



## MEMORANDUM

TO: John M. Lewis, P.E., Public Works Director

FROM: Vance Walker, Assistant Public Works Director  
Jayson Thornberg, Street Operations Manager  
Dayna Webb, P.E., Senior Project Engineer

DATE: April 29, 2019

SUBJECT: Molalla Avenue & Pearl Street Intersection Review

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We visited the site on April 25, 2019 @ 9am to review and observe the intersection. Additionally, we drove through the intersection and observed the visibility of pedestrians within the intersection.

### General Information:

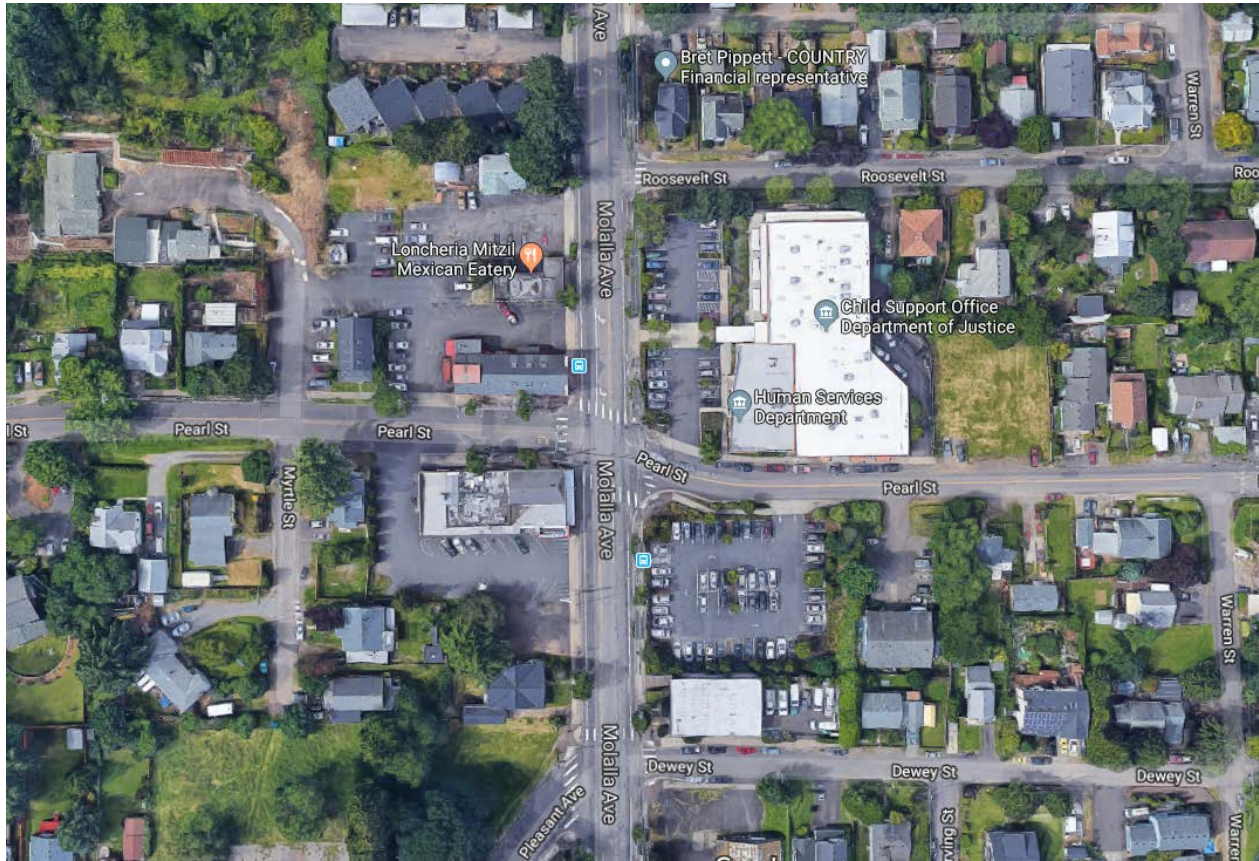
|  | <b>Molalla Avenue</b> | <b>Pearl Street</b> |
|--|-----------------------|---------------------|
| <b>Roadway Classification</b>                  | Major Arterial        | Collector           |
| <b>Posted Speed</b>                            | 30 mph                | 25 mph              |
| <b>Bike Lanes</b>                              | Yes                   | No                  |
| <b>Center Turn Lanes</b>                       | Yes                   | No                  |
| <b>ADT (2017)</b>                              | ~20,000               | ~1,200              |
| <b>85<sup>th</sup> Percentile Speed (2017)</b> | 33 mph                | 24 mph              |

### Field Observations:

- Intersection Geometry: the intersection is askew, with the Pearl Street legs slightly offset from each other.
- Intersection Illumination: the intersection has HPS lighting.

The TSP identifies both a walking project (W68) and a Biking project (B56) along Pearl Street.

Molalla Avenue & Pearl Street Intersection Review  
April 29, 2019



## Summary of Crash Data

Between 2011-2016 there were 2 crashes involving pedestrians, and 1 crash involving a bicyclist. No crash information from 2017 to now was available in the data set used for this review.

- 2016: vehicle/pedestrian crash during daylight hours, weather was dry and resulted in Injury B to the pedestrian, with a crash cause of view obstructed by fence, sign, phone booth.
- 2014: vehicle/bicyclist crashing during dusk, weather was dry and resulted in Injury B to the bicyclist, with a crash cause of did not yield right of way, non-motorist struck vehicle.
- 2012: vehicle/pedestrian crash during daylight hours, with rain and resulted in an Injury B to the pedestrian, crash cause is listed as did not yield right of way.

Following is a screen shot of Crash Reduction Factors applicable to Left Turning movements & Pedestrian Crashes at Signalized Intersections.

| General Notes:        |                       | All Injury = Fatal, A, B & C  |              | Orange = Special Condition CRF | Yellow = Not a traditional CRF value | Page 1                                |                |       |  |
|-----------------------|-----------------------|---|--------------|--------------------------------|--------------------------------------|---------------------------------------|----------------|-------|--|
| Systemic or Hotspot   | Countermeasure Number | Countermeasure  | Crash Type   | Injury, PDO or A+              | Service Life (Years)                 | Existing Intersection Traffic Control | Urban or Rural | CRF % |  |
| Intersection Systemic | I3                    | Replace Doghouse with Flashing Yellow Arrow Signal Heads                      | Left Turning | All                            | 20                                   | Signal                                | Either         | 25    |  |
| Intersection Systemic | I4                    | Replace Urban Permissive or Protected/Permissive Left Turns to Protected Only | Left Turning | All                            | 20                                   | Signal                                | Urban          | 99    |  |
| Intersection Systemic | I5                    | Replace Urban Permissive Left Turns to Protected/Permissive                   | Left Turning | All Injury                     | 20                                   | Signal                                | Urban          | 16    |  |
| Bike/Ped Systemic     | BP1                   | Install Pedestrian Countdown Timer(s)   | Pedestrian   | All                            | 20                                   | Signal                                | Either         | 70    |  |
| Bike/Ped Systemic     | BP4                   | Install No Pedestrian Phase Feature with Flashing Yellow Arrow                | Pedestrian   | All                            | 20                                   | Signal                                | Either         | 43    |  |

## Pearl Street Travelling West



### Field Observations:

- Generally, no visual obstructions from trees or excess poles exist from this approach.
- The placement of the buildings directly adjacent to the right of way is problematic at this approach for sight distance of vehicles turning from Pearl Street right onto Molalla Avenue southbound.
- An existing Left Turn Yield to Oncoming Traffic sign is located on the mast arm. This exact sign is no longer included in the MUTCD but is similar to the Left Turn Yield on Green (R10-12).
- An existing No Turn on Red (R10-11a) sign exists near the crosswalk and has clear visibility from the approaching lane.
  - This sign addresses the lack of sight distance around the building for vehicles turning right onto Molalla southbound.
- When a pedestrian activates the button to cross Pearl Street, if Molalla Avenue has a green light, the walk symbol is immediate activated. This creates an area for concern.
  - With the northbound permissive left turn movement, a vehicle could make the left at any time. Additionally, if a pedestrian activates the push button, they would get a walk signal. In the event a pedestrian is crossing from south to north, the ramp location at the south end is not visible to the northbound vehicle making a left until they have entered the intersection.





## Pearl Street Travelling East



### Field Observations:

- Generally, no visual obstructions from trees or excess poles exist from this approach.
- An existing Left Turn Yield to Oncoming Traffic sign is located on the mast arm. This exact sign is no longer included in the MUTCD but is similar to the Left Turn Yield on Green (R10-12).
- As a vehicle waiting to turn left from Pearl Street WB to Molalla Avenue SB the skew of the intersection generally presents the driver with a blind spot from the A-pillar. The pillar that connects the roof to the body, and is located at the front windshield.



## Molalla Avenue Travelling North



### Field Observations:

- Generally, no visual obstructions from trees or excess poles exist from this approach.
- A vehicle travelling NB on Molalla Avenue using the left turn lane does not have a protected left, as the signal
- An existing Left Turn Yield to Oncoming Traffic sign is located on the mast arm. This exact sign is no longer included in the MUTCD but is similar to the Left Turn Yield on Green (R10-12).
- Northbound left turns are a permissive movement, not protected and occur from a dedicated left turn lane.



R10-12



## Molalla Avenue Travelling South



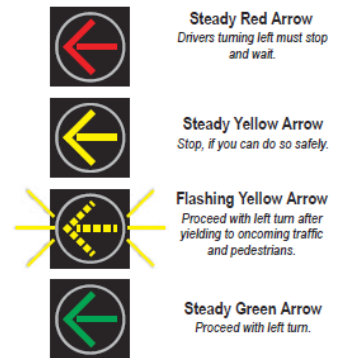
### Field Observations:

- Generally, no visual obstructions from trees or excess poles exist from this approach.
- The placement of the buildings directly adjacent to the right of way is problematic at this approach for visibility of pedestrians crossing Pearl Street by vehicles turning right onto Pearl Street westbound.
- An existing Left Turn Yield to Oncoming Traffic sign is located on the mast arm. This exact sign is no longer included in the MUTCD but is similar to the Left Turn Yield on Green (R10-12).
- Southbound left turns are a permissive movement, not protected and occur from a dedicated left turn lane.



## Possible Modifications:

- The MUTCD includes an optional regulatory sign (R10-15) to remind drivers who are making turns to yield to a pedestrian. The sign is typically installed on mast arm. We would need to determine if an additional sign can be accommodated on the mast arm.
- Conversion of the pedestrian signal heads to countdown style.
  - The crash reduction factor & safety benefit of pedestrian countdown heads are estimated to be a 60% reduction in pedestrian-vehicle crashes at intersections.
- We could evaluate the possibility of implementing a Leading Pedestrian Interval (LPI) on the crossings of Molalla Avenue. A LPI provides pedestrians a 3-7 second head start to cross the street before the corresponding green is given to the vehicles in the same direction of travel.
  - LPI's enhance the visibility of pedestrians in the intersection and reinforce their right of way over turning vehicles. The safety benefit of LPI's are a 60% reduction in pedestrian-vehicle crashes at intersections.
  - We would need to confirm with Clackamas County that this can be implemented with our existing equipment.
  - <https://nacto.org/publication/urban-street-design-guide/intersection-design-elements/traffic-signals/leading-pedestrian-interval/>
- Convert the Left Turn Lanes on Molalla Avenue from permissive to protected/permissive. This would require the addition of a new left turn signal head and changes to the signal phasing.
  - This would resolve the visibility issue with northbound left turns & the conflict with visibility of pedestrians on the west side of Molalla Avenue crossing in a south to north direction, if the left turn is not allowed when the crossing has a pedestrian call.
  - The signal would rest in permissive (flashing yellow arrow) which is similar to the current operation of the lane. When a pedestrian activates the crossing of Pearl, the left turn signal on Molalla would switch to Steady Red Arrow, removing the left turn conflict point between pedestrians & vehicles.



If we are interested in evaluating any of the above identified modifications, we should discuss them with Clackamas County to better understand the details & confirm ability to implement these modifications.