

# Draft Technical Memorandum

April 23, 2024

Project# 27003.014

To: Lisa Cornutt, Oregon Department of Transportation

Karl MacNair, City of Medford

From: Marc Butorac, PE, PTOE, PMP; John McPherson, AICP (HDR), Jon Gerlach, Darren Hippenstiel, Matt Bell, Amy Griffiths

RE: 5.1.1.A Range of Alternatives

## INTRODUCTION

This memorandum summarizes the range of alternatives developed to address the Purpose and Need (Technical Memorandum (TM) #2.1.2) and goals and objectives for the South Stage Extension Plan. The range of alternatives were developed based on input from the Project Management Team (PMT), Project Development Team (PDT), Project Advisory Committee (PAC), and community as outlined in Figure 1.<sup>1</sup>

This planning document may be adopted in a subsequent environmental review process in accordance with 23 USC 168, Integration of Planning and Environmental Review,<sup>2</sup> and 23 CFR 450, Planning Assistance and Standards.<sup>3</sup>

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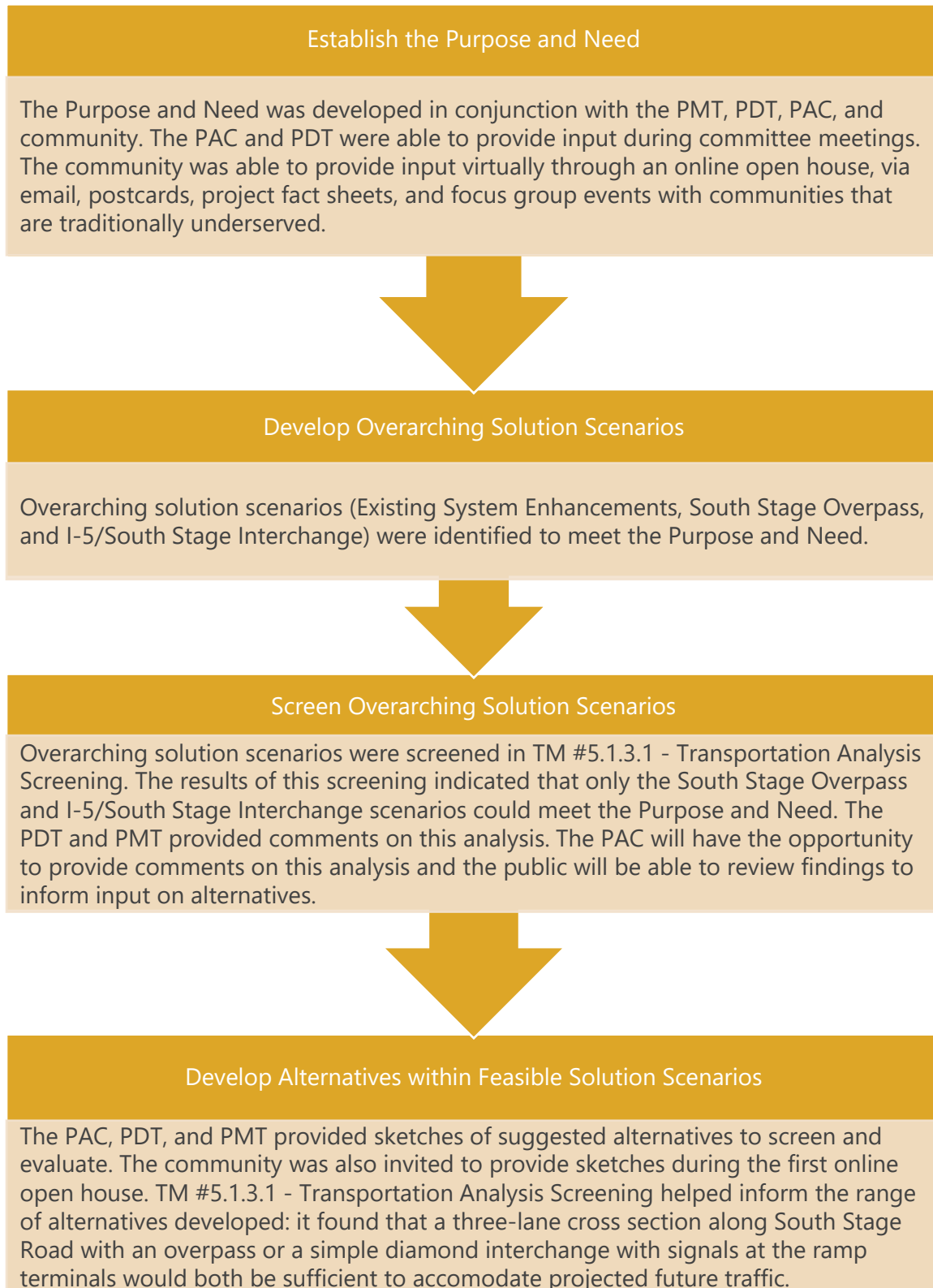
<sup>1</sup> The figure is intended to provide a general overview of the development process. The timeline has not been fully linear: the range of alternatives development process has been iterative, and steps have overlapped.

<sup>2</sup> <https://www.govinfo.gov/app/details/USCODE-2022-title23/USCODE-2022-title23-chap1-sec168/summary>

<sup>3</sup> <https://www.govinfo.gov/app/details/CFR-2022-title23-vol1/CFR-2022-title23-vol1-part450>

# RANGE OF ALTERNATIVES

**Figure 1. Range of Alternatives Development Process**



The following sections describe the alternatives in more detail.

## Existing System Enhancements

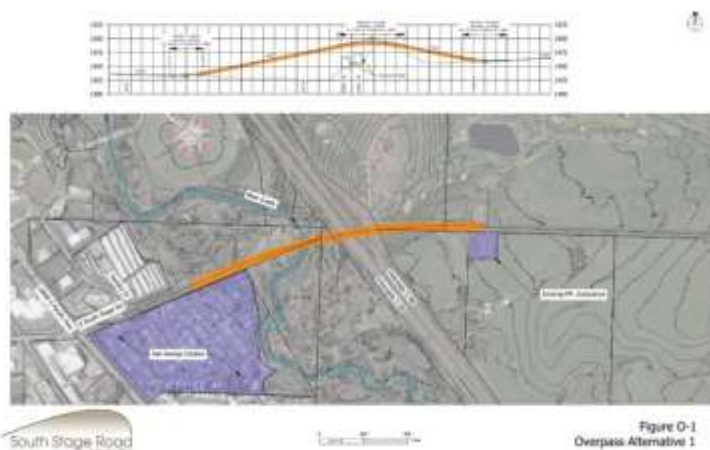
As part of TM #5.1.3.1 - Transportation Analysis Screening Appendix, the project team identified intersection (lane additions, traffic control changes, etc.) and segment (lane, bike facility, sidewalk additions) treatments to address existing and future capacity deficiencies and facility gaps defined in the Existing and Future Conditions Memorandum. However, the project team and PMT determined that these treatments in isolation would not meet the Purpose and Need. As such, the intersection and segment treatments were identified in conjunction with alternatives developed under the South Stage Overpass and I-5/South Stage Interchange alternatives identified below.

## South Stage Overpass Alternatives

The following alternatives were identified as potential solutions along the South Stage Road corridor that cross above or below I-5 to connect OR99 and N Phoenix Road. All alternatives assume a 3-lane South Stage Road cross-section with separated bicycle facilities and sidewalks on each side per the future operations analysis. Alternatives suggested by project participants that would not be approved by FHWA or ODOT were not included (e.g., partial interchanges):

### South Stage Alignment: Alternative O-1

This alternative is a single curved roadway segment crossing over Bear Creek and I-5 that generally follows the South Stage corridor alignment identified in the Medford TSP. The crossing profile rises over Bear Creek and both travel directions of Interstate 5 (I-5) to avoid vertical clearance impacts and to meet the top of hill elevation on the east side of the freeway, then returns to existing grade north of the Pacific Power & Light (PPL) substation.



### South Stage Southerly Realignment (Option 1): Alternative O-2

This alternative curves to the south at the northeast corner of the San George Estates property crossing I-5 with an approximate 53-degree skew and running to the south side of the Pacific Power & Light (PPL) substation on the east side of I-5. The crossing profile rises over Bear Creek and I-5 to meet vertical clearance standards before sloping back to the existing grade. The alignment continues east until passing the PPL substation, then follows a reverse curve to meet the South Stage Road alignment further east.

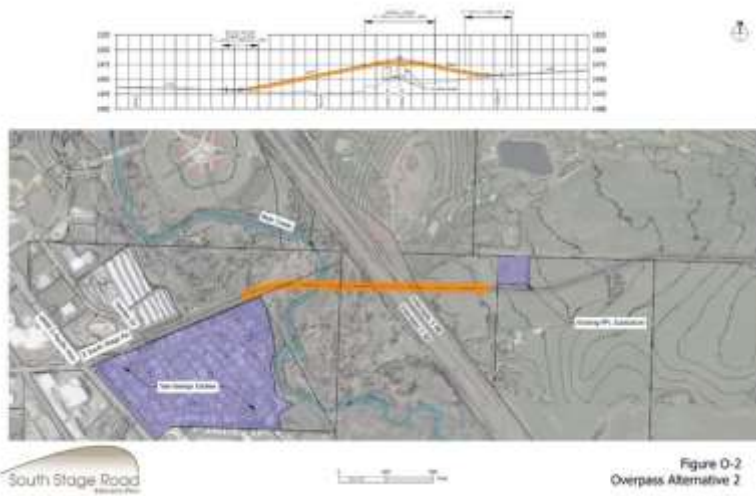


Figure O-2  
Overpass Alternative 2

### South Stage Southerly Realignment (Option 2): Alternative O-3

Similar to Alternative O-2, this alternative curves at the northeast corner of the San George Estates property and runs east, crossing I-5 with an approximate 53-degree skew. The alignment then goes through a series of curves passing north of the PPL substation on the east side of I-5. The crossing profile rises over Bear Creek and both travel directions of I-5 to avoid vertical clearance impacts before sloping back to the existing grade north of the substation and continuing to the east.

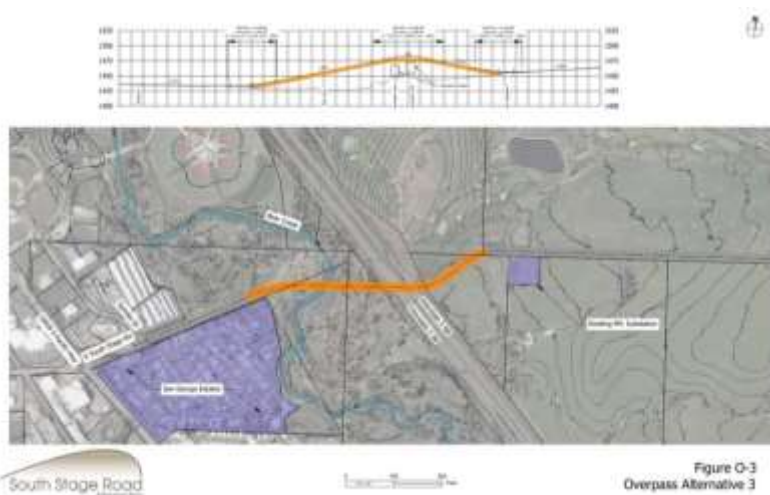
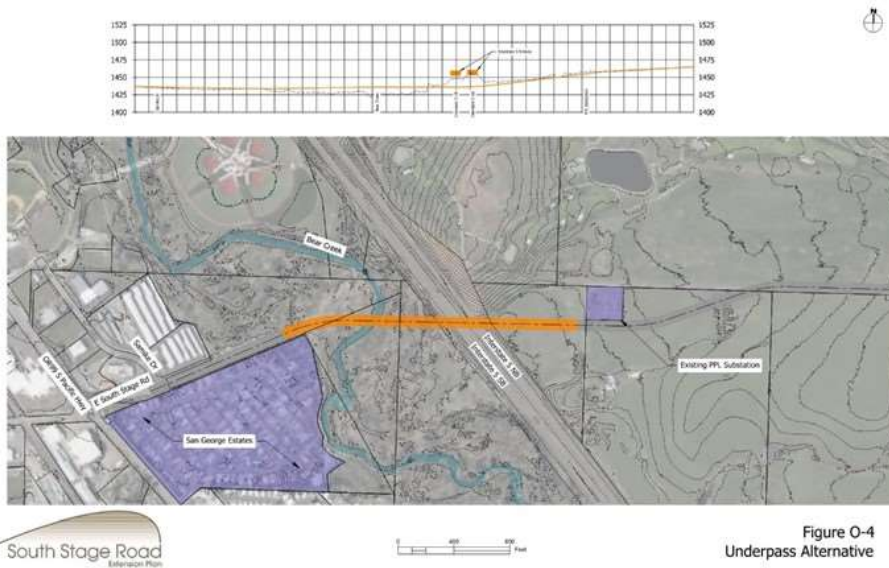


Figure O-3  
Overpass Alternative 3

### South Stage Underpass (Option 1): Alternative O-4

This alternative follows the same alignment as Alternative O-1 but crosses under I-5 instead of over. The roadway would cross over Bear Creek and then cross under I-5 either through a tunnel or under new I-5 bridges and transition to the existing grade through deep cuts on the east side of I-5.



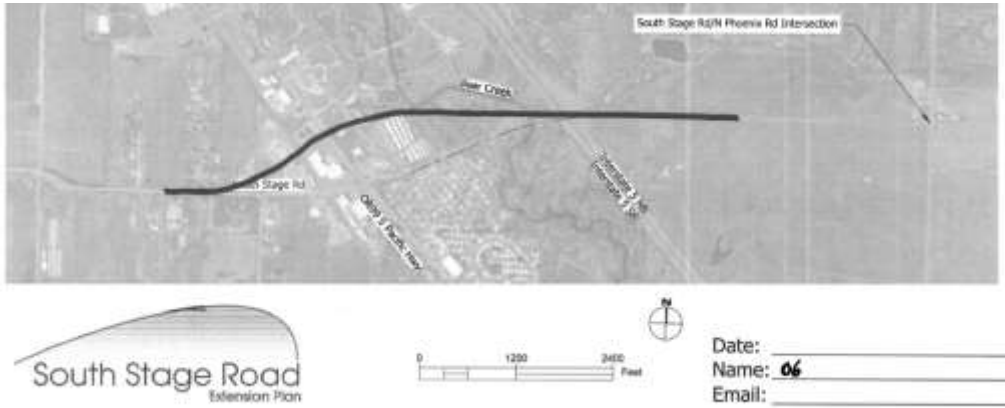
### South Stage Underpass (Option 2): Alternative O-5

This alternative follows the same alignment as Alternatives O-1 and O-4. The vertical profile would start between OR99 and Samike Drive dropping below existing grade utilizing large retaining walls and then tunneling under Bear Creek and I-5, returning to grade on the east side of the PPL substation.



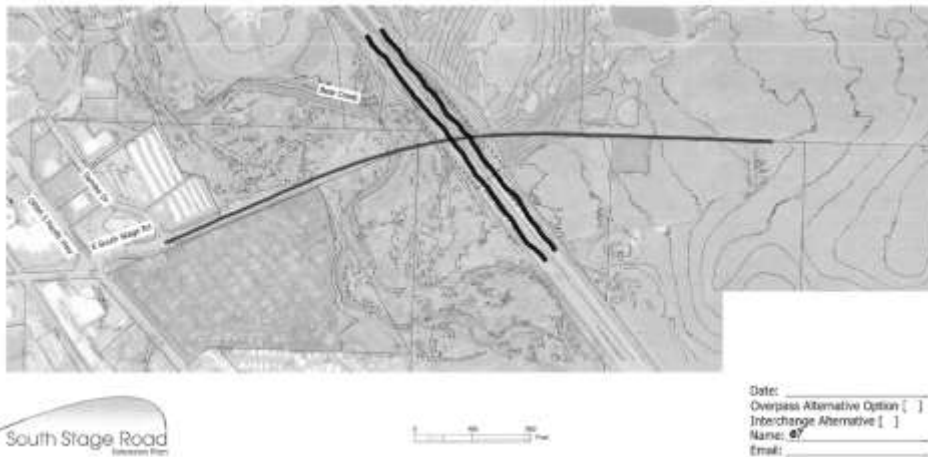
### South Stage Northerly Realignment: Alternative O-6

This alternative realigns South Stage Road from its existing crossing at OR99 to the north. The new crossing is approximately where Lowry Lane currently intersects OR99. The roadway would then curve to connect with the extended South Stage Road alignment crossing I-5, at an approximate 53-degree skew. The crossing profile rises over Bear Creek and both travel directions of I-5 to avoid vertical clearance impacts and to meet the top of hill elevation on the east side of the freeway, then returns to existing grade north of the PPL substation.



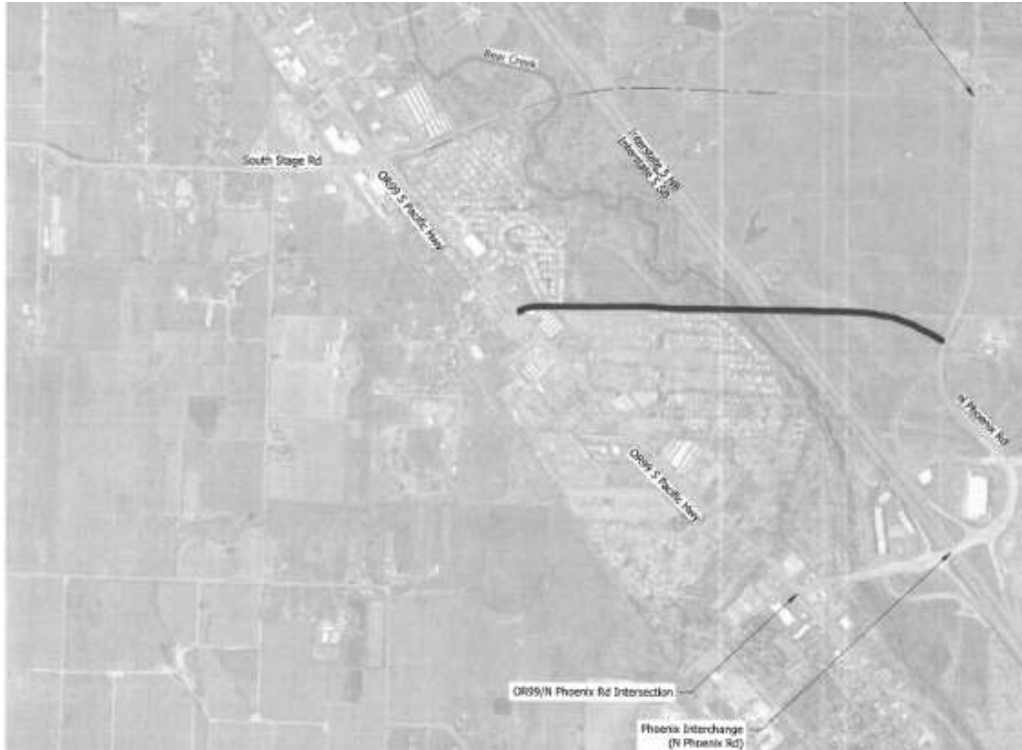
### Lower I-5 NB Travel Lanes: Alternative O-7

This alternative is like Alternatives O-1; however, to reduce the height of the bridge over I-5, the I-5 northbound lanes would be rebuilt at a lower elevation.



### Glenwood Road Alignment: Alternative O-8

This alternative uses an alignment between developed properties through the extension of East Glenwood Road approximately ½-mile south of South Stage Road along OR99. This alternative would require an overpass of Bear Creek and I-5.



## I-5/South Stage Interchange Alternatives

The following interchange alternatives have been identified as potential solutions along the South Stage Road corridor. It should be noted that the existing Centennial Golf Course and higher topography located generally east of I-5 and along and north of the South Stage corridor alignment present substantial constructability and cost issues for developing traditional northbound on-ramps. Given this constraint and the potential park impacts west of I-5 and existing PPL substation, several alternatives employ a folded diamond (Parclo A) loop ramp configuration and different South Stage Road alignments to minimize the potential impacts. All alternatives assume a 3-lane South Stage Road cross-section with separated bicycle facilities and sidewalks on each side per the future operations analysis. Alternatives suggested by project participants that would not be approved by FHWA or ODOT were not included (e.g., partial interchanges)

### South Stage Alignment: Alternative I-1

Interchange Alternative I-1 utilizes the overcrossing alignment of Alternative O-1 with a partial folded diamond interchange which reduces impacts to the hill on the east side of the I-5 and the golf course to the northeast of the overcrossing. The northbound exit ramp follows the existing grade to meet the existing South Stage Road alignment with a T-intersection west of the PPL substation. The northbound entrance ramp is a loop, curving around and under the overcrossing to merge with the northbound lanes. The southbound entrance and exit ramps follow a standard diamond layout.

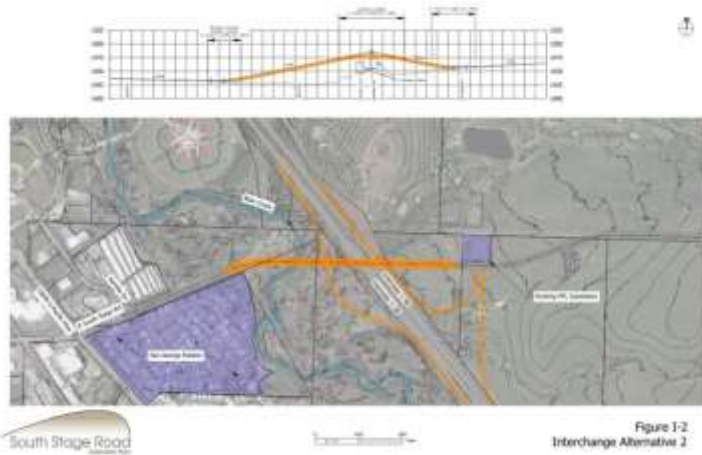


### South Stage Southerly Realignment (Option 1): Alternative I-2

This interchange alternative utilizes the overcrossing alignment of Alternative O-2 with a partial folded diamond interchange. The overcrossing alignment is south of the large hill on the east side of I-5 reducing impacts to the hill. The northbound exit ramp follows existing grade passing

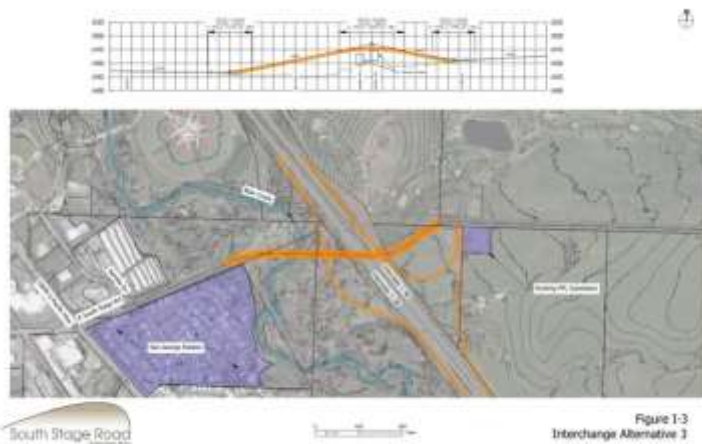


through a series of curves intended to reduce impacts to structures. The northbound I-5 ramp terminals meet at a T-intersection south of the PPL substation. The northbound entrance is a loop, curving around and under the overcrossing to merge with the northbound lanes. The southbound entrance and exit ramps follow a standard diamond layout.



### South Stage Southerly Realignment (Option 2): Alternative I-3

This interchange alternative utilizes the overcrossing alignment of Alternative O-3 with a partial folded diamond interchange. The overcrossing alignment is south of the large hill on the east side of I-5 reducing impacts to the hill and passes through a series of curves north of the PPL substation. The northbound exit ramp follows existing grade passing through a series of curves intended to reduce impacts to structures. The northbound I-5 ramp terminals meet at a T-intersection west of the PPL substation. The northbound entrance is a loop, curving around and under the overcrossing to merge with the northbound lanes. The southbound entrance and exit ramps follow a standard diamond layout.



### South Stage Underpass Interchange: Alternative I-4

This interchange alternative utilizes the crossing alignment of Alternative O-4 with a partial folded diamond interchange like Alternative I-1. The roadway profile of this alternative passes over Bear Creek and under I-5 either through a tunnel, or under new I-5 bridges and transitions to the existing grade through deep cuts on the east side of I-5. The northbound exit ramp passes through a series of curves intended to reduce impacts to structures. The northbound I-5 ramp terminals meet at a T-intersection west of the PPL substation. The northbound entrance is a loop, curving around and over the underpass to merge with the northbound lanes. The southbound entrance and exit ramps follow a standard diamond layout.



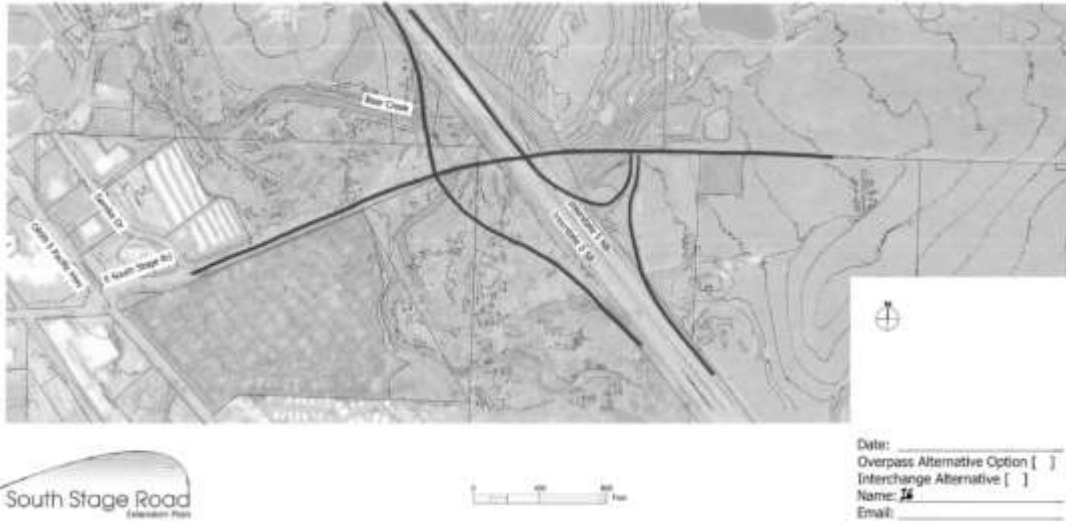
### South Stage Diverging Diamond: Alternative I-5

This interchange alternative utilizes the crossing alignment of Alternative O-1 with a diverging diamond interchange form. The crossing profile rises over Bear Creek and both travel directions of I-5 to avoid vertical clearance impacts then returns to existing grade north of the PPL substation.



### I-5 South Stage Left Lane Merge for NB On-Ramp: Alternative I-6

This interchange alternative utilizes the crossing alignment of Alternative O-1 with a partial folded diamond configuration. The northbound exit ramp follows the existing grade to meet the existing South Stage Road alignment with a T-intersection west of the PPL substation. The northbound entrance ramp is a loop, curving around and over I-5 northbound lanes, and under the overcrossing to merge with the northbound lanes on the left. The southbound entrance and exit ramps follow a standard diamond layout.



### I-5 South Stage Single Point Interchange: Alternative I-7

This interchange alternative utilizes the crossing alignment of Alternative O-1 with a single point interchange form. The crossing profile rises over Bear Creek and both travel directions of I-5 to avoid vertical clearance impacts then returns to existing grade north of the PPL substation. To keep the exit and entrance ramps close to the overcrossing and single point intersection, retaining walls will be necessary along each ramp adjacent to I-5 lanes. A Single Point Urban Interchange (SPUI) would have a similar footprint and impacts to a tight-diamond interchange form; however, the tight-diamond would have a smaller bridge structure. The tight diamond interchange will be explored further if the SPUI makes it through the technical and economic feasibility screening.



### I-5 South Stage Partial Split-Diamond Interchange: Alternative I-8

This interchange alternative includes two overcrossing alignments of I-5 to create a partial split-diamond interchange. The first utilizes the crossing alignment of Alternative O-1; however, it has a single lane for westbound and bicycle and pedestrian traffic only. The second overcrossing alignment is to the south, passing through a series of tight curves and crossing I-5 at a 90-degree angle. The alignment passes through a curve and reconnects with South Stage Road north of the PPL substation. The northbound exit ramp follows the existing grade to meet the existing South Stage Road alignment with a T-intersection east of the PPL substation. The northbound entrance ramp is a loop, curving around and under the overcrossing to merge with the northbound lanes. The southbound exit ramp is a standard diamond ramp that passes under the north overcrossing alignment, and then connects to the south overcrossing alignment.



## NEXT STEPS

The range of alternatives presented herein will be reviewed by the PAC to confirm that it represents an acceptable range of alternatives based on the Purpose and Need and preliminary findings from TM #5.1.3.1 - Transportation Analysis Screening.