



May 2009

Andover Transportation Plan

PROFESSIONAL CERTIFICATION

I hereby certify that this report, drawing, or specification was prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the laws of the State of Minnesota.



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Date: June 10, 2009

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EXECUTIVE SUMMARY

The Andover Transportation Plan contains discussion and recommendations regarding various elements that affect the mobility of its' citizens. The goal of moving traffic efficiently and safely and, at the same time, providing more "comfort" in our communities brings together the many various elements used when analyzing transportation systems. The plan provides proposals that are deemed advisable to help guide the future development of the City of Andover. As with any plan, the transportation plan is a document that will require updating as situations develop in the future.

This Executive Summary is provided to allow the reader a summation of the major findings and conclusions of the plan. In 2003, the plan was developed in conjunction with guidance and input of a project Technical Advisory Committee, staff of the City of Andover, and input received at public forums held during the course of the study. This update of the plan includes the same basic information with revisions described since the original plan. Many of the original plan's recommendations have been implemented since 2003.

Study Elements

The Andover Transportation Plan provides a review/analysis of various transportation elements that exist within the City of Andover. The study elements that are contained in this attached plan are as follows:

- Functional Classification of Roadways
- Roadway Jurisdiction Review
- State-Aid Mileage Analysis
- Projection of Traffic Volumes
- Provision of a Trails Plan
- Transit Service Considerations
- Access Management Guidelines
- Discussion of Regional Transportation
- Analysis of Certain Intersections
- Analysis of the Future of the Hanson Boulevard Corridor
- Analysis of the Future of the Crosstown Boulevard Corridor
- Review of Rail/Public Street Crossings
- Traffic Calming
- Transportation Funding Sources

Summation Of Major Recommendations

The Transportation Plan offers discussion and recommendations regarding many of the above listed transportation elements. In some cases, the plan proposes various recommendations that can be initiated immediately, such as updating the functional classification system of roadways. In other instances, the plan illustrates what Hanson Boulevard NW and Crosstown Boulevard NW should be with regard to provision of traffic lanes to accommodate future volumes. The report contains transportation goals and objectives and guidelines regarding such items as access management. The following provides a brief discussion of the major plan recommendations.

Functional Classification of Roadways

The roadway system contains a hierarchy of roadways including arterials (“A” and “B” minor) collectors, and local streets. The arterial system, which provides the backbone of the roadway system and those facilities that accommodate the highest volumes of traffic, include the following roadways:

- Bunker Lake Boulevard NW
- Round Lake Boulevard NW
- Hanson Boulevard NW
- Andover Boulevard NW
- 7th Avenue NW/Roanoke Street NW
- Crosstown Boulevard NW
- 161st Avenue NW
- 157th Avenue NW

Additionally, numerous existing and proposed roadways are designated as collector streets for purposes of accommodating existing and future trip projections.

Roadway Jurisdiction/State-Aid Routes

The plan presents a detailed analysis of Municipal State Aid (MSA) routes and provides recommendations for changes.

Projected Traffic Volumes

Projection of vehicular traffic volumes, to the year 2030, was prepared during this study. The projections indicate that most roads, with the exception of the arterials, will be able to accommodate future volumes with a two-lane roadway with exclusive turn lanes at most public street intersections. Arterial roadways, utilizing four-lane cross sections and intersection turn lanes will function within acceptable limits when considering the year 2030 volumes.

Special traffic volume assignments for the Rural Reserve Area have also been updated as part of the plan update to help indicate roadway requirements for those areas as based upon different land use densities.

Corridor Recommendation – Hanson Boulevard NW

The plan recommends that Hanson Boulevard, in the future, will be required to be improved to a four-lane divided roadway from the south boundary of the City to 161st Avenue NW in order to accommodate the future volumes projected to utilize the roadway. From 161st Avenue to the north City Boundary, a two-lane roadway will be required. A 150-foot right-of-way is recommended and access management techniques will be used. Access to the facility will be limited to selected existing and future streets in order to protect the safety and capacity of the roadway.

Corridor Recommendation – Crosstown Boulevard NW

The study recommends that the Crosstown Boulevard NW can retain its two traffic lanes, but some access management is proposed. The segment of roadway from Andover Boulevard NW to the south City limits should be converted to a two-lane roadway with a center two-way left-turn lane in order to safely serve the access in that area. The segment of Crosstown Boulevard NW in the vicinity of the Andover High School should contain a barrier median in order to improve safety along that roadway segment.

Intersection “Hot Spots”

The City of Andover has recommended a list of 14 intersections that should be reviewed to determine if traffic operations problems were evident, and if so how can the problems be solved. Of the 14 intersections, it appears that the intersections of Round Lake Boulevard NW with South Coon Creek Drive NW may require future signalization. All other intersections were deemed to be operating acceptably.

Transit Planning

Future transit planning for the City should include location of park n’ ride lots to help encourage use of transit service when it is implemented in the future. The City of Andover has recommended a list of three locations in the urban area that would have that potential (see Section IV, Part F/Transit Planning).

Trails Plan

The City should continue its present program of providing trails as new/existing roadways are provided. Gaps in trails are important to be connected which the plan has identified.

Rail At-Grade Crossings

Currently all public street crossings of the Burlington Northern Santa Fe railroad tracks are protected by gates and flashers. In the future, it would be a vast improvement if grade separated crossings could be provided at Bunker Lake Boulevard NW. This is a long-range projects that should be pursued by the City and Anoka County. The railroad quiet zone has been implemented at Bunker Lake Boulevard NW. Wayside horns have been constructed at Andover Boulevard NW and horns are also planned for Crosstown Boulevard NW. A railroad quiet zone is also planned in 2008 for the crossing at CSAH 20 (161st Avenue NW).

Access Management

The management of access along the arterial and collector roadways is an effective way of protecting the capacity of a roadway and of improving the safety along a roadway. Access management guidelines for collector and arterial streets are provided in the plan.

Traffic Calming

The ability to calm traffic on residential streets can be accomplished through physical improvements or traffic control improvements. Some methods are mildly successful and more research needs to be accomplished to better determine the effects of traffic calming options. The transportation plan provides a discussion of various options. An engineering study of any problem perceived to be mitigated by traffic calming should always be conducted.

Traffic Impact Studies

A traffic impact study is a study of existing traffic and anticipated traffic conditions with and without the traffic impacts of the development. This study should include proposed mitigation of impacts and resulting traffic conditions. There will be times that traffic studies will be required which may be dependent on the type and size of the development.

General Recommendations

- The Transportation Plan should be reviewed and updated approximately every five (5) years to further reflect changes in the community.
- Intersection “hot spots” should be reviewed every 2-3 years to address any safety or capacity problems that may develop.
- The City should require the preparation of a traffic impact analysis for proposed new development. The type and size of development requiring the traffic impact analysis should be left to the discretion of the city engineer.

Further detail regarding all of the analyses conducted is contained in the Transportation Plan which follows.

I. INTRODUCTION

The City of Andover presents this Transportation Plan as a guideline to be used for the implementation of various elements of the City's transportation system. The studies and analyses presented in the plan address each of the following:

- Roadway System
- Transit
- Access Management
- Rail Crossing Safety
- Air Service
- Trails System
- Roadway Funding Potentials

Within the transportation plan, analyses have been completed that involve the projection of traffic volumes, analysis of various potentially problematic intersections, analysis of Hanson Boulevard and of Crosstown Boulevard NW with regard to their ultimate cross-sections, as well as other identified traffic/transportation issues.

The plan, which follows, provides the recommendations regarding the various transportation elements within the City of Andover. As with any plan, it is intended to be dynamic in that it will require review and revision as conditions in the City evolve and change.

II. TRANSPORTATION GOALS, OBJECTIVES AND POLICIES

Goal: Provide a safe and efficient transportation system that is cost effective and serves the existing and future access and mobility needs of the City

Objective: Ensure adequate internal and external transportation access and links for efficient movement of people and goods

Objective: Provide a transportation system that enhances quality economic development within the City

Objective: Provide a transportation system that meets the varied needs of Andover residents

Objective: Consider the mobility needs of all persons in the planning and development of the transportation system

Policies:

- Provide for early and continuing citizen involvement in transportation planning and implementation of projects
- Provide a roadway system within a functional hierarchy that accommodates existing and future travel demands by providing the necessary design features to satisfy the roadway's intended use

- Provide sufficient roadway capacity through the construction of transportation system improvements that accommodate existing and future demand
- Require construction of transportation system improvements in conjunction with new developments when the need is created by the new development
- Require payment for future transportation improvements as a part of development approval proportionate to the demand created by new developments
- Ensure that all components of the transportation system are maintained and developed to the highest standards to insure against detrimental impact upon community growth
- Utilize the Capital Improvement Plan to schedule projects that increase public safety by minimizing hazards and improving intersections and access points in need of safety improvements

Goal: Provide a coordinated transportation system that is compatible with adjacent municipality, Anoka County, Metropolitan Council and State of Minnesota transportation plans

Objective: Coordinate transportation planning and transportation system improvements with other government agencies to increase efficiencies

Objective: Increase opportunities for funding of local transportation system improvements from federal, state and county funding sources

Policies:

- Coordinate grant applications and other funding requests, when appropriate, with neighboring municipalities, as well as state, regional and county agencies
- Coordinate participation of Anoka County and adjacent cities, where appropriate, in the provision of Transportation Plan elements

Goal: Provide multi-modal transportation options whenever and wherever feasible and advantageous

Objective: Periodically evaluate potential ridership and feasibility of joining the Metropolitan Transit Taxing District to provide additional transit options for Andover residents

Policies:

- Identify locations for park and ride facilities and preserve the ability to implement these facilities in the future
- Promote ridesharing and increased vehicle occupancies throughout the City

Goal: Minimize impacts of the transportation system on the natural environment

Objective: Ensure environmentally sensitive implementation of the transportation system through the planning, design and construction of improvements

Objective: Consider the impacts of improvements to the existing transportation system on land use, environmental, social, historic, and cultural resources

Policies:

- Adhere to best management practices and all components of the Implementation Plan during the planning, construction and maintenance of the transportation system
- Separate non-motorized traffic from arterial and collector roadways
- Encourage joint parking facilities to conserve land

Goal: Enhance accessibility by providing an interconnected multi-use trail system

Objective: Provide an accessible trail system that links residential neighborhoods, commercial developments, and park areas

Objective: Utilize multiple funding sources to complete the regional and local trail systems

Objective: Coordinate trail construction with street improvement projects, new development, expansion and redevelopment projects

Policies:

- Maintain a map of existing and future local and regional trails and coordinate trail planning, construction and maintenance in the Capital Improvement Plan
- Fund regional trail system improvements adjacent to residential properties with trail fees collected from new residential developments, state aid funds and federal funds where eligible for such funding
- Require regional trail construction adjacent to commercial and industrial properties, where shown on the trails plan, in conjunction with development, expansion and redevelopment projects
- Require local trail construction adjacent to residential, commercial and industrial properties, where shown on the trails plan, in conjunction with development, expansion and redevelopment projects
- Develop trails in accordance with the American Association of State Highway Transportation Officials (AASHTO) standards
- Coordinate trail and sidewalk improvements, where appropriate, with Anoka County and neighboring cities

III. EXISTING CONDITIONS

The development of a Transportation Plan begins with the collection and review of various data, which can be denoted as existing conditions. These existing conditions, or characteristics, provide the base upon which the system plan is then built. This chapter provides information on certain existing conditions that have been reviewed during the preparation of the Transportation Plan.

A. Roadway Jurisdiction

The Andover roadway system consists of County roads, County State-Aid Highways (CSAH), Municipal State Aid (MSA) facilities and local City streets. There aren't any State of Minnesota highways in the City of Andover. A map indicating the roadway jurisdiction is contained on *Figure 1*.

B. Roadway Functional Classification

The functional classification of roadways in the City of Andover consists of the following types:

- 'A' Minor Arterials
- 'B' Minor Arterials
- Collectors
- Local

The functional classification system will be reviewed and discussed as part of the Transportation Plan. The existing functional classification system is illustrated on *Figure 2*.

C. Existing Traffic Volumes

The most recent daily traffic volume information for the primary roadways in Andover was obtained from various sources including State and County traffic flow models and maps and the City of Andover. The most recent (2005) daily traffic volume information is provided on *Figure 3*.

D. Trails

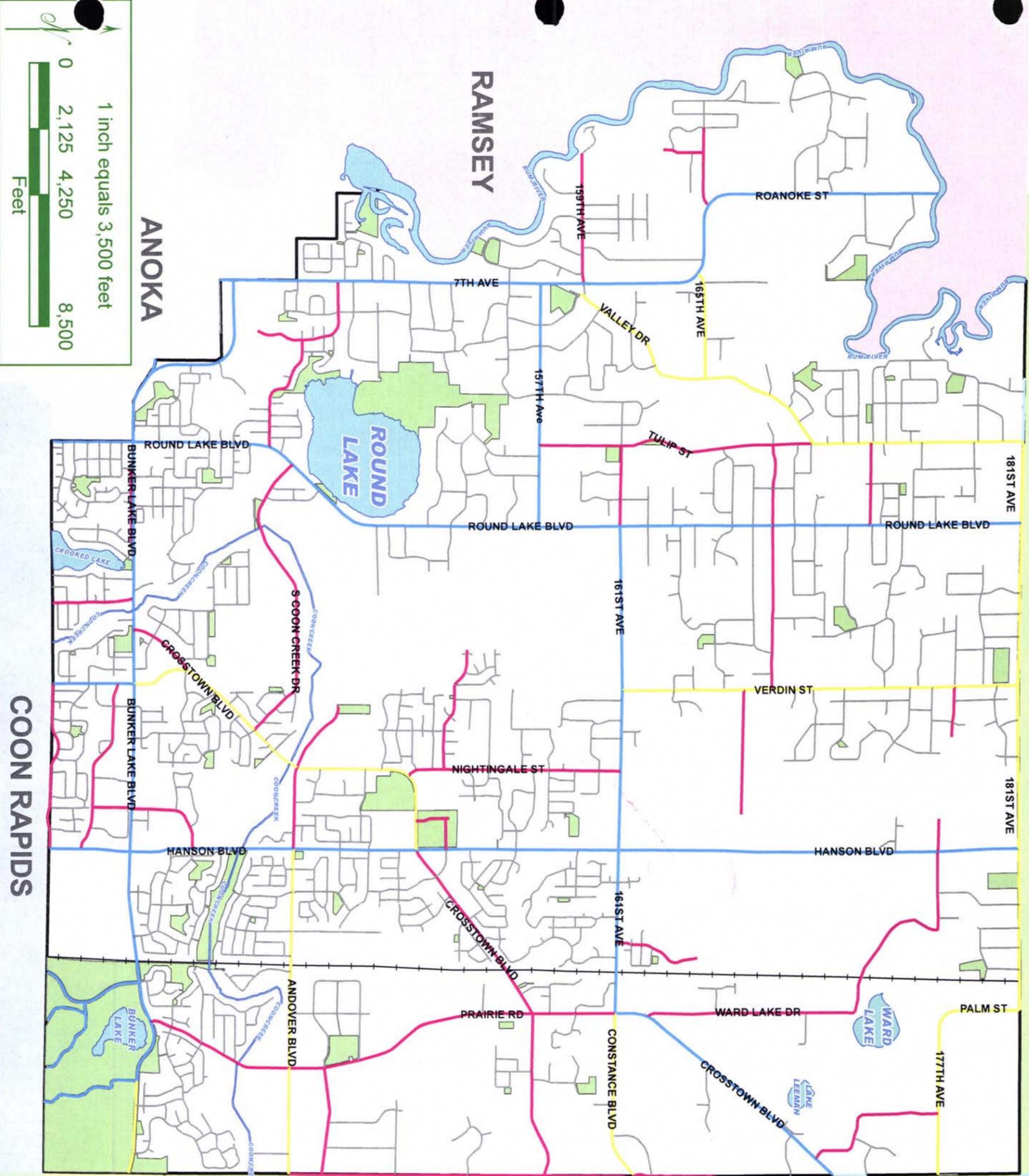
There are a number of existing trails, both on and off road, in Andover. In addition to these existing trails, the City has a trails plan that is designed to expand upon the availability of trails for use by the residents of the City. The existing Trails Plan, is shown on *Figure 4*.

E. Transit Service

Andover lies outside the former Metropolitan Transit Taxing District and does not have fixed route transit services. Two routes touch the southwestern corner of the City, traveling along Bunker Lake and Round Lake Boulevards. These are routes 850 and 851.

Paratransit services are provided by the Anoka County Traveler. Door to door dial-a-ride services are available Monday through Friday in the AM peak (6:30-8:30), noon hour (11:30AM – 1:30PM) and PM peak (3:45PM – 5:45PM) periods. Reservations can be made between the hours of 8:00AM and 5:00PM, seven days a week, up to four days in advance of the trip.

The Traveler provided a total of 2,330 passenger trips in the City of Andover in 2006. 947 passengers were picked up in Andover and 1,383 passengers were dropped off in the City.

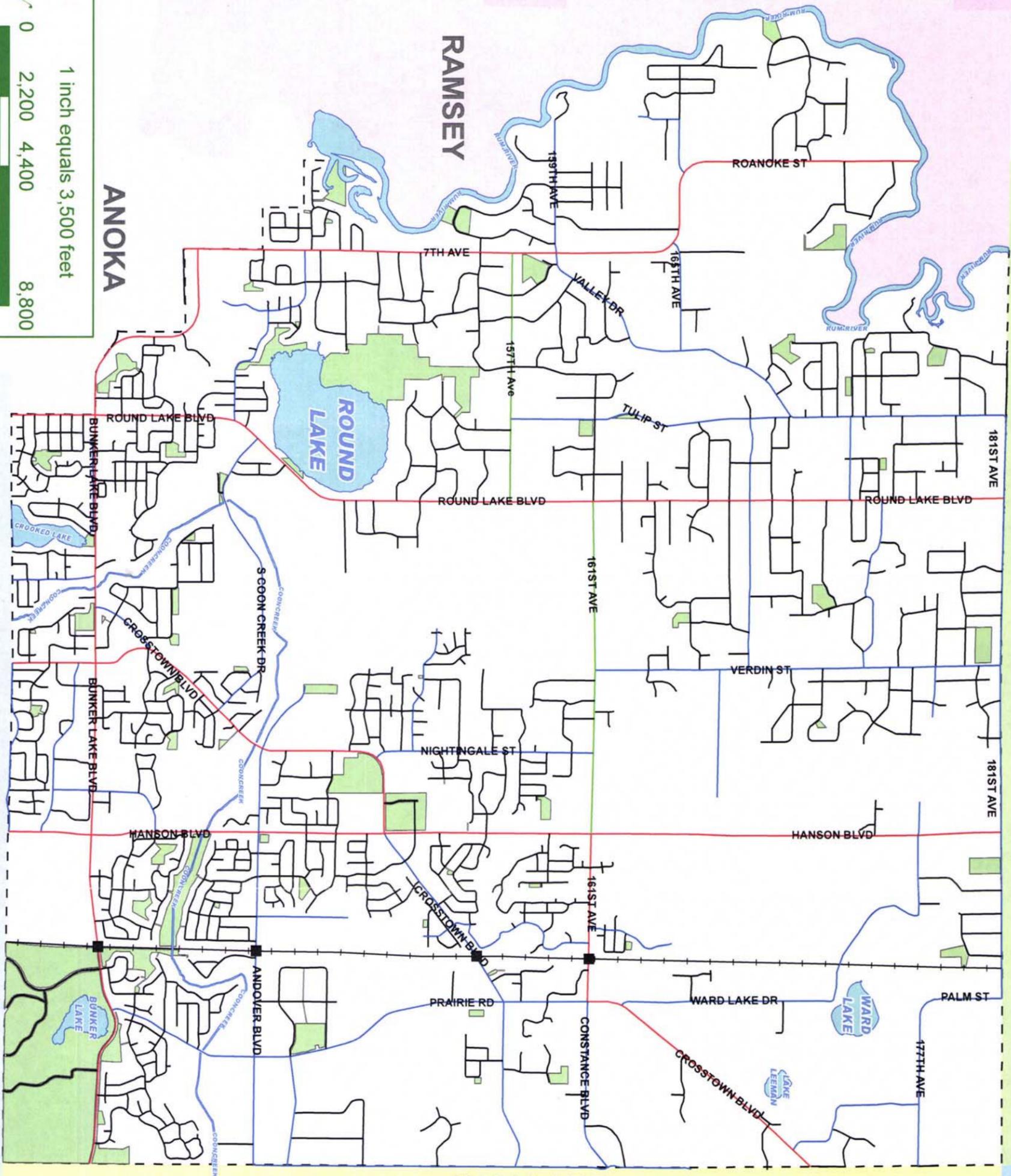


**TRANSPORTATION
PLAN**

LEGEND	
Roadway Jurisdiction	
	County State Aid Highway
	Municipal State Aid
	County Road
	County/Municipal Shared
	City Road

**Existing Roadway
Jurisdiction**

Figure 1



TRANSPORTATION PLAN

LEGEND

Functional Classification

- A Minor Arterial
- B Minor Arterial
- Collector
- Normal

Railroad

Water

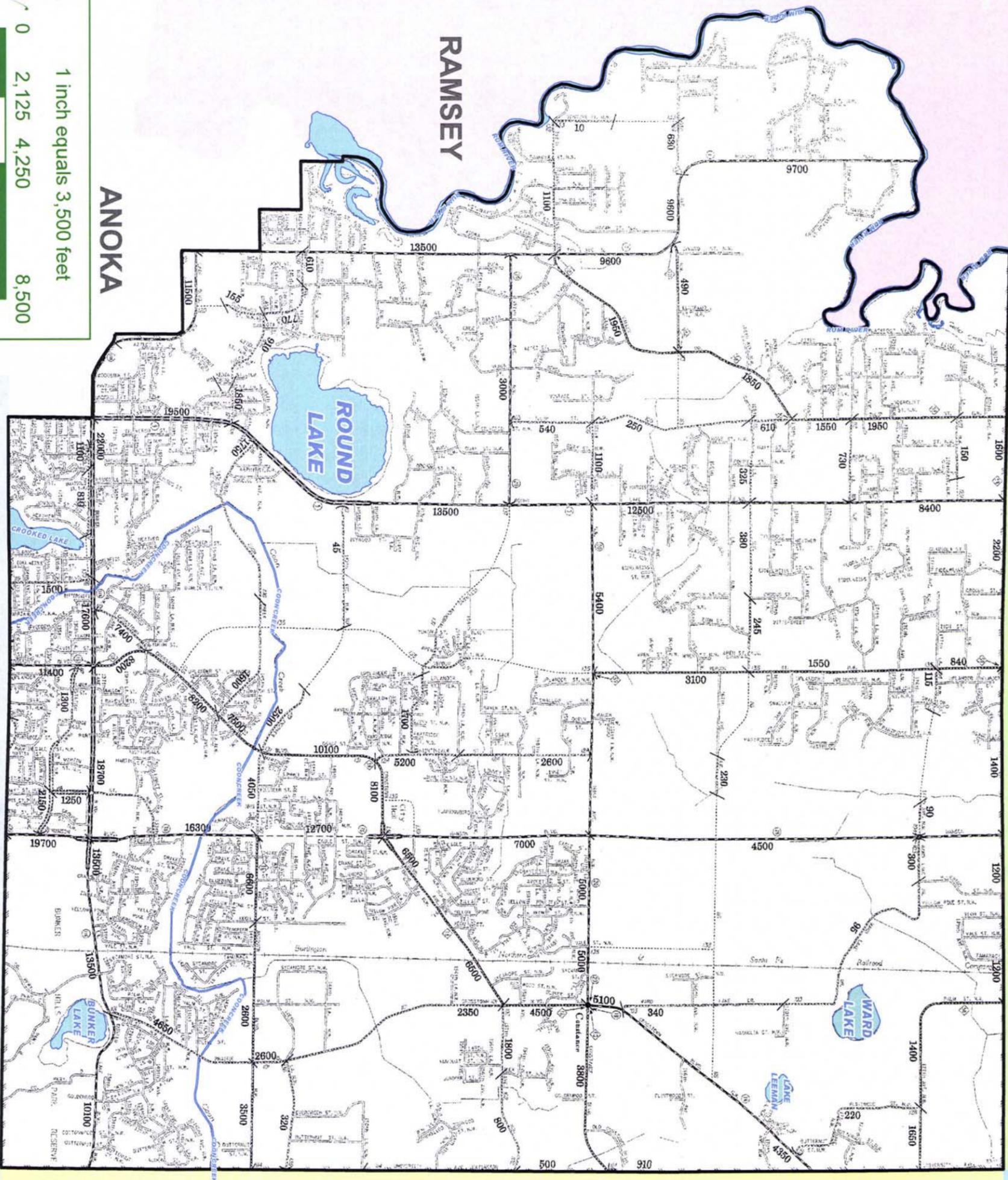
Parks

City Limits

Long Range Rail/Street
Grade Separation

Existing Functional Classification System

Figure 2



RAMSEY

ANOKA

ROUND
LAKE

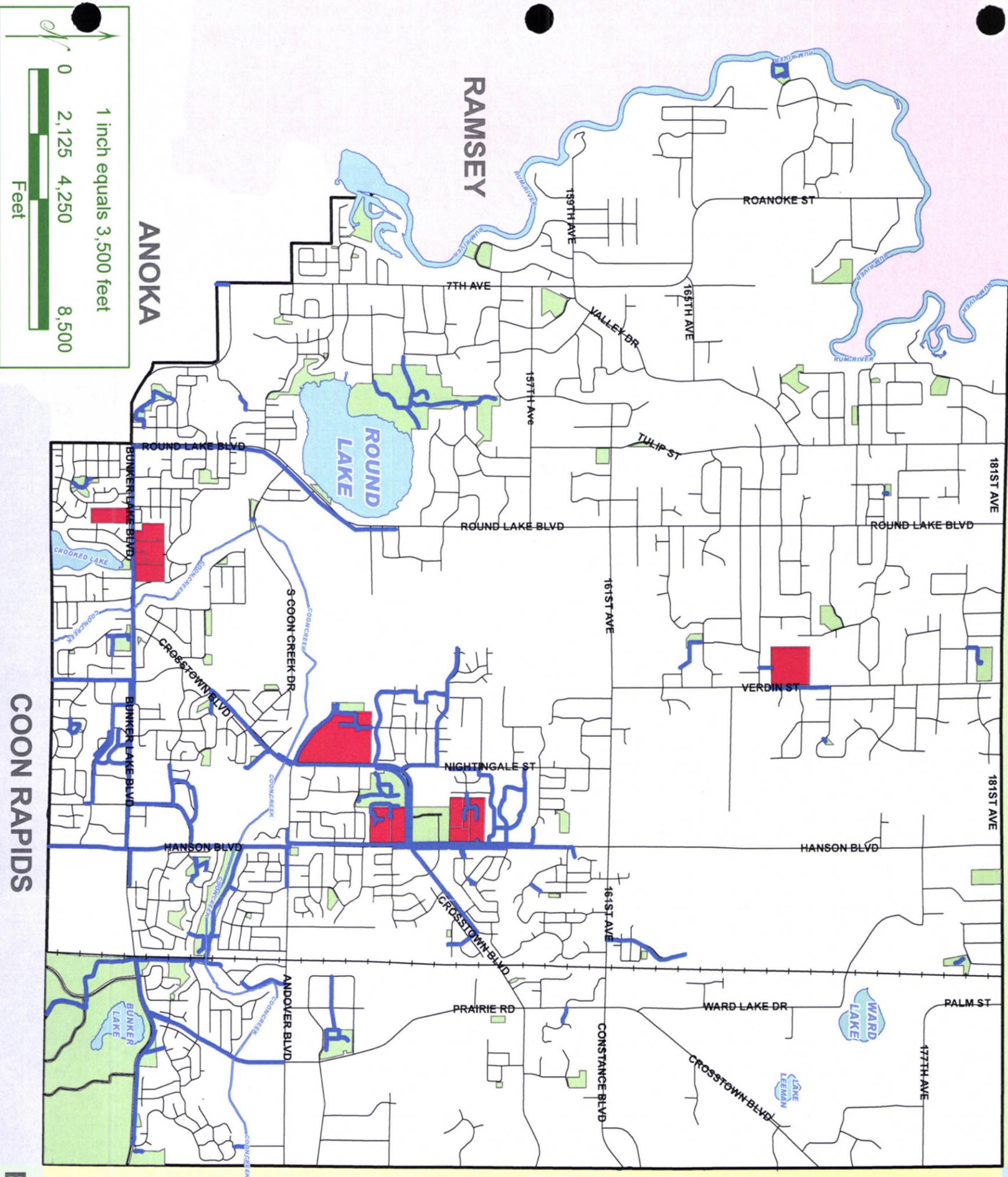
HAM LAKE

COON RAPIDS

BLAINE

**2005
Daily Traffic
Volumes**

Figure 3



LEGEND

- Existing Trails
- Other**
- Schools
- Existing Roads
- Railroad
- Parks
- Water

**Existing
Trails Plan**

Figure 4

February 2007



There are no park-and-rides or transit centers in Andover, although there are a number of Andover residents using park-and-ride facilities along Highway 10 to access service to Minneapolis and along I-35W to access service to St. Paul. Current regional Park-and-Ride lots near Andover include:

- Anoka – Garfield Street and 7th Avenue
- Blaine – Northtown Shopping Center Transit Hub – 85th Avenue and Jefferson
- Blaine – Oak Park Plaza – 109th Avenue and University Avenue
- Blaine – Park of Four Seasons – 11300 Block of University Ave. NE
- Blaine – Blainebrook Bowl – Paul Parkway and Highway 65
- Blaine – 95th Avenue and I-35W
- Coon Rapids – MTC Park & Ride - Foley Blvd – Between Coon Rapids Blvd and East River Road near Hwy 610
- Coon Rapids – Northstar Commuter Coach Riverdale Lot – Northdale Blvd.
- East Bethel – Hwy 65 at County Road 24 (no bus service)
- Elk River – Northstar Commuter Coach Park-and-Ride – Hwy 10 on 171st Ave NW
- Fridley – St. Phillip’s Lutheran Church – Hwy 65 and W. Moore Lake Drive
- Fridley – Walgreens – University Ave. and Mississippi St.
- Ramsey – Municipal Building – Vicinity of Armstrong Blvd. And Highway 10

In the event that transit services are expanded into Andover, the City has been discussing and examining future locations. Major north-south commuting routes, such as Hanson Boulevard NW and Round Lake Boulevard NW, and east-west routes, such as Bunker Lake Boulevard NW, should be examined for potential Park-and-Ride locations.

F. Rail System

The Burlington Northern and Santa Fe Railroad operate on a rail track that is situated in a north/south direction in the eastern part of the City. According to data provided by the MnDOT Office of Freight, Railroads, and Waterways, there are an average of 14 trains per day on this rail line operating at a maximum train speed of 50 miles per hour.

There are six (6) railroad grade crossings with public streets in Andover. There are also four (4) private crossings in the City. The public street crossings are with the following roadways:

- Bunker Lake Boulevard NW
- Andover Boulevard NW
- Crosstown Boulevard NW
- 161st Avenue NW
- Ward Lake Drive NW
- 181st Avenue NW

All crossings are presently controlled by flashers, gates, and bells. Wayside horns will be installed at Andover Boulevard NW in 2008. A median was constructed in 2007 to meet the Railroad Quiet Zone requirements at Bunker Lake Boulevard NW. Wayside horns are

being considered at Crosstown Boulevard NW in 2008 along with a Railroad Quiet Zone at 161st Avenue NW. The data provided by MnDOT indicates that there have not been any rail crossing accidents in the last five years in Andover. MnDOT establishes the type of crossing protection on the public streets and has a process that involves variables such as train and vehicular volumes, speeds, sight distance and number of tracks in order to determine the crossing types. The controls appear to be correct for those crossings in Andover. MnDOT works with cities in the event that a request for crossing review or improvement is presented by the City.

G. Crash Data

Data regarding reported crashes in Andover can be obtained from the Minnesota Department of Transportation and/or through the Anoka County Sheriff's Department as crash data changes very rapidly. If crash information is necessary to evaluate a particular location, the City will obtain the necessary information from MnDOT and/or the Anoka County Sheriff's Department.

H. Air Service

There are no airports within the City of Andover, nor are there any airports in near enough proximity to cause an effect with regard to airport runway clearances and land use designation.

I. Intersection "Hot Spots"

One element of the study includes an ongoing study of eleven (11) intersection "hot spots". These locations were chosen originally by the Technical Advisory Committee (TAC) following a review of the volumes and crash data as well as the receipt of input from City staff and from the public. The intersection "hot spots" selected did not include some intersections that handle higher traffic volumes. Some of those intersections have been analyzed, or will be analyzed by Anoka County Highway Department as they are on the County system. This analysis is anticipated to be within the next couple of years. These intersections were selected based on the history of each location and not on anticipated issues in the future.

The intersections that were selected for traffic operation analysis are as follows:

- Bunker Lake Boulevard NW and Crooked Lake Boulevard NW
- Bunker Lake Boulevard NW and Marigold Street NW
- Crosstown Boulevard NW/Crosstown Drive NW and 139th Avenue N.W.
- Crosstown Boulevard NW and South Coon Creek Drive NW
- South Coon Creek Drive NW and Round Lake Boulevard NW
- Crosstown Boulevard NW and Nightingale Street NW
- Crosstown Boulevard NW and Prairie Road NW
- 159th Avenue NW and CSAH 7
- CSAH 7 and 165th Avenue NW (East)
- 161st Avenue NW and Verdin Street NW
- Andover Boulevard NW and Prairie Road NW

- Roanoke Street NW (CSAH 7) and 165th Avenue NW (West)
- Hanson Boulevard NW (CSAH 78) and 161st Avenue NW (CSAH 20)
- Nightingale Street NW and 161st Avenue NW (CSAH 20)

The existing conditions operations analysis is presented in the following chapter. The locations of the 14 “hot spot” intersections are shown on *Figure 5*.

J. Study Corridors

The Transportation Plan also involves a more detailed assessment of Hanson Boulevard NW (CSAH 78) and Crosstown Boulevard NW. The purpose of the evaluation was to identify what the roadway sections should look like in order to accommodate the future traffic volumes. These analyses are discussed in a subsequent chapter.

Hanson Boulevard NW North of Coon Creek to 181st Avenue NW

The Hanson Boulevard NW corridor is presently functionally classified as an ‘A’ Minor Arterial roadway in Andover. Hanson Boulevard NW between 133rd Avenue NW and 139th Avenue NW is a 4 lane divided roadway. Hanson Boulevard NW north of 139th Avenue NW is an undivided two lane roadway to the north border of the City. Daily volumes are currently in excess of 21,000 near Bunker Lake Boulevard NW and taper off to a volume slightly in excess of 5,400 at the north City boundary. Hanson Boulevard NW contains an interchange with State Highway 10 south of the City, which makes this an attractive route for Andover and Coon Rapids residents.

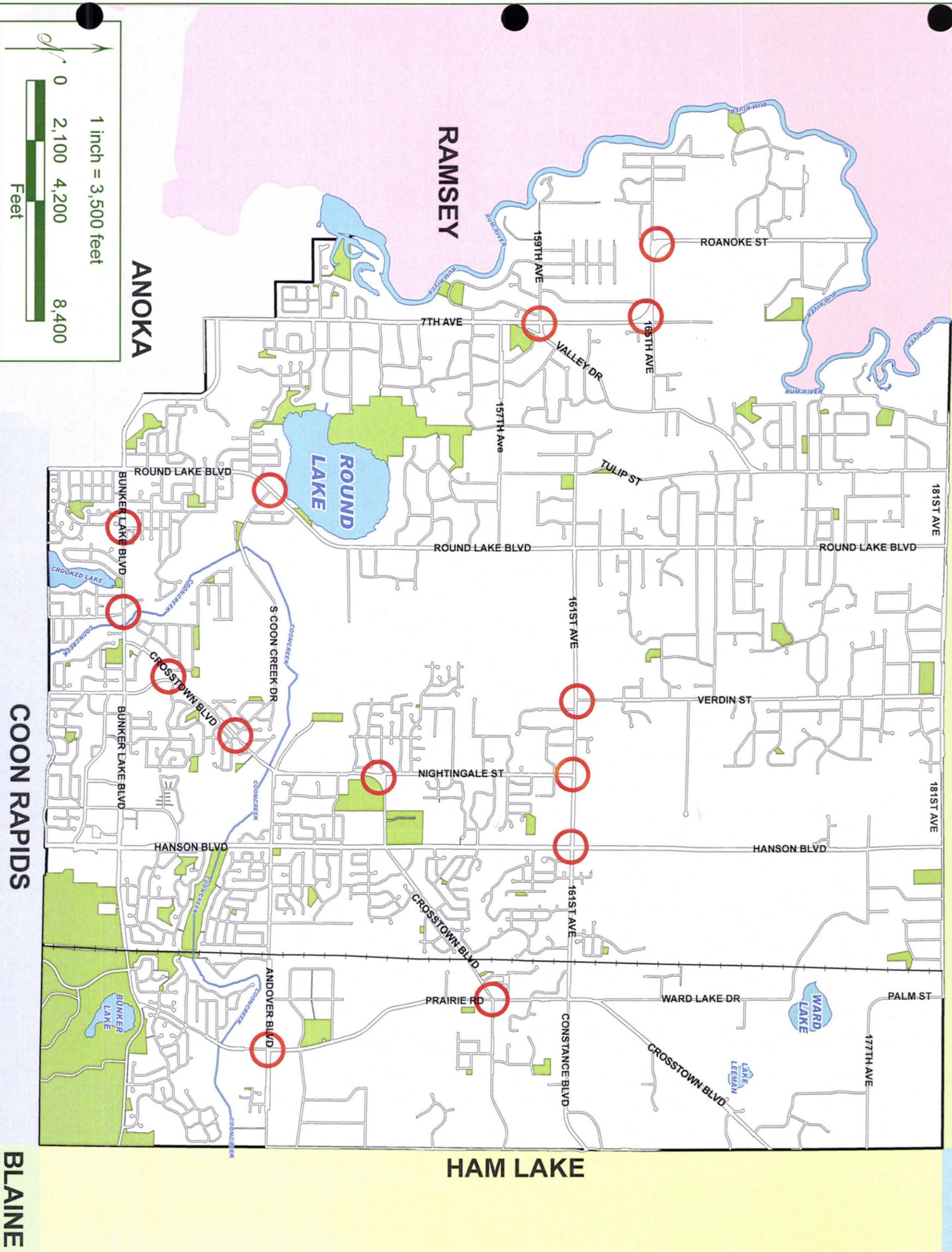
Crosstown Boulevard NW from 133rd Avenue NW to the Easterly Border of Andover

Crosstown Boulevard is a designated “A” Minor Arterial roadway that basically contains two travel lanes throughout the City. Crosstown Boulevard NW is a route that meanders from the southcentral to the northeast part of the City, sometimes oriented north-south, sometimes east-west, and sometimes as a radial route. The volumes along the route generally range from 10,000 to 16,000 vehicles per day south of Andover High School and range from 5,000 to 7,500 vehicles per day north and east of Andover High School. Volumes on this route are also expected to increase in the future as the City further develops and as the High School keeps adding students.

BURNS
TOWNSHIP

OAK GROVE

EAST
BETHEL



LEGEND

- Locations for Further Study
- Right of Way
- Railroad
- Water
- Parks
- City Limits

**CITY OF
ANDOVER**

**TRANSPORTATION
PLAN**

**Intersection
Hot Spots**

Figure 5

K. Traffic/Transportation Issues

The following are various transportation issues that should be addressed:

- A bike/walk trail along a portion of South Coon Creek Drive NW west of Crosstown Boulevard NW and a trail on the west side of Crosstown Boulevard NW between South Coon Creek Drive and Andover Boulevard NW is needed to provide a safe route to the high school for residents.
- Traffic is backed up 4-5 times per day by trains crossing Bunker Lake Boulevard NW. All streets in Andover that have rail crossings are hampered by the trains.
- Nightingale Street NW intersects Crosstown Boulevard NW at an odd angle and there is more foot traffic with the school. Traffic needs to travel slower.
- There is a need for a bike trail along Andover Boulevard NW between Hanson Boulevard NW and Prairie Road NW.

IV. STUDY ELEMENTS ANALYSIS/RECOMMENDATIONS

This chapter presents results and recommendations for the transportation elements that have been analyzed during the preparation of this Transportation Plan.

A. Roadway Jurisdiction/MSA Routes

The State of Minnesota, through the gas tax and license fees, collects funds to be used to construct and maintain the State's transportation system. Most of the funds collected are distributed for use on the State's Trunk Highway (TH) system, the County State Aid Highway (CSAH) system and the Municipal State Aid Street (MSAS) system. Of the funds available they are distributed 62% TH, 29% CSAH and 9% MSAS. When a city's population goes above 5,000 they become eligible to receive a portion of the MSAS funding. When this happens, the city develops a State Aid Street system. The MSAS system can include existing roadways as well as future roadways.

In order to develop the City's State Aid system, the total mileage of all roadways within the City is computed. The mileage that the City can designate for their State Aid system is 20% of the total roadway mileage. As development occurs and new roadways are constructed, the total mileage increases, and therefore, the total State Aid mileage will also increase. Knowing that the mileage will increase in the future, it is wise to plan where that mileage will be applied.

The City of Andover has a MSAS system in place and has been using State Aid funds for roadway maintenance and construction. As part of this Transportation Plan, an updated City collector system has been identified. Generally the collector roadways are the routes that are designated as State Aid Streets. The following section of this plan will look at the City's existing MSAS system and make recommendations regarding system revisions. This

will include removing some existing routes, designating new routes and planning for future designations as the City's state aid mileage increases.

The following recommendations are based on developing a State Aid system that provides continuity of all routes through the City. The emphasis is placed on developing north/south and east/west routes at uniform spacing throughout the City. These routes can include trunk highways and County Roads, which may not be part of the City's system, but provide continuity for the traveling public. The proposed and existing State Aid Road designations are discussed below and are illustrated in *Figure 6*.

Turnbacks from Anoka County

There are two county roads located within the City that have been discussed as potential turnback routes. Anoka County would release these roadways into the jurisdiction of the City. When this happens, the City will be allowed to add these routes to their State Aid system. These routes will be added to the City's existing state aid mileage, increasing the overall city system. Each year the City will calculate the total mileage of roadways, take 20% of those miles and then add on the turnback miles. This allows a City to take a roadway from a county and receive additional state aid funding to maintain it. The two roadways are:

- County Road 59 (Verdin Street NW) (approximately 2.45 miles)
 - From 161st Avenue NW (CSAH 20) to 181st Avenue NW (County Road 58)
- County Road 158 (165th Avenue NW) (approximately 0.65 miles)
 - From 7th Avenue NW (CSAH 7) to Valley Drive NW (County Road 58)

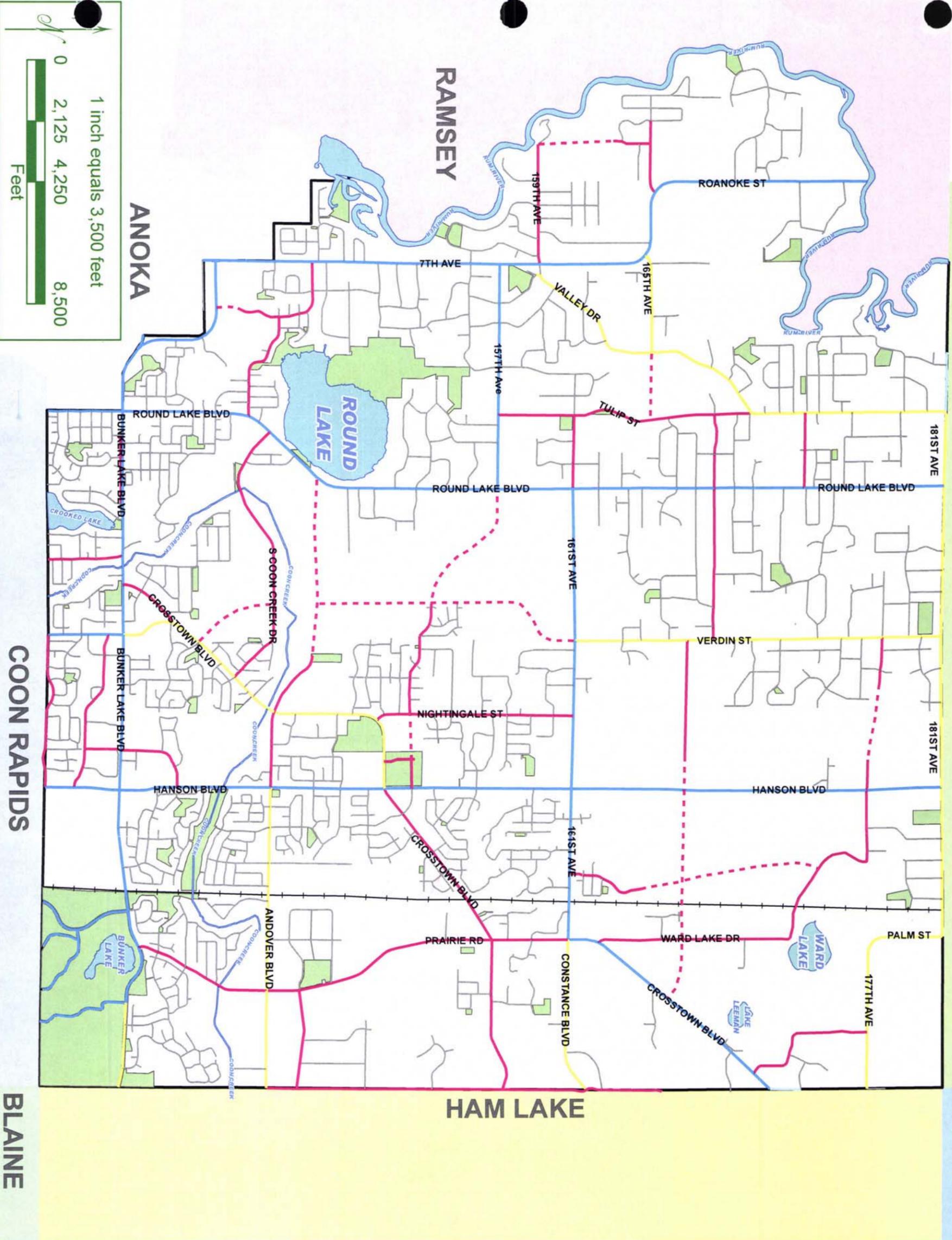
These additions would add approximately 3.10 miles to the City's current MSAS system.

Existing MSA Routes to be Removed

With the changes to the Collector Street system, there are some roadways that were designated as State Aid routes that do not improve the overall north/south or east/west continuity of the entire roadway system. Also, with the addition of other future collector streets, additional mileage is needed to apply to those routes that do provide the desired continuity. MSA routes that are designated on county roads may also be candidates for removal. There may be reasons for designating county roads on the City's system but generally this is not done because the county constructs and maintains those roadways. Routes to be removed will be analyzed on a year to year basis.

Future Municipal State Aid Street Designations

The function of the State Aid street system within the City is to provide for the movement of vehicles along a collector type system to the arterial roadway system. It also can provide for the movement of vehicles along non-arterial corridors within the City. It is desirable to designate roadways in a grid like pattern to allow for the north/south and east/west movement through the City. New routes will be analyzed on a year to year basis.



**TRANSPORTATION
PLAN**

LEGEND

Roadway Jurisdiction

- County State Aid Highway
- Existing Municipal State Aid Designation on Existing Roadway
- County Road
- County/Municipal Shared
- City Road
- Existing Designated MSA Non-Existing Roadway
- Proposed Future Designated MSA Roadway

**Existing and Proposed
Municipal State Aid Street
Designations**

Figure 6

Existing MSA Routes to be Revised

At this point, no routes are proposed to be revised. If routes are to be revised in the future there are factors that need to be considered. Prior to removing a route from the system, the City must determine if State Aid construction funds have been used on that route over the past 20 years. If so, the City will have to pay back a prorated amount of the construction funds to remove it from the system. Determining where and when those funds were spent will be necessary to justify removal of the MSA designation. *Note:* Although the City may plan to designate a future roadway to the State Aid system as outlined within this plan, this designation does not have to occur immediately. The City may not have enough mileage to provide for the designation. As the City grows and road mileage increases, the City will gain additional mileage for future dedication. Upon receiving enough mileage, the City can designate a future roadway to the Municipal State Aid Street system.

B. Roadway Functional Classification System

The intent of a functional classification system is the creation of a roadway hierarchy that collects and distributes traffic from local roadways and collectors to arterials in a safe and efficient manner. Such classification aids in determining appropriate roadway widths, speed limits, intersection control, design features, accessibility and maintenance priorities. Functional classification also helps to ensure that non-transportation factors, such as land use and development, are taken into account in planning and design of the roadway system.

A balanced system is desired, yet not always attainable due to existing conditions and characteristics. The criteria of the functional classification system are intended to be guidelines and are to be applied when plans are developed for the construction or reconstruction of a given classified route. However, the guidelines may not be strictly adhered to if the factors involved in a particular situation warrant an alternative approach. Some roadways, for a short segment, may carry higher volumes than a roadway with a higher classification. Spacing guidelines may not follow recommendations for a variety of reasons such as topography, land use type and density, and environmental concerns.

The two major considerations in the classification of roadway networks are access and mobility. Mobility is of primary importance on arterials, thus limitation of access is a necessity. The primary function of a local roadway, however, is the provision of access, which in turn limits mobility. The extent and degree of access control is a very important factor in the function of a roadway facility. The functional classification types utilized are dependent upon one another in order to provide a complete system of streets and highways.

A complete functional design system provides a series of distinct travel movements. Most trips exhibit six recognizable stages. These stages are as follows:

- Main movement
- Transition
- Distribution
- Collection
- Access

- Termination

As an example, *Figure 7* depicts this hierarchy of movement by illustrating a hypothetical trip using a freeway, which comprises the main movement. When the vehicle leaves the freeway, the transition is the use of the freeway ramp at a reduced speed. The vehicle then enters the moderate speed arterial, the distribution function, to travel toward a neighborhood. From the arterial the vehicle enters a collection road.

Then a local access road that provides direct approach to the residence or termination point. Each of the six stages of the trip is handled by a facility designed specifically for that function. Speeds and volumes normally decrease as one travels through the six stages of movement.

It must be recognized that all intermediate facilities are not always needed for various trip types. The character of movement or service that is provided has a function, and these functions do not act independently. Thus, the number of movements in the travel categories become consistent with function and the classification of that function.

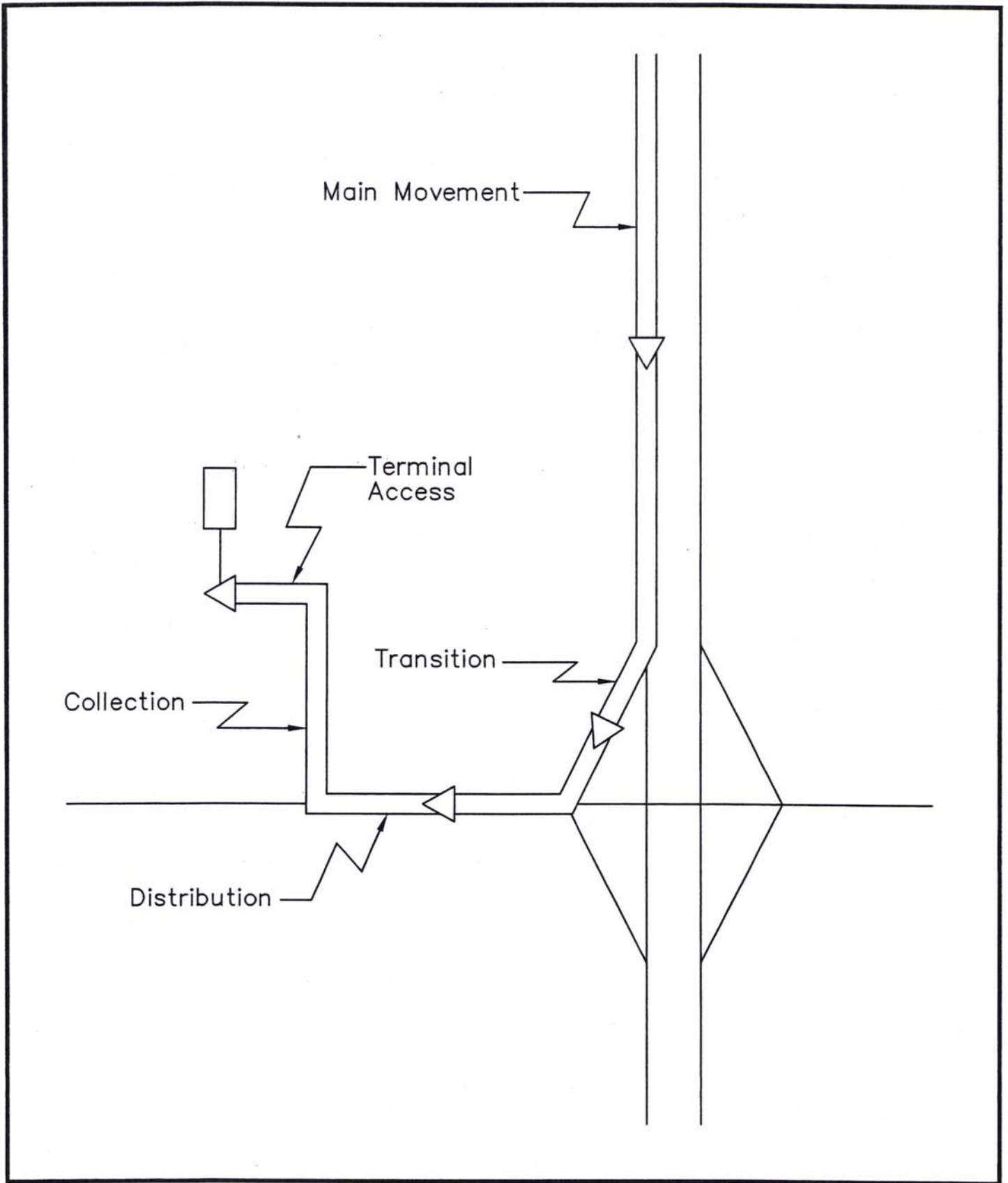


Figure 7
Hierarchy of Movement

Principal Arterials

Principal Arterial roadways serve major activity centers, higher traffic volumes, longer trips and carry a higher proportion of total urbanized travel on a minimum of mileage. Along these facilities, access needs to be limited in order to preserve the ability of the roadway to accommodate the volumes and to maximize safety. Spacing varies from 2-3 miles for a fully developed area to 3-6 miles for a developing area. The management criteria require that a 40 mph average speed be achieved during peak traffic periods. Also, little or no direct land access should be allowed within an urban area. Grade separated intersections are required for freeways and highly desired for other principal arterial roadways. Currently, there are no principal arterials within the City of Andover. Regionally, TH 10, TH 169, County Road 14 (between TH 10 and TH 65) and TH 65 are principal arterials.

Minor Arterials

Minor Arterial roadways connect the urban service area to cities and towns inside and outside the region and generally service medium to short trips. Minor Arterials may also provide an alternate route for congested Principal Arterial roadways. Minor Arterials connect principal arterials, minor arterials and connectors. The spacing ranges from $\frac{1}{4}$ to $\frac{3}{4}$ of a mile in metro centers to 1-2 miles in a developing area. The desired minimum average speed during peak traffic periods is 20 mph in fully developed areas and 30 mph in developing areas.

The emphasis for Minor Arterial roadways is on mobility rather than on land access. In urban areas, direct land access is generally restricted to concentrations of commercial/industrial land uses. Minor Arterials can be broken down further into 'A' Minor and 'B' Minor Arterials. 'A' Minor Arterials have less emphasis on land access than 'B' Minor Arterials. This allows 'A' Minor Arterials to become eligible to compete for Federal funding. Currently, there are two 'B' Minor Arterial roadways within the City of Andover: 157th Avenue NW (CSAH 20) between County Road 7 and Round Lake Boulevard NW and 161st Avenue NW (CSAH 20) between Round Lake Boulevard NW (CSAH 9) and Hanson Boulevard NW. These 'B' Minor Arterial roadways provide connections to the surrounding cities of Ham Lake, Oak Grove, Coon Rapids and Ramsey. There are currently five 'A' Minor Arterial roadways within the City of Andover: Hanson Boulevard NW, Round Lake Boulevard NW, Bunker Lake Boulevard NW, portions of Crosstown Boulevard NW and portions of 161st Avenue NW. These 'A' Minor Arterial Roadways provide critical connections to the Principal Arterial and Interregional Corridor systems, which include TH 10, TH 65, TH 169 and County Road 14 (between TH 10 and TH 65).

Collector Streets

Collector Streets provide more land access than arterials and connections to arterials, although not in all cases. As is the case with any roadway system, there will always be exceptions to the planning guidelines that are used to classify a roadway system. Collectors serve a dual function of accommodating traffic and provision of more access to adjacent properties. Mobility and land access are equally important and direct land access should predominately be to development concentrations. For collector streets that have 2,500 ADT

or less, the street would be considered a minor collector street and direct land access would be allowed. For collector streets that would have ADT's higher than 2,500, the street would be considered a major collector and direct land access would be restricted. Collectors generally connect to minor arterials and serve short trips. Spacing for collectors range from $\frac{1}{4}$ to $\frac{3}{4}$ miles in a fully developed area to $\frac{1}{2}$ to 1 mile in a developing area. In order to provide a network consistent with the spacing guidelines for a developing area; several local streets throughout the City will need to be reclassified as collectors and some new collector roadways will need to be constructed. This reclassification could require the reconstruction of the Local Streets to meet the recommended roadway widths and design features of a Collector Street. Such reconstruction, when warranted due to street conditions, may or may not provide a wider street section.

Local Streets

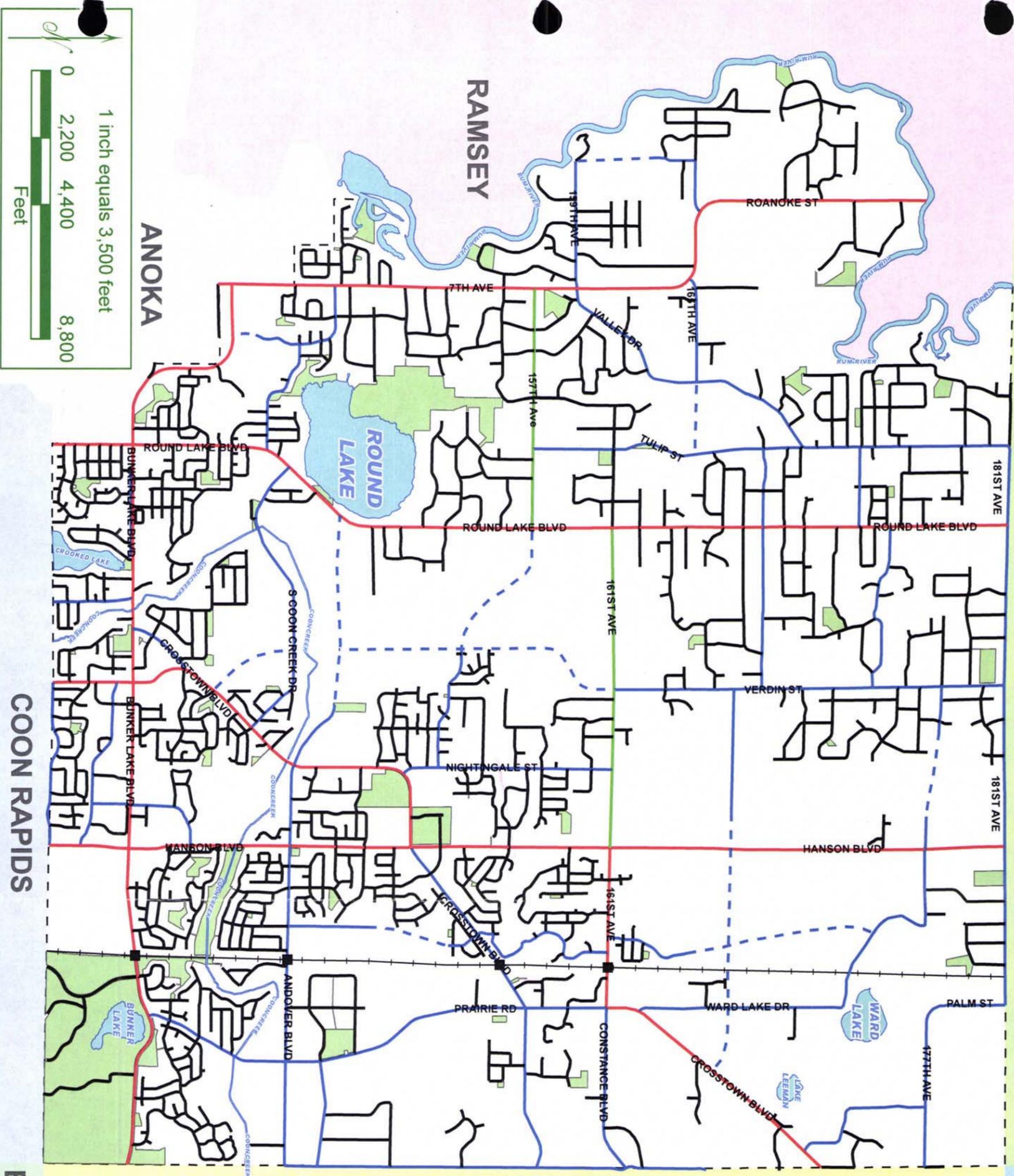
The lowest classification of roadways is the local roadway where access is provided with much less concern for control but land service is paramount. Spacing for local streets is as needed to access land uses. Local roadways generally have lower speed limits in urban areas and normally serve short trips. Local streets will connect with some minor arterials but generally connect to collectors and other local streets. The development of local streets will be guided by the location of the existing and proposed minor arterials and collectors as well as by development and the expansion of local utilities.

Recommendations

Anoka County and the City of Andover made changes since the original transportation plan was approved in 2003. The proposed functional classification system is shown on *Figure 8*.

C. Projected Traffic Volumes

Two sets of traffic volumes have been prepared which illustrate 2005 and projected year 2030 volumes for the City of Andover which are shown on *Figure 9*.



TRANSPORTATION PLAN

LEGEND

Existing Roadway

- A Minor Arterial
- B Minor Arterial
- Collector
- Normal
- Proposed Collector Roadway

Water

Railroad

Parks

City Limits

Long Range Rail/Street Grade Separation

Proposed Functional Classification System

Figure 8



MUNICIPALITY OF ANDOVER

PREPARED BY THE
MINNESOTA DEPARTMENT OF TRANSPORTATION
 OFFICE OF TRANSPORTATION DATA & ANALYSIS
 IN COOPERATION WITH
U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION



LEGEND

- INTERSTATE TRUNK HIGHWAY.....(I)
- U.S. TRUNK HIGHWAY.....(U.S.)
- STATE TRUNK HIGHWAY.....(S)
- COUNTY STATE AID HIGHWAY.....(C.S.A.)
- CORPORATE LIMITS.....(CL)
- PUBLIC ROAD.....(P)
- PRIVATE ROAD.....(PR)
- 2030 EXISTING DAILY VOLUMES.....(X,xxx)
- EXISTING DAILY VOLUMES.....(x,xxx)

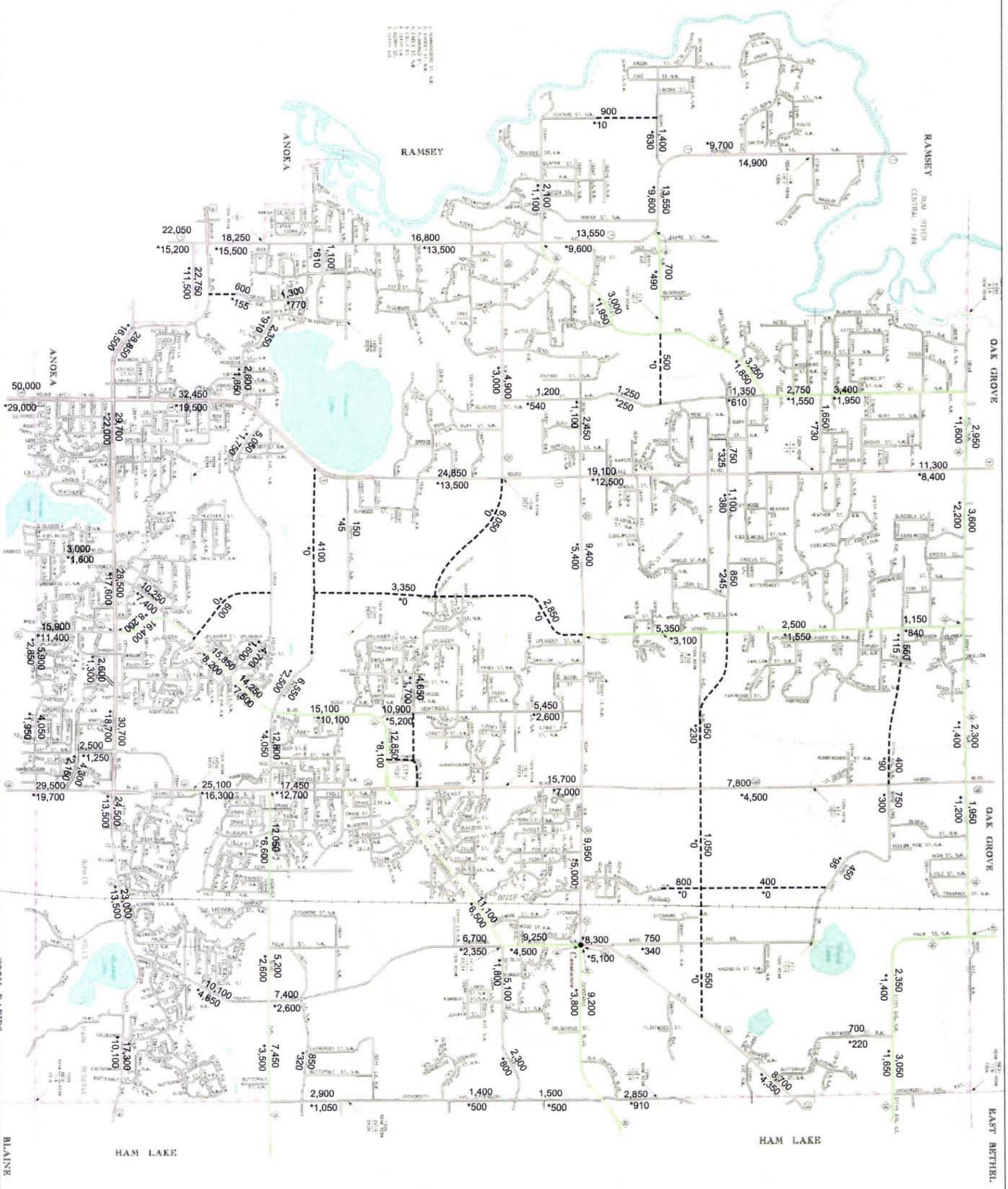


FIGURE 9

Existing 2005 & Projected 2030 Average Daily Volumes

City of Andover

K:\171\17107004\Cad\DWG\17107004_AADT MAP.dwg

FIGURE 9



Land Use Scenarios

The 2005 Existing volumes are taken directly from counts by the Minnesota Department of Transportation (MnDOT). MnDOT gathers the raw traffic volumes from the City and uses minor adjustments (determined by when the count was taken, such as month and day) to present an Annual Average Daily Traffic volume.

The 2030 projections add 25 years of general traffic growth. Historically, traffic on most roadways increases over time, with or without specific development on that roadway. To account for this general increase in volume, various factors, such as the State-Aid 20-year growth factor, historic growth over the past 10 years, roadway location and importance, were examined for the roads in Andover. Based on that information, volumes were projected to increase from one to four percent per year. The existing and year 2030 projected volumes are shown on *Figure 9*.

The projected traffic volume information is used to test the ability of the proposed roadway and land use plan to accommodate the future volumes. For purposes of this planning analysis, the daily capacity volumes that are used in the metro areas are as follows:

Two-Lane Roadway with Left and Right Turn – 21,250
Four-Lane Roadway with Left and Right Turn - 35,600

The planning capacities utilized will vary due to actual operations along any roadway. Many factors influence a roadways capacity such as number and locations of signals, number of access drives, roadway alignment, percentage of trucks on the facility, and other factors. There are four lane divided roadways that accommodate 40,000 vehicles per day and two-lane roadways that have been able to accommodate 15,000 to 20,000 vehicles per day. The capacities used in this analysis are appropriate for planning level reviews.

Most of the roadways in the City should be able to function acceptably as two-lane facilities as long as good access management is practiced along these arterials and collectors streets.

The projected volumes were conducted using existing zoning density and 3.0 units per net acre for the Rural Reserve. The reasons for the projections were to determine if the roadways in the immediate vicinity of the Rural Reserve Area would need to be upgraded when comparing existing zoning to the metro area density considered in the volume projections. The density is not a land use recommendation; it is merely used to test certain area roadways as to their ability to accommodate the generated volumes.

In all cases, the roadway systems adjacent to the Rural Reserve Area would not need to be upgraded as long as right and left turn lane improvements are provided in order to serve the vehicular demand generated by the increased density considered in the volume projections. Roadways adjacent to the Rural Reserve Area, (Round Lake Boulevard NW and 161st Avenue NW) will need to be four-lane roadways under either traffic assignment scenario. All other roadways in the immediate area will function acceptably as two-lane roadways including the proposed east-west and north-south collectors in this area. Turn lane

improvements will be needed to access the Rural Reserve once entrance/egress locations have been identified.

Review of the volume projections indicates that the expansion of existing transportation routes to provide four lane roadways would be appropriate for the following facilities in Andover.

- Hanson Boulevard NW from 139th Avenue NW to 161st Avenue NW (Divided)
- Round Lake Boulevard NW from 150th Lane NW to North City Boundary (Divided) – Through the entire City
- 7th Avenue NW from South City Boundary to 157th Avenue NW (Divided)
- 7th Avenue NW from 157th Avenue NW to North City Boundary (Undivided)
- 161st Avenue NW from Round Lake Boulevard NW to Crosstown Boulevard NW (Undivided)
- Bunker Lake Boulevard NW from Hanson Boulevard NW to East City Boundary (Divided)

Transportation Analysis Zones

The following tables provide existing and projected Population and Employment Densities by Traffic Analysis Zones (TAZ) in Andover. Table 1 represents the City's zones and Table 2 is broken down into Anoka County's TAZ's. This information was prepared using the growth projections of the Comprehensive Plan.

The most significant population growth by the year 2030 is projected in the Rural Reserve Area of the City (TAZ 30), while most commercial growth will be concentrated in the south-central portions of the City (TAZs 29 and 31). *Figures A* illustrates the TAZ boundaries.

The interrelationship between land use and transit cannot be overemphasized. Transit supportive land use patterns, which include directed planning of integrated roadway systems, careful developing concentrations of rider origins and destinations while preserving open space and community character, and developing a mix of activities and uses, is essential to the long-term viability of providing transit as a mobility option for the residents of Andover.

Table 1 Transportation Analysis Zones

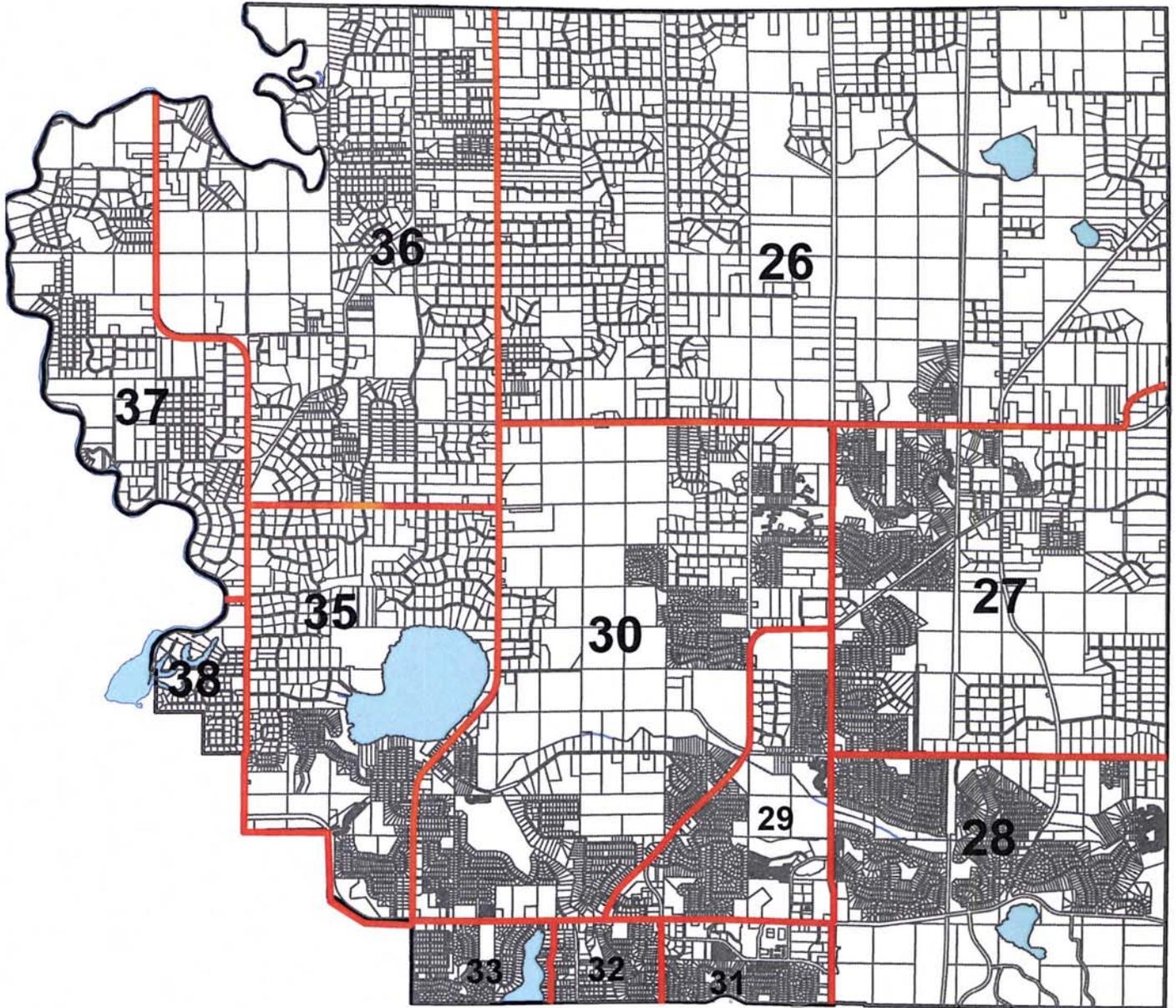
TAZ	2000 Households	2010 Households	2020 Households	2030 Households	2000 Population	2010 Population (3.28 pph)	2020 Population (3.00)	2030 Population (2.80 pph)	2000 Total Employment	2010 Total Employment	2020 Total Employment	2030 Total Employment	2000 Retail Employment	2010 Retail Employment	2020 Retail Employment	2030 Retail Employment	2000 Non-Retail Employment	2010 Non-Retail Employment	2020 Non-Retail Employment	2030 Non-Retail Employment
26	861	991	1,061	1,101	2,685	3,250	3,183	3,083	283	340	380	412	54	54	62	70	229	286	318	342
27	1,233	2,286	3,036	3,657	3,847	7,497	9,107	10,238	40	473	443	480	0	286	320	362	40	187	123	118
28	1,245	1,711	1,721	1,726	3,885	5,610	5,162	4,831	200	398	420	525	10	58	70	98	190	340	350	427
29	726	834	844	855	2,265	2,736	2,532	2,394	250	400	580	642	58	110	190	235	192	290	390	407
30	1,439	2,076	3,716	4,711	4,489	6,809	11,147	13,190	850	1,084	1,203	1,303	324	600	700	725	526	484	503	578
31	313	313	318	320	977	1,027	954	896	950	1,259	1,392	1,508	50	569	600	669	900	690	792	839
32	336	338	354	356	1,048	1,109	1,062	997	99	104	110	115	75	80	80	80	24	24	30	35
33	372	372	377	389	1,161	1,220	1,131	1,089	165	211	241	260	58	60	68	75	107	151	173	185
35	832	1,099	1,114	1,120	2,596	3,605	3,342	3,136	50	88	127	137	50	72	95	110	0	16	32	27
36	907	933	978	1,170	2,828	3,060	2,934	3,276	50	88	90	90	8	6	14	14	42	82	76	76
37	278	331	371	396	867	1,086	1,113	1,109	42	49	53	58	0	0	0	0	42	49	53	58
38	117	117	119	121	365	384	357	339	0	0	0	0	0	0	0	0	0	0	0	0
Total	8,659	11,400	14,008	15,921	27,013	37,392	42,024	44,578	2,979	4,494	5,039	5,530	687	1,895	2,199	2,438	2,292	2,599	2,840	3,092
Met Council Estimates	8,107	12,100	14,600	15,500	26,588	33,000	39,000	40,500	3,062	4,200	4,800	5,200	642	1,260	1,870	2,350	2,420	2,940	2,930	2,850



Incorporated 1974

Transportation Plan

Figure A TAZ Boundaries



City of Andover
1685 Crosstown Blvd. NW
Andover, MN 55304
(763) 755-5100



Map Date: August 2007

LEGEND

26 TAZ Number

 TAZ Boundary

Table 2 City of Andover TAZ Information

Anoka County Current Information for 2030										City Information for each Met Council TAZ										City Information adjusted to Anoka County TAZ									
Met Council Anoka Cnty					Employment					Met Council Anoka Cnty					Employment					Met Council Anoka Cnty					Employment				
TAZ Zone	Population	Households	Retail	Non-Retail	TAZ Zone	Population	Households	Retail	Non-Retail	TAZ Zone	Population	Households	Retail	Non-Retail	TAZ Zone	Population	Households	Retail	Non-Retail	TAZ Zone	Population	Households	Retail	Non-Retail					
26	1,833	327	126	0	1	26	1833			26	1833	308	111	0	1	26	1833	308	111	0	1	26	1833	308	111	0	1		
	1,834	737	282	0	259		1834				1834	696	247	0	270		1834	696	247	0	270		1834	696	247	0	270		
	1,835	556	214	21	46		1835				1835	524	188	23	48		1835	524	188	23	48		1835	524	188	23	48		
	1,836	676	260	0	4		1836				1836	637	228	0	4		1836	637	228	0	4		1836	637	228	0	4		
	1,837	653	250	43	17		1837				1837	616	219	47	18		1837	616	219	47	18		1837	616	219	47	18		
	1,838	167	64	0	0		1838				1838	157	56	0	0		1838	157	56	0	0		1838	157	56	0	0		
	1,839	154	59	0	1		1839				1839	145	52	0	1		1839	145	52	0	1		1839	145	52	0	1		
	Total	3,270	1,255	64	328		Total	3083	1101	70	342	1101	52	342	1		Total	3083	1101	70	342		Total	3083	1101	70	342		
27	1,840	1,078	392	0	13	27	1840			27	1840	1296	441	185	17		1840	1296	441	185	17		1840	1296	441	185	17		
	1,841	538	159	0	38		1841				1841	647	179	120	51		1841	647	179	120	51		1841	647	179	120	51		
	1,842	2,127	849	0	21		1842				1842	2558	956	20	28		1842	2558	956	20	28		1842	2558	956	20	28		
	1,843	3,168	1,229	0	8		1843				1843	3810	1384	0	11		1843	3810	1384	0	11		1843	3810	1384	0	11		
	1,844	923	346	0	8		1844				1844	1110	389	37	11		1844	1110	389	37	11		1844	1110	389	37	11		
	1,845	679	274	0	0		1845				1845	817	308	0	0		1845	817	308	0	0		1845	817	308	0	0		
	Total	8,513	3,249	0	88		Total	10238	3657	362	118	3657	308	118	0		Total	10238	3657	362	118		Total	10238	3657	362	118		
28	1,846	2,350	916	147	92	28	1846			28	1846	1849	668	92	172		1846	1849	668	92	172		1846	1849	668	92	172		
	1,847	787	233	0	23		1847				1847	620	170	0	43		1847	620	170	0	43		1847	620	170	0	43		
	1,848	1,097	324	0	1		1848				1848	864	236	0	2		1848	864	236	0	2		1848	864	236	0	2		
	1,849	1,903	894	10	112		1849				1849	1498	652	6	210		1849	1498	652	6	210		1849	1498	652	6	210		
	Total	6,137	2,367	157	228		Total	4831	1726	98	427	1726	652	427	210		Total	4831	1726	98	427		Total	4831	1726	98	427		
29	1,850	799	306	17	26	29	1850			29	1850	864	308	34	30		1850	864	308	34	30		1850	864	308	34	30		
	1,851	1,114	427	101	9		1851				1851	1204	430	201	10		1851	1204	430	201	10		1851	1204	430	201	10		
	1,852	302	116	0	319		1852				1852	326	117	0	367		1852	326	117	0	367		1852	326	117	0	367		
	Total	2,215	849	118	354		Total	2394	855	235	407	855	117	407	367		Total	2394	855	235	407		Total	2394	855	235	407		
30	1,853	3,453	1,321	35	31	30	1853			30	1853	5200	1861	21	147		1853	5200	1861	21	147		1853	5200	1861	21	147		
	1,854	2,838	1,070	16	35		1854				1854	4274	1507	10	166		1854	4274	1507	10	166		1854	4274	1507	10	166		
	1,855	2,468	953	1,130	56		1855				1855	3717	1343	694	265		1855	3717	1343	694	265		1855	3717	1343	694	265		
	Total	8,759	3,344	1,181	122		Total	13190	4711	725	578	4711	1343	578	265		Total	13190	4711	725	578		Total	13190	4711	725	578		
31	1,860	1,243	510	0	810	31	1860			31	1860	896	320	669	839		1860	896	320	669	839		1860	896	320	669	839		
	Total	1,243	510	0	810		Total	896	320	669	839	320	669	839		Total	896	320	669	839		Total	896	320	669	839			

City of Andover TAZ Information
Table 2, Cont.

32	1,856	474	193	0	0	340	32	1856	521	146	80	33
	1,861	160	94	0	0	3		1861	176	72	10	0
	1,864	163	133	0	0	16		1864	179	101	0	2
	1,865	110	48	0	0	0		1865	121	37	0	0
	Total	906	468	0	0	359		Total	997	356	80	35
33	1,865	1,430	600	253	266	266	33	1865	1089	389	75	185
	Total	1,430	600	253	266			Total	1089	389	75	185
35	1,870	815	312	0	14	14	35	1870	1018	364	0	10
	1,871	387	148	59	6	6		1871	484	173	66	4
	1,872	1,308	499	40	18	18		1872	1634	583	44	13
	Total	2,510	959	99	38			Total	3136	1120	110	27
36	1,873	1,618	619	6	39	39	36	1873	1515	541	4	26
	1,874	194	74	0	0	0		1874	182	65	0	0
	1,875	860	329	13	55	55		1875	805	287	8	36
	1,876	826	317	3	22	22		1876	774	277	2	14
	Total	3,498	1,339	22	116			Total	3276	1170	14	76
37	1,877	883	339	0	39	39	37	1877	547	196	0	39
	1,878	767	293	0	19	19		1878	476	169	0	19
	1,879	138	53	0	0	0		1879	86	31	0	0
	Total	1,788	685	0	58			Total	1109	396	0	58
38	1,879	139	54	0	0	0	38	1879	339	121	0	0
	Total	139	54	0	0			Total	339	121	0	0
City-Wide Total												
Anoka Cnty Info								City-Wide Total				
	40,408	15,679	1,894	2,767			Andover Updated Info	44,578	15,922	2,438	3,092	
City-Wide Total								City-Wide Total				
Andover Updated Info								with Anoka Cnty TAZ				
	40,408	15,679	1,894	2,767			Andover Updated Info	44,578	15,922	2,438	3,092	

D. Intersection “Hot Spots”

There are 14 intersections that are considered potential “hot spot” intersections. These intersections are listed in Chapter III – Existing Conditions section of this report. The City of Andover recognizes that the traffic conditions at these and other intersections change over time and such intersection review and analysis needs to occur approximately every two years.

Analysis of the intersections involves the calculation of the Level Of Service for the intersection approaches. None of the intersections analyzed are controlled by traffic signals. Two intersections, Andover Boulevard NW with Prairie Road NW and Crosstown Boulevard NW with Prairie Road NW are under all-way stop control. The other intersections are controlled by stop signs on the minor street(s) approaches. Level Of Service is a measure of how well an intersection is operating.

In order to determine if improvements need to be made at these intersections, the levels of service (LOS) will need to be calculated. The LOS will be determined at some point in the future based on City Council interest.

- Level Of Service A corresponds to a free flow condition with motorists virtually unaffected by the intersection control mechanism. For a signalized or an unsignalized intersection, the average delay per vehicle would be approximately 10 seconds or less.
- Level Of Service B represents stable flow with a high degree of freedom, but with some influence from the intersection control device and the traffic volumes. For a signalized intersection, the average delay ranges from 10 to 20 seconds. An unsignalized intersection would have delays ranging from 10 to 15 seconds for this level.
- Level Of Service C depicts a restricted flow which remains stable, but with significant influence from the intersection control device and the traffic volumes. The general level of comfort and convenience changes noticeably at this level. The delay ranges from 20 to 35 seconds for a signalized intersection and from 15 to 25 seconds for an unsignalized intersection at this level.
- Level Of Service D corresponds to high-density flow in which speed and freedom are significantly restricted. Though traffic flow remains stable, reductions in comfort and convenience are experienced. The control delay for this level is 35 to 55 seconds for a signalized intersection and 25 to 35 seconds for an unsignalized intersection. For most agencies in the Twin Cities area, Level Of Service D represents the minimal acceptable Level Of Service for regular daily operations.
- Level Of Service E represents unstable flow of traffic at or near the capacity of the intersection with poor levels of comfort and convenience. The delay ranges from 55 to 80 seconds for a signalized intersection and from 35 to 50 seconds for an unsignalized intersection at this level.
- Level Of Service F represents forced flow in which the volume of traffic approaching the intersection exceeds the volume that can be served. Characteristics often

experienced include: long queues, stop-and-go waves, poor travel times, low comfort and convenience, and increased accident exposure. Delays over 80 seconds for a signalized intersection and over 50 seconds for an unsignalized intersection correspond to this Level Of Service.

Table 3 provides the results of the Level Of Service analysis for the subject intersections utilizing existing conditions.

**TABLE 3
INTERSECTION “HOT SPOT”**

Location	Northbound		Southbound		Eastbound		Westbound	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Bunker Lake Boulevard & Crooked Lake Boulevard	C	15.8	-	-	A	-	A	9.4
Bunker Lake Boulevard & Marigold Street	C	18.6	B	12.9	A	8.9	A	9.9
139 th Avenue & Crosstown Boulevard/Crosstown Drive	A	7.6	A	7.8	B	12.2	B	12.7
S Coon Creek Drive & Crosstown Boulevard	A	7.7	A	8.1	B	13.3	B	13.1
S Coon Creek Drive & Round Lake Blvd.	A	-	B	12.4	-	-	F	65.7
Crosstown Boulevard & Nightingale Street	-	-	B	11.1	A	7.9	A	
159 th Avenue & CSAH 7	A	7.8	A	10.0	C	20.6	D	30.3
161 st Avenue (CSAH 20) & Verdin Street (CR 59)	-	-	B	13.0	A	8.2	A	
165 th Avenue (East Intersection) & CSAH 7	B	14.3	-	-	A	-	A	8.3
165 th Avenue (West Intersection) & CSAH 7	NA	NA	NA	NA	NA	NA	NA	NA
Andover Boulevard & Prairie Road	A	9.9	A	8.6	A	9.7	B	10.0
Crosstown Boulevard & Prairie Road	A	8.1	A	7.6	A	9.0	A	7.6

Note: No information is available for the following intersections:

- 165th Avenue (West Intersection) & CSAH 7
- 161st Avenue NW (CSAH 20) & Nightingale Street NW

General Notes:

- Delay times are recorded in average seconds of wait per vehicle.
- If a delay time is not listed next to a Level Of Service, it is due to a negligible result.
- If a Level Of Service and a delay time are both not listed, it is due to the absence of an approach from that direction (a T-intersection).

Recommendations:

The thirteen intersections listed in Chapter III (Existing Conditions section of this report) at this point seem to operate fairly well, with the exception of one location. The intersection of Round Lake Boulevard NW at South Coon Creek Drive seems to experience delays that could be considered to be unacceptable on the cross-street approaches that are controlled by stop signs.

The intersection of Round Lake Boulevard NW with South Coon Creek Drive NW may, in the future, require signalization as the volumes on South Coon Creek Drive NW increase. It is recommended that the City request a traffic analysis be performed by the Anoka County Highway Department on a regular basis (minimum every other year).

It does not appear that any of the other study intersections will require signalization at this time for purposes of improvement to the intersection Levels Of Service. The review of crash incidence does not warrant any improvements since the crash totals at these locations are not excessive.

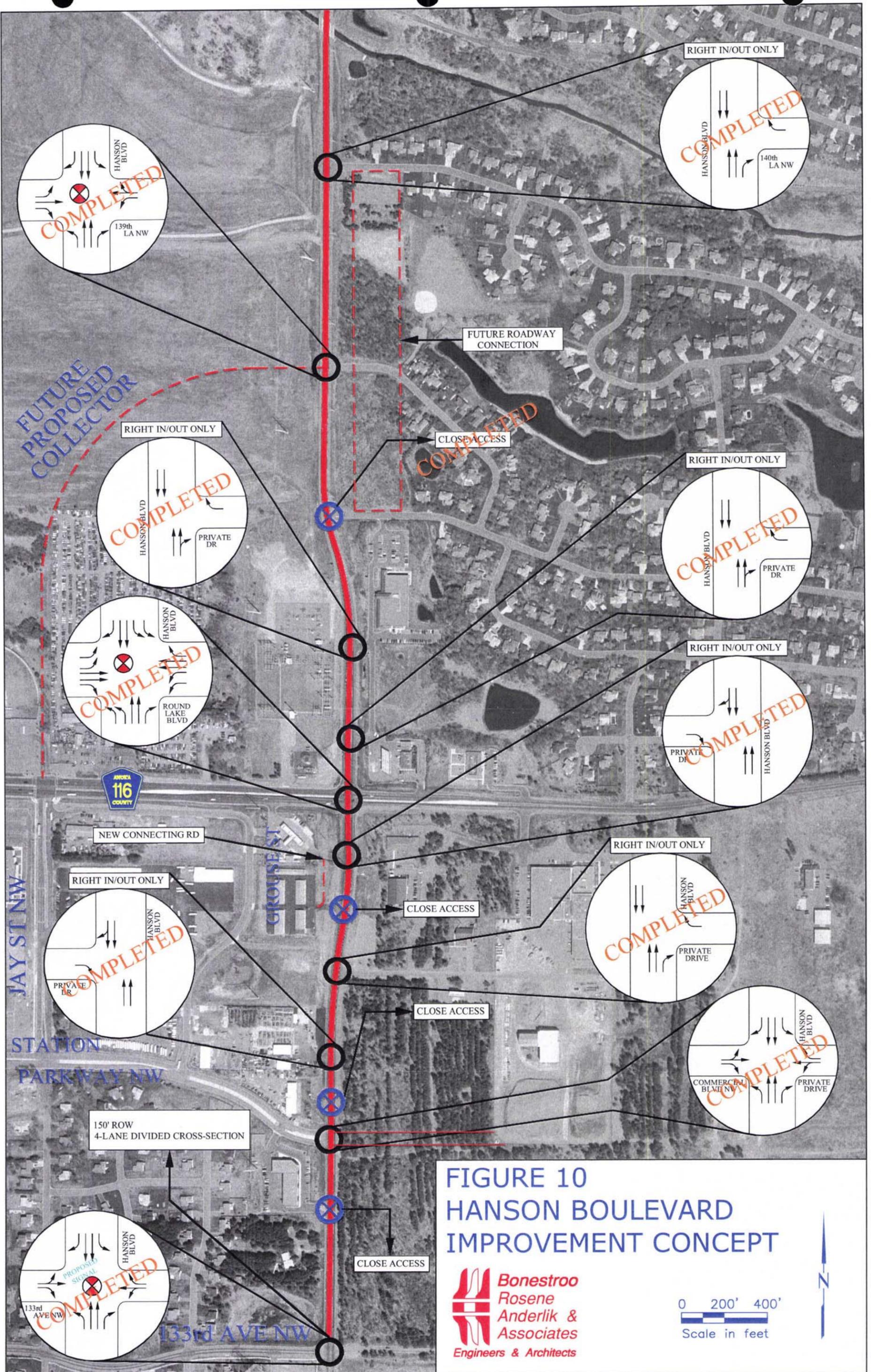
E. Study Corridors

Two corridors were selected for evaluation with the expressed purpose of preparing a conceptual improvement plan for each corridor. The conceptual improvement plan that was prepared is to be able to accommodate the projected traffic volumes and, equally as important, contain an access plan that will serve future development. The two study corridors, Hanson Boulevard NW and Crosstown Boulevard NW are discussed below with the concept improvement plan provided in graphic form.

1. Hanson Boulevard NW

It is expected that Hanson Boulevard NW will continue to be a very important north-south roadway in the City of Andover. The projected volumes, including the Rural Reserve Area, could range from almost 29,500 on the south City boundary to 7,800 on the north City boundary. The conclusion drawn from the projected volumes is that a four-lane divided roadway will be required to adequately serve those volumes. This cross-section will be needed from the south City boundary to 161st Avenue NW. North of that intersection, the roadway requirement will decrease to two-lanes.

The analysis of Hanson Boulevard NW also produced a concept improvement plan of what the roadway could be given the 25-year volume projections. Much detail in the previous plan was given to access to/from Hanson Boulevard NW, both existing and future access provisions. The Hanson Boulevard NW concept from 139th Lane NW to 181st Avenue NW improvement plan is shown on *Figures 10 through 14*. The graphic representation of that concept plan illustrates lane requirements along the route and at intersections.

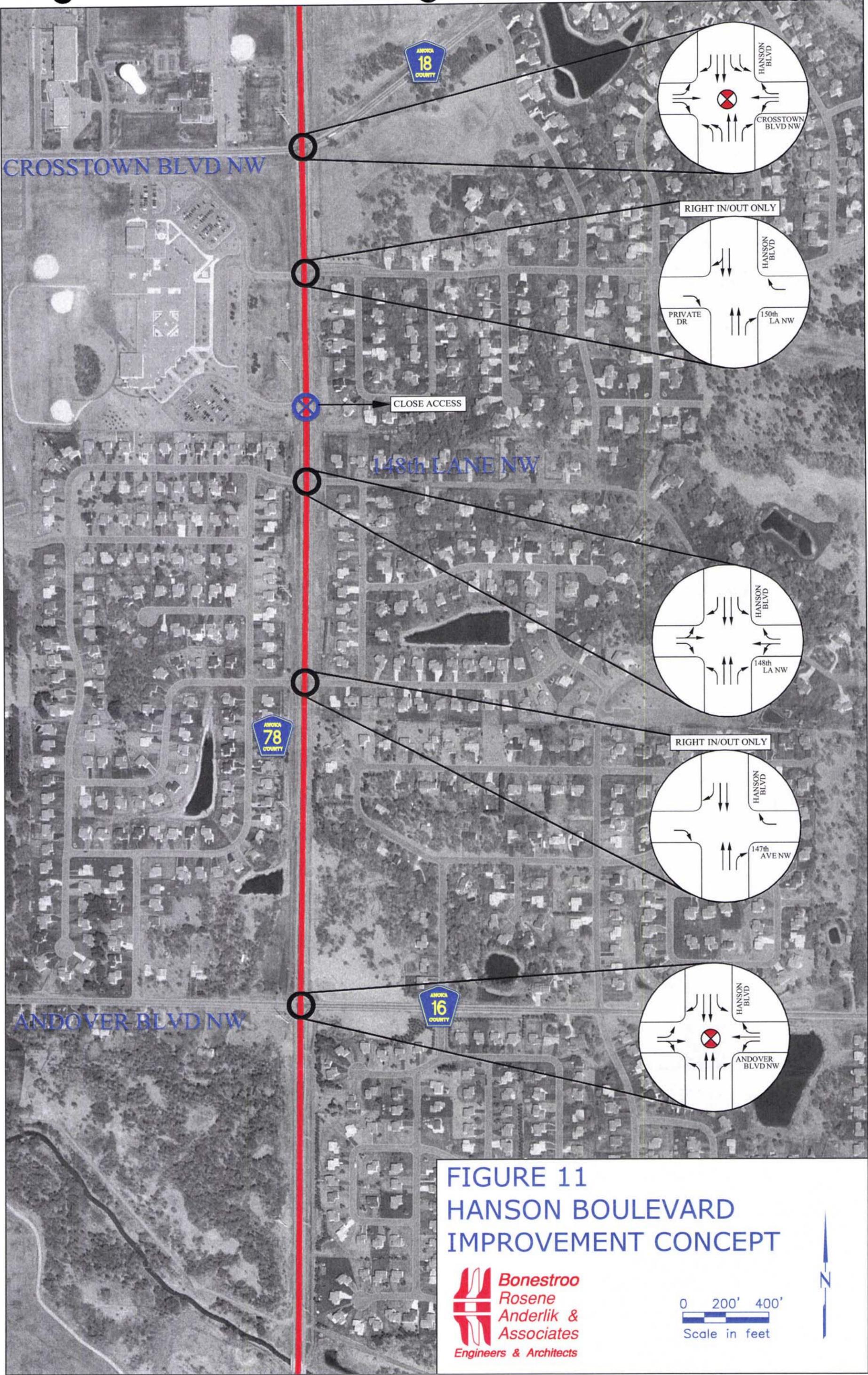


**FIGURE 10
HANSON BOULEVARD
IMPROVEMENT CONCEPT**

**Bonestroo
Rosene
Anderlik &
Associates**
Engineers & Architects

0 200' 400'
Scale in feet



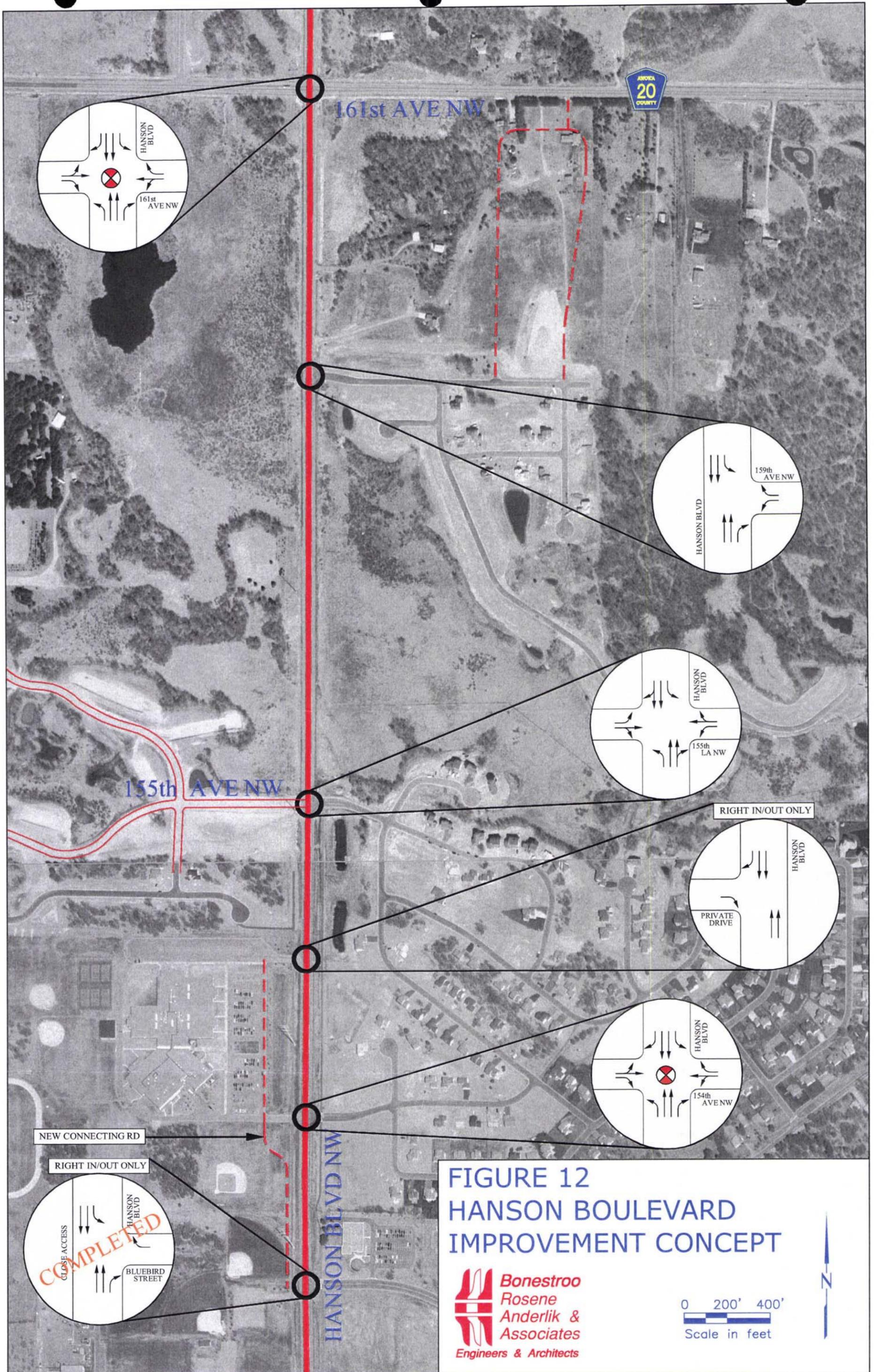


**FIGURE 11
HANSON BOULEVARD
IMPROVEMENT CONCEPT**

**Bonestroo
Rosene
Anderlik &
Associates**
Engineers & Architects

0 200' 400'
Scale in feet



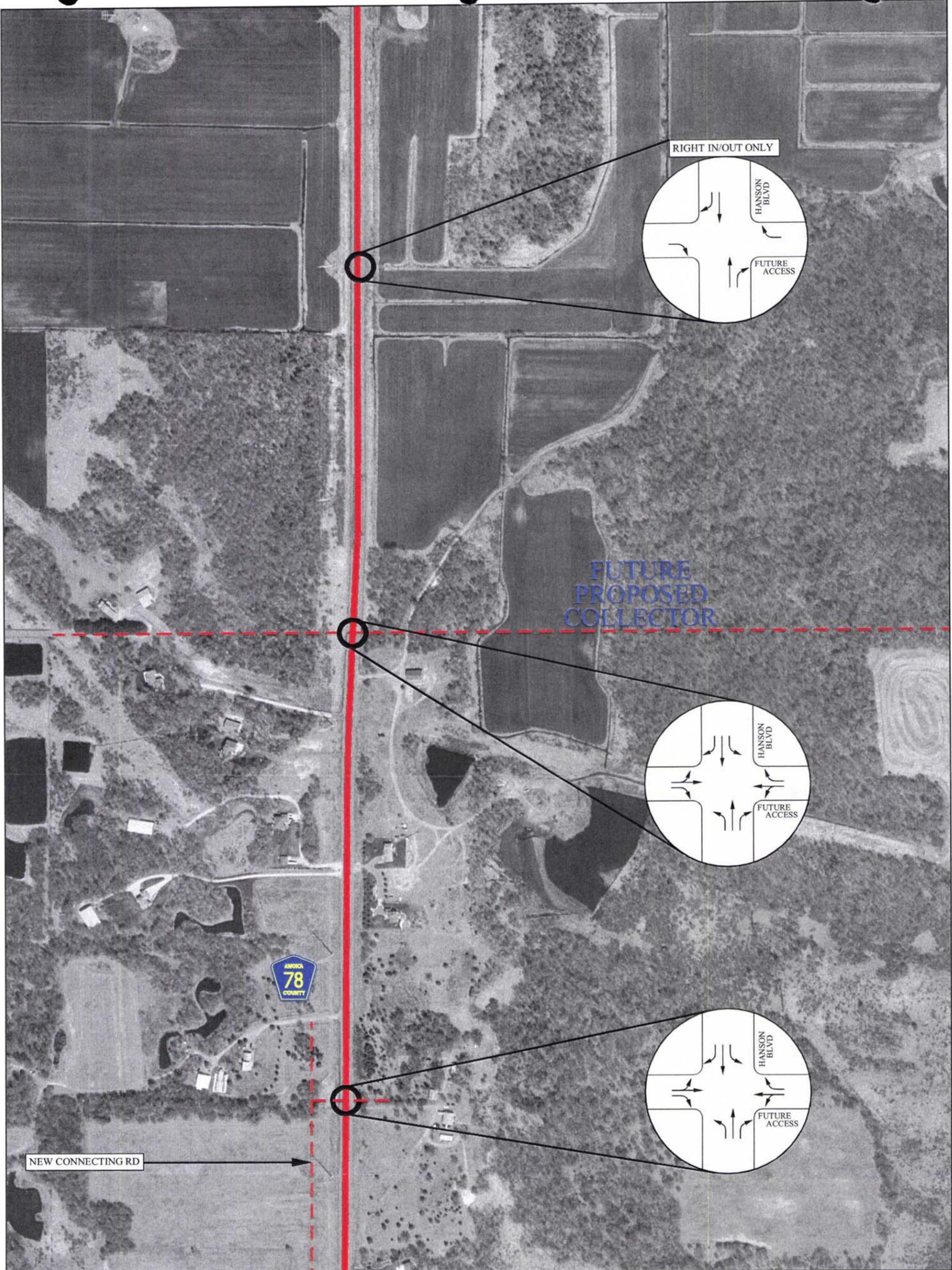


**FIGURE 12
HANSON BOULEVARD
IMPROVEMENT CONCEPT**

**Bonestroo
Rosene
Anderlik &
Associates**
Engineers & Architects

0 200' 400'
Scale in feet





NEW CONNECTING RD

150' ROW
2-LANE CROSS-SECTION
WITH CHANNELIZED TURN
LANES AT INTERSECTIONS

150' ROW
4-LANE DIVIDED CROSS-SECTION

CLOSE ACCESS OR
RIGHT IN/OUT ONLY

FUTURE
PROPOSED
COLLECTOR

RIGHT IN/OUT ONLY

HANSON
BLVD

FUTURE
ACCESS

HANSON
BLVD

FUTURE
ACCESS

HANSON
BLVD

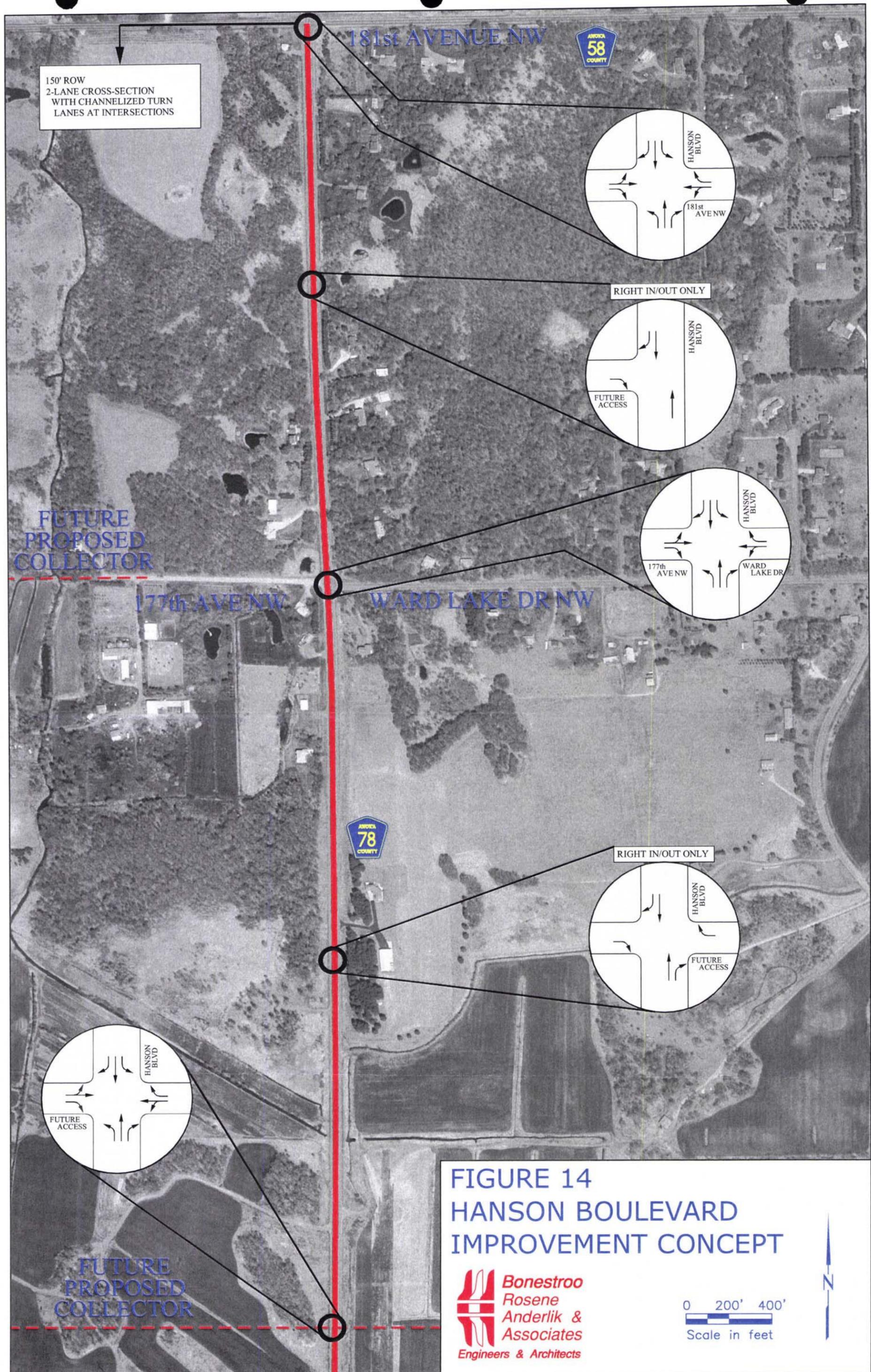
FUTURE
ACCESS

FIGURE 13
HANSON BOULEVARD
IMPROVEMENT CONCEPT

Bonestroo
Rosene
Anderlik &
Associates
Engineers & Architects

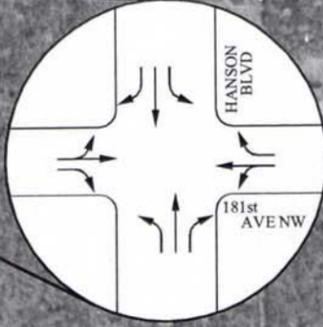
0 200' 400'
Scale in feet



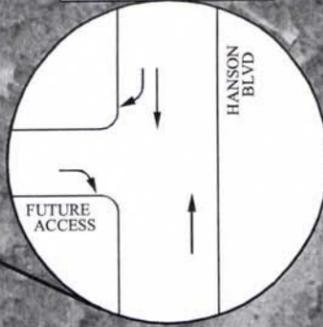


150' ROW
2-LANE CROSS-SECTION
WITH CHANNELIZED TURN
LANES AT INTERSECTIONS

181st AVENUE NW



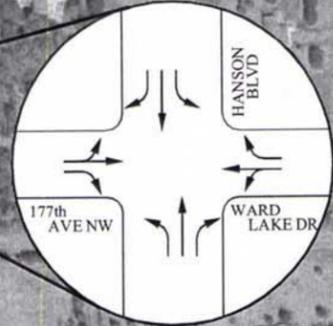
RIGHT IN/OUT ONLY



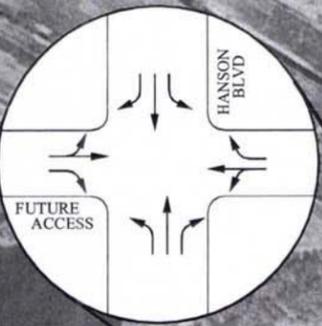
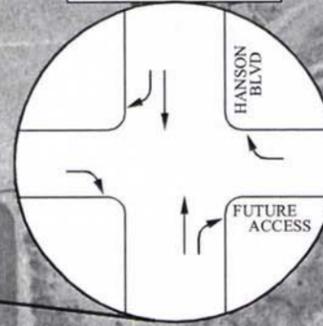
FUTURE
PROPOSED
COLLECTOR

177th AVE NW

WARD LAKE DR NW



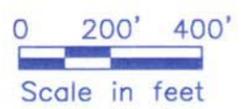
RIGHT IN/OUT ONLY



FUTURE
PROPOSED
COLLECTOR

**FIGURE 14
HANSON BOULEVARD
IMPROVEMENT CONCEPT**

**Bonestroo
Rosene
Anderlik &
Associates**
Engineers & Architects



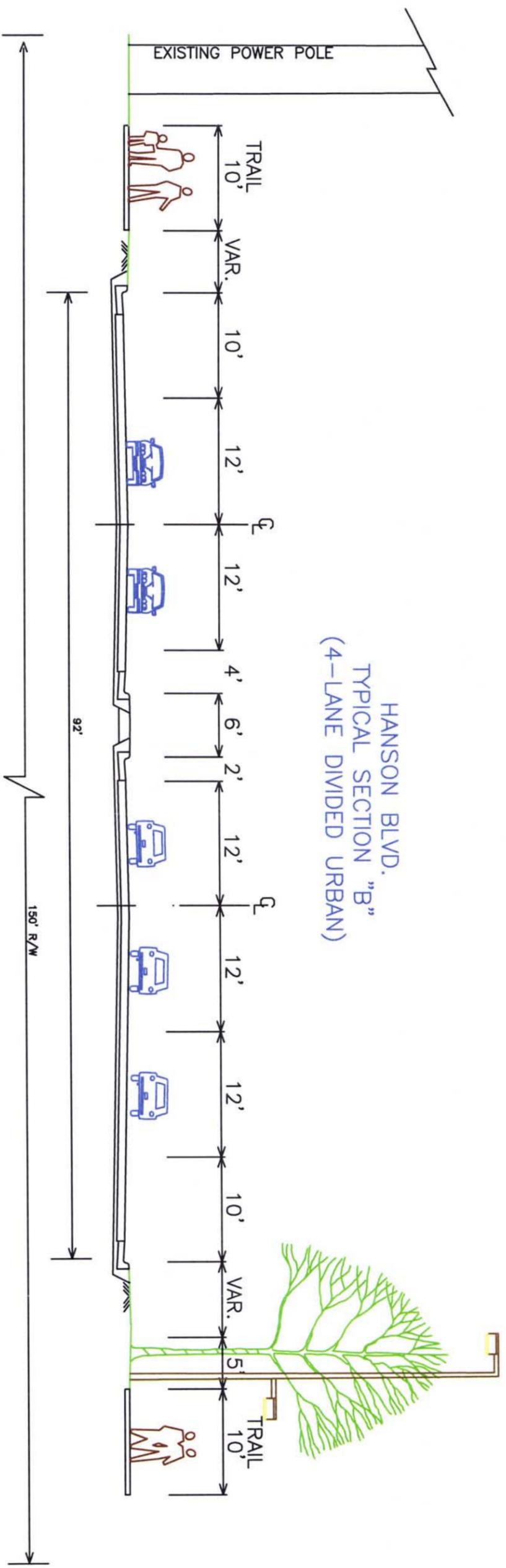
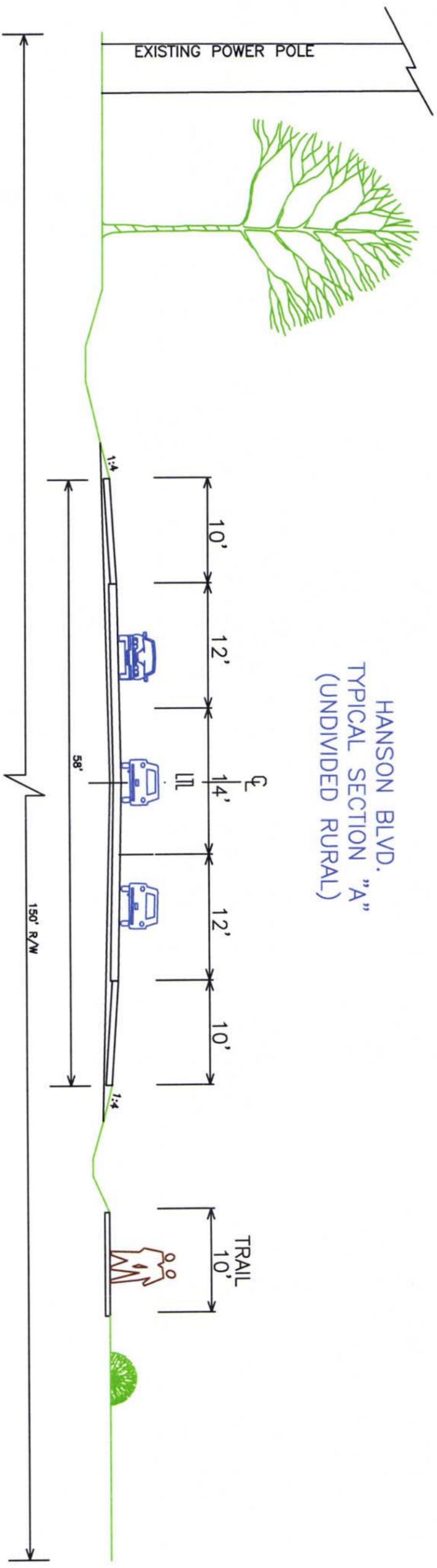
Some existing intersections are proposed to be restricted to right turn in/right turn out in the future, some existing access locations are closed given other reasonable access is provided, and future access locations for presently undeveloped property is proposed. The ultimate goal is to manage the access so that the capacity and safety of Hanson Boulevard is enhanced while providing reasonable access to the roadway.

A typical section of Hanson Boulevard NW, both the four-lane divided and the two-lane with left turn lanes, is illustrated on *Figure 15*. These cross-sections meet state-aid design standards and include some illustrative landscaping and an off-road trail on one side of the roadway. The cross-sections are placed within the 150-foot roadway right-of-way. These cross-sections are for purposes of illustrating what the facility could look like in order to accommodate the expected volumes. The section could undergo revision when roadway pre-design is conducted.

2. Crosstown Boulevard NW

Crosstown Boulevard NW “winds” its way through Andover providing a link in the City primarily connecting Highway 10 to Highway 65. The roadway provides for one travel lane in each direction along its length. The year 2030 volume projections are in the range of 9,250 to 16,400 vehicles per day at full buildout of the rural reserve area. These volumes are at the upper end of the capacity of a two-lane facility, but with good access management the volumes can be accommodated in the future. The analysis and development of a concept plan for Crosstown Boulevard NW underwent the same detailed development process, as did the Hanson Boulevard NW plan.

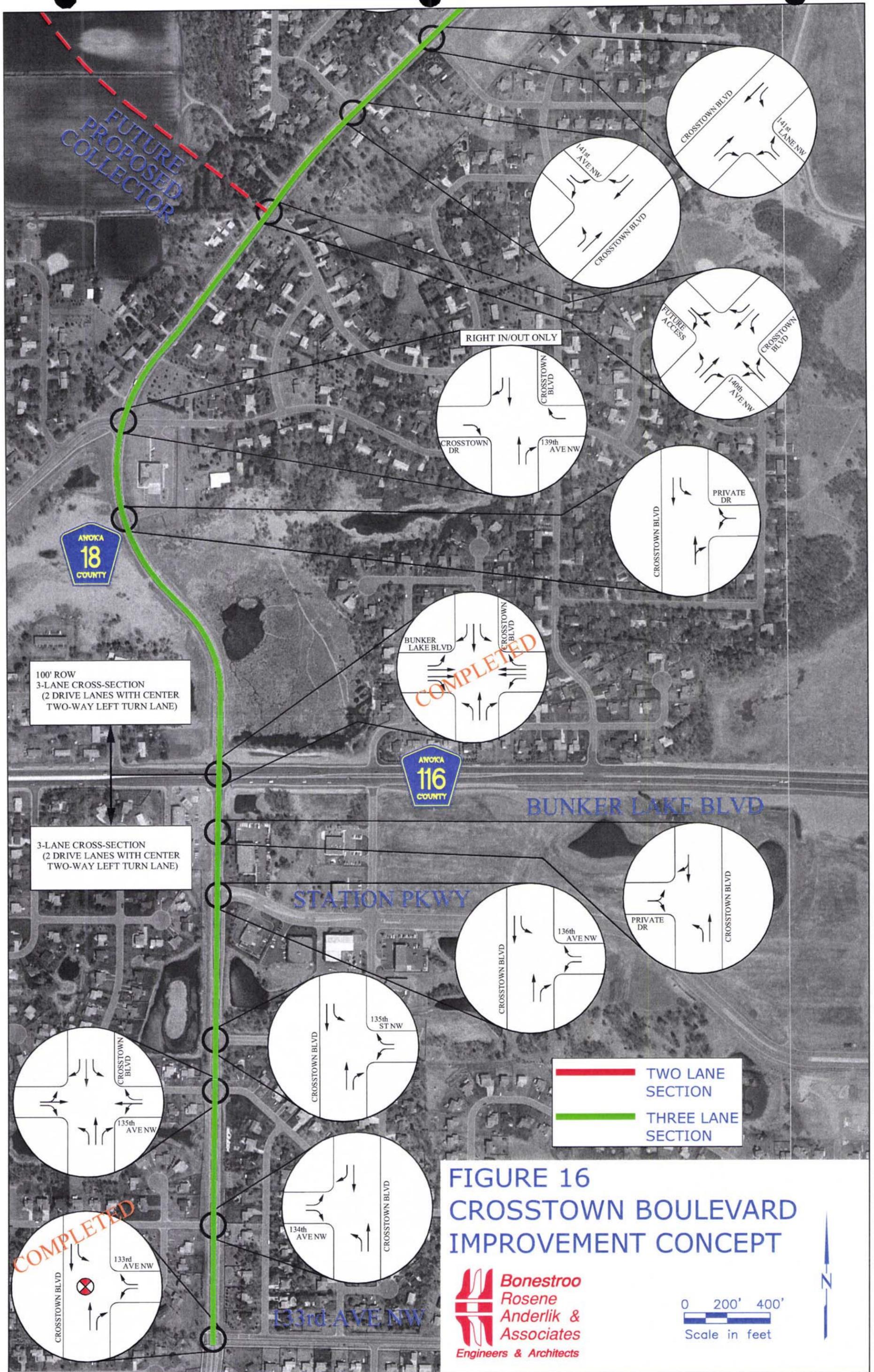
The concept plan proposes a two-lane roadway with a center left turn lane from Bluebird Street NW to Nightingale Street NW. The area adjacent to the high school is proposed to contain two lanes with a barrier median and turn lanes at appropriate locations. This segment would continue to Andover Boulevard NW. From Andover Boulevard NW to the south City limits, a two-way center left turn lane is also proposed with the two through lanes. The section of Crosstown Boulevard NW from Bluebird Street NW then easterly to the City limits is proposed to be a two-lane roadway with turn lanes at selected locations. The concept plan for Crosstown Boulevard NW is shown on *Figures 16 through 21*.



TYPICAL SECTIONS

ANDOVER, MINNESOTA
HANSON BOULEVARD
HANSON BLVD.DWG 171-02-102

FIGURE 15



FUTURE PROPOSED COLLECTOR



100' ROW
3-LANE CROSS-SECTION
(2 DRIVE LANES WITH CENTER
TWO-WAY LEFT TURN LANE)

3-LANE CROSS-SECTION
(2 DRIVE LANES WITH CENTER
TWO-WAY LEFT TURN LANE)

RIGHT IN/OUT ONLY

COMPLETED

COMPLETED

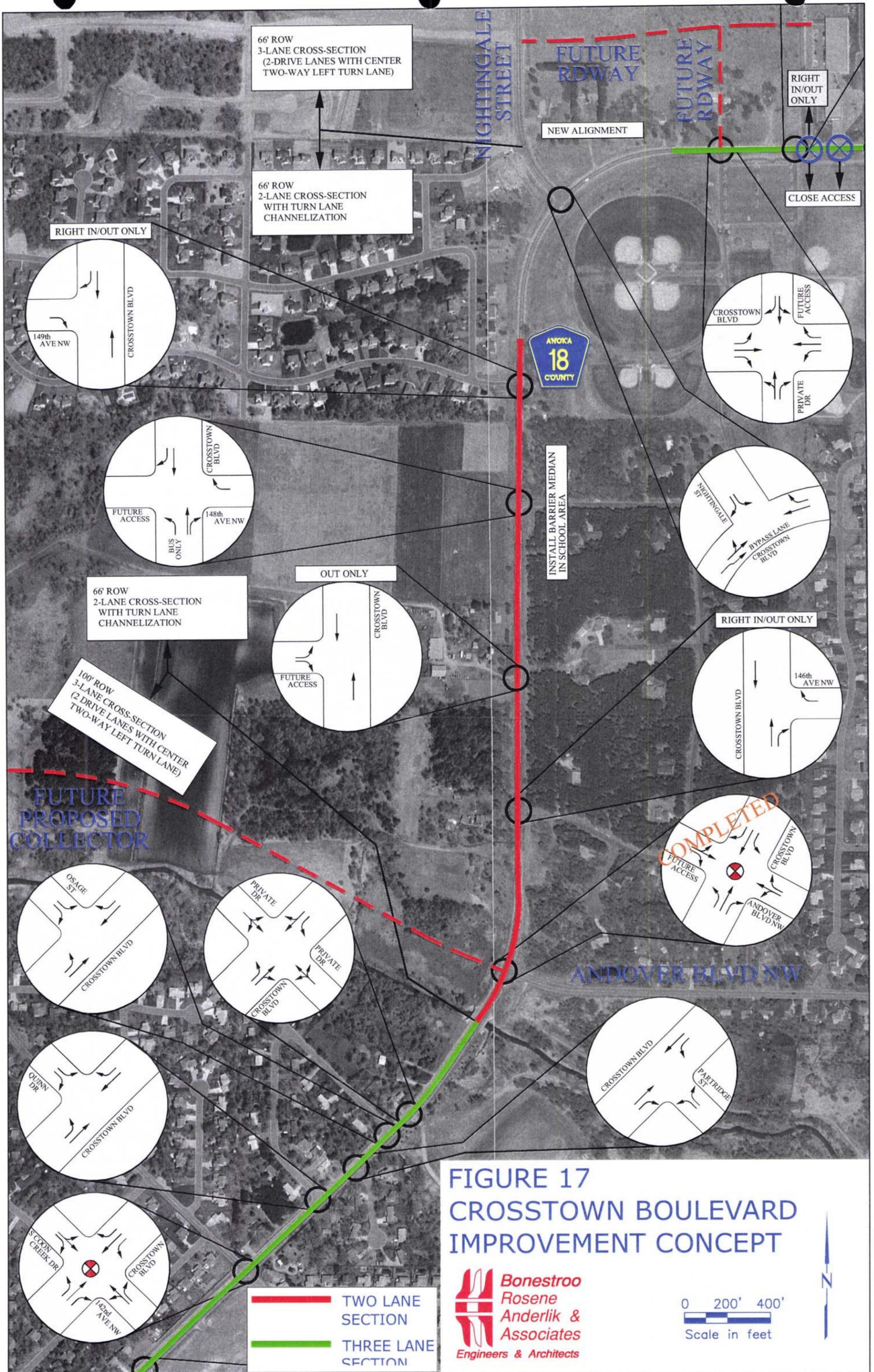
— TWO LANE SECTION
— THREE LANE SECTION

FIGURE 16
CROSSTOWN BOULEVARD
IMPROVEMENT CONCEPT

**Bonestroo
Rosene
Anderlik &
Associates**
Engineers & Architects

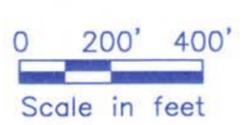
0 200' 400'
Scale in feet

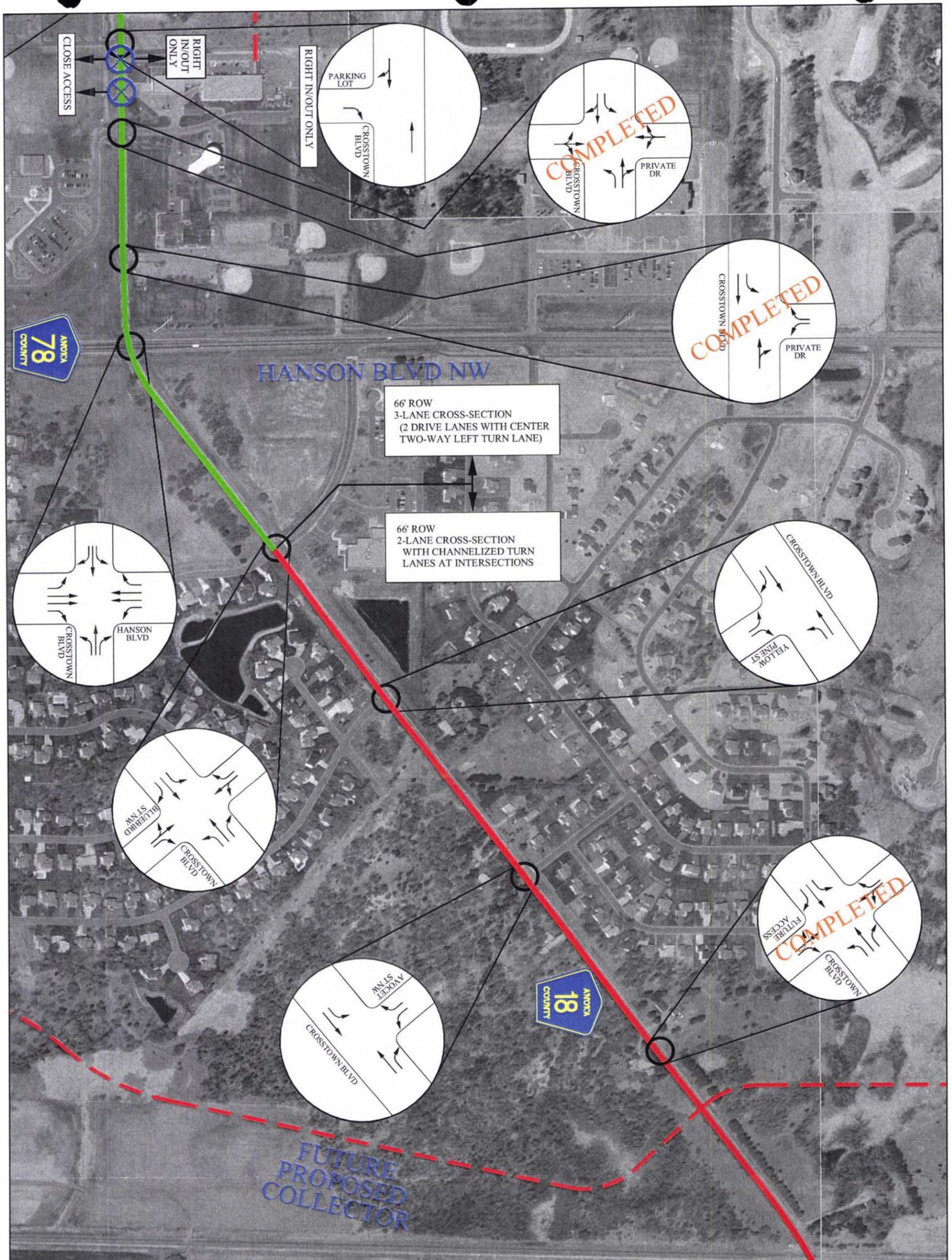




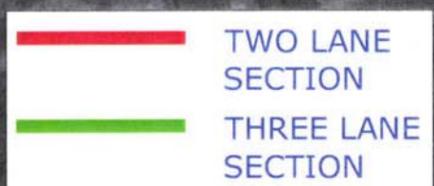
**FIGURE 17
CROSTOWN BOULEVARD
IMPROVEMENT CONCEPT**

**Bonestroo
Rosene
Anderlik &
Associates**
Engineers & Architects

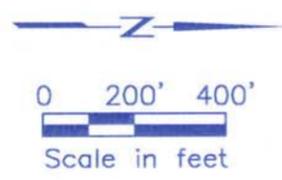


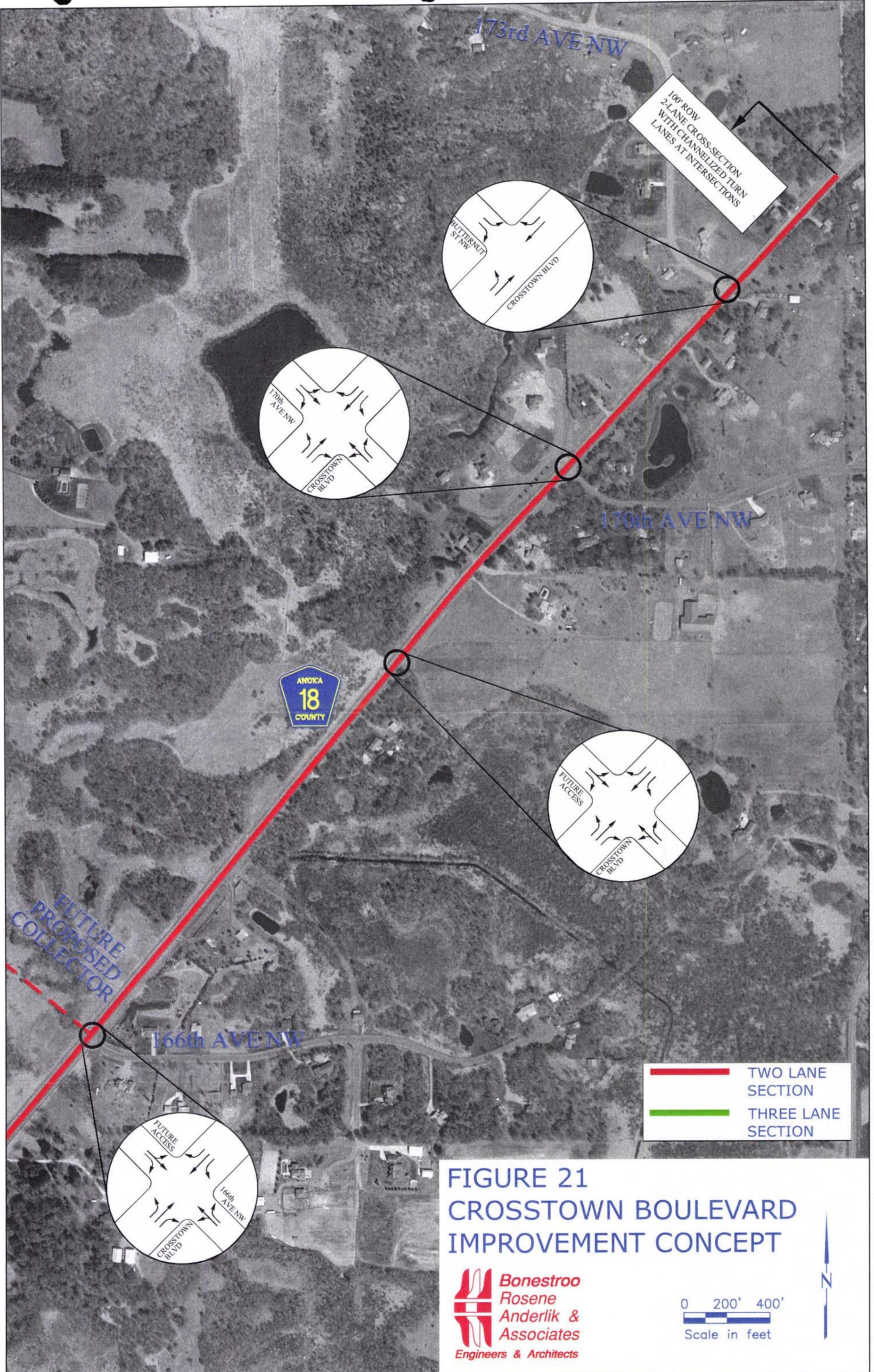


**FIGURE 19
CROSSTOWN BOULEVARD
IMPROVEMENT CONCEPT**



**Bonestroo
Rosene
Anderlik &
Associates**
Engineers & Architects





Cross-sections for Crosstown Boulevard NW are shown on *Figures 22 and 23* for a rural and urban section of the roadway. These proposed sections meet state-aid requirements and would serve the future volumes.

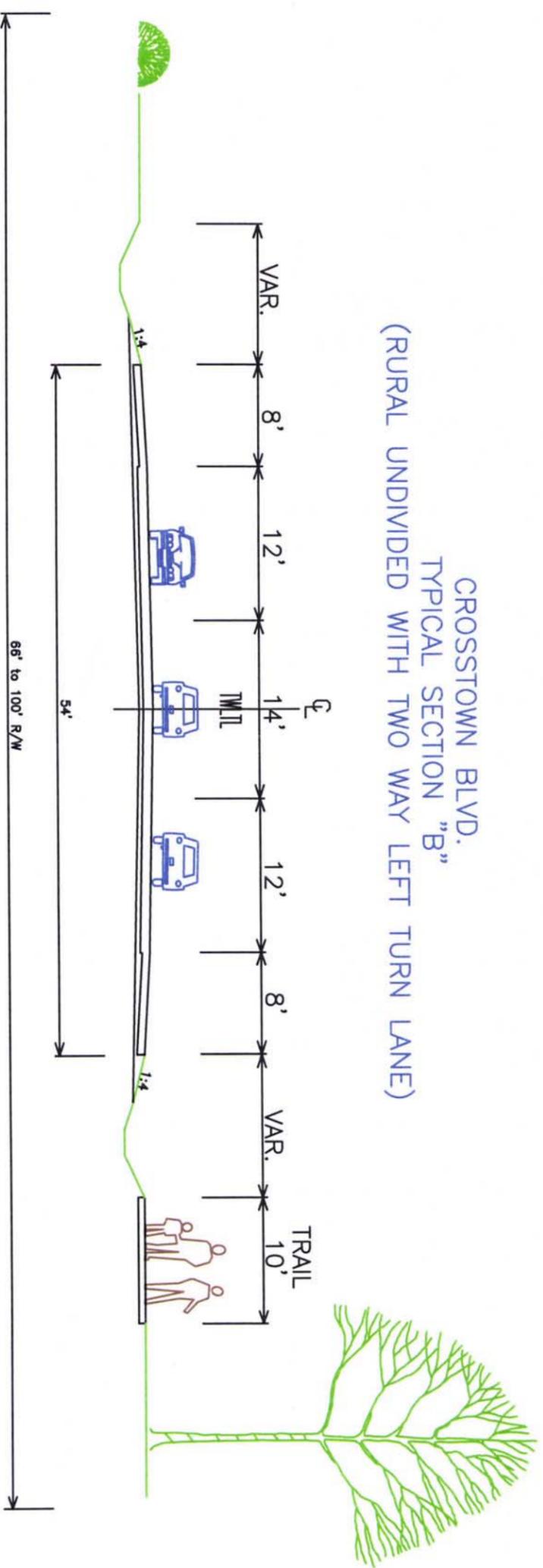
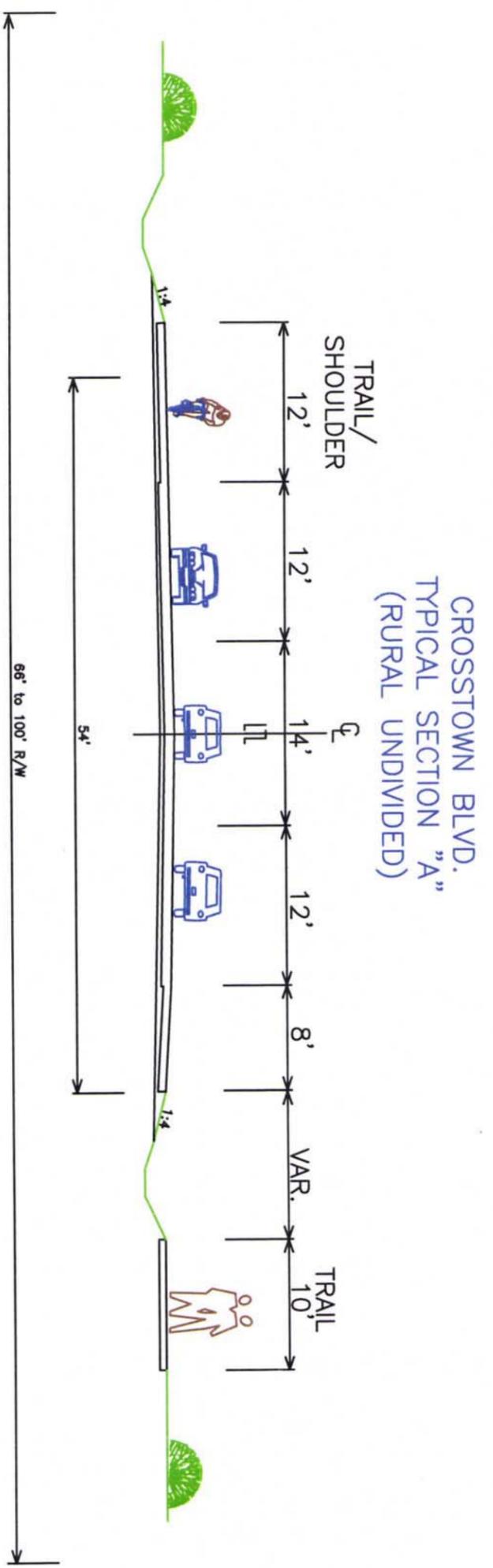
F. Transit Planning

Overview

Transportation Plan Objective number four states that the plan will “Consider multi-modal transportation alternatives where appropriate.”

Different types of transit service—fixed route, deviating fixed route, circulator, dial-a-ride, vanpooling, and others—are appropriate in different markets. Transit Redesign, a 1996 planning report by the Metropolitan Council, identified five different market areas based on population and employment densities, concentrations of transit dependent individuals, and major travel destinations. Transit Redesign also correlated different types of transit service with each of these five market areas, and established performance standards for evaluating these services. Transit Redesign focused on the geographic areas within the Transit Taxing District (TTD). Recent shifts in transit funding sources—from its historic property tax base to a dedicated percentage of revenues from the statewide Motor Vehicle Excise Tax (MVET)—created an opportunity to explore transit service outside of the TTD boundary. These opportunities are discussed later in this plan. It should be noted that the City consistently works with developers to include transit options into their developments where feasible.

The recent “Study of Transit Service Expansion beyond the Historic Transit Taxing District” incorporates the transit services areas identified in the Metropolitan Council’s Transportation Policy Plan for the region. According to the Transportation Policy Plan, approximately the southern 1/3 of Andover falls within the Outer Suburban category. The remainder of the City is considered a Rural Service Area. Table 4 provides a description of these areas and the types of service appropriate to each.

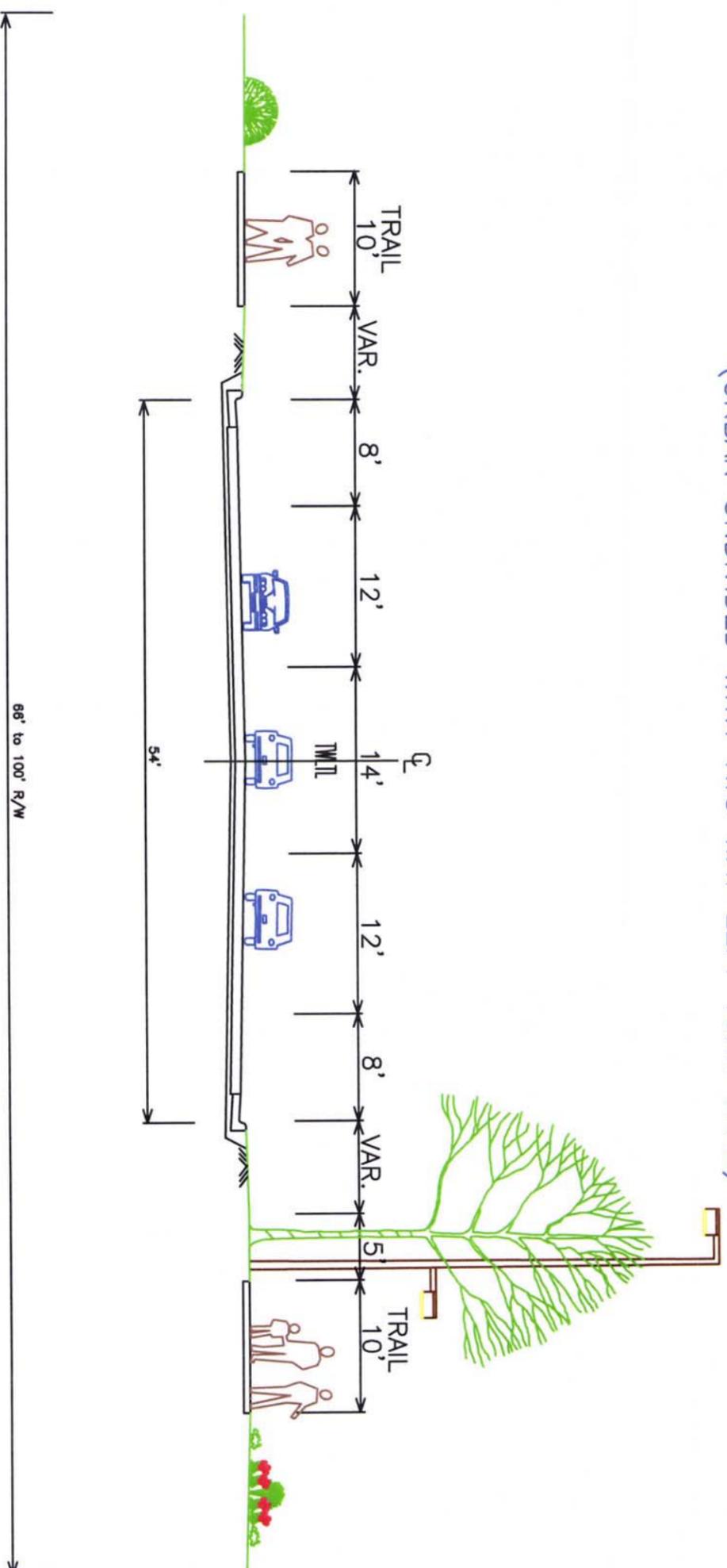


TYPICAL SECTIONS – RURAL

ANDOVER, MINNESOTA
CROSSSTOWN BOULEVARD
CROSSSTOWN BLVD.DWG 171-02-102

FIGURE 22

CROSSTOWN BLVD.
 TYPICAL SECTION "C"
 (URBAN UNDIVIDED WITH TWO WAY LEFT TURN LANE)



TYPICAL SECTION – URBAN

ANDOVER, MINNESOTA
 CROSSTOWN BOULEVARD
 CROSSTOWN BLVD.DWG 171-02-102

FIGURE 23

Table 4

ANDOVER, MINNESOTA
 BRA FILE NO. 171-02-102
 August 16, 2002

TRANSIT MARKETS/SERVICE OPTIONS
 (Adapted from Transit Redesign)

TRANSIT MARKET AREAS	SUGGESTED SERVICE TYPES	SUGGESTED SERVICE CHARACTERISTICS
AREA I		
15 or more persons/acre (or) 50 or more jobs/acre and 10,000 or more contiguous jobs	Primary emphasis on Big Bus/regular route service complemented by Metro Mobility paratransit service. Downtown area circulators possible.	SERVICE OPTIONS: Express, Radial, Crosstown, Downtown Circulator, Limited Stop, Metro Mobility ORIENTATION: Focus on both CBD's AVAILABILITY: Up to 24 hours/day & 7 days/week ACCESS: Route spacing (.25-.50 miles) with 8-10 stops per mile FREQUENCY: Generally 5-15 minutes
AREA II		
9 to 14.9 persons/acre augmented by contiguous High Transit Dependency areas	Primary emphasis on Big Bus/Regular route service complemented by Metro Mobility paratransit service. Neighborhood circulator possible in some areas. Neighborhood circulators should tie in with limited stop regular route service.	SERVICE OPTIONS: Express, Radial, Crosstown, Neighborhood Circulator, Limited Stop, Metro Mobility ORIENTATION: Link CBD's/Suburban Transit Hubs AVAILABILITY: Up to 20 hours/day & 7 days/week ACCESS: Route spacing (0.5-1.0 miles) with 6-10 stops per mile FREQUENCY: Generally 15-30 minutes
AREA III		
5 to 8.9 person/acre (excluding isolated pockets) augmented by: (a) contiguous areas with 10 to 49 jobs/acre and 3,000 or more contiguous jobs (or) (b) contiguous areas with Major Travel destinations: 50 or more non-home bound trips/acre	A mix of Big and Small Bus/Regular route and community circulator service complemented by Metro Mobility paratransit service. Community circulators should tie into regular route regional service at a transfer point.	SERVICE OPTIONS: Express, Radial, Crosstown, Community Circulator, Limited Stop, Specific Area Dial-A-Ride, Metro Mobility ORIENTATION: Link CBD's/Suburban Transit Hubs AVAILABILITY: Up to 18 hours/day & 7 days/week ACCESS: Route spacing (0.5-1.5 miles) with 6-10 stops per mile FREQUENCY: Generally 30-60 minutes

Table 4, Cont.

<p>AREA IV Population Density less than 5 person/acre</p>	<p>Primary emphasis on: 1) Small Bus/Dial-A-Ride service providing county or rural circulation, and 2) Commuter bus service tied to a major park & ride lots to create travel volume.</p>	<p>SERVICE OPTIONS: Express, Specific Location Circulator, Dial-A-Ride ORIENTATION: Suburb to Suburb and Central Cities AVAILABILITY: (Peak-Period Express and Midday Circulators); Weekdays Only ACCESS: Express routes tied to major Park & Rides/Circulators line to transit hubs FREQUENCY: 60 minutes, 2 peak trips; advance registration for Dial-A-Ride Services</p>
<p>POCKETS Areas meeting at least one of the following: 1) Population Density = more than 5 persons/acre (isolated pockets only) 2) Job Density = 10 to 49 jobs/acre and 3,000 or more contiguous jobs (isolated pockets only) 3) Major Travel destinations: 50 or more non-home bound trips/acre (isolated pockets only) 4) High Transit Dependency areas (isolated pockets only)</p>	<p>Primary emphasis on: 1) Small Bus service providing community local or Dial-A-Ride circulation, and 2) Commuter bus service may have localized service in addition to linking with major park & ride lots to create travel volumes.</p>	<p>SERVICE OPTIONS: Express, Specific Location Circulator, Specific Location Limited Stop, Dial-A-Ride, Metro Mobility ORIENTATION: Localized AVAILABILITY: Varies by Pocket; primarily Weekday service ACCESS: Door to Door or modified circulation; Express Routes primarily tied to Park & Ride lots FREQUENCY: Up to 2 hours for circulator services. Advance registration for Dial-A-Ride.</p>

System Deficiencies

Previous studies have identified the following deficiencies, among others.

- Lack of fixed route services
- Lack of Park-and-Ride facilities
- Lack of Reverse Commute services

Other issues, such as difficulty of access to bus stops or ADA accessibility of bus stops are not issues for Andover because of the lack of existing fixed route service.

Transit Service Improvements

The Metropolitan Council completed a planning document called the “Study of Transit Service Expansion beyond the Historic Transit Taxing District.” Eleven geographic areas comprised of 35 cities and townships were studied outside of the TTD, one of which was an area combining the cities of Andover and Ramsey. The Andover/Ramsey study area ranked number one in estimated daily trips with 980 trips projected to the Minneapolis Central Business District (CBD). However, revising the geography of the study area to include the cities of Andover, Ham Lake, East Bethel, Oak Grove, and part of St. Francis, cities feeding into the Highway 10 and Highway 65 travelshed, would change this number. This revised travel shed should be studied further for its transit potential.

The type of service proposed is fixed route, morning and afternoon peak, express bus service into downtown Minneapolis without intermediate stops.

While this service would be oriented around Park-and-Ride facilities as its major ridership generator, it could originate as fixed route feeder-type service with walk-up boarding at defined stops in higher density residential areas within the City. This would allow the extension of fixed route services further north into Andover, for example, along Hanson or Round Lake Boulevards. Whether, and to what distance, these feeder services are extended into Andover will depend upon the results of more detailed service planning that will establish service frequency and running times and to and from downtown Minneapolis. The viability of these feeder services can be improved by considering the needs of transit in the overall community development patterns along the corridors and by providing bus pullouts/stops and trail system connections as part of future roadway improvement projects.

Due to the cost to the City of Andover for opting into the regional transit system the City has elected not to participate.

Transit Facility Improvements

To accommodate the new riders served by the potential express bus services; new Park-and-Ride lots should be constructed in Andover. Given Andover’s location within the travel shed, and if no new Park-and-Ride facilities are constructed along Highway 10 south of the City, it is likely that at least half of these new riders would need to be accommodated in Park-and-Ride lots within Andover. These riders could be served by two or three Park-and-Ride locations with 200-300 vehicles per location.

Historically, park and pool activities also increase when dedicated parking facilities are provided. Therefore, it is likely that the number of vehicles using the Park-and-Ride sites will be higher than the number of park-and-riders alone. Further, the City could develop these facilities as park and pool locations now, and add transit service to them in the future as planning and funding components for transit services are put into place. Coordination between the City and transit service providers will help to determine suitable transit facilities and services. As an initial step in reducing single occupant vehicles and developing transit demand, the City could also promote vanpool programs, such as those available through Metro Commuter Services.

Park-and-Ride facilities should be located along major commuter routes, such as Round Lake Boulevard and Hanson Boulevard, in the southern third of the City. If the Bethel Corridor is developed, or if transit improvements such as bus-only shoulder lanes are introduced on Highway 65, it may also be advisable to construct a Park-and-Ride along Bunker Lake Boulevard or Andover Boulevard near the eastern edge of the City. Bus routing from the Park-and-Ride should offer as many travel time advantages as possible, and should be express service, without intermediate stops, for as much of its length as possible.

Approximately 3-5 acres of land is desirable at each 200-300 car Park-and-Ride location. This amount of land area eliminates the need for structured parking, which has significantly higher costs. For comparison purposes, a surface parking facility with a transit center building would cost between \$1 million and \$2 million to develop, whereas a structure parking facility would cost between \$3 million and \$5 million. Setting aside sufficient land for future Park-and-Rides is clearly desirable from a development cost standpoint.

The following locations have been discussed as potential Park-and-Ride sites:

- At the Andover Station North Ball Field Facility parking lot.
- The church on the corner of Round Lake and Bunker Lake Boulevards NW.
- Wild Iris Park along Bunker Lake Boulevard NW west of Round Lake Boulevard NW.

G. Trails Planning

The City of Andover has identified the following goals for a comprehensive city-wide trail system:

- Non-motorized traffic is separated from motor vehicles on collector and arterial roadways.
- Links are provided between residential, commercial and park areas.
- Parks are accessible.
- Trails are developed in coordination with all surrounding municipalities as well as Anoka County.
- The trails shall be developed according to American Association of State Highway Transportation Officials (AASHTO) standards and/or the MnDOT Bikeway Facility Design Manual.

Where feasible, it is preferable to develop off-road trails, which provide facilities for both bicyclists and pedestrians. Trails along rivers and through parks and natural areas are always highly desirable routes if and when they can be attained, as they provide a more scenic experience for the user. An off-road trail is one that is physically separated from motorized vehicular traffic by an open space or barrier either within the roadway right of way or within an independent right of way. According to AASHTO guidelines, the minimum width of a trail that provides for two-way bicycle traffic and allows for pedestrian use is eight (8) feet with two-foot shoulders on each side. Where traffic volumes are higher, a more desirable width for a bike path is ten (10) feet.

Adequate room is not always available within the existing road right of way for an off-road trail. Where it is necessary to develop continuous trail segments, it is recommended that the City work with residential developers and owners of commercial developments to obtain easements in areas where the roadway right of way is not adequate for an 8 or 10-foot off-road trail, or in areas where the topography does not allow the trail to be constructed within the existing right of way. It should be noted that commercial and industrial developments within the City of Andover are required to construct or pay for any regional trails located adjacent to their property as identified on the regional trail plan (Figure 24).

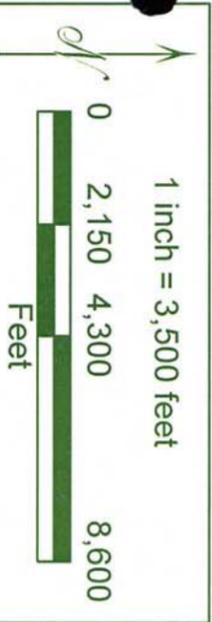
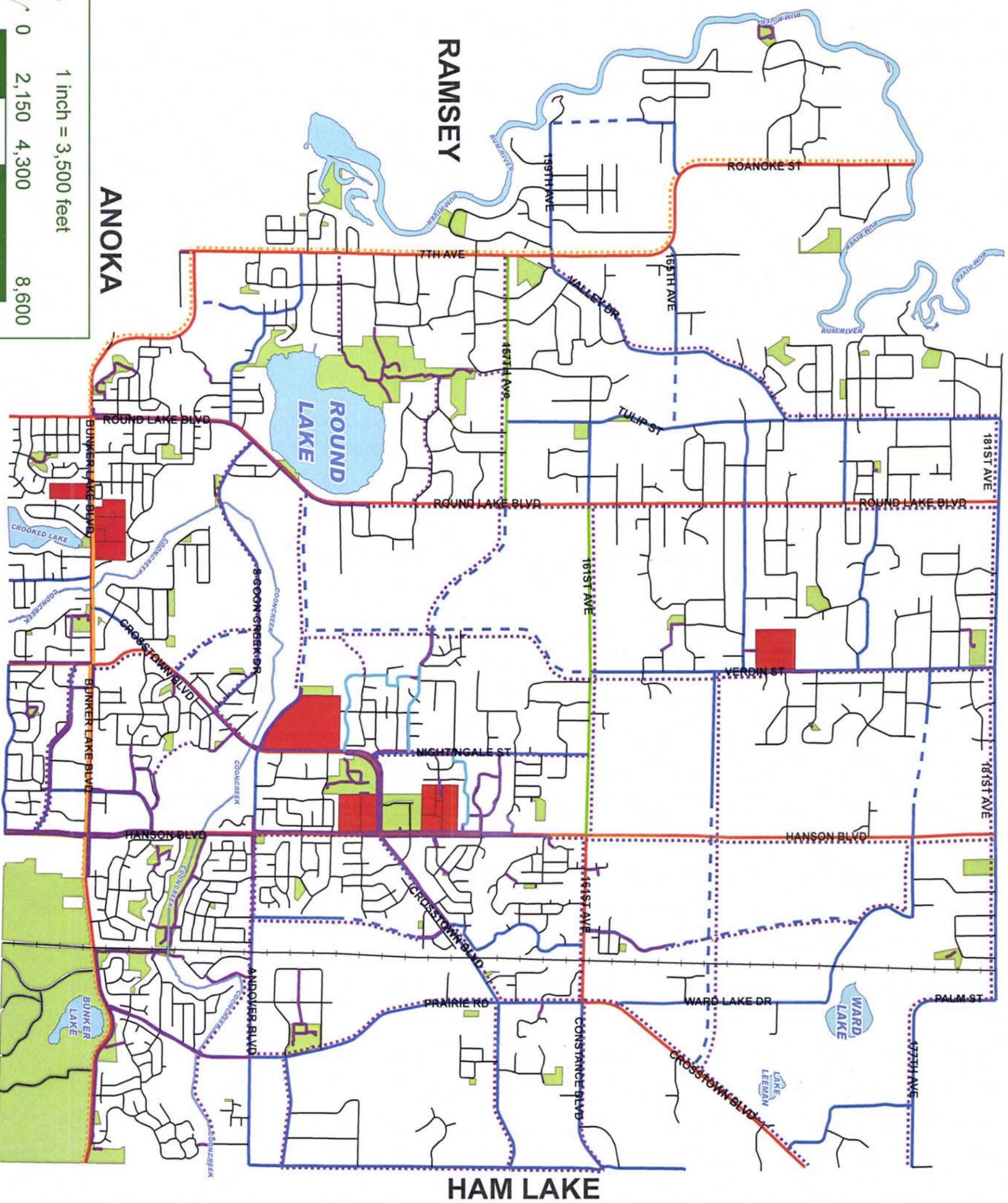
In cases where funding or right of way is limited, an on-road bicycle trail can present a more economical solution. The provision of an on-road bicycle trail can be accomplished through the restriping of existing roadways or with extra consideration during the design of a new roadway. Similar to a functional classification of roadways, bikeway facilities also have a hierarchy of structure. The following classification helps to define the different facilities available for on-road bicycle trails:

1. Bicycle lanes – One-way bicycle facilities, which travel in the same direction as adjacent vehicle traffic. Two-way bicycle lanes located together on the same side of the roadway tend to promote bike travel against the flow of vehicle traffic. This type of bicycle lane should only be used for short connections when necessary.
2. Shared Bus/Bicycle Lanes – The grouping together of bicycles and buses may be considered if the average speed and traffic volumes are low. Currently there are no bus routes or lanes in Andover.
3. Shared Lanes – Shared lanes consist of roadways with no special provisions for bicyclists. Shared lanes generally require vehicles to cross the center lane in order to pass bicyclists. These types of lanes are usually not signed and can be used in residential areas that have low traffic volumes and speeds of less than 30-mph.
4. Widened curb, wide outside lanes or shoulders – Located adjacent to the outermost through traffic lane, experienced bicyclists who are not intimidated by high traffic volumes and speeds generally use this type of facility. Shoulders may be utilized by average experience cyclists depending upon the speed and amount of traffic on the adjacent roadway.

BURNS
TOWNSHIP

OAK GROVE

EAST
BETHEL



TRANSPORTATION PLAN

LEGEND

- Proposed Regional Trails
 - City
 - County
- Existing Trails
 - City
 - County
- On Street Bike Route
- Proposed Collector Roadway
- Existing Roadway
 - A Minor Arterial
 - B Minor Arterial
 - Collector
 - Local
- Water
- Railroad
- Parks
- Schools

Proposed Regional Trails Plan

Figure 24

5. Local roadways – Typical urban local or collectors can be used as routes for bicyclists and pedestrians. Traffic calming can be implemented to reduce the speed of motor vehicles. However, given the City’s stated goals, non-motorized traffic should be separated from motorized traffic along collectors.

The City trail system includes county regional trails, City multi-use trails and school-walk routes. A distinction can also be made between pedestrian/commuter trails and recreational trails. Pedestrian/commuter trails generally connect residential areas to commercial, retail or school facilities. Pedestrian/commuter trails tend to follow collector and arterial roadways, used by motor vehicle commuters, since the users of these trails generally seek out the most direct path to their destination. An example of a pedestrian/commuter trail is the existing trail along the arterial roadway, Bunker Lake Boulevard NW, which connects several local streets to schools, parks and businesses.

Conversely, recreational trails tend to be off-road trails, which connect residential areas to parks, natural areas or greenway corridors. Recreational trails can provide a connection between parks and neighborhoods, and can meander within parks. Recreational trails generally do not travel a direct route and are often located along rivers and streams or contained within parks and greenway corridors. The proposed trail system along Coon Creek is a good example of a recreational trail, as it is entirely off-road and follows scenic Coon Creek through the City. Dividing the trails into these two categories can help to determine from where the appropriate funding should be derived.

A main goal of the trail plan is to link together the major pedestrian generators in the City such as schools, parks and commercial development. Additionally, trails can be a vital link to transit facilities. A number of municipal trails are proposed for development. Additional trails, which should be considered, include municipal trails along existing and proposed collectors providing east/west and north/south connections throughout the City. The current lack of east/west trails in the northern half of the City is related to the availability of roadways. Based on the recommended Functional Classification of the roadways in that section of the City, however, a network of east/west-traveling roadways will be developed. The construction of trails as part of these roadway projects should be considered. Trails should also be developed along a number of sub-collector roadways to provide linkages between the overall trail system and City parks. Again, *Figure 24* illustrates the proposed regional trails network throughout the City.

Trail crossing locations along collectors and arterials should be carefully considered to maximize trail user safety. There are a number of trails within the City that switch from one side of the roadway to the other. Examples include trails along Bunker Lake and Hanson Boulevards NW. Appropriate solutions, be they signed crosswalks, signals, or grade separated crossings, should be developed for each crossing location. *Note:* Whether a trail or pedestrian crossing is being considered or requested at any location within the City, a traffic engineering study at the direction of the City Council may be required to determine if criteria and warrants are met at a particular location. Trail or pedestrian crossings be concentrated to controlled intersections (traffic signal or stop sign controlled). Trail or

pedestrian crossing located at unexpected entries (such as mid-block crossings) will not be encouraged or recommended especially on higher speed routes.

School walking routes have been developed in cooperation with the Anoka-Hennepin school district to handle safety concerns. These concerns have increased due to the discontinuation of bus service to students living within 2 miles of a school. Many of these walking routes follow existing trails or sidewalks. Several of the school walking routes follow the sidewalks or trails along existing arterial and collector roadways. The City should provide a continuous connection along the arterial and collector roadways that support walking routes.

The method of funding the City's Regional Trail System includes the City's Trail Fund and Municipal State Aid Funds. Trails not identified on the proposed Regional Trail Plan are considered internal trails to specific developments. These trails are to be funded by the developer and included as part of the platting and infrastructure improvements.

H. Rail Crossing Safety

The issue with rail crossings with public streets in Andover is one of delay caused to vehicular traffic when trains are at the crossings. Flashers and gates currently control all of the existing crossings.

The delays, whether excessive or not, can be caused by length of trains, train speeds, and number of trains per day. The presence of a switching operation will also add to incurred delay. Since rail traffic and length of trains has increased during the past few years, the problem of vehicular delay to motorists is one experienced in many cities. The only short-term action that would be advisable is to continue dialogue with the owners/operators of the rail system to ensure that all is being done to minimize the time that crossings are blocked. A long-term solution is the provision of grade-separated crossings for the present rail/roadway at-grade crossings. Such crossings are, obviously, solutions that take a long time to implement. However, the approvals process needs to begin in order to have hope of realizing such improvements. Another option is to request that the railroad move the switching operation to a less populated area.

For purposes of the transportation plan, future grade separated crossings are being recommended for the following four public street crossings:

- Bunker Lake Boulevard NW

Bunker Lake Boulevard NW has a year 2030 volume projections of 23,000 or more. Bunker Lake Boulevard NW is under the jurisdiction of Anoka County so the City should work with the County for this beneficial improvement.

I. Air

Andover is not directly affected by any of the area's airports. Therefore, no recommendations are deemed to be necessary with regard to the Transportation Plan.

J. Access Management

The management of access along roadway systems, particularly arterial and collector roadways is a very important component of maximizing the capacity of a roadway and decreasing the accident potential along those facilities. Arterial roadways have a function of accommodating larger volumes of traffic and often at higher speeds. Therefore, access to such facilities must be limited in order to protect the integrity of the arterial function. Collector roadways provide a link from local streets to arterial roadways and are designed to provide more access to local land uses since the volumes and speeds are often lesser than arterial roadways.

The Minnesota Department of Transportation (MnDOT) reports that studies have shown that as the density of accesses increase, whether public or private, the traffic carrying capacity of the roadway decreases and the vehicular crash rate increases¹. Businesses suffer financially on roadways with poorly designed access. Well-designed access to commercial properties supports long-term economic vitality.

As with many transportation related decisions, land use activity and planning is an integral part of creation of a safe and efficient roadway system. Land use decisions have a major impact on the access conditions along the roadway system. Every land use plan amendment, subdivision, rezoning, conditional use permit, or site plan involves access and creates potential impact to the efficiency of the transportation system. Properties have access rights and good design will minimize the deleterious effect upon the roadway system. Access management is a combination of good land use planning and effective design of access to property.

The granting of access in the City of Andover is shared by the City and by Anoka County, with each having the permitting process responsibility over roadways under their jurisdiction. The City, working with the county produces access spacing quality that does provide benefits to the traveling public. In order to strengthen the goal of good access management, a set of access spacing guidelines has been prepared which is intended for use in the access permitting process.

The guidelines are presented for functionally classified arterial and collector roadways without reference to the jurisdiction over these roadways. The basic references for the spacing guidelines is that document previously referenced in this report segment¹ and Anoka County guidelines. The access guidelines are presented in Table 5, which follows. The stated values are meant to be “minimum” values. It is also recognized that some existing connections, both public and private, may not meet these guidelines. It is also recognized that, due to various circumstances, access may need to be granted that cannot adhere to these guidelines. The following table does not provide guidelines regarding access along Principal Arterials – this is due to the fact that there are not any roadways functionally classified as Principal Arterials in the City of Andover.

¹ "Toward An Access Classification System and Spacing Guidelines", Technical Study No. 4, MnDOT, February 1999.

**TABLE 5
ACCESS SPACING GUIDELINES
CITY OF ANDOVER**

Functional Class	Median Treatment	Existing & Proposed Land Use	Typical Posted Speed (MPH)	Full Median Opening Spacing (Miles)	Minimum Signal Spacing (Miles)	Spacing Between Connections (Feet) (1)
Minor Arterial	Divided	Rural	55	1/2	1/2	1320
		Urban	≥ 40	1/2	1/2	660
		Urban Core	< 40	1/4	1/4	660
	Undivided	Rural	55	NA	1/2	1320
		Urban	≥ 40	NA	1/2	660
		Urban Core	< 40	NA	1/4	660
Collector	Divided	Urban	≥ 40	1/4	1/4	330
		Urban Core	< 40	1/8	1/8	330
	Undivided	Rural	55	NA	1/2	330
		Urban	≥ 40	NA	1/4	330
		Urban Core	< 40	NA	1/8	330

NA – Not Applicable

- (1) Distances are based upon spacing between connections (major roads, local public streets, and private driveways).
- (1) Distances are minimum and greater spacing is beneficial.

K. Traffic Calming

During the past few years, traffic calming in residential areas has been a hot topic. In the very near future, it is expected that calming may be a technique that could spread to collectors and arterials and in some areas of the country, traffic calming of collectors is being pursued.

Traffic calming is a popular way of addressing various traffic aspects on residential streets. It allows interested citizens to voice their opinions on what they don't like, and to suggest improvements. Traffic calming can be a viable approach to decreasing volume and speed problems on residential streets. Residential traffic calming and traditional neighborhood designs are tools that can be used to help address the complex demands for more livable communities. The goal of moving traffic efficiently and safely and, at the same time, providing more "comfort" in our communities is bringing together the many various elements used when analyzing roadways. This concept of bringing together various transportation planning and design features is called harmonization.

Available Traffic Calming Techniques

There are many residential street traffic-calming techniques being used throughout the United States. Some are successful and some are not. This segment of the Transportation Plan will discuss available techniques and their levels of success.

A wide range of traffic calming techniques has been used over the years. They range from physical changes to the roadway system to traffic control techniques that use signing and/or pavement markings. A list of the various “traffic calming” techniques is listed below. A brief description of each technique follows. Graphic illustrations of some of these techniques are contained with the description.

Physical changes to the street include:

- Street narrowing
- Curvilinear street
- Choker
- Chicane
- Speed bump/hump
- Traffic circle
- Protected parking bays
- Street closure
- Diagonal diverter
- Semi-diverter
- Trumpet island
- Change in road surface material or color
- Streetscape material or landscape plantings
- Rumble strips

Traffic control techniques include:

- Police enforcement (Placement of speed trailer)
- Marked crosswalks
- Turn restrictions
- Speed watch program
- One-way streets
- Variable-speed display board
- Vehicle restrictions

Street Changes

Street Narrowing – A street can be narrowed one of two ways – The street width can be reduced by removing some of the pavement surface, or a psychological narrowing can be accomplished by using a white pavement edge line that indicates narrower travel lanes. Street narrowing may minimize or eliminate street parking, compromise bicycle safety, and affect emergency vehicle response times. On the plus side, street beautification can

accompany street narrowing projects. Pavement markings can play a dual role by also identifying bike lanes.

Choker – A choker narrows the width of the traveled lanes. A choker can be constructed at an intersection or at mid-block locations.

Curvilinear Street – The construction or reconstruction of an existing street can be done in a curvilinear fashion that, in theory, slows traffic. This can be done with a curved centerline alignment and a uniform roadway width, or through the use of chokers and alternative side barriers.

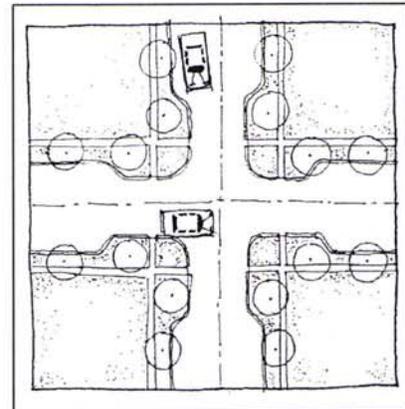
Chicane – Like the choker, the chicane narrows the street, mid-block, by construction curb bulbs that are staggered, thus creating a serpentine effect along the traveled lanes.

Speed Humps – These are raised areas in the roadway that extend across the roadway perpendicular to traffic flow. Speed humps are generally 3 to 4 inches high and approximately 12 feet long. Some cities use them on local streets. Speed humps should only be used on streets where the speed limits are 30 mph or less. The speed humps are not traffic control devices but are geometric design features. Accepted engineering judgment and principles should be used in their design and installation.

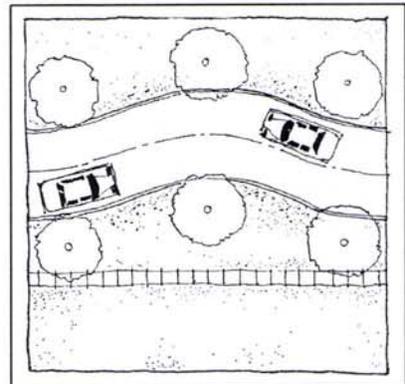
Traffic Circle – A traffic circle is a raised island placed in the intersection of local streets. The island, approximately 20 feet in diameter, deflects the path of through traffic around the island, slowing traffic speeds. These traffic circles must be carefully designed so that the desired objective of slowing traffic is achieved without compromising safety.

The traffic circle is different than a traffic roundabout. Roundabouts, popular in Europe, and becoming increasingly more popular in the United States are normally used on higher volume roadways and involve different design elements.

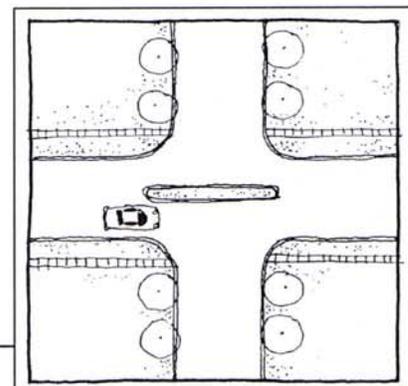
Median Island – A median island, or barrier, is a method of eliminating through traffic and left turns to/from one street of an intersection. Routes for traffic that would be diverted must be carefully analyzed so that the problem being solved isn't merely shifted to another location. Emergency vehicle access must be



Choker



Chicane

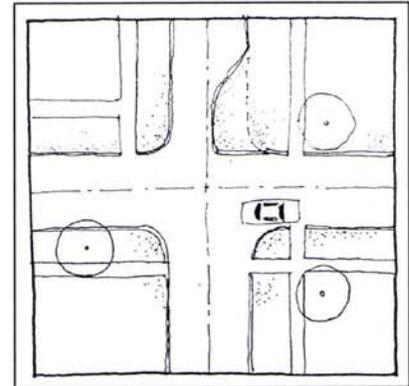


Median Island

carefully analyzed when considering this geometric technique.

Protected Parking Bays – Narrowing a street to provide protected parking bays can slow traffic. The extent to which traffic is slowed depends on the width of the lanes that remain for moving traffic.

Street Closure – One effective way to reduce traffic volumes on a local street is closing that street at an intersection, normally with a cul-de-sac. A detailed analysis of where diverted traffic will go needs to be completed to avoid introducing new and possibly unwanted traffic on an adjacent street. The effect of such a closure must also be analyzed from an emergency vehicle access standpoint. While a street study and/or closure can be accomplished as a single action, it is normally part of a larger scale, areawide analysis and control project.



Semi-Diverter

Diagonal Diverter – The diagonal diverter, placed at the intersection of two local streets, prohibits through and left-turn traffic. This diverter is normally a raised barrier than can be landscaped. The diverter can be successful in reducing “cut-through” traffic in neighborhoods. As with previous devices, an areawide treatment is normally the best practice. Care has to be exercised so that emergency vehicle traffic response times are not significantly affected.

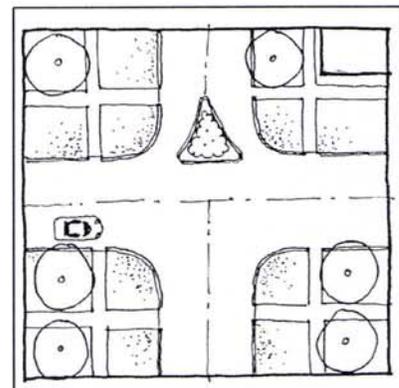
Semi-Diverter – This partial diverter narrows a two-way street at an intersection so that only one direction of travel is allowed. The semi-diverter can be designed to eliminate either entering or exiting traffic.

Trumpet Island (right turn diverter) – This raised island, placed on any leg of an intersection, allows for right turns in/out for a particular roadway. A trumpet island is normally used in situations where left turns and through traffic are safety concerns. Generally traffic volumes are reduced.

Change in Road Material, Surface, or Color – This psychological method of attempting to slow traffic is normally used as a part of an area wide beautification effort. Reconstruction is normally required.

Streetscape Material or Landscape Plantings – This is another beautification option that could affect traffic speed. The design concept/type provides the illusion that the street is narrower, generally causing drivers to slow down.

Rumble Strips – Rumble strips are historically used to alert drivers of an upcoming traffic signal or stop



Trumpet Island

control situation, or to indicate the roadway's edge. These are normally used on higher speed roadways. They have little effect on local streets.

Traffic Control Techniques

Police Enforcement – Increasing the use of radar to curb speeding can be an effective control tool – if it is administered consistently. However, radar can be costly, and assigning officers to this lower-priority task is often difficult. Though productive for the short-term, sporadic enforcement, or removing enforcement after a period of time, will see speeds creeping back up over time. The placement of the City's speed trailer can also be an effective control tool. This may also be short-term with speeds creeping back up over time.

One-Way Streets – Converting a pair or series of streets to one-way operations has safety benefits and causes a shift in traffic volumes. One-way pairs, alternating one-ways, or divergent/convergent one-ways create benefits, but can be a problem for certain local users as they can cause increased driving distances to arrive at their residences. Detailed analyses should be conducted before this concept is implemented.

Stop Signs – Stop signs should only be installed where warranted and as the result of an engineering analysis. Stop signs are not recommended for use as a speed control device. Removing stop signs, when warranted as part of an engineering study, can be as sensitive as installing one.

Marked Crosswalks – Painted crosswalks direct pedestrians to a crossing location that is judged safe for them and, equally important, visible to vehicular traffic. Crosswalks only need to be painted where pedestrian traffic is high, such as near parks and schools.

Variable Speed Display Board – The speed display unit, or trailer, uses radar to record and display a motorist's speed, along with the posted limit. Motorists do respond to this technique, but it should be repeated to gain maximum effectiveness.

Turn Restrictions – Turn Restrictions (no left turn, no right turn) along major streets at residential street intersections can be an effective technique to reducing neighborhood "cut-through" traffic. Such turn restrictions are usually posted for the peak traffic hours. Since this is not a physical deterrent, there are usually some, albeit minimal, violations.

Vehicle Restrictions – Restricting vehicles, namely trucks, from certain streets is often the result of citizen complaints. Trucks are important to the economic viability of the area. The City has designated streets upon which trucks are allowed daily travel. Explaining the impetus behind the truck route layout generally satisfies a citizen's concerns when complaints are lodged.

Speed Alert/Watch Programs – This program allows residents to become a part of the solution. Under this program, citizens are trained to operate radar units by law enforcement personnel. One person runs the radar unit while another records speed and vehicle information. Speeders are then sent letters by the police department pointing out their

recorded speed and asking them to slow down. In many cases, the speeders are area residents.

Effectiveness of Traffic Calming Techniques

Traffic calming techniques are being used on residential streets throughout Minnesota and the United States with varying success. In some cases, projects that had been installed have been subsequently removed, often at the request of the same people who requested the calming technique in the first place. Much research is still needed to determine the expected effects of these various control and geometric elements. Most research on the effects of these residential street-calming efforts has been project specific. Data and research on this topic are still in its infancy.

Some of the benefits anticipated for a specific project are based on engineering judgment, but they need to be verified. This will occur as more research is undertaken. However, some case studies have identified benefits to certain projects, often reported as an “enhancement to the street environment.” These statements can be interpreted to mean residents are experiencing a feeling of improved safety, street “livability,” and an overall improvement in their perceived quality of life.

There have been efforts, in research and project reporting studies, to indicate the types of improvements that can be expected when certain traffic calming techniques are used. These expectations are based on first-hand experience and subjective analysis.

In 1996 – 1997, the Minnesota Department of Transportation and the Minnesota Local Road Research Board sponsored a research study¹ that examined the extent of traffic calming activity in Minnesota and the degree of actual and perceived success of such projects.

Effectiveness was rated as:

- Highly Effective
- Effective
- Slightly Effective
- Uncertain of Effectiveness
- Not Effective

The study rated the effect of the project type on four different elements:

- Vehicle Speeds
- Traffic Volumes
- Street Safety
- Enhancing Perceived Street Environment

Tables 6 through 9 on the following pages present the results of these ratings.

A document prepared in 1994 by the North Central Section of the Institute of Transportation Engineers² (NCITE) contained an evaluation of the effects of various traffic engineering and traffic calming techniques. The units of measure were weighed against a variety of elements and rated for their effect – low, mid or high. The engineering/calming techniques were called a “tool box.” Table 10 on the following page presents the ratings from the report.

¹ Traffic Calming Activity in Minnesota, LRRB, SRF Consulting Group, December 1997.

² Neighborhood Traffic Control, North Central Section of the Institute of Transportation Engineers, January 1994

TABLE 6
Effectiveness of Traffic Calming Measures on Vehicle Speeds

Traffic Calming Measures	Highly Effective	Effective	Slightly Effective	Uncertain of Effectiveness	Not Effective
Street Width Adjustments:					
Street Narrowing			X		
Choker		X			
Median Island			X		
On-Street Angled Parking			X		
Protected Parking Bays			X		
Traditional Traffic Control Techniques:					
Vehicle Restrictions					X
Turn Restrictions					X
One-Way Streets				X	
Variable-Speed Display Board		X			
Trumpet Island				X	
Marked Crosswalks			X		
Stop Signs			X		
Vertical or Horizontal Realignments:					
Speed hump or bump		X			
Traffic Circle		X			
Chicane				X	
Route Modifications:					
Street Closure (cul-de-sac)			X		
Diagonal Diverter		X			
Semi-Diverter				X	
Perceptual Enhancements:					
Change in Road Surface, Materials, or Color				X	
Streetscape Materials or Landscape Plantings			X		

TABLE 7
Effectiveness of Traffic Calming Measures on Traffic Volumes

Traffic Calming Measures	Highly Effective	Effective	Slightly Effective	Uncertain of Effectiveness	Not Effective
Street Width Adjustments:					
Street Narrowing			X		
Choker			X		
Median Island			X		
On-Street Angled Parking				X	
Protected Parking Bays				X	
Traditional Traffic Control Techniques:					
Vehicle Restrictions		X			
Turn Restrictions	X				
One-Way Streets		X			
Variable-Speed Display Board				X	
Trumpet Island			X		
Marked Crosswalks					X
Stop Signs			X		
Vertical or Horizontal Realignments:					
Speed hump or bump		X			
Traffic Circle			X		
Chicane				X	
Route Modifications:					
Street Closure (cul-de-sac)	X				
Diagonal Diverter	X				
Semi-Diverter	X				
Perceptual Enhancements:					
Change in Road Surface, Materials, or Color				X	
Streetscape Materials or Landscape Plantings				X	

TABLE 8
Effectiveness of Traffic Calming Measures to Improve Street Safety

Traffic Calming Measures	Highly Effective	Effective	Slightly Effective	Uncertain of Effectiveness	Not Effective
Street Width Adjustments:					
Street Narrowing			X		
Choker			X		
Median Island			X		
On-Street Angled Parking				X	
Protected Parking Bays			X		
Traditional Traffic Control Techniques:					
Vehicle Restrictions		X			
Turn Restrictions				X	
One-Way Streets				X	
Variable-Speed Display Board			X		
Trumpet Island			X		
Marked Crosswalks			X		
Stop Signs		X			
Vertical or Horizontal Realignment:					
Speed hump or bump				X	
Traffic Circle				X	
Chicane				X	
Route Modifications:					
Street Closure (cul-de-sac)		X			
Diagonal Diverter				X	
Semi-Diverter			X		
Perceptual Enhancements:					
Change in Road Surface, Materials, or Color					X
Streetscape Materials or Landscape Plantings			X		

TABLE 9**Effectiveness of Traffic Calming Measures for Enhancing Perceived Street Environment**

Traffic Calming Measures	Highly Effective	Effective	Slightly Effective	Uncertain of Effectiveness	Not Effective
Street Width Adjustments:					
Street Narrowing	X				
Choker	X				
Median Island	X				
On-Street Angled Parking			X		
Protected Parking Bays			X		
Traditional Traffic Control Techniques:					
Vehicle Restrictions		X			
Turn Restrictions		X			
One-Way Streets				X	
Variable-Speed Display Board				X	
Trumpet Island				X	
Marked Crosswalks		X			
Stop Signs			X		
Vertical or Horizontal Realignments:					
Speed hump or bump			X		
Traffic Circle		X			
Chicane				X	
Route Modifications:					
Street Closure (cul-de-sac)		X			
Diagonal Diverter		X			
Semi-Diverter		X			
Perceptual Enhancements:					
Change in Road Surface, Materials, or Color		X			
Streetscape Materials or Landscape Plantings	X				

A document prepared in 1994 by the North Central Section of the Institute of Transportation Engineers² (NCITE) contained an evaluation of the effects of various traffic engineering and traffic calming techniques. The units of measure were weighed against a variety of elements and rated for their effect – low, mid or high. The engineering/calming techniques were called a “tool box.” Table 10 on the following page presents the ratings from the report.

² Neighborhood Traffic Control, North Central Section of the Institute of Transportation Engineers, January 1994

TABLE 10

North Central Section of the Institute of Transportation Engineers Ratings Evaluation

Engineering/ Calming Technique	Volume Reduction	Speed Reduction	Safety Improve	Pollution Reduction	Access Restriction	Emergency Access	Maintenanc e Problems	Level Of Violation	Community Acceptance	Cost
Truck Restrictions	○	○	○	◇	●	○	○	○	●	○
Increased Enforcement	○	●	■	○	○	○	○	n/a	●	■
Speed Watch	○	●	■	○	○	○	○	n/a	●	○
Variable Speed Display	○	●	■	○	○	○	○	n/a	●	○
Watch for Children	○	○	○	○	○	○	○	n/a	●	○
Pavement Markings	○	○	○	○	○	○	○	n/a	●	○
Street Narrowing	○	■	■	○	○	○	○	n/a	○	■
Turn Restrictions	●	■	■	◇	●	○	○	○	○	○
Private Streets	■	■	■	●	■	●	○	n/a	○	●
Basket Weave Stop Signs	○	■	●	○	○	○	○	○	●	○
Yield Signs	○	■	○	○	○	○	○	■	●	○
Do Not Enter	■	○	■	◇	●	○	○	■	○	○
Speed Limit Changes	○	○	○	○	○	○	○	●	●	○
Parking Restrictions	○	○	■	○	○	○	○	○	○	○
All Way Stop	○	■	■	○	○	○	○	■	●	○
One Way Streets	■	○	■	○	●	○	○	○	○	○
Stop Sign Removal	○	○	■	●	○	○	○	n/a	●	○
Chokers	■	○	■	○	○	○	○	n/a	●	●
Partial Diverters	■	■	■	◇	●	●	○	○	○	●
Street Closure	■	●	■	●	●	●	●	n/a	○	●
Full Diverters	■	■	■	◇	●	●	●	n/a	○	●
Traffic Circles	○	■	■	○	○	●	■	n/a	○	●
Median Barriers	●	○	●	◇	●	●	○	n/a	○	■
Speed Bumps/Humps	■	●	○	○	○	●	■	n/a	○	■
Curvilinear Reconstruction	■	■	■	○	○	○	○	n/a	○	●

○ Low, Unlikely, No

■ Mid, Moderate, Possible

● High, Likely, Yes

◇ Shift

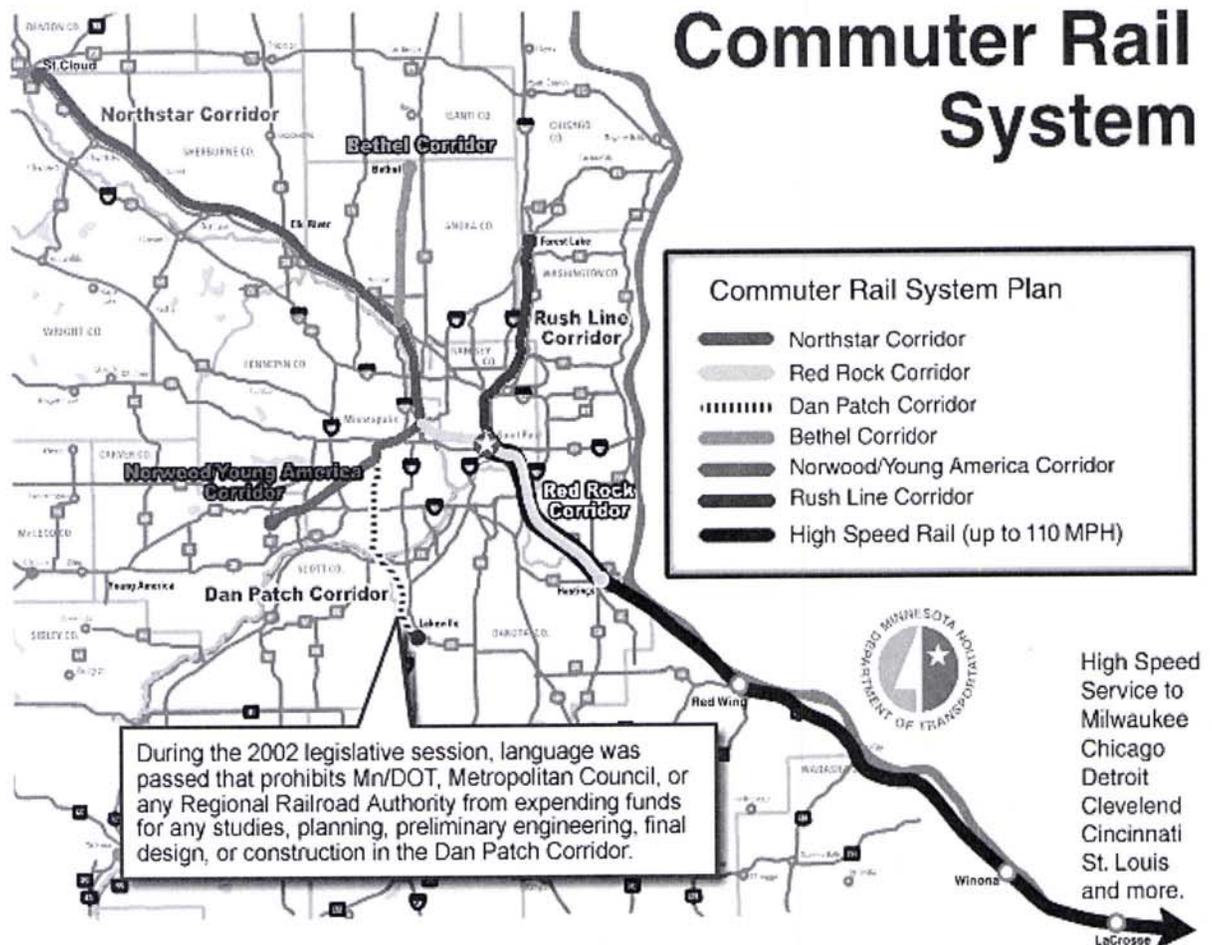
SOURCE: *Neighborhood Traffic Control, NCITE, January 1994*

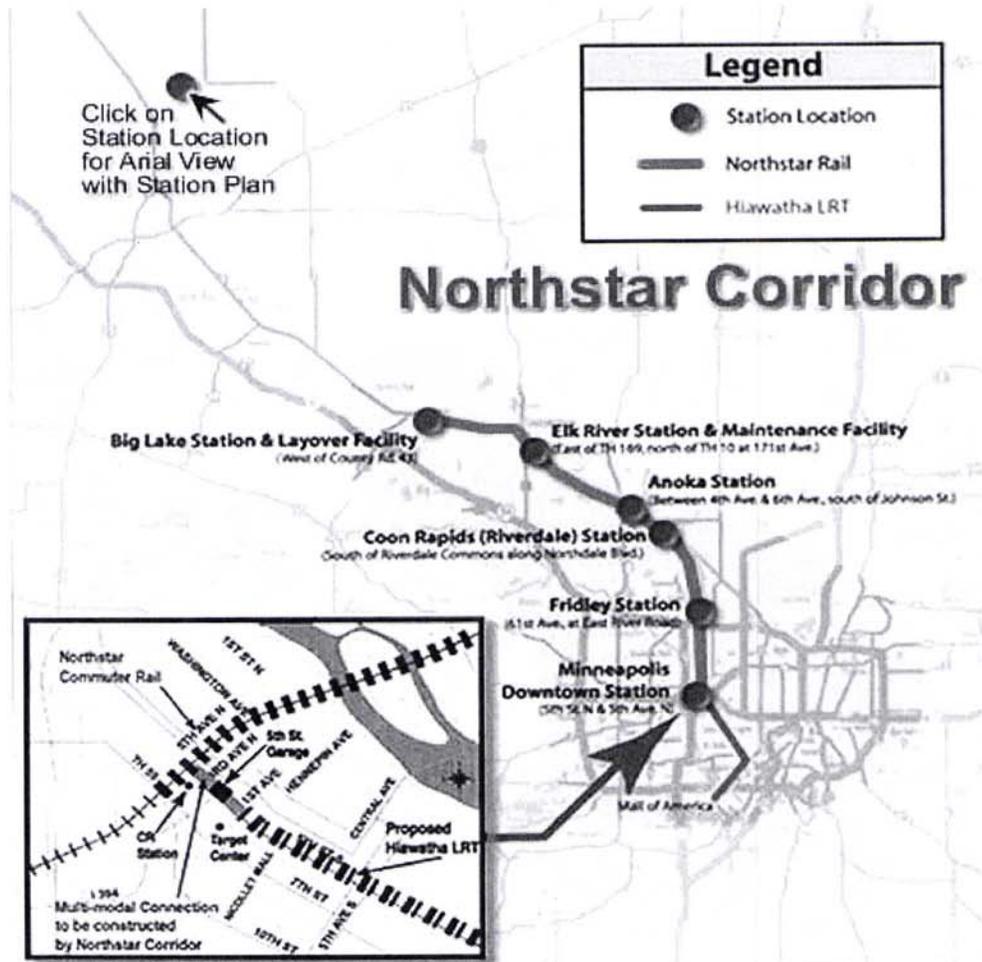
V. REGIONAL TRANSPORTATION INITIATIVES

Northstar Corridor And Bethel Corridor, Commuter Rail

Overpasses and underpasses for rail lines

The Northstar Corridor is a 50-mile transportation corridor, which runs along Hwy 10 and Hwy 47 from Minneapolis to Big Lake. The Northstar Corridor was identified by Mn/DOT and is included in the Metropolitan Council's Master Regional Transit Plan as a transit investment around the region. Northstar Commuter Rail Stations in the Northeast suburbs include: Elk River (east of TH 169 and north of TH 10), Anoka (north of TH 10 between TH 47 and TH 288) and Coon Rapids (at the Foley Park-and-Ride and along Northdale Boulevard south of Riverdale Commons). These stations will all include Park-and-Ride facilities. The proposed date for the start of construction operations is spring of 2007. Service opens in 2009.





The Bethel corridor is a tentative commuter rail corridor, which runs north/south from the City of Bethel to Coon Rapids where it ties into the Northstar corridor. A study performed by Mn/DOT on the feasibility of commuter rail corridors in the Twin Cities found the Bethel Corridor to be feasible as a tier two corridor, which means that it could support potential commuter rail service. It is anticipated that tier two corridors will be implemented after 2020. It is recommended that Andover consider the potential for this rail line as the City continues to develop. This may include selecting locations for where there is urban housing, community centers, etc. near the existing rail line. If the existing rail line becomes the location for the future commuter rail corridor, the infrastructure should compliment the use of that facility. At this point, the most appropriate location for rail station appears to be near where BNSF railway and Bunker Lake Boulevard NW intersect in the southwest quadrant, which is currently owned by Anoka County.

Both commuter rail corridors will be developed as part of a commuter rail system and will be integrated with other forms of transportation such as LRT, bus transit, bicycles and pedestrians. Due to the construction of these commuter rail lines, the City of Andover may experience an increase in bus transit, which may require the construction of new Park-and-Rides within the City. Also, an increased demand for pedestrian and bicycle transit may

occur, requiring the construction of more trails and walkways through the City as well as other pedestrian provisions.

It is expected that the Minnesota Legislature will address the funding needs of the Northstar Corridor in the 2003 Legislative session. State funding is needed to match existing federal funding. If funding is provided by the State, implementation of the Northstar corridor is expected to begin in 2003. Once the rail line is operational, Anoka County anticipates providing a feeder bus service to the Northstar corridor for the cities of Andover and Ramsey.

Regional Trails

Existing regional trails through the City of Andover include the Bunker Hills Regional Trail, which travels through Bunker Hills Regional Park in the SE corner of Andover and the Central Anoka County Regional Trail, which travels east/west through the southern section of the City of Andover. Additions to both of these regional trails are currently proposed by Anoka County. A new trail, the Rum River Regional Trail, is also proposed by Anoka County to travel north/south along County Road 7 through the City. A municipal trail is proposed to travel east/west along Coon Creek. With the construction of regional trails comes Andover's opportunity to connect existing municipal trails to the larger system.

Mississippi River Crossing

Mn/DOT is currently studying the existing Mississippi River Crossings and has determined that both the Hwy 101 and the Hwy 169 crossings are congested. Various locations are being investigated for an additional river crossing. Mn/DOT's goal is to have the additional river crossing constructed sometime after 2015. A location being considered for this crossing includes a crossing from the City of Ramsey to the City of Dayton. Due to the construction of this new river crossing, the City of Andover could expect to see more commuters heading west to cross the river and then south into Minneapolis and St. Paul. Mn/DOT is currently looking to preserve the right-of-way for this project.

As part of this project, it is anticipated that Mn/DOT will need to address how this crossing connects to the transportation system to the north. The crossing could potentially connect to TH 169 or TH 47 to the north. This may provide a TH 169 "bypass" around Elk River or a realignment of TH 47 away from Anoka. Anoka County will also be reviewing the function of CSAH 22 and how it relates to the new river crossing as well as its function as an east/west connection for the northern Minneapolis/St. Paul Metro Area.

TH 47 (Preservation Route)

A preservation route is a section of Trunk Highway (TH) that has been categorized as Mn/DOT's highest investment priority. This category involves the repair and replacement of pavement and bridges, and repair of miscellaneous infrastructure. Funding is provided to preserve the existing infrastructure and not for other improvements even though they may be warranted. Mn/DOT has categorized TH 47 as a preservation route. TH 47 was recently reconstructed through the City of Ramsey. Mn/DOT recognizes the deficiencies on TH 47 within the City of Anoka, however, there are no plans for any major improvements in the

near future. Mn/DOT and Anoka County will review the needed improvements and future alignment of TH 47 as discussions continue concerning the potential turnback of the roadway to Anoka County.

CSAH 14 (Management Route)

A Management Route is Mn/DOT's second highest investment priority category. This type of route involves preservation strategies, transportation system management, access management, jurisdictional reassignment and corridor preservation. As the first step in developing an Access Management Plan, Anoka County prepared an Access Management Study for CSAH 14 between TH 10 and I-35W. It was determined that CSAH 14 is the best east/west corridor through southern Anoka County, however, most trips on CSAH 14 were short as travelers used the corridor to access north/south roadways. It was also discovered that the number of access points along this corridor of CSAH 14 is more than double the Mn/DOT guideline for an urban principal arterial facility.

Safety issues were identified as well as problems with congestion. Results of the study indicated that widening the corridor and making intersection improvements would minimize future traffic delays and congestion. To accomplish this goal, it was recommended that this segment of CSAH 14 be reconstructed as a four-lane divided urban facility with left and right turn lanes. This would restrict access points and thereby reduce the number of conflicts.

Since Mn/DOT considers CSAH 14 a management corridor, improvements such as turn lanes, frontage roads, signal timing and access changes may receive state and regional funding. The City of Andover may be affected by improvements made to CSAH 14 particularly at Hanson Blvd. NW and Coon Creek Blvd. This will provide additional capacity through the intersections.

TH 65 (Management Route)

TH 65 is a Mn/DOT Management Route and may receive state and regional funding for improvements such as turn lanes, signal timing and access closures or modifications. Mn/DOT will be providing auxiliary lanes to TH 65 from CSAH 10 to 97th Ave. NE in Blaine. Mn/DOT, Anoka County and Blaine will continue to discuss the future of TH 65. These discussions include defining potential funding sources for future improvements. Currently TH 65 is proposed to be a 6-lane divided highway from north of TH 10 to either CSAH 14 or Ham Lake.

Mn/DOT completed a Traffic Operations Study in 2000 for TH 65 from 53rd Avenue to 245th Avenue within Anoka County. Computer modeling was completed for intersections along this segment of TH 65. It was found that 22 intersections along the study corridor would be operating at unacceptable levels in 2020 if only the programmed improvements were performed on TH 65. The recommendations in the traffic operations study include access eliminations to increase intersection spacing, dedicated turn lanes to increase the cross street capacity, and additional through lanes in some areas to increase the intersection capacity. These improvements are dependent on the implementation of an access management plan.

Access to TH 65 for a majority of Andover residents is via Bunker Lake Blvd. Anoka County plans to reconstruct Bunker Lake Blvd. NW from Hanson Blvd. NW to TH 65 in 2010. The actual year of construction may be earlier, however, Anoka County has placed it in 2010 to show that it is currently not in their five-year plan. This improvement along with improvements to TH 65 and other north/south routes may provide a more efficient route for Andover residents to commute to the Minneapolis/St. Paul Metro Area.

TH 10 (Interregional Corridor)

An Interregional Corridor (IRC) is described as a route that connects regional trade centers within Minnesota. These corridors are only two percent of all roadway miles in the state, however they account for one-third of all vehicle miles traveled. These corridors receive priority for management investment funds as well as improvement and expansion funding. TH 10 is categorized as a management investment, but is also part of the Interregional Corridor System and is eligible for IRC funds.

In May 2002, Mn/DOT completed a Management Study/Plan for TH 10 from TH 24 in Clear Lake to I-35W in Mounds View and Arden Hills. Geometric and capacity deficiencies were studied along the length of the corridor. Segments through Anoka and Ramsey were among the segments with the greatest number of deficiencies. Congestion during peak hours was determined to stretch from Coon Rapids to Elk River. A major concern is the number of existing and potential signalized intersections along the corridor. Identified alternatives including increasing the number of through lanes along TH 10 or increasing the efficiency of the existing through lanes by converting from an expressway to a freeway design. A freeway design would require the elimination of local road intersections and access points and the conversion of at-grade signalized intersections to grade separated interchanges.

The study included the following alternatives for the Anoka County area:

Elk River: Convert the existing 4-lane arterial to a 6-lane arterial or a 4 or 6-lane freeway or construct a 4-lane freeway bypass north of the City.

Ramsey: Convert the existing 4-lane expressway to either a 6-lane expressway or a 4 or 6-lane freeway.

Anoka: Convert the existing 4-lane expressway to a 4 or 6-lane freeway.

Coon Rapids: Widen the present 4-lane freeway to a 6 or 8-lane freeway.

This list of alternatives was evaluated and a list of potential projects was developed. Portions that are relevant to the Andover/Anoka County area include a project in Ramsey converting TH 10 from TH 169 to Sunfish Lake Boulevard to a 6-lane freeway, and a project in Anoka converting TH 10 from Sunfish Lake Boulevard to Round Lake Boulevard to a 6-lane freeway. It was also recommended that TH 10 from Round Lake Boulevard south to I-35W be converted to an 8-lane freeway as part of two different projects. Improvements to this corridor need to consider the Northstar Commuter Rail and related bus transit activities and facilities.

Some intersection/interchange improvements have been started and are in various stages of completion. The interchange at Round Lake Boulevard and Hanson Boulevard has been completed.

TH 169 (Interregional Corridor)

TH 169 has been classified by Mn/DOT as an interregional corridor. This corridor is eligible to receive priority for management investment funds as well as improvement and expansion funding. Mn/DOT has also identified this corridor as an at-risk, high-priority interregional corridor. There are four bottlenecks on this segment of TH 169 causing capacity problems for truck freight and passenger cars. A feasibility study completed in 1998 for TH 169 from I-94 to TH 610 has been completed. As part of the study the following improvements were recommended:

- An additional through lane in each direction between I-94 and 77th Avenue with the addition of a northbound-to-westbound exit loop at 77th Avenue in Maple Grove and Brooklyn Park.
- Diamond configuration ramps to CR 81 and 85th Avenue in Brooklyn Park.
- Grade separation of 93rd Avenue and TH 169 restricting access in Osseo and Brooklyn Park.

Mn/DOT intends to preserve Right-of-Way for the widening of TH 169 between I-94 and 109th Avenue after developing a preliminary design map. According to the Transit 2020 Master Plan, bus-only shoulders are proposed for this corridor and should be incorporated into the any new designs for TH 169. Mn/DOT will continue to analyze the project capacity deficiencies.

Roadway Turnbacks

There are two potential regional roadway turnbacks being discussed by Mn/DOT and Anoka County:

- TH 47 from Mn/DOT to Anoka County
- East/West CSAH 22 from Anoka County to Mn/DOT

A change in “ownership” of a roadway can affect funding and project priority. A roadway that may not have been a high priority to Mn/DOT may be more important to Anoka County and could receive more attention under the jurisdiction of the County. Also, the

funding that can be provided for maintenance and construction will change along with the jurisdictional change. Mn/DOT and Anoka County are currently preparing a Memorandum of Understanding (MOU) for the jurisdictional changes between agencies.

The Anoka County 2015 Transportation plan shows proposed changes to the County Highway System. The roadways that are to be turned back to the City of Andover are:

- Verdin Street NW from 181st Ave. NW to 161st Ave. NW
- 165th Ave. NW from CSAH 7 to Valley Drive NW

VI. ROADWAY SYSTEMS PLAN

A. Transportation Funding

There are several funding alternatives available to Andover for improvements to the transportation system. Below is a list of funding sources that can be utilized for various types of improvements:

- Federal Aid funding
- Federal Demonstration Funding for High Priority Projects (HPP)
- Transportation Revolving Loan Fund (TRLF)
- County State Aid Highway funding
- Municipal State Aid Street funding
- State and Federal Bridge funding
- Minnesota Railroad-Highway Grade Crossing Safety Improvement Program
- State DNR Grants
- Legislative Commission on Minnesota Resources
- Turnback funding
- County funding
- City funding

Each of these funding sources has a unique set of requirements and criteria that must be met in order to receive funding; in some cases this includes successfully competing for limited funding. There are also rules that apply to the use of the funding and what the funding can actually be used for. Below is a more detailed description of the funding sources, how to receive the funds and how the funds can be used.

Federal Aid Funding

States receive federal funding for highways through the Surface Transportation Program of the Federal Highway Trust Fund. Federal Highway Trust Fund revenue is generated from the federal gas tax, taxes on truck sales, use and tires, and from the General Trust Fund. Currently each state receives a minimum amount of federal aid equal to 90% of the amount it contributes in taxes.

The Federal Aid or TEA-21 funds are administered through the Minnesota Department of Transportation (Mn/DOT) with guidance provided through the Transportation Advisory

Board of the Metropolitan Council of the Twin Cities. Municipalities can compete for a portion of the federal funding that is available to the state. A solicitation occurs approximately every two years for the Surface Transportation Program (STP), Congestion Mitigation/Air Quality Improvement Program (CMAQ), and the Transportation Enhancement Program (TE). The next solicitation is expected to occur in July 2003 with funding becoming available for projects in 2007 and 2008. The federal funding usually covers 80% of the construction costs of a project. The other 20% must come from other funding sources. These sources could include other funds listed within this plan. The federal categories and an explanation is provided below:

Surface Transportation Program (STP)

STP funding is available for roadway construction and reconstruction, capacity projects, safety projects, bikeway or walkway components of projects, transit projects, Park-and-Ride facilities and traffic management projects. Under the STP, projects can be submitted in one of three categories:

- 1) Non-freeway, principal arterial highways
- 2) Projects on the "A: Minor Arterial Highway System" as defined by the Transportation Advisory Board (TAB); and
- 3) Bike and walk projects

In the City of Andover, there are no principal arterial roadways. The roadways on the "A: minor Arterial Highway System" are Hanson Blvd. Through the entire City and Round Lake Blvd. from the City's southern border to Bunker Lake Blvd. A bikeway project must be a major bicycle transportation facility designed pursuant to an overall plan for the transportation use of bicycles, or other vehicles propelled by human power. A walkway project must be a pedestrian transportation facility designed pursuant to an overall plan and designated for the use of pedestrians.

Congestion Mitigation and Air Quality Improvement Program (CMAQ)

CMAQ provides flexible funding to state and local governments for transportation projects and programs to help meet the requirements on the Clean Air Act of 1990. In general, eligible projects provide some type of reduction in toxic emissions. These include alternative fuel vehicles purchases, traffic flow improvements, transit projects, rideshare activities and telecommuting. CMAQ funding can be used in various fashions to defer the costs of implementing these strategies.

Transportation Enhancement Program (TE)

Transportation Enhancements are transportation-related activities designed to strengthen the cultural, aesthetic and environmental aspects of the nation's intermodal transportation system. The types of projects that are eligible for funding under this category include bicycle and pedestrian facilities, scenic beautification, historic preservation, environmental mitigation and transportation museums. Transportation enhancement funding is the largest potential funding source for trail projects throughout the City.

Hazard Elimination Safety Program (HES)

The Hazard Elimination Safety Program provides funding for spot safety improvements on roadways. These improvements usually are intersection improvements to reduce the number and/or severity of accidents. This may include the installation of a traffic signal or channelization improvements. Applications for HES funding must include a benefit/cost analysis. The greater the benefit/cost ratio, the more likely funding will be provided. The federal funding limit for this category has been \$500,000 per location.

Federal Demonstration Funding for High Priority Projects (HPP)

While Federal funding is available through the TEA-21 program, other federal funding may be available for specific high priority projects. In order to obtain this special funding a project must have technical merit, as well as political backing. A coalition may be formed from supporting agencies and elected officials to organize an effort to bring funding to a project. A special Bill passed by Congress may contain funding directly applied to a specific project. By forming a coalition and working with your congressman and other elected officials, the City may be able to bring substantial transportation funding to a regionally significant transportation project.

Transportation Revolving Loan Fund (TRLF)

The federal government established a State Infrastructure Bank (SIB) program in 1995 through the National Highway System Designation Act. A SIB is a state or multi-state fund that can be used by eligible borrowers to finance eligible transportation projects. Minnesota's SIB, known as the Transportation Revolving Loan Fund (TRLF), was established in 1997. The TRLF operates much like a commercial bank providing low interest loans to cities, counties, and other governmental entities for eligible transportation projects. When the loans are repaid, the funds are returned to the TRLF and used to finance additional transportation projects.

The TRLF is an innovative finance tool that can be used to finance transportation projects that may not get financed through traditional transportation funding methods. The TRLF's benefits include:

- Faster project completion resulting in cost-savings and improved transportation systems.
- A variety of low-cost financing options.
- The ability to fund additional projects as loans are repaid.
- The attraction of new types of dollars for transportation use.
- The generation of additional dollars for transportation purposes through leveraging.

Eligible projects include, but are not limited to, pre-design studies; acquisition of right-of-way; road and bridge maintenance, repair, improvement, or construction; enhancement items; rail safety projects; transit capital purchases and leases; and drainage structures, signs guardrails, and protective structures used in connection with these projects.

An eligible borrower's possible sources of TRLF loan repayment include, but are not limited to, special assessments, property tax levies, tax increment financing, local

government option sales taxes, future federal funds, future state funds, and customer fees from revenue-generating projects such as parking ramps and intermodal terminals.

County State Aid Highway (CSAH) funding

Anoka County receives a State Aid funding allocation each year for maintenance and construction of the County's State Aid Highway (CSAH) system. In 2002 Anoka County received approximately \$7.1 million in State Aid funding. Approximately \$3.0 million was allocated for maintenance of the CSAH system and \$4.1 million was allocated for construction funding. The County's State Aid funding can only be used for improvements made to the CSAH system. The State Aid funds can be used for construction, engineering and right of way costs. The County can also borrow from its future State Aid allocation interest free.

Municipal State Aid Street (MSAS) funding

The City of Andover receives a State Aid funding allocation each year for maintenance and construction of the City's Municipal State Aid Street (MSAS) System. In 2007 Andover received nearly \$1.1 million in State Aid funding. Twenty-five to thirty-five percent can be used for maintenance purposes and the balance is used for construction. The City's State Aid funds can be used for construction improvements to a Municipal State Aid Street (which include trails along the route), County State Aid Highway or State Trunk Highway. The State Aid funds can also be used for engineering costs and right of way costs.

The City can also borrow from its future State Aid allocation interest free. The City can borrow up to 3 years worth of future allocations up to a maximum of \$750,000. The State Aid for Local Transportation Office is continuously accepting loan applications.

State and Federal Bridge funding

Federal Bridge Replacement funds, Town Bridge funds and Minnesota State Transportation Funds (bond funds) are available to fund bridge replacement projects. These funds are available to municipalities for bridge projects and include removal of abandoned bridges to the reconstruction of deficient structures. Typically the agency is responsible for the costs of removing a structure that is to be replaced. State Aid funds can be utilized for these removal costs.

Minnesota Railroad-Highway Grade Crossing Safety Improvement Program

The mission of the Minnesota Railroad-Highway Grade Crossing Safety Improvement Program is to save lives in locations with at-grade crossings. Under this program, active warning devices have been installed at more than 1,200 Minnesota grade crossings.

Federal funds for railroad-highway grade crossing safety projects are available under TEA-21 Title I programs. Mn/DOT, local road authorities, railroads, and local planning agencies work together to identify railroad-highway grade crossing safety projects. The eight ATPs integrate projects into area-wide plans. Mn/DOT's Office of Freight, Railroads and Waterways helps the ATPs to assess grade crossing safety investment needs.

Types of projects eligible under the Minnesota Railroad-Highway Grade Crossing Safety Program include signal and signal upgrade, signs and pavement markings, lighting, crossing closures and roadway relocations, sight condition improvements, crossing alignments and grade improvements and grade separations.

State DNR Grants

The DNR has several grants available through their general, trail and water recreation programs. These grants may provide a local match to federal funding or a contribution to a project with other funding sources. The following programs are available to the City of Andover for City or County trails:

Federal Recreational Trail Grant Program

This program is available for the development, reconstruction or maintenance/restoration of either motorized or non-motorized trails. A unit of government must sponsor the project. A 50% match is required with a maximum of \$100,000 available to any one project. Federal funds can be used as a match in some circumstances. The application for this program is due annually on February 28th.

Regional Trail Grant Program

This program is intended to support the development of regionally significant trails. Demonstration of local support and a 20-year commitment from the trail developer are requirements of this trail program. Cities, counties, and townships are eligible to apply for the funding. The maximum amount available per project is \$250,000, with a 50% cash match required. This match cannot include any other state funds. The application for this program is due annually on February 28th.

Outdoor Recreational Grant Program

This program is intended to increase and enhance outdoor recreation facilities. Eligible projects include park acquisition and/or development/redevelopment; includes among others, picnic shelters, playgrounds, athletic facilities, trails, boat accesses, fishing piers, swimming beaches and campgrounds. Cities, counties, and townships are eligible to apply for the funding. No maximum amount is listed but a 50% match is required. The application for this program is due annually on January 31st.

Local Trail Connections Grant Program

This program is intended to promote relatively short trail connections between where people live and desirable locations, not to develop significant new trails. Cities, counties, and townships are eligible to apply for the funding. Priority is given to projects with residential connections to state and regional facilities. The maximum grant amount is \$50,000 with a 50% cash match required. The application for this program is due annually on February 28th.

Legislative Citizens Commission on Minnesota Resources

The LCCMR makes funding recommendations to the Minnesota Legislature each year for special natural resource projects. These projects help maintain and enhance Minnesota's natural resources. These projects include recreational parks, trails and history; fish and wildlife habitat; water resources; and environmental education. The LCCMR process is open to all provided there is a demonstrated public benefit. Recipients include state agencies, private non-profits, academic institutions, local government units, federal government, tribal governments and private corporations.

Proposals are due around September of each year. The LCCMR processes these proposals for presentation to the Legislature the following January. If selected, funding becomes available the following July and is available for a two year period.

Turnback Funding

When a jurisdictional transfer occurs, the agency releasing the roadway usually provides funding for necessary upgrades prior to releasing the roadway. These funds may include State Aid funds or special turnback funding designated by that agency for turnback purposes.

County Funding

Anoka County funding is provided by the County to maintain and construct the County Road system. These funds are utilized for roadways not on the CSAH system as well as some improvements made to County State Aid Highways.

City Funding

The City of Andover allocates City funding for maintenance and construction of its roadways. This funding, along with the MSAS funds received from the State provide the City with its yearly allocation for roadway maintenance and construction. In addition, there are certain intersection improvements on City streets and County roads that may be the responsibility of the property owners and/or developers/subdividers. These requirements are as follows:

1. The subdivider shall be required to pay a proportionate share of all costs associated with required intersection improvements along County roads and City streets when new developments trigger the need for upgrades (i.e. right and left turn lanes, bypass lanes and deceleration lanes).
2. The subdivider shall make the required improvements as a part of the street improvements for the new development as identified in the preliminary plat approval.
3. The City Council may elect to construct such improvements as an assessment project in which the subdivider shall accept an assessment for a proportionate share of the improvements as identified in the preliminary plat approval.

B. Short-term/Long-term Planning

This Transportation Plan provides the City with a guide for future improvements to the overall City transportation system. Specific recommendations have been made regarding various aspects of the system including the designation of a collector roadway system. While the development of a collector system is, in itself, a long-range plan, various pieces of it may be part of a short-range plan. Many factors outside of this Transportation Plan will affect what those short-range projects will be. In fact, the primary factor is the development or redevelopment that will occur within the City.

As development occurs, the City will require certain elements of the Transportation system to be provided as part of that development. It is at this time that many projects recommended within the Transportation Plan will be implemented. By implementing this plan the City establishes the requirements of transportation projects whenever they occur in the future. As the City updates its Capital Improvement Plan, this plan can be used as one tool to prioritize transportation improvements. However, many other factors will contribute to the CIP as well, including maintenance needs, etc.

This plan will also assist the City with projects outside of their jurisdiction. By providing recommendations for Hanson Blvd. and Crosstown Blvd. the City is able to let the County know what the desire and expectations are for future improvements. The County can use this when programming funding for future improvements along the county roads. It is anticipated that Anoka County will use this plan as a guide when developing its short and long-range transportation improvement plan.

VII. PUBLIC INPUT PROCESS

In order to complete and implement a City wide transportation plan, it is critical that the various agencies, business owners, citizens and other affected parties participate in planning activities. The City held a series of public open houses and public hearings to gather input to help decide (if any) key transportation elements not identified in the plan that may need to be identified in the plan. Also, these public open houses and hearings will also allow the City to find out which transportation elements were of greater concern to Andover residents. Two (2) public open houses were held with the first one held on November 13, 2007 and the second one on December 11, 2007. An official public hearing was held in January of 2008.

VIII. MISCELLANEOUS TRANSPORTATION RELATED RECOMMENDATIONS

The previous chapters discussed a variety of transportation system elements. During the course of the development of the plan, certain recommendations were brought forth that should be adopted by the City of Andover in order to help assure continuing development of an up-to-date plan and evaluation of various traffic and land use related conditions.

- The Transportation Plan should be reviewed and updated every five (5) years in order to better plan for changing conditions.
- The City should, on a two or three year time frame, conduct a review of the safety and traffic operations conditions of a list of “hot spot” intersections. That list will probably change as the City continues to grow.
- The City should require that a traffic impact analysis of proposed new development be conducted as a part of plan review processes. The size and type of land use development requiring such traffic analysis should be left to the discretion of the City Engineer. The primary benefit of these traffic analyses will be to determine access needs, intersection and roadway improvements adjacent to and within the general area of the proposed project, as well as traffic control needs.