



# ***CROSSING-DIAMOND INTERCHANGE***

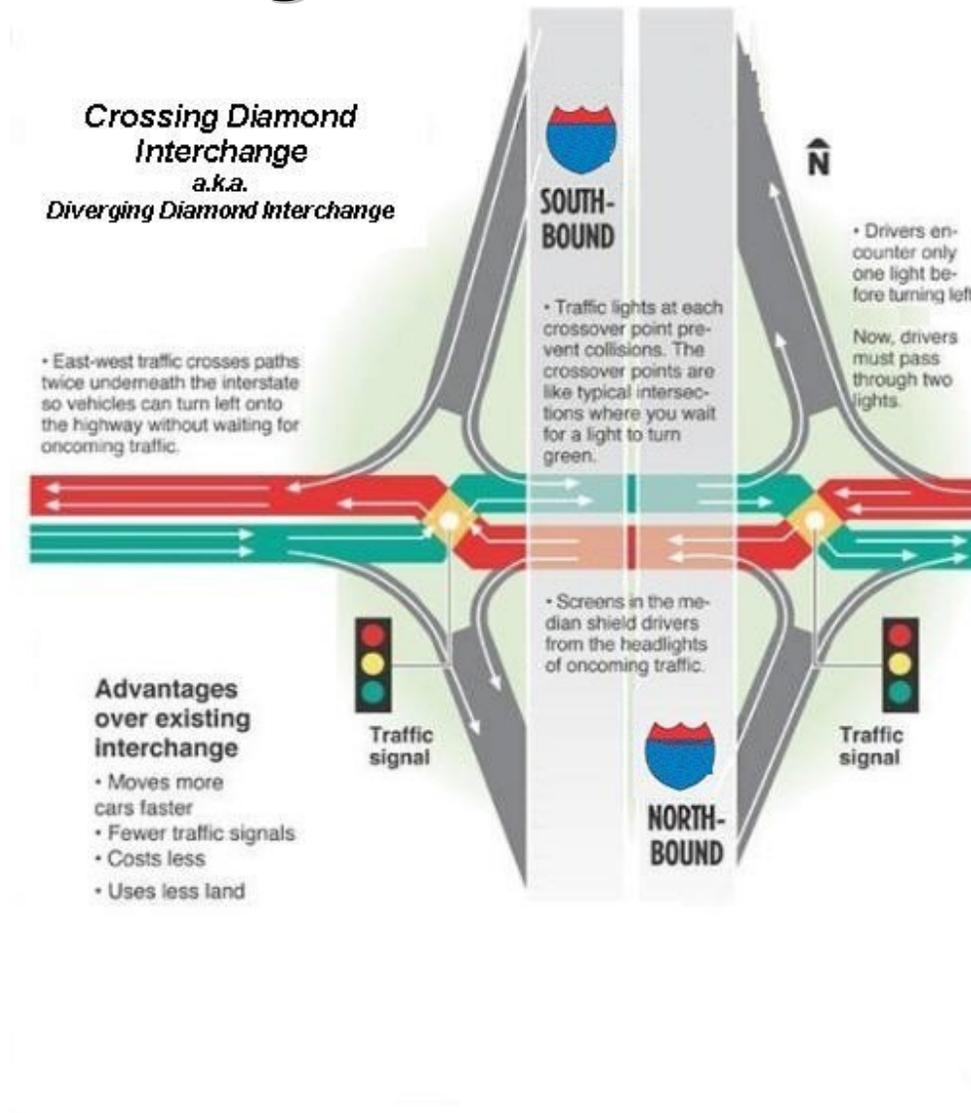
A New Interchange Concept

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# CROSSING DIAMOND SIMULATION



## Crossing-Diamond Schematic



modified graphic



## ***Why a Crossing-Diamond Interchange (CDI) now?***

- The Crossing-Diamond (CDI) is a new interchange design concept. It is also known as the Diverging Diamond Interchange.
- It is being evaluated in several locations in the in the U.S. Missouri will be constructing a CDI starting in 2007.
- ODOT is now in the process of evaluating how well the CDI could function for I-5 interchange reconstruction projects.



## *Other Agencies Considering Application*

Agency	Considering?	NEPA	Design	Construction	Site Not Suitable
Missouri DOT			◆	(2007)	
New Mexico DOT		◆			
Virginia DOT		◆			
City of Baltimore		◆			
Ministry of Ontario	◆				
Colorado DOT					◆
Ohio DOT					◆



## ***Crossing-Diamond Interchange (CDI)***

- Oregon Bridge Delivery Partners is evaluating the CDI concept as part of the Ashland Exit 14 bridge replacement project.
- The CDI has a great deal of benefits over other interchange designs and may provide a good alternative for consideration at the Fern Valley Interchange.



## ***Crossing- Diamond Interchange (CDI)***

- No apparent fatal flaws of the CDI have been identified based on roadway geometry or traffic.
- Preliminary analysis indicates the CDI would result in higher capacity, lower delays, and potentially lower costs than other alternatives—making the CDI concept viable for consideration.



## ***Key Crossing-Diamond Design Elements***

- Design eliminates left turn lanes from the crossroad (in this case, Fern Valley Road).
- Vehicles turning left onto the on-ramps only travel through one signal.
- Only through movements occur at cross-over signals.



## ***Key Crossing-Diamond Design Elements***

- Glare shields are installed on the center median to prevent views of headlights in the opposite direction.
- Requires good access management downstream of ramp terminals.
- Pedestrian & bicyclists can be handled on:
  - On the outside edge
  - Down the middle



## ***Crossing-Diamond Challenges***

- Driver Expectancy – Vehicles travel on the left side of roadway across the structure.
- Design modifications needed to permit direct off-ramp to on-ramp movement (up and over) for excess height vehicles.



## ***Mitigating CDI Challenges***

- Driver Expectancy
  - Guiding geometry (how vehicles approach signals)
  - Visual cues (signing, striping, etc.)
  - Barriers to shield views of opposing traffic
- Up and Over Options
  - Design median barrier to allow occasional movements thru ramp terminals (up and over)



## ***Crossing-Diamond Advantages***

- Improved Safety
  - Reduced conflict points
  - Up to 50% less crashes over a standard diamond
- Cost-Effective
  - Reduced cost because fewer lanes are needed on the bridge structure
  - Potentially less right-of-way needed
- Sustainability
  - Improved future growth capabilities
  - Design will better accommodate additional or unanticipated growth past the design year
- Improved Mobility
  - Fewer signal phases
  - Less congestion; more efficient



## ***Fern Valley Interchange Comparisons***

Topic	6-lane Diamond Interchange with SE Loop	Single Point Urban Interchange	Crossing-Diamond Interchange
Interchange v/c	0.65	0.58	<b>0.43</b>
Average Delay per Vehicle (seconds)	29.1	24.2	<b>10.4</b>
Signals: Number	2	1	2
Signals: Phasing	3 phase	3 phase	2 phase
Future Growth: 2030 volumes +20% (change in v/c)	0.14	0.10	0.09



## ***Fern Valley Interchange Comparisons cont.***

Topic	6-lane Diamond with SE Loop	Single Point Urban Interchange	Crossing-Diamond Interchange
General ROW impacts	Highest	Moderate	Minimal to Moderate
Access Control Issues	Most	Least	Same as diamond
Potential Conflict Points	40	40	<b>16</b>
Points with Simultaneous Conflicts	6	6	<b>0</b>
Bridge Width	6 lanes	6 lanes	4 or 6 lanes



## ***CDI Animation Notes***

- Animation is not calibrated, so this will only show how the traffic generally flows through the CDI, not the specific operation of any intersection or any roadway segment.
- Animation will show overhead, “helicopter”, and “through the windshield” views.