

TECHNICAL MEMORANDUM #2: CONTEXT AND SITE ANALYSIS

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Project:	Confederated Tribes of Umatilla Indian Reservation Transportation System Plan Upo	date
Subject:	Tech Memo #2: Context and Site Analysis	

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INTRODUCTION

This memorandum summarizes information related to existing and future (no-build) transportation system conditions within the Umatilla Indian Reservation (UIR). The information provided in this memorandum will serve as the foundation for identifying existing and projected future gaps and deficiencies in the transportation system, which will then serve as the basis for developing and evaluating transportation system alternatives and identifying improvement projects for the Confederated Tribes of Umatilla Indian Reservation (CTUIR) Transportation System Plan (TSP) update.

The study area for the CTUIR TSP update encompasses all lands within the boundaries of the UIR, including several roads on off-reservation Trust lands. The primary focus of the planning effort will be on areas within the UIR. Figure 1 shows the Umatilla Reservation and CTUIR off reservation trust and fee lands. Figure 2 illustrates the study area for the CTUIR TSP update. *Attachment A* contains the existing land use assessment.





Umatilla Indian Reservation and CTUIR Off Reservation Trust and Fee Lands Umatilla Indian Reservation



ROADWAY SYSTEM

Roadway System Inventory

The roadway system within the UIR boundary serves most trips across all travel modes. In addition to people driving, people walking, biking, riding the bus, and using other forms of transportation use the roadway system to travel to and from essential destinations and neighboring communities. This section describes the existing roadway system.

The roadway system within the UIR boundary was inventoried based on Geographic Information System (GIS) data obtained from CTUIR and the Oregon Department of Transportation (ODOT), as well as a review of recent aerial imagery. The inventory was supplemented by information provided in the 2001 CTUIR TSP and by information provided by CTUIR and ODOT.

JURISDICTION AND FUNCTIONAL CLASSIFICAITON

The roadway network is owned and operated by multiple entities, consisting of CTUIR, ODOT, Umatilla County, and the Bureau of Indian Affairs (BIA). Each jurisdiction is responsible for determining the functional classification of the streets, defining major design and multimodal features, and approving construction and access permits. Coordination is required among the jurisdictions to ensure that the streets are planned, operated, maintained, and improved to safely meet public needs. Figure 3 illustrates the jurisdiction and functional classification of streets within the UIR boundary.

CTUIR Roads

CTUIR owns and maintains most roads that serve tribal affiliated facilities and housing. These roadways include Short Mile Road, Easy Street, Cedar Street, Aspen Way (and other local spur streets serving the adjacent residential area), Timíne Way, Wildhorse Boulevard, Kusi Road, Coyote Road, Spilya Road, Tokti Road, and Arrowhead Road. CTUIR also owns and maintains Mission Road west of OR 331 to the western UIR border.

ODOT Facilities

Within the study area, ODOT owns and maintains Interstate 84 (I-84) and OR 331. I-84 is classified by the Oregon Highway Plan as an Interstate Highway, on the National Highway System and National Network, a Freight Route, and a Reduction Review Route. OR 331 (Umatilla Mission Highway) is classified by the Oregon Highway Plan as a District Highway, a Freight Route, and a Reduction Review Route.

Umatilla County Facilities

Umatilla County owns and maintains regionally significant roadways within the study area. Mission Road (County Road #900) is the primary east-west roadway, connecting the Mission area to the city of Pendleton to the west. Classified as a Major Collector, Mission Road consists of two travel lanes with a posted speed limit of 40 mph. Other County roads are classified as Minor Collectors, including Emigrant Road, Cayuse Road, and Kirkpatrick Road.

BIA Roads

Within the study area, the BIA owns and maintains several local roadways that primarily serve BIA tribal agency offices and affiliated housing. These paved roads include "A" Street, "B" Street, Alder Drive, Cayuse Loop, Confederated Way, Cottonwood Lane, Umatilla Loop Road, Walla Walla Court, Whirlwind Drive, and Willow Drive.

Paved and Unpaved Public Use Roads

Based on the 2001 TSP, all remaining roadways within the study area are considered to be "Public Use" roads. According to the TSP, these paved and unpaved roads may or may not have a dedicated right-of-way and are not claimed or maintained by any government entity.



FREIGHT ROUTES

Single-unit trucks and semi-truck and trailer combination vehicles deliver goods to and from various businesses within the UIR boundary.

Freight Routes

The OHP identifies all Interstate Highways and certain Statewide, Regional, and District Highways as freight routes. These routes are intended to facilitate efficient and reliable interstate, intrastate, and regional truck movement through a designated freight route system. As shown in Figure 4, OR 331 is designated by ODOT as a Freight Route and primarily accommodates the movement of freight between I-84 to the south and OR 11, which provides access to Washington, to the north.

There are no Tribal designated freight routes in the UIR; however, Mission Road is also used for local freightrelated movements. There are no known freight restrictions on any roadways within the UIR. However, the Mission Community Master Plan (MCMP) noted that trucks will attempt to utilize Mission Road's connection to Old Emigrant Hill Road during periods of inclement weather when I-84 is shut down. This road is narrow and steep and cannot accommodate all truck types, especially during times of inclement weather.

National Highway System

The National Highway System (NHS) is a network of highways, including Interstate Highways, that serve strategic economic, defense, and transportation facilities, such as airports, ports, rail or truck terminals, railway stations, and pipeline terminals. I-84 is designated as an NHS route within the UIR boundary.

Intersection Operations Analysis

The study intersections for the CTUIR TSP update were determined based on direction provided by ODOT and CTUIR staff. There are 13 study intersections located along tribal, County, and ODOT facilities, all of which are unsignalized. Figure 2 illustrates the location of the study intersections. Figure 5 illustrates the current lane configurations and traffic control devices at the study intersections. The *Analysis Methodology and Assumptions Memorandum* outlines the procedures used to conduct the intersection operations analysis. The analysis results include level-of-service (LOS), delay (del), and volume-to-capacity (v/c) ratios at all intersections, regardless of jurisdiction. The LOS, del, and v/c ratios are reported for the critical movement (CM) at unsignalized intersections in accordance with the methodologies outlined in ODOT's Analysis Procedures Manual (APM).

EXISTING OPERATIONS

The Analysis Methodology and Assumptions Memorandum includes information related to the turning movement counts, peak hour development, and seasonal adjustment factors used to develop traffic volumes for the traffic operations analysis. Per the memorandum, a system-wide peak hour of 3:30 to 4:30 PM was selected as a basis for the analysis. The traffic volumes were also balanced as appropriate. Figure 6 summarizes the traffic volumes developed at the study intersections for the traffic operations analysis.

The traffic operations analysis identifies how the study intersections operate under existing traffic conditions during the weekday PM peak hour. The weekday PM peak hour was selected as a basis for the analysis given that it generally represents the most critical time period throughout the day.

Table 1 summarizes the results of the intersection operations analysis and compares the results to the applicable mobility standards and targets which were presented in the *Analysis Methodology and Assumptions Memorandum*.





Minor Collectors

- Local Roads

Figure 4

Roadway Jurisdiction and Existing Functional Classification Umatilla Indian Reservation



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Table 1:	Existing	Intersection	Operations,	Weekday PM	/I Peak Hour

Map		Control	Mobility Intersectio			n Operations		
мар ID	Intersection	Type ¹	Target	CM ³	LOS	Del	v/c	
1	Mission Road/Timíne Way	TWSC	LOS E ²	NBL	В	12.6	0.16	
2	Mission Road/OR 331	AWSC	0.75	NB	В	12.9	0.45	
3	Mission Road/Short Mile Road	TWSC	LOS E ²	SB	А	9.5	0.04	
4	Mission Road/Emigrant Road-Cayuse Road	TWSC	LOS E ²	EB	А	9.6	0.00	
5	OR 331/Timíne Way	TWSC	0.75	EBL	В	14.9	0.13	
6	OR 331/Wildhorse Boulevard	TWSC	0.75	WBL	В	12.6	0.12	
7	OR 331/Kusi Road	TWSC	0.75	WB	В	14.4	0.30	
8	OR 331/Spilya Road	TWSC	0.75	WBL	D	28.8	0.36	
9	OR 331/Arrowhead Travel Plaza Access	TWSC	0.75	WB	С	18.3	0.32	
10	OR 331/Kash Kash Road	TWSC	0.75	WB	В	12.4	0.01	
11	I-84/OR 331 Interchange WB Ramps	TWSC	0.70	WB	В	11.7	0.16	
12	I-84/OR 331 Interchange EB Ramps	TWSC	0.70	EB	С	19.6	0.55	
13	S Market Road/Tokti Road	TWSC	LOS E ²	EB	В	10.1	0.03	

1) AWSC = All-way stop control; TWSC = Two-way stop control

2) If v/c is less than or equal to 1.0, LOS is based on the average control delay for the critical movement. An LOS E target for TWSC intersections is associated with a maximum control delay of 50 seconds per vehicle.

3) EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; L = Left-turn

As shown in Table 1, all study intersections currently operate acceptably during the weekday PM peak hour. *Attachment B* includes the intersection operations analysis worksheets.

Seasonal Challenges

According to CTUIR staff and public feedback, the local roadway system on the UIR experiences challenges when I-84 is closed. These include vehicles parking on freeway ramp shoulders and people trying to use local roads to go around closures and getting stuck in the snow or damaging muddy roads. Cayuse Road, Old Emigrant Road, and 56th Street have been identified as the most attempted alternate routes. ODOT's 2024-2027 Statewide Transportation Improvement Program includes the I-84 Exit 216 Snow Zone/Truck Parking project, which is intended to help address some of these closure-related concerns.

FUTURE NO-BUILD OPERATIONS

The project team used ODOT's Pendleton travel demand model and existing counts to develop future year 2040 traffic volume forecasts. The travel demand model provides base year 2015 and forecast year 2040 traffic volume projections that reflect anticipated land use changes and planned transportation improvements within the study area. The forecast traffic volumes were developed by applying the post-processing methodology presented in the National Cooperative Highway Research Program (NCHRP) Report 765 Highway Traffic Data for Urbanized Area Project Planning and Design, in conjunction with engineering judgment and knowledge of the study area. *Attachment C* contains the travel demand model data provided by ODOT.

Figure 7 illustrates the year 2040 forecast traffic volumes at the study intersections during the weekday PM peak hour. Table 2 summarizes the results of the future traffic operations analysis at the study intersections under year 2040 traffic conditions.

As shown in Table 2, all study intersections are forecast to operate within their applicable mobility standards and targets during the weekday PM peak hour. *Attachment B* includes the intersection operations analysis worksheets.



Although the operations analysis presented here did not highlight intersection capacity deficiencies based on the volumes provided, previous projects have established needs at several of the study intersections. The MCMP identified the long-term need to construct a single-lane roundabout or signal at the Mission Road/OR 331 intersection once volumes grow to meet warrants. Similarly, the Wildhorse Resort & Casino Expansion Traffic Impact Study identified the long-term need to either construct a single-lane roundabout or construct separate turn lanes for the OR 331/I-84 eastbound ramp terminal to mitigate queuing on the I-84 eastbound ramp. The OR 331 Access Management Implementation Strategy and Circulation Plan discusses the need for consolidating and/or closing accesses on OR 331 between Wildhorse Boulevard and I-84 with queuing and safety in mind, particularly due to the highway-oriented uses in that section of OR 331These alternatives will be moved forward through the TSP update process.

		Ocastacl	Mobility	Inte	ersection	Operati	ons
мар ID	Intersection	Type ¹	Standard/ Target	CM ³	LOS	Del	v/c
1	Mission Road/Timíne Way	TWSC	LOS E ²	NBL	В	13.6	0.20
2	Mission Road/OR 331	AWSC	0.75	NB	С	16.0	0.56
3	Mission Road/Short Mile Road	TWSC	LOS E ²	SB	А	9.6	0.04
4	Mission Road/Emigrant Road-Cayuse Road	TWSC	LOS E ²	EB	А	9.8	0.00
5	OR 331/Timíne Way	TWSC	0.75	EBL	С	16.6	0.18
6	OR 331/Wildhorse Boulevard	TWSC	0.75	WBL	В	13.3	0.15
7	OR 331/Kusi Road	TWSC	0.75	WB	В	15.4	0.36
8	OR 331/Spilya Road	TWSC	0.75	WBL	D	33.0	0.41
9	OR 331/Arrowhead Travel Plaza Access	TWSC	0.75	WB	С	19.9	0.35
10	OR 331/Kash Kash Road	TWSC	0.75	WB	В	12.7	0.01
11	I-84/OR 331 Interchange WB Ramps	TWSC	0.70	WB	В	12.2	0.19
12	I-84/OR 331 Interchange EB Ramps	TWSC	0.70	EB	С	23.2	0.64
13	S Market Road/Tokti Road	TWSC	LOS E ²	EB	В	10.9	0.05

Table 2: Future	No-Build Intersecti	ion Operations	. Weekday Pl	A Peak Hour
		on operations	, we concludy in	

1) AWSC = All-way stop control; TWSC = Two-way stop control

2) If v/c is less than or equal to 1.0, LOS is based on the average control delay for the critical movement. An LOS E for TWSC

intersections is associated with a maximum control delay less than or equal to 50 seconds per vehicle.

3) EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; L = Left-turn

Motor Vehicle Safety Analysis

Crash records were obtained from ODOT for the five-year period from January 1, 2016 through December 31, 2020 for the overall study area. Figure 8 illustrates the location, severity, and type of crashes that occurred within the study area over the five-year period. Based on the data, a total of 392 crashes occurred within the UIR, of which six resulted in a fatality, 12 resulted in suspected serious injuries, 135 resulted in suspected moderate or minor injuries, and 239 resulted in property-damage-only. Most (256) of the crashes within the UIR occurred on I-84, including three of the crashes resulting in fatalities and four of the crashes resulting in suspected serious injuries. There were 136 crashes reported within the UIR boundary outside I-84, including three fatal crashes and eight suspected serious injury crashes. The following summarizes the results of the intersection and segment crash analysis based on the five years of crash data.



Moderate and Minor Injury

/////

Pendleton UGB

Reported Crashes 2016 - 2020 Umatilla Indian Reservation

PDO

INTERSECTION CRASH ANALYSIS

The intersection crash analysis evaluates intersection crash rates, including critical crash rates. According to the data, 24 of the 136 non-I-84 reported crashes occurred at the study intersections. Table 3 summarizes the collision type and crash severity for all reported crashes at the study intersections.

Table 3: Intersection Crash Histor	v	(January	1	2016 throug	ıh	December 31 20	20)
המשוב אין המשוב אין	У	January	/ 1	, 2010 0000	, , ,	December 31, 20	20)

			Col	lision T	уре		Cra	sh Severity	y	
Map ID	Intersection	Angle	Turn	Rear -end	Ped/ Bike	Other	Fatal and Serious Injury	Non- Serious Injury	PDO	Total
1	Mission Road/Timíne Way	0	0	1	0	0	0	1	0	1
2	Mission Road/OR 331	1	3	0	0	0	0	1	3	4
3	Mission Road/Short Mile Road	0	0	0	0	0	0	0	0	0
4	Mission Road/Emigrant Road-Cayuse Road	0	0	0	0	0	0	0	0	0
5	OR 331/Timíne Way	0	0	1	0	0	0	1	0	1
6	OR 331/Wildhorse Boulevard	0	0	0	0	1	0	0	1	1
7	OR 331/Kusi Road	0	2	0	0	1	0	3	0	3
8	OR 331/Spilya Road	0	3	1	0	0	0	2	2	4
9	OR 331/Arrowhead Travel Plaza Access	0	3	0	0	0	0	2	1	3
10	OR 331/Kash Kash Road	0	0	0	0	0	0	0	0	0
11	I-84/OR 331 Interchange WB Ramps	1	0	1	0	1	0	1	2	3
12	I-84/OR 331 Interchange EB Ramps	0	1	3	0	0	0	0	4	4
13	S Market Road/Tokti Road	0	0	0	0	0	0	0	0	0

Other: All other collision types, such as fixed-object, head-on, and parking maneuver

PDO: Property Damage Only

Intersection crash rates were developed for the study intersections based on the total number of crashes reported at the intersections over the five-year period and the total entering volume, or million entering vehicles (MEV). Intersection crash rates were compared to 90th percentile crash rates developed by ODOT and documented in Table 4-1 of the ODOT APM. Table 4 summarizes the total number of crashes reported at the study intersections over the five-year period, the intersection crash rates, and the corresponding 90th percentile crash rates as identified in the APM.

Map ID	Intersection	Total Crashes	Intersection Crash Rate	90 th Percentile Rate	Exceed 90 th Percentile Rate?	Critical Crash Rate	Exceed Critical Crash Rate?
1	Mission Road/Timíne Way	1	0.12	0.48	No	0.41	No
2	Mission Road/OR 331	4	0.29	1.08	No	N/A	N/A
3	Mission Road/Short Mile Road	0	0.00	0.48	No	0.47	No
4	Mission Road/Emigrant Road-Cayuse Road	0	0.00	0.48	No	0.88	No
5	OR 331/Timíne Way	1	0.10	0.48	No	0.38	No
6	OR 331/Wildhorse Boulevard	1	0.09	0.48	No	0.37	No
7	OR 331/Kusi Road	3	0.25	1.08	No	N/A	N/A
8	OR 331/Spilya Road	4	0.29	1.08	No	N/A	N/A
9	OR 331/Arrowhead Travel Plaza Access	3	0.19	0.48	No	0.32	No
10	OR 331/Kash Kash Road	0	0.00	0.48	No	0.32	No
11	I-84/OR 331 Interchange WB Ramps	3	0.19	0.48	No	0.32	No
12	I-84/OR 331 Interchange EB Ramps	4	0.42	0.48	No	0.38	Yes
13	S Market Road/Tokti Road	0	0.00	0.48	No	0.62	No

Table 4: Intersection Crash Rates versus ODOT 90th Percentile Rates versus Critical Crash Rates

None of the study intersections exceeds the corresponding 90th percentile crash rate. *Attachment D* contains the intersection crash rate analysis worksheet.

For the study intersections with sufficient reference populations, critical crash rates were developed based on the total number of crashes reported at the intersections over the five-year period, intersection type, and the total entering volume or average annual daily traffic (AADT). This method is only applicable where at least 5-10 intersections are available with similar characteristics (i.e. traffic control and legs/approaches). Otherwise, the critical crash rate defaults to the 90th percentile crash rates outlined above. Critical crash rates were calculated for the study intersections using ODOT's Critical Crash Rate Calculator tool and are summarized in Table 4. As shown, the I-84/OR 331 Interchange Eastbound Ramps intersection currently exceeds the corresponding critical crash rate. At this location, there were four crashes, which is less than one crash per year. Three of the four crashes were rear-end and occurred on the ramp. Based on the Wildhorse Resort & Casino Expansion Traffic Impact Study, this interchange experiences queuing that may create conditions that increase the risk for rear-end crashes. The fourth crash involved one vehicle turning left from the ramp and one vehicle traveling southbound. All four crashes resulted in PDO Attachment D contains the critical crash rate analysis worksheet.

SEGMENT CRASH ANALYSIS

This section evaluates crashes along study area roadways, excluding crashes at study intersections, by comparing their overall crash rates in Table II of the 2019 statewide Crash Rate Book. Table II lists crash rates for mainline State highways for the past five years, by federally defined urban and rural areas and functional classification.

Segment crash rates were developed for study area roadways and roadway segments based on the total number of crashes reported along the segments over the five-year period, along with the segments lengths and traffic volumes. The total number of crashes along the segments and the segment lengths were obtained from GIS data. Traffic volume data was estimated for the segments based on the traffic counts collected at the study

intersections. Per ODOT's direction, several local road segments with similar characteristics were combined (Kusi Road, Spilya Road, and Kash Kash Road) to minimize exaggerated crash rates due to short roadway lengths. Table 5 summarizes the segment crash rates for each study segment and compares them to ODOT's state highway system crash rates.

Roadway	То	From	Number of Crashes	Segment Length (mile)	Segment Crash Rate	State Highway Crash Rate	Exceed State Highway Rate?
OR 331	Northern UIR boundary	Mission Road	5	1.48	0.64	1.22	No
OR 331	Mission Road	Timíne Way	2	0.24	1.05	1.22	No
OR 331	Timíne Way	Wildhorse Boulevard	4	0.97	0.47	1.22	No
OR 331	Wildhorse Boulevard	Kusi Road	1	0.31	0.39	1.22	No
OR 331	Kusi Road	Spilya Road	0	0.10	0.00	1.22	No
OR 331	Spilya Road	Arrowhead Travel Plaza Access	0	0.11	0.00	1.22	No
OR 331	Arrowhead Travel Plaza Access	I-84 WB Ramps	0	0.20	0.00	1.22	No
OR 331	I-84 WB Ramps	I-84 EB Ramps	2	0.17	1.27	1.22	Yes
Market Road	I-84 EB Ramps	Best Road	2	0.42	N/A	N/A	N/A
Mission Road	western UIR boundary	Mustanger Lane	10	2.11	0.79	1.45	No
Mission Road	Mustanger Lane	Timíne Way	0	0.59	0.00	1.45	No
Mission Road	Timíne Way	OR 331	1	0.46	0.32	1.45	No
Mission Road	OR 331	Cayuse Road	7	1.64	0.53	1.45	No
Emmigrant Road	Cayuse Road	St. Andrews Road	1	2.08	0.88	2.81	No
Timíne Way	Mission Road	OR 331	1	0.64	0.41	2.81	No
Short Mile Road	Mission Road	roadway eastern end	1	0.97	N/A	N/A	N/A
Cayuse Road	Mission Road	Burke Road	2	4.68	0.33	1.45	No
Wildhorse Boulevard	OR 331	roadway eastern end	0	1.38	0.00	2.81	No
Combined Kusi Road, Spilya Road, and Kash Kash Road	roadway western end	roadway eastern end	4	0.87	0.55	2.81	No
Tokti Road	roadway western	OR 331	0	0.85	0.00	2.81	No

Table 5: Seg	ment Crash Rates	versus ODOT	State Highway	System Crash Ra	tes
rabie er eeg	inonit oraon nato		otato mgimay	eyetein eraen na	

Locations with N/A results did not have enough reference population sites to conduct the analysis per ODOT's APM.

As shown in Table 5, the segment of OR 331 between the two I-84 ramp terminals currently exceeds the crash rates for similar facilities throughout the state. The segment is assigned only two crashes, but the low average daily traffic volume and short length results in a crash rate higher than the critical crash rate for similar facilities.

Two crashes occurred on this OR 331 segment in the last five years. One crash was located south of the I-84 westbound ramp terminal and included a pedestrian, resulting in a severe injury. The second crash was located

north of the I-84 eastbound ramp terminal and was a head-on crash that resulted in PDO. *Attachment D* contains the segment crash analysis worksheet.

FATAL CRASH REVIEW

Six fatal crashes were reported between 2016 and 2020 within the UIR boundary. The crashes occurred along roadway segments ranging from I-84 to local roads. A high-level summary of each crash is provided below.

- Sunday April 3, 2016 at 1AM on I-84 east of the merge with Highway 30
 - Head-on collision
 - Clear and dry in darkness with no streetlights
 - o Wrong way driving on one-way roadway
 - Alcohol involved
- Tuesday April 19, 2016 at 3PM eastbound on I-84 east of OR 331 interchange
 - Fixed-object collision with guardrail, traveling eastbound
 - Clear and dry day during daylight
 - Improper driving
- September 24, 2016 at 8PM on Mission Road west of Cedar Street
 - o Fixed-object collision into cut slope or ditch embankment, traveling westbound
 - o Clear and dry in darkness with no streetlights
 - o Improper driving
 - Alcohol involved
- Wednesday 12, 2016 at 5PM on River Road west of White Road
 - Angle collision with railway train flagged (description notes train hit vehicle), vehicle traveling southbound
 - Clear and dry during daylight
 - o Disregarded other traffic control device and failed to yield right-of-way
- Saturday March 3, 2018 at 6PM westbound on I-84 west of Emigrant Road interchange
 - o Rear-end collision, traveling westbound
 - o Clear but icy in darkness with no streetlights
 - Speed was too fast for conditions (but not exceeding speed limit) and following too closely
- Friday June 8, 2018 at 7AM on OR 331 north of Wildhorse Boulevard
 - Bicycle-involved collision, marked as a rear-end type crash traveling southbound
 - Clear and dry during daylight
 - Driving left of center on two-way road
 - Drugs involved

Three of the fatal crashes occurred on I-84. Alcohol and drugs were also involved in three of the crashes. Three crashes occurred at night and only one involved icy road surface conditions. Two crashes involved a single vehicle, one involved a bicyclist, and one involved a train.

SAFETY PRIORITY INDEX SYSTEM

The Safety Priority Index System (SPIS) was developed by ODOT to identify sites along state and local roads that may warrant further investigation. The SPIS compares the total number of crashes reported on roadway facilities and generates a list of sites (intersections and roadway segments) with calculated SPIS scores. The scores are based on crash frequency, crash rate, and crash severity. SPIS sites with scores in the top five percent are investigated by ODOT staff and reported to the Federal Highway Administration (FHWA). Per the most recent

SPIS list (2019), there are two groups of sites within the UIR boundary in the top 15 percent. These sites are located along Goad Road near the intersection with Tutuilla Church Road, where one fixed-object suspected serious injury crash occurred, and on I-84 at approximately milepoint 223.7, where two fixed-object PDO crashes occurred.

Blueprint for Urban Design Review

The project team reviewed ODOT's Blueprint for Urban Design (BUD) to determine the contexts for OR 331 within the UIR boundary. Due to varying characteristics, OR 331 was broken into two segments. The defining attributes and context selected are described below.

OR 331 FROM NORTHERN UIR BOUNDARY TO WILDHORSE BOULEVARD

OR 331 north of Wildhorse Boulevard is sparsely developed. Land uses that are present are mixed, included residential, commercial, and institutional. Off-street parking is provided, mostly in front of the buildings it serves. Block sizes range greatly.

Recommended BUD Land Use Context: Rural Community

OR 331 FROM WILDHORSE BOULEVARD TO I-84 EASTBOUND RAMPS

OR 331 south of Wildhorse Boulevard has a mix of commercial and auto-oriented development. Large off-street parking lots are provided, mostly in front of the buildings they serve. Block sizes are generally large, although there are some smaller block sizes where there is greater roadway connectivity. It is a relatively small concentration of development surrounded by lesser developed area.

Recommended BUD Land Use Context: Rural Community

Roadway System Planned Projects and Previous Feedback

Attachment E contains a list of planned projects and previous feedback provided via the 2001 CTUIR TSP, MCMP, OR 331 Access Management Implementation Strategy and Circulation Plan, and Umatilla County TSP. Most of the previously planned roadway system projects were provided in the 2001 CTUIR TSP. Figure 9 shows the project map from the 2001 CTUIR TSP.



Figure 9: 2001 CTUIR TSP Project Map





TRANSIT SYSTEM

The transit system within the UIR was inventoried based on information from CTUIR staff and their website, as well as a review of recent aerial imagery.

Transit Service and Facilities

CTUIR operates Kayak Public Transit (Kayak) which serves northeastern Oregon via fixed route local and commuter service and paratransit¹. CTUIR began public transportation services after observing people walking the distance between Pendleton and Mission. Over time, service has grown from one van to a fleet of cutaway vehicles operating seven year-round fixed routes. In 2014, CTUIR rebranded service as Kayak Public Transit to help people understand that service is open to the public, not just tribal members.

Table 6 and Figure 11 summarize the Kayak routes serving the UIR as of January 2022. CTUIR provides updated Kayak service information and schedules at the beginning of each calendar year. Because of service changes and traveler pattern changes due to COVID-19 during 2020 and 2021, the ridership for 2019 is shown for each route. In addition, Figure 10 provides a monthly overview of ridership during 2019 for the routes serving the UIR area. As shown, the highest monthly ridership during 2019 was approximately 9,670 rides in September. The lowest monthly ridership was approximately 5,225 rides in February.

Route Name	Type of Service	Days of Operation	Span of Service	2019 Annual Ridership
Hopper	Commuter	Monday - Saturday	4:55 a.m. – 7:02 p.m.	32,035
Whistler	Commuter	Monday - Saturday	4:39 a.m. – 7:12 p.m.	23,652
Metro	Local	Monday - Friday	5:00 a.m. – 8:43 p.m.	22,719
Arrow	Commuter	Monday - Friday	5:05 a.m. – 7:10 p.m.	10,668
Rocket	Commuter	Monday - Friday	6:07 a.m. – 6:30 p.m.	5,642
Tripper	Local	Monday-Friday	7:20 a.m. – 4:20 p.m.	2,950

Table 6: Kayak Services with Stops within the Umatilla Indian Reservation



Figure 10: 2019 Ridership for Kayak Routes Serving the Umatilla Indian Reservation

¹ Local fixed-route transit service is required by Federal Law to have complementary origin-to-destination service along a ³/₄ mile buffer of the fixed-route to serve those with certified temporary or permanent disabilities.



BUS STOPS SERVING UMATILLA INDIAN RESERVATION

As of January 2022, there are 18 Kayak bus stops located within the UIR boundary and shown in Figure 11. Eight of the stops have shelters available for waiting riders and seven have sidewalks immediately adjacent to the stop. No bus stops within the UIR boundary have designated bicycle facilities (e.g., bike lanes or multi-use paths) immediately adjacent.

OTHER SERVICES

Outside of the UIR boundary, Kayak also provides the Hermiston Area Regional Transit (HART) fixed route. This service operates within Hermiston on weekdays from approximately 7 a.m. to 7 p.m. with five daily trips. In addition to Kayak, there are other agencies and operators that serve the UIR or adjacent areas. CTUIR maintains a list of these operators on their website at https://ctuir.org/departments/tribal-planning-office/kayak-public-transit/other-transportation-agencies/.

Transit Qualitative Multimodal Assessment

A transit qualitative multimodal assessment was conducted in accordance with the methodology described in ODOT's APM. Transit factors that are considered are frequency and on-time reliability, schedule speed/travel times, transit stop amenities, and connecting pedestrian/bicycle network. This methodology applies a rating system of: excellent, good, fair, and poor. Table 7 outlines the methodology used for conducting a transit qualitative multimodal assessment within the UIR. Due to the rural nature of the service in the study area, the frequency and on-time reliability methodology was adjusted to review number of daily round trips. This methodology has been used in other Oregon TSPs, such as the Independence TSP.

Category	Excellent	Good	Fair	Poor
Frequency and on-time reliability	12 daily round trips	8-10 daily round trips	5-7 daily round trips	4 or fewer daily round trips
Schedule speed/ travel times	<20% slower than driving	20% to 40% slower than driving	40% to 60% slower than driving	>60% slower than driving
Transit stop amenities	Shelter	Bench	Sign with waiting area	No waiting area and/or no sign
Connecting pedestrian/ bike network	BLTS and PLTS 2 or better and crossing	BLTS and PLTS 2 or better with no crossing	BLTS or PLTS >2 and no crossing	BLTS and PLTS >2 and no crossing

Table 7: Transit Qualitative Multimodal Assessment Methodology - For Rural Service

FREQUENCY

Frequency is how many times an hour a user has access to transit service, assuming that service is provided within acceptable walking distance and at the times the user wishes to travel. Frequency helps determine the convenience of transit service to riders and is one component of overall transit trip time (helping to determine the wait time at a stop). Table 8 provides the assessment for Kayak services within the UIR boundary.

Table 8: Transit Qualitative Multimodal Assessment - Frequency

Route Name	Daily Trips	Assessment
Hopper	4 weekday trips, 2 Saturday trips	Poor
Whistler	4 weekday trips, 2 Saturday trips	Poor
Metro	6 weekday trips	Fair
Arrow	3 weekday trips	Poor
Rocket	3 weekday trips	Poor
Tripper	3 weekday trips	Poor

Due to the rural nature of the area and long service routes supporting the region, Kayak's routes operate just a few trips day. The commuter service routes only operate at peak commute times and are not intended to provide convenient service throughout the day.

SCHEDULE SPEED/TRAVEL TIMES

Schedule speed and travel time refer to the time it takes to complete a transit route in full. The bus travel time includes wait time between an outbound trip and inbound trip, as well as diversions off the most direct motor vehicle routes to reach all bus stops. Table 9 provides the assessment for Kayak services within the UIR boundary.

Route Name	Maximum Number of Roundtrip Stops	Bus Scheduled Roundtrip Travel Time (Hours:Minutes)	Vehicle Travel Time (Hours:Minutes)*	Assessment
Hopper	37	3:40	2:15	Poor
Whistler	33	3:00	2:10	Good
Metro	47	2:10	1:10	Poor
Arrow	22	2:40	2:10	Good
Rocket	16	1:35	1:30	Excellent
Tripper	22	1:20	1:10	Excellent

 Table 9: Transit Qualitative Multimodal Assessment – Schedule Speed/Travel Times

* Google Maps was used to estimate the vehicle travel time to reach major stops along the routes.

TRANSIT STOP AMENITIES

Amenities at transit stops, such as bus benches and bus shelters, enhance a transit route and make it more userfriendly. Steps that can make taking the bus as comfortable and accommodating as possible may help encourage ridership. Table 10 provides the assessment for Kayak services within the UIR boundary. Bus stop amenities in the area include shelters and signage.

Table 10: Transit Qualitative Multimodal Assessment – Transit Stop Amenities

Route Name	Condition	Assessment
Hopper	5 of 7 stops have shelters; 2 have signage	Good
Whistler	4 of 5 stops have shelters; 1 has signage	Good
Metro	7 of 13 stops have shelters; 1 has signage; 4 stops have no amenities	Fair
Arrow	4 of 5 stops have shelters; 1 has signage	Good
Rocket	5 of 8 stops have shelters, 2 have signage; 1 stop has no amenities	Good
Tripper	5 of 10 stops have shelters; 1 has signage; 4 stops have no amenities	Fair

CONNECTING PEDESTRIAN/BICYCLE NETWORK

Table 11 provides the assessment for Kayak services within the UIR boundary. There are no designated bicycle facilities adjacent to the bus stops within the UIR boundary, therefore the assessment focused on whether sidewalk was present immediately adjacent to the route bus stops within the UIR.

Table 11: Transit Qualitative Multimodal Assessment – Connecting Pedestrian/Bicycle Network

Route Name	Condition	Assessment
Hopper	Sidewalk adjacent to 5 of 7 stops; no adjacent dedicated bicycle facility	Fair
Whistler	Sidewalk adjacent to 4 of 5 stops; no adjacent dedicated bicycle facility	Fair
Metro	Sidewalk adjacent to 6 of 13 stops; no adjacent dedicated bicycle facility	Poor
Arrow	Sidewalk adjacent to 4 of 5 stops; no adjacent dedicated bicycle facility	Fair
Rocket	Sidewalk adjacent to 5 of 8 stops; no adjacent dedicated bicycle facility	Poor
Tripper	Sidewalk adjacent to 5 of 10 stops; no adjacent dedicated bicycle facility	Poor

Transit System Planned Projects and Previous Feedback

Attachment E contains a list of planned projects and previous feedback provided via the 2001 CTUIR TSP, MCMP, OR 331 Access Management Implementation Strategy and Circulation Plan, and Umatilla County TSP. CTUIR staff also noted the following transit system goals and potential project types to consider moving forward:

- Transit system goals:
 - □ Increase system capacity
 - □ Ensure safety for all users
 - Protect livability and ensure equity and access
 - Begin environment-electric vehicle service for the Mission Metro and campus shuttle routes
 - □ Establish a regional outlook and future focus Regional Transit Authority (RTA)
- Potential project types:
 - Traffic signals on OR 331 to provide safe crossing opportunities for transit riders and to better enable transit vehicles to turn onto OR 331
 - Crosswalks and mid-block crossings near stops for connectivity to pedestrian and bicycle facilities or key destinations
 - Capital improvements including Kayak Transit Center expansion to include public restrooms for passengers at the Kayak Hub
 - Increase number of bus shelters and bus stop signs

PEDESTRIAN SYSTEM

The following section describes the pedestrian system in the UIR boundary. It includes a system inventory, pedestrian level of traffic stress analysis, and a systemic safety risk analysis. It also summarizes previously planned projects.

Inventory

The pedestrian system within the UIR was inventoried based on GIS data from the MCMP, as well as a review of recent aerial imagery. The inventory was supplemented by information provided in the 2001 CTUIR TSP and by information provided by the CTUIR.

The pedestrian system consists of sidewalks and multi-use paths, as well as marked and/or signed pedestrian crossings. These facilities are primarily provided within the Mission, July Grounds, and Gateway hubs near OR 331 and Mission Road. Figure 12 illustrates the pedestrian network within the UIR.

- Mid-block crossing
- Crosses uncontrolled intersection leg
- Crosses controlled intersection leg
- Sidewalk
- Multi-Use Path

- Umatilla Indian Reservation Boundary Mission Hub
- July Grounds Hub
- Gateway Hub

Pendleton UGB

Figure 12

Existing Pedestrian Network Umatilla Indian Reservation

SIDEWALKS

Sidewalks are primarily provided within the July Grounds hub, on side streets off OR 331 south of the Wildhorse Resort & Casino, and along portions of Mission Road. Sidewalks within the UIR boundary are approximately 4-6 feet wide, although obstructions may be located within the sidewalk width. One example from a MCMP field review includes a series of mailbox obstructions. These obstructions occur periodically along the south side of Mission Road, reducing the effective width of the sidewalk and presenting barriers for the passage of wheelchairs.

Mission Road Sidewalk Obstructions Source: Mission Community Master Plan

MULTI-USE PATHS

Multi-use paths are used by people walking, biking, and rolling. They can create connections within, or between, communities, as well as provide recreational opportunities for residents and visitors. The following multi-use paths are located within the UIR boundary:

- A paved five-foot wide multi-use path network linking the residential areas between Cayuse Road and Short Mile Road.
- The paved nine-foot wide Tamastslikt Trail linking the Tamastslikt Cultural Institute to the July Grounds.
- The paved eight-foot wide Timíne Way multi-use path on the north side of the roadway.

PEDESTRIAN CROSSINGS

Based on a review of aerial imagery, there are approximately 13 marked crossings within the UIR boundary. Figure 12 shows the locations of these crossings, including five marked mid-block crossings. A field review will be conducted at these locations in May 2022.

Marked Crossings on Timíne Way Source: Google Earth

Marked Mid-block Crossing on Cayuse Road Source: Google Earth

Pedestrian Level of Traffic Stress

Pedestrian level of traffic stress (PLTS) is a perception-based analysis methodology that is used to evaluate the adequacy of streets to accommodate pedestrians in urban and rural environments. As applied by ODOT, this methodology classifies four levels of traffic stress that a pedestrian can experience on the street, ranging from PLTS 1 (little traffic stress) to PLTS 4 (high traffic stress). A street or street segment that is rated PLTS 1 generally has low traffic volumes and travel speeds and has a sidewalk that is separated from vehicle traffic. These segments are generally suitable for all pedestrians, including children. A street or street segment that is rated PLTS 4 generally has high traffic volumes and travel speeds and is perceived as unsafe by most adults. Segments rated PLTS 4 also include those with no sidewalks or other pedestrian facilities. Per the APM, PLTS 2 is considered a reasonable target for streets due to its acceptability with most pedestrians.

The PLTS score is determined based on four criteria, including sidewalk condition, physical buffer type, total buffering width, and general land use. All four criteria are scored from 1 to 4 and the highest score determines the overall score for the road segment.

Figure 13 illustrates the results of the PLTS analysis for the roadways scoped for this analysis by CTUIR and ODOT. Some segments shown as PLTS 3 or 4 may have shorter segments with lower PLTS scores.

Several of the analyzed streets have segments that are rated PLTS 3 and PLTS 4. Most segments rated PLTS 4 have no sidewalks or other pedestrian facilities, such as along OR 331 and Short Mile Road. For these segments to be rated PLTS 2, sidewalks with appropriate sidewalk and buffer widths would need to be installed along the full length of the gap. Other common characteristics related to the PLTS 3 and PLTS 4 ratings are described below:

- A few segments rated PLTS 3 or 4 have curb-tight sidewalks on roadways with speeds of 30 mph or higher, such as the sidewalks on Mission Road just east of OR 331. For these segments to be rated PLTS 2, the speeds would need to be reduced to 25 mph or a buffer would need to be installed between the sidewalk and vehicle travel lane.
- Other segments rated PLTS 3 have narrow sidewalks of 4 feet, including the sidewalks on Cedar Street. For these segments to be rated PLTS 2, the sidewalks would need to be widened to at least five feet wide.
- Other segments are be located adjacent to auto-oriented land uses, such as those near Arrowhead Travel Plaza. Per the APM, these segments are automatically rated PLTS 3 or 4 given the auto-oriented nature of these land uses. For these segments, the priority is filling gaps. Alternatives for these segments will be analyzed without respect to the land-use criteria to understand the effects of the proposed solutions.

Pedestrian Systemic Safety Risk Analysis

As part of the Oregon Pedestrian and Bicycle Safety Implementation Plan, ODOT implemented the NCHRP Research Report 893 methodology in 2020. This methodology uses risk factors to complete a systemic safety analysis aimed at identifying high risk locations for pedestrian and bicycle crashes along the state highway system. Systemic safety, opposed to the traditional review of crash history, allows practitioners to proactively identify high risk sites for potential safety improvements based on risk factors that often correlate to locations with low frequency but high injury crashes. For ODOT's statewide systemic safety analysis completed in 2020, the pedestrian risk factors used within rural areas included:

- Principal Arterial²
- Number of Lanes (>=Four Lanes)³
- Posted Speed (>=35mph)⁴

Proximity to Schools (one mile)

Other Zoning⁵

Proximity to Transit Stops (1/4 mile)

Within the UIR boundary, only one ODOT roadway segment was identified as in the highest-risk 20% of all State Highways: OR 331 north of Mission Road.

² The only roadway segment within the UIR boundary that is classified as a principal arterial is the portion of OR 11 approaching Pendleton in the northeast corner of the study area.

³ The only roadway segment within the UIR boundary that has four or more lanes is OR 331 from north of Kusi Road to South of Spilya Road.

⁴ Posted speed values were used for study segments where posted speed was already collected for LTS analysis or where the posted speed GIS data was available. For segments where speed data was unavailable, CTUIR's GIS data for "road type" was used as a proxy for speed. Segments listed as a federal/state route or as a public paved/hard-surface road were assumed to have a posted speed of 35 MPH or greater.

⁵ "Other" zoning includes all zoning classifications within the Oregon Spatial Data Library (OSDL) with the exception of residential, commercial, industrial, mixed-use, and farm-use zoning. Examples of "Other" zoning including forest/federal lands, coastline, parks, range, and public health. Based on OSDL 2017 zoning data, most of the study area is categorized as "other" zoning, except the areas to the south that are not connected to the primary boundary.

Pedestrian Level of Traffic Stress Umatilla Indian Reservation In addition to reviewing ODOT's 2020 analysis, the project team completed the same analysis on all roadways within the UIR boundary. Figure 14 illustrates the results of the pedestrian risk analysis. The top 20% of analyzed locations for the TSP study area shown in red.

One of the high-risk segments includes OR 331 near the I-84 interchange. The one reported crash involving a pedestrian within the UIR boundary from 2016 to 2020 was located on this segment, and it resulted in a serious injury.

Because most of the roadways in the UIR are non-principal arterials with less than four lanes in "other" zoning, the main risk differentiators for this assessment are if the roadway segment has a **posted speed equal to or over 35 MPH, is within one mile from the Nixyaawii Community School, and/or is within** ¼ **mile to a transit stop**. This results in streets within the more urban portions of the Mission area showing up as higher risk due to their proximity to pedestrian activity generators (e.g., the school, transit stops).

Outside of the short segment of OR 331 with four/five lanes, the highest scoring segments within the UIR boundary include OR 331, Mission Road, and Kirkpatrick Road within 1-mile of the Nixyaawii Community School, where all three of these factors are present. Other high-risk segments are primarily located on OR 331 or within the Mission and July Grounds Hub areas, where two of three of these factors are present in varying combinations. For example, A Street is located within one mile from the Nixyaawii Community School and is within ¼ mile to a transit stop, yielding a higher risk value even through the posted speed is less than 35 MPH.

Pedestrian System Planned Projects and Previous Feedback

Attachment *E* contains a list of planned projects and previous feedback provided via the 2001 CTUIR TSP, MCMP, Safe Routes to School Plan, and CTUIR Capital Improvement Plan. Most of the previously planned pedestrian system projects were provided in the MCMP.

As alternatives and projects are reviewed from these documents and/or developed to address the pedestrian system gaps and deficiencies, *Attachment F: Active Transportation and Transit Toolbox* will be used as a resource.

BICYCLE SYSTEM

The following section describes the bicycle system in the UIR boundary. It includes a system inventory, bicycle level of traffic stress analysis, and a systemic safety risk analysis. It also summarizes previously planned projects.

Inventory

The bicycle system within the UIR was inventoried based on GIS data from the MCMP, as well as a review of recent aerial imagery. The inventory was supplemented by information provided in the 2001 CTUIR TSP and by information provided by the CTUIR.

The bicycle system within the UIR boundary consists of on-street bike lanes, shoulder bikeways, and unmarked shared roadways, as well as off-street multi-use paths and bicycle parking. The only marked bike lanes are on Mission Road, connecting the Mission and July Grounds hubs with residential, school, and commercial uses. Figure 15 illustrates the bicycle system within the UIR.

Bicyclist on Mission Road Using the Wide Shoulder Lane Source: Mission Community Master Plan

Risk Factor Score

- ----- 0.00 (bottom 20%)
- 0.01 1.45
- 1.46 1.63
- 1.64 3.08
- 3.09 5.81 (top 20%)
- Umatilla Indian Reservation Boundary
- Mission Hub

- July Grounds Hub
- Gateway Hub
- Pendleton UGB

0 3 Miles

Figure 14

Pedestrian Risk Factor Screening Umatilla Indian Reservation

Existing Bicycle Network Umatilla Indian Reservation

BIKE LANES

Mission Road between SE 56th Street and OR 331 has a striped bicycle lane on both sides of the roadway representing the only formal bicycle-only facility within the UIR boundary.

SHOULDER BIKEWAYS

On Mission Road between OR 331 and Parr Lane, bicyclists may utilize an unmarked wide shoulder on both sides of the street, with a width varying between 7.5 to 10 feet.

SHARED ROADWAYS

Aside from multi-use paths and facilities described above, bicycle riders must either ride in the street with motor vehicle traffic or on the sidewalk, if present, with pedestrians.

MULTI-USE PATHS

As further described in the Pedestrian System section, there are three multi-use paths within the UIR boundary, including links between residential area between Cayuse Road and Short Mile Road, the Tamastslikt Trail, and the Timíne Way multi-use path on the north side of the roadway.

BICYCLE PARKING

Bicycle parking is limited and generally concentrated to local businesses and the school.

Bicycle Level of Traffic Stress

Similar to PLTS, Bicycle level of traffic stress (BLTS) is a perception-based analysis methodology that is used to evaluate the adequacy of streets to accommodate bicyclists in urban and rural environments. As applied by ODOT, this methodology classifies four levels of traffic stress that a cyclist can experience on the street, ranging from BLTS 1 (little traffic stress) to BLTS 4 (high traffic stress). A street or street segment that is rated BLTS 1 generally has low traffic volumes and travel speeds and is suitable for all cyclists, including children. A street or street segment that is rated BLTS 4 generally has high traffic volumes and travel speeds and is perceived as unsafe by most adults. Per the APM, BLTS 2 is considered a reasonable target for streets due to its acceptability with most cyclists.

The BLTS score is determined based on the speed of the street, the number of travel lanes per direction, the presence and width of an on-street bike lane and/or adjacent parking lane, and several other factors.

Figure 16 illustrates the results of the BLTS analysis for the roadways scoped for this analysis by CTUIR and ODOT. Some segments shown as BLTS 3 or 4 may have shorter segments with lower BLTS scores.

Several of the analyzed streets have segments that are rated BLTS 3 and BLTS 4. Most segments rated BLTS 3 or 4 do not have bike lanes or wide shoulders. For these segments to be rated BLTS 2, bike lanes with appropriate width and/or buffers would need to be installed. Mission Road has striped bike lanes, but is still rated as BLTS 3 or 4, depending on the location. This is because the bike lanes/shoulders west of OR 331 are not sufficient to provide a comfortable riding experience for most people given the posted speed of 40 mph. For these segments to be rated BLTS 2, the posted speed would need to be reduced and/or the bike lane/shoulders would need to be widened, potentially with a physical buffer installed.

Most segments evaluated as shared roadways that were rated BLTS 2 could still benefit from signage and/or striping to remind motorists to share the road. The signing and striping can also provide important wayfinding for cyclists to inform them of the preferred bicycle routes.

Bicycle Level of Traffic Stress Umatilla Indian Reservation

Bicycle Systemic Safety Risk Analysis

Similar to the pedestrian risk factor screening, ODOT completed a statewide systemic safety analysis for bicycle risk factors in 2020. The risk factors used as part of the bicycle analysis for rural areas included:

- Principal Arterial
- Posted Speed (>=35mph)
- Proximity to Schools (one mile)

- Proximity to Transit Stops (1/4 mile)
- High Population over the Age of 64⁶

Within the UIR boundary, no ODOT roadway segments were identified as in the top 20% statewide.

The project team completed a bicycle risk factor screening analysis on all roadways within the UIR boundary using the same methodology as the ODOT screening. Figure 17 illustrates the results of the bicycle risk analysis conducted, including the top 20% locations for the TSP study area shown in red

One of the high-risk segments includes OR 331 north of Wildhorse Boulevard. The one reported crash involving a bicyclist within the UIR boundary from 2016 to 2020 was located on this segment. It resulted in a fatality.

Because the entire study area meets the high population over the age of 64 risk factor and most roadways within the UIR boundary are not classified as principal arterials, the main differentiators risk for this assessment are if the roadway segment has a **posted speed equal to or over 35 MPH, is within one mile from the Nixyaawii Community School, and/or is within** ¼ **mile to a transit stop**. Similar to the pedestrian risk factor screening, this results in roads located near activity generators in the Mission area scoring in the higher tiers. The highest scoring segments within the UIR boundary include OR 331, Mission Road, and Kirkpatrick Road within one-mile of the Nixyaawii Community School, where all three of these factors are present. Other high-risk segments are primarily located within the Mission Hub and July Grounds Hub areas, where two of three of these factors are present in varying combinations. For example, Timíne Way is located within one mile from the Nixyaawii Community School and is within ¼ mile to a transit stop, yielding a higher risk value even through the posted speed is less than 35 MPH.

Bicycle System Planned Projects and Previous Feedback

Attachment E contains a list of planned projects and previous feedback provided via the 2001 CTUIR TSP, MCMP, Safe Routes to School Plan, and CTUIR Capital Improvement Plan.

As alternatives and projects are reviewed from these documents and/or developed to address the bicycle system gaps and deficiencies, *Attachment F: Active Transportation and Transit Toolbox* will be used as a resource.

RAIL SYSTEM

The rail system within the UIR boundary was inventoried based on GIS data obtained from ODOT, as well as a review of recent aerial imagery. The inventory was supplemented by information provided in the 2001 CTUIR TSP.

Rail Facilities

There is one rail line within the UIR boundary, connecting Pendleton and La Grande. The line runs east and west, parallel to Mission Road, Short Mile Road, Cayuse Road, and Bingham Roads before turning south along Meacham Creek Road and into the Blue Mountains. Union Pacific is the owner of the rail line, which has an ODOT rail line designation of 2A. The line's primary purpose is for freight movement.

⁶ The entire UIR boundary meets the high population over 64 threshold of 16.8%, with only three census blocks covering the study area.

Risk Factor Score

- 1.00 (bottom 20%)
- 1.01 2.00
- 2.01 2.03
- 2.04 2.09
- 2.10 4.12 (top 20%)
- Umatilla Indian Reservation Boundary
- Mission Hub

- July Grounds Hub
- Gateway Hub
- Pendleton UGB

Figure 17

Bicycle Risk Factor Screening Umatilla Indian Reservation

Rail Crossings

Based on GIS data from ODOT, there are 29 rail crossings within the UIR, which are summarized in Table 12.

Table 12: Rail Crossings	with the Umatilla Indian	Reservation Boundary
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Location Name	ODOT Crossing Number	Туре	Crossing Surface Material
Nr Pendleton – Mission Frontage Road	2A-218.43	Mainline at Grade	Concrete
Nr Pendleton – Private Road	2A-218.66-P	Private	Concrete
Nr Pendleton – Private Road	2A-219.12-P	Private	Concrete
Nr Pendleton – Private Road	2A-219.45-P	Private	Concrete
Mission – Private Road	2A-219.71-P	Private	Concrete
Mission – Davis Lane	2A-219.90	Mainline at Grade	Paved
Mission – Umatilla-Mission Hwy	2A-221.00	Mainline at Grade	Paved
Mission – Parr Lane	2A-221.50	Mainline at Grade	Gravel
Mission – Private Road	2A-222.25-P	Private	Concrete
Mission – Private Road	2A-222.75-P	Private	Concrete
Minthorn – Niktyoway Road	2A-224.10	Mainline at Grade	Gravel
Minthorn – Old River Road #918	2A-225.20	Mainline at Grade	Gravel
Minthorn – Private Road	2A-225.60-P	Private	Concrete
Minthorn – Private Road	2A-225.88-P	Private	Concrete
Minthorn – Old River Road #927	2A-226.20	Mainline at Grade	Gravel
Cayuse – Private Road	2A-226.68-P	Private	Concrete
Cayuse – Cayuse-Adams Road 925	2A-227.30	Mainline at Grade	Combination
Cayuse – Private Road	2A-229.34-P	Private	Concrete
Thorn Hollow – Thorn Hollow Road	2A-231.10	Mainline at Grade	Paved
Thorn Hollow – Private Road	2A-232.04-P	Private	Concrete
Thorn Hollow – Bingham Road	2A-232.40	Mainline at Grade	Paved
Thorn Hollow – Private Road	2A-233.44-P	Private	Concrete
Thorn Hollow – Private Road	2A-233.85-P	Private	Concrete
Thorn Hollow – Private Road	2A-234.36-P	Private	Concrete
Gibbon – Private Road	2A-234.92-P	Private	Concrete
Gibbon – Private Road	2A-235.53-P	Private	Concrete
Gibbon – Private Road	2A-236.27-P	Private	Concrete
Gibbon – Bingham Road	2A-236.60-C	Spur	Paved
Gibbon – Bingham Road	2A-237.30	Mainline at Grade	Paved

ATTACHMENTS

- A. Land Use Assessment Memo (APG)
- B. Traffic Operations Worksheets
- C. Travel Demand Model Data
- D. Crash Analysis Worksheets
- E. Planned Projects and Previous Feedback
- F. Active Transportation and Transit Toolbox

