CORVALLIS WALNUT BOULEVARD ROAD SAFETY AUDIT REPORT

FEBRUARY 2026

PREPARED FOR:

CITY OF Corvallis

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Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway-highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be 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 reports, surveys, schedules, lists, or data.

A Road Safety Audit is not a "standards" check for examining adherence to design guidelines. It seeks to identify opportunities to improve safety. The City will review and consider the findings in this report and determine which actions, if any, to take in response. Suggested safety improvements discussed may be impacted by funding sources, engineering evaluation, environmental and/or right of way concerns, and other factors.

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Introduction

This report summarizes the findings of the Road Safety Audit (RSA) conducted along the Walnut Boulevard corridor in Corvallis, Oregon. The following sections describe the RSA framework and process, outline when and how the audit was conducted, identify the multidisciplinary team involved, and document key characteristics of the study corridor.

WHAT IS A ROAD SAFETY AUDIT (RSA)?

An RSA is a formal safety performance examination of a street that is conducted by a multidisciplinary team. The selected team assesses the observed safety performance of the defined study corridor and suggests potential safety improvement options to reduce the number and severity of crashes to ultimately increase safety for the traveling public. An RSA is a way to proactively address safety concerns and identify improvements by applying safety evaluation techniques and engineering practices.

RSAs are meant to assess conditions by considering all modes of travel and types of people: pedestrians, bicyclists, motorcyclists, drivers (of passenger and heavy vehicles), older and younger drivers, law enforcement/emergency responders, etc. The suggested potential safety improvements discussed may not be feasible or implementable for many reasons including financial or technical reasons. RSAs represent a preliminary assessment that requires further screening and discussion to determine the overall appropriateness of the suggestions.

Two overarching questions are asked as the team conducts the audit:

1. Can we reduce the likelihood of someone making an error?
2. When someone does make an error, can we create a more recoverable or forgiving street to mitigate the severity of the crash?

WHAT IS THE RSA PROCESS?

Figure 1 shows the eight major steps for conducting an RSA consistent with FHWA RSA Guidelines.

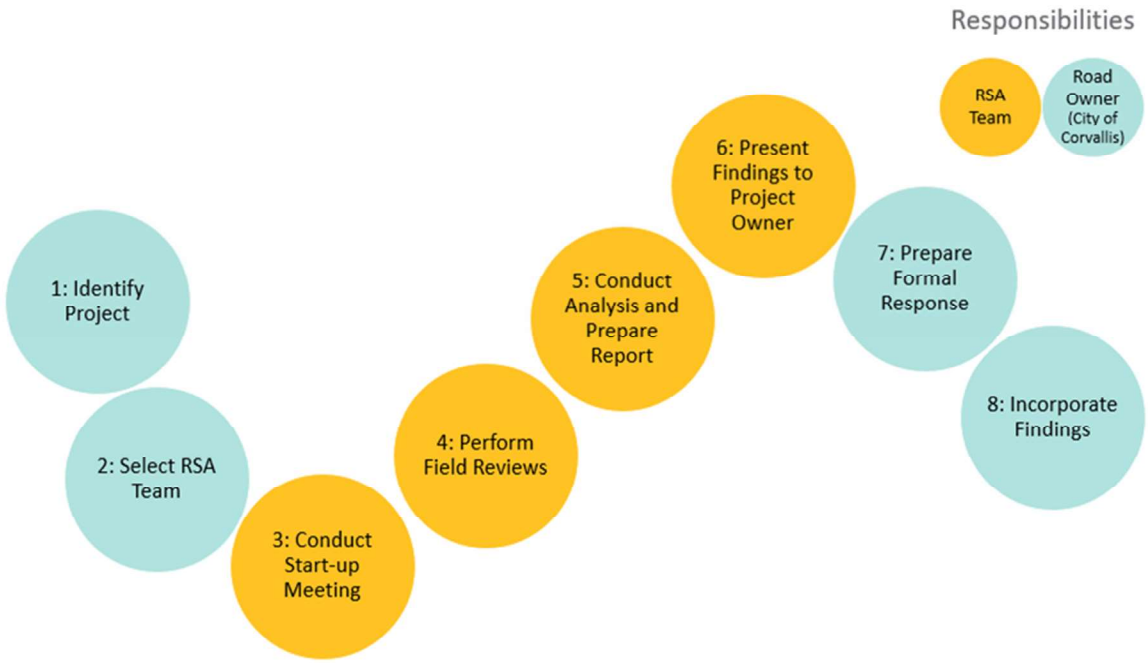


FIGURE 1. RSA PROCESS CHART

While a thorough analysis of reported crash history is a key component of an RSA, the more important element with an RSA is to identify underlying crash risk. The likelihood of a crash occurring, and the potential resulting injury severity, are used to understand crash risks.

- Potential crash frequency is qualitatively estimated by expected exposure (i.e., how many street users will likely be exposed to the identified safety risk) and probability (i.e., how likely it is that a crash will result from the identified safety risk).
- Potential crash severity is qualitatively estimated based on factors such as speed and expected crash types.

WHEN WAS THE RSA CONDUCTED?

A virtual pre-RSA workshop was held on April 1, 2025, to introduce the RSA concept to participants. The presentation slides from the pre-RSA workshop are provided in the appendix.

The Walnut Boulevard RSA team met on Tuesday, April 15, 2025, at 8:00 a.m. at the City of Corvallis Public Works building the day of field work and discussions lasted until 6:00 p.m. Field work included a mix of driving and walking the entire corridor, watching peak afternoon/evening traffic patterns, observing school let-out periods, and conducting work sessions to discuss findings. Participants were provided with a packet of materials to assist in identifying safety concerns and recommending solutions. After the peak traffic observations, the team held a debrief session at the Public Works building to

compare notes. The team also had a chance to provide solutions for safety issues observed, summarized in this report.

WHO WAS ON THE RSA TEAM?

The RSA team was selected to be an independent, experienced, and multidisciplinary team. In total, there were 12 participants representing stakeholders listed below.

- City of Corvallis
  - Public Works
  - Corvallis Police Department
  - Corvallis Fire Department
- Oregon Department of Transportation (ODOT)
- Corvallis School District
- Oregon State University (OSU)
- DKS Associates

A full list of participants is included in Table 1.

TABLE 1. ROAD SAFETY AUDIT TEAM

NAME	TITLE	AGENCY
Ted Reese	Transportation Engineering Supervisor	Public Works
Josh Capps	Active Transportation Program Specialist	Public Works
Lindsey Almarode	Active Transportation Specialist	Public Works
Jeremy Rhoades	Transportation Maintenance Supervisor	Public Works
Joel Goodwin	Lieutenant	Police Department
Jenna Berman	Active Transportation Liaison	ODOT
Derek Gustafson	Traffic Signal Operations Specialist	ODOT
Becky Weeks	Transportation Coordinator	Corvallis School District
Wyatt Brown	Student Volunteer	OSU
Pawit Potisuk	Student Volunteer	OSU
Travis Larson	Transportation Safety Engineer	DKS Associates
Scott Mansur	Transportation Safety Engineer	DKS Associates

ng Walnut Boulevard, between NW Fair Oaks Drive and Circle Boulevard, as shown in Figure 2.[1]

FIGURE 2. WALNUT BOULEVARD RSA STUDY CORRIDOR

[1] sportation Map Showing Functional Classification of City of Corvallis Streets, Oregon Department of Transportation, 2023.

SCHOOL ZONES NEAR CORRIDOR

The study corridor features Bessie Coleman Elementary School between NW Walnut Place and NW 29th Street. There is a school speed zone active on school days between 7:00 a.m. and 5:00 p.m. starting approximately 400 feet west of the NW Aspen Street intersection and ending at approximately 1100 feet east of the NW Aspen Street intersection. The corridor is also part of the Bessie Coleman Elementary Safe Routes to School path as seen in Figure 3 below. [2]

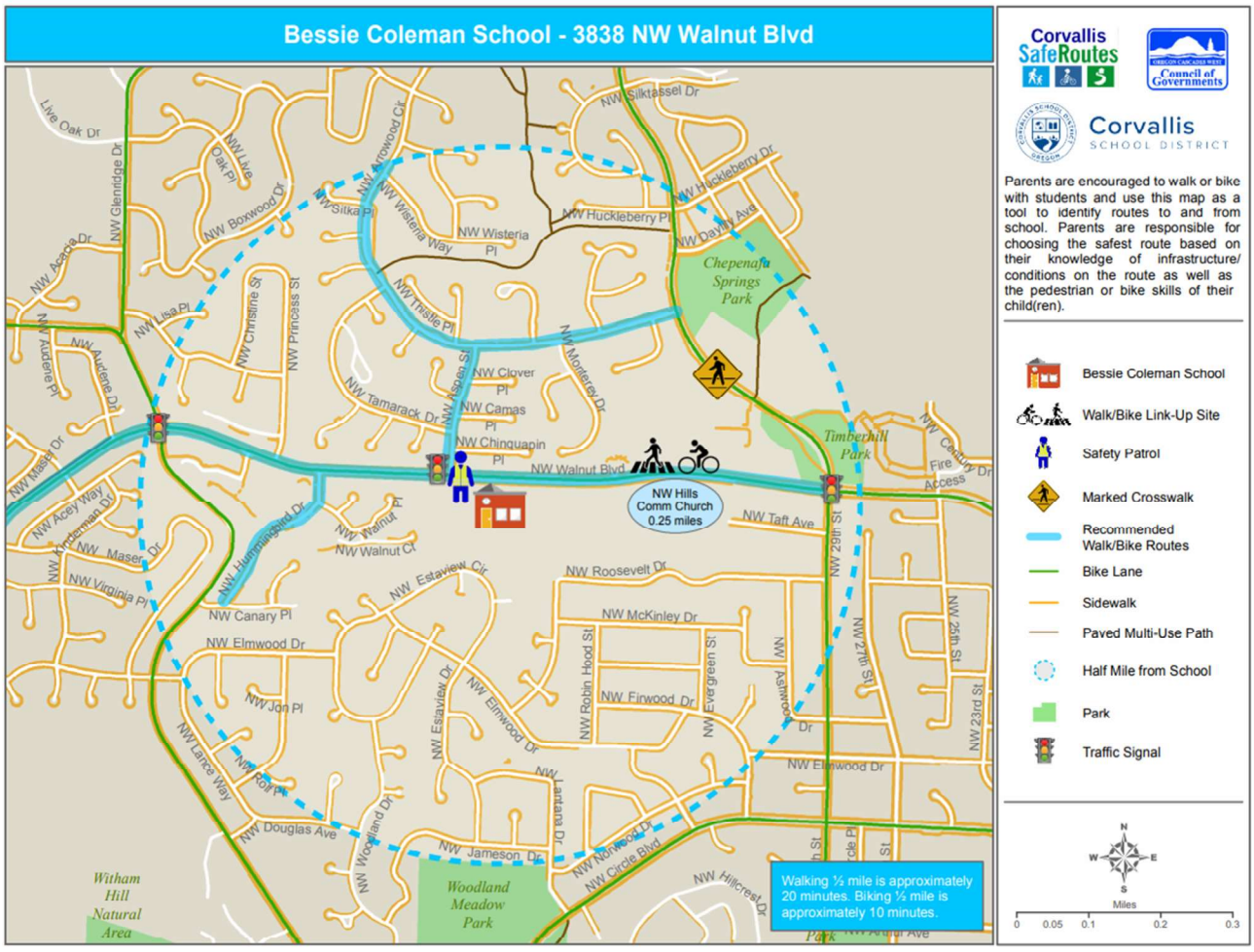


FIGURE 3. CORVALLIS SAFE ROUTES TO SCHOOL - BESSIE COLEMAN ELEMENTARY SCHOOL

[2] Bessie Coleman Elementary Safe Routes to School, Corvallis School District

Although not located directly along the study corridor, the existing Letitia Carson Elementary School is located near the intersection of NW Walnut Boulevard and NW Satinwood Street. The corridor is also part of the Letitia Carson Elementary Safe Routes to School path as seen in Figure 4 below.[3] As of November 2025, this elementary school has been voted to close for future school years.[4] This RSA includes school-related safety considerations for the area which may no longer be applicable following the school's closure.

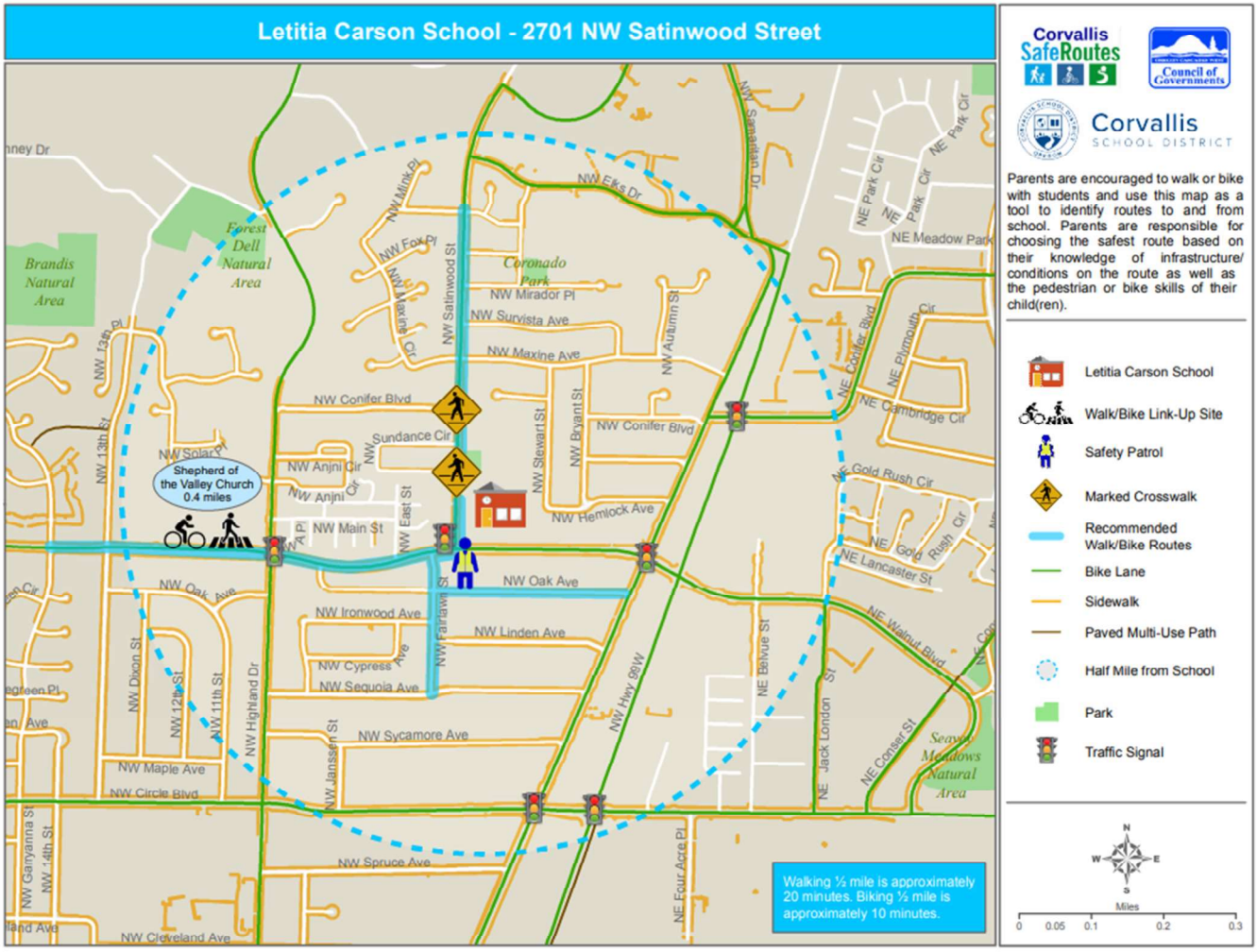


FIGURE 4. CORVALLIS SAFE ROUTES TO SCHOOL - LETITIA CARSON ELEMENTARY SCHOOL

[3] Letitia Carson Elementary Safe Routes to School, Corvallis School District

[4] November 14, 2025 Minutes, Corvallis School District, 2025

PRIORITY LOCATIONS

From the High Priority Network (HPN) analysis as part of the Corvallis Transportation Safety Action Plan, the following segment and intersections were identified:

- Priority Segments on Walnut Boulevard:
    - NW Garryanna Drive to NW 13th Street
- Priority Intersections along Walnut Boulevard:
    - NW Kings Boulevard
    - NW Witham Hill Drive/NW Glenridge Drive

RECENT IMPROVEMENTS & FUTURE PROJECTS

The following recent improvements were noted with potential to improve safety:

- **Walnut Boulevard Improvements (2019):** Pavement rehabilitation and curb ramp improvements were completed between NE Jack London Street and OR99W
- **Walnut Boulevard/NW Satinwood Street Traffic Signal Modification (2021):** The Walnut Boulevard and Satinwood traffic signal had traffic signal safety enhancements including reflectorized backplates, flashing yellow arrow left turn signal head for the southbound left turn, as well as new pushbuttons and pedestrian countdown signal heads.
- **Walnut Boulevard/NW Witham Hill Drive/NW Glenridge Drive Intersection Modifications (2024/2025):** Intersection was restriped to move the west bound merge from the west side to the east side of the intersection, retro-reflective backplates on the signal heads, installation of an advanced signal for east bound traffic due to roadway geometry and vegetation, replacement of 8-inch signal heads with 12-inch signal heads, replacement of five section left turn signal heads with three section left arrow signal heads incorporating flashing yellow arrows, count down pedestrian signal heads, APS push buttons, right turn stop for pedestrian signs, and a no right on red sign for north bound right turns.
- **Walnut Boulevard/OR99W/NW 9th Street Traffic Signals Coordination (2025):** The traffic signal timing (e.g. cycle lengths) at these closely spaced signalized intersections was coordinated and modified to minimize queuing and mitigate spillback.
- **Walnut Boulevard at Dr. Martin Luther King Jr Park Crosswalk Flasher Enhancement (2025)** – The existing older style yellow “ball” style flashing crosswalk at this location was replaced with LED light bar Rectangular Rapid Flashing Beacon (RRFB) style installations and additional signs on both sides of the road for both approaches, consistent with similar enhanced crossings in Corvallis.

The following are planned projects along Walnut Boulevard that have potential safety improvements:

- Planned street resurfacing between NE Jack London Street and NE Circle Boulevard funded in the City's Capital Improvement Projects (CIP)
    - This project will consider the use of buffered bicycle lanes and pedestrian crossing bulb-outs where feasible as noted in the previous Walnut Boulevard RSA noted in the Appendix Section C.

FOCUS AREAS

To help evaluate the corridor, it was split into smaller Focus Areas (segments), which share similar characteristics. See Figure 5 for mapped Focus Area extents. Table 2 shows the focus areas of the study corridor and Table 3 shows the posted speed, average daily traffic volumes, and general street characteristics.

TABLE 2. FOCUS AREA OUTLINE

FOCUS AREA	EXTENTS
1	Circle Boulevard to Pacific Highway 99W (OR99W)
2	Pacific Highway 99W (OR99W) to NW Satinwood Street
3	NW Satinwood Street to NW 13th Street
4	NW 13th Street to NW 25th Street
5	NW 25th Street to NW Walnut Place
6	NW Walnut Place to NW Fair Oaks Drive

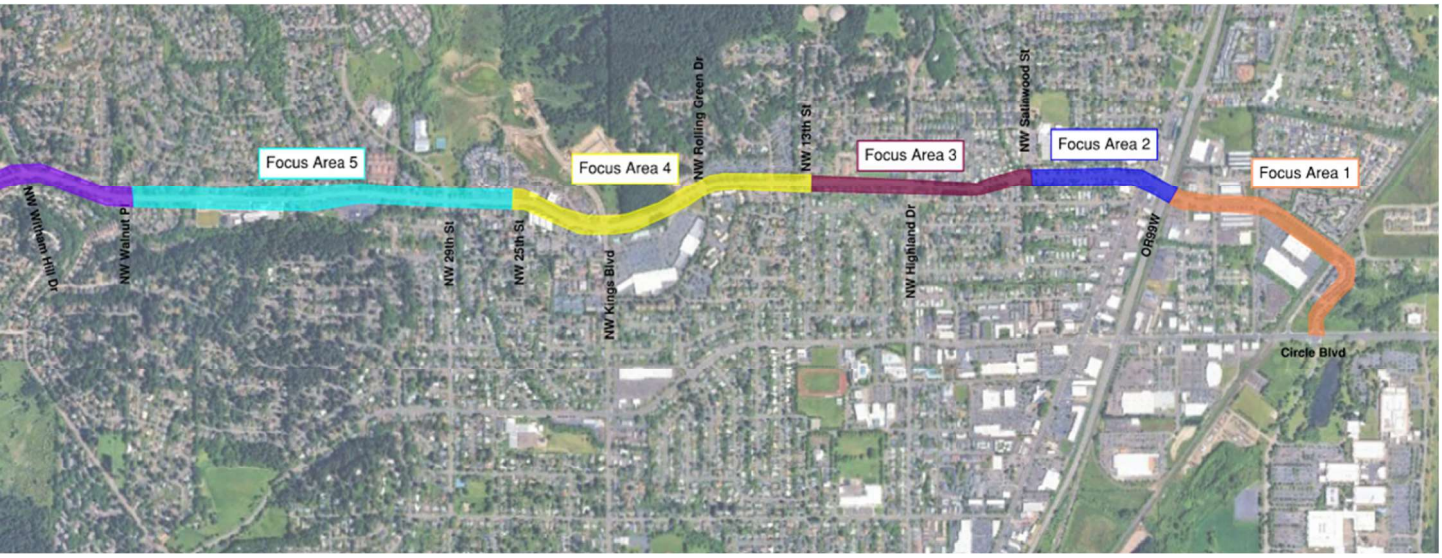


FIGURE 5. WALNUT BOULEVARD CORRIDOR FOCUS AREAS

TABLE 3: SEGMENT DATA SUMMARY

FOCUS AREA	POSTED SPEED	AVERAGE DAILY TRAFFIC [5]	STREET CHARACTERISTICS
1 (CIRCLE BOULEVARD TO NE CONSER STREET)	35 mph	~3,000 vehicles	Bike lanes on both sides, 12 ft westbound lane, 12 ft center lane (striped to prohibit turning), 12 ft eastbound travel lane
1 (NE CONSER STREET TO NE JACK LONDON STREET)	35 mph	~4,000 vehicles	Bike lanes on both sides, 12 ft westbound lane, 12 ft eastbound lanes
1 (NE JACK LONDON STREET TO OR99W)	35 mph	~5,000 vehicles	Bike lanes on both sides, two 11 ft westbound lanes, 11 ft two-way left turn lane, two 11 ft eastbound lanes
2 (OR99W TO NW 9TH STREET)	25 mph	~12,500 vehicles	Bike lanes on both sides, short area of on-street parking on north side, two 11 ft westbound lanes, two 11 ft left turn lanes, and two 11ft eastbound lanes
2/3 (NW 9TH STREET TO NW HIGHLAND DRIVE)	25 mph	~15,000 vehicles	Bike lanes on both sides, two 11 ft westbound lanes, two 11 ft eastbound lanes
3/4 (NW HIGHLAND DRIVE TO NW 25TH STREET)	35 mph	~16,000 vehicles	Bike lanes on both sides, two 10.5 ft westbound lanes, 11 ft two-way left turn lane, two 10.5 ft eastbound lanes
5 (NW 25TH STREET TO NW WITHAM HILL DRIVE)	35 mph	~12,000 vehicles	Bike lanes on both sides, two 10.5 ft westbound lanes, two 10.5 ft eastbound lanes
6 (NW WITHAM HILL DRIVE TO NW FAIR OAKS DRIVE)	35 mph	~9,500 vehicles	Bike lanes on both sides, 12 ft westbound lane, 12 ft eastbound lane

[5] Oregon Traffic Monitoring System, Traffic Counts (TCDS), 2-way AADT (Location IDs: 42105, 13002, 11079, 13135, 19056, 48019, 53145, 13194), 2024 & 2025.

UNIQUE CHARACTERISTICS

ey east/west arterial corridor serving a mix of low to high density residential land uses and mixed-use industrial. Most of ercial development land uses are concentrated near major intersections such as Circle Boulevard and OR99W. All the orridor are shown in Figure 6.[6]

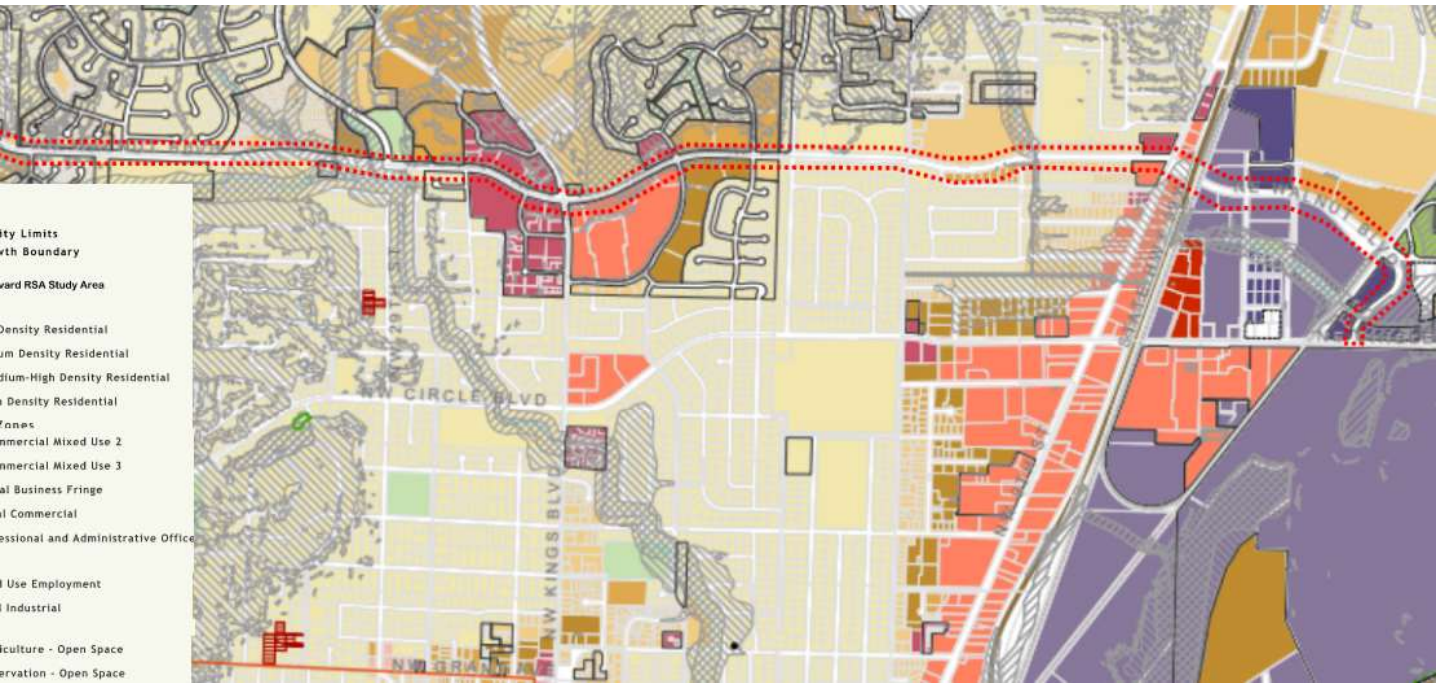


FIGURE 6. CORVALLIS ZONING MAP

Corvallis, 2006 including amendments through May 1, 2025.

Other unique characteristics of the study corridor are summarized below:

- **Public Parks:** There are two parks located near the study area. Timberhill Park is situated north of the NW 29th Street and Walnut Boulevard intersection, while Dr. Martin Luther King Jr. Park is located west of Walnut Boulevard between NW Fair Oaks Drive and NW Maser Drive.
- **Bike Routes:** As shown in Figure 7, an existing shared-use path is present within the study area between NW Fair Oaks Drive and NW Audene Drive. The figure also identifies two planned neighborhood bikeway routes at NW 25th Street and NW Rolling Green Drive that are proposed to connect to Walnut Boulevard. In addition, two future neighborhood bikeway routes are planned to cross Walnut Boulevard at NW 13th Street and NE Jack London Street.

FIGURE 7: CORVALLIS NEIGHBORHOOD BIKEWAY ROUTES

- **Public Transit:** As shown in Figure 8 all Corvallis Transit System (CTS) bus routes except for CTS Routes 3, 6, 8, and the Philomath Connection intersect within the Walnut Boulevard corridor study area.[7] There are portions of the study area that are not serviced by a bus route including between NW Highland Drive and NW Rolling Green Drive, between NE Conser Street and NE Circle Boulevard, and from the NW Fair Oaks Drive to NW Witham Hill Drive/NW Glenridge Drive intersections. A few of the bus stops have shelters and benches, while most just have a bus stop ID pole. The NW 9th Street and Walnut Boulevard bus stop (10486) has a bus pullout. At all other bus stops, the bus pulls into the bike lane to access the bus stop. The Transit Propensity Index (TPI) (see Figure 9)[8], an indicator from the Benton County Coordinated Plan that shows the potential of an area or population to use transit, shows that the Walnut Boulevard corridor has a medium to high transit propensity. Based on the demographic factors of the corridor, there is a high need for or tendency to use transit west of the NW Witham Hill Drive/NW Glenridge Drive intersection and between the NW 13th Street and OR99W intersections.

[7] Corvallis Transit System Transit Map, Corvallis Transit System, May 2025.

[8] Benton County Coordinated Plan, Oregon Cascade West Council of Governments, March 2023.

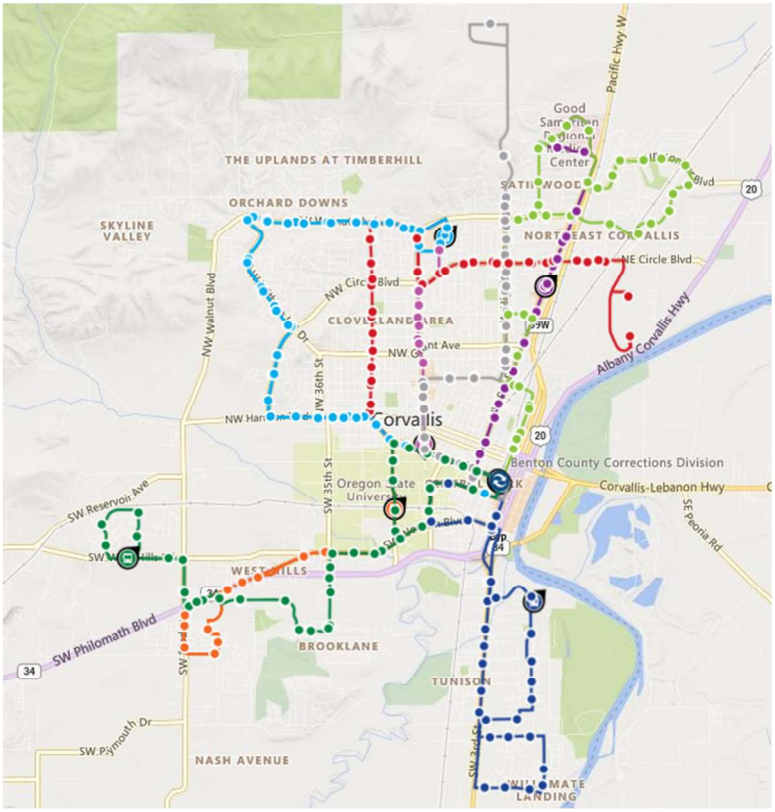


FIGURE 8: CTS BUS ROUTE MAP

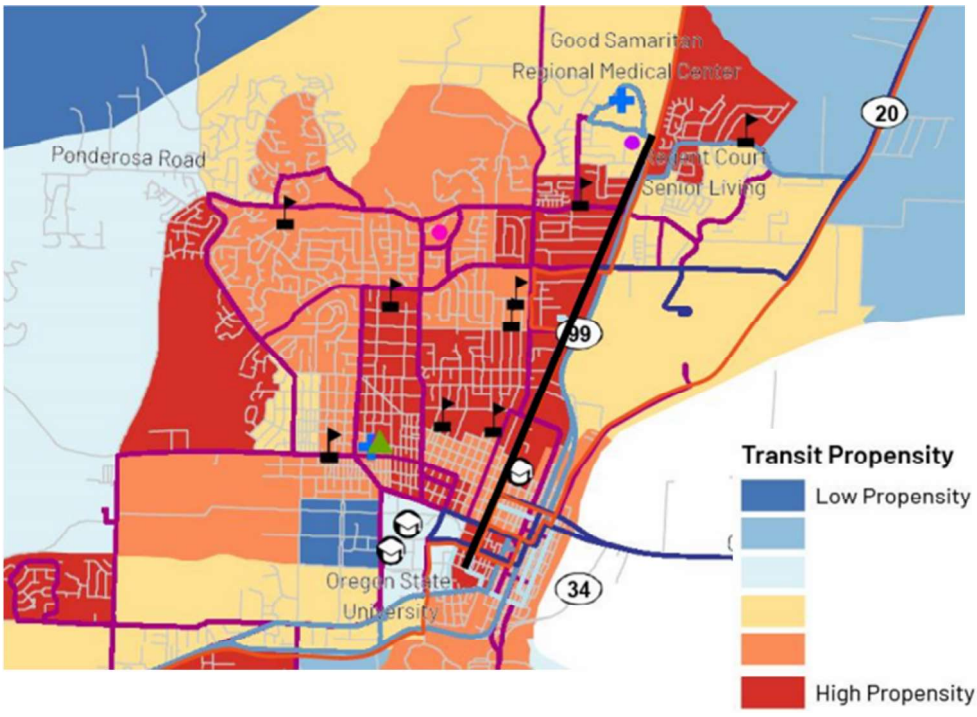


FIGURE 9: TRANSIT PROPENSITY INDEX

Corridor Crash Data Summary

Crash data for the most recent five-year period available, from 2018 to 2022, was obtained from the Oregon Department of Transportation (ODOT). Notable trends in reported crashes are summarized below, including crash severity, crash types, and primary contributing factors. The full crash data set is in the appendix.

While the crash data was assessed and presented as part of the RSA, the focus of the RSA is on the observed field conditions and user behaviors. Therefore, the crash data is only one data point used in the recommendation of projects.

The tables and graphs in the crash data summary reference the crash severity KABCO scale, which assigns a letter based on injury severity. [9] The categories are defined as follows:

- K - Fatal Injury: Any injury resulting in death within 30 days of the crash
- A - Suspected Serious Injury: Incapacitating, severe injuries preventing normal activities
- B - Suspected Minor Injury: Non-incapacitating, but visible, injuries
- C - Possible Injury: Reported, non-visible injury or complaint of pain
- O - No Apparent Injury: Property damage only (PDO)

[9] Safety Investigation Manual, Oregon Department of Transportation, January 2022.

CRASH FREQUENCY AND SEVERITY

As shown in Table 4, a total of 133 crashes were reported on the study corridor between 2018 and 2022, of which four resulted in serious injury crashes and 38 resulted in minor injury crashes. No fatal crashes were reported within the last five years of available data.

TABLE 4: CRASH FREQUENCY BY YEAR AND SEVERITY

YEAR	CRASH SEVERITY					TOTAL
	FATAL (K)	SERIOUS INJURY (A)	MINOR INJURY (B)	POSSIBLE INJURY (C)	PROPERTY DAMAGE ONLY (PDO)	
2018	0	1	7	11	17	**36**
2019	0	0	9	10	10	**29**
2020	0	1	5	6	11	**23**
2021	0	0	3	3	8	**14**
2022	0	2	14	6	9	**31**
TOTAL	**0**	**4**	**38**	**36**	**55**	**133**

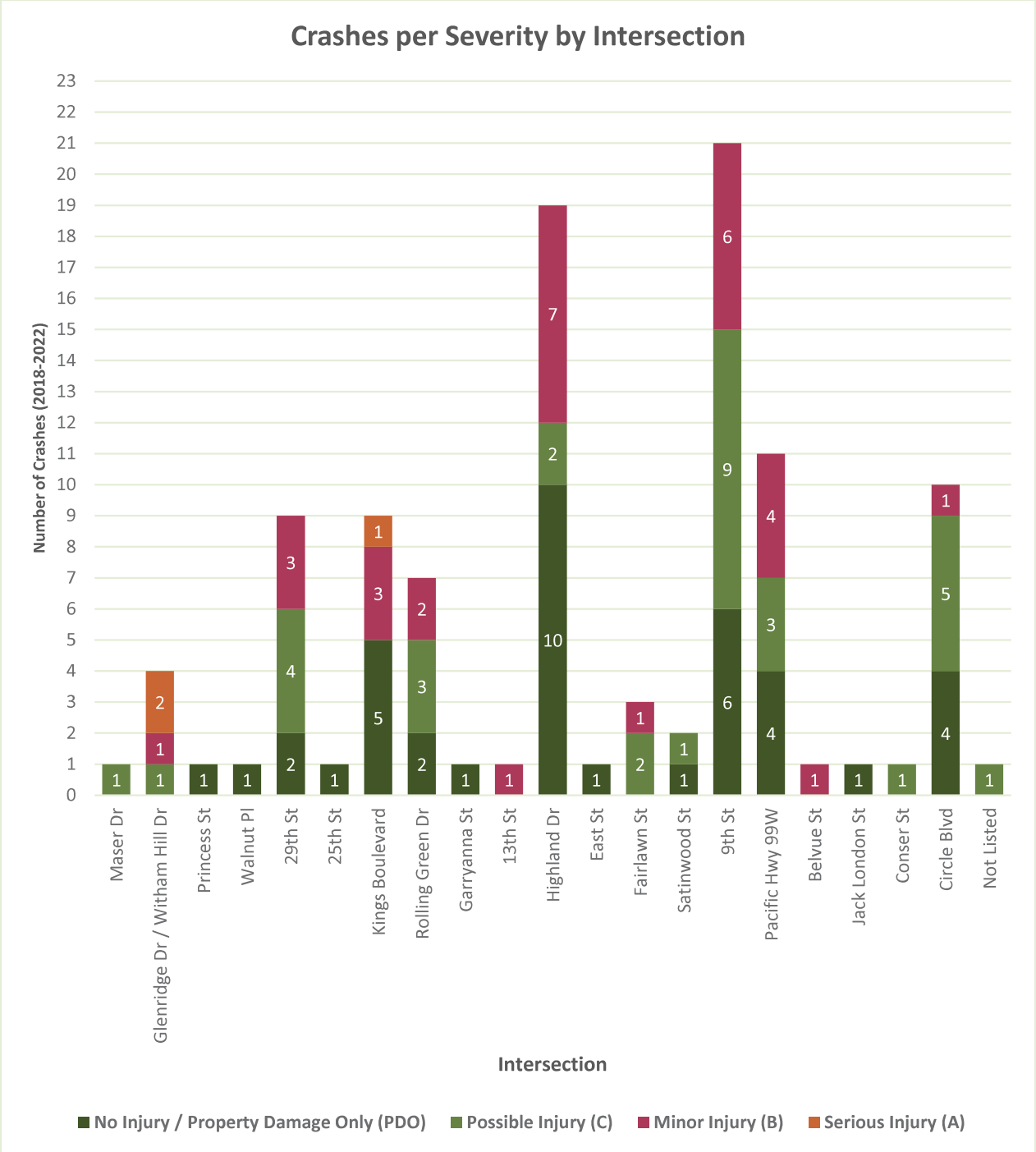


FIGURE 10. CRASHES PER SEVERITY BY INTERSECTION

As shown in Figure 10, several locations along the corridor experienced multiple crashes between 2018 and 2022, with the highest frequency of reported crashes occurring at the intersection of Walnut Boulevard and NW 9th Street. Other high-crash locations include NW Highland Drive and NW 29th Street.

CRASH TYPES

Table 5 summarizes the proportion of different crashes reported on the study corridor. As shown, the most common type of crashes along the corridor are turning movement crashes, followed by rear-end and angle crashes.

TABLE 5: CRASH TYPES

CRASH TYPES	COUNT	PERCENTAGE
TURNING MOVEMENT	52	39.0%
REAR-END	36	27.1%
ANGLE	25	18.9%
FIXED OBJECT OR OTHER OBJECT	7	5.3%
SIDESWIPE - OVERTAKING	6	4.5%
PEDESTRIAN	4	3.0%
OTHER	2	1.5%
SIDESWIPE - MEETING	1	0.7%
TOTAL	**133**	**100%**

BIKE AND PEDESTRIAN CRASHES

Between 2018 and 2022, there were 4 pedestrian crashes, 2 were serious injury, 1 was minor injury, and 1 was possible injury. There were 5 total bicycle crashes, 4 of which were minor injury and 1 of which was possible injury.

CONTRIBUTING FACTORS

Each crash record indicates the primary factor that contributed to the crash, as determined by either the responding officer or ODOT Crash Analysis & Reporting Unit. In each crash report, anywhere from 1 to 3 contributing factors are listed. However, the following statistics only examine the primary factor reported in the crash level database.

For the study corridor, the most reported primary contributing factors are failure to yield (28%), disregarding signal (20%), failing to avoid (15%), carelessness (8%), following too close (8%), recklessness (5%), improper lane change (3%), inattention (3%) and speed (3%). Three crashes were related to driving under the influence of alcohol, two of which resulted in possible injury and the other resulted in property damage only. Three other crashes were related to driving under the influence of drugs, all three resulted in a minor injury.

WEATHER & ROADWAY CONDITIONS

27% of all crashes occurred when the pavement was wet, snowy, or icy. Although these pavement conditions may have contributed to the crashes occurring, they are not unexpected in comparison to the number of inclement weather days in Corvallis. Trends related to specific inclement weather patterns, such as snow, fog, or sleet, were not seen to be significant.

LIGHTING CONDITIONS

77% of crashes occurred during daytime conditions, while the remaining 23% occurred during dawn, dark, or dusk conditions. These proportions are consistent with the amount of traffic that travels during daytime versus nighttime hours. The study corridor has intermittent lighting for its segments and intersections.

TEMPORAL TRENDS

Trends related to the time crashes occurred along the corridor are presented in Figure 11. As shown, more crashes occur in the afternoon and evening hours than in the morning hours. Peak hours for crash frequency correlate with travel times for school release (and after-school activities) and commuting from work.

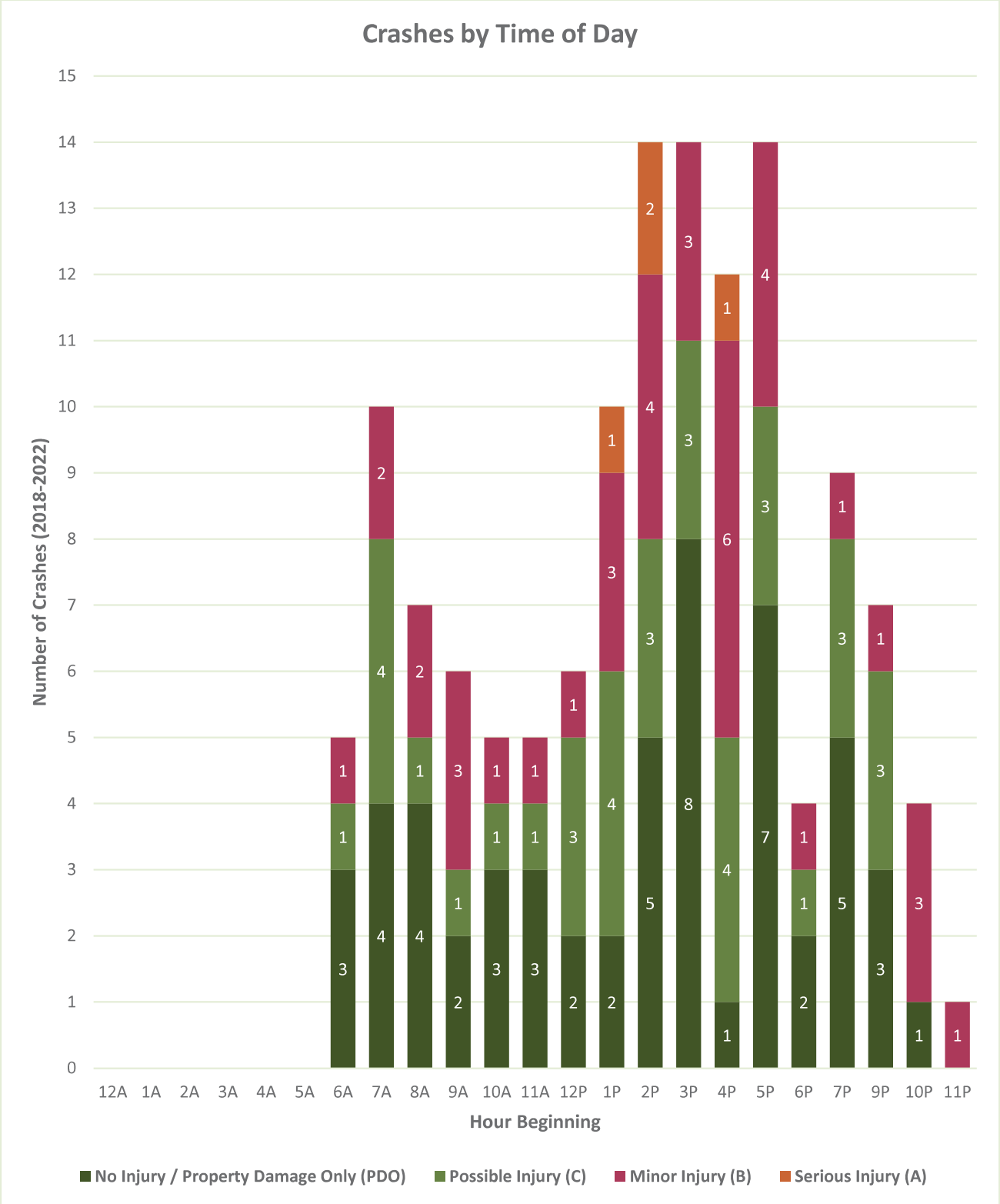


FIGURE 11. CRASHES BY TIME OF DAY

Corridor-Wide Safety Needs and Potential Solutions

Through observations by the road safety audit team and an evaluation of the crash history, several general crash risks were identified that are present at more than one location within the corridor and would be best addressed by corridor-wide application of strategic safety countermeasures. Location specific observations, safety needs, and solutions are discussed in subsequent sections.

RSA TEAM RECOMMENDED CORRIDOR-WIDE SAFETY SOLUTIONS

This section overviews the recommended safety solutions the RSA team identified through field observations that apply on a corridor-wide level and address the identified crash risks and associated reported crash patterns The following recommended safety solutions could be implemented as part of maintenance activities or other planned projects.[10]

Low Complexity

- Pedestrian Crossing Updates:
  - Review pedestrian signal crossing timing and add Leading Pedestrian Intervals (LPIs) where feasible.
- Signal Improvements:
  - Consider Manual on Uniform Traffic Control Devices (MUTCD) R10-15a "TURNING VEHICLES STOP FOR PEDESTRIANS" at heavily used pedestrian crossings and at signalized intersections where crossings are difficult to see from the driver's perspective
- Speed Limit Signage:
  - Review speed limit sign placement and add or move for consistency.

Medium Complexity

- Streetlighting
  - Improve intersection lighting and roadway lighting.
- Signal Improvements
  - Replace traffic signal heads either due to sun damage, or existing non-LED or smaller signal head than the current edition of the MUTCD requires
  - Add fluorescent yellow backplates to existing traffic signals
  - Upgrade existing pushbuttons to Accessible Pedestrian Signal (APS) pushbuttons with countdown timer signal heads
  - Install Flashing Yellow Arrow (FYA) Left Turn traffic signals where sight distance allows

[10] The Corvallis Proposed Capital Improvement Program FY2026-2030 outlines planned and funded projects.

- Curb Extensions and Crossing Reconfiguration:
  - Assess opportunities to install curb extensions on side streets during other project developments at high-benefit locations such as where there is a longer crossing distance due to a skew in the intersection.
  - Provide Americans with Disabilities Act (ADA) accessible curb ramps everywhere applicable

High Complexity

- Lane Reconfiguration
  - ODOT advises that roadways with Average Daily Traffic (ADT) of 20,000 vehicles per day (vpd) or less are good candidates for lane reconfiguration and should be evaluated for feasibility. Lane reconfigurations are often referred to as "road diets," and a local example in recent years occurred with repaving on Circle Boulevard, west of Highland Drive. Different jurisdictions' studies recommend between 15,000-25,000 vpd as the maximum volume for a four-to-three lane reconfiguration. Lane reconfigurations can reduce crashes by 29% in all crashes at all severities (including PDOs). The additional space gained from the lane reduction can help delineate space, such as bicycle lanes, to reduce opportunities for conflicts between vehicles and other road users. The two-way center turn lane separates left-turning traffic from through traffic, reduces the number of oncoming lanes for both left-turning drivers, and removes the multiple-threat situation for users crossing the roadway. [11]
  - For Walnut Boulevard, the lane reduction could occur within the existing curblines. Reconfiguration is contingent upon further analysis of the trade-offs between increased congestion and improved safety and comfort for people walking and biking, as well as additional community engagement. Lane configurations to be explored for Walnut Boulevard could include:
    - From NE Belvue Street to NE Jack London Street, shift from five lanes to three lanes
    - From NW Highland Drive to NW 9th Street, shift from four lanes to three lanes to add a two-way left-turn lane and additional dedicated left turn lanes where necessary
    - From NW Glenridge Drive/NW Witham Hill Drive to NW 25th Street, shift from four lanes to three lanes to add a two-way left-turn lane and additional dedicated left turn lanes where necessary

Focus Area Needs and Potential Solutions

This section describes the RSA findings, safety needs, and suggested solutions for specific high-crash locations, or focus areas, along the corridor, as identified previously in Figure 5.

[11] ODOT Crash Reduction Factor Manual, 3.53 H53-Convert 4-lane Roadway to 3-lane Roadway with Center Turn Lane (road diet)

FOCUS AREA 1: CIRCLE BOULEVARD TO OR99W

This segment of the corridor is characterized by industrial land uses from Circle Boulevard to NE Jack London Street, where it transitions to a medium-density residential area. Most crashes in this area were angular in nature, with contributing factors that included carelessness, failure to yield the right of way, and stop sign violations. A previous safety evaluation was completed by Kittleson Associates, Inc. between the NE Jack London Street and Circle Boulevard intersections prior to this RSA and is included in the appendix. Recommended countermeasures from that effort are incorporated into the Safety Solutions section below.[12] As noted in that previous RSA, a short shared-use path in this area connects to a sidewalk along Walnut Boulevard. Crossing at this location is prohibited by signage, although worn pavement and ground areas indicate that path users frequently cross at this location. This can be seen in Figure 12 below.

FIGURE 12. EXISTING RAILROAD CROSSING WITH SHARED USE PATH AND NO CROSSING SIGNAGE

RSA TEAM FOCUS AREA 1 SAFETY SOLUTIONS

To address the identified crash risks and associated reported crash patterns in Focus Area 1, the following solutions were identified by the RSA Team for consideration.

Low Complexity

- Restripe area to provide bicycle buffers between NE Jack London Street and Circle Boulevard
- Restripe center lane area as a two-way left turn lane between NE Conser Street and Circle Boulevard
- Restripe center lane area near access point for property address 980 NW Walnut Boulevard to provide a dedicated northbound left turn lane

[12] Improvement Program Road Safety Audits, City of Corvallis, Kittelson & Associates, Inc., January 2025.

Medium Complexity

- Relocate the 5-lane to 3-lane transition after NE Jack London Street to between NE Belvue Street and NE Jack London Street

High Complexity

- Install curb extensions and a pedestrian refuge island for a marked crossing on the east leg of the NE Jack London Street intersection. With this improvement, install a raised median on the west leg to allow travel lanes to align across the intersection
- Coordinate with ODOT Commerce and Compliance Division and railroad authority to remove the existing "No Pedestrian Crossing" R9-3 signs and install a new enhanced trail crossing for the existing trail east of the railroad crossing on Walnut Boulevard

FOCUS AREA 2: OR99W TO NW SATINWOOD STREET

This roadway segment includes two key intersections along the Walnut Boulevard corridor, at OR 99W and NW 9th Street. These intersections experienced two of the highest crash frequencies on the corridor, with most crashes involving signal violations. The OR99W intersection can be seen in Figure 13 below. The RSA identified a need for additional measures at the NW 9th Street intersection to better protect bicyclists, as southbound right-turning vehicles were observed having close calls with southbound bicyclists. It was also noted that the curb ramps at the OR 99W intersection do not have a flat turning space and some pushbuttons appear difficult to reach from a wheelchair. At the time of the RSA, the OR99W and NW 9th Street intersections were seen to not be coordinated as vehicles were observed queuing between the two intersections and periodically blocking the intersection. The coordination of these traffic signals has been updated as of February 2026.

FIGURE 13. WALNUT BOULEVARD & OR99W INTERSECTION

RSA TEAM FOCUS AREA 2 SAFETY SOLUTIONS

To address the identified crash risks and associated reported crash patterns in Focus Area 2, the following solutions were identified by the RSA Team for consideration.

Low Complexity

- Install a MUTCD sign R10-7 "DO NOT BLOCK INTERSECTION" sign between the two primary signal heads for the westbound approach of the Walnut Boulevard and OR99W intersection
- Install a MUTCD sign R10-7 "DO NOT BLOCK INTERSECTION" sign between the two primary signal heads for the eastbound approach of the Walnut Boulevard and NW 9th Street intersection
- Install green bicycle conflict markings for southbound approach due to high southbound right-turning vehicle volume and speeds at the Walnut Boulevard and NW 9th Street intersection
- Add a MUTCD W10-1 "Grade Crossing Advance Warning" sign for the eastbound traffic approaching the OR99W and Walnut Boulevard intersection

Medium Complexity

- Remove bus pullout west of the Walnut Boulevard and NW 9th Street intersection
- Raise the overhead fiber lines on the east leg of the intersection for better eastbound traffic signals visibility at the Walnut Boulevard and NW 9th Street intersection

High Complexity

- If a lane reallocation occurs along Walnut Boulevard at this location, add a two-way left-turn lane so that business driveways approximately 200 feet west of the Walnut Boulevard and NW 9th Street intersection can use it to access their driveways
- Reconstruct existing curb ramps to meet current ADA standards at the OR99W and Walnut Boulevard intersection
- Extend the OR 99W shared-use path from Circle Boulevard to Conifer Boulevard, with a wide pedestrian and bicyclist crosswalk for the east leg of the Walnut Boulevard intersection
- If full signal replacement is to occur, consider a protected intersection at the Walnut Boulevard and NW 9th Street intersection

FOCUS AREA 3: NW SATINWOOD STREET TO NW 13TH STREET

This focus area includes the NW Highland Drive and NW Satinwood Street signalized intersections. The NW Highland Drive intersection experienced the highest number of crashes within the focus area. Crash patterns in this focus area consisted primarily of rear-end crashes at the NW Satinwood Street intersection and turning-related crashes at the NW Highland Drive and NW Fairlawn Street intersections. The Letitia Carson Elementary School is also located near this focus area, and school speed zone signage is present and active when children are present, as shown in Figure 14. During the RSA field visit, it was observed that vehicles in the area did not appear to be following the school zone speed limit. However, no data was collected to verify vehicle speeds. Vehicle queuing was also observed at the eastbound left-turn lane at the NW Satinwood Street intersection. At the NW Highland Drive intersection, red-light running was observed for eastbound left-turn movements from Walnut Boulevard onto NW Highland Drive, as well as a near miss involving a southbound right-turning vehicle and a student crossing the intersection. As noted, the recent closure announcement of the Letitia Carson Elementary School may make some of these suggestions unneeded.

FIGURE 14. WALNUT BOULEVARD AND NW SATINWOOD STREET INTERSECTION

RSA TEAM FOCUS AREA 3 SAFETY SOLUTIONS

To address the identified crash risks and associated reported crash patterns in Focus Area 3, the following solutions were identified by the RSA Team for consideration.

Low Complexity

- Relocate the westbound school crossing assembly for the east leg crosswalk at the Walnut Boulevard and NW Satinwood Street intersection to the west (approximately 30 feet) to be closer to the existing school crossing

- Add a MUTCD W16-7p diagonal arrow plaque to the eastbound school crossing assembly on the southeast signal pole for the east leg crosswalk at the Walnut Boulevard and NW Satinwood Street intersection
- Relocate both eastbound and westbound school speed limit assemblies upstream away from the NW Satinwood Street intersection so that the school speed limit zone starts approximately 300 feet before the intersection (they are both currently located less than 200 feet before the intersection)[13]. Move both eastbound and westbound school zone assemblies upstream approximately 200 feet from the new locations of the school speed limit assemblies
- Update both eastbound and westbound school zone assemblies to have the MUTCD S4-3P "SCHOOL" plaque underneath the existing S1-1 sign instead of the MUTCD W16-9P "AHEAD" plaque[14]
- Restripe south approach at the Walnut Boulevard and NW Highland Drive intersection to include green bicycle conflict markings due to high southbound right-turning vehicle volume and speeds

Medium Complexity

- Upgrade the school speed limit assemblies with flashing yellow beacons and include either a MUTCD S5-1 sign or a separated sign assembly (MUTCD S4-3P "SCHOOL" plaque, R2-1 "SPEED LIMIT 20" sign, S4-4P "WHEN FLASHING" Plaque)
    - If school speed compliance is still an issue with new assembly, add an additional speed feedback system to show driver speeds
- Evaluate using an exclusive pedestrian phase for all crosswalks at once to coincide with the existing exclusive pedestrian phase of the east leg crosswalk
- Restripe north approach at the Walnut Boulevard and NW Satinwood Street intersection to shift the southbound right-turn vehicle lane to the edge and have the bicycle lane between the two vehicle lanes. Provide green bicycle conflict markings for southbound approach where the southbound right lane would intersect the shifted bicycle lane

High Complexity

- Evaluate adding a crosswalk to the west leg of the Walnut Boulevard and NW Satinwood Street intersection, including ADA curbs ramps for the relevant approaches
- Widen the south sidewalk between NW Fairlawn Street and NW Satinwood Street for both pedestrian and bike travel
- If full signal replacement is to occur, consider a roundabout or protected intersection at the Walnut Boulevard and NW Highland Drive intersection
- Evaluate limiting the vehicle movements at Fairlawn Street on Walnut Boulevard to be right-in, right-out only to extend the eastbound left-turn lane at the Walnut Boulevard and NW Satinwood Street intersection, adding approximately 75 feet of additional storage

[13] Per the MUTCD, the School Speed Limit Sign should be at least 200 feet in advance of the school grounds or a school crossing, but not greater than 500 feet.

[14] The School plaque is to be used to warn of an upcoming school area and/or school speed limit, whereas the Ahead plaque is specifically used to provide warning of a marked school crossing.

FOCUS AREA 4: NW 13TH STREET TO NW 25TH STREET

Focus Area 4 features an RRFB midblock crossing located between NW 13th Street and NW Garryanna Street as seen in Figure 15. The area also contains signalized intersections at NW Kings Boulevard and NW Rolling Green Drive, which had the highest number of crashes within the focus area, mostly involving turning vehicles. Adjacent land uses are primarily accessed via side streets along Walnut Boulevard, with dedicated left turn lanes to accommodate turning movements without impeding through traffic. RSA field observations noted a high volume of pedestrians, bicyclists, and scooter riders using the NW Kings Boulevard intersection.

FIGURE 15. MIDBLOCK CROSSING BETWEEN NW 13TH STREET AND NW GARRYANNA DRIVE

RSA TEAM FOCUS AREA 4 SAFETY SOLUTIONS

To address the identified crash risks and associated reported crash patterns in Focus Area 4, the following solutions were identified by the RSA Team for consideration.

Low Complexity

- Replace the undersized MUTCD R1-5b "STOP HERE FOR PEDESTRIANS" sign with a standard-size sign and trim surrounding vegetation to ensure full visibility at the RRFB enhanced midblock crossing between NW Garryanna Street and NW 13th Street intersections
- Add solid white lane striping between adjacent lanes leading up to the crossing at the RRFB enhanced midblock crossing between NW Garryanna Street and NW 13th Street intersections
- Install MUTCD R1-6a "STOP FOR PEDESTRIANS IN CROSSWALK" signs in the existing refuge island for both approaches at the RRFB enhanced midblock crossing between NW Garryanna Street and NW 13th Street intersections
- Replace the existing sign (MUTCD R3-7R) at the beginning of the dedicated right-turn lane for the NW Kings Boulevard and Walnut Boulevard intersection with the MUTCD R4-4 "Begin Right Turn Lane Yield to Bikes" sign
- Add green bicycle conflict markings for northbound approach of NW Kings Boulevard intersection (due to the tendency for right-turning northbound drivers to cut into the bicycle lane)

Medium Complexity

- Consider a flashing yellow arrow (FYA) right-turn head for the northbound approach at NW Rolling Green intersection
- Consider a FYA right-turn head for the westbound approach at the NW Kings Boulevard intersection
- Install a pedestrian pedestal pole assembly and relocate the existing pushbutton for the north leg crossing to be closer to the curb ramp at the northwest corner of the NW Kings Boulevard intersection

High Complexity

- Reconstruct the curb ramps and relocate the north leg crossing at NW Rolling Green & Walnut Boulevard intersection further south to be more visible to turning vehicles from Walnut Boulevard
- Consider adding bicycle lanes to the south leg of the NW Rolling Green & Walnut Boulevard intersection in preparation for the future neighborhood bikeway
- If a lane reallocation occurs along Walnut Boulevard at the NW 25th Street and Walnut Boulevard intersection, implement (a) a dedicated westbound left-turn lane onto 25th Street, and (b) add a marked pedestrian crossing on the west leg of the crosswalk with a pedestrian refuge island (this connects with the planned neighborhood bikeway along 25th Street)
- If full signal replacement is to occur, consider a roundabout or protected intersection at the Walnut Boulevard and NW Kings Boulevard intersection

FOCUS AREA 5: NW 25TH STREET TO NW WALNUT PLACE

This focus area contains signalized intersections at NW 29th Street and NW Aspen Street. The south approach of the Aspen Street intersection serves as an access point for Bessie Coleman Elementary School, as shown in Figure 16. This segment of the corridor lacks a two-way left turn lane, so left-turning vehicles outside the signalized intersections further disrupt traffic flow and increase conflict points. RSA field observations noted congestion for eastbound left-turning vehicles at the NW Aspen Street intersection, causing vehicles to maneuver around in the adjacent through lane.

FIGURE 16. NW ASPEN STREET INTERSECTION WITH BESSIE COLEMAN SCHOOL ENTRANCE

RSA TEAM FOCUS AREA 5 SAFETY SOLUTIONS

To address the identified crash risks and associated reported crash patterns in Focus Area 5, the following solutions were identified by the RSA Team for consideration.

Low Complexity

- Remove the old legacy edge line on the south side of the intersection at the NW Aspen Street intersection
- Use contrast striping for the south leg crosswalk and lane use markings on the concrete surface at the NW Aspen Street intersection
- Update both eastbound and westbound school zone assemblies to have the MUTCD S4-3P "SCHOOL" plaque underneath the existing S1-1 sign instead of the MUTCD W16-9P "AHEAD" plaque[15]

Medium Complexity

- Evaluate potential to relocate the northbound and southbound approach signal heads attached to the signal poles onto the mast arms at the NW 29th Street intersection
- Modify the north leg of the NW Aspen Street Intersection to have three lanes, creating a dedicated left-turn lane to mirror the south leg
- Upgrade the school speed limit assemblies with flashing yellow beacons and include either a MUTCD S5-1 sign or a separated sign assembly (MUTCD S4-3P "SCHOOL" plaque, R2-1 "SPEED LIMIT 20" sign, S4-4P "WHEN FLASHING" Plaque)
    - If school speed compliance is still an issue with new assembly, add an additional speed feedback system to show vehicle speeds

High Complexity

- If a lane reallocation occurs along Walnut Boulevard at this location, consider implementing a marked school crosswalk east of NW Aspen Street with a median refuge island and other enhanced features to connect the school with the north side of Walnut Boulevard, as well as specifically the neighborhood path to the north

[15] The School plaque is to be used to warn of an upcoming school area and/or school speed limit, whereas the Ahead plaque is specifically used to provide warning of a marked school crossing.

FOCUS AREA 6: NW WALNUT PLACE TO NW FAIR OAKS DRIVE

This segment of the corridor includes MLK Jr. Park and contains a single signalized intersection at NW Glenridge Drive and NW Witham Hill Drive, along with a RRFB enhanced crossing between NW Elmwood Drive and NW Maser Drive, as seen in Figure 17. A previous safety evaluation at this intersection was completed by DKS Associates prior to this RSA and is included in the appendix. Recommended countermeasures from that effort are incorporated into the Safety Solutions section below. Crashes in this area primarily involve turning movements at the signalized intersection or fixed object collisions, with contributing factors including inattentiveness, fatigue, and carelessness.

FIGURE 17. RRFB ENHANCED CROSSING AT MLK JR. PARK

RSA TEAM FOCUS AREA 6 SAFETY SOLUTIONS

To address the identified crash risks and associated reported crash patterns in Focus Area 6, the following solutions were identified by the RSA Team for consideration.

Low Complexity

- Add a marked trail crossing crosswalk to the west leg of the NW Fair Oaks Drive intersection

Medium Complexity

- Shorten the crossing distance on the west leg crosswalk by adding a curb extension on the northwest corner at the NW Glenridge Drive/NW Witham Hill Drive intersection
- Realign existing signal heads for the southbound approach to align with travel lanes at the NW Glenridge Drive/NW Witham Hill Drive intersection
- Upgrade overhead lighting for the existing RRFB enhanced crossing between NW Elmwood Drive and NW Maser Drive
- Evaluate the addition of an unmarked crosswalk with curb ramps at the south leg of the NW Elmwood Drive intersection

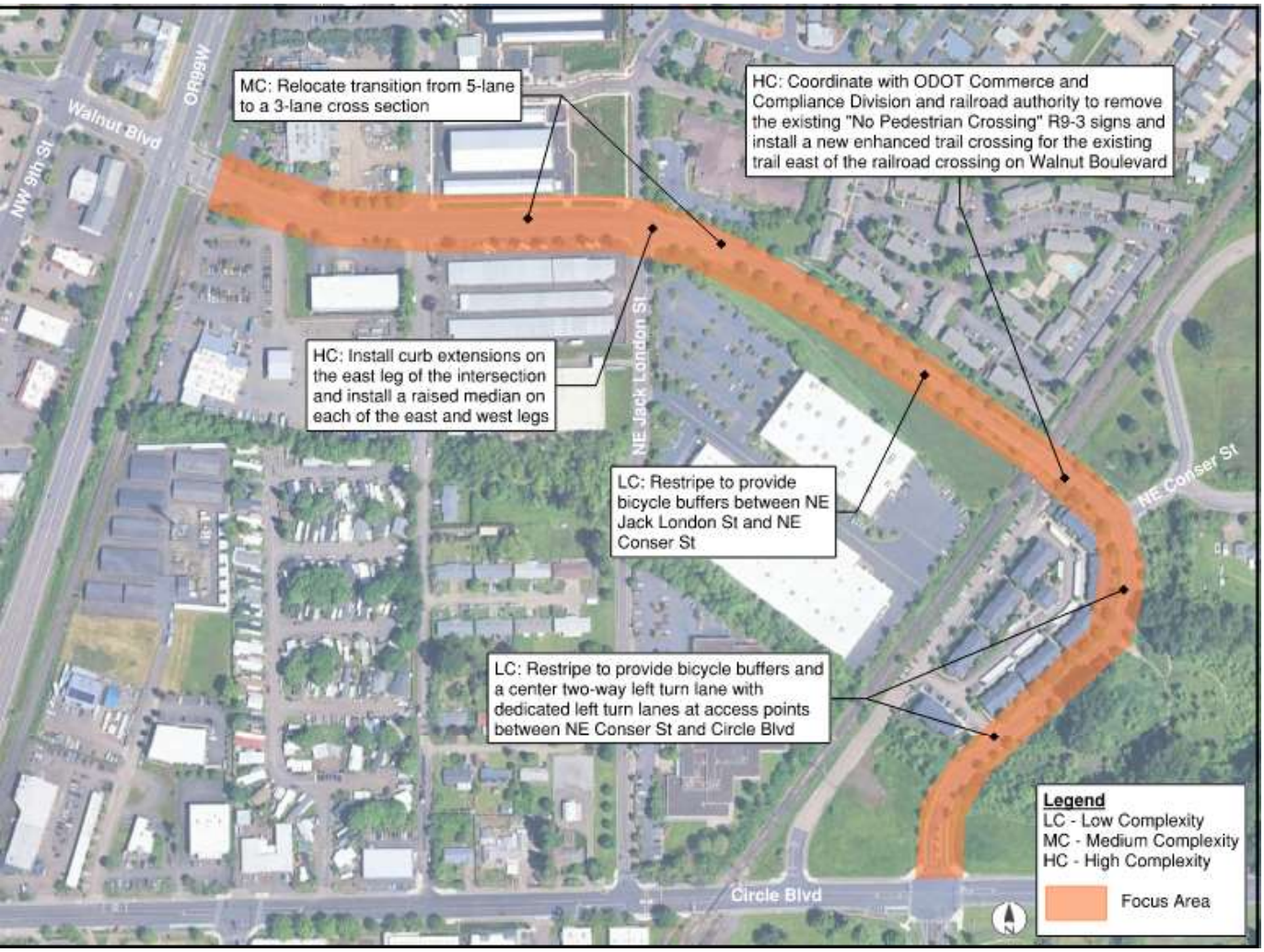
High Complexity

- If northbound approach traffic signal mast arm is upgraded to a longer mast arm, shift the three signal heads to align with travel lanes at the NW Glenridge Drive/NW Witham Hill Drive intersection
- Evaluate a potential enhanced RRFB crossing at the north leg of the NW Elmwood Drive intersection
    - Addition of south leg crossing would not be necessary if enhanced crossing was provided on north leg

Countermeasure Overviews

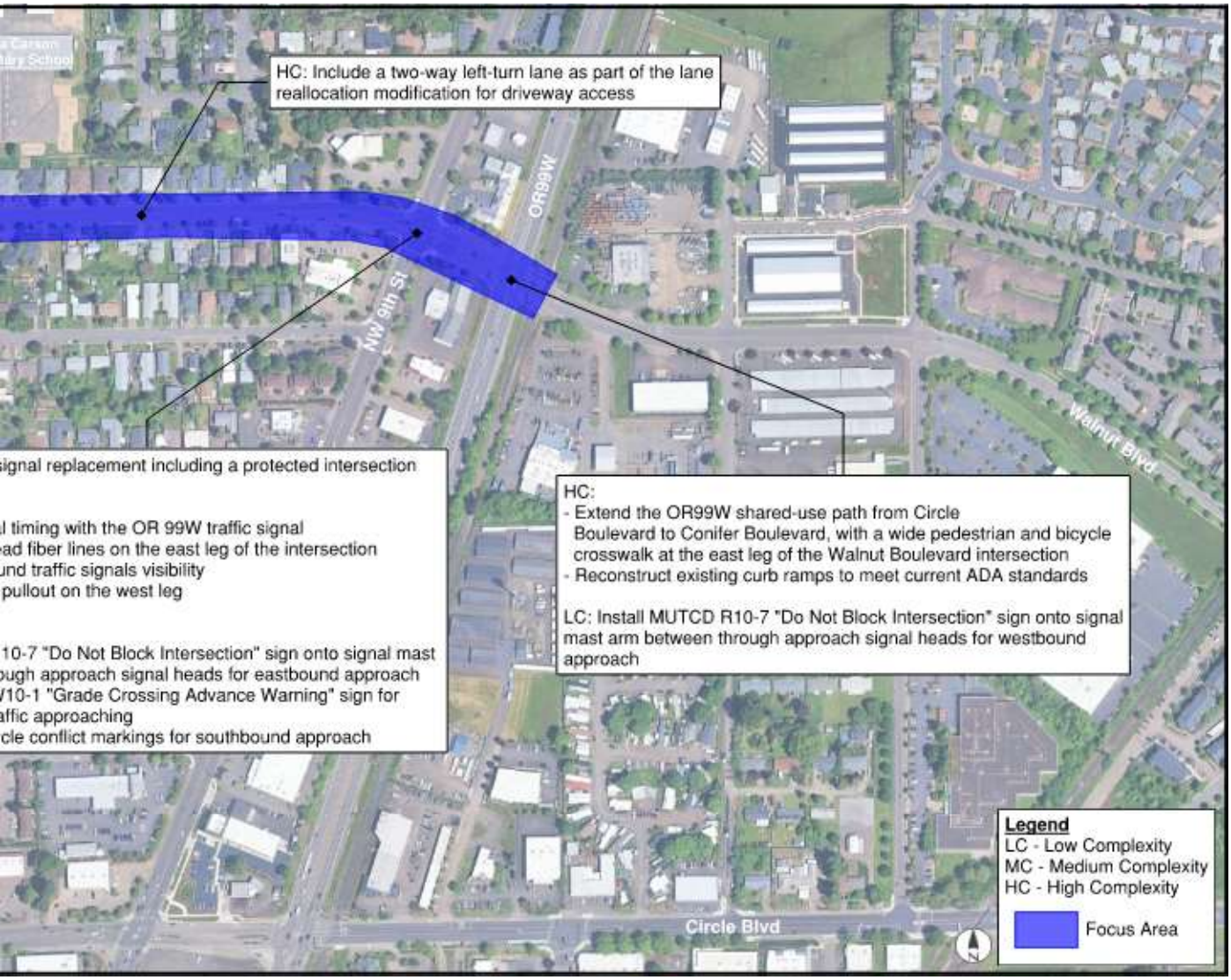
The following pages present an aerial overview of all identified countermeasures for the Walnut Boulevard corridor. This is intended to provide a visual representation of where the countermeasures are located. Most of the project descriptions are specified on the aerials, but some have descriptive text which can be found in the previous section of the report.

OVERVIEW - FOCUS AREA 1: CIRCLE BOULEVARD TO OR99W

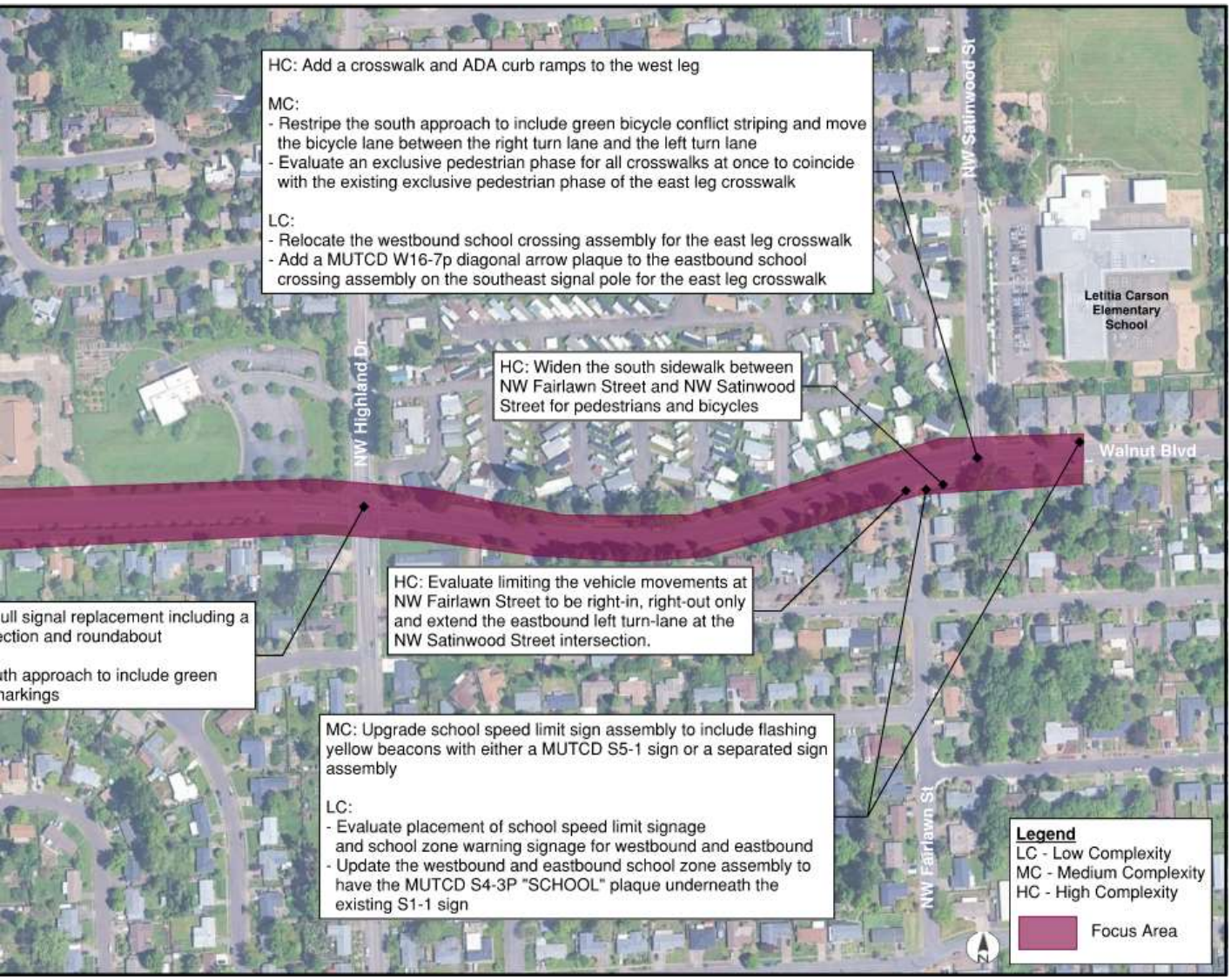


A 1: CIRCLE BOULEVARD TO OR99W

OVERVIEW - FOCUS AREA 2: OR99W TO NW SATINWOOD STREET

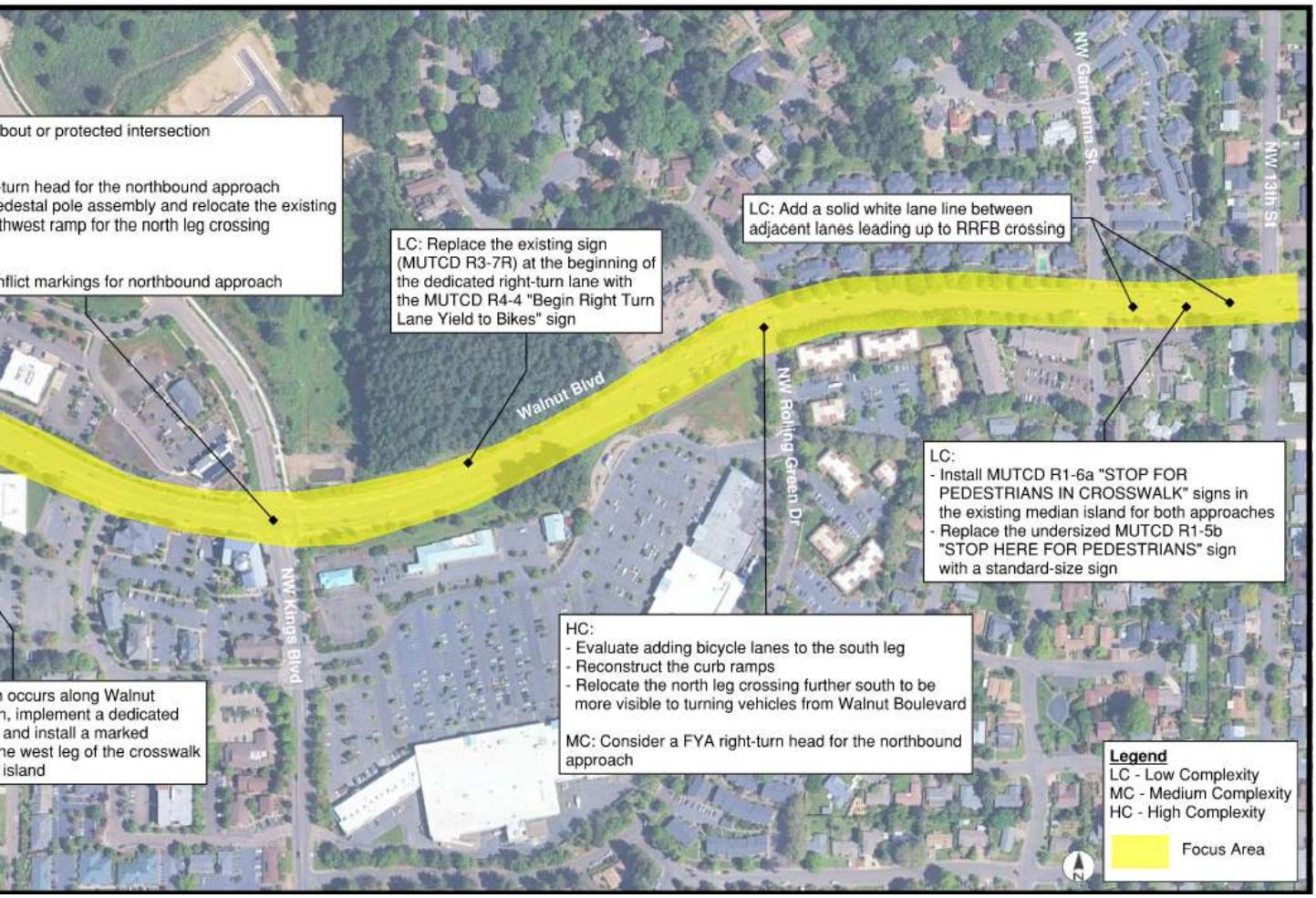


A 2: OR99W TO NW SATINWOOD STREET



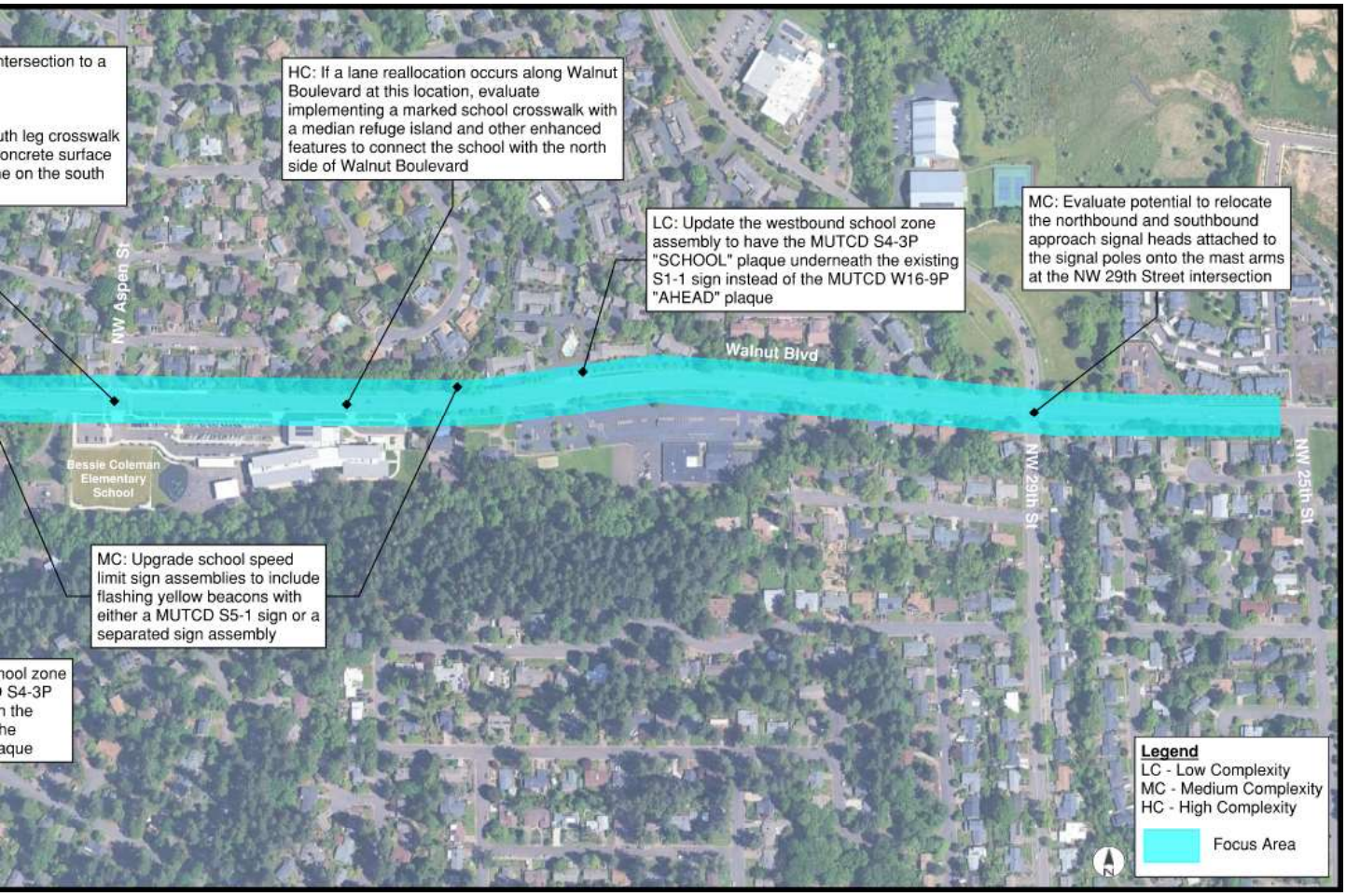
A 3: NW SATINWOOD STREET TO NW 13TH STREET

OVERVIEW - FOCUS AREA 4: NW 13TH STREET TO NW 25TH STREET



A 4: NW 13TH STREET TO NW 25TH STREET

OVERVIEW - FOCUS AREA 5: NW 25TH STREET TO NW WALNUT PLACE



A 5: NW 25TH STREET TO NW WALNUT PLACE

OVERVIEW - FOCUS AREA 6: NW WALNUT PLACE TO NW FAIR OAKS DRIVE

A 6: NW WALNUT PLACE TO NW FAIR OAKS DRIVE

Appendix

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APPENDIX A: WALNUT BOULEVARD INFORMATIONAL PACKET

APPENDIX B: CRASH DATA

APPENDIX C: WALNUT BOULEVARD PREVIOUS RSA

APPENDIX D: WALNUT GLENRIDGE SAFETY EVALUATION

APPENDIX A: WALNUT BOULEVARD INFORMATIONAL PACKET

Corvallis Transportation Safety Action Plan

DATE: April 15, 2025

TO: Road Safety Audit Team

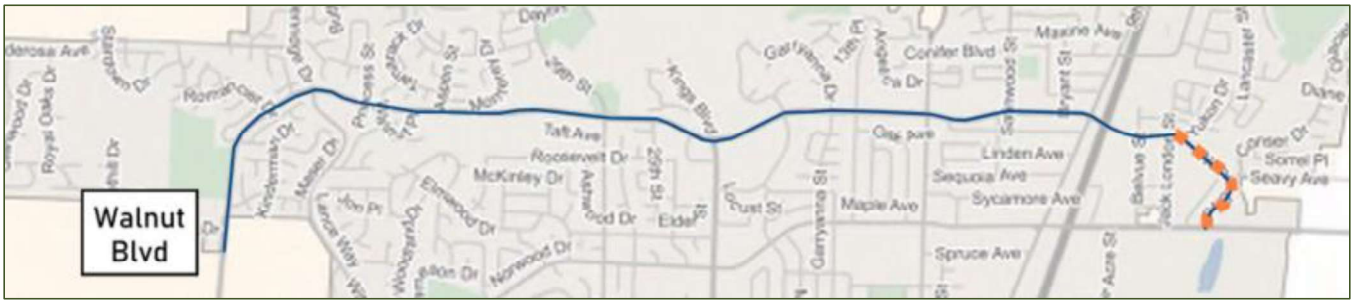
FROM: DKS Associates

SUBJECT: Corvallis Transportation Safety Action Plan

Walnut Boulevard Road Safety Audit - Informational Packet

Audit Goals for Today

The extents of the Road Safety Audit extend from Fair Oaks Drive in the west (just outside City limits) to Circle Boulevard in the east (though our assessment will pass over a short section already assessed).



PROCESS

See the attached schedule for details:

- Large group visits along the corridor
- Small group visits to specific locations during peak travel times
- Workshopping sessions to discuss issues

DOCUMENT SAFETY RISKS AND ISSUES

- Take Photos, Make Notes
- Overarching Questions:
    - Can we reduce the likelihood of someone making an error?
    - When someone does make an error, can we create a more recoverable or forgiving street to mitigate the severity of the crash?

CONSIDERATIONS FOR SAFETY RISK/ISSUE IDENTIFICATION

- Likelihood/Frequency and Severity/Impact
    - How often does/could this pattern happen?
    - If it does happen, how bad could the crash be?
- All Modes
    - Pedestrians, Bicyclists, Motorcyclists, Drivers (passenger vehicles), Drivers (heavy vehicles)
    - Older & younger drivers
    - Students
    - Law enforcement/emergency responders
- Document Infrastructure & Observe User Behavior
    - Answer the question: Based on the environment, how do people use it?
- GORE Sheets
    - Geometry: sight distance, fixed objects, street width, grade
    - Operations: traffic control devices, signage, striping
    - Road Users: Buses, Motorcyclists, Runners
    - Environment: Rain vs sun, land use, day vs night
- Assessment Sheets
    - Street Design: Posted Speed, Curves, Sidewalk Presence
    - Roadside/Environmental: Clear Zones, Vegetation
    - Signs, Signals, Markings: Lighting, School Zones, Regulatory vs Warning Signs
    - Intersections: Advance Warning, Turn Lanes, Sight Distance, Driver Expectancy

POTENTIAL SOLUTIONS

- Consider possible solutions
    - *While aspects like feasibility, standards, and cost are considered, they are not the decisive factors for a solution at this stage*
- Short term vs long term solutions
- At the end of the day…
    - What are your top safety priorities?
    - What was specifically surprising or new to observe (particularly for the City)?

Morning Corridor Overview

Spend 15-45 minutes at each location (depending on length and complexity).

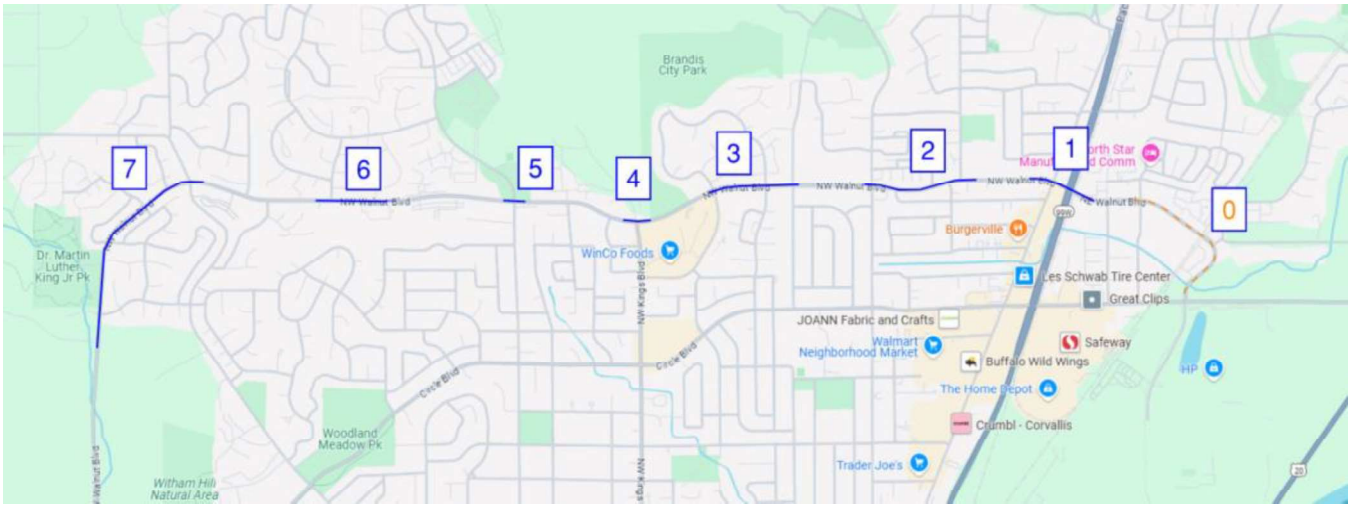


FIGURE 1: CORRIDOR OVERVIEW STOPS

STOP 0: DRIVE THROUGH EASTERN SECTION

Reference the Prior RSA Recommendations

STOP 1: OR99W & 9TH STREET INTERSECTIONS (0.2-MILE)

Parking: Walnut Plaza Parking Lot
***Focus Reasons*:**

- Crash History
- Significant Intersections
- Commercial Area

<u>OR99W/Walnut Blvd Crashes</u>

- High Crash Frequency Location - 11 crashes
- Predominately Angle Crashes (7 crashes) - No pattern for which approaches disregarded the signal

<u>9th St/Walnut Blvd Crashes</u>

- High Crash Frequency Location - 21 crashes
- 1 Pedestrian Crash (Right-turning vehicle failed to yield to ped in crosswalk)
- 1 Bicycle Crash (Northbound vehicle and eastbound bicycle - Unknown who disregarded the signal)
- Predominately Rear End Crashes (11 crashes) - 7 are Northbound Rear Ends

STOP 2: SATINWOOD STREET TO HIGHLAND DRIVE (0.3-MILE)

Parking: Fairlawn St
***Focus Reasons*:**

- School (speed, vulnerable road users, etc.)
- Crash History
- 4-Lane Cross-Section
- Driveways

Satinwood St/Walnut Blvd Crashes

- Only two crashes (Non-injury, non-ped/bike)

Fairlawn St/Walnut Blvd Crashes

- 1 Bicycle Crash (Westbound left-turning vehicle failed to yield to eastbound vehicle) - Non-student

Highland Dr/Walnut Blvd Crashes

- High Crash Frequency Location - 19 crashes
- 1 Pedestrian Crash (Left-turning vehicle failed to yield to ped in crosswalk)
- 1 Bicycle Crash (Right-turning vehicle failed to yield to bicycle in adjacent bicycle lane)
- Predominately Turning Movement Crashes (10 crashes) - Every approach, left-turns failing to yield to oncoming vehicles

STOP 3: 13TH STREET TO ROLLING GREEN DRIVE (0.3-MILE)

Parking: Garryanna St
***Focus Reasons*:**

- Crash History
- 5-Lane Cross-Section
- Mid-block Improved Crossing (only one on corridor)

Near Garryanna St

- 1 Serious Injury Rear End Crash (Careless Driving)

Rolling Green Dr/Walnut Blvd Crashes

- 6 Turning Movement Crashes (Westbound left-turning vehicles failed to yield to eastbound vehicle)

STOP 4: KINGS BOULEVARD (0.1-MILE)

Parking: Old Cascade BBQ Parking Lot
***Focus Reasons*:**

- Crash History
- Significant Intersection
- Commercial Area

Kings Dr/Walnut Blvd Crashes

- On the TSAP HIN (High Injury Network)
- 1 Serious Injury Pedestrian Crash (Left-turning vehicle failed to yield to ped in crosswalk)
- 1 Bicycle Crash (Left-turning vehicle and oncoming bicycle - unknown who disregarded the signal)
- Few Turning Movement crashes

STOP 5: 29TH STREET (0.1-MILE)

Parking: Taft Avenue
***Focus Reasons*:**

- Crash History
- Significant Intersection

29th St/Walnut Blvd Crashes

- 1 Bicycle Crash (Left-turning vehicle failed to yield to oncoming bicycle)
- Approximately half Turning Movement and half Angle crashes

STOP 6: BESSIE COLEMAN ELEMENTARY (0.1-MILE)

Parking: Aspen Street or School
***Focus Reasons*:**

- School (speed, vulnerable road users, etc.)
    - Only two crashes in the area (Non-injury, non-ped/bike)
- 4-Lane Cross-Section

STOP 7: WITHAM HILL DRIVE TO FAIR OAKS DRIVE (0.6-MILE)

Parking: MLK Park
***Focus Reasons*:**

- Witham Hill Dr-Glenridge Dr Intersection Crash History
- Urban Fringe/Transition (including speed)
- Park Area

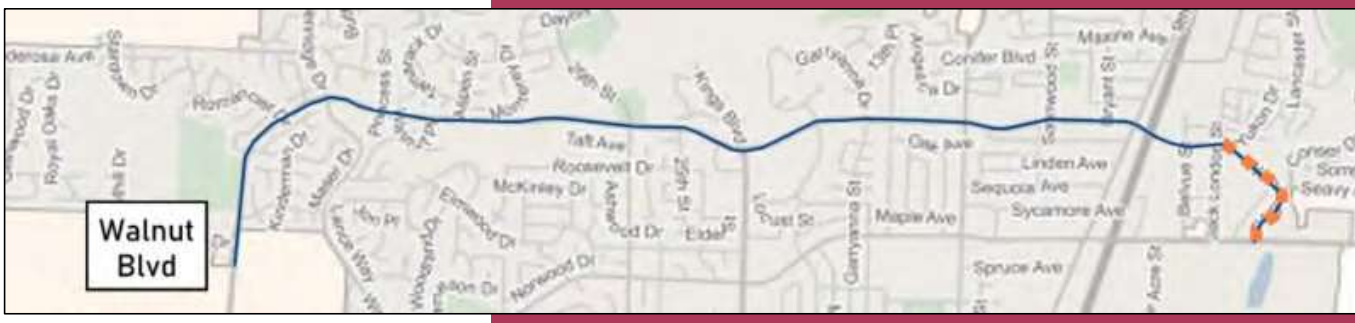
Witham Hill Dr-Glenridge Dr/Walnut Blvd Crashes

- On the TSAP HIN (High Injury Network) - only four crashes, but two were serious injury crashes
- 1 Serious Injury Pedestrian Crash (Right-turning vehicle failed to yield to ped in crosswalk)
- 1 Serious Injury Turning Movement Crash (Westbound left-turning vehicle failed to yield to oncoming traffic)

ut Blvd RSA Schedule

Activity	Notes	Location
Workshop Kickoff Discussion		*Meeting Location*
Corridor Observations	Whole Group; Focused on Infrastructure	*See Recommended Stops*
Break - Lunch		Optional: Meeting Location
Work Session (& Afternoon Location Planning)	Initial Brainstorming Thoughts	Meeting Location
School Dismissal Observations	Two Groups; School Ends @ 2:30pm for both schools	Bessie Coleman Elementary & Letitia Carson Elementary
Break		
Afternoon/Evening Peak Observations	Multiple Groups; Focused on User Behavior; Peak Hour starts at 4:30pm for most locations	*To Be Determined*
Debrief		Meeting Location

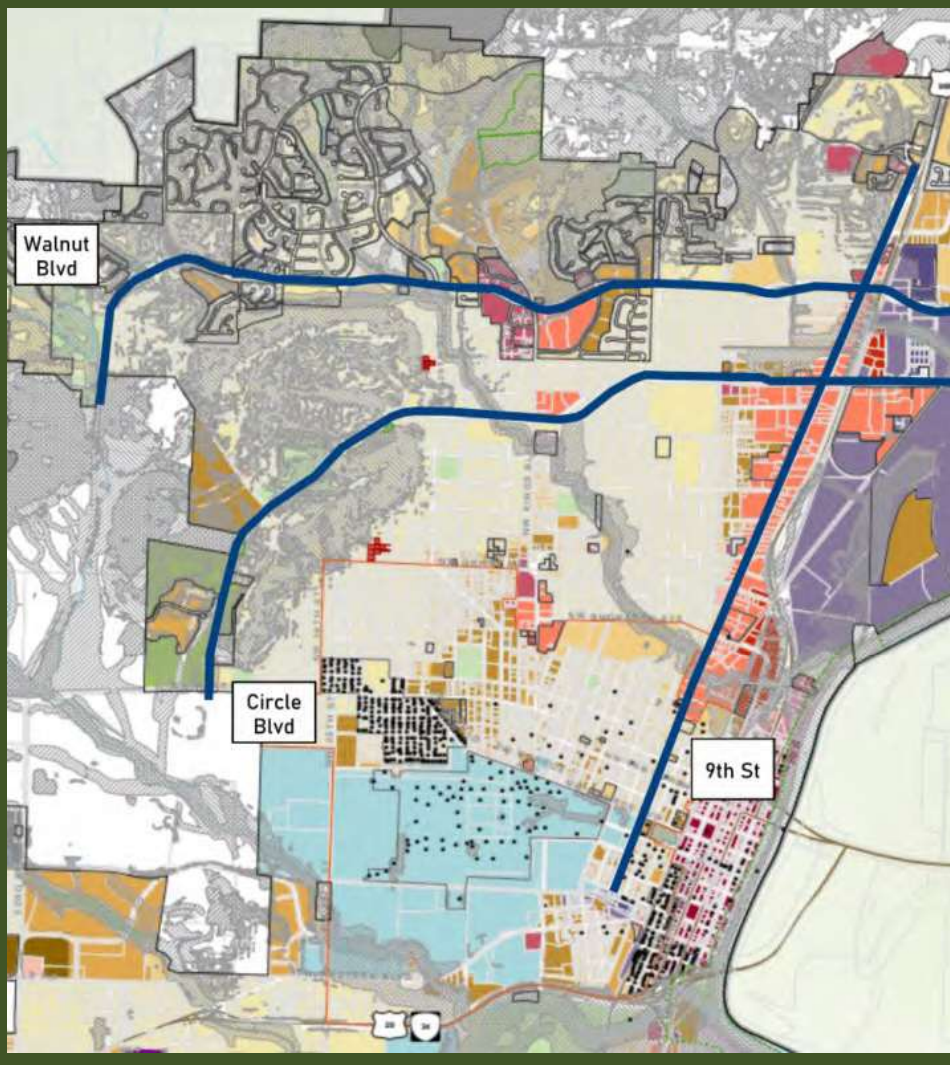
Background Data: Street Characteristics Walnut Blvd



Background Data: Land Use

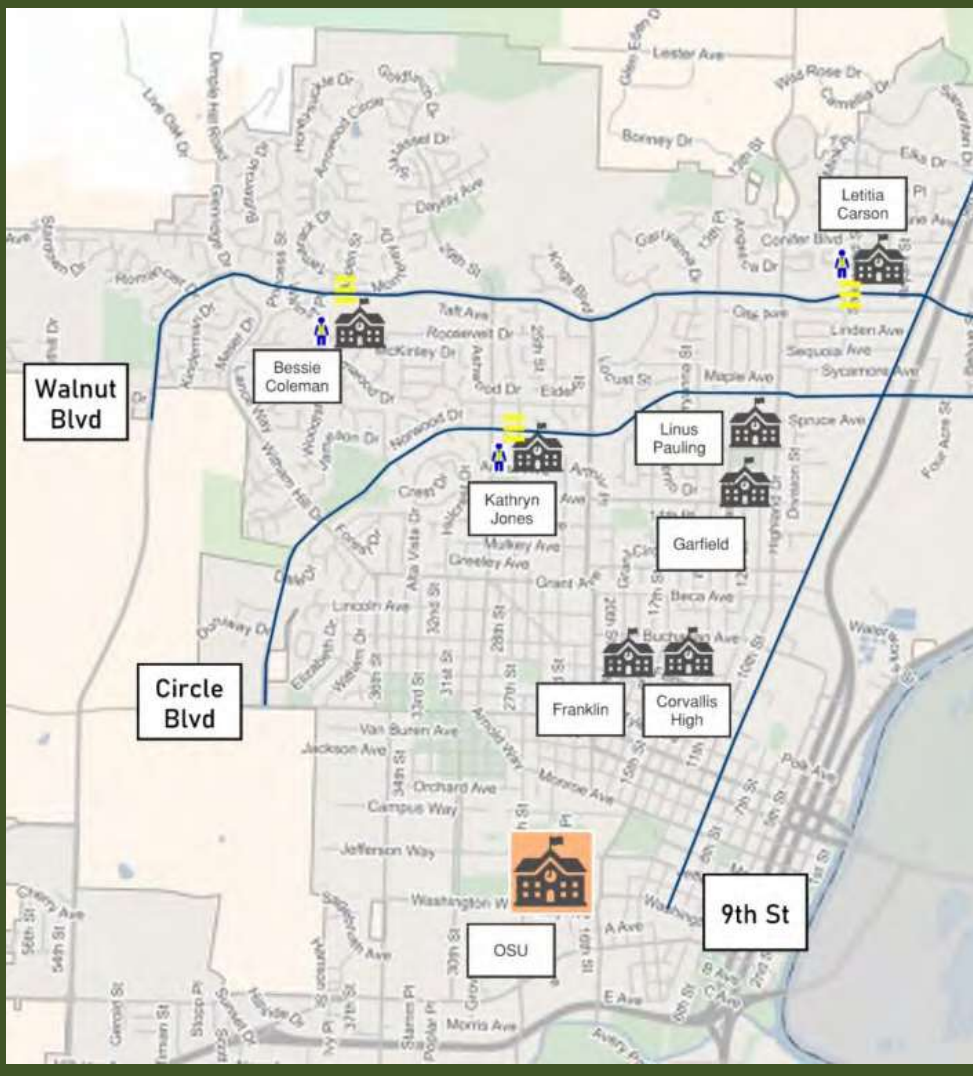
- Yellow – Residential
- Red/Pink – Commercial
- Purple – Industrial
- Green – Park

- From a land use perspective…
- Walnut Blvd and Circle Blvd are very similar
- 9th Street is unique

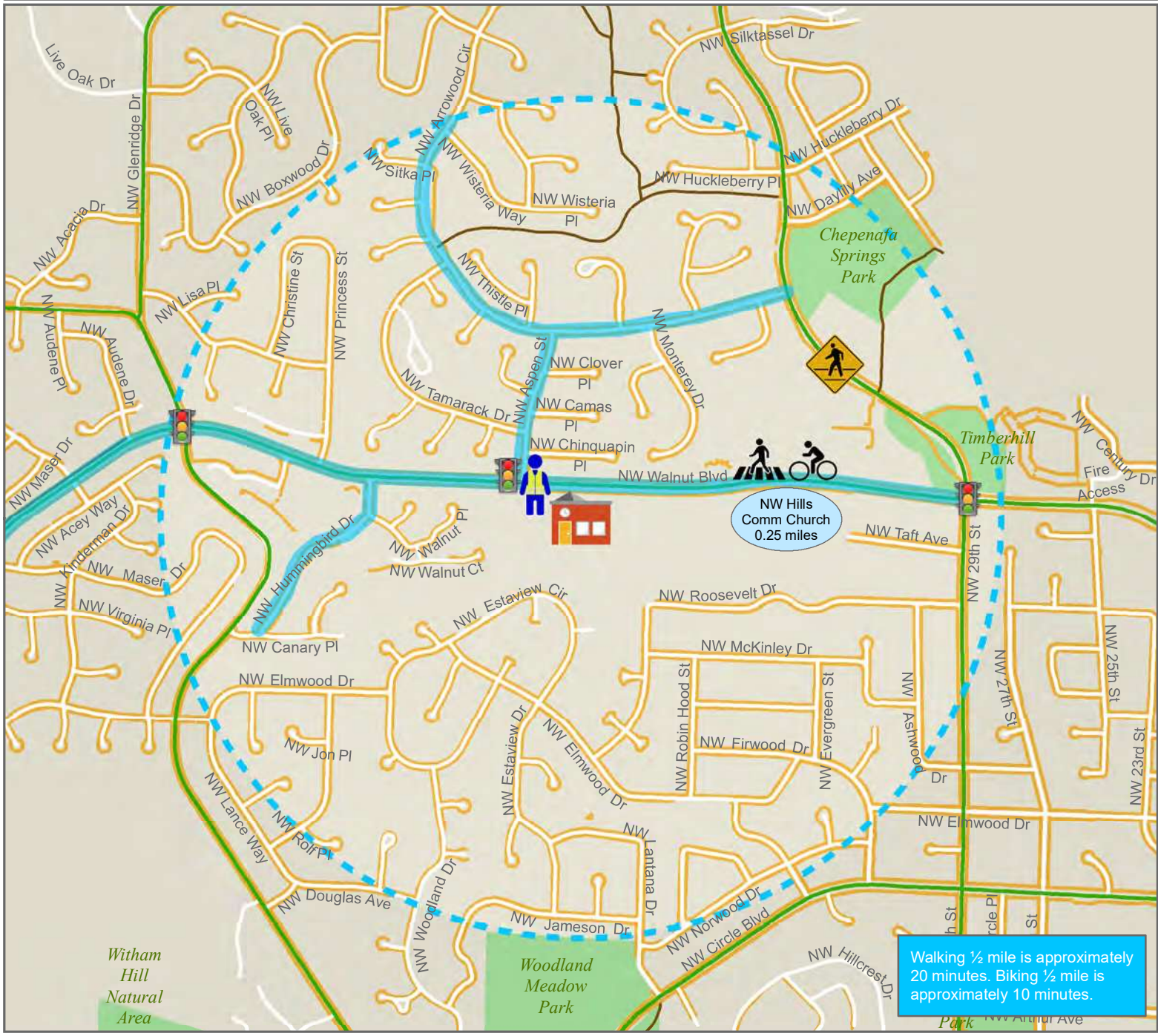


Background Data: Schools

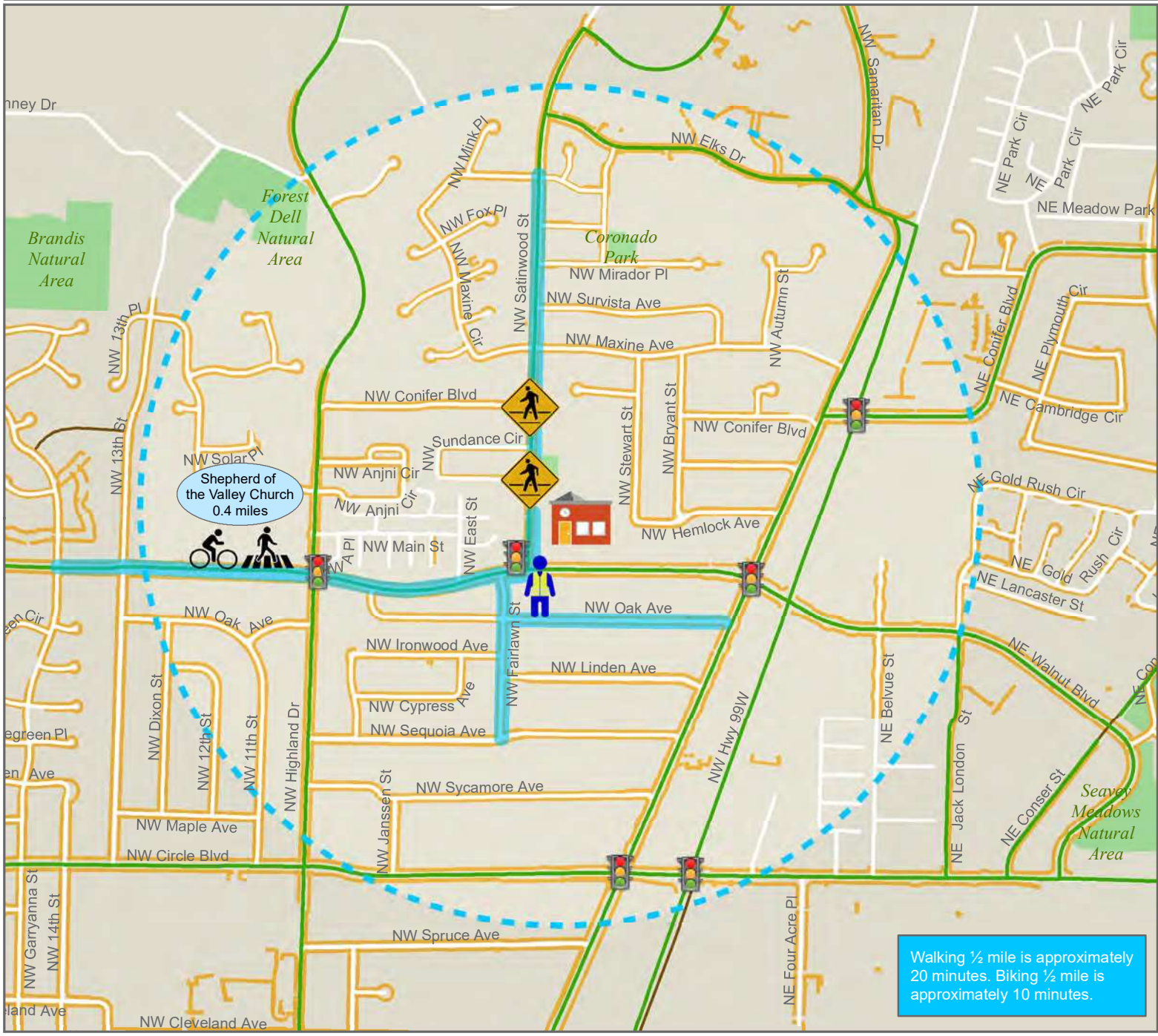
- Three schools with crossing guards on the study corridors
- Elementary School: Begins @ 8:05am, Ends @ 2:30pm



Bessie Coleman School - 3838 NW Walnut Blvd

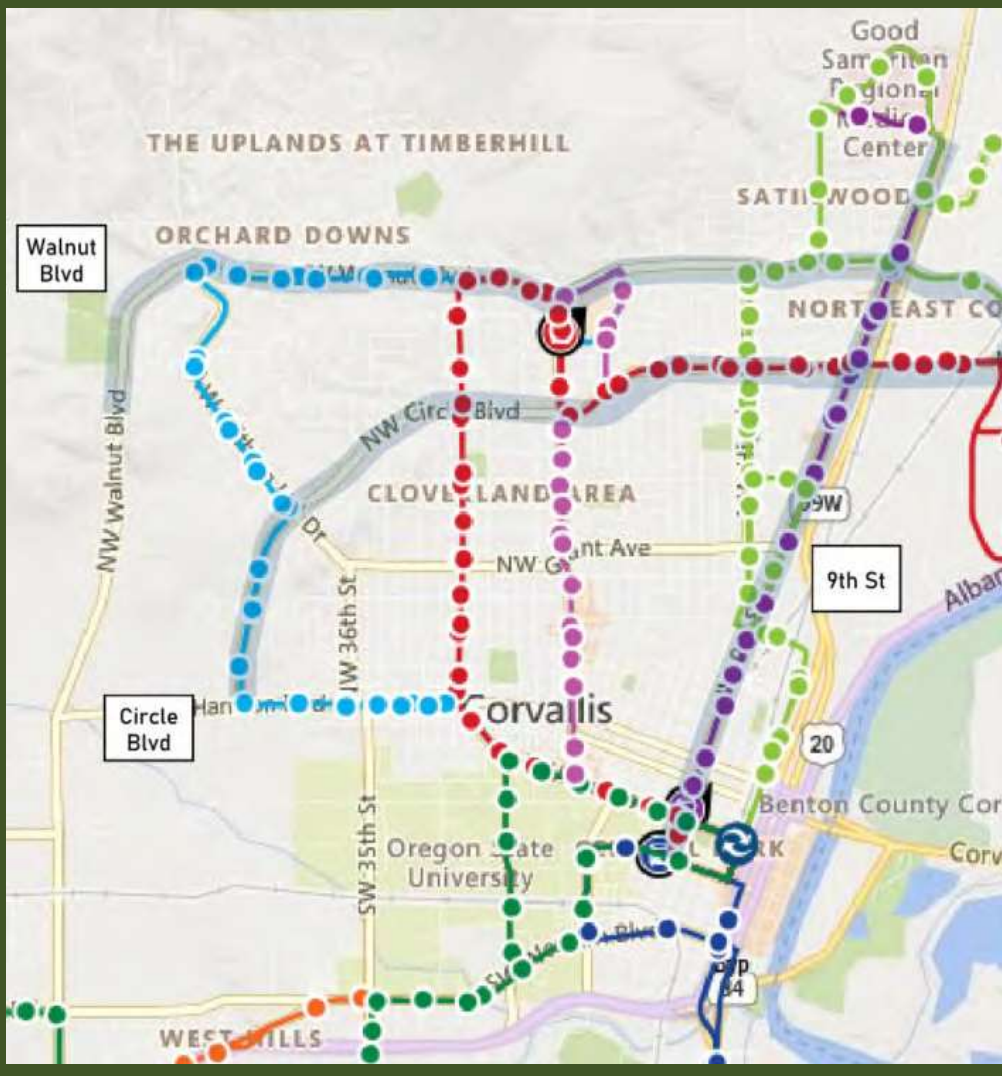


Letitia Carson School - 2701 NW Satinwood Street



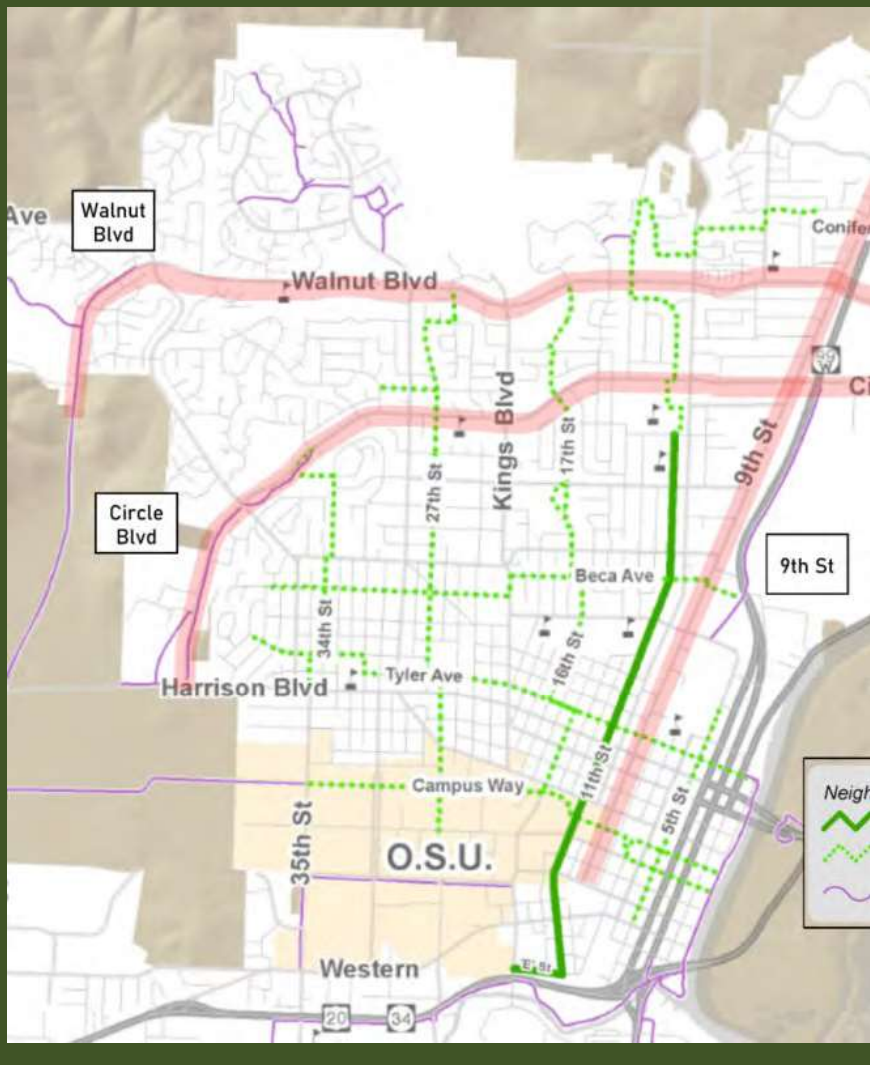
Background Data: Transit Routes & Stops

- Walnut/Circle: Piecemeal
- 9th: Full-Length

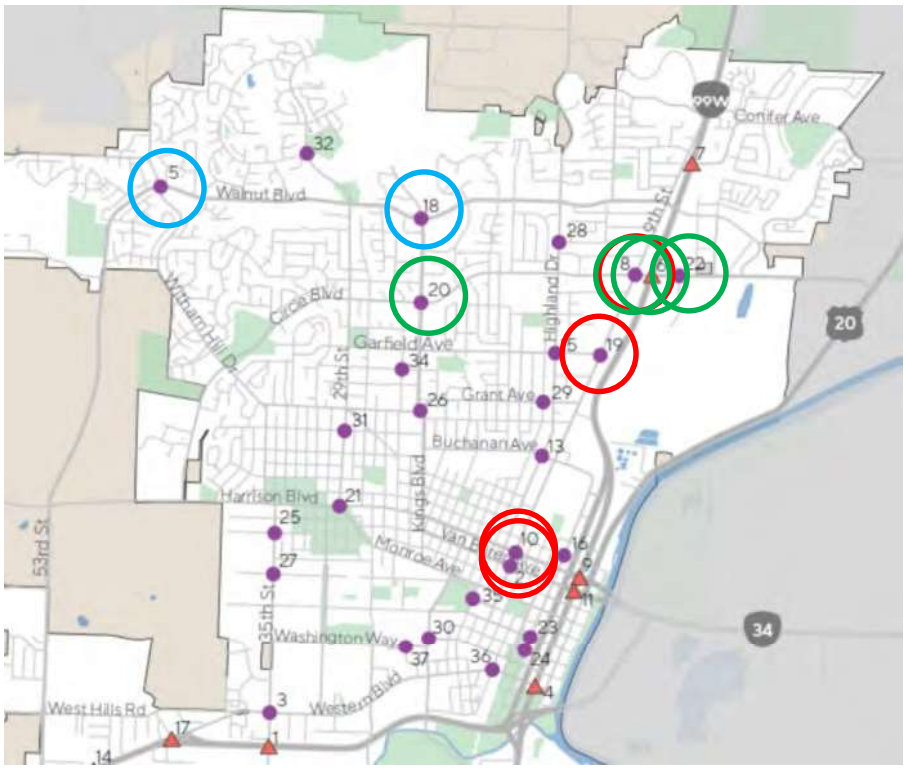


Background Data: Neighborhood Bikeway Routes

- Many potential crossing locations
- 9th St has parallel route for bicycles
- North of Circle Blvd, no other east -west routes except Walnut Blvd
- Neighborhood Bikeway Routes: Low-volume, low-speed residential streets



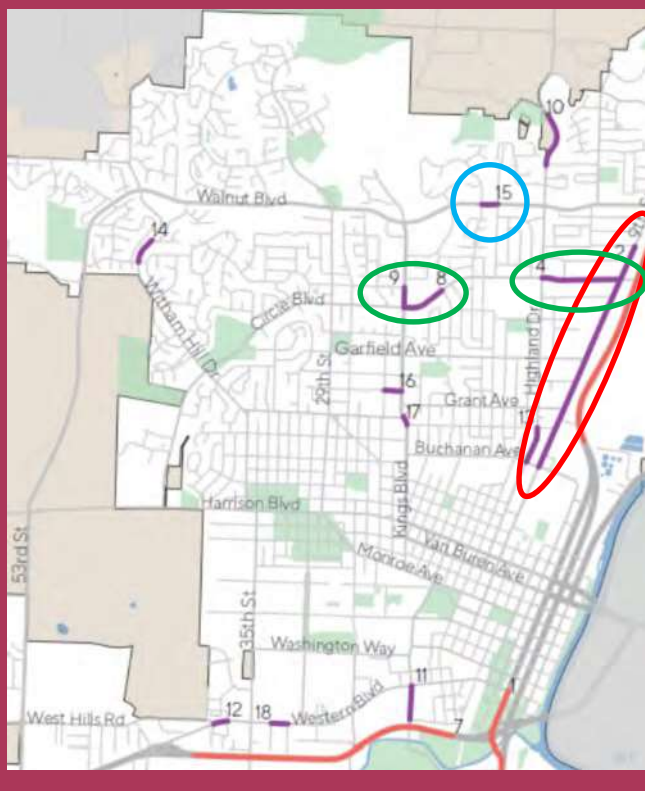
Background Data: Crash History



High Injury Network (HIN)

Intersections and Segments

Based on EPDO (Equivalent Property



Background Data:
Crash History – Walnut Blvd

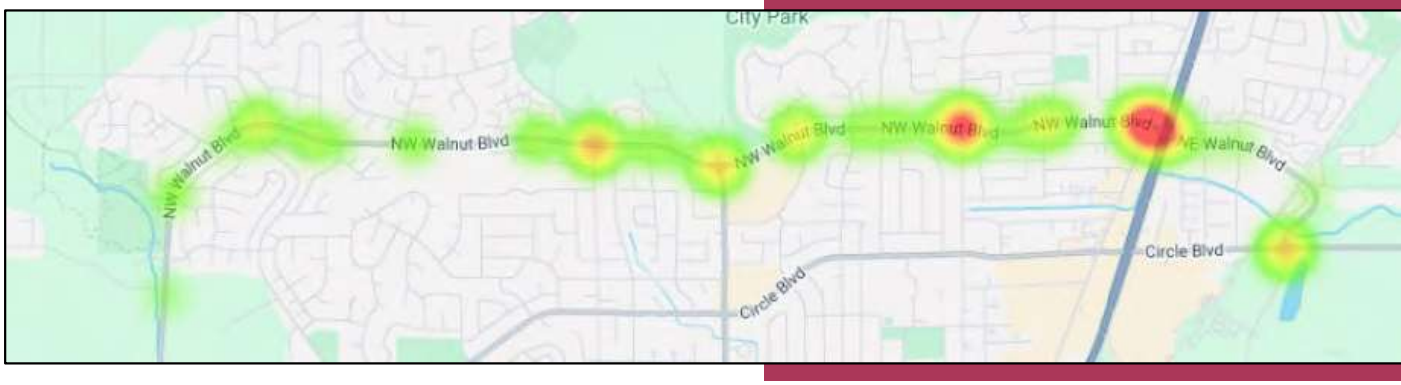
- Predominately intersection-related
- 4 Serious Injury Crashes (2 pedestrian)
- 9 Pedestrian/Bicycle Crashes
  (all occurred at intersections)

2018-2022 ODOT Cra

Potential Focus Areas

- Near 9th St & OR99 Intersections
- Highland Intersecti
- Mid-block Crossing

Heat Map based on crash frequen



OFFICE OF SAFETY

Proven Safety Countermeasures

SPEED MANAGEMENT

Speed Safety Cameras

Variable Speed Limits

Appropriate Speed Limits for All Road Users

ROADWAY DEPARTURE

Wider Edge Lines

Enhanced Delineation for Horizontal Curves

Longitudinal Rumble Strips and Stripes on Two-Lane Roads

SafetyEdge[SM]

Roadside Design Improvements at Curves

Median Barriers

INTERSECTIONS

Backplates with Retroreflective Borders

Corridor Access Management

Dedicated Left- and Right-Turn Lanes at Intersections

Reduced Left-Turn Conflict Intersections

Roundabouts

Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections

Yellow Change Intervals

PEDESTRIANS/BICYCLES

Crosswalk Visibility Enhancements

Bicycle Lanes

Rectangular Rapid Flashing Beacons (RRFB)

Leading Pedestrian Interval

Medians and Pedestrian Refuge Islands in Urban and Suburban Areas

Pedestrian Hybrid Beacons

Road Diets (Roadway Reconfiguration)

Walkways

CROSSCUTTING

Pavement Friction Management

Lighting

Local Road Safety Plans

Road Safety Audit

FHWA-SA-21-082

Stop 1:
OR99W & 9th Street Intersections

Stop 2:
Satinwood Street to Highland Drive

Stop 2:
Satinwood Street to Highland Drive

Stop 3:
13th Street to Rolling Green Drive

Stop 4:
Kings Boulevard

Stop 5:
29th Street

Stop 6:
Bessie Coleman Elementary

Stop 7:
Witham Hill Drive to Fair Oaks Drive

Stop 7:
Witham Hill Drive to Fair Oaks Drive

GEOMETRY

DKS

Category	Team Member Comments
Sight Distances	
Horizontal Curves	
Vertical Curves	
Gradient	
Roadside Objects	
Roadway Surface	
Cross Section	
Clearance	

OPERATIONS

DKS

Category	Team Member Comments
Signing	
Striping	
Speeding	
Intersection Traffic Control	
Turning Movements	
Driveways	
Congestion	

ROAD USERS

DKS

Category	Team Member Comments
Passenger Vehicles	
Motorcyclist	
Heavy Vehicles	
Buses	
Emergency Vehicles	
Bicyclists	
Pedestrians	
Special Needs	

ENVIRONMENT

DKS

Category	Team Member Comments
Performance during rain, mist, ice, fog, and/or snow conditions	
Lighting Conditions	
Surrounding Land Uses	
Visual Distractions	
Safety Effects of wind and/or sun angles	

FIELD ASSESSMENT

Roadway Design	
Factors to Consider: ○ Pavement Condition ○ Lane Width ○ Shoulder Width/ Type/Condition ○ Pavement Markings ○ Posted Speed ○ Passing Lanes/Zones ○ Horizontal Curves ○ Vertical Curves ○ Sight Distance ○ Bicycle Lanes ○ Sidewalks	
Roadside/Environmental	
Factors to Consider: ○ Side Slopes ○ Clear Zone ○ Fixed Objects ○ Drainage ○ Barriers/Guardrail ○ Sun/Headlight Glare ○ Vegetation	

Signs, Signals, Markings	
Factors to Consider: ○ Traffic Control ○ Signing (Regulatory, Warning, Guide) ○ Delineation ○ Pavement Markings ○ Lighting ○ Pedestrian Crossings ○ School Zones ○ Post Types	
Intersections	
Factors to Consider: ○ Traffic Control ○ Advanced Warning ○ Guide Signs ○ Turn Lanes ○ Sight Distance (SSD & ISD) ○ Lighting ○ Visibility ○ Driver Expectancy ○ Lane Alignment ○ Access Spacing	

Figure 51: Walnut Boulevard Overview of Spot Recommendations

Figure 52: Walnut Boulevard Spot Specific Recommendations – Page 1

Figure 53: Walnut Boulevard Spot Specific Recommendations – Page 2

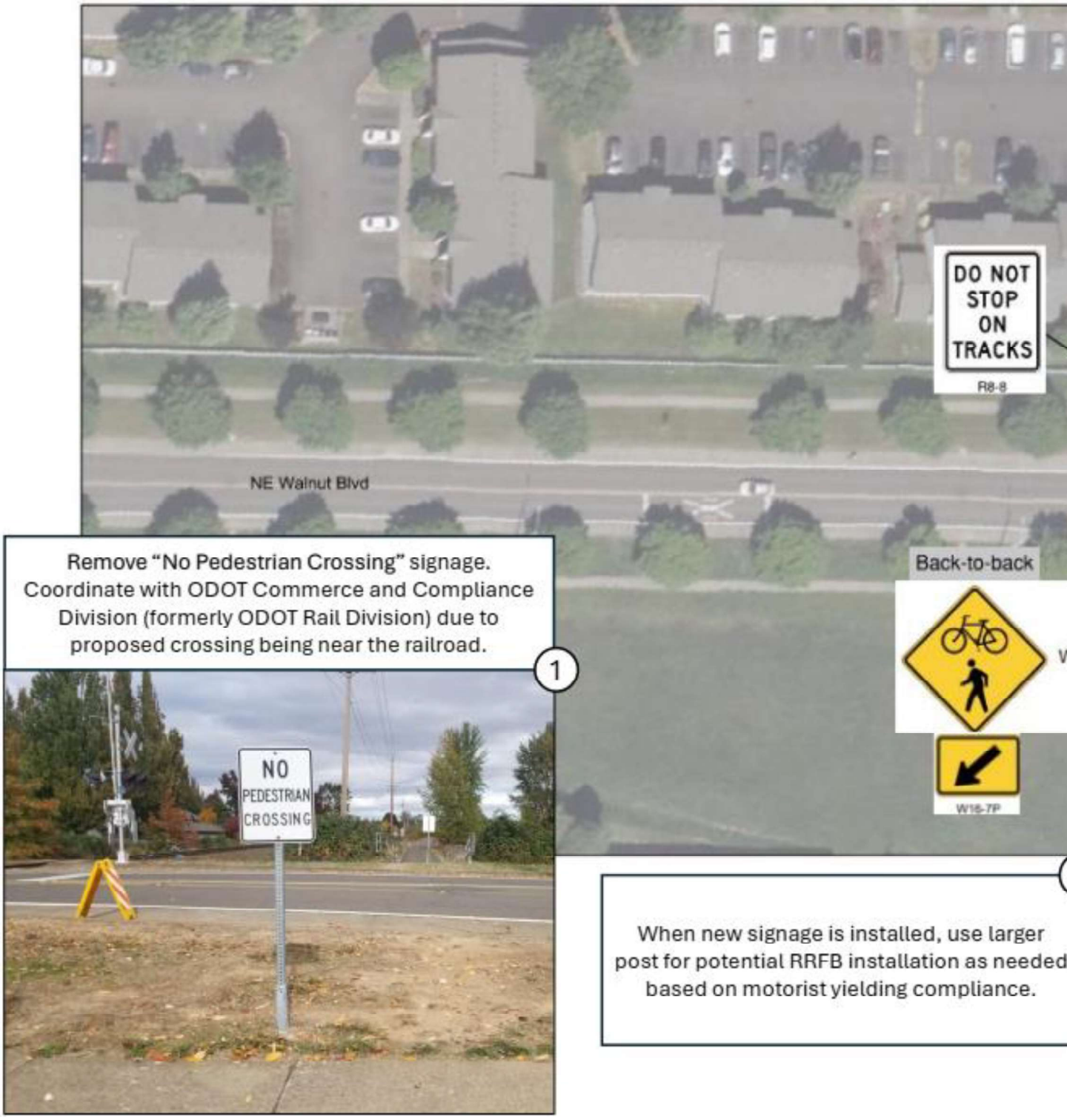
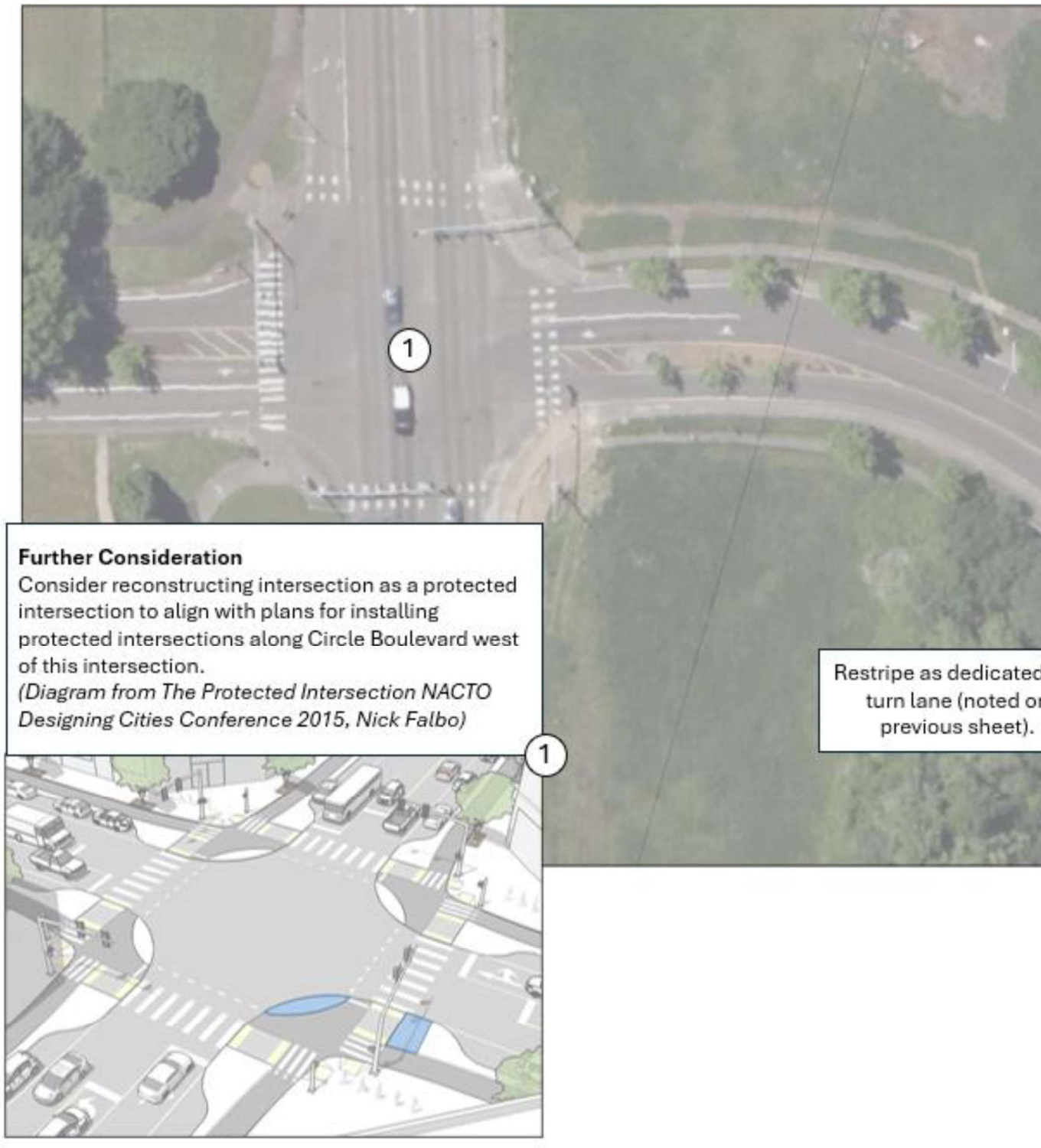


Figure 54: Walnut Boulevard Spot Specific Recommendations – Page 3

Figure 55: Walnut Boulevard Spot Specific Recommendations – Page 4



APPENDIX B: CRASH DATA

ecting Street Name	028 Crash Type	029 Collision Type	117 Severity	031 Weather Conditions	032 Road Surface Conditions	033 Lighting Conditions	118 Intersection Flag	126 Bike / Ped Related
L	S-1STOP	REAR	PDO	RAIN	WET	DAY	Yes	Neither
	S-1STOP	REAR	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
	ANGL-OTH	ANGL	PDO	UNK	UNK	DUSK	Yes	Neither
	S-1STOP	REAR	Possible Injury (C)	CLR	DRY	DAY	No	Neither
ONAL WAY	FIX OBJ	FIX	PDO	CLR	DRY	DLIT	No	Neither
D	O-1 L-TURN	TURN	PDO	CLR	DRY	DLIT	Yes	Neither
D	BIKE	TURN	Minor Injury (B)	CLR	DRY	DAY	Yes	Bicycle
REEN DR	O-1 L-TURN	TURN	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
REEN DR	O-1 L-TURN	TURN	PDO	CLR	DRY	DAY	Yes	Neither
REEN DR	ANGL-OTH	TURN	Possible Injury (C)	CLR	DRY	DLIT	Yes	Neither
IA ST	O-1 L-TURN	TURN	PDO	CLR	DRY	DAY	Yes	Neither
IA ST	S-STRGHT	REAR	Serious Injury (A)	CLR	DRY	DAY	No	Neither
DR	O-1 L-TURN	TURN	PDO	CLD	WET	DAY	Yes	Neither
DR	O-1 L-TURN	TURN	Minor Injury (B)	CLR	DRY	DARK	Yes	Neither
DR	O-1 L-TURN	TURN	PDO	CLD	WET	DLIT	Yes	Neither
T	S-1STOP	REAR	PDO	CLR	DRY	DAY	Yes	Neither
	ANGL-OTH	TURN	PDO	CLR	DRY	DAY	No	Neither
	S-1TURN	TURN	PDO	RAIN	WET	DAY	No	Neither
	S-1STOP	REAR	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
	S-OTHER	TURN	PDO	CLR	DRY	DAY	Yes	Neither
	ANGL-OTH	ANGL	Possible Injury (C)	RAIN	WET	DLIT	Yes	Neither
	PED	PED	Minor Injury (B)	CLR	DRY	DAY	Yes	Pedestrian
	S-1STOP	REAR	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
	S-1STOP	REAR	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
	PRKD MV	SS-O	Minor Injury (B)	RAIN	WET	DARK	No	Neither
	S-STRGHT	SS-O	PDO	CLR	DRY	DAY	No	Neither
GHWAY WEST	S-1STOP	REAR	Minor Injury (B)	CLR	DRY	DAY	Yes	Neither
GHWAY WEST	ANGL-OTH	ANGL	Minor Injury (B)	CLR	DRY	DAY	Yes	Neither
GHWAY WEST	ANGL-OTH	ANGL	Minor Injury (B)	RAIN	WET	DARK	Yes	Neither
GHWAY WEST	S-1STOP	REAR	PDO	RAIN	WET	DLIT	Yes	Neither
ON ST	ANGL-OTH	ANGL	PDO	FOG	WET	DAY	Yes	Neither
VD	S-1STOP	REAR	PDO	CLR	DRY	DAY	Yes	Neither
VD	O-1 L-TURN	TURN	PDO	CLD	WET	DAY	Yes	Neither
VD	O-1 L-TURN	TURN	Possible Injury (C)	CLR	DRY	DLIT	Yes	Neither
VD	ANGL-OTH	TURN	Possible Injury (C)	RAIN	WET	DAY	Yes	Neither
T	O-STRGHT	SS-M	Possible Injury (C)	RAIN	WET	DAY	Yes	Neither
	FIX OBJ	FIX	Minor Injury (B)	CLR	DRY	DAY	No	Neither
R DR	FIX OBJ	FIX	Possible Injury (C)	RAIN	WET	DARK	No	Neither
LL DR	O-1 L-TURN	TURN	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
ST	S-STRGHT	REAR	Possible Injury (C)	CLR	DRY	DAY	No	Neither
	ANIMAL	OTH	PDO	CLR	DRY	DLIT	No	Neither
D	O-1 L-TURN	TURN	PDO	CLR	DRY	DUSK	Yes	Neither
D	O-1 L-TURN	TURN	Minor Injury (B)	CLR	DRY	DAY	Yes	Neither
D	ANGL-OTH	ANGL	PDO	CLD	WET	DAY	Yes	Neither
REEN DR	O-1 L-TURN	TURN	Minor Injury (B)	CLD	WET	DAY	Yes	Neither
DR	S-1STOP	REAR	PDO	CLR	DRY	DAY	Yes	Neither
DR	O-1 L-TURN	TURN	PDO	RAIN	WET	DAY	Yes	Neither
DR	O-1 L-TURN	TURN	Minor Injury (B)	CLD	DRY	DLIT	Yes	Neither
DR	PED	PED	Possible Injury (C)	CLR	DRY	DAY	Yes	Pedestrian
DR	ANGL-OTH	ANGL	PDO	CLR	DRY	DAY	Yes	Neither
ST	BIKE	TURN	Minor Injury (B)	RAIN	WET	DAY	Yes	Bicycle
ST	O-1 L-TURN	TURN	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
	ANGL-OTH	TURN	PDO	CLR	DRY	DAY	No	Neither
	S-1STOP	REAR	Minor Injury (B)	CLR	DRY	DAY	Yes	Neither
	S-1STOP	REAR	Minor Injury (B)	CLR	DRY	DAY	Yes	Neither
	ANGL-OTH	TURN	PDO	CLR	DRY	DAY	Yes	Neither
	S-1STOP	REAR	Possible Injury (C)	RAIN	WET	DLIT	Yes	Neither
	BIKE	ANGL	Possible Injury (C)	CLR	DRY	DAY	Yes	Bicycle
	S-1STOP	REAR	Possible Injury (C)	RAIN	WET	DAY	Yes	Neither
	S-1STOP	REAR	Minor Injury (B)	CLR	DRY	DAY	Yes	Neither
GHWAY WEST	ANGL-OTH	ANGL	Possible Injury (C)	CLD	WET	DLIT	Yes	Neither
GHWAY WEST	ANGL-OTH	ANGL	PDO	CLR	DRY	DAY	Yes	Neither
VD	S-STRGHT	SS-O	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither

ecting Street Name	028 Crash Type	029 Collision Type	117 Severity	031 Weather Conditions	032 Road Surface Conditions	033 Lighting Conditions	118 Intersection Flag	126 Bike / Ped Related
VD	O-1 L-TURN	TURN	PDO	CLR	DRY	DAY	Yes	Neither
VD	ANGL-OTH	TURN	Minor Injury (B)	RAIN	WET	DAY	Yes	Neither
	S-1STOP	REAR	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
	ANGL-OTH	ANGL	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
E DR	S-STRGHT	SS-O	PDO	CLR	DRY	DLIT	No	Neither
ST	S-1STOP	REAR	PDO	RAIN	WET	DAY	No	Neither
ST	S-STRGHT	SS-O	PDO	CLD	WET	DAY	No	Neither
	ANIMAL	OTH	Minor Injury (B)	CLR	DRY	DAY	No	Neither
	ANGL-OTH	ANGL	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
	O-1 L-TURN	TURN	Minor Injury (B)	CLR	DRY	DAY	Yes	Neither
D	PED	PED	Serious Injury (A)	CLR	DRY	DAY	Yes	Pedestrian
REEN DR	O-1 L-TURN	TURN	PDO	CLR	DRY	DAY	Yes	Neither
	ANGL-OTH	TURN	Minor Injury (B)	FOG	WET	DAWN	Yes	Neither
	O-1 L-TURN	TURN	PDO	CLD	WET	DAY	No	Neither
DR	BIKE	TURN	Minor Injury (B)	CLR	DRY	DAY	Yes	Bicycle
DR	O-1 L-TURN	TURN	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
DR	O-1 L-TURN	TURN	PDO	RAIN	WET	DAY	Yes	Neither
DR	O-1 L-TURN	TURN	PDO	CLR	UNK	DAY	Yes	Neither
VE	FIX OBJ	FIX	Minor Injury (B)	CLR	WET	DLIT	No	Neither
D ST	S-1STOP	REAR	PDO	CLR	DRY	DAY	Yes	Neither
	ANGL-OTH	TURN	PDO	CLD	DRY	DAY	No	Neither
	S-1STOP	REAR	PDO	CLR	DRY	DAY	Yes	Neither
	ANGL-OTH	ANGL	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
	ANGL-OTH	ANGL	PDO	CLR	DRY	DAY	Yes	Neither
VD	ANGL-OTH	ANGL	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
LL DR	O-1 L-TURN	TURN	Minor Injury (B)	CLR	DRY	DUSK	Yes	Neither
	ANGL-OTH	ANGL	Possible Injury (C)	CLD	DRY	DAY	Yes	Neither
	ANGL-OTH	ANGL	Minor Injury (B)	CLR	DRY	DAY	Yes	Neither
	S-STRGHT	SS-O	PDO	CLR	DRY	DAY	No	Neither
	O-1 L-TURN	TURN	PDO	CLR	DRY	DAY	Yes	Neither
D	ANGL-OTH	ANGL	PDO	CLR	DRY	DAY	Yes	Neither
D	S-1STOP	REAR	PDO	CLR	DRY	DAY	Yes	Neither
DR	S-STRGHT	REAR	PDO	CLR	DRY	DAY	No	Neither
DR	S-1STOP	REAR	PDO	CLR	WET	DAY	Yes	Neither
DR	O-1 L-TURN	TURN	Minor Injury (B)	CLR	DRY	DAY	Yes	Neither
D ST	S-1STOP	REAR	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
GHWAY WEST	ANGL-OTH	TURN	Possible Injury (C)	CLD	DRY	DAY	Yes	Neither
GHWAY WEST	O-1 L-TURN	TURN	PDO	CLD	DRY	DLIT	Yes	Neither
VD	O-1 L-TURN	TURN	PDO	UNK	ICE	DAWN	Yes	Neither
E DR	PED	PED	Serious Injury (A)	CLD	WET	DAY	Yes	Pedestrian
LL DR	O-1 L-TURN	TURN	Serious Injury (A)	RAIN	WET	DAY	Yes	Neither
ST	FIX OBJ	FIX	Minor Injury (B)	CLR	DRY	DAY	No	Neither
ST	S-STRGHT	REAR	PDO	CLR	DRY	DAY	Yes	Neither
	S-STRGHT	REAR	Minor Injury (B)	CLR	DRY	DUSK	No	Neither
	S-1STOP	REAR	PDO	CLR	DRY	DAY	No	Neither
	FIX OBJ	FIX	PDO	FOG	WET	DLIT	Yes	Neither
	ANGL-OTH	TURN	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
	O-1 L-TURN	TURN	Minor Injury (B)	CLR	DRY	DAY	Yes	Neither
	BIKE	TURN	Minor Injury (B)	CLR	DRY	DAY	Yes	Bicycle
	FIX OBJ	FIX	Minor Injury (B)	CLR	DRY	DLIT	No	Neither
D	O-1 L-TURN	TURN	Minor Injury (B)	RAIN	WET	DAY	Yes	Neither
REEN DR	O-1 L-TURN	TURN	Minor Injury (B)	CLR	DRY	DAY	Yes	Neither
REEN DR	O-1 L-TURN	TURN	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
	S-STRGHT	REAR	PDO	UNK	UNK	DAY	No	Neither
DR	S-1TURN	REAR	PDO	CLR	DRY	DLIT	Yes	Neither
DR	O-1 L-TURN	TURN	Minor Injury (B)	CLR	DRY	DUSK	Yes	Neither
DR	ANGL-OTH	ANGL	PDO	RAIN	WET	DAWN	Yes	Neither
DR	S-1STOP	REAR	Minor Injury (B)	CLR	DRY	DAY	Yes	Neither
DR	ANGL-OTH	ANGL	Minor Injury (B)	CLD	DRY	DAY	Yes	Neither
ST	O-1 L-TURN	TURN	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
D ST	S-1STOP	REAR	Minor Injury (B)	CLR	DRY	DAY	No	Neither
	ANGL-OTH	ANGL	PDO	CLR	DRY	DAY	Yes	Neither
	S-1STOP	REAR	PDO	CLR	DRY	DAY	Yes	Neither

ecting Street Name	028 Crash Type	029 Collision Type	117 Severity	031 Weather Conditions	032 Road Surface Conditions	033 Lighting Conditions	118 Intersection Flag	126 Bike / Ped Related
	ANGL-OTH	TURN	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither
	S-1STOP	REAR	Minor Injury (B)	CLR	DRY	DAY	Yes	Neither
GHWAY WEST	ANGL-OTH	ANGL	Minor Injury (B)	RAIN	WET	DLIT	Yes	Neither
GHWAY WEST	ANGL-OTH	ANGL	PDO	CLR	WET	DAY	Yes	Neither
GHWAY WEST	ANGL-OTH	ANGL	Possible Injury (C)	CLR	DRY	DLIT	Yes	Neither
	ANGL-OTH	ANGL	Minor Injury (B)	CLR	DRY	DAY	Yes	Neither
VD	S-1STOP	REAR	Possible Injury (C)	CLR	DRY	DAY	Yes	Neither

APPENDIX C: WALNUT BOULEVARD PREVIOUS RSA RECOMMENDATIONS

Figure 51: Walnut Boulevard Overview of Spot Recommendations

Figure 52: Walnut Boulevard Spot Specific Recommendations – Page 1

Figure 53: Walnut Boulevard Spot Specific Recommendations – Page 2

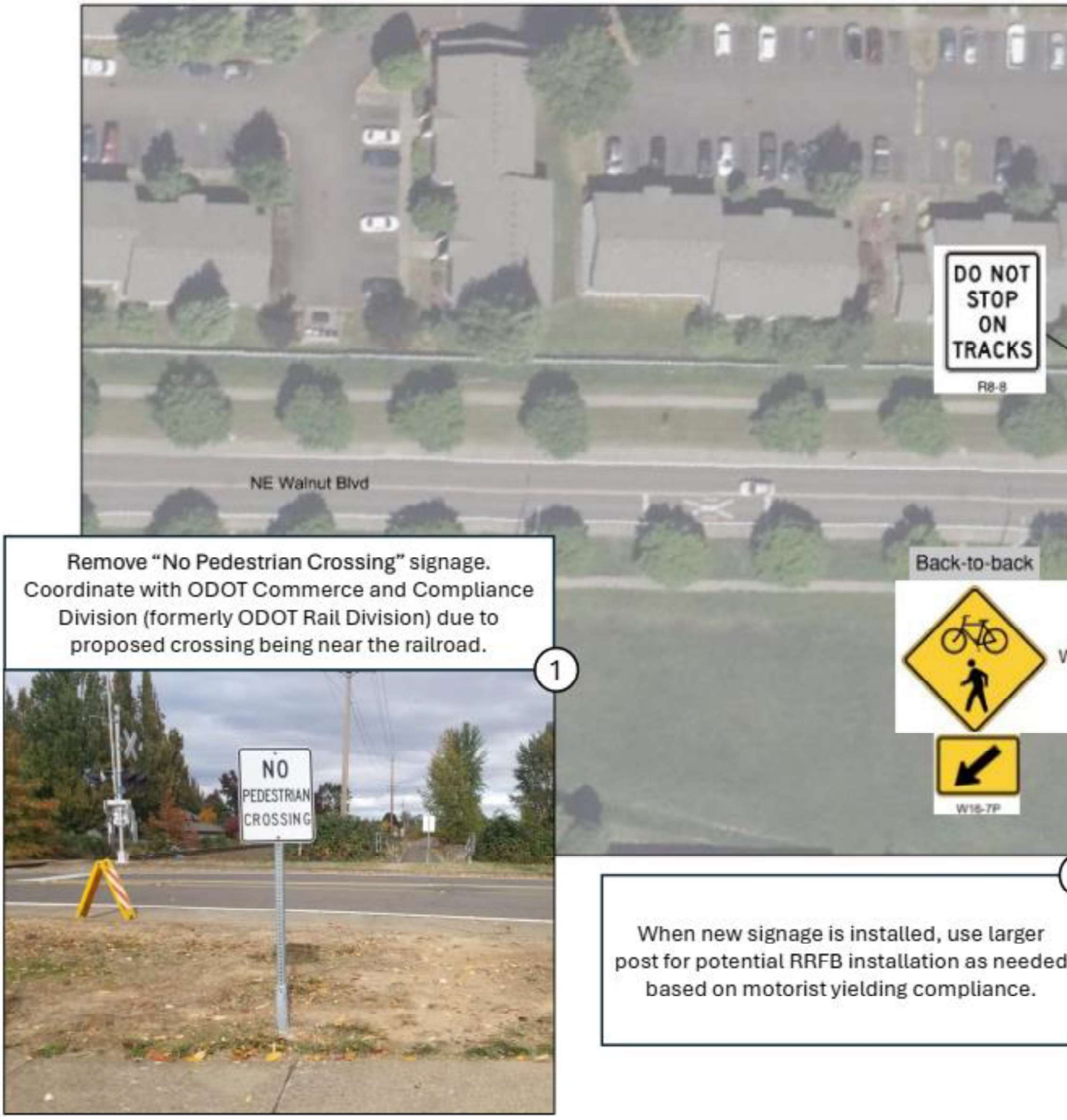
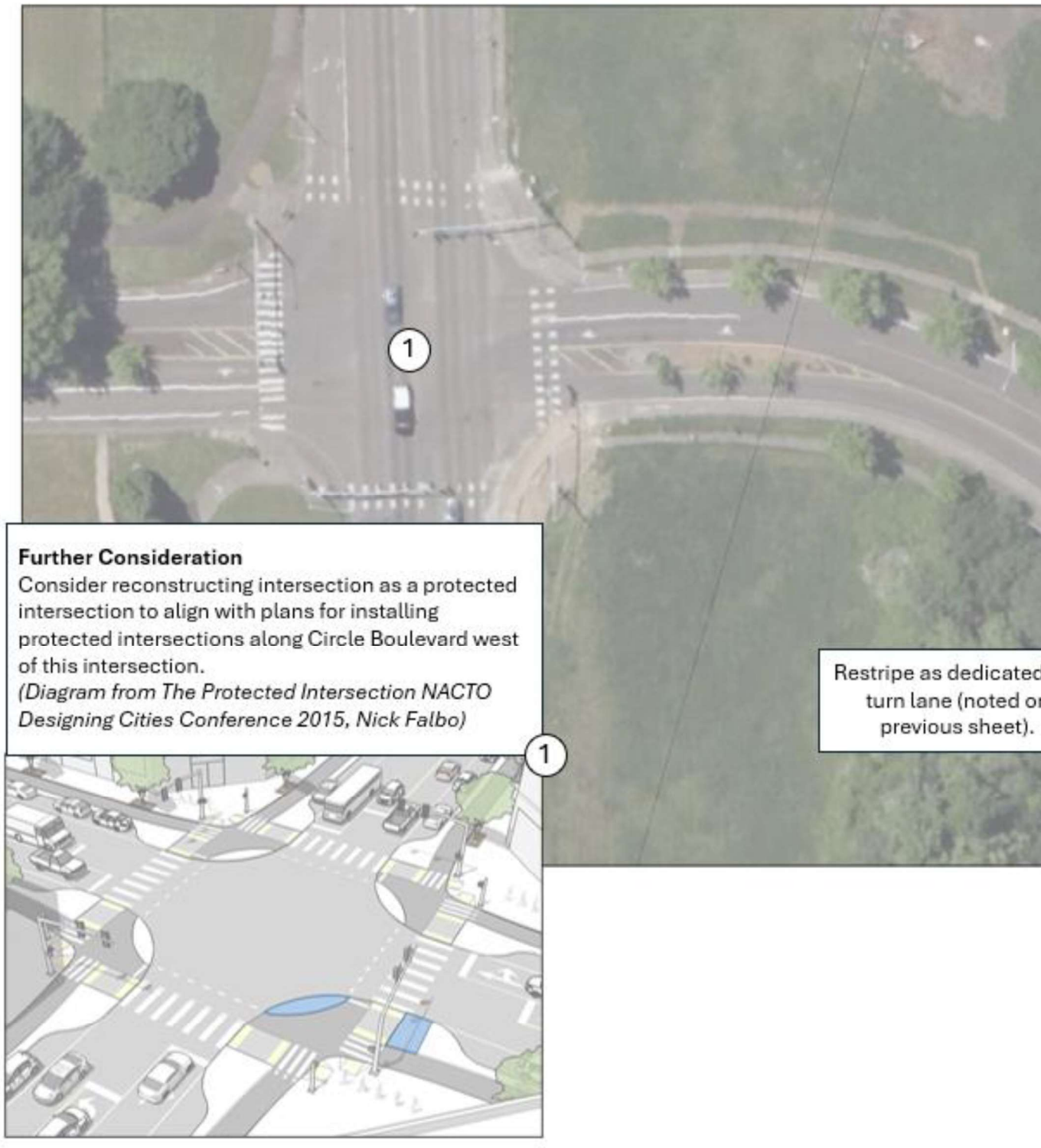


Figure 54: Walnut Boulevard Spot Specific Recommendations – Page 3

Figure 55: Walnut Boulevard Spot Specific Recommendations – Page 4



APPENDIX D: WALNUT GLENRIDGE SAFETY EVALUATION

DKS 117 COMMERCIAL STREET NE, SUITE 310, SALEM, OR 97301 • 503.391.8773 • DKSASSOCIATES.COM

WALNUT GLENRIDGE SAFETY EVALUATION

REGISTERED PROFESSIONAL ENGINEER 56,267 Digitally Signed 2024.03.13 17:12:09-07'00' OREGON JULY 9, 2002 SCOTT M. MANSUR EXPIRES: DEC. 31, 2024

DATE: March 13, 2024

TO: Public Works, Transportation Division | City of Corvallis

FROM: Travis Larson, PE | DKS Associates
Scott Mansur, PE, PTOE, RSP$_1$ | DKS Associates

SUBJECT: Corvallis Walnut Glenridge Safety Evaluation – Final

Project #22253-009

INTRODUCTION

This memorandum provides a safety evaluation of the Walnut Boulevard/Glenridge Drive-Witham Hill Drive intersection located in Corvallis, Oregon. The safety evaluation specifies recommendations for short-term and long-term enhancements that could be implemented to improve the safety conditions for all users. The study intersection and surrounding area are shown in Figure 1.

FIGURE 1: STUDY AREA

EXISTING CONDITIONS

This chapter provides documentation of the study intersection's existing conditions, including the intersection characteristics and field observation notes.

STUDY INTERSECTION STREET NETWORK

The intersecting streets and their existing characteristics within the vicinity of the intersection are summarized in Table 1. All streets considered in this evaluation are under the City of Corvallis jurisdiction, and their functional classifications are referenced from the City of Corvallis Transportation System Plan (TSP).[1]

The intersection of Walnut Boulevard/Glenridge Drive-Witham Hill Drive is a signalized intersection of an Arterial and Collector street with connected sidewalks, bicycle lanes, and no on-street parking. Left-turn lanes are present for all four approaches. The striping around the intersection is showing some normal wear.

Walnut Boulevard transitions from a four-lane street to two-lane street immediately east of the study intersection. A westbound merge is present as soon as vehicles leave the intersection, and an eastbound lane addition is present right before vehicles enter the intersection.

TABLE 1: STUDY INTERSECTION STREET CHARACTERISTICS

STREET	FUNCTIONAL CLASSIFICATION	NO. OF LANES	POSTED SPEED	SIDE-WALKS	BIKE FACILITIES	ON-STREET PARKING
WALNUT BOULEVARD	Arterial	2/4/5 [A]	35 mph	Yes	Yes	No
GLENRIDGE DRIVE	Collector	2	25 mph	Yes	Yes	No
WITHAM HILL DRIVE	Collector	2	30 mph	Yes	Yes	No

[A] Walnut Boulevard is 5 lanes wide at the Glenridge Drive-Witham Hill Drive intersection, including the left-turn lanes. East of the intersection, Walnut Boulevard is four lanes. West of the intersection, Walnut Boulevard transitions to two lanes.

PEDESTRIAN & BICYCLE FACILITIES

Basic bicycle and pedestrian facilities are present at the intersection. Sidewalks are generally 5 or 6 feet wide except for the sidewalk on the north side of Walnut Boulevard, east of the intersection, which has a larger width closer to 8 feet. No buffer zones exist between the street pavement and sidewalks. At the intersection, there are marked crosswalks across all four legs with signalized pedestrian crossing movements. The crosswalk markings for the south leg are a different pattern than the rest of the crossings.

Bicycle lanes are present on all legs of the intersection, and they provide connectivity to the greater bicycle lane network throughout the city. The bicycle lanes are standard (non-buffered) lanes. At the intersection, the bicycle lanes are controlled by the adjacent vehicular traffic signals.

[1] Street Functional Classification, Chapter 6: Standards, Transportation System Plan, City of Corvallis, January 2019.

PUBLIC TRANSIT

The City of Corvallis hosts a fareless transit system for the City called the Corvallis Transit System. Within the functional area of the study intersection, there are three transit stops serving two different routes. Route 1 (OSU/Witham Hill/Timberhill), which has a 1-hour frequency, has an eastbound far-side stop on Walnut Boulevard and a southbound far-side stop on Witham Hill Drive. The route also has an eastbound and a westbound stop less than 1000 feet to the east on Walnut Boulevard near Princess Street. Route 9 (5th/Buchanan/Grant/Witham Hill), which has a 2-hour frequency, has a westbound far-side stop on Walnut Boulevard.

INTERSECTION LAND USE CONTEXT

The study intersection is located in the far northwest quadrant of the City of Corvallis and it serves both local and regional traffic. Walnut Boulevard (and 53rd Street, as an extension) serves as a circumferential route in Corvallis on the west and north sides. Therefore, there is a large portion of east-west commuter pass-through traffic at the intersection. However, the intersection is surrounded by primarily low-density residential housing, and it serves as a gateway to many neighborhoods. The 35 mile per hour (MPH) section of Walnut Boulevard generally extends from Fair Oaks Drive in the southwest to Highland Drive in the east.

FIGURE 2: SOUTHWEST CORNER, LOOKING EAST ALONG WALNUT BOULEVARD

INTERSECTION LIGHTING

Street lighting is limited and could be improved within the study intersection and along the adjacent streets. The intersection itself has two existing low wattage overhead light poles attached to traffic signal mast arm poles. One light pole is in the northwest corner of the intersection, the other is in the southeast corner of the intersection.

VEHICLE SPEED

The posted speed limit varies across the four study intersection approaches. The speed limit is 35 MPH for the eastbound and westbound approaches, 30 MPH for the northbound approach, and 25 MPH for the southbound approach.

Vehicle speeds were observed along all four study intersection approaches, and drivers generally complied with the speed limit. The majority of the observed speeds exceeding the posted speed limit were measured on the eastbound downhill vertical curve between Romancier Drive and Audene Drive. As is typical at signalized intersections, drivers did also speed up when nearing the intersection if the green signal indication had already been green for a few seconds.

INTERSECTION SIGHT DISTANCE

Sight distance is limited at the intersection due to the presence of horizontal and vertical curves present and nearby vegetation. All four approaches have varying levels of curves or skew angles when approaching the intersection, and three of the four approaches also have significant grades within the vicinity of the intersection. Adequate sight distance at an intersection consists of multiple attributes, but most commonly the following: stopping sight distance, intersection sight distance, and signal visibility. Signal visibility (along with lateral spacing) is discussed in a later section.

At signalized intersections, intersection sight distance primarily dictates that a vehicle at the stop bar of any approach should be able to see all other vehicles located at stop bars of the other approaches.[2] This generally means that all regions of the immediate area of the intersection should be visible, including all crosswalks and bicycle lane approaches.

However, for right-turn-on-red (RTOR) operations, adequate sight distance should be provided for the right-turning driver to clearly see vehicles approaching from the left.[3] This distance is dependent on the speed of the conflicting approach. Based on preliminary measurements, the northbound approach has an obscured line of sight for conflicting vehicles if attempting a RTOR.

Similar to RTOR provisions, the presence of permitted left-turn phasing necessitates that sufficient sight distance be provided for the left-turning driver to see oncoming through and right-turning vehicles.[4] Based on preliminary measurements, all left-turn approaches have adequate sight distance for left-turn operations.

Stopping sight distance describes the distance needed for a driver to safely stop with adequate notice and not crash into any unpredicted objects (vehicle or other) in the street. This is particularly important for streets with horizontal and vertical curves that may limit how far ahead a driver can see. Stopping sight distance is also determined by the speed of the approach of the street.[5] Stopping sight distance appears appropriate based on preliminary measurements.

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[2] 9.5.3.4, Intersection Sight Distance, A Policy on Geometric Design of Highways and Streets (7th Edition), 2018.

[3] Table 9-9, Intersection Sight Distance, A Policy on Geometric Design of Highways and Streets (7th Edition), 2018.

[4] Table 9-17, Intersection Sight Distance, A Policy on Geometric Design of Highways and Streets (7th Edition), 2018.

[5] 9.6.5.1, Intersection Sight Distance, A Policy on Geometric Design of Highways and Streets (7th Edition), 2018.

CRASH ANALYSIS

A crash analysis for the study intersection was conducted based on the most recent five years (2017-2021) of reported crash data provided by ODOT. There were six crashes in the vicinity of the study intersection, which included three crashes specifically at the intersection of Walnut Boulevard and Glenridge Drive and three crashes along the approach legs. There were no serious injury or fatal crashes, and no crashes directly involved a pedestrian or bicyclist.

More recently, a pedestrian was injured in a crash in November 2022 (not included in the current official ODOT dataset). A person driving a vehicle southbound on Glenridge Drive failed to yield to a child under the age of eighteen who was walking in the west leg crosswalk as they attempted a right-turn. The child was injured in this collision. While this crash is too recent to be included in the official statewide crash database, the crash event details that could be gathered from the crash report were carefully considered as part of this evaluation.

CRASH PATTERNS

All three intersection crashes were turning movement crashes, which occurs when at least one driver is attempting to make a turn at the time of the collision. Two of the crashes (one minor injury and one possible injury) involved a westbound-left turning driver failing to yield to an eastbound-through traveling driver. The other turning movement crash involved a southbound-left and a northbound-right turning driver colliding when both were turning onto Walnut Boulevard eastbound.

Of the three crashes beyond the intersection itself, two crashes were fixed object crashes. One fixed object crash involved a speeding driver traveling northbound on Witham Hill Drive, resulting in property damage only. The other fixed object crash involved an inattentive driver traveling southbound on Glenridge Drive, resulting in a minor injury. Most related to the intersection itself, however, was a property damage only crash that involved two westbound drivers merging at the merge point on Walnut Boulevard.

SPIS IDENTIFICATION

The Safety Priority Index System (SPIS) is a ranking system developed by ODOT to identify potential safety problems on roadways across the state. SPIS scores are developed based upon crash frequency, crash severity, and traffic volume for 0.10-mile length segments along all roadways in the state over a rolling three-year window. No SPIS locations were identified within the vicinity of the study intersection in any of the recent SPIS cycles.

CRASH RATE COMPARISON

Crash rates describe crash frequency in relation to traffic volume. Crash rates at intersections are given in units of crashes per million entering vehicles (crashes/MEV). The Calculated Crash Rate is calculated based on the number of reported crashes, vehicle volume, and type of intersection. It is then compared to both the Calculated Statewide Comparison Crash Rates (based on mean crash rates) and the Published Statewide Comparison Crash Rates (based on 90th-percentile crash rates), which represent a typical or expected crash rate for similar intersections across the state. As shown in Table 2 below, the observed calculated crash rate for the study intersection is significantly below the statewide comparison crash rates.

TABLE 2: CRITICAL CRASH RATE EVALUATION

INTERSECTION	GROUPING TYPE	AADT	NUMBER OF CRASHES	CALCULATED CRASH RATE	CALCULATED STATEWIDE COMPARISON CRASH RATE	PUBLISHED STATEWIDE COMPARSION CRASH RATE
WALNUT BLVD/ GLENRIDGE DR	Urban 4SG	10,300	3	0.160	0.766	0.860

INTERSECTION TRAFFIC SIGNAL CHARACTERISTICS

Each of the four intersection approaches has two standard 3-section signal heads for the through-right lanes and one five-section signal head for the left-turn lane to provide permitted-protected phasing. The left-turn heads also have accompanying 'Yield' signs to clarify what the green ball indicates. The five-section signal heads can be unclear to drivers, as they can show a red ball and green arrow indication at the same time during certain signal phasing, and they are no longer an ODOT standard signal head type. The northbound and southbound approaches also have near-side supplemental signal heads located on the southwest and northeast signal poles. Those two signal heads, however, have older 8-inch lenses for the yellow and green indications. No reflectorized backplates are present on any of the signal heads.

FIGURE 3: LEFT-TURN SIGNAL HEAD WITH RED BALL AND GREEN ARROW

There are pedestrian push buttons and pedestrian signal heads present for all four crosswalks. There was an observed 'Walk' time of approximately 8 seconds and 'Flashing Don't Walk' time of approximately 16 seconds for each approach. The pedestrian signal heads do not include countdown timers. The intersection timing and phasing includes a Leading Pedestrian Interval (LPI), which improves safety by giving the 'Walk' indication to pedestrians a few seconds before the accompanying green indication for vehicles. This provides pedestrians with a few extra seconds to begin crossing the street before vehicles enter the intersection, making pedestrians more visible to drivers turning left or right.

Traffic signal visibility describes how far away drivers should be able to see the traffic signals on their approach to the intersection.[6] This distance is calculated based on the speed of the approaching street. Based on preliminary measurements, the eastbound approach has an obscured line of sight for signal visibility due to the horizontal curve and street trees. However, a traffic signal warning sign is present at this approach to provide advance warning of the upcoming traffic signal. In addition to being visible, the traffic signal heads should be spaced laterally on the signal pole mast arms per ODOT standards, which dictates that through signals should be placed over the receiving lanes.[7] Due to the intersection skew, the northbound and southbound approach signal heads are not placed per ODOT standards.

INTERSECTION OPERATIONS

Intersection operations were previously documented for the study intersection in an operations analysis memo completed in 2023.[8] The City of Corvallis allows for intersections to operate at a maximum volume-to-capacity (v/c) ratio of 0.85 during the AM and PM peak hours. For signalized intersections, the combined intersection v/c ratio (not individual legs) must comply with the standard. As shown in Table 3 below, the intersection meets operational standards and has significant excess capacity available.

TABLE 3: INTERSECTION OPERATIONS (2023)[9]

INTERSECTION	MOBILITY STANDARD	AM PEAK			PM PEAK		
		V/C RATIO	DELAY (SECS)	LOS	V/C RATIO	DELAY (SECS)	LOS
WALNUT BLVD/ GLENRIDGE DR-WITHAM HILL DR	v/c ≤ 0.85	0.34	10.2	B	0.27	9.1	A

SIGNALIZED INTERSECTION:
v/c = Total Volume-to-Capacity Ratio
Delay = Average Intersection Delay (secs)
LOS = Total Level of Service

QUALITATIVE FIELD OBSERVATIONS

Field observations were conducted at the study intersection and surrounding area in January 2024 when both the Corvallis School District and Oregon State University were in session. Observations included afternoon, evening, and morning periods, allowing for a variety of traffic and lighting conditions. Human behavior and traffic operations were observed to gather information related to near-misses, non-compliant behavior, or other qualitative data points.

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[6] Table 4D-2, Design Features of Traffic Control Signals, Manual on Uniform Traffic Control Devices (11th), December 2023.

[7] 5.2.2: Head Placement, Signal Plan, Traffic Signal Design Manual, Oregon Department of Transportation, January 2024.

[8] Intersection Modification Analysis, City of Corvallis, DKS Associates, October 2023.

[9] Intersection Modification Analysis, City of Corvallis, DKS Associates, October 2023.

A few key observations were made:

- People Walking and Running
  - A few people running and walking wore reflective vests during nighttime and dusk/dawn conditions.
  - A person running disregarded the red 'Don't Walk' indication and ran across the street against conflicting traffic.
  - A person walking across the north leg of Glenridge Drive did not utilize the Leading Pedestrian Interval (LPI) walk time, but instead waited for all westbound vehicles to pass through the intersection before crossing themselves.
- People Driving
  - Two people driving larger vehicles traveling westbound each accelerated significantly through the intersection to try to be the first one to reach the merge point just west of the intersection.
  - A person driving southbound ran a red signal indication.
  - A person driving a truck with attached trailer made a permitted eastbound left-turn while on their cellphone.

VEGETATION GROWTH

Natural vegetation and purposeful street trees can provide both beautiful scenery and visual cues along city streets. However, care must be taken to confirm that the vegetation does not restrict sight distance and obscure intersection conflict points.

The study intersection and surrounding area has significant vegetation along all approaches and at each corner, which can restrict sight distance. While preliminary sight distance measurements did not identify a vegetation obstruction in January, it is possible that sight distance may be impacted at other times of year. This is especially true for the northwest corner (see Figure 4), which has a lot of brush and mature trees in the riparian zone/creek.

FIGURE 4: VEGETATION IN NW CORNER (JANUARY 2024 & JULY 2019[10])

[10] Photo courtesy of Google Maps

SUGGESTED INTERSECTION IMPROVEMENTS

Based on the comprehensive safety evaluation described, the following improvements are suggested to improve the safety of the Walnut Boulevard/Glenridge Drive intersection. The improvements have been identified based on the Federal Highway Administration (FHWA) Proven Safety Countermeasures[11] and the associated Oregon Department of Transportation (ODOT) approved Crash Reduction Factors (CRFs),[12] which are data-driven improvements based on estimated crash reduction and safety benefits expected from implementing the improvements.

- **Traffic Signal Upgrades**
  - 3-Section Flashing Yellow Arrow (FYA) Left-Turn Signal Heads: For all four left-turn lane approaches, replace the existing 5-section signal heads with protected/permitted Flashing Yellow Arrow 3-section signal heads (ODOT Type 3LCF).[13] Once completed, the extraneous 'yield' signage associated with the 5-section signal heads can be removed.
  - Supplemental Eastbound Signal Head**:** Add an eastbound near-side supplemental signal head to the side of the traffic signal pole in the northwest corner of the intersection.[14]
  - 12-Inch Signal Heads: Replace the existing 8-inch signal head lenses on the two existing supplemental signal heads (located on the northeast and southwest signal poles) with new standard 12-inch lenses.
  - Signal Head Visibility Upgrades**:** Add retroreflective backplates to all signal heads, including the supplemental signal heads, to improve visibility.
  - Signal Head Lateral Realignment: Laterally realign the existing traffic signal heads on the southbound approach's respective mast arm by shifting the three signal heads approximately 10 feet west along the mast arm.[15] If the northbound approach had a longer mast arm, it would be recommended to shift the three signal heads west along the mast arm.
  - APS Push Buttons: Install Accessible Pedestrian Signal (APS) push buttons to better alert pedestrians of pedestrian signal indications by communicating phasing in audible and vibrotactile (non-visual) walk indications.
  - Countdown Pedestrian Signals: Install pedestrian countdown signals to inform pedestrians of the remaining number of seconds in the 'Flashing Don't Walk' interval.
  - Permitted Phasing Elimination During Pedestrian Phases: Once other signal upgrades are completed, implement signal phasing for all approaches that eliminates permitted left-turns (and right-turns, if applicable) when a conflicting pedestrian 'Walk' phase is present.

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[11] Proven Safety Countermeasures, Federal Highway Administration, United States Department of Transportation, https://highways.dot.gov/safety/proven-safety-countermeasures.

[12] Crash Reduction Factor Manual, Oregon Department of Transportation, January 2023.

[13] Standard Signal Head Types (TM460), Traffic Signal Design Manual, January 2024.

[14] 5.2.3 Supplemental Signal Heads, Traffic Signal Design Manual, January 2024.

[15] 5.2.2 Head Placement, Traffic Signal Design Manual, January 2024.

- Traffic Signal Controller Upgrade: Upgrade the existing 170 controller with an ATC controller, which will be needed to implement some of the above improvements. Maintain the Leading Pedestrian Interval (LPI) and longer 'Walk' times currently in operation.
- No Right-Turn-On-Red (RTOR) Signage**:** Implement right-turn-on-red (RTOR) restriction for the northbound approach by installing a 'No Turn on Red' sign (MUTCD R10-11)[16] on the right side of the right-most signal head on the northern mast arm for the northbound approach.
- Yield to Pedestrians Signage**:** Provide warning to all approaches of the possibility of conflicting pedestrians in the crosswalk for right-turning vehicles by installing the 'Turning Vehicles Stop for Pedestrians' sign (ODOT OR10-15/MUTCD R10-15a)[17] on the right side of the right-most signal head on each of the four approach mast arms. The yellow fluorescent yellow-green backing should be used to match existing City policy.

- **Visibility**
  - Vegetation Removal/Trimming: Initiate and sustain substantial vegetation removal and trimming to maintain adequate sight distance at the intersection, including signal head visibility, permitted left-turn visibility, right-turn-on-red visibility, stopping sight visibility, and general intersection functional area visibility. Recommended vegetation removal includes the northwest corner of the intersection, south side of Walnut Boulevard (west of the intersection), east side of Witham Hill Drive, the northeast corner, and the east side of Glenridge Drive. See attached markup in the appendix for more specific instructions on vegetation removal and maintenance.
  - Intersection Lighting: Add/upgrade lighting throughout the intersection. For the northwest and southeast corners that already have light poles attached to the signal poles, upgrade the LEDs to higher wattages to provide better illuminance. In the northeast and southwest corners, install new separate light poles with LEDs that meet current intersection lighting guidance. This may require a formal lighting analysis to achieve the best lighting results.
  - Intersection Striping: Restripe the intersection to better note lanes and crosswalks, including the approach lanes, receiving lanes, bicycle lanes, and crosswalks. The crosswalk pattern for the southern crosswalk should match the other crosswalk legs.
- **Speed**
  - Speed Feedback Signs: Install a 'Vehicle Speed Feedback' plaque (MUTCD W13-20aP)[18] below a new 'Speed Limit 35' sign (MUTCD R2-1) on Walnut Boulevard (eastbound/ northbound) on the vertical curve between Romancier Drive and Audene Drive. The higher speeds measured, along with the changing street context, merits the plaque. Any speed feedback signs or plaques on Walnut Boulevard westbound should be systemically assessed and applied across the corridor, especially as it relates to the nearby elementary school.

[16] Section 2B.60, Manual on Uniform Traffic Control Devices for Street and Highways, December 2023.

[17] Figure 27, Sign Policy and Guidelines, Oregon Department of Transportation, January 2024; Section 2B.59, Manual on Uniform Traffic Control Devices for Street and Highways, December 2023.

[18] Section 2C.13, Manual on Uniform Traffic Control Devices for Street and Highways, December 2023.

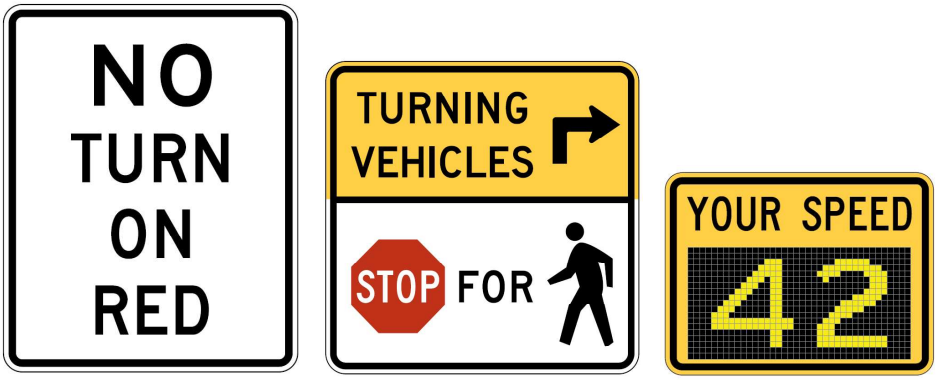


FIGURE 5: MUTCD SIGNS (R10-11, R10-15, W13-20AP)

LONGER-TERM STREETSCAPE REALIGNMENT/REALLOCATION

A longer-term suggested improvement that would involve more holistic changes to the intersection and surrounding area includes reallocating the streetscape for different vehicle and pedestrian/bicyclist uses. The dual through-lane approaches for Walnut Boulevard are not necessary for vehicle operations and they can pose safety challenges for both people driving (the westbound downstream merge) and people walking and bicycling (longer crossing distances of Walnut Boulevard). The basics for this concept and the operational and safety impacts were previously explored in an operations analysis memo completed in 2023.[19]

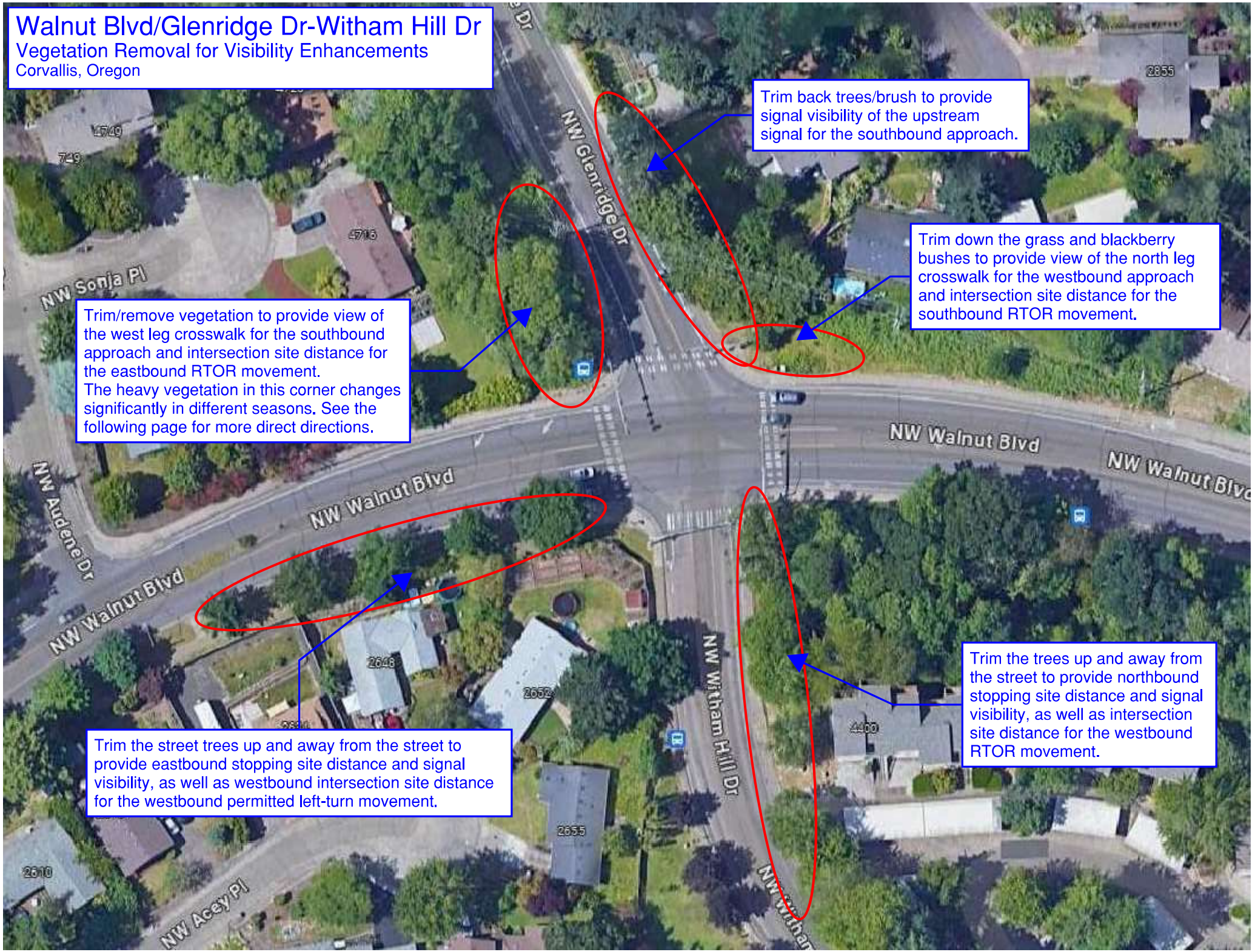
For the realignment or reallocation, the outside through lanes on Walnut Boulevard could either be (a) converted to dedicated right-turn lanes, or (b) removed and the space allocated to pedestrian uses, shortening the crossing distances. This could also be implemented with a more complete road diet conversion of the greater Walnut Boulevard corridor (including one travel lane in each direction and a center two-way left-turn lane). If dedicated right-turn lanes on Walnut Boulevard were installed, the accompanying bicycle lanes would need to be shifted to be between the through lane and right-turn lane. With dedicated right turn lanes, protected/permitted phasing of the right-turn lanes could also be implemented, eliminating permitted right-turns when a conflicting pedestrian 'Walk' phase is present.

[19] Intersection Modification Analysis, City of Corvallis, DKS Associates, October 2023.

Walnut Blvd/Glenridge Dr-Witham Hill Dr

Vegetation Removal for Visibility Enhancements

Corvallis, Oregon




Walnut Blvd/Glenridge Dr-Witham Hill Dr
Vegetation Removal for Visibility Enhancements
Corvallis, Oregon
General: Cut down grass, low-laying vegetation, and blackberry bushes (as currently shown in this photo). Trimming will need to be maintained consistently at this NW corner and the NE corner to maintain safe site distance conditions.
Cut back tree limbs so that the power pole is visible from the west leg crosswalk (and vice versa).
Consider removing entire tree.

000 Crash	015 Street	016 Interse	028 Crash	029 Collisic	031 Weath	032 Road S	033 Lightin	034 Traffic	036 Crash	114 Road D	117 Severi	118 Interse	126 Bike /	Week of 0(	002 Year1	005 Regior	007 Count	008 Jurisdi	021 Road C	022 Off Ro	119 State H
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1901751	WALNUT B	GLENRIDG	S-STRGHT	SS-O	CLR	DRY	DLIT	ACCEL LAN	IMP LN C	No	PDO	No	Neither	16-Feb-20	2020	2	Benton	Corvallis	STRGHT	FALSE	No
1850266	WALNUT B	WITHAM H	O-1 L-TURN	TURN	CLR	DRY	DAY	TRF SIGNA	NO-YIELD	No	Possible In	Yes	Neither	16-Jun-19	2019	2	Benton	Corvallis	INTER	FALSE	No
1790292	GLENRIDG	WALNUT B	FIX OBJ	FIX	CLR	DRY	DAY	UNKNOWN	INATTENT	Yes	Minor Inju	No	Pedestrian	17-Jun-18	2018	2	Benton	Corvallis	STRGHT	TRUE	No
1774470	WALNUT B	WITHAM H	O-OTHER	TURN	FOG	WET	DLIT	TRF SIGNA	NO-YIELD	No	PDO	Yes	Neither	17-Dec-17	2017	2	Benton	Corvallis	INTER	FALSE	No

127 Drivew	128 Jurisdi	011 Hwy N	013 Lat	014 Long	019 Mp Nc	001 CRASH	003 Crash	004 Crash	006 Cnty Ic	009 Urban	010 Functi	012 Hwy N	017 From I	018 Cmpss	020 Postec	023 Isect T	024 Isect R	025 Drvwy	026 Ln Qty	027 Medn	030 Crash
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