Travel demand models forecast the amount of travel on transportation facilities given assumptions of future development and transportation system improvements. Travel demand forecasts developed for this planning process were based on the modified Twin Cities regional travel demand model, which was released by the Metropolitan Council in 2004. The base year used to develop the model was 2000 because of the availability of U.S. Census data and travel behavior data for that time period.

Zonal Data Representation

The travel demand model uses development activity as expressed by population, household, retail employment and non-retail employment to estimate travel activity. The model is represented by transportation analysis zones (TAZs). The Metropolitan Council regional model is divided into geographical zones that cover the seven-county Twin Cities Metropolitan area. In order to capture the appropriate level of detail for a local travel demand model, SRF further divided the TAZs into smaller areas to better reflect the location of development within a city or county. The TAZ boundaries within the City of Maple Grove were based on the Hennepin County model. Guidance and feedback for the allocation of development data into the TAZs was completed with local input from staff.

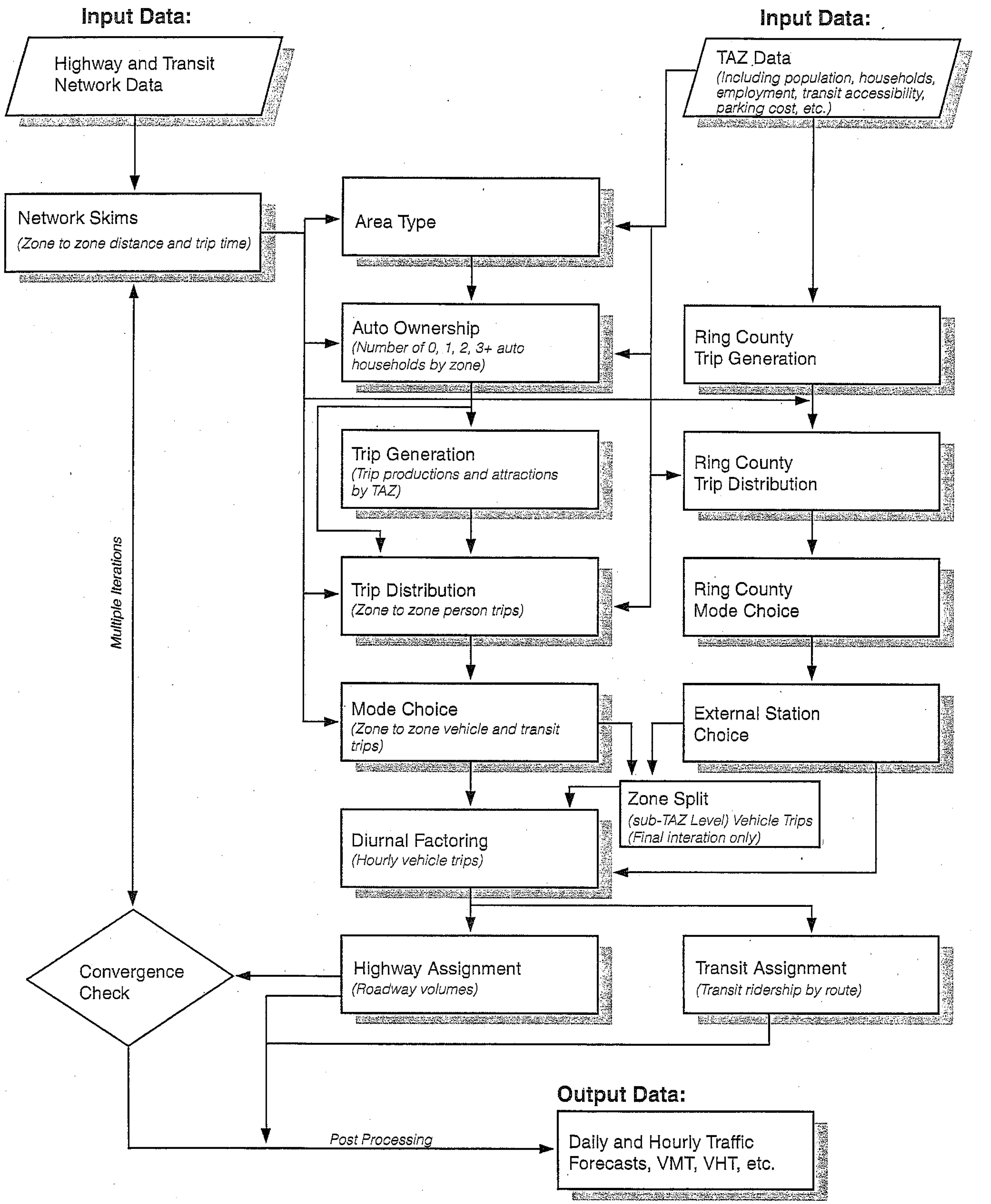
Roadway Network Representation

The base year roadway system is presented in the travel demand model as a representation of attributes, such as area type, facility type, length, speed, number of lanes and capacity. The level of detail in the highway network was expanded to include all principal arterials, minor arterials and key collector roadways.

Travel Demand Modeling Process

The main components of the travel forecasting process are illustrated in Figure B-1 and are described below. As noted above, the travel demand forecasts are based on the Twin Cities regional travel demand model. The Metropolitan Council and Mn/DOT have established guidelines to guide the appropriate use of the Twin Cities regional model. Thus, more detailed documentation of the model parameters is available from the Metropolitan Council.

The model was calibrated through multiple iterations until the travel patterns and choices of modes and routes reflected the current traffic patterns. Then, future socioeconomic and future roadway system data was incorporated into the model to generate the various forecast scenarios.



Travel Demand Forecasting Process

Figure B-1

Highway Network: Roadways are described in terms of attributes, such as area type, facility type, length, free-flow speed, number of lanes and capacity. The level of detail in the highway network was expanded to include all appropriate local roadways as specified by the project scope.

Zonal Data: The TAZ structure of the regional model was expanded to better reflect the location of local development. The extra zones were subdivisions of regional model zones. Specific allocation of future development and socioeconomic assumptions are further described in the report.

Trip Generation: Trip generation is the process by which the number of trips attributed to a zone is estimated based on the amount and type of socioeconomic activity in that zone (i.e., population, households and employment). The end result of trip generation estimation is the total number of trips produced by and attracted to each zone.

Destination Choice: The destination-choice trip distribution process converts the person-trips estimated in the trip generation process to movements between pairs of zones based on the amount of travel activity in a zone and a generalized travel time between the producing zone and other zones.

Mode Choice: The mode choice process takes the number of person-trips between each pair of zones and determines whether the trips are made by single-occupant vehicles, carpools or transit.

Highway Assignment: Highway trips for each of the 24 periods were routed from zone-to-zone along the roadway system using an equilibrium assignment process. This process reflected congested conditions at appropriate times of the day for any given portion of the highway system. The hourly assignments were summed to produce a daily traffic volume.

Validation: For the purpose of this study, model validation is defined to include the degree to which the travel demand model replicates known ground counts. A model was run for the 2005 highway network and socioeconomic data in order to compare the modeled daily volumes with actual ground counts. In general, most model parameters should not be altered in the course of preparing a travel demand forecast because they are based on collected travel behavior data. Furthermore, adjustments to a model solely for the purpose of matching ground counts leads to a condition where a model matches well against existing ground counts, but is not appropriately (or reliably) sensitive to future-year changes in roadway or development characteristics. Consequently, a forced validation negates the very purpose of a travel demand model – to determine the effects of roadway scenarios and long-range development. As a result this model is developed using a minimum of model adjustments designed to correct systematic errors in the model (as opposed to spot-specific adjustments), with a systematic process for reconciling any residual errors in the model.

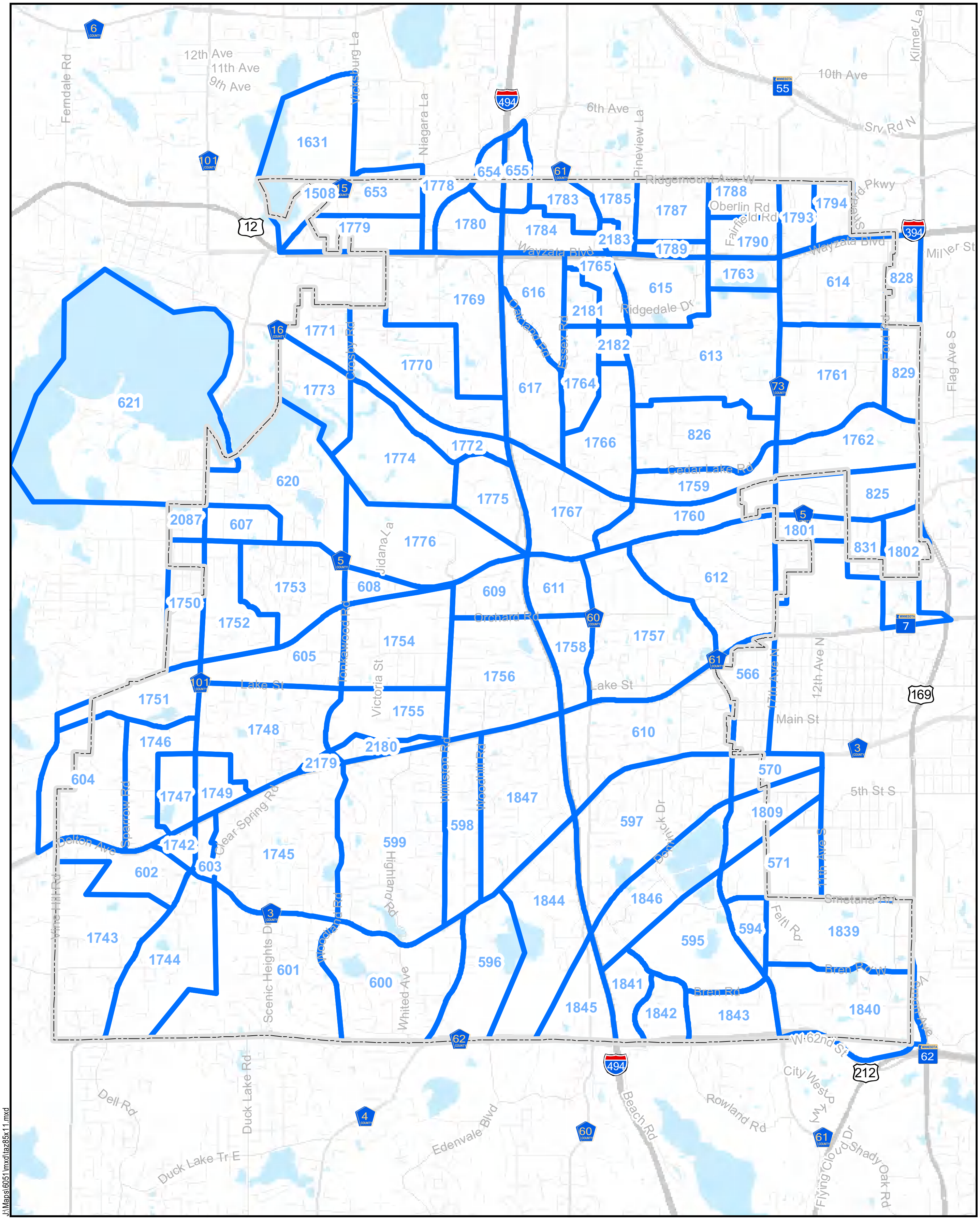
Model Adjustment Process: The final step in model development is to establish a process for adjusting the future modeled volumes to account for the error in the base model. The National Cooperative Highway Research Program Special Report 255 suggests methods of adjusting models based on:

- The difference between model and count
- The ratio of the model to count
- The magnitude of growth between existing and future

Table B-1 shows the conditions under which each of these methods is appropriate. A fourth method, that of manual adjustment using engineering judgment, may also be appropriate under certain conditions. The modeling datasets identify which adjustment methods were used.

Table B-1
Model Adjustment Process

Condition	Implications of Condition	Method Used
$\frac{Future\,Volume}{Base\,Volume} > 3$	High model growth may cause the ratio method to result in unreasonably high adjusted volumes.	Difference Method
$\frac{Base\,Count}{Base\,Volume} > 1.5$	A large underestimation by the model in the base year may cause the ratio method to result in unreasonably high adjusted volumes.	Difference Method
$\frac{Base\,Volume}{Base\,Count} > 1.5$	A large overestimation by the model in the base year may cause the ratio method to result in unreasonably low adjusted volumes.	Difference Method
All Other Cases		Average Method



2007 MINNETONKA TAZ

Minnetonka Comprehensive Plan

City of Minnetonka