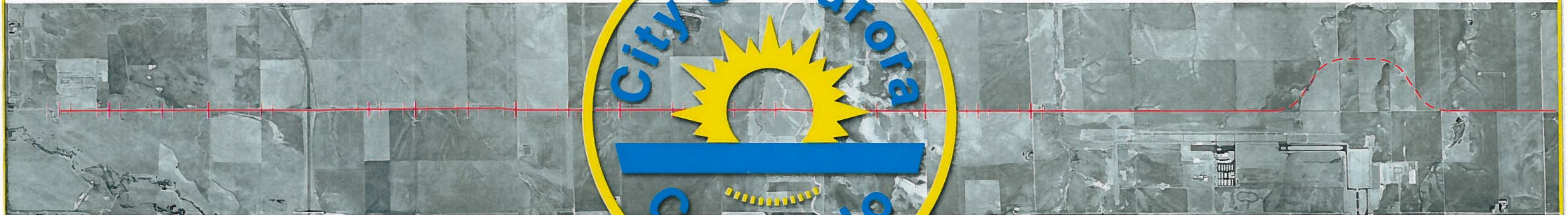


56th AVENUE ACCESS CONTROL PLAN

Dunkirk Street to Imboden Road



December 2000

Prepared by:



Prepared for:

**City of Aurora
Department of Public Works
& Planning Department**

56TH AVENUE ACCESS CONTROL PLAN

DUNKIRK STREET TO IMBODEN ROAD

Prepared for:

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INTRODUCTION

OVERVIEW OF ACCESS CONTROL PLANS

The City of Aurora is responsible for developing access control plans for key elements of its arterial street system. An access control plan provides the City with a comprehensive roadway access design for the purpose of bringing that roadway into conformance with its access category and its functional intent to the extent feasible given existing conditions. The plan attempts to achieve the optimum balance between transportation planning objectives, traffic operations, and land access requirements.

The access control plan should identify future access locations and all access-related design elements, including traffic signals. The plan should not preclude the future accommodation of other transportation modes. All traffic control devices should meet the requirements of the Manual of Uniform Traffic Control Devices (MUTCD). To the extent practical, the plan should meet the characteristics and design standards of the assigned functional category.

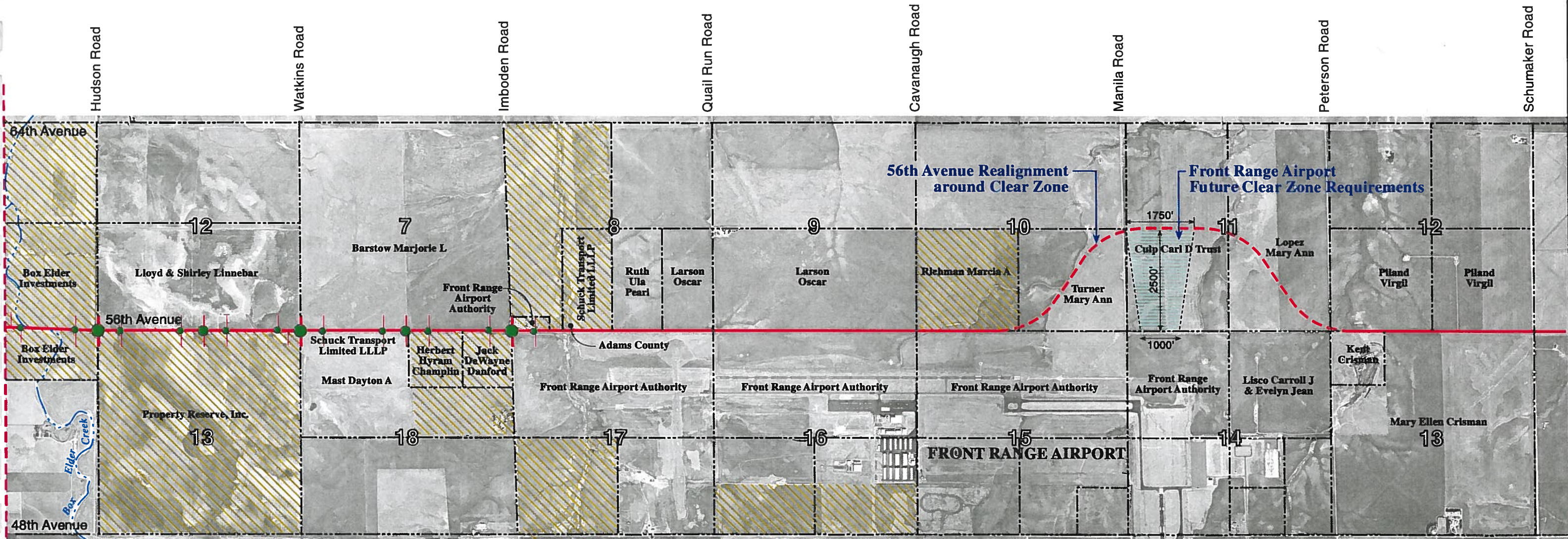
56TH AVENUE CHARACTERISTICS

Of all of the east-west arterial corridors north of I-70, 56th Avenue is the only one which provides the potential for extended continuity. 56th Avenue has access to both Pena Boulevard and E-470 with continuity west to Vasquez Boulevard (SH 2) and east beyond Front Range Airport to Schumaker Road. These characteristics make 56th Avenue the most important long-term east-west corridor in the northeastern metropolitan area.

As a consequence, both the alignment and the right-of-way for 56th Avenue should be established as soon as possible, especially in the vicinity of E-470 and around the north boundary of Front Range Airport. Additionally, the City desires to adopt an access management plan to maximize the traffic carrying capacity of 56th Avenue.

CORRIDOR OVERVIEW

This mapping package, is illustrated on two pages and places the 56th Avenue corridor within the regional framework. The mapping is at a scale of 1" = 2,500' and extends from Tower Road to Schumaker Road. Adjacent property ownership is documented along with major natural and man-made features.

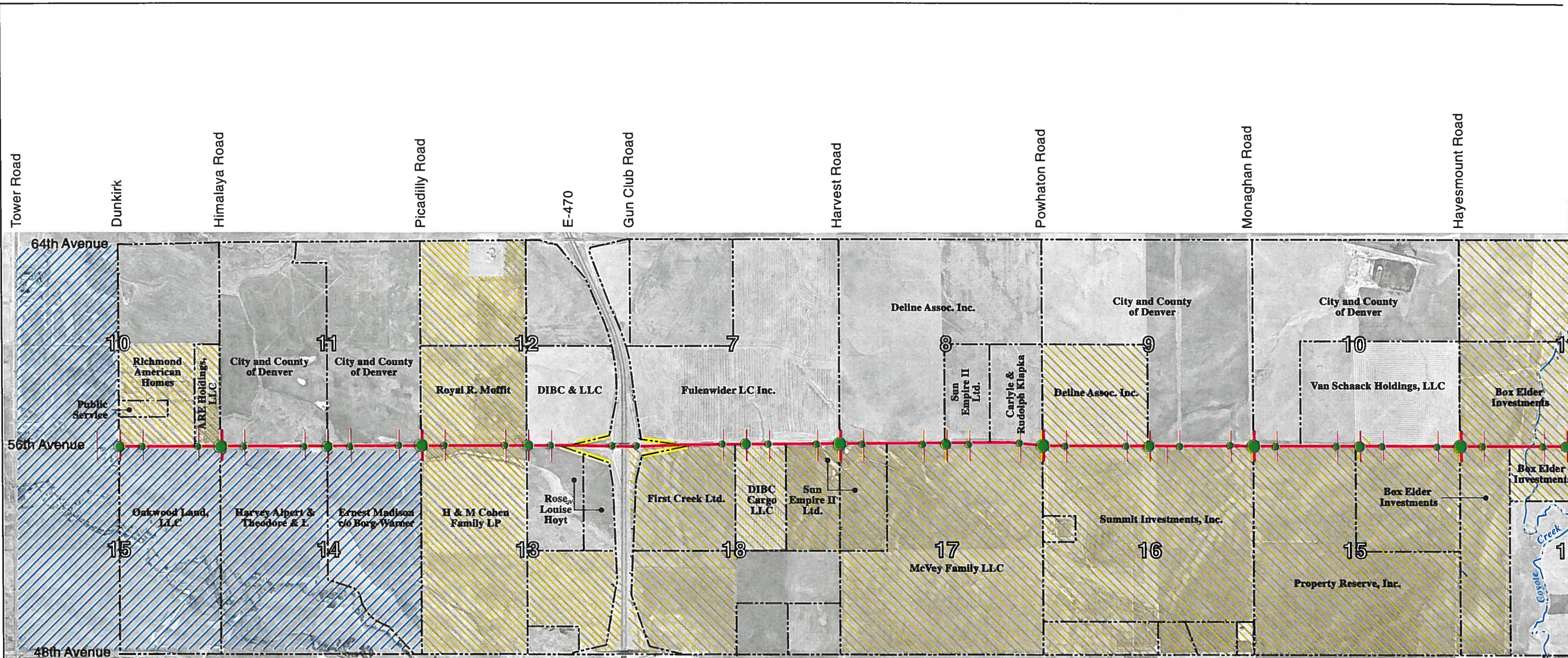


MATCHLINE







56th Avenue Access Control Plan

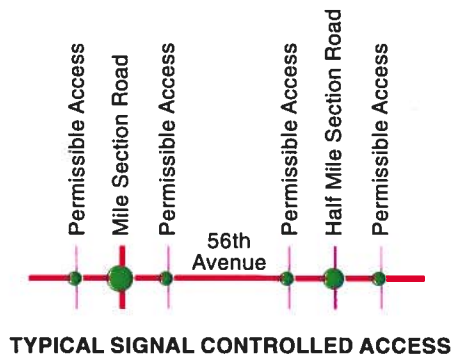
September 14, 2000 99-004





LEGEND

-  = City of Denver
-  = City of Aurora
-  = Adams County
-  = Property Boundary
-  = Section Number
-  = Access Control Acquired by E-470



MATCHLINE

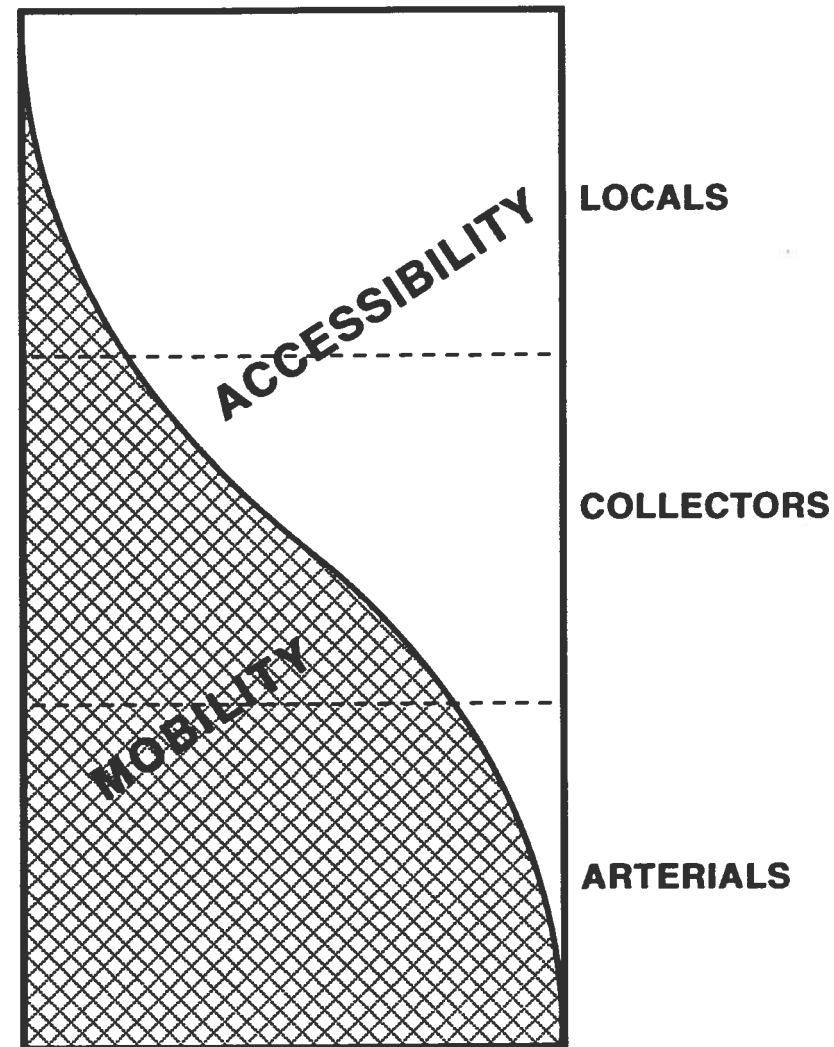
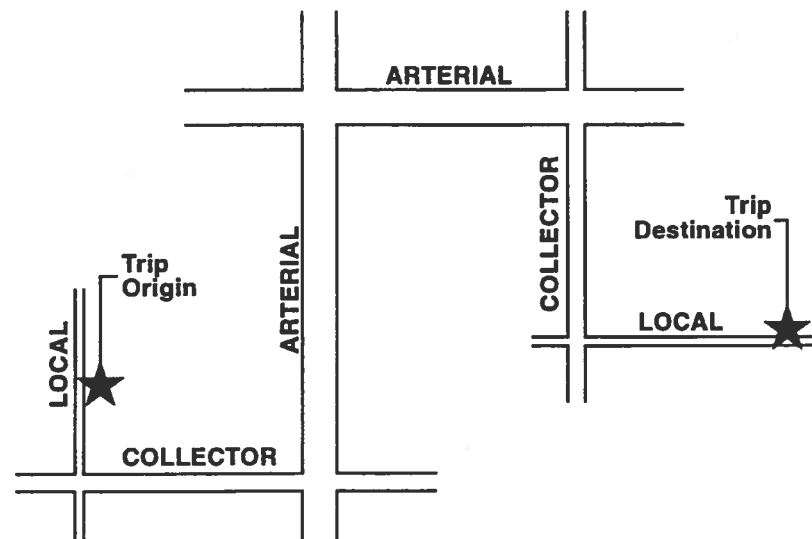
PRINCIPLES OF ACCESS MANAGEMENT

URBAN TRIP ELEMENTS

A typical trip on an urban street system occurs in identifiable steps or stages as diagrammatically illustrated below. These stages can be sorted into a definite hierarchy with respect to how the competing functions of movement and access are satisfied. The hierarchy of roadways equates to their functional classification. This concept was detailed in the Aurora Northeast Transportation Study which includes the basic functional elements of arterials, collectors, and locals.

The high end of the hierarchy is represented by facilities that provide good traffic movement and a high level of mobility. Therefore, access to an arterial must be controlled and limited in order to reduce interferences and minimize conflicts.

At the low end of the hierarchy are roadway facilities that provide good access to adjoining property. The predominant purpose of local streets is to provide a high level of accessibility which is accomplished by limiting speeds and allowing frequent access points consistent with proper design practice.



ACCESS DESIGN OBJECTIVES

The following principles should govern access planning and design.

- Conflicts at intersections and driveways should be minimized and separated.
- Optimum progressive travel speeds along arterial roadways should be determined and maintained to guide:
 - The location, timing, and coordination of traffic signals.
 - The placement of access points.
 - The design and operation of intersections.
- Signal cycles should be as short as possible consistent with capacity, pedestrian clearance, and coordination requirements. A cycle length range of 60 to 120 seconds is appropriate for most urban and suburban environments.
- Special phasing for left turns may be necessary for capacity or safety reasons. Left turn flows over 100 vph typically need separate phasing. Left turn flows over 300 vph typically require dual left turn lanes.
- Unsignalized access points should be located so as not to interfere with queues or maneuvering areas of signalized intersections. They should be positioned to take advantage of gaps in the traffic flow induced by signal operations at nearby intersections.
- Local access traffic should be removed from through traffic lanes by providing exclusive turning lanes and adequate on-site storage and driveway dimensions. Fewer, properly placed, and adequately designed driveways are preferable, especially when spaced at least 500 feet apart.



SPEED DIFFERENTIAL

The chance of being involved in a rear-end accident is minimal when successive vehicles are traveling at nearly the same speed. Approximately 65 percent of the vehicles involved in rear-end accidents have been found to be traveling at a speed differential in excess of 10 mph. Approximately 35 percent of the other vehicles (those not involved in rear-end accidents) were traveling at a speed differential of less than 10 mph.

The speed of a vehicle making a turn at an intersection is very slow compared to the through traffic lanes. The forward speeds of the turning vehicle are between 6 and 13 mph.

A speed differential of 10 mph or more occurs at least 250 feet and at least 9 seconds upstream from a driveway for arterial street speeds of 40 to 45 mph. The fact that excessive speed differentials are created a considerable distance upstream from the point at which the driveway maneuver is made probably results in an under-reporting of driveway-related accidents. It also shows that turn lanes are needed to achieve acceptable speed differentials between driveway traffic and through vehicles on arterial streets. The addition of separate turn lanes can significantly reduce the number and rate of crashes.

SIGNALIZED INTERSECTION SPACING

The spacing of traffic signals in terms of frequency and uniformity has an important bearing on the overall efficiency of arterial roadways. Closely or irregularly spaced traffic signals can reduce arterial travel speeds below reasonable limits and result in excessive stops. This reduction can mean that the arterial fails to meet its intended purpose, especially during peak traffic hours.

The combination of operating speed, cycle length, and uniform signal spacing are all critical to efficient traffic movement. As signal spacing decreases, the flexibility to efficiently time a traffic signal also decreases.

When a traffic signal location deviates from a uniform spacing interval, the green time for the main traffic stream must be increased to maintain progression efficiency. This additional time must be taken from the cross street or other phases. For each deviation of 1 percent from the optimum location, the main street green must be increased by 1 percent of the cycle length for short cycle lengths (60 to 90 seconds). However, to maintain traffic progression efficiency for long cycle lengths (100 to 120 seconds), 2 percent of the cycle length must be taken from the cross street green and added to the main street green for each percent of deviation in uniform spacing.

UNSIGNALIZED INTERSECTION SPACING

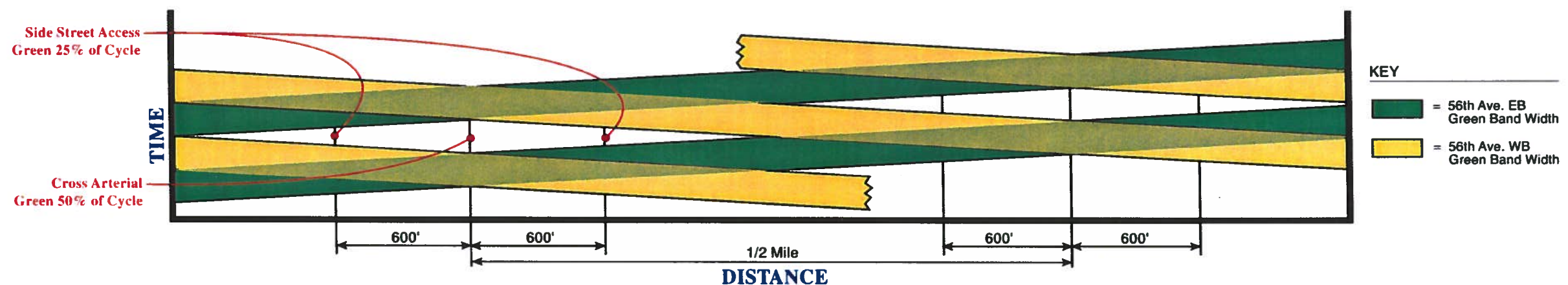
Unsignalized intersections and driveways are far more common than signalized intersections. They affect and serve all kinds of activity ranging from residential areas to large activity centers.

Traffic operational factors leading toward greater spacing between unsignalized intersections include weaving and merging distances, stopping sight distance, acceleration and deceleration rates, and storage distance for back-to-back left turns.

Strict application of traffic engineering criteria may place desirable spacing requirements at 500 feet or more. Access spacing of 200 feet or less have been documented to nearly double crash rates.

Spacing standards for full movement, unsignalized driveways should complement those for signalized intersections. Ideally, potentially high-volume, unsignalized access points should be located where they conform with signal spacing criteria should it ultimately become necessary to signalize the intersection.

HYPOTHETICAL TIME SPACE DIAGRAM FOR 56TH AVENUE





CRITERIA FOR 56TH AVENUE ACCESS

FUNCTIONAL CHARACTERISTICS

The principal arterial classification of 56th Avenue (as determined in the Aurora Northeast Area Transportation Study) means that this roadway must serve travel occurring at medium to high speeds and serve medium to high traffic volumes over relatively long distances. The 56th Avenue corridor will provide for inter-regional and intercity travel needs. Direct access service to abutting land is subordinate to providing a high level of mobility to through traffic movements.

ACCESS SPACING AND OPERATIONS

One access may be granted for each parcel if reasonable alternative access cannot be obtained from the local street system (see Mapping Set 1 for existing property ownership limits). The location of any access should serve as many properties as possible to reduce the need for additional direct access to 56th Avenue. No additional access rights shall accrue upon the splitting or dividing of existing parcels of land or contiguous parcels under or previously under the same ownership or controlling interest. All access to newly created properties shall be provided internally.

The desirable standard for the spacing of all intersecting accesses that will be full movement, or have the potential for signalization, is one-half mile and is based upon section lines where feasible. A traffic analysis must verify that the potential signalized access is able to achieve a signal progression of 35 percent efficiency or better.

In addition, signal spacings of 600-feet may be permitted on either side of a Section Line Road or a Half-Section Line Road. It should be emphasized that these are permissible signal locations (not mandatory or necessarily desirable) intended to accommodate major developments at the intersection of arterial streets which are uniquely constrained. These signals can normally operate within signal progression guidelines. However, it is preferable to have only one 600 foot spaced intersection rather than two and a 3-legged intersection is preferable to a 4-legged intersection.

It is critical that adequate storage be provided to accommodate left turn queues between 600-foot spaced intersections. At the intersection of 56th Avenue with north-south principal arterials, dual left turn lanes should be provided on all intersection approaches to insure that the maximum storage area is available.

DESIGN ELEMENTS AND TRAFFIC CONTROL

Auxiliary turn lanes should be installed according to the criteria below.

- A left turn deceleration lane (or dual left turn lane, when needed) and taper with adequate storage length is required for any 3/4 or full movement access. The length of the auxiliary lane will be determined through a traffic impact analysis.
- A left turn acceleration lane may be required if it would be a benefit to the safety and operation of 56th Avenue. A left turn acceleration lane is generally not required where the posted speed limit is less than 45 mph or the intersection is signalized.
- Right turn deceleration and acceleration lanes are generally not required on roadways with three or more travel lanes in the direction of the right turn. However, right turn deceleration lanes may be required if traffic flows exceed 200 vph or if the right turns will adversely affect the through traffic in the outside lane of 56th Avenue.

Left turns-in (3/4 movement) may be allowed if the addition of left turns will improve operation at an adjacent full-movement intersection, and significant operational or safety problems do not occur, and if reasonable access does not currently or will not exist in the future.

Additional right turn only access may be allowed where required acceleration and deceleration lanes can be provided or relief to identified congestion or safety problems on 56th Avenue would result. No access will be allowed within the 600-foot spacing between signalized intersections.

When an existing access meets the warrants for a traffic signal as defined in the MUTCD, but the location does not meet the requirements of the 56th Avenue Access Control Plan, the access may be modified to eliminate the traffic movements that cause the traffic signal warrant to be met. Peak hour turning movement restrictions may be used or a raised median may be required to achieve this condition. Closure or elimination of the access may be required if alternative access is available.



56TH AVENUE ACCESS CONTROL PLAN

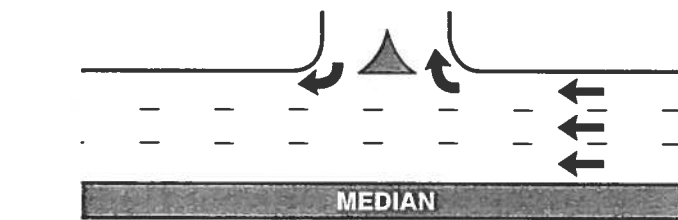
MAPPING FORMAT

The 56th Avenue Access Control Plan is presented on the following aerial photography at 1" = 100 feet from Dunkirk Street to Imboden Road. This mapping package, consisting of 36 sheets, documents specific access locations, anticipated laneages, and traffic control devices. The basic access control plan as illustrated herein is subject to modification pending more detailed traffic analysis and engineering studies which will be required as a part of future development projects.

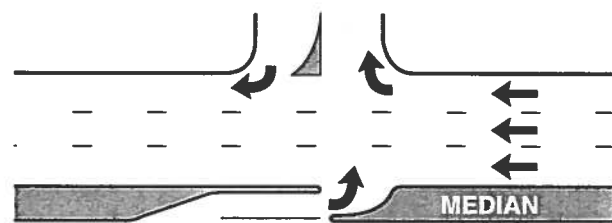
SYMBOLS AND DEFINITIONS

The major elements of the access control plan are depicted utilizing the symbols, notations, and definitions illustrated on this sheet. These legend items are applicable to each of the 36 mapping sheets comprising the 56th Avenue Access Control Plan.

PARTIAL ACCESS TREATMENTS

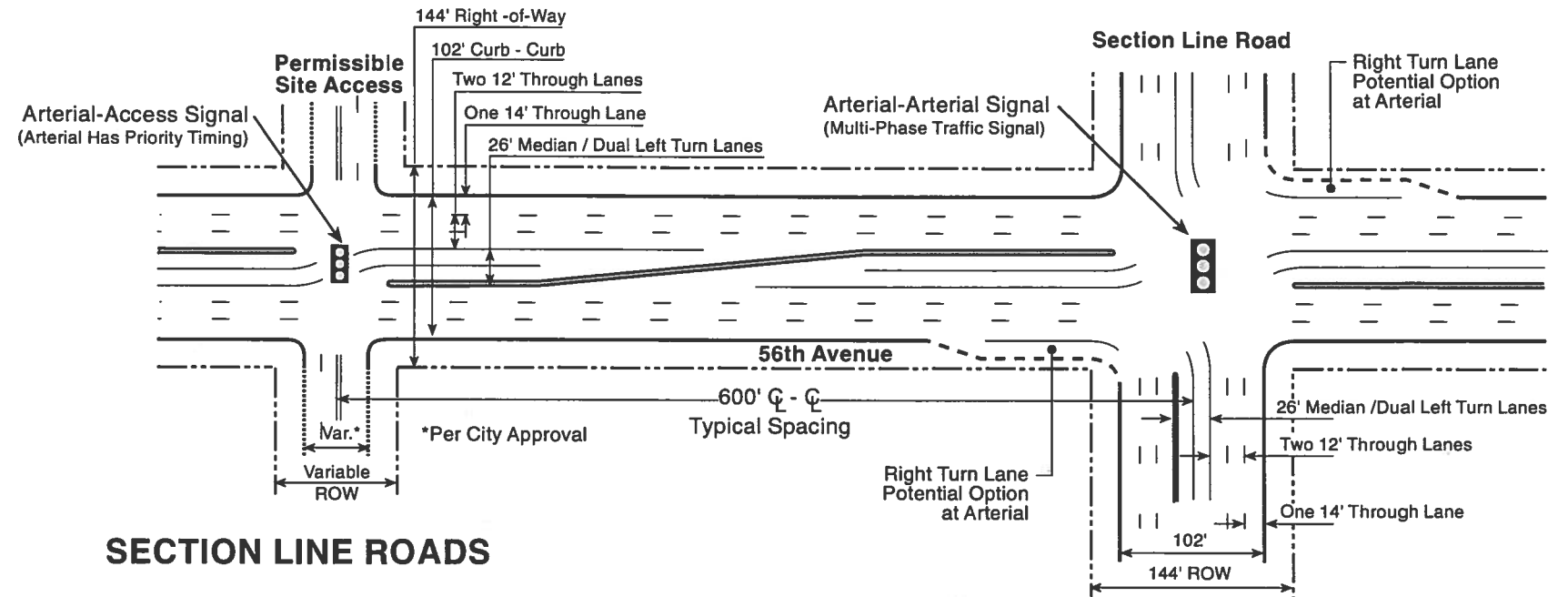


RIGHT-IN / RIGHT-OUT ONLY ACCESS

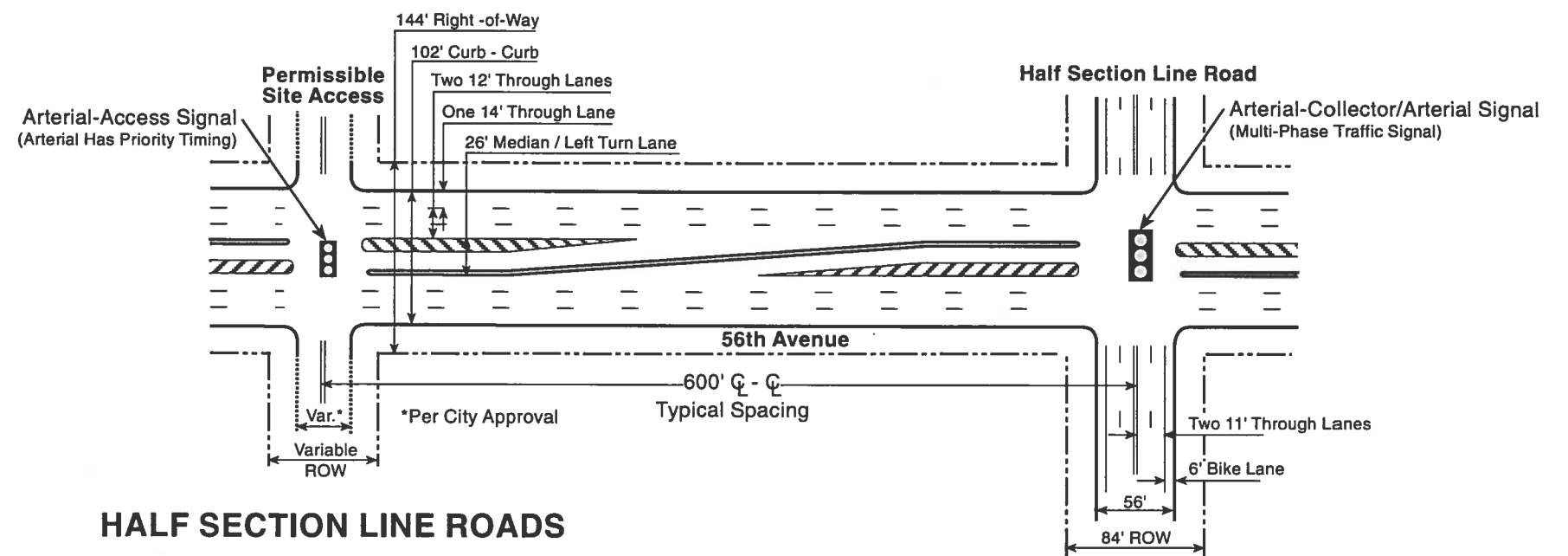


3/4 LEFT-IN ACCESS

ARTERIAL INTERSECTION DETAILS



SECTION LINE ROADS



HALF SECTION LINE ROADS