

**I-5 Exits 40 and 43 (Gold Hill)  
Interchange Area Management Plans**

**DRAFT Technical Memorandum #6  
Alternative Analysis**

**Prepared for**

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## 6. ALTERNATIVES ANALYSIS

This memorandum presents the preliminary improvement concepts developed to address deficiencies in the I-5 Exits 40 and 43 interchange management study areas (IMSAs). The identified improvement concepts are intended to help achieve the goals and objectives set forth for this project while addressing identified deficiencies for all modes.

Once concepts are selected for further analysis, they will be combined to create a comprehensive improvement strategy. As the overall strategy is developed, concepts will be refined so that the improvements work well together.

### 6.1. Concept Development

Each improvement concept was developed to address specific deficiencies, safety issues, or access concerns. These concepts were developed based upon available standards, warrants, perceived need, safety data, traffic operations, and community livability. Concepts were not limited to roadway issues, and include many bicycle and pedestrian-related projects.

The concepts were developed keeping in mind the objectives developed for this IAMP:

- Protect the function of the interchanges as specified in the Oregon Highway Plan (OHP) and Jackson County Transportation System Plan (TSP).
- Provide safe and efficient operations on I-5, Access Road, and Main Street as specified in the OHP and Jackson County TSP.
- Facilitate freight travel to the interchange from nearby resource lands.
- Maintain existing emergency routes and identify improvements to the transportation system that may enhance emergency vehicle access.
- Identify safe and convenient bicycle and pedestrian improvements to connect and enhance non-motorized travel at and around the interchanges, including access to the Rogue River Greenway.
- Incorporate bicycle and pedestrian elements, such as sidewalks and bike lanes or shoulders, in roadway upgrades.
- Incorporate current and planned land uses into the design and management systems for Exits 40 and 43, including recommended strategies for land use control.
- Consider the 2009 Regional Plan for the Greater Bear Creek Valley (specifically inclusion and buildout of the adjacent Tolo industrial area) when evaluating design modifications and management systems for Exits 40 and 43, including recommended strategies for land use control.
- Develop an access management plan that provides for safe and acceptable operations on the transportation network, and meet OHP requirements and the access spacing standards in Oregon Administrative Rule (OAR) 734-051.

- Provide a process to educate and involve the public in the planning and funding for future transportation system improvements.

This memorandum considers changes/improvements in three general categories:

- **Interchange Ramp Improvements** – These concepts address concerns raised about driver expectation and safety on interchange ramps.
- **Intersection Improvements** – These concepts identify potential improvements to improve traffic flow and/or address safety concerns at individual intersections within the IMSA.
- **Multimodal Improvements** – These concepts identify potential improvements to enhance safety, desirability, and continuity of facilities for non-auto users in the IMSA.

The improvement concept categories often overlap or complement each other. For instance, a roadway segment improvement may include strategies to improve safety and could be combined with a number of pedestrian improvements. Linkages between concepts are discussed in the evaluations.

### **6.1.1. Interchange Ramp Improvements**

A review of interchange ramp characteristics indicates inadequate acceleration and deceleration distances at all four I-5 Exit 40 ramps as well as the northbound and southbound off ramps of Exit 43. Additionally, a detailed review of crash history data for the period between January 1, 2007, and December 31, 2011 shows multiple crashes along IMSA ramps. Collective evaluation of the Exit 40 ramps indicates multiple crashes with one fatality (southbound off ramp). At Exit 43 multiple ramp crashes were reported for the northbound on ramp and southbound off ramp; one of the crashes at the northbound on ramp was a fatality.

### **6.1.2. Intersection Improvements**

The concepts developed for intersection improvements address operational and safety deficiencies at individual intersections within the IMSAs. Many of the intersection improvements address truck turning issues and sight distance concerns. Other suggested improvements may address queue storage lengths and multimodal connectivity at intersections where overall capacity is not expected to be of concern.

### **6.1.3. Multimodal Improvements**

In alignment with the goals of this plan, the proposed improvements provide enhanced safety and crossing opportunities, improved visibility and awareness between modes, and move toward continuity of facilities for non-auto users in the IMSA. These improvements primarily serve pedestrians and cyclists; there is currently no transit service within the IMSAs. The concepts focus on improving crossings where pedestrians and/or cyclists interact with motorized vehicles as well as access to the Rogue River Greenway.

The Oregon Bicycle and Pedestrian Plan recommends shoulders that are 6 feet wide for bicycle use, although a minimum 4-foot shoulder is considered adequate when there are physical width limitations. Wider shoulders allow a cyclist to ride far enough from the edge of pavement to avoid debris and conflicts with passing vehicles. Applicable guidelines, standards, environmental constraints, and costs were considered in the development of bicycle/shoulder improvements throughout the corridor.

The crossing improvements proposed include striped crosswalks, pedestrian refuge islands (with striped or unstriped crossings), pathway connections and other spot improvements.

## **6.2. Concept Evaluation**

Not all of the concepts proposed in this memorandum will be recommended for implementation. Each improvement concept will be evaluated with regard to applicable impacts (e.g. traffic operations, safety, environmental, etc.), feasibility, stakeholder feedback, and ability to meet the goals of the interchange management plan.

The concept analysis included traffic operations, road geometries and ROW requirements, environmental and land use consequences, and cost opinions (near the interchange ramp terminals only).

### **6.2.1. Traffic Operations and Safety**

I-5 Exit 40 and 43 study area intersections are forecast to meet operational targets in the future year (2038); however, traffic safety and a multimodal system that supports all forms of transportation are issues. Potential improvements include traffic control modifications, improved intersection turning radii, extensions of ramp lengths at the ramp terminals, and multimodal improvements/connections to local trails. The operational assessment focuses on the volume-to-capacity (v/c) ratio and level of service (LOS) for the 2038 future condition.

At intersections where potential changes in traffic control or turn lanes were considered, the procedures in the ODOT Analysis Procedures Manual (APM) were followed. For potential turn lanes on the rural sections of the highway, the APM turn lane criteria<sup>1</sup> were evaluated. Existing traffic volumes were applied to determine if warrants for turn lanes might be met today.

Some improvements are focused on addressing safety concerns or may address safety as well as traffic operations deficiencies. Crash patterns from the five-year analysis period (2005 through 2009) are discussed for those improvements that address safety.

Multimodal improvements focus on deficiencies or gaps in the system so that all modes of travel are better accommodated.

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<sup>1</sup> Section 7.2 Turn Lane Criteria, Analysis Procedures Manual, April 2006, Updated January 2011, online reference: [http://www.oregon.gov/ODOT/TD/TPAU/docs/A\\_APM/APM.pdf](http://www.oregon.gov/ODOT/TD/TPAU/docs/A_APM/APM.pdf). Note: These criteria are also consistent with the criteria in Appendix F of the Highway Design Manual.

### **6.2.2. Basic Roadway Geometries and Right-of-Way Requirements**

Illustrations of basic roadway geometry and ROW needs were developed for concepts that involve infrastructure improvements. The drawings approximate roadway centerlines, edge of roadway and ROW using available base mapping.

### **6.2.3. Environmental and Land Use Assessment**

Impacts to resources were qualitatively assessed based on the data assembled for the environmental and land use reconnaissance. The level of analysis of the study area is designed to identify those areas judged to have considerable potential for conflict.

Socioeconomic effects are also considered. Concept descriptions note if there is a potential for impacts or benefits to Title VI populations in the IMSAs.

### **6.2.4. Concepts Cost Opinions**

Rough order of magnitude cost opinions were developed using present day dollars and are consistent with standard estimating methods. The cost opinions include a contingency factor but do not include ROW costs (unless noted otherwise). The cost opinions are intended to help differentiate alternatives by approximating the relative costs of each concept.

Cost opinions were prepared for all improvements associated with the I-5 Exits 40 and 43 interchange management areas.

## **6.3. Organization of Improvement Concepts**

The I-5 Exits 40 and 43 IAMP includes two interchanges and nearby intersections. For discussions purposes in this memorandum, the concepts have been grouped by interchange as discussed in previous memoranda. Each interchange focuses on the four primary improvement categories: intersection, interchange, multimodal, and safety. There are a total of 22 improvement concepts (12 within the Exit 40 IMSA, 10 within the Exit 43 IMSA).

Some improvement concepts have various options to consider while others may have only one potential solution. Many of the concepts can be combined with others; some provide different solutions to address the same issue. The 22 concepts are discussed in the following sections.

## **6.4. I-5 Exit 40 Concept Evaluation**

I-5 Exit 40 provides access to the City of Gold Hill from the south, the Tolo Industrial area (to the southeast, near Exit 35), and to surrounding recreational areas. The IMSA includes four roadways in addition to Access Road which serves the interchange. The roadways include (listed from north to south): 2<sup>nd</sup> Avenue/OR 99, Blackwell Road, Lampman Road, and Old Stage Road. Roadway characteristics are presented in Technical Memorandum #3: Study Area Inventory. In general, all roadways are two lanes with pavement width ranging from 18-34 feet. There are no signalized intersections in the IMSA. Posted speed, functional classification, and average daily traffic (ADT) also influences improvement concept development. IMSA characteristics include:

- Posted speed is 35 miles per hour (mph) along Access Road, 40 mph along 2<sup>nd</sup> Avenue (OR 99)/Blackwell Road, and 45 mph along Lampman and Old Stage Roads.
- Roadway classifications include rural minor arterial (both Access Road and 2<sup>nd</sup> Avenue/OR 99, rural major collector (Blackwell Road), and local (Lampman and Old Stage Roads).
- Existing ADT is approximately 5,500 vehicle per day (vpd) along Access Road; the ADT along the side streets 2<sup>nd</sup> Avenue/OR 99 (~5,800 vpd), Blackwell Road (~2,500 vpd), Lampman Road (~600 vpd), and Old Stage Road (~900 vpd).
- Forecast ADT for year 2038 for area roadways is Access Road (~6,800 vpd), 2<sup>nd</sup> Avenue/OR 99 (~6,500 vpd), Blackwell Road (~3,500), Lampman Road (~700 vpd), and Old Stage Road (~1,100).

There are 12 improvement concepts for this interchange, several of which have varying options to consider. A brief summary of the concepts are presented in Table 6-1. The following sections discuss in detail the potential changes and improvements that are specific to this interchange.

**Table 6-1. I-5 Exit 40 Improvement Concepts**

ID	Location	General Description	Purpose	Benefit
R-1	Southbound Off Ramp	Extend southbound off ramp	Provide adequate deceleration distance	Safety, Freight
R-2	Southbound On Ramp	Extend southbound on ramp	Provide adequate acceleration distance	Safety, Freight
R-3	Southbound Ramp Terminal	Improve turning radii	Accommodate truck traffic (WB-67)	Safety, Freight
R-4	Northbound Off Ramp	Extend northbound off ramp	Provide adequate deceleration distance	Safety, Freight
R-5	Northbound On Ramp	Extend northbound on ramp	Provide adequate acceleration distance	Safety, Freight
R-6	Northbound Ramp Terminal	Improve turning radii	Accommodate truck traffic (WB-67)	Safety, Freight
I-1	2 <sup>nd</sup> Avenue/Blackwell Road at Access Road	Modify intersection <ul style="list-style-type: none"> <li>▪ <u>Option A</u>: Modify traffic control to all-way STOP</li> <li>▪ <u>Option B</u>: Modify traffic control to all-way STOP and add left-turn lane</li> </ul>	Better facilitate turning movements and pedestrian crossing	Mobility, Multimodal, Safety
I-2	Access Road at 2 <sup>nd</sup> Avenue/Blackwell Road	Improve turning radii	Accommodate truck traffic (WB-67)	Safety, Freight
I-3	Access Road at Old Stage Road	Improve turning radii	Accommodate truck traffic (WB-67)	Safety, Freight

**Table 6-1. I-5 Exit 40 Improvement Concepts**

ID	Location	General Description	Purpose	Benefit
MM-1	2 <sup>nd</sup> Avenue/OR 99 Bridge (ID 00576)	Enhance multimodal access from the interchange into Gold Hill <ul style="list-style-type: none"> <li>▪ <u>Option A</u>: Add sharrows and signage to travel lanes</li> <li>▪ <u>Option B</u>: Widen existing cantilevered path</li> <li>▪ <u>Option C</u>: Widen existing cantilevered path and add cantilevered path to the north</li> <li>▪ <u>Option D</u>: Build a parallel structure</li> </ul>	Provide facilities along 2 <sup>nd</sup> Avenue/OR 99 for all modes of travel and enhance downtown accessibility	Multimodal, Safety
MM-2	Blackwell Road	Widen to provide a multiuse path between Access Road and KOA camp ground	Provide facilities along Blackwell Road/OR 99 for all modes of travel and enhance downtown environment	Multimodal, Safety
MM-3	2 <sup>nd</sup> Avenue/Blackwell Road at Access Road	Expand the multimodal system <ul style="list-style-type: none"> <li>▪ Add a multiuse path from Upper River Road under bridge to Access Road</li> <li>▪ Add pathway connection from 2<sup>nd</sup> Avenue bridge to multiuse path</li> </ul>	Enhance opportunities and increase the safety of the pedestrian crossing of OR 99	Multimodal

#### **6.4.1. Concept R-1 – Southbound Off Ramp Extension**

The southbound off ramp is a single lane with an approximate width of 16 feet. It has a gradual incline to the ramp terminal intersection with Access Road. The advisory exit speed on the ramp is 35 mph and the current ramp deceleration length is approximately 280 feet with a taper of 185 feet. In addition to passenger vehicles, various larger vehicles use the ramp including trucks and recreational (campers and vehicles with boat trailers).

The desired ramp deceleration distance is 500 feet and taper is 400 feet (compared to the current 280 feet and 185 feet provided, respectively). The less than desirable ramp length and taper is noticed by all of the vehicles and may become a safety issue if queues get longer or multiple trucks/recreational vehicles use the off ramp at the same time. Access Road is the link between the interchange, city, recreational areas (including nearby KOA), and provides alternative access to the nearby intermodal hub at I-5 Exit 35 (Seven Oaks). Further development of the intermodal hub would likely result in increased Exit 40 use by large vehicles and corresponding queue lengths.

The improvement would extend the southbound off ramp with the purpose of providing adequate deceleration distance and improving safety, as shown in Figure 6-1.

### Concept R-1 – Traffic Operations and Safety

Existing ADT traffic volumes on the southbound off ramp are approximately 750 vpd. Future 2038 off ramp ADT volumes are estimated at 900 vpd. During the five year analysis period there was one fixed object crash attributed to the southbound ramps which resulted in a fatality. The crash was attributed to fatigue and resulted in hitting a berm and sign before overturning.

The Concept R-1 improvement would result in a more gradual elevation gain, a longer distance to stop, and thus, a more comfortable deceleration experience. It would include guardrail for the length of the improvement (comparable to current conditions) and overall improve the safety of the off ramp.

Overall, the intersection capacity is not expected to change with this improvement. However, it would create additional distance between the ramp terminal and the interstate to provide additional storage for queued vehicles.

### Concept R-1 – Basic Roadway Geometries and Right-of-Way Requirements

Concept R-1 would extend the length of the southbound off ramp to meet the applicable roadway design standards. The longer ramp length would result in a more gradual elevation gain and longer distance to stop. Guardrail would also be extended. All improvements are anticipated to be within ODOT ROW.

### Concept R-1 – Environmental and Land Use Assessment

Adjacent land uses include rural residential and EFU. No additional ROW is required, thus no land use impacts are anticipated.

There are two nearby water features, Kane Creek and a ditch/irrigation canal. Kane Creek is listed as a summer and winter steelhead habitat by Oregon Department of Fish and Wildlife (ODFW). The concept includes extension of the existing box culvert and modifications to the irrigation canal.

The increased impervious surface area may produce additional stormwater that would need to be treated.

No socioeconomic impacts are anticipated.

### Concept R-1 – Cost Opinions

The estimate for this concept is \$1,470,000.

### **6.4.2. Concept R-2 – Southbound On Ramp Extension**

Exit 40 has a single lane southbound on ramp with an approximate width of 17 feet. The current ramp acceleration length is approximately 700 feet while the desired length is approximately 1,100. The current taper length is approximately 225 feet, though the desired ramp is 300 feet.

Vehicles of various sizes (including trucks, campers, and vehicles with trailers) use the ramp; the larger vehicles may have issues getting up to speed prior to entering the Interstate.

The improvement would extend the southbound on ramp to provide adequate acceleration distance with the purpose of improving safety, as shown in Figure 6-2.

### Concept R-2 – Traffic Operations and Safety

Existing ADT traffic volumes on the southbound on ramp are approximately 1,800 vpd, while the 2038 ADT volumes are 2,250 vpd. Three crashes were attributed to the southbound on ramp during the five year analysis period and included two collisions types: rear end (1), and fixed object (2). One of the crashes resulted in minor injuries, while the other two were property damage only. The rear end collision may be attributable to a short acceleration distance as the error was identified “as failure to decrease speed for slower moving vehicle”.

While the on ramp would be lengthened with this project, traffic operations are not expected to change within the merge area. There is no apparent crash pattern; however, the longer on ramp which is consistent with design standards, would likely improve the vehicular safety and provide additional space for larger vehicles to get up to speed before merging with interstate traffic.

### Concept R-2 – Basic Roadway Geometries and Right-of-Way Requirements

Concept R-2 would extend the length of the southbound on ramp to meet the applicable roadway design standards. All improvements are anticipated to be within ODOT ROW.

### Concept R-2 – Environmental and Land Use Assessment

The southbound on ramp and interstate are located on EFU zoned land and there are no natural features near the proposed concept. No land use or environmental impacts are anticipated.

The increased impervious surface area may produce additional stormwater that would need to be treated. No socioeconomic impacts are anticipated.

### Concept R-2 – Cost Opinions

The cost of the extended on ramp in Concept R-2 is estimated at \$850,000.

### **6.4.3. Concept R-3 – Southbound Ramp Terminal Turning Radius Improvements**

I-5 Exit 40 serves city traffic, recreation traffic (including nearby KOA park), and provides alternative access to the nearby intermodal hub at Interchange 35-Seven Oaks. Access Road is a two lane facility with a posted speed of 35 mph and a paved surface of 24 to 34 feet. The southbound ramps (on and off) have a single lane approach approximately 16 feet wide.

Currently, the ramp terminal design does not provide a turning radius large enough to accommodate truck traffic design vehicles. This design challenge is predominantly focused on the northeast corner for the southbound left-turn movement from Access Road to the southbound on-ramp. In addition to the truck traffic experiencing difficulties (occasionally creating their own path in adjacent lanes), large and/or long recreational vehicles may also have difficulties navigating the ramp terminal.

Concept R-3 would modify the northeastern corner to provide a turning radius sufficient to handle a typical design truck (WB-67), as shown in Figure 6-3. The purpose of the improvement is to improve safety for larger loads.

### Concept R-3 – Traffic Operations and Safety

Existing ADT traffic volumes on Access Road are 2,550 to 3,800 vehicles per day (vpd) while the ramp is approximately 750 vpd. Future 2038 volumes on Access Road are estimated at 3,200 to 4,750 vpd; the forecast southbound ramp ADT is approximately 900 vpd. During the 5-year analysis period (2007-2011) there were no crashes reported along Access Road near the southbound ramp terminal.

The improvements associated with Concept R-3 would improve the overall safety of the intersection (less chance of semi-trailers tracking into other travel lanes) but are not anticipated to change the roadway capacity at the intersection. The increased turning radius would allow heavy vehicles to turn at higher speeds and accelerate more comfortably.

### Concept R-3 – Basic Roadway Geometries and Right-of-Way Requirements

The improvement would widen the shoulder up to 24' with guardrail in the northeast corner of the southbound ramp terminal. The existing land within the northeast corner of the ramp terminal is all ODOT jurisdiction and ROW.

### Concept R-3 – Environmental and Land Use Assessment

Exclusive farm use (EFU) is the only adjacent land use. Statewide Planning Goals would need to be considered when impacting EFU zones.

There are no documented environmental resources near Concept R-3, though the increased impervious surface area may produce additional stormwater that would need to be treated.

No socioeconomic impacts are anticipated.

### Concept R-3 – Cost Opinions

The estimate for this concept is \$110,000.

#### **6.4.4. Concept R-4 – Northbound Off Ramp Extension**

The northbound off ramp is a single lane with an approximate width of 16 feet. It has a gradual incline to the ramp terminal, intersection with Access Road. The advisory exit speed on the ramp is 45 mph and the current ramp deceleration length is approximately 200 feet. The taper length for this ramp is zero. Similar to the southbound off ramp, this ramp is used by vehicles of various sizes (including trucks, campers, and vehicles with trailers).

The desired ramp deceleration distance is 460 feet and the taper is 360 feet (a 200 feet deceleration distance is provided, while a taper does not currently exist). Like the southbound off ramp the deceleration distance is less than the desirable length and may become a safety issue if the length of queues increases. Access Road links and serves multiple uses, including Interchange 35 and the nearby intermodal hub.

The improvement would extend the northbound off ramp to provide adequate deceleration distance (include guardrail for the length of the improvement) with the purpose of improving safety. Figure 6-4 illustrates the concept.

#### **Concept R-4 – Traffic Operations and Safety**

The northbound off ramp has an existing ADT of 2,300 vpd and future (2038) ADT volume forecast of 2,900 vpd. During the five year analysis period there were 5 crashes attributed to the northbound off ramp. The crashes included three collisions types: rear end (2), fixed object (2), and sideswipe (1). Four of the crashes resulted in minor injuries, while the other one was property damage only.

The benefits would be similar to the southbound off ramp extension (R-1): a more comfortable deceleration experience and additional storage for queuing at the ramp terminal. Overall, the operations are not expected to change with this improvement, but safety would be enhanced.

#### **Concept R-4 – Basic Roadway Geometries and Right-of-Way Requirements**

Concept R-4 would extend the length of the northbound off ramp to meet the applicable roadway design standards. All improvements are anticipated to be within ODOT ROW.

#### **Concept R-4 – Environmental and Land Use Assessment**

The adjacent land use is rural residential and nearby Kane Creek is listed as a summer and winter steelhead habitat by Oregon Department of Fish and Wildlife (ODFW). No impacts to the resources are anticipated. No socioeconomic impacts are anticipated either.

The increased impervious surface area may produce additional stormwater that would need to be treated.

#### **Concept R-4 – Cost Opinions**

The estimate for this concept is \$620,000.

### **6.4.5. Concept R-5 – Northbound On Ramp Extension**

The northbound on ramp at Exit 40 has a single lane with an approximate width of 17 feet. The current ramp acceleration length is approximately 765 feet, though the desired ramp acceleration distance is 1,100 feet. The on ramp taper is also shorter than the desired length, 190 feet versus 295 feet. Vehicles of various sizes (including trucks, campers, and vehicles with trailers) use the ramp; the larger vehicles may have issues getting up to speed prior to entering the Interstate.

The improvement would extend the northbound on ramp to provide adequate acceleration distance, as shown in Figure 6-5. The extension would impact the adjacent frontage road, requiring guardrail and a drainage system. The purpose of the improvement is to improve safety.

#### **Concept R-5 – Traffic Operations and Safety**

Existing ADT traffic volumes on the northbound on ramp are approximately 1,000 vpd, while the 2038 ADT volumes are 1,300 vpd. One crash was attributed to the northbound on ramp during the five year analysis period. The fixed object collision resulted in property damage only. The interchange ramp spacing does not currently meet standards.

Similar to Concept R-2, traffic operations are not expected to change within the merge area. There is no apparent crash pattern; however, the longer on ramp which is consistent with design standards, would likely improve the vehicular safety and provide additional space for larger vehicles to get up to speed before merging with interstate traffic.

#### **Concept R-5 – Basic Roadway Geometries and Right-of-Way Requirements**

Concept R-5 would extend the length of the northbound on ramp to meet the applicable roadway design standards. Additional ROW would be required to extend the ramp.

#### **Concept R-5 – Environmental and Land Use Assessment**

The northbound on ramp and interstate are located on rural residential zoned land. There are potential ROW impacts to properties adjacent to the on ramp. No socioeconomic impacts are anticipated with the additional ROW acquisition.

Kane Creek runs nearby, but is not anticipated to be impacted by the concept.

The increased impervious surface area may produce additional stormwater that would need to be treated. .

#### **Concept R-5 – Cost Opinions**

The cost of the on ramp extension in Concept R-5 is estimated at \$1,100,000, which does not include potential ROW impacts.

#### **6.4.6. Concept R-6 – Northbound Ramp Terminal Turning Radius Improvements**

The northbound ramps (on and off) have a single lane approach approximately 16 feet wide while the crossroad, Access Road, is a two lane facility with a posted speed of 35 mph with a paved surface of 24 to 34 feet.

Currently, the ramp terminal design does not provide a turning radius large enough to accommodate truck traffic design vehicles without crossing into other travel lanes. This design challenge is predominantly focused on the southwest corner for the westbound left-turn movement from the northbound on-ramp. In addition to the truck traffic experiencing difficulties (occasionally creating their own path in adjacent lanes), large and/or long recreational vehicles may also have difficulties navigating the ramp terminal.

Concept R-6 would modify the southwest corner (westbound left turn) to provide a turning radius sufficient to handle a typical design truck (WB-67), as shown in Figure 6-6. The purpose of the improvement is to improve safety for larger loads.

#### **Concept R-6 – Traffic Operations and Safety**

Existing ADT traffic volumes on Access Road are 3,800 to 5,450 vehicles per day (vpd) while the ramp is approximately 2,250 vpd. Future 2038 volumes on Access Road are estimated at 4,750 to 6,800 vpd; the forecast southbound ramp ADT is approximately 2,800 vpd. There were seven crashes reported at the northbound ramp terminal during the 5-year analysis period (2007-2011), including one serious injury. Four of the crashes included a collision with a fixed object, three were in the northbound direction and involved guardrail. The observed intersection crash rate exceeds the statewide critical crash rate.

The improvement associated with Concept R-6 would move the guardrail in the southwest corner back and improve the overall safety of the intersection (less chance of semi-trailers tracking into other travel lanes) but is not anticipated to change the capacity of the intersection. The increased turning radius would allow heavy vehicles to turn at higher speeds and accelerate more comfortably.

#### **Concept R-6 – Basic Roadway Geometries and Right-of-Way Requirements**

The improvement would widen the shoulder up to 23 feet with guardrail in the southwest corner of the northbound ramp terminal. The existing land within the improvement area is all ODOT jurisdiction and ROW.

#### **Concept R-6 – Environmental and Land Use Assessment**

Rural residential is the only adjacent land use but no additional ROW is needed. No socioeconomic impacts are anticipated.

There are no documented environmental resources near Concept R-6, though the increased impervious surface area may produce additional stormwater that would need to be treated.

## Concept R-6 – Cost Opinions

The estimate for this concept is \$160,000.

### **6.4.7. Concept I-1 – 2<sup>nd</sup> Avenue/Blackwell Road/Access Road Intersection Modifications**

2<sup>nd</sup> Avenue/Blackwell Road is a 2-lane facility with a posted speed of 40 mph through the Access Road intersection. Access Road is also a 2-lane facility and provides access between I-5, adjacent neighborhoods, and recreational facilities. Additionally, Upper River Road intersects Blackwell Road just west of Access Road creating an off-set intersection. Upper River Road crosses under the Southern Pacific Railroad and runs parallel to the Rogue River, a recreational attraction.

Concept I-1 has two options:

- Option A would modify the intersection traffic control to an all-way STOP to make it easier to turn left from Access Road to 2nd Avenue.
- Option B would include the all-way STOP control and add a westbound left-turn lane to facilitate access to the I-5 interchange.

Figure 6-7 illustrates Option B of Concept I-1.

## Concept I-1 – Traffic Operations and Safety

Existing traffic volumes on 2<sup>nd</sup> Avenue, Blackwell Road, and Access Road are 5,800, 2,500, and 5,500 vehicles per day (vpd), respectively. Future 2038 volumes are respectively estimated at 6,500, 3,500, and 6,800 vpd. There were four total crashes at this intersection, three resulting in minor injuries, during the five-year analysis period. The crashes were dispersed among the movements with no apparent pattern.

- Option A: The modification to a conventional all-way STOP would improve the overall safety of the intersection and meet driver expectancy. The traffic control modification would slow all movements at the intersection and make it easier to turn left from Access Road towards Gold Hill. In turn it would slow traffic through the area (not just the intersection) making the off-set access to Upper River Road more noticeable and thus ingress and egress, improving the safety. Furthermore, the all-way STOP would facilitate non-motorized crossings of 2<sup>nd</sup> Avenue/Blackwell Road for resident and recreational users alike, thus non-motorized safety is also improved. Existing intersection operations, with proposed all-way STOP indicate the northbound left-right movement v/c ratio is well below capacity and standard (0.44), while the future operations for the same movement would be 0.55; well below standard and capacity.
- Options B: Adding the left-turn lane with the all-way STOP would provide similar benefits as Option A but would increase capacity on Blackwell Road by separating the left-turning movements from the through movements. The left-turn lane criteria were evaluated and met for the westbound left-turn movement. Installation of guardrail on

the east side (Blackwell Road) would also improve safety for motorized traffic from the steep ditch which runs parallel to 2<sup>nd</sup> Avenue/Blackwell Road.

### Concept I-1 – Basic Roadway Geometries and Right-of-Way Requirements

Design and ROW needs vary with each option:

- Option A: The traffic control modification for Option A would not require any geometric modifications to the intersection.
- Option B would have geometric modifications. Existing cross section along 2<sup>nd</sup> Avenue/Blackwell Road includes two 12' travel lanes with two-foot shoulder (paved width of 24-28 feet), while Access Road also has two 12' travel lanes the shoulder width is only one-foot (paved width of 24-34 feet). Adequate ROW exists along both roadways (2<sup>nd</sup> Avenue and Blackwell Road) for improvements. Option B would construct a 14' left-turn lane and 8' (Blackwell Road) to 12' (2<sup>nd</sup> Avenue) shoulders. Significant fill may be needed to maintain slopes between roadway and ditch, which could have some ROW impacts. Blackwell Road would also include guardrail which would also be an improvement over existing conditions.

### Concept I-1 – Environmental and Land Use Assessment

Adjacent land uses include exclusive farm use (EFU) and rural residential.

- Option A would have no environmental impacts or land use impacts.
- While no buildings appear in the vicinity of the improvements associated with Option B, the widening would impact EFU land. Statewide Planning Goals would need to be considered when impacting EFU zones. The addition of impervious surface area may produce additional stormwater that would need to be treated.

The traffic control modification for both options could make pedestrian crossings at the intersection easier, which could potentially be considered a socioeconomic benefit. Improved pedestrian access generally benefits disadvantaged populations.

### Concept I-1 – Cost Opinions

The cost for Option A of this concept is estimated at \$10,000. The cost for Option B is estimated at \$850,000.

The cost for Option A is considerably lower than Option B because it only includes pavement restriping and signs for the traffic control change while Option B widens the roadway and constructs a new westbound left turn lane and wider shoulders. Neither of these costs includes utility relocation or acquisition of additional ROW. Costs associated with these elements would increase the gap between project costs.

### **6.4.8. Concept I-2 – 2<sup>nd</sup> Avenue/Blackwell Road at Access Road Turning Radius Improvements**

The roadway characteristics for Concept I-2 are the same as those described for Concept I-1.

Currently, the intersection design does not provide a turning radius large enough to accommodate truck traffic design vehicles (WB-67). This design challenge is predominantly focused on the southwest corner. In addition to the truck traffic experiencing difficulties (occasionally creating their own path in adjacent lanes), large and/or long recreational vehicles may also have difficulties navigating the intersection. This intersection is the link between the interchange, city, recreation (including nearby KOA), and alternative access to the nearby intermodal hub at Interchange 35-Seven Oaks.

Concept I-2 would modify the southwest corner (eastbound right turn) to provide a turning radius sufficient to handle a typical design truck (WB-67), as shown in Figure 6-8. The purpose of the improvement is to improve safety for larger loads. It is related to Concept I-1.

#### **Concept I-2 – Traffic Operations and Safety**

Existing traffic volumes on 2<sup>nd</sup> Avenue, Blackwell Road, and Access Road are 5,800, 2,500, and 5,500 vehicles per day (vpd), respectively. Future 2038 volumes are respectively estimated at 6,500, 3,500, and 6,800 vpd. There were four total crashes at this intersection, three resulting in minor injuries, during the five-year analysis period. The eastbound right turning movement was not attributed to any of the minor injury collisions.

The improvements associated with Concept I-3 would improve the overall safety of the intersection (less chance of semi-trailers tracking into other travel lanes) but are not anticipated to change the roadway capacity at the intersection. The increased turning radius would allow heavy vehicles to turn at higher speeds and accelerate more comfortably.

#### **Concept I-2 – Basic Roadway Geometries and Right-of-Way Requirements**

The improvement includes a 12-foot shoulder without guardrail. The existing ROW along 2<sup>nd</sup> Avenue/Blackwell Road is approximately 80 feet (or greater) compared to the roadway width of 24 feet. Along Access Road the roadway width is approximately 24 feet compared to the 40 feet of ROW. The improvement appears to be constructible within the existing ROW.

#### **Concept I-2 – Environmental and Land Use Assessment**

Adjacent land uses include rural residential and EFU. While no buildings appear in the vicinity of the improvements, the widening would impact lands zoned rural residential.

The increased impervious surface area may have stormwater impacts that would need to be treated.

No socioeconomic impacts are anticipated.

### Concept I-3 – Cost Opinions

The estimate for this concept is \$225,000.

#### **6.4.9. Concept I-3 – Access Road/Old Stage Road Turning Radius Improvements**

Access Road is a two lane roadway that changes to Old Stage Road after passing Old Stage Road (side street). Posted speed along the roadway is 45 mph (south of the interchange has a higher posted speed than the northern counterpart). Old Stage Road (side street) is a 2-lane facility with a posted speed of 45 mph. Access Road provides access between I-5, adjacent neighborhoods, the Moose Family Center, and recreational areas.

Currently, the intersection design does not provide a turning radius large enough to accommodate truck traffic design vehicles. This design challenge is predominantly focused west of the intersection on both the north and south corners. In addition to the truck traffic experiencing difficulties (occasionally creating their own path in adjacent lanes), large and/or long recreational vehicles may also have difficulties navigating the intersection. The intersection area is an opportunity for new development and may be affected by the configuration of this intersection. There were no crashes reported during the 5-year analysis period (2007-2011).

Concept I-3 would modify the northwest corner (southbound right turn) as well as the southwest corner (northbound left turn) to provide a turning radius sufficient to handle a typical design truck (WB-67), as shown in Figure 6-8. The purpose of the improvement is to improve safety for larger loads and remove potential barriers to new interchange commercial development.

### Concept I-3 – Traffic Operations and Safety

Current traffic volumes along Access Road are approximately 2,550 vpd and 400 vpd along Old Stage Road. The forecast 2038 daily volumes are anticipated to increase slightly to approximately 3,200 vpd and 450 vpd for Access Road and Old Stage Road, respectively. The improvements associated with Concept I-3 would improve the overall safety but are not anticipated to change the roadway capacity at the intersection. The increased turning radius would allow heavy vehicles to turn at higher speeds, accelerate more comfortably, and reduce the delay for through vehicles.

### Concept I-3 – Basic Roadway Geometries and Right-of-Way Requirements

This improvement considers two locations for improvement, the northwest and the southwest corners. Both corners include 12' shoulders without guardrail. The existing ROW along Access Road/Old Stage Road is 70 feet (or greater) compared to the roadway width of 34 feet. Along Old Stage Road (side street) the roadway width is approximately 21 feet compared to the 65 feet (or more) of ROW. Both improvements appear to be constructible within the existing ROW.

### Concept I-3 – Environmental and Land Use Assessment

The widening is located on EFU (northwest corner) and interchange commercial (southwest corner) lands; the Moose Family Center is located in the southwest corner. The bulk of the intersection appears to be within ODOT interchange ROW, but may have impacts to other adjacent land uses. Statewide Planning Goals would need to be considered when impacting EFU zones.

Environmental impacts are not anticipated though Kane Creek is nearby (to the north). However, the increased impervious surface area may produce additional stormwater that would need to be treated.

### Concept I-3 – Cost Opinions

The estimated cost associated with the improvement is \$165,000 for the northwest corner improvements and \$115,000 for the southwest corner. Cost estimates do not consider ROW acquisition, if needed.

#### **6.4.10. Concept MM-1 – 2<sup>nd</sup> Avenue (OR 99) Bridge Multimodal Improvements**

The link between downtown Gold Hill and Exit 40 is provided by the Gold Hill Bridge (ODOT Bridge 00576). It is a historic 2-lane structure that is 20 feet wide, built in 1927. In 1995 a 6 foot cantilevered path was added to the south side to provide a separated non-motorized access across the river to and from the city. To the north is a railroad bridge that closely parallels the Gold Hill Bridge.

Pedestrians primarily use the cantilevered path for travel in both directions across the bridge. The width is constraining when passing another user. Bicyclists can either chose to ride with traffic across the bridge or along the cantilevered path, depending on the riders comfort level. Operationally, passing opposing users and serving a mix of mode types on the cantilevered pathway is an issue. Additionally, westbound travelers who start or end their trip on the north side of the roadway have to cross to the south side to gain access to the existing pathway.

Concept MM-1 considers improvements to the multimodal options across the Gold Hill Bridge. This improvement concept includes the following options for consideration:

- Option A would add sharrows and signage to travel lanes
- Option B would widen existing cantilevered pathway (south side)
- Option C includes Option A and a new cantilevered pathway on north side
- Option D would construct a new multiuse path bridge connecting the Gold Rogue Sports Park to Upper River Road, north of the railroad bridge (approximately 250' in length)

These options are all shown schematically in Figure 6-10.

### Concept MM-1 – Traffic Operations and Safety

There is no documented crash history associated with the existing cantilevered path. Vehicular capacity is not anticipated to change; non-vehicular level of service and safety could be improved by providing additional facilities as presented in any of these options:

- Option A would alert motorized traffic to the presence of non-vehicular traffic which may be sharing the roadway. Roadway speed is a concern for this type of installation and may trigger a Condition C approval process. Consideration could be given to moving the speed zone to the east of the Access Road intersection, but would require State Traffic Engineer approval.
- Option B would provide a wider pathway to better facilitate the mix and passing of users, but would still require westbound users originating on and/or destined for the north side of the roadway to cross the road at least once.
- Option C would allow users an opportunity to cross over the bridge without crossing the roadway as well as provide a wider than existing pathway, but would be closer to the existing railroad which may be a safety issue.
- Option D would provide a dedicated non-vehicular bridge with adequate width to serve a mix of modes and directions. However, Option D would also result in a less direct route as users would need to detour beyond the adjacent railroad bridge.

### Concept MM-1 – Basic Roadway Geometries and Right-of-Way Requirements

Design and ROW needs vary with each option:

- Option A would not result in any changes to roadway geometry or ROW impacts.
- Option B would not modify the existing roadway geometry of the bridge itself; however, it would replace and widen the existing 6-foot path to 8 feet and affect the aesthetics and historical nature of the bridge on the south side. Option B can be constructed within existing ROW.
- In addition to the impacts described for Option B, Option C would compromise the aesthetics of the north side of the bridge by adding a new cantilevered pathway (8-feet wide) as well as safety concerns due to the close proximity of the Southern Pacific Railroad. Option C would likely require coordination with Southern Pacific Railroad for an easement.
- Option D would include a new multiuse path bridge that includes 10 feet of travel width, 2 feet shy distance on each side, and railing (total of 15 feet wide). It would require new non-motorized connections to the existing roadway network. Option D would require new ROW, the extents to be determined at time of placement and design.

### Concept MM-1 – Environmental and Land Use Assessment

The Rogue River carries summer and winter Steelhead and fall and spring Chinook, Coho Salmon, and Pacific Lamprey and will be affected by all of the options. Additionally impacts include:

- Option A would have minimal, if any, additional environmental impacts and no land use impacts.
- In the case of Option B, there are also nearby freshwater emergent wetlands. The land use adjacent to, and east of, the existing bridge is zoned rural residential. No land use impacts are anticipated. Some increase in impervious surface area may require additional stormwater treatment.
- Option C also has nearby freshwater emergent wetlands. No land use impacts are anticipated on the on the east side of the bridge. Option C would likely require coordination with Southern Pacific Railroad for an easement. Increased impervious surface area may require additional stormwater treatment.
- Depending on the placement of the new bridge, Option D could affect nearby lands zoned rural residential and EFU. Statewide Planning Goals would need to be considered when impacting EFU zones. There may also be nearby freshwater emergent wetlands. The impervious surface of the new bridge would produce additional stormwater that would need to be addressed as part of the project.

Any of these options could provide socioeconomic benefits by improving non-motorized access across the river. Improved pedestrian and bicycle access generally benefits disadvantaged populations.

### Concept MM-1 – Cost Opinions

The cost opinions for concepts involving bridge construction (Options B, C and D) include work bridge and falsework considerations; however, they do not include 50% E & C, roadway, TP&D costs, or inflation. The costs of Concept MM-1 vary as follows:

- Option A – \$10,000
- Option B – \$400,000
- Option C – \$700,000
- Option D – \$1,400,000

#### **6.4.11. Concept MM-2 – Blackwell Road – Multimodal Access**

Blackwell Road is a 2-lane facility with a posted speed of 40 mph (which reduces to 30 just west of the Access Road intersection). It includes narrow shoulders (2 feet) and drainage ditches on both sides. It also provides access to Exit 40, area homes, recreational facilities, and a campground. Currently non-motorized traffic must travel on the edge of the roadway pinched between higher speed vehicles and a deep drainage ditch, which is a safety concern.

Concept MM-2 would provide a multi-use path adjacent to the roadway between Access Road and the campground, separate the traffic modes, and enhance non-motorized access along the roadway. The path would be 10 feet wide and located on the south side of the roadway, as shown in Figure 6-11.

### Concept MM-2 – Traffic Operations and Safety

Existing ADT traffic volumes on Blackwell Road are 2,500 vpd. Future 2038 volumes are estimated as 3,500 vpd. Crash data for Blackwell Road was not assessed east of the intersection with Access Road.

The addition of a multi-use path is not anticipated to effect vehicular operations, though it will improve the experience of non-motorized users. The separation of traffic modes would enhance the overall safety.

### Concept MM-2 – Basic Roadway Geometries and Right-of-Way Requirements

The existing cross section along Blackwell Road includes two 12' travel lanes with two-foot shoulders (one in each direction). The multi-use path was assumed to be 10 feet wide and include 3-foot gravel shoulders per the Oregon Bicycle and Pedestrian Guide. The existing ROW along Blackwell Road is approximately 80 feet (or greater) compared to the roadway width of 24 feet. The path could possibly be constructed within existing ROW but may require some ROW acquisition on the south side of the roadway.

### Concept MM-2 – Environmental and Land Use Assessment

Adjacent lands are zoned rural residential. While no buildings appear in the vicinity of the improvements, the widening would impact adjacent properties. The increased impervious surface area may require additional stormwater treatment.

Concept MM-2 could provide socioeconomic benefits because improved pedestrian and bicycle access generally benefits disadvantaged populations.

### Concept MM-2 – Cost Opinions

The estimated cost of Concept MM-2 is approximately \$215,000

### **6.4.12. Concept MM-3– 2<sup>nd</sup> Avenue/Blackwell Road/Access Road Expanded Multimodal System**

Exit 40 and Access Road provide access to the City of Gold Hill and surrounding recreational areas. However, the continuity of access for non-motorized users is sporadic. This concept (MM-3) considers a 2<sup>nd</sup> Avenue bridge undercrossing as well as a multi-use path linking Access Road with the cantilevered path on the east side of the bridge.

With this concept it is possible to avoid crossing 2<sup>nd</sup> Avenue/Blackwell Road, instead rerouting users to a multi-use path between Upper River Road and Access Road, under the railroad and Gold Hill bridges, as shown in Figure 6-12. This connection would remove the conflicts between motorized and non-motorized modes while still providing a safe crossing opportunity and access to nearby recreational sites. A connection between the 2<sup>nd</sup> Avenue Bridge and this multi-use path is also considered; however, because this connection could also be combined with other improvements, its benefits and impacts are itemized separately.

### Concept MM-3 – Traffic Operations and Safety

There is no documented non-motorized crash history in this area, but all modes could benefit by distinctly identifying areas for non-motorized traffic. The multi-use path from Access Road, under the bridges, to Upper River Road would enhance the crossing safety for non-motorized users by separating them from vehicular traffic. Vehicular traffic would also experience safety benefits with a reduction of (non-motorized) conflict points at the intersection.

Operationally, the impact to vehicles would be marginal, primarily reducing the potential need to stop for a pedestrian or cyclist. The level of service/experience for non-motorized users would be improved.

After crossing the bridge, the roadway shoulder narrows and there is a grade differential with the adjacent land (it is substantially lower), making the trek by bike or on foot disconcerting. Providing a connection to this pathway undercrossing would allow users to separate from the roadway enhancing the safety of all modes. The connection between the 2<sup>nd</sup> Avenue Bridge and this new path is not anticipated to have any operational impacts to vehicles, but would improve level of service/experience for non-motorized users.

### Concept MM-3 – Basic Roadway Geometries and Right-of-Way Requirements

The multi-use path was assumed to be a 10-foot wide asphalt concrete path with 3 feet gravel shoulders. It is anticipated to have ROW impacts; however, the extent cannot be determined until time of design.

The connection path was assumed to be seven (7) feet wide and approximately 250 feet long. It would include a tubular steel railing for the entire length and upgrade guardrail on the south side of 2<sup>nd</sup> Avenue. No retaining wall would be needed. It would also likely have ROW impacts; however, the location and extent cannot be determined until the design phase.

### Concept MM-3 – Environmental and Land Use Assessment

The land east of the 2<sup>nd</sup> Avenue bridge is zoned rural residential to the south and EFU to the north. Statewide Planning Goals would need to be considered when impacting EFU zones. Additional ROW acquisition would impact lands in the vicinity.

The bridge spans the Rogue River which carries summer and winter Steelhead and fall and spring Chinook, Coho Salmon, and Pacific Lamprey and may be affected. Within the Rogue River are nearby freshwater emergent wetlands.

The increased impervious surface area may require additional stormwater treatment.

This concept could provide socioeconomic benefits by improving non-motorized access across the roadways and river. Improved pedestrian and bicycle access generally benefits disadvantaged populations.

## Concept MM-3 – Cost Opinions

The estimated cost of the multi-use path crossing under the bridge is approximately \$300,000. The cost of the connecting pathway is approximately \$200,000.

### 6.5. I-5 Exit 43 Concept Evaluation

I-5 Exit 43 provides access to the City of Gold Hill from the north and serves nearby recreational areas. This interchange includes five crossroads in addition to Main Street, the main roadway (listed from north to south): 2<sup>nd</sup> Avenue (OR 99), River Road, Lampman Road, Rogue River Highway, Frontage Road and Profetta Lane. Roadway characteristic details are presented in Technical Memorandum #3: Study Area Inventory. In general, all roadways are two lanes with pavement width ranging from 18-28 feet. There are no signalized intersections in the IMSA. Posted speed, functional classification, and average daily traffic (ADT) also influence concept development. IMSA characteristics include:

- Posted speed is 45 mph along all IMSA roadways.
- Roadway classifications include rural minor arterial (both Main Street and OR 234/Rogue River Highway/OR 99), rural major collector (N River Road), and local (Lampman Road, Profetta Lane and Frontage Road).
- Existing ADT is approximately 200-1,300 vpd along Main Street; the ADT along the side streets OR 234/Rogue River Highway/OR 99 (~1,600-2,300 vpd), River Road (~1,100 vpd), Lampman Road (~500), Frontage Road (~130), and Profetta Lane (~70 vpd).
- Forecast ADT for year 2038: Main Street (200-1,500 vpd), OR 234/Rogue River Highway/OR 99 (~1,900-2,700 vpd), River Road (~1,200 vpd), Lampman Road (~500), Frontage Road (~130), and Profetta Lane (~70 vpd).

There are 10 improvement concepts for this interchange, several of which have varying options to consider. A brief summary of the concepts are presented in Table 6-2. The following sections discuss in detail the potential changes and improvements that are specific to this interchange.

**Table 6-2. I-5 Exit 43 Improvement Concepts**

ID	Location	General Description	Purpose	Benefit
R-1	Southbound Off Ramp	Extend southbound off ramp	Provide adequate deceleration distance	Safety, Freight
R-2	Southbound Ramp Terminal	Improve turning radii	Accommodate truck traffic (WB-67)	Safety, Freight
R-3	Northbound Off Ramp	Extend northbound off ramp	Provide adequate deceleration distance	Safety, Freight
R-4	Northbound Ramp Terminal	Improve turning radii	Accommodate truck traffic (WB-67)	Safety, Freight
I-1	Rogue River Highway at Main Street	Provide for all modes at the intersection <ul style="list-style-type: none"> <li>▪ <u>Option A</u>: Add crosswalk on west side of intersection</li> <li>▪ <u>Option B</u>: Modify the traffic control and add crosswalks on multiple approaches</li> </ul>	Enhance opportunities and increase the safety of the pedestrian crossing of OR 99	Safety, Multimodal

**Table 6-2. I-5 Exit 43 Improvement Concepts**

ID	Location	General Description	Purpose	Benefit
I-2	Main Street at Rogue River Highway (OR 99 and OR 234)	Improve turning radii	Accommodate truck traffic (WB-67)	Safety, Freight
I-3	2 <sup>nd</sup> Avenue/River Road at Rogue River Highway	Provide for all modes at the intersection <ul style="list-style-type: none"> <li>▪ <u>Option A</u>: Improve turning radii</li> <li>▪ <u>Option B</u>: Modify the traffic control (2 stopped approaches to all way STOP), and crosswalk</li> </ul>	Accommodate truck traffic (WB-67) and enhance opportunities and safety of the pedestrian crossing	Safety, Freight, Multimodal
MM-1	Study Area roadways	Enhance multimodal access along study area roadways <ul style="list-style-type: none"> <li>▪ <u>Option A</u>: Add sharrows and/or signage to roadway</li> <li>▪ <u>Option B</u>: Widen shoulders where ROW permits</li> <li>▪ <u>Option C</u>: Add signage and activated warning lights</li> </ul>	Provide facilities along Main Street, River Road, and Rogue River Highway for all modes of travel	Multimodal, Safety
MM-2	OR 234/OR 99 Rock Point Bridge (ID 00332A)	Enhance multimodal access across the bridge <ul style="list-style-type: none"> <li>▪ <u>Option A</u>: Add sharrows and/or signage</li> <li>▪ <u>Option B</u>: Construct cantilevered paths on both sides of bridge</li> <li>▪ <u>Option C</u>: Build a new structure</li> </ul>	Provide facilities along Rock Point Bridge for all modes of travel	Multimodal, Safety

### **6.5.1. Concept R-1 – Southbound Off Ramp Extension**

The southbound off ramp is a single lane with an approximate width of 16 feet. It has a gradual incline to the ramp terminal, intersection with Main Street. The exit speed on the ramp is 45 mph and the current ramp deceleration length is approximately 280 feet. Like Exit 40, there is a variety of vehicle types that use Exit 43 including trucks and recreational (campers and vehicles with boat trailers).

The desired ramp deceleration distance is 345 feet. The less than desirable ramp length is noticed by all of the vehicles and may become a safety issue if queues get longer or multiple trucks/recreational vehicles use the off ramp at the same time. Main Street provides the link between the interchange and Rogue River Highway which provides access to residential areas, area businesses, and recreational sites.

During the five year analysis period there were four crashes reported along the southbound off-ramp of Exit 43. There was no identifiable crash pattern as each crash was a different collision type: rear-end, fixed object, side-swipe, and other. Half of the crashes resulted in minor injuries (2), while the other half resulted in property damage only (2).

The improvement would extend the southbound off ramp with the purpose of providing adequate deceleration distance and improving safety, as shown in Figure 6-13.

### Concept R-1 – Traffic Operations and Safety

Existing ADT traffic volumes on the southbound off ramp are approximately 500 vpd. Future 2038 off ramp ADT volumes are estimated at 600 vpd. The benefits would be similar to those identified for the off-ramp extension identified at Exit 40: enhanced the safety and a more comfortable deceleration experience, and longer storage at the ramp terminal. Overall, the operations are not expected to change with this improvement.

### Concept R-1 – Basic Roadway Geometries and Right-of-Way Requirements

Concept R-1 would extend the length of the southbound off ramp to meet the applicable roadway design standards. The longer ramp length would result in a more gradual elevation gain and longer distance to stop. All improvements are anticipated to be within ODOT ROW.

### Concept R-1 – Environmental and Land Use Assessment

Adjacent land uses include rural residential, rural light industrial and exclusive farm use (EFU) and the West Valley Wildlife Area is located to the south. No ROW impacts are anticipated for any of these lands.

An unknown Hazardous waste site has been identified near the off ramp diverge from I-5. Additional investigation into the extent of hazardous materials in the area may be required.

The increased impervious surface area may produce additional stormwater that would need to be treated.

No socioeconomic impacts are anticipated.

### Concept R-1 – Cost Opinions

The estimate for this concept is \$370,000.

### **6.5.2. Concept R-2 – Southbound Ramp Terminal Turning Radius Improvements**

Main Street is a 2-lane facility that provides access between I-5, adjacent neighborhoods, and recreational facilities. There is no posted speed. During the 5-year analysis period (2007-2011) there were no crashes reported along Main Street near the southbound ramp terminal.

Currently, the ramp terminal design does not provide a turning radius large enough to accommodate truck traffic design vehicles (WB-67). This design deficiency is predominantly focused on the southwest corner. In addition to the truck traffic experiencing difficulties (occasionally creating their own path in adjacent lanes), large and/or long recreational vehicles may also have difficulties navigating the ramp terminal.

Concept R-2 would modify the southwestern corner (for eastbound right turn from the off ramp) to provide a turning radius sufficient to accommodate a typical design truck (WB-67), as shown in Figure 6-13. The purpose of the improvement is to improve safety for larger loads.

### Concept R-2 – Traffic Operations and Safety

Existing ADT traffic volumes along Main Street range from 200 to 900 vpd while the southbound off ramp is approximately 500 vpd. Future 2038 ADT volumes along Main Street would range from 200 to 900 vpd, while the southbound off ramp ADT volumes are estimated at 600 vpd. The improvements associated with Concept R-2 would improve the overall safety of the intersection (less chance of semi-trailers tracking into other travel lanes) but are not anticipated to change the traffic operations at the intersection. The increased turning radius would improve access to the light industrial lands on Frontage Road to the west.

### Concept R-2 – Basic Roadway Geometries and Right-of-Way Requirements

The improvement is located in the southwestern corner of the ramp terminal and would widen the paved section of roadway between the southbound off ramp and Profetta Lane (parallel to Main Street) up to 28 feet to facilitate the eastbound right turn of a WB-67. All improvements are anticipated to be within ODOT ROW.

### Concept R-2 – Environmental and Land Use Assessment

Adjacent land uses include rural residential, rural light industrial and exclusive farm use (EFU). The West Valley Wildlife Area is located to the south, though impacts are not anticipated.

The increased impervious surface area may produce additional stormwater that would need to be treated but no environmental or natural resource impacts are anticipated as a result of the improvement.

No socioeconomic impacts are anticipated.

### Concept R-2 – Cost Opinions

The estimate for this concept is \$150,000.

### **6.5.3. Concept R-3– Northbound Off Ramp Extension**

The northbound off ramp is a single lane with an approximate width of 16 feet. The exit speed on the ramp is 45 mph and the current ramp deceleration length is approximately 305 feet. The taper length for this ramp is 187 feet. Like its southbound counterpart (Concept R-1 – Southbound Off Ramp Extension) there are a variety of vehicle types that use the northbound ramp including trucks and recreational (campers and vehicles with boat trailers).

The desired ramp deceleration distance is 345 feet and the taper is 215 feet. The deceleration distance is less than the desirable length and may become a safety issue if the length of queues

increases. Main Street provides the link between the interchange and Rogue River Highway which provides access to residential areas, area businesses, and recreational sites.

The improvement would extend the northbound off ramp to provide adequate deceleration distance (include guardrail for the length of the improvement) with the purpose of improving safety, as shown in Figure 6-14.

### Concept R-3 – Traffic Operations and Safety

The northbound off ramp has an existing ADT of 300 vpd and future (2038) ADT volume forecast of 350 vpd. During the five year analysis period there were no crashes reported for the northbound off ramp.

The benefits would be similar to the southbound off ramp extension (R-1): a more comfortable deceleration experience and additional storage for queuing at the ramp terminal. Overall, the operations are not expected to change with this improvement, but safety would be enhanced.

### Concept R-3 – Basic Roadway Geometries and Right-of-Way Requirements

Concept R-3 would extend the length of the northbound off ramp to meet the applicable roadway design standards. All improvements are anticipated to be within ODOT ROW.

### Concept R-3 – Environmental and Land Use Assessment

The adjacent land use is EFU and the Rogue River is nearby. However, no impacts are anticipated to these resources.

The increased impervious surface area may produce additional stormwater that would need to be treated. No socioeconomic impacts are anticipated.

### Concept R-3 – Cost Opinions

The estimate for this concept is \$550,000.

### **6.5.4. Concept R-4 – Northbound Ramp Terminal Turning Radius Improvements**

Main Street is a 2-lane facility that provides access between I-5, adjacent neighborhoods, and recreational facilities. There is no posted speed.

The northeast corner (westbound right turn from the off ramp) of the ramp terminal design does not provide a turning radius large enough to accommodate truck traffic design vehicles (WB-67). In addition to the truck traffic experiencing difficulties (occasionally creating their own path in adjacent lanes), large and/or long recreational vehicles may also have difficulties navigating the ramp terminal. During the 5-year analysis period (2007-2011) there were no crashes reported along Main Street near the southbound ramp terminal.

Concept R-4 would modify the northeast corner to provide a turning radius sufficient to handle a typical design truck (WB-67), as shown in Figure 6-14. The purpose of the improvement is to improve safety for larger loads.

### Concept R-4 – Traffic Operations and Safety

Existing ADT traffic volumes along Main Street range from 750 to 1,250 vpd while the northbound off ramp is approximately 300 vpd. Future 2038 ADT volumes along Main Street would range from 900 to 1,500 vpd, while the northbound off ramp ADT volumes are estimated at 350 vpd.

As with Concept R-2 – Southbound Ramp Terminal Turning Radius Improvements, Concept R-4 would improve the overall safety of the intersection (less chance of semi-trailers tracking into other travel lanes) but are not anticipated to change the intersection capacity or traffic operations. The increased turning radius would improve access to the Rogue River Highway and adjacent interchange commercial lands.

### Concept R-4 – Basic Roadway Geometries and Right-of-Way Requirements

The improvement is located in the northeastern corner of the ramp terminal and would widen the paved section of roadway between the northbound off ramp and the Rogue River Highway (parallel to Main Street) up to 17 feet to facilitate the westbound right turn of a WB-67. All improvements are anticipated to be within ODOT ROW.

### Concept R-4 – Environmental and Land Use Assessment

The adjacent land use is interchange commercial and EFU. Nearby is the Rogue River and a freshwater emergent wetland. Because no additional ROW is required, no impacts to these resources are anticipated.

The increased impervious surface area may produce additional stormwater that would need to be treated. No socioeconomic impacts are anticipated.

### Concept R-4 – Cost Opinions

The estimated cost of Concept R-4 is approximately \$60,000.

## **6.5.5. Concept I-1 – Rogue River Highway/Main Street Intersection Modifications**

Rogue River Highway (also known as OR 99 and OR 234, parallel alignment) is a 2-lane facility with a posted speed of 45 mph through the Main Street intersection. Main Street is also a 2-lane facility that provides access between I-5, adjacent neighborhoods, and recreational facilities.

Currently, the intersection functions with STOP-controlled movements in the eastbound direction (all movements) and for the northbound left-turn movement (northbound right turns

and westbound movements do not need to stop); a nonconventional arrangement. While pedestrians can legally cross an intersection it is confusing to do so at an unconventional intersection, particularly if there is no marked crosswalk.

This concept would improve the pedestrian crossing experience and has two options as shown in Figure 6-15:

- Option A would stripe a crosswalk on the west side of the intersection and add signage to alert users to look for oncoming westbound traffic
- Option B would modify the intersection traffic control to a conventional all way STOP configuration as well as add marked crosswalks. The purpose of the project is to enhance crossing opportunities and overall safety.

### Concept I-1 – Traffic Operations and Safety

Existing ADT traffic volumes on Rogue River Highway range from 400 vpd (west of the intersection) to 1,800 vpd (to the east); while Main Street is 1,800 vpd. Future 2038 volumes are estimated at 450 to 2,150 vpd along the Rogue River Highway and 1,250 vpd along Main Street. Pedestrian data is not available at this time. There were no crashes reported at this intersection during the five-year analysis period.

- Option A, adding the crosswalk striping along the west side, would have nominal operational impacts for westbound traffic and no additional operational impacts to the currently stopped movements. While Option A provides a clearly marked crosswalk it may also provide a false sense of security to pedestrians and potentially make the intersection less safe. While no crashes were reported the potential for crashes is higher at unconventional intersections.
- Option B, modifying traffic control to a conventional all way STOP, would result in more of an operational impact as all westbound traffic would have to stop, not just those waiting for a pedestrian. Overall, Option B (all-way STOP) would operate acceptably with an existing v/c ratio of 0.13 (westbound left-through movement, worst movement) and 0.15 (same movement). A traffic control modification such as Option B would slow all movements, meet driver expectancy, provide a designated crosswalk, and improve the safety of the intersection. By slowing drivers down in a conflict area, and facilitating non-motorized crossings of Rogue River Highway for residents and recreational users alike, non-motorized safety is also improved.

### Concept I-1 – Basic Roadway Geometries and Right-of-Way Requirements

The existing cross-section along Rogue River Highway includes two 12' travel lanes with minimal shoulder (approximately 2 feet). Both Option A and Option B would not require additional pavement or lane width therefore no additional ROW would be required.

## Concept I-1 – Environmental and Land Use Assessment

No environmental or land use impacts have been identified for this concept. The concept could provide socioeconomic benefits by improving non-motorized access in the IMSA. Improved pedestrian and bicycle access generally benefits disadvantaged populations.

## Concept I-1 – Cost Opinions

Costs for this concept would be:

- Option A: \$7,000
- Option B: \$10,000

### **6.5.6. Concept I-2– Rogue River Highway/Main Street Turning Radius Improvements**

Rogue River Highway (also known as OR 99 and OR 234, parallel alignment) is a 2-lane facility with a posted speed of 45 mph through the Main Street intersection. Main Street is also a 2-lane facility that provides access between I-5, adjacent neighborhoods, and recreational facilities.

As discussed in Concept I-1 – Rogue River Highway/Main Street Intersection Modification, this intersection does not operate with convention STOP control. Intersection truck turning templates were evaluated for a WB-67 (typical design vehicle) and determined that the eastbound right turn (from Rogue River Highway to southbound Main Street) cannot be made within the existing travel lane. This is a safety concern for motorists when trucks need to swing wide into oncoming traffic lanes and non-vehicular traffic if the truck needs to cut the corner and infringe on the shoulder/bikeway. The intersection area is an opportunity for new development and may be affected by the configuration of this intersection.

This concept would increase the turning radius on the southwest corner of the intersection, as shown in Figure 6-16, to provide improved safety for all modes, enhance the connections to area businesses and recreational areas, and remove potential barriers to new interchange commercial development

## Concept I-2 – Traffic Operations and Safety

The improvement associated with Concept I-2 is not anticipated to change the capacity or traffic operations at the intersection. The increased turning radius would allow heavy vehicles to turn at higher speeds and accelerate more comfortably. The Concept I-2 improvements would improve the overall safety at the intersection by providing adequate space to serve all modes.

During the five year analysis period there were no crashes reported at this intersection.

## Concept I-2 – Basic Roadway Geometries and Right-of-Way Requirements

The improvements would widen the southwest corner to accommodate a WB-67 and may require additional ROW. Physical constraints include the adjacent utility corridor.

## Concept I-2 – Environmental and Land Use Assessment

Adjacent lands are zoned interchange commercial, rural residential, and EFU. The improved eastbound truck turning radius would serve the commercially zoned property located to the west of the intersection on the south side.

Freshwater emergent wetlands are nearby, but likely beyond the ROW impacts associated with Concept I-2. However, the increased impervious surface area may produce additional stormwater that would need to be treated.

No socioeconomic impacts are anticipated.

## Concept I-2 – Cost Opinions

The estimated cost of Concept I-3 is \$160,000.

### **6.5.7. Concept I-3 – Rogue River Highway/2<sup>nd</sup> Avenue/N. River Road Intersection Enhancements**

Rogue River Highway (OR 99 and OR 234 alignments, also known as 2<sup>nd</sup> Avenue) and N. River Road are 2-lane facilities. The posted speed along both roadways is 45 mph. N. River Road provides access to a nearby quarry, while the Rogue River Highway provides access to the northern part of Gold Hill. The intersection is skewed and has unconventional traffic control.

Intersection truck turning templates were evaluated for a WB-67 (typical design vehicle) and determined that the eastbound right turn (from N. River Road to southbound Rogue River Highway) cannot be made while maintaining a single travel lane. This is a safety concern for motorists when trucks need to swing wide into oncoming traffic lanes and non-vehicular traffic if the truck needs to cut the corner and infringe on the shoulder/bikeway.

There are two options (shown in Figure 6-17) for this concept:

- Option A addresses the eastbound truck turning movement by widening the southwest corner.
- Option B would realign the southern leg (bridge access) of the intersection at a near 90-degree angle to create a conventional all-way STOP while in the process addressing the truck turning limitations and adding crosswalks.

A third realignment option (realignment of N. River Road as a single stopped approach) was considered but discarded due to environmental and physical constraints. Environmental constraints include Sardine Creek Wildlife area. Physical constraints include the adjacent utility

corridor, railroad tracks, Rogue River, and the Rogue River Bridge (a historic structure with 18 feet width). The land and environmental impacts were assumed to be too great.

The purpose of this concept is to provide improved safety for all modes and enhance the connections to area businesses and recreational areas.

### Concept I-3 – Traffic Operations and Safety

The northbound approach of Rogue River Highway is the movement with the worst v/c ratio, currently operating at 0.09. During the five year analysis period there were no crashes reported at this intersection.

- Option A would improve the overall safety but is not anticipated to change the traffic capacity or operations at the intersection. The increased turning radius would allow heavy vehicles to turn at higher speeds and accelerate more comfortably. Increasing the turning radius will potentially impact a new multiuse path on the south side of N. River Road.
- Option B would realign the intersection to address both the truck turning deficiency and the unconventional traffic control at the intersection. Crosswalks could also be added with the traffic control change. The realignment and truck turning modifications are not anticipated to have capacity impacts; however, the change in traffic control (all-way STOP) would have roadway capacity impacts and would result in a westbound left-through v/c ratio of 0.17 (existing 2012) and 0.20 (2038). While the traffic control would be conventional, it would require highway traffic to stop on a 45 mph facility in a rural area, which is unexpected and a potential safety concern in itself. The project would result in improved safety for trucks turning right onto Rogue River Highway (eastbound right movement), but the additional STOP signs along Rogue River Highway have a potential to increase the number of rear-end collisions or failure to stop at all. While crosswalks would be provided for pedestrians which are a safety improvement, they can create a false sense of security and are only effective if a vehicle stops. The increased turning radius could also impact the new multiuse path on the south side of N. River Road.

### Concept I-3 – Basic Roadway Geometries and Right-of-Way Requirements

Physical constraints include the adjacent utility corridor, railroad tracks, and the historic Rogue River Bridge. Design features and ROW impacts include:

- Option A would widen the southwest corner to accommodate a WB-67 which may require additional ROW. Some fill may be required to increase the turning radius on the southwest corner.
- Option B would realign the southern leg of the Rogue River Highway at the intersection as a 2-lane approach and potentially result in ROW impacts. The degree of ROW impacts will need to be quantified at time of design. Utility poles run perpendicular and adjacent to N. River Road (on both sides). Easements may be required.

### Concept I-3 – Environmental and Land Use Assessment

The adjacent lands are zoned EFU and rural residential. Environmental constraints include the Rogue River which has two classified habitats by ODFW: summer and winter Steelhead and fall and spring Chinook, Coho Salmon, and Pacific Lamprey. The Sardine Creek Wildlife area is located to the north nearby (other side of railroad tracks).

- Option A would have ROW impacts in the southwest quadrant of the intersection. The proximity of the Rogue River and the need to fill near the river is also a concern with this option although impacts may be avoided. The nearby Sardine Creek Wildlife area is another consideration. Any impact to the new multiuse path could trigger Section 6(f) concerns. Additional impervious surface and stormwater treatment would also need to be addressed.
- Option B would have all of the same impacts as Option A although changes on both sides of the intersection would result a greater area of impact.

No socioeconomic impacts are anticipated with either option but the potential impact to the multiuse path could be construed as a negative effect for disadvantaged populations who may be more reliant on non-auto modes of travel.

### Concept I-3 – Cost Opinions

The estimated costs of Concept I-2:

- Option A - \$220,000
- Option B - \$230,000

#### **6.5.8. Concept MM-1– Study Area Roadways Multimodal Improvements**

Study area roadways are narrow, some with minimal lane widths (as narrow as 9 feet across the Rogue River Bridge), most with minimal shoulder widths (1-5 feet), all with no bicycle or pedestrian facilities. Gold Hill is increasingly becoming known for its recreational opportunities including the Rogue River Greenway and cycling routes.

This concept considers improvements along Main Street and Rogue River Highway (bridges will be considered later in Concept MM-2– Rogue River Bridge (Rock Point, 00332A) – Enhance Multimodal Access) and includes three options. Rogue River Highway/2<sup>nd</sup> Avenue (north of the Rock Point Bridge) will be served by a pathway connecting to the Sardine Creek Trail. The project completed the design phase in early 2014, has funding and is anticipated to be constructed in the summer of 2014. Some of the pathway may already be constructed.

The three options, illustrated in Figure 6-18, include:

- Option A would add sharrows and signage along both study area roadways. While signage can be added to most roadways, sharrows are more appropriate on roadways with slower speeds (30 mph or less). Depending on the location signs can warn drivers of bicycles and/or pedestrians in the roadway or remind them to share the road. Main

Street does not have a posted speed and may be an opportunity for sharrows; however, the speed along Rogue River Highway may preclude it from this type of treatment. Signage can be added to either of the roadways.

- Option B would widen the shoulders where ROW exists. This is a spot treatment and would not result in continuous facilities.
- Option C would include the signage from Option A with warning lights to get driver's attention. The installation would be ideal in areas that are constrained (areas of narrow ROW or bridge width) and only activated when users are present. An example of a sign/warning light combination is the caution pedestrian sign with a light ensemble attached (either LED or alternating yellow).

### Concept MM-1 – Traffic Operations and Safety

There were two crashes reported along Rogue River Highway (between N. River Road and Lampman Road) in the five year analysis period. Both were fixed object collisions that resulted in property damage only. Neither involved non-auto transportation.

All of the options would improve driver awareness of other modes using the roadways. Additionally:

- Operationally Option A would provide no change to the roadway capacity and would not change how the road is currently used
- Option B would not modify roadway capacity either, though it would provide areas for non-motorized users to pull off of the road to let motorized users pass and would improve the non-motorized user experience. Option B would provide areas where the modes could be separated which is an enhancement along the 45 mph facility.
- Option C would be the same as Option A.

### Concept MM-1 – Basic Roadway Geometries and Right-of-Way Requirements

All improvements are anticipated to be within ODOT ROW. Design features include:

- Option A would maintain existing paved section and ROW. As noted earlier, sharrows are not typically installed on higher speed roadways which could be barrier to pursuing this option.
- Option B would widen the paved roadway to the south in spot locations along Rogue River Highway within existing ROW.
- Physically, Option C would be the same as Option A; however, this option would not have the concerns about sharrows.

### Concept MM-1 – Environmental and Land Use Assessment

The Rogue River and freshwater emergent wetlands are in close proximity to the north of this concept. Lands in the vicinity are zoned rural residential, interchange commercial, and EFU.

- There are no environmental or land use impacts anticipated for Option A or Option C.
- Option B would be within ODOT ROW along Rogue River Highway. While the Rogue River is in close proximity to the north of the Rogue River Highway widening is anticipated to the south and therefore not impacted. Two hazardous sites have been identified along Rogue River Highway (WQ SIS, unknown HazWaste).

Any of these options could provide socioeconomic benefits by improving non-motorized access across the roadways and river. Improved pedestrian and bicycle access generally benefits disadvantaged populations.

### Concept MM-1 – Cost Opinions

The estimated costs for MM-1 are:

- Option A - \$15,000 (signage and sharrows along Main Street, signage along Rogue River Highway)
- Option B - \$450,000 (widen Rogue River Highway to the south, install guardrail, provides paved 8 feet shoulders on both sides)
- Option C – approximately \$50,000 (per warning light installation)

### **6.5.9. Concept MM-2– Rogue River Bridge (Rock Point, 00332A) – Enhance Multimodal Access**

The Rogue River Bridge (Rock Point, 00332A) is a historic structure built in 1919. The railing were recently replaced (2010). However the travel lanes are still only 9 feet wide. The total structure width is 19-20 feet leaving no room for bicycle or pedestrian facilities.

Concept MM-2 considers multimodal enhancements to facilitate non-motorized crossings of the bridge and has three options for consideration, as illustrated in Figure 6-19:

- Option A would add signage and possibly sharrows to the bridge. A description of sharrows and signage can be found in Concept MM-1– Study Area Roadways Multimodal Improvements.
- Option B would construct 8 foot paths on both sides of the Rogue River Highway Bridge.
- Option C would build a parallel multiuse path structure and maintain the aesthetics of the historic bridge. The structure is assumed to be located at the nearest narrow section which was assumed to be the connection between Main Street and N. River Road directly to the north. The structure is assumed to be 270 feet long and 15 feet wide. The width includes a 10 feet path with 2 foot shy distance (and railing) on both sides.

### Concept MM-2 – Traffic Operations and Safety

There are no documented crash patterns along Main Street or Rogue River Highway. Non-vehicular operations could be improved by providing additional facilities as presented in any of these options.

- Option A would alert motorized traffic to the presence of non-vehicular traffic which may be sharing the roadway.
- Option B would provide pathways along the bridge that would serve non-auto modes and separate them from motorized vehicles.
- Option C would provide a dedicated non-vehicular bridge with adequate width to serve a mix of modes and directions. Option C would also move non-motorized users off of the highway onto N. River Road, a rural major collector with a comparable posted speed of 45 mph, avoid the need to widen Rogue River Highway between Main Street and the Rock Point Bridge, and provide a direct route to Exit 43.

### Concept MM-2 – Basic Roadway Geometries and Right-of-Way Requirements

Design and ROW needs vary with each option:

- Option A would not result in any changes to roadway geometry. Any further modifications to the bridge will continue to compromise the historic nature and aesthetics of the bridge. Option A can be implemented within existing ROW.
- Option B would not modify the existing roadway geometry of the bridge itself; however, it would create two 8 feet wide paths that affect the aesthetics and historical nature of the bridge on both sides. Safe transitions at either end of the bridge are a concern that has not been considered in much detail with this preliminary concept but are another physical feature. Option B can be constructed within existing ROW.
- Option C would include a new multiuse path bridge that includes 10 feet of travel width, 2 feet shy distance on each side, and railing (total of 15 feet wide). It will require new non-motorized connections to the existing roadway network. Option C will require new ROW, the extents to be determined at time of placement and design.

### Concept MM-2 – Environmental and Land Use Assessment

The land adjacent to the existing bridge is zoned EFU while the land between Main Street and N. River Road is zoned rural residential, interchange commercial, and EFU.

- Option A would occur within the current pavement extents and have no anticipated environmental impacts.
- Option B would require bridge work over the Rogue River which carries summer and winter Steelhead and fall and spring Chinook, Coho Salmon, and Pacific Lamprey.
- Option C would also require bridge work over the Rogue River which carries summer and winter Steelhead and fall and spring Chinook, Coho Salmon, and Pacific Lamprey. Additionally Option C would potentially be aligned within two types of nearby wetlands: freshwater emergent and freshwater forested/shrub.

## Concept MM-2 – Cost Opinions

The cost opinions for concepts involving bridge construction (Options B and C) include work bridge and falsework considerations; however, they do not include 50% E & C, roadway, TP&D costs, or inflation. The costs of Concept MM-2 vary as follows:

- Option A - \$1,500
- Option B - \$1,000,000
- Option C - \$1,500,000

### *Attachments:*

*Figure 6-1. Concept R-1 – Southbound Off Ramp Extension – I-5 Exit 40*

*Figure 6-2. Concept R-2 - Southbound On Ramp Extension – I-5 Exit 40*

*Figure 6-3. Concept R-3 – Southbound Ramp Terminal Turning Radius Improvements – I-5 Exit 40*

*Figure 6-4. Concept R-4 – Northbound Off-Ramp Extension – I-5 Exit 40*

*Figure 6-5. Concept R-5 – Northbound On Ramp Extension – I-5 Exit 40*

*Figure 6-6 .Concept R-6 – Northbound Ramp Terminal Turning Radius Improvements – I-5 Exit 40*

*Figure 6-7. Concept I-1 – 2<sup>nd</sup> Avenue/Blackwell Road/Access Road Intersection Modifications– I-5 Exit 40*

*Figure 6-8. Concept I-2 – 2<sup>nd</sup> Avenue/Blackwell Road/Access Road Turning Radius Improvements*

*Figure 6-9. Concept I-3 – Access Road/Old Stage Road Turning Radius Improvements – I-5 Exit 40*

*Figure 6-10. Concept MM-1 – 2<sup>nd</sup> Avenue (OR 99) Bridge Multimodal Improvements – I-5 Exit 40*

*Figure 6-11. Concept MM-2 – Blackwell Road Multimodal Path – I-5 Exit 40*

*Figure 6-12. Concept MM-3 – 2<sup>nd</sup> Avenue/Blackwell Road/Access Road Expanded Multimodal System – I-5 Exit 40*

*Figure 6-13. Concepts R-1 and R-2 – Southbound Off Ramp and Turning Radius Improvements – I-5 Exit 43*

*Figure 6-14. Concepts R-3 and R-4 – Northbound Off Ramp and Turning Radius Improvements – I-5 Exit 43*

*Figure 6-15. Concept I-1 – Rogue River Highway/Main Street Intersection Modifications – I-5 Exit 43*

*Figure 6-16. Concept I-2 – Rogue River Highway/Main Street Turning Radius Improvements – I-5 Exit 43*

*Figure 6-17. Concept I-3 – Rogue River Highway/2<sup>nd</sup> Avenue/N. River Road Intersection Enhancements – I-5 Exit 43*

*Figure 6-18. Concept MM-1 – Study Area Roadways Multimodal Improvements – I-5 Exit 43*

*Figure 6-19. Concept MM-2 – Rogue River Highway (OR 234/OR 99) Bridge Multimodal Improvements – I-5 Exit 43*



Southbound Off Ramp Extension



I-5 Exits 40 and 43 Interchange Area Management Plans

**DRAFT Figure 6-1**  
 Concept R-1  
 Southbound Off Ramp Extension  
 I-5 Exit 40

- Legend**
-  ROW Line
  -  Edge of Pavement
  -  Edge of Gravel
  -  Guardrail
  -  New Pavement





Southbound On Ramp Extension

I-5

Access



**Legend**

-  ROW Line
-  Ramp Extension

**I-5 Exits 40 and 43 Interchange Area Management Plans**

**DRAFT Figure 6-2**  
 Concept R-2  
 Southbound On Ramp Extension  
 I-5 Exit 40





# Widening for Southbound Left Turn Movement



## I-5 Exits 40 and 43 Interchange Area Management Plans

**DRAFT Figure 6-3**

*Concept R-3*

*Southbound Ramp Terminal  
Turning Radius Improvements*

*I-5 Exit 40*

### Legend

-  ROW Line
-  Edge of Pavement
-  Edge of Gravel
-  Proposed Guardrail

-  New Pavement





Northbound Off Ramp Extension

Access Road

I-5

I-5 Exits 40 and 43 Interchange Area Management Plans

**DRAFT Figure 6-4**  
 Concept R-4  
 Northbound Off Ramp Extension  
 I-5 Exit 40

- Legend**
-  ROW Line
  -  Edge of Pavement
  -  Edge of Gravel
  -  Proposed Guardrail
  -  New Pavement





Northbound On Ramp Extension

Frontage Road

I-5



**Legend**

-  ROW Line
-  Edge of Pavement
-  Edge of Gravel
-  Guardrail



New Pavement

**I-5 Exits 40 and 43 Interchange Area Management Plans**

**DRAFT Figure 6-5**  
 Concept R-5  
 Northbound On Ramp Extension  
 I-5 Exit 40





# Widen for Westbound Left Turn Movement



## I-5 Exits 40 and 43 Interchange Area Management Plans

### Legend

- ROW Line
- Edge of Pavement
- Edge of Gravel
- - - Guardrail

 New Pavement

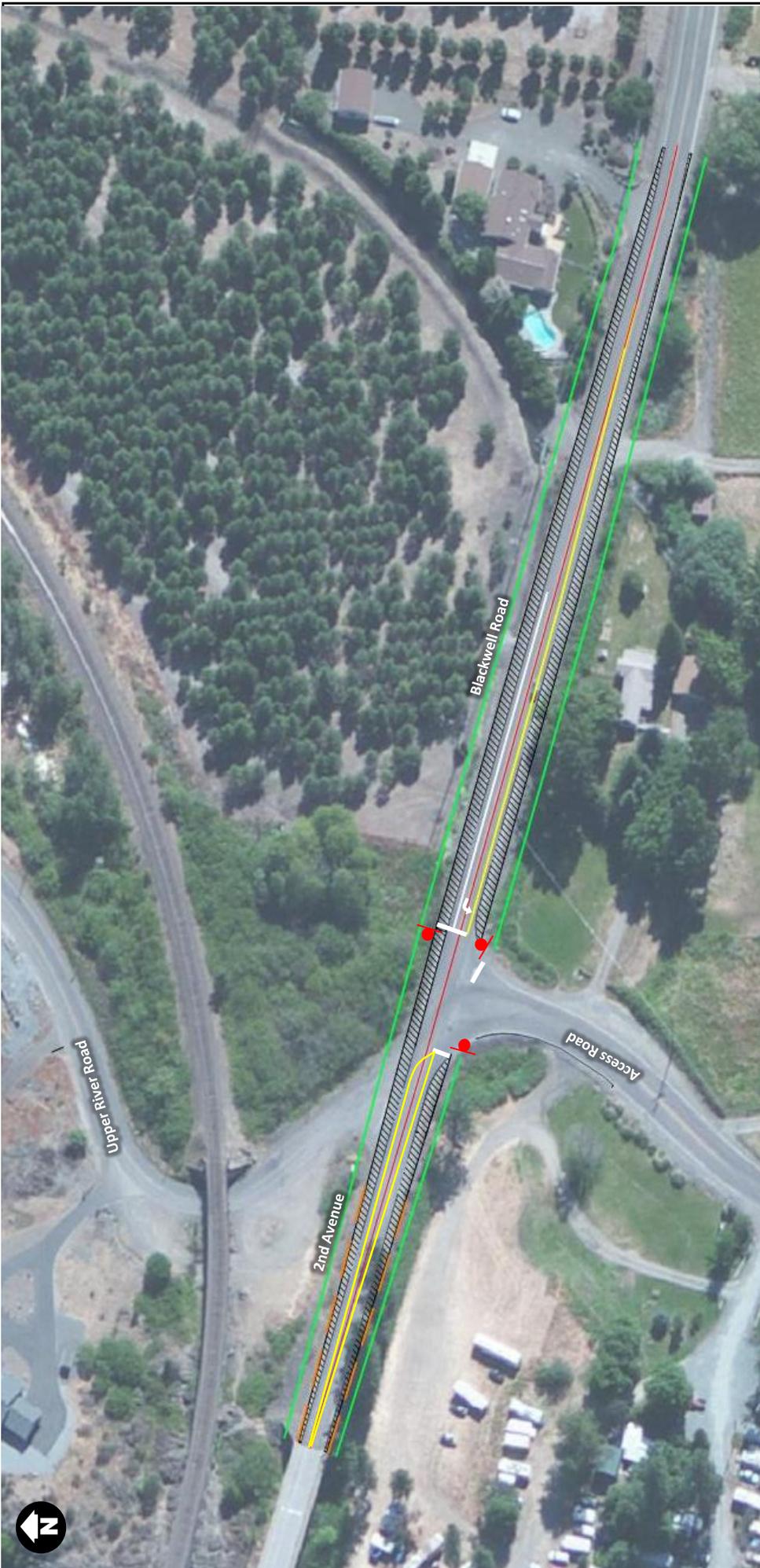
**DRAFT Figure 6-6**

*Concept R-6*

*Northbound Ramp Terminal  
Turning Radius Improvements*

*I-5 Exit 40*





**I-5 Exits 40 and 43 Interchange Area Management Plans**

**DRAFT Figure 6-7**

Concept I-1

2nd Avenue/Blackwell Road/Access Road

Intersection Modifications

I-5 Exit 40



**Legend**

-  ROW Line
-  Edge of Pavement
-  Edge of Gravel
-  Guardrail
-  Centerline
-  Striping

-  New Pavement
-  STOP Control



# Widening for Eastbound Right Turn Movement



## I-5 Exits 40 and 43 Interchange Area Management Plans

DRAFT Figure 6-8

Concept I-3

2nd Avenue/Blackwell Road/Access Road

Turning Radius Improvements

I-5 Exit 40

### Legend

- Property Line
- Edge of Pavement
- Edge of Gravel

New Pavement

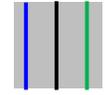




Widening for Southbound Right Turn Movement

Widening for Northbound Left and Eastbound Right Turn Movement

**Legend**



ROW Line  
Edge of Pavement  
Edge of Gravel



New Pavement

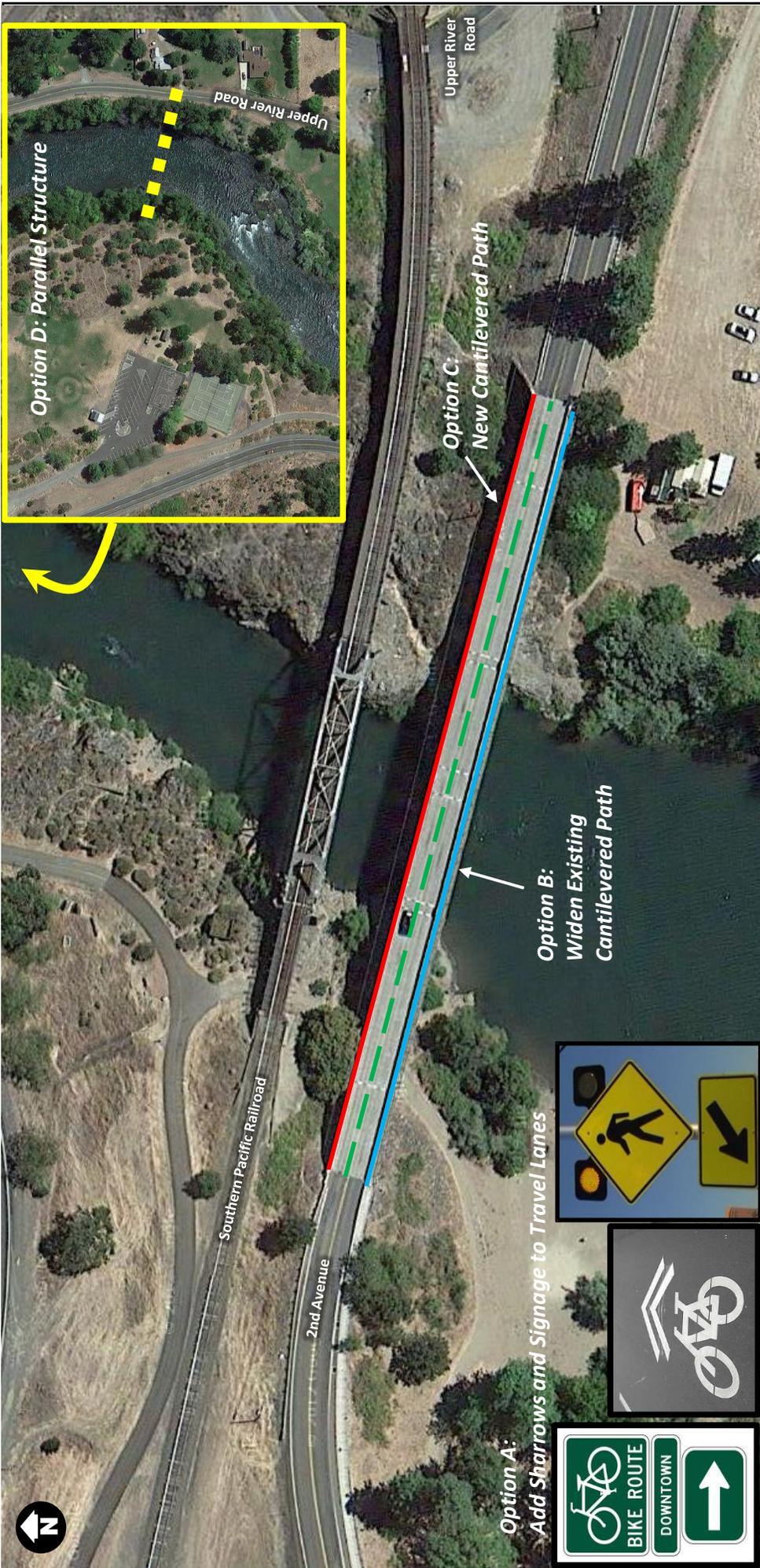
**I-5 Exits 40 and 43 Interchange Area Management Plans**

**DRAFT Figure 6-9**

Concept I-3

Access Road/Old Stage Road  
Turning Radius Improvements  
I-5 Exit 40





I-5 Exits 40 and 43 Interchange Area Management Plans

DRAFT Figure 6-10

Concept MM-1

2nd Avenue (OR 99) Bridge

Multimodal Improvements

I-5 Exit 40



Legend

-  Sharrows and Signs (Option A)
-  Widen Existing Cantilevered Pathway (Option B)
-  New Cantilevered Path on North Side (Option C)
-  Parallel Structure (Option D)



**I-5 Exits 40 and 43 Interchange Area Management Plans**

**DRAFT Figure 6-11**

Concept MM-2

Blackwell Road

Multimodal Path

I-5 Exit 40

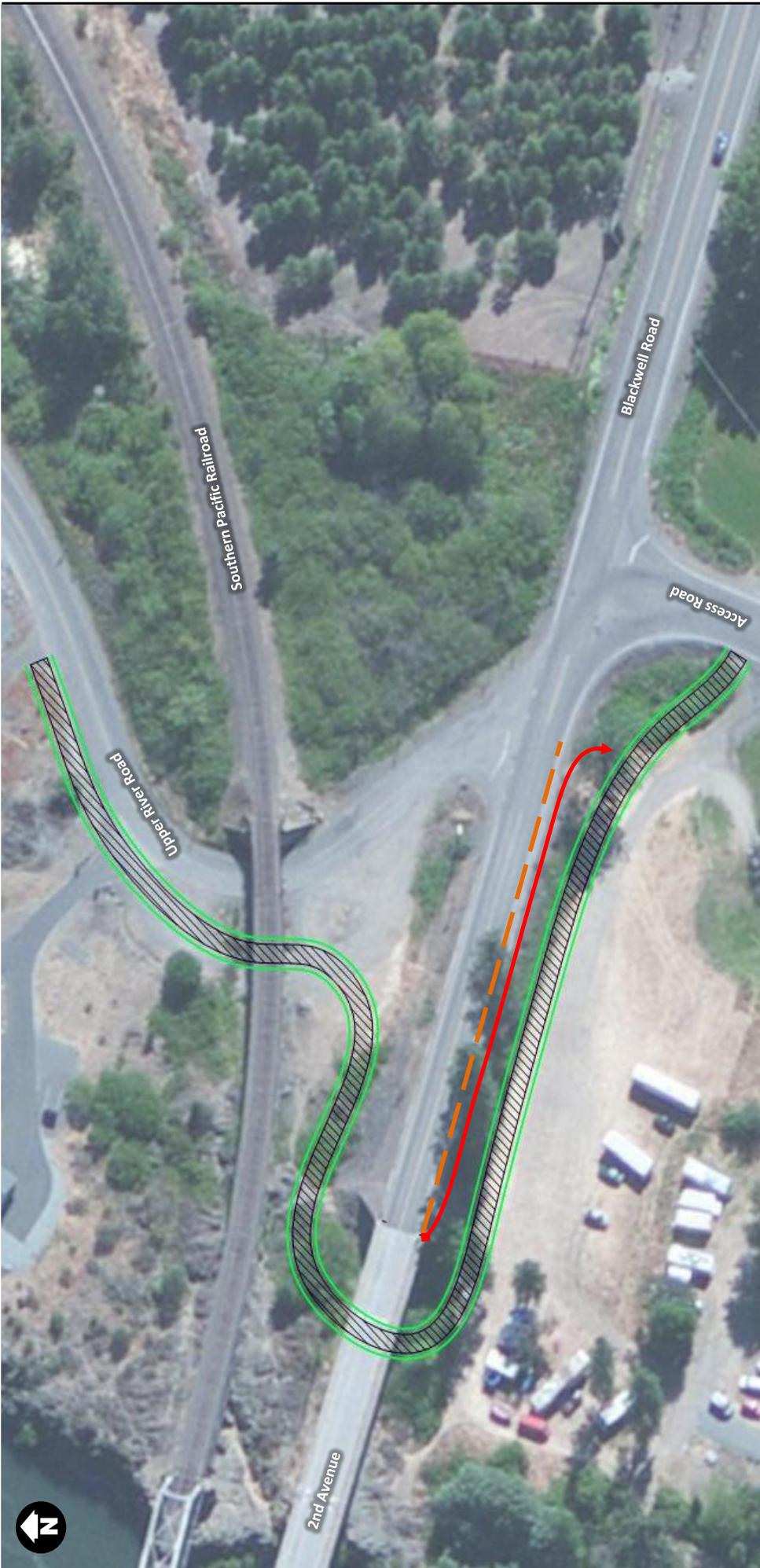


**Legend**

-  ROW Line
-  Edge of Pavement
-  Edge of Gravel



New Pavement



**I-5 Exits 40 and 43 Interchange Area Management Plans**

**DRAFT Figure 6-12**  
 Concept MM-3  
 2nd Avenue/Blackwell Road/Access Road  
 Expanded Multimodal System  
 I-5 Exit 40



- Legend**
-  ROW Line
  -  Edge of Pavement
  -  Edge of Gravel
  -  Guardrail
  -  Connection to Bridge

 New Pavement



**I-5 Exits 40 and 43 Interchange Area Management Plans**

**DRAFT Figure 6-13**  
**Concepts R-1 and R-2**  
**Southbound Off Ramp Extension**  
**and Turning Radius Improvements**  
**I-5 Exit 43**



**Legend**

-  ROW Line
-  Edge of Pavement
-  Edge of Gravel



-  New Pavement for Ramp Extension
-  New Pavement for Turning Radii



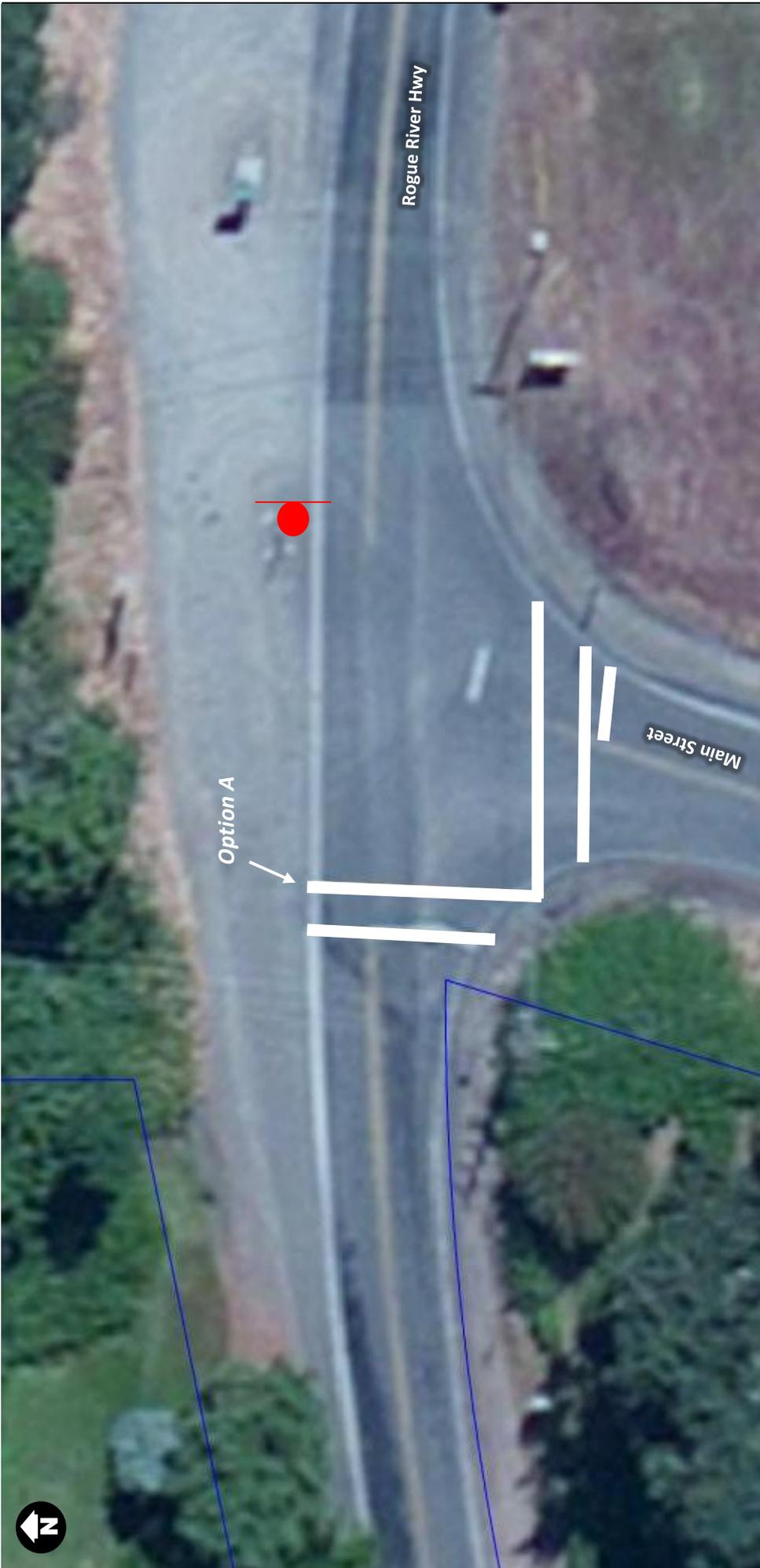
**I-5 Exits 40 and 43 Interchange Area Management Plans**

**DRAFT Figure 6-14**  
**Concepts R-3 and R-4**  
**Northbound Off Ramp Extension**  
**and Turning Radius Improvements**  
**I-5 Exit 43**



**Legend**

-  Property Line
-  Edge of Pavement
-  Edge of Gravel
-  Guardrail
-  New Pavement for Ramp Extension
-  New Pavement for Turning Radii



**I-5 Exits 40 and 43 Interchange Area Management Plans**

**DRAFT Figure 6-15**

Concept I-1

Rogue River Highway/Main Street

Intersection Modifications

I-5 Exit 43



**Legend**



Property Line  
Crosswalk



STOP Control (Option B only)



# Widening for Eastbound Right Turn Movement



## I-5 Exits 40 and 43 Interchange Area Management Plans

DRAFT Figure 6-16

Concept I-2

Rogue River Highway/Main Street

Turning Radius Improvements

I-5 Exit 43

### Legend

- (Blue line) ROW Line
- (Grey line) Edge of Pavement
- (Green line) Edge of Gravel

▨ (Hatched pattern) New Pavement

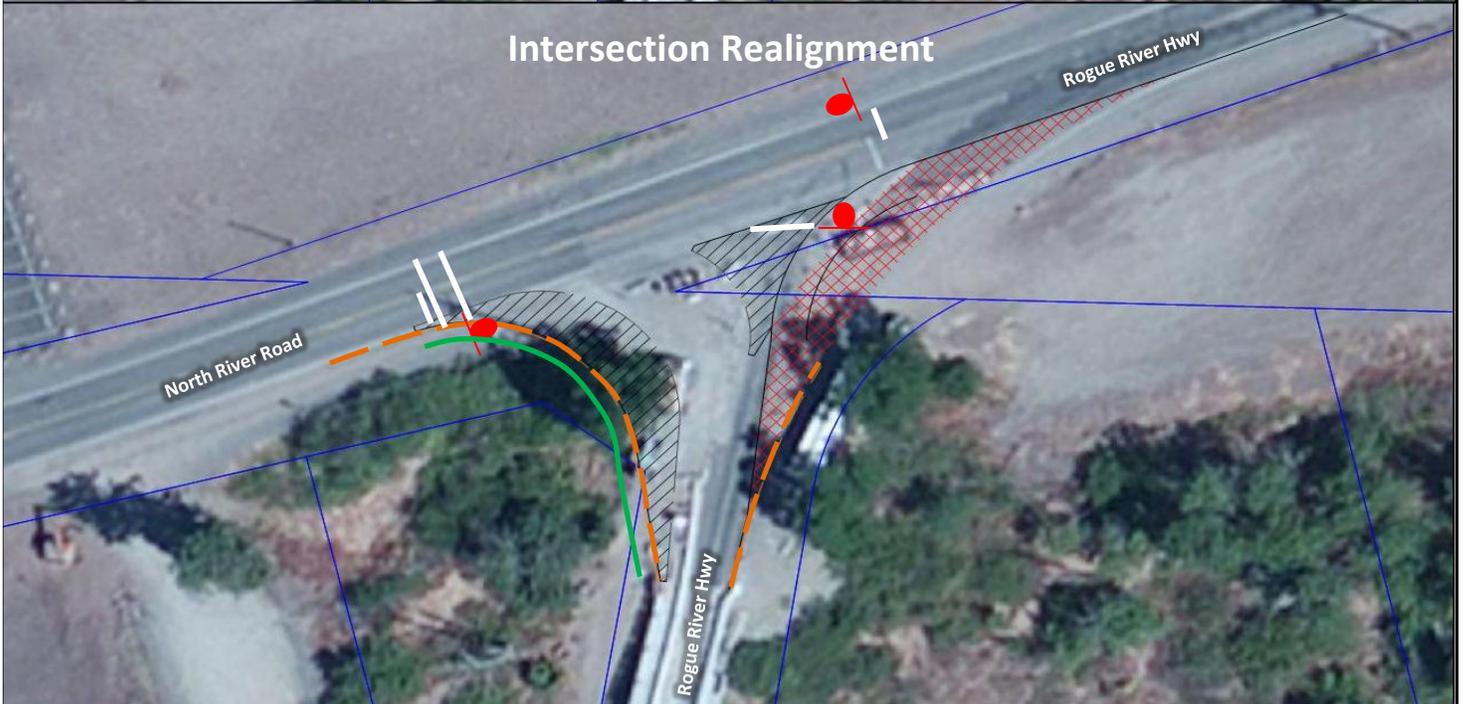




# Widening for Eastbound Right Turn Movement



# Intersection Realignment



## I-5 Exits 40 and 43 Interchange Area Management Plans

DRAFT Figure 6-17

Concept I-3

Rogue River Highway/2nd Avenue/N.River Road

Intersection Enhancements

I-5 Exit 40

### Legend

-  ROW Line
-  Edge of Pavement
-  Edge of Gravel
-  Guardrail
-  Crosswalk

-  New Pavement
-  Pavement Removal

-  STOP Control

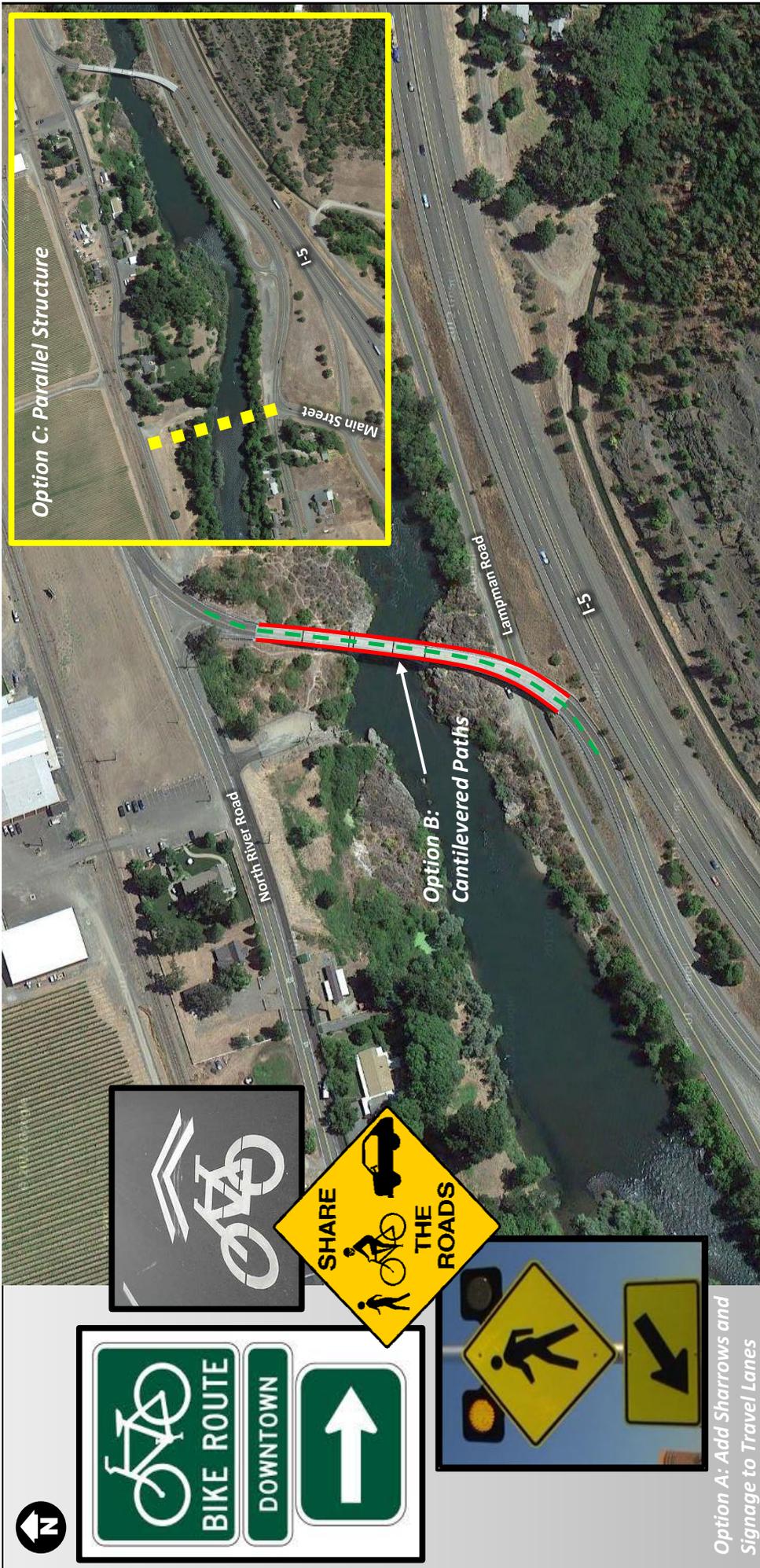




**I-5 Exits 40 and 43 Interchange Area Management Plans**

**DRAFT Figure 6-18**  
 Concepts MM-1  
 Study Area Roadways  
 Multimodal Improvements  
 I-5 Exit 43





Option A: Add Sharrows and Signage to Travel Lanes

**Legend**



- Sharrows and Signs (Option A)
- Cantilevered Paths (Option B)
- Parallel Structure (Option C)

**I-5 Exits 40 and 43 Interchange Area Management Plans**

**DRAFT Figure 6-19**

Concepts MM-2

Rogue River Highway (OR 234/OR 99) Bridge

Multimodal Improvements

I-5 Exit 43

