intersection could be considered to improve intersection safety; however, this would be a costly project which may not be feasible given the existing intersection grades. A speed feedback sign could be considered on the south leg, for traffic heading southbound from Market Street to Illinois Avenue. This feedback sign would alert drivers that they are leaving a four-lane principal arterial and entering a two-lane minor arterial. Based on speed measurements from 2019, the 85th percentile travel speed on Illinois Avenue is relatively high (39 mph at Cook Street, or 9 mph over the posted speed limit).

In addition, prohibiting the westbound left (from Greene Street to Illinois Avenue) at this intersection may improve intersection safety. However, traffic count data is needed to determine how many vehicles would be impacted by this turn prohibition.

Recommended Solution:

Particular concerns were identified regarding sight distance and safety at the Illinois Avenue/Market Street/Greene Street intersection at the south end of the corridor. A speed feedback sign could be considered on the south leg, to alert drivers that they are leaving a four-lane principal arterial and entering a two-lane minor arterial. In addition, prohibiting the westbound left (from Greene Street to Illinois Avenue) at this intersection may improve intersection safety. It is recommended that a traffic count be conducted to determine how many vehicles would be impacted by this turn prohibition.

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District:	1
Neighborhood:	Bemiss
Project Extent:	Wellesley Avenue and Crestline Street Intersection

Problem Statement: Residents of the Bemiss neighborhood raised concerns over left-turn queues and safety at the Wellesley Avenue and Crestline Street intersection. Wellesley Avenue is classified as a major arterial with a speed limit of 30 mph. Crestline Street is classified as a minor arterial with a speed limit of 30 mph. The intersection is currently signalized with protected-permitted left-turn phasing on all approaches.

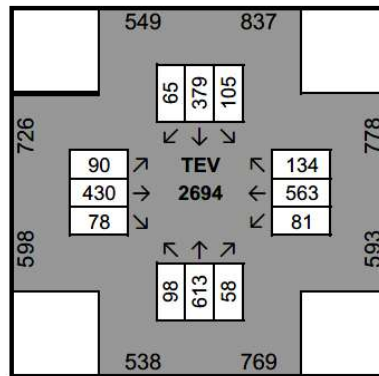


Wellesley Avenue and Crestline Avenue Intersection

Traffic Analysis

The figure below shows the PM peak hour traffic volumes at the Wellesley Avenue and Crestline Street intersection (traffic count conducted on April 10, 2019). Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor of 1.02 was applied to the traffic count, based on historical traffic data from the city to estimate the 30th highest hour volume. As shown in the figure, existing left-turn volumes are around 100 vehicles per hour. Queue lengths were examined using Synchro/SimTraffic, revealing that the primary issue may relate to left-turn lanes being blocked by through traffic. Left-turn pocket lengths may need to be increased to resolve this issue. Turn pocket blockage appears to primarily be an issue for the North and South legs due to only having one thru vehicle lane. Therefore, it is recommended that the turn pockets on these legs be extended. Further intersection analysis is recommended to better understand existing operational issues, analyze signal timings, and determine the feasibility of extending left-turn pockets.

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PM Peak Hour Traffic at Wellesley Avenue and Crestline Street

The table below shows the severity and types of crashes occurring at the Wellesley Avenue and Crestline Street intersection over the last five years. There were 42 total crashes, including one fatal pedestrian crash, and 17 injury crashes. Turning-related crashes were the most common crash type, making up 45% of all crashes.

Crashes at Wellesley Avenue and Crestline Street Intersection (2017 to 2021)

Crash Type	Crash Severity				Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	
Rear End	-	-	5	8	13
Turning	-	2	6	11	19
Sideswipe	-	-	1	3	4
Fixed Object	-	-	-	2	2
Pedestrian	1	-	3	-	4
Total	1	2	15	24	42

Left turn crashes could be reduced by converting the existing “doghouse” style left-turn signal heads to flashing yellow arrow signal heads. According to the Crash Modification Factors Clearinghouse, this upgrade has a crash reduction factor of 16% for left-turning vehicles.¹

Recommended Solution:

It is recommended that the existing left-turn signal heads at the Wellesley Avenue and Crestline Street intersection be upgraded from “doghouse” style signal heads to flashing yellow arrow signal heads. Additionally, it is recommended that the turn pockets on the north and south legs of the intersection be extended to provide more access to vehicles trying to make left turns. Further intersection analysis is recommended to better understand existing operational issues, analyze existing signal timings, and determine the feasibility of extending left-turn pockets

¹ Crash Modification Factors Clearinghouse, <https://www.cmfclearinghouse.org/detail.cfm?facid=7696>

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District: 1
Neighborhood: Chief Garry
Project Extent: Mission Avenue and Magnolia Street Intersection

Problem Statement: Residents of the Chief Garry neighborhood raised concerns related to pedestrian crossing safety at the Mission Avenue and Magnolia Street intersection. Mission Avenue is classified as a principal arterial. The speed limit on Mission Avenue (at Magnolia Street) is 30 mph, with a 20-mph speed limit during school hours. The intersection is currently stop-controlled on Magnolia Street, with free-flowing traffic on Mission Avenue. The crosswalk of concern crosses Mission Avenue on the east leg of the intersection. This crosswalk is located just east of the Stevens Elementary School. The nearest traffic signal is located on Mission Avenue at Napa Street (300 feet east of the pedestrian crossing).



Mission Avenue and Magnolia Street Intersection

Traffic Analysis

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Mission Avenue (west of Marshall Avenue). As shown in the table, there are about 19,200 vehicles per day on Mission Avenue with an 85th percentile speed of 34 mph (4 mph over the speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Mission Avenue (West of Marshall Avenue)

Direction	# Lanes	Estimated 2022 Daily Traffic (vehicles per day)^a	85th Percentile Speed (mph)	Posted Speed (mph)
EB	2	9,704	34	30
WB	2	9,469	34	30
Both Dir.	4	19,173		

^a Traffic data collected on April 10, 2019. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor of 0.98 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

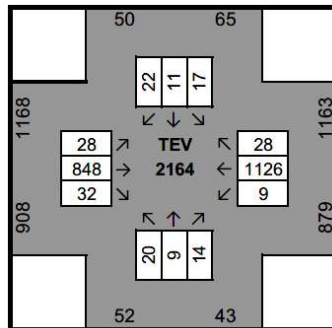
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The table below shows crashes at the Mission Avenue and Magnolia Street intersection over the last five years. One pedestrian crash occurred in the last five years. It's worth noting that the existing crosswalk is lacking ADA compliant curb ramps at the north and south ends of the crosswalk.

Crashes at Mission Avenue and Magnolia Street Intersection (2017 to 2021)

Crash Type	Crash Severity				Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	
Rear End	-	-	-	1	1
Turning	-	-	1	-	1
Pedestrian	-	-	1	-	1
Fixed Object	-	-	-	1	1
Total	-	-	2	2	4

The figure below shows PM peak hour traffic counts at the Mission Avenue and Magnolia Street intersection. There were only four pedestrians observed on the east leg during the PM peak hour; however, the number of pedestrian crossings peaked during school release (3:00 to 4:00 PM), with 59 pedestrians on the east leg.



PM Peak Hour Traffic at Mission Avenue and Magnolia Street

The need for enhanced pedestrian crossing treatments (across Mission Avenue) was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.¹ This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed.

Based on NCHRP 562, with the existing traffic volumes, a signalized pedestrian crossing is recommended if there are 20 or more pedestrian crossings during the peak hour. High Intensity Activated Crosswalk (HAWK) beacons could be considered; however, a HAWK is not recommended at Magnolia Street, as a traffic signal is provided on Mission Avenue and Napa Street, located just 300 feet east of the crosswalk.

¹ NCHRP Report 562: *Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

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If a HAWK is desired, it is recommended that the pedestrian crossing be moved further west (to the east leg of Marshall Avenue), allowing for 600 feet of separation from the Napa Street signal. The crosswalk at Magnolia Street should be removed if a crosswalk is added at Marshall Avenue.

The City of Spokane has active applications to the State to receive safe routes to school funding for this project. The pedestrian hybrid beacon will likely receive this funding and will move towards design and construction with state funds.

Recommended Solution:

The Magnolia Street crosswalk is located just east of the Stevens Elementary School. A HAWK is not recommended at the Magnolia Street intersection, due to its close proximity to the Napa Street signal. If a HAWK is desired for this school crossing, it is recommended that the crosswalk be moved to the east leg of Marshall Avenue (600 feet west of the Napa Street signal). The crosswalk at Magnolia Street should be removed if a crosswalk is added at Marshall Avenue. A crossing guard is also recommended to facilitate safer crossings during school start and release times, along with ADA compliant curb ramps.

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District:	1
Neighborhood:	Chief Garry
Project Extent:	Marshall Avenue from Mission Avenue to Regal Street

Problem Statement: Residents of the Chief Garry neighborhood raised concerns over speeding along Marshall Avenue between Mission Avenue and Regal Street (0.9 miles). Marshall Avenue is classified as a local street with a 25-mph speed limit.

Traffic Analysis

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Marshall Avenue (west of Crestline Street). As shown in the table, there are about 500 vehicles per day on Marshall Avenue with an 85th percentile speed of 29 mph (4 mph higher than the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Marshall Avenue (West of Crestline Street)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
EB	1	329		
WB	1	207		
Both Dir.	2	536	29	25

^a Traffic data collected on November 16, 2022. A seasonal adjustment factor of 1.01 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

The table below shows crashes on Marshall Avenue over the last five years. Fixed object collisions, specifically with parked cars, are the most common crash type on this roadway.

Crashes on Marshall Avenue from Mission Avenue to Regal Street (2017 to 2021)

Crash Type	Crash Severity				Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	
Rear End	-	-	-	1	1
Turning	-	-	-	2	2
Parked Car	-	-	1	3	4
Fixed Object	-	-	1	-	1
Other	-	-	1	-	1
Total	-	-	3	6	9

Curb extensions could be considered as a means to lower travel speeds on Marshall Avenue. These features narrow the roadway width, resulting in lower speeds and shorter pedestrian crossings. Curb extensions are estimated to reduce the 85th percentile speeds by 3 mph.¹

¹ *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed.* Federal Highway Administration. July 2014.

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Recommended Solution:

It is recommended that curb extensions be considered on Marshall Avenue at Zappone Place (at the west end of the corridor). Curb extensions are recommended on the west end, as it represents the gateway to the neighborhood and vehicle volumes are higher on this end. Curb extensions will narrow the roadway width and are expected to reduce travel speeds on Marshall Avenue.

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District:	1
Neighborhood:	Chief Garry
Project Extent:	Mission Avenue at Crestline Street and Chief Garry Park

Problem Statement: Residents of the Chief Garry neighborhood raised concerns regarding vehicle speeds and visibility of speed limit signs on Mission Avenue near Chief Garry Park and Crestline Street. Mission Avenue is classified as a principal arterial. At Crestline Street, the speed limit on Mission Avenue is posted at 30 mph; the speed limit reduces to 20 mph in front of Chief Garry Park.

Traffic Analysis

The table below shows historical speed data and volume data on Mission Avenue. Based on a March 2022 traffic count, there are about 12,100 vehicles per day on Mission Avenue (east of Cook Street). Prior to 2020, Mission Avenue was signed as a 20-mph speed zone in front of Chief Garry Park only during the summer months. In 2020, the speed limit changed to 20-mph year round in front of the park. At the west end of the park, the 85th percentile travel speed on Mission Avenue was 37 mph in March 2022 (17 mph over the posted speed limit). However, historical speed data shows a 25 mph 85th percentile speed in August 2019. This shows that drivers are willing to travel at lower speeds when park activity is high. However, when the park activity is low, drivers tend to have higher travel speeds.

2022 Daily Traffic and 85th Percentile Speeds on Mission Avenue

Location	Month/Year	Posted Speed	WB 85 th Percentile Speed (mph)	EB 85 th Percentile Speed (mph)	Combined 85 th Percentile Speed (mph)	2022 Estimated Daily Traffic (Vehicles per day) ^a
Mission Ave, east of Cook Street (west end of park)	March 2016	30	-	-	37	-
	August 2019	20	-	25	-	-
	March 2022	20	37	37	-	12,134
Mission Ave, east of Marshall Avenue	April 2019	30	-	34	-	-
	August 2019	30	34	-	-	-

^a A seasonal adjustment factor of 1.02 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

Adding advanced speed limit warning signs may help warn drivers of the speed limit reduction. In addition, speed feedback signs would help alert drivers to the reduced speed limit. Speed feedback signs are shown to reduce the average travel speed by 2 mph and reduce the 85th percentile speed by 4 mph.¹ This follows the guidance laid out in the Revised Code of Washington (Section 46.61.440) that states school and playground zones can be installed up to 300' away from active schools or playgrounds.² Additionally, if speeding continues to be an issue it would be recommended that a speed ticketing sign

¹ *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed.* Federal Highway Administration. July 2014.

² *Revised Code of Washington Section 46.61.440.* <https://app.leg.wa.gov/rcw/default.aspx?cite=46.61.440>

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be implemented near Lacey Street for both directions to further enforce high speeds near Chief Garry Park. A road diet could be considered on Mission Avenue, given the existing daily traffic volumes are about 12,100 vehicles per day (at Cook Street). As a point of reference, the planning level capacity of a two-lane urban arterial is 18,300 vehicles per day (assuming left-turn lanes are provided on the mainline at signalized intersections).³ However, a road diet is not recommended at this time, given traffic volumes are higher to the west (19,200 vehicles per day west of Marshall Avenue) and operational issues may arise with the existing transit service on the corridor.

Recommended Solution:

The speed limit on Mission Avenue reduces to 20 mph in front of Chief Garry Park. It is recommended that speed feedback signs be added east and west of the park to alert drivers to the reduced speed limit. The speed feedback signs are recommended at the following locations:

- Eastbound Mission Avenue (west of Cook Street) – west end of park
- Westbound Mission Avenue (east of Regal Street) – east end of park

³ *Highway Capacity Manual 6th Edition: A Guide for Multimodal Mobility Analysis*. Page 16-30, Exhibit 16-16. Washington, DC: The National Academies Press.

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District:	1
Neighborhood:	East Central
Project Extent:	9 th Avenue from Altamont Street to Perry Street 9 th Avenue and Pittsburg Street Intersection

Problem Statement: Residents of the East Central neighborhood raised concerns over vehicle speeds, congestion, and safety, on 9th Avenue between Altamont Street and Perry Street (0.58 Miles). Additionally, residents raised specific concerns about pedestrian crossing safety at the 9th Avenue and Pittsburg Street intersection. In the project area, 9th Avenue is classified as a minor arterial with a speed limit of 30 mph. On-street parking is provided only on the north side of the street.

Traffic Analysis

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on 9th Avenue (east of Pittsburg Street). As shown in the table, there are about 4,500 vehicles per day on 9th Avenue with an 85th percentile speed of 33 mph (3 mph higher than the posted speed limit). Community members have raised concerns about the posted speed limit of 30 mph along 9th Avenue, suggesting that it be lowered to 25 mph. In order to lower the posted speed, it would need to be evaluated and confirmed by city council.

2022 Daily Traffic and 85th Percentile Speeds on 9th Avenue (East of Pittsburg Street)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
EB	1	2,387		
WB	1	1,988		
Both Dir.	2	4,375	33	30

^a Traffic data collected on April 12, 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor of 0.98 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

The table below shows the severity and types of crashes occurring on 9th Avenue between Altamont Street and Perry Street over the last five-years (excluding intersection crashes at the east and west ends). As shown in the table, there were a total of 14 crashes, including six injury crashes. Stationary object collisions were the most common crash type (representing 60% of all crashes). Of the 14 total crashes, six crashes occurred on the block between Helena Street and Pittsburg Street (including five collisions with parked vehicles).

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Crashes on 9th Avenue from Altamont Street to Perry Street (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Turning	-	-	1	2	-	3
Sideswipe	-	-	1	-	-	1
Stationary Object or Car	-	-	4	3	2	9
Unknown	-	-	-	1	-	1
Total	-	-	6	6	2	14

The need for enhanced pedestrian crossing treatments (across 9th Avenue) was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.¹ This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed. This analysis shows that no additional crossing treatment would be required unless there are 20 or more pedestrians during the peak hour, at which point a crosswalk would be recommended.

Curb extensions are recommended on the north side of 9th Avenue at both the Pittsburg Street and Helena Street intersections, to narrow the roadway width. Curb extensions are expected to decrease the 85th percentile speeds by 3 mph² and may also reduce parked vehicle crashes by directing traffic towards the center of the roadway. The addition of curb extensions will also reduce the crossing distance for pedestrians crossing 9th Avenue to access Liberty Park. Lastly, it is recommended that additional pedestrian counts be collected at the 9th Avenue and Pittsburg Street intersection to determine the proper crossing treatment.

Recommended Solution:

Curb extensions are recommended on the north side of 9th Avenue at both the Pittsburg Street and Helena Street intersections. Curb extensions will narrow the roadway width and are expected to reduce travel speeds on 9th Avenue. Additionally, updated pedestrian counts are recommended to determine the proper crossing treatment at the 9th Avenue and Pittsburg Street intersection.

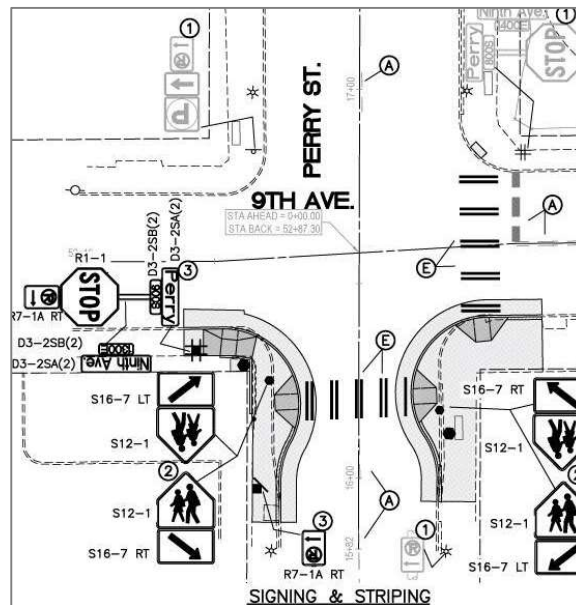
¹ NCHRP Report 562: *Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

² *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed*. Federal Highway Administration. July 2014.

Spokane Traffic Calming Master Plan

District:	1
Neighborhood:	East Central
Project Extent:	9 th Avenue and Perry Street by Grant Elementary

Problem Statement: Residents of the East Central neighborhood raised concerns over school zone signing, vehicle speeds, and speed enforcement on both 9th Avenue and Perry Street near Grant Elementary. In front of Grant Elementary, 9th Avenue is classified as a local street with a speed limit of 25 mph, while Perry Street is classified as a minor arterial with a speed limit of 20 mph. The City of Spokane has plans to upgrade the 9th Avenue and Perry Street intersection as a part of a Cycle 9 Traffic Calming project (proposed design shown in the figure below). This upgrade will add curb extensions and rectangular rapid flashing beacons on the south leg of the intersection. The intersection is currently stop controlled on the east and west legs.



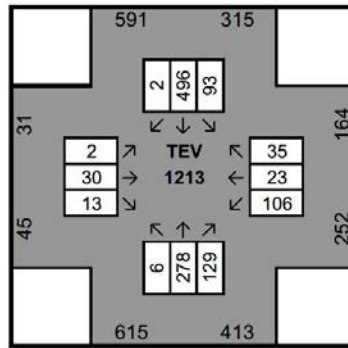
Proposed Intersection Upgrade at 9th Avenue and Perry Street

Traffic Analysis:

The figure below shows the existing PM peak hour traffic volumes at the 9th Avenue and Perry Street intersection, based on a traffic count from November 1, 2022. These volumes were adjusted with a seasonal adjustment factor of 1.05, based on historical traffic data from the city to estimate the 30th highest hour. Pedestrian activity peaked during the school release (2:45 to 3:45 PM); during this timeframe, there were a total of 157 pedestrian crossings, as noted below:

- South Leg: 56 crossings
- North Leg: 12 crossings
- West Leg: 35 crossings
- East Leg: 54 crossings

Spokane Traffic Calming Master Plan



PM Peak Hour Traffic at 9th Avenue and Perry Street

The table below shows the severity and types of crashes on 9th Avenue and Perry Street in the vicinity of the school. There were a total of eight crashes, primarily consisting of fixed object and angle collisions.

Crashes on Perry Street and 9th Avenue in Study Area (2017 to 2021)

Segment	Crash Type	Crash Severity					Total
		Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Perry St (8 th to 11 th Ave)	Rear End	-	-	-	1	-	1
	Angle	-	-	-	2	-	2
	Fixed Object	-	-	-	2	1	3
9 th Ave (Perry to Arthur St)	Angle	-	-	1	-	-	1
	Fixed Object	-	-	1	-	-	1
Total		0	0	2	5	1	8

A review of existing signing indicates that the 20 mph speed limit sign on southbound Perry Street is being blocked by trees. It was also noted that the existing 20 mph school speed zone signing is incomplete for east-west traffic on 9th Avenue. There are no 20 mph school zone signs east of the school (for westbound traffic on 9th Avenue). In addition, both eastbound and westbound traffic are lacking signs which indicate where the school speed zone ends. Therefore, it is recommended that school speed zone signing be updated on 9th Avenue, in front of Grant Elementary, to clarify the extents of the school speed zone. Per the Revised Code of Washington (Section 46.61.440) school zones can be installed up to 300' away from active schools or playgrounds.¹ In order to update these school zone signs; a motion will need to go through city council to update the school zone extents.

Recommended Solution:

It is recommended that school speed zone signing be updated for east-west traffic on 9th Avenue in front of Grant elementary, to clarify the extents of the speed zone. In addition, the southbound 20 mph speed limit sign on Perry Street near 8th Avenue is blocked by trees and should be relocated to increase visibility. These signing changes will complement the proposed intersection upgrades at the 9th Avenue and Perry Street intersection, to address concerns about speeding and pedestrian safety in the area.

¹ Revised Code of Washington Section 46.61.440. <https://app.leg.wa.gov/rcw/default.aspx?cite=46.61.440>

Spokane Traffic Calming Master Plan

District:	1
Neighborhood:	East Central
Project Extent:	Rebecca Street from 4 th Avenue to 5 th Avenue

Problem Statement: Residents of the East Central neighborhood raised concerns over speeding and cut through traffic volumes on Rebecca Street near 4th Avenue and 5th Avenue (adjacent to Frances Scott Elementary). Rebecca Street is classified as a local street with a speed limit of 25 mph.

Traffic Analysis:

Traffic counts are still pending on Rebecca Street and therefore cannot be reported at this time. This traffic analysis will be updated once traffic count data is available. However, with the neighborhood concern, it can be assumed that vehicles are using Rebecca Street to access I-90 Eastbound and bypass traffic signals on Freya Street.

The table below shows the severity and types of crashes on Rebecca Street from 4th Avenue to 5th Avenue over the last five years. Only two crashes occurred within the project limits.

Crashes on Rebecca Street from 4th Avenue to 5th Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Angle	-	-	-	1	-	1
Fixed Object	-	-	-	1	-	1
Total	-	-	-	2	-	2

Closure of Rebecca Street (between 3rd Avenue and 4th Avenue) could be considered as a means to reduce cut through traffic in front of the school. Ideally, this road closure would funnel traffic to arterial streets, including Freya Street (northbound major arterial), 3rd Avenue or Hartson Avenue (east-west minor arterials). It is recommended that temporary concrete barriers be used to close off this section of Rebecca Street. A permanent closure is not recommended as the North Spokane Corridor Improvement project is expected to reconfigure access to I-90 in the project area in the future (I-90 interchange to be reconfigured by 2029).

Recommended Solution:

The installation of temporary concrete barriers to close Rebecca Street between 3rd Avenue and 4th Avenue should be considered to reduce cut through traffic on Rebecca Street. Closure of this northernmost block of Rebecca Street is expected to have minimal impacts to traffic in the study area.

Spokane Traffic Calming Master Plan

District:	1
Neighborhood:	Hillyard
Project Extent:	Market Street and Haven Street between Rich Avenue and Joseph Avenue

Problem Statement: Residents of the Hillyard neighborhood raised concerns over vehicle speeds on Market Street and Haven Street between Rich Avenue and Joseph Avenue (0.86 miles). Both Market Street and Haven Street are classified as major arterials through the project area. The streets are one-way couplets, with northbound traffic on Market Street and southbound traffic on Haven Street. Market Street has a 20 mph speed limit for most of the project extents, with a 35 mph speed limit on the south end (south of Wellesley Avenue). Haven Street has a 30 mph speed limit for most of the project extents, with a 35 mph speed limit on the south end (speed limit increases one block south of Wellesley Avenue).

Traffic Analysis

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Market Street and Haven Street at the north and south ends of the couplet. As shown in the table, the roadways serve 10,000 to 12,000 vehicles per day at the north end of the couplet and 13,000 to 15,000 vehicles per day on the south end. Of note, the North Spokane Corridor project is currently under construction, located just east of the couplet. Traffic is expected to decrease on the couplet (north of Wellesley Avenue) when the Wellesley Avenue Interchange opens (expected in late 2023).

The 85th percentile speeds are 4 to 7 mph higher than the posted speed limits at the north end of the couplet. At the south end, 85th percentile speeds are 1 to 3 mph higher than the posted speed limit.

2022 Daily Traffic and 85th Percentile Speeds on Market Street and Haven Street

Segment	Road	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
N of Queen Avenue (North End)	Market (NB)	2	10,160	27	20
	Haven (SB)	2	11,681	34	30
N of Rich Avenue (South End)	Market (NB)	3	13,379	38	35
	Haven (SB)	2	14,920	36	35

^a Traffic count data was collected on March 21, 2019. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor of 1.02 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

The table below shows the severity and types of crashes occurring on Market Street and Haven Street between Rich Avenue and Joseph Avenue over the last five-years. As shown in the table, there were a total of 81 crashes, including 36 injury crashes. Turning related collisions were the most common crash type (representing 48% of all crashes).

Spokane Traffic Calming Master Plan

Crashes on Market Street and Haven Street, between Rich Avenue and Joseph Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Turning	-	1	15	23	-	39
Sideswipe	-	-	1	4	-	5
Rear End	-	-	9	3	-	12
Stationary Object or Car	-	-	3	10	5	18
Pedestrian	-	-	7	-	-	7
Total	0	1	35	40	5	81

The traffic data shows 85th percentile travel speeds are 7 mph over the 20 mph posted speed limit on Market Street north of Wellesley Avenue. This section of Market Street has more commercial development and already has curb extensions, street parking, and pedestrian-scale street lighting. Therefore, no additional traffic calming measures are recommended on Market Street.

However, there are no curb extensions or other traffic calming measures provided on Haven Street. There are four marked pedestrian crossings on Haven Street (at Wabash Avenue, Queen Avenue, Everett Avenue, and Rowan Avenue). It is recommended that updated pedestrian crossing counts be collected to determine the highest crossed streets to narrow the roadway width and provide shorter crossing distances. Curb extensions are recommended at the four intersections with the highest east-west pedestrian crossing volumes. The addition of curb extensions is expected to decrease 85th percentile speeds by 3 mph on Haven Street.¹ Narrowing the travel lanes and adding street parking on the east side of Haven Street could also be considered as a means to reduce travel speeds.

Recommended Solution:

Curb extensions are recommended at the four intersections with the highest pedestrian crossing volumes on Haven Street. Narrowing the travel lanes and adding street parking on the east side of Haven Street could also be considered as a means to reduce travel speeds. Due to the size of this project, this project will count as two projects.

¹ *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed.* Federal Highway Administration. July 2014.

Spokane Traffic Calming Master Plan

District:	1
Neighborhood:	Hillyard
Project Extent:	Haven Street from Wellesley Avenue to Market Street

Problem Statement: Residents of the East Central neighborhood raised concerns over pedestrian crossing safety and pedestrian network connectivity on Haven Street between Wellesley Avenue and Market Street (0.38 miles). Haven Street allows one-way southbound traffic and is classified as a major arterial with a speed limit of 35 mph for most of the project extent.

Traffic Analysis:

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Haven Street (north of Rich Avenue). There are about 15,000 vehicles per day on this section of Haven Street, with an 85th percentile speed of 36 mph (1 mph over the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Haven Street (North of Rich Avenue)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Haven Street (SB)	2	14,920	36	35

^a Traffic count data was collected on March 21, 2019. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor of 1.02 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

The table below shows the severity and types of crashes occurring on Haven Street between Wellesley Avenue and Market Street over the last five-years. There were 11 total crashes, with fixed object collisions representing the most common crash type.

Crashes on Haven Street, between Wellesley Ave and Market Street (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Turning	-	-	1	2	-	3
Stationary Object or Car	-	-	-	3	3	6
Pedestrian	-	-	1	1	-	2
Total	0	0	2	6	3	11

A review of existing sidewalk connectivity shows that Haven Street is lacking sidewalks on several blocks throughout the study area. The City of Spokane has funded a project to build the sidewalk along the west side of Haven Street to enhance pedestrian connectivity in the area. An east-west pedestrian crossing exists at the north end of the project area (at the Wellesley Avenue signal). However, it is also recommended that a second east-west crossing be considered at the south end (near Rockwell Avenue). This crossing would provide an east-west connection between the residential neighborhood (to the west) and the future Children of the Sun Trail (to the east). The Children of the Sun Trail will be a north-south multi-use path, running parallel to the North Spokane Corridor (trail completion expected in 2024).

Spokane Traffic Calming Master Plan

To fully connect to the trail, a crossing would be needed across Haven Street and Market Street near Rockwell Avenue. This east-west crossing location aligns with the planned improvements in the City of Spokane Bicycle Master Plan.

The recommended pedestrian crossing treatments (across Haven Street and Market Street) were analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.¹ This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed. Based on NCHRP 562, rapid rectangular flashing beacons would be recommended across both Market and Haven if there are between 14 and 38 pedestrian crossings during the peak hour.

Recommended Solution:

. It is recommended that an east-west crossing be considered on Haven Street and Market Street at the south end of the project area (near Rockwell Avenue). This east-west pedestrian crossing would provide access to the to the future Children of the Sun Trail and the location aligns with the planned improvements in the City of Spokane Bicycle Master Plan.

¹ NCHRP Report 562: *Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

Spokane Traffic Calming Master Plan

District:	1
Neighborhood:	Logan
Project Extent:	North Foothills Drive from Division Street to Hamilton Street

Problem Statement: Residents of the Logan neighborhood raised concerns over speeding and pedestrian crossing safety on North Foothills Drive between Division Street and Hamilton Street (0.68 miles). North Foothills Drive is classified as minor arterial with a speed limit of 30 mph. There are existing rectangular rapid flashing beacon (RRFB) crosswalks at both the east and west legs of the North Foothills Drive and Cincinnati Street intersection, and an RRFB under construction across the west leg of the North Foothills Drive and Astor Street intersection.

Traffic Analysis:

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on North Foothills Drive (west of Standard Street). As shown in the table, there are about 15,400 vehicles per day on North Foothills Drive with an 85th percentile speed of 34 to 38 mph (4 to 8 mph higher than the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on North Foothills Drive (West of Standard Street)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
EB	2	8,249	34	30
WB	2	7,181	38	30
Both Dir.	4	15,430		

^a Traffic data collected on April 9, 2019. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor of 0.98 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

The table below shows the severity and types of crashes occurring on North Foothills Drive between Division Street and Hamilton Street over the last five years. There were a total of 45 crashes, with 18 injury crashes. Turning-related crashes were the most common, representing 51% of all crashes.

Crashes on North Foothills Drive, between Division Street and Hamilton Street (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Rear End	-	-	3	5	-	8
Turning	-	-	8	14	1	23
Fixed Object	-	1	2	4	-	7
Sideswipe	-	-	1	3	-	4
Pedestrian	-	-	2	-	-	2
Head On	-	-	1	-	-	1
Total	0	1	17	26	1	45

Spokane Traffic Calming Master Plan

Given the relatively high 85th percentile speed and the high number of turning crashes, a road diet was considered as means to reduce travel speeds and enhance safety on this stretch of North Foothills Drive. With an estimated 15,400 vehicles per day, North Foothills Drive could be reduced to a three-lane cross section with a center two-way left-turn lane. As a point of reference, the planning level capacity of a two-lane urban arterial is 18,300 vehicles per day (assuming left-turn lanes are provided on the mainline at signalized intersections).¹

A road diet is expected to reduce crashes by 29%, per the Crash Modification Factors Clearinghouse.² A road diet on North Foothills Drive may also result in more uniform travel speeds on the corridor and is expected to reduce the average travel speed by 3 mph.³ Road diets are more successful when implemented on longer stretches of roadway; therefore it is recommended that the lane reduction continue further east of the study area (of note, the street name changes from North Foothills Drive to Euclid Avenue east of Crestline Street). When analyzing the cross section and daily traffic volumes east of the study area, it is recommended that the road diet extend 2.6 miles, from North Foothills Drive and Division Street (at the west end) to Euclid Avenue and Freya Street (at the east end). Freya Street is a logical terminus on the east end because Euclid Avenue transitions to a two-lane cross section east of this intersection. Division Street was recommended as the western terminus because North Foothills Drive transitions to a three-lane cross section west of this intersection.

The need for enhanced pedestrian crossing treatments (across North Foothills Drive) was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.⁴ This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed. Outside of the signalized intersections on the east and west ends, three north-south crosswalks are provided across North Foothills Drive at Cincinnati Street and Astor Street with RRFBs. This analysis shows that, with the installation of a road diet and median islands at potential pedestrian crossings, only a signed crossing would be required if there are 20 or more pedestrians during the peak hour. It is recommended that pedestrian volumes be evaluated at the Cincinnati Street intersection during the summer months to determine if the existing RRFBs are still warranted with the road diet. The recommended improvements maintain the existing RRFBs, pending an updated pedestrian count.

¹ *Highway Capacity Manual 6th Edition: A Guide for Multimodal Mobility Analysis*. Page 16-30, Exhibit 16-16. Washington, DC: The National Academies Press.

² *Crash Modification Factors Clearinghouse*, <https://www.cmfclearinghouse.org/detail.cfm?facid=199>

³ *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed*. Federal Highway Administration. July 2014.

⁴ *NCHRP Report 562: Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

Spokane Traffic Calming Master Plan

Recommended Solution:

It is recommended that a road diet be considered on North Foothills Drive, reducing the current four-lane cross section to a three-lane cross section with a center turn-lane and bike lanes. The addition of a center turn-lane is expected to reduce crashes, while the lane reduction is expected to reduce vehicle speeds. It is recommended that the City of Spokane further study the expected impacts of the road diet. The road diet can be considered along the 2.6 mile segment from North Foothills Drive and Division Street (at the west end) to Euclid Avenue and Freya Street (at the east end).

Spokane Traffic Calming Master Plan

District:	1
Neighborhood:	Logan
Project Extent:	Upriver Drive from North Center Street to Crestline Street

Problem Statement: Residents of the Logan neighborhood raised concerns over speeding and pedestrian crossing safety on Upriver Drive between North Center Street and Crestline Street (0.24 miles). In the project area, Upriver Drive is classified as minor arterial with a speed limit of 30 mph. There are three existing crosswalks across Upriver Drive, located at North Center Street, Granite Street and Crestline Street. These crosswalks connect the residential community on the north side of the roadway with Centennial Trail to the south. Of note, the intersection at Upriver Drive and North Center Street was recently reconfigured, closing the west leg of the intersection and adding a crosswalk.

Traffic Analysis:

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Upriver Drive (west of North Center Street). This traffic data was collected in 2019, before the changes at the Upriver Drive and North Center Street intersection, but still provide a good estimate of volumes and speeds on the corridor. There are about 4,300 vehicles per day on Upriver Drive with an 85th percentile speed of 38 mph (8 mph higher than the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Upriver Drive (West of North Center Street)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Both Dir.	2	4,297	38	30

^a Traffic data collected on April 9, 2019. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor of 0.98 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

The table below shows crashes on Upriver Drive over the last five years. There were only two crashes on Upriver Drive within the project limits. Both crashes were fixed object collisions with one resulting in minor injury and the other resulting in property damage only.

Crashes on Upriver Drive from North Center Street to Crestline Street (2017 to 2021)

Crash Type	Crash Severity				Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	
Stationary Object or Car	-	-	1	1	2
Total	0	0	1	1	2

Spokane Traffic Calming Master Plan

The need for enhanced pedestrian crossing treatments (across Upriver Drive) was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.¹ This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed.

There are three existing crosswalks within the project limits, located at North Center Drive, Granite Street and Crestline Street. All crosswalks have pedestrian crossing warning signs. Per NCHRP 562, with existing speeds and traffic volumes, a rectangular rapid flashing beacon would be recommended at these crosswalks if there are 14 or more pedestrians during the peak hour. However, if the 85th percentile speeds can be reduced below 35 mph, then the existing crosswalks are considered appropriate treatments. Speed feedback signs are expected to reduce the average travel speed by 2 mph and reduce the 85th percentile speed by 4 mph.² In the case of Upriver Drive, speed feedback signs are expected to reduce the 85th percentile travel speed to 34 mph.

Additionally, this project will examine the sidewalk connecting the crosswalk at Crestline Street to the Centennial Trail. The sidewalk will be upgraded to meet Americans with Disabilities Act Standards.

Recommended Solution:

It is recommended that speed feedback signs be installed on Upriver Drive near the project area to reduce speeds and allow for safer pedestrian crossing movements at the marked crosswalks. Speed feedback signs are recommended at the following locations:

- On Upriver Drive, east of North Center Street (for eastbound traffic)
- On Upriver Drive, east of Crestline Street (for westbound traffic)

Additionally, it is recommended that improvements for the sidewalk connecting the Crestline Street crosswalk and Centennial Trail be explored to meet Americans with Disabilities Act standards.

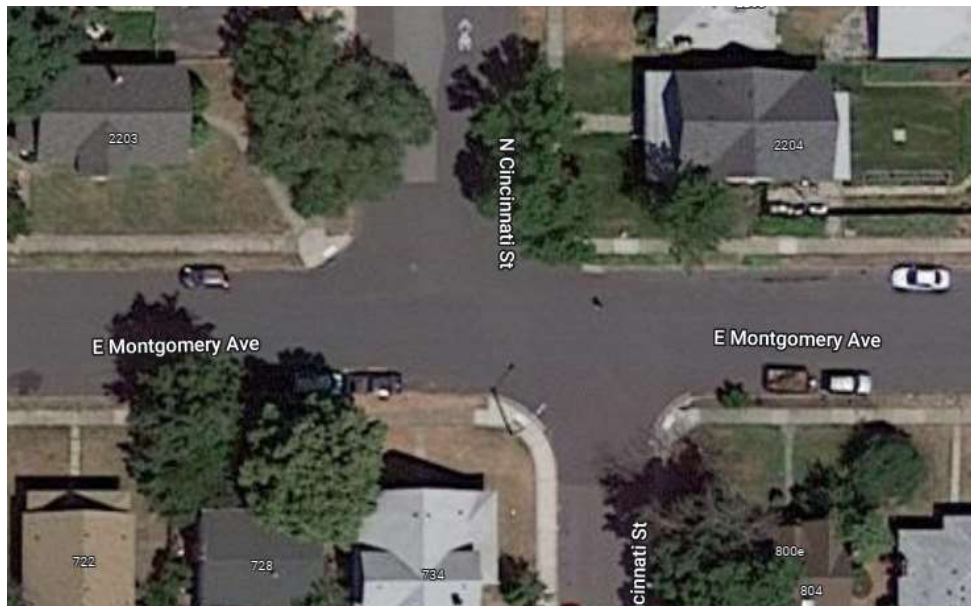
¹ NCHRP Report 562: *Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

² *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed*. Federal Highway Administration. July 2014.

Spokane Traffic Calming Master Plan

District:	1
Neighborhood:	Logan
Project Extent:	Montgomery Avenue and Cincinnati Street Intersection

Problem Statement: Residents of the Logan neighborhood raised concerns over speeding and safety at the Montgomery Avenue and Cincinnati Street intersection. Both streets are classified as local streets with a speed limit of 25 mph. The intersection has no stop or yield control signs on any approaches. The north and south legs of the intersection are offset by 50 feet.



Montgomery Avenue and Cincinnati Street Intersection

Traffic Analysis:

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Montgomery Avenue (west of Cincinnati Street). There are about 600 vehicles per day on Montgomery Avenue with an 85th percentile speed of 27 mph (2 mph higher than the posted speed limit).

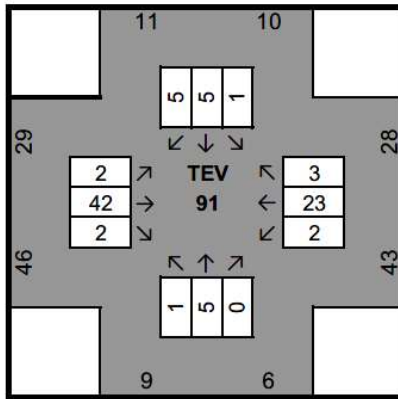
2022 Daily Traffic and 85th Percentile Speeds on Montgomery Avenue (West of Cincinnati Street)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Both Dir.	2	596	27	25

^a Traffic data collected on November 16, 2022. A seasonal adjustment factor of 1.01 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

The figure below shows the existing PM peak hour traffic volumes at the Montgomery Avenue and Cincinnati Street intersection, based on a traffic count from November 1, 2022. These volumes were adjusted with a seasonal adjustment factor of 1.05, based on historical traffic data from the city to estimate the 30th highest hour. There are only 11 vehicles on the southbound approach, with six vehicles on the northbound approach during the PM peak hour.

Spokane Traffic Calming Master Plan



PM Peak Hour Traffic at Montgomery Avenue and Cincinnati Street

The table below shows the type and severity of crashes at the Montgomery Avenue and Cincinnati Street intersection over the last five years. There were only two crashes, both turning-related collisions resulting in minor injury.

Crashes at Montgomery Avenue and Cincinnati Street Intersection (2017 to 2021)

Crash Type	Crash Severity				Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	
Turning	-	-	2	-	2
Total	0	0	2	0	2

The north and south legs of Cincinnati Street are offset by 50 feet; therefore, vehicles need to turn slightly to continue north or south on this street. Currently the intersection is uncontrolled, with no stop or yield control signs on any approaches. Section 2B.04 of the Manual on Uniform Traffic Control Devices (MUTCD)³ states that the use of yield or stop signs should be considered at the intersection of two minor streets or local roads where the intersection has more than three approaches and where one or more of the following conditions exist:

- The combined vehicular, bicycle and pedestrian volume entering the intersection from all approaches averages more than 2,000 units per day;
- The ability to see conflicting traffic on an approach is not sufficient to allow a road user to stop or yield in compliance with the normal right of way rule if such stopping or yielding is necessary; and/or
- Crash records indicate that five or more crashes that involve the failure to yield the right-of-way at the intersection under the normal right-of-way rule have been reported within a 3-year period, or that three or more such crashes have been reported within a 2-year period.

Requirements a) and c) are not met. However, as shown in the figure below, the northbound and southbound approaches have obstructions within their required stopping sight distance triangles. Because of these sight restrictions, vehicles are required to slow down in order to proceed north or

³ Federal Highway Administration, *Manual on Uniform Traffic Control Devices, 2009 Edition, Pg. 50.*
<https://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part2b.pdf>

Spokane Traffic Calming Master Plan

south on Cincinnati Street. Typical right of way guidelines would indicate that the through movement on Montgomery Avenue would have priority over Cincinnati Street. Therefore, it is recommended that stop signs be installed on the northbound and southbound approaches to improve intersection safety.



Montgomery Avenue and Cincinnati Street Intersection – Required Sight Distance Triangles

Additionally, curb extensions could be considered as a means to lower travel speeds on Montgomery Avenue through the intersection. These features narrow the roadway width, resulting in lower speeds and shorter pedestrian crossings. Curb extensions are estimated to reduce the 85th percentile speeds by 3 mph.⁴

Recommended Solution:

The Montgomery Avenue and Cincinnati Street intersection has no stop or yield control signs on any approaches. The north and south legs of the intersection are offset by 50 feet. It is recommended that stop signs be installed on the northbound and southbound approaches to improve intersection safety. Additionally, it is recommended that curb extensions be installed on Montgomery Avenue to slow speeds and increase intersection safety.

⁴ *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed.* Federal Highway Administration. July 2014.

Spokane Traffic Calming Master Plan

District: 1
Neighborhood: Minnehaha
Project Extent: Euclid Avenue / Frederick Avenue Corridor

Problem Statement:

Residents of the Minnehaha neighborhood raised concerns over pedestrian network connectivity, bicycle network connectivity, and pedestrian crossing safety on the Frederick Avenue corridor from Freya Street to Havana Street (0.5 miles). Frederick Avenue in the project area is classified as a minor arterial with a 30 mph speed limit.

Traffic Analysis:

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Frederick Avenue. As shown in the table, there are around 10,000 vehicles per day on Frederick Avenue, with an 85th percentile speed of 37 mph (7 mph higher than the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Frederick Avenue (East of Julia Street)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Both Dir.	2	10,011	37	30

^a Traffic data collected on March 21, 2019. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor of 1.02 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

The table below shows the severity and types of crashes occurring on Frederick Avenue between Freya Street and Havana Street over the last five years. There were a total of 13 crashes, with seven injury crashes. Turning-related crashes were the most common, representing 46% of all crashes.

Crashes on Frederick Avenue between Freya Street and Havana Street (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Rear End	-	-	3	1	-	4
Turning	-	-	2	4	-	6
Fixed Object	-	-	1	1	-	2
Sideswipe	-	-	1	-	-	1
Total	0	0	7	6	0	13

The City of Spokane Bicycle Master Plan shows that bike lanes are planned on Frederick Avenue in the future. Sidewalks are currently provided on both the north and south side of Frederick Avenue for most of the project extents (with the exception of the eastern-most block from Cuba Street to Havana Street). However, most of the intersections do not have curb ramps and do not meet ADA standards.

Spokane Traffic Calming Master Plan

Spokane Transit Authority is planning on adding a new bus route that will run along Euclid Avenue and Frederick Avenue. The new route 38 is expected to be added in 2024 and will likely include the installation of new bus stops in the project area.

A road diet is being considered on Euclid Avenue (just west of the Euclid Avenue/Frederick Avenue/Freya Street intersection), as part of the Bemiss and Logan neighborhood traffic calming projects. The proposed road diet would extend 2.6 miles from North Foothills Drive and Division Street (at the west end) to Euclid Avenue and Freya Street (at the east end). West of Freya Street, Euclid Avenue has a four-lane cross section with 12,100 vehicles per day; therefore, a three-lane cross section expected to accommodate the existing daily traffic volumes on Euclid Avenue. As a point of reference, the planning level capacity of a two-lane urban arterial is 18,300 vehicles per day (assuming left-turn lanes are provided on the mainline at signalized intersections).¹

If implemented, the road diet on Euclid Avenue would provide a three-lane cross section with a center turn-lane and bike lanes. Therefore, if bike lanes were added to this section of Frederick Avenue, there would be further bike lane connectivity to the west (with the Euclid Avenue road diet).

Recommended Solution:

It is recommended that a road diet be considered on Euclid Avenue from Market Street to Freya Street in conjunction with the North Foothills Drive road diet from the Bemiss and Logan neighborhood traffic calming projects. East of Euclid Avenue, it is recommended that Frederick Avenue be re-stripped to provide bike lanes between Freya Street and Havana Street, to extend bike lane connectivity on the corridor. Lastly, it is recommended that sidewalk be added on the on the eastern-most block of Frederick Avenue (from Cuba Street to Havana Street).

¹ *Highway Capacity Manual 6th Edition: A Guide for Multimodal Mobility Analysis*. Page 16-30, Exhibit 16-16. Washington, DC: The National Academies Press.

Spokane Traffic Calming Master Plan

District:	1
Neighborhood:	Minnehaha
Project Extent:	Freya Street Corridor from Euclid Avenue to Bridgeport Avenue

Problem Statement:

Residents of the Minnehaha neighborhood raised concerns over school zone speeds, pedestrian crossing safety, and heavy vehicle speeds on Freya Street near Cooper Elementary. Freya Street is classified as a minor arterial with a speed limit of 30 mph (20 mph speed limit on Freya Street during school hours). Within the project extents (from Euclid Avenue to Bridgeport Avenue, length of 0.14 miles) there are two existing east-west crosswalks at Liberty Avenue and Bridgeport Avenue. An east-west crossing also exists at the traffic signal at Freya Street and Euclid Avenue.

Traffic Analysis:

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Freya Street (north of Euclid Avenue). As shown in the table, there are around 9,000 vehicles per day on Freya Street with an 85th percentile speed of 32 mph (2 mph higher than the posted speed limit or 12 mph higher than the school speed zone). Of note, new tube counts will be collected on Freya Street near Cooper Elementary in early 2023; this analysis will be updated to report the most recent speed and volume data on Freya Street, when available.

2022 Daily Traffic and 85th Percentile Speeds on Freya Street (North of Euclid Avenue)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Both Dir.	2	9,043	32	30

^a Traffic data collected on March 21, 2019. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor of 1.02 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

The table below shows the severity and types of crashes occurring on Freya Street between Euclid Avenue and Bridgeport Avenue over the last five years. There were a total of four crashes, with three injury crashes. Rear end crashes were the most common crash type.

Crashes on Freya Street between Euclid Avenue and Bridgeport Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Rear End	-	-	3	-	-	3
Fixed Object	-	-	-	1	-	1
Total	0	0	3	1	0	4

Spokane Traffic Calming Master Plan

The need for enhanced pedestrian crossing treatments (across Freya Street) was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.¹ This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed. Based on NCHRP 562, a signed and striped crosswalk would be recommended across Freya Street if there are 20 or more pedestrian crossings during the peak hour.

Recommended Solution:

There are two existing east-west crosswalks with pedestrian crossing warning signs on Freya Street near Cooper Elementary (at Liberty Avenue and Bridgeport Avenue). Based on speed and traffic count data from 2014, the existing signed and marked crosswalks provide adequate crossing treatments for pedestrians. However, it is recommended that these crossings be upgraded to provide curb extensions, which narrow the roadway width and shorten the pedestrian crossing distance. Curb extensions are expected to reduce the 85th percentile speed by 3 mph on Freya Street.²

¹ *NCHRP Report 562: Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

² *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed*. Federal Highway Administration. July 2014.

Spokane Traffic Calming Master Plan

District:	1
Neighborhood:	Minnehaha
Project Extent:	Marietta Avenue and Freya Street Intersection

Problem Statement:

Residents of the Minnehaha neighborhood raised concerns over the pedestrian crossings at the Marietta Avenue and Freya Street intersection. Freya Street in the project area is classified as a collector with a 30 mph speed limit. At this intersection, Marietta Avenue is a local road with a 25 mph speed limit. The intersection is stop controlled on the east and west legs, with free-flowing traffic on Freya Street.



Marietta Avenue and Freya Street Intersection

Traffic Analysis:

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Freya Street (north of Marietta Avenue). As shown in the table, there are around 5,700 vehicles per day on Freya Street with an 85th percentile speed of 34 mph (4 mph higher than the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Freya Street (North of Marietta Avenue)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Both Dir.	2	5,677	34	30

^a Traffic data collected on March 21, 2019. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor of 1.02 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

Pedestrian counts were collected on November 1, 2022; the number of pedestrian crossings was highest on the west leg (with seven crossings on the west leg and two to four crossings on all other legs during their respective peak hours). However, it's worth noting that pedestrian traffic is likely higher during the warmer summer months.

Spokane Traffic Calming Master Plan

The table below shows the severity and types of crashes occurring at the Freya Street and Marietta Avenue intersection over the last five years. There were a total of four crashes, with one major injury crash involving a pedestrian.

Crashes at the Freya Street and Marietta Avenue Intersection (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Angle	-	-	1	-	-	3
Fixed Object	-	-	-	2	-	2
Pedestrian	-	1	-	-	-	1
Total	0	1	1	2	0	4

The need for enhanced pedestrian crossing treatments (across Freya Avenue) was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.¹ This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed.

Based on NCHRP 562, a signed and striped crosswalk would be recommended across Freya Street if there are 20 or more pedestrian crossings during the peak hour. Based on the November 2022 traffic count, the existing pedestrian volumes would not warrant a marked crosswalk on Freya Street. However, curb extensions could be considered on the north leg reduce the pedestrian crossing distance and reduce travel speeds on Freya Street. It is recommended that the curb extension on the northwest corner be extended onto Marietta Avenue as well to better align crosswalk and curb lines. Curb extensions are expected to reduce the 85th percentile speed by 3 mph.²

Recommended Solution:

It is recommended that the curb ramp on the northwest corner be upgraded to meet ADA standards at the Freya Street and Marietta Avenue intersection (this upgrade may require relocating the utility pole at this corner). No crosswalks are recommended at this time; however, curb extensions are recommended on the north leg of the intersection to reduce the pedestrian crossing distance and reduce travel speeds on Freya Street. It is also recommended that pedestrian volumes be re-counted during warmer summer months to better understand peak pedestrian crossing volumes.

¹ NCHRP Report 562: *Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

² *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed*. Federal Highway Administration. July 2014.

Spokane Traffic Calming Master Plan

District: 1
Neighborhood: Minnehaha
Project Extent: Frederick Avenue and Myrtle Street Intersection

Problem Statement: Residents of the Minnehaha neighborhood raised concerns over the pedestrian crossings at the Frederick Avenue and Myrtle Street Intersection. Frederick Avenue in the project area is classified as a minor arterial with a 30 mph speed limit. Myrtle Street is a local road with a 25 mph speed limit. The intersection is stop controlled on the north and south legs, with free-flowing traffic on Frederick Avenue. A signed and striped crosswalk is provided on the east leg of the intersection.



Frederick Avenue and Myrtle Street Intersection

Traffic Analysis:

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Frederick Avenue (east of Julia Street). As shown in the table, there are around 10,000 vehicles per day on Frederick Avenue, with an 85th percentile speed of 37 mph (7 mph higher than the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Frederick Avenue (East of Julia Street)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Both Dir.	2	10,011	37	30

^a Traffic data collected on March 21, 2019. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor of 1.02 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

Pedestrian counts were collected on November 1, 2022, showing that there were two crossings of Frederick Avenue and two crossings of Myrtle Street during the pedestrian peak hour. However, it's worth noting that pedestrian traffic is likely higher during the warmer summer months.

Spokane Traffic Calming Master Plan

The table below shows the severity and types of crashes occurring at the Frederick Avenue and Myrtle Street intersection over the last five years. There were a total of three crashes at the intersection.

Crashes at the Frederick Avenue and Myrtle Street Intersection (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Angle	-	-	-	1	-	1
Rear End	-	-	2	-	-	2
Total	0	0	2	1	0	3

The need for enhanced pedestrian crossing treatments (across Frederick Avenue) was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.¹ This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed.

Based on NCHRP 562, no crosswalk is needed at this intersection with the observed pedestrian volumes. However, an active or enhanced crosswalk would be recommended (e.g., rectangular rapid flashing beacon) if there are 14 or more pedestrian crossings during the peak hour.

Recommended Solution:

It is recommended that the ramp in the northwest corner be upgraded to meet ADA standards at the Frederick Avenue and Myrtle Street intersection. No additional pedestrian crossing treatments are recommended at this time; however, it is recommended that pedestrian volumes be re-counted during warmer summer months to better understand peak pedestrian crossing volumes.

Of note, bike lanes are being considered on Frederick Avenue between Freya Street and Havana Street (as part of the Euclid Avenue and Frederick Avenue Corridor traffic calming project within the Minnehaha neighborhood). Adding bike lanes narrows the travel lanes on Frederick Avenue and is expected to reduce corridor travel speeds, improving safety at this north-south crossing.

¹ NCHRP Report 562: *Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

Spokane Traffic Calming Master Plan

District: 1
Neighborhood: Minnehaha
Project Extent: Euclid Avenue and Ferrall Street Intersection

Problem Statement: Residents of the Minnehaha neighborhood raised concerns over the pedestrian crossings at the Euclid Avenue and Ferrall Street Intersection. Euclid Avenue in the project area is classified as a minor arterial with a 30 mph speed limit. Ferrall Street is classified as a local road with a 25 mph speed limit. The intersection is stop-controlled on the north and south legs, with free-flowing traffic on Euclid Avenue. Crosswalks are provided on the south and east legs of the intersection. Of note, Euclid Avenue has a four-lane cross section at Ferrall Street but reduces to a two-lane cross section two blocks east of this intersection. The nearest traffic signal is located one block to the east at Freya Street.



Euclid Avenue and Ferrall Street Intersection

Traffic Analysis:

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Euclid Avenue (east of Ralph Street). As shown in the table, there are around 12,100 vehicles per day on Euclid Avenue, with an 85th percentile speed of 38 mph (8 mph higher than the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Euclid Avenue (East of Ralph Street)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Both Dir.	4	12,114	38	30

^a Traffic data collected on March 21, 2019. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor of 1.02 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

Spokane Traffic Calming Master Plan

Pedestrian counts were collected at the intersection on November 1, 2022. These counts show that there was one crossing on the east leg and one crossing on the south leg during the pedestrian peak hour. However, it's worth noting that pedestrian traffic is likely higher during the warmer summer months.

The table below shows the severity and types of crashes occurring at the Euclid Avenue and Ferrall Street intersection over the last five years. There were a total of three crashes at the intersection.

Crashes at the Euclid Avenue and Ferrall Street Intersection (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Angle	-	-	1	-	-	1
Fixed Object	-	-	-	1	1	2
Total	0	0	1	2	0	3

Through discussions with the City of Spokane and local school district representatives, the school prefers that students use the north-south pedestrian crossing at Freya Street over the crossing at Ferrall Street due to the curve in alignment and longer crossing distance. It is recommended that this crosswalk be moved one block west to cross the east leg of the Thor Street intersection where the crossing can be more tangent and with a shorter crossing distance. The east leg of this intersection was selected as there is a popular food mart and a Spokane Transit Authority bus stop on this side.

Recommended Solution:

It is recommended that the existing north-south crosswalk be removed and marked as closed at Euclid Avenue and Ferrall Street. With this crosswalk removal, the south leg of the intersection can be re-designed to remove the median island and right-turn bay. Additionally, a new crosswalk is recommended at the Thor Street intersection to provide a shorter pedestrian crossing and improved sight distance.

Spokane Traffic Calming Master Plan

District: 1
Neighborhood: Nevada Heights
Project Extent: Liberty Avenue and Lidgerwood Street Intersection

Problem Statement: Residents of the Nevada Heights neighborhood raised concerns over pedestrian crossing safety at the school bus stop located at the Liberty Avenue and Lidgerwood Street intersection. In the project area, Liberty Avenue and Lidgerwood Street are classified as local streets with 25 mph speed limits. The intersection has no stop or yield control signs on any approaches.

Traffic Analysis:

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Lidgerwood Street (north of Euclid Avenue). As shown in the table, there are around 400 vehicles per day on Lidgerwood Street, with an 85th percentile speed of 23 mph (2 mph below the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Lidgerwood Street (north of Euclid Avenue)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Both Dir.	2	405	23	25

^a Traffic data collected on June 5, 2019. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor of 0.96 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

Crashes at the Lidgerwood Street and Liberty Avenue intersection were analyzed over the last five years (2017 through 2021), showing that no crashes were reported at this intersection within that timeframe. A review of school bus routes shows that there are no buses currently stopping at this intersection during the 2022 to 2023 school year. However, bus routes may be adjusted in the future, making this a potential future bus stop.

While no issues were identified through the speed and crash data, residents of the neighborhood were concerned about the intersection; so potential upgrades were evaluated to identify solutions to enhance pedestrian crossing safety. A review of the site shows that existing intersection curb ramps do not meet ADA standards. Additionally, no sidewalk is provided on the west side of Lidgerwood Street, south of the intersection. Curb extensions could be considered on the west and north legs of the intersection to reduce vehicle speeds and reduce the pedestrian crossing distance. Curb extensions are expected to decrease the 85th percentile speed by 3 mph.¹

Recommended Solution:

It is recommended that all four ramps at the Lidgerwood Street and Liberty intersection be upgraded to meet ADA standards and that sidewalk be added on the west side of Lidgerwood Street on the block south of Liberty Avenue. Curb extensions could be considered on the west leg of the intersection to reduce vehicle speeds on Liberty Avenue and reduce the pedestrian crossing distance.

¹ *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed.* Federal Highway Administration. July 2014.

Spokane Traffic Calming Master Plan

District:	1
Neighborhood:	Nevada Heights
Project Extent:	Lidgerwood Street from Empire Avenue to Wellesley Avenue

Problem Statement: Residents of the Nevada Heights neighborhood raised concerns over speeding and yield compliance on Lidgerwood Street from Empire Avenue to Wellesley Avenue (0.52 miles). In the project area, Lidgerwood Street has two travel lanes and is classified as a local street with a 25 mph speed limit. A traffic signal exists at Wellesley Avenue, while other intersections are stop controlled, yield controlled, or uncontrolled along the corridor.

Traffic Analysis:

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Lidgerwood Street. As shown in the table, there are 1,000 to 2,000 vehicles per day on Lidgerwood Street, with an 85th percentile speed of 23 to 25 mph (either at or just below the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Lidgerwood Street

Location	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
North of Hoffman Ave (north end)	2	2,048	23	25
North of Heroy Ave (north end)	2	1,282	25	25
North of Rich Ave (mid-point)	2	966	24	25

^a Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. Seasonal adjustment factors (SAF) were applied based on historical traffic data from the city to estimate average daily traffic. Traffic data at Hoffman was collected on August 6, 2019 (SAF of 0.98). Traffic data at Heroy and Rich were collected on July 9 and 10, 2019 (SAF of 0.96).

The table below shows the severity and types of crashes occurring on Lidgerwood Street between Empire Avenue and Wellesley Avenue over the last five years (excluding intersection crashes at either end of the project extents). There were a total of 15 crashes, with seven injury crashes. Turning-related crashes were most common, representing 67% of all crashes.

Crashes on Lidgerwood Street, between Empire Avenue and Wellesley Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Rear End	-	-	-	1	-	1
Turning	-	-	5	5	-	10
Fixed Object	-	-	2	2	-	4
Total	0	0	7	8	0	15

Spokane Traffic Calming Master Plan

The intersection traffic control varies throughout the half mile corridor, as shown in the table below. Four of the intersections have no traffic control (Princeton, Longfellow, Rockwell, and Walton Avenue). Given the sporadic nature of uncontrolled versus controlled intersections, there may be some confusion about when drivers on Lidgerwood Street are expected to yield to the side street.

Existing Intersection Traffic Control and Right Angle Crash History along Lidgerwood Street

Cross Street	Traffic Control	Classification	Number of Angle Crashes (2017-2021)
Wellesley Avenue	Signal	Major Arterial	-
Hoffman Avenue	All-way stop control	Local	1
Princeton Avenue	Uncontrolled	Local	3
Heroy Avenue	Side street yield control	Local	0
Longfellow Avenue	Uncontrolled	Local	2
Rich Avenue	All-way stop control	Local	0
Rockwell Avenue	Uncontrolled	Local	0
Lacrosse Avenue	Side street yield control	Local	4
Walton Avenue	Uncontrolled	Local	0
Garland Avenue	Side street yield control	Local	0
Empire Avenue	Two-way stop control (on Lidgerwood)	Minor Arterial	-

Section 2B.04 of the Manual on Uniform Traffic Control Devices (MUTCD)¹ states that the use of yield or stop signs should be considered at the intersection of two minor streets or local roads where the intersection has more than three approaches and where one or more of the following conditions exist:

- a) The combined vehicular, bicycle and pedestrian volume entering the intersection from all approaches averages more than 2,000 units per day;
- b) The ability to see conflicting traffic on an approach is not sufficient to allow a road user to stop or yield in compliance with the normal right of way rule if such stopping or yielding is necessary; and/or
- c) Crash records indicate that five or more crashes that involve the failure to yield the right-of-way at the intersection under the normal right-of-way rule have been reported within a 3-year period, or that three or more such crashes have been reported within a 2-year period.

No intersections met the crash history requirement (c) regarding failure to yield crashes. However, additional data collection is needed to assess the vehicular volume requirement (a) and sight distance requirement (b). A desktop review shows that there is a sight distance concern on the southeast corner of the Lidgerwood Street and Lacrosse Avenue intersection. Therefore, it is recommended that stop signs be installed on the east and west approaches of that intersection. There were no obvious sight distance concerns noted at other intersections.

¹ Federal Highway Administration, Manual on Uniform Traffic Control Devices, 2009 Edition, Pg. 50.
<https://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part2b.pdf>

Spokane Traffic Calming Master Plan

If stop control warrants are not met, typically no traffic control is provided when a local street intersects another local street in a residential neighborhood. For consistency, it is recommended that removal of the existing traffic control signing between Wellesley Avenue and Empire Avenue be considered, to provide uncontrolled intersections (except at Lacrosse Avenue).

It is recommended that a choker and “end arterial” sign be provided on the north end of the study corridor (south of Wellesley Avenue) to indicate a transition from an arterial to a local street. Additionally, it is recommended that curb extensions be installed at the Longfellow Avenue and Lacrosse Avenue intersections, to reduce travel speeds and provide increased sight distance for pedestrians. Curb extensions and chokers are expected to result in a speed reduction of 3 mph.²

Recommended Solution:

It is recommended that a choker be installed on the north end of the corridor and that curb extensions be installed at the Longfellow Avenue and Lacrosse Avenue intersections, to make it more clear to drivers that this section of Lidgerwood is a local road.

Typically, no traffic control is provided when a local street intersects another local street in a residential neighborhood. For consistency, it is recommended that removal of the existing traffic control signing between Wellesley Avenue and Empire Avenue be considered, to provide uncontrolled intersections (except at Lacrosse Avenue). A desktop review indicated there may be a sight distance concern at the Lacrosse Avenue intersection, which would warrant stop control on the side street approaches. Intersection traffic control needs should be evaluated based on intersection traffic counts and sight distance, before signing is removed or added. If stop control is still warranted at an intersection, a traffic circle could be considered in its place.

² *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed.* Federal Highway Administration. July 2014.

Spokane Traffic Calming Master Plan

District:	1
Neighborhood:	Nevada Heights
Project Extent:	Perry Street near Rogers High School

Problem Statement: Residents of the Nevada Heights neighborhood raised concerns over pedestrian crossing safety for school students near Rogers High School. In the project area, Perry Street is classified as a collector with a 30 mph speed limit.

Traffic Analysis:

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Perry Street (north of Rockwell Avenue). As shown in the table, there are around 2,700 vehicles per day on Perry Street, with an 85th percentile speed of 33 mph (3 mph above the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Perry Street (North of Rockwell Avenue)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Both Dir.	2	2,712	33	30

^a Traffic data collected on May 1, 2019. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor of 0.96 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

The table below shows the severity and types of crashes occurring on Perry Street between Rich Avenue and Wellesley Avenue over the last five years. There was only one crash on this section of Perry Street involving a turning-related collision with minor injury.

Crashes on Perry Street, between Rich Avenue and Wellesley Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Turning	-	-	1	-	-	1
Total	0	0	1	0	0	1

The need for enhanced pedestrian crossing treatments (across Perry Street) was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.¹ This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed. Based on NCHRP 562, if there are 20 or more pedestrian crossings in the peak hour, a crosswalk is recommended as the crossing treatment on Perry Street.

If installed, these crossings would qualify as school crossings and would therefore need to have school zone signage installed on Perry Street, to clarify the extents of the school speed zone. Per the Revised Code of Washington (Section 46.61.440) school zones can be installed up to 300 feet away from active

¹ NCHRP Report 562: *Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

Spokane Traffic Calming Master Plan

schools or playgrounds.² In order to install these school zone signs; a motion will need to go through city council to update the school zone extents.

Recommended Solution:

The installation of a school zone on Perry Street is recommended along with marked school zone crosswalks at two locations on Perry Street (adjacent to Rogers High School):

- North leg of the Longfellow Avenue and Perry Street intersection
- North leg of the Princeton Avenue and Perry Street intersection

The curb ramps at the Longfellow Avenue intersection were recently upgraded; therefore, only a marked crosswalk is recommended at this location. At the Princeton Avenue crossing, curb ramp upgrades would be needed, along with a marked crosswalk. Curb extensions are also recommended on the west side of the Princeton Avenue intersection to decrease the pedestrian crossing distance and lower travel speeds on Perry Street. Curb extensions are expected to decrease the 85th percentile speeds by 3 mph.³

² Revised Code of Washington Section 46.61.440. <https://app.leg.wa.gov/rcw/default.aspx?cite=46.61.440>

³ Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed. Federal Highway Administration. July 2014.

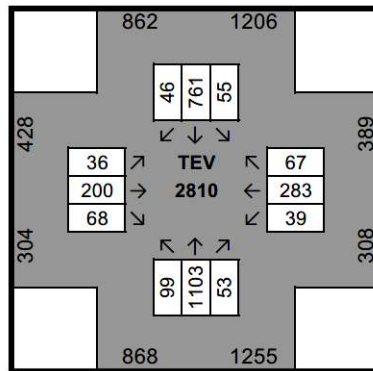
Spokane Traffic Calming Master Plan

District:	1
Neighborhood:	Nevada Heights
Project Extent:	Longfellow Elementary Safe Routes to School

Problem Statement: Residents of the Nevada Heights neighborhood raised concerns over safe routes to school for school children near Longfellow Elementary School. The city also expressed concerns specific to the Empire Avenue and Nevada Street signalized intersection, just north of the school. In the project area, Nevada Street is classified as a major arterial with a 30 mph speed limit, while Empire Avenue is a minor arterial with a 30 mph speed limit. During school hours, Nevada Street has a school speed zone of 20 mph through the intersection.

Traffic Analysis:

The figure below shows the existing PM peak hour traffic volumes at the Empire Avenue and Nevada Street intersection, based on a traffic count from May 7, 2019. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. Traffic volumes were adjusted with a seasonal adjustment factor of 1.00, based on historical traffic data from the city to estimate the 30th highest hour. As shown in the figure, Nevada Street (north-south major arterial) has significantly higher volumes than Empire Avenue (east-west minor arterial).



PM Peak Hour Traffic at Empire Avenue and Nevada Street

The table below shows the severity and types of crashes occurring at the Empire Avenue and Nevada Street intersection from 2017 through 2021. There were a total of 27 crashes, with turning-related crashes representing 56% of all crashes.

Crashes at Empire Avenue and Nevada Street Intersection (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Sideswipe	-	-	-	4	-	4
Pedestrian	-	1	2	-	-	3
Turning	-	2	9	3	1	15
Fixed Object	-	-	-	-	1	1
Rear-end	-	-	3	1	-	4
Total	0	3	14	8	2	27

Spokane Traffic Calming Master Plan

An analysis of protected phasing was completed for the eastbound and westbound left turn lanes using the Federal Highway Administration Signal Timing Manual.¹ This indicates that signals should be evaluated on the following conditions:

- Protected-permissive phasing was considered if sight distance did not meet the following criteria: 200 feet for 25 mph oncoming traffic speed, 280 feet for 35 mph oncoming traffic speed.
- Protected-permissive phasing was considered if the cross product of left turning and opposing thru volumes exceeds 50,000 for a left-turn movement with one opposing thru lane or exceeds 100,000 for a left-turn movement with two opposing thru lanes.
- Protected-permissive phasing was considered if left-turning crashes met the following criteria; four crashes in one year, six crashes in two years, or seven crashes in three years.
- Protected-only phasing was recommended for intersections with two or more left-turn lanes.

The eastbound and westbound left turn lanes did not meet any of the above criteria, and therefore it is recommended that the left turning movements remain permissive only.

Recommended Solution:

The existing pavement markings on Empire Avenue show that the roadway transitions from a two-lane cross section to a four-lane cross section, just east and west of Nevada Street (four-lane cross section extends about 400 feet). It is recommended that the pavement markings on Empire Avenue be updated to provide a three-lane cross section at the Nevada Street intersection with left-turn lanes on the east and west legs. This improvement will lower the number of lanes that are crossed for pedestrians crossing the intersection going north and south.

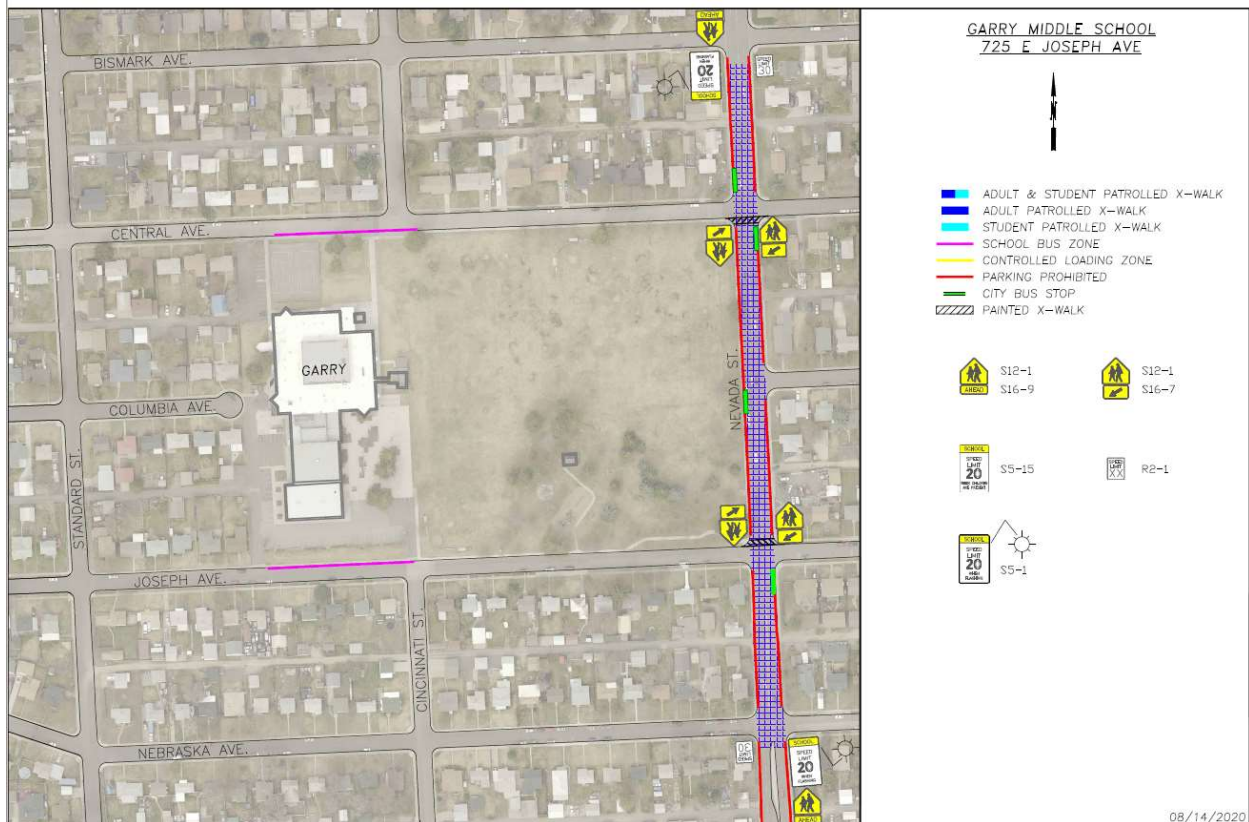
A school parent also expressed interest in adding a north-south marked crosswalk at Empire Avenue and Cincinnati Street (600 feet west of the signal at Empire Avenue and Nevada Street). It is recommended that a traffic count be conducted during the school year to better understand the existing pedestrian crossing demand at this intersection.

¹ *Traffic Signal Timing Manual, Federal Highway Administration, June 2008.*
<https://ops.fhwa.dot.gov/publications/fhwahop08024/index.htm>

Spokane Traffic Calming Master Plan

District: 1
Neighborhood: Nevada Heights
Project Extent: Garry Middle School Safe Routes to School

Problem Statement: Residents of the Nevada Heights neighborhood raised concerns over safe routes to school for school children near Garry Middle School. The figure below shows the locations of the existing marked crosswalks on Nevada Street, east of the school (east-west crosswalks located at Central Avenue and Joseph Avenue). A new pedestrian hybrid beacon is also planned at the Nevada Street and Joseph Avenue intersection. This project analyses the need for marked crossings for pedestrians coming to/from the north and south (on Joseph Avenue and Central Avenue at Cincinnati Street). In front of the school, Joseph Avenue and Central Avenue are classified as local streets with a 25 mph speed limit.



Existing Marked Crosswalks on Nevada Street (east of Garry Middle School)

Traffic Analysis:

The need for pedestrian crossing treatments was analyzed at the Central Avenue and Cincinnati Street intersection (for pedestrians coming to/from the north) and at the Joseph Avenue and Cincinnati Street intersection (for pedestrians coming to/from the south).

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Central Avenue and Joseph Avenue. As shown in the table, there are around 2,600 vehicles per day on Central Avenue, with only 400 vehicles per day on Joseph Avenue.

Spokane Traffic Calming Master Plan

2022 Daily Traffic and 85th Percentile Speeds on Central Avenue and Joseph Avenue

Location	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Central Avenue east of Astor Street	2	2,578	29	30
Joseph Avenue east of Standard Street	2	405	28	25

^a Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. A seasonal adjustment factor (SAF) was applied, based on historical traffic data from the city to estimate average daily traffic. Traffic data at Central Avenue collected on April 16, 2019 (SAF of 0.98). Traffic data at Joseph Avenue collected on May 20, 2021 (SAF of 0.96).

The 85th percentile speed was measured as 28 and 29 mph on Joseph Avenue and Central Avenue, respectively. Although it's worth noting that both roadways have 25 mph speed limits in front of the school (the speed limit on Central Avenue increases to 30 mph two blocks west of the school where the traffic count was collected).

Crashes at the Cincinnati Street/Central Avenue and Cincinnati Street/Joseph Avenue intersections were analyzed over the last five years (2017 through 2021), showing that no crashes were reported at these intersections within that timeframe. The need for enhanced pedestrian crossing treatments at these locations was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.² This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed.

Based on NCHRP 562, crosswalks would be warranted at these locations if there are more than 20 pedestrians in the peak hour. However, there is some discretion allowed regarding the application of crosswalks in school zones. It is recommended that pedestrian counts be collected during the school year to verify the level of pedestrian activity at these intersections. Pending the findings of the data collection, north-south crosswalks are recommended at the Cincinnati Street/Central Avenue and Cincinnati Street/Joseph Avenue intersections. Ramp upgrades are also recommended at these intersections to meet ADA standards.

If installed, these crossings would qualify as school crossings and would therefore need to have school zone signage installed on Central Avenue and Joseph Avenue, to clarify the extents of the school speed zone. Per the Revised Code of Washington (Section 46.61.440) school zones can be installed up to 300 feet away from active schools or playgrounds.³ In order to install these school zone signs; a motion will need to go through city council to update the school zone extents.

² NCHRP Report 562: *Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

³ Revised Code of Washington Section 46.61.440. <https://app.leg.wa.gov/rcw/default.aspx?cite=46.61.440>

Spokane Traffic Calming Master Plan

Recommended Solution:

It is recommended that north-south crosswalks and ADA ramp upgrades be considered at the Cincinnati Street/Central Avenue and Cincinnati Street/Joseph Avenue intersections (pending additional data collection to verify existing pedestrian travel patterns at the school). These crossings would be accompanied by the installation of school zone signage on both of these streets. These upgrades will allow for safer access to the school for students traveling to/from the north and south of Garry Middle School.

Spokane Traffic Calming Master Plan

District:	1
Neighborhood:	Shiloh Hills
Project Extent:	Standard Street and Colton Street from Magnesium Road to Francis Avenue (includes Greta Avenue to Calkins Drive)

Problem Statement: Residents of the Shiloh Hills neighborhood raised concerns over vehicle speeds on the Addison Street / Standard Street / Colton Street north-south corridor between Magnesium Road and Francis Avenue (1.6 miles). An additional concern was raised specifically about Standard Street between Greta Avenue and Calkins Drive near Friendship Park. The figure on the following page shows the project extents graphically; this north-south corridor is classified a collector street and has a 25 mph speed limit for most of the project extents, with a 30 mph speed limit south of Lyons Avenue. The speed limit reduces to 20 mph in front of Friendship Park (just north of Cozza Drive).

Traffic Analysis:

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds along the corridor. As shown in the table, there are only 1,300 vehicles per day on the north end of the corridor (north of Lincoln Road); however, traffic volumes south of Lincoln Road are higher with 4,000 to 5,000 vehicles per day. Vehicle speeds are high throughout the corridor, with an 85th percentile speed of 33 to 38 mph (8 to 13 mph higher than the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Project Corridor

Location	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Standard St (North of Lincoln Rd)	2	1,324	33	25
Standard St (South of Lincoln Rd)	2	4,150	38	25
Standard St (South of Cozza Dr)	2	5,233	33	25

^a Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. Seasonal adjustment factors (SAF) were applied based on historical traffic data from the city to estimate average daily traffic. Traffic data north of Lincoln Rd was collected on November 16, 2022 (SAF of 1.01). Traffic data south of Lincoln Rd and Cozza Dr were collected on April 23, 2019 (SAF of 0.98).

The table below shows the severity and types of crashes occurring on the corridor over the last five years. There were a total of 34 crashes, with turning-related crashes being the most common crash type.

Crashes on Project Corridor, between Magnesium Road and Francis Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Rear End	-	-	1	3	-	4
Turning	-	-	7	13	-	20
Fixed Object	-	-	2	11	2	15
Pedestrian	-	-	1	1	-	2
Head On	-	-	1	1	-	2
Sideswipe	-	-	-	2	-	2
Total	0	0	12	31	2	45

Spokane Traffic Calming Master Plan



Crashes were highest at the intersections where Standard Street intersects non-local roads, including Lincoln Road (nine crashes), Lyons Avenue (six crashes), and Cozza Drive (five crashes). Crashes at these intersections made up 44% of the total crashes on the corridor. Additionally, it is important to note that there were no reported crashes in front of Friendship Park (Greta Avenue to Calkins Drive).

Curb extensions could be considered as a means to lower travel speeds on the corridor. These features narrow the roadway width, resulting in lower speeds and shorter pedestrian crossings. Curb extensions are estimated to reduce the 85th percentile speed by 3 mph.¹ Curb extensions were proposed near locations of particular concern along the corridor, while considering input from the City of Spokane. Curb extensions are recommended at the north and south ends of Friendship Park (Calkins Drive and Greta Avenue). Curb extensions are recommended at the intersection of Colton Place and Standard Street. Curb extensions are also recommended at the pedestrian crossing at St. Thomas More Way (north of Lincoln Road). Further information about the St. Thomas More Way intersection upgrades can be found in its respective project report.

To facilitate the installation of curb extensions near Friendship Park, it is recommended that sidewalks be added along the west side of Standard Street from Lidgerwood Street to Cozza Drive. Adding sidewalk on this segment will allow for continuous sidewalk along the west side of the project corridor from Francis Avenue to Magnesium Road.

Recommended Solution:

It is recommended that curb extensions be considered on Standard Street at the Calkins Drive, Greta Avenue, St. Thomas More Way, and Colton Place intersections. Curb extensions will narrow the roadway width and are expected to reduce travel speeds. Additionally, it is recommended that sidewalk be added along the west side of Standard

¹ *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed.* Federal Highway Administration. July 2014.

Spokane Traffic Calming Master Plan

Street (from Lidgerwood Street to Cozza Drive), allowing for continuous sidewalk along the west side of the project corridor.

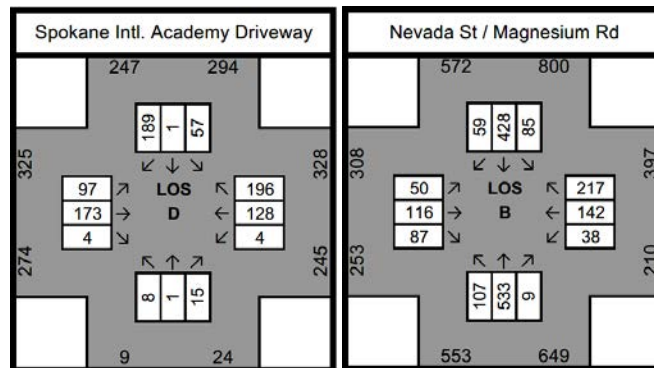
Spokane Traffic Calming Master Plan

District: 1
Neighborhood: Shiloh Hills
Project Extent: Magnesium Road from Nevada Street to North Dakota Street

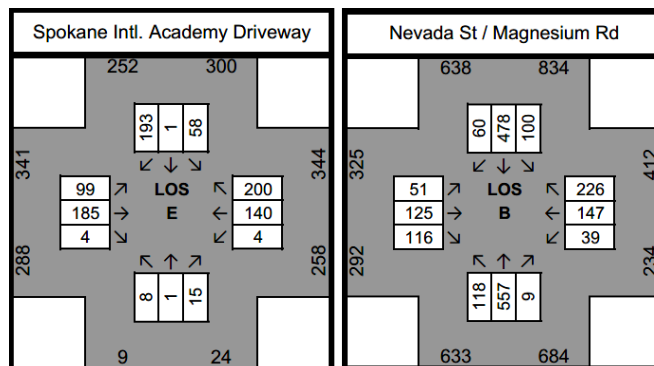
Problem Statement: Residents of the Shiloh Hills neighborhood raised concerns over congestion, access management, and safety on Magnesium Road between Nevada Street and North Dakota Street (0.2 miles). Particular concern was raised over access to Spokane International Academy, a new school which opened in the fall of 2021 (school driveway is located on Magnesium Road between North Dakota Street and Nevada Street). In the project area, Magnesium Road is classified as a collector with a 30 mph speed limit. The Nevada Street intersection is signalized, while North Dakota Street and the school driveway are stop-controlled on the north and south legs.

Traffic Analysis:

Traffic at the school driveway and the Nevada Street signal were obtained from a 2022 traffic impact study for a new apartment complex near Spokane International Academy.¹ The figures below show the existing AM peak hour volumes, along with the forecasted 2024 volumes with the new apartment complex. The AM peak hour was reported as it has higher traffic volumes at the school driveway.



Existing AM Peak Hour Traffic on Magnesium Avenue at Spokane Intl. Academy and Nevada Street



2024 Build AM Peak Hour Traffic on Magnesium Avenue at Spokane Intl. Academy and Nevada Street

¹ Magnesium Village, Expanded Trip Generation and Distribution Letter. Whipple Consulting Engineers, May 2022.

Spokane Traffic Calming Master Plan

As shown in the figures, the school driveway currently operates at LOS D (with 294 entering vehicles and 247 exiting vehicles in the AM peak hour). Traffic at the intersection is expected to slightly increase with the addition of the apartment complex (driveway expected to operate at LOS E). By comparison, there are no existing operational issues at the Nevada Street traffic signal and delay is relatively low (even with the development, the intersection is expected to operate at LOS C in the PM peak hour).

The southbound left-turn movement at the school driveway represents the highest-delay movement. The installation of a center two-way left-turn lane (TWLTL) on Magnesium Road would reduce delay, allowing southbound left turning vehicles to make two-stage left-turn movements out of the driveway (first crossing the westbound travel lane and then merging with eastbound traffic). It is recommended that this turn bay be extended east through Nevada street, transitioning to eastbound and westbound left-turn lanes at the signal. The addition of left turn-lanes improves safety and operations by removing left-turning traffic from the through travel lane.

The table below shows the severity and types of crashes occurring on Magnesium Road between Nevada Street and North Dakota Street over the last five years. There were a total of five crashes, including two injury crashes. Four of the five crashes occurred within 100 feet of the Nevada Street intersection. Of note, additional crash data was requested for 2022 (as the school opened in the fall of 2021). This traffic analysis will be updated to incorporate 2022 crash data, when made available.

Crashes on Magnesium Road, between North Dakota Street and Nevada Street (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Rear End	-	-	2	1	-	3
Sideswipe	-	-	-	2	-	2
Total	0	0	2	3	0	5

An analysis of protected phasing was completed for the eastbound and westbound left turn lanes using the Federal Highway Administration Signal Timing Manual². This indicates that signals should be evaluated on the following conditions:

- Protected-permissive phasing was considered if sight distance did not meet the following criteria: 200 feet for 25 mph oncoming traffic speed, 280 feet for 35 mph oncoming traffic speed.
- Protected-permissive phasing was considered if the cross product of left turning and opposing thru volumes exceeds 50,000 for a left-turn movement with one opposing thru lane or exceeds 100,000 for a left-turn movement with two opposing thru lanes.
- Protected-permissive phasing was considered if left-turning crashes met the following criteria; four crashes in one year, six crashes in two years, or seven crashes in three years.
- Protected-only phasing was recommended for intersections with two or more left-turn lanes.

² Traffic Signal Timing Manual, Federal Highway Administration, June 2008.
<https://ops.fhwa.dot.gov/publications/fhwahop08024/index.htm>

Spokane Traffic Calming Master Plan

The eastbound and westbound left turn lanes did not meet any of the above criteria, and therefore it is recommended that the left turning movements remain permissive only.

Recommended Solution:

The Spokane International Academy opened in fall of 2021 and experiences high turning movements at the school driveway on Magnesium Road, just east of North Dakota Street. It is recommended that a center TWLTL be added on Magnesium Road from North Dakota Street to Nevada Street. This center turn lane will improve safety and operations at the school driveway by allowing two-stage left turns from the driveway and by removing left-turning vehicles from the mainline travel lane. It is recommended that the TWLTL transition to eastbound and westbound left-turn lanes at the Nevada Street traffic signal.

Spokane Traffic Calming Master Plan

District:	1
Neighborhood:	Shiloh Hills
Project Extent:	Standard Street and St. Thomas More Way Bus Stop

Problem Statement: Residents of the Shiloh Hills neighborhood raised concerns over pedestrian crossing safety at the Standard Street and St. Thomas More Way intersection. In the project area, Standard Street is classified as a collector with a 25 mph speed limit, while St. Thomas More Way is classified as a local street with a 25 mph speed limit. A marked crosswalk exists on the north leg of the intersection with pedestrian crossing warning signs. The intersection is stop-controlled on the east and west legs.



Standard Street and St. Thomas More Way Intersection

Traffic Analysis:

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on Standard Street just south of the St. Thomas More Way intersection. As shown in the table, there are around 1,300 vehicles per day on Standard Street, with an 85th percentile speed of 33 mph (8 mph higher than the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Standard Street (South of St. Thomas More Way)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day)^a	85th Percentile Speed (mph)	Posted Speed (mph)
Both Dir.	2	1,324	33	25

^a Traffic data collected on November 16, 2022. A seasonal adjustment factor of 1.01 was applied to the traffic count, based on historical traffic data from the city to estimate average daily traffic.

Spokane Traffic Calming Master Plan

The table below shows the severity and types of crashes occurring at the Standard Street and St. Thomas More Way intersection over the last five years. There were a total of two crashes over the last five year period, including one pedestrian crash.

Crashes at Standard Street and St. Thomas More Way Intersection (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Turning	-	-	1	-	-	1
Pedestrian	-	-	-	1	-	1
Total	0	0	1	1	0	2

The need for enhanced pedestrian crossing treatments (across Standard Street) was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.¹ This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed.

Pedestrian crossing data from November 2, 2022 showed that there were 14 peak hour crossings on the north leg (occurring between 3:00 and 4:00 PM). Per NCHRP 562, with existing speeds, traffic volumes, and pedestrian volumes, no additional treatment would be required at this intersection. However, curb extensions on the west side of the intersection could be considered to reduce the crossing distance.

There is limited east-west sidewalk connectivity on St. Thomas More Way (no sidewalk exists east of the intersection). As a first-step, it is recommended that the sidewalk gap be filled just west of the intersection (gap extends 120 feet on the north side of St. Thomas More Way).

Recommended Solution:

It is recommended that curb extensions be added on the west side of the Standard Street and St. Thomas More Way intersection, to reduce the pedestrian crossing distance at the crosswalk. It is also recommended that the sidewalk gap be filled just west of the intersection (gap extends 120 feet on the north side of St. Thomas More Way).

¹ NCHRP Report 562: *Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

Spokane Traffic Calming Master Plan

District: 1
Neighborhood: Shiloh Hills
Project Extent: Standard Street and Lyons Avenue Intersection

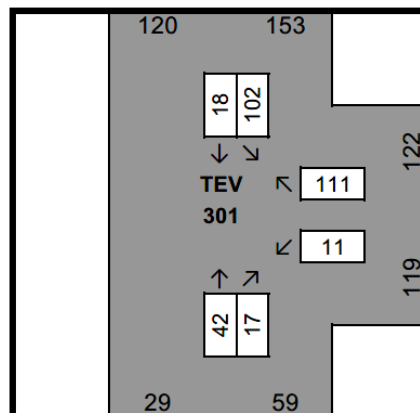
Problem Statement: Residents of the Shiloh Hills neighborhood raised concerns over traffic control, pedestrian crossings, and lack of signage at the Standard Street and Lyons Avenue intersection. Both streets are classified as local streets with a speed limit of 25 mph. The intersection is a three-legged intersection with no stop or yield control signs on any approaches.



Standard Street and Lyons Avenue Intersection

Traffic Analysis:

The figure below shows the existing PM peak hour traffic volumes at the Standard Street and Lyons Avenue intersection, based on a traffic count from November 1, 2022. These volumes were adjusted with a seasonal adjustment factor of 1.05, based on historical traffic data from the city to estimate the 30th highest hour. This count shows that the east and north legs are the highest volume legs.



PM Peak Hour Traffic at Standard Street and Lyons Avenue

Spokane Traffic Calming Master Plan

The table below shows the type and severity of crashes at the Standard Street and Lyons Avenue intersection over the last five years. There were only four crashes at this intersection, with most crashes being fixed object collisions.

Crashes at Standard Street and Lyons Avenue Intersection (2017 to 2021)

Crash Type	Crash Severity				Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	
Turning	-	-	-	1	1
Fixed Object	-	-	-	3	3
Total	0	0	0	4	4

Currently the intersection is uncontrolled, with no stop or yield control signs on any approaches. Section 2B.06 of the Manual on Uniform Traffic Control Devices (MUTCD)¹ states that the use of stop signs on the minor-street approaches should be considered if engineering judgement indicated that a stop is always required because of one or more of the following conditions:

- a) The vehicular traffic volumes on the through street or highway exceed 6,000 vehicles per day;
- b) A restricted view exists that requires road users to stop in order to adequately observe conflicting traffic on the through street or highway; and/or
- c) Crash records indicate that three or more crashes that are susceptible to correction by the installation of a stop sign have been reported within a 12-month period, or that five or more such crashes have been reported within a 2-year period. Such crashes include right-angle collisions involving road users on the minor-street approach failing to yield the right-of way to traffic on the through street or highway.

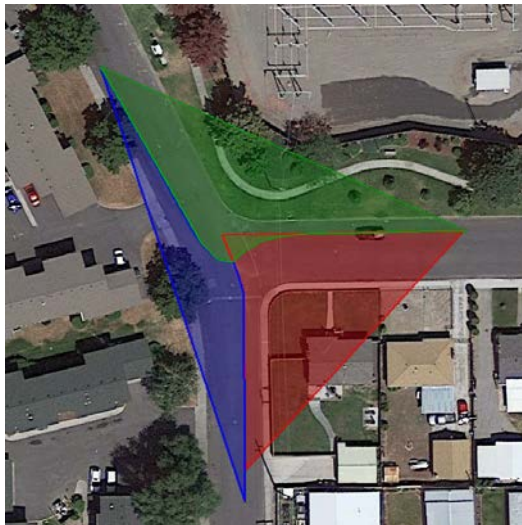
With the assumption that PM peak hour traffic volumes are 10% of daily traffic volumes, the total vehicular traffic on the through street (Standard Street) is only 1,790 vehicles per day. Therefore requirements (a) and (c) are not met. However, as shown in the figure below, vehicles traveling northbound and westbound do not have adequate sight distance due to the residential property on the southeast corner (sight distance conflict shown in red polygon). Because of these sight restrictions, vehicles are required to slow down in order to proceed. Typical right of way guidelines² would indicate that drivers yield to vehicles coming from their right. Given that sight distance is impacted by the property on the southeast corner, it is recommended that a stop sign be installed on the westbound approach to improve intersection safety.

¹ Federal Highway Administration, *Manual on Uniform Traffic Control Devices, 2009 Edition, Pg. 52.*
<https://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part2b.pdf>

² Washington State Department of Licensing, *Washington Driver Guide, 2023, Page 3-25.*
<https://www.dol.wa.gov/driverslicense/docs/driverguide-en.pdf>

Spokane Traffic Calming Master Plan

It is also recommended that curb extensions are installed on the east leg on the intersection to narrow the intersection and lower speeds on approaches to the intersection. Curb extensions are expected to reduce the 85th percentile speed by 3 mph.³



Standard Street and Lyons Avenue Intersection – Required Sight Distance Triangles

The need for enhanced pedestrian crossing treatments (across Standard Street) was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.⁴ This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed. Pedestrian crossing data collected on November 1, 2022 showed that there were only three pedestrian crossings on the south leg in the peak hour.

Per NCHRP 562, with existing speeds, traffic volumes, and pedestrian volumes, no crossing treatment would be recommended at this location. However, the pedestrian volumes were collected in November and therefore it is recommended that pedestrian volumes be monitored and counted during summer months when volumes are likely to be higher. There would need to be 20 or more pedestrians during the peak hour to warrant a signed and striped crosswalk at this location.

Recommended Solution:

It is recommended that a stop sign be added on the east leg of the intersection due to sight distance conflicts. No pedestrian crossing treatments are recommended at this time; however, it is recommended that pedestrian volumes be re-counted during warmer summer months to better understand peak pedestrian crossing volumes. Additionally, it is recommended that curb extensions be installed on the east leg to lower vehicle speeds entering the intersection.

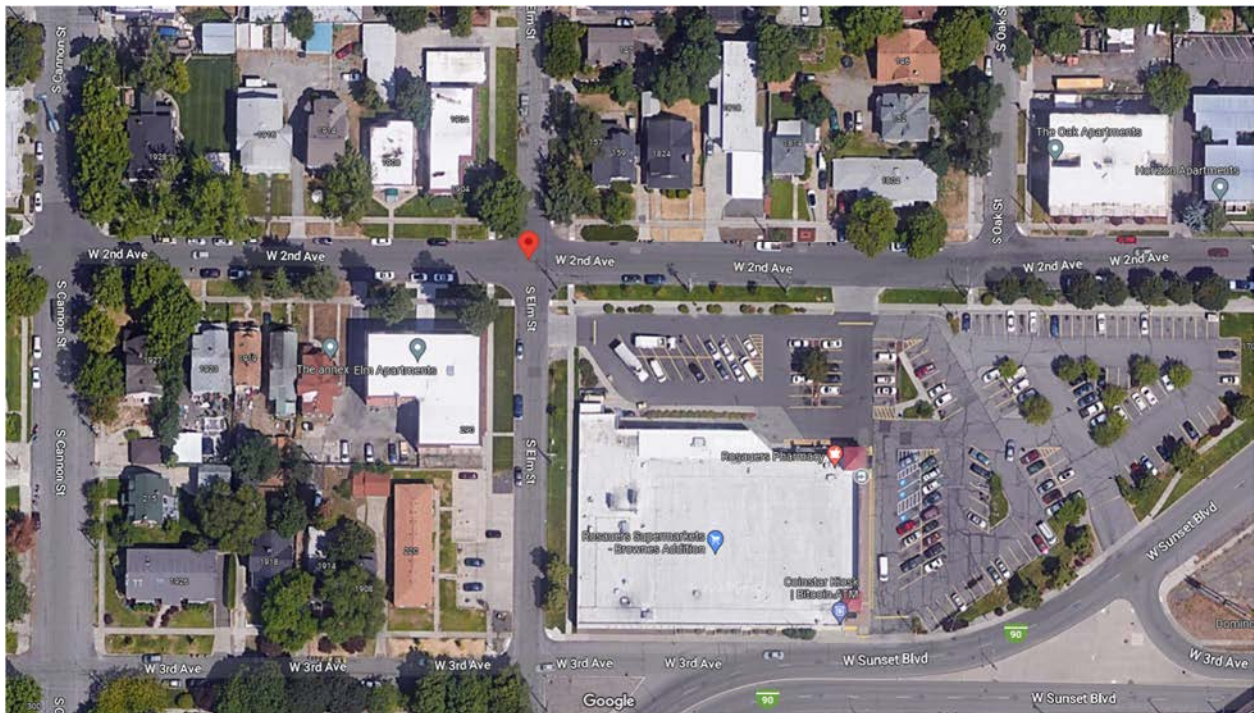
³ *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed.* Federal Highway Administration. July 2014.

⁴ *NCHRP Report 562: Improving Pedestrian Safety and Unsignalized Crossings.* National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

Spokane Traffic Calming Master Plan

District: 2
Neighborhood: Browne's Addition
Project Extent: 2nd Avenue near Elm Street

Problem Statement: Residents of the Browne's Addition neighborhood raised concerns over speeding, traffic volumes, pedestrian/bicyclist safety, and narrow lanes on 2nd Avenue near Elm Street.



Elm Street/2nd Avenue Intersection

Traffic Analysis

2nd Avenue and Elm Street are both classified as urban local access roads. 2nd Avenue has a speed limit of 25 miles per hour, provides one lane in each direction, complete sidewalks and on-street parking on both sides of the roadway. Elm Street does not have a posted speed limit, provides one lane in each direction, complete sidewalks and on-street parking on both sides of the roadway. The City's Bike and Pedestrian Master Plan identifies 2nd Avenue as an existing and future bike friendly route.

The table below shows the daily traffic volumes and 85th percentile speeds on 2nd Avenue west of Elm Street. The daily volume on 2nd Avenue was 1,992 vehicles. The 85th percentile speed was 24 miles per hour (lower than the posted speed limit). The data indicates there is not a speeding issue.

Spokane Traffic Calming Master Plan

2022 Daily Traffic and 85th Percentile Speeds on 2nd Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
West of Elm Street				
EB	1	670	24	
WB	1	1,322	24	
Both Dir.	2	1,992	24	25

The table below shows the severity and types of crashes occurring at the 2nd Avenue and Elm Street intersection from 2017 through 2021. There were two non-injury crashes, indicating there is not a safety issue at the intersection.

Crashes at 2nd Avenue/Elm Street Intersection (2017 to 2021)

Crash Type	Crash Severity				Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	
Rear End	-	-	-	-	-
Angle	-	-	-	1	1
Sideswipe	-	-	-	-	-
Fixed Object	-	-	-	1	1
Total	-	-	-	2	2

The need for enhanced pedestrian crossing treatments across 2nd Avenue was analyzed based on NCHRP Report 562, using collected traffic data. Based on the findings, a marked crosswalk is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. Although pedestrian data is not available, it is assumed the 20 or more pedestrian crossing threshold is met due to the surrounding urban neighborhoods and commercial uses near the study corridor.

Curb extensions could be considered as a traffic calming measure on 2nd Avenue. These features narrow the roadway width, resulting in lower speeds and shorter pedestrian crossings. Curb extensions are estimated to reduce the 85th percentile speeds by 3 mph.¹

The intersection is currently uncontrolled with no stop or yield signs. The need for intersection control was evaluated to determine if the current lack of signs is appropriate for the conditions. The traffic volumes and travel speeds are low indicating control signage is not required to manage operations at the intersection. The crash data does not show a safety issue that would trigger the need for stop or yield signs.

¹ *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed.* Federal Highway Administration. July 2014.

Spokane Traffic Calming Master Plan

Recommended Solution

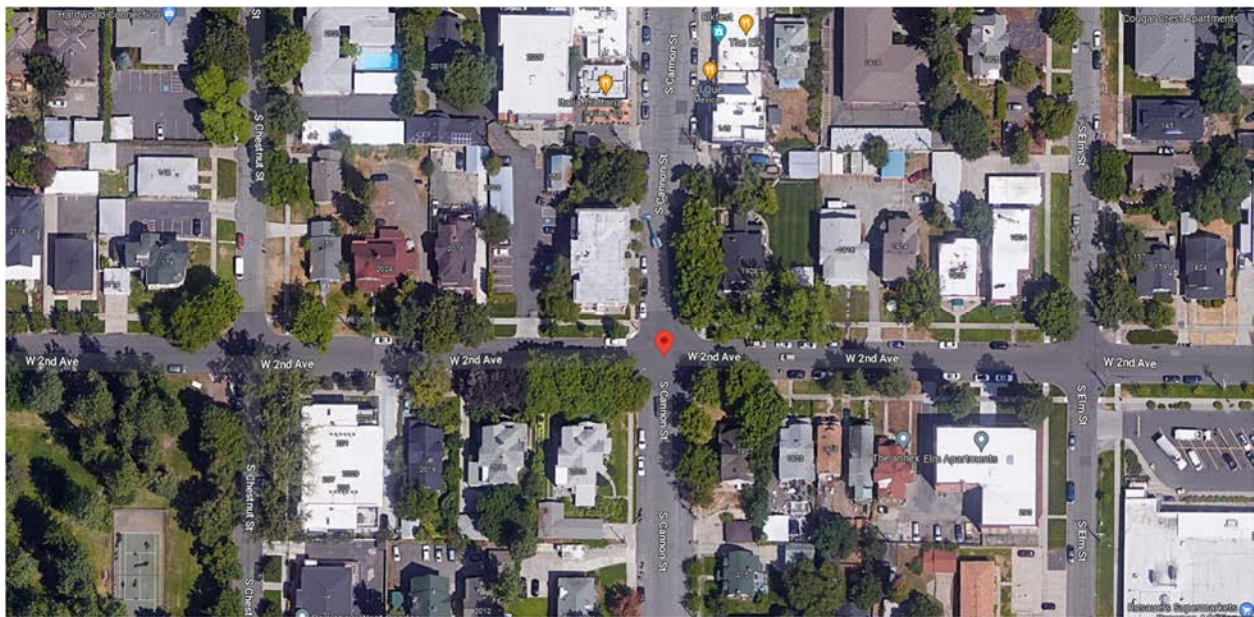
Improvements are recommended at the intersection to calm traffic volumes and speeds and enhance pedestrian safety:

- Install curb extension on each corner of the 2nd Avenue and Elm Street intersection.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Browne's Addition
Project Extent:	2 nd Avenue/Cannon Street Intersection

Problem Statement: Residents of the Browne's Addition neighborhood raised concerns over speeding, collisions, intersection safety (signs covered or not present), and pedestrian/bicyclist safety.



2nd Avenue and Cannon Street Intersection

Traffic Analysis

2nd Avenue and Cannon Street are both classified as urban local access roads. 2nd Avenue in the study area has a posted speed limit of 25 miles per hour, provides one lane in each direction, complete sidewalks and on-street parking on both sides of the street. Cannon Street in the study area does not have a posted speed limit, provides one lane in each direction, complete sidewalks and on-street parking on both sides of the road. The City's Bike and Pedestrian Master Plan identifies both roadways as an existing and future bike friendly route.

The table below show the daily traffic volumes and 85th percentile speeds on 2nd Avenue and Cannon Street. The daily volume on 2nd Avenue was 1,992 vehicles. The daily volume on Cannon Street was 1,038 vehicles. The 85th percentile speed on 2nd Avenue was 24 miles per hour (lower than the posted speed limit). The 85th percentile speed on Cannon Street was 23 miles per hour (lower than the posted speed limit). The data indicates there is not a speeding issue on either roadway.

Spokane Traffic Calming Master Plan

2022 Daily Traffic and 85th Percentile Speeds on 2nd Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
2 nd Avenue East of Cannon Street				
EB	1	670	24	
WB	1	1,322	24	
Both Dir.	2	1,992	24	25
Cannon Street North of 2 nd Avenue				
NB	1	637	23	
SB	1	446	23	
Both Dir.	2	1,083	23	25

The table below shows the severity and types of crashes occurring at the 2nd Avenue/Cannon Street intersection from 2017 through 2021. There were two minor crashes, indicating there is not a safety issue at the intersection.

Crashes at 2nd Avenue/Cannon Street Intersection (2017 to 2021)

Crash Type	Crash Severity				Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	
Rear End	-	-	-		-
Angle	-	-	1	1	2
Sideswipe	-	-	-	-	-
Fixed Object	-	-	-	-	-
Total	-	-	1	1	2

Curb extensions could be considered as a traffic calming measure on 2nd Avenue at the intersection. These features narrow the roadway width, resulting in lower speeds and shorter pedestrian crossings. Curb extensions are estimated to reduce the 85th percentile speeds by 3 mph.²

Recommended Solution:

Improvements are recommended at the intersection to calm traffic volumes and speeds and enhance pedestrian safety:

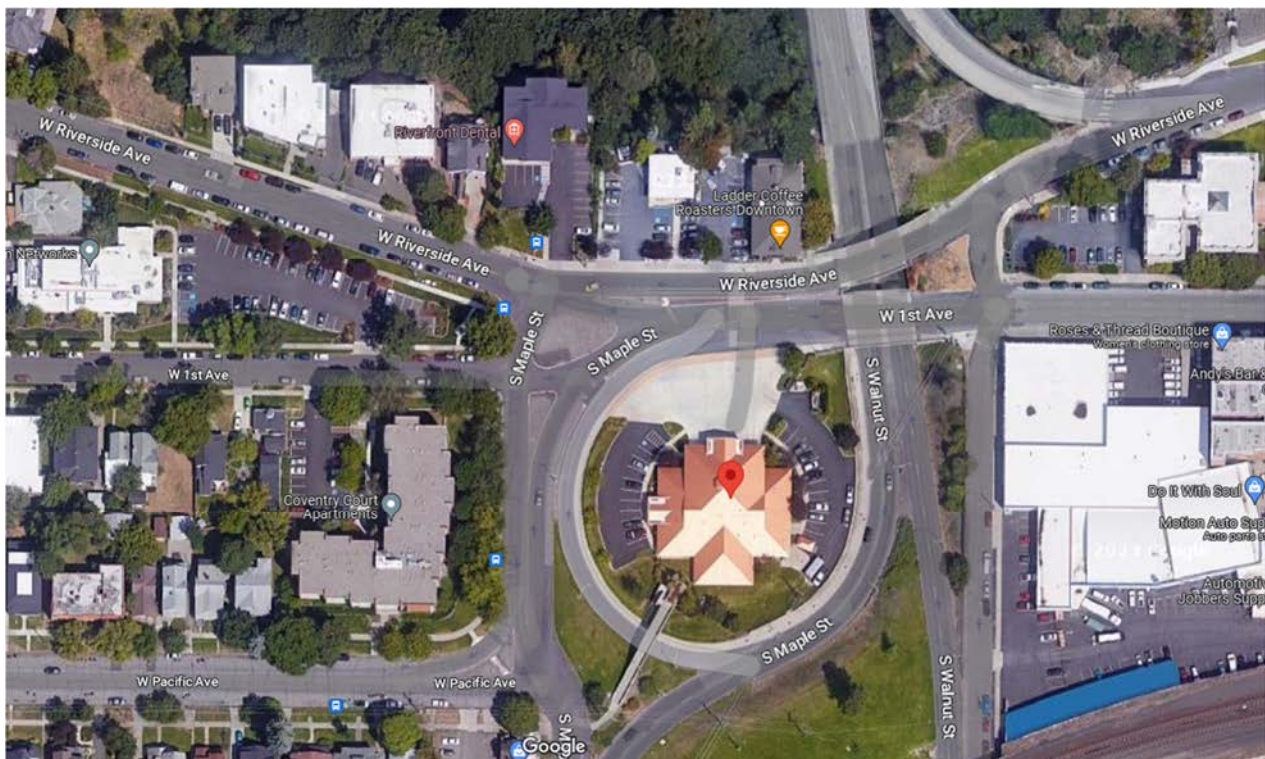
- Install curb extension on each corner of the 2nd Avenue and Cannon Street intersection.

² Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed. Federal Highway Administration. July 2014.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Browne's Addition
Project Extent:	1 st Avenue and Maple Street Intersection

Problem Statement: Residents of the Browne's Addition neighborhood raised concerns over the confusion driving/walking/biking around the fire station loop and the lack of safe pedestrian connections to downtown. The roadway network is shown in the figure below.



1st Avenue and Maple Street Intersection

Traffic Analysis

Maple Street is classified as an urban principal arterial. Maple Street in the study area does not have a posted speed limit, provides one lane in each direction, sidewalks on both sides of the street and no on-street parking. 1st Avenue west of Maple Street is classified as an urban local access road, does not have a posted speed limit, provides one lane in each direction, on-street parking and sidewalks on both sides of the street. 1st Avenue east of Maple Street is classified as an urban principal arterial, does not have a posted speed limit, provides multiple eastbound lanes, no on-street parking and sidewalks on the south side of the street. Riverside Avenue is classified as an urban major collector with no posted speed limit. Riverside Avenue west of Maple Street provides one lane in each direction, sidewalks on both sides of

Spokane Traffic Calming Master Plan

the street and on-street parking. Riverside Avenue east of Maple Street provides one westbound lane, sidewalk on the north side and no on-street parking.

The table below show the daily traffic volumes on 1st Avenue, Riverside Avenue, Maple Street and the Walnut Street ramp. The highest daily traffic volumes were on Riverside Avenue westbound and 1st Avenue eastbound. Pedestrian volumes data was collected for the PM peak hour with the highest volumes on Riverside Avenue (24 pedestrians) and 1st Avenue (14 pedestrians).

2022 Daily ^a Traffic and Pedestrian Volumes		
Location	# Lanes	2022 Estimated Daily Traffic (Vehicles per day)
1 st Avenue and Riverside Avenue east of Maple Street		
EB	1	2,460
WB	1	2,680
Both Dir.	2	5,140
Maple Street south of 1 st Avenue		
NB	1	670
SB	1	1,610
Both Dir.	2	2,280
Walnut Street Ramp		
NB	1	760

^A Daily traffic volumes estimated based on ten times the evening peak hour volume.

The table below shows the severity and types of crashes occurring near the 1st Avenue and Riverside Avenue intersections at Maple Street from 2017 through 2021. There were seven minor crashes indicating there is not a significant safety issue at the intersections.

Crashes at the Riverside Avenue and 1st Avenue/Maple Street Intersections (2017 to 2021)

Crash Type	Crash Severity				Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	
Riverside Avenue/Maple Street					
Fixed Object	-	-	1	2	3
Overturn	-	-	-	1	1
1 st Avenue/Maple Street					
Angle	-	-	1	1	2
Sideswipe	-	-	-	-	-
Fixed Object	-	-	-	1	1
Total	-	-	2	5	7

Spokane Traffic Calming Master Plan

The need for enhanced pedestrian crossing treatments across each roadway in the study area was analyzed based on NCHRP Report 562, using collected traffic data. Based on the findings and pedestrian count data, a marked crosswalk is the preferred treatment for each study roadway.

The study area is comprised of several closely spaced intersections, raised medians/islands and roadways that merge together that result in a high number of conflicting vehicle turn movements. There is a lack of street name and wayfinding signage to help drivers navigate through the area. There are no marked pedestrian crossings to identify the preferred walking route between the neighborhood and downtown. Many intersection approaches serve a low volume of traffic and were considered for restrictions or closure to reduce vehicle conflicts.

Recommended Solution:

To reduce vehicle conflicts at the 1st Avenue/Maple Street intersection and improve pedestrian safety:

- Connect the existing raised medians on Maple Street to prohibit east and west traffic flow on 1st Avenue. The low volume of drivers travelling eastbound on 1st Avenue can reroute one block north to continue east of 1st Avenue.
- Construct a marked pedestrian crossing on Maple Street connecting the sidewalks on the south side of 1st Avenue and the center median on Maple Street.
- Construct a marked pedestrian crossing on Maple Street and Walnut Street ramp connecting the sidewalks on the east side of Walnut Street ramp. Advanced warning signs for the pedestrian crossing on the Walnut Street ramp may be necessary due to horizontal curve.
- Provide a pedestrian connection on the raised median between the marked crossings.



Spokane Traffic Calming Master Plan

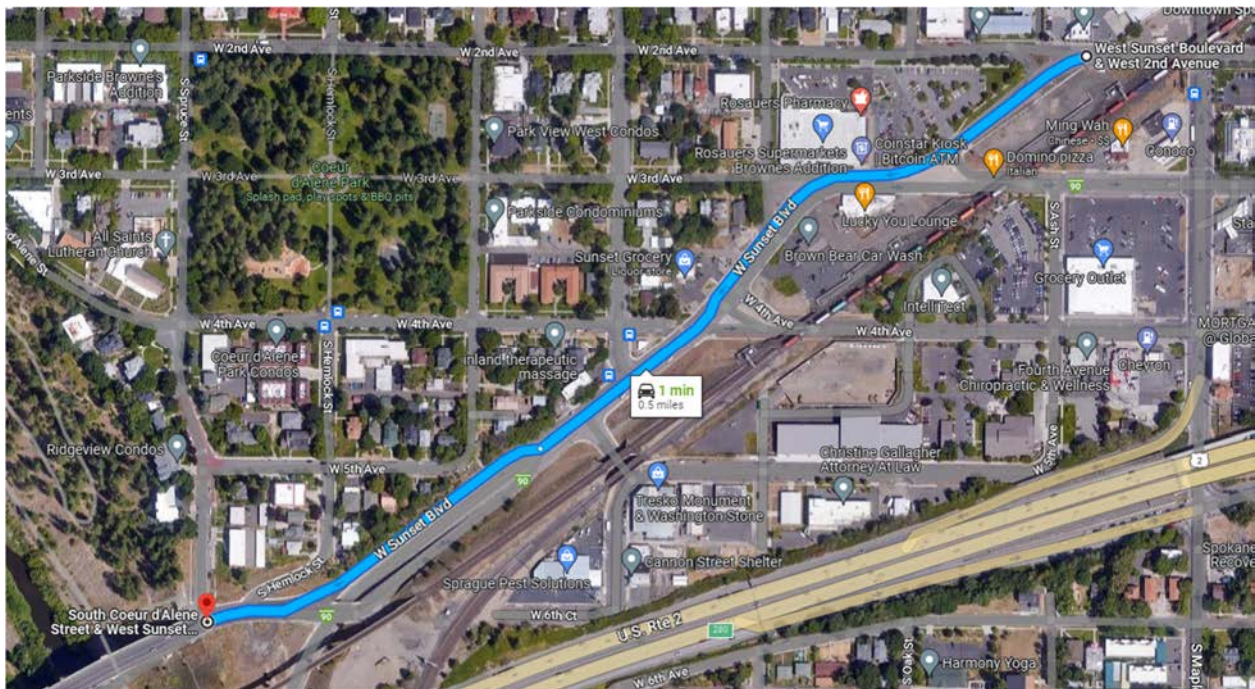
To reduce driver confusion and improve safety in the study area:

- Install a stop bar on the eastbound 1st Avenue approach to Maple Street.
- Install a stop bar on the eastbound Riverside Avenue approach to Maple Street.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Browne's Addition
Project Extent:	Sunset Boulevard from 2 nd Avenue to Spruce Avenue (Coeur d'Alene Street)

Problem Statement: Residents of the Browne's Addition neighborhood raised concerns over speeding, the lack of a pedestrian crossing facility, especially at Cannon Street, along Sunset Boulevard from 2nd Avenue to Spruce Avenue/Coeur d'Alene Street.



Sunset Boulevard from 2nd Avenue to Spruce Avenue (Coeur d'Alene Street)

Traffic Analysis

Sunset Boulevard is classified as an urban principal arterial. Sunset Boulevard in the study area has a posted speed limit of 30 miles per hour, provides 2 lanes in each direction and does not have on-street parking. 2nd Avenue and Spruce Avenue/Coeur d'Alene Street are classified as urban local access roads. 2nd Avenue in the study area has a posted speed limit of 25 miles per hour, provides one lane in each direction and on-street parking on the north side of the street. Spruce Avenue/Coeur d'Alene Street does not have a posted speed limit, provides one lane in each direction and on-street parking on both sides of the street. Both 2nd Avenue and Coeur d'Alene are classified as bike friendly route on the City of Spokane Master Bike and Pedestrian Plan map. The sidewalk network along Sunset Boulevard is in poor

Spokane Traffic Calming Master Plan

condition, especially from 3rd Avenue to Spruce Avenue/Coeur d'Alene Street. There is an unsignalized crosswalk midblock between 4th Avenue and Cannon Street.

The table below shows the daily traffic volumes and 85th percentile speeds on Sunset Boulevard near 4th Avenue and Coeur d'Alene Avenue. The highest average daily volume on Sunset Boulevard was 19,250 westbound vehicles. The 85th percentile speed was 36 miles per hour (six miles per hour greater than the posted speed limit). The data indicates there is a moderate speeding concern. This could be attributed to the uncontrolled intersections on Sunset Boulevard.

2022 Daily Traffic and 85th Percentile Speeds on Sunset Boulevard near 4th Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Sunset Boulevard near 4 th Avenue				
EB	1	10,240	35	
WB	1	9,010	36	
Both Dir.	2	19,250	36	30
Sunset Boulevard near Coeur d'Alene Avenue				
EB	1	8,182	NA	
WB	1	7,090	NA	
Both Dir.	2	15,273	NA	30

^a Traffic data collected in 2015 and 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

The table below shows the severity and types of crashes occurring on the Sunset Boulevard corridor from 2017 through 2021. The corridor experienced 40 crashes over a four-year period. There was a pedestrian fatality at Cannon Street and multiple pedestrian and bicycle crashes at 3rd Avenue and 4th Avenue indicating a safety concern.

Crashes at the Riverside Avenue and 1st Avenue/Maple Street Intersections (2017 to 2021)

Crash Type	Crash Severity				Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	
Sunset Blvd/2 nd Avenue					
Fixed Object	-	-	1	1	2
Sunset Blvd/3 rd Avenue					
Rearend	-	-	1	-	1
Head On	-	-	1	-	1
Angle	-	-	-	1	1
Sideswipe	-	-	-	1	1
Bicycle	-	-	2	-	2
Pedestrian	-	-	1	-	1
Sunset Blvd/Elm Street					
Angle	-	-	-	5	5

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Rearend	-	-	-	1	1
Fixed Object	-	1	-	1	1
Sunset Blvd/4 th Avenue					
Rearend	-	-	-	1	1
Head On	-	-	1	-	1
Angle	-	-	1	7	8
Sideswipe	-	-	-	1	1
Fixed Object	-	-	-	1	1
Pedestrian		2	-	-	2
Sunset Blvd/Cannon Street					
Angle	-	-	2	1	3
Rearend	-	-	-	2	2
Fixed Object	-	-		1	1
Pedestrian	1	-	-	--	1
Sunset Blvd/Coeur d'Alene Street					
Rearend	-	-	-	1	1
Fixed Object	-	-	-	1	1
Total	1	3	10	26	40

The need for enhanced pedestrian crossing treatments across each roadway in the study area was analyzed based on NCHRP Report 562, using collected traffic data. Based on the findings, active or enhanced pedestrian crossing treatments would be appropriate given the high existing traffic volumes and speeds on the study corridor. The study corridor was evaluated to determine the best placement for an enhanced pedestrian crossing with consideration for fronting land use, location of bus stops, estimated crossing demand and spacing from existing protected crossings. 3rd Avenue and 4th Avenue were selected to connect the adjacent commercial uses and bus stops to the neighborhood. Cannon Street was not selected due to its close spacing to 4th Avenue (approximately 300 feet) and lack of walking destinations to the east.

Recommended Solution:

- Install a rectangular rapid flashing beacon on Sunset Boulevard at 3rd Avenue slip lane to downtown (opposite Rosauer's driveway). This location would provide a connection to destinations east on 3rd Avenue.
- Install a rectangular rapid flashing beacon on Sunset Boulevard to replace the existing marked crossing at 4th Avenue. The roadway width, traffic volume and speed warrant higher protection than is provided currently. This location would provide a connection to destinations east on 3rd Avenue. Sunset Boulevard provides sidewalks on the south side of the street that would connect the 4th Avenue crossing to destinations south on Cannon Street.

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- Close the existing eastbound slip lane from Sunset Boulevard to 4th Avenue, adjacent to the pedestrian crossing, to reduce vehicle conflicts and speeds.
- Add raised median on Sunset Boulevard west of 4th Avenue to reduce vehicle conflicts and potential angle crashes.
- Combine the existing 3rd Avenue and Elm Street approaches to a single perpendicular approach to Sunset to reduce conflicts and improve safety.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Browne's Addition
Project Extent:	Spruce St/Coeur d'Alene St/4 th Ave Intersection

Problem Statement: Residents of the Browne's Addition neighborhood raised concerns over safety at the Spruce Street/Coeur d'Alene Street/4th Avenue intersection due to motorists travelling from Sunset Boulevard (750 feet south of the intersection).



Spruce Avenue and Coeur d'Alene Street Intersection

Traffic Analysis

Spruce Street, Coeur d'Alene Street and 4th Avenue are classified as urban local access roads. Coeur d'Alene Street classified as bike friendly route on the City of Spokane Master Bike and Pedestrian Plan map, does not have a posted speed limit, provides one lane in each direction and on-street parking on both sides of the street. Spruce Street does not have a posted speed limit, provides one lane in each direction and on-street parking on both sides of the street. Spruce Street/Coeur d'Alene Street/4th Avenue intersection has unneeded pavement width on the southwest corner.

Spokane Traffic Calming Master Plan

The table below shows the daily traffic volumes and 85th percentile speeds on Spruce Street near Coeur d'Alene Avenue. The average daily volume on Spruce Street was 892 vehicles. The 85th percentile speed was 26 miles per hour (one mile per hour greater than the posted speed limit). The data indicates there is not a speeding concern.

2022 Daily Traffic and 85th Percentile Speeds on Spruce Street

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Spruce Street north of Coeur d'Alene Street/4 th Avenue				
NB	1	401		
SB	1	491		
Both Dir.	2	892	26	25

^a Traffic data collected in 2015. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

The table below shows the severity and types of crashes occurring at the Spruce Street/Coeur d'Alene Street/4th Avenue intersection from 2017 through 2021. There were three minor crashes indicating there is not a significant safety issue at the intersections.

Crashes at Spruce Street/Coeur d'Alene Street Intersection (2017 to 2021)

Crash Type	Crash Severity				Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	
Angle	-	-	-	3	3
Total	-	-	-	3	3

Recommended Solution:

The following traffic calming elements are recommended at the Spruce Street/Coeur d'Alene Street/4th Avenue intersection:

- Add pedestrian crosswalk markings at the east and north legs of the intersection
- Add posted speed limit sign in northbound direction at Sunset Boulevard and Coeur d'Alene Street to alert drivers coming off Sunset Boulevard
- Extend out the curb area on the southwest corner to reduce the intersection size, either with a new curb or pavement markings

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Cliff-Cannon
Project Extent:	Cedar Street – 12 th to 21 st Avenue

Problem Statement: Residents of the Cliff-Cannon neighborhood raised concerns over speeding on Cedar Street through the neighborhood. The study corridor includes Cedar Street from 12th to 21st Avenue.

Traffic Analysis

Cedar Street within the study area is classified as a local street with a posted speed limit of 30 miles per hour. The study segment provides two lanes with a center turn lane (north of 14th Avenue), sidewalks and bike lanes. Pockets of on-street parking is allowed south of 15th Avenue. There is a marked pedestrian crossing at 14th Avenue.

The table below shows the 2022 daily traffic volumes and 85th percentile speeds on Cedar Street within the study area. The highest daily volume on Cedar Street was 12,975 vehicles at 12th Avenue. The highest 85th percentile speed was 45 miles per hour in the southbound direction near 16th Avenue (15 miles per hour greater than the posted speed limit). The data indicates there is a significant speeding concern.

2022 Estimated Daily Traffic and 85th Percentile Speeds on Cedar Street

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
North of 12 th Avenue				
NB	1	8,835	42	30
SB	1	8,008	41	
Both Dir.	2	16,843	42	
North of 16 th Avenue				
NB	1	5,676	40	30
SB	1	4,907	45	
Both Dir.	2	10,583	43	

^a Traffic data collected in May 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. Speed data collected in 2022.

The need for enhanced pedestrian crossing treatments across Cedar Street using the highest daily volume and 85th percentile speed along the study segment was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.1 Based on the finding, red treatments (e.g., HAWK signal beacon, midblock pedestrian signal) are the preferred treatment if there are 20 or

¹ NCHRP Report 562: *Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

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more pedestrian crossings during the peak hour. Although pedestrian data is not available, it is assumed the 20 or more pedestrian crossing threshold is met due to surrounding urban neighborhoods.

The table below shows the severity and types of crashes occurring on Cedar Street between 12th Avenue and 21st Avenue from 2017 through 2021. There were 15 total crashes and included two minor injury crashes, indicating there is a minor safety concern along the segment.

Crashes on Cedar Street between 5th Avenue and 11th Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Angle	-	-	-	-	4	4
Head On					1	1
Fixed Object			1		4	5
Rear End	-	-	1	-	4	5
Total	0	0	2	0	13	15

The speeding issue on Cedar Street is a concern. The roadway provides a direct connection through the neighborhood with uncontrolled intersections. There are bike lanes and pockets of on-street parking that limit the opportunity to narrow the roadway. There are segments near intersections where on-street parking is restricted and curb extensions could be added for traffic calming.

Recommended Solution:

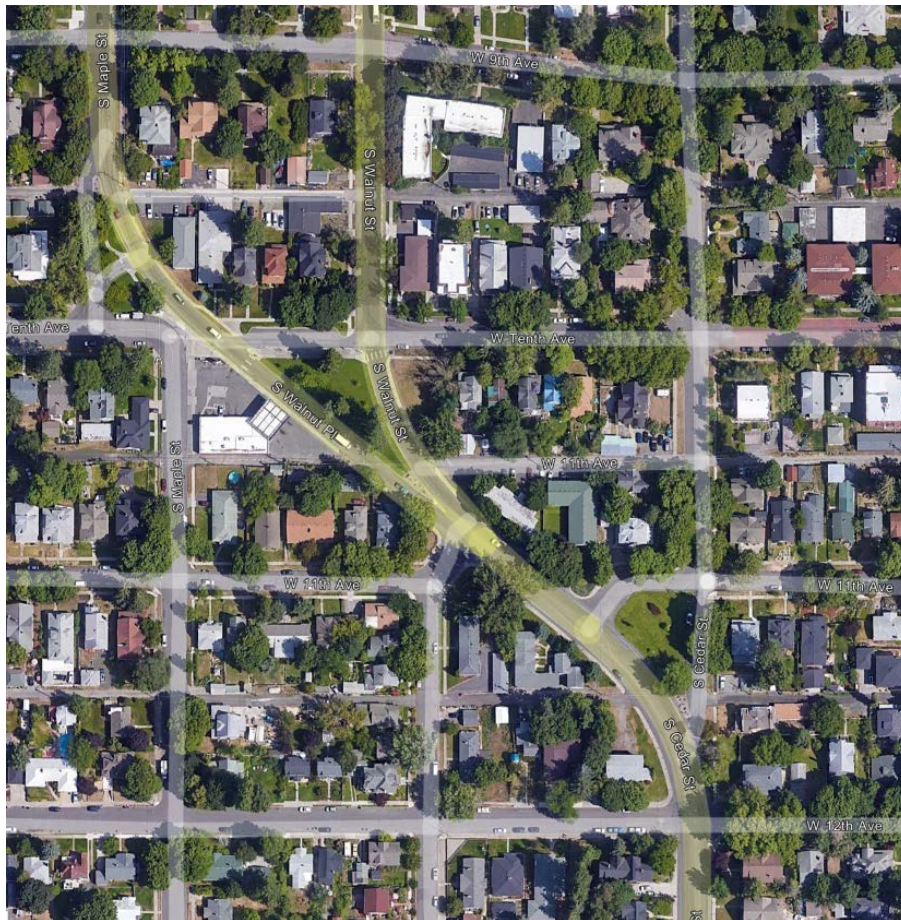
Conditions on Cedar Street could benefit from the addition of traffic calming elements to manage driver speeds and improve pedestrian crossing safety. The following improvements are recommended.

- Install a rectangular rapid flashing beacon at the existing marked crosswalk at 14th Avenue to increase the visibility of the crossing.
- Install raised curb extensions on Cedar Street at key locations to narrow the roadway, locations to consider include:
 - North and south side of 17th Avenue
 - North and south side of 19th Avenue

Spokane Traffic Calming Master Plan

District: 2
Neighborhood: Cliff-Cannon
Project Extent: Walnut Street/Maple Street and Cedar Street

Problem Statement: Residents of the Cliff-Cannon neighborhood raised concerns over speeding, congestion, and difficult pedestrian crossings due to the wide streets at the Walnut Street/Maple Street and Cedar Street intersection. Figure below shows the study area.



Walnut Street/Maple Street and Cedar Street Intersection

Traffic Analysis

Walnut Street, Maple Street, Walnut Place and Cedar Street (south of 11th Avenue) are classified as an urban principal arterial with a posted speed limit of 30 miles per hour. North of 11th Avenue, Cedar Street transitions into Walnut Place then Walnut Street and Walnut Place-Maple Street split into a north-south couplet facility. Walnut Street operates one-way northbound and Walnut Place-Maple Street operates one-way southbound. Both streets provide two lanes with bike lanes. Walnut Place provides two lanes and a two-way-left-turn lane. Marked crosswalk and warning signs are provided at Walnut Place at 10th Avenue and sidewalks are provided within the study area. Transit Route 42 and 43

Spokane Traffic Calming Master Plan

travels on Walnut Place/Cedar Street, where 11th Avenue has stops for route 43 and 12th Avenue has stops for Route 42 and 43.

The table below shows the estimated 2022 daily traffic volumes and 85th percentile speeds on Walnut Place and Cedar Street within the study area. The highest daily volume within the study area was 16,843 vehicles on Cedar Street north of 12th Avenue. The highest 85th percentile speed was 42 miles per hour (12 miles per hour greater than the posted speed limit) on Cedar Street north of 12th Avenue. The data indicates there is a significant speeding issue.

2022 Estimated Daily Traffic and 85th Percentile Speeds within Study Area

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
Walnut Place North of 11 th Avenue ^a				
NB	1	7,930		
SB	1	7,625		30
Both Dir.	3	15,555	35	
Cedar Street North of 12 th Avenue ^b				
NB	1	8,835	42	
SB	1	8,008	41	30
Both Dir.	2	16,843	42	

^a Traffic data collected in March 2015. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

^b Traffic data collected in May 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions. Speed data collected in 2022.

The table below shows the severity and types of crashes occurring within the study area from 2017 through 2021. There were eight total crashes, including one injury crash. Fixed objects related collisions were the most common crash type, representing 50 percent of all crashes.

Crashes on Walnut Street/Maple Street and Cedar Street (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Rear End	-	-	-	-	2	2
Sideswipe	-	-	-	-	1	1
Fixed Objects	-	-	-	1	3	4
Others	-	-	-	-	1	1
Total	0	0	0	1	7	8

The need for enhanced pedestrian crossing treatments was analyzed for Walnut Street/Maple Street and Cedar Street based on NCHRP Report 562. Based on the findings, red treatment (e.g., HAWK signal beacon, midblock pedestrian signal) is the preferred treatment if there are 20 or more pedestrian

Spokane Traffic Calming Master Plan

crossings during the peak hour. It was assumed the pedestrian crossing is met given the surrounding urban neighborhood, bus stops and commercial uses.

The speeding issue on the arterials is a major concern. The roadways appear to have wide lane widths (more than 12 feet) along several segments. Speeds could be better managed with narrower vehicle lanes and the extra width could be allocated to provide wider bike lanes (currently 5 feet). Installing a raised median on specific segments could also manage speeds, reduce turning conflicts and improve safety for all users.

Recommended Solution:

Conditions on the study corridor could benefit from the addition of traffic calming elements to manage driver speeds and improve pedestrian crossing safety. The following improvements are recommended.

- Close the Cedar Street slip lane north of 12th Avenue by expanding the existing median (see red area below). The slip lane encourages vehicles travelling north on Cedar Street to enter the neighborhood at higher speeds. Access to Cedar Street would be provided by the 11th Avenue intersection one block north.



- Restripe Cedar Street, Walnut Place, Walnut Street, and Maple Street with 11-foot vehicle lanes and 6-foot bike lanes.
- Install a marked crossing with a rectangular rapid flashing beacon across 12th Avenue to increase pedestrian crossing safety.

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- Install a raised median on Cedar Street between 11th and 12th Avenue, retain the existing southbound left turn lane to 12th Avenue with minimal storage (approximately 75 feet). The alley intersection on the west side of Cedar Street would be restricted to right-in/right-out movements.



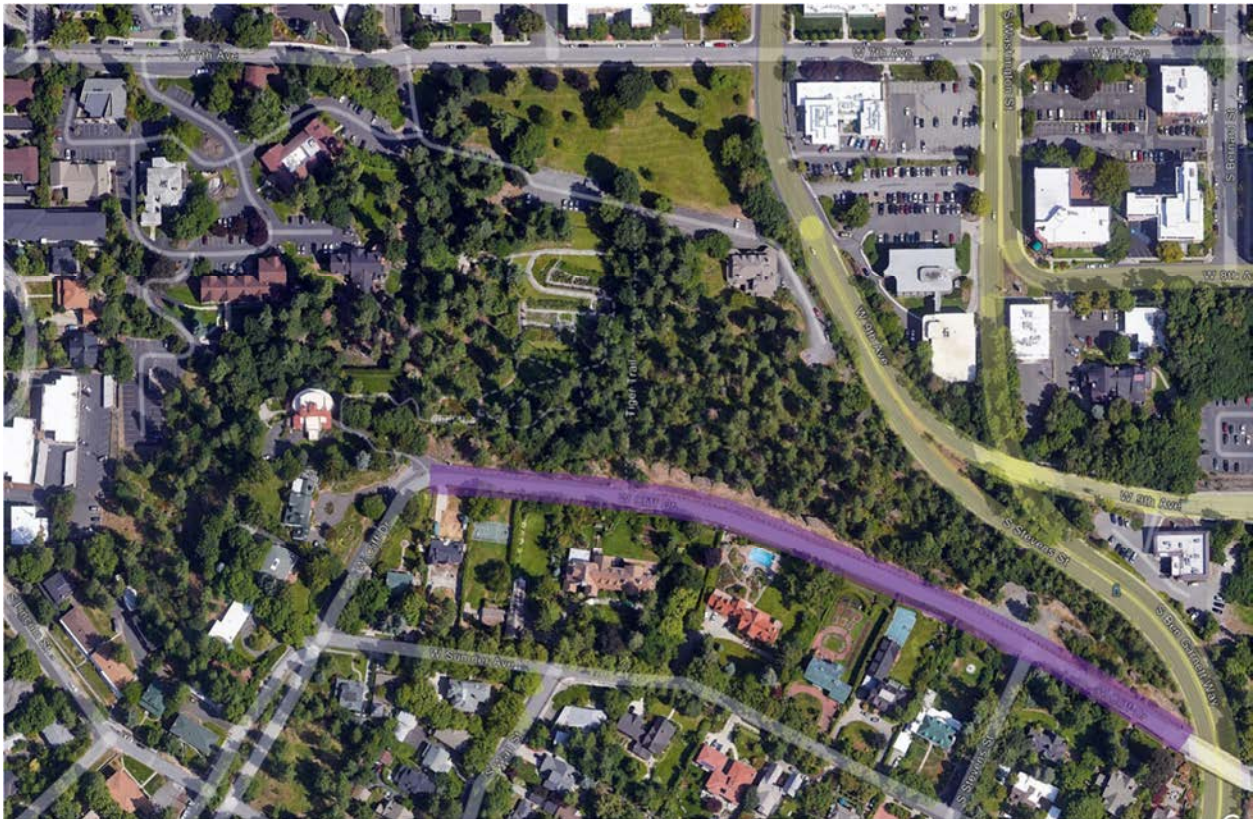
- Extend the existing center raised median on Walnut Place and Walnut Street to the south, retain the existing southbound left turn lane to 11th Avenue with minimal storage (approximately 75 feet). The Walnut Street intersection on the west side of Cedar Street would be restricted to right-in/right-out movements.



Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Cliff-Cannon
Project Extent:	Cliff Drive at Edwidge Woldson Park

Problem Statement: Residents of the Cliff-Cannon neighborhood raised concerns over speeding, noise, parking availability, pedestrian safety, and Tiger Trail connections along Cliff Drive at Edwidge Woldson Park. Figure below shows the study segment.



Cliff Drive at Edwidge Woldson Park

Traffic Analysis

Cliff Drive within the study area is classified as local street with posted speed limit of 20 miles per hour. The study corridor provides two lanes. Sidewalks, protected crossing, on-street parking, and bike facilities are not provided along the study corridor. Edwidge Woldson Park is located north of Cliff Drive and has approximately 40 on-site parking spaces while Cliff Drive has no vehicular access to the park. People walking and biking can access the Tiger Trail inside the park via Cliff Drive. Spokane Viewpoint is located next to Cliff Drive on the west side of the street where illegal parking is often observed.

Spokane Traffic Calming Master Plan

The table below shows the estimated 2022 daily traffic volumes on Cliff Drive within the study area. The daily volume on Cliff Drive was 738 vehicles west of Grove Street. Speed data was not available for the study corridor.

2022 Estimated Daily Traffic on Cliff Drive

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a
West of Grove Street		
EB	1	258
WB	1	480
Both Dir.	2	738

^a Traffic data collected in June 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

The table below shows the severity and types of crashes occurring on Cliff Drive at Edwidge Woldson Park from 2017 through 2021. There were five total crashes with no injury crashes. Two of the fixed object related collisions involved parked vehicles. On-street parking is not provided on the study corridor indicating illegal parking may be a safety concern.

Crashes on Cliff Drive near Edwidge Woldson Park (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Property Damage Only	Unknown	
Sideswipe	-	-	-	-	1	1
Fixed Object	-	-	-	4	-	4
Total	0	0	0	4	1	5

The pavement on Cliff Drive ranges from 20 to 25-foot wide. Providing a consistent 20-foot-wide pavement section would restrict vehicle speeds and calm traffic. There is additional available right-of-way but the north side of the street has topography constraints, especially the west end. The north side of the street provides an informal gravel walking path and boulders to prevent on-street parking. A sidewalk on the north side of the roadway would improve safety for pedestrians and replace the boulders to prevent on-street parking.

Cliff Drive within the study area is currently classified as a bike friendly route per the Spokane Bicycle Master Plan, people biking need to share a lane with auto vehicles. The study corridor has a future plan of neighborhood greenway per the Plan. The low volumes on Cliff Drive indicate bicycles can share the roadway with vehicles.

Recommended Solution:

- Pending civil review, install a curb-tight sidewalk on the north side of the roadway and provide a 20-foot-wide pavement section.
- Pending civil review, construct a parking lot at the viewpoint. An initial review indicates up to 6 parking spaces could be provided to reduce demand for on-street parking.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Cliff-Cannon
Project Extent:	5 th Avenue Intersections at Lincoln Street and Monroe Street

Problem Statement: Residents of the Cliff-Cannon neighborhood raised concerns over pedestrian crossing safety on 5th Avenue at Lincoln Street and Monroe Street. Figure below shows the study intersections.



5th Avenue at Lincoln Street (Right) and Monroe Street (Left)

Traffic Analysis

Lincoln Street and Monroe Street are classified as an urban principal arterial, and 5th Avenue is classified as an urban major collector east of Monroe Street and a local street west of Monroe Street, all with a posted speed limit of 25 miles per hour. Monroe Street operates one-way southbound, Lincoln Street operates one-way northbound, both streets provide two lanes. 5th Avenue west of Monroe Street and east of Lincoln Street provides two lanes with on-street parking. 5th Avenue in between Monroe Street and Lincoln Street provides two lanes and a center two-way-left-turn lane. Sidewalks are provided but no bike facilities are provided. Both intersections are two-way-stop controlled with stop signs on the 5th Avenue approaches. Marked crosswalk with warning sign are provided on the north leg of 5th Avenue and Monroe Street. Marked crosswalks are provided on all approaches at 5th Avenue and Lincoln Street with warning sign on the south leg. Transit Route 42 travels on 5th Avenue and has bus stops at both intersections.

Spokane Traffic Calming Master Plan

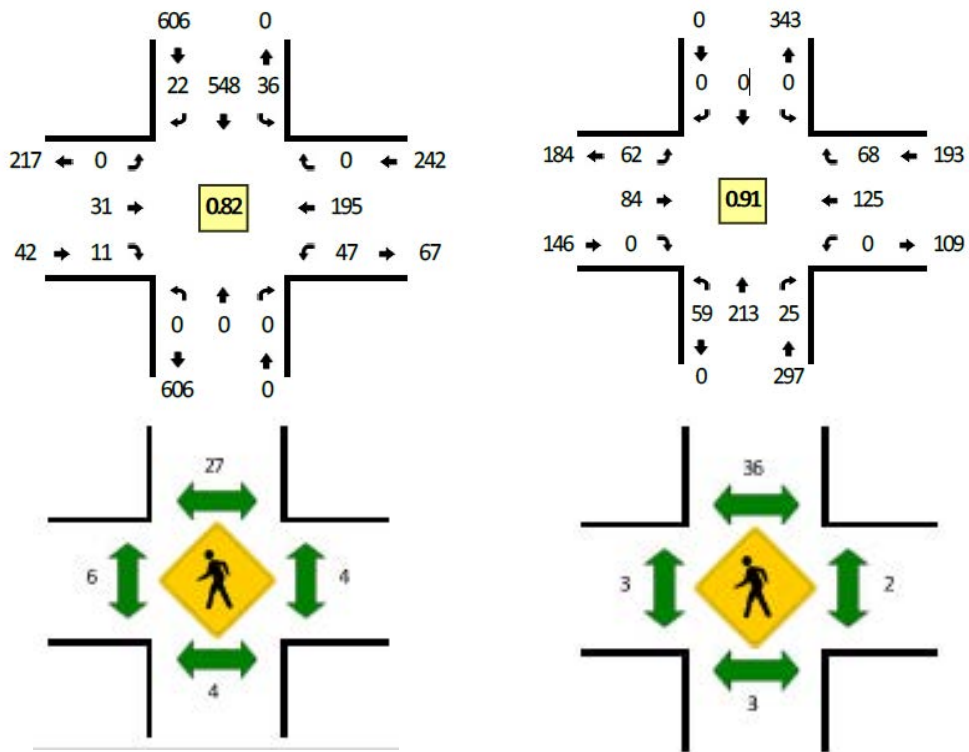
The table below shows the estimated 2022 daily traffic volumes and 85th percentile speeds on 5th Avenue. The highest daily volume within the study area was 4,635 vehicles east of Lincoln Street. The highest 85th percentile speed was 24 miles per hour indicating there is not a speeding issue.

2022 Estimated Daily Traffic and 85th Percentile Speeds on 5th Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
East of Monroe Street				
EB	1	2,063		
WB	1	2,133		25
Both Dir.	3	4,196	22	
East of Lincoln Street				
EB	1	1,604		
WB	1	3,031		25
Both Dir.	2	4,635	24	

^a Traffic data collected in May 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

The figures below show the existing PM peak hour traffic volumes and pedestrian crossing volumes at the study intersections, based on a traffic count from November 1, 2022. Pedestrian crossing volumes are highest on the north leg of both intersections.



PM Peak Hour Traffic and Pedestrian Volume at 5th Avenue/Monroe St (Left) and Lincoln St (Right)

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The table below shows the severity and types of crashes occurring at 5th Avenue and Monroe Street from 2017 through 2021. There were 12 total crashes, including six injury crashes. Angle collisions were the most common crash type (representing 58 percent of all crashes).

Crashes at 5th Avenue/Monroe Street (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Angle	-	1	1	4	1	7
Turning	-	-	-	-	4	4
Sideswipe	-	-	-	-	1	1
Total	0	1	1	4	6	12

The table below shows the severity and types of crashes occurring at 5th Avenue and Lincoln Street over the last five years. There were 27 total crashes, including seven injury crashes. Angle collisions were the most common crash type (representing 74 percent of all crashes).

Crashes at 5th Avenue/Lincoln Street (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Angle	-	-	2	2	16	20
Rear End	-	-	-	-	1	1
Fixed Object	-	-	1	1	3	5
Ped/Bike	-	-	-	1	-	1
Total	0	0	3	4	20	27

Recommended Solution:

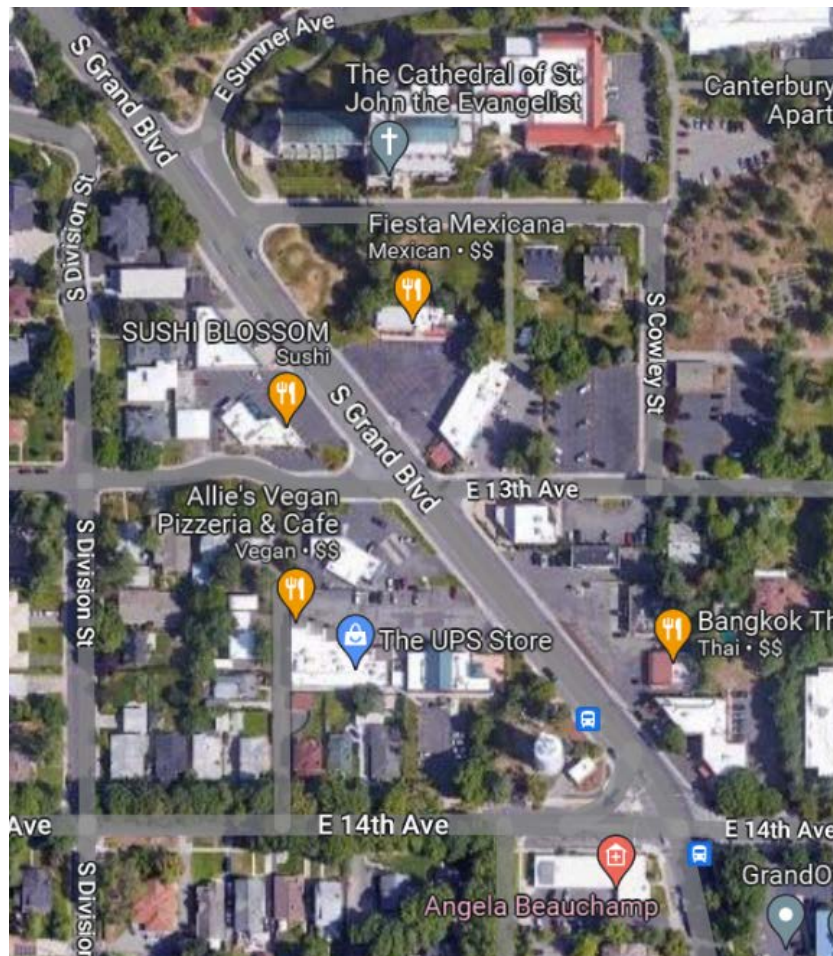
The following improvements are recommended to increase pedestrian safety at the study intersections:

- Install a rectangular rapid flashing beacon on the north leg of the Monroe Street/5th Avenue intersection to increase the visibility of the crossing.
- Install a rectangular rapid flashing beacon on the north leg of the Lincoln Street/5th Avenue intersection to increase the visibility of the crossing.
- Install marked crossings at the east, west and south legs of the Monroe Street/5th Avenue intersection to increase the visibility of the crossing, similar to Lincoln Street/5th Avenue.
- Install stop bars on the 5th Avenue approaches to Monroe Street, similar to Lincoln Street.

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District:	2
Neighborhood:	Cliff-Cannon, Rockwood
Project Extent:	14 th Avenue/Grand Blvd, Grand Blvd from Sumner Avenue to 14 th Avenue

Problem Statement: Residents of the Cliff-Cannon neighborhood raised concerns over lack of a left turn lane, confusing intersection geometry, increased speeds, and narrow lanes at 14th Avenue and Grand Boulevard. Residents of the Rockwood neighborhood raised concerns over pedestrian crossing safety on Grand Boulevard – difficult to cross a high-volume street. Figure below shows the study area.



Grand Boulevard from Sumner Street to 14th Avenue

Traffic Analysis

Grand Boulevard within the study area is classified as an urban principal arterial with a posted speed limit of 30 miles per hour. 14th Avenue is classified as an urban major collector west of Grand Boulevard and a local access street east of Grand Boulevard, both with a posted speed limit of 25 miles per hour. Grand Boulevard provides four lanes and 14th Avenue provides two lanes. There is a marked pedestrian

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crossing with a raised median on Grand Boulevard at 13th Avenue. The intersection is signalized with marked crosswalks. Sidewalks are provided but no bike facilities are provided. Transit Route 4 serves Grand Boulevard and has bus stops at 14th Avenue.

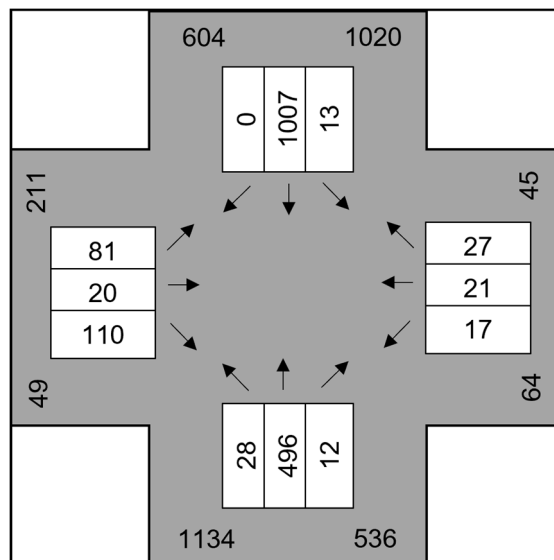
The table below shows the estimated 2022 daily traffic volumes on Grand Boulevard within the study area. The highest daily volume within the study area was 17,948 vehicles north of 12th Avenue. The highest 85th percentile speed was 38 miles per hour (eight miles per hour greater than the posted speed limit), indicating there is a speeding issue near 12th Avenue but not 14th Avenue.

2022 Estimated Daily Traffic and 85th Percentile Speeds on Grand Boulevard at 14th

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
North of 12 th Avenue				
EB	1	9,108	39	
WB	1	8,840	37	30
Both Dir.	2	17,948	38	
South of 14 th Avenue				
EB	1	8,665	31	
WB	1	8,802	30	30
Both Dir.	2	17,467	31	

^a Traffic data collected in May 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

The figure below shows the existing PM peak hour traffic volumes at the study intersection, based on a traffic count from April 24, 2018, factored up to 2022.



PM Peak Hour Traffic at 14th Avenue/Grand Boulevard

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The table below shows the severity and types of crashes occurring at the study intersection from 2017 through 2021. There were 16 total crashes, including nine injury crashes. Left turning collisions were the most common crash type (representing 50 percent of all crashes). Additionally, there were two pedestrian related crashes involving left turning vehicles.

Crashes at 14th Avenue/Grand Boulevard (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Turning	-	-	2	1	5	8
Angle	-	-	-	-	1	1
Rear End	-	2	-	1	-	3
Fixed Objects	-	-	-	-	1	1
Ped/Bike	-	1	-	2	-	3
Total	0	3	2	4	7	16

Given the relatively high 85th percentile speeds and the turning crash trend, a road diet was considered as means to reduce travel speeds and enhance safety on the study segment. With an estimated 18,000 vehicles per day, Grand Boulevard could be reduced to a three-lane cross section with a center two-way left-turn lane. As a point of reference, the planning level capacity of a two-lane urban arterial is 18,300 vehicles per day (assuming left-turn lanes are provided on the mainline at signalized intersections).¹

A road diet is expected to reduce crashes by 29%, per the Crash Modification Factors Clearinghouse.² A road diet on Grand Boulevard may also result in more uniform travel speeds on the corridor and is expected to reduce the average travel speed by 3 mph.³ Road diets are more successful when implemented on longer stretches of roadway; therefore, it is recommended that the lane reduction continue beyond the study area. When analyzing the cross section and daily traffic volumes on Grand Boulevard, it is recommended that the road diet extend 1.7 miles, from 9th Avenue/McClellan Street (at the north end) to 33rd Avenue (at the south end). The 9th Avenue/McClellan Street intersection is a logical terminus on the north end because Grand Boulevard ends and provides opportunity to drop and add lanes at intersection roadways. 33rd Avenue was recommended as the south terminus because Grand Boulevard transitions to a three-lane cross section.

Grand Boulevard in the study area is designated as a “moderate traffic (shared)” route in the Spokane Bike and Pedestrian Master Plan. If the cross-section on Grand Boulevard is reduced to three lanes, there is an opportunity to add bike facilities. The existing curb-to-curb width would allow buffered bike lanes to be added to the corridor segments from 9th to 17th Avenue and 27th to 33rd Avenue. The corridor segment between 17th and 27th Avenue is constrained, allowing a buffered bike lane in the uphill

¹ *Highway Capacity Manual 6th Edition: A Guide for Multimodal Mobility Analysis*. Page 16-30, Exhibit 16-16. Washington, DC: The National Academies Press.

² *Crash Modification Factors Clearinghouse*, <https://www.cmfclearinghouse.org/detail.cfm?facid=199>

³ *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed*. Federal Highway Administration. July 2014.

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(southbound) direction and shared lane treatment in the downhill (northbound) direction. Bicyclists are anticipated to travel at higher speeds in the downhill direction and more comfortably share a lane with vehicles.

The need for enhanced pedestrian crossing treatments was analyzed for Grand Boulevard based on NCHRP Report 562. The analysis considered both the existing four-lane section and the proposed three-lane section. Based on the findings for both cross-sections, a red treatment (e.g., HAWK signal beacon, midblock pedestrian signal) is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. It was assumed the pedestrian crossing is met given the surrounding urban neighborhood, bus stops and commercial uses. There is an existing marked crosswalk at 13th Avenue and 14th Avenue is a signalized intersection. A new crossing at Sumner Street was considered to improve crossing improvements however is not recommended due the roadway grade and limited sight distance in that location.

The 14th Avenue/Grand Boulevard intersection has several design features that may contribute to driver confusion and safety concerns. The east and west 14th Avenue approaches have a significant offset. The south curb on 14th Avenue just west of the intersection is angled and widens towards Grand Boulevard. The north side of 14th Avenue just west of the intersection provides an on-street parking pocket that appears to have low demand. Due to the skewed north leg, there is a channelized southbound right turn lane to accommodate turns movements.

Recommended Solution:

It is recommended that a road diet be considered on Grand Boulevard, reducing the current four-lane cross section to a three-lane cross section with a center turn-lane. The addition of a center turn-lane is expected to reduce crashes, while the lane reduction is expected to reduce vehicle speeds. It is recommended that the City of Spokane further study the expected impacts of the road diet. The road diet can be considered along the 1.7-mile segment from 9th Avenue/McClellan Street (at the north end) to 33rd Avenue (at the south end).

Buffered bike lanes in both directions are recommended from 9th to 17th Avenue and 27th to 33rd Avenue. A buffered bike lane in the uphill direction and shared lane treatment in the downhill direction are recommended between 17th and 27th Avenue.

The following improvements are recommended to reduce driver confusion and increase safety at the study intersection:

- Install a rectangular rapid flashing beacon at the existing marked crosswalk on the north leg of the Grand Boulevard/13th Avenue intersection to increase the visibility of the crossing. Adding a raised median would be recommended if Grand Boulevard is reconfigured to a three-lane section.
- Reconstruct the west leg of the intersection (see figure below).

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- Relocate the curbs to be parallel and match the curbs on the east leg to remove the approach offset.
- Fill in the on-street parking pocket on the north side.
- Remove the raised center median.
- Expand the separated southbound right turn lane island to narrow the westbound lane.



- Angle collisions at the intersection could be mitigated by upgrading the traffic signal timing with split phasing for the east and westbound approaches.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Comstock
Project Extent:	33 rd Avenue/Lincoln Drive intersection

Problem Statement: Residents of the Comstock neighborhood raised concerns over speeding and pedestrian crossings safety, specifically the visibility due to on-street parking and vegetation, at 33rd Avenue and Lincoln Drive intersection. The figure below shows the study intersection.



33rd Avenue and Lincoln Drive Intersection

Traffic Analysis

33rd Avenue and Lincoln Drive within the study area are classified as urban local access streets. 33rd Avenue to the west and Lincoln Drive to the south of the intersection have a posted speed limit of 25 miles per hour while 33rd Avenue to the east and Lincoln Drive to the north have posted speed limit of 20 miles per hour along the Comstock Park frontage. All approaches provide two lanes with on street parking. Sidewalks are provided along the Comstock Park frontage and the west side of Lincoln Drive north of 33rd Avenue.

The northeast corner of the intersection has a curb extension and marked crosswalks are provided on the north and east legs of the intersection. No bike facilities are available within the study area. Both 33rd Avenue and Lincoln Drive has current classification of bike friendly route per the Bicycle Facility Classification in the City Bicycle Master Plan. 33rd Avenue is a planned future neighborhood greenway while there is no plan designated for Lincoln Drive in the City's Bicycle Master Plan.

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The study intersection is uncontrolled. Vegetation (large trees) on the southwest and southeast corner and on-street parking appear to affect intersection sight distance and stopping sight distance, as shown in the below figure.



View Looking North on Lincoln Drive

The table below shows the 2022 daily traffic volumes and 85th percentile speeds on 33rd Avenue between Lincoln Drive and Howard Street (east of the study intersection). The daily volume within the study area was 451 vehicles on 33rd Avenue. The 85th percentile speed was 29 miles per hour (nine miles per hour greater than the posted speed limit), indicating there is a speeding concern.

2022 Daily Traffic and 85th Percentile Speeds on 33rd Avenue

Direction	# Lanes	2022 Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Between Lincoln Drive and Howard Street				
EB	1	232	29	
WB	1	219	29	20
Both Dir.	2	451	29	

^a Traffic data collected in November 2022.

The need for enhanced pedestrian crossing treatments across 33rd Avenue was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.¹ Based on the finding, a marked crosswalk is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. Although pedestrian data is not available, it is assumed the 20 or more pedestrian crossing threshold is met due to the adjacent park and surrounding medium density, residential neighborhoods.

¹ NCHRP Report 562: *Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

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One angle related crash was reported at the 33rd Avenue/Lincoln Drive intersection from 2017 through 2021 and caused property damage only, indicating citizen safety concerns are not appearing in the collision record.

Warrants to add stop signs on a local street intersection were assessed below per the MUTCD guidelines. At least one of the conditions must be true to consider the use of stop or yield signs. The analysis shows the sight distance limitation is met at the intersection, which could be mitigated by trimming/removing the adjacent vegetation and improving driver visibility at the intersection rather than installing stop or yield signs.

Local Road Single or Two-Way Stop Warrants

MUTCD	Description	Status?	
2B.04(04)A	Combined (vehicle, bicycle, ped) volume entering the intersection from all approaches averages more than 2,000 units per day	Lincoln Street data not available. Daily volume on 33 rd Avenue is 451 vehicles. Not likely to meet the criteria.	
2B.04(04)B	Ability to see conflicting traffic on an approach is not sufficient to allow a road user to stop/yield in compliance with the normal right-of-way rule if such stopping/yielding is necessary.	Y	
2B.04(04)C	Crash records indicate that five or more crashes that involve failure to yield ROW at the intersection under the normal ROW rule have been reported within a 3-yr period or >= 3 have been reported within a 2-yr period.	2017	0
		2018	0
		2019	1
		2020	0
		2021	0

Recommended Solution:

The following improvements are recommended to manage vehicle speeds and improve driver visibility at the study intersection:

- Install speed bumps along the Comstock Park frontage at the following locations:
 - On 33rd Avenue midblock between Lincoln Street and Howard Street
 - On Lincoln Street midblock between Melinda Lane and Comstock Court
- Install a curb extension on the west side of the existing north leg crosswalk.
- Install a curb extension on the south side of the existing east leg crosswalk.
- Trim vegetation on the southwest and southeast corners to provide a full view of the intersection.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Comstock
Project Extent:	37 th Avenue/Perry Street Intersection

Problem Statement: Residents of the Comstock neighborhood raised concerns over traffic volume and congestion at 37th Avenue and Perry Street intersection. Figure below shows the study intersection.



37th Avenue and Perry Street Intersection

Traffic Analysis

37th Avenue within the study area is classified as an urban minor arterial, Perry Street is classified as an urban major collector. Both streets provide two lanes, a posted speed limit of 30 miles per hour and no on-street parking. Sidewalks are provided within the study area while bike lanes are only available on 37th Avenue west of Perry Street. No marked crosswalks are provided at the study intersection. There are no marked pedestrian crossings near the intersection. The study intersection is all-way stop controlled and the 37th Avenue approaches are offset. Transit Route 43 travels on 37th Avenue and has bus stops at the study intersection.

The table below shows the estimated 2022 daily traffic volumes and 85th percentile speeds on 37th Avenue and Perry Street. The highest daily volume was 7,872 vehicles on Perry Street north of 33rd Avenue. The highest 85th percentile speed was 36 miles per hour on 37th Avenue (six miles per hour greater than the posted speed limit), indicating there is a speeding issue.

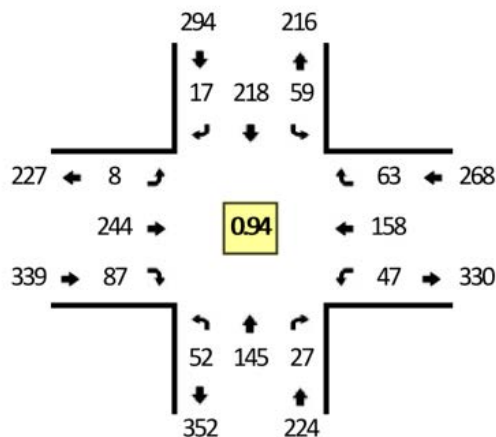
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2022 Estimated Daily Traffic and 85th Percentile Speeds on 37th Avenue and Perry Street

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Perry Street South of 32 nd Avenue				
NB	1	4,168		
SB	1	3,704		30
Both Dir.	2	7,872	34	
37 th Avenue East of Perry Street				
EB	1	3,482		
WB	1	3,510		30
Both Dir.	2	6,992	36	

^a Traffic data collected March 2015 and April 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

The figure below shows the existing PM peak hour traffic volumes at the study intersection, based on a traffic count conducted in November 2022.



PM Peak Hour Traffic on 37th Avenue and Perry Street

A review of the peak hour volumes suggests the current all-way stop control is appropriate with balanced volumes on each intersection approach. A signal warrant analysis was conducted for the intersection based on the PM peak hour volumes and was not met. The offset approaches on 37th Avenue likely contribute to longer turn movements and delays at the intersection compared to an aligned all-way stop controlled intersection. No change in intersection control is recommended.

The table below shows the severity and types of crashes occurring at the study intersection from 2017 through 2021. There were eight total crashes, including three injury crashes. Fixed objects related collisions were the most common crash type, representing 50 percent of all crashes. Three of the fixed objects related crashes, including one major injury crash, involving the influence of alcohol.

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Crashes at 37th Avenue/Perry Street (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Rear End	-	-	-	1	-	1
Angle	-	-	1	-	2	3
Fixed Objects	-	1	-	-	3	4
Total	0	1	1	1	5	8

The need for enhanced pedestrian crossing treatments was analyzed for 37th Avenue and Perry Street based on NCHRP Report 562. Based on the findings, a crosswalk is the preferred treatment crossing if there are 20 or more pedestrian crossings during the peak hour. It was assumed the pedestrian crossing is met given the surrounding urban neighborhood and adjacent bus stops.

There is no on-street parking allowed near the intersections therefore curb extensions cannot be considered for traffic calming.

Recommended Solution:

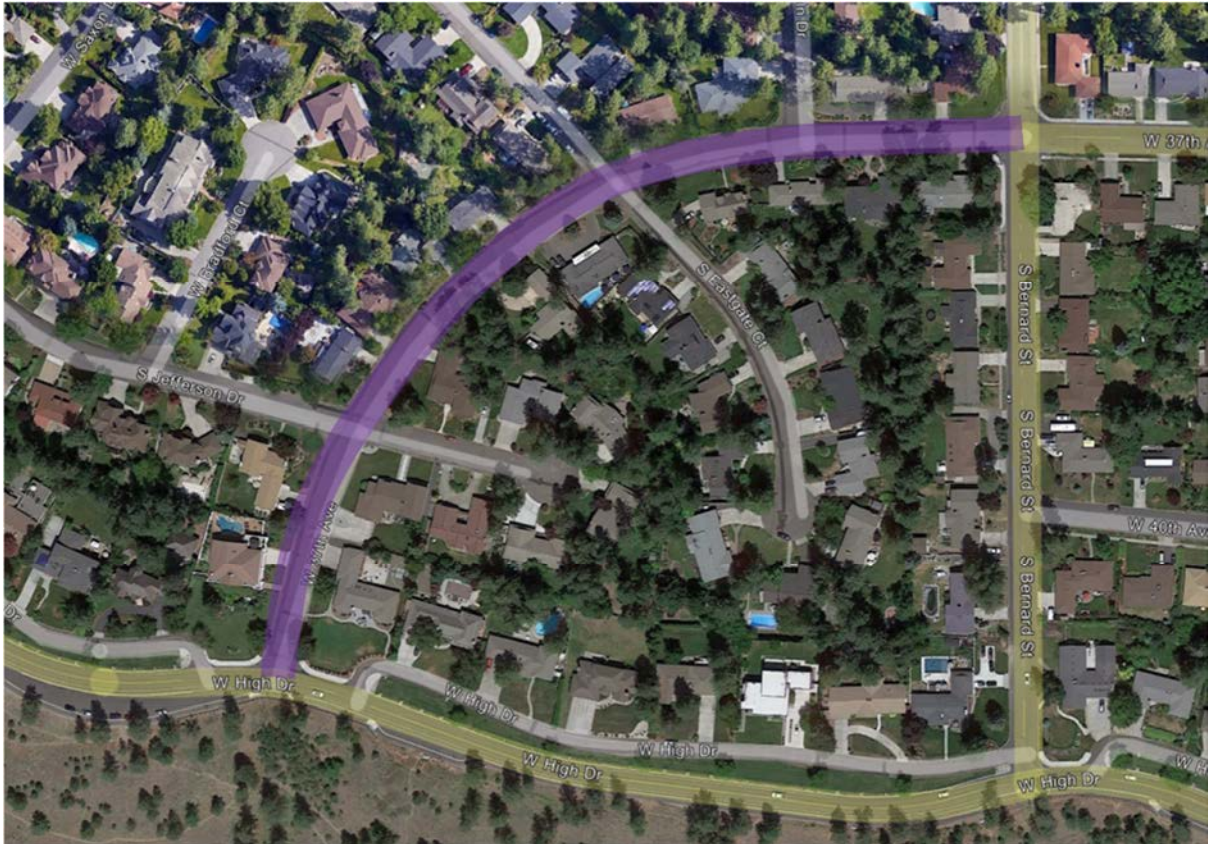
The following improvements are recommended to calm traffic volumes and improve overall safety at the study intersection:

- Install curb extensions on the northeast and southwest corners to narrow the roadway and reduce the offset of the east and west approaches.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Comstock
Project Extent:	37 th Avenue from High Drive to Bernard Street

Problem Statement: Residents of the Comstock neighborhood raised concerns over speeding on 37th Avenue from High Drive to Bernard Street (approximately 0.27 miles). The figure below shows the study segment.



37th Avenue from High Drive to Bernard Street

Traffic Analysis

37th Avenue within the study area is classified as an urban local access street with a posted speed limit of 25 miles per hour. The study segment provides two lanes with on-street parking. Sidewalks, bike facilities, and protected crossings are not provided within the study area, the nearest marked crossing is located 0.25 miles to the east at Manito Boulevard. Transit Route 43 travels on 37th Avenue east of Bernard Street and has bus stops at the Bernard Street intersection. 37th Avenue within the study area is currently classified as bike friendly route per the Spokane Bicycle and Pedestrian Master Plan. The study corridor has no future plan per the Plan.

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The 37th Avenue intersections with High Drive and Bernard Street are controlled by stop signs on the 37th Avenue approach. The remaining intersection on the study corridor are uncontrolled.

The table below shows the 2022 daily traffic volumes on 37th Avenue within the study area. The daily volume on 37th Avenue was 694 vehicles between Jefferson Drive and Eastgate Court. The 85th percentile speed was 28 miles per hour (three miles per hour greater than the posted speed limit), indicating there might be a speeding issue.

2022 Daily Traffic and 85th Percentile Speeds on 37th Avenue

Direction	# Lanes	2022 Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Between Jefferson Drive and Eastgate Court				
NB	1	263	27	
SB	1	431	29	25
Both Dir.	2	694	28	

^a Traffic data collected in November 2022.

The table below shows the severity and types of crashes occurring on 37th Avenue between High Drive and Bernard Street from 2017 through 2021 (excluding intersection crashes at the east and west ends). There were three total crashes which included no injury crashes. Two crashes were angle related and one crash involved a moving vehicle striking a parked vehicle.

Crashes 37th Avenue between High Drive and Bernard Street (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Angle	-	-	-	-	2	2
Fixed Object	-	-	-	-	1	1
Total	0	0	0	0	3	3

The need for enhanced pedestrian crossing treatments across 37th Avenue was analyzed based on NCHRP Report 562, using the estimated traffic data. Based on the findings, a crosswalk is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. Although pedestrian data is not available, it is assumed the 20 or more pedestrian crossing threshold is met due to the surrounding neighborhood, popular walking route on High Drive and bus stops at Bernard Street.

Since 37th Avenue does not have sidewalks in the study area, people are required to walk within the vehicle travel lane which may emphasize the vehicle speeding issue. Adding curb extensions and speed bumps at key locations would narrow the roadway and reduce vehicle speeds. 37th Avenue is approximately 42 feet wide measured curb to curb providing two 8-foot-wide parking areas and two 13-foot-wide vehicle lanes. Removing parking on one side of the street would provide room to add a sidewalk and landscape buffer. If on-street parking was retained, a sidewalk could be added without a landscape buffer.

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Recommended Solution:

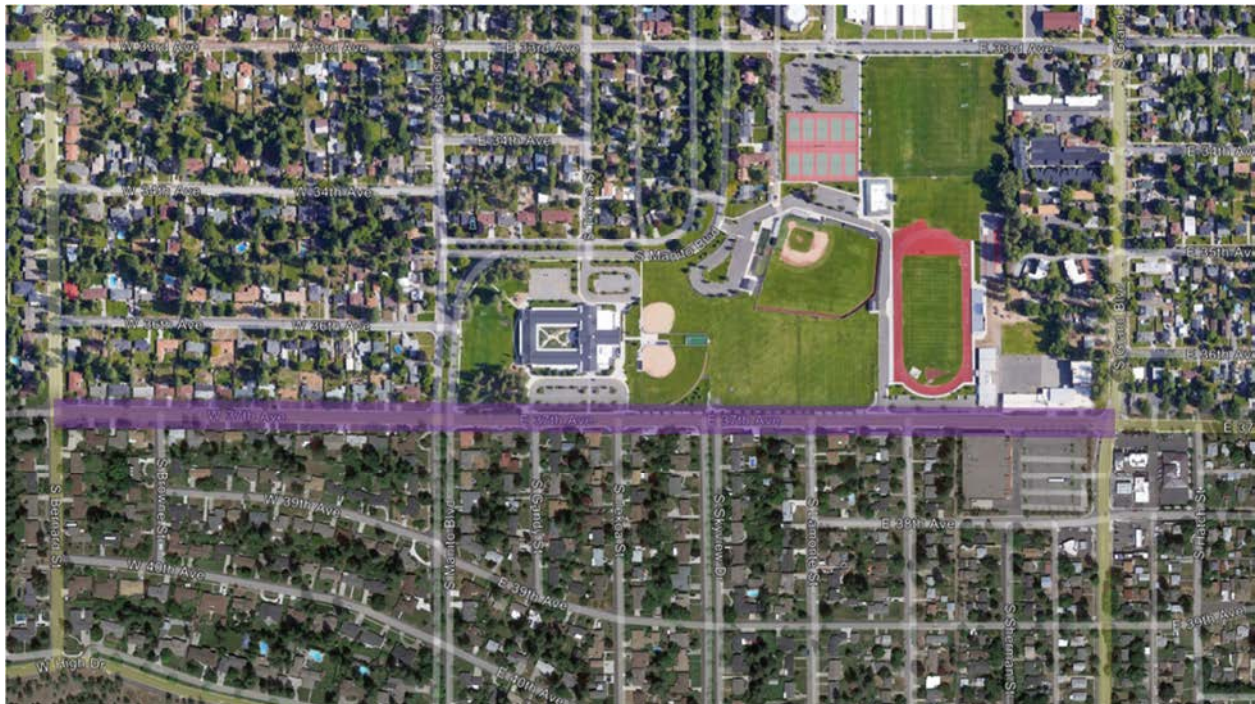
The following improvements are recommended to manage vehicle speeds on the study corridor:

- Install curb extensions and a marked crosswalk on 37th Avenue east of High Drive to reduce vehicle speeds entering the neighborhood and increase pedestrian visibility.
- Install curb extensions on 37th Avenue west of Bernard Street to reduce vehicle speeds entering the neighborhood.
- Add a sidewalk on the north side of the street.
- Install speed bumps on 37th Avenue at the following locations:
 - Midblock between Jefferson Court and Eastgate Court
 - East of Lincoln Drive

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Comstock
Project Extent:	37 th Avenue from Bernard Street to Grand Boulevard

Problem Statement: Residents of the Comstock raised concerns over children biking with a lack of dedicated bicycle facilities and vehicles parking on the sidewalk on 37th Avenue from Bernard Street to Grand Boulevard (approximately 0.7 miles). Figure below shows the study segment.



37th Avenue from Bernard Street to Grand Boulevard

Traffic Analysis

37th Avenue within the study area is classified as an urban minor arterial with two lanes and a posted speed limit of 30 miles per hour. Jefferson Elementary School is located north of 37th Avenue between Grand Boulevard and Manito Boulevard, with a school zone speed of 20 miles per hour. Sidewalks are provided but no bicycle facilities are available. Marked crosswalks are provided on 37th Avenue at Manito Boulevard, Latawah Street, and Grand Boulevard. Transit Route 43 provides service on 37th Avenue and has bus stops at Bernard Street, Manito Boulevard, Skyview Drive, Latawah Street, and Grand Boulevard. The 37th Avenue/Grand Boulevard intersection is signalized. 37th Avenue is stop sign controlled at Bernard Street. The remaining intersections on the study corridor are controlled by a stop sign on the side street approach (not 37th Avenue).

On-street parking is allowed on both sides of the street west of Latawah Street. Neighbors expressed concerns regarding vehicles parking on the sidewalk, an example is shown in the figure below. The corridor is approximately 40-foot wide measured curb-to-curb allowing for two 12-foot-wide vehicle

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lanes and an 8-foot-wide parking area on each side of the street. It is unclear why drivers choose to park partially on the sidewalk. The on-street parking demand on the corridor appears to be low.



The table below shows the 2022 daily traffic volumes and 85th percentile speeds on 37th Avenue within the study area. The daily volume within the study area was 3,655 vehicles and the 85th percentile speed was 34 miles per hour (four miles per hour greater than posted speed limit), indicating a moderate speeding issue.

2022 Daily Traffic and 85th Percentile Speeds on 37th Avenue

Direction	# Lanes	2022 Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Between Skyline Drive and Lamonte Street				
EB	1	1,689	36	
WB	1	1,966	34	30
Both Dir.	2	3,655	34	

^a Traffic data collected on November 15, 2022.

The table below shows the severity and types of crashes occurring on 37th Avenue Bernard Street and Grand Boulevard from 2017 through 2021 (excluding intersection crashes at the east and west ends). There were five total crashes and included three injury crashes. The pedestrian related crash involved a left turning vehicle at Manito Boulevard. The fixed object crash involved a moving vehicle striking a parked vehicle.

Crashes on Cliff Drive at 5th Avenue and Monroe Street (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Rear End	-	-	-		1	1
Turning	-	-	-	1	-	1
Angle	-	-	1	-	-	1
Fixed Objects	-	-	-	-	1	1
Ped/Bike	-	-	-	1	-	1
Total	0	0	1	2	2	5

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37th Avenue within the study area has a current condition of moderate traffic with shared facility in the Spokane Bicycle Master Plan. The study corridor has a future plan for bike lane installation east of Manito Boulevard per the Bicycle Master Plan. The daily volumes and speeds support the need for dedicated bike lanes on 37th Avenue.

With the current roadway cross-section, bike lanes could not be accommodated if on-street parking was retained. If on street parking was removed from one side of the street, bike lanes could be provided in each direction. The resulting cross-section would provide approximately two 11-foot-wide vehicle lanes, two 5-foot-wide bike lanes and an 8-foot-wide parking area on one side of the street.

The roadway curb-to-curb width narrows to approximately 36 feet between Latawah Street and Grand Boulevard where no on-street parking is allowed except bus parking on the north curb to support the adjacent sports fields. A westbound bike lane could not be accommodated on this section due to the permitted bus parking. The westbound bike lane could transition to a shared bike route east of Latawah Street.

Recommended Solution:

The following improvements are recommended to accommodate bicyclist safely on the study corridor:

- Restripe 37th Avenue between Bernard Street and Latawah Street to add bike lanes and remove parking on one side of the street. The north side is the preferred location for a parking restriction due to the lack of fronting residential property along the school frontage east of Manito Boulevard. The proposed cross-section would provide approximately two 11-foot-wide vehicle lanes, two 5-foot-wide bike lanes, and an 8-foot-wide parking area on one side of the street.
- An alternative option is to restripe 37th Avenue between Manito Boulevard and Latawah Street if the removal of parking on one side of the street is not supported between Manito Boulevard and Bernard Street.
- Install westbound shared bike route pavement markings and an eastbound bike lane on 37th Avenue between Latawah Street and Grand Boulevard.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Comstock
Project Extent:	33 rd Avenue and Grand Boulevard Intersection

Problem Statement: Residents of the Comstock neighborhood raised concerns over bottleneck and traffic flow difficulties at 33rd Avenue and Grand Boulevard. Figure below shows the study intersection.



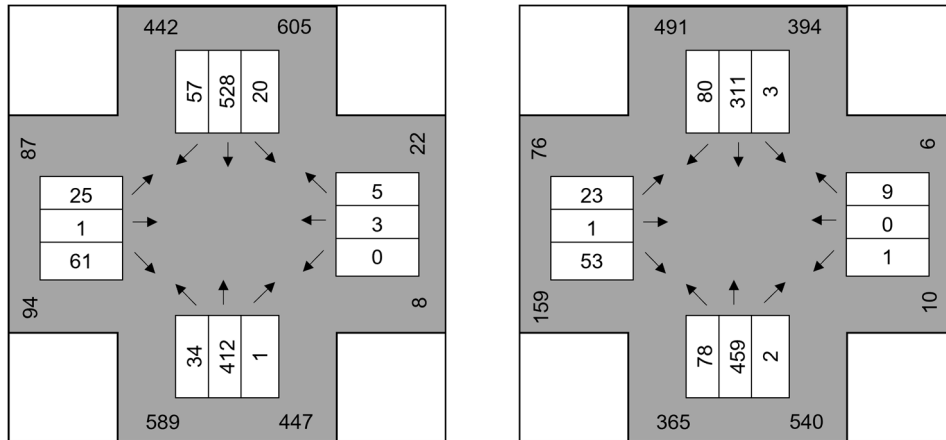
33rd Avenue and Grand Boulevard Intersection

Traffic Analysis

Grand Boulevard within the study area is classified as an urban major arterial with a posted speed limit of 30 miles per hour. 33rd Avenue within the study area is classified as an urban local access street with a posted speed limit of 25 miles per hour. Grand Boulevard provides two lanes with a two-way-left-turn lane, 33rd Avenue provides two lanes with on-street parking. Sidewalks are provided within the study area while no bicycle facilities are available. The study intersection is two-way-stop controlled on 33rd Avenue with a marked crossing and warning signs on the north leg. Sacajawea Middle School is located north of 33rd Avenue on the west side of Grand Boulevard and Jefferson Elementary School is located on 37th Avenue and west of Grand Boulevard. Manito United Methodist Church is located at the northwest corner of the intersection.

The figure below shows the existing AM and PM peak hour traffic volumes at the study intersection, based on a traffic count from May 2019, factored up to 2022.

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AM (Left) and PM (Right) Peak Hour Traffic at 33rd Avenue and Grand Boulevard

According to the Spokane Grand Boulevard Study, the 2019 peak hour operations at the 33rd Avenue/Grand Boulevard intersection meets the City’s performance standards but is forecasted to fall below the mobility targets by 2040 during the AM peak hour.

The table below shows the severity and types of crashes occurring at the study intersection from 2017 through 2021. There were three total crashes, all were injury crashes. The only pedestrian related crash involved fatigued driver striking metal signpost.

Crashes at 33rd Avenue and Grand Boulevard (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Rear End	-	-	-	2	-	2
Ped/Bike	-	-	1	-	-	1
Total	0	0	1	2	0	3

33rd Avenue within the study area is currently classified as a bike friendly route and Grand Boulevard is classified as a moderate traffic with shared facilities in the City Bicycle Master Plan. According to the Spokane Grand Boulevard Transportation and Land Use Study, 33rd Avenue is a popular crossing location for people walking and biking and is designated as a walking route for Jefferson Elementary School and a planned Neighborhood Greenway. The Study recommended several improvements on Grand Boulevard at 33rd Avenue including reducing vehicle lanes to the north, installing a protected pedestrian crossing and greenway crossing pavement markings.

Recommended Solution:

The following improvements are recommended to calm traffic volumes and improve overall safety at the study intersection:

- Consistent with the Grand Boulevard Transportation and Land Use Study:

Spokane Traffic Calming Master Plan

- Install a rectangular rapid flashing beacon on the north leg of the intersection to increase the visibility of the crossing.
 - Install marked pedestrian crossings on all legs of the intersection.
 - Install marked bicycle greenway crossings through the intersection.
- Consider installing a center median on Grand Boulevard at the intersection to restrict vehicle movements from the 33rd Avenue approaches to right/in right only. The median would provide a gap to allow bicycle and pedestrian movements. The treatment would reduce vehicle delays associated with left turns from the side streets and improve pedestrian and bicycle safety by reducing vehicle conflicts at the intersection.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Latah-Hangman
Project Extent:	Hatch Road and Highland Park Drive Intersection

Problem Statement: Residents of the Latah-Hangman neighborhood raised concerns over speeding vehicles on Hatch Road, poor visibility, and safety concerns at the Highland Park Drive intersection.



Hatch Road and Highland Park Drive Intersection

Traffic Analysis

Hatch Road is classified as an urban minor arterial roadway. Hatch Road in the study area has a posted speed limit of 35 miles per hour, provides one lane in each direction with a northbound left turn lane at the intersection, marked shoulders, and no on-street parking. Highland Park Drive is classified as an urban local access road, has one lane in each direction, on-street parking, and no posted speed limit.

The table below shows the 2022 estimated daily traffic volumes and 85th percentile speeds on Hatch Road near Hangman Valley Road. The daily volume on Hatch Road was 10,953 vehicles. The 85th percentile speed was 39 miles per hour (4 miles per hour greater than the posted speed limit on Hatch Road). The data indicates there is a moderate speed concern on the corridor.

Spokane Traffic Calming Master Plan

2022 Daily Traffic and 85th Percentile Speeds on South Hatch Road (at Hangman Valley Road)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
Hatch Road at Hangman Valley Road				
NB	1	5,113		
SB	1	5,418		
Both Dir.	2	10,531	39	35

^a Traffic data collected in May 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

The crash data for the Hatch Road/Highland Park Drive intersection from 2017 through 2021 was evaluated. There were no crashes reported, indicating there is not a safety issue at the intersection.

Recommended Solution:

To increase the visibility of the intersection for drivers on Hatch Road, adding MUTCD intersection warning signs from both directions on Hatch Road (i.e. W2-2, W2-8, etc.) is recommended. Also, it is recommended to stripe a stop bar at the Highland Park Drive approach to provide driver cues for the intersection.

To visually narrow the lanes and decrease speeding, a raised median strip should be added on the north leg of the intersection.

To allow eastbound left turn movements from Highland Park Drive to make a two-stage turn movement onto Hatch Road, the median area on the north leg of the intersection should be restriped to provide a center turn lane area for vehicles to merge into northbound traffic flow.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Latah-Hangman
Project Extent:	Hatch Road and Westchester Drive Intersection

Problem Statement: Residents of the Latah-Hangman neighborhood raised concerns over speeding vehicles on Hatch Road approaching the Westchester Drive intersection and poor visibility.



Hatch Road and Westchester Drive Intersection

Traffic Analysis

Hatch Road is classified as an urban minor arterial roadway. Hatch Road in the study area has a posted speed limit of 35 miles per hour, provides one lane in each direction with an unmarked left lane at the intersection, marked shoulders, and no on-street parking. Westchester Drive is classified as an urban local access road that provides one lane in each direction, on-street parking, and does not have a posted speed limit. Tomaker Lane is a private road that intersects Hatch Road opposite Westchester Drive.

The table below shows the 2022 daily traffic volumes and 85th percentile speeds on Hatch Road near Hangman Valley Road. The daily volume on Hatch Road was 10,531 vehicles. The 85th percentile speed was 39 miles per hour (4 miles per hour greater than the posted speed limit on Hatch). The data indicates there is a moderate speed concern on the corridor.

Spokane Traffic Calming Master Plan

2022 Daily Traffic and 85th Percentile Speeds on South Hatch Road (at Hangman Valley Road)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
Hatch Road at Hangman Valley Road				
NB	1	5,113		
SB	1	5,418		
Both Dir.	2	10,531	39	35

^a Traffic data collected in May 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

The crash data for the Hatch Road/Westchester Drive intersection from 2017 through 2021 was evaluated. There were no crashes reported, indicating there is not a safety issue at the intersection.

Recommended Solution:

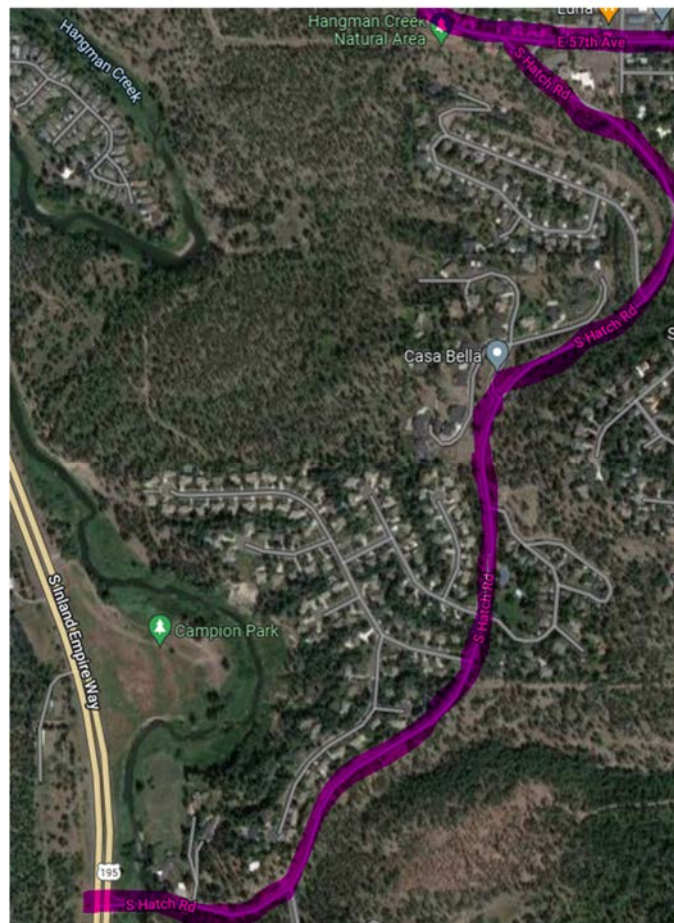
To increase the visibility of the intersection for drivers on Hatch Road, adding MUTCD intersection warning signs from both directions on Hatch Rd (i.e. W2-2, W2-8, etc.) is recommended. Also, it is recommended to stripe a stop bar at the Westchester Drive and Tomaker Lane approaches to provide driver cues for the intersection.

To visually narrow the lanes and decrease speeding, a raised median strip should be added on the north leg of the intersection. The median would require southbound left turn movements from Hatch Road to Tomaker Lane to turn from the through lane or reroute to enter the neighborhood at Tomaker Lane to the north.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Latah-Hangman
Project Extent:	Hatch Road from U.S. Highway 195 to 57 th Avenue

Problem Statement: Residents of the Latah-Hangman neighborhood raised concerns over the absence of sidewalks and bike lanes as well as the narrow lanes along the Hatch Road corridor.



Hatch Road from U.S. Highway 195 to 57th Avenue

Traffic Analysis

Hatch Road is classified as an urban minor arterial roadway. Hatch Road in this study area has a posted speed limit of 35 miles per hour, provides one lane in each direction, has marked shoulders, and no on-street parking. U.S. 195 is classified as an urban other freeway and expressway, provides 2 lanes in each direction divided by a landscaped median, and has a posted speed limit of 55 miles per hour. 57th Avenue in the study corridor is classified as an urban minor arterial roadway, provides one lane in each direction, has a posted speed limit of 30 miles per hour, no on-street parking, and a striped, unprotected

Spokane Traffic Calming Master Plan

bike lane. Hatch Road is part of the Spokane Master Bike Plan and identified as a future shared bike facility.

The table below shows the 2022 daily traffic volumes and 85th percentile speeds on Hatch Road near Hangman Valley Road and US 195. The highest daily volume on Hatch Road was 10,531 vehicles near Hangman Valley Road. The highest 85th percentile speed was 39 miles per hour (4 miles per hour greater than the posted speed limit on Hatch Road).

2022 Estimated Daily Traffic and 85th Percentile Speeds on South Hatch Road (Hangman Valley Road and US 195)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
Hatch Road near Hangman Valley Road				
NB	1	5,113		
SB	1	5,418		
Both Dir.	2	10,531	39	35
Hatch Road near US 195				
NB	1	3,622		
SB	1	5,475		
Both Dir.	2	9,097	34	35

^a Traffic data collected in April 2015 and May 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

The daily traffic volumes and 85th percentile speed on Hatch Road suggest a shared bike facility is not the preferred treatment. Either dedicated bike lanes or a separated path would be recommended to provide bicycle facilities. The available right-of-way on Hatch Road east of Hangman Creek Bridge ranges from 56 to 68 feet wide. The existing three-lane cross-section is approximately 36-foot wide. The addition of a 5-foot-wide sidewalk and a 6-foot-wide bike lane on each side of the roadway would require adding 22 feet to the section. Due to the environmental constraints on the roadway (such as steep topography and existing guardrail), a separated multi-use path on one side of Hatch Road could provide to a comfortable facility for walking and biking trips while limiting the need for widening the facility.

Recommended Solution:

The following improvements are recommended:

- The lanes on Hatch Road appear to be about 11 to 12 feet wide which is an appropriate width for the roadway classification and conditions. Wider lanes could result in higher vehicle speeds on the corridor. No changes to lane widths are recommended.
- Constructing a separated 10- to 12-foot-wide multi-use path on the west side of Hatch Road is a long-term option to serve pedestrian and bicycle needs. The west side was selected because the majority of neighborhoods that connect to Hatch Road are located to the west and would not

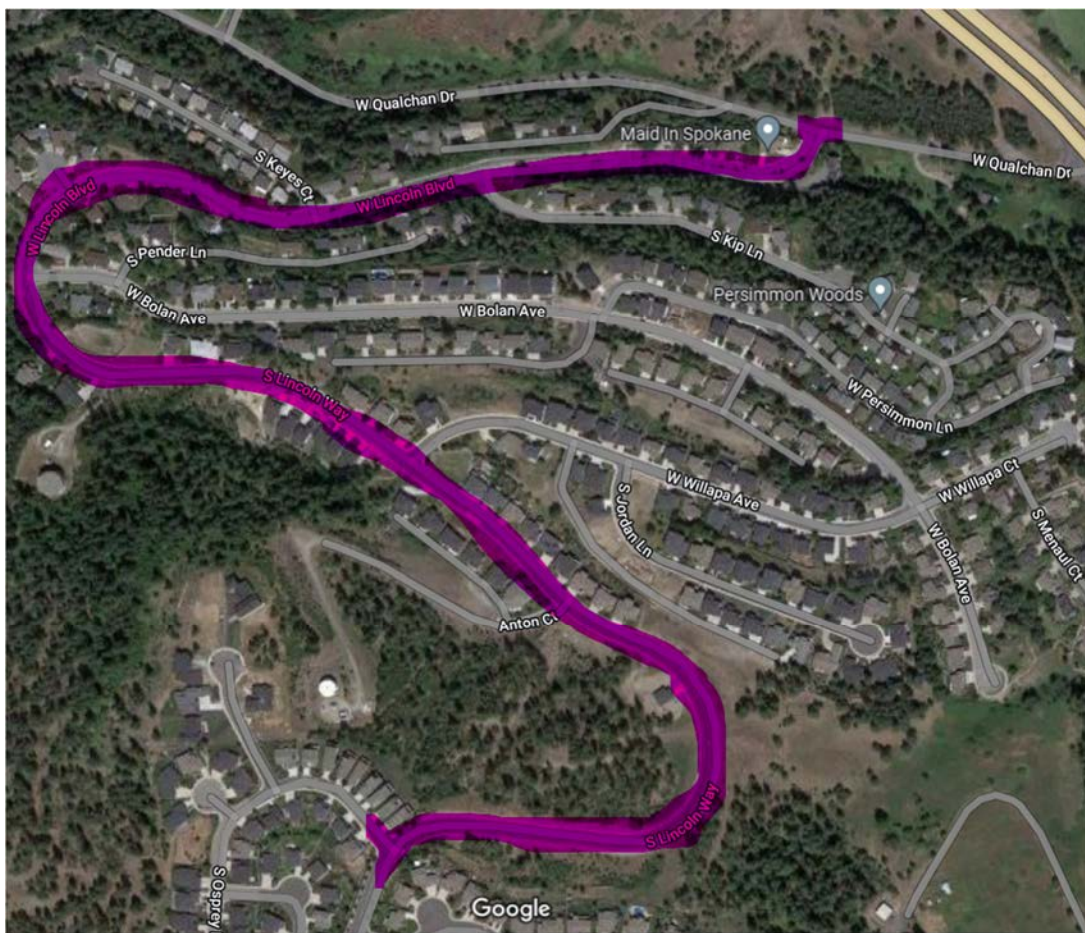
Spokane Traffic Calming Master Plan

need to cross Hatch Road to access the path. We recommend construction of a path between 57th Avenue and Torino Lane as a short-term improvement. Crosswalks should be installed at locations where the path would cross a local street intersecting Hatch Road (at Torino Lane and Blackwood Lane).

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District:	2
Neighborhood:	Latah-Hangman
Project Extent:	Lincoln Way/Boulevard from Osprey Heights Drive to Qualchan Drive

Problem Statement: Residents of the Latah-Hangman neighborhood raised concerns over speeding vehicles along Lincoln Way/Boulevard and the existing roadway alignment.



Lincoln Way from Osprey Heights Drive to Qualchan Drive

Traffic Analysis

Lincoln Way/Boulevard in the study area is classified as an urban minor collector roadway, provides one lane in each direction, has a posted speed limit of 25 miles per hour, and does not have on-street parking. Osprey Heights Drive is classified as an urban local access road, provides one lane in each direction, has unmarked on-street parking, and no posted speed limit. Qualchan Drive in the study area

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is classified as an urban major collector, provides one lane in each direction, a posted speed limit of 25 miles per hour, and does not have on-street parking.

The table below shows the 2022 daily traffic volumes and 85th percentile speeds on Lincoln Way between Willapa Avenue and Anton Court. The 85th percentile speed was 39 miles per hour (15 miles per hour greater than the posted speed limit). The data indicates that speeding is a significant problem. The roadway has a wide street cross-section (36 feet for two lanes) which can encourage driving at faster speeds.

2022 Daily Traffic and 85th Percentile Speeds on Lincoln Way

Direction	# Lanes	2022 Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
East of Willapa Avenue				
NB	1	450	38	
SB	1	579	37	25
Both Dir.	2	1,029	38	

^a Traffic data collected in November 2022

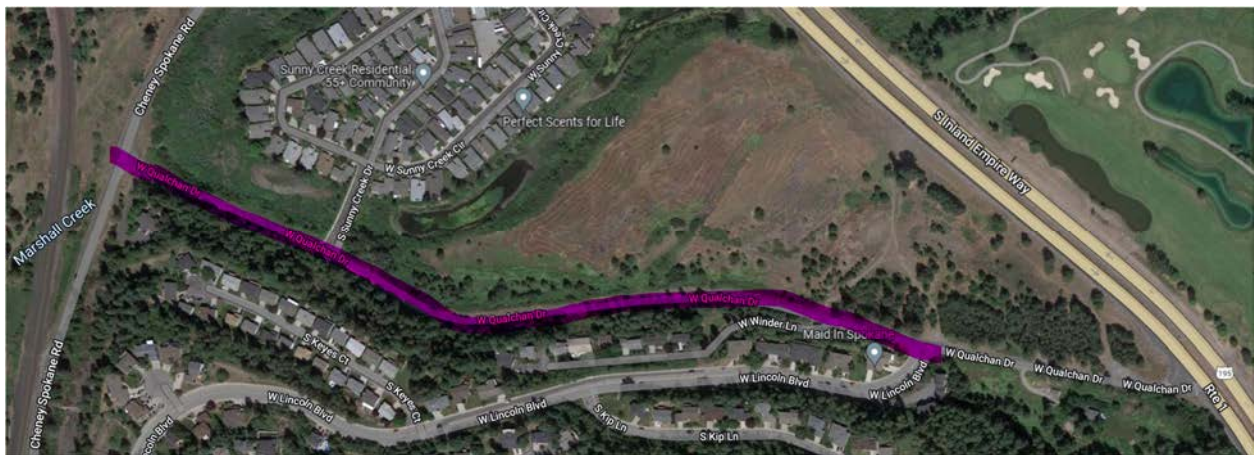
Recommendations:

In general, this roadway has curves which naturally slow drivers down. However, the speed data shows significant speeding issues near Willapa Avenue where the corridor alignment is straight. It is recommended to install driver feedback signs near the Willapa Avenue and Kip Lane intersections (both straight segments) to alert drivers of speed conditions. The installation of swales/rain gardens along the existing curbs is recommended to reduce the roadway width and encourage slower vehicle speeds. The swales would also provide a buffer for the curb tight sidewalk and add green space along the corridor.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Latah-Hangman
Project Extent:	Qualchan Drive from Lincoln Boulevard to Cheney Spokane Road

Problem Statement: Residents of the Latah-Hangman neighborhood raised concerns over a lack of a sidewalk and biking network on Qualchan Drive from Lincoln Boulevard to Cheney Spokane Road.



Qualchan Drive from Lincoln Boulevard to Cheney Spokane Road

Traffic Analysis

Qualchan Drive in the study area is classified as an urban major collector, provides one lane in each direction, a posted speed limit of 25 miles per hour, and does not have on-street parking. Lincoln Boulevard is classified as an urban minor collector, provides one lane in direction, has a posted speed limit of 25 miles per hour, and has on-street parking. Cheney Spokane Road in the study area is classified as an urban minor arterial roadway, provides one lane in each direction, has a posted speed limit of 45 miles per hour, and does not have on-street parking. Qualchan Drive is designated a future shared use path east of Lincoln Boulevard and a shared bike facility west of Lincoln Boulevard.

The table below shows the 2022 estimated daily traffic volumes and 85th percentile speeds on Qualchan Drive near Winder Lane. The 85th percentile speed was 32 miles per hour (25 miles per hour greater than the posted speed limit). The data indicates that speeding is a moderate problem.

Spokane Traffic Calming Master Plan

2022 Daily Traffic and 85th Percentile Speeds on Qualchan Drive

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
Near Winder Lane				
EB	1	1,007		
WB	1	1,111		
Both Dir.	2	2,118	32	25

^a Traffic data collected in April 2015. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

Recommendations:

Shared bicycle pavement markings could be installed to promote the bike friendly route on Qualchan Drive. The daily vehicle volumes are appropriate for shared markings and do not indicate that designated bike lanes are appropriate. The 85th percentile speed of 32 mph is at the high end of preferred speeds for a shared bicycle facility. Implementing traffic calming measures to reduce speeds on the corridor would support the shared bicycle designation.

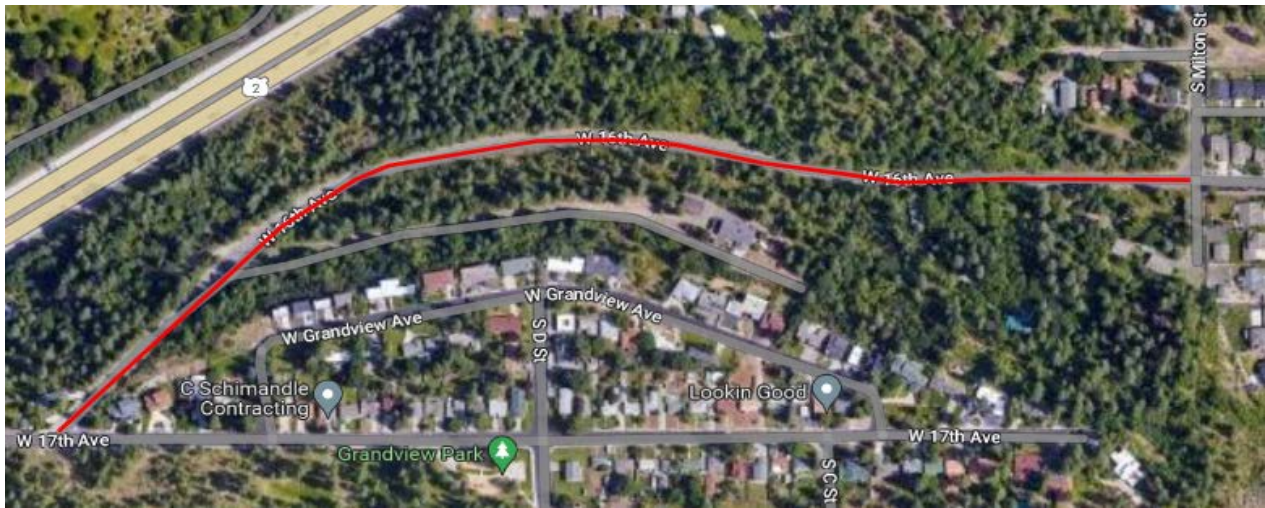
The available right-of-way on Qualchan Drive is a minimum of 56 feet wide. It is recommended to add shared bicycle pavement markings and sidewalks on both sides to improve walking and biking safety. The roadway vehicle lane widths should be no more than 11 feet wide to manage vehicle speeds.

An alternative improvement recommendation is to construct a shared use path on one side of the street if potential wetland impacts are found to be acceptable with further analysis. A shared use path would provide a separate facility for cyclists and be more comfortable than sharing the roadway with vehicles.

Spokane Traffic Calming Master Plan

District: 2
Neighborhood: Grandview – Thorpe
Project Extent: 16th Avenue from Milton St to 17th Ave

Problem Statement: Residents of the Grandview – Thorpe neighborhood raised concerns over street completeness with dedicated pedestrian and bicycle facilities on 16th Avenue from Milton Street up the hill to 17th Avenue. Figure below presents the study intersection.



16th Avenue between Milton Street and 17th Avenue

Traffic Analysis

16th Avenue is classified as the collector route from Grandview down to US-195. The route is 2 lanes with posted speed limit of 25 miles per hour. Sidewalks only exist on the east leg and northbound on north leg of the study intersection and no crosswalks and bicycle facilities are provided. The south leg of the intersection is a potential future connection to the Trolley Trail. The 16th Avenue/Milton Street intersection is controlled by multi-way stop, which contains stop signs on the south and east legs, and a yield sign on the north leg.

The table below shows the 2022 daily traffic volumes and 85th percentile speeds on 16th Avenue between Milton Street and 17th Avenue. The highest daily volume on 16th Avenue was 1,059 vehicles west of study intersection. The highest 85th percentile speed was 40 miles per hour (15 miles per hour greater than the posted speed limit). The data indicates there is a significant speeding concern.

2022 Daily Traffic and 85th Percentile Speeds on 16th Avenue

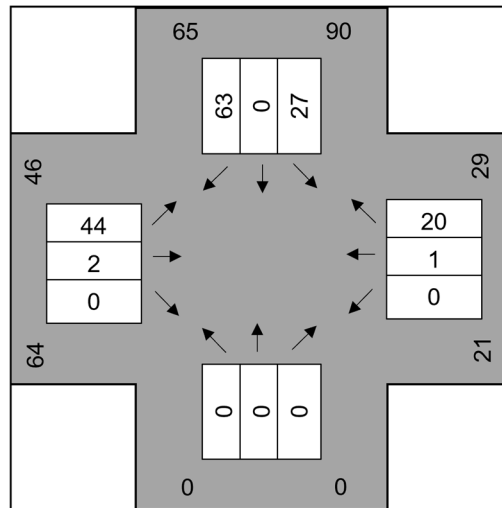
Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
16 th Avenue between Milton Street and 17 th Avenue				
EB	1	616	40	
WB	1	443	39	25
Both Dir.	2	1,059	39	

^a Traffic data collected in May 2022.

Spokane Traffic Calming Master Plan

One crash related is recorded over the last five years (from 2017 to 2021). The crash was related to stationary object or car and caused the crash severity of property damage only.

The figure below shows the existing PM peak hour traffic volumes at the study intersection, based on a traffic count from March 16, 2021, factored up to 2022. The eastbound left and southbound right are the highest volume movements.



PM Peak Hour Traffic at 16th Avenue and Milton Street

The 85th percentile speed of 39 mph indicates a shared bike facility is not the preferred treatment. Either dedicated bike lanes or a separated path would be recommended to provide bicycle facilities. The available right-of-way on 16th Avenue west of Milton Street is approximately 60 feet wide. The addition of a multi-modal shared use path would provide facilities for walking and biking. The north side of 16th Avenue has no intersections or driveways and could provide a pathway with no vehicle conflicts.

The pavement on 16th Avenue is approximately 26-feet wide and has no lane markings. Striping the center lane and shoulder area and providing narrow vehicle lanes could result in lower travel speeds.

Nearby future development will be required to construct urban improvements at the 16th Avenue/17th Avenue/H Street intersection that will address safety concerns.

Recommended Solution:

The construction of a multi-use path is recommended on the south side of 16th Avenue between Milton Street and 17th Avenue. The south side was selected to provide a direct connection to the future Trolley Trail via Milton Street to the south and to avoid utility conflicts on the north side. The roadway should be upgraded by adding a centerline and shoulder edge pavement markings with 11-foot-wide lanes.

Modifications to the 16th Avenue/Milton Street intersection are recommended to reduce the radius of the northwest corner to slow the speeds of southbound right turning vehicles.

Spokane Traffic Calming Master Plan

District: 2
Neighborhood: Grandview – Thorpe
Project Extent: 17th Avenue and D Street Intersection

Problem Statement: Residents of the Grandview – Thorpe neighborhood raised concerns over intersection safety and traffic volume at the 17th Avenue and D Street intersection.



17th Avenue and D Street

Traffic Analysis

17th Avenue and D Street within the study area are classified as local street with posted speed limit of 25 miles per hour. All approaches provide two lanes with on-street parking. Sidewalks are provided along the southwest corner and east leg of the intersection. Residents from the neighborhood stated they do not want a complete sidewalk network at the intersection. The south leg of the intersection contains faded crosswalk, and no bicycle facilities are provided. The study intersection is uncontrolled.

The table below shows the estimated 2022 daily traffic volumes and 85th percentile speeds on 17th Avenue and D Street. The highest daily volume around the study intersection was 1,194 vehicles west of D Street on 17th Avenue. The highest 85th percentile speed was 29 miles per hour (4 miles per hour greater than the posted speed limit), indicating a moderate speeding issue.

Spokane Traffic Calming Master Plan

2022 Estimated Daily Traffic and 85th Percentile Speeds on 17th Avenue and D Street

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
D Street south of 17 th Avenue				
NB	1	482	24	
SB	1	485	24	25
Both Dir.	2	967	24	
17 th Avenue west of D Street				
EB	1	612	28	
WB	1	582	29	25
Both Dir.	2	1,194	29	

^a Traffic data collected in November 2022.

No crashes were recorded from 2017 to 2021 at the study intersection.

The need for enhanced pedestrian crossing treatments at the study intersection was analyzed based on NCHRP Report 562. Based on the findings, crosswalk is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. Based on the surrounding neighborhood, it was estimated the pedestrian volume threshold is not met.

Warrants to add stop signs on a local street intersection were assessed below per the MUTCD guidelines. At least one of the conditions must be true to consider the use of stop or yield signs. None of the conditions are met at the study intersection.

Local Road Single or Two-Way Stop Warrants

MUTCD	Description	Status?	
2B.04(04)A	Combined (vehicle, bicycle, ped) volume entering the intersection from all approaches averages more than 2,000 units per day	1,094 vehicles per day, N	
2B.04(04)B	Ability to see conflicting traffic on an approach is not sufficient to allow a road user to stop/yield in compliance with the normal right-of-way rule if such stopping/yielding is necessary.	N	
2B.04(04)C	Crash records indicate that five or more crashes that involve failure to yield ROW at the intersection under the normal ROW rule have been reported within a 3-yr period or >= 3 have been reported within a 2-yr period.	2017	0
		2018	0
		2019	0
		2020	0
		2021	0

Recommended Solution:

To increase safety at the intersection and slow driver speeds on 17th Avenue, the installation of a traffic circle is recommended. In addition, speed bumps should be installed on 16th Avenue to reduce driver speeds.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Grandview – Thorpe
Project Extent:	Trolley Trail and Fish Lake Trail

Problem Statement: Residents of the Grandview – Thorpe neighborhood raised concerns over connectivity between Trolley trail and Fish Lake trail.



Connectivity of Trolley Trail and Fish Lake Trail

Traffic Analysis

Trolley Trail is 1.91 miles long and located south of US Route 2/I-90. Fish Lake Trail is 10 miles long and located west of US 195 and east of an active rail line. The trail can be accessed from the south end from the area of Cheney Spokane Road and Myers Park Road intersection. The figure shows the location of both trails, where Fish Lake Trail extends further south and is not showing on the figure. As shown, the two trails can potentially be connected from the north end of Trolley Trail to approximately 0.47 mile south from the north end of Fish Lake Trail.

Recommended Solution:

The connectivity of the two trails is constrained by local neighborhood area and an active rail line in between. Several options of connection could be chosen to connect two trails. The recommended option is shown in the below figure, showing an extension from the north end of Trolley Trail to 14th

Spokane Traffic Calming Master Plan

Avenue to the north, turning right to Fish Lake Trail (approximately 0.3 miles). This is because 14th Avenue provides at-grade rail crossing and can separate people using the trails from the rail traffic.

The connection required improvements on Milton Street and 14th Avenue to provide a safer environment for people using the trails. The roadway width for Milton Street and 14th Avenue along the connection are around 30 feet. A marked shared use path on the is recommended to provide a safe path connection. Also, marked crosswalks should be provided on the east and west legs of 16th Avenue and Milton Street intersection¹ and north and south legs of 14th Avenue and Lindeke Street intersection to ensure safe crossing. The connection also requires a paved road segment of around 100 feet to connect from the east end of 14th Street to Fish Lake Trail. Warning signs should be installed to alert motorists of people walking and biking on roadway.



Proposed Connection Recommendation

¹ This can be done in conjunction with the improvement plans at the 16th Avenue and Milton Street intersection (discussed above).

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District:	2
Neighborhood:	Grandview – Thorpe
Project Extent:	21 st Avenue and D Street Intersection

Problem Statement: Residents of the Grandview – Thorpe neighborhood raised concerns over visibility, steep grade, lack of signage and intersection control at the intersection of 21st Avenue and D Street.



21st Avenue and D Street Intersection

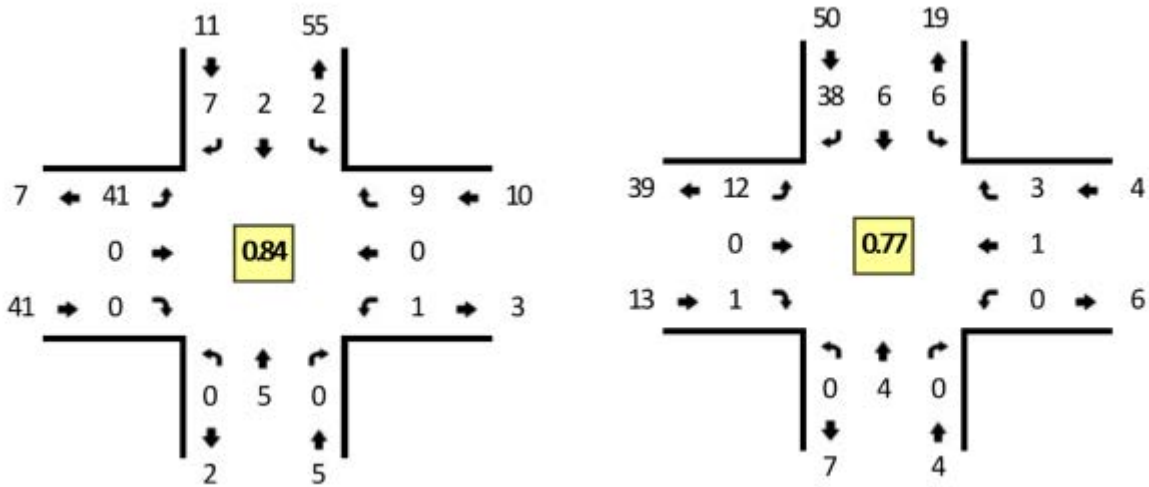
Traffic Analysis

21st Avenue and D Street within the study area are classified as local street with posted speed limit of 25 miles per hour. D Street intersects with 21st Avenue at two locations. All approaches at both intersections provide two lanes with on-street parking. As shown in figure, three intersections (D Street east, D Street west and Scenic Boulevard) are located closely (less than 150 feet). 21st Avenue has a steep grade towards west (uphill) and the geometry limited users sight distance for turning movement from side street. Also, the turning movement at the south leg on D Street is obstructed by a tree which is further affecting visibility. Sidewalks are mostly provided, except the east leg of the intersection. Crosswalk and bike facilities are not provided in the study area. The only intersection control is a yield sign on the eastbound approach of 21st Avenue to D Street west.

No crashes were recorded from 2017 to 2021 at the study intersection.

The figures below show the existing AM and PM peak hour traffic volumes at the study intersection, based on traffic counts from November 1, 2022. As shown in the figures, the volumes travelling through the 21st Avenue/D Street west intersection are low.

Spokane Traffic Calming Master Plan



AM (Left) and PM (Right) Peak Hour Traffic at 21st Avenue and D Street

The need for enhanced pedestrian crossing treatments across 21st Avenue was analyzed based on NCHRP Report 562, using collected traffic data. Based on the findings, crosswalk is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. Pedestrian data indicates there would be less than the required demand.

Warrants to add stop signs on a local street intersection were assessed below per the MUTCD guidelines. At least one of the conditions must be true to consider the use of stop or yield signs. The sight distance condition is met due to the roadway geometry and steep grade.

Local Road Single or Two-Way Stop Warrants

MUTCD	Description	Status?	
2B.04(04)A	Combined (vehicle, bicycle, ped) volume entering the intersection from all approaches averages more than 2,000 units per day	710 vehicles per day, N	
2B.04(04)B	Ability to see conflicting traffic on an approach is not sufficient to allow a road user to stop/yield in compliance with the normal right-of-way rule if such stopping/yielding is necessary.	Y	
2B.04(04)C	Crash records indicate that five or more crashes that involve failure to yield ROW at the intersection under the normal ROW rule have been reported within a 3-yr period or ≥ 3 have been reported within a 2-yr period.	2017	0
		2018	0
		2019	0
		2020	0
		2021	0

Spokane Traffic Calming Master Plan

Recommended Solution:

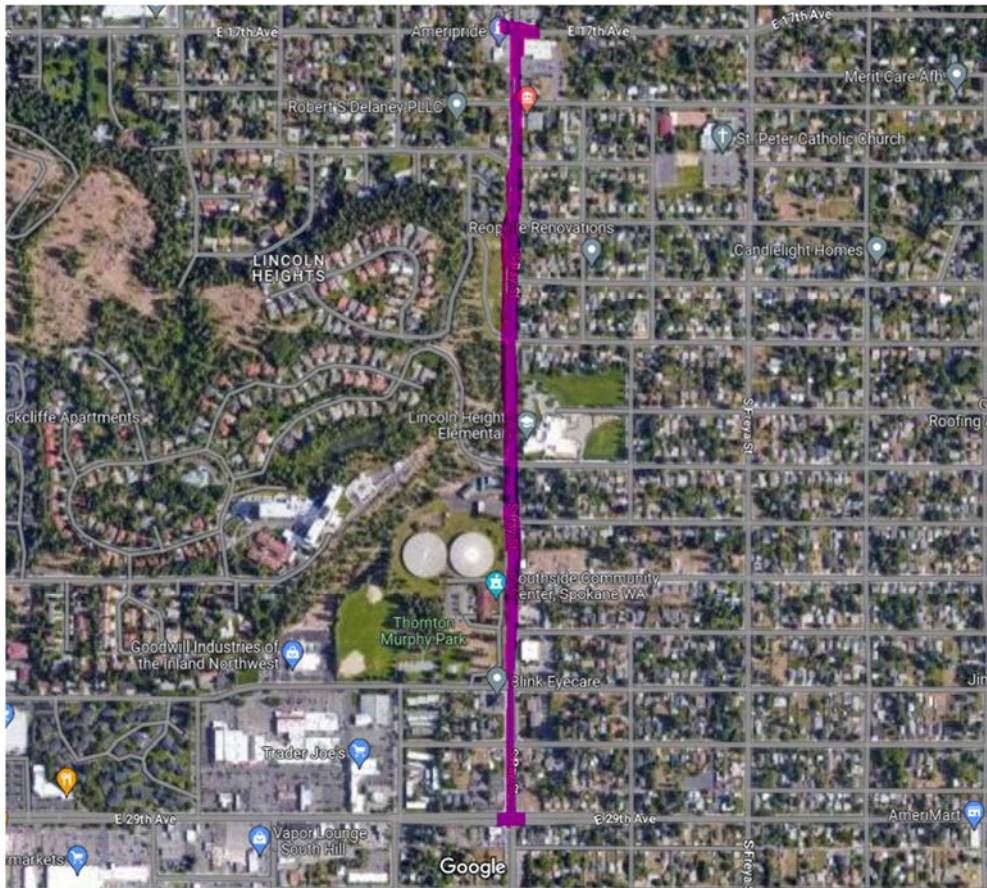
To reduce driver confusion and increase safety, intersection signage at the 21st Avenue/D Street west intersection should be modified as follows.

- The intersection configuration indicates 21st Avenue is the through street and D Street is the side street approach. The installation of a stop sign and stop bar on the D Street southbound approach is recommended. This approach also has the most impaired visibility at the intersection. Adding a stop sign would give drivers on D Street the ability to come to a stop and verify there are no conflicts before entering the intersection.
- The existing yield sign on the west approach should be removed.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Lincoln Heights
Project Extent:	Ray Street Corridor from 17 th Avenue to 29 th Avenue

Problem Statement: Residents of the Lincoln Heights neighborhood raised concerns over north-south pedestrian access and bicycle network connectivity along Ray Street from 17th Avenue to 29th Avenue.



Ray Street Corridor from 17th Avenue to 29th Avenue

Traffic Analysis

Ray Street in the study area is classified as an urban principal arterial. Ray Street has a posted speed limit of 30 miles per hour, provides two lanes in each direction, no on-street parking, and sidewalks (some in poor condition). Ray Street is not included in the Spokane Bike and Pedestrian Master Plan. There are traffic signals at 17th Avenue and 29th Avenue and a fire access signal at 18th Street.

The table below shows daily traffic counts and speed data on Ray Street at 27th Avenue. The estimated 2022 daily traffic count was 22,770 vehicles on Ray Street. The 85th percentile speed along this corridor

Spokane Traffic Calming Master Plan

was 40 miles per hour (10 miles per hour over the 30 mile per hour speed limit). The data indicates that there is a significant speeding concern on Ray Street.

2022 Daily Traffic and 85th Percentile Speeds on Ray Street at 27th Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
South of 27 th Avenue				
NB	2	10,544	39	
SB	2	12,226	41	
Both Dir.	4	22,770	40	30

^a Traffic data collected in May 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

The table below shows the severity and types of crashes occurring on the Ray Street study corridor over the last five years. The data includes all crashes on the corridor and are reported for the nearest intersection. There was a total of 44 crashes, including two minor injury crashes where a vehicle hit a bicyclist at 17th Avenue and 27th Avenue. Angle and rearend crashes were the most common crash type on the corridor. Ray Street/27th Avenue had the highest number of crashes, approximately 70% were angle crashes. This intersection provides a raised center median that prohibits eastbound and westbound left turn lanes from 27th Avenue. Additional traffic calming is recommended to prohibit the northbound and southbound left turn lanes to reduce the number of angle crashes.

Crashes on Ray Street from 17th to 29th Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
17th Ave	-	-	1	1	4	6
18th Ave	-	-	-	-	3	3
19th Ave	-	-	-	-	2	2
20th Ave	-	-	-	-	1	1
Congress Ave	-	-	-	-	1	1
21st Ave	-	-	1	2	2	5
23rd Ave	-	-	1	-	2	3
24th Ave	-	-	1	3	1	5
26th Ave	-	-	-	-	1	1
27th Ave	-	-	3	3	6	12
28th Ave	-	-	2	1	2	5
Total	-	-	9	10	25	44

The need for enhanced pedestrian crossing treatments was analyzed for Ray Street based on NCHRP Report 562. Based on the findings, red treatments (e.g., HAWK signal beacon, midblock pedestrian signal) is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. It was assumed the pedestrian crossing is not met due to the lack of pedestrian destination on the west side of the street and no transit service provided on Ray Street.

Spokane Traffic Calming Master Plan

Ray Street is a four-lane roadway with no center median area or on-street parking. The constrained cross-section and developed fronting properties limit the opportunities to add bike facilities to Ray Street. The Spokane Bike and Pedestrian Master Plan identifies Myrtle Street as a parallel bike friendly facility. The Plan identifies a planned shared use path connecting the west end of 23rd Avenue (west of Ray Street) to the 25th Avenue opposite Fiske Street, west of the reservoir and through Thornton Murphy Park.

Recommended Solution

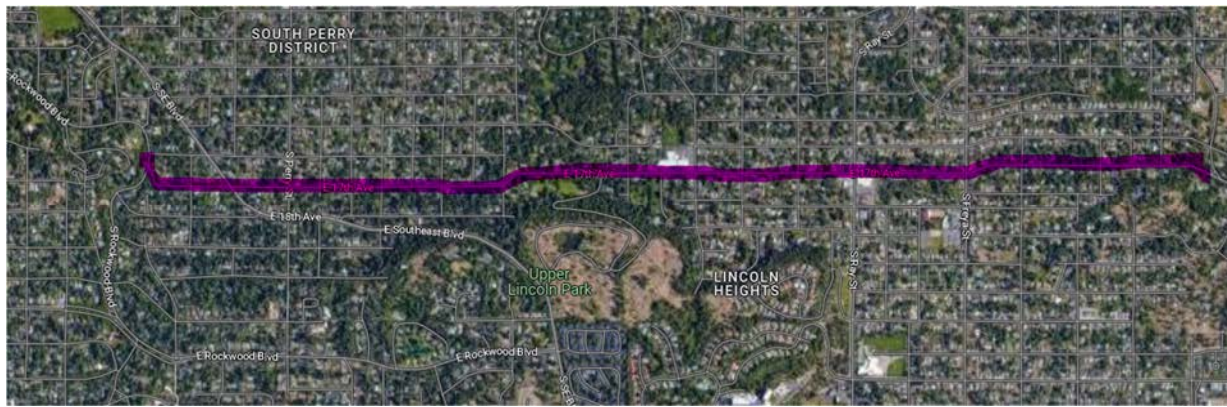
The roadway could benefit from traffic calming elements to manage driver speeds and improve overall safety. The following improvements are recommended.

- Install a pedestrian hybrid beacon crossing at 23rd Avenue to provide a connection between the neighborhood to the east and the planned shared use path to Thornton Murphy Park.
- Widen sidewalk on the west side of Ray Street between 21st and 23rd Avenue to provide a separated 10-foot-wide path

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Lincoln Heights
Project Extent:	17 th Avenue Corridor from S Havana Street to Rockwood Boulevard

Problem Statement: Residents of the Lincoln Heights neighborhood raised concerns over high speeds and visibility concerns throughout the 17th Avenue corridor from Havana Street to Rockwood Boulevard.



17th Avenue Corridor from Havana Street to Rockwood Boulevard

Traffic Analysis

17th Avenue is classified as an urban major collector from Ray Street to Southeast Boulevard and as an urban local access road along the rest of the corridor. 17th Avenue has different characteristics throughout the corridor.

- From Rockwood Boulevard to Perry Street, 17th Avenue has a posted speed limit of 25 miles per hour, provides one lane in each direction, on-street parking on both sides of the street, and has an acceptable sidewalk network.
- From Perry Street to Martin Street, 17th Avenue has a posted speed limit of 30 miles per hour, provides one lane in each direction, no on-street parking on the south side of 17th Street, and has an acceptable sidewalk network.
- From Martin Street to the north entrance of Upper Lincoln Park (just west of Cook Street), 17th Avenue has a posted speed limit of 20 miles per hour, provides one lane in direction, no on-street parking on the northside of 17th Street, and has an acceptable sidewalk network.
- From the north entrance of Upper Lincoln Park to Ray Street, 17th Avenue has a posted speed limit of 30 miles per hour, a 20 miles per hour school speed zone at Franklin Elementary, provides one lane in each direction, no on-street parking west of Mt Vernon Street, and has an acceptable sidewalk network.
- From Ray Street to Havana Street, 17th Avenue has a posted speed limit of 25 miles per hour, provides one lane in each direction, on-street parking on both sides of the street, and has an

Spokane Traffic Calming Master Plan

acceptable sidewalk network (until just west of Havana Street). 17th Avenue is designated as a “moderate traffic (shared)” path in the Spokane Bike and Pedestrian Master Plan. The Ray Street/17th Avenue intersection is controlled by a traffic signal.

The table below shows daily traffic counts and 85th percentile speed data along 17th Avenue at several locations. The highest estimated 2022 daily traffic count was 3,927 vehicles near Regal Street. The highest 85th percentile speed was 34 miles per hour near St. Helena Street (4 miles per hour higher than the 30 miles per hour posted speed). The data indicates that there is a moderate speeding concern along 17th Avenue.

2022 Daily Traffic and 85th Percentile Speeds on 17th Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
17 th Avenue - 1300 Block, west of Perry Street				
NB	1	778		
SB	1	1,001		
Both Dir.	2	1,779	28	25
17 th Avenue - 1500 Block, west of St Helena Street				
NB	1	1,435		
SB	1	1,563		
Both Dir.	2	2,998	34	30
17 th Avenue - 2900 Block, west of Regal Street				
EB	1	1,967		
WB	1	1,960		
Both Dir.	2	3,927	33	30
17 th Avenue - 3300 Block, east of Ray Street				
EB	1	724		
WB	1	1,002		
Both Dir.	2	1,726	28	25
17 th Avenue – 3800 Block, east of Rebecca Street				
EB	1	695		
WB	1	528		
Both Dir.	2	1,223	31	25

^a Traffic data collected in May 2019. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

The table below shows the severity and types of crashes occurring on the 17th Avenue study corridor over the last five years. The data includes all crashes on the corridor and are reported for the nearest intersection. Many intersections on 17th Avenue did not have reported crashes and are not listed in the table. There was a total of 30 crashes, including one serious injury crash where a vehicle hit a pedestrian at Mt. Vernon Street during dusk with no street lighting. Angle and fixed object crashes were the most common crash type.

Spokane Traffic Calming Master Plan

Crashes on 17th Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Southeast Blvd	-	-		1	2	3
Perry Street	-	-	1		2	3
Pittsburg Street	-	-			1	1
Magnolia Street	-			1	1	2
Martin Street	-	-			2	2
Mt. Vernon Street	-	1			1	2
Ray Street	-	-	1		6	7
Freya Street	-	1	1	3	4	9
Cuba Street	-	-			1	1
Total	-	2	3	5	20	30

There are existing curb extensions and marked crosswalks at Mt Vernon Street to support the adjacent elementary school. There is a marked crosswalk on 17th Avenue west of Cook Street to provide access to the adjacent park.

The need for additional enhanced pedestrian crossing treatments was analyzed for 17th Avenue based on NCHRP Report 562. Based on the findings, a marked crossing is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. It was assumed the pedestrian crossing demand is only met at key intersections such as Perry Street with higher traffic volumes to cross and adjacent bus stops.

Recommended Solution

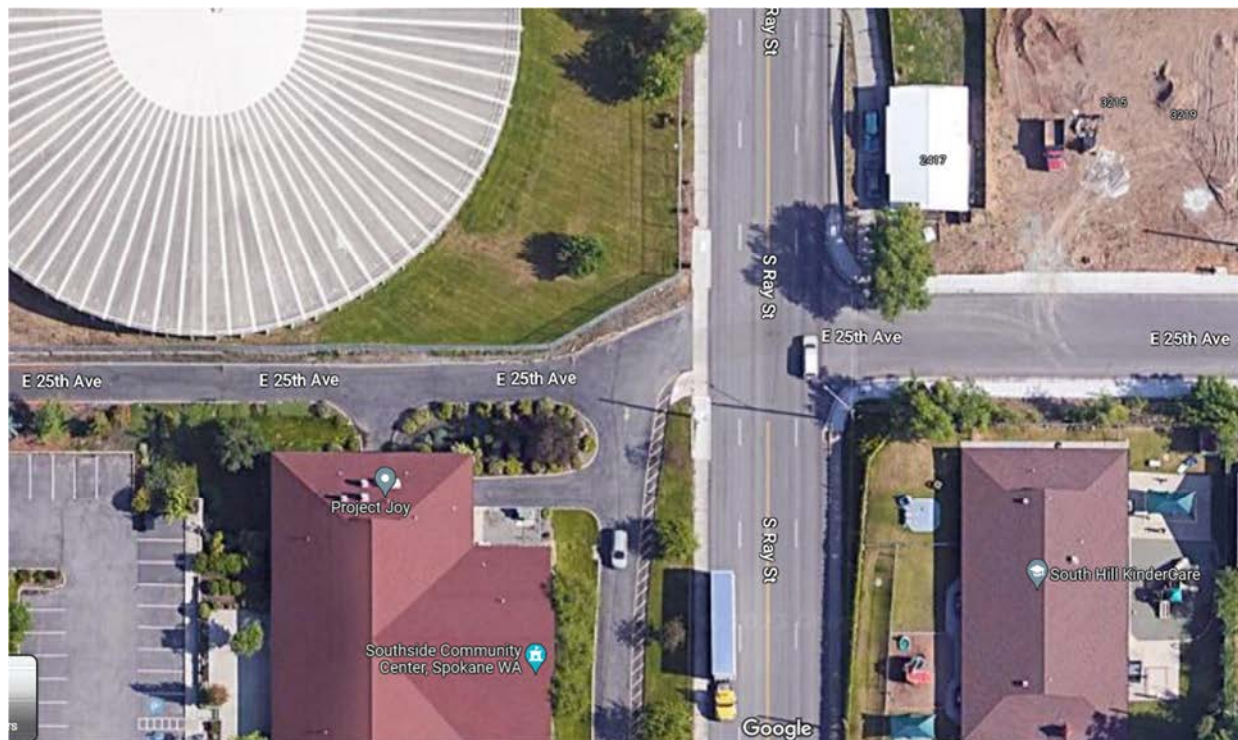
The roadway could benefit from traffic calming elements to manage driver speeds and improve overall safety. The following improvements are recommended.

- Install curb extensions and marked crosswalk at the Perry Street/17th Avenue intersection to narrow the roadway to reduce vehicle speeds and improve pedestrian access to the bus stops.
- Install up to four curb extensions along the 17th Avenue corridor both east and west of the Perry Street intersection to narrow the roadway to reduce vehicle speeds entering the neighborhood.
- Install curb extensions on 17th Avenue both east and west of Regal Street to narrow the roadway to reduce vehicle speeds entering the neighborhood.
- Install curb extensions at 17th Avenue and Pittsburg Street to reduce vehicle speeds through the neighborhood.
- Install a traffic circle at 17th Avenue and Regal Street to slow vehicle speeds
 - 17th Avenue and Regal Street
- Install street lighting at the 17th Avenue/Mt Vernon Street intersection to improve pedestrian and bicyclist visibility in dark lighting conditions.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Lincoln Heights
Project Extent:	Lincoln Heights Reservoir Tank at Ray Street and 25 th Avenue Intersection

Problem Statement: Residents of the Lincoln Heights neighborhood raised concerns over the lack of pedestrian crossing facilities at the Lincoln Heights Reservoir Tank at Ray Street and 25th Avenue.



Lincoln Heights Reservoir Tank at Ray Street and 25th Avenue

Traffic Analysis

Ray Street in the study area is classified as an urban principal arterial. Ray Street has a posted speed limit of 30 miles per hour, provides two lanes in each direction, no on-street parking, and has an acceptable sidewalk network. 25th Avenue in the study area is classified as an urban local access road. 25th Avenue does not have a posted speed limit, provides one lane in each direction, on-street parking in both directions, and has an acceptable sidewalk network.

The Spokane Bike and Pedestrian Master Plan identifies a planned shared use path connecting the west end of 23rd Avenue (west of Ray Street) to the 25th Avenue opposite Fiske Street, west of the reservoir and through Thornton Murphy Park.

Spokane Traffic Calming Master Plan

The table below shows daily traffic counts and speed data on Ray Street at 27th Avenue. The estimated 2022 daily traffic count was 22,770 vehicles on Ray Street. The 85th percentile speed along this corridor was 40 miles per hour (10 miles per hour over the 30 mile per hour speed limit). The data indicates that there is a significant speeding concern on Ray Street.

2022 Daily Traffic and 85th Percentile Speeds on Ray Street at 27th Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
South of 27 th Avenue				
NB	2	10,544	39	
SB	2	12,226	41	
Both Dir.	4	22,770	40	30

^a Traffic data collected in May 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

The need for enhanced pedestrian crossing treatments across each roadway in the study area was analyzed based on NCHRP Report 562, using collected traffic data. Based on the findings, active or enhanced pedestrian crossing treatments would be appropriate given the high existing traffic volumes and speeds on the study corridor. Based on an evaluation of the surrounding land uses and the planned shared use path west of the reservoir, 23rd Avenue is the preferred location for a protected pedestrian crossing on Ray Street. This improvement is recommended in the Ray Street corridor traffic analysis.

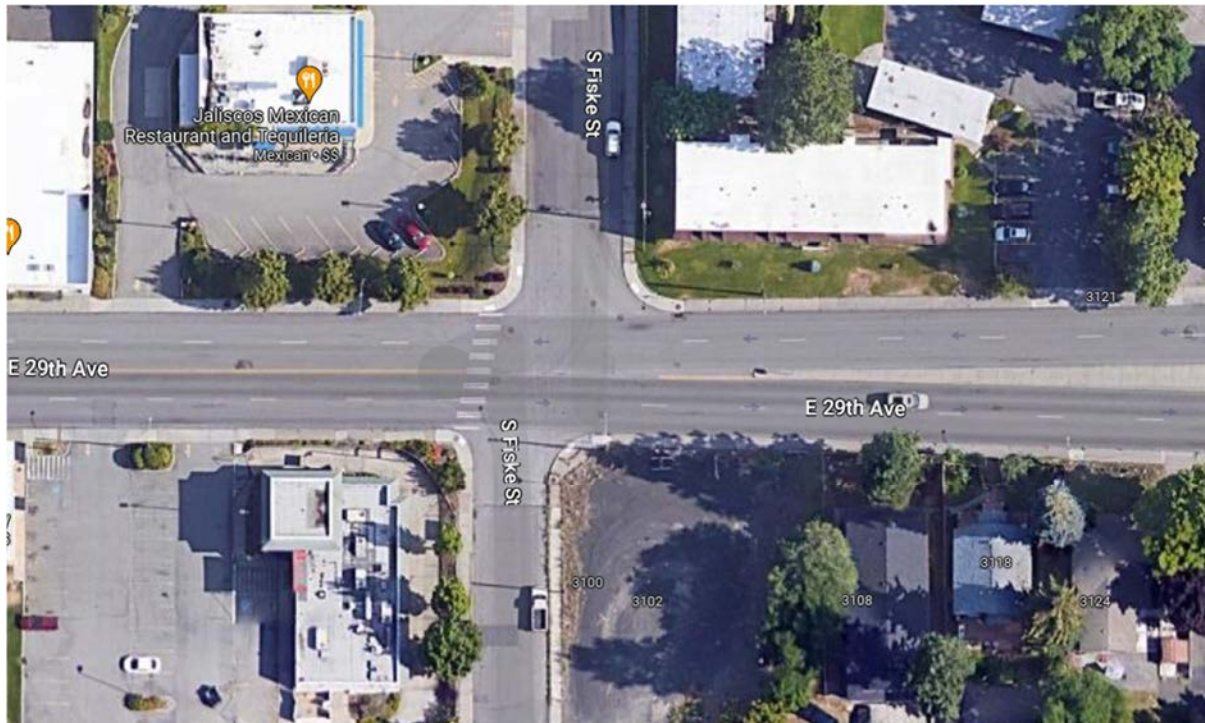
Recommended Solution

With the installation of a pedestrian hybrid beacon crossing at 23rd Avenue, the closure of the pedestrian ramps to Ray Street at 25th Avenue is recommended to direct pedestrians to the preferred location at 23rd Avenue.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Lincoln Heights
Project Extent:	29 th Avenue/Fiske Street Intersection

Problem Statement: Residents of the Lincoln Heights neighborhood raised concerns over pedestrian crossing safety and level of difficulty crossing 29th Avenue at Fiske Street.



29th Avenue and Fiske Street Intersection

Traffic Analysis

29th Avenue in the study area is classified as an urban principal arterial. 29th Avenue has a posted speed limit of 30 miles per hour, two lanes in each direction, no on-street parking, and an acceptable sidewalk network. 29th Avenue is designated as a “high bike traffic (shared lane)” roadway in the Spokane Bike and Pedestrian Master Plan. Fiske Street in the study area is classified urban local access. Fiske Street does not have a posted speed limit, provides one lane in each direction, on-street parking on both sides of the street, and has an acceptable sidewalk network. There is a marked pedestrian crossing on west leg of the 29th Avenue/Fiske Street intersection. The closest signalized crossing on 29th Avenue is located 550 feet south at the Ray Street signalized intersection.

The table below shows daily traffic counts and speed data on 29th Avenue at Regal Street. The estimated 2022 daily traffic count was 19,031 vehicles on 29th Avenue. The 85th percentile speed along this corridor

Spokane Traffic Calming Master Plan

was 35 miles per hour in the westbound direction (5 miles per hour over the 30 mile per hour speed limit). The data indicates that there is a significant speeding concern on 29th Avenue.

2022 Daily Traffic and 85th Percentile Speeds on 29th Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
At Regal Street				
EB	2	9,660	28	
WB	2	9,371	35	
Both Dir.	4	19,031	32	30

^a Traffic data collected in October 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

The need for enhanced pedestrian crossing treatments was analyzed for 29th Avenue based on NCHRP Report 562. Based on the findings, red treatments (e.g., HAWK signal beacon, midblock pedestrian signal) is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. It was assumed the pedestrian crossing demand is met due to the surrounding commercial uses and urban neighborhoods, and Thornton Murphy Park to the north.

Three crashes were recorded over the last five years (from 2017 to 2021), including one minor injury crash related to a pedestrian being hit by a vehicle going straight at the intersection.

Recommended Solution

The installation of a pedestrian hybrid beacon is recommended at the existing crosswalk on 29th Avenue at Fiske Street to improve safety. Coordination with the adjacent signals will require evaluation if this improvement moves forward to design.

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District:	2
Neighborhood:	Lincoln Heights
Project Extent:	29 th Avenue and Mount Vernon Street Intersection

Problem Statement: Residents of the Lincoln Heights neighborhood raised concerns over pedestrian crossing safety and level of difficulty to cross the intersection of 29th Avenue and Mount Vernon Street.



29th Avenue and Mount Vernon Street Intersection

Traffic Analysis

29th Avenue in the study area is classified as an urban principal arterial. 29th Avenue has a posted speed limit of 30 miles per hour, two lanes in each direction, no on-street parking, and an acceptable sidewalk network except for the frequent driveway conflicts. 29th Avenue is designated as a “high bike traffic (shared lane)” roadway in the Spokane Bike and Pedestrian Master Plan. Mt. Vernon Street in the study area is classified as an urban local access road. Mt Vernon Street does not have a posted speed limit, provides one lane in each direction, on-street parking on both sides of the street, and has an acceptable sidewalk network except where it discontinues on the east side of Mt Vernon Street. Mt Vernon Street is not included in the Spokane Bike and Pedestrian Master Plan.

The table below shows daily traffic counts and speed data on 29th Avenue at Regal Street. The estimated 2022 daily traffic count was 19,031 vehicles on 29th Avenue. The 85th percentile speed along this corridor was 35 miles per hour in the westbound direction (5 miles per hour over the 30 mile per hour speed limit). The data indicates that there is a significant speeding concern on 29th Avenue.

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2022 Daily Traffic and 85th Percentile Speeds on 29th Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
At Regal Street				
EB	2	9,660	28	
WB	2	9,371	35	
Both Dir.	4	19,031	32	30

^a Traffic data collected in October 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

Five crashes were recorded over the last five years (from 2017 to 2021), the primary crash type was angle and turning across the intersection.

The need for enhanced pedestrian crossing treatments was analyzed for 29th Avenue based on NCHRP Report 562. Based on the findings, red treatments (e.g., HAWK signal beacon, midblock pedestrian signal) is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. It was assumed the pedestrian crossing demand is met on 29th Avenue due to the surrounding commercial uses and urban neighborhoods.

The installation of a pedestrian hybrid beacon is planned across 29th Avenue at the existing marked crossing near Rosauers approximately 330-feet west of Mt. Vernon Street (south leg). The project will be funded by a prior City traffic calming funding cycle. The installation of a protected pedestrian crossing on 29th Avenue at Fiske Street is recommended in the previous traffic analysis. The funded crossing near Rosauers and the proposed crossing at Fiske Street are approximately 1,700 feet apart. The proposed pedestrian crossing at Mt. Vernon is not recommended due to the close spacing to the other funded and proposed crossings.

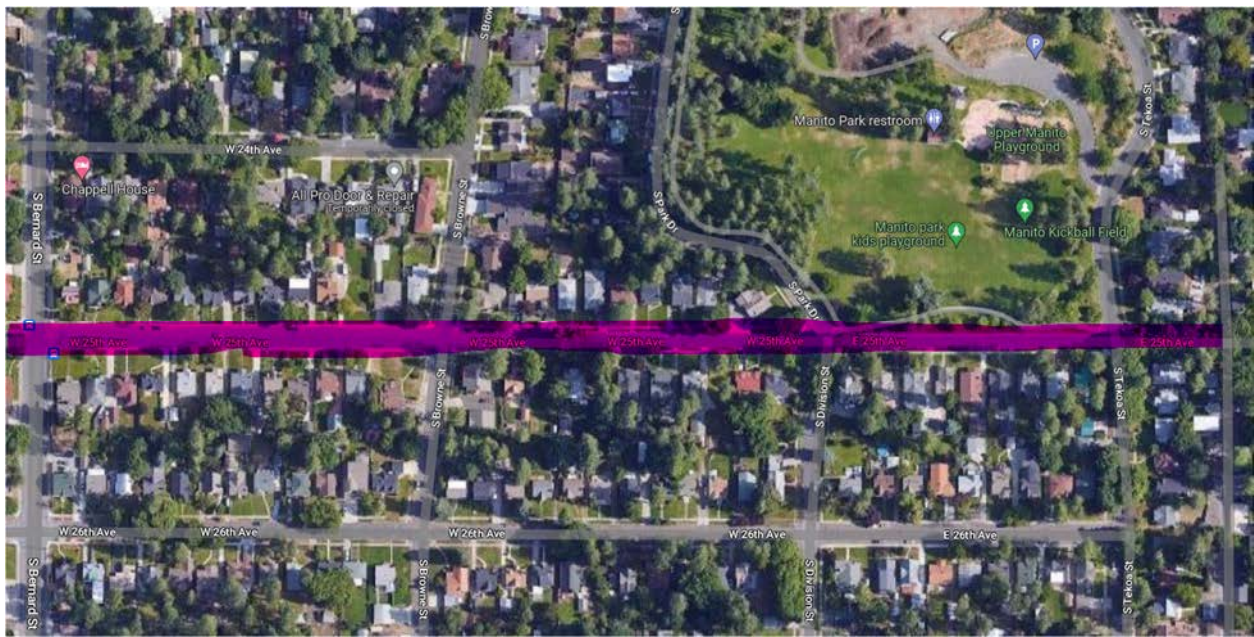
Recommended Solution

With the installation of a pedestrian hybrid beacon crossing at Fiske Street, it is recommended to remove the existing marked pedestrian crossing at Mt Vernon to direct pedestrians to the preferred and protected crossing location.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Manito-Cannon Hill
Project Extent:	25 th Avenue from Bernard Street to Tekoa Street (near Manito Park)

Problem Statement: Residents of the Manito-Cannon Hills neighborhood raised concerns over the need for sidewalk infill/repair, speeding, and cut through traffic along 25th Avenue from Bernard Street to Tekoa Street (near Manito Park).



25th Avenue from Bernard Street to Tekoa Street

Traffic Analysis

25th Avenue is classified as an urban minor collector and provides one lane in each direction and a posted speed limit of 25 miles per hour. 25th Avenue does not allow on-street parking from Tekoa Street to Division Street (at Manito Park) but does the rest of the study area. 25th Avenue is designated as a “bike friendly route” in Spokane Bike and Pedestrian Master Plan. Bernard Street is classified as an urban minor arterial. Bernard Street has a posted speed limit of 30 miles per hour, provides one lane in each direction, on-street parking on the west side of the road, a striped bike lane in both directions, and an acceptable sidewalk network. Bernard Street in the study area is designated as a “high traffic (bike lane)” route in the Spokane Bike and Pedestrian Master Plan.

The table below shows daily traffic counts and 85th Percentile speed data on 25th Avenue between Browne Street and Bernard Street – one block west of the study area. The 2022 daily traffic count was 666 vehicles. The 85th percentile speed along this corridor was 28 miles per hour (3 miles per hour

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higher than 25 mile per hour posted speed limit). The data indicates that there is a minor speeding problem along 25th Avenue near the study area.

2022 Daily Traffic and 85th Percentile Speeds on 25th Avenue between Browne St and Bernard St

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
25 th Avenue				
EB	1	333	27	25
WB	1	333	28	25
Both Dir.	2	666	28	25

25th Avenue provides a direct connection between Grand Boulevard and Bernard Street along the edge of Manito Park. The curb-to-curb width is approximately 34-feet with underutilized on-street parking which may encourage higher travel speeds.

Recommended Solution

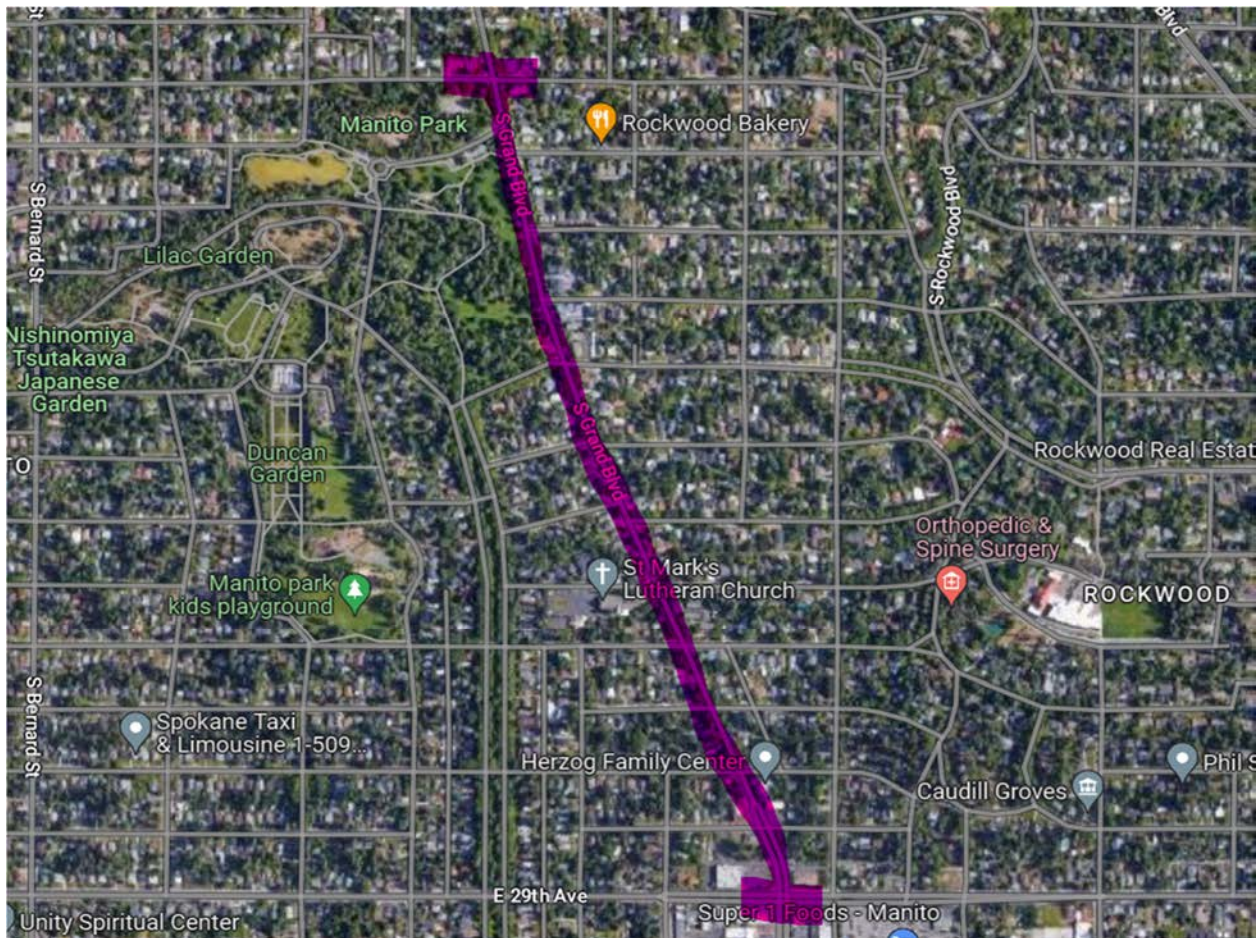
The roadway could benefit from the addition of traffic calming elements to manage driver speeds and improve the sidewalk network. The following improvements are recommended.

- Repair sidewalk and/or curb at the following locations on 25th Avenue:
 - North side of street - Browne Street to 118 W 25th Avenue
 - South side of street - Browne Street to 131 W 25th Avenue
- Install curb extensions across 25th Avenue east of Browne Street to reduce vehicle speeds entering the neighborhood.
- Install a marked crosswalk and curb extensions on the north and east legs of the 25th Avenue/Division Street/Park Drive intersection to improve crossing safety to the park and reduce vehicle speeds.

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District:	2
Neighborhood:	Manito-Cannon Hill, Rockwood
Project Extent:	Grand Boulevard from 17 th Avenue to 29 th Avenue

Problem Statement: Residents of the Manito-Cannon Hills neighborhood raised concerns over speeding, lack of bicyclist network connectivity, lack of pedestrian crossing facilities, and the width of Grand Boulevard from 17th Avenue to 29th Avenue. Residents of the Rockwood neighborhood raised concerns over pedestrian crossing safety and difficulty crossing a high-volume roadway on Grand Boulevard at 18th, 21st and 25th Avenues.



Grand Boulevard from 17th Avenue to 29th Avenue

Traffic Analysis

Grand Boulevard in the study area is classified as an urban principal arterial. Grand Boulevard provides two lanes in each direction and has a posted speed limit of 20 miles per hour between 17th Avenue and Manito Place (along Manito Park frontage), and 30 miles per hour between Manito Place and 29th

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Avenue. Grand Boulevard provides two lanes in each direction, no on-street parking, and has an acceptable sidewalk network. There is a pedestrian signal across Grand Boulevard at 18th Avenue. Grand Boulevard in the study area is designated as a “moderate traffic (shared)” route in the Spokane Bike and Pedestrian Master Plan. Grand Boulevard provide transit service and bus stops.

The table below shows daily traffic counts and 85th Percentile speed data at several locations on Grand Boulevard from 17th Avenue to 29th Avenue. The highest 2022 daily traffic count was 15,564 vehicles near 20th Avenue. The highest 85th percentile speed along this corridor was 35 miles per hour near 26th Avenue (5 miles per hour higher than the posted speed limit of 30 miles per hour). The data indicates there is a moderate speed issue along the study corridor.

2022 Estimated Daily Traffic and 85th Percentile Speeds on Grand Boulevard at Several Locations

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
20th Avenue				
NB	2	N/A	N/A	
SB	2	N/A	N/A	
Both Dir.	4	15,564	29	30
24th Avenue				
NB	2	7,309	33	
SB	2	7,418	32	
Both Dir.	4	14,727	33	30
25th Avenue				
NB	2	4,933	N/A	
SB	2	9,170	N/A	
Both Dir.	4	14,103	N/A	30
26th Avenue				
NB	2	N/A	N/A	
SB	2	N/A	N/A	
Both Dir.	4	15,069	35	30
27th Avenue				
NB	1	N/A	N/A	
SB	1	N/A	N/A	
Both Dir.	2	14,699	34	30
29th Avenue				
NB		4,922	N/A	
SB		8,924	N/A	
Both Dir.		13,846	N/A	30

^a Traffic data collected in March, June and July of 2015 and May 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

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The table below shows the severity and types of crashes occurring on the Grand Boulevard study corridor over the last five years. The data includes all crashes on the corridor and are reported for the nearest intersection. There was a total of 33 crashes, including one minor injury crash where a vehicle hit a pedestrian at Grand Boulevard/25th Avenue. Angle and rearend crashes were the most common crash type.

Crashes on Grand Boulevard from 17th to 28th Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
17th Ave	-	-	-	4	7	11
18th Ave	-	-	-	-	1	1
19th Ave	-	-	-	1	-	1
20th Ave	-	-	-	-	1	1
21st Ave	-	1	-	1	3	5
22nd Ave	-	-	-	-	3	3
23rd Ave	-	-	-	1	1	2
24th Ave	-	-	-	-	3	3
25th Ave	-	-	1	-	2	3
26th Ave	-	-	-	-	1	1
27th Ave	-	-	-	-	-	0
28th Ave	-	-	-	-	2	2
Total	-	1	1	7	24	33

Given the 85th percentile speeds and the angle crash trend, a road diet was considered as means to reduce travel speeds and enhance safety on the study segment. With an estimated 15,000 vehicles per day, Grand Boulevard could be reduced to a three-lane cross section with a center two-way left-turn lane. As a point of reference, the planning level capacity of a two-lane urban arterial is 18,300 vehicles per day (assuming left-turn lanes are provided on the mainline at signalized intersections).¹

A road diet is expected to reduce crashes by 29%, per the Crash Modification Factors Clearinghouse.² A road diet on Grand Boulevard may also result in more uniform travel speeds on the corridor and is expected to reduce the average travel speed by 3 mph.³ Road diets are more successful when implemented on longer stretches of roadway; therefore, it is recommended that the lane reduction continue beyond the study area. When analyzing the cross section and daily traffic volumes on Grand Boulevard, it is recommended that the road diet extend 1.7 miles, from 9th Avenue/McClellan Street (at the north end) to 33rd Avenue (at the south end). The 9th Avenue/McClellan Street intersection is a logical terminus on the north end because Grand Boulevard ends and provides opportunity to drop and

¹ *Highway Capacity Manual 6th Edition: A Guide for Multimodal Mobility Analysis*. Page 16-30, Exhibit 16-16. Washington, DC: The National Academies Press.

² *Crash Modification Factors Clearinghouse*, <https://www.cmfclearinghouse.org/detail.cfm?facid=199>

³ *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed*. Federal Highway Administration. July 2014.

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add lanes at intersection roadways. 33rd Avenue was recommended as the south terminus because Grand Boulevard transitions to a three-lane cross section.

Grand Boulevard in the study area is designated as a “moderate traffic (shared)” route in the Spokane Bike and Pedestrian Master Plan. If the cross-section on Grand Boulevard is reduced to three lanes, there is an opportunity to add bike facilities. The existing curb-to-curb width would allow buffered bike lanes to be added to the corridor segments from 9th to 17th Avenue and 27th to 33rd Avenue. The corridor segment between 17th and 27th Avenue is constrained, allowing a buffered bike lane in the uphill (southbound) direction and shared lane treatment in the downhill (northbound) direction. Bicyclists are anticipated to travel at higher speeds in the downhill direction and more comfortably share a lane with vehicles.

The need for enhanced pedestrian crossing treatments was analyzed for Grand Boulevard based on NCHRP Report 562. Based on the findings, red treatments (e.g., HAWK signal beacon, midblock pedestrian signal) is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. It was assumed the pedestrian crossing is met given the surrounding urban neighborhood, bus stops and adjacent city park. There is a pedestrian signal across Grand Boulevard at 18th Avenue that connects to the northern area of the park. There are marked crossings with no signal or beacon at the other local streets that intersection the park frontage on Grand Boulevard (19th, 20th, 21st Avenues). An additional pedestrian signal at the southern end of the park would improve pedestrian access. If a pedestrian signal is installed at 21st Avenue/Manito Place, there is a need for sidewalks on Manito Place to provide a connection to the park path system.

Recommended Solution

It is recommended that a road diet be considered on Grand Boulevard, reducing the current four-lane cross section to a three-lane cross section with a center turn-lane. The addition of a center turn-lane is expected to reduce crashes, while the lane reduction is expected to reduce vehicle speeds. It is recommended that the City of Spokane further study the expected impacts of the road diet. The road diet can be considered along the 1.7-mile segment from 9th Avenue/McClellan Street (at the north end) to 33rd Avenue (at the south end).

Buffered bike lanes in both directions are recommended from 9th to 17th Avenue and 27th to 33rd Avenue. A buffered bike lane in the uphill direction and shared lane treatment in the downhill direction are recommended between 17th and 27th Avenue.

The following improvements are recommended to manage vehicle speeds and increase pedestrian safety along the study corridor.

- Install a rectangular rapid flashing beacon at the existing marked crosswalk on the north leg of the Grand Boulevard/21st Avenue/Manito Place intersection to increase the visibility of the crossing. This location connects to the southern portion of the park and bus stops.

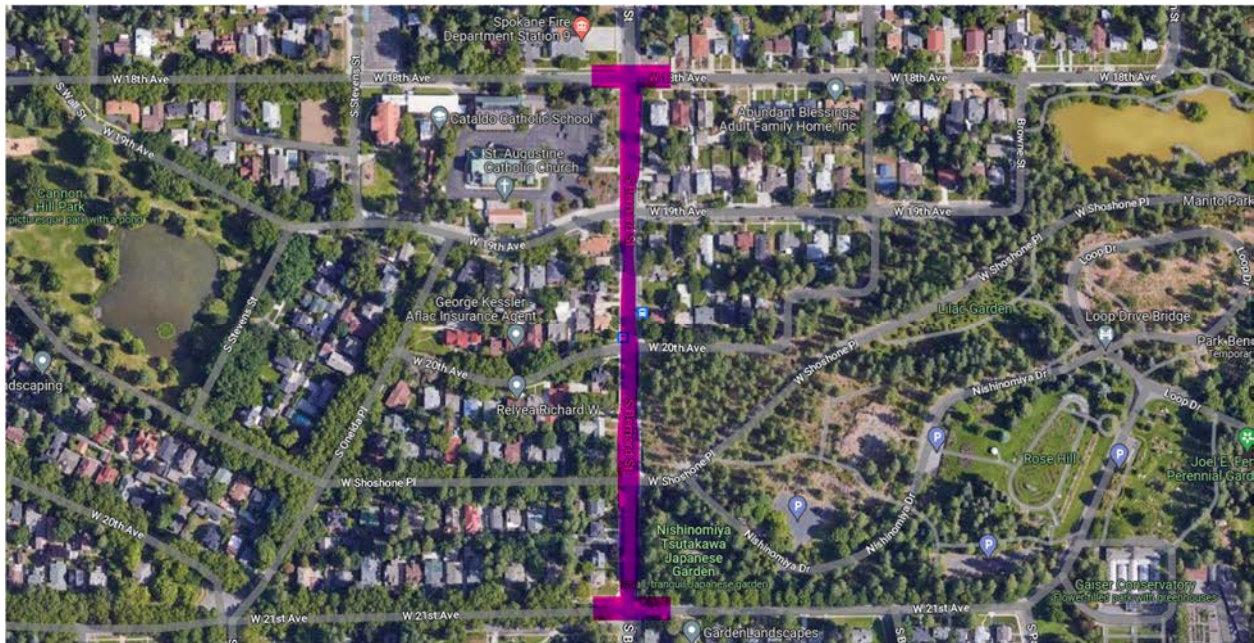
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- Add a sidewalk on the north side of Manito Place between the marked crosswalk on the north leg of the Grand Boulevard/21st Avenue/Manito Place intersection and the park pathway near Manito Boulevard. Pending civil review, the sidewalk could replace the on-street parking to limit impacts to trees.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Manito-Cannon Hill
Project Extent:	Bernard Street from 18 th Avenue to 21 st Avenue

Problem Statement: Residents of the Manito-Cannon Hills neighborhood raised concerns over speeding near Manito Park on Bernard Street from 18th Avenue to 21st Avenue.



Bernard Street from 18th Avenue to 21st Avenue

Traffic Analysis

Bernard Street in the study area is classified as an urban minor arterial. Bernard Street has a posted speed limit of 20 miles per hour, provides one lane in each direction, on-street parking on the west side of the road, a striped bike lane in both directions, and an acceptable sidewalk network. Bernard Street is designated as a “high traffic (bike lane)” route in the Spokane Bike and Pedestrian Master Plan. There is a marked school crossing with overhead flashers across Bernard Street at 18th Avenue. All intersections along the study corridor are controlled by a stop sign on the side street. Manito Park fronts the east side of Bernard Street between 20th and 21st Avenue.

18th Avenue in the study area is classified as an urban local access road. 18th Avenue has a posted speed limit of 20 miles per hour on the west side and 25 miles per hour on the east side. 18th Avenue provides one lane in each direction, on-street parking on both sides of the road and has an acceptable sidewalk network. 18th Avenue in the study area is designated as a “neighborhood greenway” in the Spokane Bike and Pedestrian Master Plan.

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21st Avenue in the study area is classified as an urban local access road. 21st Avenue does not have a posted speed limit, provides one lane in each direction, on-street parking, and an acceptable sidewalk network. 21st Avenue is designated as a “neighborhood greenway” in the Spokane Bike and Pedestrian Master Plan.

The table below shows estimated daily traffic counts at Bernard Street near 18th Avenue. The estimated 2022 daily traffic count was 1,134 vehicles on Bernard Street. There was no speed data available for this study area.

2022 Estimated Daily Traffic on Bernard Street near 18th Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a
Bernard Street		
NB	1	356
SB	1	778
Both Dir.	2	1,134

^a Traffic data collected in June 2017. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

Three non-injury crashes were recorded over the last five years (from 2017 to 2021) related to angle collisions or hitting an object.

The need for enhanced pedestrian crossing treatments was analyzed for Bernard Street based on NCHRP Report 562. Based on the findings, marked crosswalk treatments is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. It was assumed the pedestrian crossing is met given the surrounding urban neighborhood, bus stops and adjacent city park. There is a school crossing at 18th Avenue. The addition of a marked crossing at Shoshone Place would provide a connection to the western portion of Manito Park. The addition of a marked crossing at 21st Avenue would be consistent with the City’s neighborhood greenway designation.

Potential speeding issues on Bernard Street are a concern, especially with a 20 mile per hour posted speed limit near the park. The roadway provides bike lanes and has on-street parking on the west side of the street so there is limited opportunity to add curb extensions or narrow the roadway with a center median treatment.

Recommended Solution

The following improvements are recommended to manage vehicle speeds and increase pedestrian safety along the study corridor.

- Install curb extensions on the west side of Bernard Street adjacent to the on-street parking at the following locations:
 - 19th Avenue
 - 20th Avenue

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- Shoshone Place
 - 21st Avenue
- Install a marked pedestrian crossing on the north leg of the Bernard Street/Shoshone Place intersection to provide a connection to the western portion of Manito Park.
- Install a marked pedestrian crossing on Bernard Street at 21st Avenue to support the City's neighborhood greenway designation.

Spokane Traffic Calming Master Plan

2022 Daily Traffic and 85th Percentile Speed on 28th Avenue between Howard Street and Wall Street

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed/Statutory Speed (mph)
28 th Avenue between Howard Street and Wall Street				
EB	1	74	21	
WB	1	40	22	
Both Dir.	2	114	22	25

Recommended Solution

The following improvements are recommended to manage vehicle speeds and discourage cut-through traffic along the study corridor.

- Infill sidewalks on 28th Avenue between Bernard Street and Lincoln Street.

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District: 2
Neighborhood: Peaceful Valley
Project Extent: Main Avenue near Cedar Street

Problem Statement: Residents of the Peaceful Valley neighborhood raised concerns over speeding and collisions with curbs along Main Avenue near Cedar Street.



Main Avenue Near Cedar Street

Traffic Analysis

Main Avenue east of Cedar Street is classified as collector, the remaining study roadways are classified as local access streets, all with posted speed limit of 25 miles per hour. Main Avenue and Cedar Street provide two lanes and on-street parking. North leg of Cedar Street provides one lane for northbound movement only and on-street parking is not allowed. Sidewalks are provided along Main Avenue and Cedar Street within the study area. No crosswalks and designated bicycle facilities are available. There are bus stops on the northwest and southwest corners of the intersection. The north side of Main Avenue west of Cedar Street is a curb tight sidewalk and fence on top of a retaining wall.

The Main Avenue/Cedar Street intersection is stop-controlled on the Cedar Street approach. The Main Avenue approaches at the intersection are offset. No on-street parking is allowed on the south side of Main Avenue east of Cedar Street, parked vehicles would limit the visibility of the intersection for

Spokane Traffic Calming Master Plan

westbound drivers approaching Cedar Street. The resulting wide eastbound lane may contribute to speed issues.

The table below shows the daily traffic volumes and 85th percentile speeds on Main Avenue near Cedar Street. The daily volume on Main Avenue was 1,981 vehicles. The 85th percentile speed was 29 miles per hour (four miles per hour greater than the posted speed limit). The data indicates there is a moderate speeding concern. Note that the data was collected in 2013, before the current configuration of the intersection constructed in 2019.

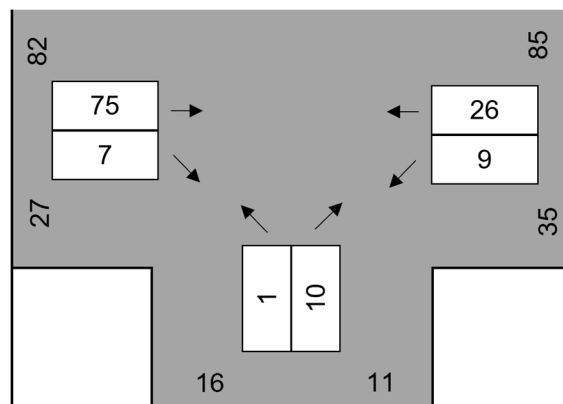
2022 Daily Traffic and 85th Percentile Speeds on Main Avenue near Cedar Street

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
East of Cedar Street				
EB	1	985	29	25
WB	1	996		
Both Dir.	2	1,981		

^a Traffic data collected in June 2013. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

Two crashes were recorded over the last five years (from 2017 to 2021), both related to vehicles entering at an angle. One of the crashes caused the crash severity of property damage only (in 2019, from improper backing out of a driveway) and the other caused a minor injury (in 2017, driver under the influence of alcohol). The data does not show a significant crash pattern related to the offset intersection configuration or raised high curb along the north side of Main Avenue.

The figure below shows PM peak hour (weekend) traffic volumes at the Main Avenue/Cedar Street intersection, based on a traffic count from July 11, 2021, factored up to 2022 conditions (assuming 1% per year growth).



PM Peak Hour Traffic at Main Avenue and Cedar Street

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Recommended Solution:

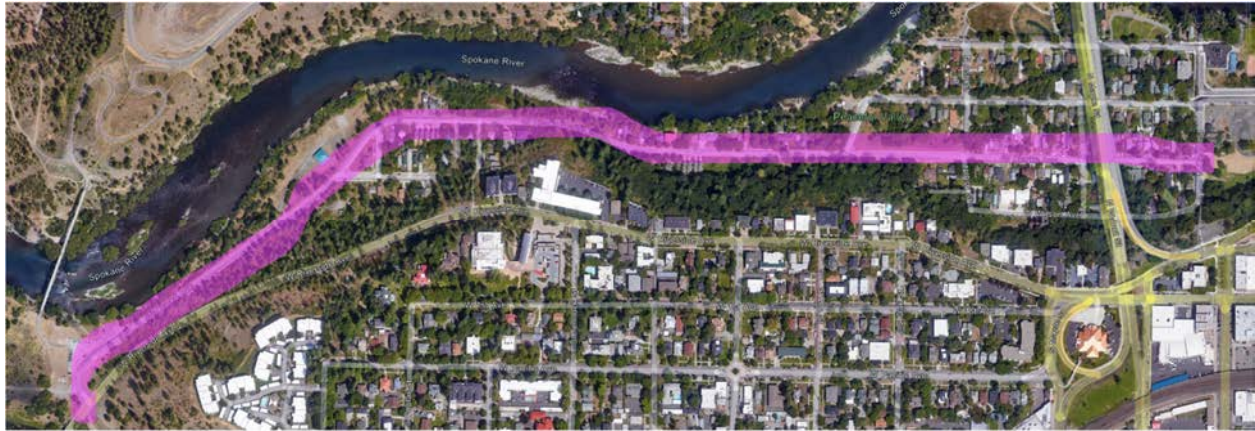
The following improvements are recommended to reduce vehicle speeds and increase the visibility of the intersection and pedestrian safety.

- Install marked pedestrian crossings on all legs of the Main Avenue/Cedar Street intersection.
- Install a stop bar on the Cedar Street approach.

Spokane Traffic Calming Master Plan

District: 2
Neighborhood: Peaceful Valley
Project Extent: Clarke Avenue Corridor

Problem Statement: Residents of the Peaceful Valley neighborhood raised concerns over speeding along Clarke Avenue (approximately 0.88 miles) from Riverside Avenue to Cedar Street.



Clarke Avenue Study Corridor

Traffic Analysis

Clarke Avenue within the study corridor is classified as local street and provides two lanes with a posted speed limit of 25 miles per hour. Sidewalks and on-street parking are provided along the study corridor east of Bennett Avenue. No designated bicycle facilities and marked crosswalks are provided within the study area. There are seven intersections along the study corridor, all are stop controlled on the side street (not Clark Avenue) or uncontrolled.

The table below shows the 2022 daily traffic volumes and 85th percentile speeds on Clarke Avenue. The daily volume on Clarke Avenue was 337 vehicles east of Cedar Street. The 85th percentile speed was 32 miles per hour (seven miles per hour greater than the posted speed limit). The data indicates there is a moderate speeding concern.

2022 Daily Traffic and 85th Percentile Speeds on Clarke Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
East of Spruce Street				
EB	1	180	32	25
WB	1	157	32	
Both Dir.	2	337	32	

^a Traffic data collected in November 2022.

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The table below shows the severity and types of crashes occurring on Clarke Avenue study corridor over the last five years (excluding intersection crashes at the east and west ends). There was a total of six crashes on Clarke Avenue, including one injury crash involving a pedestrian. Crashes related to moving vehicles colliding with stationary objects or vehicles were the most common crash type.

Crashes on Clarke Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Turning	-	-	-	-	1	1
Fixed Object or Car	-	-	-	-	4	4
Ped/Bike	-	-	1	-	-	1
Total	0	0	1	0	5	6

The need for enhanced pedestrian crossing treatments across Clarke Avenue was analyzed based on NCHRP Report 562, using collected traffic data. Based on the findings, a crosswalk is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. Although pedestrian data is not available, it is assumed the 20 or more pedestrian crossing threshold is met due to the neighborhoods on the east, an active trail (South Gorge Trail) to the north and bus stops on the study corridor.

Recommended Solution:

It is recommended to install curb extensions along Clarke Avenue to reduce the pavement width and vehicle speeds at the following locations:

- West of Ash Street at the bus stops

It is recommended that speed feedback signs be installed on Clarke Avenue at the following locations to alert drivers of the posted speed limit. Locations represent sections of the roadway that are long and straight with limited fronting driveways.

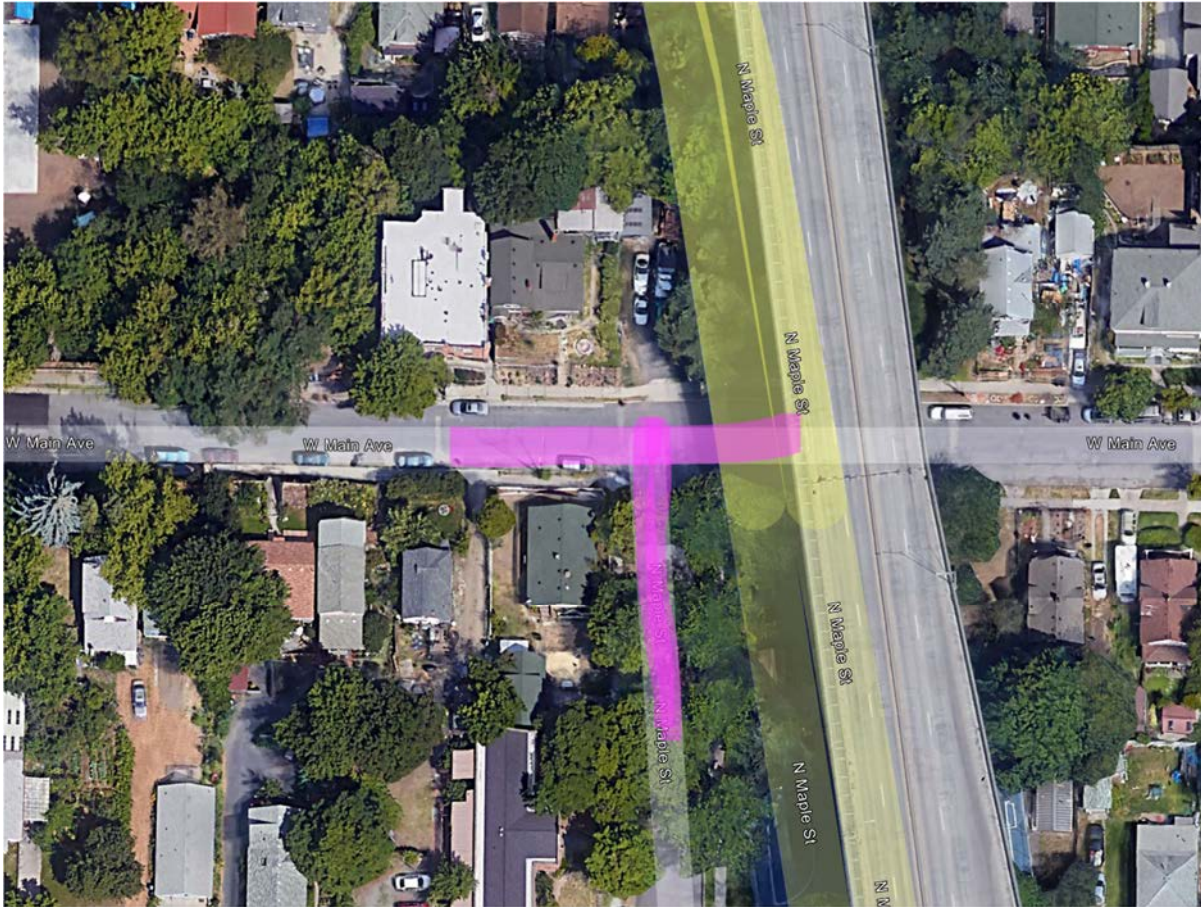
- Halfway between the People’s Park access and Bennett Avenue
- Halfway between Spruce Street and Elm Street

It is recommended to install marked crosswalks across Clarke Avenue at Spruce Street and Ash Street near the bus stops where there may be increased pedestrian activity.

Spokane Traffic Calming Master Plan

District: 2
Neighborhood: Peaceful Valley
Project Extent: Maple Street and Main Avenue

Problem Statement: Residents of the Peaceful Village raised concerns over stop sign location and intersection safety at the intersection of Maple Street and Main Avenue, as shown in figure below.



Maple Street/Main Avenue Intersection

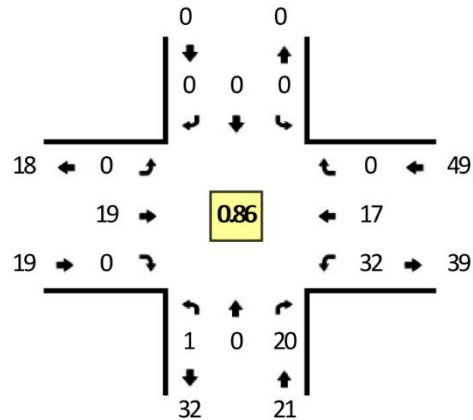
Both Maple Street and Main Avenue within the study area are classified as a local access street with a posted speed limit of 25 miles per hour. All approaches provide two lanes with on-street parking. Sidewalks are provided but no marked crosswalks or designated bike facilities are provided.

The study intersection is two-way-stop-controlled. The placement of the stop sign on the Maple Street approach is located far back from the intersection corner, to avoid being obstructed by the existing tree.

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Traffic Analysis

Three crashes were reported over the last five years (from 2017 to 2021). Two crashes were related to moving vehicles and stationary objects/vehicles with crash severity of property damage only. The third crash was related to a turning movement and had the crash severity of possible injury. The figure below shows the existing PM peak hour traffic volumes at the study intersection, based on a traffic count from November 2022. As shown in the figures, the volumes travelling through the study intersection are low.



PM Peak Hour Traffic at Maple Street and Main Avenue

The need for enhanced pedestrian crossing treatments across Main Avenue was analyzed based on NCHRP Report 562, using collected traffic data. Based on the findings, a marked crosswalk is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. Weekday evening peak hour pedestrian count data indicates there would be less than the required demand. However, it is estimated that pedestrian crossing demand would be high enough to warrant crosswalks during weekends and warm weather due to the adjacent Peaceful Valley Park and bus stops.

Recommended Solution:

Trim low hanging limbs on the tree at the southeast corner of the intersection and relocate the stop sign closer to the intersection.

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- Pacific Avenue provides two lanes serving two-way traffic while Browne Street provides four lanes serving southbound traffic.
- 2nd Avenue/Browne Street (SR 2)
 - 2nd Avenue is classified as a major arterial with a posted speed limit of 30 miles per hour.
 - The roadway provides four lanes serving westbound traffic.
- 3rd Avenue/Division Street (SR 2)
 - Division Street is classified as an urban other principal arterial with a posted speed limit of 30 miles per hour.
 - The roadway operates one-way street serving northbound traffic, where the south leg provides five lanes and converges into three lanes on the north leg.

The table below summarizes each of the five reported pedestrian fatal crashes that occurred at a downtown intersection. Two additional pedestrian fatal crashes are summarized which occurred at a midblock location.

Pedestrian Fatal Crashes within Spokane Downtown Core (2017 to 2021)

Location	Date	Control Type	Collision Type	Striking Vehicle Contributing Circumstances	Other Circumstances
Riverside Avenue at Steven Street	May 2021	Signal	Left Turning	Distracted driver	Daytime, dry weather
3 rd Avenue at Howard Street	Dec 2020	Signal	Right Turning	Under influence of drugs	Nighttime, streetlights on, dry weather
Pacific Avenue at Browne Street	Sept 2021	Two-way-stop	Straight	None	Nighttime, streetlights on, dry weather
2 nd Avenue at Browne Street	June 2018	Signal	Left Turning	Did not grant right-of-way to non-motorist	Daytime, dry weather
3 rd Avenue at Division Street	Aug 2017	Signal	Sideswipe	Disregard stop and go light	Daytime, dry weather
Howard Street south of 1 st Avenue	Nov 2017	None	Backing	Did not grant right-of-way to non-motorist	Daytime, dry weather
2 nd Avenue east of Lincoln Street	June 2021	None	Straight	Distracted driver	Nighttime, streetlights on, dry weather

The city has funding to install traffic signals at the Pacific Avenue/Browne Street and Pacific Avenue/Division Street intersections as part of the Pacific Avenue Greenway project.

Recommended Solution:

The signal timing on key downtown corridors, such and 2nd and 3rd Avenues, should be updated to provide a leading pedestrian interval (LPI) to give pedestrians the opportunity to enter the marked crosswalk at an intersection 3 to 7 seconds before opposing vehicles are given a green light indication.

Spokane Traffic Calming Master Plan

Pedestrians can better establish their presence in the crosswalk before vehicles have a signal to turn right or left. This treatment would increase vehicle delay at the intersection slightly, however implementing a leading pedestrian interval has crash reduction factor¹ of 19% for pedestrian-involved collisions.

Install curb extensions at the following intersection locations to shorten the pedestrian crossing distance and reduce pedestrian exposure:

- 3rd Avenue at Howard Street – east and west leg crosswalks
- 2nd Avenue at Browne Street – east leg crosswalk

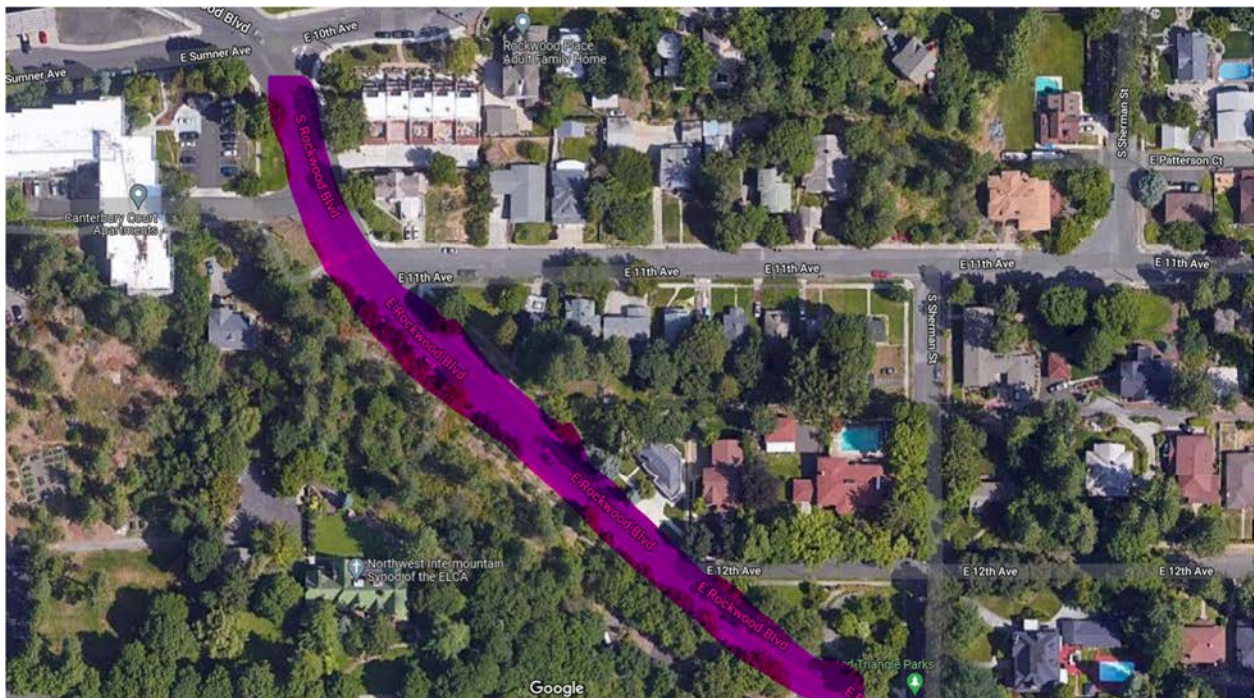
At the Pacific Avenue/Browne Street intersection, add curb extensions on both the east and west legs across Pacific Avenue and marked pedestrian crossings on all intersection approaches.

¹ *Crash Modification Factors Clearinghouse, March 2019*

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Rockwood
Project Extent:	Rockwood Boulevard near 11 th and 12 th Avenue

Problem Statement: Residents of the Rockwood neighborhood raised concerns over speeding vehicles along Rockwood Boulevard near 11th and 12th Avenue.



Rockwood Boulevard near 11th Avenue and 12th Avenue

Traffic Analysis

Rockwood Boulevard in this study area is classified as an urban major collector, has one lane in each direction with on-street parking, and a posted speed limit of 25 miles per hour. 11th and 12th Avenue are both classified as urban local access roads, have one lane in each direction, have on-street parking, and do not have a posted speed limit. A driver speed feedback sign was installed facing southbound travel on Rockwood Boulevard near Sherman Street (one block south of 12th Avenue).

The table below shows the 2022 daily traffic volumes and 85th percentile speeds on Rockwood Boulevard between 11th Avenue and 12th Avenue. The highest daily volume on Rockwood Boulevard was 2,217 southbound vehicles. The highest 85th percentile speed was 37 miles per hour (12 miles per hour greater than the posted speed limit). The data indicates there is a significant speeding issue.

Spokane Traffic Calming Master Plan

2022 Daily Traffic and 85th Percentile Speeds on Rockwood Boulevard between 11th and 12th Avenue

Direction	# Lanes	2022 Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
Rockwood Boulevard (between 11 th Avenue and 12 th Avenue)				
NB	1	1,571	37	
SB	1	2,217	34	
Both Dir.	2	3,788	35	25

^a Traffic data collected in Nov 2022.

Recommended Solution:

Rockwood Boulevard appears as a wide street when the on-street parking on both sides of the corridor has low occupancy. There are several areas on the corridor without active on-street parking that could be modified to reduce the pavement width. The installation of curb extensions is recommended across Rockwood Boulevard at the existing marked pedestrian crossing at 11th Avenue to narrow the roadway width. The curb extension on the west side of Rockwood Boulevard could extend from 11th Avenue (access to Canterbury Court Apartments) to the south where no on-street parking is allowed (across from 11th Avenue east leg). The installation of a curb extension is also recommended on the east side of Rockwood Boulevard, northwest of Sherman Street and along Olmstead Triangle Park, to slow downhill vehicle speeds. Curb extensions are expected to decrease the 85th percentile speed by 3 miles per hour.¹

¹ Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed. Federal Highway Administration. July 2014.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Rockwood
Project Extent:	Rockwood Boulevard and Sumner Avenue/10 th Avenue

Problem Statement: Residents of the Rockwood neighborhood raised concerns with sight distance, visibility, and the confusion driving through the intersection at Rockwood Boulevard and Sumner Avenue.



Rockwood Boulevard and Sumner Avenue Intersection

Traffic Analysis

Rockwood Boulevard is classified as an urban major collector, provides one lane in each direction, has unmarked on-street parking, and a posted speed limit of 30 miles per hour north of Sumner/10th Avenue and 25 miles per hour south of Sumner/10th Avenue. Sumner Avenue/10th Avenue is classified as an urban local access road that provides one lane in each direction with a posted speed limit of 25 miles per hour. It should be noted that there is on-street parking on Sumner Avenue and 10th Avenue; however, the on-street parking on Sumner Avenue is marked whereas the on-street parking on 10th Avenue is not.

Spokane Traffic Calming Master Plan

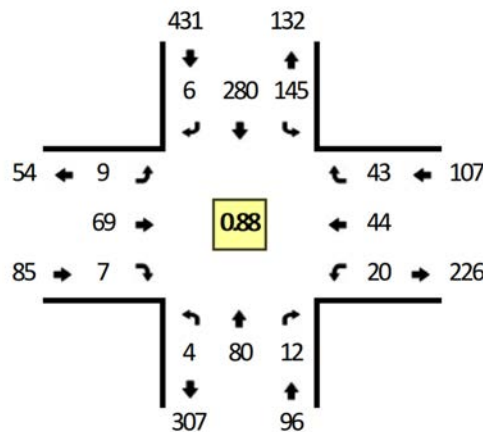
The table below shows the 2022 daily traffic volumes and 85th percentile speeds at the intersection of Rockwood Boulevard and Sumner/10th Avenue. The daily volume on Rockwood Boulevard was 6,400 vehicles, and volumes on Sumner Avenue and 10th Avenue were lower. Speed data was not available for this intersection.

2022 Daily Traffic on Rockwood Boulevard and Sumner/10th Avenue

Direction	2022 Estimated Daily Traffic (Vehicles per day)
Rockwood Blvd - Both Directions	6,360
Sumner Avenue – Both Directions	1,390
10 th Avenue Both Directions	3,300

^a Traffic data collected in November 2022. Only PM volume data was available, data multiplied by a factor of 10 to estimate daily traffic.

The figure below shows the existing PM peak hour traffic volumes at the Rockwood Boulevard and Sumner/10th Avenue intersection, based on a traffic count from November 1, 2022. The peak hour volumes are relatively low and could be accommodated by a single lane roundabout. However, the available right-of-way at the intersection is limited, with approximately 100-feet of width between the northeast and southwest edge, and the roadways have a moderate slope which is not appropriate for roundabout controlled intersections.



PM Peak Hour Traffic at Rockwood Boulevard and Sumner/10th Avenue Intersection

Recommended Solution:

To improve overall safety and reduce confusion at this intersection, the following projects are recommended.

- Install curb extensions on 10th Avenue at the existing marked pedestrian crossing to narrow the roadway width.
- Install curb extensions at each intersection corner to reduce the skew of each approach and narrow the roadway.

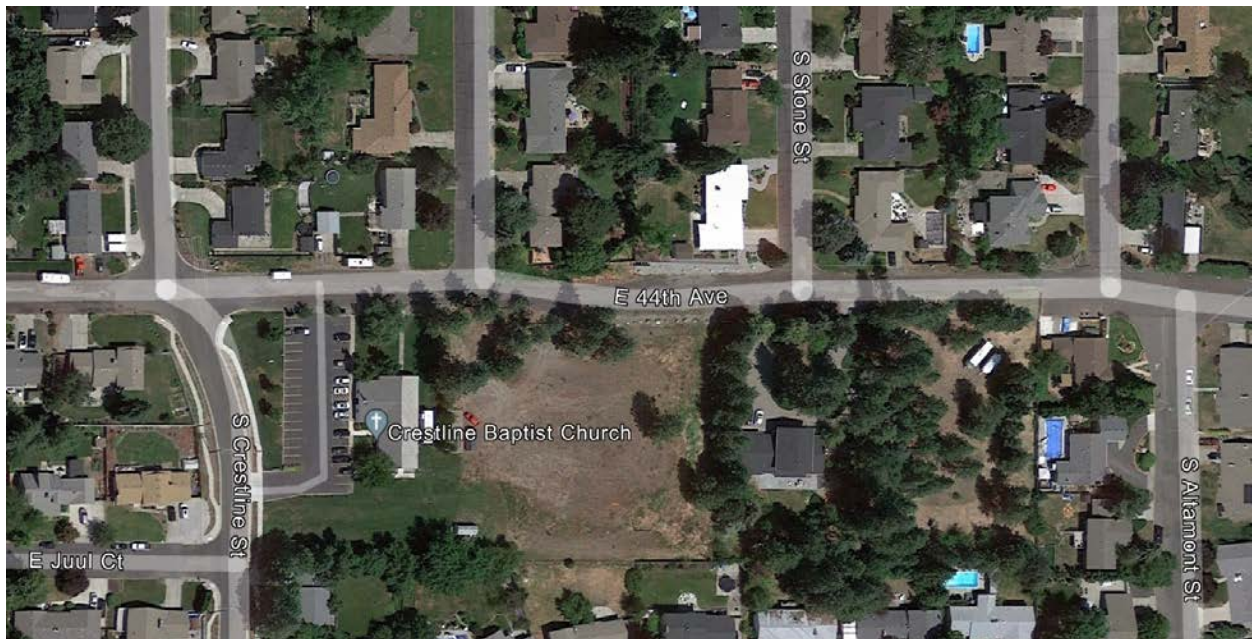
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- Add pavement markings on Rockwood Boulevard to designate on street parking areas near the intersection.
- Add stop bars on the east and west approaches.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Southgate
Project Extent:	44 th Avenue from Crestline Street to Altamont Street

Problem Statement: Residents of the Southgate neighborhood raised concerns over speeding and traffic cut through on 44th Avenue from Crestline Street to Altamont Street (approximately 0.18 miles). The figure below shows the study segment on 44th Street.



44th Ave from Crestline Street to Altamont Street

Traffic Analysis

44th Avenue within the study area is classified as local street with a posted speed limit of 25 miles per hour and a two-lane cross-section. The study segment was recently improved with a paved roadway surface, curbs, and sidewalks on the north side. There are no crossing treatments along the study segment and the nearest protected crossing is located 0.3 miles east of Altamont Street.

The table below shows the 2022 daily traffic volumes and 85th percentile speeds on 44th Avenue between Altamont Street and Cook Street. The daily volume on 44th Street was 843 vehicles west of Altamont Street. The 85th percentile speed was 27 miles per hour (two miles per hour greater than the posted speed limit), indicating there is a moderate speeding concern.

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2022 Daily Traffic and 85th Percentile Speeds on 44th Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
44 th Avenue between Altamont Street and Cook Street (east of Altamont)				
EB	1	363	27	
WB	1	480	27	25
Both Dir.	2	843	27	

^a Traffic data collected in Nov 2022.

There are no crashes recorded on the study corridor over the last five years from 2017 to 2021.

Recommended Solution:

The recent count and speed data shows 44th Avenue serves a moderate level of traffic with some speeding concerns. 44th Avenue provides a direct east-west connection between the neighborhood and commercial designations on Regal Street to the east. The addition of traffic calming treatments are recommended to lower driver speeds and improve overall safety for all users.

The installation of curb extensions is recommended on 44th Avenue at Cook Street to narrow the roadway. Curb extensions are expected to decrease the 85th percentile speed by three miles per hour¹.

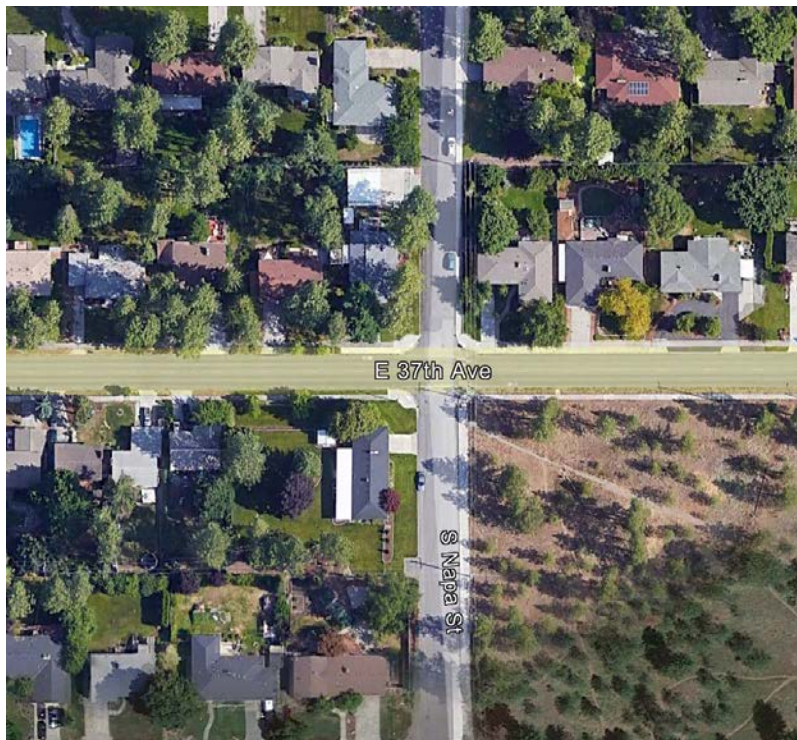
The construction of sidewalks with a landscape strip on the north side of 44th Avenue between Cook Street and Altamont Street is recommended to fill in a sidewalk gap and narrow the roadway for speed management.

¹ *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed.* Federal Highway Administration. July 2014.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	Southgate
Project Extent:	37 th Avenue and Napa Street Intersection

Problem Statement: Residents of the Southgate neighborhood raised concerns over pedestrian crossing safety, especially difficulties crossing 37th Avenue at Napa Street. Figure below shows the study intersection.



37th Avenue and Napa Street Intersection

Traffic Analysis

37th Avenue within the study area is classified as minor arterial with a posted speed limit of 30 miles per hour and provides two lanes. Napa Street is classified as local street with a posted speed limit of 25 miles per hour and provides two lanes with on-street parking. Sidewalks within the study area are mostly completed, except for the southbound direction on the north and south legs. Marked crossings are provided on the east leg of the intersection with warning signs. The intersection approaches do not have marked bike lanes or shoulder, however a bike sharrow marking is provided along 37th Avenue (east and west legs). The intersection is controlled by two-way-stop on the Napa Street approaches. Transit Route 43 travels on 37th Avenue and has bus stops one block to the east and west of Napa Street.

Spokane Traffic Calming Master Plan

The table below shows the estimated 2022 daily traffic volumes and 85th percentile speeds on the approaches of study intersection. The highest daily volume on 37th Avenue was 6,992 vehicles east of Helena Street. The highest 85th percentile speed was 36 miles per hour (six miles per hour greater than the posted speed limit). The data indicates there is a moderate speeding issue on 37th Avenue.

2022 Estimated Daily Traffic and 85th Percentile Speeds on 37th Avenue and 37th Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
37 th Avenue East of Helena Street ^a				
EB	1	3,482	36	30
WB	1	3,510		
Both Dir.	2	6,992		
Napa Street South of 39 th Street ^b				
NB	1	274	27	25
SB	1	243		
Both Dir.	2	517		

^a Traffic data collected in April 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

^b Traffic data collected in May 2017. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

No crashes were recorded at the intersection over the past five years from 2017 to 2021. The need for enhanced pedestrian crossing treatments on 37th Avenue was analyzed at the intersection based on NCHRP Report 562. Based on the findings, active or enhanced is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. Although pedestrian data is not available, it is assumed the 20 or more pedestrian crossing threshold is met due to the surrounding urban neighborhoods, nearby park, and adjacent bus stops.

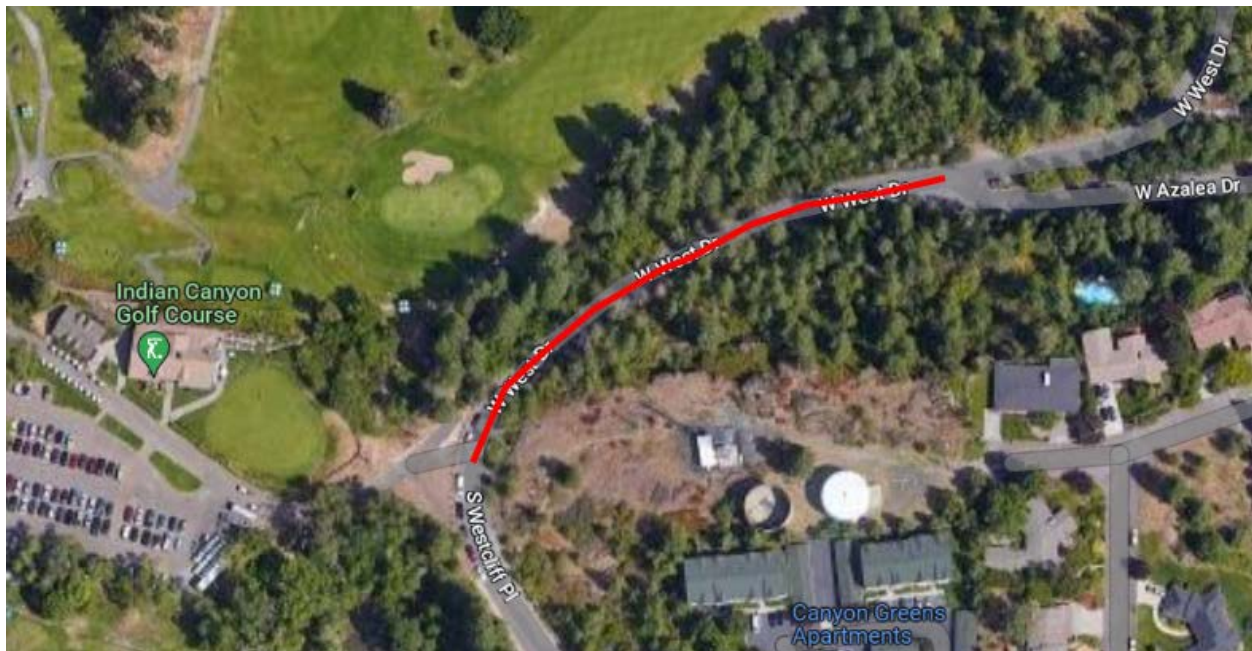
Recommended Solution:

To increase pedestrian safety and address community concerns, the installation of a rectangular rapid flashing beacon (RRFB) pedestrian crossing is recommended given the traffic volumes and speeds on 37th Avenue. The RRFB should be located on the east leg crossing 37th Avenue where the existing marked crosswalk is located. The roadway width and lack of on-street parking does not provide an opportunity to install curb extensions with the crossing.

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District:	2
Neighborhood:	West Hills
Project Extent:	West Drive from Westcliff Place to Azalea Drive

Problem Statement: Residents of the West Hills neighborhood raised concerns over speeding and pedestrian crossing safety on West Drive – specifically the visibility and frequency of pedestrian crossings.



West Drive from Westcliff Place to Azalea Drive

Traffic Analysis

West Drive in the study area is classified as an urban minor collector. West Drive provides one lane in each direction and does not have a posted speed limit and does not provide on-street parking or provide sidewalks. The roadway has narrow lanes (approximately 34-foot wide measures curb to curb) and limited right-of-way (approximately 50 feet wide). Westcliff Place in the study area is classified as an urban minor collector. Westcliff Place provides one lane in each direction, does not have on-street parking, and has sidewalks on both sides of the street south of West Drive. Westcliff Place does not have a posted speed limit, it does have 15 miles per hour turn warning signs in both directions approaching the curve near the golf course frontage. West Drive and Westcliff Place are designated a bike friendly route on the Spokane Bike and Pedestrian Master Plan. Azalea Drive in the study area is classified as an urban local access road, provides one lane in each direction, does not have a posted speed limit, provides on-street parking on both sides of the street, and does not have a sidewalk.

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The table below shows daily traffic counts and speed data along West Drive west of Azalea Drive. The daily traffic count was 247 vehicles. The 85th percentile speed along this corridor was 31 miles per hour. Although there is not a posted speed limit, the statutory speed limit is 25 miles per hour which indicates there is a moderate speeding issue.

2022 Daily Traffic and 85th Percentile Speeds on West Drive west of Azalea Drive

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted or Statutory Speed (mph)
A Street				
EB	1	147		
WB	1	100		
Both Dir.	2	247	31	25

^a Traffic data collected in March 2018. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

One crash was recorded over the last five years (from 2017 to 2021). The crash occurred on Westcliff Place south of the golf course frontage and was caused by a vehicle hitting a boulder in the roadway. The crash severity was not reported.

There is low demand for walking on West Drive between the golf course frontage and Azalea Drive. There is an informal dirt trail that provide a direct connection from Rimrock Drive in the Sunset Hills neighborhood to Westcliff Place near the golf course frontage. The trail is through City of Spokane property with a large water tank and communication tower. Upgrading the dirt trail to a paved multi-use path would provide a direct connection between the neighborhood and the golf course. Extending the sidewalks on the west side of West Drive along the golf course frontage would support the on-street parking needs.

The need for enhanced pedestrian crossing treatments across Westcliff Place and West Drive was analyzed based on NCHRP Report 562, using collected traffic data. Based on the findings, a marked crosswalk is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. Although pedestrian data is not available, it is assumed the 20 or more pedestrian crossing threshold is met due to the neighborhood and apartment complex to the east, the existing trail through the City property and the golf course to the west. The crossing location at the golf course frontage has limited sight distance due to the vertical curve. An active advanced warning system may be needed to alert drivers of the pedestrian crossing.

Recommended Solution

The installation of 25 mile per hour posted speed limit signs on Westcliff Place and West Drive is recommended to provide clear expectations for drivers.

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The extension of the existing curb-tight sidewalks on the west side of Westcliff Place is recommended to West Drive along the golf course frontage to support on-street parking needs.

The removal of the low growing vegetation that covers the sidewalk on the east side of Westcliff Place is recommended to improve pedestrian conditions.

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	West Hills
Project Extent:	Rosamond Avenue and F Street

Problem Statement: Residents of the West Hills neighborhood raised concerns over intersection control at Rosamond Avenue and F Street.



Rosamond Avenue and F Street Intersection

Traffic Analysis

Rosamond Avenue in the study area is classified as an urban minor collector. Rosamond Avenue provides one lane in each direction, does not have a posted speed limit, provides on-street parking in the residential areas, and is designated a bike friendly route in the Spokane Bike and Pedestrian Master Plan. F Street in the study area is classified as an urban local access road. F Street provides one lane in each direction and on-street parking only north of Rosamond Avenue, does not have a posted speed limit, and is not included in the Spokane Bike and Pedestrian Master Plan.

Rosamond Avenue and F Street have a moderate grade uphill towards the west and north. Rosamond Avenue curves through the intersection which limits driver sight distance for making turn movements. A

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single-family driveway connects to the northwest corner of the intersection. There are several large trees and lower vegetation that impedes driver sight.

The F Street/Rosamond Avenue intersection looking to the west is shown below. Rosamond Avenue has a parallel dead-end facility at a lower elevation that intersects F Street just south of the study intersection. The closely spaced intersection configuration increases vehicle conflicts and driver confusion. The lower Rosamond Avenue provides access to two single family homes and planned development. The other fronting homes have access on F Street or Sunset Boulevard to the south. F Street is controlled with stop signs on the north and southbound approaches at Rosamond Avenue.



The table below shows daily traffic counts for the study roadways. Speed data was not available. PM peak hour data showed the intersection serves low volumes with no movements over 20 vehicles per hour. There were 5 pedestrians and one bicyclist recorded during the PM peak hour.

2022 Daily Traffic (Vehicles per day) on Rosamond Avenue and F Street Intersection

Direction	# Lanes	2022 Daily Traffic (Vehicles per day) ^a
Rosamond Avenue		
EB	1	330
WB	1	460
Both Dir.	2	790
F Street		
NB	1	420
SB	1	230
Both Dir.	2	550

^a Traffic data collected in November 2022 during PM peak hours. Traffic volumes were multiplied by a factor of 10 to reflect estimated daily traffic conditions.

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Based on the turn movement volumes, the current intersection control with stop signs on F Street is appropriate.

No crashes were recorded over the last five years (from 2017 to 2021) near the study intersection.

There is an opportunity to close the lower Rosamond Avenue intersection with F Street if alternate access can be provided to the two homes at the west end. Adding new driveways onto Sunset Boulevard, an urban principal arterial, would not meet the city's access spacing standards. Connecting the lower Rosamond Avenue to the upper Rosamond Avenue is challenging due to the change in grade and close spacing. If alternate access is not available and the connection to lower Rosamond Avenue to F Street must stay open, the intersection could be reconstructed as a separate approach and spaced further south from upper Rosamond Avenue. There is a wide right-of-way available on the west side of F Street.

It would be beneficial to relocate the driveway on the northwest corner of the intersection but the grade difference on the adjacent roadways is challenging. The driveway serves one home, and the vehicle usage is estimated to be very low.

Recommended Solution

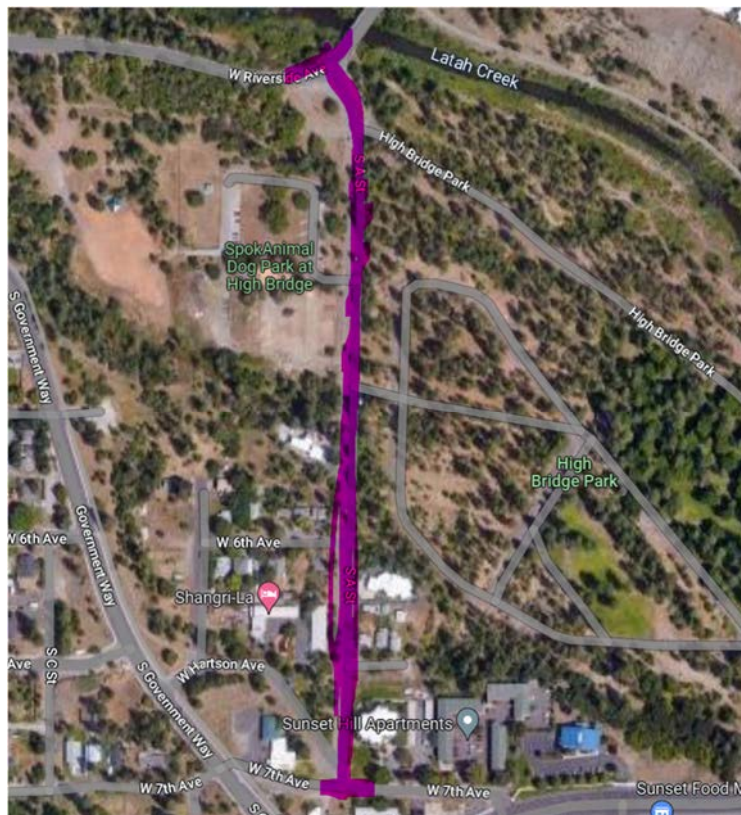
Several modifications to the intersection are recommended to reduce vehicle conflicts and improve overall safety:

- There is an opportunity to close the lower Rosamond Avenue intersection with F Street if alternate access can be provided to the two homes at the west end. However, if this is not feasible, reconstruct the lower Rosamond Avenue connection to F Street as a separate approach. Locate the approach further south, opposite the driveway for 1007 S F Street.
- Expand the southeast corner of the intersection to reduce the radius and move the stop sign further north, closer to Rosamond Avenue to improve driver visibility.
- Add stop bars on the F Street approaches to increase visibility of the intersection.
- Add MUTCD intersection warning signs (e.g., W2-1, W2-3, W2-7L, etc.) on both approaches on Rosamond Avenue

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	West Hills
Project Extent:	A Street Corridor from Riverside Avenue to 7 th Avenue

Problem Statement: Residents of the West Hills neighborhood raised concerns over speeding on A Street from Riverside Avenue to 7th Avenue.



A Street Corridor from Riverside Avenue to 7th Avenue

Traffic Analysis

A Street in the study area is classified as an urban local access road. A Street provides one lane in each direction and on-street parking in some sections, does not have a posted speed limit or sidewalks. A Street is designated a bike friendly route on the Spokane Bike and Pedestrian Master Plan. Riverside Avenue in the study area is classified as an urban major collector. Riverside Avenue provides one lane in each direction and does not have a posted speed limit, on-street parking, or sidewalks. The Spokane Bike and Pedestrian Master Plan designates Riverside Avenue as a moderate traffic (shared) facility. 7th Avenue in the study area is classified as an urban local access road. 7th Avenue provides one lane in each direction and does not have a posted speed limit or on-street parking. 7th Avenue has an inadequate sidewalk network on the north side of the street and none on the south side of the street. 7th Avenue is

Spokane Traffic Calming Master Plan

not included in the Spokane Bike and Pedestrian Master Plan. The city plans to extend the Fish Lake Trail through High Bridge Park with a crossing on A Street south of 3rd Avenue.

The table below shows daily traffic counts and speed data along A Street between High Bridge Park driveway and 3rd Avenue. The 2022 daily traffic count was 215 vehicles. The 85th percentile speed along this corridor was 25 miles per hour, which does not indicate a speed issue.

2022 Daily Traffic and 85th Percentile Speeds on A Street (High Bridge Park to 3rd Avenue)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted or Statutory Speed (mph)
A Street				
NB	1	110		
SB	1	105		
Both Dir.	2	215	25	25

Recommended Solution

A Street provides a direct and straight connection between Riverside Avenue and 7th Avenue. The roadway could benefit from the addition of traffic calming elements to manage driver speeds and improve pedestrian crossings. The following improvements are recommended.

- Add speed humps on A Street at the following locations
 - South of High Bridge Park access (just south of Riverside Avenue, lowest priority)
 - North of Hartson Avenue
- Add a raised pedestrian crossing on A Street to serve the planned Fish Lake Trail and install an RRFB (rectangular rapid flashing beacon)

Spokane Traffic Calming Master Plan

District:	2
Neighborhood:	West Hills
Project Extent:	Sand Ridge Ave (near Government Way and Whistalks Way Intersection)

Problem Statement: Residents of the West Hills neighborhood raised concerns over cut through traffic and speeding on Sand Ridge Avenue due to drivers avoiding congested conditions at the signalized Government Way/Whistalks Way intersection.



Sandridge Avenue near Government Way and Whistalk Way Intersection

Traffic Analysis

Sand Ridge Avenue in the study area is classified as an urban local access road. Sand Ridge Avenue provides one lane in each direction, does not have a posted speed limit, and provides on-street parking and sidewalks. Government Way is classified as an urban minor arterial roadway. Government Way provides one lane in each direction, has a posted speed limit of 35 miles per hour, does not provide on-street parking, and has a multi-use path on the east side.

To avoid congested conditions at the signalized Government Way/Whistalks Way intersection, northbound drivers on Government Way would divert their route to Sand Ridge Avenue and River Ridge

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Boulevard to access Whistalk Way eastbound. The Government Way/Sandridge Avenue and Whistalk Way/River Ridge Boulevard intersections are stop sign controlled on the side street approaches. The Sand Ridge Avenue/ River Ridge Boulevard intersection is uncontrolled.

The table below shows daily traffic counts and speed data on Sand Ridge Avenue between Government Way and River Ridge Boulevard. The 2022 daily traffic count was 391 vehicles per day. The 85th percentile speed along this corridor was 30 miles per hour which does indicate a moderate speeding issue.

2022 Daily Traffic and 85th Percentile Speeds on Sand Ridge Avenue at River Ridge Boulevard

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted or Statutory Speed (mph)
Sandridge Avenue				
EB	1	184	29	
WB	1	207	30	
Both Dir.	2	391	30	25

Recommended Solution

Sand Ridge Avenue provides a direct connection between Government Way and River Ridge Road. The roadway could benefit from the addition of traffic calming elements to manage driver speeds. The following improvements are recommended.

- Add speed humps at the following locations along Sand Ridge Avenue to slow drivers and discourage cut through traffic:
 - Two evenly spaced locations between Rogue River Street and River Ridge Boulevard
- Add a MUTCD speed limit sign along Sand Ridge Avenue for eastbound traffic entering the neighborhood from Government Way

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District:	2
Neighborhood:	West Hills
Project Extent:	F Street at Whittier Park

Problem Statement: Residents of the West Hills neighborhood raised concerns over speeding on F Street at Whittier Park.



F Street at Whittier Park between Hartson Avenue and 7th Avenue

Traffic Analysis

F Street, Hartson Avenue and 7th Avenue in the study area are all classified as urban local access roads. All three streets provide one lane in each direction and on-street parking on both sides, do not have a posted speed limit, and are not included in the Spokane Bike and Pedestrian Master Plan. F Street provides sidewalks. Hartson Avenue has a sidewalk on the north side of the street in the 3400 block but lacks sidewalks everywhere else. 7th Avenue does not have sidewalks. Marked crosswalks are provided on F Street at the Hartson Avenue and 7th Avenue intersections.

The table below shows daily traffic counts and speed data along F Street between Hartson Avenue and 7th Avenue. The 2022 daily traffic count was 231 vehicles. The 85th percentile speed along this corridor was 27 miles per hour which does not indicate a speeding issue.

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2022 Daily Traffic and 85th Percentile Speeds on F Street between Hartson Ave and 7th Ave

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted or Statutory Speed (mph)
F Street				
NB	1	129	28	
SB	1	102	26	
Both Dir.	2	231	27	25

Recommended Solution:

F Street provides a direct connection through the neighborhood to Sunset Boulevard. The roadway could benefit from the addition of traffic calming elements to manage driver speeds, especially along the park frontage. The following improvements are recommended.

- Designate a 20 mile per hour speed zone on F Street along the park frontage. A 20 mile per hour speed zone will require Council action.
- Install a midblock speed hump on F Street between Hartson Avenue and 7th Avenue.
- Install curb extensions at the existing marked crosswalks on F Street at Hartson Avenue and 7th Avenue.
- Relocate the northbound MUTCD park sign (W15-1) on F Street to an area without as much vegetation growing around it. Overgrowth has resulted in low visibility of the sign.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	Audubon – Downriver
Project Extent:	Wellesley Avenue Near Pauline Flett Middle School (At Hartley Street)

Problem Statement: Residents of the Audubon – Downriver neighborhood raised concerns about safe routes to school along Wellesley Avenue near the new Pauline Flett Middle School at Hartley Street. In addition, the resident also raised concerns about potential cut through traffic on King Court and Royal Court to the school diverting from Assembly Street.

Traffic Analysis

Within the study area, Wellesley Avenue west of Assembly Street and Hartley Street are classified as local streets with posted speed limit of 25 miles per hour. Assembly Street and Wellesley Avenue east of Assembly Street are classified as major arterial with posted speed limit of 30 miles per hour. Wellesley Avenue and Hartley Street both provide two lanes with on-street parking, without striped shoulder or dedicated bike lanes. Assembly Street to the north provides four lanes, and two lanes with two-way-left-turn lane to the south, without bike lanes but marked shoulder is provided. The sidewalk network in the study corridor is predominately complete, however there is no sidewalk west of Hartley Street and eastbound west of North King Court (0.3 miles east of Hartley Street). On Wellesley Avenue, Hartley Street intersection is unsignalized with a yield sign on the south leg and a stop sign on the north leg. Assembly intersection is all-way stop controlled with red light flashers. There is no crosswalk provided at Hartley Street, the nearest crosswalk is located 0.44 miles to the east at Assembly Street.

The following tables show the estimated 2022 daily traffic volumes and 85th percentile speeds on Wellesley Avenue west of Rustle Street (0.6 miles east of Hartley Street). The daily volume on Wellesley Avenue was 3,984 vehicles west of Rustle Street. The highest 85th percentile speed was 35 miles per hour (5 miles per hour greater than the posted speed limit)

2022 Estimated Daily Traffic and 85th Percentile Speeds on Wellesley Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
West of Rustle Street				
EB	1	2,132		
WB	1	1,852		
Both Dir.	2	3,984	35	30

^a Traffic data collected on April 19, 2012. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

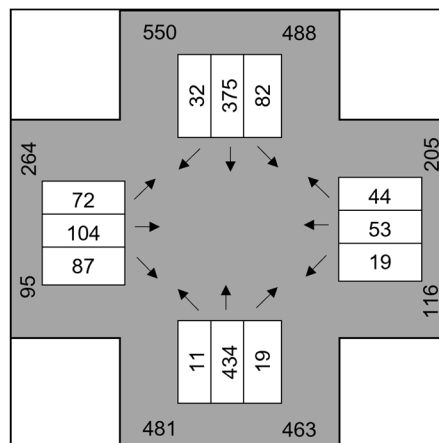
Spokane Traffic Calming Master Plan

There are no crashes recorded at the intersection of Wellesley Avenue and Hartley Street. The table below shows the severity and types of crashes occurring on Wellesley Avenue from Hartley Street and Rustle Street (0.65 miles) over the last five years (excluding intersection crashes at the east and west ends). There was a total of 16 crashes on Wellesley Avenue, including four injury crashes. Collision related to moving vehicles and stationary objects or vehicle were the most common crash type (representing 37 percent of all crashes).

Crashes on Wellesley Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Minor Injury	Possible Injury	Property Damage Only	Unknown	
Rear End	-	-	1	2	-	3
Angle	-	1	1	3	-	5
Turning	-	-	1	-	-	1
Stationary Object or Car	-	-	-	5	1	6
From Same Direction	-	-	-	1	-	1
Total	0	1	3	11	1	16

Multiple driveways are located on Wellesley Avenue near Assembly Street, with the closest driveway 70 feet to the south, 110 feet to the east, 160 feet to the west, and 350 feet to the north of Assembly Street. Such characteristic will likely encourage traffic cut through to local neighborhood to avoid delay at the intersection. The figure below shows the existing PM peak hour traffic volumes at the Wellesley Avenue and Assembly Street intersection, based on a traffic count from July 12, 2017, factored up to 2022.



PM Peak Hour Traffic at Wellesley Avenue and Assembly Street

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The need for enhanced pedestrian crossing treatments across Wellesley Avenue at Hartley Street and Assembly Street were analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.¹ This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed. Based on the findings, marked crosswalks are preferred treatment if there are 20 or more pedestrian crossings during the peak hour. Although pedestrian data is not available, it is assumed the 20 or more pedestrian crossing threshold is met given the middle school and the surrounding urban neighborhood on Wellesley Avenue. The study corridor west of Rustle Street has existing conditions of moderate traffic (shared facility) per the Bicycle Facility Classification in the City's Bicycle Master Plan. The segment has a future plan of bike lane implementation per the Bicycle Master Plan.

Recommended Solution:

The following traffic calming elements are recommended to improve pedestrian safety and reduce the potential for cut through traffic in the neighborhood.

The installation of curb extensions and marked pedestrian crossing is recommended on Wellesley Avenue at Hartley Street and Royal Court to narrow the roadway and provide a safer crossing. Curb extensions are expected to decrease the 85th percentile speed by three miles per hour².

The installation of sidewalks on the south side of Wellesley Avenue between King Court and Hartley Street is recommended to provide a safer environment for people walking and support the safe route to school program.

The Royal Court approach to Wellesley Avenue is located across from the school driveway and should be restricted to right-in/right-out traffic movements with a center raised median to discourage school related trips cutting through the neighborhood.

The King Court approach to Wellesley Avenue should be considered for restricted right-in/right-out/left-out traffic movements with a center raised median to restrict northbound and southbound through movements at the intersection and discourage school related trips cutting through the neighborhood. The north leg of the intersection (Independence Drive) provides access to the VA Medical Center and should be considered in the design of access restrictions.

¹ NCHRP Report 562: *Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

² *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed*. Federal Highway Administration. July 2014.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	Audubon - Downriver
Project Extent:	Northwest Boulevard from T.J. Meenach Drive to Assembly Street

Problem Statement: Residents of the Audubon – Downriver neighborhood raised concerns over speeding and pedestrian crossing safety along Northwest Boulevard from T.J. Meenach Drive to Assembly Street (1.69 miles). Specifically, the residents expressed the crossing difficulties due to width of Northwest Boulevard.

Funded Improvements:

The following improvement projects are funded:

- marked crosswalk on Northwest Boulevard at I Street and Lacrosse Avenue
- installing a pedestrian hybrid beacon on Northwest Boulevard north of Audubon Elementary, replacing old overhead crosswalk light

Traffic Analysis

Northwest Boulevard within the study area is classified as major arterial with posted speed limit of 30 miles per hour. The roadway from Assembly Street to Audubon Street (1.26 miles east of Assembly Street) provides two lanes with a two-way-left-turn lane, and the roadway from Audubon Street to T.J. Meenach Drive contains four lanes. Along the study corridor, Alberta Street (1.59 miles east of Assembly Street) and T.J. Meenach Drive are intersections controlled with a traffic signal and protected crossings. Striped crosswalks and warning signs are provided at Audubon Street and Milton Street, and a marked crosswalk is provided at E Street. The nearest controlled crosswalk from Assembly Street is located 525 feet north/west at Wellesley Avenue (outside of study area), and the next nearest crosswalk is located 1 mile east at E Street. Speed feedback signs were installed on Northwest Boulevard between H Street and E Street

The table below shows the estimated 2022 daily traffic volumes and 85th percentile speeds on Northwest Boulevard along the study corridor. As shown in the table, the highest daily volume on Northwest Boulevard was 11,844 vehicles west of G Street. The highest 85th percentile speed was 40 miles per hour (10 miles per hour greater than the posted speed limit).

Spokane Traffic Calming Master Plan

2022 Daily Traffic and 85th Percentile Speeds on Northwest Boulevard

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
West of G Street				
EB	1	6,431		
WB	1	5,413		
Both Dir.	3	11,844	33	30
West of Rustle Street				
EB	1	6,404		
WB	1	5,398		
Both Dir.	3	11,802	40	30

^a Traffic data collected in June 2022.

The table below shows the severity and types of crashes occurring on Northwest Boulevard from Assembly Street to T.J. Meenach Drive from 2017 through 2021(excluding intersection crashes at the east and west ends). There were 44 total crashes, including 15 injury crashes. Angle collision were the most common crash type (representing 34 percent of all crashes).

Crashes on Northwest Boulevard, between Assembly Street and T.J. Meenach Drive (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Rear End	-	-	-	4	6	10
Angle	-	-	3	4	8	15
Turning	-	-	1	-	-	1
Sideswipe	-	-	-	1	3	4
Stationary Object or Car	-	-	1	1	10	12
From Same Direction	-	-	-	-	2	2
Total	0	0	5	10	29	44

The need for enhanced pedestrian crossing treatments across Northwest Boulevard was analyzed based on NCHRP Report 562, using collected crossing data at various locations on the corridor. Based on the findings, active or enhanced pedestrian crossing treatments would be appropriate given the high existing traffic volumes and speeds on the study corridor. The study corridor was evaluated to determine the best placement for an enhanced pedestrian crossing with consideration for fronting land use, location of bus stops, estimated crossing demand and spacing from existing protected crossings. F Street was selected to connect the adjacent restaurants and bus stops to the nearby neighborhoods.

Recommended Solution:

The installation of a marked pedestrian crossing with rectangular rapid flashing beacons (RRFB) is recommended at the east leg of the Northwest Boulevard/F Street intersection. The existing marked crossing at E Street (one block east) should be removed due to its lack of protection.

It is recommended that speed feedback signs be added on Northwest Boulevard near Rockwell Street to alert drivers of the posted speed limit.

Spokane Traffic Calming Master Plan

The three-lane section of Northwest Boulevard between Assembly Street and Audubon Street/Alice Avenue has a curb-to-curb width of approximately 48 to 50 feet which would allow for a restriping improvement to reduce vehicle lanes to lower travel speeds and provide wider bike lanes on the corridor. The cross-section would provide at a minimum two 6-foot-wide bike lanes, two 11-foot-wide vehicle lanes and a 14-foot-wide center turn lane.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	Audubon – Downriver
Project Extent:	Wellesley Avenue and Alberta Street

Problem Statement: Residents of the Audubon – Downriver raised concerns about pedestrian-vehicle conflicts at Wellesley Avenue and Alberta Street intersection.

Traffic Analysis

Wellesley Avenue within the intersection is classified as major arterial and Alberta Street is classified as minor arterial, both with posted speed limit of 30 miles per hour. Wellesley Avenue provides four lanes with a raised median and Alberta Street contains two lanes with a two-way-left-turn lane. Marked shoulder and bike lanes are not provided within the network. The intersection is signalized with marked pedestrian crossings, as shown below.



Wellesley Avenue and Alberta Street Intersection

The table below shows the 2022 daily traffic volumes and 85th percentile speeds on Wellesley Avenue around the study intersection. The highest daily volume on Wellesley Avenue was 13,067 west of Belt Street (east leg of the intersection). The highest 85th percentile speed was 40 miles per hour (10 miles per hour greater than the posted speed limit) west of Milton Street.

Spokane Traffic Calming Master Plan

2022 Daily Traffic and 85th Percentile Speeds on Wellesley Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
West of Belt Street				
EB	2	7,119	37	
WB	2	5,948	31	
Both Dir.	4	13,067	34	30
West of Milton Street				
EB	2	4,613	39	
WB	2	3,977	41	
Both Dir.	4	8,590	40	30

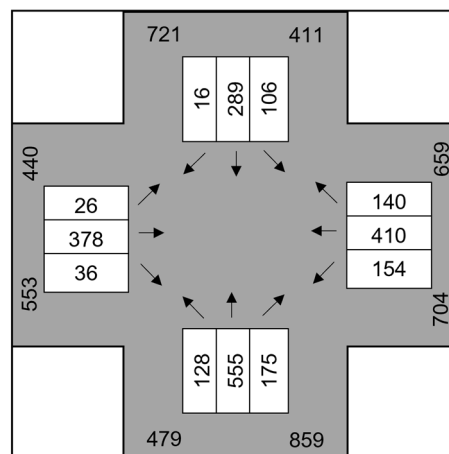
^a Traffic data collected in May 2022.

The table below shows the severity and types of crashes occurring at Wellesley Avenue and Alberta Street intersection from 2017 through 2021. There were 19 total crashes, including four injury crashes. Rear-end collisions were the most common crash type (representing 32 percent of all crashes).

Crashes at Wellesley Avenue and Alberta Street Intersection (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Minor Injury	Possible Injury	Property Damage Only	Unknown	
Rear End	-	-	2	4	-	6
Angle	-	1	-	1	1	3
Turning	-	-	-	3	2	5
Sideswipe	-	-	-	2	-	2
Stationary Object or Car	-	-	-	2	-	2
Pedestrian/Bike	-	1	-	-	-	1
Total	0	2	2	12	3	19

The figure below shows the existing PM peak hour traffic volumes at the Wellesley Avenue and Alberta Street intersection, based on a traffic count from May 17, 2017, factored up to 2022.



PM Peak Hour Traffic at Wellesley Avenue and Alberta Street

Spokane Traffic Calming Master Plan

Recommended Solution:

The signal timing at the Wellesley Avenue and Alberta Street intersection should be updated to provide a leading pedestrian interval (LPI) to provide pedestrians the opportunity to enter the crosswalk at an intersection 3 to 7 seconds before vehicles are given a green light indication. Pedestrians can better establish their presence in the crosswalk before vehicles have priority to turn right or left.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	Audubon – Downriver
Project Extent:	Northwest Boulevard and T.J. Meenach Drive Intersection

Problem Statement: Residents of the Audubon – Downriver raised concerns over pedestrian and bicyclist crossing safety at Northwest Boulevard and T.J. Meenach Drive intersection. As shown in the figure below, this study intersection is a skewed intersection, where the north leg connects to Cochran Street and Cleveland Avenue is located 70 feet to the south on the west.



Northwest Boulevard and T.J. Meenach Drive Intersection

Traffic Analysis

Northwest Boulevard and T.J. Meenach Drive (south leg) within the study area are classified as major arterial and the north leg of the intersection (Cochran Street) is classified as minor arterial, all with posted speed limit of 30 miles per hour. Cleveland Avenue is classified as local street with posted speed limit of 25 miles per hour. Northwest Boulevard to the west provides four lanes and contains an additional two-way-left-turn left to the east. T.J. Meenach Drive provides four lanes while Cochran Street is one-way street and provides two lanes. Cleveland Avenue provides two lanes with on-street parking. There is no marked shoulder or bike lanes around the study intersection. Sidewalks are provided on Northwest Boulevard but not consistent on T.J. Meenach Drive and Cochran Street, with the mixed of paved, unpaved, separated, and curb tight sidewalks. A dedicated right turn channel is provided on the south leg of the intersection.

Spokane Traffic Calming Master Plan

The table below shows the 2022 daily traffic volumes and 85th percentile speeds on Northwest Boulevard around the study intersection. As shown in the table, the highest daily volume on Northwest Boulevard was 28,904 vehicles west of Belt Street. The highest 85th percentile speed was 41 miles per hour (six miles per hour greater than the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Northwest Boulevard

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
West of Belt Street ^a (0.3 miles east of study intersection)				
EB	2	14,637	42	
WB	2	14,267	40	
Both Dir.	5	28,904	41	35
West of Audubon Street ^b (0.4 miles west of study intersection)				
EB	1	7,340		
WB	1	4,096		
Both Dir.	3	11,436	34	30

^a Traffic data collected in June 2022.

^b Traffic data collected in August 2014. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

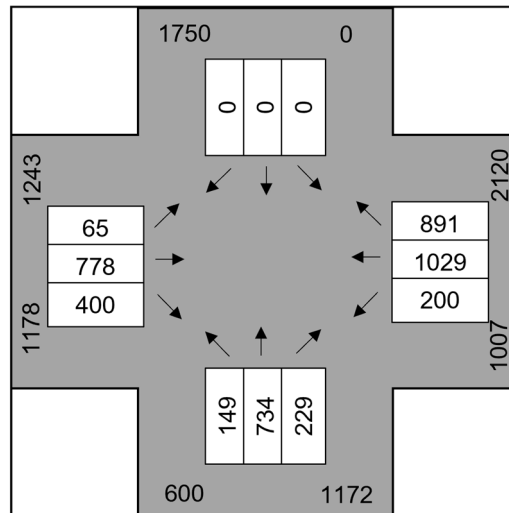
The table below shows the severity and types of crashes occurring at Northwest Boulevard and T.J. Meenach Drive from 2017 through 2021. There were 25 total crashes, including 14 injury crashes. Rear-end collision were the most common crash type (representing 48 percent of all crashes).

Crashes at Northwest Boulevard and T.J. Meenach Drive Intersection (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Rear End	-	-	-	6	6	12
Angle	-	-	-	3	3	6
Turning	-	-	-	2	-	2
Sideswipe	-	-	-	1	1	2
Stationary Object or Car	-	-	1	-	-	1
From Same Direction	-	-	-	-	1	1
Pedestrian/Bicycle	-	-	-	1	-	1
Total	0	0	1	13	11	25

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The following figure shows the existing PM peak hour traffic volumes at the Northwest Boulevard and T.J. Meenach Drive intersection, based on a traffic count from June 7, 2017, factored up to 2022.



PM Peak Hour Traffic at Northwest Boulevard and T.J. Meenach Drive Intersection

Skewed intersections tend to limit user sight distances and require longer pedestrian crossing distances. It is more than 100 feet to cross Northwest Boulevard at this intersection. The crossing distance on the south leg is reduced by the channelized right turn lane. There is no marked crosswalk on the east leg, crossings are provided on the west leg only. Treatments need to be implemented to improve the intersection performance given the high crash rate. The City of Spokane has a planned construction project to add sidewalk on Cochran Street north of the intersection.

Recommended Solution:

The signal timing at the intersection should be updated to provide a leading pedestrian interval (LPI) to provide pedestrians the opportunity to enter the crosswalk at an intersection 3 to 7 seconds before vehicles are given a green light indication. Pedestrians can better establish their presence in the crosswalk before vehicles have priority to turn right or left. The planned sidewalk on Cochran Street will likely increase pedestrian crossing demand at the study intersection.

There are numerous intersections and driveways closely spaced to the Northwest Boulevard and T.J. Meenach Drive intersection that can contribute to vehicle conflicts with pedestrians and cyclists. The alley intersection with Cochran Street is spaced very close to Northwest Boulevard and should be considered for closure to vehicles.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	Balboa – South Indian Trail
Project Extent:	Indian Trail Road (Holyoke Avenue to Janice Avenue)

Problem Statement: Residents of the Balboa – South Indian Trail neighborhood raised concerns over pedestrian and bicyclist safety along and crossing Indian Trail Road between Holyoke Avenue and Janice Avenue (0.74-mile segment).

Traffic Analysis

Indian Trail Road within the study area is classified as a major arterial with a posted speed limit of 30 miles per hour and provides four lanes. The study corridor does not provide marked shoulders or bike lanes. The study corridor has marked pedestrian crossings at Weile Avenue (0.39 miles east of Janice Avenue) and Woodside Avenue (newly installed, 0.54 mile east of Janice Avenue). There is no signalized intersection within the study area. Sidewalks with a landscape strip are provided along the study corridor.

The table below shows the 2022 daily traffic volumes and 85th percentile speeds on Indian Trail Road. The highest daily volume on Indian Trail Road was 18,845 vehicles west of Elmhurst Avenue (one block east of Holyoke Avenue). The highest 85th percentile speed was 41 miles per hour (11 miles per hour greater than the posted speed limit). The data indicates there is a speeding concern.

2022 Daily Traffic and 85th Percentile Speeds on Northwest Boulevard

Direction	# Lanes	2022 Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
West of Elmhurst Avenue ^a				
EB	2	9,436	39	
WB	2	9,409	42	
Both Dir.	4	18,845	41	30
West of Kathleen Avenue ^b				
EB/SB	2	9,230		
WB/NB	1	9,230		
Both Dir.	4	18,460	40	30

^a Traffic data collected in May 2022.

^b Traffic data collected in April 2014. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

The table below shows the severity and types of crashes occurring on Indian Trail Road from Holyoke Avenue to Janice Avenue over the last five years (excluding intersection crashes at the east and west ends). There was a total of 17 crashes on Indian Trail Road, including 10 injury crashes and one fatal crash. The only fatal crash was related to left turning at Beacon Avenue. Angle and turning related collisions were the most common crash type (each representing 29 percent of all crashes).

Spokane Traffic Calming Master Plan

Crashes on Indian Trail Road from Holyoke Avenue to Janice Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Minor Injury	Possible Injury	Property Damage Only	Unknown	
Rear End	-	1	-	-	-	1
Angle	-	1	1	3	-	5
Turning	1	-	4	-	-	5
Sideswipe	-	-	1	-	-	1
Stationary Object or Car	-	-	-	2	1	3
Pedestrian/Bicycle	-	1	1	-	-	2
Total	1	3	7	5	1	17

The study corridor has existing conditions of high traffic with shared facility per the Bicycle Facility Classification in the City Bicycle Master Plan, people biking need to share a lane with auto vehicles. The study corridor has future plans for a shared use path implementation per the Bicycle Master Plan.

The need for enhanced pedestrian crossing treatments across Indian Trail Road in the study area was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.¹ This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed. Based on the findings, red treatment (e.g., High Intensity Activated Crosswalk [HAWK] signal beacon, midblock pedestrian signal) is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour given the high existing traffic volume. Although pedestrian crossing data is not available, it is assumed the 20 or more pedestrian crossing threshold is met given the surrounding urban neighborhood and commercial destinations on Indian Trail Road study corridor.

Recommended Solution:

The study corridor was evaluated to determine the best placement for an enhanced pedestrian crossing with consideration for fronting land use, location of bus stops, estimated crossing demand and spacing from existing protected crossings.

The installation of a hybrid beacon pedestrian crossing is recommended on Indian Trail Road at Holyoke Avenue to serve the crossing demand for the nearby commercial uses and STA stops. The nearby southbound bus stop (ID 1376) should be relocated to the intersection.

The installation of a traffic signal or hybrid beacon pedestrian crossing is recommended on Indian Trail Road at the existing Woodside Avenue marked crossing to serve the crossing demand for the nearby STA stops and Woodside Avenue which is designated a city Bike Friendly Route. The traffic volumes at the intersection are high enough to warrant a traffic signal but may attract more drivers to use Woodside Avenue to access Indian Trail Road.

¹ NCHRP Report 562: *Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

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The installation of a hybrid beacon pedestrian crossing should be considered on Indian Trail Road at Excell Avenue to serve the crossing demand for the nearby STA stops. This location is the lowest priority of the three recommendations due to the crossing demand.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	Balboa – South Indian Trail
Project Extent:	Francis Avenue at Five Mile Shopping Center (West of North Ash Street)

Problem Statement: Residents of the Balboa – South Indian Trail neighborhood raised concerns over access management and limited pedestrian crossing options on Francis Avenue at Five Mile Shopping Center located west of North Ash Street and east of Cannon Street.



Francis Avenue at Five Mile Shopping Center (West of Ash Street)

Traffic Analysis

The shopping center has a site frontage of approximately 970 feet and contains four driveways along Francis Avenue. Francis Avenue within the study area is classified as an urban principal arterial with a posted speed limit of 35 miles per hour. The roadway provides four lanes with a two-way-left-turn lane. Francis Avenue operates at State Route 291 under WSDOT jurisdiction. Ash Street is classified as a major arterial with a posted speed limit of 30 miles per hour. The roadway operates as a southbound one-way street with three lanes north of Francis and two lanes south of Francis. Cannon Street is classified as a local street with a posted speed limit of 25 miles per hour. The roadway provides two lanes with on-street parking. The nearest controlled crosswalk is located at Ash Street, and the nearest crosswalk to the west is located 0.6 miles west of Ash Street at Alberta Street. Curb tight sidewalks are provided, while marked shoulders and bike lanes are not available within the study area.

The following table shows the estimated 2022 daily traffic volumes and 85th percentile speeds on Francis Avenue at Five Mile Shopping Center. The highest daily volume on Francis Avenue was 31,150 vehicles west of Belt Street. The highest 85th percentile speed was 40 miles per hour (10 miles per hour greater than the posted speed limit). The data indicates there is a speeding issue.

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2022 Estimated Daily Traffic and 85th Percentile Speeds on Francis Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
West of A Street ^a (West of study area)				
EB	2	14,338	40	
WB	2	15,340	39	
Both Dir.	5	29,678	40	30
West of Belt Street ^a (West of study area)				
EB	2	14,988	36	
WB	2	16,162	41	
Both Dir.	5	31,150	39	30
West of Adams Street ^b (East of study area)				
EB	2	15,462	37	
WB	2	15,329	41	
Both Dir.	5	30,791	39	30

^a Traffic data collected in Oct 2014. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

^b Traffic data collected in March 2017. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

The table below shows the severity and types of crashes occurring on Francis Avenue at Five Mile Shopping Center from 2017 through 2021 (from Cannon Street to Ash Street, excluding intersection crashes at the east and west ends). There were 28 total crashes, including 12 injury crashes. Rear end and angle related crashes were the most common crash type (each representing 29 percent of all crashes).

Crashes on Francis Avenue at Five Mile Shopping Center (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Rear End	-	-	-	2	6	8
Angle	-	-	-	2	6	8
Turning	-	-	2	2	2	6
Sideswipe	-	-	1	1	2	4
From Same Direction	-	-	-	1	-	1
Pedestrian/Bicycle	-	-	1	-	-	1
Total	0	0	4	8	16	28

The need for enhanced pedestrian crossing treatments across Francis Avenue was analyzed based on NCHRP Report 562, using collected traffic data. Based on the findings, red treatment (e.g., HAWK signal beacon, midblock pedestrian signal, half signals) is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. Although pedestrian data is not available, it is assumed the 20 or more pedestrian crossing threshold is met due on Francis Avenue due to the adjacent shopping center and surrounding urban neighborhoods.

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Recommended Solution:

The study corridor was evaluated to determine the best placement for an enhanced pedestrian crossing on Francis Avenue with consideration for walking pathways through the shopping center, location of bus stops, estimated crossing demand and spacing from existing protected crossings. Any improvements on Francis Avenue will require approval from WSDOT.

The installation of a hybrid beacon pedestrian crossing is recommended on the west leg of the Francis Avenue/Cannon Street intersection to maximize spacing from the Ash Street signalized crossing and proposed crossing at Belt Street (see below). The crossing should consider alignment with the existing pedestrian pathway on the north side of Francis Avenue between the gas station and the bank.

The installation of a hybrid beacon pedestrian crossing is recommended on Francis Avenue at Belt Street to serve the crossing demand for the nearby commercial uses and STA stops and Belt Street which is designated a city Bike Friendly Route. This location is not directly along the frontage of the Five Mile Shopping center but provides appropriate spacing between the existing signalized crossings at Alberta Street and Ash Street. This location is a priority over Cannon Street due to anticipated future crossing demand.

Access management strategies should be applied to Francis Avenue to mitigate conflicts.

- Install a narrow-raised center median on Francis Avenue west of Ash Street, extending from the existing raised median west to Oak Street. This would allow Oak Street full movements but restrict the Five Mile Shopping Center driveway adjacent to Starbucks to right-in/right-out movements.
- Install a raised center median on Francis Avenue east of Elm Street (approximately 120-ft long) to restrict the driveway between Subway and Burger King to right-in/right-out movements. This raised median would be incorporated into the recommended pedestrian crossing at this location.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	Balboa – South Indian Trail
Project Extent:	Maple Street and Ash Street at Country Homes Boulevard

Problem Statement: Residents of the Balboa – South Indian Trail neighborhood raised concerns over access management and pedestrian safety on Maple Street and Ash Street at Country Homes Boulevard.



Maple Street and Ash Street at Country Homes Boulevard Intersection

Traffic Analysis

Ash Street, Maple Street, and Country Homes Boulevard are classified as major arterials with posted speed limits of 30 miles per hour. Ash Street is a southbound one-way street and provides three lanes. Maple Street is a northbound one-way street and provides two lanes. The two streets connect on the north and converge into Country Homes Boulevard with a raised center median separating the movements. Curb tight sidewalks are provided in the network except for the east side of Maple Street, which lacks pedestrian facilities. County Homes Boulevard/Cedar Road is a signalized intersection located 500 feet north of Maple Street/Ash Street/County Homes Boulevard intersection. There is one existing transit stop located at Ash Street north of Five Mile Road serving Route 4 and Route 662 for

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southbound traffic. The transit stop has a turnout/bay to prevent blocking traffic flow when stopping for riders. The commercial area bounded by Ash Street and Maple Street has three driveways on Ash Street, three driveways on Maple Street and one driveway on Five Mile Road.

The table below shows the 2022 daily traffic volumes and 85th percentile speeds on Ash Street and Maple Street within and around the study area. The highest daily volume on Maple Street was 13,131 vehicles North of Francis Avenue and 11,575 on Ash Street north of Five Mile Road. The highest 85th percentile speed on Maple Street was 40 miles per hour (10 miles per hour greater than the posted speed limit) and 37 miles per hour on Ash Street (seven miles per hour greater than the posted speed limit). The data indicates there is a speeding issue on both Maple and Ash Street north of Five Mile Road.

2022 Daily Traffic and 85th Percentile Speeds on Ash Street and Maple Street

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Maple Street North of Francis Avenue				
NB	2	13,131	32	30
Maple Street North of Five Mile Road				
NB	2	13,052	40	30
Ash Street North of Five Mile Road				
SB	3	11,575	37	30

^a Traffic data collected in May 2022.

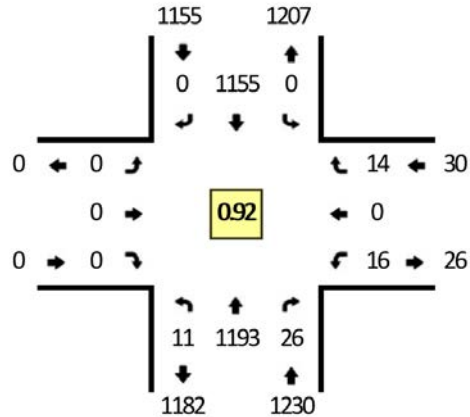
The table below shows the severity and types of crashes occurring at Maple Street, Ash Street, and Country Homes Boulevard from Five Mile Road to Country Home Boulevard over the past five years (excluding intersection crashes at the north and south ends). There were six total crashes without injuries crashes. Angle collisions were the most common crash type (representing 50 percent of all crashes)

Crashes at Maple Street, Ash Street, and Country Homes Boulevard Intersection (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Rear End	-	-	-	-	1	1
Angle	-	-	-	-	3	3
Sideswipe	-	-	-	-	1	1
Stationary Object or Car	-	-	-	-	1	1
Total	0	0	0	0	6	6

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The figure below shows the existing PM peak hour traffic volumes at the Maple Street and Ash Street Boulevard intersection, based on a traffic count from November 2, 2022.



PM Peak Hour Traffic at Maple Street and Ash Street Intersection

The need for enhanced pedestrian crossing treatments was analyzed for Maple Street and Ash Street near Country Homes Boulevard based on NCHRP Report 562. Based on the findings, red treatment (e.g., HAWK signal beacon, midblock pedestrian signal) is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. It was assumed the pedestrian crossing threshold would not be met due to the lack of walking destinations in the study area.

Recommended Solution:

Maple Street and the northbound section of County Homes Boulevard between 5 Mile Road and Cedar Road have wide vehicle lanes that can promote faster driver speeds. Maple Street is approximately 36-foot wide, and the County Homes Boulevard northbound section is approximately 32-foot wide, both with 2 vehicle lanes. It is recommended both roadway segments be restriped with two 11-foot-wide lanes and the additional width repurposed to provide a northbound bike lane and a landscape buffer to separate the sidewalk from the vehicle lane.

Ash Street is also a wide roadway that provides three southbound vehicle lanes but could be reduced to two lanes and adequately serve vehicle demand. It is recommended the roadway be restriped with two 11-foot-wide lanes and the additional width repurposed to provide a landscape buffer to separate the sidewalk from the vehicle lane.

A pedestrian signal is not recommended due to the low estimated crossing demand on Maple Street and Ash Street at Country Homes Boulevard.

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There are several driveways on the study corridors with opportunities to consolidate and/or close them to reduce conflicts for both vehicles and pedestrians. The following access management improvements are recommended:

- Close the existing driveway on the west side of Maple Street that serve the building located at 6520 N Ash Street. This is the second driveway north of 5 Mile Road.
- Close the existing driveway on the east side of Ash Street that serve the building located at 6520 N Ash Street. The property has direct access to the parking lot to the north and a driveway approximately 25-feet to the north.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	Balboa – South Indian Trail
Project Extent:	Five Mile Road from Cochran Street to Ash Street

Problem Statement: Residents of the Balboa – South Indian Trail neighborhood raised concerns over pedestrian crossing and bicyclist facilities on Five Mile Road from Cochran Street to Ash Street (0.66 miles). Five Mile Road within the study is classified as a minor arterial with a posted speed limit of 30 miles per hour. The roadway provides two lanes for westbound and one lane for eastbound. The sidewalk network in the study corridor is predominantly complete. There is a westbound (uphill) bike lane on the corridor from Austin Road to Cochran Street. The future plan for the corridor per the Bicycle Master Plan remains the same as existing: moderate traffic with bike lane. No marked crosswalks are provided within the study corridor.

Traffic Analysis

The table below shows the 2022 daily traffic volumes and 85th percentile speeds on Five Mile Road. The highest daily volume on Five Mile Road 10,153 vehicles west of Austin Road. The highest 85th percentile speed was 40 miles per hour (10 miles per hour greater than the posted speed limit). The data shows there is a speed concern on Five Mile Road.

2022 Daily Traffic and 85th Percentile Speeds on Five Mile Road

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
West of Austin Road				
EB	1	5,762	38	
WB	2	4,391	42	
Both Dir.	3	10,153	40	30
West of Wedgewood Avenue				
EB	1	4,628	41	
WB	2	4,449	40	
Both Dir.	3	9,077	40	30

^a Traffic data collected in March 2022.

The table below shows the severity and types of crashes occurring on Five Mile Road from Cochran Street to Ash Street over the last five years (excluding intersection crashes at the east and west ends). There were 18 total crashes, including eight injury crashes. Angle collisions were the most common crash type (representing 61 percent of all crashes).

Spokane Traffic Calming Master Plan

Crashes on Five Mile Road from Cochran Street to Ash Street (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Rear End	-	-	-	1	1	2
Angle	-	-	1	4	6	11
Sideswipe	-	-	-	-	1	1
Stationary Object or Car	-	-	-	2	1	3
From Same Direction	-	-	-	-	1	1
Total	0	0	1	7	10	18

The need for enhanced pedestrian crossing treatments on Five Mile Road was analyzed based on NCHRP Report 562. Based on the findings, active or enhanced are the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. Although no pedestrian data were recorded during the collection period, it is assumed the 20 or more pedestrian crossing threshold is met due to the surrounding urban neighborhood and commercial destinations east on Five Mile Road.

Recommended Solution:

The installation of a rectangular rapid flashing beacon (RRFB) pedestrian crossing is recommended on Five Mile Road at the Woodside Avenue to serve the crossing demand and Woodside Avenue which is designated a city Bike Friendly Route.

A lane reduction on Five Mile Road should be considered from Austin Street to Horizon Ridge Plan. Removing the second westbound vehicle lane would provide a three-lane section with bike lanes in both directions. This would match the cross-section on Five Mile Road west of Horizon Ridge Plan. The existing multilane section between Austin Street and Ash Street is needed for vehicle capacity.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	Balboa – South Indian Trail
Project Extent:	Woodside Avenue Corridor

Problem Statement: Residents of the Balboa – South Indian Trail neighborhood raised concerns over speeding, cut through traffic, and lack of bicycle facilities on Woodside Avenue corridor within the neighborhood (approximately 1.76 miles). Woodside Avenue within the study area is classified as a local street with a speed limit of 25 miles per hour. The roadway provides two lanes with on-street parking. The sidewalk network in the study corridor is predominantly complete, except for the segment east of Five Mile Road. Along the study corridor, traffic circles are provided at Alberta Street, Dell Drive, and F Street to reduce travel speeds.

Traffic Analysis

The table below shows the 2022 daily traffic volumes and 85th percentile speeds on Woodside Avenue within the neighborhood. The highest daily volume on Woodside Avenue was 3,337 vehicles west of Five Mile Road. The highest 85th percentile speed was 31 miles per hour (six miles per hour greater than the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Woodside Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
West of Five Mile Road				
EB	1	1,926	30	
WB	1	1,411	31	
Both Dir.	2	3,337	30	25
West of Alberta Street				
EB	1	1,327	30	
WB	1	1,075	30	
Both Di.	2	2,402	30	25
West of Audubon Court				
EB	1	1,001	31	
WB	1	889	32	
Both Dir.	2	1,890	31	25
West of G Street				
EB	1	905	28	
WB	1	846	31	
Both Dir.	2	1,751	30	25

^a Traffic data collected in May 2022.

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The table below shows the severity and types of crashes occurring on Woodside Avenue over the last five years (excluding intersection crashes at the west end). There were 23 total crashes, including 13 injury crashes. Angle collisions were the most common crash type (representing 70 percent of all crashes).

Crashes on Woodside Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Rear End	-	-	-	1	-	1
Angle	-	-	2	5	9	16
Turning	-	-	-	4	-	4
Stationary Object or Car	-	-	-	-	1	1
From Same Direction	-	-	1	-	-	1
Total	0	0	3	10	10	23

The need for enhanced pedestrian crossing treatments was analyzed based on NCHRP Report 562. Based on the findings, crosswalks are the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. Although no pedestrian data were recorded during the collection period, it is assumed the 20 or more pedestrian crossing threshold is met due to the surrounding urban neighborhood. Curb extensions are currently in place at F Street to reduce traffic speed. Temporary curb extensions were installed at Bruce Avenue, G Street, Audubon Drive and Lindeke Street but were deemed not effective and removed by the City.

The study corridor is classified as a bike friendly route per the Bicycle Facility Classification in the City's Bicycle Master Plan, given the low traffic volumes and vehicle speeds travelling on the corridor. Woodside Avenue is a local street that connects east and west from Five Mile Road to Assembly Street. Road users tend to use the study corridor to avoid potential delay on other close major east-west roadways, where the study corridor will serve cut through traffic.

Recommended Solution:

Shared bicycle pavement markings should be considered to promote the bike friendly route on Woodside Avenue. The current vehicle volumes and speeds are appropriate for shared markings and do not indicate that bike lanes are appropriate.

It is recommended that speed feedback signs be added on Woodside Avenue east of Lindeke Street to alert drivers of the posted speed limit.

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District:	3
Neighborhood:	Emerson-Garfield
Project Extent:	Buckeye Avenue between Post Street and Division Street

Problem Statement: Residents of Emerson-Garfield neighborhood raised concerns over speeding and the need for pedestrian crossing improvements on Buckeye Avenue from Post Street to Division Street (approximately 0.6 miles). Buckeye Avenue within the study area is classified as a minor arterial with a speed limit of 30 miles per hour. Along the study corridor, Post Street, Washington Street, and Division Street are intersections controlled with a traffic signal and provides protected crossings. Normandie Street intersection is unsignalized with a marked school crosswalk and 20 MPH When Flashing speed zone on the east leg and adjacent transit stops. The remaining unsignalized intersections do not provide marked crosswalks.

Traffic Analysis

The table below shows the estimated 2022 daily traffic volumes and 85th percentile speeds on Buckeye Avenue at several locations along the study corridor. As shown in the table, there are approximately 12,190 vehicles per day on Buckeye Ave with an 85th percentile speed of 35 miles per hour (5 miles per hour higher than the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Buckeye Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
West of Howard Street				
EB	1	4,621		
WB	1	6,942	34	30
Both Dir.	3	11,563		
West of Stevens Street				
EB	1	5,137		
WB	1	6,920	34	30
Both Dir.	3	12,057		
West of Atlantic Street				
EB	1	6,911		
WB	1	6,041	36	30
Both Dir.	3	12,952		
Average		12,190	35	30

^a Traffic data collected on May 3, 2017. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

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The table below shows the severity and types of crashes occurring on Buckeye Avenue between Post Street and Division Street over the last five years (excluding intersection crashes at the east and west ends). As shown in the table, there were a total of 38 crashes, including 15 injury crashes. Turning collisions were the most common crash type (representing 32% of all crashes), with 11 left turn related and 1 right turn related.

Crashes on Buckeye Avenue, between Post Street and Division Street (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Rear End	-	-	-	4	4	8
Angle	-	-	-	5	6	11
Turning	-	-	1	2	9	12
Sideswipe	-	-	-	1	1	2
Stationary Object or Car	-	-	-	2	3	5
Total	0	0	1	14	23	38

The need for enhanced pedestrian crossing treatments was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562¹ at Howard Street, Stevens Street, and Atlantic Street due to the availability of count data. This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed. No pedestrian crossings were recorded during the May 3, 2017 counts. Based on NCHRP 562, active or enhanced treatment (such as a rapid flashing rectangular beacon) would be recommended if there are 20 or more pedestrian crossings during the peak hour. Similar locations along the corridor would be expected to have similar recommendations depending on pedestrian volumes.

Buckeye Avenue has a three-lane cross-section with bike lanes and curb tight sidewalks. The curb-to-curb width is approximately 44-feet wide. The vehicle and center turn lanes could be narrowed to encourage lower vehicle speeds and provide additional space for cyclists.

Recommended Solution:

Given the location of bus stops at Normandie Street, pedestrian activity is assumed to be higher at this location. Therefore, the installation of an enhanced crossing with a rectangular rapid flashing beacon (RRFB) is recommended to upgrade the existing crossing location. Based on the spacing of existing crossings, the installation of an enhanced crossing with a RRFB is also recommended at Howard Street midway between the Post Street and Washington Street signals. This will make the average distance between enhanced pedestrian crossings no more than approximately 750 feet. This will provide

¹ NCHRP Report 562: *Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

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increased safety and comfort for pedestrian and bicyclist crossings and will help slow vehicles down with more frequent locations where they will need to stop or yield.

The existing roadway width on Buckeye Avenue would allow the corridor to be restriped to manage vehicle speeds. The following cross-section is recommended:

- Provide 11-foot-wide vehicle lanes
- Provide a 11-foot-wide center turn lane
- Provide 5.5-foot-wide bike lanes

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	Emerson Garfield
Project Extent:	Buckeye Avenue and Washington Street Intersection

Problem Statement: Residents of the Emerson Garfield neighborhood raised concerns over vehicle and the need for pedestrian safety at the Buckeye Avenue and Washington Street Intersection. The main intersection concern was related to driver yielding, where drivers do not yield properly for the right of way due to the lane alignment. The north and south legs of the intersection are offset by 30 feet. The intersection is currently signal controlled with overhead signal on the eastbound approach and pole mounted traffic signals on the other approaches. Buckeye Avenue is a two-lane facility with a two-way-left-turn lane and is classified as a minor arterial with speed limit of 30 miles per hour. Washington Street south of Buckeye Avenue is a four-lane facility and is classified as a major arterial with a speed limit of 30 miles per hour. Washington Street north of Buckeye Avenue is a two-lane facility and classified as local street with speed limit of 25 miles per hour.



Buckeye Avenue and Washington Street Intersection

Traffic Analysis

The table below shows the estimated 2022 daily traffic volumes and 85th percentile speeds on Buckeye Avenue west of Washington Street. As shown in the table, there are about 11,482 per day passing through the intersection with an 85th percentile speed of 34 miles per hour (4 miles per hour higher than the posted speed limit).

Spokane Traffic Calming Master Plan

2022 Daily Traffic and 85th Percentile Speeds on Buckeye Avenue (west of Washington Street)

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
EB	1	4,892		
WB	1	6,590	34	30
Both Dir.	3	11,482		

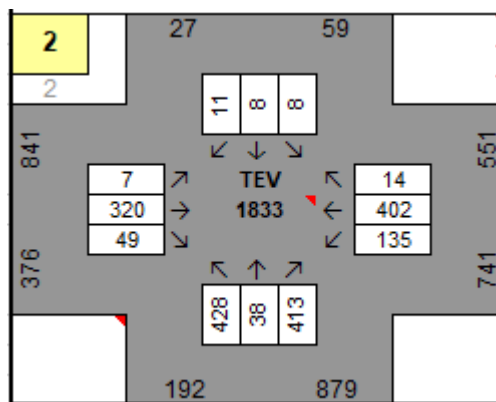
^a Traffic data collected on May 3, 2017. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

The table below shows the severity and types of crashes occurring at Buckeye Avenue and Washington Street intersection from 2017 through 2021. There was a total of 17 crashes, including 8 injury crashes. Turning collisions were the most common crash type (representing 59% of all crashes), with all of them related to left turn.

Crashes at Buckeye Avenue and Washington Street Intersection (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Rear End	-	-	-	2	-	2
Angle	-	-	-	-	1	1
Turning	-	-	1	2	7	10
Sideswipe	-	-	-	1	-	1
Stationary Object or Car	-	-	-	2	1	3
Total	0	0	1	7	9	17

The figure below shows the existing PM peak hour traffic volumes at the Buckeye Avenue and Washington Street intersection, based on a traffic count from May 25, 2017, factored up to 2022.



PM Peak Hour Traffic at Buckeye Avenue and Washington Street

The intersection currently has fairly low demand from the offset north leg. The highest left turn volume is northbound left. This signal would likely benefit from improved signal timing and upgraded signal heads to be clearer and more visible to drivers. Left turn phasing or split phasing would help with conflict management at the intersection, especially for the northbound left vehicle and northbound pedestrian conflicts.

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Recommended Solution:

Several improvements are recommended to improve safety at the intersection:

- Restripe the crosswalks at the intersection for increased pedestrian visibility.
- Close north leg of the intersection to reduce conflicts and improve safety.
- Install a curb extension on the southwest corner to shorten the pedestrian crossing distance.
- Upgrade signal heads to modern overhead configuration for better visibility and accompanying signage.
- Upgrade signal timing to include split phasing for the northbound and southbound movements to reduce potential conflicts.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	Five Mile Prairie
Project Extent:	Cascade Way - Austin Road to 5 Mile Road

Problem Statement: Residents of Five Mile Prairie neighborhood requested dedicated bike facilities on Cascade Way between Austin Road. Cascade Way is classified as an urban minor arterial. It is a two-lane facility with a 25 mile per hour posted speed. The street is fronted by single family homes.

Traffic Analysis

The table below shows 2022 daily traffic volumes and 85th percentile speeds on Cascade Way along the study corridor (count conducted near Lindeke Court). There are 381 per day with an 85th percentile speed of 25 miles per hour (same as the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Cascade Way

Direction	# Lanes	2022 Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
EB	1	166	25	25
WB	1	215	25	25
Both Dir.	2	381	25	25

The City of Spokane online Pedestrian and Bicycle Data Tool identified Cascade Way with a level of traffic stress of 1 which represents the lowest stress conditions.

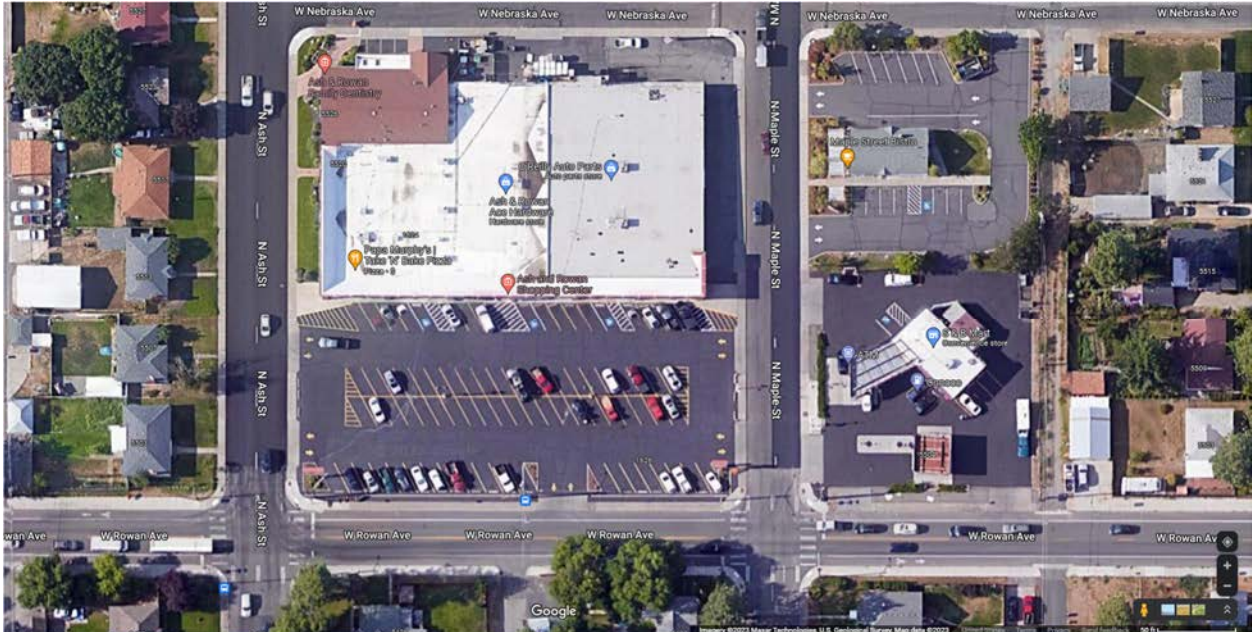
Recommended Solution:

Cascade Way is classified as a bike friendly route. Cascade Way, Lincoln Road, Hiawatha Drive and Arrowhead Road combined provide an east-west connection between Indian Trail Road, 5 Mile Road and Austin Road. The low vehicle speeds (85th percentile speed of 25 mile per hour) and low daily traffic volumes (less than 400 vehicles) suggest that dedicated bike lanes are not warranted to accommodate cyclists on the corridor. The installation of shared lane markings on Cascade Way is recommended to indicate a shared lane environment for bicycles and automobiles. The markings reinforce the legitimacy of bicycle traffic on the street, recommend proper bicyclist positioning, and can provide wayfinding guidance for the preferred bicycle route. The addition of dedicated bike lanes in each direction would require the removal of on-street parking.

Spokane Traffic Calming Master Plan

District: 3
Neighborhood: North Hill
Project Extent: Ash Street and Rowan Avenue

Problem Statement: Residents of the North Hill neighborhood raised concerns over pedestrian crossing safety on Ash Street north of Rowan Avenue and Rowan Avenue between Ash and Maple Street.



Rowan Avenue between Ash Street and Maple Street

Traffic Analysis

Ash Street within the study area is classified as an urban principal arterial with a posted speed limit of 30 miles per hour and provides two southbound lanes. Rowan Avenue within the study area is classified as an urban minor arterial with a posted speed limit of 30 miles per hour and provides one lane in each direction. Ash Street does not provide marked shoulders or bike lanes; however, Rowan Avenue has a striped bike lane in both directions.

Rowan Avenue is stop signed controlled at the Ash Street and Maple Street approaches. The Rowan Avenue intersections at Ash Street and Maple Street (one block east) provide marked pedestrian crossings on each leg. There is a marked crossing on Ash Street at Nebraska Avenue (one block north).

The following table shows the 2022 daily traffic volumes and 85th percentile speeds on Rowan Avenue between Ash Street and Maple Street. As shown in the table, the highest daily volume on Rowan Avenue was 1,476 vehicles. The highest 85th percentile speed was 24 miles per hour (6 miles per hour lower than the posted speed limit).

Spokane Traffic Calming Master Plan

2022 Daily Traffic and 85th Percentile Speeds on Rowan Avenue

Direction	# Lanes	2022 Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
Rowan Avenue between Ash Street and Maple Street ^a				
EB	1	1,476	24	
WB	1	1,225	23	
Both Dir.	2	2701	24	30

^a Traffic data collected in November 2022.

Data shows that on average drivers are travelling below the posted speed limit. Since speeding is not the issue for pedestrian crossing safety, more efforts should be focused on providing visibility of pedestrians and pedestrian infrastructure to drivers. Crossing treatment analysis was performed for Rowan Avenue using NCHRP 562 which indicated that a marked crosswalk is recommended.

Ash Street was not evaluated for a new pedestrian crossing treatment. There are existing pedestrian marked crossings at all legs of the Rowan Avenue/Ash Street intersection and at Nebraska Avenue, approximately 315 feet apart. The existing crossing facilities are sufficient to meet the estimated crossing demand on Ash Street. The marked crossing on Ash Street at Nebraska Avenue is in good condition with clear pavement markings and signage.

Recommended Solution:

It is recommended to enhance the existing crossings of Ash Street and Maple Street at Rowan Avenue with signalized pedestrian crossings provided by a pedestrian hybrid beacon or a full traffic signal. A new traffic signal would provide additional benefits from a reduction in angle crashes and controlled intersection operations for all modes.

The addition of curb extension at the Ash Street and Maple Street crossings at Rowan Avenue were considered, however this improvement should be coordinated with the city as they would conflict with future plans to add bike lanes.

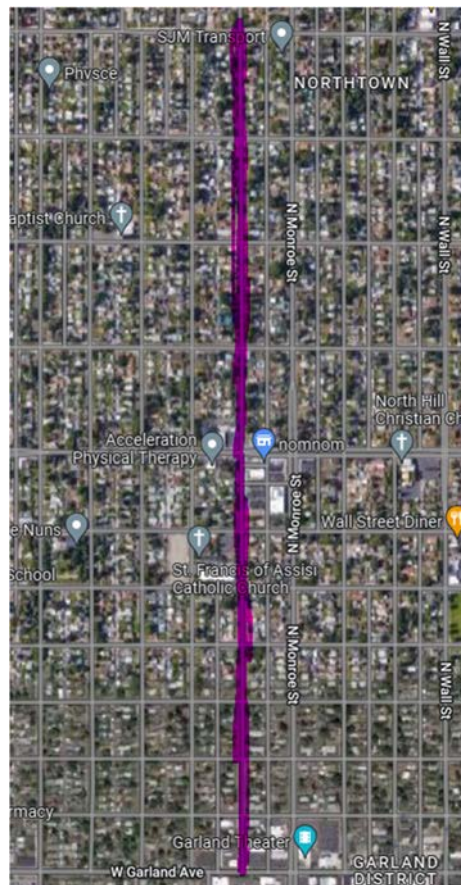
Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	North Hill
Project Extent:	Madison Street from Rowan Avenue to Garland Avenue

Problem Statement: Residents of the North Hill neighborhood raised concerns over cut through traffic on Madison Street from Rowan Avenue to Garland Avenue (1 mile corridor) to avoid congestion on Monroe Street (one block east).

Traffic Analysis

Madison Street within the study area is classified as a local street and does not have a posted speed limit. The statutory speed limit of 25 miles per hour is applied to all local streets. The roadway provides one lane in each direction. Rowan Avenue is classified as urban minor arterial with a posted speed limit of 30 miles per hour and provides one lane in each direction. Garland Avenue is classified as a minor arterial with a posted speed limit of 20 miles per hour. The roadway provides one lane each direction with on-street parking on the south side of the street. The entire study corridor lacks intersection control except at Rowan Avenue, Wellesley Avenue, and Garland Avenue, which are controlled by stop signs on the Madison Street approaches. The entire study corridor lacks pedestrian crosswalks. There is only one curb extension at Everett Avenue.



Madison Street from Rowan Avenue to Garland Avenue

Spokane Traffic Calming Master Plan

The table below shows the estimated 2022 daily traffic volumes on Madison Street from Rowan Avenue to Garland Avenue, south of Queen Avenue. The daily volume on Madison Street was 311 vehicles. Speed data was not available. The traffic data shows an appropriate level of traffic on a local street and suggests there is not a cut-through issue on this corridor.

2022 Estimated Daily Traffic Madison Street

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
Madison Street South of Queen Avenue ^a				
NB	1	174		
SB	1	137	N/A	N/A
Both Dir.	2	311		

^a Traffic data collected in July 2018. Volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

Available crash data was evaluated for Madison Street from Rowan Avenue to Garland Avenue to determine if there is a trend in crash type or location. There was a fatal collision at the Madison Street/Lacrosse Avenue intersection in 2021. The majority of crashes occurred midblock due to a vehicle hitting a parked car. No safety concerns were found at a specific local street intersection on Madison Street that would benefit from traffic calming improvements.

Crashes on Madison Street between Rowan Avenue and Garland Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Rear End					1	1
Angle	1			2	5	8
Turning						
Sideswipe						
Stationary Object or Car				2	8	10
Total	1	0	0	4	14	19

Recommended Solution:

It was determined the corridor would benefit from an overall traffic calming treatment to lower speeds and increase travel times to deter drivers from diverting their route from Monroe Street to Madison Street. The addition of traffic circles is recommended at the following locations, selected at the neighborhood entrances (first local street intersection after an arterial intersection).

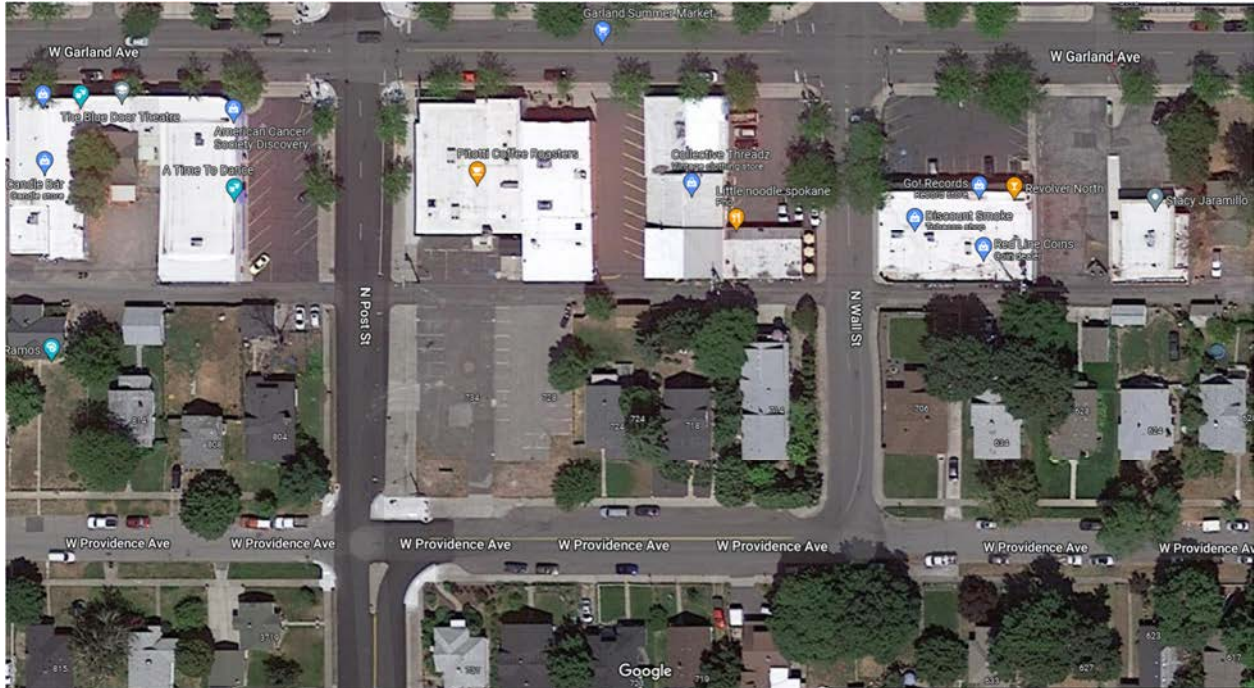
- W Everett Avenue
- W Wabash Avenue
- W Princeton Avenue
- W Walton Avenue

An alternative to traffic circles is installing curb extensions on each corner at an intersection to reduce vehicle lane widths and pedestrian crossing lengths. This improvement was installed at the Madison Street/Everett Avenue intersection. This improvement alternative is more expensive than traffic circles.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	North Hill
Project Extent:	Wall Street/Post Street Couplet near Providence Avenue

Problem Statement: Residents of the North Hill neighborhood raised concerns over the merging and diverging traffic on one-way couplets Wall Street and Post Street near Providence Avenue.



Wall Street/Post Street couplet near Providence Avenue

Traffic Analysis:

Wall Street is a northbound one-way roadway with two lanes and a posted speed limit of 30 miles per hour in the study area. Post Street is a southbound one-way with two lanes and a posted speed limit of 30 miles per hour in the study area. Both Wall Street and Post Street are classified as minor arterials. In the study area, Providence Avenue provides one lane in each direction with on-street parking, is classified as a local street, and does not have a posted speed limit. There are no bike lanes or pedestrian crosswalks in this study area, but there is a robust sidewalk network.

The following table shows the estimated 2022 daily traffic volumes on Providence Avenue at the Wall Street intersection. The highest daily volume was 632 vehicles in the eastbound direction. Speed data was not available.

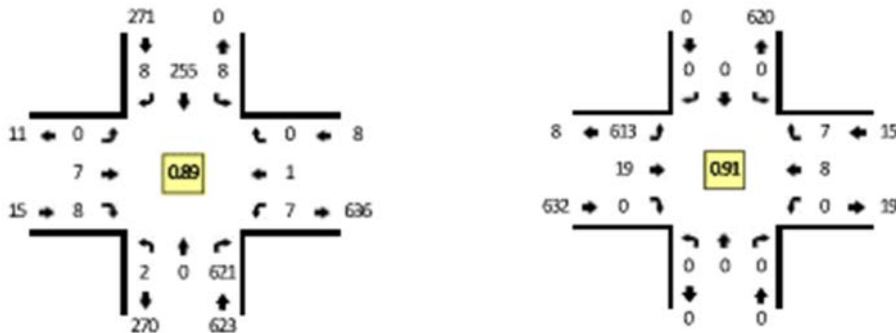
Spokane Traffic Calming Master Plan

2022 Daily Traffic on Providence Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
Providence Avenue ^a				
EB	1	632		
WB	1	8	N/A	N/A
Both Dir.	2	640		

^a Traffic data collected in November 2022

The figure below shows the existing PM peak hour traffic volumes at the Post Street (left figure) and Wall Street (right figure) intersections with Providence Avenue, based on a traffic count from November 2, 2022.



Recommended Solution:

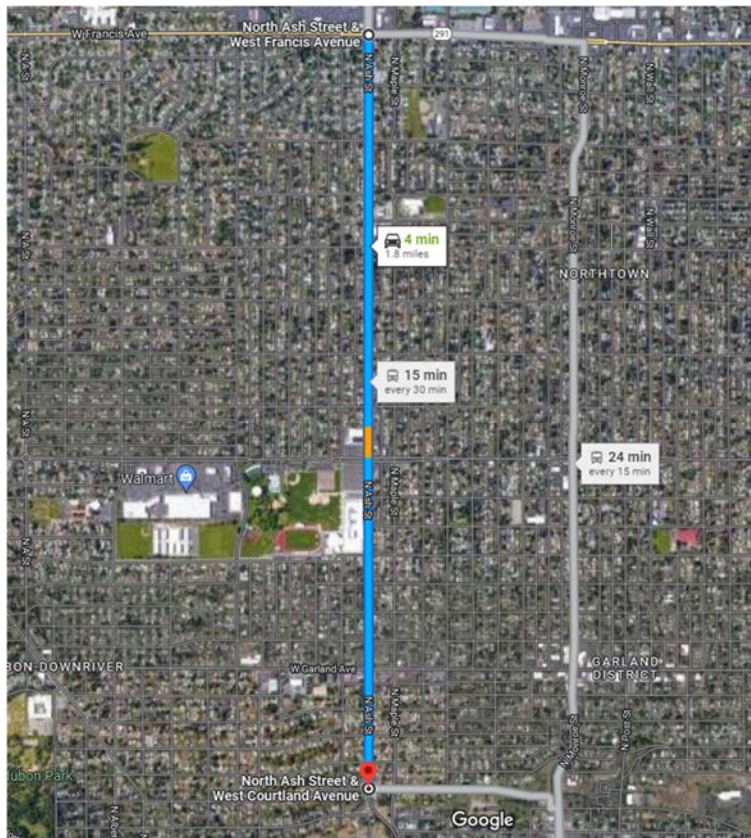
There are very few people per day who use the allowed two-way movements on Providence Avenue between Post Street and Wall Street. Most trips follow the one-way flow of the couplet. In order to reduce conflict and driver confusion, the following improvements are recommended.

- Close the southbound left turn movement from Post Street to Providence Avenue which serves very low volumes.
- Close the east leg of the Providence Avenue and Wall Street intersection which serves very low volumes.
- Convert Providence Avenue to one-way eastbound flow between Post Street to Wall Street, consistent with Wall Street traffic flow. Providence Avenue would provide two eastbound west lanes and two left turn lanes onto Wall Street which would serve the high peak hour demand.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	North Hill
Project Extent:	Ash Street Corridor from Francis Avenue to Courtland Avenue

Problem Statement: Residents of the North Hill neighborhood raised concerns over insufficient pedestrian crossing facilities along Ash Street from Francis Avenue to Courtland Avenue (1.8 miles).



Ash Street Corridor from Francis Avenue to Courtland Avenue

Traffic Analysis:

Ash Street within the study area is classified as a one-way urban principal arterial with a posted speed limit of 30 miles per hour and provides two lanes. Francis Avenue is also classified as a principal arterial with a posted speed limit of 35 miles per hour and provides two lanes in each direction and a road diet for left turn movements until the intersection with Ash Street, which has three lanes in each direction and no road diet. Courtland Avenue is a local street, does not have a posted speed limit in the immediate surroundings of the study area, and provides one lane in each direction and enough right-of-way for on-street parking on either side of the roadway. The sidewalk network in the study corridor is predominantly complete, with a few blocks needing sidewalks on at least one side of the roadway. Bike lanes are not provided in the study corridor. The pedestrian crossing facilities are found mainly at higher

Spokane Traffic Calming Master Plan

classification roadways and school zones (Rowan Ave, Wellesley Ave, Longfellow Ave, etc.) along the corridor.

The table below shows the 2022 daily traffic volumes along Ash Street from Francis Avenue to Courtland Street. The highest daily volume had 12,095 vehicles in the southbound direction. The highest 85th percentile speed was 39 miles per hour (9 miles per hour greater than the posted speed limit). The data indicated there is a speeding issue on the corridor.

2022 Daily Traffic on Ash Street from Francis Avenue to Courtland Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
Ash Street from Francis Avenue to Courtland Avenue ^a				
SB	2	12,095	39	30

^a Traffic data collected in November 2022.

To increase pedestrian safety, speeding vehicles must be addressed and traffic calming solutions should be implemented, where appropriate. Crossing treatment analysis using NCHRP 562 indicates that due to corridor speeds and volume, the red treatment category is recommended for pedestrian crossings which includes pedestrian hybrid beacons and signals. If the 85th percentile speed was lowered to 35 miles per hour, a RRFB (rectangular rapid flashing beacon) would be an appropriate treatment at pedestrian crossings.

Recommended Solution:

Since this is an arterial corridor, speed bumps and traffic circles are not appropriate. However, pedestrian crossing visibility can be improved to alert drivers of the need to slow down for pedestrians in the area, especially busy areas around schools and commercial areas. Curb extensions could be used to narrow the roadway to reduce vehicle speeds and shorten pedestrian crossing lengths. Ash Street has a wide curb-to-curb width, approximately 38 feet providing two southbound vehicle lanes and no on-street parking (except school buses during restricted times).

The installation of curb extensions should be considered on Ash Street along the Shadle Park High School frontage.

- Longfellow Avenue (existing school crossing and designated a city Bike Friendly Route and future Neighborhood Greenway)
- Heroy Avenue (existing school crossing)
- Princeton Avenue (existing school crossing and southbound bus stop)

If the installation of curb extensions along the school frontage reduces vehicle speeds, the installation of a RRFB (rectangular rapid flashing beacon) would be recommended at the Longfellow Avenue crossing which connects to the primary entrance to the high school.

It is recommended to enhance the existing crossings at Ash Street/Rowan Avenue with signalized pedestrian crossings provided by a pedestrian hybrid beacon or a full traffic signal. A new traffic signal would provide additional benefits from controlling intersection operations for all modes.

Spokane Traffic Calming Master Plan

It is recommended that up to two speed feedback signs be added on Ash Street. Potential locations are near Gordon Avenue, Queen Avenue and Central Avenue to alert drivers of the posted speed limit.

District: 3
Neighborhood: North Indian Trail
Project Extent: Shawnee Avenue and Farmdale Street Intersection

Problem Statement: Residents of North Indian Trail neighborhood raised concerns about pedestrian crossing safety at the Shawnee Avenue/Farmdale Street intersection. The primary concern was for school children walking to Woodridge Elementary School located on the northwest corner of the intersection. The intersection is currently stop-controlled on Farmdale Street, with free-flowing traffic on Shawnee Avenue. There are standard crosswalk markings on the north and south legs of the intersection and continental crosswalk markings on the east and west legs of the intersection. Both Shawnee Avenue and Farmdale Street are two-lane facilities with 25 mph speed limits. Shawnee Avenue is classified as an urban minor arterial. Farmdale Street is classified as an urban local access street. An aerial photo of the intersection is provided below.



Traffic Analysis

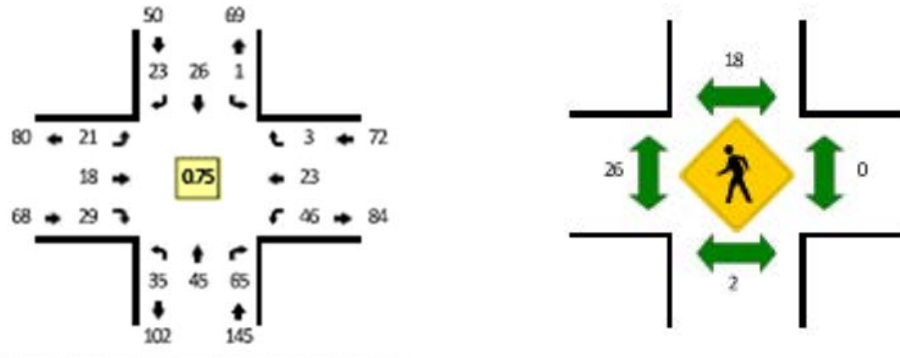
The table below shows 2022 daily traffic volumes and 85th percentile speeds on Shawnee Avenue along the study corridor (count conducted near Woodridge Drive). There are 1,862 per day with an 85th percentile speed of 29 miles per hour (4 mph higher than the 25 mph posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Shawnee Avenue

Direction	# Lanes	2022 Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
EB	1	931	29	25
WB	1	931	29	25
Both Dir.	2	1,862	29	25

^a Traffic data collected in May 2022.

No crashes were observed at the intersection of Shawnee Avenue and Farmdale Street over the last five years. The figure below shows the existing PM peak hour traffic volumes (left) and pedestrian volumes (right) at the Shawnee Avenue and Farmdale Street intersection, based on a traffic count from November 2, 2022.



PM Peak Hour Traffic and Pedestrian Count at Shawnee Avenue and Farmdale Street

The need for enhanced pedestrian crossing treatments (across Shawnee Avenue) was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.1 This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed. The recent count shows 26 pedestrians crossing Shawnee Avenue during the PM peak hour. Pedestrian volumes are likely much higher during the hour before school starts and the hour after school ends. Based on NCHRP 562, a marked crosswalk is the preferred treatment, and no additional crossing treatment would be required.

Recommended Solution:

The installation of curb extensions is recommended at the Shawnee Avenue/Farmdale Street intersection on the north and south sides of Shawnee Avenue at both crosswalks to narrow the roadway crossing width. Curb extensions are expected to decrease the 85th percentile speed by 3 miles per hour.²

The removal of the existing crosswalk on the east leg is recommended since count data shows there is little to now crossing demand and the installation of a curb extension at that location is not recommended.

¹ NCHRP Report 562: *Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

² Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed. Federal Highway Administration. July 2014.

District: 3
Neighborhood: North Indian Trail
Project Extent: Pamela Street from Barnes Road to Pacific Park Drive

Problem Statement: Residents of the North Indian Trail neighborhood raised concerns over speeding on Pamela Street from Barnes Road to Pacific Park Drive (0.5 miles). Pamela Street is classified as local street with speed limit of 25 miles per hour. Sections of Pamela Street are identified as a Bike Friendly Route in the Spokane Bicycle Master Plan. The street provides two lanes with on-street parking.

Traffic Analysis

The table below shows daily traffic volumes and 85th percentile vehicle speeds Pamela Street between Barnes Road and Pacific Park Drive. The 85th percentile vehicle speeds on Pamela Street within the study area is 29 miles per hour (4 miles per hour higher than the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on Pamela St Between Barnes Rd and Pacific Park Dr

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
NB	1	214	29	
SB	1	180	29	
Both Dir.	2	394	29	25

^a Traffic data collected in November 2022.

No crashes were reported on Pamela Street between Barnes Road and Pacific Park Drive, excluding intersection crashes at the north and south endpoints over the last five years.

Recommended Solution:

The installation of speed bumps is recommended to slow speeds on this residential street. This street connects Barnes Road and Pacific Park Drive in a direct path, allowing for cut-through traffic to drive through the neighborhood at a faster speed than the posted speed. To be an effective traffic calming strategy, it is recommended that the speed bumps be installed at the entrance to the neighborhood just south of Barnes Road, on either end of Lowell Avenue, and north of Pacific Park Drive. Speed bumps are recommended pending Fire Dept review and approval. Speed bumps are expected to decrease the 85th percentile speed by 8 miles per hour.³

In addition, Pamela Street is the uncontrolled approach at each intersection on the study corridor. The installation of a traffic circle at the Pamela Street/Lowell Avenue intersection (middle of the study corridor) should be considered to reduce vehicle speeds. A traffic circle is expected to decrease the 85th percentile speed by 3 miles per hour.⁴

³ Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed. Federal Highway Administration. July 2014.

⁴ Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed. Federal Highway Administration. July 2014.

District:	3
Neighborhood:	North Indian Trail
Project Extent:	Indian Trail Road Corridor

Problem Statement: Residents of the North Indian Trail neighborhood raised particular concern regarding bicyclist network connectivity along the Indian Trail Road Corridor (2.24 miles) within the neighborhood.

Funded Improvements:

The following improvement project is funded:

- installing a pedestrian hybrid beacon on Indian Trail Road at Lowell Avenue (north of study corridor)

Traffic Analysis

North Indian Trail Road is classified as minor arterial north of Shawnee Road and major arterial south of Shawnee Road. The City’s Bike Plan identifies the corridor is planned for a shared use path or bike lanes in the future. The corridor north of Bedford Avenue has a speed limit of 45 miles per hour and 35 miles per hour south of Bedford Avenue. The study corridor north of Ridgecrest Drive has two-lane facilities with marked and paved shoulders on both sides. The corridor between Ridgecrest Drive and Barnes Street has no shoulder and contains two lanes with a two-way-left-turn lane and sidewalk. The corridor between Barnes Street and Lowell Avenue has an additional lane southbound, and an additional lane on northbound south of Lowell Avenue. There are three traffic signals on the corridor located at Shawnee Avenue, Barnes Road, and Strong Road/Pacific Park Drive.

The table below shows estimated 2022 daily traffic volumes and 85th percentile speeds on North Indian Trail Corridor. As shown in the table, the highest daily volume on the corridor was estimated to be up to 16,181 vehicles south of Strong Road/Pacific Park Drive on the five-lane section. The 85th percentile speeds ranged from 43 to 46 miles per hour, indicating high speeding condition (8 to 11 miles per hour greater than the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds on North Indian Trail Corridor

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
North of Shawnee Avenue				
NB	1	3,809	44	
SB	1	3,866	42	35
Both Dir.	3	7,675	43	
North of Barnes Road				
NB	2	4,843	45	
SB	2	4,976	43	35
Both Dir.	5	9,819	44	
North of Lowell Avenue				

NB	1	6,741	41	
SB	2	6,566	45	35
Both Dir.	4	13,307	43	
South of Strong Road/Pacific Park Drive				
NB	2	8,439	44	
SB	2	7,742	48	35
Both Dir.	5	16,181	46	

^a Traffic data collected in May 2022.

The table below shows the severity and types of crashes occurring on North Indian Trail Corridor within the neighborhood over the last five years. There was a total of 28 crashes, with 18 injury crashes and one fatal crash (angle crash). Rear-end crashes were the most common, representing 39 percent of all crashes. There were two noted crashes involving pedestrians or cyclists.

Crashes on Northwest Boulevard, between Cochran Street and Monroe Street (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Rear End	-	-	2	6	3	11
Angle	1	-	1	3	1	6
Turning	-	-	1	-	-	1
Sideswipe	-	-	-	-	1	1
Stationary Object or Car	-	-	-	1	4	5
From Same Direction	-	-	-	1	-	1
Pedestrian/Bike	-	1	-	2	-	3
Total	1	1	4	13	9	28

The study corridor north of Shawnee has existing conditions of moderate traffic (shared facility), and heavy traffic (shared facility) south of Shawnee Road per the Bicycle Facility Classification in the City's Bicycle Master Plan. However recent counts indicate the segment north of Shawnee may be in the heavy traffic classification now. Both do not contain bike lanes currently, and instead bicyclists need to share a lane with auto vehicles. The segment south of Shawnee Road has a future plan of bike lane and/or shared use path implementation per the Bicycle Master Plan.

Recommended Solution:

The installation of bike lanes or a multi-use path is the long-range recommendation in the City's Bicycle Plan. The majority of the corridor frontage is development and provides inadequate right-of-way to add bicycle facilities unless a vehicle travel lane is removed. A detailed alternatives analysis should be conducted to determine feasible solutions to adequately accommodate multimodal needs on the corridor. Refer to North Indian Trail concept design for shared-use path from Sutherlin Place to Northside Landfill.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	Northwest
Project Extent:	Francis Avenue and A Street Intersection

Problem Statement: Residents of the Northwest neighborhood raised concerns over pedestrian crossing safety at the intersection of Francis Avenue and A Street, particularly the lack of pedestrian crossing infrastructure, difficulty of crossing, and fatal collisions.



Francis Avenue and North A Street Intersection

Traffic Analysis

Francis Avenue within the study area is classified a principal arterial with a posted speed limit of 35 miles per hour, provides two lanes in each direction, and road diet for left turn movements from either direction. Francis Avenue also serves as State Route 291 and is under WSDOT jurisdiction. A Street within the study area is classified as a major collector with a posted speed limit of 30 miles per hour and provides one lane in each direction with no on-street parking. Both Francis Avenue and A Street in the study area do not provide marked shoulders or bike lanes. The study area does not have any marked pedestrian crosswalks. The Francis Avenue and A Street intersection is stop-controlled for the A Street approaches.

The following table shows the estimated 2022 daily traffic volumes and 85th percentile speeds on Francis Avenue and A Street. As shown in the table, the highest daily volume at the intersection was on Francis Avenue with 16,247 west bound vehicles. The highest 85th percentile speed was 38 miles per hour (3 miles per hour greater than the posted speed limit).

Spokane Traffic Calming Master Plan

2022 Daily Traffic and 85th Percentile Speed at Francis Avenue and North A Street Intersection

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
Francis Avenue ^a				
EB	2	14,505	38	
WB	2	16,247	38	
Both Dir.	4	30,752	38	35
North A Street ^b				
NB	1	1,860		
SB	1	1,960		
Both Dir.	2	3,820	N/A	30

^a Traffic data collected in March 2017. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

^b Traffic data collected in August 2015. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

Data shows that on average driver speeds are just above the posted speed limit. Speeding may be a smaller issue compared to the lack of pedestrian crossing infrastructure. More efforts should be focused on providing visibility of pedestrians to drivers and pedestrian infrastructure at the intersection.

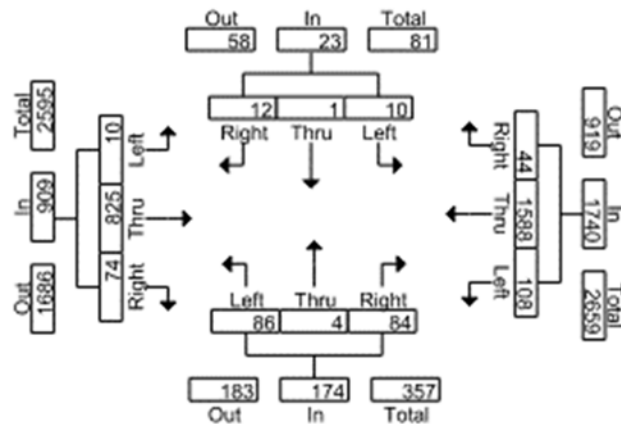
The table below shows the severity and types of crashes occurring at the intersection. None of the collisions were reported to have involved pedestrians or cyclists, however speeding and not yielding right-of-way were primary contributing circumstances to the collisions.

Crashes at Francis Avenue and A Street (2016 to 2021)

Crash Type	Crash Severity		Total
	Possible Injury	Property Damage Only	
Rear End	1	1	2
Angle	3	4	7
Turning	-	1	1
Total	4	6	10

Spokane Traffic Calming Master Plan

Vehicle counts taken at the Francis Avenue/A Street intersection in 2015 during the PM peak hour are summarized below.



The need for enhanced pedestrian crossing treatments at the intersection was analyzed based on NCHRP Report 562. Based on the findings, a treatment with a red indication, such as a pedestrian hybrid beacon or pedestrian signal is warranted due to long crossing distances, and high vehicle volumes. The closest protected pedestrian crossings on Francis Avenue are approximately 1,100 feet west at the Indian Trail Road traffic signal and 1,200 feet east at the Alberta Street traffic signal.

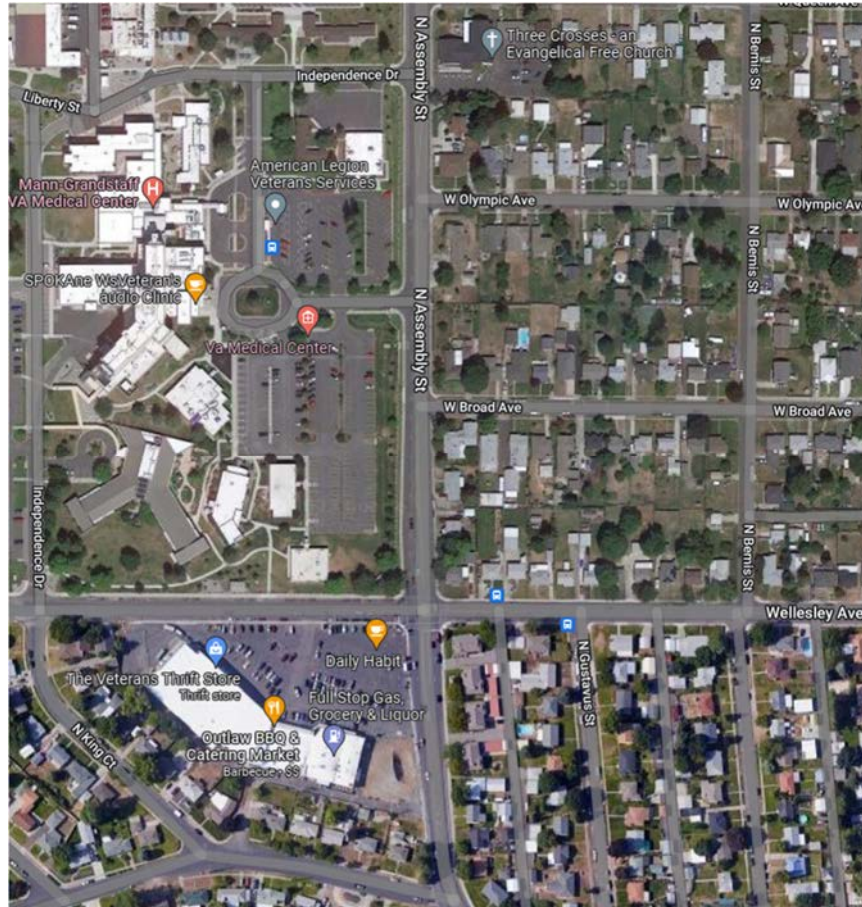
Recommended Solution:

The installation of a HAWK or hybrid beacon pedestrian crossing is recommended on Francis Avenue at A Street to serve the crossing demand for the surrounding urban neighborhood. The installation of a traffic signal is an alternative to a signalized pedestrian crossing. However, the PM peak hour volumes do not warrant the installation of a traffic signal. Any improvements on Francis Avenue will require WSDOT approval.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	Northwest
Project Extent:	Wellesley Avenue and Assembly Street Intersection

Problem Statement: Residents of the Northwest neighborhood raised concerns over pedestrian crossing safety and how a new school route may impact it.



Wellesley Avenue and Assembly Street Intersection

Traffic Analysis:

Both Wellesley Avenue and Assembly Street have a functional classification of principal arterial within the study area. Wellesley Avenue has a posted speed limit of 30 miles per hour and provides one lane in each direction with on-street parking available on both sides of the roadway. Assembly Street has a posted speed limit of 30 miles per hour and provides one lane for each direction and a road diet for left turn movements, except at the intersection where Assembly expands to two lanes in each direction and one as a left-turn-only lane. The intersection is controlled by a four-way stop with red light flashers and has marked crosswalks on all approaches. The study area has an established sidewalk network.

Spokane Traffic Calming Master Plan

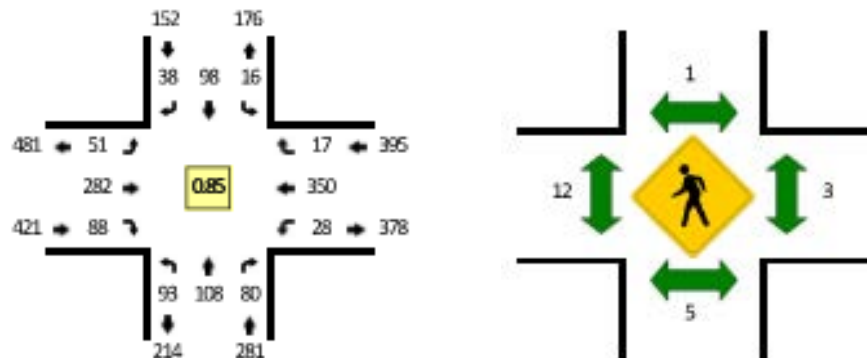
The table below shows the 2022 daily traffic volumes on Wellesley Avenue and Assembly Street. Speed data was not available.

2022 Daily Traffic at Wellesley Avenue and Assembly Street Intersection

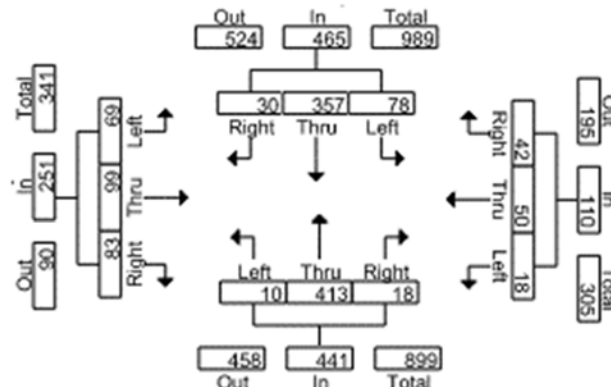
Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
Wellesley Avenue ^a				
EB	1	4,210	N/A	30
WB	1	4,810		
Both Dir.	2	9,020		
Assembly Street ^a				
NB	1	2,810	N/A	30
SB	1	2,140		
Both Dir.	2	4,950		

^a Traffic data collected in November 2022

Turning movement counts taken at the Wellesley Avenue/Assembly Street intersection in November 2022 for the afternoon peak hour (3:30 to 4:30 p.m.) show the following vehicle and pedestrian volumes.



Turning movement counts taken at the Wellesley Avenue/Assembly Street intersection in 2017 during the PM peak hour are summarized below.



Spokane Traffic Calming Master Plan

The installation of a traffic signal was evaluated; however, the PM peak hour volumes do not warrant the installation of a traffic signal.

The need for enhanced pedestrian crossing treatments across Assembly Street was analyzed based on NCHRP Report 562, using collected traffic data. While the crossing distance is quite wide, the vehicle volumes are moderate, thus a crosswalk is the level of recommendation here. Given the low volumes for a five-lane facility, the location would not meet signal warrants.

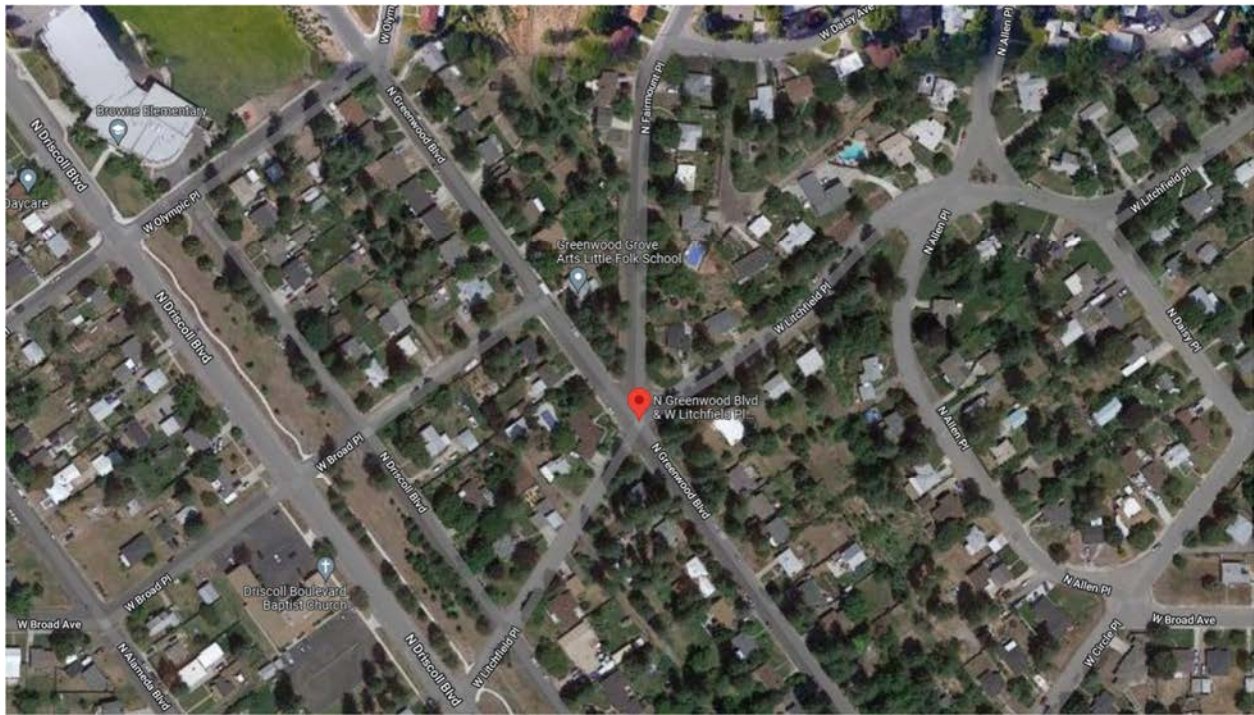
Recommended Solution:

Improve the existing crosswalk facilities by re-stripping crosswalk pavement markings. Add MUTCD compliant pedestrian crossing warning signs before the approach (i.e., R1-5, R1-6, etc.) on both Wellesley Avenue and Assembly Street. Add school zone signage, especially signs that indicate warnings when children are present. Additionally, add curb extensions on Wellesley Avenue where on-street parking is present to shorten the crossing distance in the intersection.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	Northwest
Project Extent:	Greenwood Boulevard, Litchfield Place, and Fairmount Place Intersection

Problem Statement: Residents of the Northwest neighborhood raised concerns over confusion when traveling through the five-leg intersection, pedestrian safety, and vehicles speeding in the area.



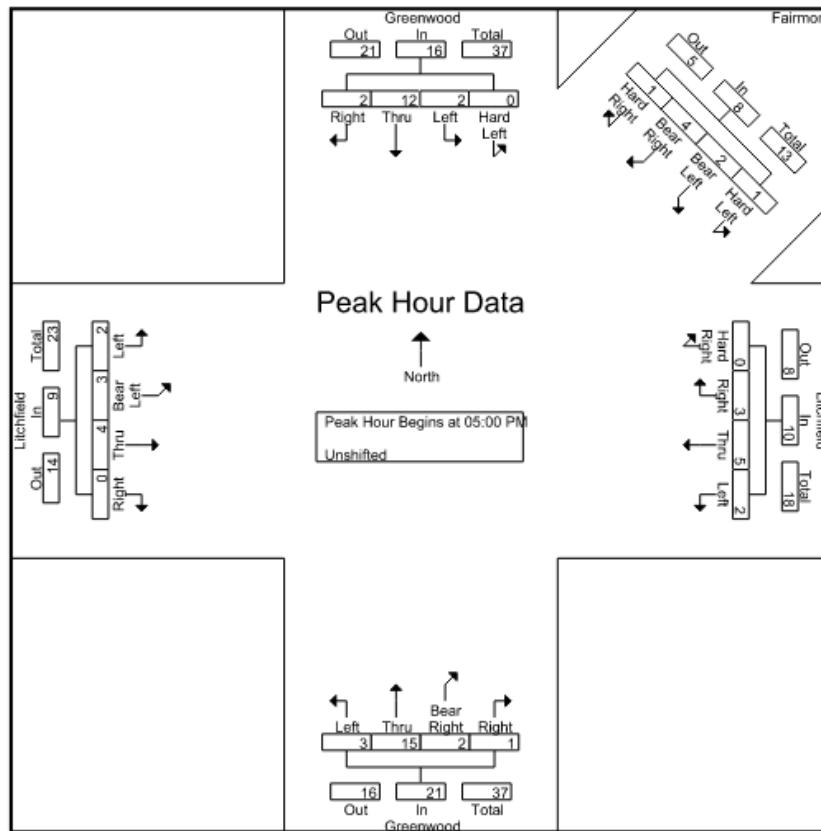
Greenwood Boulevard, Litchfield Place, and Fairmount Place Intersection

Traffic Analysis:

Greenwood Boulevard, Litchfield Place, and Fairmount Place are local streets. Greenwood Boulevard, Litchfield Place and Fairmount place are roadways with one lane in each direction, on-street parking available on both sides of the street, and no posted speed limit on any of the roadways in this study area. Greenwood Boulevard is the only roadway in this study area with a robust sidewalk network. Both Litchfield Place and Fairmount Place have very little sidewalks or none at all. There are no bike lanes or pedestrian crosswalks in this study area.

The following figure shows the estimated 2022 pm peak hour traffic volumes at the study intersection. As shown in the table, the intersection has evenly dispersed volumes on the approaches that are relatively low. Speed data was not available.

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^a Traffic data collected in 2015. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

Recommended Solution:

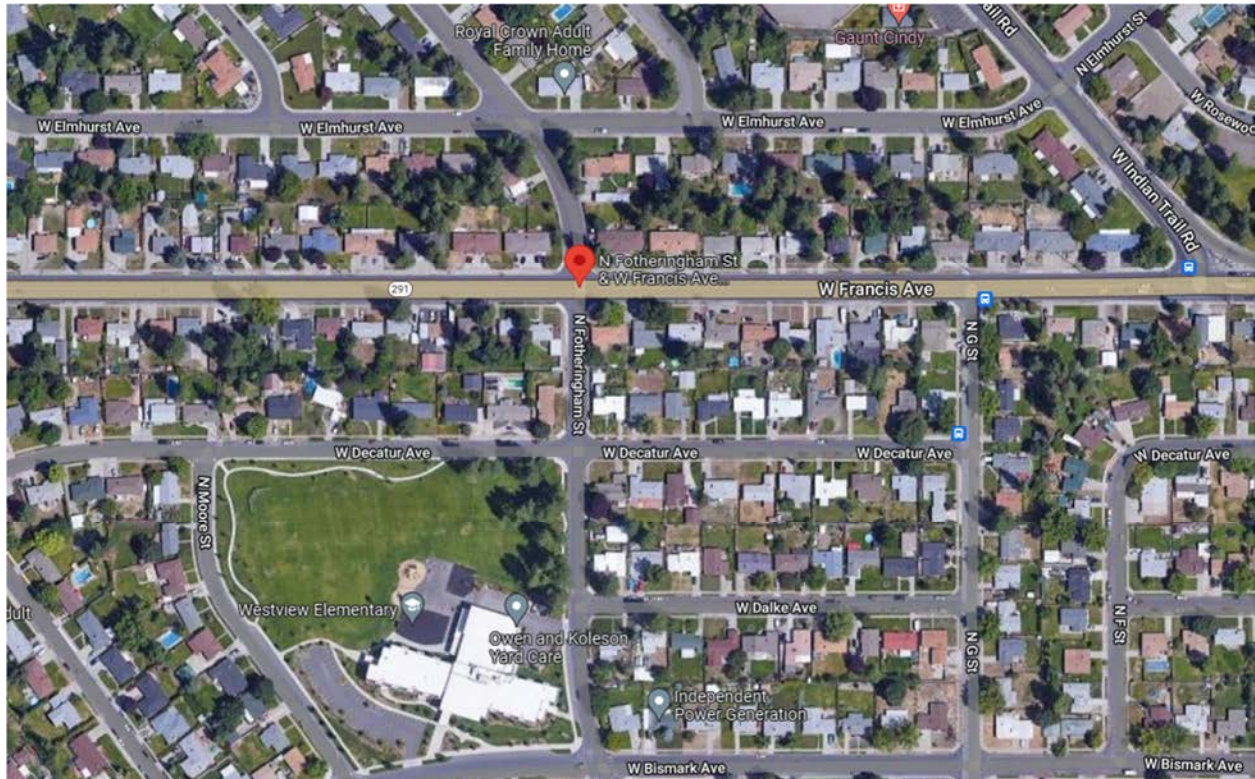
The configuration of the five lane intersection results in confusion for all users traveling through the intersection. Intersection operations and safety would benefit if the intersection was configured as a common four-lane intersection with perpendicular approaches. Both the Fairmont Place and Litchfield Place east leg approaches are candidates for closure at Greenwood Boulevard. Both operate with very low peak hour volume (less than 20 vehicles per hour) at Greenwood Boulevard. The local street system east of the intersection is well connected and provides both Fairmont Place and Litchfield Place alternative routes to redirect traffic.

The closure of the Fairmont Place approach at Greenwood Boulevard is recommended due it's skewed approach to the intersection. Fairmont Place should remain open to pedestrians and cyclists. Vehicle trips on Fairmont Place are low and could reroute to the north to Daisy Avenue. The remaining intersection approaches would be close to a perpendicular four leg intersection.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	Northwest
Project Extent:	Francis Avenue and Fotheringham Street Intersection

Problem Statement: Residents of the Northwest neighborhood raised concerns over the lack of a pedestrian crossing facility at the intersection of Francis Avenue and Fotheringham Street.



Francis Avenue and Fotheringham Street Intersection

Traffic Analysis:

Francis Avenue within the study area is classified as a principal arterial with a posted speed limit of 35 miles per hour and provides two lanes in each direction. Francis Avenue also serves as State Route 291 and is under WSDOT jurisdiction. Fotheringham Street is a local street. Fotheringham Street has one lane in each direction with available on-street parking on either side of the roadway. Fotheringham Street has a posted speed limit of 25 miles per hour and a 20 mile per hour posted school zone speed limit when children are present. The sidewalk network in the study corridor is complete. Bike lanes are not provided in the study corridor. The pedestrian crossing facilities are found only at intersections with Fotheringham Street that are directly adjacent to the school. The intersection of Francis Avenue and Fotheringham Street does not have any pedestrian crossing facilities.

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The table below shows the estimated 2022 daily traffic volumes and 85th percentile speeds on Francis Avenue at the 3500 block, which is the intersection with Fotheringham Street. As shown in the table, the highest daily volume at the intersection was on Francis Avenue with 8,712 west bound vehicles. The highest 85th percentile speed was 42 miles per hour (7 miles per hour greater than the posted speed limit).

2022 Daily Traffic and 85th Percentile Speeds at Francis Avenue and Fotheringham Street Intersection

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day)	85 th Percentile Speed (mph)	Posted Speed (mph)
Francis Avenue ^a				
EB	2	8,394	41	
WB	2	8,712	42	
Both Dir.	4	17,106	N/A	35

^a Traffic data collected in March 2012. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

The need for enhanced pedestrian crossing treatments was analyzed based on NCHRP Report 562. Based on the findings, red treatment (e.g., HAWK signal beacon, midblock pedestrian signal) is the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. Although pedestrian data is not available, it is assumed the 20 or more pedestrian crossing threshold is met due to nearby commercial uses and the surrounding urban neighborhood.

Recommended Solution:

The installation of a HAWK or hybrid beacon pedestrian crossing is recommended on Francis Avenue at Fotheringham Street to serve the crossing demand from nearby commercial uses and the designation as a city Bike Friendly Route. Any improvements on Francis Avenue will require WSDOT approval.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	West Central
Project Extent:	Summit Boulevard, Broadway Avenue, Boone Avenue, Maxwell/Mission Avenue

Problem Statement: Residents of the West Central neighborhood raised concerns over speeding on Summit Boulevard (1.11 miles), Broadway Avenue (1.28 miles), Boone Avenue (1.45 miles), and Maxwell/Mission Avenue (1.35 miles) within the neighborhood (from western terminals to Monroe Street). These are the primary roadways in the neighborhood. Within the study area, Summit Boulevard is classified as an urban minor arterial between Broadway Avenue and Cochran Street with a posted speed limit of 30 miles per hour. The roadway provides two lanes with on-street parking and a multiuse path along the bluff. Broadway Avenue and Boone Avenue are classified as urban major collectors west of Ash Street and urban minor arterials east of Ash Street, all with a posted speed limit of 30 miles per hour. Broadway Avenue provides two lanes with on-street parking west of Chestnut Street and an additional two-way-left-turn lane east of Chestnut Street. Boone Avenue provides two lanes with on-street parking west of Maple Street and four lanes east of Maple Street. Maxwell Avenue is classified as an urban local access street west of Belt Street with speed limit of 25 miles per hour, a minor arterial between Belt Street and Maple Street with a 20 mile per hour speed zone along the Cannon Park frontage and speed limit of 30 miles per hour east of Oak Street, and a major arterial to Monroe Street with speed limit of 30 miles per hour. Maxwell Avenue west of Madison Street and Mission Avenue provides two lanes with on-street parking. Maxwell Avenue east of Madison Street provides four lanes.

Pending Grant Applications

The following improvement projects have pending funding through grants:

- Restripe of Pettet Drive and Maxwell Avenue from West Central Community Center to Walnut. Includes bike lanes, crosswalk improvements. Pathway through the park from Pettet/Belt to the community center.

Traffic Analysis

The following tables show 2022 daily traffic volumes and 85th percentile speeds on the study corridors. The highest daily volume on Summit Boulevard was 511 vehicles north of Webb Place. The highest 85th percentile speed was 32 miles per hour, indicating minor speeding conditions.

2022 Daily Traffic and 85th Percentile Speeds on Summit Boulevard

Direction	# Lanes	2022 Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
North of Webb Place				
NB	1	253	31	
SB	1	258	32	
Both Dir.	2	511	31	30

Spokane Traffic Calming Master Plan

North of Broadway Avenue				
NB	1	159	30	
SB	1	127	29	
Both Dir.	2	286	30	30

^a Traffic data collected in March 2022.

The highest daily volume on Broadway Avenue was 4,177 vehicles west of Adams Street. The 85th percentile speed ranged from 34 to 39 miles per hour. This indicates a moderate to significant speeding condition along the study corridor.

2022 Daily Traffic and 85th Percentile Speeds on Broadway Avenue

Direction	# Lanes	2022 Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
West of Nettleton Street				
EB	1	533	36	
WB	1	585	34	
Both Dir.	2	1,118	35	30
West of Adams Street				
EB	1	2,630	35	
WB	1	1,547	39	
Both Dir.	3	4,177	36	30

^a Traffic data collected in March 2022.

The highest daily volume on Boone Avenue was estimated to be 9,666 vehicles west of Adams Street on the four-lane section. The 85th percentile speeds ranged from 33 to 34 miles per hour, indicating minor speeding condition (4 mph greater than the posted speed limit).

2022 Daily Estimated Traffic and 85th Percentile Speeds on Boone Avenue

Direction	# Lanes	2022 Estimated Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
West of Nettelson Street				
EB	1	1,966		
WB	1	1,908		
Both Dir.	2	3,874	33	30
West of Oak Street				
EB	1	2,875		
WB	1	2,679		
Both Dir.	2	5,553	33	30
West of Adams Street				
EB	2	5,545		
WB	2	4,121		
Both Dir.	4	9,666	34	30

^a Traffic data collected in May 2017. Traffic volumes were grown at a 1.0% annual growth rate, to estimate 2022 traffic conditions.

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The highest daily volume on Maxwell Avenue was 4,355 vehicles east of Elm Street. The highest 85th percentile speed compared to the posted speed was 35 miles per hour occurred on Maxwell Avenue east of Elm Street which indicates a speeding concern (5 mph greater than the posted speed limit). The 85th percentile speed on Mission Avenue was 28 mile per hour, lower than the posted speed limit.

2022 Daily Traffic and 85th Percentile Speeds on Maxwell/Mission Avenue

Direction	# Lanes	2022 Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
Mission Avenue West of Holliston Road				
EB	1	984	28	
WB	1	606	27	
Both Dir.	2	1,590	28	30
Maxwell Avenue East of Elm Street				
EB	1	2,177	35	
WB	1	2,178	35	
Both Dir.	2	4,355	35	30

^a Traffic data collected in March 2022.

The following tables show the severity and types of crashes occurring on Summit Boulevard, Broadway Avenue, Boone Avenue, and Maxwell/Mission Avenue (excluding intersection crashes at the east and west ends). As shown in the table below, there were a total of 6 crashes, including 2 injury crashes, with all related to moving vehicles and stationary objects or vehicle.

Crashes on Summit Boulevard (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Stationary Object or Car	-	-	-	2	4	6
Total	0	0	0	2	4	6

As shown in the table below, there were a total of 39 crashes on Broadway Avenue, including 14 injury crashes. Collisions related to moving vehicles and stationary objects or vehicles were the most common crash type (representing 51% of all crashes).

Crashes on Broadway Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Rear End	-	-	1	1	1	3
Angle	-	-	2	5	3	10
Turning	-	-	-	1	1	2
Sideswipe	-	-	-	-	1	1
Stationary Object or Car	-	-	2	1	17	20
From Same Direction	-	-	-	-	2	2
Pedestrian/Bike	-	-	1	-	-	1
Total	0	0	6	8	25	39

Spokane Traffic Calming Master Plan

As shown in the table below, there were a total of 66 crashes on Boone Avenue, including 23 injury crashes. Angle collisions were the most common crash type (representing 42% of all crashes).

Crashes on Boone Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Rear End	-	-	-	2	10	12
Angle	-	-	2	11	15	28
Turning	-	-	-	1	6	7
Sideswipe	-	-	-	-	1	1
Stationary Object or Car	-	-	1	2	8	11
From Same Direction	-	-	-	1	2	3
Pedestrian/Bike	-	1	-	2	1	4
Total	0	1	3	19	43	66

As shown in the table below, there were a total of 82 crashes on Maxwell/Mission Avenue, including 35 injury crashes. Angle collisions were the most common crash type (representing 41% of all crashes).

Crashes on Maxwell/Mission Avenue (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Rear End	-	-	1	6	4	11
Angle	-	1	6	8	19	34
Turning	-	-	-	2	7	9
Stationary Object or Car	-	-	-	1	15	16
From Same Direction	-	-	-	-	2	2
Pedestrian/Bike	-	5	3	2	-	10
Total	0	6	10	19	47	82

Recommended Solution:

The Chestnut Street and Elm Street Neighborhood Greenway Assessment proposed various crossing improvements at the Broadway Avenue/Chestnut Street, Broadway Avenue/Elm Street, Boone Avenue/Chestnut Street and Boone Avenue/Elm Street intersections to support a north-south greenway through the West Central neighborhood. These treatments were recommended to manage vehicle speeds on Broadway Avenue and Boone Avenue and providing comfortable crossings for pedestrians and cyclists.

Based on available data, speeding appears to be an issue along the study section of Broadway Avenue and Maxwell Avenue. Maxwell/Mission Avenue has an increased crash rate, with several bicycle and pedestrian crashes included. The crashes were dispersed along the corridor without a clear safety deficiency at a specific unsignalized intersection. Boone Avenue has a high crash rate with a significant amount of angle crashes and quite a few pedestrian and bike crashes with major injuries. The crashes

Spokane Traffic Calming Master Plan

were dispersed along the corridor without a clear safety deficiency at a specific unsignalized intersection. An overall corridor treatment is recommended to improve lower speeds. The Chestnut Street and Elm Street Neighborhood Greenway Assessment already recommended greenway crossing improvements on Boone Avenue at Chestnut Street and Elm Street. There is a potential issue with active on-street parking on Boone Avenue near intersections that reduces driver visibility and contributes to angle crashes. The addition of curb extensions on Boone Avenue at Nettleton Street and Lindeke Street would move the stop bar closer to an intersection and increase driver visibility and potentially reduce angle crashes.

The addition of a raised center median on Boone Avenue at select intersections was considered to eliminate left turning conflicts, however this would change travel patterns on local streets within the neighborhood.

Recommended improvements at the Broadway Avenue/Cedar Street intersection are included in a separate West Central neighborhood project.

The installation of curb extensions is recommended on Maxwell Avenue at Elm Street at the existing marked crossing on the west leg of the intersection to narrow the roadway and provide a safer crossing for the adjacent park and aquatic center.

Maxwell Avenue is a two-lane facility west of Elm Street with no on-street parking allowed. The travel lanes are approximately 23 feet wide, much wider than needed which likely encourages speeding. The installation of bike lanes should be considered to connect to the existing bike lanes on Pettet Drive to the west.

The speed limit on Maxwell Avenue-Pettet Drive reduces to 20 miles per hour in front of Cannon Park and the West Central Community Center. It is recommended that a speed feedback sign be added westbound on Maxwell Avenue (east of Elm Street) to alert drivers to the reduced speed limit.

Spokane Traffic Calming Master Plan

District:	3
Neighborhood:	Western Central
Project Extent:	Broadway Avenue Intersections at Chestnut Street and Elm Street

Problem Statement: Residents of the Western Central neighborhood raised concerns over pedestrian crossing safety at the Broadway Avenue intersections at Chestnut Street and Elm Street. Broadway Avenue within the study area is classified as a collector with speed limit of 30 miles per hour. The roadway contains two lanes with two-way-left-turn lane and on-street parking. Both Chestnut Street and Elm Street are classified as local streets with a posted speed limit of 25 miles per hour. As shown in the figure below, there is a striped crosswalk at the Broadway Avenue/Chestnut Street intersection and Dutch Jake’s Park is located on the southwest corner.



Broadway Avenue Intersections at Chestnut Street (Left) and Elm Street (Right)

Traffic Analysis

The table below shows daily traffic volumes and 85th percentile vehicle speeds on Broadway Avenue west of Elm Street. There are about 1,919 vehicles per day with a 85th percentile speed of 33 miles per hour, indicating no significant speeding.

2022 Daily Traffic and 85th Percentile Speeds on Broadway Avenue

Direction	# Lanes	2022 Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
West of Elm Street				
EB	1	870	33	
WB	1	1,049	32	
Both Dir.	2	1,919	33	30

^a Traffic data collected in November 2022.

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The table below shows the severity and types of crashes occurring at the Broadway Avenue study intersections from 2017 through 2021. There were four total crashes, one rear-end collision at Chestnut Street and three angle collisions at Elm Street. The data does not indicate there is a concern at the study intersections.

Crashes at Broadway Avenue Study Intersections (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Chestnut Street/Broadway Avenue						
Rear End	-	-	-	1	-	1
Elm Street/Broadway Avenue						
Angle	-	-	1	-	2	3

The need for enhanced pedestrian crossing treatments across Broadway Avenue was analyzed based on the National Cooperative Highway Research Program (NCHRP) Report 562.¹ This report uses four main criteria to identify appropriate crossing treatment: peak hour pedestrian volumes, conflicting vehicle volumes, conflicting vehicle speed, and crossing distance/number of travel lanes to be crossed. Based on the findings, marked crosswalks at both intersections are the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. Although pedestrian data is not available, it is assumed the 20 or more pedestrian crossing threshold is met due to the surrounding urban neighborhood and commercial destinations on Broadway Avenue.

Recommended Solution:

The existing marked crosswalk on Broadway Avenue at Chestnut Street appears to be newly constructed with new striping and ramps at each corner. The installation of curb extensions should be considered to narrow the crossing distance for pedestrians and reduce vehicle speeds. Curb extensions are expected to decrease the 85th percentile speed by 3 miles per hour.²

At the Broadway Avenue/Elm Street intersection, the installation of a marked crosswalk with a protected median and curb extensions is recommended on the west side of the intersection.

¹ NCHRP Report 562: *Improving Pedestrian Safety and Unsignalized Crossings*. National Cooperative Highway Research Program, 2006. <https://nacto.org/wp-content/uploads/2010/08/NCHRP-562-Improving-Pedestrian-Safety-at-Unsignalized-Crossings.pdf>

² Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed. Federal Highway Administration. July 2014.

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District:	3
Neighborhood:	West Central
Project Extent:	Broadway Avenue from Spokane County Courthouse to Maple Street

Problem Statement: Residents of the West Central neighborhood raised concerns about the pedestrian network on Broadway Avenue from Spokane County Courthouse to Maple Street (0.26 miles) and where crossing enhancements are needed. Broadway Avenue within the study area is classified as minor arterial with a speed limit of 30 miles per hour. The roadway provides on-street parking, four lanes and a two-way-left-turn lane. The sidewalk network in the study corridor is predominately complete but is not consistent, with the mix of curb tight, separated, and narrow sidewalks.

Traffic Analysis

The daily volume on Broadway Avenue was 4,177 vehicles west of Adams Street. The 85th percentile speed ranged from 34 to 39 miles per hour. This indicates a moderate to significant speeding condition along the study corridor.

2022 Daily Traffic and 85th Percentile Speeds on Broadway Avenue

Direction	# Lanes	2022 Daily Traffic (Vehicles per day) ^a	85 th Percentile Speed (mph)	Posted Speed (mph)
West of Adams Street				
EB	1	2,630	35	
WB	1	1,547	39	
Both Dir.	3	4,177	36	30

^a Traffic data collected in March 2022.

The table below shows the severity and types of crashes occurring on Broadway Avenue from Spokane Courthouse to Maple Street over the last five years (excluding intersection crashes at the east and west ends). There was a total of 10 crashes, with 6 injury crashes. Angle crashes were the most common, representing 40 percent of all crashes. One crash was related to pedestrian and caused minor injury.

Crashes on Northwest Boulevard, between Cochran Street and Monroe Street (2017 to 2021)

Crash Type	Crash Severity					Total
	Fatal	Major Injury	Minor Injury	Possible Injury	Property Damage Only	
Angle	-	-	-	3	1	4
Turning	-	-	-	1	1	2
Stationary Object or Car	-	-	1	-	2	3
Pedestrian/Bike	-	-	1	-	-	1
Total	0	0	2	4	4	10

Spokane Traffic Calming Master Plan

The need for enhanced pedestrian crossing treatments was analyzed based on NCHRP Report 562. Based on the findings, marked crosswalks are the preferred treatment if there are 20 or more pedestrian crossings during the peak hour. Although pedestrian data is not available, it is assumed the 20 or more pedestrian crossing threshold is met do the surrounding urban neighborhood and commercial destinations on Broadway Avenue.

Recommended Solution:

The installation of curb extensions and marked pedestrian crossings is recommended on Broadway Avenue at Cedar Street (both east and west crossings) to narrow the roadway and provide a safer crossing for the adjacent transit stops. Curb extensions are expected to decrease the 85th percentile speed by 3 miles per hour.¹ Cedar Street was selected due to its location two blocks west of the Broadway Avenue/Jefferson Street signal and three blocks east of the Ash Street signal. Cedar Street also connects the residential area to the north to Kendall Yards and the Centennial Trail to the south.

¹ Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed. Federal Highway Administration. July 2014.