US 97 BAKER RD INTERCHANGE AREA MANAGEMENT PLAN (IAMP)

JOINT TECHNICAL AND COMMUNITY ADVISORY COMMITTEE MEETING #4

JANUARY 10, 2022

AGENDA

1 / INTRODUCTIONS, MEETING PURPOSE, PROJECT STATUS

2 / BRIEF REVIEW OF ALTERNATIVES

3 / FEEDBACK RECEIVED

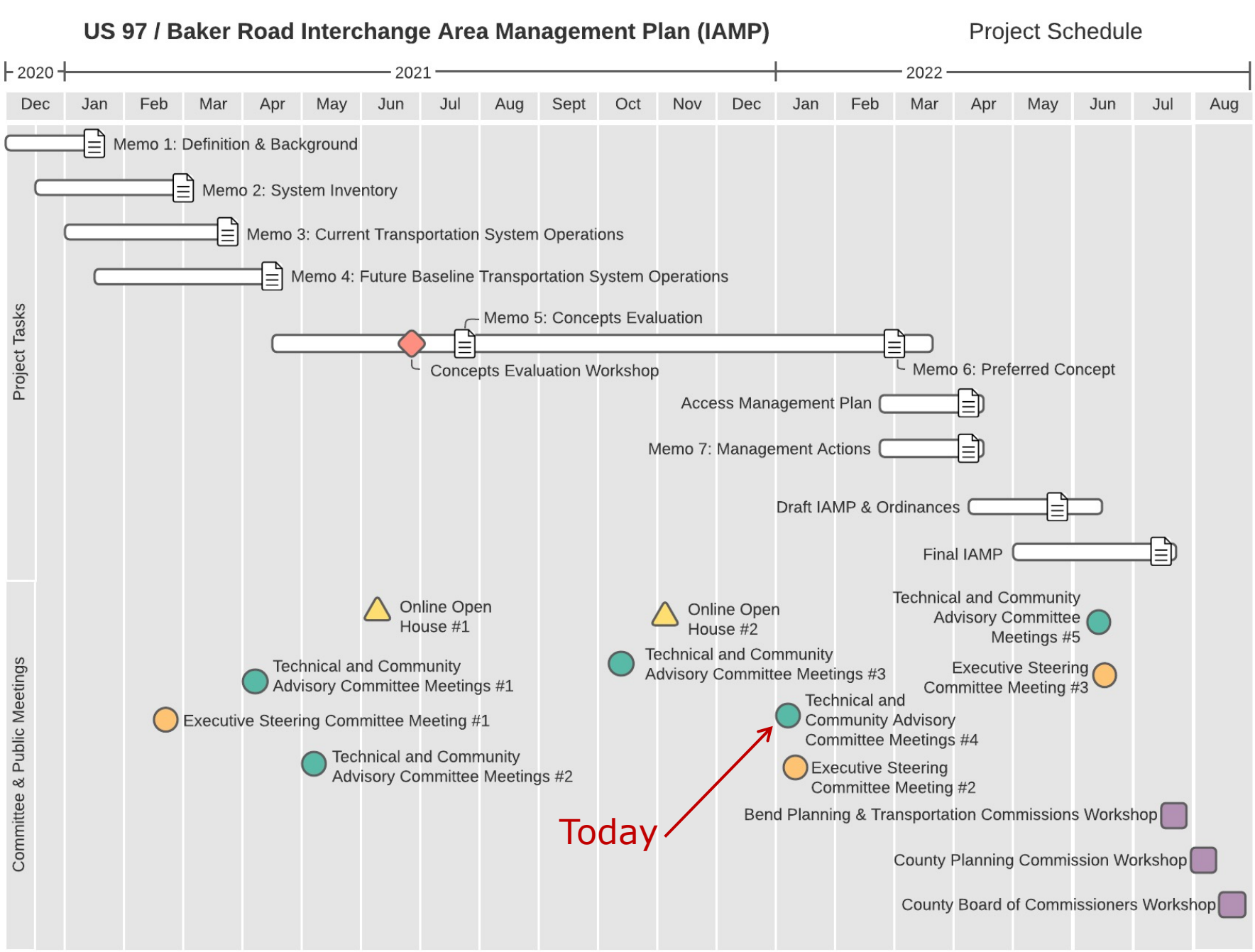
4 / DISCUSS A RECOMMENDATION

5 / PUBLIC COMMENT

6 / NEXT STEPS

PROJECT STATUS

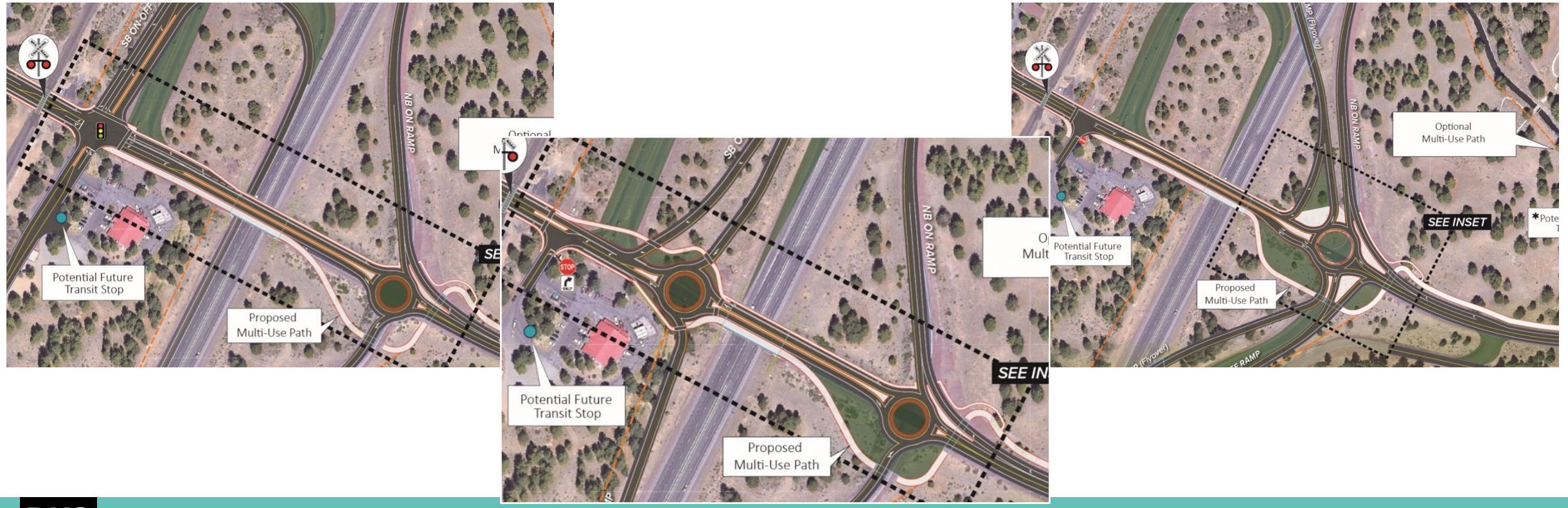
- TAC Meeting #3: Oct. 13
- CAC Meeting #3: Oct. 27
- Online Open House: Nov. 1 through Nov. 14
- Virtual Public Meeting: Nov. 3; 6:00 PM



MEETING PURPOSE

Agree on a recommendation for a preferred alternative.

Could be one of the three alternatives as-is, or with conditions/ modifications.

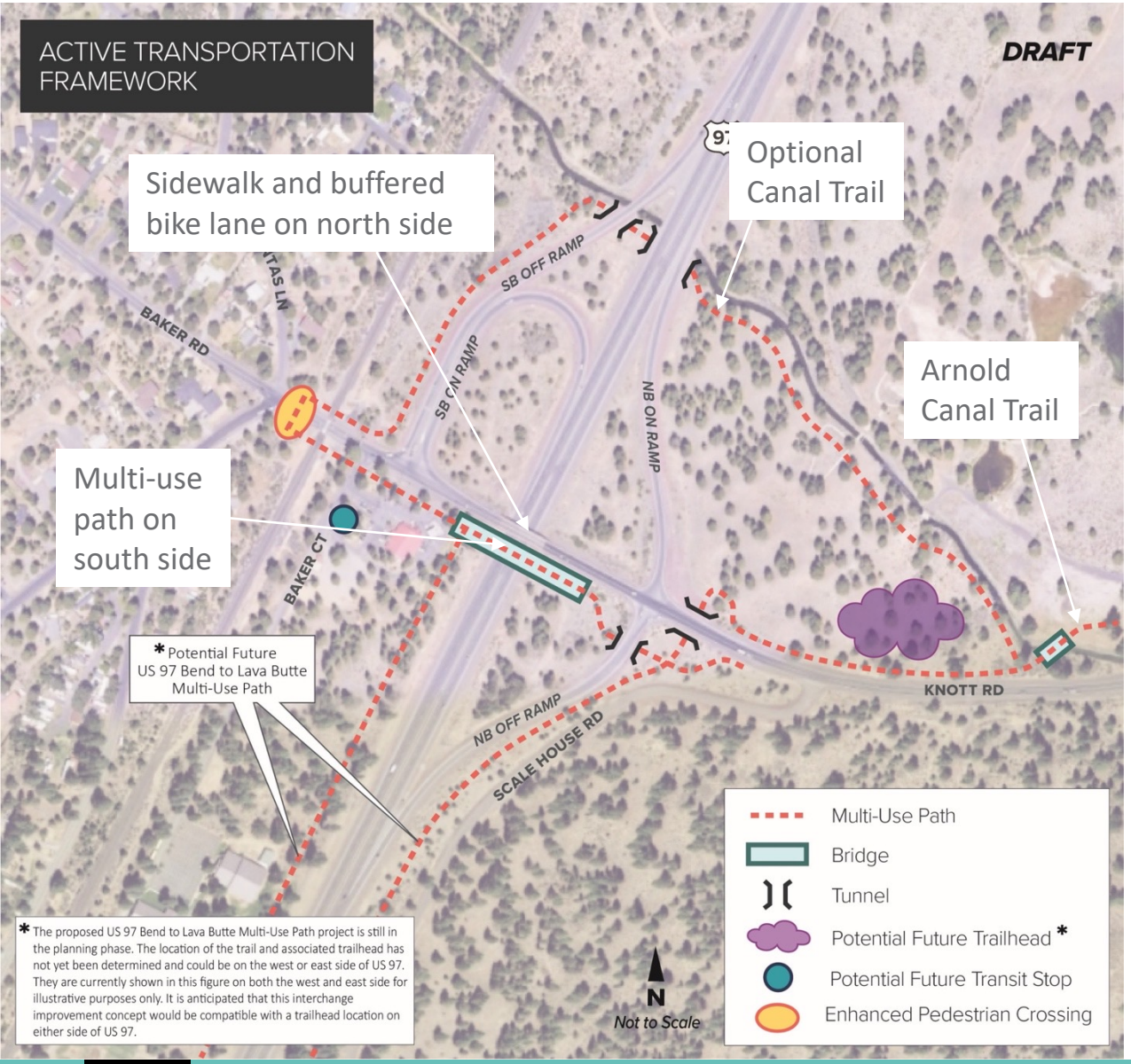


BRIEF REVIEW OF ALTERNATIVES

- Alternative 1: Enhance Existing Ramp Terminals
- Alternative 2: Tight Urban Diamond Interchange (TUDI)
- Alternative 3: Southbound On- And Off-Ramp Flyovers with Roundabout (Flyover Interchange)

(Alternative 3 used to be Alternative 4)

Active Transportation Improvements – included with all 3 concepts



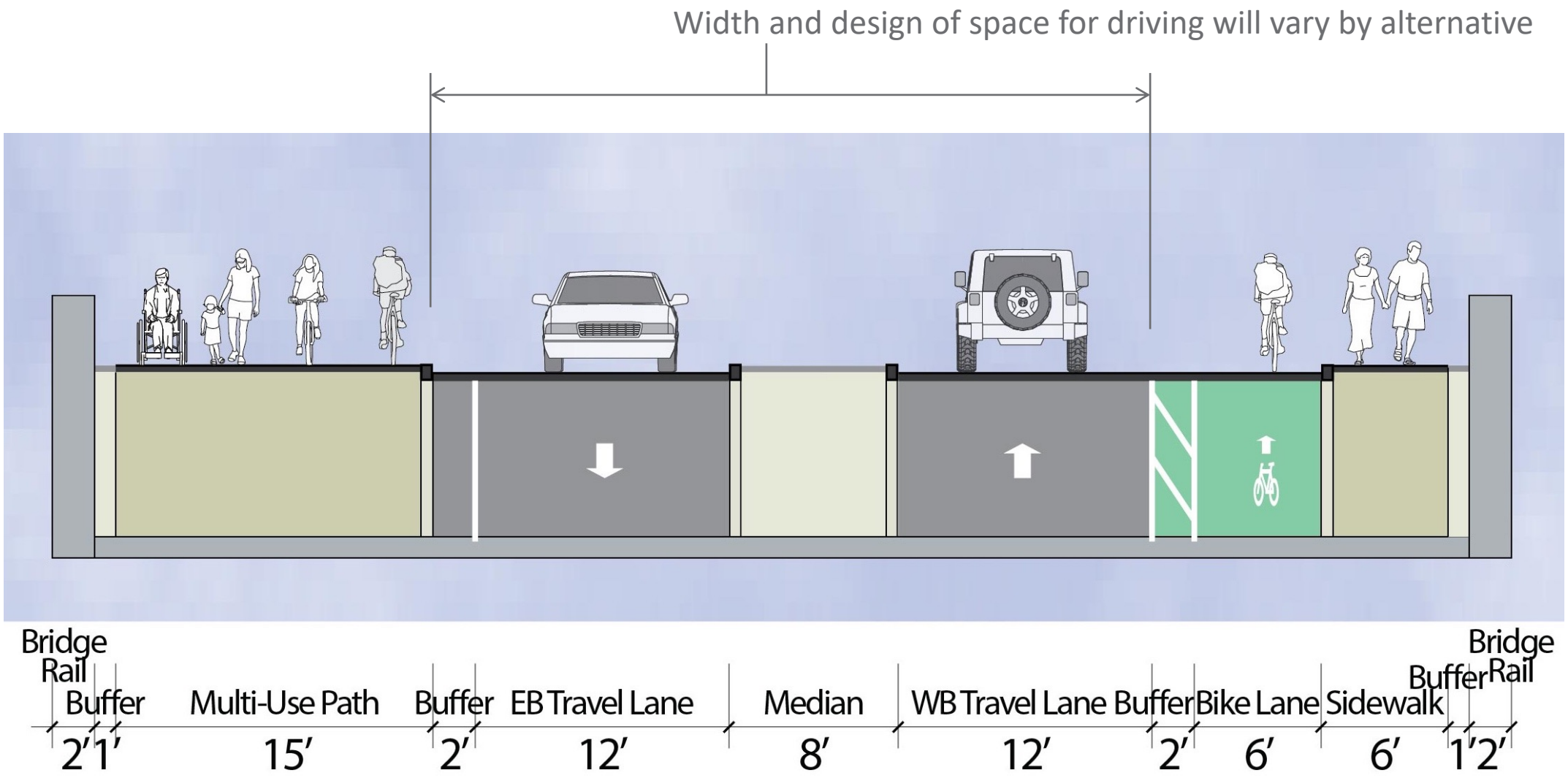
West end of Interchange

- The multi-use path connects to Baker Court, providing access to Riverwoods Country Store and Morning Star Christian School
- An enhanced crossing (location varies) provides access to the multi-use path from the north side of Baker Road
- A transit stop could be located near the store

East end of Interchange

- Multi-use path tunnels under the US 97 northbound off-ramp and Knott Road - improves safety for people walking and biking by eliminating conflicts with motor vehicles
- Crossing the multi-use path under Knott Road to the north allows the path to connect to the future Arnold Canal Trail
- Potential for a future trailhead to be located in the northeast quadrant, connecting to the paved multi-use path that is planned between this interchange and the Lava Lands Visitor Center (**the path could be either on the west or east side of US 97**)

Baker Road Cross Section with Active Transportation Improvements



Roundabouts or Traffic Signals

Source: The Columbian

All alternatives include roundabouts at one or more US 97 ramp terminals. Any roundabouts on the state highway system would be subject to the stakeholder engagement process for approval outlined in ODOT Highway Directive DES 02. If during the stakeholder engagement process it was determined roundabouts would be infeasible at the US 97 ramp terminals, traffic signals would be necessary instead. Therefore, intersection operations were analyzed for both roundabouts and traffic signals at the ramp terminals.

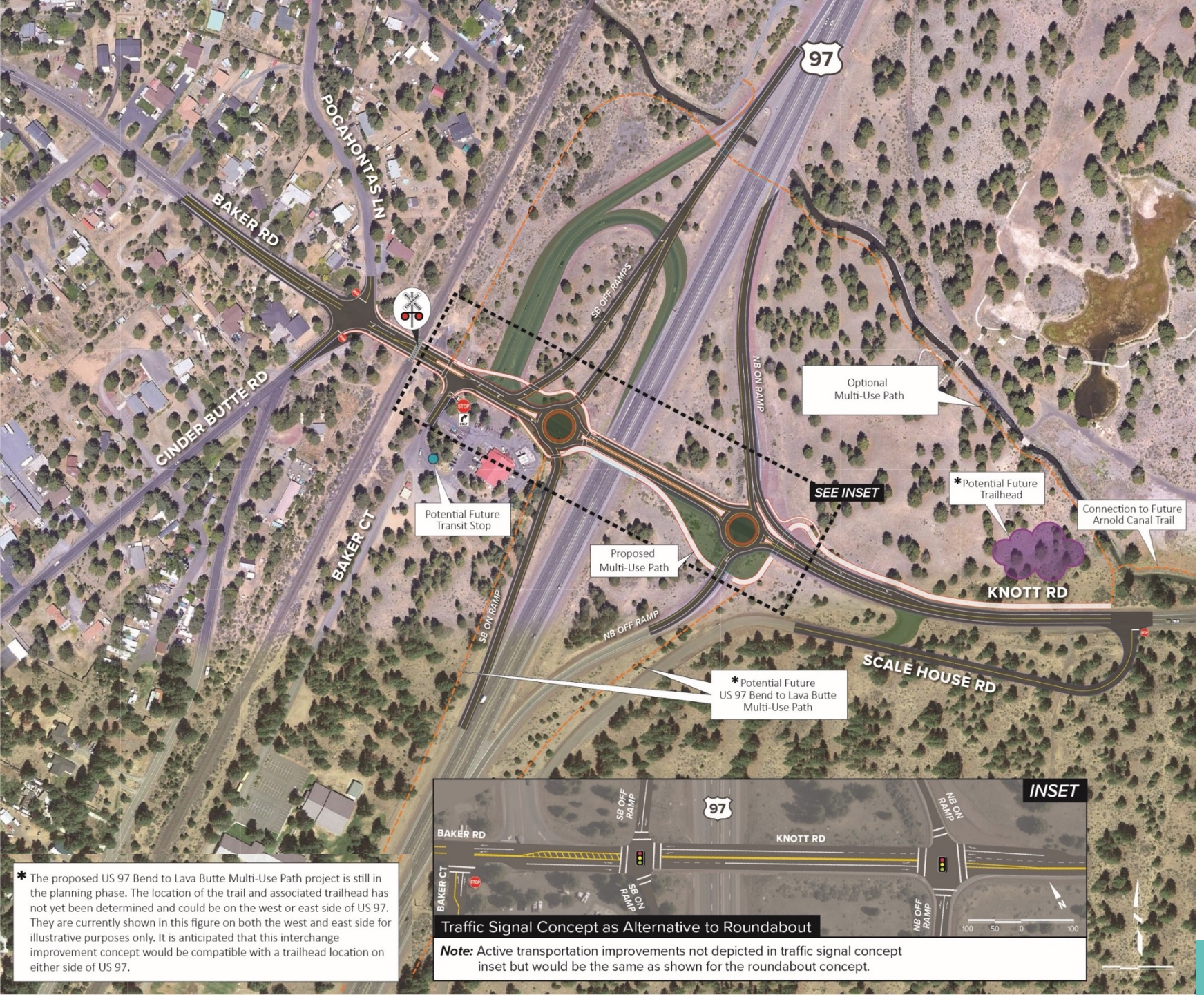
Alternatives for the Baker Road at Cinder Butte Road Intersection

Considered four alternatives

- Construct short (125-foot) left turn lanes on Baker Road, an optional northbound right turn lane, and realign intersection 25-50 ft. west. **Leave existing two-way stop-control.**
- **Install Traffic Signal.** Construct short (125-foot) left turn lanes on Baker Road, an optional northbound right turn lane, and realign intersection 25-50 ft. west.
- **Construct a roundabout.** (removed from further consideration)
- **Realigning Baker Road** so the major movements at the intersection are the northbound to eastbound and westbound to southbound movement, with the eastbound movement being stop-controlled. (removed from further consideration)

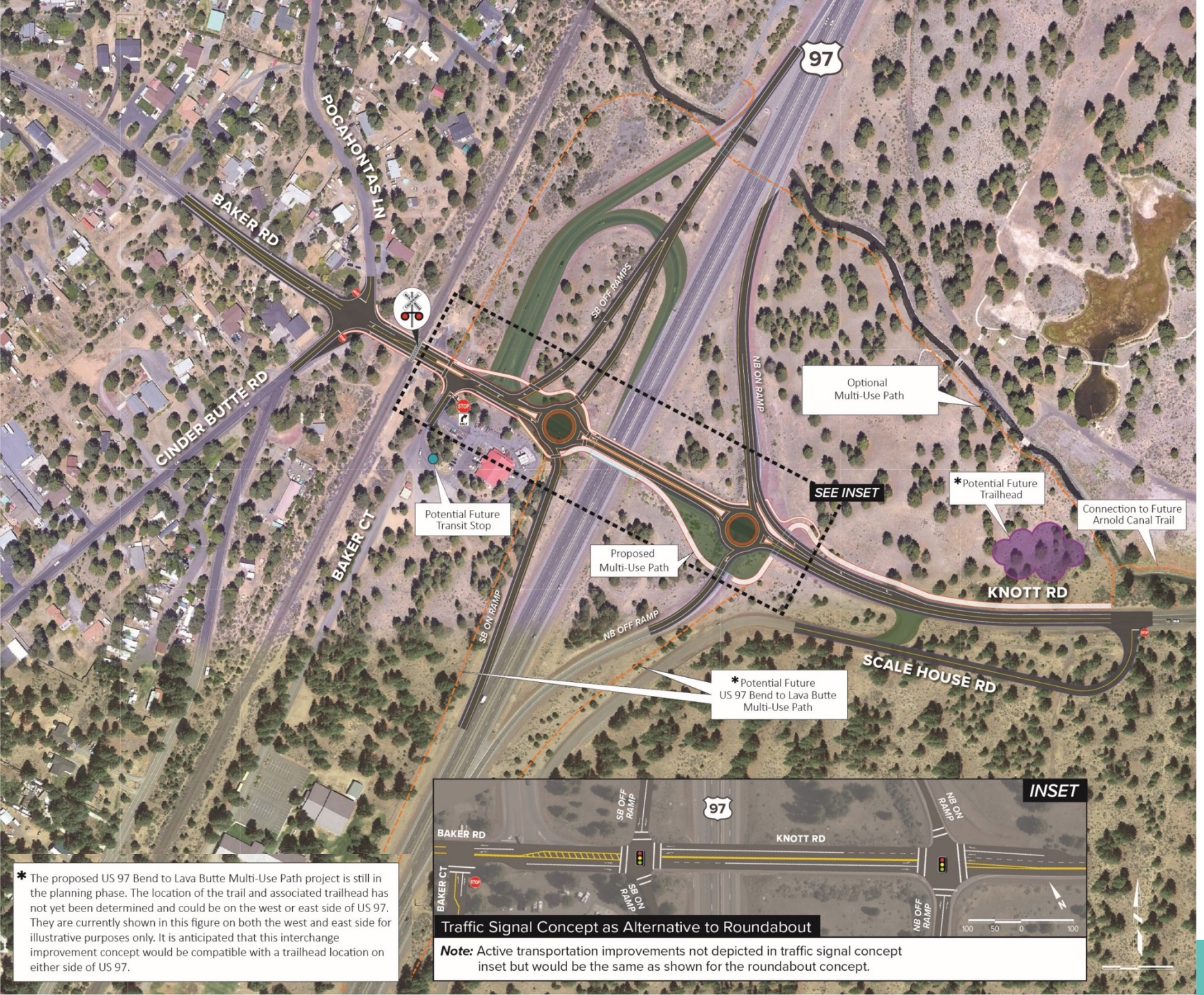
Alt. 1: Enhanced Existing Ramp Terminals

- Focuses on enhancing the existing ramp terminals to address the operational deficiencies along Baker Road
- Reduces the potential for queue spillback onto US 97 with a longer southbound off-ramp
- Lengthens the southbound on-ramp
- Eliminates turning conflicts between closely spaced intersections
- The southbound ramp terminal intersection is closer to the railroad – the signal must be coordinated with the crossing to clear queues
- Signal provides a wide, but controlled ped/bike crossing
- Est. Cost: **$14.1 Million**



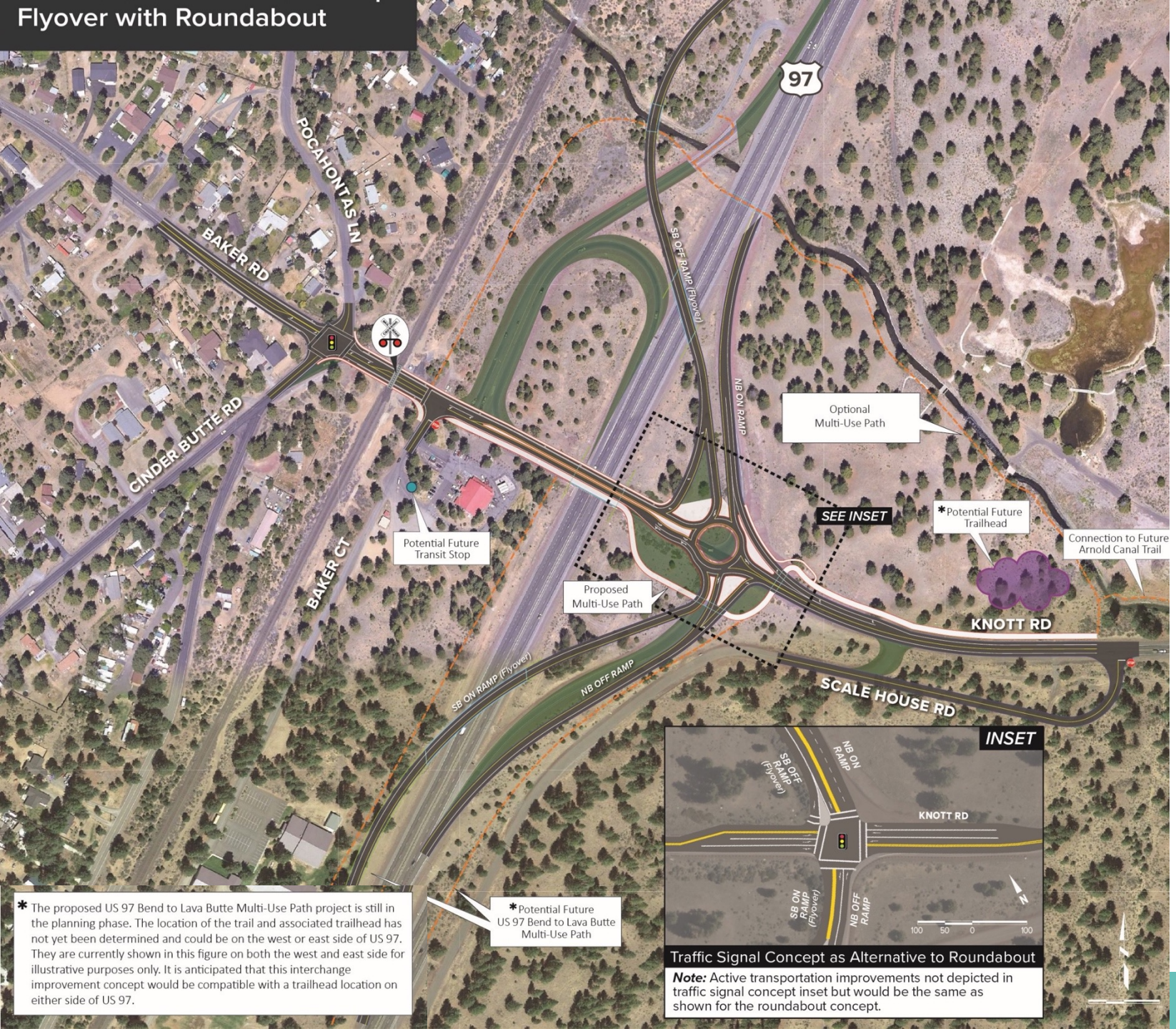
Alt. 2: Tight Urban Diamond Interchange (TUDI)

- Reconstructs the interchange to use a more traditional “diamond” configuration
- Replacing the existing US 97 southbound on- and off-ramps with a configuration similar to that used for the northbound ramps
- Both ramp terminals are controlled by roundabouts
- Requires minimal widening of the bridge structure over US 97, with only two lanes of motor vehicle traffic needed across the bridge
- No direct left out of Baker Court – must U-turn at roundabout



Alt. 2: Tight Urban Diamond Interchange (TUDI)

- Includes lengthening of the southbound off- and on-ramps
- This alternative is the only one that includes an at-grade crossing with the multi-use path on the south side of Baker Road (though it is only a one-lane crossing)
- On the west side, ped/bike crossings occur at the southbound ramp roundabout
- Est. Cost: **$18.3 Million**



Alt. 3: Southbound On- And Off-Ramp Flyovers with Roundabout (Flyover Interchange)

- Reconstructs the US 97 southbound on- and off-ramps by realigning them to a shared intersection with the northbound ramps on the east side of US 97
- This would require new bridges over US 97 for the southbound on- and off-ramps and a new bridge over the Arnold Canal
- All of the on- and off- ramps would connect at one partial multilane roundabout intersection
- Baker/Cinder Butte intersection assumed signalized to provide a controlled west side ped/bike crossing
- Est. Cost: **$34.5 Million**

FEEDBACK RECEIVED

- Roundabouts are generally preferred over traffic signals (subject to freight stakeholder review)
- Ability to accommodate evacuation needs is essential
- Desire to get improvements soon and recognition that project costs will impact that
- Concern about serving more traffic from the new high school or more traffic than anticipated from new development to the east
- Should we consider a protected or raised bike lane on the north side?
- Should we consider closing some movements at Baker Road/Cinder Butte? No.
- Would like more focus on improving Baker Court access

FEEDBACK RECEIVED

- A lot of interest in how improvements could be constructed in phases
- Alternative 1 brings the ramp terminal close to the railroad but also resolves access conflicts
- Alternative 2 has a less desirable at-grade crossing with the multi-use path on the south side
- Alternative 2 does not fully address access conflicts on the west side
- Alternative 3 cost is high, and the complex construction risks may increase the cost further
- Alternative 3 may be more difficult to build in phases

FEEDBACK RECEIVED

Which Alternative do people prefer?

Community Advisory Committee (3 responses)

- Preference for Alternative 3, but recognize cost is high. Second choice is Alternative 1 (2 votes) or Alternative 2 (1 vote). Some concern with Alternative 2 was expressed due to the multi-use path crossing. Some concern with Alternative 1 was expressed because it includes a traffic signal.

Virtual Public Workshop (20 attendees)

- Most expressed interest was for Alternative 3, but want an interim improvement also

Online Open House (12 responses)

- Alternative 2 favored slightly over Alternative 1
- Alternative 3 favored the least (9 last place votes)

DISCUSS A RECOMMENDATION

Project Team Observations

- Alternative 3 is widely supported, but also recognized to be significantly more costly and harder to build and phase. Many have expressed a desire to get improvements soon.
  - > Since Alternatives 1 and 2 are also effective solutions and widely supported but at significantly lower costs, they may be better choices for a preferred alternative. Alternative 3 could still be recognized in the plan as a potential solution if needed longer term.
- Alternative 1 does a better job than Alternative 2 at resolving access conflicts and improving Baker Ct. access
- Alternative 1 may be the best alternative for efficient transit travel

DISCUSS A RECOMMENDATION

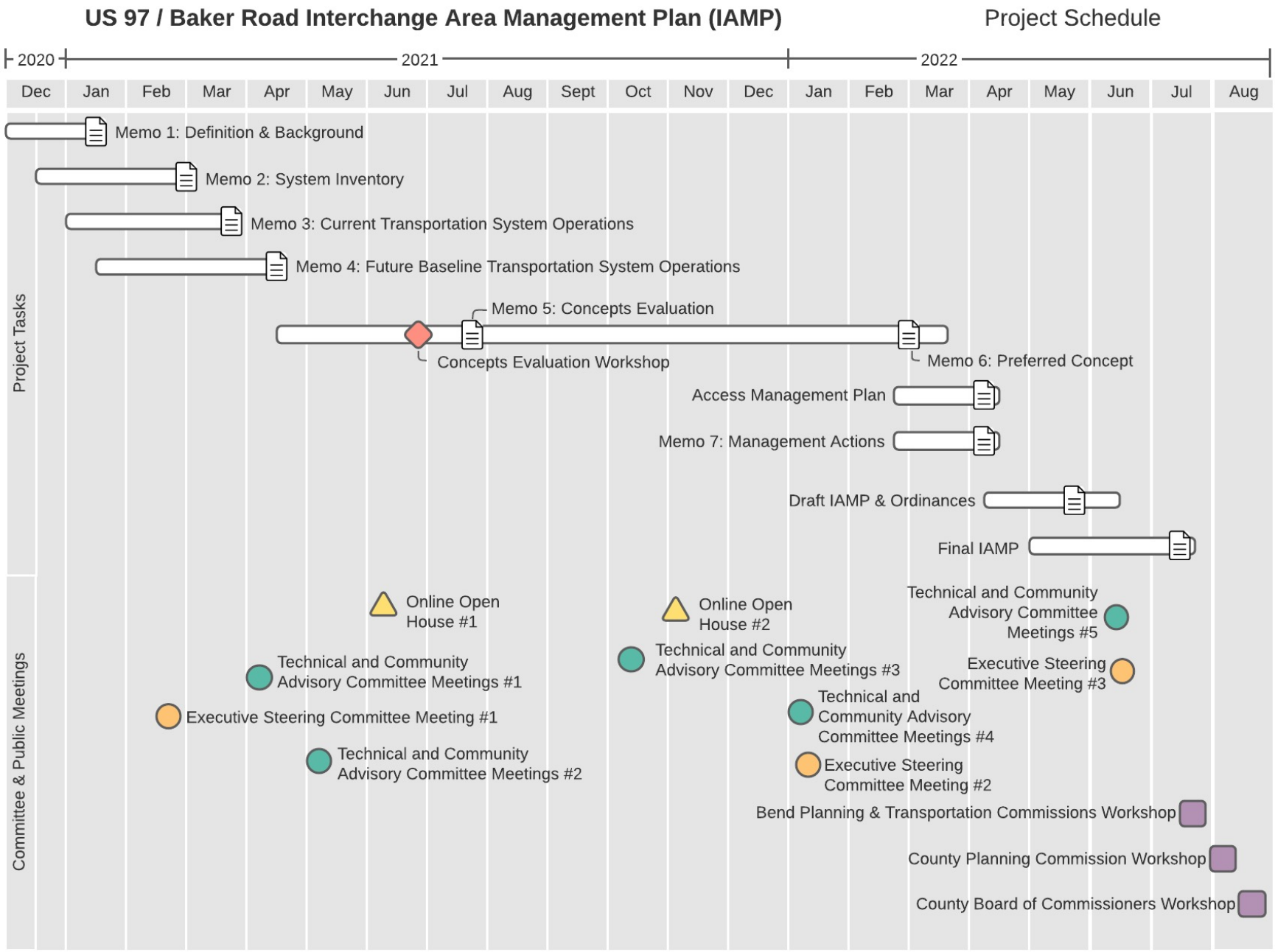
Project Team Observations

- Alternative 2 is the only alternative to include an at-grade vehicular crossing with the low-stress multi-use path. This is NOT considered to be a fatal flaw, but is not desirable.
- Alternative 3 creates opportunity for access to properties in the NW quadrant.
- Alternative 1 rates the lowest for evacuation support.
- Alternative 2 would be more impacted by railroad crossings than other alternatives
- Our recommendations would be to use RABs (not SB Alt 1) unless found to be not feasible per freight discussion

PUBLIC COMMENT?

NEXT STEPS

- Present recommendation to MPO Policy Board
- Refine the preferred alternative
- Draft Interchange Area Management Plan
- Last TAC and CAC Meetings end of spring



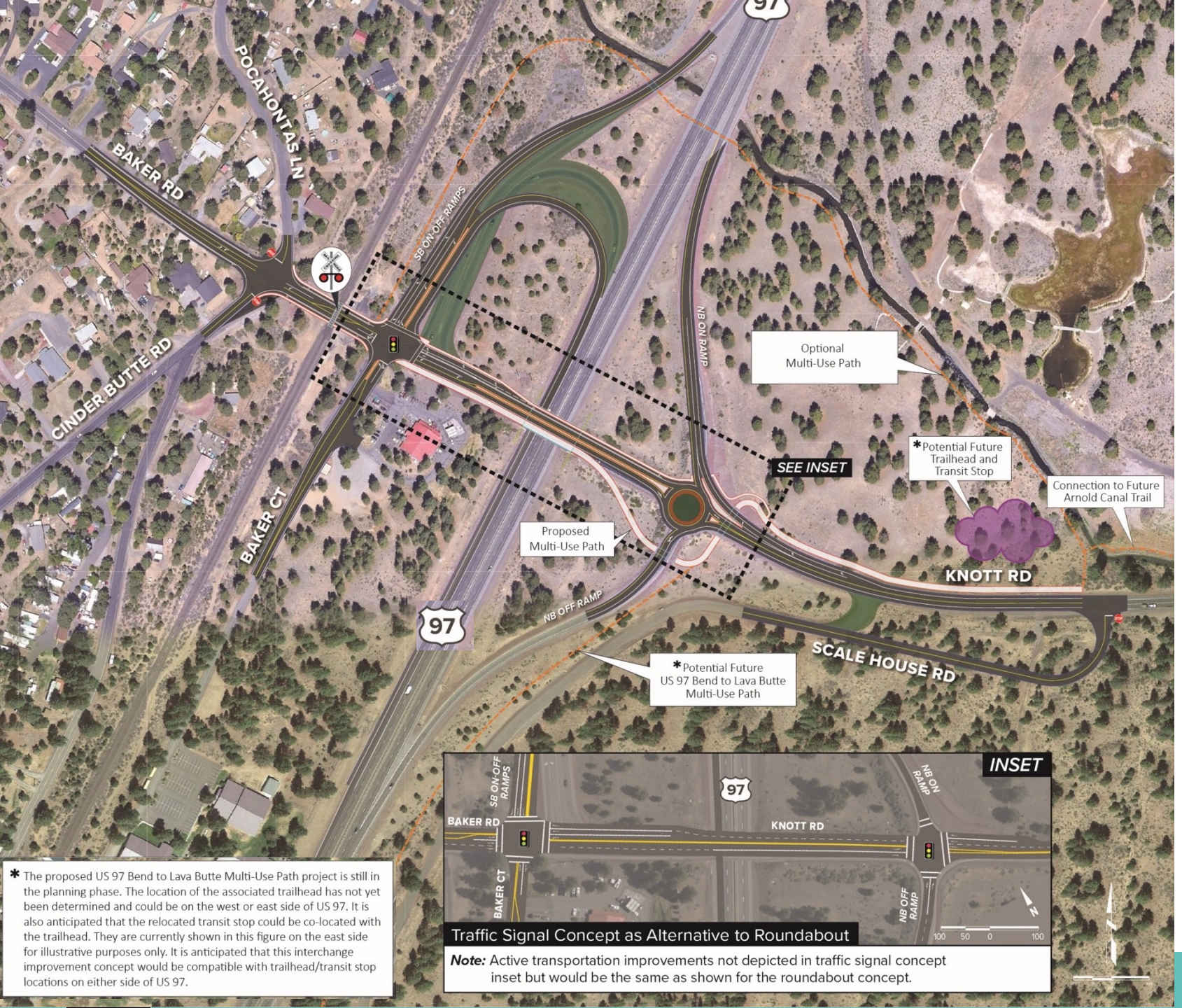
GOALS AND OBJECTIVES

Currently 8 goals focused on:

1. Efficient (motor vehicle) travel
2. Improving safety for all modes of travel
3. Supporting regional and local economic development
4. Creating opportunity for more multimodal travel
5. Providing for equitable participation in the process and evaluating just allocation of burdens and benefits among community members
6. Environmental stewardship
7. Consistency with the shared state and local vision for the corridor/area
8. Developing implementable solutions

Goals & Scoring – Summary by Goal

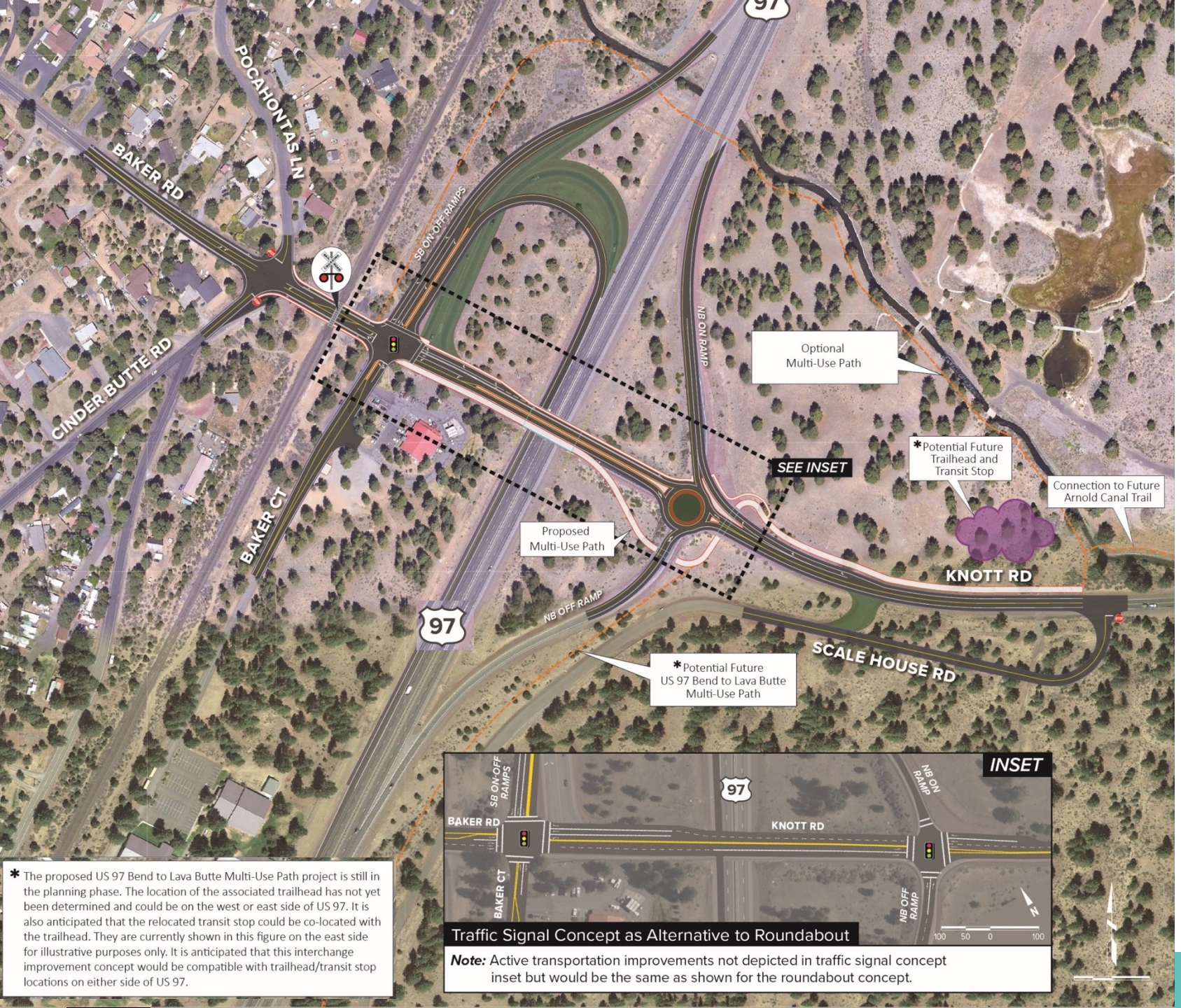
GOALS	NO-BUILD	ALT. 1 (ENHANCE EXISTING)	ALT. 2 (TUDI)	ALT. 4 (FLYOVER)
1. Provide for efficient travel through the interchange area based on existing and planned land uses in the area.				
2. Improve safety for all modes of travel.				
3. Support regional and local economic development.				
4. Facilitate the use of multimodal travel options.				
5. Develop the project to support the community's value of equity.				
6. Practice good stewardship of the environment.				
7. Develop solutions that are consistent with the established shared corridor vision and adopted state and local plans.				
8. Develop implementable solutions for the interchange area.	NA			



Alt. 1: Enhanced Existing Ramp Terminals

- Ramp terminal operations are fair.
  - SB v/c = 0.81 (0.75 standard)
  - NB v/c = 0.78 (0.75 standard)
  - Heavy SB RT from US 97 to Baker Rd is limiting factor

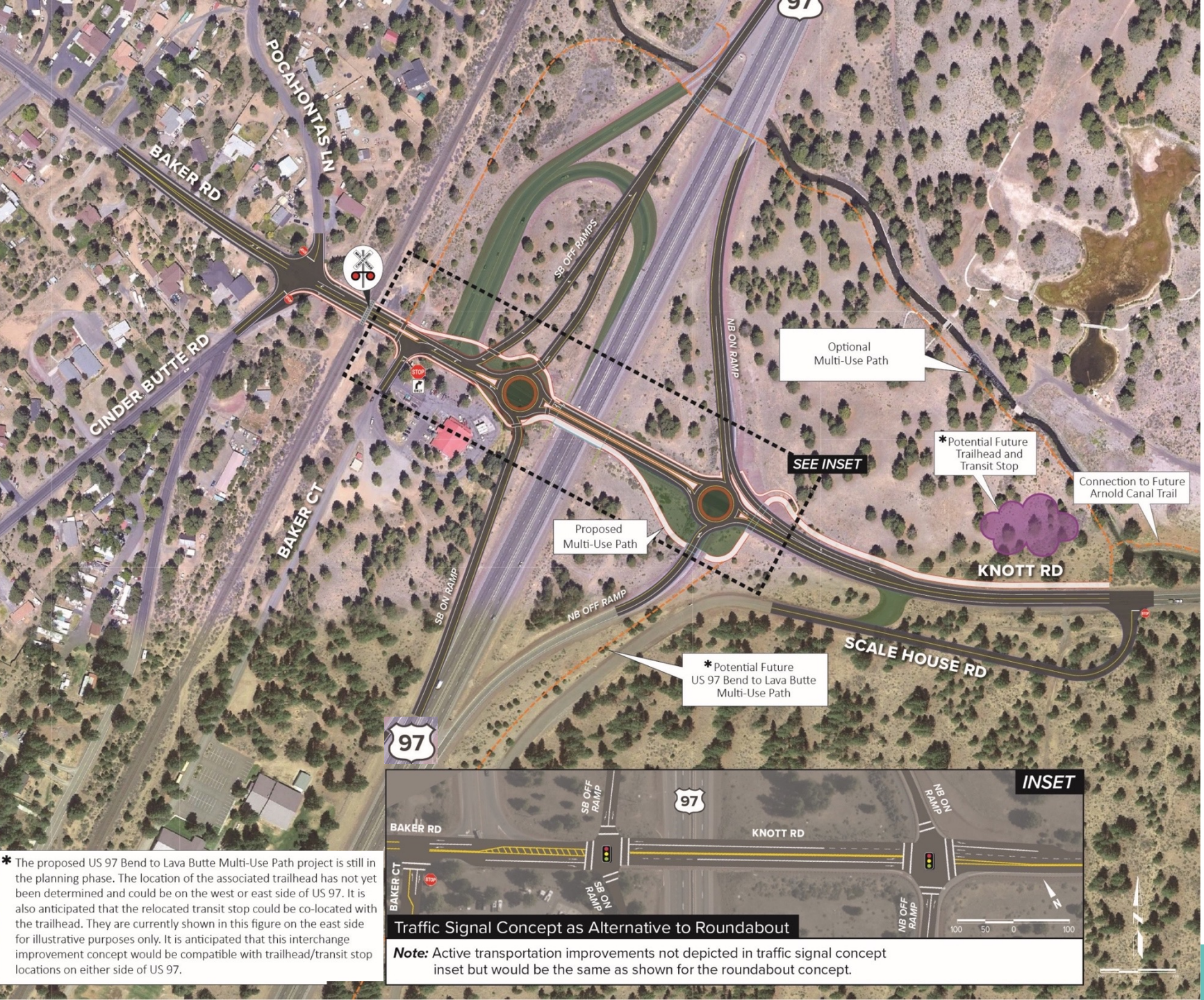
- Most queuing is accommodated.
  - Extend the SB off-ramp 375’ to accommodate 95% + railroad crossing queues
  - EB queues at the SB ramp will queue past the RR and to Cinder Butte (300’) – must rely on railroad pre-emption



Alt. 1: Enhanced Existing Ramp Terminals – all signals

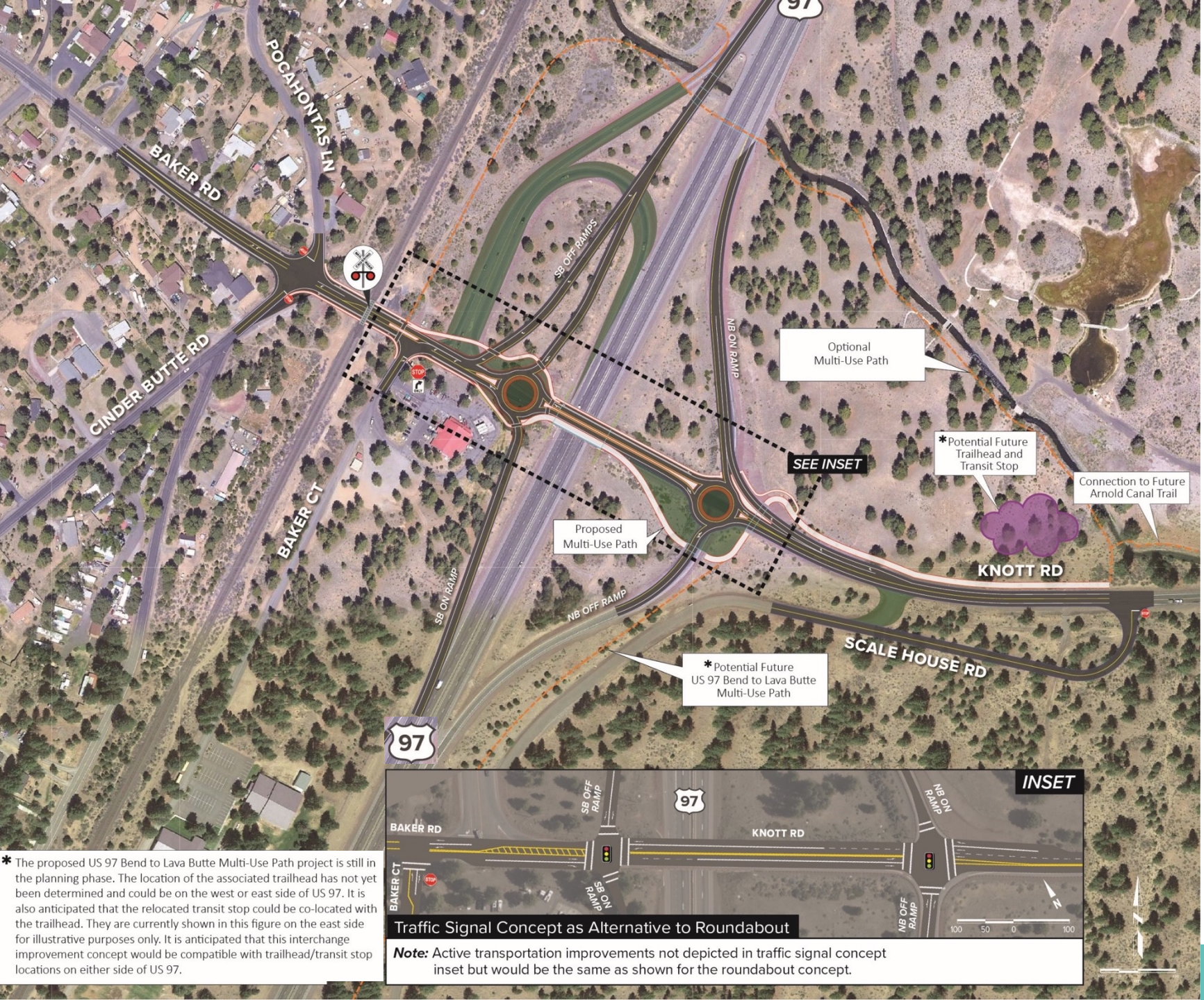
- SB Ramp terminal v/c changes from 0.81 to 0.76.
- NB Ramp terminal v/c changes from 0.78 to 0.65.

- The signal does not manage queues as well as the roundabout, but does well enough and keeps the EB queue from spilling back to the SB ramp terminal
- Estimated cost not yet available for all signals option.



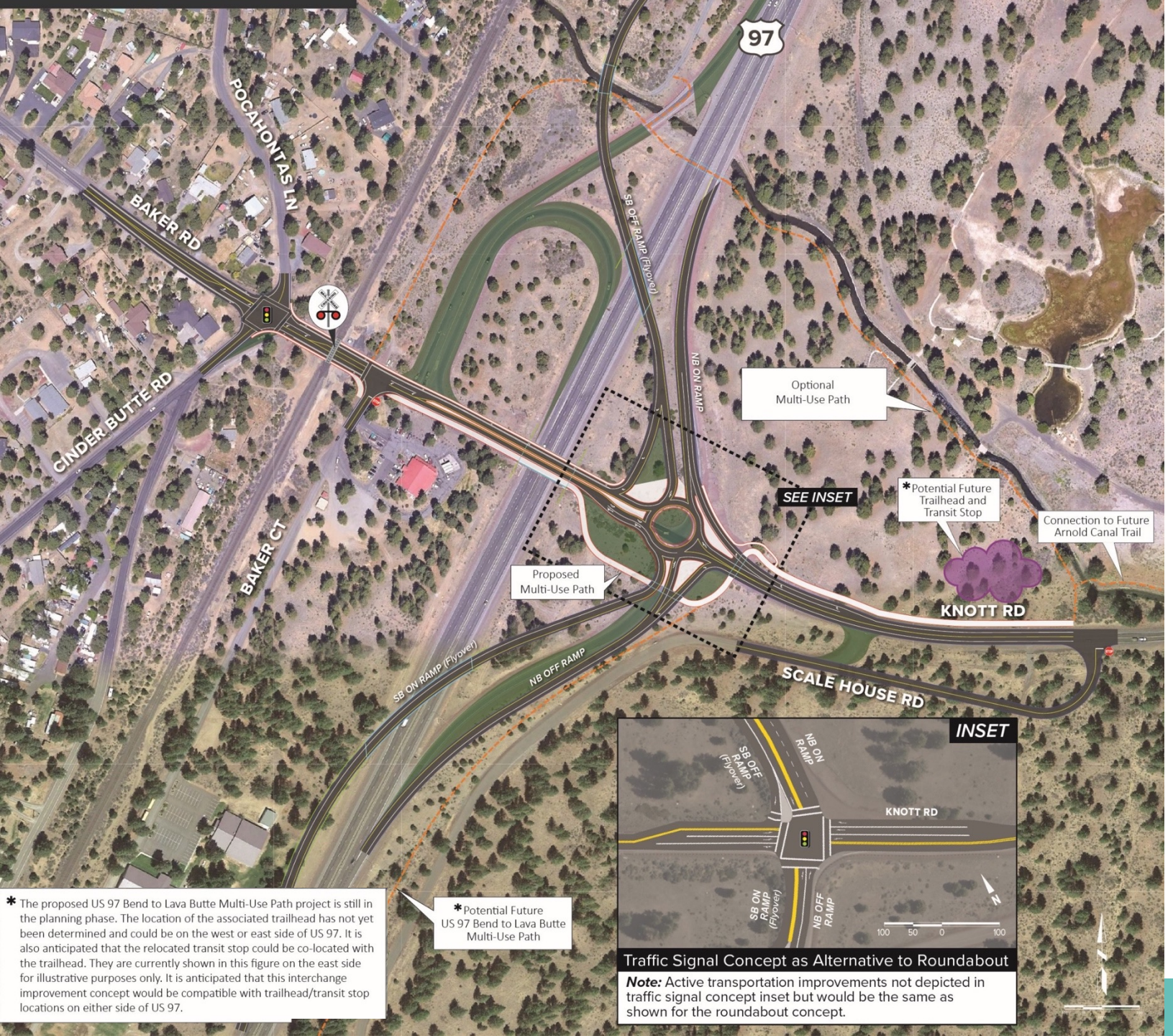
Alt. 2: Tight Urban Diamond Interchange (TUDI)

- Ramp terminal operations are good.
  - SB v/c = 0.76 (0.75 standard)
  - NB v/c = 0.78 (0.75 standard)
- Most queues are very short as a result of the roundabouts and conflicts with the railroad are eliminated
- Access to Baker Court is somewhat constrained and could be a problem during the a.m. school peak hour (WB LT only has 100’ of storage).
- Queue spillback during railroad crossings could block southbound roundabout movements



Alt. 2: Tight Urban Diamond Interchange (TUDI) – all signals

- SB Ramp terminal v/c changes from 0.76 to 0.70
- NB Ramp terminal v/c changes from 0.78 to 0.60
- Will require side-by-side left turn lanes across the bridge
- Close spacing of SB ramps, Baker Court, railroad, and Cinder Butte may still be problematic
- Estimated cost not yet available for all signals option.

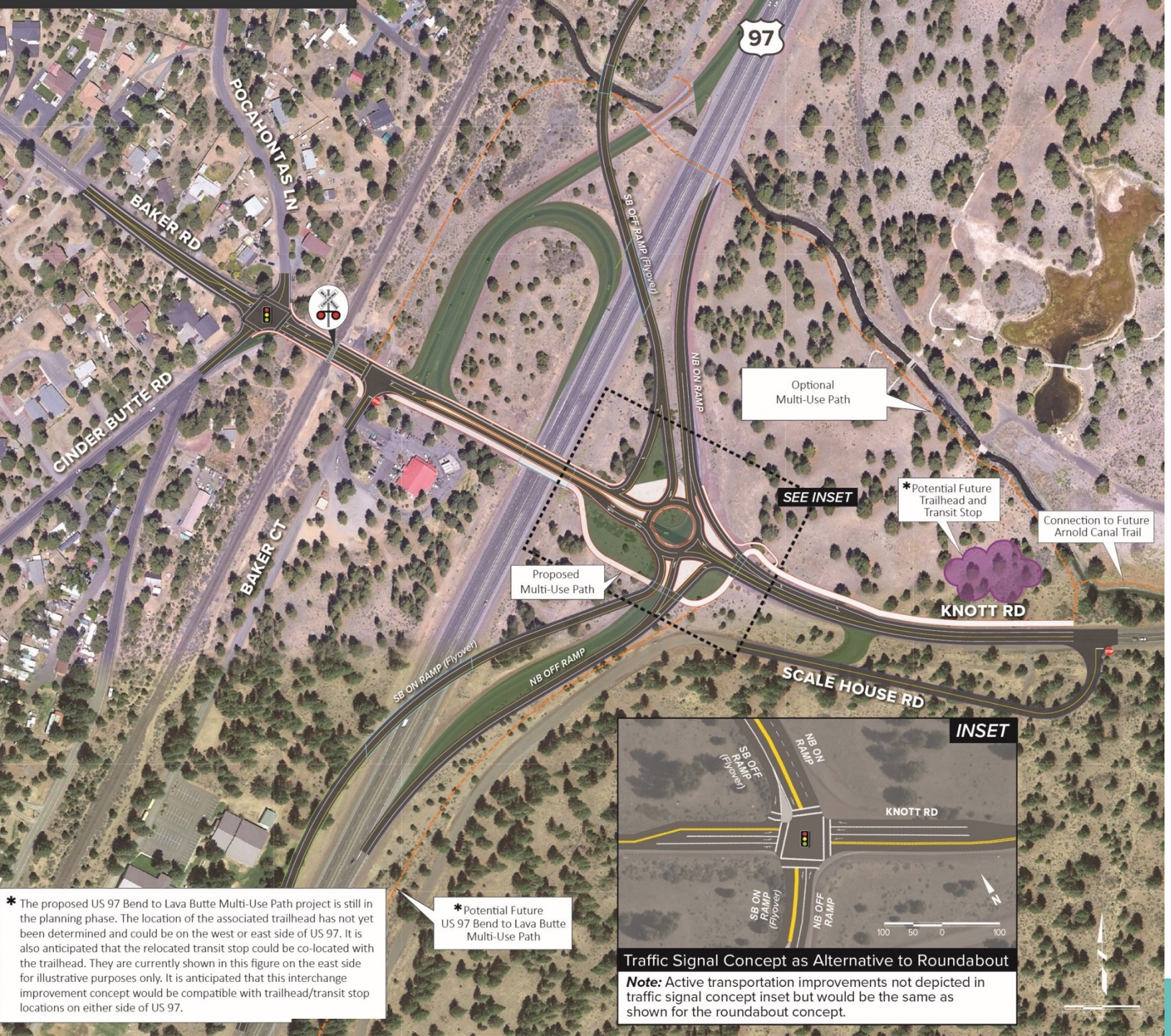


Alt. 4: Southbound On- And Off-Ramp Flyovers with Roundabout (Flyover Interchange)

- Ramp terminal operations are good.
  - SB/NB v/c = 0.76 (0.75 standard)
- Queuing is managed better than all other concepts with no spillback concerns other than from Cinder Butte if signalized (WB queues will cross railroad)
  - Signal at Cinder Butte would not likely meet volume-based signal warrants

Alt. 4: Southbound On- And Off-Ramp Flyovers with Roundabout (Flyover Interchange) – all signals

- SB / NB Ramp terminal v/c changes from 0.76 to 0.78
- Dual EB lefts would be needed to get close to the mobility standard, including dual receiving lanes on the on-ramps
- Queues are longer than with a roundabout, but there are no new queue spillback concerns
- Estimated cost not yet available for all signals option



Goals & Scoring

GOALS	OBJECTIVES	EVALUATION CRITERIA	NO-BUILD	ALTERNATIVE 1 (ENHANCE EXISTING) (ROUNDABOUT/SIGNAL)	ALTERNATIVE 2 (TUDI) (ROUNDABOUT/SIGNAL)	ALTERNATIVE 4 (FLYOVER) (ROUNDABOUT/SIGNAL)
1. Provide for efficient travel through the interchange area based on existing and planned land uses in the area.	a. Provide for efficient travel for regional through traffic along US 97.	Meets ODOT's adopted mobility standards for US 97 through the planning horizon.				
		Meets ODOT's adopted mobility standards at the US 97 ramp terminals with Baker Road and Knott Road through the planning horizon.				
	b. Provide for efficient travel on the local roadway system in the interchange area.	Meets Deschutes County and City of Bend mobility standards for local system study intersections through the planning horizon.				
2. Improve safety for all modes of travel.	a. Reduce the frequency and severity of crashes for all modes with an emphasis on severe and fatal injuries.	Reduces the frequency and severity of crashes, as assessed through analysis of crash data and use of Crash Modification Factors.	NA			
		Minimizes conflicts and risk factors that could lead to crashes.				
		Enhances safety for vehicular and non-motorized modes of transportation at rail crossings.				
	b. Move in the direction of meeting ODOT's adopted access spacing standards along US 97, Baker Road, and Knott Road, or meet the standards where feasible.	Meets or improves access spacing pursuant to ODOT's adopted access spacing standards.				

	Excellent		Poor
	Good		Very Poor
	Fair		

Goals & Scoring

GOALS	OBJECTIVES	EVALUATION CRITERIA	NO-BUILD	ALTERNATIVE 1 (ENHANCE EXISTING) (ROUNDABOUT/SIGNAL)	ALTERNATIVE 2 (TUDI) (ROUNDABOUT/SIGNAL)	ALTERNATIVE 4 (FLYOVER) (ROUNDABOUT/SIGNAL)
3. Support regional and local economic development.	a. Maintain access to properties along Baker Road and Knott Road in a manner that supports the economic development objectives of existing and future businesses consistent with the Deschutes County and Bend Comprehensive Plans.	Maintains accessibility to properties consistent with the documented needs of existing land uses and anticipated potential needs of future uses based on Comprehensive Plan designations.				
	b. Develop an interchange design that facilitates truck freight movement along US 97 and to and from destinations to the east.	Proposed interchange geometry, such as curves, clearances, and grades, accommodates trucks and oversize vehicles.				
	c. Allow for safe and uninterrupted service on the Burlington Northern Santa Fe railroad.	Based on qualitative criteria, reduces potential conflicts with the rail crossing on Baker Road.				
4. Facilitate the use of multimodal travel options.	a. Provide low-stress walking and biking facilities that create east-west connectivity through the interchange area.	Based on qualitative criteria, enhances the quality of walking and biking facilities.				
		Reduces the level of traffic stress for people walking and biking.				
		Increases the number of grade-separated US 97 crossings provided in the Area of Potential Impact for people walking and biking.				
	b. Identify where planned trails in the interchange area can be safely connected and accessed.	Based on qualitative criteria, enhances trail system completeness and quality of connections.				
	c. Accommodate long-term connectivity to the south.	Incorporates the alignment of the proposed US 97: Baker/Knott Road to Lava Butte Multi-Use Path and connects it to the walking and biking network in the interchange area.				
	d. Support future enhancements to Cascades East Transit service.	Can accommodate planned transit service improvements and expansions.				
		Provides safe walking and biking access to transit.				

Goals & Scoring

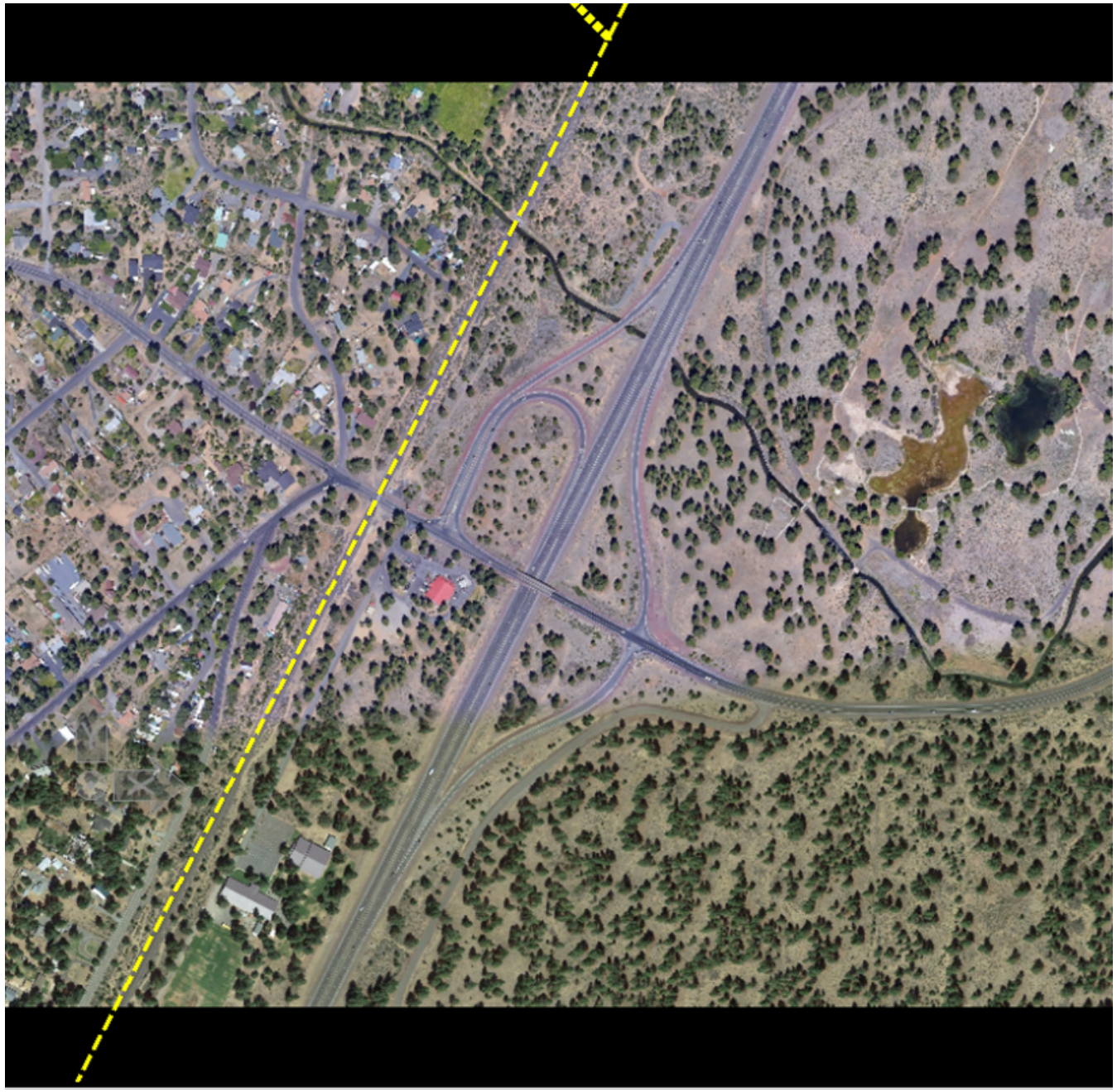
GOALS	OBJECTIVES	EVALUATION CRITERIA	NO-BUILD	ALTERNATIVE 1 (ENHANCE EXISTING) (ROUNDABOUT/SIGNAL)	ALTERNATIVE 2 (TUDI) (ROUNDABOUT/SIGNAL)	ALTERNATIVE 4 (FLYOVER) (ROUNDABOUT/SIGNAL)
5. Develop the project to support the community's value of equity.	a. Provide an equitable decision-making process that encourages participation by all.	Historically underrepresented community members within the Area of Social Impact were invited to participate in the project. (This will be used to evaluate the project process, but not individual alternatives.)	NA	NA	NA	NA
		Feedback from historically underrepresented community members indicates they were able to participate in the process. (This will be used to evaluate the project process, but not individual alternatives.)	NA	NA	NA	NA
	b. Achieve a just allocation of burdens and benefits among community members.	Impacts to properties owned, used by, or accessed by historically underrepresented community members are proportionate to those of other populations.	⌃	⌃	⌃	⌃
6. Practice good stewardship of the environment.	a. Reduce vehicle emissions through reduction of vehicular delay, improved connections in the local system, and the use of alternative travel modes.	Assessment of reductions in vehicular delay and vehicle-miles traveled, as well as improvements supporting walking, biking, and use of transit.	⌄⌄	⌃	⌃⌃ / ⌃	⌃⌃ / ⌃
	b. Minimize impacts on resource lands.	Minimizes impacts on land designated for natural resources, scenic and historic areas, and open spaces.	⌃	⌃	⌃	⌃
	c. Minimize adverse impacts on wildlife.	Recommendations minimize or avoid impacts to wildlife habitat and safety.	⌃	⌃	⌃	⌃

Goals & Scoring

GOALS	OBJECTIVES	EVALUATION CRITERIA	NO-BUILD	ALTERNATIVE 1 (ENHANCE EXISTING) (ROUNDABOUT/SIGNAL)	ALTERNATIVE 2 (TUDI) (ROUNDABOUT/SIGNAL)	ALTERNATIVE 4 (FLYOVER) (ROUNDABOUT/SIGNAL)
7. Develop solutions that are consistent with the established shared corridor vision and adopted state and local plans.	a. Create a US 97 corridor that is compatible with the recommendations from the US 97 Parkway Plan and Bend to Lava Butte Refinement Plan.	Recommendations are compatible with those from the US 97 Parkway Plan and Bend to Lava Butte Refinement Plan.				
	b. Ensure compatibility with future planned growth in Bend's opportunity areas and expansion areas.	Traffic forecasts and connectivity improvements in the Area of Potential Impact account for the impact of housing and employment growth in Bend's opportunity areas and expansion areas.				
	c. Consider the visual sequence of project elements as an entry/exit node to the City of Bend.	Can accommodate or does not compete with visual and physical gateway elements to south Bend.				
	d. Support the action plan in the Greater Bend Community Wildfire Protection Plan to enhance community safety.	Recommendations maintain or enhance access and evacuation routes for the Southwest and Southeast Communities.				
8. Develop implementable solutions for the interchange area.	a. Minimize impacts on resource lands.	Minimizes impacts on land designated for natural resources, scenic and historic areas, and open spaces.				
	b. Ensure public funds are invested efficiently and effectively, and solutions are fiscally responsible.	Based on qualitative criteria, solutions are effective at addressing goals and objectives compared to costs and would reasonably fit within funding expectations for project partners.	NA			
	c. Develop solutions that can be implemented in phases.	Solutions can be implemented incrementally in functional phases.	NA			
	d. Develop a design that is constructable and could be reasonably maintained.	Minimizes the number of potential design exceptions.	NA			
		Is easily constructable with regard to rail impacts and ability to maintain traffic.	NA			
		Does not create maintenance challenges.	NA			

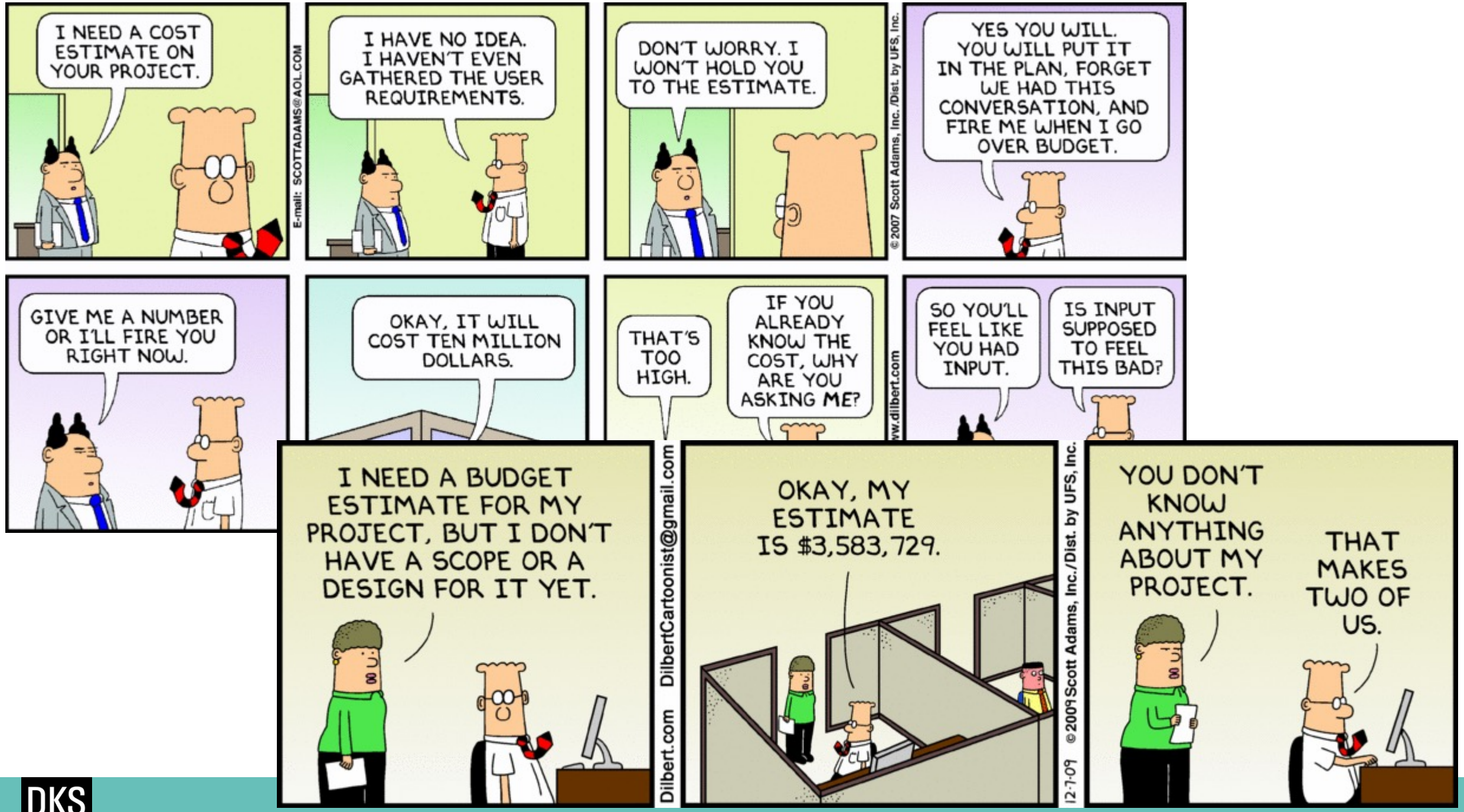
GRADE-SEPARATING THE RAILROAD CROSSING

- Option to put the railroad over Baker Road



GRADE-SEPARATING THE RAILROAD CROSSING

- Option to Baker Road over the railroad


I NEED A COST ESTIMATE ON YOUR PROJECT.
I HAVE NO IDEA. I HAVEN'T EVEN GATHERED THE USER REQUIREMENTS.
DON'T WORRY. I WON'T HOLD YOU TO THE ESTIMATE.
YES YOU WILL. YOU WILL PUT IT IN THE PLAN, FORGET WE HAD THIS CONVERSATION, AND FIRE ME WHEN I GO OVER BUDGET.
E-mail: SCOTTADAMS@AOL.COM
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GIVE ME A NUMBER OR I'LL FIRE YOU RIGHT NOW.
OKAY, IT WILL COST TEN MILLION DOLLARS.
THAT'S TOO HIGH.
IF YOU ALREADY KNOW THE COST, WHY ARE YOU ASKING ME?
SO YOU'LL FEEL LIKE YOU HAD INPUT.
IS INPUT SUPPOSED TO FEEL THIS BAD?
www.dilbert.com
I NEED A BUDGET ESTIMATE FOR MY PROJECT, BUT I DON'T HAVE A SCOPE OR A DESIGN FOR IT YET.
Dilbert.com DilbertCartoonist@gmail.com
OKAY, MY ESTIMATE IS $3,583,729.
12-7-09 © 2009 Scott Adams, Inc./Dist. by UFS, Inc.
YOU DON'T KNOW ANYTHING ABOUT MY PROJECT.
THAT MAKES TWO OF US.

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