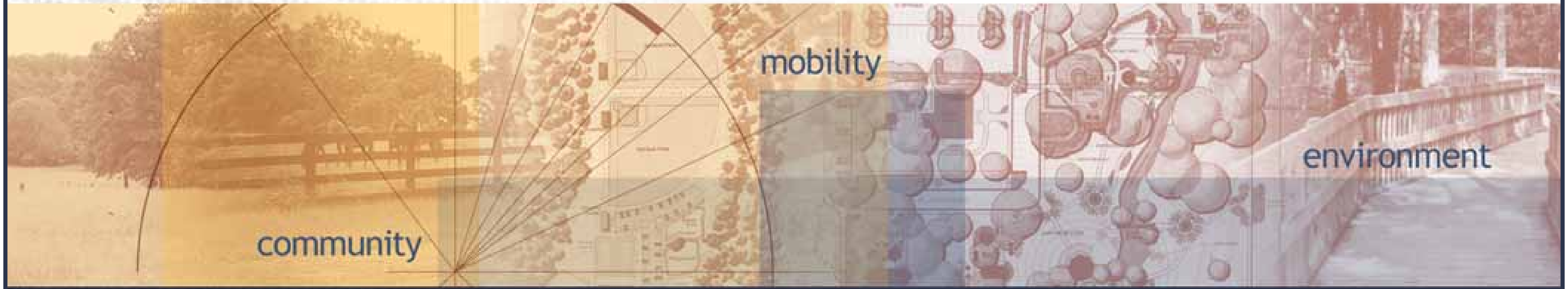
Ames Area MPO
metropolitan planning organization



Chapter 5: Needs Assessment

HDR

CHAPTER 5: NEEDS ASSESSMENT

The Long Range Transportation Plan (LRTP) Needs Assessment consists of several components including roadway needs, bicycle and pedestrian needs and transit needs. The existing and future needs of each mode were assessed and considered in the development and evaluation of the alternatives.

5.1 Existing Conditions

The existing conditions section evaluates the current roadway, bicycle/pedestrian and transit facilities in the Ames area.

ROADWAY SYSTEM

Overview

The roadway system in the Ames area is the primary transportation system and serves a variety of modes and vehicular types, including automobile, truck, transit and bicycles. The emphasis in the roadway element is to operate the system as safely and efficiently as possible.

Issues

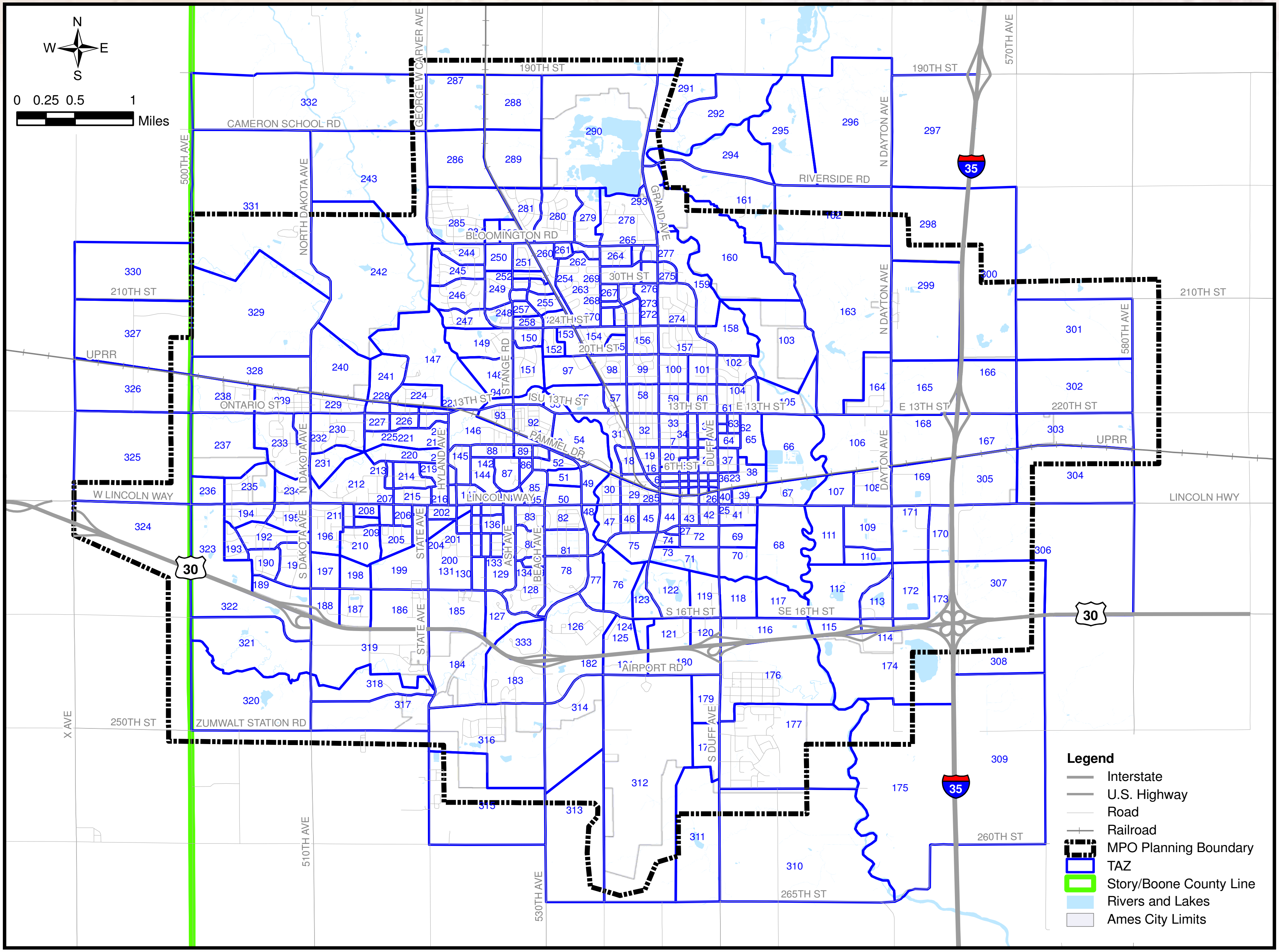
In the Issues and Visioning phase of the LRTP update process, input from the Focus Group and general public was gathered through an Issues and Visioning Workshop held in the fall of 2009. Roadway issues gathered through this process are discussed in Chapter 3.

Travel Demand Model

A travel demand model was used as a primary tool for the transportation analysis of the AAMPO. The model is comprised of 332 traffic analysis zones (TAZ's) that represent a smaller geographic area within the overall coverage of the model. The size of a zone varies, but typically is made up of census blocks or block groups. TAZ's are typically made up of homogeneous land uses or areas bounded by major arterial streets, rivers, or jurisdictional boundaries. In the travel demand model, each TAZ is quantified with certain socioeconomic data, including household size, number of available vehicles and employees. Trip making calculations are then performed based on the number of productions (homes) and attractions (employment) by TAZ. A map of the AAMPO TAZ's is shown in **Figure 5.1**.

The model network generally consists of roadways classified as major collectors or higher. Other local streets and access points are represented in the form of centroid connectors that attach trips from an analysis zone to roadways in the network. The modeled roadways are characterized with attributes such as speed, capacity and functional classification.

Figure 5.1. AAMPO Travel Demand Model Travel Analysis Zones



Travel demand models were updated for the year 2007 (existing conditions) and the year 2035 (future). Year 2007 was used for existing conditions in order to compare to latest Iowa DOT traffic count data. The purpose of modeling an existing 2007 model is to calibrate the model to existing counts.

The AAMPO model is a daily model, meaning traffic volume output reflects a 24-hour period or average daily traffic (ADT) volume. The validation process of travel demand modeling includes measuring how well the actual existing ground counts compare to the traffic volume assignment outputs from the model. Two standard measures in travel demand model calibration statistics are R-Squared (Coefficient of Determination) and Root Mean Square Error (RMSE). R-Squared is a statistic that gives information about the goodness of fit of a model. An R-Squared of 1.0 indicates that the regression line perfectly fits the data. The RMSE measures the differences between the values predicted by a mode and the values actually observed. The 2007 AAMPO travel demand model has the following statistics:

- R-Squared = 0.94
- RMSE = 30%

According to the United States Department of Transportation (US DOT) Travel Model Improvement Program (TMIP) *Model Validation and Reasonableness Checking Manual, February 1997,* a model is considered calibrated with an R-squared statistic of at least 0.88 and an RMSE less than 30%.

The Model Validation and Reasonableness Checking Manual also provides guidance on the deviation between ground count ADT's and model assignment ADT's according to facility type categories. Table 5.1 illustrates the percentage deviation within the volume categories for the 2007 AAMPO model. The "Total Count" column illustrates the sum of the actual counts and the "Total Model" column illustrates the sum of the model assignments.

Table 5.1. Travel Demand Model Accuracy by Facility Type Category

Facility Type	Total Count	Total Model	Deviation	AAMPO
Interstate	546,850	532,787	7%	2.6%
Principal Arterial	3,827,500	3,638,751	10%	5.2%
Minor Arterial	2,773,950	2,341,251	15%	18.5%
Collector	875,570	519,499	25%	68.5%
Minor Collector	56,780	69,477	25%	18.3%

The 2007 AAMPO model exceeds the suggested maximum percent deviation for the Minor Arterial and Collector facility types. Deviation in the model for low volume roadways (collector and minor arterial) is not as important as for high volume roadways (interstate and principal arterial). This is why the allowable deviation increases as the volume decreases. In order to address this deviation, the future year model projections were post-processed using the methodologies described in the National Cooperative Highway Research Program (NCHRP) Study 255.

Another travel demand model validation check is presented in the NCHRP Study 255. This document provides deviation limits, categorized by the roadway volume. TABLE 5.2 shows the percentage deviation within the volume categories for the 2007 AAMPO model.

TABLE 5.2. TRAVEL DEMAND MODEL ACCURACY BY VOLUME CATEGORY

DAILY VOLUME CATEGORY	TOTAL COUNT	TOTAL MODEL	DEVIATION LIMIT (NCHRP)	AAMPO DEVIATION
0-5,000	991,505	679,768	60%	45.9%
5,000-10,000	2,211,880	1,849,090	44%	19.6%
10,000-15,000	2,297,100	2,194,518	33%	4.7%
15,000-25,000	2,490,950	2,260,535	30%	10.2%
> 25,000	218,600	172,547	25%	26.7%

The 2007 AAMPO model only exceeds the suggested maximum percent deviation for the greater than 25,000 volume category. In order to address this deviation, the future year model projections were post-processed using methodologies described in NCHRP 255. The post-processing is needed since no model will be 100 percent accurate; therefore, deviations in the base model are determined so appropriate adjustments are incorporated to alleviate the deviation in the future year model. The travel demand model provides acceptable accuracy for planning level analysis.

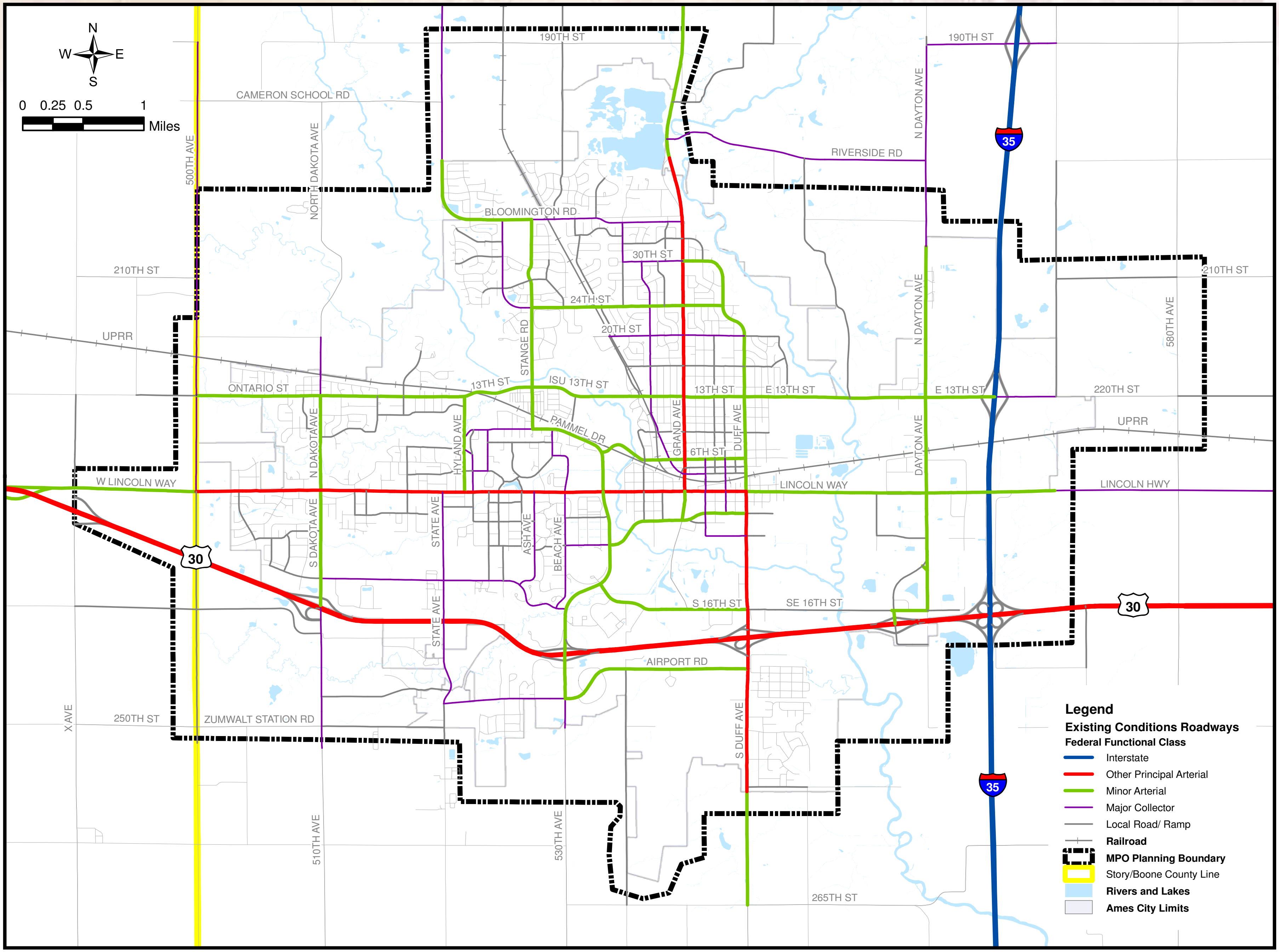
2007 Existing Traffic ADT Volumes

Average daily traffic (ADT) volume counts were collected for year 2007 and used as a baseline for the existing conditions analysis. The majority of the count locations were collected by the Iowa Department of Transportation. These volumes were collected for roadways with a functional classification of collector or higher (not local roads).

FIGURE 5.2 shows the study area roadways and the existing federal functional classifications. Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide. Functional classifications for the AAMPO roadways include:

- **INTERSTATE.** (i.e., I-35) A divided, limited access facility with no direct land access and no at-grade crossings or intersections. Interstates are intended to provide the highest degree of mobility serving higher traffic volumes and longer length trips.
- **OTHER PRINCIPAL ARTERIAL.** (i.e., U.S. 30) Permit traffic flow through the urban area and between major destinations. Principal arterials carry a high proportion of the total urban travel, since movement and not necessarily access is the primary function.
- **MINOR ARTERIAL.** (i.e., 13th Street, Payton Avenue) Collect and distribute traffic from principal arterials and interstates to streets of lower classification, and, in some cases, allow traffic to directly access destinations. Access to land use activities is generally permitted, but is oftentimes consolidated, shared, or limited to larger-scale users.
- **MAJOR COLLECTOR.** (i.e., 20th Street, Beach Avenue) Provide for land access and traffic circulation within and between residential neighborhoods and commercial and industrial areas, as well as distribute traffic movements from these areas to the arterial streets. Collectors do not typically accommodate long through trips and are not continuous for long distances.
- **LOCAL ROAD.** Offer the lowest level of mobility and the highest level of local property access. Local streets typically make up the largest percentage of street mileage and provide direct access to adjacent land uses.

FIGURE 5.2. EXISTING ROADWAY FEDERAL FUNCTIONAL CLASSIFICATIONS



2007 Existing Traffic Analysis

The traffic analysis was conducted using an Intersection Capacity Utilization (ICU) methodology at intersections. Key intersections within the study area were evaluated using ICU Level of Service (LOS) analysis. LOS is a qualitative measure describing operational conditions. It can range from "A" representing free-flow conditions to "F" representing gridlock. ICU analysis characterizes the capacity of an intersection in terms of the amount of time needed to serve all movements and to relate that capacity to the demand at the intersection. Therefore, the primary calculation in the ICU method is that of a reference time for each movement. The reference time is the amount of time required to serve a given movement at 100 percent capacity (saturation). Signal timings are not an input in determining intersection ICU LOS.

The ICU method was selected to complete the intersection analyses because of its simplistic nature and because the results are not dependent on specific signal timings. The parameters used to analyze each intersection with the ICU method are the same and results at multiple intersections or for various geometric/volume conditions of an intersection can be directly compared. A popular method for calculating intersection delay is the Highway Capacity Manual (HCM) method which requires specific signal timings to derive intersection delay. However, signal timings can be tailored to an intersection's geometry and volumes which can vary results significantly. Modifying signal timings can be useful for intersections that are over capacity but do not always provide results that can be directly compared to other study intersections or different geometric/volume conditions of the intersection.

Table 5.3 outlines the thresholds for each ICU Level of Service category.

Table 5.3. Intersection Capacity Utilization Level of Service Thresholds

	Level of Service (LOS)							
	A	B	C	D	E	F	G	H
Intersection Capacity Utilization (Percent of Capacity)	< 60%	60% - 70%	70% - 80%	80% - 90%	90% - 100%	100% - 110%	110% - 120%	> 120%
Level of Congestion	No congestion	Very little congestion	No major congestion	Normally has no congestion	On the verge of congested conditions	Over capacity and likely experiences congestion periods of 15 to 60 minutes per day	Over capacity and likely experiences congestion periods of 60 to 120 minutes per day	Over capacity and could experience congestion periods over 120 minutes per day
	All traffic served on first cycle *Intersection can accommodate up to 40% more traffic on all movements*	*Almost all traffic served on first cycle* *Intersection can accommodate up to 30% more traffic on all movements*	*Most traffic served on first cycle* *Intersection can accommodate up to 20% more traffic on all movements*	*Majority of traffic served on first cycle* *Intersection can accommodate up to 10% more traffic on all movements*	*Many vehicles not served on first cycle* *Intersection has less than 10% reserve capacity*	*Residual queues at the end of green are common*	*Long queues are common*	*Long queues are common*

ICU analysis was performed for existing volume conditions of key intersections within the study area. The AAMPO selected the key intersection to be analyzed. Existing turning movement volumes were collected during Fall 2009 and Spring 2010 and provided by the City of Ames. The City also provided existing reference cycle lengths to be used in the analysis.

Table 5.4 summarizes the results from the existing conditions ICU analysis. As shown in the table, all the intersections currently perform within acceptable levels (LOS C or better) for peak hour conditions, with the exception of four study intersections:

- 13th St / Stange Rd
- 13th St / Grand Ave
- Lincoln Way / Duff Ave
- S 16th St / S Duff Ave

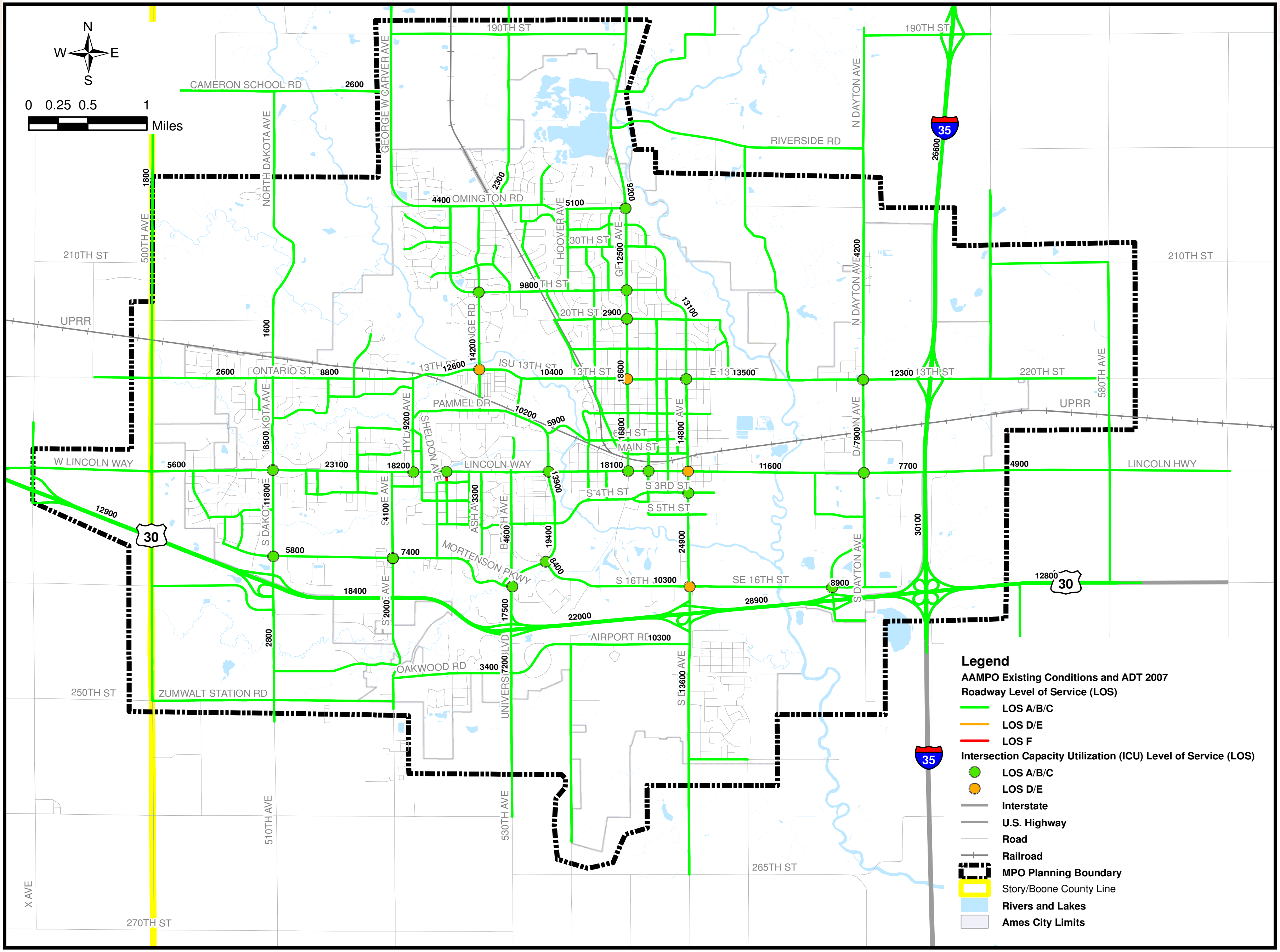
In addition to peak hour level of service measured at the study area intersections, a planning level of service was also calculated by roadway segment. The Roadway LOS is based on an average weekday (24-hour) volume and capacity. Roadway LOS is defined by thresholds using a volume to capacity ratio (V/C). For the AAMPO, capacity is established at LOS C (a V/C ratio of 1.0). Volumes are based on existing 2007 count data. Capacities are based on criteria defined by the Iowa DOT, classified according to roadway functional class, area type, and number of lanes. The roadway LOS analysis for the AAMPO shows all roadways perform during the average weekday at acceptable levels of service (C or better).

The existing conditions roadway LOS, ICU LOS, and ADT's for the 2007 existing conditions analysis are shown in Figure 5.3.

Table 5.4. Existing Conditions Intersection Capacity Utilization Analysis Results

Intersection	Peak Hour LOS		
	A/B/C	D/E	F/G/H
Bloomington Rd / Grand Ave	♦		
24th St / Stange Rd	♦		
24th St / Grand Ave	♦		
20th St / Grand Ave	♦		
13th St / Stange Rd		♦	
13th St / Grand Ave		♦	
13th St / Duff Ave	♦		
13th St / Dayton Ave	♦		
Lincoln Way / Dakota Ave	♦		
Lincoln Way / Hyland Ave	♦		
Lincoln Way / Welch Ave	♦		
Lincoln Way / University Blvd	♦		
Lincoln Way / Grand Ave	♦		
Lincoln Way / Clarke Ave / Walnut Ave	♦		
Lincoln Way / Duff Ave		♦	
Lincoln Way / Dayton Ave	♦		
S 3rd St / S Duff Ave	♦		
Mortensen Rd / S Dakota Ave	♦		
Mortensen Rd / State Ave	♦		
Mortensen Pkwy / University Blvd	♦		
S 16th St / University Blvd	♦		
S 16th St / S Duff Ave		♦	
SE 16th St / S Dayton Ave	♦		

Figure 5.3. 2007 Existing Conditions Average Daily Traffic Volumes, Intersection LOS and Roadway Segment LOS



BICYCLE/ PEDESTRIAN SYSTEM

Overview

Bicycling and walking as healthy modes of transportation, or as purely recreational activities, provide positive benefits in many areas including personal health, the health of the environment, reduced traffic congestion, improved quality of life, and the increased economic vitality of communities that have emphasized bicycle and pedestrian mobility. In a growing number of communities, bicycling and walking are considered as indicators of a community's livability – a factor that has a profound impact on attracting businesses and workers as well as tourism. In cities and towns where people can regularly be seen out bicycling and walking, there is a sense that these are safe and friendly places to live and visit. In areas that are heavily centered on a university or college, such as Ames, it is all the more important to emphasize bicycling and walking, as many students rely on these modes for most, if not all, of their transportation needs for on-campus and off-campus activities.

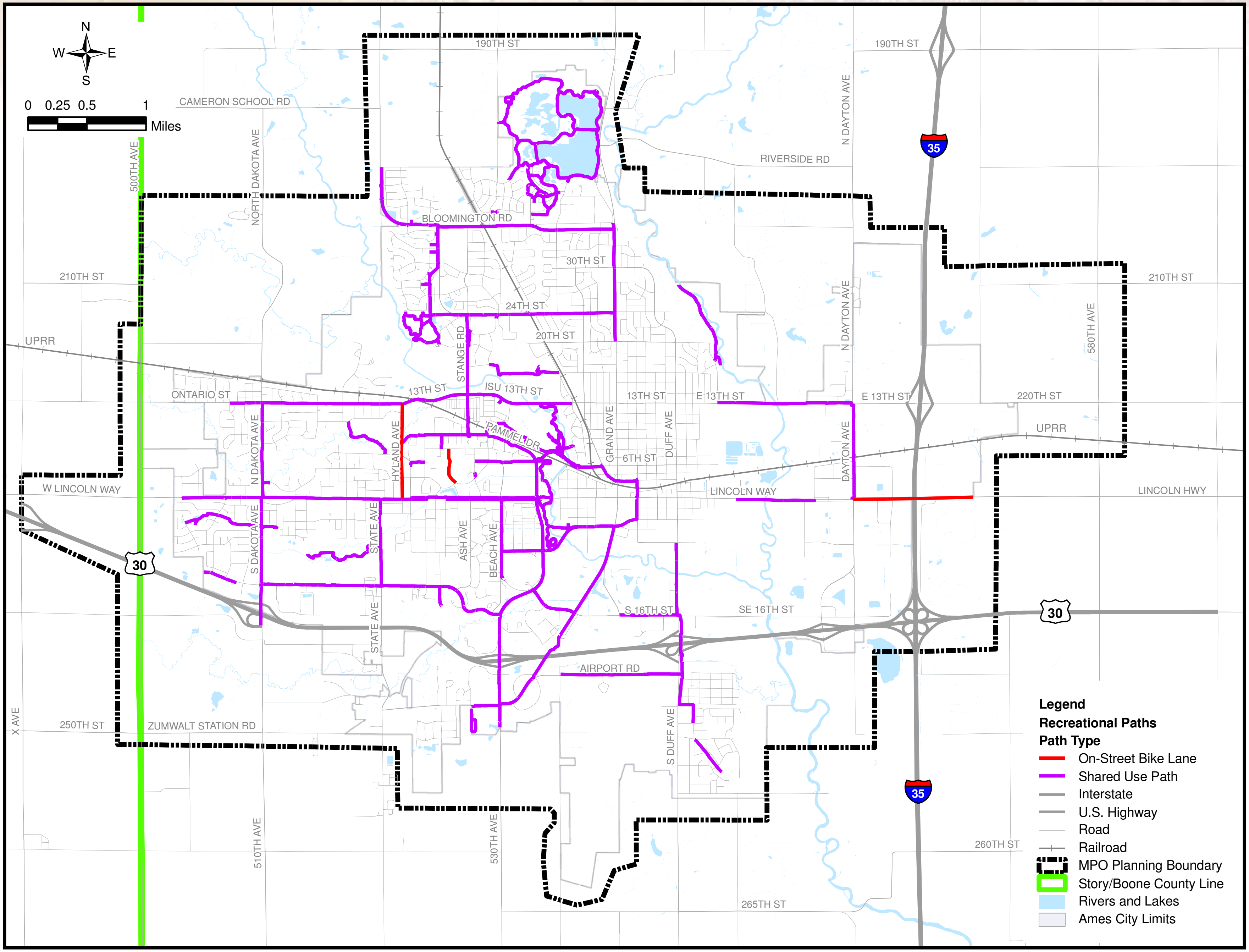
The keys to creating pedestrian and bicycle-friendly, walkable, livable places are:

- Providing a mix of complementary land uses that support shorter trips that can be made by bicycling or walking.
- Implementing traditional street patterns that better distribute traffic across the network and provide more route choices.
- Balancing the needs of all road users through the implementation of "complete streets." Streets must consider the needs of all the potential users, not just the automobile. In addition to providing route choice for the traveling public, streets must also provide for mode choice. Successful, sustainable communities consider all users, not just the majority. Incomplete streets may not only discourage travel by alternative modes, but may be hazardous for non-auto users. In contrast, a network of complete streets improves the safety, convenience, efficiency, and accessibility of the transportation system for all users.
- Using good urban design that satisfies each of the five elements that every street and place needs to succeed: security, convenience, efficiency, comfort, and welcome. Ultimately, it must be recognized that people will travel by walking or bicycling if they feel safe, if it is convenient to do so, if origins and destinations are linked through a well-connected network, and if the environment is positive and inviting.
- Implementing a comprehensive program that includes all of the 5 E's: Engineering, Education, Encouragement, Enforcement, and Evaluation. While this plan will focus on Engineering, it is important to recognize that aspects of each other area need to be implemented to ensure a bicycle and pedestrian-friendly community.

Northwestern Avenue is signed as a "Bicycle Friendly Street."

There are a growing number of bicycle and pedestrian facilities in the Ames area, which include sidewalks, on-road bicycle facilities (paved shoulders or bicycle lanes), and off-road shared use paths. The majority of existing bicycles facilities in Ames are shared use paths that are located immediately adjacent to and parallel to roadways, which are also known as "sidepaths". Many arterial and collector roadways within the area have sidepaths, and there has been a concerted effort to expand the existing system of pathways in recent years, including sidepaths and other shared use paths in exclusive rights-of-way. While there are many pathways in the area, there are very few on-road bicycle facilities. In fact, the only dedicated bicycle lanes in the area are on Hyland Avenue and Morrill Road on the Iowa State campus, the portion of Lincoln Way from Dayton Avenue to the eastern City limits and the newly constructed bicycle lanes on South Dakota from U.S. 30 to 250th Street. There are a few roadways, such as Northwestern Avenue and Ross Road, which have existing signage that recognizes them as a "Bicycle Friendly Street"; these streets do not provide dedicated bicycle facilities, but offer shared roadway environments. **Figure 5.4** shows the existing bicycle facilities within the Ames area.

Figure 5.4. Existing Bicycle Facilities



Issues

In the Issues and Visioning phase of the LRTP update process, input from the Focus Group and general public was gathered through an Issues and Visioning Workshop held in the fall of 2009. Bicycle and pedestrian issues gathered through this process are discussed in Chapter 3.

Existing Service Evaluation

Research Background

There is a general consensus that bicyclists' and pedestrians' sense of safety and comfort within a roadway corridor is based on a complex assortment of factors including traffic characteristics, roadway geometrics, personal safety, security, aesthetics, lighting and amenities, and conditions at intersections. Recent research has led to the development of two models, one each for bicyclists and pedestrians, which measure the perceptions of personal safety and comfort with respect to motor vehicle traffic. The Bicycle Level of Service (BLOS) and Pedestrian Level of Service (PLOS) models do not measure vehicle flow or capacity, but are based on human responses to measurable roadway and traffic stimuli. Each of the two models were derived from a study that placed participants in actual urban roadway and traffic conditions to obtain feedback regarding the perception of hazard or level of comfort on a variety of different roadway segments. Participants graded roadway segments on a scale from A (least hazardous) to F (most hazardous) based on how safe or comfortable they felt as they bicycled or walked on each segment. While these studies focused on the quality, or level of service, of the roadway links, the conditions at intersections were not addressed.

The result of the research was the calibration of statistically reliable mathematical models that quantify bicyclists' and pedestrians' perceptions of the quality of service on shared use roadway environments. The two models have been used or adopted by many City and State agencies. Part of the reason for the models' widespread acceptance is that they use the same measurable traffic and roadway factors that transportation planners and engineers use for other travel modes.

The BLOS model clearly reflects the effect on bicycling suitability or "compatibility" factors such as roadway width, bike lane widths and striping combinations, traffic volume, pavement surface conditions, motor vehicle speed and type, and on-street parking. Statistically, the most important variables involved the separation of the bicyclist from motorized traffic, such as the presence of a designated, striped bicycle lane. It is important to note that the BLOS model only represents bicycling suitability of the on-road environment, and does not incorporate shared use paths or sidepaths.

The factors contained in the PLOS model include lateral separation elements between pedestrians and motor vehicle traffic (i.e., width of sidewalk, width of buffer, etc.), as well as motor vehicle traffic volume, and motor vehicle speed. Similar to the BLOS model, the most important variable was found to be the lateral separation between pedestrians and motor vehicle traffic. A pedestrian's sense of safety or comfort is strongly influenced by the presence of a sidewalk. Furthermore, the value of the sidewalk varies according to its location and buffering (separation) from the motor vehicle traffic. In general, as the buffering increases, the pedestrian's comfort level increases. Additionally, a pedestrian's comfort level increases further with the presence of a barrier within the buffer, such as on-street parking, a line of trees, or a roadside swale. Unlike the BLOS model, the PLOS model does account for the presence of sidepaths, since they are located adjacent to the roadway and essentially function as wide sidewalks.

Ames Area Data

An analysis of the existing BLOS and PLOS was conducted within the MPO planning boundary. The BLOS and PLOS grades for the arterial and collector roadways within the study area are shown on **Figure 5.5** and **Figure 5.6**, respectively.

A total of approximately 65 miles of roadway were evaluated using the BLOS and PLOS models. **Table 5.5** provides a summation of the data showing the total miles and percentage at each level of service. As shown, the overall conditions in the Ames study area today can be

Figure 5.5. Bicycle Level of Service

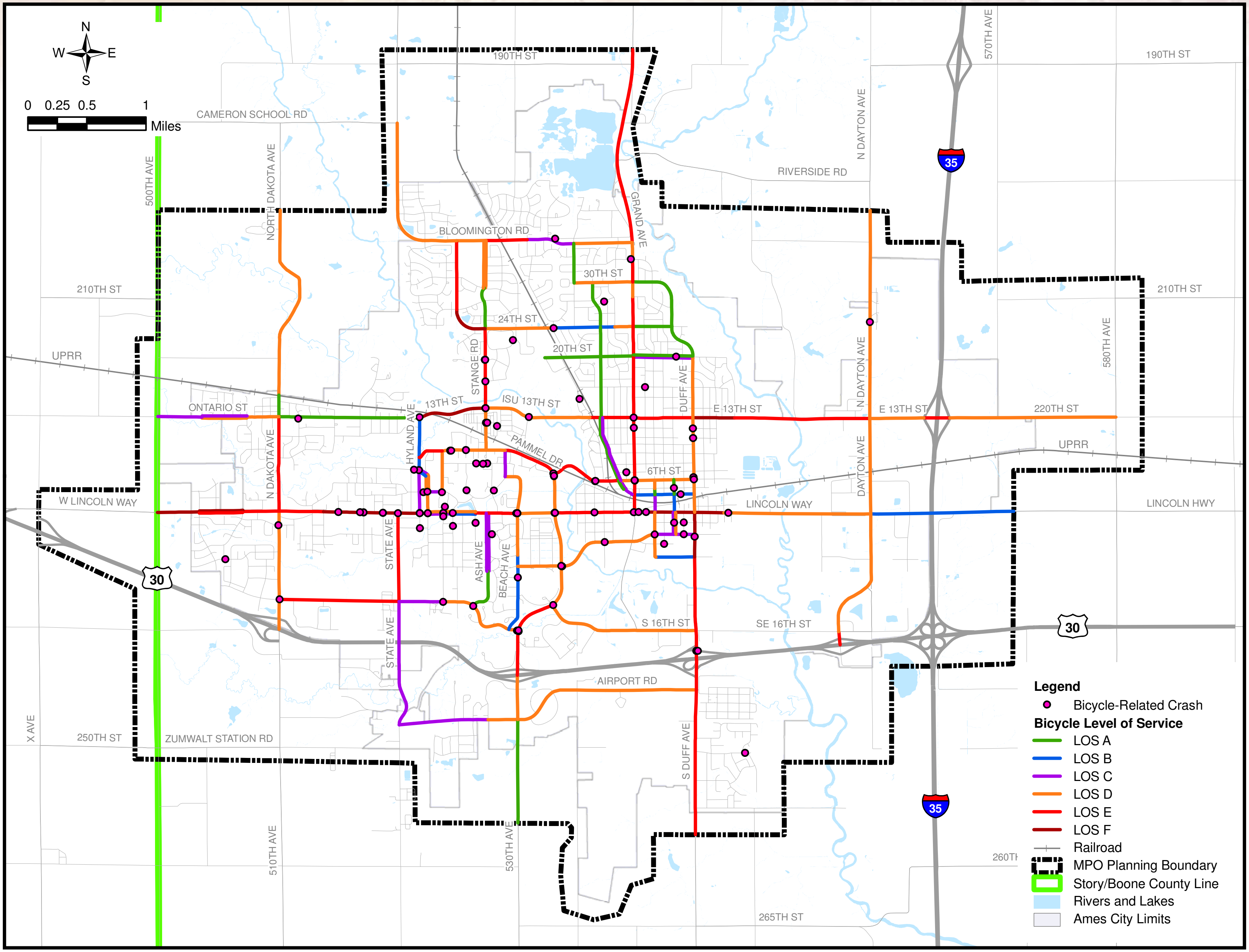
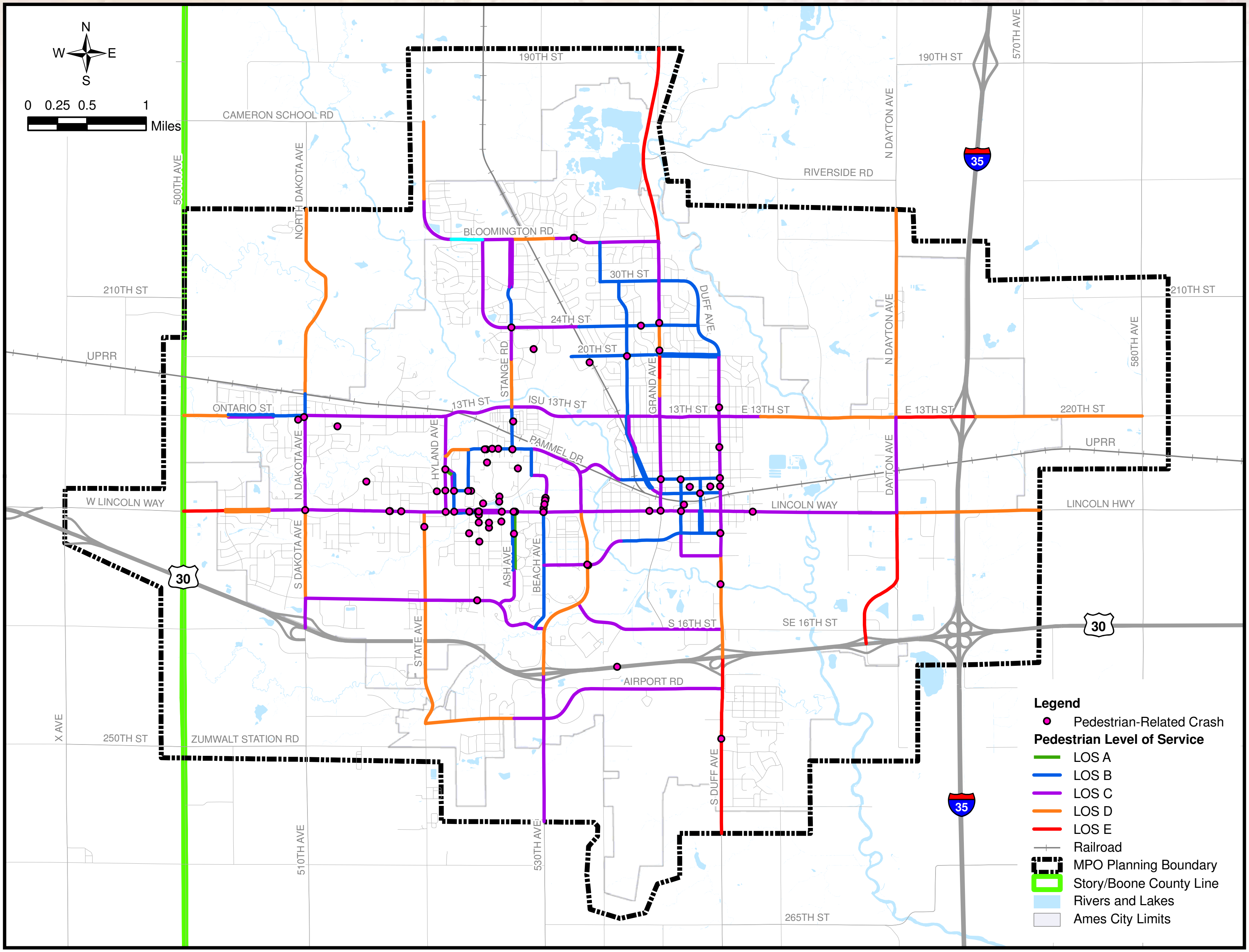


Figure 5.6. Pedestrian Level of Service



described as fair for pedestrians and fair to poor for bicyclists riding in an on-road environment. Only 17 and 21 percent of roadway miles rated a "B" or better in BLOS and PLOS, respectively. However, while nearly one-half of the roadway miles rated a "C" in PLOS, only 9 percent rated a "C" in BLOS. In many communities where BLOS and PLOS have been used, a standard of "C" is considered acceptable, and it is recommended to use this standard in Ames. This means that while 67 percent of the arterial and collector roadway network miles in Ames would be considered acceptable for pedestrians, only 26 percent would be considered acceptable for bicyclists in an on-road environment. The BLOS and PLOS summary and results are shown in Table 5.5.

Table 5.5. Ames Area MPO Bicycle and Pedestrian Level of Service Summary

Bicycle Level of Service			Pedestrian Level of Service		
BLOS	Distance (mi)	Percentage (%)	PLOS	Distance (mi)	Percentage (%)
A	7.3	11	A	0.3	1
B	3.7	6	B	13.1	20
C	5.8	9	C	29.7	46
D	27.3	42	D	15.7	24
E	16.5	26	E	5.6	9
F	3.8	6	F	0	0

The level of service analysis represents a "supply side" analysis. The results of this analysis are significant in that they can be used to conduct a benefits comparison among proposed roadway cross-sections, identify roadway re-striping or reconfiguration candidates for bicycle or pedestrian improvements, and to prioritize and program roadways for improvements. This is especially true when the LOS results are combined with an analysis of demand, because the roadways with the poorest level of service and the highest user demand can be given a high priority for making improvements. Although a formal bicycle and pedestrian demand analysis was not completed for this plan, the demand for these modes is generally highest in the areas encompassing and immediately surrounding the Iowa State campus and downtown Ames; this is because these areas have a mix of complementary land uses in close proximity to each other where short trips can easily be made by bicycling or walking. The further away from ISU and downtown Ames, the less demand generally exists for bicycling and walking trips because these areas consist largely of a single land use, and trips supportable by bicycling or walking are typically longer. For this reason, roadways closer in to ISU and downtown Ames with poor BLOS and/or PLOS grades (below the recommended standard of "C") should generally be considered higher priorities for improvement than roadways with poor levels of service further out or on the periphery of town.

TRANSIT SYSTEM

Overview

There are three main public transit services provided in the Ames area. The City of Ames, through the Ames Transit Agency (CyRide), provides fixed route transit service using city employees as well as demand responsive service through Heartland Senior Services. CyRide is jointly governed by the City, Iowa State University, and ISU's Government of the Student Body (ISU students). Further, demand responsive regional service is provided by the Heart of Iowa Regional Transit Agency (HIRTA) also by contract with Heartland Senior Services.

The primary focus of this discussion is the services provided within the study area by CyRide, the primary public transit provider in the City of Ames. The transit system information contained in this report substantially uses work contained in the Ames Area 2010 Passenger Transportation Development Plan (PTDP) completed in April of 2009 and the Ames Area MPO 2011 Passenger Transportation Plan Update in March of 2010. The PTDP is an effort of providing key community decision makers with the knowledge of how individuals are currently being transported throughout Ames, the additional transportation needs and service requests identified, and recommended projects to overcome these needs. This document is available on the CyRide website at http://www.cyride.com/planning_policies/planning.html.

Issues

In the Issues and Visioning phase of the LRTP update process, input from the Focus Group and general public was gathered through an Issues and Visioning Workshop held in the fall of 2009. Transit issues gathered through this process are discussed in Chapter 3.

Existing Service Evaluation

The City of Ames has extensive transit service, operating seven days a week. Table 5.6 summarizes the chief characteristics of this service.

The PTDP reviewed the CyRide route structure for its four main service periods and compared them with the distribution of populations considered to be below the poverty level in Ames. In addition, the comparison of the route structure with locations of rental housing/ commercial and industrial zones in the city was also made.

The main service periods are:

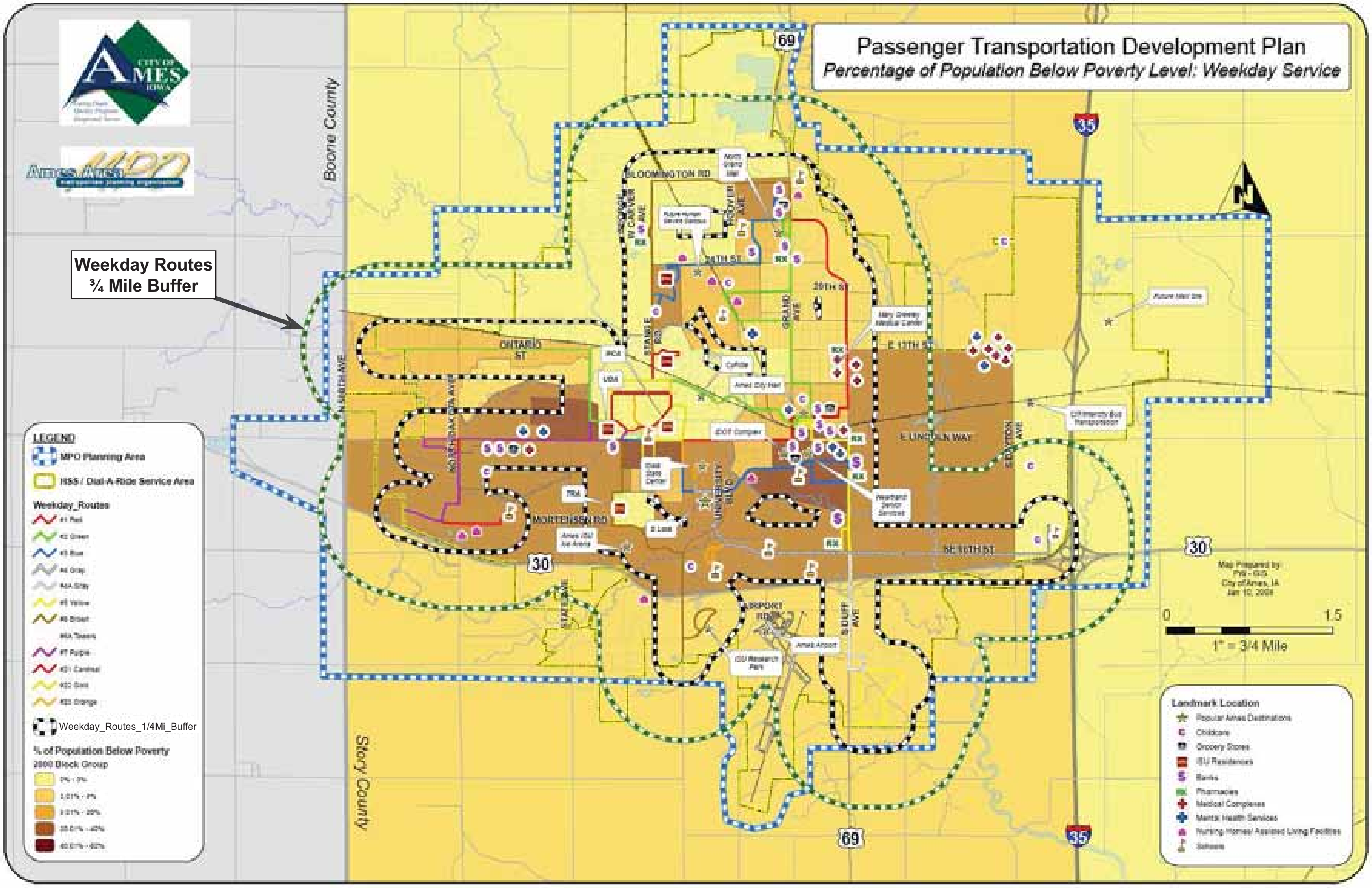
- Weekdays
- Weekday Nights
- Saturdays
- Saturday nights and Sundays

The PDTP compares weekday service period route structure with areas considered below the poverty level, with concentrations of key landmarks, and with areas of rental housing, commercial and industrial zones. This comparison is shown in Figure 5.7 and Figure 5.8, with service areas of the routes (quarter-mile and three-quarter mile buffers around the routes). A quarter mile is the standard measure for the maximum distance people will typically walk to access service. The three-quarter mile buffer is the minimum service area for ADA paratransit. Figure 5.7 shows that many of the parts of Ames with the highest concentrations of people living below the poverty level are within a quarter mile of the bus routes operating during the weekday. Expanding the service area to three-quarters of a mile from a route, an even greater portion of this population is covered by service. Figure 5.8 shows the rental property, commercial and industrial zones within the quarter mile and three-quarters of a mile buffers. Most rental and commercial areas are within the quarter mile buffer. Residential rental units not only illustrate where high density living occurs, but also where transit dependent individuals may live. The commercial and industrial areas illustrate locations where residents work and shop.

Table 5.6. Summary of Ames Area Transit Providers

Type of Service	Fixed-Route Service	Dial-A-Ride (ADA Complementary Service)	HIRTA Regional Service	Intercity Service
Operator	Ames Transit Agency *(CyRide)*	Heartland Senior Services *(contractor to CyRide)*	Heartland Senior Services *(contractor to HIRTA)*	Jefferson Line & Burlington Trailways
Service Area	City of Ames	City of Ames	Story County	Midwest
Groups Served	General Public	General Public *(as ADA eligible)*	General Public, Seniors & Persons with Disabilities	General Public
Days of Operation Monday-Friday; Saturday; Sunday & Holidays	362 days/year 6am – 12am 8am – 12am; 9am – 12am *Closed Thanksgiving, Christmas and New Year's Day.*	362 days/year 6am – 12am; 8am – 12am; 9am – 12am *Closed Thanksgiving, Christmas and New Year's Day.*	Weekdays 6am – 6pm; 8am – 12am (within Ames only); 9am – 12am (within Ames only); *Closed Thanksgiving, Christmas and New Year's Day.*	362 days/year Varies *Closed Thanksgiving, Christmas and New Year's Day.*
Fare Structure (one-way)	$1.00 $0.50 - Elderly/disabled, K-12 students and Medicare cardholders Free - ISU students	$2.00 $6.00 (east of Skunk River; weeknights after 6:00 PM and all day Saturday and Sunday)	$5.50 $0.25 - $5.50 - (low-income passengers; prior approval required)	Varies

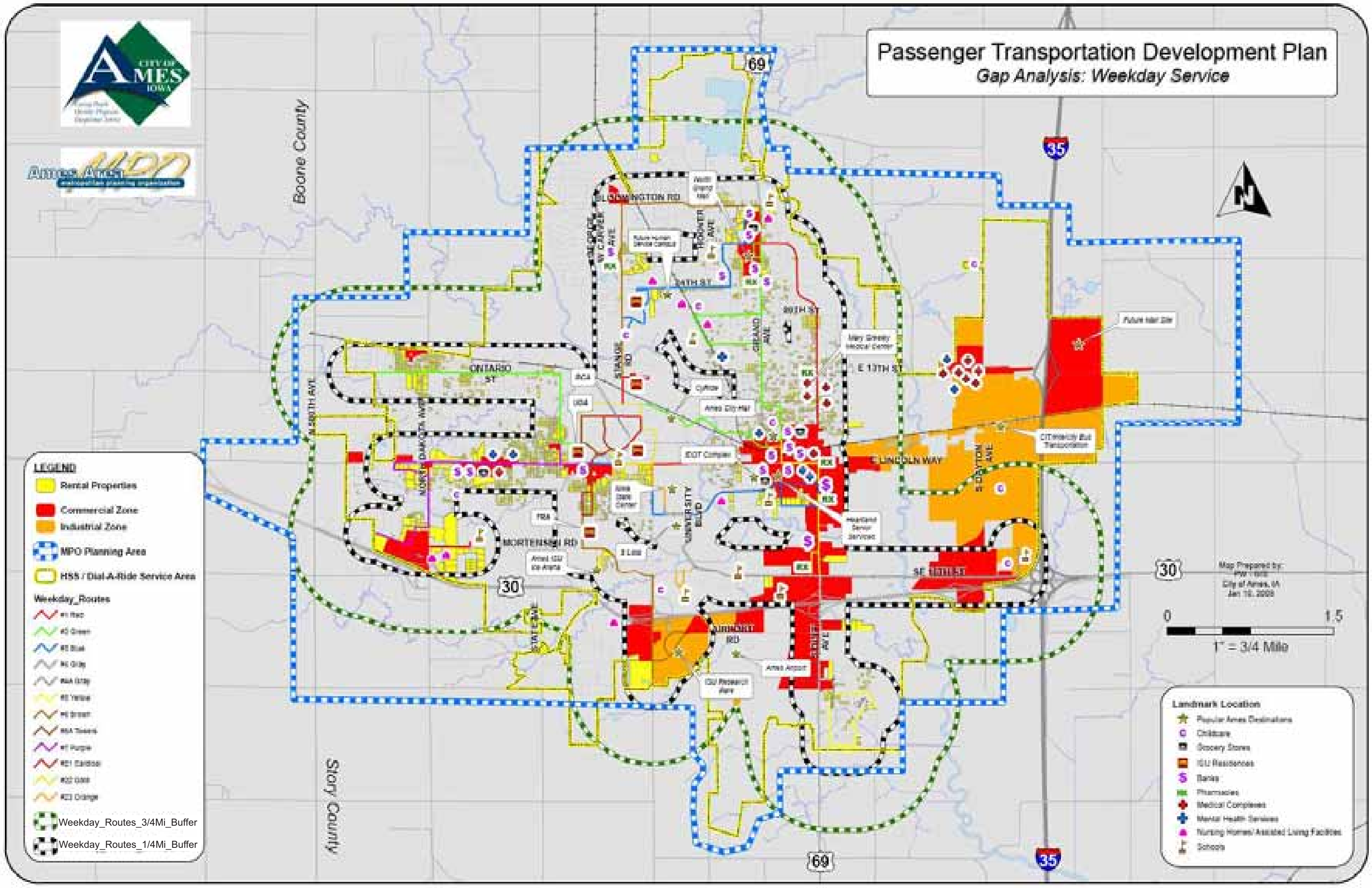
Figure 5.7. Percentage of Population below Poverty Level - Weekday Service



Ames Area Passenger Transportation Development Plan 32

Source: Ames Area 2010 Passenger Transportation Development Plan, April 2009, page 32.

FIGURE 5.8. RENTAL, COMMERCIAL AND INDUSTRIAL ZONE LANDMARK GAP ANALYSIS - WEEKDAY SERVICE



Ames Area Passenger Transportation Development Plan 31

Source: Ames Area 2010 Passenger Transportation Development Plan, April 2009, page 31.

5.2 Future Conditions

The plan uses a 2035 planning horizon in order to provide a minimum 25 year time period between the date of the plan and the analysis period for the improvements. This section discusses the future needs of the transportation system, as required by SAFETEA-LU.

ROADWAY SYSTEM

Travel Demand Model

The 2035 Existing Plus Committed (E+C) travel demand model network consists of the existing roadway network and any transportation improvements to be completed in the next 25 years that have already been committed to project funding through prior planning efforts and capital improvement programs in the study area. The socioeconomic data used in the model was established using a future land use plan and data provided by the AAMPO.

The AAMPO currently has several projects that are committed to be built in the near future. These projects are part of developer agreements and are projected to be constructed within the next five years. For the purposes of the transportation planning analysis conducted as part of the LRTP update process, only committed projects that relate to a change in the roadway capacity pertain to a modification in the travel demand model network. The 2035 E+C network includes the following committed projects:

- Grant Avenue - W. Wind Drive to 190th Street
- 13th Street - I-35 to 570th Avenue
- 570th Avenue - 13th Street to ½ mile north (corporate limits)
- 13th Street and Dayton Avenue Intersection Improvements

2035 Future E+C Traffic Analysis

An ICU analysis was performed for year 2035 E+C volume conditions of key intersection with existing plus committed geometrics. Committed projects that will be built before year 2035 were included in the geometric conditions of the analysis. Year 2035 E+C peak hour volumes were developed using the existing peak hour turning movement volumes, existing annual daily traffic (ADT) volumes on each key intersection leg, and forecasted year 2035 E+C ADT volumes on each key intersection leg generated with the travel demand model.

Table 5.7 summarizes the results from the 2035 E+C conditions ICU analysis. The intersections that are shown to operate in the peak hour with unacceptable levels of service (LOS D or worse) include the following:

Peak Hour LOS D/E:

- 13th St / Grand Ave
- Lincoln Way/ Dakota Ave
- Lincoln Way/ Grand Ave
- Lincoln Way / Duff Ave
- S 16th St / S Duff Ave

Peak Hour LOS F:

- 13th St / Stange Rd

In addition to peak hour level of service measured at the study area intersections, a planning level of service was also calculated by roadway segment. The Roadway LOS is based on an average weekday (24-hour) volume and capacity. Roadway LOS is defined by thresholds using a volume to capacity ratio (V/C). Volumes are based on post-processed 2035 E+C ADT forecasts from the travel demand model. The roadway LOS analysis for the AAMPO shows the majority of roadways perform during the average weekday at acceptable levels of service (C or better).

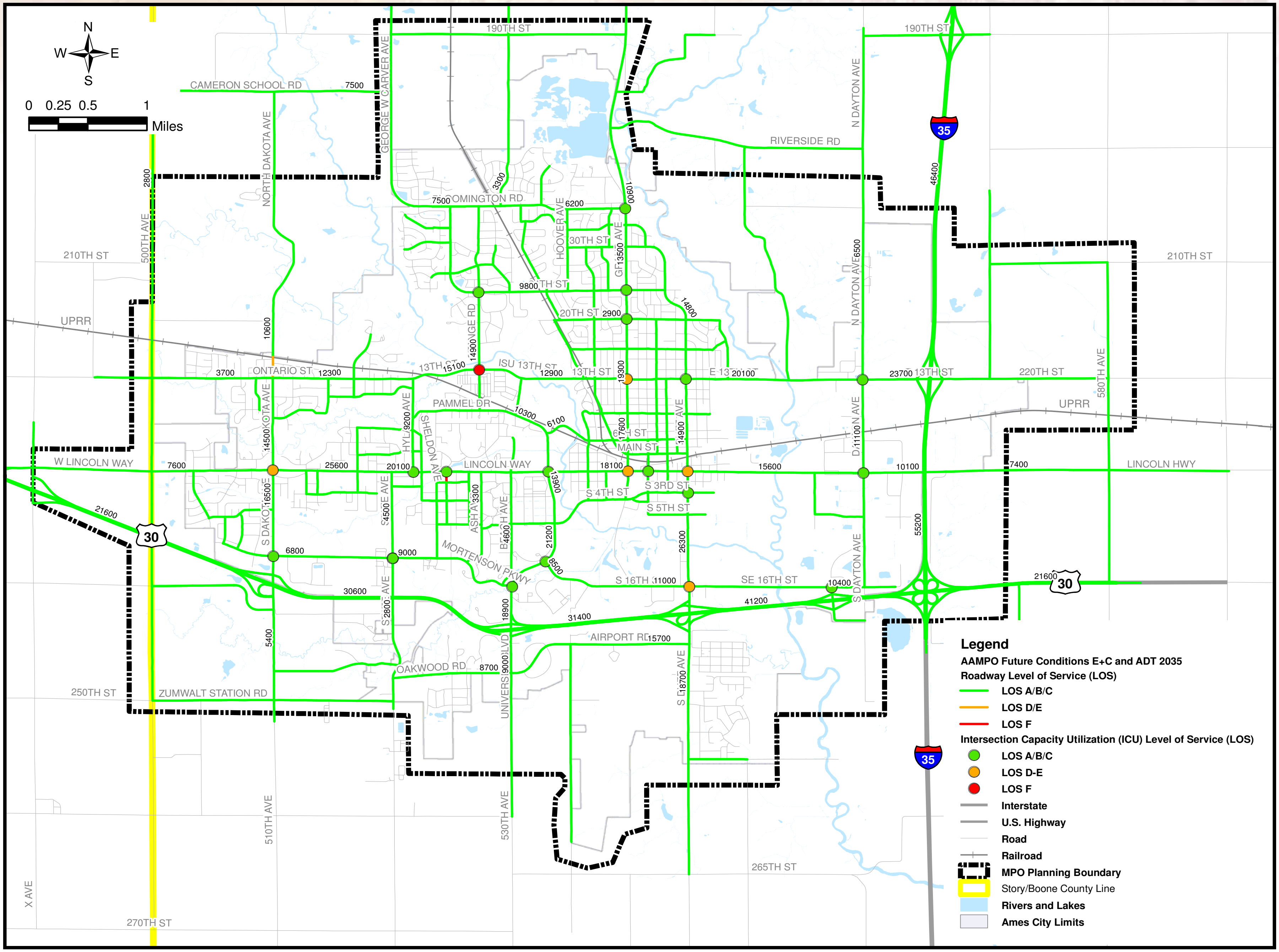
A segment of North Dakota Avenue north of 13th Street is projected to approach daily capacity by year 2035 with only the existing plus committed roadway projects in place.

The Roadway LOS, ICU LOS, and ADT's for the 2035 E+C conditions analysis are shown in **Figure 5.9**.

Table 5.7. 2035 Existing + Committed Intersection Capacity Utilization Analysis Results

Intersection	Peak Hour LOS		
	A/B/C	D/E	F/G/H
Bloomington Rd / Grand Ave	♦		
24th St / Stange Rd	♦		
24th St / Grand Ave	♦		
20th St / Grand Ave	♦		
13th St / Stange Rd			♦
13th St / Grand Ave		♦	
13th St / Duff Ave	♦		
13th St / Dayton Ave	♦		
Lincoln Way / Dakota Ave		♦	
Lincoln Way / Hyland Ave	♦		
Lincoln Way / Welch Ave	♦		
Lincoln Way / University Blvd	♦		
Lincoln Way / Grand Ave		♦	
Lincoln Way / Clarke Ave / Walnut Ave	♦		
Lincoln Way / Duff Ave		♦	
Lincoln Way / Dayton Ave	♦		
S 3rd St / S Duff Ave	♦		
Mortensen Rd / S Dakota Ave	♦		
Mortensen Rd / State Ave	♦		
Mortensen Pkwy / University Blvd	♦		
S 16th St / University Blvd	♦		
S 16th St / S Duff Ave		♦	
SE 16th St / S Dayton Ave	♦		

Figure 5.9. 2035 Existing + Committed Average Daily Traffic Volumes, Intersection LOS and Roadway Segment LOS



BICYCLE/PEDESTRIAN SYSTEM

Bicycle Facilities

The community survey discussed in **3.1** revealed some interesting public opinions regarding bicycle facilities. According to the survey, 43 percent of respondents were dissatisfied (including 13 percent who were very dissatisfied) with the availability of on-street bicycle lanes. It is interesting to note that this represented the second lowest satisfaction rate among the 18 transportation issues respondents were asked about behind only the condition of roadways. Only 23 percent of respondents were either satisfied or very satisfied with the availability of on-street bicycle lanes, which represented a decrease from 46 percent from the last such survey in 2004. When asked which three transportation issues are the most important to address over the next ten years (out of 18 possible transportation issue choices), 20 percent of respondents listed the availability of on-street bicycle lanes in their top three, which ranked this as the fifth most important issue. Further, 55 percent of respondents were supportive or very supportive of dedicated bicycle lanes, while only 22 percent were not supportive. While the City has a fairly good and well connected network of sidepaths, these survey results clearly point to the desire from the public to incorporate more on-road facilities for bicyclists.

Different types of bicycle facilities cater to the characteristics of different types of cyclists, and one type of facility will not meet the demands of the entire population of cyclists. Sidepaths are most appropriate for cyclists riding at slow speeds (10-12 mph), or young children. However, many recreational or commuter cyclists desire to travel significantly faster at speeds that are not appropriate for sidepaths. Many sidepaths in Ames cross numerous driveways and/or cross streets, each representing a potential vehicle conflict point for cyclists. Cyclists riding on a sidepath against the flow of traffic in the adjacent lane(s) are even more susceptible to vehicle conflicts at driveways and cross streets because drivers do not typically expect conflicts coming from their right on a sidewalk or sidepath. Further, sidepaths can be hazardous for cyclists because they are shared with pedestrians who are typically moving much slower than the cyclist and who may make unpredictable movements that a cyclist does not have adequate time to react to. The faster a cyclist travels on a sidepath that crosses driveways/cross streets and/or has pedestrian traffic, the more likely conflicts becomes. Other potential conflicts include motorists on side streets or driveways who may block the sidepath, and bicyclists that may travel on the road against traffic to access a pathway provided only on one side of the street, or similarly travel against traffic once a pathway ends.

While sidepaths can be used successfully and safely by bicyclists who are aware of their potential hazards, it is important that Ames broaden its bicycle facilities focus. Rather than continuing to only build and connect its network of shared use paths and sidepaths, a range of bicycle facilities should be implemented that will support bicycle travel options for all types and ability-levels of cyclists. This would include additional on-road bicycle facilities such as bicycle lanes, paved shoulders, and shared/signed routes (which can be designated by shared lane markings, or "sharrows"). It is important to note that even if a roadway has an existing sidepath, the implementation of an on-road facility should not be precluded; both on-road and off-road facilities are provided on the same roadway in many communities across the country.

> The *AASHTO Guide for the Planning, Design, and Operation of Bicycle Facilities (Draft, February 2010)* provides justification by stating that "*provision of a pathway adjacent to the road is generally not a substitute for the provision of on-road accommodation such as paved shoulders or bike lanes, but may be considered in some locations in addition to on-road bicycle facilities, or as an interim accommodation until roadway conditions can be improved.*"

Pedestrian Facilities

There were few public comments on specific pedestrian-related issues, although most were regarding intersections (unsafe crossings and vehicle conflicts); examples included Grand Avenue at 13th and 24th Streets; Lincoln Way intersections in the ISU/Campustown area and South Dakota Avenue; Duff Avenue at South 5th Street; 13th Street at Stange Road and Hyland Avenue; and University Boulevard at 6th Street, Mortensen Parkway, and the US 30 ramp intersections.

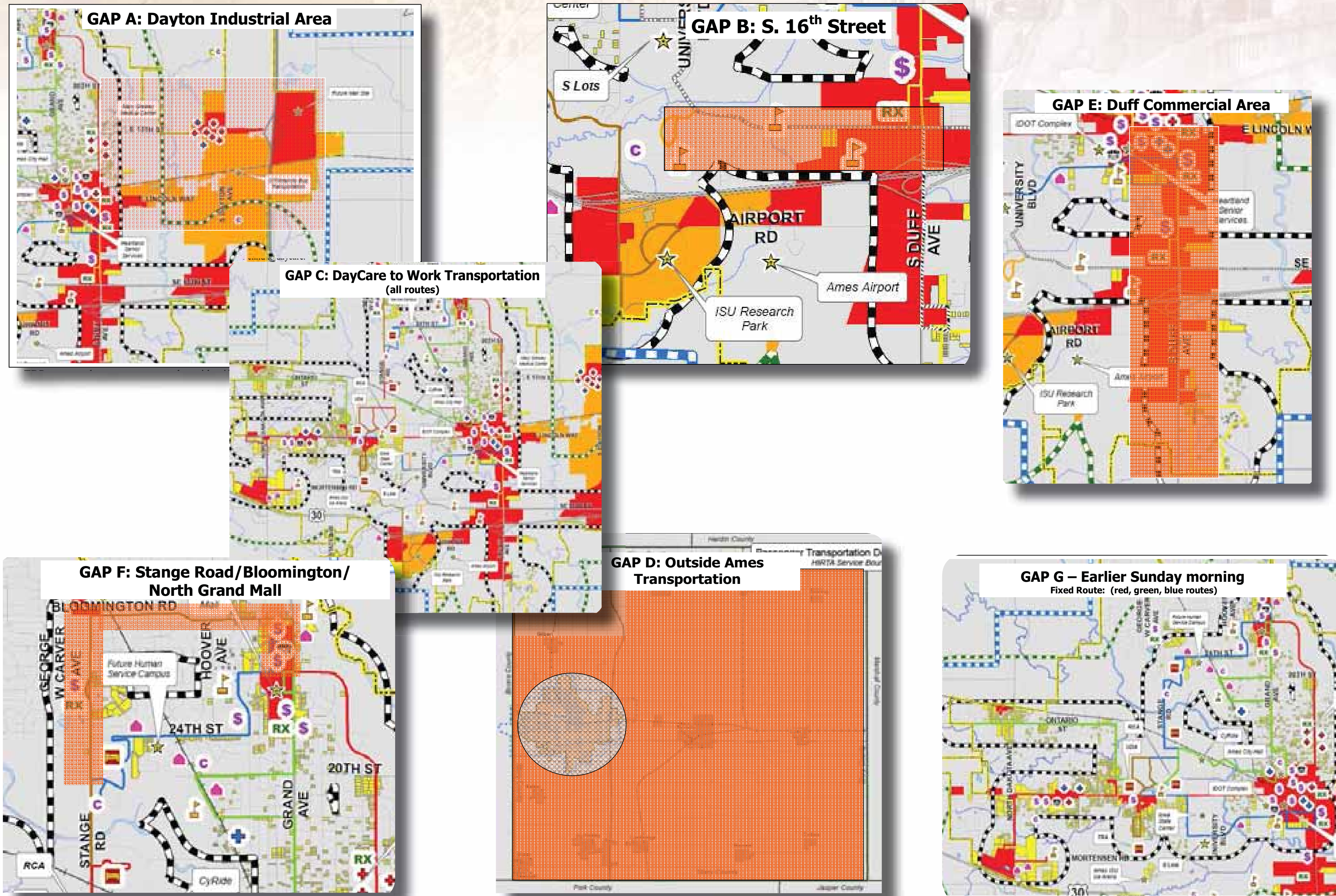
Based on the inventory completed for the PLOS evaluation, a total of approximately 57 miles of additional sidewalk would be needed to complete the sidewalk network for all the roadway segments evaluated (this length accounts for sidewalks missing on each side of the street); approximately 35 miles of sidewalks are needed on those roadway segments that do not currently meet or exceed the PLOS standard of "C". These segments are illustrated on **Figure 5.6**. However, it should be noted that sidewalks may not be warranted on all facilities (or on both sides of all facilities) if the facility is in a more rural setting or pedestrian demand is projected to be very low.

TRANSIT SYSTEM

The PTDP reveals several areas of "service gaps" or areas needing service improvement. This section presents these "gaps" which represent service improvement opportunities. These seven gaps are summarized in **Table 5.8** and illustrated on the following page.

Table 5.8. Ames Area Service Gaps Analysis Results

Gap Area/Name	Service Gap	Comments
Gap A: Dayton Industrial Area *Located in the northeast part of the City*	No service in an area with significant commercial and industrial development. A new mall is proposed for the area	This area has been a priority for the previous three years as part of the PTDP process. #10 Pink Route began August 20,2010, offering 6 trips/weekday.
Gap B: South 16th Street *Located on South 16th between South Duff Avenue and University Boulevard.*	The area is not conveniently reached by transit. There is currently hourly service during the midday. More frequent service during more times of the day is needed.	
Gap C: Day Care to Work Transportation *Applies to all routes, city-wide.*	The current service levels in the system do not make trips to day care as part of a work trip very practical. People who wish to take their child to day care find it difficult to "drop off" the child and then continue on their way to work on transit. The overall system frequencies of 20 to 40 minutes make such combined trips nearly 90 minutes to complete.	
Gap D: Outside Ames Transportation	Travel options from outlying areas into the city for medical and shopping trips are limited.	The highest priority service for the 2010 PTDP was service between Ames and medical services located in Iowa City and Des Moines. HIRTA provides service each Tuesday and Thursday via JARC New Freedom funding.
Gap E: Duff Commercial Area *South Duff Avenue from East Lincoln Way to the city's southern boundary.*	Currently service in this corridor is infrequent with large gaps in service hours.	South Duff Avenue is one of Ames' major commercial areas.
Gap F: Stange Road/Bloomington/ North Grand Mall	Continuation of services previously funded under Job Access Reverse Commute (JARC) funding.	JARC funded services relieved high capacity loads on buses.
Gap G: Earlier Sunday Morning Service *(Red, Green and Blue routes)*	Provide Sunday service before the current 9:00 am start time.	Implemented earlier trip on Green Route due to public request in 2009.



Source: Ames Area 2010 Passenger Transportation Development Plan, April 2009, pages 39 to 45.