

MEMORANDUM

DATE: October 23, 2020
TO: Nicholas McMurtrey
FROM: Nate Schroeder, PE, PTOE
SUBJECT: Traffic Analysis – Jennings Ave OR 99E to Oatfield Rd



Project # P19196-000

This memorandum presents the results of the pedestrian crossing analysis completed for possible pedestrian crossing treatments on the segment of SE Jennings Avenue from OR 99E to SE Oatfield Road – in particular, focusing on SE Rose Street, SE Emerald Street/SE Candy Lane and SE Portland Avenue in Clackamas County, OR. The purpose of the analysis was to evaluate the potential pedestrian crossing of SE Jennings Avenue and consider the inclusion of a Rectangular Rapid Flashing Beacon (RRFB) and/or Driver Speed Feedback Sign at any of these unsignalized intersections. The following sections discuss the project background, existing conditions, treatment evaluation, and conclusions and recommendations.

PROJECT BACKGROUND

SE Jennings Avenue is a minor arterial in a densely populated residential area. The Jennings: OR 99E to SE Oatfield Road improvements are approximately $\frac{3}{4}$ of a mile (estimated 3,860 feet) and include constructing a curb tight sidewalk on the north side of the road and constructing bike lanes on both sides of the road for enhanced bicycle and pedestrian connectivity. The study intersections of SE Rose Street and SE Emerald Street/SE Candy Lane were selected because of the existing crosswalk pavement markings and their vicinity to SE Candy Lane Elementary School. Recently, a trail was established that links the north end of SE Portland Avenue to SE Jennings Avenue, connecting directly to the school. Evaluation was performed to assess the potential for enhanced pedestrian crossings at these locations.

EXISTING CONDITIONS

The three study intersections are located between OR 99E and SE Oatfield Road on SE Jennings Avenue, at SE Rose Street, SE Emerald Street/SE Candy Lane and SE Portland Ave. This segment is approximately at the midpoint of the OR 99E to Oatfield Road segment. Each of these streets are side street stop-controlled intersections (Figure 1). Within the project limits, SE Jennings Avenue has one travel lane in both directions and no existing bike lanes and/or sidewalks (Table 1).

VOLUMES

SE Jennings Avenue carries approximately 8,300 daily vehicles (total for both directions) between OR 99E and SE Addie Street, and approximately 8,000 vehicles in both directions between SE Howard Street and SE Oatfield Road. The morning peak-hour volume is approximately 600 vehicles in both directions on both SE Emerald Street/SE Candy Lane and SE Rose Street. The evening peak hour volume is 700 vehicles in both directions on both SE Emerald Street/SE Candy Lane and SE Rose Street. Even though counts were not collected at SE Portland Avenue, it serves only a few residential structures to the north. All the volumes are shown in Figure 1 below.

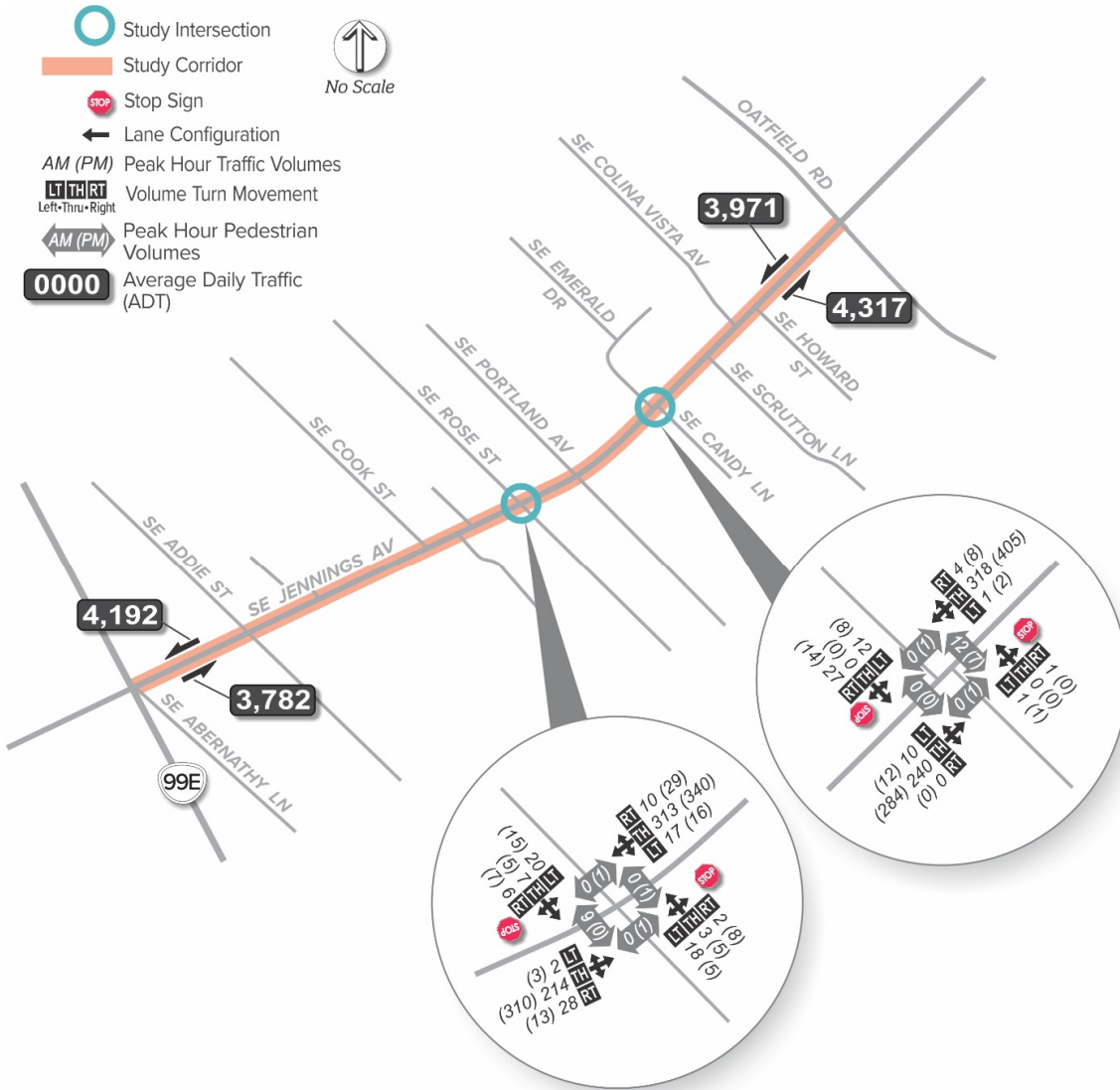


FIGURE 1: STUDY AREA AND EXISTING PEAK-HOUR VOLUMES AND 24-HOUR VOLUMES

SPEED

The posted speed on SE Jennings Avenue is 30 miles per hour (mph). The 85th percentile speed measured was 35 mph in both eastbound and westbound directions between OR 99E and SE Addie Street. This indicates that the majority of the vehicles are traveling above the posted speed limit. The 85th percentile speed measured was 31 miles per hour eastbound and 30 mph westbound, respectively between SE Howard Street and SE Oatfield Road. All the characteristics of SE Jennings Avenue at the three intersections are summarized in Table 1, and the speed and volume data can be found in the appendix.

TABLE 1: SE JENNINGS AVENUE SPEED AND EXISTING CHARACTERISTICS

LOCATION	POSTED SPEED (MPH)	85 TH PERCENTILE SPEED (MPH)	NUMBER OF TRAVEL LANES	LANE WIDTH (FT)	SIDEWALKS	BIKE LANES
SE Jennings Avenue between OR 99E and SE Addie Street	30	35	2	10	No	No
SE Jennings Avenue between SE Howard Street and Oatfield Road	30	31	2	10	No	No

COLLISION ANALYSIS

In order to evaluate the relative safety of the roadway segment within the project limits, the most recent five years of collision history was obtained for SE Jennings Avenue between OR 99E and SE Oatfield Road and the study intersections in between.

Collision rates at study intersections were calculated to identify problem areas in need of mitigation. The total number of collisions experienced at an intersection is typically proportional to the number of vehicles entering it. Therefore, a collision rate describing the frequency of collisions per million entering vehicles (MEV) is used to evaluate the rate at intersection. This collision rate (referred to as the observed collision rate) is compared to the critical collision rate, which is based on the 90th-percentile statewide crash rates for similar intersections.¹ Intersections with an observed collision rate greater than the critical collision rate warrant further review. The collision rates calculated for the three study intersections can be seen in Table 2. None of the observed crash rates at the study intersections exceed the critical collision rate for similar intersections. However, the intersection at SE Jennings Avenue and SE Rose Street had an injury collision involving a pedestrian.

¹ Oregon Department of Transportation, *Analysis Procedure Manual*, Chapter 4. Exhibit 4-1 Intersection Crash Rate per MEV by Land Type and Traffic Control.

TABLE 2: COLLISION RATES AT STUDY INTERSECTIONS (2013-2017)

LOCATION	COLLISION SEVERITY			COLLISION TOTAL	SEGMENT CRASH RATE (MVMT) ²	STATEWIDE AVERAGE RATE (MVMT) ³
	FATAL	INJURY	PROPERTY DAMAGE ONLY			
Jennings/Rose	0	2	1	3	0.23	0.408
Jennings/Emerald	0	1	1	2	0.15	0.408
Jennings/Portland	0	0	1	1	0.07	0.408

The segment collision rate along SE Jennings Avenue from east of OR 99E to Oatfield Road was calculated to complement the intersection-based analysis and provide a more complete picture of roadway safety. The segment collision rate was determined by dividing the number of collisions everywhere on the segment by the total vehicle traffic along the segment and are reported in collisions per million vehicle miles traveled (MVMT). The calculated collision rates were compared to the five-year average of statewide crash rates for similar facilities. The crash rates calculated for the segment can be seen in Table 3, showing that it exceeds that of the statewide average rate by a fraction. However, it is important to note that more than 60 percent of the crashes result in an injury crash.

TABLE 3: CRASH RATE AT SE JENNINGS AVENUE SEGMENT (2013-2017)

LOCATION	COLLISION SEVERITY			COLLISION TOTAL	SEGMENT CRASH RATE (MVMT) ²	STATEWIDE AVERAGE RATE (MVMT) ³
	FATAL	INJURY	PROPERTY DAMAGE ONLY			
SE Jennings Avenue	1	19	11	31	2.79	2.77

TREATMENT EVALUATION

CROSSING TREATMENT EVALUATION

Treatment options for the proposed crossing were evaluated based on the research contained in the National Cooperative Highway Research Program (NCHRP) Report 562² and the 2009 Manual on Uniform Traffic Control Devices (MUTCD). These resources identify various categories of crossing treatments such as:

- **Crosswalk** – crossing marked with pavement markings only.
- **Enhanced and/or high visibility** – devices and treatments that enhance the visibility of the crossing and the ability of pedestrians to cross the street. Examples include warning signs, in-roadway signs, median refuge islands, or added pavement markings.
- **Active when present** – devices that display a warning only when pedestrians are present or actively crossing the street. Examples include flashing amber beacons, rectangular rapid flashing beacons (RRFB), or pedestrian crossing flags.
- **Red signal or beacon** – devices that display a circular red indication to motor vehicles. Examples include half signals and pedestrian hybrid beacons (PHBs).
- **Traffic signal** – standard traffic signal control devices on all approaches.

Factors such as pedestrian crossing activity, crossing distance, traffic volumes, vehicle speeds, and the contextual surroundings are all considered in determining the recommended treatment. Figure 1 highlights the pedestrian crossings of the study intersections of SE Jennings Avenue. This data collected on a typical Thursday morning between 7:00 AM and 9:00 AM showed that when students were present, over 20 pedestrians crossed SE Jennings Avenue, cumulatively (12 at SE Emerald Street/SE Candy Lane and 9 at SE Rose Street).³

Based on existing traffic conditions and the guidance in NCHRP Report 562, potential crossings were evaluated at the SE Jennings Avenue intersections with SE Emerald Street/SE Candy Lane and SE Rose Street, which are all within or in proximity to a school zone. With access to pedestrian crossing data limited to morning and evening peak time hours, each option used a range of values to determine which thresholds would warrant various treatment options. Results indicate that these intersections would warrant raised medians, curb extensions or traffic calming methods. An “Active when Present” treatment is considered at a minimum threshold of 14 pedestrians (which neither SE Rose Street nor SE Emerald Street/SE Candy Lane would meet on their own). The intersection at SE Jennings Avenue at SE Emerald Street/SE Candy Lane nearly meets this threshold and would be a candidate for an “Active when Present” treatment if motorist compliance is deemed to be low.

Even though pedestrians utilize the marked crossings at SE Rose Street and SE Emerald Street/SE Candy Lane in similar numbers, SE Rose Street is less utilized. The proposed north sidewalk and a direct trail link to the elementary school at SE Portland Avenue would make a marked crossing at

² Improving Pedestrian Safety at Unsignalized Crossings, NCHRP Report 562, 2006.

³ Counts collected by Key Data Network on Thursday 21, 2019.

this intersection more appropriate, as it provides a more direct connection with the school. SE Rose and SE Portland Avenue are only 300 feet apart, making it redundant to maintain both marked crosswalks. Therefore, it is recommended that the existing marked crossing at SE Rose Street be relocated to SE Portland Avenue, east of the intersection, to provide better connectivity. Relocating the crosswalk will also constitute relocating the school speed zone and update the signing to current standard.

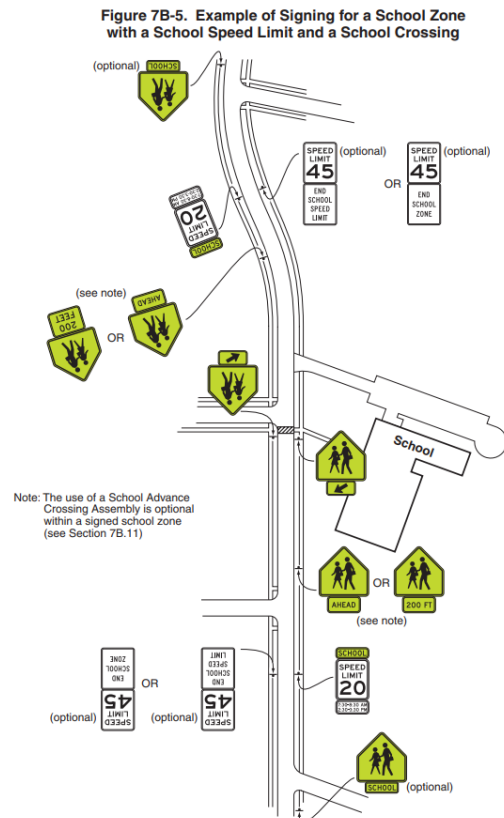
SPEED RADAR FEEDBACK SIGN

The posted speed limit along SE Jennings Ave is 30 MPH and is based on the observed free-flow 85th-percentile speed, or the level at or under which 85 percent of people are driving. The observed 85th-percentile speeds in both directions of SE Jennings Avenue were measured to be between 31 and 35 MPH. Since adding sidewalks and bicycle lanes could lead to potentially more pedestrian crossings in the future, and because measured vehicle speeds are slightly above the posted speed, a driver speed feedback sign is an advisable, flexible, and low-cost option for traffic calming.

CONCLUSIONS AND RECOMMENDATIONS

Based on these results, the following insights and recommendations were generated:

- Using the County’s sight-distance analysis, it was confirmed that there is adequate sight distance at SE Portland Avenue to relocate the existing pedestrian crossing at SE Rose Street.
- Relocate the existing school crossing from SE Rose Street to the SE Portland Avenue.
- Install traffic control devices consistent with signing and marking a school zone with school speed zone and school crossing (Figure 7B-5 of the MUTCD and as shown below).
- Install an RRFB at the SE Portland Avenue crossing.
- Install driver speed feedback signs approaching the school speed zone.



Source: MUTCD 2009 Edition (Page No- 740)