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MEMORANDUM #1

DATE: January 21, 2021

TO: Project Management Team

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SUBJECT: Wheatland Road Corridor Plan – Existing and Future Forecast Conditions Project #20020-009

INTRODUCTION

The primary objective of the Wheatland Road Corridor Plan project is to develop a multimodal corridor plan and conceptual street design that removes barriers for all modes of travel, considers the latest urban safety improvements for pedestrians (refuge medians, street lighting, pedestrian activated flashers), bicycles (separated multi-use paths or buffered/protected bikes lanes), and transit riders (updated facilities and waiting areas), and creates an enjoyable experience for users of all ages and abilities. The project will also include community involvement to assure the design plan is consistent with the needs of key stakeholders (including neighborhoods, schools, and businesses).

This memorandum also serves as a technical evaluation of both the existing and future forecast operational conditions of Wheatland Road corridor from River Road to Jays Drive (northern city limit). The study corridor and study intersections are shown in Figure 1 and are listed below:

- Wheatland Road/River Road
- Wheatland Road/Russett Drive
- Wheatland Road/Aldridge Drive
- Wheatland Road/Parkmeadow Drive
- Wheatland Road/Clear Lake Road

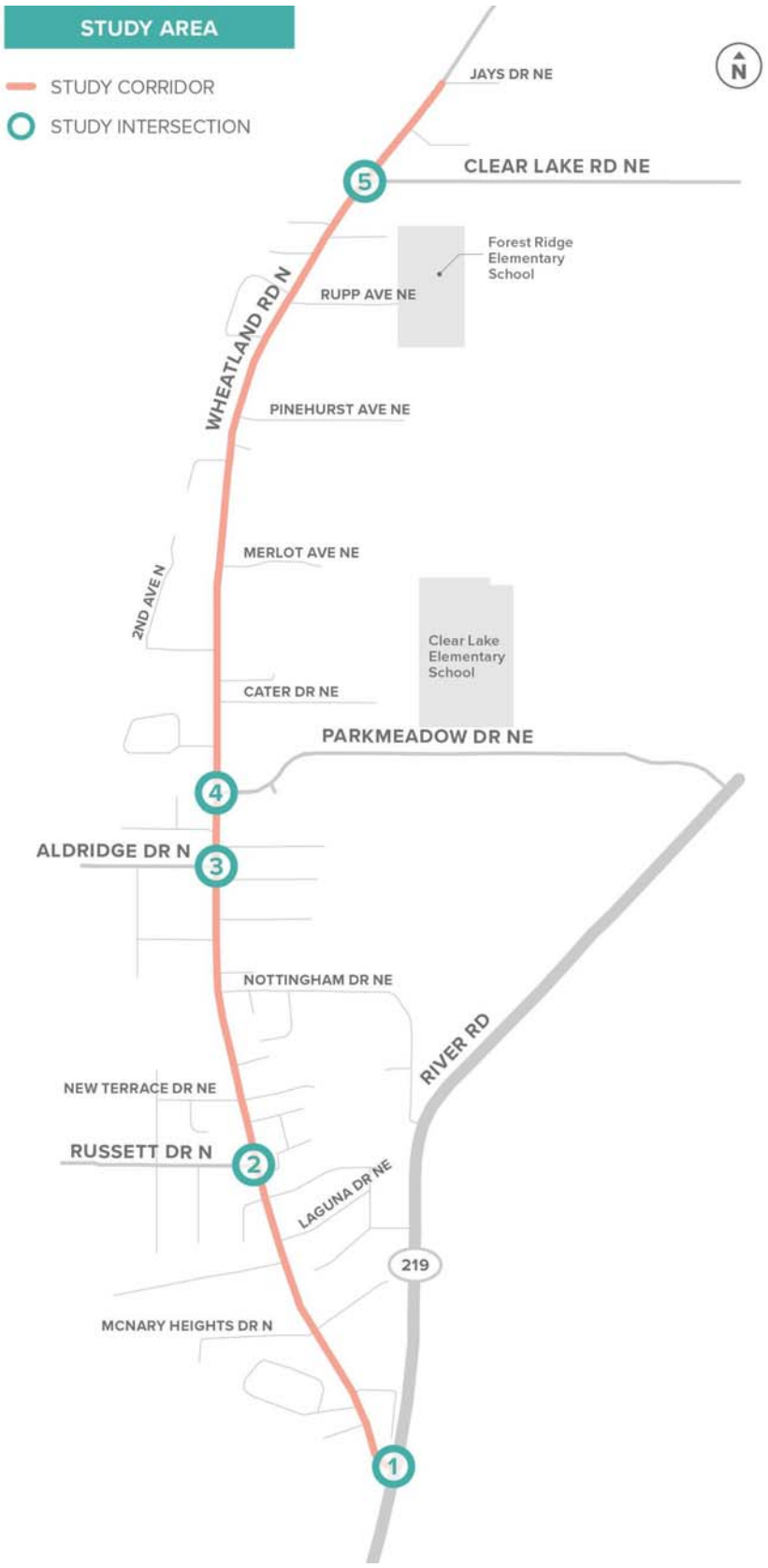

FIGURE 1: STUDY AREA AND PROJECT EXTENTS

The contents of this memorandum are listed below and include sections that address existing and future conditions of the study corridor. The sections also document safety analysis.

MEMORANDUM CONTENTS

EXISTING PEDESTRIAN AND BICYCLE CONDITIONS

This section contains an evaluation of the existing pedestrian and bicycle conditions along the study corridor. The following subsections discuss the existing facilities, a qualitative assessment of the facilities based on field observations, and an ADA assessment of the Wheatland Road corridor.

EXISTING PEDESTRIAN AND BICYCLE FACILITIES

There are existing segments of paved sidewalk along Wheatland Road in multiple areas with many gaps. This provides poor pedestrian connectivity with numerous places without sidewalk on either side of the road. Figure 2 shows a typical example of pedestrians walking along the shoulder of the road.

There are existing bicycle lanes along Wheatland Road on both sides. The bike lane widths vary between 5-feet to 6-feet wide and are always directly adjacent to the vehicular travel lanes.

Refer to Figure 3 for the locations of existing pedestrian sidewalks and existing bike lanes. Existing public transit and school conditions are discussed later in the report.

FIGURE 2: PEDESTRIANS WALKING ON ROAD SHOULDER

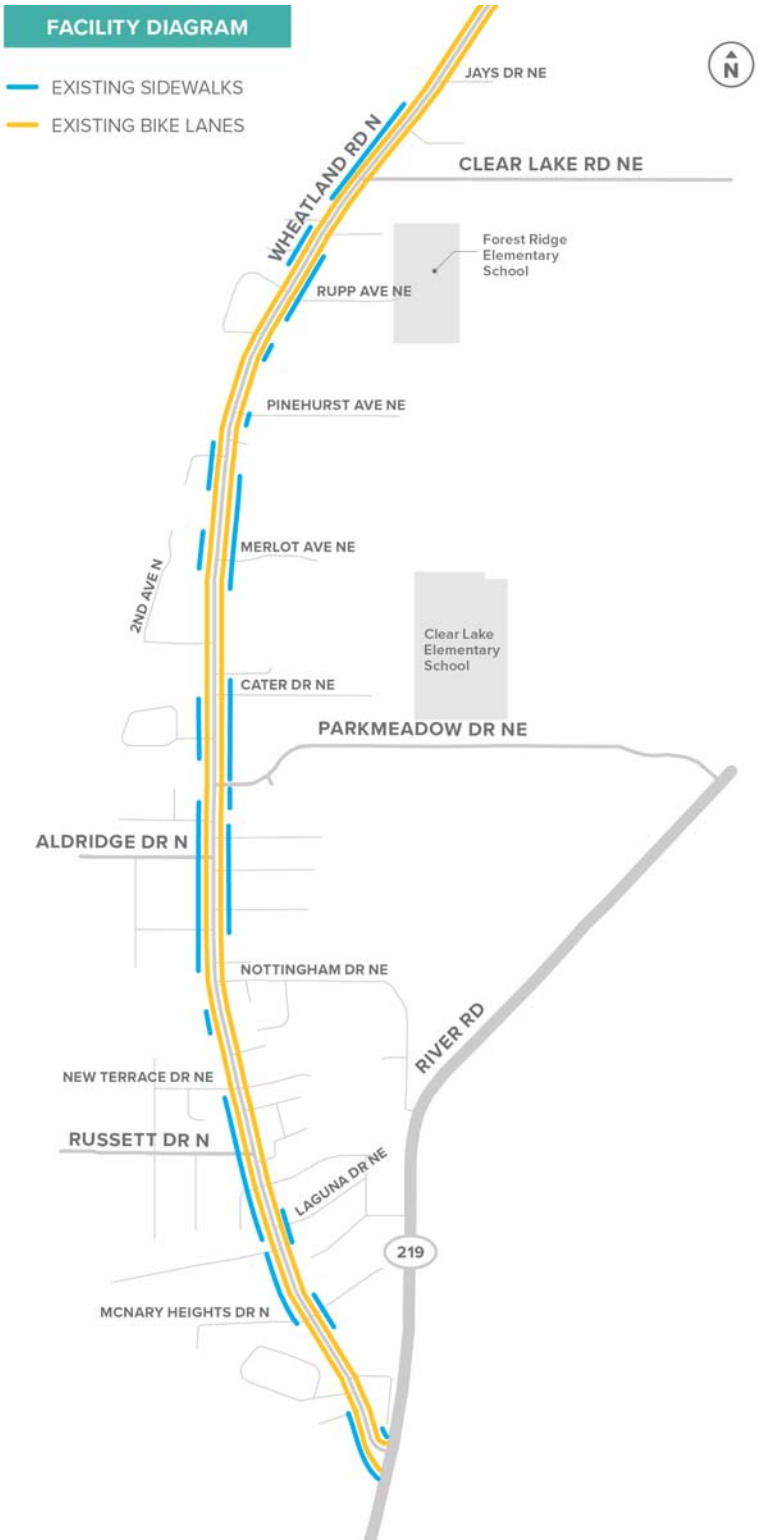

FIGURE 3: EXISTING PEDESTRIAN AND BICYCLE FACILITIES

QUALITATIVE ASSESSMENT OF FACILITIES

A qualitative assessment of the walkability and bikeability of the study intersections and whole study corridor was conducted using the Oregon Department of Transportation (ODOT) Qualitative Multimodal Assessment tool found in the ODOT Analysis Procedure Manual (APM)[1]. Various aspects of walkability and bikeability at each of the study intersections and along the corridor were assigned one of the following ratings based on study area field observations and the recommended criteria.

- "Excellent"
- "Good"
- "Fair"
- "Poor"

[1] Analysis Procedures Manual (APM), Chapter 14, Oregon Department of Transportation, Updated 10/22/2020.

Table 1 displays a summary of the qualitative grading for each study intersection and corridor segments.

TABLE 1: QUALITATIVE GRADING OF WALKABILITY AND BIKEABILITY OF WHEATLAND ROAD

LOCATION	WALKING	BIKING
SEGMENTS		
RIVER ROAD -> LAGUNA DRIVE	Poor	Poor
LAGUNA DRIVE -> PARKMEADOW DRIVE	Poor	Fair
PARKMEADOW DRIVE -> 2ND AVENUE	Poor	Fair
2ND AVENUE -> JAYS DRIVE	Poor	Fair
STUDY INTERSECTIONS		
RIVER ROAD	Good	Fair
RUSSETT DRIVE	Poor	Fair
ALDRIDGE DRIVE	Fair	Fair
PARKMEADOW DRIVE	Poor	Fair
CLEAR LAKE ROAD	Poor	Fair

The walkability grade of each segment is determined by, but limited to, sidewalk presence, lighting, adjacent traffic speed, and buffer presence. As a whole, this corridor lacks in sidewalk connectivity and adequate nighttime lighting which translates to the "Poor" rating. The walkability grade of each intersection is determined by, but not limited to, street crossing widths, median islands, and ramp presence. Most of the intersections were either missing ramps or sidewalk on one or more of the corners which translates to the mixed set of ratings. Marked school crossing were graded more stringently. The River Road intersection, however, was given a "Good" rating for ADA compliant curbs ramps and marked crosswalks which were just installed within the last few years.

The bikeability grade of each segment is determined by, but limited to, bike facility/shoulder presence and width, pavement condition, on-street parking, roadway grade, and speed of adjacent traffic. As a whole, this corridor has minimum six-foot bike lanes on both sides with no on-street parking or other obstructions which translates to the "Fair" rating for most of the segments. The River Road to Laguna Drive segment was given a "Poor" rating, though, as it has a decently steep hill (5.3% grade) which can be difficult for cyclists, especially right up against traffic. The bikeability grade of each intersection is determined by, but not limited to, street crossing widths and type of traffic control. All of the intersections had acceptable crossing widths with either no traffic control at the stop-controlled intersections or adequate bike lanes and detection at the signalized intersection which translates to the "Fair" rating.

Context sensitive design must be employed when evaluating this facility and proposing future enhancements. For pedestrians, system connectivity needs to be achieved by adding sidewalk and curb ramps. There are many segments of roadway without sidewalk on either side of the road which can discourage or inhibit walking for many users. For cyclists, all types of cyclists should be comfortable while riding along a bike facility. The National Association of City Transportation Officials (NACTO) published contextual guidance for designing bicycle facilities for all ages and abilities using the criteria of safety, comfortability, and equity[2]. For a bike facility adjacent to a high-speed roadway like Wheatland Road[3], a protected bike lane or separated bike facility is recommended.

ADA ASSESSMENT

An assessment of all curb ramps along the Wheatland Road corridor was conducted by the project team in December 2020. All but a few of the curb ramps existing within the corridor do not meet ADA requirements. In addition, curb ramps are missing at T-intersections where sidewalk exists opposite of the intersection. These are legal crossings as defined by Oregon Revised Statues (ORS). Curb ramps should be added to the opposite side of T-intersections for all legal crossings, or the legal crossing should be closed. Figure 4 provides a visual representation of the curb ramps that either pass ADA compliance, fail ADA compliance, or are missing altogether.

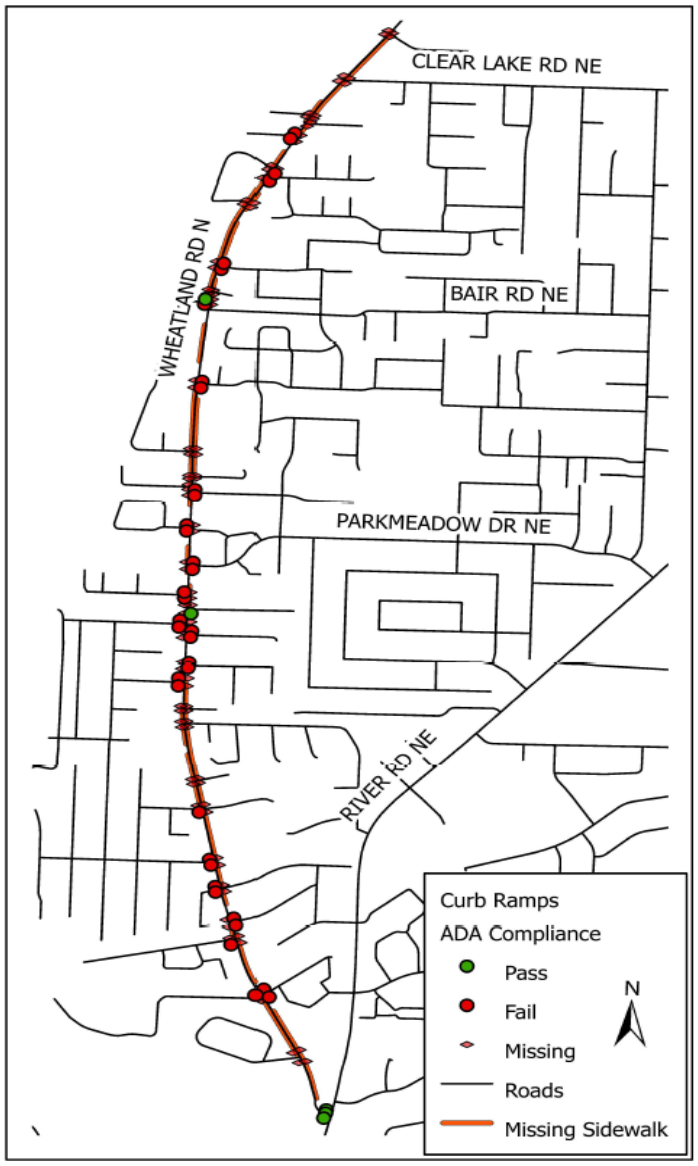

FIGURE 4: ADA RAMP COMPLIANCE

[2] Designing for All Ages and Abilities, National Association of City Transportation Officials, December 2017.

[3] See posted and 85th percentile speeds for Wheatland in Table 4.

EXISTING TRANSIT CONDITONS

CHERRIOTS TRANSIT

Cherriots provides public transit service in the Salem-Keizer area via one route. The route, Route 9 (Cherry/River Road), operates Monday through Saturday and provides service between the Downtown Transit Center in Salem and the intersection of Parkmeadow Drive and Wheatland Road. It only services the corridor south of Parkmeadow Drive and it is a southbound-only route along Wheatland Road. The bus has 30-minute headways on weekdays and one-hour headways on Saturdays. Figure 5 shows the route and bus stop locations.

Within the vicinity of the study corridor, there are five bus stops for Route 9. A wide shoulder is present at the McNary Heights bus stop, however, it is not intended for use as a bus pullout. None of the bus stops provide seating or a covered waiting area.

Many pedestrians utilize the transit bus stops along Wheatland Road and are often waiting for buses during the morning peak period.

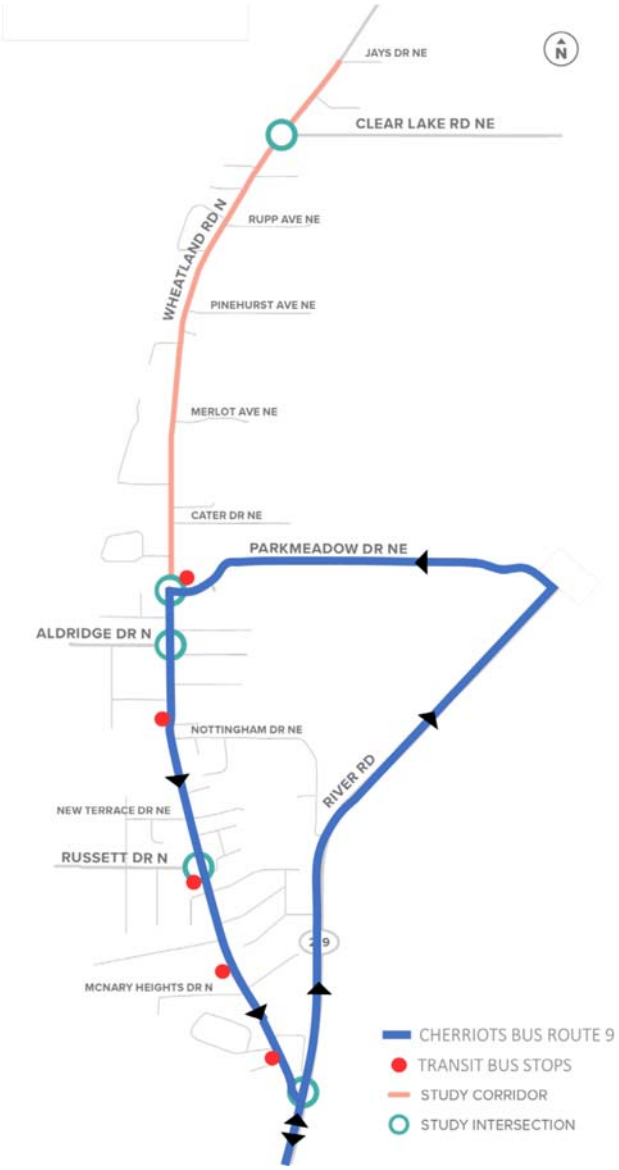

FIGURE 5: CHERRIOTS BUS ROUTE AND STOPS

NEARBY SALEM-KEIZER SCHOOLS

There are two elementary schools near the study corridor: Clear Lake Elementary School and Forest Ridge Elementary School. Many students walk from the neighborhoods around Wheatland Road to these schools. However, most students that live on the west side of Wheatland Road that attend Forest Ridge are provided school bus service. In addition to the elementary students, middle school and high school students walk the corridor to reach their respective school bus stops. Figure 7 shows the school locations, school speed zones, and school bus stops.

There are also two 20 mph school speed zones located along the corridor. The school zone for Clear Lake Elementary School is from Farmland Lane to Cater Drive and the school zone for Forest Ridge Elementary is from Marks Drive to approximately 225 feet north of Clear Lake Road intersection as well as along Clear Lake Road.

There are marked school crosswalks at Parkmeadow Drive (north leg, with a crossing guard) and at Clear Lake Road (south leg and east leg). While the crosswalks are marked, each intersection is missing curb ramps with the marked crosswalks. Figure 6 shows the Parkmeadow Drive marked school crosswalk.

School bus stop locations on Wheatland Road are shown in Table 2. There are 14 individual bus stop locations along Wheatland Road for the four schools listed.

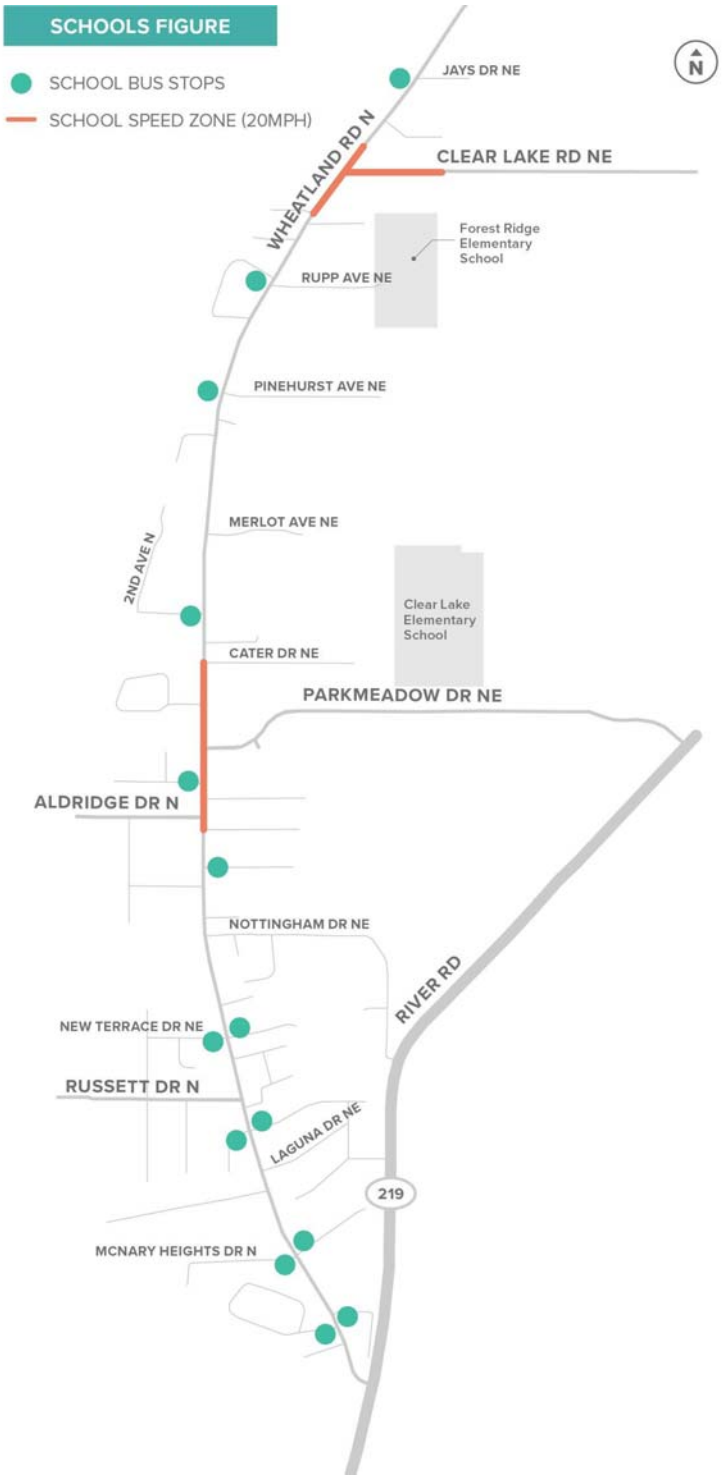

FIGURE 6: SCHOOL ZONES AND SCHOOL BUS STOPS

TABLE 2: SCHOOL BUS STOP LOCATIONS

CLEAR LAKE ELEMENTARY AND FOREST RIDGE ELEMENTARY	WHITAKER MIDDLE SCHOOL AND MCNARY HIGH SCHOOL
Courtside Manor Apartments (northbound)	Jays Drive (southbound)
Foothill Court (northbound)	Rupp Avenue (southbound)
Delta Drive (northbound)	Pinehurst Avenue (southbound)
New Terrace Court (northbound)	Otter Way (southbound)
Springridge Drive (northbound)	Hazelbrook Drive (southbound)
Otter Way (southbound)	New Terrace Drive (southbound)
Delta Court (southbound)	Delta Court (southbound)
McNary Heights Drive (southbound)	McNary Heights Drive (southbound)
	Mistletoe Loop (southbound)

Currently, there is a lack of street lighting, sidewalks, and safe pedestrian crossings of Wheatland Road for students walking to school, crossing Wheatland Road, traveling to a school bus stop, or waiting at a school bus stop. During the winter, students waiting for school buses in the morning hours are often waiting in the dark and must walk and cross along stretches of Wheatland Road without sidewalks or lighting as shown in Figure 9.

FIGURE 7: PARKMEADOW DRIVE MARKED SCHOOL CROSSWALK

EXISTING LIGHTING CONDITIONS

Street lighting observations were conducted along the Wheatland Road project area during the nighttime conditions on November 30, 2020. There is some existing street lighting along most of Wheatland Road corridor. Observed light levels indicate that additional lighting along the study corridor is needed. Existing lighting along the corridor is mainly located on utility poles and is not uniform, creating contrast between light and dark sections and making it difficult to identify pedestrians, bikes, and motor vehicles on or crossing the street. Visibility is especially challenging at several of the school bus stops as shown in Figure 9. Supplemental lighting along the corridor would be needed to meet current street lighting guidelines (average light levels and uniformity).

FIGURE 8: DARK CONDITIONS AT A SCHOOL BUS STOP

EXISTING STORMWATER AND NATURAL RESOURCE CONDITIONS

STORMWATER CONDITIONS

Most of the corridor has some existing stormwater infrastructure and piping in place that is part of the City's MS4 system. Areas of exception include between Mistle Toe Loop and River Road; between New Terrace and Malory Lane; and from Jacobsen Street to Merlot Avenue. Additional study and analysis will need to be completed to determine the available capacity of this system.

There is minimal slope along Wheatland Road north of Laguna Drive. South of Laguna Drive, Wheatland Road slopes south toward River Road with a low point around McNary Heights Drive. The City of Keizer prefers the use of Underground Injection Controls (UICs) to manage stormwater runoff which should be the preferred method of stormwater discharge for this project.

The project corridor has limited right-of-way and the roadside areas are almost completely developed. However, there are some limited opportunities for stormwater facilities to assist with stormwater management and infiltration. These include installing perforated UIC storm drain piping within the roadway, constructing narrow above ground linear features such as swales or rain garden planters along the western side of the corridor under existing transmission power lines or where there is sufficient right-of-way is available on the eastern side; between New Terrace Court and Nottingham Drive, for example. Other options could include purchasing private property at strategic undeveloped locations such as the open fields adjacent to Keizer Christian Church or at the southwest corner of the intersection of Wheatland Road and McNary Heights Drive.

Curb only exists on parts of Wheatland Road, potentially draining stormwater runoff from public infrastructure onto adjacent private properties. For example, on the west side of Wheatland Road, between Mistletoe Loop and McNary Heights Drive, the adjacent properties are below the road grade and no curb or sidewalk exists to direct stormwater runoff away from those properties. Heavy storms that do not fully infiltrate immediately adjacent to the road may runoff onto private property. Installing curb and sidewalk on both sides of the roadway should improve stormwater runoff conditions along the corridor.

NATURAL RESOURCE IMPACTS

A desktop review of the project corridor was completed to identify potential natural resources features that may be impacted by the project. Based on the review of available information, no impacts to wetlands or waters of the state are anticipated for this project. Data was reviewed on the Oregon Rapid Wetland Assessment Protocol and Stream Function Assessment Method online mapping. No mapped wetlands or mapped hydric soils are within the project boundaries.

There are several areas along the east side of Wheatland Road with mature trees that may be impacted when installing new sidewalk, separating existing curb tight sidewalk, or widening the paved surfacing. City of Keizer defines a significant tree as anything over 12-inch diameter at breast height. In many cases, meandering sidewalk would not be sufficient to avoid impacts to the critical root zone of significant trees with a widened corridor.

On the east side of the corridor, significant trees are located at the following general locations: between entrances of Courtside Manor opposite of Mistletoe Loop; near the embankment slope south of Laguna Drive; 2 large oaks north of New Terrace Court; immediately north of Farmland; immediately north of Park Meadow. On the west side of the corridor only one large oak was identified north of Russett.

EXISTING MOTOR VEHICLE CONDITIONS

Existing motor vehicle conditions were evaluated for the Wheatland Road corridor within the study area and included various inventories, observations, and analysis.

PAVEMENT CONDITION

Wheatland Road is a two-lane arterial corridor with a typical width of 32 feet. According to City provided data, the southern section beginning at River Road and ending at Bair Road, approximately 6,900-ft, has a Pavement Condition Index (PCI) of 85. This indicates that the pavement is in very good condition and is not in need of significant preservation efforts beyond crack sealing. The section beginning at Bair Road and ending 100-ft north of Jays Drive, approximately 3,000-ft, has a PCI of 70. A PCI of 70 indicates that the pavement is in good condition but is at a critical point for preventative maintenance. Delaying preventative maintenance below a PCI of approximately 65-70 will lead to significantly higher corrective maintenance, rehabilitation, or reconstruction. This is the appropriate time in the pavement's life for pavement

preservation treatment. A minor overlay or grind and inlay may be appropriate to extend the pavement life.

ROADWAY NETWORK

The transportation characteristics of the key study area roadways and key cross streets are shown in Table 3 and include functional classification, number of travel lanes, posted speeds, and the presence of sidewalks and bike lanes. All of the study roadways are under the City of Keizer's jurisdiction. The functional classification is a key roadway characteristic because it specifies the purpose of the facility[4] and is a determining factor of applicable cross-section, access spacing, and intersection performance standards.

TABLE 3: EXISTING STUDY AREA ROADWAY CHARACTERISTICS

ROADWAY	FUNCTIONAL CLASSIFICATION	TRAVEL LANES	POSTED SPEED	SIDEWALK	BIKE LANES
WHEATLAND ROAD	Minor Arterial	2	40 mph	Partial [a]	Both Sides
RIVER ROAD	Major Arterial	3-5	40 mph	Both Sides	None
RUSSETT DRIVE	Local Street	2	Not Posted	Both Sides	None
ALDRIDGE DRIVE	Local Street	2	Not Posted	Both Sides	None
PARKMEADOW DRIVE	Collector	2	25 mph	Both Sides	None
CLEAR LAKE ROAD	Collector	2	40 mph	None	None

[a] Refer to the Figure 3 to see the location of existing sidewalks and bicycle lanes on Wheatland Road.

EXISTING VEHICULAR VOLUME, SPEED, AND CLASSIFICATION

Traffic data was collected using 24-hour tube counts[5] at two locations within the project study area. The locations of these tube counts are shown in Table 4. This data includes directional average daily vehicular volumes, heavy vehicle percentages, and 85th percentile speeds.

At the time that the traffic counts were collected, traffic volumes were lighter than normal due to the COVID-19 pandemic. However, historical traffic count data collected in March 2020, prior to the COVID-19 closure of schools and businesses, were available at the intersections of River Road and

[4] The primary purpose of an arterial is to provide mobility, whereas at the opposite end of the spectrum, a local road is primarily concerned with site access. Collector roadways provide a transition between arterials and local roads.

[5] Traffic Data was collected on Tuesday, September 29, 2020 by All Traffic Data.

Clear Lake Road for the PM peak hour. These counts were used to determine the change (reduction) in traffic volumes during the peak periods of the COVID-19 pandemic so that the traffic counts collected in September of 2020 could be scaled appropriately and would therefore represent typical traffic volume levels. It was determined that a factor of 1.15 be applied (15% increase) to the September 2020 traffic counts to represent pre-COVID-19 conditions.

As shown in Table 4, Wheatland Road experiences daily traffic volumes between 5,300 and 8,600 vehicles (adjusted for impacts due to COVID-19). The 85th percentile travel speeds range from 3 mph to 5 mph above the posted speed.

TABLE 4: WHEATLAND ROAD VOLUMES, HEAVY VEHICLES, AND SPEEDS

DATA	LOCATION ALONG WHEATLAND ROAD	
	NORTH OF LAGUNA DR	SOUTH OF CATER DR
AVERAGE DAILY TRAFFIC		
NORTHBOUND	4,200	2,600
SOUTHBOUND	4,400	2,700
TOTAL	8,600	5,300
HEAVY VEHICLE PERCENTAGES		
NORTHBOUND	1.4%	2.0%
SOUTHBOUND	2.1%	1.7%
85TH PERCENTILE SPEEDS (POSTED SPEED = 40 MPH)		
NORTHBOUND	43 MPH	45 MPH
SOUTHBOUND	45 MPH	44 MPH

EXISTING 2020 TURNING MOVEMENT COUNTS

Intersection turn movement volumes were collected at the five study intersections along Wheatland Road in September 2020.[6] The intersection volumes were collected for the AM (7 am – 9am) and PM (4 pm – 6 pm) peak periods. The peak hours for each period (AM and PM) at each study intersection were calculated and will be analyzed as part of the intersection performance analysis. The five study intersections and their corresponding traffic control are listed below:

- Wheatland Road/River Road (Signalized)
- Wheatland Road/Russett Drive (Unsignalized)

[6] Traffic count data was collected on Tuesday, September 29, 2020 by All Traffic Data.

- Wheatland Road/Aldridge Drive (Unsignalized)
- Wheatland Road/Parkmeadow Drive (Unsignalized)
- Wheatland Road/Clear Lake Road (Unsignalized)

The adjusted existing 2020 intersection volumes are shown in Figure 9 on the following page. The detailed, two-hour traffic counts collected in March 2020 and September 2020 can be found in the appendix.

INTERSECTON OPERATING STANDARDS

Agency mobility standards often require intersections to meet level of service (LOS) or volume-to-capacity (V/C) intersection operation thresholds.

- The intersection LOS is similar to a "report card" rating based upon average vehicle delay. Level of service A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. Level of service D and E are progressively worse operating conditions. Level of service F represents conditions where average vehicle delay has become excessive and demand has exceeded capacity. This condition is typically evident in long queues and delays.
- The volume-to-capacity (v/c) ratio represents the level of saturation of the intersection or individual movement. It is determined by dividing the peak hour traffic volume by the maximum hourly capacity of an intersection or turn movement. When the V/C ratio approaches 0.95, operations become unstable and small disruptions can cause the traffic flow to break down, resulting in the formation of excessive queues.

All of the study intersections are under City of Keizer jurisdiction and are required to meet the City's operating standards. Per the City's Transportation System Plan[7], intersections of two arterial roadways must have a v/c ratio of 0.95 or less to be operating acceptably. This includes the Wheatland Road/River Road intersection. For the remaining unsignalized study intersections, only the LOS is used for determining intersection operation. LOS "E" (representing no more than 50 seconds of average minor street stopped delay) is the minimum acceptable level.

[7] City of Keizer Transportation System Plan, Part 1 of 2, Revised June 2014.

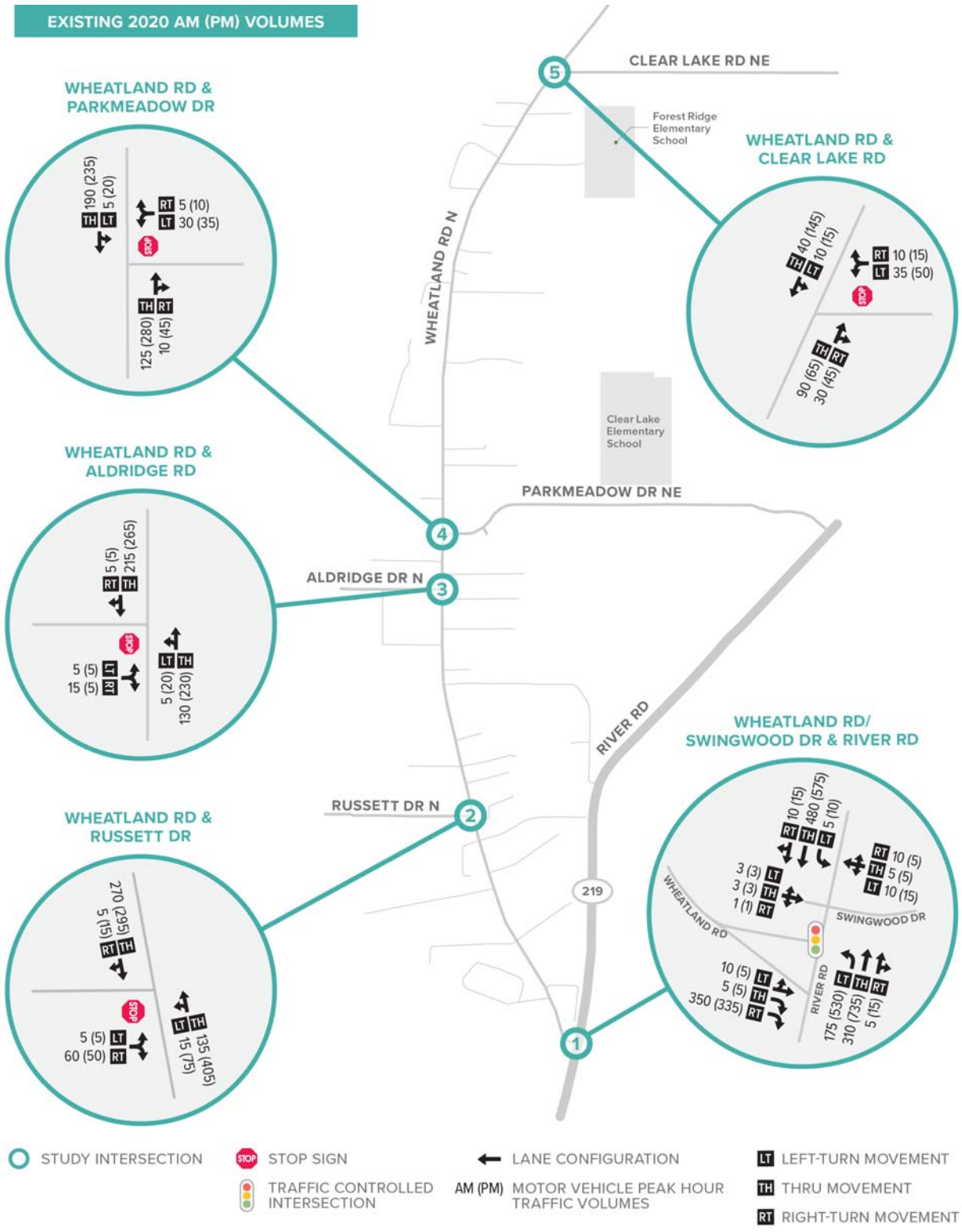

FIGURE 9: EXISITING (2020) TRAFFIC VOLUMES

EXISTING 2020 INTERSECTION PERFORMANCE

The existing performance of the study intersections was evaluated using Synchro™ software, which employs methodology from the 6th Edition of the Highway Capacity Manual[8] for both unsignalized and signalized intersections.

The intersection operation performance standards of level of service (LOS), delay, and volume-to-capacity (V/C) ratios were calculated for the AM and PM peak hours and are reported in Table 5. As shown, all intersections currently meet the City of Keizer's mobility standards.

TABLE 5: EXISTING (2020) INTERSECTION OPERATIONS

INTERSECTION	OPERATING STANDARD	AM PEAK HOUR			PM PEAK HOUR		
		V/C RATIO	DELAY	LOS	V/C RATIO	DELAY	LOS
SIGNALIZED							
WHEATLAND RD/ RIVER RD	v/c ≤ 0.95	0.22	7.3	A	0.38	11.6	B
UNSIGNALIZED							
WHEATLAND RD/ RUSSETT DR	LOS E	0.10	10.4	A/B	0.09	11.4	A/B
WHEATLAND RD/ ALDRIDGE DR	LOS E	0.03	10.1	A/B	0.02	12.0	A/B
WHEATLAND RD/ PARKMEADOW DR	LOS E	0.06	10.9	A/B	0.11	14.0	A/B
WHEATLAND RD/ CLEAR LAKE RD	LOS E	0.07	9.9	A/A	0.10	10.7	A/B

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

TWO-WAY STOP CONTROLLED INTERSECTION:
Delay = Critical Movement Approach Delay (sec.)
v/c = Critical Movement Volume-to-Capacity Ratio
LOS = Level of Service (Major/Minor Road)

[8] Highway Capacity Manual, 6th Edition, Highway Transportation Research Board, 2017.

SAFETY ANALYSIS

A brief discussion of the crash analysis that was performed for the study area is presented in the sections below. Crash data was obtained from the ODOT Crash Analysis and Reporting Unit for the five most recent years of published data (2014-2018). Figure 10 shows the location of all crashes along Wheatland Road during this period.

CRASH STATISTICS

Between 2014 and 2018, 54 crashes were recorded along the project corridor (from River Road to Jays Drive). There were 24 Rear-End crashes (44%), 11 Turning Movement crashes (20%), and 7 Fixed Objects crashes (13%). Among the fixed object crashes, the fixed objects included mailboxes, utility poles, ditches, vegetation, signs, and curbs. The number of crashes at each study intersection is recorded in Table 6.

There were no fatal crashes in the study area. There was, however, one serious injury (Injury A) crash that occurred at the intersection of Wheatland Road/New Terrace Court. The crash occurred in 2017 during clear, dry conditions and resulted in a rear-end collision.

There were three pedestrian crashes and one bicycle crash recorded on the study corridor. The location of the pedestrian and bicycle crashes are shown in Figure 10. Three of the crashes resulted in moderate injury (Injury B) and one resulted in minor injury (Injury C). All four occurred during daylight under clear and dry conditions. The pedestrian crash at Wheatland Road/River Road was caused by a motor vehicle driver's disregard for the traffic signal.

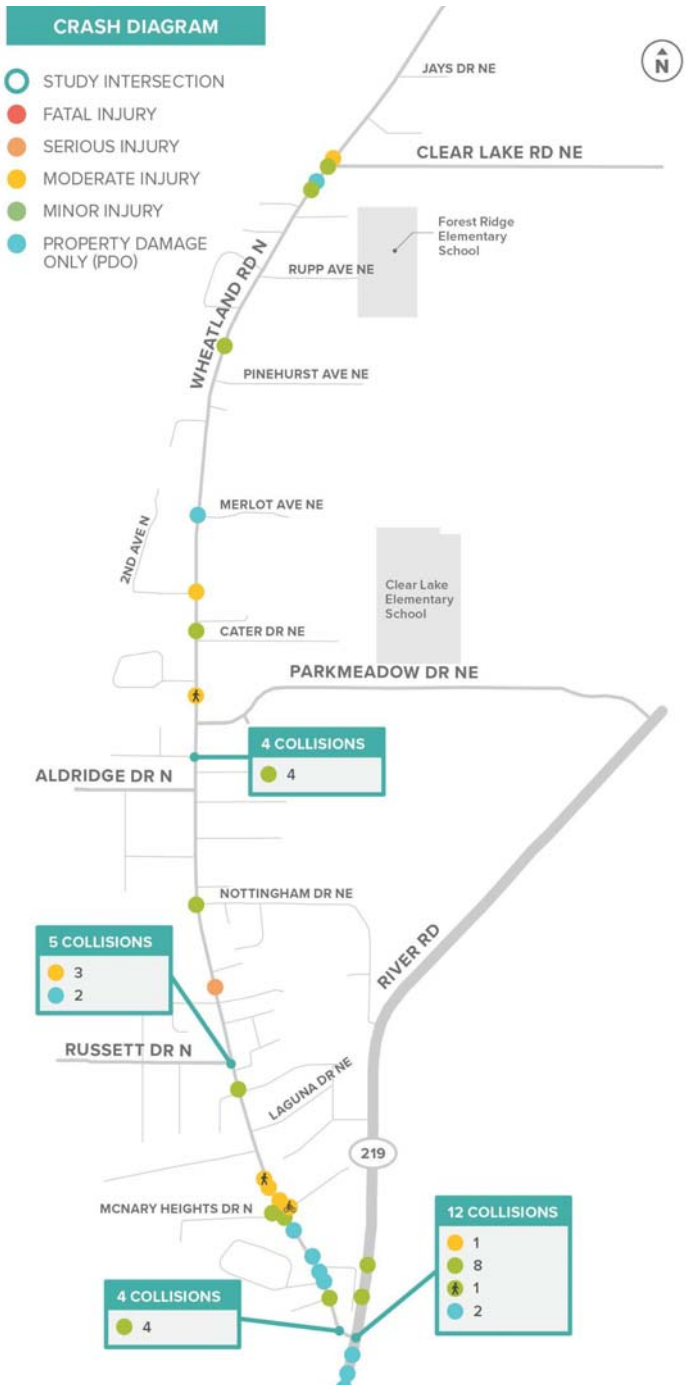

FIGURE 10: CRASH MAP (2014 – 2018)

CRITICAL CRASH RATE CALCULATIONS

ODOT guidance was followed to evaluate the crash rates at the five study intersections. Table 6 shows the results of the evaluation. The intersection types were determined by their respective geometries and traffic control. Exhibit 4-1 in the Analysis Procedures Manual[9] provides 90th percentile critical crash rates for similar intersection types in Oregon. These rates were compared to the calculated observed crash rates at the study intersections.

TABLE 6: CRITICAL CRASH RATE RESULTS

INTERSECTION	TYPE [a]	NUMBER OF CRASHES	90th %ILE CRASH RATE	AVERAGE DAILY TRAFFIC	CALCULATED CRASH RATE
SEGMENT					
WHEATLAND ROAD (RIVER RD TO JAYS DR)	-	54	2.84 [b]	7,000	2.22
INTERSECTON					
WHEATLAND RD/ RIVER RD	URBAN 4SG	21	0.860	22,500	0.511
WHEATLAND RD/ RUSSETT DR	URBAN 3ST	5	0.293	8,450	**0.324**
WHEATLAND RD/ ALDRIDGE DR	URBAN 3ST	0	0.293	6,200	0.000
WHEATLAND RD/ PARKMEADOW DR	URBAN 3ST	0	0.293	6,250	0.000
WHEATLAND RD/ CLEAR LAKE ROAD	URBAN 3ST	2	0.293	3,350	**0.327**

[a] 4SG = Four-Leg Signalized, 3ST = Three-Leg Minor Stop-Controlled

[b] The 90th percentile rate is the average of the crash rates between 2014 – 2018 for Urban Minor Arterials from ODOT's State Highway Crash Rate Table II

Bold/Highlighted = Calculated Rate exceeds Critical Rate

As shown, two intersections, Russett Drive and Clear Lake Road had calculated rates higher than the 90th percentile critical rate determined by ODOT. All five of the crashes that occurred at the Russett Drive intersection were rear-end crashes where the northbound left turning vehicle was hit by through vehicles on Wheatland Road while waiting to turn left onto Russett Drive. This is likely due to the high northbound left turn volume at Russett Drive and the lack of a left turn lane at this location. The installation of a northbound left turn lane should be considered to eliminate conflicts between northbound left turning and southbound through vehicles. Of the two crashes that the Clear Lake Road intersection, one was a Fixed Object crash and the other was a Parking Maneuver crash.

9 Analysis Procedures Manual, Oregon Department of Transportation, Updated 7/7/2020.

MOTOR VEHICLE FIELD OBSERVATIONS

The following observations have been made of the motor vehicle operations on the Wheatland Road corridor.

- The northbound left turn at the Wheatland Road/River Road intersection will often back up into the through lanes of traffic on River Road near Manzanita Street during the PM peak period. If the queue is long, vehicles will often continue north through the intersection and will use neighborhood streets, such as Nottingham Drive and Parkmeadow Drive.
- The driveway to the B&S Market just north of the Wheatland Road/River Road intersection is signalized, however, there are no right turns on red permitted. This is often ignored and vehicles conflict with protected northbound left turning vehicles from River Road.
- There have been many rear-end vehicle conflicts between vehicles waiting to turn left onto Russett Drive and northbound through vehicles on Wheatland Road. There is a hill just before Russett Drive that blocks the view of approaching vehicles and the roadway has a posted speed of 40 mph.

PLANNED IMPROVEMENTS

The City of Keizer Transportation System Plan (TSP) provides a list of projects that the City desires to construct to improve motor vehicle operations and multimodal safety.

- R2- Move the River Road/Manzanita Street intersection approximately 250 feet to the south. Realign and reconstruct Manzanita Street and McNary Estates Drive approaches to River Road. Construct separate westbound through and right-turn lanes. Medium Priority.
- R3 – At River Road/Wheatland Road intersection, construct dual northbound left-turn lanes, change north and south left-turn phases to a protected left-turn phase, and extend the length of second southbound through lane. Medium Priority.

Additionally, there is a project currently in the design phase for the installation of new optical fiber cable to connect from Shangri-La Avenue (City of Salem) to Wheatland Road (City of Keizer). This will be used to link traffic signals along the River Road to improve traffic flow. This project is currently being designed and will be constructed in 2021.

FUTURE MOTOR VEHICLE CONDITIONS

This section contains an evaluation of the future motor vehicle conditions along the study corridor. The following subsections discuss the future forecast volume development, forecasted 2042 volumes, and future 2042 intersection performance.

SALEM-KEIZER AREA TRANSPORTATION STUDY (SKATS) TRAVEL DEMAND MODEL

Future motor vehicle conditions for 2042 AM and PM peak hour intersection performance were evaluated for the study intersections. The background growth for the turning movement volumes was calculated based on traffic growth as modeled in the Salem Keizer Transportation Study (SKATS) travel demand model.[10] A rate of 1% per year growth rate was calculated based on the 2043 and 2017 models on Wheatland Road and was applied to the study intersection volumes to forecast 2042 AM and PM peak hour volumes.

FUTURE 2042 TURNING MOVEMENT COUNTS

The annual growth rate of 1% was applied to all the intersection turning movement counts at the study intersections. The traffic volumes are shown in Figure 11. The volumes shown include both the AM and PM peak hour.

[10] Salem-Keizer Transportation Study (SKATS) travel demand models 2043 and 2017 were used.

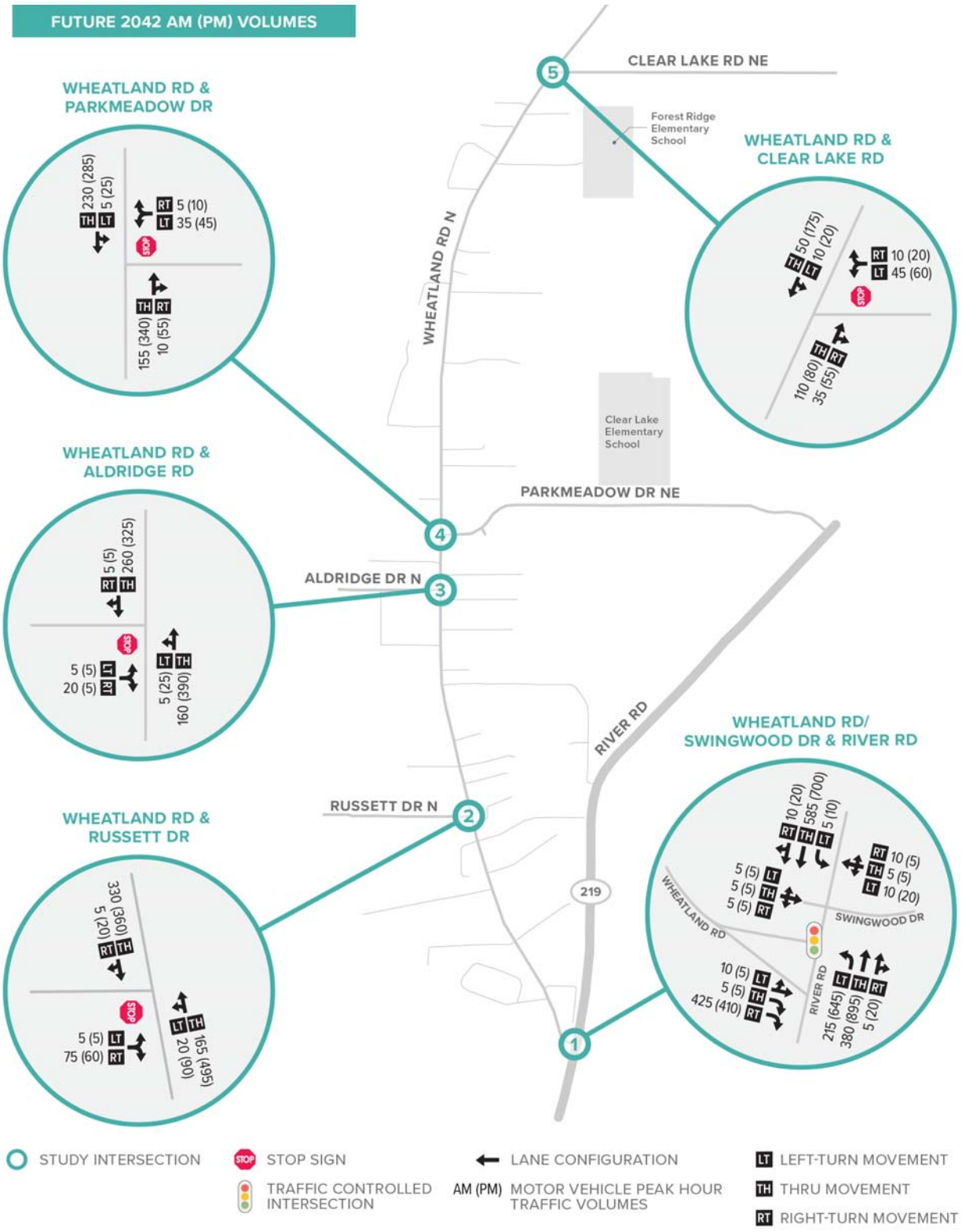

FIGURE 11: FUTURE FORECAST (2042) TRAFFIC VOLUMES

FUTURE 2042 INTERSECTION PERFORMANCE

The future performance of the study intersections was evaluated using Synchro™ software, which employs methodology from the 6th Edition of the Highway Capacity Manual[11] for unsignalized intersections and signalized intersections.

The intersection operation performance standards of level of service (LOS), delay, and volume-to-capacity (V/C) ratios, were calculated for the AM and PM peak hours and are reported in Table 7 below. As shown, all intersections currently meet the City of Keizer's mobility standards.

TABLE 7: FUTURE (2042) INTERSECTION OPERATIONS

INTERSECTION	OPERATING STANDARD	AM PEAK HOUR			PM PEAK HOUR		
		V/C RATIO	DELAY	LOS	V/C RATIO	DELAY	LOS
SIGNALIZED							
WHEATLAND RD/ RIVER RD	v/c ≤ 0.95	0.27	7.7	A	0.50	24.4	C
UNSIGNALIZED							
WHEATLAND RD/ RUSSETT DR	LOS E	0.13	11.1	A/B	0.12	12.4	A/B
WHEATLAND RD/ ALDRIDGE DR	LOS E	0.04	10.4	A/B	0.02	13.3	A/B
WHEATLAND RD/ PARKMEADOW DR	LOS E	0.07	11.7	A/B	0.16	16.4	A/C
WHEATLAND RD/ CLEAR LAKE RD	LOS E	0.08	10.2	A/B	0.14	11.4	A/B

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

TWO-WAY STOP CONTROLLED INTERSECTION:
Delay = Critical Movement Approach Delay (sec.)
v/c = Critical Movement Volume-to-Capacity Ratio
LOS = Level of Service (Major/Minor Road)

LEFT-TURN LANE CRITERIA EVALUATION

The inclusion of a dedicated left turn pocket was investigated at each of the unsignalized study intersections for the major approach per the specific procedure described in the ODOT Analysis Procedures Manual (APM) [12]. Primarily, a left turn lane should be installed if any of the following three criteria are met: Vehicular Volume, Crash Experience, or Special Cases. No Special Cases

[11] Highway Capacity Manual, 6th Edition, Highway Transportation Research Board, 2017.

[12] Chapter 12, Analysis Procedures Manual, Oregon Department of Transportation, January 2020.

apply to these left turn lane evaluations for the corridor. It should be noted that the criteria only addresses left turns on the major approach and that meeting one or more of the criteria only indicates that a turn lane would be appropriate; it does not require that a turn lane be installed. For this analysis, a northbound left at Russett Drive, northbound left at Aldridge Drive, southbound left at Parkmeadow Drive, and southbound left at Clear Lake Road were evaluated.

The Vehicular Volume criteria is evaluated using major road volumes and Exhibit 12-1 from the APM[13] to determine if the volumes pass a recommended threshold of left turns versus general vehicular volume. Both AM and PM volumes for Existing and Future conditions were tested to determine current and future outcomes. The left turns at Russett Drive, Aldridge Drive, and Parkmeadow Drive all met the recommended threshold for Existing and Future Condition volumes, but the northbound left at Russett Drive significantly exceeded the threshold for both conditions. Conversely, the southbound left at Clear Lake Road did not meet the threshold for any of the conditions.

The Crash Experience criteria is evaluated by investigating prior crash history and the presence of crash remedy trials, and then examining how adding a dedicated left turn could alleviate certain crash types. The primary crash type that adding a dedicated lane turn alleviates is rear-ends. At Russett Drive, there were five rear-end crashes from vehicles trying to make a northbound left as shown in the safety analysis. While there are technically no known crash remedy trials at this location, these crashes could theoretically be minimized by adding a northbound left turn at this location. Neither Aldridge Drive, Parkmeadow Drive, nor Clear Lake Road had any rear-end crashes.

TABLE 8: LEFT-TURN LANE CRITERIA EVALUATION RESULTS

INTERSECTION	CRITERIA MET?			IS A LEFT TURN POCKET RECOMMENDED?
	VEHICULAR VOLUME	CRASH EXPERIENCE	SPECIAL CASES	
NORTHBOUND LEFT @ RUSSETT DRIVE	Yes[1]	Yes[2]	No	Yes
NORTHBOUND LEFT @ ALDRIDGE DRIVE	Yes	No	No	No
SOUTHBOUND LEFT @ PARKMEADOW DRIVE	Yes	No	No	No
SOUTHBOUND LEFT @ CLEAR LAKE DRIVE	No	No	No	No

[1] The Vehicular Volume criteria significantly exceeded the threshold.
[2] No known crash remedy trials were performed at this intersection.

[13] Chapter 12, Analysis Procedures Manual, Oregon Department of Transportation, January 2020.

Based on the findings summarized in Table 8, a northbound left turn pocket is recommended at Russett Drive only. It will potentially minimize rear-end crashes and provide queuing space for the high volume of turning vehicles (75 vehicles at PM peak hour). In an effort to conserve roadway cross-sectional width, dedicated left turn lanes at the other intersections are not recommended as they do not introduce significant operational or safety benefits to the corridor.

SUMMARY

The Wheatland Road study corridor is an approximately two-mile segment with varying levels of vehicular, pedestrian, cyclist, and transit usage. In general, the corridor works well for vehicles but has deficiencies for pedestrians, cyclists, and safe routes to schools. The study results are itemized into effective and deficient findings. From these results, the majority of the improvements for the corridor center around multi-modal transportation needs for pedestrians, bicyclists, school safety, and transit facilities.

Effective Findings

- The pavement is in either good or very good condition but could use some preventative maintenance.
- All study intersections met City of Keizer standards for both the Existing 2020 and Future 2042 traffic volume levels.
- The Wheatland Road corridor crash rate was below the critical segment crash rate, with three of the intersections also below the critical intersection crash rate.
- Bicycle lanes are present on both sides of the entire corridor.

Deficient Findings

- There is a lack of sidewalks, pedestrian connectivity, and enhanced pedestrian crossings of Wheatland Road. This is true for both the general pedestrians and school children that lack the necessary sidewalk to walk to and from school-related destinations.
- The majority of curb ramps along the corridor are either missing or not ADA compliant.
- While bicycle lanes do exist, they are not buffered, protected, or separated from vehicular traffic.
- There is inadequate street lighting throughout the corridor.
- No public transit bus stops have amenities or enhanced waiting areas.
- Two intersections had crash rates higher than the critical intersection crash rates.
- It is recommended that at Russett Drive, a northbound left turn lane be added to help prevent rear-ends (the primary crash type) and provide queuing space.