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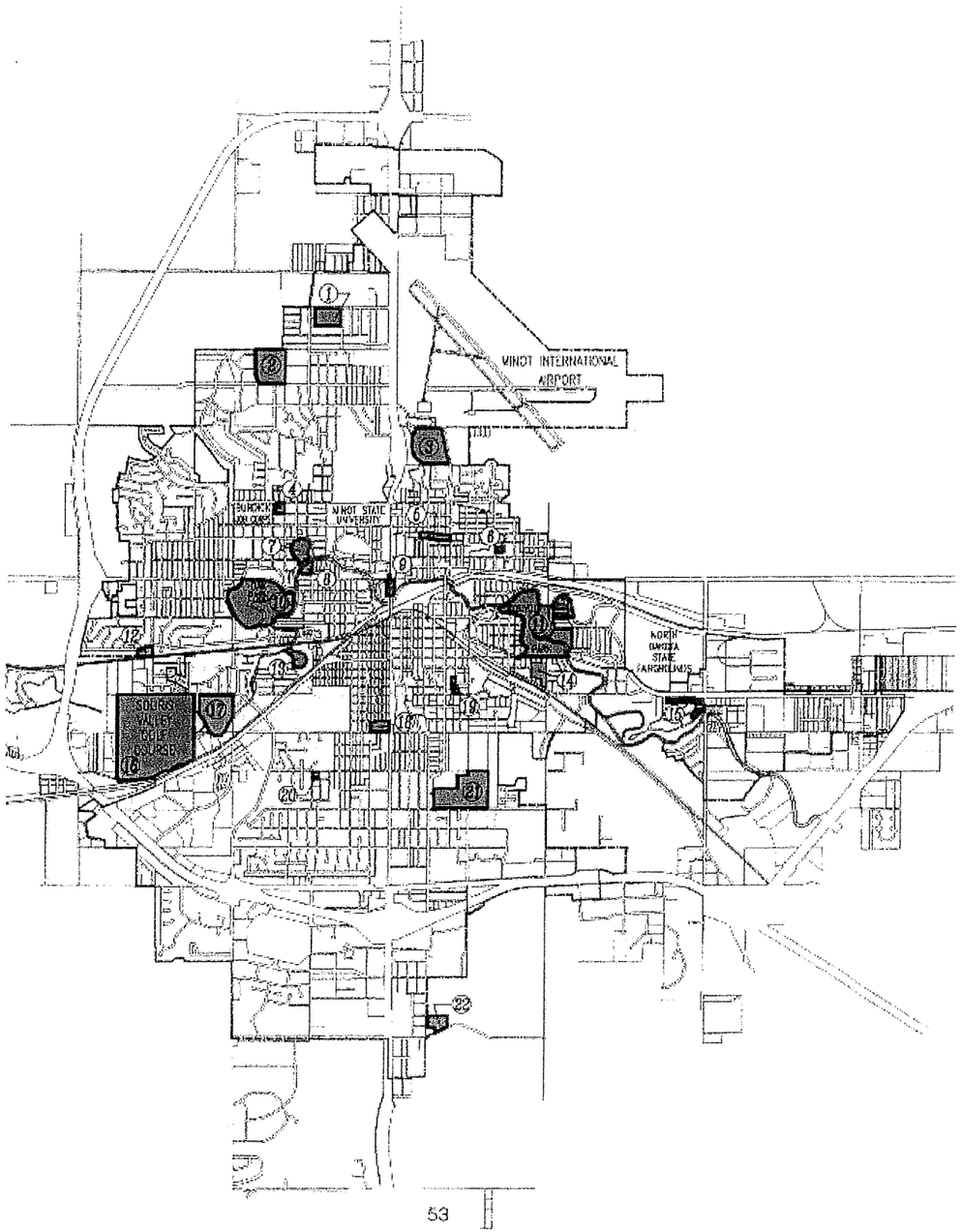

List of Parks

1. Polaris Park
2. Soccer Addition
3. Sertoma Complex
4. 11th @ 11th Park
5. Hammond Park
6. Roosevelt Rink
7. Ramstad Loop
8. Riverside Park
9. N. Broadway @ 4th Avenue
10. Oak Park
11. Roosevelt Park
12. Leach Park
13. Moose Park
14. Corbett Field
15. Green Valley Park
16. Souris Valley Golf Course
17. "Water Plant" Park
18. Bicentennial Park
19. Sunnyside
20. Milla Vista Park
21. South Hill Complex
22. Radio City Park

Public Parks and Recreation Areas

FIGURE 5-7

APPENDIX A

Socioeconomic Data

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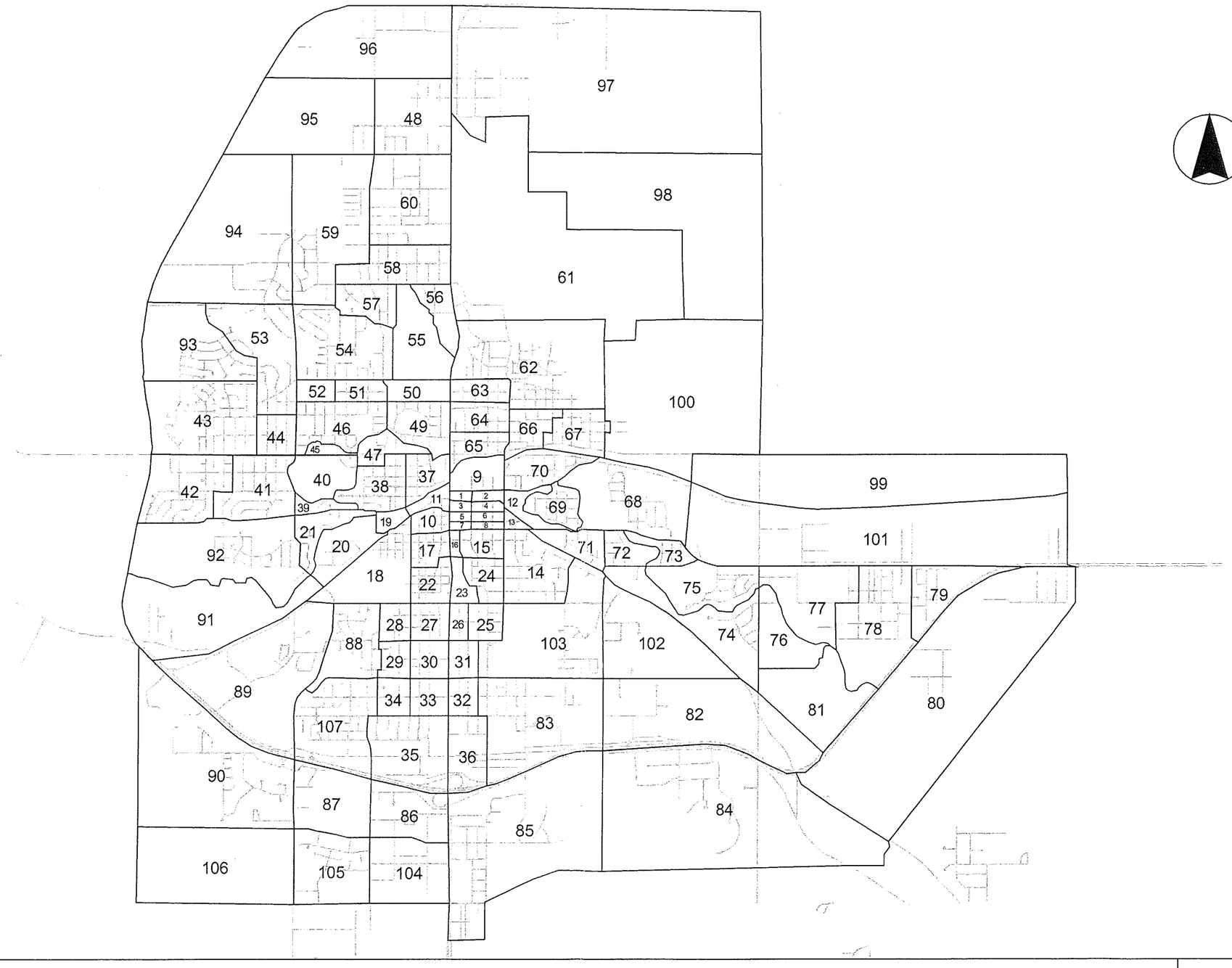

Minot Land Use and Transportation Plan--Traffic Analysis Zones

FIGURE A-1

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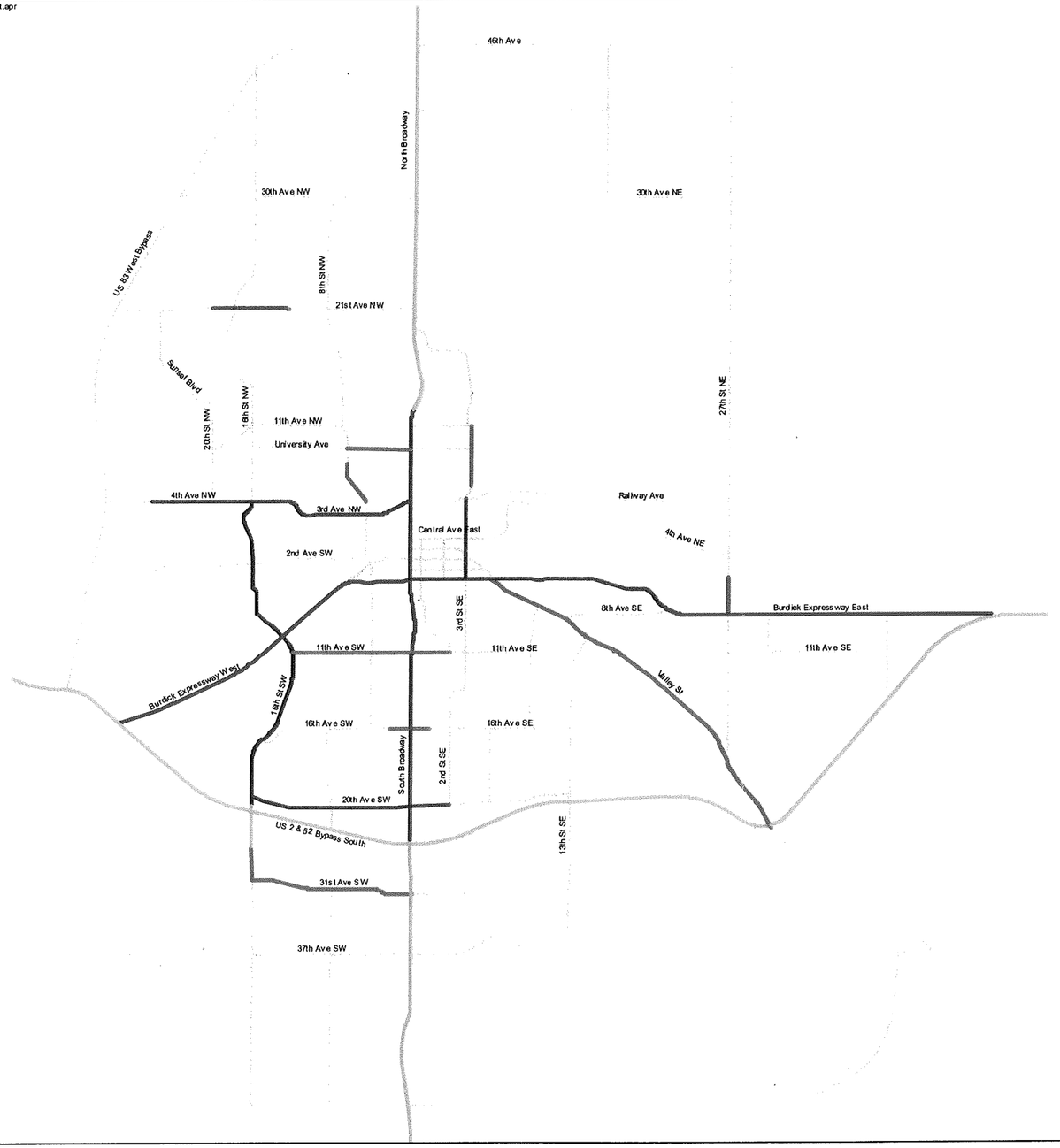

3-lane
4-lane undivided
4-lane divided
5-lane

Existing Number of Lanes

FIGURE B-3

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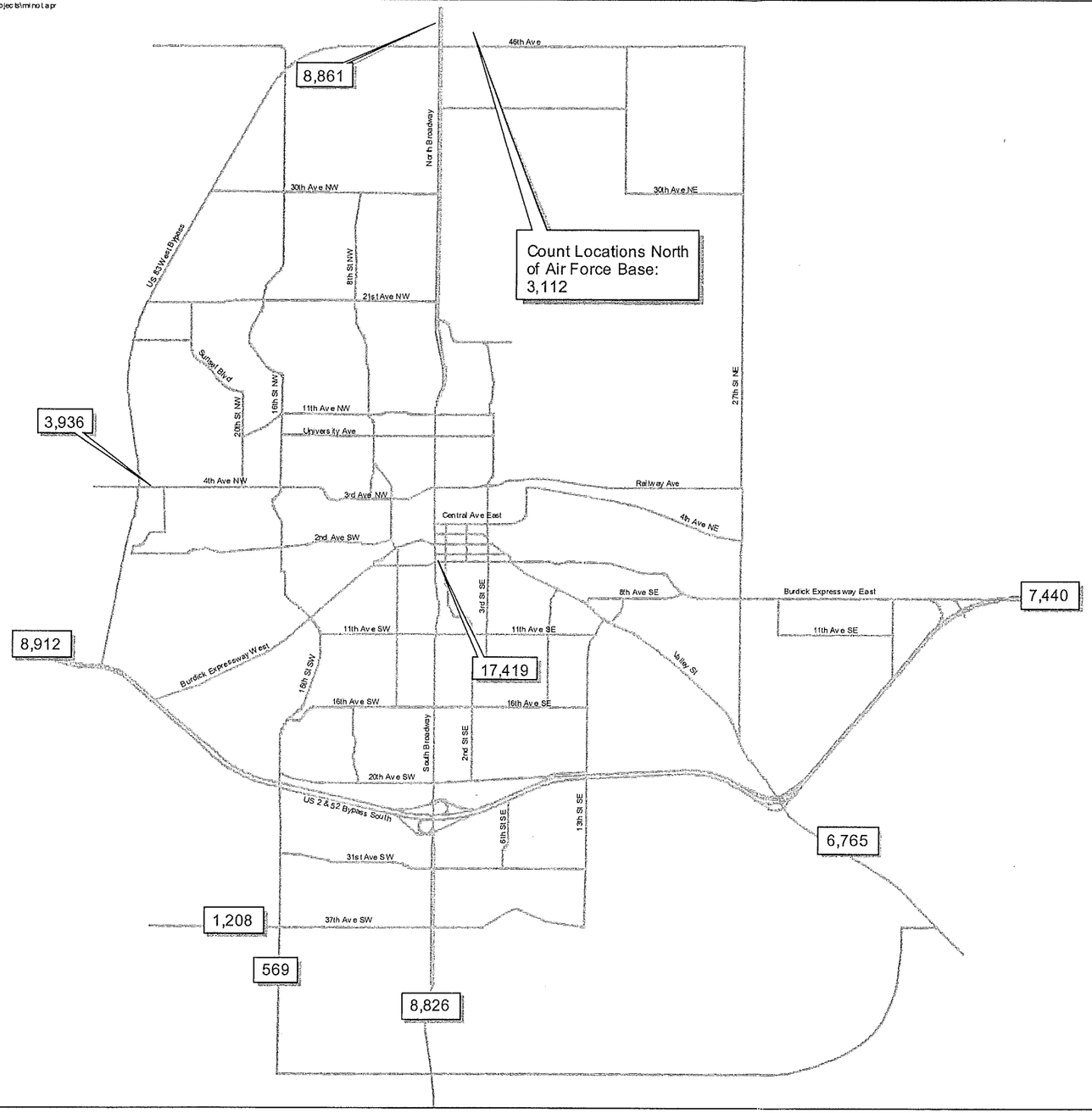

Minot Land Use and Transportation Plan--ADT Volumes, October 2000

FIGURE B-6

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APPENDICES

1. INTRODUCTION

Planning, and more importantly implementing adopted plans, has played a key role in the development of the City of Minot. The original Comprehensive Plan was adopted in 1958. The Comprehensive Plan was updated in 1969 and again in 1995. In 1980, a set of land use guidelines was adopted to supplement the Comprehensive Plan. These guidelines included a Master Street Plan, which was updated and incorporated into the most recent Transportation Plan for the City of Minot, adopted in 1986. The Major Street Plan was updated and approved in 1992.

As part of the 1995 Comprehensive Plan update, a questionnaire was sent to area businesses and organizations. Of the 92 comments received, nearly half, 44, dealt with transportation issues. Other comments received were pretty much equally divided among land use, redevelopment, government activities, parks and recreation, the Central Business District, and solid waste.

2001 TRANSPORTATION PLAN SCOPE

This 2001 Transportation Plan deals exclusively with the street system in Minot. The City does operate a public transit system that provides bus service for school children and the general public. The city bus operates early morning and afternoon routes to and from schools and midday (9:00 am to 5:00 pm) routes to other destinations Monday through Friday.

The City created a Master Plan of Trails for Minot in 1996. The Plan, when complete, will result in a network of paths throughout the City for use by sports enthusiasts of all types.

2001 TRANSPORTATION PLAN STUDY AREA

The Transportation and Major Streets Component of the 1995 Comprehensive Plan concluded that growth over the next 20 years is expected to occur basically within the already developed areas of the City. Therefore, the greatest needs for Minot were stated to be maintenance of the existing roadways and improvements designed to increase capacity.

Given this Comprehensive Plan conclusion and field observations, it was determined that the Study Area for the 2001 study would remain the same as the Study Area for the 1986 study.

GOALS AND OBJECTIVES

The 1995 Comprehensive Plan includes the following Goals and Objectives for transportation:

A. Maintain the existing roadway system with the use of Federal and local funding.

B. Increase capacity of the existing transportation system to meet the demands of increasing traffic volumes.

C. Ensure that future developments conform to the Major Street Plan.

D. Maintain the existing public transit system.

E. Maintain all air and rail transportation access in Minot.

An annual update of project priorities to reflect changing development activities was called for under 'Actions Needed' in The Comprehensive Plan.

PUBLIC INVOLVEMENT

The 2001 Transportation Plan was prepared with significant input from the public, gathered through a Technical Advisory Committee (TAC), public meetings, and the adoption process.

Technical Advisory Committee

The Technical Advisory Committee (TAC) was composed of representatives from the following employment sectors:

Public Sector

- City of Minot Public Works Department
- City of Minot Engineering Department
- City of Minot Planning Department
- North Dakota Department of Transportation
- Elected City Officials
- City Planning Commission
- Ward County
- Minot Public Schools

Private Sector

- Chamber of Commerce
- Development Community
- Health
- Trucking
- Insurance
- Agriculture
- Energy
- Banking

The TAC met on four occasions to address the following topics:

- September 27, 2000 - vision for Minot; transportation issues; land use issues.
- February 13, 2001 – existing conditions; transportation improvements; future land use strategies.
- August 27, 2001 – traffic forecast model calibration; socioeconomic projections.
- October 22, 2001 – traffic forecasts and analysis.

Public Meetings

Two public meetings were held during the study. The first meeting was held on April 11, 2001 to introduce the study and to discuss transportation and land use issues; the second meeting was held on June 17, 2002 to discuss draft findings of the study.

April 11, 2001 Public Meeting

An open house format was used at the April 11, 2001 public meeting. Maps showing current traffic counts, current level of service, the City's Capital Improvement Program, the existing Land Use Plan and the proposed Land Use Plan to take the City to a population level of 50,000 persons were shown. Twenty-three persons attended. Following is a summary of comments received.

Transportation Issues:

- Need east-west access in University area
- Create east-west alternatives for Burdick Expressway
- Create north-south alternatives for Broadway
- Five-year road plan looks good
- Keep the 2/52 Bypass a safe bypass by replacing stop lights; maintain access to nearby properties through creative engineering
- Provide roadways that are business and access friendly. Design roadways to first encourage growth and second to move traffic
- 16th Street SW and 13th Street SE grade separations are important
- Extend 37th Avenue SE from 2nd Avenue SE to 13th Street SE and remove dangerous curves
- Extend 31st Avenue SE to 13th Street SE
- Extend 10th Street SW to 54th Avenue SW
- Extend 6th Street SE to 37th Avenue SW
- Extend 30th Avenue NW to West 83 Bypass

Land Use Issues:

- Single family residential should not be shown west of the West Bypass - difficult to serve with utilities
- Too much Green Space shown west of the West Bypass
- If Single Family Residential remains west of the West Bypass, include a Town Center
- Show Town Center at 16th Street NW and 21st Avenue NW
- Show Green Space corridor for Rails-to-Trails on abandoned railroad tracks to the north
- Show Industrial along US-2 on the east end of the study area as shown on the existing plan
- Show more Single Family Residential south of US-2 at the eastern edge of the study area. Utilities are available to this area
- Change Open Space and Commercial uses in the southeast quadrant of the 2/52 Bypass and South Broadway as per planned developments
- Change Single Family Residential to Green Space at 4th Avenue NW/9th Street NW – currently a park
- Space at 4th Avenue NW/9th Street NW - currently a park
- Change Multi-Family Residential to Single Family Residential at Cottonwood Avenue and 14th Avenue SW - currently single family
- Keep Industrial between the tracks on the west side of the study area as shown on existing plan
- Expand Commercial and Multi Family Residential in 27th Avenue NW/Broadway area as exists today
- Add to clear zone on north end of runway - see Airport Master Plan
- Avoid additional strip malls

Adoption Process

The draft final report was presented to the City of Minot Planning Commission on June 17, 2002, July 15, 2002, and August 19, 2002. Minutes for these meetings are provided in Appendix D of this report. The final report was presented to the City Council on October 15, 2002.

REPORT ORGANIZATION

The City of Minot Land Use and Transportation Plan includes these chapters:

Chapter 1 **Introduction**

Chapter 2 **Land Use Plan:** The plan for the growth of Minot from approximately 36,500 persons in the year 2000 to 50,000 in the future is presented.

Chapter 3 **Existing Transportation Conditions:** The status of transportation service in 2001 is documented.

Chapter 4 **Traffic Analysis:** The traffic analysis, using the TP+ traffic forecast model and a population of 50,000 is presented.

Chapter 5 **Transportation Plan:** The Transportation Plan for the City of Minot is presented and documented.

2. LAND USE PLAN

The purpose of the Land Use Plan is to provide a direction where new development may take place to accommodate projected growth. The planning effort begins with the current Land Use Plan and builds a new Land Use Plan based upon the past population trends and future population projections. Once the population and the resultant employment projections were quantified, a new Land Use Plan was generated to locate this new growth.

1995 LAND USE PLAN

The 1995 Land Use Plan, shown in Figure 2-1, was approved by the City as part of the 1995 Comprehensive Plan. The 1995 Plan was based upon a projected population level of 39,000 in the year 2015.

This plan designates commercial areas primarily along Broadway and the US 2/52 Bypass – industrial areas along railways, north of the airport – and residential areas interspersed throughout the city, as well as significant areas planned for outlying areas to the west, south and east of the city.

POPULATION

Historical Population Growth

As shown in Table 2-1, the City of Minot has experienced fairly consistent growth over the last 40 years, growing from 30,604 persons in 1960 to 36,567 persons in 2000. Approximate increases in population during the four decades were 1700 in the sixties, 550 in the seventies, 1700 in the eighties, and 2000 in the nineties. The following table reflects the population data for the City of Minot from 1960 to 2000.

Table 2-1: City of Minot Population From 1960 to 2000

Year	Population
1960	30,604
1970	32,290
1980	32,843
1990	34,544
2000	36,567

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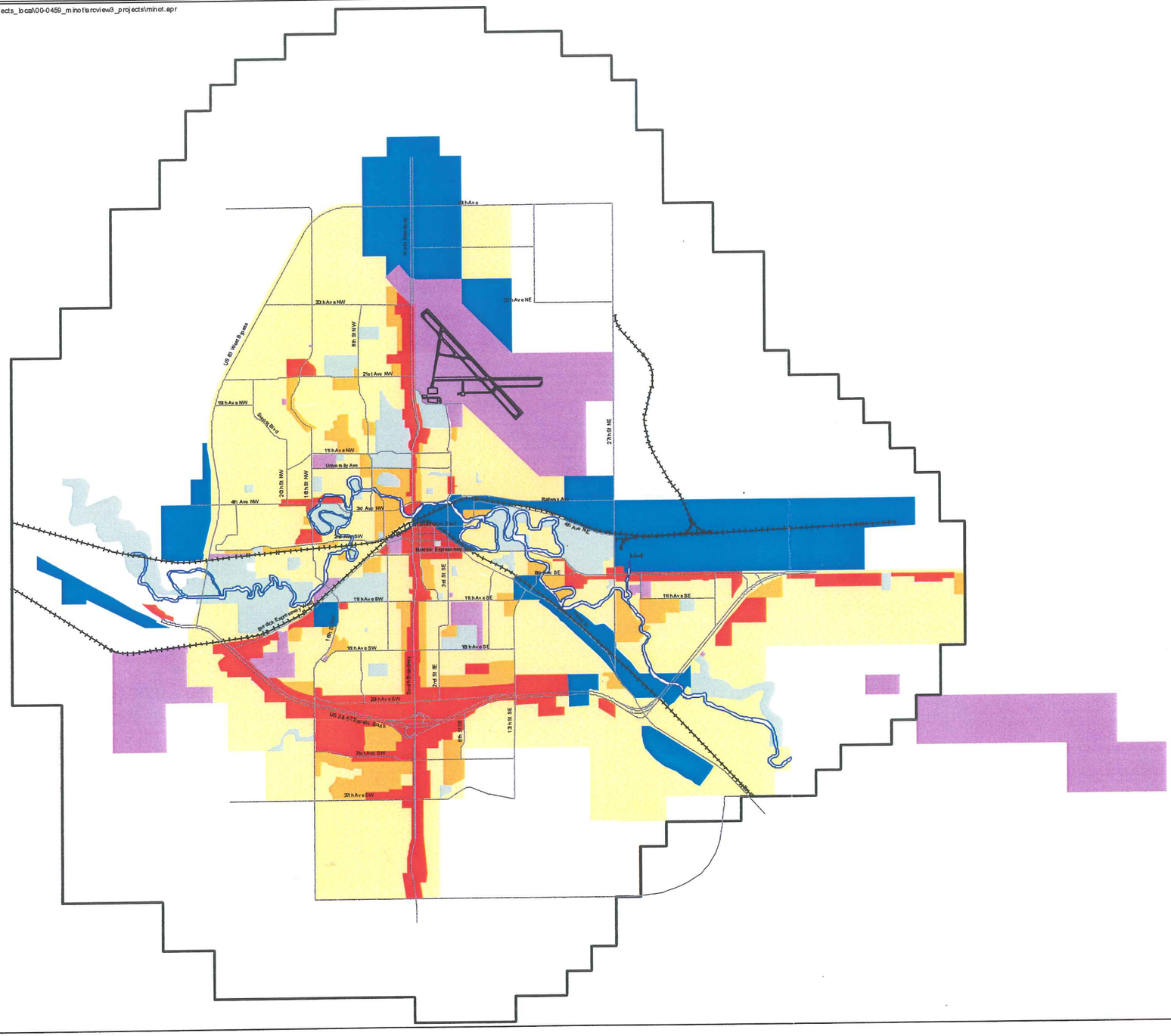

1995 Land Use Plan

FIGURE 2-1

In 1990, Minot voters approved a measure which established a one percent City sales tax, forty percent of which was designated for economic and industrial development. The funds accumulated from the sales tax became the Minot Area Growth through Investment and Cooperation (MAGIC) Fund. The tax generates approximately $1.6 million per year to provide financial incentives to new and existing primary sector businesses. MAGIC fund dollars may be used to provide temporary or permanent financing for business costs that are related to the expansion of an existing business, the relocation of an existing business, or the establishment of a new business. The MAGIC Fund is largely credited with the population growth in the nineties.

Population Projections

A goal of the City of Minot is to reach a population of 50,000 persons. Based upon a 2000 person per decade growth as achieved in the nineties, 50,000 would be reached in sixty to seventy years – in the year 2065. However, the City re-evaluated population projections by including the influence of the MAGIC Fund (or comparable economic tool) with historical growth rates. The conclusion of this examination was that with steady economic growth, Minot could feasibly reach a population of 50,000 within twenty to thirty years, as opposed to the sixty to seventy years it would take to reach the same population level without a program such as the MAGIC Fund.

For purposes of this study, it is projected that a population of 50,000 will be reached in the year 2040.

PROPOSED LAND USE PLAN

The proposed Land Use Plan was discussed with TAC during the September 27, 2000 and February 13, 2001 meetings, and again at the April 11, 2001 public meeting. The proposed Plan is shown in Figure 2-2. Key elements of the proposed Plan are:

- Sufficient land is already guided for non-residential use in the existing Land Use Plan.
- Residential land use was expanded in the northwest, southwest, and southeast. Those expansions were around 'Town Centers,' which will provide some higher density residential plus neighborhood commercial to support a walkable community.
- Gateways are included in the proposed Plan to announce the arrival into Minot and to enhance the University area.
- The green space designations shown on the Land Use Plan will be used as a guide to be considered when development occurs.

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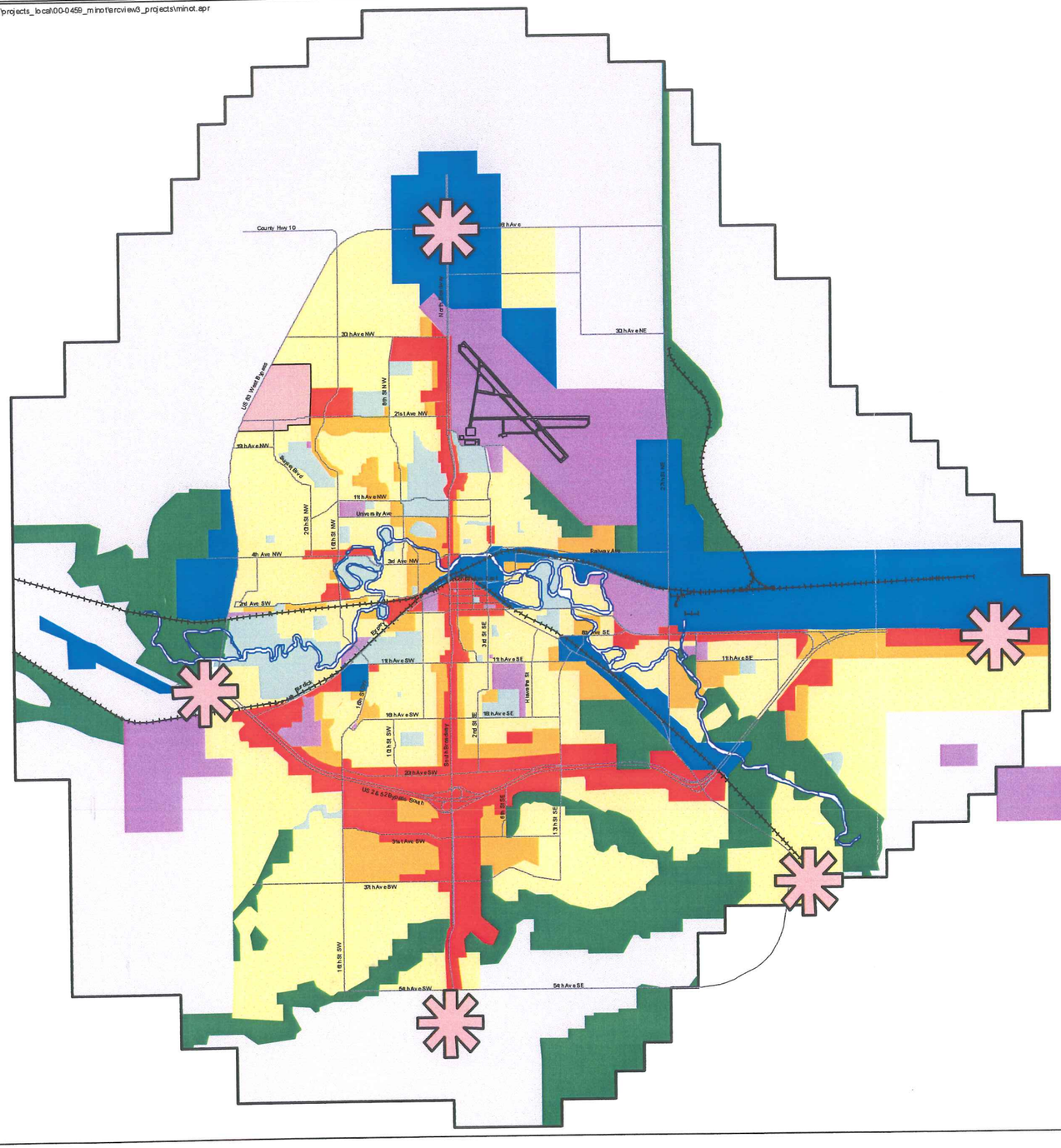

- 2-Mile Planning Jurisdiction
- Commercial
- Office Park
- Industrial
- Parks & Schools
- Public Land
- Residential (single)
- Residential (high density)
- Agricultural
- Wetland and Water Bodies
- Green Space
  - Linkages
  - Trail Opportunities
  - Views
  - Corridors
- Gateways
  - Highlight Entries
  - Additional Landscaping Required
  - Increased Setbacks Required
  - No Billboard Advertising

Proposed Land Use Plan

FIGURE 2-2

The Land Use Plan includes two elements, Gateways and Town Centers, which are not included on the City's current Land Use Plan. These, along with a discussion of the agricultural land are elaborated upon below.

Gateways

Gateways are areas which announce arrival into Minot. These areas would need to be specifically identified and an effort should be undertaken by the City to design an entrance feature. To set this feature in an appropriate location, the surrounding area and development must also accommodate this "gateway" land use. There must be increased setbacks, no parking allowed in front yards, no billboards, and increased landscaping. These requirements are only needed in a small zone. This zone would be probably no more than 300-400 feet on either side of the "gateway".

The University should also have a similar zone on or adjacent to University land that announces arrival at Minot State University. The City needs to assist in this effort and again impose increased setbacks, increased landscaping, no billboards and no front yard parking in the vicinity of the gateway.

These gateway areas could be handled by creating a small overlay district for each area. It is an effort to create a special area that has slightly higher development/re-development standards than normal.

Town Centers

Town centers provide a small commercial focal point to a large residential community. They are not located on the fringe of new development along some major roadway. They are internal and provide service to small residential neighborhoods. They could provide mixed use development with commercial usage on the first floors and office or residential uses on the upper floors. They provide limited commercial uses to a walkable community. They provide no more than 80,000 - 100,000 square feet of non-residential development. They could also be provided along with some small open space or "town square". The Land Use Plan does not show specific locations, but town centers would logically occur in the northwest, southwest and southeast residential growth areas.

Agricultural Land Development

If development is allowed within the designated agricultural land, it must be shown that the development can be served in the future by sewer and water. Any development should be required to submit conceptual plans to show how the parcel can be developed to more urban standards. To eliminate the problem of large property owners carving off two-acre parcels along county or township roads, all new parcels must be served by internal roads or shared access points. The City/County will not allow isolated two-acre lots to be developed randomly, but rather, these must be shown as part of a master plan for an entire ownership.

SOCIOECONOMIC PROJECTIONS

The traffic forecast model requires that the Land Use Plan be quantified by small areas called Traffic Analysis Zones (TAZ). Within each TAZ, socioeconomic data is projected. This data consists of single and multi-family dwelling units; employment – divided into commercial, industrial, office, and service; university enrollment, and enrollment for elementary, middle, and high schools.

The 2000 population and employment data was developed using the land use parcel data provided by the City Assessor's Office and the AutoCAD map file and parcel data base also provided by the City. The data set was developed using the Geographic Information System (GIS) by converting the AutoCAD map file into GIS ARCINFO coverage and linking the parcel database provided by the Assessor's Office. A traffic analysis zone (TAZ) ARCINFO file was also created and used for spatially linking the parcels to the corresponding TAZ. Using a land use conversion table, the Assessor's codes were aggregated to represent the model land use codes. The model land use codes were then summarized by TAZ and converted into demographic variables. If unreasonable results were uncovered, further investigation was performed and adjustments were made employing Census and aerial data. The 2000 Census data and 1995 aerial photos were employed to verify data. Year 2040 projections were developed using the proposed land use plan.

Population and employment data for the year 2000 and projections for the year 2040 are shown graphically by TAZ in Figures 2-3 and 2-4 – and in tabular form in Appendix A.

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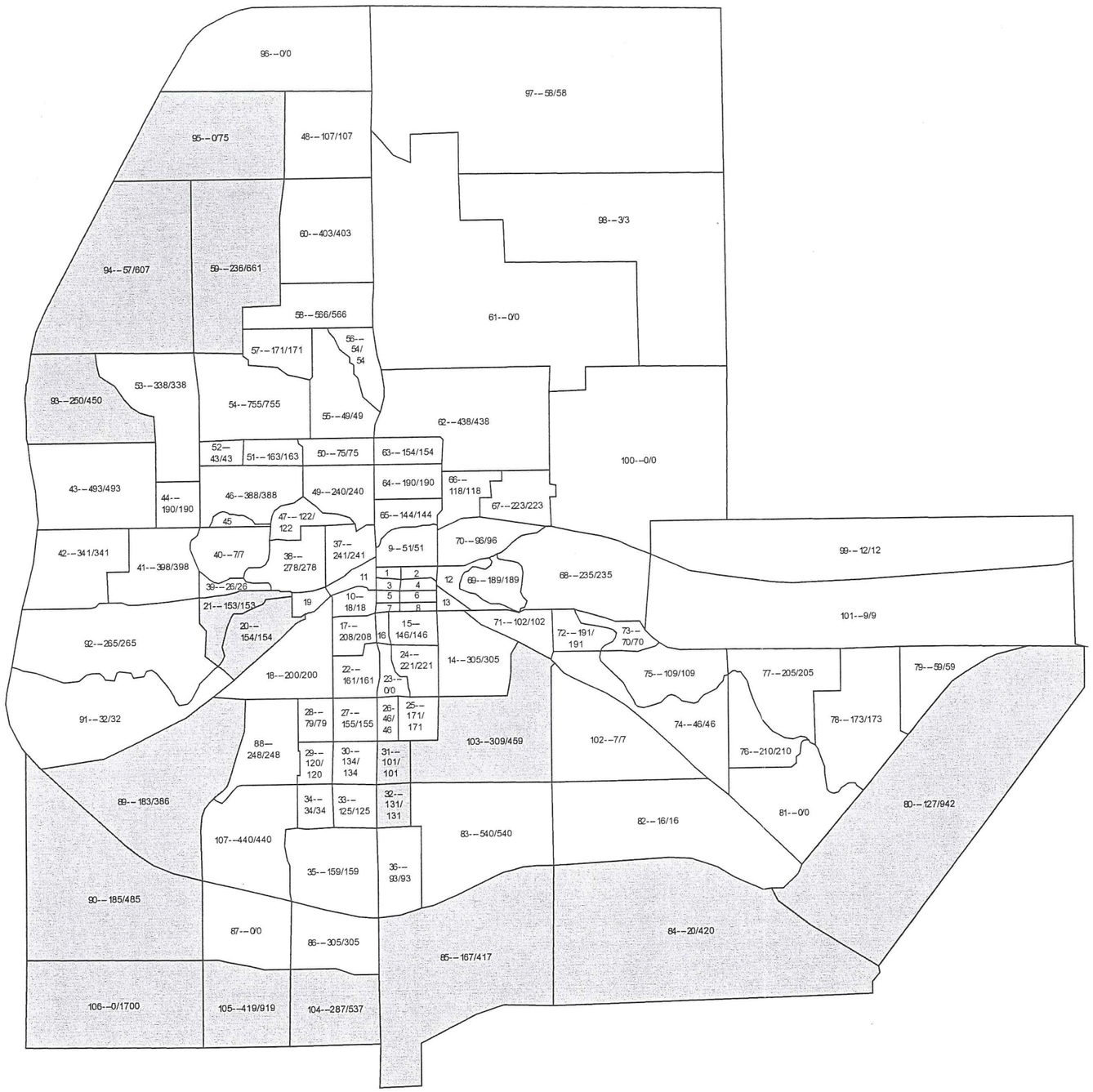

Traffic Analysis Zones

Areas of population growth

Numbering scheme:

XX--YY / ZZZ

- XX: Traffic Analysis Zone
- YY: Dwelling Units in Year 2000
- ZZZ: Dwelling Units in Future (50,000 population)

SMALL ZONE DATA

TAZ	2000	FUTURE
1	74	74
2	73	73
3	7	7
4	69	69
5	2	2
6	33	33
7	32	32
8	227	227
11	2	2
12	55	55
13	7	7
16	0	0
19	5	5
45	2	2

Dwelling Unit Projections

FIGURE 2-3

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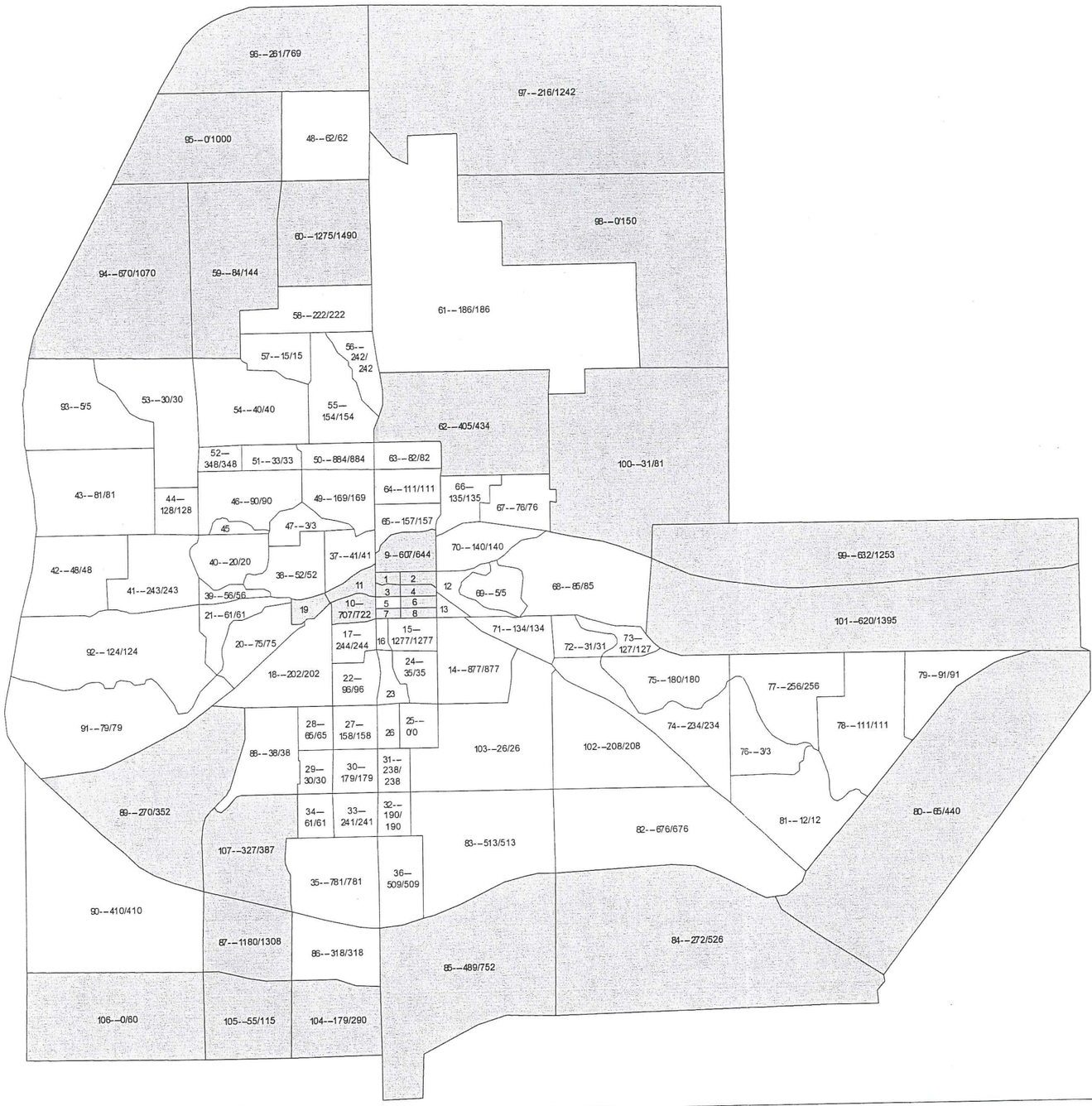

Traffic Analysis Zones

Areas of employment growth

Numbering scheme:

XX--YYY / ZZZ

- XX: Traffic Analysis Zone
- YYY: Employment in Year 2000
- ZZZ: Employment in Future (50,000 population)

SMALL ZONE DATA

TAZ	2000	FUTURE
1	292	309
2	307	335
3	621	645
4	643	677
5	187	187
6	746	781
7	166	180
8	251	273
9	607	644
10	707	722
11	122	137
12	75	75
13	352	352
16	392	392
19	148	201
23	720	720
26	207	207
45	114	114

Total Employment Projections

FIGURE 2-4

3. EXISTING TRANSPORTATION CONDITIONS

The purpose of this chapter is to document the results of the data collection effort and existing conditions analysis for the City of Minot Land Use and Transportation Study. The existing conditions analysis included operational analysis for the morning and afternoon peak hours for selected intersection locations and a review of high accident locations based on information provided by the City.

DATA COLLECTION SUMMARY

Existing information assembled for use in the project includes the following:

- Previous studies and reports
- Comprehensive Plan (1995)
- Capital Improvement Program (2000-2004)
- Average daily traffic (ADT) volumes (1998 North Dakota Department of Transportation (NDDOT))
- Existing roadway characteristics (number of lanes, functional classification, facility type, speed limits, traffic control devices, etc.)
- Accident Information
- Socioeconomic data (population, land use, employment, etc.)
- Environmental data (wetlands, floodplains, cultural resources, endangered species, etc.)
- Census data
- Travel characteristics data from the National Personal Transportation Survey (NPTS)

Existing traffic control devices, functional classification, number of lanes, and speed limits are illustrated in figures B-1 through B-4. [*Note: Because of the large amount of data presented in numerous graphics for this chapter, all figures have been placed in appendix B of this report.*]

The 1998 Traffic Flow Map (24-hour volumes) for the City of Minot was provided by the NDDOT. In addition to this existing traffic volume data, ADT volumes were collected at ten locations throughout the City and peak hour turning movement volumes were collected at twenty locations throughout the City. These traffic count locations are illustrated in Figure B-5.

The ADT volumes were selected primarily to supplement existing volume information and to provide external count data for the model calibration/validation process. Volumes were collected over a two-day (48-hour) period and the average taken to develop the 24-hour volume. These volumes are illustrated in Figure B-6.

The peak hour turning movement locations were selected to provide an overview of traffic operations at various intersections throughout the City. Turning movement volumes were collected from 7:00 to 9:00 AM and 4:00 to 6:00 PM. Citywide peak hours were determined to be 7:45 to 8:45 AM and 4:45 to 5:45 PM. Field observations were also conducted at all

study area intersections during these time periods to record intersection geometrics, observe existing traffic conditions, and note deficiencies such as cycle failures, excessive queue lengths, etc. Existing lane configurations and traffic control at these intersections are illustrated in Appendix B, Figures B-7a through B-7e. Existing peak hour turning movement volumes at these intersections are illustrated in Figures B-8a through B-8e.

EXISTING CONDITIONS OPERATIONAL ANALYSIS

Capacity analyses were conducted to assess existing operations during both the morning and afternoon peak hours at the twenty signalized and unsignalized intersection locations identified in Figure B-5. Signalized intersection capacity analyses were conducted using Synchro, Version 4.0, using the delay methodology outlined in Chapter 9 of the Highway Capacity Manual (HCM). Unnsignalized intersection capacity analyses were conducted in accordance with the capacity analysis methodology outlined in Chapter 10 of the HCM.

Level of service (LOS) at signalized and unsignalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Six levels of service are defined with letter designations ranging from A to F. LOS A represents the best operating conditions and LOS F the worst. LOS C or D operation is typically considered acceptable in most urban areas. Level of service criteria for signalized and unsignalized intersections are summarized in Table 3-1.

Table 3-1: Level of Service Criteria

Level Of Service	Control Delay (seconds/vehicle)	
	Signalized Intersection	Unsignalized Intersection
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

The complete results of the operational analyses for each intersection are illustrated in Figures B-9a through B-9e and summarized for signalized intersections in Table 3-2. All existing intersections included in the evaluation currently operate at LOS C or better during both the morning and afternoon peak periods.

Table 3-2: Intersection Level of Service

Signalized Intersections	AM LOS	PM LOS
2nd Avenue SW & 16th Street SW	A	A
4th Avenue NW & 16th Street NW	A	A
4th Avenue NW & North Broadway	A	A
6th Avenue NE & 3rd Street SE	A	A
20th Avenue NW & North Broadway	A	A
20th Avenue SW & 16th Street SW	A	A
Burdick Expwy East & Main Street South	A	A
Burdick Expwy East & 27th Street SE	A	A
Burdick Expwy West & 16th Street SW	A	B
Burdick Expwy West & South Broadway	B	C
Burdick Expwy West & 6th Street SW	A	A
Central Avenue East & North Broadway	B	B
University Avenue & 8th Street NW	A	A
University Avenue & North Broadway	A	A
Unsignalized Intersections		
21st Avenue NW & 16th Street NW	C	B
Valley Street & 13th Street SE	C	D

LOS C or better operation is also reported for individual movements at these intersections with the exception of two intersections: Broadway and Burdick Expressway and Valley Street and 13th Street SE. At each of these intersections one or more movements operate at LOS D during either the morning or afternoon peak period. Acceptable roadway and intersection operation was also confirmed based on field observations. No cycle failures or excessive queue lengths were observed and existing traffic demand appeared to be accommodated efficiently at each location.

The Minot Transportation Plan Update, published in May 2000 by Kadrmas Lee and Jackson, and HDR Engineering, included an evaluation of intersections in the US 2/52 Bypass corridor. The two signalized intersections studied operated at LOS B or better during both the AM and PM peak hours. The remaining intersections within the corridor were unsignalized and operated at LOS A. Locations were not provided in the report.

SIGNAL WARRANT ANALYSES

The peak hour volume warrant (Warrant 11) in the Manual on Uniform Traffic Control Devices (MUTCD) was evaluated for the intersections of 16th Street with 21st Avenue NW and 13th Street with Valley Street SE. The warrant was not satisfied at either intersection based on the existing peak hour volumes and intersection geometric configuration.

ACCIDENT DATA

Potential high accident intersection and roadway segment locations within the City are compiled annually by City staff. These locations, based on data reviewed for the period 1997 through 1999, are illustrated in Figure B-10. Ten of the sixty-four intersections, as listed below, have also been included in the *High Crash Locations in All Urban Areas* listing (1996 – 1998) compiled by the NDDOT:

- Broadway and 20th Avenue SW
- Broadway and 16th Avenue SW
- Burdick Expressway and 3rd Street SE
- Broadway and Burdick Expressway
- US 2/52 Bypass and US 83 Bypass
- US 2/52 Bypass and 13th Street SE
- Central Avenue and 3rd Street East
- Broadway and 11th Avenue SW
- Broadway and 4th Avenue NW
- 16th Street SW and 22nd Avenue SW

[Note: Improvements are scheduled or have been completed at several of these intersections since publication of the State's high accident listing that may have changed the accident experience at these locations.]

While a detailed accident review will not be completed as part of this project, the accident experience at most high accident intersections and/or roadway segments in the City can likely be attributed to site-specific conditions (sight distance, intersection and/or roadway geometrics, etc.) or driver error that would not typically be addressed in a planning project of this nature. However, there may be some accident experience that may be positively impacted by a system-level improvement such as access management or a capacity improvement along a particular roadway corridor. The potential to improve high accident locations was considered as transportation improvement alternatives were developed and evaluated later in this study.

4. TRAFFIC ANALYSIS

The traffic analysis for Minot is presented in this chapter. The chapter begins with a discussion of the traffic forecast model used in the analysis process. This is followed by an overview of the traffic forecast for the year 2040 and a discussion of specific transportation issues which surfaced during the course of the study. The Transportation Plan and recommended improvement program are presented in the next chapter.

TRAFFIC FORECAST MODEL

The traffic analysis for the Minot transportation study is based upon traffic forecasts prepared through the use of a traffic forecast model. There are many forecast models commercially available, all of which require the user to input a roadway network and socioeconomic – population (dwelling unit) and employment – data. The North Dakota Department of Transportation prefers the model TP+Viper, therefore it was used as the traffic forecast model for the Minot study.

Cambridge Systematics calibrated and ran the traffic assignment model for the study. The Travel Model Documentation Report prepared by Cambridge is included in Appendix C.

Calibration

The first step in the modeling process is to calibrate the model. Calibration involves running the model using existing data and comparing model results to actual traffic counts. The model was calibrated using existing population and employment data and 1998 traffic counts. Results of this calibration are shown below in Table 4-1, a comparison of the assignment results by volume group, and Table 4-2, a comparison of assignment results by facility type.

Table 4-1: Modeled Volumes Vs Observed Volumes by Volume Groups

DAILY VOLUME GROUP	MODEL VOLUME	TRAFFIC COUNTS	DIFFERENCE	% DIFF	TARGET
Less than 5000	923,947	943,446	-19,499	-2.1%	+/- 40%
5000 - 10,000	389,092	407,100	-18,008	-4.4%	+/- 35%
10,000-15,000	261,084	246,800	14,284	5.8%	+/- 30%
Grand Total	**1,574,122**	**1,597,346**	**-23,224**	**-1.5%**	+/- 5%

Table 4-2: Modeled Volumes Vs Observed Volumes by Facility Type

FACILITY TYPE	MODEL VOLUME	TRAFFIC COUNTS	DIFFERENCE	% DIFF	TARGET
Freeways	164,751	170,425	-5,674	-3.3%	+/-5%
Divided Highways	119,901	119,700	201	0.2%	+/- 10%
Principal Arterials	405,651	412,050	-6,399	-1.6%	+/- 10%
Minor Arterials	591,490	553,730	37,760	6.8%	+/- 15%
Major Collectors	256,466	290,891	-34,425	-11.8%	+/- 25%
Local Roads	24,522	38,350	-13,828	-36.1%	No Target
Frontage Roads	11,341	12,200	-859	-7.0%	No Target
Grand Total	**1,574,122**	**1,597,346**	**-23,224**	**-1.5%**	**+/- 5%**

The goal of model calibration is to have the comparison between modeled volumes and traffic counts fall within allowable limits established through national research [e.g. - for the volume group between 10,000 and 15,000 shown in Table 4-1 – the total model volume was 261,084 vehicle miles of travel and the corresponding traffic counts were 246,800 vehicle miles of travel. The difference is 14,284 (5.8 percent), well within the +/- 30 percent target.] As shown in Tables 4-1 and 4-2, model calibration in all categories is within allowable limits.

Future Assignments

Once the model is calibrated, it is ready for use in forecasting future traffic volumes. The socioeconomic data discussed in concert with the proposed Land Use Plan presented in Chapter 2 was input into the model and a future year traffic assignment was prepared. As discussed in the Land Use chapter, the target population for Minot is 50,000 persons, a number that could be reached anytime in the next twenty to seventy years. For this analysis, it has been assumed that 50,000 persons will reside in Minot in the year 2040. Therefore, the traffic forecasts prepared for this report will be referred to as year 2040 forecasts.

TRAFFIC FORECAST

The purpose of this section is to present the evaluation and subsequent recommendations for improvements to the street network in Minot. Forecast volumes for the year 2040 are compared to 1998 traffic counts in Figure 4-1. Volumes will increase throughout the street network, with some segments of the system as much as doubling in volume and other links showing minimal increase. In general, the model seems to be balancing traffic volume relative to capacity on segments throughout the network.

LOS C, stable flow, should be the goal of a community the size of Minot. It represents a condition in which up to 80 percent of a roadway's capacity is utilized. Having a higher goal could result in the wasting of resources – both dollars to construct wider roadways and land, which could be used for tax-generating purposes.

Based upon the 2040 forecast, all streets in the City will operate at LOS C or better (volume/capacity ratio less than 0.8), a degradation of the LOS A and B generally found in Minot today, but still a condition that will not significantly inconvenience the driving public. This does not mean that there will not be isolated intersection problems at some locations. However, overall, the street network will operate at an acceptable level of service.

TRANSPORTATION ISSUES

A number of transportation issues, which have been identified during the course of the study are discussed in this section. The section begins with a discussion of some specific projects. This is followed by discussions of the west and east bypass routes, Broadway, and the US-2/52 Bypass. These issues will be considered in the development of the implementation element of the Transportation Plan.

Identified Projects

A number of projects were identified by the TAC or in the public meeting during the study process. Four of these projects are either under construction, completed, or programmed and therefore are not considered further in this evaluation. These four projects are:

- Sunset Boulevard between 19th Avenue NW and 21st Avenue NW
- 16th Street SW grade separation at 2nd Avenue SW
- 4th Avenue NE to 5th Avenue NE transition on Railway Avenue
- University Avenue between 8th Street NW and North Broadway

The other thirteen projects that were identified are shown in Figure 4-2. Since, based strictly upon the traffic forecast, there are no major roadway capacity problems in Minot, none of these projects are essential to solve serious congestion problems. However, all of these projects have some merit to improve traffic flow at specific locations within the City.

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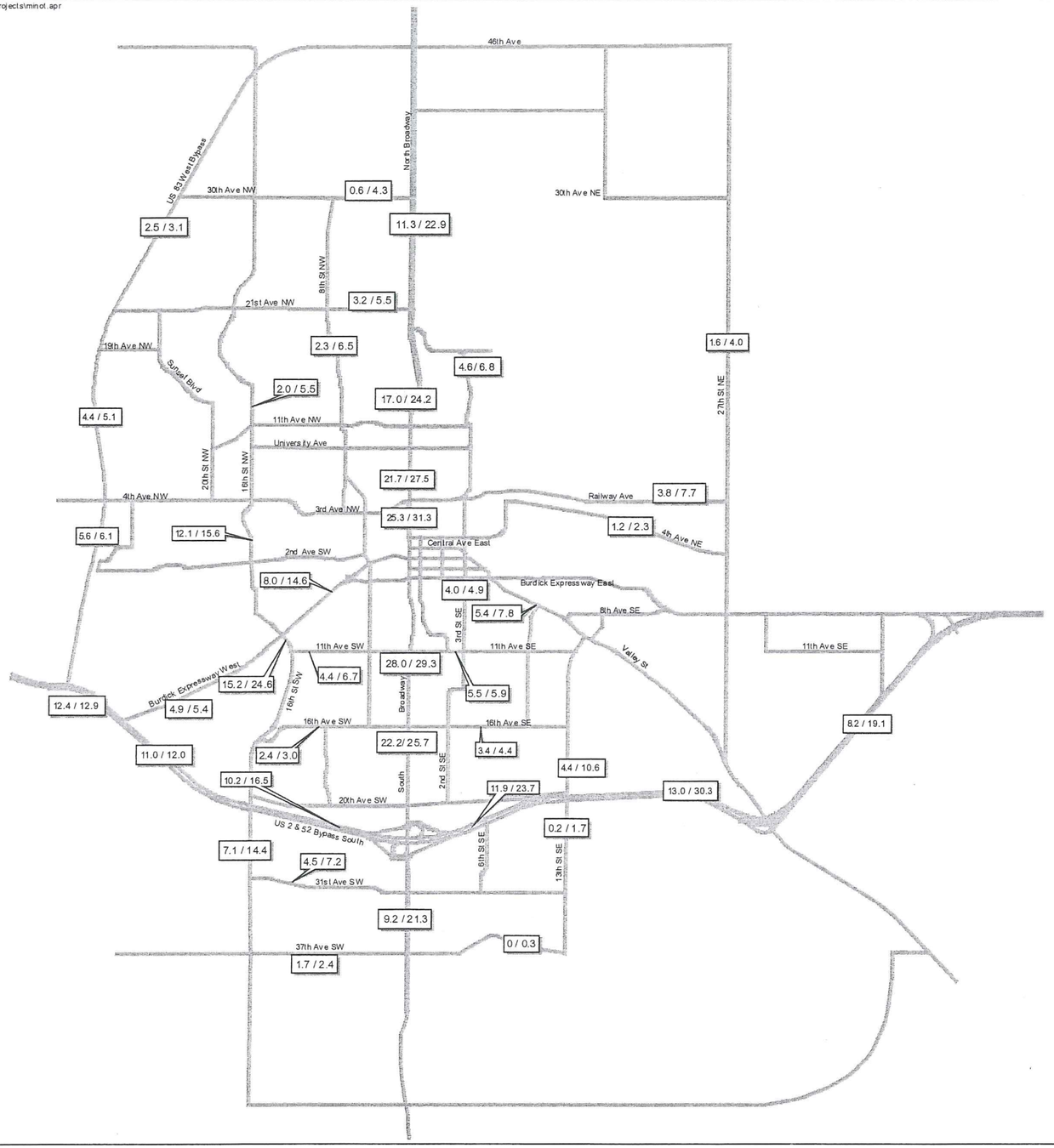

XX.X / YY.Y

1998 Volume (in Thousands)

Forecast Volume (in Thousands)

1998 Traffic Counts / Forecast Traffic Volumes (in thousands)

FIGURE 4-1

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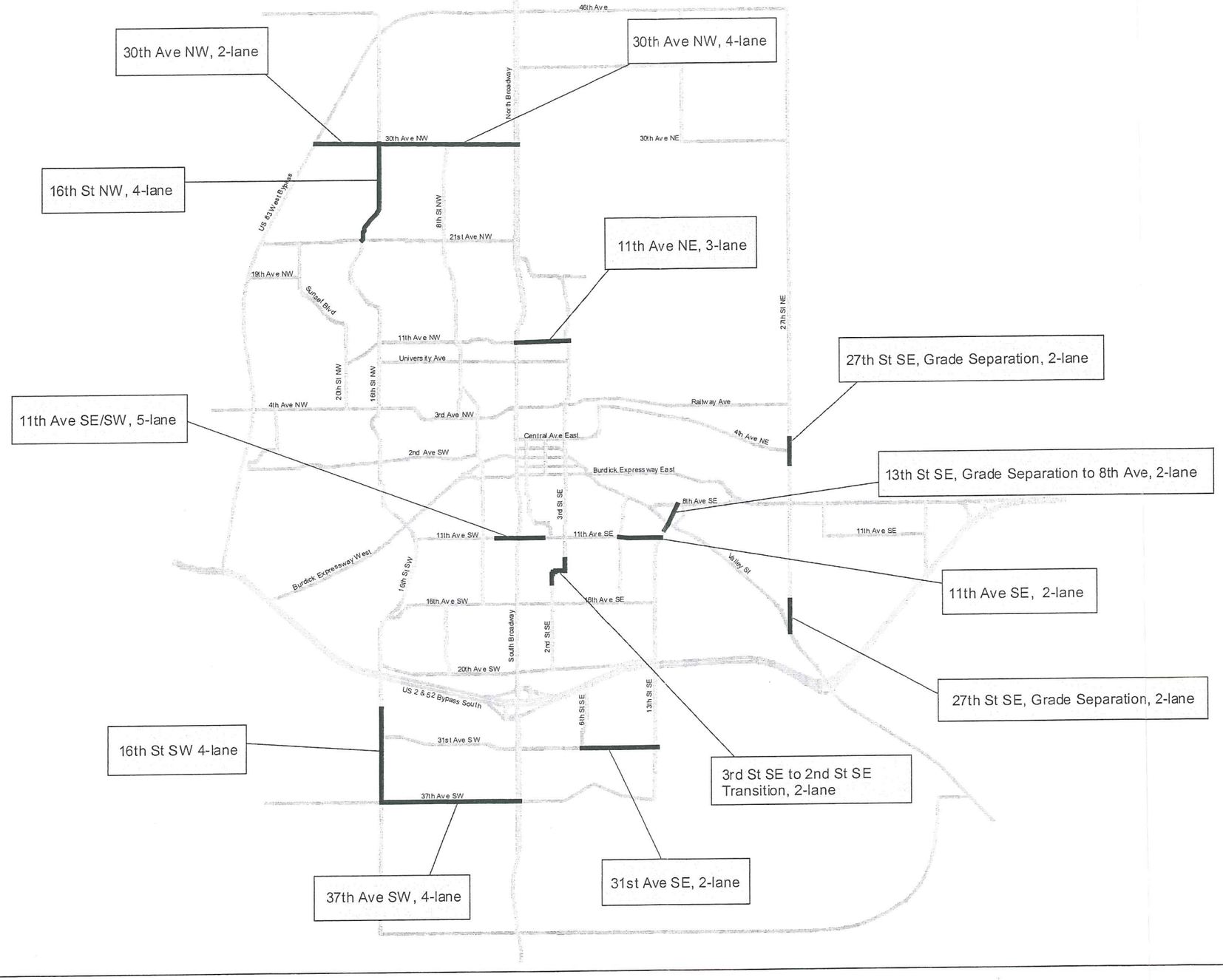

Public Identified Projects

FIGURE 4-2

West and East Bypass Routes

US 83 West Bypass

The US 83 West Bypass connects the US 2/52 Bypass near 33rd Street SW to North Broadway at 46th Avenue NW. It is currently a two-lane roadway with ten-foot shoulders and a traffic interchange at 4th Avenue NW. Both ends of the West Bypass are traffic signal-controlled. A few stop sign-controlled intersections provide the only other access to the facility. The US 83 West Bypass is a designated National Highway System (NHS) and Strategic Highway Network (STRAHNET) Connector route.

The 1998 traffic counts range from 2500 vpd north of 21st Avenue NW to 5600 vpd south of 4th Avenue NW. Forecast volumes at the same locations are 3100 vpd and 6100 vpd, respectively. The minimal increase forecast is largely due to the fact that traffic on US 2/52 west of Minot has decreased in the last fifteen years. Therefore, for the forecasts prepared for this study, no growth was assumed for the external traffic entering the City from the west.

The roadway as constructed will operate very well with volumes as much as double those forecast. With the traffic interchange at 4th Avenue NW, the southern portion of the roadway operates with no entering traffic conflicts until the intersections with 19th Avenue NW and 21st Avenue NW. The 1998 volumes on these two roadways are 200 vpd and 2000 vpd, respectively.

The construction of the 4th Avenue NW traffic interchange has opened up the probability that the US 83 West Bypass will someday be a freeway. Therefore, it is important to maintain the integrity of the roadway by limiting access to 21st Avenue NW, 30th Avenue NW and Ward County Highway 10. Highway 10 should line up with the extension of 16th Street NW. All other existing access should be closed as the area develops and in no case should additional driveway or minor street access be allowed on the US 83 West Bypass. The only exceptions shall be the existing access into Tierracita Vallejo, the access opposite same on the east side of the Bypass, the access to the Souris Valley Golf Course and the access opposite same on the west side of the Bypass. Access to new developments, such as to the large office park area included in the Land Use Plan on 21st Avenue NW would be to the arterial streets and frontage roads.

As traffic volumes on the Bypass approach 10,000 vpd, plans for widening the roadway to four lanes should be developed and traffic signal warrants at the three future traffic interchange sites should be reviewed. The traffic signals should be replaced by traffic interchanges when the Bypass volume reaches 30,000 vpd. Right-of-way should be reserved for future traffic interchanges at the three designated locations.

East Bypass

The need for a roadway around the City to the northeast was identified during the study process to primarily service truck traffic. One route would be to continue eastward from the end of the West Bypass on 46th Avenue NW to 27th Street NE, then south to Valley Street, and then southeast to the US 2/52 Bypass. However, this route may cause increased congestion and delays at East Burdick Expressway. A second route is proposed which would extend 46th Avenue NE to 55th Street NE and then south to US Highway 2 east. The forecast volumes for this bypass are relatively low, therefore a

freeway-type facility is not recommended. A two-lane facility will be adequate, but access should be managed so that intersections are at future streets with cross traffic controlled by stop signs.

Broadway

Broadway is the main north-south street in the City. It provides access to a significant amount of Minot's commercial activity as well as to Minot International Airport. Traffic volumes on Broadway in 1998 ranged from 11,000 vpd near 30th Avenue NW to 28,000 vpd near 16th Avenue SW. The forecast model indicates minimal traffic growth on Broadway with the maximum volume being 31,300 vpd north of Central Avenue. This is probably because the growth of Minot is projected to occur primarily to the south and northwest in undeveloped areas of the City. The model also seems to be spreading traffic to fill available capacity on parallel north-south streets, thus minimizing additional traffic on Broadway.

Actual volumes on Broadway will probably exceed those forecast by the model, however the five-lane roadway will, with spot improvements, be able to accommodate the increase in traffic at LOS C or better. Maintaining access to businesses located along Broadway will remain an important function of the roadway. However, as traffic patterns evolve, it will be important to make spot improvements to enhance traffic carrying capabilities. Conditions should be monitored and right-turn lanes constructed at locations where turning traffic creates safety or congestion problems.

During the preparation of a Project Concept Report for South Broadway, a number of commercial driveways were found to lie within the operational zone of adjacent street intersections. In other words, due to the limited distance between intersections and driveways, conflicts arise between driveway turning movements and intersection turning movements. Some properties were found to have multiple driveways onto South Broadway. When possible, limiting properties to one access onto South Broadway or to side-street access can reduce driver confusion and improve safety and mobility.

Another important factor in keeping traffic flowing smoothly on Broadway will be to keep additional traffic signals to a minimum and to monitor traffic at existing signals. Capacity problems that appear through monitoring can be addressed through intersection geometric improvements to maintain a minimum LOS C at each intersection. Signal progression should also be maintained through coordination of traffic signals on Broadway.

US 2/52 Bypass

Background

The US-2/52 Bypass has been a controversial issue in Minot for the past fifteen years, therefore a significant amount of effort was put into the evaluation of this facility. The Bypass was the primary subject of the Minot Transportation Plan Update published in May 2000 by Kadrmas Lee & Jackson and HDR Engineering. The recommendations from this study were:

"(Option B) Freeway is recommended as a long-range plan for the US 2/52 corridor, with (Option A) Urban Arterial recommended for implementation as a short-range plan."

The report recommended the freeway option because of "issues relating to driver expectancy, traffic operations and safety concerns". Among the issues specified were:

- "The inconsistencies of speed limit paired with high speed rural design.
- Mixing of interchanges, at-grade intersections and traffic signals on the same facility.
- Slow moving weigh station truck traffic merging into high speed traffic from the left side of the roadway."

The report also recommended that the short-range urban arterial concept include features such as:

- "A consistent 40 mph speed limit between logical termini.
- The use of traffic signals combined with partial access control to restrict traffic signal spacing and maintain a safe and efficient facility.
- Highway lighting along developing areas to emphasize the urban nature of the roadway and improve motorist comfort.
- Access control restricting full access intersections to a one-half mile spacing and right-in/right-out only access to one-quarter mile spacing."

The 2000 plan evaluated the bypass between 10th Street SW and 55th Street SE. The corridor was extended west to the US 83 West Bypass for this new evaluation.

Existing Conditions

The existing roadway includes one traffic signal - located at the US 83 West Bypass at the very west end of the corridor - and three traffic interchanges - located at 16th Street SW, South Broadway, and Valley Street. Access, controlled by stop signs on the intersecting streets, is provided at more than ten other locations along the seven-mile corridor.

The rural freeway cross-section of the four-lane facility with ten-foot outside and two-foot inside shoulders - includes a wide median with a drainage ditch, which leads drivers to feel that they're on a rural freeway. Coupled with the low traffic volumes – 8,200 to 13,000 vpd – the rural feel leads to high speeds with the potential for serious accidents.

Within the Minot urban area, the mixture of traffic interchanges with numerous street and driveway access points violates driver expectancy, thus creating another safety issue.

Traffic Data

Traffic counts taken in 1998 and year 2040 forecast volumes are shown in Table 4-3. The 1998 counts ranged from a low of 8,200 vehicles per day (vpd) between Valley Street and 42nd Street SE to a high of 13,000 vpd between 6th Street SE and 13th Street SE. Forecast volumes range from 12,000 vpd between Burdick Expressway West and 16th Street SW to 30,300 vpd between 13th Street SE and Valley Street. The total forecast vehicle-miles of travel on the bypass are 132,680, reflecting an 82 percent increase over 2000. According to the NDDOT 1998 Traffic Volume Map, approximately fifteen percent of traffic on the Bypass is commercial truck traffic.

Table 4-3: US 2/52 Bypass Traffic Volumes

Location	1998 Counts	Forecast Volumes
From US 83 West Bypass to Burdick Expressway West	12,400	12,900
From Burdick Expressway West to 16th Street SW	11,000	12,000
From 16th Street SW to South Broadway	10,200	16,500
From South Broadway to 13th Street SE	11,900	23,700
From 13th Street SE to Valley Street	13,000	30,300
From Valley Street to Burdick Expressway East	8,200	19,100

Description of Options

The two options as defined in the 2000 report for the bypass are presented in Table 4-4. As stated earlier, the report provided options between 10th Street SW and 55th Street SE. Access management options, which adhere to the same access philosophy, are included in the table for locations west of 10th Street SW.

Table 4-4: 2000 Report Options for the US 2/52 Bypass

Location	Existing Conditions	Freeway Option	Urban Arterial Option
US 83 West Bypass	Traffic Signal	Traffic Interchange	Traffic Signal
Burdick Expressway West	Intersection	Traffic Interchange	Traffic Signal
Driveway Access	Intersection	RI/RO Access	RI/RO Access
16th Street SW	Traffic Interchange	Traffic Interchange	Traffic Interchange
10th Street SW	Eastbound RI/RO Access	Eastbound RI/RO Access	Eastbound RI/RO Access
South Broadway	Traffic Interchange	Traffic Interchange	Traffic Interchange
6th Street SE	Intersection	Overpass	Traffic Signal
13th Street SE	Intersection	Traffic Interchange	Traffic Signal
Weigh Station Access	Intersection	Close Weigh Station	Close Weigh Station
20th /23rd Streets SE	Intersection	Half Diamond Traffic Interchange to the East	RI/RO Access
Valley Street	Traffic Interchange	Traffic Interchange	Traffic Interchange
Driveway Access	Intersection	RI/RO Access	Consolidate Driveways
42nd Street SE and NDDOT District Office	Intersection	Half Diamond Traffic Interchange to the West	Traffic Signal at 42nd Street SE; RI/RO Access for NDDOT
Burdick Expressway East	Intersection	Traffic Interchange	Traffic Signal
52nd/53rd/55th Streets SE	Intersections	Close 52nd and 53rd; Overpass on 55th	Close 52nd and 53rd; Partial Access at 55th

RI/RO: right-in and right-out access only

Freeway Option

The freeway option includes: additional traffic interchanges at 13th Street SE, 23rd Street SE, 42nd Street SE, and Burdick Expressway East; right-in/right-out access at 10th Street SW and at consolidated driveway locations between Valley and 42nd Streets; and provides for overpasses at 6th Street SE and 55th Street SE.

For this evaluation, the freeway concept was extended to the west by including a traffic interchange at the US 83 West Bypass and right-in/right-out access at driveways located between Burdick Expressway West and 16th Street SW. Access to and from Burdick Expressway West would be provided with a traffic interchange. Interchange alternatives are discussed at the end of this chapter.

Urban Arterial Option

The urban arterial option includes traffic signals at 6th Street SE, 13th Street SE, 42nd Street SE, and Burdick Expressway East. Access at other locations is generally restricted to right-in/right-out. The urban arterial concept to the west would include traffic signals at US 83 Bypass and Burdick Expressway West. Other locations, west of 16th Street SW, would have right-in/right-out access.

Evaluation Factors

The following factors are considered important in the evaluation of options for the bypass:

- Safety
- Capacity
- Cost

Both the freeway option and the urban arterial options are discussed for each of these evaluation factors below.

Safety

Freeways are generally considered the safest type of roadway because access is managed and controlled, thus limiting conflict points. However, the freeway option as defined includes a number of right-in/right-out access points, which may negate the typical safety benefits of a freeway. The low volume and rural freeway design characteristics will result in travel at higher speeds than with the urban arterial option, thus creating more dangerous conflicts with slower moving urban traffic, particularly at locations where right-in/right-out access is provided.

The urban arterial, as defined with all major intersections traffic signal controlled and right-in/right-out access at other locations, will result in lower speeds and could thus result in less severe crashes. There probably will, however, be more crashes than with the freeway option because of the additional conflicts at the signalized intersections as opposed to grade-separated traffic interchanges.

Capacity

The freeway option provides the most capacity, in the range of 75,000 vehicles per day (vpd), which is well over the maximum forecast volume of 30,300 vpd. The capacity of the urban arterial will be controlled by the traffic signals. Since there will be less traffic on the approach streets than on the bypass, the majority of the green-time at the traffic signals will be given to the bypass, thus a Level of Service C or better can be maintained. Since LOS C is the goal of Minot, either option will provide the desired service level.

Cost

The 2000 report estimated the cost of the freeway option at approximately $30 million and the cost of the urban arterial option at approximately $16 million. These estimates will increase with the extension of the corridor to the west; however, the relative costs should remain the same.

Impacts

The impact on local businesses, all Bypass users and monetary damages to a business if access is modified must be considered in evaluating options.

<u>Recommendation</u>

In the 1970s, the North Dakota Department of Transportation and the City of Minot made a decision to build the US 2/52 Bypass and constructed a grade-separated traffic interchange at its junction with South Broadway. In 1985, a decision was made by the City and NDDOT to construct another grade-separated traffic interchange at the 16th Street SW junction with the Bypass. These two interchanges, plus the previously constructed interchange at Valley Street established the Bypass as a freeway.

Since:

- The City of Minot and the NDDOT have, through decisions made over the past 25 years, established the US 2/52 Bypass as a freeway;
- A freeway is a safer facility than an arterial;
- A freeway will maximize the capacity of the roadway and will operate a higher level of service than an arterial;

It is recommended that:

1. The ultimate US 2/52 Bypass is a freeway.
2. Interim improvements, upgrading the Bypass to an expressway, are made to address current driver expectancy and operational problems on the roadway.

Action items on the Bypass are:

1. The urban arterial option, modified from the 2000 report to an expressway option, should be implemented over the next 10 years.

2. A frontage road master plan serving the entire corridor, as called for in the 2000 report, should be prepared and implemented over the next 5 years.

3. Traffic should be monitored and when volumes reach 20,000 vpd on the bypass, implementation of the freeway option should begin. Depending upon growth rates, this could occur within 10 to 25 years.

The existing conditions and recommended modifications for expressway and freeway options are shown in Table 4-5 and on Figure 4-3.

Table 4-5: US 2/52 Bypass Modified Options

Location	Existing Conditions	Modified Expressway Option	Modified Freeway Option
US 83 West Bypass	Traffic Signal	Modified Traffic Signal	Traffic Interchange
Burdick Expressway West	Intersection	Traffic Signal	Traffic Interchange
Driveway Access	Intersection	RI/RO/LI Access	Convert to Frontage Road Access
16th Street SW	Traffic Interchange	Traffic Interchange	Traffic Interchange
10th Street SW	Eastbound RI/RO Access	Overpass	Overpass
South Broadway	Traffic Interchange	Traffic Interchange	Traffic Interchange
6th Street SE	Intersection	Traffic Signal	Overpass
13th Street SE	Intersection	Traffic Signal	Traffic Interchange
Weigh Station Access	Intersection	Close Weigh Station	Close Weigh Station
20th/23rd Streets SE	Intersection	Traffic Signal at 20th Street SE	Half Diamond Traffic Interchange to the East
Valley Street	Traffic Interchange	Traffic Interchange	Traffic Interchange
Driveway Access	Intersection	RI/RO/LI Access	Convert to Frontage Road Access
42nd Street SE and NDDOT District Office	Intersection	Traffic Signal at 42nd Street; RI/RO/LI Access for NDDOT	Half Diamond Traffic Interchange to the West
Burdick Expressway East	Intersection	Traffic Signal	Traffic Interchange
52nd/53rd/55th Streets SE	Intersections	Convert 52nd and 53rd Access; Intersection at 55th Street SE	Convert 52nd and 53rd Access; Interchange at 55th Street SE

RI/RO: right-in and right-out access only
RI/RO/LI: right-in, right-out, and left-in access only

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Existing Conditions

Expressway Option

Freeway Option

Burdick Expressway West

Intersection
Traffic Signal
Traffic Interchange

16th Street SW

Traffic Interchange
Traffic Interchange
Traffic Interchange

South Broadway

Traffic Interchange
Traffic Interchange
Traffic Interchange

13th Street SE

Intersection
Traffic Signal
Traffic Interchange

20th / 23rd Streets SE

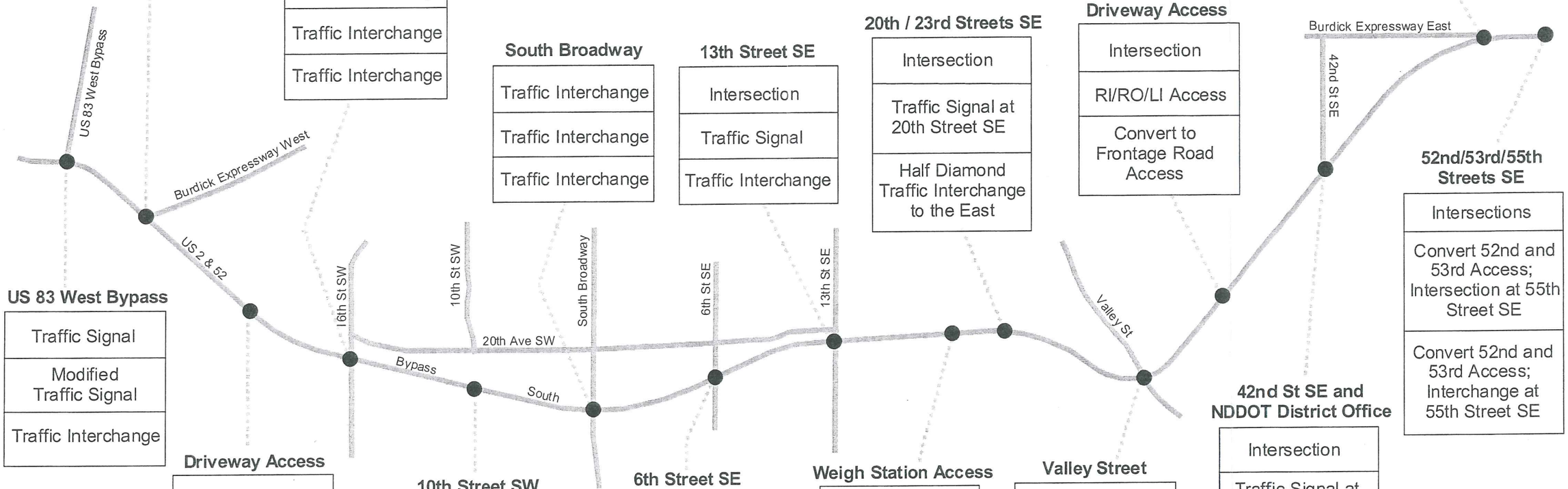
Intersection
Traffic Signal at 20th Street SE
Half Diamond Traffic Interchange to the East

Driveway Access

Intersection
RI/RO/LI Access
Convert to Frontage Road Access

Burdick Expressway East

Intersection
Traffic Signal
Traffic Interchange



US 83 West Bypass

Traffic Signal
Modified Traffic Signal
Traffic Interchange

Driveway Access

Intersection
RI/RO/LI Access
Convert to Frontage Road Access

10th Street SW

Eastbound RI/RO Access
Overpass
Overpass

6th Street SE

Intersection
Traffic Signal
Overpass

Weigh Station Access

Intersection
Close Weigh Station
Close Weigh Station

Valley Street

Traffic Interchange
Traffic Interchange
Traffic Interchange

42nd St SE and NDDOT District Office

Intersection
Traffic Signal at 42nd Street; RI/RO/LI Access for NDDOT
Half Diamond Traffic Interchange to the West

52nd/53rd/55th Streets SE

Intersections
Convert 52nd and 53rd Access; Intersection at 55th Street SE
Convert 52nd and 53rd Access; Interchange at 55th Street SE

US 2/52 Bypass Modified Options

FIGURE 4-3

The modified expressway option includes:

- Reconstruction of the US 83 West Bypass intersection, closing access to the south and creating a left-side merge situation for southbound to eastbound traffic, thus allowing eastbound traffic to continue without stopping.

- Traffic signals at Burdick Expressway West, 6th Street SE, 13th Street SE, 20th Street SE, 42nd Street SE, and Burdick Expressway East.

- Overpass at 10th Street SW to provide a circulation system within the developing commercial area and to provide alternative routes to South Broadway and 16th Street SW.

- Relocation of the weigh station outside of the urban area.

- Right-in/right-out/left-in access at existing driveways and minor streets between Burdick Expressway West and 16th Street SW and between Valley Street and Burdick Expressway East. Right and left turn lanes should be provided at all locations.

The modified freeway option includes:

- Additional traffic interchanges at US 83 West Bypass, Burdick Expressway West, 13th Street SE, 20th Street SE, 42nd Street SE, and Burdick Expressway East.

- All non-interchange access to the freeway will be served by frontage roads.

- Overpasses at 10th Street SW and 6th Street SE to provide a circulation system within the developing commercial area and to provide alternative routes to South Broadway and 16th Street.

Specific projects to implement the recommendations are provided in Table 4-6.

Table 4-6: US 2/52 Projects

Location	Project
Short Range – (0-5 years)	
US 83 West Bypass to 55th Street SE	Prepare a design concept report/environmental report to construct a freeway for the entire corridor to establish right-of-way requirements
Frontage Road Master Plan	Prepare a frontage road master plan in conjunction with the freeway design concept
Weigh Station	Move to outside of the urban area
Burdick Expressway West	Install traffic signal (1)
13th Street SE	Install traffic signal (1)
US 83 West Bypass to Burdick Expressway East	Convert all minor access points to right-in/right-out/left-in movements; construct left- and right-turn lanes as needed
Mid Range – (5-15 years)	
6th Street SE	Install traffic signal
10th Street SW	Construct an overpass over the Bypass
20th Street SE	Install traffic signal when warranted
42nd Street SE	Install traffic signal when warranted
Burdick Expressway East	Install traffic signal when warranted
US 83 West Bypass/Burdick Expressway West	Construct two half-diamond traffic interchanges with frontage road connection (2)
US 83 West Bypass to 16th Street SW	Convert to frontage road access
Long Range – (15+ years)	
6th Street SE	Construct an overpass over the Bypass
13th Street SE	Construct Traffic Interchange
20th Street SE	Construct Traffic Interchange
42nd Street SE	Construct Traffic Interchange
Burdick Expressway East	Construct Traffic Interchange
55th Street SE	Construct Traffic Interchange
U 83 West Bypass to 55th Street SE	Convert all other access to frontage road access

(1) Traffic signals should be installed at 13th Street SE and Burdick Expressway West to help define the corridor as an urban arterial and to slow traffic, even if signal warrants are not met. Other signals should be installed as warranted.
(2) The suggested interchange configuration is a half-diamond to the west at US 83 West Bypass and a half-diamond to the east at Burdick Expressway West with one-way frontage roads connecting the ramp terminals. This suggestion is subject to review in subsequent design concept reports.

US 2/52 Bypass: West End Interchange Alternatives

The west end of the US 2/52 Bypass - encompassing the intersections of the Bypass with the US 83 West Bypass and the West Burdick Expressway - has been an issue within the City for a number of years. The May 2000 Minot Transportation Plan Update did not include these intersections, and the Project Concept Report prepared in May 1999 by the NDDOT dealt only with the US 83 West Bypass intersection.

As part of this planning study, four alternative roadway configurations for these two intersections with the US-2/52 Bypass have been identified. These four alternatives are discussed below and illustrated in Figures 4-6 to 4-9, which are included at the end of this chapter. All of the alternatives will accommodate the forecast traffic.

The alternative evaluation is based upon interchange configurations laid out on aerial photos. Considerably more detailed engineering will be required before a final decision can be made and cost estimates prepared.

Alternative A, Frontage Road Connection

The Frontage Road Connection Alternative includes a half-diamond interchange to the west at the junction of the US 2/52 Bypass and the US-83 West Bypass, and a half-diamond interchange to the east at the junction of the US-2/52 Bypass and West Burdick Expressway. One-way frontage roads provide connections between the two half-diamonds. With this configuration, eastbound traffic on the US 2/52 Bypass wanting to access either the US 83 West Bypass or West Burdick Expressway would exit at the US-83 West Bypass off-ramp. Westbound traffic wanting to access either roadway would exit at the West Burdick Expressway off-ramp.

Alternative A Evaluation:

- Maintains the existing alignment of the US 83 West Bypass and West Burdick Expressway.
- Provides connectivity between the US 83 West Bypass and West Burdick Expressway without requiring travel on the US 2/52 West Bypass.
- Provides the driver with a familiar situation with a traditional interchange configuration.
- Involves the construction of new structures over the US 2/52 Bypass for the two interchanges and widening the structures over the railroad tracks to accommodate the frontage roads.
- Will probably encroach upon the residential neighborhood south of the US 2/52 Bypass near the US 83 West Bypass.

Alternative B, West Burdick Expressway Extension

The West Burdick Expressway Extension Alternative is similar to Alternative A in that it includes a half-diamond interchange to the west at the junction of the US 2/52 Bypass and the

US-83 West Bypass, and a half-diamond interchange to the east at the junction of the US-2/52 Bypass and West Burdick Expressway. However, instead of connecting the two half-diamonds with frontage roads, West Burdick Expressway access to the west is provided by extending both the West Burdick Expressway and the US-83 West Bypass to an intersection at a point south of the US-2/52 Bypass.

Alternative B Evaluation:

- Maintains the current alignments of West Burdick Expressway and US 83 West Bypass.
- Provides connectivity between West Burdick Expressway and US 83 West Bypass without requiring travel on the US 2/52 West Bypass.
- Provides access to West Burdick Expressway and to the US 83 West Bypass for land south of the US 2/52 Bypass.
- Involves the construction of three structures: two at the interchanges with the US 2/52 Bypass and the third over the railroad tracks.
- Provides non-traditional access to and from the US 2/52 bypass, thus placing drivers in unfamiliar driving patterns.
- Traverses difficult topography south of the US 2/52 Bypass.
- May infringe upon a Superfund Site located south of the Bypass.

Alternative C, West Burdick Expressway Relocation

The West Burdick Expressway Relocation Alternative involves the relocation of a portion of West Burdick Expressway southeast of its present location in order to provide adequate interchange spacing along the US-2/52 Bypass. A full diamond interchange would be constructed at the relocated West Burdick Expressway and a full interchange, with one loop ramp, would be constructed at the US 83 West Bypass.

Alternative C Evaluation:

- Provides direct access to both West Burdick Expressway and the US 83 West Bypass from the US 2/52 Bypass.
- Allows for two separate interchanges because of improved spacing.
- Provides the driver with a familiar situation with a traditional interchange configuration.
- Involves the construction of two structures for the two interchanges.
- Would increase traffic immediately adjacent to residential area south of the US 2/52 Bypass and US 83 West Bypass interchange.
- Would impact businesses along West Burdick Expressway because of the re-alignment.

Alternative D, US-83 West Bypass Relocation

The US-83 West Bypass Relocation Alternative includes the relocation of the US-83 West Bypass to the west to provide adequate interchange spacing along the US-2/52 Bypass. Full-diamond interchanges would be constructed at the junction of the US-2/52 Bypass with both West Burdick Expressway and the US-83 West Bypass.

Alternative D Evaluation:

- Allows for two separate interchanges because of improved spacing.

- Requires a new interchange on the US 83 West Bypass at 4th Avenue NW because of the relocation.

- Provides the driver with a familiar situation with a traditional interchange configuration.

- Involves the construction of new structures over the US 2/52 Bypass for the two interchanges and structures over the railroad tracks and the river on the relocated US 83 West Bypass. Some widening of the US 2/52 Bypass structures over the railroad tracks would be required to accommodate the West Burdick Expressway ramps.

- Would involve environmental issues near the river with the relocation of the US 83 West Bypass.

Conclusions

Based upon this preliminary evaluation of alternatives, it appears that Alternative A, the Frontage Road Connection Alternative is the best option for the following reasons:

- All other alternatives involve the acquisition of right-of-way outside of the US 2/52 Bypass corridor for either the US 83 West Bypass or West Burdick Expressway relocation or for additional roadway construction. Additional right-of-way will probably be required for Alternative A; however, it will be considerably less than any of the other alternatives and will be adjacent to the US 2/52 Bypass.

- Alternative A is less disruptive to existing development because it does not require additional right-of-way corridors.

- Alternative A can be implemented without a lengthy environmental process because of the minimal new right-of-way requirements.
- Alternative A appears to be the least expensive of the alternatives.

As stated at the beginning of this section, the alternative evaluation is based upon interchange configurations laid out on aerial photos and considerably more detailed engineering will be required before a final decision can be made and cost estimates prepared.

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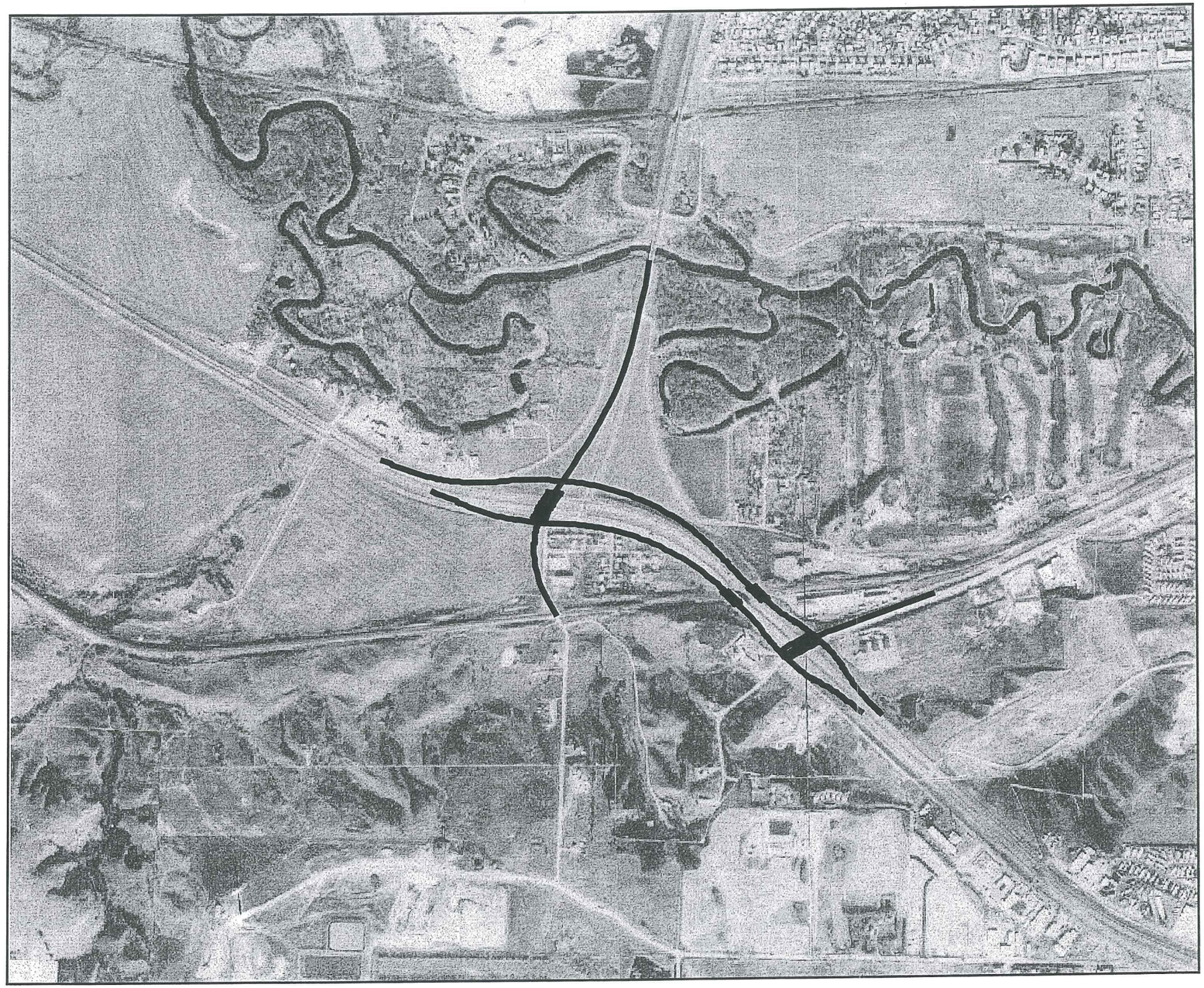

Alternative A

- Half-Diamond to the west at US 83 West Bypass
- Half-Diamond to the east at West Burdick Expressway
- One-Way Frontage-Road Connection

US 2/52 Bypass West Alternative A

FIGURE 4-4

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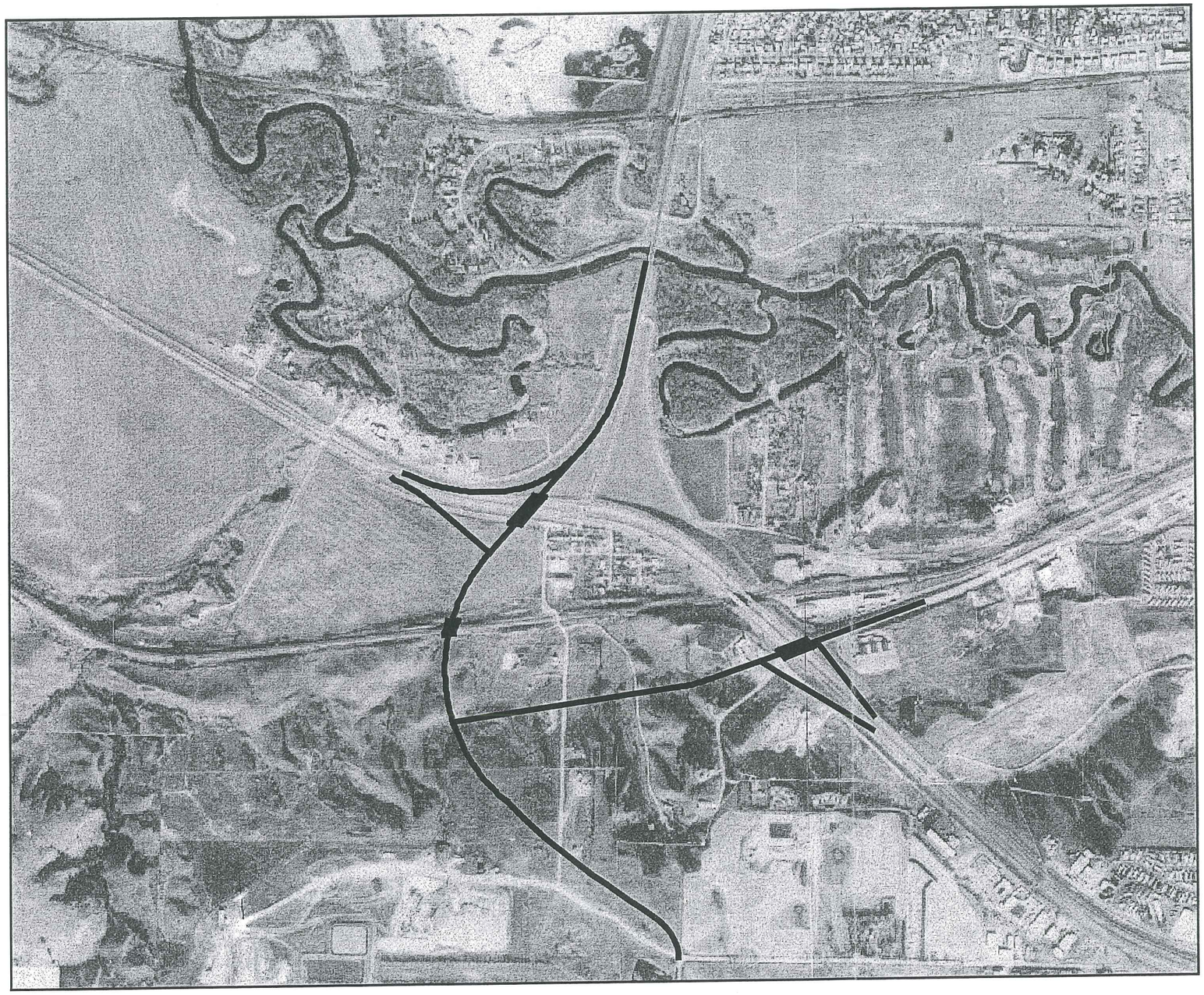

Alternative B

- Half-Diamond to the east at West Burdick Expressway
- West Burdick Expressway access to the west provided by extending West Burdick Expressway and US 83 West Bypass to intersect south of US 2/52 Bypass
- Half Diamond to the west at US 83 West Bypass

US 2/52 Bypass West Alternative B

FIGURE 4-5

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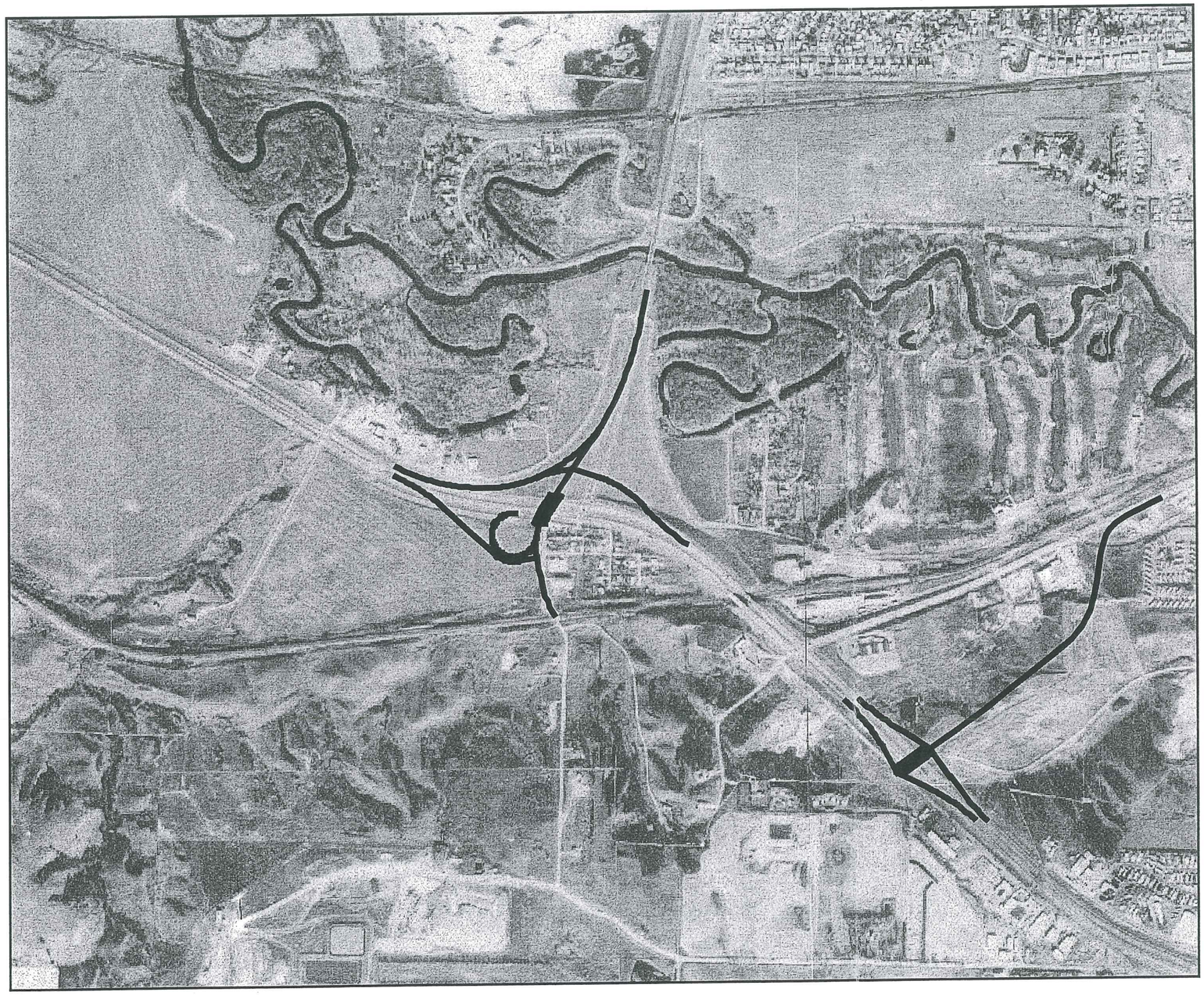

Alternative C

- Relocate West Burdick Expressway to the east to provide adequate interchange spacing
- Full Diamond at West Burdick Expressway
- Full Interchange at US 83 West Bypass

US 2/52 Bypass West Alternative C

FIGURE 4-6

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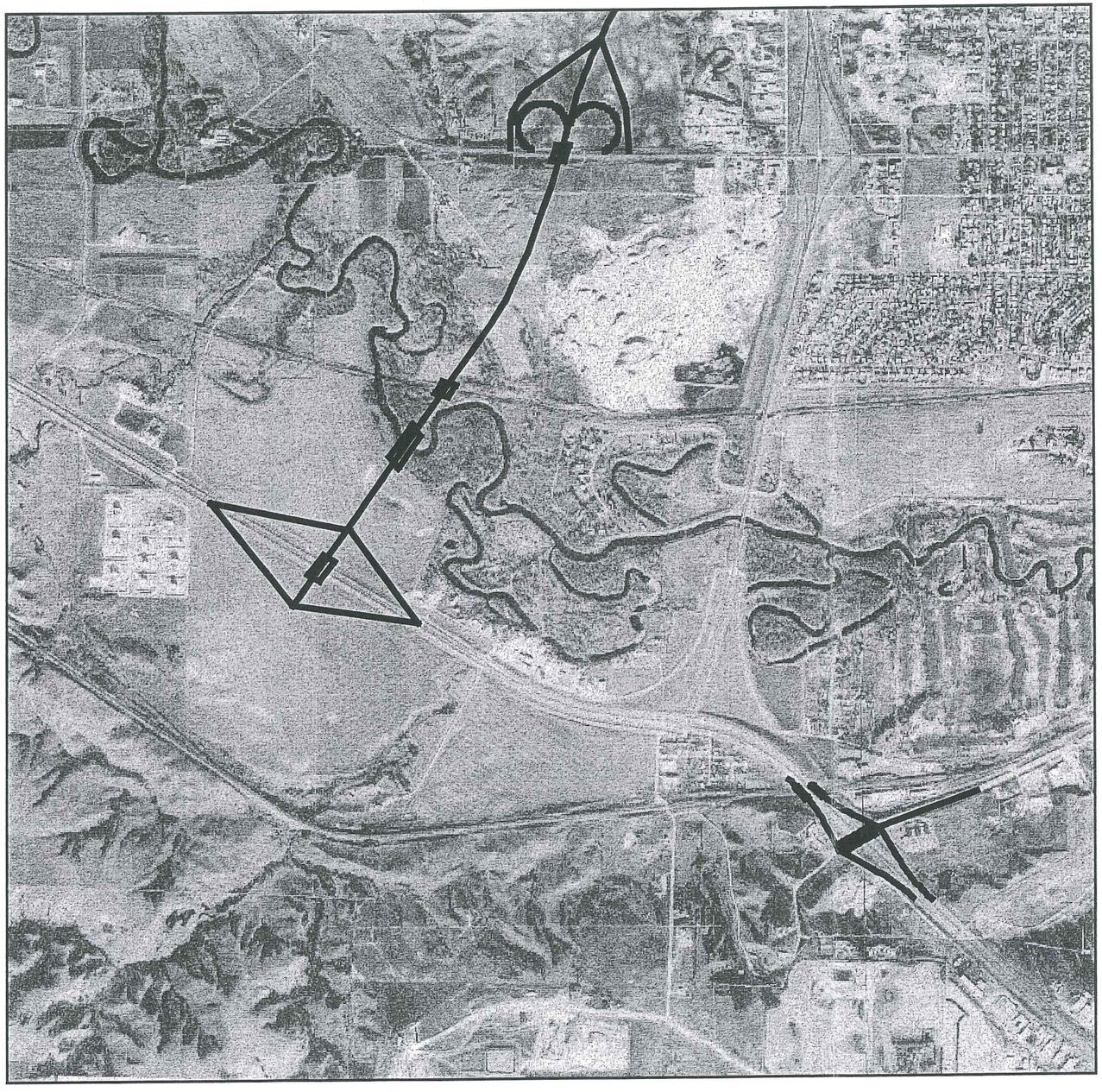

Alternative D

- Relocate US 83 West Bypass to the west to provide adequate interchange spacing
- Full Diamond at West Burdick Expressway
- Full Diamond at US-83 West Bypass
- New Interchange at US 83 West Bypass and 4th Avenue NW

US 2/52 Bypass West Alternative D

FIGURE 4-7

5. TRANSPORTATION PLAN

Included in this chapter are the recommended transportation Plan for the City of Minot and an implementation plan designating specific transportation improvement projects. The chapter concludes with an overview of environmental issues that must be dealt with in implementing the Plan.

RECOMMENDED TRANSPORTATION PLAN

The recommended Minot Transportation Plan is shown in Figure 5-1. The Plan includes three classifications of roadways, defined to reflect conditions and potential project funding in Minot.

- Principal arterial streets are designed to carry traffic. Access may be limited to other major arterial or major collector streets, with spacing limited to a minimum of one-half mile. Either intersections or interchanges are allowable. The US 2/52 Bypass, US 83 West Bypass, and the proposed East Bypass are limited access Principal Arterials and are funded with Regional Primary funds.

  Principal arterial streets such as Broadway, Burdick Expressway, and Valley Street are also designed to carry traffic, but do provide some access to local and collector streets, and to major businesses. Improvements to these principal arterial streets are funded with Regional Secondary Funds. Principal arterials will carry the majority of non-resident generated traffic and truck traffic within the City.

- Minor arterial streets are intended to provide access within Minot. For the most part, they have developed with extensive residential driveway access and therefore are not suitable for truck traffic nor will they carry large volumes. They do provide alternative routes to the arterials for residents. Minor arterial projects are funded with Urban Roads Funds.

- Collector streets provide routes for short trips or to higher classified streets. Collector street projects are also funded with Urban Roads Funds.

Regional Primary and Regional Secondary funds are controlled by the NDDOT and used to fund highway improvement projects throughout the State. Urban Roads funds, allocated to the City through the NDDOT, are Federal funds that require a 20% match from the City. Minot has historically received about $1.5 million per year of Urban Roads funds.

The NDDOT uses three roadway classifications: principal arterial, minor arterial, and collector. NDDOT principal arterial streets include both the principal and major arterials used in the City of Minot classification system.

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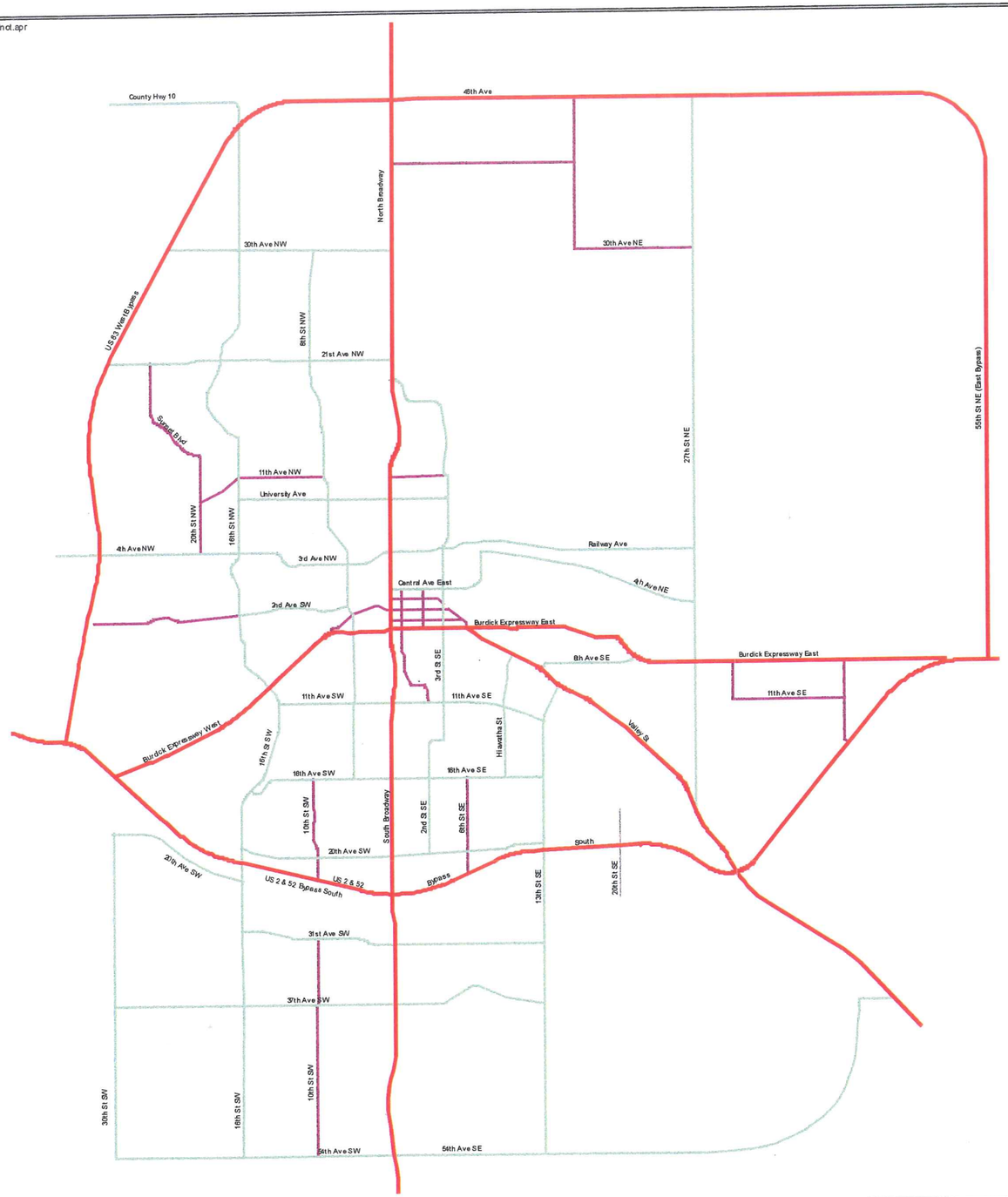

Functional Classification

- Principal Arterial
- Minor Arterial
- Collector

Proposed Transportation Plan

FIGURE 5-1

PLAN IMPLEMENTATION PROGRAM

The implementation program for the Minot Transportation Plan in presented in this section. The program has been divided into three time frames: short – 0 to 5 years, mid – 6 to 15 years, and long – 16 to 40 years. Projects within each timeframe are listed in Tables 5-1, 5-2, and 5-3. Urban Road Fund projects are shown graphically on Figure 5-2; US 2/52 Bypass Regional Primary Fund projects are shown in Figure 5-3; and US 83 West Bypass and East Bypass projects are shown in Figure 5-4.

Table 5-1: Short Range (0 – 5 Year) Improvement Projects

LOCATION	PROJECT
37th Avenue SE from 2nd Street SE to 13th Street SE	Pave roadway when adjacent development warrants
13th Street SE from south of US-2/52 Bypass to 37th Avenue SE	Pave roadway when adjacent development warrants
30th Avenue NW from US 83 West Bypass to 8th Street NW	Pave roadway
27th Street SE/Valley Street	Construct grade separation
US 2/52 Bypass: US 83 West Bypass to 55th Street SE	Prepare a design concept report/environmental report to construct a freeway for the entire corridor to establish right-of-way requirements
US 2/52 Bypass: Frontage Road Master Plan	Prepare a frontage road master plan in conjunction with the freeway design concept
US 2/52 Bypass: Weigh Station	Move to outside of the urban area
US 2/52 Bypass: Burdick Expressway West	Install traffic signal (1)
US 2/52 Bypass: 13th Street SE	Install traffic signal (1)
US 2/52 Bypass: US 83 West Bypass to Burdick Expressway East	Convert all minor access points to right-in/right-out/left-in movements; construct left- and right-turn lanes as needed
US 83 West Bypass	Manage access – Do not allow driveway access
East Bypass	Manage access – Do not allow driveway access

(1) Traffic signals should be installed at 13th Street SE and Burdick Expressway West to help define the corridor as an urban arterial and to slow traffic, even if signal warrants are not met. Other signals should be installed as warranted.

Table 5-2: Mid Range (6 - 15 Year) Improvement Projects

LOCATION	PROJECT
3rd Street SE/2nd Street SE Transition at 14th Avenue SE	Align roadway
16th Street NW from 21st Avenue NW to West Bypass	Construct roadway as development occurs
16th Street SW from 26th Avenue SW to 37th Avenue SW	Widen to four lanes when volume approaches 10,000 vpd
31ST Avenue SE from 9th Street SE to 13th Street SE	Construct roadway as development occurs
Broadway	Monitor traffic and make spot improvements as needed
US 2/52 Bypass: 6th Street SE	Install traffic signal
US 2/52 Bypass: 10th Street SW	Construct an overpass at the bypass
US 2/52 Bypass: 20th Street SE	Install traffic signal when warranted
US 2/52 Bypass: 42nd Street SE	Install traffic signal when warranted
US 2/52 Bypass: Burdick Expressway East	Install traffic signal when warranted
US 2/52 Bypass: US 83 West Bypass/Burdick Expressway West	Construct two half-diamond traffic interchanges with frontage road connection (1)
US 2/52 Bypass: US 83 West Bypass to 16th Street SW	Close all access not provided by traffic interchanges
US 83 West Bypass	Widen to four lanes
US 83 West Bypass: 21st Avenue NW	Install traffic signal when warranted
US 83 West Bypass: 30th Avenue NW	Install traffic signal when warranted
US 83 West Bypass: Ward County Highway 10	Install traffic signal when warranted

(1) The suggested interchange configuration is a half-diamond to the west at US 83 West Bypass and a half-diamond to the east at Burdick Expressway West with one-way frontage roads connecting the ramp terminals. This suggestion is subject to review in subsequent design concept reports.

Table 5-3: Long Range (16 - 40 Year) Improvement Projects

LOCATION	PROJECT
East Bypass: 55th Street East at BNSF tracks	Construct railroad overpass
13th Street SE at Valley Street	Construct railroad overpass
US 2/52 Bypass: 6th Street SE	Construct an overpass at the bypass
US 2/52 Bypass: 13th Street SE	Construct traffic interchange
US 2/52 Bypass: 20th Street SE	Construct traffic interchange
US 2/52 Bypass: 42nd Street SE	Construct traffic interchange
US 2/52 Bypass: Burdick Expressway East	Construct traffic interchange
US 2/52 Bypass: 55th Street SE	Construct traffic interchange
US 2/52 Bypass: US 83 West Bypass to 55th Street SE	Convert non-interchange access to Frontage road access
US 83 West Bypass: 21st Avenue NW	Construct traffic interchange
US 83 West Bypass: 30th Avenue NW	Construct traffic interchange
US 83 West Bypass: Ward County Highway 10	Construct traffic interchange
US 83 West Bypass: US 2/52 Bypass to North Broadway	Convert non-interchange access to frontage road access
East Bypass: North Broadway to Valley Street	Install traffic signals when warranted

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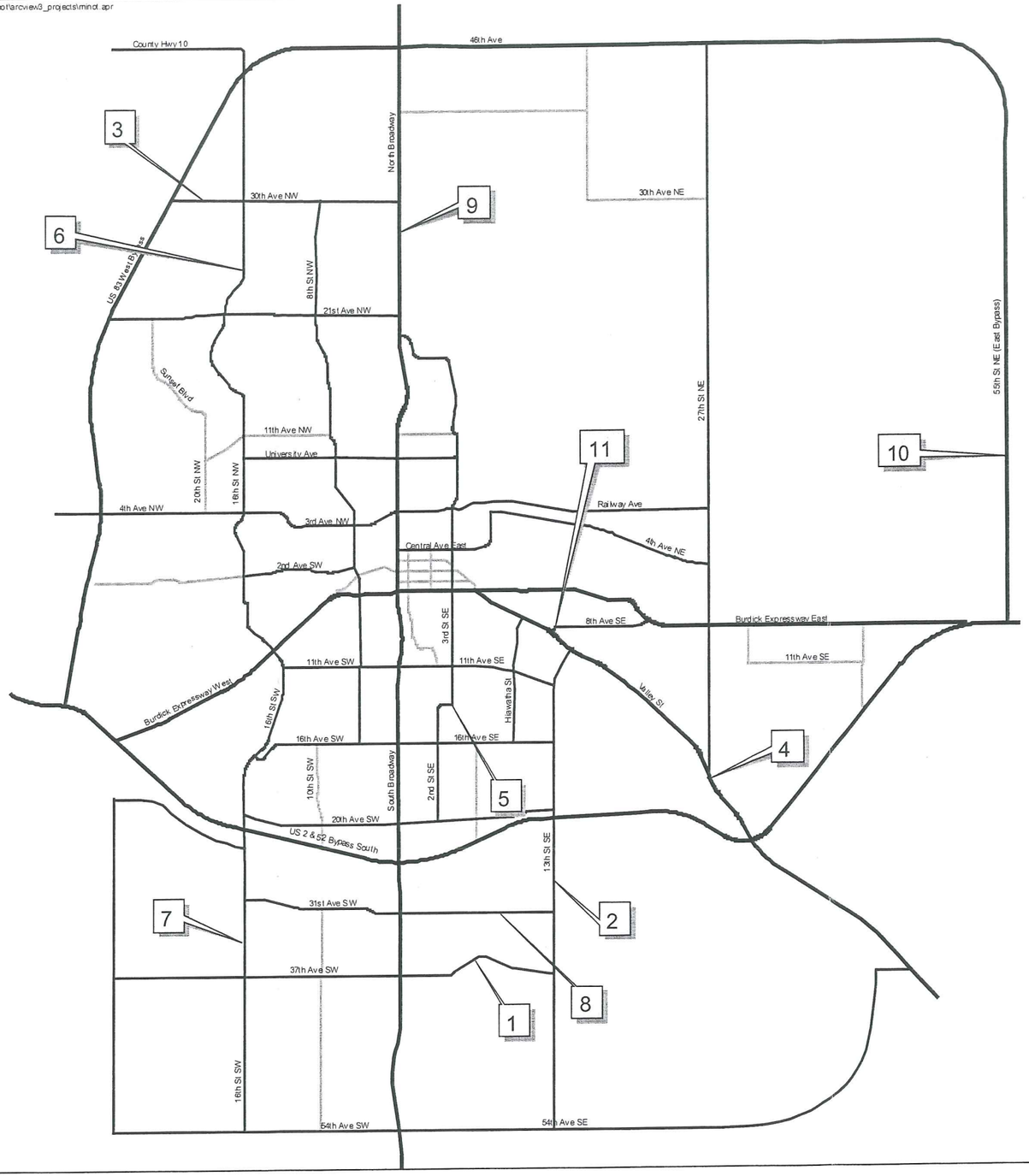


LOCATION / PROJECT

Short Range

1	37th Avenue SE from 2nd Street SE to 13th Street SE	Pave Roadway
2	13th Street SE from south of US-2/52 Bypass to 37th Avenue SE	Pave Roadway
3	30th Avenue NW from US 83 West Bypass to 8th Street NW	Pave Roadway
4	27th Street SE / Valley St	Grade Separation
5	3rd Street SE / 2nd Street SE Transition at 14th Avenue SE	Align Roadway

Mid Range

6	16th Street NW from 21st Avenue NW to West Bypass	Construct Roadway
7	16th Street SW from 26th Avenue SW to 37th Avenue SW	Widen to Four Lanes
8	31st Avenue SE from 9th Street SE to 13th Street SE	Construct Roadway
9	Broadway	Spot Improvements as Needed

Long Range

10	East Bypass	Construct Railroad Overpass
11	13th Street SE at Valley Street	Construct Railroad Overpass

Urban Roads Projects

FIGURE 5-2

Short, Mid Range Improvements

- **Prepare Design Concept / Environmental Report**
- **Prepare Frontage Road Master Plan**

Traffic Interchange (Mid Range)

Traffic Signal (Short Range)

RI/RO/LI Access (Short Range)

Traffic Interchange (Mid Range)

Convert Access (Mid Range)

US 83 West Bypass

Burdick Expressway West

US 2 & 52

16th St SW

10th St SW

Overpass (Mid Range)

South Broadway

Traffic Signal (Short Range)

6th St SE

13th St SE

Move Weigh Station (Short Range)

Traffic Signal at 20th St SE (Mid Range)

20th Ave SW

Bypass

South

Valley St

RI/RO/LI Access (Short Range)

RI/RO/LI at 52nd St SE and 53rd St SE; Intersection at 55th St SE (Mid Range)

Traffic Signal at 42nd St SE (Mid Range)

Traffic Signal (Mid Range)

Burdick Expressway East

42nd St SE

Traffic Interchange (Long Range)

Convert 52nd St SE and 53rd St SE Access; Interchange on 55th St SE (Long Range)

Traffic Interchange (Long Range)

Traffic Interchange (Long Range)

Overpass (Long Range)

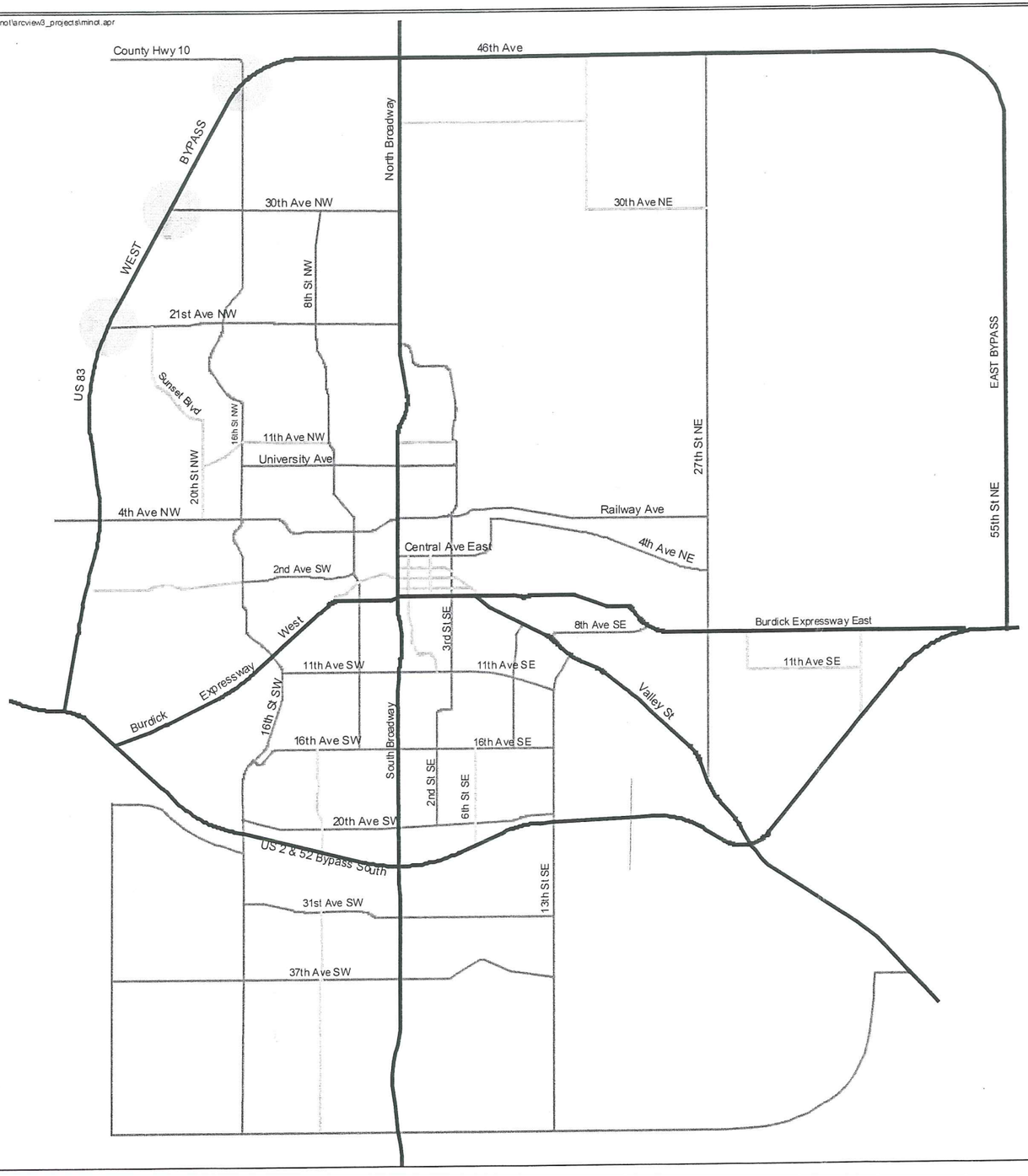
Traffic Interchange (Long Range)

Convert Access (Long Range)

Long Range Improvements

US 2/52 Bypass Projects

FIGURE 5-3



US 83 West Bypass

Manage Access

LOCATION	PROJECT
Mid Range	
21st Ave NW	Install Traffic Signal
30th Ave NW	Install Traffic Signal
County Highway 10	Install Traffic Signal
US 2/52 Bypass to North Broadway	Widen to four lanes
Long Range	
21st Ave NW	Construct Traffic Interchange
30th Ave NW	Construct Traffic Interchange
County Highway 10	Construct Traffic Interchange

East Bypass

Manage Access

US 83 West Bypass and East Bypass Projects

FIGURE 5-4

PLAN IMPLEMENTATION – FUNDING ANALYSIS

The purpose of this section is to present the funding analysis on the improvement projects identified in the previous section.

The primary sources of funds for major roadway construction projects in the City of Minot are Regional System funds, which are used to fund principal arterial street projects such as the US-2/52 Bypass and other State Highway projects, and Urban Roads Funds, which are used to fund minor arterial street projects. A discussion of each of these funding sources and the identified projects within each are presented below.

Regional System Projects

The NDDOT has about $14 million per year to distribute on State Highways in Urban Areas throughout the State.

The Regional System projects in Minot include the short, mid, and long range improvements on the US 2/52 Bypass and the US 83 West Bypass. The 2000 Minot Transportation Plan Update included a cost estimate for the US 2/52 Bypass of $15.3 to $16.5 million for the urban arterial option, $28.7 to $31.2 million for the freeway option, and $2.8 to $3.3 million for right-of-way. These estimates did not include the Burdick Expressway and US 83 West Bypass interchanges, the latter of which was estimated at between $1.6 million and $9.0 million in the Project Concept Report prepared in 1999 by the NDDOT.

The City-preferred alternative for the US 83 West Bypass interchange is a partial interchange, half diamond concept at a estimated cost of just under $5.0 million. The split (two half) diamond option for the combination US 83 West Bypass and Burdick Expressway interchanges appears to be the best option from the evaluation completed for this report. Therefore, for planning purposes, it is estimated that the combination of the two interchanges will cost approximately $10 million. Adding this to the maximum freeway estimate of $31.2 million and the maximum right-of-way estimate of $3.3 million from the 2000 Minot Transportation Plan, results in a total of $44.5 million for the US 2/52 Bypass freeway.

Starting with the $44.5 million estimate and providing an allowance for interim improvements to be completed in the short and mid ranges, a planning level estimate for the US 2/52 Bypass is $50 million. Given that the implementation time frame is 40 years, during which time, at current funding levels, the NDDOT will have $560 million to distribute among Urban Areas in the State, Minot would need about nine percent of the available Regional System dollars to complete the US 2/52 Bypass.

The US 83 West Bypass is also recommended for construction during this time frame. Assuming the three interchanges would cost about $7 million each and widening the roadway to four lanes would cost $15 million (at $3 million per mile) and adding a contingency factor, this Bypass could be constructed for approximately $40 million, another seven percent of the Regional System funds. Thus both the US 2/52 Bypass and the US 83 West Bypass could be completed for about sixteen percent of the Regional System funds over the next 40 years.

Urban Roads Projects

Minot receives approximately $1.5 million annually in Urban Roads Funds. Other funds used for these projects may include assessment districts, mill levy, sales tax and, where appropriate, county highway funds. The local share of the 2002-2006 Capital Improvements program includes $11,516,000 for regional and urban street system projects of which $6,319,000 is funded with the Highway Fund/sales tax.

The planning level cost estimates for Urban Roads projects are given in Table 5-4.

Table 5-4: Urban Roads Projects Funding Analysis

LOCATION	PROJECT	COST ESTIMATE
Short Range		
37th Avenue SE from 2nd Street SE to 13th Street SE	Pave Roadway	$450,000.00
13th Street SE from south of US-2/52 Bypass to 37th Avenue SE	Pave Roadway	$450,000.00
30th Avenue NW from US 83 West Bypass to 8th Street NW	Pave Roadway	$361,000.00
27th Street SE / Valley Street	Grade Separation	$3,053,000.00
	Short Range Total	**$4,314,000.00**
Mid Range		
3rd Street SE / 2nd Street SE Transition at 14th Avenue SE	Align Roadway	$300,000.00
16th Street NW from 21st Avenue NW to West Bypass	Construct Roadway	$2,000,000.00
16th Street SW from 26th Avenue SW to 37th Avenue SW	Widen to Four Lanes	$700,000.00
31st Avenue SE from 9th Street SE to 13th Street SE	Construct Roadway	$750,000.00
Broadway	Spot Improvements as Needed	-
	Mid Range Total	**$3,750,000.00**
Long Range		
East Bypass 55th Street East at BNSF tracks	Construct Railroad Overpass	$3,000,000.00
13th Street SE at Valley Street	Construct Railroad Overpass	$3,000,000.00
	Long Range Total	**$6,000,000.00**

The short range list of projects includes two projects, the 37th Avenue SE and 13 Street SE projects that are not included in the current program. These two projects, at an

estimated total cost of $900,000 can be included in the 2007 apportionment of Urban Roads Funds.

The estimated cost of the four mid range projects is $3,750,000. These projects can be funded with the $22.5 million that will be available over the 15 year mid range period. Likewise, the two long range projects, at an estimated $6,000,000 can easily be covered in the 25-year long range period.

PLAN IMPLEMENTATION – ENVIRONMENTAL ISSUES

Several environmental issues must be dealt with in implementing specific transportation improvement projects. These issues are briefly summarized below.

Cultural Resources

Several Class 1 historical surveys have been done in the Minot area and are available at the State Historical Society. Specific transportation plans or land developments must be reviewed for potential impact on cultural or historic resources by the North Dakota Department of Transportation through the office of the Cultural Resources Director. North Dakota is somewhat unique in that while primary responsibility for Section 106 review of federally funded projects remains with the state of North Dakota, the State Historic Preservation Office (SHPO) defers to the Cultural Resources Director for review of most transportation projects.

Stream Crossings/Wetlands

The most prominent topographic feature in the study area is the presence of the Souris (Mouse) River, which runs through the City of Minot. The river and its associated drainages have entrenched into the surrounding glacial moraine topography. The National Wetland Inventory (NWI) maps indicate wetlands associated with the river and its tributaries (Figure 5-5). In addition to the stream network, the moraine topography in this area is also marked by hills and plains with shallow depressions. Many of these depressions are indicated as wetlands on the NWI maps, although after recent court rulings, some isolated wetlands might no longer be regulated by the US Army Corps of Engineers (COE).

When specific corridors or project areas are identified for improvements, wetland impacts must be assessed with on-site investigations. Wetland areas must be delineated, and a determination must be made whether they are within the jurisdiction of the COE. If they are, a section 404 permit will be required for the project, and impacts may require compensatory mitigation.

Floodplains

Many areas in and around the City of Minot are within the 100-year floodplain of the Souris River or its tributaries. Planned improvements must comply with the City of Minot flood protection requirements. These ordinances regulate construction activities with the potential to change flood levels within the community.

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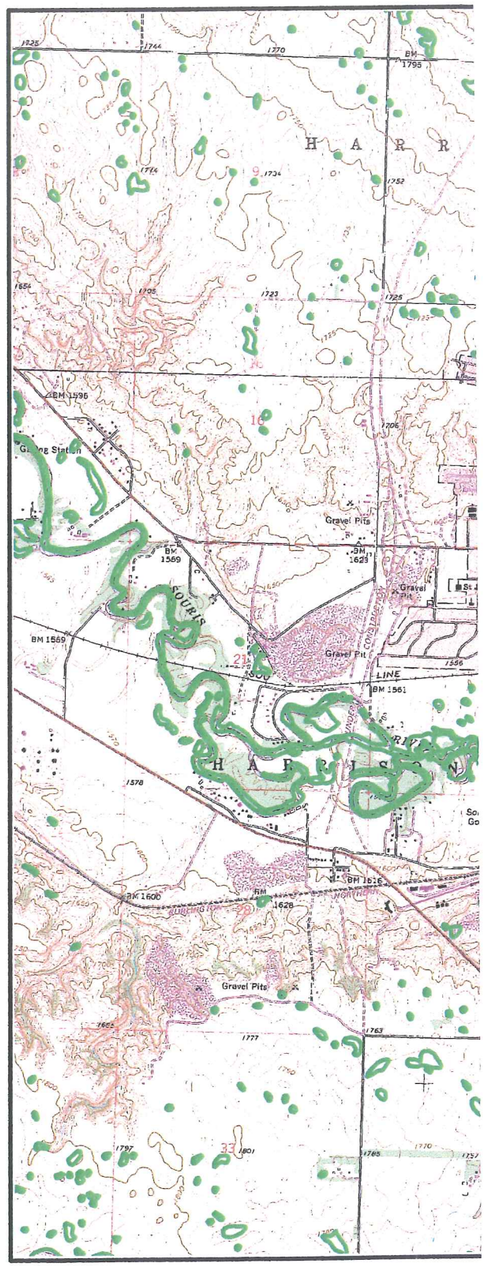


NWI Wetlands

USGS 7.5 MINUTE TOPOGRAPHIC MAP
Burlington, Deering SW, Minot,
Minot NW, and Surrey Quadrangles

0.5 0 0.5 1 Mile

National Wetlands Inventory

FIGURE 5-5

Endangered/Threatened Species and Critical Habitat

The primary contact for information regarding endangered or threatened species, or their critical habitat, is the Ecological Services Division of the US Fish and Wildlife service in Bismarck. Several federal threatened and endangered species are known to occur in Ward County, such as bald eagle (*Haliaeetus leucocephalus*), piping plover (*Charadrius melodus*), whooping crane (*Grus americana*), and gray wolf (*Canis lupus*). The State of North Dakota, Division of Conservation and Communication, provides expertise on government projects, however they do not keep a separate list of endangered or threatened species.

Any project that might impact these species or their habitat should be coordinated with these agencies.

Air Quality

The City of Minot is not located in a non-attainment area and therefore there is no air quality implementation plan. Transportation projects for new roads or projects which increase traffic flow on existing roads may require an air quality study. If it can be shown from previous analyses from similar projects, or from simplified graphical or "look-up" tables, that the alternative would result in carbon monoxide (CO) impacts well below the 1- and 8-hour National Ambient Air Quality Standards, no further study is necessary. If, however, a microscale CO analysis shows that a preferred alternative would result in violations of the 1- or 8-hour CO standards, an effort should be made to develop reasonable mitigation measures through early coordination between FHWA, EPA, and the North Dakota Department of Health – Division of Air Quality.

Socioeconomic

Transportation improvements and land use changes arising from this planning effort must be evaluated according to their probable beneficial and adverse social and economic impacts on a community. The issues that must be evaluated are complex and should be addressed early in the transportation planning process.

Impacts on the regional or local economy

The economic impacts may include tax revenues and public expenditures, employment opportunities, retail sales, and development within or outside of central business districts. Economic impacts may be direct, for example the establishment of highway-related businesses; or indirect, such as the loss of business or employment resulting from building an alternative on a new location bypassing a neighborhood or local community. Where substantial impacts on the economic viability of neighborhoods are likely to occur, the discussion should include efforts to use the transportation investment to support both public and private economic development plans.

Possible relocation issues should be addressed. The discussion should include efforts to avoid displacements, or mitigate displacements where unavoidable. Early and extensive public involvement is necessary to identify and resolve relocation concerns. Specific financial and incentive programs, such the Uniform Relocation Act, should be identified and pursued.

Transportation Enhancements

The positive impacts of transportation projects should be highlighted and promoted. Transportation-related activities designed to strengthen the cultural, aesthetic, and environmental aspects of the transportation system may be eligible for federal funds under the Transportation Equity Act for the 21st Century. Transportation Enhancement projects are divide into three categories: 1) bicycle and pedestrian, 2) scenic and environmental, and 3) historic. Bicycle and Pedestrian projects include: a) the construction of bicycle and pedestrian facilities, b) preservation of abandoned railway corridors including the conversion for use as bicycle or pedestrian trails, and c) provision of safety and educational activities for pedestrians and bicyclists. Scenic and Environmental projects include: a) scenic highway programs, b) landscaping and other scenic beautification, c) control and removal of outdoor advertising, d) tourist and welcome centers, and e) environmental mitigation to address water pollution due to highway runoff or reduce vehicle-caused wildlife mortality while maintaining habitat connectivity. Historic projects include: a) historic highway programs, b) historic preservation studies and/or rehabilitation and operation of historic transportation buildings, structures, or facilities, and c) establishment of transportation museums.

Some of the criteria used for project selection in North Dakota are: benefit to the community, region, or state; environmental impact of the proposed project; anticipated number of users; benefits provided to the existing transportation system; and support of other local organizations or the general public.

Environmental Justice

The Executive Order on Environmental Justice (EO 12898) was signed by President Clinton on February 11, 1994. The executive order required that, to the extent practicable and permitted by law, neither low income nor minority populations may receive disproportionately high or adverse impacts as a result of a proposed project. Federal agencies must take necessary steps to identify and address "disproportionately high and adverse" effects of federal projects on the health or environment of low-income and minority populations. Also, representatives of any low-income or minority populations in the community that may be affected by a project must be given the opportunity to be included in the impact assessment and public involvement process.

For any specific project, any impacted minority and low-income populations should be included in the planning process. In addition, the project should be designed so that benefits are equally available to all members of the community, including minority and low-income.

Changes in neighborhoods or community cohesion

These changes may be beneficial or adverse. Projects must be evaluated according to whether impacts include splitting neighborhoods, isolating a portion of a neighborhood or an ethnic group, generating new development, changing property values, or separating residents from community facilities.

Changes in travel patterns and accessibility

Transportation projects must be assessed as to whether they improve vehicular, commuter, bicycle, or pedestrian travel.

Impacts on school districts, recreational areas, churches, businesses, police, and fire protection.

Project evaluation should include both direct impacts to these entities and the indirect impacts resulting from the displacement of households and businesses.

Hazardous Waste Sites

Hazardous waste sites are regulated by the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). A list of such sites, as well as other sites identified by the North Dakota Department of Health, Division of Water Quality, are shown on Figure 5-6. The Minot landfill in southwest Minot was listed as a Superfund site, but was removed from the National Priorities List in 1997 and no further action has been required.

If a known or potential hazardous waste site is affected by a transportation project, information about the site, the potential impacts and public health concerns, and the proposed mitigation measures to eliminate or minimize impacts should be addressed.

Section 4(f) and 6(f) Issues

Figure 5-7 shows public parks and recreation areas in Minot. Transportation improvements involving the US Department of Transportation must be evaluated according to their impact on park lands under section 4(f) of the Department of Transportation Act.

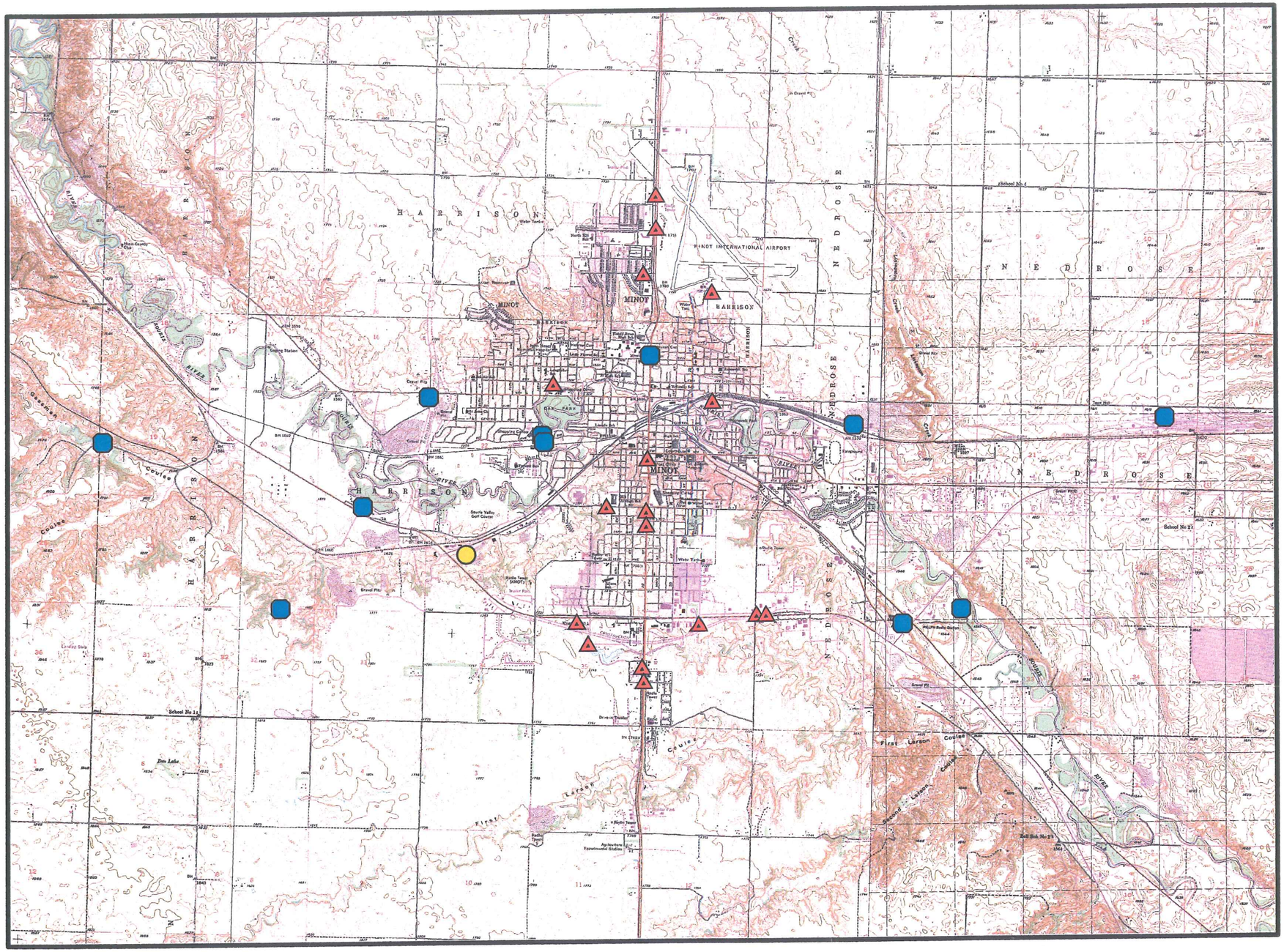
Also, projects must be evaluated according to their impact on any recreational lands acquired or improved through funding of section 6(f) of the Land and Water Conservation Fund Act. Use of this land for transportation purposes may require an environmental assessment of impacts as well as mitigation.

Farmlands

When specific corridors or project areas are identified for improvements, the impact of the project on prime or statewide or locally important farmland must be assessed in conjunction with the Natural Resources Conservation Service. This is accomplished by completion of a Farmland Conversion Impact Rating of the project alternatives.

Noise

Transportation projects involving federal funds for new roads or projects which substantially change the road alignment or increase the number of lanes on existing roads may require a noise study. The study typically involves a noise impact analysis on sensitive receptors, such as houses, schools, businesses and others. In addition, if significant impacts are expected, the study may include an analysis of mitigation procedures, and any reasonable and feasible noise abatement measures to reduce or eliminate the noise impact.



Approximate Locations of Environmental Concerns

- Superfund Sites *
- Hazardous Waste Sites *
- Groundwater Contamination Sites **

Data Sources
* EPA Envirofacts Hazardous Data
** North Dakota Department of Health, Division of Water Quality

USGS 7.5 MINUTE TOPOGRAPHIC MAP
Burlington, Deering SW, Minot, Minot NW, and Surrey Quadrangles

1 0 1 Mile

Hazardous Waste Sites

FIGURE 5-6

Table A-1: Socioeconomic Data (Year 2000)

	Dwelling Units			Employment					Student Enrollment			
TRAFFIC ANALYSIS ZONE	MF DU	SF DU	TOTAL DU	COMM EMP	INDUS EMP	OFFICE EMP	SERVICE EMP	TOTAL EMP	ELEMENTARY SCHOOL STUDENTS	MIDDLE SCHOOL STUDENTS	HIGH SCHOOL STUDENTS	UNIVIVERSITY STUDENTS
1	74	0	74	84	0	159	49	292	0	0	0	0
2	11	62	73	132	7	49	119	307	0	0	0	0
3	0	7	7	76	0	170	375	621	0	0	0	0
4	67	2	69	156	125	45	317	643	0	0	1099	0
5	0	2	2	0	0	163	24	187	0	0	0	0
6	30	3	33	45	0	80	621	746	0	0	0	0
7	32	0	32	11	0	0	155	166	0	0	0	0
8	227	0	227	18	0	85	148	251	121	0	0	0
9	51	0	51	168	285	129	25	607	0	0	0	0
10	18	0	18	35	55	172	445	707	0	0	0	0
11	0	2	2	15	10	35	62	122	0	0	0	0
12	25	30	55	11	54	10	0	75	0	0	0	0
13	0	7	7	32	52	0	268	352	0	0	0	0
14	42	263	305	15	0	162	700	877	0	0	0	0
15	55	91	146	12	0	45	1220	1277	0	0	0	0
16	0	0	0	20	0	83	289	392	0	0	0	0
17	144	64	208	174	0	70	0	244	0	0	0	0
18	176	24	200	123	32	18	29	202	0	634	1085	0
19	0	5	5	10	40	98	0	148	0	0	0	0
20	45	68	113	5	11	54	5	75	0	0	0	0
21	38	89	127	21	0	20	20	61	0	0	0	0
22	12	149	161	14	0	77	5	96	0	0	0	0
23	0	0	0	510	0	0	210	720	0	0	0	0
24	101	120	221	0	0	0	35	35	277	0	0	0
25	5	166	171	0	0	0	0	0	0	0	0	0
26	4	42	46	115	0	92	0	207	0	0	0	0
27	50	105	155	138	0	7	13	158	0	0	0	0
28	6	73	79	0	0	0	65	65	0	0	0	0
29	4	116	120	0	0	0	30	30	0	0	0	0

Table A-1: Socioeconomic Data (Year 2000)

	Dwelling Units			Employment					Student Enrollment			
TRAFFIC ANALYSIS ZONE	MF DU	SF DU	TOTAL DU	COMM EMP	INDUS EMP	OFFICE EMP	SERVICE EMP	TOTAL EMP	ELEMENTARY SCHOOL STUDENTS	MIDDLE SCHOOL STUDENTS	HIGH SCHOOL STUDENTS	UNIVIVERSITY STUDENTS
30	38	96	134	153	0	0	26	179	0	0	0	0
31	4	56	60	203	0	35	0	238	0	0	0	0
32	59	62	121	83	91	0	16	190	0	0	0	0
33	35	90	125	91	5	145	0	241	0	0	0	0
34	0	34	34	0	0	0	61	61	355	0	0	0
35	0	159	159	461	27	202	91	781	0	0	0	0
36	67	26	93	363	45	101	0	509	0	0	0	0
37	98	143	241	9	7	25	0	41	0	0	0	0
38	15	263	278	0	0	0	52	52	183	0	0	0
39	6	20	26	25	0	0	31	56	0	0	0	0
40	0	7	7	0	0	0	20	20	0	0	0	0
41	39	359	398	158	7	34	44	243	0	0	0	0
42	0	341	341	0	0	16	32	48	0	0	0	0
43	24	469	493	14	10	32	25	81	355	0	0	0
44	18	172	190	69	0	36	23	128	0	0	0	0
45	0	2	2	114	0	0	0	114	0	0	0	0
46	39	349	388	12	0	0	78	90	243	0	0	0
47	30	92	122	0	0	0	3	3	0	0	0	0
48	105	2	107	62	0	0	0	62	0	0	0	0
49	65	175	240	55	5	49	60	169	0	475	0	0
50	75	0	75	16	0	0	868	884	0	0	0	2100
51	57	106	163	0	0	0	33	33	92	0	0	0
52	43	0	43	0	0	0	348	348	0	0	0	0
53	27	311	338	0	0	0	30	30	0	0	0	0
54	420	335	755	0	35	0	5	40	0	0	0	0
55	16	33	49	21	0	4	129	154	0	0	394	0
56	0	54	54	192	0	20	30	242	0	0	0	0
57	0	171	171	0	0	0	15	15	0	0	0	0
58	363	203	566	134	16	45	27	222	0	0	0	0

Table A-1: Socioeconomic Data (Year 2000)

	Dwelling Units			Employment					Student Enrollment			
TRAFFIC ANALYSIS ZONE	MF DU	SF DU	TOTAL DU	COMM EMP	INDUS EMP	OFFICE EMP	SERVICE EMP	TOTAL EMP	ELEMENTARY SCHOOL STUDENTS	MIDDLE SCHOOL STUDENTS	HIGH SCHOOL STUDENTS	UNIVIVERSITY STUDENTS
59	72	164	236	0	0	0	84	84	338	0	0	0
60	148	255	403	85	0	1070	120	1275	0	0	0	0
61	0	0	0	61	65	5	55	186	0	0	0	0
62	54	384	438	261	36	5	103	405	0	0	0	0
63	19	135	154	20	0	59	3	82	0	0	0	0
64	33	157	190	64	0	36	11	111	0	0	0	0
65	51	93	144	51	20	21	65	157	110	0	0	0
66	19	99	118	32	47	0	56	135	148	0	0	0
67	10	213	223	5	5	66	0	76	0	0	0	0
68	54	181	235	11	69	0	5	85	0	0	0	0
69	38	151	189	0	0	0	5	5	0	0	0	0
70	29	67	96	38	84	16	2	140	0	0	0	0
71	31	71	102	16	80	11	27	134	201	0	0	0
72	130	61	191	21	10	0	0	31	0	0	0	0
73	17	53	70	90	0	37	0	127	0	0	0	0
74	0	46	46	7	220	0	7	234	0	0	0	0
75	10	99	109	43	40	16	81	180	0	0	0	0
76	210	0	210	3	0	0	0	3	0	0	0	0
77	174	31	205	16	96	142	2	256	0	0	0	0
78	62	111	173	38	43	21	9	111	107	0	0	0
79	26	33	59	33	47	11	0	91	0	0	0	0
80	65	62	127	19	46	0	0	65	0	0	0	0
81	0	0	0	6	0	0	6	12	0	0	0	0
82	0	16	16	87	122	447	20	676	0	0	0	0
83	387	153	540	161	185	76	91	513	240	0	0	0
84	0	20	20	106	116	30	20	272	0	0	0	0
85	37	130	167	217	216	41	15	489	0	0	0	0
86	140	165	305	56	142	103	17	318	0	0	0	0
87	0	0	0	982	0	96	102	1180	0	0	0	0

Table A-1: Socioeconomic Data (Year 2000)

	Dwelling Units			Employment					Student Enrollment			
TRAFFIC ANALYSIS ZONE	MF DU	SF DU	TOTAL DU	COMM EMP	INDUS EMP	OFFICE EMP	SERVICE EMP	TOTAL EMP	ELEMENTARY SCHOOL STUDENTS	MIDDLE SCHOOL STUDENTS	HIGH SCHOOL STUDENTS	UNIVIVERSITY STUDENTS
88	12	236	248	25	5	0	8	38	0	0	0	0
89	106	77	183	68	159	0	43	270	0	0	0	0
90	27	158	185	352	56	0	2	410	0	0	0	0
91	10	22	32	0	0	55	24	79	0	0	0	0
92	124	141	265	11	56	9	48	124	172	0	0	0
93	0	250	250	1	4	0	0	5	0	0	0	0
94	0	57	57	20	0	650	0	670	0	0	0	0
95	0	0	0	0	0	0	0	0	0	0	0	0
96	0	0	0	0	122	0	139	261	0	0	0	0
97	58	0	58	87	64	0	65	216	0	0	0	0
98	0	3	3	0	0	0	0	0	0	0	0	0
99	0	12	12	76	504	0	52	632	0	0	0	0
100	0	0	0	0	31	0	0	31	0	0	0	0
101	2	7	9	65	480	0	75	620	0	0	0	0
102	0	7	7	66	112	0	30	208	0	0	0	0
103	67	242	309	0	3	16	7	26	0	0	0	0
104	158	129	287	64	70	30	15	179	0	0	0	0
105	299	120	419	20	0	35	0	55	0	0	0	0
106	0	0	0	0	0	0	0	0	0	0	0	0
107	6	434	440	151	114	0	62	327	0	0	0	0
Total	5545	10465	16010	7710	4388	5671	8752	26521	2942	1109	2578	2100

Table A-2: Socioeconomic Data (Future – 50,000 Population)

	Dwelling Units			Employment					Student Enrollment			
TRAFFIC ANALYSIS ZONE	FUTURE MF DU	FUTURE SF DU	FUTURE TOTAL DU	COMM EMP	INDUS EMP	OFFICE EMP	SERVICE EMP	FUTURE TOTAL EMP	ELEMENTARY SCHOOL STUDENTS	MIDDLE SCHOOL STUDENTS	HIGH SCHOOL STUDENTS	UNIVIVERSITY STUDENTS
1	74	0	74	89	0	168	52	309	0	0	0	0
2	11	62	73	144	8	53	130	335	0	0	0	0
3	0	7	7	79	0	177	389	645	0	0	0	0
4	67	2	69	164	132	47	334	677	0	0	1450	0
5	0	2	2	0	0	163	24	187	0	0	0	0
6	30	3	33	47	0	84	650	781	0	0	0	0
7	32	0	32	12	0	0	168	180	0	0	0	0
8	227	0	227	20	0	92	161	273	0	0	0	0
9	51	0	51	178	302	137	27	644	0	0	0	0
10	18	0	18	36	56	176	454	722	0	0	0	0
11	0	2	2	17	11	39	70	137	0	0	0	0
12	25	30	55	11	54	10	0	75	0	0	0	0
13	0	7	7	32	52	0	268	352	0	0	0	0
14	42	263	305	15	0	162	700	877	0	0	0	0
15	55	91	146	12	0	45	1220	1277	0	0	0	0
16	0	0	0	20	0	83	289	392	0	0	0	0
17	144	64	208	174	0	70	0	244	0	0	0	0
18	176	24	200	123	32	18	29	202	0	225	1450	0
19	0	5	5	14	54	133	0	201	0	0	0	0
20	72	82	154	5	11	54	5	75	0	0	0	0
21	58	95	153	21	0	20	20	61	0	0	0	0
22	12	149	161	14	0	77	5	96	0	0	0	0
23	0	0	0	510	0	0	210	720	0	0	0	0
24	101	120	221	0	0	0	35	35	200	0	0	0
25	5	166	171	0	0	0	0	0	0	0	0	0
26	4	42	46	115	0	92	0	207	0	0	0	0
27	50	105	155	138	0	7	13	158	0	0	0	0
28	6	73	79	0	0	0	65	65	0	0	0	0

Table A-2: Socioeconomic Data (Future – 50,000 Population)

	Dwelling Units			Employment					Student Enrollment			
TRAFFIC ANALYSIS ZONE	FUTURE MF DU	FUTURE SF DU	FUTURE TOTAL DU	COMM EMP	INDUS EMP	OFFICE EMP	SERVICE EMP	FUTURE TOTAL EMP	ELEMENTARY SCHOOL STUDENTS	MIDDLE SCHOOL STUDENTS	HIGH SCHOOL STUDENTS	UNIVIVERSITY STUDENTS
29	4	116	120	0	0	0	30	30	0	0	0	0
30	38	96	134	153	0	0	26	179	0	0	0	0
31	4	97	101	203	0	35	0	238	0	0	0	0
32	69	62	131	83	91	0	16	190	0	0	0	0
33	35	90	125	91	5	145	0	241	0	0	0	0
34	0	34	34	0	0	0	61	61	250	0	0	0
35	0	159	159	461	27	202	91	781	0	0	0	0
36	67	26	93	363	45	101	0	509	0	0	0	0
37	98	143	241	9	7	25	0	41	0	0	0	0
38	15	263	278	0	0	0	52	52	150	0	0	0
39	6	20	26	25	0	0	31	56	0	0	0	0
40	0	7	7	0	0	0	20	20	0	0	0	0
41	39	359	398	158	7	34	44	243	0	0	0	0
42	0	341	341	0	0	16	32	48	0	0	0	0
43	24	469	493	14	10	32	25	81	250	0	0	0
44	18	172	190	69	0	36	23	128	0	0	0	0
45	0	2	2	114	0	0	0	114	0	0	0	0
46	39	349	388	12	0	0	78	90	200	0	0	0
47	30	92	122	0	0	0	3	3	0	0	0	0
48	105	2	107	62	0	0	0	62	0	0	0	0
49	65	175	240	55	5	49	60	169	0	225	0	0
50	75	0	75	16	0	0	868	884	0	0	0	2900
51	57	106	163	0	0	0	33	33	100	0	0	0
52	43	0	43	0	0	0	348	348	0	0	0	0
53	27	311	338	0	0	0	30	30	0	0	0	0
54	420	335	755	0	35	0	5	40	0	0	0	0
55	16	33	49	21	0	4	129	154	0	0	0	0
56	0	54	54	192	0	20	30	242	0	0	0	0
57	0	171	171	0	0	0	15	15	0	0	0	0

Table A-2: Socioeconomic Data (Future – 50,000 Population)

	Dwelling Units			Employment					Student Enrollment			
TRAFFIC ANALYSIS ZONE	FUTURE MF DU	FUTURE SF DU	FUTURE TOTAL DU	COMM EMP	INDUS EMP	OFFICE EMP	SERVICE EMP	FUTURE TOTAL EMP	ELEMENTARY SCHOOL STUDENTS	MIDDLE SCHOOL STUDENTS	HIGH SCHOOL STUDENTS	UNIVIVERSITY STUDENTS
58	363	203	566	134	16	45	27	222	0	0	0	0
59	297	364	661	0	0	0	144	144	250	0	0	0
60	148	255	403	99	0	1251	140	1490	0	0	0	0
61	0	0	0	61	65	5	55	186	0	0	0	0
62	54	384	438	280	39	5	110	434	0	0	0	0
63	19	135	154	20	0	59	3	82	0	0	0	0
64	33	157	190	64	0	36	11	111	0	0	0	0
65	51	93	144	51	20	21	65	157	100	0	0	0
66	19	99	118	32	47	0	56	135	100	0	0	0
67	10	213	223	5	5	66	0	76	0	0	0	0
68	54	181	235	11	69	0	5	85	0	0	0	0
69	38	151	189	0	0	0	5	5	0	0	0	0
70	29	67	96	38	84	16	2	140	0	0	0	0
71	31	71	102	16	80	11	27	134	150	0	0	0
72	130	61	191	21	10	0	0	31	0	0	0	0
73	17	53	70	90	0	37	0	127	0	0	0	0
74	0	46	46	7	220	0	7	234	0	0	0	0
75	10	99	109	43	40	16	81	180	0	0	0	0
76	210	0	210	3	0	0	0	3	0	0	0	0
77	174	31	205	16	96	142	2	256	0	0	0	0
78	62	111	173	38	43	21	9	111	100	0	0	0
79	26	33	59	33	47	11	0	91	0	0	0	0
80	465	477	942	129	311	0	0	440	170	0	0	0
81	0	0	0	6	0	0	6	12	0	0	0	0
82	0	16	16	87	122	447	20	676	0	0	0	0
83	387	153	540	161	185	76	91	513	200	0	0	0
84	0	420	420	205	224	58	39	526	170	0	0	0
85	37	380	417	334	332	63	23	752	170	0	0	0
86	140	165	305	56	142	103	17	318	0	0	0	0

Table A-2: Socioeconomic Data (Future – 50,000 Population)

	Dwelling Units			Employment					Student Enrollment			
TRAFFIC ANALYSIS ZONE	FUTURE MF DU	FUTURE SF DU	FUTURE TOTAL DU	COMM EMP	INDUS EMP	OFFICE EMP	SERVICE EMP	FUTURE TOTAL EMP	ELEMENTARY SCHOOL STUDENTS	MIDDLE SCHOOL STUDENTS	HIGH SCHOOL STUDENTS	UNIVIVERSITY STUDENTS
87	0	0	0	1089	0	106	113	1308	0	0	0	0
88	12	236	248	25	5	0	8	38	0	0	0	0
89	309	77	386	89	207	0	56	352	170	0	0	0
90	27	458	485	352	56	0	2	410	170	0	0	0
91	10	22	32	0	0	55	24	79	0	0	0	0
92	124	141	265	11	56	9	48	124	150	0	0	0
93	0	450	450	1	4	0	0	5	170	0	0	0
94	250	357	607	32	0	1038	0	1070	170	0	0	0
95	75	0	75	200	0	700	100	1000	0	0	0	0
96	0	0	0	0	359	0	410	769	0	0	0	0
97	58	0	58	500	368	0	374	1242	0	0	0	0
98	0	3	3	0	150	0	0	150	0	0	0	0
99	0	12	12	151	999	0	103	1253	0	0	0	0
100	0	0	0	0	81	0	0	81	0	0	0	0
101	2	7	9	146	1080	0	169	1395	0	0	0	0
102	0	7	7	66	112	0	30	208	0	0	0	0
103	217	242	459	0	3	16	7	26	170	0	0	0
104	408	129	537	104	113	49	24	290	0	0	0	0
105	699	220	919	42	0	73	0	115	170	0	0	0
106	0	1700	1700	60	0	0	0	60	170	0	0	0
107	6	434	440	179	135	0	73	387	0	0	0	0
Total	**7231**	**14391**	**21622**	**9178**	**6869**	**7141**	**9854**	**33042**	**3900**	**450**	**2900**	**2900**

APPENDIX B

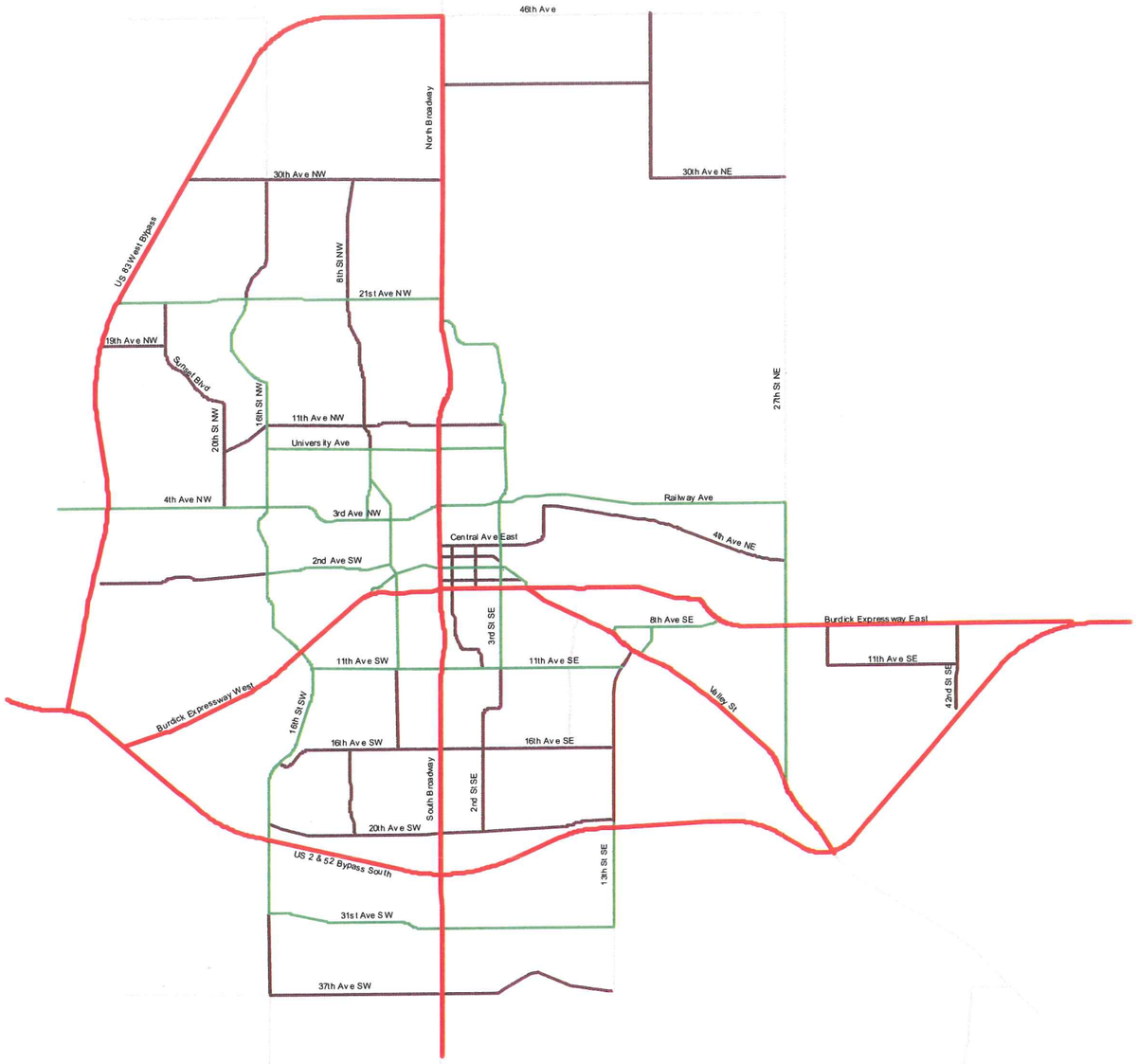
Street Inventory Data

1/14/2002 c:\projects_local\00-0459_minot\arcview3_projects\minot.apr

Existing Traffic Control Devices

FIGURE B-1

5/13/2002 c:\projects_local\00-0459_minot\arcview3_projects\minot.apr



Principal Arterial
Minor Arterial
Collector
Unclassified

Existing Functional Classification

FIGURE B-2

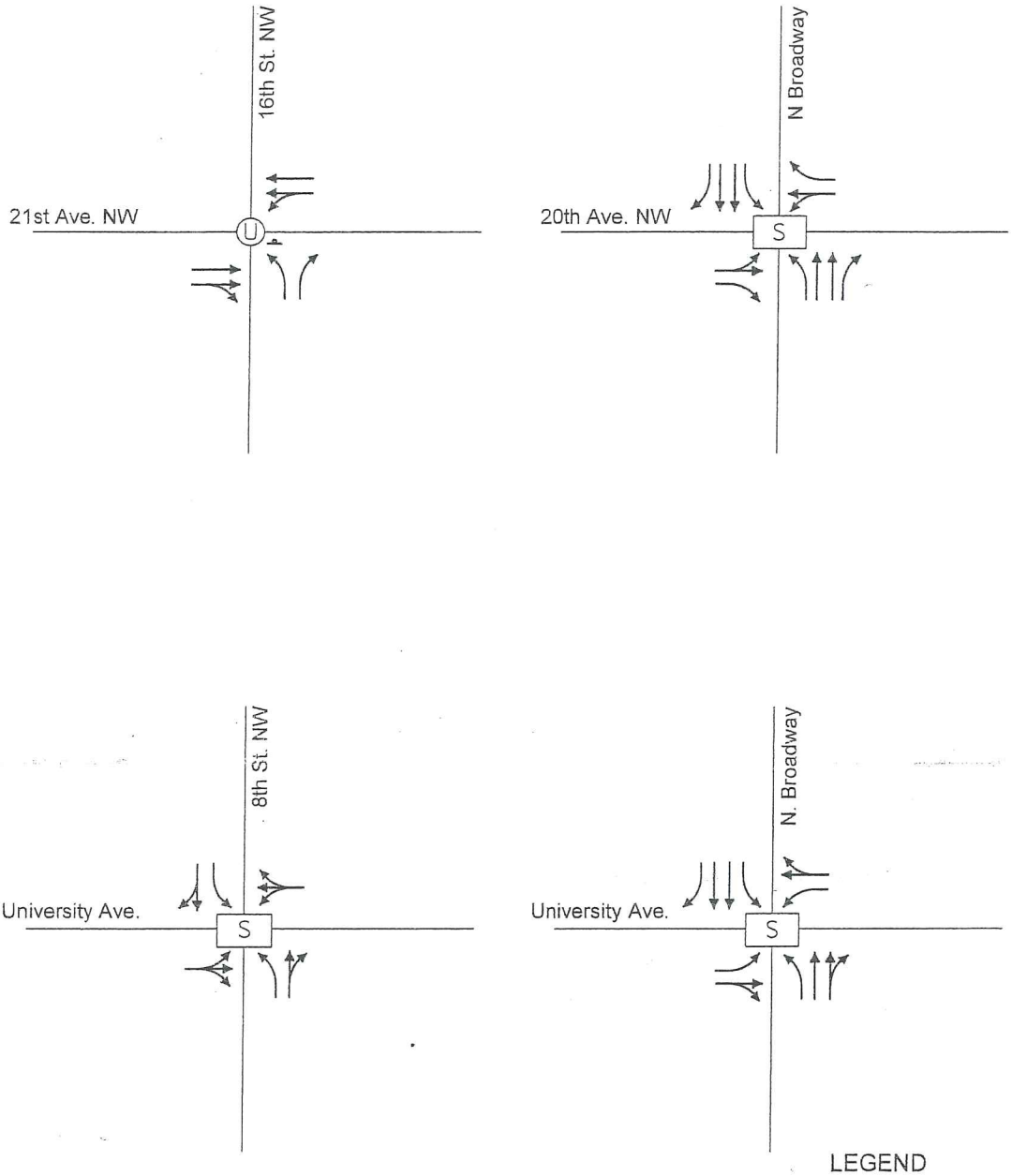
11/13/2001 c:\projects_local\00-0459_minot\arcview3_projects\minot.apr

Minot Land Use and Transportation Plan--Count Locations

FIGURE B-5

N

NTS



LEGEND

XX (XX) - AM (PM) Peak Hour Volumes
AM Peak = 7:45-8:45, PM Peak = 4:45-5:45

(U) Unsignalized Intersection

Stop-Controlled

[S] Signalized Intersection

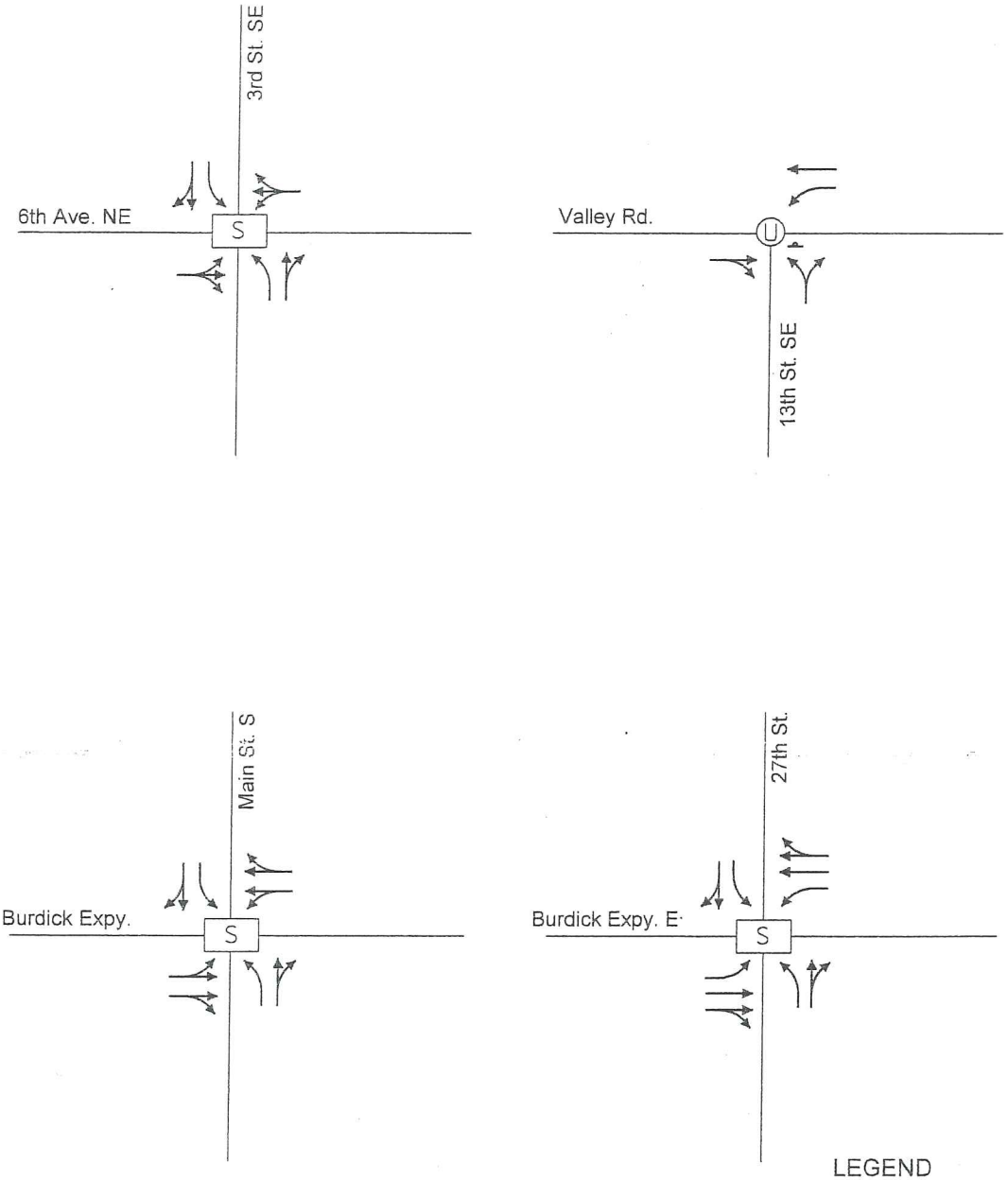
OLSSON ASSOCIATES
CONSULTING ENGINEERS

Existing Lane Configurations & Traffic Control

FIGURE
B-7A

N

NTS



LEGEND

XX (XX) - AM (PM) Peak Hour Volumes
AM Peak = 7:45-8:45, PM Peak = 4:45-5:45

(U) Unsignalized Intersection

Stop-Controlled

[S] Signalized Intersection

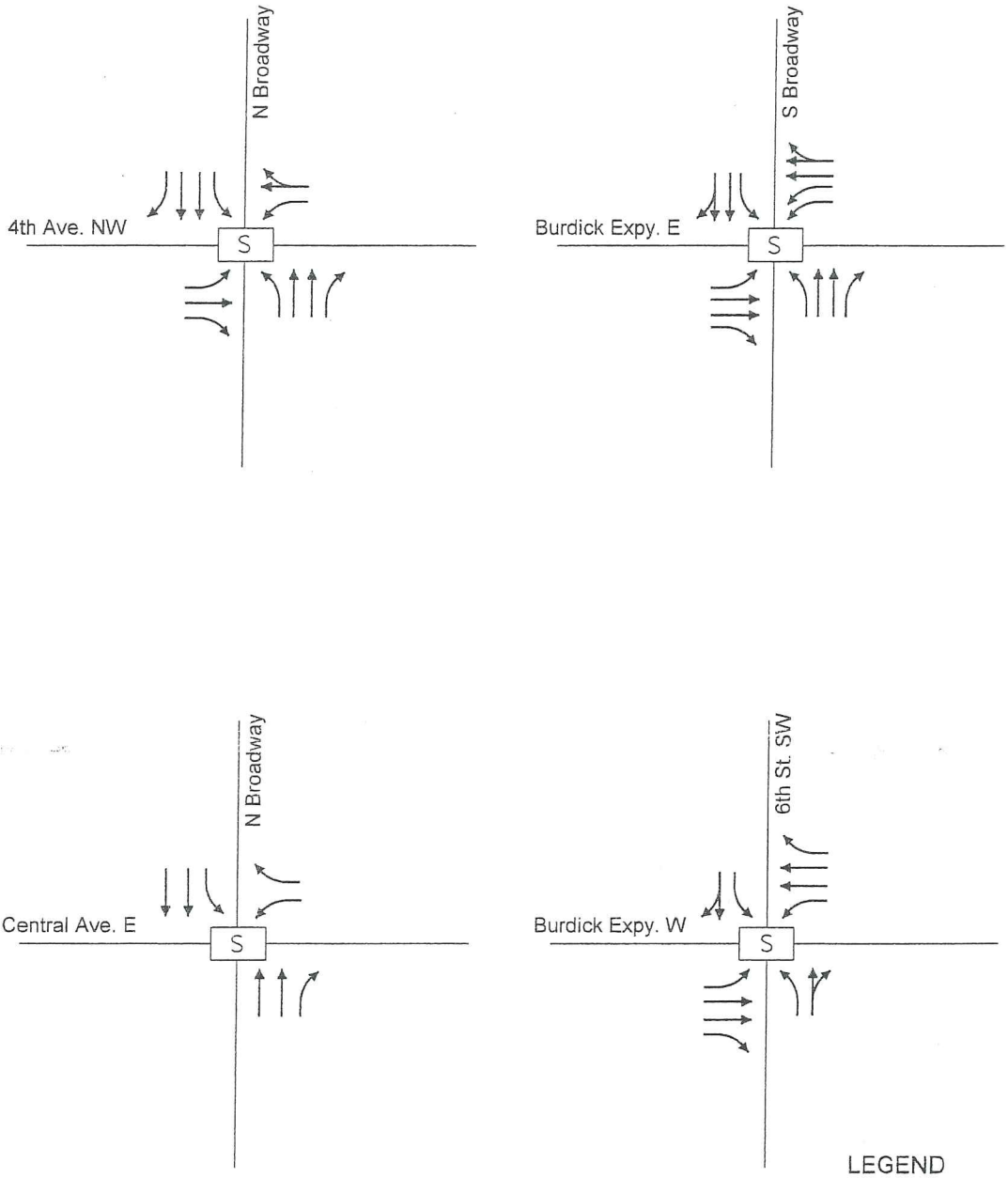
OLSSON ASSOCIATES
CONSULTING ENGINEERS

Existing Lane Configurations & Traffic Control

FIGURE
B-7B

N

NTS



LEGEND

XX (XX) - AM (PM) Peak Hour Volumes
AM Peak = 7:45-8:45, PM Peak = 4:45-5:45

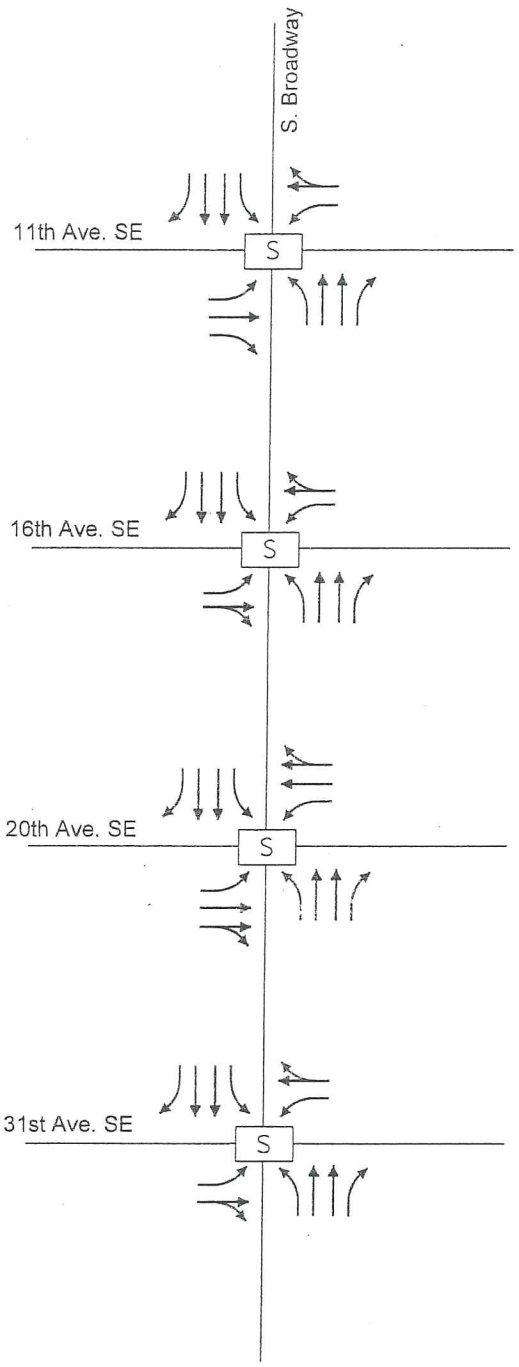
S Signalized Intersection

OLSSON ASSOCIATES
CONSULTING ENGINEERS

Existing Lane Configurations & Traffic Control

FIGURE
B-7C

NTS



LEGEND

XX (XX) - AM (PM) Peak Hour Volumes
AM Peak = 7:45-8:45, PM Peak = 4:45-5:45

S Signalized Intersection

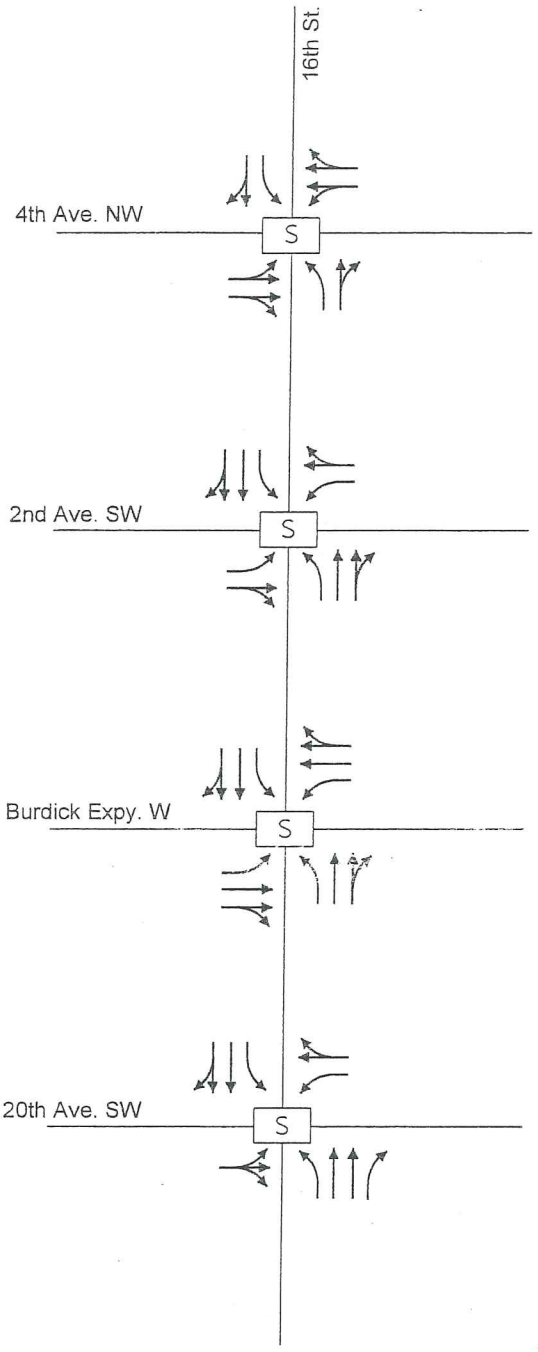
OLSSON ASSOCIATES
CONSULTING ENGINEERS

Existing Lane Configurations & Traffic Control

FIGURE B-7D

N

NTS



LEGEND

XX (XX) - AM (PM) Peak Hour Volumes
AM Peak = 7:45-8:45, PM Peak = 4:45-5:45

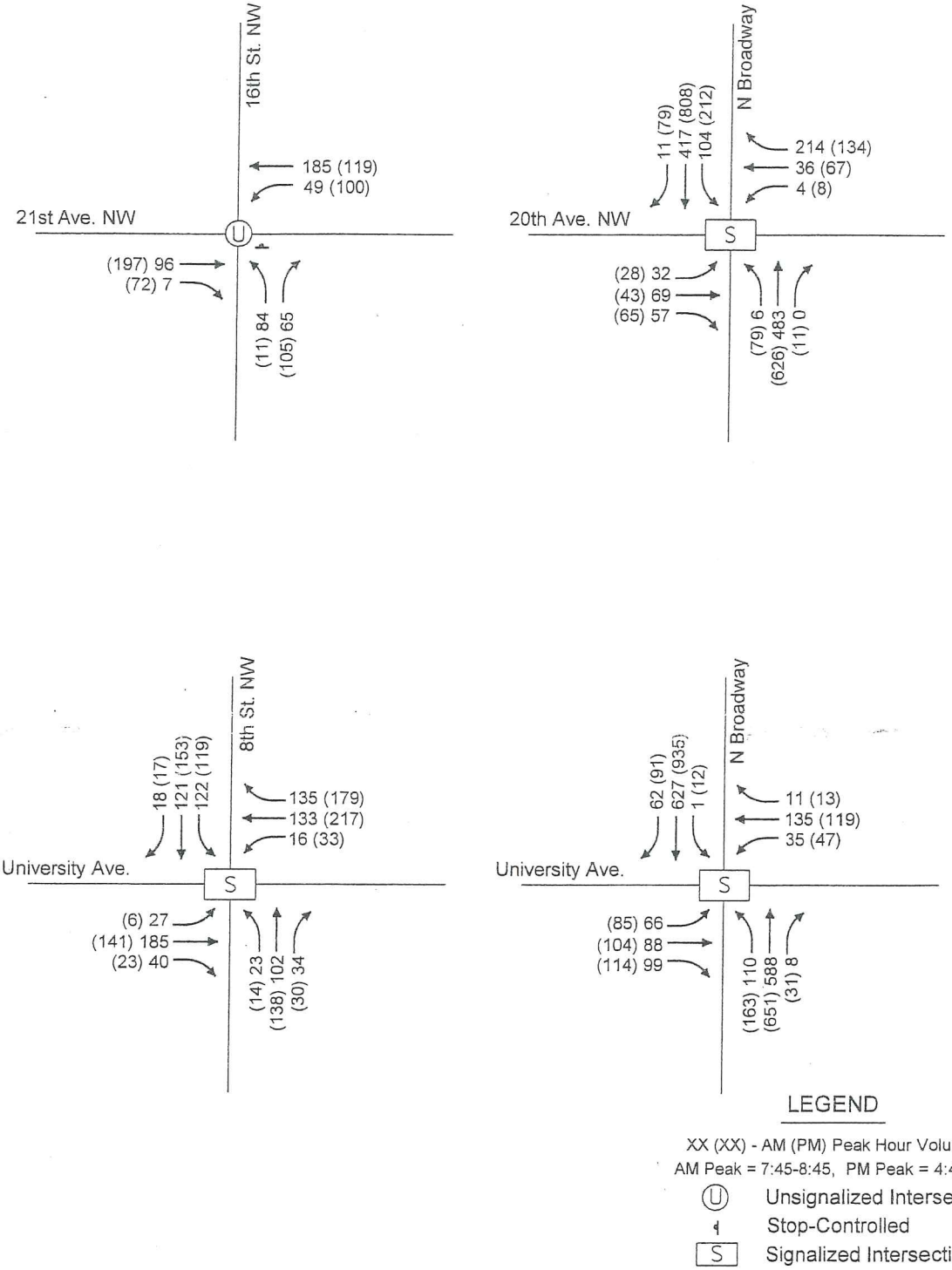
[S] Signalized Intersection

OLSSON ASSOCIATES
CONSULTING ENGINEERS

Existing Lane Configurations & Traffic Control

FIGURE
B-7E

NTS



LEGEND

XX (XX) - AM (PM) Peak Hour Volumes
AM Peak = 7:45-8:45, PM Peak = 4:45-5:45

(U) Unsignalized Intersection

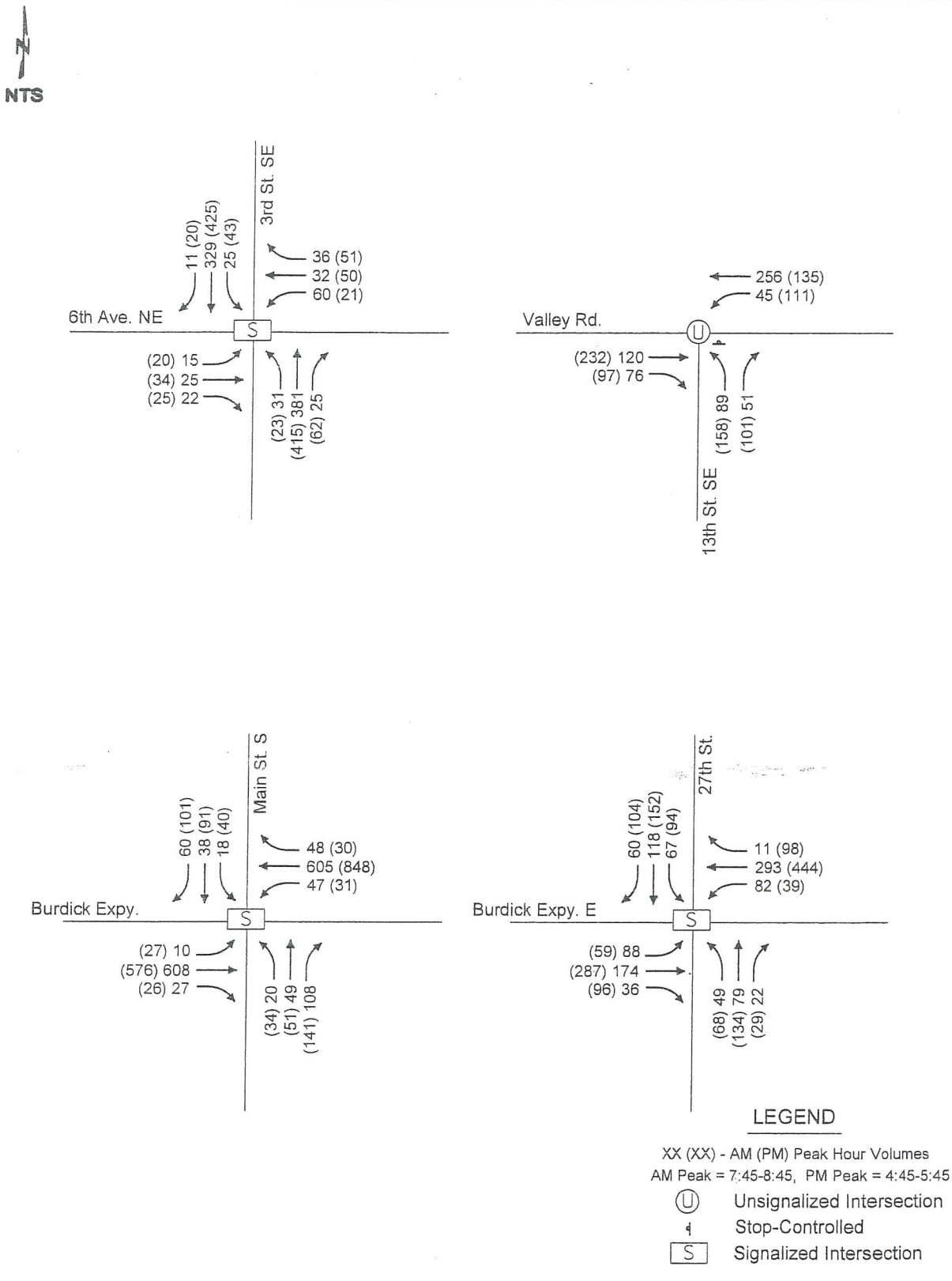
Stop-Controlled

[S] Signalized Intersection

OLSSON ASSOCIATES
CONSULTING ENGINEERS

Existing Peak Hour Volumes

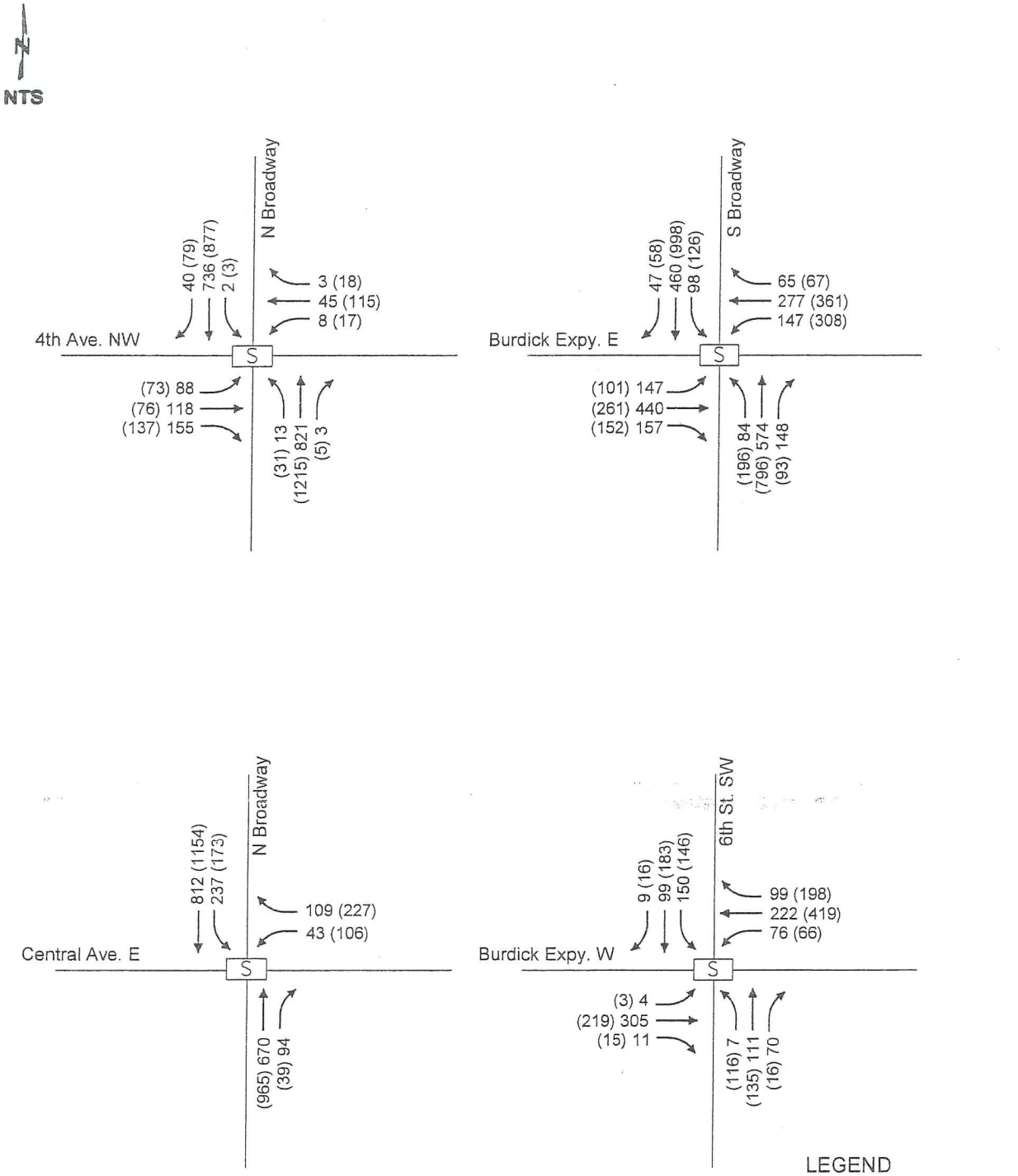
FIGURE
B-8A



OLSSON ASSOCIATES
CONSULTING ENGINEERS

Existing Peak Hour Volumes

FIGURE
B-8B

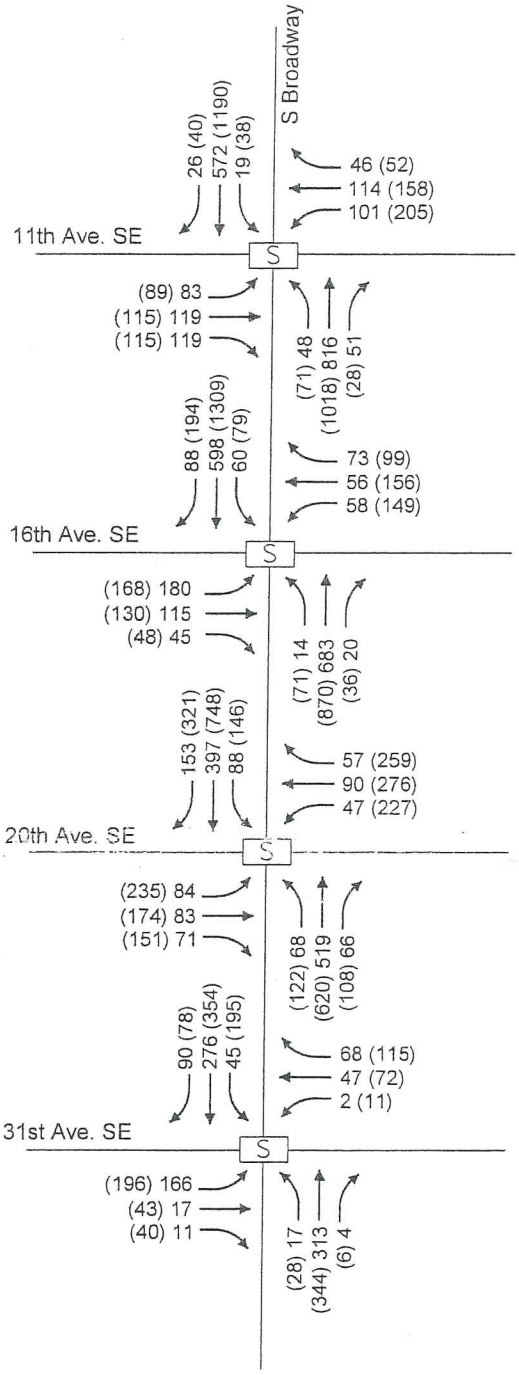


OLSSON ASSOCIATES
CONSULTING ENGINEERS

Existing Peak Hour Volumes

FIGURE
B-8C

NTS



LEGEND

XX (XX) - AM (PM) Peak Hour Volumes
AM Peak = 7:45-8:45, PM Peak = 4:45-5:45

S Signalized Intersection

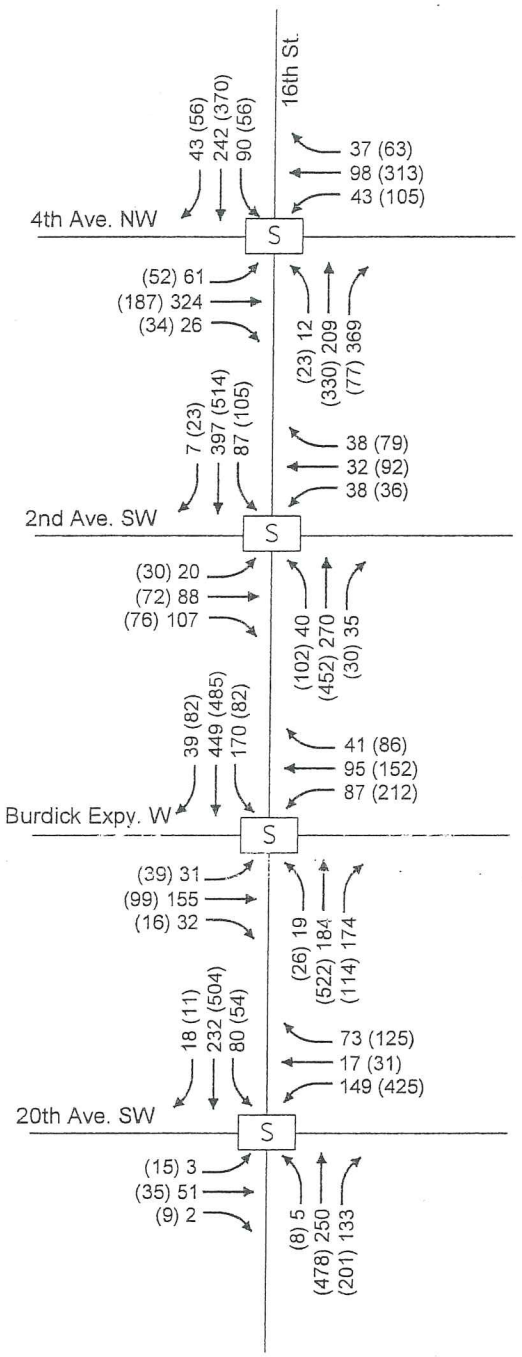
OLSSON ASSOCIATES
CONSULTING ENGINEERS

Existing Peak Hour Volumes

FIGURE
B-8D

N

NTS



LEGEND

XX (XX) - AM (PM) Peak Hour Volumes
AM Peak = 7:45-8:45, PM Peak = 4:45-5:45

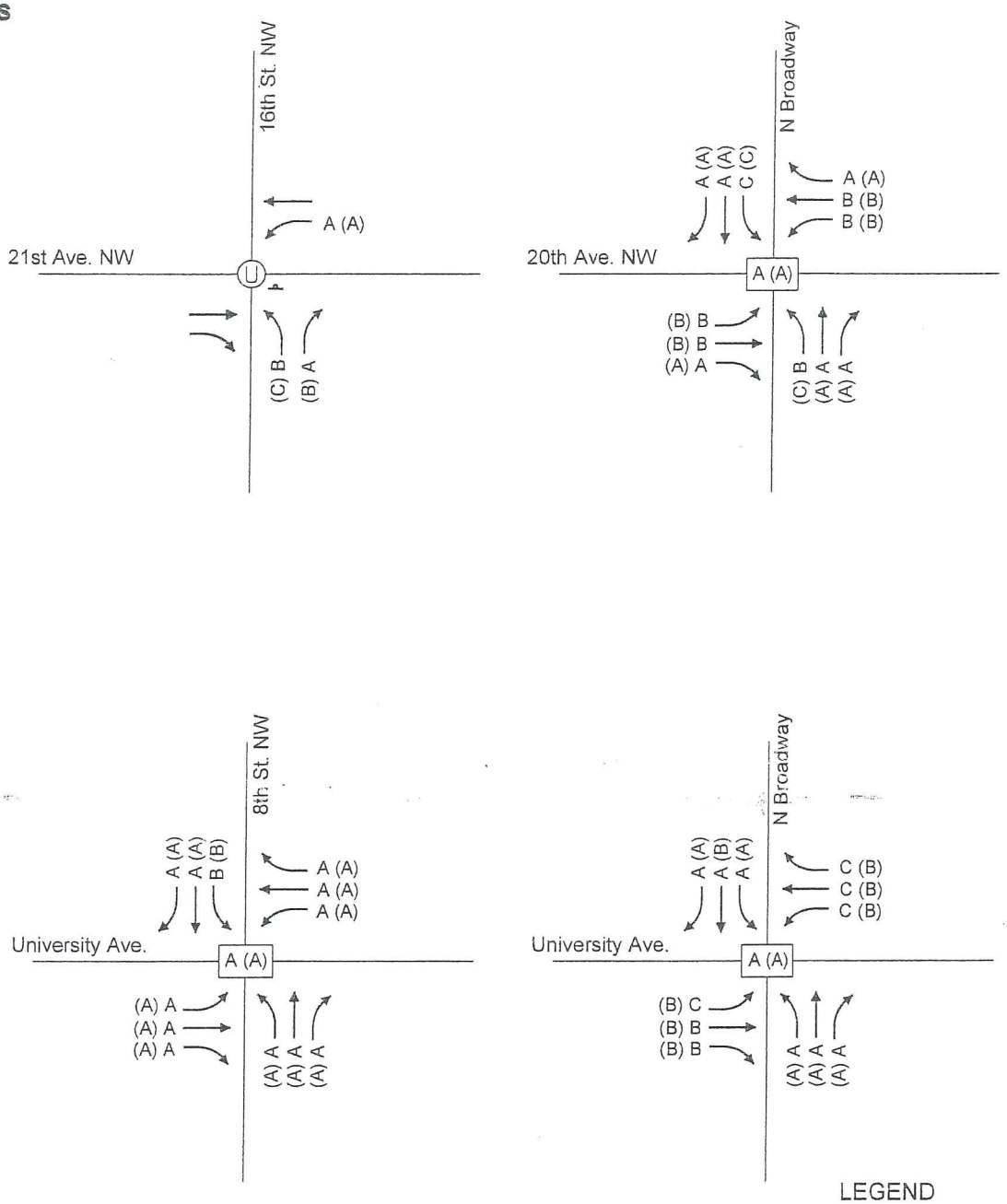
S Signalized Intersection

OLSSON ASSOCIATES
CONSULTING ENGINEERS

Existing Peak Hour Volumes

FIGURE
B-8E

NTS



LEGEND

XX (XX) - AM (PM) Peak Hour Volumes
AM Peak = 7:45-8:45, PM Peak = 4:45-5:45

(U) Unsignalized Intersection

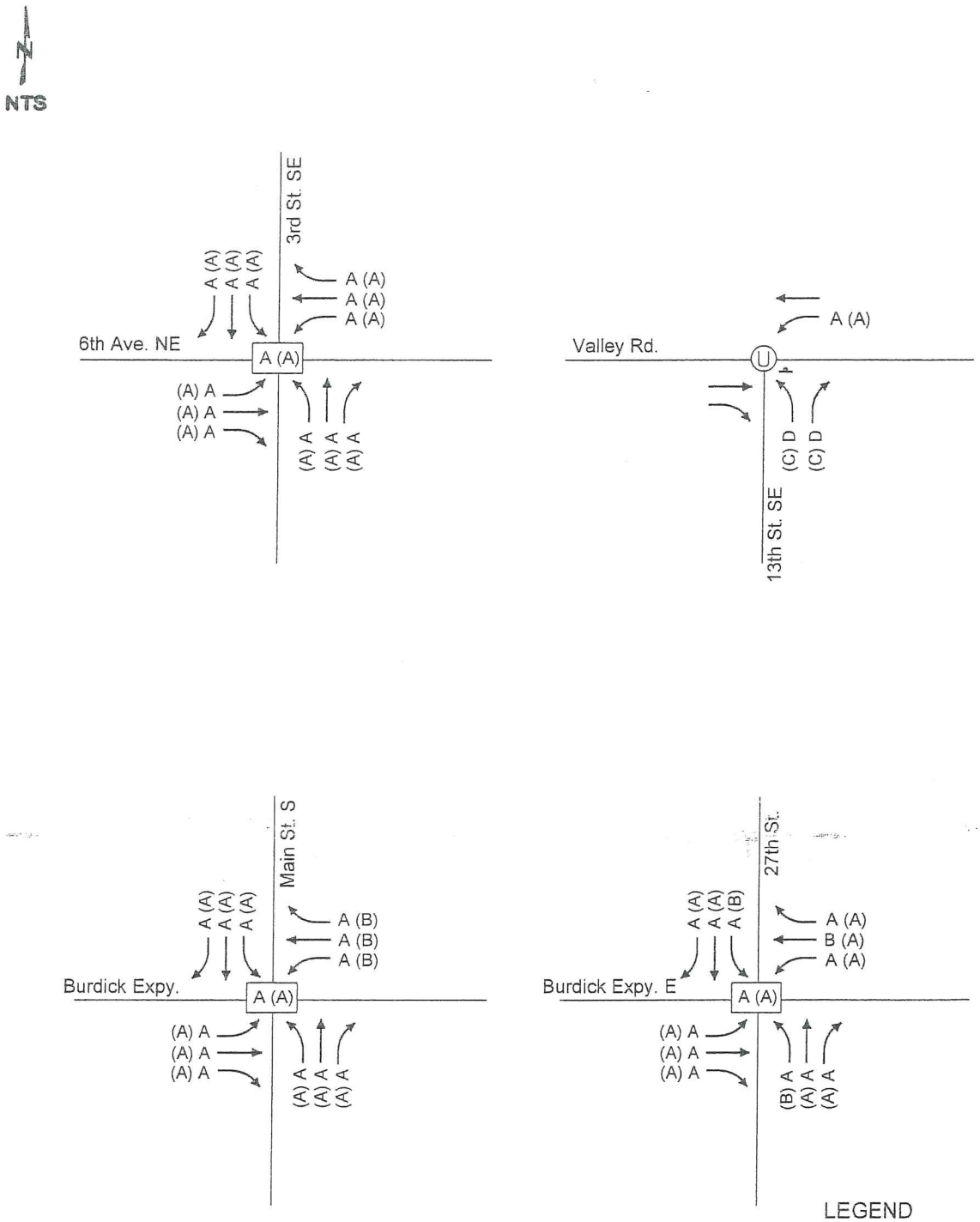
Stop-Controlled

[S] Signalized Intersection

OLSSON ASSOCIATES
CONSULTING ENGINEERS

Existing Peak Hour Level of Service Summary

FIGURE B-9A

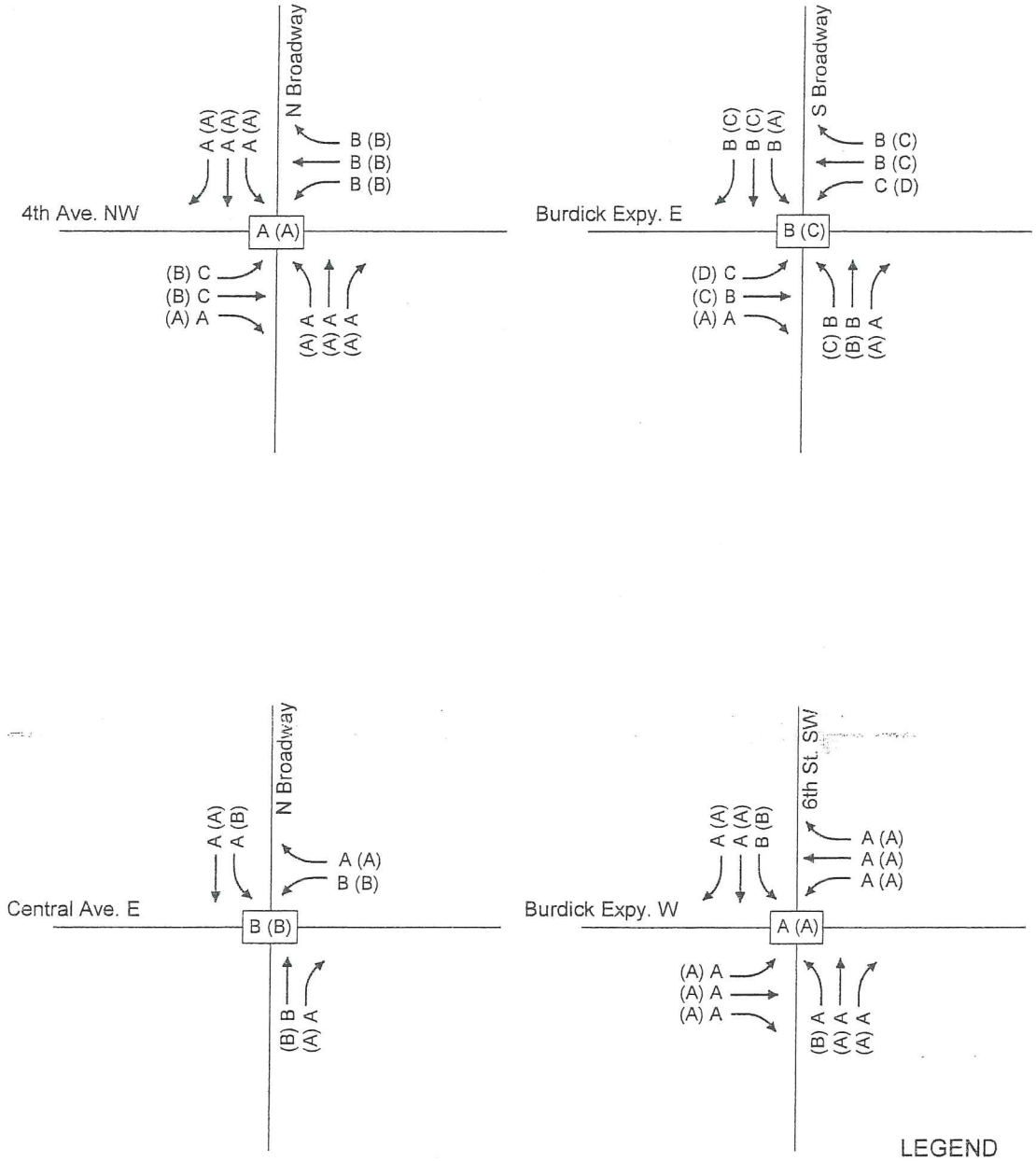


OLSSON ASSOCIATES
CONSULTING ENGINEERS

Existing Peak Hour Level of Service Summary

FIGURE B-9B

NTS



LEGEND

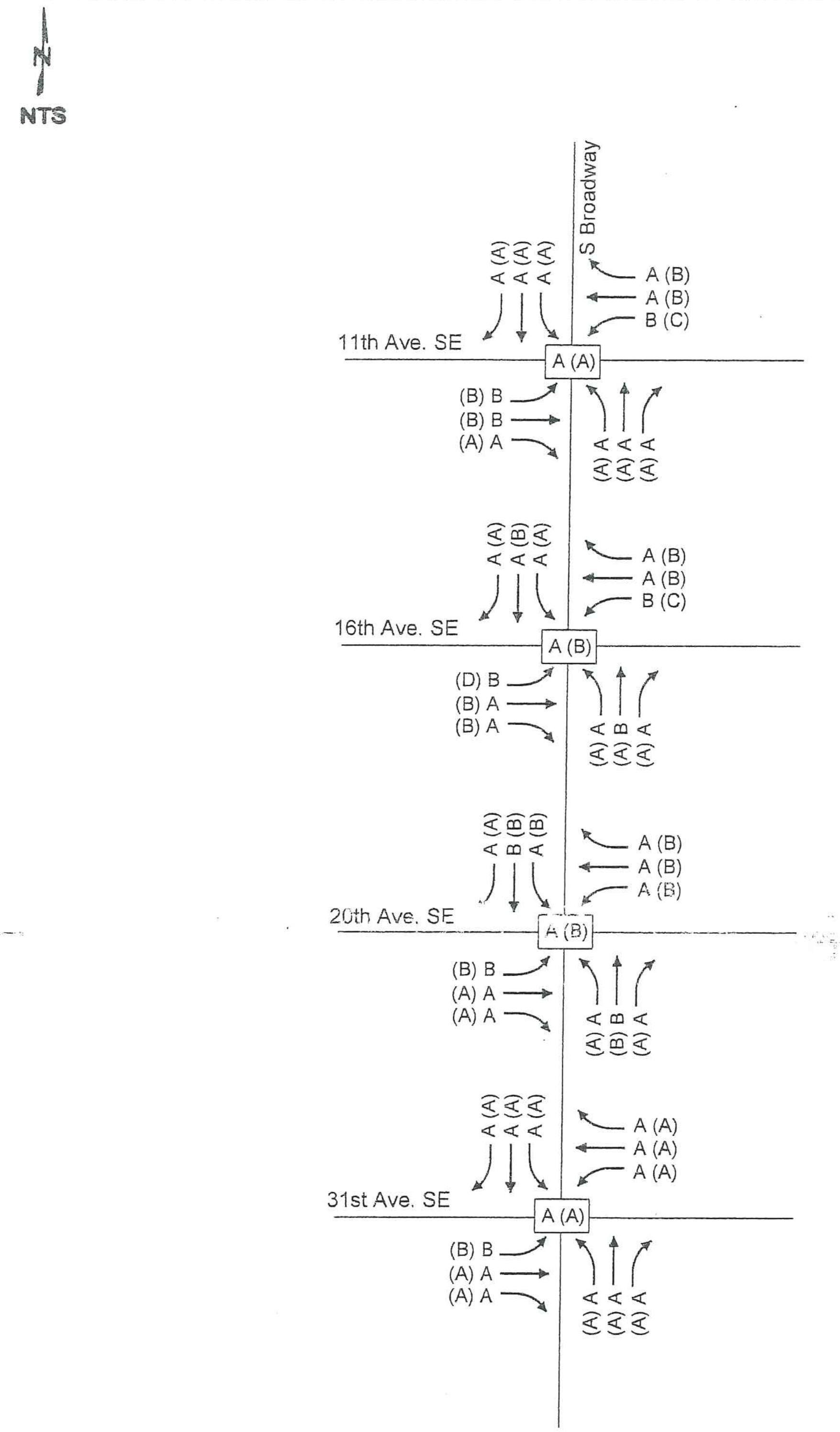
XX (XX) - AM (PM) Peak Hour Volumes
AM Peak = 7:45-8:45, PM Peak = 4:45-5:45

[S] Signalized Intersection

OLSSON ASSOCIATES
CONSULTING ENGINEERS

Existing Peak Hour Level of Service Summary

FIGURE B-9C



LEGEND

XX (XX) - AM (PM) Peak Hour Volumes
AM Peak = 7:45-8:45, PM Peak = 4:45-5:45

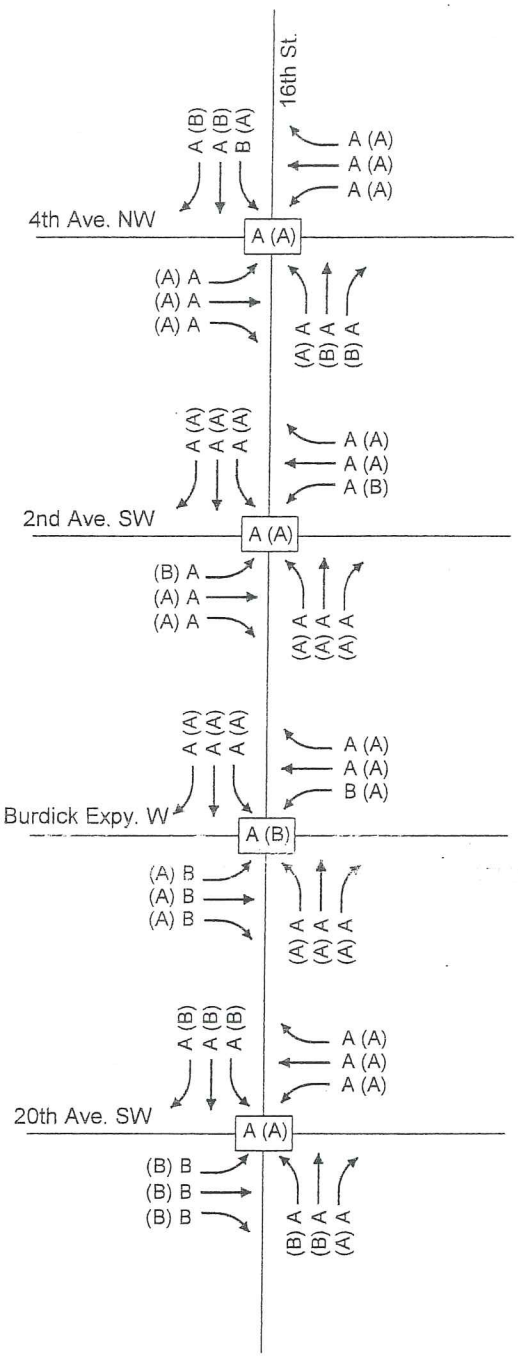
[S] Signalized Intersection

OLSSON ASSOCIATES CONSULTING ENGINEERS

Existing Peak Hour Level of Service Summary

FIGURE B-9D

NTS



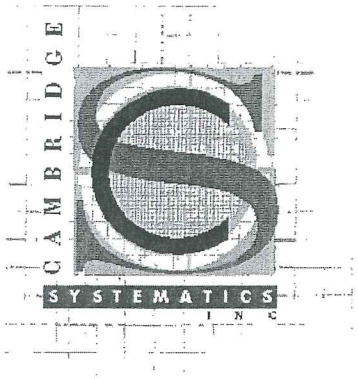
OLSSON ASSOCIATES
CONSULTING ENGINEERS

Existing Peak Hour Level of Service Summary

FIGURE B-9E

APPENDIX C

Travel Model Documentation



Minot Land Use and Transportation Plan

Travel Model Documentation

final report

prepared for

City of Minot

prepared by

Cambridge Systematics, Inc.

with

Olsson Associates

November, 2001

Table of Contents

1.0 Introduction

The 2000 Minot Model Update was conducted primarily to support the development of the 20-year Land Use and Transportation Plan. The 2000 Model Update included estimation of new model parameters using the 1995 National Personal Transportation Survey (NPTS).

This report documents the model calibration and validation processes, as well as the data used in developing and applying the model for the 2000 base year. Many of the data sources were developed by the City of Minot staff and reviewed for reasonableness. This model update was a collaborative process between the consultants and City staff. The results presented herein have been reviewed and revised to include the most recent traffic counts available.

The 2000 Minot Model was developed using a new software package, TP+ and VIPER. This software allowed greater flexibility in developing and applying models and has improved graphics capabilities.

The 2000 Minot Model meets the vast majority of the validation standards set forth by Cambridge Systematics staff. The results are reasonable in total and for stratifications of functional class and volume group.

2.0 Network Data

The data required to begin the 2000 Minot Model were obtained from the City of Minot staff and private sector sources and converted to appropriate formats for use the Minot Land Use and Transportation Plan project. The roadway network for the city of Minot was developed using an Arc View street map that was purchased from GDT street map services. This file was imported to VIPER format.

The variables in the Minot highway network are presented in Table 2.1 along with the source of each variable. Descriptions of variables added by Cambridge Systematics are provided in the following sections. Centroids and centroid connectors were added using the Minot TAZ (Transportation Analysis Zone) shape file. Additional variables that are used in the modeling process like functional class (FTYPE), speed and capacity were added.

There are a number of network attributes that were added to the networks and other network attributes that were refined and/or redefined. The details about the refinements to the network attributes are described below.

Table 2.1 Summary of Network Data for 2000

Variable	Name	Units	Source
A	Anode	4-digit identifier	GDT network in Arcview format
B	Bnode	4-digit identifier	GDT network in Arcview format
AB	Unique ID	8-digit identifier	Cambridge Systematics
LENGTH	Distance		GDT network in Arcview format
TYPE	Road Type	Text	GDT network in Arcview format
SUFFIX	Address Suffix	Text	GDT network in Arcview format
ACC			GDT network in Arcview format
NAME_TYPE			GDT network in Arcview format
SHIELD			GDT network in Arcview format
HWY_NUM	Highway Number	Text	GDT network in Arcview format
ONE_WAY	One Way Designator	GDT network in Arcview format	
F_ZLEV			GDT network in Arcview format
T_ZLEV			GDT network in Arcview format
FT_COST			GDT network in Arcview format
TF_COST			GDT network in Arcview format
FTYPE_NOT_USED	Functional Class	Not used	GDT network in Arcview format
NAME	Street Name	Text	GDT network in Arcview format
FCC	Functional Class	See description below	GDT network in Arcview format
SPEED	Speed	Miles per Hour	Cambridge Systematics
DISTANCE	Distance	Miles, calculated from Length	Cambridge Systematics
COUNT	Traffic Count	Average Daily Traffic (ADT), estimated from counts	Olsson Associates/City of Minot
TIME	Travel Time	Minutes, calculated from Speed and Distance variables	Cambridge Systematics
CAPACITY	Capacity	Vehicles per Day	Cambridge Systematics
LANE	Lanes	Number of Lanes in each Direction	Olsson Associates/City of Minot
HR_CAPA	Capacity	Vehicles per Hour	Cambridge Systematics
NEWFTYPE	Functional Class	see Table 2.4	Cambridge Systematics
FTYPE_NAME	Functional Class	See Table 2.4	Cambridge Systematics
SCLN	Screenline Number	See Figure 2.1	Cambridge Systematics

Lanes

The Arc View street map did not have accurate information on the number of lanes. Staff of Olsson Associates provided plots of the network with correct number of lanes for each road. This information was coded in the VIPER network. Number of lanes is a key variable that is used to calculate capacity of the roadway. The following lane configurations of roadways are present in the Minot Model network:

- Two-way Traffic – 2-lane, 3-lane or 4-lane and 5-lane surface streets and 4-lane divided expressways
- One-way Traffic – 4-lane surface streets

After the number of lanes was defined as a separate network attribute, plots of the network were developed to check the accuracy of these calculations.

Functional Classification

In the original GDT ArcView shape file, roadways were classified into 6 facility types (FCC).

- A20 = primary road - no limited access, major us and state highway
- A21 = primary road - no limited access, unseparated us and state highway
- A30 = secondary and connecting road, state and county highways
- A40 = local, neighborhood, rural road, city street - major
- A41 = local, neighborhood, rural city minor
- A60 = road with special characteristic, unspecified (for ramps)

The above roadway definitions were used to develop the final functional classifications for the 2000 Minot Model. Table 2.2 presents a description of functional class codes.

Table 2.2 Functional Classifications for 2000 Model

Functional Classification in the 2000 Model (Code)	Description of Functional Classifications	Number of Links
1	Freeways	153
7	Freeway Ramps	51
2	Divided Highways	82
8	Frontage Roads	180
3	Principal Arterials	233
4	Minor Arterials	948
5	Major Collectors	2,676
6	Local Roads	3,107
9	Internal Centroid Connectors and External Centroid Connectors	685
TOTAL		8,115

Freeways, divided highways and frontage roads were identified during model calibration as functional classifications that warranted different speeds and were therefore separated from the other roadways based on their classifications. In addition, some functional classifications were revised based on a consistency evaluation. In other words, if a facility was coded with different functional classes and the roadway has the same design characteristics, the functional class was revised to be consistent along the length of the corridor.

Area Type

Area types were not used in the 2000 Minot Model. It was determined that area types would be added if it were deemed necessary from the model validation step. Validation statistics showed that the model was performing well in the CBD, urban, suburban and the rural areas. Therefore area type classification was not used.

Speeds

The speed data from the GDT network was inaccurate and therefore not used in the model. Staff of the city of Minot and Olsson Associates provided plots of the highway network with speeds. The speeds specified in the model for each functional class and area type and are presented in Table 2.3. This speed table was revised during model validation.

Table 2.3 Proposed Input Speeds in the 2000 Model

Functional Class	Speed (miles per hours)
Freeways	50.0/35.0
Freeway Ramps	25.0
Divided Highways	50.0
Frontage Roads	25.0
Principal Arterials	30.0
Minor Arterials	30.0
Collectors	25.0
Local Roads	25.0
Centroid Connectors	15.0

Capacities

The capacities were developed in the 2000 Minot Model Network as a function of the functional classification of the roadway and the number of through lanes for roadways operating at level of service "C" (or 80 percent of capacity). These capacities are summarized in Table 2.4 for reference.

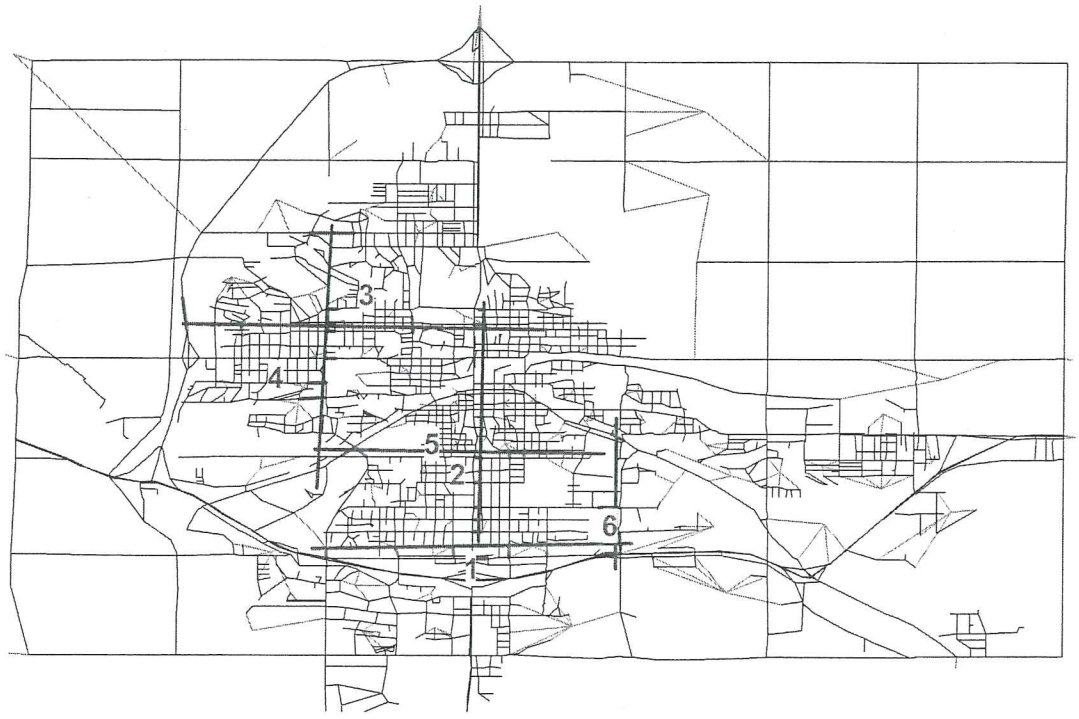
Table 2.4 Capacities used in the 2000 Model

Functional Class	Capacity (Vehicles per lane per hour)
Freeways	1300
Freeway Ramps	1300
Divided Highways	950
Frontage Roads	850
Principal Arterials	750
Minor Arterials	700
Collectors	700
Local Roads	600
Centroid Connectors	1300

Screenlines

Six screenlines were used in the 2000 Minot Model. These screenlines cover the north-south and east-west movements in the model. Some of the locations of these screenlines cross streets without traffic counts. These locations are typically in the rural areas where counts where not available. Figure 2.1 presents a map of the screenlines. Summaries of the traffic counts for these screenlines are provided in Section 6 on Model Validation.

Figure 2.1 Screenlines



Turn Penalties

Turn penalties were not used in the 2000 Model but could be considered for subarea studies where intersection turning movements are more critical to the analysis than they are for a citywide modeling tool.

3.0 Zonal Data

Traffic Analysis Zones

In the 2000 Minot Model, there are 117 internal Traffic Analysis Zones (TAZs). These are shown in Figure 3.1. In addition to the internal zones, there are 10 external stations (TAZs 108 through 117). The external stations are as follows:

- US 83 North (TAZ 108)
- US 2 East (TAZ 109)
- US 52 South (TAZ 110)
- US 83 South (TAZ 111)
- 16th Ave SW (TAZ 112)
- 46th Ave NW/County Hwy (TAZ 113)
- US 2/52 (TAZ 114)
- 4th Ave NW (TAZ 115)
- 37th Ave NW/County Hwy (TAZ 116)
- 5th Ave NE/County Hwy (TAZ 117)

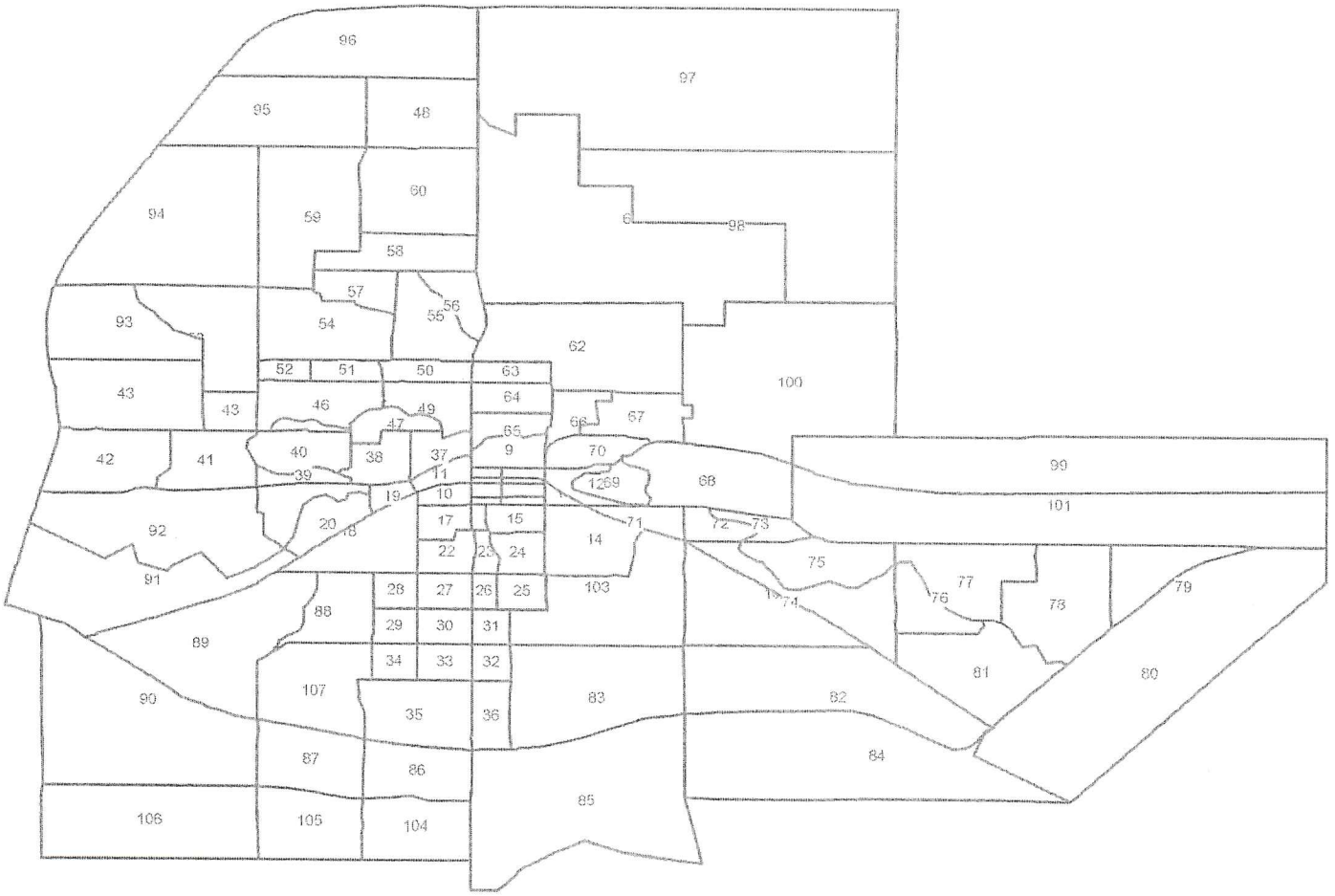
Land Use Data

The Land use data was developed from the City's parcel-level GIS database and provided in spreadsheet format for the 2000 model. This data was further reviewed and refined by the City's staff. These data are summarized in Table 3.1 for year 2000 and year 2040.

Table 3.1 Summary of Land Use Data

Category	Units	2000 Total	2040 Total	Percent Increase
Total Dwelling Units	Dwelling	16,010	21,622	35%
MF Residential	Dwelling	5,545	7,231	30%
SF Residential	Dwelling	10,465	14,391	38%
Elementary Schools	Student	2,942	3,900	33%
Middle Schools	Student	1,109	450	-59%
High School	Student	2,578	2,900	12%
College/University	Student	2,100	2,900	38%
Industrial	Employees	4,388	6,869	19%
General Commercial	Employees	7,710	9,178	51%
Office	Employees	5,671	7,141	26%
Service	Employees	8,752	9,854	13%

Figure 3.1 Traffic Analysis Zones



4.0 Calibration and Validation Data

Travel Characteristics Data

Travel characteristics data are collected using household travel surveys conducted by the U.S. Department of Transportation in a program called the National Personal Transportation Survey (NPTS). For this study, the 1995 NPTS data were obtained and analyzed for three segments of the population, as follows:

- All Metropolitan Statistical Areas (MSAs) with less than 250,000 population
- The West North Central Region, including Nebraska, South Dakota, North Dakota, Iowa, Kansas, Minnesota and Missouri
- All households (29,650 households making weekday trips)

These data are a valuable source of travel characteristics data for cities and states that do not conduct individual household surveys.

The NPTS data were processed for use in estimating trip generation and distribution models for the City of Minot. This data processing reduced the full national household survey dataset to extract only the households reporting weekday travel (the NPTS survey did collect data on weekend travel but this was not used to estimate the Minot model, which is designed to represent average weekday travel only). The results of this data processing are described below:

- There are 2,992 households in the sample, weighted to represent 5,274,128 households in MSAs with less than 250,000 populations.
- There are 1,001 households in the sample, weighted to represent 5,092,060 households in the West North Central region.
- There are 29,650 households in the full sample, weighted to represent 65,505,650 total households.

An analysis of the three potential segments of the NPTS data resulted in the selection of the West North Central segment for use in developing trip rates for the Minot model. This selection was made based on higher trip rates for single-family households and lower trip lengths overall, which was determined during model calibration to be more appropriate for Minot. This resulted in an average trip rate of 7.46 weekday trips per household for the sample and 7.75 weekday trips per household for the weighted sample. The difference between these trip rates was created by the differences in the weighting factors by type of household, characterized by household size and income category.

All of the trips reported in the NPTS for this study are reported as vehicle trips because the Minot Travel Model is a vehicle trip model. It is common to report person trips from the household survey and any comparisons to the reporting of NPTS (or other household surveys) should be reviewed to identify whether person trips or vehicle trips are being reported.

The NPTS data were evaluated using the two key household characteristics variables in the Minot Model: dwelling unit type and area type. Dwelling units from the 1995 NPTS data were combined to reflect the two categories of dwelling units in the 2000 Minot Land Use data: single family dwelling (including single family houses and duplexes) and multi-family dwelling units (including row houses, apartments and mobile homes). Area type was determined to be not significant for modeling purposes and was not used in the final model.

Observed Data

Traffic Counts

Traffic counts were obtained for the year 1998 from the City of Minot in map format. An electronic file of the map was not available. Therefore the traffic counts were manually coded into the TP+ Minot Model network. These counts covered 571 locations in the network. In addition, the city provided traffic counts at 10 external stations.

One of the primary analysis tools that the traffic counts support is the analysis of screenline locations. These screenlines cover the north-south and east-west movements in the model. A small number of the lower volume roads do not have traffic counts provided, even though they have been identified in the screenline. These links may be added in the future to complete the traffic counts for the screenlines. The screenlines were presented in Figure 2.1.

5.0 Model Calibration

Model calibration is the process to estimate the parameters used in each of the components of the 4-step travel demand forecasting model. The term "4-step" model is commonly used in practice but in the case of the 2000 Minot Model, the 3rd step of the process, mode choice, was not considered significant or necessary for inclusion into the Minot Model. To accommodate this decision, the 2000 Minot Model was developed as a vehicle trip model instead of a person trip model. The development of a vehicle trip model rather than the person trip model eliminates the need to convert person trips to vehicle trips or to determine the vehicle occupancy of auto trips.

The model calibration process for the 2000 Minot Model used national averages to estimate model parameters. A comparison of the travel characteristics from the current dataset used (the 1995 NPTS data) showed that the vehicle trip rates in the West North Central region (where Minot is located) are significantly higher than the national average. This is typical for cities with lower densities and fewer modal options. The larger metropolitan areas often dominate the national average and this makes national averages less useful for smaller cities.

The data and process to calibrate the 2000 Minot Model are described in the following sections. The process to validate this model, which is the process to make adjustments to the model parameters based on a comparison of traffic counts to model volumes, is described in Section 6.0. The model parameters reported in this section are derived directly from the original data sources.

Trip Generation

Residential Trip Rates by Household Type

The weekday vehicle trips from the 1995 NPTS data were compared to the households from the same sample to estimate average weekday vehicle trip rates by household category. The household categories were developed from the Minot land use data for two categories of dwelling units. These trip rates were calculated for the West North Central region and the full national database and are presented in Table 5.1. A comparison of the differences between the National and West North Central region indicate that there are some differences in trip rates, as high as 0.50 vehicle trips per household.

Table 5.1. Average Vehicle Trip Rates from the 1995 NPTS

Dwelling Unit Type	West North Central Region	National	Difference
Single Family & Duplex	8.25	7.98	0.27
Multi-Family	5.68	5.34	0.33
Total Households	7.75	7.24	0.50

Trip Purposes

One of the advantages of using the 1995 NPTS survey data for deriving trip rates is that there are many choices of trip purpose categories. The trip purposes were developed with the following guidelines:

- Trip purposes should represent a significant portion of total trips, or at least 10 percent of total travel, to warrant a separate trip purpose.
- Trip purposes should be developed to take advantage of the stratification of land uses in the Minot area. For instance, general commercial and shopping center land uses support a separation of home-based shopping trip purpose. Home-based school trips were considered using this guideline, but they represented a small portion of total travel.
- The 2000 Minot Model should be able to differentiate between land uses that would be used in future analysis so that the evaluation of traffic in these areas reflects the types of land uses being proposed.

These guidelines resulted in the specification of five trip purposes, presented in Table 5.2. The 2000 Minot model combined the Home-Based Shop, Social/Recreational and Other trip purposes into a single Home-Based Other trip purpose. The 1995 NPTS data contains many more trip purposes than the five defined for the 2000 Minot Model. These are also presented in Table 5.2 for reference.

Table 5.2. Definition of Trip Purposes for the 2000 Model

Trip Purpose	1995 NPTS Trip Purposes Included	Percent of Total Trips
Home-Based Work	Work and Work-related Business	25
Home-Based Shop	Shopping	10
Home-Based Recreational	Vacation, Visit Friends or Relatives, Went out to Eat, and Other Social/Recreational	13
Home-Based Other	Religious, Medical/Dental, Personal Business, School, Take Someone or Pick Up Someone, and Other)	18
Non-Home-Based	Any trips that start and end away from home	34

Residential Trip Rates by Trip Purpose

The residential trip rates were developed from the 1995 NPTS for the household types and trip purposes identified in the previous sections. These are presented in Table 5.3. The total daily trip rate differs slightly from the trip rates presented in Table 5.1 because the visit friends and relatives was considered as a trip attraction rate as well as a trip production rate. So the total daily trip rate for households is equal to the total trip productions plus the trips attracted to other households.

Non-Residential Trip Rates

Non-residential trip rates were calculated from an analysis of the trip rates by land use type in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 6th Edition, which was updated in 1997. Table 5.4 presents the ITE trip rates for each land use type and for the land use categories used in the 2000 Minot Model. The trip rates were slightly adjusted to facilitate model validation.

Non-residential trip rates were stratified to trip purposes using a combination of estimated trip attraction shares from a model developed in Tucson, Arizona with very similar trip purposes and land use categories and engineering judgment. These stratifications are presented in Table 12. The trip attraction shares used in the Tucson model are presented in this table for comparison.

Summary of Trip Rates

Table 13 presents a summary of all trip rates developed for the Minot Trip Generation Model by trip purpose and land use category. This table includes trip rates for the special generators and internal-external trips, which are all part of the total trip generation model.

Table 5.3 Daily Residential Trip Rates by Trip Purpose

Land Use Category	Units	Production Rate					Attraction Rate					Total
		HBW	HBS	HBR	HBO	NHB	HBW	HBS	HBR	HBO	NHB	Daily
Trip Rates												
SF Residential	Dwelling	2.76	1.16	1.54	2.28	4.01	-	-	0.26	-	-	12.01
MF Residential	Dwelling	2.33	0.82	1.11	1.11	2.76	-	-	0.18	-	-	8.31
Percent of Trips by Trip Purpose												
SF Residential Average	Dwelling	23.0%	9.7%	12.8%	19.0%	33.4%	0.0%	0.0%	2.2%	0.0%	0.0%	100.0%
MF Residential Average	Dwelling	28.0%	11.0%	12.5%	13.7%	32.3%	0.0%	0.0%	2.4%	0.0%	0.0%	100.0%

Sources:
(1) Nationwide Personal Transportation Survey for 1995, Bureau of Transportation Statistics CD-ROM, US Department of Transportation
(2) Trip Rates adjusted during model calibration

Table 5.4 Daily Land Use Trip Generation Rates

Land Use Category	Units	2000 Minot Daily Rate	1997 ITE Daily Rate	ITE Trip Generation Category
MF Residential	Dwelling	10.25	6.84	Apartment
SF Residential	Dwelling	12.01	9.88	Single Family Detached
Elementary Schools	Student	0.99	1.02	Elementary School
Middle Schools	Student	1.43	1.45	Average Middle-High School
High Schools	Student	1.76	1.79	Community College
College/University	Student	2.33	2.38	University
Industrial	Employees	2.66	2.56	Average of Industrial Uses
General Commercial	Employees	13.54	13.85	Average of Retail Uses
Office	Employees	2.60	2.87	Average of Office Uses
Service	Employees	4.85	5.10	Average of Service Uses
Notes on ITE Trip Rates for Special Generators				
		Trips/Emp	Average Size	Definition for Size /# Sites
Minot Airport	Employees	10.3	2,649	Low range of rates
Notes on ITE Trip Rates for Industrial Classifications				
Gen. Light Ind.	Employee	3.02	469	
Manufacturing	Employee	2.10	641	
Average		2.56	555	
Notes on ITE Trip Rates for Retail Classifications				
Auto Dealership	Employee	21.14	62	
Furniture Store	Employee	12.19	33	
Wholesale Market	Employee	8.21	250	
Average		13.85	115	
Notes on ITE Trip Rates for Office Classifications				
Office Buildings	Employee	3.32	610	
Corporate HQ	Employee	2.27	606	
R&D	Employee	2.27	1,022	
Single Tenant Office	Employee	3.62	346	
Average		2.87	646	
Notes on ITE Trip Rates for Service Classifications				
Nursing Home	Employee	4.05	171	
Govt Complex	Employee	6.09	575	
Hospital	Employee	5.17	888	
Average		5.10	545	

Source: ITE Trip Generation Manual, 6th Edition, 1997

Table 5.5 Trip Attraction Shares for the 2000 Model

Land Use Category	HBW	HBS	HBR	HBO	NHB	Total
SF Residential			2.5%			
MF Residential			2.5%			
Elementary Schools	10.0%			40.0%	50.0%	100.0%
Secondary Schools	10.0%			40.0%	50.0%	100.0%
Community College	10.0%			40.0%	50.0%	100.0%
College/University	10.0%			40.0%	50.0%	100.0%
Industrial	85.0%				15.0%	100.0%
General Commercial	12.2%	22.8%	17.5%	11.5%	36.0%	100.0%
Shopping Center	12.2%	22.8%	17.5%	11.5%	36.0%	100.0%
Office	22.3%			19.9%	57.8%	100.0%
Service	40.7%			33.8%	25.5%	100.0%
Airport	15.0%		70.0%		15.0%	100.0%

Table 5.6 Daily Land Use Trip Generation Rates by Trip Purpose

Land Use		Production Rate					Attraction Rate					Total Daily Rates	ITE Daily Rates	ITE Trip Generation Category
Category	Units	HBW	HBS	HBR	HBO	NHB	HBW	HBS	HBR	HBO	NHB			
SF Residential	Dwelling	2.76	1.16	1.54	2.28	4.01	0.00	0.00	0.26	0.00	0.00	12.01	9.88	Single Family Detached
MF Residential	Dwelling	2.12	0.94	1.41	1.93	3.60	0.00	0.00	0.25	0.00	0.00	10.25	6.84	Apartment
Elementary Schools	Student	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.40	0.50	0.99	1.02	Elementary School
Middle School	Student	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.56	0.71	1.43	1.45	High School
High School	Student	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.71	0.88	1.76	1.79	Community College
College/University	Student	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.93	1.16	2.33	2.38	University
Industrial	Employee	0.00	0.00	0.00	0.00	0.00	2.26	0.00	0.00	0.00	0.40	2.66	2.56	General Light Industrial
General Commercial	Employee	0.00	0.00	0.00	0.00	0.00	1.65	3.09	2.37	1.56	4.88	13.54	13.85	Average of Retail Uses
Office	Employee	0.00	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.52	1.50	2.60	2.87	Weighted Average of Office
Service	Employee	0.00	0.00	0.00	0.00	0.00	1.97	0.00	0.00	1.65	1.23	4.85	5.10	Average of Service Uses
Special Generator Trip Rates														
Minot Airport	Employee	0.00	0.00	0.00	0.00	0.00	2.01	0.00	9.38	0.00	2.01	10.3	13.4	Comm/GenAviation Airport
Internal-External Trip Rates														
Internal-External Traffic	Vehicle	0.119	0.049	0.065	0.095	0.172	0.119	0.049	0.065	0.095	0.172	1.00		Percent by purpose

Sources:
(1) ITE Trip Generation Manual, 6th Edition, 1997
(2) Nationwide Personal Transportation Survey for 1995, Bureau of Transportation Statistics CD-ROM, US Department of Transportation

Trip Distribution

Trip Lengths

Trip lengths are defined by the average trip length as well as the trip length frequency distribution for each trip purpose. Observed data on trip lengths was developed from the 1995 NPTS data. These data were reported in five minute time increments so some smoothing of the trip length frequency distributions were necessary to achieve minute-by-minute estimate of trip length distributions. These observations are reported in Figure 5.1.

Friction Factors

Friction factors were developed using a gamma function to estimate the friction factors and application of the trip distribution model to identify the "best-fit" for the average trip length and trip length frequency distributions. The friction factors estimated are presented in Figure 5.2 by trip purpose. The gamma functions used to develop these functions used the following equation:

$$Alpha * (I^{Beta} * e^{I * Gamma})$$

Where Alpha, Beta and Gamma are coefficients and I is the impedance, or trip length in minutes.

The coefficients in the gamma function are estimated to provide the "best-fit" for the average trip length and are provided in Table 5.7.

Table 5.7 Coefficients in the Gamma Function to Estimate Friction Factors

Trip Purpose	Alpha	Beta	Gamma
Home-Based Work	5000	0.20	-0.03
Home-Based Shop	30000	0.00	-0.30
Home-Based Recreational	15000	0.40	-0.05
Home-Based Other	20000	0.10	-0.10
Non-Home-Based	25000	0.20	-0.05

Figure 5.1 Trip Length Frequency Distributions 1995 NPTS for West North Central

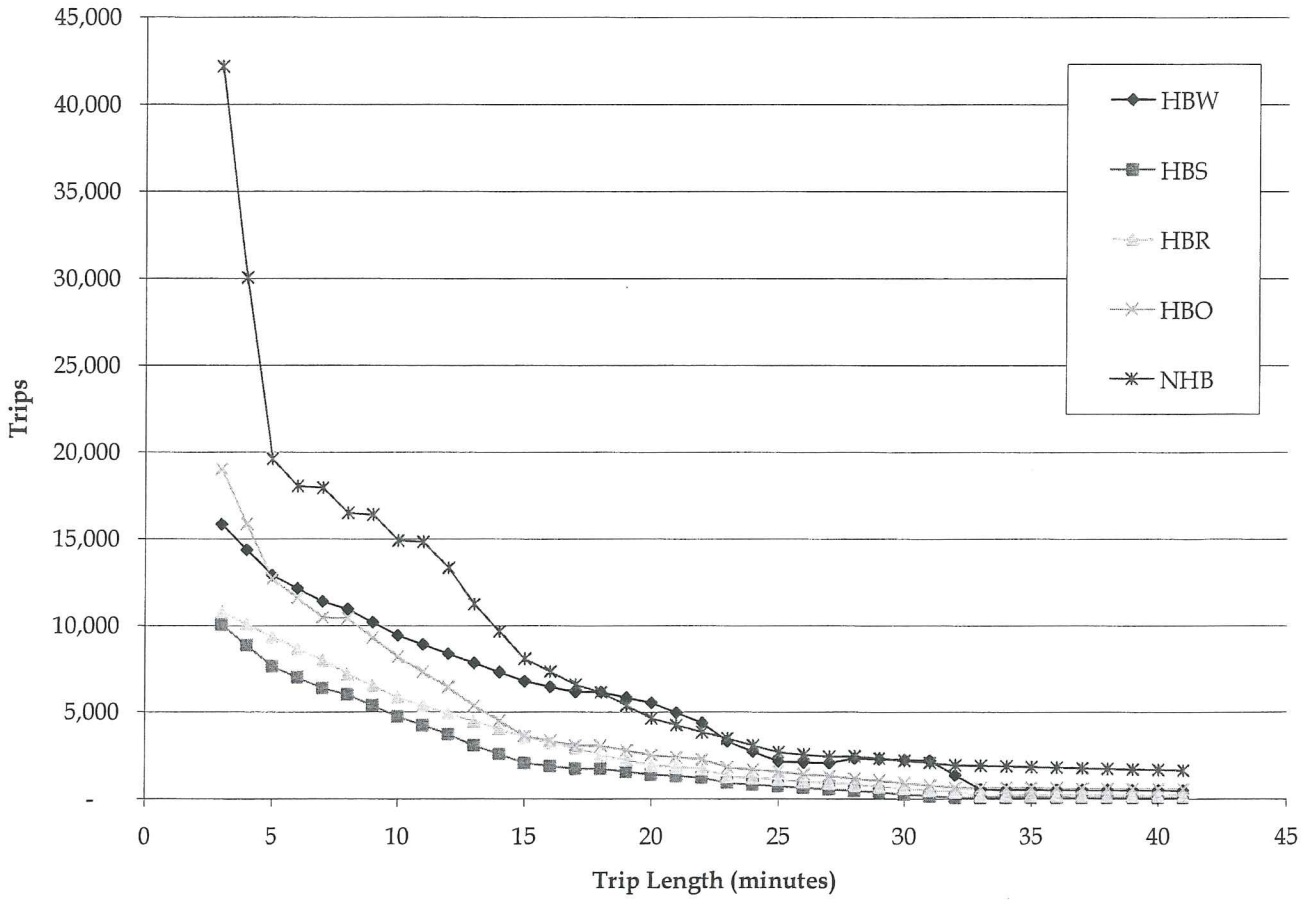
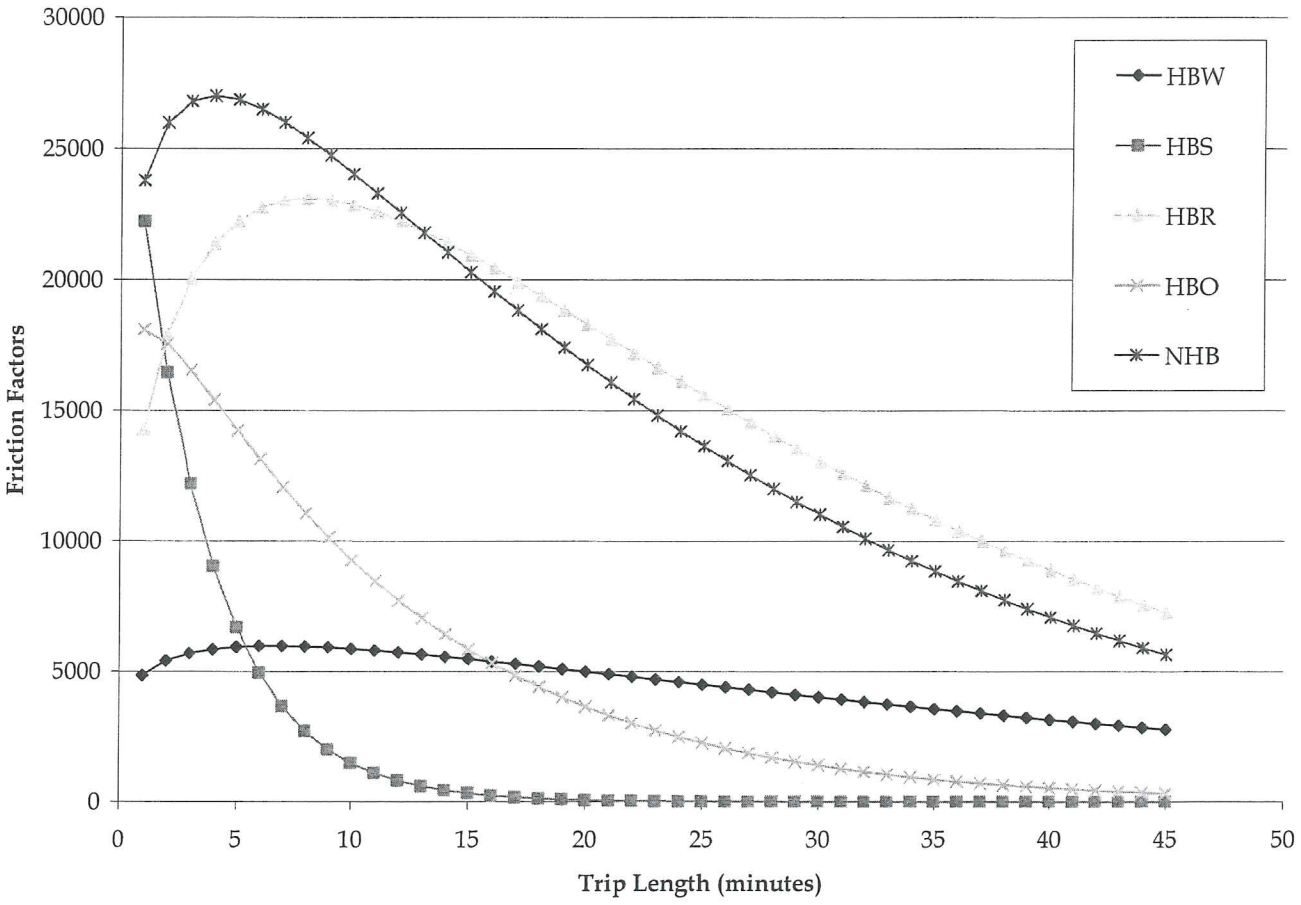


Figure 5.2 Estimated Friction Factors for the 2000 Minot Model Update



External Trips

External trips were developed from an analysis of the traffic counts at the external stations. This analysis is presented in Table 5.8. This analysis of external traffic included reviewing traffic counts for 2000 and identifying the percent of traffic at each external station that would be traveling through the study area (called external-to-external trips, or E-E trips) rather than going to destinations within Minot (called internal-external trips, or I-E trips). The original E-E and I-E percentages of external trips shown in Table 5.8 were modified during model validation. Table 5.8 also presents the external trips developed for 2040. Total volumes for 2040 were developed based on historical trends in traffic counts (from 1995 to 1998) and E-E trip percentages were assumed constant for both 2000 and 2040.

During model calibration, some of the external station centroid connectors were revised to reflect the fact that they may represent more than one road entering the study area. The traffic counts on these external stations were estimated to represent these additional roads so this is consistent with the development of the external station volumes.

External trips were developed to reflect the direction of travel and the fact that travelers would not back-track to leave the study area in the same direction they entered the study area. To achieve this logical direction of travel, restrictions were placed on certain external movements that were considered illogical, as follows:

- Trips between external station 108-108 on the Northern Border
- Trips between external stations 109-117 on the Eastern Border
- Trips between external stations 110-112, 110-111 on the Southern Border
- Trips between external stations 113-116 on the Western Border

Table 5.8 External Trips

Name	Side of Study Area	ZONE	2000 Total Volume	E-E Percentage	2000 E-E Trips	2000 I-E Trips	2040 Total Volume	Percent Increase
US 83	North	108	8,860	15%	1,329	7,531	10,099	14%
US 2	East	109	7,440	25%	1,860	5,580	18,819	153%
US 52	South	110	6,760	10%	676	6,084	13,909	106%
US 83	South	111	8,830	15%	1,325	7,506	18,170	106%
16th Ave SW	South	112	570	0%	-	570	1,173	106%
46th Ave NW/County Hwy	South	113	1,210	0%	-	1,210	1,210	0%
US 2/52	West	114	8,910	25%	2,228	6,683	8,910	0%
4th Ave NW	West	115	2,000	0%	-	2,000	2,000	0%
37th Ave NW/County Hwy	West	116	600	0%	-	600	600	0%
5th Ave NE/County Hwy	East	117	1,100	0%	-	1,100	2,529	130%
Total			**46,280**		**7,417**	**38,863**	**77,419**	**67%**

Trip Assignment

Calibrating the trip assignment model involves specifying the volume-delay functions that will determine how travelers will respond to congestion and identifying the mathematical formulation that is used to assign trips to the network. The volume-delay functions determine the changes in travel time based on volume-to-capacity ratios. The mathematical functions determine the number and type of iterations that the assignment model will be processing before determining the final traffic for each link.

The vast majority of trip assignment models in use today employ the equilibrium assignment technique using a minimum number of iterations to achieve convergence. TP+ is designed so that the user can set a maximum number of iterations (30) and the program will continue until convergence is reached (20 iterations).

The original volume-delay function developed for 4-step travel forecasting models was developed by the Bureau of Public Roads (BPR), as follows:

$$T = T_f * \left[1 + a * (V / C)^b\right]$$

where "a" and "b" are coefficients in the equation, V/C is the volume-to-capacity ration, T_f is the Travel Time and T is the output Travel Time. In the original BPR function, "a" was equal to 0.15 and "b" was equal to 4. In the application of the 2000 Minot Model, these volume-delay functions, which are presented in Table 5.9, were revised to reflect steeper curves.

Table 5.9 Volume-Delay Function Parameters by Functional Class

Functional Class	"a"	"b"
Freeways and Divided Highways	0.15	10
Principal Arterials and Frontage Roads and Freeway Ramps	0.15	7
Minor Arterials, Major Collectors and Local Roads	0.15	4

6.0 Model Validation

Model validation is the process to adjust the model parameters developed during the calibration process based on a comparison of the trip assignment outputs (model volumes) to observed values (traffic counts). In addition, model validation ensures that the model parameters being developed are reasonable compared to other available sources, such as national standards or travel models developed for other areas. Model validation varies for each model component, depending on the data available and the ability to isolate travel behavior into market segments. The following sections describe the adjustments made to the model parameters and the model validation results for the 2000 Minot Model.

Trip Generation

Trip generation models are often validated by comparing trip rates to those developed for other travel models in cities of a similar size. This comparison is difficult in the case of Minot's travel model because the trip generation rates are "vehicle" trips when many other trip generation models in other cities are "person" trip models.

Trip Generation Model Results

Trip generation models must balance the trip attractions to trip productions. Trip productions are used as the control total for trips because the trip productions are estimated from household survey data and the trip attractions are estimated using national estimates of land use trip generation rates. While both are valid observed data sources, the use of national trip rates can be very different when applied to Minot. In this case, the trip attraction rates were higher than the trip production rates for all trip purposes. These trip rates were adjusted to be more consistent with the trip production rates. Before making adjustments to the balancing procedures, the internal-external trips were extracted and estimated using separate trip rate equations so that these trips would not be adjusted during the balancing process. The results of applying these adjustment factors developed for trip attraction rates are provided in Table 6.1.

Table 6.1 Trip Productions and Attractions for the 2000 Minot Model

Trip Purpose	Trip Productions	Trip Attractions Before Adjustment	Trip Attractions After Adjustment
Home-Based Work	41,803	44,534	41,803
Home-Based Shop	16,686	23,824	16,686
Home-Based Recreational	22,271	21,863	22,271
Home-Based Other	30,015	34,999	30,015
Non-Home-Based	57,269	65,279	57,269
Internal-External	38,863	37,720	38,863
	206,907	**228,219**	**206,907**

External Trips

External trips were developed from an analysis of the traffic counts at the external stations. External trips include trips that travel through the study area (called external-to-external trips, or E-E trips) and trips going to destinations within Minot (called internal-external trips, or I-E trips). The E-E percent was assumed as 6 percent and I-E as 94 percent of the total external trips. The E-E percent assumed in the Minot model is very low compared to the 25-45 percent in other cities of similar size. The I-E and E-E ratio was adjusted as shown in Table 6.2 during validation.

Table 6.2 External Trips

Name	Side of Study Area	Traffic Analysis Zone	Total External Volume	Through Trip Percentage	Through Trips	Other External Trips
US 83	North	108	8,860	15%	1,329	7,531
US 2	East	109	7,440	25%	1,860	5,580
US 52	South	110	6,760	10%	676	6,084
US 83	South	111	8,830	15%	1,325	7,506
16th Ave SW	South	112	570	0%	-	570
46th Ave NW/County Hwy	South	113	1,210	0%	-	1,210
US 2/52	West	114	8,910	25%	2,228	6,683
4th Ave NW	West	115	2,000	0%	-	2,000
37th Ave NW/County Hwy	West	116	600	0%	-	600
5th Ave NE/County Hwy	East	117	1,100	0%	-	1,100
Total			**46,280**	**16%**	**7,417**	**38,863**

Trip Distribution

Trip distribution models can be validated in two ways: first, by verifying that the average trip lengths in the model compare favorably to the average trip lengths reported in the household survey and second, by comparing screenline traffic counts with model volumes.

Average Trip Lengths

A comparison of average trip lengths by trip purpose is provided in Table 6.3. The 1995 NPTS average trip lengths were used to estimate friction factors for use in the 2000 Minot Model, but these trip lengths produced traffic volumes considerably higher than traffic counts in Minot. This would indicate the average trip lengths are lower in Minot than in other areas around the West North Central region, which is expected given the geographic size of the City. Two other cities are provided for comparison. Again, it should be recognized that vehicle trip lengths might differ from person trip lengths in a comparison to another city's model.

Table 6.3 Average Trip Lengths for the 2000 Minot Model in Minutes

Trip Purpose	2000 Model	1995 NPTS	Reno, NV	Lincoln, NE
Home-Based Work	8.7	12.93	11.2	12.35
Home-Based Shop	7.7	10.08	8.6	9.40
Home-Based Recreational	8.5	11.11		9.92
Home-Based Other	7.9	11.19	10.4	10.4
Non-Home-Based	8.1	11.89	8.1	10.62

Screenline Validation

There are six screenlines in the Minot Model. Screenlines are usually indicative of whether the trip distribution is reasonable because they will identify patterns of east-west or north-south movements. Table 6.4 presents the results of the screenlines. In all the cases, the screenlines meet the +/- 10 percent goal. The results of the screenline analysis indicate that the pattern of trip movements is reasonable compared to observed values.

Table 6.4 Modeled Volumes Vs Observed Counts for Screenlines

Screenline	Number of Counts	Model Volume	Traffic Counts	Difference	Percent Difference	Target
1	12	25,235	25,050	185	0.7%	+/- 10%
2	16	70,168	64,300	5,868	9.1%	+/- 10%
3	12	48,896	48,000	896	1.9%	+/- 10%
4	14	22,734	25,200	-2,466	-9.8%	+/- 10%
5	16	28,833	29,300	-467	-1.6%	+/- 10%
6	8	24,234	24,400	-166	-0.7%	+/- 10%
Grand Total	**78**	**220,101**	**216,250**	**3,851**	**1.8%**	**+/- 10%**

Trip Assignment

Systemwide

Trip assignment is typically validated by comparing traffic counts to modeled volumes for different market segments and to summarize systemwide variables.

Functional Class and Volume Group

The summaries of traffic counts and modeled volumes by functional class and volume group are presented in Tables 6.5 and 6.6. These classifications also have established goals of percent deviation that are presented in the table. All of the classifications meet the goals for percent deviation. The overall percent deviation is 5.0 percent.

Table 6.5 Modeled Volume Vs Observed Volume by Facility Type

Functional Classification	Number of Counts	Model Volume	Traffic Counts	Difference	Percent Difference	Target
Freeways	44	164,751	170,425	-5,674	-3.3%	+/- 5%
Divided Highways	20	119,901	119,700	201	0.2%	+/- 10%
Principal Arterials	50	405,651	412,050	-6,399	-1.6%	+/- 10%
Minor Arterials	217	591,490	553,730	37,760	6.8%	+/- 15%
Major Collectors	196	256,466	290,891	-34,425	-11.8%	+/- 25%
Local Roads	42	24,522	38,350	-13,828	-36.1%	No Target
Frontage Roads	8	11,341	12,200	-859	-7.0%	No Target
Grand Total	**577**	**1,574,122**	**1,597,346**	**-23,224**	**-1.5%**	**+/- 5%**

Table 6.6 Modeled Volume Vs Observed Volume by Volume Groups

Volume Group	Number of Counts	Model Volume	Traffic Counts	Difference	Percent Difference	Target
Less than 5000	495	923,947	943,446	-19,499	-2.1%	+/- 40%
5000 - 10,000	62	389,092	407,100	-18,008	-4.4%	+/- 35%
10,000-15,000	20	261,084	246,800	14,284	5.8%	+/- 30%
Grand Total	**577**	**1,574,122**	**1,597,346**	**-23,224**	**-1.5%**	**+/- 5%**

Speeds

The speeds for the roads in the Minot network were provided by Olsson Associates and the City of Minot staff. An analysis of the link speeds uncovered some discrepancies in the coding. Here are a few observations:

- The proposed speed on US Highway 2 was 50mph. This facility was coded as a freeway. This speed was increased to 55mph based on professional judgment and a comparison of speeds in cities of similar size.
- The speed on US Highway 83 was set at 35mph. This facility is also coded as a freeway. This road passes through the downtown and might not justify the 55mph speed of a freeway. Therefore, it was identified as a different facility type called divided highway and given a speed of 42mph.
- The Frontage roads that run parallel to the freeways were coded as local roads and hence had a very low speed. Because of the low speeds, the model was estimating zero volumes on all these roads. A new facility type called "Frontage Roads" was introduced and was coded with a speeds comparable to those on the divided highways.
- While most of the principal arterials speeds were specified as 35mph, some were coded as 30mph. Most of the minor arterials were coded as 30mph.
- Collectors and local roads had the same speeds of 25mph.

The speeds that were specified were too low and inconsistent with respect to facility types. This was resulting in an overall underestimation of volumes on the roads. To maintain consistency in speeds on different facility type, a speed lookup table was developed. The proposed speeds in Table 6.7 are based on speeds for roadway facilities in cities that are comparable in size to Minot.

Table 6.7 Minot Speed Lookup Table

Facility Type	Speed (miles per hour)
Freeways	62.0
Divided Highways	42.5
Principal Arterials	40.0
Minor Arterials	38.5
Major Collectors	35.0
Local Roads	25.0
Ramps	40.0
Frontage Roads	42.0

7.0 Forecast Results

Vehicle miles traveled were estimated for both the year 2000 and year 2040 by functional classification. Vehicle miles traveled increased at a rate that was faster than the growth in households (35 percent) or employment (25 percent). This is most likely a result of growth occurring in areas that are further away from the center and a result of the increases in external trips (67 percent).

Table 7.1 Vehicle Miles Traveled

Functional Classification	2000 VMT	2040 VMT	Percent Increase
Freeways	107,676	211,519	96.4%
Divided Highways	39,749	80,307	102.0%
Principal Arterials	133,002	157,960	18.8%
Minor Arterials	211,180	311,653	47.6%
Major Collectors	154,201	315,439	104.6%
Local Roads	42,650	66,134	55.1%
Ramps	7,327	11,844	61.7%
Frontage Roads	13,765	20,683	50.3%
Centroids	45,734	69,989	53.0%
Grand Total	**755,285**	**1,245,528**	**64.9%**

APPENDIX D

Planning Commission Meeting Minutes
June 17, 2002
July 15, 2002
and
August 19, 2002

City Council Meeting Minutes
October 15, 2002

Planning Commission
Special Meeting
June 17, 2002

MEMBERS PRESENT: Dammen, Galusha, Lehner, Schempp, Semrau, Seymour, Volk, Ekblad

MEMBERS ABSENT: Hight, Hoffart, Kleven, Schmidt, Wetzler

OTHERS PRESENT: City Planner, City Engineer, Public Works Director, Traffic Engineer, Mayor Erickson, Aldermen Boen, Hatlelid, Snyder, Podrygula, Medalen, Krabseth, Kuhn, Greenheck,
County Engineer

Chairman Ekblad introduced the consultants from Olsson & Associates, Jack Lynch and Mike Connors and asked them to begin their presentation of the Transportation and Land Use Plan.

Jack Lynch began the presentation talking about the proposed Land Use Plan. The presentation consisted of population information gathered from Census data with a goal to reach a population of 50,000. He compared the 1995 plan to the current proposal, which suggested where growth might occur. He indicated it is currently expanding to the northwest, east and south. He indicated the Airport Zone indicated in purple, as 'Public' land would be scaled down after conversations with the Airport Director.

Jack Lynch spoke of the open space corridors, gateways, signage and town centers proposed on the plan. He stated the city should consider these to announce or identify a special place within the city. This could be accomplished by increasing development standards or creating a theme and including it in other public spaces.

He indicated there was no increase in the amount of commercial property designated but that it appeared to be more than the 1995 plan due to an increase in property used as commercial. He indicated plenty of commercial property is available downtown and should be focused there. He defined a town center as being adjacent to residential and serving approximately 200-300 homes in the neighborhood. Seymour questioned if the study looked at business signage, billboards, and how they might be controlled. Lynch responded by saying the Planning Commission should recommend a strong sign ordinance for specific areas.

Mike Connors began the second part of the presentation discussing a brief history of the road system, including the 2-52 Bypass. He indicated some similar recommendations were derived from a former KLJ study. He discussed three options, 1) Leaving it in its current state, 2) Installing a traffic signal at 13th Street SE and 20th Street SE; right in, right out only at specific access points, 3) Freeway option with interchanges, no signals and frontage roads from the Highway 83 Bypass to 55th Street SE. In conclusion, the ND DOT and City of Minot have established the bypass as a freeway system. The short-range goal to reach in the next 15 to 20 years is the expressway with the long-range solution being a freeway.

Mr. Connors also discussed the west end study relative to Burdick Expressway and Highway 83 Bypass and their intersections with Highway 2&52 West. He discussed Alternative A being ½ diamonds with frontages in between access points. The charts were discussed and a recommendation was made to prepare the design concept/environmental reports and frontage road master plans. He also discussed funding from the federal, state and local levels.

Mr. Connors stated the decline in traffic counts on the west end of the study were probably due to a declining population in the western part of the state and possibly the loss of Canadian traffic to the state.

Following the presentation, questions were taken from the audience and the Commission. Dammen questioned the west end solutions and his concern with safety. Steve Blasing, Westlie Motors, asked if the population doesn't reach 50,000 in the future, would the expressway still be necessary. Bob Miller questioned the coordination with the Broadway widening and 'one way pairs' on South Broadway vs. North Broadway. City Engineer, Bob Amptman, stated the level of service 'C' analysis is mute and that it is not an issue based on current volumes. John Coughlin asked the consultants for traffic counts west of the study. Mr. Connors indicated he didn't know how far out the model addressed but that he would give his findings to Mr. Coughlin. Earl Allen asked if the study had addressed Air Force Base traffic. Mr. Connors stated it did not. Mr. Allen questioned an east bypass and suggested it should be near the new Mill serving the businesses with truck traffic.

Steve Blasing stated the businesses that depend on truck traffic need easy on and easy off access and asked the consultants to keep that in mind. John Coughlin referred to the chart on page 4-14 and the deaths that had occurred there. He proposed that traffic signals should be at the 6th Street and 10th Street intersections as well as the 13th Street SE intersection in order to reduce accidents as a modified solution. Dammen stated he believed the signals would cause a greater hazard to the drivers. Marv Semrau stated he was not in favor of the west end solution the consultants had recommended and suggested a turn lane at specific intersections could be a solution.

Schempp stated that 'damages' should be mentioned with respect to transportation access if businesses are affected. Asked the consultants if they would be willing to add a phrase in the document. They agreed. Also, that 11th Avenue SE should be shown to connect to 13th Street SE on figure 5-1. Also, that 6th Street SE should be shown to connect to the Bypass on figure 5-1.

The Commission asked what was the next step in approving the Plan. City Engineer Amptman stated it needed to be approved by the City Council and the ND DOT. Schempp stated the first solution should come at 13th Street SE.

Concern over the Airport clear zone, started a discussion with the alderman of that area. The consultants stated they has spoken with the Airport Director Ryan and would need to make a modification to the NW area. Schempp questioned the greenspace intention of the land use map. He suggested contacting the Parks Department for their review. An overlay zone was discussed with the group but was decided that it wasn't needed.

Mr. Lynch discussed the 'University Place' and how the City might step up control on signs and landscaping in that area. Alderman Hatlelid made reference to the area known as Ridgedale Acres and why it was partially shown as industrial on the land use map. The consultants stated it should probably be changed to show the correct use. Roger Kluck, County Engineer, stated the Plan should be given to the County for their review especially in the fringe areas.

John Coughlin stated there had not been enough time for the community or business owners along the Bypass to review the Plans. He requested the Commission to hold its recommendation and contact the property owners along the Bypass.

It was decided that another special Planning Commission meeting would be set for July 15th, 2002 at 7pm in the City Council chambers. Motion by Lehner, second by Volk, to have a special meeting and send notice to those business owners. The motion passed unanimously.

The meeting adjourned at 8:20pm.

Attachments

Planning Commission
Special Meeting
July 15, 2002

MEMBERS PRESENT: Eggen, Hoffart, Kleven, Langager, Schempp, Semrau, Volk, Ekblad

MEMBERS ABSENT: Dammen, Galusha, Hight, Seymour, Wetzler

OTHERS PRESENT: City Planner, City Engineer, City Manager, Mayor Zimbelman, Aldermen Boen, Hatlelid, Barney, Somerville, Burckhard, Medalen, Greenheck, Lehner, Garcia, Frey, Molla Romine, ND DOT employees; Tim Horner, Jim Redding, Dave Leftwich

MINUTES: Motion by Semrau, second by Hoffart to approve minutes of the June 17, 2002 meeting. Motion carried unanimously.

Chairman Ekblad introduced the new members of the Planning Commission, Gene Eggen and Rita Langager. He also introduced staff from the ND DOT and requested anyone in the audience with concerns to discuss them at the podium. Gary Price, 3520 30th Street NW, questioned the interchange proposed at 30th Avenue NW and the Highway 83 Bypass as to whether or not it was going to be a four lane and wanted to see plans that might affect his business at that location. The City Engineer commented on the concern by stating that the study is only conceptual with design details to be formulated in the next few phases. The City Engineer stated the City Council and ND DOT have yet to approve the Study and preliminary plans will begin as soon as that occurs. The City Engineer stated a series of public input meetings would occur in the future as plans develop. Gary Price questioned the paving of 30th Avenue NW as part of the Capital Improvements 5-year Plan (CIP). The City Engineer stated it would most likely be paved as development along 30th Avenue NW. Schempp questioned the wording of the study and how it affects the CIP. The City Engineer responded to say the projects are dependent on Federal funding and if the City Council wishes to change its priorities, it can do so during the budget hearings and CIP consideration each year.

Lt. Hernandez, MAFB, questioned the possible closing of the Highway 83 Bypass. He stated it would interfere with critical missions at the base. The City Engineer responded by saying there is no plan to close the Highway 83 Bypass and reminded everyone this study is a very long-range look into the future.

Steve Blasing, Westlie Motors, referred to his attendance at the June Special meeting and wanted to know when plans would be available for review. The City Engineer responded by saying if the plan is adopted as written, a consultant will proceed with an in-depth study of the frontage roads and property acquisition. If the expressway option is approved, frontage road planning will still have to occur along with a signal

study to ensure the signals would operate properly. The City Engineer stated activity should begin within a year. Steve Blasing closed by asking the Planning Commission to consider the need for access on and off the highway.

Clara Sue Price, District 40 Representative, spoke of her concerns with North Hill School. She stated the paving of 30th Avenue NW might increase traffic around 8th Street NW. She recommended a survey be done to find out what impacts that would have on the safety of the children in that area. The City Engineer stated the City Council can prioritize CIP projects but it doesn't necessarily lock them in.

Brad Haugeberg, 2417 Brookside Drive, representing Sun Prairie Grain, spoke of his involvement with the Advisory Committee for the Study. His concerns are for the Agricultural importance that is not reflected in the Plan. Haugeberg stated the study does not address Agricultural commodities, their transport and the economic driver they provide. He polled major cities to find that Grand Forks and Minot are the top two Ag related traffic centers with 36,000 truckloads over a 5-month period each year. He stated the Study did traffic counts were done in April but that would be one of the lowest counts for truck traffic due to the road restrictions and that most farmers are in the fields not yet on the road. Haugeberg spoke of other businesses that use truck hauling and how signals would impede their businesses also because of the time it takes a truck to start and stop at a traffic signal. He stated he would be in favor of the expressway system, but a truck route similar to one in Grand Forks, could be considered.

John Fjeldahl, 301 254th Street SW, representing Ward County Farm Bureau, reiterated what Haugeberg stated and his reasons to support the freeway option. He also questioned when a plan would be available for review. The City Engineer stated there will be a series of input meetings and public hearing notices as it is proposed.

Brian Beeter, 1825 26th Street SE, owns 25 acres and is concerned that a frontage road map shown on the Study will affect possible future development of his land. He also stated he is concerned with the designation of green space that also encompasses much of his property. The Commission responded by saying it is a working document and that further study with regards to frontage roads will be likely in the near future.

Bob Miller, 512 5th Avenue NW, was present at the last special meeting and wanted to remind the Commission and the ND DOT that a plan should be developed with the concerns of traffic safety, not private preference. Miller stated his preference to the freeway system to prevent any further accidents and reminded the Commission that the businesses along the bypass will likely change ownership and type over the life of the highway system. He also referred to the City of Washburn's new city entrance signs and stated he would be in favor of Minot having them around the City.

Hans Gayzur, 3215 15th Ave. SW, stated he lived in Sorenson's Addition and questioned by the temporary signal at the 83 Bypass and Highway 2&52 has remained. He stated the trucks using either highway have to brake for the light, which is very loud, or once they stop, shift noisily to regain speed. He would like the study to consider removing the temporary light and supports the freeway option.

Chairman Ekblad received no more interest from the audience to speak and requested a motion to close the public hearing. Motion by Schempp, second by Hoffart to close the public hearing. Motion passed unanimously.

Bob Schempp stated he had at least sixteen concerns he would like to discuss. The first concern was the designation of the land owned by the fairgrounds. It was shown on the land use plan as park and school property as well as a portion shown as single-family residence. He made a motion to designate it as public, second by Kleven. Motion passed unanimously.

Bob Schempp stated his next concern was property of the new YMCA and property north of it have been developed or plats have been approved. He stated it is designated as green space on the plan and should be designated properly. Motion by Schempp, second by Semrau to change those property designations to high density residential. Motion passed unanimously.

Schempp pointed out that at the last meeting, the airport clear zone was expanded from the 1995 Comprehensive Plan and should be corrected. The consultants inadvertently eliminated commercial designations on 30th Avenue NW from Broadway to 8th Street NW and on 31st Avenue SW between 12th and 16th Streets SW. A motion by Schempp, second by Volk to correct these changes. The motion passed unanimously.

Schempp made reference to the University Place designation on the Land Use map stating it included a motel, car dealership, Bishop Ryan High School, commercial property, a cemetery and Minot State University. He recommended the designation include the university and cemetery specific taking the designation off the map but rewording the paragraph referring to University Place. Marv Semrau agreed with Schempp and stated something similar could be considered in future planning. Motion by Schempp, second by Semrau to eliminate the University designation from the map but leave the paragraph in the document. Discussion came from Langager with regards to the residential near the University. She stated any proposals would enhance the University but rotating the box 90 degrees would encompass the school. Kleven stated the criteria was specific to development and that long-term goals should be considered without jeopardizing businesses in that area. Schempp stated he would like to amend his motion to state the University Place paragraph should be rewritten to discuss the area but not businesses specific. The motion passed 7-1.

Schempp questioned the Gateway symbol on the Land Use map and why it was covering commercial and residential. He stated it should be residential on both sides of South Broadway. City Engineer stated it could be handled administratively.

Schempp questioned the location of the Town Centers on the Land Use map and if the City wanted to make them site specific or develop criteria and designate the areas at a later date. City Engineer stated the consultants felt these were undeveloped areas with little impact and would develop as the City grows. Kleven stated he did not wish to designate an exact location but to leave the concept in the wording of the document. Also suggested that the east Town Center location should be eliminated. Motion by Schempp, second by Kleven to remove all specific locations from the Land Use map but revise paragraph referring to them.

Bruce Walker, 1415 10th Street SW, reminds the Commission that the document under discussion is an ever-changing guide and supported the removal of the Town Center symbol but that the wording should remain in the document.

Schempp questioned the commercial designation on 21st Avenue NW near Sykes and suggested it should be changed to Office Park designation for fear of any type of commercial the Zoning Ordinance might allow. Motion by Schempp, second by Volk to designate that area as Office Park. The motion passed unanimously.

The discussion lead into green space designation on the Land Use map. Schempp questioned the wording on the map versus the paragraph referring to green space. The Addendum didn't seem to address his concerns and recommended a rewrite of the paragraph to eliminate a portion of that sentence regarding development. The new sentence will read, "The green space designation shown on the Land Use Plan will be used as a guide to be considered when development occurs" which is Item 3 on page 1 of the Addendum. Motion by Schempp, second by Semrau. The motion passed unanimously.

The Chairman declared a 5-minute recess. Discussion resumed with the possible closing of access points along the Highway 83 Bypass leading to Tierrecita Vallejo and the Golf Course. This reference is on page 4-6 of the Transportation and Land Use Study. The paragraph refers to access points that stay open not those that are closing but these two entrances are not mentioned. In the City Engineer's opinion, they should remain open. Motion by Schempp, second by Eggen, to add those two entrances to the paragraph stating they remain open. Motion passed unanimously.

Schempp questioned the NE Bypass recommendation and recalled it was changed to 55th Street NE but the consultants show it at 27th Street NE. Alderman Hatlelid supported it be moved back to 55th Street NE rather than 27th Street NE due to congestion. Motion by Kleven, second by Semrau to correct this in the Plan. The motion passed unanimously.

Schempp questioned the location of overpasses on 10th Street SW and 6th Street SE. The City Engineer stated this was possibly the result of a solution to incorporate additional north-south traffic. Motion by Schempp, second by Semrau to eliminate 10th Street SW bridge proposal. Motion failed 4-4. Schempp questioned the medians on 20th, 23rd and 42nd Avenues SW and whether they would be removed with the freeway concept. The City Engineer stated yes. Schempp requested the last two sentences of the Agricultural paragraph be rewritten because they are unclear. City Engineer stated we would handle that administratively.

Discussion from Eggen came regarding 11th Avenue SE. He questioned the extension to 13th Street SE and was opposed because of the detriment it would cause to the natural features in the area. City Engineer stated it could be possible with grading of the hillside. It was also discussed as to curving 11th Ave. SE to the south avoiding residential property that currently exists. He stated he was in favor of eliminating both possibilities. The City Engineer stated this proposal has been on the Major Street Plan for many decades but was not carried over by the consultants. Motion by Schempp, second by Eggen, to eliminate the section of the street proposal of 11th Avenue SE from Hiawatha Street to 13th Street SE. Motion passed 7-1.

Motion by Schempp, second by Kleven, to realign the designation sloping southeastward and continue through the coulee to 13th Street SE. The motion passed 5-3.

It was suggested by Chairman Ekblad to contact the School District to inform them of the Plan. City Planner, Donna Bye, said she would contact the superintendent.

Being no further comments, the meeting adjourned at 8:50pm.

Attachments

Planning Commission
Special Meeting
August 19, 2002

MEMBERS PRESENT:	Eggen, Galusha, Hoffart, Kleven, Schempp, Semrau, Seymour, Volk, Wetzler, Ekblad
MEMBERS ABSENT:	Dammen, Hight, Langager
OTHERS PRESENT:	City Planner, City Engineer, Traffic Engineer, Finance Director, Mayor Zimbelman, Aldermen Boen, Hatlelid, Somerville, Burckhard, Medalen, Greenheck, Lehner, Leigh, Garcia, Frey, Jim Redding, Paul Reagan

MINUTES: Motion by Seymour, second by Galusha to approve minutes of the July 15, 2002 meeting. Motion carried unanimously.

Chairman Ekblad asked the audience for testimony. The City Engineer stated there were a few corrections that should be addressed before testimony. The first item refers to the third bullet on page 4-15. It should read 'Overpass at 10th Street SW and 6th Street SE to provide a circulation system within the developing commercial area and to provide alternative routes to South Broadway and 16th Street SW.' The second item refers to page 5-7, Figure 5-3 on the 6th Street SE designation. The word 'Signal' should replace Overpass on the top of the diagram and the words 'Overpass and Long Range' should be added to the bottom of the designation. This refers to the Improvements along the US 2/52 Bypass.

Charles Pospishil, 1021 48th Street SW, spoke in favor of the city's efforts in construction of bike paths and hopes the City and County could work together to connect paths around the city. Mr. Pospishil stated he had concerns with the transit system of Minot and referred to Economic Development. Chairman Ekblad interrupted to state the meeting was not addressing Transit concerns and that Mr. Pospishil should bring his concerns to the next City Council meeting.

Eric Clausen, 1120 11th Street NW, presented his comments to the Planning Commission on a handout, which is included with these minutes. The document refers to the future of Minot and the MAFB as well as the population projections from the last census. Mr. Clausen stated he would like to see the City of Minot spend money on enhancements to attract young people to move to Minot.

Hans Gayzur, 3215 15th Ave. SW, referred to the neighborhood he is representing, Sorenson's Addition. He stated this neighborhood would be severely affected if Option A were chosen with regards to frontage roads. He discussed

property values and the difficulty those homeowners would have in relocating to other parts of the City if the Bypass option took their homes. Schempp asked if Option C would be a better Alternative to the neighborhood, Gayzur stated yes with some minor modifications. Gayzur stated it is currently difficult to slow down and turn left in the westbound lane.

Danny Schatz, 2808 SW 18th Ave., presented plans regarding access to his business. He indicated that traffic signals create problems for many users and referred to highway systems in Houston, TX. He stated between 50-100,000 people travel the roads daily on Interstate 10 with no problems. He suggested a one-way frontage road with on and off access points. His plan is submitted with the minutes.

Schempp asked if Schatz was in favor of the compressed diamond option with little taking of property. He stated yes and suggested it might work at the 83 Bypass or near the Burdick Expressway and US 2/52 intersection. Schatz believes most accidents occur between two cars, not trucks and cars.

The City Engineer questioned the height of the proposed overpass in relation to the frontage roads and figured it to be about 13 feet. Wetzler questioned the different colors of lines on the plan. Schatz stated the green lines were 2-way streets, and the blue lines were one-way streets. Schatz stated a new street would have to be proposed south of his property for circulation reasons but that the coulee west of 17th Street SE would make it difficult and expensive.

Brad Haugeberg, 2417 Brookside Drive, representing Sun Prairie Grain, stated his presence at the July Special meeting and supports what Schatz has proposed. Reminded the Commission to consider the agricultural industry in and around Minot and that those producers need to move their products.

Travis Zablotney, representing Magic City Implement, has concerns with his truck driver and how large farm machinery can move in and around Minot. Farming equipment is getting bigger especially wider and the weight doesn't allow for the driver to start and stop easily at signals. He stated that whether or not the population grows, farm equipment would still be needed and transported.

Lars Schrensky, rural Minot, spoke of his deliveries as a farmer to the City of Minot and how traffic signals impede his delivery time. He spoke in favor of the Schatz plan without signals.

Jonathon Leclear, 816 10th Avenue NW, stated his concerns with the 2nd Street SE to 3rd Street SE transition. Asked the Commission to consider changing the status from a mid-range plan to the short-range plan stating people need the bus system in that area. Schempp stated the consultants were not hired to look at transit, airport or trails but that it would be considered.

Chairman Ekblad called for any more testimony, hearing none, he closed the testimony period. Schempp question whether or not the Land Use Plan and Major Street Plan would be amendments to the 1995 Plan. The City Engineer stated yes and Schempp moved to recommend the adoption of the Land Use Plan dated 7/29/2002 as an amendment, second by Kleven. Motion passed unanimously.

Chairman Ekblad read a memo from the County Engineer, Roger Kluck, regarding support for the Land Use Plan. He was unable to attend the meeting and asked that the memo be read to the Commission. Currently, the County Commission

is reviewing the Transportation Plan and will comment before the City Council meeting.

The City Engineer stated he was pleased with the comments from the audience with regards to the Plan. He also stated the options heard tonight would be decided by funding and the ND DOT.

Schempp stated the next matter was to approve Figure 5-1 the Proposed Transportation Plan. Semrau said he had concerns with the 10th Street SW designation as a collector street. Schempp said he was not in favor of having 10th Street SW continue over the Bypass. Schempp stated if we remove 10th Street as a collector, we are essentially removing the idea that a bridge could be built over it. Motion by Schempp to remove 10th Street SW as a collector from the Figure 5-1 from 16th Avenue SW to the Bypass. Wetzler stated he didn't agree with the overpass issue but was concerned with removing it as a collector. The Traffic Engineer, Jeff Rodacker said if 10th Street SW were removed as a collector street from the Classified Street Plan, it would no longer be eligible for Federal aid. Semrau asked if a portion of it could be removed. Rodacker stated a collector street is defined in that it connects two classified streets. Schempp withdrew his motion and stated an option to leave in the portion from 20th to the Bypass for eligibility. Following due consideration, motion by Semrau, second by Kleven to remove 10th Street SW from 16th Avenue SW to 20th Avenue SW. Motion passed unanimously. Motion by Schempp, second by Wetzler to remove 10th Street SW as a collector from 20th Avenue SW to the Bypass. Motion passed 8-2; no votes from Seymour and Volk.

Schempp commented on the request regarding 2nd & 3rd Street SE transition. Motion by Semrau, second by Galusha to move the transition from a mid-range designation to a short-range designation. Motion passed unanimously.

Following due consideration motion by Kleven, second by Schempp to accept the Proposed Transportation Plan, Figure 5-1, as amended. Motion passed unanimously.

Semrau spoke negatively about the addition of traffic signals along the Bypass. He stated he didn't agree with the results or type of plan the Commission was discussing and recommended moving forward with ideas of accumulating additional funding. Relocation of the West Burdick intersection was discussed along with frontage roads in this area. Following due consideration, motion by Semrau, second by Hoffart to adopt Alternate C for the West Bypass solution. Kleven stated that an alternative to go over the superfund site would be so costly it wouldn't be feasible and the likelihood that the EPA would allow it would be small. He stated the ground has no base and is not solid enough to hold a roadway system of the type proposed. He stated an elevated bridge might work but it would also be costly. Motion failed 10-2; yes votes from Seymour and Ekblad. The Schatz proposal was further discussed and possibly moving the Burdick Expressway interchange. Motion by Schempp, second by Kleven to ask the City Council to consider the Schatz proposal for the West Bypass, Burdick Expressway, 13th Street SE or 17th Street SE.

A suggestion came from Wetzler to change the alignment on Alternate C near Burdick Expressway to miss the superfund site and relocate it further west and south. He stated if the transition could happen further south by shifting the compressed diamonds, it might work. A short recess was taken.

Following a recess, discussion by Wetzler and Eggen to recommend Alternate C to the City Council for the West Highway 83 Bypass; Figure 4-6, page 4-22. Schempp stated if the Schatz proposal does not work at the Burdick Expressway intersection, a different configuration is needed. Alderman Lehner questioned the Burdick Expressway one-way pairs for a frontage road system and stated there would be difficulty in designing around the railroad tracks at that location. Motion by Schempp moved to reconsider the previous motion, second by Volk. Motion passed unanimously. Discussion followed with frontage roads near the motel and restaurant. Motion by Schempp, second by Galusha, that the Planning Commission recommend that the City Council consider the Schatz proposal for interchanges wherever possible and in particular that the City Council consider the Schatz proposal for 13th or 17th Streets SE. Motion passed unanimously.

John Coughlin suggested before sending the recommendations to the City Council, the Planning Commission should consider conversing with Olsson and Associates about the changes made. Coughlin fears the City Council will be burdened with the Engineering decisions they are going to have to make. Kleven suggested seeking another consultant to finish out the study. The City Engineer explained that the 1986 Transportation plan was purely conceptual as this one is supposed to be also. He stated design was not in the scope of the project for Olsson and Associates. Motion by Wetzler, second by Semrau to send to the City Council a recommendation for the concept of Alternate C for the US 83 Bypass. Motion passed unanimously.

Semrau tried to verbally visualize the traffic signals along the route if someone started in Surrey and headed west. He stated the number of signals and possible stops would create many problems even though it's meant to protect our citizens. Following due consideration, motion by Semrau, second by Hoffart that the City Council consider as few if any additional stop lights on the Proposed Burdick Expressway intersection, the US 83 Bypass, and the West 83 Bypass. Motion passed unanimously.

Schempp questioned the City Engineer as to whether or not design concepts and estimates could be done with staff. The City Engineer stated a study separate from this would have to be done on right of way requirements. Schempp questioned the possible location of the proposed grade school. The City Planner stated she had spoken with the Superintendent of Schools and was told the proposed location would not be affected by the road system proposals. Motion by Schempp, second by Kleven to have the Planning Commission furnished right of way requirements for frontage roads and proposed interchanges as soon as possible and to submit the report with amendments to the City Council. The motion passed unanimously.

Being no further comments, the meeting adjourned at 9:30 pm.

Attachments

October 15, 2002

MINOT CITY COUNCIL - SPECIAL MEETING - 7:00 P.M.

Called for the purpose of receiving the proposed Transportation and Land Use Plan prepared by Olsson Associates and providing an opportunity for any interested citizen to appear before the City Council and give comment on the Plan; and further, to consider other such business as may be legally brought before the City Council.

ROLL CALL

Members Present:

Barney, Boen, Burckhard, Frantsvog, Frey, Garcia, Greenheck, Hatlelid, Krabseth, Lehner, Leigh, Medalen, Somerville, Snyder.

Members Absent:

None.

Mayor Curt Zimbelman presiding.

PLEDGE OF ALLEGIANCE

Mayor Zimbelman led the City Council in the Pledge of Allegiance.

PRESENTATION OF THE TRANSPORTATION AND LAND USE PLAN – OLSSON ASSOCIATES

Mayor Zimbelman introduced Jack Lynch and Mike Malone from Olsson Associates, who had prepared the Transportation and Land Use Plan for the City of Minot. Mr. Lynch provided a presentation on the land use portion of the Plan. He highlighted the population statistics for the City of Minot and reviewed the projected residential growth areas. He further commented on the importance of fully utilizing the downtown area and on three components of the Land Use Plan, which included open space areas, gateway areas, and new residential development areas. Mr. Lynch then answered questions from aldermen regarding the land use portion of the Plan.

Mike Malone then presented the transportation element of the Plan by highlighting the U. S. Highway 2 and 52 Bypass, the U. S. Highway 83 West Bypass, and the components of the Transportation Plan. He indicated that both the City and the North Dakota Department of Transportation (NDDOT) have established the Bypass as a freeway. He then explained the recommendations on a short-range expressway and a long-term freeway concept. He provided cost estimates for the freeway option and provided vehicular statistics that would provide guidelines to initiate either traffic lights or interchanges. He further commented on the transportation portion of the Plan and indicated that portion was based on employment growth areas and residential growth areas, in determining what traffic models should be used. He also provided information on principal arterial, minor arterial, and collector streets and short-term, mid-term, and long-term recommendations for these areas.

PUBLIC COMMENT – TRANSPORTATION AND LAND USE PLAN

Mayor Zimbelman then opened the meeting to public comment.

Roger Kluck, Ward County Engineer, appeared before the Council to present a Ward County Commission motion to support the Bypass as a freeway and oppose the installation of signal lights on the U. S. Highway 2 and 52 Bypass.

Steve Blasing, representing Westlie Motors, commented on the need for adequate access in the 13th Street SE area. Corey Grossman, representing Northwest Tire, also supported adequate access in the 13th Street area. Brad Haugeberg, representing Sun Prairie Grains, indicated support for the Bypass as a freeway and stated opposition to the installation of signal lights on the Bypass. He commented on the need for a truck route to get products to and from market.

Darrell Swenson, representing Minot Machinery, commented that interchanges are expensive and that there might be a need for a stop light on 13th Street SE. The City Engineer commented that the Transportation Plan would be driven by the ability to pay through Federal, State, and local funding. He commented that, to install all of the interchanges recommended within 10 years was not feasible and that traffic lights to slow the traffic to create a safer area might be needed in the interim.

Alderman Hatlelid questioned the status of the State plan for an interchange on the Bypass at the West 83 Bypass, and the City Engineer provided history on the development of that plan. Alderman Burckhard questioned when funding would become

available if a freeway option were chosen. The City Engineer explained that "Regional" primary funds available are based on need and that "Urban" funds available are based on population. Alderman Boen commented that the freeway option might not be a practical approach at this time, due to the extensive cost of that option. The City Engineer indicated that the NDDOT wants the City's input on the project but that the State would be making the final decision regarding those areas.

Ed Sundby, 2417 8th Street SW, expressed his concern that the Council consider existing businesses on the Bypass, as well as potential growth, when making its decisions. He further commented that limiting access does not increase growth.

Jared Andrist, 2626 8th Street NW, appeared before the Council and provided a brief history of his interpretation of Federal highway funding. He commented that the Transportation Plan needed to be taken to the next level by addressing quality-of-life issues such as bike and walking paths and sidewalks, as well as arterial and collector streets. He further expressed his concerns regarding the future of 8th Street NW and the need to improve 30th Avenue NW from 8th Street west to the Bypass.

Following discussion, Alderman Hatlelid moved that the City Council adopt the land use portion of the Transportation Plan. Motion seconded by Alderman Barney and carried by the following roll call vote: ayes: Barney, Boen, Burckhard, Frantsvog, Frey, Garcia, Greenheck, Hatlelid, Krabseth, Lehner, Leigh, Medalen, Snyder, Somerville. nays: none.

Following further discussion, Alderman Hatlelid moved that the City Council request that the NDDOT immediately commence a detailed frontage road and interchange right-of-way needs assessment for both bypasses (south and west), to be completed in 1 year. Motion seconded by Alderman Garcia.

Following discussion, the above motion by Alderman Hatlelid, seconded by Alderman Garcia, carried by the following roll call vote: ayes: Barney, Boen, Burckhard, Frantsvog, Frey, Garcia, Greenheck, Hatlelid, Krabseth, Lehner, Leigh, Medalen, Snyder, Somerville. nays: none.

Following further discussion, Alderman Lehner moved that the City Council:

a. Go on record as supporting the freeway concept portion of the Transportation Study; further,

b. Request that the NDDOT immediately commence alternative design development and project concepts, to be completed in 1 year for interchanges at the West U. S. 83/U. S. 2-52 intersection (and Burdick Expressway, if necessary), the 13th Street SE/U. S. 2-52 intersection, and an overpass (no interchange) at 6th Street SE/U. S. 2-52, and that these be constructed as soon as funding will permit; further,

c. That the urban interchange (compact diamond) concept be considered where appropriate for the alternative interchange concepts along the west and south bypasses; and further,

d. That the use of traffic signals along both bypasses be kept to a minimum but, if warranted, installed only on an interim basis prior to interchange construction, with any signal being installed, in no instance to be operating for more than 5 years, and with the NDDOT to make the final decision on any signal installation based upon warrants contained in the Manual of Uniform Traffic Control Devices.

Motion seconded by Alderman Barney and carried by the following roll call vote: ayes: Barney, Burckhard, Frantsvog, Frey, Greenheck, Hatlelid, Krabseth, Lehner, Leigh, Medalen, Snyder, Somerville. nays: Boen, Garcia.

ADJOURNMENT

There being no further business, Mayor Zimbelman adjourned the meeting at 8:25 p.m.

APPROVED:

ATTEST:

_____
Curt Zimbelman, Mayor

_____
Roberta Ripplinger, City Clerk