Appendix T-3

Travel Forecasting Model and Methods

TRAVEL FORECASTING MODEL AND METHODS

Travel forecasting is based upon computer modeling which uses land use/socioeconomic data in conjunction with transportation network information to determine future roadway traffic levels. The projections for the Edina transportation chapter of the 2030 Comprehensive Plan Update were performed by WSB & Associates, Inc. (WSB) using the Metropolitan Council regional travel model. The regional model has been set up to focus primarily on regional flows on important arterials, so some local adjustments are required when using it to evaluate individual areas like cities and lower level roadways within those cities.

Traffic Analysis Zone System and Information

As with any transportation forecasting model, the core of the regional transportation model is the use of Transportation Analysis Zones (TAZs). The Metropolitan Council has divided the entire metro region into a series of TAZs. The TAZs which have been established for Edina are depicted on ***Figure 7.11*** of the main document. Demographic and employment data is loaded into the model for each zone. The Metropolitan Council has projections for each TAZ for 2030 based on their assessment of information in previous Comprehensive Plans for all of the Metro cities. The City of Edina has made some adjustments to those forecasts based on local conditions and information. These adjustments have been discussed and coordinated with Metropolitan Council staff.

The allocation of trips from each TAZ to adjacent roadways is set within the regional model. In some instances, these allocations were revised based on a more detailed assessment of local land use and trip distribution patterns than what the Met Council uses. City staff and consultants took the Metropolitan Council's generalized 2030 TAZ forecasts and fine-tuned them based on the most current assumptions regarding future land use redevelopment, and on the knowledge of local conditions and issues.

Transportation Network

As part of the forecasting process, a roadway network needs to be assumed so that capacities and linkages can be calculated. The modeling for the 2030 Edina transportation chapter assumed no substantial roadway improvements in the Edina area.

Preliminary Results

Once the population, household, and employment (broken down to retail versus non-retail) information is loaded into the model, by TAZ as discussed above, the model calculates trip generations and attractions based on this data. It then routes those trips throughout the network of TAZs based on a complex series of algorithms using assumptions from travel behavior surveys and other factors. It also assigns mode choice (e.g. private vehicle, transit, bike, pedestrian) for each TAZ based on historical data, local context, and future assumptions. The vehicular trips area assigned by the model to

individual roadway links based on distance, speed, and congestion factors associated with the links.

Trendline/Quality Check - Results

The 2030 traffic volume results were evaluated based on historic traffic trends for the study area, and consistency with other studies. As is generally the case, local adjustments were required based on this trend analysis, knowledge of local conditions, and common traffic engineering assumptions and judgment. The resulting volumes appear on ***Figure 7.3*** of the main document.

Appendix T-4

Mn/DOT and Hennepin County Access Management Guidelines

Figure 2.1: Access Categories

Category	Land-Use or Facility Type	Typical Functional Classification	Typical Posted Speed
1 - High-Priority Interregional Corridors (IRCs)			
1F	Interstate Freeway	Interstate Highways	55 – 75 mph
1AF	Non-Interstate Freeway	Principal Arterials	55 – 65 mph
1A	Rural	Principal Arterials	55 – 65 mph
1B	Urban / Urbanizing	Principal Arterials	40 – 55 mph
1C	Urban Core	Principal Arterials	30 – 40 mph
2 - Medium-Priority Interregional Corridors			
2AF	Non-Interstate Freeway	Principal Arterials	55 – 65 mph
2A	Rural	Principal Arterials	55 – 65 mph
2B	Urban / Urbanizing	Principal Arterials	40 – 55 mph
2C	Urban Core	Principal Arterials	30 – 40 mph
3 - Regional Corridors			
3AF	Non-Interstate Freeway	Principal Arterials	55 – 65 mph
3A	Rural	Principal/Minor Arterials	45 – 65 mph
3B	Urban / Urbanizing	Principal /Minor Arterials	40 – 45 mph
3C	Urban Core	Principal/Minor Arterials	30 – 40 mph
4 - Principal Arterials in the Twin Cities Metropolitan Area and Primary Regional Trade Centers (Non-IRCs)			
4AF	Non-Interstate Freeway	Principal Arterials	55 – 65 mph
4A	Rural	Principal Arterials	45 – 55 mph
4B	Urban / Urbanizing	Principal Arterials	40 – 45 mph
4C	Urban Core	Principal Arterials	30 – 40 mph
5 - Minor Arterials			
5A	Rural	Minor Arterials	45 – 55 mph
5B	Urban / Urbanizing	Minor Arterials	40 – 45 mph
5C	Urban Core	Minor Arterials	30 – 40 mph
6 - Collectors			
6A	Rural	Collectors	45 – 55 mph
6B	Urban / Urbanizing	Collectors	40 – 45 mph
6C	Urban Core	Collectors	30 – 40 mph
7 - Specific Area Access Management Plans			
7	All	All	All

Figure 3.1 – Summary of Recommended Street Spacing for IRCs

Category	Area or Facility Type	Typical Functional Class	Public Street Spacing		Signal Spacing
			Primary Full-Movement Intersection	Secondary Intersection	
1	**High-Priority Interregional Corridors & Interstate System (IRCs)**				
1F	Interstate Freeway	Principal Arterials	Interchange Access Only		⊘
1AF	Non-Interstate Freeway		Interchange Access Only (see Section 3.2.7 for interim spacing)		See Section 3.2.5 for Signalization on Interregional Corridors
1A	Rural		1 mile	1/2 mile	
1B	Urban/ Urbanizing		1/2 mile	1/4 mile	
1C	Urban Core		300-660 feet dependent upon block length		
2	**Medium-Priority Interregional Corridors**				
2AF	Non-Interstate Freeway	Principal Arterials	Interchange Access Only (see Section 3.2.7 for interim spacing)		See Section 3.2.5 for Signalization on Interregional Corridors
2A	Rural		1 mile	1/2 mile	
2B	Urban/ Urbanizing		1/2 mile	1/4 mile	
2C	Urban Core		300-660 feet, dependent upon block length		1/4 mile
3	**Regional Corridors**				
3AF	Non-Interstate Freeway	Principal and Minor Arterials	Interchange Access Only (see Section 3.2.7 for interim spacing)		Interim
3A	Rural		1 mile	1/2 mile	See Section 3.2.5
3B	Urban/ Urbanizing		1/2 mile	1/4 mile	1/2 mile
3C	Urban Core		300-660 feet, dependent upon block length		1/4 mile

Figure 3.2 – Summary of Recommended Street Spacing for Non-IRCs

Category	Area or Facility Type	Typical Functional Class	Public Street Spacing		Signal Spacing
			Primary Full-Movement Intersection	Secondary Intersection	
4	**Principal Arterials in the Twin Cities Metropolitan Area and Primary Regional Trade Centers (Non-IRCs)**				
4AF	Non-Interstate Freeway	Principal Arterials	Interchange Access Only (see Section 3.2.7 for interim spacing)		Interim
4A	Rural		1 mile	1/2 mile	See Section 3.2.5
4B	Urban/ Urbanizing		1/2 mile	1/4 mile	1/2 mile
4C	Urban Core		300-660 feet, dependent upon block length		1/4 mile
5	**Minor Arterials**				
5A	Rural	Minor Arterials	1/2 mile	1/4 mile	See Section 3.2.5
5B	Urban/ Urbanizing		1/4 mile	1/8 mile	1/4 mile
5C	Urban Core		300-660 feet, dependent upon block length		1/4 mile
6	**Collectors**				
6A	Rural	Collectors	1/2 mile	1/4 mile	See Section 3.2.5
6B	Urban/ Urbanizing		1/8 mile	Not Applicable	1/4 mile
6C	Urban Core		300-660 feet, dependent upon block length		1/8 mile
7	**Specific Area Access Management Plans**				
7	All	All	By adopted plan		

Permit Process

After the application is submitted to the county, the county staff will often perform a field review and then complete the permit. The permit will be sent to the property owner noting any specific requirements or special provisions. If the county guidelines for design, access spacing or sight distance can not be met, further justification may be required, or additional evaluation and analysis may need to be completed by the property owner.

It should be noted if the entrance is associated with a development undergoing platting, then the preliminary plat reviews and city approvals are necessary prior to issuance of an entrance permit. However, the county encourages early informal submittals of site plans and access proposals prior to the submittal of an entrance permit application to allow County staff to identify any possible issues and give time for discussion and the investigation of mitigation options.

If a permit is issued for an entrance that is later found to be part of a platting or zoning action (that was not previously approved by the City) the entrance permit may be declared null and void. This may result in significant delays to the development project, a possible order to stop work, and requirements for significant changes or removal of the entrance.

Permit Fees

Current fees are:

Residential Driveway - $ 50
Temporary Entrance - $ 100
Commercial Driveway or Street - $ 200

- Multiple driveway entrances or street accesses can be combined for the same development within a single permit application and fee payment
- Temporary permits are for short-term construction access, or conditions that are expected to have duration of less than one year. The temporary permit may be issued with specific termination dates.
- No fees are charged for removals of driveways.
- No fees are charged for an extension of a current access permit if the applicant applies prior to the permit expiration date (see below).

The permit process normally takes approximately 2 weeks from the application to issuance of the permit to allow construction. However, larger more involved developments can take up to 30 days or longer if complex design issues need to be resolved.

An entrance permit is valid for 1-year from the date of issuance. If construction can not begin within this time period, an extension is available for an additional 6 months upon the written request of the applicant (made prior to the expiration of the permit). An extension can be granted one time without any additional fee. Once the permit expires or if additional extensions are needed, the renewal may require resubmittal of a permit application and payment of the appropriate application fee.

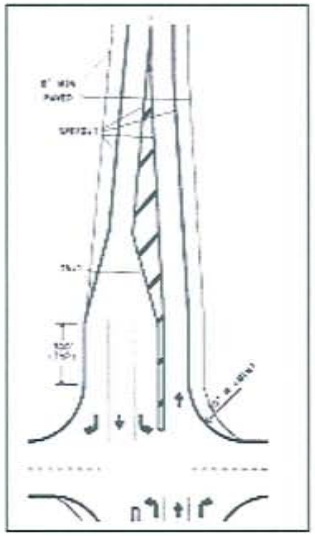
Contacts for More Information

Further information and permit forms are available on the Hennepin County website at: co.hennepin.mn.us (search on the term "entrance permit"). Additional questions or requests can be referred to:

Robert H. Byers, Senior Transportation Engineer
Phone: (612) 596-0354 FAX: (763) 478-4000
E-mail: robert.byers@co.hennepin.mn.us
Or:
Dave Zetterstrom, Entrance Permit Coordinator
Phone: (612) 596-0355

Access Management Guidelines

Entrance & Driveway Permits



Hennepin

September 2007

Hennepin County Public Works – Transportation Dept.
1600 Prairie Drive, Medina, MN 55340-5421
(612) 596-0300

What is Access Management ?

Access Management has become an important subject as transportation professionals grapple with the issues of increasing congestion and deteriorating roadway operations. The goal of managing access, whether it be street entrances or individual driveways, is to achieve an optimal balance between what is needed for safe, efficient roadway operations, and the need to provide access to adjacent properties and businesses.

The term access management is applied to a number of ***measures that can be used to enhance a roadway's safety and its ability to move vehicular traffic through management and control of access points to the roadway.*** These measures include:

- Limiting the driveway access points to decrease turning conflicts
- Locating entrance or access points further from adjacent intersections
- Providing sufficient spacing between intersecting streets
- Spacing traffic signals to optimize traffic flow
- Implementing sight distance guidelines to improve safety
- Use of channelization to preclude selected turning conflicts

This brochure has been prepared to explain the entrance / driveway permitting process in Hennepin County, and the basis behind the evaluation and regulation of access to county roadways.

Access Spacing Guidelines

Hennepin County has adopted access spacing guidelines that are based on local and national research that shows that crash rates decrease markedly as the spacing between driveways and streets increases. The guidelines address five types of access and they differentiate for Urban and Rural situations (see next column):

Access Spacing Guidelines – Urban

Facilities Requesting Access to County Roadways	Type of Access	Access Spacing Criteria on County Roadway: Minor Arterial Roadways, Undivided	Minor Arterial Roadways, Divided	Collector Streets
Non-Public - Low Volume (< 1,000 ADT) • Residential Driveways • Low Trip Generating Commercial	Full Movement Access	⊘	⊘	1/8 Mile (660 ft)
	Partial Access	⊘	1/8 Mile (660 ft)	1/16 Mile (330 ft)
Local Public Streets • Local Residential Streets • Local Minor Collector Streets	Full Movement Access	1/4 Mile (1,320 ft)	1/4 Mile (1,320 ft)	1/8 Mile (660 ft)
	Partial Access	Not Applicable	1/8 Mile (660 ft)	Not Applicable
Non-Public - High Volume (> 1,000 ADT) • Shopping Center entrances • Large Apt. Complexes • Large Industries, Industrial Park Entrances	Full Movement Access	1/4 Mile (1,320 ft)	1/4 Mile (1,320 ft)	1/8 Mile (660 ft)
	Partial Access	Not Applicable	1/8 Mile (660 ft)	Not Applicable
Arterial and Major Collector Roadways • Principal Arterials (state highways) • Minor Arterials and Major Collector Roads	Full Movement Access	1/4 Mile (1,320 ft)	1/4 Mile (1,320 ft)	1/4 Mile (1,320 ft)
	Partial Access	Not Applicable	Full Access Allowed	Not Applicable

⊘ - Access via alternative facility required
- Further changes considered under hardship conditions

Notes: 1) Urban definition is based on being within the Year 2000 Metropolitan Urban Service Area boundary
2) Average Daily Traffic (ADT) volumes are based on 20-year forecasts
3) Measurements for spacing are taken to next access (driveway or street) on the same roadway side
4) Measurements for spacing are taken to next access on either side of road for undivided minor arteri
5) Existing medians will not be broken (even if the above guidelines would suggest full access is allowe
6) Other criteria are also reviewed such as sight distance, speeds, traffic volumes and other elements (vehicle types, land u

Access Spacing Guidelines – Rural

Facilities Requesting Access to County Roadways	Type of Access	Access Spacing Criteria on County Roadway: Minor Arterial Roadways Undivided, Greater Than 7,500 ADT *	Minor Arterial Roadways Undivided, Less Than 7,500 ADT *	Collector Streets
Non-Public - Low Volume (< 1,000 ADT) • Residential Driveways • Low Trip Generating Commercial	Full Movement Access	1/4 Mile (1,320 ft)	1/8 Mile (660 ft)	1/8 Mile (660 ft)
Local Public Streets • Local Residential Streets • Local Minor Collector Streets	Full Movement Access	1/4 Mile (1,320 ft)	1/4 Mile (1,320 ft)	1/8 Mile (660 ft)
Non-Public - High Volume (> 1,000 ADT) • Shopping Center entrances • Large Apt. Complexes • Large Industries, Industrial Park Entrances	Full Movement Access	1/4 Mile (1,320 ft)	1/4 Mile (1,320 ft)	1/8 Mile (660 ft)
Arterial and Major Collector Roadways • Principal Arterials (state highways) • Minor Arterials and Major Collector Roads	Full Movement Access	1/2 Mile (2,640 ft)	1/4 Mile (1,320 ft)	1/4 Mile (1,320 ft)

Notes: 1) Measurements for spacing are taken to next access (driveway or street) on the same roadway side for divided minor arterials
2) Measurements for spacing are taken to next access on either side of road for undivided minor arterials
3) Chart assumes all rural County roadways are undivided
4) Other criteria are also reviewed such as sight distance, speeds, traffic volumes and other elements (vehicle types, land use activity, etc.)
5) Rural area is defined as being outside the Year 2000 Metropolitan Service Area (MUSA) as defined by the Metropolitan Council

Changes to the above spacing guidelines may be granted where sufficient justification is provided.

When is a Permit Required ?

An entrance permit is required:

- Whenever a new driveway or street connection is proposed on a county road.
- Whenever an existing driveway is proposed to be modified (widened, channelized, relocated, etc.)
- Whenever a driveway is removed (required for work in the County roadway right-of-way)
- Changes in site land uses (even if no modifications to existing driveways are proposed)
- If temporary access is needed to facilitate construction activities
- If development-driven traffic impacts predicate needed changes on the county roadway (such as the need for turn or auxiliary lanes)

A permit is ***not*** required if:

- The request is for an entrance located within the project limits of an active county roadway project (requires coordination with Construction project manager).
- Tenant changes on the property that do not change the land use activity.
- Changes due to county maintenance operations or utility permit actions
- The entrance is within Minneapolis (permitting is delegated to City)

The entrance permit process includes:

1) An application submitted by the property owner, developer or City
2) A permit issued by Hennepin County to the applicant
3) A request from the applicant for County final inspection and permit sign-off

Appendix T-5

Transit Circulator Service – Preliminary Evalutation

CIRCULATOR TRANSIT SERICE
PRELIMINARY EVALUATION

There currently is a lack of transit service in the western portion of Edina. Metro Transit has cited relatively high incomes and rates of auto ownership in this area as factors contributing to making it not a viable location for additional Metro Transit service. Reflecting community sentiment and input during the 2008 comprehensive planning process, the City of Edina evaluated the option of providing circulator service which would cover the western portion of the City and would also access key destinations east of TH 100.

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To provide a preliminary evaluation of circulator transit service in Edina, two operational scenarios have been identified. The first scenario is termed "Baseline Service," and the second is termed "Full Service." Both include the following parameters:

- The use of cutaway vans with a seating capacity of 12-14 occupants, and ADA compliant features.
- The circulator route identified on ***Figure 1***. This route was defined so as to cover residential areas, neighborhood and larger scale commercial areas, parks, the public library, and other features. It may be emphasized that this route is identified only for preliminary analytical purposes. If this general concept is advanced, the precise route could be refined based on further evaluation.
- Each loop would begin and end at the Southdale Transit Center. Each loop would operate on an hourly basis.

The operating parameters for each alternative area summarized below:

Operating Parameter	Baseline Service	Full Service
Hours of Operation	M-F: Between 6 a.m. and 6 p.m. Weekends: Between 8 a.m. and 4 p.m.	M-F: Between 6 a.m. and 10 p.m. Weekends: Between 8 a.m. and 4 p.m.
Number of Vehicles	Three (two operating, one in reserve)	Five (four operating, one in reserve)
Service Operations	One vehicle circulates one direction, the other circulates the other; each van is on a one-hour cycle for the whole route, so the system has one hour directional headways	Two vehicles one direction, the other two circulate the other; each van is on a one-hour cycle for the whole route, so the system has 30 minute directional headways

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Thus, the primary differences between the two scenarios are: a) the Full Service alternative has evening service during the week while the Baseline Service alternative does not, and b) the Full Service alternative has half hour directional headways as opposed to hourly directional headways. This means that any given point on the route will have a van pass by every 30 minutes going in one direction, and every 30 minutes going in the other direction for the Full Service alternative.

To make a preliminary estimate of costs for these alternatives, the following assumptions were used:

Capital costs

- Vans @ $50,000 per unit

Operating Costs

- Labor @ $25 per hour (includes benefits)
- Administrative costs (management, clerical support) @ 15% of labor costs.
- Vehicle maintenance plus insurance @ 10 percent of capital costs
- Fuel @ $3.00 per gallon
- Fuel consumption @ 7.5 miles per gallon
- Distance of each loop @ 13 miles

These assumptions were used to derive the costs in the table below:

Cost Category	Baseline	Full Service
Capital Cost (vehicles)	**$150,000**	**$250,000**
Annual Operating Costs		
- vehicle maintenance, ins.	$15,000	$25,000
- fuel	$36,800	$95,200
- drivers	$176,800	$457,600
- administrative	$26,500	$68,600
Total Annual Operating Costs	**$255,100**	**$646,400**

Another option would be to provide a combination fixed route/flex route service. There would be scheduled stops for a given route, but also the ability to deviate from the fixed route to provide doorstep service. This would require sufficient "give" or extra time for each route. It would also require a management system which would allow residents to call ahead of time to indicate when they would like to be picked up. Some flex systems require each request a day in advance, while others allow same-day requests.

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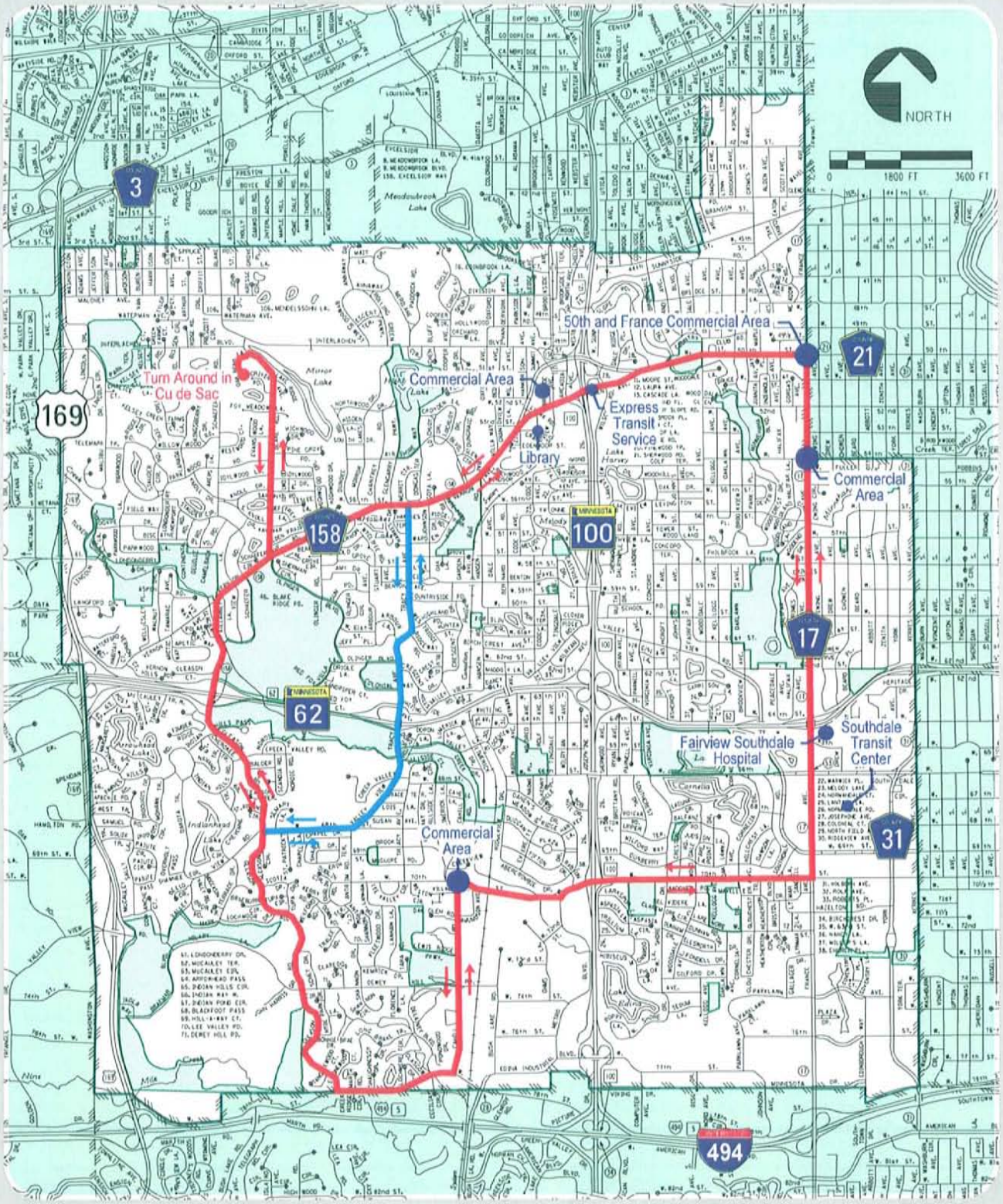

LEGEND: Potential Route | Potential Alternate Route | Parks

City of Edina, Minnesota
2030 Comprehensive Plan

Potential Circulator Transit Services

Figure 1

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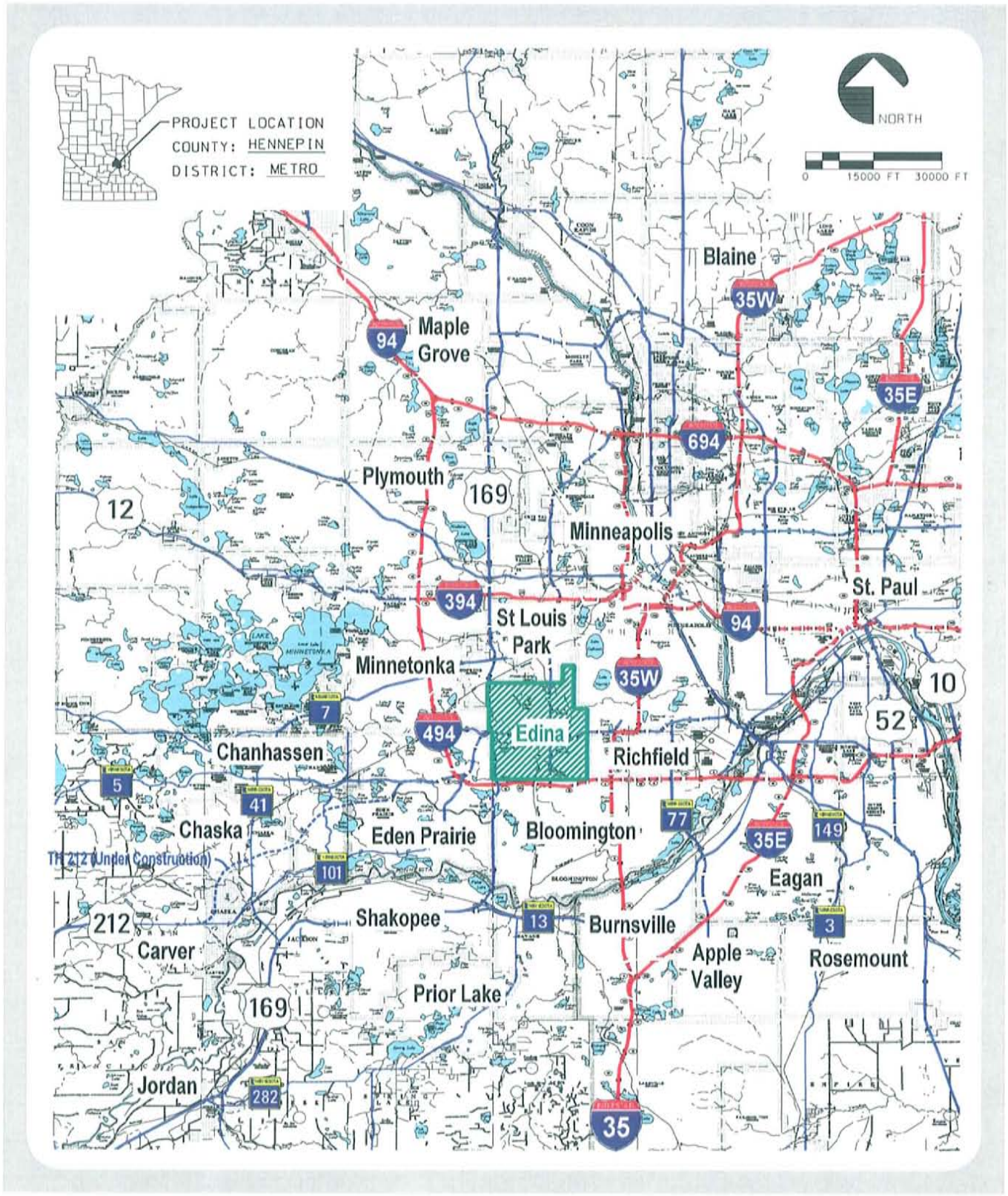

City of Edina
2008 Comprehensive Plan Update

Regional Roadway Network

Figure 7.1

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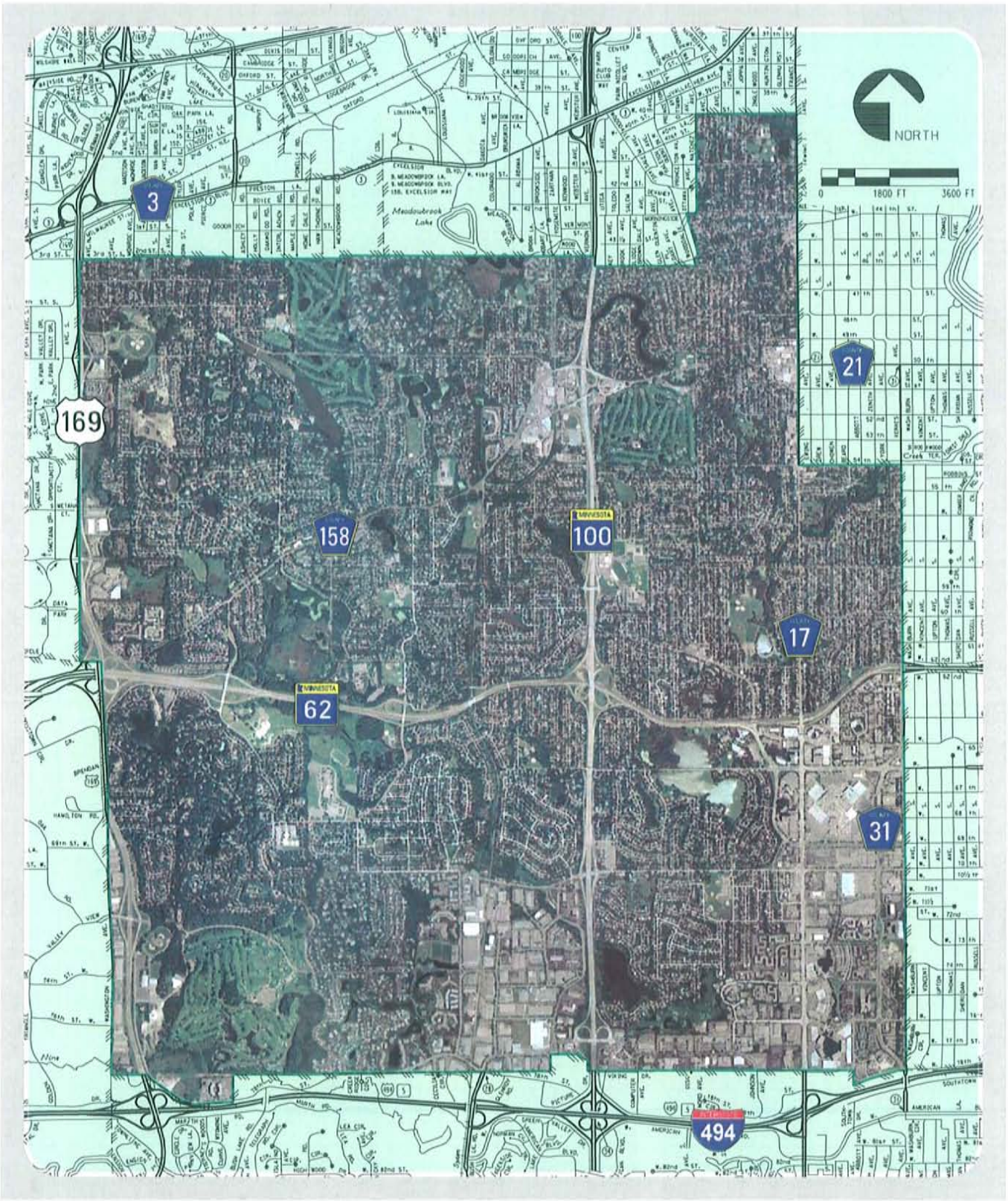

City of Edina
2008 Comprehensive Plan Update

Aerial Photograph

Figure 7.2

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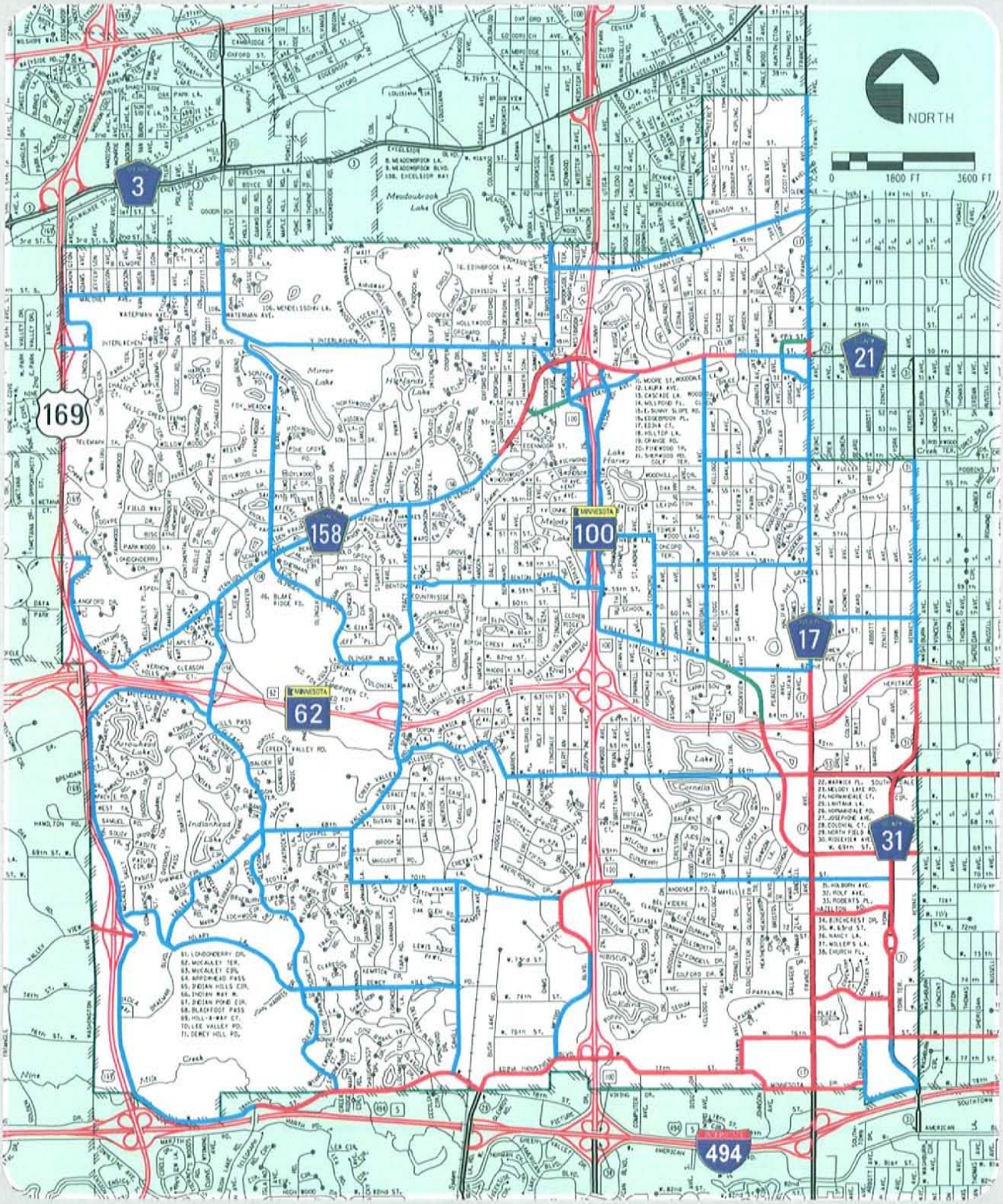

LEGEND: Number of Traffic Lanes: 4 Lanes 3 Lanes 2 Lanes

City of Edina
2008 Comprehensive Plan Update

Number of Traffic Lanes Collectors and Arterials

Figure 7.3

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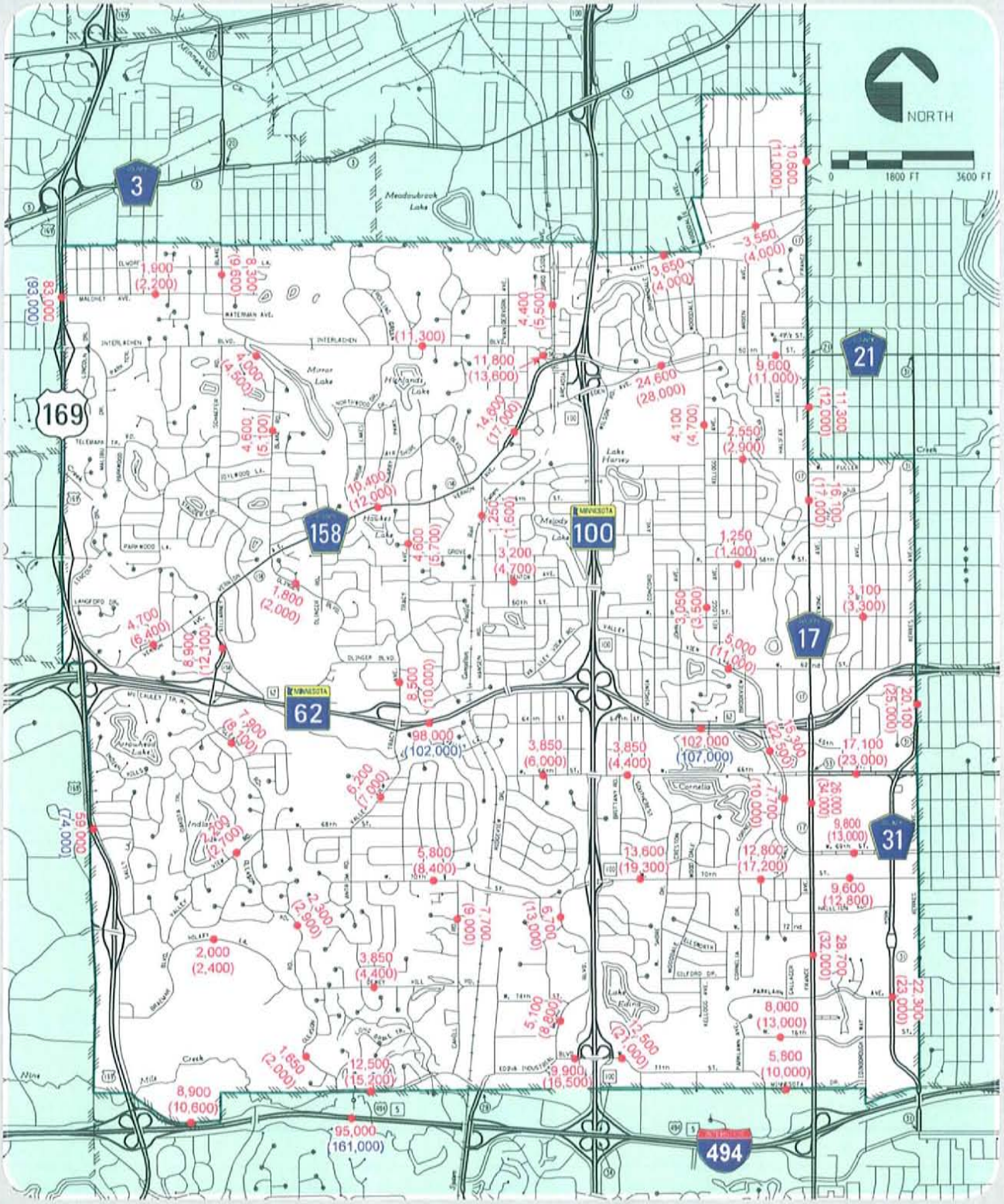

LEGEND:

X,XXX - Existing Daily Traffic Volumes (2005 Mn/DOT Data)

(X,XXX) - Projected 2030 Daily Traffic Volumes

(X,XXX) - Projected 2030 Daily Traffic Volumes - Met Council

City of Edina
2008 Comprehensive Plan Update

Current and Projected Traffic Volumes

Figure 7.4

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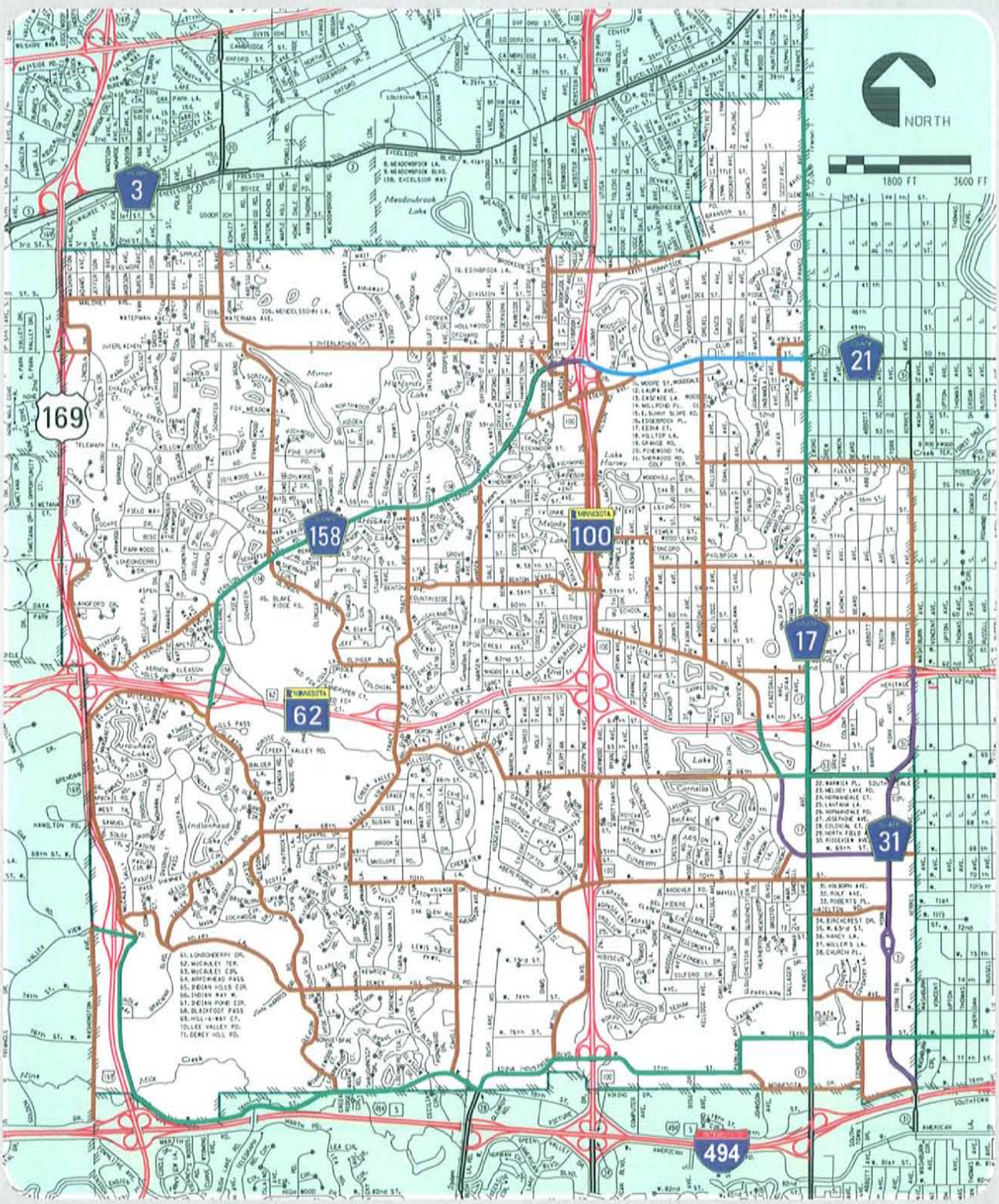

LEGEND: Principal Arterial | "A" Minor Arterial (Reliever) | "A" Minor Arterial (Augmenter) | "B" Minor Arterial | Collector

City of Edina
2008 Comprehensive Plan Update

Roadway Functional Classification

Figure 7.5

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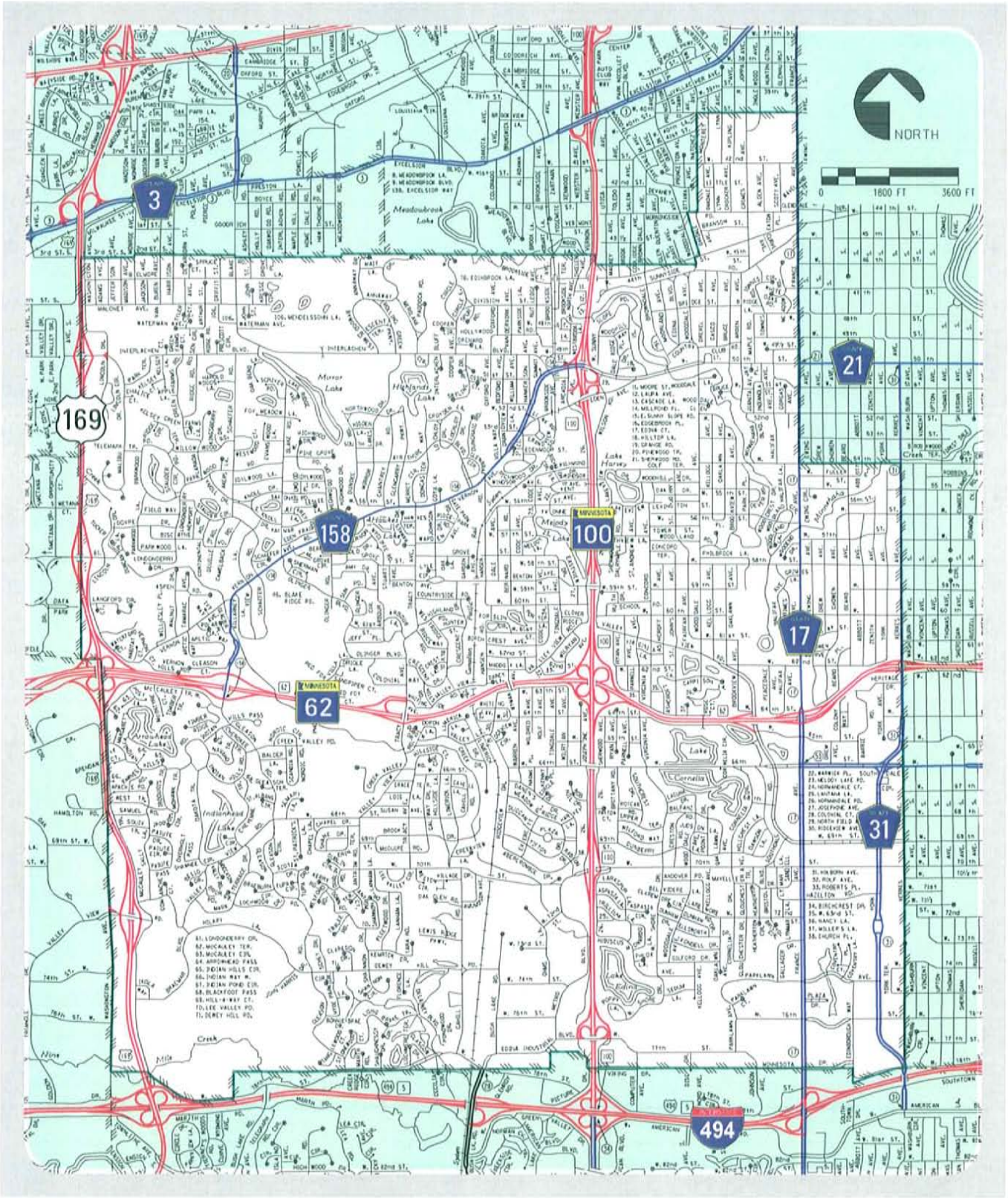

LEGEND: MnDOT | Hennepin County | City of Edina

City of Edina
2008 Comprehensive Plan Update

Existing Jurisdictional Classification

Figure 7.6

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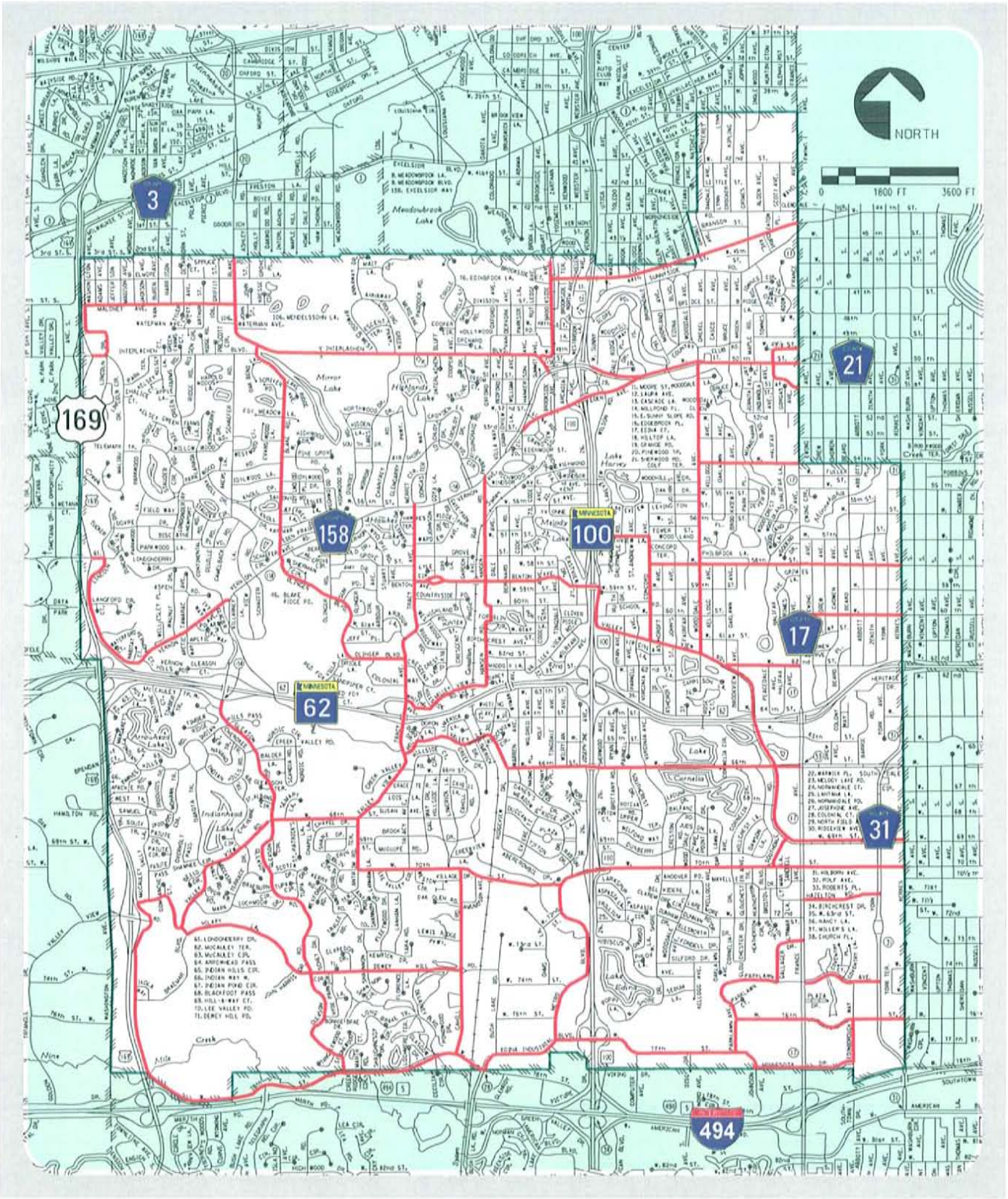

LEGEND: State Aid Streets (2007 Network)

City of Edina
2008 Comprehensive Plan Update

Municipal State Aid Streets

Figure 7.7

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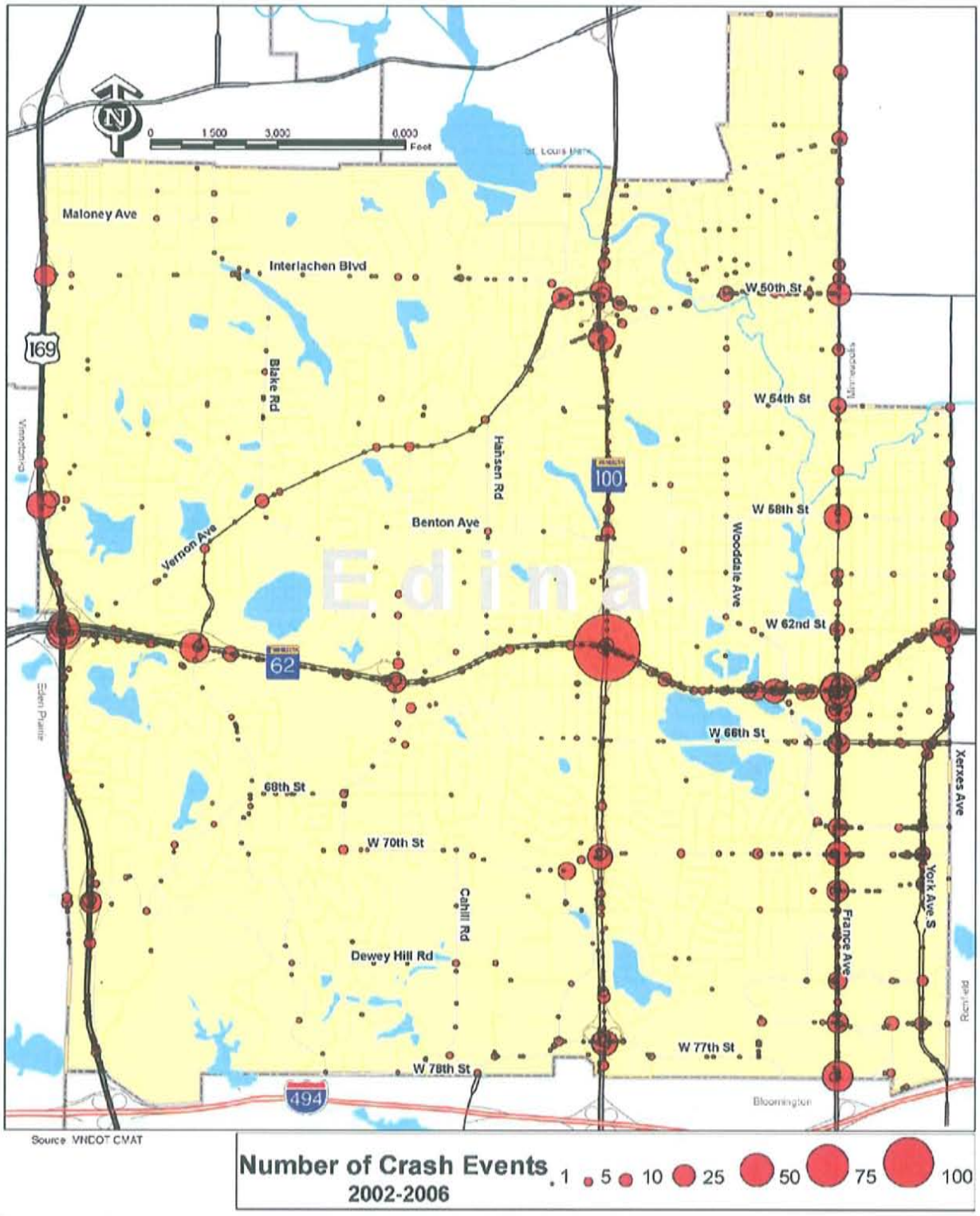

City of Edina
2008 Comprehensive Plan Update

Crash Location and Frequency

Figure 7.8

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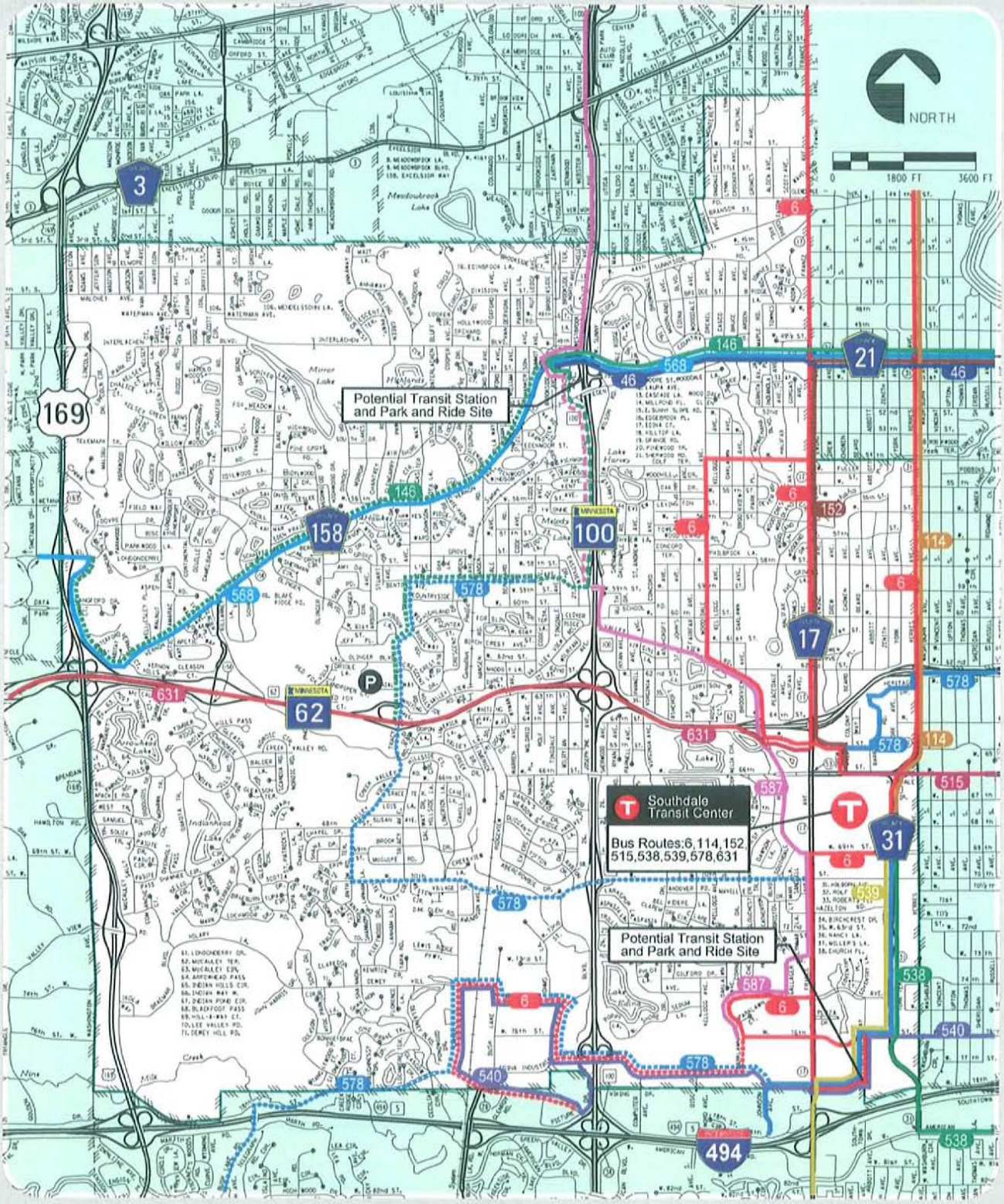

LEGEND: Bus Route | Limited Service | Southdale Transit Center with Parking | Park and Ride Lot

City of Edina
2008 Comprehensive Plan Update

Transit Service

Figure 7.9

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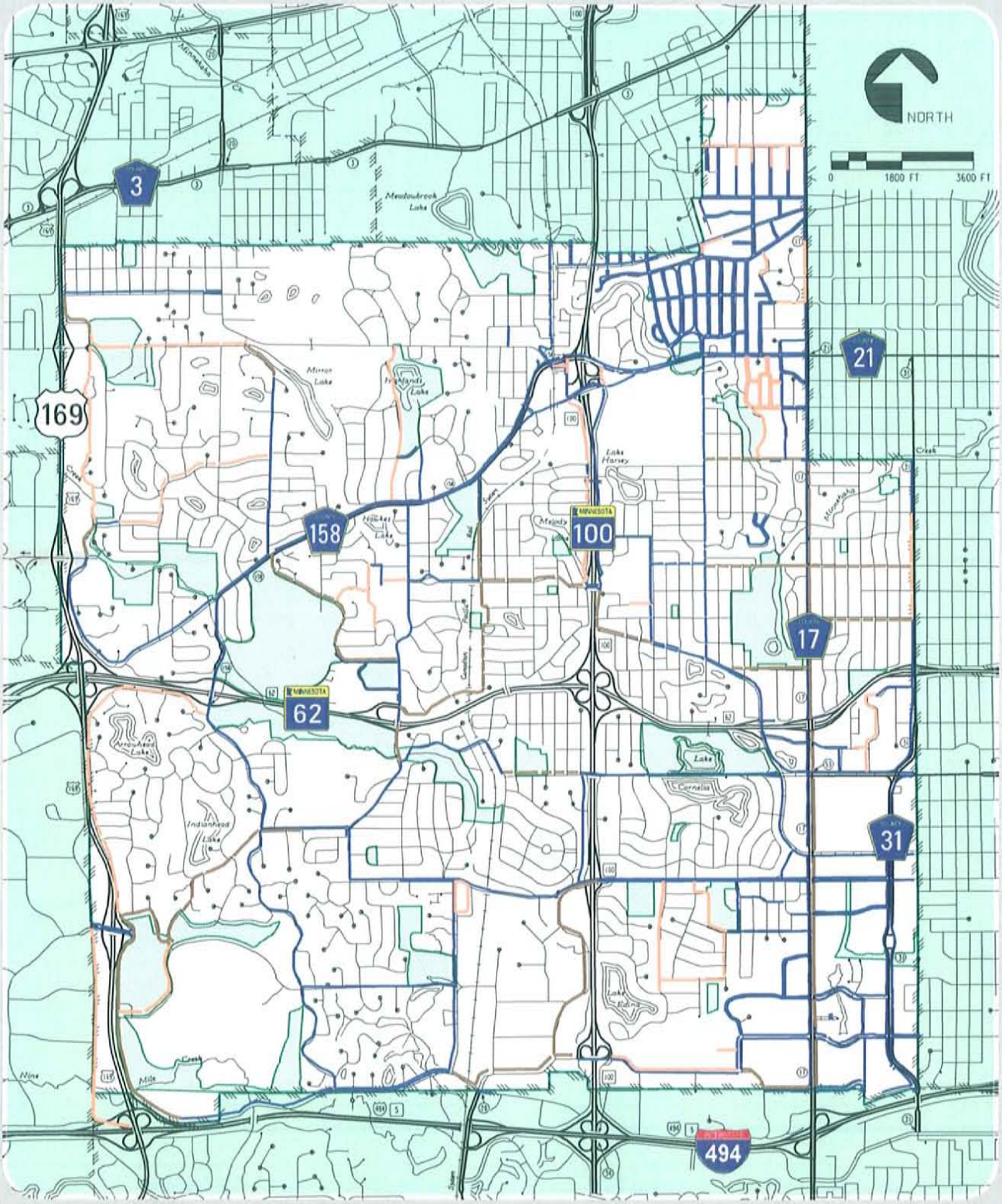

LEGEND: Existing Sidewalk | Proposed School / Business Sidewalk | Proposed State-Aid Sidewalk

Note: Park Pathways are included on Figure 7.11

City of Edina
2008 Comprehensive Plan Update

Sidewalk Facilities

Figure 7.10

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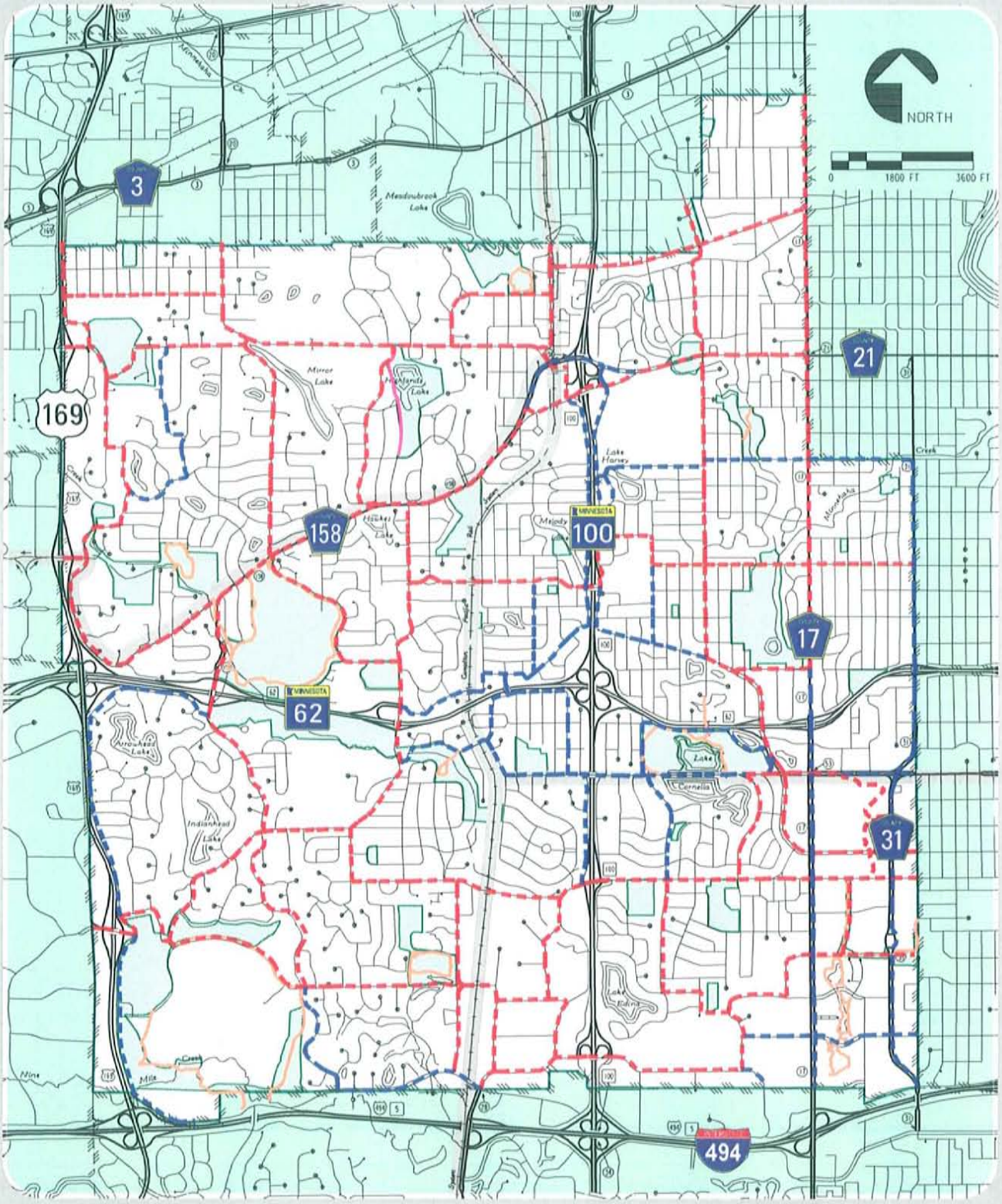

LEGEND: Existing Park Pathway | Existing Hennepin County Corridors | Proposed Park Pathway

From the 2007 Edina Comprehensive Bicycle Transportation Plan: Primary Route | Secondary Route

City of Edina
2008 Comprehensive Plan Update

Bicycle Facilities

Figure 7.11

Date Printed: 10/22/2008
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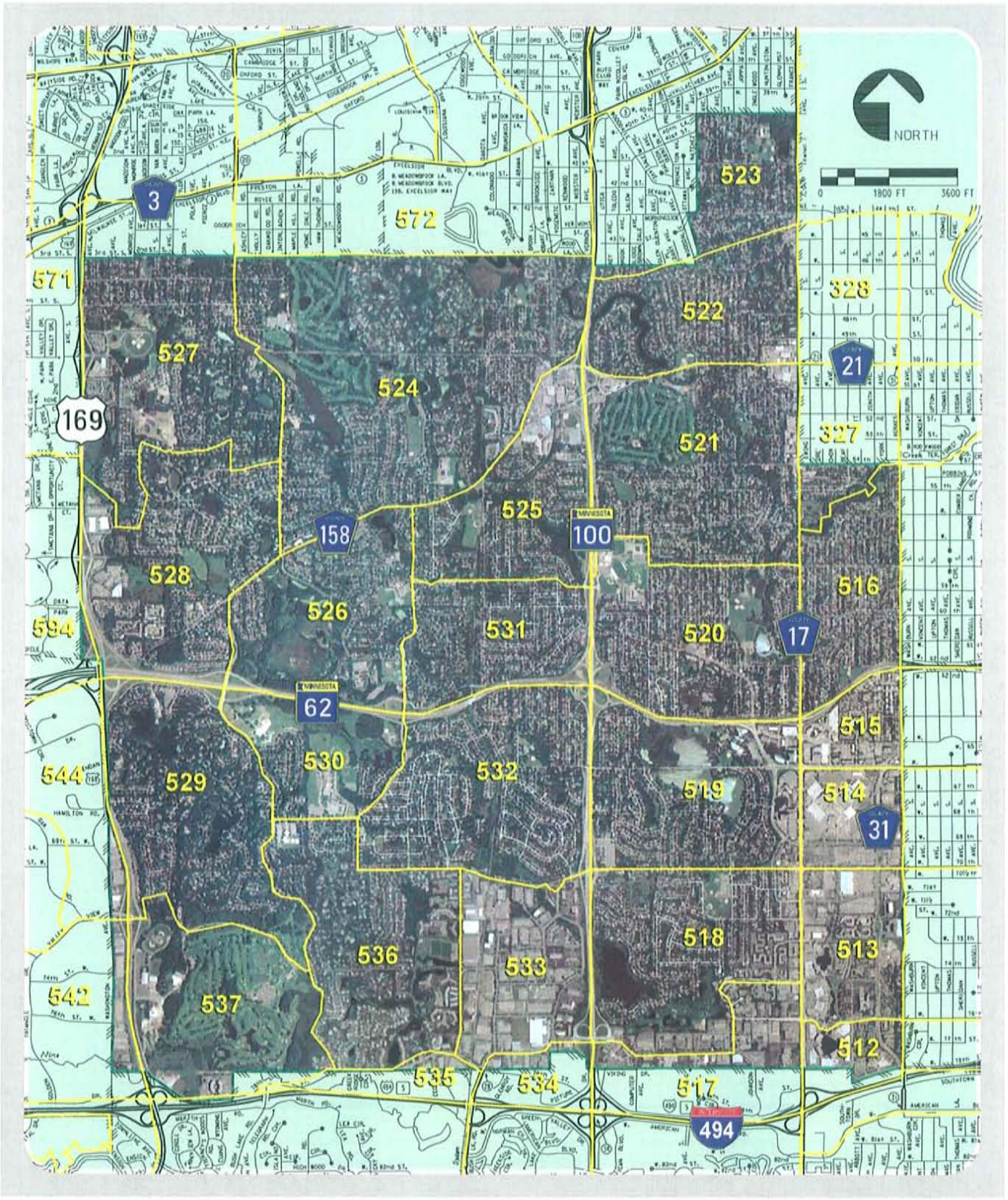
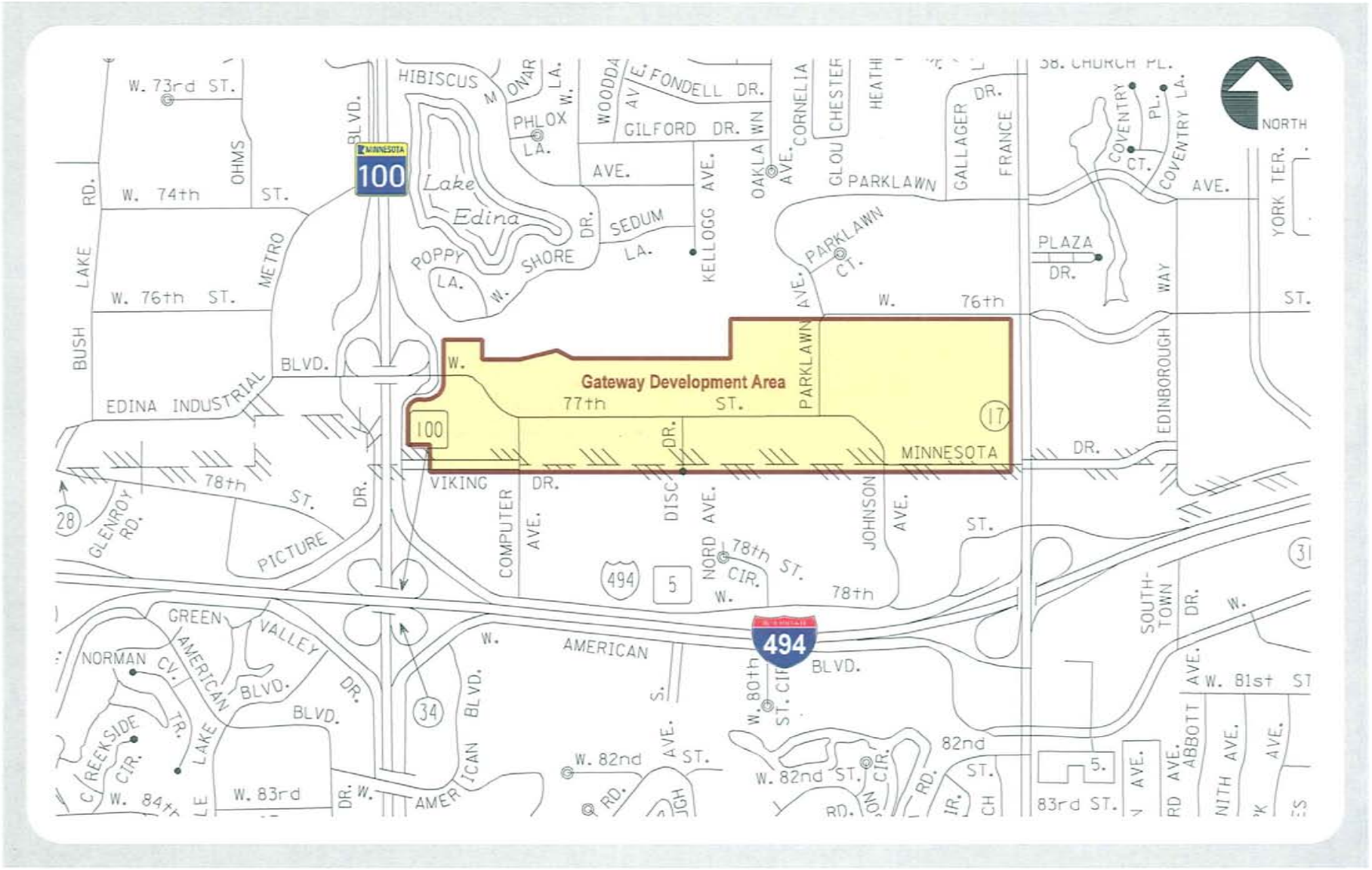


City of Edina
2008 Comprehensive Plan Update

Edina TAZ Network

Figure 7.12

Date Printed: 10/22/2008
MSB Filename: K:\06686-03\Cad\Plan\Fig-7-12.dgn



City of Edina
2008 Comprehensive Plan Update

Gateway Development Area Location Map

Figure 7.13

Date Printed: 10/22/2008
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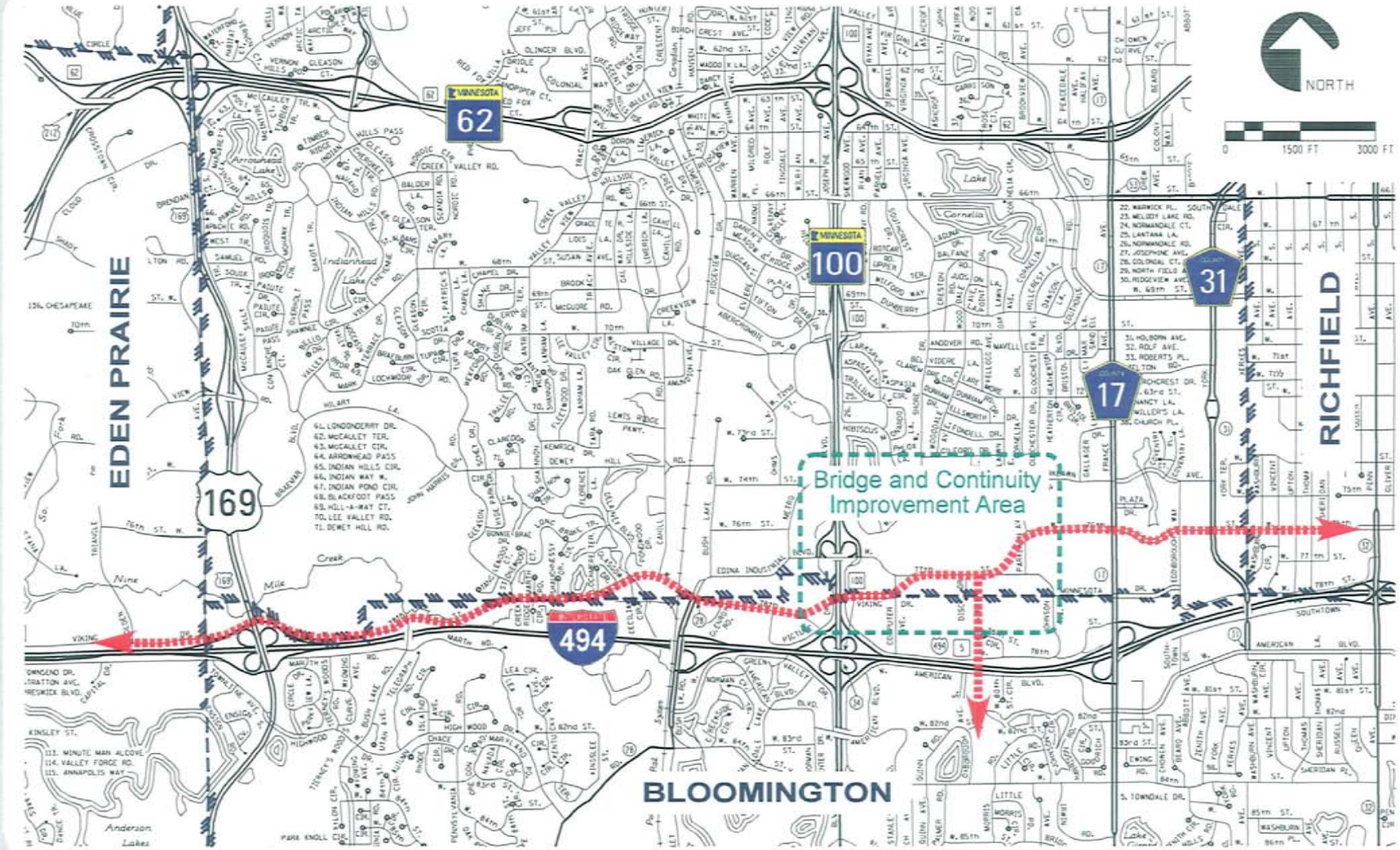
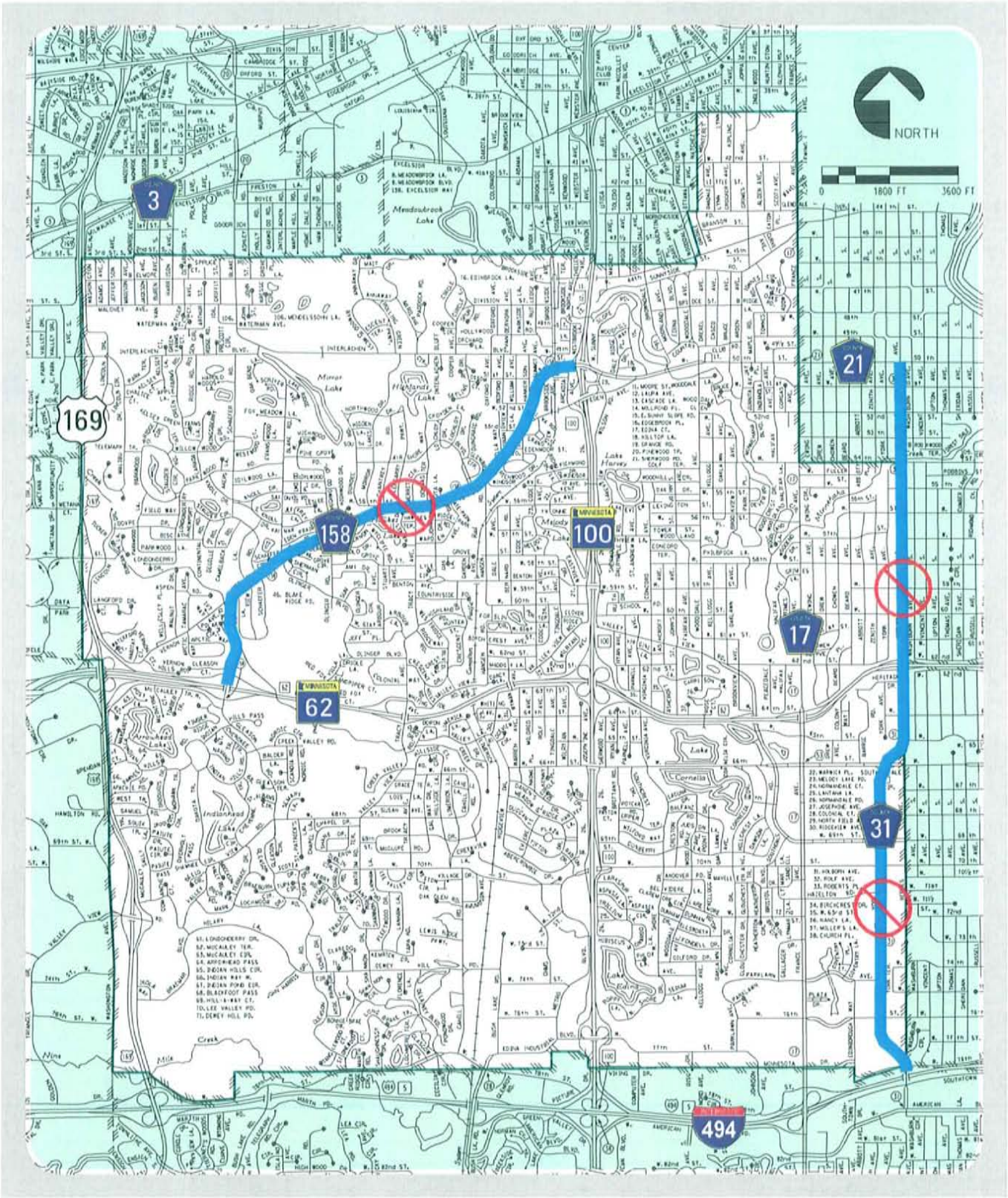


City of Edina
2008 Comprehensive Plan Update

East - West Connector Concept

Figure 7.14

Date Printed: 10/22/2008
WSB Filename: K:\0686-03\Cad\Plan\Fig-7-14.dgn



LEGEND: Identified by Hennepin County as a candidate for turnback to City

Not endorsed by City of Edina

City of Edina
2008 Comprehensive Plan Update

Jurisdictional Turnbacks Proposed by Hennepin County

Figure 7.15

Date Printed: 10/22/2008
MSB Filename: K:\06686-03\Cad\Plan\fig-7-15.dgn

Path System Concepts

Recommended Path and Transit Plan

October 15, 2006

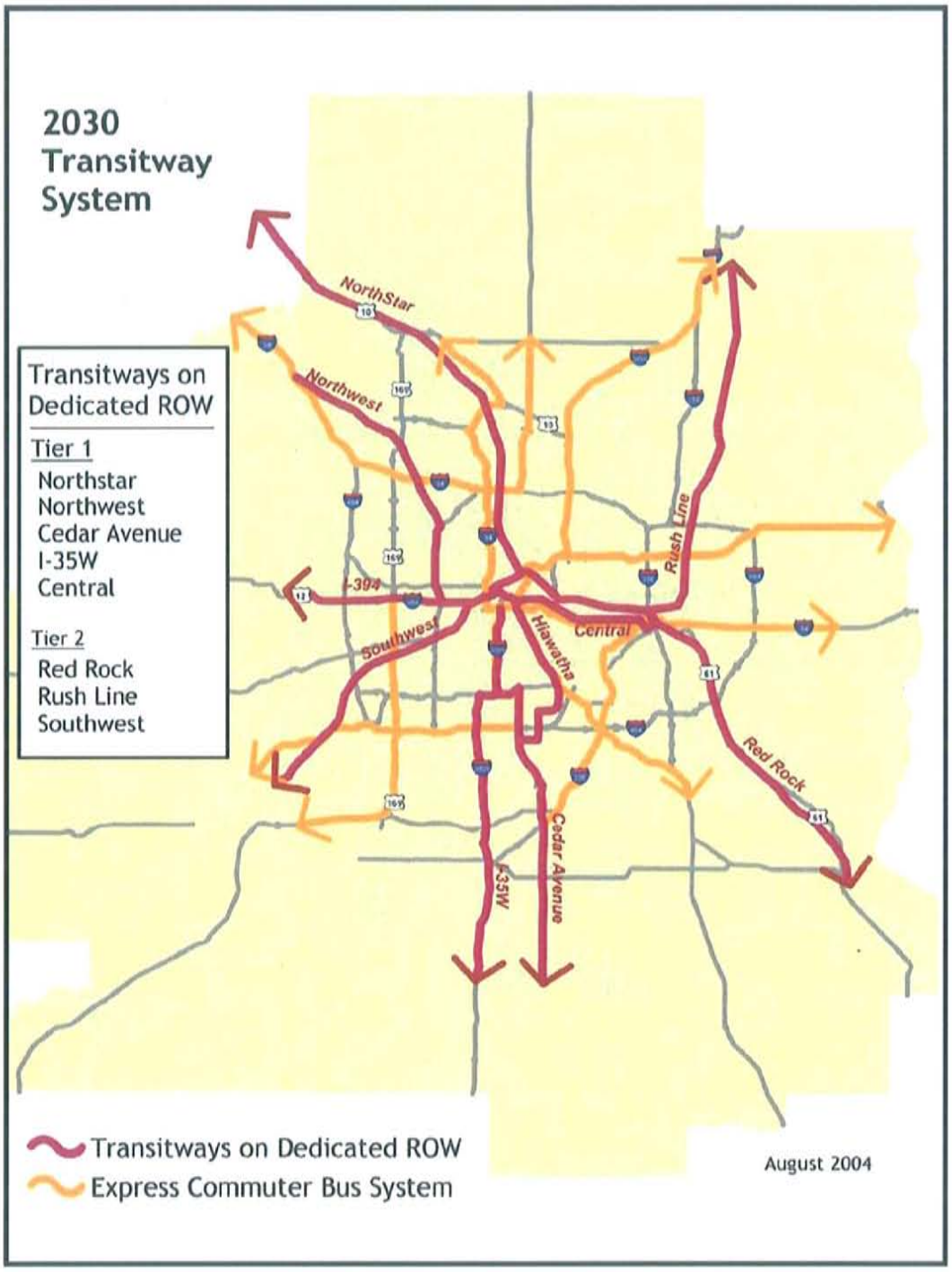
Source: URS Corporation - Edina Prominade, Urban Design Plan.

Date Printed: 10/22/2008
MSB Filename: K:\01686-03\Cad\Plan\fig-7-16.dgn

City of Edina
2008 Comprehensive Plan Update

Potential Greater Southdale Area Shuttle Service

Figure 7.16



Source: Metropolitan Council

City of Edina
2008 Comprehensive Plan Update

Metropolitan Council
2030 Transitway System

Figure 7.17

Date Printed: 10/22/2008
WSB Filename: K:\01686-03\Cad\Plan\fig-7-17.dgn