

# Highlands Ranch Transportation Improvement Program

January 12, 2007

Prepared for:



Prepared by:



in association with

*Pat Noyes & Associates*



**CH2M HILL**  
9191 South Jamaica Street  
Englewood, CO 80112-5946  
P.O. Box 241325  
Denver, CO 80224-9325  
**Tel 720.286.2000**  
**Fax 720.286.9250**

January 12, 2007

Mr. Larry Corcoran  
Douglas County  
100 Third Street  
Castle Rock, CO 80104

Subject: Highlands Ranch Transportation Improvement Program Final Report

Dear Larry:

CH2M HILL is pleased to deliver this final report for the Highlands Ranch Transportation Improvement Program (HRTIP). Preparation of the Program has been interesting and challenging, and implementation of the recommendations will improve mobility in Highlands Ranch while maintaining focus on community values and limiting environmental impacts.

The successful completion of this project was facilitated by our two key working groups; the Technical Leadership Team (ELT) who provided technical input and review, and the Executive Leadership Team (TLT) who guided the overall program direction. The work of those two groups efficiently facilitated our study processes, provided valuable local insights, and enabled us to prepare recommendations that will most effectively address the transportation needs of the Highlands Ranch community.

At the final working session, which included representatives of both the TLT and ELT, a consensus approval on all but two of the over 100 program elements was achieved. Those exceptions were by the Highlands Ranch Community Association (HRCA) to the "construction of four lanes on Monarch Boulevard" and the "construction of a paved connection between Griggs Road and Daniels Park Road". This agreement forms the basis of intergovernmental and interagency cooperation for implementation of the program.

Sincerely,

CH2M HILL

Tom Ragland, PE  
CH2M HILL Vice President  
Highlands Ranch Transportation Improvement Program Project Manager

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# Acronyms and Abbreviations

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CDOT	Colorado Department of Transportation
CIP	Capital Improvement Program
CMAQ	Congestion Mitigation/Air Quality
DRCOG	Denver Regional Council of Governments
DSCO	Douglas County Sheriff's Office
EB	eastbound
EIS	Environmental Impact Statement
ELT	Executive Leadership Team
GIS	Geographic Information Systems
HCM	Highway Capacity Manual
HRCA	Highlands Ranch Community Association
HRMD	Highlands Ranch Metropolitan Districts
ITS	Intelligent Transportation Systems
LOS	Level of Service
LRT	Light Rail Transit
mph	miles per hour
MUTCD	Manual on Uniform Traffic Control Devices
NB	northbound
NCHRP	National Cooperative Highway Research Program
PTZ	Pan Tilt Zoom camera
RTA	Regional or Rural Transportation Authority
RTD	Regional Transportation District
RTP	Regional Transportation Plan
SB	southbound
TDM	Travel Demand Management
TIP	Transportation Improvement Program
TLT	Technical Leadership Team

TMC	Traffic Management Center
TMO	Transportation Management Organization
TRB	Transportation Research Board
TSM	Transportation Systems Management
VMS	Variable Message Sign
WB	westbound

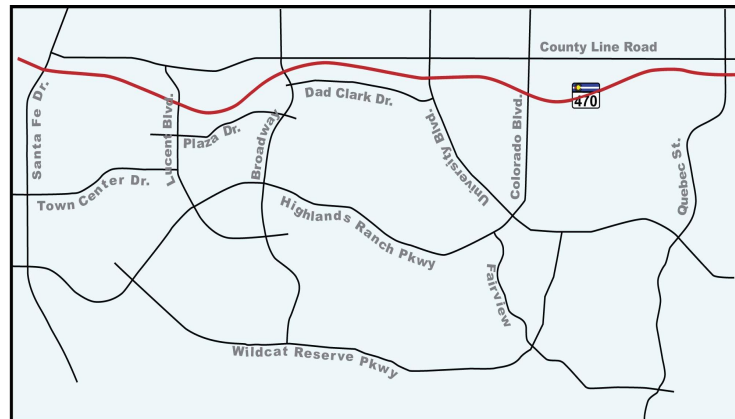
# Executive Summary

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## Introduction

Douglas County (DC) initiated development of the Highlands Ranch Transportation Improvement Program (HRTIP) in January 2006. The study area, shown on Figure ES-1, is bounded on the west by US 85 (Santa Fe Drive), on the north by County Line Road, on the east by the City of Lone Tree, and on the south by the future location of the Chatfield-Cherry Creek Regional Trail. The goal of this study was to develop a set of cost-effective improvement recommendations that would:

- Improve mobility.
- Improve multi-modal opportunities, access, and use.
- Improve safety.



**FIGURE ES-1**  
Highlands Ranch Transportation Improvement Program Study Area

## Study Methodology

The methodology used to develop recommended improvements included identifying criteria for screening and evaluating alternatives, brainstorming potential improvements with the stakeholders and general public, screening viable alternatives, evaluating improvements to determine which ones met the program objectives most effectively, and packaging individual improvements into the final program recommendations.

Agency stakeholders and the public were involved throughout the planning process described above. Agency representatives from Douglas County, the Highlands Ranch Metro District (HRMD), the Highlands Ranch Community Association (HRCA), the Colorado Department of Transportation (CDOT), the Regional Transportation District (RTD), and the Denver Regional Council of Governments (DRCOG) participated in four workshops to clarify the planning goals and objectives, develop screening and evaluation criteria, generate ideas for solutions, screen and evaluate potential improvements, and develop final recommendations.

Two open houses were held to involve the public in identifying issues and potential solutions, developing evaluation criteria, and providing input on draft recommendations.

Based on the results of the evaluation process and review of opportunities to combine individual improvements into packages of improvements, the final recommendations are presented in the following nine areas:

1. Traffic operations: signals
2. Traffic operations: signing and marking
3. Roadway
4. Intelligent Transportation Systems (ITS)/Traffic Management Center (TMC)
5. Transit
6. Bicycle, pedestrian, and trails
7. Education and information
8. Policy
9. Capital improvements

These recommendations include alternatives that showed the greatest improvement potential and alternatives that could be combined as packages for greater mobility, safety, operational, or multi-modal enhancements in the study area.

## Summary of Program Recommendations

This HRTIP includes recommendations to address short- and long-term transportation needs in the Highlands Ranch community; many of which are recommended for implementation over the next 1 to 3 years. A number of these recommendations address operation and maintenance of the existing system to ensure the most effective expenditure of funds. These are projects or programs, with a high benefit to cost ratio, which can be implemented quickly without lengthy planning or design, and which will have an immediate effect on improving safety and mobility in the Highlands Ranch community. The more comprehensive projects, such as major capital improvements, will require implementation over a longer timeframe with extensive public input process and long range budgetary planning.

If funding were available, many of these smaller highly beneficial projects and programs could be implemented within a 5 year planning horizon. Funding will be the key obstacle to accomplishing this and will likely have to come from new sources along with the current funding priorities shown in the Douglas County Public Works capital budget. New sources would likely include the extension of the current road sales tax where some of these projects would be part of the commitments made as part of the extension approval. The Douglas County 2004 - 2009 Capital Improvement Program projected Traffic Engineering funding for capacity and safety improvements at a level of \$1.5 M per year, for use on any specific traffic project or location within the county. This funding level would provide for some progress on the needs identified in this report.

However, as we enter 2007, the funds available to the County for road capital projects and traffic capacity and safety projects is significantly less than what was available in 2004 when that plan was drafted. As the need for maintaining and operating our roadways increases, the funds available for road capital, traffic capacity, and safety projects decreases as there is only one funding source. As a result, this leaves just \$300,000 for traffic capacity and safety improvements. This reduced funding level will not allow any significant progress toward



the recommendations in this report. It is the County's hope that the extension of the road sales tax or other new funding sources will help return the traffic capacity and safety funding closer to the original CIP plan of \$1.5 M annually.

It is important to note that the existing capital improvement budget includes some major projects in the Highlands Ranch community including the rebuilding of County Line Road west of Colorado Boulevard, rebuilding Quebec Street from County Line Road south to Business Center Drive (including the C-470 ramp intersections) and capacity/safety improvements at the University Boulevard / Colorado Boulevard / Highlands Ranch Parkway intersection.

It should also be noted that these recommended improvements in the Highlands Ranch community do not address impacts from C-470 if it is not improved or the impacts if it is made into a toll road. Douglas County will be commissioning a study of the C-470 impacts to the Highlands Ranch roadway system.

### **Critical Program Components**

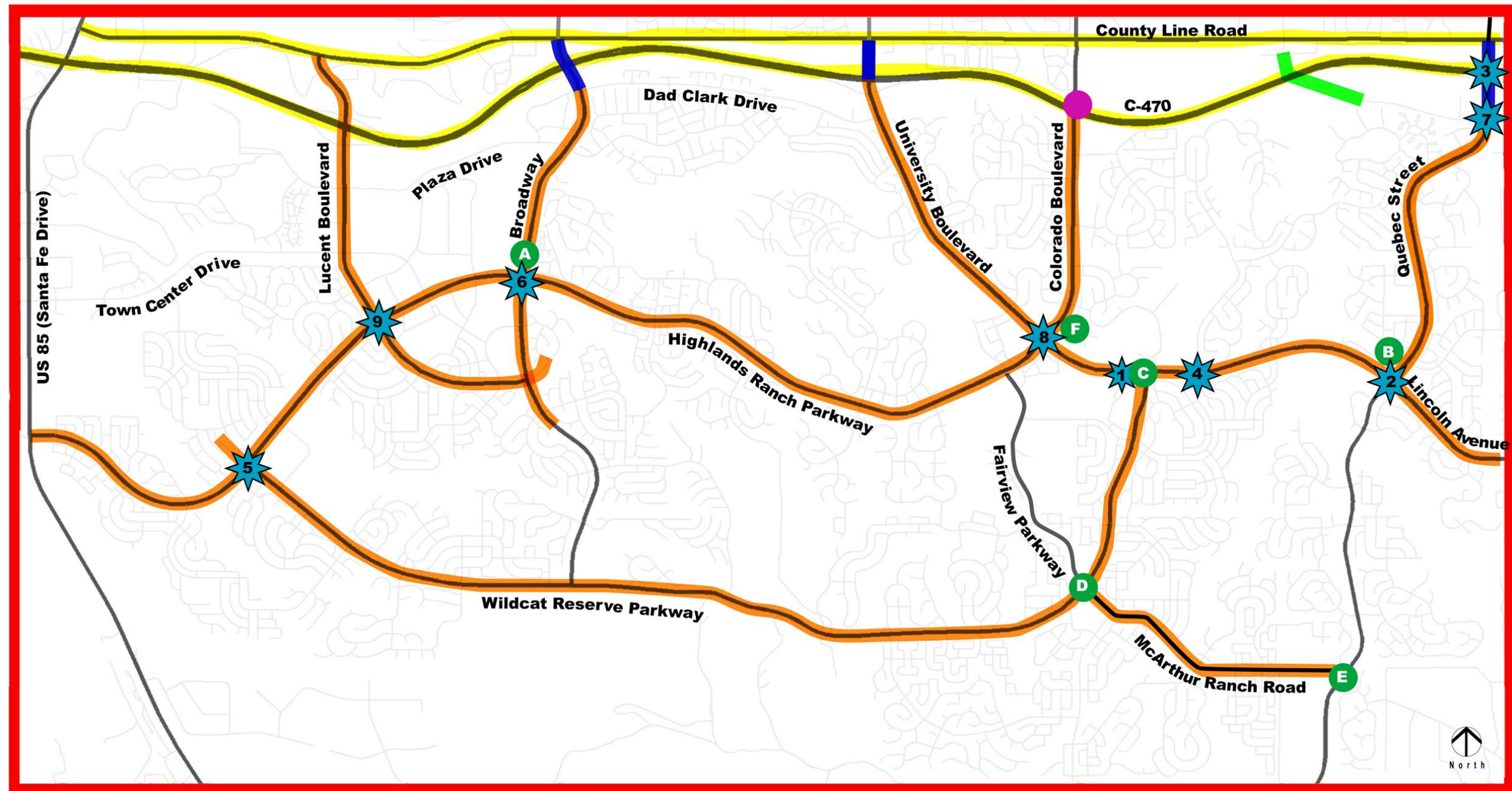
The following 10 items represent parts of the recommended program that are considered critical to the overall program success. These improvements are recommended for immediate implementation:

1. Apply all the HRTIP recommended signing, marking, signal, and minor improvement techniques as a test case in the Quebec Street Corridor and complete before and after delay, average speed, and queue studies. This should include the following modifications:
  - all video detection
  - right-turn overlaps when needed
  - bicycle detection
  - video counts
  - fine tune time-of-day traffic operations plans based on counts
  - eliminate physical left turn lane offsets
  - eliminate any unnecessary left turn phases
  - install advance street name signs
  - install destination signing and marking
  - add deceleration-right turn lanes when needed
  - improve "Positive Guidance" signing
2. Convert vehicle detection at signalized intersections to video where using video data provides additional operational improvements or flexibility, such as the presence of bikes, highly variable left-turn volumes, and right-turn-only approach lanes.
3. Use Viewcoms (Traficon), where communication exists, as a remote traffic diagnostic and observation tool. Also, bring this information back to the Traffic Management Center for remote evaluation and operation of traffic signals. This includes a plan for comprehensive communications within the Highlands Ranch community.
4. Conduct a detailed analysis of high accident and/or accident rate intersections to identify operational or physical problems and corrective projects.

5. Repaint the University Boulevard and Wildcat Reserve Parkway intersection to provide dual left turn lanes for westbound (WB) traffic. Also, collect volume data to use to modify time-of-day signal timing.
6. Rebuild the University Boulevard/Colorado Boulevard/Highlands Ranch Parkway intersection to provide dual WB left turn lanes and an additional WB through lane for Colorado Boulevard. Also, provide better advanced notification of the southbound University Boulevard right turn lane becoming trapped as a right turn lane to Highlands Ranch Parkway.
7. Recount traffic volumes and re-analyze the operational conditions at the Highlands Ranch Parkway and Broadway intersection to confirm or modify recommended improvements.
8. Prepare a bicycle master plan for the Highlands Ranch community, in conjunction with the Highlands Ranch Metropolitan District (HRMD), the Douglas County Sheriff's Office (DCSO), and bicycle groups.
9. Develop a public information system on the DC website using live video feed of critical intersections, segments, and available ramps.
10. Systematically remove left turn and through lane offsets at locations where this condition is greater than two feet. Use public input and accident statistics as criteria for prioritization.

A summary of the complete program recommendations is shown in Figure ES-2.

**FIGURE ES-2**  
Program Recommendations



LEGEND		
	Major Arterial corridors improved with video detection, biannual signal coordination, TMC, etc.	
	Multijurisdictional planning approach for C-470 and County Line Road	
	Roadway widening	
	Construct additional crossing of C-470	
	Intersection reconstruction and/or construct turn lanes	
	A. Broadway & Highlands Ranch Parkway	
	B. Lincoln Avenue & Quebec Street	
	C. Wildcat Reserve Parkway & University Boulevard	
	D. Wildcat Reserve Parkway & Fairview Parkway	
	E. McArthur Ranch Road & Quebec Street	
	F. University Boulevard/Colorado Boulevard/Highlands Ranch Parkway	
	Evaluate high crash location/ implement safety improvements	
	1. University Boulevard & Teal Ridge Court	5. Highlands Ranch Parkway & Wildcat Reserve Parkway
	2. Quebec Street & University Boulevard	6. Broadway & Highlands Ranch Parkway
	3. Quebec Street & C470	7. Quebec Street & Park Meadows Drive
	4. University Boulevard & Cresthill Lane	8. University Boulevard. & Highlands Ranch Parkway
		9. Lucent Boulevard & Highlands Ranch Parkway
	Full access interchange at C-470/Colorado Boulevard	

# 1.0 Study Purpose

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Douglas County initiated the Highlands Ranch Transportation Improvement Program in 2006 to:

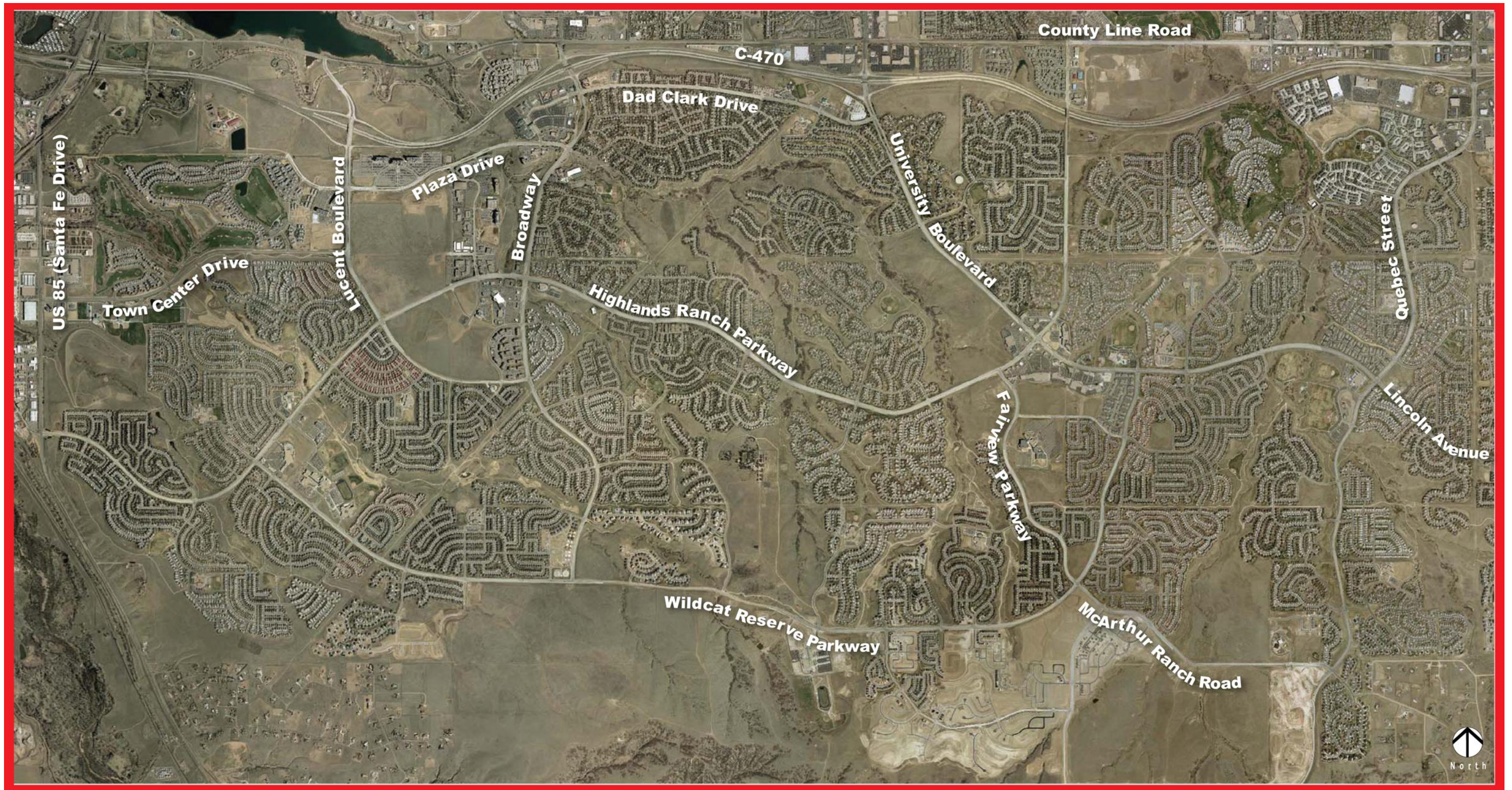
- Identify transportation improvement needs such as the modification of existing, or addition of new facilities in the study area.
- Develop data and analysis sufficient to determine impacts and potential effectiveness of alternative transportation improvements.
- Prepare a compatible and complementary set of improvement recommendations.
- Identify low-cost improvements that can be implemented on an immediate basis, and which will be compatible with long-term improvements.
- Identify funding sources, funding gaps to meet needs, and potential new funding sources and partners.
- Develop a Transportation Improvement Program for the Highlands Ranch community that is accepted by stakeholders.

Key to the completion of this study was the clear definition of a set of goals and objectives, and specific criteria that were used to identify and evaluate improvement alternatives. Both the Technical Leadership and Executive Leadership Teams worked to develop these principles that guided the completion of this study.

As shown in Figure 1, the study included the area bounded on the west by US 85 (Santa Fe Drive), on the north by County Line Road, on the east by the City of Lone Tree, and on the south by the Chatfield - Cherry Creek Regional Trail future location.

The study was structured for review and direction by a Technical Leadership Team, and an Executive Leadership Team. The TLT was comprised of technical staff from the County and coordinating agencies. The TLT was responsible for technical input and review of study findings and conclusions. The ELT was comprised of members appointed by the County responsible for transportation policy and improvement implementation. The ELT reviewed the study process and provided guidance and approval of recommendations. Participating agencies included Douglas County, the Highlands Ranch Metro District, Denver Regional Council of Governments, Colorado Department of Transportation, and the Regional Transportation District.

**FIGURE 1**  
Highlands Ranch Transportation Improvement Program Study Area



The goal of this study was to develop a set of cost-effective improvement recommendations that would:

- Improve mobility.
- Improve multi-modal opportunities, access and use.
- Improve safety.

To accomplish this, the study process was designed to accomplish the following objectives:

- Use existing studies as appropriate.
- Input to long-range planning including DRCOG 2035; the Douglas County Comprehensive Plan, and the Douglas County Transportation Plan.
- Serve as a resource for short-term improvements.
- Identify additional access points.
- Be used for public education:
  - Management of expectations
  - Levels of congestion
  - Levels of funding
  - Need
  - What are we trying to accomplish
  - Results and outcomes from study
- Develop interagency cooperation:
  - Team makeup
  - Other neighboring agencies

The criteria used to evaluate improvement alternatives, and the process of their development is discussed in Section 2.2, Study Process, and Section 2.5, Identification of Transportation Issues and Concerns.

# 2.0 Assessment of Existing Conditions

This section highlights the stakeholder input activities, data collected, existing and future operational conditions, project constraints, and key project issues and concerns.

## 2.1 Stakeholder Input Activities

### 2.1.1 Selection of Key Stakeholders

Agency representatives from Douglas County, HRMD, HRCA, CDOT, RTD, and DRCOG participated in four workshops to clarify the planning goals and objectives, develop screening and evaluation criteria, generate ideas for solutions, screen and evaluate potential improvements, and develop final recommendations.

The agency stakeholders included two groups of representatives, the Executive Leadership Team and the Technical Leadership Team. For much of the planning process these two groups met to consider both policy and technical aspects of the plan. For the last meeting the groups met separately to focus specifically on policy and technical issues, respectively.

The invitees and alternates identified for the ELT and TLT are shown in Table 1.

**TABLE 1**  
Executive Leadership Team and Technical Leadership Team Invitees and Alternates

Invitee	Title	Alternate	Title	Executive or Technical Leadership Team
Melanie Worley	Douglas County Commissioner			Executive Leadership Team
Duane Fellhauer	Douglas County Director of Public Works			Executive Leadership Team
Gil Butler	Chairman HRMD			Executive Leadership Team
Jeff Kullman	CDOT Region 1 Director	Scott McDaniel	CDOT Region 1 Program Engineer	Executive Leadership Team
Pam Hutton	CDOT Region 6 Director	Reza Akhavan	CDOT Region 6 South Program Engineer	Executive Leadership Team
Fred Koch	Douglas County Director of Engineering			Technical Leadership Team
Larry Corcoran	Douglas County Traffic Engineer Manager	Robert Kenny Alex Larson	Douglas County Traffic Engineer Douglas County Traffic Engineer	Technical Leadership Team
Peter Italiano	Douglas County Director of Community Development			Technical Leadership Team
Ron Benson	Douglas County Director of Parks			Technical Leadership Team

**TABLE 1**  
Executive Leadership Team and Technical Leadership Team Invitees and Alternates

Invitee	Title	Alternate	Title	Executive or Technical Leadership Team
Troy McCarty	Douglas County Sheriff's Office	Ken Rost	Douglas County Sheriff's Office	Technical Leadership Team
Bill VanMeter	RTD FasTracks Senior Manager Systems Planning	Chris Quinn	RTD FasTracks Project Manager	Technical Leadership Team
Steve Rudy	DRCOG			Technical Leadership Team
Jeff Case	HRMD, Chief Engineer	Terry Nolan	HRMD	Technical Leadership Team
Forrest Dykstra	HRMD, Manager of Development Engineering			Technical Leadership Team
Jeff Wasden	HRCA Board of Directors	Nick Robinson	HRCA Board of Directors	Technical Leadership Team
		Gary Debus	HRCA Board of Directors	Technical Leadership Team
Bernardo Guevara	CDOT Region 1 Traffic and Safety Engineer	Scott McDaniel	CDOT Region 1 Program Engineer	Technical Leadership Team
Jake Kononov	CDOT Region 6 Traffic and Safety Engineer	Reza Akhavan	CDOT Region 6 South Program Engineer	Technical Leadership Team

A number of the ELT and TLT members attended both committee meetings including the following consultant team members:

- Tom Ragland - CH2M HILL Project Manager
- Zeke Lynch - CH2M HILL Deputy Project Manager/Lead Traffic Engineer
- George Garcia - CH2M HILL Quality Manager
- Loretta LaRiviere - CH2M HILL Project Assistant
- Pat Noyes - Pat Noyes and Associates, Public Involvement Specialist

## 2.1.2 Public Involvement

Two open houses were held to involve the public in identifying issues and potential solutions, developing evaluation criteria, and providing input on draft recommendations. The public open houses were held early in the planning process and after the draft recommendations were developed. Notices for the meetings were provided on the Douglas County website, in the Highlands Ranch newsletter, through direct e-mails, and through homeowners associations. Notices were also placed on variable message signs in Highlands Ranch in advance of the public open houses. Public comment was gathered at the meetings and through the Douglas County website. These comments were incorporated into the potential alternatives, the evaluation criteria, and the final recommendations.



*Public Input was Gathered at Two Public Open Houses Early in the Planning Process*



## 2.2 Study Process

Figure 2 shows the study process that was used as a guide to develop the Transportation Improvement Program. Stakeholder meetings are shown in blue and public meetings in yellow. This process was used to integrate the various stakeholders and public involvement efforts in an effective and timely manner. The process facilitated study decisions in a collaborative manner and resulted in consensus by the TLT and ELT on all but two of the recommendations.

## 2.3 Review of Available Information, Data Collection, and Operational Analyses

### 2.3.1 Current and On-going Plans and Studies

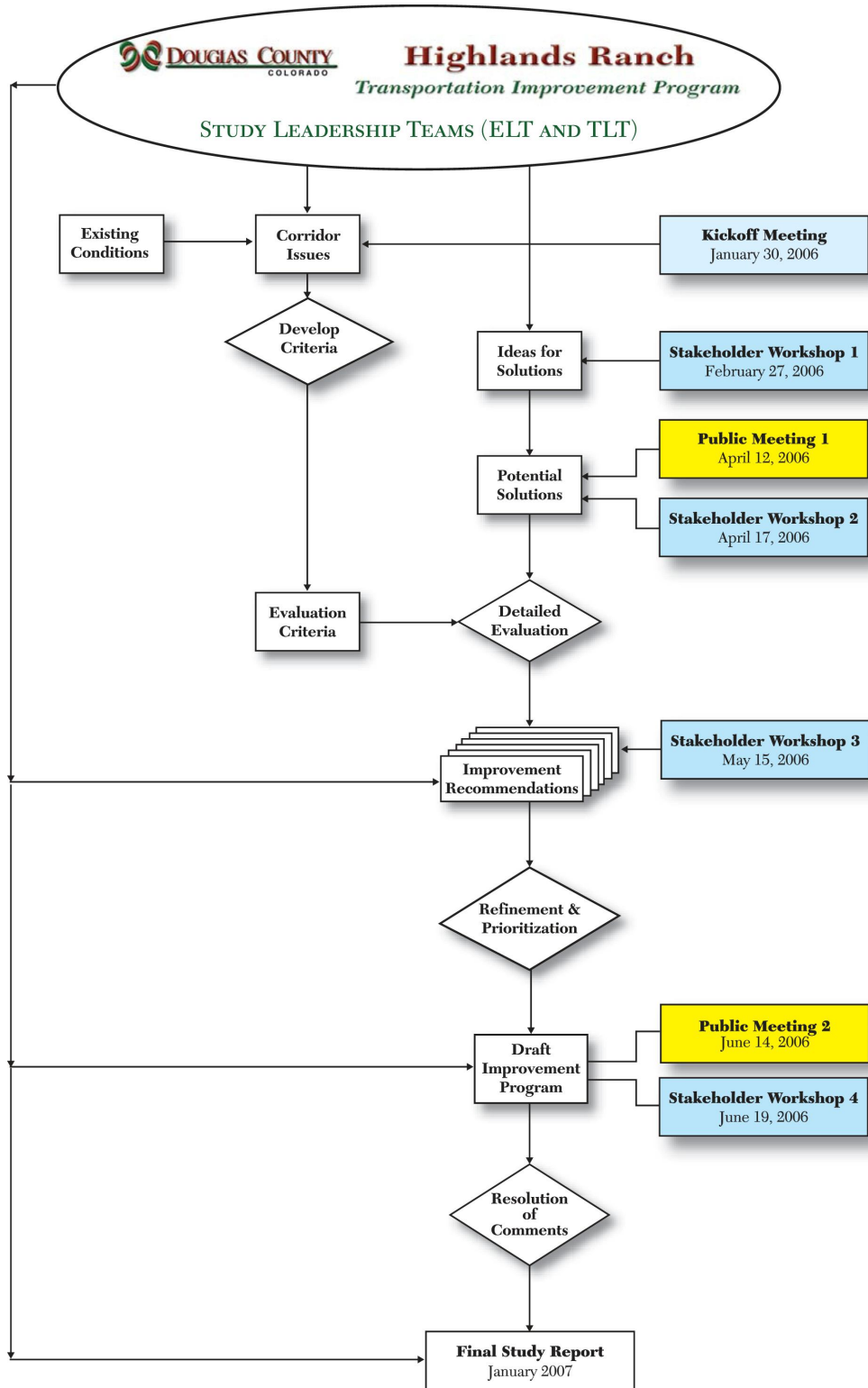
The project team utilized a number of current and on-going planning studies as resources. The primary planning documents that helped guide development of the program include:

- 2020 Comprehensive Master Plan – Douglas County
- 2020 Transportation Master Plan – Douglas County
- 2004 – 2009 5-Year Capital Improvement Plan – Douglas County
- C-470 Express Lanes Feasibility Study – Colorado Department of Transportation
- Draft Intelligent Transportation System Plan – Douglas County
- Arterial Transportation Plan – Highlands Ranch Metropolitan Districts
- Sheriff's Office 2005 Statistics Summary – Douglas County
- Highlands Ranch Traffic Signal Assessment Report – Douglas County

A number of additional planning documents and other data resources were utilized during the development of the plan, including:

- Geographic Information System (GIS) coverage for physical and operational conditions including aerial photography
- Historical, current, and on-going traffic count data
- Parks, recreation, and trail plans
- Development Traffic Impact Studies
- Denver Regional Council of Governments travel demand forecasting model
- Denver Regional Council of Governments Metro Vision 2030
- Regional Transportation District routes, stops, and LRT planning
- Douglas County Public Works Citizen Surveys (2005 and 2006)

**FIGURE 2**  
Study Process



### 2.3.2 Data Collection

Additional data was collected to supplement and build upon the work performed in previous planning efforts. A comprehensive GIS database was compiled to evaluate physical and operational conditions. A number of field reviews were performed to supplement the GIS data ranging from signing and striping evaluation to identification of trail discontinuities.

On-going coordination with Douglas County traffic operations staff and review of available studies helped ensure that the most current available traffic count information was used in the study. Neighboring agencies, CDOT, and DRCOG were also contacted to obtain the best available data. Both average daily traffic on roadway segments and intersection turning movements were compiled for key locations in the study area. Traffic counts were performed at 10 key intersection locations. Existing traffic information at over 30 arterial intersections was used to determine the Level of Service (LOS) and potential intersection improvements. Level of Service is a quantitative measure based on average vehicle delay that describes the operating performance of an intersection or roadway. LOS is measured from A to F, with A representing the best performance and F the worst.

### 2.3.3 Existing Traffic Operational Analysis

The intersection evaluation focused on those arterial-arterial intersections with the worst existing LOS, rated below D (E or worse), and locations with high traffic crash incidents. According to available 2005 Douglas County Sheriff's Office crash reporting, 9 of the top 11 high crash intersections within the County are located in the Highlands Ranch community:

- University Boulevard and Teal Ridge Court
- Quebec Street and University Boulevard/Lincoln Avenue
- Quebec Street and C-470
- University Boulevard and Cresthill Lane
- Highlands Ranch Parkway and Wildcat Reserve Parkway
- Broadway Street and Highlands Ranch Parkway
- Quebec Street and Park Meadows Drive
- University Boulevard and Highlands Ranch Parkway
- Highlands Ranch Parkway and Lucent Boulevard

These locations were identified as problem areas based on the total number of crashes. The County is currently compiling data to enable comparison of intersections against each other as well as comparison to state and national crash rates. This will allow better identification of those locations requiring attention.

In lieu of this data, it is reasonable to assume that some of the proposed improvements identified through the LOS analysis will benefit the arterial-arterial high crash locations, and other minor arterial high crash locations are improved by



*Traffic Congestion*

proposed signal modifications, corridor signal coordination, and other less direct program recommendations. When more data becomes available these crash locations should be evaluated on an individual basis and specific improvement recommendations should be identified to reduce the number and severity of traffic crashes.

Existing traffic conditions were evaluated by determining the intersection LOS at more than 30 arterial intersections. Intersections were analyzed using methodology similar to the Highway Capacity Manual (HCM) 2000 (Transportation Research Board, 2000) via Synchro software.

As part of the program recommendations, the County should develop, prioritize, and annually revisit a list of immediate intersection modifications to improve capacity and safety such as improvements that include complete intersection reconstruction, implementation of double left turn lanes, and construction of right turn lanes. Based on the existing LOS evaluation, the following intersection improvements are recommended to be considered in the transportation improvement program and in future planning efforts:

- Reconstruct the Broadway and Highlands Ranch Parkway intersection to include double left turn lanes at all approaches, a southbound (SB) right lane with channelization, and a WB right turn lane. Improvements that do not require a full intersection reconstruction should be phased to optimize expenditures.
- Continue the multi-jurisdictional planning approach to intersection improvements at the C-470 ramps and along County Line Road.
- Construct double WB left turn lanes at the University and Wildcat Reserve Parkway intersection.
- Increase the northbound (NB) right turn lane storage length at Lincoln Avenue and Quebec Street further south and consider a right turn overlap phase.
- In addition to the existing configuration, plan for construction of a third WB through lane at Lincoln Avenue and Quebec Street. This recommendation would maintain the SB right turn lane “add” and the WB right turn lane.
- Realign left turn lanes at intersections with a left turn negative offset of more than two feet.

The existing turning movement traffic volumes and level of service are shown in Figure 3.



### 2.3.4 Future Traffic Operational Analysis

Forecast 2030 traffic conditions were determined using DRCOG's regional travel demand model "Compass". This regional model is a robust database of land use characteristics, expected future roadway network improvements, and travel behavior used to forecast future regional traffic volumes. The demand model was used to assess and compare the additional C-470 crossings as well as to help determine appropriate expected future turning movements at intersections. Future intersection turning movement volumes were used to identify needed operational and geometric intersection improvements to be included in the Transportation Improvement Program. As with the existing evaluation, LOS D served as the threshold of acceptable LOS.

#### C-470 Crossing Evaluation

In order to test the effectiveness of an additional C-470 crossing, the DRCOG model was used to determine the potential new corridor's daily traffic, reduction of traffic on parallel routes, and changes to vehicle miles traveled and vehicle hours traveled. Three alternate crossings were evaluated:

1. Holly Street between Quebec Street and Colorado Boulevard,
2. Clarkson Street between University Boulevard and Broadway, and
3. Southpark Lane between Broadway and Lucent Boulevard.

Each of the alternate crossings resulted in a slight increase in the amount of vehicle miles and vehicle hours of travel but each reduced the traffic on the following parallel roadways:

- Santa Fe Drive,
- Lucent Boulevard,
- Broadway,
- University Boulevard,
- Colorado Boulevard, and
- Quebec Street.

As shown in Table 2, the Holly Street and Clarkson Street crossings had a cumulative reduction over these corridors of about 3 percent and carried a future forecast daily traffic volume of 18,300 and 12,800 respectively. The Southpark crossing proved to be much less effective at carrying daily traffic and reducing traffic on parallel facilities.

**TABLE 2**  
 Alternate Crossing Forecast Daily Volume and Traffic Reduction on Parallel Routes

Forecast 2030 Daily Volume	Santa Fe Drive	Southpark		Clarkson		Holly	Alternate Crossing	Total	Total on Parallels	Reduction on Parallels	% Reduction on Parallel Routes
		Lucent Boulevard	Broadway	University Boulevard	Colorado Boulevard	Quebec Street					
2005 Base	38,900	11,400	55,700	38,800	13,100	53,100	NA	211,000	211,000	NA	NA
2030 Base	87,100	27,700	70,100	50,100	21,500	56,100	NA	312,600	312,600	NA	NA
Holly Street	87,100	27,300	69,200	49,500	19,000	51,100	18,300	321,500	303,200	9,400	3.0%
Clarkson Street	86,900	25,900	65,800	46,800	21,100	55,900	12,800	315,200	302,400	10,200	3.3%
Southpark Lane	87,000	27,500	69,600	50,100	21,500	56,200	1,400	313,400	312,000	600	0.2%

While each of these alternatives have their own unique challenges, the Holly Street crossing proved to be the most beneficial from a traffic standpoint in both carrying daily traffic and lowering traffic on parallel routes.

**Future Intersection Operations**

As part of the program recommendations, the County should develop, prioritize, and annually revisit a list of future intersection modifications to improve capacity and safety such as improvements that include complete intersection reconstruction, implementation of double left turn lanes, and construction of right turn lanes. Based on the 2030 LOS evaluation the following intersection improvements are recommended for future inclusion in the transportation improvement program:

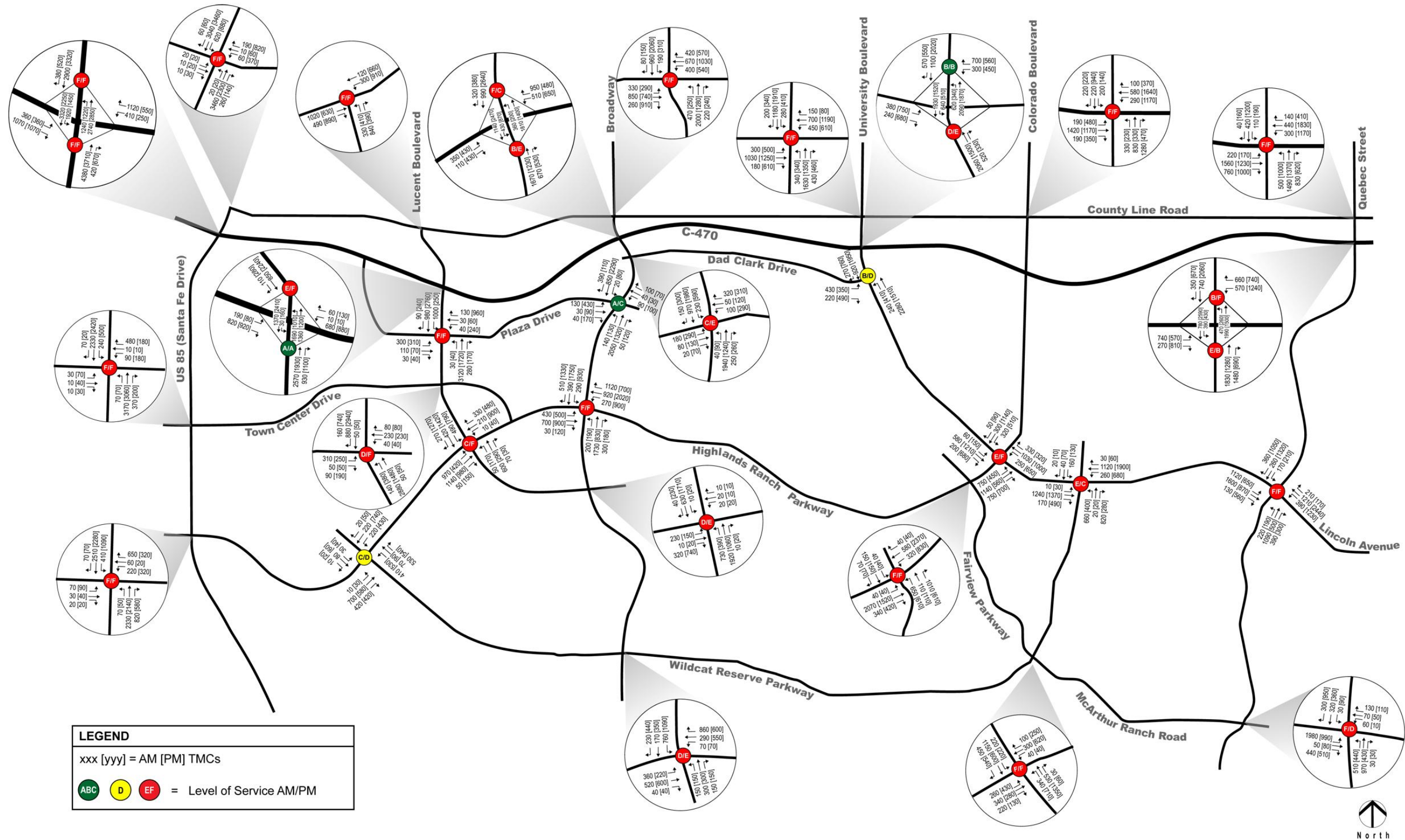
- Provide a continuous acceleration lane for NB Quebec Street to EB C-470. Also add a third left turn lane from the WB C-470 ramp to SB Quebec Street.
- Construct double NB and SB left turn lanes at the University Boulevard and C-470 interchange.
- Reconstruct the University Boulevard and County Line Road intersection to 3 through lanes, double left turn lanes, and exclusive right turn lanes at all approaches.
- Reconstruct the Colorado Boulevard and County Line Road intersection to 3 EB and 3 WB through lanes, double left turn lanes at the NB and EB approaches, and exclusive right turn lanes for the SB and NB approaches.
- Reconstruct the Quebec Street and County Line Road intersection.
- Further reconstruct the Broadway and Highlands Ranch Parkway intersection to provide 3 EB through lanes, an exclusive EB right turn lane, and a WB right turn lane.
- Reconstruct the Wildcat Reserve Parkway and Fairview Parkway intersection to include exclusive right turn lanes for the EB and SB approaches, 2 WB through lanes, and 2 NB left turn lanes.

- Construct an exclusive SB right turn lane at the Quebec Street and McArthur Ranch Road intersection.
- Provide a continuous acceleration lane for NB Wildcat Reserve Parkway to EB University Boulevard.
- Realign left turn lanes at intersections with a left turn negative offset of more than two feet.

The forecast 2030 turning movement traffic volumes and level of service are shown in Figure 4.



**FIGURE 4**  
Forecast 2030 Turning Movement Traffic Volumes and Level of Service



## 2.4 Constraints

A GIS database was compiled from Douglas County, DRCOG, RTD, the US Census Bureau, and other readily available data sources. The GIS information was supplemented by geocoding community facilities, signalized intersection locations, and high traffic crash intersections identified in the Douglas County Sheriff's Office 2005 Statistics Summary Report. In addition to this information, thorough field surveys were performed to assist in the identification of locations where physical or operational conditions may limit the potential to implement a proposed improvement alternative. This information also served to identify environmental and community resources. The physical features are shown in Figure 5 and the transportation elements are shown in Figure 6.



*Shoulder Treatment*

## 2.5 Identification of Transportation Issues and Concerns

Review of stakeholder and public input, existing conditions, and operational analysis were used to identify issues and concerns relative to transportation facilities. These included concerns at a variety levels such as capacity, operations, and non-auto travel. Each of these concerns was considered in developing a range of potential improvements. This list was updated throughout the study process as additional issues and concerns were identified.

### 2.5.1 Issues

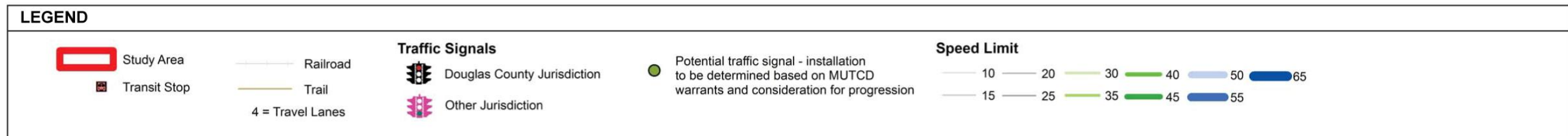
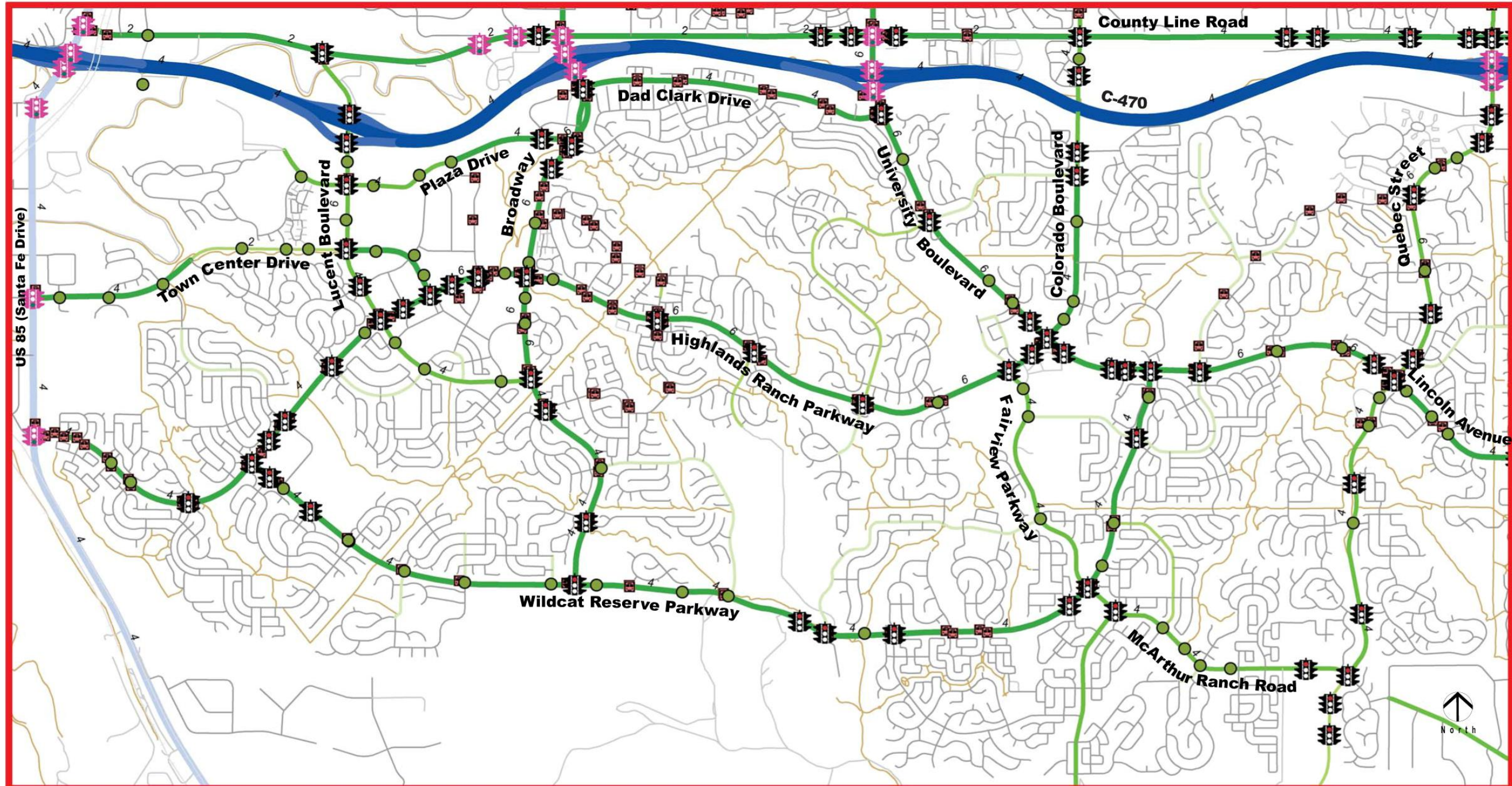
- Use existing studies as appropriate.
- Provide input to long-range planning including DRCOG 2035, Douglas County Comprehensive Plan, and Douglas County Transportation Plan.
- Serve as a resource for short-term improvements.
- Identify additional access points.
- Be used as a tool for public education of management of expectations, levels of congestion, levels of funding, need, what we are trying to accomplish, and the results and outcomes of the study.
- Develop cooperation between the team makeup and other neighboring agencies.
- Traffic signal functioning, timing, and coordination.
- Neighborhood connectivity (parks, trails, and parking).
- Environmental Impacts (air and noise).

## 2.5.2 Concerns

- Left turn issues
- Using shoulders for turns
- Access to C-470
- Access to Colorado Boulevard
- East-west regional mobility
- North-south mobility
- Addition to north-south access
- Need for exclusive right turn lanes
- Gaps identification and analysis of trails
- Mid-block pedestrian crossings
- Access to C-470/Centennial Trail
- Public education on enforcement of speed limits and aggressive drivers
- Realistic expectations of growth characteristics
- Glen Eagle/Red Wing closure (safety, access and mobility)
- Wildlife crossing impacts associated with widening Monarch Blvd. and Griggs Rd.
- Good north-south and east-west access to the Castle Rock area
- Arterial speeds too high
- Need additional signals
- Town Center area not pedestrian friendly
- Bicycle/vehicle conflicts
- Griggs Rd. should not become a north-south arterial
- Environmental impacts of Griggs Rd. and Monarch Blvd. widening
- Post office operations at Lincoln Ave. and Quebec St.
- Traffic noise
- Expansion gaps on bikeways unsafe
- Raised pavement at left turns problematic
- Access to light rail transit (LRT) station
- Too much traffic in Highlands Ranch
- Cut-through traffic
- Frequency of signals



**FIGURE 6**  
Transportation Elements Used to Guide Development of Alternatives



# 3.0 Planning Process

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The methodology used to develop recommended improvements included identifying criteria for screening and evaluating alternatives, brainstorming potential improvements with stakeholders and the general public, screening viable alternatives, evaluating improvements to determine which ones met the program objectives most effectively, and packaging individual improvements into the final program recommendations. The following outlines the process and results of each of the steps.

## 3.1 Consensus on Key Criteria and Alternatives Evaluation

Criteria were developed based on issues and concerns of the stakeholder groups, the public, and supplemented based on the Consultant’s professional experience. Criteria were developed prior to identification of alternatives to ensure there was no bias to specific improvement alternatives. The final criteria were reviewed and approved by the stakeholder groups. Level 1 Screening criteria were qualitative in nature and focused on identifying “fatal flaws” that would prevent an idea or alternative from future study, while the Level 2 Evaluation criteria applied a more quantitative focus on prioritizing alternatives.

The screening criteria were developed based on project goals and resulting criteria grouped into five categories to clarify results: implementation, mobility, multi-modal opportunities, safety, and environmental impacts.

### 3.1.1 Level 1 — Alternative Screening Criteria

Level 1 Screening was used to identify viable alternatives and eliminate those alternatives that did not meet the screening criteria. Each of the screening criteria was applied as a yes, no, or not applicable basis. Each criterion was weighted equally and used to identify “fatal flaws” and eliminate alternatives that did not meet study objectives. Because the first category, Implementation, required all four criteria to receive a yes determination, it was a critical category for moving alternatives forward to further screening. Some ideas were eliminated from consideration because they were determined to be out of the project scope. The screening criteria that were developed are:

1. Implementation (needs all yes to continue)
  - a. Is it compatible with current plans and studies?
  - b. Can it be used as an update to current plans?
  - c. Is the cost feasible within expected funding sources?
  - d. Does it promote interagency cooperation?
2. Mobility (needs at least one yes to continue):
  - a. Is north-south mobility across C-470 improved?
  - b. Does it support mobility awareness through public education?
  - c. Does it improve traffic operations (LOS)?
  - d. Does it improve overall circulation?

3. Multi-modal opportunities (needs at least one yes to continue):
  - a. Are gaps in trails closed?
  - b. Is pedestrian and/or bicycle circulation improved?
  - c. Is access to the C-470 Trail improved?
  - d. Is access to bus stops, future LRT stations, and other facility modes improved?
4. Safety (needs at least one yes to continue):
  - a. Is safety expected to improve?
  - b. Does it address problems at a high accident location?
5. Environmental impacts (needs a yes to continue):
  - a. Can expected air quality, noise levels, or wildlife habitat impacts be avoided or mitigated?

### 3.1.2 Level 2 Alternative Evaluation Criteria

Level 2 Evaluation criteria were used to quantitatively evaluate alternatives, which passed Level 1 Screening, to determine which improvements addressed the planning objectives most effectively. Again, the criteria were weighted equally and were applied on a good, fair, poor, or not applicable basis. The following criteria were developed to allow comparison and evaluation of all alternatives against each other:

1. Implementation:
  - a. Does it support current plans and studies?
  - b. What is the magnitude of cost?
  - c. Does it promote interagency cooperation?
2. Mobility:
  - a. Does it improve north-south mobility across C-470?
  - b. What is the expected level of mobility awareness through public education?
  - c. What amount of vehicular delay is reduced (for system management and minor capital improvement projects)?
  - d. What is the improvement in overall circulation by reduced VMT and LOS improvements (for major capital solutions)?
3. Multi-modal opportunities:
  - a. Does it construct missing links in the trail system?
  - b. What is the level of increased access to the C-470 Trail?
  - c. Does it improve access to bus stops, future LRT stations, or other alternate modes?
4. Safety:
  - a. What is the level (high/medium/low) that safety is expected to improve?
  - b. What is the number and priority of high accident locations improved?

5. Environmental impacts:
  - a. What is the ability to avoid or mitigate expected impacts to air quality, noise levels, or wildlife habitat?

## 3.2 Development of Improvement Recommendations

A list of improvement alternatives was developed for screening and evaluation. Initial improvement alternatives that could address the study issues and concerns were identified based on previous plans and studies, stakeholder input, solutions used in other municipalities, new concepts developed by the County and Consultant, and input received from the public through the open houses and website. These alternatives included traffic operations, Intelligent Transportation System (ITS) and Traffic Management Center (TMC) applications, minor roadway improvements, transit, bicycle/pedestrian/trail improvements, education and information, policy changes, and major capital improvements. Alternatives included both general concepts as well as specific improvements.

### 3.2.1 Alternatives Screening

Improvement alternatives were screened using the criteria outlined above. The Level 1 Screening determined which alternatives would be carried forward for further study. The complete Level 1 Screening Matrix is included as Appendix 1. The following list includes those alternatives that were not carried forward for evaluation and the reason why they were eliminated:

1. Improve arterial connections between Highlands Ranch and Castle Rock – not in scope
2. Widen Lincoln east of Quebec – not in scope
3. Improve/expand the University and County Line Road intersection – currently committed
4. Install ramp meters at all C-470 ramps – not in scope
5. Light rail transit along C-470 to connect southwest and southeast corridors – not in scope
6. Connect Highlands Ranch trails to southern Douglas County and Castle Rock – not in scope
7. Build sidewalks in shopping and recreation centers – not in scope
8. Improve signage and pedestrian facilities within the Town Center – not in scope
9. Develop and maintain a public hotline to report aggressive drivers, speeders, and DUIs – Colorado State Patrol has process in place
10. Improve the C-470 and Santa Fe Drive interchange – currently committed
11. Focus speed enforcement in neighborhoods – not in scope



12. Red Wing Avenue closure re-evaluation- not in scope
13. Glen Eagles Village Parkway extension - not in scope
14. Lead left turn signals at all locations - does not promote interagency cooperation
15. Priority lanes for high efficiency vehicles - not compatible with current plans, cost not feasible
16. Extend LRT from the planned end-of-line station at Lucent Boulevard to Town Center park-n-ride, cost not feasible
17. LRT service in Highlands Ranch - not compatible with current plans, cost not feasible, does not promote interagency cooperation
18. Eliminate on-street bicycle lanes - not compatible with current plans, does not promote interagency cooperation
19. Interchange at Broadway and Highlands Ranch Parkway - not compatible with current plans, cost not feasible, does not promote interagency cooperation
20. Interchange at Colorado and University Boulevards - not compatible with current plans, cost not feasible, does not promote interagency cooperation
21. Interchange at Quebec Street and Lincoln Boulevard - not compatible with current plans, cost not feasible, does not promote interagency cooperation
22. More freeways - Santa Fe, University and new beltway south of C-470 - not compatible with current plans, cost not feasible, does not promote interagency cooperation
23. Provide slip ramps between existing C-470 interchanges - not compatible with current plans, cost not feasible, does not promote interagency cooperation
24. Reconfigure C-470 ramps at Broadway and at Quebec Street - not compatible with current plans, cost not feasible, does not promote interagency cooperation
25. Reconfigure Highlands Ranch Post Office parking lot to two-way circulation - not in scope
26. Install noise barriers/mitigation along major arterials - does not improve mobility
27. Replace roadway surface with noise-mitigating materials - does not improve mobility
28. Lower speed limit on major arterials from 45 to 40 mph - does not improve mobility, does not improve safety

The following list includes those alternatives that were grouped together and carried forward to Level 2 Screening because they were similar in nature or considered duplicative:

- 29-30. Allow permissive left turns at all intersections unless a safety problem is observed includes allowing implementation of permissive left turns, and time-of-day protected/ permissive left turn signalization
31. Utilize shoulders for turn lanes was combined with use shoulder for right-turn lanes
32. Improving access to the proposed LRT station is addressed by other improvement recommendations.
33. Increase bus frequency between Town Center and Mineral LRT station is included in the improvement alternative to increase bus service to proposed LRT station
34. Pedestrian signals at mid-block locations is included in the improvement alternative to provide for mid-block pedestrian/bicycle crossings
35. Construct access over C-470 is addressed by other improvement recommendations.
36. Increase speed limits and consistent speed limits were combined into implement consistent speed limits
37. Increase signal clearance time and reduce all red clearance time were combined into implement red light clearance time in conformance with national standards

### **3.2.2 Evaluation of Viable Alternatives**

The alternatives brought forward from the screening process were evaluated against the Level 2 Evaluation criteria to determine the most effective improvement alternatives. These were evaluated qualitatively and those that scored well in the greatest number of categories were included in the final recommendations. Many individual ideas that did not score well as a stand-alone alternative were packaged with other similar ideas for a corridor improvement. Because the list of alternatives included a broad range of improvements, from the very site-specific to corridor and programmatic alternatives, the most effective options were combined into final recommendation packages. The complete Level 2 Evaluation Matrix is included as Appendix 2.

The following list of viable alternatives were evaluated in further detail and considered for inclusion in the final recommendations:

1. Synchronize traffic signals.
2. Provide biannual signal retiming.
3. Prioritize corridors and movements for signal timing.
4. Change the Highlands Ranch Parkway and Broadway intersection to make Broadway the priority progression corridor.
5. Enhance signal communications/operations between jurisdictions.
6. Implement traffic responsive signal operations.

7. Convert all signal detection to cameras.
8. Reduce number of signals.
9. Replace signals with roundabouts.
10. Improve guide signing.
11. Change EB and WB left turn signal phasing to protected only at University Boulevard and Teal Ridge Court.
12. Allow permissive left turns at all intersection unless a safety problem is observed.
13. Install detection on County Line Road and Lucent Boulevard.
14. Install detectors for bicycles and pedestrians.
15. Increase pavement and destination markings.
16. Install advance street name signs.
17. Implement flashing yellow signals after hours.
18. Implement time-of-day protected/ permissive left turn signalization.
19. Implement right turn overlap phases.
20. Increase detection time for exclusive right turn lanes.
21. Install detection at Centennial Lane and Plaza Drive.
22. Install speed display signs.
23. Eliminate second double yellow stripe to reduce "negative" offset of left turn lanes and improve sight distance.
24. Improve advanced warning of trap lanes.
25. Implement third car actuation for left turn phases, where appropriate.
26. Install imbedded reflector pavement markers.
27. Install a traffic signal at McArthur Ranch Road and Southridge Recreation Center.
28. Install a traffic signal at McArthur Ranch Road and Wagonbox Circle/Valleybrook Drive.
29. Install a traffic signal at Quebec Street and Palomino Parkway.
30. Install a traffic signal at University Blvd. and Crosspoint Drive.
31. Install a traffic signal at Lincoln Ave. and Laredo Street.
32. Implement travel demand management techniques.
33. Implement system monitoring and observation for signal timing.
34. Use ITS for public information.

35. Implement ITS detection of congestion.
36. Implement incident detection and rapid removal.
37. Use broadcast traveler information to provide traffic condition information.
38. Construct second SB left turn lane at Broadway and Highlands Ranch Parkway.
39. Utilize shoulders for turn lanes.
40. Increase length of left turn bays.
41. Construct wildlife crossings for Monarch Boulevard and Griggs Road.
42. Extend Teal Ridge Court to Grace Boulevard.
43. Add turn lanes in addition to shoulders.
44. Separate through and right turns at intersections.
45. Change lane and shoulder dimensions.
46. Realign SB Wildcat Reserve Parkway and Fairview Parkway/McArthur Ranch so approach lanes and departure lanes line up though the intersection.
47. Increase the NB right turn lane at Quebec Street and Lincoln Avenue further south and consider a right turn overlap phase.
48. Construct double left turns lanes to improve intersection operations.
49. Add second WB left turn lane at University Boulevard and Wildcat Reserve Parkway.
50. Remove raised medians on intersections approaches.
51. Fill or seal concrete expansion joints.
52. Increase the NB right turn lane storage at University Boulevard and Wildcat Reserve Parkway and consider right turn overlap phase.
53. Change intersection striping for SB Quebec Street to WB McArthur Ranch right turn movement or construct an exclusive right turn lane.
54. Construct an exclusive right turn lane for SB Wildcat Reserve Parkway to WB Grace Boulevard.
55. Install a right turn lane at WB University Boulevard to NB Cresthill Lane.
56. Add tree lining to six-lane arterials.
57. Implement rideshare programs for HR residents.
58. Implement a circulator bus system to serve community, retail, and RTD facilities.
59. Implement a feeder bus system to/from/ between the southeast and southwest LRT corridors.

60. Increase bus frequency between Town Center and Mineral LRT station.
61. Provide real-time information signs at bus stops.
62. Provide Access-a-Ride to LRT.
63. Construct trail access along US 85 between Highlands Ranch Parkway and C-470.
64. Designate bike lanes.
65. Construct bike path grade separations.
66. Grade separate Centennial Trail at major arterials.
67. Provide for mid-block pedestrian/bicycle crossings.
68. Provide signed/striped crosswalks at all trail crossing locations on local streets.
69. Improve bike access to planned LRT stations.
70. Install countdown pedestrian signals.
71. Install pedestrian refuge medians with pedestrian push buttons at major arterial intersections.
72. Consider a neckdown or other traffic calming device for the crosswalk at Poston Parkway and Chadsworth Lane.
73. Implement public education campaigns to reduce trips.
74. Develop public informational brochure to manage expectations and educate about level of congestion, available funding and sources, and limitations/challenges of traffic operations and maintenance.
75. Disseminate public information on cable TV.
76. Implement web-based public information.
77. Implement a public education program on pedestrian signal operations.
78. Implement a public education campaign to reduce speeding.
79. Pursue a local tax initiative to support transportation improvement in the Ranch.
80. Pursue bicycle, pedestrian, and trail master plan.
81. After cooperative development of a best practices guideline for signal timing, coordination, and strategy; draft and implement an intergovernmental agreement with the state and neighboring agencies to manage traffic and implement timing strategies that are compatible with each other, especially at municipal boundaries.
82. Remove unwarranted signals.
83. Enforce speed and red light violations.

84. Establish criteria for traffic signal installation that a study be conducted to ensure the new signal can effectively be coordinated with adjacent signals and not impact corridor progression, prior to approval.
85. Implement red light clearance time in conformance with national standards.
86. Test implementation of the flashing yellow arrow for permitted left turn movements. A good test location may be EB and WB lefts at Wildcat Reserve Parkway and Highlands Ranch Parkway
87. Implement consistent speed limits.
88. Designate University Boulevard at Cresthill Lane as a school zone, install flashers, and reduce speed limit.
89. Construct an interchange at Colorado Blvd. and C-470.
90. Consider additional connections across C-470 west of Holly Street.
91. Construct a Holly Street connection across C-470.
92. Widen Broadway between Dad Clark Drive and County Line Road.
93. Widen University between Dad Clark Drive and County Line Road.
94. Widen Quebec St. at C-470.
95. Construct four lanes on Monarch Blvd.
96. Construct a frontage road to extend Dad Clark Drive between University and Colorado Boulevards.
97. Provide paved connection between Griggs Rd. and Daniels Park.
98. Install a traffic signal at Broadway and Gwendelyn Road (idea received after completion of the study, consistent application of the Manual on Uniform Traffic Control Devices [MUTCD] addressed this and other signal installation requests).

Additional ideas were added after the screening was complete and additional information, such as LOS evaluation, field review, and unique ideas were also added. These were included in the packaged recommendations to support and enhance the packages.

As stated above, the Level 1 Screening was performed for “fatal flaw” analysis and evaluated the criteria on a yes/no basis. Criteria were evaluated utilizing a good/fair/poor rating system in the Level 2 Evaluation. Both the Level 1 Alternative Screening and Level 2 Alternative Evaluation matrices are included as appendices.

### **3.2.3 Stakeholder Involvement and Consensus Building**

Agency stakeholders and the public were involved during each step of the planning process outlined above. Agency representatives from Douglas County, Highlands Ranch Metro District, Highlands Ranch Community Association, CDOT, RTD, and DRCOG participated in four workshops to clarify the planning goals and objectives, develop screening and evaluation criteria, generate ideas for solutions, screen and evaluate potential

improvements, and develop final recommendations. Two open houses were held to involve the public in identifying issues and potential solutions, developing evaluation criteria, and providing input on draft recommendations.

The agency stakeholders included two groups of representatives on the Executive Leadership Team and the Technical Leadership Team. Throughout much of the planning process these two groups met to consider both policy and technical aspects of the plan. For the last meeting they met separately to focus specifically on policy and technical issues, respectively. The public open houses were held early in the planning process and after the draft recommendations were developed. Notices for the meetings were provided on the Douglas County website, in the Highlands Ranch newsletter, through direct e-mails, and through homeowners associations. Notices were also placed on variable message signs in Highlands Ranch in advance of the public open houses. Public comment was gathered at the meetings and through the Douglas County website. These comments were incorporated into the potential alternatives, the evaluation criteria, and the final recommendations.

# 4.0 Program Recommendations

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The final recommendations, presented in nine areas, are based on the results of the evaluation process and combining individual improvements into packages that contain similar and complimentary improvements. These recommendations include alternatives that showed the greatest improvement potential and those that could be combined for greater mobility, safety, operational, or multi-modal enhancements. An example of combined improvement alternatives (a package) is including all signal operation improvements along a corridor rather than at individual intersections.

## 4.1 Program Elements

The program recommendations considered the plan goals and desired outcomes, the evaluation criteria, and opportunities to combine projects. Prioritization of program elements reflects these considerations and influences the schedule for each improvement. The recommendations also include which agency should be the lead agency as well as which other agencies, such as CDOT, RTD, and the Highlands Ranch Metro District should also participate. Those projects that affect facilities that cross jurisdictional boundaries also considered system compatibility with plans and operations in these jurisdictions. The planning process resulted in recommendations in the following nine areas:

1. Traffic operations: signals
2. Traffic operations: signing and marking
3. Roadway
4. Intelligent Transportation Systems/Traffic Management Center
5. Transit
6. Bicycle, pedestrian, and trails
7. Education and information
8. Policy
9. Capital improvements

### 4.1.1 Traffic Operations — Signals

A number of concerns and suggested improvements were associated with traffic signal operations. A programmatic approach to signal operations addresses a number of evaluation criteria, including implementation, mobility, safety and environmental. Opportunities to combine improvements at individual intersections into corridor-level applications can provide significant benefits. Most of the signals within the Highlands Ranch community are the direct responsibility of Douglas County, which coordinates with CDOT and neighboring cities. Traffic signal improvements are recommended as high priority improvement to be completed in the next 1 to 3 years.



**Recommendations:**

- Implement a program of traffic signal operation improvements to more cost effectively maintain optimum timing and operations. Phase implementation with initial focus on one corridor to test effectiveness of technologies and techniques. The Quebec Street and University Boulevard Corridors should be given highest consideration.
- Develop and implement a written Policies and Procedures Manual for implementation and operation of traffic signals.

**4.1.2 Traffic Operations — Signing and Marking**

A number of operational recommendations related to signing and marking are encompassed in the proposed program. These focus mainly on policy and procedural improvements and generally provide cost-effective opportunities to address safety and mobility concerns. The recommended program would also provide improved coordination with adjacent agencies through increased compatibility. Douglas County would be the responsible agency and most components of the program could be implemented in the next 3 years.

**Recommendation:**

- Develop and implement a signing and striping program to address operations and maintenance needs.

**4.1.3 Roadway**

Roadway recommendations include minor roadway improvements, such as intersection reconstruction, geometric changes, and policies for future improvements. These types of recommendations are relatively easy to implement in terms of cost and compatibility with current plans and studies and they address a variety of mobility and safety issues. For most of the recommended roadway improvements Douglas County would be the responsible agency but coordination may be required with adjacent jurisdictions.

**Recommendations:**

- Immediate Roadway Improvement Program. Develop, prioritize, and annually revisit a list of immediate intersection improvements that include complete intersection reconstruction, implementation of double left turn lanes, and construction of right turn lanes. The program should focus on locations with the worst existing LOS below D (E or worse) and locations with high traffic crash rates.
- Future Roadway Improvement Program. Develop, prioritize, and annually revisit a list of future intersection improvements that include complete intersection reconstruction, implementation of double left turn lanes, and construction of right turn lanes. The program should focus on locations with LOS currently at D or better, but which are expected to deteriorate to E or worse in the future, as well as those locations with high traffic crash rates.
- Consider other geometric/operational improvements identified in the program in subsequent planning efforts and/or develop policies to address these issues.

#### 4.1.4 Intelligent Transportation Systems/Traffic Management Center

Intelligent transportation systems and Douglas County's Traffic Management Center provide opportunities to improve mobility and safety through cost-effective deployment of current techniques and technology. Conducting congestion monitoring, disseminating information to adjacent agencies and the public, providing traveler information, and improving incident response are just a few examples of the benefits of improved ITS and TMC communication. Douglas County would be the responsible agency but coordination would be required with adjacent jurisdictions, particularly with CDOT along C-470.

##### Recommendations:

- Implement a program to support travel demand and congestion management; including staffing.
- Implement a congestion identification and traffic information dissemination program.

#### 4.1.5 Transit

Although transit is generally the responsibility of RTD, a number of suggested improvements addressed a range of programmatic and operational improvements to support transit use in the Highlands Ranch community. The recommended program would be led by Douglas County to identify specific elements that would encourage ridership and would be recommended to RTD for further development. This program would enhance mobility and multi-modal opportunities, and would reduce environmental impacts. Program development should be undertaken in coordination with RTD and CDOT over the next 2 years.

##### Recommendation:

- Pursue a program to improve local bus circulation and ridership, including expansion of existing and new service, and facilities such as signing and bus stops.

#### 4.1.6 Bicycle, Pedestrian, and Trails

A number of very specific bicycle and pedestrian improvements were evaluated. Although individual projects provided only minor improvements to mobility, safety, multi-modal opportunities, and environmental impacts, a comprehensive approach that strategically combined projects does offer positive impacts. It was determined that a comprehensive approach with specific implementation policies should be pursued by Douglas County in coordination with the Highlands Ranch Metro District. This planning process was considered to be a moderate-to-high priority with implementation over the next 5 years.

##### Recommendations:

- Develop a comprehensive trails and bike lane program.
- Prepare a policy for implementation of pedestrian facilities.

#### 4.1.7 Education and Information

Public education and information can be used to support transportation system operations through demand management, travel planning, realistic expectations, and driver behavior. By developing a coordinated program for education and information, Douglas County can

promote improved cooperation between the public, the County, and other transportation agencies. This program is recommended as a high priority project to be implemented in the next 2 years.

**Recommendation:**

- Develop a traffic information program to educate and inform the general public about traffic operations.

### 4.1.8 Policy

A number of issues and concerns raised by stakeholders and the public are best addressed through the development and implementation of new policies. These policies can support and enhance opportunities for implementation; increased mobility, safety, and multi-modal transportation; and reduce environmental impacts. It is evident that current funding levels will not allow the implementation of many of the programs and projects recommended in this plan. Further work is needed at the policy level to identify and secure funding sources for these recommendations. Douglas County should take the lead on this in coordination with the HRMD, DRCOG and CDOT.

**Recommendations:**

- Create dependable, transportation specific, and need based funding sources for maintenance and future improvements in capacity, mobility, and safety.
- Create policies on speed limits and safety standards near schools and parks.

### 4.1.9 Capital Improvements

Included in the recommendations are several specific projects that require significant investment in capital improvements. Included in the recommendations are large-scale construction projects, such as major widening projects and new interchanges, which require significant planning, programming, design, and construction. A long-range major capital improvement program will help guide priorities and pursue funding. Douglas County should take the lead in developing a priority list and policies needed to support implementation.

**Recommendations:**

- Develop a long-range major capital improvement priority list and pursue various funding sources.
- Consider other major capital improvements identified in the program in subsequent planning efforts and/or develop policies to address these issues.

## 4.2 Schedule

This HRTIP includes recommendations to address short- and long-term transportation needs in the Highlands Ranch community; many of which are recommended for implementation over the next 1 to 3 years. A number of these recommendations address operation and maintenance of the existing system to ensure the most effective expenditure

of funds. These are projects or programs, with a high benefit to cost ratio, which can be implemented quickly without lengthy planning or design efforts and which will have an immediate effect on improving safety and mobility in the Highlands Ranch community. The more comprehensive projects, such as major capital improvements, will require implementation over a longer timeframe with extensive public input process and long range budgetary planning.

The recommendations were categorized and grouped to maximize the effectiveness of individual ideas. The development of programs and policies can be accomplished over the next year, whereas implementation may require a longer timeframe to secure appropriate funding levels. Clearly defined programs and policies will also support efforts to secure additional funding sources or to request reallocation of existing funding to support the program. Table 3 and Figure 7 illustrate program recommendations.

**TABLE 3**  
Refinement and Prioritization of Improvement Recommendations

Category	Recommendations	Comments and Details	Priority	Scheduling	Staffing Needs	Implementation Costs <sup>2</sup>	Lead and Cooperating Agency/Potential Funding Sources	Associated Level 2 Ideas <sup>3</sup>
<b>Traffic Operations Signals</b>	I. Implement a program of traffic signal operation improvements to more cost effectively maintain optimum timing and operations. Phase implementation with initial focus on one corridor to test effectiveness of technologies and techniques. Quebec Street and University Boulevard corridors should be given highest consideration.	1. Conversion of existing vehicle detection and new detection to video detection with turning movement count capabilities at all signalized intersections. Include viewcoms to allow remote operations and viewing.	High	Should be initiated in 1 year and completed in the next 3 years.	Existing personnel can manage contractor	\$800,000	Douglas County	TO7, TO13, TO20, and TO21
		2. Implement a traffic count program to determine when and where signal retiming is needed, and when signals should be coordinated.	High	Should be implemented in the next year.	Existing personnel can manage program	\$10,000/year for 3 years	Douglas County	TO1 – 6
		3. Implement an AM and PM peak hour traffic monitoring program as video detection and communication are significantly implemented.	High	Should be implemented in the next 3 years.	Additional personnel may be needed (0.5 FTE)	\$30,000/year	Douglas County	I2
		4. Centralize and staff traffic signal operation functions into the dedicated Traffic Management Center (TMC).	High	Should be implemented in the next 3 years.	Additional personnel would be needed (1.5 FTE)	\$500,000 capital \$90,000/year	Douglas County	I2
		5. Develop and implement special event, weather, and incident management traffic signal timing plans.	High	Should be implemented in the next year.	Staffing included in TMC (Item #4)	Staffing included in TMC (Item #4)	Douglas County and DRCOG	TO1 and TO6
		6. Construct missing links in the communication network and connect to the Traffic Management Center.	High	Should be implemented in the next 3 years.	Existing personnel can manage program	\$1,500,000	Douglas County and DRCOG	TO1 and TO5
	II. Develop and implement a written Policies and Procedures manual for implementation and operation of traffic signals.	1. Continue use of MUTCD recommended standards for warranting signal installations at all locations, including considerations for signal progression and intersection spacing.	High	Should be implemented immediately.	Can be accomplished with existing personnel	NA	HRMD and Douglas County (Funded by HRMD/Developer, approved by County)	TO8, TO27 – 31, P4, and P6
		2. Install countdown pedestrian signals at all new signal locations and retrofit at those locations with school crossings or near areas with significant amount of older users.	High	Should be implemented in the next year.	Existing personnel can manage program	\$250,000	Douglas County, DRCOG and HRMD	B8
		3. Review signal design standards relative to signing to reduce/limit the amount signing installed on signal mast arms.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	NA	Douglas County and HRMD	TO15
		4. Provide video detection for bicycles at signalized intersections where needed by bicycle traffic.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	NA	Douglas County and HRMD	TO14
		5. Provide the least restrictive methods of operation using NCHRP recommendations for left turn phasing and implement the shortest possible cycle length where appropriate.	High	Should be implemented in the next year.	Existing personnel can manage program	NA	Douglas County	TO11, TO12, TO18, and TO25
		6. Implement third car actuation and/or time of day protected/permitted left turn phases where appropriate.	High	Should be implemented in the next year.	Existing personnel can manage contractor	NA	Douglas County	TO11, TO12, TO18, and TO25
		7. Adopt standards for installation of separate right turn lanes, right turn traffic detection, and use of overlap phases at signalized intersections.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	NA	Douglas County	TO19 and TO20
		8. Develop guidelines for evaluation and implementation of roundabouts as a substitute or replacement for traffic signals.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	NA	Douglas County	TO9
9. Develop policy for the use of advanced detection on cross streets to reduce delay.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	NA	Douglas County	TO7		
10. Develop a policy for extending pedestrian signal "walk" time during coordination to the maximum time based on the "flash don't walk" minimum for street width, i.e. rest pedestrian signals in "walk".	High	Should be implemented in the next year.	Can be accomplished with existing personnel	NA	Douglas County	TO14		
11. Develop a policy for operation of traffic signals during low volume periods.	High	Should be developed in the next year.	Can be accomplished with existing personnel	NA	Douglas County, CDOT, Arapahoe County and Littleton	TO17		
12. Develop a procedure to test implementation of the flashing yellow arrow for permitted left turn movements and include a pre-implementation public education program (EB and WB lefts at Wildcat Reserve Parkway and Highlands Ranch Parkway).	Moderate	Should be developed in the next year.	Can be accomplished with existing personnel	\$10,000	Douglas County	P8		

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Refinement and Prioritization of Improvement Recommendations

Category	Recommendations	Comments and Details	Priority	Scheduling	Staffing Needs	Implementation Costs <sup>2</sup>	Lead and Cooperating Agency/Potential Funding Sources	Associated Level 2 Ideas <sup>3</sup>
<b>Traffic Operations Signing and Marking</b>	I. Develop and implement a signing and striping program to address operations and maintenance needs.	1. Implement a policy of elimination of the negative offset for opposing left turn lanes as streets are repainted.	High	Should be implemented in next one to 3 years with video.	Existing personnel can perform design, move signal equipment/signs, and manage striping contractor	\$200,000	Douglas County	TO23
		2. Implement a policy for use of advanced street name signs and destination signage.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	\$30,000	Douglas County	TO15 and TO16
		3. Implement miscellaneous general striping recommendations (provided separately).	High	Should be implemented in the next year.	Existing personnel can manage contractor	\$10,000	Douglas County	TO15
		4. Move the Hearth sign for westbound Wagonbox to the north at the McArthur Ranch intersection to improve the sight distance (by others).	High	Should be implemented in the next year.	Can be accomplished with existing personnel	\$1,000	Developer who installed sign, HRMD or HRCA	TO28
		5. Obtain and use non-scarring lane marking removal equipment to prevent potential conflict between old, no longer applicable, and new pavement markings.	High	Should be implemented in the next year.	Additional personnel and equipment would be needed	\$50,000	Douglas County	TO15 and TO23
		6. Implement usage of pavement markings to supplement destination signage for major roads.	Moderate	Should be implemented in the next 3 years.	Can be accomplished with existing personnel	\$50,000	Douglas County	TO15 and TO24
		7. Change out street name signs to 6" lettering for all intersection approaches with a 35 MPH or greater speed limit (consider using higher visibility font).	Moderate	Should be implemented in the next 3 to 5 years.	Existing personnel can manage program	\$100,000	Douglas County	TO16
		8. Reduce signage at major intersections; use positive guidance principles for all sign placements.	Moderate	Should be implemented in the next 3 years.	Can be accomplished with existing personnel	\$25,000	Douglas County	TO15
		9. Use signal mounted lane control signage only when configuration varies from driver expectations or for trap lanes.	Moderate	Should be implemented in the next 3 years.	Can be accomplished with existing personnel	\$25,000	Douglas County	TO15
		10. Improve advanced warning of trap lanes with signing and/or pavement markings.	Moderate	Should be implemented in the next year.	Existing personnel can perform design and manage contractor	\$50,000	Douglas County	TO24
		11. Develop policy for use of speed display signs. Signs may be temporary/portable and used to focus speed enforcement efforts at identified problem locations and/or be permanently installed near high level activity centers, bicycle and pedestrian locations, or school areas.	Moderate	Should be implemented in the next year.	Can be accomplished with existing personnel	NA	Douglas County	TO22
		12. Consider developing a policy to evaluate embedded reflector pavement markers to replace striping.	Low	Should be implemented over the next 5 to 7 years if deemed appropriate for the area.	Existing personnel can manage contractor	NA	Douglas County	TO26

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Roadway	I. Immediate Roadway Improvement Program. Develop, prioritize, and annually revisit a list of immediate intersection improvements that include complete intersection reconstruction, implementation of double left turn lanes, and construction of right turn lanes. The program should focus on locations with the worst existing LOS below D (E or worse) and locations with high traffic crash rates.	1. Create a 5 year capital improvement program and 1 year annual prioritized list of immediate improvements.	High	High priority for overall program development and implementation. This element is the first priority in the immediate roadway improvement program.	Existing personnel can manage contractor	\$50,000	Douglas County	R1 – 19
		2. Reconstruct the Broadway and Highlands Ranch Parkway intersection to include double left turn lanes at all approaches, a southbound right lane with channelization, and a westbound right turn lane. Improvements that do not require a full intersection reconstruction should be phased to optimize expenditures.	High	Should be the next intersection considered for reconstruction.	Existing personnel can manage contractor	\$50,000 phasing \$900,000 ultimate	Douglas County	R1
		3. Continue the multi-jurisdictional planning approach to intersection improvements at the C-470 ramps and along County Line Road.	High	Many of the ramp intersections and intersections adjacent to the freeway operate at a poor LOS or are expected to degrade to a poor LOS in the future. Ongoing coordination with CDOT and adjacent jurisdictions is required.	Can be accomplished with existing personnel	NA	CDOT and Douglas County	R3, R6, and R11
		4. Construct double westbound left turn lanes at the University and Wildcat Reserve Parkway intersection.	High	Should be implemented in the next year.	Existing personnel can manage contractor	\$100,000	Douglas County	R11 and R12
		5. Develop policies/procedures/thresholds to determine implementation of double left turn lanes, construction of right turn lanes, and lengthening of turn lanes.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	NA	Douglas County	R2, R3, R6, R7, R8, R11, R15, R16, R17, and R18
		6. Increase the northbound right turn lane storage length at Lincoln and Quebec further south and consider a right turn overlap phase.	Moderate	Local cut through traffic drives this recommendation	Existing personnel can manage contractor	\$90,000	Douglas County	R10
		7. In addition to the existing configuration, plan for construction of a third westbound through lane at Lincoln and Quebec. This recommendation would maintain the southbound right turn lane "add" and the westbound right turn lane.	Moderate	Should be coordinated with the City of Lone Tree	Existing personnel can manage contractor	\$500,000	Douglas County and City of Lone Tree	R8

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Roadway (Cont'd)	II. Future Roadway Improvement Program. Develop, prioritize, and annually revisit a list of future intersection improvements that include complete intersection reconstruction, implementation of double left turn lanes, and construction of right turn lanes. The program should focus on locations with LOS currently at D or better, but are expected to deteriorate to E or worse in the future as well as those locations with high traffic crash rates.	1. Create a 20 year capital improvement plan for use in developing a 5 year capital improvement program.	High	High priority for overall program development and implementation. This element is the first priority in the future roadway improvement program. Moderate for individual elements until they become elements in the Immediate Roadway Improvement Program.	Existing personnel can manage contractor	\$100,000	CDOT and Douglas County	R1 – 19
		2. Continue the multi-jurisdictional planning approach to intersection improvements at the C-470 ramps and along County Line Road. Some beneficial improvements may include: <ul style="list-style-type: none"> <li>• Provide a continuous acceleration lane for NB Quebec Street to EB C-470. Also add a third left turn lane from the WB C-470 ramp to SB Quebec Street.</li> <li>• Construct double NB and SB left turn lanes at the University Boulevard and C 470 interchange.</li> <li>• Reconstruct the University Boulevard and County Line Road intersection to 3 through lanes, double left turn lanes, and exclusive right turn lanes at all approaches.</li> <li>• Reconstruct the Colorado Boulevard and County Line Road intersection to 3 EB and 3 WB through lanes, double left turn lanes at the NB and EB approaches, and exclusive right turn lanes for the SB and NB approaches.</li> <li>• Reconstruct the Quebec Street and County Line Road intersection.</li> <li>• Major interchange reconstruction with directional ramps at C-470 and Santa Fe Drive including modifications to the County Line Road intersection.</li> </ul>	Moderate	Many of the ramp intersections and intersections adjacent to the freeway are expected to degrade to a poor LOS in the future. On-going coordination with CDOT and adjacent jurisdictions is required.	Existing personnel can manage contractor	TBD	CDOT and Douglas County	R2, R3, R6, R7, R8 and R11
		3. Further reconstruct the Broadway and Highlands Ranch Parkway intersection to provide 3 EB through lanes, an exclusive EB right turn lane, and a WB right turn lane.	Moderate	Further analysis required for scheduling.	Existing personnel can manage contractor	\$300,000	Douglas County	R2, R6, R7, and R8
		4. Reconstruct the Wildcat Reserve Parkway and Fairview Parkway intersection to include exclusive right turn lanes for the EB and SB approaches, 2 WB through lanes, and 2 NB left turn lanes.	Moderate	Further analysis required for scheduling.	Existing personnel can manage contractor	\$500,000	Douglas County	R9 and R11
		5. Construct an exclusive SB right turn lane at the Quebec Street and McArthur Ranch Road intersection.	Moderate	Further analysis required for scheduling.	Existing personnel can manage contractor	\$80,000	Douglas County	R16
		6. Provide a continuous acceleration lane for NB Wildcat Reserve Parkway to EB University Boulevard.	Moderate	Further analysis required for scheduling.	Existing personnel can manage contractor	\$150,000	Douglas County	R2, R6, R7, and R8
	III. Consider the following geometric/operational improvements in subsequent planning efforts and/or develop policies to address these issues.	1. Adopt a policy to remove/reconstruct/redesign raised medians on intersections approaches to improve alignment through intersections.	High	Details should be considered in subsequent planning efforts/development of policies	Can be accomplished with existing personnel	NA	Douglas County	R13
		2. Clarify the appropriate use of excess pavement as shoulders or bike lanes and coordinate with the development of the bike plan.	Moderate		Can be accomplished with existing personnel	NA	Douglas County, HRMD and HRCA	R2, R6, R7, and R8
		3. Fill or seal concrete expansion joints.	Moderate		Can be accomplished with existing personnel	\$250,000	Douglas County	R14
		4. Realign SB Wildcat Reserve Parkway and Fairview/McArthur Ranch so approach lanes and departure lanes line up though the intersection.	Low		Existing personnel can manage contractor	\$100,000	Douglas County	R9
		5. Construct planned wildlife crossings for Monarch Boulevard and consider wildlife crossings for Griggs Road.	Low		Existing personnel can manage contractor	\$750,000	Douglas County, HRMD and HRCA	R4
		6. Extend Teal Ridge Court to Grace Boulevard.	Low		Existing personnel can manage contractor	\$750,000	Developer and Douglas County	R5
		7. Adopt a policy for tree lining six-lane arterials consistent with clear zone requirements.	Low		Can be accomplished with existing personnel	NA	Douglas County	R19

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ITS/TMC	I. Implement a program to support travel demand and congestion management; including staffing.	1. Coordinate with DRCOGs TDM related programs such as "Ride Share" and car/van pool matching.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	\$10,000	Douglas County, DRCOG and HRMD	I1, T1, and T6
		2. Create policy for TDM incentives used at the planning/development stage to reduce trip generation and modify peak travel behavior.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	NA	Douglas County	I1, I3, I6, and E1
		3. Coordinate with local employers about their TDM programs, and educate them about options and how they could implement them.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	\$10,000	Douglas County, DRCOG and Private entities	I1, I3, I6, and E1
		4. Develop and maintain a C-470 Corridor Traffic Management Organization (TMO). The TMO could include Douglas County, Arapahoe County, Lone Tree, Centennial, Littleton, and Highlands Ranch Metropolitan District.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	\$50,000	Douglas County, DRCOG, Arapahoe County, Lone Tree Centennial, Littleton HRMD and Private entities	I1
	II. Implement a congestion identification and traffic information dissemination program.	1. Include congestion monitoring at signalized intersections with TMC development.	High	Should be implemented in the next 3 years.	Included in TMC	Included in TMC	Douglas County	I2, I3, and I4
		2. Install Pan-Tilt-Zoom cameras (PTZs) at locations identified in the ITS plan.	High	Should be implemented in the next 1 to 3 years.	Can be accomplished with existing personnel	\$100,000	Douglas County	I2, I4, and TO6
		3. Disseminate information to list of recipients to include CDOT, television, website, local radio stations, police, and emergency service providers.	Moderate	Should be implemented in the next 2 years.	Additional personnel may be needed (0.25 FTE)	\$20,000/year	Douglas County and CDOT	I5 and I6
		4. Encourage CDOT to implement an automated incident detection system on C-470 with auto-messaging VMS units at/near the University, Broadway, and Quebec interchanges.	Moderate	Should be implemented in the next 5 years.	Can be accomplished with existing personnel	NA	CDOT and DRCOG	I5
		5. Create fast response incident removal program with private towing companies on major arterials.	Low	Should be implemented in the next 5 years.	Included in Item #3		Douglas County	I5 and I6
		6. Provide live streaming video of traffic conditions at key intersections.	Low	Should be implemented as the TMC comes online.	Included in Item #3		Douglas County	I5 and I6
		7. Install arterial sized Variable Message Signs (VMS) in appropriate locations per the ITS plan.	Low	Should be implemented in the next 3 to 5 years.	Can be accomplished with existing personnel	\$150,000	Douglas County	I3, I5, and I6
Transit	I. Pursue a program to improve local bus circulation and ridership. This should include expansion of existing and new service, and facilities such as signing and bus stops.	1. Coordinate with RTD to implement a circulator bus that connects the Southwest and Southeast LRT corridors.	High	Should be pursued in the next year.	Can be accomplished with existing personnel	NA	RTD and HRMD	T3
		2. Coordinate with RTD to implement a circulator bus that connects commercial retail, business and regional RTD facilities.	Moderate	Should be pursued in the next 2 years.	Can be accomplished with existing personnel	NA	RTD and HRMD	T2 and T4
		3. Pursue real time information systems at bus stops. Consider permitting advertising at bus shelters to encourage private shelter installation.	Moderate	Should be implemented in the next 2 years.	Can be accomplished with existing personnel	NA	RTD, DRCOG and HRMD	T5
		4. Coordinate with the City of Lone Tree to implement a circulator bus that connects the Highlands Ranch community to Park Meadows Mall.	Moderate	Should be implemented in the next 2 years.	Can be accomplished with existing personnel	NA	City of Lone Tree, RTD and HRMD	T2

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<b>Bicycle, Pedestrian, Trails</b>	I. Develop a comprehensive trails and bike lane program.	1. Prepare a comprehensive trail and bike lane plan, and identify specific improvements to implement the plan.	High	High for development of a comprehensive trail plan. High to moderate for specific elements of construction.	Existing personnel can manage contractor	\$50,000	Douglas County, HRMD and HRCA	B1 – 10 and P2
		2. Reduce crossing widths at intersections with measurable pedestrian usage (neckdowns).	Moderate	Should be implemented in the next 3 to 5 years.	Existing personnel can manage contractor	\$50,000	Douglas County and HRMD	B10
		3. Relocate the Centennial Trail crossing of Colorado Boulevard to under the bridge and adjacent to C-470.	Moderate	Should be implemented in the next 3 to 5 years.	Existing personnel can manage contractor	\$200,000	Douglas County, CDOT, DRCOG, HRMD and HRCA	B3 and B4
		4. Develop a policy for the use of available excess pavement for bike lanes in support of the bike plan.	Moderate	Should be implemented in the next 3 to 5 years.	Can be accomplished with existing personnel	\$40,000	Douglas County and HRMD	B2
	II. Prepare a policy for implementation of pedestrian facilities.	1. Mid-block crossings and median refuges with pedestrian warning devices or signals. This policy should be coordinated with general signal policies.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	NA	Douglas County and HRMD	B5, B8, and B9
<b>Education and Information</b>	I. Develop a traffic information program to educate and inform the general public about traffic operations.	1. Develop and distribute a public information brochure to manage expectations and educate about available funding and sources, and limitations/ challenges of traffic operations, and maintenance. Consider distribution with license plate renewal.	High	Should be implemented in the next 2 years.	Can be accomplished with existing personnel	\$50,000	Douglas County	E2
		2. Disseminate traveler information on cable TV.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	\$50,000	Douglas County	E3
		3. Implement web-based transportation related traveler information.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	\$25,000	Douglas County	E4
		4. Implement a public education campaign to reduce speeding.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	\$25,000	Douglas County	E6
		5. Implement public education program on pedestrian signal operations (including countdown pedestrian signals).	Moderate	Should be implemented in the next 2 years.	Can be accomplished with existing personnel	\$25,000	Douglas County	E5
		6. Implement a public education campaign to reduce trips.	Moderate	Should be implemented in the next 2 years.	Can be accomplished with existing personnel	\$25,000	Douglas County	E1
<b>Policy</b>	I. Create dependable, transportation specific, and need based funding sources for maintenance and future improvements in capacity, mobility, and safety.	1. Pursue additional funding sources to support transportation improvements such as RTA or local tax initiatives that could be focused within HRMD boundaries.	High	Should be implemented in the next year.	Additional personnel may be needed	TBD	Douglas County	P1
		2. Establish a dedicated maintenance fund for traffic signal operations and maintenance.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	NA	Douglas County	P1
		3. Establish a dedicated TSM fund as part of the annual County budget for minor safety and operational improvements (e.g. pedestrian crossings, missing sidewalks, neckdowns, etc.).	High	Should be implemented in the next year.	Can be accomplished with existing personnel	NA	Douglas County	P2
		4. Define periodic and recurring meetings with the State and neighboring agencies to manage traffic and implement timing strategies that are compatible with each other, especially at municipal boundaries.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	NA	Douglas County, DRCOG, CDOT, Arapahoe County, Littleton, Centennial and Lone Tree	P3
	II. Create policies on speed limits and safety standards near schools and parks.	1. Document procedures for the determination and establishment of speed limits and process of coordination on traffic enforcement with the Sheriff.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	NA	Douglas County	P5, P7, and P9
		2. Refine the current traffic operations policies at/near school zones and parks.	High	Should be implemented in the next year.	Can be accomplished with existing personnel	NA	Douglas County	P10

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<b>Capital Improvements</b>	I. Develop a long-range major capital improvement priority list and pursue various funding sources.	1. Widen Quebec between Park Meadows Drive and County Line Road.	High	Further analysis required for scheduling.	Existing personnel can manage contractor	\$10,000,000	Douglas County, CDOT and DRCOG	C6
		2. Widen Broadway between Dad Clark and County Line Road.	Moderate	Further analysis required for scheduling.	Existing personnel can manage contractor	\$2,000,000	Douglas County, CDOT and DRCOG	C4
		3. Widen University between Dad Clark and County Line Road.	Moderate	Further analysis required for scheduling.	Existing personnel can manage contractor	\$2,000,000	Douglas County, CDOT and DRCOG	C5
		4. Consider a full access interchange at Colorado and C-470 (a half diamond toll only configuration is being considered in the current CDOT EIS).	Moderate	Environmental clearance of C-470 improvements required for input.	Existing personnel can manage contractor	\$20,000,000	Douglas County, CDOT, DRCOG, Centennial and Arapahoe County	C1
		5. Construct additional crossings of C-470.	Moderate	Further analysis required for scheduling.	Existing personnel can manage contractor	\$10,000,000	Douglas County and CDOT	C2 and C3
	II. Consider these other major capital improvements in subsequent planning efforts and/or develop policies to address these issues:	1. Construction of four lanes on Monarch (an origin-destination study may assist in the planning of this facility).	NA	Further analysis required for scheduling.	Existing personnel can manage contractor	\$10,000,000	Douglas County	C7
		2. Construction of a frontage road to extend Dad Clark between University and Colorado.	NA	Further analysis required for scheduling.	Existing personnel can manage contractor	\$10,000,000	Douglas County, HRMD and HRCA	C8
		3. Construction of a paved connection between Griggs Road and Daniels Park Road.	NA	Further analysis required for scheduling.	Existing personnel can manage contractor	\$10,000,000	Douglas County, HRMD and HRCA	C9
		4. Operational impacts from potential modifications of C-470. This evaluation will need the final plans for C-470 and the potential implementation of toll lanes.	NA	Further analysis required for scheduling.	Can be accomplished with existing personnel	TBD	Douglas County and CDOT	C1 – 6

Notes:

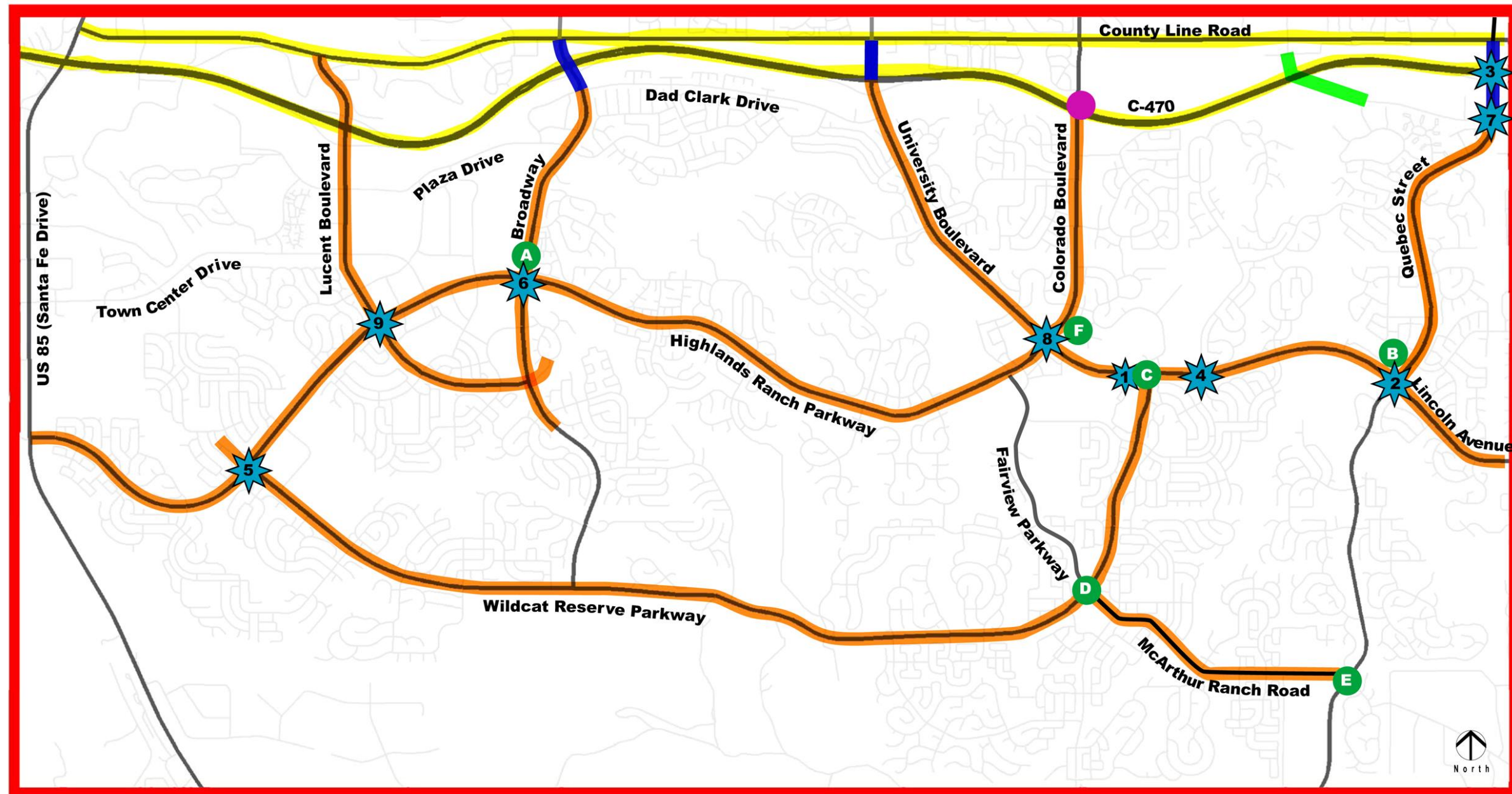
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FIGURE 7  
Program Recommendations



LEGEND					
	Major Arterial corridors improved with video detection, biannual signal coordination, TMC, etc.		Intersection reconstruction and/or construct turn lanes		Evaluate high crash location/ implement safety improvements
	Multijurisdictional planning approach for C-470 and County Line Road	A.	Broadway & Highlands Ranch Parkway	1.	University Boulevard & Teal Ridge Court
	Roadway widening	B.	Lincoln Avenue & Quebec Street	2.	Quebec Street & University Boulevard
	Construct additional crossing of C-470	C.	Wildcat Reserve Parkway & University Boulevard	3.	Quebec Street & C470
		D.	Wildcat Reserve Parkway & Fairview Parkway	4.	University Boulevard & Cresthill Lane
		E.	McArthur Ranch Road & Quebec Street	5.	Highlands Ranch Parkway & Wildcat Reserve Parkway
		F.	University Boulevard/Colorado Boulevard/Highlands Ranch Parkway	6.	Broadway & Highlands Ranch Parkway
				7.	Quebec Street & Park Meadows Drive
				8.	University Boulevard. & Highlands Ranch Parkway
				9.	Lucent Boulevard & Highlands Ranch Parkway
					Full access interchange at C-470/Colorado Boulevard

## 4.3 Funding

Current funding sources for transportation programs and projects in Douglas County vary by the types of facilities. State and Federal highways such as C-470 and US 85 are funded through CDOT. County roadways are generally funded by County Fund 200, Road and Bridge and County Fund 230, Road Sales and Use. County roadway projects are also funded in part by the development community, local improvement districts, and DRCOG. Transit facilities and services are funded by RTD.

If funding were available, many of the recommended smaller highly beneficial projects and programs could be implemented within a 5 year planning horizon. Funding will be the key obstacle to accomplishing this and will likely have to come from new sources along with the current funding priorities shown in the Douglas County Public Works capital budget. New sources would likely include the extension of the current road sales tax where some of these projects would be part of the commitments made as part of the extension approval. The Douglas County 2004 - 2009 Capital Improvement Program projected Traffic Engineering funding for capacity and safety improvements at a level of \$1.5 M per year, for use on any specific traffic project or location within the county. This funding level would provide for some progress on the needs identified in this report

However, as we enter 2007, the funds available to the County for road capital projects and traffic capacity and safety projects is significantly less than what was available in 2004 when that plan was drafted. As the need for maintaining and operating our roadways increases, the funds available for road capital, traffic capacity, and safety projects decreases as there is only one funding source. As a result, this leaves just \$300,000 for traffic capacity and safety improvements. This reduced funding level will not allow any significant progress toward the recommendations in this report. It is the County's hope that the extension of the road sales tax or other new funding sources will help return the traffic capacity and safety funding closer to the original CIP plan of \$1.5 M annually.

When comparing appropriate funding sources for the recommended projects, it is evident that current funding is not sufficient to complete the entire program in a reasonable timeframe. The purpose of this section is to identify current funding available for the recommended projects, expected short falls in funding assuming a 5-year schedule for program completion, and potential funding sources to fill expected funding gaps.

### 4.3.1 Current and On-going Projects and Planning Efforts

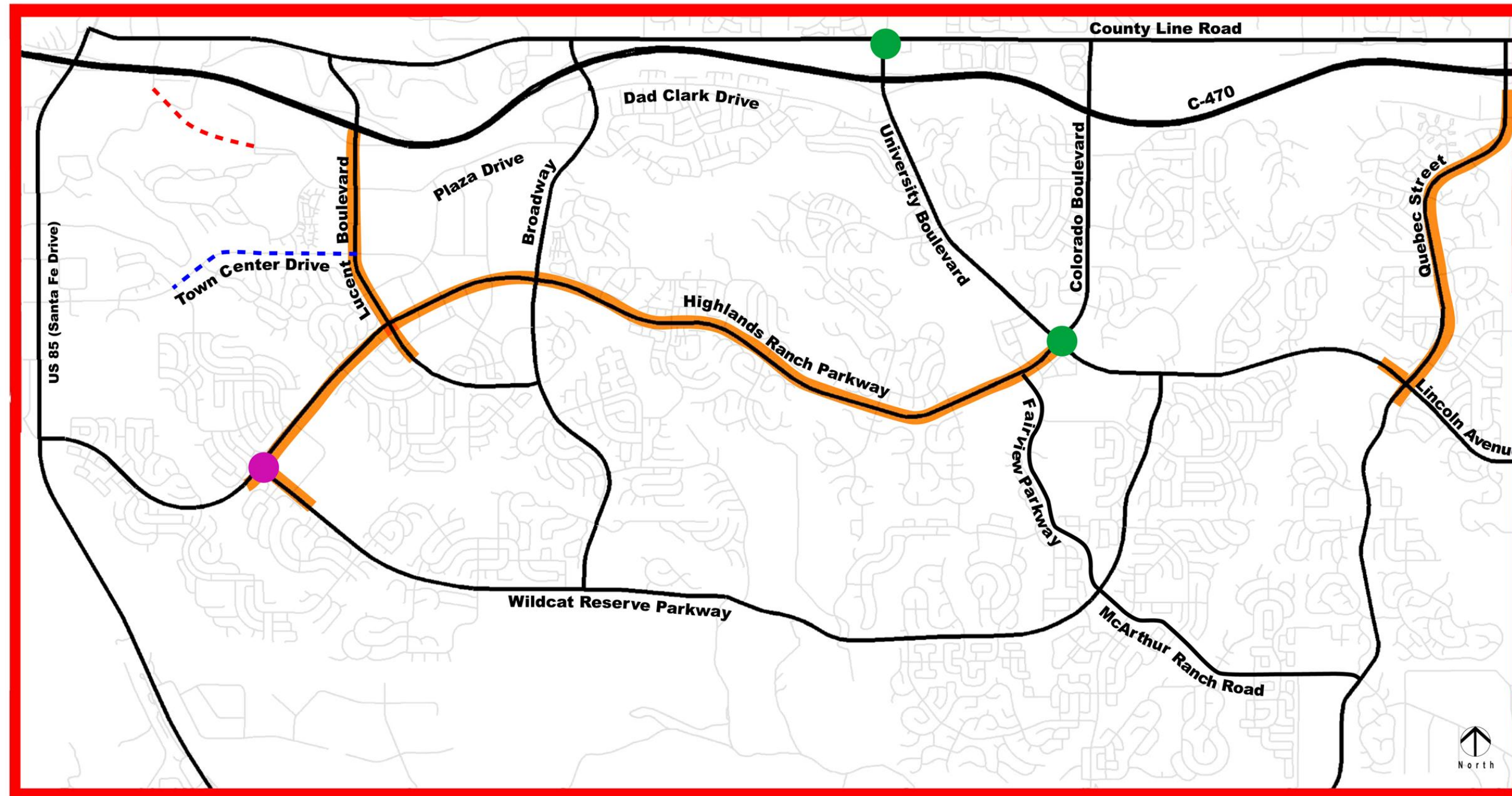
In addition to annual maintenance, a number of planning, operations, and capital improvement projects within the Highlands Ranch community have been completed in 2006:






- In cooperation with CDOT, the County is currently completing final design and right-of-way acquisition for improvements and widening along County Line Road between Colorado Boulevard and University Boulevard including intersection improvements at University Boulevard. Construction is scheduled to begin in 2007.
- The University Boulevard and Highlands Ranch Parkway intersection improvements are being identified and may begin construction as early as 2007.

- County Traffic completed corridor retiming projects along Quebec Street, Broadway, Highlands Ranch Parkway, and Lucent Boulevard.
- A Record of Decision for the CDOT C-470 Express Lanes Feasibility Study is pending. Douglas County, HRMD, and HRCA oppose toll lanes on C-470.
- In cooperation with the Erickson Retirement Community, the HRMD is extending Plaza Drive from Lucent Boulevard to Erickson Drive and constructing Erickson Drive to County Line Road.
- HRMD also completed the southern half of Town Center Drive; widening this roadway from 2 to 4 lanes.

The current and on-going capital projects and operational improvements shown in Figure 8 are a result of multi-jurisdictional cooperation and combining multiple years of past funding and other sources that cannot be depended upon for future projects.

**FIGURE 8**  
Current and On-Going Capital Projects and Operational Improvements



LEGEND			
	Corridors retimed in 2006		Test implementation of flashing yellow arrow operation
			Intersection reconstruction
			Roadway construction (Plaza Drive extension)
			Roadway construction (Town Center Drive widening)

### 4.3.2 Current County Funding

The current County funding used for the type of improvements identified in this program is primarily derived from two funding sources, County Funds 200 and 230.

County Fund 200, Road and Bridge – “As required by state law, this fund is used to account for the costs associated with the construction and maintenance of County roads and bridges. Restricted sources include property taxes and highway user fees. Of the Road and Bridge Fund property taxes, the County must share back with the incorporated municipalities one-half of the taxes collected on the properties within the incorporated areas.”

County Fund 230, Road Sales and Use – “As required by state law, this fund is used to account for revenues derived from the 0.4 percent sales and use tax approved by voters in November 1995 and designated for the improvement and maintenance of County roads and bridges. The three incorporated municipalities located within the County at the time the sales tax was approved receive a share back of these revenues in accordance with approved intergovernmental agreements.” The sales and use tax used for this fund is scheduled to sunset on December 31, 2010.

With the annexation of Park Meadows Mall into the City of Lone Tree and the expectation that the anchor stores will eventually be annexed as well, sales at the mall may be affected by the higher tax rate and consequently may decrease Douglas County revenue.

Given current and expected revenues of Funds 200 and 230 and a similar commitment of funding to HRTIP projects, it will take 25 years to complete the traffic capacity and safety improvements and over 100 years to complete the entire program including the major capital improvements. Assuming that 5 percent of the County’s annual new project budget was to be allocated to HRTIP projects, the traffic capacity and safety improvements could be completed in 8 years. At Year 5, a \$2.7 million shortfall would be expected.

### 4.3.3 Other Typical Funding Mechanisms

While a significant amount of other typical funding sources are already committed to other programs and projects, planning should begin to maximize the potential use of these funding sources. Other typical potential funding of HRTIP projects include funds leveraged by CDOT and DRCOG.

#### CDOT

Due to funding limitations and recent completion of major bond projects, CDOT anticipates significant limitations in funding for major projects over the next 20 years. CDOT has and continues to look for alternative funding mechanisms for major projects. CDOT has historically funded development and implementation of intelligent transportation systems, which is administered from an annual ITS funding pool. An ITS system along C-470 may qualify for these funds through a cooperative submittal to DRCOG with CDOT as the lead agency.



## DRCOG

DRCOG is the Metropolitan Planning Organization in the greater Denver area responsible for regional planning and administering funds. According to DRCOG less than half of projects identified in Metro Vision are anticipated to have funding in the 20-year planning horizon. HRTIP projects may qualify for funds from two of the three funding sources administered by DRCOG:

- Surface Transportation Program (STP) Metro
- Surface Transportation Program (STP) Enhancement
- Congestion Mitigation and Air Quality “CMAQ” funding pool

The Denver Regional Council of Government’s Surface Transportation Program (STP) “Metro” funding pool primarily addresses roadway capacity and operational improvement projects. Improvements must be on the regionally significant transportation system in order to qualify for Metro funds. None of the proposed HRTIP projects are on this regionally significant roadway network.

The Denver Regional Council of Government’s Surface Transportation Program (STP) “Enhancement” funding pool primarily addresses bicycle and pedestrian improvement projects. Historically, very few requests for this funding have been made by Douglas County or other municipalities within the County. Approximately \$400,000 is available annually. To qualify for this funding the project sponsor must meet local matching requirements; the split is 20 percent by the sponsor and 80 percent by DRCOG. Greater consideration is given to those projects with a higher local match, typically 40 percent.

All applications for enhancement funding are considered and weighed against each other. For example, more points are awarded for projects that meet regional goals, are included in regional planning efforts, or are identified in local planning documents. Enhancement funds can be used for such projects as completing missing links in trails, providing roadway crossing improvements, and constructing sidewalks. The first step in qualifying for this funding is to develop a bicycle, pedestrian, and trails master plan for the Highlands Ranch community. Installation of countdown pedestrian signals and completion of missing trail or sidewalk segments may also qualify for this funding.

The Denver Regional Council of Government’s Congestion Mitigation and Air Quality “CMAQ” funding pool addresses primarily capital transit and travel demand management as well as roadway and intersection improvements that reduce severe congestion and address air quality problem locations. Establishing new bus service in the Highlands Ranch community may qualify for these funds but would need an organization like RTD to perform and maintain the service. Historically, transit services within the Highlands Ranch community have been underutilized.

Creation of a Traffic Management Organization for the C-470 Corridor is another potential project that could be implemented with CMAQ funding. A corridor Transportation Management Organization (TMO) would be comprised of Douglas County, Arapahoe County, Lone Tree, Centennial, Littleton, the Highlands Ranch Metropolitan District, and major local businesses. DRCOG funding contributions decrease annually with the expectation that the project sponsor annually contribute more to maintain the TMO. The

DRCOG/local split is 80/20 percent in year one, 50/50 percent in year two, and in year three the sponsor is wholly responsible for operational funding of the TMO.

Intersection operational improvements and minor capital improvements meant to reduce congestion and improve air quality may also qualify for CMAQ funding.

#### **4.3.4 Additional Funding Sources and Recommendation**

Outside of typical funding mechanisms other municipal governments have had mixed success with alternative funding sources such as bond measures, establishment of regional transportation authorities, gas tax increases, and sales tax increases.

Based on recent funding surveys performed by the County, area residents are strongly opposed to raising the gasoline tax, are less opposed to annual vehicle registration fees, and are most receptive to sales and use tax as a form of raising revenue for transportation improvements (Arapahoe, Douglas, and Jefferson County - C-470 Toll/Transportation Funding Survey, April 2006).

Since only a fraction of the improvements recommended in this program can be completed with current funding, reallocation of existing funding and identification of other sources of funding is needed to meet the growing demand and to maintain current service levels. The most viable new alternative funding source appears to be bond measures targeted at local improvements. As recommended by the ELT, a financial focus group comprised of ELT and TLT members should be formed to shepherd the program recommendations and pursue alternative funding mechanisms.

APPENDIX 1

# Level 1 Alternative Screening Matrix

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APPENDIX 1

# Level 1 Alternative Screening Matrix

Category	Implementation (Need all yes)					Mobility (Need one yes)			Multi-Modal Opportunities (Need one yes)				Safety (Need one yes)		Environmental Impacts
	Criteria	Is it compatible with current Plans and Studies?	Can it be used as an update to Current Plans?	Is the cost feasible within expected funding sources?	Does it promote interagency cooperation? (Move to Mobility)	Is north/south mobility across C-470 improved?	Does it support mobility awareness through public education?	Does it improve traffic operations (LOS)?	Does it improve overall circulation?	Are gaps in trails closed?	Is pedestrian and/or bicycle circulation improved?	Is access to C-470 trail improved?	Is access to bus stops, future LRT stations, and other facility modes improved?	Is safety expected to improve?	Does it address problems at a high accident location?
Ideas															
Synchronize traffic signals	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Bi-annual signal retiming	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Traffic responsive signal operations	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Convert all signal detection to cameras	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Prioritize corridors and movements for signal timing	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Change the Highlands Ranch Parkway and Broadway intersection to make Broadway the priority progression corridor.	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Flashing yellow signals after hours	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Implement third+ car actuation for permissive left turn phases	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Allow permissive left turns at all intersection unless a safety problem is observed	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Change EB and WB left turn signal phasing to protected only at University and Teal Ridge	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Lead left turn signals at all locations	Y	N	Y	N	NA	NA	N	N	NA	NA	NA	NA	NA	N	Y
Allow implementation of permissive left turns	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	NA	Y	Y
Time-of-day protected/permissive left turn signalization	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	NA	Y	Y
Implement right turn overlap phases	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	NA	Y	Y
Increase detection time for exclusive right turn lanes	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	NA	Y	Y

Category	Implementation (Need all yes)					Mobility (Need one yes)			Multi-Modal Opportunities (Need one yes)				Safety (Need one yes)		Environmental Impacts
	Criteria	Is it compatible with current Plans and Studies?	Can it be used as an update to Current Plans?	Is the cost feasible within expected funding sources?	Does it promote interagency cooperation? (Move to Mobility)	Is north/south mobility across C-470 improved?	Does it support mobility awareness through public education?	Does it improve traffic operations (LOS)?	Does it improve overall circulation?	Are gaps in trails closed?	Is pedestrian and/or bicycle circulation improved?	Is access to C-470 trail improved?	Is access to bus stops, future LRT stations, and other facility modes improved?	Is safety expected to improve?	Does it address problems at a high accident location?
Ideas															
Install a traffic signal at McArthur Ranch Road and Southridge Recreation Center	Y	Y	Y	Y	NA	NA	Y	NA	NA	NA	NA	NA	NA	Y	Y
Install a traffic signal at McArthur Ranch Road and Wagonbox/Valleybrook	Y	Y	Y	Y	NA	NA	Y	NA	NA	NA	NA	NA	NA	Y	Y
Install a traffic signal at Quebec and Palomino	Y	Y	Y	Y	NA	NA	Y	NA	NA	NA	NA	NA	NA	Y	Y
Install a traffic signal at University and Crosspoint	Y	Y	Y	Y	NA	NA	Y	NA	NA	NA	NA	NA	NA	Y	Y
Install detection at Centennial and Plaza	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	NA	Y	Y
Install detection on County Line Road and Lucent	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	NA	Y	Y
Install detectors for bicycles and pedestrians	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	NA	Y	Y
Reduce number of signals	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	NA	Y	Y
Remove unwarranted signals	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	NA	Y	Y
Replace signals with roundabouts	Y	Y	Y	NA	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Enhance signal communications between jurisdictions	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Lower speed limit on major arterials from 45 to 40 mph	Y	Y	Y	Y	Y	NA	N	N	NA	NA	NA	NA	N	NA	Y
Speed display signs	Y	Y	Y	Y	NA	Y	Y	Y	NA	NA	NA	NA	Y	Y	Y
Implement travel demand management techniques	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	Y	Y	Y	Y	Y
Incident detection and rapid removal	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
ITS detection of congestion	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
System monitoring and observation for signal timing	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Use highway advisory radio to provide traffic condition information	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA	NA	Y	Y	Y
Utilize shoulders for turn lanes	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Add turn lanes in addition to shoulders	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Double Left Turns to improve intersection operations	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y

Category	Implementation (Need all yes)					Mobility (Need one yes)			Multi-Modal Opportunities (Need one yes)				Safety (Need one yes)		Environmental Impacts
	Criteria	Is it compatible with current Plans and Studies?	Can it be used as an update to Current Plans?	Is the cost feasible within expected funding sources?	Does it promote interagency cooperation? (Move to Mobility)	Is north/south mobility across C-470 improved?	Does it support mobility awareness through public education?	Does it improve traffic operations (LOS)?	Does it improve overall circulation?	Are gaps in trails closed?	Is pedestrian and/or bicycle circulation improved?	Is access to C-470 trail improved?	Is access to bus stops, future LRT stations, and other facility modes improved?	Is safety expected to improve?	Does it address problems at a high accident location?
Ideas															
Increase length of left turn bays	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Add 2nd WB left turn lane at University and Wildcat Reserve Parkway	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Construct 2nd SB left turn lane at Broadway and Highlands Ranch Parkway	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Separate through and right turns at intersection	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Use shoulder for right turn lanes	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Increase the NB right turn lane at Quebec and Lincoln further south and consider a right turn overlap phase	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Increase the NB right turn lane storage at University and Wildcat Reserve Parkway and consider right turn overlap phase	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Change intersection striping for SB Quebec to WB McArthur Ranch right turn movement or construct an exclusive right turn lane	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Construct an exclusive right turn lane for SB Wildcat to WB Grace	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Install a right turn lane at WB University to NB Cresthill	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Construct a frontage road to extend Dad Clark between University and Colorado	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	NA	NA	Y	NA	Y
Four-lane Monarch	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	NA	Y
Extend Griggs Road to Daniels Park	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	NA	Y
Extend Teal Ridge Court to Grace Boulevard	Y	Y	Y	NA	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Construct wildlife crossings for Monarch and Griggs	Y	Y	Y	Y	NA	NA	NA	NA	NA	NA	NA	NA	Y	NA	Y
Improve arterial connections between Highlands Ranch and Castle Rock	NOT IN SCOPE														

Category	Implementation (Need all yes)					Mobility (Need one yes)			Multi-Modal Opportunities (Need one yes)				Safety (Need one yes)		Environmental Impacts	
	Criteria	Is it compatible with current Plans and Studies?	Can it be used as an update to Current Plans?	Is the cost feasible within expected funding sources?	Does it promote interagency cooperation? (Move to Mobility)	Is north/south mobility across C-470 improved?	Does it support mobility awareness through public education?	Does it improve traffic operations (LOS)?	Does it improve overall circulation?	Are gaps in trails closed?	Is pedestrian and/or bicycle circulation improved?	Is access to C-470 trail improved?	Is access to bus stops, future LRT stations, and other facility modes improved?	Is safety expected to improve?	Does it address problems at a high accident location?	Can air quality, noise levels, or wildlife habitat expected impacts be avoided or mitigated?
Widen Lincoln east of Quebec	NOT IN SCOPE															
Improve/expand the University and County Line Road intersection	CURRENTLY COMMITTED															
Change lane and shoulder dimensions	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Add tree lining to six-lane arterials	Y	Y	Y	Y	N	NA	N	N	NA	NA	NA	NA	NA	NA	NA	NA
Imbedded reflector pavement markers	Y	Y	Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	Y	Y	Y	Y
Fill or seal concrete expansion joints	Y	Y	Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	Y	Y	Y	Y
Eliminate 2nd Double Yellow stripe to reduce "negative" offset of LT lanes and improve sight distance	Y	Y	Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	Y	Y	Y	Y
Improve guide signing	Y	Y	Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	Y	Y	Y	Y
Improve advanced warning of trap lanes	Y	Y	Y	NA	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y	Y
Increase pavement and destination markings	Y	Y	Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	Y	Y	Y	Y
Install advance street name signs	Y	Y	Y	NA	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y	Y
Install ramp meters at all C-470 ramps	NOT IN SCOPE															
Priority lanes for high efficiency vehicles	N	N	N	NA												
Realign SB Wildcat Reserve Parkway and Fairview/McArthur Ranch so approach lanes and departure lanes line up though the intersection	Y	Y	Y	NA	NA	NA	Y	Y	NA	NA	NA	NA	Y	N	Y	Y
Remove raised medians on intersection approaches	Y	Y	Y	NA	NA	NA	Y	NA	NA	NA	NA	NA	Y	Y	Y	Y
Replace roadway surface with noise-mitigating materials	Y	Y	Y	NA	N	N	N	N								
Provide Access-a-Ride – to light rail transit (LRT)	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	Y	Y	Y	N	Y	Y
Circulator bus system to serve community, retail, and RTD facilities	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	Y	Y	Y	N	Y	Y

Category	Implementation (Need all yes)					Mobility (Need one yes)			Multi-Modal Opportunities (Need one yes)				Safety (Need one yes)		Environmental Impacts	
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Extend LRT from the planned end-of-line station at Lucent to Town Center park-n-ride	Y	Y	N	Y												
Implement a feeder bus system to/from/ between the southeast and southwest LRT corridors	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	Y	Y	Y	N	Y	
Improve access to proposed LRT station	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	Y	Y	Y	N	Y	
Increase bus frequency between Town Center and Mineral LRT station	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	Y	Y	Y	N	Y	
Increase bus service to proposed LRT station	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	Y	Y	Y	N	Y	
LRT along C-470 to connect southwest and southeast corridors	NOT IN SCOPE															
LRT service in Highlands Ranch	N	N	N	N												
Real-time information signs at bus stops	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	Y	Y	Y	Y	Y	Y
Rideshare programs for Highlands Ranch residents	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	Y	Y	Y	Y	Y	Y
Designate bike lanes	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Eliminate on street bicycle lanes	N	Y	Y	N												
Bike path underpasses	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Grade separate Centennial Trail at major arterials	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Construct curb cuts at trail crossings	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	N	N	Y	
Improve arterial bike and pedestrian crossings	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Provide for mid-block pedestrian/bicycle crossings	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Provide signed/stripped crosswalks at all trail crossing locations on local streets	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Connect HR trails to southern Douglas County and Castle Rock	NOT IN SCOPE															



Category	Implementation (Need all yes)					Mobility (Need one yes)			Multi-Modal Opportunities (Need one yes)				Safety (Need one yes)		Environmental Impacts	
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Ideas																
Construct trail access along US 85 between Highlands Ranch Parkway and C-470	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Improve bike access to planned LRT stations	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Build sidewalks in shopping and recreation centers	NOT IN SCOPE															
Improve signage and pedestrian facilities within the Town Center	NOT IN SCOPE															
Countdown pedestrian signals	Y	Y	Y	Y	NA	NA	Y	Y	N	Y	N	Y	Y	Y	Y	Y
Install pedestrian refuge medians with pedestrian push buttons at major arterial intersections	Y	Y	Y	Y	NA	NA	Y	Y	N	Y	N	Y	Y	Y	Y	Y
Pedestrian signals at mid-block locations	Y	Y	Y	Y	NA	NA	Y	Y	N	Y	N	Y	Y	Y	Y	Y
Develop and maintain a public hotline to report aggressive drivers, speeders, and DUIs	CSP HAS PROCESS IN PLACE															
Develop public informational brochure to manage expectations and educate about level of congestion, available funding and sources, and limitations/challenges of traffic operations and maintenance	Y	Y	Y	Y	NA	Y	NA	NA	NA	NA	NA	NA	Y	N	Y	Y
Public education campaigns to reduce trips	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA	NA	Y	N	Y	Y
Public education on pedestrian signal operations	Y	Y	Y	Y	NA	Y	NA	NA	NA	NA	NA	NA	Y	N	Y	Y
Public education to reduce speeding	Y	Y	Y	Y	NA	Y	NA	NA	NA	NA	NA	NA	Y	N	Y	Y
Public information on cable TV	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA	NA	Y	N	Y	Y
Use ITS for public information	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA	NA	Y	N	Y	Y
Web-based public information	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA	NA	Y	N	Y	Y
Consider additional connections across C-470 west of Holly	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Category	Implementation (Need all yes)					Mobility (Need one yes)			Multi-Modal Opportunities (Need one yes)				Safety (Need one yes)		Environmental Impacts
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<b>Ideas</b>															
Construct access over C-470	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y
Construct interchange at Colorado and C-470	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y
Holly connection across C-470	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y
Improve the C-470 and Santa Fe Drive interchange	CURRENTLY COMMITTED														
Interchange at Broadway and Highlands Ranch Parkway	N	N	N	N											
Interchange at Colorado and University	N	N	N	N											
Interchange at Quebec and Lincoln	N	N	N	N											
More freeways – Santa Fe, University and new beltway south of C-470	N	N	N	N											
Provide slip ramps between existing C-470 interchanges	N	N	N	N											
Reconfigure C-470 ramps at Broadway and at Quebec	N	N	N	N											
Widen Broadway between Dad Clark and County Line Road	Y	Y	Y	Y	Y	NA	Y	Y	N	Y	Y	Y	Y	N	Y
Widen University between Dad Clark and County Line Road	Y	Y	Y	Y	Y	NA	Y	Y	N	Y	Y	Y	Y	N	Y
Widen Quebec at C-470	Y	Y	Y	Y	Y	NA	Y	Y	N	Y	Y	Y	Y	N	Y
Pursue bicycle, pedestrian, and trail master plan	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	N	Y
After cooperative development of a best practices guideline for signal timing, coordination, and strategy; draft and implement an intergovernmental agreement with the State and neighboring agencies to manage traffic and implement timing strategies that are compatible with each other especially at municipal boundaries.	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	NA	NA	Y	N	Y

Category	Implementation (Need all yes)					Mobility (Need one yes)			Multi-Modal Opportunities (Need one yes)				Safety (Need one yes)		Environmental Impacts
	Criteria	Is it compatible with current Plans and Studies?	Can it be used as an update to Current Plans?	Is the cost feasible within expected funding sources?	Does it promote interagency cooperation? (Move to Mobility)	Is north/south mobility across C-470 improved?	Does it support mobility awareness through public education?	Does it improve traffic operations (LOS)?	Does it improve overall circulation?	Are gaps in trails closed?	Is pedestrian and/or bicycle circulation improved?	Is access to C-470 trail improved?	Is access to bus stops, future LRT stations, and other facility modes improved?	Is safety expected to improve?	Does it address problems at a high accident location?
Designate University Boulevard at Cresthill as a school zone, install flashers, and reduce speed limit	Y	Y	Y	Y	NA	NA	NA	Y	NA	Y	NA	NA	Y	Y	Y
Establish criteria for traffic signal installation that a study be conducted to ensure the new signal can effectively be coordinated with adjacent signals and not impact corridor progression, prior to approval	Y	Y	Y	Y	Y	NA	Y	Y	NA	NA	NA	NA	Y	N	Y
Increase speed limits	Y	Y	Y	NA	NA	NA	Y	Y	NA	NA	NA	NA	N	N	Y
Consistent speed limits	Y	Y	Y	NA	NA	NA	Y	Y	NA	NA	NA	NA	Y	N	Y
Focus speed enforcement in neighborhoods	NOT IN SCOPE														
Speed and red light enforcement	Y	Y	Y	NA	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y
Increase signal clearance time	Y	Y	Y	NA	NA	NA	N	N	NA	NA	NA	NA	NA	Y	Y
Reduce all red clearance time	Y	Y	Y	NA	NA	NA	Y	Y	NA	NA	NA	NA	NA	Y	Y
Install noise barriers/mitigation along major arterials	Y	Y	Y	NA	N	N	N	N							
Pursue a local tax initiative to support transportation improvement in the ranch	Y	Y	Y	Y	NA	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y
Reconfigure Highlands Ranch Post Office parking lot to two way circulation	Y	Y	N	N											
Test implementation of the flashing yellow arrow for permitted left turn movements, a good test location may be EB and WB lefts at Wildcat Reserve Parkway and Highlands Ranch Parkway	Y	Y	Y	Y	NA	NA	Y	Y	NA	NA	NA	NA	Y	Y	Y

APPENDIX 2

## **Level 2 Alternative Evaluation Matrix**

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# Level 2 Alternative Evaluation Matrix

<b>Legend</b> ● = Good ○ = Poor ◐ = Fair ○ = Poor NA = Not Applicable	<b>Notes:</b> <sup>1</sup> Currently planned or being implemented by Douglas County <sup>2</sup> Traffic signals must meet MUTCD warrants <sup>3</sup> TO = Traffic Operations, I = ITS/TMC, R = Minor Roadway Improvements, T = Transit, B = Bicycle/Pedestrian/Trail, E = Education and Information, P = Policy, & C = Major Capital Improvement Some individual ideas don't score well in the larger context of the program but result in a much higher ranking when grouped with similar ideas. Individual ideas are packaged into the final transportation improvement program recommendations.
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Category <sup>3</sup>	Criteria	Ideas	Implementation			Mobility			Multi-Modal Opportunities			Safety		Environmental Impacts	
			Supports current plans and studies	Magnitude of cost	Promotes interagency cooperation	Improves north/south mobility across C470	Expected level of mobility awareness through public education	(System Management and Minor Capital Improvements) Amount vehicular delay is reduced	(Major Capital Solutions) Improvement in overall circulation by reduced VMT and LOS improvements	Improved trail operations	Level of increased access to C470 Trail	Improves access to bus stops, future LRT stations, and other alternative modes	Level (high/med/low) that safety is expected to improve	Number and priority of high accident locations improved	Ability to avoid or mitigate expected impacts to air quality, noise levels, or wildlife habitat
Traffic Operations	TO1	Synchronize traffic signals <sup>1</sup>	◐	●	●	●	○	◐	NA	○	○	○	○	○	◐
	TO2	Bi-annual signal retiming	◐	●	●	●	○	◐	NA	○	○	○	○	○	◐
	TO3	Prioritize corridors and movements for signal timing <sup>1</sup>	◐	●	●	●	○	◐	NA	○	○	○	○	○	◐
	TO4	Change the Highlands Ranch Parkway and Broadway intersection to make Broadway the priority progression corridor.	◐	●	●	●	○	◐	NA	○	○	○	○	○	◐
	TO5	Enhance signal communications/operations between jurisdictions	◐	●	●	◐	○	◐	NA	○	○	○	◐	○	◐
	TO6	Implement traffic responsive signal operations	◐	◐	●	●	○	◐	NA	○	○	○	○	○	◐
	TO7	Convert all signal detection to cameras	◐	◐	●	●	○	◐	NA	○	○	○	○	○	◐
	TO8	Reduce number of signals	◐	●	◐	◐	○	◐	NA	○	○	○	◐	○	◐
	TO9	Replace signals with roundabouts	◐	◐	○	◐	○	●	NA	○	○	○	●	○	◐
	TO10	Improve guide signing	◐	●	◐	◐	○	○	NA	○	◐	◐	○	○	◐
	TO11	Change EB and WB left turn signal phasing to protected only at University and Teal Ridge	◐	●	●	○	○	○	NA	○	○	○	◐	●	○
	TO12	Allow permissive left turns at all intersection unless a safety problem is observed	◐	●	●	○	○	◐	NA	○	○	○	○	○	◐
	TO13	Install detection on County Line and Lucent	◐	●	◐	◐	○	◐	NA	○	○	○	○	○	◐
	TO14	Install detectors for bicycles and pedestrians	◐	●	◐	○	○	○	NA	○	○	◐	◐	○	◐
	TO15	Increase pavement and destination markings	◐	●	◐	◐	○	○	NA	○	○	○	◐	○	◐
	TO16	Install advance street name signs	◐	●	◐	◐	○	○	NA	○	○	○	◐	○	◐

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Traffic Operations	TO17	Implement flashing yellow signals after hours <sup>1</sup>	◐	●	●	○	○	◐	NA	○	○	○	○	○	○
	TO18	Implement time of day protected/ permissive left turn signalization	◐	●	○	◐	○	◐	NA	○	○	○	○	○	○
	TO19	Implement right turn overlap phases <sup>1</sup>	◐	●	◐	○	○	◐	NA	○	○	○	○	○	○
	TO20	Increase detection time for exclusive right turn lanes	◐	●	◐	○	○	◐	NA	○	○	○	○	○	○
	TO21	Install detection at Centennial and Plaza	◐	●	◐	○	○	◐	NA	○	○	○	○	○	○
	TO22	Install speed display signs	◐	●	○	○	◐	○	NA	○	○	○	◐	○	○
	TO23	Eliminate 2nd Double Yellow stripe to reduce "negative" offset of LT lanes and improve sight distance <sup>1</sup>	◐	●	○	○	○	◐	NA	○	○	○	◐	○	○
	TO24	Improve advanced warning of trap lanes	◐	●	◐	○	○	○	NA	○	○	○	◐	○	○
	TO25	Implement 3rd car actuation for left turn phases, where appropriate	◐	●	○	○	○	◐	NA	○	○	○	○	○	○
	TO26	Install imbedded reflector pavement markers	○	◐	○	○	○	○	NA	○	○	○	◐	○	○
	TO27	Install a traffic signal at McArthur Ranch Road and Southridge Recreation Center <sup>2</sup>	○	◐	○	○	○	○	NA	○	○	○	○	○	○
	TO28	Install a traffic signal at McArthur Ranch Road and Wagonbox/Valleybrook <sup>2</sup>	○	◐	○	○	○	○	NA	○	○	○	○	○	○
	TO29	Install a traffic signal at Quebec and Palomino <sup>2</sup>	○	◐	○	○	○	○	NA	○	○	○	○	○	○
	TO30	Install a traffic signal at University and Crosspoint <sup>2</sup>	○	◐	○	○	○	○	NA	○	○	○	○	○	○
TO31	Install a traffic signal at Lincoln and Laredo <sup>2</sup>	○	◐	○	○	○	○	NA	○	○	○	○	○	○	
ITS / TMC	I1	Implement travel demand management techniques	◐	●	●	◐	◐	◐	NA	○	○	◐	○	○	○
	I2	Implement system monitoring and observation for signal timing	◐	◐	●	●	○	◐	NA	○	○	○	◐	○	○
	I3	Use ITS for public information	◐	◐	●	○	●	○	NA	○	○	○	◐	○	○
	I4	Implement ITS detection of congestion	◐	◐	◐	○	◐	◐	NA	○	○	○	◐	○	○
	I5	Implement incident detection and rapid removal	◐	◐	◐	○	○	◐	NA	○	○	○	◐	○	○
	I6	Use broadcast traveler information to provide traffic condition information	◐	◐	◐	○	◐	◐	NA	○	○	○	◐	○	○

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Minor Roadway Improvements	R1	Construct 2nd SB left turn lane at Broadway and Highlands Ranch Parkway	◐	◐	◐	◐	○	◐	NA	○	○	○	◐	●	◐
	R2	Utilize shoulders for turn lanes	◐	●	◐	○	○	◐	NA	○	○	○	◐	○	◐
	R3	Increase length of left turn bays	◐	●	◐	○	○	◐	NA	○	○	○	◐	○	◐
	R4	Construct wildlife crossings for Monarch and Griggs	◐	◐	◐	○	○	○	NA	◐	○	○	◐	○	●
	R5	Extend Teal Ridge to Grace Boulevard	◐	◐	○	○	○	◐	NA	○	○	○	◐	●	◐
	R6	Add turn lanes in addition to shoulders	◐	◐	◐	○	○	◐	NA	○	○	○	◐	○	◐
	R7	Separate through and right turns at intersections	◐	◐	◐	○	○	◐	NA	○	○	○	◐	○	◐
	R8	Change lane and shoulder dimensions	◐	◐	◐	○	○	◐	NA	○	○	○	◐	○	◐
	R9	Realign SB Wildcat Reserve Parkway and Fairview/McArthur Ranch so approach lanes and departure lanes line up though the intersection	◐	◐	◐	○	○	◐	NA	○	○	○	◐	○	◐
	R10	Increase the NB right turn lane at Quebec and Lincoln further south and consider a right turn overlap phase <sup>1</sup>	◐	◐	○	○	○	◐	NA	○	○	○	◐	●	○
	R11	Construct double left turns lanes to improve intersection operations	◐	◐	◐	○	○	◐	NA	○	○	○	○	○	◐
	R12	Add 2nd WB left turn lane at University and Wildcat Reserve Parkway	◐	◐	◐	○	○	◐	NA	○	○	○	○	○	◐
	R13	Remove raised medians on intersections approaches	◐	◐	◐	○	○	○	NA	○	○	○	◐	○	◐
	R14	Fill or seal concrete expansion joints	◐	●	○	○	○	○	NA	○	○	○	◐	○	◐
	R15	Increase the NB right turn lane storage at University and Wildcat Reserve Parkway and consider right turn overlap phase	◐	◐	○	○	○	◐	NA	○	○	○	◐	○	○
	R16	Change intersection striping for SB Quebec to WB McArthur Ranch right turn movement or construct an exclusive right turn lane	◐	◐	○	○	○	◐	NA	○	○	○	◐	○	○
	R17	Construct an exclusive right turn lane for SB Wildcat to WB Grace	◐	◐	○	○	○	◐	NA	○	○	○	◐	○	○
	R18	Install a right turn lane at WB University to NB Cresthill	◐	◐	○	○	○	◐	NA	○	○	○	◐	○	○
	R19	Add tree lining to six-lane arterials	○	◐	○	○	○	○	NA	○	○	○	○	○	◐

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Transit	T1	Implement rideshare programs for HR residents	◐	●	●	◐	◐	◐	NA	○	○	◐	○	○	◐
	T2	Implement a circulator bus system to serve community, retail, and RTD facilities	◐	○	◐	◐	○	◐	NA	○	○	●	◐	○	◐
	T3	Implement a feeder bus system to/from/ between the southeast and southwest LRT corridors	◐	○	◐	◐	○	◐	NA	○	○	●	◐	○	◐
	T4	Increase bus frequency between Town Center and Mineral LRT station	◐	○	◐	◐	○	◐	NA	○	○	●	◐	○	◐
	T5	Provide real-time information signs at bus stops	◐	◐	◐	◐	◐	◐	NA	○	○	◐	○	○	◐
	T6	Provide Access-a-Ride – to LRT	◐	○	◐	◐	○	○	NA	○	○	◐	◐	○	◐
Bicycle / Pedestrian / Trail	B1	Construct trail access along US 85 between Highlands Ranch Parkway and C-470	●	◐	◐	◐	○	○	NA	●	●	◐	◐	○	◐
	B2	Designate bike lanes	◐	◐	◐	◐	○	○	NA	◐	◐	◐	◐	○	◐
	B3	Construct bike path grade separations	◐	○	◐	○	○	○	NA	◐	●	◐	◐	◐	◐
	B4	Grade separate Centennial Trail at major arterials	◐	○	◐	○	○	○	NA	◐	●	◐	◐	◐	◐
	B5	Provide for mid-block pedestrian/bicycle crossings	◐	◐	◐	◐	○	○	NA	◐	◐	◐	◐	○	◐
	B6	Provide signed/striped crosswalks at all trail crossing locations on local streets	◐	◐	◐	◐	○	○	NA	◐	◐	◐	◐	○	◐
	B7	Improve bike access to planned LRT stations	◐	◐	◐	◐	○	○	NA	◐	◐	◐	◐	○	◐
	B8	Install countdown pedestrian signals	◐	◐	◐	○	○	○	NA	○	○	◐	◐	○	◐
	B9	Install pedestrian refuge medians with pedestrian push buttons at major arterial intersections	◐	◐	◐	○	○	○	NA	○	○	◐	◐	○	◐
	B10	Consider a neck down or other traffic calming device for the crosswalk at Poston and Chadwick	◐	◐	◐	○	○	○	NA	○	○	◐	◐	○	◐
Education and Information	E1	Implement public education campaigns to reduce trips	◐	●	●	○	●	◐	NA	○	○	○	◐	○	◐
	E2	Develop public informational brochure to manage expectations and educate about level of congestion, available funding and sources, and limitations/challenges of traffic operations and maintenance	◐	●	●	○	●	○	NA	○	○	○	◐	○	◐
	E3	Disseminate public information on cable TV	◐	●	●	○	●	○	NA	○	○	○	◐	○	◐
	E4	Implement web-based public information	◐	●	●	○	●	○	NA	○	○	○	◐	○	◐
	E5	Implement a public education program on pedestrian signal operations	◐	●	●	○	◐	○	NA	○	○	○	◐	○	◐
	E6	Implement a public education campaign to reduce speeding	◐	●	●	○	◐	○	NA	○	○	○	◐	○	◐



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Policy	P1	Pursue a local tax initiative to support transportation improvement in the Ranch	◐	◐	●	○	○	NA	●	◐	◐	◐	◐	◐	
	P2	Pursue bicycle, pedestrian, and trail master plan	◐	◐	◐	◐	○	○	NA	●	◐	◐	◐	○	◐
	P3	After cooperative development of a best practices guideline for signal timing, coordination, and strategy; draft and implement an intergovernmental agreement with the State and neighboring agencies to manage traffic and implement timing strategies that are compatible with each other especially at municipal boundaries.	◐	◐	●	◐	○	◐	NA	○	○	◐	○	◐	◐
	P4	Remove unwarranted signals	◐	●	◐	◐	○	◐	NA	○	○	○	◐	○	◐
	P5	Enforce speed and red light violations <sup>1</sup>	◐	◐	◐	○	○	○	NA	○	○	○	◐	●	◐
	P6	Establish criteria for traffic signal installation that a study be conducted to ensure the new signal can effectively be coordinated with adjacent signals and not impact corridor progression, prior to approval <sup>1</sup>	◐	●	◐	○	○	◐	NA	○	○	○	◐	○	◐
	P7	Implement red light clearance time in conformance with national standards <sup>1</sup>	◐	●	◐	○	○	◐	NA	○	○	○	◐	○	◐
	P8	Test implementation of the flashing yellow arrow for permitted left turn movements, a good test location may be EB and WB lefts at Wildcat Reserve Parkway and Highlands Ranch Parkway	◐	●	○	○	○	◐	NA	○	○	○	◐	◐	◐
	P9	Implement consistent speed limits	◐	●	◐	○	○	○	NA	○	○	○	◐	○	◐
	P10	Designate University Boulevard at Cresthill as a school zone, install flashers, and reduce speed limit	◐	◐	○	○	○	○	NA	○	○	○	◐	◐	○
Major Capital Improvement	C1	Construct an interchange at Colorado and C-470	●	○	◐	●	○	NA	●	◐	◐	○	◐	○	◐
	C2	Consider additional connections across C-470 west of Holly	◐	○	◐	●	○	NA	◐	◐	◐	○	◐	○	◐
	C3	Construct a Holly connection across C-470	◐	○	◐	●	○	NA	◐	◐	◐	○	◐	○	◐
	C4	Widen Broadway between Dad Clark and County Line Road	◐	○	◐	●	○	NA	◐	◐	◐	○	◐	○	◐
	C5	Widen University between Dad Clark and County Line Road	◐	○	◐	●	○	NA	◐	◐	◐	○	◐	○	◐
	C6	Widen Quebec at C470	◐	○	◐	●	○	NA	◐	◐	◐	○	◐	○	◐
	C7	Construct four lanes on Monarch	●	○	●	◐	○	NA	◐	○	◐	○	○	○	◐
	C8	Construct a frontage road to extend Dad Clark between University and Colorado	○	○	◐	◐	○	NA	◐	○	○	○	○	○	◐
	C9	Provide paved connection between Griggs and Daniels Park	○	○	○	○	○	NA	◐	○	○	○	○	○	○

APPENDIX 3

# HRCA Opposition Letters

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# HRCA Opposition Letters

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9568 South University Boulevard  
Highlands Ranch, CO 80126

Administration Office  
(303) 791-8958  
FAX (303) 791-6705  
www.hrcaonline.org

July 21, 2006

Honorable Board of County Commissioners  
Douglas County Commissioners Office  
100 Third Street  
Castle Rock, CO 80104  
Douglas County, Colorado

RE: Highlands Ranch Transportation Improvement Program;  
Monarch Boulevard

Dear Commissioners:

Thank you and your staff for allowing the Highlands Ranch Community Association (HRCA) to participate in the Highlands Ranch Transportation Improvement Program (HRTIP). We believe that the end result will provide a great number of improvements to transportation systems in Highlands Ranch. We also want to congratulate the entire team of Douglas County staff and consultants from CH2MHill for taking the time to obtain and consider public comments relating to Highlands Ranch transportation.

Resolving transportation and traffic related issues are topics of utmost importance to Highlands Ranch residents. Our monthly Recreation Advisory Committee meetings with the 88 HRCA District Delegates (elected to represent defined neighborhoods) almost always include discussions about transportation and traffic concerns within our community.

The HRCA's Board of Directors thanks you for spearheading this project and we believe the final CH2MHill report identifies a number of transportation projects (improvements) that will benefit our residents.

However, we would like to go on record to voice the HRCA's objection with regard to the "construction of four lanes on Monarch" item listed under Capital Improvements. While we understand that this recommendation is categorized as "further analysis required for scheduling", the HRCA opposes the widening of Monarch Boulevard under any circumstances.

As you are aware, the HRCA now owns the property east of Monarch Boulevard as part of the Backcountry Wilderness Area (Backcountry) of Highlands Ranch (formerly known as OSCA). Within a few short years, the property west of Monarch Boulevard will be conveyed to the HRCA by Shea Homes as required by the 1988 Open Space Conservation Agreement (OSCA).

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Recreation Center at <i>Northridge</i> 8801 South Broadway (303) 791-2500 • FAX (303) 791-0657	Recreation Center at <i>Eastridge</i> 9568 South University Boulevard (303) 791-2500 • FAX (303) 471-8905	Recreation Center at <i>Westridge</i> 9650 South Foothills Canyon Boulevard (303) 791-2500 • Fax (720) 348-8222	Recreation Center at <i>Southridge</i> 4800 McArthur Ranch Road (303) 791-2500 • Fax (303) 346-0235
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The entire Backcountry, consisting of 8,200 acres of pristine wilderness land, was set aside in 1988 as open space as part of the Highlands Ranch Development Plan. We believe any expansion of Monarch Boulevard will create adverse wildlife issues in this critical ecosystem of Highlands Ranch. Additional traffic will unfairly burden the Highlands Ranch roadways that were paid for by the citizens of Highlands Ranch and further load Quebec, University, and Lincoln. We do not believe Monarch Boulevard was envisioned to be widened during the 11-year committee process to develop the OSCA Plan which was approved by the Board of County Commissioners in 2000.

The OSCA Agreement between Douglas County, Mission Viejo Company (now Shea Homes), and the HRCAs designated this land as open space and unnecessary road development (not originally planned to support this great community) that would fragment this area was certainly not anticipated. We strongly believe that the OSCA property is one of the greatest assets of Highlands Ranch as one of the largest contiguous protected lands in Douglas County. We believe that you, as our progressive local government, values and acts to protect large open space tracts of land. Any expansion of Monarch Boulevard does not reflect the value and character that you have already established.

When Monarch Boulevard's construction was being considered initially, the then seated Douglas County Commissioners met with the HRCAs Board of Directors to discuss Douglas County's desire to extend Quebec from McArthur Ranch Road to the south to allow another access to Castle Pines North. During those discussions, the Commissioners assured the HRCAs Board of Directors that Monarch Boulevard would never be widened and the 35 miles per hour speed limit would not be increased. Under the auspices of those assurances, the HRCAs Board agreed to not object to Douglas County's plans to construct Monarch Boulevard. In less than a year, the speed limit was increased to 45 miles per hour.

We ask the County Commissioners to recognize and record our objection to widening Monarch Boulevard and any further study associated with this issue. Thank you for your consideration.

Sincerely,



Nicholas J. Robinson  
President

cc: Board of Directors  
CH2MHill



9568 South University Boulevard  
Highlands Ranch, CO 80126

Administration Office  
(303) 791-8958  
FAX (303) 791-6705  
www.hrcaonline.org

July 26, 2006

Honorable Board of County Commissioners  
Douglas County Commissioners Office  
100 Third Street  
Castle Rock, CO 80104  
Douglas County, Colorado

RE: Highlands Ranch Transportation Improvement Program;  
Grigs Road

Dear Commissioners:

Thank you and your staff for allowing the Highlands Ranch Community Association (HRCA) to participate in the Highlands Ranch Transportation Improvement Program (HRTIP). Resolving transportation and traffic related issues are topics of utmost importance to Highlands Ranch residents. Our monthly Recreation Advisory Committee meetings with the 88 HRCA District Delegates (elected to represent defined neighborhoods) almost always include discussions about transportation and traffic concerns within our community. The HRCA's Board of Directors thanks you for spearheading this project and we believe the final CH2MHill report identifies a number of transportation projects (improvements) that will benefit our residents.

However, we would like to go on record to voice the HRCA's objection with regard to the "construction of a paved connection between Griggs [sic] Road and Daniels Park Road" item listed under Capital Improvements. While we understand that this recommendation is categorized as "further analysis required for scheduling", the HRCA opposes the construction of any paved connection between Grigs Road and Daniels Park Road.

As you are aware, the HRCA now owns 874 acres of the Backcountry Wilderness Area (Backcountry) of Highlands Ranch (formerly known as OSCA). Within a few short years, the entire Backcountry, consisting of 8,200 acres of pristine wilderness land set aside as open space in the 1988 OSCA Agreement and included in the Highlands Ranch Development Plan, will be conveyed to HRCA. As the future manager of this land asset, we strongly believe the construction of any paved connection between Grigs Road and Daniels Park Road will create adverse wildlife issues in this critical ecosystem of Highlands Ranch and will destroy the character of this valuable Douglas County and

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Recreation Center at <i>Northridge</i> 8801 South Broadway (303) 791-2500 • FAX (303) 791-0657	Recreation Center at <i>Eastridge</i> 9568 South University Boulevard (303) 791-2500 • FAX (303) 471-8905	Recreation Center at <i>Westridge</i> 9650 South Foothills Canyon Boulevard (303) 791-2500 • FAX (720) 348-8222	Recreation Center at <i>Southridge</i> 4800 McArthur Ranch Road (303) 791-2500 • FAX (303) 346-0235
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Highlands Ranch asset. Any realignment of the current roadway should also be set aside at this time and we believe that the construction of any paved connection between Grigs Road and Daniels Park Road is not in the Highlands Ranch Development Plan, and object to it being considered now or in the future. This potential project was not included in the OSCA Plan that was approved by the Douglas County Commissioners in 2000 after the HRCAs concluded an 11-year planning process with the citizens of Highlands Ranch and organizations like Douglas County Community Development (Planning Division) and the Colorado Division of Wildlife.

The OSCA Agreement between Douglas County, Mission Viejo Company (now Shea Homes), and the HRCAs designated this land as open space and unnecessary road development (not originally planned to support this great community) that would fragment this area was certainly not anticipated. We strongly believe that the OSCA property is one of the greatest assets of Highlands Ranch and one of the largest contiguous protected lands in Douglas County. We believe that you, as our progressive local government, value and act to protect large open space tracts of land. A paved connection between Grigs Road and Daniels Park Road does not reflect the value and character that we have jointly established.

We ask the County Commissioners to recognize and record our objection to any changes relative to Grigs Road and any further study associated with this issue. Thank you for your consideration.

Sincerely,



Nicholas J. Robinson  
President

cc: Board of Directors  
CH2MHill