Puyallup Comprehensive Plan
Final Environmental Impact Statement

Appendix A
Transportation Analysis Support Documentation

February 2025

Appendix A: Transportation Analysis Support Documentation

1. Travel Demand Model Memorandum, May 2024
2. Traffic Operations Analysis Memorandum, June 2024
3. City of Puyallup Existing Conditions Memorandum, June 2024

FEHR PEERS

Memorandum

Date: May 2024

To: City of Puyallup

From: Steven Goodsell, Marissa Milam - Fehr & Peers

Subject: Puyallup Comprehensive Plan – Model Development and Validation

TC23-0070

As part of the process to update the City of Puyallup's Comprehensive Plan update, Fehr & Peers developed a customized travel demand forecasting (TDF) model for the City. The City's model was developed based on edits to the South Pierce Multimodal Connectivity Study (SPMCS) model. This technical memorandum describes how the base year scenario of the model was updated to 2023 conditions, how the model was customized for the City of Puyallup, and how the model was calibrated and validated to reflect local and regional travel within the City. The development of the future year scenario is discussed at the end of the memo including the assumptions related to land use growth and assumed transportation improvement projects.

Model Development

The SPMCS model used as the basis for the City of Puyallup TDF was originally developed from the SR 167 Master Plan work, and was customized to include more detail within the south Pierce County area and less detail in the surrounding area. Reducing the amount of detail outside the area decreases both the model run-time and the file sizes associated with the model. This section describes the structural changes to the PSRC model for the SR 167 Master Plan and SPMCS project, as well as the changes necessary to update the base year of the Puyallup model from 2019 to 2023 conditions.

Regional Model Updates for SR 167 Master Plan

The PSRC regional model is a traditional four-step travel demand forecasting model that uses land use estimates (people, households, jobs, and students) to generate person trip activity across four counties. The geographic extent of the model includes King, Snohomish, Pierce, and Kitsap Counties. The model produces estimates of person trips across several modes (automobile, transit, walk, bike, and freight) and for five time periods (AM, midday, PM, evening, and nighttime). The land use information and person trips are aggregated into traffic analysis zones

(TAZ) across the four counties. The base year scenario was validated to 2014 conditions and the future scenario represents 2040 conditions. The PSRC model is run using INRO's Emme software.

The SR 167 Master Plan included the following updates to bring the model to a 2019 base year:

- Modifications to the toll-portion of the model to ensure appropriate usage of toll lanes on SR 167 and I-405
- Replaced trip generation with PSRC 4k v4.1.0, which is consistent with Soundcast
- Reconfigured the zone system to align with the 4k TAZ system in the general study area of King and Pierce counties, and aggregated TAZs further away in Kitsap and Snohomish counties
- Interpolated PSRC 4k land use, trip rates, costs, and tolls from 2014 to 2019 inputs
- Network edits for construction transportation infrastructure projects between 2014 and 2019

TAZ Updates for the SPMCS project

The SR 167 Master Plan model did not have enough zonal detail to provide accurate loading onto the roadway network within the SPMCS study area. To add more detail, some of the PSRC 4k TAZs were disaggregated to provide more detail in and around the study area, including zone splits within the City of Puyallup. Disaggregation was coordinated with the modeling team at Pierce County. The splits improved vehicle assignment within the study area and helped to distribute future land use growth at a more granular level than the original 4k zones. See **Figure 1** for the edits to the SR 167 Master Plan TAZs for the SPMCS model.

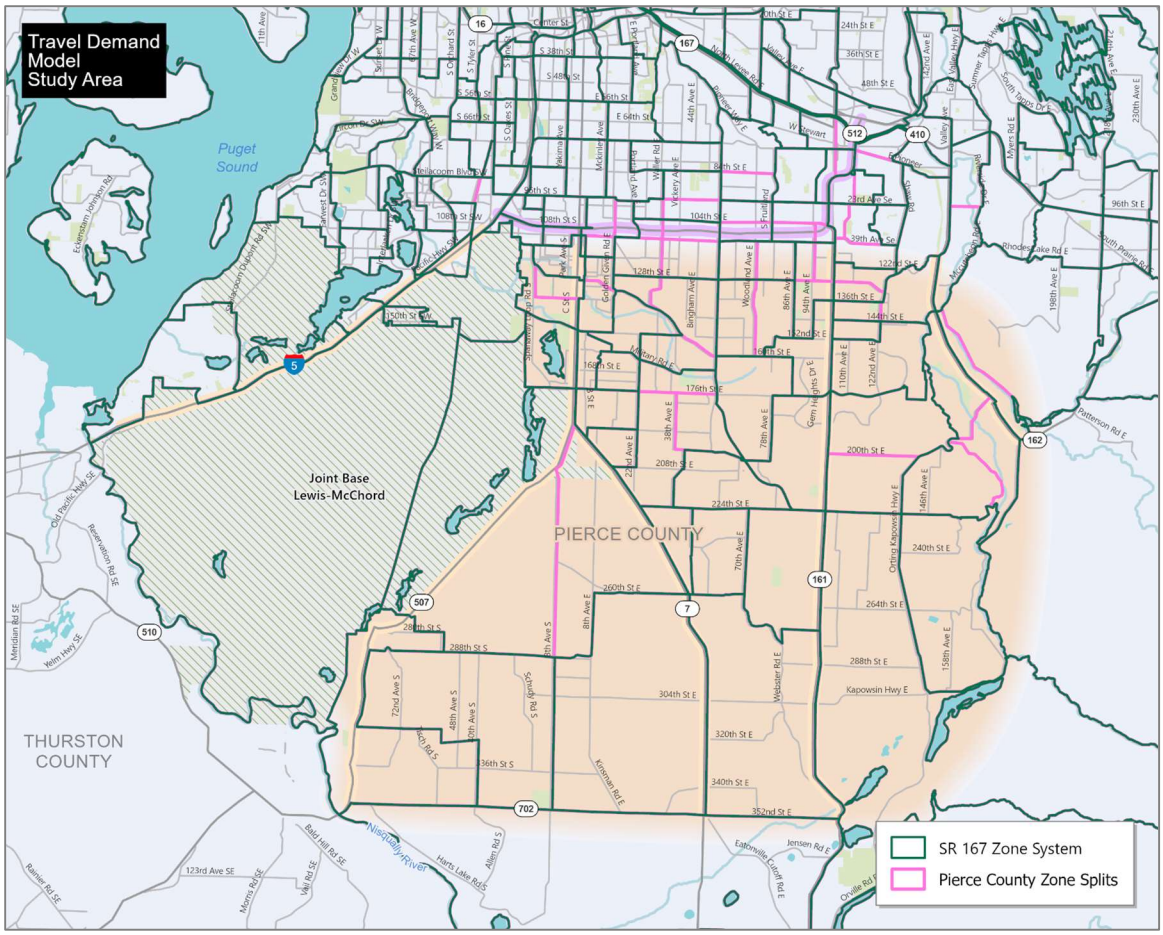


Figure 1: South Pierce Multimodal Connectivity Study TAZ splits.

Those edits were retained for the model customized for the City of Puyallup. Nine additional TAZs were created within the city limits, primarily along Meridian.

City of Puyallup Base Year Update

The base year of the Puyallup model was updated from 2019 conditions to 2023 conditions by interpolating the necessary inputs between the 2019 and 2050 scenarios used in the SPMCS project, and incorporating transportation network improvement projects that occurred within and around the City since 2019.

The following model inputs were linearly interpolated between 2019 and 2050 because the values change between the base and future year scenarios:

- Land use (population, households, jobs, and student enrollment)
- Special generator trips (SeaTac airport, Port Facilities, JBLM, Seattle Center, and stadiums)
- External gateway trips

- Transit and ferry fares
- Parking costs

Inputs that don't need to be interpolated for a new model year include trip generation rates, trip distribution parameters, mode choice coefficients, time of day constants, roadway tolls, auto operating costs, values of time, or TAZ access variables.

The land use inputs were interpolated for each TAZ. **Table 1** shows a summary of the 2019 and 2023 land use inputs for the entire PSRC model area and the City of Puyallup specifically.

Table 1: Interpolated Land Use Inputs

Land Use	2019	2023	Percent Increase
Region			
Households	1,639,892	1,741,000	6%
Jobs (Employees)	2,213,215	2,335,000	6%
Students	830,276	849,000	2%
City of Puyallup TAZs			
Households	26,600	28,800	8%
Jobs (Employees)	32,200	34,600	8%
Students	16,000	16,500	3%

Source: Fehr & Peers, 2024.

While the land use totals were updated for each TAZ in the model, the underlying distributions which further stratify the residential and commercial land uses were not updated. This assumes that no TAZs experienced a complete redevelopment since 2019 which would have dramatically altered the underlying assumptions.

The roadway network within and around the City of Puyallup was updated to more accurately model travel along collectors and arterials. Network changes were incorporated to reflect projects that had occurred between 2019 and 2023.

Within the City, the speed limit, number of lanes, and capacity on each roadway in the model was also reviewed and updated to match the existing configuration. Turning restrictions at the freeway interchanges within the City were verified as well. The transit service (routes and headways) was also reviewed and updated as necessary.

Calibration and Validation

Model validation describes a model's performance in terms of how closely the model's output matches existing travel data in the base year. Calibration is the process of adjusting the model's inputs to achieve the desired validation.

Traditionally, most model validation guidelines have focused on the performance of the trip assignment function in accurately assigning trips to the street network. This metric is called static validation, and it remains the most common means of measuring model accuracy. Models are seldom used for static applications, however. By far the most common use of travel demand models is to forecast how a change in the transportation network or land use variables (e.g., a new street, a speed limit change, or a new development) result in a change in traffic conditions. Therefore, another test of a model's accuracy focuses on the model's ability to predict reasonable differences in outputs (e.g., traffic volumes on given streets) as transportation and/or land use inputs are changed. This method is referred to as dynamic validation.

The model calibration and validation results are presented in this section for the City of Puyallup model. Since there are not established validation criteria for travel demand forecasting models in Washington State, the criteria are taken from the *2010 California Regional Transportation Plan Guidelines* (California Transportation Commission, 2010) which incorporated relevant guidance from *Travel Forecasting Guidelines* (Caltrans, 1992) and *Model Validation and Reasonableness Checking Manual* (Travel Model Improvement Program, FHWA, 1997).

Static Validation

The most critical static measurement of the accuracy of any travel model is the degree to which it can approximate actual traffic counts for the base year. The validity of the City of Puyallup model was evaluated for PM peak period (3-6PM) conditions. Volume estimates from the model were examined and where these differed substantially from the observed counts those roadways were reviewed to ensure that the attributes reflected local operating conditions.

Since it would be impossible for any model to replicate all counts precisely, the following static validation guidelines are used to evaluate the City of Puyallup model. These requirements are adapted from the resources cited above.

- At least 75 percent of the roadway links for which counts are available should be within the maximum desirable deviation, which ranges from 15 percent to 60 percent (the larger the volume, the less deviation permitted)
- All the roadway screenlines should be within the maximum desirable deviation, which ranges from 15 percent to 64 percent
- The two-way sum of the volumes on all roadway links for which counts are available should be within 10 percent of the count volume

- The correlation coefficient between the volumes on all roadway links for which counts are available and the observed counts should be greater than 0.88
- The percent root mean square error (RMSE) should be less than 40 percent

Figure 2 shows the maximum desirable deviation for count location and screenlines based on the observed daily traffic volume. Model volumes were compared to existing traffic counts at 62 locations on arterials and collectors within the City, three of which were on SR 512. Nine screenlines were also drawn using the count locations. Screenlines are imaginary boundaries drawn across the street network to determine whether the model's depiction of volumes moving across the City are consistent with the observed volumes. The screenlines extend across the entire City but do not include SR 512 and SR 167 since the volumes on these facilities are so much larger than on the arterial network. The approximate locations of the screenlines are:

- North of E Pioneer (east-west)
- South of 9th Avenue (east-west)
- North of 23rd Avenue (east-west)
- South of 31st Avenue (east-west)
- South of 39th Avenue (east-west)
- East of Fruitland Avenue (north-south)
- West of 11th Street (north-south)
- East of Meridian (north-south)
- West of Shaw Road (north-south)

The correlation coefficient estimates the overall level of accuracy between observed traffic counts and the estimated traffic volumes from the model. The coefficient ranges from 0 to 1, where 1.0 indicates that the model perfectly fits the data. The percent root mean square error (RMSE) is the average of all the link-by-link percent differences, and it is an indicator on how far the model volumes are from the counts expressed as a percent. It is a measure similar to standard deviation in that it assesses the accuracy of the entire model.

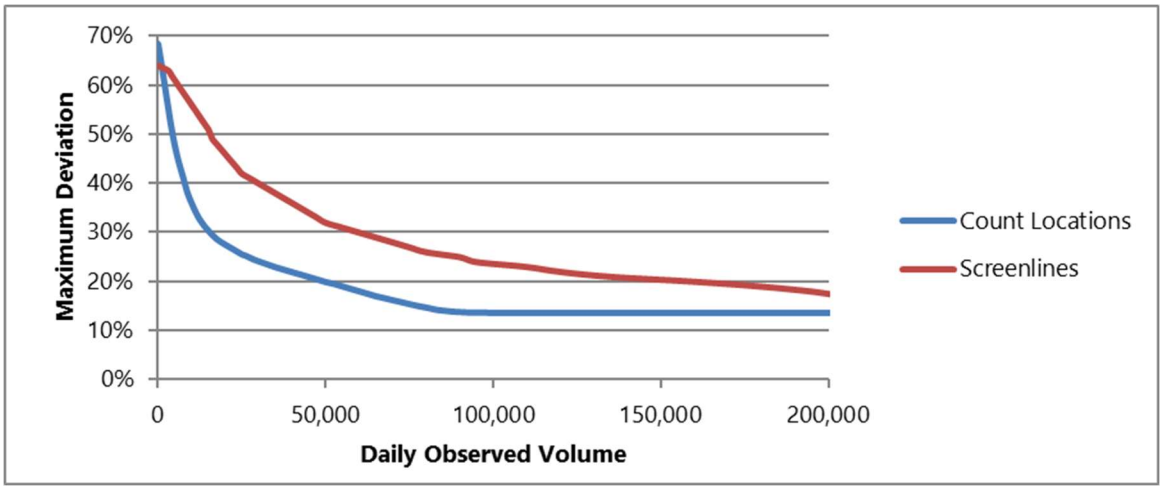


Figure 2: Maximum allowable deviation.

Static validation statistics were computed for the three assignment periods mentioned previously. The results are shown below in **Table 2**.

Table 2: Static Validation Results

Validation Metric	*Criteria*	3-6PM
Total deviation at all count locations	*+/- 10%*	-3%
Count locations within deviation criteria	*> 75%*	85%
Root mean square error (RMSE) for all locations	*< 40 %*	16%
Correlation coefficient (R) for all locations	*> 0.88*	0.97
Screenlines within deviation criteria	*100%*	100%

Source: Fehr & Peers, 2024.

The PM assignment passes all validation criteria. The locations that do not meet the validation criteria are evenly distributed across the City and do not suggest that specific areas of the model are under-performing relative to the entire City. In order to further improve the model validation, more substantial changes to the PSRC model framework would be required, which could include updating the mode choice model parameters (which affects how many vehicle trips are generated) or the time of day model (which determines when vehicle trips are assigned to the network). These steps would require significantly more effort and would only provide marginal benefit to the overall model performance. Based on the results presented, the model is considered to be statically validated for the PM time period.

2044 Scenario

The future year model scenario was developed based on the adopted 2044 LUV-it scenario provided by PSRC. Except where noted, the City of Puyallup model is consistent with the assumptions from PSRC. All network changes included in the base year model were applied to the future year model as well. This section describes how the assumptions related to land use, transportation improvement projects, and travel costs.

Land Use

The land use assumptions within the City of Puyallup were developed by the City and MIG. The household and employment assumptions within the City of Puyallup by subarea are summarized in **Table 3**. The table shows the total households and jobs forecasted for each alternative.

Table 3: City of Puyallup 2044 Land Use Forecasts

Subarea	*No Action*	*Alternative 2*	*Alternative 3*
Households			
Downtown RGC	1,510	2,310	2,070
Fairground Mixed Use	160	170	980
Medical Mixed Use	20	30	480
Meridian Corridor	60	300	250
Pioneer Mixed Use	70	470	540
River Road Mixed Use	70	560	420
Shaw Road Mixed Use	30	30	510
South Hill RGC	2,940	7,230	5,730
South River Employment	-	-	30
Southwest Node	30	30	330
Stewart Nodes	30	40	240
W Pioneer Nodes	20	20	110
All Other Areas	1,750	1,750	1,750
Middle Housing Development (vacant and underutilized)		190	240
Middle Housing Infill/Redevelopment (developed)	-	270	450
Total Households	**6,690**	**13,420**	**14,210**
Jobs			
Downtown RGC	1,830	3,040	2,700
Fairground Mixed Use	220	220	1,150
Medical Mixed Use	720	720	5,360
Meridian Corridor	-	340	100
Pioneer Mixed Use	310	960	470
River Road Mixed Use	850	960	720
Shaw Road Mixed Use	10	10	310
South Hill RGC	3,320	9,160	5,300
South River Employment	170	170	340
Southwest Node	-	-	340
Stewart Nodes	10	10	250
W Pioneer Nodes	10	10	40
All Other Areas	1,440	1,440	1,440
Total Jobs	**8,880**	**17,020**	**18,520**

Source: MIG, 2024.

The updated household and employee totals by TAZ were used to override the values in the PSRC forecast. The underlying cross-classification demographic data for households, population, and jobs are consistent with the 2044 PSRC assumptions. All other land use data (school and university enrollment, general quarters population, and military trips) were taken directly from the PSRC model. Outside of the City of Puyallup, all land use assumptions are consistent with PSRC.

Transportation Networks

Transportation improvement projects assumed to be completed by 2044 were included in the Puyallup model, including projects within a neighboring City, or a major regional project in King or Pierce County. All projects in the PSRC model that met these criteria were included. For projects within the City of Puyallup, the City provided a specific list of improvement projects to assume. The following projects were assumed in the future scenarios in addition to the regional projects already included in PSRC's regional model based on the Regional Transportation Plan (RTP).

- Shaw Road Widening (City of Puyallup)
- 9th St SW Widening from 15th Ave SW to 31st Ave SW (City of Puyallup)
- Canyon Road North Extension (Pierce County)

The parking capacity at Park and Rides across the region was increased based on the assumptions in the PSRC model.

Travel Costs

The travel costs in the model include roadway tolls, vehicle operating costs, transit fares, ferry fares, parking charges, and park and ride costs. Transit fares, ferry fares, and parking charges are all forecasted to increase higher than inflation in the PSRC model and these increases are incorporated into the City of Puyallup model. In addition to the cost increases, PSRC also assumes that most business districts across the region will have parking charges by 2044. The hourly and daily parking costs for the City of Puyallup downtown are approximately $3.80 and $13.35, respectively.

Forecast Results

This section describes the citywide travel model results from the 2044 No Action scenario as well as the methodology for developing the PM peak hour intersection forecasts. **Table 4** shows the total PM period (3-6pm) vehicle miles traveled (VMT) and vehicle trips within the City of Puyallup for the 2023 and 2044 No Action scenarios.

Table 4: City of Puyallup Estimated PM Period VMT and Vehicle Trips

Metric	2023	2044 No Action	*Absolute Growth*	*Percent Growth*
Vehicle Miles Traveled	249,700	294,900	*45,200*	*18%*
Vehicle Trips	25,200	32,400	*7,200*	*29%*
VMT Per Capita	3.9	3.4	*-0.5*	*-13%*
Average Trip Length (miles)	9.9	9.1	*-0.8*	*-8%*

Source: Fehr & Peers, 2024.

The model shows 7,000 new trips generated by 2044, an 18 percent increase over 2023 conditions. The overall percent growth in person trips is less than the percent increase in households and employment (approximately 35 percent) due to assumed changes in the underlying household demographics (older/smaller households) that result in lower average trip generation rates. These changes are consistent with the PSRC land use forecasts for the City of Puyallup.

The PM peak hour intersection forecasts were developed using the methods described in NHCRP 255. The primary methodology was the difference method which applies the difference in a turning movement volume between the base and future model scenario to the observed traffic volume. The three-hour volume estimates from the City's model are converted to peak hour volumes with a conversion factor of 0.365, a commonly used factor for the PSRC model based on observed multi-hour traffic counts.

Intersection forecasts for the City's TMP were prepared at 40 study intersections. After applying the difference method for all intersections, the individual turning movements were reviewed at each intersection and adjusted if necessary. The most common adjustments were at intersections with driveways or minor streets that are not captured in the model. For these low-volume locations, the existing traffic counts were rounded up to the nearest ten vehicles. At a limited number of locations, the forecasts were increased to show positive growth from 2023 conditions where negative growth was not deemed reasonable. On average, the increase in intersection volumes between 2023 and 2044 No Action conditions is 14 percent.

The project team will be using this model, combined with a robust arsenal of multimodal performance metrics, to evaluate a large list of capital needs and recommend a set of capital investments that seek to provide a complete, functional, and safe transportation system in Puyallup in the coming decades.

FEHR PEERS

Memorandum

Date: June 11, 2024

To: City of Puyallup

From: Zahra Khan, Steven Goodsell, and Daniel Dye, Fehr & Peers

Subject: Traffic Operations Analysis Memo

TC21-0017

Introduction

This memo describes and reports the results of the traffic operations analysis carried out to support the City of Puyallup's 2024 Comprehensive Plan Update. Traffic operations were evaluated for 2023, representing existing conditions, and 2044, representing the horizon year. For the horizon year, or future conditions, three alternatives with different land use scenarios were assessed.

Traffic operations were assessed at 40 intersections throughout the city, both signalized and unsignalized. These intersections are situated along critical junctions and corridors and were selected in consultation with the City. Of the 40 study intersections, 24 were also evaluated for the last Comprehensive Plan (adopted 2015). All study intersections are shown in **Figure 1** and are listed below:

1. Freeman Road E & Valley Avenue E
2. 11th Street NW & River Road
3. 7th Street NW & River Road
4. 4th Street NW & River Road
5. River Road & Fred Meyer Access
6. N Meridian & River Road/2nd Street NE
7. S Fruitland & Pioneer Way E/W Pioneer
8. S Fruitland & WSU Driveway/7th Avenue SW
9. 5th Street NW/4th Street NW & W Stewart Street
10. 5th Street SW & W Pioneer
11. 5th Street SW & 7th Avenue SW
12. N Meridian & W Stewart Street/E Stewart Street

13. 2nd Street NE & E Stewart Street/E Main
14. S Meridian & W Pioneer/E Pioneer
15. 3rd Street SE & E Pioneer
16. S Meridian & 9th Avenue SW/9th Avenue SE
17. 5th Street NE & 5th Avenue NE
18. 5th Street SE/5th Street NE & E Main
19. 5th Street SE & E Pioneer
20. Shaw Road E & E Main
21. E Main & 5th Avenue NE
22. Shaw Road & E Pioneer
23. 9th Street SW/Fairview Dr & 15th Avenue SW
24. S Meridian & SR 512 EB Ramps
25. S Meridian & 15th Avenue SW/15th Avenue SE
26. 7th Street SE & 23rd Avenue SE
27. Shaw Road & 23rd Avenue SE
28. Fruitland Avenue & 104th Street E/31st Avenue SW
29. 9th Street SW & 31st Avenue SW
30. 9th Street SW & SR 512 WB on ramp/SR 512 on ramp
31. 9th Street SW & SR 512 EB off ramp/SR 512 off ramp
32. 9th Street SW & 39th Avenue SW
33. 31Street Avenue SW & S Meridian
34. S Meridian & 35th Avenue SE
35. S Meridian & 37th Avenue SE
36. S Meridian & 39th Avenue SW/39th Avenue SE
37. 5th Street SE & 31st Avenue SE
38. 5th Street SE & 37th Avenue SE
39. 5th Street SE & 43rd Avenue SE
40. Shaw Road E/Shaw Road & 39th Avenue SE

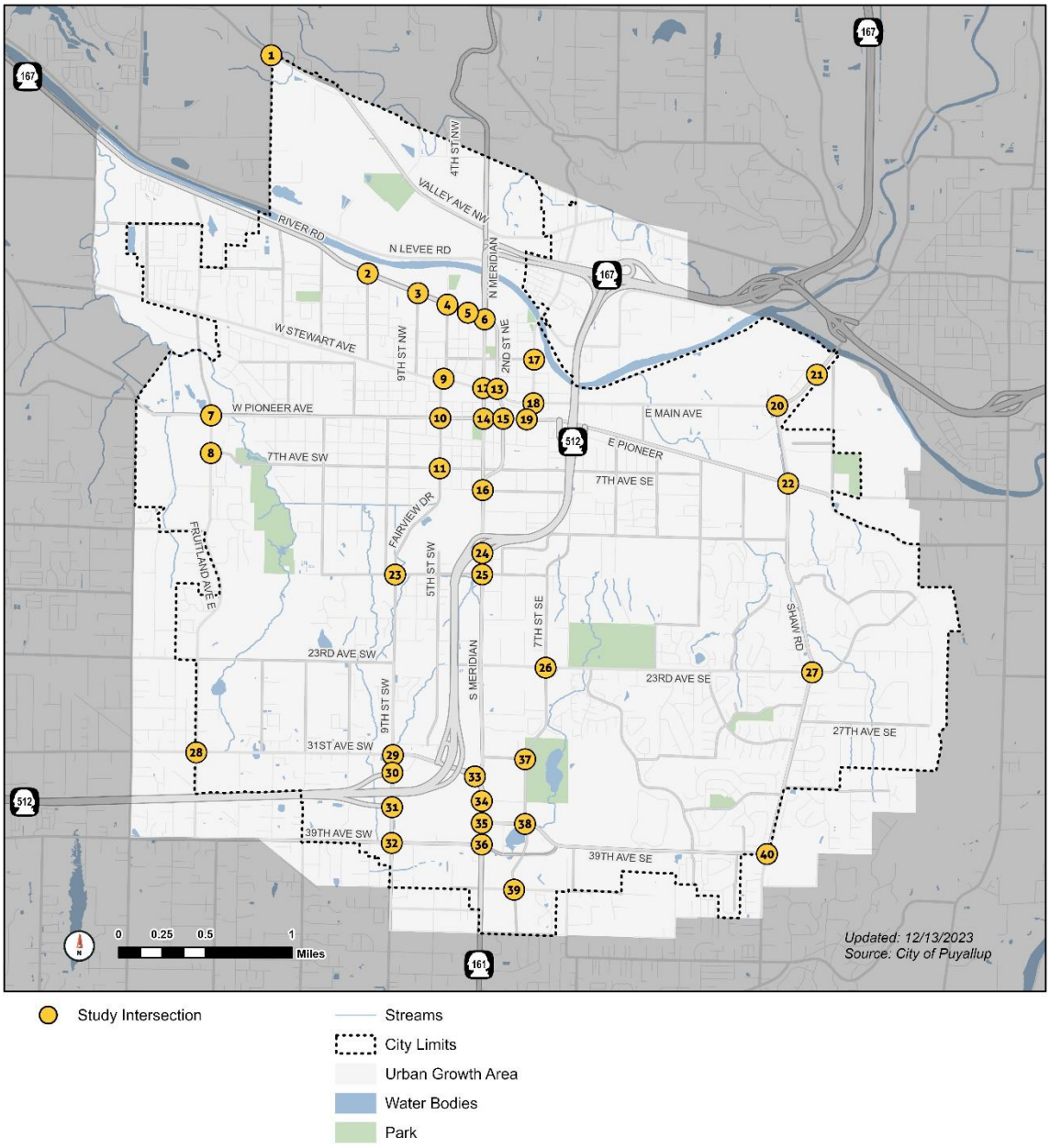


Figure 1: Study Intersections

Source: Fehr & Peers, 2024

Data Collection

Turning Movement Counts

Turning movement counts for the existing conditions analysis were collected for 20 intersections on June 21, 2023, as part of a different study led by the City. Due to lower than typical volumes on this day, adjustments were made to these counts based on signal detection data and engineering judgement. The intersections for which counts were collected are 9-16, 18, 19, 23-26, 29, 33, and 35-38. Pedestrian, bicycle, and heavy vehicle counts were also collected during this period.

StreetLight Data

StreetLight Data was used to obtain turning movement volumes for the remaining intersections. StreetLight Data is an online platform that retrieves and processes anonymized Connected Vehicle Data (CVD) to estimate turning movement volumes at intersections. StreetLight Data allows users to select date ranges, days of week, and hours of day, and produces outputs based on an aggregation and expansion of all CVD trips available in that range. It does not provide turning movement counts for a specific date and time but may be representative of the typical traffic behavior within the above parameters.

Data was aggregated for a period from March 1 to May 31, 2023, Tuesdays through Thursdays, 4 to 5 PM. Although turning movement counts were collected in June 2023, the month was excluded from the StreetLight Data download because of lower than typical volumes, potentially related to the end of the school year.

Methodology

Delay and Level of Service

Intersection-level delay (measured in seconds per vehicle) and level of service (LOS) are the primary measures of effectiveness for the traffic operations analysis.

The *Highway Capacity Manual* (HCM) defines delay as "delay brought about by the presence of a traffic control device including delay associated with vehicles slowing in advance of an intersection, the time spent stopped on an intersection approach, the time spent as vehicles move up in the queue, and the time needed for vehicles to accelerate to their desired speed." Signalized and all-way stop controlled (AWSC) intersection delay is an average of delay experienced across all movements, weighted by volume. For two-way stop controlled (TWSC) intersections, delay from the worst performing movement is reported.

LOS is a term that qualitatively describes the operating performance of an intersection, and is a standard method for characterizing delay at an intersection. For signalized and AWSC intersections, the LOS is based on the average delay for all approaches. For TWSC intersections,

the movement with the highest delay is used. LOS is reported on a scale from A to F, with A representing the lowest delays and F the highest. **Table 1** provides a brief description of each LOS letter designation and the intersection delay range associated with each one, based on the HCM, 6th Edition.

Table 1: Level of service descriptions

LOS	Description
A	Free-flowing conditions.
B	Stable operating conditions.
C	Stable operating conditions, but individual motorists are affected by interaction with others.
D	High density of motorists, but stable flow.
E	Near-capacity operations, with significant delay and low speeds.
F	Over capacity, with excessive delays and forced, unpredictable flows.

Source: Fehr & Peers descriptions, based on *Highway Capacity Manual, 6th Edition*.

For the purpose of this analysis, both delay and LOS will be reported for all intersections. Each intersection has a LOS standard that it must comply with. Existing policies in the City of Puyallup set the following standards:

- LOS E on Meridian, Shaw Road and 9th Street SW
- LOS D for all other intersections

Operations Analysis

The project team utilized Synchro 11 to analyze traffic operations for all 40 study intersections during the PM Peak Hour (4 PM to 5 PM). The analysis was carried out for four scenarios: existing conditions, Alternative 1 (no action), Alternative 2 and Alternative 3. All intersections were assessed for delay and LOS using the HCM 6th Edition methodology.

The consultant team received existing signal timing files from the City, and these were coded into the operations model as received for existing conditions. For all future alternatives, signal timing was optimized for the volume forecasts.

For the operations analysis, the peak hour factor (PHF) was calculated using data from the 20 intersections where counts were available. The PHF measures variation of traffic demand and is the ratio of the average 15-minute count to the maximum 15-minute count in the peak hour. It is always less than 1, and a high PHF represents traffic flow that is evenly distributed between the four 15-minute segments that make up an hour. A low PHF represents traffic that is significantly higher in the busiest 15 minutes than it is during the remaining hour. For this analysis, 15-minute counts were summed for the 20 intersections, and the PHF was calculated using these sums. The

PHF value, 0.96, was then applied to all intersections. This high PHF reflects that afternoon congestion likely spreads trips across the peak hour more evenly than in areas with less congestion.

Conflicting pedestrian volumes were determined using counts, where available. Conflicting pedestrian volumes were assumed to be 5 per hour for any movements where counts were not available, or where counts were less than 5 pedestrians per hour.

Heavy vehicle volumes were used to determine intersection-specific heavy vehicle percentages where counts were available. For all other intersections, a heavy vehicle percentage of 2% was used.

Existing Conditions

Results from the existing traffic operations analysis for existing conditions are shown in **Table 2** and **Figure 2**.

Table 2: Existing Conditions Intersection Delay and Level of Service

#	Intersection Name	Control	Data Source	LOS Standard	LOS	Delay (s/veh)
1	Freeman Road E & Valley Avenue E	Signal	StreetLight	D	C	23
2	11th Street NW & River Road	Signal	StreetLight	D	B	18
3	7th Street NW & River Road	Signal	StreetLight	D	B	13
4	4th Street NW & River Road	Signal	StreetLight	D	A	6
5	River Road & Fred Meyer Access	Signal	StreetLight	D	B	12
6	N Meridian & River Road-/2nd Street NE	Signal	StreetLight	E	D	54
7	S Fruitland & W Pioneer	Signal	StreetLight	D	B	16
8	**S Fruitland & WSU Driveway/7th Avenue SW**	**TWSC**	**StreetLight**	**D**	**F**	**>180**
9	**5th Street NW/4th Street NW & W Stewart Street**	**Signal**	**Counts**	**D**	**E**	**71**
10	5th Street SW & W Pioneer	Signal	Counts	D	D	40
11	5th Street SW & 7th Avenue SW	Signal	Counts	D	C	30
12	**N Meridian & W Stewart Street/E Stewart Street**	**Signal**	**Counts**	**E**	**F**	**91**
13	2nd Street NE & E Stewart Street/E Main	Signal	Counts	D	C	26
14	S Meridian & W Pioneer/E Pioneer	Signal	Counts	E	E	63

#	Intersection Name	Control	Data Source	LOS Standard	LOS	Delay (s/veh)
15	3rd Street SE & E Pioneer	Signal	Counts	D	D	36
16	S Meridian & 9th Avenue SW/9th Avenue SE	Signal	Counts	E	E	60
17	5th Street NE & 5th Avenue NE	TWSC	StreetLight	D	D	31
18	5th Street SE/5th Street NE & E Main	Signal	Counts	D	D	42
19	5th Street SE & E Pioneer	Signal	Counts	D	C	34
20	Shaw Road E & E Main	Signal	StreetLight	E	D	39
21	**E Main & 5th Avenue NE**	**TWSC**	**StreetLight**	**D**	**F**	**61**
22	Shaw Road & E Pioneer	Signal	StreetLight	E	E	71
23	9th Street SW/Fairview Drive & 15th Avenue SW	Signal	Counts	E	B	16
24	S Meridian & SR 512 EB Ramps	Signal	Counts	E	B	11
25	S Meridian & 15th Avenue SW/15th Avenue SE	Signal	Counts	E	E	78
26	**7th Street SE & 23rd Avenue SE**	**AWSC**	**Counts**	**D**	**E**	**36**
27	Shaw Road & 23rd Avenue SE	Signal	StreetLight	E	D	43
28	**Fruitland Avenue & 104th Street E/31st Avenue SW**	**AWSC**	**StreetLight**	**D**	**F**	**169**
29	**9th Street SW & 31st Avenue SW**	**Signal**	**Counts**	**E**	**F**	**99**
30	9th Street SW & SR 512 WB on ramp/SR 512 on ramp	Signal	StreetLight	E	D	50
31	9th Street SW & SR 512 EB off ramp/SR 512 off ramp	Signal	StreetLight	E	D	53
32	9th Street SW & 39th Avenue SW	Signal	StreetLight	E	D	41
33	31st Avenue SW & S Meridian	Signal	Counts	E	D	52
34	S Meridian & 35th Avenue SE	Signal	StreetLight	E	E	64
35	S Meridian & 37th Avenue SE	Signal	Counts	E	E	69
36	S Meridian & 39th Avenue SW/39th Avenue SE	Signal	Counts	E	D	41
37	5th Street SE & 31st Avenue SE	Signal	Counts	D	C	22
38	5th Street SE & 37th Avenue SE	Signal	Counts	D	D	38
39	5th Street SE & 43rd Avenue SE	Signal	StreetLight	D	C	31

#	Intersection Name	Control	Data Source	LOS Standard	LOS	Delay (s/veh)
40	Shaw Road E/Shaw Road & 39th Avenue SE	Signal	StreetLight	E	E	76

Note: Intersections in **bold** do not meet their LOS standard.
Source: Fehr & Peers, 2024.

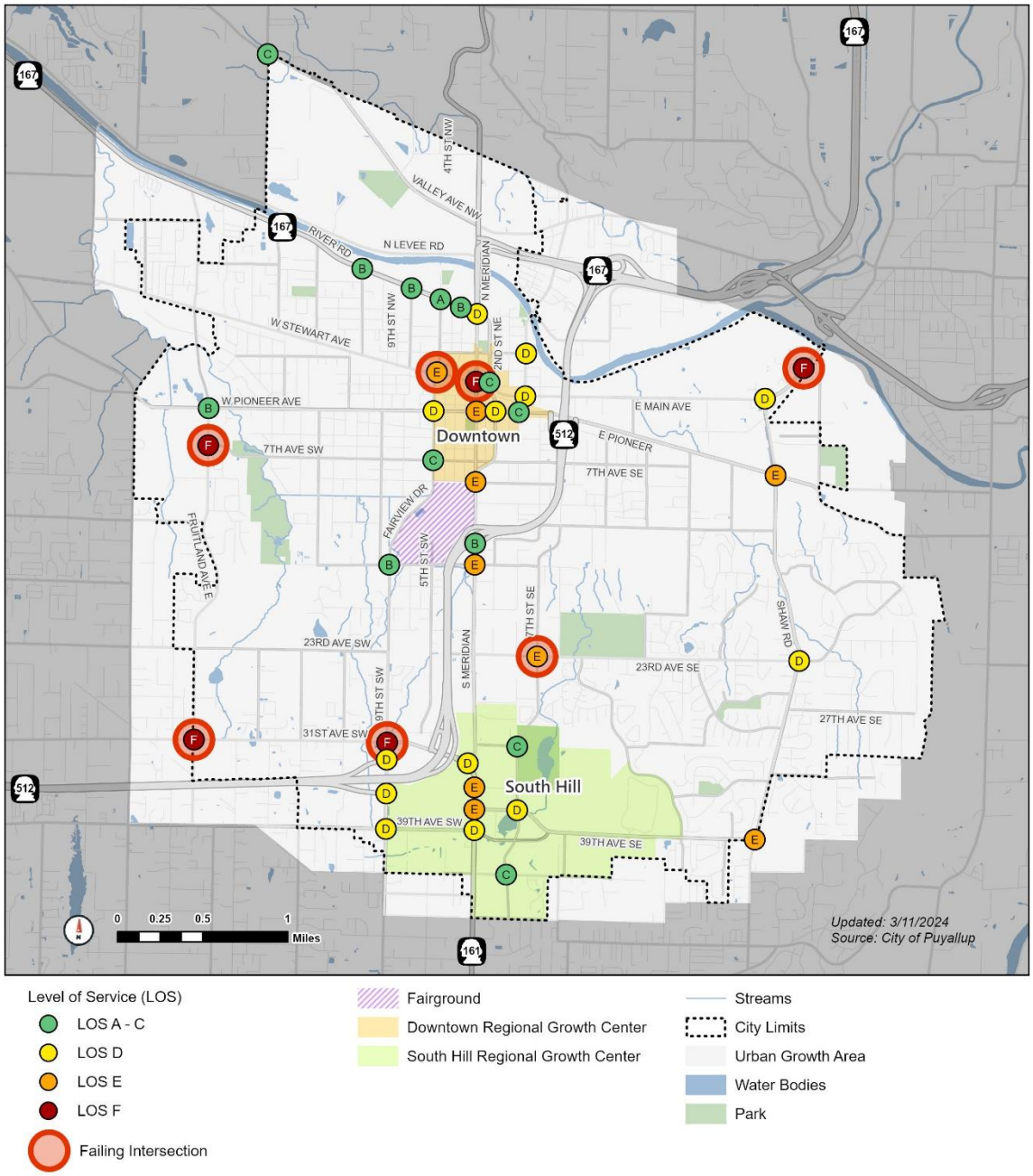


Figure 2: Existing Conditions Intersection Level of Service

Source: Fehr & Peers, 2024

Out of the 40 intersections analyzed, seven were failing based on the City's adopted LOS standards (four stop controlled and three signalized intersections). Five of these intersections had an LOS of F, and two had an LOS of E. In general, these intersections are located along key north-south arterials. Barriers including the Puyallup River, the BNSF rail line, a disconnected street network, and SR 512 funnel congestion to the few arterials that cross these barriers, which results in higher reported delays.

S Meridian/SR 161 serves as a major regional facility providing access to SR 512 and SR 167 from unincorporated communities like South Hill and Graham. The combination of regional and local traffic and congestion on SR 512 often means S Meridian operates at or over capacity during peak hours. Drivers use parallel north-south roadways in the city to avoid those conditions, which results in other facilities experiencing high demand.

Two of the four stop-controlled intersections are along S Fruitland where high east-west volumes intersect with a key north-south facility. The Fruitland & 7th Avenue SW TWSC intersection reported the highest delay of the study intersections, which corresponded to the westbound left turning movement from the minor street. Longer wait times for traffic on the westbound approach may be due to high volumes along the uncontrolled major street approaches, which conflict with high westbound left turning volumes. People turning westbound left are likely to travel from the downtown area to Fruitland Avenue E to avoid southbound congestion on 9th Street SW and S Meridian.

31st Avenue SW has high east-west volumes from vehicles exiting SR 512 westbound to access the South Hill area. Fruitland and 9th St SW are two significant north-south corridors that intersect 31st Avenue SW. The combined volumes at these intersections result in higher delays.

The 7th Street SE & 23rd Avenue SE intersection is an AWSC intersection that fails with a delay of 36 seconds per vehicle. The westbound approach experiences the highest volume and delay, which may be attributed to drivers turning onto 7th Street SE from S Meridian to avoid north-south congestion.

The fourth failing stop control intersection is E Main & 5th Avenue NE (TWSC). E Main serves as a main arterial to the City of Puyallup for vehicles traveling from SR 410 or the Sumner area and has high westbound volumes in the PM peak hour. Vehicles waiting to turn left at the stop sign on 5th Avenue NE can experience delays of over 60 seconds waiting for gaps in traffic to enter E Main. Even with relatively low left turn volumes and the median to accommodate two-staged left turns, vehicles can have a difficult time finding gaps due to the constant flow of westbound traffic from Traffic Avenue and SR 410.

In the Downtown Regional Growth Center, there are two failing signalized intersections. 5th Street NW/4th Street NW & W Stewart Street fails with an LOS of E and N Meridian & W/E Stewart Street fails with an LOS of F and over 90 seconds of delay. Both signalized intersections have limited capacity to move north-south volumes due to the railroad crossings to the south. Due to the limited capacity, queues can develop and can impact other intersections. 5th Street SE/NE & E Main is an example of an intersection near failing with limited capacity due to rail operations during the peak hour. N Meridian & W/E Stewart Street has the highest delay of the signalized study intersections.

The 2023-2028 Transportation Improvement Plan (TIP) adopted by the City Council includes improvements to address performance needs at both intersections. Corridors with multiple intersections near LOS thresholds include S Meridian/SR 161 by the South Hill Mall, Shaw Road E, and E Pioneer in the downtown area. Corridor and intersection improvements are also planned for some of those locations.

Future Conditions

Future conditions, representative of 2044, were analyzed for three alternatives: Alternatives 1 (or No Action), 2 and 3. The alternatives assume a broad range of land uses, including existing land use classifications identified in the City's Future Land Use (FLU) map. The alternatives also include new land use classifications to incorporate a broader range of housing and development types, including multifamily residential and mixed-use development with various numbers of floors, middle housing (i.e., duplexes, triplexes, fourplexes, and townhomes), and a variety of other development types that address community input that desires more walkable development and access to services.

The No Action Alternative assumes that no change would occur to the existing 2015 FLU Map or Comprehensive Plan policies relating to development within the Puyallup city limits. This alternative would maintain the City's existing land use designations without modifications, which means growth would occur within existing land use regulations and policies. This alternative would not meet the adopted growth targets.

Alternative 2 assumes more housing and jobs and a greater diversity of housing types than the No Action Alternative by concentrating growth in certain areas of the city.

Alternative 3 would allow more housing and jobs and a greater diversity of housing types than the No Action Alternative and Alternative 2 by focusing growth among a wider range of areas in the city.

Traffic volumes are expected to increase across all alternatives compared to existing conditions, due to growth in housing units and employment in the region.

City Staff identified projects from existing plans that are very likely to be in place by 2044, these baseline projects were included in the future operations analysis.

Operations results for all future alternatives are shown in **Table 3**. **Figures 3, 4** and **5** show LOS results for failing intersections in Alternatives 1, 2, and 3 respectively.

Table 3: Future Alternatives Intersection Delay and Level of Service

#	Intersection Name	Control	LOS Standard	LOS (Delay in s/veh)		
				No Action (Alt 1)	Alt 2	Alt 3
1	Freeman Road E & Valley Avenue E	Signal	D	C (25)	C (25)	C (26)
2	11th Street NW & River Road	Signal	D	C (33)	D (38)	D (38)
3	7th Street NW & River Road	Signal	D	B (16)	B (16)	B (16)
4	4th Street NW & River Road	Signal	D	A (8)	B (11)	B (11)
5	River Road & Fred Meyer Access	Signal	D	B (12)	B (12)	B (12)
6	**N Meridian & River Road/2nd Street NE**	**Signal**	**D**	**E (63)**	**E (64)**	**E (66)**
7	S Fruitland & W Pioneer	Signal	D	C (30)	C (32)	D (44)
8	**S Fruitland & WSU Driveway/7th Avenue SW**	**TWSC**	**D**	**F (>180)**	**F (>180)**	**F (>180)**
9	**5th Street NW/4th Street NW & W Stewart Street**	**Signal**	**D**	**F (143)**	**F (144)**	**F (147)**
10	5th Street SW & W Pioneer	Signal	D	D (47)	D (46)	D (47)
11	5th Street SW & 7th Avenue SW	Signal	D	C (30)	C (33)	C (35)
12	N Meridian & W Stewart Street/E Stewart Street	Signal	E	E (73)	E (72)	E (72)
13	2nd Street NE & E Stewart Street/E Main	Signal	D	C (28)	C (28)	C (28)
14	S Meridian & W Pioneer/E Pioneer	Signal	E	D (46)	D (54)	E (62)
15	3rd Street SE & E Pioneer	Signal	D	D (36)	D (40)	D (40)
16	**S Meridian & 9th Avenue SW/9th Avenue SE**	**Signal**	**E**	**E (72)**	**E (77)**	**F (>180)**
17	**5th Street NE & 5th Avenue NE**	**TWSC**	**D**	**F (102)**	**F (>180)**	**F (>180)**
18	**5th Street SE/5th Street NE & E Main**	**Signal**	**D**	**F (137)**	**F (159)**	**F (178)**
19	**5th Street SE & E Pioneer**	**Signal**	**D**	**F (85)**	**F (95)**	**F (102)**
20	Shaw Road E & E Main	Signal	E	E (61)	E (67)	E (69)

#	Intersection Name	Control	LOS Standard	LOS (Delay in s/veh)		
				No Action (Alt 1)	Alt 2	Alt 3
21	**E Main & 5th Avenue NE**	**TWSC**	**D**	**F (106)**	**F (109)**	**F (142)**
22	**Shaw Road & E Pioneer**	**Signal**	**E**	**F (168)**	**F (>180)**	**F (>180)**
23	9th Street SW/Fairview Drive & 15th Avenue SW	Signal	E	C (21)	C (25)	C (26)
24	S Meridian & SR 512 EB Ramps	Signal	E	B (12)	B (12)	B (12)
25	**S Meridian & 15th Avenue SW/15th Avenue SE**	**Signal**	**E**	**E (71)**	**F (89)**	**F (82)**
26	7th Street SE & 23rd Avenue SE	Signal	D	B (11)	B (10)	B (14)
27	Shaw Road & 23rd Avenue SE	Signal	E	D (52)	E (60)	E (62)
28	**Fruitland Avenue & 104th Street E/31st Avenue SW**	**AWSC**	**D**	**F (>180)**	**F (>180)**	**F (>180)**
29	**9th Street SW & 31st Avenue SW**	**Signal**	**E**	**F (111)**	**F (124)**	**F (128)**
30	9th Street SW & SR 512 WB on ramp/SR 512 on ramp	Signal	E	E (65)	C (34)	E (69)
31	**9th Street SW & SR 512 EB off ramp/SR 512 off ramp**	**Signal**	**E**	**E (66)**	**F (89)**	**E (70)**
32	**9th Street SW & 39th Avenue SW**	**Signal**	**E**	**E (68)**	**F (86)**	**E (55)**
33	**31st Avenue SW & S Meridian**	**Signal**	**E**	**F (113)**	**F (120)**	**F (126)**
34	S Meridian & 35th Avenue SE	Signal	E	E (64)	D (43)	D (36)
35	**S Meridian & 37th Avenue SE**	**Signal**	**E**	**D (51)**	**F (87)**	**E (78)**
36	S Meridian & 39th Avenue SW/39th Avenue SE	Signal	E	E (61)	E (77)	E (64)
37	5th Street SE & 31st Avenue SE	Signal	D	D (42)	D (35)	D (37)
38	**5th Street SE & 37th Avenue SE**	**Signal**	**D**	**D (49)**	**E (61)**	**E (60)**
39	**5th Street SE & 43rd Avenue SE**	**Signal**	**D**	**D (53)**	**E (67)**	**D (54)**
40	**Shaw Road E/Shaw Road & 39th Avenue SE**	**Signal**	**E**	**F (165)**	**F (135)**	**F (>180)**

Note: Intersections in **bold** do not meet their LOS threshold for at least one alternative.
Source: Fehr & Peers, 2024.

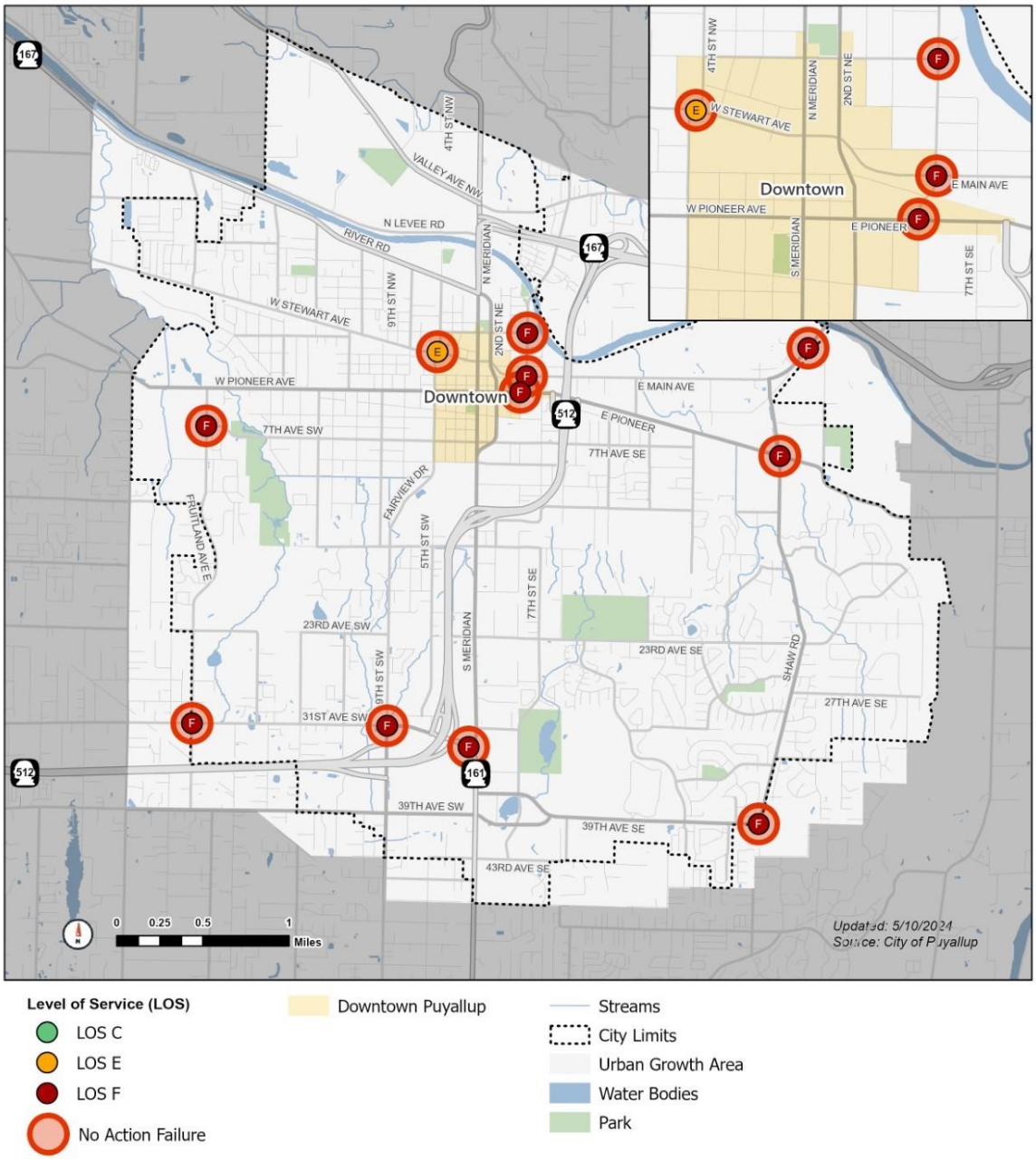


Figure 3: No Action (Alternative 1) Intersection Level of Service (Failing Only)

Source: Fehr & Peers, 2024

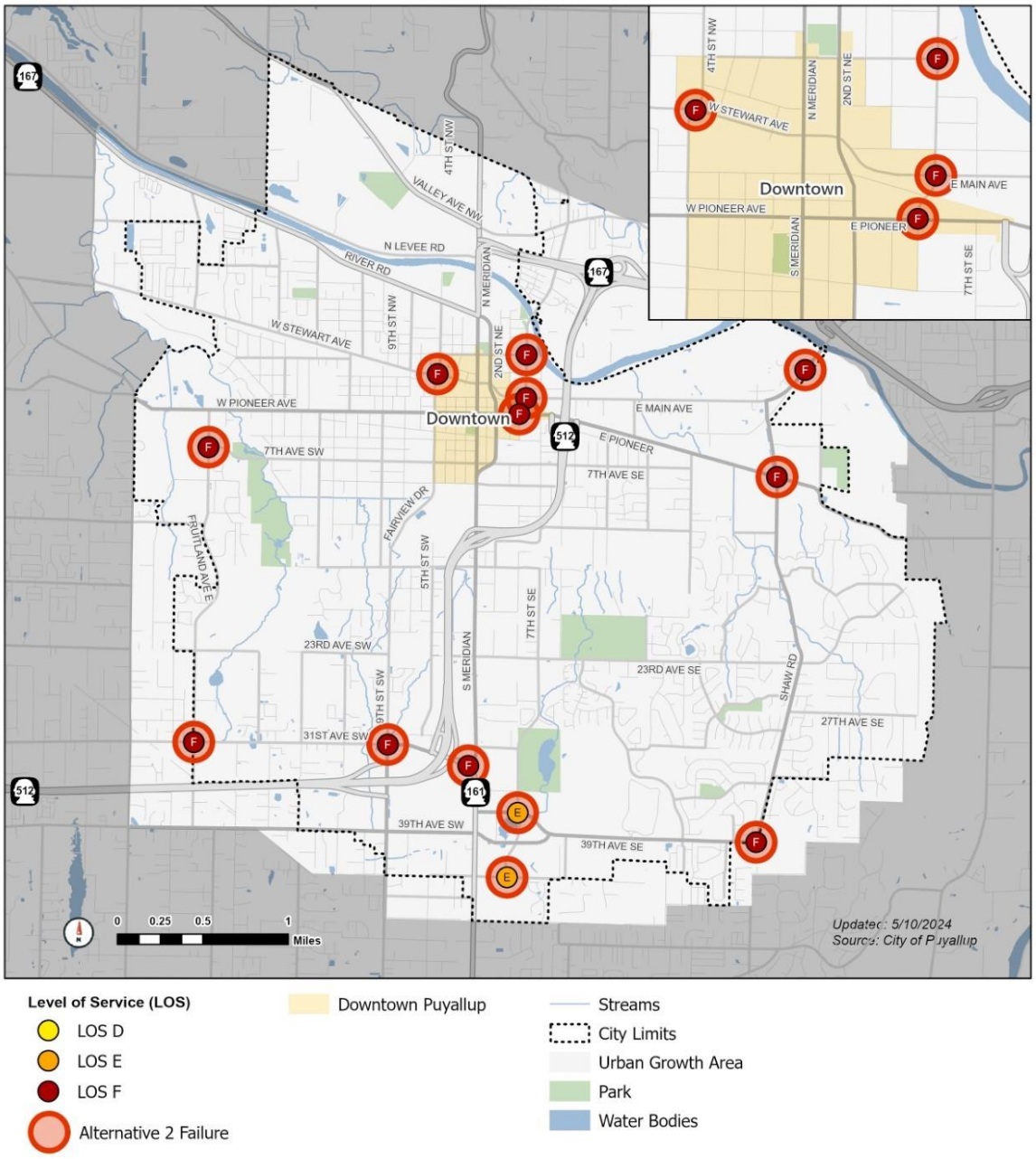


Figure 4: Alternative 2 Intersection Level of Service (Failing Only)

Source: Fehr & Peers, 2024

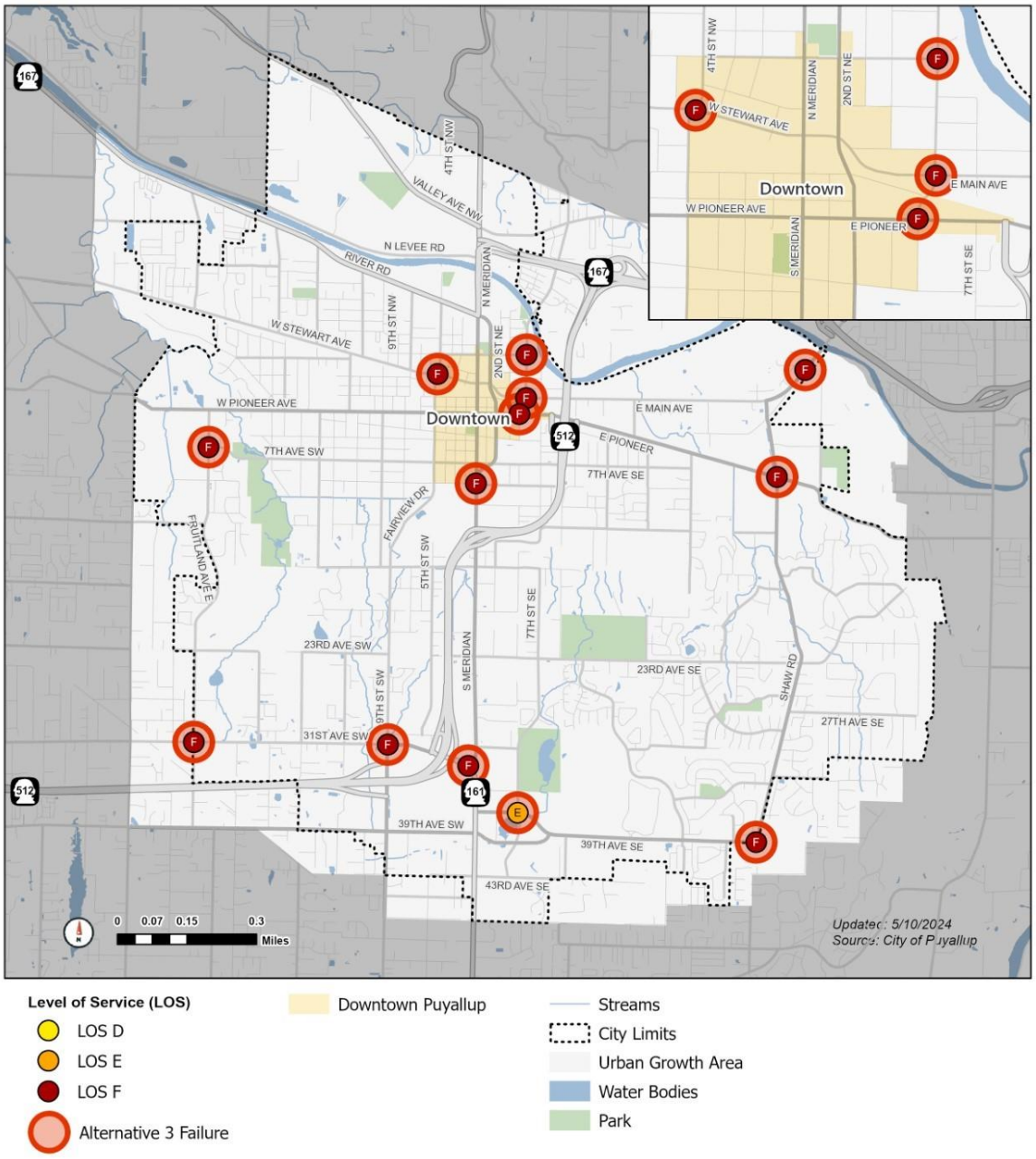


Figure 5: Alternative 3 Intersection Level of Service (Failing Only)

Source: Fehr & Peers, 2024

There are 11 intersections that fail their LOS standards in all three alternatives. These include five of the seven intersections that were failing under existing conditions. Two intersections do not fail under future conditions due to assumed completion of baseline projects. The intersection of N Meridian & W Stewart Street/ W Stewart Street (intersection 12) is situated at the railway crossing and fails under existing conditions due to the railroad crossing, which limits capacity to move north-south volumes. In all future alternatives, it is assumed that an additional southbound left turn lane is added here, resulting in lower delay. 7th Street SE & 23rd Avenue SE (intersection 26) also fails under existing conditions as a stop-controlled intersection, but is converted to a signalized intersection in all future alternatives. This results in lower delay, and it meets its LOS standard in all future alternatives.

In addition to the five failing intersections under existing conditions, intersections 6, 17, 18, 19, 33 and 40 fail in all three alternatives. These intersections are located in areas where growth is expected in all future alternatives, leading to higher traffic volumes and delays.

In Alternative 2, two additional intersections (38 and 39) fail their LOS standard, resulting in a total of 13 failing intersections. Alternative 2 concentrates residential and employment growth in Puyallup's designated Regional Growth Centers (RGCs), Downtown and South Hill. It would also focus growth along major commercial corridors such as River Road and South Meridian, and at the intersection of East Pioneer and Shaw Road. This causes the intersections of 5th Street SE & 37th Avenue SE (intersection 38) and 5th Street SE & 43rd Avenue SE (intersection 39) to fail their LOS standards, since they are situated within Alternative 2's South Hill focus area.

In Alternative 3, two additional intersections (16 and 38) fail their LOS standard, resulting in a total of 13 failing intersections. Alternative 3 would target new jobs and housing growth at key locations throughout the city at important intersections and along transportation corridors, while assuming somewhat less-intense growth within the Regional Growth Centers and other focus areas of Alternative 2. This alternative generally assumed more low- to medium-density residential and mixed use across a wider range of areas. The South Hill and Downtown RGCs still assume the most housing and employment, although at a smaller percentage of the overall capacity compared to Alternative 2. In addition to South Hill and Downtown, this alternative includes the Fairground as a focus area, around the intersections of SR 512 ramps and S Meridian. This results in high delays at S Meridian & 9th Avenue SW/SE, causing it to fail. Intersection 38 also fails in this alternative because of the growth allocated to South Hill. However, because the growth allocated to South Hill is sparser than that in Alternative 2, intersection 39 experiences less delay in comparison, and does not fail its LOS standard.

Conclusions

Between seven (existing conditions) and 13 (Alternatives 2 and 3) City of Puyallup intersections do not meet their current or future forecasted LOS standards. The transportation element will identify potential improvements that would mitigate these LOS failures.

FEHR PEERS

Memorandum

Date: June 11, 2024

To: City of Puyallup

From: Jackson Hwang, Steven Goodsell, Zahra Khan, & Daniel Dye, Fehr & Peers

Subject: City of Puyallup Existing Conditions Memo

TC23-0070

The City of Puyallup is in the process of updating the Transportation Element (TE) of its Comprehensive Plan. The purpose of this update is to guide transportation investments over the next two decades in alignment with the community's vision and objectives. The overarching goal is to integrate a multi-modal transportation system that addresses the needs of both current and future transportation system users. This memorandum describes Puyallup's existing transportation infrastructure and identifies challenges and opportunities.

Land Uses and Key Destinations

The configuration of living, working, and recreational spaces within a city and its surrounding communities is significantly influenced by how development is guided. This guidance is encapsulated in the Land Use Element of the Comprehensive Plan. Zoning is a key tool employed by cities to shape specific types of development, directing homes and businesses to targeted areas. Considering land use is crucial in transportation planning as it offers insights into areas that will likely experience heavier traffic conditions.

Puyallup has major commercial hubs downtown and in the South Hill area, both designated as Regional Growth Centers by the Puget Sound Regional Council. These centers are connected by South Meridian, a principal arterial that is surrounded by zoning for fairgrounds, general commercial, and high-density multiple-family residential properties.

Other pockets of commercial and industrial land use can be found in the northern parts of the city along Valley Avenue, River Road, and East Main Avenue. A significant portion of the city is zoned for public facilities and single-family residential use. Limited manufacturing land use is primarily designated north of the Puyallup River, with additional areas located between East Main Avenue and East Pioneer, as well as to the east of Shaw Road.

Areas characterized by commercial, industrial, and dense residential land use tend to generate more trips, making them conducive to alternative modes of travel like walking, rolling, and transit. In contrast, areas with low-density residential land use exhibit dispersed trip patterns, often favoring personal vehicle travel. A map of Puyallup's current zoning is shown in **Figure 1**.

Much of the land use south of Puyallup is low-density single-family housing developments as well as auto oriented businesses along key arterial corridors. South Meridian, South Fruitland Avenue, and Shaw Road East function as major north-south corridors that funnel significant traffic through Puyallup in order to access regional routes such as SR 167, SR 512, and SR 410.

Key destinations were reviewed as part of the existing transportation conditions to provide an understanding of travel patterns within the city. Key destinations are summarized in **Figure 2**.

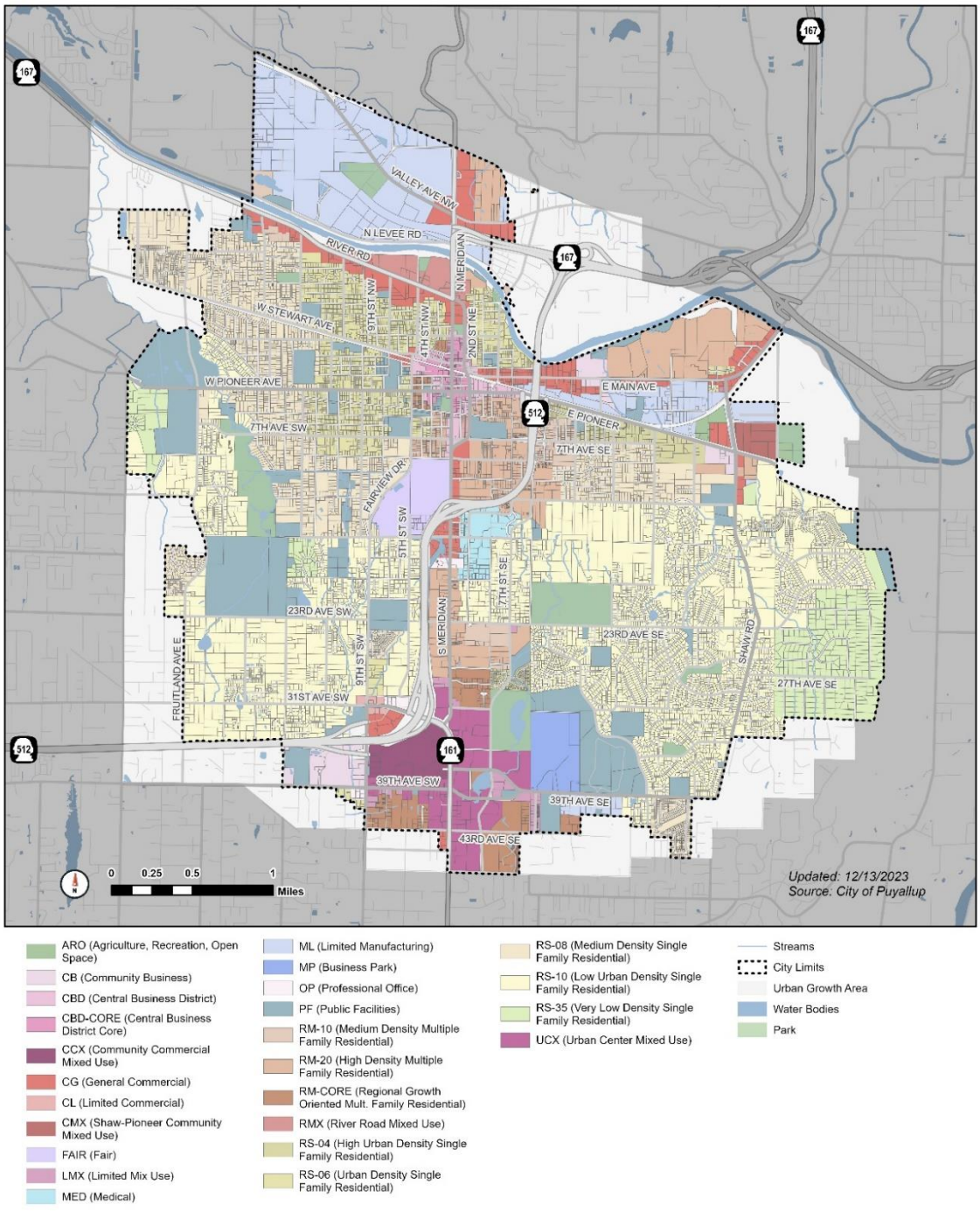


Figure 1: Zoning Map

Source: MIG, 2023.

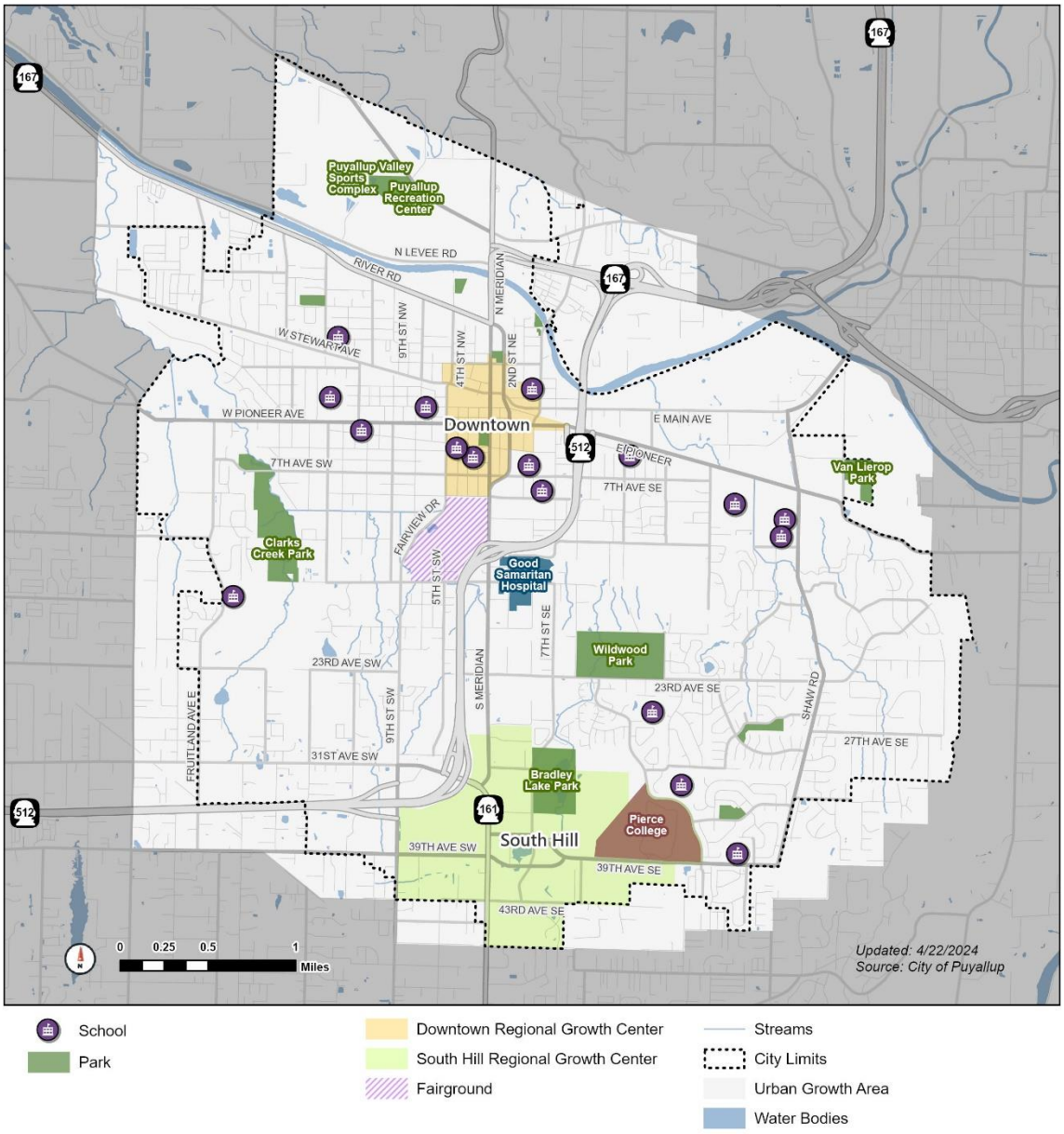


Figure 2: Key Destinations and Trip Generators

Source: Fehr & Peers, 2023.

Downtown Puyallup and Sounder Station

Within the downtown business district, there is a vibrant array of restaurants, shops, and civic landmarks, such as City Hall and the public library. Various events like the Puyallup Farmer's Market at Pioneer Park also bring people to the downtown area. Additionally, the Puyallup Sounder Station offers convenient access to Sound Transit's Lakewood-Seattle Sounder commuter rail line.

Washington State Fair Events Center

Annually drawing in over one million attendees in September, the Washington State Fair is a significant event, accompanied by over 100,000 attendees during the three-day Spring Fair held each April. Beyond these headline events, the Fair Events Center serves as a venue for various other gatherings throughout the year.

South Hill Mall and Pierce College Puyallup

The South Hill Mall and adjacent commercial areas house large retail stores, contributing to substantial vehicle traffic in and out of the area. Pierce College operates a Puyallup campus about one mile east of the mall. The college generates jobs and provides higher education to thousands of enrolled students.

MultiCare Good Samaritan Hospital

The hospital serves as the regional medical center for eastern Pierce County. In 2022, it experienced around 162,400 emergency department visits, conducted 2,800 inpatient surgeries, facilitated 5,800 outpatient surgeries, and celebrated 2,300 births.[1]

Schools

Puyallup has 13 public schools within city limits as part of the Puyallup School District, as well as four private schools. The public schools encompass a range from elementary to high school levels. See the list of schools below.

Puyallup Public Schools:

- Fruitland Elementary
- Karshner Elementary
- Maplewood Elementary
- Meeker Elementary
- Shaw Road Elementary

[1] https://www.multicare.org/newsroom/multicare-facts/#pattern2_6

- Spinning Elementary
- Stewart Elementary
- Sunrise Elementary
- Wildwood Elementary
- Aylen Junior High
- Ferrucci Junior High
- Kalles Junior High
- Puyallup High School

Puyallup Private Schools:

- All Saints Catholic School
- Cascade Christian Elementary School
- Cascade Christian Junior/Senior High School
- Northwest Christian School

Multimodal access varies by school and neighborhood. Key travel modes that serve schools include walking, biking, carpools, personal vehicles, and school buses. The transportation networks surrounding these schools can become congested before and after the school day, raising safety concerns due to the simultaneous use of various modes of transportation within a compressed timeframe. Schools that do not have safe or accessible routes for people walking, rolling, and bicycling generally experience more intense vehicle traffic in the peak periods and are more likely to have that traffic spill over onto the transportation network. Overall, many public schools in Puyallup do not effectively accommodate the current vehicle queuing demand for parent pick-up/drop-off.

Parks and Recreation Areas

The parks and recreation areas within the city feature a range of amenities, including ball fields, playgrounds, walking paths, ponds, a dog park, a skate park, community gardens, picnic areas, an indoor recreation center, a pavilion, and restrooms (**Figure 2**). These spaces attract a diverse group of users of various ages and different modes of transportation. Parks and Recreation Areas within Puyallup are listed below.

Community Parks:

- Bradley Lake Park
- Clarks Creek Park
- Van Lierop Park
- Wildwood Park

Neighborhood Parks:

- Decoursey Park
- Grayland Park
- Manorwood Park
- Pioneer Park
- Rainier Woods Park
- Sam Peach Park
- Veterans Park
- Wildwood Park

Recreation Centers:

- Puyallup Recreation Center
- Puyallup Skatepark
- Puyallup Valley Sports Complex

Existing Transportation Plans

The City of Puyallup has adopted a handful of city-wide transportation plans over the last eight years in conjunction with the last Comprehensive Plan, published in 2015. The Transportation Element of the 2015 Comprehensive Plan serves as a guide for the improvement and expansion of the transportation system to meet the demands of future growth up to 2035. In addition to laying out Puyallup's future transportation vision and goals, it outlines a list of transportation projects that respond to identified needs.

The City of Puyallup also updates its 6 Year Transportation Improvement Plan (TIP) every year, as required by the State. The TIP, most recently published for 2023-2028, is informed by the Comprehensive Plan and identifies near-term improvements to the transportation network and allocates funding for each year. The TIP is designed to provide a framework for prioritizing, scheduling, and implementing projects within the Transportation element. These projects include corridor and intersection improvements, investments in active transportation infrastructure, traffic calming programs, and maintenance. Projects within the TIP are not required to be financially constrained to secured funding and may include reasonable sources of funding such as grants the City may apply for.

Three pedestrian oriented plans have been adopted since 2017 as part of the City's ongoing effort to improve active transportation. These include the Active Transportation Plan (ATP, 2017), ADA Transition Plan (2018), and Safe Routes to School (SRTS, 2019) master plan. These plans evaluate existing facilities and identify a range of potential projects that can be implemented to provide connectivity for local travel, improve safety and accessibility for all road users, and encourage the creation of a walkable identity for Puyallup's downtown. The ADA Transition Plan also serves as a

framework for implementing accessibility requirements across public right-of-way pedestrian facilities.

Other transportation plans for the surrounding area include WSDOT's South Pierce Multimodal Connectivity Study (SPMCS, 2023), and Puget Sound Regional Council's (PSRC's) Regional Transportation Plan (RTP, 2022) and Vision 2050 regional growth plan.

SPMCS

SPMCS included the area of Pierce County south of SR 512, including parts of Puyallup. The study recommended strategies to improve safety, multimodality, congestion, and connectivity in the area, among other goals. Below are the specific recommended strategies from SPMCS within Puyallup:

Transit Strategies

- Implement Bus Rapid Transit Routes along SR 161 and 112th/39th Street (long-term strategy)
- Increased frequency and earlier/later service on existing transit routes (near-term strategy)

Active Mode Strategies

- New trails as identified in the Pierce County Trails Plan (all phases strategy)

Vehicle and Freight Capacity Strategies

- Capacity Improvements to Military Road corridor as an identified corridor for connecting to the valley floor from the eastern part of the study area (long-term strategy)

Additionally, SPMCS identified programmatic improvements such as intersection upgrades (Near-term strategy), traffic signal upgrades (Near-term strategy) and transit queue jumps (Near-term strategy), turn lanes (Near-term strategy), access management improvements (Near-term strategy), and new sidewalks (All phases strategy) and bike facilities (All phases strategy) that may fall within Puyallup.

Vision 2050

Vision 2050 aims to "provide an exceptional quality of life, opportunity for all, connected communities, a spectacular natural environment, and an innovative, thriving economy" by the year 2050 in the central Puget Sound region. Vision 2050 also sets the stage for updates to local comprehensive plans for cities and counties in the region, including Puyallup. It includes a planning resource titled "Transportation Element Guidance" which provides guidance, best practices, and technical assistance to support local governments.

RTP

The PSRC's RTP is the long-range transportation plan for the central Puget Sound region and is adopted every four years. It is designed to implement Vision 2050, outlining investments the region is making in transit, rail, ferry, streets and highways, freight, bicycle and pedestrian facilities, and other systems. Below is the list of recommended strategies from the PSRC's RTP in Puyallup.

Active Transportation Strategies

- Implement the Tacoma to Puyallup Regional Trail along SR 161, connecting from Riverwalk Trail to SR 167/Meridian IC, and extending along SR 167 to 70th Avenue E Interurban Trailhead in Fife (2025)

Transit Strategies

- Establish High-Capacity Transit on Route 4, connecting Lakewood to Puyallup (2040)
- Develop High-Capacity Transit on Route 402, along S Meridian/SR 161 from Downtown Puyallup to 176th Street E, as part of the BRT System Expansion Study (2035)

Vehicle and Freight Capacity Strategies

- Shaw Road Widening from 12th Avenue SE to 23rd Avenue SE (2040)
- Implement Stage 2 of SR 167/I-5 to SR 161, involving the construction of a new four-lane alignment on SR 167 between I-5 near Fife and SR 161 in Puyallup. This project includes the establishment of new interchanges at SR 161 and Valley Avenue (2029)
- Construct eastbound and westbound auxiliary lanes from Meridian to Pioneer Way, incorporating two-lane off-ramps at each interchange. This initiative aims to enhance mainline operations on SR 512 and improve safety at this interchange (2029)

SR 167 Master Plan and SR 512 Corridor Study

WSDOT's State Route plans that are applicable to Puyallup are the SR 167 Master Plan (2023) and the SR 512 Corridor Study (2023). The SR 167 Master Plan designates Puyallup as an Active Mode Priority Area with the aim to close gaps in the active transportation net stwork and address mobility needs for the SR 167 corridor. Below is the list of recommended strategies from the SR 167 Master Plan in Puyallup.

Active Transportation:

- Bicycle facility improvements to connect to the Puyallup Sounder Station (near- or mid Term Strategy)

Transportation System Management and Operations:

- New traffic signals or other street crossing improvements in downtown Puyallup (near- or mid Term strategy)

Transit:

- New SR 167 BRT service between Puyallup and Renton with possible extension to Link light rail (mid- or long-term strategy)

The SR 512 Corridor Study recommends strategies for corridors in the city that include changes to traffic operations, roadway widening, transit access and sidewalk and crossing improvements to supplement other corridor improvements. Below is the list of recommended strategies from the SR 512 Corridor Study in Puyallup.

Active Transportation:

- Bike lane at 94th Avenue - 39th Avenue SW & north (mid-term strategy)
- Bike lane on SR 512 interchange & to the west on E Pioneer (mid-term strategy)
- Tacoma to Puyallup Regional Trail (mid-term strategy)
- New crossing of SR 512 at 23rd Avenue SW (long-term strategy)

Strategic Bottlenecks:

- Eastbound Auxiliary lanes from S Meridian to E Pioneer (mid-term strategy)
- Interchange at 31st Avenue SW, widen overpass & modify ramps (mid-term strategy)
- Both directions auxiliary lanes from 31st to Meridian (mid-term strategy)
- Interchange at E Pioneer, widen overpass & modify ramps (long-term strategy)
- Interchange at S Meridian, widen overpass & modify ramps (long-term strategy)
- Interchange at 94th Avenue E, widen overpass & modify ramps (long-term strategy)

Transportation System Management and Operations:

- Puyallup 5th Street SE corridor operations improvements (mid-term strategy)

Transit:

- BRT: Pierce County Airport to South Hill Transit Center & downtown Puyallup via SR 161/Meridian Avenue (long-term strategy)
- BRT: Lakewood to South Hill Mall TC via 112th Street E (long-term strategy)

Pierce County Comprehensive Plan

Pierce County is currently updating their Comprehensive Plan, which includes plans for roads in unincorporated areas around Puyallup and is expected to be completed by December 31, 2024.

These plans will shape how Puyallup evolves to accommodate growth and address the challenges and needs of those who use the transportation network. Although the existing conditions do not reflect projects or plans that have not been completed as of Fall 2023, these plans will be reviewed and accounted for as part of the future analysis and project recommendations for the Comprehensive Plan update.

Transportation Network Overview

Puyallup's transportation network accommodates many modes of travel, including walking, bicycling, public transit, freight, and driving. Vehicular travel is the primary choice for most travelers in and around Puyallup, and the roads must accommodate both local trips and regional travelers passing through. This is captured by the commuting data shown in **Figure 3** (American Community Survey, 2021). Although work-based trips generally have a higher proportion of drive alone trips compared to other trip purposes, only 7% of commuters choose alternative modes, which is indicative of larger trends in mode choice and mobility. Recently, the City of Puyallup has made significant investments in multimodal transportation downtown, but gaps in connectivity still exist for non-vehicular modes and bike infrastructure is extremely limited throughout the network. This section documents how Puyallup's roads and streets serve different modes, and how residents and visitors experience the city.

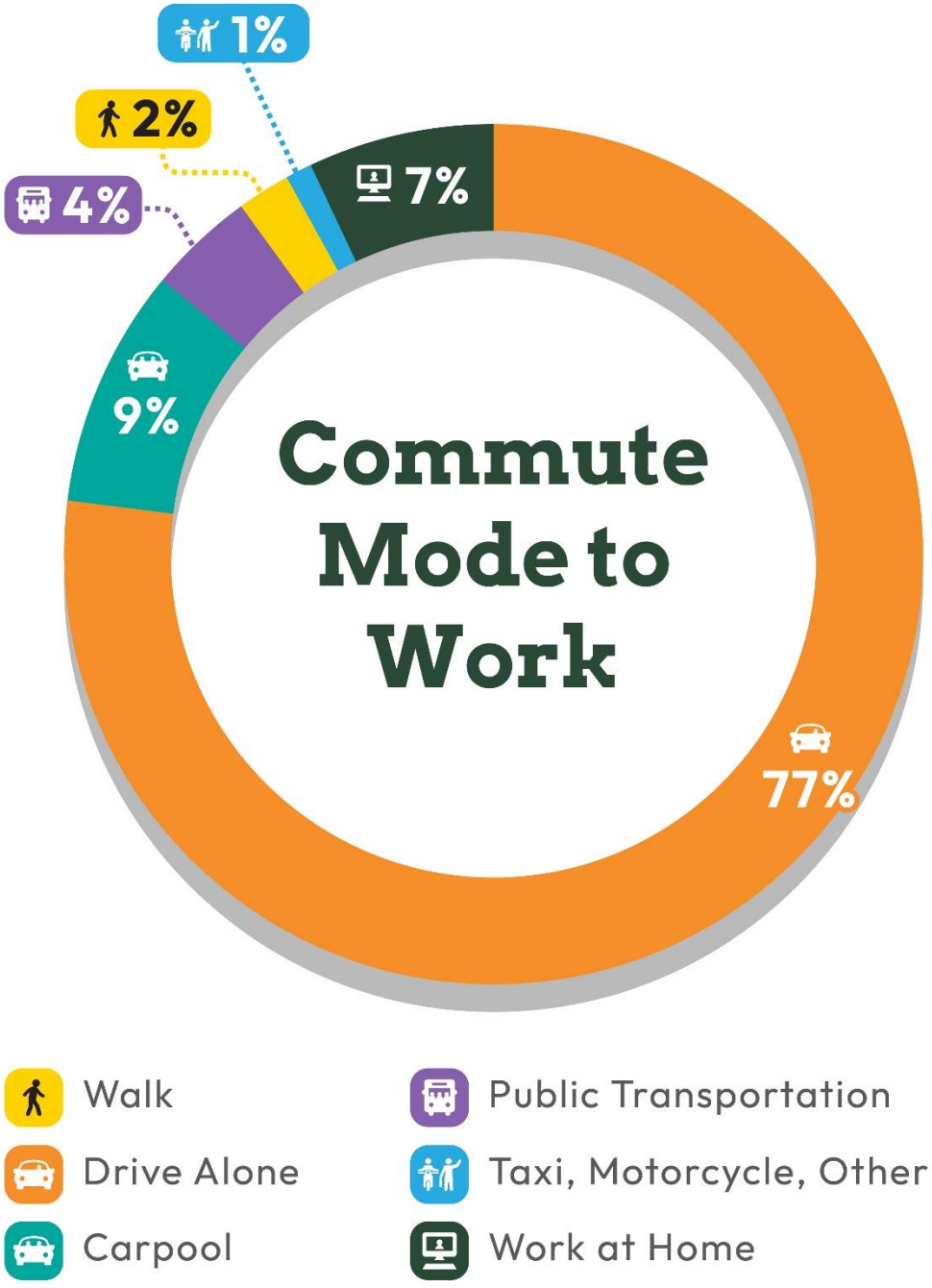


Figure 3: Commute Mode to Work

Source: United States Census Bureau 5-year ACS S0801, 2021.

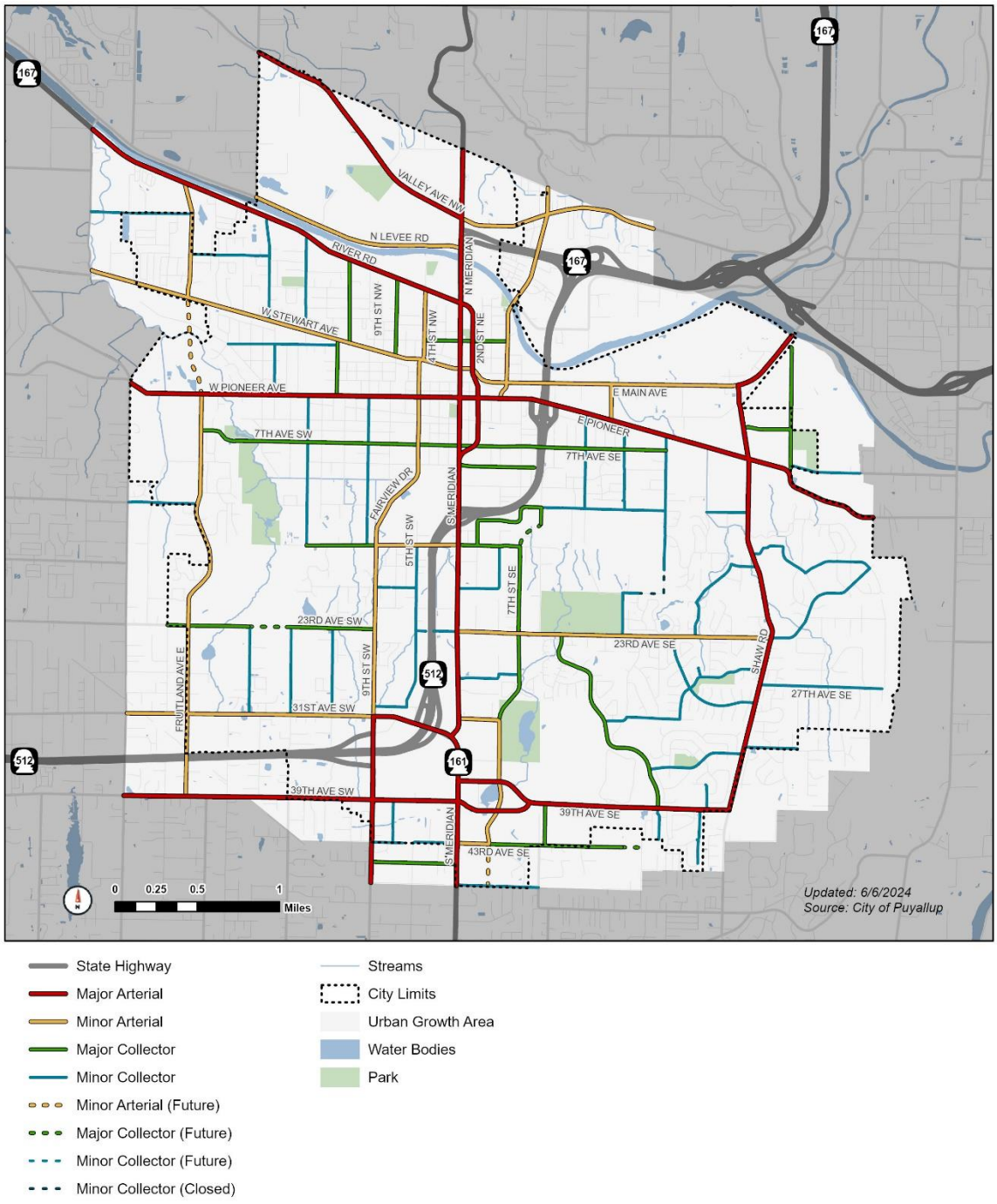
The main travel corridors in Puyallup are mostly roadways with sidewalks but also include trails, bus routes, and a commuter rail line. The northern portion of Puyallup, roughly between the Puyallup River and 7th Avenue SE and SW, has a well-connected street grid. The southern and eastern portions of the city are characterized by larger blocks and curvy streets with limited outlets, which can make direct connections more difficult.

This plan classifies Puyallup's roadways into major arterials, minor arterials, major collectors, minor collectors, and local streets, as shown in **Table 1** and displayed in **Figure 4**. Examples of each roadway type and the intended uses served are described below.

Table 1: Functional Classification of Roadways

Functional Classification	Average Annual Daily Traffic (AADT) Range	Description	Example
Major Arterial	15,000 >	These streets are Puyallup's highest functional classification and tend to carry the highest volumes. Major arterials serve regional through trips and connect Puyallup with the rest of the region.	East/West Pioneer, South Meridian
Minor Arterial	7,000 – 15,000	Puyallup's next highest functional classification, which are designed for higher volumes, but tend not to be major regional connectors. Minor arterial streets provide inter-neighborhood connections.	Fairview Drive, West Stewart
Major Collectors	1,500 – 7,000	Major Collectors distribute trips between local streets and arterials and serve as transition roadways to or from commercial and residential areas. These are higher volume collectors.	7th Avenue SW/SE, Wildwood Park Drive
Minor Collectors	1,500 – 5,000	These streets also distribute trips between local streets and arterials and serve as transition roadways to or from commercial and residential areas. Minor Collectors have lower volumes and can include select traffic calming elements to balance experience for all modes with vehicular mobility.	12th Avenue SE, 4th Avenue NW
Local	< 1,500	Local streets are the lowest functional classification, providing circulation and access within residential neighborhoods.	9th Avenue SW, 11th Street SW

Source: Fehr & Peers, 2023.
Note: AADT ranges are only one consideration when classifying roadways, other considerations include surrounding land uses, roadway usage, and access to property provided by each roadway.



State Highway
Major Arterial
Minor Arterial
Major Collector
Minor Collector
Minor Arterial (Future)
Major Collector (Future)
Minor Collector (Future)
Minor Collector (Closed)
Streams
City Limits
Urban Growth Area
Water Bodies
Park

Figure 4: Roadway Classification

Source: Fehr & Peers, 2023.

Pedestrian and Bicycle Network

Puyallup's pedestrian and bicycle network consists of sidewalks, trails, sharrows, bike lanes, and shared use paths. Generally, sidewalks are available along many arterials, streets within the central business district, and in newer subdivisions. However, older residential areas in Puyallup often feature incomplete or poorly maintained sidewalks. Even along arterials and in the downtown area, sidewalks may not be well maintained or meet current accessibility requirements such as width, cross slope, and curb ramps. A recent City assessment for arterials and collectors calculated approximately 100 miles of missing sidewalk.

The Puyallup Riverwalk Trail is approximately five miles long and is located along the southern bank of the Puyallup River. The Riverwalk Trail provides a connection to the Sumner Link Trail. The 21-mile Foothills Regional Trail currently terminates at E Pioneer and Shaw Road within city limits. It extends east and south along SR 162 outside of the city as a commuter and recreational scenic route.

Bicycle infrastructure within the city primarily consists of sharrows, bike lanes, and a shared-use trail. Sharrows are located on 5th Street NE between 4th Street NE and 5th Street NE, as well as 5th Street NE from 5th Avenue NE to 2nd Avenue NE. Bike Lanes exist on 23rd Avenue SE between 9th Street SE to Forest Green Boulevard, and will be implemented soon on W Stewart Avenue and 4th Street NW. The Foothills Trail starts as a shared-use trail on East Pioneer Avenue from Shaw Road East to 33rd Street Southeast. There is also a shared use path on Shaw Road East from 23rd Avenue to Manorwood Drive Southeast. Additionally, certain downtown areas currently have bike projects in the design phase.

Despite pedestrian facility coverage on most arterials in the city, bicyclists still encounter challenges navigating Puyallup's street network due to a lack of bicycle facilities or shared-use paths. **Figure 5** provides the locations of pedestrian/bike facilities and trails.

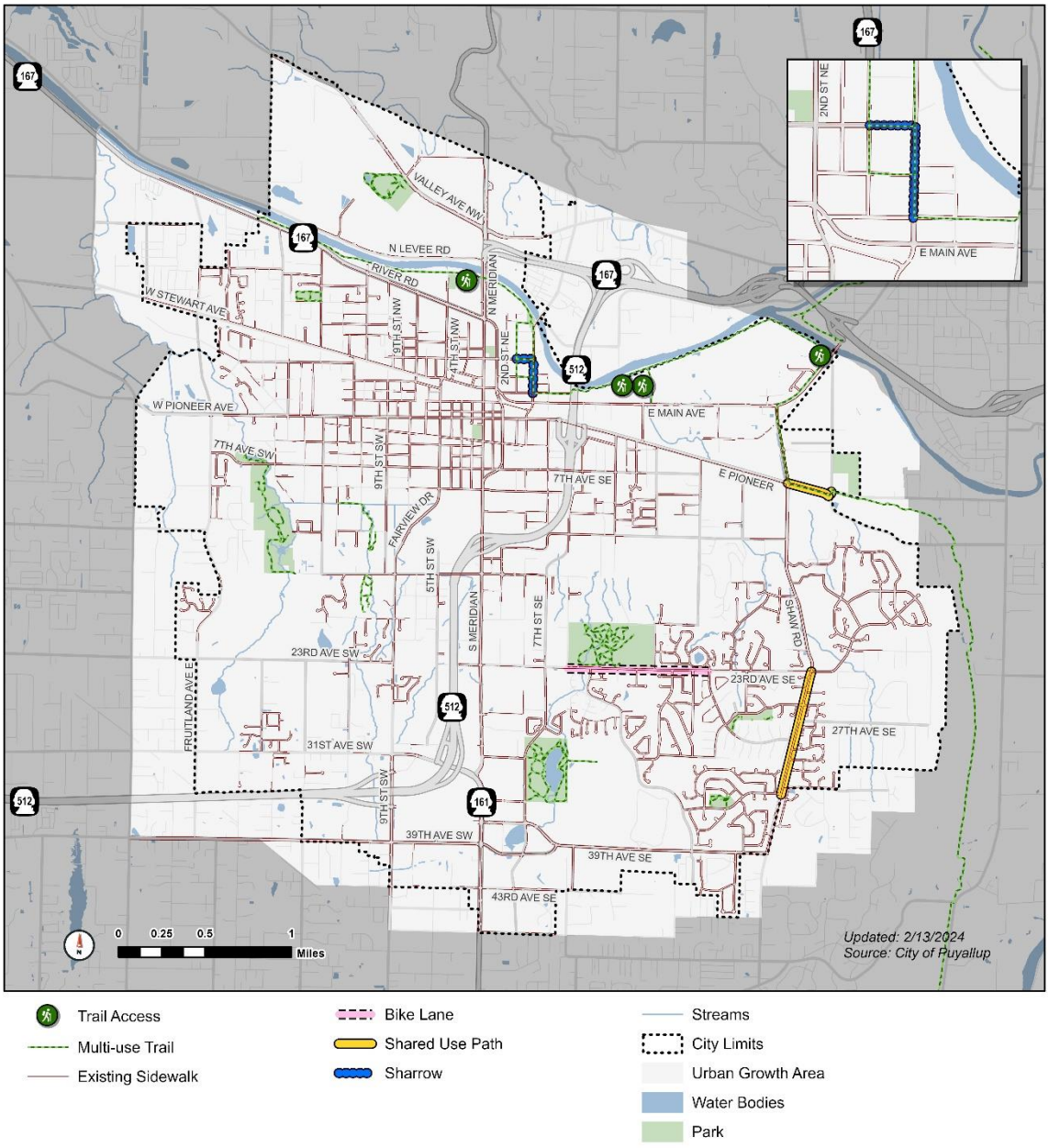


Figure 5: Existing Bicycle and Pedestrian Facilities

Source: Fehr & Peers, 2023.

Level of Traffic Stress

Level of Traffic Stress (LTS) provides a quantifiable tool to gauge the existing conditions of active transportation infrastructure. The lowest level of traffic stress is classified as LTS 1, where a wide range of users feel safe and comfortable on an active transportation facility. LTS 4 represents the highest level of traffic stress where most users feel uncomfortable when walking or biking. See **Figure 6**, which illustrates all four levels. The City of Puyallup has no adopted standards for Bicycle Level of Traffic Stress (BLTS) and Pedestrian Level of Traffic Stress (PLTS), so a set of criteria was developed by the Fehr & Peers team to analyze current conditions and to help identify potential future active transportation projects. Given that LTS levels for biking and walking are influenced by slightly different factors, the breakdown for BLTS and PLTS varies slightly.

Figure 6: LTS Level Breakdown

Source: Fehr & Peers, 2023.

Pedestrian facilities in Puyallup consist of sidewalks and shared-use trails. The LTS value assigned to a roadway is based on the roadway classification and presence of pedestrian facilities. **Table 2** illustrates the breakdown of PLTS values. In **Figure 7**, major arterials within the city, like Meridian Avenue and 39th Avenue SW, typically receive PLTS 2 given the presence of sidewalks on both sides. Where there are no pedestrian facilities, PLTS 4 is assigned, such as 5th Street SW.

The PLTS value does not account for roadway crossing comfort, sidewalk quality, consider if accessibility standards are met, or account for factors such as landscaping strips and greater horizontal separation from high-speed roadways. When designing pedestrian projects, developers and the City should consider these pedestrian comfort factors in addition to the presence or lack of sidewalks on both sides of the roadway.

Table 2: Pedestrian Level of Traffic Stress Table

Roadway Classification	Pedestrian Facility			
	No Ped Facility	Sidewalk One Side	Sidewalk Both Sides	Separated Path/Trail
Local	4	2	1	1
Minor Collector	4	3	2	1
Major Collector	4	3	2	1
Minor Arterial	4	3	2	1
Major Arterial	4	3	2	1

Source: Fehr & Peers, 2023.

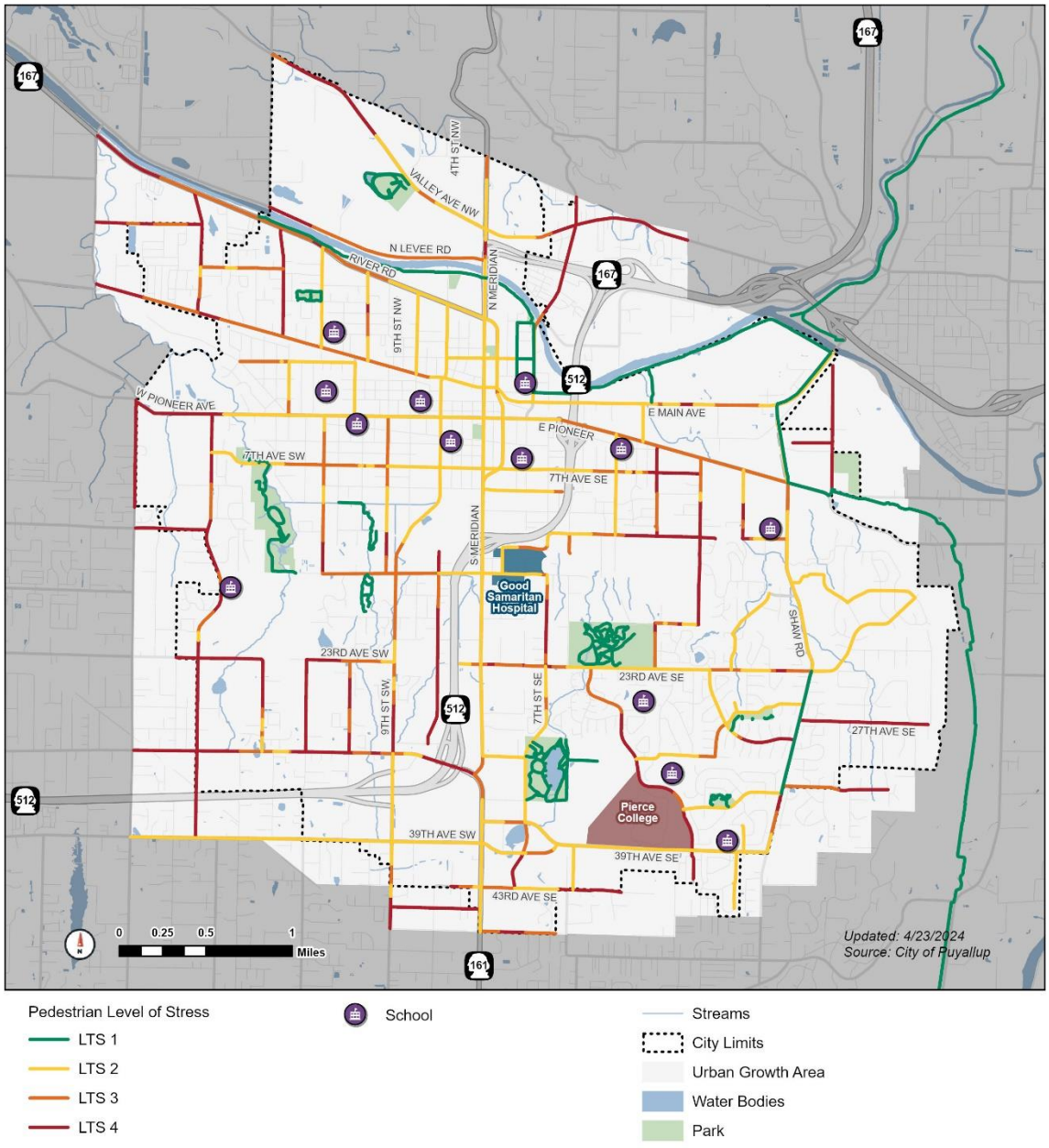


Figure 7: Existing Pedestrian Level of Traffic Stress

Source: Fehr & Peers, 2023.

The existing bicycle infrastructure in the city includes significant gaps for cyclists. The breakdown of the BLTS classifications is provided in **Table 3**. This breakdown incorporates factors such as speed limit, Annual Average Daily Traffic (AADT), and presence of bicycle facilities. Although features like striped bike lanes, buffered bike lanes, and separated bike lanes are largely absent in city corridors, they are included for future reference.

The AADT breakdown varies based on speed limits. For instance, a speed limit of 25 miles per hour (mph) categorizes AADT into less than 1,500, between 1,500 and 7,000, and more than 7,000. In contrast, a speed limit above 35 mph does not consider AADT, as the higher speed is uncomfortable for almost all users, unless there is a separated bike lane or shared-use path.

Facilities like shared-use paths consistently receive BLTS 1, as they are entirely separated from the roadway and are not affected by vehicular traffic. As illustrated in **Figure 8**, all roadways, except those with shared-use paths, received LTS 4 due to the absence of bicycle facilities in Puyallup. Even areas with sharrows on the map still received LTS 4, given that speeds of 30 mph are high enough for cyclists to perceive a significant level of discomfort.

The LTS analysis pinpoints the gaps within both the bicycle and pedestrian networks. However, it is crucial to acknowledge that both PLTS and BLTS assessments lack considerations for factors such as maintenance, roadway crossings, and facility width, which are crucial in ensuring optimal user experiences. Thus, any formulation of future bike and pedestrian projects in Puyallup should use the PLTS and BLTS map as a reference and holistically address these additional considerations.

Table 3: Bicycle Level of Traffic Stress Table

Roadway Characteristics		Bicycle Facility Component					
Speed Limit (mph)	AADT	No Bicycle Facility	Sharrow	Striped Bike Lane	Buffered Bike Lane (Horizontal)	Separated Bike Lane (Vertical)	Shared Use Path
25	<1,500	4	1	1	1	1	1
	1,500 – 7,000	4	2	2	2	1	1
	>7,000	4	3	2	2	1	1
30	<7,000	4	4	2	2	1	1
	7,000 – 15,000	4	4	3	2	1	1
	15,000 – 25,000	4	4	3	3	2	1
	>25,000	4	4	3	3	2	1
35	<25,000	4	4	3	3	3	1
	>25,000	4	4	4	3	3	1
>35	Any	4	4	4	4	3	1

Source: Fehr & Peers, 2023.

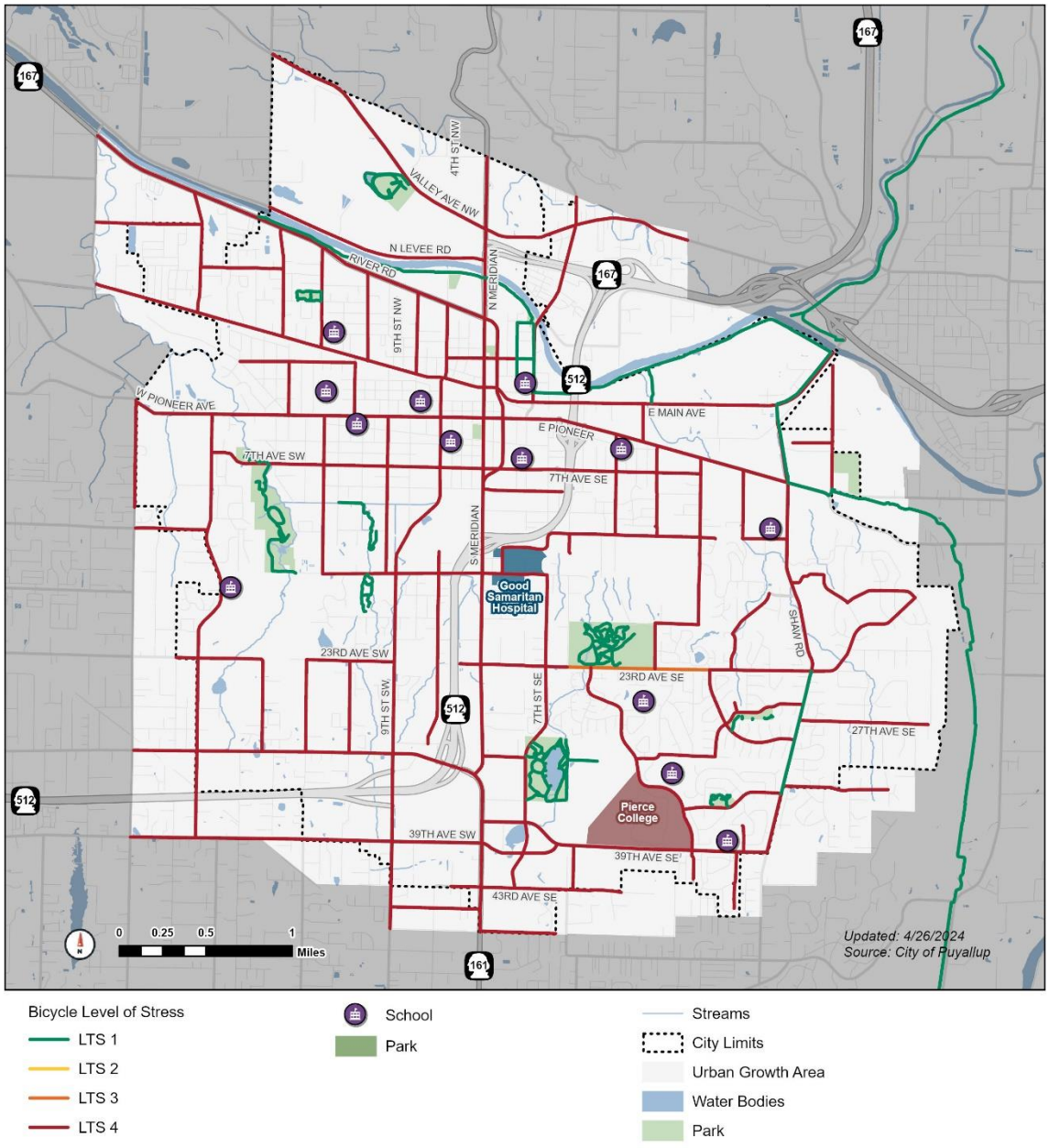


Figure 8: Existing Bicycle Level of Traffic Stress

Source: Fehr & Peers, 2023.

Transit Network

Pierce Transit and Sound Transit jointly provide transit services in Puyallup. Sound Transit facilitates the Sounder S line, connecting Seattle to Pierce County with a stop at Puyallup Station. Pierce Transit operates bus lines, paratransit shuttles, Vanpool, and on-demand transit services within and around the City of Puyallup.

Operating as a commuter train, the S line records an average daily boarding of more than 5,900 as of 2023, based on data available until September according to Sound Transit. This figure significantly contrasts with the over 14,000 boardings reported in 2019.[2]

The Puyallup Sounder Station is located on West Stewart north of Pioneer Park. Sound Transit recently built a 680-stall parking garage west of the station with a pedestrian bridge across 5th Street NW to access the platform.

The S line operates from Lakewood Station to King Street Station in Seattle with seven stops between. Trips from Puyallup to Seattle typically last around 49 minutes, while the reverse route takes approximately 42 minutes. Operating primarily on weekdays to align with commuting patterns, the S line sees northbound trips dominating the morning peak hour, and southbound trips prevailing in the afternoon peak hour. On a typical weekday, the Northbound S line departs from Puyallup station ten times, ranging from 5:03 am to 10:38 am. In the afternoon, three trains depart between 4:18 pm and 5:27 pm. Southbound S line trips feature three morning departures (6:47 am to 8:37 am) and ten afternoon trains (3:17 pm to 7:12 pm).

Currently, Puyallup is served by four bus routes—three from Pierce Transit (400, 402, 409) and one from Sound Transit (578).

Pierce Transit's routes cover distinct areas, including Downtown Tacoma to South Hill Mall (400), Meridian north-south corridor connections (402), and east-west routes mainly within 72nd Street and E Pioneer (409).[3] Sound Transit's 578 route, along with the S line, establishes a direct connection between Puyallup and Seattle. Northbound buses run every 20 minutes during peak hours and operate from 7:22 am to 9:08 pm. The journey from Puyallup Station to various destinations within Seattle takes around 1 hour and 30 minutes. On the southbound route, buses run every 20 minutes during peak PM hours and operate from 4:56 am to 10:50 pm. The travel time from the general Seattle area to Puyallup Station is approximately 1 hour and 20 minutes.[4]

As of March 31st, 2024, Pierce Transit Route 409 has been shortened, and Route 425 is no longer in service. Sound Transit has also suspended service of Route 580, which connected Puyallup

[2] https://www.soundtransit.org/ride-with-us/system-performance-tracker/ridership
[3] https://www.piercetransit.org/pierce-transit-routes/
[4] https://www.soundtransit.org/ride-with-us/routes-schedules

Sounder Station to the South Hill Park and Ride via SR 512, as part of the Spring 2024 service changes.[5]

Impacts of Covid-19 and service changes have impacted transit ridership within Puyallup. In Spring 2023, the S line at Puyallup Station had average weekday boardings of 650 passengers at Puyallup Station, Route 578 had 27 boardings at Puyallup Station, and Route 580 recorded less than 10 boardings within Puyallup on the average weekday.[6]

Pierce Transit's Vanpool service facilitates ridesharing for groups of 3 to 15 individuals who wish to coordinate a carpool for their daily commutes to and from work. Participants can organize a carpool using Pierce Transit's Vanpool vehicles, which are available for those with similar commutes.[7] Fares are based on daily commute mileage.

In addition to paratransit and Vanpool, Pierce Transit's on-demand transit service called Runner started serving the Puyallup area in November of 2023.[8] The Puyallup Runner lets individuals to use their app to request a van that will transport them to destinations within the designated Runner service zone. The service is tailored for areas in Puyallup that might not be served by regular bus routes, and it does so by ensuring that its service is provided within a 15-minute timeframe window. This service is available every day of the week from 7 am to 10 pm. The Spanaway Runner zone also overlaps with a small portion of Puyallup city limits, as depicted in the **Figure 9** below.

[5] https://www.soundtransit.org/get-to-know-us/news-events/news-releases/sound-transit-announces-march-2024-service-change
[6] PT and ST Boardings and Alightings by Route Stop and Month, March – June 2023, provided by Sound Transit Staff
[7] https://www.piercetransit.org/rideshare/
[8] https://www.piercetransit.org/puyalluprunner/

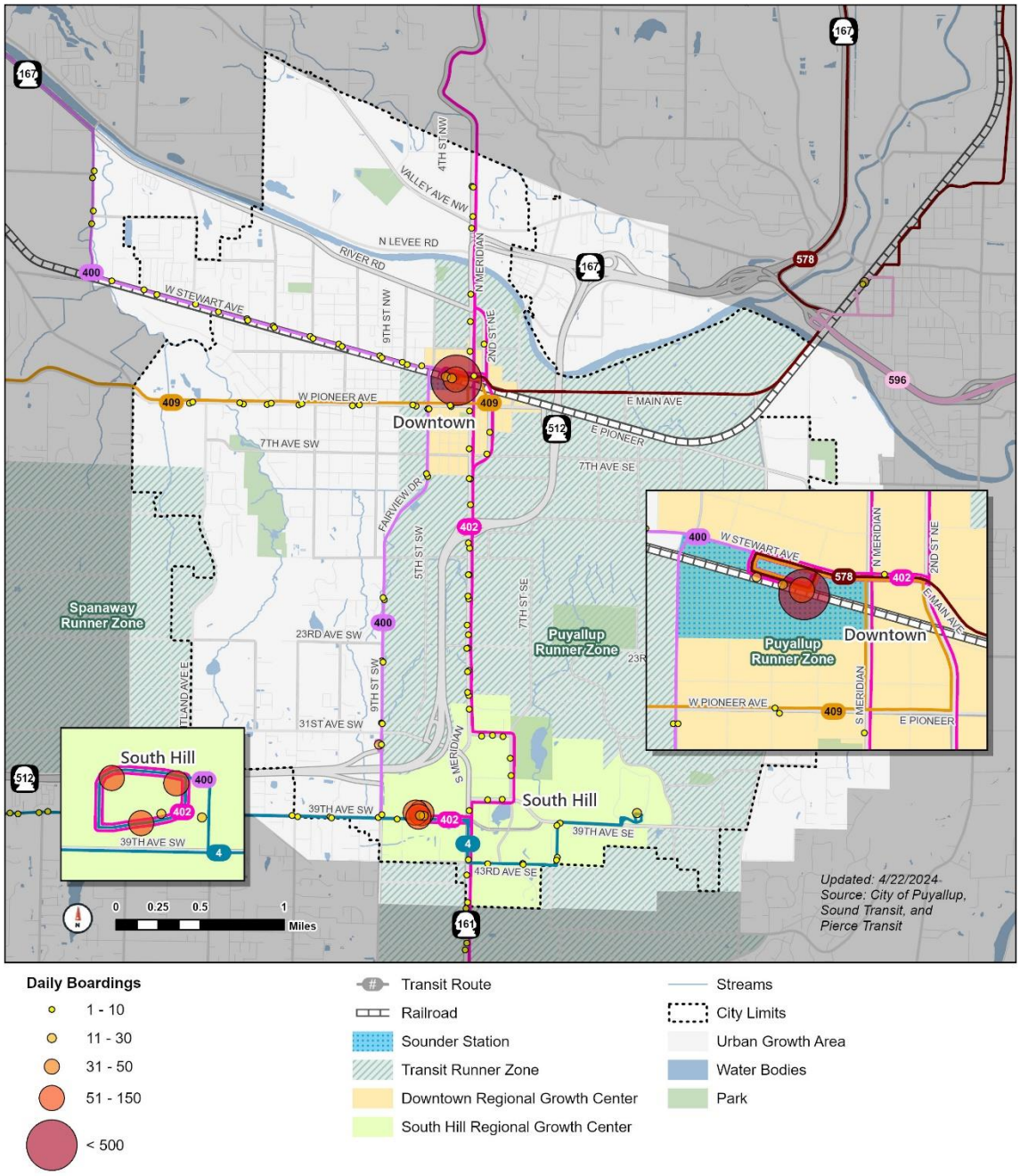


Figure 9: Existing Transit Facilities

Source: Fehr & Peers, 2023.

Freight Network

The Washington State Department of Transportation (WSDOT) employs a classification to designate strategic freight corridors within the state as part of the Freight and Goods Transportation System (FGTS).[9] The classifications (T-1 through T-5) are based on annual freight tonnage moved along a corridor. The breakdown of freight corridor classifications is shown in **Table 4**. In Puyallup, the primary transportation of freight is facilitated through three state routes serving the city: SR 512, SR 167, and SR 161.

SR 512, recognized as a T-1 Freight Corridor by WSDOT, is a freeway that spans the entirety of the city and connects I-5 to SR 167. Another T-1 corridor, Valley Avenue E, serves as a crucial arterial, supporting Puyallup's primary industrial zone to the north of the Puyallup River. SR 167 is designated as a T-1 Freight Corridor freeway east of the SR 512 interchange and classified as a T-2 Freight Corridor along the Puyallup River to the west of the interchange, establishing a connection between Puyallup and the Port of Tacoma. SR 161 south of SR 512 is classified as a T-2 Freight Corridor and links SR 512 with the South Hill Center and areas south of the city. The T-3 Freight corridors include W Stewart Avenue/E Main Avenue, Shaw Road, and Fruitland Avenue, facilitating the distribution of east-west and north south freight traffic on city facilities. 5th Street NE, connecting E Main Avenue to Milwaukee Avenue E, is the only road classified as a T-4 corridor and was recently included as part of WSDOT's latest FGTS update in 2021.

Figure 10 illustrates the WSDOT FGTS freight corridors and additional truck routes assigned by the City of Puyallup. Within the City-designated routes, Fairview Drive and South Meridian act as north-south truck routes, while 39th Avenue SE serves as a freight connection between South Meridian and Shaw Road.

[9] https://wsdot.wa.gov/sites/default/files/2021-12/2021-FGTS-update.pdf

Table 4: WSDOT Freight Classifications in Puyallup

Freight Corridor	Description	Example in Puyallup
T-1	More than 10 million tons of freight per year	SR 512
T-2	4 million to 10 million tons per year	SR 161, SR 167
T-3	300,000 to 4 million tons per year	W Stewart Avenue, E Main Avenue, Fruitland Avenue E, Shaw Road E
T-4	100,000 to 300,000 tons per year	5th Street NE
T-5	At least 20,000 tons in 60 days	No streets classified

Source: WSDOT, Fehr & Peers, 2023

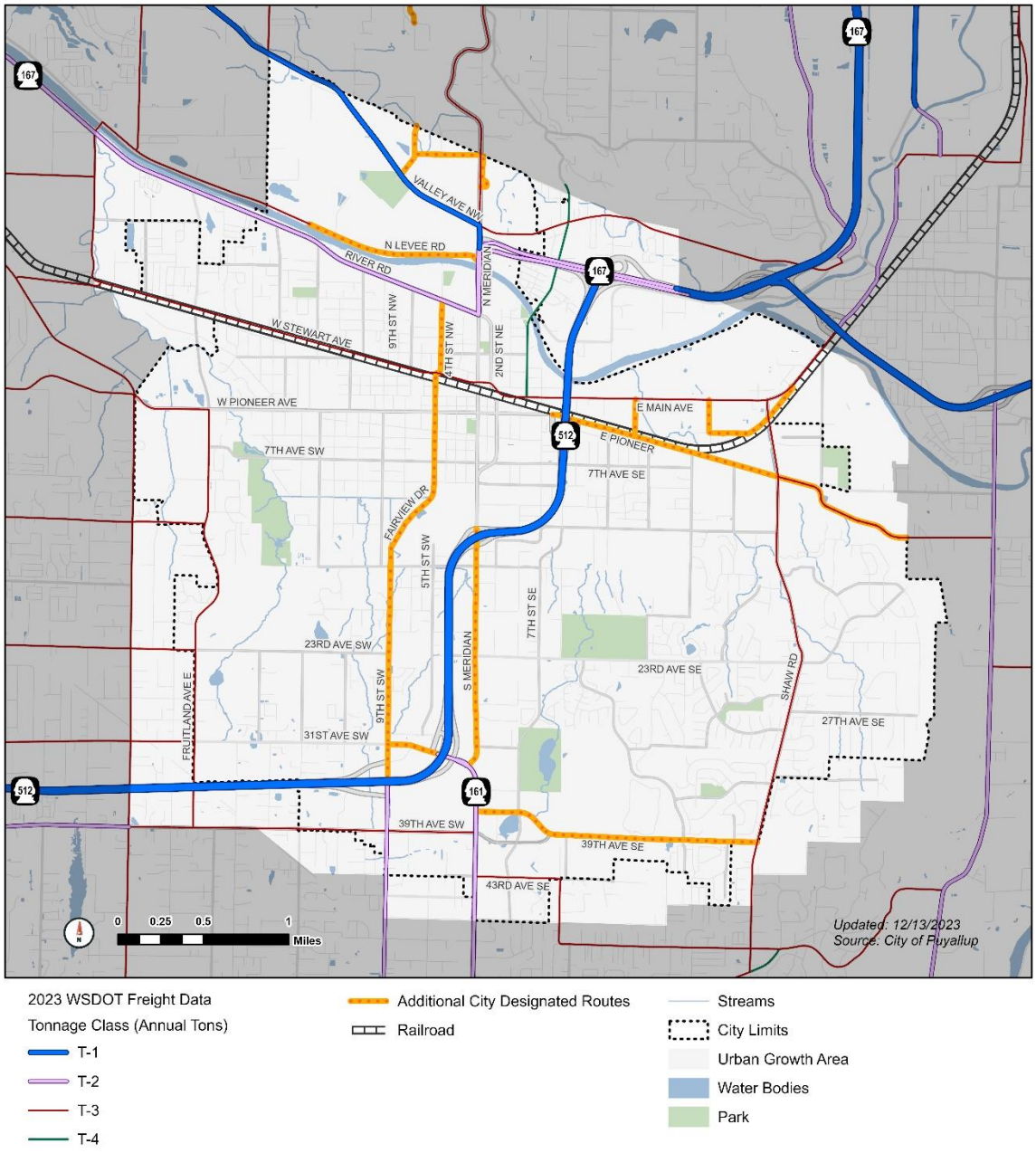


Figure 10: Existing Freight Routes

Source: WSDOT, Fehr & Peers, 2023

Automobile Network

With Puyallup's transportation network being used by both local and regional traffic, major corridors in the city have experienced a substantial growth in traffic volume between 2015 and 2023. The transportation network was evaluated based on traffic counts and roadway conditions compiled in 2023, representing existing conditions.

As part of the Comprehensive Plan Update, traffic operations were assessed at 40 intersections, both signalized and unsignalized, throughout the city. These intersections are situated along critical junctions and corridors and were selected in consultation with City staff. Out of the 40, 24 were also evaluated as part of the 2015 Comprehensive Plan, and others were added based on engineering judgement and discussions with staff.

This section discusses the methodology and findings from the traffic operations analysis under existing conditions and evaluates how well the existing system may be serving both local and regional needs.

Delay and Level of Service

Intersection-level delay (measured in seconds per vehicle) and level of service (LOS) will be the primary measures of intersection performance for the traffic operations analysis.

The *Highway Capacity Manual* (HCM) defines delay as "delay brought about by the presence of a traffic control device including delay associated with vehicles slowing in advance of an intersection, the time spent stopped on an intersection approach, the time spent as vehicles move up in the queue, and the time needed for vehicles to accelerate to their desired speed."

LOS is a term that qualitatively describes the operating performance of an intersection and is a standard method for characterizing delay at an intersection. For signalized and AWSC intersections, the LOS is based on the average delay for all approaches. For TWSC intersections, the movement with the highest delay is used. LOS is reported on a scale from A to F, with A representing the lowest delays and F the highest. **Table 5** provides a brief description of each LOS letter designation based on the HCM, 6th Edition.

Table 5: Level of Service Descriptions

LOS	Description
A	Free-flowing conditions.
B	Stable operating conditions.
C	Stable operating conditions, but individual motorists are affected by interaction with others.
D	High density of motorists, but stable flow.
E	Near-capacity operations, with significant delay and low speeds.
F	Over capacity, with excessive delays and forced, unpredictable flows.

Source: Fehr & Peers descriptions, based on Highway Capacity Manual, 6th Edition.

The existing level of service policy in the City of Puyallup sets the following standards:

- LOS E for intersections on Meridian, Shaw Road and 9th Street SW
- LOS D for all other intersections in the city

The LOS standards applicable to each study intersection are noted in **Table 6**.

Traffic Operations Methodology

To understand traffic operations in the City of Puyallup, the project team utilized Synchro 11 traffic operations analysis software. The baseline year for the existing conditions analysis was determined to be 2023, and the analysis was carried out for the PM Peak Hour (4 PM to 5 PM). All intersections were assessed for delay and LOS using the HCM 6th Edition methodology. All study intersections are listed in **Table 6** and depicted in **Figure 11**.

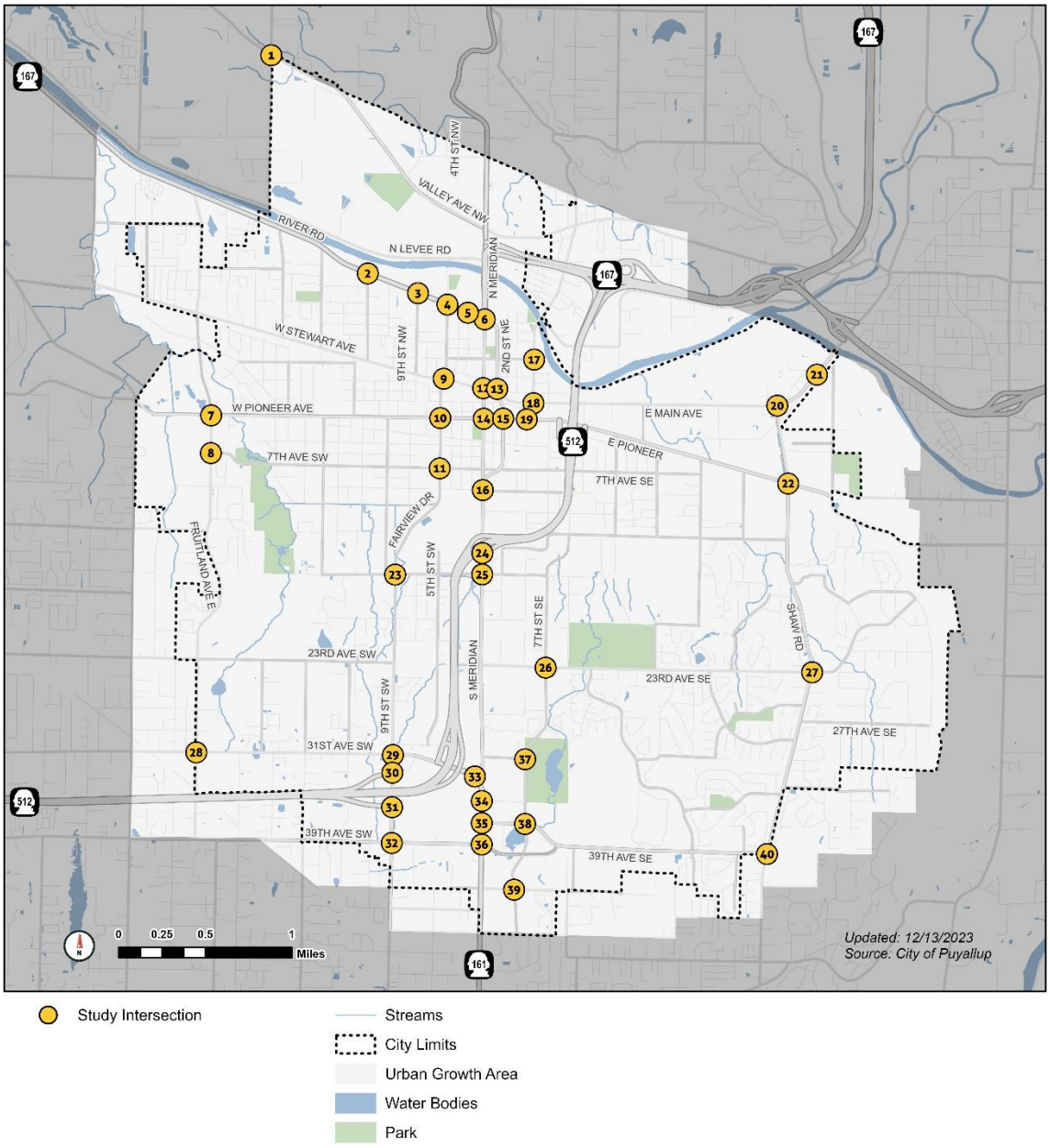


Figure 11: Study Intersections

Source: Fehr & Peers, 2023

Turning movement counts for the existing conditions analysis were collected for 20 intersections on June 21, 2023, as part of a traffic impact analysis within the city. The intersections for which counts were collected are noted in **Table 6**, with "Counts" as their data source. Due to lower than typical volumes on this day, adjustments were made to those 20 counts based on signal detection data and engineering judgement. Pedestrian, bicycle and heavy vehicle data was also collected during this period.

StreetLight Data was used to obtain turning movement volumes for the remaining intersections. StreetLight Data is an online platform that retrieves and processes Connected Vehicles Data (CVD) to estimate turning movement volumes at intersections. StreetLight Data allows users to select date ranges, days of week, and hours of day, and produces outputs based on an aggregation and expansion of all CVD trips available in that range. It does not provide turning movement counts for a specific date and time, but may be representative of the typical traffic behavior expected in a date range during a time range. For the StreetLight turning movement volumes, data was aggregated for a period from March 1 to May 31, 2023, Tuesdays through Thursdays, 4 to 5 PM. Although turning movement counts were collected in June 2023, the month was excluded from the StreetLight Data download because of lower than typical volumes, potentially related to the end of the school year.

For the operations analysis, the peak hour factor (PHF) was calculated using data from the 20 intersections where counts were available. The PHF measures variation of traffic demand and is the ratio of the average 15-minute count to the maximum 15-minute count in the peak hour. It is always less than 1, and a high PHF represents traffic flow that is evenly distributed between the four 15-minute segments that make up an hour. A low PHF represents traffic that is significantly higher in the busiest 15 minutes than it is during the remaining hour. For this analysis, 15-minute counts were summed for the 20 intersections, and the PHF was calculated using these sums. The PHF value, 0.96, was then applied to all intersections. This high PHF reflects that commute from work congestion likely spreads trips across the peak hour more evenly than in areas with less congestion.

Conflicting pedestrian volumes were determined using counts, where available. Conflicting pedestrian volumes were assumed to be 5 per hour for any movements where counts were not available, or where counts were less than 5 pedestrians per hour.

Heavy vehicle volumes were used to determine intersection-specific heavy vehicle percentages where counts were available. For all other intersections, a heavy vehicle percentage of 2% was used.

Traffic Operations Analysis Results

The results of the operations analysis are shown in **Table 6** and **Figure 12**.

Table 6: Intersection Delay and Level of Service

#	Intersection Name	Control	Data Source	LOS Standard	LOS	Delay (sec/veh)
1	Freeman Road E & Valley Avenue E	Signal	StreetLight	D	C	23
2	11th Street NW & River Road	Signal	StreetLight	D	B	18
3	7th Street NW & River Road	Signal	StreetLight	D	B	13
4	4th Street NW & River Road	Signal	StreetLight	D	A	6
5	River Road & Fred Meyer Access	Signal	StreetLight	D	B	12
6	N Meridian & River Road-/2nd Street NE	Signal	StreetLight	D	D	54
7	S Fruitland & W Pioneer	Signal	StreetLight	D	B	16
8	**S Fruitland & WSU Driveway/7th Avenue SW**	**TWSC**	**StreetLight**	**D**	**F**	**>180**
9	**5th Street NW/4th Street NW & W Stewart Street**	**Signal**	**Counts**	**D**	**E**	**71**
10	5th Street SW & W Pioneer	Signal	Counts	D	D	40
11	5th Street SW & 7th Avenue SW	Signal	Counts	D	C	30
12	**N Meridian & W Stewart Street/E Stewart Street**	**Signal**	**Counts**	**E**	**F**	**91**
13	2nd Street NE & E Stewart Street/E Main	Signal	Counts	D	C	26
14	S Meridian & W Pioneer/E Pioneer	Signal	Counts	E	E	63
15	3rd Street SE & E Pioneer	Signal	Counts	D	D	36
16	S Meridian & 9th Avenue SW/9th Avenue SE	Signal	Counts	E	E	60
17	5th Street NE & 5th Avenue NE	TWSC	StreetLight	D	D	31
18	5th Street SE/5th Street NE & E Main	Signal	Counts	D	D	42
19	5th Street SE & E Pioneer	Signal	Counts	D	C	34
20	Shaw Road E & E Main	Signal	StreetLight	E	D	39
21	**E Main & 5th Avenue NE**	**TWSC**	**StreetLight**	**D**	**F**	**61**
22	Shaw Road & E Pioneer	Signal	StreetLight	E	E	71
23	9th Street SW/Fairview Drive & 15th Avenue SW	Signal	Counts	E	B	16
24	S Meridian & SR 512 EB Ramps	Signal	Counts	E	B	11

#	Intersection Name	Control	Data Source	LOS Standard	LOS	Delay (sec/veh)
25	S Meridian & 15th Avenue SW/15th Avenue SE	Signal	Counts	E	E	78
26	**7th Street SE & 23rd Avenue SE**	**AWSC**	**Counts**	**D**	**E**	**36**
27	Shaw Road & 23rd Avenue SE	Signal	StreetLight	E	D	43
28	**Fruitland Avenue & 104th Street E/31st Avenue SW**	**AWSC**	**StreetLight**	**D**	**F**	**169**
29	**9th Street SW & 31st Avenue SW**	**Signal**	**Counts**	**E**	**F**	**99**
30	9th Street SW & SR 512 WB on ramp/SR 512 on ramp	Signal	StreetLight	E	D	50
31	9th Street SW & SR 512 EB off ramp/SR 512 off ramp	Signal	StreetLight	E	D	53
32	9th Street SW & 39th Avenue SW	Signal	StreetLight	E	D	41
33	31st Avenue SW & S Meridian	Signal	Counts	E	D	52
34	S Meridian & 35th Avenue SE	Signal	StreetLight	E	E	64
35	S Meridian & 37th Avenue SE	Signal	Counts	E	E	69
36	S Meridian & 39th Avenue SW/39th Avenue SE	Signal	Counts	E	D	41
37	5th Street SE & 31st Avenue SE	Signal	Counts	D	C	22
38	5th Street SE & 37th Avenue SE	Signal	Counts	D	D	38
39	5th Street SE & 43rd Avenue SE	Signal	StreetLight	D	C	31
40	Shaw Road E/Shaw Road & 39th Avenue SE	Signal	StreetLight	E	E	76

Note: Intersections in **bold** do not meet their LOS threshold.
Source: Fehr & Peers, 2023.

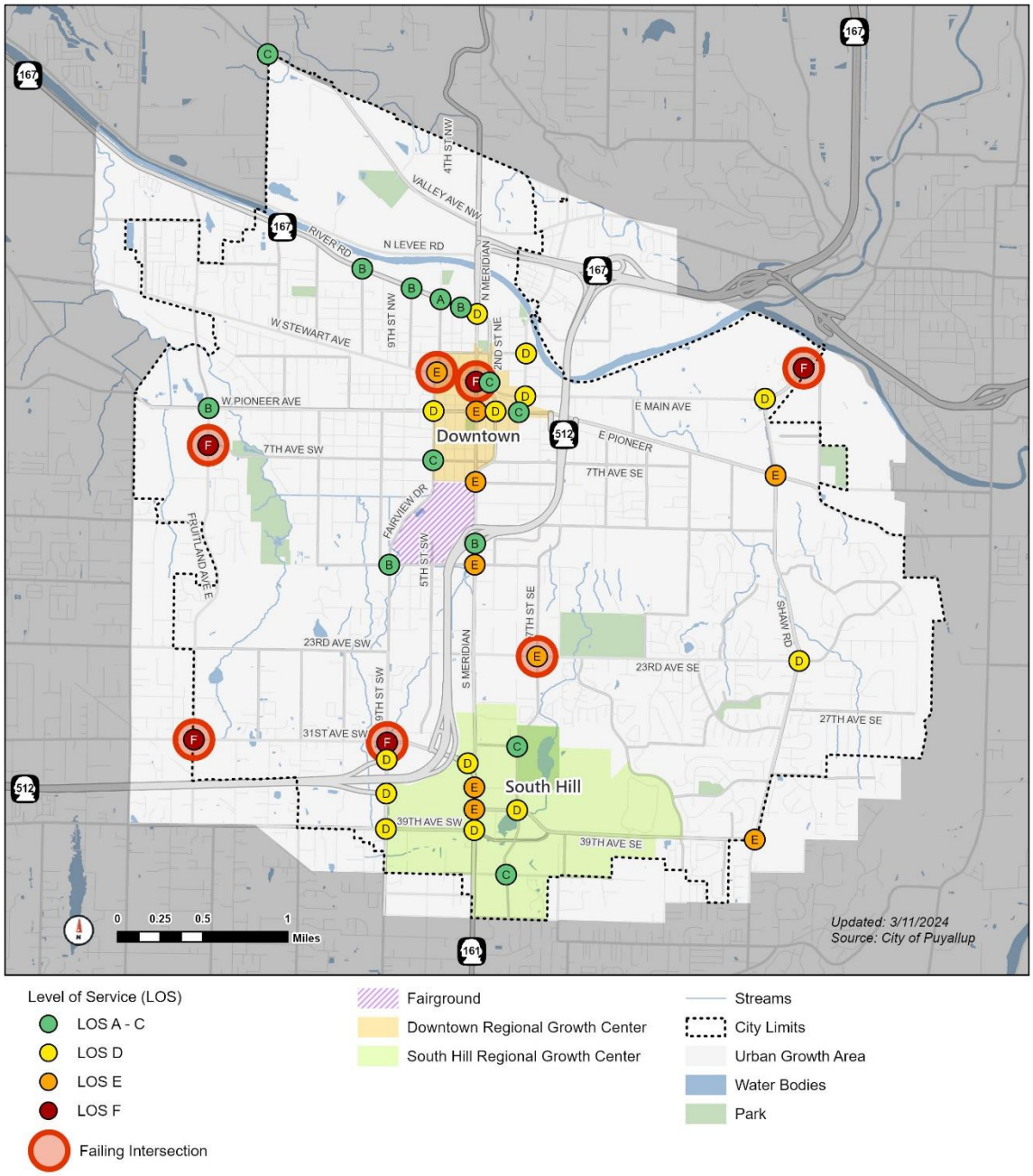


Figure 12: Intersection Level of Service

Source: Fehr & Peers, 2023

Out of the 40 intersections analyzed, seven were failing based on the City's adopted LOS standards (four stop controlled and three signalized). Five of these intersections had an LOS of F, and two had an LOS of E. In general, these intersections are located along key north-south arterials. Barriers including the Puyallup River, the rail line, a disconnected street network, and SR 512 funnel congestion to the few arterials that cross these barriers, which results in higher reported delays.

S Meridian/SR 161 serves as a major regional facility providing access to SR 512 and SR 167 from unincorporated communities like South Hill and Graham. The combination of regional and local traffic and congestion on SR 512 often means S Meridian operates at or over capacity during peak hours. Drivers use parallel north-south roadways in the city to avoid those conditions, which results in other facilities experiencing high demand.

Two of the four stop-controlled intersections are along S Fruitland where high east-west volumes intersect with a key north-south facility. The Fruitland & 7th Avenue SW TWSC intersection reported the highest delay of the study intersections, which corresponded to the westbound left turning movement from the minor street. Longer wait times for traffic on the westbound approach may be due to high volumes along the uncontrolled major street approaches, which conflict with high westbound left turning volumes. People turning westbound left are likely to travel from the downtown area to Fruitland Avenue E to avoid southbound congestion on 9th Street SW and S Meridian.

31st Avenue SW has high east-west volumes from vehicles exiting SR 512 westbound to access the South Hill area. Fruitland and 9th St SW are two significant north-south corridors that intersect 31st Avenue SW. The combined volumes at these intersections result in higher delays.

The 7th Street SE & 23rd Avenue SE intersection is an AWSC intersection that fails with a delay of 36 seconds per vehicle. The westbound approach experiences the highest volume and delay, which may be attributed to drivers turning onto 7th Street SE from S Meridian to avoid north-south congestion.

The fourth failing stop control intersection is E Main & 5th Avenue NE (TWSC). E Main serves as a main arterial to the City of Puyallup for vehicles traveling from SR 410 or the Sumner area and has high westbound volumes in the PM peak hour. Vehicles waiting to turn left at the stop sign on 5th Avenue NE can experience delays of over 60 seconds waiting for gaps in traffic to enter E Main. Even with relatively low left turn volumes and the median to accommodate two-staged left turns, vehicles can have a difficult time finding gaps due to the constant flow of westbound traffic from Traffic Avenue and SR 410.

In the Downtown Regional Growth Center, there are two failing signalized intersections. 5th Street NW/4th Street NW & W Stewart Street fails with an LOS of E and N Meridian & W/E Stewart Street fails with an LOS of F and over 90 seconds of delay. Both signalized intersections have

limited capacity to move north-south volumes due to the railroad crossings to the south. Due to the limited capacity, queues can develop and can impact other intersections. 5th Street SE/NE & E Main is an example of an intersection near failing with limited capacity due to rail operations during the peak hour. N Meridian & W/E Stewart Street has the highest delay of the signalized study intersections.

The 2023-2028 Transportation Improvement Plan (TIP) adopted by the City Council includes improvements to address performance needs at both intersections. Corridors with multiple intersections near LOS thresholds include S Meridian/SR 161 by the South Hill Mall, Shaw Road E, and E Pioneer in the downtown area. Corridor and intersection improvements are also planned for some of those locations.

Safety

Collision data was obtained from WSDOT[10] to identify safety hotspots and overall collision trends for the City of Puyallup. The analysis covered a five-year period from January 2018 to December 2022, the most recent available data. The analysis revealed a total of 4,364 reported collisions within city limits. Of these, 76 incidents included pedestrians and 40 involved bicyclists. Within this dataset, 67 cases resulted in serious injuries, with 11 affecting pedestrians and 6 involving bicyclists. Additionally, there were 18 fatalities, with 6 incidents specifically affecting pedestrians. **Table 7** provides a breakdown of collisions by injury severity and a comparison to city averages state-wide.

Killed or Seriously Injured (KSI) collisions make up ~3% of total collisions. However, when vulnerable users (pedestrians and bicyclists) are involved, there is a greater share of minor injury and KSI resulting from the collision. While the sample size for pedestrians and bicycle collisions are small, the percentages are indicative of their vulnerability on the vehicle network. Further analysis is necessary to determine potential deficiencies on the pedestrian, bicycle, and vehicle facilities that may result in higher KSI percentages.

The percentages of collisions by mode for the City of Puyallup compared to all jurisdictions state-wide seem to reflect a demand for protected/separated facilities. Vehicle speeds, facility conditions, active transportation treatments, and other variables can affect safety conditions. Existing plans include projects to add bike lanes, traffic calming treatments, and shared-use paths within city limits.

Figure 13 displays a heat map illustrating all-modes collisions across the study area, visually representing collision density, with darker regions indicating higher concentrations of collisions. **Figure 14** presents all pedestrians and **Figure 15** presents all bicycle collisions during the same timeframe. Killed or Seriously Injured (KSI) collisions are highlighted with separate points.

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[10] *Under 23 U.S. Code 148 and 23 U.S. Code 407, safety data, reports, surveys, schedules, list compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such report, surveys, schedules, lists, or data.*

Table 7: Collisions by Injury Severity

Severity	Number of Collisions	City-Wide	Washington Cities
All Collisions		**Percentage of All Collisions**	
Property Damage Only	3,125	72%	68%
Minor injury (Including Possible and Unknown Injuries)	1,154	26%	30%
Serious Injury	67	2%	2%
Fatality	18	<1%	<1%
Total	4,364	-	-
Vehicle-to-Pedestrian Collisions		**Percentage of Pedestrian Collisions**	
Property Damage Only	0	0%	2%
Minor injury (Including Possible and Unknown Injuries)	59	78%	74%
Serious Injury	11	14%	19%
Fatality	6	8%	5%
Total	76	-	-
Vehicle-to-Bicycle Collisions		**Percentage of Bicycle Collisions**	
Property Damage Only	3	8%	6%
Minor injury (Including Possible and Unknown Injuries)	31	77%	83%
Serious Injury	6	15%	11%
Fatality	0	0%	1%
Total	40	-	-

Notes: Does not include SR 512 and Ramp from/to SR 167 to/from SR 512
Source: Fehr & Peers, 2023

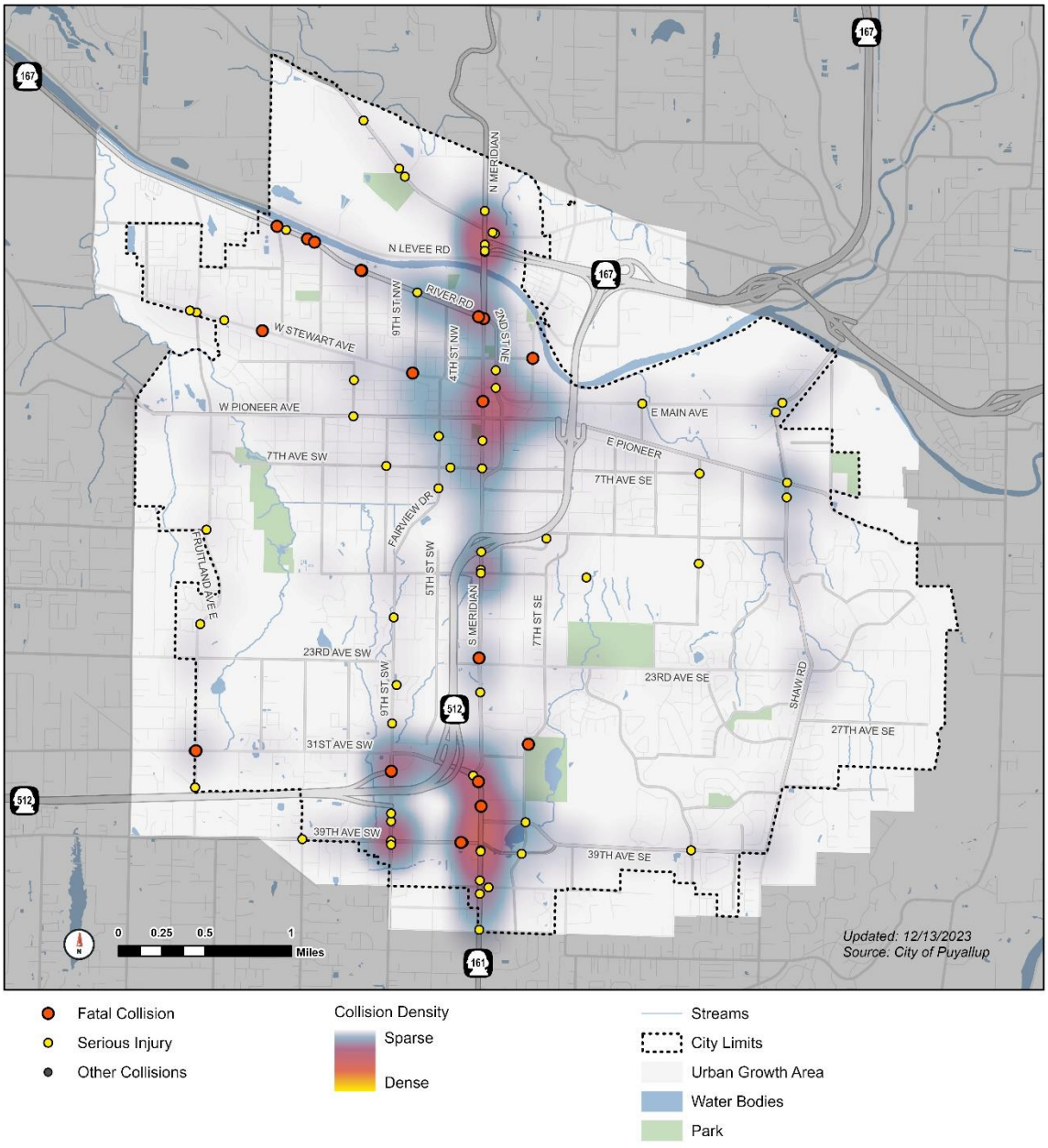

Figure 13: All-Mode Collisions

Source: Fehr & Peers, 2023

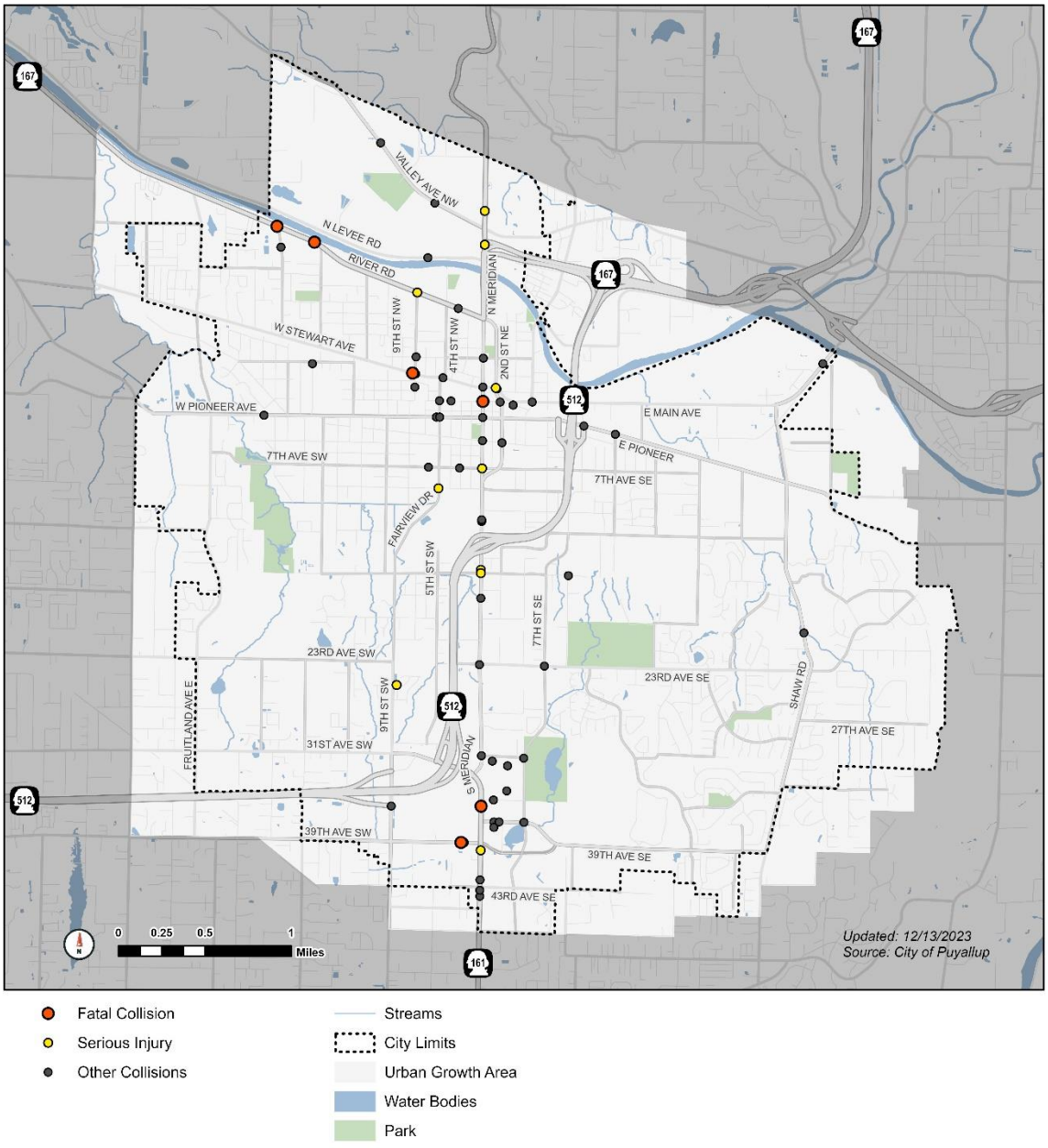

Figure 14: Pedestrian Collisions

Source: Fehr & Peers, 2023

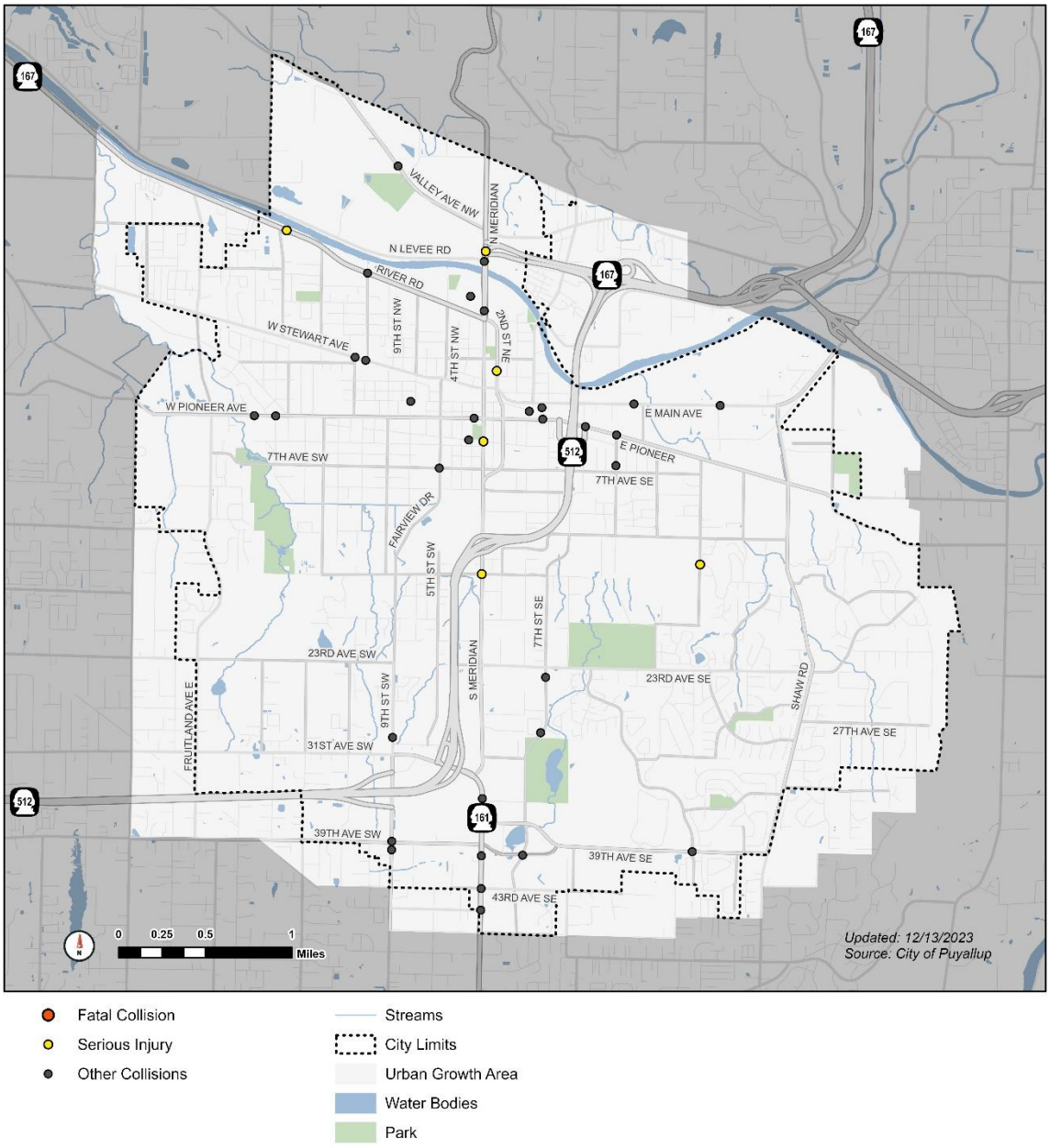

Figure 15: Bicycle Collisions

Source: Fehr & Peers, 2023

Current Trends and Opportunities

This section documents existing trends that will impact Puyallup as it prepares for future growth. Although automobile travel currently dominates the transportation network, Puyallup is working to create an improved multimodal transportation network with better street grid and interconnectivity throughout. Understanding and addressing transportation trends and finding opportunities to realize Puyallup's vision and goals will be key to its success.

Active Transportation

Downtown Puyallup has a network of sidewalks along major roadways, but gaps exist in the pedestrian network especially in older residential areas and the South Hill area. Some roadways with sidewalks have higher traffic volumes and speeds and some existing sidewalks are not well maintained. Bicycle facilities in the city are limited to a small number of trails and on-street shared facilities. These gaps in infrastructure create challenges for pedestrian and bicycle travel within the city, and limit mobility and access for pedestrians and cyclists between major destinations. Downtown Puyallup and South Hill's designations as regional growth centers in PSRC's VISION 2050 can serve as an opportunity to continue to invest in active transportation and build a more robust and cohesive pedestrian and bicyclist network.

Electric Vehicle Infrastructure

With electric vehicles (EVs) becoming more common, the city is in need of more vehicle charging infrastructure that can serve the needs of the existing fleet and encourage greater EV usage. Electric vehicles can help reduce emissions in Puyallup and can play a role in helping the city meet its Environment and Sustainability goals.

Safety

Between 2018 and 2022, Puyallup experienced more than 4,000 collisions with 85 of these resulting in a fatality or suspected serious injury. This accounts for approximately 3% of the total collisions, which is in line with the proportion of fatalities or suspected serious injuries seen across all cities in Washington. The City has made an effort to increase pedestrian safety by investing in pedestrian infrastructure and safer crossings. Sidewalks are generally available along arterials, streets within the central business district, and in newer subdivisions. However, the level of comfort experienced by pedestrians along these facilities is still low, and busy corridors, such as Pioneer and Meridian, have recently seen a significant number of collisions involving pedestrians. Currently, Puyallup does not have a local road safety plan and is therefore not eligible for Highway Safety Improvement Program funding to address critical safety needs. Looking ahead, the City may explore the development of a Comprehensive Safety Action Plan (CSAP) using grant funding from the federal Safe Streets and Roads for All (SS4A) program.

Network Connectivity

Few north-south arterials serve the entire city because barriers, including the Burlington Northern/Santa Fe Railroad and the Puyallup River, limit connectivity. These barriers affect all modes of travel and lead to increased congestion on the north-south arterials. Additionally, SR 512 bisects the center of Puyallup and restricts east-west connections.

These barriers are further exacerbated by low density developments and a lack of connectivity between development projects around the city. There is a desire for greater connectivity for all modes between residences, commercial areas, and employment hubs. The subdivision code regulating new residential developments was amended in previous years, requiring roads to be stubbed out for future connectivity and to require connectivity between existing neighborhoods and new developments.

Active transportation could be an alternative to driving on congested roadways, but the existing infrastructure between major areas of interest suffers from sidewalk gaps, limited-to-no dedicated on street bike infrastructure, a disconnected roadway network, and low levels of comfort.

Local and Regional Growth

Current development activities in the city include industrial and commercial projects, with some multi-family housing. The majority of Puyallup consists of low density residential neighborhoods. Some stakeholders are concerned that increased density will lead to increased traffic and congestion. Growth outside the city will also play a major role in the growing demands on Puyallup's transportation network. Puyallup is working to accommodate both local and regional growth, investing in improving opportunities to travel by all modes.

Transportation Goals

The five goals presented in this section seek to build a shared vision for transportation in Puyallup, supported by the community, City staff, and Council leadership. Under each goal are supporting policies. The goals and policies are rooted in a realistic understanding of what can be implemented and funded over the next twenty years.

The goals and policies were drafted in collaboration with City staff during a workshop that took place on June 13, 2023, and the subsequent review and comment period.

1. **Build a complete system that supports people walking, rolling, and biking, accessing transit, and making regional connections.**
    - Policy T-1.1: Develop a low stress network for walking, rolling, and biking and connect to local and regional trails.

- Policy T-1.2: Coordinate with transit agencies to provide meaningful transit connections and stop improvements in Puyallup.
- Policy T-1.3: Improve streetscapes and intersections to encourage walking, biking and rolling.
- Policy T-1.4: Create Traffic Impact Analysis (TIA) guidelines to ensure that developers help reduce multimodal network gaps.
- Policy T-1.5: Partner with other transportation agencies to deliver a complete multimodal system.
- Policy T-1.6: Develop a multimodal concurrency tracking program to ensure that transportation improvements are built to support growth in travel by all modes and support implementation of Transportation System Management and Operational (TSMO) strategies.
- Policy T-1.7: Coordinate land use and transportation decision making to promote dense development patterns and build stronger connections between housing and employment opportunities.

2. **Prioritize safety and quality of life, especially for the most vulnerable users of our system.**

- Policy T-2.1: Embrace a safe system approach to transportation safety, which comprehensively considers the transportation system: safe road users, safe vehicles, safe speeds, safe roads, and post-crash care.
- Policy T-2.2: Review access management, particularly along key corridors that have a history of severe injury collisions. Where appropriate, invest in roadway improvements that manage access and improve safety.
- Policy T-2.3: In an effort to eliminate serious injuries and fatalities in the network, consider becoming a Vision Zero community and developing a Comprehensive Safety Action Plan.
- Policy T-2.4: Seek external funding and partnerships to implement the Puyallup Safe Routes to School Master Plan, adopted in 2019.
- Policy T-2.5: Maintain quality access for existing neighborhoods.
- Policy T-2.6: Provide transportation options that are accessible and affordable for people of all ages and abilities.
- Policy T-2.7: Review existing and planned uses near Pierce County Airport (Thun Field) and review regulations periodically to discourage incompatible uses.
- Policy T-2.8: Identify racial and social equity as a core objective when planning and implementing transportation improvements, programs, and services.
- Policy T-2.9: Connect jobs, housing, and services, especially for low-income residents and workers.

3. **Move people and goods safely and efficiently.**

- Policy T-3.1: Proactively address congestion on city streets by maintaining the following LOS standard: (Volume to capacity (V/C) ratio of 0.85 for arterial/collector segments in the PM peak hour and LOS D for all intersections in the city)
- Policy T-3.2: Collaborate with regional transportation agencies, including WSDOT, to maintain access to the state system and support the State's level of service policies. (SR 512 LOS standard: D, SR 167 LOS Standard: D, SR 161 LOS Standard within City boundary: E).
- Policy T-3.3: Promote safe, sustainable, and efficient goods movement and delivery to local businesses and homes in Puyallup.
- Policy T-3.4: Enhance multimodal mobility within Puyallup's growth centers.
- Policy T-3.5: Maintain railroad crossings in compliance with Washington Utilities and Transportation Commission requirements.
- Policy T-3.6: Structure key transportation programs and facilities that accommodate development of affordable housing and moving goods to vibrant local businesses.

4. **Minimize our impacts and advance environmental goals.**

- Policy T-4.1: Support vehicle electrification.
- Policy T-4.2: Increase the number of trips made without a car.
- Policy T-4.3: Coordinate with the Environment & Sustainability Action Plan.
- Policy T-4.4: Reduce emissions in areas that are disproportionately affected by pollution, especially historically marginalized communities.
- Policy T-4.5: Seek to reduce stormwater pollution from transportation facilities and improve fish passage.
- Policy T-4.6: Incorporate environmental factors into transportation decision-making, including attention to human health and safety.
- Policy T-4.7: Minimize or eliminate the potentially adverse effects of light, glare, and obstructions on the operation of the Pierce County Airport (Thun Field).

5. **Invest wisely to support a resilient transportation system.**

- Policy T-5.1: Develop redundant lifeline routes in Puyallup that facilitate accessible and equitable evacuation during emergencies.
- Policy T-5.2: Ensure investments are cost effective for both initial capital as well as ongoing operations and maintenance.
- Policy T-5.3: Create upfront lifecycle costs for large infrastructure items (e.g., traffic signals) to help budget for replacement and allocate additional staff/resources for maintenance and operation.

- Policy T-5.4: Maintain a state of good repair for Puyallup's existing transportation network.
- Policy T-5.5: Update the City's transportation impact fee program to ensure growth pays for appropriate mitigation projects.
- Policy T-5.6: Finance transportation facilities within the City's financial capacity. If funding is insufficient, adjust service standards, revise the Land Use Plan, increase existing revenues, or adopt new revenue sources.
- Policy T-5.7: Adopt TDM strategies to lessen the impact on the transportation system capacity.
- Policy T-5.8: Prepare for changes in transportation technologies and mobility patterns.