Chapter 2
Alternatives

2.1 Description of Alternatives

The US 97 Bend North Corridor project is considering three alternatives including two build alternatives, referred to as the East DS1 and East DS2 Alternatives, and the No Build Alternative as required by the National Environmental Policy Act. Exhibit 2-1 through Exhibit 2-3 show the general alignments of the three alternatives.

As a result of public comments received on the Draft EIS, the East DS2 Alternative was modified to minimize impacts and address concerns raised by the public. This modified alternative, the East DS2 Modified Alternative, is identified as the Preferred Alternative (Exhibit 2-3 FEIS), and the associated design changes are described and illustrated in this chapter.

2.1.1 No Build Alternative

The No Build Alternative would maintain the current US 97 facility as the roadway presently exists, which is described below in three sections from south to north. The transportation analysis conducted for the No Build Alternative assumed construction of both planned publicly funded and privately funded roadway improvement and traffic signal projects; projects funded through the Oregon Statewide Transportation Improvement Program or the City of Bend's *Capital Improvement Program*; and roadway improvements in approved developments. These improvements are detailed in Exhibit 3-9B FEIS in Section 3.1 Transportation Facilities.

South Section—Butler Market Road to Nels Anderson Place

From Butler Market Road north to Nels Anderson Place, US 97 (also named the Bend Parkway) has two northbound travel lanes, two southbound travel lanes, a vegetated median, and paved shoulders marked as bicycle lanes. A sidewalk is present on the west side from the Sisters loop ramp to Nels Anderson Place. US 97 crosses over Butler Market Road on an elevated structure. An auxiliary lane would be built in each direction between Butler Market Road and Empire Avenue, although this would occur independent of the proposed action. Empire Avenue crosses over US 97 on an elevated structure and signal; ramps from US 97 provide access from northbound US 97 to Empire Avenue, from Empire Avenue to northbound US 97, and from Empire Avenue to southbound US 97 (Exhibit 2-4).

Chapter 2 Content

2.1 Description of Alternatives
2.2 Alternatives Development and Screening
2.3 Practical Design Elements
2.4 Alternatives Developed but Eliminated from Further Consideration
2.5 Comparison of Alternatives
2.6 Identification of the Preferred Alternative—East DS2 Modified Alternative
2.7 Permits and Approvals Needed

Exhibit 2-1: *No Build Alternative*

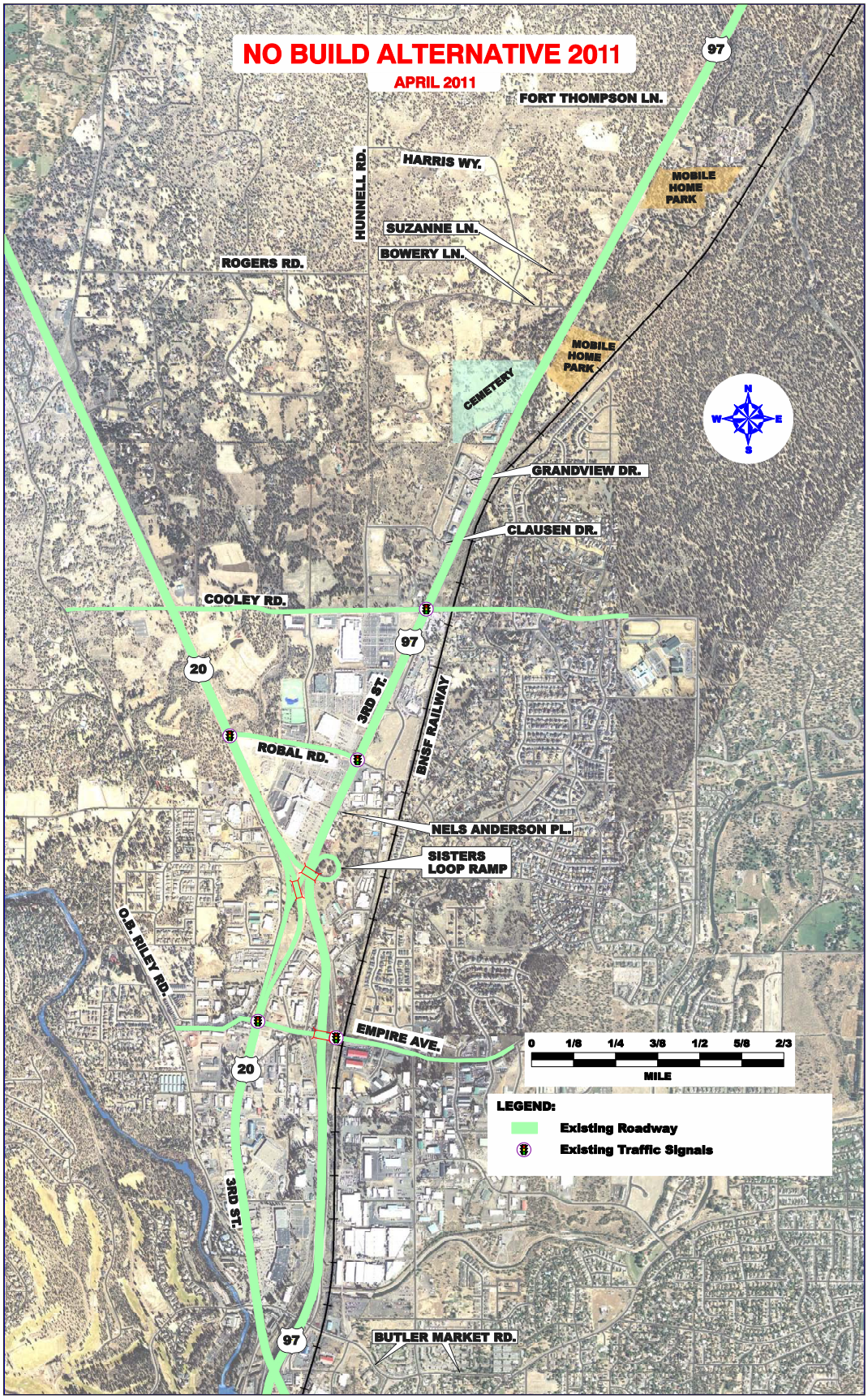


Exhibit 2-2: *East DS1 Alternative*

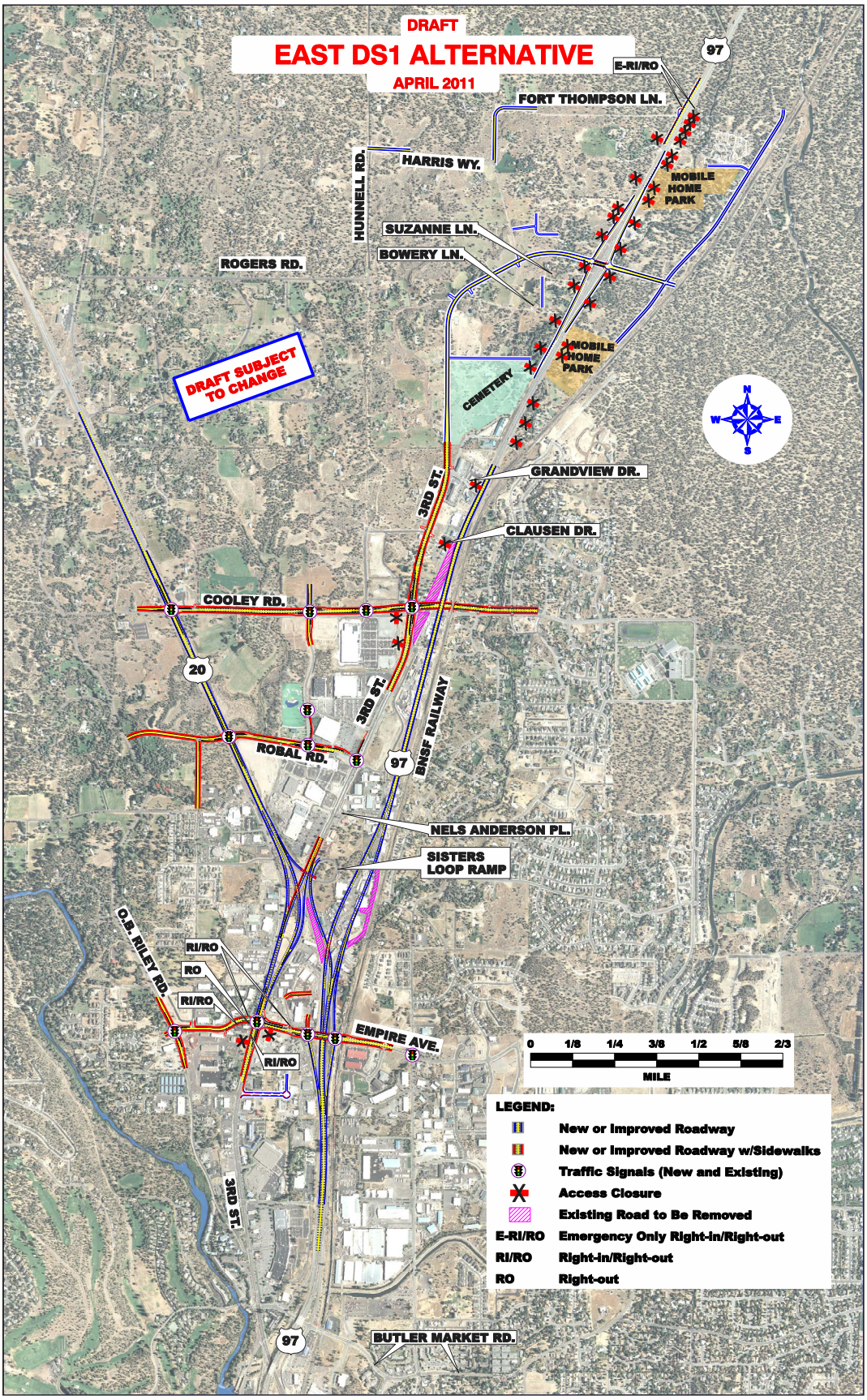


Exhibit 2-3: *East DS2 Alternative*

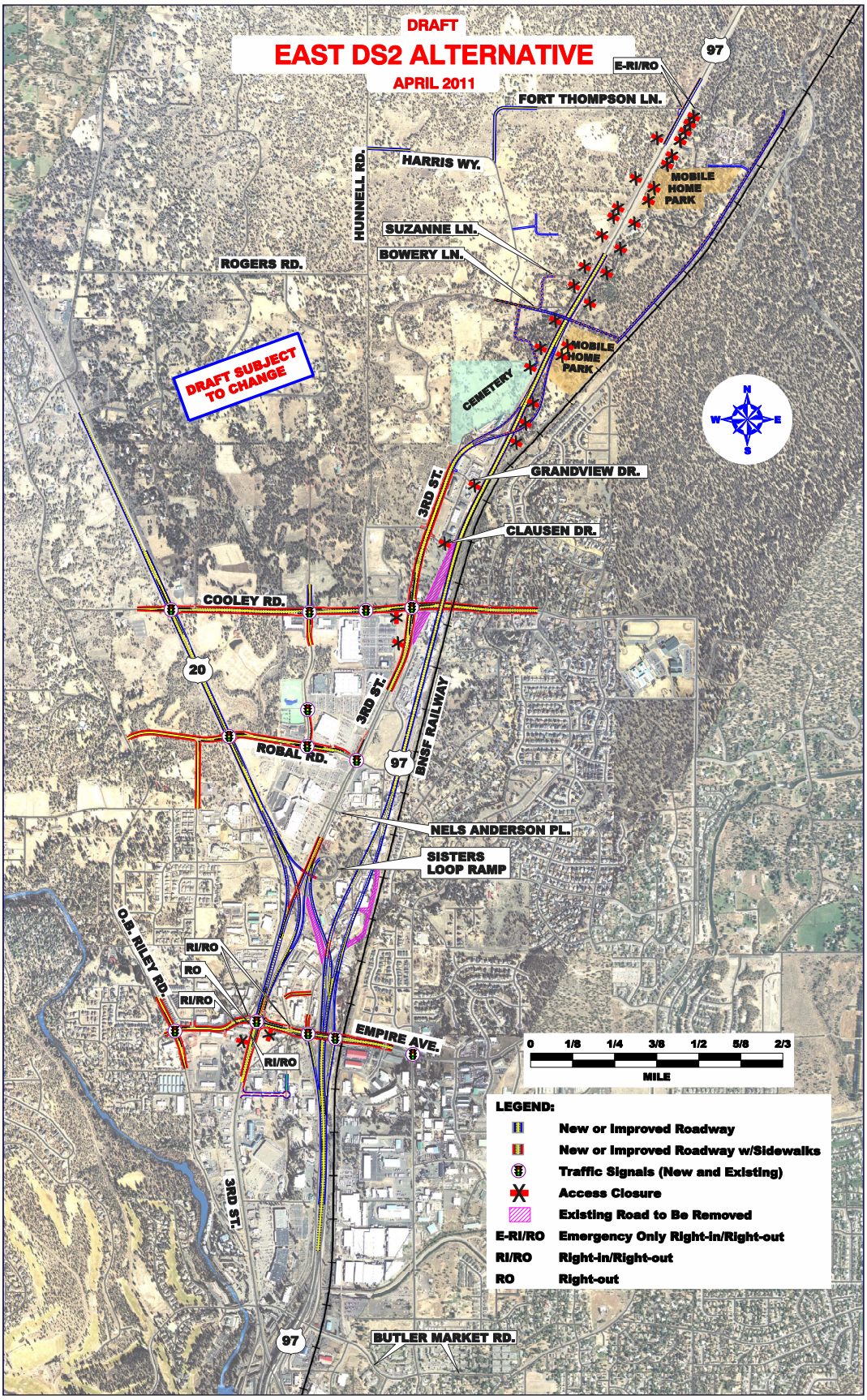
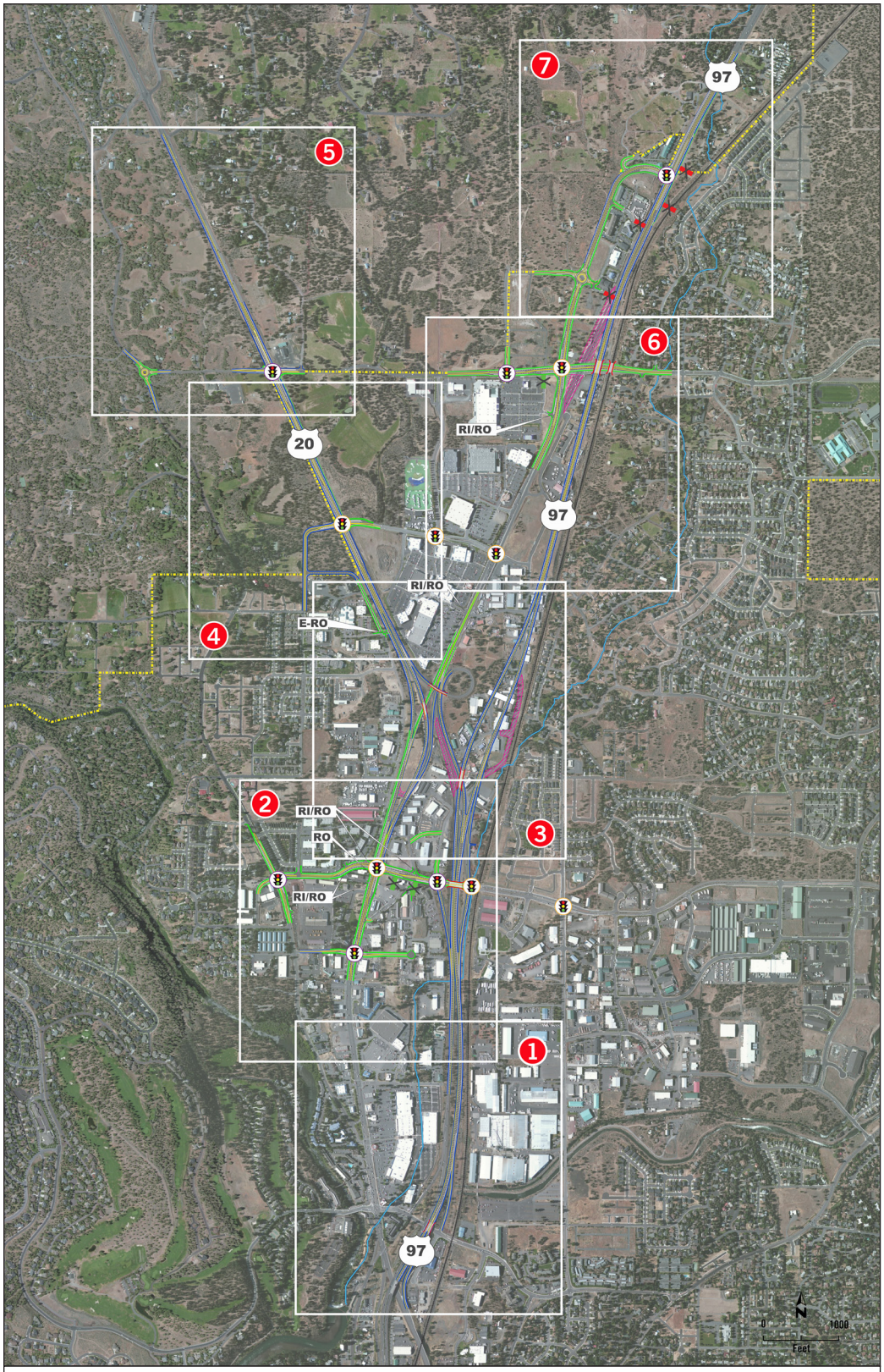


Exhibit 2-3 FEIS: Preferred Alternative



INDEX MAP

Roadway Improvements without Sidewalks
Roadway Improvements with Sidewalks
New Traffic Signals
Trail Undercrossing
Access or Local Road Closure - ODOT
Access or Local Road Closure - City*
Existing Traffic Signals
Map
E-RO Emergency Only Right-out
RI/RO Right-In/Right-out
Existing Roadway to be Removed
RO Right-out
Urban Growth Boundary
Swalley Main Canal Pipeline
Bridge

* Traffic analysis assumes closure of these access points. City of Bend will make the final determination on closures.

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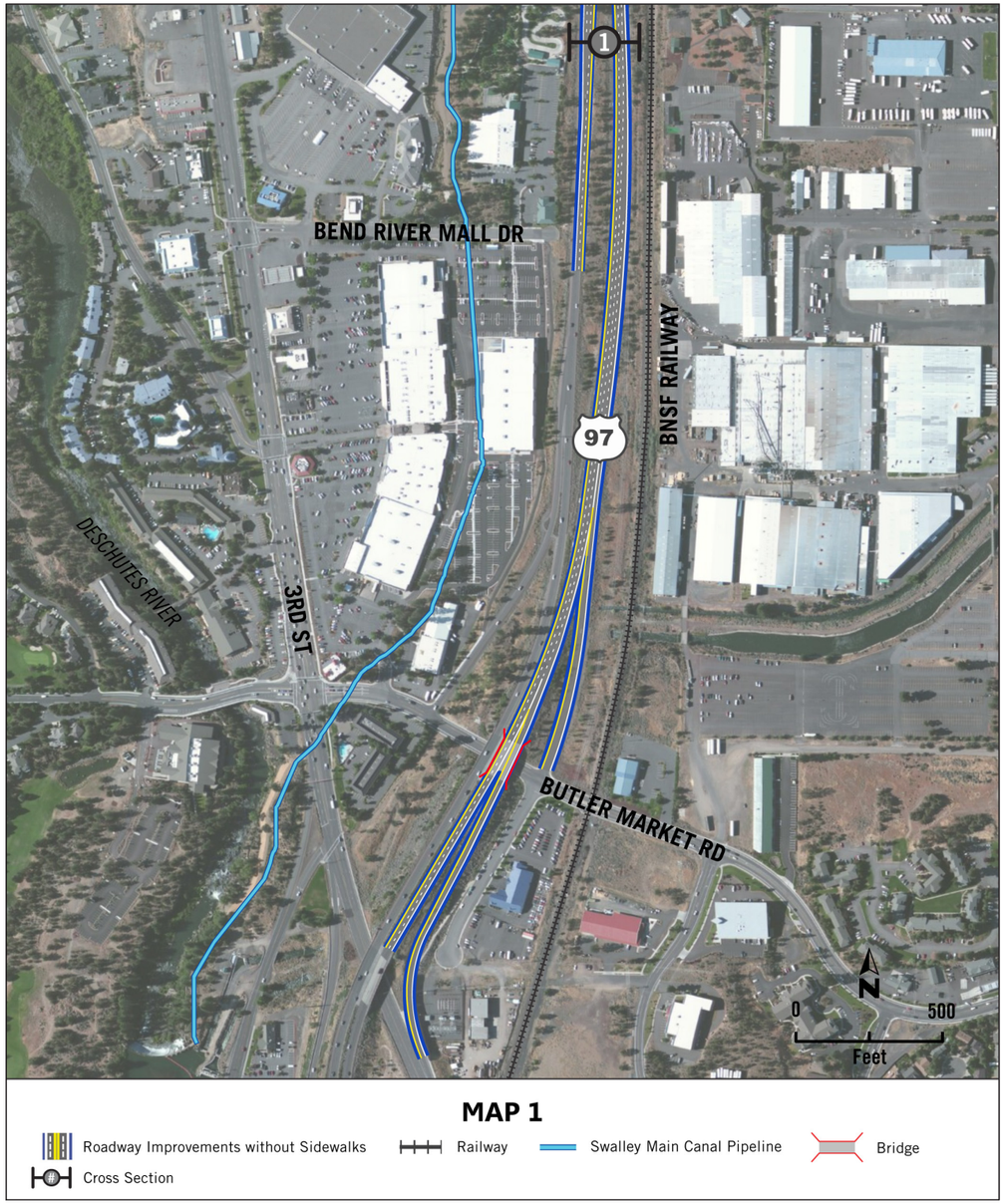
Exhibit 2-3 FEIS: *Preferred Alternative (Map 1)*



Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.

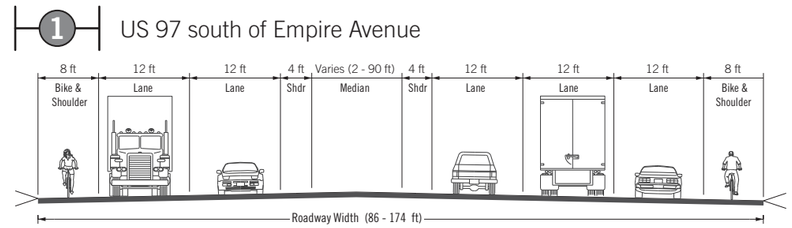


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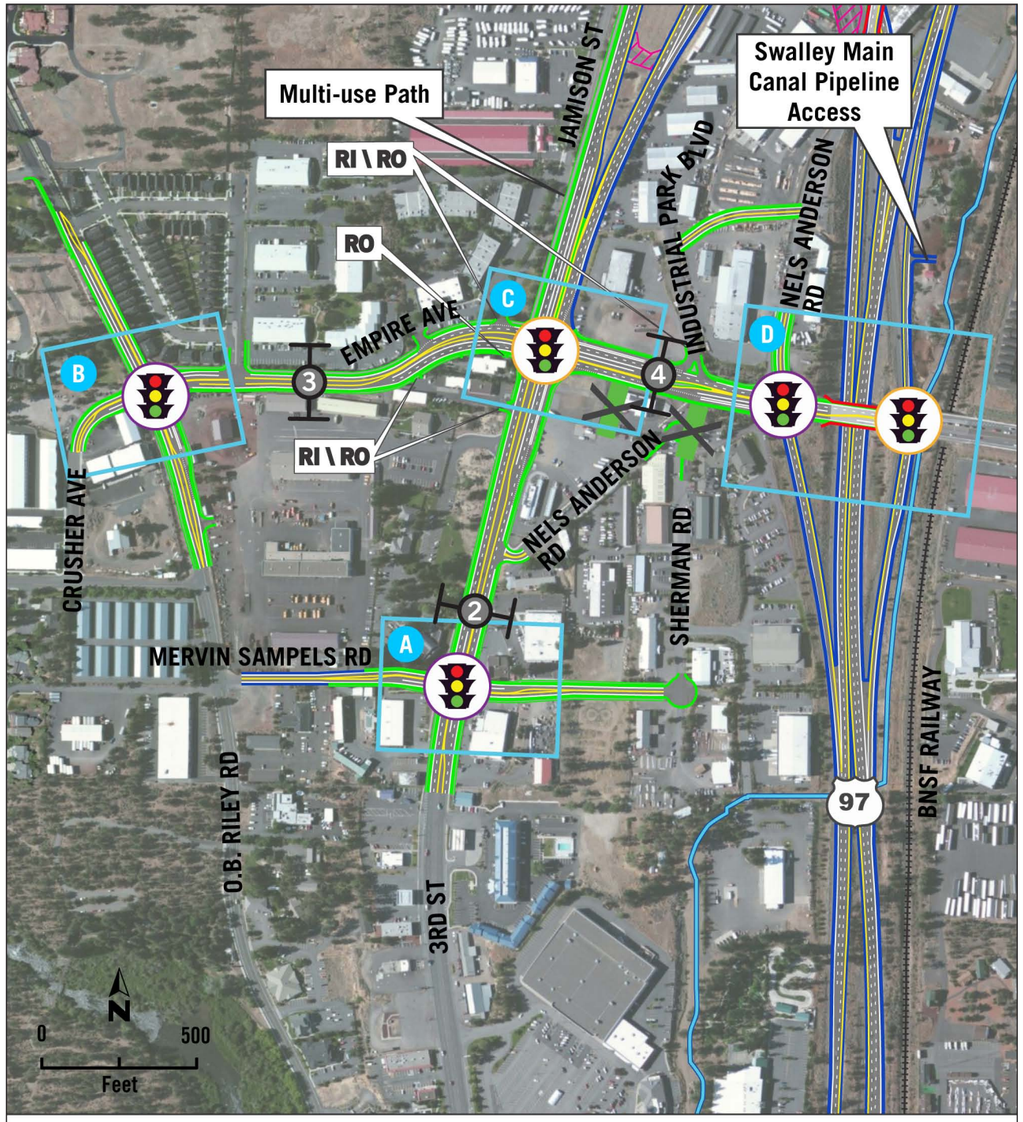
Exhibit 2-3 FEIS: *Preferred Alternative (Map 2)*



MAP 2

Roadway Improvements without Sidewalks
Roadway Improvements with Sidewalks
RI/RO Right-In/Right-out
Access or Local Road Closure - City*
Railway
Bridge
RO Right-out
New Traffic Signals
Existing Traffic Signals
Swalley Main Canal Pipeline
Intersection Enlargements
Cross Section
Existing Roadway to be Removed

* Traffic analysis assumes closure of these access points. City of Bend will make the final determination on closures.

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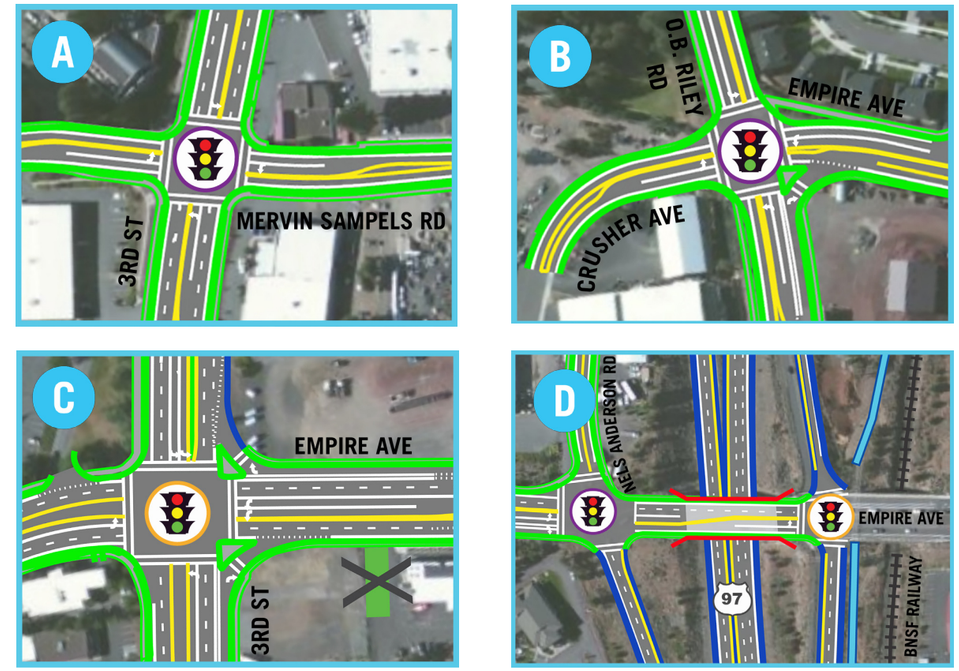
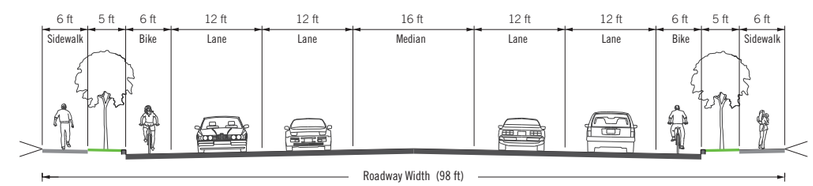
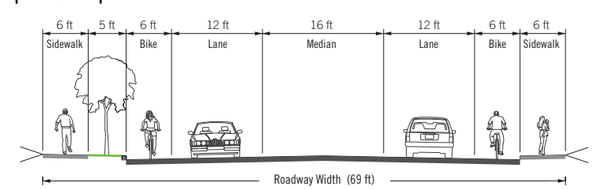


2 3rd Street south of Loco Road



3 Empire Avenue between O.B. Riley Road and 3rd Street



4 Empire Avenue east of 3rd Street

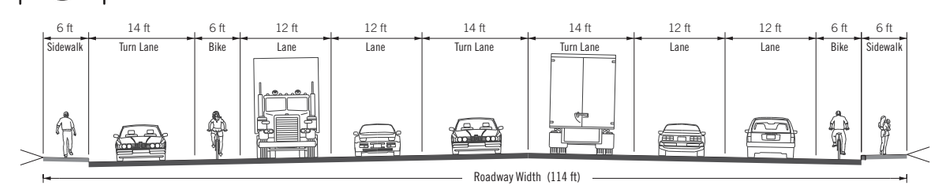


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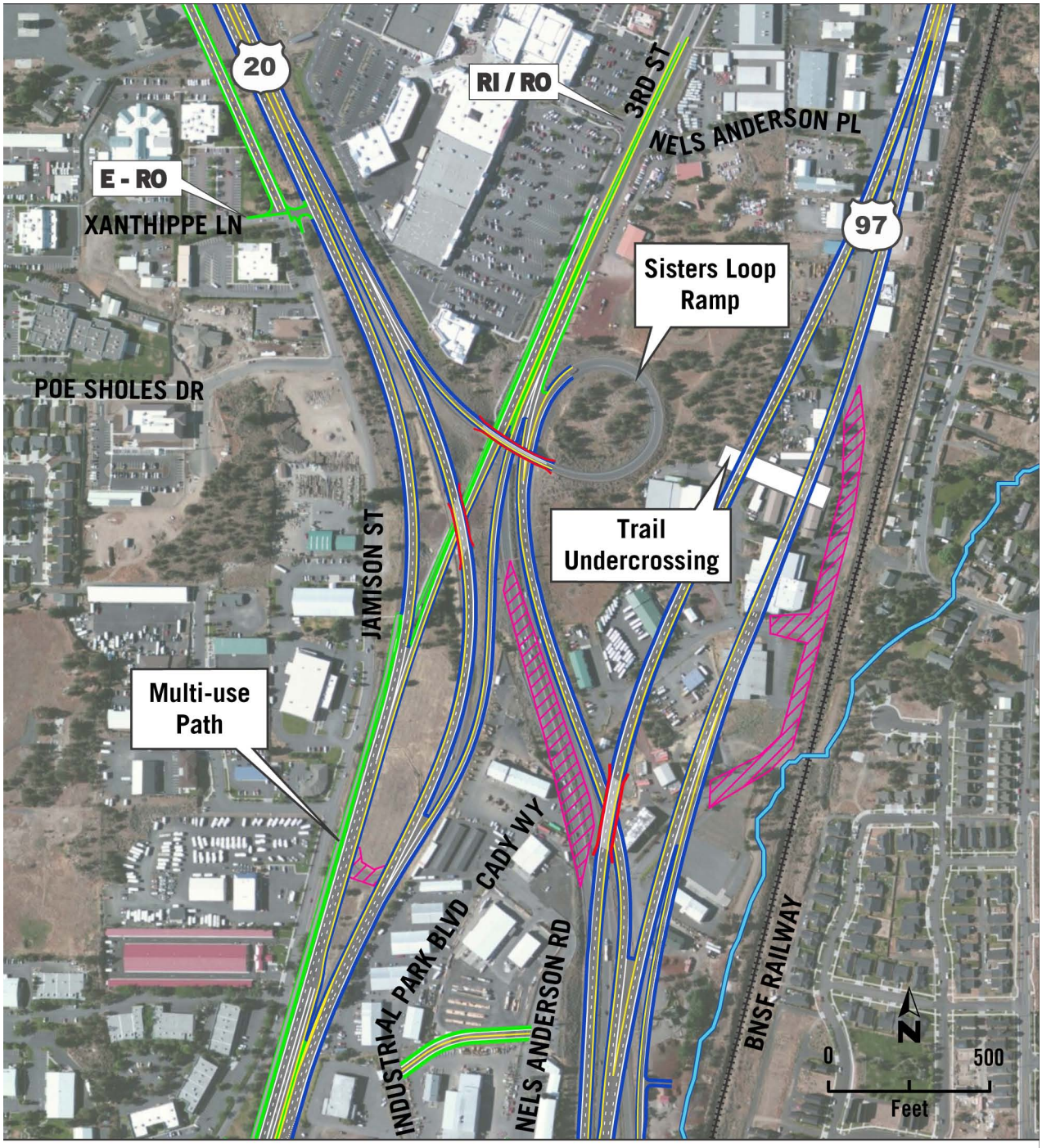
Exhibit 2-3 FEIS: *Preferred Alternative (Map 3)*



MAP 3

Roadway Improvements without Sidewalks | Roadway Improvements with Sidewalks | **RI/RO** Right-In/Right-out

Existing Roadway to be Removed | Railway | Bridge | **E-RO** Emergency Only Right-out

Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.

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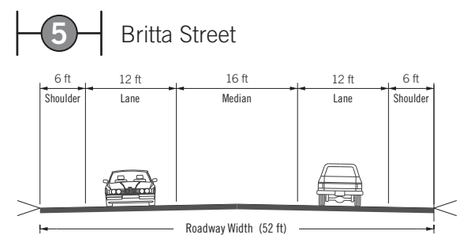
Exhibit 2-3 FEIS: *Preferred Alternative (Map 4)*

Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.



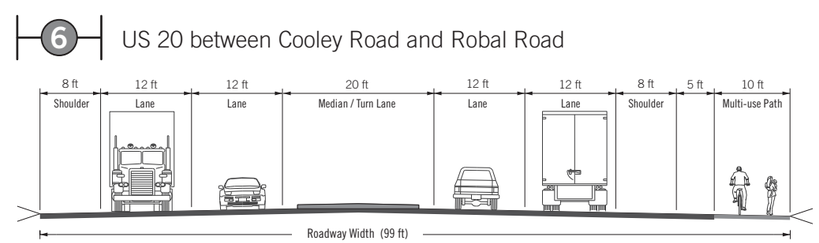


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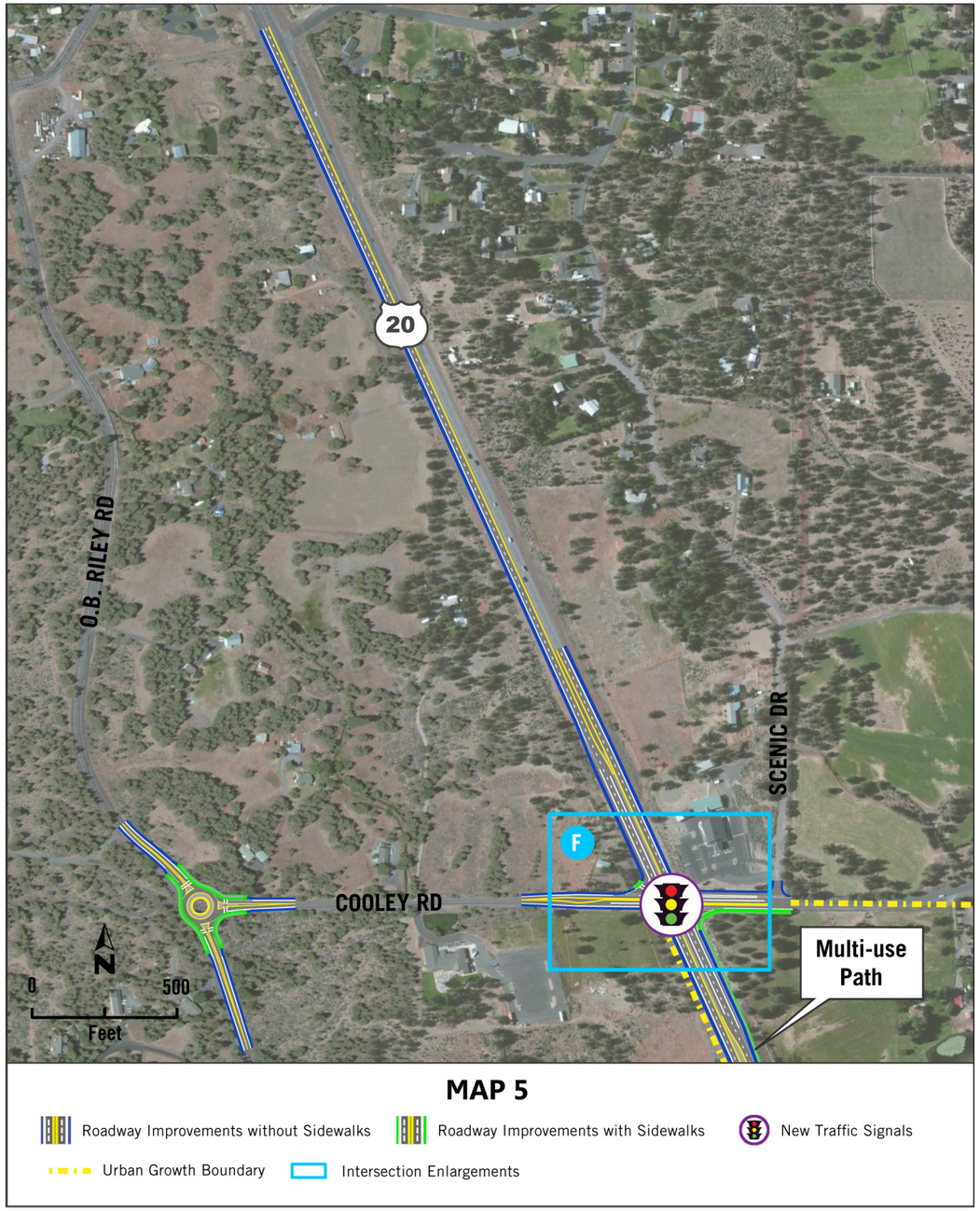
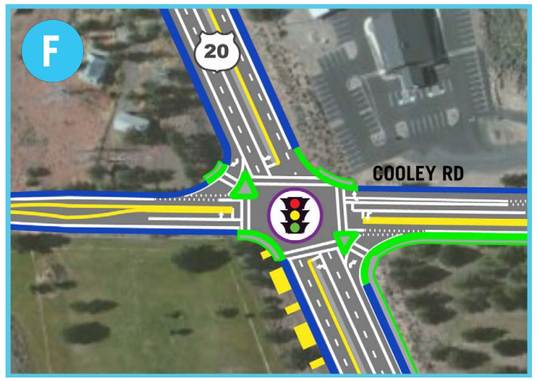
Exhibit 2-3 FEIS: *Preferred Alternative (Map 5)*





Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.

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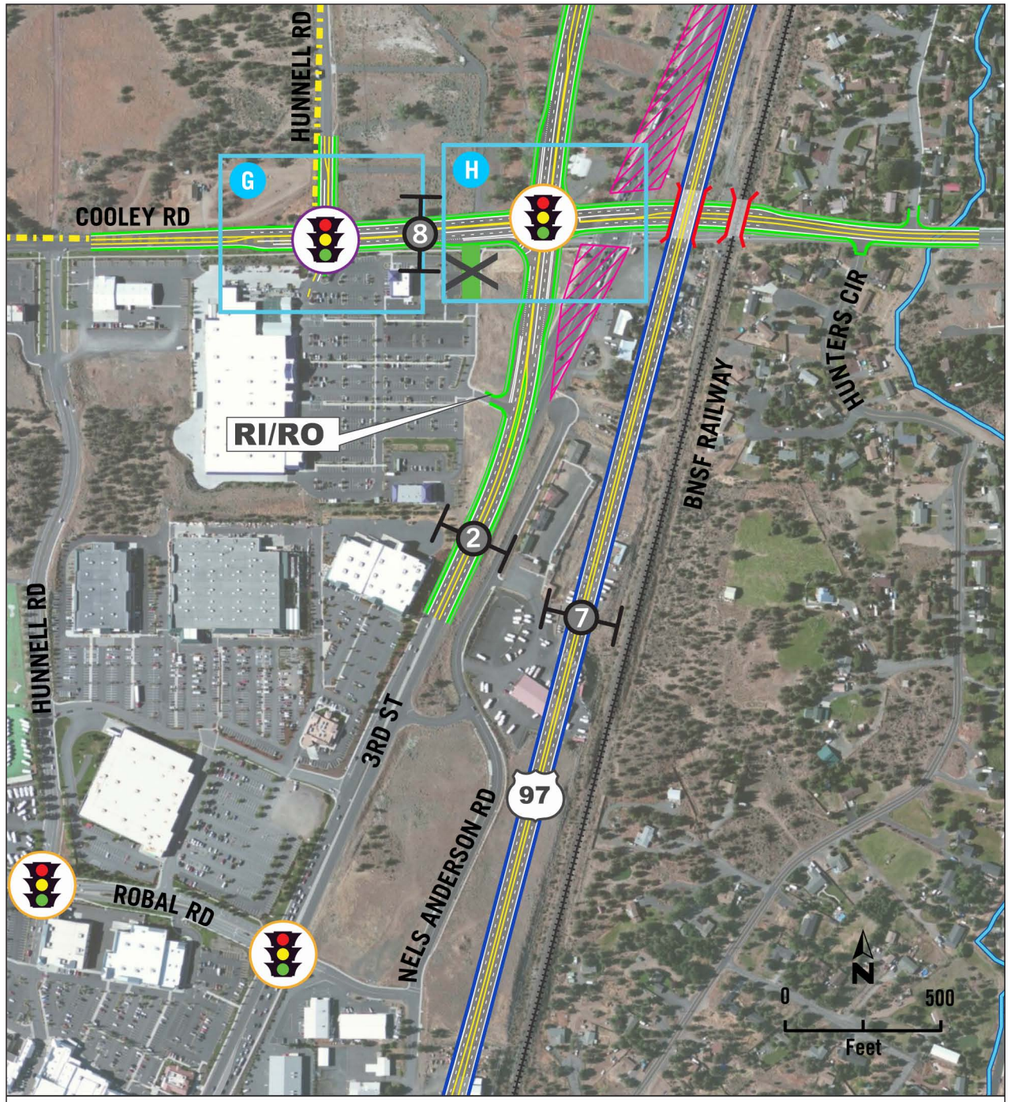
Exhibit 2-3 FEIS: *Preferred Alternative (Map 6)*



MAP 6

Roadway Improvements without Sidewalks
Roadway Improvements with Sidewalks
RI/RO Right-In/Right-out
Access or Local Road Closure - City*
Railway
Bridge
Urban Growth Boundary
New Traffic Signals
Existing Traffic Signals
Swalley Main Canal Pipeline
Cross Section
Intersection Enlargements
Existing Roadway to be Removed

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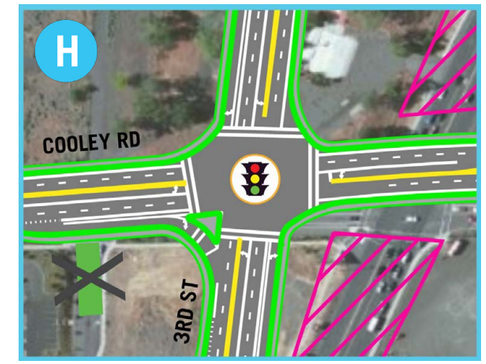
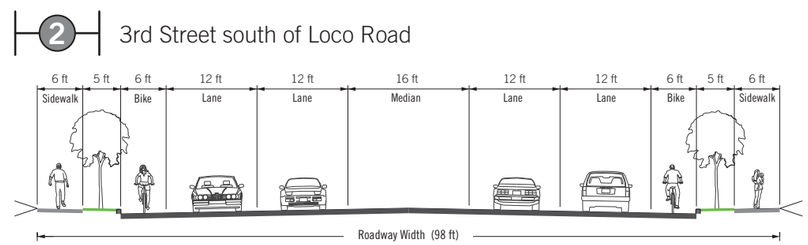
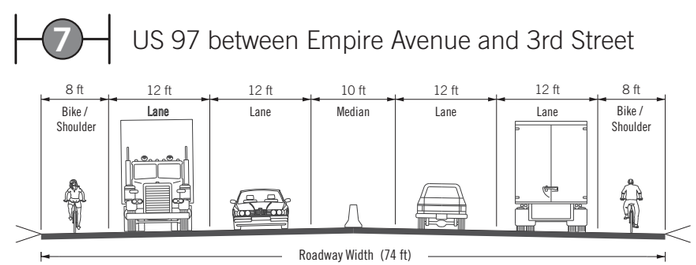
Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.







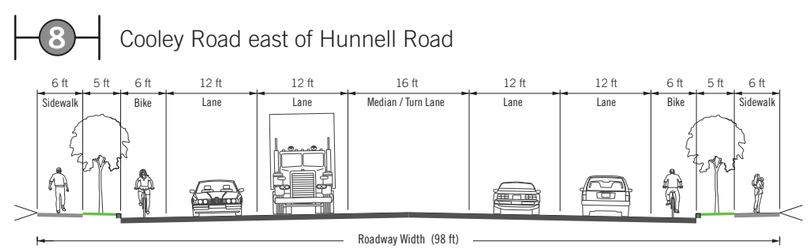


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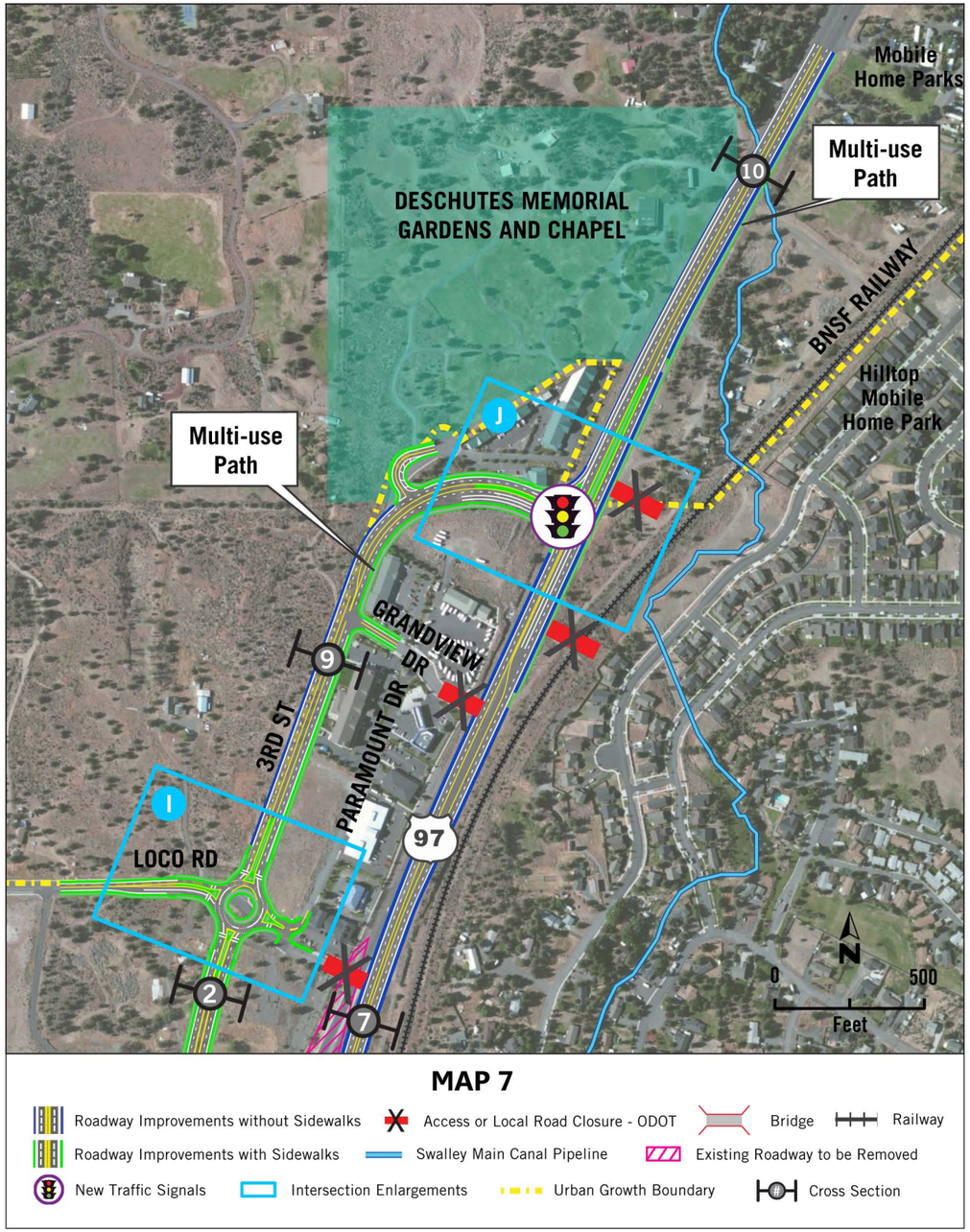
Exhibit 2-3 FEIS: *Preferred Alternative (Map 7)*



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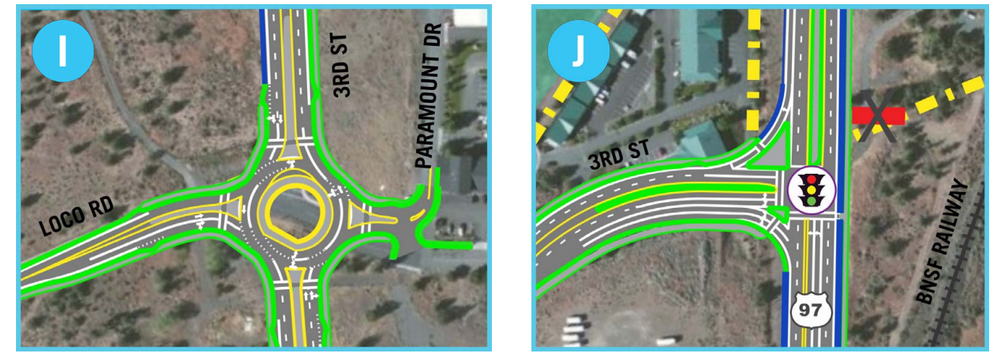

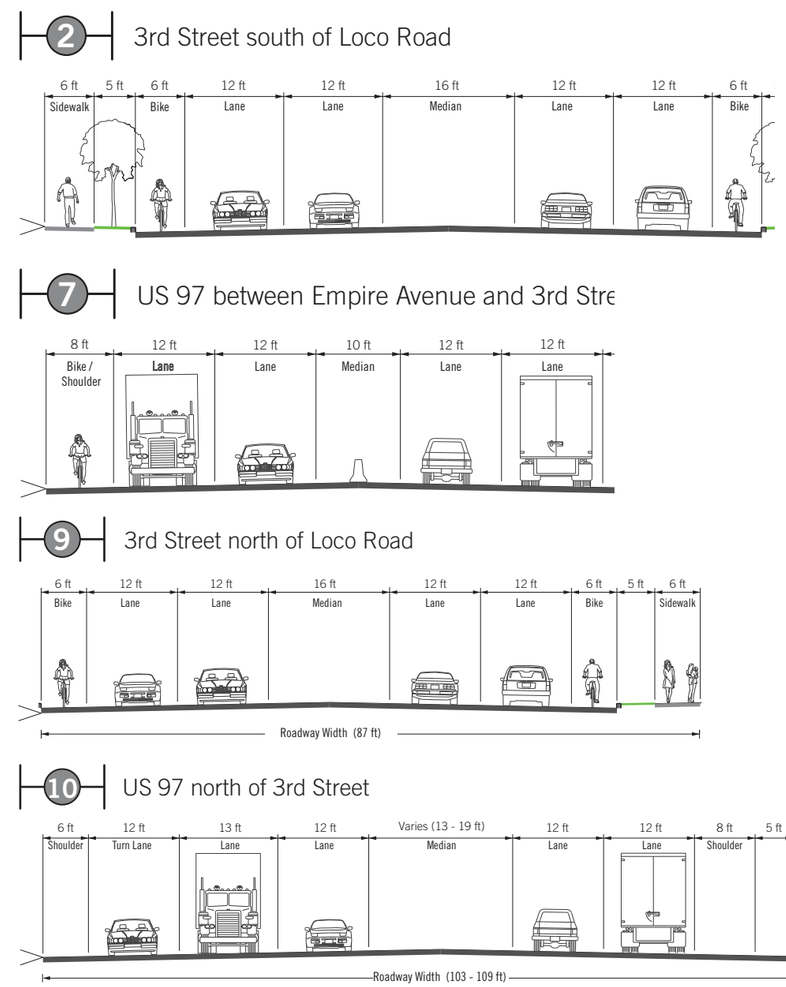

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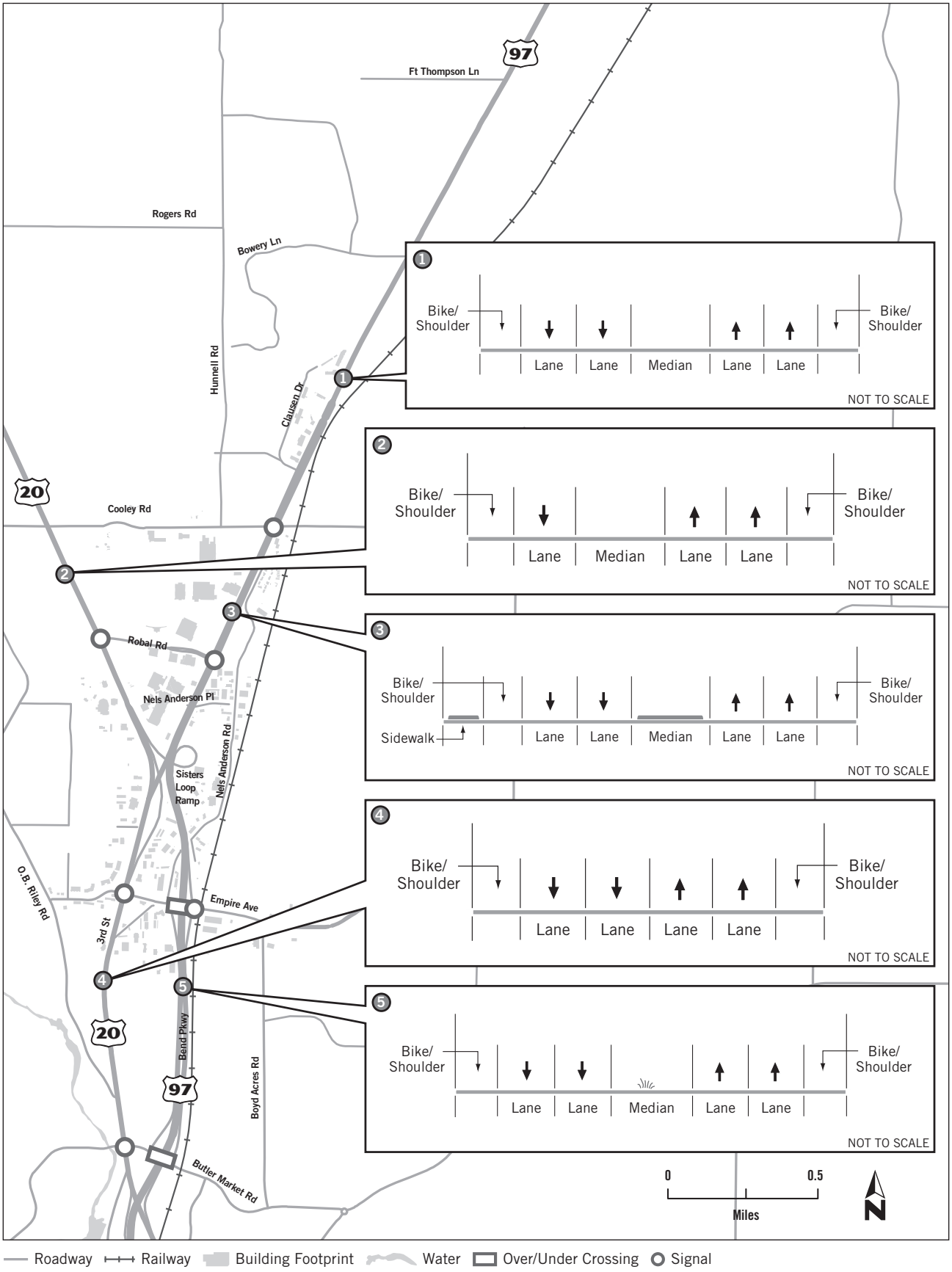
Exhibit 2-4: *No Build Alternative*



Current lane configuration of US 97 between Butler Market Road and Empire Avenue

Definition

Median

A median is a structure in the center of a roadway that physically separates the two directions of travel. The primary purpose of a median is to prevent vehicles from straying into opposing lanes. In addition, medians can prevent turns where they are undesirable from a traffic flow or safety standpoint.

Definition

Median Barrier

A median barrier is typically a three-foot-high concrete barrier that separates and controls traffic movements. The concrete Jersey barrier shown above is an example of a median barrier.

US 97 at Cooley Road

In this section, US 20 is collocated with 3rd Street and consists of two travel lanes in each direction with paved shoulders marked as bicycle lanes and intermittent sidewalks. US 20 and Empire Avenue intersect at a signalized at-grade intersection. The northbound 3rd Street/US 20 and southbound 3rd Street/eastbound US 20 travel lanes are separated north of Empire Avenue by a vegetated median, and the two northbound 3rd Street/westbound US 20 lanes narrow to a single lane before intersecting with westbound vehicles coming from US 97 via the Sisters loop ramp, as shown in Exhibit 2-4. West of the Sisters loop ramp, US 20 continues northwest with two westbound lanes, one eastbound lane, and a median.

Exhibit 2-5 shows the travel movements between US 97, US 20, 3rd Street, and Empire Avenue. There are no direct connections between southbound US 97 and westbound US 20 or eastbound US 20 and US 97 (north or southbound); however, the signed routes for these movements are through the US 97/Empire Avenue interchange.

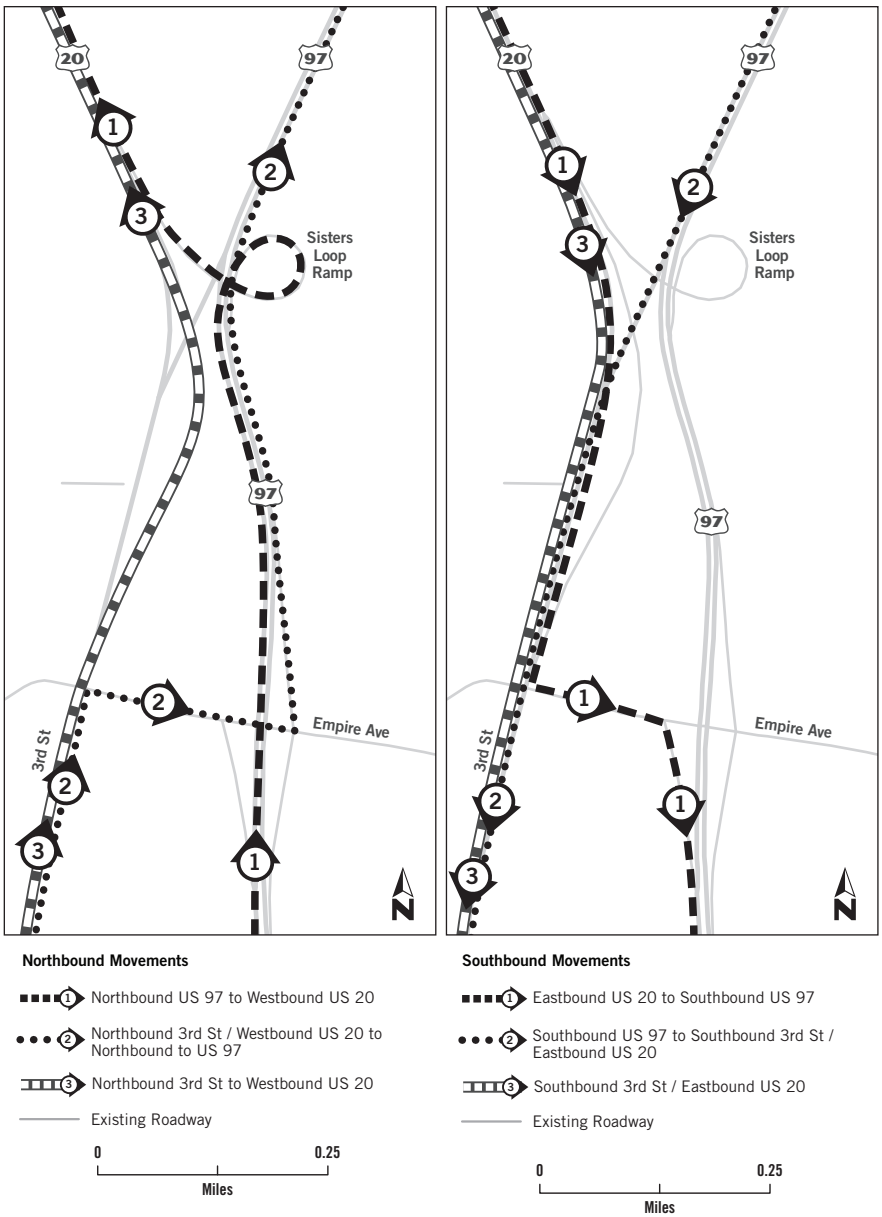
The Final EIS description of the No Build Alternative is supplemented as a result of public comments received on the Draft EIS. North of Empire Avenue and east of 3rd Street there is an existing fire lane that connects to Cady Way for those businesses between US 97, 3rd Street, and Empire Avenue. This fire lane does not meet current City of Bend design standards.

Central Section—Nels Anderson Place to Cooley Road

From Nels Anderson Place north to Cooley Road, US 97 includes two northbound travel lanes, two southbound travel lanes, a curb median, bicycle lanes, and a sidewalk on the west side. On the east side of US 97 there is a short segment of a sidewalk south of Robal Road. The intersection of US 97 and Robal Road is an at-grade signalized intersection with turn lanes and crosswalks. The intersection of US 97 and Cooley Road is also an at-grade signalized intersection with turn lanes and crosswalks.

In this central section, US 20 includes one eastbound travel lane, two westbound travel lanes, paved shoulders marked as bicycle lanes, and a paved median (no barrier). US 20 intersects with Robal Road in a three-way at-grade signalized intersection with crosswalks and turn lanes. Robal Road includes an eastbound travel lane, a westbound travel lane, a vegetated median, bicycle lanes, and sidewalk segments. The intersection of US 20 and Cooley Road is at-grade with turn lanes. The intersection is not signalized, but stop controls are provided on Cooley Road in both directions. Cooley Road includes an eastbound travel lane, a westbound travel lane, bicycle lanes, sidewalk segments near US 97, and sections of median curbing to channelize turn lanes.

Exhibit 2-5: *No Build Alternative: Travel Movements in South Section*



North Section—Cooley Road to Tumalo Road/Deschutes Market Road

In the north section, US 97 continues from Cooley Road north to Grandview Drive with two northbound travel lanes, two southbound travel lanes, curbed median, paved shoulders that serve as bicycle lanes, and a sidewalk on the west side. The intersections on the west side of US 97 with Clausen Drive and Grandview Drive are stop controlled only on these local streets. Access to Clausen Drive is right-in/right-out only. Drivers on northbound US 97 may make a left onto Grandview Drive, but access from Grandview Drive is right-out only to southbound US 97.

North of Grandview Drive, US 97 continues with two northbound travel lanes, two southbound travel lanes, a paved median (no barrier), and paved shoulders that serve as bicycle lanes. The intersection on the west side of US 97 with Bowery Lane is stop controlled from Bowery Lane only, and drivers can make turns in all directions. Further north, Fort Thompson Lane intersects with US 97 on the west side; drivers may turn in all directions. Between Bowery Lane and Fort Thompson Lane, there are numerous private driveways and turning movements are allowed in all directions.

Local roads north of Cooley Road vary in their existing condition. Some are paved while others, like Bowery Lane and Hunnell Road, have segments that are unpaved.

North of the API, the Deschutes Market/Tumalo Junction interchange allows for all directions of traffic movement on and off of US 97. Median barrier is present on US 97 in the vicinity of the Deschutes Market/Tumalo Junction interchange, limiting all movements to right-turns only, as shown in Exhibit 2-6.

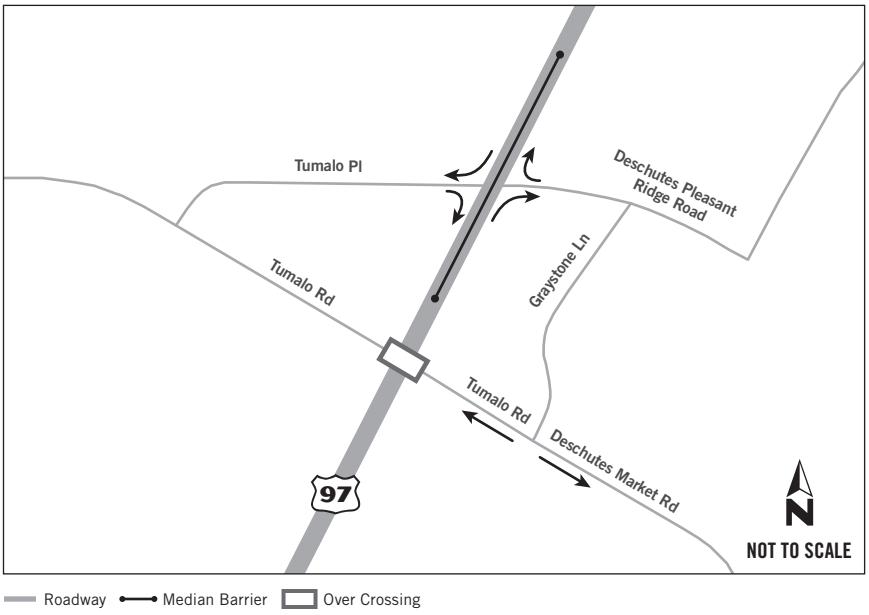
Key Point

The improvements proposed for the East DS1 and East DS2 Alternatives would not preclude other future improvements to US 97, such as a direct connection between US 97 and US 20 or an east connection to the new northern interchange.

The Preferred Alternative will not preclude other future, independent improvements to US 97, such as a direct connection between US 97 and US 20, a new northern interchange, or a connection between US 97 and Robal Road

US 97 north of Cooley Road

Exhibit 2-6: *No Build Alternative: Deschutes Market/Tumalo Junction Interchange*



Key Point

ODOT's *Bypass Policy* is applicable to the build alternatives. Consistency with this policy is discussed in Section 3.2.3 Land Use.

2.1.2 Build Alternatives

The East DS1 and East DS2, Alternatives would reroute US 97 east of its current alignment, adjacent to the existing railroad tracks. The current US 97 roadway would become a local arterial, an extension of 3rd Street. Within the City of Bend UGB, jurisdiction over this converted segment of US 97 is proposed to be transferred to the City of Bend under either build alternative. ODOT would retain jurisdiction of the converted roadway outside of the UGB.

South of Cooley Road, the build alternatives generally have the same design. North of Cooley Road, US 97 has the same alignment under both build alternatives, but the build alternatives differ in the location and type of the US 97 connection to 3rd Street.

Preferred Alternative

The Preferred Alternative will also reroute US 97 east of its current alignment, adjacent to the existing railroad tracks. The current US 97 roadway will become a local arterial and will also serve as an extension of 3rd Street. Decisions on jurisdictional transfers of roadways will be made during final design.

South of Cooley Road, the Preferred Alternative will generally have the same design as the East DS1 and East DS2 Alternatives. North of Cooley Road, US 97 will have the same alignment under the Preferred Alternative as the East DS1 and East DS2 Alternatives, but will connect US 97 to 3rd Street with a signalized intersection instead of an interchange.

Logical Termini and Independent Utility

The primary areas of congestion, poor traffic flow, and safety problems in the northern end of Bend occur around the intersections of US 97 with Cooley Road and with Robal Road. To address these areas, improvements would be needed both north and south of these intersections. To separate local and regional trips, a new interchange or intersection would be needed north of Cooley Road before the Deschutes Market/Junction interchange, and minor safety improvements would be needed at the Deschutes Market/Tumalo Junction interchange. Thus, Deschutes Market Road was selected as the logical northern terminus. Empire Avenue is the interchange on US 97 south of Robal Road, and traffic at this intersection also contributes to congestion through the northern end of Bend. Thus, Empire Avenue was selected as the logical southern project terminus. These end points serve as both logical termini for assessing transportation improvements and for reviewing environmental impacts on a broad scope. Further, these termini define a project corridor which has independent utility. Construction of the alternatives studied in the EIS would be a usable and reasonable expenditure that would address the congestion, traffic flow, and safety problems identified in the purpose and need statement without causing problems elsewhere or requiring the construction of additional transportation improvements in the area.

Incremental Construction

The project would likely be funded in increments, which would necessitate either build alternative being constructed in multiple increments or phases. Specific increments or the sequencing of increments have not been determined at this time. Upon completion

Key Point

Beneficial and adverse impacts on environmental resources are discussed in Chapter 3 Affected Environment, Environmental Consequences, and Avoidance, Minimization and/or Mitigation Measures for each of the three alternatives studied.

Definitions

Auxiliary Lane

An auxiliary lane is a lane along a highway that extends between an on-ramp and off-ramp. They are added to reduce heavy traffic merging associated with highway ramps.

Diamond Interchanges

A full diamond interchange is an interchange involving four ramps where they enter and leave the highway at a small angle and meet the non-highway at almost right angles. These ramps at the non-highway can be controlled through stop signs, traffic signals, or turn ramps. A partial diamond interchange is a diamond interchange with fewer than four ramps.

of the Final EIS and Record of Decision, ODOT will begin the process of obtaining funding and developing project increments. Public input will continue to be an integral part of the decision-making process on identifying project increments, determining the incremental benefit to US 97, assessing associated adverse and beneficial impacts, and developing mitigation measures.

Phasing and funding considerations for the Preferred Alternative are discussed in Section 2.6.2 Funding and Phasing of the Preferred Alternative.

Common Design Features of the Build Alternatives

Between Butler Market Road and Cooley Road, the build alternatives have the same design for the US 97 corridor. Design features that are common include intersection configurations, ramps, auxiliary lanes, grade-separations, and pedestrian and bicycle facilities.

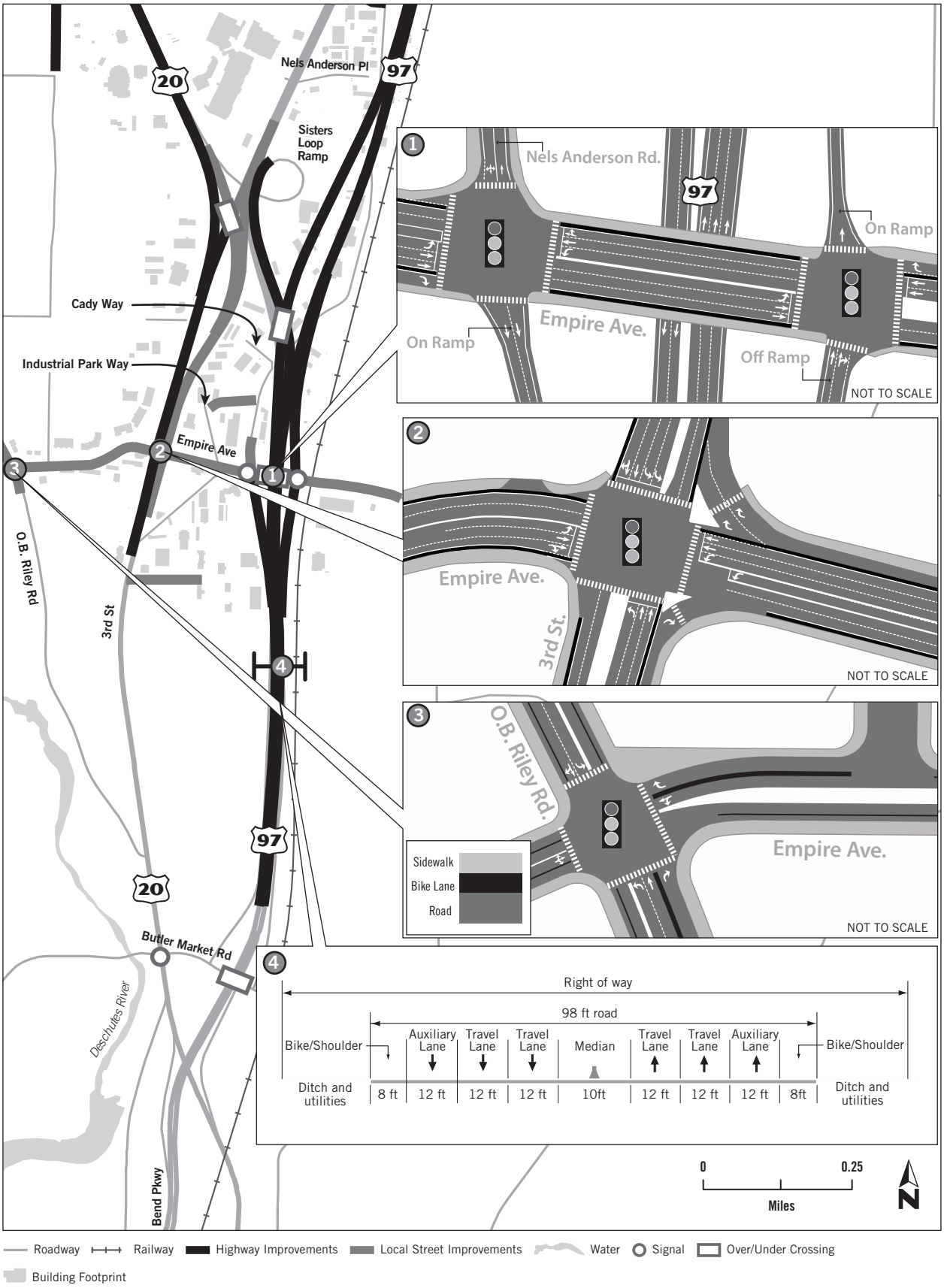
South Section—Butler Market Road to Nels Anderson Place

Butler Market Road to Empire Avenue—US 97 would be a free flow highway facility with access to and from the highway occurring through the Butler Market Road interchange and the Empire Avenue interchange. Northbound US 97 and southbound US 97 would have two travel lanes in each direction. In addition, there would be an outermost northbound lane that would be an auxiliary lane to the Empire Avenue interchange and an outermost lane in the southbound direction that would be an auxiliary lane to the Butler Market Road interchange. The northbound and southbound travel lanes would be separated by an approximately 10-foot-wide median. A typical cross-section of US 97 south of Empire Avenue is shown in Exhibit 2-7. Between Butler Market Road and Empire Avenue, US 20 and 3rd Street would be a collocated four-lane facility with two travel lanes in both directions.

Empire Avenue Interchange—The Empire Avenue interchange would retain its configuration as a partial diamond interchange with Empire Avenue crossing over US 97 (Exhibit 2-7). An off-ramp would allow vehicles on northbound US 97 to exit the highway at Empire Avenue. There would be no off-ramp from southbound US 97 to Empire Avenue. On-ramps would allow eastbound and westbound vehicles on Empire Avenue to enter northbound or southbound US 97. Exhibit 2-8 shows the various directional movements that would be possible via the Empire Avenue interchange. The Empire Avenue overcrossing would be expanded to a total of six lanes; two travel lanes plus a turning lane in each direction.

The intersection of Empire Avenue with O.B. Riley Road would be expanded and improved. A signal would be installed at the intersection of Empire Avenue and O.B. Riley Road.

Exhibit 2-7: *East DS1 and East DS2 Alternatives: South Section Design*



US 97, US 20 and 3rd Street between Empire Avenue and Nels Anderson Place—Northbound US 97 would have three travel lanes. About half way between Empire Avenue and the Sisters loop ramp, the travel lanes would split, and the two right lanes would continue on northbound US 97. The left lane would veer to the northwest, expand to two lanes and would connect to the Sisters loop ramp and northbound 3rd Street. Southbound US 97 would have two travel lanes and would cross over the left lane exiting from northbound US 97 to northbound 3rd Street/westbound US 20 on an elevated structure.

Between Empire Avenue and the Sisters loop ramp, the US 20/3rd Street travel lanes would be separated by a vegetated or aesthetic concrete median when feasible. The combined westbound US 20/northbound 3rd Street would have three lanes. The right lane would continue northbound to 3rd Street. The left lanes would continue as westbound US 20.

The two-lane, eastbound US 20 would merge with the two-lane southbound 3rd Street. Once merged, there would be two through travel lanes on southbound 3rd Street and two left turn lanes at the Empire Avenue signal. There would be numerous directional movements available through the US 97/US 20/3rd Street connection (Exhibit 2-8).

Exhibit 2-9 illustrates the proposed design of US 97 and nearby road network for both the East DS1 and East DS2 Alternatives.

Exhibit 2-8: *East DS1 and East DS2 Alternatives and Preferred Alternative Movements in the South Section*

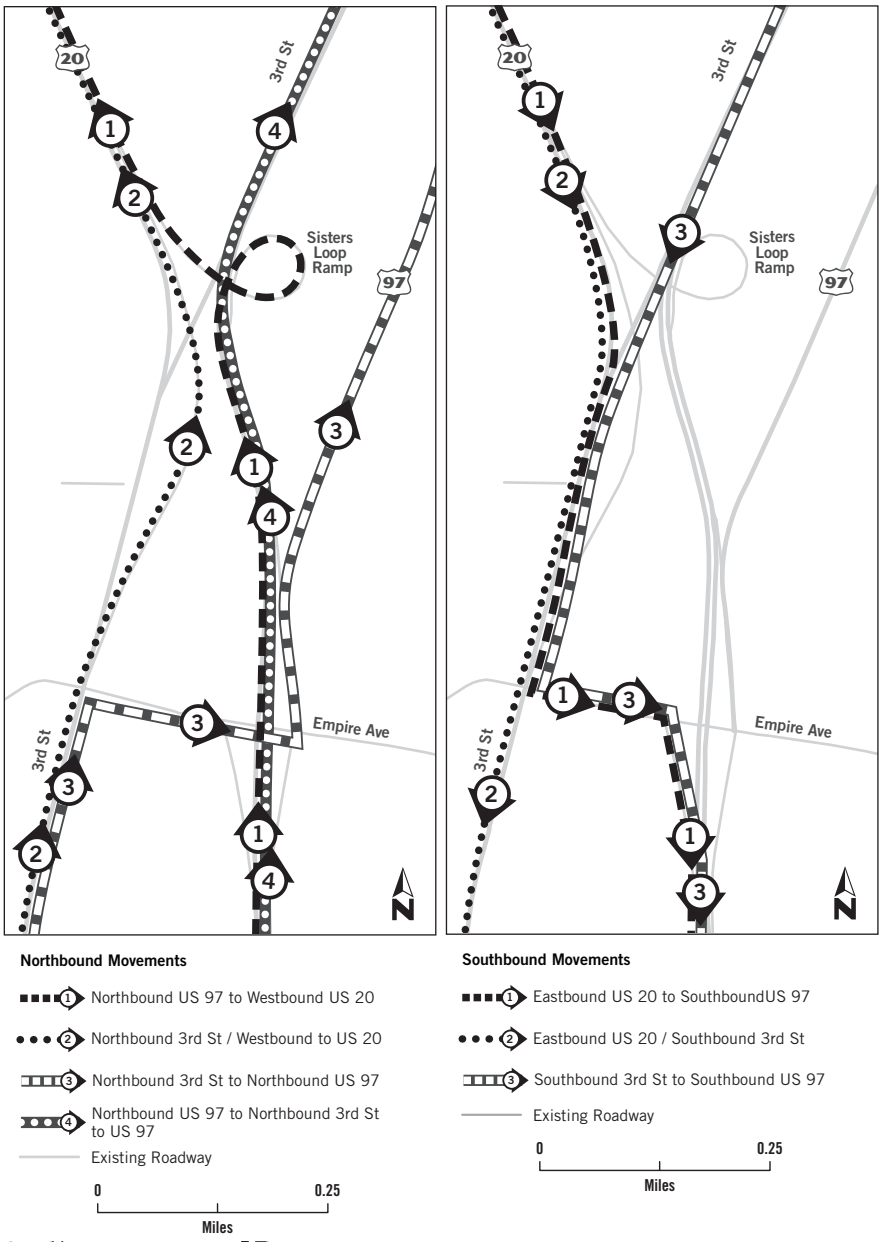
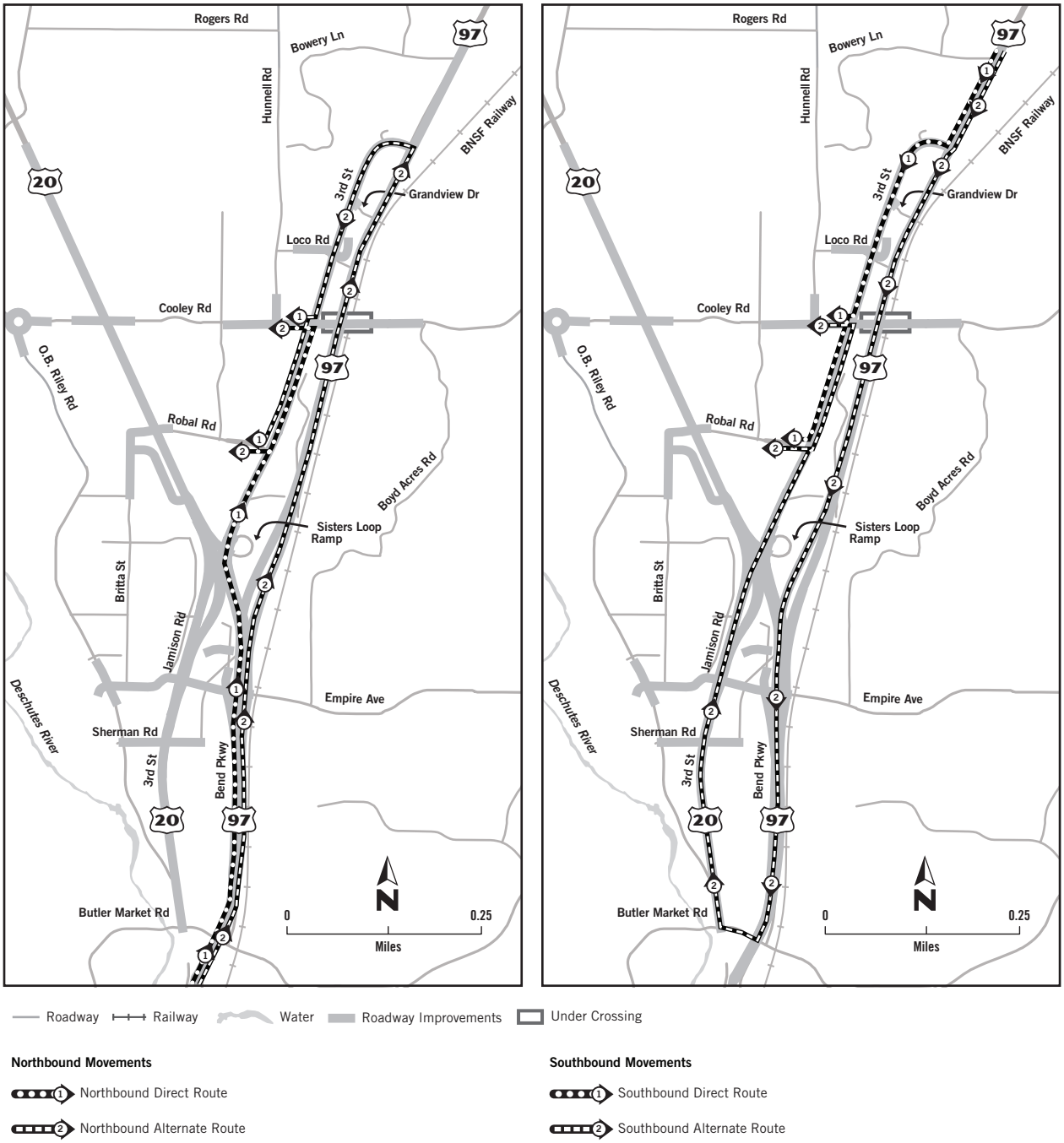


Exhibit 2-8 FEIS: *Preferred Alternative Travel Routes to Commercial Area between US 97 and US 20*



Northbound Movements

- Northbound Direct Route
- Northbound Alternate Route

Southbound Movements

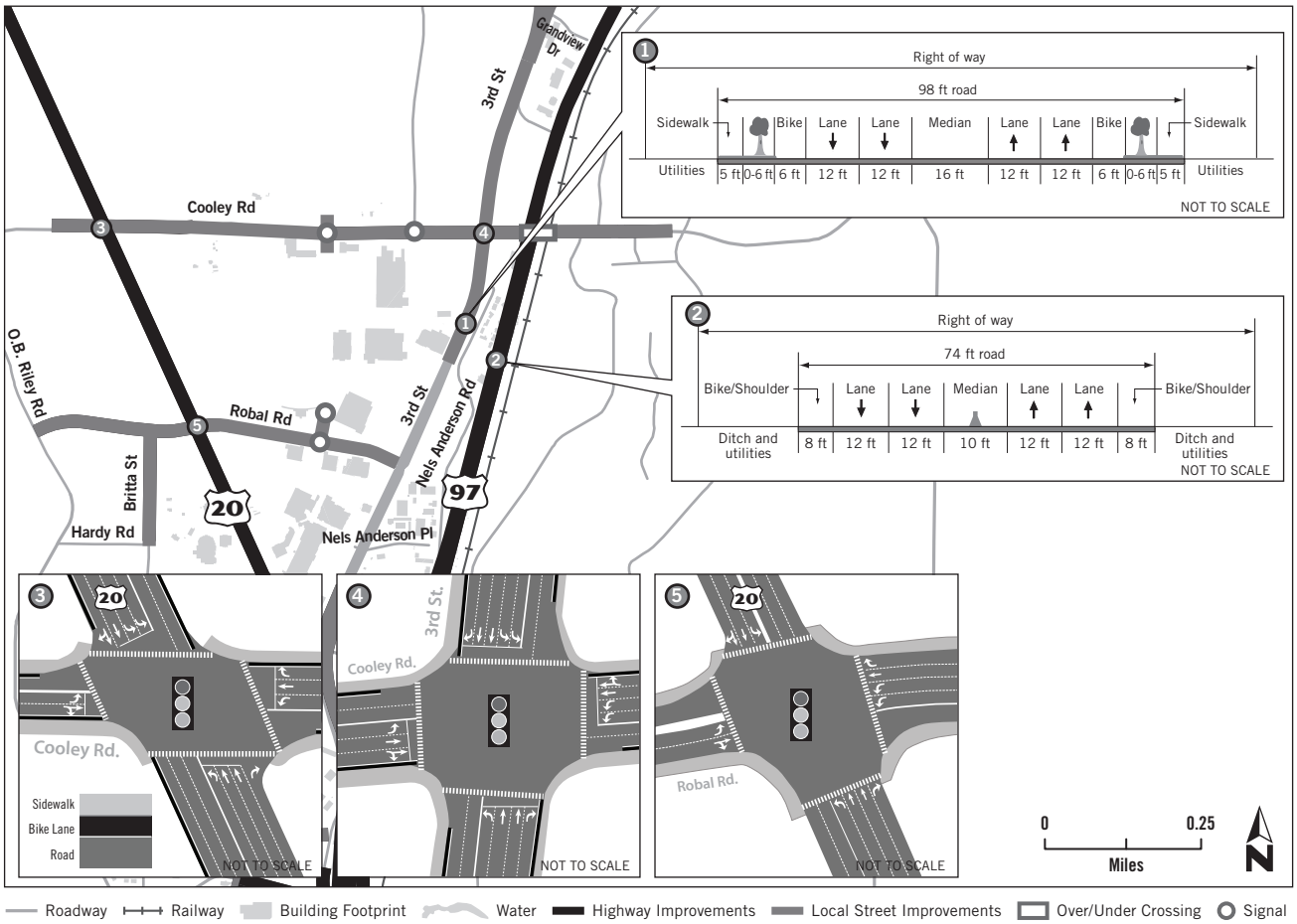
- Southbound Direct Route
- Southbound Alternate Route

Exhibit 2-9: *Photo Simulation of the South Section for the East DS1 and East DS2 Alternatives*

Exhibit 2-9 FEIS: *Photo Simulation of the South Section for the Preferred Alternative*

Note: For the Preferred Alternative the Empire Avenue bridges over US 97 and the BNSF Railway are unchanged from their current widths. These elements differ from the East DS2 Alternative, which would have widened both bridges.

Exhibit 2-10: *East DS1 and East DS2 Alternatives: Central Section Design*



Central Section—Nels Anderson Place to Cooley Road

US 97 and 3rd Street between Nels Anderson Place and Cooley Road—US 97 would be four lanes, with two northbound and two southbound lanes separated by a median or a median barrier. The highway would be shifted east, immediately adjacent to the railroad right-of-way. A typical cross-section of US 97 in this area and intersection details are shown in Exhibit 2-10. There would be four through lanes on 3rd Street, with two northbound and two southbound lanes separated by a center turn lane. The intersections of 3rd Street with Robal Road and Cooley Road would be signalized. Cooley Road would travel under US 97 and the railroad tracks; to do this Cooley Road would be lowered approximately 25 feet and 3rd Street would be lowered approximately 10 feet. There would be no direct connection to US 97 at Cooley Road. A photo-simulation illustrates the proposed grade-separation of US 97 at Cooley Road (Exhibit 2-11).

US 20 between Robal Road and Cooley Road—US 20 would be four lanes, with two eastbound and two westbound lanes separated by a 20-foot-wide median. The intersections of US 20 with Robal Road and Cooley Road would be expanded and signalized. These

Exhibit 2-11: *Photo Simulation of the Central Section for the East DS1 and East DS2 Alternatives*

Exhibit 2-11 FEIS: *Photo Simulation of the Central Section for the Preferred Alternative*

Note: For the Preferred Alternative, Cooley Road east of the US 97 and BNSF Railway overpasses tapers so that impacts to the Hunters Circle access are minimized. This design element differs from the East DS2 Alternative, which would have continued the widening of Cooley Road further east.

intersections are shown in detail in Exhibit 2-10. Robal Road would be extended west of US 20 as a new two-lane road and would connect with O.B. Riley Road at an unsignalized intersection. Britta Street would be extended north of Hardy Road as a new two-lane road and would connect with the extended Robal Road at a signalized intersection.

Design Features Unique to the East DS1 Alternative

The difference in the two build alternatives is the design of the north section, from Cooley Road to Fort Thompson Lane, which is described below and illustrated in Exhibit 2-12 through Exhibit 2-15.

North Section—Cooley Road to Fort Thompson Lane

For the East DS1 Alternative, US 97 would have two northbound and two southbound travel lanes, separated by median barrier. Between Cooley Road and the City of Bend's UGB, 3rd Street would have two northbound lanes and two southbound lanes. North of the UGB, 3rd Street would have one northbound travel lane and one southbound travel lane. US 97 would have a full diamond interchange with 3rd Street just north of Bowery Lane. The interchange would allow all northbound and southbound movements on to and off of US 97.

From Cooley Road, travelers would travel approximately 1.4 miles on northbound 3rd Street to access US 97 via the full diamond interchange. At the interchange, 3rd Street would be elevated above US 97 and would have one eastbound and one westbound travel lane. Access to properties east of US 97 would be provided by new roads which would be connected to 3rd Street. Just west of the railroad tracks, 3rd Street would terminate (Exhibit 2-12 and Exhibit 2-13).

Between Grandview Drive and Fort Thompson Lane, a number of new connections or new roads would be constructed:

- A new road would extend east of 3rd Street to access existing properties north of the Deschutes Memorial Gardens and Chapel
- A new road would connect Bowery Lane to Suzanne Lane
- A new road would extend east of Harris Way to access existing properties between Harris Way and US 97
- An upgraded connection would be provided between Fort Thompson Lane and Harris Way, and between Harris Way and Hunnell Road
- A new road would extend north and south of 3rd Street to access existing properties east of US 97.

New county roads and private driveways have been designed to meet the appropriate standards. Existing substandard county roads would

Exhibit 2-12: *East DS1 Alternative: North Section Design*

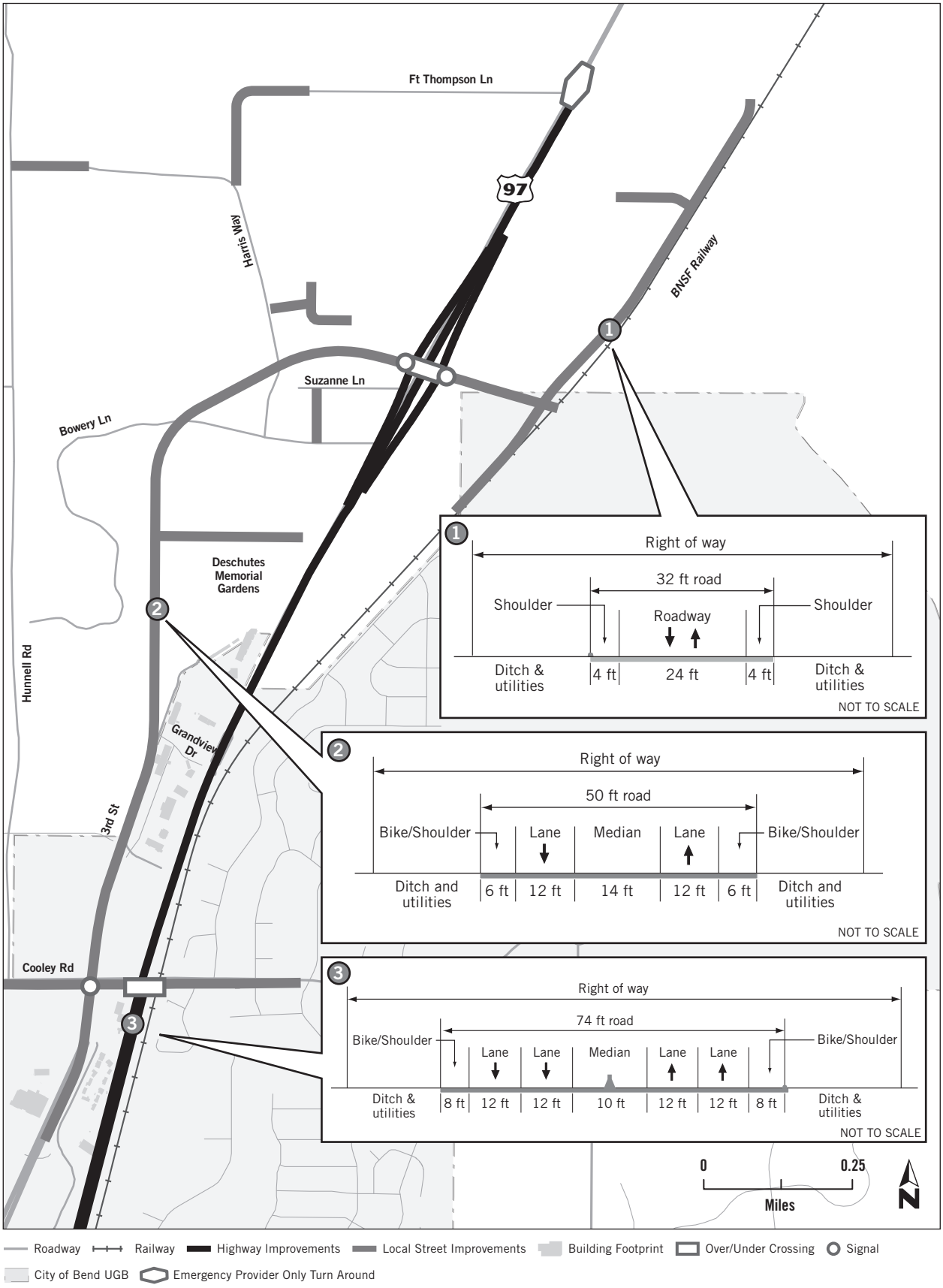


Exhibit 2-13: *Photo Simulation of the North Section for the East DS1 Alternative*

not be upgraded by this project, but could be prioritized and developed as standalone projects in the County TSP and State STIP.

Design Features Unique to the East DS2 Alternative

North Section—Cooley Road to Fort Thompson Lane

For the East DS2 Alternative, US 97 would have two northbound and two southbound travel lanes separated by a median barrier. North of Cooley Road, 3rd Street would have two travel lanes in each direction separated by a two-way left turn lane. The new extension of 3rd Street would connect with US 97 through a directional interchange on the southeast side of the Deschutes Memorial Gardens and Chapel (Exhibit 2-14 and Exhibit 2-15).

The directional interchange would allow southbound US 97 traffic to flow freely via an off-ramp to southbound 3rd Street. The directional interchange would also allow northbound 3rd Street traffic to cross over US 97 and flow freely via an onramp to northbound US 97. From Cooley Road, travelers would travel approximately 0.6 miles on northbound 3rd Street to access northbound US 97 via the new directional interchange. From Cooley Road, travelers would travel approximately 1.5 miles on southbound 3rd Street to access southbound US 97 via the Empire Avenue interchange.

Definition

Directional Interchange

A directional interchange is an interchange between two major highway or freeway facilities where all of the movements are maintained without stopping or delays.

More Information

More detail on the elements associated with transportation system management and transportation demand management is provided in Section 2.4.4.

Exhibit 2 14: *East DS2 Alternative: North Section Design*

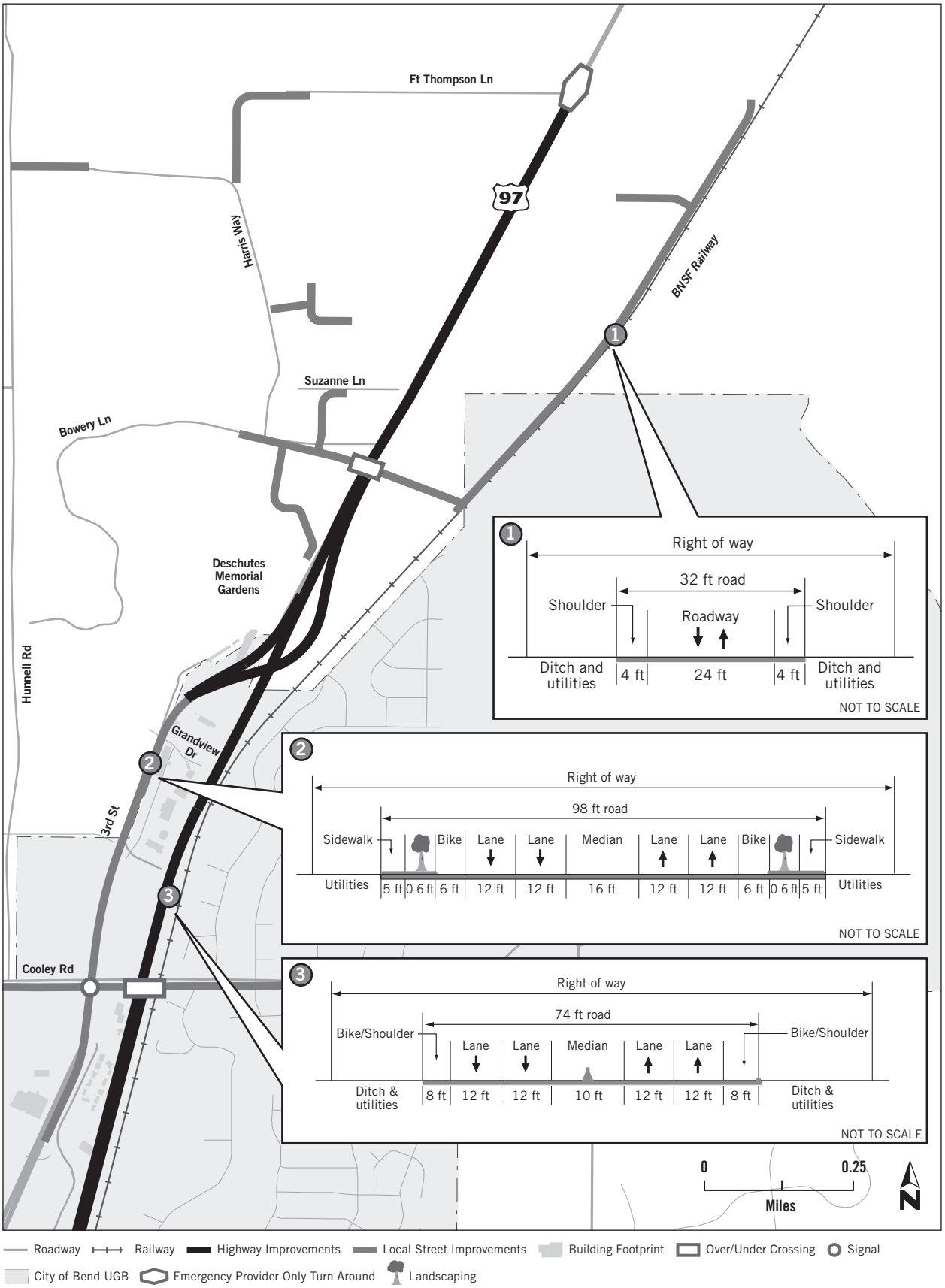


Exhibit 2 15: *Photo Simulation of the North Section for the East DS2 Alternative*

Exhibit 2-15 FEIS: *Photo Simulation of the North Section for the Preferred Alternative*

Note: The view and direction used in this photo simulation for the US 97/3rd Street intersection element of the Preferred Alternative was selected so that more detail could be readily seen. This view and direction differs from that selected for the photo simulation of the East DS2 Alternative northern interchange.

Between Grandview Drive and Fort Thompson Lane, a number of new connections, new local roads, or upgrades to existing local roads would be constructed:

- Bowery Lane would be upgraded and extended to the east, across US 97
- A new road would extend north and south of Bowery Lane to access existing properties east of US 97
- A new road would extend south of Bowery Lane to access existing properties southwest of the Bowery Lane overcrossing
- A new road would extend north of Bowery Lane to access existing properties northwest of the Bowery Lane overcrossing of US 97
- A new road would extend east of Harris Way to access existing properties between Harris Way and US 97
- An upgraded connection would be provided between Fort Thompson Lane and Harris Way, and between Harris Way and Hunnell Road.

New county roads and private driveways have been designed to meet the appropriate standards. Existing substandard county roads would not be upgraded by this project, but could be prioritized and developed as standalone projects in the County TSP and State STIP.

Description of the Preferred Alternative—East DS2 Modified Alternative

South Section—Butler Market Road to Nels Anderson Place

The south section of the Preferred Alternative is shown in Exhibit 2-3 FEIS, Maps 1 through 3. The Preferred Alternative constructs a new alignment of US 97 which will be a free flow highway facility with access to and from the newly aligned US 97 occurring through the existing Butler Market Road interchange and the existing Empire Avenue interchange. A third travel lane will be added to the existing two travel lanes on northbound US 97 starting at the point where the 3rd Street northbound on-ramp merges, which is just north of the Butler Market Road overcrossing of US 97. The merge distance for the northbound on-ramp at the Butler Market Road interchange will be lengthened as shown in Exhibit 2-3 FEIS, Map 1. Southbound US 97 between the Butler Market Road and Empire Avenue interchanges will retain the current two travel lanes. The southbound on-ramp from Empire Avenue will be lengthened to provide additional merging distance as shown in Exhibit 2-3 FEIS, Map 2. The northbound and southbound travel lanes will be separated by a median that varies between 2 feet and 90 feet in width. Please see Exhibit 2-3 FEIS, Map 1, Cross Section 1, for a typical cross section of

US 97 south of Empire Avenue for the Preferred Alternative. Between Butler Market Road and Empire Avenue, US 20 and 3rd Street will be a collocated four-lane facility with two travel lanes in both directions as shown in Exhibit 2-3 FEIS, Map 2, Cross Section 2.

Empire Avenue Interchange—The Empire Avenue interchange will retain its configuration as a partial diamond interchange with Empire Avenue crossing over US 97, as shown in Exhibit 2-3 FEIS, Map 2, Intersection Enlargement D. An off-ramp will allow vehicles on northbound US 97 to exit the highway at Empire Avenue. There will be no off-ramp from southbound US 97 to Empire Avenue. On-ramps will allow eastbound and westbound vehicles on Empire Avenue to enter northbound or southbound US 97. Exhibit 2-8 shows the various directional movements that will be possible via the Empire Avenue interchange. Exhibit 2-8A FEIS shows travel routes to the commercial area between US 97 and US 20 under the Preferred Alternative.

In order to provide access into the industrial area south of Empire Avenue, Mervin Sampels Road will be improved east of 3rd Street with a signalized intersection at 3rd Street as shown in Exhibit 2-3 FEIS, Map 2, Intersection Enlargement A. The Preferred Alternative will retain the existing Empire Avenue bridge over existing US 97 and will enlarge the Empire Avenue/3rd Street intersection from the current three lanes of traffic to seven lanes as shown in Exhibit 2-3 FEIS, Map 2, Intersection Enlargement D. The intersection of Empire Avenue and O.B. Riley Road will be expanded and improved, including the installation of a traffic signal, as shown on Exhibit 2-3 FEIS, Map 2, Intersection Enlargement B.

US 97, US 20 and 3rd Street between Empire Avenue and Nels Anderson Place—Under the Preferred Alternative, northbound US 97 will have three travel lanes on its existing alignment. About halfway between Empire Avenue and the Sisters loop ramp, US 97 veers east from its existing alignment to the new alignment. The three travel lanes on the newly aligned US 97 split with the two right lanes continuing on northbound US 97, as shown on Exhibit 2-3 FEIS, Maps 2 and 3. The left lane will veer to the northwest and expand to two lanes with one of those lanes connecting to westbound US 20 via the Sisters loop ramp and the other lane connecting to northbound 3rd Street. The newly aligned southbound US 97 will have two travel lanes and will cross over the left lane exiting from northbound US 97 to northbound 3rd Street/westbound US 20 on an elevated structure as shown in Exhibit 2-3 FEIS, Map 3.

Between Empire Avenue and the Sisters loop ramp, the collocated US 20/3rd Street will remain on its existing alignment that is separated by a vegetated and concrete median. The combined westbound US 20/

northbound 3rd Street facility will be widened from two lanes to three lanes beginning at Empire Avenue. North of Empire Avenue, a new off-ramp will route the right lane northbound to the newly extended 3rd Street, which uses the existing US 97 facility. The two left lanes continue as westbound US 20, which requires replacing the structure over 3rd Street to accommodate a second lane on US 20 as well as span the newly extended 3rd Street as shown in Exhibit 2-3 FEIS, Map 3. In this segment, eastbound US 20 is a one-lane roadway that merges with the newly extended two-lane southbound 3rd Street as shown in Exhibit 2-3 FEIS, Map 3. Once merged, there will be two through travel lanes on southbound 3rd Street and two left turn lanes at the Empire Avenue signal, as shown in Exhibit 2-3 FEIS, Map 2, Intersection Enlargement C. There will be numerous directional movements available through the US 97/US 20/3rd Street connection as shown in Exhibit 2-8.

North of Empire Avenue a new east-west local street will be constructed to connect Industrial Park Boulevard and Nels Anderson Road, improving traffic flow in this area, as shown in Exhibit 2-3 FEIS, Map 2. South of Empire Avenue, improvements will be made to the intersection at Sherman Road and Nels Anderson Road to facilitate truck turning movements, including a widened pavement section for tractor/trailer turning radii differences (off-tracking). The intersection of Sherman Road and Empire Avenue and private accesses slightly west of Sherman Road are shown as closed under the Preferred Alternative. As the Preferred Alternative moves into final design and construction phases, the timing of implementation of access changes on Empire Avenue will be important. The City of Bend and ODOT will work jointly with stakeholders to develop a strategy for the phasing and criteria that will trigger the implementation of these changes.

An access road for the Swalley Irrigation District to perform maintenance on the Swalley Main Canal Pipeline will be constructed off of the new northbound US 97 on-ramp at the Empire Avenue interchange, as shown in Exhibit 2-3 FEIS, Map 2.

A trail undercrossing of the newly aligned US 97 will be installed to support the City's future trail plan as shown in Exhibit 2-3 FEIS, Map 3, and Exhibit 3-61D FEIS.

Exhibit 2-9 FEIS is a photo simulation of the south section design for the Preferred Alternative.

Central Section—Nels Anderson Place to Cooley Road

The central section of the Preferred Alternative is shown in Exhibit 2-3 FEIS, Maps 3 through 6.

US 97 and 3rd Street between Nels Anderson Place and Cooley Road—Under the Preferred Alternative, US 97 will be four lanes, with two northbound and two southbound lanes separated by a median or a median barrier. The realigned segment of the highway will be east of the current alignment and will be located immediately adjacent to the railroad right-of-way. A typical cross-section of US 97 in this area and intersection details are shown in Exhibit 2-3 FEIS, Map 6, Cross Section 7. Third Street will have two northbound and two southbound lanes separated by a center turn lane, as shown in Exhibit 2-3 FEIS, Map 6, Cross Section 2. The intersections of 3rd Street with Robal Road and Cooley Road will be signalized. Exhibit 2-3 FEIS, Map 6, Intersection Enlargement H shows the reconfiguration of the signalized intersection of Cooley Road and 3rd Street. Cooley Road will travel under the realigned US 97 and the railroad tracks, which requires lowering Cooley Road approximately 25 feet and lowering 3rd Street 10 feet. There will be no direct connection to US 97 at Cooley Road.

Britta Street will be extended north from its current termination at Hardy Road, as a new two-lane road and will connect to US 20 at Robal Road at a signalized intersection, as shown in Exhibit 2-3 FEIS, Map 4, Intersection Enlargement E. The portion of existing Jamison Street that parallels US 20 on the west side will be extended north, then west to connect to the extended segment of Britta Street.

The intersection of Cooley Road and O.B. Riley Road will be improved with a one-lane roundabout to improve traffic flow as shown in Exhibit 2-3 FEIS, Map 5. The Preferred Alternative will widen Cooley Road from the current three lanes to five lanes between the new signalized intersection with Hunnell Road and the new crossing under the BNSF Railway as shown in Exhibit 2-3 FEIS Map 6, Cross Section 8. The Preferred Alternative minimizes impacts by maintaining access to Hunters Circle from Cooley Road, east of the realigned US 97, as shown in Exhibit 2-3 FEIS, Map 6. Exhibit 2-3 FEIS, Map 6, Cross Section 7 provides the typical cross section of the newly aligned US 97 in this area for the Preferred Alternative. Please see Exhibit 2-11 FEIS, for the photo-simulation which illustrates the grade-separation of US 97 at Cooley Road for the Preferred Alternative.

North Section—Cooley Road to Fort Thompson Lane

The north section of the Preferred Alternative is shown in Exhibit 2-3 FEIS, Maps 6 and 7. Newly aligned US 97 will have two northbound and two southbound travel lanes separated by a median barrier as shown in Exhibit 2-3 FEIS, Map 7, Cross Section 7. Approximately 500 feet south of Cooley Road, 3rd Street will be shifted west from the current US 97/3rd Street. Third Street will continue

north of Cooley Road with two travel lanes in each direction, separated by a two-way left turn lane as shown in Exhibit 2-3 FEIS, Map 7, Cross Section 2. The realigned US 97 will reconnect with the existing US 97 alignment just south of Grandview Drive as shown on Exhibit 2-3 FEIS, Map 7. A new signalized intersection will connect US 97 with the extended 3rd Street, which is aligned on the existing Clausen Road facility, on the southeast side of the Deschutes Memorial Gardens and Chapel (Exhibit 2-3 FEIS, Map 7, Intersection Enlargement J; and Exhibit 2-15 FEIS).

The intersection of Loco Road and 3rd Street will have a two-lane roundabout designed to City of Bend standards as shown on Exhibit 2-3 FEIS, Map 7, Intersection Enlargement I. Access to US 97 at Grandview Drive and at Loco Road will be closed. In addition, two access driveways to US 97 from rural residential lots on the east side of US 97 will be closed as shown on Exhibit 2-3 FEIS, Map 7.

Other Components of the Build Alternatives

Access Management

For the build alternatives, along US 97 between Empire Avenue and the new northern interchange access would be limited to public approach roads at intersections. No private driveways would be allowed. Additionally, private driveways and public approach roads connecting to US 20 in the vicinity of newly signalized intersections would be closed. In cases where private driveways or public road approaches to state highways are closed, alternate access would be provided to the local street network. In some cases, this would require new roads to be built to connect existing local streets.

For the Preferred Alternative, along US 97 between Empire Avenue and the new intersection at 3rd Street, access will be limited to public approach roads at intersections.

Emergency Service Turnaround

An emergency service turnaround would be provided on US 97 at Fort Thompson Lane. There would be a break in the median barrier for emergency vehicles only. Expanded shoulders in this area would accommodate emergency vehicles turning around to change direction.

For the Preferred Alternative, the signalized intersection of US 97 and 3rd Street will provide for emergency service turnaround capability. The improvements for the Preferred Alternative will not change the current configuration of US 97 at Fort Thompson Lane; consequently no emergency service turnaround on US 97 at Fort Thompson Lane will be provided.

Transportation System Management/Transportation Demand Management

Several transportation system management strategies have been incorporated into the build alternatives. These include ramp metering, auxiliary lanes, turning lanes, traffic signal timing optimization, access management, and traveler information. ODOT is coordinating with other agencies to implement transportation demand management strategies independent of the proposed action.

The traffic analysis conducted for the Preferred Alternative included transportation system management and the transportation demand management elements, which resulted in revised roadway configurations, additional bike and pedestrian facilities, and transit accommodations.

Transportation system management measures incorporated into the Preferred Alternative include:

- Metering the on-ramps to US 97/Butler Market Road interchange and US 97/Empire Avenue interchange on-ramps to control the timing of traffic merging onto US 97
- Adding one new northbound travel lane on the existing US 97 to provide more capacity between 3rd Street and Empire Avenue where there are a significant number of short trips (470 trips or 17 percent of US 97 northbound traffic)
- Adding turning lanes and making turning lanes longer to reduce congestion and delay at intersections such as at Cooley Road and 3rd Street, US 20/3rd Street and Empire Avenue, and Empire Avenue to US 97 northbound on-ramps
- Optimizing the timing of signals to better respond to traffic demands
- Reducing the number of driveways and local street connections to US 97.

Transportation demand management measures incorporated into the Preferred Alternative include:

- Continue coordinating with the Central Oregon Intergovernmental Council (COIC) regarding their existing and future planned services and facilities in the area for Cascades East Transit and design the Preferred Alternative so as to not impact existing transit facilities and to not preclude planned local and regional transit facilities within the north Bend area

- Creating transportation management areas for new businesses that limit parking spaces, encourage staggered work start and end times, and provide incentives to encourage alternate commuting options
- Continue coordination with COIC and the Bend MPO to accommodate intercity and local transit
- Providing additional pedestrian and bicycle facilities throughout the API.

Stormwater Management

For the East DS1 and East DS2 Alternatives, stormwater would be conveyed for treatment via new ditches to new stormwater detention ponds and swales for the portion of the API that currently discharges stormwater to drywells and drainwells (the method of stormwater management within the urban area, which consists of curbs and inlets). For the remainder of the API, stormwater would drain to roadside ditches and infiltrate into the soil similar to existing conditions.

The Preferred Alternative will include stormwater conveyance and treatment similar to East DS1 and East DS2 Alternatives.

Aesthetic Treatment

For the build alternatives, aesthetic treatments would be applied to US 97 and improved or new local roads within the API. These treatments would be consistent with existing treatments on ODOT facilities and local roads in Bend and would promote visual unity across the transportation network. Moreover, these treatments would help visually blend roads and highways with surrounding vegetation and rock features. Local road improvements included in the proposed action would be consistent with the roadway standards for the City of Bend or Deschutes County, including any associated aesthetic requirements such as street lighting or vegetation. Examples of aesthetic treatments that could be incorporated into the build alternatives include raised medians of aesthetic concrete or vegetation for local roads, textured, scored or stained surfaces for retaining walls, and slope paving with lava rock and curb for structures such as bridges. The landscaping treatment to be applied to the highway right of way would include a mix of grass, sagebrush, and some trees.

Landscaping treatments are no longer being considered by ODOT and will not be included with the Preferred Alternative.

Definitions

Drywell

A drywell is an underground structure that disposes of stormwater runoff by dissipating it into the ground where it merges with the local groundwater. A drywell is typically constructed of a metal or concrete cylinder with perforated sides and bottom.

Drainwell

A drainwell is similar to a drywell but a drainwell consists of a pit filled with gravel, riprap, rubble, or other stony debris.

2.2 Alternatives Development and Screening

2.2.1 Alternatives Development

The alternatives development phase gathered input from technical staff, project committees, participating agencies, and the public to identify alternatives that would address the purpose of and need for the proposed action. Initially, a preliminary range of alternatives was developed that comprised 21 build alternatives located along three project corridors (Exhibit 2-16):

- **West corridor**—Reroute US 97 west of its existing alignment and closer to US 20
- **Existing corridor**—Retain US 97 on its existing alignment
- **East corridor**—Reroute US 97 east of its existing alignment and closer to the BNSF Railway.

A No Build Alternative was also considered by ODOT and was automatically forwarded into the Draft EIS for evaluation per requirements under the National Environmental Policy Act.

This preliminary range of 21 build alternatives were assessed in terms of engineering feasibility (operational benefits, geometrical design feasibility), significant environmental impacts, and economic feasibility. From this initial assessment, the range of alternatives was revised based on how the alternatives compared to one another, and the best performing alternative(s) in each corridor were carried forward (Exhibit 2-17 FEIS). The result yielded a combined preliminary range of alternatives, which were then forwarded to alternatives screening to determine which alternatives would satisfy the purpose and need for the proposed action and meet other screening criteria.

As a clarification to address public comments received on the Draft EIS, approximately two thirds of these build alternatives were designed to address a large number of operational issues for US 97, US 20, and the local street network. Some of these build alternatives had greater impacts, larger construction footprints, and costs in excess of $300 million. Under direction from the Oregon Transportation Commission, ODOT developed several down-scaled alternatives that would have fewer impacts, smaller footprints, and more affordable costs. For example, the East DS1, East DS2, and East 1 Alternatives provided similar operational performance; however, the East DS1 and East DS2 Alternatives had substantially fewer impacts and were approximately 30 percent lower in cost, so the East 1 Alternative was not advanced for screening against the purpose and need.

Exhibit 2-16: *Corridors Evaluated for the Proposed Action*

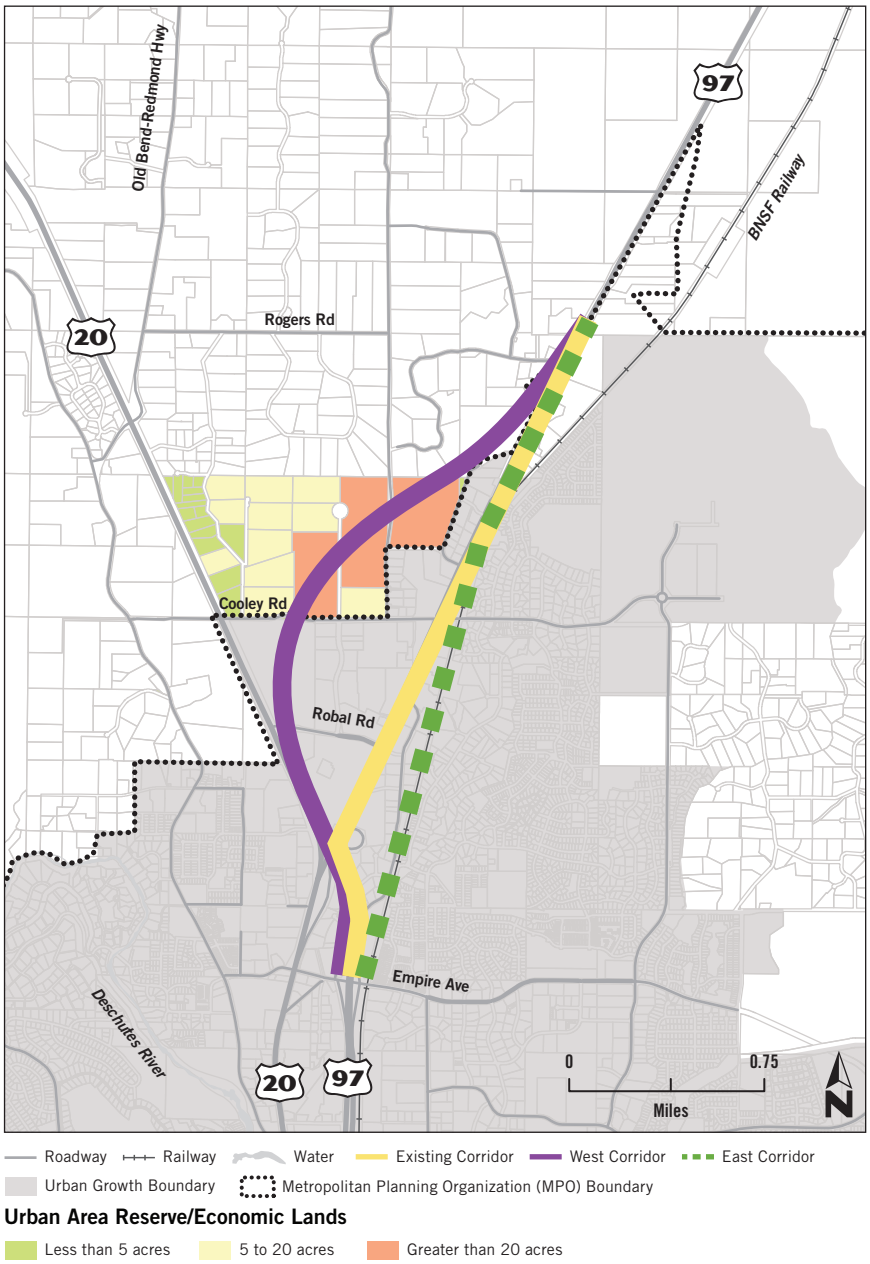


***Exhibit 2-17** FEIS: Narrowing the Preliminary Range of Alternatives*

	Preliminary Range of Alternatives	Assessment	Revised Preliminary Range of Alternatives
West Corridor Alternatives	WS West Modified WS West E (Modified)	These two alternatives were developed by a public stakeholder and were forwarded directly to alternatives screening.	→ WS West Modified → WS West E (Modified)
West Corridor Alternatives	RWA-1 DL-1 West A West A-2B West B West C West 1	Each of these ODOT-developed alternatives had similar design elements; however, the West 1 Alternative provided the best operations for similar costs, geometrical design elements, and environmental impacts and is representative of all other alternatives. Thus, only the West 1 Alternative was forwarded to alternatives screening.	→ West 1
West Corridor Alternatives	West DS1	West DS1 Alternative minimized the design footprint compared to all other West Corridor alternatives and had substantially less cost. Thus, West DS1 was forwarded to alternatives screening.	→ West DS1
Existing Corridor Alternatives	GM-2	This alternative was developed by a public stakeholder and was forwarded directly to alternatives screening.	→ GM-2
Existing Corridor Alternatives	Existing A Existing DS1 TSM/TDM	Each of these alternatives were distinctly different from other Existing Corridor alternatives in terms of traffic operations, design elements and cost. Thus each was forwarded to alternatives screening.	→ Existing A → Existing DS1 → TSM/TDM
Existing Corridor Alternatives	WS East A Modified	This alternative was developed by a public stakeholder and was forwarded directly to alternatives screening.	→ WS East A Modified
Existing Corridor Alternatives	RRA-2B East 1 East 2 East 3 East DS1 East DS2 East DS2 Modified	These alternatives have similar design features and operational performance compared to each other except for RRA-2B Alternative which had poorer performance. The operational performance of East 1, East 2 and East 3 Alternatives were similar to the East DS1 and East DS2 and East DS2 Modified Alternatives; however, the East DS1 and East DS2 and East DS2 Modified Alternatives have significantly lower cost (30 percent less). Thus, the East DS1 and East DS2 and East DS2 Modified Alternatives were representative of other alternatives and forwarded to alternatives screening.	→ East DS1 → East DS2 → East DS2 Modified

Note: The East DS2 Modified Alternative was added to the East Corridor Alternatives considered and advanced for further analysis.

2.2.2 Alternatives Screening

Screening criteria were developed to assess whether an alternative would meet the purpose and need for the proposed action as well as demonstrate economic and technical feasibility. The screening process included pass/fail criteria to determine if an alternative would achieve the following:

- Reduce congestion
- Improve traffic flow
- Improve safety
- Be economically feasible
- Improve expressway operations
- Support current and future economic development
- Maintain local street connectivity.

Each alternative was sequentially screened through a three-step screening process. Exhibit 2-18 FEIS summarizes the screening criteria and screening results for each alternative. The criteria were developed from project issues detailed in Section 1.3 Need for the Proposed Action, and Section 1.4 Background. A more detailed explanation on why an alternative failed one or more of the screening criteria as well as why an alternative was eliminated from further study is provided in Section 2.4 Alternatives Developed but Eliminated from Further Consideration.

The first step was a technical feasibility screen and measured whether or not an alternative could carry projected traffic volumes on US 97 while reducing delay by eliminating traffic signals on US 97, achieving minimum standards and policies set by the *Oregon Highway Plan* and American Association of State Highway and Transportation Officials, and providing safety improvements. The alternatives screened at this step had planning-level design analysis. Those alternatives that passed the first screening step were refined with additional design to allow for system-level traffic analysis to be conducted.

The second screening step also assessed technical feasibility. Using system-level traffic modeling analysis, this screening step measured an alternative's ability to reduce congestion and improve traffic operations on US 97. Those alternatives that passed the second screening step were further refined through additional design analysis so that more detailed impacts and operational performance could be assessed.

For the final third screening step, critical operational feasibility, environmental impacts, and economic feasibility was assessed across six criteria:

More Information

In addition to public comment on the information presented in the Draft EIS, ODOT will evaluate the extent to which each alternative achieves the project goals and objectives. This evaluation will assist differentiating the alternatives and be part of the process in recommending the Preferred Alternative, which will then be documented in the Final EIS. For more information on the project goals and objectives, refer to Section 1.4.

More Information

See Section 3.2 Land Use for more information on exceptions to Oregon's Statewide Planning Goals.

- **Total cost**—the cost for an alternative would not exceed more than $250 million
- **Incremental benefits**—the alterative could be constructed in multiple increments where each increment provides operational benefits to US 97
- **Capacity**—the alternative would have the capacity for traffic demands projected for the next 20 years
- **Expressway operations**—approaches to commercial areas could be acquired without encountering unique challenges or impacts
- **Economic development**—critically important economic lands identified by the City of Bend would not be bisected or removed from the economic base; and other significant impacts that would jeopardize the viability of existing large employment lands would be avoided
- **Connectivity**—barriers to local street connectivity and/or inner-connectivity on large economic lands would be avoided.

Of the 11 build alternatives screened, 9 alternatives failed one or more of the screening criteria. These alternatives were withdrawn from further consideration (see Section 2.4 Alternatives Developed but Eliminated from Further Consideration for additional discussion). Two alternatives, the East DS1 and East DS2 Alternatives, passed all screening criteria and were advanced for detailed study and comparison in the Draft EIS. No evaluation of the alternatives' ability to achieve project goals and objectives was performed at this screening phase.

The evaluation criteria outlined above were developed and vetted by the following groups: the Steering Team, which included representatives from the City, County, ODOT, and the Citizen Advisory Committee Chair; the Citizen Advisory Committee, which included community members representing various interest groups within the area of potential impact; and the Technical Advisory Committee, which included members from the City, County, Oregon Department of Land Conservation and Development, Bend Metropolitan Planning Organization, and ODOT. Chapter 7 of the Final EIS provides a summary of agency and public coordination throughout the National Environmental Policy Act (NEPA) process for the project.

As part of the Final EIS analysis, the Preferred Alternative was evaluated against all of the screening criteria as shown in Exhibit 2-18 FEIS.

2.3 Practical Design Elements

While not used as a screening criterion, practical design was applied as an overall approach to develop alternatives for the proposed action to deliver focused transportation benefits. Practical design uses a systematic approach to deliver the broadest benefits to the transportation system or corridor, within existing resources, by establishing appropriate project scopes to deliver specific results. For example, one practical design element included matching the existing roadway context of the Bend Parkway, which in turn applied to elements such as shoulder widths which also served to minimize the design footprint, associated impacts to the community and environment, and overall cost. The key considerations in applying practical design include:

- **Safety**—ODOT's goal is to make the system as safe as practical. Choices around safety would use sound engineering judgment (i.e., look for high value add ins with minimal cost). No individual project would degrade the overall system safety.
- **Corridor context**—Projects take a system wide corridor approach in establishing or evaluating design criteria. Community character and current and planned land uses as well as the unique features of the project would need to be consistent with the existing Bend Parkway corridor context, the natural and built environment surrounding it and with the guidance and policies for the highway provided in the *2011 Amended Oregon Highway Plan.*
- **Optimize the system**—Managing pavement, bridge and roadway safety feature assets allows ODOT to assess the current state of an individual asset and to develop specific maintenance, repair, rehabilitation and replacement strategies that optimize the lifecycle investment in that particular asset

Public input—ODOT does business in partnership with the local communities and wants system improvements to be visible to the traveling public. ODOT would provide opportunities for the community to shape the chosen solution and consider needs for pedestrians, bicyclists, transit users, freight, and mobility.

- **Efficient cost**—Develop projects that meet the desired purpose, but would be open to considering incremental improvements. Practical design would require applying the appropriate standards to the critical elements to meet the proposed action's specific purpose and need.

Definitions

Oregon Statewide Planning Goals

The Oregon statewide planning goals were established in 1973 and constitute the framework for the statewide land use planning program. Two goals would require exceptions to be approved for the proposed action.

Goal 11: Public Facilities and Services

To plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development.

Goal 14: Urbanization

To provide for an orderly and efficient transition from rural to urban land use, to accommodate urban population and urban employment inside urban growth boundaries, to ensure efficient use of land, and to provide for livable communities.

The Preferred Alternative does not require any goal exceptions.

***Exhibit 2-18** FEIS: Purpose and Need Screening of Alternatives*

Purpose and Need Screening Criteria		Assumptions and Context
STEP 1		
1a	Could the alternative carry the volume of traffic and reduce delay on US 97? – (minimum criteria for traffic in year ~~2032~~ 2035) ~~The alternative must be free flow on US 97 Mainline for through traffic – No signals to stop through traffic on US 97~~. During the analysis for the Final EIS, this criteria was revised to exclude the requirement of excluding signals on US 97 due to public comments received on the Draft EIS	~~2032~~ 2035 Traffic projection at 61,000 ADT 2003 HDM pg 10-40 & 41 4-lane expressway maximum ideal daily capacity is approx. 74,500. With 6-10% trucks, a signal will reduce capacity to approximately (.90)*(.51)*74,500= 38,000 ADT 6-lane expressway maximum ideal daily capacity is approx. 117,500. With 6-10% trucks, a signal will reduce capacity to approximately (.90)*(.51)*117,500= 54,000 ADT
1b	Would the alternative meet respective policies on interchanges?	Any new interchange on US 97 must serve roadways of regional significance (highway/major arterial) and require an interchange access management plan as outlined in the Oregon Highway Plan. Alternative must meet OAR Division 51 regulations.
1c	Would the alternative meet respective interchange function standards?	Spacing between interchange ramps (weave on mainline facility) *(Highway Design Manual Figure 9-29 (AASHTO (Exhibit 10-68) 1600' minimum spacing)*
		Ramp terminal to intersection spacing (Cross-street spacing) *(outlined in the Oregon Highway Plan (Table 19, p. 199) minimum 750 ft)*
		Ramp taper to at-grade intersection spacing (mainline facility) *(outlined in the Oregon Highway Plan (Table 19, p. 199). Minimum 1 mile)*
		At-grade intersection spacing between new interchanges on US 97 (Mainline facility) *(outlined in the Oregon Highway Plan) (Table 19, Note 3 p. 199). Minimum 5 mile)*
1d	Would the alternative meet facility design standards?	Geometry of alternative has the potential to meet the facility design speed for US 97 *(minimum design speed – 60 mph which equates to a 45 mph travel speed)*
1e	Would the alternative provide facility safety improvements?	The alternative reduces the number of potential conflict points on US 97 The alternative provides for access control on US 97
Does Alternative Move Forward to Purpose and Need Step #2?		
STEP 2		
2a	Based on system level traffic model analysis, would the alternative reduce congestion and improve traffic operations?	System level traffic modeling demonstrates that the alternative reduces congestion on US 97
Does Alternative Move Forward to Purpose and Need Step #3?		
STEP 3		
3a	Would the estimated total project cost range fit within the projected long-term funding allocations?	A project is considered unreasonable if the estimated cost is more than $250 million dollars
3b	Would the alternative have fundable phases that provide incremental operations and safety benefits at US 97/Cooley and US 97/Robal road within the medium-term planning period?	Can the project be built in increments that provide benefit to the operations of US 97.
3c	Would the segments on US 97 have the capacity necessary to provide for the projected 20-year traffic demands?	Within the project area, there would not be more than two roadway segments on US 97 with a Demand to Capacity ratio greater than 0.9 between Deschutes Market Overcrossing to just south of Empire Avenue?
3d	Would the alternative provide satisfactory expressway operations along US 97?	Unique challenges to acquire approaches to commercial areas on US 97 would be avoided.
3e	Would the alternative support economic development?	Critical large developable and/or economically important lands would not be bisected or removed from the City of Bend's economic base.
		Would the project result in other significant impacts that jeopardize economic viability to existing critical large employment lands within the City or Deschutes County.
3f	Would the alternative maintain local street connectivity?	Barriers to local street connectivity would be avoided.
Does Alternative Move Forward to the Reasonable Range of Alternatives to be Evaluated in the Draft EIS?		

Preferred Alternative	East DS2	East DS1	WS East A	Existing DS1	Existing A	GM-2	TSM/TDM	No Build	West DS1	West 1	WS West E Modified	WS West Modified
✔	✔	✔	✔	✔	✔	✔	✘	✘	✔	✔	✔	✔
N/A	✔	✔	✔	✔	✔	✔	N/A	N/A	✔	✔	✘	✘
	✔	✔	✘	✔	✔	✘	N/A	N/A	✔	✔	✘	✔
	✔	✔	✘	✔	✔	✘	N/A	N/A	✔	✔	✘	✔
	✔	✔	✔	✔	✔	✔	N/A	N/A	✔	✔	✔	✔
	✔	✔	✔	✔	✔	✔	N/A	N/A	✔	✔	✔	✔
✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
✔	✔	✔	✔	✔	✔	✔	✘	✘	✔	✔	✔	✔
Yes	Yes	Yes	No	Yes	Yes	No	No	Yes[1]	Yes	Yes	No	No
✔	✔	✔		✔	✔			✘	✔	✔		
Yes	Yes	Yes		Yes	Yes			Yes[1]	Yes	Yes		
✔	✔	✔	No Further Study	✔	✘	No Further Study	No Further Study	N/A	✔	✘	No Further Study	No Further Study
✔	✔	✔		✔	✔			N/A	✘	✘		
✔	✔	✔		✘	✔			✘	✔	✔		
✔	✔	✔		✔	✘			✔	✔	✔		
✔	✔	✔		✔	✘			✔	✘	✘		
✔	✔	✔		✔	✘			✔	✔	✔		
✔	✔	✔		✔	✔			✔	✘	✘		
Yes	Yes	Yes		No	No			Yes[1]	No	No		

[1]The No Build Alternative is required to be included for study in the Draft EIS; thus, it was forwarded to the next step regardless of failing any criteria.

✔ = Pass ✘ = Fail N/A = Not applicable; the alternative does not require an interchange

2.4 Alternatives Developed but Eliminated from Further Consideration

Nine of the 11 build alternatives that were screened against the purpose and need and other screening criteria were eliminated from further consideration. Justification for the elimination of alternatives is provided in the following sections. In addition, other considerations about how practical design elements were applied to each alternative and the potential impacts to low-income and minority populations are also presented below as ODOT did consider these elements during the alternatives development process. The rationale to eliminate an alternative was based solely on its ability to meet the screening criteria described in Section 2.2.2, Alternatives Screening; other considerations were for informational purposes only and not a decision variable.

All of the screened build alternatives (excluding the Transportation System Management/Transportation Demand Management Alternative) would require one to four exceptions to Oregon's Statewide Planning Goals 11 and 14. Exceptions would be needed for new roadway improvements outside of the UGB north of Cooley Road and/or north of the UGB along US 97, a new interchange north of Cooley Road and/or north of the UGB along US 97, and the western extension of Robal Road outside of the UGB.

2.4.1 West Corridor Alternatives Eliminated from Further Consideration

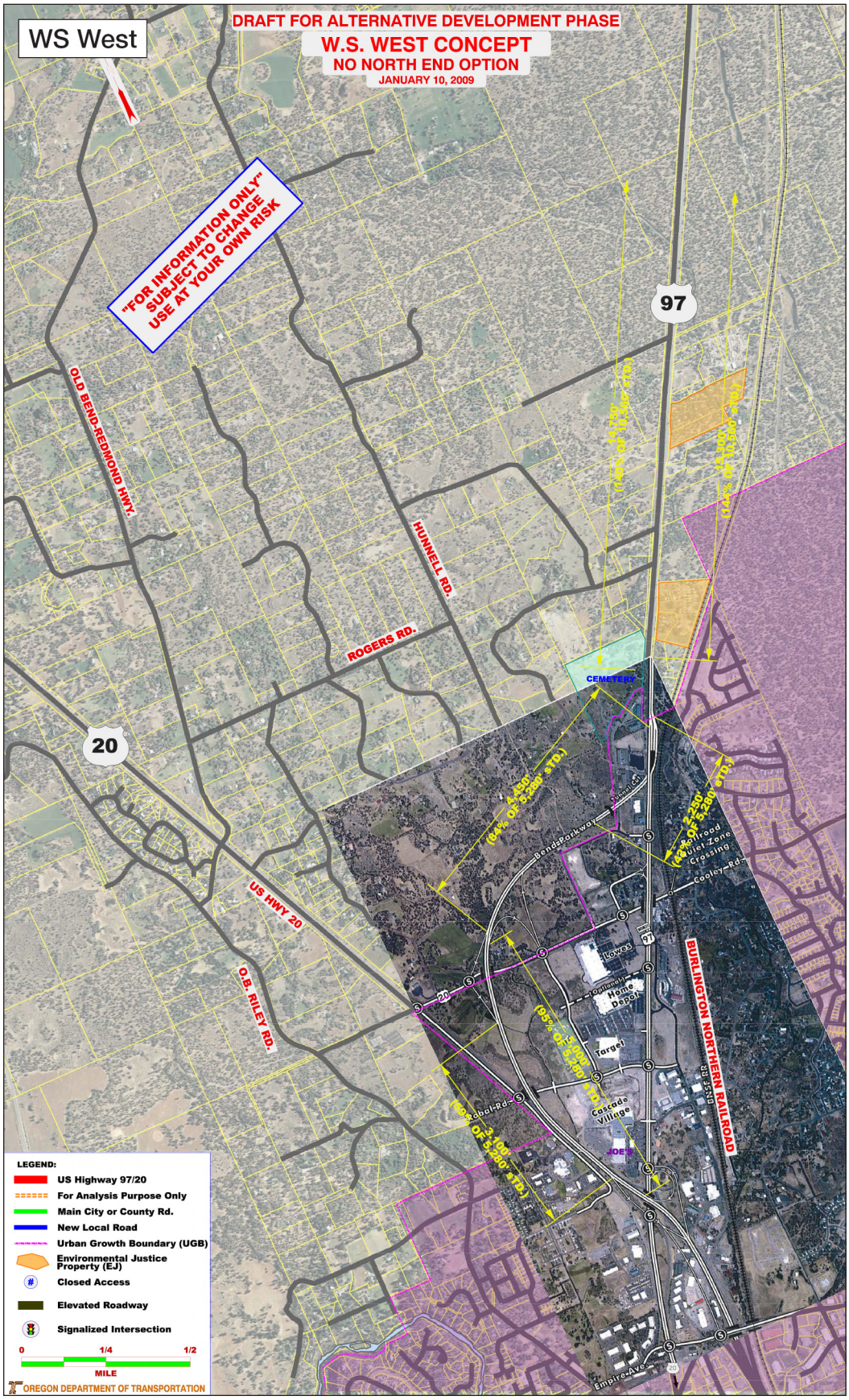
WS West Modified Alternative

Key Features

- Full interchange on US 97 with realigned US 20 and Cooley Road
- Directional interchange on US 97 north of Cooley Road
- Existing US 97 would become a local arterial.

Justification for Elimination—The WS West Modified Alternative (Exhibit 2-19) failed to meet the purpose and need of the proposed action because it would not meet critical design and operational standards necessary for expressway facilities; and, therefore would be technically infeasible. This alternative would have an inadequate ramp terminus location and would not meet associated design spacing standards. These problems could not be resolved through design refinements without causing other spacing problems. Specifically, this alternative would not meet respective policies on interchanges (Criterion 1b) (Exhibit 2-18 FEIS).

Exhibit 2-19: *WS West Modified Alternative*



Criterion 1b—OAR Division 51 states, "The Department shall not approve an Application for a Grant of Access for a private approach opposite a freeway or expressway ramp terminal" (OAR 734-051-0295 Grants of Access 3(c)). Under the WS West Modified Alternative, the US 97 ramp terminals directly across from Hunnell Road would be in direct violation of OAR 734-051-0295 Grants of Access 3(c). Design refinements could not resolve the violation without causing other spacing problems.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The WS West Modified Alternative would include many improvements to the state highway facilities and local road network; however, the impacts of these improvements would result in exceeding constraints (e.g., violation of OAR Division 51 [see Criterion 1b]) and incurring impacts that would not fit the Bend area context (e.g., bisecting rural lands with an access controlled transportation facility and creating a large design footprint with associated property acquisition impacts). Design refinements were investigated to develop a more practical design, which resulted in considering the West DS1 Alternative. Please see subsequent screening analysis on this separate alternative.

Therefore, the WS West Modified Alternative was eliminated from further consideration during Step 1 of the purpose and need screening. This alternative was not advanced for further screening under Steps 2 and 3.

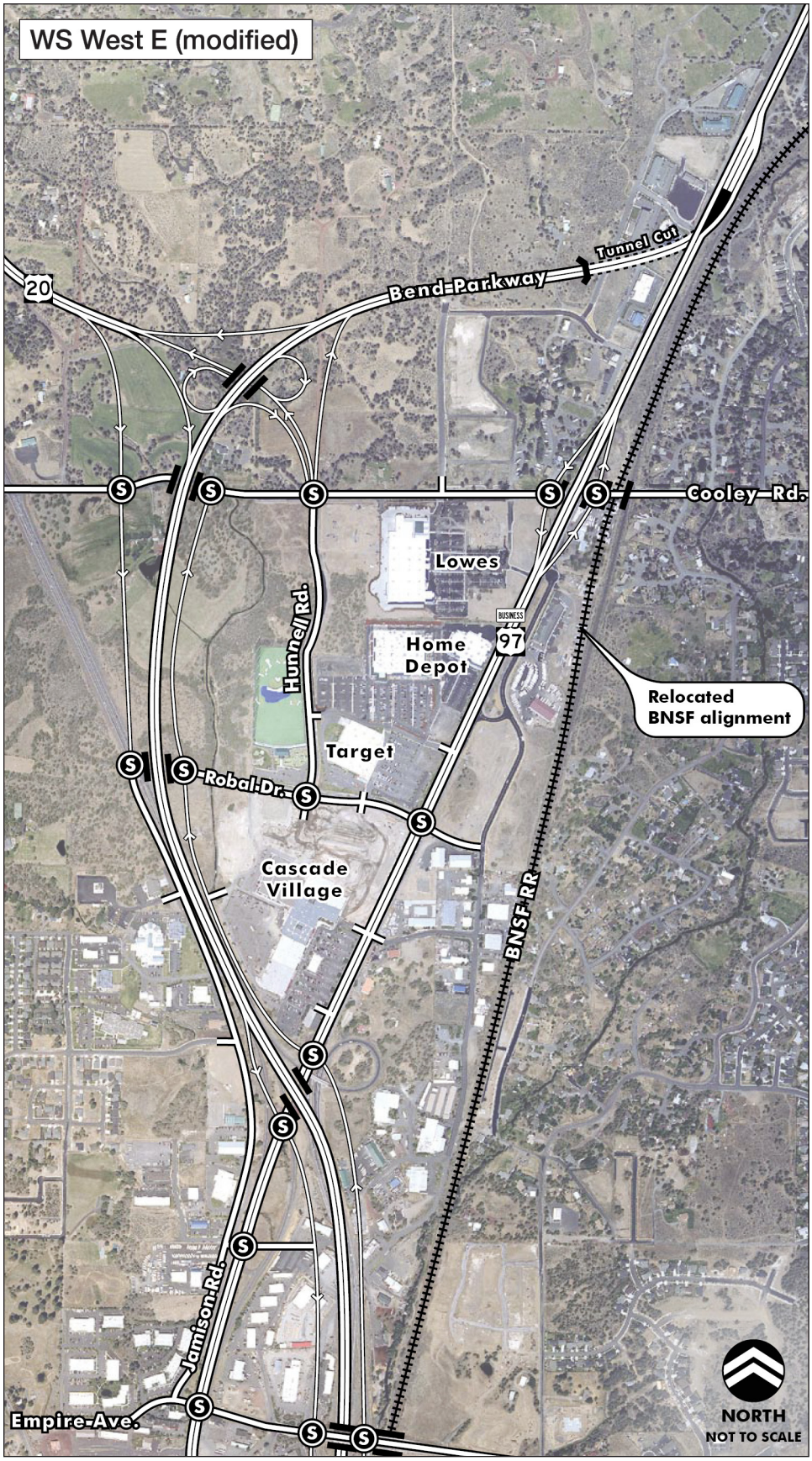
WS West E (Modified) Alternative

Key Features

- Four-ramp partial cloverleaf interchange on US 97 with US 20
- Split diamond interchange of US 97/US 20 at Empire Avenue and 3rd Street extension
- Directional interchange near Clausen Drive.

Justification for Elimination—The WS West E (Modified) Alternative (Exhibit 2-20) failed to meet the purpose and need for the proposed action because it would not meet critical design and operational standards necessary for expressway facilities; and, therefore would be technically infeasible. This alternative would have inadequate weave/merge distances and inadequate ramp terminus to cross-road spacing. These problems could not be resolved through design refinements without causing other spacing problems. Specifically, this alternative would not meet respective policies on interchanges (Criterion 1b and Criterion 1c) (Exhibit 2-18 FEIS).

Exhibit 2-20: *WS West E (Modified) Alternative*



Criterion 1b—OAR Division 51 states, "The Department shall not approve an Application for a Grant of Access for a private approach opposite a freeway or expressway ramp terminal" (OAR 734-051-0295 Grants of Access 3(c)). Under the WS West E (Modified) Alternative, the US 97 ramp terminals directly across from Hunnell Road would be in direct violation of OAR 734-051-0295 Grants of Access 3(c). Design refinements could not resolve the violation without causing other spacing problems.

Criterion 1c—The *Oregon Highway Design Manual* (ODOT 2003b) specifies minimum distances between interchange ramps (entrance to entrance/exit to exit (1,000 feet), exit to entrance (500 feet) and entrance to exit (1,600 feet)). The purpose of this standard is to ensure that traffic flows smoothly and does not back up into travel lanes, which in turn reduces safety and contributes to congestion. The *Oregon Highway Plan* specifies a minimum 750 foot ramp terminal to intersection spacing. This minimum spacing between a ramp terminal and the first intersection on the right is needed to ensure that traffic operations at the intersection do not impede/impact the operation of the ramp terminal and/or the mainline highway. The distance of 750 feet represents the distance required to accommodate for perception and reaction time, lateral traffic movement to turn left or right at the ramp terminal/intersection, and deceleration to a stop prior to the end of the traffic queue.

Under the WS West E (Modified) Alternative, the northbound US 97 exit (Cooley Road) to the westbound US 20 exits distance would be approximately 500 feet. Engineering spacing standards require a minimum of 1,000 feet to assure adequate distance to provide safe "weave" distance for traffic and to not impact traffic flow on the high speed facility. Additionally, the distance from the northbound US 97 off-ramp to 3rd Street and connection to Cascade Village Shopping Center would be approximately 300 feet and would not meet the minimum standard of 750 feet, resulting in increased congestion and poor operations. Design refinements could not resolve these spacing problems without causing other spacing problems elsewhere.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The WS West E (Modified) Alternative would include many improvements to the state highway facilities and local road network; however, the impacts of these improvements would result in exceeding constraints (e.g., Highway Design Manual standards [see Criterion 1c]) and incurring impacts that would not fit the Bend area context (e.g., bisecting rural lands with an access controlled transportation facility and creating a large design footprint

with associated property acquisition impacts). Design refinements were investigated to develop a more practical design, which resulted in considering the West DS1 Alternative. Please see subsequent screening analysis on this separate alternative.

Therefore, the WS West E (Modified) Alternative was eliminated from further consideration during Step 1 of the purpose and need screening. This alternative was not advanced for further screening under Steps 2 and 3.

West 1 Alternative

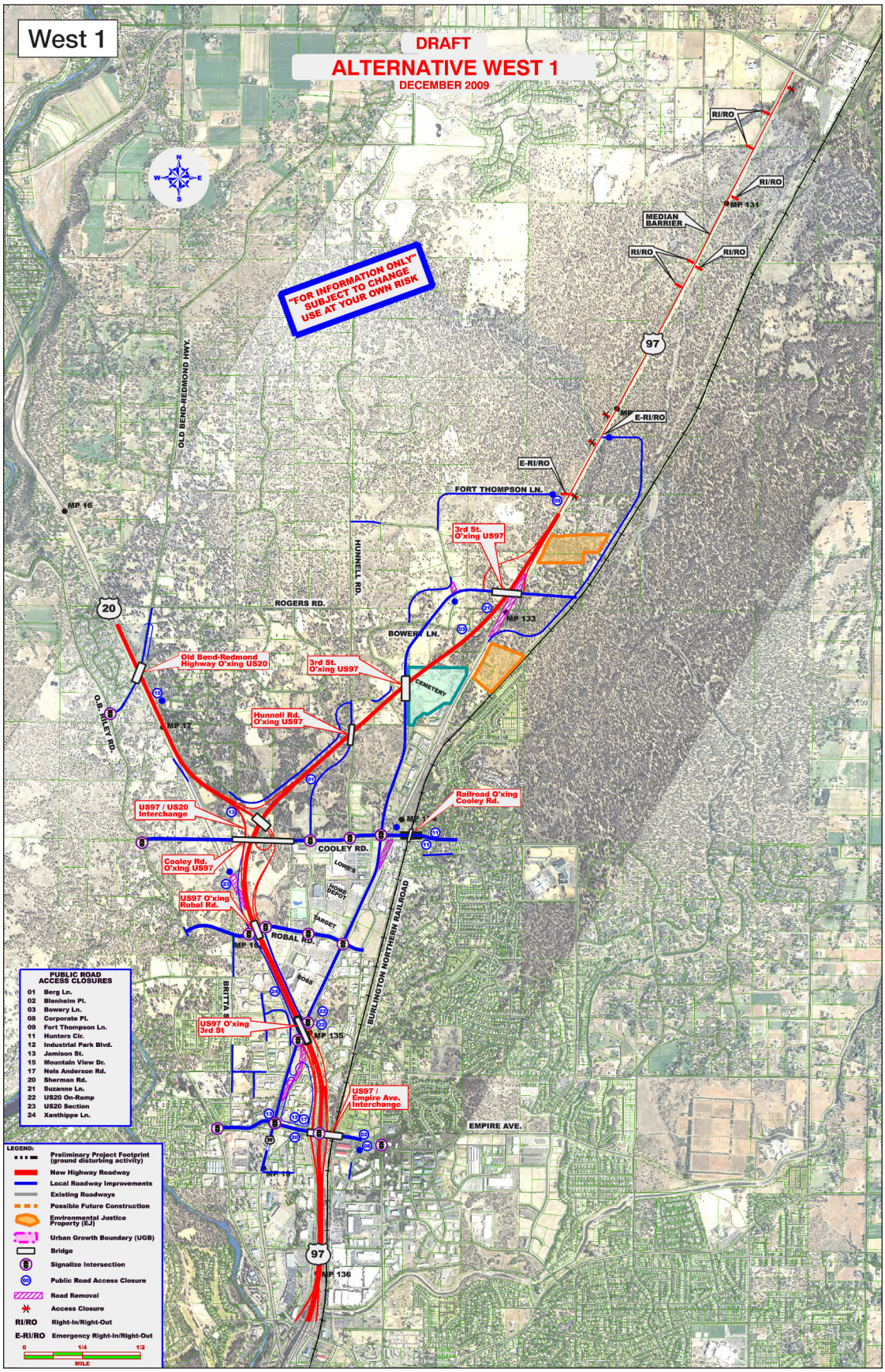
Key Features

- Two ramp diamond interchange on US 97 north of Rogers Road
- Existing US 97 would become a local arterial
- Split diamond interchange of US 97/US 20 at Empire Avenue and 3rd Street extension
- Four ramp interchange at US 97/US 20.

Justification for Elimination—The West 1 Alternative (Exhibit 2-22) failed to meet the purpose and need for the proposed action because the estimated total project cost would exceed the projected long-term funding allocation by 25-40 percent (Criterion 3a), incremental operational and safety benefits to US 97 would not be provided (Criterion 3b), significant economic lands would be bisected (Criterion 3e), and barriers to local connectivity would result (Criterion 3f) (Exhibit 2-18 FEIS).

Criterion 3a—The estimated total project cost of the West 1 Alternative would be approximately $310 to $360 million. An expectation that the proposed action would receive 25-40 percent more than $250 million funding threshold is not reasonable given the numerous highway modernization needs in other Central Oregon communities. Section 1.4 Background, provides additional information on past funding allocation and project funding availability. Design refinements were investigated to reduce the overall cost, which led to developing a new alternative West DS1. Please see subsequent screening analysis on this separate alternative.

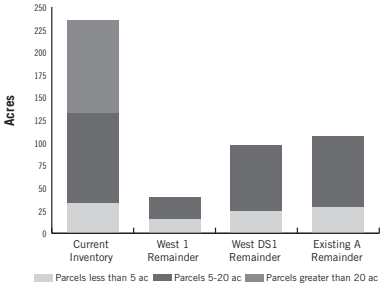
Exhibit 2-22: *West 1 Alternative*



Criterion 3b—One of the key elements for an alternative to be technically viable for the long-term is its ability to be built in increments to match available funding and provide operational benefit to the new US 97 alignment. This is critical because each increment when constructed would need to provide operational benefit over extended periods of time. To provide operational and safety benefits to US 97, the West 1 Alternative would require a significant portion of the new US97 alignment to be built in a single increment. This increment would require building the new US 97 roadway and the associated improvements at the new northern interchange, the Empire Avenue and 3rd Street interchange, and the extension of 3rd Street to the new northern interchange to enable US 97 to function. Aside from other minor local street connections that do not provide any independent operational or safety benefits to US 97, this set of interdependent improvements with the West 1 Alternative could not be split into multiple increments such that each increment would provide safety and operational benefits to US 97 in the short-term or medium-term planning periods.

Criterion 3e—North of Cooley Road, the West 1 Alternative would bisect 176 acres (75 percent) of the Urban Area Reserve lands between US 97 and US 20, including 6 parcels (57 acres) in the 520 acre size range and 3 parcels (102 acres) that are 20+ acres (Exhibit 2-21). Urban Area Reserve lands are designated by Deschutes County and serve as a holding category for lands identified for future urban growth and preserves them as useful open space until needed for orderly growth. The City of Bend has identified these parcels as critically important future employment lands as they are suitable for development. As noted by the City in its 2008 Economic Opportunities Analysis, there is a scarcity of large parcels (520+ acres) that are currently available for developers who seek a single large parcel rather than a set of disaggregated small parcels. Bisecting these large parcels would further reduce the availability of large developable lands, which would severely limit large scale employment and economic development in Bend.

Exhibit 2-21: *Remaining Urban Area Reserve/Economic Lands by Alternative*



Criterion 3f—In addition to bisecting the Urban Area Reserve lands (see Criterion 3e) and adversely affecting future economic development, the severing of these parcels would also reduce the current and future transportation connectivity and traffic circulation north of Cooley Road. Typically in large development areas, it is critical to have road/grid networks that serve all modes of transportation and provide inner-connectivity. Specific design elements to foster inner-connectivity include shorter block lengths, minimum street widths, pedestrian amenities, building orientation to the roadways, high level of street connectivity to distribute traffic volumes, provide redundancy

in the roadway network, tightly spaced grid networks to calm traffic and create pedestrian-oriented areas that are safe and convenient.

As the new portion of US 97 would be a limited access facility, transportation connectivity for the future development areas north of Cooley Road would be severely limited and not meet critical elements outlined above that are necessary for large scale development of economic lands. There would be no inner-connectivity or grid network necessary for large developments due to the "barrier effect" of US 97. Travel would be limited to over/under-crossings of US 97 which in turn create another barrier by bisecting additional lands and exacerbating the ability to maintain further inner-connectivity on those lands. Such segregation would make orderly development in this area impossible in the future.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The West 1 Alternative would include many improvements to the state highway facilities and local road network; however, the cost and impacts of these improvements would result in exceeding constraints (e.g., cost and, incremental benefits [see

Criterion 3a and Criterion 3b]) and incurring impacts that would not fit the Bend area context (e.g., bisecting rural lands with an access controlled transportation facility and creating a large design footprint with associated property acquisition impacts). Design refinements were investigated to develop a more practical design, which resulted in considering the West DS1 Alternative. Please see subsequent screening analysis on this separate alternative.

Therefore, the West 1 Alternative was eliminated from further consideration.

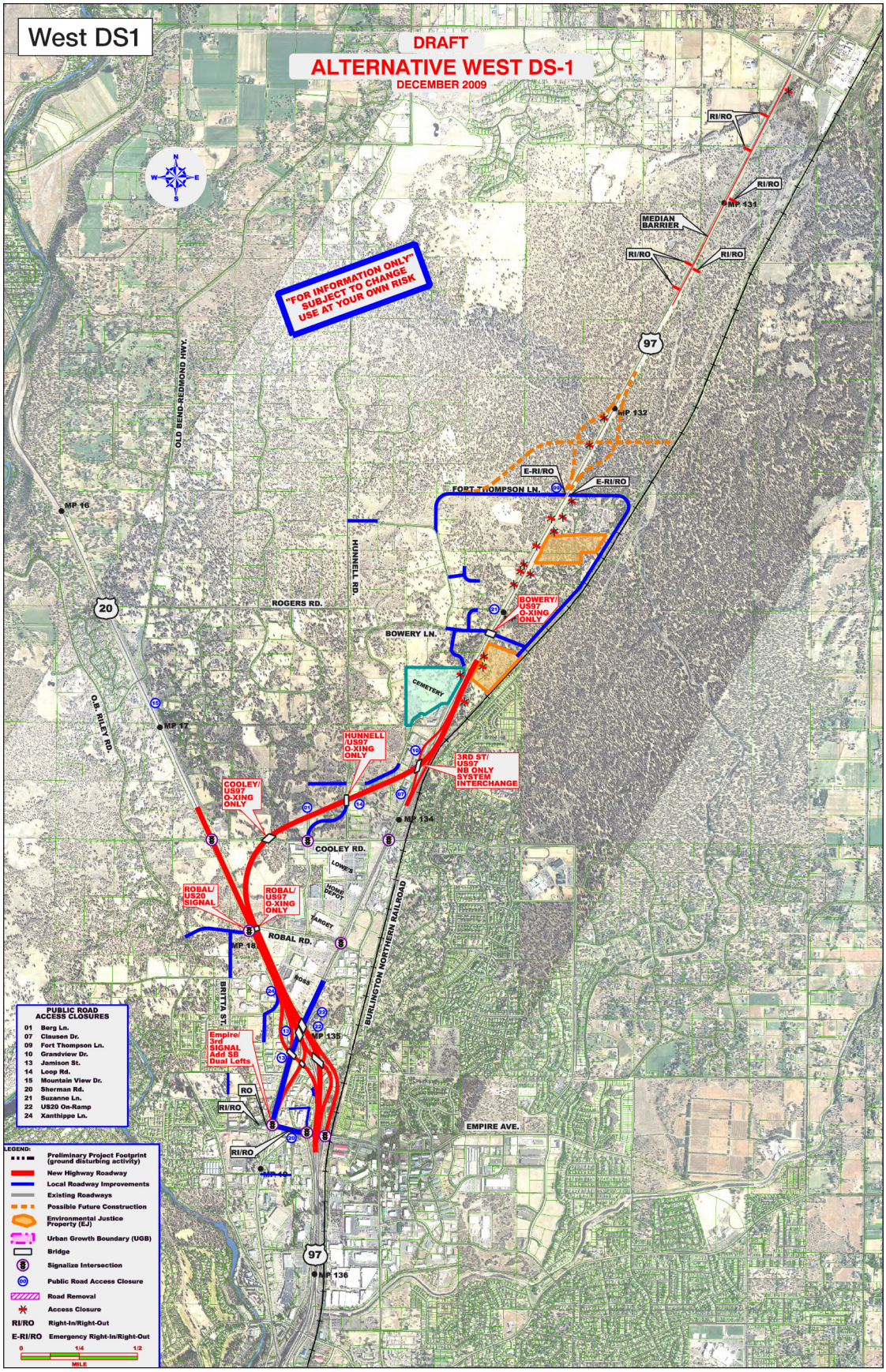
West DS1 Alternative

Key Features

- Existing US 97 would become a local arterial
- 3rd Street/northbound US 97 directional interchange near Clausen Drive
- Diamond interchange at US 97/Empire Avenue
- Adjacent US 97 and US 20 corridors.

Justification for Elimination—The West DS1 Alternative (Exhibit 2-23) failed to meet the purpose and need for the proposed action because incremental operational and safety benefits to US 97 would not be provided (Criterion 3b), significant economic lands would be bisected (Criterion 3e), and barriers to local connectivity would result (Criterion 3f) (Exhibit 2-18 FEIS).

Exhibit 2-23: *West DS1 Alternative*



Criterion 3b—One of the key elements for an alternative to be technically viable for the long-term is its ability to be built in increments to match available funding and provide operational benefit to the new US 97 alignment. This is critical because each increment when constructed would need to provide operational benefit over extended periods of time. To provide operational and safety benefits to US 97, the West DS1 Alternative would require a significant portion of the new US 97 alignment to be built in a single increment. This increment would require building the new US 97 roadway and the associated improvements at the new northern interchange and the Empire Avenue and 3rd Street interchange to enable US 97 to function. Aside from other minor local street connections that do not provide any independent operational or safety benefits to US 97, this set of interdependent improvements with the West DS1 Alternative could not be split into multiple increments such that each increment would provide safety and operational benefits to US 97.

Criterion 3e—North of Cooley Road, the West DS1 Alternative would bisect 138 acres (59 percent) of the Urban Area Reserve lands between US 97 and US 20, including 3 parcels (27 acres) in the 520 acre size range and 3 parcels (102 acres) that are 20+ acres (Exhibit 2-21). Urban Area Reserve lands are designated by Deschutes County and serve as a holding category for lands identified for future urban growth and preserves them as useful open space until needed for orderly growth. The City of Bend has identified these parcels as critically important future employment lands as they are suitable for development. As noted by the City in its 2008 Economic Opportunities Analysis, there is a scarcity of large parcels (520+ acres) that are currently available for developers who seek a single large parcel rather than a set of disaggregated small parcels. Bisecting these large parcels would further reduce the availability of large developable lands, which would severely limit large scale employment and economic development in Bend.

Criterion 3f—In addition to bisecting the Urban Area Reserve lands (see Criterion 3e) and adversely affecting future economic development, the severing of these parcels would also reduce the current and future transportation connectivity and traffic circulation north of Cooley Road. Typically in large development areas, it is critical to have road/grid networks that serve all modes of transportation and provide inner-connectivity. Specific design elements to foster inner-connectivity include shorter block lengths, minimum street widths, pedestrian amenities, building orientation to the roadways, high level of street connectivity to distribute traffic volumes, provide redundancy in the roadway network, tightly spaced grid networks to calm traffic and create pedestrian-oriented areas that are safe and convenient.

As the new portion of US 97 would be a limited access facility, transportation connectivity for the future development areas north of Cooley Road would be severely limited and not meet critical elements outlined above that are necessary for large scale development of economic lands. There would be no inner-connectivity or grid network necessary for large developments due to the "barrier effect" of US 97. Travel would be limited to over/under-crossings of US 97 which in turn create another barrier by bisecting additional lands and exacerbating further inner-connectivity on those lands.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The West DS1 Alternative would include many improvements to the state highway facilities and local road network. Practical design elements would reduce the overall cost. However, the improvements associated with West DS1 Alternative would result in incurring impacts that would not fit the Bend area context (e.g., bisecting rural lands with an access controlled transportation facility and creating a moderate design footprint with associated property acquisition impacts).

Therefore, the West DS1 Alternative was eliminated from further consideration.

2.4.2 Existing Corridor Alternatives Eliminated from Further Consideration

GM-2 Alternative

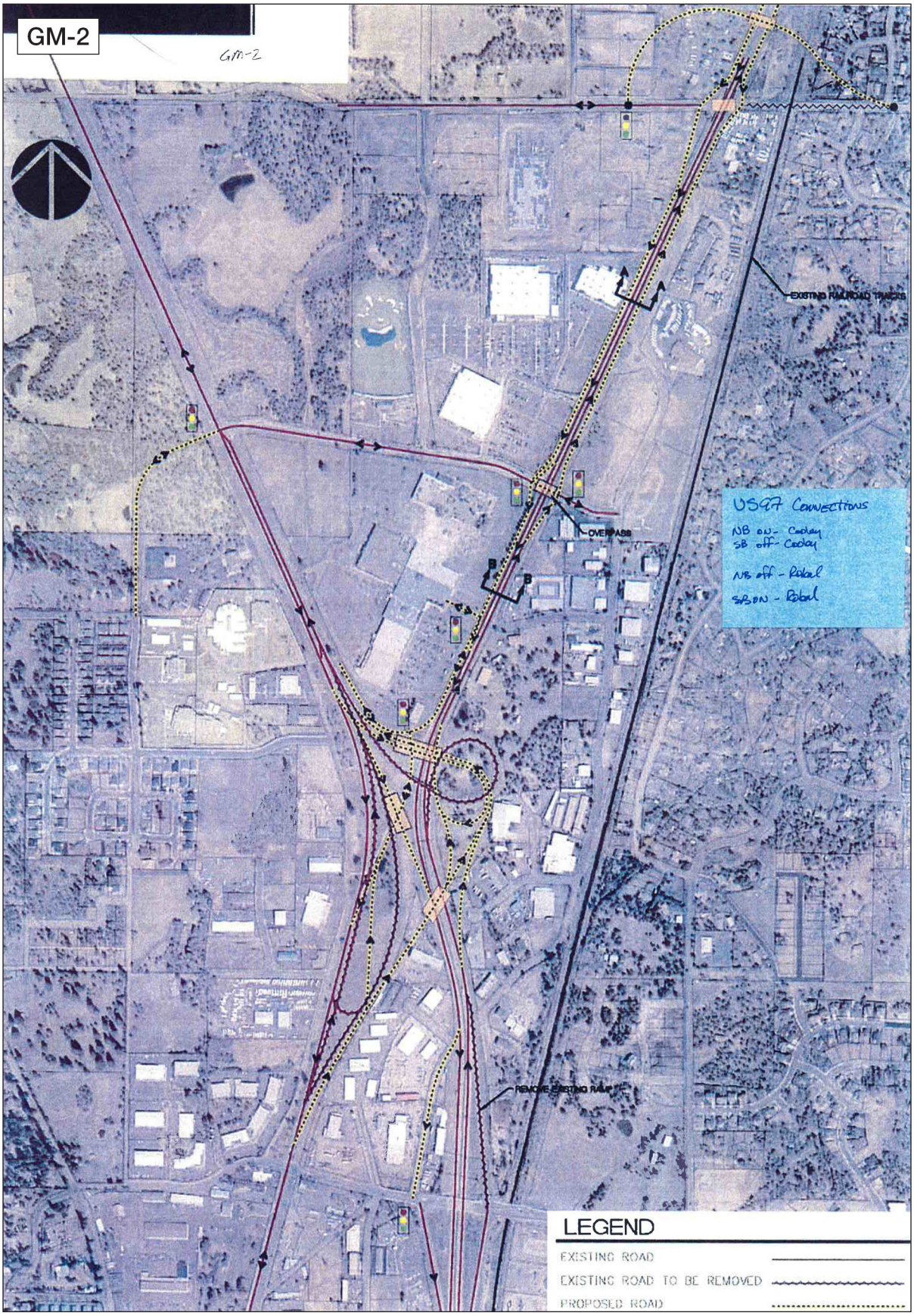
Key Features

- Frontage roads would be added between Cooley Road and Robal Road
- Interchange for US 20, US 97 and 3rd Street just north of Empire Avenue
- Diamond interchange at US 97/Empire Avenue.

Justification for Elimination—The GM-2 Alternative (Exhibit 2-24) failed to meet the purpose and need of the proposed action because it would have traffic flow and safety problems that could not be resolved through design refinements. Specifically, this alternative would not meet respective interchange design standards (Criterion 1c) (Exhibit 2-18 FEIS).

Chapter 1 Purpose of and Need For Proposed Action
Chapter 2 Alternatives
Chapter 3 Affected Environment, Environmental Consequences and Mitigation
Chapter 4 Cumulative Impacts
Chapter 5 Local Short-term Uses and Long-term Productivity
Chapter 6 Irreversible and Irretrievable Commitment of Resources
Chapter 7 Comments and Coordination

Exhibit 2-24: *GM-2 Alternative*



Criterion 1c—The *Oregon Highway Design Manual* (ODOT 2003b) specifies minimum distances between interchange ramps (entrance to entrance/exit to exit (1,000 feet), exit to entrance (500 feet) and entrance to exit (1,600 feet)). The purpose of this standard is to ensure that traffic flows smoothly and does not back up into travel lanes, which in turn reduces safety and contributes to congestion. The *Oregon Highway Plan* specifies a minimum 750 foot ramp terminal to intersection spacing. This minimum spacing between a ramp terminal and the first intersection on the right is needed to ensure that traffic operations at the intersection do not impede/impact the operation of the ramp terminal and/or the mainline highway. The distance of 750 feet represents the distance required to accommodate for perception and reaction time, lateral traffic movement to turn left or right at the ramp terminal/intersection, and deceleration to a stop prior to the end of the traffic queue.

Under GM-2 Alternative, the distance between northbound US 97 onramp from 3rd Street and the northbound US 97 off-ramp to Robal Road would be less than 1,000 feet. The distance between the southbound onramp from US 20 and the southbound off-ramp at Empire Avenue would be less than 1,000 feet. These distances would not meet the minimum of 1,600 feet. Furthermore, under the GM-2 Alternative the northbound and southbound ramps at Cooley Road and Robal Road, and the southbound off-ramp to Empire Avenue and Industrial Park/Nels Anderson Road would all be about 500 feet. These distances would not meet the minimum of 750 feet. Design refinements could not resolve these spacing problems without causing other spacing problems elsewhere.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The GM-2 Alternative would include many improvements to the state highway facilities and local road network; however, the impacts of these improvements would result in exceeding constraints (e.g., Highway Design Manual standards [see Criterion 1c]) and incurring impacts that would not fit the Bend area context by creating a large vertical and horizontal design footprint to connect US 97 and US 20 near Empire Avenue, which had adverse aesthetic and property acquisition impacts. Design refinements were investigated to develop a more practical design, which resulted in considering the Existing DS1 Alternative. Please see subsequent screening analysis on this separate alternative.

Therefore, the GM-2 Alternative was eliminated from further consideration during Step 1 of the purpose and need screening. This alternative was not advanced for further screening under Steps 2 and 3.

Existing A Alternative

Key Features

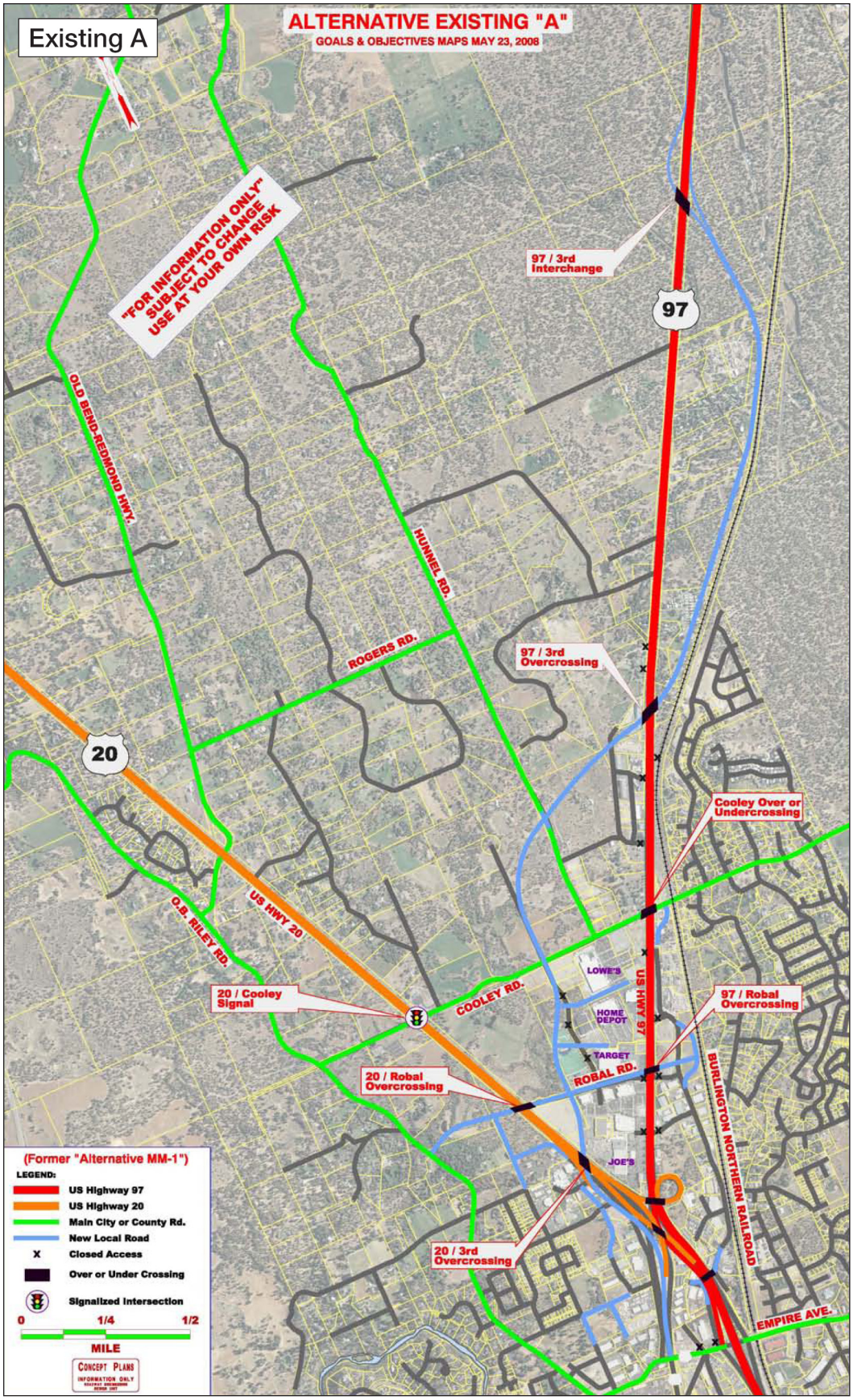
- Directional interchange on US 97 near Rogers Road
- 3rd Street extended north
- Diamond interchange at US 97/Empire Avenue.

Justification for Elimination—The Existing A Alternative (Exhibit 2-25) failed to meet the purpose and need for the proposed action because the estimated total project cost would exceed projected long-term funding allocations (Criterion 3a), unique adverse technical and economic impacts would occur in order to provide satisfactory expressway operations (Criterion 3d and Criterion 3e), and significant economic lands would be bisected (Criterion 3e) (Exhibit 2-18 FEIS).

Criterion 3a—The estimated total project cost of the Existing A Alternative would be approximately $300 to $350 million. An expectation that the proposed action would receive 25-40 percent more than $250 million funding threshold is not reasonable given the numerous highway modernization needs in other Central Oregon communities. Section 1.4 Background, provides additional information on past funding allocation and project funding availability. Design refinements were investigated to reduce the overall cost, which led to developing a new alternative Existing DS1. Please see subsequent screening analysis on this separate alternative.

Criterion 3d and Criterion 3e—In order to achieve the operational performances required of an expressway, approaches to the commercial areas east and west of the current US 97 would be closed under the Existing A Alternative. However, closing these approaches has multiple adverse technical and economic impacts to the community, particularly to commercial owners and tenants. These approaches are primarily for commercial parcels, including both small and large commercial operations. Approaches to businesses on the east side of US 97 would be relocated to the local street network. These relocated approaches would increase travel times and result in lengthy out-of-direction travel for both passenger and freight traffic, which in turn could have an adverse economic impact in terms of additional fuel and freight shipment costs. Approaches to businesses on the west side of US 97 would be relocated to the new extension of 3rd Street. Most commercial structures currently face US 97 with abundant parking and shared common areas located between US 97 and the commercial structure entrances. Under the Existing A Alternative, business

Exhibit 2-25: *Existing A Alternative*



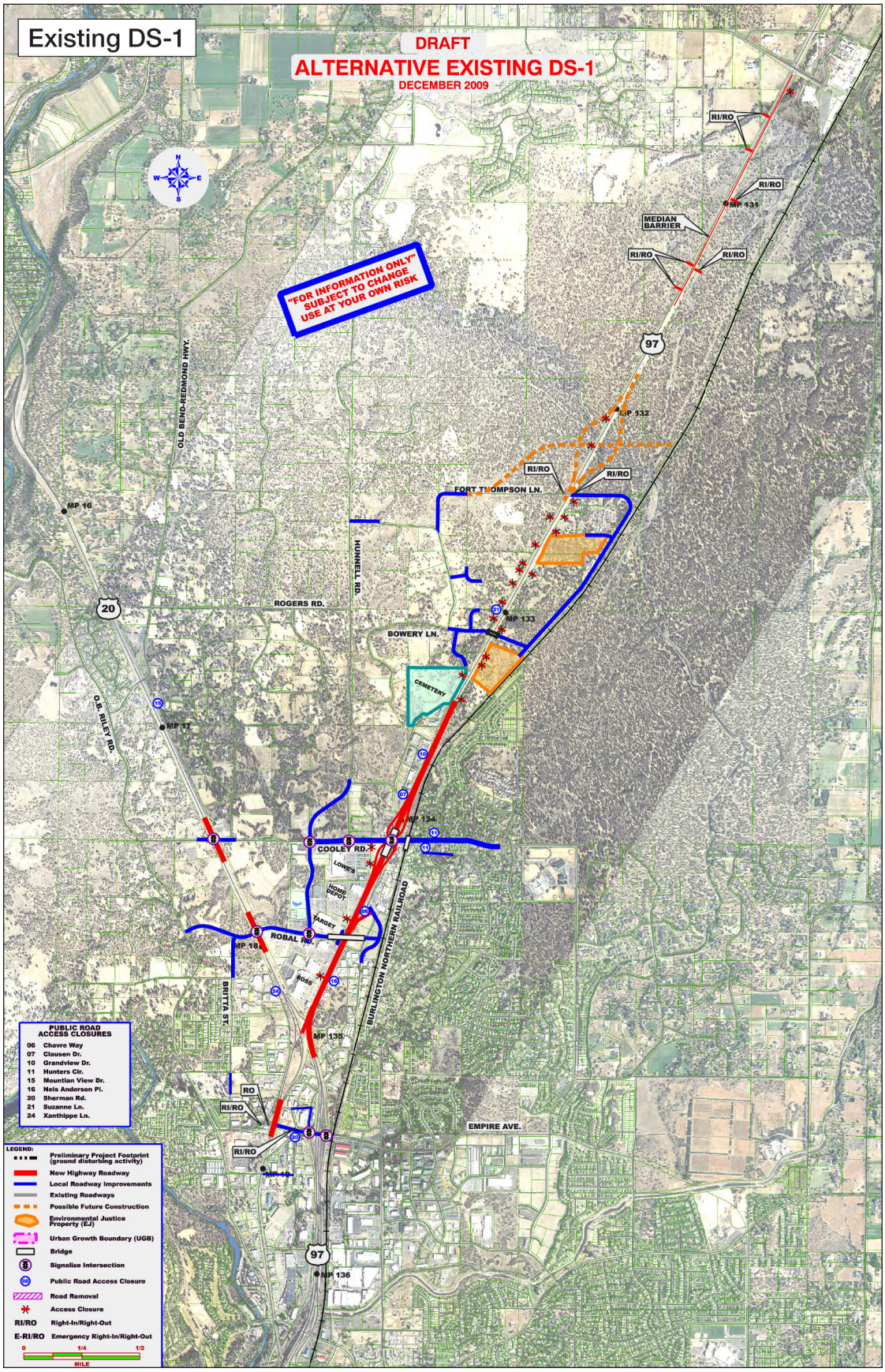
visibility would diminish, parking lots would be less balanced, and shared common areas would no longer be positioned for customers entering on the sides or rears of the commercial structures. The potential economic loss to these businesses associated with the Existing A Alternative could entail substantial diminished property value, tenant lease terminations and relocations, reduction in annual property tax, job losses, and reduction in annual payroll. This alternative impacts several existing large employment centers in Bend, the largest being Cascade Village Shopping Center, which currently employs 600800 citizens of Central Oregon.

Furthermore, north of Cooley Road, the Existing A Alternative would bisect 128 acres (54 percent) of the Urban Area Reserve lands between US 97 and US 20, including 2 parcels (22 acres) in the 520 acre size range and 3 parcels (102 acres) that are 20+ acres (Exhibit 2-21). Urban Area Reserve lands are designated by Deschutes County and serve as a holding category for lands identified for future urban growth and preserves them as useful open space until needed for orderly growth. The City of Bend has identified these parcels as critically important future employment lands as they are suitable for development. As noted by the City of Bend in its 2008 Economic Opportunities Analysis, there is a scarcity of large parcels (520+ acres) that are currently available for developers who seek a single large parcel rather than a set of disaggregated small parcels. Bisecting these large parcels would further reduce the availability of large developable lands and prevent inter-connectivity of these large developable lands, which would severely limit large scale employment and economic development in Bend.

Other Unique Considerations—The Existing A Alternative also would require displacing 45 households within mobile home parks near Bowery Lane. Concentrations of low-income (11 percent of households) and minority (45 percent) households have been identified within these mobile home parks (Parsons Brinckerhoff 2008b); thus, these displacements could affect persons protected under Presidential Executive Order 12898 on Environmental Justice. As all other alternatives considered for the proposed action would displace no households at the mobile home parks, the Existing A Alternative could have significantly more adverse impacts to environmental justice populations.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The Existing A Alternative would include many improvements to the state highway facilities and local road network; however, the cost and impacts of these improvements would result in exceeding constraints (e.g., cost [see Criterion 3a])

Exhibit 2-26: *Existing DS1 Alternative*



and incurring impacts that would not fit the Bend area context (e.g., changing access to large commercial areas to the back side of the current building orientations by rerouting 3rd Street, which in turn would reduce visibility of the business to patrons; and, creating a large vertical and horizontal design footprint to connect US 97 and US 20 near Empire Avenue, which would have adverse aesthetic and property acquisition impacts). Design refinements were investigated to develop a more practical design, which resulted in considering the Existing DS1 Alternative. Please see subsequent screening analysis on this separate alternative.

Therefore, the Existing A Alternative was eliminated from further consideration.

Existing DS1 Alternative

Key Features

- Single-point urban interchange of US 97 at Cooley Road
- Robal Road overcrossing of US 97.

Justification for Elimination—The Existing DS1 Alternative (Exhibit 2-26) failed to meet the purpose and need of the proposed action because it would not reduce congestion on US 97 (Criterion 3c) (Exhibit 2-18 FEIS).

Criterion 3c—Demand-to-capacity ratios were measured for four segments along US 97. Any alternative with more than two roadway segments on US 97 with a demand-to-capacity ratio greater than 0.9 would not provide for the projected 20 year traffic demands. Under Existing DS1 Alternative three segments of US 97 would have a demand-to-capacity ratio above 0.9: Deschutes Market Road to Cooley Road, Nels Anderson Road to Empire Avenue, and US 97 south of Empire Avenue.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The Existing DS1 Alternative would include many practical design elements and improvements to the state highway facilities and local road network. These practical design elements would reduce the overall cost. However, the impacts of these improvements would result in exceeding constraints (e.g. traffic operations measured by demand-to-capacity ratios [see Criterion 3c]).

Therefore, the Existing DS1 Alternative was eliminated from further consideration.

Transportation System Management/Transportation Demand Management Alternative

Key Features—This alternative would implement the following measures within the API as it currently exists: ramp metering, auxiliary lanes, turning lanes, traffic signal timing optimization, access management, and traveler information.

Justification for Elimination—The Transportation System Management/Transportation Demand Management Alternative failed to the meet the purpose and need for the proposed action because it would not provide the necessary capacity to reduce congestion and delay (Criterion 1a), and it would not provide facility safety improvements (Criterion 1e) (Exhibit 2-18 FEIS).

Criterion 1a—The projected average daily traffic for US 97 in 2035 would be 61,000 vehicles. A four-lane expressway with 6-10 percent trucks in its vehicle mix and at least one signal can only provide capacity for 38,000 vehicles per day. The Transportation System Management/Transportation Demand Management Alternative would retain the current four lanes on US 97 and the two signals at Cooley Road and Robal Road; no alternate facility would be added for local trips, which would remain mixed with the through trips on US 97 similar to existing conditions. Thus, this alternative would provide capacity for 38,000 vehicles per day, which would fail to meet the projected average daily traffic needs for 61,000 vehicles per day in 2035.

Criterion 1e—Providing access control and reducing the number of potential conflict points along a roadway improves safety along a roadway. The Transportation System Management/Transportation Demand Management Alternative would not provide access control or reduce the number of potential conflict points, and therefore would not provide facility safety improvements. No additional level of transportation system management or transportation system demand measures could be incorporated into this alternative to resolve the capacity issues.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The Transportation System Management/Transportation Demand Management Alternative would include many practical design improvements to the state highway facilities and local road network that would reduce the overall cost. Examples of these improvements include ramp metering, auxiliary lanes, turning lanes, traffic signal timing optimization, access management, and traveler information. However, the Transportation System Management/Transportation Demand Management Alternative fails on other criteria as explained above.

Therefore, the Transportation System Management/Transportation Demand Management Alternative was eliminated from further consideration as a stand-alone alternative during Step 1 of the purpose and need screening. This alternative was not advanced for further screening under Steps 2 and 3.

2.4.3 East Corridor Alternative Eliminated from Further Consideration

WS East A Modified Alternative

Key Features

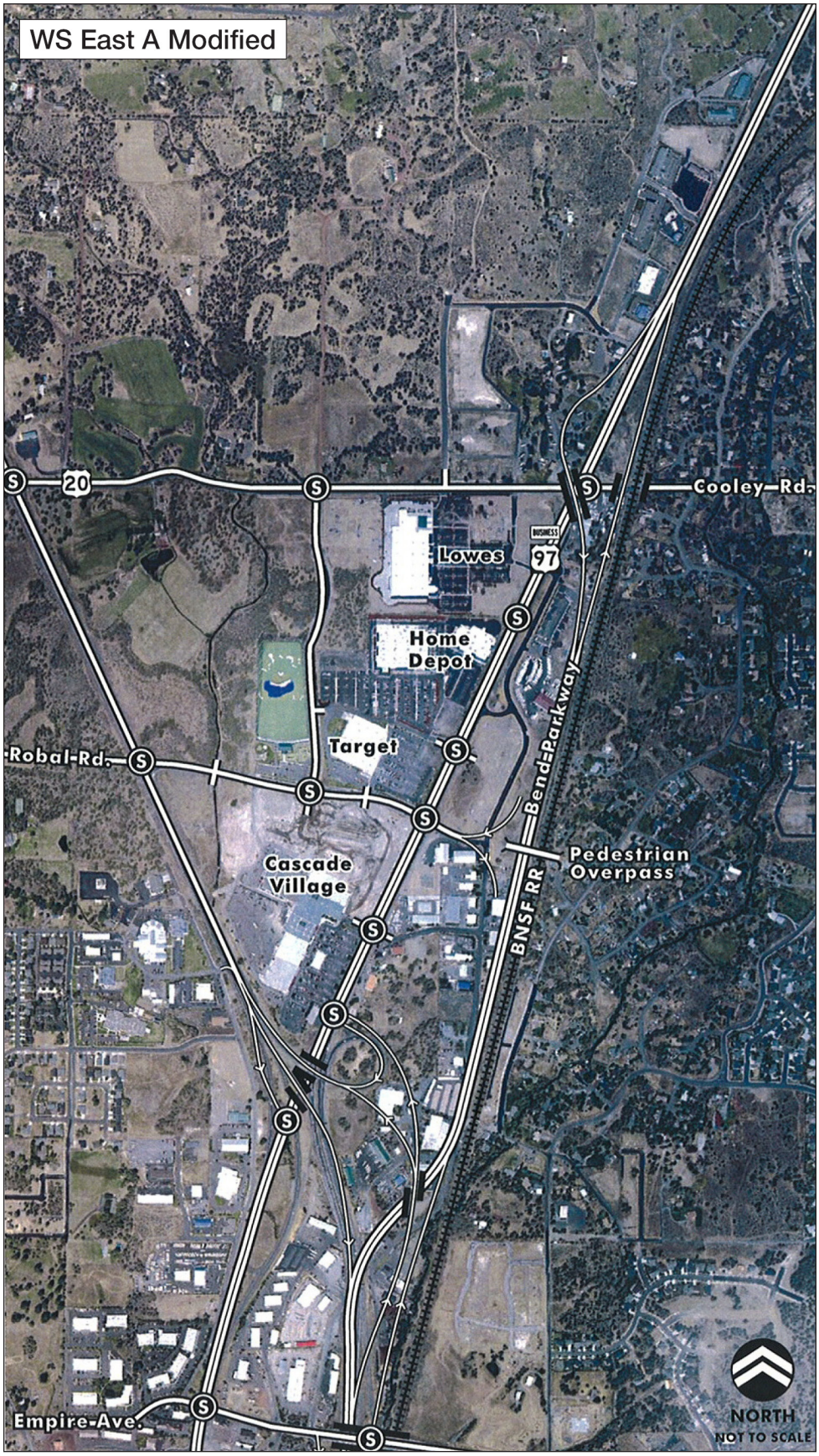
- Directional interchange on US 97 at Clausen Drive
- Partial diamond interchange at US 97/Robal Road
- Existing US 97 would become a local arterial
- Partial diamond interchange at US 97/Empire Avenue.

Justification for Elimination—The WS East A Modified Alternative (Exhibit 2-27) failed to meet the purpose and need of the proposed action because it would not improve traffic flow or improve safety. Design refinements would not be able to mitigate these failures. Specifically, this alternative would not meet respective interchange function standards (Criterion 1c) (Exhibit 2-18 FEIS).

Criterion 1c—The *Oregon Highway Design Manual* (ODOT 2003b) specifies minimum distances between interchange ramps (entrance to entrance/exit to exit (1,000 feet), exit to entrance (500 feet) and entrance to exit (1,600 feet)). The purpose of this standard is to ensure that traffic flows smoothly and does not back up into travel lanes, which in turn reduces safety and contributes to congestion. The *Oregon Highway Plan* specifies a minimum 750 foot ramp terminal to intersection spacing. This minimum spacing between a ramp terminal and the first intersection on the right is needed to ensure that traffic operations at the intersection do not impede/impact the operation of the ramp terminal and/or the mainline highway. The distance of 750 feet represents the distance required to accommodate for perception and reaction time, lateral traffic movement to turn left or right at the ramp terminal/intersection, and deceleration to a stop prior to the end of the traffic queue.

With the WS East A (Modified) Alternative the distances between the northbound US 97 off-ramp and onramp at Cooley Road would be only about 500 feet, which would not meet the standard of 1,600 feet. Furthermore, the distances between the southbound US 97 off-ramp to 3rd Street and the connection to Cascade Village Shopping Center would be less than 300 feet, which would not meet the standard of 750 feet.-Design refinements could not resolve these spacing problems without causing other spacing problems elsewhere.

Exhibit 2-27: *WS East A Modified Alternative*



The description of this alternative as it relates to criterion 1c has been revised as a result of discussions between ODOT and a property owner during and subsequent to the public comment period for the Draft EIS.

With the WS East A Modified Alternative the distances between the southbound US 97 off-ramp at Robal Road to 3rd Street and the connection to Target/Home Depot signal is 530 feet. The distance between the northbound US 97 off-ramp to 3rd Street and the connection to Nels Anderson Road is 660 feet; neither of these distances meets the standard of 750 feet.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The WS East A Modified Alternative would include many improvements to the state highway facilities and local road network; however, the impacts of these improvements would result in exceeding constraints (e.g., Highway Design Manual standards [see Criterion 1c]) and incurring impacts that would not fit the Bend area context (e.g., creating a large vertical and horizontal design footprint to connect US 97 and US 20 near Empire Avenue, which would have adverse aesthetic and property acquisition impacts). Design refinements were investigated to develop a more practical design, which resulted in considering the East DS1 and East DS2 Alternatives. Please see subsequent screening analysis on these separate alternatives.

Therefore, the WS East A Modified Alternative was eliminated from further consideration during Step 1 of the purpose and need screening. This alternative was not advanced for further screening under Steps 2 and 3.

2.4.4 Transportation System Management/ Transportation Demand Management Alternative and Mass Transit Alternative

As discussed earlier in Section 2.4.2 Existing Corridor Alternatives Eliminated from Further Consideration, a Transportation System Management/Transportation Demand Management Alternative was evaluated for the proposed action. As a standalone alternative, this alternative could not satisfy the purpose and need of the proposed action because it would not significantly reduce congestion, improve traffic flow, or improve safety.

Transportation system management strategies tend to be most effective for populations over 200,000, whereas the population of Bend is approximately 83,000. The FEIS acknowledges that transportation system management strategies can be effective for populations less than 200,000.

Definitions

Transportation System Management

Transportation system management uses various actions that increase the efficiency of existing facilities. They are actions that increase the number of vehicle trips a facility can carry without increasing the number of through lanes.

Transportation Demand Management

Transportation demand management focuses on strategies for reducing the number of vehicle trips and vehicle miles traveled as well as increasing vehicle occupancy. It facilitates higher vehicle occupancy or reduces traffic congestion by expanding the traveler's transportation choice in terms of travel method, travel time, travel route, travel costs, and the quality and convenience of the travel experience.

Although the Transportation System Management/Transportation Demand Management Alternative alone could not satisfy the purpose and need of the proposed action, transportation system management strategies from this alternative have been incorporated into the build alternatives, including ramp metering, auxiliary lanes, turning lanes, traffic signal timing optimization, access management, and traveler information.

Transportation demand management strategies include carpooling, vanpooling, biking, walking, transit, management of work start and end times, parking space management, and telecommuting. The implementation of these strategies is typically outside of the jurisdiction of ODOT. As detailed in Exhibit 2-28 FEIS, efforts to implement transportation demand management strategies in the Bend area are currently underway by various jurisdictions, and ODOT is coordinating with these entities to facilitate the successful implementation of these strategies in the future and independent of the proposed action.

More Information

See Section 2.1.2 for more information on the transportation system management/transportation demand management components that are included in the Preferred Alternative.

***Exhibit 2-28** FEIS: Summary of Transportation Demand Management Measures Being Considered in the Bend Area*

Measure	Description	ODOT's Efforts to Facilitate this Measure
Central Oregon Commute Options (Deschutes, Jefferson and Crook Counties)	Provides a carpooling matching service, and facilitates marketing and implementation of vanpooling, bicycle/ pedestrian facilities, and park and ride lots	Working with stakeholders on locating additional park and ride opportunities within the API; the Preferred Alternative will not preclude a future transit facility in the northern area of Bend
Juniper Ridge Transportation Management Area	Creates a transportation management area for Juniper Ridge and other north urban commercial and industrial areas affecting the US 97/Cooley Road area	Coordinating with the City to plan for expansion of the transportation management area to cover additional parts of the Bend urban area
Central Oregon Intergovernmental Council Regional Transit	Provides limited intercity transit between several Central Oregon cities	Working with the Central Oregon Intergovernmental Council to explore the feasibility of planning a commuter rail system
Central East Transit	Provides a local fixed-route system for portions of the Bend area, including 3rd Street in the API and a regional service between Bend and Redmond	Exploring options with Cascade East Transit for potential new routes to serve the API ; the Preferred Alternative will not preclude a future transit facility in the northern area of Bend
Bicycle and Pedestrian Advisory Committee	Identifies bicycle and pedestrian improvements to incorporate into the proposed action	Incorporating bicycle and pedestrian improvements into the proposed action
Safe Routes to Schools	Provides educational outreach and pursues funding opportunities for reducing vehicle travel to or from schools	Incorporating bicycle and pedestrian improvements into the proposed action
Bicycle and Pedestrian Improvement Priorities	Inventories existing bicycle lanes and sidewalks in Bend and within the API, proposes trails (through the Bend Urban Trails Plan), prioritizes improvements or new construction and identifies funding sources	Incorporating improved bicycle and pedestrian facilities into the build alternatives and working with the City of Bend and the Bend Park and Recreation District to identify funding sources to implement the Bend Urban Trails Plan

Key Point

Beneficial and adverse impacts on environmental resources are discussed in Chapter 3 Affected Environment, Environmental Consequences, and Avoidance, Minimization and/or Mitigation Measures for each of the three alternatives studied.

A mass transit alternative was not considered for the proposed action because the API is not within an urban area with a population over 200,000. However, ODOT is coordinating with the Central Oregon Intergovernmental Council to explore the long-term feasibility of a commuter rail system.

Additional mass transit facilities were identified subsequent to publishing the Draft EIS. The Central Oregon Intergovernmental Council published a *Draft Park and Ride Lot Plan* in June 2013. This plan identifies a priority need for a park and ride lot in the Cascade Village shopping center area. The Bend Metropolitan Planning Organization (MPO) published a *Public Transit Plan and Transit Corridor Land Use Assessment* in March 2013. This plan identified the near-term need for a Redmond - Bend Community Connector (Route #24) stop serving Cascade Village and a future transit hub at the same location. The Preferred Alternative will not preclude the development of transit facilities within the Cascade Village shopping center area.

ODOT will continue to provide ongoing financial support to Commute Options, a non-profit organization that promotes a variety of transportation options in Central Oregon to encourage increased intercity and local transit.

2.5 Comparison of Alternatives

Three alternatives were forwarded for further study in the Draft EIS: the East DS1 Alternative, East DS2 Alternative, and No Build Alternative. A comparison of the results of the screening criteria is provided in Exhibit 2-18 FEIS for the three alternatives and the Preferred Alternative. Although the No Build Alternative fails to pass all screening criteria, the National Environmental Policy Act requires that the No Build Alternative be evaluated in an EIS.

Other relevant factors that must be balanced with results of the screening criteria include: public comments on the Draft EIS, balance of adverse and beneficial impacts, alternative constructability, public support or opposition, and maintenance factors.

2.5.1 No Build Alternative

As described in Section 2.1.1 No Build Alternative, the No Build Alternative would not construct any improvements within the API beyond those identified in the Oregon Statewide Transportation Improvement Program or the City of Bend's *Capital Improvement Program* (Exhibit 3-9B). As shown in Exhibit 2-18 FEIS, this alternative would not meet the purpose and need for the proposed action, and thus would not reduce congestion, improve traffic flow, and enhance safety within the API. This alternative does not require construction

of any improvements, so constructability is not an area of concern. To date, there has been no public opposition to the No Build Alternative, but the public has voiced support for improvements to traffic flow and safety in the north end of Bend, so the No Build Alternative is not generally supported by the public. Maintenance of the No Build Alternative would become more costly over time as the existing facilities operate at over-capacity levels and continue to deteriorate.

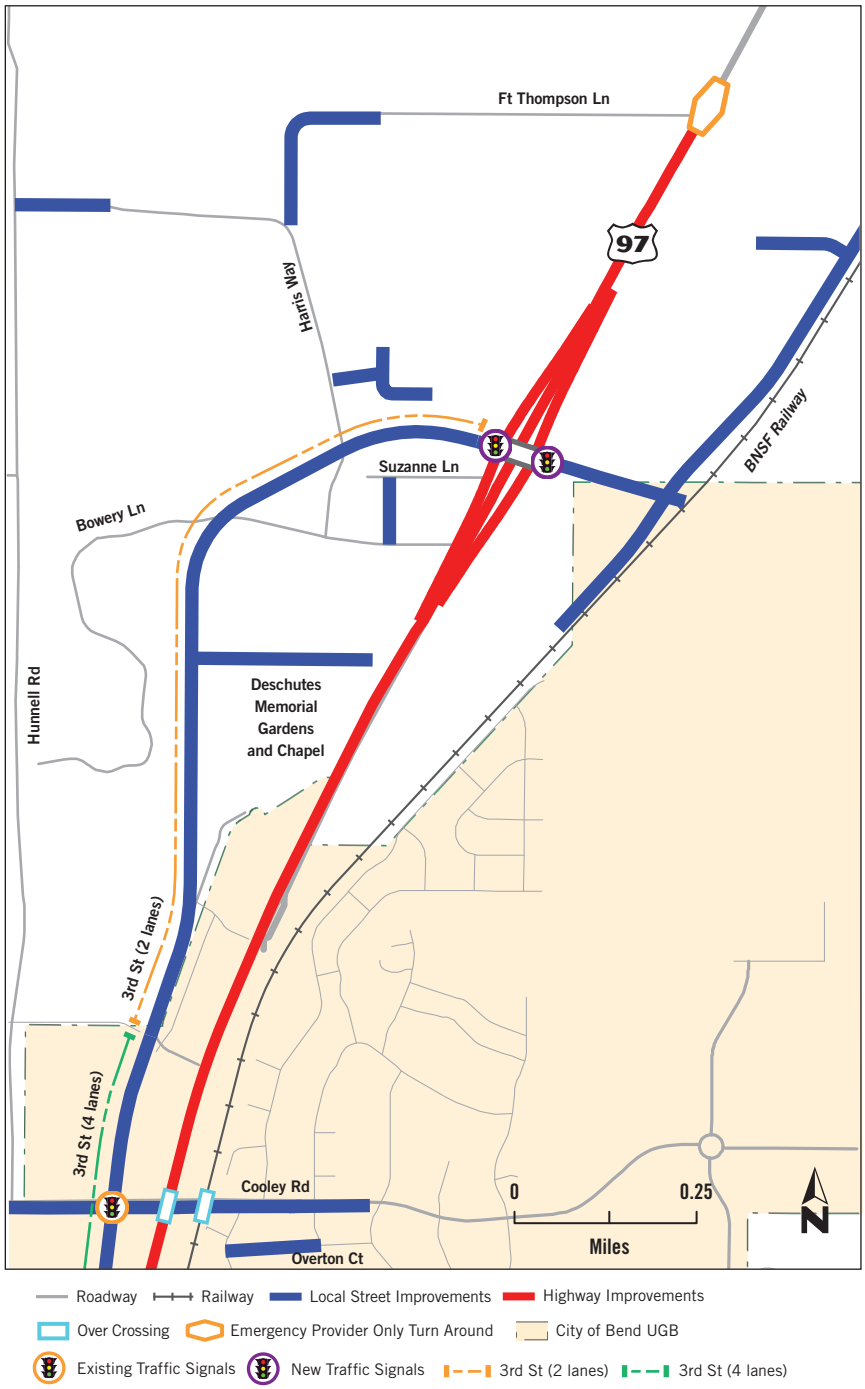
2.5.2 East DS1 Alternative

As described in Section 2.1.2 Build Alternatives, the East DS1 Alternative would reroute US 97 east of its current alignment, and the current US 97 roadway would become an extension of 3rd Street, a local arterial. The 3rd Street extension would continue north on the west side of the Deschutes Memorial Gardens and Chapel, and US 97 would have a full diamond interchange with 3rd Street just north of Bowery Lane (Exhibit 2-29 FEIS). As shown in Exhibit 2-18 FEIS, this alternative passed all screening criteria and would meet the purpose and need for the proposed action, and thus would reduce congestion, improve traffic flow, enhance safety, and could be feasibly constructed within ODOT design standards. To date, public input to this alternative has focused on the alignment of 3rd Street through the edge of an established residential neighborhood, the location of the northern interchange in relation to existing commercial areas near Cooley and Robal Roads, and business displacements in the Nels Anderson Road business area.

Maintenance of the East DS1 Alternative would be greater than the existing facility today because there would be more roadway and a new interchange, including new highway bridges, ramps, and undercrossings, to maintain. The East DS1 Alternative provides an advantage to future maintenance activities as the northern interchange would allow for better access and turn-around capabilities for winter maintenance, which is especially valuable on this section of US 97 that has a median barrier blocking existing turn-around options. Further coordination between ODOT and the City of Bend would be needed to address any jurisdictional transfer of the US 97 facility, which would become a local arterial, and the associated maintenance.

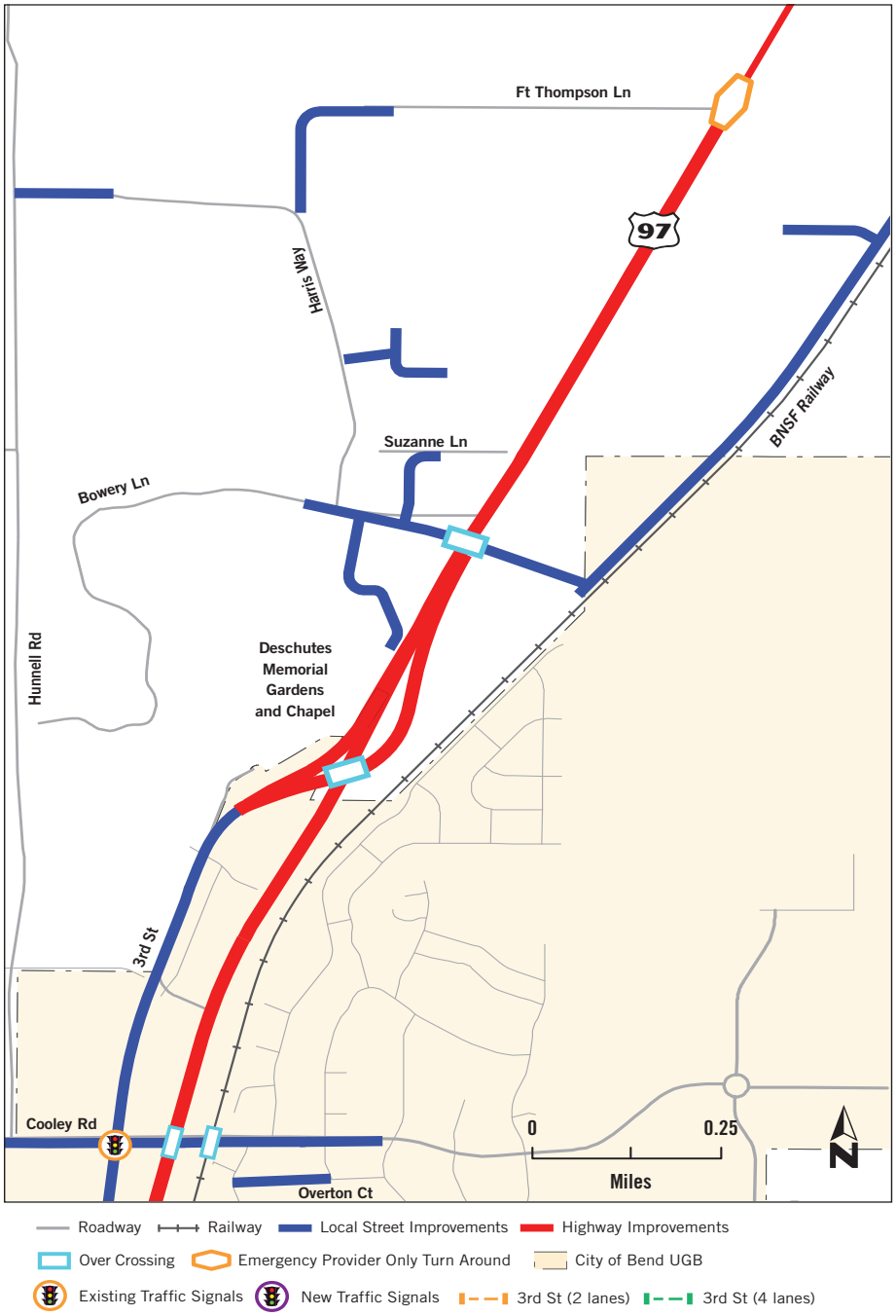
The estimated total project cost for the East DS1 Alternative would be $170 to $220 million (2014 dollars).

***Exhibit 2-29** FEIS: East DS1 Alternative Northern Interchange*



Note: This exhibit has been updated to show a larger view of the East DS1 Alternative, which can be compared to the Preferred Alternative. Interchange ramps for the northbound and southbound movements onto and off US 97 would be elevated to connect with 3rd Street.

***Exhibit 2-30** FEIS: East DS2 Alternative Northern Interchange*



Note: This exhibit has been updated to show a larger view of the East DS2 Alternative, which can be compared to the Preferred Alternative.

2.5.3 East DS2 Alternative

Like the East DS1 Alternative, the East DS2 Alternative would reroute US 97 east of its current alignment, and the current US 97 roadway would become a local arterial, as described in Section 2.1.2 Build Alternatives. Under this build alternative, however, the extension of 3rd Street would continue north on the east side of the Deschutes Memorial Gardens and Chapel, and would connect to US 97 through a directional interchange near Bowery Lane (Exhibit 2-30 FEIS). As shown in Exhibit 2-18 FEIS, this alternative passed all screening criteria and would meet the purpose and need for the proposed action, and thus would reduce congestion, improve traffic flow, enhance safety, and could be feasibly constructed within ODOT design standards. To date, public input to this alternative has focused on the extended travel routes via Bowery Lane and Hunnell Road rather than US 97 that would be required for drivers accessing the mobile home parks on the east side of US 97. There has also been public concern about the location of the northern interchange in relation to existing commercial areas near Cooley and Robal Roads and business displacements in the Nels Anderson Road business area similar to the East DS1 Alternative. The East DS2 Alternative would also have similar increased maintenance, advantages for winter maintenance options, and a potential change in maintenance responsibilities for the portion of US 97 that would become a local arterial compared to the existing conditions.

The estimated total project cost for the East DS2 Alternative would be $170 to $220 million (2014 dollars).

2.5.4 Unresolved Issues

The Draft EIS identified several outstanding issues that needed to be resolved prior to publishing the Final EIS. These issues were identified by the project team early on and are expected to be successfully resolved.

Goal Exceptions

Construction of roadways outside of the UGB would require exceptions to Oregon Statewide Planning Goals 11 (public facilities and services) and 14 (urbanization). Two goal exceptions are anticipated for the East DS1 and East DS2 Alternatives: one for the new US 97/3rd Street interchange and one for the Robal Road extension west of US 20 to O.B. Riley Road. Through the goal exception process, the proposed action would need to demonstrate that it meets the applicable standards for exceptions for transportation improvements, which are listed in OAR 660-012-0070. They require the applicant to:

- Identify the transportation need

- Demonstrate that the need cannot "reasonably be accommodated" through alternatives not requiring goal exceptions, such as through improvements to existing facilities or in locations not requiring new exceptions (such as on lands inside the UGB)
- Compare the economic, social, environmental and energy consequences of the recommended alternative with other alternatives, and select the recommended alternative only if the net economic, social, environmental and energy consequences of that alternative, with mitigation, are not significantly more adverse than the net consequences of the other alternatives
- Provide measures to minimize development pressures on rural lands and protect such lands for rural uses.

The Preferred Alternative will not require any exceptions to the Oregon Statewide Planning Goals.

Interchange Area Management Plans

Interchange area management plans would be developed to protect the function of the existing US 97 interchange at Empire Avenue and a future interchange on US 97 in the northern portion of the API. The interchange area management plan for the Empire Avenue interchange would help ensure that this facility continues to provide safe and efficient connections between US 97, US 20, and the local roadways within the vicinity of the interchange. The interchange area management plan for the new northern interchange would serve a similar function to ensure that the US 97 facility would operate as intended over a long-range planning horizon. Both interchange area management plans would identify land use management strategies, short-term and long-term transportation improvements, access management goals, and strategies to fund identified improvements. The City of Bend and Deschutes County would adopt policies and ordinances necessary to implement the interchange area management plans prior to the publication of the Final EIS. The interchange area management plans would be adopted by the Oregon Transportation Commission prior to the beginning of construction.

The Preferred Alternative will not require any interchange area management plans be developed or adopted. Interchange area management plans are required for new interchanges or interchanges with substantial changes. For the Preferred Alternative, no substantial improvements will occur at the US 97/Empire Avenue interchange and no changes to land use along Empire Avenue will occur; thus, an interchange area management plan is not required. Minor interchange improvements associated with the Preferred Alternative include: realigning one existing ramp; restriping the travel and turn lanes on

Definition

Interchange Area Management Plan

An interchange area management plan is a joint ODOT and local government long term (20+ years) transportation and land use plan to balance and manage transportation and land use decisions in interchange areas, and is an important tool in protecting the function of state highway interchanges and the supporting local street network (ODOT 2006b).

the Empire Avenue overcrossing; and adding ramp metering to the on-ramps. Empire Avenue over US 97 will not be widened so there is no significant reconstruction of the overcrossing. In addition, the Preferred Alternative does not include a new northern interchange.

Highway Designations

US 97 is currently designated as a bypass from Nels Anderson Place south to Romaine Village Way (beyond the extent of the proposed action). US 97 is also designated as an expressway and a freight route on the National Highway System. For the realigned portions of US 97 under the proposed action these designations would need to be transferred from the existing alignment to the new alignment, and the Oregon Transportation Commission would need to extend the bypass designation north to the new northern interchange. The proposed action would be consistent with the Oregon Department of Transportation's Bypass Policy as US 97 would be access controlled and would function as an expressway.

Local Plan Amendments and Land Use Permits

The Preferred Alternative to be identified in the Final EIS would need to be adopted and amended into the Bend Metropolitan Planning Organization's *2007–2030 Metropolitan Transportation Plan.* The *2007–2030 Metropolitan Transportation Plan* is a 20 year long-range transportation plan that addresses all modes of transportation, establishes transportation policy and project priorities, and includes a "financially constrained" project list (FHWA 2011). Part of the long-range planning process is development of a long-range revenue forecast. Only projects that fit within or can be funded with forecasted revenues are included in the *2007–2030 Metropolitan Transportation Plan*. ODOT is coordinating with the Bend Metropolitan Planning Organization for adoption of the Preferred Alternative into the next update of the plan (FHWA 2011).

The Preferred Alternative would also need to be adopted and amended into the *Bend Area General Plan, Bend Urban Area Transportation System Plan, Deschutes County Comprehensive Plan,* and *Deschutes County Transportation System Plan.* Any new local roads outside of existing right of way could require land use permits from the City and County.

Following is a summary of how the issues noted above have been resolved for the Preferred Alternative:

- Portions of the Preferred Alternative have identified funding and are included in the financially-constrained list in the Bend Metropolitan Planning Organization's *2007-2030 Metropolitan Transportation Plan*. On August 15, 2013, the Bend Metropolitan Planning Organization voted to amend the *2007-2030*

Metropolitan Transportation Plan to include the remaining portions of the Preferred Alternative in the Plan's illustrative list thereby making the Preferred Alternative consistent with this plan (see Appendix M).

- The City of Bend's *Bend Urban Area Transportation System Plan* and the *Bend Area General Plan* were amended on March 5, 2014, to include the Preferred Alternative as well as designated the new alignment of US 97 as a bypass, expressway and freight route.
- As determined by Deschutes County in June 2013, the Britta Street extension in unincorporated Deschutes County, which is part of the Preferred Alternative, is already included in the *Deschutes County Transportation System Plan* (see Appendix M). The roundabout at Cooley Road and O.B. Riley Road has been designed in coordination with Deschutes County. On June 14, 2013, ODOT and Deschutes County agreed that this improvement will be added to the *Deschutes County Transportation System Plan* when the project is funded for construction. Therefore, the Preferred Alternative is consistent with the *Deschutes County Transportation System Plan* and the *Deschutes County Comprehensive Plan*.

Areas Remaining to be Surveyed

Some areas within the APE have not yet been surveyed for archaeological resources due to land owners not granting permission for surveys and design changes to the alternatives that occurred since the surveys were conducted. Upon gaining right of entry ODOT would survey all remaining areas and comply with Section 106 of the National Historic Preservation Act prior to construction.

With the exception of small areas adjacent to the existing right of way on eight parcels that total approximately 1.8 acres, all areas within the design footprint of the Preferred Alternative have been surveyed for archaeological resources. The Final EIS includes a commitment by ODOT to survey these remaining areas for archaeological resources prior to construction as ODOT purchases right of way and takes ownership.

2.5.5 Identified Areas of Concern

Throughout the alternatives development process a number of issues were raised by the public, participating agencies, and the ODOT-sponsored committees. Generally, the primary areas of concern were:

Changes to Approaches and Travel Routes—Visibility of businesses from the realigned US 97, travel routes to businesses from US 97, and changes to businesses' private driveways, public street connections, and public approach roads are concerns that have been raised repeatedly.

More Information

An amendment to the Deschutes County Transportation System Plan would be required to place collectors or arterials on a new alignment, if any roads were reclassified to a higher classification, or for any new interchange.

No amendments to the Deschutes County Transportation System Plan will be required for the Preferred Alternative.

Emergency Service Providers—Impacts to emergency response time as a result of altered travel routes and loss of emergency service vehicle maneuvering within streets (emergency u-turns) have been raised as an area of concern by emergency service providers.

Business and Residential Displacements—Representatives from individual businesses, established business areas, and the residential areas in and around the API have expressed concern about displacements resulting from right of way acquisition and availability of commercial, industrial and residential properties that would be suitable for relocation.

Quality of Life—Concerns regarding potential impacts to quality of life have been raised by residents and business representatives throughout the API. These impacts could include:

- Increased air, noise, and visual impacts of new and expanded local roads, elevated structures, and the realignment of US 97 closer to residential neighborhoods
- Availability of affordable housing for relocated residents
- Roadway connectivity and travel routes to existing and future destinations, including out-of-direction travel once access is modified and private driveways on US 97 are eliminated.

The Preferred Alternative was specifically developed to address many of these concerns either through avoidance, such as replacing the northern interchange with a signalized intersection that is contained within the City of Bend UGB, or minimization, such as decreasing impacts to rural residential lands.

2.5.6 Final Decision-making Process

After the Draft EIS public comment period closed, all comments were considered. ODOT and FHWA have identified a preferred alternative and made a determination of the project's impact on the human and natural environment. ODOT and FHWA will document and explain the decision regarding the selected alternative, project impacts, and mitigation measures in a Record of Decision.

In response to comments on the Draft EIS, opportunities to reduce and/or mitigate the impacts resulting from the East DS1 and East DS2 Alternatives were thoroughly examined. This effort included discussions with the City of Bend, Bend Metropolitan Planning Organization, Deschutes County, Oregon Department of Land Conservation and Development, and Swalley Irrigation District to make sure a shared long-term vision and investment strategy for US 97 in relation to this project supports the economic and livability goals of the community and the state. This effort resulted in identifying

the East DS2 Modified Alternative, which is a modified version of the East DS2 Alternative evaluated in the Draft EIS, as the Preferred Alternative. The Preferred Alternative does not include an interchange north of Cooley Road but instead includes a signalized intersection of US 97 and 3rd Street just south of Deschutes Memorial Gardens and Chapel and just north of Grandview Drive. In the rural residential area north of Cooley Road, the Preferred Alternative will limit local road improvements to the extension of 3rd Street along Clausen Drive and a new roundabout at Loco Road and 3rd Street. The Preferred Alternative will not include any access closures on US 97 north of Deschutes Memorial Gardens and Chapel or any of the associated local road improvements to Fort Thompson Lane, Harris Way, Suzanne Lane, and Bowery Lane as compared to the East DS1 and East DS2 Alternatives evaluated in the Draft EIS.

The Preferred Alternative minimizes impacts to neighborhoods east of US 97, including the Boyd Acres Neighborhood. For example, compared to the East DS1 and East DS2 Alternatives there will be three fewer residential displacements from the Boyd Acres Neighborhood and access to the mobile home parks will not change.

The Preferred Alternative also substantially minimizes impacts to rural residential properties north of Cooley Road (including the Hunnell Neighborhood and the Rock O' the Range area) by containing all improvements within the adopted UGB, except for the extension of Britta Street to intersect with US 20 and Robal Road and the roundabout at Cooley Road and O.B. Riley Road. With the Preferred Alternative improvements to Hunnell Road will only occur at the intersection with Cooley Road where a traffic signal will be installed. With the Preferred Alternative the land zoned Multiple Use Agriculture (MUA) in Deschutes County that will be acquired is less than 1 acre, compared to approximately 77 acres with the East DS1 Alternative and 31 acres with the East DS2 Alternative. The Preferred Alternative will not displace any residences in the MUA zone, compared to 10 residential displacements with the East DS1 Alternative and 6 residential displacements with the East DS2 Alternative. By containing the roadway improvements within the adopted UGB the Preferred Alternative also reduces the roadway noise and changes in scenery compared to the East DS1 and East DS2 Alternatives, thereby minimizing impacts to the rural character of area north of Cooley Road.

2.6 Identification of the Preferred Alternative—East DS2 Modified Alternative

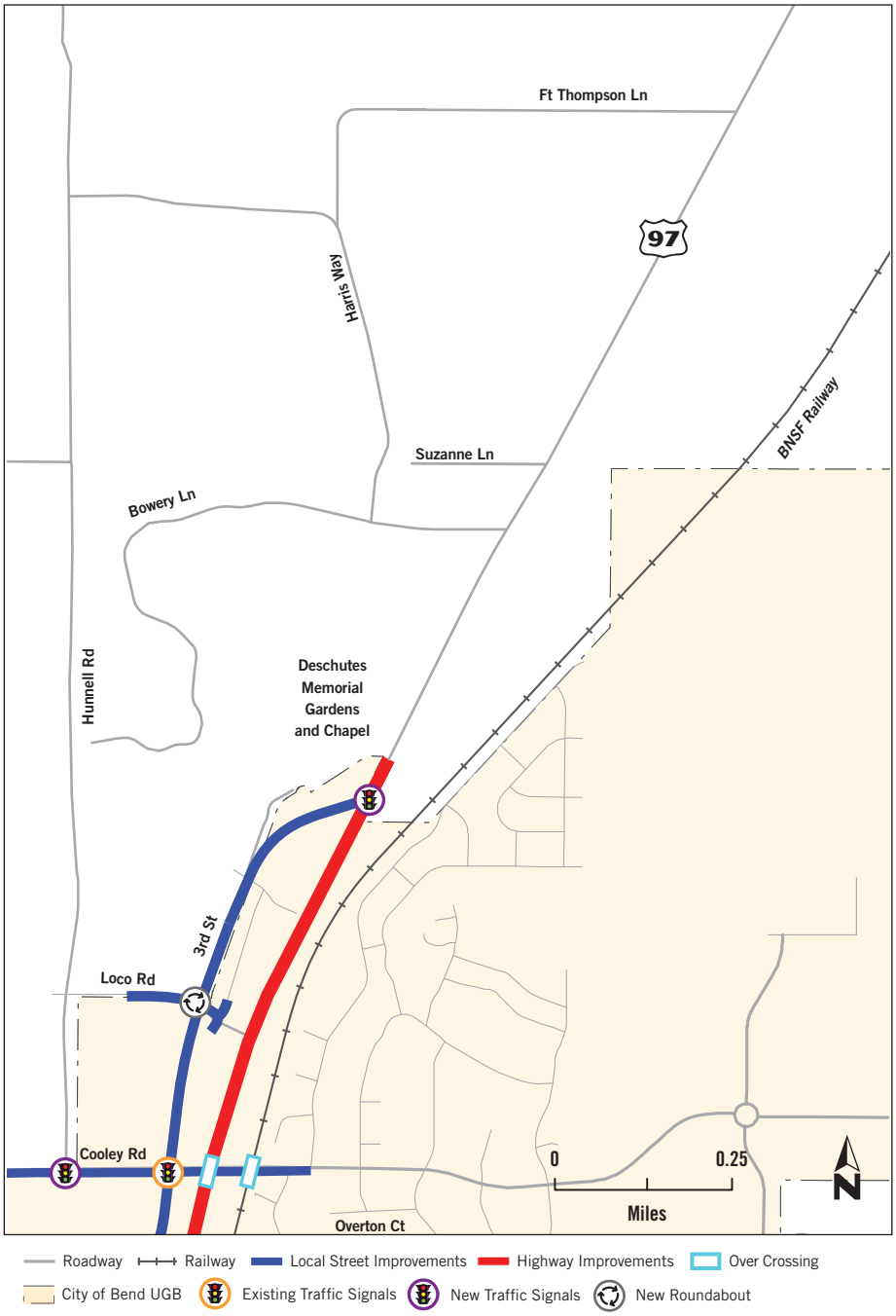
2.6.1 Rationale for Identifying the Preferred Alternative

The Preferred Alternative is a modified version of the East DS2 Alternative that was studied in the Draft EIS and is depicted in Exhibit 2-3 FEIS and the associated inset maps. The primary modification is replacing the directional interchange in the northern area to a signalized intersection at US 97 and 3rd Street as shown in Exhibit 2-30A FEIS. This modified version will:

- Minimize impacts to neighborhoods east of US 97
- Substantially minimize impacts to rural residential properties north of Cooley Road and west of US 97 by containing all improvements within the City of Bend's UGB, except for the extension of Britta Street west of US 20 and intersection improvements at Cooley Road and O.B. Riley Road
- Separate the highway and local street functions; allow peak operating speeds to be reasonably close to the posted speeds
- Improve the access spacing on US 97 to meet spacing standards between the connection to US 20/3rd Street and the north 3rd Street signalized intersection.

As shown in Exhibit 2-18 FEIS, this alternative passed all screening criteria and meets the purpose and need for the proposed action, and thus will reduce congestion, improve traffic flow, enhance safety, and can be feasibly constructed within ODOT design standards.

Exhibit 2-30A FEIS: *Preferred Alternative Northern Intersection*



Note: This Exhibit was added to show the new intersection for the Proposed Alternative

2.6.2 Funding and Phasing of the Preferred Alternative

The estimated total project cost for the Preferred Alternative is $174 million with right-of-way costs estimated at $74 million in 2016 dollars (42 percent of total project cost). This alternative provides flexibility to accommodate phased funding and construction.

Portions of the Preferred Alternative have identified funding and are included as medium- and long-term projects in the Bend Metropolitan

Planning Organization's *2007-2030 Metropolitan Transportation Plan* financially constrained project list (FHWA 2011). A total of $6.26 million is identified in the fiscally constrained *2007-2030 Metropolitan Transportation Plan* for the US 97 Bend North Corridor project (Exhibit 2-30B).

Exhibit 2-30B: *List of Financially Constrained Projects Related to the Preferred Alternative*

MPO MTP Project #	Location (Jurisdiction)	From	To	Improvement	Project Priority	Planning Level Cost ($1,000s)[1]
2	Empire Ave (Bend)	3rd Street	Parkway	Add one travel lane in each direction	Medium	$4,620
24	Empire Avenue (Bend/ODOT)	Parkway SB Ramps		Install traffic signal	Medium	$250
23	O.B. Riley Road (Bend)	Empire Avenue		Install traffic signal	Medium	$250
5	US 97 NB off-ramp (ODOT)	Empire Avenue		Add one ramp lane	Long	$1,140

[1]The project cost estimates do not include right of way costs. Right of way costs vary significantly with each project. Right of way costs will be addressed in the development/engineering phases of each project.
Source: Information is excerpted from Table 6-16 in the Bend Metropolitan Planning Organization's (MPO) *2007-2030 Metropolitan Transportation Plan* (MTP).

The remaining improvements associated with the Preferred Alternative are included in the Bend Metropolitan Transportation Plan's Illustrative Project List. As funding is obtained for additional components of the Preferred Alternative, ODOT will request that the Bend Metropolitan Planning Organization move those funded elements from the illustrative list to the financially constrained list (FHWA 2011).

As outlined in Section 1.4.1, over the past 20 years highway modernization projects for all of Central Oregon have totaled approximately $275 million. Recent highway modernization projects in Central Oregon have received approximately $115 million (US 97 Bend Parkway) and approximately $90 million (US 97 Reroute Phase 1 in Redmond). When developing these highway modernization projects initial funding fell short of the total funding necessary to complete the project but eventually each project was fully funded and constructed.

For the 2007-2030 planning period, the Bend Metropolitan Transportation Plan identifies a total of $253.3 to $271.7 million of capital funding, of which $40.4 to $42.2 million is allocated directly to ODOT. Some of this funding is available for this project. In addition, the Bend Metropolitan Transportation Plan identifies funding allocated to Deschutes County ($1.0 million) and the City of Bend ($253.3 to $271.7 million). The local agencies can contribute portions of their funding to the US 97 Bend North Corridor project. In addition, this forecast does not account for the potential full range of alternative financing mechanisms such as impact fees, tax increment financing,

local improvement districts, state infrastructure bank, local option transportation taxes, fair share mitigation, publicprivate partnership and/or transportation concurrency.

Based on past experience and forecasts for Central Oregon, it is reasonable that a project of this importance could receive up to $250 million over the 20–30 year timeframe. Although it is reasonable that the Preferred Alternative could receive total project funding of up to $250 million, it is unlikely that such a significant amount of funding could be raised entirely within the first 10 years. Smaller funding packages would be more likely, which would enable phased improvements to be made, with each phase providing some congestion relief and improving traffic flow and safety on US 97 to support the longterm solution. The Preferred Alternative can be constructed in phases with improvements that are within the fiscal constraints of the state, county, and city.

The Preferred Alternative will be constructed in phases to match available funding. Phasing decisions will be made as funding is secured; these decisions will be based on the highest need in the area.

ODOT will continue to involve the public during final design of each phase. Prior to construction of a first phase of the project that would include federal-aid funding, FHWA will re-evaluate this NEPA document. The re-evaluation will include an analysis of any impacts that would occur due to the phase being constructed.

2.6.3 Elements to be Coordinated during Final Design

ODOT has identified several design issues related to the Preferred Alternative that ODOT will continue to work on in collaboration with the City of Bend, Deschutes County, and other partners through various planning, project, and operational processes. The following design issues are anticipated to be completed during the final design phase:

- Empire Avenue access closures including Sherman Road and private driveways on the south side of Empire Avenue
- Jurisdictional transfer of 3rd Street to the City of Bend.

2.7 Permits and Approvals Needed

More Information

If a building permit is needed, compliance with Title 18.84 – Landscape Management Combining Zone of the Deschutes County Code would be required.

The permits, approvals, plan amendments, and licenses listed in Exhibit 2-31 FEIS would be required to construct either of the build alternatives.

The permits, approvals, plan amendments, and licenses listed in Exhibit 2-31 FEIS will be required to construct the Preferred Alternative. ODOT will obtain these permits, approvals, plan amendments, and licenses prior to initiating construction.

Exhibit 2-31 FEIS: Permits and Approvals Required

Agency	Permit/Approval/License	Updated Final EIS Status
Federal Highway Administration	Section 106 determination with Memorandum of Agreement	Completed
Federal Highway Administration	Section 4(f) Evaluation Approval	Completed
Oregon Department of Environmental Quality	National Pollution Discharge Elimination System General Construction Permits (including 1200-CA)	To Be Obtained During Final Design
Oregon Department of Environmental Quality	Oversight of hazardous materials issues	To Be Obtained During Final Design
Oregon Department of Environmental Quality	Site preparation permits for grading, erosion, blasting, and air and noise emissions	To Be Obtained During Final Design
Oregon Department of Transportation	Permit for relocation of utility lines in a state road right-of-way	To Be Obtained During Final Design
Oregon Department of Transportation	Compliance with Oregon Senate Bill 408	To Be Obtained During Final Design
Oregon Department of Water Resources	Water Rights	To Be Obtained During Final Design
State Historic Preservation Office	Section 106 Historic Resource Concurrence	Completed
Bend Metropolitan Planning Organization	Amendment of 2007-2030 *Metropolitan Transportation Plan*	Completed
Deschutes County	Amendment of *Deschutes County Comprehensive Plan*	Not Required for the Preferred Alternative
Deschutes County	Amendment to the *Deschutes County Transportation System Plan*	Not Required for the Preferred Alternative
Deschutes County	Compliance with Deschutes County Code	To Be Obtained During Final Design
Deschutes County	Goal Exception Application for Statewide Planning Goals 11 (Public Facilities and Services) and 14 (Urbanization)	Not Required for the Preferred Alternative
Deschutes County	Grading Permit	To Be Obtained During Final Design
Deschutes County	Land Use Permit	To Be Obtained During Final Design
City of Bend	Landmarks Commission Approval for relocating or demolishing the Nels and Lillian Andersen house	To Be Obtained During Final Design
Deschutes County	Noise variance	To Be Obtained During Final Design
Deschutes County	Utility Permit	To Be Obtained During Final Design
City of Bend	Amendment of *Bend Area General Plan*	Completed

***Exhibit 2-31** FEIS: Permits and Approvals Required*

Agency	Permit/Approval/License	Updated Final EIS Status
City of Bend	Amendment of *Bend Urban Area Transportation System Plan*	Completed
City of Bend	Approval of a Special Planned Areas application (Lava Ridge Refinement Plan Area)	To Be Obtained During Final Design
City of Bend	Land Use Permit	To Be Obtained During Final Design
City of Bend	Demolition Permit	To Be Obtained During Final Design
City of Bend	Noise variance	To Be Obtained During Final Design
City of Bend	Compliance with Bend Development Code	To Be Obtained During Final Design
BNSF Railway	Encroachment/Crossing Permit	To Be Obtained During Final Design
Swalley Irrigation District	Encroachment/Crossing Easements	To Be Obtained During Final Design

Note: This exhibit was updated to identify the status of each permit or approval at the time of publication of the Final EIS. Additional permits and approvals were identified during the development of the Final EIS.

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