INTRODUCTION

Transportation systems are the backbone of a community's functioning, providing the essential routes for commerce, industry, government, schools, police and fire, and all other daily travel by automobile or truck. The larger transportation system also includes modes other than automobile or truck: railroads, aviation, transit, and pedestrian/bicycle trails.

KEY PRINCIPLES TO IMPLEMENTING THE TRANSPORTATION PLAN INCLUDE:

Transportation

- **Maintain a safe, efficient roadway system**
- **Create a netwirk of connections vs. closed, dead-end streets/plats**
- **Improve north-south connections**
- **Integrate pedestrian/bicycle trails**
- **Provide improved rail crossings or overpasses**

GOALS

Early in the process goals and policies were discussed and adopted for various elements of the Plan. Several goals were thought to be important in the near term and were adopted as Immediate Goals. Two of these Immediate Goals relate to transportation, an indication of the importance of transportation to Minot.

GOAL 1:

Coordinate transportation with land use planning.

Rationale:

Understanding the impact of land use on transportation systems is an important element to supporting growth and development.

Policies:

1. Analyze the traffic generation characteristics of proposed land uses to avoid exceeding the capacity of local, county, and regional roadways.
2. Consider the impacts to neighborhoods when planning new or upgrading existing roadways.
3. Ensure that the fully integrated comprehensive plan, which includes coordinated land use and transportation plans, is reviewed annually to provide a rationale for transportation and land use decisions.
4. Land use planning surrounding the Minot International Airport should be compatible with the airport operations with respect to noise, building height, flight patterns, expansion plans, and flight operations.
5. Consider long-range plans for a new airport northeast of Minot.
6. Encourage shared parking facilities for commercial, industrial, and mixed use projects to reduce impervious surface, minimize land consumption, and minimize traffic.

GOAL 2:

Attract and encourage a balance of new commercial, light industrial, office-industrial, heavy industrial, knowledge-based business, and professional services and expansion of existing businesses.

Rationale:

Minot's commercial, light industrial and heavy industrial development will be concentrated primarily along its existing business corridors. This provides opportunities for a diversified economic base, expanded employment opportunities and maintaining conformity with the existing commercial, light industrial and heavy industrial land use patterns.

Policies:

1. Protect designated industrial areas from encroachment by residential development and marginal land uses that will preclude the highest economic use of land available for commercial, light industrial and heavy industrial development.
2. Work with local business organizations to develop strategies and programs to draw high-end business park development that attracts medical, energy technology, value-added agricultural and knowledge-based businesses which provide quality employment and higher wages with the expansion of city services.
3. Work with property owners to redevelop existing industrial sites that are in disrepair, are obsolete with respect to design, have environmental concerns and are incompatible with neighboring land uses.
4. Designate areas for industrial expansion within the City's growth areas and exterior limits that are accessible to public infrastructure and transportation, including rail and air.
5. Create a community identity that will help recruit targeted business and industry to Minot.
6. Use the presence and resources of educational institutions including Minot State, industries, business organizations to support and facilitate new businesses and expansion of existing.
7. Encourage site upkeep and quality maintenance through code enforcement to maintain and promote a positive image.

GOAL 3:

Develop and maintain a roadway system that accommodates the safe and efficient movement of people and goods.

Rationale:

Minot is a growing city and policy makers face decisions that will affect the existing and future roadway facilities in addition to other transportation modes. These decisions must be made with proper information. The establishment of transportation goals and policies helps to guide these decisions by directing the development of the transportation system.

Policies:

1. Use traffic management technology to improve the operations and safety of the roadway system.
2. Plan for, design, and construct roadways to accommodate existing traffic demand and future traffic growth, considering the predominant land uses utilizing the roadways.
3. Identify roadway improvements for existing needs and future demand.
4. Identify corridors to relieve congestion.
5. Integrate pedestrian and bicycle trails into the design of roadway facilities where appropriate and feasible that provide links to parks, cultural and historic resources, and public uses.

6. Coordinate with NDDOT on interchange improvements located within the City.
7. Provide improved at-grade rail crossings or rail overpasses/underpasses.
8. Examine truck routes to bypass the city for the benefit of industries and drivers.
9. Maintain existing facilities in a manner necessary to preserve acceptable levels of service and minimize life-cycle costs.
10. Implement access management guidelines for collector and arterial roadways with adequate distance between intersections/driveways and appropriate traffic control methods.
11. Avoid or minimize impacts to natural, cultural, and historic features.
12. Investigate "quite zones" in the City.

HIGHWAY SYSTEM

Existing Roadway Jurisdiction

Roadways are categorized under the agency that is responsible for their maintenance. The State of North Dakota is responsible for Federal Interstate, US Highways, North Dakota State Roads, and State Park Roads. The County is responsible for Ward County Roads. The City is responsible for the remainder within city limits.

Existing Functional Classification

The North Dakota Department of Transportation (NDDOT) uses four roadway classifications: interstate, principal arterial, minor arterial, and collector. Of these, the interstate classification does not apply to the City of Minot.

Principal Arterial roadways are designed to carry traffic. Access may be limited to other major arterials or major collectors, 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 roadways such as Broadway (US 83), Burdick Expressway, and Valley Street, are also designed to carry traffic, but provide access to local and collector streets as well as major businesses. Improvements to principal arterials are funded with Regional Secondary funds.

Minor Arterial roadways are intended to provide access within Minot. They typically have extensive residential access and do not carry truck traffic nor heavy traffic volumes. They are used as alternates to principal arterials. Minor arterial improvements are funded with Urban Roads funds.

Collector streets provide routes for short trips or to higher classified roadways. Collector street improvements are also funded with Urban Roads funds.

Figure 3.1 shows the existing roadways functional classification.

City of Minot

2012 Comprehensive Plan

Roadway Functional Classifications and High Accident Locations

N

W E

S

3,500 0 3,500 Feet

- High Accident Locations
- Principal Arterial
- Minor Arterial
- Collector
- Proposed Collector
- City Boundary
- Open Water
- Wetlands
- Streams
- Railroad

Figure 3.1

October 8, 2010

Stantec

V:\1938\active\193801073\GIS\Projects\functional classifications.mxd

Safety Analysis

Crash data in North Dakota is collected by NDDOT and is categorized by type of crash, severity, time of day, weather, and other contributing factors. High accident intersection locations are also illustrated in Figure 3.1.

Existing Traffic Volumes

The most recent daily traffic volume information for the primary roadways in Minot were obtained from NDDOT. The year 2011 daily traffic volume information is shown graphically on Figure 3.2. Figure 3.3 shows the existing typical sections of the roadway network.

Previous Studies

MINOT LAND USE AND TRANSPORTATION PLAN

In November 2002, Olsson Associates prepared a land use and transportation plan. The transportation part of the plan documented existing conditions, modeled and analyzed future traffic volumes, and recommended a plan with specific transportation improvements.

US 2/52 BYPASS STUDY

In May 2005, Ulteig performed a corridor study on the US 2/52 Bypass. The purpose of the study was to develop alternatives that will provide acceptable traffic flow for current and future traffic, enhance access, and improve safety along the corridor. Concepts included converting the bypass into a free-flowing freeway, improving the corridor to an expressway, and consideration of a new bypass south of Minot.

SOUTH BROADWAY CORRIDOR STUDY

In 2008, URS and Houston Engineering performed a corridor study on South Broadway between 20th Avenue SW and 40th Avenue SW. The purpose of the study was to evaluate the long-term needs of the corridor, and to determine the impact from the proposed development of a 19.6 acre property on the corridor. The study examined existing conditions, trip generation due to development, and future year 2028 conditions. Recommendations included capacity and geometric improvements at certain intersections.

Traffic Signals

All traffic signals within Minot are city maintained and operated regardless of roadway jurisdiction. Figure 3.4 shows the current traffic signals in the city.

Existing Congestion

Broadway (US 83) has seen significant increases in volumes and delays. The existing signal controllers are not interconnected and currently run fixed-time. The City is pursuing an energy grant that could fund an improvement project to interconnect these signals.

Critical intersections include Broadway (US 83) at 31st Street S, with heavy volumes in the southbound left-turn movement, and Broadway (US 83) at 20th Avenue S. Figure x shows the average daily traffic on roadways.

Hwy 83 through Minot

City of Minot
2012 Comprehensive Plan

2011 Average Daily Traffic (ADT)

N
W E
S

3,500 0 3,500 Feet

ADT:

- < 1,000
- 1,000 - 5,000
- 5,000 - 10,000
- 10,000 - 15,000
- > 15,000

- City Boundary
- Open Water
- Wetlands
- Streams
- Railroad

Figure 3.2
May 11, 2012

Stantec

V:\1938\active\193801073\GIS\Projects\2011 ADT.mxd

City of Minot
2012 Comprehensive Plan

Roadway Sections

N
W E
S

3,500 0 3,500 Feet

- 5 Lane
- 5 Lane (Future)
- 4 Lane Divided
- 4 Lane Undivided
- 4 Lane (Future)
- 3 Lane
- 3 Lane (Future)
- City Boundary
- Railroad
- AIRPORT
- Open Water
- Wetlands

Figure 3.3
May 11, 2012
Stantec
V:\1938\active\193801073\GIS\Projects\roadway sections.mxd

City of Minot
2012 Comprehensive Plan

Signalized Intersections

N
W E
S

3,500 0 3,500 Feet

- Signalized Intersections
- City Boundary
- Open Water
- Wetlands
- Streams
- Railroad

Figure 3.4
October 8, 2010

Stantec

V:\1938\active\193801073\GIS\Projects\Traffic Signals.mxd

ROADWAY IMPROVEMENT PROJECTS

US 2/52 BYPASS

NDDOT is proceeding with a project to improve US 2/52 Bypass to an expressway from 6th Street SE to 23rd Street SE. Intersection improvements include a traffic signal at US 2/52 at 13th Street SE, and ¾ intersections at 17th Street SE, 20th Street SE, and 23rd Street SE. 6th Street SE and 21st Avenue SE will be realigned to provide a south backage road to US 2/52.

EAST BYPASS

The City of Minot has applied for a TIGER grant, which stands for Transportation Investment Generating Economic Recovery under the Federal American Recovery and Reinvestment Act, to proceed with the East Bypass. The Bypass would consist of a two-lane rural section from the intersection of US 2 at 55th Street NE and continue north and west to N Broadway (US 83) at 46th Avenue N. The project would include a signalized intersection at US 2 at 55th Street NE, and a 55th Street NE overpass above the BNSF rail line north of the intersection.

WEST BYPASS

NDDOT is planning within the next few years depending on funding to reconstruct the failing pavement on the West Bypass. The project is currently in the concept report phase, and some left-turn or right-turn lane additions could be included in the project.

13TH STREET SE/37TH AVENUE SE

The City is planning to pave 13th Street SE from the US 2/52 Bypass to 37th Avenue SE, and 37th Avenue from Broadway (US 83) to 13th Street SE.

31ST AVENUE SE

The City plans to improve 31st Avenue SE to a three-lane section between Broadway (US 83) and 13th Street SE. This improvement is planned for year 2015.

6TH STREET SW UNDERPASS

6th Street SW currently crosses under the CP and BNSF rail lines at a grade separated crossing west of downtown. The City plans to lower the underpass and improve storm drainage. This improvement is needed due to traffic flow, safety, and emergency vehicle mobility.

US 2/52 through Minot

FUTURE TRANSPORTATION PROJECTS

The overall transportation system in Minot will be studied in more depth in Transportation Plan Update to be conducted soon after the completion of this Comprehensive Plan. That Plan will model the transportation system and give more detailed recommendations on the adequacy of existing and future roadways, major intersections, and truck routes.

SOUTH RING ROUTE

As Minot grows a significant amount of this new growth will happen in southwest Minot, to the west and south of the Dakota Square Mall, which is the City's major concentration of commercial development. As part of this Plan a future Ring Route is proposed around the south side of the City, similar to the West Bypass around the NW corner of the City and the Northeast Bypass (under construction) around NE corner of City. This ring route might ultimately be classified a principal arterial, but it might be built in phases and might start as a minor arterial.

The southwest segment of this Ring Route is more important in the short term than the southeast segment. The southwest segment would connect from the intersection of the Highway 83 West Bypass and the Highway 2/52 Bypass south into the Southwest Growth Area more or less along 30th Street SW, then east along 66th Avenue SW to Broadway/Highway 83.

This southwest segment of the Ring Route will serve a significant amount of new residential and industrial growth in Minot. It would provide an alternate route for truck traffic for other kinds of trips:

- Trucks going north and south on Highway 83 (e.g., Bismarck to the Air Force Base) could take the SW Ring Route and the West Bypass, avoiding Broadway Street through the middle of Minot.

Minot Ring Route Expansion

- Trucks going north and west on Highway 83 to Highway 2/52 (e.g., Bismarck to Stanley/Tioga) could take the SW Ring Route and avoid Broadway past the active, congested commercial area between 37th Avenue SW and 28th Avenue SW at the Highway 2/52 Bypass.
- Trucks coming into Minot from the west on Highway 2/52 (e.g. from Stanley/Tioga) can access the commercial areas around the Dakota Square Mall from the west, without having to go down Broadway and access from the east. Also they can access the landfill and new industrial areas west of 30th Street SW.
- The southeast segment of the South Ring Route will serve a similar function as the southwest segment, but will likely be built later. It will connect Highway 83 at 66th Avenue SE east to 42nd Street SE, then north to connect with 37th Avenue SE, crossing Highway 52 and the Souris River, then connecting with 55th Street SE, then north to connect with the new NE Bypass at Highway 2.

Hwy 83 north to Minot

The SE Ring Route will provide the following:

- Trucks going north on Highway 83 (e.g., from Bismarck) to the railroad hub and industrials uses on the east edge of the City would take the Ring Route and avoid the busiest commercial areas on South Broadway. This route becomes increasingly important as large, truck-intensive, intermodal uses are developed on the east side of the city.
- Trucks going northwest on Highway 52 to the landfill or new industrial uses to be built in that area on the southwest side of the City would take the Ring Route and avoid the busy Highway 2/52 South Bypass and more local commercial streets such as 37th Avenue SW.

FUTURE FUNCTIONAL CLASSIFICATION OF ROADWAYS

Future roadways are illustrated on the attached Figure 3.5 Planned Roadway System, as well as on the Future Land Use Plan, indicating the extension of existing roadways or new ones. The anticipated future roadway system would consist of all or portions of the following:

PRINCIPAL ARTERIALS

- Highway 83 (north-south)
- Highway 2/52 – South Bypass (east-west)
- Highway 52 (SE to west)
- Burdick Expressway (east-west)
- West Bypass
- Northeast Bypass
- Southwest Ring Route
- Southeast Ring Route

MINOR ARTERIALS

- 30th Avenue NW
- 21st Avenue NW
- University Avenue
- 4th Avenue/3rd Avenue NW
- Railway Avenue NE
- 4th Avenue NE
- 2nd Avenue SW/SE
- 8th Avenue SE
- 11th Avenue SW/SE
- 20th Avenue SW/SE
- 20th Avenue SW (west of 16th Street SW)
- 31st Avenue SW/SE
- 37th Avenue SW/SE
- 54th Avenue SW/SE
- 16th Street NW/SW
- 8th Street NW
- 6th Street SW
- 2nd Street SE
- 3rd Street SE/NE
- 13th Street SE
- 27th Street SE/NE

COLLECTORS

(numerous)

Northwest Growth Area

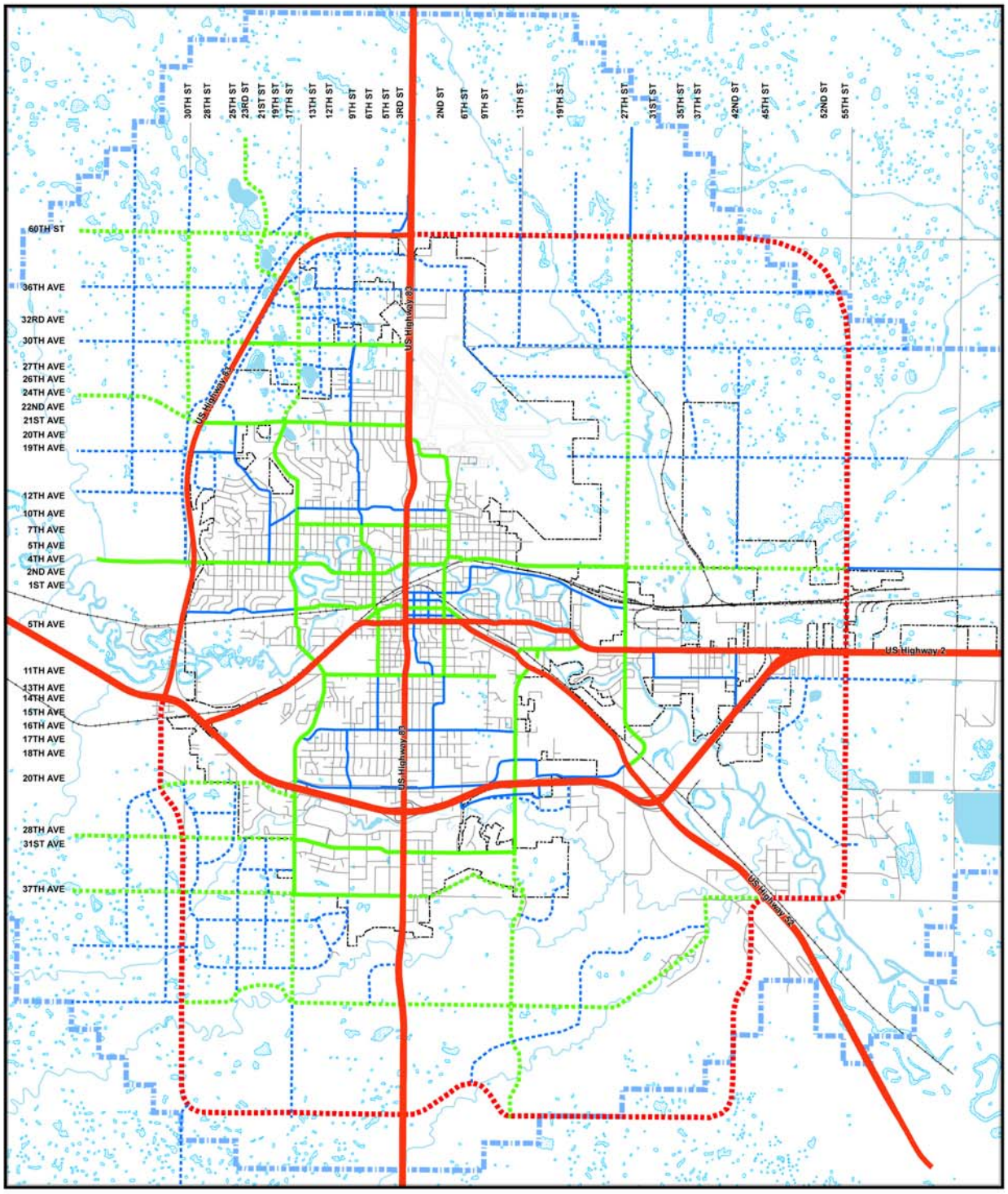
Key elements of the transportation system in the Northwest area of the City are the extension of 8th and 16th Streets NW as north-south arterials and frontage roads on both sides of the West Bypass as land is platted and development occurs close to the Bypass, connecting the major intersections at 21st, 30th, and 36th Avenues NW. Also important as development increases will be access and intersection spacing on Broadway/Highway 83. The future Transportation Plan Update will further analyze connections in this part of the City.

Southwest Growth Area

Key elements of the transportation system in the Southwest area of the City are the extension of 20th, 31st, 37th, and 54th Avenues SW to the west to serve new residential, commercial and industrial growth. Also important will be extension of 16th and 24th Streets SW south into new development. Essential to the development of these new areas in the SW part of the City is the creation of a network of streets versus loops or cul-de-sacs. Also important as development increases will be access and intersection spacing on Broadway/Highway 83, given its location as the largest concentration of commercial development and traffic in the City. The future Transportation Plan Update will analyze how the SW Ring Route connects with the roadway system in this part of the City, including access management.

Southeast Growth Area

Key elements of the transportation system in the Southeast part of the City are the completion 37th Avenue SE to the east and the extension of 13th Street SE south to 54th Avenue SE and beyond and as growth and development require. Also important as development increases will be access and intersection spacing on Broadway/Highway 83. The future Transportation Plan will analyze the timing and access issues of the SE Ring Route in this part of the City.



Planned Roadway System

City of Minot

2012 Comprehensive Plan

- Existing Principal Arterial
- Proposed Principal Arterial
- Existing Minor Arterial
- Proposed Minor Arterial
- Existing Collector
- Proposed Collector
- Local Streets
- Railroad
- City Boundary
- Extended 2-Mile Boundary
- Open Water
- Wetlands

N
W E
S

4,500 0 4,500 Feet

Figure 3.5

May 11, 2012

Stantec

V:\1938\active\193801073\GIS\Projects\future roads.mxd

Central and East Growth Areas

Key elements of the transportation system Central and East Growth Areas are handling of increased truck traffic in and out of the industrial and rail uses in that part of the City, as well as how the NE Bypass (under construction) impacts traffic.

Northeast Growth Area

Key elements of the transportation system in the northeast part of the City focus on getting to and from the vast industrial uses likely to develop there and getting traffic in and out of the Minot Airport. Because of the large areas and distances involved the system in this part of the City will be sparse but heavy on truck traffic.

TRANSPORTATION MODEL DEVELOPMENT AND REFINEMENTS

As part of the transportation analysis for the comprehensive plan, the Minot Travel Demand Model – the computer model of the city's roadway system - was updated and calibrated to the year 2010 conditions and projections were made of 2030 conditions, called the Horizon Year travel demand.

The existing Minot Travel Demand Model was developed by Cambridge Systematics in 2001. The model was previously calibrated to 2000 conditions, which have since changed significantly due to the rapid growth in the Minot region. Stantec obtained and benchmarked the prior model and converted the scripts (computer instructions) from the earlier computer language (TP+ CUBE Voyager) to the latest version of CUBE, which is the current industry standard for modeling software. This new model is an interim version that will serve the immediate needs of Minot until a more comprehensive model update is performed.

In preparation for the model calibration process, several refinements to the modeling procedures and input data sets were performed. These refinements included the development of a simple truck trip submodel and expansion of the model zonal system and highway network to incorporate the areas where further development is being anticipated by 2030. The following sections describe these refinements.

Traffic Analysis Zone System and Socio-Economic Data

The city is divided into areas for traffic analysis called TAZs – Traffic Analysis Zones. The existing TAZ system was expanded to account for the rapid growth into areas surrounding Minot that has occurred since the previous model base year of 2000, and to accommodate the anticipated growth in population and employment that is anticipated beyond the existing model boundary. There were 107 internal TAZs previously, plus 10 external zones. This was expanded to a total of 138 zones plus 10 external zones. The external zones representing the major highways entering the region was adjusted to be consistent with the new model's regional boundary. The existing and expanded TAZ maps are shown in Fig. 3.9 and 3.10.

Based on existing estimates of population and employment available from several public sources including the 2010 census, the zonal socioeconomic data (SED) for 2010 base year and the 2030 horizon year were developed as input variables to the model. Updated estimates of traffic at the external zones for 2010 and 2030 were also prepared.

Highway Network

As part of the model updating effort, additional roadway and zone connectors were incorporated to reflect the extended model study area boundary, while a number of network links were identified as inappropriate or misrepresented, and therefore removed from the network. In summary, the revised model highway network includes approximately 7,600 links, excluding centroid connector links. A significant number of links within the model are classified "shape links", which were incorporated in the model network to reflect the alignment of roadways.

Truck Model

The existing Minot Model estimated only total vehicle trips. Given the significant number of trucks using the region's roads with the new energy resource development, a simple truck sub-model was developed. This truck sub-model was developed and incorporated into the model to account for truck vehicle movements that were not previously estimated separately by the Minot Model. Truck vehicles were defined as any commercial vehicles with 2-axle/6-tire and or 3+ axles.

Initially, the daily truck trip generation rates per number of jobs by employment type and households for the each TAZ were adopted from other travel demand models. A

distribution of truck trips by travel time was adopted to use as observed values for the truck trip distribution process. These trip rates were subsequently adjusted, based on comparisons between available observed truck count and estimated truck volumes from the new model.

The external trip model had also been revised to stratify traffic into auto and truck classes to be consistent with the new highway assignment process which loads autos and trucks separately as individual vehicle types. The partitioning of volumes by vehicle type at individual external stations was based on available traffic counts sourced from the North Dakota Department of Transportation (NDDOT) database, available online via the Transportation Information Map webpage.

Other Parameters

For the airport serving the Minot Region, it was necessary to update the number of vehicle trips being generated. Stantec adopted the 2010 enplanement as the basis and applied a daily trip rate of 3.76 trips per enplanement that was borrowed from the Piedmont Triad Regional Model (PTRM) in North Carolina.

MODEL CALIBRATION STATISTICS

The objective of model calibration was to replicate the observed traffic volumes reflecting the 2010 traffic conditions. The AADT all-vehicle traffic volume and truck counts were obtained from the NDDOT online database.

The calibration process involved the adjustment of trip generation rates with a factor of 0.82 to account for new model's direct estimation of truck trips. In addition, free-flow speeds for Minor Arterial and Local Road facility types were adjusted in order to provide better model estimates in comparison the observed traffic volumes.

The comparisons of observed and model estimated volumes for all vehicles are summarized in Table 3-1 and 3-2, respectively, by facility type and volume group, while the corresponding comparisons for truck volumes are presented in Table 3-5 and Table 3-6. Note that while the calibration is adequate and within acceptable tolerances for most of the categories, the number of observed counts is limited, particularly for trucks.

In summary, the revised Minot Travel Demand Model is considered to be calibrated at a satisfactory level for use an interim transportation planning tool. This model will also be an initial starting point for a more comprehensive model update when additional resources become available.

Table 3.1 - Model Validation Statistics by Facility Type (All-Vehicles)

FACILITY TYPE	DAILY VOLUME				TARGET
	OBSERVED	ESTIMATED	EST/OBS	COUNTS	
Freeway	187,338	201,955	1.08	30	+/- 5%
Divided Highways	155,326	189,560	1.22	22	+/- 10%
Principal Arterial	565,401	552,084	0.98	65	+/- 10%
Minor Arterial	767,481	811,642	1.06	273	+/- 15%
Major Collector	305,304	283,639	0.93	255	+/- 25%
Local Roads	187,286	144,603	0.77	208	Not Applicable
Freeway Ramps	26,649	17,750	0.67	16	Not Applicable
Frontage Roads	2,751	4,190	1.52	6	Not Applicable
TOTAL	**2,197,536**	**2,205,423**	**1.00**	**875**	**+/- 5%**

Table 3.2 - Model Validation Statistics by Volume Group (All-Vehicles)

VOLUME GROUP	DAILY VOLUME				TARGET
	OBSERVED	ESTIMATED	EST/OBS	COUNTS	
0-5,000	1,200,535	1,277,024	1.06	763	+/- 40%
5,000-10,000	573,477	571,908	1.00	82	+/- 35%
10,000-15,000	406,342	347,353	0.85	32	+/- 30%
15,000 +	30,850	22,606	0.73	2	Not Applicable
TOTAL	**2,211,204**	**2,218,891**	**1.00**	**879**	**+/- 5%**

Table 3.3 - Model Validation Statistics by Facility Type (Trucks)

FACILITY TYPE	DAILY VOLUME			
	OBSERVED	ESTIMATED	EST/OBS	COUNTS
Freeway	19,277	16,815	0.87	18
Divided Highways	7,455	8,659	1.16	8
Principal Arterial	18,023	17,222	0.96	14
Minor Arterial	13,975	17,331	1.24	40
Major Collector	3,163	2,159	0.68	14
Local Roads	459	543	1.18	2
Freeway Ramps	3,027	2,137	0.71	12
TOTAL	**65,379**	**64,866**	**0.99**	**108**

Table 3.4 - Model Validation Statistics by Volume Group (Trucks)

VOLUME GROUP	DAILY VOLUME			
	OBSERVED	ESTIMATED	EST/OBS	COUNTS
0-800	28,404	36,064	1.27	86
800-1,600	17,800	17,376	0.98	16
1,600-2,400	15,095	11,407	0.76	8
2,400 +	6,178	2,412	0.39	2
TOTAL	**67,477**	**67,259**	**1.00**	**112**

2030 TRAFFIC FORECAST &CONDITIONS

Using the revised Minot TDM, the 2030 traffic was projected using the zonal socioeconomic data and the highway network assumptions developed for this task. The growth in total population of Minot from 2010 to 2030 is assumed to be 101%, while the corresponding growth assumptions in employment are 93%.

In addition to the existing roadways, the 2030 highway network assumptions include several major highway projects such as the Minot 55th Street Northeast Bypass, as well as minor upgrades (i.e. center lane) for several roadways within the city limit. While there will be other likely improvements either now being planned or under construction in the near future, researching these improvements in terms of their configuration and implementation schedule was beyond the scope of the work for this Comp Plan.

Table 3.5 - Comparison of Network-wide 2010 and 2030 Model Estimates

Variables	2010	2030	%Diff
VMT	713,919	1,563,504	119.0%
VHT	19,752	53,287	169.8%
Speed	36.14	29.34	-18.8%

The network-wide traffic projection for 2030 is compared to 2010 condition in Table 3-5. As anticipated, the model shows that overall traffic conditions for Minot would deteriorate, as the increases of traffic caused by robust growth in population and employment are unable to be accommodated by the limited capacity provided by the highway network. This results in significant increases of delay, as reflected by the 19% reduction in average speed. Note that this represents a daily average and conditions in the peak periods would likely be more significant.

The route mileage for specific roadway types under various congestion levels are summarized in Table 3-6. Four general categories are provided and these categories can be approximated in terms of the more-common level of service (LOS) categories. The category defined as under capacity reflects a good traffic flow typical of LOS 'A' or 'B'. For roadway segments approaching capacity, conditions would be consistent with LOS 'C' and 'D'. The 'At Capacity' designation indicates significant congestion which is consistent with LOS 'E' and beyond this level the roadway segments and associated traffic would experience failure conditions. As listed in the table, by the year 2030 all but a few roadway types would be operating in significant levels of congestion throughout the day.

Following are two maps which identify the congested roadway segments under the 2010 calibration year and 2030 horizon year, in terms of the daily 'volume-capacity ratio'. Note that due to the limitation of the model methodology, which depicts traffic condition at daily level, known traffic hotspots occur during specific time periods may not be reflected in these figures.

In Figure 3.6, under the existing traffic condition, several roadway segments are under significant pressure, mainly along the US 83/Broadway, as well as the parallel sections of 3rd St NE and 6th St NW in the vicinity of the CBD.

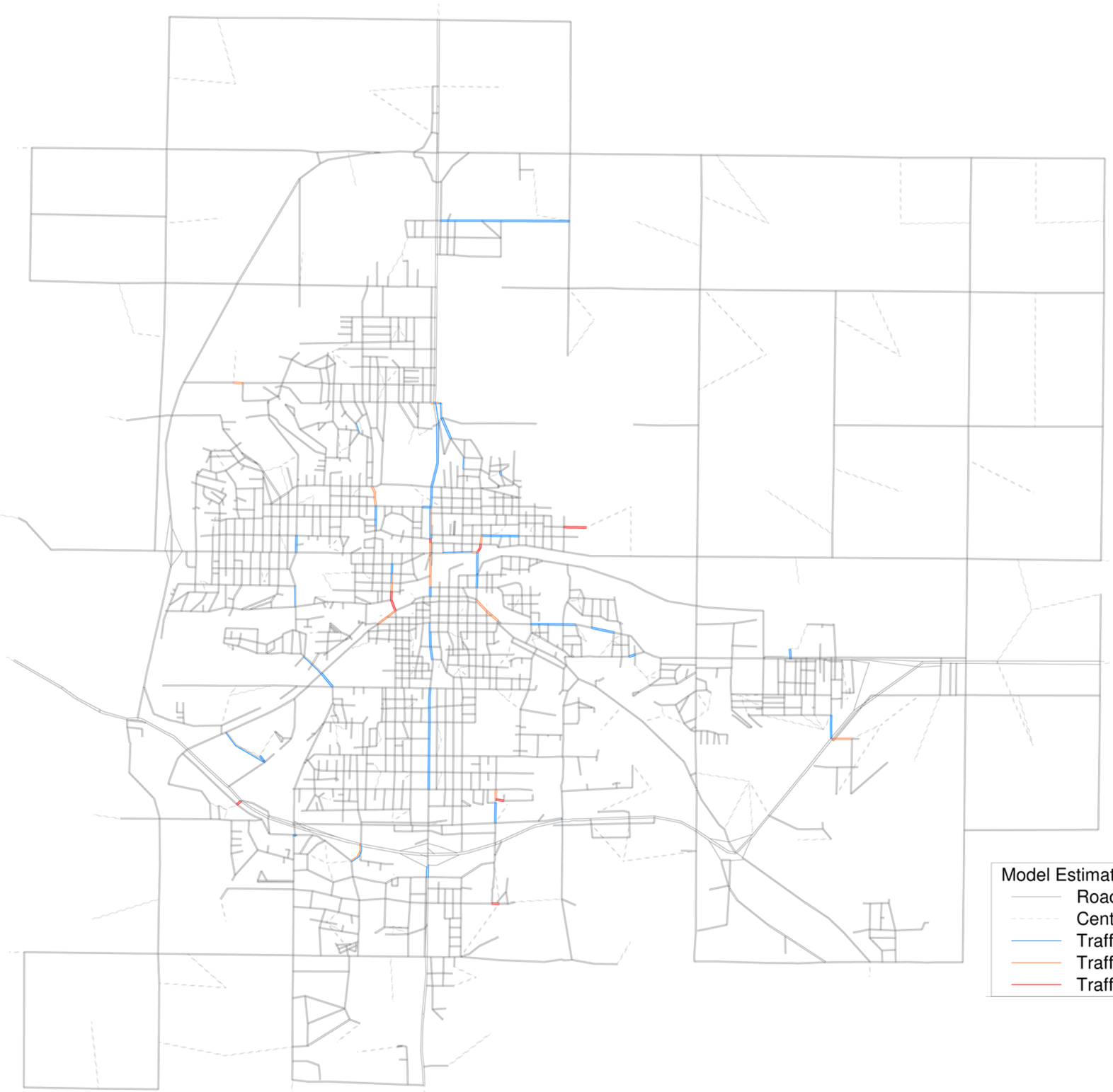
As shown in Figure 3.7, under the 2030 condition, substantial delay and congestion should be expected along all major roadways that facilitate north-south traffic movements, as well as US 2 Business and 5th Ave NE/Co Hwy 12 east of US 83 as the city continues to develop into the surrounding area. Note that there will most likely be other localized network improvements implemented in the future years as developments are constructed, so the level of congestion indicated by this map would be mitigated to a certain degree by those improvements.

Table 3.6 - Route-Mileage by Roadway Type

Functional Class	2010				2030			
	Under Capacity	Approaching Capacity	At Capacity	Over Capacity	Under Capacity	Approaching Capacity	At Capacity	Over Capacity
Freeways	18.5	0.0	0.0	0.0	11.4	5.5	1.6	0.0
Divided Highways	9.0	0.9	0.0	0.0	7.1	5.7	7.1	4.7
Principal Arterials	12.0	3.4	0.9	0.1	4.9	2.6	6.5	2.3
Minor Arterials	74.0	3.1	0.8	0.4	41.6	12.9	10.7	13.1
Major Collectors	262.1	3.7	0.9	0.1	216.9	14.3	9.8	14.2
Local Roads	231.0	0.8	0.6	0.5	222.2	5.1	2.9	2.7
Ramps	5.7	0.0	0.0	0.0	5.7	0.0	0.0	0.0
Frontage Roads	4.3	0.0	0.0	0.0	1.6	1.0	0.5	1.2
TOTAL	**616.6**	**11.9**	**3.2**	**1.1**	**511.4**	**47.1**	**39.1**	**38.3**

City of Minot
2012 Comprehensive Plan

Model Estimated Volume Capacity Ratio (2010 Base Year)



Model Estimated Volume Capacity Ratio (2010 Base Year)
- Roadway Link
- Centroid Connector
- Traffic Volume approaching Capacity (0.75 to 0.90)
- Traffic Volume at Capacity (0.90 to 1.10)
- Traffic Volume above Capacity (>1.10)

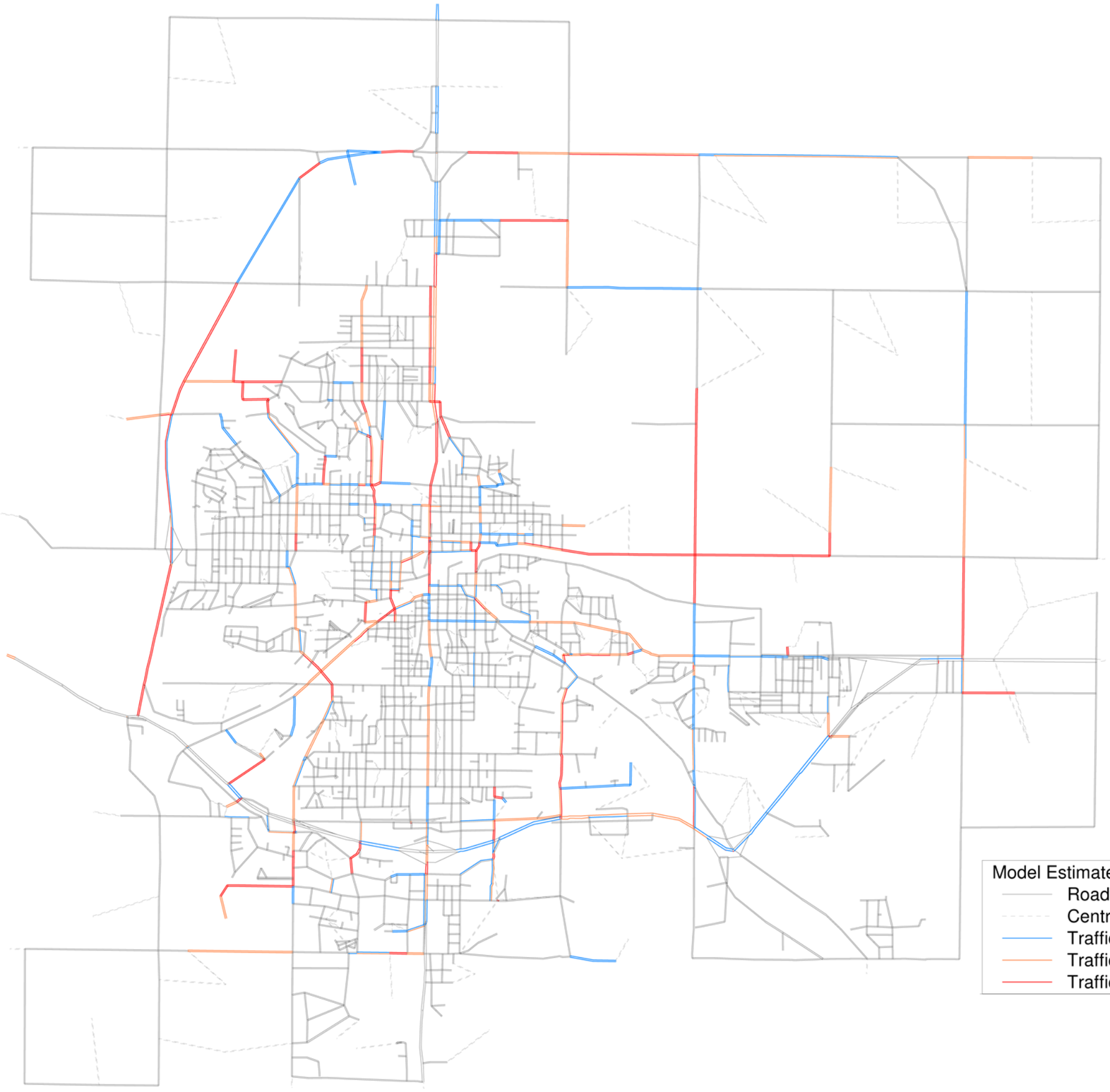
Figure 3.6

August 30, 2012

Stantec

City of Minot
2012 Comprehensive Plan

Model Estimated Volume Capacity Ratio (2030 Horizon Year)



Model Estimated Volume Capacity Ratio (2030 Horizon Year)
- Roadway Link
- Centroid Connector
- Traffic Volume approaching Capacity (0.75 to 0.90)
- Traffic Volume at Capacity (0.90 to 1.10)
- Traffic Volume above Capacity (>1.10)

Figure 3.7

August 30, 2012

Stantec

TRANSIT SYSTEM

Existing Transit System

Minot City Transit (MCT) is operated by the Minot Public Works department. It currently operates nine transit routes, including fixed-route transit service, and school service with early morning and afternoon services for schoolchildren.

Accessible transportation, dial-a-ride, is provided by the Minot Commission on Aging. Figure 3.8 displays the Existing Early Morning Transit Routes while Figure 3.9 displays the Existing Mid-day Transit Routes.

With the expressed desire for a more accessible community of walking and biking and fewer automobile trips, and the likely development of new neighborhoods at a sufficient density to support public transit, Minot's transit system will become more important in coming years.

AVIATION

Minot International Airport

Minot International Airport (MOT) is a public airport located at 25 Airport Road 2 miles northeast of downtown. The airport serves over 42,000 commercial, air taxi, itinerant, local, and military operations per year. There are daily flights to/from Minneapolis-St Paul on Delta Airlines, between Minot and Denver served by United, and between Minot and Las Vegas served by Allegiant. Recently flights to and from Mesa, Arizona and Houston, Texas have been added. The airport is feeling considerable strain from the increase in traffic over the last couple years, which only stands to increase more as pressure from oil-related businesses use the Minot Airport to get to and from the oil fields and other businesses in the region.

Minot International Airport

The Airport's infrastructure includes a passenger terminal, a general aviation terminal building, three aprons, two lighted runways, and a number of hangers, offices, and other support buildings and equipment. Primary Runway 13-31 is 7,700 feet in length by 150 feet in width, and crosswind Runway 8-26 is 6,350 feet in length by 100 feet in width. Plans are being considerd for the expansion of the terminal and parking at the airport.

Delta Airlines, UPS, Federal Express, and DHL are the major providers of cargo services. Federal Express leases a building and has two flights per day. DHL leases an office from the airport and has one flight per day. UPS is located off property and sends delivery trucks to meet the cargo aircraft. UPS sends two flights daily.

Airport Road is a two-lane roadway that allows access to the air carrier terminal area from North Broadway at the 20th Avenue NW signalized intersection. 19th Avenue NW also serves as access between North Broadway and Airport Road.

The general aviation terminal area is accessed from driveways on North Broadway located at 22nd Avenue NW and 24th Avenue NW.

Minot Air Force Base

Minot Air Force Base Airport is located 13 miles north of Minot and is owned by the United States Air Force. It has one runway and serves 30,000 military operations per year.

Minot Air Force Base

Flying S Ranch Airport

Flying S Ranch Airport is a privately owned airport located five miles southwest of the city. It has one runway and serves 1,000 itinerant and local operations per year.

Trinity Medical Center Heliport

The Trinity Medical Center Heliport is located at the Trinity Medical Center and is used for medical purposes. Trinity Medical has discussed the possibility of moving its main facility to new buildings in SW Minot. If and when they do, the heliport would move there too.

RAILWAYS

Existing Freight Rail System

There are two class 1 commercial rail lines operating within the City of Minot. The Burlington Northern Santa Fe (BNSF) line runs from the multi-modal year located east of 55th Street and runs east-west north of downtown and parallel to the Burdick Expressway west of town. Canadian Pacific (CP) also runs east-west and parallels Valley Street east of town. Figure 3.10 shows the existing rail crossings in the city. There are currently 12 grade crossings in the city.

The crossings are located in areas of relatively low traffic volumes. Crossing controls range from crossbuck signs in areas with low traffic volumes, to arms with overhead flashing lights in higher traffic areas.

BNSF Railway in Minot

The Great Northern Railway depot built in 1905 still serves as Amtrak's stop for Minot. The station is served by two trains daily and is located at 400 1st Avenue SW.

Great Northern Railway - 1910

IMPLEMENTATION

To achieve a successful and effective transportation plan a number of implementation steps will be required:

- The City staff, Planning Commission and city Council will refer to the Transportation Plan when making land use, infrastructure or other key decisions about expansion and growth in Minot.
- In reviewing the design of new subdivisions, emphasis will be placed on creating a network of streets with connections to surrounding properties and streets versus dead-ends and cul-de-sacs.
- Sidewalks and trails will be incorporated onto or near new and existing roadways as new development occurs.
- A full transportation study will be conducted modeling the Minot roadway system and making recommendations on location, size, geometry and timing of roadway improvements.

City of Minot
2012 Comprehensive Plan

Early Morning Transit Routes

N
W E
S

3,500 0 3,500 Feet

Early Morning Transit Routes:

- Belair-Pickett Route
- East Route
- North Route
- North Central Route
- South 1 Route
- South 2 Route
- South Route 2
- Sunnyside Route
- Washington School Route
- West Route

- City Boundary
- Open Water
- Wetlands
- Streams
- Railroad

Figure 3.8

October 8, 2010

Stantec

V:\1938\active\193801073\GIS\Projects\early transit.mxd

City of Minot
2012 Comprehensive Plan

Mid-Day Transit Routes

3,500 0 3,500 Feet

Mid-Day Transit Routes:

- East Route
- North Route
- South Route 1
- South Route 3
- West Route

- City Boundary
- Open Water
- Wetlands
- Streams
- Railroad

Figure 3.9

October 8, 2010

Stantec

V:\1938\active\193801073\GIS\Projects\mid day transit.mxd

City of Minot
2012 Comprehensive Plan

Rail Crossing Locations

3,500 0 3,500 Feet

- Rail Crossings
- City Boundary
- Open Water
- Wetlands
- Streams
- Railroad

Figure 3.10

October 8, 2010

Stantec

V:\1938\active\193801073\GIS\Projects\Rail Crossings.mxd