DRAFT TECHNICAL MEMORANDUM #4: ALTERNATIVES ANALYSIS

Date:	January 27, 2022
To:	Thomas Guevara, Oregon Department of Transportation
From:	Ashleigh Ludwig, PE, Camilla Dartnell, and Hermanus Steyn, PE, Kittelson & Associates, Inc.
Project:	US 199 Corridor Plan
Subject:	Revised Technical Memorandum #4: Alternatives Analysis

Project #: 23021.028

1. Introduction

Kittelson & Associates, Inc. (Kittelson) prepared this technical memorandum to document draft recommendations to address operational and safety findings for the US 199 study corridor. Corridor operational and safety performance evaluation findings are documented in Technical Memorandum #3, Existing and Future Conditions and Needs. Technical Memorandum #3 summarizes these needs in detail, with the majority focusing on roadway safety for all users. The US 199 Corridor Plan study corridor is from the Applegate River to the California border, excluding the City of Cave Junction.

Based on input received from the Project Management Team (PMT), Project Advisory Committee (PAC), and public, Kittelson will revise, prioritize, and incorporate the alternatives presented in this technical memorandum into the Draft US 199 Corridor Plan.

This document is organized into the following sections:

1. Introduction: summarizes memorandum contents and purpose.
2. Corridor History: summarizes how the corridor's function, use, and roadway configuration has changed over the years.
3. Planned and In-Process Improvements: documents projects that are already planned for the corridor.
4. Alternatives Analysis Approach: describes the principles guiding the recommendations development and provides a toolbox of potential treatments.
5. Recommended Corridor Strategies: documents the broader strategies to address the safety risks in the various corridor context zones.
6. Location-Specific Strategy Application: presents graphics illustrating where these strategies may be applied throughout the corridor.
7. Implementation Considerations: summarizes potential policy, environmental, or other considerations that may impact implementation of the projects. These considerations will be further explored in Technical Memorandum #5 (Policy and Ordinance Amendments, Findings).

2. Corridor History

The US 199 study corridor is over 100 years old. During this time, several changes have been made to the corridor, but the predominant cross-section for the majority of the corridor remains relatively unchanged. However, the function of the corridor and land uses surrounding the corridor have changed over the years. A brief overview of ODOT's history of the corridor is provided below, with locations where reroutes occurred shown in Figure 1.

- 1917: The map of the highway was approved.
- 1924: The highway was re-designated as Redwood Highway.
- 1939: The highway was added in the State Highway System.
- 1953: The Hayes Hill section of the highway was abandoned and rerouted, creating the alignment currently used today.
- 1956: A portion of the Applegate River Bridge section of the highway was abandoned and rerouted.
- 1958: The west/east fork of the Illinois River Bridge section of highway was abandoned, and a new bridge was constructed.
- 1966: The Hegan Creek to Selma section was abandoned and rerouted.
- 1974: The Siss's Gap section was abandoned and rerouted.
- 1977: The section from Grants Pass to Kerby was redesignated as a State Primary Highway.

The highway is serving two competing functions: carrying through traffic such as commuters and recreational traffic while also serving as the only access for many properties located along the corridor. Over the past 100 years there have been significant changes in the uses and user needs on US 199:

- The corridor has become a commuter and tourist/recreation route,
- Traffic volumes have increased,
- Vehicle capabilities have changed,
- Vehicle speeds have increased, and
- Driver behavior has evolved.

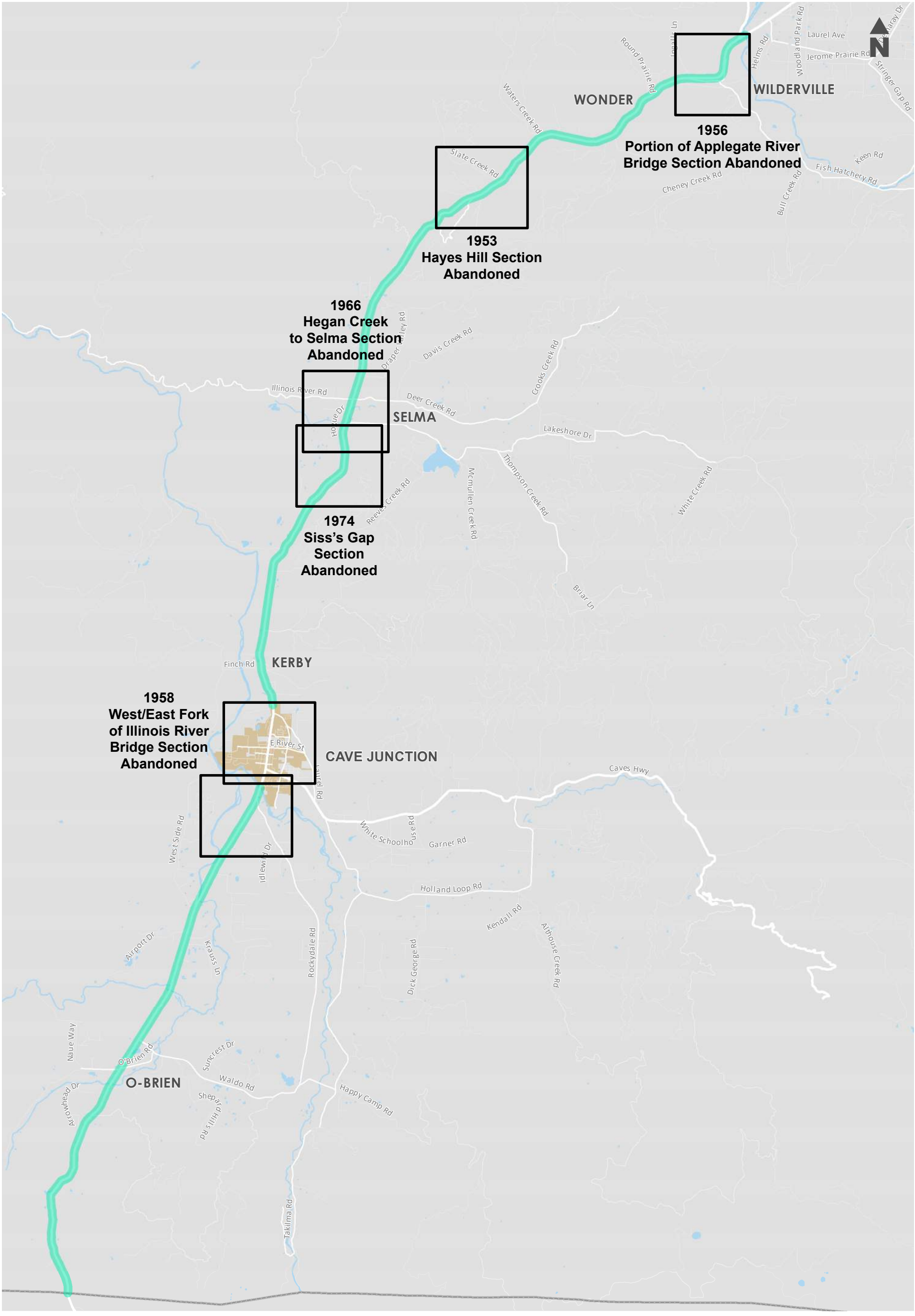
During this same time:

- Communities have grown,
- Many driveways and local roadways have direct highway access,
- Conflicts at driveways have intensified, and
- Active transportation modes have become more common.

The various reconstructed corridor segments were built according to design standards and best practices at the time of design and construction. Roadway design continues to evolve, and today's roadways are designed and built differently than those changes implemented between 1953 and 1974, when the construction of reroutes occurred. Because of this, roadway elements such as shoulder width, intersection and driveway design, and multimodal considerations may not be consistent with current and future corridor land use and traveler needs.

Understanding the history of this corridor helps illustrate the need for evaluating current and future corridor needs and establishing corridor safety priorities. The recommendations provided in this

memorandum focus on reasonably likely options for improving the safety performance for all modes of the corridor, given the topographic and funding constraints. Reconstructing the entire 35-mile corridor to match current and future corridor needs would be cost-prohibitive and infeasible due to topographic and environmental constraints. The incremental approach presented in this memorandum reflects an approach to implement corridor strategies immediately and continue actively enhancing the corridor over time. The remainder of this memorandum discusses options to improve corridor safety performance for all modes.



US 199 Corridor History
Josephine County, Oregon

Figure
1

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3. Recent, In-Process, and Planned Projects

ODOT has completed several projects on the corridor, and several additional projects are in the planning stage. Kittelson has summarized those efforts in this section. The recent projects are relevant because some of the crash data (analyzed and discussed in Technical Memorandum #3) may reflect conditions prior to these projects. The upcoming projects and maintenance activities may present opportunities to bundle recommendations from this Corridor Plan with those planned projects. In addition to these specific projects, ODOT regularly maintains US 199 through activities such as sign replacement, pavement repairs, and vegetation removal.

Completed and upcoming projects in the study segment include:

- **Signage (Curve Warning Project):** ODOT evaluated the entire corridor to determine where additional curve warning signs and chevrons are needed. ODOT installed chevrons at the curve located near MP 40.67 (about a mile north of the California border). In addition, several curve warning signs were added throughout the corridor. These changes were completed in 2016.

- **Traffic Enhancements:** ODOT (in 2021) updated striping along the corridor, including clarifying where passing opportunities are allowed. As part of this project, ODOT also installed shoulder rumble strips at feasible locations, due to existing pavement width constraints. This project also included maintaining and replacing delineators and pavement markers.

- **Clear Zone Project:** The Clear Zone project is programmed in ODOT's 2021 – 2024 Statewide Transportation Improvement Program (STIP) list. The plans are to add new guardrail and extend existing guardrail at fatal and other run-off-the-road crash locations. Locations planned included: MP 13.00 – 13.06, MP 14.77 – 14.91, MP 23.0 – 23.26, MP 39.94-40.06, and MP 40.01-40.05. However, conversations with ODOT indicate that the project will be limited to increasing clear zone width by removing trees; no guardrail additions will be included.

- **US 199 Holton Creek Pedestrian Bridge (in Kerby):** This project is programmed in ODOT's 2021 – 2024 STIP list and includes bridge widening to provide pedestrian facilities.

- **US 199 and Elliott Creek Road Left-Turn Lane:** ODOT is currently evaluating a project to add a westbound left-turn lane on US 199 at Elliott Creek Road (MP 11.2-11.4). If the project is selected, it will be included in the 2024 – 2027 STIP list.

In addition, the County's **Transportation System Plan (TSP)** identifies several projects for consideration in the US 199 Corridor Plan. The most recent TSP identified the need for the US 199 Corridor Plan to evaluate full corridor rather than identifying individual projects. Therefore, the list of projects below were identified in the County's previous 2004 TSP.

- Install turn lanes at the following locations:
    - US 199/Ken Rose Lane – Add southbound left-turn lane
    - US 199/Waldo Road – Add southbound left-turn lane

- Passing Lanes: The 2004 TSP identified the need to evaluate the need for new passing lanes in key locations, particularly in the northbound direction at MP 16 to 24 and southbound at MP 7 to 14.
- Safety Improvements: The TSP identified the need for safety improvements at key locations along the corridor, noting that the entire corridor exceeded the 90th percentile rates for similar facilities in Oregon. The 2004 TSP identified safety improvements at the following intersections:
  - US 199/Waters Creek Road – Flatten the vertical curve immediately north of the intersection on US 199 to improve sight distance and install warning signs.
  - US 199/Rockydale Road – Make safety improvements to warn drivers of intersections and/or enhance intersection visibility.
- Pedestrian and Bicycle Improvements: The TSP identified a potential need for bicycle and pedestrian improvements along the corridor, particularly within unincorporated communities.
- Enhanced Pedestrian Crossings: The TSP identified a potential need for enhanced pedestrian crossings at key locations along the corridor.

Kittelson reviewed the TSP projects during the development of strategies. Projects were included to address each of the general categories and locations above (intersections, passing lanes, general safety, pedestrian and bicycle, and enhanced pedestrian crossings). Because Kittelson did not identify capacity constraints during the operational analyses (summarized in Technical Memorandum #3), the need for additional passing lanes was not identified.

4. Alternatives Analysis Approach

In conjunction with the Project Management Team (PMT), Kittelson developed recommendations for the US 199 corridor study segment to address the safety issues for all modes documented in Technical Memorandum #3. Since the majority of the documented needs were multimodal safety-driven needs, Kittelson used the AASHTO *Highway Safety Manual (HSM)* principles to guide and inform recommended treatments. Many of the countermeasures considered have documented Crash Modification Factors (CMFs) that estimate the expected percentage change in crashes that can be anticipated with the treatment. Where possible, Kittelson provided a documented measure of effectiveness such as a CMF, or Crash Reduction Factor (CRF), and used them to guide countermeasure consideration and selection. Countermeasures with the highest effectiveness and lowest cost are generally those that should be prioritized first.

Kittelson used the *HSM* to assess a standard cross-section for rural two-lane highways and used CMFs to measure the anticipated change in predicted number of crashes on a roadway when a road's cross-section differs from that standard cross section. For example, the standard rural two-lane highway cross-section assumes 12-foot wide lanes and 6-foot wide paved shoulders, among other features. The US 199 corridor has shoulders that do not meet this minimum throughout much of the corridor. In addition, the *HSM* baseline assumes no horizontal or vertical curvature, no centerline rumble strips, a roadside hazard rating (a measure that accounts for the clear zone width and slope) of three, a driveway density of five driveways per mile, no passing lanes, and no lighting.

While the US 199 corridor differs from these assumptions in many aspects, Kittelson acknowledges the topography within the corridor makes realigning the highway to minimize horizontal and vertical curvature high in cost. It would have significant right-of-way requirements, and potentially have extensive environmental impacts. Therefore, the recommendations in this memorandum provide options that can be completed largely within existing corridor constraints, using *HSM* principles to guide selecting cost effective and context appropriate options for reducing crash frequency and severity.

4.1 Treatments Toolbox

With input from the PMT, Kittelson prepared a toolbox of potential countermeasures that may be applicable to different contexts along the study corridor. Many of these are systemic countermeasures that can be applied on a wide-scale for relatively low-cost. Many of these may be incorporated into ongoing maintenance activities to maximize cost-effectiveness with the benefit of including them with regular activities The countermeasures are presented in three general groups and summarized with the documented effectiveness at reducing crashes through the Crash Reduction Factor (CRF), when available:

- **Roadway Segments and Curves Countermeasures** (shown in Table 1)**,** which are treatments to reduce crashes most commonly observed along roadway segments, including lane departure crashes. **Pedestrian and bicycle countermeasures** are also included in this section;
- **Systemic Intersection Countermeasures** (shown in Table 2), which may be applied systemically and for relatively low cost (at intersections and some driveways) along the corridor (several higher cost options are also included for consideration at some intersections); and
- **Speed Management Countermeasures** (shown in Table 3)**,** which can encourage speeds consistent with those appropriate for a specific segment, locations, or corridor context area. Speeds commensurate with the surrounding context promotes appropriate driver reaction times. Reduced speeds also reduces crash risk and severity.

Table 1. Treatments for Roadway Segments and Curves				
ID	**Countermeasure**	**Applicable Crash Types**	**Crash Reduction Factor**	**Planning Level Cost***
Rural Roadway Segments & Curves (Signing, Striping, Clear Zone, and Delineation)				
S-1	Install Shoulder Rumble Strips (Note: ODOT has installed these at feasible locations as part of the 2021 Traffic Enhancements. Consider for future shoulder widening projects.)	Run off the road crashes	16-42%[1,3]	$
S-2	Install Centerline Rumble Strips	All injury crashes	9-45%[1,3]	$
S-3	Widen Paved Shoulder (Note: Widen gravel shoulder is also beneficial and may be more cost effective.)	All crashes	3-18%[1,3]	$$
S-4	Install Chevron Signs on Horizontal Curves. (Note: Site specific curve conditions may indicate for more signs or different placement compared to the MUTCD.)	Run off the road injury crashes	4-25%	$
S-5	Install Oversized, Doubled Up and/or Fluorescent Yellow Sheeting for Advance Curve Warning Signs (Note: ODOT already uses oversized curve warning and chevron signs on this corridor. This practice should be continued. ODOT typically applies fluorescent sheeting only in school zones.)	Run off the road crashes	20%	$
S-6	Install Dynamic Feedback Signs on Curves	All crashes	5%[1,3]	$
S-7	Install Dynamic Speed Feedback Signs	All crash types	5-7%	$
S-8	Increase Pavement Friction (Note: ODOT has evaluated the corridor and determined the current pavement friction is adequate. This option is included for future consideration if wet road crashes increase at specific locations. Another option ODOT considers is installing drainage grooves to remove water from roadway.)	Crashes on wet roads	20-68%[1,3]	$

Table 1. Treatments for Roadway Segments and Curves				
ID	**Countermeasure**	**Applicable Crash Types**	**Crash Reduction Factor**	**Planning Level Cost***
S-9	Install/Widen Edge-Line (4 inch to 6 inch) or Centerline Markings (Note: ODOT indicates this will become state's standard to accommodate autonomous vehicles.)	All	17.5%[3]	$
S-10	Install Recessed Pavement Markers (Note: ODOT currently requires these in the corridor; continued maintenance of these is needed.)	Night-time crashes	15%[1]	$
S-11	Install Post-Mounted Delineators (Curve Application) (Note: Continued maintenance is needed.)	Night-time crashes	0-30%[1]	$
S-12	Remove, Relocate, or Protect Fixed Objects Adjacent to Road	All crashes	38%[3]	Varies
S-13	Safety Edge	All crashes	5-15%	$
S-14	Soften grade break changes beyond the edge of shoulder (foreslope/backslope)	Run off the road crashes	Varies	$$
S-15	Add curb, gutter, and sidewalks (context and character changes to encourage slower speeds) in some corridor locations	All crashes	N/A	$$$
S-16	Install street lighting at some locations	Night-time crashes	17-29%	$$
S-17	Install median barrier	All crashes	24-43%	$$
S-18	Install new guardrail	Run off the road crashes	44-47%	$$
S-19	Install Passing Lane or Climbing Lane on Rural Two-Lane Roadway	All crashes	25-35%	$$$
Corridor Access Management				
A-1	Close, Consolidate, or Relocate Driveways (Access Management)	All injury crashes	Varies based on driveway density	Varies
Pedestrians & Bicyclists				
PB-1	Install Pedestrian Refuge Island	Pedestrian crashes	26-31%[1,4]	$

Table 1. Treatments for Roadway Segments and Curves				
ID	**Countermeasure**	**Applicable Crash Types**	**Crash Reduction Factor**	**Planning Level Cost***
PB-2	Install Pedestrian-Scale Lighting	Night-time pedestrian and bicycle crashes	42%[1,2]	$
PB-3	Install or improve bicycle facilities (add or buffer bicycle lanes, add shoulders, or add separated facility or path)	Bicycle	Varies	Varies
PB-4	Bicycle Signage and Beacons at Pinch Points	Bicycle	N/A	$
PB-5	Add sidewalks	Pedestrian crashes	20%	$$
Enhanced Pedestrian Crossings				
C-1	Install Rectangular Rapid Flashing Beacon**	Pedestrian crashes	10-56%[1]	$$
C-2	Install Pedestrian Hybrid Beacon**	Pedestrian crashes	55-63%	$$
C-3	Install Pedestrian Signal**	Pedestrian crashes	15-69%	$$

*This column indicates relative cost considerations ($ = Low, $$ = Medium, $$$ = High).
**Selection of appropriate pedestrian crossing treatments would be based on a future engineering study that would consider traffic volumes and speeds, pedestrian volumes, area context, etc.
Crash Reduction Factor Sources:
[1] ODOT ARTS
[2] Highway Safety Manual
[3] CMF Clearinghouse
[4] NCHRP Report 841

Table 2. Treatments for Intersections and Driveways				
ID	**Countermeasure**	**Applicable Crash Types**	**Crash Reduction Factor**	**Planning Level Cost***
Rural Two-Way Stop-Controlled Intersections (Signing, Striping, and Illumination)				
I-1	Increase Intersection Warning with Signing and Striping (FHWA low-cost systemic intersection recommendations)	All	11 – 55%[1,4]	$
I-2	Install Raised Divider on Stop Approach (Splitter Island)	All crashes	15%[1]	$
I-3	Transverse Rumble Strips on Stop-controlled Approaches (Note: Location dependent)	Fatal and incapacitating crashes	25%[1, 3]	$
I-4	Provide “Stop Ahead” Pavement Markings	All crash types	31%[1, 3]	$
I-5	Provide Flashing Beacons at Stop-Controlled Intersections	Angle crashes	5-58%[1,2]	$$
I-6	Install intersection lighting	Nighttime	31 – 38%[1,2]	$$
I-7	Install flashing beacons as advance warning at intersections	All crashes	13.3%	$$
I-8	Install dynamic intersection warning signs to detect vehicles on side street waiting to turn (and warn mainline drivers) or detect vehicles stopped to turn left and warn approaching drivers	All crashes	29%[3]	$$
Intersection Geometry				
IG-1	Install Roundabout	All crash types	19-82%[1,2]	$$$
IG-2	Reduce Intersection Skew	All crash types	Varies by skew angle[3]	Varies
IG-3	Increase Sight Distance	All injury crashes	11-56%[1,3]	Varies
IG-4	Install Left-Turn Lanes on Major Roads at Stop-Controlled Intersections	All crash types	33-58%[1,2]	$$
IG-5	Install J-Turn	All crashes	34%[4]	$$

*This column indicates relative cost considerations ($ = Low, $$ = Medium, $$$ = High). Crash Reduction Factor Sources:[1] ODOT ARTS, [2] Highway Safety Manual, [3] CMF Clearinghouse, [4] NCHRP Report 841

Table 3. Speed Management Treatments
Pavement Markings
Transverse Lane Markings
Speed Advisory Markings in Lane (“Slow”, “Curve”, or “Speed Limit XX”)
Colored Pavement Advisory Markings
Shoulder Widening to Narrow Travel Lanes
Wider Edge-Lines
Physical Roadway Improvements
Splitter Islands at Intersections
Horizontal Deflections
Vertical Centerline Posts
Sinusoidal Transverse Rumble Strips
Intersection Realignment
Signage
Dynamic Speed Displays and Vehicle-Actuated Signs / Speed Trailers
Enhanced Signing
Curve Warning Sign with Flashing Beacon
LEDs in Signs
Community Gateway Signage

5. Recommended Corridor Strategies

Kittelson identified strategies, which include a mixture of maintenance practices, low-cost signage and striping recommendations, and larger capital improvement projects, to address the safety and mobility needs identified for the US 199 study corridor. Many of these strategies are applicable at numerous locations. This section presents the broad strategies followed by documentation of specific locations (presented in Section 6) where they may be applicable.

Potential countermeasures to support the strategies are provided, when possible. Treatments are categorized into different implementation categories to reflect the relative ease of implementation and assist with programming (i.e., funding needs and timing). Treatments are categorized into one of the following:

- **Maintenance Projects:** These are efforts that can be completed during routine maintenance activities. No additional project design is typically needed. ODOT may need to increase typical annual maintenance funding to integrate recommendations from the US 199 corridor plan.

- **Systemic Projects:** These are projects that are generally lower cost, with documented crash reduction effectiveness, and relatively easy to implement without additional design and environmental work. These projects may be funded through mechanisms such as ODOT's All Roads Transportation Safety (ARTS) programs, Quick Fix safety funds, and other grant programs. When possible, these treatments should be bundled to implement them in multiple locations and/or with other systemic treatments for efficiency and for greater competitiveness when competing for grant funding.

- **Capital Improvement Projects:** These are projects that are typically higher cost projects and require project development activities to obtain environmental clearance and project approval. During project development, ODOT would explore potential environmental, right-of-way, and other impacts of the project. These projects typically take multiple years of project development prior to construction. Programming for future projects should incorporate time, often multiple years, for the project development process. This means some capital project development may need to occur early so the projects can be implemented within an identified desired sequence.

- **Study:** These are recommendations that would involve additional evaluation to refine the need for and feasibility of a treatment. The study may result in a capital improvement project that would need to be programmed and funded in the future.

Many of the countermeasures discussed are already present in much of the corridor and are included for consideration because there may be additional locations where they would be beneficial, need increased maintenance frequency to replace damaged or missing items (such as signage and pavement markings), or may need consideration for implementation beyond the standard application (such as increasing the frequency of signage or delineators).

In addition, some countermeasures may require a maintenance agreement between ODOT, the County, and/or other jurisdictions. For example, while ODOT typically manages improvements along the state highway right-of-way, maintenance and power for pedestrian scaled lighting may need to be

provided by another entity. The County may be responsible for treatments on side street approaches to the highway and may be a partner in projects impacting intersections with County roads. Maintenance agreements for countermeasures should be confirmed prior to installation.

5.1 Context Zones

The US 199 study corridor passes through various environments such as rural forested lands and small unincorporated communities; these changing environments are referred to as 'context zones.' Understanding the context zones within the study corridor presents the opportunity to implement systemic transportation solutions or context zone-specific strategies where they are appropriate. For example, a set of solutions may be appropriate in transition areas to a community but not necessarily in rural areas.

Kittelson defined the following context zones for the US 199 study corridor for use in identifying strategies that are applicable to different locations:

- Rural highway
- Passing lanes
- Curves
- Unincorporated communities (i.e., Wilderville, Wonder, Selma, Kerby, and O'Brien)
- Transition areas between rural segments and unincorporated communities
- Rural development outside of unincorporated communities
- Intersections

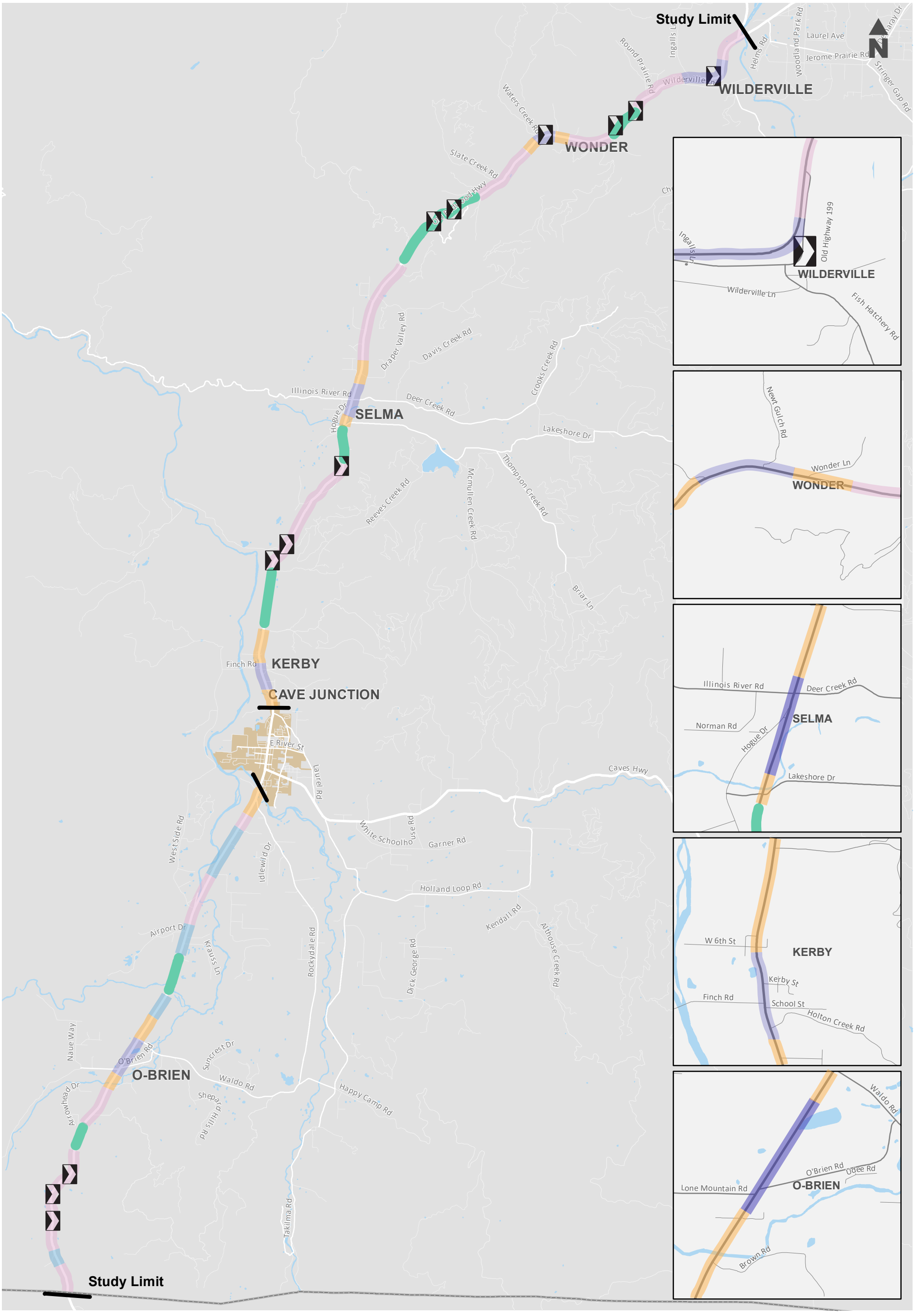
Figure 2 shows the location of the context zones on the corridor and should be used to correlate the strategies in the following sections to specific locations. Intersections are not shown on the figure because the strategies apply to the many intersections and driveways along the corridor. Context zones do not mean that each area reflects the same characteristics. For example, the unincorporated communities are each unique; Kerby is more developed than smaller communities such as Wonder and Wilderville. However, consistent treatments such as gateway signage along the corridor will provide visual cues to drivers that they are entering an area where they need to be more alert for potential conflicts at driveways or with people walking and bicycling. The treatments applicable within each context zone may vary, but the general strategies applied to each area should be consistent.

Many of these context zones overlap at locations. The context zones are not mutually exclusive. For example, several of the curves also contain passing lanes, and key intersections are located within each of the other context zones. In other areas, passing lanes may pass through areas or rural development or transition areas. The following sections discuss strategies appropriate for each context zone, beginning with strategies that are appropriate throughout the general corridor. The context zones used for this project are intended to help with implementation of treatments and are not ODOT Blueprint for Urban Design (BUD) classifications.

5.4 Engineering, Education, Enforcement, and Emergency Response

A comprehensive approach of addressing traffic safety involves what is often referred to as the 4 E's: Engineering, Education, Enforcement, and Emergency Response. Many of the recommendations of this plan are engineering/infrastructure treatments. In addition to the infrastructure countermeasures presented in this section, additional focus on Education, Enforcement, and Emergency Response should

be considered throughout the corridor as part of a comprehensive approach to changing transportation safety culture within the corridor. The crash data summary, presented in Technical Memorandum #3, showed behavioral factors such as impaired driving and speeding, contributed to many of the fatal and severe crashes. Educational outreach efforts along with increased enforcement should be used in conjunction with the infrastructure changes along the highway to encourage safe travel behaviors.



Unincorporated Communities
Transition Zone
Rural Development
Rural Highway
Passing Lane
Curve

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US 199 Context Zones
Josephine County, Oregon

Figure 2

5.2 Corridor Wide Strategies

This section describes general strategies that could be applicable throughout the US 199 study corridor, including Rural Highway. The existing cross-section of US 199 generally has two- to four foot-wide shoulders, limited curve and intersection delineation, and few facilities for people walking and biking. These corridor-wide strategies are intended to improve safety performance for motorized users on US 199 by increasing the ability of a user to recover after leaving a lane, reducing the risk of hitting an object after leaving a lane, reducing the severity of a crash by reducing speed, and increasing awareness of potential conflicts such as driveways and intersections. The strategies may enhance the quality of service and reduce crash risk for non-motorized users who access transit, walk along, or cross US 199.

Strategies

The general strategies presented in Table 4 are applicable at many locations throughout the corridor. While there are sections of the corridor where these may be lower priority (such as locations with wider shoulders or fewer crashes), these are presented as corridor-wide options because of their prevalence. Technical Memorandum #3 provides maps illustrating the location of roadway features and may be used to guide the implementation of these treatments, in addition to the context areas shown in Figure 2.

Many of the countermeasures are already in practice, but signage, delineators, recessed pavement markings, and striping require ongoing maintenance. The recommended strategies could result in increasing the frequency of maintenance activities at some locations to continuously provide the needed messages to drivers. The overall goal is to increase and maintain the visibility of the changing roadway features and elements along the study corridor. This emphasis on maintenance and consistent monitoring of countermeasures is because of the frequency and severity of observed crashes.

Table 4. Corridor Wide Strategies		
Potential Countermeasures	**Relevant Toolbox References**	**Implementation Category**
Strategy: Reduce crash severity.		
Speed management treatments	See Table 3	Systemic
Evaluate intersection control to determine if a change in control, such as a roundabout, or turn lanes are needed.	IG-1, IG-4	Study
Strategy: Delineate the corridor and increase maintenance activities as needed to maintain delineation, signage, and pavement markings.		
Verify adherence to the ODOT Traffic Line Manual, consider the location of delineators and other signage such as chevrons, curve warning signs, etc. Delineators are also applicable at driveways and intersections to increase visibility.	S-11, S-4, S-5	Maintenance
Install/widen edge-line or centerline markings	S-9	Maintenance
Install recessed pavement markers (RPMs). Consider application in centerline and potential alternative application of installing RPMs inside edgelines. Continued maintenance is needed to replace RPMs.	S-10	Systemic
Increase maintenance frequency to replace signs, pavement markers, striping, etc. to provide enhanced delineation of the corridor throughout the year.	N/A	Maintenance
Strategy: Provide opportunity for recovery after lane departure.		
Provide quality shoulder: • Consistently provide predominantly minimum shoulder width (i.e., 4 feet) • Widen shoulders (paved or gravel) to 6 to 8 feet.	S-3	Capital Improvement Project
Install Safety Edge treatment	S-13	Systemic
Soften grade break changes beyond the edge of shoulder (foreslope/backslope)	S-14	Capital Improvement Project
Reduce fixed object risk • Remove, relocate, or protect fixed objects adjacent to road, prioritizing areas closest to the shoulder edge.	S-12	Systemic

Table 4. Corridor Wide Strategies		
Potential Countermeasures	**Relevant Toolbox References**	**Implementation Category**
Strategy: Reduce intersection conflicts.		
Restrict movements at intersections with channelization (e.g., right-in, right-out)	N/A	Systemic
Restrict movements at intersections with a barrier	N/A	Systemic
Close, consolidate, or relocate driveways at intersections (access management)	A-1	Capital Improvement Project
Strategy: Support multimodal users (people walking, biking, and taking transit).		
Provide facilities along highway	PB-3, PB-5, PB-2, PB-4	Capital Improvement Project
Provide facilities across highway	PB-1, PB-2, C-1, C-2, C-3	Systemic
Support transit along highway with appropriate signage, pull-outs, and multimodal connections	N/A	Systemic / Capital Improvement Project
Strategy: Increase intersection visibility / awareness.		
Install low-cost systemic intersection signage and striping treatments	I-1	Systemic
Install delineators at driveways and intersections	N/A	Systemic
Install reflective posts and signs	N/A	Systemic

5.3 Strategies for Passing Lanes

The analyses in Technical Memorandum #3 identified a correlation between severe and fatal crashes and the presence of passing lanes. As shown in Figure 2, passing lanes are located at the following approximately mileposts: 10.5 to 11.3, 14.7 to 16.9, 21 to 22, 24.5 to 25.9, 33.5 to 34.1, 37.7 to 38.1. Crashes were reported within passing lanes as well as at the transitions in/out of passing lanes. Kittelson identified several locations with driveways present within the passing lanes or the transition areas. Driveways within passing lanes have additional potential conflicts due to the increased number of lanes and the higher speeds. Vehicles often increase speed at the end of passing lanes to complete a passing maneuver before the end of the lane; drivers of these vehicles may not be aware if another vehicle is attempting to decelerate and turn at a driveway.

Strategies

The strategies recommended for passing lanes include a variety of treatments to reduce potential conflicts, manage speeds, and evaluate the location of passing lanes (or their terminals) relative to potential conflicts. These are summarized in Table 5.

Table 5. Strategies for Passing Lanes		
Potential Countermeasures	**Relevant Toolbox References**	**Implementation Category**
Strategy: Reduce conflicts through passing lanes.		
Minimize conflicts at intersections/driveways: • Restrict movements at intersections with channelization (e.g., right-in, right-out) • Restrict movements at intersections with a barrier • Close, consolidate, or relocate driveways or intersections (access management)	A-1	Capital Improvement Project
Consider removing, reconfiguring, or relocating passing lanes if conflicts cannot be reduced.	N/A	Capital Improvement Project
Increase intersection/driveway awareness.	I-1	Systemic
Strategy: Evaluate passing lane termini.		
Provide sufficient notification for merging (with signage and pavement markings).	N/A	Maintenance/ Systemic
Evaluate termini locations to determine if passing lanes should be shortened to reduce conflicts (driveways, intersections, or curve locations).	N/A	Study
Strategy: Manage speeds through passing lanes.		
Install dynamic speed feedback signs, particularly downstream of passing lane.	S-7	Systemic
Strategy: Evaluate the benefit of additional opportunities to pass slower vehicles.		
Install passing lane or climbing lane on rural two-lane roadway. (Additional slow vehicle pull-outs are not appropriate for this corridor. Topography constraints would make a standard design challenging.) Based on feedback from the freight industry, additional passing lanes may be evaluated between Cave Junction and the California border.	S-19	Capital Improvement Project
Strategy: Evaluate passing lane and curve relationship.		
Evaluate passing lanes within curves. Consider whether speed management is needed.	N/A	Study
Evaluate passing lane termini location. Consider shortening passing lanes to provide distance for vehicles to slow before entering curves.	N/A	Study

5.4 Strategies for Curves

The existing and future conditions analyses identified a correlation between severe and fatal crashes and the presence of horizontal curves. The crash types reported within the curves varied, with roadway departure and head-on crashes being some of the most common among severe crashes. As shown in Figure 2, key curves are located at the following approximately mileposts: 8, 11, 12.8, 15 – 16, 22, 24 – 24.5, and 39 – 40.

Kittelson also noted many of the curves are located in constrained areas with limited shoulder width. In addition, passing lanes are located within some of the curves. In some locations, passing lanes terminate shortly prior to horizontal curves, leaving vehicles with limited distance to slow in advance of the curve; head-on crashes were reported at some of these locations.

Strategies

Table 6 summarizes the recommended strategies for reducing crash frequency and severity at curves. These strategies focus on increasing recovery opportunities for vehicles that do leave the lane, increasing driver awareness of impending curves, delineating the roadway through the curve, promoting lane discipline, reducing crash severity, reducing speeds, and reducing conflicts.

Table 6. Strategies for Curves

Potential Countermeasures	Relevant Toolbox References	Implementation Category
Strategy: Increase opportunity for recovery / provide opportunity for recovery after lane departure.		
Widen paved or gravel shoulder.	S-3	Capital Improvement Project
Provide softer shoulder transitions.	S-14	Capital Improvement Project
Install Safety Edge.	S-13	Systemic
Strategy: Improve awareness of upcoming curves. Prioritize curves for low-cost systemic treatments.		
Reevaluate Chevron sign locations on horizontal curves.	S-4	Systemic
Consider supplemental chevrons at high crash locations or identified curves.	S-4	Maintenance / Systemic
Install oversized, doubled up advance curve warning signs.	S-5	Maintenance / Systemic
Decrease spacing of post-mounted delineators in curves.	S-11	Systemic / Maintenance
Strategy: Promote lane discipline.		
Install shoulder rumble strips.	S-1	Systemic
Install centerline rumble strips.	S-2	Systemic
Install recessed pavement markers. Consider installing them inside of edgelines.	S-10	Systemic

Table 6. Strategies for Curves		
Potential Countermeasures	**Relevant Toolbox References**	**Implementation Category**
Strategy: Reduce crash severity after roadway departure.		
Install new guardrail.	S-18	Systemic / Capital Improvement Project
Increase clear zone distance.	S-12	Systemic / Capital Improvement Project
Strategy: Reduce speeds through curves.		
Install dynamic feedback signs on curves.	S-6	Systemic
Strategy: Reduce conflicts and improve visibility at intersections and access points.		
Close, consolidate, or relocate driveways (access management).	A-1	Capital Improvement Project
Increase sight distance.	IG-3	Maintenance
Install flashing beacons at stop-controlled intersections.	I-5	Systemic
Increase intersection warning with signing and striping.	I-1	Systemic
Install intersection warning signs at locations with limited sight distance in curves.	I-1	Systemic
Reduce intersection skew.	IG-2	Capital Improvement Project
When appropriate, consider turn lanes to provide refuge for slowing or stopped vehicles.	IG-4	Capital Improvement Project
Strategy: Reduce the potential risk of head-on crashes in/near curves.		
Install raised median barrier. (Note: This would involve major road reconstruction and widening. The median barrier also introduces an obstacle into the roadway which may increase fixed object crash risk.)	S-17	Capital Improvement Project

5.5 Strategies for Unincorporated Communities

Five unincorporated communities are located within the US 199 study corridor: Wonder, Wilderville, Selma, Kerby, and O'Brien. These five communities have a higher density of residential development, and many have retail establishments, restaurants, schools, or other destinations. With the increase in potential conflicts and the increase in multimodal users in these areas, slower speeds are appropriate in these areas compared to other corridor segments and context zones. The speed limit drops in many of the communities. The majority of the pedestrian and bicycle crashes reported along the corridor occurred within or near these areas.

Strategies

Table 7 summarizes the strategies and potential countermeasures for unincorporated communities. Several of the strategies include physically defining the community limits so there is a clear beginning and end of the community. Strategies also include changing the visual and physical roadway context of the area using features such as curb and sidewalk or shared-use path. Providing a visual cue to drivers that they are entering an urban area and encourage slower speeds and promote maintaining those speeds while in that community. Although these strategies are identified as potential options for each of the unincorporated communities, the needs and relative priority of each community will be used to determine when and where these would be installed. For example, based on crash history and densities, treatments such as sidewalk and shared-use paths would likely be highest priority in Kerby.

Table 7. Strategies for Unincorporated Communities		
Potential Countermeasures	**Relevant Toolbox References**	**Implementation Category**
Strategy: Define community limits.		
Install signage to define community limits (entering and exiting)	N/A	Systemic
Change the roadway context to provide visual cues to driver they are entering/exiting a community	S-15	Capital Improvement Project
Strategy: Reinforce context and speed changes.		
Install dynamic speed feedback signs.	S-7	Systemic
Add curb, gutter, and sidewalks to reinforce context and slower speeds.	S-15	Capital Improvement Project
Install gateway treatments such as signage, land scaping, or a roundabout to slow speeds and define community limits.	N/A	Varies depending on treatment
Consider installing roadway and intersection illumination in communities.	S-16	Systemic, Capital Improvement Project
Strategy: Provide facilities for people walking and biking along and across the highway. Prioritize at key destinations (medical facilities, grocery stores, colleges, campgrounds, post office, etc.) and transit stops.		
Install sidewalks	PB-5	Capital Improvement Project
Install or enhance pedestrian crossings, based on an engineering study to determine the appropriate treatment: • Rectangular Rapid Flashing Beacon • Pedestrian Hybrid Beacon • Pedestrian Signal • Pedestrian Refuge Island	C-1, C-2, C-3, PB-1	Systemic, Capital Improvement Project
Install pedestrian-scale lighting. (Note: During design, determine where funding for ongoing maintenance and power will be obtained.)	PB-2	Capital Improvement Project
Install or improve bicycle facilities (add or buffer bicycle lanes, add shoulders, or add separated facility or path).	PB-3	Capital Improvement Project
Strategy: Consider median treatments and turn lanes.		
Install two-way center turn-lane	N/A	Capital Improvement Project
Install raised median, which will also restrict turning movements	S-17	Capital Improvement Project
Install left-turn lanes	IG-4	Systemic / Capital Improvement Project

Table 7. Strategies for Unincorporated Communities		
Potential Countermeasures	**Relevant Toolbox References**	**Implementation Category**
Strategy: Evaluate private driveways for delineation and possible consolidation opportunities.		
Delineate driveways and intersections. Prioritize major intersections.	N/A	Systemic
Identify opportunities for access consolidation.	A-1	Study
Strategy: Evaluate intersections within the communities to identify opportunities to reduce speeds and reduce potential conflicts.		
Evaluate whether intersection changes are needed to reinforce the context.	N/A	Study
Evaluate whether changes are needed to channel traffic to key intersections (frontage roads).	N/A	Study
Evaluate opportunities to install turn lanes at key intersections.	N/A	Study

5.6 Strategies for Transitions Areas (Rural to Urban)

Transition areas are located between the rural, higher speed roadways and the unincorporated communities, such as Kerby or Selma. In these areas, vehicles are slowing or speeding up as they approach or exit the communities. Transition areas typically exhibit higher speeds than the communities but continue to have potential conflicts such as driveways and more people walking and biking. Approximate mileposts of the transition areas for each community are illustrated on Figure 2.

Strategies

Table 8 summarizes strategies for transition areas. These strategies are focused on encouraging and maintaining slower speeds and raising awareness of the change in roadway character and associated increased risk of turning vehicles to and from adjacent land uses.

Table 8. Strategies for Transition Areas (Rural to Communities)		
Potential Countermeasures	**Relevant Toolbox References**	**Implementation Category**
Strategy: Increase awareness of context and speed changes.		
Install dynamic speed feedback signs at gateway to communities.	S-7	Systemic

Table 8. Strategies for Transition Areas (Rural to Communities)		
Potential Countermeasures	**Relevant Toolbox References**	**Implementation Category**
Install curb, gutter, sidewalks, and/or other traffic calming features such as landscaping to indicate the change in context and character to encourage slower speeds.	S-15	Capital Improvement Project
Install a gateway roundabout to slow speeds. (Note: Intersection control changes such as a roundabout may also need to be justified with intersection needs such as side street delay, vehicles unable to find appropriate gaps, document crash history, etc.)	IG-1	Capital Improvement Project

5.7 Strategies for Rural Development

Several areas of rural development are located within the corridor. These areas have a cluster of destinations that create some of the same conditions present in the unincorporated communities: increased conflicts and people walking and biking along and across US 199. These areas may not have the same decrease in posted speed limits that communities have and may not have clearly defined limits.

Strategies

Table 9 summarizes potential strategies for rural development areas. Many of these overlap with those in unincorporated communities. The focus is encouraging slower speeds, providing visual indication of the change in roadway character and land use, and providing dedicated multimodal facilities to separate pedestrians and bicyclists from vehicles.

Table 9. Strategies for Rural Development		
Potential Countermeasures	**Relevant Toolbox References**	**Implementation Category**
Strategy: Increase awareness of context and speed changes.		
Install dynamic speed feedback signs	S-7	Systemic
Install curb, gutter, and sidewalks to indicate the change in context and character to encourage slower speeds.	S-15	Capital Improvement Project
Install a gateway roundabout to slow speeds.	IG-1	Capital Improvement Project
Strategy: Provide facilities for people walking and biking.		
Install sidewalks	PB-5	Capital Improvement Project

Table 9. Strategies for Rural Development		
Potential Countermeasures	**Relevant Toolbox References**	**Implementation Category**
Install or enhance pedestrian crossings, based on engineering study to determine the appropriate treatment: • Rectangular Rapid Flashing Beacon • Pedestrian Hybrid Beacon • Pedestrian Signal • Pedestrian Refuge Island	C-1, C-2, C-3, PB-1	Systemic, Capital Improvement Project
Install pedestrian-scale lighting. (Note: During design, determine where funding for ongoing maintenance and power will be obtained.)	PB-2	Capital Improvement Project
Install or improve bicycle facilities (add or buffer bicycle lanes, add shoulders, or add separated facility or path).	PB-3	Capital Improvement Project
Strategy: Evaluate private driveways for delineation and possible consolidation opportunities.		
Delineate driveways and intersections. Prioritize major intersections.	N/A	Systemic
Identify opportunities for access consolidation.	A-1	Study

5.8 Strategies for Intersections and Driveways

Intersections and driveways are frequent along the US 199 study corridor. The public roads provide access to many destinations in the region. Many of these intersections and driveways are not well delineated and this makes it difficult for drivers to see and be aware of potential conflicts. Some intersections are located within curves, which may create sight distance challenges or not meet driver expectations of encountering vehicles turning to and from US 199. At intersections without turn lanes or deceleration lanes the speed differential between through and turning traffic increases crash risk and crash severity of potential crashes.

Strategies

Table 10 presents strategies to reduce crash frequency and severity at intersections and driveways. Many of the low-cost, systemic options are focused on increasing intersection visibility and improving sight distance. Providing increased delineation helps through drivers understand the increased risk of potential turning vehicles compared to other US 199 study segments. In some locations, capital projects such as adding turn lanes or installing a roundabout may be appropriate.

Intersections frequently overlap with other context zones. In these situations, larger projects extending beyond the intersection extents may be most beneficial.

Table 10. Strategies for Intersections and Driveways		
Potential Countermeasures	**Relevant Toolbox References**	**Implementation Category**
Strategy: Improve awareness of intersections and driveways.		
Increase intersection awareness with low-cost systemic intersection signing and striping.	I-1	Systemic
Install raised divider on stop-controlled approach (splitter island) to increase visibility on the minor approach and add a left side stop sign.	I-2	Systemic
Install transverse rumble strips on stop-controlled approaches. Coordination and approval from County is needed. These may not be appropriate in locations with nearby development nearby.	I-3	Systemic
Provide “Stop Ahead” pavement markings. (Note: Agency responsible for maintenance must agree to maintain.)	I-4	Systemic
Provide flashing beacons at stop-controlled intersections.	I-5	Systemic
Install intersection lighting. (Note: This is primarily applicable in communities but may be applicable in rural areas with crash history at night.)	I-6	Systemic
Install flashing beacons as advance warning at intersections.	I-7	Systemic
Install dynamic intersection warning system.	I-8	Systemic, Capital Improvement
Strategy: Evaluate access management opportunities.		
Evaluate opportunities for access consolidation, access control, and/or frontage roads to minimize the number of conflict points. Define and delineate existing accesses.	A-1	Study
Strategy: Improve sight distance at intersections and driveways.		
Reduce intersection/driveway skew.	IG-2	Systemic or Capital Improvement Project
Increase sight distance.	IG-3	Maintenance (for vegetation removal)
Strategy: Provide opportunities to safely transition to and from turning speeds at intersections and major driveways.		
Install roundabout.	IG-1	Capital Improvement Project
Install left-turn lanes on major roads at stop-controlled intersections.	IG-4	Systemic or Capital Improvement Project
Install J-turn.	IG-5	Capital Improvement Project

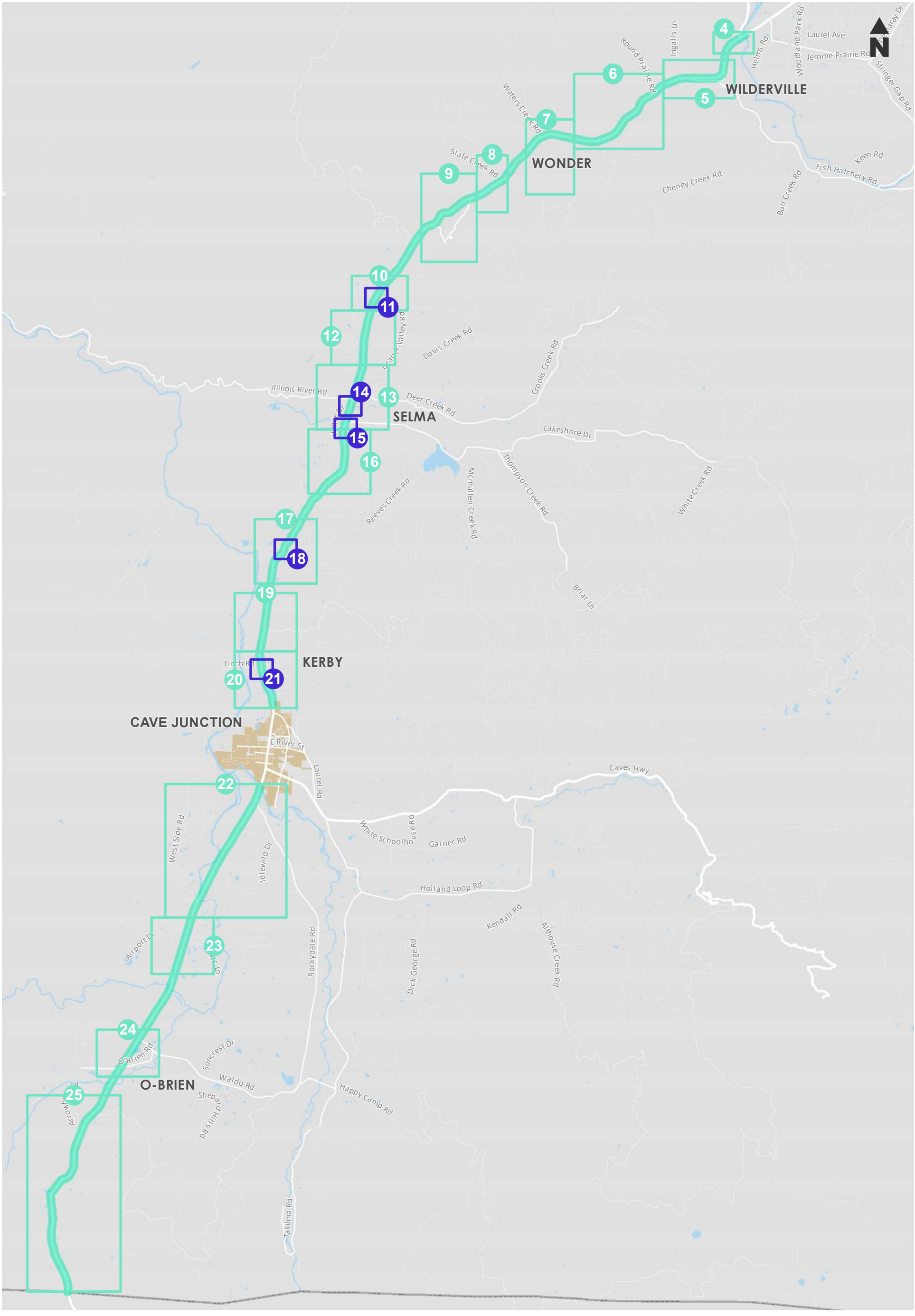
6. Location-Specific Strategy Application

This section provides figures illustrating how some of these strategies may be applied at key locations throughout the corridor, acknowledging that strategies from multiple context zones are often present. The figures illustrate some of the specific recommendations unique to the locations shown. Many intersections are included in larger area studies because efficiencies can be gained by packaging projects together. These figures do not list all of the corridor-wide strategies or context-zone specific strategies discussed in Section 5. These broader strategies should be considered in addition to the recommendations shown on the figures.

Figure 3 illustrates the locations where location-specific figures are provided. Kittelson reviewed the entire corridor, and the sections of highway that are not shown in a figure are covered through the corridor-wide and context-zone specific strategies presented in Section 5.

The Draft Corridor Plan will identify relative priorities among these locations to assist with implementation. Based on the crash frequency and severity screening summarized in Technical Memorandum #3 (Existing Conditions), the following locations exhibited the highest scores and would likely be highest priority for implementation:

- Curves with a history of fatal and severe crashes:
  - Hayes Hill (Figure 9)
  - North of Reeves Creek Road / Near Eight Dollar Road (Figures 17-18)
  - North of Wild Park Lane (Figure 16)
  - Near Fort Hay Ranch (Figures 10 - 11)
- Communities and Transitions in/out of Communities with a history of fatal and severe crashes:
  - Transitions in and out of Kerby (Figures 19-21)
  - Community of Selma, and transition area north of Selma (Figures 12-15)
  - Transition area south of Cave Junction (Figure 22)
- Intersections with a history of fatal/severe crashes
  - Riverbanks Road (Figure 4)



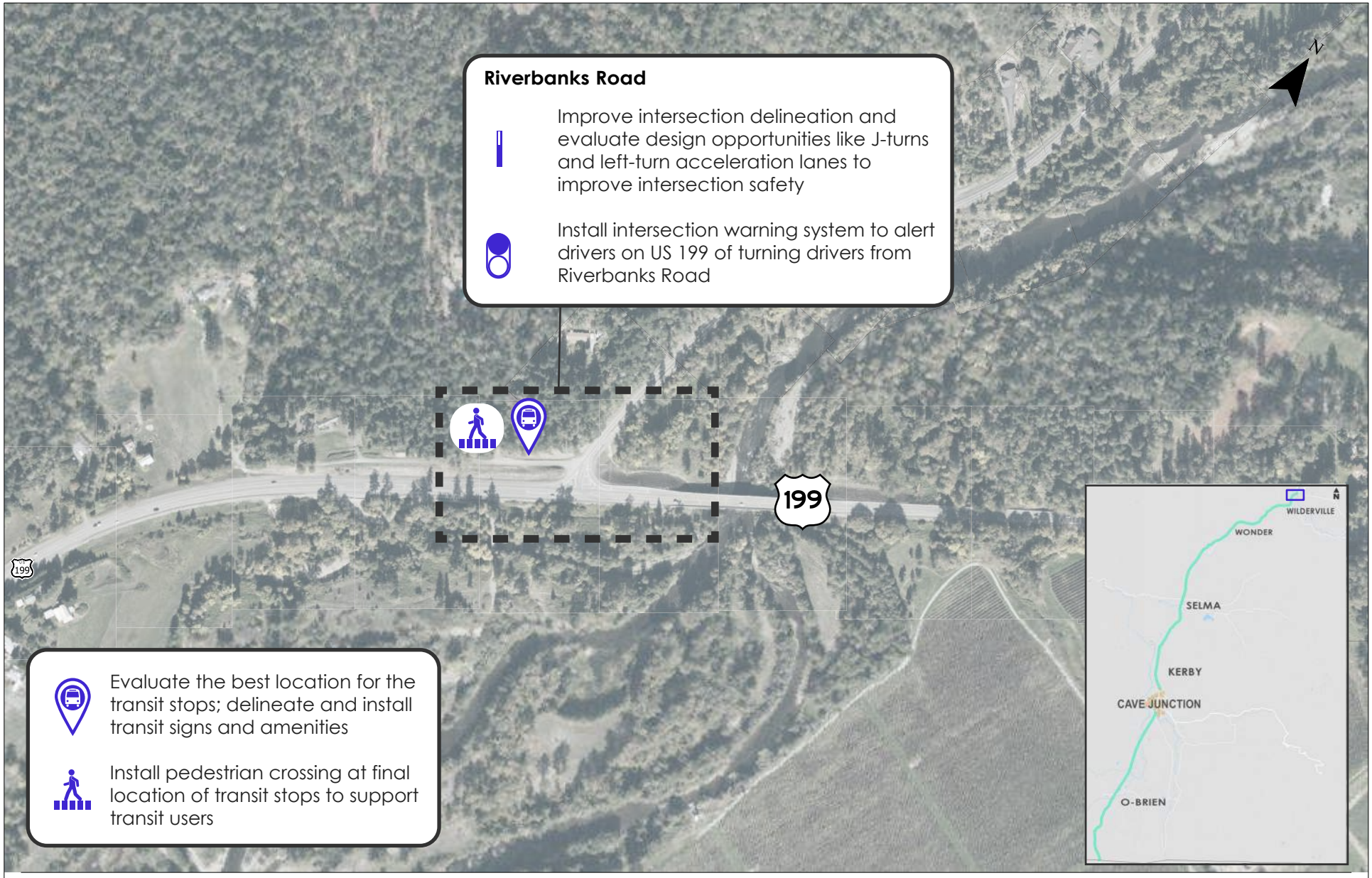
X Segment Location and Figure Number

X Intersection Location and Figure Number

Segment and Intersection Figure Key
Josephine County, Oregon

Figure 3

KITTELSON & ASSOCIATES



The recommendations shown on this figure are in addition to the corridor-wide and context-zone specific strategies presented in Section 5 of the memorandum.

Riverbanks Road
Josephine County, Oregon

Figure 4

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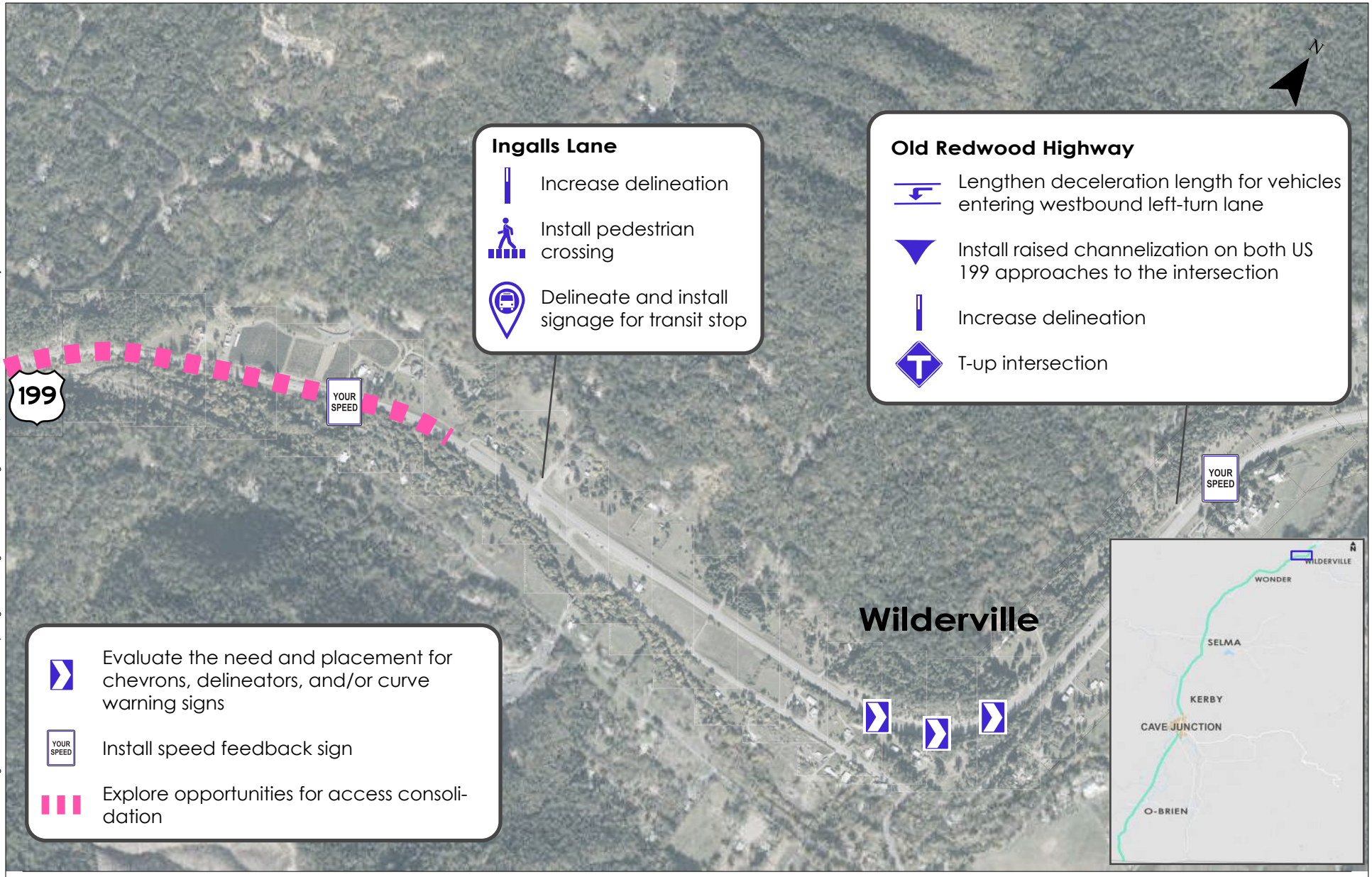

The recommendations shown on this figure are in addition to the corridor-wide and context-zone specific strategies presented in Section 5 of the memorandum.

Wilderville
Josephine County, Oregon

Figure 5

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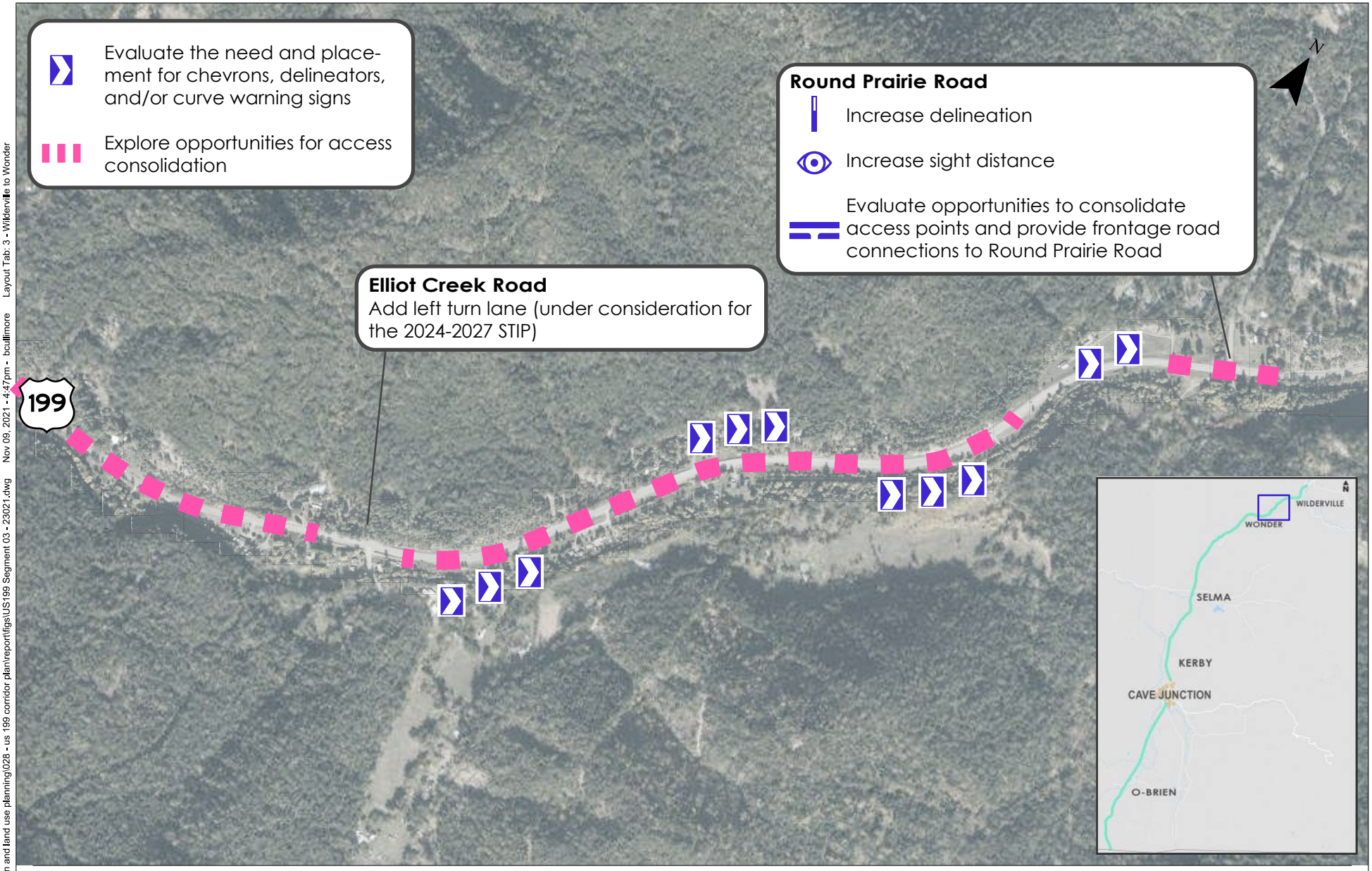
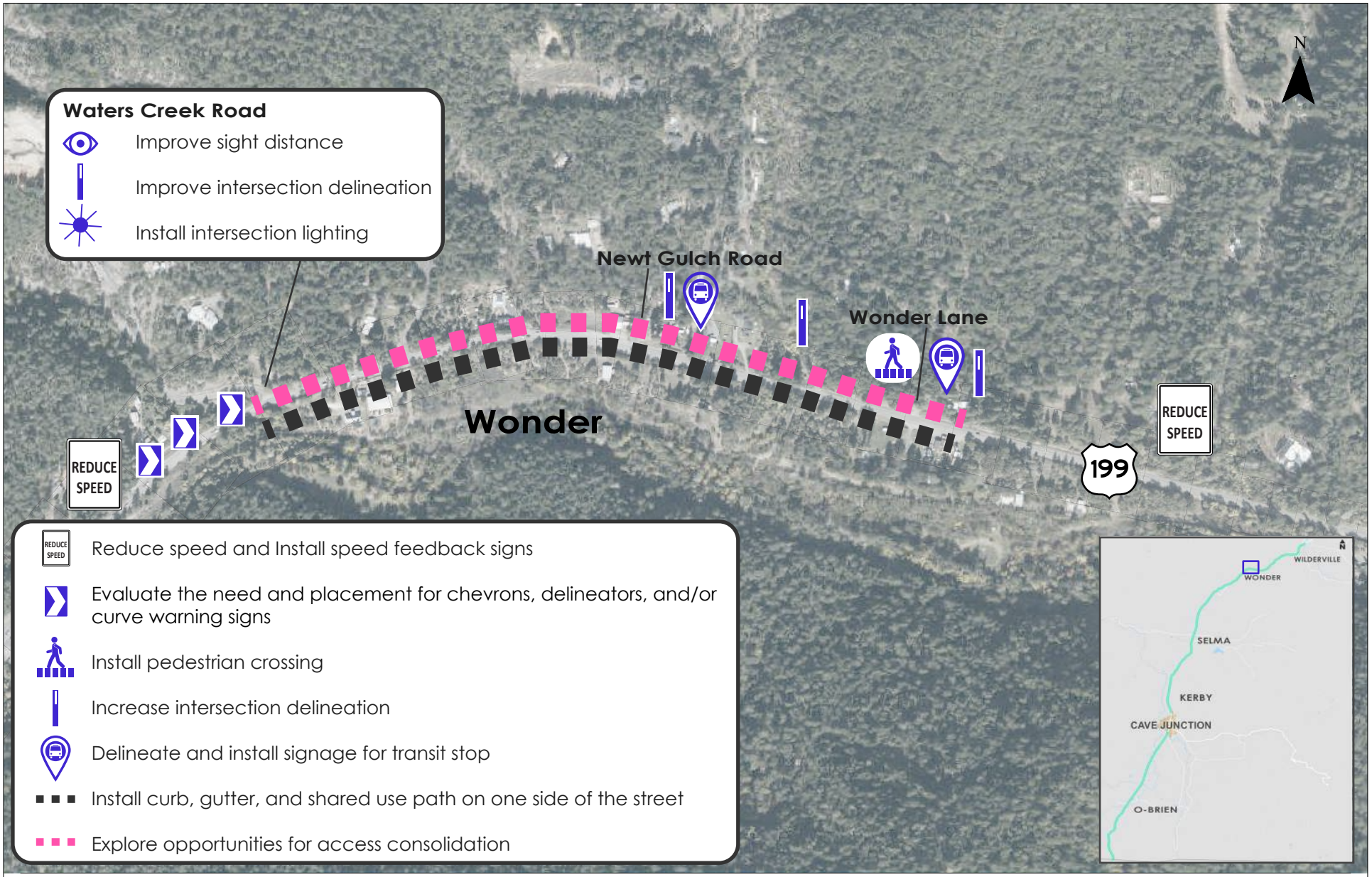


The recommendations shown on this figure are in addition to the corridor-wide and context-zone specific strategies presented in Section 5 of the memorandum.

Wilderville to Wonder
Josephine County, Oregon

Figure 6

KITTELSON & ASSOCIATES



The recommendations shown on this figure are in addition to the corridor-wide and context-zone specific strategies presented in Section 5 of the memorandum.

Wonder
Josephine County, Oregon

Figure 7

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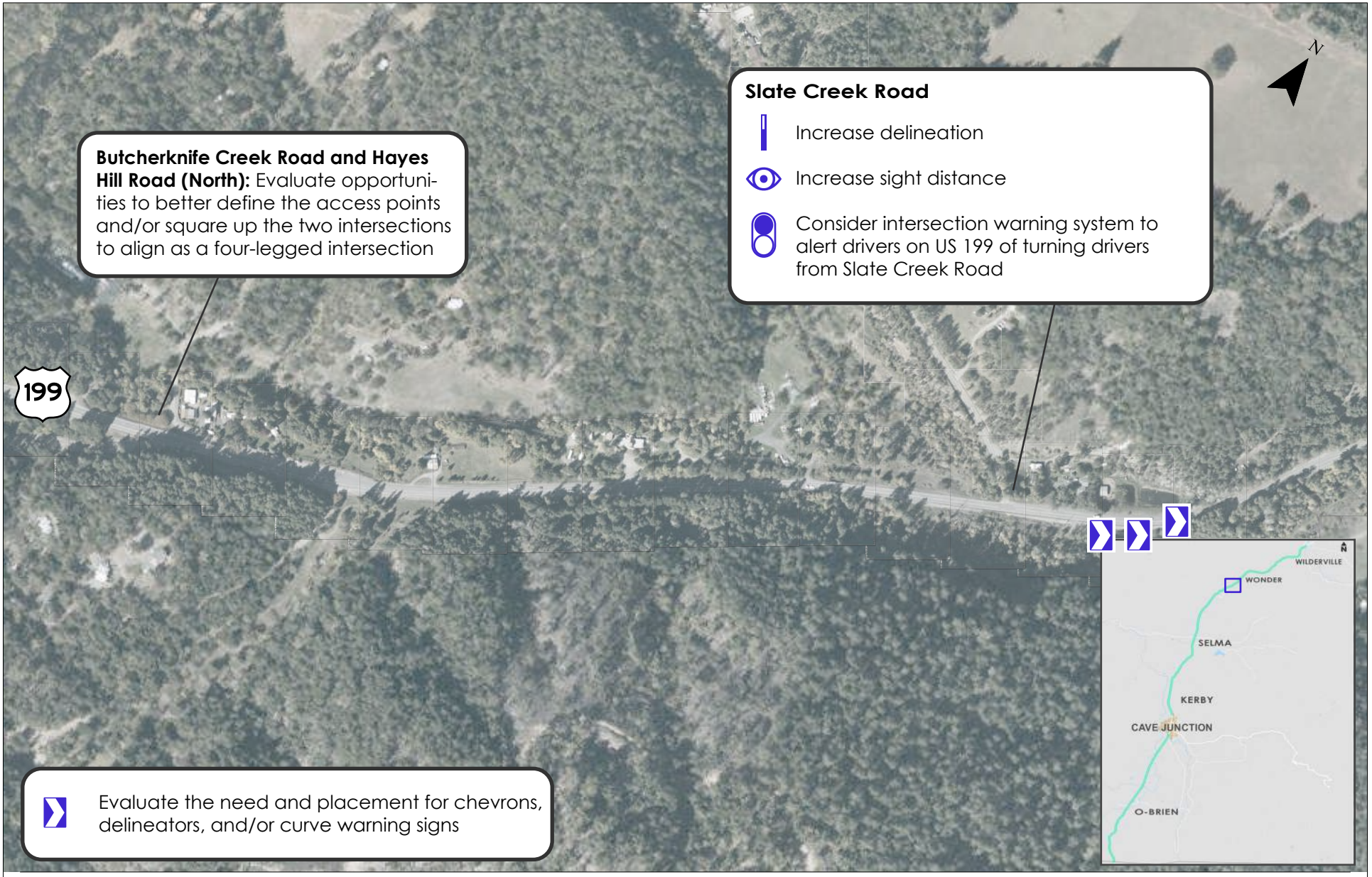
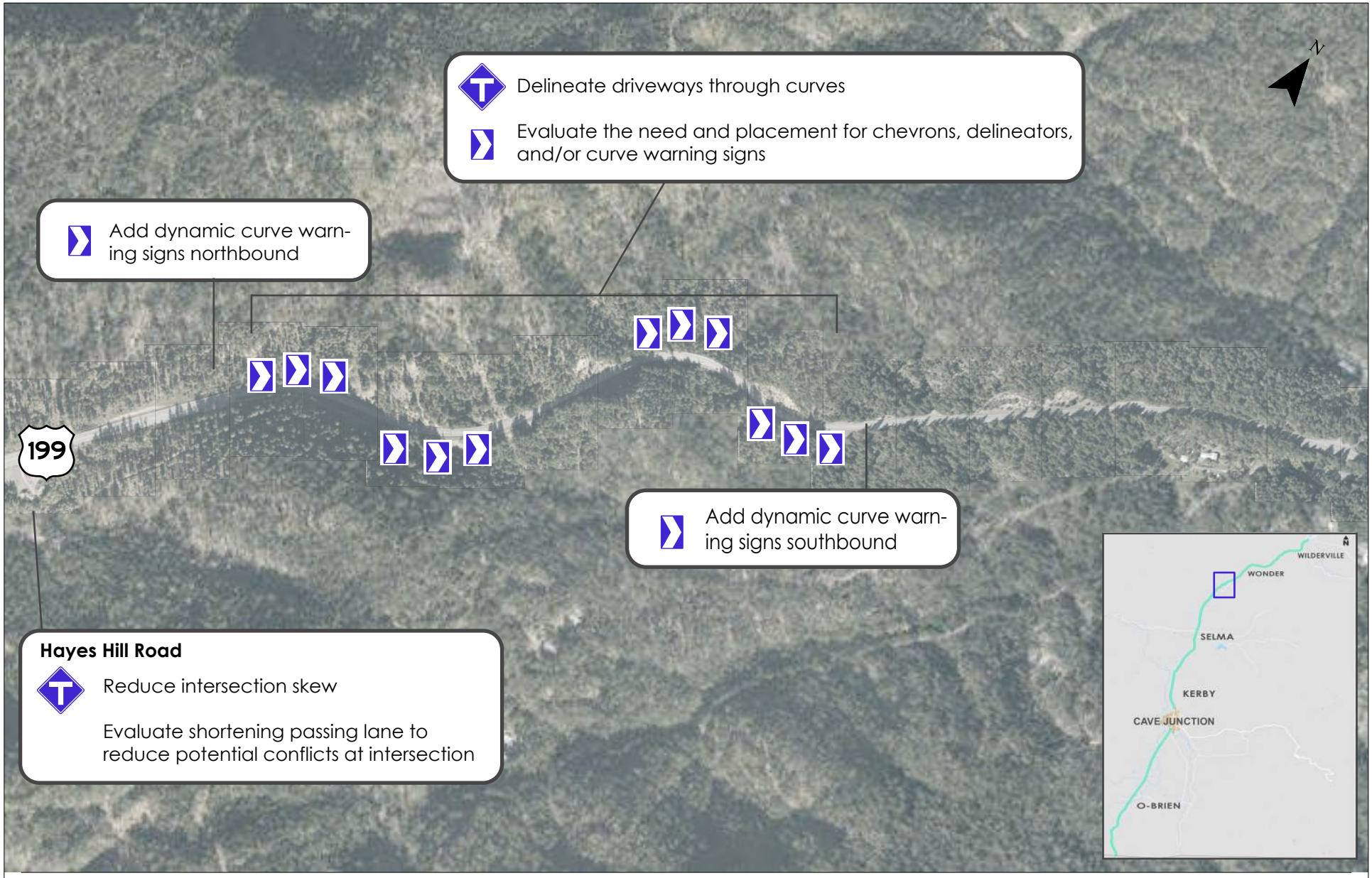


The recommendations shown on this figure are in addition to the corridor-wide and context-zone specific strategies presented in Section 5 of the memorandum.

Wonder to Hayes Hill
Josephine County, Oregon

Figure 8



The recommendations shown on this figure are in addition to the corridor-wide and context-zone specific strategies presented in Section 5 of the memorandum.

Near Hayes Hill Summit
Josephine County, Oregon

Figure 9

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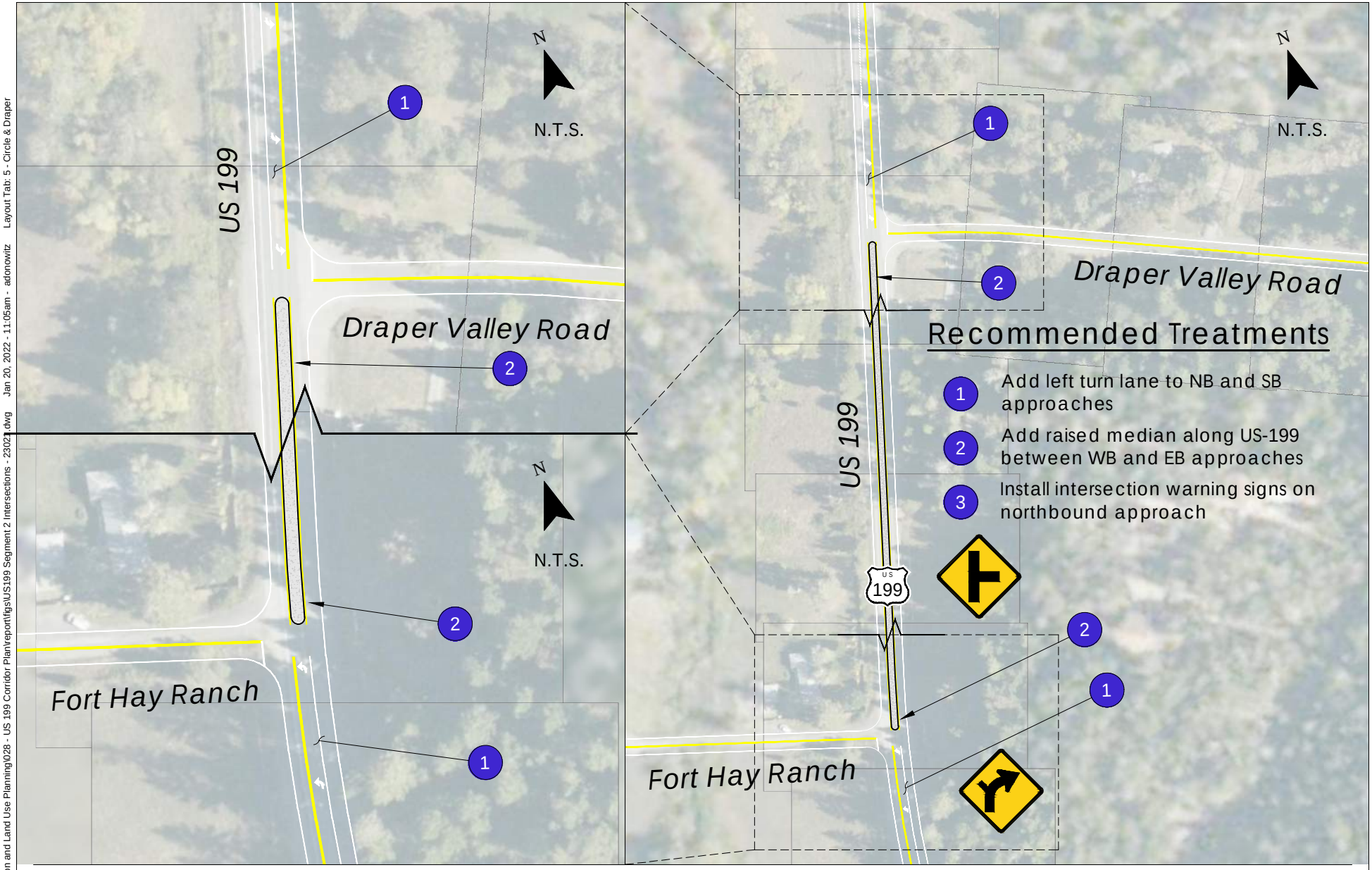
The recommendations shown on this figure are in addition to the corridor-wide and context-zone specific strategies presented in Section 5 of the memorandum.

Near Draper Valley Road
Josephine County, Oregon

Figure 10



Fort Hay Ranch
& Draper Valley Road
Josephine County, Oregon

Figure
11

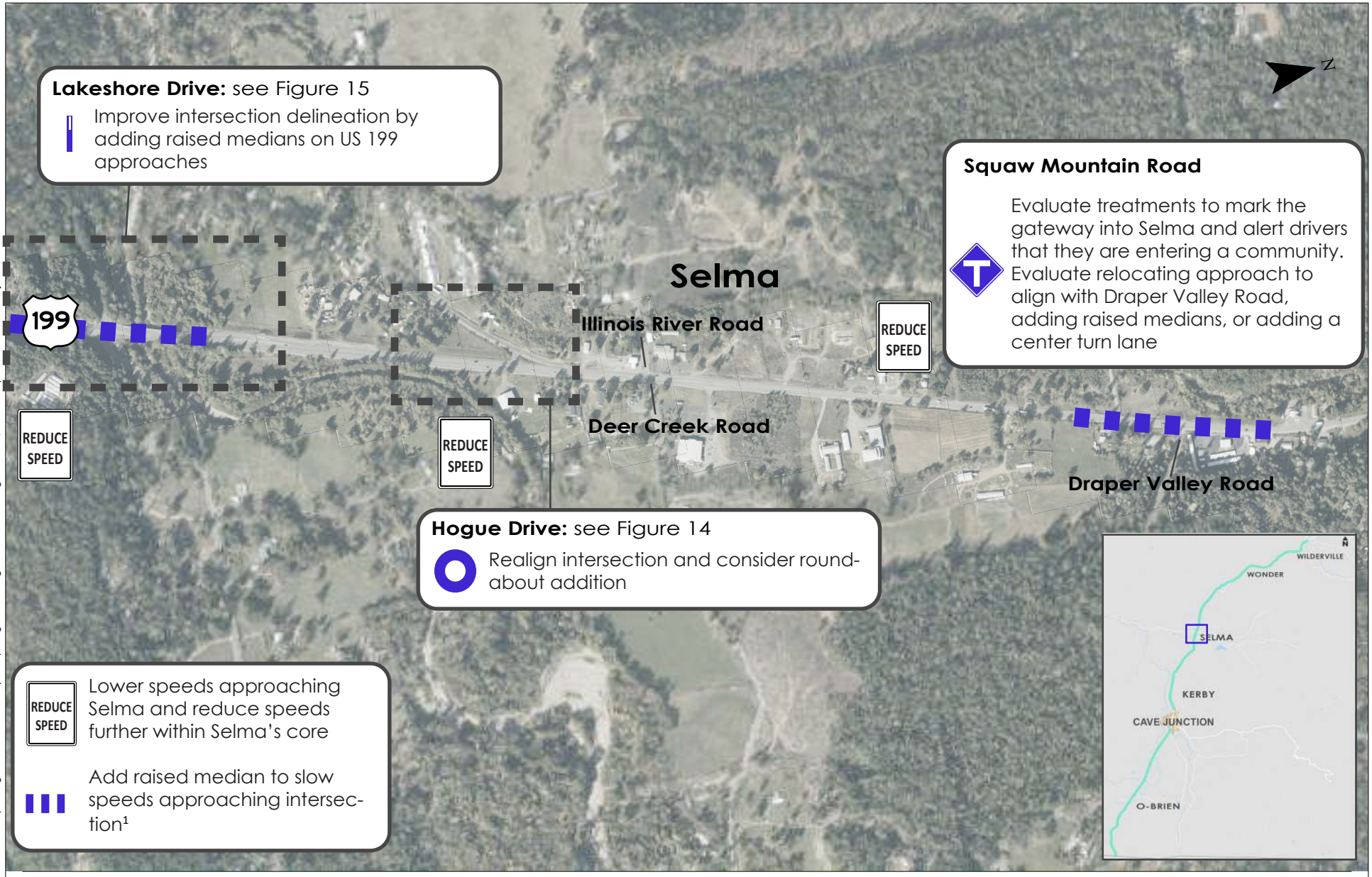
KITTELSON & ASSOCIATES

The recommendations shown on this figure are in addition to the corridor-wide and context-zone specific strategies presented in Section 5 of the memorandum.

North of Selma
Josephine County, Oregon

Figure 12

KITTELSON & ASSOCIATES



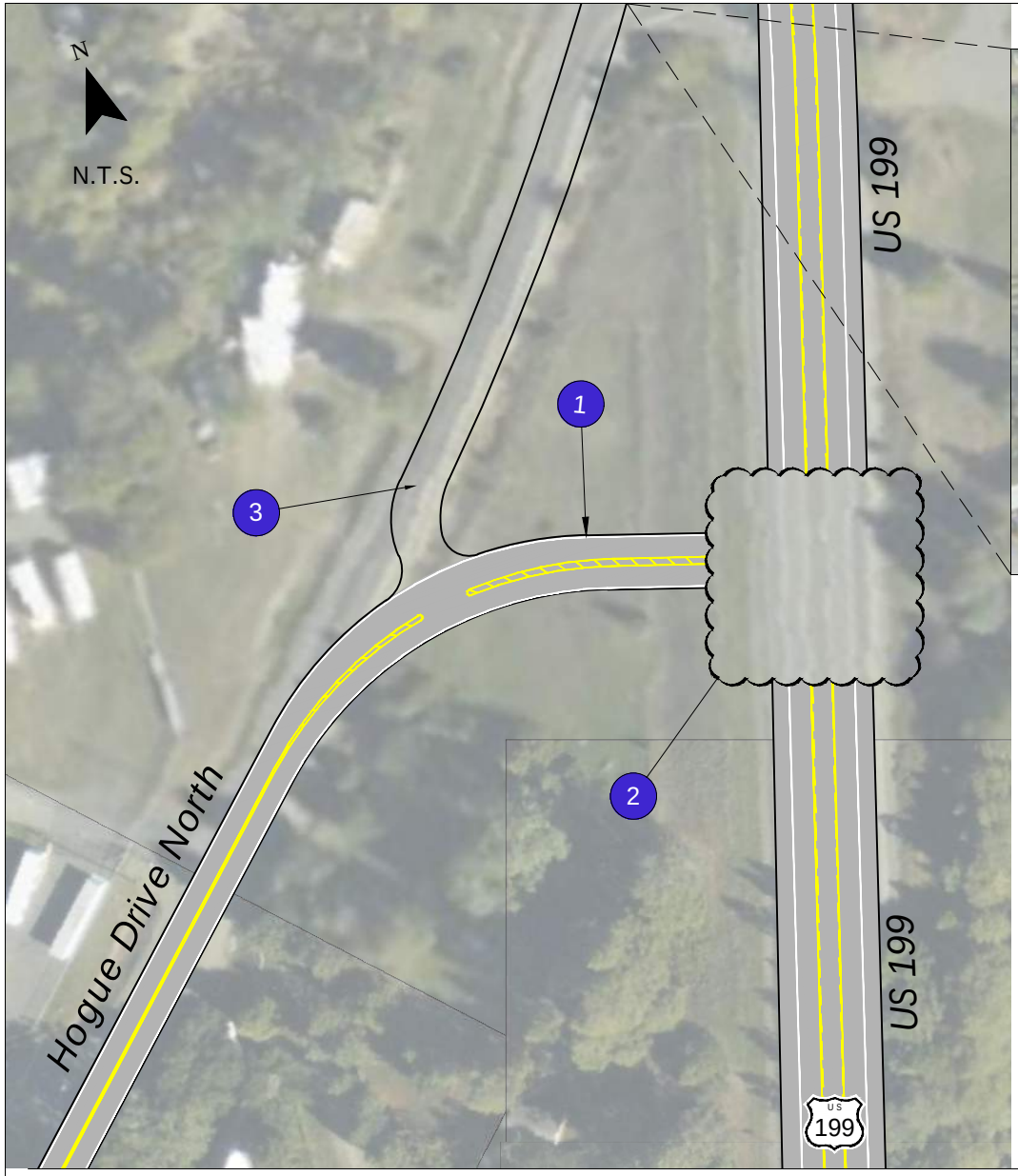
The recommendations shown on this figure are in addition to the corridor-wide and context-zone specific strategies presented in Section 5 of the memorandum.

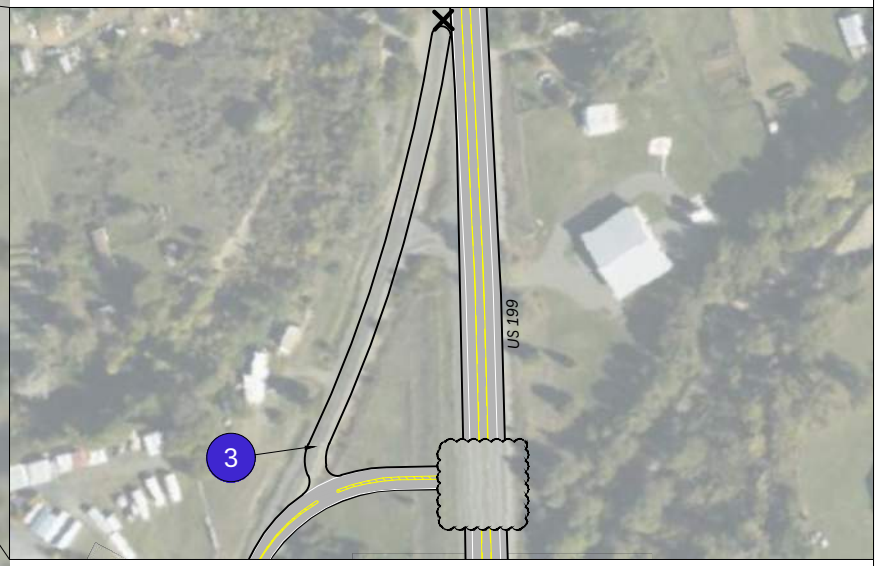
[1] May require ORS 366.215 process review

Selma
Josephine County, Oregon

Figure 13

KITTELSON & ASSOCIATES



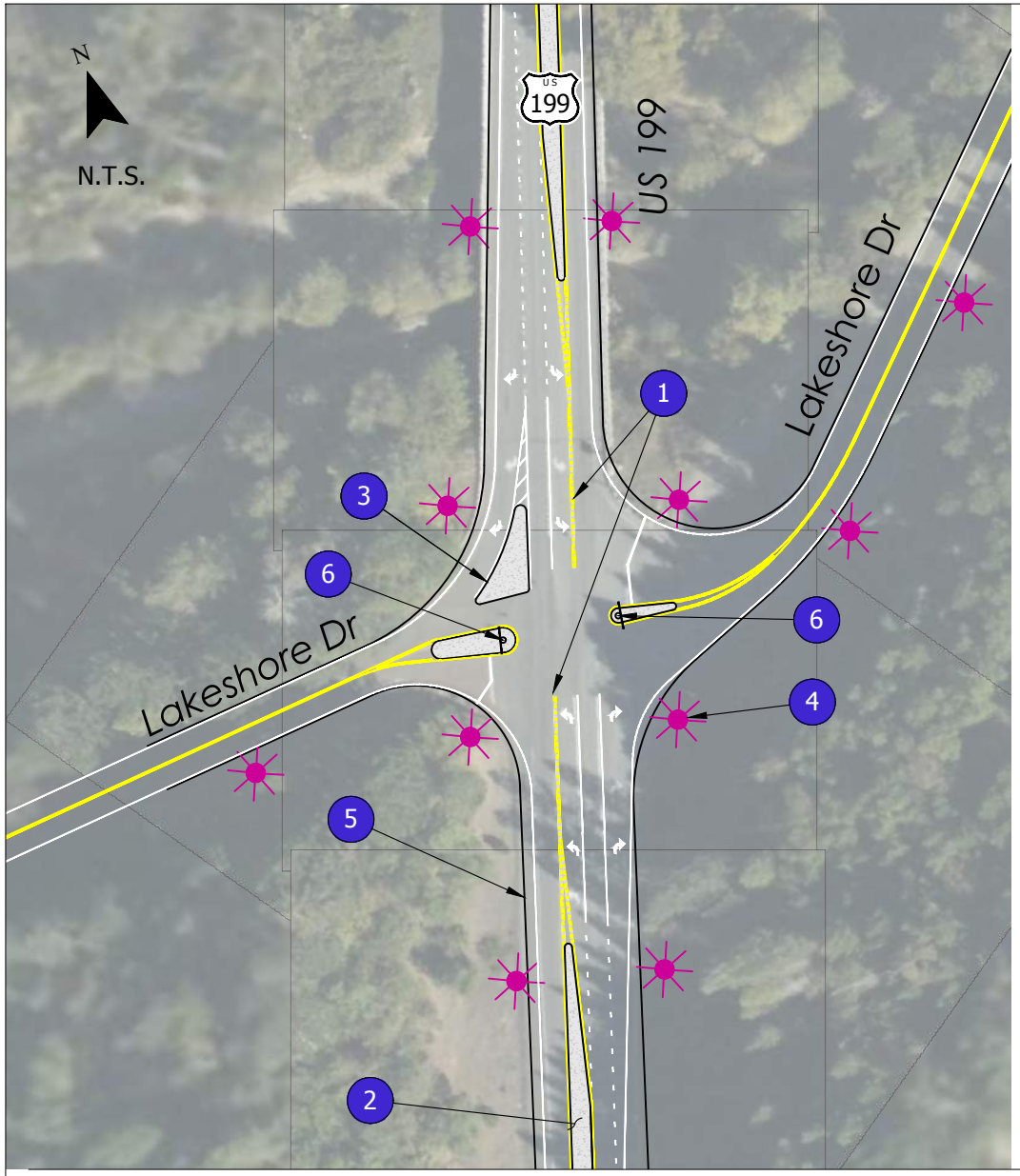


Recommended Treatments

1. Realign Hogue Drive North approach to U.S. Route 199
2. Consider intersection forms such as a roundabout to slow speeds, serve as a gateway treatment, and facilitate turning movement counts.
3. Maintain driveway access

Hogue Drive North
Josephine County, Oregon

Figure
14



Recommended Treatments

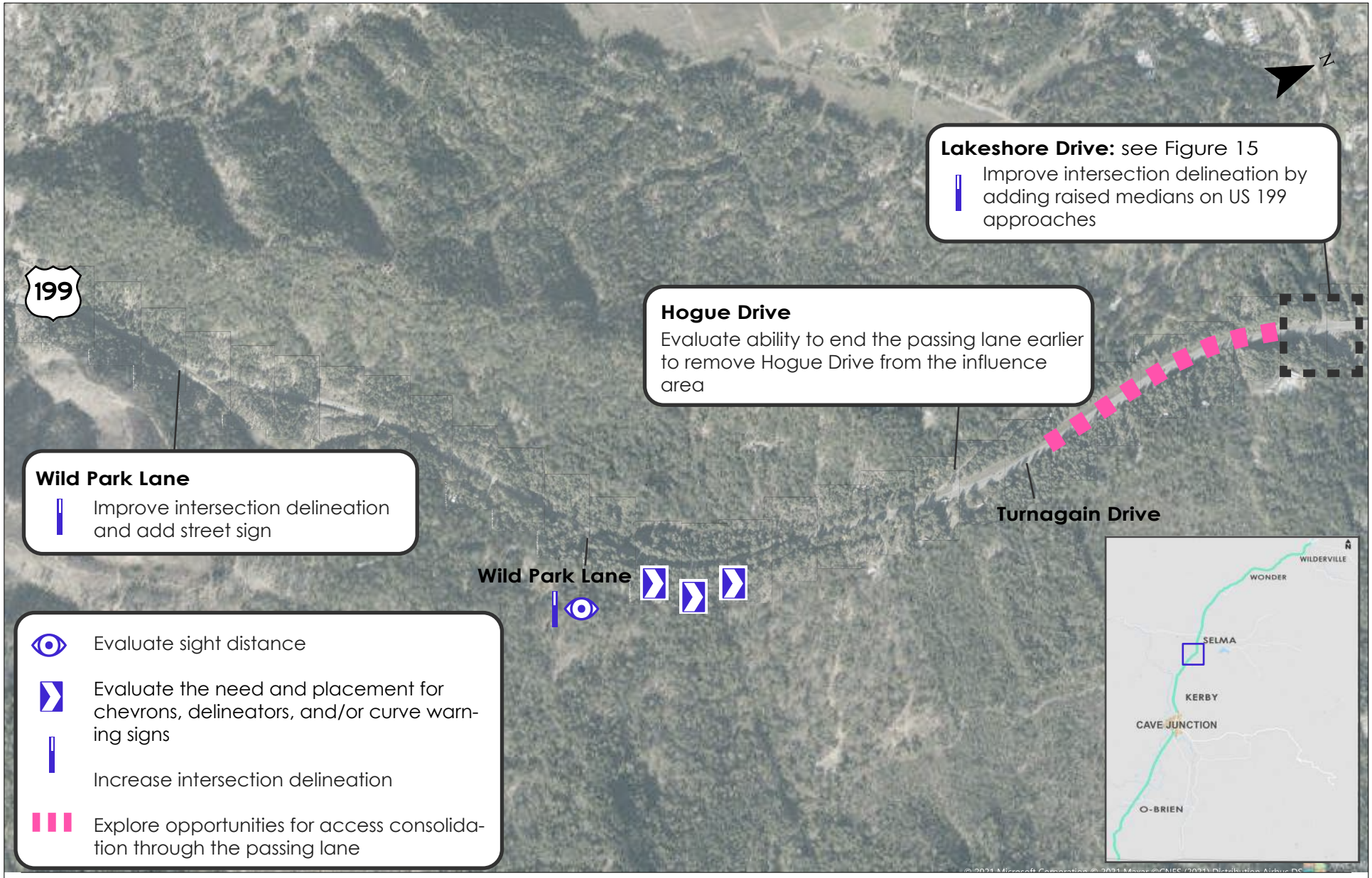
1. Consider centerline traffic separators on NB and SB approaches
2. Consider raised medians on approaches
3. Consider right turn island on SB approach
4. Consider intersection lighting
5. Consider curbing on each approach
6. Consider splitter island and left side stop sign

General Note

Consider the treatments shown to improve intersection visibility and awareness. Project design should evaluate intersection configuration, including the need for the existing southbound right-turn lane and facilities for bicyclists and pedestrians.

Lakeshore Drive
Josephine County, Oregon

Figure
15



The recommendations shown on this figure are in addition to the corridor-wide and context-zone specific strategies presented in Section 5 of the memorandum.

South of Selma
Josephine County, Oregon

Figure 16

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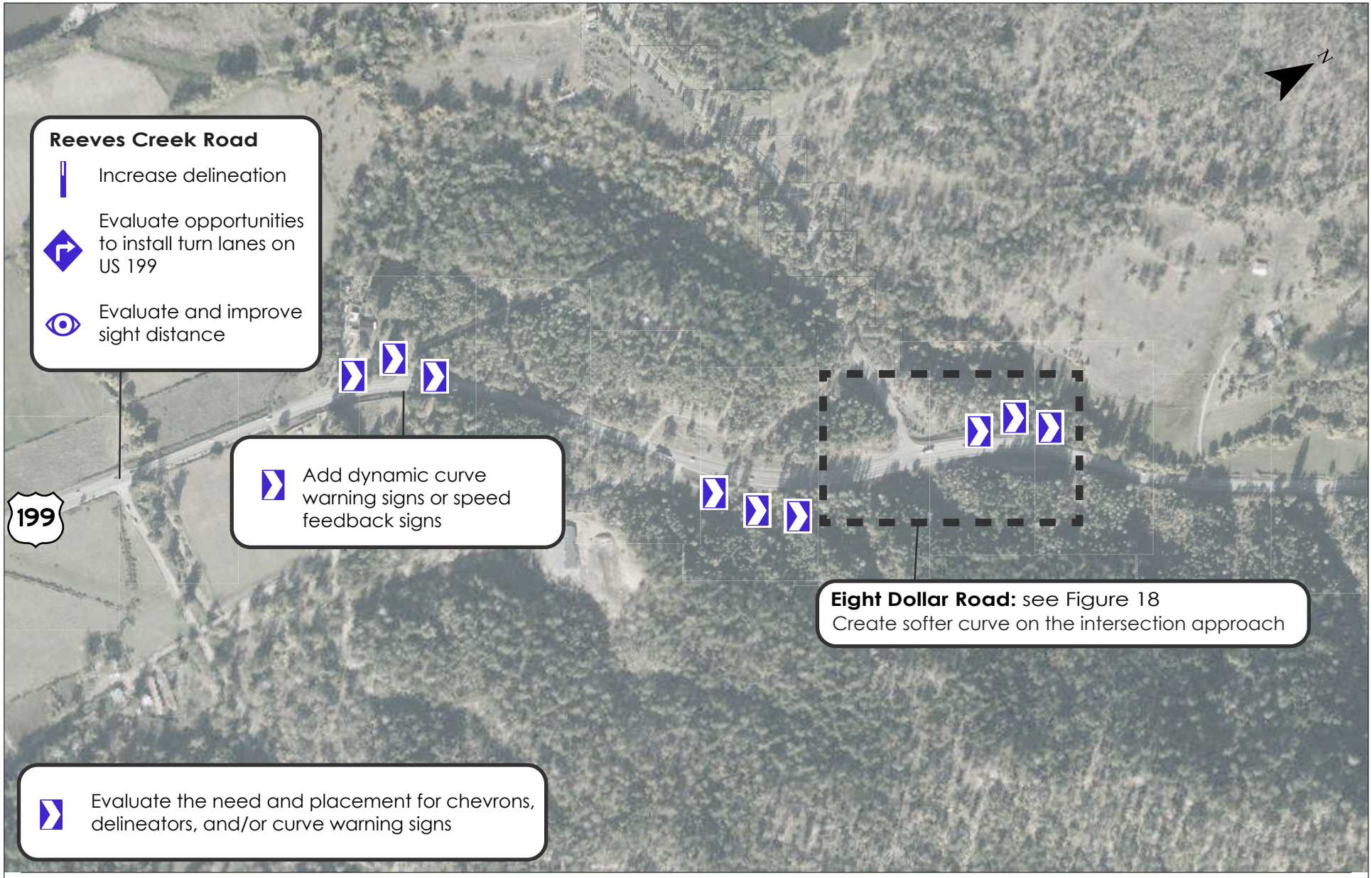
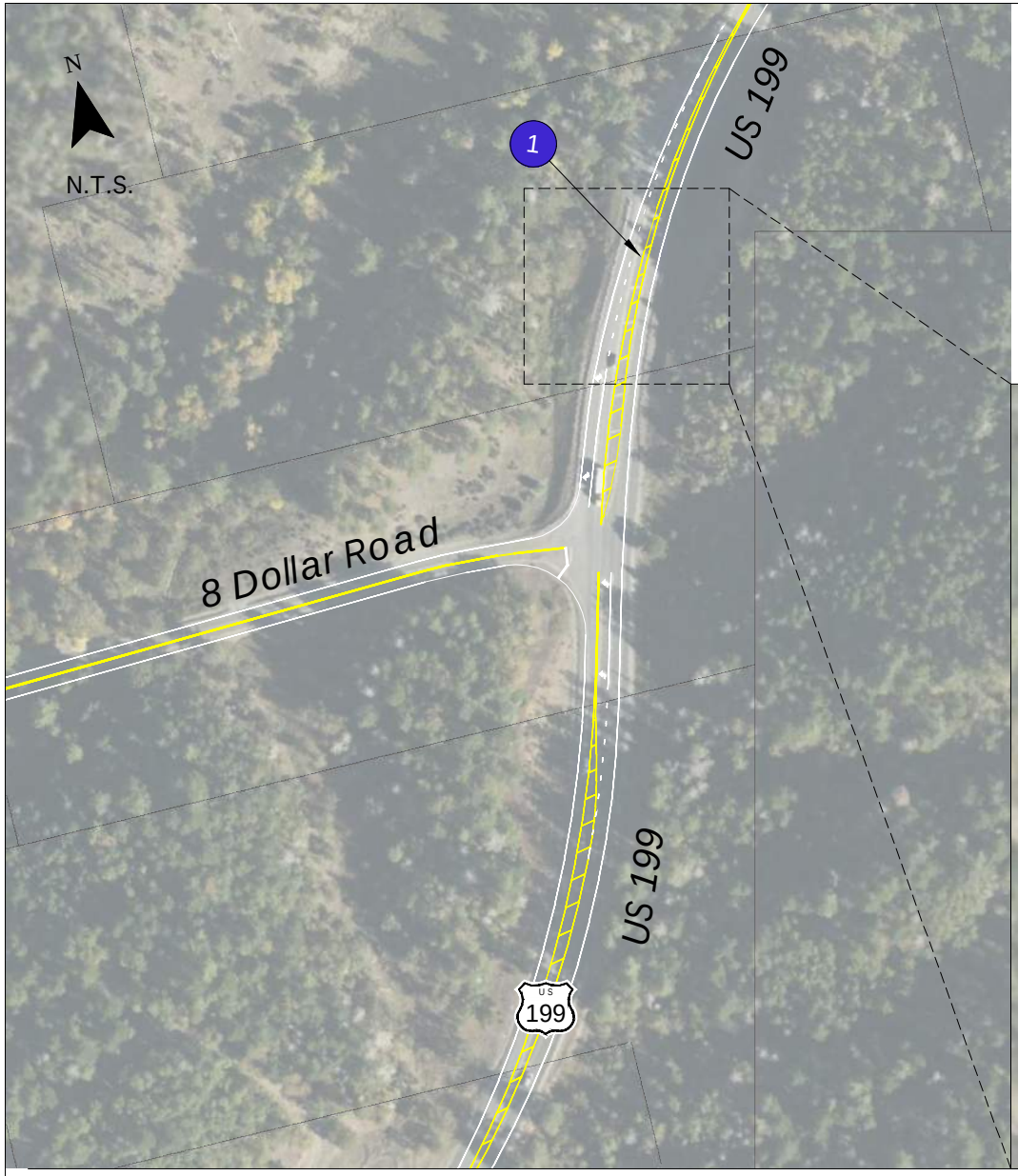


The recommendations shown on this figure are in addition to the corridor-wide and context-zone specific strategies presented in Section 5 of the memorandum.

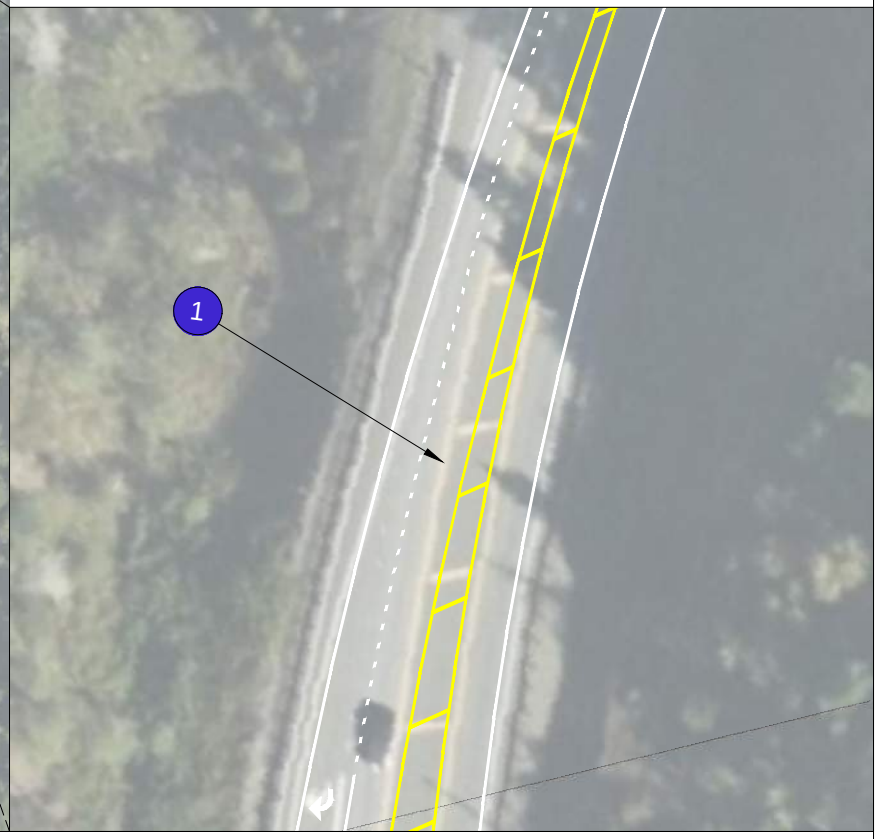
US 199 Near Reeves Creek Road
Josephine County, Oregon

Figure 17



Recommended Treatments

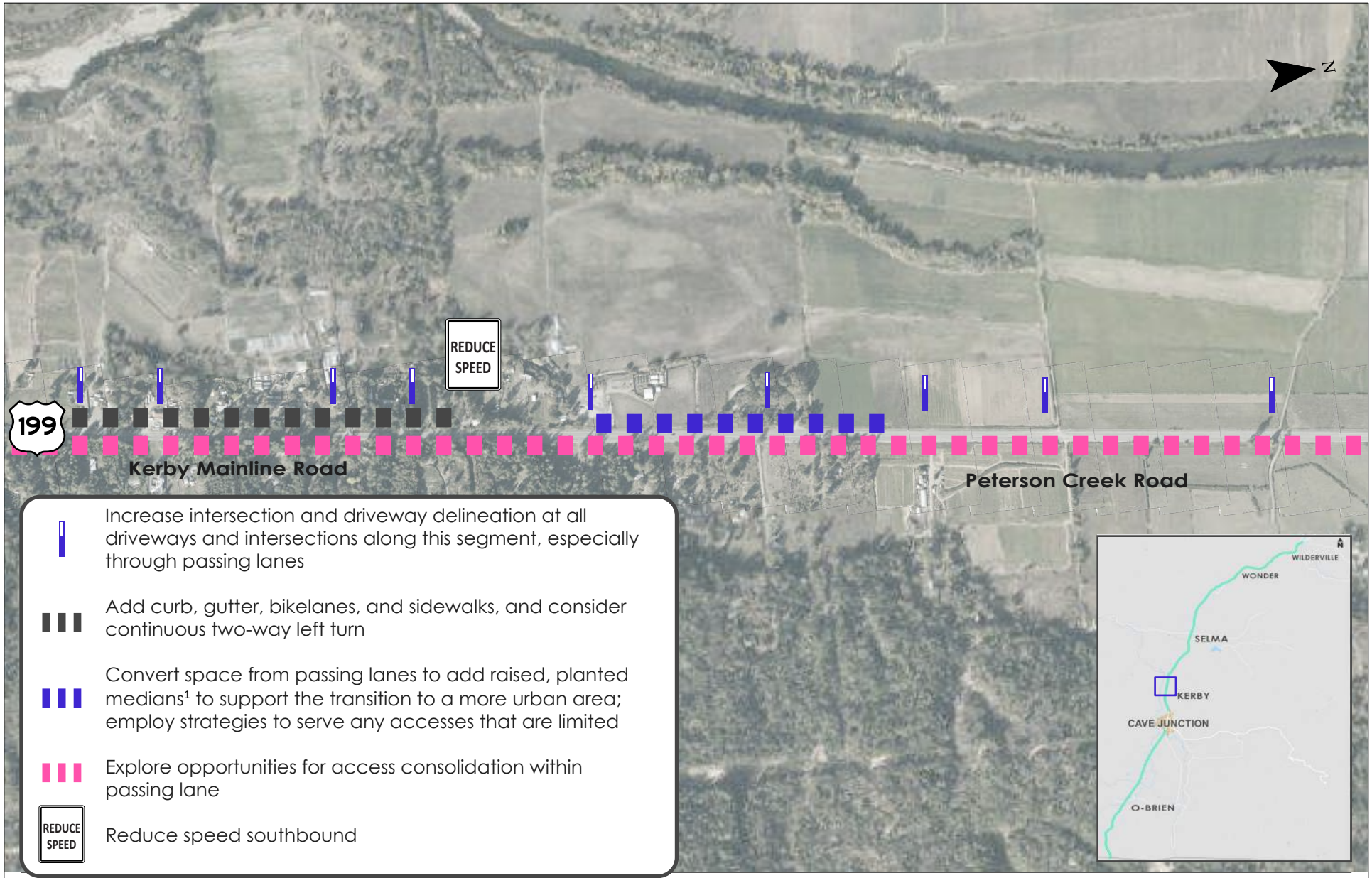
1. Restripe compound curve to provide appropriate radii and lane widths for through movements in both directions
2. Improve intersection sight distance to the south



8 Dollar Road
Josephine County, Oregon

Figure 18

KITTELSON & ASSOCIATES



The recommendations shown on this figure are in addition to the corridor-wide and context-zone specific strategies presented in Section 5 of the memorandum.

[1] May require ORS 366.215 process review

US 199 at Kerby
Josephine County, Oregon

Figure 19

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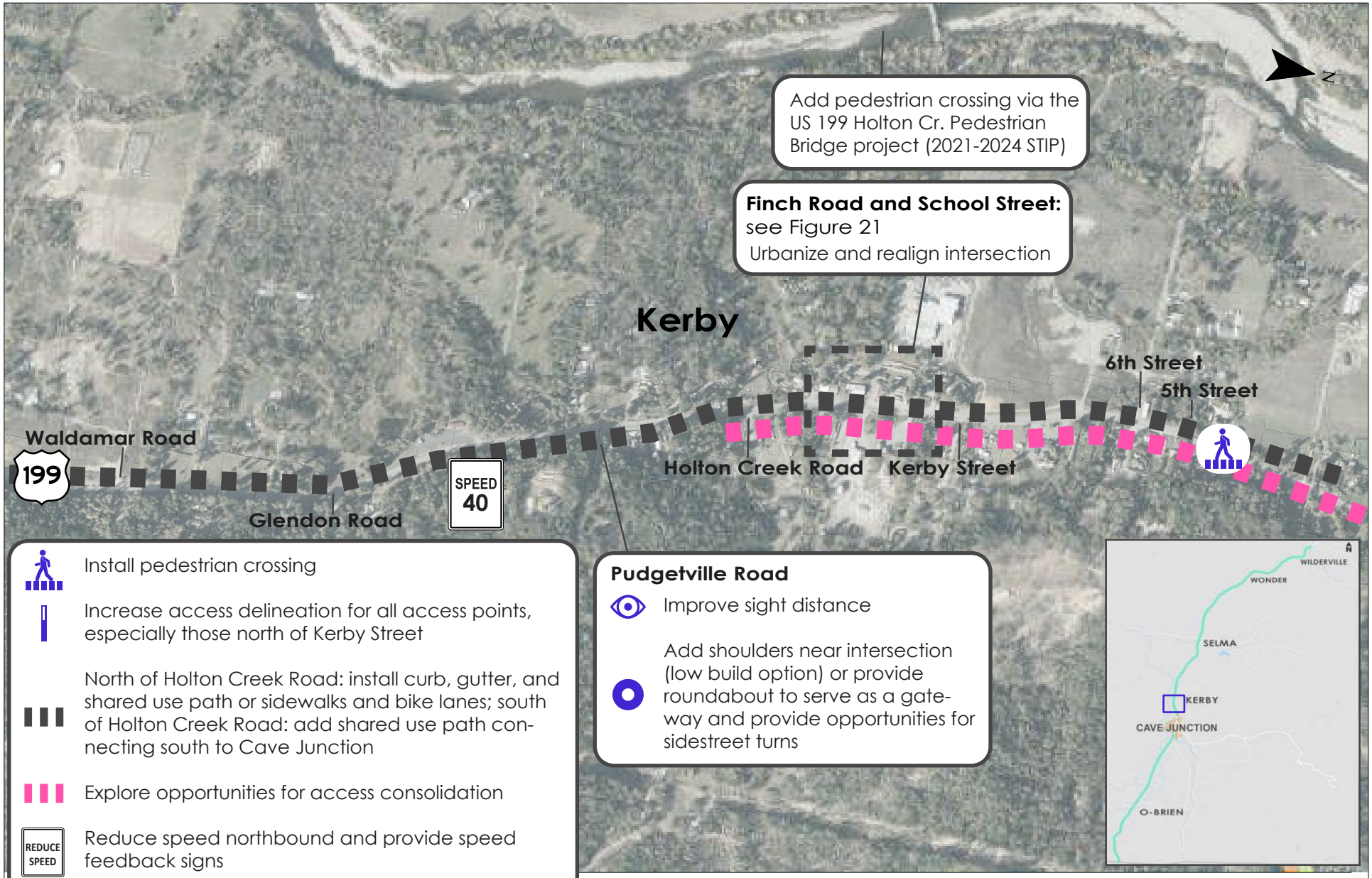

The recommendations shown on this figure are in addition to the corridor-wide and context-zone specific strategies presented in Section 5 of the memorandum.

Kerby
Josephine County, Oregon

Figure 20

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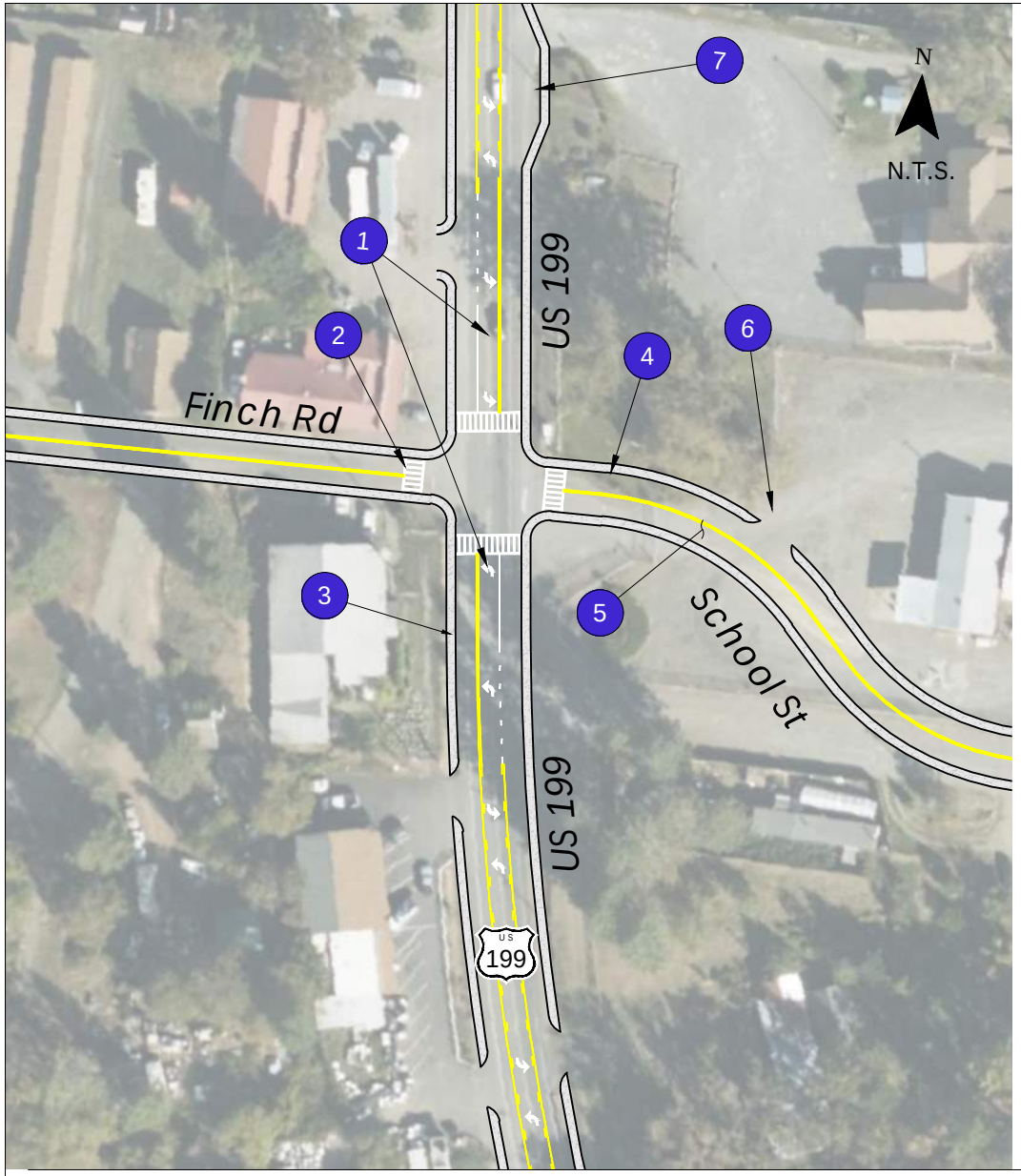
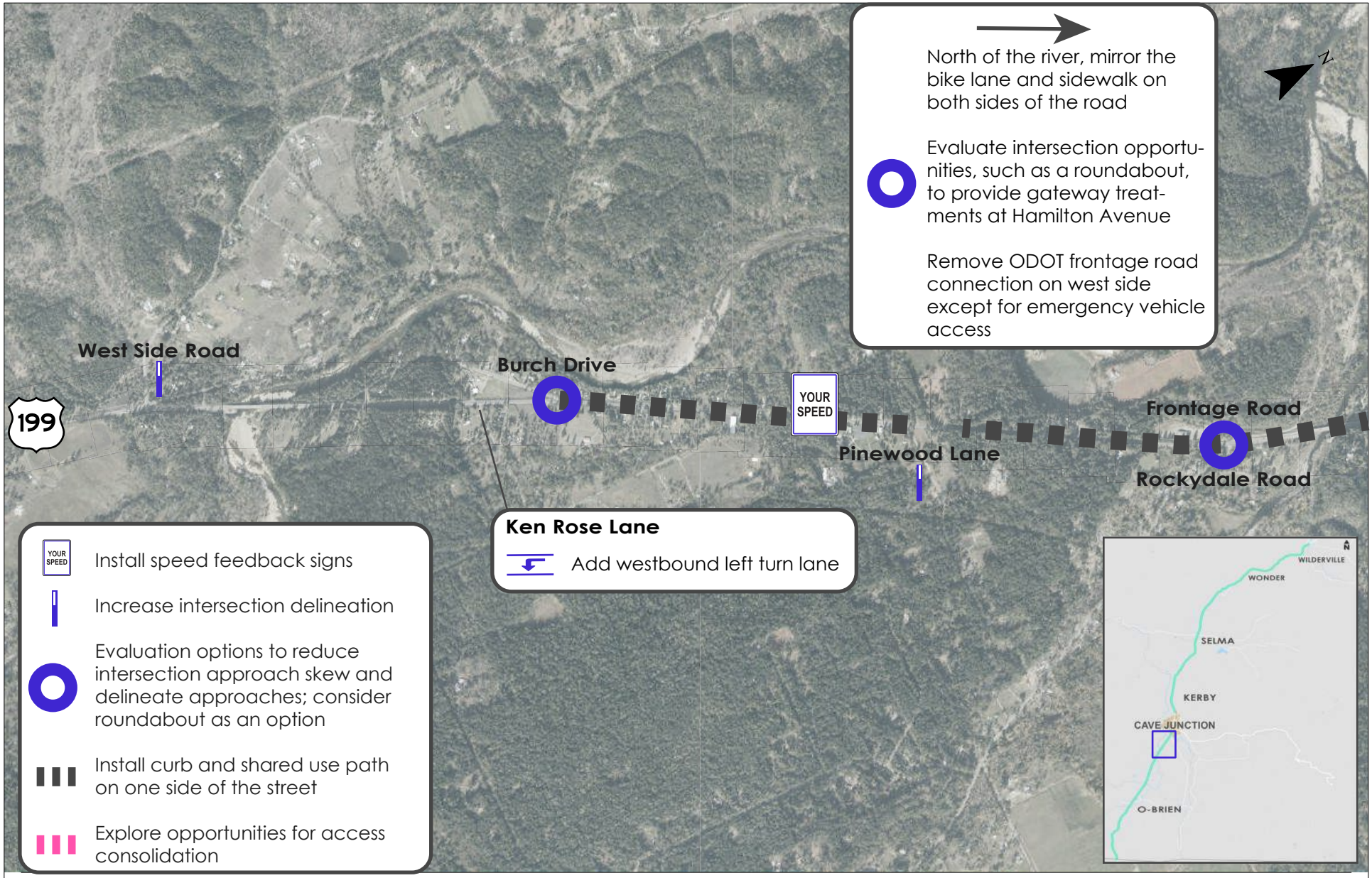


Recommended Treatments

1. Add left turn lanes on NB and SB approaches
2. Install crosswalks on each approach
3. Add sidewalks on either side of each approach
4. Add curbing on each approach
5. Realign West approach
6. Consolidate driveways along the NB side
7. Add transit stop

Kerby
Josephine County, Oregon

Figure
21



The recommendations shown on this figure are in addition to the corridor-wide and context-zone specific strategies presented in Section 5 of the memorandum.

South of Cave Junction
Josephine County, Oregon

Figure 22

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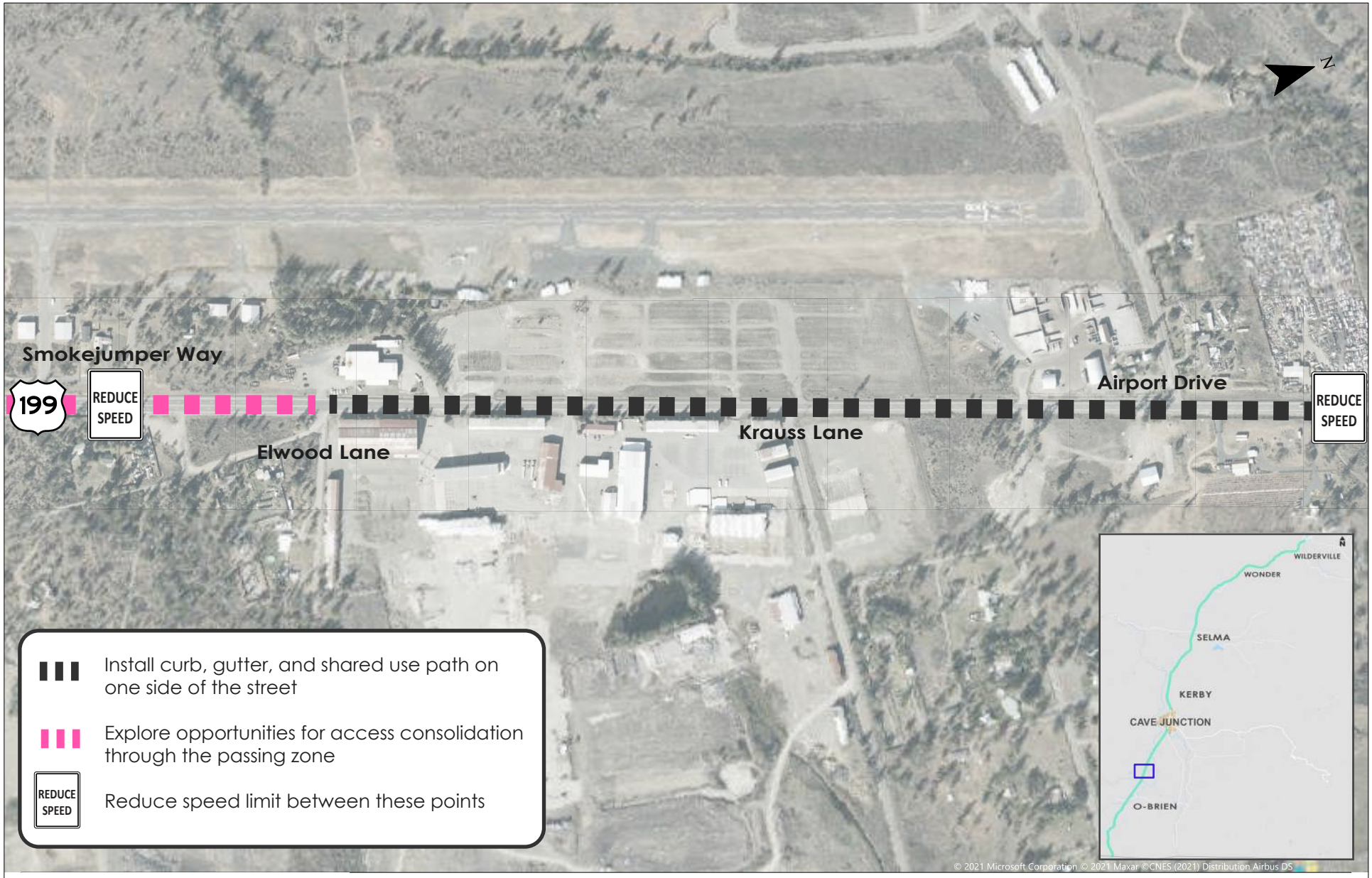
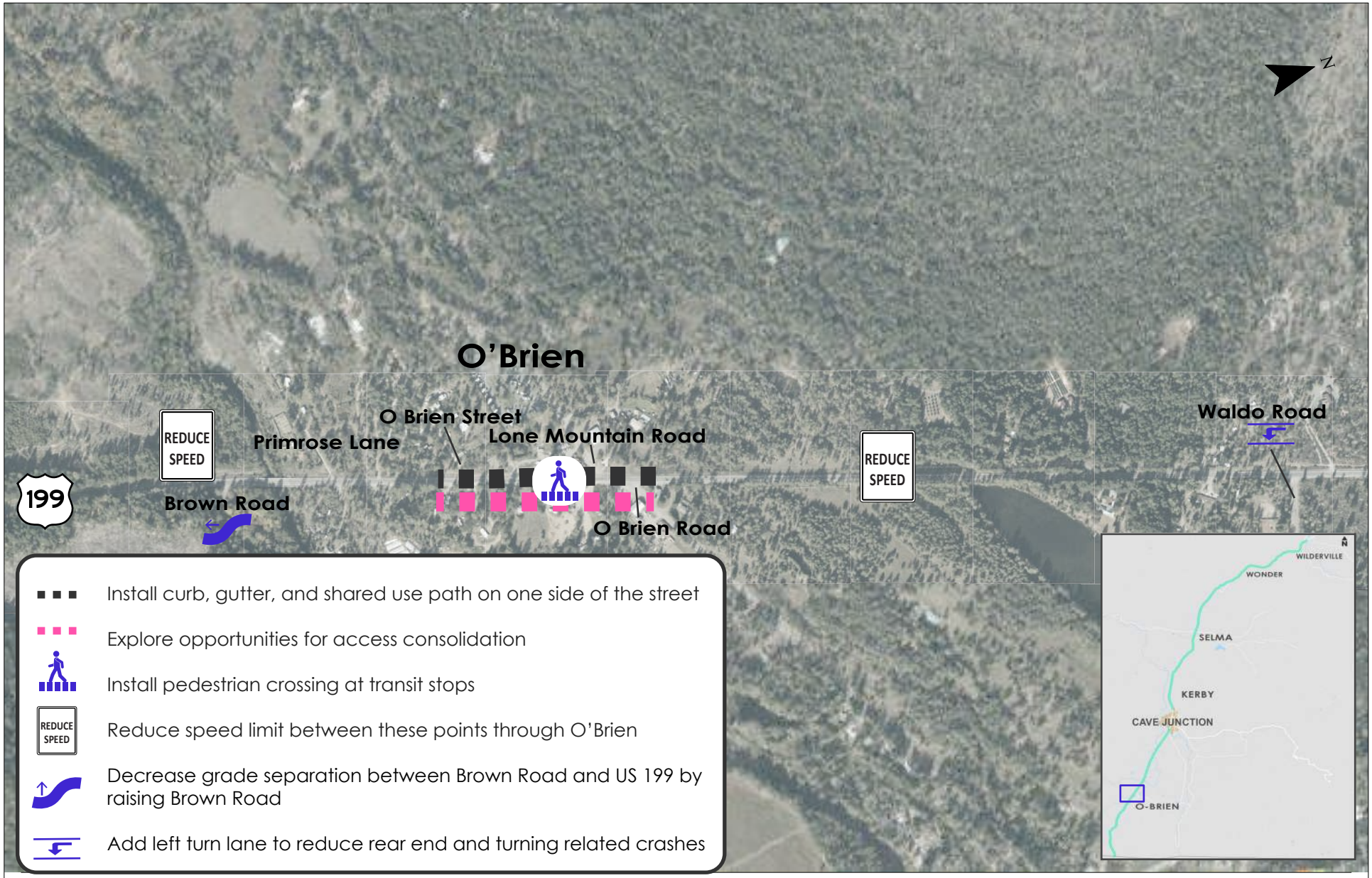


The recommendations shown on this figure are in addition to the corridor-wide and context-zone specific strategies presented in Section 5 of the memorandum.

Near Illinois Valley Airport
Josephine County, Oregon

Figure 23

KITTELSON & ASSOCIATES

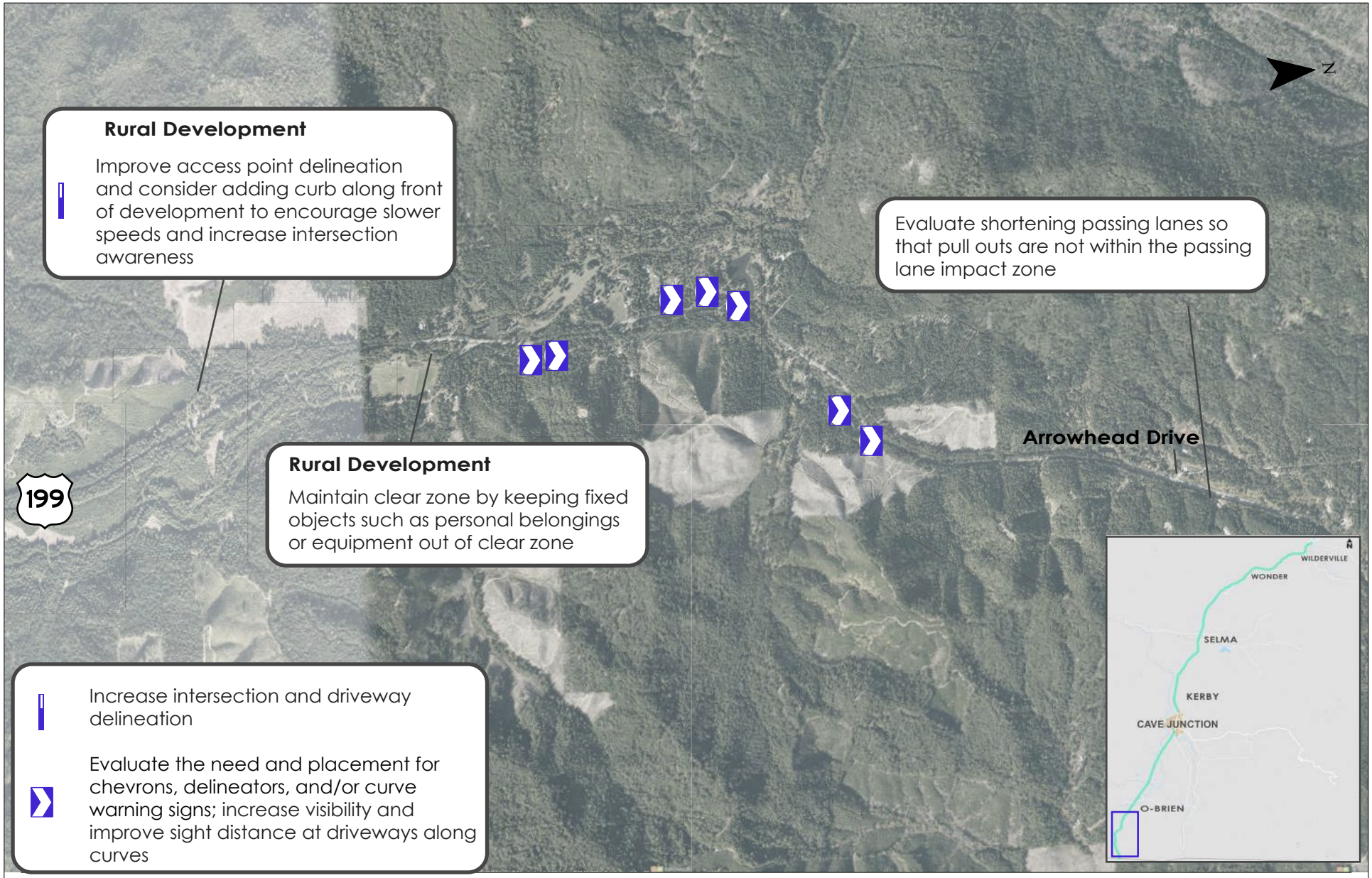


The recommendations shown on this figure are in addition to the corridor-wide and context-zone specific strategies presented in Section 5 of the memorandum.

US 199 at O'Brien
Josephine County, Oregon

Figure 24

KITTELSON & ASSOCIATES



The recommendations shown on this figure are in addition to the corridor-wide and context-zone specific strategies presented in Section 5 of the memorandum.

South of O'Brien
Josephine County, Oregon

Figure 25

7. Implementation Considerations

This section summarizes the steps to adopt and implement the US 199 Corridor Plan, after revisions to incorporate public input and prioritize the recommendations provided in this memorandum. The next Technical Memorandum will focus on implementation considerations in more detail and revisit the existing plans, regulations, and policies reviewed as part of Technical Memorandum #1 (Plan and Policy Review, Goals and Objectives) to evaluate consistency between the US 199 Corridor Plan and those documents.

7.1 Plan Adoption

The US 199 Corridor Plan is expected to be adopted at the state and local levels so the state facility and associated planned improvements are consistent with the regional transportation system. This will allow them to collectively support the planned land uses served by the US 199 study corridor.

The State and Josephine County may adopt the recommendations in the US 199 Corridor Plan. Ultimately, the Corridor Plan will be adopted by the State as an amendment to the Oregon Highway Plan (OHP), a modal plan of the Oregon Transportation Plan. The OHP establishes long-range policies and investment strategies for the state highway system and is amended as needed to incorporate refinement plans such as the US 199 Corridor Plan. Adopting the US 199 Corridor Plan will help guide ODOT's investment on the study corridor.

Upon adoption, the US 199 Corridor Plan will become the planning document that governs future transportation investment in the study corridor. Prior to adoption by the State and consistent with the current planning project objectives, ODOT and Josephine County will collaborate to develop amendments to local and regional policy documents such as the County's Goals and Policies of the Comprehensive Plan (Comprehensive Plan) and the Josephine Transportation System Plan (TSP). The purpose of these amendments will be to memorialize the County's support with the US 199 Corridor Plan goals and identified improvements and continued commitment to coordinate with ODOT on implementing the projects once the plan is adopted.

7.2 Implementing the US 199 Corridor Plan

After adopting the US 199 Corridor Plan, the next steps will involve implementing the recommended projects. No timeline has yet been established. Many of the Maintenance projects could be completed in the near-term, while some of the Capital Improvement Projects will take many years to obtain funds, develop the project and obtain approvals, and to acquire right-of-way and construct the project.

The following general considerations will be involved in implementing many of the projects:

- **Identifying funding mechanisms:** Securing funding to design and construct a project is an essential step in the process. The draft recommendations in this technical memorandum suggest possible funding mechanisms for each countermeasure. However, these will need to be confirmed. Many of the funding mechanisms are competitive grant processes that will require applying for funding.

- **Coordinating with agencies and stakeholders:** ODOT will need to coordinate internally and externally. Internally, many departments may be engaged to provide input on various aspects of the project such as right-of-way, access management, environmental, roadway design, freight, etc. Externally, ODOT is likely to coordinate with Josephine County, particularly if the project involves an intersection with a County road. Because US 199 is a Reduction Review Route, additional coordination and review of the Draft Plan will be required per Oregon Revised Statute (ORS) 366.215.

- **Coordinating with the freight industry:** US 199 is a designated Reduction Review Route (RRR), which prohibits modifications to the roadway that would reduce freight vehicle-carrying capacity. Coordination with the freight industry will confirm project compliance of this requirement (ORS 366.215 and OAR Chapter 731, Division 12 designate the requirements for reviewing Reduction of Vehicle-carrying Capacity (RVC) on a designated Reduction Review Route (RRR).)

- **Additional project development and design:** Most of the ARTS and Capital Improvement projects recommended will require a project development process that results in refining the project in greater detail than can be done at a corridor plan scale. This process can take months or years to complete.

- **Identifying potential right-of-way impacts**: During project development, right-of-way will be reviewed to determine potential impacts and needs for additional right-of-way.

- **Public outreach for access management**: In several locations, the US 199 Corridor Plan recommends reviewing opportunities to consolidate access points. In reviewing these locations, ODOT must follow the OAR Chapter 731, Division 51[1] procedures, standards, and approval criteria that govern highway access management and approach permitting.

- **Identifying potential land use impacts:** US 199 Corridor Plan projects may impact adjacent land uses through changes in access, right-of-way acquisition (where necessary), or impacts to the built environment. Similarly, the projects have the potential to affect local mobility, access, and parking availability that in turn may impact commuting patterns, access to businesses, commercial vehicle travel, and ADA facilities. Potential project impacts must be evaluated.

- **Reviewing County Overlay Zone Requirements:** US 199 Corridor Plan projects must comply with overlay zone requirements, such as:

  - Flood Hazard Overlay (RLDC Chapter 19.69A) applies to all flood hazard areas within the County. US 199 Corridor Plan projects must not increase flood levels.
  - Airport Overlay (RLDC Chapter 19.69D) applies to areas designated around the Illinois Valley Airport. US 199 Corridor Plan projects are subject to height and lighting restrictions.

[1] OAR 734-051, https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=3317

- **Identifying potential environmental impacts:** There are several possible permits and/or approvals that could be required from various agencies prior to constructing US 199 Corridor Plan projects, depending on the extent to which a project has the potential to impact environmental resources. Some of these may include:

  - Federally funded projects require ODOT to comply with federal environmental regulations in regard to biological resources, including the Fish and Wildlife Coordination Act, Oregon Endangered Species Act, and Section 7 of the Endangered Species Act (ESA).
  - Federal ESA prohibits federal agencies from conducting activities that will jeopardize the continuing existence of a listed species.
  - Fish passage is required on any stream. A fish passage plan will be required if a project triggers the Oregon State Fish Passage Statute.

7.3 Next Steps

Kittelson will be gathering input from the PMT, the PAC, and the public at a Virtual Public Open House in February 2022. Kittelson will use input to revise and prioritize the recommendations for the US 199 Corridor Plan. After gathering input, the Draft US 199 Corridor Plan will be developed and shared with the public at a second Virtual Public Open House.