

CENTRAL DENVER TRANSPORTATION STUDY



**City and County of Denver
Transportation Planning and Engineering
Planning and Community Development**

May 1998



Central Denver Transportation Study

I certify that this report was prepared under my supervision. The transportation planning and evaluation efforts followed commonly accepted professional practices for studies of this type. The recommendations contained herein are based upon standard traffic engineering and transportation principles, and are a reflection of the direction given by the community members that participated in this project. This is a planning level study and report. Thus, impacts and results of various recommendations have been identified to the level of certainty typically associated with the transportation planning process.

J. Todd Chavers, P.E.

Kimley-Horn and Associates, Inc.



CREDITS & LEADERSHIP

CITY AND COUNTY OF DENVER

Mayor Wellington Webb

CITY COUNCIL

(Districts within study area)

District 5: Councilmember Polly
Flobeck

District 6: Councilmember Susan
Casey

District 7: Councilmember Bill
Himmelmann

District 10: Councilmember Ed
Thomas

(Districts adjacent to study area)

District 8: Councilmember
Hiawatha Davis

District 9: Councilmember
Debbie Ortega

District 11: Councilmember
Happy Haynes

Department of Public Works
Bruce Baumgartner, Director
Alan Wheeler, Deputy Manager
for Transportation

CONSULTANT KIMLEY-HORN AND ASSOCIATES, INC.

Todd Chavers, Project Manager
Sara Jane MacLennan
James Cromar

(Additional Council Members)

At Large: Councilmember Cathy
Reynolds

Councilmember Susan Barnes-
Gelt

District 1: Councilmember
Dennis Gallagher

District 2 Councilmember Ted
Hackworth

District 3: Councilmember
Ramona Martinez

District 4: Councilmember Joyce
Foster

Department of Transportation
Engineering

Dennis Royer, Director
Robert F. Dorroh, III, Project
Manager

SUBCONSULTANTS
Balloffet & Associates, Inc.
Ray Moe, Traffic Modeling

City Visions
Katherine Woods, Community
Involvement

Counter Measures
Kit M. McCay, Data Collection

DENVER PLANNING BOARD

William ("Bill") H. Hornby,
Chairman

Jan Belle

Pat Cortez

James ("Jim") Daniels

Thomas H. Foster, Jr.

Dan Guimond

Cyrus ("Rus") Hackstaff III

Mark Johnson

Joyce Oberfeld

Mary Beth Susman

Stephen Velazquez

Department of Planning and
Community Development

Jennifer Moulton, Director
Dennis Swain, Deputy Project
Manager

Theresa Lucero, Neighborhood
Planner

Ken Brewer, Neighborhood Planner

Diane Short & Associates
Diane Short, Environmental Issues

Elaine Shiramizu Graphic Design
Elaine Shiramizu, Graphic
Presentations

Robert M. Burchfield, Traffic
Calming

**1996-1998
Central Denver
Transportation Study**



CITIZENS ADVISORY COMMITTEE

Area One: Jean Larson Abney Michael Henry Area Two: Debra Adams Rich Gonzales Area Three: Debbie James J.S. Fechisin Area Four: Peter Blair Gloria Le Free Area Five: Diane Barrett Roberta Simonton Area Six: Debbie Parsons Brian Wert At-Large: Cindy Christensen - Downtown Denver Partnership Judy Raizen	Alternates: William Brayshaw Susan Burgamy Alternates: Touhami Elfahdi Mary Kanan Walt Kembel Kenneth J. Mills Alternates: Libby Kirkpatrick Sandy Smith Alternates: KK Ciruli William Reid Good Alternate: John Sunderland Alternate: Anne W. Callison	City Council Representatives Judy Ann Kriss for District 5 Councilmember Polly Flobeck Phil Demosthenes for District 6 Councilmember Susan Casey Peggy Lehman, Administrative Aide for District 7 Councilmember Bill Himmelmann Bill James for District 10 Councilmember Ed Thomas
--	---	---

1996-1998
Central Denver
Transportation Study



LETTER FROM THE CAC

December 2, 1997

Ladies and Gentlemen,

Enclosed please find the final Report (the "Report") generated by the consulting firm of Kimley Horn & Associates from the work done for the Central Denver Transportation Study. A fifteen-member Citizens Advisory Committee (the "Committee"), elected from neighborhoods in the study area nearly two years ago, has worked closely with the consultants on this project. The Committee believes that the enclosed Report reflects accurately the conclusions the Committee has reached over that extended time period.

Originally the objectives of the Committee members were individual, diverse, and often quite specific. Some members were adamantly opposed to a bridge over Cherry Creek at Alameda; some were just as adamantly in favor of it. Some members wanted to eliminate certain one-way streets; some were in favor of adding more one-way streets. As the City convened the Committee it must have wondered if such fervor and diversity could ever produce anything but chaos and animosity.

As the Committee worked together over the months, and particularly after the consultants were brought in and began to provide instruction in transportation study theory and method as well as data to work with, the Committee underwent a change in thinking. Presented with the data generated by the consultants' computer models, individual committee members began to understand that simply pushing their own traffic problems onto another street would not achieve the underlying goal: preserving the quality of life in central Denver neighborhoods.

Compromise was clearly necessary. The individual mind-sets evolved into neighborhood ones, and neighborhood mindsets into citywide perspectives as the Committee members recognized the need for a balance between moving traffic and preserving neighborhoods. This report represents a continued effort in Denver to strike that balance.

The Committee determined that it would not accept solutions that would move traffic but erode neighborhoods. Good transportation is certainly necessary for Denver's economic health and the Committee recommendations are not meant to disregard business needs. But as traffic volumes have grown, the impacts on neighborhoods have become unacceptable. The Committee worked through traffic patterns and modeling, through engineering and urban planning techniques, through presentations from City staff, planning experts, the police, and the Regional Transportation District. The Committee held six public meetings and took public comment at Committee meetings. Individual neighborhood associations and boards met to discuss the work of the CAC. From those hours of study and discussion, from the public and professional comment and assistance, a matrix of solution sets was formulated. It is those solution sets that form the basis for the Report, which the Committee is submitting to the City with this letter.

The Committee recognizes that the solution sets it puts forward will have the primary impact of slowing traffic within neighborhoods; in some situations such slowing may be dramatic. The Committee believes that overall slowing of traffic in the central areas of Denver will result in increased safety for the residents of the neighborhoods and perhaps ultimately in less congested streets if motorists find other routes or modes of travel which get them to their destinations faster.

The Committee intends the Report to serve as a continuing framework for action. The committee looks forward to the City's initial implementation of some of the solution sets. The City has the opportunity to find out if what the Committee thought would happen actually will happen as the solution sets are implemented. As the City proceeds to implement certain of the solution sets, it is inevitable that some may be more successful than others. Future implementation will of course be based on actual experience; however, members of the Committee, as citizens of Denver, want to see continued public input during the implementation period and beyond.

The traffic problems in Denver are not problems with a single solution or set of solutions that will make them go away. Dealing with these problems will continue to require cooperation among the neighborhoods, the City, RTD and other service providers. The City and the citizens of Denver must continue to work together and must look at each other, not as enemies, but as partners in the continuing process of finding good solutions to Denver's transportation demands.

Respectfully submitted,

Citizens Advisory Committee

Central Denver Transportation Study



Transit has traditionally been part of Denver's transportation system.

Courtesy of Denver Public Library, Western History Department

Historic Background

Denver's grid street system is typical of many western cities. After the era of horse travel, trolley cars and inter-urban streetcars were the dominant form of transportation. Then came the automobile. By the 1950s, with Denver's population growth and increased wealth, the auto-oriented society had emerged. People wanted to get places quickly and were impatient with traffic delays.

At the same time, the federal government was just starting its national highway system. Until the highways could be built, something had to be done to respond to public demand for easy traffic flow: Denver's one-way street system was born.

In the 1950s, State and City officials planned freeways and parkways: the 6th Avenue Freeway to Aurora, Alameda Avenue through the City from east to west, and other projects designed to increase street capacity. Denver citizens were alarmed at the effect these projects would have on their neighborhoods. Opposition led to many projects being stopped. The basic network of major streets designed to move traffic to, through, and within the city was never completed.

The opening of I-25 and I-70 offered relief for regional traffic, but it did not help with local traffic demands. Increasing traffic, the incomplete network of freeways, and the public's demand for reducing traffic delays led to the decision to keep the one-way streets. Since the 1950s, Denver has continued its pattern of a "boom/bust" economy. Traffic has grown and sometimes shrunk along with the economy, but the overall trend has been ever-increasing traffic. To this day, Denver suffers from basic street infrastructure limitations. Many streets functioning as arterials were never intended for that use.

The Central Denver neighborhoods have advocated for mitigating the effects of this traffic for two decades and focused on the one-way streets as a major problem. The 1986 North/South One-Way Streets Study recommended a phased approach to changing traffic patterns including streets south of I-25 being converted to two-way operations. That study also endorsed completion of previously planned projects to improve traffic conditions including reconstruction of 6th/Lincoln/Speer, rebuilding the Colfax/I-25 and

Broadway/Lincoln/I-25 interchanges, and upgrading the traffic signal system. Completion of the 6th/Speer/Lincoln intersection was recommended to "trigger" Phase II of the 1986 study: to study the feasibility of continuing conversion of one-way streets north of I-25 to two-way operation.

At the same time, the Southeast Quadrant Transportation and Land Use Study was commissioned by the City. This study recommended expanded transit services, increased rideshare, and a list of roadway improvements. These improvements focused on widening, extending, and generally increasing the capacity of roads to keep the traffic outside of neighborhoods on edge streets.

Growing concerns voiced by neighborhoods in Central Denver, the possibilities for improvement outlined in the Southeast Quadrant Study, and the fact that "triggers" had been reached, formed the basis for the Central Denver Transportation Study. A Citizens Advisory Committee, a project consultant, and the City began working together in February of 1996. This document presents their findings and recommendations.

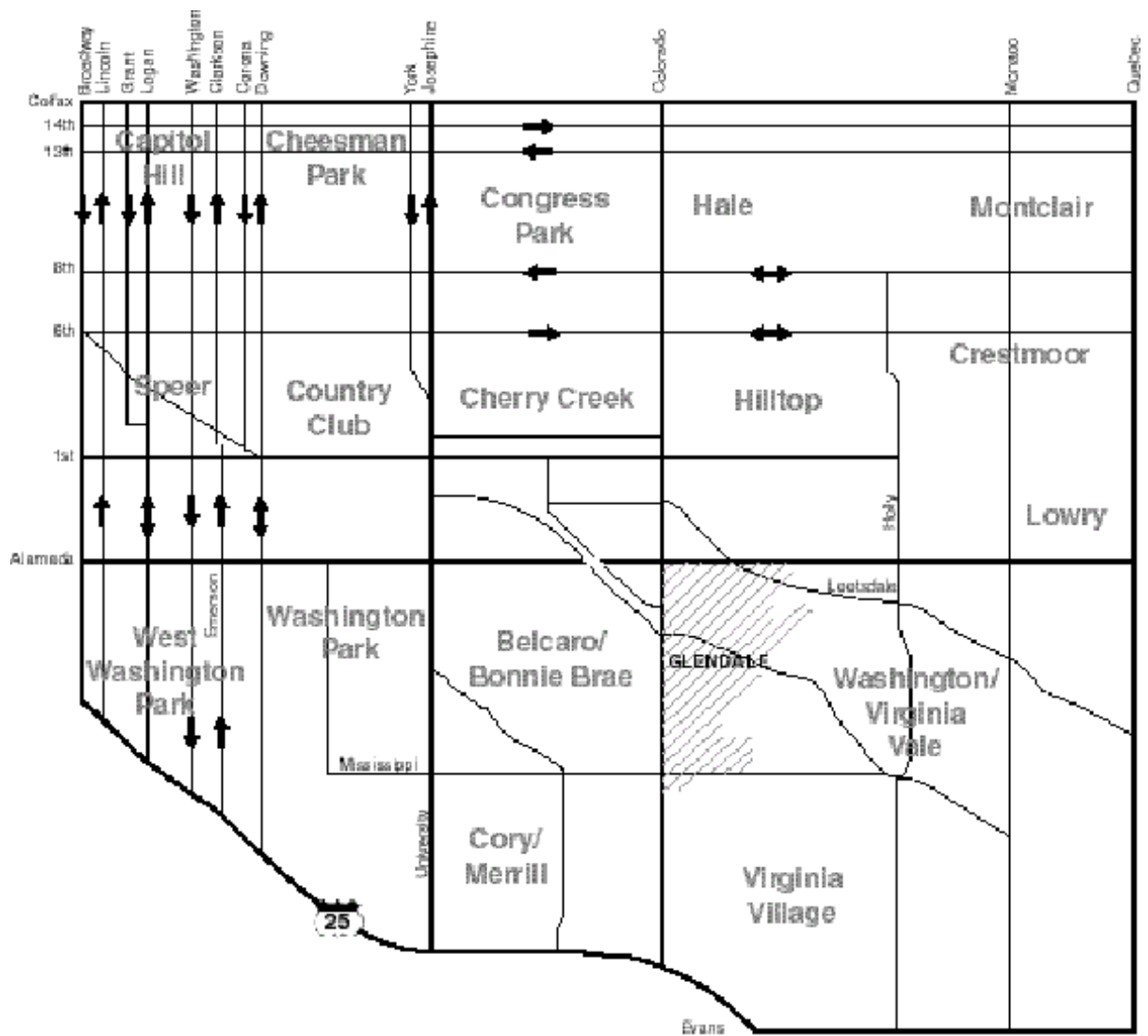


Transportation is a key element in Denver's growth as a regional business center

Table of Contents

	<u>PAGE</u>		<u>PAGE</u>
Credits & Leadership	3	Tools	41
Letter from the CAC	5	<i>Changes to Capacity</i>	42
Historic Background	7	<i>Traffic Calming/Management Tools</i>	44
Executive Summary	10	<i>Education</i>	47
		<i>Urban Design</i>	48
		<i>Traffic Enforcement Tools</i>	49
		<i>Conclusion</i>	51
Introduction	14		
<i>Citizens Advisory Committee</i>	16	Recommendations	53
<i>The Process</i>	17	<i>Overall Recommendations</i>	55
<i>Why Plan</i>	18	<i>North/South Streets</i>	59
		<i>East/West Streets</i>	61
CAC Philosophy	20	<i>Other Key Streets</i>	67
<i>Public Involvement</i>	22	<i>Implementation Plan</i>	68
Technical Data	24	Trade-Offs	72
<i>Accidents</i>	25	<i>Air Quality Evaluation</i>	74
<i>Volumes and Traffic Counts</i>	26		
<i>Developing the Modeling</i>	28	The Solution Set Matrix	78
<i>Modeling Results</i>	30		
<i>Other Techniques</i>	31		
<i>Driver Behavior</i>	33		
<i>Land Use</i>	34		
<i>Signalization</i>	36		
<i>Technical Information Summary</i>	37		

Central Denver Transportation Study Area





Executive Summary

The Central Denver Transportation Study (CDTS) is both a success story and watershed in how the City of Denver is addressing traffic issues in its neighborhoods. Denver has long faced traffic problems associated with the lack of a complete street network in the Central Denver neighborhoods. Namely, at the turn of the century when the land was originally platted and streets were laid out, there was no understanding of the need for arterial streets. As a consequence, many of the streets in the Central Denver neighborhoods serve arterial functions even though they were never really designed for that function. In the 1980s, the City responded to growing traffic concerns with several in-depth studies and numerous street construction projects aimed at improving arterial street conditions as well as at mitigating traffic impacts on neighborhoods. The CDTS was initiated by the City in early 1995 as a continuation, and desired culmination, of that process.

The City began this Study by meeting with neighborhoods several times and organizing a Citizens Advisory Committee (CAC) to act as a representative of the neighborhoods. The CAC was involved in helping the City determine the scope for this Study and in selecting a technical consultant. In February 1996, the CAC began a series of meetings with the consultant and members of City staff as the backbone for conducting this very important project. The process of the CDTS was designed to be sure that ensuing recommendations would be technically sound and would respond to neighborhood concerns. Neighborhood and area-wide meetings were held to develop and refine the issues, and brainstorm potential solutions to problems.

In concert with the technical evaluation conducted by the project consultant, the CAC assessed the range of tools which could be applied to resolving traffic issues. Traffic calming, traffic management, traffic enforcement, urban design, and education/awareness techniques were all explored to better understand how various tools work individually as well as in a solution set.

Findings reached by the CAC in reviewing the technical data illuminated several fundamental choices. Making decisions among these choices was critical to moving forward with the application of tools and development of solutions. A project goal was defined to guide the thinking:

To minimize the effect of traffic and growth in order to maintain and improve the quality of life, environmental conditions, and economic viability of the Central Denver neighborhoods.

The CAC carefully considered several approaches to the general traffic problem in Central Denver:

- ◆ Increase the capacity of the street system: add lanes for moving more traffic
- ◆ Decrease the capacity of the street system: remove lanes that move traffic
- ◆ Leave the system as it is today: allow the increasing demand for mobility to find other ways to travel than the "one person, one car" common today

The CAC concluded that automatic, continuous upgrade and expansion of the roadway system has too dear a price: further erosion of the quality of life in the neighborhoods. Environmentally and economically, it was also clear that reducing the capacity of the street system could be harmful. The CAC arrived at the decision that there is no choice but to move more people, not more cars. On behalf of the neighborhoods, the CAC chose to recommend solutions which strike a balance between traffic movement, mobility, and neighborhood and business concerns. With this approach, the CAC recognized that at least initially, some streets may seem more congested,

traffic will move slower, and enforcement will be more strict. For this trade-off, it is also expected that a safer street system will emerge with less traffic intrusion in the neighborhoods, a slower more comfortable pace throughout the study area, and a generally higher quality of life for the Central Denver neighborhoods.

The recommendations which emerged from this decision-making process were guided in principle by two thoughts:

- ◆ don't solve one neighborhood's problem at the expense of another
- ◆ distribute benefits and treat issues evenly

Recommendations address a number of streets over virtually the entire Study area. In addition, there are overall recommendations which target changes to current City-wide policies and practices for addressing transportation issues.

The two sets of recommendations are interdependent because many of the recommended changes to specific streets cannot be realized without fundamental shifts in City actions. Likewise, changes in the way the City addresses transportation problems become empty policies if there are no corresponding revisions to the streets.

Overall recommendations include the following:

- ◆ enhance and expand the transportation resources devoted by the City to this important element of City operations
- ◆ hire staff positions focused on traffic management and calming
- ◆ create a citizen-based Transportation Advisory Committee as a forum for resolving transportation issues and monitoring on-going transportation programs
- ◆ formulate a City-wide Major Thoroughfare Master Plan"

The purpose of this document is to provide guidance to those people responsible for addressing traffic concerns in the Central Denver neighborhoods. This document presents many general and specific recommendations for measures that are intended to manage traffic such that neighborhoods become less affected by the real and perceived impacts of traffic. While there is emphasis on maintaining access to protect the economic vitality of the Central Denver area, there are no recommendations which focus on increasing the mobility of vehicles with one occupant.

This document is intended to be an amendment to the existing Comprehensive Plan, and integrated into an updated Comprehensive Plan when one is completed. Recommendations regarding the general relationship of land use and transportation are made with the intention that they be used to guide changes to the Comprehensive Plan. However, adoption of this document does not imply that the Comprehensive Plan has been modified.

which can be an integrated component of an updated Comprehensive Plan

Improve land use planning activities by the City with respect to transportation needs

- ◆ establish stronger ties between project review and traffic impact assessment
- ◆ update neighborhood plans and other plans, to achieve overall consistency regarding transportation issues and infrastructure

Increase enforcement to improve traffic "behavior"

- ◆ increase police presence - utilize high-technology for greater enforcement effort
- ◆ increase penalties for speeding and driver misbehavior

Provide greater emphasis on transit and alternative modes of transportation

- ◆ support RTD efforts for enhanced service, including improved bus service
- ◆ seek ways to provide local circulators, jitneys, and other small-scale transit
- ◆ support long-term transit infrastructure improvements such as light rail

Pursue an education campaign

- ◆ increase awareness of traffic impacts on neighborhoods
- ◆ raise standard for acceptable driving behavior
- ◆ alert motorists of increased emphasis on enforcement

Specific street recommendations are too numerous to describe in detail within this Executive Summary. However, they are a tailored set of solutions that work in unison, and include changes to street capacity, increased on-street parking, and traffic calming measures. In a sense, they are a "package deal" which should be treated as a whole and not as a series of individual improvements. (Please refer to the Solution Set Matrix for details.)

To the extent that it is fiscally possible, and as the need for further traffic mitigation is required, the Implementation Plan should be closely adhered to because the grouping and precedence of various improvements was carefully constructed to achieve balance among many, sometimes competing, interests. Also, to preserve the fairness policy, certain recommendations must be implemented together to avoid simply shifting traffic from one street to another.

The procedures used by the City in conducting the CDTs, the positions adopted by the CAC, and the resulting recommendations presented in this document represent a substantial change in the way the community thinks about and deals with traffic issues. It sounds easy to say that bigger isn't always better and more isn't always the answer, but the CAC understands that achieving the goals articulated by the community in this Study will take determination and perseverance. In creating these recommendations, the CAC and the community have overwhelmingly stated that the

value received for improving the quality of life in Central Denver is worth the trade-off of longer travel times, less freedom to drive alone, and increased costs to provide the transit services that will meet the regional mobility needs of a vibrant, growing metropolitan area

The Central Denver Transportation Study (CDTS) began as an effort to modify a few streets, manage resulting impacts, and close a chapter in the long-running process. Instead, the CDTS evolved into an effort to define a process by which Denver could deal with transportation issues in an on-going fashion and make consensus changes desired by the community.





INTRODUCTION

The Central Denver Transportation Study (CDTS) was initiated by the City in early 1995. The Central Denver neighborhoods lobbied the City to ensure that they were a significant partner in the project. At the urging of neighborhood groups, the City began by building the foundation for a Citizens Advisory Committee (CAC). The City held meetings with the neighborhoods to discuss issues and avoid the deep-seated mistrust which had plagued previous studies.

The CAC was involved in helping the City write an outline of work required and hire the consultant. The goal of the study was broad: to balance neighborhood quality of life with transportation needs. One-way streets, east-west access and the possibility of an Alameda bridge over Cherry Creek were identified as the primary focus for the CDTS. Additionally, 1st Avenue and Speer, and 6th, 8th, 13th, and 14th Avenues were noted as significant topics for discussion.

Historical photograph of Sherman Street, looking south to the study area as it looked nearly 100 years ago

Courtesy of Denver Public Library, Western History Department



The neighborhoods in Central Denver wanted to have a significant role in determining changes to the streets and the transportation system in their area. The quality of their neighborhoods was at stake.

The CDTS was sought by citizens and City alike as a follow-up effort and conclusion to two previous studies completed in 1986 and 1988: the North/South One-Way Streets Study and the Southeast Quadrant Transportation and Land Use Study. The primary area of focus was between Colfax, Broadway, I-25 and Colorado Boulevard. Neighborhoods wanted relief from existing traffic problems, and they wanted to play an integral part in determining the solutions.

ISSUES

The City asked for a list of issues to examine in the CDTS, and the neighbors identified their concerns including:

- ◆ increasing traffic volumes;
- ◆ speed, safety, and motorist behavior;
- ◆ lack of a police presence resulting in continuous, flagrant violations of traffic rules;
- ◆ commuters, especially from suburban areas, accessing Downtown and avoiding I-25 congestion by cutting through the neighborhoods on the one-way streets, 1st Avenue, and Speer;
- ◆ overall growth patterns including planned expansion of the Cherry Creek Shopping Center, the Sears site, increased density in Cherry Creek East and Cherry Creek North, redevelopment of Lowry, and expansion of the Botanic Gardens;
- ◆ lack of adequate public transit;
- ◆ noise, airborne particulates and pollution; and
- ◆ traffic misbehavior on one-way streets in the residential neighborhoods.

Citizens Advisory Committee Project Goal:

To minimize the effect of traffic and growth in order to maintain and improve the quality of life, environmental conditions, and economic viability of the Central Denver neighborhoods.

Growth along the Southeast Corridor has made I-25 and Colorado Blvd. increasingly congested



The CAC understood that if there was not strong support for their recommendations both within the Committee and their represented neighborhoods, the City would not make changes to the streets



Citizens Advisory Committee members discussing ideas at a public meeting

CITIZENS ADVISORY COMMITTEE

Neighborhood organizations and citizens wanted to be an integral part of the Central Denver Transportation Study. They met with the City to establish a committee that would work with the City and a consultant throughout the process. At a public meeting in May 1995, meeting attendees selected a Citizens Advisory Committee (CAC) with two representatives from six sub-areas within the study area, two at-large members, representatives of the City Council members, and alternates. The CAC agreed to a consensus-based approach and to be the City's principal contact with the neighborhoods.

The CAC established ground rules at the first meeting held in July of 1995. These rules confirmed their agreement to work toward a consensus, conduct CAC meetings in a participatory fashion, and recognize that the recommendations of the CDTs would be forwarded to the Planning Board and City Council before they could be included in the Comprehensive Plan.

The City and members of the CAC selected a transportation consultant (Kimley-Horn and Associates) to conduct the technical work and coordinate the study process. The City and Kimley-Horn formed a project team to achieve those purposes.

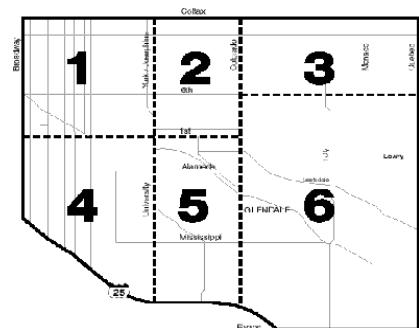
With that groundwork laid, in February of 1996 the CAC began regular meetings with the project team. These meetings were aimed at overcoming serious issues of mistrust with the City, addressing inter-neighborhood issues, and establishing a fair and reasonable philosophy for decision making. These factors were known to be critical to the project's success.

As agreed to earlier, these were working meetings for the CAC and the project team. These meetings were often attended by as many as sixty other individuals who observed and were given an opportunity to comment at specified points. The CAC members were in regular contact with citizens and neighborhood associations in their

area. Additionally, a large general public meeting was held in April 1996, area meetings to review alternative recommendations were held in the early fall, and a final general public meeting convened in December 1996 to review progress and recommendations. The CAC members were diligent in their work. They learned to understand traffic data, which included computer traffic models that could help identify the effects of various options such as reverting one-way streets to two-way operation, a bridge on Alameda Avenue over Cherry Creek, and innovative ideas such as reversible lanes on Broadway. They examined traffic calming measures with a national expert, and discussed potential effects of speed reduction on travel time, police enforcement measures, the relationship of traffic and land use, and urban design changes.

Working through many difficult issues, the CAC reached full consensus on a set of recommendations to balance neighborhood and transportation goals.

There are six sub-areas within the study area



The consultant contacted the area's fifty-three neighborhood organizations and sent them mailings regularly. A project hotline, a newsletter with a mailing list of over 400, a project brochure, an e-mail address, and newspaper reports contributed to the public contact efforts.

The Process

To ensure that the CDTS' final recommendations would be technically sound and respond to neighborhood concerns, the study process was designed with two tracks going forward at the same time. One track centered on technical tasks and the other on working with the Citizens Advisory Committee (CAC). While the project team gathered and analyzed traffic data, the CAC identified its list of issues. In April 1996, a general public meeting attended by more than 150 citizens was held to review that list and give everyone a chance to disagree, agree, or augment it. The project team and the CAC met regularly to discuss each finding and begin a list of improvement ideas. The project team used computer traffic modeling and analysis to test some of the ideas.

The CAC also heard from a national expert on traffic calming and discussed traditional methods of addressing the problems they had identified. With this background, the CAC then discussed which alternatives seemed the most reasonable. As a result of testing alternatives and discussing technical findings, many of the ideas initially thought to be sound did not prove to be so.

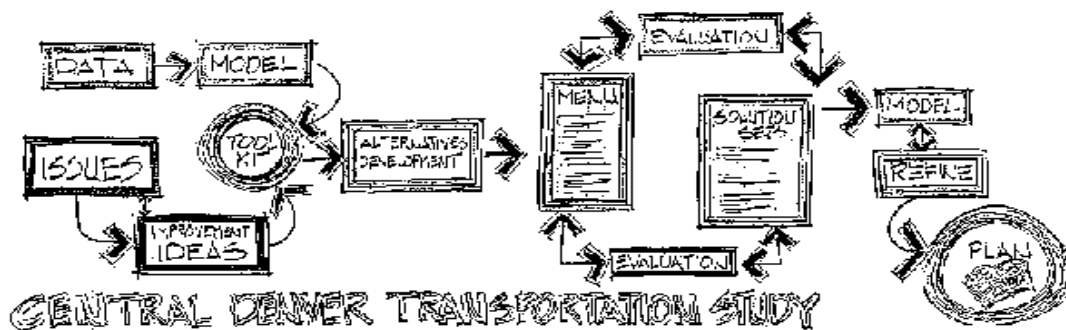
Keeping in contact with the public was a prime objective of the CAC and the project team. To supplement CAC meetings, brown bag lunch discussion groups, meetings with small groups, individual meetings, innumerable phone conversations, and discussions at neighborhood meetings were on-going throughout the project. The CAC and the project team jointly hosted individual meetings with the six sub-areas (see page 7) in September 1996. A final public meeting to review the recommendations was held in December 1996. Business community involvement was sought in the process.

Although the make-up of the CAC (largely consisting of residents) was established prior to the start of the formal study process, the business community did have membership, and its input was considered at every step. The Downtown Denver Partnership and the Cherry Creek Chamber of Commerce provided significant direction and valuable insight to the CAC.

A set of solutions laid out in a matrix that stretched over sixteen feet long served as a useful tool to craft the final recommendations. Each idea was viewed in its relationship to the entire system. The CAC worked with the City and the project team for several months to resolve difficult issues and fine-tune this solution set. Additional technical analysis, including an example of urban design improvements applied to two specific streets, helped in this refinement.

A logical system of comparing alternative ideas allowed the Citizens Advisory Committee to create a solution set that did not cure the problems of one street at the expense of another

The study process followed two tracks: technical and public input





Traffic has increased steadily due to economic and population growth, and changes in driving habits

PLAN ORGANIZATION

The document is organized according to:

- ◆ **Citizens' Advisory Committee Philosophy and Issues**
- ◆ **Types of technical data collected**
- ◆ **Tools available for addressing traffic and transportation concerns**
- ◆ **Recommendations**
- ◆ **Background information**

Back-up data is available in the Plan's appendix

By creating a plan and fostering discussions, we can make the difficult decisions necessary to guide our City toward a future of our own determination.

Why Plan

Across the country and around the world, cities are struggling with the question of how to deal with traffic and transportation needs. As more demands are put on its urban roadways, Denver is changing. Transportation pressures are compounded by population growth in the metropolitan area, greater density development in Denver, and changing driving habits.

The number of miles people drive is calculated as Vehicle Miles Traveled (VMT). Between 1987 and 1995, annual VMT on metropolitan roads doubled while population increased by 36 percent. Denver's growth was not as dramatic as the population increased by about 7% in that same period. This increase in VMT can be attributed to a number of factors:

- ◆ people drive more as destinations spread out;
- ◆ more two-income homes, with both individuals commuting to work;

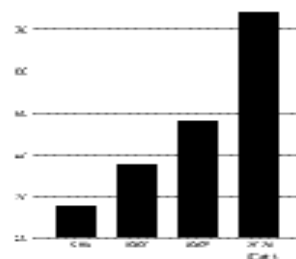
- ◆ a higher percentage of the population owns cars; and
- ◆ work trips are not simply between work and home, but often include stops at the grocery store, day-care center, or other destinations.

The citizens of Denver are often of two minds: one that objects to the speed of traffic and its related noise in the neighborhoods, and one that objects to slow-moving, congested streets. As a community, Denver faces three options:

- ◆ take no action,
- ◆ adjust the streets to accommodate this increase in traffic, or
- ◆ strike a new balance between transportation and neighborhood needs.

The advantage of a logical planning process is that the choices and their associated trade-offs can be examined, compared, and debated by citizens and elected policy-makers. Often, what appear to be ideal solutions do not really get the desired result. Compromise becomes necessary to truly gain significant public support for effecting change.

Vehicle Miles Traveled in the Denver Region (millions of miles)







CITIZENS ADVISORY COMMITTEE PHILOSOPHY

The Central Denver Transportation Study (CDTS) was a broadly focused effort dealing with major north/south and east/west travel corridors. It was never intended to address detailed, site-specific issues such as alley closures and crosswalks throughout the neighborhoods. Detailed issues could easily have taken up all of the time and budget allotted the Study and more. Rather, the Citizens Advisory Committee (CAC) worked to create a framework for transportation in the Central Denver area, including not only vehicular traffic, but also public transit, bicycle, and pedestrian needs.

This broad focus of the CDTS was concentrated on:

- Quality of life
- Neighborhood values
- Safety
- Air quality
- Economic vitality

Treating neighborhoods and streets equally and fairly quickly became the CAC's theme. In an effort to strike the right balance, the CAC's discussions often centered on two philosophies:

- don't solve one neighborhood's problem at the expense of another; and
- distribute benefits and treat issues evenly.

The CAC fully understood that, as it crafted recommendations that would make travel more difficult for commuter traffic, travel will also become somewhat more difficult for local traffic. Local traffic is part of the problem and part of the solution.

PROJECT GOAL:

To minimize the effect of traffic and growth in order to maintain and improve the quality of life, environmental conditions, and economic viability in Central Denver neighborhoods.

"It is my hope that the residents of Central Denver will find less aggressive traffic and safer and quieter streets which provide an improved quality of life as a result of the CAC recommendations."

—Debbie Parsons



Many of Denver's streets provide an inviting atmosphere for driving, bicycling and walking

The following supporting goals were established shortly after the first public meeting in April 1996:

1. To manage traffic in the Central Denver area so that —

- ◆ the quality of life in the neighborhoods is improved or maintained;
- ◆ traffic flow is maintained or improved;
- ◆ traffic speed is controlled or reduced;
- ◆ regional cut-through traffic is diminished or re-directed to specific routes; and
- ◆ air quality is improved or not worsened.

2. To explore public transit, bicycle/pedestrian and other mode alternatives as a means of providing transportation for the

neighborhoods and those who travel through them.

3. To work with the City's Public Works and Police Departments on enforcement of speed limits and other measures to modify traffic behavior.

4. To harmoniously balance the access needs of the neighborhoods, local businesses, and downtown businesses.

5. To work through the Citizens Advisory Committee and craft a set of recommendations that has strong public support for inclusion in the City's Comprehensive Plan.

The project goal, supporting goals, and philosophy were the underlying theme of all CAC discussions and critical to adjusting the

final recommendations. To achieve these goals, CAC members had to adjust some of their original positions and think far more broadly than just about their street or neighborhood. Only then were they able to come to a full consensus on their recommendations.

The effort to reach consensus should not be taken lightly. The issues addressed in this Study were complex and in many cases quite personal. The realization that in order to move forward it was necessary to back off strongly held positions, was difficult for many CAC members. The recommendations made by the CAC, and that follow in subsequent sections of this document, are well considered not only individually, but also collectively.

Central Denver Transportation Study 21

PUBLIC INVOLVEMENT

The Central Denver Transportation Study was set up by the City and the neighborhoods to work with a Citizens Advisory Committee (CAC) format. (For more information on the CAC, please refer to page 7.) The CAC, the City, and the project consultants held six general public meetings throughout the project. The project team members contacted 53 neighborhood organizations in the study area and regularly sent them project newsletters and updates.

In any project of this size and complexity, the effort to create opportunities for public contact is a significant part of the work program. The CAC met with neighborhood groups as did the project team who also responded to an average of 10 to 15 calls a week from concerned citizens. A project brochure included an invitation to be on the mailing list and gave project phone numbers and an e-mail address. The Study's progress was reported in local and neighborhood newsletters, meetings were announced on public radio, and every reasonable effort was made to garner public interest and gather public comment. Many neighborhood associations assisted with outreach and fostered discussion among their members.

Attendance at the first public meeting held in April 1996 was approximately 150 people. Approximately 300 people attended the four neighborhood meetings held in early fall 1996. The December 1996 meeting to review the recommendations of the CAC drew approximately 200 citizens. Additionally, members of the public regularly attended CAC meetings to watch the proceedings and were given an opportunity to comment.

The CAC, the City, RTD, the Downtown Denver Partnership, and the project consultants were all part of the public involvement process. Despite these efforts, people would occasionally state that they were unaware of this Study. When asked what other methods could be used to inform the public, they generally did not offer workable ideas. This dilemma is not untypical of public processes.

In conclusion, the participants in this Study felt that public involvement was helpful to giving direction to the effort and in forming the recommendations. They are grateful for the commitment of the public to this process and for their many insightful suggestions and comments





TECHNICAL DATA

The project team gathered and analyzed technical data within the study area to get an overall picture of local transportation problems, specifically as they related to vehicular traffic. While some technical data had been previously available, the CAC had mostly anecdotal information which is not measurable. In order to be able to correct problems and understand the effects of making changes to the transportation system, a baseline of current traffic conditions was necessary.

The project team analyzed the technical data. In some cases conditions were compared to similar situations in other parts of the City to determine the comparative severity of the problem. As the CAC discussed the data analysis with the project team, potential recommendations emerged. The CAC clearly stated that it wanted to know what would happen if their ideas were implemented, rather than simply be told, "you can't do that."

These discussions illuminated three points:

- ◆ changing conditions on one street could have detrimental effects on surrounding streets;
- ◆ it would not be possible to make all the changes the neighborhoods wanted and still have reasonable traffic flow; and
- ◆ there is no obvious extra capacity within the street system that could be used to direct traffic to major streets. (It should be noted that parking lanes could be converted to travel lanes, but such choices were deemed unacceptable in neighborhood plans and by the CAC in general.)

In view of the project goal created by the CAC, there were discussions of issues associated with "quality of life, environmental conditions, and economic vitality." Each of these general criteria was discussed as a measure of traffic conditions. For example:

Quality of life is a perception of how safe a person feels walking down the sidewalk or crossing the street near their house. Is traffic speeding? Are there no gaps in the vehicle stream to permit safe crossings? Can people allow their children to ride a bike on the street in front of their house?

The CAC worked with technical data to clearly understand the issues to be resolved.

- ◆ Environmental issues were distilled to two aspects. Is air quality getting better or worse; and are the noise levels from traffic too high?
- ◆ Economic vitality is best understood by one's ability to get to a place of business or employment. Is it getting harder or easier to access shops, businesses, and workplaces? If it is getting harder, is there a negative impact on the local economy?

The CAC and the project team jointly determined to use limited project resources to focus on specific traffic data. These data were then assessed to determine qualitative responses to the above three criteria. Detailed data on quality of life, the environment, and the economy were not assembled.



Wherever there are cars, there will be accidents. However, where there are many accidents, city engineers seek to determine corrective measures.

ACCIDENTS

The CAC and members of the public stated that safety on the streets for cars, bicycles and pedestrians was a very important issue in the CDTS study area. Many people reported that accidents were increasing and that this was a major problem. The most commonly expressed opinion was that traffic volumes were increasing, driver behavior was worsening, and that it was more dangerous on the streets of the study area than at any time before. The project team and the CAC discussed the fact that accidents are an inevitable fact given the traffic volumes common to Denver and the metropolitan region. Mechanical failure, poor judgment, weather, excessive speed, inexperience, alcohol or substance use, and a myriad of unpredictable events cause accidents. The question posed by the CAC was: "Are there accident patterns that point to a problem and if so, can this be fixed?"

High accident rates in the same location can also be an indication that motorists don't interact well with the street design, intersection, signage, signalization or some other aspect of the street system. The City continuously monitors accident records and investigates potential causes. For the CDTS, the project team analyzed Denver's traffic accident data collected from 1993 through 1995.

When compared to the City as a whole, the percentage of traffic accidents in the CDTS study area was less than otherwise might be expected. This conclusion was drawn from the following:

- ◆ Forty percent of the City's signalized intersections are located in the study area. But, of the highest twenty accident locations, only five (25%) were in the CDTS study area in 1995.
- ◆ The number of accidents at the top five intersections in the study area has, in fact, decreased since 1993, not increased.
- ◆ The accident ratio per 1000 cars at the top five intersections is neither increasing nor decreasing when compared with similar intersections elsewhere in the City.

The number of injury accidents is also decreasing; this could be due in large part to new car designs which have air bags and other safety features. This could also be due to vehicles traveling at slower speeds because of increased congestion.



Maintaining the quality of Denver's neighborhoods requires a balance between access and livability

The project team studied records of fatal accidents (1990-1995) for the CDTs area. Since the CDTs study area has about 40% of Denver's traffic signals, and since signalized intersections are the places with the greatest potential for vehicle conflict, it could be assumed that the study area would also have 40% of the City's fatal accidents. In fact, the CDTs study area has fewer than 20% of the City's fatal accidents. Overall, fatal accidents in the CDTs area were not related to one particular location, but rather were isolated incidents stemming from factors generally not related to the streets or the volume of traffic.

Based on the traffic accident analysis, the conclusion of the project team was that the streets in the CDTs study area are, in fact, as safe if not safer than other areas of the City.

VOLUMES AND TRAFFIC COUNTS

Traffic volumes within the study area are affected by conditions far beyond its boundaries. Because Central Denver is a densely urbanized area, there are few options to build extra street capacity without displacing existing development, housing, or on-street parking. In the first general public meeting held in April 1996 at the Botanic Gardens, participants were very clear that they did not want to lose housing or trees along streets to expand existing or build new roadways. Their overwhelming preference for transportation expansion was to increase transit services.

The project team collected traffic counts for the CDTs area to understand volume levels and historical growth patterns, and to assist in traffic modeling. Two types of counts were conducted:

average daily traffic counts (ADT) and peak hour turning movements. ADT counts are taken over a 24-hour period by placing a tube across the roadway. These counts were used to approximate the number of vehicles traveling a corridor on a typical weekday. Peak hour turning movement counts were collected at a limited number of intersections between 7 and 9 AM and again between 4 and 6 PM. These counts were used to determine how efficiently a given intersection is working and how many vehicles are turning left or right or proceeding through the intersection.

The Denver Regional Council of Governments (DRCOG) estimates that vehicle miles traveled (VMT) is increasing at the rate of 5% per year over the entire metropolitan area.

After reviewing the historical traffic count data, the project team concluded that within the CDTs study area, traffic volumes have been growing at approximately 3% per year over the past five years. The project team also looked for patterns of traffic movement that would indicate where traffic is coming from and going to, and how the corridors in the CDTs area are being used.

The following examples illustrate current traffic patterns in the CDTs study area:

- ◆ • Traffic levels steadily increase on University northbound from I-25 to 1st Avenue. Once past 1st Avenue, northbound traffic volumes on Josephine decrease at each cross street. This suggests that while a large portion of traffic on University is going to the Cherry Creek retail area as a destination, a sizable amount also turns off University onto east-west streets between 1st and Colfax.
- ◆ 13th Avenue traffic steadily increases in volume as it approaches Downtown, and 14th Avenue traffic steadily drops in volume from Downtown as it heads east.

This illustrates that vehicles are using these streets to enter the adjacent neighborhoods or access north-south corridors such as York and Josephine.

- ◆ Traveling southbound, traffic on north-south corridors (Broadway, Grant, Logan, Washington, York & Colorado Blvd.), build in volume south from Colfax until 6th and 8th Avenues where a noticeable drop-off occurs. However, the majority of the traffic continues south toward I-25 where a significant portion enters the freeway.
- ◆ • Broadway and Lincoln have minimal excess capacity at peak hours, even with the existence of parking lanes. Colorado Boulevard traffic volumes are literally at or over street capacity from mid-morning until mid-evening. These major north/south corridors cannot readily absorb all of the traffic currently traveling the one-way streets in residential areas, unless peak hour travel conditions spread to other times of the day.

The CAC and the project team (consultant and City staff) used the information on traffic volumes and patterns, distribution patterns and employment centers, along with other technical information, to realistically assess potential solutions for dealing with traffic in the study area.

Traffic volumes increase as the streets get closer to downtown



Alameda Avenue traffic waiting to turn left onto northbound University Blvd. back up into the residential neighborhood.

Traffic modeling information and the analysis of it was at the center of CAC discussions. One of the CAC's guiding principles was to avoid making changes to one area at the expense of another. The traffic model was useful for focusing these discussions.

DEVELOPING THE MODELING

The project team used a computer-driven traffic model as a tool to measure proposed changes to the street system. Current traffic volumes, as described earlier, were used along with information provided by the Denver Regional Council of Governments (DRCOG) to create a base case model. A base case model is a tool that simulates existing traffic patterns and volumes on the street network as it exists today. The base case model was provided by DRCOG and includes the entire metropolitan area. It was refined for this study so that it could be more easily used for the CDTs study area.

The model is one of the best tools available for predicting changes in traffic patterns over large areas. It projects daily traffic volumes on major streets, but does not include every street, driveway, and intersection. DRCOG incorporates

present conditions and future growth plans when creating the model. Considerations include:

- ◆ employment statistics;
- ◆ travel by truck, bicycle, and transit as well as pedestrian travel;
- ◆ population changes;
- ◆ socio-economic data; and
- ◆ land use patterns and development trends.

Starting from the base model, the computer uses this information to predict travel patterns in the future up to Year 2015.

The traffic modeling system is not a "crystal ball" for the future. The project team interpreted model results, adjusted the model as necessary, and discussed their analysis with the CAC. The level of confidence in model results was discussed at length. For major streets like University, Speer, and Colorado Boulevards, the confidence level is high because the model is better suited to addressing major streets. The CAC was told that the project team felt that a 90% to 95% level of confidence was reasonable to assume. For streets like York Street, 14th Avenue, and Washington Street, the project team stated that the results of the model were likely accurate within a ten to fifteen percent range of projected volumes. Minor street volumes predicted by the model are less accurate (fifteen to twenty percent range) and many local streets are not included in the model at all.

Lower levels of confidence are simply due to the fact that streets with lower traffic volumes are more susceptible to minor, but normal, variations in how the model assigns traffic.

The model works well for the major street system, but is not the right tool to use to measure the effects of minor elements such as alleys, driveways, or stop signs.

Based on goals and objectives stated by the CAC and by individuals at public meetings, possible changes to the streets were coded into the 1995 model individually to evaluate the "cause and effects" of each change. The CAC discussed the engineering analysis and assessed the logic of the model output. The CAC narrowed options so that groupings of possible changes to the streets could be modeled. Several selected solution sets were also run on the 2015 model to allow the CAC to review how proposed changes might perform twenty years from now.

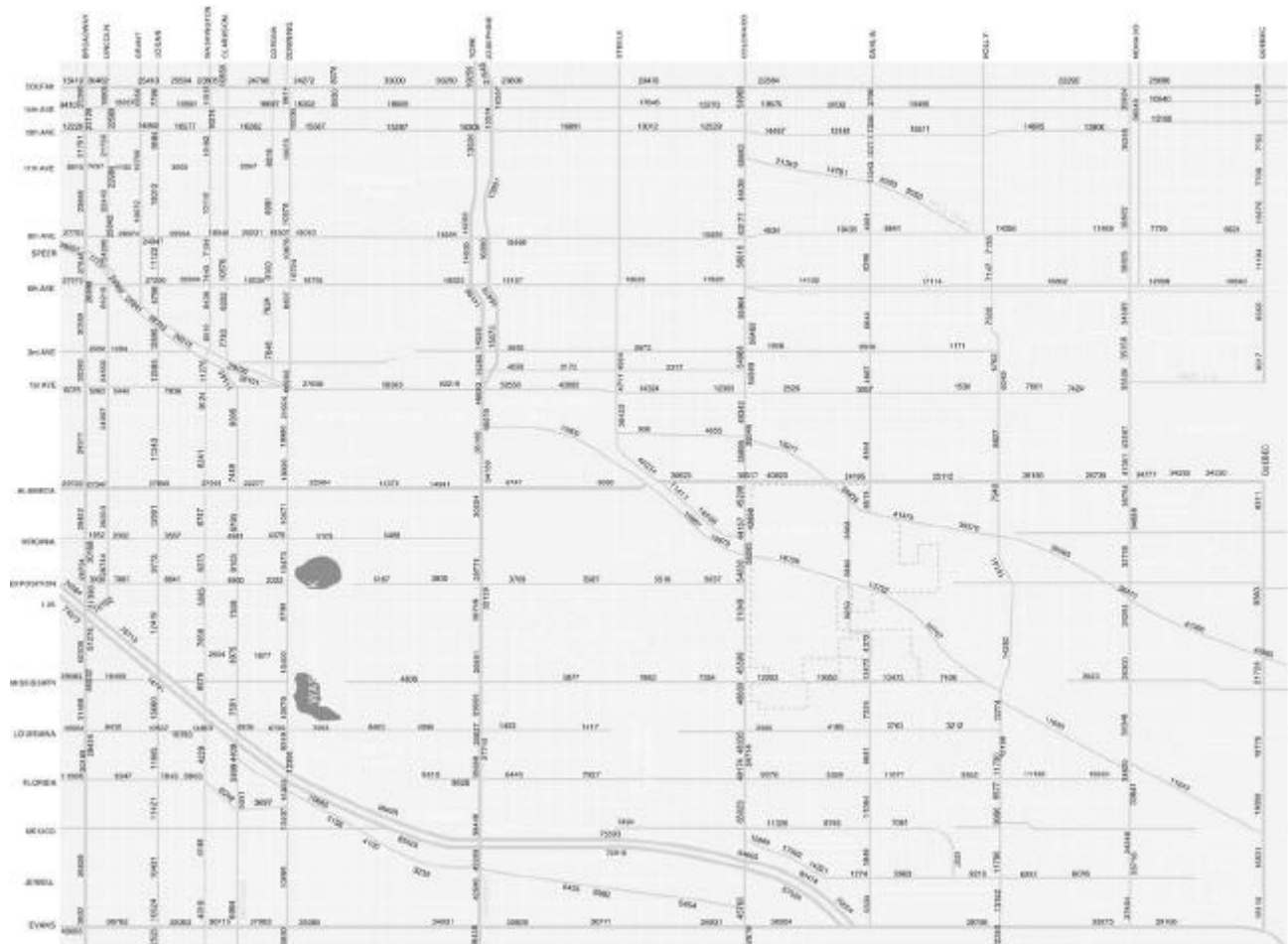
The map on the following page illustrates typical output from the traffic model. In this figure, model-generated daily traffic volumes for the base year of 1995 are shown. These volumes are not actual traffic counts; the numbers represent a simulation of existing conditions made by the model.

1996-1998 Central Denver Transportation Study



Modeled Daily Traffic Volume

1995 Base



Modeling is not an exact science. The CAC reviewed model output in the context of overall changes, and not in terms of individual numbers.

MODELING RESULTS

Initial model runs focused on changes that the CAC members were interested in testing. Initially, the following ideas were explored:

Washington/Emerson/Clarkson Streets

- ◆ two-way streets with two lanes of traffic and parking on one side

- ◆ one-way streets with one lane of traffic and parking on two sides

Downing/Corona Streets (north of Speer)

- ◆ two-way streets with two lanes of traffic and parking on one side (two sides where space allows)
- ◆ one-way streets with one lane of traffic (two lanes of traffic in certain locations on Downing) and parking on two sides

York/Josephine

- ◆ one-way streets with two lanes of traffic and parking on one side (two where space allows)
- ◆ operating speeds reduced from 30 mph to 25 mph.

Alameda Avenue

- ◆ a four lane bridge over Cherry Creek and restriping Alameda Avenue to four lanes between the Creek and University Boulevard
- ◆ a four lane bridge over Cherry Creek, restriping to four lanes, and widening to four lanes between Franklin Street and University Boulevard

The project team ran additional traffic models as needed to further understand the traffic system. The model showed that changing all of the one-way streets to two-way produced unacceptable shifts in traffic to nearby streets and created serious congestion. In fact, the two-way operation on Downing north of Speer attracted more daily traffic volumes. The two-way operation was further complicated on Downing, Corona, York, and Josephine by roadway alignments. The Downing/Corona intersections with Speer, and York/Josephine's transition to two-way traffic on University Boulevard at 1st Avenue were two particularly difficult aspects which could cost millions of dollars to change.

Other results of the model runs indicated that one-way, one-lane operations on Washington and Emerson Streets produced smaller shifts in traffic than did two-way operations. Based on these results and discussions of how to treat the neighborhoods fairly, the CAC grouped one-way, one-lane operations on Washington and Emerson with carefully managed traffic on York/Josephine as a potential initial building block for near-term action. The final CAC recommendations were made only after much more technical information was discussed and other traffic models run

Model results showed that adding a bridge to Alameda Avenue over Cherry Creek, and even widening Alameda to four lanes between University and Franklin, did not dramatically alter area travel patterns. Specifically, traffic was not reduced on 1st Avenue and Speer as many had assumed. In fact, the overall traffic benefits were of relatively little value compared to the economic and social costs of constructing the bridge and widening the road. The CAC dropped the bridge option from near-term consideration because it did not provide improvement to east-west travel routes.

Subsequent model runs were conducted to provide data for CAC recommendations addressing the long-term need for a bridge over Cherry Creek at Alameda. A 2015 year version of the traffic model, including the widening of Alameda to four lanes where it is currently two, again showed no significant benefits to east-west traffic. Again, traffic levels on 1st Avenue were not reduced significantly. The model was useful to dispel the idea that building a bridge on Alameda at Cherry Creek would relieve traffic pressure on 1st Avenue and Speer Boulevard. This finding conflicted with what many people believed previous studies had recommended. Discussion at CAC meetings and with various community activists yielded an interesting array of interpretations of the assumptions and recommendations made in other transportation plans..

Some CAC members and public participants even stated that they felt they had been misled, "lied to," or misinformed on both the one-way street issues and the Alameda Bridge. In general, it was not possible to determine whether opinions were founded on fact, community folklore, or simple misconceptions. Thus, the CAC determined that it was best to present the recommendations of the CDTS as a fresh slate. The CAC understood that unforeseeable changes in the future could require revisiting any of the long-term recommendations in this study and that "never say never" was an appropriate position on all planning issues. Bearing this in mind, the CAC did not recommend the Alameda Bridge as a long-term solution given the information that was available.

The CAC expressed support for a strong and viable Cherry Creek retail area. Access and circulation needs around Cherry Creek are sensitive issues because improvements to roadways here are thought to encourage regional travel between the eastern/southeastern suburbs and Downtown Denver. The 1995 base traffic model was used to predict what might happen if an improved Cherry Creek Drive was developed. A transit-oriented corridor with an equivalent capacity of two lanes in each direction was assumed along Cherry Creek from Colorado Boulevard to Iliff.

The initial results showed improved access not only to the shopping center, but also on some east-west streets, Leetsdale, and certain portions of Colorado Boulevard. The model does not suggest that an improved Cherry Creek corridor encourages regional traffic. Its most significant impact is the local traffic that is removed from neighborhood streets adjacent to the Creek. Given the past contentious nature of this issue, and the fact that this topic was outside the primary study area, the CAC did not feel comfortable proceeding on the information at hand. The concept of an improved Cherry Creek corridor was not pursued further. The CAC recommended further study that would look at not only localized traffic implications, but also concerns about the natural quality of the Creek; Southeast Quadrant, Glendale and Arapahoe County plans; potential increase of traffic on Speer Boulevard; and transit opportunities.

OTHER TECHNIQUES

The computer traffic models were one of the tools used by the CAC to make recommendations, but models were not used exclusively in making these decisions. Urban design and traffic calming techniques, speed and enforcement issues, and future transit options were also assumed in all facets of the analysis to be available as part of the solution set.



Light rail trains offer an alternative mode of travel between Downtown and the Central Denver neighborhoods

The project team also used the model combined with other technical information and its engineering expertise to respond to recurring questions. CAC members and many residents expressed frustration at increasing traffic. Ideas such as "let's charge everyone a toll to use our streets" and "let's not allow commuters on neighborhood streets" were suggested out of this frustration. Yet, several ideas voiced were worthy of greater consideration. Many ideas could not be directly modeled, but the project team could respond based on a combination of certain model results, knowledge of local planning efforts both past and present, and sound transportation engineering principles. In this way, the CAC considered these suggestions and explored their suitability as components of a solution set.

Here is a sampling of these suggestions with a brief response:

- ◆ *"Rebuild the freeways and put the traffic there."*

The region has recently prepared plans for freeway improvements through Major Investment Studies (MIS)..

Because of funding constraints, air quality mandates, and public sentiment, the freeways will not be widened to add more general traffic lanes. Some widening is planned, but only for lanes to serve buses, carpools, or rail. Construction will occur over the next twenty years as funding is available. Freeway improvements have been designed to handle more people, but not more cars. This is a long-term solution that may take twenty years to implement. Yet, the CAC was in tune with the concept of moving more people than cars

- ◆ *"Change Broadway/Lincoln and put more traffic on them."*

In the early 1990s, the City completed a rigorous study of this couplet to determine how it could best serve adjacent land uses, the community, and increasing traffic demands. Several options, including reversible lanes and widening one or both streets, were considered. The outcome of that study resulted in a master plan for the couplet which formed the basis for the significant investment visible today. The traffic assumptions used in the master plan remain true today and the existing improvements are the optimal arrangement.

Thus, changes to Broadway/Lincoln are not a magic solution to traffic problems in the area.

- ◆ *"It is the suburban traffic using Denver streets that is causing the problem."*

Detailed origin/destination studies were not available for this study. But, sufficient data exist to reasonably conclude that of all traffic in the CDTS study area, at least 60% and perhaps as much as 70% is directly attributable to people and businesses in the area. In other words, 30-40% of the CDTS study area's traffic is likely suburban traffic that is accessing downtown Denver or traveling to destinations such as Children's Hospital, the Cherry Creek retail area, or retail on Colorado Blvd. While this is not insignificant, it remains that the majority of the traffic in the study area is created by the residents and businesses of the CDTS area. These findings coincide with those from the original one-way streets study conducted over ten years ago

- ◆ *"Make Colfax an arterial and put the traffic there."*

Colfax has long been viewed as the key to improved east/west travel. It is the location of one of the most successful bus routes in the RTD system. It is a major spine of the east Denver business community and a key source of services for east Denver neighborhoods. Community plans have clearly stated that Colfax Avenue will seek a "Main Street, USA" feel with local traffic, parking and pedestrian activity. This is in direct conflict with the notion of adding more, faster-moving traffic as a means of relieving other streets.

- ◆ *"Lets get everyone to use transit."*

RTD maintains thorough statistics on ridership, and the fundamental truth is that people in the metro area prefer to drive. Currently, less than 4% of daily trips made in the region are made on transit. As much as 25% of peak hour commuters to Downtown use transit. While there is great potential, it is unrealistic to rely on transit as a singular solution. The CAC strongly supports RTD efforts to increase ridership, and the CAC discussed ways to increase transit use through increased services, circulator buses, upscale transit vehicles, and urban design amenities

- ◆ *"Let's build light rail."*

Light rail does seem to attract more riders, but is an expensive solution and will not likely reduce the number of cars on the road. Light rail could offset future growth, but it is not easy to reduce existing traffic volumes with transit systems. Light rail will likely be constructed in the metro area and the CAC supports these efforts; however, light rail is neither a short-term nor an all-encompassing solution. The November 1997 defeat by the voters of RTD's Guide the Ride program will at least delay significantly a comprehensive light rail program

In summary, the CAC recognized that there are no easy solutions; the street network is nearly full and traffic is distributed to all streets. The idea of increasing the capacity of streets or building a new major thoroughfare was unpopular with both the CAC and those who attended the public meetings. The traffic models helped to show how the existing street system could be adjusted to address neighborhood concerns and still allow access to, through, and within the study area. The traffic models were also useful to dispel long-held beliefs of easy solutions as well as dramatic changes. Finally, the traffic models were a good tool to ensure that the CAC's recommendations to improve one area did not adversely affect neighboring areas

National statistics show that approximately 15% of drivers will speed consistently

At the public meetings, citizens strongly voiced their objection to speeding traffic on their neighborhood streets. They cited lack of enforcement and police tolerance of excessive speeds as a major problem.

DRIVER BEHAVIOR

Discussions by the CAC often centered on concerns about traffic behavior, particularly speeding. This was echoed at public meetings where many people spoke of traffic accidents near their homes and in some cases of tragic personal loss. These discussions were paralleled by questions about why police don't do more to enforce speed limits, issue citations, and do a better job of controlling traffic.

Research conducted by the project team on this subject revealed the following:

- ◆ Field observations show that motorists generally seem to drive at or above the speed limit. The average speed of all cars on a street was generally not alarming but the upper end of speeds is noticeably higher than the speed limit.
- ◆ Detailed data about traffic tickets, time of day written, or speed infractions were not available.
- ◆ Signal timing provides excellent progression, and promotes traffic flow at or below the posted limit according to City records.

Land use patterns drive the needs of the transportation system. Thus, land use planning is vitally important to managing traffic growth

- ◆ Anecdotal input and field observation by the project team indicates that many people drive faster in off-peak periods than the signal timing otherwise allows.
- ◆ Those who choose to speed can make it through several green lights before they come to a red light if they begin in the last few seconds of the green light cycle.
- ◆ National statistics show that approximately 15% of drivers will speed consistently.
- ◆ Citations for speeding as well as all traffic violations have been decriminalized by the State in an effort to free up the overburdened court system. Speeding tickets seem to carry little or no public censure.

The CAC held a session with the Denver Police Department to discuss the present enforcement situation and to gain an understanding of its policies and procedures. The police monitor accident records to determine where to deploy traffic enforcement officers. In addition, they respond to citizens' complaints. Of the 1,428 officers employed by the Department, 800 are on patrol and 80 are assigned to traffic enforcement. At any given time, there are about six enforcement officers on the streets of Denver. Additionally, other patrol officers will issue citations if they see an infraction and are not on call at a crime scene or an accident, or on other duty.

Conversely, enforcement officers may be called to an accident scene, as that is a higher priority. CAC members asked if more enforcement personnel would be helpful in controlling speed and other infractions. The police responded that the level of enforcement today is adequate and more officers are not needed for that purpose. If more officers were made available, they would be targeted toward patrol which also serves traffic purposes. The police officers felt that the level of traffic enforcement practiced today is appropriate for the problem at hand, especially in consideration of Denverites' attitudes: the perception of a police state with "big brother" watching every move is unacceptable.

Both the CAC and the residents who spoke at the public meetings disagreed with the police position. They believe that there are too few police assigned to traffic enforcement, not enough enforcement, and a decided absence of a police presence on Denver streets. Many noted that other cities have reputations for speed enforcement, so motorists drive more cautiously. While admittedly this reputation may not be desirable, if it causes traffic to slow down in the neighborhoods, the CAC felt it would be acceptable

LAND USE

There is an undeniable relationship between traffic, transportation, and land use.

The CAC held a special session with representatives from the development community and City officials to discuss current land use policies and future plans.

City planning officials stated that there is currently coordination and cooperation between the Planning Department and the Traffic Engineering Division. Developers who propose planned unit developments (PUDs) are required to document not only their building plans, but also traffic information. But, the City of Denver, as well as most municipal agencies in Colorado, does not have the means to require traffic impact studies for most proposed development which is done under existing zoning. Nor are off-site traffic mitigation measures easily obtained by the City from proposed development and redevelopment under current zoning law.

The CAC and numerous individuals noted that as Denver continues to grow and there is ever increasing traffic pressure, there will have to be changes in the way that transportation infrastructure is obtained. Many people foresee a linkage between land use/development and the consumption of transportation resources. City officials predict that they will have to adjust zoning and policy practices to comply with the desires of the citizenry.

The Denver Regional Council of Governments (DRCOG) is currently working on regional future plans in its Vision 2020 study. DRCOG anticipates that in the next 25 years, the region will grow by 700,000 from its current population of 2.2 million. Fundamental questions of how the metropolitan area grows - sprawl versus density - are an integral element of this study.

Urban densification via redevelopment and infill construction is commonly expected within the CDTs area and elsewhere in Denver. Infill land development projects include substantial growth in the Cherry Creek area, at Lowry, and at Stapleton. With this growth, there will be increased travel demand. Additionally, there will be pressure from areas outside of Denver accessing Cherry Creek retail area, Downtown/Lower Downtown, and the Central Platte Valley.

Besides the Vision 2020 planning effort, there are Major Investment Studies (MIS) currently under way in the metro area. These studies are looking at transportation needs along major corridors. Interstates 70 and 25 are a focus of this effort. Their preliminary recommendations generally do not contain more general travel lanes on the freeway facilities. High occupancy vehicle lanes (HOV) for carpools and buses, and rail lines are under consideration.

The MIS studies have included extensive public involvement..

Citizens in many cases have voiced strong opposition to continuing to widen highways. While they understand that specific ramp improvements, safety improvements, and selected widening may be necessary, they see the addition of general traffic lanes as a shortsighted solution to travel demand. Most people feel that building more lanes simply attracts more traffic. Many people prefer improvements to public transportation (particularly the development of a light rail system), and carpooling. This position is strongly echoed by Federal Highway Administration funding policies, Environmental Protection Agency mandates, the DRCOG Vision 2020 study, and many participants of the Central Denver Transportation Study.

The Vision 2020 study, in concert with the City and County of Denver and other municipalities, has outlined a system of potential long-range public transportation corridors. One of those corridors runs between Downtown and Cherry Creek, although neither a specific alignment nor technology has been determined.

The CAC generally expressed support for the public transportation concepts identified in the MIS and Vision 2020 efforts. A majority of the CAC felt that there must be a policy transition from one-person-in-one-car to more efficient methods of moving people. The CAC also recognized the density of land use that is necessary to make this kind of public transportation system work well.

The Cherry Creek retail area is developing at densities that will support enhanced transit services.

Some who live in the Cherry Creek area do not want more density. Thus, there is an inherent conflict in their desire to have significant upgrades to the public transportation system and their opposition to increased density. Creating specific land use plans that increase density without destroying the quality of life in the neighborhoods will be challenging.

The main problem now seems to be how to deal with transportation needs and traffic pressures until such a public transportation system is in place, which could be ten years or longer. Circulation trolleys, special shuttles between Downtown and Cherry Creek, and perhaps an upscale boutique-type transit service were suggested by the CAC

The CAC remained concerned about the level of coordination between land use planning transportation resources, and development impacts. Clearly, there is coordination among various City departments

The CAC recognized that the continuing success of the Cherry Creek retail area and Downtown is important to neighborhood vitality



Traffic signals at 13th & Downing Street maintain the traffic flow on these one-way streets, and allow for safe pedestrian crossing

regarding review and processing of development/redevelopment proposals. However, the City lacks policy which would require development to mitigate adverse traffic impacts. Nor is there any flexibility for the City to suggest incentives for a development proposal which provides contributions to the transportation infrastructure. Without a series of flexible, targeted tools, the reactive practice of improvements to areas experiencing traffic difficulties will continue.

Yet, to give City departments the basic tools for addressing development/redevelopment, traffic impacts will require a fundamental shift in policy at the highest levels of the City. This shift will have City-wide implications and requires a conscious decision to improve alternative modes for moving people rather than improvements for moving cars.

The CAC understands the difficulty and implications of making this policy transition. For example, if Denver's development practices are too restrictive compared to surrounding municipalities,

Denver could lose its competitive edge and its economy or development activity could decline. Likewise, problems associated with traffic in the CDTS area could also have economic implications for the entire region.

The CAC recognized that the continuing success of the Cherry Creek shopping area and Downtown is important to neighborhood vitality. Both of these areas contribute significantly to Denver's tax revenue. The CDTS neighborhoods would be less desirable if located next to a decaying downtown or an unsuccessful shopping district.

Conversely, Downtown and the Cherry Creek shopping district would be less vital if they were located next to eroding neighborhoods. There is a symbiotic relationship that makes it in everyone's best interest to support the CAC's philosophy of assuring that changes to one area do not adversely affect another.

SIGNALIZATION

The CAC was interested in using every tool at its disposal to

address the neighborhood traffic concerns. One of the tools discussed was traffic signals, their timing, and their ability to be adjusted to control traffic progression and speed.

Denver currently operates more than 500 traffic signals within the Central Denver Transportation Study area. The majority of these signals are located on major streets and provide intersection control and safety. Currently, about 10% of the signals operate under a limited form of computerized control, which allows them to synchronize time with each other and report malfunctions. The remaining signals are independent units that are synchronized using time clocks at each intersection. This allows the signals to provide the progression of green lights that motorists expect so that their travel proceeds smoothly. Traffic flow is also critical to air quality; the continuous acceleration and deceleration of vehicles contributes to pollution.

While it is a relatively simple task to time traffic signals and set progression speeds for individual corridors, there are significant conflicts which often arise in establishing signal timing and progression patterns for a grid network of streets. For example, if the progression speed on York/Josephine is to be reduced, timing of signals will need to be revised to reflect a progression speed of 25 MPH. Yet, the signal timing of the major cross-streets such as 6th and 8th Avenues means that 30 MPH must be used at the 6th/8th - York/ Josephine intersections. Where York/Josephine intersects with minor cross-streets such as 7th, signal timing can be adjusted to a 25 MPH progression speed. Subtle changes like this are difficult for a motorist to see and may result in driver frustration and unacceptable behavior, such as increased speed, as some drivers try to "beat" the lights. Moreover, it is unrealistic to suggest that an entire grid network of streets be shifted to a 25 MPH progression speed. Therefore, carefully targeted use of revised signal timing for various times of the day is anticipated. Modest gains may be all that can be reasonably expected, but the CAC recognized that this tool is one part of an overall solution set.

Maintenance and upkeep of the time clocks and timing patterns in each traffic signal is a significant commitment. Denver completed retiming all of the signals in the study area in 1996. Staff vigorously oversees signal operations, but because of the

large area and the number of traffic signals involved, the manual process is relatively inefficient and changes to signal timing are burdensome.

The City, in coordination with the DRCOG under a grant from the Federal Government, is currently designing an advanced computer-controlled traffic signal management system. This system will rely on communication links between traffic signals and will let them "talk" to each other. The central computer will monitor all of the signals, and implement signal timing patterns to respond to varying traffic demands and special events. This five-year program is starting in Downtown and will extend into the study area as funding permits. Major streets such as Broadway, Colfax, and Colorado will be targeted first, with other streets completed thereafter.

The computerized system will enable City staff to be more aggressive with traffic management and provide traffic signal operations that are responsive to traffic demands as well as neighborhood goals.

The modeling exercises showed that the major street system in the CDTS area is nearly full during peak periods.

TECHNICAL INFORMATION SUMMARY

The CAC was charged with making recommendations to the City that will allow reasonable traffic access to, through, and within the study area. As with almost any planning process, the tendency is to latch onto a solution and then promote it. This leads to "solution wars," but not necessarily the best recommendations.

The planning process for this study called for investigation of technical information for two reasons:

- ◆ to thoroughly understand the problems, their causes, and the effects of imposing changes; and
- ◆ to allow the CAC members to work with the information, make reasoned suggestions, and understand the trade-offs inherent in their recommendations.

The technical information collected can be summarized as follows:

- ◆ Given the "core-city" characteristics of the CDTS area, the corresponding traffic patterns and behavior may account for the lower accident rate. This does not mean that there are no accidents; wherever there is traffic, there are accidents. It simply means that there don't seem to be the conditions ~ roadway design, intersection problems, etc. ~ that would cause the CDTS area to have a higher rate of accidents than elsewhere in the City.

The traffic model used in this study showed that an Alameda bridge, by itself and even with the widening of Alameda to four lanes, did not significantly change regional travel patterns or offer relief to 1st Avenue.

- ◆ Traffic volumes are increasing metro-wide approximately 2-3 percent per year, while the vehicle miles traveled are increasing slightly more, perhaps 5-6 percent per year. This is attributable to the average length of each trip being longer as the Denver-metro area grows outward. DRCOG estimated that in 1995 there were 48 million vehicle miles traveled in the metro area.
- ◆ People are driving more. The vehicle miles traveled in the Denver-metro area doubled between 1987 and 1995, and yet our population has not nearly reached a doubling proportion. This can be attributed to several facts. Simple trips to work now often include stops for day care, shopping, and other errands. If there are two adults in the home, typically both now have cars and both commute to work. More young people have their own cars rather than sharing a family car. Destinations become more spread out as the community grows. All of these are contributing factors to additional vehicle miles traveled.
- ◆ The modeling exercises showed that the major street system in the CDTS area is nearly full in the peak periods.

Shifting significant traffic from one set of streets to another is not possible. Making smaller changes is possible and can offer some relief to overburdened streets, but will not bring traffic conditions back to levels common several decades ago.

Analysis of model output and daily traffic volumes suggests that over half and perhaps as much as two-thirds of the traffic in the CDTS area is attributable to the residents and businesses in the CDTS area.

- ◆ Changing all the north/south one-way streets to two-way in the model not only strained the traffic system, but also adversely affected other streets in the area. Making more modest changes to the number of lanes and parking configurations, adding urban design amenities, and slowing speeds could improve the current situation on the north-south one-ways without severely impacting other streets. This will reduce the capacity of targeted streets. It also implies holding traffic levels on other streets to current numbers with minimal increases, rather than building more roadway facilities and accepting significantly more traffic throughout the CDTS area.

East/west access along 13th, 14th, 6th, and 8th Avenues becomes more congested near Broadway. People use the east/west corridors to get to the major north/south routes (for example, Washington, York, and Colorado Boulevard) as well as to travel between eastern neighborhoods and destinations in the CDTS area.

- ◆ Past studies of the CDTS area have resulted in volumes of technical data, some of it inconsistent, and much of it misinterpreted by the public. Previous considerations of the Alameda bridge and widening of Alameda between University and Franklin were part of a larger scale recommendation that included widening I-25, connecting 6th Avenue through Lowry, making Colfax six lanes, and other roadway improvements. Studies are often reflective of the attitudes of the time, which may partially account for the type of roadway improvements assumed. The traffic model used in this study showed that an Alameda bridge, by itself and even with the widening of Alameda to four lanes, did not significantly change regional travel patterns or offer relief to 1st Avenue.
- ◆ Discussion with CAC members and the general public indicates that the irritation with traffic revolves around traffic behavior, not volume. Speed is the most often-mentioned complaint. Police believe that they are doing all that can be done within the accepted attitudes of Denverites. The CAC disagrees, but understands that greater enforcement is only part of the solution. Still, the goal is to attain reasonable compliance with posted speed limits.

- ◆ Expanded coordination between Denver's land use planning and transportation engineering/planning; creation of neighborhood plans that have transportation sections which are consistent with each other and the Comprehensive Plan; and better local and regional approaches to transportation and land use planning are needed.

- ◆ Taking advantage of public transportation now and in the future is going to require a major shift from current habits. For transit to take a significant share of trips off of the roadway system, Denver will have to do more than just build more facilities; a strong public relations, education, and encouragement program is needed. In addition, fairly dramatic social changes will need to occur. This includes increased support of transit by employers in practices such as greater work schedule flexibility to allow employees to coordinate their work hours with transit. People need to begin thinking that it is socially acceptable and even desirable for all ages and classes of people to use the transit system. Finally, community and business leaders need to lead by example and use the transit system, maybe amid some fanfare, to generate interest and support for shifts in social thinking.

- ◆ Denver's pedestrian and bicycle system is an important part of the transportation network and is more effective when combined with public transportation. Well-maintained

sidewalks, a bicycle route network, secure bicycle storage, and bikes on transit are all part of the network.

- ◆ Denver is currently implementing a signal timing system that will give traffic engineers more flexibility and power to use signalization as a tool to manage traffic.

- ◆ In general, Denver is not doing enough to encourage increased development density around transportation nodes. For example, at light rail stations there should be additional density and mixed land uses to create a hub of activity which doesn't impact the street system.

Understanding technical information helped the CAC avoid "magical solutions" that sound good, but in fact are problematic.

While many would like to turn back the clock to a time when traffic was not as serious a concern, it is clear that this is not a realistic option. Interestingly enough, traffic has been a long-standing problem for Denver, and the rose colored glasses used to view the past tend to overlook this fact. Denver hired a traffic engineer in 1948 (one of the first cities in the country to do so) to solve the traffic problems.

Traffic and transportation systems are complex, and resolving issues related to them requires a logical, persistent, and comprehensive approach. The technical information presented here is the basis for recommending changes responsive to both neighborhood goals and travel needs.

Denver was ranked sixth among the top ten cities for bicycling in North America by Bicycling Magazine (1996.)





TOOLS

Most people think that "solving" traffic problems falls within the domain of traffic engineering and in many cases this is true. However, in dense urban areas with interwoven complex issues, solutions to traffic problems frequently encompass engineering as well as planning, traffic enforcement, and education functions. Also, technical and social solutions can only be achieved with strong political support. Elected officials must be solidly behind the solutions and their applications to problems. This has never been more true than with the Central Denver Transportation Study.

After gaining an understanding of the technical information, the CAC reviewed the tools available to address transportation issues. The "tools" included:

CAC members commonly asked, "What problem are we trying to solve?" and, "Does this solution actually help or worsen the overall situation?" Each of these tools comes with trade-offs that have been carefully considered by the CAC in its effort to reach consensus.

- ◆ changing the capacity of a street;
- ◆ traffic calming techniques;
- ◆ education and public relations;
- ◆ urban design improvements; and
- ◆ traffic law enforcement.

Using the appropriate combination of tools was clearly the challenge to creating recommendations in line with neighborhood goals and transportation demands. A nationally-recognized traffic calming engineer from Portland, Oregon who had experience with traffic management techniques worked with the project team and the CAC to review techniques and discuss his experience. The CAC held numerous brown bag lunches, monthly meetings, and a workshop to discuss the pros and cons of these various methods of traffic management.

None of these tools is a magical solution; each has benefits and trade-offs. Not all of the tools can be used in every situation, and implementation will often require detailed examination of specific streets, right-of-way measurements, intersection configurations, and traffic levels.

CHANGES TO CAPACITY

The size of the street, or its capacity, is one of the key factors in traffic flow whether the focus is the number of vehicles accommodated or the speed of the vehicles. At one of the early CAC meetings, three basic choices and the effect of these choices on traffic were discussed:

- ◆ Increase the capacity of the street system: add lanes for moving traffic;
- ◆ Decrease the capacity of the street system: remove lanes for moving traffic; and
- ◆ Leave the system as it is today.

The first choice, increasing capacity, implies removing parking to add lanes, widening streets, and perhaps adding one or more major facilities such as a new freeway or major arterial road. Because the study area is mainly a built-out urban environment, adding capacity could mean removal of existing homes, trees, businesses, or other buildings. The following trade-offs were discussed —

On the "plus" side:

- ◆ Adding capacity would relieve traffic congestion and allow for smoother, easier vehicle travel within the study area;

because there is not presently a good system of major east/west travel corridors (generally, one major arterial every mile) this study might present a good opportunity to remedy that

situation by building a new corridor and reducing traffic, at least temporarily, on existing streets;

- ◆ new major arterials or freeways, or adding general traffic lanes to existing roadways, would attract traffic to those facilities and away from neighborhood streets.

Conversely:

- ◆ there are limited places to add such a facility that would not raise objections from nearby residents;
- ◆ adding capacity appears to be a never-ending cycle that many in the public and on the CAC see as detrimental to the feeling of community and the quality of life in their neighborhoods;
- ◆ large roadway facilities can physically divide a neighborhood, encourage vehicular travel, and thus deteriorate the environment in general and the neighborhoods in particular.

Decreasing capacity has the following advantages:

- ◆ it limits the number of vehicles that can be accommodated;
- ◆ it does not require widening or any expansion that detracts from the amount of space dedicated to other uses such as sidewalks, easements, or private property;
- ◆ limiting capacity can alter trip-making because people may try to avoid congestion and time

delays by either rescheduling their travel to an uncongested time of day or not making the trip at all.

Disadvantages of decreasing capacity include:

- ◆ the roadways will feel more congested;
- ◆ travel times for all - including those who live in the neighborhood - will increase;
- ◆ congestion on the major travel routes is likely to result in increased cut-through traffic on local streets. Additionally, there may be more traffic on all of the local streets as residents opt to use them instead of the converted streets because there is no advantage to using the converted street. This could require additional traffic management on streets that are not major travel routes.

Simply narrowing streets or changing them to two-way functions does not make the traffic go away. The solution lies in a combination of changes that disperses some traffic, moves people to other modes of travel, and modifies the behavior of the traffic that remains.

"Dealing with contentious issues for so long was often unpleasant. But I believe the study area's residents were well represented, that all issues and concerns were addressed, and that we did our best to develop equitable solutions. Let's hope the City supports our efforts."

—Gloria Le Free



Logan Street, north of Speer is a one-way, two-lane street with residential densities that are among the highest in the study area.

- ◆ decreased capacity can also cause air quality to worsen as congestion and delay are increased;
- ◆ the business climate could ultimately be harmed because access to commercial areas would be degraded by worsening congestion and delay.

Keeping the existing capacity has the following advantages:

- ◆ the traveling public will not need to adjust to changes;
- ◆ no public investment is needed for changing the streets;
- ◆ maintaining the status quo does not require garnering significant public support for changes.

Conversely:

- ◆ existing problems in the roadway system will continue to worsen;

- ◆ while most neighborhoods are generally doing well, the perception is that they are at a critical juncture where more traffic will have adverse impacts on the quality of life. (Some believe that this stage has been reached and passed already.)

CAC members and many who have been involved in the public process of this study believe that those who live on the north/ south one-way streets in the study area need relief from the traffic going by their homes. The streets and homes were never designed to process the amount of traffic currently seen. However, the project team has received public comments which express a different opinion. The argument is that those streets have been one-way for over fifty years, are in an urban environment, and people who bought homes on or adjacent to those streets should not be surprised by the traffic. Some

have also pointed out that homes on these streets are less expensive because of the annoyance of traffic. Many indicated that limiting capacity on these streets would interfere with their right to travel through the City efficiently. In addition, some comments have pointed out that certain major streets should carry significant loads of traffic and carry it quickly. This point of view was somewhat adamant with regard to neighborhoods that have had recent landscape and noise-wall improvements as a means of buffering them from traffic on adjacent streets.

The CAC is not unaware of these arguments; they simply disagree. One CAC member stated that a problem on any one street in the neighborhood is a problem for the whole neighborhood and that we should seek to cooperatively address these problems rather than let them worsen.

Traffic management is a broader set of techniques that deals not only with flow, but also with traffic origins and destination, parking, other travel modes, and the interrelationships of land use and transportation.

TRAFFIC CALMING AND MANAGEMENT TOOLS

There is an array of engineering tools available for improving traffic conditions or lessening the effects of traffic. These tools generally fall into one of two categories: calming measures and management techniques.

- ◆ Traffic calming refers to methods that tend to slow traffic flows, make them more predictable, and generally lessen the effects of traffic on adjacent land uses. Traffic calming measures are typically applied to local residential streets and often form the core of neighborhood traffic plans. These techniques are not in and of themselves new, but applying them as a system to a large area has recently found a renewed interest in many European and North American cities as a way of controlling traffic behavior. It should be noted that there are downsides to traffic calming as well.

- ◆ Compared to traffic calming, traffic management is a broader set of techniques that deals not only with flow, but also with traffic origins and destination, parking, other travel modes, and the interrelationships of land use and transportation. These techniques are generally applied to busy streets like collectors and arterials. In short, traffic management is much more encompassing and can incorporate traffic calming as a subset of an overall plan.

Traffic calming tools focus on making changes to the roadway so that traffic is less disruptive to adjacent uses, generally residences. Measures vary from simply encouraging on-street parking to narrow or meandering travel lanes. Most drivers travel at a speed that seems comfortable considering the width of the lane, the sight distances, and their ability to maneuver their vehicles. Narrowing lanes reduces drivers' sense of comfort, causing them to slow down. Examples of traffic calming techniques include:



The median on Logan Street south of Speer Blvd. is an example of an urban design feature that calms traffic.

- ◆ "choking" the intersection to shorten pedestrian crosswalks and narrow the approach to the intersection;
- ◆ adding "chokers" at the mid-block point to reduce travel lane widths;
- ◆ meandering travel lanes (rather than having them straight) by using "bump-outs." These are sometimes referred to as chicanes or woonerf streets;
- ◆ adding off-peak parking to streets which effectively reduces the lane widths;
- ◆ installing speed tables (elongated speed humps) forcing drivers to slow down or receive unpleasant jolts as they travel;
- ◆ traffic circles; and
- ◆ traffic islands in the center of the street that restrict lane widths.

Other more restrictive measures include street closures, cul-de-sacs, and traffic diverters. All of these measures can be effective in reducing traffic intrusion, but are also a source of inconvenience to residents of the neighborhoods.

Use of these measures can be very controversial for a number of reasons. For example, speed humps or tables reduce speeds in close proximity to their location. Thus, close spacing is usually needed. They also have disadvantages such as potentially slowing emergency vehicle response time, adversely impacting bicycle traffic, and increasing noise levels due to decelerating and accelerating vehicles. There is no nationally recognized design standard. Local agencies have to develop their own standards and implementation policies. Many cities have also needed to develop removal policies for speed humps that have proven ineffective or unacceptable to the neighborhood. Drivers expect roadways to be relatively uniform. However, some cities have had experience with speed hump and table design, and consistent design criteria is starting to emerge.

The cost of installing speed tables is a factor because to be effective they need to be installed in a series, not just sporadically. Residents often object to them because they can cause excess noise as cars accelerate and decelerate between them. Emergency vehicles and street maintenance equipment can have problems with speed tables.

Traffic calming refers to methods, typically used in residential areas on local streets. They tend to slow traffic flows, make them more predictable, and generally lessen the effects of traffic on adjacent land uses.



The traffic circle in the Country Club neighborhood encourages a safe and orderly flow of traffic.



CAC members and citizens at public meetings expressed concern about traffic safety.

Taken altogether, speed tables have proven both to be effective and to have associated problems. They were described by the traffic calming expert who worked with the project team and the CAC as the most effective measure to slow traffic in his city. It was also noted by the study team that some cities in the Denver metro-area have tried speed humps and removed them because of associated controversy. He also stated that they need to be carefully placed; they are not a panacea for all traffic behavior problems.

Choking down traffic at intersections seems to be an effective way of achieving several objectives: narrowing lanes, shortening pedestrian crossing distances, and slowing traffic. Mid-block chokers, or chicanes that cause travel lanes to meander, have similar attributes, but could reduce parking spaces.

Traffic circles should be a minimum of ten feet wide so that they are substantial enough to be seen. With Denver's thirty-foot wide streets, this becomes difficult because it would require widening the road and reducing tree lawns and sidewalk areas. This makes pedestrian crossing distances longer and therefore, the traffic circle is generally a less-attractive option.

Traffic management tools, as mentioned earlier, address transportation on a bigger scale and involve techniques applied to major streets and sizeable activity centers. Signal timing, intersection control, high occupancy vehicle lanes, and reversible lanes are some traffic management tools.

The use of reversible lanes is a tool that designates one or more traffic lanes to operate in the direction of the major traffic flow for the morning peak hour and then, using signage, reverses the direction to accommodate the evening peak hour. One advantage of this technique is that it does not require a wider road to move peak traffic loads that are only present for four hours of the day. This tool is not only cost effective, but also reduces the amount of asphalt added to our urban environment. However, it is not without its problems. Left-hand turns become difficult or forbidden, thereby reducing direct access to adjacent properties. Some drivers may find reversible lanes initially confusing. There may also be objections from adjacent neighborhoods to the very notion of moving more traffic

High occupancy vehicle (HOV) lanes are reserved for transit and vehicles with more than one person. They are more efficient than general travel lanes because of the numbers of people per vehicle and because they often are not congested and result in better travel flow. It is one way to give a travel time advantage to transit and carpooling. This travel time advantage also produces greater efficiency in transit operations which allows for more service and potentially even more people switching from cars to buses. But, like all the tools, HOV lanes have their problems. If an HOV lane is implemented by replacing a general travel lane, congestion may increase. Neighborhoods are sometimes skeptical of agreeing to HOV lanes because they may be affected by bus noise or other unpleasant effects of large vehicles. Placement of the HOV lane within an existing roadway may cause problems with turning movements and transit stop locations.

The goal of traffic management is to process vehicles efficiently and is not focused so much on behavior. Making the major street network work efficiently helps reduce cut-through traffic and reduce congestion by controlling traffic flow. All of the tools can be used in combination to both manage and calm traffic. They do not, however, make traffic and transportation problems go away.

Calming and management measures are applied based on a diagnosis of the problem identified. Most often, a mixture of these measures is applied over several streets after detailed study of the nuances involved. Traffic management measures are often paired with streetscape and other urban design elements as described later in this section. The key to successful traffic calming and management programs is strong support from the residents of neighborhoods and the City, as well as a clear sense of purpose for the goals and an understanding of the potential trade-offs involved.

The bus lanes on Broadway and Lincoln are similar to High Occupancy Vehicle (HOV) lanes, giving priority to vehicles with multiple passengers



EDUCATION

Beyond traffic engineering techniques, educational and public relations efforts have been used in places such as California and Oregon to influence travel choices and driver behavior. Here in Colorado, there has been a long-standing effort to encourage carpooling, transit and bicycle use, and other alternative modes. Clean Air Colorado and Denver's "Bike to Work" week are two examples of these efforts. Reducing congestion and air pollution are stated goals of these programs.

As traffic pressures increase, driver aggravation increases. This often results in aggression which only makes the situation worse. Violent actions are not limited to other states. Here in Colorado we now have a history of such behavior. A public relations and education campaign can be designed to address this problem. Public service announcements on television and other broadcast and print media messages can educate the driving and travelling public, making them aware of this and other issues including:

- ◆ transit choices;
- ◆ flexible hour options;
- ◆ driving etiquette and safe driving rules;
- ◆ City plans for managing traffic;
- ◆ rights and responsibilities of bicyclists and pedestrians;
- ◆ increased traffic enforcement; and
- ◆ neighborhood concerns about traffic.

The CAC discussed the importance of educating the community about the habit of driving alone for most trips: overall effects include impacts on neighborhood quality of life, the environment, and land use patterns. To achieve neighborhood goals and maintain good access, these driving habits need to change.

The citizens who attended the public meetings were very clear that they wanted an improved transit system to help alleviate growing traffic problems. Current data shows that only 4% of all trips are being made on transit; this suggests that simply providing more transit is not the answer. Most people have very legitimate reasons for not using transit. Until the community makes a major shift in how it thinks about making each trip, transit cannot be expected to gain a significantly higher percentage share of all trips. The CAC felt that a significant educational effort is a necessary component to encouraging transit use.



Bicycles amount for approximately 1.5% of commuter trips in Denver.

Education programs can also be used in the school systems, with large employers, and in other community organizations. One of the most promising tools to work with is the transportation management association (TMA) or transportation management organization (TMO). These are private organizations that operate using a mixture of public and private funds and work with large employers in a specific geographic area to promote and coordinate traffic management tools such as carpooling, flexible hours to relieve peak hour congestion, and telecommuting options for employees. There are currently TMAs for the Cherry Creek/South Colorado Boulevard area, Downtown Denver business district, and the Medical Center on Colorado Boulevard, and a proposed TMA for the Lowry Redevelopment

One suggestion made at a public meeting was to let the public know how the signal timing worked. That way, drivers won't speed from one light to another only to encounter a red light that will stop their progress.

A strategic, well-organized education and incentive plan can support the other tools outlined in this section. If the citizens understand what changes are being made to the traffic system and why, how they can help alleviate traffic problems, and why they should consider options other than driving alone, they are likely to be more supportive of a comprehensive transportation program.

URBAN DESIGN

Most drivers travel at speeds that feel comfortable and safe to them. They may not even be aware that these speeds are above the posted speed limit or are unnerving to nearby residents, pedestrians, and bicyclists. And, Denver's grid system of streets allows drivers multiple choices to their destinations, many of them through neighborhoods. One of the problems inherent in the grid system as stated by one CAC member is that "the roadways look like the barrel of a gun and cars speed down them like bullets." This analogy clearly portrays a problem that can be addressed through good urban design techniques. Urban design is not a solution for every street. It can be expensive, and therefore must be carefully applied in correct situations.

Urban design elements include:

- ◆ streetscaping - adding trees, lights, neighborhood markers or other vertical features, together with undergrounding of overhead utilities;

- ◆ implementing traffic calming measures (such as narrowing intersections) with consistent design appropriate to the adjacent land uses; and
- ◆ adding visual clues to help drivers understand the environment on either side of the roadway such as textured/colored paving at busy crosswalks, neighborhood entry monuments, and signage.

Noise walls are often pointed to as a good urban design technique. These elements are not really traffic calming devices in that they do nothing to change traffic behavior. Rather, noise walls buffer adjacent homes from the street. Noise walls can also send a mixed message to motorists in that the street now appears more "freeway-like".

An example of how this works can be seen around the Cherry Creek shopping area. Drivers traveling southeast on Speer Boulevard transition to 1st Avenue, and once through the intersection at University immediately realize that they have entered an area of high pedestrian activity. The streetscape, the bollards, the brick colored pavers, signs, and plantings work in unison with the change in adjacent land uses to tell drivers that they should be more aware. This design technique can be applied to neighborhood streets as well. There are also some good examples of urban design in the Country Club neighborhood with its special plantings, entry gateways, and tree-lined streets.

An urban design approach combined with traffic calming measures simply means that the reconfiguration of the street can be well-designed so it contributes to an overall neighborhood image. Rather than simply add concrete "chokers" (as described earlier in the Traffic Calming and Management section), the area added to the sidewalk and right-of-way might contain grass and trees, special paving, a neighborhood entry monument, or even artwork. Changes to the street width or alignment can be consistent along the length of the roadway and perhaps throughout a defined neighborhood.

The project team created an urban design concept for York and Josephine Streets from 3rd Avenue to Colfax as an example. Intersections were narrowed, the median on 7th Avenue was extended to reduce lane width, and special paving was added to Josephine and 8th Avenue where many people cross on their way to Congress Park. Trees were added to complete the existing tree pattern along the easements, locations for neighborhood markers were identified, and significant parking was added without widening the street or impacting the tree lawns. This example can be applied to other streets and will need to be adjusted to meet special conditions such as schools, bus stops, businesses, and bicycle routes.

Like all of the tools, urban design applications have trade-offs: *they generally have significant costs and require maintenance.*

The initial expense varies and unless there is continued maintenance, the goal of creating a place that people care about is lost. In times when budgets are stretched to meet basic needs, urban design improvements can easily fall to the bottom of a priority list. However, examples of successful installations include projects developed by the government with perpetual maintenance provided by the neighborhood.

Over time, these urban design techniques can be used throughout the study area as a tool to change the look of the streets so they seem less like "gun barrels" and more like places people live, walk, bicycle, and enjoy as a neighborhood.

Cheesman Park & Downtown are amenities that contribute to the quality of life in the Central Denver neighborhoods.



TRAFFIC ENFORCEMENT TOOLS

Traffic enforcement is a key ingredient to controlling undesirable traffic behavior such as speeding, accidents, and unsafe vehicle operations. However, it cannot resolve every problem and must be used in coordination with other tools such as traffic management and calming measures, education, and urban design. Traffic enforcement is a powerful tool that can materially change people's lives not only from the standpoint of vehicle operation, but also economically and socially.

Traffic engineers and police report that voluntary compliance with traffic laws is fundamental to safe roads and that most people do comply.

Traffic enforcement is a critical tool in controlling traffic behavior, but it cannot realistically be expected to solve every problem.

To most drivers, the unpleasantness of getting a ticket, paying the fine, appearing in court, or possibly losing a driver's license are all sufficient motivators to good driving behavior. These drivers keep in mind the potential consequences of improper driving. Other drivers need reminding to assure appropriate behavior. Finally, there is a small percentage that purposefully disregard traffic laws and are an obvious danger to the community.

Education and public relations efforts work in tandem with traffic enforcement. If the public is aware that enforcement is strict, they are more likely to obey laws. Publicizing renewed efforts in traffic enforcement policies can have a positive effect almost immediately. One California city realized a 50% reduction in the number of traffic accidents over a five year period when strict enforcement of speed limits was implemented. Basic tools that can be used for traffic enforcement include:

- ◆ signage and police presence;
- ◆ increasing the number of police;
- ◆ using photo enforcement techniques to record violations;
- ◆ using sign boards that display driver's speeds; and
- ◆ increased fines for speeding

Selected placement of speed limit signs can help remind motorists of appropriate driving behavior..

Yet, when taken to the extreme, too many signs lessen their impact and cause a visual blight. The same can be said for police presence. Patrol cars or police on every corner may well produce the desired traffic behavior effect, but most would see it as an expensive and possibly oppressive situation.

A police department can deploy more officers in traffic patrol cars or motorcycles for the express purpose of enforcing traffic behavior as well as responding to traffic incidents which would otherwise cause congestion. This approach is labor and equipment intensive, and is relatively expensive. The number of traffic enforcement police should be carefully determined - too few or too many can be problematic. The concept of just adding more and more police to an enforcement assignment eventually results in diminishing returns: the results are not worth the costs. Thus, increasing the number of enforcement police should be considered as part of an overall approach to modifying traffic behavior and not a "magical solution" to achieving traffic control.

One tool that has been tested elsewhere nationally and here on the Front Range is a device called photo radar. Using advanced video, radar, and computer technology, a City-owned (or leased) vehicle is equipped with components that allow it to identify a speeding vehicle and photograph its front including the license plate and driver.

Similar technology can identify vehicles that run red lights. Computer technology automatically reads the license plate number, scans Department of Motor Vehicle records, and mails a speeding ticket to the vehicle owner. Because this can be done from a parked position, the photo radar units are extremely cost-effective and can result in issuance of many more tickets than possible using police officers in a vehicle. (One vendor reports up to two per second using photo radar vs. 8 to 15 per hour by an officer.) Just the knowledge that photo radar equipment is used tends to slow traffic much the same as the presence of a police car or motorcycle. Upon receipt of the citation, the car owner can pay the fine by mail or file a protest requesting a review. The photo can be used to prove or disprove the claim.

The advantages of photo radar are that it can be mobile, can issue citations much more quickly than conventional methods, and requires minimal personnel to operate. The disadvantages include the lack of person-to-person contact - a key element of police enforcement - and inability to address violations that may occur in addition to speeding.

Some communities are contracting with private corporations to provide, and in some cases operate, the photo radar units and collect fines. Denver is currently reviewing this technology for a pilot program in the near future.

Ft. Collins recently tested a photo enforcement system and attained dramatic results. In the first nine months of operation, the city saw a 7% decline in accidents and a 7% decline in injury accidents. Speed compliance increased from an average of 18% to over 40%.

As mentioned earlier, a simple reminder is often sufficient to promote good traffic behavior. One technique that has been suggested for speed control is a portable message board that is operated by a radar gun. As the car approaches, the sign board displays the vehicle's speed. Typically, it reads: "Your speed is...." These units are not generally used jointly with enforcement activities; they are simply there as a reminder. However, enforcement can be used in conjunction with the display and often is assumed by motorists. Compliance with speed limits as a result of using a sign board is surprisingly high, particularly if occasional enforcement activities occur in the same area..



Maintaining traffic flow on I-25 will discourage motorists from cutting through local neighborhoods to avoid congestion.

CONCLUSION

All of the tools presented are useful and no one tool solves all traffic problems. Using the tools in combination and matching the right tool to the right situation is critical to success.

Applying these tools is a combination of art and science. Traffic engineers and planners will have to assess individual situations, discuss options with the neighborhoods and the community at large, and adjust the use of these tools as necessary to achieve the goal of reducing the effects of traffic.

While the overwhelming majority of people at the public meetings favored ways to slow traffic and encourage alternative travel choices such as public transit, there were those who did not share that view..

They stated that getting places quickly and easily by car was becoming more difficult and that the thrust of this study should be to improve traffic flow. These divergent points of view will likely surface more frequently as traffic tools are applied and traffic slows

When the community has some experience with tools such as photo radar, speed tables, and lane restrictions, undoubtedly more debate will follow.

While many citizens would like to simply reduce volumes on Central Denver's streets, it is clearly unrealistic to expect that to happen given regional growth trends and current driving habits. The Citizens Advisory Committee has discussed the trade-offs inherent in applying these tools and stated that it is in the best interest of their neighborhoods to pursue implementation.





Recommendations

The following recommendations are a "solution set." As the Citizens Advisory Committee (CAC) crafted these recommendations, it became clear that making a change to any one recommendation could, and often did, affect others. Inherent in these recommendations is a fine-tuned balancing that took hours of in-depth discussion to create. Therefore, individual recommendations cannot be viewed singly, but rather as a piece of a much larger solution set.

The recommendations fall into two main categories:

- ◆ Overall recommendations: changes to current City-wide policies and practices addressing transportation; and
- ◆ Street Recommendations: improvements to specific streets in a logical step-by-step fashion.

Recommendations are also divided into near-, mid-, and long-term categories. To the extent that it is fiscally possible, certain solutions should be implemented concurrently because they represent not only immediate response, but also reflect a carefully constructed balance among competing interests. Toward achieving that goal, the CAC also considered a plan for implementation of the recommendations.

The CAC envisioned a process in which coordinated near-term efforts would be implemented, monitored and assessed. Mid- and long-term implementations are expected to be adjusted and implemented based on the relative success achieved by near-term implementations.

These recommendations are a "set" because each change influences surrounding streets.

It may be determined that near-term improvements achieve the desired overall goals. In that case, further implementation of long-term recommendations may not be warranted because no additional benefit would be gained.

The recommendations not only respond to the traffic concerns and problems, they respond to the criteria contained in the CAC's stated project goal.

QUALITY OF LIFE

Calming and managing traffic will improve the perception and the reality of the quality of life in the CDTS neighborhoods. Reduced operating speeds and more desirable driver behavior will provide a better sense of safety and livability. If traffic volumes are reduced on some streets, this may give the neighborhoods a noticeable change in the way it feels to live there. As noted previously in this Final Report, this is not necessarily a measurable result. But, the Transportation Advisory Committee will be in a position to interact with the community and "check the pulse" of these criteria.

ENVIRONMENTAL CONDITIONS

Air quality is a major concern and calmed traffic could result in increased congestion and delay in adjacent areas. Again, there is no base line of data created by this study against which to compare results of the recommendations. However, each improvement project should be



The recommendations are the result of hours of in-depth conversation.

evaluated before and after it is completed so that air quality concerns can be addressed. Noise impacts are somewhat easier to address from a qualitative perspective. Lower speeds and managed traffic generally results in lowered noise levels. Again, the Transportation Advisory Committee will be in a position to interact with the community and monitor the environmental criteria.

ECONOMIC VITALITY

The recommendations were carefully crafted in light of the need to protect access to the businesses and places of employment. The CAC recognizes that these land uses are the tax revenue engine that makes the area prosper and in fact key reasons for the attractiveness of the CDTS neighborhoods. Each recommendation and solution set respects the needs of the business community..

It will be up to the Transportation Advisory Committee to coordinate with the business interests in Central Denver. Traffic issues should be addressed in such a way that competing interests are satisfied to the greatest possible extent, without compromising the goals of retaining quality of life in the neighborhood

The CAC recognized that it is not possible to conduct one traffic study and have that be the final answer, although that idea is certainly appealing. Responding to traffic is an on-going task that requires vigilance. Thus, this Plan strongly endorses a set of measures to create a dynamic arrangement for addressing never-ending transportation challenges

Creation of a Transportation Advisory Committee is key to providing the means for better traffic management in the City.

**OVERALL
RECOMMENDATIONS**

The Overall Recommendations are the foundation for any and all of the specific street solutions and have City-wide implications. They fall into five basic categories: Engineering and Traffic Management, Education, Enforcement, Planning, and Public Transportation.

Engineering and Traffic Management

As the CAC was creating its solution set of recommendations, it became obvious that many citizens disagree with or don't understand how traffic problems are addressed City-wide. Further investigation revealed various problems as the root of the basic difficulty.

◆ There is no City traffic management master plan or major thoroughfare plan with agreed-upon concepts and relative priorities. This results in the generation of traffic studies that are always handicapped by not being part of a larger framework and thus have difficulty in resolving all of the issues they are meant to solve. Over time, studies have varying goals, are conducted for different purposes, and usually have different participants. This has resulted in a legacy of reports that citizens and city staff must interpret and implement. Sometimes, this has led to mistrust between citizens and City staff.

◆ The shortage of City staff makes it difficult to deal with increasing neighborhood traffic problems in a timely way, and only adds to the perceived lack of credibility. In researching comparable cities (i.e. Kansas City, Seattle, Portland, San Diego, etc.) the project team found that Denver has significantly fewer traffic engineering staff and less budget to address traffic concerns.

The CAC recommended four engineering and traffic management related courses of action to address traffic management problems:

1. Create a City-wide "Transportation Advisory Committee" and provide the necessary staff to support it.
2. Formulate a City-wide Traffic Management Master Plan and Major Thoroughfare Plan to be added to the City's Comprehensive Plan. Given the upcoming update of the Comprehensive Plan, creation of a transportation master plan could be part of the Comprehensive Plan effort.
3. Establish the budgets and supporting policies to fund both the Commission and the Plan.
4. Provide adequate staffing to support a neighborhood transportation management team.

Developing the specifics of a Transportation Advisory Committee is the first task.

Creating such a committee will require additional thought and input from a range of stake holders. The project team and the CAC suggested that the following guidelines be considered by the City as it moves forward with the creation of the TAC

- ◆ Establish a citizen-based Committee: this body would be charged with overseeing resolution to transportation problems, setting priorities, and making recommendations to City officials and staff for specific improvements to the transportation system. This Committee will act as a liaison between the City and the public and provide a forum for hearing public concerns and setting goals. It will be the body responsible for seeing that implementation of the recommendations made in the Central Denver Transportation Study (as well as in subsequent City traffic studies) are prioritized and carried out.
- ◆ Nominate and appoint the Members such that nominations come from Council and from the Mayor; the Manager of Public Works would be responsible for all appointments. Appointed Members should receive technical and committee operations training prior to starting operations.

This training should include a basic overview of transportation planning, traffic engineering, and a primer on the roles and responsibilities of their job as Members, similar to the training set up for new legislators and congressional Members. The Members can serve as the eyes and ears of the City as well as act as stewards of traffic management throughout the City. They can deal with public and neighborhood traffic concerns in more depth than City officials alone.

- ◆ Set clear lines of authority and responsibility together with the methods for public interaction. The traffic management staff could be a section of Traffic Engineering. Wherever seated, the new staff must have a clearly understood relationship within the Traffic Engineering and Transportation Planning Divisions, and the Planning Department

In setting up the TAC, the City should strive to ensure fair neighborhood representation and appropriate demographic distribution. The City should consider the following ideas:

- ◆ TAC members should represent a wide array of community interests including businesses, neighborhoods, commuters, and perhaps traffic experts.
- ◆ Regular monthly meetings should be scheduled, and a time for public comment should be incorporated.

- ◆ Regular public forums should be scheduled, perhaps every four months.
- ◆ The Police, Public Works, and Planning Departments should assign staff to attend the TAC meetings. This may require additional staffing for the Police and Planning Departments.
- ◆ The TAC should appoint a chair and vice-chair to conduct meetings and represent the TAC.
- ◆ All neighborhood plans should be reviewed by the TAC prior to their inclusion in the Comprehensive Plan to ensure consistency among City-wide transportation plans and common intentions
- ◆ The TAC and City staff should issue a neighborhood traffic management handbook to educate the public about management tools, functions, and limitations.

A regular meeting should be set up, perhaps 3 times a year, to meet with Council and the Mayor's office to discuss upcoming issues, related policies, and direction for future action.

The Committee should serve as a technical advisor to the Planning Board on transportation issues. The Planning Board is focused on its primary duties associated with land use management and development oversight..

The Transportation Advisory Committee could oversee preparation of major transportation plans and forward them to the Planning Board for review, revision, and adoption. This approach will allow traffic-related issues to have their own forum and free the Planning Board to deal with broader City issues

Creation of a Committee should alleviate some of the need for continuous future studies. However, realistically, when plans and studies are needed, the TAC can serve as an effective forum for the public involvement portions. The proposed City-wide Traffic Management Master Plan and Major Thoroughfare Plan will guide the Committee as they recommend individual improvements, budgets, and other changes. As part of the updated Comprehensive Plan, traffic management and planning, zoning, and other City policies need to be consistent. Only in this way will policy and direction set by the City be clear.

Finally, the Council should seek adequate funding not only for the TAC and its staff, but also for implementing improvements such as those recommended in this Report. Council policies may have to be created to assure the smooth functioning of the Committee. The CAC understands the fiscal implications of this suggestion and informed those who attended public meetings of the need to provide additional funding for the Committee function, as well as for implementation of traffic management measures.

"The study has provided the opportunity for the citizens of central Denver to finally begin to adapt to its growing transportation problems. We have found that the available solutions are limited to difficult choices between fundamental lifestyle changes. Business and residential neighbors have begun to realize that we are all in this together and that much work is left to do after the study is approved. Consensus will have to be built for the broad solutions necessary to maintain the quality of life that keeps us all living in Denver.

—Bill James

Colorado law may, at this point in time, not be conducive to such practices. However, many other states have successful impact mitigation measures. (Florida's concurrency program is well over 10 years old.) And the predictions of economic problems voiced by the development community have proven to be unfounded. In Florida, the economy is robust, development pays its fair share, and the median cost of a typical home is less than in Denver.

Public Transportation

While the City does not have direct responsibility for transit, the Study supports greater participation by the City in bringing increased and more creative transit service to the core neighborhoods. More transit opportunities, at a scale consistent with the neighborhoods they serve, is a key goal of this Study and is one cornerstone for reducing traffic congestion. The CAC defined scale to mean smaller, friendlier vehicles operating within a schedule that meets the needs of the neighborhoods. Concepts such as the Boulder Hop, jitney-type services, local circulators, and innovative upscale transportation systems should be explored.

Public transit decisions are largely within the venue of the Regional Transportation District (RTD) but must meet with State and Federal guidelines/legislation. Other studies mentioned earlier (MIS efforts and DRCOG's 2020 Plan) are also considering transit options.

The CAC supports these efforts and remains committed to improving the public transportation system. RTD staff regularly attended Study meetings, and the project team met with RTD throughout the Study. Any lack of depth in the public transportation recommendations should not be construed as a lack of interest. It is simply that detailed plans for public transportation are taking shape in other arenas.

Throughout the Study's public meeting process, many people were quick to point out that transit is critical to any solution for reducing traffic congestion. The CAC quickly realized that while transit sounds good, it is the riders that make it successful - including residents within the study area. Too often people assume that someone else must use transit so that the streets are cleared for their own personal mobility..

The Study is fundamentally rooted in its recommendation that transit play an ever-increasing role in reducing the effects of traffic on neighborhood streets.

The CAC noted that a change in our traditional way of thinking about how we travel is a necessary step not only for regional travelers, but also for Central Denver residents.

Wherever possible, the City should seek ways to give transit and high occupancy vehicles travel time advantages through use of designated lanes, signal priority, and other measures. Single occupant motorists need to see that transit is quicker, more convenient, or both. The Transportation Management Associations (TMA) in Downtown, Cherry Creek, South Colorado Boulevard and the Medical Center should be tirelessly promoted. Financial incentives to employees who carpool or use transit should be applied as broadly as possible. Where appropriate, disincentives may be necessary for those who continue to drive alone when other options are available.

Bicycle/Pedestrian Facilities

Other options for travel include using bicycles for transportation purposes, not simply recreation. The City and County of Denver is systematically implementing the recommendations of the 1993 Bicycle Master Plan. In 1996, Denver was rated one of the top ten bicycling cities in North America (number six) and continues to provide an excellent network of bicycling facilities both on-street and off-street. The project team coordinated recommendations in this Study with Denver's bicycle planner. The CAC is supportive of improving the bicycle network as well as pedestrian amenities.

SPECIFIC RECOMMENDATIONS FOR STREET IMPROVEMENTS

This Report contains recommendations that can be phased in over time and that allow for interim evaluation without undermining the Study or forcing exhaustive new studies.

The recommendations are classified as near-term improvements (relatively low-cost implementation), mid-term improvements (moderate-cost capital improvements or improvements that build upon near-term improvements), and long-term improvements (requiring larger capital investment or more time to implement).

Recommendations are presented with near-, mid-, and long-term objectives. Since funding options and staff availability are currently unknown, no time estimates have been attached to these recommendations. It is the intent of the CAC that this Study and the various changes to streets be done in a balanced way so that specific objectives are met and overall benefits are derived.

Studies of "before" conditions involving collection of recent traffic counts, speed data and similar informational studies should precede any improvement project. This information will be vital in assessing what kind of change in traffic characteristics has resulted from a project.

Many street improvement recommendations are really the basis for City-wide programs. The key programs are photo-radar enforcement of speeding and urban design treatments. The CAC endorses current City efforts to use photo radar enforcement. The CAC also calls for development of a pilot program for speed tables to test their viability as a traffic calming tool, the citizens' acceptance of them, and their effect on reducing speeds. To do this, the Transportation Advisory Committee must create a policy for installation, design standards, maintenance requirements, and evaluation and removal, that meet responsible engineering practices.

It is imperative that the City adopt a position that it is pursuing these elements on a trial basis for the purpose of improving neighborhood quality of life. As such, the City proper will need to address perceived liability associated with installation of speed tables. This Study recognizes that if installed speed tables do not prove useful, removal is an appropriate action.

NORTH/SOUTH STREETS

Washington/Emerson/Clarkson

These streets are presently one-way, two-lane facilities with off-peak parking permitted in some blocks. It is the long-term objective of this Study to revert Washington and Emerson Streets to two-way operation between I-25 and Speer. This will only be accomplished in a phased fashion in such a way that corridor traffic is equitably distributed to adjacent streets which are monitored at common cross streets. In the near-term, Washington and Emerson between I-25 and Speer should change to have one lane of traffic with parking on both sides of the street, 24 hours a day. Special signing will be deployed north of I-25 to alert motorists that they are entering a neighborhood and that street operations have changed. The City will pursue means to achieve lower operating speeds through tighter signal progression and stricter enforcement.

Mid-term objectives for this couplet include installation of urban design amenities such as gateway signs and monuments to advise motorists that they are entering residential neighborhoods

If two-way operation is to be achieved as a long-term objective, removal of traffic signals and installation of stop signs will need to occur in accordance with warrants and City policy. One opportunity for two-way operation may occur if the I-25 ramps are closed as part of improvements to the highway. Such a ramp closure would have impacts to those ramps which remain open between University Boulevard and Lincoln Street. Serious neighborhood issues surfaced during previous studies of potential ramp closures. Those issues included increased negative impacts on streets which still had ramp access and a concern about additional traffic circulating through neighborhoods due to lack of access to I-25. Any future study of potential ramp closures should carefully evaluate traffic diversion to assure that no neighborhood would be adversely impacted. As with all long-term objectives in this Study, the recommendation of two-way operation should be reassessed when and if circumstances change.

Recommendations for specific street improvements must be treated as a "package deal" for them to be fair and effective. At the same time, the City must make changes carefully and cautiously to assure proper results and avoid unnecessary impact.

Washington and Clarkson Streets from Speer to Colfax should undergo changes similar to Washington and Emerson south of Speer, except that the long-term objective is for these streets to remain one-way, one lane, with parking on both sides for 24 hours a day.

Mid-term objectives for this couplet include installation of urban design amenities such as gateway signs and monuments to advise motorists that they are entering neighborhoods.

Downing/Corona

Downing from I-25 to Speer is a two-way street that should continue to provide area circulation and access to Washington Park and its adjacent neighborhoods. However, this Study recognizes that Downing is also a residential street and efforts must be made to enhance that character. In the near-term, improved pedestrian amenities, a parking management program, and related urban design amenities should be pursued to make Downing more "livable." Selected intersections where lane widths are greater than they need to be should be narrowed to slow vehicle speeds.

The City should pursue means to achieve better compliance with an operating speed of 25 mph through tighter signal progression, stricter enforcement, and application of traffic management elements such as photo enforcement.

North of Speer, Downing and Corona Streets should continue to operate as a one-way couplet but with greater emphasis on the neighborhood character of the streets. These segments should be changed to have one lane of traffic with parking on both sides of the street 24 hours a day. This is a general goal and may vary along the street in specific areas where needed. For example, near the Dora Moore School and neighborhood shopping commercial area, parking may need to be reduced to allow for turning movements so that traffic flow is not impeded. Additionally, specific attention should be focused on Downing between Speer and 6th Avenue, where the street is wider and more than one travel lane is possible even with parking on both sides of the street. Finally, RTD bus operations along Downing may require changes to the parking scheme within the one-lane concept at various locations.

York/Josephine

Extensive evaluation showed that this one-way couplet could not be reverted to two-way operations without major capital investment and without causing significant traffic shifts to other streets. The overall goal for York and Josephine Streets is to reduce volumes within realistic bounds, and improve vehicle behavior dramatically. Near-term objectives include off-peak parking on both



sides of the street so that only one lane of traffic is available outside of commuting hours. During peak periods, this couplet will have two lanes but with a reduced operating speed. While tightened signal progression is one means of achieving this goal, the recommended course for reducing operating speeds is through application of urban streetscape and traffic calming techniques. Selected intersections will be narrowed in the near term to channel and slow traffic in a safe manner. Mid- and long-term objectives for York and Josephine Streets are to extend the streetscape program from Colfax to 3rd Avenue. The intention of this effort is to use urban design techniques to signify to motorists that they are in a neighborhood and should drive accordingly. The specific elements of this streetscape need to be integrated with the Botanical Gardens streetscape plans and the existing designs at 3rd Avenue where the Cherry Creek North Shopping District begins.

Grant/Logan

While not a primary focus of this Study, these streets must be

considered so that they are not burdened by shifting traffic caused by changes to other streets. Currently Grant and Logan operate as a one-way couplet north of Speer, with Logan becoming the primary two-way street south of Speer to I-25.

Lane marking changes on Logan at I-25 are recommended for the near term as a means of discouraging regional traffic from using the street. Such changes to turn lanes and through lanes would make it less inviting for cut-through traffic. Off-peak parking for Logan, north of Speer, is recommended as a near-term measure. Increased enforcement, possibly with photo radar technology, is also a near-term recommendation. Mid- and long-term objectives include consideration of urban design amenities such as streetscape on Grant north of Speer, extension of medians along Logan, installation of traffic signals and improvements to pedestrian crossings (like better markings or perhaps shortened crossing distances via curb extensions).

Finally, in the long term, an improved linkage between the West Washington Park neighborhoods and the light rail station at Broadway/I-25 should be pursued. It is difficult for residents to cross Logan and Broadway to get to the LRT station either as drivers or as pedestrians. An enhanced, or readily identifiable "connection" between light rail and residential neighborhoods is a crucial step toward getting people out of their cars and onto the transit system.

EAST/WEST STREETS

Alameda Bridge

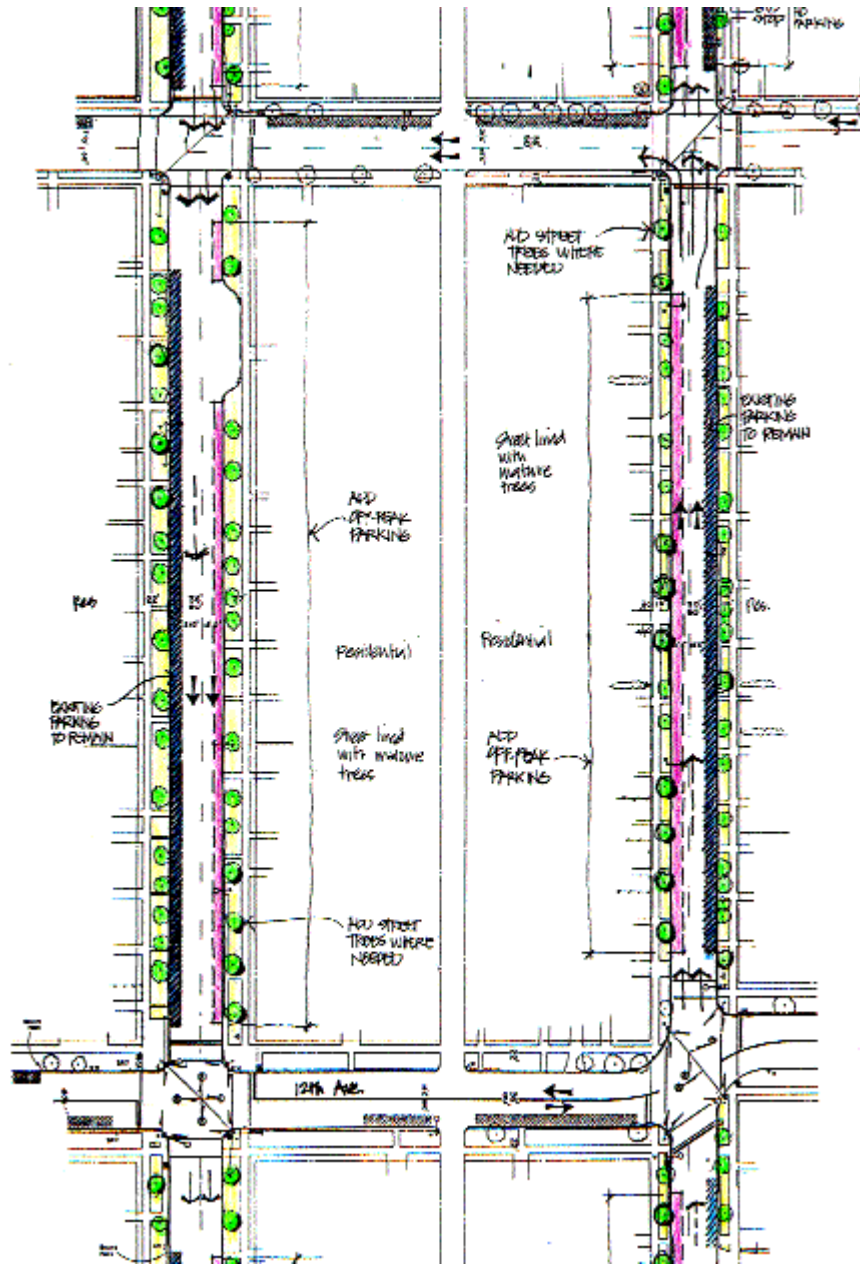
While east/west mobility is of critical importance to the entire area addressed in this Report, connecting Alameda Avenue across Cherry Creek does not provide sufficient traffic benefits to recommend building a bridge. This Report recommends that no bridge be built as part of near- and mid-term objectives. With regard to long-term objectives, 1996 projections of future conditions suggest that this recommendation does not change; a bridge is not worthwhile because it does not resolve the east/west regional traffic dilemma. As with all long-term objectives contained in this Report, the "no bridge" recommendation should be reassessed when and if circumstances change.

Alameda Avenue

West of Cherry Creek, Alameda Avenue should remain as is, with two lanes between University and Franklin. Alameda Avenue should receive traffic management actions to better control traffic behavior in the near- and mid-term. The City should pursue means to create operating speeds of 25 to 30 mph by pursuing more stringent enforcement, perhaps with photo radar.

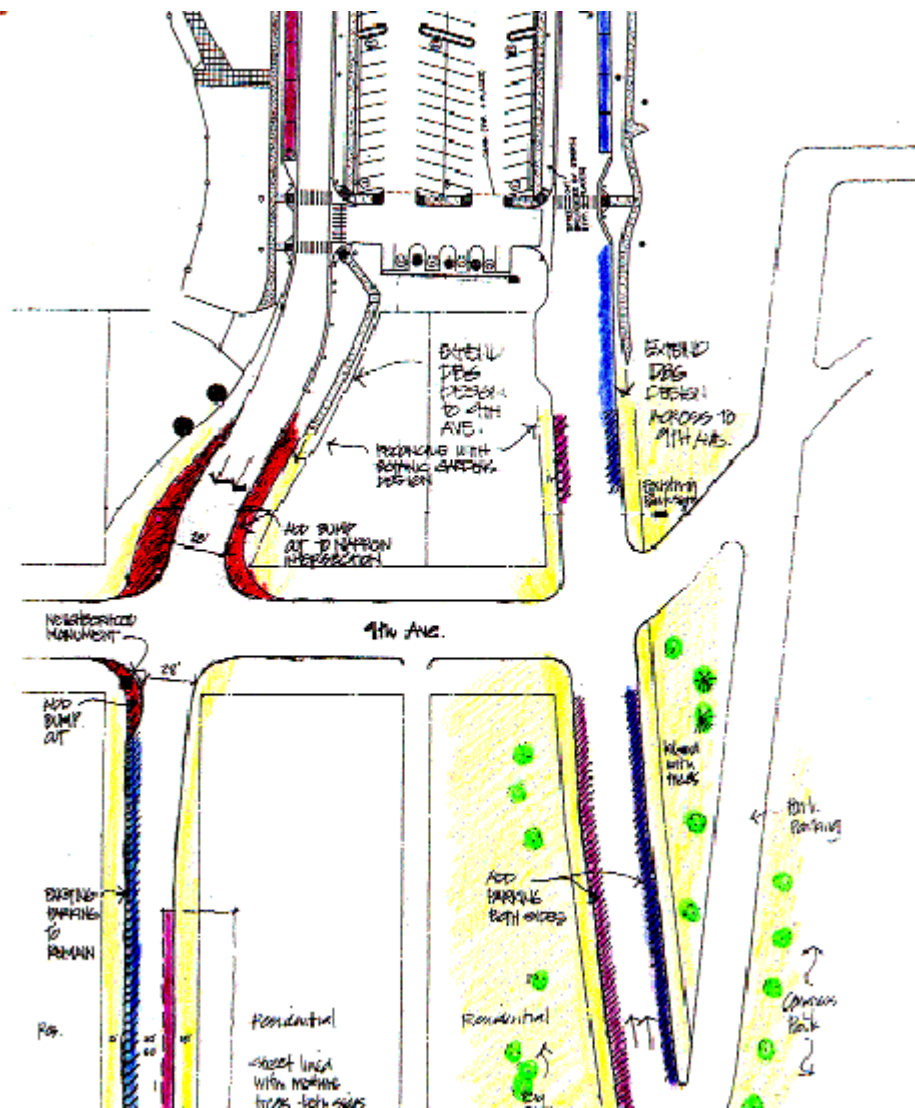
Urban Design Concepts for York and Josephine Streets

Urban design elements used in conjunction with traffic management & calming.



Urban Design Concepts for York and Josephine Streets

Urban design elements used in conjunction with traffic management & calming.



6th/8th Avenues

Those who live along the eastern segments of this couplet seek protection from potential traffic created by Lowry redevelopment and continued growth in the suburban commuter traffic. The CAC reaffirms community sentiment that east of Colorado Boulevard, 6th and 8th Avenues are not intended to be regional traffic corridors.

The CAC acknowledges that the recommendations for the eastern segments of 6th and 8th Avenues may not coincide with the intentions of the Lowry Plan. There is no time frame associated with the recommendations of the Lowry Plan. It states that the "transportation section is primarily long-range in focus and needs further refinement, particularly relative to interim activities and phasing." The CAC supports the recommendations for 6th and 8th Avenues which have emerged from residents representing the neighborhoods adjacent to Lowry. It endorses using the Lowry Redevelopment Authority and the proposed Transportation Advisory Committee as the means to resolve conflicts which may arise regarding the recommendations their timing, and their relationship to other streets and developments in the area.

Near-term objectives recommended include establishing lower operating speeds through tightened signal progression and increased enforcement (photo enforcement). One travel lane each way on 6th Avenue with bike and parking lanes along the curb between Quebec and Colorado Boulevard is desired.

Pedestrian crossings and school zones should draw greater attention with more signs and markings.

Similarly, one travel lane each with parking on both sides of 8th Avenue is generally recommended. Exceptions on both 6th and 8th Avenues are noted near Colorado Boulevard, at Hale Parkway, and at Monaco. These recommendations should be refined where adjacent land uses and signalized intersections indicate the need. Mid-term objectives include relocation of mid-block signals to intersections. The community recognizes that they must support the relocated signals, or the City will be unable to meet this objective. Mid-term objectives include development of an urban design plan to support street laneage, enhanced transit stops, and improved pedestrian amenities.

West of Colorado Boulevard, 6th and 8th Avenues will continue to operate as one-way pairs, but with more attention to traffic management. On 8th Avenue west of Colorado, the near-term objectives call for two travel lanes and a full-time parking lane along the north curb line. At the York/Josephine intersections, three travel lanes will remain to avoid localized congestion that would result in cut-through traffic to adjacent streets. West of York, an off-peak parking plan will be created that is tailored to the special conditions of each block (it is noted that some blocks support full-time parking because of previous street widening).

Mid-term objectives call for relocation of mid-block signals to intersections and re-installation of a signal on 8th at Garfield. An urban design plan will be initiated to complete the sidewalks along Congress Park, reinforce parking and laneage concepts, enhance bus stops, and narrow selected intersections to improve pedestrian crossings.

Near-term objectives for 6th Avenue west of Colorado Boulevard call for restriping the approach to the intersection so that there are two left turn-lanes, one through-lane, and one right-turn lane. Design efforts are likely needed to determine if minor construction is necessary for this concept. In addition, the City should pursue partial or full closure of Harrison south of 6th Ave. to create egress only or a cul-de-sac and stop cut-through traffic problems. The mid-term and long-term objectives for this segment of 6th Avenue will dovetail with the urban design program recommended for 8th Ave.

Speer and 1st Avenue

Technically serving both north/south and east/west travel demand, this linkage west of University Boulevard has been criticized by its adjacent neighborhoods for encouraging speeding and high volumes of traffic. This linkage, on the edge of these neighborhoods, serves as a vital connection between the Cherry Creek urban village and Downtown Denver.

This Study recognizes that this function is necessary and recommends that near-term objectives address the behavior of the traffic.

Tighter signal progression is recommended. This is best accomplished by extending the computerized traffic signal control system the City is starting to construct downtown. Increased enforcement via photo radar and speed advisory sign-trailers are also strongly encouraged.

Near- and long-term, this Study recommends increasing transit usage with an emphasis on moving more people rather than more vehicles. The City should explore the utilization of the traffic control system to provide priority treatment for buses and jitneys and shuttles. The best hope for reducing traffic pressure on Speer is building regional roadway improvements, and light rail lines on I-25 and Santa Fe Drive. The Eastern Transit Corridor identified in the Vision 2020 Plan will also provide a significant opportunity to reduce or offset growth in traffic. For this reason, and in support of increasing transit opportunities, the CAC strongly supports development of those regional facilities in the shortest time possible.

It is the desire of the CAC to maintain Speer Boulevard and 1st Avenue in their historic context. No additional laneage is to be added; this is consistent with the Memorandum of Understanding signed by the City of Denver and the State Historic Preservation Office.

Cherry Creek Area Streets

Cherry Creek access and circulation issues are treated differently because of its function as an urban village. The Cherry Creek retail area represents a significant portion of Denver's sales tax revenue. The area has a national reputation for its charm, amenities, and desirability. One of the goals of this Study is to support and enhance the commercial viability of this area through improved circulation in balance with the needs of adjacent neighborhoods. The Cherry Creek retail area should be easy to access, but not encourage regional through traffic.

The near-term objectives in this area involve a wide range of actions. Pedestrian and bicycle linkages from adjacent neighborhoods south across the Creek and east across Steele Street should be improved. The neighborhoods, with the support of the City, should pursue vacation of Steele between Cherry Creek Drive South and Alameda, thereby creating an esplanade facility for parking, pedestrians, and bicycles. Vacation of Steele should be done in a way to allow public access for pedestrians and bicyclists. The parking and landscape areas would become the responsibility of the adjacent land owners. In conjunction with this, the ability of pedestrians and bicyclists to cross Alameda and Cherry Creek Drive South at Steele should be improved.

Extension of a designated bike lane on Steele south of Alameda will encourage bicycling while narrowing traffic lanes, thus calming traffic in that neighborhood.

Traffic management and urban design plans should address 1st Avenue from Steele to Colorado. Similar efforts should be prepared for Bayaud, Ellsworth, 2nd, and 3rd between Steele and Colorado.

Finally, a partnership should be formed among the City, RTD, merchants, and residents to develop and implement a transit circulator tailored to the needs of shoppers, employees, and residents. This is something that will occur within the venue of the Colorado Boulevard/Cherry Creek Area TMA. The transit circulator program should focus on:

- ◆ moving nearby residents in and around the village;
- ◆ encouraging shoppers to park their cars (which implies shared parking arrangements) and take the circulator using comfortable facilities and convenient schedules; and
- ◆ integrating commuter needs and retail needs for residents, shoppers and local employees

Mid-term objectives for the Cherry Creek retail area include working with the proposed Traffic and Transportation Advisory Committee to study and resolve a transportation corridor extending east from the Cherry Creek retail area along Cherry Creek to Iliff.



Throughout the Study area, the convenience of commercial areas mixed in with residential neighborhoods adds to the quality of life.

The criteria for this effort must be based on several key assumptions:

- ◆ the corridor must be designed for Cherry Creek retail area and shopping area access only and not provide an attractive commuter route to downtown;
- ◆ it must be multi-modal in nature;
- ◆ it should reduce traffic in adjacent neighborhoods; and
- ◆ it must be environmentally compatible with the Creek and adjacent neighborhoods.

The design of a Cherry Creek Corridor should use the model output from this study as a starting point. In general, the roadway design should consider the following:

- ◆ two travel lanes and necessary turn lanes from University to Alameda;
- ◆ between Alameda and Colorado Blvd. there should be travel and turn lanes consistent with the design goal of providing direct access from the corridor into the Cherry Creek retail area.;

- ◆ four travel lanes (assigned to vehicles and transit) and necessary turn lanes between Colorado Blvd. and Quebec; and
- ◆ two travel lanes and necessary turn lanes between Quebec and Iliff.

The CAC recognized that a route which encourages multi-modal transportation may also attract commuter traffic. Thus, a careful balancing of the needs of a successful transit line with the desire to not attract commuters in single occupant cars must be achieved. Flexibility and creativity are encouraged as the design and implementation of such a corridor is conducted. Long-term objectives for access to and circulation within the Cherry Creek neighborhoods are simply to implement what is planned and designed in the near- and mid-term efforts.

OTHER KEY STREETS

Colfax & Broadway/Lincoln

The study area is bounded on the north by Colfax and on the west by the Broadway/Lincoln couplet.

This Study recommends that these streets maintain their current configuration and that efforts be made by the City to improve traffic flow on them so that traffic is more attracted to them.

In the near-term, this is best accomplished by implementing the computerized traffic signal control system the City is constructing. Central Denver mid- and long-term objectives involve developing means to improve transit operations so that transit vehicles gain travel-time advantages over single occupant vehicles. This will likely be accomplished through the computerized traffic signal control system, and with key intelligent vehicle technologies being installed on transit vehicles that can advance the signals to promote transit flow. The ultimate goal is to make transit a more attractive option and move commuters from their cars to transit. As a near-term objective, the City should coordinate closely with DRCOG to maximize the productivity of recently installed communications links between traffic signals so that traffic progression is taken to its highest level.

The City is currently considering ways to allow multi-occupant cars in the bus lanes on Broadway/ Lincoln during peak hours. This effort is endorsed by the CAC as a good way to move more people and not just more cars.

Colorado Boulevard

Colorado Boulevard bisects the study area and is the major north/south street for moving regional traffic. However, this roadway is lined with significant commercial developments that generate traffic of their own. While there are still residences that face Colorado Boulevard between Colfax and Alameda, it is necessary for Colorado Boulevard to process as much traffic as possible. This is true from a regional viewpoint as well as from the perspective of adjacent neighborhoods which do not want excess traffic to spill into the neighborhoods. The street is reaching its physical capacity to carry cars and this Study's recommendations are based on moving more people, not more cars.

Mid-term and long-term objectives are to implement the improvements identified in the Colorado Boulevard Master Plan. Transit priority and perhaps a transit/HOV lane should be evaluated as an opportunity to move more people. It is clear that Colorado Boulevard serves both local access and regional travel purposes. Thus, multi-modal opportunities must be envisioned in the context of which travel demand segment is being served. Reducing the number of curb cuts and consolidating access points is also a critical element for Colorado Boulevard.

Finally, reconstructing I-25 will mean an improved interchange with Colorado Boulevard. This Study fully endorses that effort.

Activities and actions sponsored by the two Traffic Management Associations (South Colorado Boulevard and the Medical Center groups) are fully endorsed by the CAC.

IMPLEMENTATION PLAN

Upon completion of crafting the solution set, the City and the CAC recognized that funding limitations and time constraints would play a major role in implementing the recommendations. The project team conducted an evaluation of solution groupings, sequencing, and likely costs to identify a plan for implementing the various components of the solution set. Near-term objectives were the primary topic of this effort because there are too many variables and unknowns to permit detailed implementation planning for mid- and long-term objectives.

It should be noted that this Implementation Plan does not presume to have developed final design for the various projects with the solution set recommended by the CAC. Sufficient design details have been assumed to permit reasonable opinions of probable cost to be developed. These costs, in turn, then allow the City to develop budget allocations for coming fiscal years. **Assumption of these design details for budgeting purposes does not imply that the final design will take that form.**

Also, it is important to recognize that the steps identified in the Implementation Plan are subject to on-going review and consideration by the Transportation Advisory Committee.

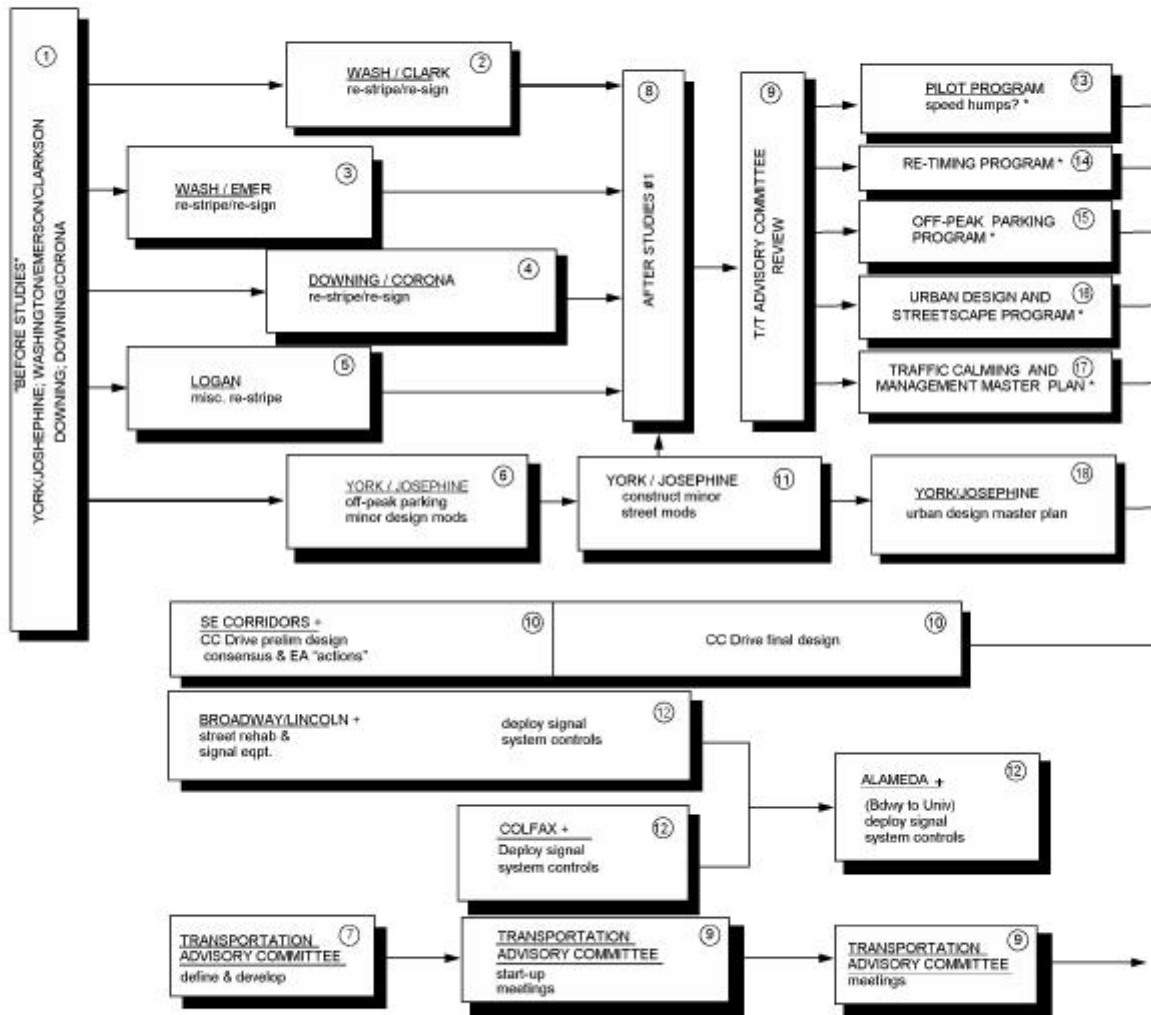
The Committee is expected to monitor results of near-term objectives, determine what further components of the solution set should be implemented, and recommend appropriate projects to the City for implementation. While the flow chart and the tables used in describing the Implementation Plan present various steps as discrete elements, the intention of the CAC (and the overall CDTS process) remains as originally presented earlier in this document. That is, there must be a smooth, integrated flow of street changes so that no neighborhood benefits at the expense of another

Suggested Implementation Plan

FY 97

FY 98

FY 99

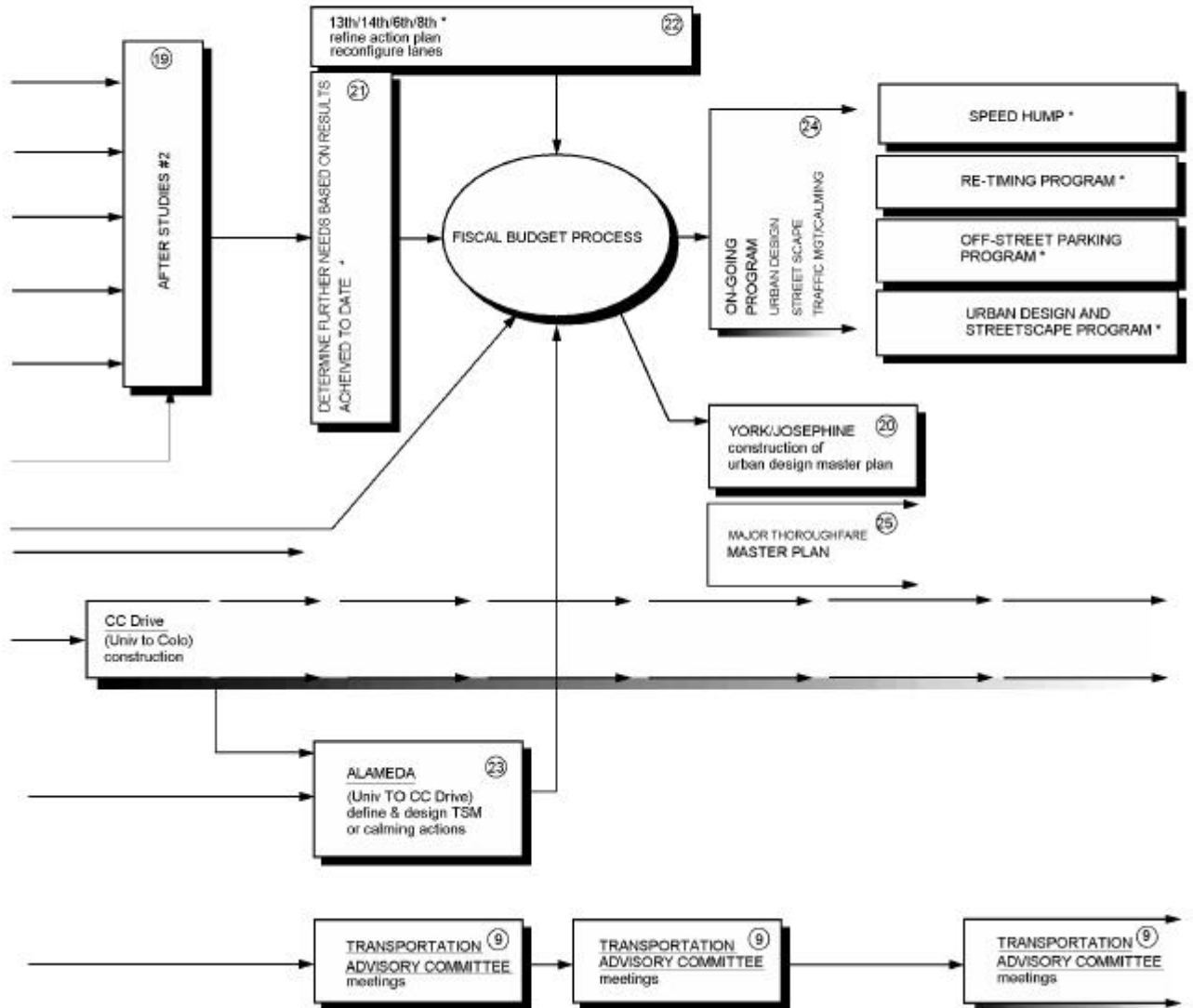


* indicates improvements to be coordinated by Transportation Advisory Committee

+ indicates improvements to be completed by City outside of CDTS process

FY 00

FY 01



Plan Details

There are five parts to the Implementation Plan:

- ◆ a flow chart which illustrates how individual projects should be deployed;
- ◆ a summary table of the Implementation Plan;
- ◆ a narrative which describes the assumed parts of each individual project;
- ◆ a spreadsheet which tabulates the projected costs; and
- ◆ a brief description of the unit/items used in the estimate of probable costs.

The first two components described above are included in this document. The last three items are incorporated into the Appendices to this document.

Flow Chart

This figure shows the sequence and order of the projects within the recommended solution set of the CDTS Final Report. Again, it is important to note that each project is shown individually as well as within a general time frame. Yet, the sequence and nature of each project must remain flexible. This is because actual deployment of any one project must be based on the success of previous related projects, budget considerations, and input from the Transportation Advisory Committee. Many projects are tagged to indicate that they need to be evaluated by the Committee using results from initial projects.

Funding limitations and time required for design and construction will also have a major impact on the schedule. Also, the time between an initial project and a follow-up project will need to vary. It may take longer for some projects to create the desired effect, or for results to be known given seasonal variations in traffic.

Summary Table

This table is keyed to the flow chart and provides a brief written discussion of the items contained in the flow chart. For more information, users of this Final Report should refer to the Project Descriptions.

Finally, several projects identified in the flow chart are City-efforts which will occur outside of the specific implementation of CDTS recommendations. Examples include deployment of the signal control system on Broadway/Lincoln, Colfax and Alameda, and design/construction of Cherry Creek Drive between Colorado and University Boulevards.

Cost Issues

The CAC recognized that improvements and changes to the streets of Central Denver will cost money. Participants in the CDTS process frequently were asked if they understood this fact, and more importantly, were they willing to bear the burden for those costs. The response was invariably strong and clear: residents of the area are willing to pay for improvements (i.e., greater

taxes) as long as there is a guarantee that the funds collected are spent solely on transportation projects.

Reduction of other services provided by the City was not an attractive alternative for generating fiscal resources to pay for roadway improvements. The consensus was to collect additional revenue and earmark it directly for traffic management or calming projects.

The CAC believes its recommendations to be a reasonable and prudent compromise among diverse neighborhood interests. The City participated fully in all aspects of the process. The CAC and the City have shown mutual interest in building trust and working together. Therefore the CAC expects that the City will take the steps necessary to implement these recommendations, and to commit funds to ensure adequate staffing as well as capital improvements.



TRADE-Offs

And the Art of Balancing Complex Issues

**Central Denver is
attractive; people want to
live, work, & shop here.
This means traffic.**

Everyone involved in this Study and planning effort recognized that there is no easy, perfect solution to Denver's traffic and transportation woes. Discussions of even the seemingly simplest topics quickly led participants to see that there are many facets to any given problem and just as many opinions on how to resolve that problem. Frequently, it was a challenge to gain agreement on whether an issue was really a problem at all.

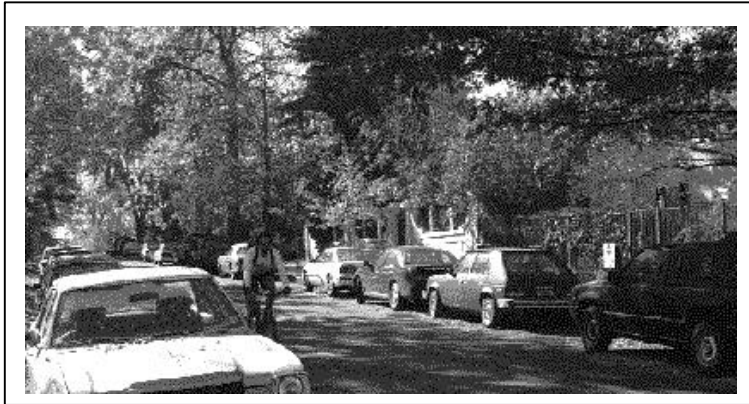
Mobility, and the inherent freedom that it represents, is a very personal issue; what is good for one person may be unsuitable for another. Likewise, what helps one person frequently hinders another. This was evident throughout the Study. The very things that make Central Denver a desirable area to residents and businesses - convenience, accessibility, a dynamic and attractive environment, cultural resources, quality housing, and parks - contribute to mobility issues and traffic concerns. This begs the question: what is the price of being a part of the Central Denver neighborhoods and is it worth the cost? Costs can be measured in a variety of ways including economically, socially, and environmentally.

The CAC carefully considered numerous potential trade-offs in formulating the recommendations contained in the Study. Many "big-picture" trade-offs were discussed including:

- ◆ Is it reasonable to sacrifice the use of existing streets in the Central Denver neighborhoods for regional accessibility which enhances the economy, but harms the neighborhoods?
- ◆ Are we willing to accept slower-moving traffic that has less impact on neighborhoods but potentially worsens air quality levels because of increased congestion?
- ◆ Can we accept building a new road or freeway which serves tens of thousands of vehicles each day, but forces the removal of homes and relocation of residents?
- ◆ Will residents of Central Denver neighborhoods accept a trade which slows traffic, but also causes increased travel time and delay for the residents themselves?
- ◆ Will the "big brother" aspects of photo enforcement be an acceptable trade-off for traffic that is more likely to obey posted speeds?

"The City must be ready to rethink its solutions for traffic issues by understanding and believing that neighborhoods want change now."

—Debbie Parsons



Trade-offs to maintain quality of life should reflect local values.

- ◆ Will Denver residents be willing to pay for the increased City staff, and costs associated with a Transportation Advisory Committee and the construction/maintenance of proposed improvements?
- ◆ Will Denverites support funding expensive infrastructure such as light rail?
- ◆ Can there be an equitable balance between development/redevelopment and the quality of life in residential neighborhoods?

The recommendations in this Study reflect the CAC's assessment of these questions and set a new direction for how the City deals with transportation issues. The CAC believes that automatic, continuous upgrade and expansion of the roadway system, while it will move traffic

more efficiently, has too dear a price: the erosion of the quality of life in the neighborhoods.

On behalf of their neighborhoods, the CAC chose the recommended solution set to strike a better balance between traffic movement, mobility, and neighborhood and business concerns. In doing this, the CAC accepts the fact that at least initially, the streets will seem more congested, traffic will move slower, personal mobility will be decreased, and traffic law enforcement will be more stringent. For this trade-off, the CAC expects a safer street system, less traffic intrusion on the neighborhoods, a slower and more comfortable traffic pace throughout the study area, and a generally higher quality of life for those who live, work, shop, and play in the Central Denver area.

The CAC believes that our homes, businesses, and cultural amenities

are the very fabric which constitutes the quality of life in Central Denver. This is part of the heart of Denver and the entire metropolitan region. For the region to be healthy, the heart must be healthy. Thus, a key trade-off is that to protect this asset, it is worthwhile for the metropolitan region to contribute to its well-being. This contribution takes the form of changing the very nature of the street system in Central Denver with the result that regional and area commuters change their travel habits and take mass transit, carpool, or any number of other choices. This also requires financial support from local and regional residents to build a better regional transportation system which doesn't rely on the streets of Central Denver's neighborhoods.

There are also societal and cultural changes which must occur for the Central Denver neighborhoods to have traffic conditions that contribute to the desired overall quality of life. Employers should encourage flexible work schedules; find means to allow employees to coordinate with transit schedules; utilize telecommuting opportunities; and participate in incentive programs for employees who do not commute as a single driver in a car.



At public meetings, local residents discussed the trade-offs to achieve neighborhood transportation goals

The Central Denver Transportation Study recommendations propose a trade-off of traffic mobility for neighborhood quality of life.

This Study does indeed recommend changes that will make it more difficult for single-occupant vehicles to move about on some streets at certain times during weekdays. The same impact could be felt by transit vehicles. Some of the changes will also facilitate smoother movement of traffic in many areas. Implementing these actions should occur in concert with a strategy that provides alternatives to those who must travel to, through, and within Central Denver neighborhoods.

Trade-offs are a reflection of values. Rather than simply live with the existing trends, the CAC has taken a deliberately different track because the consequences of not doing so are unacceptable. In creating these recommendations, the CAC and the public involved have overwhelmingly stated that the value received for improving

the quality of life in Central Denver is worth the trade-off of slightly longer travel times, less freedom to drive alone and quickly get to destinations, and greater costs to provide the infrastructure and programs that will meet the mobility needs of the growing metropolitan region

AIR QUALITY EVALUATION

Potential air quality impacts were assessed as part of this Study. The assessment qualitatively considered the effects of the recommendations made by the CAC. Only near-term objectives were considered because there are too many variables which could potentially affect air quality in the future. The complex transportation issues associated with the proposed solution sets necessitate a balance between many of the community concerns as well as the transportation goals. Air quality issues are a critical part of the trade-off decisions. There are many variables that may affect air quality due to the near-term objectives. Extensive traffic data and air quality modeling would be necessary to provide a detailed air

quality analysis. This level of detail was not reasonable to achieve in this Study. In the absence of a detailed air quality analysis, the following general statements can be made:

- ◆ If traffic congestion or delays on major arterials increase, carbon monoxide (CO) emissions would also be expected to increase. Two of the intersections most likely to be affected by an increase in traffic are Speer/Broadway and Alameda/Broadway because of the current levels of congestion. Yet, improved traffic flows on other streets with decreased traffic may offset any negative impacts on an area-wide basis.
- ◆ Major streets currently operating at or near capacity that will have an increase in traffic volumes may experience peak traffic flows for longer periods of time. The increased period of peak hour traffic flows will most likely see increased CO emissions and CO concentrations because stop-and-go traffic will occur for longer periods of time. Colfax/Broadway is one of the locations which may be problematic in this regard since the intersection and all of its approaches are operating at or above peak hour capacity

The following air quality impacts may occur as a result of the near-term objectives:

- ◆ Decreases in traffic speed caused by traffic calming measures may increase CO emissions and worsen air quality in localized areas. These emissions may be offset by a corresponding reduction in traffic volumes.
- ◆ The computerized traffic signal system can keep traffic moving more smoothly, and this may result in lower CO emissions.
- ◆ Increasing transit and HOV usage along Speer and 1st Avenue could improve air quality by reducing total vehicle-miles-traveled (VMT) and congestion if this near-term objective is implemented.
- ◆ Since Colorado Boulevard and Colfax Avenue are at or above their physical carrying capacity on some links, extended peak hour flows may result in increased CO emissions and worsen air quality.
- ◆ On an area-wide basis, if free-flow traffic is maintained at current levels and delays at intersections are not increased, CO concentrations can be reasonably expected to decrease in the future assuming all current emission control programs remain in effect.

Air quality recommendations are necessarily limited to the level of detail consistent with that of the assessment:

- ◆ It is recommended that traffic increases on adjacent side streets be monitored due to traffic shifts associated with traffic reductions on streets that are modified as part of the CDTs solution set.
- ◆ Traffic monitoring is recommended for streets that are at or near their physical carrying capacity to assess peak hour spread.
- ◆ Incentives for use of mass transit should be provided as a way to reduce VMT and improve air quality.
- ◆ Expanding the enhanced street sweeping program that is currently used in the CBD to other streets in the CDTs area would decrease particulate emissions (PM10).

Air quality will continue to need to be monitored regardless of the changes this Study recommends. No recommendations appear to significantly alter Denver's air quality balance. However, continuous monitoring will be required and adjustments made as necessary.

The CAC grappled with the trade-offs of proposed improvements and created a solution set that treats all neighborhoods equally and fairly.

Closure

Perhaps the most significant trade-off recognized by the CAC lies within the public's patience and trust in the CDTS recommendations. There are no guarantees that any or all of the CAC's recommendations will be implemented or for that matter achieve all that is hoped for. The underlying theme of this Final Report is to build a process by which the community can begin to proactively manage its transportation issues. The CAC recognized that there is no "silver bullet" which will make all of the traffic problems go away. Rather, they identified a series of steps intended to solve the traffic problems incrementally. But improvements take money and time. With a series of incremental changes, careful attention must be given to the results of each step so that the next step is crafted accordingly. Success of the recommendations requires support of the phased implementation process, particularly adequate review and monitoring time.

Finally, while successful outcomes are expected from the recommended improvements, there is always the chance that something will not work as envisioned. Indeed, there may even be a worsening of the very traffic problems which formed the basis for the change in the first place, or other unexpected complications may emerge.

For this reason, the implementation process should work in reverse as well. For example, if after review of a specific change City staff reports to the Transportation Advisory Committee that there are problems, the Committee should not be discouraged from removing the original improvement and implementing a different one designed to remain true to the CAC's intent. The Committee may even decide that the starting conditions are the most favorable possible, and recommend returning to that situation.

Here again, what is important is that the citizens and the City together support and respect the process. It is critical that residents, business owners, and City staff work closely together in a consensus fashion. There will undoubtedly be times when not everyone will be happy with a particular action. The biggest question is just that:

Can the community accept changes to transportation habits and land use patterns which benefit the whole but may cause individual changes that may not be convenient or desired?

This question can only be answered by the actions of the City and citizens as they work together to implement these recommendations. It is the greatest hope of the CAC, the public who have participated and the project team, that all will keep faith with the agreements and goals forged during this process.



The Solution Set Matrix

The following pages show the matrix that was used by the CAC to create the recommendations in this Study. It is a tool that allows a shorthand version of the recommendations to be viewed in relation to each other. The matrix was useful because changes to one recommendation often have implications for others. By using the matrix, the CAC was able to identify when those trade-offs might occur and adjust the recommendations as necessary.

The matrix entries under each category are necessarily shorthand because of the limitations of the matrix tool itself. Consequently, the recommendations can easily be misunderstood. For further explanation of any recommendation, please turn to the Recommendations section of this document, and look specifically for the street in question.

The matrix is organized by street or area and then by near-, mid-, and long-term actions. No timetable was attached to these categories because future funding potential was unknown. Also, initial recommendations may achieve the intended goals. In that case, mid- and long-term recommendations may not produce further benefits. Implementation is largely dependent on available funding, staff availability, and City Council policy decisions. Implementation must also be done in a manner such that traffic isn't merely moved from one neighborhood to another. The CAC supports each of the individual recommendations but also feels strongly that the recommendations work together as a group and must be treated accordingly.

The matrix is organized by street or area and then by near-, mid-, and long-term actions. No timetable was attached to these categories because future funding potential was unknown. Also, initial recommendations may achieve the intended goals. In that case, mid- and long-term recommendations may not produce further benefits. Implementation is largely dependent on available funding, staff availability, and City Council policy decisions. Implementation must also be done in a manner such that traffic isn't merely moved from one neighborhood to another. The CAC supports each of the individual recommendations but also feels strongly that the recommendations work together as a group and must be treated accordingly.

1996-1998
Central Denver
Transportation Study



CENTRAL DENVER TRANSPORTATION STUDY PRELIMINARY SOLUTION MATRIX (OVERALL RECOMMENDATIONS*)

Transit	◆ Support RTD efforts to expand service ◆ Support DRCOG Vision 2020 for a comprehensive transportation/land use plan ◆ Seek ways to have local circulator, jitneys, and other smaller forms of transportation ◆ Work with education component to shift drive-alone habits to transit
Enforcement	◆ Speed advisory panels ◆ Photo radar speed enforcement ◆ Video enforcement of red-light violations ◆ Additional police presence ◆ Increased fines for speeding (and related misbehavior)
Education	◆ Publicity campaign to initiate traffic behavior modification ◆ Pamphlet/brochure series on traffic management ◆ Pamphlet/brochure series on traffic calming ◆ Pamphlet to support RTD and alternative transportation ◆ Short video for speakers bureaus, schools, public meetings, etc.
Engineering	◆ Create City staff position (new hire?) "Traffic Management Engineer" ◆ Develop formalized traffic response programs: - traffic management techniques for arterial streets - traffic calming techniques for local and collector streets - neighborhood traffic management plans ◆ Formulate City-wide "Traffic Management Master Plan" and "Major Thoroughfare Plan" - big picture/concept level with relative priorities ◆ Establish citizen commission (Transportation Advisory Committee) - one appointee from each council district - meet monthly or bi-monthly - act as liaison between Council and public - review/comment on on-going actions by City and staff - hear/make recommendations on citizen inquiries/input
Planning	◆ Establish stronger linkages between project review/approval effort conducted by Planning with traffic impacts review conducted by Engineering ◆ Update Comprehensive Plan to reflect overall transportation infrastructure needs to meet requirements of build-out according to zoning or land use plan ◆ Update Neighborhood Plans to reflect overall transportation infrastructure needs identified in Comprehensive Plan and integrate strategies in all Neighborhood Plans

**CENTRAL DENVER TRANSPORTATION STUDY
PRELIMINARY SOLUTION MATRIX**

STREET	NEAR-TERM OBJECTIVES	MID-TERM OBJECTIVES	LONG-TERM OBJECTIVES	IDEA POOL*
Washington/ Emerson I-25 to Speer	◆ One-way, parking on both sides ◆ Speed limit & signal progression resulting in operating speeds of 25-30 mph ◆ Striping and signing to reinforce desired traffic operation and behavior - warning/ advisory signs north of I-25 and north of Speer to alert NB motorists of one lane operation ◆ Pilot program for speed humps /tables	◆ Additional traffic signals if street is to remain one way - Bayaud/ Washington to address jog in roadway ◆ Urban design amenities - gateway signs and monuments to advise motorists they are entering a neighborhood ◆ Institute better speed enforcement	◆ Two-way, parking on both sides ◆ Remove signals - replace with stop signs ◆ Close I-25 ramps or restrict turning movements to/from ramps onto Washington/ Emerson (assuming that actions are not at expense of neighboring streets)	◆ One-way option - parking both sides - retime signals to 25 mph ◆ Two-way option - parking on one side - parking on two sides - eliminate traffic lights; add 4-way stop signs ◆ Traffic calming - speed tables - chokers ◆ Close I-25 ramps
Washington/ Clarkson Speer to Colfax	◆ One-way, parking on both sides ◆ Speed limit & signal progression resulting in operating speeds of 25-30 mph ◆ Striping and signing to reinforce desired traffic operation and behavior	◆ Additional traffic signals ◆ Urban design amenities - gateway signs and monuments to advise motorists they are entering a neighborhood ◆ Institute better speed enforcement	◆ Maintain status achieved in near and mid-term actions	◆ One-way option - parking both sides - retime signals to 25 mph ◆ Two-way option - parking on one side - parking on two sides - eliminate traffic lights, add 4-way stops ◆ Traffic calming - speed tables - chokers

***The Idea Pool is a representative list of ideas that were discussed; not all of the ideas are used as a solution.**

STREET	NEAR-TERM OBJECTIVES	MID-TERM OBJECTIVES	LONG-TERM OBJECTIVES	IDEA POOL*
Downing I-25 to Bayaud	◆ Parking management program ◆ Improved pedestrian crossings/ amenities ◆ Two-way, parking on both sides - general recommendation, specific design on a block-by-block basis ◆ Speed limit and signal progression resulting in operating speeds of 25-30 mph	◆ Urban design amenities ◆ Additional signals ◆ Program for speed humps/tables	◆ Maintain status achieved in near and mid-term actions ◆ Balance Washington/ Emerson actions with Downing needs	◆ Traffic calming - speed tables - chokers ◆ Urban design - crosswalks at park - landscape - gateway/ monumentation
Downing Bayaud to Speer	◆ Narrow/reduce lanes (two-way operation) (NB) ◆ Improve bike lanes (NB) ◆ Restripe to accent parking opportunities ◆ Striping & signing @ Bayaud intersection ◆ Speed limit and signal progression resulting in operating speeds of 25-30 mph	◆ Establish urban design connection between Washington Park and Speer Blvd greenway ◆ Program for speed humps/tables	◆ Maintain status achieved in near and mid-term actions	◆ Traffic calming - speed tables - chokers ◆ Narrow/reduce lanes ◆ Improve bike lanes ◆ Urban design - gateway / monumentation - pedestrian refuges - landscape/ streetscape
Downing Speer to Colfax	◆ One-way, parking on both sides with one lane (However: must address traffic flow by school and grocery stores) ◆ Speed limit & signal progression resulting in operating speeds of 25-30 mph ◆ Potential extension of bike route north of Speer ◆ Upgrade school crossings	◆ Urban design amenities ◆ Gateway signs and monuments to advise motorists they are entering a neighborhood ◆ Program for speed humps/tables	◆ Maintain status achieved in near and mid-term actions	◆ Traffic calming - speed tables - chokers ◆ Narrow lanes ◆ Urban design - gateway / monumentation - pedestrian refuges - landscape/ streetscape

***The Idea Pool is a representative list of ideas that were discussed; not all of the ideas are used as a solution.**

STREET	NEAR-TERM OBJECTIVES	MID-TERM OBJECTIVES	LONG-TERM OBJECTIVES	IDEA POOL*
Corona Speer to Colfax	◆ One-way, parking on both Sides with one lane (However: must address traffic flow by school and grocery stores) ◆ Speed limit and signal progression resulting in operating speeds of 25-30 mph ◆ Striping and signing to reinforce ideas ◆ Upgrade school crossings	◆ Urban design amenities ◆ Institute better speed enforcement ◆ Program for speed humps/tables	◆ Continued deployment of mid-term action items (assuming that actions are not at expense of neighboring streets)	◆ one-way option - parking on both sides - retime signals to 25 mph ◆ two-way option - parking on one side - parking on two sides - eliminate traffic lights, add 4-way stops ◆ traffic calming - speed tables - chokers
Logan I-25 to Speer	◆ speed limit and signal progression resulting in operating speeds of 25-30 mph ◆ restripe Mississippi/Buchtel intersection ◆ change double right to single right on WB Buchtel ◆ evaluate additional medians ◆ investigate deletion of right turn lane EB Speer to SB Logan	◆ Complete medians where appropriate ◆ Urban design and pedestrian amenities ◆ Improve E/W flow on Ohio for linkage to LRT station - signal at Ohio/Logan - upgrades at Lincoln/Bdwy split (Ohio intersection)	◆ Continued implementation of mid-term action items ◆ Balance Washington/Emerson actions with Logan needs	◆ Traffic calming ◆ Enforcement ◆ Retime signals to 25 mph
Grant/Logan Speer to Colfax	◆ Striping and signing improvements - Logan jog at 9th Ave. ◆ Maintain status as minor arterial (30 mph speeds) ◆ Add off-peak parking on Logan	◆ Urban design and pedestrian amenities in wide parkways ◆ Upgrade streetscape	◆ Continued implementation of mid-term action items	◆ Traffic calming ◆ Enforcement ◆ Retime signals to 25 mph

***The Idea Pool is a representative list of ideas that were discussed; not all of the ideas are used as a solution.**

STREET	NEAR-TERM OBJECTIVES	MID-TERM OBJECTIVES	LONG-TERM OBJECTIVES	IDEA POOL*
York/Josephine 1st to Colfax	♦ Minor arterial in peak periods - one-way, two lanes, parking on one side (North of 6th to DBG & north of DBG) - one-way, two lanes, parking on one or two sides (South of 6th) ♦ Residential collector in off-peak periods - one-way, one lane, parking on two sides (North of 6th to DBG & north of DBG) - one-way, two lanes, parking on one or two sides (South of 6th) ♦ Intersection narrowed @ 4th, 6th, 7th , 8th , 9th	♦ Extend DBG streetscape North to Colfax and South to 6th ♦ Develop urban design program for links South of 6th ♦ Gateway signs/ monuments to advise motorists	♦ Continued implementation of mid-term action items	♦ Traffic calming - chokers ♦ Enforcement ♦ Add parking ♦ Narrow intersections ♦ Eliminate right-hand turns ♦ Retime signals to 25 mph
Alameda East of Colorado	♦ Prepare updated corridor master plan - study speed control and 30 mph operation - study sound walls and increased streetscape	♦ Deploy measures identified in near-term action	♦ Support transit corridor (light rail?) consistent with Vision 2020 regional plan	

***The Idea Pool is a representative list of ideas that were discussed; not all of the ideas are used as a solution.**

STREET	NEAR-TERM OBJECTIVES	MID-TERM OBJECTIVES	LONG-TERM OBJECTIVES	IDEA POOL*
Alameda Colorado to Steele	◆ Do nothing to street ◆ No bridge over creek	◆ Widen/restripe to 6 lanes where appropriate ◆ No bridge over creek	◆ 1996 evaluation indicates bridge not needed nor sufficiently beneficial; reconfirm this assessment as with all long-term objectives in this plan	◆ Alameda bridge ◆ Photo radar demonstration ◆ Retime signals to 25 mph ◆ Urban design - pedestrian amenities ◆ Convert to one-way
Alameda Cherry Creek Drive South to Franklin	◆ No physical improvements such as widening ◆ Speed limits & signal progression resulting in operating speeds of 25-30 mph ◆ Enhanced striping/ signing to better channel traffic to/from Alameda to Cherry Creek Drive South ◆ Gateway signage and medians to advise motorists they are entering a neighborhood	◆ No physical improvements such as widening ◆ Urban design amenities ◆ Encourage pedestrian/bike activities	◆ Coordinate Implementation of mid-term actions with revised configuration of Cherry Creek Dr. South	◆ Make entirely 4-lanes ◆ Make 2-lane with center left turn lane ◆ Traffic calming - chokers - traffic channeling/diverters ◆ Convert to one-way
Alameda Franklin to Broadway	◆ No physical improvements such as widening except in specific locations such as intersections ◆ Speed limit & signal progression resulting in operating speeds of 25-30 mph ◆ Enhanced striping/signing ◆ Reduce turn restrictions to peak period only	◆ No physical improvements Such as widening except in Specific locations such as Intersections ◆ Urban design amenities ◆ Enhanced pedestrian Amenities ◆ Off-peak parking where Appropriate	◆ Continued implementation of mid-term action items	◆ Photo radar demonstration ◆ Traffic calming - chokers ◆ Enforcement ◆ Convert to one-way ◆ Retime signals to 25 mph

***The Idea Pool is a representative list of ideas that were discussed; not all of the ideas are used as a solution.**

STREET	NEAR-TERM OBJECTIVES	MID-TERM OBJECTIVES	LONG-TERM OBJECTIVES	IDEA POOL *
13th / 14th Yosemite to Colorado	Street changes must be consistent with neighborhood plan North of Colfax	- Two-way, two-lane with mixture of parking on one side and urban design amenities - Yosemite to Quebec as first step - Quebec to Monaco as second step - Monaco to Colorado as third step - Two-way, two-lane with center left turn lane - Monaco to Hudson - Relocate or remove mid-block signals	Continued implementation of mid-term action items	- Retime signals to 25 mph - Photo radar demonstration - One-way, one lane option - Two-way, two lane option
13th / 14th Colorado to Lincoln	These objectives apply to 14th Avenue only. No changes are suggested in the near-term for 13th Avenue. - In peak periods: - one-way, three-lanes; parking as currently marked¹ - In off-peak hours and on weekends: - one-way, two lanes; off peak parking on one side (Colorado to Downing)¹ - one-way, three lanes; parking as currently marked (Broadway to Downing)¹ ¹ This is a general recommendation and certain blocks will require specific attention where parking cut-ins have been built, turn lanes constructed, etc.	These two objectives apply to 14th Avenue only: - In peak periods: - one-way, two lanes, parking 1 side full time (York/Josephine to Colorado)¹ - one-way, three lanes, no parking (Broadway to York/Josephine)¹ - In off-peak hours and on weekends: - one-way, three lanes, no parking (Broadway to Logan)¹ - one-way, two lanes, parking one side (Logan to Colorado)¹ These two objectives apply to both 13th Avenue and 14th Avenue: - Urban design (pedestrian amenities, monuments, streetscape) - Relocate mid-block signals to intersections	Continued implementation of mid-term urban design elements	- Parking on both sides all the time - off-peak parking - Urban design - pedestrian refuges - landscape/ streetscape - gateway / monumentation

***The Idea Pool is a representative list of ideas that were discussed; not all of the ideas are used as a solution.**

STREET	NEAR-TERM OBJECTIVES	MID-TERM OBJECTIVES	LONG-TERM OBJECTIVES	IDEA POOL*
6th / 8th Quebec to Colorado	◆ 6th : one-lane with bike/parking lane each way (refine at intersection) ◆ 8th : two-lanes, one each way Quebec to Monaco (refine at intersection) ◆ Speed limit & signal progression resulting in 25 mph traffic ◆ Upgrade school zone markings	◆ Relocate mid-block signals on 6th to intersections ◆ Develop urban design plan to: - support street laneage - enhance bus stops	◆ Continued deployment of mid-term action items to achieve long-term objectives that are consistent with long-term measures in adopted Lowry Plan	◆ Make 6th like Montview - one lane - bike lane/ parking ◆ 2 Westbound and 1 Eastbound lane on 8th ◆ Speed tables
6th / 8th Colorado to Broadway	◆ One-way, two lanes, full time parking on one side of 8th from Colorado to York/ Josephine - no parking / 3 lanes at York/ Josephine - off-peak or specific full time parking plan for segment west of York/ Josephine ◆ Restripe lanes on 6th EB @ Colorado to achieve two lefts, one thru, and one right ◆ Speed limit & signal progression resulting in 30 mph traffic on both 6th and 8th	◆ Relocate or remove mid-block signals - install signal at 8th/Garfield - complete sidewalks on 8th at Congress Park ◆ Develop urban design plan to: - support parking and laneage - enhance bus stops - narrow intersections and improve pedestrian crossings	◆ Continued deployment of mid-term action items	◆ Parking on both sides of 8th - striped ◆ Light on 8th between Steele and Colorado ◆ Urban design - gateway / monumentation - improved pedestrian crossings - landscape/ streetscape
Broadway/ Lincoln	◆ Signal control system to achieve traffic responsive signal operations ◆ Upgrade bus/HOV lane operations to give travel time advantages to multi-occupant vehicles	◆ Develop transportation infrastructure serving Golden Triangle to preserve Broadway's arterial function (part of Downtown Area Plan)	◆ Support upgrades to I-25, Santa Fe roadway and transit (LRT) routes	◆ Broadway: - reversible lane - revert to two-way ◆ Lincoln: - revert to two-way - eliminate buses - transit corridor

***The Idea Pool is a representative list of ideas that were discussed; not all of the ideas are used as a solution**

STREET	NEAR-TERM OBJECTIVES	MID-TERM OBJECTIVES	LONG-TERM OBJECTIVES	IDEA POOL*
Colfax Broadway to Yosemite	◆ Integrate intelligent traffic signal control system to achieve improved traffic responsive signal operations	◆ Investigate/implement bus "priority" operations to provide travel time advantages to transit ◆ Upgrade pedestrian and transit user facilities	◆ Continued deployment of near and mid-term action items	◆ HOV lane ◆ Angle parking on selected blocks ◆ Remove all parking and create a 6-lane arterial
Colorado Evans to Colfax	◆ Pursue goals in Colorado Blvd Plan - TMA - upgrade pedestrian facilities - improve transit service and station/stop facilities	◆ Continued implementation of near-term action item ◆ Improve major Intersections ◆ Rebuild I-25 interchange (part of I-25 corridor project) ◆ Consolidate/eliminate private drives (commercial/retail) ◆ Investigate/implement transit "priority" operations to provide travel time advantages to transit	◆ Continued deployment of mid-term action items	
Speer / 1st University to Colfax	◆ Seek means to control traffic behavior, namely speeding, via electronic equipment and signal progression ◆ Integrate intelligent traffic signal control system to achieve improved traffic responsive signal operations	◆ Continued deployment of near-term action items ◆ Identify and deploy means of increasing transit usage ◆ Investigate/implement bus "priority" operations to provide travel time advantages to transit	◆ Support upgrades to I-25, Sante Fe roadway and transit (LRT) routes ◆ Support transit route plan shown in Vision 2020	◆ HOV lane ◆ Retime signals to 25 mph ◆ Photo radar demonstration ◆ Maintain current landscape

***The Idea Pool is a representative list of ideas that were discussed; not all of the ideas are used as a solution**

STREET	NEAR-TERM OBJECTIVES	MID-TERM OBJECTIVES	LONG-TERM OBJECTIVES	IDEA POOL*
Cherry Creek access & circulation	◆ Improve ped/ bike linkages across Steele Street and across Cherry Creek (channel) between University and Colorado a) a) close Steele between Cherry Creek Drive South and Alameda to create a ped/ bike/ parking area for neighborhood b) striping/ signing on Steele south of Alameda to create bike lane and reduce cut-thru traffic c) upgraded ped crossings adjacent to Shopping Center ◆ Develop & implement transit circulator program - shopping district/ Colorado Blvd/ residential areas ◆ Develop traffic mgt and urban design plans: - 1st (from Steele to Colorado) ◆ Develop traffic calming and urban design plans: - Ellsworth, 2nd, 3rd, Bayaud (from Steele to Colorado) - Exposition (from University to Colorado)	◆ Charter the Transportation Advisory Committee to determine balance between: a) Cherry Creek Drive linkage from shopping district to Iliff and a connection between Steele and Colorado Blvd b) greater access and circulation via a series of improvements to 1st , 2nd, 3rd, Ellsworth, Bayaud ◆ Include Leetsdale and Cherry Creek Drive in corridor Master plan proposed for Alameda Ave east of Colorado Blvd	◆ Deploy mid-term action items	

***The Idea Pool is a representative list of ideas that were discussed; not all of the ideas are used as a solution**