

5. ANALYSIS OF CONCEPTUAL CIRCULATION AND DESIGN ALTERNATIVES

The six original conceptual design and circulation alternatives that were advanced after the initial screening analysis were refined to determine approximate roadway geometrics and right-of-way needs. These alternatives were then more rigorously evaluated and conceptual cost estimates were developed. The findings from this evaluation were summarized in an evaluation matrix and presented to the three project committees where recommendations on which alternatives should be considered for further study were developed. Finally, the alternatives were presented at a public open house to provide information to the community and gather input.

Two additional design alternatives (Concept 6) formulated during later stages of the study were screened and advanced by the CAC and TAC for further evaluation. These new alternatives were presented at a fourth public open house, along with the two alternatives advanced during the previous evaluation period, and then presented for review by the SC.

This section of the report presents a description and evaluation of each alternative followed by the conceptual cost estimates and the evaluation matrix. Summaries of the committee recommendations are presented following the discussion of the matrix.

Alternatives Evaluation

The alternatives were refined from the initial concepts through the development of volume forecasts, subsequent traffic analysis, and application of appropriate roadway geometrics. The traffic forecasts reflect the shifts in traffic volumes both within the project area and from roadways outside the project area.

Although existing and future No Build operations were compared against the OHP standard of 0.85 for Highway 138, when evaluating future capacity improvements, ODOT uses the HDM standard of 0.75 as the target for operations. Therefore, the lane configurations needed to meet HDM standards, where applicable.

These lane configurations, along with horizontal and vertical geographic data were used to develop approximate roadway and right-of-way for each design alternative. Transportation, environmental and land use impacts of the improvements were then identified along with conceptual cost estimates.

Improvements under each alternative were developed keeping in mind that the IAMP for I-5 Exit 124 is also underway. The proposed lane configurations should be compatible with recommendations for Harvard Avenue as a seven-lane roadway but do not attempt to incorporate the various interchange options considered for the IAMP.

Alternative 1(a): Existing Alignment Improvements

This design alternative would implement improvements that maximize system capacity and traffic flow within the existing Highway 138 corridor. As displayed in Figure 5-1, improvements were identified at seven intersections in the project area under Alternative 1(a). One improvement addresses geometrics while the other six address capacity constraints. Improvements at these locations range from re-striping travel lanes to widening roadways for additional capacity. Specific intersection improvements are described below with lane configurations shown more clearly in Figure 5-2.

Lane Configurations and Traffic Flow

Although traffic flow would not change with Alternative 1(a), improvements at seven intersections were identified as noted above.

Improvements at the Stephens Street/Diamond Lake Boulevard intersection would include the addition of two lanes on Stephens as shown in Figure 5-2. A second southbound left-turn lane from Stephens Street to Diamond Lake Boulevard and a third northbound through lane on Stephens Street are identified as part of the alternative. These two capacity additions would bring the 2030 forecast v/c ratio to 0.86 which would exceed the HDM standard of 0.75 and be just above the OHP standard of 0.85. The intersection could not be improved beyond this level without creating triple left-turn lanes or adding a fourth northbound through travel lane.

Although operations at the Winchester Street/Diamond Lake Boulevard intersection would meet the OHP standard of 0.85 without any capacity improvement, long queues are expected to form on several legs of the intersection. To add more capacity to the intersection and accommodate the demand by traffic using Winchester Street as an alternate route to Stephens Street, a second southbound left-turn lane was considered (see Figure 5-2). With this additional turn lane, the 2030 forecast v/c ratio for the intersection would be 0.72, which would meet the HDM standard of 0.75 and reduce queuing on both Diamond Lake Boulevard and Winchester Street.

Adding a third northbound travel lane on Stephens Street approaching Diamond Lake Boulevard intersection creates the possibility of adding a southbound left-turn lane at the Stephens Street/Douglas Avenue intersection by carrying the widening southward to Douglas Avenue. Under this scenario, a southbound left-turn lane and a third northbound through travel lane (see Figure 5-2) would be added to the intersection. The capacity additions would result in a 2030 forecast v/c ratio of 0.76 which would be just above the HDM standard of 0.75.

At the Washington Avenue/Stephens Street intersection, the northbound approach would be re-striped to allow for dual left-turn movements but would not require additional travel lanes (see Figure 5-2). This improvement would result in a 2030 forecast v/c ratio of 0.79 which would exceed the HDM standard of 0.75 but would still meet the OHP standard of 0.85. Increasing the curb radius at the southwest corner of the intersection to facilitate the northbound to westbound left-turn movement for trucks is also recommended at this intersection.

Highway 138 Corridor Solutions Study
Roseburg, Oregon

Legend

- Centerline
- Striping
- 6-ft Shoulder
- Railroad



Figure 5-1
*Alternative 1(a):
Existing Alignment Improvements*

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Legend

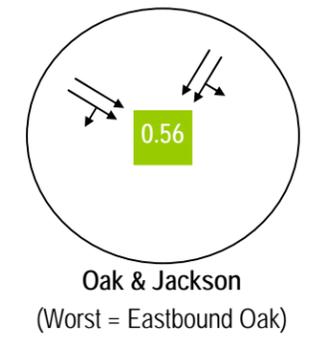
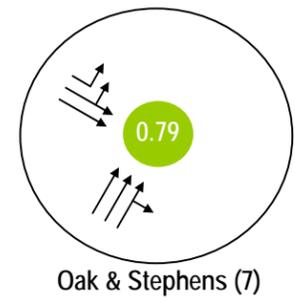
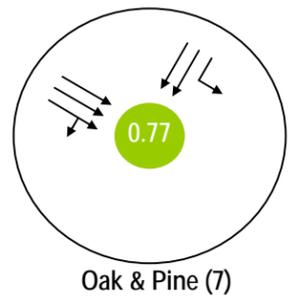
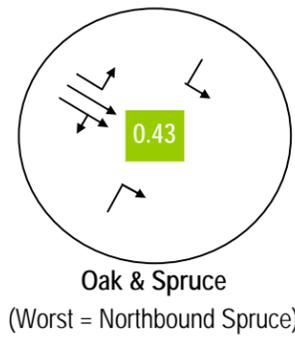
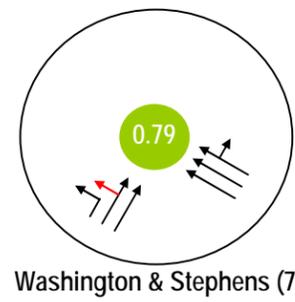
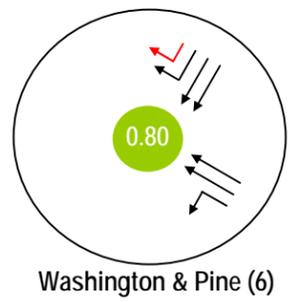
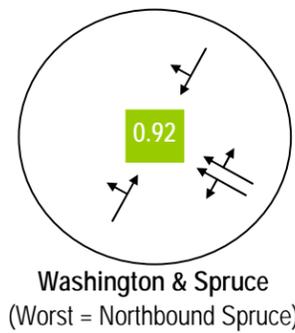
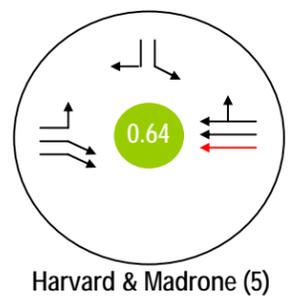
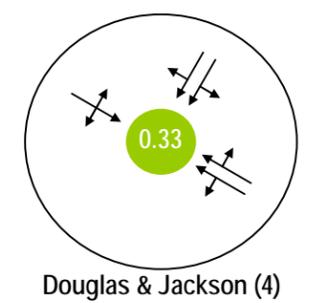
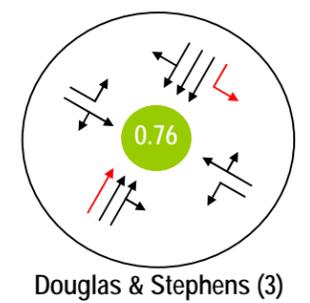
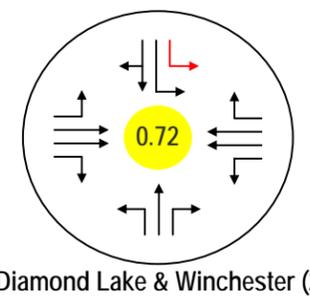
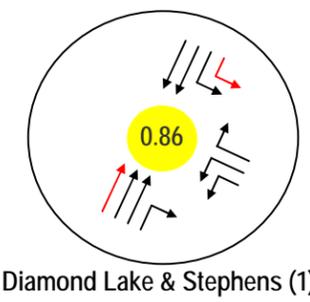
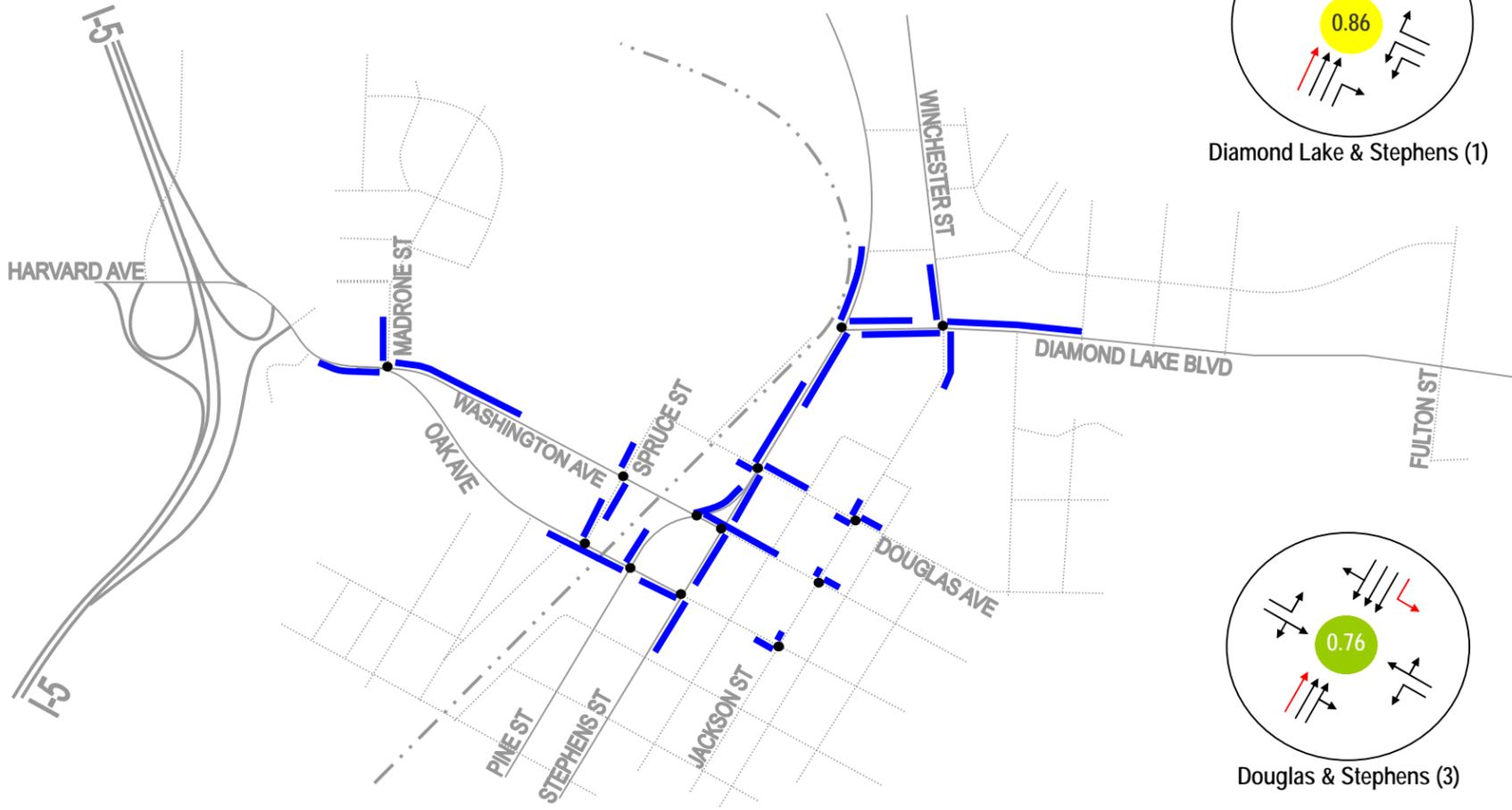


- 0.00 Signalized V/C Ratio
- 0.00 Unsignalized V/C Ratio (Worst Stopped Approach)
- Level of Service A, B, C
- Level of Service D
- Level of Service E
- Level of Service F
- 95th Percentile Queue
- Existing Lane & Permitted Turning Movements
- Additional Lane & Permitted Turning Movements

- Notes:
- (1) Intersection could not be improved to HDM standard (0.75) without going to triple lefts or four NB through lanes.
 - (2) Southbound dual lefts would bring intersection below HDM standard (0.75)
 - (3) Extending third northbound through and adding southbound left would bring intersection just above HDM standard (0.75) but would meet OHP standard (0.85)
 - (4) Signal installed with Public Safety Center
 - (5) A seven-lane section on Harvard is proposed as part of the Exit 24 IAMP.
 - (6) Intersection would require triple throughs on either Washington or Pine to meet HDM standard (0.75).
 - (7) These intersections meet the applicable OHP standard (0.85) with no capacity additions.

HDM = Highway Design Manual
 OHP = Oregon Highway Plan
 IAMP = Interchange Area Management Plan

Figure 5-2
Alternative 1(a) - Traffic Operations Summary and Lane Configuration



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As shown in Figure 5-2, the curb radius at the northwest corner of the Oak Avenue/Stephens Street intersection was increased to facilitate the eastbound to northbound left-turn movement for trucks, which is currently substandard.

At the Washington Avenue/Pine Street intersection, the southbound approach on Pine Street would require an additional travel lane to allow dual right turns and two through travel lanes (see Figure 5-2). This improvement would result in a 2030 forecast v/c ratio of 0.80 which would exceed the HDM standard of 0.75 but would still meet the OHP standard of 0.85. To meet the HDM standard at this intersection, a third through travel lane would be needed on Washington. This improvement would have a limited benefit since the Washington Avenue Bridge can only accommodate two travel lanes and the roadway would need to taper down again immediately west of Pine; therefore it was not recommended as part of the alternative.

As noted earlier, Harvard Avenue is assumed to have a seven-lane section in the vicinity of the I-5 interchange. The improvements to the Harvard Avenue/Madrone Street intersection (see Figure 5-2) reflect the addition of a third westbound through lane from the Washington Avenue Bridge but assume the third eastbound through lane is dropped prior to the intersection. The resulting forecast v/c ratio of 0.64 would meet the HDM standard.

In addition to the improvements described above, the Douglas Avenue/Jackson Street intersection, which is currently all-way STOP-controlled, would become signalized to serve the City's Public Safety Center.

Transportation Analysis

Overall, Alternative 1(a) would improve the movement of traffic through the Highway 138 corridor by reducing delays and queuing. The number of traffic signals along the highway between Madrone Street and Fulton Street would remain the same at seven for eastbound travel and five for westbound travel. Traffic patterns would generally be unchanged except for the addition of southbound left turns at the Stephens Street/Douglas Avenue intersection, which could provide some relief to the southbound left-turn movement at Diamond Lake Boulevard.

All of the intersections would have overall 2030 forecast v/c ratios near or below the city and OHP standards of 0.85 but two of the intersections where capacity improvements would require widening the roadway, would not meet the HDM standard of 0.75. Additional widening at these intersections is either impractical or of little benefit to the operations.

Capacity improvements associated with Alternative 1(a) would require widening or replacing the Stephens Street Bridge over Deer Creek and, if any realignment of the intersection occurs, possibly widening or replacing the Diamond Lake Boulevard Bridge over Deer Creek as well.

Alternative 1(a) would not create any grade-separated crossing of the CORP tracks; therefore, delays and queues would still occur when trains pass through downtown. However, with the rail yard relocation to the north, this problem should be alleviated because trains should move continuously through downtown and switching activities will no longer impact traffic in this vicinity.

Although some new bicycle and pedestrian facilities may be added with the widening of Stephens Street at Diamond Lake Boulevard, the system will not be substantially improved.

The Alternative 1(a) improvements would not impact existing transit routes and it is possible that some bus pullouts could be added where roadway widening would occur along Stephens Street.

Environmental and Land Use Assessment

Design Alternative 1(a) environmental and land use impacts are summarized in Figure 5-3. Essentially, there are no to minimal impacts to the parks, bike paths or community features. Likewise, impacts to the South Umpqua River are estimated to be minimal. Deer Creek could undergo higher impacts depending upon the extent of improvements that occur in the vicinity of the Stephens Street/Diamond Lake Boulevard intersection. Based on available information, there are no impacts to potential archeology sites and no to minimal impacts to known hazardous materials locations.

Improvements at the Diamond Lake Boulevard/Stephens Street intersection may include reorientation of the intersection to provide wider turning radii. Widening of the turning radii will result in potential disruption to downtown businesses along the designated Highway 138 route. Widening of Highway 138 east of the Jackson Street intersection would impact the business property at 1540 NE Diamond Lake Boulevard (Gene's Brake and Alignment).

Two residences identified in the "Historic and Archeological Resources" section are located south of the Diamond Lake Boulevard/Stephens Street intersections, fronting Stephens along where additional travel lanes are likely to be added. These two residences - 236 SE Stephens Street and 256 SE Stephens Street- are considered potentially eligible for inclusion in the NRHP. It is unlikely that the existing roadway will be widened on the west side of Stephens Street in this area. Therefore, impacts to these two residences will be minimal under Alternative 1(a).

The Alternative 1(a) option is expected to produce minimal impacts to Cow Creek tribal properties held in trust. No to minimal impacts to visual resources are expected. No diversion of traffic and noise to other routes are expected.

The Alternative 1(a) option is in keeping with applicable state and local land use plans. It is expected that upon completion, a moderate level of economic development stimulus would be produced in the study area over the short term based on the scale and duration of the project and the residual impacts during and after construction. The potential level of long-term economic development stimulus resulting from the improvements is unknown and will need to be assessed in more detail during a future phase of the project.

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Alternative 2(a): Harvard-Washington-Stephens-Diamond Lake Alignment

Design Alternative 2(a) would incorporate a new Highway 138 alignment into the existing downtown grid and would prioritize traffic flow through downtown on the newly realigned highway by widening the Washington Avenue Bridge to four lanes with two-way travel (see Figure 5-4). Highway 138 would use the Washington Bridge in both directions and then follow the existing route along the Stephens Street alignment to Diamond Lake Boulevard. Downtown traffic flow would be modified to become subordinate to the Highway 138 flow.

Under Alternative 2(a), the Washington Avenue Bridge would become the primary route for traffic traveling to/from the north along Stephens Street or to/from the east along Diamond Lake Boulevard and Douglas Avenue. The Oak Avenue Bridge would remain as a secondary two-way auxiliary roadway providing the downtown gateway access from I-5 and carrying most of the traffic to/from the south.

Specific intersection improvements are described below with lane configurations shown more clearly in Figure 5-5.

Lane Configurations and Traffic Flow

Alternative 2(a) would require changes in traffic flow downtown. The northbound couplet portion of Stephens Street south of Washington Avenue would merge into the reconfigured highway corridor. Washington Avenue east of Stephens Street could either remain a westbound one-way street or convert to two-way traffic. West of Stephens Street, however, the alignment would be restricted to a one-way eastbound loop south onto Pine Street. Under this configuration, the Washington Avenue Bridge becomes the primary route while the Oak Avenue Bridge and corridor becomes a secondary two-way auxiliary roadway providing direct access into and out of downtown and points south.

Intersection improvements would begin at the Harvard Avenue/Madrone Street intersection. Some realignment of the Oak Avenue Bridge footing would be necessary along with possible widening to allow for two lanes on Oak Avenue approaching the intersection to reduce queuing along the bridge. Washington Avenue would need three lanes approaching the intersection and two lanes departing. Harvard Avenue would have a seven-lane section west of the intersection (compatible with Exit 124 IAMP findings). The lane configurations are shown in Figure 5-5. These improvements would result in a 2030 forecast v/c ratio of 0.71 which would meet both ODOT's HDM standard of 0.75 and the OHP standard of 0.85.

With two-way travel on Washington Avenue, the STOP-controlled approaches on Spruce Street would experience longer delays, particularly left turns and through movements across Washington Avenue. While the 2030 forecast v/c ratios indicate that demand of some Spruce Street movements would exceed capacity, simulation of traffic flow shows that the upstream traffic signals would create gaps in the Washington Avenue traffic so that the Spruce Street traffic could be accommodated. The illustration of the intersection lane configuration in Figure 5-5 shows no left turns permitted from Washington Avenue to Spruce Street; however, they

could be permitted as long as separate left-turn lanes are provided (i.e. a five-lane section on Washington Avenue).

At the Washington Avenue/Pine Street intersection, through traffic would flow in both directions from Washington Avenue west of the intersection to/from Pine Street north of the intersection. To travel southbound on Pine Street through downtown, traffic from Stephens Street (Highway 138) would need to turn left (see Figure 5-5). Through travel movements would have two lanes in each direction. Dual left-turn lanes would be needed to accommodate the traffic continuing through downtown. These improvements would result in a 2030 forecast v/c ratio of 0.66 which would meet both ODOT's HDM standard of 0.75 the OHP standard of 0.85.

As shown in Figure 5-5, Washington Avenue would not connect between Pine and Stephens Streets. As a result, lane striping changes would be needed at the Washington Avenue/Stephens Street intersection but no additional travel lanes would be needed. This improvement would result in a 2030 forecast v/c ratio of 0.79 which would meet the Roseburg standard of 0.85.

With Alternative 2(a), Oak Avenue would no longer be part of Highway 138 and would need to allow two directions of travel from Stephens Street to Madrone Street. Two-way traffic could be accommodated on Oak Avenue with lane striping changes but no widening of roadways. The resulting 2030 forecast v/c ratios for the Oak Avenue intersections at Pine Street and Stephens Street would meet the City of Roseburg standards of 0.85 and LOS D. The STOP-controlled approaches of Spruce Street would experience some longer delays because of the two-way traffic flow on Oak Avenue but would still meet Roseburg standards.

Stephens Street at Douglas Avenue would require widening to allow for two additional northbound travel lanes as shown in Figure 5-5. Four lanes are needed to accommodate the merge of two travel lanes from the realigned Highway 138 and two travel lanes from northbound Stephens Street. The traffic on these two roadways would not have an adequate distance to merge into three travel lanes before the signal at Douglas Avenue. Alternative 2(a) does not consider adding left-turn movements from Stephens Street to Douglas Avenue because the roadway would already require widening. With the additional travel lanes identified, the 2030 forecast v/c ratio would be 0.66, which would meet the HDM standard.

Alternative 2(a) takes a different approach at the Diamond Lake Boulevard/Stephens Street intersection compared with Alternative 1(a). As shown in Figure 5-5, the southbound through movement on Stephens Street is separated from the rest of the intersection movements and allowed to flow continuously in one or two travel lanes. The other movements would be accommodated at a signalized intersection that would emphasize flow along Highway 138. As with Alternative 1(a), a second southbound left-turn lane from Stephens Street to Diamond Lake Boulevard and a third northbound through lane on Stephens Street would still be needed. With this intersection configuration, the 2030 forecast v/c ratio of 0.84 would still exceed the HDM standard of 0.75 and be just below the OHP standard of 0.85. The intersection could not be improved beyond this level without creating triple left-turn lanes or adding a fourth northbound through travel lane.

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Roseburg, Oregon

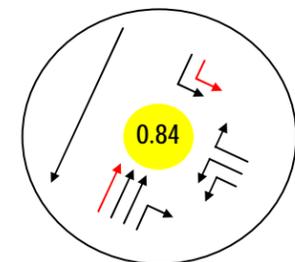
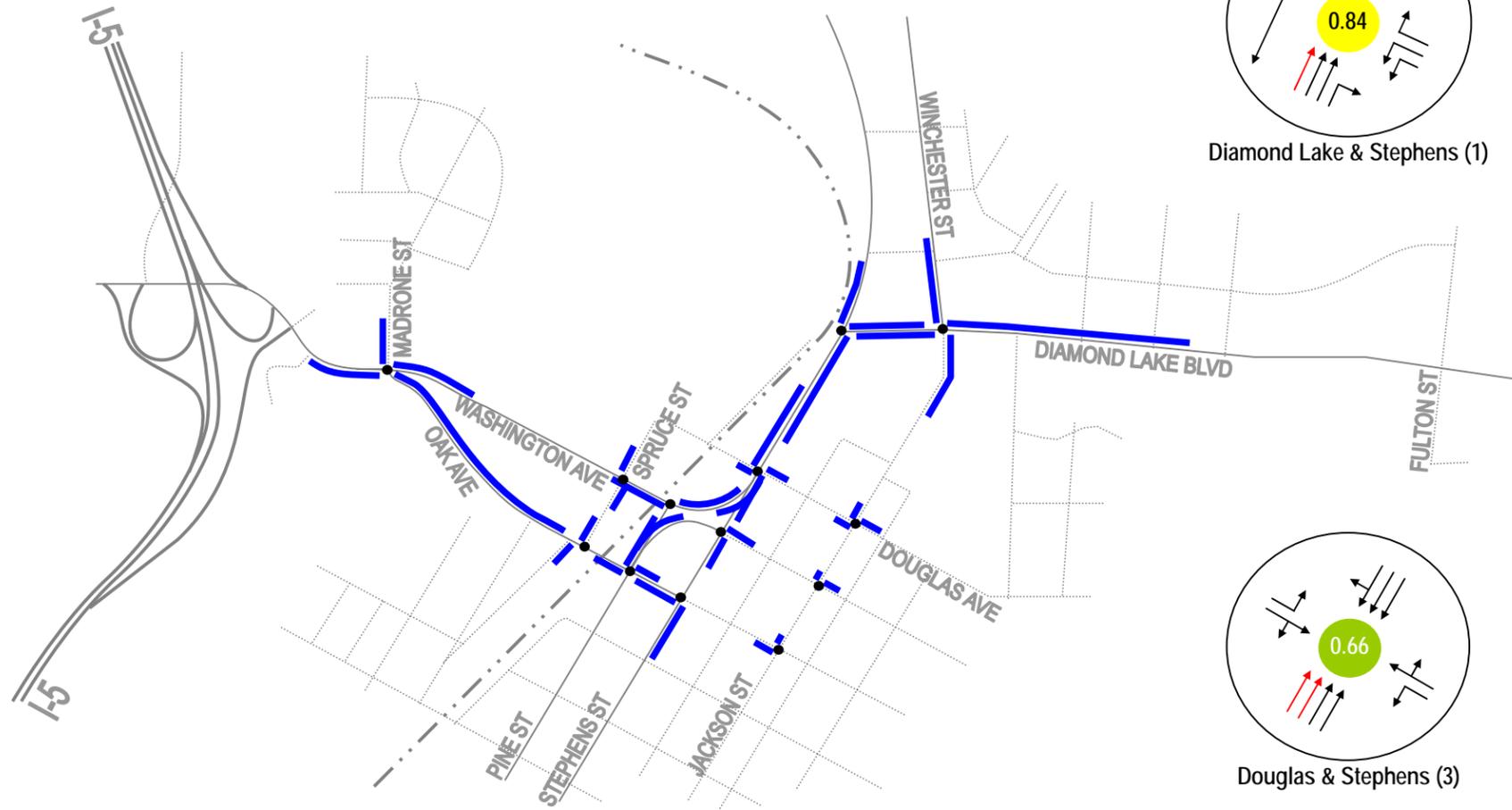
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- Centerline
- Striping
- 6-ft Shoulder
- Railroad

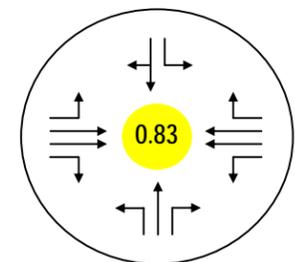


Figure 5-4
Alternative 2(a):
Harvard - Washington - Stephens -
Diamond Lake Alignment

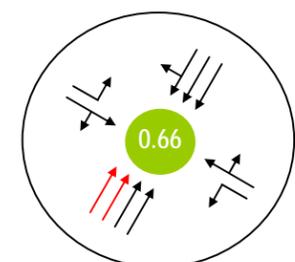
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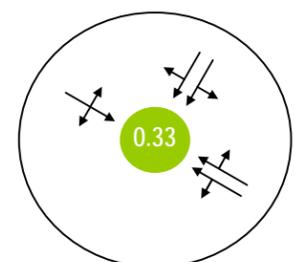
Diamond Lake & Stephens (1)



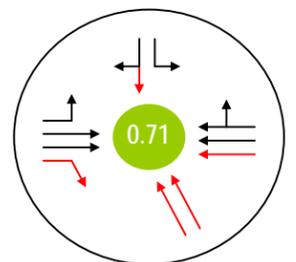
Diamond Lake & Winchester (2)



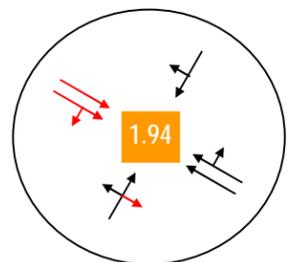
Douglas & Stephens (3)



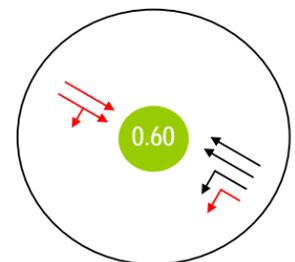
Douglas & Jackson (4)



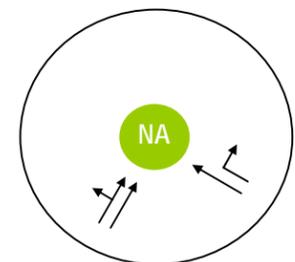
Harvard & Madrone (5)



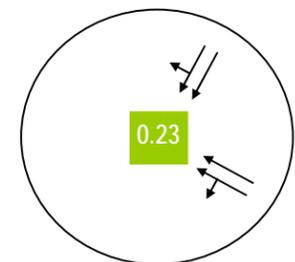
Washington & Spruce (6)
(Worst = Northbound Spruce)



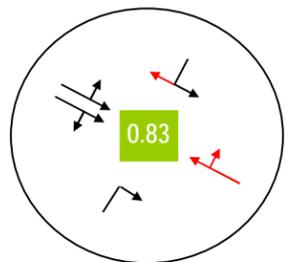
Washington & Pine



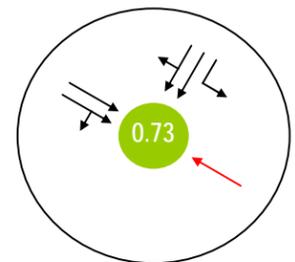
Washington & Stephens



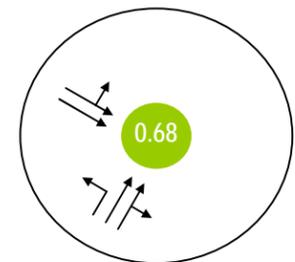
Washington & Jackson
(Worst = Westbound Washington)



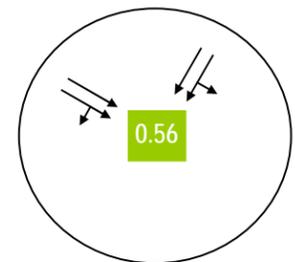
Oak & Spruce
(Worst = Southbound Spruce)



Oak & Pine



Oak & Stephens



Oak & Jackson
(Worst = Eastbound Oak)

Legend

- Signalized V/C Ratio
- Unsignalized V/C Ratio (Worst Stopped Approach)
- Level of Service A, B, C
- Level of Service D
- Level of Service E
- Level of Service F
- 95th Percentile Queue
- Existing Lane & Permitted Turning Movements
- Additional Lane & Permitted Turning Movements



Notes:

- (1) Intersection could not be improved to HDM standard (0.75) without going to triple lefts or four NB through lanes.
- (2) Without additional capacity, intersection would not meet HDM standard (0.75). Dual southbound lefts would bring below standard.
- (3) Four northbound throughs needed for merging traffic from Highway 138 and Stephens.
- (4) Signal installed with Public Safety Center.
- (5) A seven-lane section on Harvard is proposed as part of the Exit 24 IAMP.
- (6) Although the v/c ratio indicates some stopped movements would fail, simulation indicates that movements could be accommodated but would experience longer delays.

HDM = Highway Design Manual
 OHP = Oregon Highway Plan
 IAMP = Interchange Area Management Plan

Figure 5-5

Alternative 2(a) - Traffic Operations Summary and Lane Configuration

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In addition to the improvements described above, the Douglas Avenue/Jackson Street intersection, which is currently all-way STOP-controlled, would become signalized to serve the City's Public Safety Center.

No improvements were assumed at the Diamond Lake Boulevard/Winchester Street intersection under Alternative 2(a) but the second southbound left-turn lane on Winchester Street could be added. If included, this improvement would reduce the forecast v/c ratio from 0.83 to 0.72, as shown for Alternative 1(a).

Transportation Analysis

Overall, Alternative 2(a) would simplify traffic flow along Highway 138 by removing part of the couplet system and concentrating movements along a single route. Generally, delays and queues in the corridor would be reduced. One roadway segment that would experience long queues with Alternative 2(a) is the Oak Avenue Bridge where traffic would back up from the Harvard Avenue/Madrone Street intersection across the river. Long queues would develop on Diamond Lake at Winchester intersection without additional lane improvements

The number of traffic signals along the highway between Madrone Street and Fulton Street would be five for both eastbound and westbound travel. However, signal phasing along the highway would become more complex in those areas that were converted from the one-way couplet system to two-way travel. As a result, delays for some of the minor movements (i.e., left turns and cross streets) may increase in order to give priority to the mainline highway movements.

All of the intersections would have overall 2030 forecast v/c ratios near or below the city and OHP standards of 0.85 but the intersection of Diamond Lake Boulevard and Stephens Street, where capacity improvements would require widening the roadway, would not meet the HDM standard of 0.75. Additional widening at this intersection is impractical.

Capacity improvements associated with Alternative 2(a) would require widening or replacing the Washington Avenue Bridge over the South Umpqua River and the Stephens Street Bridge over Deer Creek. With the realignment option shown for the Diamond Lake Boulevard/Stephens Street intersection, the alternative would require widening or replacing the Diamond Lake Boulevard Bridge over Deer Creek. It is also possible that some improvements at the west end of the Oak Avenue Bridge would also be needed to accommodate two-way travel.

Alternative 2(a) would not create any grade-separated crossing of the CORP tracks; therefore, delays and queues would still occur when trains pass through downtown. However, with the rail yard relocation to the north, this problem should be alleviated because trains should move continuously through downtown and switching activities will no longer impact traffic.

With the Alternative 2(a) improvements along Washington Avenue and Stephens Street some new bicycle and pedestrian facilities may be added to the system. It's possible that bicycle facilities would be present along Highway 138 from the Washington Avenue Bridge as far east as Diamond Lake Boulevard. One potential disadvantage would be the wider and more complex intersections which could make both bicycle and pedestrian crossings more difficult.

Changes in downtown circulation with Alternative 2(a) could affect existing transit routes; however, it is possible that some bus pullouts could be added where roadway widening would occur along Stephens Street.

Environmental and Land Use Assessment

Moderate impacts to the South Umpqua River (a statewide Planning Goal 5 resource) and the surrounding area floodways are expected under design Alternative 2(a) due to widening and reconstruction of the Washington Avenue Bridge (see Figure 5-6). The widening and reconstruction of the bridge will also produce a low-to-moderate impact on Riverside Park (a potential candidate for a Section 4(f) resource), and the existing bike path on the bridge.

There are moderate impacts expected to Deer Creek depending upon the extent of improvements at the Stephens/Diamond Lake Boulevard intersection.

Disruption to properties in the vicinity of the Stephens/Diamond Lake Boulevard intersection is expected under Alternative 2(a). Properties along Douglas Street and Washington Avenue located between Rose Street and the railroad will be impacted by this option. The construction and widening of the Washington Avenue Bridge is expected to impact Cow Creek tribal properties held in trust.

The Douglas County Health Department, located at 621 W Madrone St, is listed as *possibly* eligible for inclusion in the NRHP. Impacts to the property would be expected during the Alternative 2(a) construction phase. It is unlikely that the existing roadway will be widened on the west side of Stephens south of the Stephens/Diamond Lake Boulevard intersection; therefore, impacts to the two potentially eligible NRHP residences located in this area will be minimal.

The key visual impact due to the Alternative 2(a) design option will be the vantage point from Riverside Park due to the widened Washington Avenue Bridge. Noise levels are expected to be slightly higher along Washington Avenue due to wider bridge and higher volumes.

Since the option is not currently proposed in Roseburg's Comprehensive Plan, the TSP would need to be amended to incorporate the Alternative 2(a) improvements into the Comprehensive Plan. Otherwise, a state land use goal exception would be required on account of Goal 5 resource impacts. It is expected upon completion that economic development stimulus would be produced in the study area over the short term based on the scale and duration of the project and the residual impacts during and after construction. The potential level of long-term economic development stimulus resulting from the improvements is unknown and will need to be assessed in more detail during a future phase of the project.

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Alternative 2(c): Harvard-Washington-Rose-Diamond Lake Alignment

This design alternative would also incorporate a new highway alignment into the existing downtown grid. Similar to Design Alternative 2(a), prioritization of east-west traffic flow through downtown would be aligned with Washington Avenue. However, as displayed in Figure 5-7, Highway 138 would cross Stephens Street and veer north onto the Rose Street alignment toward Diamond Lake Boulevard. A new segment would connect Rose Street and Washington Avenue with the Highway 138 corridor via a right-in/right-out intersection. Another change under this alternative would be the Diamond Lake Boulevard approach to Stephens Street, which would become one-way westbound. Traffic traveling from southbound Stephens Street to eastbound Diamond Lake would need an alternative option for connecting with Highway 138 and the option shown uses a connection between Stephens Street and Rose Street aligned with Court Avenue.

There are two options for the Oak Avenue Bridge with Design Alternative 2(c). The bridge could continue to allow one-way travel only or it could be converted to two-way travel but would remain two lanes. Specific intersection improvements with these two Oak Avenue Bridge options are described below with lane configurations shown more clearly in Figure 5-8 for one-way travel and Figure 5-9 for two-way travel.

Lane Configurations and Traffic Flow with Oak Avenue Bridge One-Way

Alternative 2(c) would require changes in traffic flow downtown. The northbound couplet portion of Stephens Street south of Washington Avenue would merge into the reconfigured highway corridor that would run along Rose Street. Washington Avenue east of Rose Street could either remain a westbound one-way street or convert to two-way traffic. Under this configuration, the Washington Avenue Bridge becomes the primary route while the Oak Avenue Bridge and corridor would remain as an auxiliary one-way roadway providing direct access into downtown and points south.

Intersection improvements would begin at the Harvard Avenue/Madrone Street intersection. Washington Avenue would need three lanes approaching the intersection and two lanes departing. Harvard Avenue would have a seven-lane section west of the intersection (compatible with Exit 124 IAMP findings). The lane configurations are shown in Figure 5-8. These improvements would result in a 2030 forecast v/c ratio of 0.62 which would meet both ODOT's HDM standard of 0.75 the OHP standard of 0.85.

With two-way travel on Washington Avenue, the STOP-controlled approaches on Spruce Street would experience longer delays, particularly left turns and through movements across Washington Avenue. Simulation of traffic flow shows that these movements would experience long delays and queues. The illustration of the intersection lane configuration in Figure 5-8 shows no left turns permitted from Washington Avenue to Spruce Street; however, they could be permitted as long as separate left-turn lanes are provided (i.e. a five-lane section on Washington Avenue).

The Washington Avenue/Pine Street intersection would be eliminated with this alternative as the Pine/Stephens Street couplet would begin south of Washington Avenue

At the Washington Avenue/Stephens Street intersection, through traffic would flow in both directions from Washington Avenue west of the intersection to/from Rose Street east of the intersection. To accommodate the forecast two-way traffic demand on both Washington Avenue and Stephens Street, the intersection would need to be very large (Figure 5-8). Through travel would have two lanes in each direction on all approaches but westbound Washington Avenue, which would require three through lanes. Dual left-turn lanes would be needed on all approaches except southbound Stephens Street; these left turns would be accommodated at Oak Avenue instead. Even with these improvements, the 2030 forecast v/c ratio is 0.85 which would not meet both ODOT's HDM standard of 0.75 but would just meet the OHP standard of 0.85.

With this option of Alternative 2(c), Oak Avenue would no longer be part of Highway 138 but would remain one-way eastbound. The resulting 2030 forecast v/c ratios for the Oak Avenue intersections at Pine Street and Stephens Street would meet the City of Roseburg standards of 0.85 and LOS D. The STOP-controlled approaches of Spruce Street would experience some longer delays at Oak Avenue but would still meet Roseburg standards.

Stephens Street at Douglas Avenue would become unsignalized under Alternative 2(c) since traffic from Douglas destined for Highway 138 could use the Rose Street corridor instead. With no signal, both the 2030 forecast v/c ratios and traffic flow simulations indicate that stopped movements (left turns and through movements) on Douglas Avenue would experience long delays and queuing.

The Douglas Avenue/Rose Street intersection would become part of the Highway 138 corridor with Alternative 2(c), as shown in Figure 5-8. The intersection would be signalized and would require a five-lane cross-section on Rose Street. The 2030 forecast v/c ratio of 0.70 would meet both the HDM and OHP standards.

Two new intersections would be added to the network to provide a reroute for the southbound left turn movement from Stephens Street to Diamond Lake Boulevard. These new intersections would be signalized and located on Stephens Street and Rose Street in an approximate alignment with Court Avenue, which would be one-way eastbound. Traffic traveling from Stephens Street southbound would turn left onto Court Avenue, then turn left again onto Rose Street which would connect with Diamond Lake Boulevard at Winchester Street. This routing requires out-of-direction travel for this traffic movement and other options could be investigated. Both of these intersections would have 2030 forecast v/c ratios that meet the HDM and OHP standards.

With Alternative 2(c), Diamond Lake Boulevard would become one-way from Winchester Street to an unsignalized intersection with Stephens Street. Although the analysis program did not yield a v/c ratio calculation for the 2030 forecast condition, the traffic flow simulation indicates low delays and relatively short queues.

Highway 138 Corridor Solutions Study
Roseburg, Oregon

Legend

- Centerline
- Striping
- 6-ft Shoulder
- Railroad



Figure 5-7
*Alternative 2(c):
Harvard - Washington - Rose -
Diamond Lake Alignment*

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Legend



- 0.00 Signalized V/C Ratio
- 0.00 Unsignalized V/C Ratio (Worst Stopped Approach)
- Level of Service A, B, C
- Level of Service D
- Level of Service E
- Level of Service F
- 95th Percentile Queue
- Existing Lane & Permitted Turning Movements
- Additional Lane & Permitted Turning Movements

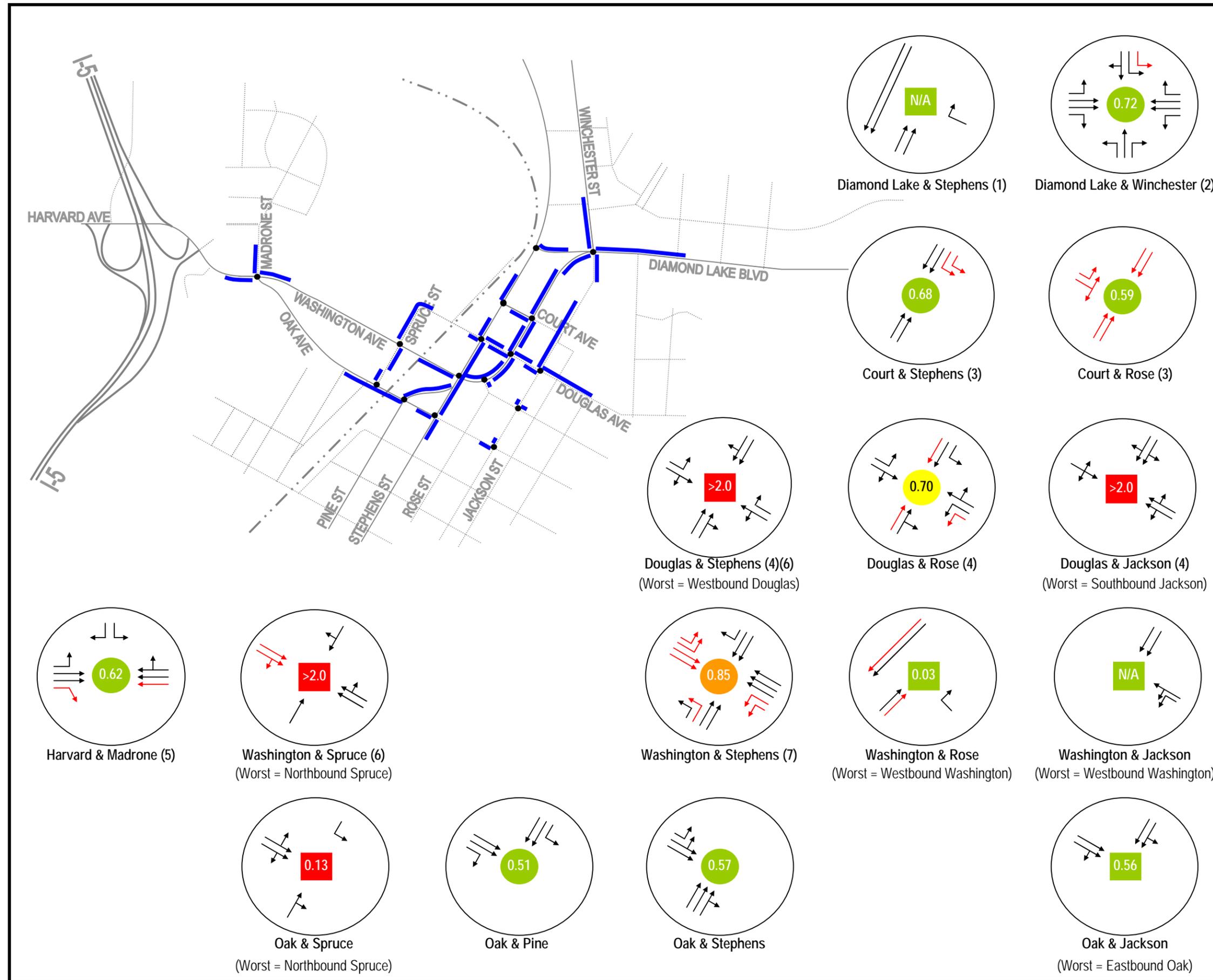
Notes:

- (1) Diamond Lake would be one-way westbound from Winchester to Stephens and signal would be removed from Stephens.
- (2) Southbound dual lefts would bring intersection below HDM standard (0.75)
- (3) New intersection created to bring southbound traffic from Stephens to Diamond Lake.
- (4) Douglas/Rose intersection would be signalized while Douglas/Stephens and Douglas/Jackson intersections would be unsignalized.
- (5) A seven-lane section on Harvard is proposed as part of the Exit 24 IAMP.
- (6) Both the v/c ratio indicates and LOS indicate that some stopped movements (left turns and throughs from side streets) would fail.
- (7) Intersection could not be improved to HDM standard (0.75) without going to triple through lanes on at least one other approach.

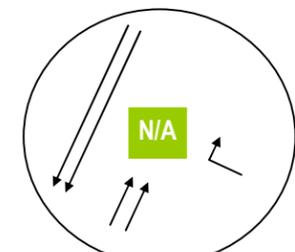
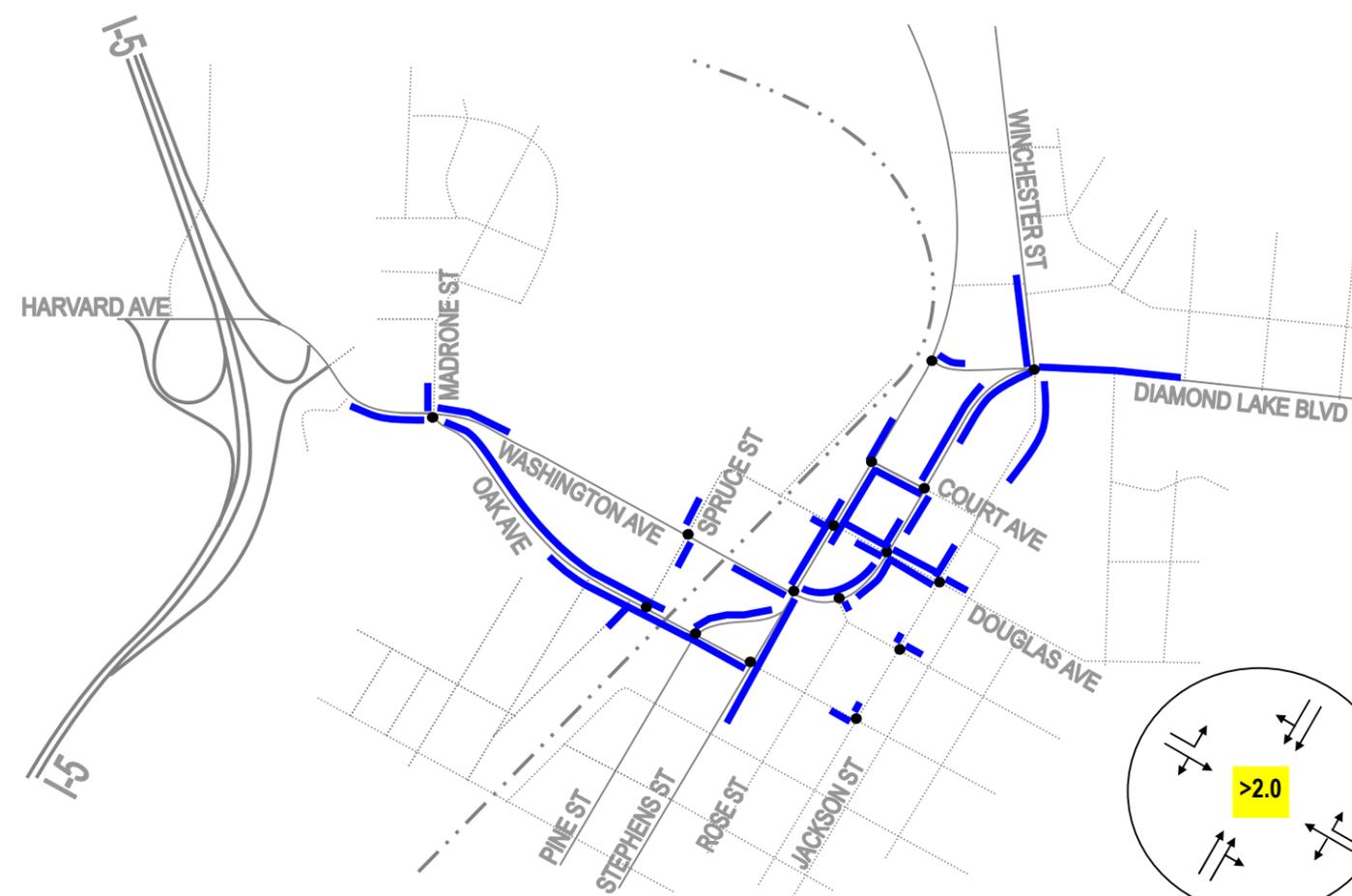
*HDM = Highway Design Manual
 OHP = Oregon Highway Plan
 IAMP = Interchange Area Management Plan*

Figure 5-8

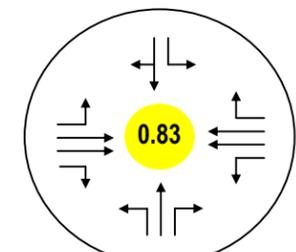
Alternative 2(c) with Oak Bridge One-Way - Traffic Operations Summary and Lane Configuration



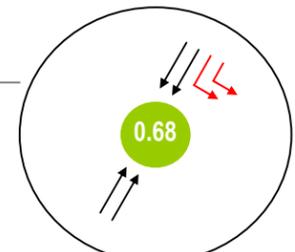
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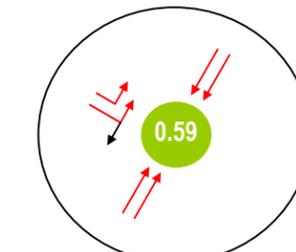
Diamond Lake & Stephens (1)



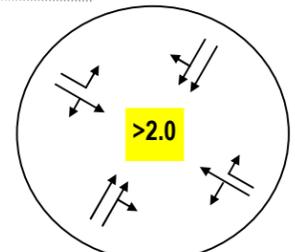
Diamond Lake & Winchester (2)



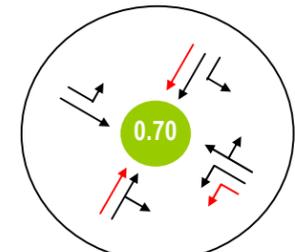
Court & Stephens (3)



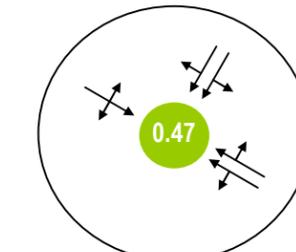
Court & Rose (3)



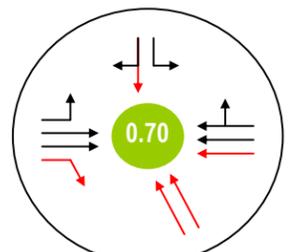
Douglas & Stephens (4)(6)
(Worst = Westbound Douglas)



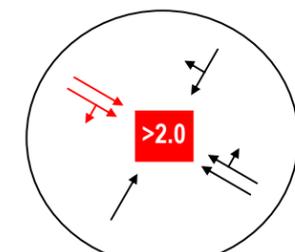
Douglas & Rose (4)



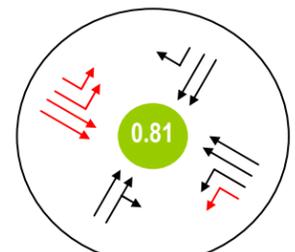
Douglas & Jackson (4)



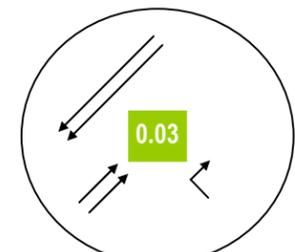
Harvard & Madrone (5)



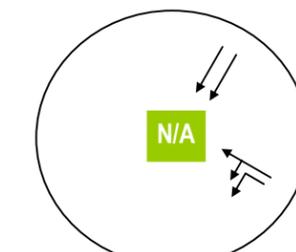
Washington & Spruce (6)
(Worst = Northbound Spruce)



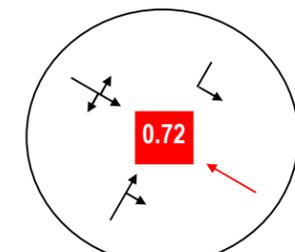
Washington & Stephens (7)



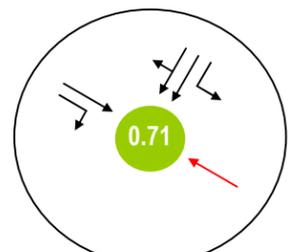
Washington & Rose
(Worst = Westbound Washington)



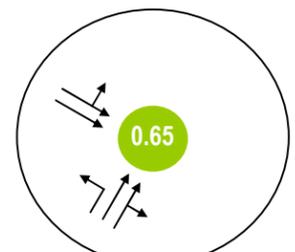
Washington & Jackson
(Worst = Westbound Washington)



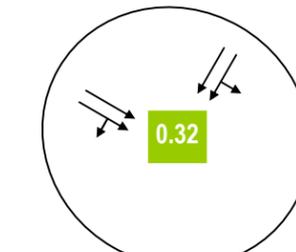
Oak & Spruce
(Worst = Northbound Spruce)



Oak & Pine



Oak & Stephens



Oak & Jackson
(Worst = Eastbound Oak)

Legend

- Signalized V/C Ratio
- Unsignalized V/C Ratio (Worst Stopped Approach)
- Level of Service A, B, C
- Level of Service D
- Level of Service E
- Level of Service F
- 95th Percentile Queue
- Existing Lane & Permitted Turning Movements
- Additional Lane & Permitted Turning Movements



Notes:

- (1) Diamond Lake would be one-way westbound from Winchester to Stephens and signal would be removed from Stephens.
- (2) Southbound dual lefts would bring intersection below HDM standard (0.75)
- (3) New intersection created to bring southbound traffic from Stephens to Diamond Lake.
- (4) Douglas/Rose intersection would be signalized while Douglas/Stephens and Douglas/Jackson intersections would be unsignalized.
- (5) A seven-lane section on Harvard is proposed as part of the Exit 24 IAMP.
- (6) Both the v/c ratio indicates and LOS indicate that some stopped movements (left turns and throughs from side streets) would fail.
- (7) Intersection could not be improved to HDM standard (0.75) without going to triple through lanes on at least one other approach.

HDM = Highway Design Manual
 OHP = Oregon Highway Plan
 IAMP = Interchange Area Management Plan

Figure 5-9

Alternative 2(c) with Oak Bridge Two-Way - Traffic Operations Summary and Lane Configuration

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As shown in Figure 5-7, the new alignment of Highway 138 would intersect with Diamond Lake Boulevard at Winchester Street. Lane configurations would be similar to those currently present at the intersection. Although operations at the Winchester Street/Diamond Lake Boulevard intersection would meet the OHP standard of 0.85 without any capacity improvement, long queues are expected to form on several legs of the intersection. To add more capacity to the intersection and accommodate the demand by traffic using Winchester Street as an alternate route to Stephens Street, a second southbound left-turn lane was considered (see Figure 5-8). With this additional turn lane, the 2030 forecast v/c ratio for the intersection would be 0.72, which would meet the HDM standard of 0.75 and reduce queuing on both Diamond Lake Boulevard and Winchester Street.

Lane Configurations and Traffic Flow with Oak Avenue Bridge Two-Way

If the Oak Avenue Bridge were converted to two-way traffic flow with Alternative 2(c), the lane configurations for intersections along Harvard Avenue, Washington Avenue, and Oak Avenue would differ from those discussed above. To see the differences, compare Figure 5-9 with Figure 5-8.

With two-way travel on the Oak Avenue Bridge, the lane configuration at the Harvard Avenue/Madrone Street intersection would be the same as that shown for Alternative 2(a). Some realignment of the Oak Avenue Bridge footing would be necessary along with possible widening to allow for two lanes on Oak Avenue approaching the intersection to reduce queuing along the bridge. Washington Avenue would need three lanes approaching the intersection and two lanes departing. Harvard Avenue would have a seven-lane section west of the intersection (compatible with Exit 124 IAMP findings). These improvements would result in a 2030 forecast v/c ratio of 0.70 which would meet both ODOT's HDM standard of 0.75 the OHP standard of 0.85.

The cross-section of Stephens Street at Washington Avenue could be reduced with two-way traffic on Oak Avenue because left turns from Stephens Street northbound could be made at Oak Avenue instead. The result is a five-lane cross-section on Stephens Street (see Figure 5-9) as compared with seven lanes on Stephens Street (see Figure 5-8). With these improvements, the 2030 forecast v/c ratio is 0.81 which would not meet ODOT's HDM standard of 0.75 but would meet the OHP standard of 0.85.

As with Alternative 2(a), Oak Avenue would no longer be part of Highway 138 and would need to allow two directions of travel from Stephens Street to Madrone Street. Two-way traffic could be accommodated on Oak Avenue with lane striping changes but no widening of roadways. The resulting 2030 forecast v/c ratios for the Oak Avenue intersections at Pine Street and Stephens Street would meet the City of Roseburg standards of 0.85 and LOS D. The STOP-controlled approaches of Spruce Street would experience some longer delays because of the two-way traffic flow on Oak Avenue but would still meet Roseburg standards.

Transportation Analysis

Overall, Alternative 2(c) would add complexity to the traffic flow along Highway 138 and in downtown Roseburg while providing few operational benefits and several very large intersections. It would also require out-of-direction travel for southbound traffic on Stephens

Street trying to access Diamond Lake Boulevard which may increase demand along Winchester Street. With either one-way or two-way travel on Oak Avenue, queuing would be not be alleviated in the study area with queues present from one intersection to the next on many roadway segments.

The number of traffic signals along the highway between Madrone Street and Fulton Street would be six for both eastbound and westbound travel. However, signal phasing along the highway would become more complex in those areas that were converted from the one-way couplet system to two-way travel. As a result, delays for some of the minor movements (i.e., left turns and cross streets) may increase in order to give priority to the mainline highway movements.

All of the intersections would have overall 2030 forecast v/c ratios near or below the city and OHP standards of 0.85. All of the intersections where capacity improvements would require widening the roadway would also meet ODOT's HDM standard of 0.75 with the exception of the Washington Avenue/Stephens Street intersection, which would be at 0.85 with one-way travel remaining on the Oak Avenue Bridge and 0.81 with two-way travel permitted on the Oak Avenue Bridge.

Capacity improvements associated with Alternative 2(c) would require widening or replacing the Washington Avenue Bridge over the South Umpqua River and a new bridge across Deer Creek aligned with Rose Street. It is also possible that some improvements at the west end of the Oak Avenue Bridge would also be needed to accommodate two-way travel.

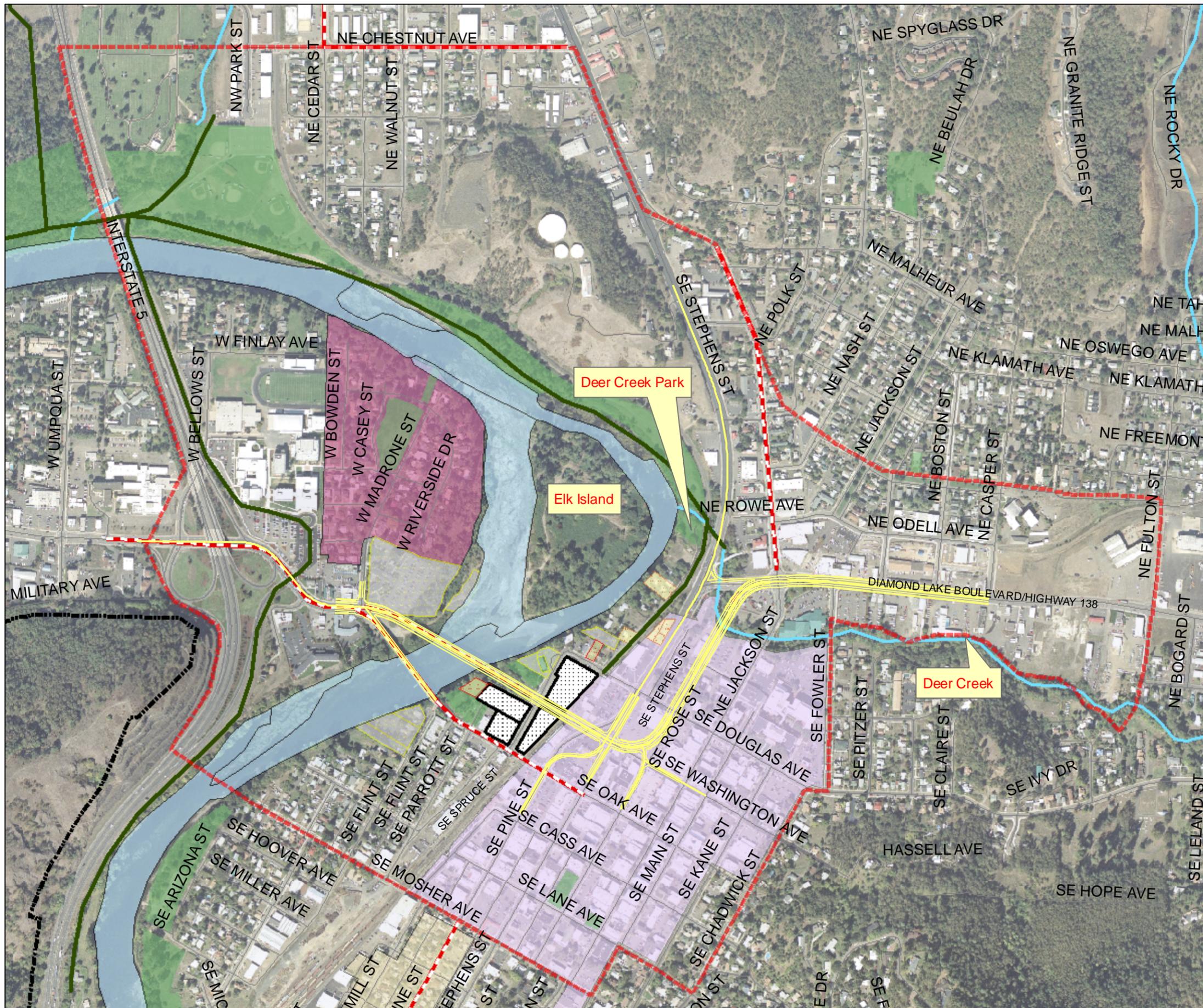
Alternative 2(c) would not create any grade-separated crossing of the CORP tracks; therefore, delays and queues would still occur when trains pass through downtown. Again, with the rail yard relocation to the north, this problem should be alleviated because trains should move continuously through downtown and switching activities will no longer impact traffic.

With the Alternative 2(c) improvements along Washington Avenue and Stephens Street some new bicycle and pedestrian facilities may be added to the system. It's possible that bicycle facilities would be present along Highway 138 from the Washington Avenue Bridge as far east as Diamond Lake Boulevard. One potential disadvantage would be the wider and more complex intersections which could make both bicycle and pedestrian crossings more difficult.

Changes in downtown circulation with Alternative 2(c) would affect existing transit routes. It is possible that some bus pullouts could be added where roadway widening would occur along Stephens Street.

Environmental and Land Use Assessment

Moderate impacts to the South Umpqua River and the surrounding area floodways would be expected under design Alternative 2(c) due to widening and reconstruction of the Washington Avenue Bridge (see Figure 5-10). The widening and reconstruction of the bridge would also impact Riverside Park and the existing bike path on the bridge.



Legend

- Alternative
- Study Area Boundary
- Creeks/Streams
- Roseburg UGB
- Bike Lane
- Multi-Use Path
- Parks

- Downtown Historic District
- Mill-Pine Historic District
- Laurelwood Historic District

- Tribal Properties Held In Trust

Historic Resources Status

- NRHP Listed
- Likely Eligible for NRHP
- Possibly Eligible for NRHP

Sources:
 U.S. Census Bureau, Douglas County
 and City of Roseburg

Figure 5-10
*Alternative 2(c):
 Environmental and
 Land Use Impacts*
 OR 138 Corridor Solutions Study

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Alternative 2(c) would produce impacts to Deer Creek and the surrounding floodplain areas due to construction of a new bridge aligned with Rose Street and bridge reconstruction on Diamond Lake Boulevard.

Properties between Douglas Avenue and Washington Avenue and between Rose Street and Stephens Street would be impacted by this option. Properties between Oak Avenue and Washington Avenue and between Pine Street and Stephens Street would be also be impacted.

Impacts to the Douglas County Health Department property would be expected during the Alternative 2(a) construction phase. The proposed Public Safety Building site, which will be located on Douglas Avenue west of City Hall and east of Stephens Street, would also be impacted by this design option. The construction and widening of the Washington Avenue Bridge is expected to impact Cow Creek tribal properties held in trust.

The key visual impact due to the Alternative 2(c) design option will be the vantage point from Riverside Park due to the widened Washington Avenue Bridge. The new traffic route along Rose Street would increase noise for that corridor area. Noise levels are expected to be slightly higher along Washington Avenue due to the wider bridge and higher volumes.

Since the option is not currently proposed in Roseburg's Comprehensive Plan, the TSP would need to be amended to incorporate the Alternative 2(c) improvements into the Comprehensive Plan. Otherwise, a state land use goal exception would be required on account of Goal 5 resource impacts. It is expected upon completion that economic development stimulus would be produced in the study area over the short term based on the scale and duration of the project and the residual impacts during and after construction. The potential level of long-term economic development stimulus resulting from the improvements is unknown and will need to be assessed in more detail during a future phase of the project.

Alternative 3(a): Harvard-Diamond Lake Bridge Connection (RR At-Grade)

Design Alternative 3(a) is configured to provide the most direct link between Harvard Avenue west of the South Umpqua River to Diamond Lake Boulevard on the east side of the river (see Figure 5-11). The central feature is a new bridge crossing diagonally over the South Umpqua River and southern portion of Elk Island. The new configuration would require vacating the Washington Avenue Bridge. The east end of the new bridge would cross the existing railroad line at-grade and connect with Stephens Street at a signalized crossing before proceeding eastward along the existing Diamond Lake Boulevard alignment.

There are two options for the Oak Avenue Bridge with Design Alternative 3(a). The bridge could continue to allow one-way travel only or it could be converted to two-way travel but would remain two lanes. Specific intersection improvements with these two Oak Avenue Bridge options are described below with lane configurations shown more clearly in Figure 5-12 for one-way travel and Figure 5-13 for two-way travel.

Lane Configurations and Traffic Flow with Oak Avenue Bridge One-Way

Alternative 3(a) would require some modifications in downtown traffic flow with the elimination of the Washington Avenue Bridge. With one-way traffic maintained on Oak Avenue, all westbound traffic would need to use the new bridge to cross the river to Harvard Avenue. In general, 2030 forecast traffic volumes on downtown roadways would be lower than the No Build volumes because traffic traveling between Harvard Avenue (and I-5) and points north and east would use the new bridge and would not need to travel through downtown.

Intersection improvements would begin at the Harvard Avenue/Madrone Street intersection. The new bridge would need to widen to three lanes approaching the intersection and two lanes departing. Harvard Avenue would have a seven-lane section west of the intersection (compatible with Exit 124 IAMP findings). The lane configurations are shown in Figure 5-12. These improvements would result in a 2030 forecast v/c ratio of 0.69 which would meet both ODOT's HDM standard of 0.75 the OHP standard of 0.85.

With Alternative 3(a), neither Washington Avenue nor Oak Avenue would be part of Highway 138 and both would maintain one-way travel (one-way travel along Washington Avenue west of Pine Street optional one-way or two-way). The resulting 2030 forecast v/c ratios for the Washington Avenue and Oak Avenue intersections would meet the City of Roseburg standards of 0.85 and LOS D. The STOP-controlled approaches of Spruce Street would experience some longer delays at Oak Avenue but would still meet Roseburg standards for v/c ratio.

The lane configuration shown in Figure 5-12 for the Douglas Avenue/Stephens Street intersection reflects a shift in the dominant travel flow direction from southbound to northbound. Northbound traffic on Stephens Street would be higher with Oak Avenue maintained as one-way because westbound traffic from downtown and points south would need to travel northward to the new bridge. Conversely, the southbound traffic would be lower because westbound traffic from Diamond Lake Boulevard and points north would no longer need to travel into downtown to cross the river. As a result the lane configuration requires three northbound through lanes and only two southbound through lanes. The intersection could also accommodate the addition of the southbound left-turn movement and, with a 2030 forecast v/c ratio of 0.75, still meet ODOT's HDM standard.

A four-legged and very large intersection would be needed at Stephens Street and /Diamond Lake Boulevard, as shown in Figure 5-12. To accommodate the high demand for turning movements, dual left-turn lanes would be needed on all approaches and supplemental right-turn lanes would be need on three approaches. Through movements on Stephens Street would require three lanes in each direction while two through lanes in each direction would be adequate for Diamond Lake Boulevard. With all of these improvements, the 2030 forecast v/c ratio of 0.84 would exceed the HDM standard of 0.75 and be just below the OHP standard of 0.85. This intersection could be a potential candidate for a multi-lane roundabout since demand is heavy on all approaches. However, the close proximity of the intersection to the railroad line poses a considerable obstacle toward implementing such a design option.

Highway 138 Corridor Solutions Study
Roseburg, Oregon

Legend

- Centerline
- Striping
- 6-ft Shoulder
- Railroad



Figure 5-11
Alternative 3(a):
Harvard - Diamond Lake Alignment
(Railroad At-Grade Crossing)

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Legend



- 0.00 Signalized V/C Ratio
- 0.00 Unsignalized V/C Ratio (Worst Stopped Approach)
- Level of Service A, B, C
- Level of Service D
- Level of Service E
- Level of Service F
- 95th Percentile Queue
- Existing Lane & Permitted Turning Movements
- Additional Lane & Permitted Turning Movements

- Notes:
- (1) Intersection could not be improved to HDM standard (0.75) without going to triple lefts or three EW through lanes.
 - (2) Southbound dual lefts would bring intersection below HDM standard (0.75)
 - (3) A third northbound through lane is needed to meet downtown traffic shifting from Washington Ave Bridge northward to new bridge. Southbound left turns also added and still meets HDM standard (0.75).
 - (4) Signal installed with Public Safety Center

HDM = Highway Design Manual
 OHP = Oregon Highway Plan
 IAMP = Interchange Area Management Plan

Figure 5-12
Alternatives 3(a) & 3(d) with Oak Bridge One-Way - Traffic Operations Summary and Lane Configuration



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Legend



- 0.00 Signalized V/C Ratio
- 0.00 Unsignalized V/C Ratio (Worst Stopped Approach)
- Level of Service A, B, C
- Level of Service D
- Level of Service E
- Level of Service F
- 95th Percentile Queue
- Existing Lane & Permitted Turning Movements
- Additional Lane & Permitted Turning Movements

Notes:

- (1) Intersection could not be improved to HDM standard (0.75) without going to triple lefts or three EW through lanes.
- (2) Without additional capacity, intersection would not meet HDM standard (0.75). Dual southbound lefts would bring below standard.
- (3) The existing third southbound lane could be converted to a left-turn lane and still meet HDM standard (0.75)
- (4) Signal installed with Public Safety Center

HDM = Highway Design Manual
 OHP = Oregon Highway Plan
 IAMP = Interchange Area Management Plan

Figure 5-13
Alternatives 3(a) & 3(d) with Oak Bridge Two-Way - Traffic Operations Summary and Lane Configuration



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In addition to the improvements described above, the Douglas Avenue/Jackson Street intersection, which is currently all-way STOP-controlled, would become signalized to serve the City's Public Safety Center.

No improvements were assumed at the Diamond Lake Boulevard/Winchester Street intersection under Alternative 3(a) but the second southbound left-turn lane on Winchester Street could be added. If included, this improvement would reduce the forecast v/c ratio at Diamond Lake Boulevard/Winchester Street from 0.82 to 0.72, as shown for Alternative 1(a).

Lane Configurations and Traffic Flow with Oak Avenue Bridge Two-Way

If the Oak Avenue Bridge were converted to two-way traffic flow with Alternative 3(a), westbound traffic from downtown and points south would be able to use it to cross the river rather than traveling northward to the new bridge. This difference would result in lower northbound traffic volumes on Stephens Street as some volumes would shift to Oak Avenue. The resulting lane configurations for many intersections in the study area would differ from those discussed above (with Oak Avenue Bridge one-way). To see the differences, compare Figure 5-13 with Figure 5-12.

With two-way travel on the Oak Avenue Bridge, the lane configuration at the Harvard Avenue/Madrone Street intersection would be similar to that shown for Alternative 2(a). Some realignment of the Oak Avenue Bridge would be necessary along with possible widening to allow for two or three lanes on Oak Avenue approaching the intersection to reduce queuing along the bridge. Harvard Avenue would have a seven-lane section west of the intersection (compatible with Exit 124 IAMP findings). These improvements would result in a 2030 forecast v/c ratio of 0.69 which would meet both ODOT's HDM standard of 0.75 the OHP standard of 0.85.

As with Alternative 2(a), Oak Avenue would no longer be part of Highway 138 and would need to allow two directions of travel from Stephens Street to Madrone Street. Two-way traffic could be accommodated on Oak Avenue with lane striping changes but no widening of roadways. The resulting 2030 forecast v/c ratios for the Oak Avenue intersections at Pine Street and Stephens Street would meet the City of Roseburg standards of 0.85 and LOS D. The STOP-controlled approaches of Spruce Street would experience some longer delays because of the two-way traffic flow on Oak Avenue but would still meet Roseburg standards.

The Diamond Lake Boulevard/Stephens Street intersection would require fewer travel lanes with the Oak Avenue Bridge carrying two-way traffic but it would still be very large, as shown in Figure 5-13. To accommodate the high demand for turning movements, dual left-turn lanes would be needed on three approaches and supplemental right-turn lanes would be need on three approaches. Through movements on Stephens Street would require three northbound lanes and two southbound lanes. Two through lanes in each direction would still be adequate for Diamond Lake Boulevard. With all of these improvements, the 2030 forecast v/c ratio of 0.83 which would exceed the HDM standard of 0.75 and be just below the OHP standard of 0.85. As with Alternative 3(a), this intersection could potentially be a candidate for a multi-lane roundabout since demand is heavy on all approaches. However, the close proximity of the intersection to the railroad line poses a considerable obstacle toward implementing such a design option.

Transportation Analysis

Overall, Alternative 3(a) would improve the movement of traffic through the Highway 138 corridor by shortening the trip while generally reducing delays and queuing downtown. Drivers would only pass through three traffic signals along the highway between Madrone Street and Fulton Street for both eastbound and westbound travel. Traffic patterns would be simplified throughout the study area although some large intersections would be created to accommodate the changes.

All of the intersections would have overall 2030 forecast v/c ratios near or below the city and OHP standards of 0.85 but the Diamond Lake Boulevard/Stephens Street intersection, where capacity improvements would require widening the roadway, would not meet the HDM standard of 0.75. The 2030 v/c ratio is estimated at 0.84 at this location with one-way traffic on the Oak Avenue Bridge and 0.83 with two-way traffic on the Oak Avenue Bridge. Additional widening at this intersection is either impractical or of little benefit to the operations; however, this intersection could be a candidate for a multi-lane roundabout since demand is heavy on all approaches.

Capacity improvements associated with Alternative 3(a) would include a new bridge over the South Umpqua River that would connect from Harvard Avenue to Stephens Street at Diamond Lake Boulevard. The existing Washington Avenue Bridge would be decommissioned and possibly torn down. It is also possible that some improvements at the west end of the Oak Avenue Bridge would also be needed to accommodate two-way travel. Widening or replacing the Diamond Lake Boulevard Bridge over Deer Creek may also be required.

Alternative 3(a) would not create any grade-separated crossing of the CORP tracks; therefore, delays and queues would still occur when trains pass through downtown. With the rail yard relocation to the north, this problem should be alleviated because trains should move continuously through downtown and switching activities will no longer impact traffic.

With the Alternative 3(a) the new bridge would include bicycle and pedestrian facilities connecting Harvard Avenue to Diamond Lake Boulevard. At the same time, reduced demand downtown could ease bicycle travel on those roadways. The biggest disadvantage to pedestrians and bicyclists would be the wider and more complex intersections which could make both crossings more difficult.

Alternative 3(a) would allow for a more direct transit route connection from Harvard Avenue to Diamond Lake Boulevard; however, this routing would not necessarily be desirable from a transit standpoint where more stops provide better connectivity and options for riders.

Environmental and Land Use Assessment

Impacts to the South Umpqua River and the surrounding area floodways would be expected under design option Alternative 3(a) due to construction of a new and longer span bridge crossing the river diagonally (see Figure 5-14). The existing Umpqua River bike path (a potential Section 4(f) resource) would be impacted by construction and placement of a new at-

grade five-lane roadway connecting Harvard Avenue to Diamond Lake Boulevard. There are no to minimal impacts to area parks under this design alternative.

Alternative 3(a) would impact Deer Creek and the surrounding floodplain areas due to the construction of a new bridge over the river embankment and the reconstruction and widening of the Diamond Lake Boulevard Bridge and the Stephens Street Bridge. Additionally, the wetland areas classified palustrine surrounding the South Umpqua River/Deer Creek confluence would be impacted.

This design option would impact properties surrounding the Stephens Street/Diamond Lake Boulevard intersection due to the widening and realignment to the north. There would be impacts to the Douglas County Health Department property due to the new bridge structure which would encroach on the parking area.

It is unlikely that the existing roadway will be widened on the west side of Stephens south of the Stephens/Diamond Lake Boulevard intersection; therefore, impacts to the two potentially eligible NRHP residences located in this area will be minimal. There would be minimal impact to the Cow Creek tribal properties held in trust, unless the Oak Avenue Bridge would require widening.

The Alternative 3(a) option would produce a visual impact to the area due to the construction of a new bridge spanning across Elk Island. The new bridge would move traffic noise further north and potentially produce noise impacts to the Laurelwood neighborhood.

Since the option is not currently proposed in Roseburg's Comprehensive Plan, the TSP would need to be amended to incorporate the Alternative 3(a) improvements into the Comprehensive Plan. Otherwise, a state land use goal exception would be required on account of Goal 5 resource impacts. It is expected upon completion that economic development stimulus would be produced in the study area over the short term based on the scale and duration of the project and the residual impacts during and after construction. The potential level of long-term economic development stimulus resulting from the improvements is unknown and will need to be assessed in more detail during a future phase of the project.

Alternative 3(d): Harvard-Diamond Lake Bridge Connection (RR Above-Grade)

Design Alternative 3(d) is differentiated from Alternative 3(a) in that the railroad would be elevated above several downtown blocks and existing roadways, including the new direct bridge connection from Harvard Avenue to Diamond Lake Boulevard (illustrated in Figure 5-15). This design alternative would gradually elevate the existing railroad bed starting from the south in the vicinity of Mosher Avenue to a point where the line goes over Oak, Washington, and Douglas Avenues as an overpass and then continues north and over the realigned Highway 138 at Diamond Lake Boulevard, before descending north of the Diamond Lake Boulevard corridor to its existing grade.

Lane Configurations and Traffic Flow

The lane configurations and traffic flow would be the same for Alternative 3(d) as they would be for Alternative 3(a) and are illustrated in Figure 5-12 with the Oak Avenue Bridge travel remaining one-way and Figure 5-13 with the Oak Avenue Bridge travel converted to two-way.

Transportation Analysis

The results of the transportation evaluation for Alternative 3(d) would be the same as those described for Alternative 3(a) with one exception: railroad crossings. By elevating the railroad through downtown and north of Diamond Lake Boulevard, as many as four grade-separated crossings would be created. The new bridge would pass below the railroad tracks to connect with Stephens Street at Diamond Lake Boulevard. Both Oak Avenue and Douglas Avenue could have below-grade crossings in downtown. Although Washington Avenue is shown crossing below the railroad tracks, it would carry very low traffic volumes west of Pine Street and could be closed altogether.

The elevated railway would create several impacts to bicycle and pedestrian travel. The raised viaduct may disrupt crossings except at those roadways which pass below grade. There could also be some disruption to travel along Mosher Avenue due to an elevated at-grade crossing.

Environmental and Land Use Assessment

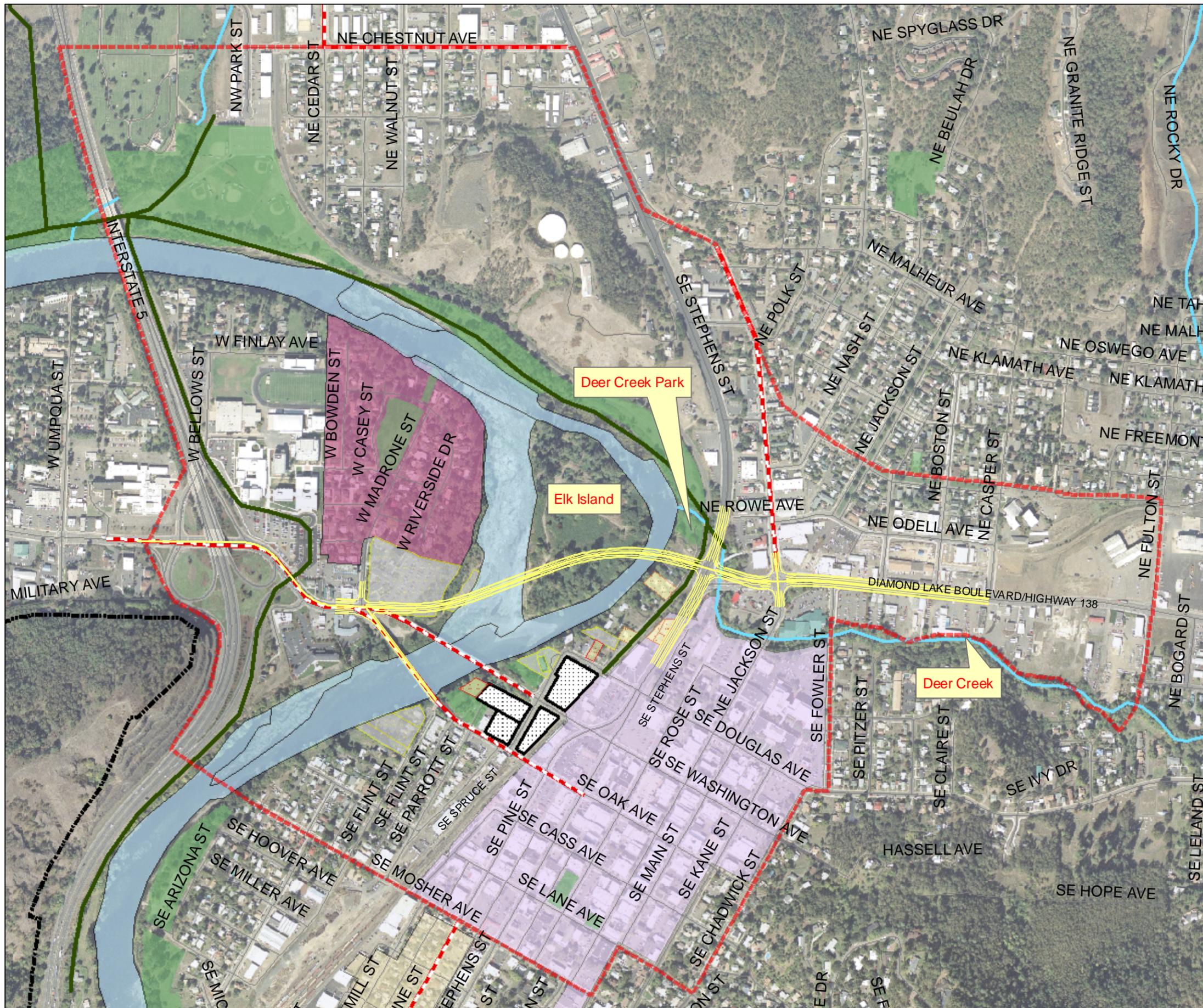
Impacts to the South Umpqua River and the surrounding area floodways would be expected under design option Alternative 3(d) due to construction of a new and longer span bridge crossing the river diagonally (see Figure 5-16).

Alternative 3(d) would impact Deer Creek and the surrounding floodplain due to:

- the construction of a new bridge over the river embankment and the reconstruction and widening of the Diamond Lake Boulevard bridge and the Stephens Street bridge
- the construction of a railroad viaduct

Additionally, the wetland areas classified palustrine surrounding the South Umpqua River/Deer Creek confluence would be impacted.

The existing Umpqua River bike path would be impacted by construction and placement of a new at-grade five-lane roadway connecting Harvard Avenue to Diamond Lake Boulevard. The bike path leading to historic and potentially-historic homes in and around the Downtown Historic District and Mill-Pine Historic Districts would also be impacted. There would be impacts to Deer Creek Park due to the construction of a railroad viaduct.



Legend

- Alternative
- Study Area Boundary
- Creeks/Streams
- Roseburg UGB
- Bike Lane
- Multi-Use Path
- Parks

- Downtown Historic District
- Mill-Pine Historic District
- Laurelwood Historic District

- Tribal Properties Held In Trust

Historic Resources Status

- NRHP Listed
- Likely Eligible for NRHP
- Possibly Eligible for NRHP

Sources:
 U.S. Census Bureau, Douglas County
 and City of Roseburg

Figure 5-14
*Alternative 3(a):
 Environmental and
 Land Use Impacts*
 OR 138 Corridor Solutions Study

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Highway 138 Corridor Solutions Study
Roseburg, Oregon

Legend

- Centerline
- Striping
- 6-ft Shoulder
- Railroad

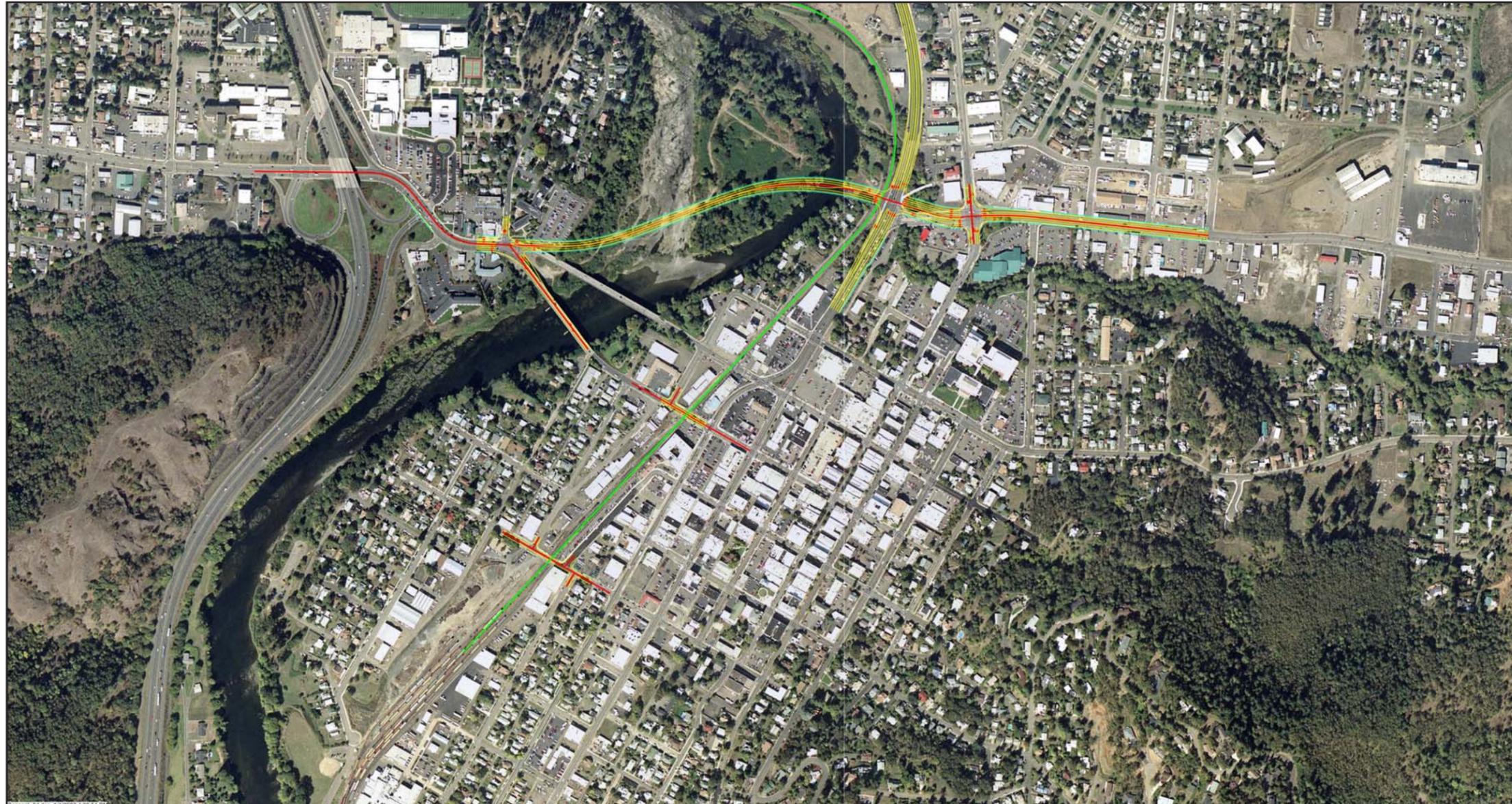
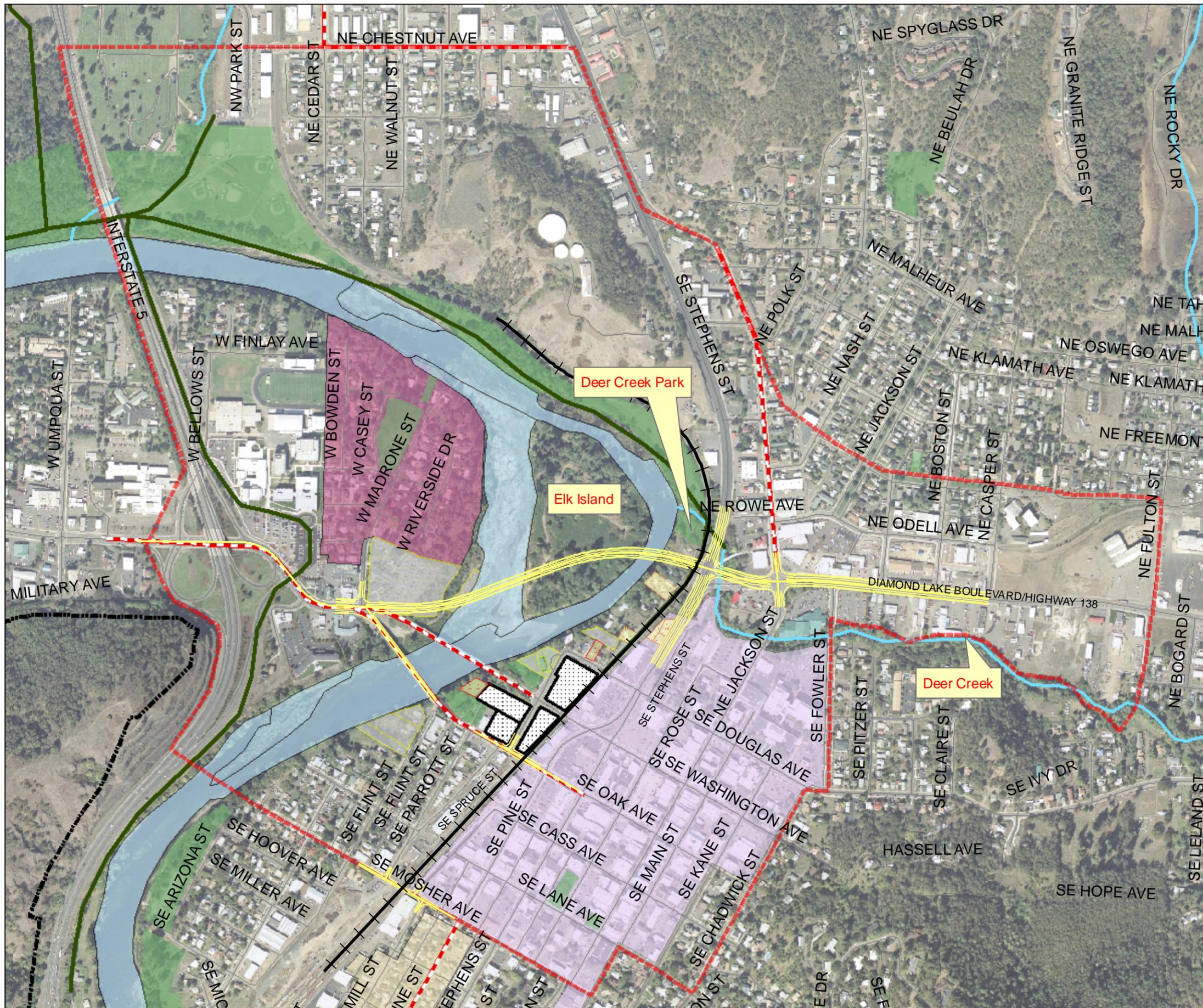


Figure 5-15
*Alternative 3(d):
Harvard - Diamond Lake Alignment
(Railroad Above-Grave Crossing)*

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Legend

- Alternative
- Study Area Boundary
- Creeks/Streams
- Roseburg UGB
- Bike Lane
- Multi-Use Path
- Parks
- Railroad
- Downtown Historic District
- Mill-Pine Historic District
- Laurelwood Historic District
- Tribal Properties Held In Trust

Historic Resources Status

- NRHP Listed
- Likely Eligible for NRHP
- Possibly Eligible for NRHP

Sources:
 U.S. Census Bureau, Douglas County
 and City of Roseburg

Figure 5-16
*Alternative 3(d):
 Environmental and
 Land Use Impacts*
 OR 138 Corridor Solutions Study

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This design option would impact properties surrounding the Stephens Street/Diamond Lake Boulevard intersection due to the widening and realignment to the north. The raising of the railroad to construct a new viaduct would substantially impact adjacent properties in the Downtown Historic District, the Mill-Pine Historic District, and the surrounding area, which includes the Cow Creek tribal properties held in trust. There would be impacts to the Douglas County Health Department property due to the new bridge structure which would encroach on the parking area.

It is unlikely that the existing roadway will be widened on the west side of Stephens south of the Stephens/Diamond Lake Boulevard intersection. The two potentially eligible NRHP residences located at 236 SE Stephens and 256 SE Stephens could be potentially impacted, however, due to the construction of the railroad viaduct.

The Alternative 3(d) option would produce visual impacts to residences and businesses in the study area due to the construction of a new bridge spanning across Elk Island and the raising of the railroad. Noise generated from the railroad viaduct through downtown would travel further due to the facility being elevated above streets and many buildings. The new bridge would move traffic noise further north and potentially produce noise impacts to the Laurelwood neighborhood.

Since the option is not currently proposed in Roseburg's Comprehensive Plan, the TSP would need to be amended to incorporate the Alternative 3(d) improvements into the Comprehensive Plan. Otherwise, a state land use goal exception would be required on account of Goal 5 resource impacts. It is expected upon completion that economic development stimulus would be produced in the study area over the short term based on the scale and duration of the project and the residual impacts during and after construction. The potential level of long-term economic development stimulus resulting from the improvements is unknown and will need to be assessed in more detail during a future phase of the project.

Alternative 4(a): Northern Alignment Flyover (RR Below-Grade)

Design Alternative 4(a) attempts to take advantage of existing topography to align a new bridge that crosses over the railroad line (see Figure 5-17). North of Diamond Lake Boulevard, the railroad line stays relatively level along the banks of the South Umpqua River while Stephens Street and the surrounding landscape east of the corridor ascend uphill, thus enabling a bridge to cross over the railroad with shorter distances to descend onto the surface streets. This alternative incorporates a new bridge over the South Umpqua River and Elk Island to align north and parallel to the existing Highway 138 route along Diamond Lake Boulevard, reconnecting with the existing corridor at Odell Avenue and Jackson Street. The alternative would require vacating the Washington Avenue Bridge and widening Oak Avenue Bridge to four-lane, two-way traffic due to access limitations with some of the new bridge configurations. The eastern terminus of the bridge aligns with Rowe/Odell Avenues, descending to a signalized intersection at Jackson Street north of Diamond Lake Boulevard. The limited bridge clearance at Winchester Street would require closing Winchester Street north of Odell Avenue and eliminating existing north-south through access to Diamond Lake Boulevard. Specific intersection improvements are described below with lane configurations shown more clearly in Figure 5-18.

Lane Configurations and Traffic Flow

Alternative 4(a) would require some modifications in downtown traffic flow with the elimination of the Washington Avenue Bridge. The wider, two-way Oak Avenue Bridge would carry traffic from downtown and points south as well as some traffic from Diamond Lake Boulevard and points north that would not circle around to use the new bridge. In general, 2030 forecast traffic volumes on downtown roadways would be lower than the No Build volumes because some traffic traveling between Harvard Avenue (and I-5) and points north and east would use the new bridge and would not need to travel through downtown but these differences would be less than those discussed for Alternative 3(a).

Intersection improvements would begin at the Harvard Avenue/Madrone Street intersection. The new bridge would need at least a two-lane, possibly three-lane approach. Harvard Avenue would need dual right-turn lanes to accommodate traffic using the Oak Avenue Bridge and two through lanes destined for the new bridge. The lane configurations are shown in Figure 5-18. The 2030 forecast v/c ratio would be 0.93 with only two through lanes traveling to and from the new bridge, which would exceed both ODOT's HDM standard of 0.75 and the OHP standard of 0.85. Additional through lanes could improve operations yet still not meet the HDM standard.

With this option of Alternative 4(a), neither Washington Avenue nor Oak Avenue would be part of Highway 138 and both would convert to two-way travel. The resulting 2030 forecast v/c ratios for the Washington Avenue and Oak Avenue intersections would meet the City of Roseburg standards of 0.85 and LOS D. The STOP-controlled approaches of Spruce Street would experience some longer delays at Oak Avenue but would still meet Roseburg standards for v/c ratio.

The lane configuration shown in Figure 5-18 for the Douglas Avenue/Stephens Street intersection reflects some reduction in southbound traffic because some of the westbound traffic from Diamond Lake Boulevard and points north would no longer travel into downtown to cross the river. As a result the lane configuration requires two through lanes in each direction on Stephens. It may be possible to accommodate southbound left-turns as well since the 2030 forecast v/c ratio of 0.64 would be below ODOT's HDM standard; however, that option was not tested as part of the alternative.

Improvements at the Stephens Street/Diamond Lake Boulevard intersection would include the addition of several lanes, as shown in Figure 5-18. A second southbound left-turn lane from Stephens Street to Diamond Lake Boulevard and a third northbound through lane on Stephens Street are identified as part of the alternative. A second westbound right-turn lane on Diamond Lake Boulevard would also be needed to accommodate the increased demand caused by the closure of Winchester Street to through traffic. These capacity additions would bring the 2030 forecast v/c ratio to 0.87 which would exceed the HDM standard of 0.75 and be just above the OHP standard of 0.85. The intersection could not be improved beyond this level without creating triple left-turn lanes or adding a fourth northbound through travel lane.

Highway 138 Corridor Solutions Study
Roseburg, Oregon

Legend

- Centerline
- Striping
- 6-ft Shoulder
- Railroad



Figure 5-17
Alternative 4(a): Harvard - Odell -
Northern Alignment Flyover
(Railroad Below-Grade Crossing)

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Legend

- 0.00 Signalized V/C Ratio
- 0.00 Unsignalized V/C Ratio (Worst Stopped Approach)
- Level of Service A, B, C
- Level of Service D
- Level of Service E
- Level of Service F
- 95th Percentile Queue
- Existing Lane & Permitted Turning Movements
- Additional Lane & Permitted Turning Movements

Notes:

- (1) Intersection could not be improved to HDM standard (0.75) without going to triple lefts or three EW through lanes.
- (2) Diamond Lake/Jackson intersection would look similar to Winchester intersection.
- (3) New intersection created to bring Highway 138 to Diamond Lake.
- (4) Signal installed with Public Safety Center
- (5) Intersection could not be improved to HDM standard (0.75) without increasing to three through lanes from both bridges.
- (6) Oak Avenue would need to have two travel lanes in each direction from Stephens Street westward across the river where it would flair to three westbound lanes at Harvard Avenue.

HDM = Highway Design Manual
 OHP = Oregon Highway Plan
 IAMP = Interchange Area Management Plan

Figure 5-18
Alternative 4(a) - Traffic Operations Summary and Lane Configuration

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On Diamond Lake Boulevard, the existing intersection at Winchester would become a driveway for adjacent businesses and the Jackson Street intersection would be reopened at its old alignment. The lane configuration of the new Highway 138 route at the Jackson Street intersection shown in Figure 5-18 would be similar as the configuration that currently exists at Winchester Street. The 2030 forecast v/c ratio for the intersection would be 0.71, which would meet the Roseburg standard of 0.85 and LOS D.

Since Highway 138 would eventually return to the Diamond Lake Boulevard alignment, the roadway east of the new bridge would extend along the existing Odell Avenue alignment, forming a new intersection at Diamond Lake Boulevard. Although the initial design showed Highway 138 (Odell Avenue alignment) with the priority movements, traffic demand appears to indicate that Diamond Lake may carry the greater traffic volume. This intersection was assumed to be signalized and would have the lane configuration shown in Figure 5-18. The 2030 forecast v/c ratio for the intersection would be 0.67, which would meet ODOT's HDM standard.

In addition to the improvements described above, the Douglas Avenue/Jackson Street intersection, which is currently all-way STOP-controlled, would become signalized to serve the City's Public Safety Center.

Transportation Analysis

Overall, Alternative 4(a) would improve the movement of traffic through the Highway 138 corridor by shortening the trip while somewhat reducing delays and queuing downtown. The number of traffic signals along the highway between Madrone Street and Fulton Street would two or possibly three (with one at Jackson Street) for both eastbound and westbound travel.

Traffic patterns would change in a number of areas as a result of Alternative 4(a). With the closure of Winchester Street to through traffic just north of Diamond Lake Boulevard, the traffic that is projected to travel that route would primarily use Stephens Street instead. Two-way travel on Oak Avenue and the elimination of the Washington Avenue Bridge would shift traffic downtown as well.

Two intersections would have overall 2030 forecast v/c ratios above the city and OHP standards of 0.85 but all other intersections would meet these standards and the HDM standard of 0.75. Additional widening at the Harvard Avenue/Madrone Street intersection could improve operations but still may not meet the HDM standard. Capacity improvements at the Diamond Lake Boulevard/Stephens Street intersection would require either triple left-turn lanes or four northbound through lanes, neither of which is practical.

Capacity improvements associated with Alternative 4(a) would include a new bridge over the South Umpqua River that would connect from Harvard Avenue to Odell Avenue at Jackson Street. This bridge could possibly be two lanes (one in each direction) widening to provide additional travel lanes at the intersections at either end. The existing Washington Avenue Bridge would be decommissioned and possibly torn down. The Oak Avenue Bridge would be widened or replaced with a four-lane structure that would accommodate two-way travel. Widening or replacing the Diamond Lake Boulevard Bridge over Deer Creek may also be required.

Alternative 4(a) would create one grade-separated crossing of the CORP tracks where the new bridge crosses over the river, railroad tracks, and Stephens Street before connecting with Odell Avenue at Jackson Street. Although this crossing could be somewhat awkward to access from downtown, it would provide a grade-separated option.

With Alternative 4(a), the new bridge would include bicycle and pedestrian facilities connecting Harvard Avenue to Odell Avenue and eventually Diamond Lake Boulevard. Ramps could also provide a pedestrian connection from the bridge to Stephens Street. The biggest disadvantage to pedestrians and bicyclists would be the wider and more complex intersections and four-lane, two-way travel on Oak Avenue, which could make crossings more difficult.

Alternative 4(a) would allow for a more direct transit route connection from Harvard Avenue to Diamond Lake Boulevard; however, this routing would not necessarily be desirable from a transit standpoint where more stops provide better connectivity and options for riders.

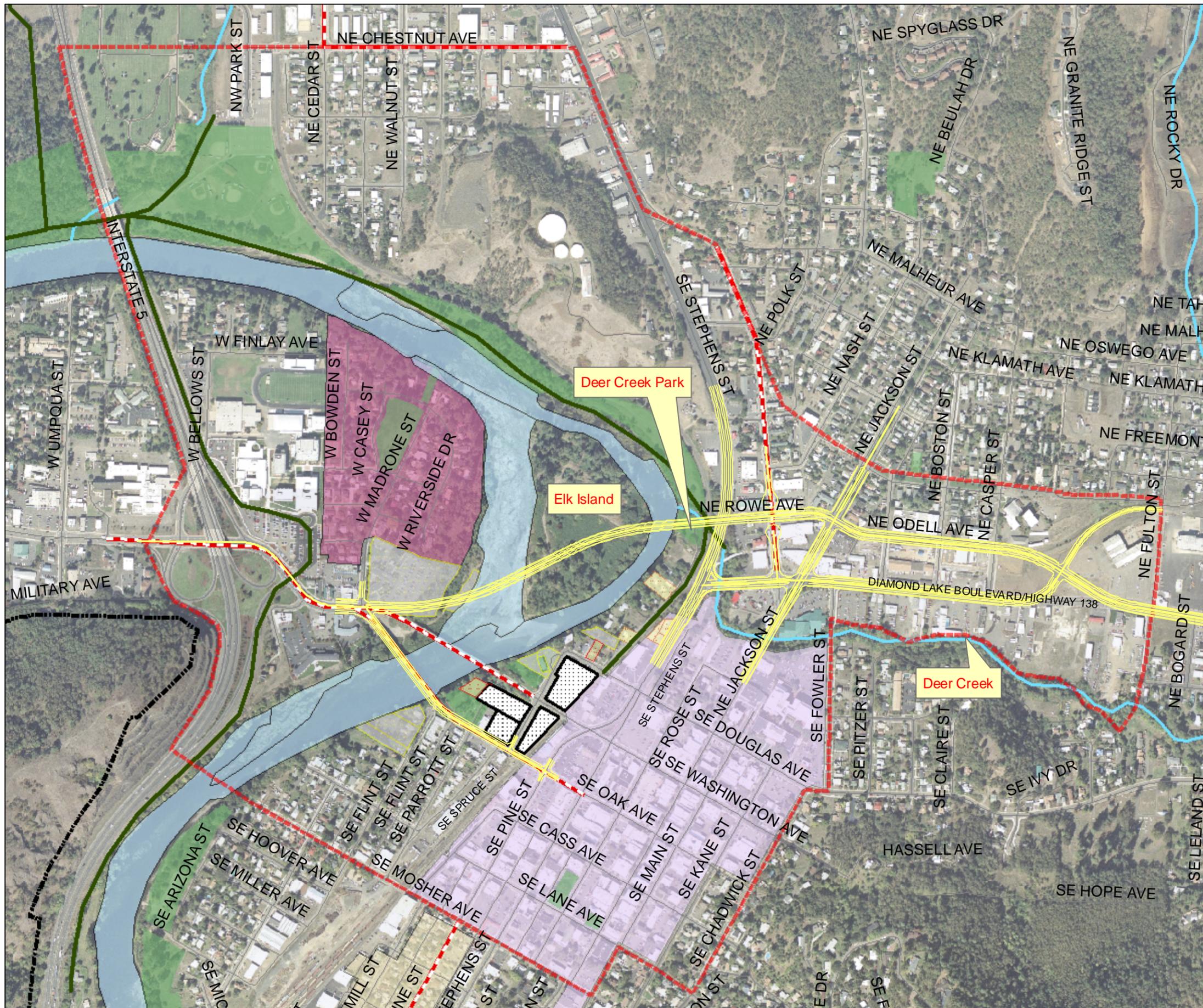
Environmental and Land Use Assessment

Impacts to the South Umpqua River and the surrounding area floodways would be expected under design option Alternative 4(a) due to construction of a new and longer span bridge crossing the river diagonally (see Figure 5-19). There would be impacts to Deer Creek Park and the Umpqua River bike path during the construction of the new bridge. Alternative 4(a) would impact Deer Creek and the surrounding floodplain areas due to the construction of a new bridge crossing over the vicinity where the creek empties into the South Umpqua River. Additionally, the wetland areas classified palustrine surrounding the South Umpqua River/Deer Creek confluence would be impacted.

This design option would impact businesses along Diamond Lake Boulevard in the vicinity of Stephens Street and Winchester Street. Downtown businesses would be impacted by the widening of the Oak Avenue Bridge. The construction and widening of the Oak Avenue Bridge would also impact the Cow Creek tribal properties held in trust. There would be impacts to the Douglas County Health Department property due to the new bridge structure which would encroach on the parking area.

It is unlikely that the existing roadway will be widened on the west side of Stephens south of the Stephens/Diamond Lake Boulevard intersection; therefore, impacts to the two potentially eligible NRHP residences located in this area will be minimal.

Alternative 4(a) would produce visual impacts to the area due to the construction of a new bridge spanning across Elk Island and the construction of a new bridge with a span above Stephens Street and Winchester Street. The new bridge would move traffic noise further north and potentially produce noise impacts to the Laurelwood neighborhood.



Legend

- Alternative
- Study Area Boundary
- Creeks/Streams
- Roseburg UGB
- Bike Lane
- Multi-Use Path
- Parks

- Downtown Historic District
- Mill-Pine Historic District
- Laurelwood Historic District

- Tribal Properties Held In Trust

Historic Resources Status

- NRHP Listed
- Likely Eligible for NRHP
- Possibly Eligible for NRHP

Sources:
 U.S. Census Bureau, Douglas County
 and City of Roseburg

Figure 5-19
*Alternative 4(a):
 Environmental and
 Land Use Impacts*
 OR 138 Corridor Solutions Study

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Since the option is not currently proposed in Roseburg's Comprehensive Plan, the TSP would need to be amended to incorporate the Alternative 4(a) improvements into the Comprehensive Plan. Otherwise, a state land use goal exception would be required on account of Goal 5 resource impacts. It is expected upon completion that economic development stimulus would be produced in the study area over the short term based on the scale and duration of the project and the residual impacts during and after construction. The potential level of long-term economic development stimulus resulting from the improvements is unknown and will need to be assessed in more detail during a future phase of the project.

Alternative 6(a): Diamond Lake Boulevard – Odell Avenue Couplet

The focus of Design Alternative 6(a) is on improving traffic circulation in the vicinity of the Diamond Lake Boulevard/Stephens Street intersection by incorporating east-west and north-south couplets aligned with Diamond Lake Boulevard-Odell Avenue and Stephens Street-Winchester Street respectively, as shown in **Error! Reference source not found.** Westbound traffic on Highway 138 would be rerouted onto Odell Avenue with this option and one additional block on Stephens Street would also become part of the highway.

This alternative would not require much roadway widening or improvements with the exception of extending Odell Avenue westward from Winchester Street to Stephens Street and eastward from its current terminus to Diamond Lake Boulevard just west of Fulton Street. The configuration displayed in Figure 5-20 could potentially incorporate features south of Diamond Lake Boulevard associated with Design Alternative 1(a), such as wider turning radii within the downtown blocks.

Lane Configurations and Traffic Flow

Alternative 6(a) would require major changes in traffic flow as two one-way couplets are added to the transportation system. The roadway system and lane configurations associated with these improvements are shown in Figure 5-21.

The east-west couplet configuration converts Diamond Lake Boulevard to an eastbound one-way street and creates an Odell Avenue alignment one-way in the westbound direction. The eastern terminus of the couplet would be west of Fulton Street while Stephens Street would form the western end.

The north-south couplet would be created using Stephens Street and Winchester Street between Diamond Lake Boulevard and the existing merge point of the two roadways. Northbound traffic leaving downtown along Stephens Street would enter the north-south couplet by turning onto Diamond Lake Boulevard eastbound for one block and then turning northward onto Winchester Street, which would be a continuous one-way northbound street. Meanwhile, southbound traffic approaching downtown would continue onto Stephens Street, keeping to the right if destined for downtown or I-5 and to the left if destined to points east of the city via Highway 138 eastbound (Diamond Lake Boulevard).

As shown in Figure 5-21, the intersection of Diamond Lake Boulevard and Stephens Street would not need to be widened to accommodate the couplet system but changes in striping and

lane configurations would be needed. Since all of Stephens Street north of the intersection would be dedicated to southbound travel, the existing five-lane section would be restriped to provide two southbound through lanes and three southbound left-turn lanes. South of the intersection, the six-lane cross-section would include two southbound lanes to accept traffic from the north and four northbound right-turn lanes. Signage would be needed to indicate that the two rightmost northbound lanes would be dedicated to traffic continuing eastbound on Diamond Lake Boulevard while the two leftmost lanes would be dedicated to traffic continuing northbound on Winchester Street. All five lanes on Diamond Lake Boulevard would become receiving lanes for eastbound traffic. With the revised lane travel movements, traffic signal operations could be simplified to allow a northbound green phase and a separate southbound green phase and the resulting 2030 forecast v/c ratio is estimated at 0.73, which would meet all state and city standards.

The proposed lane configurations for the intersection of Diamond Lake Boulevard and Winchester Street are shown in Figure 5-21. All travel on Diamond Lake Boulevard would be eastbound and the six-lane cross-section approaching Winchester Street from the west would be restriped to provide two left-turn lanes for traffic turning northbound, three through lanes for traffic continuing eastbound, and one right-turn lane for traffic turning southbound toward downtown. The northbound approach of Jackson Street at Diamond Lake Boulevard would have two through lanes and left-turns would not be permitted. Winchester Street north of the intersection would have three northbound receiving lanes and Diamond Lake Boulevard east of the intersection would have three eastbound receiving lanes. Traffic signal operations would be simplified to allow an eastbound green phase and a northbound green phase with a resulting 2030 forecast v/c ratio of 0.60, which would meet all state and city standards.

At the Odell Avenue/Winchester Street intersection, all travel on Odell Avenue would be westbound while all travel on Winchester Street would be northbound. Odell Avenue would have four approach lanes with two westbound through lanes and two right-turn lanes for vehicles turning northward. Winchester Street would have three northbound approach lanes with left turns onto Odell Avenue permitted in with left-most lane. A new traffic signal would be needed under Alternative 6(a) with two-phase operations (northbound green and westbound green) to create gaps in traffic. This would improve access for side streets, enabling motorist to more easily turn right onto Winchester Street. With these improvements, the 2030 forecast v/c ratio is estimated at 0.75, which would meet all state and city standards.

A new intersection would be created with the extension of Odell Avenue westward to Stephens Street. This new leg of Odell Avenue would be two lanes, both dedicated left-turn lanes at Stephens Street, as shown in Figure 5-21. All five travel lanes on Stephens Street would be southbound through travel lanes although advance signage north of this intersection would be needed to indicate which lanes were continuing through to downtown and which would be turning left onto Diamond Lake Boulevard. A new traffic signal with two-phase operations (southbound green and westbound green) would be included with these improvements.

Highway 138 Corridor Solutions Study
Roseburg, Oregon

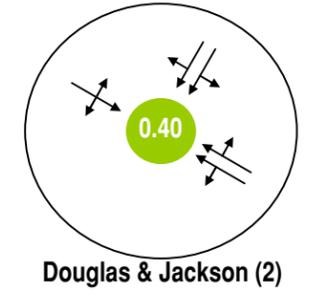
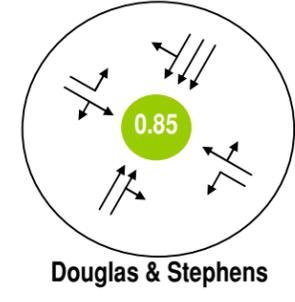
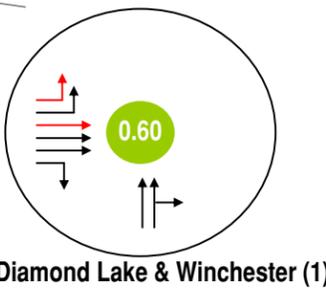
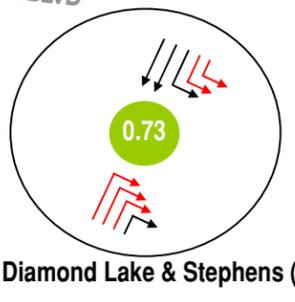
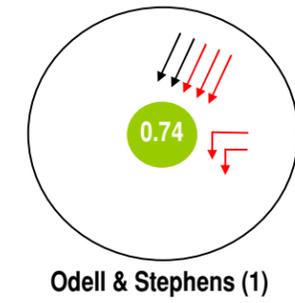
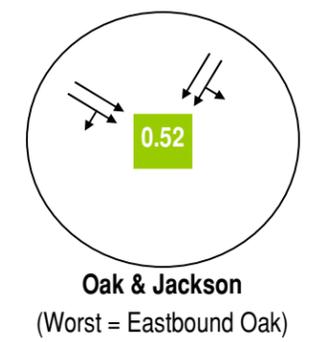
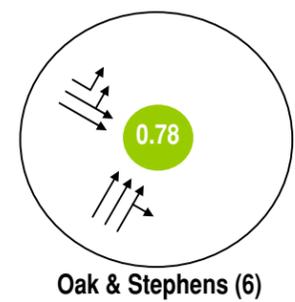
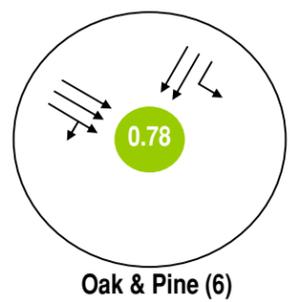
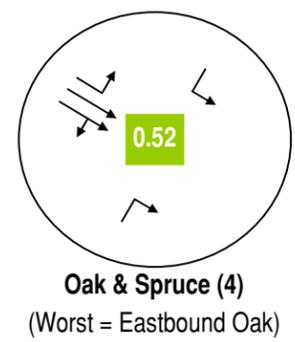
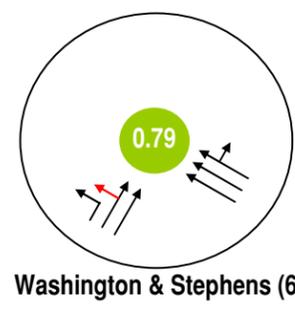
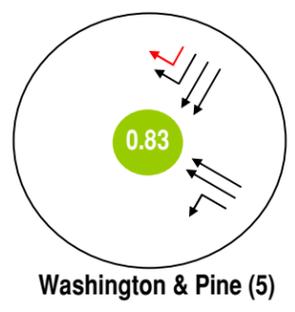
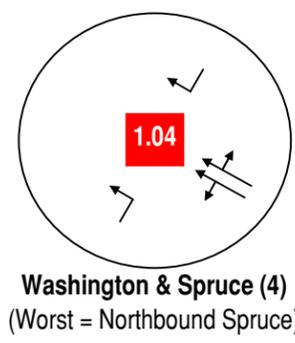
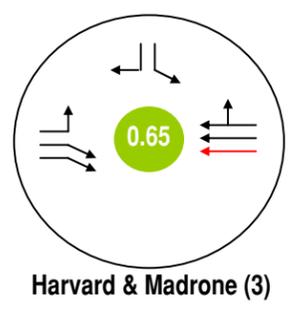
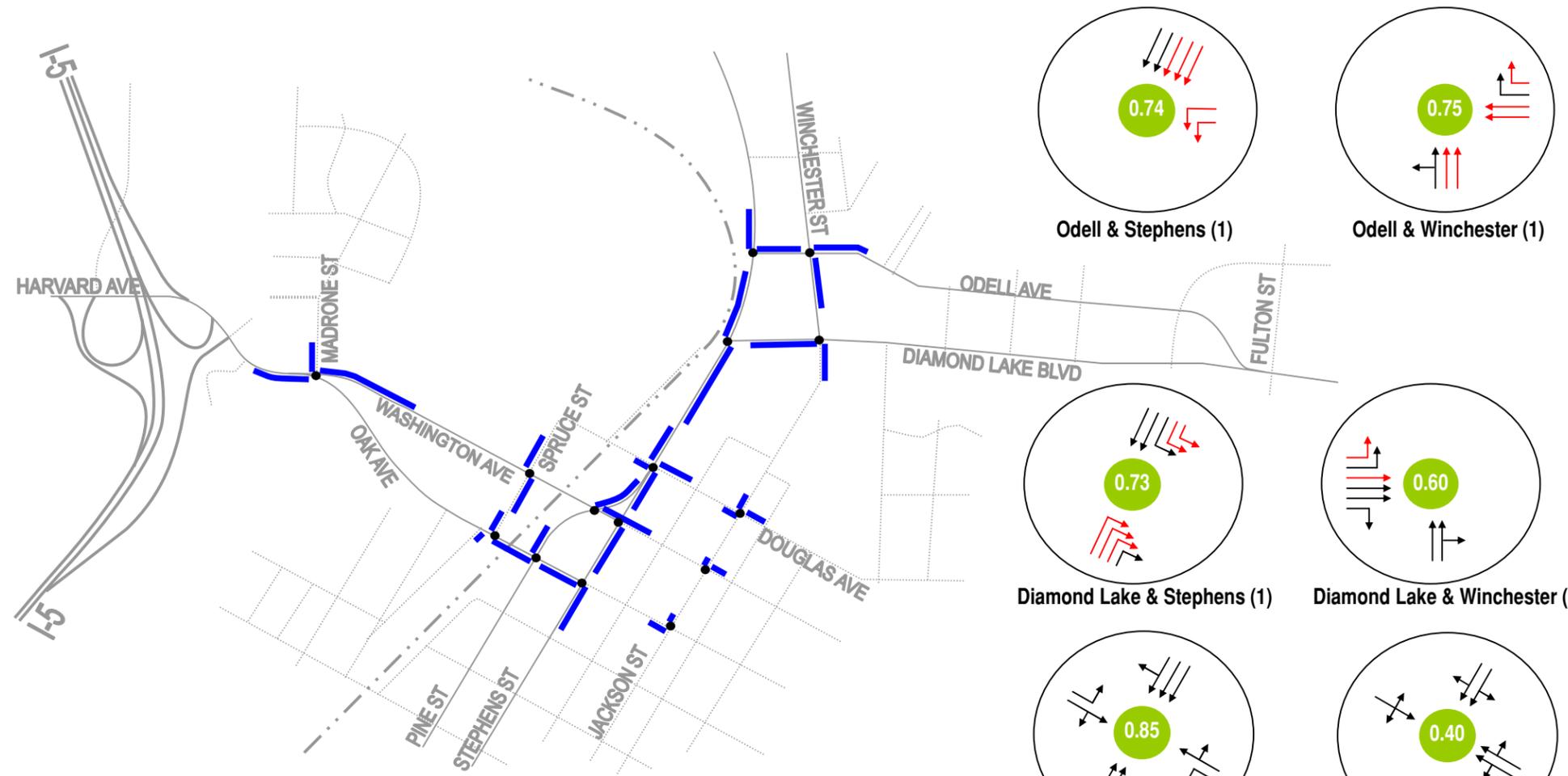
Legend

- Centerline
- Striping
- 6-ft Shoulder
- Railroad



Figure 5-20
*Alternative 6(a):
Diamond Lake Blvd. -
Odell Avenue Couplet*

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Legend



- Signalized V/C Ratio
- Unsignalized V/C Ratio (Worst Stopped Approach)
- Level of Service A, B, C
- Level of Service D
- Level of Service E
- Level of Service F
- 95th Percentile Queue
- Existing Lane & Permitted Turning Movements
- Additional Lane & Permitted Turning Movements

Notes:

- (1) One-way couplet systems created for Hwy 138 with Diamond Lake (eastbound) and Odell (westbound) and for north-south traffic with Winchester (northbound) and Stephens (southbound).
- (2) Signal installed with Public Safety Center
- (3) A seven-lane section on Harvard is proposed as part of the Exit 24 IAMP.
- (4) High volumes on Oak and Washington indicate that limiting Spruce movements to right turns only may become necessary during the PM peak period.
- (5) Intersection would require triple throughs on either Washington or Pine to meet HDM standard (0.75).
- (6) These intersections meet the applicable OHP standard (0.85) with no capacity additions.

HDM = Highway Design Manual
 OHP = Oregon Highway Plan
 IAMP = Interchange Area Management Plan

Figure 5-21

Alternative 6(a) - Traffic Operations Summary and Lane Configuration

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Redesign in the vicinity of the Stephens-Winchester merge (northern end of the Stephens-Winchester couplet) would incorporate a left turn lane from Winchester Street northbound onto Stephens Street southbound. This would enable a smooth transition for reverse north-to-south traffic movements.

As shown in Figure 5-21, a number of downtown improvements similar to those in Alternative 1(a) are also assumed for the analysis of Alternative 6(a). At the Washington Avenue/Stephens Street intersection, the northbound approach would be re-striped to allow for dual left-turn movements but would not require additional travel lanes. At the Washington Avenue/Pine Street intersection, the southbound approach on Pine Street would require an additional travel lane to allow dual right turns and two through travel lanes. Increasing the curb radii at the southwest corner of the Washington Avenue/Pine Street intersection and the northwest corner of the Oak Avenue/Stephens Street intersection is also recommended to facilitate truck turning movements.

As with other alternatives, Harvard Avenue is assumed to have a seven-lane section in the vicinity of the I-5 interchange. The improvements to the Harvard Avenue/Madrone Street intersection (see Figure 5-21) reflect the addition of a third westbound through lane from the Washington Avenue Bridge but assume the third eastbound through lane is dropped prior to the intersection.

In addition to the improvements described above, the Douglas Avenue/Jackson Street intersection, which is currently all-way STOP-controlled, would become signalized to serve the City's Public Safety Center.

Transportation Analysis

Overall, the additional couplets associated with Alternative 6(a) would improve traffic flow along Highway 138 by creating more intersections with simple two-phase signal operations and fewer turning movements. However, these changes would bring shifts of traffic from busy arterials to roadways that currently have much lower traffic volumes. In particular, volumes would increase on Odell Avenue and Winchester Street while volumes on Stephens Street and Diamond Lake Boulevard would decrease.

On the other hand, reconfiguring Stephens Street and Winchester Street into a respective southbound and northbound one-way couplet would enhance safety where the two roadways currently converge. Incorporating a one-way street pattern would eliminate motorists making left turn movements off of Stephens Street southbound across oncoming northbound Stephens Street traffic in an effort to access Winchester Street southbound. Likewise, improvements at the Stephens-Winchester convergence would eliminate the existing condition of northbound Winchester traffic attempting to merge with motorist traveling northbound on Stephens Street which causes a high incidence of auto accidents at the location.

One negative impact to traffic flow would be fewer simple options for accessing downtown Roseburg from the north and east. For southbound traffic destined for downtown the Stephens Street to Oak Avenue option would remain unchanged but the route from southbound Winchester Street to Jackson Street would no longer be possible. Since all of the southbound traffic would be on Stephens Street with this alternative, vehicles would need to turn left onto

Diamond Lake Boulevard and then right onto Jackson Street instead of the more direct Winchester Street to Jackson Street connection.

All of the intersections would have overall 2030 forecast v/c ratios near or below the city and OHP standards of 0.85 and those intersections that would be improved as part of Alternative 6(a) would also meet the HDM standard of 0.75. The number of traffic signals along the highway between Madrone Street and Fulton Street would be eight for eastbound travel and seven for westbound travel, an increase over existing but delays at most signals would be shorter than the current system because signal operations would be simplified.

Alternative 6(a) would not create any grade-separated crossing of the CORP tracks; therefore, delays and queues would still occur when trains pass through downtown. However, with the rail yard relocation to the north, this problem should be alleviated because trains should move continuously through downtown and switching activities will no longer impact traffic.

With the creation of the new couplets in Alternative 6(a), new and/or improved bicycle and pedestrian facilities could be added to the system. On Diamond Lake Boulevard east of Winchester Street, few vehicular travel lanes would be required; therefore a bicycle lane could be striped and sidewalks could possibly be widened. On Stephens Street, it might be possible to stripe a bicycle lane along the one-way section of roadway. Odell Avenue would need more improvements than the other roadways in the couplet system and new construction would likely include a bike lane and sidewalks.

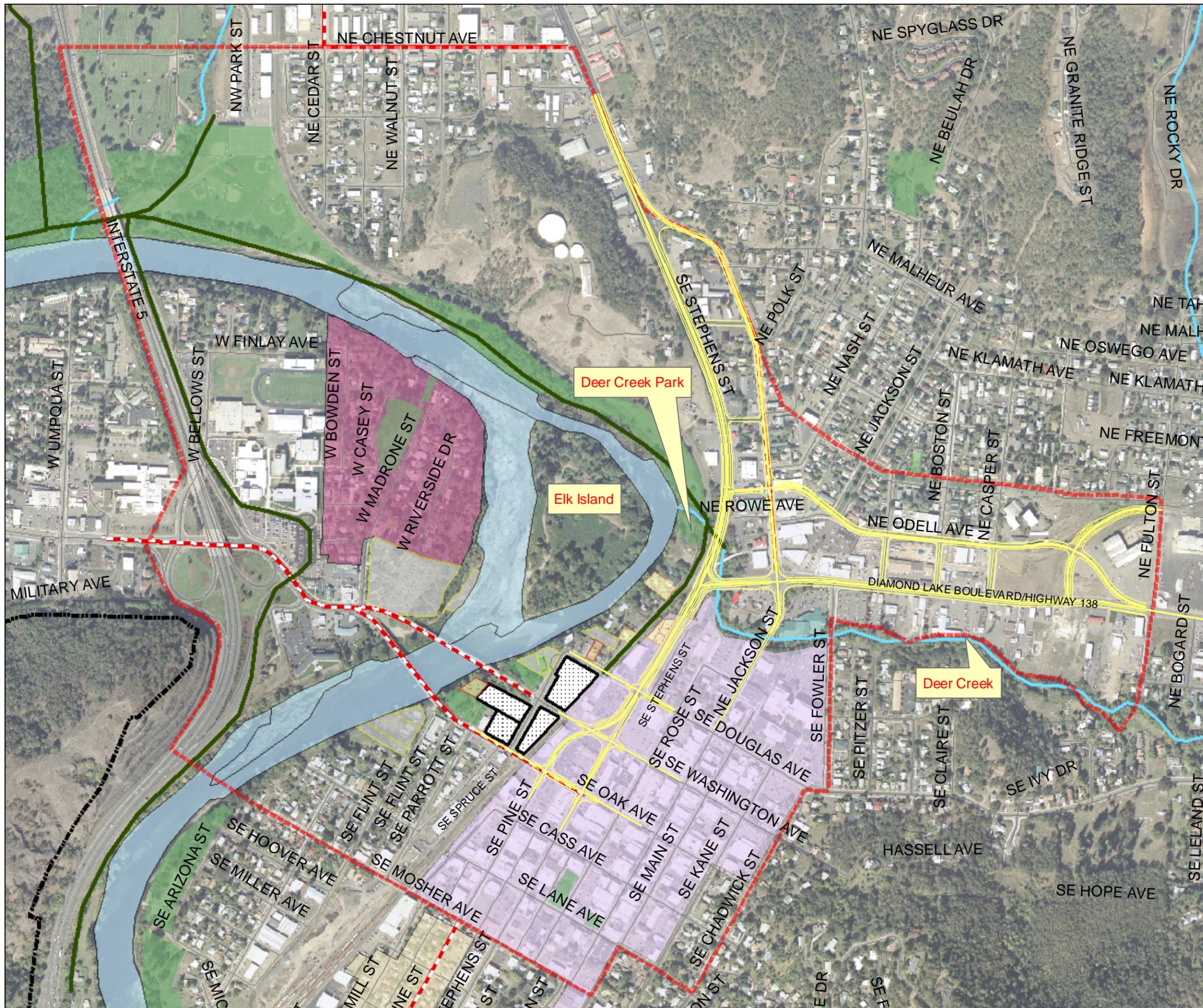
The new couplets would affect transit operations as buses would operate on two parallel roadways instead of a single route. This would require that some transit users walk an additional block to access bus stops on the transit routes.

Environmental and Land Use Assessment

Impacts associated with Design Alternative 6(a) closely parallel those of Alternative 1(a). As Figure 5-22 displays, there are no to minimal impacts to the parks, bike paths or community features. Likewise, impacts to the South Umpqua River are estimated to be minimal. Potential impacts to Deer Creek are the least severe as this is the only design alternative under consideration that would not require widening of existing bridge structures or construction of new bridge facilities. Based on available information, there are no impacts to potential archeology sites and no to minimal impacts to known hazardous materials locations.

Improvements at the Diamond Lake Boulevard/Stephens Street intersection may include reorientation of the intersection to provide wider turning radii. Widening of the turning radii will result in potential disruption to downtown businesses along the designated Highway 138 route. Construction of westbound Odell Avenue will required removal of some existing structures along the alignment. Survey data will further pinpoint the extent of necessary demolition.

Two residences identified in the “Historic and Archeological Resources” section are located south of the Diamond Lake Boulevard/Stephens Street intersections, fronting Stephens along where additional travel lanes are likely to be added. These two residences - 236 SE Stephens Street and 256 SE Stephens Street- are considered potentially eligible for inclusion in the NRHP.



Legend

- Alternative
- Study Area Boundary
- Creeks/Streams
- Roseburg UGB
- Bike Lane
- Multi-Use Path
- Parks

- Downtown Historic District
- Mill-Pine Historic District
- Laurelwood Historic District

- Tribal Properties Held In Trust

Historic Resources Status

- NRHP Listed
- Likely Eligible for NRHP
- Possibly Eligible for NRHP

Sources:
 U.S. Census Bureau, Douglas County
 and City of Roseburg

Figure 5-22
*Alternative 6(a):
 Environmental and
 Land Use Impacts*
 OR 138 Corridor Solutions Study

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It is unlikely that the existing roadway will be widened on the west side of Stephens Street in this area. Therefore, impacts to these to residences will be minimal under Alternative 6(a).

The Alternative 6(a) option is expected to produce minimal impacts to Cow Creek tribal properties held in trust. Visual impacts will be associated primarily with the newly configured Diamond Lake Boulevard – Odell Avenue couplet. The Nash-Commercial-Klamath neighborhoods north of Diamond Lake Boulevard and east of Stephens Street will likely experience a noticeable noise increase associated with traffic.

The Alternative 6(a) option is in keeping with applicable state and local land use plans. It is expected upon completion that economic development stimulus would be produced in the study area over the short term based on the scale and duration of the project and the residual impacts during and after construction. The potential level of long-term economic development stimulus resulting from the improvements is unknown and will need to be assessed in more detail during a future phase of the project.

Alternative 6(b): Diamond Lake Boulevard – Odell Avenue Couplet with Direct Connection

This design alternative, displayed in Figure 5-23, combines the Diamond Lake–Odell/Stephens-Winchester couplet system of Design Alternative 6(a) with the direct at-grade Harvard Avenue to Diamond Lake Boulevard bridge connection of Design Alternative 3(a). The configuration would require vacating the Washington Avenue Bridge as described previously. However, unlike Design Alternative 3(a), combining the bridge connection with the couplet system limits the options for the Oak Avenue Bridge to exclusive single lane two-way traffic.

Lane Configurations and Traffic Flow

With the addition of the direct connection from Harvard to Diamond Lake Boulevard in Alternative 6(b), there would be some minor changes to the couplet improvements outlined for Alternative 6(a) but downtown traffic flow and circulation changes would be similar to those described for Alternative 3(a). The required lane configurations are shown in Figure 5-24.

The only difference between the couplet lane configurations described for Alternative 6(a) and those for 6(b) would occur at the Diamond Lake Boulevard/Stephens Street intersection where the direct connection from Harvard Avenue would tie in. This new approach would make the intersection more complex by adding a third major traffic movement from the bridge which would require an additional green phase in the traffic signal timing. The bridge would only need two receiving lanes in the westbound direction but the eastbound bridge approach would need to widen to four through travel lanes near Stephens Street to accommodate the additional traffic demand and reduced signal capacity. Even with this wide approach, the signal operations would be compromised and the 2030 forecast v/c ratio would be 0.80, which would meet the OHP and city standards but would not meet the HDM standard of 0.75.

Alternative 6(b) would require some modifications in downtown traffic flow with the elimination of the Washington Avenue Bridge. The Oak Avenue Bridge would need to be converted to two-way traffic flow with Alternative 6(b) because the Diamond Lake Boulevard/Stephens Street

intersection would not have adequate capacity to add accommodate a northbound left-turn movement. Therefore, westbound traffic from downtown and points south would use the Oak Avenue Bridge to cross the river.

With two-way travel on the Oak Avenue Bridge, the lane configuration at the Harvard Avenue/Madrone Street intersection would be similar to that shown for Alternative 2(a). Some realignment of the Oak Avenue Bridge footing would be necessary along with possible widening to allow for two or three lanes on Oak Avenue approaching the intersection to reduce queuing along the bridge. Harvard Avenue would have a seven-lane section west of the intersection (compatible with Exit 124 IAMP findings). These improvements would result in a 2030 forecast v/c ratio of 0.68 which would meet both ODOT's HDM standard of 0.75 the OHP standard of 0.85.

As with Alternative 2(a), Oak Avenue would no longer be part of Highway 138 and would need to allow two directions of travel from Stephens Street to Madrone Street. Two-way traffic could be accommodated on Oak Avenue with lane striping changes but no widening of roadways. The resulting 2030 forecast v/c ratios for the Oak Avenue intersections at Pine Street and Stephens Street would meet the City of Roseburg standards of 0.85 and LOS D. The STOP-controlled approaches of Spruce Street would experience some longer delays because of the two-way traffic flow on Oak Avenue but would still meet Roseburg standards.

Redesign in the vicinity of the Stephens-Winchester merge (northern end of the Stephens-Winchester couplet) would incorporate a left turn lane from Winchester Street northbound onto Stephens Street southbound. This would enable a smooth transition for reverse north-to-south traffic movements.

The lane configuration shown in Figure 5-24 for the Douglas Avenue/Stephens Street intersection reflects a reduction in northbound and southbound traffic flow because traffic to/from Diamond Lake Boulevard and points north would no longer need to travel into downtown to cross the river. As a result, one of the southbound through lanes could be converted to a southbound left-turn lane with adequate capacity at the intersection to allow the addition of a left-turn phase as well. The v/c ratio with the 2030 forecast demand and illustrated lane configuration is estimated at 0.47, well below the city and state standards.

In addition to the improvements described above, the Douglas Avenue/Jackson Street intersection, which is currently all-way STOP-controlled, would become signalized to serve the City's Public Safety Center.

Transportation Analysis

Overall, the additional couplets associated with Alternative 6(b) would improve traffic flow along Highway 138 by both shortening the trip and creating more intersections with simple two-phase signal operations and fewer turning movements. The number of traffic signals along the highway between Madrone Street and Fulton Street would be three for eastbound travel and four for westbound travel.

Highway 138 Corridor Solutions Study
Roseburg, Oregon

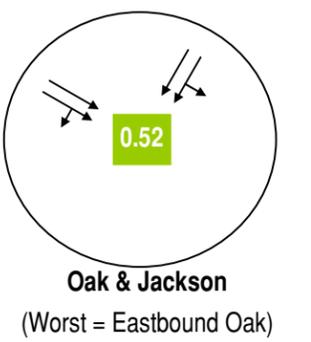
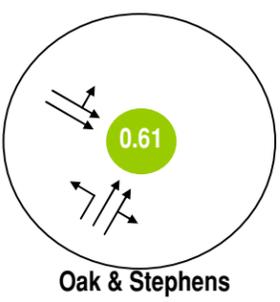
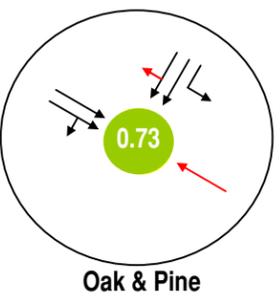
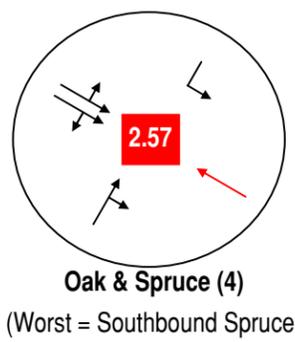
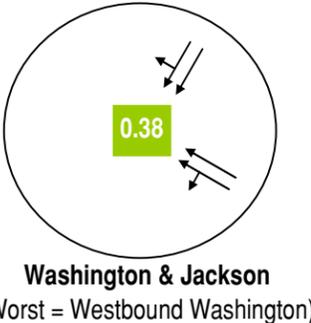
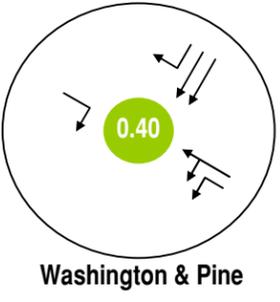
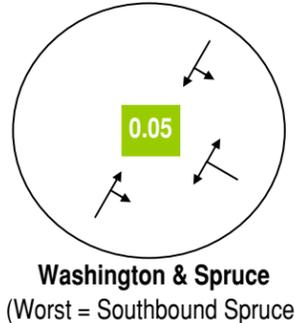
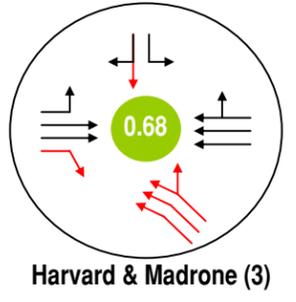
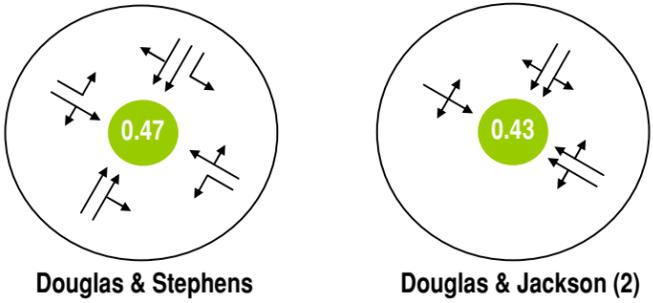
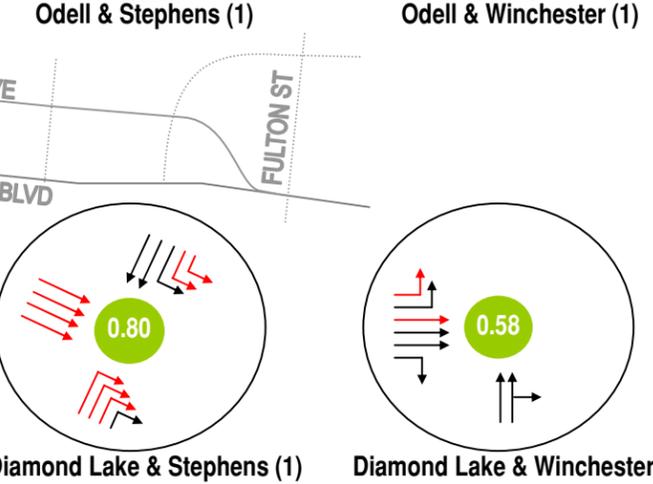
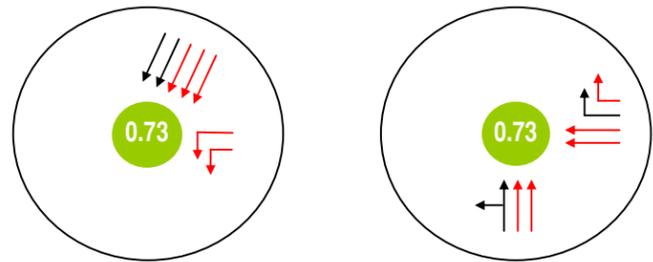
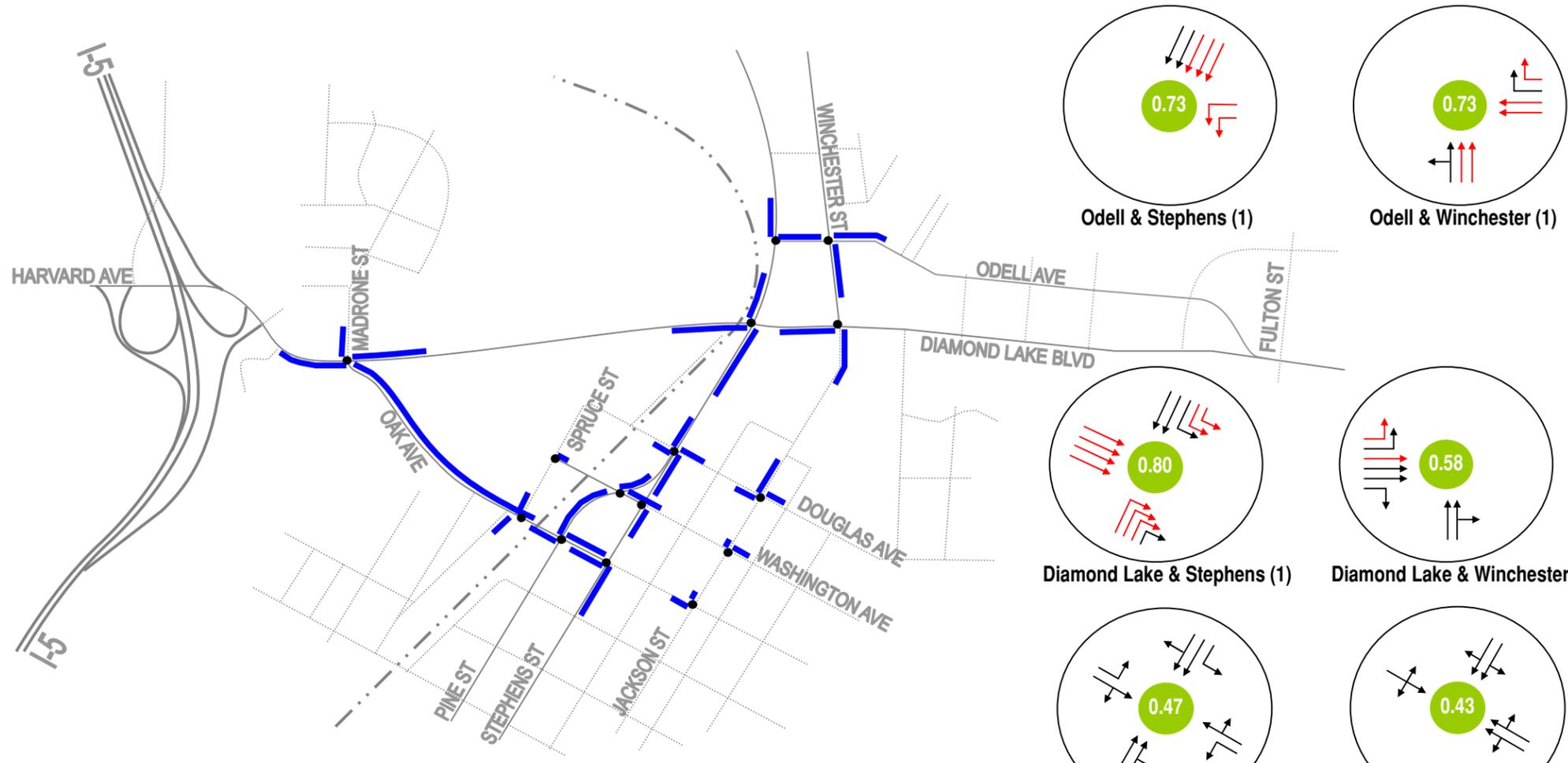
Legend

- Centerline
- Striping
- 6-ft Shoulder
- Railroad



Figure 5-23
*Alternative 6(b):
Diamond Lake Blvd. - Odell Avenue
Couplet with Direct Connection*

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Legend



- Signalized V/C Ratio
- Unsignalized V/C Ratio (Worst Stopped Approach)
- Level of Service A, B, C
- Level of Service D
- Level of Service E
- Level of Service F
- 95th Percentile Queue
- Existing Lane & Permitted Turning Movements
- Additional Lane & Permitted Turning Movements

Notes:

- (1) One-way couplet systems created for Hwy 138 with Diamond Lake (eastbound) and Odell (westbound) and for north-south traffic with Winchester (northbound) and Stephens (southbound).
- (2) Signal installed with Public Safety Center
- (3) A seven-lane section on Harvard is proposed as part of the Exit 24 IAMP.
- (4) High volumes on Oak and Washington indicate that limiting Spruce movements to right turns only may become necessary during the PM peak period.

HDM = Highway Design Manual
 OHP = Oregon Highway Plan
 IAMP = Interchange Area Management Plan

Figure 5-24

Alternatives 6(b) - Traffic Operations Summary and Lane Configuration

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All of the intersections would have overall 2030 forecast v/c ratios near or below the city and OHP standards of 0.85 and all but one intersection would meet the HDM standard of 0.75. With the addition of the direct bridge connection, the 2030 forecast v/c ratio for the Diamond Lake Boulevard/Stephens Street intersection is estimated at 0.80.

While the couplet system would provide many benefits, it would also have some impacts to traffic flow. One impact would be fewer simple options for accessing downtown Roseburg from the north and east as discussed for Alternative 6(a). Alternative 6(b) would also be slightly more circuitous than Alternative 3(a) for westbound traffic accessing the new Harvard Avenue-Diamond Lake Boulevard Bridge. Instead of a traveling directly Stephens Street from Diamond Lake Boulevard to the bridge, traffic would turn left from Odell Avenue to Stephen Street southbound and then right onto the bridge.

The changes associated with the couplets would also bring shifts of traffic from busy arterials to roadways that currently have much lower traffic volumes. In particular, volumes would increase on Odell Avenue and Winchester Street while volumes on Stephens Street and Diamond Lake Boulevard would decrease.

On the other hand, reconfiguring Stephens Street and Winchester Street into a respective southbound and northbound one-way couplet would enhance safety where the two roadways currently converge. Incorporating a one-way street pattern would eliminate motorists making left turn movements off of Stephens Street southbound across oncoming northbound Stephens Street traffic in an effort to access Winchester Street southbound. Likewise, improvements at the Stephens-Winchester convergence would eliminate the existing condition of northbound Winchester traffic attempting to merge with motorist traveling northbound on Stephens Street which causes a high incidence of auto accidents at the location.

Improvements associated with Alternative 6(b) would include a new bridge over the South Umpqua River that would connect from Harvard Avenue to Stephens Street at Diamond Lake Boulevard. The existing Washington Avenue Bridge would be decommissioned and possibly torn down. It is also likely that some improvements at the west end of the Oak Avenue Bridge would also be needed to accommodate two-way travel.

Alternative 6(b) would not create any grade-separated crossing of the CORP tracks; therefore, delays and queues would still occur when trains pass through downtown. With the rail yard relocation to the north, this problem should be alleviated because trains should move continuously through downtown and switching activities will no longer impact traffic.

With the creation of the new couplets in Alternative 6(b), new and/or improved bicycle and pedestrian facilities could be added to the system. On Diamond Lake Boulevard east of Winchester Street, few vehicular travel lanes would be required; therefore a bicycle lane could be striped and sidewalks could possibly be widened. On Stephens Street, it might be possible to stripe a bicycle lane along the one-way section of roadway. Odell Avenue would need more improvements than the other roadways in the couplet system and new construction would likely include a bike lane and sidewalks.

The new couplets would affect transit operations as buses would operate on two parallel roadways instead of a single route. This would require that some transit users walk an additional block to access bus stops on the transit routes. It's possible that some of the steeper grade level cross streets between Diamond Lake Boulevard and Odell Avenue would not meet Americans with Disabilities Act (ADA) standards.

Alternative 6(b) would also allow for a more direct transit route connection from Harvard Avenue to Diamond Lake Boulevard; however, this routing would not necessarily be desirable from a transit standpoint where more stops provide better connectivity and options for riders.

Environmental and Land Use Assessment

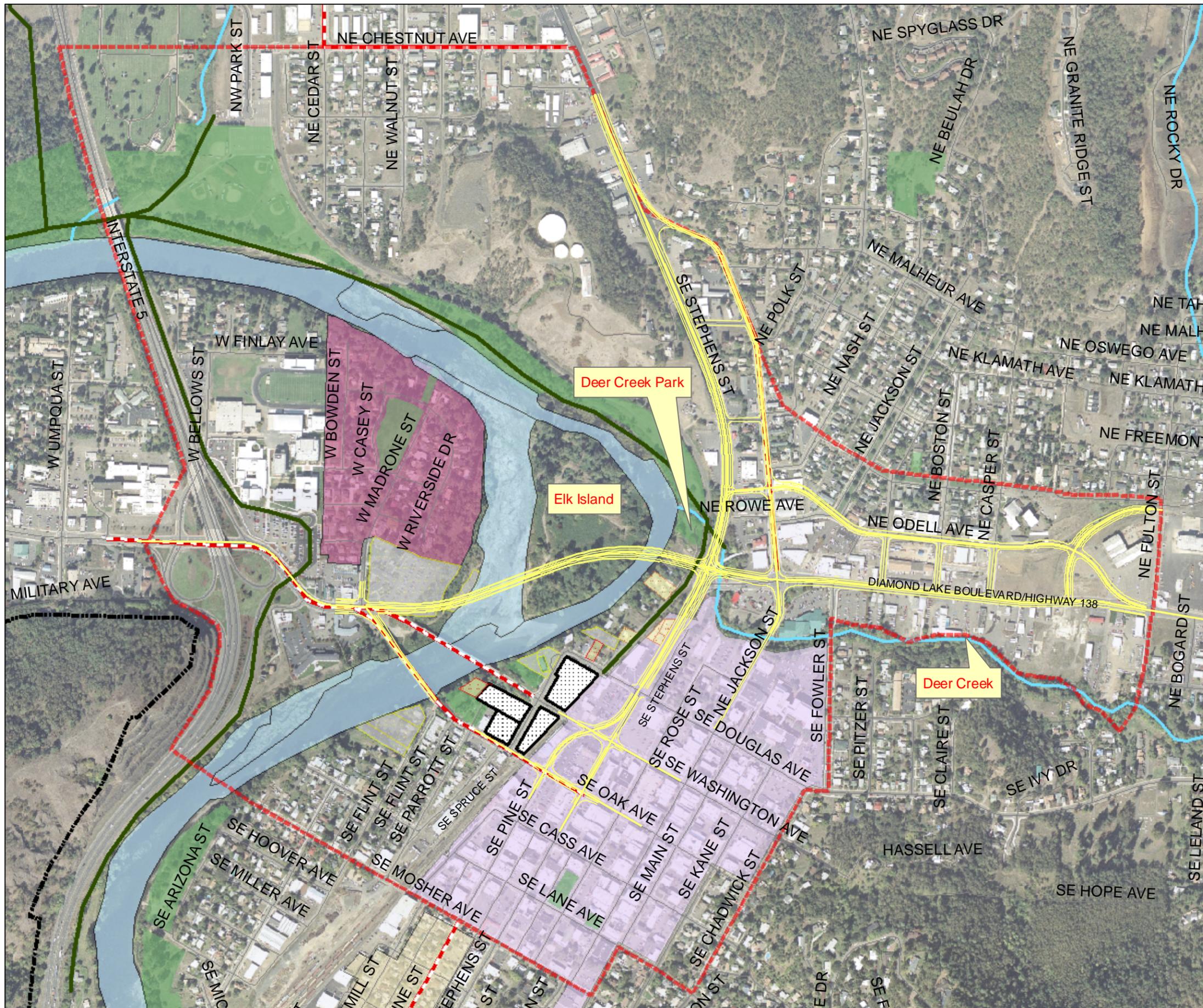
Impacts closely reflect those associated with Design Alternative 3(a). The South Umpqua River and the surrounding area floodways would be expected under design option Alternative 6(a) due to construction of a new and longer span bridge crossing the river diagonally as displayed in Figure 5-25.

The existing Umpqua River bike path (a potential Section 4(f) resource) would be impacted by construction and placement of a new at-grade five-lane roadway connecting Harvard Avenue to Diamond Lake Boulevard. There are no to minimal impacts to area parks under this design alternative. Alternative 6(a) would impact Deer Creek and the surrounding floodplain areas due to the construction of a new bridge over the river embankment and the reconstruction and widening of the Diamond Lake Boulevard Bridge and the Stephens Street Bridge. Additionally, the wetland areas classified palustrine surrounding the South Umpqua River/Deer Creek confluence would be impacted.

This design option would impact properties surrounding the Stephens Street/Diamond Lake Boulevard intersection due to the widening and realignment to the north. There would be impacts to the Douglas County Health Department property due to the new bridge structure which would encroach on the parking area. Construction of westbound Odell Avenue will required demolition of existing structures along the alignment.

It is unlikely that the existing roadway will be widened on the west side of Stephens south of the Stephens/Diamond Lake Boulevard intersection; therefore, impacts to the two potentially eligible NRHP residences located in this area will be minimal. There would be minimal impact to the Cow Creek tribal properties held in trust, unless the Oak Avenue Bridge would require widening.

Design Alternative 6(a) would produce a visual impact to the area due to the construction of a new bridge spanning across Elk Island and the Diamond Lake Boulevard–Odell Avenue couplet. The new bridge would move traffic noise further north and potentially produce noise impacts to the Laurelwood neighborhood. Likewise, the Nash-Commercial-Klamath neighborhoods north of Diamond Lake Boulevard and east of Stephens Street will likely experience a noticeable noise increase associated with traffic from the new east-west couplet.



Legend

- Alternative
- Study Area Boundary
- Creeks/Streams
- Roseburg UGB
- Bike Lane
- Multi-Use Path
- Parks
- Downtown Historic District
- Mill-Pine Historic District
- Laurelwood Historic District
- Tribal Properties Held In Trust

Historic Resources Status

- NRHP Listed
- Likely Eligible for NRHP
- Possibly Eligible for NRHP

500 250 0 500 Feet

Sources:
 U.S. Census Bureau, Douglas County
 and City of Roseburg

Figure 5-25
*Alternative 6(b):
 Environmental and
 Land Use Impacts*
 OR 138 Corridor Solutions Study

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Since the option is not currently proposed in Roseburg’s Comprehensive Plan, the TSP would need to be amended to incorporate the Alternative 6(b) improvements into the Comprehensive Plan. Otherwise, a state land use goal exception would be required on account of Goal 5 resource impacts. It is expected upon completion that economic development stimulus would be produced in the study area over the short term based on the scale and duration of the project and the residual impacts during and after construction. The potential level of long-term economic development stimulus resulting from the improvements is unknown and will need to be assessed in more detail during a future phase of the project.

Cost Opinions

Conceptual cost estimates for each of the eight build alternatives demonstrate Alternative 1(a) to be the least costly and 3(d) the most expensive options under consideration (see Table 5-1). The cost estimates were calculated based on itemization of mobilization and traffic control; roadwork, drainage and sewers; bridge costs; bases; wearing surfacing; permanent traffic control and guidance devices; and right of way and development control. The cost estimates displayed in Table 5-1 are based on 2007 dollars and thus, are not adjusted for inflation.

Table 5-1. Build Alternative Cost Estimates

Build Alternative	Cost Estimate (2007 dollars)
1(a) Existing Alignment Improvements	\$9 Million
2(a) Harvard-Washington-Stephens-Diamond Lake Alignment	\$20 Million
2(c) Harvard-Washington-Rose-Diamond Lake Alignment	\$21 Million
3(a) Harvard-Diamond Lake Bridge Connection (RR at-grade)	\$74 Million
3(d) Harvard-Diamond Lake Bridge Connection (RR above-grade)	\$350 Million
4(a) Northern Alignment Flyover (RR below-grade)	\$95 Million
6(a) Diamond Lake Boulevard – Odell Avenue Couplet	\$14 Million
6(b) Couplet with Direct Connection	\$82 Million

Evaluation Matrix

An evaluation matrix was developed from the analysis to compare the six alternatives. Criteria used in the matrix were developed from the project goals and objectives. A description of each criterion is presented below with the evaluation matrices for alternatives recommended and not recommended for further consideration presented as Exhibit 5-1 and Exhibit 5-2, respectively.

An evaluation matrix was developed from the analysis to compare the six alternatives. Criteria used in the matrix were developed from the project goals and objectives. A description of each criterion is presented below with the evaluation matrix itself presented as An evaluation matrix was developed from the analysis to compare the six alternatives. Criteria used in the matrix were developed from the project goals and objectives. A description of each criterion is presented below.

Transportation

The transportation evaluation addressed traffic operations, traffic flow, and the impacts to other modes of travel. Future year 2030 traffic operations were assessed using design hourly traffic volumes. Criteria used to evaluate transportation impacts are:

- **Mobility Standards:** Does the alternative meet State and City mobility standards with respect to v/c ratio and LOS for 2030 traffic demands through the study area?
- **Signalized Intersections:** How many signalized intersections would the alternative require and at what complexity?
- **Traffic Flow:** To what extent would the alternative change the existing roadway alignment? What new facilities would be required and what would need to be closed?
- **Bridges:** Would the alternative incorporate a new bridge structure or utilize existing facilities?
- **Queuing:** Would the alternative reduce overall queue lengths and delay at the primary intersections throughout the study area? What are the specific locations of projected queuing problems for each alternative?
- **Grade Separation between OR 138 and Railroad:** Will the alternative provide a grade-separated crossing of the railroad?
- **Bicycle and Pedestrian Facilities:** Does the alternative provide bicycle and pedestrian facilities that would meet ODOT and local standards?
- **Transit Facilities:** Does the alternative maintain or enhance existing and planned public transit transportation services? Does the alternative provide for bus ingress and egress and accommodate for pedestrians?

Environmental and Land Use

Potential environmental and land use impacts were assessed based on mapping and previous data collected throughout the study area (see Section 2 of the report) and basic roadway geometrics and right-of-way needs. Criteria used to evaluate traffic operations are:

- **Goal 5 Resources:** To what extent are identified natural resources, historic areas, and open spaces impacted by the alternative?
- **FEMA Floodplain:** To what extent are Zone AE Floodway Areas and Zone X Flood Areas impacted by the alternative?
- **Natural Heritage Database/Threatened & Endangered (T&E) Listed Species:** No T&E listed species are documented in the project area. Therefore, the criteria will be not applicable.
- **Historic Resources:** To what extent are historic resources impacted by the alternative? What are the specific sites impacted?

Exhibit 5-1: ALTERNATIVES EVALUATION MATRIX

Evaluation Criteria	Alternatives Forwarded		
	3(a) Harvard-Diamond Lake Alignment (Railroad At Grade)	6(a) Diamond Lake – Odell Couplet	6(b) Diamond Lake – Odell Couplet with Direct Connection
Transportation			
Mobility Standards	<ul style="list-style-type: none"> All signalized intersections would meet Oregon Highway Plan and city mobility standards One signalized intersection with capacity improvements would not meet the Highway Design Manual mobility standards 	<ul style="list-style-type: none"> All signalized intersections would meet Highway Design Manual, Oregon Highway Plan, and city mobility standards 	<ul style="list-style-type: none"> All signalized intersections would meet Oregon Highway Plan and city mobility standards One signalized intersection with capacity improvements would not meet the Highway Design Manual mobility standards
Signalized Intersections	<ul style="list-style-type: none"> Three signals in both directions along OR 138 between Madrone and Fulton New signal at Douglas & Jackson 	<ul style="list-style-type: none"> Eight eastbound and seven westbound signals along OR 138 between Madrone and Fulton New signals at Odell & Stephens, Odell & Winchester, and Douglas & Jackson Signal phasing changes at Diamond Lake & Stephens and Diamond Lake & Winchester 	<ul style="list-style-type: none"> Three eastbound and four westbound signals along OR 138 between Madrone and Fulton New signals at Odell & Stephens, Odell & Winchester, and Douglas & Jackson Signal phasing changes at Diamond Lake & Stephens and Diamond Lake & Winchester
Traffic Flow	<ul style="list-style-type: none"> New direct connection from Harvard Ave to Diamond Lake Blvd Washington Avenue would be closed at Spruce St 	<ul style="list-style-type: none"> Stephens St would be one-way southbound from Winchester St to Diamond Lake Blvd Winchester St would be one-way northbound from Diamond Lake Blvd to Stephens St Diamond Lake Blvd would be one-way eastbound from Stephens St to new Odell Ave connection Odell Ave would be one-way westbound from Diamond Lake Blvd connection to Stephens St Downtown accessibility via Jackson St more limited 	<ul style="list-style-type: none"> New direct connection from Harvard Ave to Diamond Lake Blvd Stephens St would be one-way southbound from Winchester St to Diamond Lake Blvd Winchester St would be one-way northbound from Diamond Lake Blvd to Stephens St Diamond Lake Blvd would be one-way eastbound from Stephens St to new Odell Ave connection Odell Ave would be one-way westbound from Diamond Lake Blvd connection to Stephens St Downtown accessibility via Jackson St more limited
Bridges	<ul style="list-style-type: none"> New bridge would serve traffic to/from north and Diamond Lake Blvd with added demand from south if Oak Ave bridge is one-way Oak Ave bridge could be one-way or two-way and mostly serve downtown and to/from south Washington Ave bridge would be closed Stephens and Diamond Lake bridges over Deer Creek would be widened 	<ul style="list-style-type: none"> Existing Oak and Washington Ave bridges would continue to serve as OR 138 	<ul style="list-style-type: none"> New bridge would serve traffic to/from north and Diamond Lake Blvd Oak Ave bridge would become two-way and mostly serve downtown and to/from south Washington Avenue bridge would be closed
Queuing	<ul style="list-style-type: none"> Moderate queuing at Stephens/ Diamond Lake intersection Westbound traffic along Oak Ave bridge would queue across river to Spruce with two-way travel Long queues on Diamond Lake at Winchester intersection without additional lane improvements 	<ul style="list-style-type: none"> Two-way couplet and additional travel lanes at existing intersections would generally reduce queues 	<ul style="list-style-type: none"> Moderate queuing at Stephens/ Diamond Lake intersection with addition of new bridge Westbound traffic along Oak Ave bridge would queue across river to Spruce
Grade Separation between OR 138 and Railroad	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None
Bicycle and Pedestrian Facilities	<ul style="list-style-type: none"> New facilities added with bridge directly to Diamond Lake Blvd Large intersections could disrupt bike/ped traffic flow (may explore below grade crossing) 	<ul style="list-style-type: none"> Bikes and enhanced sidewalks added on Diamond Lake Blvd east of Winchester and on Odell Avenue 	<ul style="list-style-type: none"> New facilities added with bridge directly to Diamond Lake Blvd Bikes and enhanced sidewalks added on Diamond Lake Blvd east of Winchester and on Odell Ave
Transit Facilities	<ul style="list-style-type: none"> More direct route to Diamond Lake Blvd available, although not necessarily desirable from a transit standpoint (more stops to pick up riders) 	<ul style="list-style-type: none"> Existing routes would be split over couplets Some bus pullouts could be added Potentially longer distances to some bus stops 	<ul style="list-style-type: none"> Existing routes would be split over couplets More direct route to Diamond Lake Blvd available although not necessarily desirable Some bus pullouts could be added Potentially longer distances to some bus stops
Environmental and Land Use			
Goal 5 Resources Natural Resources, Scenic and Historic Areas, and Open Spaces	<ul style="list-style-type: none"> Significant impact to the South Umpqua River due to construction of new and longer span bridge crossing the river diagonally. Significant impact to Deer Creek due to reconstruction and widening of DLB and Stephens Bridges. 	<ul style="list-style-type: none"> No to minimal impact to the South Umpqua River (no bridge construction or reconstruction) Moderate to significant impact to Deer Creek depending upon the extent of improvements at the Stephens/DLB intersection 	<ul style="list-style-type: none"> Significant impact to the South Umpqua River due to construction of new and longer span bridge crossing the river diagonally. Significant impact to Deer Creek due to reconstruction and widening of DLB and Stephens Bridges.

Exhibit 5-1: ALTERNATIVES EVALUATION MATRIX

Evaluation Criteria	Alternatives Forwarded		
	3(a) Harvard-Diamond Lake Alignment (Railroad At Grade)	6(a) Diamond Lake – Odell Couplet	6(b) Diamond Lake – Odell Couplet with Direct Connection
FEMA Floodplain	<ul style="list-style-type: none"> • Significant impact to the floodway areas due to construction of new and longer span bridge crossing the river basin diagonally • Significant impact to floodplain areas due new bridge construction over river embankment and reconstruction and widening of DLB and Stephens Bridges over Deer Creek 	<ul style="list-style-type: none"> • No to minimal impact to Zone AE floodway areas (South Umpqua River/Deer Creek) • Moderate impact to Zone X 100-year floodplain areas depending upon the extent of improvements at the Stephens/DLB intersection 	<ul style="list-style-type: none"> • Significant impact to the floodway areas due to construction of new and longer span bridge crossing the river basin diagonally • Significant impact to floodplain areas due new bridge construction over river embankment and reconstruction and widening of DLB and Stephens Bridges over Deer Creek
Natural Heritage Database/ Threatened & Endangered (T&E) Listed Species	<ul style="list-style-type: none"> • No T&E listed species documented in the project area. 	<ul style="list-style-type: none"> • No T&E listed species documented in the project area. 	<ul style="list-style-type: none"> • No T&E listed species documented in the project area.
Historic Resources	<ul style="list-style-type: none"> • Potential impact to one site (236 SE Stephens St.) categorized as Eligible for NRHP list • Indirect impacts from increased noise to Laurelwood historic district • Significant impacts at Douglas County Health Department due to new bridge structure encroaching on parking area 	<ul style="list-style-type: none"> • Potential impact to one site (236 SE Stephens St.) categorized as Eligible for NRHP list • Some roadway widening in downtown historic district 	<ul style="list-style-type: none"> • Potential impact to one site (236 SE Stephens St.) categorized as Eligible for NRHP list • Indirect impacts from increased noise to Laurelwood historic district • Significant impacts at Douglas County Health Department due to new bridge structure encroaching on parking area
Potential Archeology Sites	<ul style="list-style-type: none"> • No impact based on available information 	<ul style="list-style-type: none"> • No impact based on available information 	<ul style="list-style-type: none"> • No impact based on available information
Known Hazardous Materials Locations	<ul style="list-style-type: none"> • No to minimal impact based on available information 	<ul style="list-style-type: none"> • No to minimal impact based on available information 	<ul style="list-style-type: none"> • No to minimal impact based on available information
Potential Wetlands/ Riparian Corridor and Jurisdictional Area of South Umpqua River and Deer Creek	<ul style="list-style-type: none"> • See impacts under Goal 5 Resources category. Additionally, palustrine areas surrounding the South Umpqua River/Deer Creek confluence significantly impacted. 	<ul style="list-style-type: none"> • See impacts under Goal 5 Resources category 	<ul style="list-style-type: none"> • See impacts under Goal 5 Resources category. Additionally, palustrine areas surrounding the South Umpqua River/Deer Creek confluence significantly impacted.
Parks and Recreation, Section 4(f) and 6(f) Resources	<ul style="list-style-type: none"> • See impacts under Historic Resources category • Existing South Umpqua River bike path impacted by construction and placement of new at-grade five lane roadway connecting Harvard Avenue to DLB • No to minimal impact to parks 	<ul style="list-style-type: none"> • See impacts under Historic Resources category • No to minimal impact to parks or bike paths 	<ul style="list-style-type: none"> • See impacts under Historic Resources category • Existing South Umpqua River bike path impacted by construction and placement of new at-grade five lane roadway connecting Harvard Avenue to DLB • No to minimal impact to parks
Community Features	<ul style="list-style-type: none"> • Significant impacts at Douglas County Health Department due to new bridge structure encroaching on parking area 	<ul style="list-style-type: none"> • No to minimal impact to community features 	<ul style="list-style-type: none"> • Significant impacts at Douglas County Health Department due to new bridge structure encroaching on parking area
Socioeconomic and Environmental Justice	<ul style="list-style-type: none"> • Minimal impact to tribal properties held in trust (unless the Oak Avenue Bridge requires widening) 	<ul style="list-style-type: none"> • Minimal impacts expected to Cow Creek tribal properties held in trust. 	<ul style="list-style-type: none"> • Minimal impact to tribal properties held in trust (unless the Oak Avenue Bridge requires widening)
Air Quality	<ul style="list-style-type: none"> • No conflict anticipated 	<ul style="list-style-type: none"> • No conflict anticipated 	<ul style="list-style-type: none"> • No conflict anticipated
Existing Land Uses	<ul style="list-style-type: none"> • See Community Features, Historic Resources and Parks and Recreation • Properties around Stephens/Diamond Lake intersection would be impacted by widening and realignment to north • Significant short term economic development stimulus • Significant potential long term economic development stimulus 	<ul style="list-style-type: none"> • Potential disruption to downtown businesses if downtown turning radii are widened along the designated Hwy 138 route • Demolition of properties in the Odell alignment • Disruption expected in vicinity of DLB and Stephens • Significant short term economic development stimulus • Moderate potential long term economic development stimulus 	<ul style="list-style-type: none"> • See Community Features, Historic Resources and Parks and Recreation • Demolition of properties in the Odell alignment • Properties around Stephens/Diamond Lake intersection would be impacted by widening and realignment to north • Significant short term economic development stimulus • Significant potential long term economic development stimulus
Applicable Land Use Plans, Policies, Studies and Reports	<ul style="list-style-type: none"> • Alternative is listed in the Roseburg Comprehensive Plan (TSP) 	<ul style="list-style-type: none"> • In keeping with applicable plans 	<ul style="list-style-type: none"> • Alternative is listed in the Roseburg Comprehensive Plan (TSP)
Land Use Goal Exceptions	<ul style="list-style-type: none"> • No goal exception required provided Comprehensive Plan (TSP) is amended to include project 	<ul style="list-style-type: none"> • No goal exception required provided Comprehensive Plan (TSP) is amended to include project 	<ul style="list-style-type: none"> • No goal exception required provided Comprehensive Plan (TSP) is amended to include project
Visual Resources	<ul style="list-style-type: none"> • Visual impact of new bridge spanning across Elk Island. 	<ul style="list-style-type: none"> • Visual impact to Diamond Lake Boulevard and Odell Avenue 	<ul style="list-style-type: none"> • Visual impact of new bridge spanning across Elk Island. • Visual impact to Diamond Lake Boulevard and Odell Avenue
Noise Impacts	<ul style="list-style-type: none"> • New bridge directly to Diamond Lake Blvd will move traffic noise further north and closer to the Laurelwood neighborhood 	<ul style="list-style-type: none"> • Residences north of Diamond Lake Boulevard and east of Stephen Street will be impacted 	<ul style="list-style-type: none"> • New bridge directly to Diamond Lake Blvd will move traffic noise further north and closer to the Laurelwood neighborhood • Residences north of Diamond Lake Boulevard and east of Stephen Street will be impacted
Cost Opinions (2007 Dollars)			
	• \$74 million	• \$14 million	• \$82 million

Exhibit 5-2: ALTERNATIVES EVALUATION MATRIX

Evaluation Criteria	Alternatives Not Forwarded				
	1(a) Existing Alignment Improvements	2(a) Harvard-Washington-Stephens-Diamond Lake Alignment	2(c) Harvard-Washington-Rose-Diamond Lake Alignment	3(d) Harvard-Diamond Lake Align. (Railroad Above Grade)	4(a) Northern Alignment Flyover (Railroad Below Grade)
Transportation					
Mobility Standards	<ul style="list-style-type: none"> All signalized intersections would meet Oregon Highway Plan and city mobility standards Two signalized intersections with capacity improvements would not meet the Highway Design Manual mobility standards 	<ul style="list-style-type: none"> All signalized intersections would meet Oregon Highway Plan and city mobility standards One signalized intersection with capacity improvements would not meet the Highway Design Manual mobility standards 	<ul style="list-style-type: none"> All signalized intersections would meet Oregon Highway Plan and city mobility standards One signalized intersection with capacity improvements would not meet the Highway Design Manual mobility standards Three unsignalized intersections would have movements that fail (only one would fail if Oak Avenue Bridge is two-way) 	<ul style="list-style-type: none"> All signalized intersections would meet Oregon Highway Plan and city mobility standards One signalized intersection with capacity improvements would not meet the Highway Design Manual mobility standards 	<ul style="list-style-type: none"> Two signalized intersections would not meet state and city mobility standards
Signalized Intersections	<ul style="list-style-type: none"> Seven eastbound and five westbound signals along OR 138 between Madrone and Fulton No changes in signal phasing required New signal at Douglas & Jackson 	<ul style="list-style-type: none"> Five signals for both directions along OR 138 between Madrone and Fulton Changes in traffic flow would require more complex signal phasing downtown New signal at Douglas & Jackson 	<ul style="list-style-type: none"> Six signals for both directions along OR 138 between Madrone and Fulton Changes in traffic flow would require more complex signal phasing downtown New signal at Douglas & Jackson 	<ul style="list-style-type: none"> Three signals in both directions along OR 138 between Madrone and Fulton New signal at Douglas & Jackson 	<ul style="list-style-type: none"> Two signals in both directions along OR 138 between Madrone and Fulton New signal at Douglas & Jackson
Traffic Flow	<ul style="list-style-type: none"> Traffic patterns would remain the same as existing 	<ul style="list-style-type: none"> Southbound traffic flow on Stephens/Pine would require left-turn at Washington/Pine intersection Washington Ave would not continue through at Pine St 	<ul style="list-style-type: none"> North-south traffic flow would be split over Stephens and Rose St Washington Ave would not continue through at Stephens St New connection between Stephens and Rose needed for southbound traffic destined for Diamond Lake Blvd 	<ul style="list-style-type: none"> New direct connection from Harvard Ave to Diamond Lake Blvd Washington Avenue would be closed at Spruce St 	<ul style="list-style-type: none"> New direct connection from Harvard Ave to Diamond Lake Blvd but no direct connection to Stephens Winchester closed at new bridge with no through movement Washington Avenue would be closed at Spruce St
Bridges	<ul style="list-style-type: none"> Existing Oak and Washington Ave bridges would continue to serve as OR 138 Stephens and Diamond Lake bridges over Deer Creek would be widened 	<ul style="list-style-type: none"> Oak Ave bridge would serve most of downtown and traffic to/from south Washington Ave bridge widened to four lanes and would serve traffic to/from north and Diamond Lake Blvd Stephens and Diamond Lake bridges over Deer Creek would need to be either widened or replaced 	<ul style="list-style-type: none"> Oak Ave bridge could be one-way or two-way and mostly serve downtown and to/from south Washington Ave bridge widened to four lanes and would serve traffic to/from north and Diamond Lake Blvd with added traffic demand from south if Oak Ave bridge remains one-way New bridge over Deer Creek aligned with Rose Street 	<ul style="list-style-type: none"> New bridge would serve traffic to/from north and Diamond Lake Blvd with added demand from south if Oak Ave bridge is one-way Oak Ave bridge could be one-way or two-way and mostly serve downtown and to/from south Washington Ave bridge would be closed Stephens and Diamond Lake bridges over Deer Creek would be widened 	<ul style="list-style-type: none"> New bridge would serve some traffic to/from Diamond Lake Blvd and potentially some traffic to/from north Oak Ave bridge would be widened to four lanes and would serve most traffic except to/from Diamond Lake Washington Ave bridge would be closed Stephens bridges over Deer Creek would be widened
Queuing	<ul style="list-style-type: none"> Additional travel lanes at existing intersections would generally reduce queues 	<ul style="list-style-type: none"> Westbound traffic along Oak Ave bridge would queue across river Long queues would develop on Diamond Lake at Winchester intersection without additional lane improvements 	<ul style="list-style-type: none"> Westbound traffic along Oak Ave bridge would queue across river to Spruce with two-way travel Many downtown blocks require widening to accommodate two-way travel and queues would be present from one intersection to the next 	<ul style="list-style-type: none"> Moderate queuing at Stephens/Diamond Lake intersection Westbound traffic along Oak Ave bridge would queue across river to Spruce with two-way travel Long queues on Diamond Lake at Winchester intersection without additional lane improvements 	<ul style="list-style-type: none"> Westbound traffic along Oak Ave bridge would queue across river to Spruce
Grade Separation between OR 138 and Railroad	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Four crossings: Oak Avenue, Washington Avenue, Douglas Avenue, Diamond Lake Boulevard 	<ul style="list-style-type: none"> One crossing: Diamond Lake Boulevard

Exhibit 5-2: ALTERNATIVES EVALUATION MATRIX

Evaluation Criteria	Alternatives Not Forwarded				
	1(a) Existing Alignment Improvements	2(a) Harvard-Washington-Stephens-Diamond Lake Alignment	2(c) Harvard-Washington-Rose-Diamond Lake Alignment	3(d) Harvard-Diamond Lake Align. (Railroad Above Grade)	4(a) Northern Alignment Flyover (Railroad Below Grade)
Bicycle and Pedestrian Facilities	<ul style="list-style-type: none"> Some facilities may be added with improvements to Stephens/ Diamond Lake intersection 	<ul style="list-style-type: none"> Some facilities may be added with roadway improvements Bike lanes may be extended across Washington Ave bridge with widening or addition of second structure Complex and wide intersections would make bike/ped travel more difficult 	<ul style="list-style-type: none"> Some facilities may be added with roadway improvements Bike lanes may be extended across Washington Ave bridge with widening or addition of second structure Complex and wide intersections would make bike/ped travel more difficult 	<ul style="list-style-type: none"> Railroad viaduct may disrupt pedestrian crossing except at grade-separated crossings Large intersections could disrupt bike/ped traffic flow (may explore below grade crossing) Disruption along Mosher Avenue due to elevated at-grade crossing New facilities added with bridge directly to Diamond Lake Blvd 	<ul style="list-style-type: none"> New facilities added with new bridge Closure of Winchester St to accommodate new bridge would also interrupt pedestrian and bicycle travel
Transit Facilities	<ul style="list-style-type: none"> No disruption to existing transit routes Some bus pullouts could be added where roadway widening would occur 	<ul style="list-style-type: none"> Changes in downtown circulation could affect existing transit routes Some bus pullouts could be added where roadway widening would occur 	<ul style="list-style-type: none"> Changes in downtown circulation would affect existing transit routes Some bus pullouts could be added where roadway widening would occur 	<ul style="list-style-type: none"> More direct route to Diamond Lake Blvd possible available, although not necessarily desirable from a transit standpoint (more stops to pick up riders) 	<ul style="list-style-type: none"> More direct route to Diamond Lake Blvd possible
Environmental and Land Use					
Goal 5 Resources <ul style="list-style-type: none"> Natural Resources, Scenic and Historic Areas, and Open Spaces 	<ul style="list-style-type: none"> No to minimal impact to the South Umpqua River (no bridge construction or reconstruction) Moderate to significant impact to Deer Creek depending upon the extent of improvements at the Stephens/DLB intersection 	<ul style="list-style-type: none"> Moderate impact to the South Umpqua River due to widening and reconstruction of the Washington Avenue Bridge Moderate to significant impact to Deer Creek depending upon the extent of improvements at the Stephens/DLB intersection 	<ul style="list-style-type: none"> Moderate impact to the South Umpqua River due to widening and reconstruction of the Washington Avenue Bridge Significant impact to Deer Creek due to construction of new bridge aligned with Rose Street and bridge reconstruction on DLB 	<ul style="list-style-type: none"> Significant impact to the South Umpqua River due to construction of new and longer span bridge crossing the river diagonally Significant impact to Deer Creek due to reconstruction and widening of DLB and Stephens Bridges Railroad viaduct crossing Deer Creek 	<ul style="list-style-type: none"> Significant impact to the South Umpqua River due to construction of new and longer span bridge crossing the river diagonally Significant impact to Deer Creek due to new bridge crossing over vicinity where the creek empties into the South Umpqua River
FEMA Floodplain	<ul style="list-style-type: none"> No to minimal impact to Zone AE floodway areas (South Umpqua River/Deer Creek) Moderate impact to Zone X 100-year floodplain areas depending upon the extent of improvements at the Stephens/DLB intersection 	<ul style="list-style-type: none"> Moderate impact to floodway areas due to widening and reconstruction of the Washington Avenue Bridge Moderate impact to floodplain areas depending upon the extent of improvements at the Stephens/DLB intersection 	<ul style="list-style-type: none"> Moderate impact to floodway areas due to widening and reconstruction of the Washington Avenue Bridge Significant impact to floodplain areas due to construction of new bridge aligned with Rose Street and bridge reconstruction on DLB 	<ul style="list-style-type: none"> Significant impact to the floodway areas due to construction of new and longer span bridge crossing the river basin diagonally Significant impact to floodplain areas due to new bridge construction over river embankment and reconstruction and widening of DLB and Stephens Bridges over Deer Creek Railroad viaduct impacts to Deer Creek floodway and floodplain 	<ul style="list-style-type: none"> Significant impact to the floodway areas due to construction of new and longer span bridge crossing the river basin diagonally Significant impact to floodplain area due to new bridge crossing over vicinity where the creek empties into the South Umpqua River
Natural Heritage Database/ Threatened & Endangered (T&E) Listed Species	<ul style="list-style-type: none"> No T&E listed species documented in the project area. 	<ul style="list-style-type: none"> No T&E listed species documented in the project area. 	<ul style="list-style-type: none"> No T&E listed species documented in the project area. 	<ul style="list-style-type: none"> No T&E listed species documented in the project area. 	<ul style="list-style-type: none"> No T&E listed species documented in the project area.

Exhibit 5-2: ALTERNATIVES EVALUATION MATRIX

Evaluation Criteria	Alternatives Not Forwarded				
	1(a) Existing Alignment Improvements	2(a) Harvard-Washington-Stephens-Diamond Lake Alignment	2(c) Harvard-Washington-Rose-Diamond Lake Alignment	3(d) Harvard-Diamond Lake Align. (Railroad Above Grade)	4(a) Northern Alignment Flyover (Railroad Below Grade)
Historic Resources	<ul style="list-style-type: none"> • Potential impact to one site (236 SE Stephens St.) categorized as Eligible for NRHP list • Some roadway widening in downtown historic district 	<ul style="list-style-type: none"> • Potential impact to one site (236 SE Stephens St.) categorized as Eligible for NRHP list • Some roadway widening in downtown historic district • Construction phase impacts expected at Douglas County Health Department. 	<ul style="list-style-type: none"> • Some roadway widening and new roadway construction in downtown historic district • Construction phase impacts expected at Douglas County Health Department 	<ul style="list-style-type: none"> • Potential impact to one site (236 SE Stephens St.) categorized as Eligible for NRHP list • Significant impacts at Douglas County Health Department due to new bridge structure encroaching on parking area • Significant impact to Downtown and Mill-Pine Historic Districts due to elevated RR facility • Significant impact to bike path leading to historic and potential historic homes adjacent to the railroad line • Impact to restored railroad station from elevated tracks • Indirect impacts from increased noise to Laurelwood historic district 	<ul style="list-style-type: none"> • Potential impact to one site (236 SE Stephens St.) categorized as Eligible for NRHP list • Significant impacts at Douglas County Health Department due to new bridge structure encroaching on parking area • Indirect impacts from increased noise to Laurelwood historic district
Potential Archeology Sites	• No impact based on available information	• No impact based on available information	• No impact based on available information	• No impact based on available information	• No impact based on available information
Known Hazardous Materials Locations	• No to minimal impact based on available information	• No to minimal impact based on available information	• No to minimal impact based on available information	• No to minimal impact based on available information	• No to minimal impact based on available information
Potential Wetlands/ Riparian Corridor and Jurisdictional Area of South Umpqua River and Deer Creek	• See impacts under Goal 5 Resources category	• See impacts under Goal 5 Resources category	• See impacts under Goal 5 Resources category.	• See impacts under Goal 5 Resources category. Additionally, palustrine areas surrounding the South Umpqua River/Deer Creek confluence significantly impacted.	• See impacts under Goal 5 Resources category. Additionally, palustrine areas surrounding the South Umpqua River/Deer Creek confluence significantly impacted.
Parks and Recreation, Section 4(f) and 6(f) Resources	<ul style="list-style-type: none"> • See impacts under Historic Resources category • No to minimal impact to parks or bike paths 	<ul style="list-style-type: none"> • See impacts under Historic Resources category • Existing bike path on Washington Avenue bridge impacted due to widening and reconstruction • Some potential impact to Riverside Park due to widening the Washington bridge 	<ul style="list-style-type: none"> • See impacts under Historic Resources category • Existing bike path on Washington Avenue bridge impacted due to widening and reconstruction • Some potential impact to Riverside Park due to widening the Washington bridge 	<ul style="list-style-type: none"> • See impacts under Historic Resources category • Significant impact to Deer Creek Park • Significant impact to South Umpqua River bike path 	<ul style="list-style-type: none"> • See impacts under Historic Resources category • Significant construction impact to Deer Creek Park and bike path • Completed bridge project would be above park and bike path, thus minimal impact other than visual and noise
Community Features	• No to minimal impact to community features	• Construction phase impacts expected at Douglas County Health Department.	• Construction phase impacts expected at Douglas County Health Department	• Significant impacts at Douglas County Health Department due to new bridge structure encroaching on parking area	• Significant impacts at Douglas County Health Department due to new bridge structure encroaching on parking area
Socioeconomic and Environmental Justice	• Minimal impacts expected to Cow Creek tribal properties held in trust.	• Significant impact to Cow Creek tribal properties held in trust due to construction and widening of Washington Avenue Bridge	• Significant impact to Cow Creek tribal properties held in trust due to construction and widening of Washington Avenue Bridge	• Substantial impact to Cow Creek tribal properties held in trust due to raised railroad viaduct alongside parcels	• Significant impact to Cow Creek tribal properties held in trust due to construction and widening of Oak Avenue Bridge
Air Quality	• No conflict anticipated	• No conflict anticipated	• No conflict anticipated	• No conflict anticipated	• No conflict anticipated

Exhibit 5-2: ALTERNATIVES EVALUATION MATRIX

Evaluation Criteria	Alternatives Not Forwarded				
	1(a) Existing Alignment Improvements	2(a) Harvard-Washington-Stephens-Diamond Lake Alignment	2(c) Harvard-Washington-Rose-Diamond Lake Alignment	3(d) Harvard-Diamond Lake Align. (Railroad Above Grade)	4(a) Northern Alignment Flyover (Railroad Below Grade)
Existing Land Uses	<ul style="list-style-type: none"> • Potential disruption to downtown businesses if downtown turning radii are widened along the designated Hwy 138 route • Disruption expected in vicinity of DLB and Stephens • Moderate short term economic development stimulus • Minimal potential long term economic development stimulus 	<ul style="list-style-type: none"> • Properties between Douglas and Washington impacted between Rose Street and Railroad • Disruption expected in vicinity of DLB and Stephens • Significant short term economic development stimulus • Moderate potential long term economic development stimulus 	<ul style="list-style-type: none"> • Properties between Washington and Oak impacted between Pine and Stephens • Properties between Douglas and Washington impacted between Rose and Stephens • Planned future public safety center impacted • Significant short term economic development stimulus • Moderate potential long term economic development stimulus 	<ul style="list-style-type: none"> • See Community Features, Historic Resources and Parks and Recreation • Properties around Stephens/Diamond Lake intersection would be impacted by widening and realignment to north • Raising railroad would impact adjacent properties • Significant short term economic development stimulus • Moderate potential long term economic development stimulus 	<ul style="list-style-type: none"> • See Community Features, Historic Resources and Parks and Recreation • Businesses along DLB in vicinity of Stephens/Winchester impacted • Downtown businesses impacted due to widening of Oak Avenue Bridge • Significant short term economic development stimulus • Moderate potential long term economic development stimulus
Applicable Land Use Plans, Policies, Studies and Reports	<ul style="list-style-type: none"> • In keeping with applicable plans 	<ul style="list-style-type: none"> • Alternative not proposed in Roseburg Comprehensive Plan (TSP) 	<ul style="list-style-type: none"> • Alternative not proposed in Roseburg Comprehensive Plan (TSP) 	<ul style="list-style-type: none"> • Alternative not proposed in Roseburg Comprehensive Plan (TSP) 	<ul style="list-style-type: none"> • Alternative not proposed in Roseburg Comprehensive Plan (TSP)
Land Use Goal Exceptions	<ul style="list-style-type: none"> • No goal exception requirement anticipated 	<ul style="list-style-type: none"> • No goal exception required provided Comprehensive Plan (TSP) is amended to include project 	<ul style="list-style-type: none"> • No goal exception required provided Comprehensive Plan (TSP) is amended to include project 	<ul style="list-style-type: none"> • No goal exception required provided Comprehensive Plan (TSP) is amended to include project 	<ul style="list-style-type: none"> • No goal exception required provided Comprehensive Plan (TSP) is amended to include project
Visual Resources	<ul style="list-style-type: none"> • No to minimal impacts expected 	<ul style="list-style-type: none"> • Vantage point from Riverside Park would be altered due to widened Washington Avenue Bridge 	<ul style="list-style-type: none"> • Vantage point from Riverside Park would be altered due to widened Washington Avenue Bridge 	<ul style="list-style-type: none"> • Visual impact of new bridge spanning across Elk Island • Visual impact of railroad viaduct on surrounding historic neighborhood and structures 	<ul style="list-style-type: none"> • Visual impact of new bridge spanning across Elk Island. • Visual impact of new bridge spanning above Stephens Street and Winchester Street
Noise Impacts	<ul style="list-style-type: none"> • No diversion of traffic and noise to other routes. 	<ul style="list-style-type: none"> • Noise levels would be slightly higher along Washington Avenue due to wider bridge and higher volumes. 	<ul style="list-style-type: none"> • New traffic route along Rose Street would increase noise in this corridor • Noise levels would be slightly higher along Washington Avenue due to wider bridge and higher volumes 	<ul style="list-style-type: none"> • Noise generated from the railroad viaduct through downtown would travel further due to elevation above streets and many buildings • New bridge directly to Diamond Lake Blvd will move traffic noise north and closer to the Laurelwood neighborhood 	<ul style="list-style-type: none"> • New bridge to Diamond Lake Blvd will move traffic noise further north and closer to the Laurelwood neighborhood
Cost Opinions (2007 Dollars)					
	• \$9 million	• \$20 million	• \$21 million	• \$350 million	• \$95 million

- **Potential Archaeology Sites:** No impacts are identified based on available data.
- **Known Hazardous Materials Locations:** No impacts based on available information.
- **Potential Wetlands/Riparian Corridor and Jurisdictional Area of South Umpqua River and Deer Creek:** In addition to Goal 5 Resource impacts, are there additional impacts to palustrine wetland areas surrounding the South Umpqua River/Deer Creek confluence area?
- **Parks and Recreation, Section 4(f) and 6(f) Resources:** In addition to Historic Resource impacts, what additional impacts are associated with the alternatives pertaining to parks, bike paths, etc.
- **Community Features:** To what extent do the alternatives impact existing and planned public facilities?
- **Socioeconomic and Environmental Justice:** From the standpoint of the corridor study, socioeconomics addresses impacts associated with right-of-way takes on businesses and residential relocation. Environmental justice focuses on assessing the extent of disproportionate adverse affects to minority and low income residents.
- **Air Quality:** As mentioned in Section 2 of the report, Roseburg is in attainment for NAAQS. None of the build alternatives under consideration are expected to conflict with those standards.
- **Existing Land Uses:** What are the benefits and disruptions to area businesses, residential neighborhoods, economic development, and planned developments?
- **Applicable Land Use Plans, Policies, Studies and Reports:** Is the proposed build alternative in keeping with existing plans and polices?
- **Land Use Goal Exceptions:** This pertains primarily to Goal 5 (Natural Resources, Scenic and Historic Areas and Open Spaces).
- **Visual Resources:** What are the visual impacts from key vantage points associated with the build alternatives?
- **Noise Impacts:** What are the noise level impacts associated with the build alternatives and where would they occur?

Cost Opinions

The cost opinions expressed in current (2007) dollars are the last criterion included in the matrix.

Analyses by Oversight Committees

The three oversight committees reviewed future year 2030 traffic operations and impacts based on the evaluation criteria of the initial six build alternatives, compared them against the no-build option and forwarded recommendations of preferred alternatives. Prior to the SC convening, the CAC and TAC advanced their prospective recommendations, with the CAC opting for Alternatives 1(a), 2(a) and 3(a) to be initially forwarded for further study. Members of the TAC selected 3(a) and 4(a). The SC had the final recommendation on which alternatives would

advance for further analysis; members chose Build Alternatives 1(a) and 3(a) for further study. Following introduction and review of the Concept 6 Design Options, Alternatives 6(a) and 6(b) were subsequently forwarded for further study as well. Although originally forwarded for consideration, it was determined that components of Alternative 1(a) would instead be incorporated into 6(a). The final votes and results from all three oversight committees are summarized in Table 5-2.

Table 5-2. Preferences by Oversight Committees

Build Alternative	CAC	TAC	SC
1(a) Existing Alignment Improvements	Yes	No	Yes
2(a) Harvard-Washington-Stephens-Diamond Lake Alignment	Yes	No	No
2(c) Harvard-Washington-Rose-Diamond Lake Alignment	No	No	No
3(a) Harvard-Diamond Lake Bridge Connection (RR at-grade)	Yes	Yes	Yes
3(d) Harvard-Diamond Lake Bridge Connection (RR above-grade)	No	No	No
4(a) Northern Alignment Flyover (RR below-grade)	No	Yes	No
6(a) Diamond Lake Boulevard – Odell Avenue Couplet	Yes	Yes	Yes
6(b) Couplet with Direct Connection	No	Yes	Yes

Citizen Advisory Committee

The CAC advanced build alternatives 1(a), 2(a), 3(a), and 6(a) as Preferred Alternatives for further study. Although committee members found many deficiencies with the advance alternatives, they were recommended based on their perceived ability to improve traffic flow while maintaining downtown access.

- Alternative 1(a) was initially recommended because it would be the least costly and could serve as a phased improvement.
- Alternative 2(a) was considered a viable option for diverting some traffic from downtown while enabling access to the riverfront south of Washington Avenue. A few weaknesses were acknowledged with the alternative as well, namely the convoluted connection between Washington Avenue and Oak Avenue and the failure to resolve traffic problems at the Stephen Street/Diamond Lake Boulevard intersection.
- Committee members viewed Alternative 3(a) as the most viable for efficiently relieving traffic congestion downtown without the disruptive impact of the more intense options presented with Alternative 3(d) and 4(a). Nonetheless, concerns were expressed regarding the intersection width along Diamond Lake Boulevard at Stephens Street.
- Alternative 6(a) was viewed favorably by the majority of committee members for its ability to solve existing problems with Diamond Lake Boulevard at the intersections of Stephens Street and Winchester Street, to enable all intersections to perform in 2030 without the direct Harvard-Diamond Lake connection, and to incorporate multi-modal facilities along the couplet system. Potential negative impacts expressed included forced circuitous routes into downtown from the north and east and residential impacts north of Odell Avenue.

The remaining four alternatives were not advanced due to potential impacts. Alternative 2(c) was considered highly disruptive and would initiate dramatic change to the downtown core. The alternative would also impact the site of the planned Public Safety Center. Alternative 3(d) was eliminated due to high cost and impacts, both physically and visually to the surrounding area. Alternative 4(a) was considered overly disruptive to traffic flow while providing minimal benefit. Although Alternative 6(b) was viewed to have the same advantages and disadvantages as Alternative 6(a), additional disadvantages led to a majority vote by committee members not to advance the alternative for further consideration. Concerns centered primarily on increased costs when modeling suggests that Alternative 6(a) would function adequately in 2030.

Technical Advisory Committee

The TAC advanced Alternatives 3(a), 4(a), 6(a), and 6(b) for further study. Committee members placed emphasis on a grade-separated crossing of the railroad. Hence, Alternative 4(a) was heavily favored as the preferred option.

- Alternative 3(a) was recommended for further consideration because it would achieve a direct Harvard Avenue to Diamond Lake Boulevard connection. Committee members expressed reservation about the alternative because it did not incorporate a grade-separated railroad crossing into the design; however, it was acknowledged that the relocation of the railroad switching yard would likely ease the traffic conflicts.
- Alternative 4(a) received support from voting members of the TAC. The option was considered to have elements that met original goals of the study. However, the committee also acknowledged the need to explore other alignment options and to resolve cross over issues at the east end of the study area.
- The TAC approved forwarding Alternative 6(a) for further study. Citing positive traits similar to those listed by the CAC, members of the TAC favorably viewed the alternative for its ability to solve intersection problems along Diamond Lake Boulevard at Stephens Street and Winchester Street, to improve traffic operations without improvements or widening of existing bridges, to increase bicycle and pedestrian access, and that it enables a direct river crossing at a later date if deemed necessary. Conversely, the alternative represents an opportunity forgone to provide a grade separated railroad crossing in the immediate vicinity.
- Although Alternative 6(b) was also forwarded for further study, the TAC acknowledged constraints similar to those addressed by the CAC. It would be difficult to justify the additional expense of constructing a new bridge if Alternative 6(a) effectively solves the traffic problems as the modeling suggests.

Alternative 1(a) was not recommended because it was not considered progressive enough in addressing the problems. Although the option was acknowledged to be a viable short-term solution that has less impact upon surrounding land uses, it would not provide a simplified Harvard Avenue to Diamond Lake Boulevard connection. Alternatives 2(a) and 2(c) were not forwarded as preferred alternatives due to concerns over potential disruptions that the new alignments would impose upon downtown Roseburg, including increased congestion and, in the case of Alternative 2(c), lost opportunity to redevelop the former Safeway property. Finally,

Alternative 3(d) was not recommended due to projected high cost, impact to downtown, and noise issues.

Steering Committee

The Steering Committee (SC) members voted to advance Alternative 1(a) provided that the implemented improvements are not immediately torn out later with a future long-term project. Alternative 3(a) advanced because it moves traffic to the north side of downtown. Alternatives 2(a) and 2(c) were not recommended due to disruptions to downtown circulation and, in the case of 2(c), impact to planned Public Safety Building. Alternative 3(d) was considered too expensive and to have too high a visual impact. Finally, Alternative 4(a) was not considered a feasible option given priorities elsewhere throughout the region plus too many disturbances to access downtown. Following the introduction of Alternatives 6(a) and 6(b), the SC arrived at a consensus to advance Alternative 6(a) and 6(b). Members of the committee acknowledged that Alternative 6(a) does not preclude a future direct Harvard Avenue to Diamond Lake Boulevard bridge connection if needed.