



Administration Building  
West Hearing Room  
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Nancy A. Doty, Chair, District 1  
Nancy Sharpe, District 2  
Rod Bockenfeld, District 3  
Nancy Jackson, Chair Pro-Tem, District 4  
Bill Holen, District 5

## **Study Session**

### **July 18, 2016**

The Arapahoe County Board of County Commissioners typically holds weekly Study Sessions on Monday and Tuesday. Study Sessions (except for Executive Sessions) are open to the public and items for discussion are included on this agenda. Agendas (except for Executive Sessions agendas) are available through the Commissioners' Office or through the County's web site at [www.arapahoegov.com](http://www.arapahoegov.com). Please note that the Board may discuss any topic relevant to County business, whether or not the topic has been specifically noticed on this agenda. In particular, the Board typically schedules time each Monday under "Committee Updates" to discuss a wide range of topics. In addition, the Board may alter the times of the meetings throughout the day, or cancel or reschedule noticed meetings. Questions about this agenda? Contact the Commissioners' Office at 303-795-4630 or by e-mail at [commissioners@arapahoegov.com](mailto:commissioners@arapahoegov.com)

### **Study Session Topics**

**9:00 A.M. Calendar Updates (WHR)**

*Diana Maes  
BoCC Administration Manager*

**9:30 A.M. Communication Services Update (WHR)**

*Andrea Rasizer, Director  
Communications Services*

**10:00 A.M. BOCC Updates (WHR)**

*Board of County Commissioners*

**11:00 A.M. \*C14-028; I-25 & Dry Creek Road Interchange And Corridor Study  
Project Status 2nd Update (WHR)**

Discussion and project status second update for the C14-028; I-25 and Dry Creek Road Interchange and Corridor Study

Request: Information/Direction

*Brian Love, CIP Manager, Public Works & Development  
Bryan Weimer, Transportation Division Manager, Public Works & Development  
David Schmit, Director, Public Works & Development  
Todd Weaver, Budget Manager, Finance  
Robert Hill, Senior Assistant County Attorney*

Documents:

C14-028 I-25 AND DRY CREEK RD INTERCHANGE STUDY BOCC UPDATE 2 7-11-16 FINAL.DOCX  
C14-028 LEVEL 2 SCREENING MATRIX.PDF

**Break**

**1:00 P.M. \*Align Arapahoe - Service First (WHR)**

*Chandra DeSimone, Performance Management Analyst, Department of Strategy & Performance*

*Matthew Nii, Performance Management Analyst, Department of Strategy & Performance Elected Officials and Department Directors*

**2:00 P.M. \* Executive Session (WHR)**

Executive Study Session and County Attorney Administrative Meeting [Section 24-6-402 (4)(b)C.R.S.](As required by law, specific agenda topics will be announced in open meeting prior to the commencement of the closed and confidential portion of this session) (WHR)

*Ron Carl, County Attorney*

**\* To Be Recorded As Required By Law**

WHR - West Hearing Room

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*Please contact our office at least 3 days in advance to make arrangements.*



## Board Summary Report

**Date:** July 11, 2016  
**To:** Board of County Commissioners  
**Through:** David M. Schmit, Director  
Public Works  
**From:** Bryan D. Weimer, PWLF, Division Manager  
Transportation Division  
**Subject:** C14-028; I-25 & DRY CREEK ROAD INTERCHANGE AND CORRIDOR  
STUDY, BOCC STUDY SESSION FOR PROJECT STATUS  
UPDATE #2

### Direction/Information

Staff will provide an update on the I-25 and Dry Creek Road Interchange and Corridor Study with the Board of County Commissioners (BOCC) prior to a scheduled Public Meeting on July 28, 2016.

### Request and Recommendation

This Study Session is to present to the BOCC and update on the above referenced project. The session will discuss current status, next steps, schedule, etc. Staff would like to obtain feedback and direction from the Board as they see appropriate.

### Links to Align Arapahoe

#### Service First –

The implementation of the study is an example of the cooperation between various governmental agencies to accomplish improvements that benefit citizens, business, and commuters alike. This study will identify short and long term improvements to an area of the County transportation system which is highly congested. With the identification of solutions and implementation of such, the citizen of Arapahoe County, motorists traveling the roadways, and the users of transit and the pedestrian/bike network will see an improved level of service.

**Quality of Life –**

Quality of life will improve with the implementation of the improvements for those using the transportation system in the area, as well as the citizens lining in the area, and the business depending on the system to provide goods and services.

**Fiscal Responsible –**

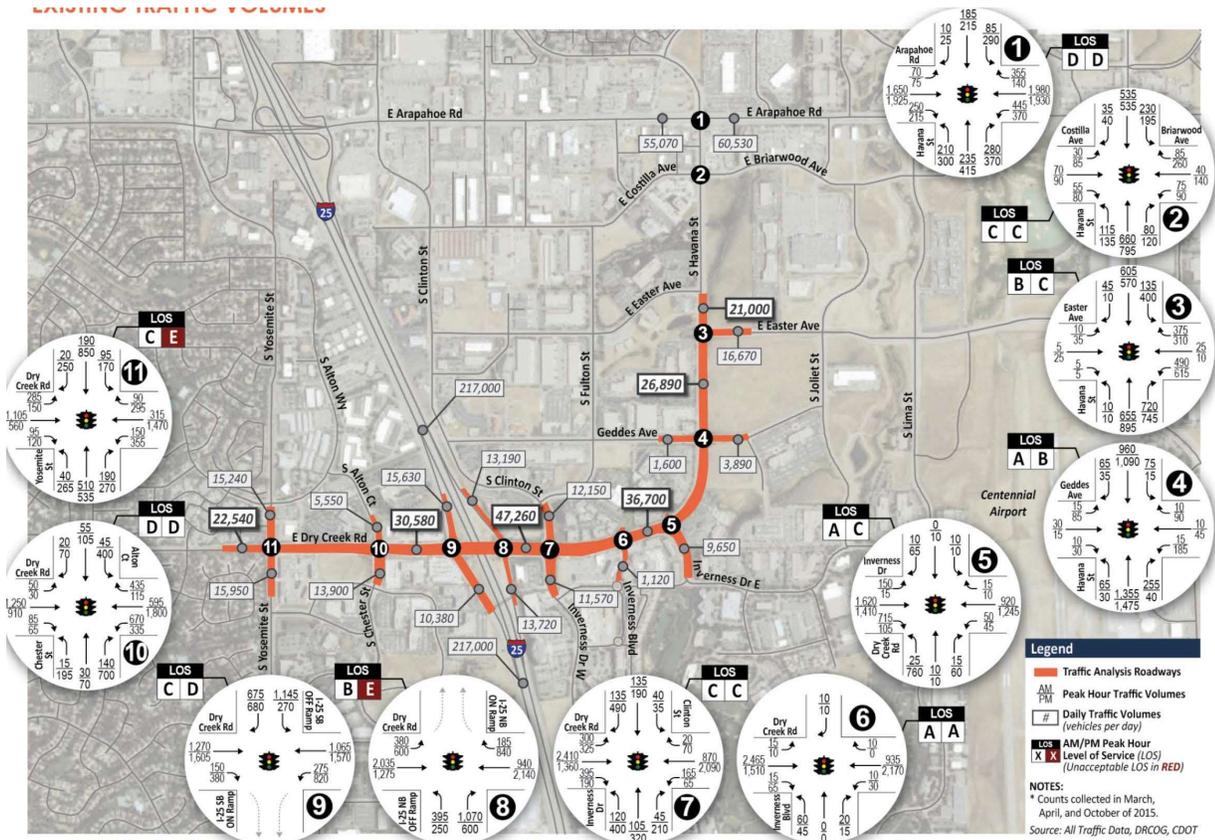
This project is a joint funded project between SPIMD, City of Centennial, and Arapahoe County whereby the County funds are leveraged to implement a needed project.

**Background**

Forecasted growth in south Denver Metro Area, western Arapahoe County, and surrounding areas will result in an increasing need for improvements to the Interstate 25 (I-25) and Dry Creek Road interchange and corridor. Dry Creek Road west of I-25 is located within the City of Centennial. East of the interchange the City of Centennial recently annexed Dry Creek Road and Dry Creek Road turns into Havana Street near Inverness Drive East. The private property north and south of Dry Creek Road is currently located within unincorporated Arapahoe County. Generally, Dry Creek Road between Yosemite Street and Easter Avenue is a 6-through lane principal/major arterial with ancillary left turn and right turn lanes at various intersections. It is an important commuter roadway that provides access to the south portions of the Denver Technology Center (DTC), and other surrounding employment districts. The Dry Creek Road/Havana Street/Easter Avenue/Broncos Parkway corridor provides connectivity between I-25 and Parker Road and an alternative for the traveling public to Arapahoe Road. As such the study area will extend north along Havana Street to Arapahoe Road to show what impacts the resulting recommended improvements will have on the intersection of Arapahoe Road and Havana Street and possible relief that might occur for Arapahoe Road. West of the interchange, Dry Creek Road provides continuity from I-25 to C-470 in Jefferson County via the Dry Creek Road/Mineral Avenue/Ken Caryl corridor. The study area consists of 300' west of Yosemite Street on the west, ½ mile to the north, north of Easter Avenue to Arapahoe Road and ½ mile to the east and south and needs to consider the interchange at I-25.

Traffic conditions around the interchange are reported to have level of service (LOS) C and D (AM/PM) for the west side ramp intersection and LOS B and E (AM/PM) for the east side ramp intersection with Dry Creek Road. The following graphic depicts the specifics of the existing traffic information.

### Existing Traffic Volumes



Existing corridor operations for the Dry Creek Road study corridor, including travel speed and LOS, were also analyzed. Average travel speeds along the Dry Creek Corridor were recorded in SimTraffic from Yosemite Street to Easter Avenue. Existing corridor operation reports are depicted below.

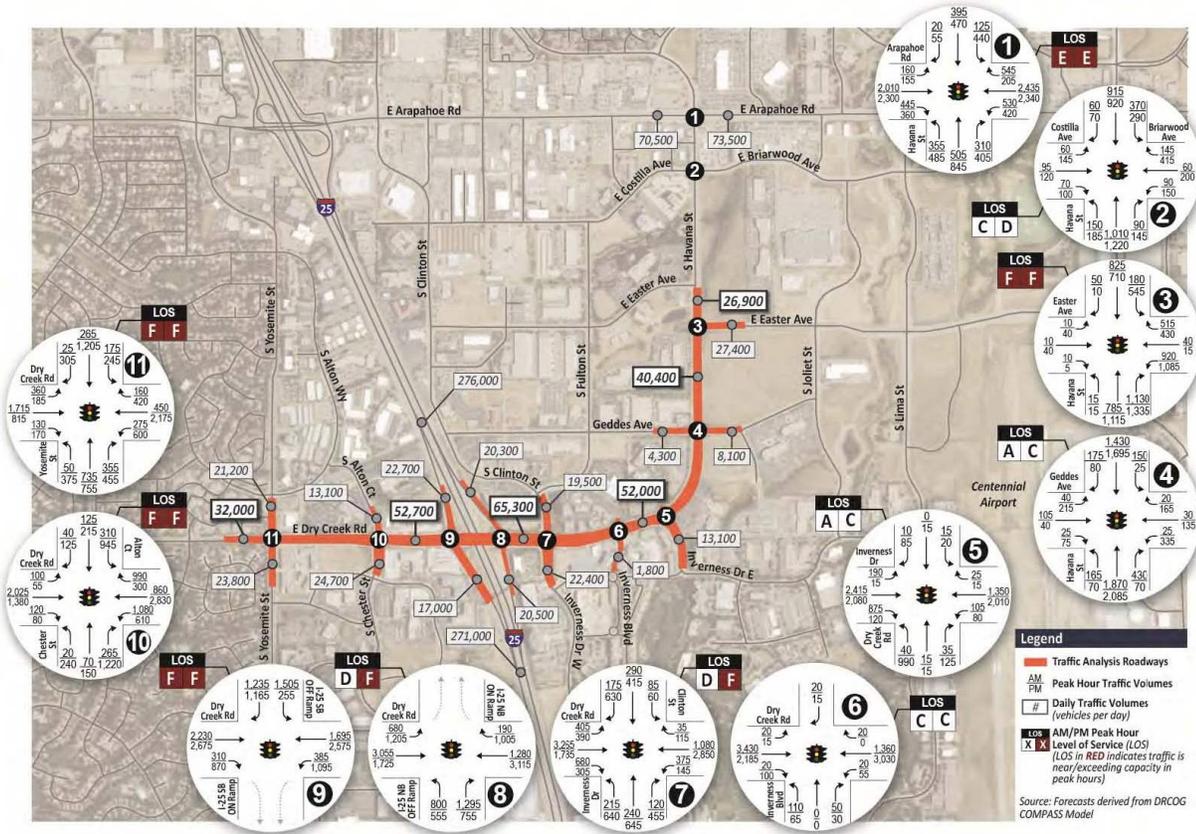
**Table 7: Existing Corridor Level of Service (LOS) Results**

DIRECTION	DRY CREEK ROAD SEGMENT	AM/PM PEAK HOUR	
		LOS	SPEED (MPH)
<b>Eastbound</b>	Yosemite St to Alton Ct St	D / F	17 / 9
	Chester St/Alton Ct St to I-25 West Ramps	F / F	8 / 5
	I-25 West Ramps to I-25 East Ramps	F / F	3 / 7
	I-25 East Ramps to Inverness Dr W/Clinton St	D / C	14 / 21
	Inverness Dr W/Clinton S to Inverness Blvd	F / C	10 / 21
	Inverness Blvd to Inverness Dr E	F / A	7 / 32
	<b>OVERALL</b>	<b>F / F</b>	<b>9 / 9</b>
<b>Northbound</b>	Inverness Dr E to Geddes St	F / B	7 / 25
	Geddes St to Easter Ave	B / C	24 / 23
	<b>OVERALL</b>	<b>D / C</b>	<b>17 / 23</b>
<b>Southbound</b>	Easter Ave to Geddes St	A / A	34 / 35
	Geddes St to Inverness Dr E	A / A	30 / 34
	<b>OVERALL</b>	<b>A / A</b>	<b>32 / 35</b>
<b>Westbound</b>	Inverness Dr E to Inverness Blvd	D / C	17 / 19
	Inverness Blvd to Inverness Dr W/Clinton St	C / E	18 / 13
	Inverness Dr W/Clinton St to I-25 East Ramps	C / E	20 / 12
	I-25 East Ramps to I-25 West Ramps	F / D	9 / 15
	I-25 West Ramps to Alton Ct	F / F	9 / 5
	Chester St/Alton Ct to Yosemite St	D / F	17 / 4
	<b>OVERALL</b>	<b>D / F</b>	<b>17 / 8</b>

Source: Highway Capacity Manual, 2010

Future 2040 traffic was projected and assigned to the intersection and corridor. Volumes west of the intersection were projected to increase to 65,300 vpd east of I-25 and 52,700 vpd west of I-25, which represents 30% and 42% increase, respective. Six out of the 11 intersections analyzed are predicted to perform at LOS F during the 2040 AM and/or PM peak hours, assuming no improvements are made to the existing corridor. Four of the eleven intersections perform at LOS F during both the AM and PM peak hours; Yosemite Street, Chester Street, I-25 West Ramps, and Easter Avenue. The intersections that perform the worst are the Havana Street/Easter Avenue intersection and intersections west of I-25. The following depicts the future traffic, comparisons with existing level of service for both intersections, and corridor as a whole.

Figure 9: 2040 Traffic Volumes and LOS



**Table 8: 2040 Intersection Level of Service (LOS) Results – AM Peak Hour**

Intersection	Existing		2040		Difference (sec/veh)
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	
Yosemite Street	C	20	F	124.6	104.6
Chester Street/Alton Court	D	49.6	F	248.1	198.5
I-25 West Ramps	C	29.2	F	135.7	106.5
I-25 East Ramps	B	18	D	35.9	17.9
Inverness Drive West/Clinton Street	C	26	D	49.2	23.2
Inverness Boulevard	A	4.4	C	22.2	17.8
Inverness Drive East	A	3.2	A	9.6	6.4
Geddes Street	A	5.2	A	9.8	4.6
Easter Avenue	B	19.7	F	100	80.3
Costilla Avenue/Briarwood Avenue	B	13.3	C	22	8.7
Arapahoe Road	C	37.4	E	55.8	18.4

Source: Highway Capacity Manual, 2010

**Table 9: 2040 Intersection Level of Service (LOS) Results – PM Peak Hour**

Intersection	Existing		2040		Difference (sec/veh)
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	
Yosemite Street	E	66.2	F	223.6	157.4
Chester Street/Alton Court	D	44.8	F	215.6	170.8
I-25 West Ramps	D	38.9	F	134.4	95.5
I-25 East Ramps	E	60.8	F	214.3	153.5
Inverness Drive West/Clinton Street	C	26.5	F	94.7	68.2
Inverness Boulevard	A	9.9	C	22	12.1
Inverness Drive East	C	21.3	C	20.1	-1.2
Geddes Street	B	13	C	21.4	8.4
Easter Avenue	C	23.3	F	185.4	162.1
Costilla Avenue/Briarwood Avenue	C	25.5	D	47.3	21.8
Arapahoe Road	D	45.2	E	76	30.8

Source: Highway Capacity Manual, 2010

**Table 10: 2040 Corridor Level of Service (LOS) Results – AM Peak Hour**

DIRECTION	DRY CREEK ROAD SEGMENT	AM/PM PEAK HOUR				DIFFERENCE (MPH)
		EXISTING		2040		
		LOS	SPEED (MPH)	LOS	SPEED (MPH)	
<b>Eastbound</b>	Yosemite St to Chester St	D	17	F	3	-14
	Chester St to I-25 West Ramps	F	8	F	3	-5
	I-25 West Ramps to I-25 East Ramps	F	3	F	4	1
	I-25 East Ramps to Inverness Dr W/Clinton St	D	14	F	7	-7
	Inverness Dr W/Clinton S to Inverness Blvd	F	10	F	9	-1
	Inverness Blvd to Inverness Dr E	F	7	F	6	-1
	<b>OVERALL</b>	<b>F</b>	<b>9</b>	<b>F</b>	<b>4</b>	<b>-5</b>
<b>Northbound</b>	Inverness Dr E to Geddes St	F	7	F	7	0
	Geddes St to Easter Ave	B	24	C	21	-3
	Easter Ave to Briarwood Ave	C	27	D	18	-9
	Briarwood Ave to Arapahoe Rd	F	5	F	4	-1
	<b>OVERALL</b>	<b>E</b>	<b>16</b>	<b>F</b>	<b>13</b>	<b>-3</b>
<b>Southbound</b>	Arapahoe Rd to Briarwood Ave	F	6	E	17	11
	Briarwood Ave to Easter Ave	E	19	C	27	8
	Easter Ave to Geddes St	A	34	B	27	-7
	Geddes St to Inverness Dr E	A	30	F	8	-22
	<b>OVERALL</b>	<b>D</b>	<b>22</b>	<b>D</b>	<b>18</b>	<b>-4</b>
<b>Westbound</b>	Inverness Dr E to Inverness Blvd	D	17	F	7	-10
	Inverness Blvd to Inverness Dr W/Clinton St	CE	18	F	3	-15
	Inverness Dr W/Clinton St to I-25 East Ramps	C	20	F	5	-15
	I-25 East Ramps to I-25 West Ramps	F	9	E	13	4
	I-25 West Ramps to Chester St	F	9	F	8	-1
	Chester St to Yosemite St	D	17	F	9	-8
	<b>OVERALL</b>	<b>D</b>	<b>17</b>	<b>F</b>	<b>7</b>	<b>-10</b>

Source: Highway Capacity Manual, 2010

**Table 11: 2040 Corridor Level of Service (LOS) Results – PM Peak Hour**

DIRECTION	DRY CREEK ROAD SEGMENT	AM/PM PEAK HOUR				DIFFERENCE (MPH)
		EXISTING		2040		
		LOS	SPEED (MPH)	LOS	SPEED (MPH)	
Eastbound	Yosemite St to Chester St	F	9	F	2	-7
	Chester St to I-25 West Ramps	F	5	F	2	-3
	I-25 West Ramps to I-25 East Ramps	F	7	F	7	0
	I-25 East Ramps to Inverness Dr W/Clinton St	C	21	C	19	-2
	Inverness Dr W/Clinton S to Inverness Blvd	C	21	D	17	-4
	Inverness Blvd to Inverness Dr E	B	32	B	30	-2
	<b>OVERALL</b>	<b>F</b>	<b>9</b>	<b>F</b>	<b>5</b>	<b>-4</b>
Northbound	Inverness Dr E to Geddes St	C	25	E	21	-4
	Geddes St to Easter Ave	C	23	C	26	3
	Easter Ave to Briarwood Ave	C	30	F	6	-24
	Briarwood Ave to Arapahoe Rd	F	4	F	2	-2
	<b>OVERALL</b>	<b>C</b>	<b>21</b>	<b>B</b>	<b>14</b>	<b>-7</b>
Southbound	Arapahoe Rd to Briarwood Ave	D	20	D	18	-2
	Briarwood Ave to Easter Ave	B	35	C	29	-6
	Easter Ave to Geddes St	B	35	C	29	-6
	Geddes St to Inverness Dr E	B	34	D	22	-12
	<b>OVERALL</b>	<b>B</b>	<b>31</b>	<b>C</b>	<b>24</b>	<b>-7</b>
Westbound	Inverness Dr E to Inverness Blvd	D	19	F	6	-13
	Inverness Blvd to Inverness Dr W/Clinton St	E	13	F	6	-7
	Inverness Dr W/Clinton St to I-25 East Ramps	E	12	F	5	-7
	I-25 East Ramps to I-25 West Ramps	E	15	F	6	-9
	I-25 West Ramps to Chester St	F	5	F	7	2
	Chester St to Yosemite St	F	4	F	6	2
	<b>OVERALL</b>	<b>F</b>	<b>8</b>	<b>F</b>	<b>5</b>	<b>-3</b>

Source: Highway Capacity Manual, 2010

Since the last BOCC update in February 2016, the Study Team has completed the Corridor Existing Conditions Report, held the first Public Meeting, presented at the Walnut Hills Civic Association, Hunters Hill HOA, Willow Creek HOA, held an individual one on one meeting with Arrow Electronics, and provided project display boards for interaction in Arrow Electronics, Innovation Pavilion, and Arapahoe County Lima Plaza facilities, and Bike to Work Day.

**Discussion**

Over the next 25 years and beyond, the I-25/Dry Creek Road interchange and corridor between Yosemite Street and Easter Avenue will serve as an important facility for both local and regional travel. Dry Creek Road will provide an appropriate balance of improved traffic operations, multimodal mobility, and safety while maintaining local accessibility. Planned improvements will minimize impacts to existing neighborhoods, maintain the community

identity, and match the neighborhood/mixed use surroundings. The goals of the project are to develop a range of short-term and long-term improvements to:

- Improve regional access
- Improve mobility and reliability of the system
- Improve congestion and safety
- Optimize existing infrastructure
- Consider all modes of transportation

Improvements to solve the various issues and meet the goals and objectives of the study, such as level of service, travel time, mobility, alternative travel modes, queue lengths, etc. were created and evaluated and packaged into four (4) Alternatives. These Alternatives included 1) Operational and Multi-Modal Improvements, 2) Intersection Capacity, 3) I-25 Access Improvements, and 4) East-West Corridor Capacity Improvements. All of these Alternatives were compared to the No Action Alternative. The Level 2 Screening of these alternatives included the following evaluation criteria.

## Level 2 Evaluation Criteria

The following evaluation criteria were developed to compare how well each alternative meets the Corridor Vision and goals of the project. The performance measures are a mix of qualitative and quantitative assessments based on the criteria and the availability of data at this stage of analysis.

### • Operations and Safety

- 2040 Arterial Peak Hour Level of Service and Speed
  - Arterial Level of Service (LOS) and average speed for the Dry Creek Road corridor for the AM and PM peak hours
- Dry Creek Road Corridor wide Peak Hour Delay
  - Total delay (seconds/vehicle) along the Dry Creek Road corridor for the AM and PM peak hours
- 2040 Peak Hour Queue Lengths
  - Queue lengths (feet) on the EB and WB Dry Creek Road approaches to the major intersections for the AM and PM peak hours
- 2040 Intersection Level of Service and Delay
  - Overall intersection Level of Service (LOS) and average delay for the major intersections for the AM and PM peak hours
- Predicted Vehicular Safety Benefits
  - Predicted vehicular crash reduction between Yosemite Street and Easter Avenue
- Multimodal Conflict Reduction
  - Ability of the alternative to reduce the number of potential multimodal conflict points

### • Multimodal Connectivity

- Pedestrian/Bicyclist Connections
  - Continuous sidewalk and/or paths and pedestrian/bicyclist intersection treatments to enhance and encourage pedestrian and bicyclist activity
- Pedestrian/Bicycle Movement Comfort and Safety
  - Evaluation of user perception based on crossing distance and refuge areas at roadway crossings and operational characteristics of pedestrian and bicycle facilities

- Transit Connections
  - General evaluation of enhancements to transit facilities, such as bus stop locations and connections to Dry Creek Station for all modes (drivers, pedestrians, bicyclist, bus riders)
- **Community and Environment**
  - Right-of-Way (ROW) Required
    - Number and acres of properties with full and partial acquisition of property expected based on alternative conceptual layout
  - Property Access Impacts
    - Evaluation of property access impacts based on alternative conceptual layout
  - Aesthetic Treatment Opportunities
    - Evaluation of the level and type of potential aesthetic treatments accommodated by the alternative conceptual layout
  - Consistency with Established Local and Regional Plans
    - Evaluation of consistency of alternative elements with documented planning efforts for the area transportation system and surrounding land use
- **Feasibility and Cost**
  - Conceptual-level Probable Construction Costs
    - General evaluation (low, moderate, high) based on major cost items of the alternative conceptual layout
  - Constructability
    - Evaluation of general construction complexity and difficulty from contractor perspective
  - Ability to Construct in Phases
    - Evaluation of the ability to construct useful portions of the improvements as separate projects over a phased implementation period
  - Use of Existing Infrastructure
    - General evaluation of ability to maximize the use of existing infrastructure (including transportation infrastructure and utilities)

A summary of the elements of each of the 4 Alternatives is presented as follows

### **Alternative 1 - Operational and Multimodal Improvements**

Alternative 1 includes operational and multimodal improvements, including signal timing/phasing improvements, pedestrian and bicycle facilities, Travel Demand Management (TDM) programs, and transit facilities and operations.

- **Signal Operations**
  - Optimized signal timing and phasing to facilitate travel along Dry Creek Road
  - At Chester Street/Alton Court, Dynamic Lane Assignment by time-of-day to convert WB right turn lane (AM peak period and off-peak) to WB through/ right turn lane (PM peak period)
  - At Chester Street/Alton Court, removal of north/south pedestrian phase and more green time allocated to east/west movements (with pedestrian bridge over Dry Creek at intersection)

- **Bicycle and Pedestrian Facilities**
  - Sidewalk improvements
    - Detached 10-foot sidewalk under the I-25 bridge
    - Multiuse path (10 – 12 feet wide) on north and south sides of Dry Creek Road between Yosemite Street and Easter Avenue
  - Between Alton Way and Dry Creek Road, 10-foot sidewalks on the east side and a new sidewalk on the east side. South of Dry Creek Road, 10-foot sidewalks on both sides of Chester Street. Pedestrian bridge over Dry Creek Road at Chester Street/Alton Court.
  - Bike access to LRT Station
    - Bike lanes on Panorama Circle east of Chester Street
    - Directional shared lane (sharrow) pavement markings on private access road of Panorama Corporate Center IV from Panorama Circle to LRT station
  - Pedestrian/bicyclist crossing improvements
    - Crosswalk location modifications to optimize pedestrian/bicyclist visibility
    - Rapid rectangular flashing beacons at crosswalks of free right turn lanes leading to northbound and southbound I-25 ramps
  - Flashing yellow arrow to encourage right turning drivers to yield to pedestrians and bicyclists
    - Yosemite Street intersection (all approaches)
    - Chester Street intersection (eastbound, southbound and westbound approaches)
    - Inverness Drive East intersection (northbound approach)
- **Transit**
  - Additional wayfinding signs to LRT station (for drivers, pedestrians, and bicyclists)
  - Circulator service west of I-25
    - Service to neighborhoods to access LRT station
  - New LRT station parking opportunities on east side of I-25
- **Travel Demand Management (TDM) Programs**
  - Targeted vanpools (neighborhood, employer and apartment building programs)
  - Peak hour trip reduction programs
    - Transit pass program
    - Flexible employee work schedules
    - Real time information about travel time and delay
  - Small-scale bike sharing program
    - Up to 10 bikes at three to five locations (at large multi-family developments and office complexes)
    - Storage and bicycle maintenance

## **Alternative 2 - Intersection Capacity Improvements**

Alternative 2 includes the operational and multimodal improvements described in Alternative 1 with the following additional capacity improvements at intersections. Additional pedestrian and bicyclist improvements at intersections are also included to enhance multimodal safety.

### **Yosemite Street**

- Added NB and SB left turn lanes (double lefts)
- Converted WB right turn to WB through lane
- Added WB right turn lane

- More prominent NB free right turn lane
- Perpendicular crosswalk alignments
- High visibility crosswalks
- Converted SB right-in/right-out access east of intersection to right-in only

#### **Chester Street/Alton Court**

- Added SB left turn lane (triple lefts)
- Added NB free right turn movement with acceleration lane, continuous to SB I-25 Ramp
- Prohibited WB U-turns with new WB left turn lane at entrance to LRT station east of intersection

#### **I-25 SB Ramps**

- Added SB left turn lane (triple left turn)
- Converted EB free right turn to yield condition
- High visibility crosswalk

#### **I-25 NB Ramps**

- Extended WB left turn lane for I-25 SB Ramps through intersection
- High visibility crosswalk

#### **Inverness Drive West/Clinton Street**

- Converted EB right turn lane to EB through/right lane
- Added EB right turn lane

#### **Inverness Boulevard**

- Converted to  $\frac{3}{4}$ -movement signalized intersection
- Converted EB right turn lane to EB through/right lane

#### **Inverness Drive East**

- Added EB right turn lane (EB lane from NB I-25 ramp drops)

#### **Geddes Avenue**

- Added NB right turn lane

#### **Easter Avenue**

- Converted NB right turn lane to free right turn with channelization leading to acceleration lane

### **Alternative 3 - I-25 Access Improvements**

Alternative 3 includes the following elements to improve access to I-25 from Dry Creek Road.

#### **I-25 SB Ramp**

- Added peak period lane on SB on ramp using outside shoulder (three lanes leading to ramp meter and use alternate green with overhead signals for ramp meter)

#### **I-25 NB Ramp**

- Added peak period lane on SB on ramp using outside shoulder (three lanes leading to ramp meter and use alternate green with overhead signals for ramp meter)

### **Alternative 4 - East-West Corridor Capacity Improvements**

Alternative 4 includes the operational, multimodal, and intersection capacity improvements described in Alternatives 1 and 2 with the following additional elements to increase east-west capacity along Dry Creek Road.

#### **Inverness Drive West/Clinton Street**

- SB right turn bypass leading directly to NB I-25 Ramps

#### **Inverness Boulevard**

- Converted to unsignalized right-in/right-out intersection

**Easter Avenue**

- Reconstruction for displaced left turn intersection configuration

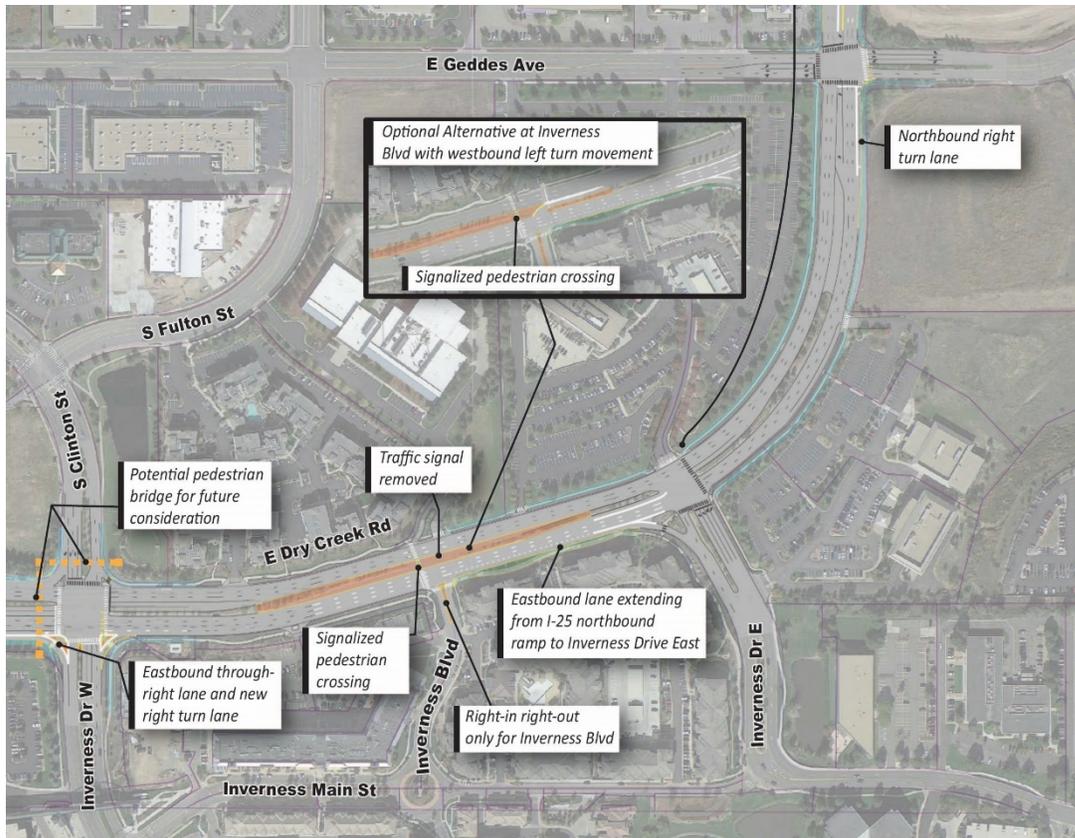
The recommended improvements will likely include components of each alternative described above to provide a solution. Items under consideration with the recommendations currently include:

- **Alternative 2**
  - Alternative 1 multimodal improvements
  - Intersection lanes and configurations
- **Alternative 3**
  - Additional queue area along I-25 on ramps during peak periods
- **Alternative 4 Components**
  - Remove Inverness Boulevard vehicular signal
  - Easter Avenue displaced left turn intersection configuration

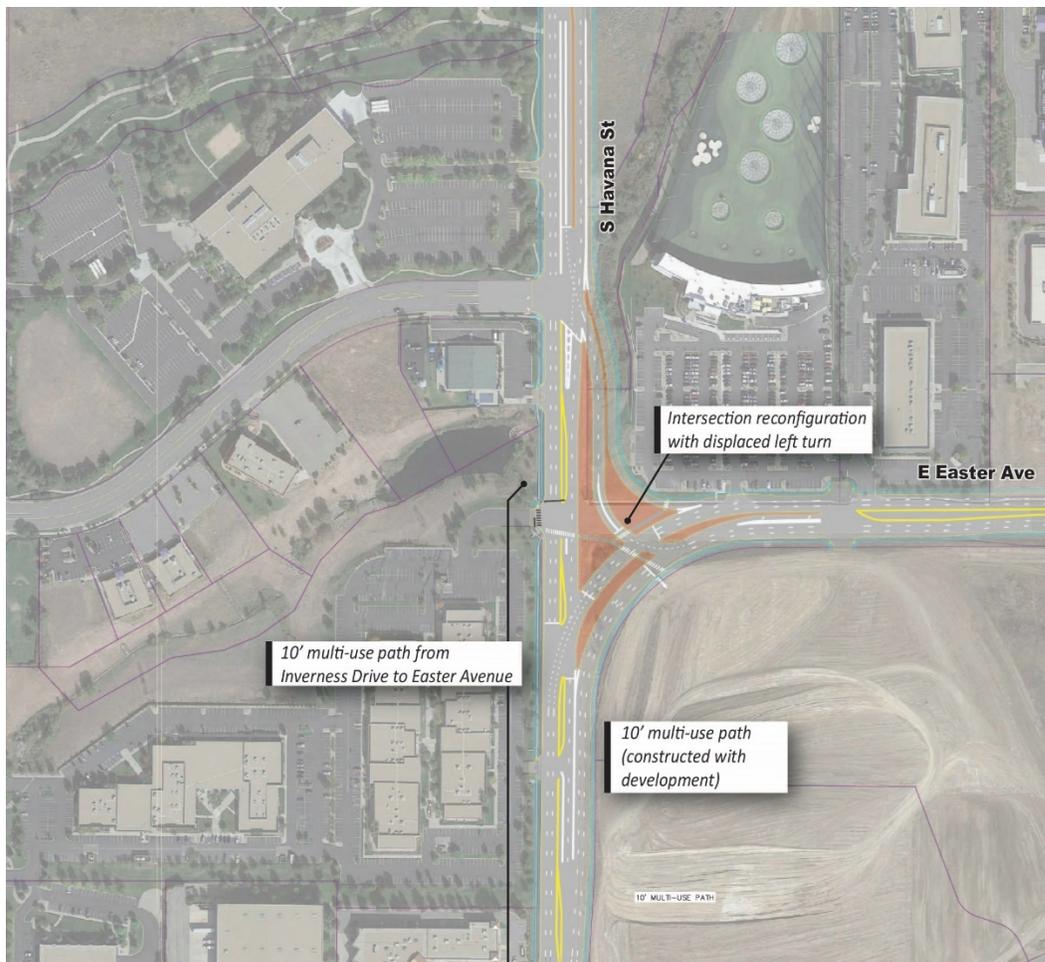
The following graphically represents the potential recommended improvements broken into 4 locations along the corridor for ease of review and clarity. Also, the Long-term improvements at Havana and Easter are shown.











**Next Steps for this study**

The next steps with the project will be to receive comments at the 2<sup>nd</sup> Public Meeting on July 28, 2016. With the feedback received from the Public Meeting, the project team will finalize the recommended improvements. The Study Team is also available to meeting with various groups on a one on one fashion. At that point, cost estimates, prioritization/phasing/potential funding can be evaluated, and the draft Corridor Study will be prepared for agency review and comments. We will hold a final Technical Advisory Committee Meeting on August 15 and will have elected Official Briefings in early September. Public notification of the project/study recommendations will be in late September 2016.

**Schedule**



**Alternatives**

Not applicable for this Study Session. However, direction and feedback is requested of the BOCC with regard to the information presented

**Fiscal Impact**

There is no specific financial impact or benefits associated with this discussion. However, as project specific details and partnerships are developed, separate fiscal impacts will be discussed and presented for approval.

**Reviewed by**

Not applicable for this Study Session.

**Attorney Comments**

The Arapahoe County Attorney's Office has reviewed this Study Session topic and this report and has no comments at this time.

cc: Board of County Commissioners  
David M. Schmit, Director  
Brian R. Love, CIP Manager  
Todd Weaver, Finance Department  
Robert Hill, Assistant County Attorney  
Joe Hart, David Evans and Associates  
File (C14-028)  
File (Study Session Agenda)  
Reader

**Level 2 Screening Matrix**

June 7, 2016

Level 2 Evaluation Criteria	N/A	1	2	3	4	
	No Action	Operational and Multimodal Improvements	Intersection Capacity Improvements	I-25 Access Improvements	East-West Corridor Capacity Improvements	
Operations and Safety	2040 Arterial Peak Hour Level of Service (LOS) and Speed (mph)	<p><u>AM Peak Hour:</u>                      West of I-25: LOS F (8 mph)                      East of I-25: LOS E (14 mph)</p> <p><u>PM Peak Hour:</u>                      West of I-25: LOS F (5 mph)                      East of I-25: LOS E (15 mph)</p>	<p><u>AM Peak Hour:</u>                      West of I-25: LOS F (10 mph)                      East of I-25: LOS E (15 mph)</p> <p><u>PM Peak Hour:</u>                      West of I-25: LOS F (10 mph)                      East of I-25: LOS E (13 mph)</p>	<p><u>AM Peak Hour:</u>                      West of I-25: LOS E (14 mph)                      East of I-25: LOS D (18 mph)</p> <p><u>PM Peak Hour:</u>                      West of I-25: LOS E (16 mph)                      East of I-25: LOS F (11 mph)</p>	<p><u>AM Peak Hour:</u>                      West of I-25: LOS F (10 mph)                      East of I-25: LOS E (15 mph)</p> <p><u>PM Peak Hour:</u>                      West of I-25: LOS F (10 mph)                      East of I-25: LOS E (13 mph)</p>	<p><u>AM Peak Hour:</u>                      West of I-25: LOS E (16 mph)                      East of I-25: LOS E (15 mph)</p> <p><u>PM Peak Hour:</u>                      West of I-25: LOS E (13 mph)                      East of I-25: LOS E (15 mph)</p>
	Dry Creek Road Corridorwide Peak Hour Delay (sec/veh)	<p><b>AM Peak Hour: 1,342</b>  <b>PM Peak Hour: 1,727</b></p>	<p>AM Peak Hour: 1,261 (- 6%)                      PM Peak Hour: 1,635 (- 5%)</p>	<p>AM Peak Hour: 1,305 (- 3%)  <b>PM Peak Hour: 1,552 (- 10%)</b></p>	<p>AM Peak Hour: 1,261 (- 6%)                      PM Peak Hour: 1,635 (- 5%)</p>	<p>AM Peak Hour: 1,226 (- 9%)  <b>PM Peak Hour: 1,328 (- 23%)</b></p>
	2040 Peak Hour Queue Lengths (ft) (AM / PM) on Dry Creek Road	<p><u>Westbound at:</u>                      Chester/Alton: 77 / 785                      Clinton/Inverness Dr W: 810 / 785</p> <p><u>Eastbound at:</u>                      Yosemite: 905 / 690                      Clinton/Inverness Dr W: 95 / 50</p>	<p><u>Westbound at:</u>                      Chester/Alton: 635 / 755                      Clinton/Inverness Dr W: 730 / 825</p> <p><u>Eastbound at:</u>                      Yosemite: 760 / 910                      Clinton/Inverness Dr W: 100 / 60</p>	<p><u>Westbound at:</u>                      Chester/Alton: 665 / 185                      Clinton/Inverness Dr W: 650 / 845</p> <p><u>Eastbound at:</u>                      Yosemite: 695 / 720                      Clinton/Inverness Dr W: 110 / 80</p>	<p><u>Westbound at:</u>                      Chester/Alton: 635 / 755                      Clinton/Inverness Dr W: 730 / 825</p> <p><u>Eastbound at:</u>                      Yosemite: 760 / 910                      Clinton/Inverness Dr W: 100 / 60</p>	<p><u>Westbound at:</u>                      Chester/Alton: 395 / 415                      Clinton/Inverness Dr W: 765 / 865</p> <p><u>Eastbound at:</u>                      Yosemite: 670 / 475                      Clinton/Inverness Dr W: 115 / 90</p>
	2040 Intersection Peak Hour Level of Service (LOS) and Delay (sec/veh) (AM / PM)	<p>Yosemite: <b>F (99) / F (148)</b>                      Chester: <b>F (135) / F (178)</b>                      SB I-25: D (53) / <b>E (73)</b>                      NB I-25: C (31) / <b>E (59)</b>                      Clinton: <b>E (79) / F (125)</b>                      Inverness Blvd: <b>F (121) / D (53)</b>                      Inverness Dr E: <b>F (120) / F (98)</b>                      Geddes: D (48) / D (39)                      Easter: D (50) / <b>F (140)</b></p>	<p>Yosemite: <b>F (125) / F (140)</b>                      Chester: <b>F (93) / F (101)</b>                      SB I-25: D (37) / C (33)                      NB I-25: C (37) / C (21)                      Clinton: <b>E (60) / E (73)</b>                      Inverness Blvd: D (50) / <b>E (62)</b>                      Inverness Dr E: D (38) / <b>F (150)</b>                      Geddes: <b>B (19) / F (137)</b>                      Easter: C (24) / <b>F (112)</b></p>	<p>Yosemite: <b>F (98) / F (118)</b>                      Chester: <b>F (82) / E (67)</b>                      SB I-25: D (37) / C (24)                      NB I-25: D (39) / C (23)                      Clinton: D (47) / <b>E (76)</b>                      Inverness Blvd: <b>B (16) / E (65)</b>                      Inverness Dr E: <b>B (12) / F (154)</b>                      Geddes: <b>B (13) / F (173)</b>                      Easter: C (25) / <b>F (132)</b></p>	<p>Yosemite: <b>F (125) / F (140)</b>                      Chester: <b>F (93) / F (101)</b>                      SB I-25: D (37) / C (33)                      NB I-25: C (37) / C (21)                      Clinton: <b>E (60) / E (73)</b>                      Inverness Blvd: D (50) / <b>E (62)</b>                      Inverness Dr E: D (38) / <b>F (150)</b>                      Geddes: <b>B (19) / F (137)</b>                      Easter: C (24) / <b>F (112)</b></p>	<p>Yosemite: <b>F (99) / F (81)</b>                      Chester: <b>E (74) / E (55)</b>                      SB I-25: D (38) / C (27)                      NB I-25: D (41) / D (39)                      Clinton: <b>E (68) / E (76)</b>                      Inverness Blvd: D (43) / C (30)                      Inverness Dr E: C (35) / <b>F (104)</b>                      Geddes: <b>B (15) / C (25)</b>                      Easter: <b>B (18) / B (12)</b></p>
	Predicted Vehicular Safety Benefits	No Change	<p><b>Low</b>                      - Improved signal timing reduces rear-end crash potential</p>	<p>Moderate                      - Improved signal timing reduces rear-end crash potential                      - Protected left turn phases reduce approach collisions                      - Access control reduces conflict points</p>	<p><b>Low</b>                      - Improved signal timing reduces rear-end crash potential</p>	<p><b>High</b>                      - Improved signal timing reduces rear-end crash potential                      - Protected left turn phases reduce approach collisions                      - Access control reduces conflict points                      - All phases protected at Easter Ave                      - Right turn bypass at SB Clinton removes substantial volume from conflict point on Dry Creek Rd</p>
	Multimodal Conflict Reduction	No change	<p>Reduced conflict points as a result of the pedestrian bridges across Dry Creek Rd and Chester St/Alton Ct</p>	<p>Increased turning lanes increase the potential for conflict points between vehicles and people, but reduced conflict points as a result of the pedestrian bridges across Dry Creek Rd and Chester St/Alton Ct</p>	No significant benefit or impact	<p>Increased conflict points with right turn bypass at SB Clinton</p>

**Level 2 Screening Matrix**

June 7, 2016

Level 2 Evaluation Criteria		N/A	1	2	3	4
		No Action	Operational and Multimodal Improvements	Intersection Capacity Improvements	I-25 Access Improvements	East-West Corridor Capacity Improvements
Multimodal Connectivity	Pedestrian/Bicyclist Connections	Missing sidewalks create fragmented connections on Alton Ct to Dry Creek Rd and along Havana St north of Inverness Dr E. Many sections of wide sidewalks (up to 10') along Dry Creek Rd. Overall poor crossing opportunities.	Improved connections with widened sidewalks on Alton Ct to Dry Creek Rd and along Havana St north of Inverness Dr E. Improved crossings at intersections. Pedestrian bridges provide improved access at Chester St/Alton Ct.	Perpendicular crosswalks and high visibility crosswalks establish improved pedestrians and bicyclists connections. Pedestrian bridges provide improved access at Chester St/Alton Ct.	No significant benefit or impact	Pedestrian activated crossing at Inverness Blvd and large median provides connection for pedestrians and bicyclists, but right turn bypass at SB Clinton is a substantial barrier for pedestrian/bicyclist movements.
	Pedestrian/Bicyclist Movement Comfort and Safety	Long crossing distances and uncomfortable environment across I-25 ramps. Wide lanes and turning radii create fast moving vehicles at intersections. However, crossings of Dry Creek Rd at I-25 provide a comfortable waiting area. Sidewalk under I-25 bridge is a loud environment, but is 10' wide.	Crossing improvements throughout corridor make it easier for pedestrians and bicyclists to cross at intersections. Pedestrian bridges at Alton Ct/Chester St will provide improved convenience and safety.	Reduced comfort and safety at intersections with additional turn lanes and free right turn movements. Pedestrian bridges at Alton Ct/Chester St will provide improved convenience and safety.	No significant benefit or impact	Barrier at right turn bypass at SB Clinton negatively impacts the pedestrian and bicyclist experience.
	Transit Connections	Access to Dry Creek Park and Ride is difficult for drivers and bicyclists. Drivers traveling west on Dry Creek Rd must make U-turn to access garage. There are no on-road facilities for bicyclists. There is pedestrian access from Park and Ride, but no direct access for bicyclists from Dry Creek Rd.	Improved access to Dry Creek Park and Ride for those walking and biking with improvements on Alton Ct and Panorama Cir.	Improved access to Dry Creek Park and Ride for drivers traveling west on Dry Creek Rd and for those walking and biking with improvements on Alton Ct and Panorama Cir.	No significant benefit or impact	The right turn bypass at SB Clinton negatively impacts the pedestrian and bicyclist connection from north of Dry Creek Rd to the Dry Creek LRT station.
Community and Environment	Right-of-Way (ROW) Required (acres)	None	3.04 acres	3.15 acres	None	3.25 acres
	Right-of-Way (ROW) Required (properties)	None	Residential = 1 Commercial = 16 Public/Community = 1 Commercial/Residential = 1	Residential = 1 Commercial = 18 Public/Community = 1 Commercial/Residential = 1	None	Residential = 1 Commercial = 18 Public/Community = 1 Commercial/Residential = 1
	Property Access Impacts	None	- Walgreens access limited to a right in movement only from WB Dry Creek Rd	- Walgreens access limited to right in movement only from WB Dry Creek Rd - 3/4 movement at Inverness Blvd eliminates movements	None	- Walgreens access limited to right in movement only from WB Dry Creek Rd - Median at Inverness Blvd eliminates movements
	Aesthetic Treatment Opportunities	No change	New and widened sidewalks improve community environment and provide opportunities for enhanced landscaped treatments, especially at the Alton Ct/Chester St/Dry Creek Rd intersection	Widening for additional lanes will decrease area for landscape treatments	No significant benefit or impact	Widening for additional lanes will decrease area for landscape treatments, but additional landscape area available within median at Inverness Blvd.
	Consistency with Established Local and Regional Plans	Inconsistent with Centennial Master Plan and Last Half Mile Connectivity Study	Pedestrian and bicyclist improvements consistent with Centennial Master Plan and Last Half Mile Connectivity Study. Operational improvements consistent with Arapahoe County 2035 Transportation Plan.	Intersection improvements are generally consistent with the Centennial Transportation Master Plan and Arapahoe County 2035 Transportation Plan	Accommodation of queues on I-25 ramps consistent with CDOT's Road X program. Intersection operational improvements are generally consistent with the Centennial Transportation Master Plan and Arapahoe County 2035 Transportation Plan.	Intersection improvements are generally consistent with the Centennial Transportation Master Plan and Arapahoe County 2035 Transportation Plan

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June 7, 2016

Level 2 Evaluation Criteria		N/A	1	2	3	4
		No Action	Operational and Multimodal Improvements	Intersection Capacity Improvements	I-25 Access Improvements	East-West Corridor Capacity Improvements
<b>Feasibility and Cost</b>	Conceptual-level Probable Construction Costs (low, moderate, high)	None	Moderate Includes new sidewalks, pedestrian ramps, and bike facilities throughout the corridor	Moderate Includes new sidewalks, pedestrian ramps, and bike facilities throughout the corridor, plus typical intersection improvements along corridor	Low Typical construction of ramp meter improvements and sign bridges.	High Includes new sidewalks, pedestrian ramps, and bike facilities throughout the corridor, plus substantial intersection reconfiguration costs associated with right turn bypass at SB Clinton and Easter Ave intersection
	Constructability	N/A	Moderate Relatively simple construction for sidewalk improvements. Pedestrian bridges construction would require nighttime detours.	Moderate Intersection improvements can be constructed while maintaining traffic movements	Moderate Ramp and signal construction can be constructed while maintaining traffic movements	Difficult Right turn bypass at SB Clinton can be constructed with some reduced capacity and Easter Ave intersection includes major reconstruction
	Ability to Construct in Phases	N/A	Easy Elements can be constructed as funding is available for each location	Moderate Elements can be constructed as funding is available, with some linked projects: - Yosemite intersection with Walgreens driveway - Chester intersection with LRT access and SB I-25 ramps intersection - Inverness Dr W and Inverness Blvd intersections	Moderate NB and SB I-25 ramp improvements should be completed together to maximize benefits	Moderate Elements can be constructed as funding is available, with some linked projects: - Yosemite intersection with Walgreens driveway - Chester intersection with LRT access and SB I-25 ramps intersection - Right turn bypass lane at SB Clinton with Inverness Dr W and Inverness Blvd intersections
	Use of Existing Infrastructure	N/A	Sidewalk improvements would build on existing connections and operational improvements utilize existing infrastructure without widening	Intersection improvements can be constructed to optimize existing roadway and signal infrastructure	Ramps remain in existing configuration with widening and new signal equipment	Easter Ave intersection improvements require total reconstruction
<b>DRAFT RECOMMENDATION</b>		<b>CARRIED FORWARD</b>	<b>NOT RECOMMENDED</b>	<b>RECOMMENDED</b>	<b>RECOMMENDED as elements of overall corridor plan</b>	<b>RECOMMENDED as long-term elements of overall corridor plan</b>
<b>NOTES</b>		Further analysis required as the No Action Alternative in NEPA process for comparison to improvement alternatives	Operational and multimodal improvements alone do not adequately address the Corridor Vision and Study Goals	Intersection capacity improvements when combined with operational and multimodal improvements fully address the short-term Corridor Vision and Study Goals	Improvements to I-25 on ramp operations help address the short-term Corridor Vision and Study Goals and should be considered as elements of an overall corridor plan	The Easter intersection reconstruction, when combined with the other intersection capacity, operational and multimodal improvements, fully address the long-term Corridor Vision and Study Goals. Not included in the recommendation are the southbound right turn bypass from Clinton to I-25 and the conversion to right-in/right-out at Inverness Blvd due to minimal benefit and substantial pedestrian and bicycle impacts.

GREEN = Comparatively beneficial and/or minor impacts

BLACK = Comparatively neutral benefits and/or moderate impacts

RED = Comparatively minor or no benefits and/or major impacts