PB 100 YEARS

LSL Planning, Inc.

The City of Ann Arbor Transportation Master Plan Update

2009 Transportation Plan Update

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Chapter 1: Executive Summary

The City of Ann Arbor Transportation Plan Update serves as a guide for improvements to the City's system of roads, sidewalks, paths, bike lanes, and public transit for the next twenty years. The Plan addresses and reflects the City's continued emphasis and expansion of existing transportation policy, which was adopted in the 1990 Transportation Plan. The policy was to manage the system and the demands on it. The new policy is to acknowledge that growth is occurring and to accommodate that positive growth, which includes development and redevelopment. This must be handled in a manner that achieves the City's vision for transportation and includes all forms of mobility. New demand will be captured relying on a variety of modes (autos, transit, and active travel systems). All of the travel options will contribute to a healthy, vibrant community with safe and efficient travel choices for its residents, workers, and visitors. The City's vision is to become more transit-oriented, bike-friendly, and pedestrian-friendly, and less reliant on fuel consumptive forms of motorized travel.

Long ago the City realized that the land use in Ann Arbor precludes widening the streets. Ann Arbor does not desire to tie up scarce and valuable land resources in streets and surface parking in the key activity areas. The City reinforces, encourages, and supports the full gamut of travel options. There are real environmental benefits which accrue to communities with multiple travel options, compared to those that rely on an automobile dominated system. The automobile is not the most preferred option to accommodate future demand. The City embraces policy and programs to broaden the options as well as increase the reliance on "Green Transportation".

Ann Arbor is a city with a transit system that allows residents and visitors to leave their vehicles and use public transit, or walk and bike safely and comfortably. Ann Arbor is a place that has a civic-minded, creative populous that embraces their community, seeks to lessen their impact on the environment, and protects and enhances its resources for future generations.

This Plan intends to continue the movement of the City into the future with this long-range vision in mind. It is expected to evolve over time, with the short-, mid- and long-range recommendations summarized herein to be implemented over the course of the next 20 years. It is the long-term possibility of public transit in the form of both bus and rail, that when coupled with smart land use policies and urban design, will synthesize into an urban, pedestrian environment and an improved quality of life, both ecologically and economically.

The expected result of any transportation plan is a list of recommendations to meet existing and future transportation needs. This plan provides recommendations over the next twenty years, including what department should lead, when the recommendation should be implemented, and why the recommendation was made. This Transportation Plan Update is an element of the City of Ann Arbor's Master Plan. The recommendations included within this plan are intended to provide policy guidance when making future transportation investments and decisions. The Transportation Plan, as an element of the City's Master Plan provides guidance regarding transportation-related issues, is supported by the Non-motorized Plan, and is intended to complement the recommendations of land use elements (area plans) of the City's Master Plan.

Plan Goals

"An integrated multi-modal system that will build upon the unique qualities of each part of the city" is the City of Ann Arbor's vision for its transportation system. To achieve this vision, the transportation plan is focused on meeting the needs of all transportation users: pedestrians, bicyclists, transit users, commercial trucking, and motorists.

The City of Ann Arbor is highly active in transportation planning, both locally and within the region. They participate in the Washtenaw Area Transportation Study (WATS) and Southeast Michigan Council of Governments (SEMCOG), as well as support the Ann Arbor Transportation Authority (AATA). As part of this comprehensive plan update, all of the existing land use and transportation plans were reviewed at the beginning of the planning process, and key elements have been incorporated into this draft Plan.

These plans, along with input from the public, city staff, officials and the Steering and Advisory Committees, were the basis of the Plan goals. These goals were presented at public workshops and refined throughout the process. The goals are to:

1. Provide effective access and mobility for people and goods, with minimal negative impacts for all.
2. Protect and enhance the natural environment and energy resources, and the human and built environment.
3. Promote a safe, secure, attractive, and productive transportation system.
4. Invest in transportation infrastructure in a manner consistent with other goals, and within the financial constraints of public/private resources.
5. Promote cooperation between the City of Ann Arbor and other governmental entities, particularly the surrounding townships and municipalities and the University of Michigan, in support of transportation initiatives in a manner consistent with the other goals.
6. Ensure that meaningful public involvement will be part of any transportation project in the City of Ann Arbor.
7. Promote a transportation system supportive of and integrated with land use decisions.
8. Promote green transportation improvements to reduce vehicle emissions.

These goals have been synthesized into the recommendations.

Previous and Existing Plan Recommendations

Vital to updating the Ann Arbor Transportation Plan was a review of recommendations from previous and existing plans. Included in this review were the City of Ann Arbor 1990 Transportation Plan, the Washtenaw Area Transportation Study 2030 Regional Transportation Plan, the City Non-Motorized Plan, the Northeast Area Transportation Plan, the AATA Transit Service Design Report, and other plans. These were key plans for review and development of the Transportation Plan Update.

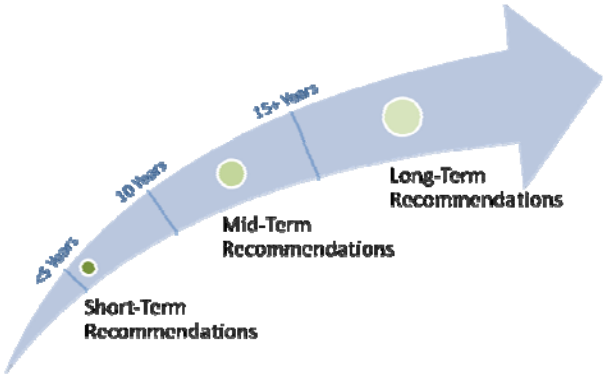
Recommendations by Time Frame

Based on the previous and existing plan recommendations and the analysis of new data an updated transportation plan was created. Recommendations are prioritized by short-, mid-, and long-term timeframe, reflecting the goals and vision supported by city policies for transportation in Ann Arbor as identified in Chapter 2. This prioritization is essential to guiding the city's capital budget decisions to assign resources for implementation, especially when resources for

transportation projects are scarce. As more of these recommendations are implemented over the next 20 years, Ann Arbor's vision for an integrated multi-modal transportation system will be increasingly evident. However, some priorities may need to be shifted over time as transportation data are updated, new development changes transportation needs, or funding becomes available for specific initiatives.

The short-, mid-, and long-term time periods also reflect the existing and proposed future land use plans for Ann Arbor. Since transportation investments influence land use (and vice-versa), transportation and land use recommendations are inextricably tied in charting the course of the city's development. The plan carefully examines the current and future land use patterns and development design along corridors identified for enhanced transit service to ensure sustainable, effective transportation investment. As reflected in the recommendations, developing corridors will include pedestrian-, bicycle-, and transit-oriented design and development. Coordinated with multi-modal transportation investment, these changes will act as economic development catalysts, and facilitate public and private improvements to support a shift away from single-occupancy automobile trips.

Figure 1-1: Recommendations Time-Frame



Chapter 3 provides short-, mid-, and long-term recommendations that have been identified as a result of this plan. A short description of each suggested improvement is given, as well as the location and estimated cost. A lead agency that would be responsible for the coordinating and encouraging the implementation of each recommendation is also identified here. The recommendations made in this chapter should be implemented with a coordinated effort including stakeholders, citizens, and government agencies.

A more detailed description of each recommendation, as well as the analysis that support them is available in Chapter 6. The methodology followed for this analysis is also available in Appendix D.

Short-term (<5 Years) Recommendations

The short-term time period reflects existing land use in Ann Arbor and anticipated land use changes over the next five years. This change will occur with both new development as well as increasing redevelopment. Recommendations for this period include the completion of projects that have already been planned and programmed, including those listed in the transportation improvement program (TIP), such as the Washtenaw Avenue off-road path. They also include the implementation of new projects that can be executed with relative ease, such as the addition of bicycle lanes to some city streets.

It should be noted that land use is dynamic and will change even in the short-term. Short-term land use and transportation decisions affect the ability to implement the longer term recommendations that will achieve the city's vision for transportation.

Mid-Term (5-10 Years) Recommendations

Mid-term recommendations represent the time period from five to ten years in the future. During this time period, it is expected that the land use density in Ann Arbor will continue to change and the density and diversity of development is increased in strategic locations, the need for alternative means of transportation will become even more vital. The recommendations found here will continue to develop the diversification of Ann Arbor's transportation system by emphasizing non-motorized and transit modes while also maintaining efficiency in the roadway network.

Long Term (>10 Years) Recommendations

The long-term time period represents the time period of more than ten years in the future. There will be additional land use changes in the community. Thus, the transportation recommendations in this section are made with a future land use in mind.

During this future time period the densification of downtown and the orientation of development along designated corridors will result in a transportation system balanced with land use planning and development. Transit, bicycle, and pedestrian users will be provided equal consideration with auto users within the city. Recommendations within this section are made with the idea of all users being able to use any of the corridors within the city for their transportation needs.

A full set of recommendations were made for each time frame and then combined into a full set of recommendations. The highlights of these recommendations are shown in Table 1-1 and on Figure 1-2.

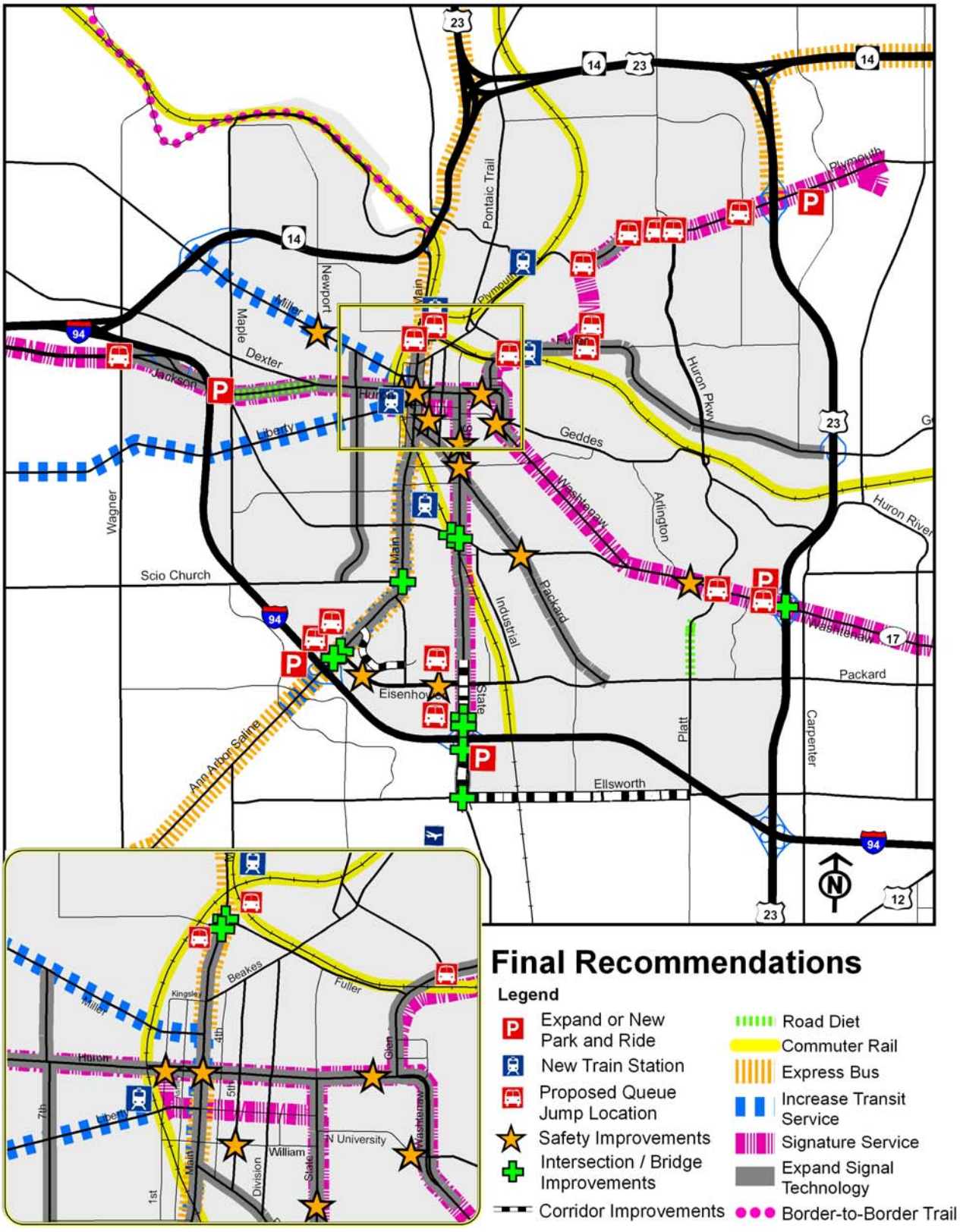
Table 1-1: Ann Arbor Transportation Update Recommendations

INTERSECTION AND ROAD IMPROVEMENTS
• Conduct Road Diet feasibility studies and implement recommendations for Platt Road from Packard to Huron Parkway • Conduct/Construct corridor study improvement along Ellsworth Road between State to east of Platt Road • Expand Signal Technology/SCOOT along Geddes/Fuller, Packard, Seventh, State Road, S. Main-Ann Arbor-Saline-N. Main, and Huron-Jackson • Assess State Street Corridor between Hill Street and North University • Re-time and coordinate traffic signals (Huron Street between 7th and Glen; Washtenaw between NB US-23 Off-ramp and Carpenter; Packard/Hill/Stadium/Arbor; Main/Depot; Main/Summit; WB I-94 Off-ramp/State; and EB I-94 Off-ramp/State) • Intersection improvements at Ann Arbor-Saline at Eisenhower/I-94; N. Main at Depot; I-94 EB Off-ramp at State Street; Platt and Washtenaw; and Scio-Church at S. Main • Completion of Oakbrook Drive • Nixon Road Corridor Study between Huron Parkway and M-14 • Stadium Boulevard Bridges (over State and Ann Arbor Railroad) • Corridor Study as part of safety recommendation for State between Hill and Huron • Signal Warrant Analysis recommended as part of Safety Recommendations (Church Street/N. University; Northbrook Place/Eisenhower Parkway; Plaza Drive/Eisenhower Parkway; Miller/Newport; Platt/Washtenaw; and State/S. University) • Study of management and enforcement of commercial vehicles in the downtown • Evaluate/Design/Construct State Road Improvements from Eisenhower to Ellsworth (signalize and coordinate NB State Street/Victors Way and SB State Street/Hilton with adjacent signals, as well as interchange redesign at State Road/I-94) • Assess interchange redesign at US-23 and Washtenaw Avenue • Assess potential for "Place Based" tax increment funding for corridor enhancements (can be used for transit infrastructure, parking, etc.)
TRANSIT
• Study and implement improved service opportunities for high-quality transit on signature transit corridors identified (Plymouth-Fuller, State, Washtenaw, and Jackson) • Evaluate and install Signal Priority Equipment on AATA fleet of busses • Evaluate and construct queue-jumping lanes (Washtenaw between US-23 and Platt; Ann Arbor-Saline at I-94 and Eisenhower; Maiden Lane/Fuller/Geddes; Plymouth and I-94; Plymouth/Murfin • Implement AATA's recommended service for more frequent service along Ann Arbor-Saline, Jackson/Dexter, Miller/Liberty; and Washtenaw • Improve AATA stop amenities along Routes 4, 9, 16, 18, and 36 • Construct Park and Ride / Interceptor Lots • Support the expansion of Commuter Express Bus Program to/from western Wayne County from/to Ann Arbor, and to/from northern Washtenaw/Livingston County from/to Ann Arbor, and to/from Saline to Ann Arbor • Study relocation of Amtrak Station from Depot Street to Fuller Road and a new train station at the football stadium • Implement regional service from Park & Ride lots to downtown • Coordinate and construct stations for WALLY & Ann Arbor to Detroit commuter rail projects • Support the expansion of the Ann Arbor to Detroit commuter rail service to Dexter / Chelsea / Jackson

Table 1-1: Ann Arbor Transportation Update Recommendations Continued

ACTIVE TRANSPORTATION (NON-MOTORIZED)
• Continue to implement recommendations from City's Non-Motorized Plan • Complete Washtenaw Shared Use Path • Complete the Huron River Greenway Border-to-Border (B2B) Trail within Ann Arbor (Non-motorized plan) • Implement pilot projects for new road designs and concepts • Implement minimum levels of service for bike & pedestrian • Review and update City's Non-Motorized Plan • Implement 2010 Campaign Investments
SYSTEM MANAGEMENT
• Adopt access management standards in City Zoning Ordinance • Amend City code to require transportation impact studies for larger developments to evaluate impacts on all modes – travel reduction program • Expand to hire and support a Citywide Travel Choices Coordinator • Review and revise as warranted the City's traffic impact study ordinance • Include access management improvements and continue to implement • Deploy new "intelligent transportation" as part of road improvement and transit projects • Support technology upgrades that enable citizens to receive early information on road congestion, construction/special event delays, parking options, etc. using equipment in their vehicle or on their personal digital assistant (PDA), as a way to reduce emissions
LAND USE
• Update the land use recommendations of the Master Plan to support increased density and mixed land uses in signature transit corridors • Create transit-oriented development overlay districts for signature corridors, to incorporate tools such as density bonuses, design guidelines and building form regulations to guide redevelopment • Amend the Traffic Impact Analysis requirements of the Land Development Regulations to allow trip reduction factors for site design that incorporates plan recommendations • Evaluate the potential for designating signature transit corridors as receiving zones for a transfer of development rights program • Incorporate into the zoning ordinance form-based regulations that support transit and active transportation, such as parking lot placement and build-to lines • Coordinate land use planning with adjoining jurisdictions and County agencies to extend opportunities for transit-oriented development on key transit corridors outside of the city

Figure 1-2: Ann Arbor Transportation Plan Update Recommendations



**Implement bike lane recommendations from the non-motorized plan.*

Cost Estimation

Given these recommendations, a preliminary cost estimate was determined for those recommendations that would require significant funding by time frame. The costs were conceptual and do not include right-of-way acquisition. Chapter 3 provides the estimated costs for each improvement by time frame. A number of additional planning studies would be required to determine the scope of the improvements that will best suit the needs of Ann Arbor and the various travel corridors, as well as the timing of their implementation. The cost estimates have many undefined variables, the biggest of which is the type of transit technology (bus or rail) for the proposed Signature Transit corridors. Another unknown concerning these costs, however, is the future cost of the materials and labor that will be required to bring them to completion.

Table 1-2 below summarizes the cost by time frame as well as agency. It should be noted that the cost to build or operate any of the Signature Transit corridors is not included in the tabulation below.

Table 1-2: Cost Estimate by Time Frame

Time Frame	City of Ann Arbor	AATA**	MDOT	Total Cost
Short-Term (2009-2014)	$14,810,000	$15,069,500	$3,165,000	$33,014,500
Mid-Term (2014-2024)	$63,440,000	$34,221,000	$2,568,000	$100,229,000
Long-Term (2024-2030)	$28,085,000	$13,970,000	$10,000,000	$52,055,000
Total Cost	$106,335,000	$63,260,500	$15,733,000	$185,298,500

**All Costs are in 2007 dollars*
***Costs do not include Signature Transit Capitol and Operating Costs*

Funding

Table 1-3 outlines potential funding sources for transportation improvements in Ann Arbor. More detailed description of the background, funding sources, and eligible uses for the following funding sources related to Federal, State, and Local Programs can be found in Appendix D.

For signature transit improvements, further study – perhaps as part of the alternatives analysis process – will be needed to identify a funding strategy. It is assumed that the State of Michigan would supply a portion of the operating cost as it does now for inter-city Amtrak costs. Additionally, because several of the proposed signature transit corridors would overlap with service provided by University of Michigan Parking and Transportation Services (UM PTS), operating costs for a signature transit service may potentially seek out funding from UM PTS as a replacement for current shuttle service. However, it is beyond the scope of this document to suggest that the signature transit service would replace the current shuttle service.

Therefore, it is unknown what combination of local, state and Federal sources would be needed for signature transit service. The issue should be addressed in finer detail during the Alternatives Analysis process.

Table 1-3: Potential Funding Sources

FEDERAL PROGRAMS	
• National Highway System • Surface Transportation Program • Transportation, Community and System Preservation Program • Congestion Mitigation and Air Quality Improvement Program • Highway Safety Improvement Program (HSIP) • New Starts, Small Starts, Very Small Starts • Rail and Fixed Guideway Modernization • Bus and Bus Facilities • Transportation for Elderly Persons and Persons with Disabilities	• Job Access and Reverse Commute Program • New Freedom Program • Alternatives Analysis • Safe Routes to School • Transportation Enhancement Program • Intelligent Transportation Systems Program • Railroad Rehabilitation & Improvement Financing • Federal High Priority Funds • The Energy Efficiency and Conservation Block Grant (EECBG)
STATE OF MICHIGAN PROGRAMS	
• Michigan Transportation Fund • State Trunkline Fund • Comprehensive Transportation Fund (CTF)	• Transportation Economic Development Fund • Local Bridge Program
LOCAL PROGRAMS	
• Dedicated Transportation Millages • Special Assessments	• Downtown Development Authority • Corridor Improvement Authority
FINANCING	
• Grant Anticipation Revenue Vehicles (GARVEES) • Transportation Infrastructure Finance and Innovation Act of 1998	• State Infrastructure Bank Program • Local Road/Railroad Grade Separation Loan Program • Bonds
COST REDUCTION	
• Advance construction	• Public/Private/Partnerships

Conclusion

Ann Arbor is a city that is approximately five square miles and does not exist in isolation. The Ann Arbor Transportation Plan Update will be used for the City and also to coordinate adjacent transportation opportunities in Southeast Michigan. This plan takes into consideration all users of the transportation system, residents, employees, students, and visitors come from outside the city. This Transportation Plan is conducted with an understanding that the City will commit itself to working with nearby communities to build road, transit, pedestrian, and bike networks that support all users.

The eight goals guiding the development of this transportation plan update range from providing access and mobility to all people, protecting the environment, safety, public involvement, and incorporating land use into the transportation decision process. The eight goals guided the development of all the recommendations presented in this Plan and none of these recommendations contradict the goals presented in this Plan.

Chapter 2: Vision, Goals, and Strategies

A Vision for Ann Arbor's Transportation System

"An integrated multi-modal system that will build upon the unique qualities of each part of the city" is the City of Ann Arbor's vision for its transportation system. To achieve this vision, the transportation plan is focused on meeting the needs of all transportation users: pedestrians, bicyclists, transit users, commercial trucking, and motorists.

In the past, transportation plans focused solely on transportation solutions. As travel patterns have become more complex; congestion is no longer associated just with trips between home and work in the peak hours. In addition, the public and community officials no longer view the transportation system just as a way of getting around, but as an important ingredient in the city's overall character, economic health and sustainability. The link between transportation and land use decisions has become more obvious, and this plan considers both the transportation consequences and opportunities of various land use scenarios. The city's transportation philosophy is to improve safety, reduce emissions, and reduce congestion not by widening streets, but through a series of transportation improvements and policy changes. The city has an adopted goal of "Supporting a safe and reliable municipal infrastructure." This indicates the priority to maintain the existing system and is related to the first goal below to provide effective access and mobility for people and goods. The city is committed to properly maintain the transportation system currently in place. Many of the recommendations in this Plan incorporate the best transportation and land use principles being used by other progressive cities, but with careful refinement to acknowledge and support the unique qualities of Ann Arbor and the high expectations of its residents, employers and visitors. The Plan directs investment and decision-making toward mobility and accessibility for all user groups, building on the success of the 1990 plan and setting a course for the next 20 years.

The Ann Arbor Transportation Plan Advisory Committee, comprised of representatives from City, County, local agencies, business leaders, and residents, developed a set of goals to drive the recommendations and provide a performance measure for proposed transportation improvements. These goals were presented at public workshops and refined throughout the process. The goals are to:

1. Provide effective access and mobility for people and goods, with minimal negative impacts for all.
2. Protect and enhance the natural environment and energy resources, and the human and built environment.
3. Promote a safe, secure, attractive, and productive transportation system.
4. Invest in transportation infrastructure in a manner consistent with other goals, and within the financial constraints of public/private resources.
5. Promote cooperation between the City of Ann Arbor and other governmental entities, particularly the surrounding townships and municipalities and the University of Michigan, in support of transportation initiatives in a manner consistent with the other goals.

6. Ensure that meaningful public involvement will be part of any transportation project in the City of Ann Arbor.
7. Promote a transportation system supportive of and integrated with land use decisions.
8. Promote green transportation improvements to reduce vehicle emissions.

Supporting the Vision and Goals: Ann Arbor Strategies

To support the vision and goals, several key strategies have been identified to harmonize all **modes** for a sustainable transportation system. Transportation Demand Management (TDM) was a key component of the 1990 plan. Traditionally, TDM involved policies and programs to reduce the number of vehicle trips, especially single-occupant vehicle trips in the peak hour. This Plan Update builds on this foundation for managing travel demand to further advance the city's traveler choices and options to provide a balanced, cost-effective transportation system in the light of projected growth. A revised approach to TDM supplements additional key strategies such as Transit-Oriented Development (TOD), Context Sensitive Solutions (CSS), non-motorized systems, access management, and Transportation Impact Analyses, all described below. The success of implementing this Plan will be directly linked to establishment of city policies and capital investment, as well as policies and capital investment of all public agencies, including the UM, which align transportation and land use decisions with the Plan's recommendations. The strategies in this Chapter are referred to throughout the plan as the rationale for intersection, street, and transit improvement projects and as the tools for implementing recommendations to meet Plan goals, and provide traveler choices to all.

What is a Mode?

A transportation "**mode**" is, simply put, a type of travel. A mode can be walking or biking, driving a car or truck, riding a bus or other transit facility, or using any means of transportation.

Traveler Choices and Options (Transportation Demand Management or TDM)

Consistent with the vision and goals of this plan, improving the city's transportation system requires maximizing the existing automobile facilities while directing more investment to alternate modes. Traveler Choices strategies are critical to running an efficient multi-modal transportation system. A number of strategies developed as part of the North East Area Plan (NEAP) which have been refined and incorporated in Plan update, to be supported through policy and funding decisions, including:

- Employment of a full-time Travel Choices Coordinator for part/all of the city
- Improvement / enhancement of transit development/funding
- Improvement / enhancement of non-motorized network
- Advanced traffic signal technology
- Parking management
- Ridesharing

Building a Sustainable Transportation System

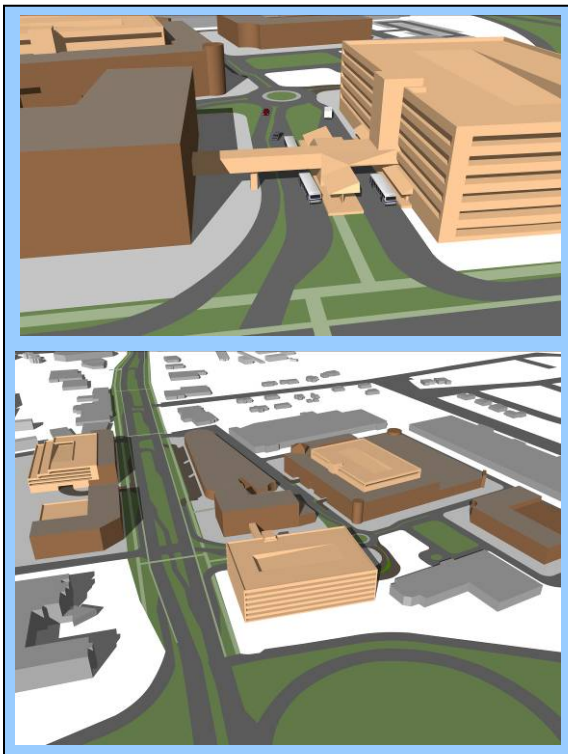
- Encourage walking and biking for better health.
- Make cost-effective investments over the long term.
- Support an efficient transportation system that meets the needs of commerce and helps attract and retain young professionals.
- Reduce the reliance on fossil fuels and reduce carbon footprint.
- Utilize green technologies, such as for signal systems.
- Incorporate environmentally friendly design (street design, re-use of materials, green stormwater).
- Reduce emissions through less congestion and travel by means other than single-occupant automobiles.

- Telecommuting/Alternative work hours
- Urban and building design which encourages transit use, including construction close to the street with parking lots behind.

Transit Enhancements

A key foundation of this Plan is to improve traveler choices, with expansion of transit as an important ingredient to meeting Plan goals. Ann Arbor already has a first-class transit system, especially when compared to other cities of its size. AATA and the U of M have implemented many enhancements to make transit more convenient and accessible such as additional park and ride lots and continuous monitoring of the system to revise routing. Plans are in place to improve the system through "green" buses, additional park and ride lots and potential commuter rail connections to Howell (WALLY), Metro Airport and Detroit. The package of planned improvements will make Ann Arbor even more transit friendly.

But rather than contentment with those improvements to transit already under development, this Plan proposes a more varied transit system, possibly with new types of transit service along "signature corridors" to link key destinations in the city. A separate transit feasibility study is recommended to evaluate options for additional transit such as more frequent bus service, street cars or bus rapid transit for those corridors. Among the factors that will be considered are potential ridership, benefits to economic and environmental sustainability and financial feasibility.

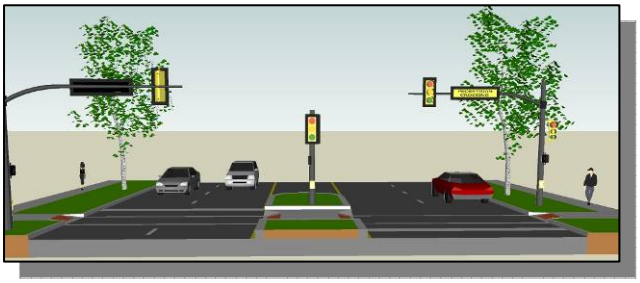


This Washtenaw/US-23 interchange area simulation illustrates one land use-transportation intensification concept with infill development designed to support increased walking, biking, and transit use with multi-story, mixed-use buildings, structured parking, and integral transit facilities.

One approach to support viable transit, especially along those signature corridors, is for more transit-friendly land uses and design, sometimes called Transit-Oriented Development or Transit-Oriented Design (TOD). Ann Arbor already has many transit-oriented areas – downtown, U of M campuses, some compact neighborhoods. But there are opportunities to gradually make those signature corridors more transit friendly through the following actions:

- Use zoning to restrict additional development of auto-related design such as gas stations, office buildings, or large shopping centers with large amounts of parking in the front. Instead, zoning should encourage more compact development, with buildings closer to the street to increase traveler choices by making it more convenient for walkers, bicyclists and transit riders.

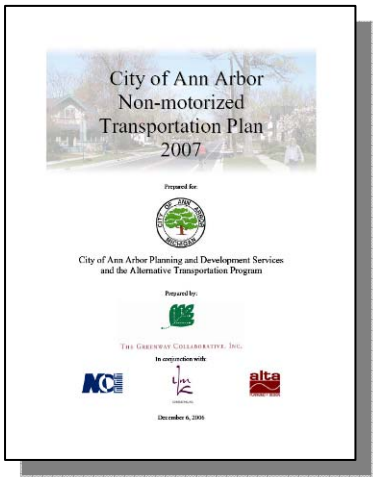
- Provide an inviting environment for walking with pedestrian-oriented design. That would include buildings closer to the street, streetscape amenities, and convenient pedestrian connections between uses and transit stops.
- Promote residential and employment densities that support transit for development and redevelopment. This could mean minimum heights rather than maximum heights, and mixed use rather than single-use developments (example, a multistory building with commercial on the first floor and offices or residential above instead of single- story commercial).
- Decrease required parking needs as transit availability increases at each location. Parking could be located in the rear, sides or even in parking structures to make development more compact. Employers could offer incentives to encourage employees to use transit rather than park on site.
- Use zoning revisions through a corridor overlay district or a more "form based" rather than "use based" approach to support transit, along with walking and bicycling. A model overlay TOD zoning district is included in Appendix A.
- Use density bonus incentive in City code for developments within ¼ mile of transit routes.
- Promote transit corridors as an attraction for employers looking to locate in the city, as a way to accommodate new employees and visitors without increasing congestion, emissions and other environmental consequences of single occupant auto travel.



A mid-block pedestrian crossing, shown above, is one example of a street design element that provides a supportive environment for pedestrians and promotes transit as a viable, safe option for travelers.

Active Transportation (Non-Motorized Transportation Systems)

The city's position on non-motorized transportation is best summarized in the 2007 Non-Motorized Transportation Plan. It maintains three primary goals:



1. To integrate planning practice with non-motorized policies.
2. To develop a comprehensive non-motorized network as part of the city's overall system.
3. To raise awareness of the benefits of non-motorized transportation on the quality of life and the environment.

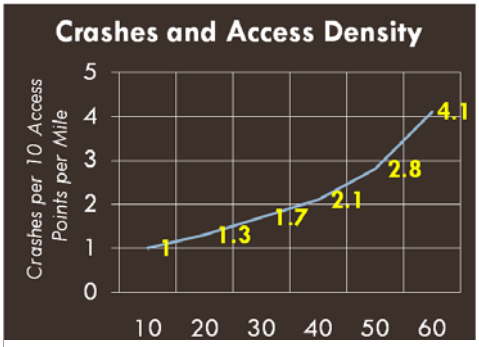
Together, these statements support the city's policies to elevate the importance of non-motorized modes of travel so they are equal to other modes that must be accommodated. In other words, the City of Ann Arbor is developing and maintaining a transportation system where investment and priority is spread across all modes.

As such, the city's Non-Motorized Transportation Plan includes policy recommendations to include non-motorized elements in the design of all future street projects, and/or to be accepting of reductions to vehicular Levels of Service if it is necessary to accommodate non-motorized enhancements. The city's Non-Motorized Transportation Plan aims to educate its citizenry toward

better understanding of the physical, mental and environmental benefits of non-motorized travel, as it can reduce noise, water and air pollution, encourage healthier living, and provide a more sustainable transportation system. It is also necessary to serve the city's growing senior population. The percentage of residents over the age of 60 increased from 9.7% in 1990 to 10.6% in 2000, and continues to grow. There are health benefits to all with non-motorized options of walking and biking regardless of age. As it does, additional non-motorized travel options will be required to assure these residents maintain a high level of accessibility and quality of life. This transportation plan supports those recommended policies.

Access Management

Numerous studies in Michigan and nationwide have shown that a proliferation of driveways or an uncontrolled driveway environment can increase the number or severity of crashes, reduce capacity of the street, and may create a need for more costly improvements in the future. Excessive access points also make streets less safe and inviting for pedestrians and bicyclists. Ann Arbor has several streets where the number and location of access points have a noticeable influence on traffic flow, such as along segments of Packard, Jackson, State, and Plymouth.

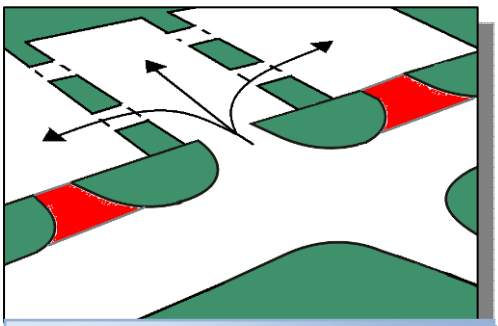


Data from the National Highway Institute.

Access management involves a series of tools to reduce crash potential, maximize street capacity and improve corridors for transit, bicyclists, and pedestrians. These tools are implemented through the regulation of number, spacing and design of access points.

Ann Arbor participated in the preparation of a corridor access management study for the Jackson / Huron / Washtenaw Corridor *(Washtenaw County Access Management Plan - WCAMP)*. This plan incorporates the specific recommendations of that plan, but expands the scope to include all the major streets in the City. The City crafted a city-wide access management zoning ordinance amendment to implement recommendations and establish general standards for access management. As other major corridors in the City require reconstruction or improvement, similar studies should be prepared in advance of final design.

Optimum driveway spacing reduces the amount of information a driver must process and improves driver reactions. Adequate spacing between driveways and unsignalized roadways (or other driveways) can reduce confusion that otherwise requires drivers to watch for ingress and egress traffic at several points simultaneously while controlling their vehicle and monitoring other traffic ahead and behind them. Reducing the amount of information related to selecting an access point and avoiding conflicting turns and traffic provides greater opportunity to see and safely react to non-motorized and transit users both on- and off-street.



One key access management principle is sharing driveways and promoting cross-access connections between adjacent properties.

Access Management Principles.
To achieve the typical benefits of access management, access standards and practical application of access management must recognize the following principles:

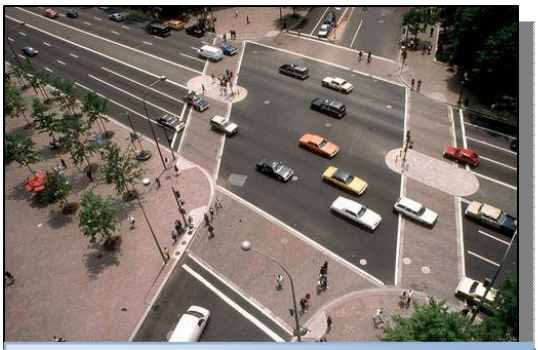
- Locate driveways away from intersections.
- Consolidate and eliminate driveways wherever feasible to increase driveway spacing.
- Establish shared access connections wherever feasible to promote cross-access and reduce individual access points.
- Relocate or eliminate driveways with poor offset spacing from driveways on the opposite side of the street.
- Design driveways to meet the needs of pedestrians, bicyclists and motorists.

Implementation. This Plan promotes access management implementation generally in two ways: as part of street reconstruction or improvement projects, or interpretive application of access management standards as sites are developed or redeveloped. While City-wide access management standards recommended in the zoning ordinance amendment are based on national research and the Michigan Department of Transportation (MDOT) Access Management Program, the recommended regulations include an inherent acknowledgement that the built-out character of Ann Arbor's major streets will require application of recognized access management principles on a case-by-case basis.

While individual land owners may see the regulations as a burden to access, a well managed access system will improve access to properties and maintain travel efficiency, enhancing economic prosperity of local businesses. Chapter 3 makes specific recommendations related to access management in Ann Arbor, including recommended zoning ordinance amendment language (located in Appendix A) to establish standards and guiding principles for implementing access management on the City's major streets.

Context Sensitive Solutions (CSS)

Since the 1990 Plan, Context Sensitive Solutions (CSS) emerged as a process to better ensure transportation improvements complement the character (or context) of the vicinity. The Federal Highway Administration (FHWA) defines CSS as a "collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility."



Enhanced crosswalks are supported by CSS principles by placing equal emphasis on pedestrians, bicyclists, and autos, which is integral to the character of Ann Arbor's streets.

Conventional street design standards define features such as minimum lane width, design speed and minimum parking supply. A traditional engineering approach reflected the assumption that bigger and faster is better, resulting in wider roadways and higher design speeds. Ann Arbor has taken a different approach, applying many of the CSS principles before they came into vogue.

While safe and efficient travel for automobiles and commercial traffic is always a component of street improvement projects, the city has balanced those needs with the needs of transit, walkers, and bicyclists. Examples includes the narrowing of lanes and other design features to calm traffic

speeds along Platt Road, and the use of micro roundabouts in neighborhoods as a method of traffic calming.

As new projects are designed, the city will continue to consider all users. In addition, Ann Arbor will continue to promote public awareness and input during the design process, a feature of its CSS-based approach.

Green Transportation

Virtually all of the various Ann Arbor planning documents have a common goal related to a reduction in negative environmental impacts and "sustainability". An environmentally friendly approach to transportation is an ingredient in implementation of those goals. Through various workshops and public forums conducted as this plan was prepared, there was frequent expression that Ann Arbor's transportation plan should promote environmental goals through its policies and recommendations. In 2005, Mayor Hieftje announced his Green Energy Challenge, calling for municipal use of at least 20% "green energy" by the year 2010 and for city-wide use of green energy by the year 2015. As of June, 2006, 14.7% of the city's energy was from green sources. The elements listed below intend to further this goal:

Streetscape enhancements improve aesthetics, provide public spaces, and serve adjacent land uses.

- Reduce automobile use by offering more attractive choices for walking, bicycling and transit.
- Accommodate planned growth without an increase in vehicle use or greenhouse gas emissions through promotion of other modes of travel and more compact, mixed use development.
- Reduce emissions through improved traffic flow. This can include select intersection improvements, improved signal timing coordination, and ever improving technology. Technology (including on board systems) can direct motorists to their destination, available parking, and alert them of incidents or construction so those potentially congested areas can be avoided.
- Recycle materials and use of recycled materials, when practical.
- Use landscaping generously, such as in medians and along the street edge to filter runoff and reduce the "heat island effect".
- Deploy more energy efficient vehicle fleets and lighting.
- Use best management practices and Low Impact Design techniques for stormwater runoff from streets, and other transportation infrastructure such as park and ride lots.. Low Impact Design considers use of individual stormwater systems that include design elements such as reduced impervious surfaces, functional grading, open channel sections, disconnection of hydrologic flowpaths, and the use of bioretention/filtration landscape areas.
- Assess alternative transportation on an ongoing basis, through use of surveys and bicycle/pedestrian counts.
- Offer priority parking or pricing to "clean" vehicles such as electric cars, hybrids, shared rental cars, and carpools.

- Pursue alternative energy sources for transportation vehicles, signs, parking equipment, and lighting such as solar and hydro-power or wind energy.

Transportation Impact Analysis and Trip Reduction Factors

In order for transportation impacts of proposed development to be anticipated and mitigated, it is important to understand how many new "trips" will be generated, and how those trips will impact the transportation system. City policy requires a transportation impact study be prepared by a developer for any project that would generate 50 or more directional (one-way) trips in the peak hour or 500 trips expected in an average day. Guidelines for preparing transportation impact studies have been established by the "Evaluating Traffic Impact Studies: A Recommended Practice for Michigan Communities," the Institute of Transportation Engineers (ITE) Trip Generation Manual, and other handbooks. Traditionally, these studies have focused on traffic impacts and what improvements are needed to retain a certain "acceptable" level of traffic operations (LOS). Ann Arbor's philosophy to harmonize the needs of all users (motorists, pedestrians, bicyclists, transit users) calls for refinement of this practice.

This plan recommends the traffic impact study requirement be expanded to require evaluation of all modes of transportation when analyzing transportation impacts of a proposed development. This process should require developers to demonstrate not only the traffic impact and improvements to reduce that impact to meet the City's operational standards, but also how vehicle trips, especially those in the peak hour, will be reduced through demand management, mixed-use, transit- and pedestrian-oriented design elements. The developers need to address the availability of other transportation modes such as transit, walking, or bicycling to the site. Examples of these reductions include designing a development to include retail, office, and residential uses on one site to provide the ability for travelers to replace auto trips between uses with walking trips, and designing strong physical links between the site and transit facilities, pathways, and other facilities. Some other examples could include carpool parking spaces, shared rental car facilities, and contributing funds to extend bus service to the site, to name a few. In addition, the transportation impact studies should evaluate the number and placement of access points, including alternatives that would benefit the public and still provide reasonable access to the property. Model language for Transportation Impact Analyses and requirements are included in Appendix A.

Conclusion of Ann Arbor's Support for the Vision and Goals

The City of Ann Arbor demonstrates a long term and genuine commitment to environmental and sustainability objectives. The City has taken many actions that complement and support green house gas reductions that coincide with the proposed actions of this transportation plan update. The following various plans/reports have supported these green house gas reduction actions: The Model for Mobility, the Non-Motorized Transportation Plan, the Green Energy Challenge, the Clean Cities Coalition, the A2D2 study, as well as others.

Chapter 3: Action Plan Recommendations

Recommendations for Ann Arbor

The expected result of any transportation plan is a list of recommendations to meet existing and future transportation needs. This chapter details recommendations over the next twenty years, including what department should lead, when the recommendation should be implemented, and why the recommendation was made. The Transportation Plan Update is an element of the City of Ann Arbor's master plan. It will be used to guide transportation and transportation-related decisions within the City and to areas outside of the City. The recommendations included within this plan are intended to provide policy guidance when making future transportation investments and decisions.

The overarching theme for recommendations is that roadways should not be reserved just for motorized vehicles, but should encompass and accommodate all modes of transportation. Improvements in corridors should not be for the sake of vehicle mobility, but instead should enable people to access their destination regardless of their chosen mode of travel.

Because the City of Ann Arbor desires a transportation system with an emphasis on utilizing all modes of transport, many of the refined recommendations found in this chapter have been made with the idea that all modes be considered when assessing a corridor. However, it should be noted that providing this emphasis can not be applied to all corridors, due to various different reasons, including right-of-way constraints, the environment, or the type of facility or roadway.

Corridor Prioritization

Corridors within Ann Arbor were given a prioritization based on the desire that all facets of a corridor should be improved at the same time. Corridors were prioritized by importance in order to coordinate when multimodal improvements should occur. Below is a list of corridors in the priority order with which transportation improvements are important to Ann Arbor. Of course, due to budget constraints and required coordination for certain projects, prioritization cannot always follow the list below. Therefore, this priority list should be considered a guiding tool when considering projects of equal merit, with priority given to the most important corridor.

High-Priority Corridors

The corridors listed here are those that are considered the most important for future transportation to and through the city. They are considered vibrant gateways to the city, but some are congested especially during the morning and evening peak hours. Thus, these corridors should receive the greatest analysis when considering transportation and development projects.

- State Street
- Washtenaw Avenue
- Plymouth Road
- S. Main Street/Ann Arbor-Saline Road

- N. Main Street
- Fuller-Geddes Road
- Ellsworth Road

Medium Priority Corridors

Medium priority corridors are those that are important to the overall transportation health of the city, but have a lower priority and should be considered only after considering projects on the high-priority corridors. Some of the projects associated with these corridors are actually recommended to advance during the short-term time frame even though they are medium priority corridors, these corridors are listed below.

- Jackson Avenue
- Dexter Avenue
- Packard Street
- Liberty Street
- Huron Street
- Miller Avenue
- Stadium Boulevard
- Eisenhower Parkway
- Platt Road
- Scio Church Road
- Maple Road
- Huron River Parkway

Low Priority Corridor

Low priority corridors are those that are important to the overall transportation health of the city, but either do not have recommendations or have projects that are less important than on some other corridors. Even if they do not have projects currently listed, they are still listed here because there is potential for projects to change in the future.

- Newport Road
- Pontiac Trail
- Stone School Road
- Nixon Road
- E. Huron River Drive
- Seventh Street
- Green Road
- Dhu Varren Road
- Broadway Street

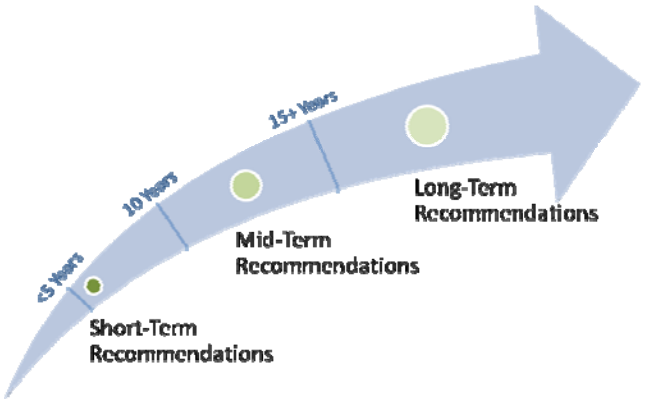
Recommendations by Time Frame

Recommendations in this chapter are prioritized by short-, mid-, and long-term timeframe, reflecting the goals and vision supported by city policies for transportation in Ann Arbor as identified in Chapter 2. This prioritization is essential to guiding the city's capital budget decisions to assign resources for implementation, especially when resources for transportation projects are scarce. As more of these recommendations are implemented over the next 20 years, Ann Arbor's vision for an integrated multi-modal transportation system will be increasingly evident. However, some priorities may need to be shifted over time as traffic data are updated, new development changes transportation needs, or funding becomes available for specific

initiatives. It may appear to be a time-specific plan, but initiatives and/or opportunities may reprioritize this list over time.

The short-, mid-, and long-term time periods also reflect the existing and proposed future land use plans for Ann Arbor. Since transportation investments influence land use (and vice-versa), transportation and land use recommendations are inextricably tied in charting the course of the city's development. The plan carefully examines the current and future land use patterns and development design along corridors identified for enhanced transit service to ensure sustainable, effective transportation investment. As reflected in the recommendations, developing corridors will include pedestrian-, bicycle-, and transit-oriented design and development. Coordinated with multi-modal transportation investment, these changes will act as economic development catalysts, and facilitate public and private improvements to support a shift away from single-occupancy automobile trips.

Figure 3-1: Recommendations Time-Frame



Tables 3-1 through 3-3 outline the short-, mid-, and long-term recommendations that have been identified as a result of this study. A short description of each suggested improvement is given, as well as the location and estimated cost. A lead agency that would be responsible for coordinating and encouraging the implementation of each recommendation is also identified here. The recommendations made in this chapter should be implemented with a coordinated effort between stakeholders, citizens, and government agencies.

A more detailed description of each recommendation, as well as the analysis that support them is available in Chapter 6. The methodology followed for this analysis is also available in Appendix D.

Short-term (<5 Years) Recommendations

The short-term time period reflects existing land use in Ann Arbor and anticipated land use changes over the next five years. These recommendations do not include those projects that have already been planned and programmed, including those listed in the regional transportation improvement program (TIP), such as the Huron River off-road path. They also include the implementation of new projects that can be executed with relative ease, such as the addition of bicycle lanes to some city streets. Table 3-1 summarizes the recommendations and then following the table there is more description on most of the recommendations. Figure 3-2 illustrates these recommendations following Table 3-1.

Table 3-1: Short-Term Recommendations

Short-Term Recommendations				
	Improvement	**Location**	**Cost**	**Lead Agency**
Roadway Improvements				
1	Assess State Street Corridor between Hill Street and North University (Page 6-10)	State between Hill and North University	$25,000	Ann Arbor
2	Conduct Corridor Study along Ellsworth Road between State to east of Platt Road	Ellsworth between State to east of Platt	$70,000	Ann Arbor
3	Conduct Downtown Circulation Study, if needed, after implementation of Fifth / Division improvements	Downtown	$100,000	Ann Arbor
4	Expand Signal Technology / SCOOT (Page 6-13)	Fuller / Geddes (14 signal)	$700,000	Ann Arbor
5	Expand Signal Technology / SCOOT (Page 6-13)	Packard (12 signals)	$400,000	Ann Arbor
6	Expand Signal Technology / SCOOT (Page 6-13)	Seventh (6 signals)	$400,000	Ann Arbor
7	Support US-23/M-14 ITS and MDOT Courtesy Patrol expansion between I-96 and Main Street ramps	US-23 / M-14 between I-96 and Main Street ramps	None	WATS / MDOT
8	Completion of Oakbrook Drive	Oakbrook Drive between State and Boardwalk	$2,500,000	Ann Arbor
9	State Street Corridor Study (Eisenhower Parkway to Stimson Street) and Nixon Road Corridor Study	State Street from Eisenhower Parkway to Stimson Street and Nixon Road between Huron Parkway and M-14	$100,000	Ann Arbor
10	Conduct Road Diet feasibility study on relocated Platt Road and work with MDOT on the road diet for Jackson Avenue	Platt Road from Packard to Huron Parkway and Jackson Avenue from Maple Road to Revena Boulevard	$60,000	Ann Arbor
11	Study of management and enforcement of commercial vehicles in the downtown	Downtown Ann Arbor	$75,000	Downtown Development Authority (DDA)

Short-Term Recommendations				
	Improvement	**Location**	**Cost**	**Lead Agency**
12	Assess potential for "Place Based" tax increment funding for corridor enhancements (can be used for transit infrastructure, parking, etc.)	Plymouth, State, Washtenaw, and Jackson Avenue/Maple Road Intersection (primarily west along Jackson Avenue to Wagner Road and north along Maple Road to Dexter Avenue, also considering appropriate segments to the south and east where zoning is currently non-residential)	$25,000	Corridor Improvement Authority, Ann Arbor
Intersection Improvements and Policies				
1	Install SCOOT Traffic Signal (Page 6-6)	- State at Victors Way / Hilton - EB I-94 Off-ramp at State - WB I-94 Off-ramp at State - State and Ellsworth	$200,000 ($125,000 for new signal, $25,000 for existing signal)	Ann Arbor / MDOT
2	Retime and coordinate traffic signals, safety recommendation for Packard at Stadium and Hill at State (Page 6-10)	Packard / Hill / Stadium / Arbor	$20,000	Ann Arbor
3	Investigate possible illegal left-turn maneuvers / intersection study, safety recommendation (Page 6-10)	Platt at Washtenaw	Internal Staff	Ann Arbor
4	Signal Warrant Analysis recommended as part of Safety Recommendations (Page 6-10)	- Northbrook Place at Eisenhower Parkway - Plaza Drive at Eisenhower Parkway - Platt at Washtenaw - Miller at Newport	Internal Staff	Ann Arbor
5	Optimize signal timings (Page 6-6)	- Main at Depot - Main at Summit - WB I-94 Off-ramp at State - EB I-94 Off-ramp at State	Internal Staff	Ann Arbor MDOT

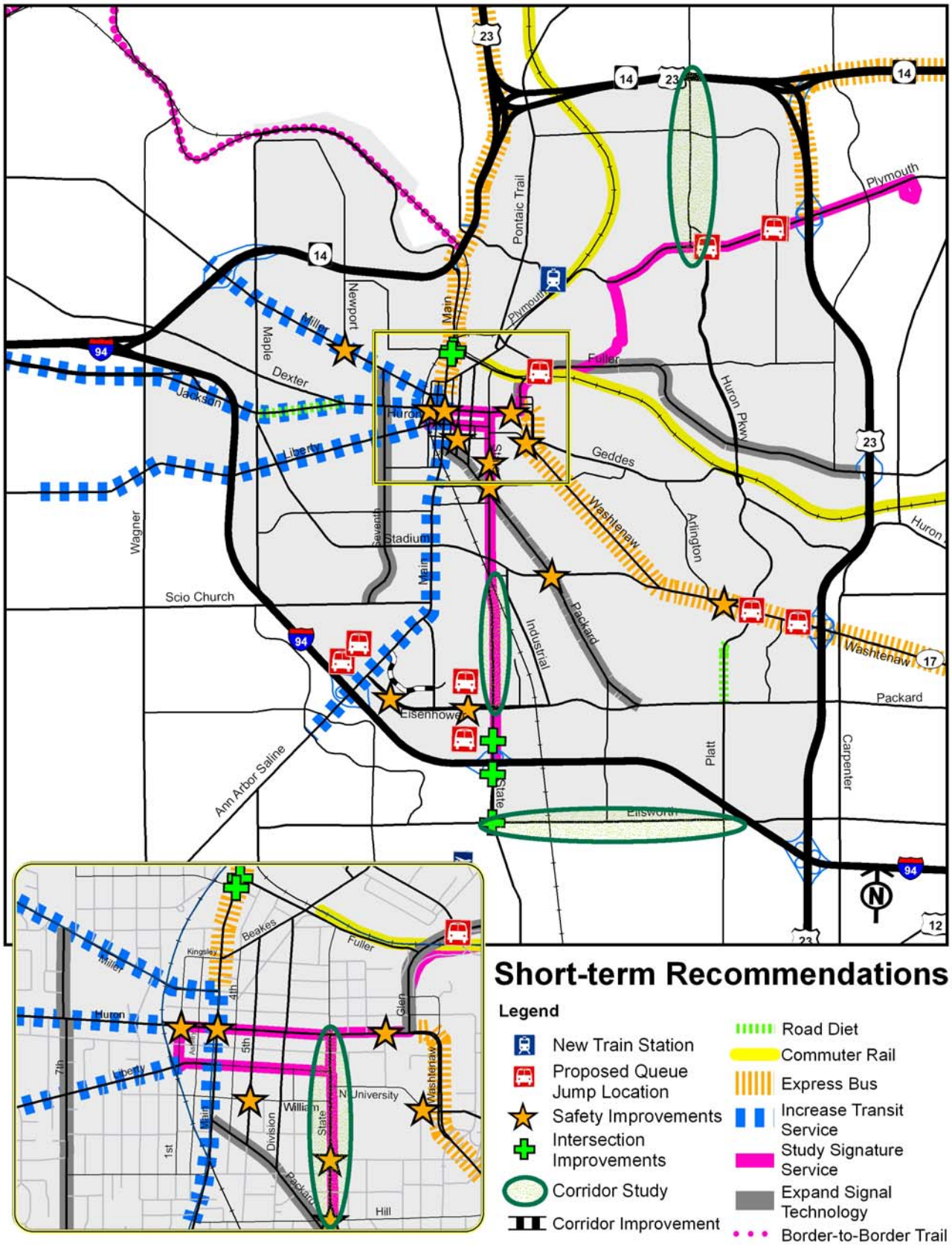
Short-Term Recommendations				
	Improvement	**Location**	**Cost**	**Lead Agency**
6	Signalize and coordinate with adjacent signals (Page 6-6)	- NB State Street at Victors Way - SB State Street at Hilton	$200,000	Ann Arbor
Traveler Choices (Travel Demand Management-TDM)				
1	Amend City code to require transportation impact studies for larger developments to evaluate impacts on all modes – travel reduction program (Page 2-7)	Citywide	Internal Staff	Ann Arbor: Planning
2	Expand to hire a Citywide Travel Choices Coordinator (Page 2-2)	Citywide	$100,000 yearly	Ann Arbor
Access Management				
1	Amend zoning ordinance to include more detailed access management standards (Page 2-5)	Citywide	Internal Staff	Ann Arbor: Planning
2	Evaluate planned street projects to identify candidates for implementation of access management (Page 2-5)	Citywide	Internal Staff	Ann Arbor
Transit				
1	An alternatives analysis is recommended to analyze signature service on Plymouth-Fuller and State Street corridors (Page 6-22)	Plymouth-Fuller/State	$500,000	Ann Arbor
2	Evaluate and install Signal Priority Equipment on busses (Page 6-17)	AATA Fleet	$336,000	AATA
3	Evaluate queue-jumping lanes (Page 6-17)	Washtenaw between US-23 and Platt (3 signalized intersections)	$75,000	MDOT
4	Evaluate queue-jumping lanes (Page 6-17)	Ann Arbor-Saline at I-94 and Eisenhower (2 signalized intersections)	$50,000	Ann Arbor
5	Evaluate queue-jumping lanes (Page 6-17)	Maiden Lane / Fuller / Geddes	$50,000	Ann Arbor
6	Evaluate queue-jumping lanes (Page 6-17)	State between Eisenhower and I-94	$50,000	Ann Arbor

Short-Term Recommendations				
	Improvement	Location	Cost	Lead Agency
7	Evaluate queue-jumping lanes (Page 6-17)	Plymouth and Green Plymouth and Huron Parkway	$50,000	Ann Arbor
8	Construct queue-jumping lanes (Page 6-17)	Washtenaw between US-23 and Platt (3 signalized intersections)	$3,090,000	MDOT
9	Construct queue-jumping lanes (Page 6-17)	Ann Arbor-Saline at I-94 and Eisenhower (2 signalized intersections)	$2,060,000	Ann Arbor
10	Construct queue-jumping lanes (Page 6-17)	Maiden Lane / Fuller / Geddes	$1,030,000	Ann Arbor
11	Construct queue-jumping lanes (Page 6-17)	Plymouth and Green Plymouth and Huron Parkway	$2,060,000	Ann Arbor
12	Construct queue-jumping lanes (Page 6-17)	State between Eisenhower and I-94	$2,060,000	Ann Arbor
13	Improve stop amenities on select priority corridors, including improvement of sidewalks (Page 6-28)	Route 4 - Washtenaw (5 major stops – 4.7 miles from AA limits one way)	$123,500	AATA / MDOT
14	Improve stop amenities on select priority corridors (Page 6-28)	Route 36 – State (6 major stops – 4 miles one way)	$135,000	AATA
15	Implement increased frequency on select priority corridors (Page 6-16)	Ann Arbor-Saline	$249,000 yearly	AATA
16	Implement increased frequency on select priority corridors (Page 6-16)	Jackson / Dexter	$124,000 yearly	AATA
17	Implement increased frequency on select priority corridors (Page 6-16)	Miller / Liberty	$249,000 yearly	AATA
18	Implement increased frequency on select priority corridors/possible Express Bus (Page 6-16)	Washtenaw	$373,000 yearly	AATA
19	Support the expansion of Commuter Express Bus Program to/from western Wayne County from/to Ann Arbor	Countywide	$250,000 yearly	AATA

Short-Term Recommendations				
	Improvement	**Location**	**Cost**	**Lead Agency**
20	Support the expansion of Commuter Express Bus Program to/from northern Washtenaw/Livingston County from/to Ann Arbor	Countywide	$250,000 yearly	AATA
21	Support the expansion of Commuter Express Bus Program to/from downtown Ypsilanti from/to Ann Arbor	Countywide	$250,000 yearly	AATA
22	Coordination for Ann Arbor to Detroit demonstration commuter rail service (Page 6-28)	Norfolk Southern Corridor	None	SEMCOG
23	Coordination by the city for development WALLY commuter rail service (Page 6-28)	Great Lakes Central corridor	None	Ann Arbor
24	Study relocation of Amtrak Station from Depot Street to Fuller Road	Ann Arbor	$250,000	Ann Arbor
25	Implement connecting bus service and retime schedule to connect commuter rail passengers on WALLY and Ann Arbor to Detroit lines to downtown/UM core (Page 6-28)	Downtown/UM Core	$750,000 yearly	AATA
Park and Ride				
1	Construct Park and Ride / Interceptor Lots at two locations and provide transit service to new lots (Page 6-26)	To be determined	$2,000,000	AATA
Non-Motorized				
1	Implement Short-Term Recommendations from Non-Motorized Report with emphasis on high and medium priority corridors (Page 6-31) and establish a line-item in the CIP for gap improvements in the sidewalk system, with priority to gaps from neighborhoods to schools, and to transit	Citywide	$250,000 yearly	Ann Arbor
2	Complete the Huron River Greenway Border-to-Border (B2B) Trail within Ann Arbor (Non-motorized plan)	Huron River Greenway	TBD	Ann Arbor
3	Research converting Allen Creek Greenway into a Shared Use Path	Allen Creek Greenway	TBD	Ann Arbor

Short-Term Recommendations				
	Improvement	Location	Cost	Lead Agency
Land Use Policy				
1	Create Design Plan Guidelines and/or Land Use practices to support a transit-oriented development overlay-type district (Page 2-3)	For designation along signature transit corridors	Internal Staff	Ann Arbor: Planning
2	Amend city ordinance to require Transportation Impact Analysis for rezoning and developments including trip reduction factors for certain criteria in site design (Page 2-7)	Citywide	Internal Staff	Ann Arbor: Planning
3	Increase density along enhanced signature transit corridors toward an average of 25-40 residents plus employees per acre and to an average of at least 50 residents plus employees per acre in the downtown through transit-oriented development overlay zoning and/or density bonuses. (Page 2-3)	Citywide, with emphasis along planned signature transit corridors	Internal Staff	Ann Arbor: Planning

Figure 3-2: Short-term Recommendations



It should be noted that land use is dynamic and will change even in the short-term. Short-term land use and transportation decisions affect the ability to implement the longer term recommendations that will achieve the city's vision for transportation.

Roadway/Intersection Improvements

A road diet feasibility study was recommended for two locations: one on Platt Road from Packard to Huron Parkway and the second on Jackson Avenue from Maple Road to Revena Boulevard. A road diet is applied by reducing the number of lanes of a roadway typically from an even number of lanes to an odd number of lanes. This is done by removing one of the through lanes in each direction and creating a center left-turn lane. There is a minor decrease in capacity; however, the safety of the roadway is improved significantly for all modes of travel (vehicular, pedestrian, and bicyclists). The by-product is also an extra lane that can be converted to bike lanes. Reducing the overall width of the roadway can result in lower vehicle speeds and promotion of other modes of transportation, such as cycling and/or walking.

Analysis of sixteen intersections as part of this plan update indicates operations at several intersections could be improved with signal optimization or implementation of an advanced signal system (SCOOT). Signal optimization and coordination can add efficiency to the system and reduce congestion without high-cost capital improvements. Table 6-4 in Chapter 6 shows in detail the optimization recommendations for these intersections. High crash locations were also evaluated throughout the city. Short-term safety recommendations for these locations include corridor analysis of State Street, signal warrant analysis at currently unsignalized intersections, and continued observation by the City of Ann Arbor staff.

Access Management

With respect to access management, the short-term recommendations of this plan include amending the city's zoning ordinance with a comprehensive access management ordinance drafted as part of the Washtenaw Corridor Access Management Plan (WCAMP). Another short-term recommendation of this plan is to establish protocol for an access management study to be prepared prior to the design phase of any street project to identify specific access management improvement opportunities that would support a safer and more efficient transportation system. Recommendations from those plans should then be incorporated into the street design to increase convenience and ensure recommended changes are implemented.

Transit

An alternatives analysis study will be conducted by the city to analyze the potential of signature/high-quality transit improvements on both the Plymouth Road/Fuller Road corridor in the northeast portion of the city and the State Street corridor in the southern portion of the city. This analysis is anticipated to begin in 2008 and should be completed by 2010. Under this schedule, construction of signature transit improvements is possible within the short-term time frame, however, it is listed within the mid-term timeframe of this plan due to complexity of construction and funding.

It is recommended that transit-supportive intersection improvements such as queue jumping lanes and traffic signal prioritization should be implemented along select high priority corridors in order to maintain a high level of service. Figure 3-3 illustrates an example of a queue-jump at an intersection. A queue-jump allows a bus to receive a green light a few seconds before the other traffic receives a green light. This allows the bus to move ahead of any traffic waiting at an intersection. The queue-jump lane could either be a separate bus-only lane (as shown in the figure below) or incorporated into an existing right-turn only lane.

This plan recommends that the following corridors and intersections should receive transit-supportive intersection improvements in the short-term time frame in order to maintain operation efficiency on select AATA routes. Queue jumps were evaluated at some intersections where facilities might benefit, but some were not easily feasible due to physical constraints. See analysis in Chapter 6 for a full list of intersections considered.

Figure 3-3: Example of a Queue Jump

Of the four corridors that are recommended to receive signature transit improvements, the Plymouth/Fuller and State Street corridors currently have the best potential to support signature transit. This recommendation stems from the fact that these corridors have some of the highest ridership in the AATA and UM bus systems, connect to high-use activity centers, and have potential redevelopment opportunities that could be driven by transit improvements. Thus, the next step incrementally for each of these corridors would be feasibility studies for signature transit.

Two park and ride lot locations are recommended to be built within the short-term timeframe, especially along signature transit corridors. The locations were not specified since land availability and acquisition for all the locations listed in Chapter 6 can vary. Therefore, the recommendation remains flexible such that if land becomes available the City and/or AATA should act to construct the park and ride lot. In addition, if a park and ride lot is constructed and there is not adjacent transit service it is recommended that transit service be modified to service the park and ride facilities. The *Ann Arbor Transit System Development Report*, Appendix E, has various park and ride lot procedural recommendations from joint-use agreements, to lot sizes, signage, capital costs, etc.

It is also recommended that the City of Ann Arbor continue to support the two commuter rail projects that are currently being studied, these being the Ann Arbor to Detroit east-west commuter rail study as well as the WALLY north-south study.

Non-Motorized

Since Ann Arbor recently adopted a non-motorized plan in 2007 and WATS has programmed many non-motorized improvements into their Transportation Improvement Program (TIP), short-term recommendations are to continue the implementation of these improvements as suggested in the Ann Arbor Non-Motorized Plan. It is also recommended to establish a line-item in the CIP for gap improvements in the sidewalk system, with priority to gaps from neighborhoods to schools, and to transit.

Land Use Policy

The vision of this plan emphasizes the direct relationship between land use and transportation when planning for a transportation system. Transportation is no longer just a way to serve the

needs of new development; transportation investments can act as a catalyst for infill and redevelopment of a design and density to support a walkable, bikeable community. Reconstruction of a street with elements such as signature transit, medians, or installation of a streetscape system can attract other quality development, causing resurgence in activity and economic development/investment. This plan recommends techniques to better manage transportation through land uses, density, and design, for transit friendly and walkable development to harmonize transportation with its surroundings. It should be carefully considered to not close any core area streets or create more one-way streets, as this changes traffic flow and potentially diverts traffic into new areas.

The importance of the land use-transportation connection is reiterated throughout this plan. Implementing a successful multi-modal transportation system will rely heavily on guiding land use development in the public and private realm to support transportation investment. In the short-term, this plan recommends establishing tools and policies that will encourage an increase in land use densities along signature transit corridors to 25-40 RE/AC and 50 RE/AC in the downtown. Ordinance amendments to help support density include a Transit-Oriented Corridor Overlay District and Transportation Impact Analyses, as outlined below.

Transportation Impact Analysis

Because the City is striving for enhanced transit and non-motorized transportation, the availability of transit and non-motorized facilities needs to be factored in to trip generation forecasts. Transportation impact study requirements need to account for the modal shift in areas served by transit and should at the same time create incentives for transit-oriented development. A short-term recommendation of this plan includes replacing the current traffic impact study with a transportation impact analysis. Model language can be found in Appendix A for the analyses, which includes intent and details to support higher densities and transit-oriented design along multi-modal corridors.

The revised code should also require one of several forms of transportation impact analysis for a range of applications. These should include a transportation impact comparison for rezoning, a transportation impact assessment for smaller development proposals, and a full transportation impact study for large development proposals. Appendix A includes model language for transportation impact analysis requirements that includes more details including the thresholds and applicability of the various types of analyses.

Mid-Term (5-10 Years) Recommendations

Mid-term recommendations represent the time period from five to ten years in the future. During this time period, it is expected that the land use density in Ann Arbor may change and the density and diversity of development is increased in strategic locations, the need for alternative means of transportation will become even more vital. The recommendations found here will continue to develop the diversification of Ann Arbor's transportation system by emphasizing non-motorized and transit modes while also maintaining efficiency in the roadway network. Table 3-2 details the recommendations for the mid-term period. Figure 3-4 illustrates the mid-term recommendations.

Roadway/Intersection Improvements

The State Street corridor will continue to be a congested area. In the short term, signal optimization and coordination and additional signals along the corridor are recommended to help alleviate some of this congestion. However, in the mid-term, larger improvements may be needed. One recommendation for this corridor is the implementation of a boulevard between

Ellsworth Road and Eisenhower Road with indirect lefts. This will reduce conflict points and provide more through capacity along the corridor.

Table 6-7 outlines the other physical intersection improvements that are recommended in the mid-term. These include additional through and/or turn lanes. At this point, improved efficiency along the corridor will not be enough to counter traffic growth. It should be noted that intersection and corridor improvements are suggested based on the assumption that no effort is made to impact driver mode choice. Should vehicular drivers switch their method of travel, some of these improvements may not be needed.

Access Management

In line with the short-term recommendations for promoting access management in the city, continued development of access plans and implementation of the WCAMP recommendations is part of the incremental implementation process. A mid-term recommendation of this plan includes adding a line item in standard street improvement project budgets with specific funding for access-related improvements in and near the right-of-way. Incentivizing implementation by making funds available for voluntary compliance or improvement of access spacing and design as part of a street project is one proven method of speeding up the access management process.

Transit

A mid-term recommendation is to construct and operate the signature transit improvements on State Street and Plymouth-Fuller, assuming that the alternatives analysis was successful, and funding can be secured.

In addition, alternatives analysis studies should commence to analyze the potential for signature transit improvements on both the Washtenaw Avenue and Jackson Road/West Huron corridors. These two corridors have been identified as having the potential to support signature transit improvements. Both corridors have interchanges to the freeway system on the outer fringe of the city, connect to city activity centers, and are highly used radial corridors that are gateways to the city for visitors and commuters.

Transit improvements to other radial corridors should also be implemented even as improvements on the Plymouth/Fuller, State, and Washtenaw corridors continue. Stop amenities, including variable message boards and distinctive shelters, should be implemented on the South Main, Ann Arbor-Saline, Liberty, Jackson-West Huron, and Miller corridors. Improvements to amenities on these corridors will give the radial, high-frequency corridor service a distinctive look and feel that will promote transit service as a viable way for visitors and commuters to access destinations within the city. In coordination with the stop amenities, the priority radial corridors should also improve their service frequencies in order to reflect the higher quality service.

It is also anticipated that permanent stations will be necessary for the WALLY, AMTRAK, and the Ann Arbor to Detroit commuter rail services. It is recommended that two permanent stations be constructed during this time period to serve commuters, one on the west side of downtown Ann Arbor to serve WALLY commuters, and another near the Fuller/Maiden intersection to serve AMTRAK and the Ann Arbor to Detroit commuters. Once a final location for both stations is selected, AATA should consider operational changes to the Link to ensure that it serves the stations in a frequent manner, connects to the Blake Transit Center, and serves the areas with the most jobs in the downtown/UM core.

Table 3-2: Mid-Term Recommendations

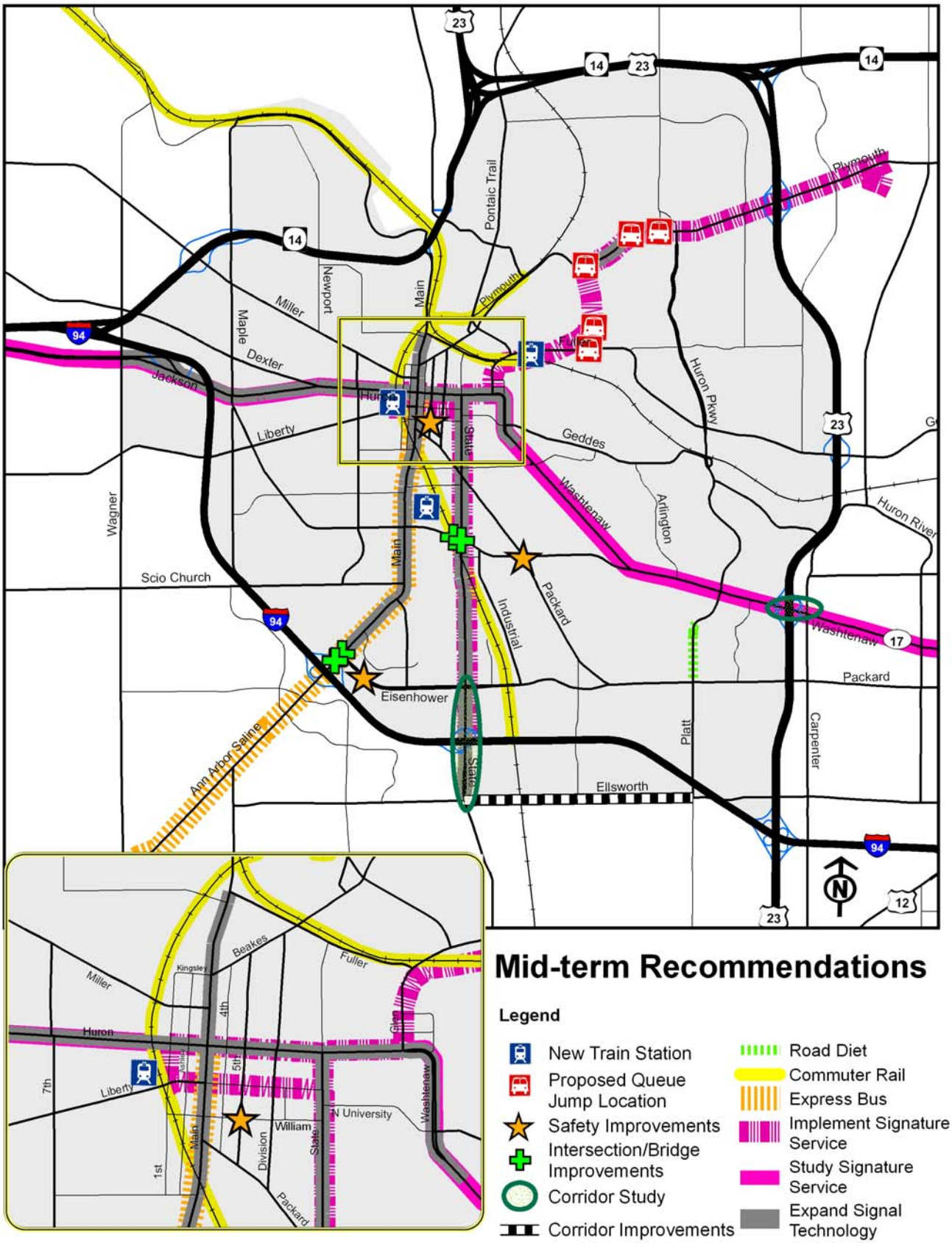
Mid-Term Recommendations				
	Improvement	**Location**	**Cost**	**Lead Agency**
Roadway Improvements				
1	Evaluate/Design State Street corridor improvements (Page 6-6)	State between Ellsworth & Eisenhower	$750,000	Ann Arbor
2	Construct Ellsworth Road corridor improvements (2.2 miles)	Ellsworth between State to east of Platt	$3,200,000	Ann Arbor
3	Expand Signal Technology / SCOOT (Page 6-11)	S. Main/Ann Arbor-Saline N. Main (14 signals)	$350,000	Ann Arbor
4	Expand Signal Technology / SCOOT (Page 6-11)	Huron / Jackson (16 signals)	$400,000	Ann Arbor / MDOT
5	Implement Road Diet, if recommended in near term, on relocated Platt Road, from Packard to Huron Parkway	Platt	$10,000	Ann Arbor
6	Stadium Boulevard Bridges over State and the Ann Arbor Railroad	Stadium at State	$30,000,000	Ann Arbor
7	Conduct an intersection study	Fuller Road/Maiden Lane intersection	$25,000	Ann Arbor
Intersection Improvements				
1	Construct additional southbound lane at Ann Arbor-Saline at Eisenhower and I-94 (Page 6-5 and 6-6) (Needs to be monitored in the future, so if Ann Arbor-Saline Express Bus is implanted and successful, it may reduce the need for this improvement)	Ann Arbor Saline at Eisenhower / I-94	$1,618,000	Ann Arbor / MDOT
2	Review William and Fifth intersection for safety concerns (Page 6-10)	William and Fifth	Internal Staff	Ann Arbor
3	Review Stadium and Packard intersection for safety concerns (Page 6-10)	Stadium and Packard	Internal Staff	Ann Arbor
4	Add northbound right-turn pocket, and add southbound dual left-turn lane (Page 6-6)	N. Main at Depot	$400,000	Ann Arbor / MDOT
5	Add eastbound right-turn lane (Page 6-6)	I-94 EB Off-ramp at State Street	$50,000	MDOT

Mid-Term Recommendations				
	Improvement	**Location**	**Cost**	**Lead Agency**
6	Support interchange study with conceptual design of Washtenaw at US-23 and intersection analysis for Carpenter at Washtenaw (Page 6-10)	Washtenaw and US-23	$250,000	MDOT
7	Support interchange study with conceptual design of State at I-94 (Page 6-8)	State and I-94	$250,000	MDOT
Traveler Choices (Travel Demand Management)				
1	Continue supporting and expanding Travel Choices Coordinator for city (Page 2-2)	Citywide	$125,000 yearly	Ann Arbor
2	Institute a Education / Marketing Campaign on how changing modes allows citizens to be green and is better for the City	Citywide	$25,000	Ann Arbor
3	Provide shuttles to the rail station with no additional fare due to coordinated transfer with a purchase of a monthly / yearly rail pass	Downtown	$500,000 annual operating and initial $3,300,000 capital cost	Ann Arbor / AATA
4	Support expansion of shared rental cars (Zipcar) and provide special free parking spaces for them, as well as support a shared bike program	Downtown	Minimal Cost	Ann Arbor
5	Study and evaluate Traveler Choices program to determine effectiveness	Citywide	$30,000	Ann Arbor
Access Management				
1	Establish line item in CIP for access improvements in and near the right-of-way (Page 6-14)	Citywide	$100,000 yearly	Ann Arbor
Transit				
1	Construct and operate signature transit on State Street corridor (Page 6-21)	State Street	$35.1-93.5 million (capital) $1.2-1.7 million (operating)	AATA
2	Construct and operate signature transit on Plymouth-Fuller corridor (Page 6-21)	Plymouth-Fuller	$44.1-117.7 million (capital) $1.5-2.2 million (operating)	AATA

Mid-Term Recommendations				
	Improvement	Location	Cost	Lead Agency
3	Improve stop amenities on select priority corridors (Page D-18)	Route 16 – S. Main / Ann Arbor – Saline	$98,000	AATA
4	Improve stop amenities on select priority corridors (Page D-18)	Route 9 - Jackson / Dexter	$68,000	AATA
5	Improve stop amenities on select priority corridors (Page D-18)	Route 18 – Miller Road	$105,000	AATA
6	Evaluate queue-jumping lanes (Page 6-17)	Plymouth and Murfin Corridors (5 signalized intersections)	$50,000	Ann Arbor
7	Construct queue-jumping lanes (Page 6-17)	Plymouth and Murfin Corridors (5 signalized intersections)	$5,150,000	Ann Arbor
8	Conduct alternatives analysis study for signature service on Washtenaw corridor (Page 6-22)	Washtenaw Avenue	$750,000	AATA
9	Conduct alternatives analysis study for signature service on Jackson corridor (Page 6-22)	Jackson Road	$750,000	AATA
10	Construct permanent downtown station and UM Football station for WALLY commuter rail line (Page 6-29)	West side of downtown	$6,000,000	Ann Arbor
11	Construct permanent station at Fuller/Maiden intersection for Ann Arbor to Detroit Commuter Rail/AMTRAK service (Page 6-29)	Fuller/Maiden intersection	$10,000,000	Ann Arbor
12	Run new circulator service (or reroute the Link) to serve downtown WALLY station and Fuller/Maiden Commuter Rail Station (Page 6-29)	Downtown/UM Core	$100,000 yearly	AATA
13	Provide real-time traveler information signs at Park and Ride locations	8 Park and Ride Lots	$150,000 per location or $1.2 Million for 8	AATA

Mid-Term Recommendations				
	Improvement	**Location**	**Cost**	**Lead Agency**
14	Support the expansion of the Ann Arbor to Detroit commuter rail service to Dexter / Chelsea / Jackson	Norfolk Southern Corridor	None	SEMCOG / WATS / MDOT
15	Implement the expansion of Commuter Express Bus to/from Saline to Ann Arbor	Ann Arbor-Saline Road from Saline to downtown Ann Arbor	$250,000 yearly	AATA
Park and Ride				
1	Construct Park and Ride interceptor lots for up to two locations and provide transit service to new lots (Page 6-26)	To be determined	$2,000,000	AATA
Non-Motorized				
1	Continue supporting recommendations from Non-Motorized Report with emphasis on medium-priority corridors	Citywide	$500,000 yearly	Ann Arbor
2	Formal Review of Non-Motorized Plan	Citywide	$100,000	Ann Arbor
Land Use Policy				
1	Evaluate and/or develop a Form-Based type code for the Downtown to more strictly regulate form and character to support transportation improvements citywide that connect into downtown (Page 2-4)	Downtown	Internal Staff	Ann Arbor: Planning
2	Increase density along signature transit corridors to an average of 25-40 RE/AC and average of at least 75 RE/AC in the downtown via development reviews and updates of planning documents (Page 2-3)	Along signature transit corridors	Internal Staff	Ann Arbor: Planning
3	Update Comprehensive Parking Management Plan	Downtown	$100,000	Ann Arbor

Figure 3-4: Mid-term Recommendations



Land Use Policy

Implementing a successful multi-modal transportation system will rely heavily on guiding land use development in the public and private realm to support transportation investment. In the mid-term, this plan recommends continuing the short-term efforts with tools and policies that will encourage an increase in land use densities along signature transit corridors to at least 25-40 RE/AC and to at least 75 RE/AC in the downtown.

Another mid-term recommendation of this plan is the development a Form-Based Code for the Downtown and signature transit corridors to regulate form and character and establish build-to lines, to support transportation improvements citywide that connect into downtown.

In line with proposed increases in future land use intensity for select sites around the city, another mid-term recommendation is to evaluate a Transfer of Development Rights (TDR) program. Such a program could allow a transfer of land use maximum densities from sites around the city (or even outlying townships or land in the "greenbelt") to sites along signature transit corridors, further supporting the transportation investment and preventing increased density development farther away from the signature transit corridors.

Long Term (>10 Years) Recommendations

The long-term time period represents the time period of more than fifteen years in the future. There may be additional land use changes associated and Land Use Alternative #3 may be a reality. Thus, the transportation recommendations in this section are made with this future land use in mind.

During this future time period the densification of downtown and the channelization of development along designated corridors will result in a more balanced transportation system. Transit, bicycle, and pedestrian users will be on balance with auto users within the city. Recommendations within this section are made with the idea of all users being able to use any of the corridors within the city for their transportation needs. Table 3-3 details the recommendations for the long-term time period. Figure 3-5 illustrates these long-term recommendations.

Transit

During the long-term time period, the changes to transit service frequency, stop amenities, and land use should have taken effect to the point that both the Jackson/Huron and Washtenaw corridors should be able to support a signature transit investment. Implementation and operation of signature transit along these corridors should occur during the long-term time period.

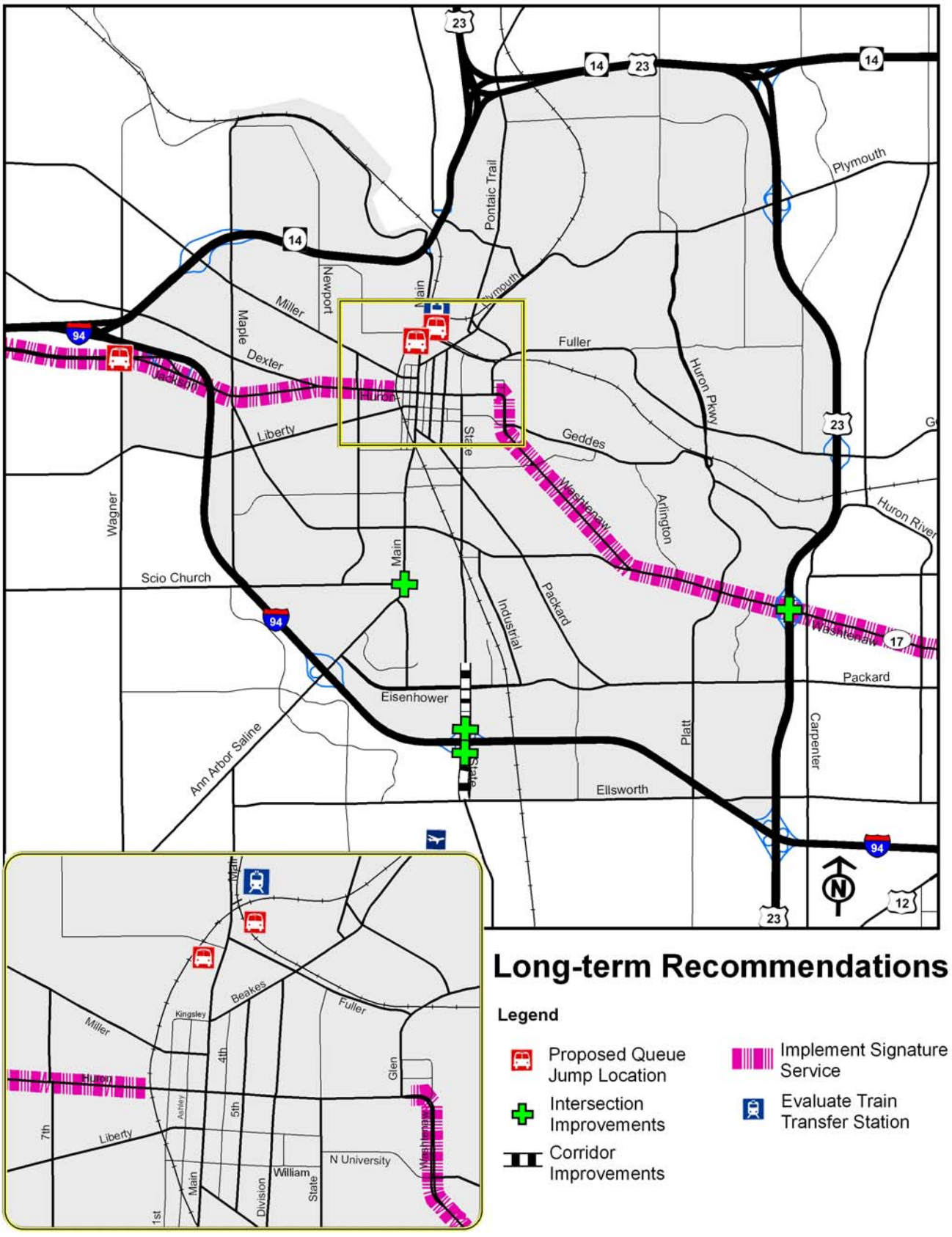
Table 3-3: Long-Term Recommendations

Long-Term Recommendations				
Improvement		**Location**	**Cost**	**Lead Agency**
Roadway Improvements				
1	Implement US-23/Washtenaw interchange reconfiguration study recommendation (Page 6-10)	US-23 / Washtenaw	$6,000,000	MDOT
2	Implement I-94/State Street interchange redesign study recommendation (Page 6-8)	I-94 / State Street	$4,000,000	MDOT
Intersection Improvements				
1	Construct a boulevard with indirect left turn lanes (Page 6-6)	State Street between Eisenhower Pkwy and Ellsworth Rd	$6,900,000	Ann Arbor
2	Add southbound right/through lane, add eastbound dual left-turn lane (Page 6-6)	Scio Church at S. Main	$250,000	Ann Arbor
Traveler Choices (Travel Demand Management)				
1	Continue supporting and expanding Citywide Travel Choices Coordinator (Page 2-2)	Citywide	$150,000 yearly	Ann Arbor
2	Expand real-time traveler information to website / mobile phones / radio by using SCOOT data and bus location	Citywide	$1,000,000	Ann Arbor
3	Provide a Mobility Center within Downtown that would house the City-wide Traveler Choices Coordinator and staff which would provide information on busses, commuter rail, and bicycle facilities. Staff would provide individual travel planning. The Mobility Center would also offer locker-rooms, showers, and indoor bicycle facilities for those enrolled in a program	Downtown	$60,000/year lease	Ann Arbor
4	Expand real-time traveler information at four arterial locations entering City that have signature transit built (Jackson / Plymouth / Washtenaw / State)	Citywide focus on 8 initial locations	$1,200,000	Ann Arbor
5	Research having a city-deck or special parking spaces for “Carpool Only”	Downtown	$10,000	Ann Arbor

Long-Term Recommendations				
Improvement		**Location**	**Cost**	**Lead Agency**
Access Management				
1	Continued implementation and development of corridor specific plans prior to street project design (Page 6-14)	Citywide	$200,000 yearly	Ann Arbor
2	Pursuit/establishment and expansion of funding sources to assist in construction of recommended modifications (Page 6-14)	Citywide	Internal Staff	Ann Arbor
Transit				
1	Construct and operate signature transit on Washtenaw and Jackson corridors (Page 6-22)	Jackson/Washtenaw	$51.1-136.4 million (capital) $2.4-2.8 million (operating)	AATA
2	Support development of permanent Ann Arbor to Detroit commuter rail service (Page 6-28)	Norfolk Southern RR	None	Ann Arbor
3	Evaluate Commuter Train Transfer Station where north-south (WALLY) and east-west (Ann Arbor-Detroti) lines cross	North of Downtown	$100,000	Ann Arbor
4	Evaluate queue-jumping lanes (Page 6-17)	Main at Depot / Summit	$50,000	Ann Arbor
5	Evaluate queue-jumping lanes (Page 6-17)	Jackson at Wagner	$25,000	Ann Arbor
6	Construct queue-jumping lanes (Page 6-17)	Main at Depot / Summit	$2,060,000	Ann Arbor
7	Evaluate queue-jumping lanes (Page 6-17)	Jackson at Wagner	$1,030,000	Ann Arbor
Park and Ride				
1	Evaluate and construct new Washtenaw Park and Ride Interceptor Parking Deck as part of US-23/Washtenaw interchange reconfiguration (Page 6-26)	US-23/Washtenaw interchange	$10,000,000	Ann Arbor
Non-Motorized				
1	Implement recommendations from non-motorized plan on low-priority corridors	Newport, Pontiac, Stone School, Nixon, E. Huron River Drive	$500,000 yearly	Ann Arbor

Long-Term Recommendations				
Improvement		**Location**	**Cost**	**Lead Agency**
Land Use Policy				
1	Increase density along signature transit corridors to an average of at least 40 RE/AC and average of at least 100 RE/AC in the downtown via development reviews and updates of planning documents (Page 2-3)	Select locations around the city	Internal Staff	Ann Arbor
2	Evaluate a Transfer of Development Rights (TDR) program which would allow a transfer of land use maximum densities from sites around the city to sites along signature transit corridors	Citywide	Internal Staff	Ann Arbor

Figure 3-5: Long-term Recommendations



Transit (cont)

Also during the long-term time period it is anticipated that the Ann Arbor to Detroit commuter rail service should go from demonstration to a permanent service. It is not known what agency would operate the service or other important details of operation. However, this commuter service is important to Ann Arbor's overall vision as a regional employment center. Therefore, the city and AATA should support the efforts to develop this commuter rail as a permanent service and should coordinate wherever possible to provide public transportation links that ensure that commuters arriving in Ann Arbor are able to reach their final destination.

Another uncertainty related to the proposed commuter rail service and the existing train station located on Depot Street in Ann Arbor. Both demonstration and permanent commuter rail service to Detroit presumably would use the Norfolk Southern alignment through Ann Arbor and could use the existing train station. Potential north-south commuter rail service on the Ann Arbor Railroad alignment would not have access to the Depot Street station, and would generate the need to construct a new commuter rail station.

Passengers desiring to use both services need a connection between the two services. The Model for Mobility addresses this issue by recommending a local connector. This connector would look to provide a high-speed connection between the two rail stations (the Wally on the west edge of the downtown and the Ann Arbor to Detroit relocated station along Fuller Road). The question of connecting potentially transferring passengers will need to be resolved, possibly with a bus or fixed guideway transfer connection or with the development of connecting tracks, a common station and new rail facilities. It is recommended that coordination between these two commuter rail services and their existing or potential train stations will be needed in the long term time period in order to efficiently promote commuter rail within the city of Ann Arbor.

Land Use Policy

In the long-term, this plan recommends continuing the shorter-term efforts with tools and policies that will strongly encourage and regulate an increase in land use densities along signature transit corridors to at least 40 RE/AC and to at least 100 RE/AC in the downtown.

Another long-term recommendation that builds on the short- and mid-term recommendations is the development a Form-Based Code for the signature transit corridors, to regulate form and character and establish build-to lines that will support increasing density and continued transportation improvements along the corridors.

The table below is organized by recommendation and time frame and establishes improvements, locations, lead agencies, and costs (where appropriate) associated with implementing the recommendations.

Cost Estimation

Given these recommendations, a preliminary cost estimate was determined for those recommendations that would require significant funding. This section is broken into costs for transit and intersection/roadway improvements.

Transit Cost Estimate

Conceptual capital and operating-maintenance cost estimates were prepared for each of the transit recommendations, including signature transit, improved bus service, queue jump facilities, and stop amenities. Cost estimating is particularly challenging at this time due to the

rapidly rising costs of several components of costs. Capital cost estimates are complicated by the rising cost of concrete and steel, which have risen faster than inflation for much of the past decade. Operating costs have also risen rapidly during this decade due to the rising costs of employee fringe benefits. In addition, both capital and operating costs are affected by the rising price of fuel. This problem has been ameliorated somewhat by using as up to date information as possible, both on the costs of developing similar systems nationally, and information on the current costs of operating the AATA system. Tables 3-4 and 3-5 outline the estimated capital investment, operating, and maintenance costs for the recommended transit improvements. Detailed calculations for each recommendation are provided in Appendix D.

Table 3-4: Signature Transit Estimated Capital, Operating, and Maintenance Costs

Corridor	Length (Miles)	BRT		Streetcar	
		Capital Cost (k)	Operations/ Maintenance (k)	Capital Cost (k)	Operations/ Maintenance (k)
Plymouth/Fuller	5.35	$44,100	$1,483	$117,700	$2,216
Washtenaw	3.7	$30,500	$1,157	$81,400	$1,708
State	4.25	$35,100	$1,319	$93,500	$1,806
Jackson/W. Huron	2.5	$20,600	$1,107	$55,000	$1,011
Total	**15.8**	**$130,300**	**$5,066**	**$347,600**	**$6,741**

Table 3-5: Other Transit Improvement Estimated Implementation and Operational Costs

Improvement	Corridor	Quantity	Cost (k) Each	Total Cost (k)
Increased Bus Frequency on Priority Corridors	Washtenaw	3	$124	$373
	Ann Arbor-Saline	2		$249
	Jackson/Dexter	1		$124
	Miller/Liberty	2		$249
Queue Jump Facilities	Plymouth	7		$7,000
	Washtenaw	3		$3,000
	State	3		$3,000
	S. Main	3		$3,000
	N. Main	2		$2,000
	Jackson	4		$4,000
Stop Amenities for Priority Corridors	Route 2 - Plymouth	See Page D-17 for cost breakdown		$105
	Route 4 - Washtenaw			$123
	Route 36 – State / Wolverine Tower			$135
	Route 16 - S. Main / Ann Arbor - Saline			$98
	Route 9 – Jackson / Dexter			$68
	Route 18 – Miller Road			$105
Signal Priority Equipment	On-board vehicle	48	$7	$336
	Signal improvements	22	$30	$660

Three Park and Ride interceptor lots are proposed for three of the four signature transit corridors. These Park and Ride lots would fill out AATA's inner Park and Ride system and

facilitate the movement of commuters and visitors to high-use activity centers in Ann Arbor's core. Unlike the other costs, Park and Ride lots are not assumed to be included in the estimated capital costs of signature transit corridors, so these costs could be assumed to be additional to the costs presented for those corridors.

The plan assumes that 500 spaces will be needed in order to promote the easy movement of commuters to the Ann Arbor core. Of the corridors identified for Park and Ride improvements, State Street currently has a large Park and Ride lot (with 550 spaces), thereby not needing any expansion. Both Jackson Road and Ann Arbor-Saline Road each would need a new 500-space lot. Both Plymouth Road and Arborland (Washtenaw Avenue at US-23) have existing Park and Ride lots, with 100 and 220 spaces respectively, so they each would need additional spaces to reach the level of 500 spaces in each corridor.

The estimate for surface parking is $5,000 per space. Traditionally, one-acre parking lots have 100 spaces, which gives the number of acres needed for each of the lots and the associated right-of-way cost of each. This plan assumes no structured parking would be required. The table below summarizes the cost involved in new or expanded Park and Ride lots for the Plymouth, Washtenaw, Ann Arbor-Saline and Jackson corridors. Additional studies should be conducted on whether a parking deck should be built instead of expanding a park and ride lot.

Table 3-6: Cost Estimate for Proposed Park and Ride Lots

Proposed Lots	Proposed spaces	ROW needed	Total Estimated Cost (2007 dollars)
Plymouth/Fuller	400	4 acres	$1,200,000
Ann Arbor-Saline	500	5 acres	$ 1,500,000
Jackson Road	500	5 acres	$1,500,000
Washtenaw	280	2.8 acres	$840,000
Estimated Park and Ride Cost including ROW			**$5,040,000**

A total of $5.0 million dollars would be needed for new Park and Ride lots at the ends of each of these corridors. Operating costs vary based on maintenance agreements; whether the lot is owned outright by AATA or a shared use lot with maintenance agreements with the original owner.

Intersection/Corridor Improvement Cost Estimate

Intersection/corridor improvements such as additional lanes, signalization, and interchange improvement have been recommended. Cost estimates have been performed for each intersection/corridor needing improvement based on the following assumptions.

- $800,000 per lane mile for additional lanes
- $4.9 million per mile for conversion to a boulevard with indirect lefts
- $100/square foot for bridge improvements
- $4.0 million for single point urban interchange construction
- $100,000 per signal for intersection signalization

Total estimated cost to implement all recommended intersection/corridor improvements is $16.65 million, not including right-of-way acquisition costs. Costs are detailed below:

- Ann Arbor-Saline at Eisenhower Parkway - $128,000
- Ann Arbor-Saline at I-94, including bridge work - $1.49 million

- Main Street at Depot Street - $50,000
- Main Street at Scio Church Road - $58,000
- State Street from Eisenhower Parkway to Ellsworth Road boulevard construction - $6.9 million
- Eisenhower Parkway at Northbrook Place - $100,000
- State at I-94 SPUI - $4 million
- Eisenhower Parkway at Plaza Drive - $100,000
- Fletcher Street at Huron Street - $100,000
- Platt Road at Washtenaw Avenue - $50,000 - $100,000
- State Street at South University Avenue $100,000
- Ellsworth between State Road to east of Platt Road - $3,520,000

Cost Estimate Conclusions

A number of additional planning studies would be required to determine the precise improvements that will best suit the needs of Ann Arbor and the various travel corridors, as well as the timing of their implementation. The cost estimates found here have many undefined variables, the biggest of which is the mode of transit for the proposed Signature Transit corridors. Probably the largest unknown concerning these costs, however, is the future cost of the materials and labor that will be required to bring them to completion. Therefore, the cost of the signature transit is not included in the cost estimate below. Table 3-7 below summarizes the cost by time frame as well as agency.

Table 3-7: Cost Estimate by Time Frame*

Time Frame	City of Ann Arbor	AATA**	MDOT	Total Cost
Short-Term (2009-2014)	$14,810,000	$15,069,500	$3,165,000	$33,014,500
Mid-Term (2014-2024)	$63,440,000	$34,221,000	$2,568,000	$100,229,000
Long-Term (2024-2030)	$28,085,000	$13,970,000	$10,000,000	$52,055,000
Total Cost	$106,335,000	$63,260,500	$15,733,000	$185,298,500

**All Costs are in 2007 dollars*

***Costs do not include Signature Transit Capitol and Operating Costs*

Funding

Table 3-8 outlines potential funding sources for transportation improvements in Ann Arbor. More detailed description of the background, funding sources, and eligible uses for the following funding sources related to Federal, State, and Local Programs can be found in Appendix D. All transportation systems are subsidized. Even though buses may run full during certain times of the day along some routes, overall transit service in Ann Arbor will continue to require a subsidy to operate.

Table 3-8: Potential Funding Sources

FEDERAL PROGRAMS	
• National Highway System • Surface Transportation Program • Transportation, Community and System Preservation Program • Congestion Mitigation and Air Quality Improvement Program • Highway Safety Improvement Program (HSIP) • New Starts • Rail and Fixed Guideway Modernization • Bus and Bus Facilities • Transportation for Elderly Persons and Persons with Disabilities	• Job Access and Reverse Commute Program • New Freedom Program • Alternatives Analysis • Safe Routes to School • Transportation Enhancement Program • Intelligent Transportation Systems Program • Railroad Rehabilitation & Improvement Financing • Federal High Priority Funds • The Energy Efficiency and Conservation Block Grant (EECBG)
STATE OF MICHIGAN PROGRAMS	
• Michigan Transportation Fund • State Trunkline Fund • Comprehensive Transportation Fund (CTF)	• Transportation Economic Development Fund • Local Bridge Program
LOCAL PROGRAMS	
• Dedicated Road Millages • Special Assessments	• Downtown Development Authority • Corridor Improvement Authority
FINANCING	
• Grant Anticipation Revenue Vehicles (GARVEES) • Transportation Infrastructure Finance and Innovation Act of 1998	• State Infrastructure Bank Program • Local Road/Railroad Grade Separation Loan Program • Bonds
COST REDUCTION	
• Advance construction	• Public / Private Partnerships

Transit Funding

According to the AATA Transit System Development Report completed in January 2007, AATA's existing transit service is funded through a combination of local taxes (approximately 40%), state operating assistance (approximately 33%), passenger fares (approximately 15%) and federal operating assistance (approximately 9%). The Transit System Development Report notes that because the bulk of funding for AATA comes from local sources, expansion of the system may require new local revenue sources. Currently, AATA has funding through an

existing charter millage and has recently reduced costs by utilizing hybrid busses and managing fuel costs.

The transit recommendations found in this plan can be divided into two funding categories – capital costs associated with infrastructure improvements, and operating and maintenance costs associated with the new service recommendations.

Capital Costs

The most significant transit recommendations in this plan are related to the study, development and operation of signature/high-quality transit service on a handful of priority corridors throughout the city. The development of a signature transit improvement would likely go through the Federal Transit Administration (FTA) Section 5309 New Starts process, which currently requires that each corridor undergo a planning and environmental study called an Alternatives Analysis. In this process, a problem statement is developed for the corridor and a series of alternatives are considered to address the transit needs of the corridor. The process culminates with the selection of a locally preferred alternative. Ann Arbor is initiating this process with a study for the Plymouth/Fuller and State Corridors which is expected to begin in the early 2009.

The outcome of such a study could be the recommendation to develop signature transit (rail or bus rapid transit), or the selection of a low-cost or no-build alternative. To move forward in the New Starts process, a signature/high quality transit recommendation must be approved by the local MPO and meet certain FTA standards (including its current cost effectiveness criteria). The region also must have a feasible plan for funding from local and state sources the non-Federal share of the capital development costs of the signature transit improvements and to fund the operating and maintenance costs of the project in addition to continuing to fund existing transit services (operating and maintenance costs are not covered by FTA funding).

Theoretically up to 80% of the capital investment can be provided by Federal sources. However, the New Starts program is highly competitive, and in recent years most cities receiving grants under the program have received around 50% of the capital cost, with the remainder of the funds coming from local and state sources. As a Federal grant program, New Starts procedures and guidance relating to Capital Cost estimating can be found on FTA's website (http://www.fta.dot.gov/planning/newstarts/planning_environment_213.html).

The Federal New Starts program is administered by the FTA, but it is a financial program, and could change substantially under a new Congress and Presidential administration due in 2009.

Park and Ride lots, Surface Transportation Program, queue jump facilities, and other corridor amenity recommendations on a less than full corridor basis might be ineligible for funding under the New Starts program. These improvements would require funding from other Federal programs (such as Enhancement or CMAQ grants) and from state and local sources.

Operating Costs

Service improvements to several corridors, as well as the operating and maintenance costs associated with signature transit improvements falls under funding for service costs. As noted above, current AATA operating costs are covered by a combination of local, state, and Federal sources. Additional service would require an increase in one or more of the funding sources listed previously.

For AATA fixed-route bus service improvements, currently about 15% of the cost can be recovered by fares while the State of Michigan funds 33% of the total fixed-route cost. Thus, 48% of any fixed-route service introduced can be accounted for currently, however, State of Michigan funding does not remain fixed. The other 52% of the operating cost would need to come from an additional source.

For signature transit improvements, further study – perhaps as part of the alternatives analysis process – will be needed to identify a funding strategy. It is assumed that the State of Michigan would supply a portion of the operating cost as it does now for inter-city Amtrak costs. Additionally, because several of the proposed signature transit corridors would overlap with service provided by University of Michigan Parking and Transportation Services (UM PTS), operating costs for a signature transit service may potentially seek out funding from UM PTS as a replacement for current shuttle service. However, it is beyond the scope of this document to suggest that the signature transit service would replace the current shuttle service.

Therefore, it is unknown what combination of local, state and Federal sources would be needed for signature transit service. The issue should be addressed in finer detail during the Alternatives Analysis process.

Conclusion

This chapter reviewed the overall recommendations broken down by short-, mid-, and long-term timeframes. Figure 3-6 illustrates all the recommendations resulting from this plan. The process to determine these recommendations utilized three different future land uses and found that some recommendations would be needed regardless to the land use while others would be needed with denser land uses in the City. As stated earlier, land use and transportation are tied together and both affect each other in significant ways. This plan recommends changes to policy that would affect land use and it was the goal of this document that the plan be responsive to land use changes. Figure 3-7 illustrates the 2030 daily roadway congestion within and surrounding Ann Arbor with the recommendations in place.

Another goal of this plan was to protect and enhance the natural environment and energy sources. In determining recommendations for this plan, there were two major objectives: minimize roadway widening and encourage shift in modes from the automobile. Several ways to meet these objectives are to maximize current efficiency of the roadways and provide other transportation modes to meet future demand. Recommendations from these plans to meet these objectives are to continue the implementation of the SCOOT system and enhance the transit system. These two recommendations will increase efficiency of the roadway system and potentially shift trips from automobile to transit. These will essentially reduce CO emissions by reducing congestion and removing automobiles. Table 3-9 outlines the shift in mode resulting from the recommendation from the plan.

Table 3-9: 2005 and 2030 Person Trips in Washtenaw County by Mode with Recommendations

Mode	2005	Land Use #1*	Land Use #2*	Land Use #3*
Walk	181,750	230,857 (+15%)	245,439 (+16%)	260,487 (+17%)
Bike	10,830	12,638 (+6%)	13,098 (+6%)	13,494 (+7%)
Transit	17,905	42,059 (+32%)	45,985 (+31%)	49,696 (+30%)
Vehicular Travel	1,114,810	1,517,596 (-3%)	1,547,378 (-3%)	1,584,923 (-3%)
Total	**1,325,295**	**1,803,150**	**1,851,900**	**1,908,600**

** Number of Trips (Percent Change from 2030 No-Build)*

Table 3-10 outlines the vehicle miles of travel (VMT) and the vehicle hours of travel (VHT) with the final recommendations for the year 2030.

Table 3-10: 2005 and 2030 Vehicle Miles of Travel and Vehicle Hours of Travel with Recommendations

	2005	2030 with Recommendations		
		Land Use #1	Land Use #2	Land U #3
Vehicle Miles of Travel (VMT)	1,529,938	1,662,927	1,699,403	1,737,928
Vehicle Hours of Travel (VHT)	46,968	49,122	50,523	52,119
Congested VMT*	426,614	448,707	466,754	488,316
Congested VHT*	14,783	14,727	15,830	16,468

**Congested indicates any roadway with a LOS E or F*

While the vehicle miles of travel (VMT) still increased from the year 2005 between 9-14% with the recommendations, the amount of increase without the recommendations is estimated to be between 22-33%. The vehicle hours of travel (VHT) also increased with the recommendations to between 5-11%, however, without the recommendations the increase would be between 32-47%. Table 3-11 compares the percent of congested roadways in 2005 and 2030 with the recommendations with the varying Land Use Alternatives.

Table 3-11: Percent Congested VMT and VHT of Travel

	2005	2030 with Recommendations		
		Land Use #1	Land Use #2	Land Use #3
Percent Congested VMT*	28%	27%	27%	28%
Percent Congested VHT*	31%	30%	31%	31%

**Congested indicates any roadway with a LOS E or F*

Without the recommendations the percent congested VMT ranged between 39-49% and the percent congested VHT ranged between 45-52%. With the recommendations in place, the percent congested VMT and VHT would be either at or below the levels experienced in 2005.

It has been estimated by the American Public Transportation Agency (APTA) that a single vehicle travelling one mile produces one pound of CO^2 emissions. Table 3-12 illustrates the potential reduction in CO^2 emissions gained by implementing transit and coordinated signal system (SCOOT) recommendations from this study.

Table 3-12: Estimated Reduction in CO^2 Emissions by Land Use and Recommendation

Land Use Alternative	2030 Doing Nothing*	2030 with Recommendations*	Percent Reduction
2030 Land Use Alternative #1	1,867,207 (22%)	1,662,927 (9%)	11%
2030 Land Use Alternative #2	1,939,575 (27%)	1,699,403 (11%)	12%
2030 Land Use Alternative #3	2,001,639 (31%)	1,737,928 (14%)	13%

** Amount of CO^2 emissions (increase from 2005 levels)*

By reducing congestion and moving some trips to alternate modes, these recommendations make it possible to reduce the amount of emissions by 11-13% from doing nothing by the year 2030. APTA states that one-third of all greenhouse gas emissions are produced by the transportation sector in the United States. One of the strategies employed by this plan is to enhance public transportation such that a shift in mode should occur reducing the amount of automobiles on the road. The recommendations from this plan indicated the transit ridership within Washtenaw County would increase from today's levels of 22,000 (2008) to a ridership of almost 50,000 with the Land Use #3 alternative. This is more than a doubling of ridership in 22 years, or 3.8% per year. However, within the past 10 years, AATA has seen their ridership double and increased at a rate of 4% per year. Therefore, it is expected that the ridership forecasts from this plan are conservative and implementing transit recommendations from this study could increase transit ridership further than estimated.

There were eight goals listed in Chapter 2 of this report ranging from providing access and mobility to all people, protecting the environment, safety, public involvement, and incorporating land use into the transportation decision process. These eight goals guided the development of all the recommendations presented in this Plan and none of these recommendations contradict the goals presented in this Plan.

Figure 3-6: Final Recommendations

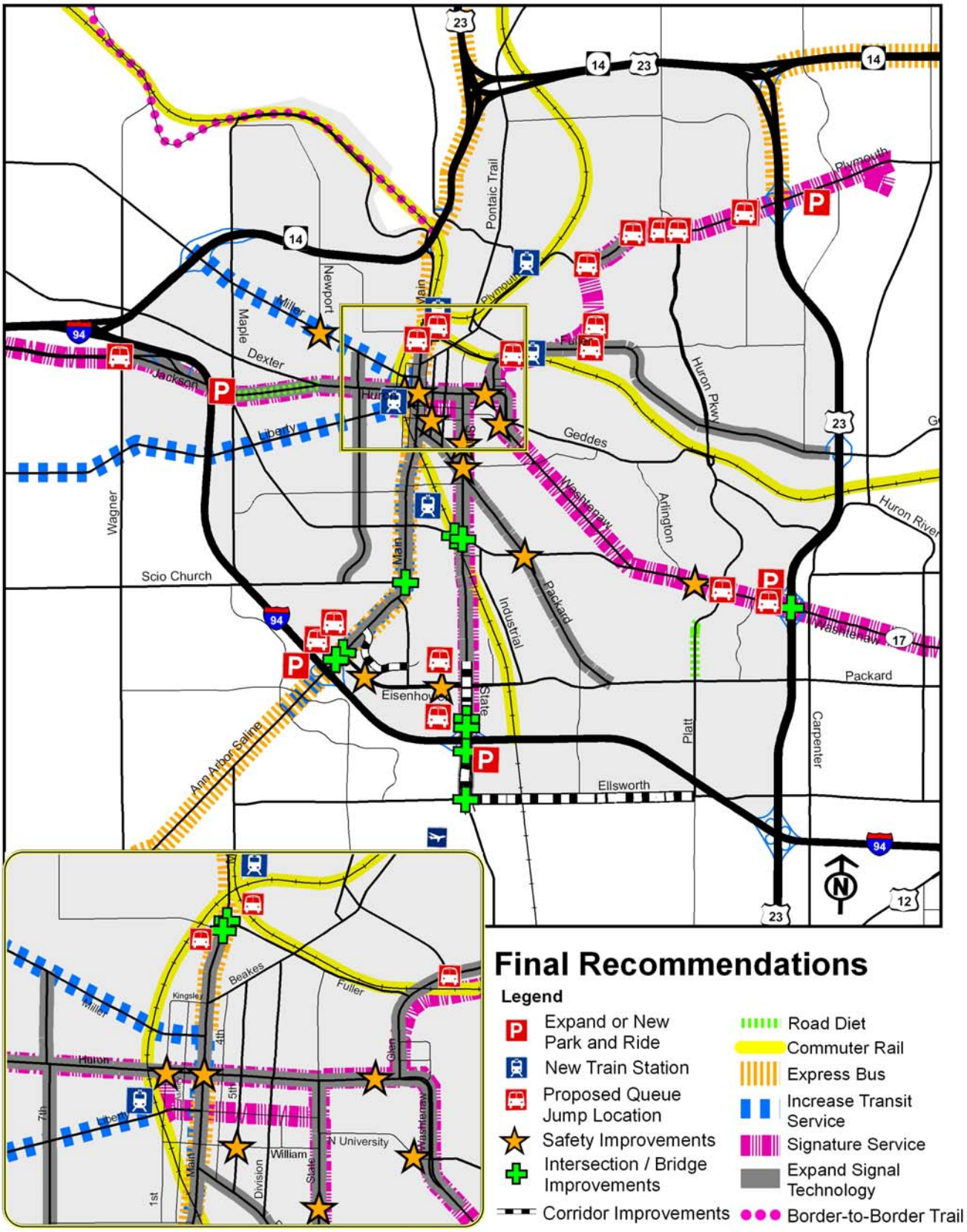


Figure 3-7: 2030 Daily Roadway Congestion with Final Recommendations

Chapter 4: Basis for the Plan

Previous and Existing Plan Recommendations

Vital to updating the Ann Arbor Transportation Plan is a review of recommendations from previous and existing plans. Included in this review are the City of Ann Arbor 1990 Transportation Plan, the City Non-Motorized Plan, the Northeast Area Transportation Plan, the Ann Arbor Transit System Development Report, the Washtenaw Area Transportation Study 2030 Regional Transportation Plan, the Washtenaw County Transit Plan, the SEMCOG and MDOT Long-Range Plans, and other plans. This plan not only incorporated plans within the City of Ann Arbor and the County, but within the region and the state to ensure that plans outside of the City and County are considered. Other information on each plan, including goals, objectives, and recommendations not found in this text can be found in Appendix B, Previous Plan Recommendations.

City of Ann Arbor 1990 Transportation Plan

The last Ann Arbor Transportation Plan was completed in November 1990 and made short-, mid-, and long-range recommendations. These recommendations included non-motorized, transit, and automobile modes related to all the different infrastructure types in the city. The short-range recommendations were for the period of 1991 to 1995, while the long-range recommendations were made for the period from 1995 until the year 2010.

The short-range recommendations of the plan, from 1991 to 1995, included a travel demand management (TDM) element, which recommended a ridesharing program, the creation of a Transportation Management Organization, implementation of variable work hours, a parking study, a TMD Coordinator, and a TMD ordinance. Other recommendations included designing and installing a new traffic signal system, providing express bus and park and ride lots, paving roadways and a corridor study. Most of these recommendations were implemented.

Mid-range recommendations, from 1996 to 2002, continued the TDM recommendations from the short-range period. The mid-range recommendations also included suggestions for traffic operations, non-motorized and transit improvements, and paving and widening of roadways. Traffic operations, transit improvements, and some non-motorized improvements were implemented.

The long-range recommendations, from 2003 to 2010, also continued the TDM recommendations from the short-range stage. Other recommendations included HOV lanes along the Fuller/Geddes Conrail Corridor, a study to convert two-way roadways to one-way streets, further roadway widening and paving, and non-motorized improvements. Mostly the non-motorized improvements were implemented.

City of Ann Arbor Non-Motorized Plan

The Ann Arbor Non-Motorized Plan was adopted by the City Council in January 2007. The purpose of the plan is to provide a general background on the issues of non-motorized transportation as well as implementation through policies, programs, and design guidelines for facility improvements. The plan is intended to replace the City of Ann Arbor's 1992 Bicycle Plan

as well as complement and be integrated with the City's Transportation Plan Update. It is also intended to complement the City's Park, Recreation and Open Space Plan and Northeast Area Plan. Many of the recommendations in the Northeast Area Transportation Plan were incorporated into this plan although there are some differences and the two plans should be viewed separately.

The summary of Near-term Opportunities and the Long-term Plan in the City of Ann Arbor Non-Motorized Plan include:

Near-term Opportunities

- 38 miles of new bike lanes on the City Primary Roads by reducing roadway lanes and on-street parking in downtown area
- Five (5) signalized crossings or roundabouts, 105 major mid-block crosswalks, and 25 minor mid-block crosswalks
- Approximately 25 miles of new sidewalk, priority improvements include completing gaps along primary road system and sidewalks serving schools

Long-term Plan

- 76 miles of bike lanes on the City Primary Roads by reducing roadway lanes, roadway widening, or removal of on-street parking in downtown area
- Providing off-road bike paths and walkways

Ann Arbor Transit System Development Report

The Ann Arbor Transit System Development Report was completed in January 2007. The focus of the report was to develop a series of recommendations for improved and expanded transit service for the AATA. Service recommendations were classified into two primary sections. The first section of recommendations focused on the existing transit system design and the existing park and ride system. The recommendations sought to maximize the operating efficiency of this system and establish an identifiable park and ride service within the AATA system plan. The second section included recommendations focused on developing expanded transit service throughout Washtenaw County, including developing the next ring of park and ride facilities. These "service expansion recommendations" identified potential opportunities for expanding the AATA system, looked at placing new park and ride facilities closer to the residential origins being served, and focused on generating greater commuter choice ridership in the system.

City of Ann Arbor Northeast Area Transportation Plan

The Northeast Area Transportation Plan (NEATP) was completed in August 2006. This plan evaluated the combined traffic impact of the existing and future (planned or unplanned) population and employment in the Northeast Area. Overall, the Northeast Area Plan addresses one of four planning areas in Ann Arbor and is an element of the City's Master Plan. The Northeast Area is bounded by M-14 to the north, US-23 to the east, Washtenaw Avenue to the south and Huron River/M-14 to the west.

City of Ann Arbor Parks & Recreation Open Space Plan

The Park and Recreation Open Space (PROS) Plan for 2006 to 2011 is the most recent update of the parks and recreation plan for the city and was completed in January 2006. The plan states it wants to reflect tradition; to provide a balance of parks, facilities and programs; to respond to the needs of today; and to set a direction for the future. The plan is also intended to facilitate the airing and evaluation of major issues, problems, and potentials, the setting of priorities for the next five years, and the identification of goals and objectives that reach further into the future.

City of Ann Arbor's Model for Mobility

Ann Arbor Mayor John Hieftje introduced his "Model for Mobility," a transportation vision for the City in June 2006. Key elements of this transportation vision include expansion of the City's bus system and construction of a commuter rail and circulator system to support a region-wide vision of mobility and to reduce Ann Arbor's over-reliance on auto travel.

The Mayor outlined three key components of the Model for Mobility vision:

- An east-west regional transit route that would link the central core of Ann Arbor, including the downtown, University of Michigan Central Campus and the University of Michigan Medical Center, with communities in southeast Michigan.
- A possible north-south rail connection that would use the existing railway between Ann Arbor, Milan and Howell, including portions of the Ann Arbor Railroad and the TSB Railway's operating territory.
- A local connector system that would link the two regional railroads, with the system running from downtown and through the Central, Medical, and North campuses of the University of Michigan.

Each of the three major transportation components was thoroughly assessed by demographic growth, economic development, travel patterns, and transportation infrastructure facilities. In addition, the report identified the current issues and deficiencies as well as the future opportunities and improvement recommendations for those key travel components.

The Mayor presented the long-term planning strategies and encouraged agencies' collaborations at all levels. He also showed great enthusiasm and support for the Ann Arbor–Detroit regional rail corridor by providing leadership in SEMCOG's planning process and seeking the institutional and financial mechanisms to sustain this regional project.

In addition to the recommended roadway improvements, the report also suggested the recommended transit and non-motorized improvements in order to meet mobility and land use goals and maintain or enhance the character of the area.

DDA Downtown Parking Study

The DDA Downtown Parking Study was conducted in 2007 as the first step in the City's pursuit of a comprehensive parking strategy for Downtown. Phase I of the study focused on analysis of the existing parking supply and demand, and parking perceptions from the user end. Phase II of the study developed parking policy recommendations.

Recommended actions and other information on this study can be found in Appendix B.

WATS Transportation Improvement Program (TIP)

The Washtenaw Area Transportation Study (WATS) is a local Transportation Management Association (TMA) and covers the City of Ann Arbor. WATS allocates federal and other transportation funding resources for Washtenaw County and provides planning to reflect the region's shared vision for its future. Short-term commitments for transportation funding for the county is summarized through the transportation improvement program (TIP) for the county. Information on the current 2008-2001 TIP can be found in Appendix B.

2030 Long Range Transportation Plan for Washtenaw County

WATS also develops a Long-Range Transportation Plan for Washtenaw County. The last adoption of the long-range plan was in June 2004 and was reaffirmed in 2007 and includes 410 capital transportation improvements and 18 operating improvements for the Washtenaw County area. The plan was incorporated into the regional plan and approved by the Southeast Michigan Council of Governments (SEMCOG) as the overseeing regional metropolitan planning organization for the southeast Michigan area.

The plan lists transportation improvements to address six deficiencies that were identified, including: congestion, safety-intersection, bridge, transit, pavement, and non-motorized. Of the transportation improvements that were identified, both those that could be funded using the financial forecasts are included in the plan, as well as unfunded improvements. Information on the current 2030 Long Range Transportation Plan for Washtenaw County can be found in Appendix B.

Transit Plan for Washtenaw County

WATS recently finalized the Transit Plan for Washtenaw County, which was adopted February 2008. This plan reviewed the existing transit service within the entire Washtenaw County area and made recommendations such as linking cities and villages to the Ann Arbor urbanized area, establish park and ride lots, increasing existing service, provision of dial-a-ride service throughout the county, and linking neighboring counties to the Ann Arbor urbanized area.

Non-Motorized Plan for Washtenaw County

WATS developed a non-motorized plan for Washtenaw County which was completed in September, 2006. The purpose of this plan was to identify the county's existing non-motorized facilities, to establish a future conceptual network for non-motorized facilities as expressed through a list of improvements and adopted policies, and to identify sources of funding for future additions to the county's non-motorized network. The plan was intended to assist local officials and developers by providing guidelines for the inclusion of non-motorized facilities as part of the land use and plan review process for new development. Further information for this plan can be found in Appendix B.

Detroit to Ann Arbor Rapid Transit Study

SEMCOG embarked on a study of the development of high-capacity rapid transit service between City of Ann Arbor and Downtown Detroit in 2004. The study is to seek the effective approach and analyze the options for providing reliable and efficient rapid transit service for this critical transportation corridor. The purpose of the study is to enhance the overall regional transportation system, to improve the transportation efficiency and mobility, to provide alternative transportation options for commuters, and to encourage and improve the region's economic competitiveness.

A set of preliminary alternatives was identified for this study. These alternatives were identified based on an assessment of transit needs for the corridor and previous transportation studies.

These preliminary alternatives include:

- *No Build Alternative*: existing transit services in the corridor and transportation improvements that are currently programmed for implementation.
- *Transportation System Management (TSM)/Baseline Alternative*: best transit service improvements that can be provided in the study area without a major capital investment, such as that required for a transit guideway.

- *Build Alternatives*: require more significant capital investments associated with the construction of transit guideways, such as busways, railways, and stations. The three build alternatives considered included:
    - Bus rapid transit (BRT)
    - Light rail transit (LRT)
    - Commuter rail transit (CRT)

Southeast Michigan Council of Governments Regional Transportation Plan (RTP)

SEMCOG also develops a Long-Range Regional Transportation Plan, which typically incorporates those recommendations from the WATS RTP. The seven-county SEMCOG region maintains a 25-year long-range vision for transportation. It serves as a guide for developing a transportation system that is accessible, safe, and reliable and contributes to a higher quality of life for the region's citizens. The plan's policies, initiatives, and projects are implemented by SEMCOG and its partners. Projects to be implemented in the near term are included in the region's short-range Transportation Improvement Program. The last SEMCOG RTP was adopted in November 2004.

Michigan Department of Transportation Long Range Transportation Plan

The Michigan Department of Transportation recently finalized a long-range Transportation Plan for the state of Michigan in June 2007. This plan reviewed every aspect of Federal/State-owned transportation in several technical reports. The goals are to preserve, modernize, enhance, improve efficiency on existing facilities, and improve safety. Several corridors were listed as Corridors of National/International Significance, including I-94 between Chicago and Detroit, going through Ann Arbor. Figure 4-1 provides the MDOT corridors of significance. Two other corridors, US-12 and US-23, are listed as corridors of Statewide Significance.

Other Plans

Other plans of importance to this Transportation Plan Update are the Wayfinding Analysis and Recommendations Document for the Ann Arbor DDA, the State Road Corridor Study, the Huron, Fifth, and Division Streetscape Traffic Impact Study, and the Ann Arbor Discovering Downtown (A2D2) plans. Information on these studies can be found in Appendix B—Previous Plan Recommendations.

Figure 4-1: MDOT Corridors of Significance

Existing Conditions

The existing conditions section outlines the existing transportation system infrastructure and services within and affecting the City of Ann Arbor. The system has a wide breadth and comprises various modes of transportation including roadways used by vehicles and transit, non-motorized pathways, railroads, and air access. Travelers and freight can access Ann Arbor via private cars and trucks, public bus transit, taxi, private bus, passenger rail, freight rail, and commercial and private airplanes. Travelers can also use non-motorized modes such as walking and biking to travel around Ann Arbor.

The information gathered in this chapter will be used to understand the existing network, help identify short term improvements, and to build on for the future analysis to make recommendations for the transportation plan update. A large amount of existing conditions information was gathered, but not all of it is included in the text in this chapter. More detailed information on existing conditions can be found in the Appendix C—Existing Conditions.

Roadways

The Roadways Section examines existing conditions on the Ann Arbor roadway network, specifically conditions for motor vehicles. It should be noted that while this section includes information for motor vehicle users, the transportation system in Ann Arbor is for all users and modes of travel. Other users are addressed in later parts of the chapter.

Roadway Network Capacity

Roadway Capacity, as measured by traffic congestion, is an important measure to help determine the overall health of the roadway network. Traffic congestion for motor vehicles on the transportation network can be determined by comparing average daily traffic volumes to the vehicular capacity of the roadway. Roadway capacity is typically dictated by the functional classification and the number of travel lanes. This section assesses the current operational performance of the roadway network within Ann Arbor.

Two types of traffic volume information were used to evaluate congestion within the city: Average Daily Traffic (ADT) volumes for roadway segment operations, and peak hour turning-movement volumes for intersection operations. Levels of service for roadway segments in between intersections are typically calculated by comparing peak hour traffic volumes to the capacity of the roadway based on the number of lanes.

With regards to the Ann Arbor roadway network, traffic volumes within the city are consistent with typical functional classification, with higher classified roadways typically carrying higher traffic volumes.

The roadways in Ann Arbor that have a daily volume-to-capacity ratio greater than 1.0 (where the volume of traffic on the roadway is greater than the capacity) include:

- US 23 between I-94 and M-14 EB
- M-14 from Main Street to the M-14 WB/US 23 interchange
- I-94 between US 23 and State Street
- Huron Parkway between Fuller/Geddes Road and Hubbard Street
- Depot Street between Main Street and Fuller Road
- Eisenhower Parkway between Main Street and Boardwalk Street
- Fuller Road between Maiden Lane and Glazier Way
- Jackson Road between Wagner Road and I-94

- State Street between Hill Street and Stimson Street
- State Street between Eisenhower Parkway and Ellsworth Road
- Main Street between Packard Road and Kingsley Street
- Barton Drive between US 23 and Plymouth Road
- Beakes Street between 5th Avenue and Maiden Lane
- Hill Street between Packard Road and E. University Avenue

Figure 4-2 illustrates the 2005 daily congestion levels throughout the study, with the volume-to-capacity (v/c) ratio representing traffic volumes on the roadway compared to the capacity of the roadway.

Intersection Operations

Intersection capacity analysis is the traditional form of measuring operational performance, as intersections control the flow of most roadways. Intersection capacity is a function of a calculated delay experienced by the average vehicle due to the intersection control.

Sixteen congested intersections within the city were selected to study current intersection operations. Peak hour turning-movement counts were conducted during the month of September 2007, for the 7 to 9 AM morning peak period and 4 to 6 PM afternoon peak period.

The AM and PM peak traffic counts and current traffic signal timings for the 16 intersections were entered into Synchro Studio 7, a traffic modeling software suite. Level of service (LOS), a grading system used in traffic engineering where LOS A is uncongested and LOS F is very congested, was used for the fifteen intersections was evaluated during the AM and PM peak hours.

The intersections with a LOS of F (very congested) are:

- State Street and S. University Avenue (AM & PM)
- State Street and Hill Street (AM & PM)
- State Street and Monroe Street (AM & PM)
- State Street and Hilton Boulevard (AM & PM)
- Huron Parkway and Plymouth Road (AM & PM)
- Monroe Street and Tappan Street (PM)
- Hill Street and Tappan Street (PM)
- S. University Avenue and Tappan Street (PM)
- Oakland Avenue and Hill Street (PM)
- Oakland Avenue and Monroe Street (PM)
- State Street and Ellsworth Road (PM)
- State Street and Airport Drive (PM)
- Liberty Road and Scio Ridge Road (PM)

Figures 4-3 and 4-4 illustrate the AM and PM peak hour levels of service at the study intersections. The figures also provide the existing levels of service for other intersections within Ann Arbor as collected from other recent studies (last five years) provided from the City. Appendix C provides more detail on the intersection operational analysis.

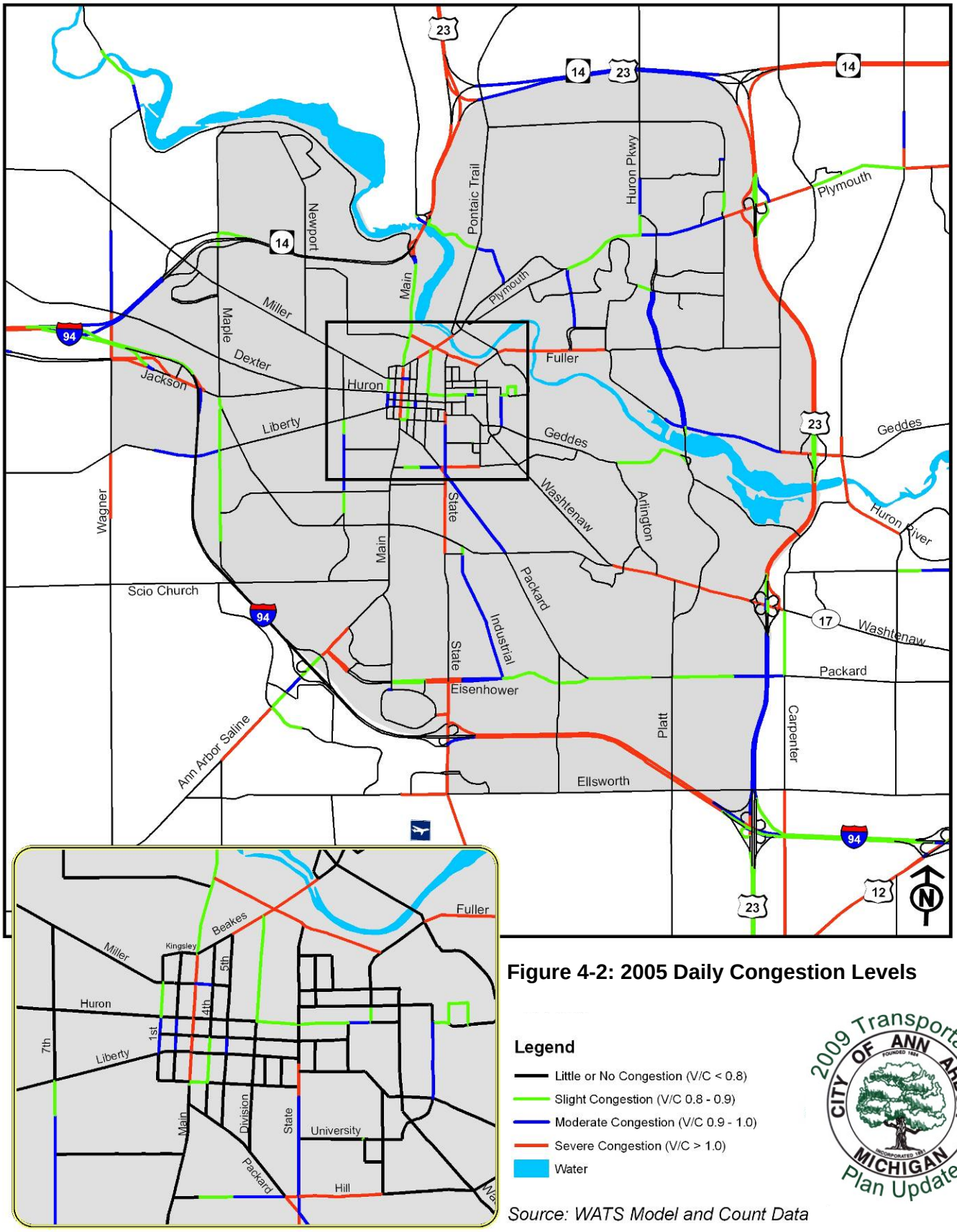


Figure 4-2: 2005 Daily Congestion Levels

Source: WATS Model and Count Data

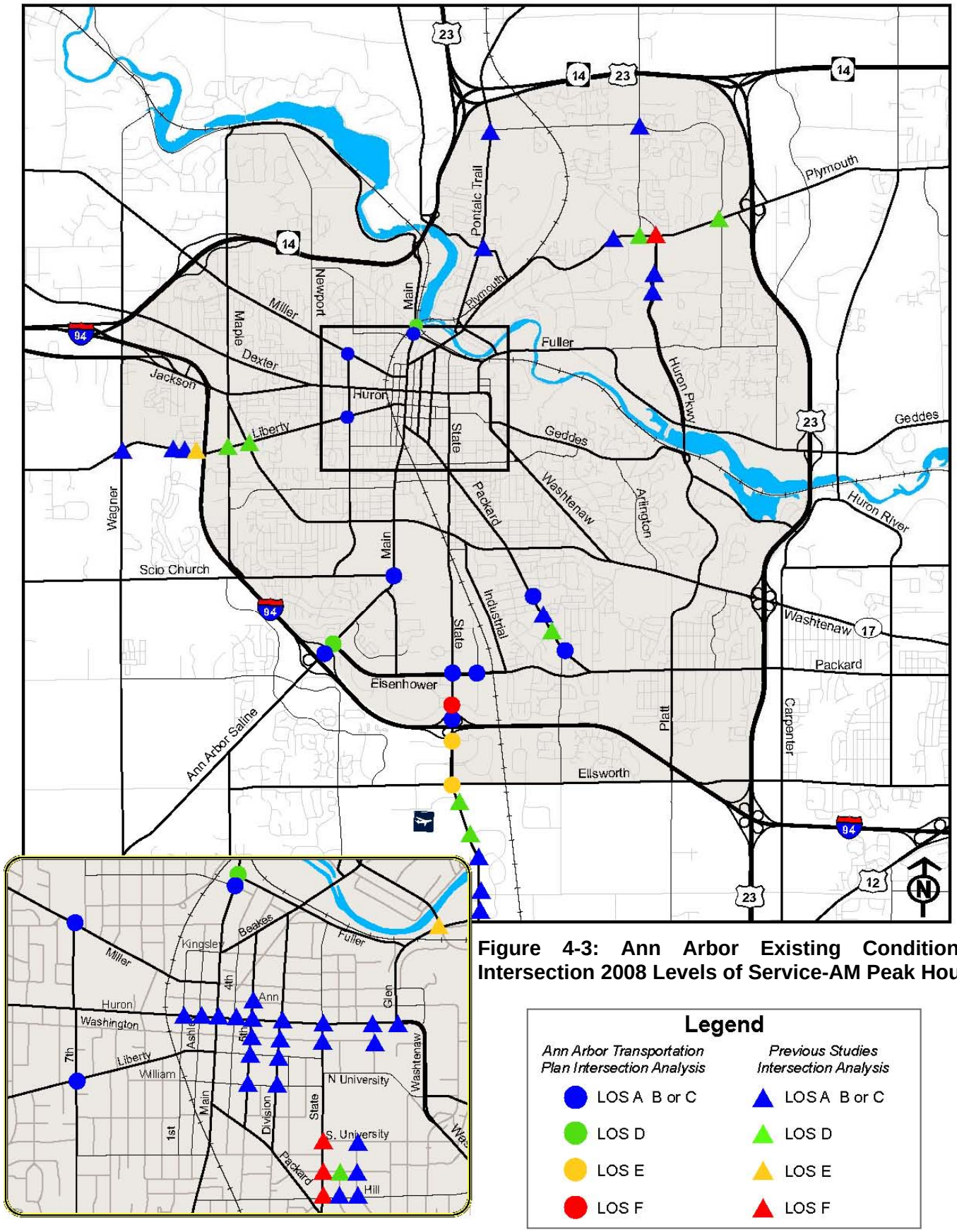


Figure 4-3: Ann Arbor Existing Conditions Intersection 2008 Levels of Service-AM Peak Hour

Legend

Ann Arbor Transportation Plan Intersection Analysis	*Previous Studies Intersection Analysis*
LOS A B or C	LOS A B or C
LOS D	LOS D
LOS E	LOS E
LOS F	LOS F

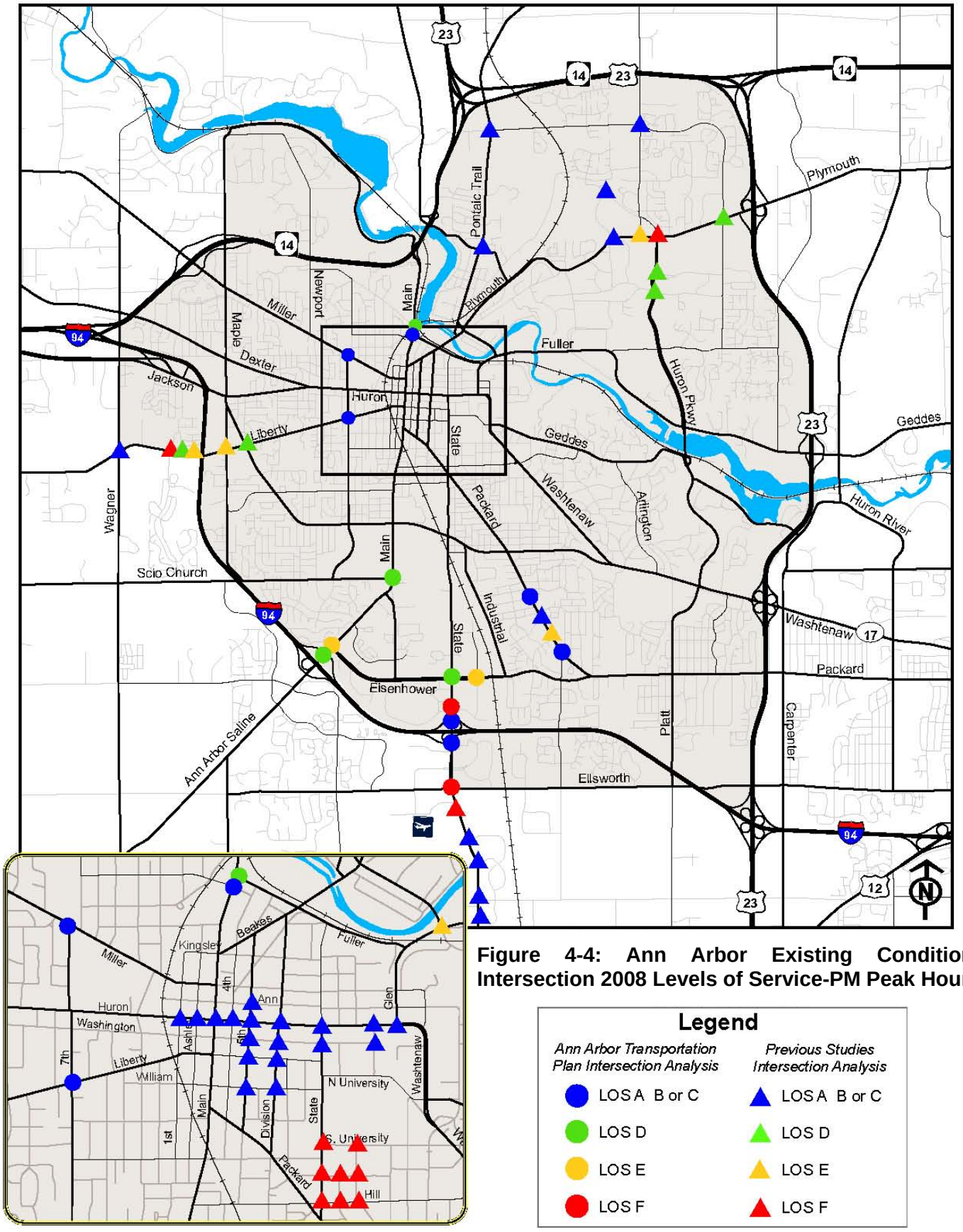


Figure 4-4: Ann Arbor Existing Conditions Intersection 2008 Levels of Service-PM Peak Hour

Crash Analysis

A crash study looks at three years (2003-2005) of crash data in order to identify deficiencies in the roadway system and suggest design improvements or solutions to reduce the number of crashes. Sixteen study area intersections were identified as critical crash locations based on the thresholds for crash frequency and crash rate as defined by SEMCOG.

The thirteen high priority crash locations within the City of Ann Arbor are as follows:

- State Street at Victors Way (98 crashes)
- Huron Street at Main Street (85 crashes)
- Packard Street at Stadium Boulevard (71 crashes)
- First Street at Huron Street (64 crashes)
- Fifth Avenue at William Street (59 crashes)
- Hill Street at State Street (57 crashes)
- Church Street at South University Avenue (39 crashes)
- Platt Road at Washtenaw Avenue (36 crashes)
- Fletcher Street at Huron Street (30 crashes)
- Maple Road at WB M-14 Ramp (26 crashes)
- Eisenhower Parkway at Plaza Road (24 crashes)
- Eisenhower Parkway at Northbrook Place (21 crashes)
- State Street at South University Avenue (21 crashes)

Figure 4-5 indicates the location of the intersection critical crash locations.

State Street Corridor Analysis

As part of the existing conditions evaluation, the State Street corridor between Ellsworth Road and Eisenhower Parkway was identified as a corridor with special operational and safety needs. The full findings of this analysis can be found in the Appendix C.

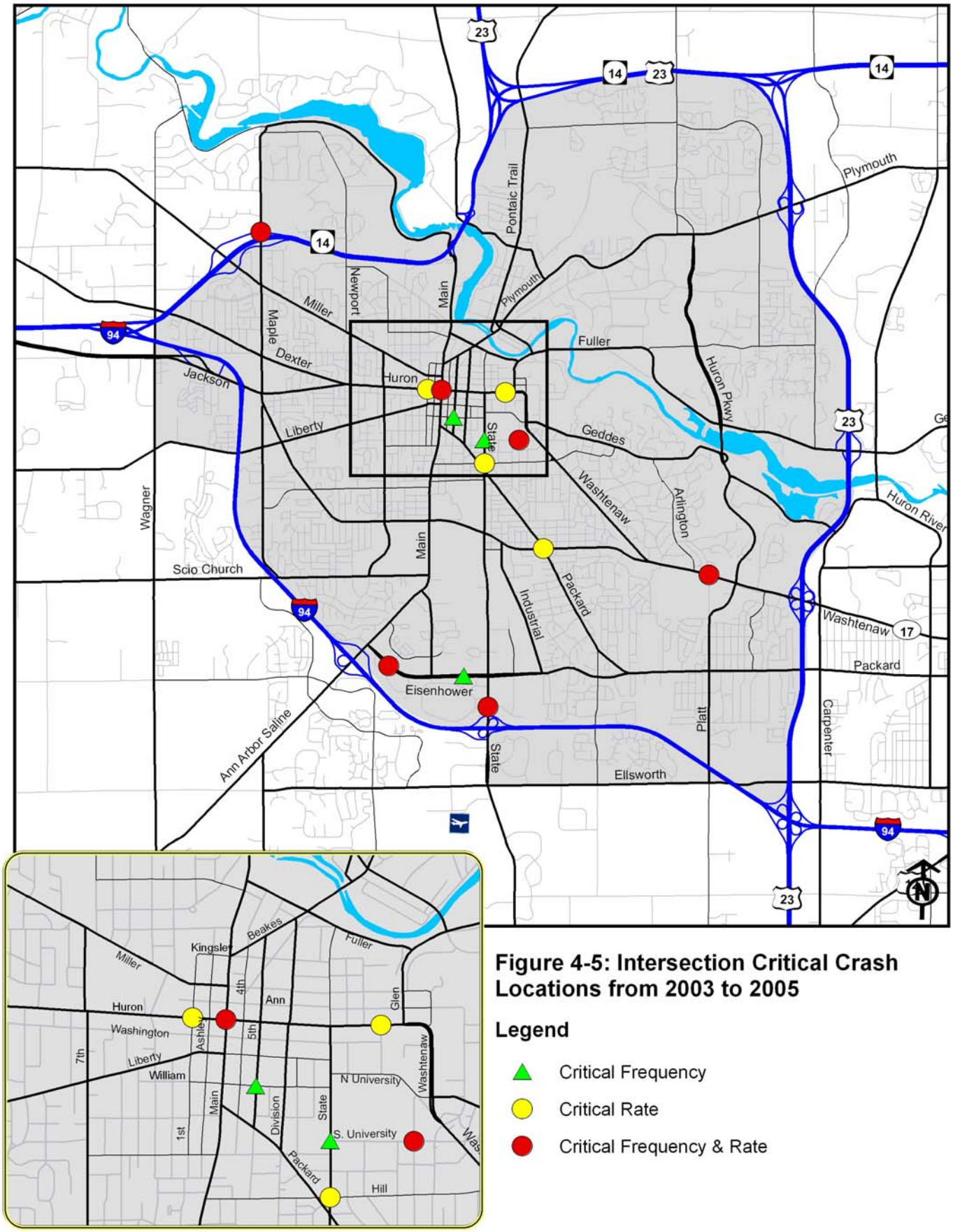


Figure 4-5: Intersection Critical Crash Locations from 2003 to 2005

Legend

- Critical Frequency
- Critical Rate
- Critical Frequency & Rate

Transit Services

The main transit provider in Ann Arbor is the Ann Arbor Transportation Authority (AATA), which provides local public transit to the city itself and parts of the surrounding region. The University of Michigan Parking and Transportation Services (UM PTS) also provides public transit, serving the university population and its environs.

AATA

AATA currently operates 26 fixed service routes within their service area, 14 of which operate entirely within the City of Ann Arbor. This total does not include The Link, which is a seasonal operation. AATA typically adjusts their service schedule three times a year – January, April, and August – which reflects the seasonal fluctuations that occur due to UM students.

According to their submittal to the National Transit Database (NTD), in 2006 AATA had a fleet of 69 buses, 58 of which are used during maximum service. The NTD report also reveals that for 2006 AATA ran 2,403,730 vehicle miles, had 5,338,018 annual unlinked trips, and operated 182,730 vehicle revenue hours. AATA's operating expenses in 2006 were $22.1 million.

Analysis conducted as part of the Ann Arbor Transit System Development Report concluded that none of the routes had capacity constraints and that no overcrowding was occurring on AATA bus routes at any time of day. However, since the Development Report was finished at the end of 2006 AATA has seen an increase in ridership to the point where many routes do experience overcrowding.

Most routes on the AATA system run at 30 minute frequencies all day. Recently though, AATA has changed its schedule to include higher frequency service, especially in response to overcrowding on certain routes (many people standing). As of 2008, eight corridors have either 15 minute frequencies, or coverage from more than one route that results in less than 30 minutes between buses, but not all bus stops are the same for the multiple routes. Those corridors include:

- #2 Plymouth
- #4 Washtenaw
- #5 Packard
- #6/#36 State
- #7/#16 S. Main
- #12A-B/#12 UL Liberty
- #12 A-B/#12UM Miller
- #9/#9U Jackson-Huron

Additionally, in August 2007 AATA began running the #2X Plymouth Route, an express bus with limited stops during AM and PM peaks.

AATA Stops with Highest Volume

The following sixteen stops located in Ann Arbor account for approximately 30 percent of all boardings on the AATA system:

Table 4-1: Top weekday boarding locations for AATA stops in Ann Arbor

Stop Name	Total Weekday Boardings	Percent of total boardings
Oxford south of South University	1278	4.29%
Blake Transit Center - 4th Ave (12s)	769	2.58%
Briarwood Mall - Sears	685	2.30%
Blake Transit Center - 4th Ave (4,2)	644	2.16%
Blake Transit Center - 4th Ave (3,9)	617	2.07%
Blake Transit Center Mall (8)	593	1.99%
Wolverine Tower at Entrance #C	579	1.95%
Blake Transit Center Mall (5)	569	1.91%
Arborland #3 4IB	528	1.77%
Blake Transit Center Mall (6,16)	499	1.68%
Ingalls Mall	429	1.44%
Arborland #1 22IB	428	1.44%
East Medical Ctr Dr at E Hospital	347	1.17%
Blake Transit Center	332	1.12%
South Geddes Ave. west of Church St	319	1.07%
South University east of State	290	0.97%

AATA Corridors with Highest Volumes

The following table shows the corridors in Ann Arbor with the highest number of daily boardings in 2008. The data did not include ridership data on individual routes, and thus was presented as boardings for the corridor as a whole. As a result, the corridor analysis could not show boardings within the downtown/UM core, which is why it is listed separately.

Table 4-2: AATA Daily Boardings on Select Corridors

Corridor	Limits	Inbound	Outbound	Other*	Total
State	Between Eisenhower and N. University	756	422	580	1,758
Washtenaw	Between US23 and Observatory	761	688		1,449
Plymouth	Between Depot and Green Park and Ride	746	237		983
Miller	Between M-14 Park and Ride and Main	277	68	196	541
Jackson/Huron/ Dexter	Between Main and Wagner	354	162	4	520
Ann Arbor-Saline/S. Main	Between I-94 and William	54	55	195	304
Liberty	Between Main and Maple	133	40	110	283
Downtown/UM Core	Ann Arbor DDA Boundary and UM Medical Campus				6,772

**Other includes Loops or Park and Ride lots*

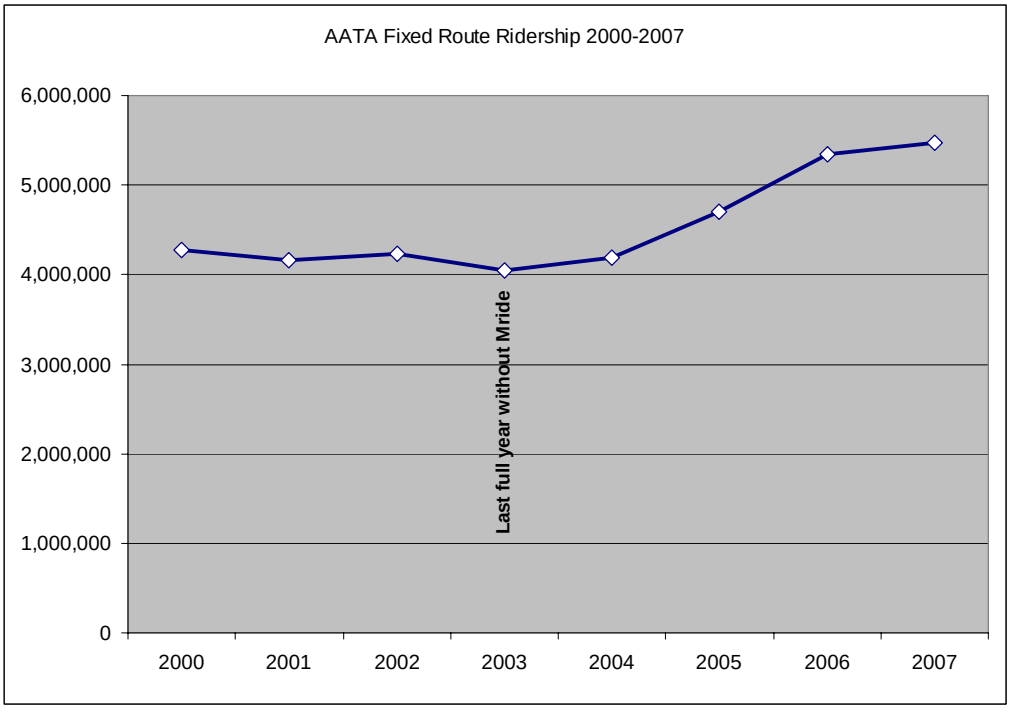
MRide

The University pays AATA to allow those carrying a University ID (a yellow MCard) to ride for free on AATA fixed routes, a program known as MRide. For the period between September 2006 and August 2007, over 2.1 million riders used the MRide program. This is a 23.9% increase from the August 2004-September 2005 period, the first full year of MRide.

Ridership growth due to MRide was initially slow due to implementation in August 2004 when most UM students already had housing for the 2004-2005 school year, and student housing choices were made on the assumption the MRide program was not in effect. As UM students became familiar with MRide, housing choices along AATA routes became more common and ridership increased. The routes with the largest MRide ridership are (highest first): Routes #2-Plymouth, #36-Wolverine Tower Shuttle, #4-Washtenaw, and #6-Ellsworth. Figure 4-6 details AATA ridership for the past eight years, including a large increase in riders after the introduction of MRide.

AATA routes and facilities are detailed in Figure 4-7.

Figure 4-6: AATA Fixed Route Ridership, 2000-2007



University of Michigan

The University of Michigan's Parking and Transportation Services runs ten fixed service routes that operate at various times throughout the year. Six of these routes run all year long, typically serving year-round graduate student housing and highly-concentrated employment areas such as the UM Health System hospitals. Four routes are seasonal and are only available during the main UM Fall and Winter semesters. According to NTD, UM PTS has a fleet of 58 buses, 34 of which are used during maximum service. The NTD report also reveals that for 2006, UM PTS ran 956,788 vehicle miles, had 5,682,304 unlinked trips, and operated 100,291 vehicle revenue hours. The operating expenses for UM's transit service were $5.2 million in 2006.

UM Stops with Highest Volume

- CC Little / Museum
- Pierpont Commons (North Campus)
- Michigan Union / Museum of Art
- UM Medical Campus – Markley Dormitory

The Michigan Union, CC Little/Museum, Museum of Art, and UM Medical Center are stops served by both AATA and UM routes, and have among the highest volumes in each system. These stops serve as major transfer points.

Figure 4-8 details the routes provided by University of Michigan Parking and Transportation Services.

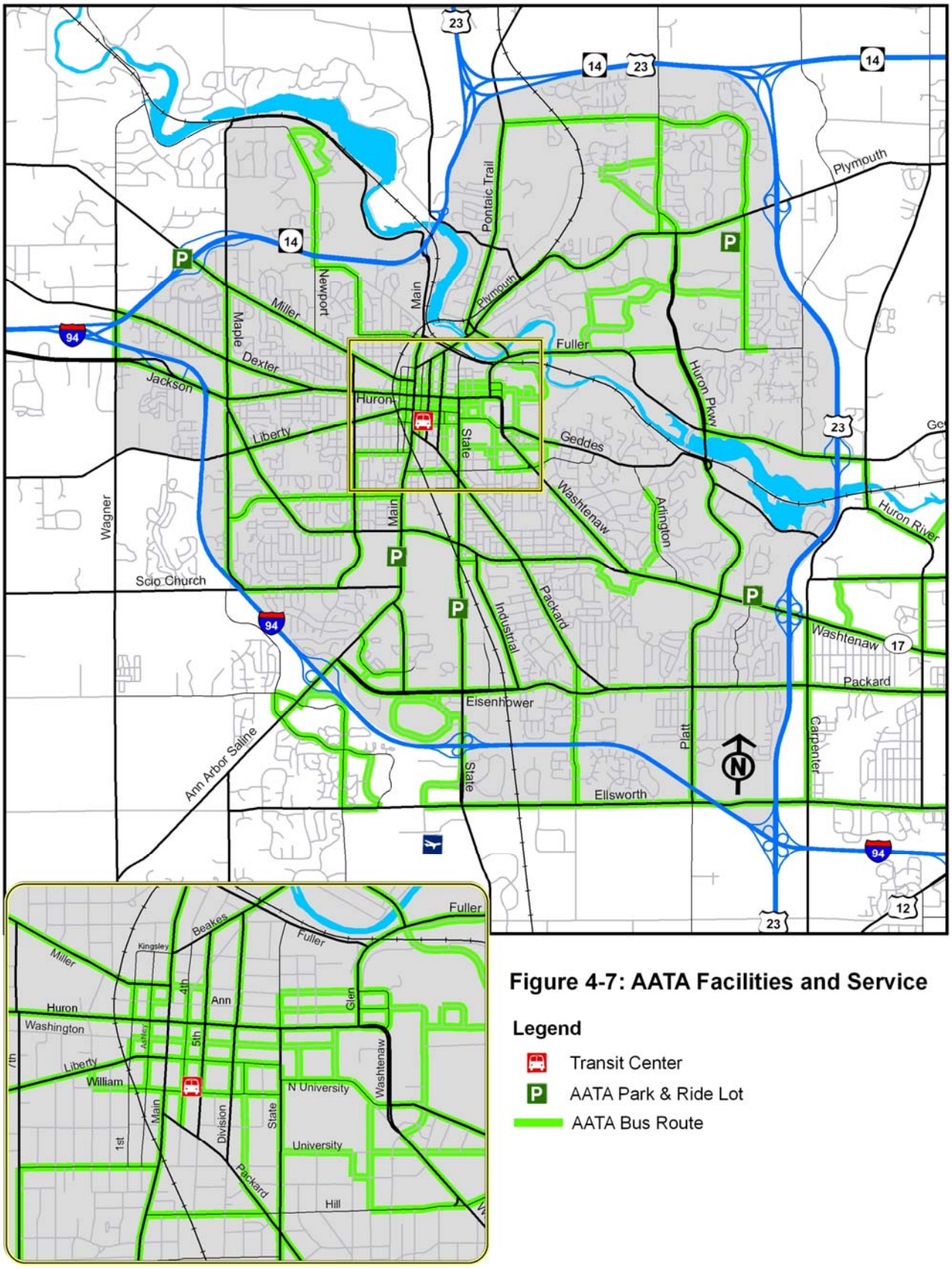


Figure 4-7: AATA Facilities and Service

Legend

- Transit Center
- AATA Park & Ride Lot
- AATA Bus Route

**Routes as of June 2007*

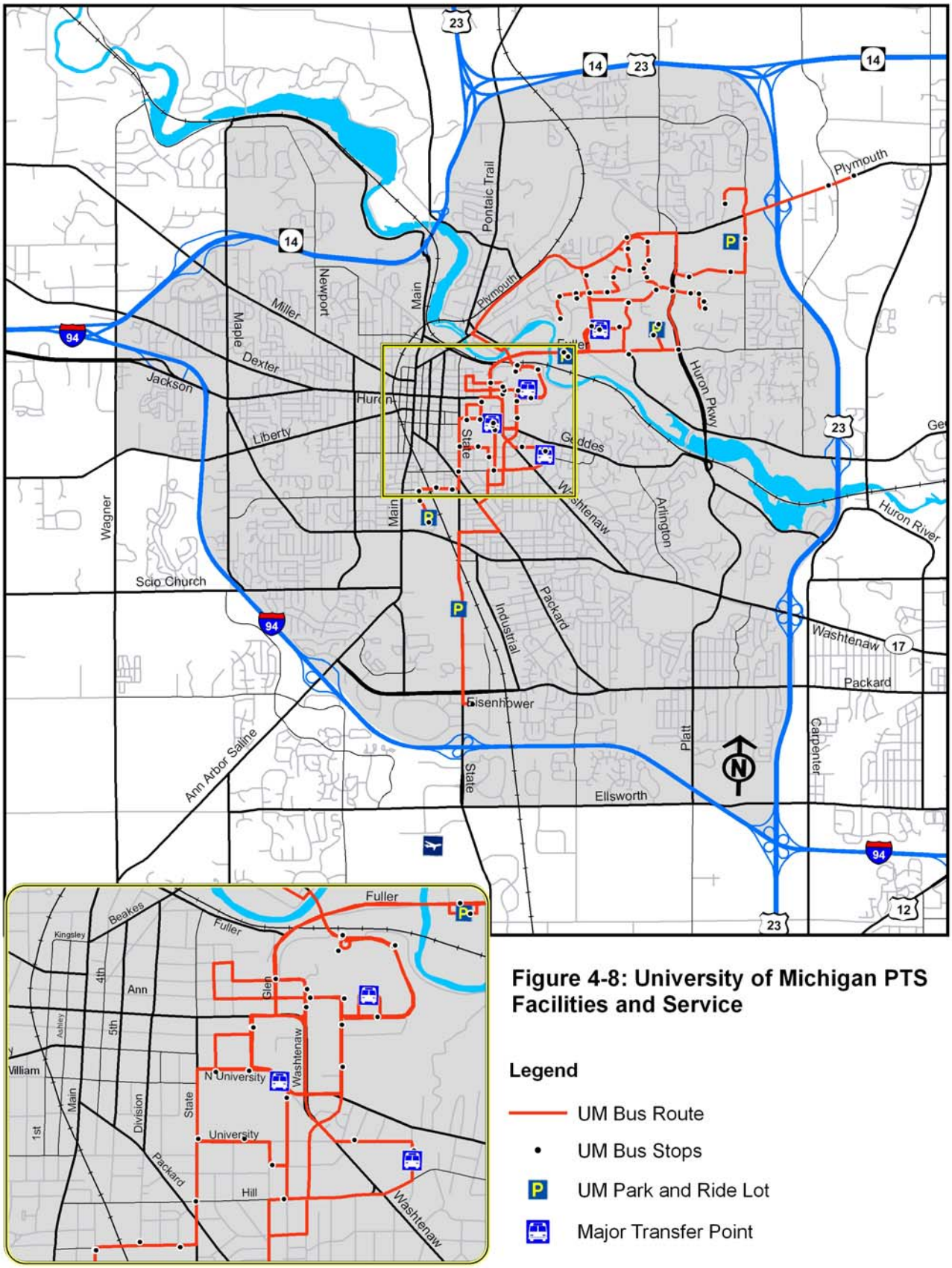


Figure 4-8: University of Michigan PTS Facilities and Service

Non-Motorized Facilities

Non-Motorized facilities in Ann Arbor are vital to the transportation network, as witnessed by the 18% of commuters (compared to 1-2% nationally) that bike and walk to work or school within the city. In 2006, the City of Ann Arbor approved the Non-Motorized Transportation Plan for the city. The purpose of the Non-Motorized Plan was to present the existing non-motorized conditions within the city and provide a blueprint for implementation of non-motorized improvements for the future.

The City of Ann Arbor's non-motorized network has developed into two distinct patterns. The older parts of town, including the Downtown, near north side, near west side, and Burns Park area generally have a grid street pattern and about half of the primary roads are only two to three lanes wide. Pedestrian and bicycle travel in these areas is generally easy and comfortable.

The newer areas of Ann Arbor, including the northeast area, south area and development around the freeway loop, are scaled for automobile use. Few arterial and collector alternatives exist in these areas for bicyclists and pedestrians. Bicycles and pedestrians are directed into corridors with the highest concentration of vehicular traffic.

It should be noted, however, there is currently very little pedestrian or bicycle volume data for facilities in Ann Arbor available for inclusion into this section. More information on the Non-Motorized Plan itself can be found in Appendix B—Previous Plan Recommendations. Information on Non-Motorized Facilities can be found in Appendix C—Existing Conditions.

Non-Motorized Analysis

Vehicle crashes involving pedestrians and bicyclists were evaluated by using available crash data from 2003 to 2005, the last three years where complete data was available. Intersections with an average of one or more pedestrian/bicycle crashes per year were reviewed as well as any location where a pedestrian/bicycle fatality or serious injury (A-type) occurred. This can be especially important in a university town such as Ann Arbor where there are more student pedestrians than in a typical urban or suburban setting with non-grid street design.

The citywide analysis for pedestrian crashes found that there was a total of 126 pedestrian/vehicle crashes over the three-year period with an average of 42 crashes per year. Thirteen crashes were classified as serious (either fatalities or A-level crashes). Figure 4-9 shows the location of pedestrian crashes for the three year period.

The citywide analysis for bicycle crashes found there were 119 bicycle/vehicle crashes, which averages to 39 crashes per year. Four of these crashes were classified as serious (all four were A-level crashes). Figure 4-10 shows the location of bicycle crashes for the three year period.

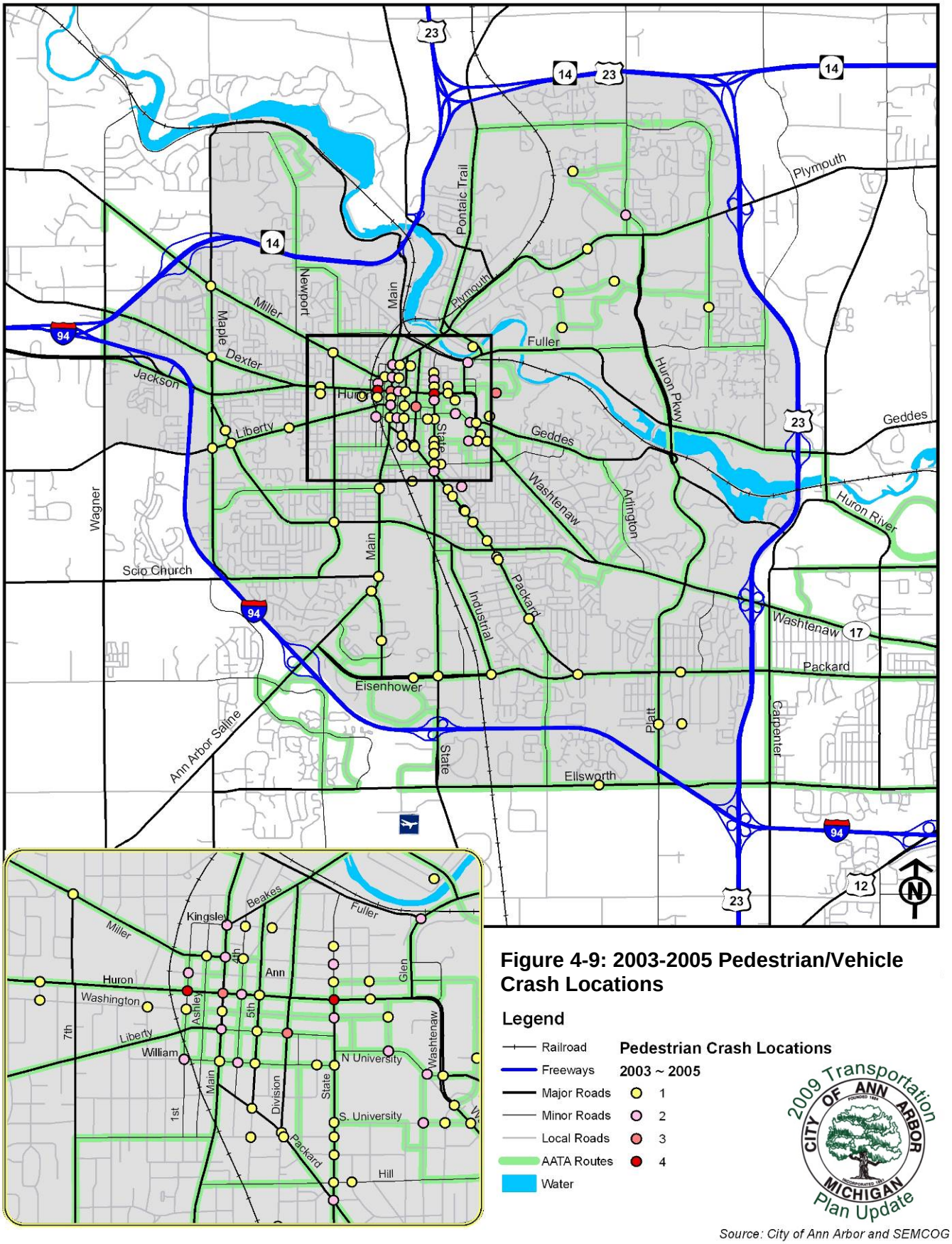


Figure 4-9: 2003-2005 Pedestrian/Vehicle Crash Locations

Legend

- Railroad
- Freeways
- Major Roads
- Minor Roads
- Local Roads
- AATA Routes
- Water

Pedestrian Crash Locations
2003 ~ 2005

- 1
- 2
- 3
- 4

2009 Transportation Plan Update

Source: City of Ann Arbor and SEMCOG

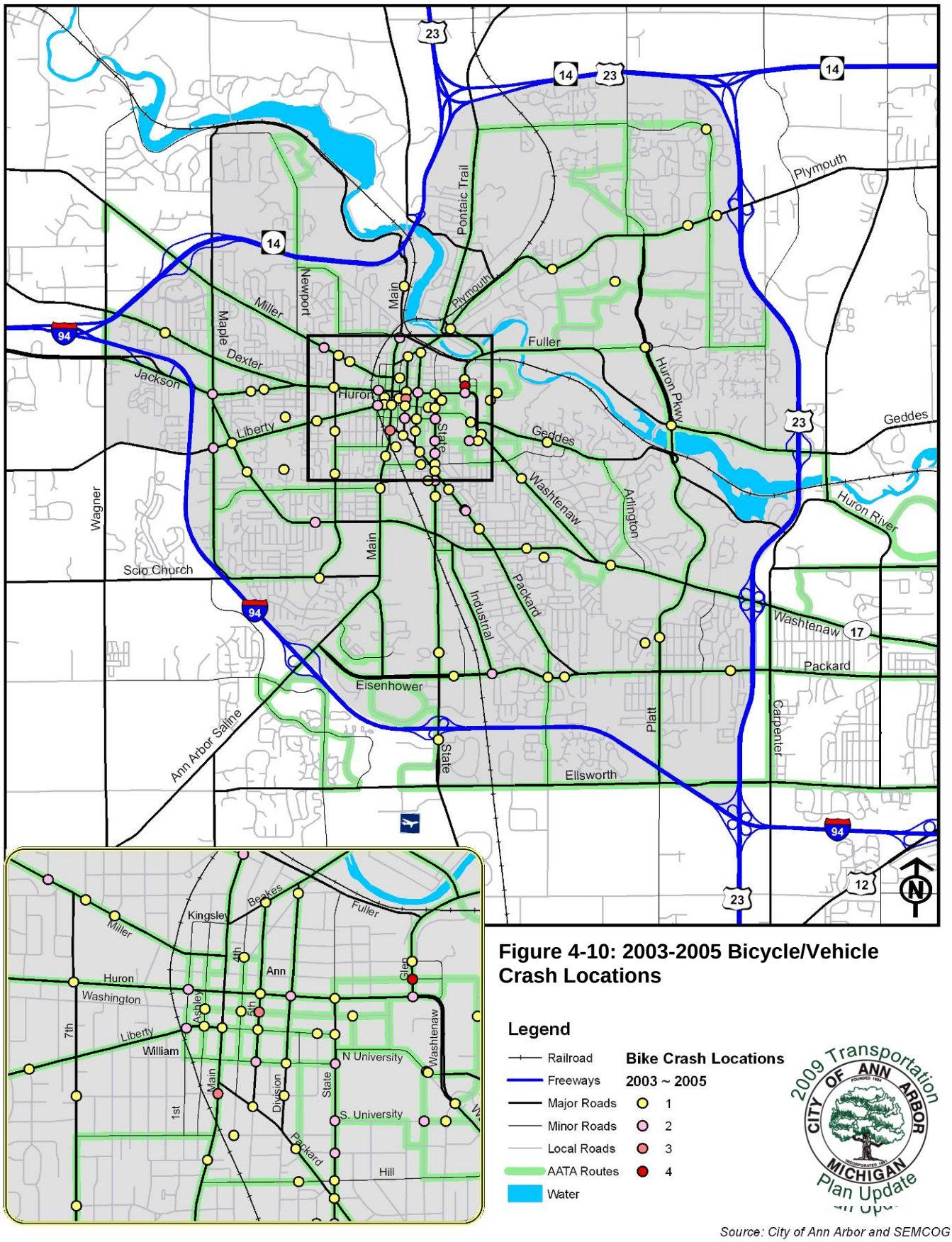


Figure 4-10: 2003-2005 Bicycle/Vehicle Crash Locations

Legend

- Railroad
- Freeways
- Major Roads
- Minor Roads
- Local Roads
- AATA Routes
- Water

Bike Crash Locations
2003 ~ 2005

- 1
- 2
- 3
- 4

2009 Transportation Plan Update
CITY OF ANN ARBOR MICHIGAN

Source: City of Ann Arbor and SEMCOG

Parking

A variety of public parking options are available in downtown Ann Arbor to serve a range of transportation needs. These options include all-day off-street parking and on- and off-street short-term parking with convenient access to businesses, services, residences, and UM campus. Public and private parking facilities are available throughout downtown, including on-street parking, surface parking lots, and parking structures.

In January 2007, City Council adopted a work plan for a Comprehensive Parking Strategy project and in May 2007, a Recommended Parking Policy was released on the city's website. Recommendations of the Parking Study can be found in Appendix B--Previous Plan Recommendations. In addition, a map showing locations of on and off-street parking, can be found in the Appendix C—Existing Conditions.

On-Street Parking

The Ann Arbor Downtown Development Authority manages on-street paid public parking within the city and the City of Ann Arbor manages on-street parking enforcement, as well as the on-street residential parking permit program in the neighborhoods surrounding the core area. There are approximately 1,500 on-street metered parking spaces city-wide. Within the downtown area, most on-street parking is metered with half-hour, one-hour, two-hour and four-hour, and ten-hour limits. Two-hour meters are the most common among the short-term spaces. As such, the intent of on-street parking is to provide convenient, short-term access to businesses, and designed to limit occurrence of all-day parking.

Off-Street Parking

In addition to on-street parking, the DDA maintains 5,100 off-street parking spaces. There are 15 surface parking lots and six parking structures. Of the 22 parking lots/structure locations, eleven allow monthly permits including overnight/off peak permits.

University of Michigan Parking

The parking system at UM consists of 23,000 parking spaces located on-street, and in various surface lots and parking garages. Parking in many areas of central, north, and medical campus is difficult due to the myriad of students, faculty, staff, and visitors, all whom have different schedules and needs. Further complications arise from the fact that the UM campus includes a dense Central Campus core, an adjacent, active Medical Campus, and lower-density areas including various satellite buildings and North Campus.

Long term parking is available for faculty, students, and staff through the purchase of an annual parking pass, which can be paid for by the month or other arrangements. Short-term and visitor parking on Central Campus is available both at on-street meters and within parking garages that are typically located on the periphery of campus. For outer areas, short-term parking is available at various surface lots where patrons must pay money into an automated machine for their space.

Rail Facilities

Two rail lines traverse Ann Arbor, one in an east-west direction and one in a north-south direction. The east-west rail line is currently owned by Norfolk Southern and services freight movement and a limited number of passenger trains operated by Amtrak. There are twelve trains that use the east-west rail line daily, including six freight and six passenger trains.

Rail service to Ann Arbor is provided by Amtrak. The train station is located on Depot Street adjacent to downtown. The Amtrak Wolverine route provides service between Chicago and Detroit, with three eastbound and three westbound trains stopping in Ann Arbor each day. The trip to Detroit takes approximately one hour. However, the infrequency of service, the scheduling of trains during non-commuting times, and the relatively high fare makes commuting to downtown Detroit via Amtrak impractical.

Transportation Policy

There are several programs and policies that the City of Ann Arbor has started since the completion of the 1990 Transportation Plan Update. These programs and policies include getDowntown, go!pass, M-Ride, and AATA Rideshare.

getDowntown Program

The getDowntown program began in 1999 and is a partnership of the AATA, DDA, and City of Ann Arbor and the Ann Arbor Area Chamber of Commerce. This program provides information and assistance to downtown businesses and employees on alternative commuting options, such as biking, riding the bus, walking, and vanpooling.

go!pass

The go!pass is an unlimited use of an AATA bus pass available to employees who work within the Downtown Development Authority (DDA) boundary. The Ann Arbor DDA sponsors these passes for businesses located in the DDA District. Currently, the cost for a go!pass is $53/year;the DDA provides $48/year per pass and the employer provides $5/year per pass. Over 6,000 downtown employees received go!passes in 200/09.

M-Ride

Since August 2004, University of Michigan students, faculty, and staff are able to transfer and ride on AATA fixed route buses for free if they have a UM ID card. This is a five-year agreement.

AATA Rideshare

The AATA RideShare program is a free, publicly funded commuter service designed to inform people about less expensive and environmentally friendly commuting alternatives, including carpooling, vanpooling, public transit, bicycling, and telecommuting. The RideShare program also runs a ride-match program.

Traditional vanpooling consists of five or more passengers who share a ride in a privately owned van – or who lease a van on a month-to-month basis through the MichiVan Program. Volunteer drivers pick up others at specific points, drop them off at common sites and return them to the pickup point at the end of each day. In exchange for driving, the volunteer driver rides for free.

Land Use

An understanding of the relationship between land use and transportation is needed in order to proactively manage Ann Arbor's transportation system. The demand placed on facilities, whether motorized or non-motorized, is largely dependent upon the amount, type and intensity of land uses. Demand on these facilities during different times of the day is also affected by the types of land uses, which have different peak hour traffic characteristics.

Other land use related factors that can influence roadway congestion and travel patterns include the location and distance between land uses, the arrangement and connectivity of the roadway system and access characteristics along a roadway.

Compact land use patterns can reduce vehicle-miles-traveled by shortening distance people need to drive between home and destinations. In addition, pedestrian/transit-oriented development can eliminate some automobile trips by giving people other choices, such as transit, walking, or biking.

The City of Ann Arbor has a wide variety of land uses that range in character from a compact, traditional mixed use close to downtown to more suburban character in the outer areas of the City. Figure 4-11 shows the existing land use map.

The purchase of the Pfizer property by the University of Michigan allows for the property to be used/redeveloped. It is currently anticipated to be used for research. Any new building redevelopment should have multiple transportation modes accommodated, as well as addressing for the Plymouth corridor redesign.

Residential

Residential land use is the most dominant, occupying nearly 50% of the City. While single-family residential is the predominant residential use, 11% of the City is multiple-family residential. In and around the downtown residential tends to be a fine-grain mixture of single-family, two-family and multiple-family, often intermixed within the same neighborhood. These areas tend to be well designed for pedestrian travel and in turn are supportive of transit use. Student housing is also a major land use within the City with student housing in and around the University campuses. The density and arrangement of these uses is well suited for transit.

In the outlying areas of the City, uses tend to be more segregated into single family neighborhoods and multiple family complexes, following more modern development and zoning patterns. While pedestrian facilities are provided in these areas, the densities are not always supportive of transit, though there is the potential to encourage more bicycle use from these areas into the central core of the city.

Institutional

Public and institutional uses, including the governmental, education, religious, hospital and other institutional uses comprise over 10% of the City. The University of Michigan occupies a significant amount of land within the downtown and the northeast area of the City, and the University of Michigan Medical Center is also a major land use adjacent to the downtown. These uses tend to be major generators of trips by all modes of transportation and designed to accommodate pedestrians.

Recreational

The City of Ann Arbor has a large percentage of the City occupied by recreational uses (18%). This includes City parks as well as recreational land owned by the University of Michigan and the county.

Commercial

Commercial and office uses occupy approximately 7% of the City, which is typical for a city of this size. Commercial uses range from neighborhood shopping designed to serve residents of nearby neighborhoods to regional shopping intended to serve the overall county. There is a

concentration of commercial land use downtown, which is integrated into a compact mixed-use environment.

Outside of the downtown, most commercial land use occurs at nodes along major roadway corridors. Larger scale general and regional commercial tends to be clustered at locations where major arterials intersect with expressway interchanges, such as Arborland Shopping Center on Washtenaw Avenue at US-23 and Briarwood Mall on State Street at I-94. Many of these uses tend to be more automobile-oriented and attract a relatively large amount of vehicular trips, but proper redesign can also make these areas suitable to higher frequency transit. Transit access to and from the centers exist, but enhancements could be made to increase the attractiveness.

Industrial

Industrial land use area is somewhat limited, comprising less than 3% of the City. Smaller industrial sites have been historically located on the edges of the downtown along the rail corridors, while more modern industrial development has occurred on larger sites located in more outlying areas of the City near expressways.

Future Land Use

The City of Ann Arbor Master Plan consists of four subarea plans that cover the Central Area, the South Area, the West Area, and the Northeast Area of the City.

The Central Area Plan covers the downtown and surrounding neighborhoods. The downtown is considered a mixed-use urban neighborhood. Established residential neighborhoods to the west and southeast of downtown are to be protected from commercial encroachment. Multiple-family residential is planned for the interface area around the perimeter of the downtown. Institutional land uses comprise a large area with the University of Michigan facilities and other governmental and educational facilities. Parks and open space are located along the Huron River and in neighborhood parks. There are some limited industrial areas planned to remain along the rail corridor on the west side of downtown.

The South Area Plan covers the areas of the City south of Stadium and Washtenaw Avenue. This area includes a variety of land uses, with single-family detached residential being the most predominant. Areas are planned for office, research and industrial, and commercial along State Street. The Washtenaw Avenue corridor is planned for commercial near US-23 and single-family residential closer to the downtown, with a node of commercial, office and multiple-family residential near the intersection with Stadium Street. Areas along Main Street and Ann Arbor-Saline Road are planned for a mixture of single-family residential with a small amount of office and commercial.

The West Area Plan covers the area of the city west of downtown, south of the Huron River and north of the of Scio-Church Road. Single-family residential is the largest land use component for this area. There is a large area planned for commercial along Maple and Jackson Roads. Multiple-family is planned around the commercial areas to serve as a transition to the single-family residential. Office/research/light industrial are planned along North Main Street. Parks and open space are planned along the Huron River.

The Northeast Area Plan covers the area of the city north and east of the Huron River and the area between Washtenaw Avenue and the Huron River. The center of this area includes a large area planned for public and quasi-public, much of which is the University of Michigan North Campus. Industrial and research are planned along Plymouth Road. Much of the

remainder of this area is planned for a combination of single-family residential, multiple-family residential, and parks and recreation. Parks and recreation are also planned along the Huron River.

The future land use maps for the various areas of the City are generally consistent with the current zoning. There are some areas shown to convert from a 'Limited Industrial' to more of a 'Research and Development' as older industrial sites are redeveloped, such as along State Street and the northwest side of downtown. The plans also designate a number of "Study Sites" or "Specific Areas" for potential development/redevelopment areas. Detailed recommendations are provided for land uses in these study sites, many of which encourage a mixture of land uses, either a mixture of housing types or a mixture of residential and non-residential uses. Low density single-family areas with additional development potential are also identified for infill residential. Cluster development is recommended for sites that have significant natural features.

Conclusions

The key to recommending Ann Arbor's transportation future is in assessing what is Ann Arbor's transportation present. The existing conditions chapter has taken a comprehensive look at conditions for transportation as they exist in Ann Arbor today.

From all the information gathered, the overall theme in Ann Arbor is growth. While some growing communities experience an increase in a single mode of travel – private automobile – Ann Arbor is experiencing growth in all facets of travel. For roadway users this chapter identified both corridors and intersections where congestion could be considered a problem. The chapter noted the growth in AATA ridership since the start of the MRide program, and how some AATA routes are now experiencing overcrowding at peak times. The chapter also considered the increase in non-motorized users in Ann Arbor, as witnessed by the number of pedestrian/vehicle and bicycle/vehicle crashes that have occurred in the last three years.

Thus this chapter has identified the challenges and complications which Ann Arbor currently faces in their transportation system. Later chapters of this plan will use the conditions of the transportation system detailed here as the basis for recommendations for the future.

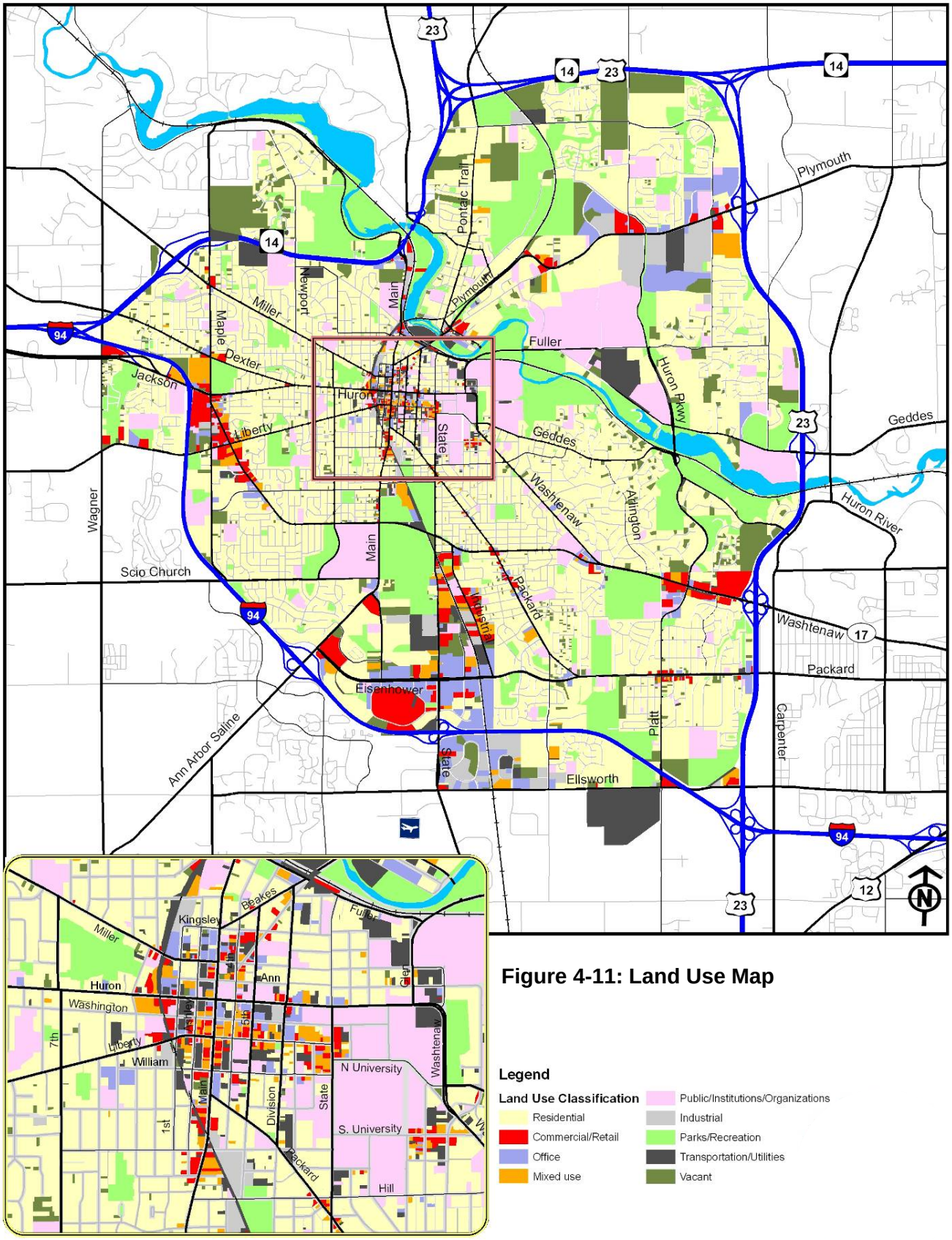


Figure 4-11: Land Use Map

Source: City of Ann Arbor Planning

Chapter 5: Future Conditions

This chapter is an overview of potential future conditions for the year 2030 in Ann Arbor if transportation projects and policy continue as they currently exist. In addition, it also assesses three increased land use alternatives and the impact to the transportation network if various improvements and policies are not implemented. Thus, this chapter details what congestion will look like in the future with the currently planned land use changes, as well as two increased land use alternatives studied in this plan.

While Ann Arbor has made a commitment to modes of travel other than the automobile, such as non-motorized or active transportation and transit, currently the automobile is the dominant mode of transportation for the No-Build condition. With the two intensified land use alternatives there is the potential to further enhance alternative modes of transportation, both motorized and non-motorized in the future if significant changes are implemented in the transportation plan.

Land Use and 2030 Projected Traffic

An evaluation of the No-Build condition at the 2030 planning horizon year was conducted in order to identify future transportation network deficiencies within the City of Ann Arbor. The No-Build condition refers to a baseline scenario in which no transportation improvements are implemented, with the exception of those projects currently programmed in the Washtenaw Area Transportation Study Transportation Improvement Program (WATS TIP) and those projects within the WATS RTP outside of the city of Ann Arbor, as well as approved land use updates from recent plans/studies to reflect the most current picture of Ann Arbor for the future year 2030. This up-to-date current land use vision for 2030 is called Land Use Alternative #1.

The following sections outline the land use updates and alternatives, the methodology used to prepare the traffic forecasts, the projected traffic volumes and operational performance, and the identified transportation deficiencies. Recommendations, and the testing of recommendations, can be found in Chapter 6 of this report.

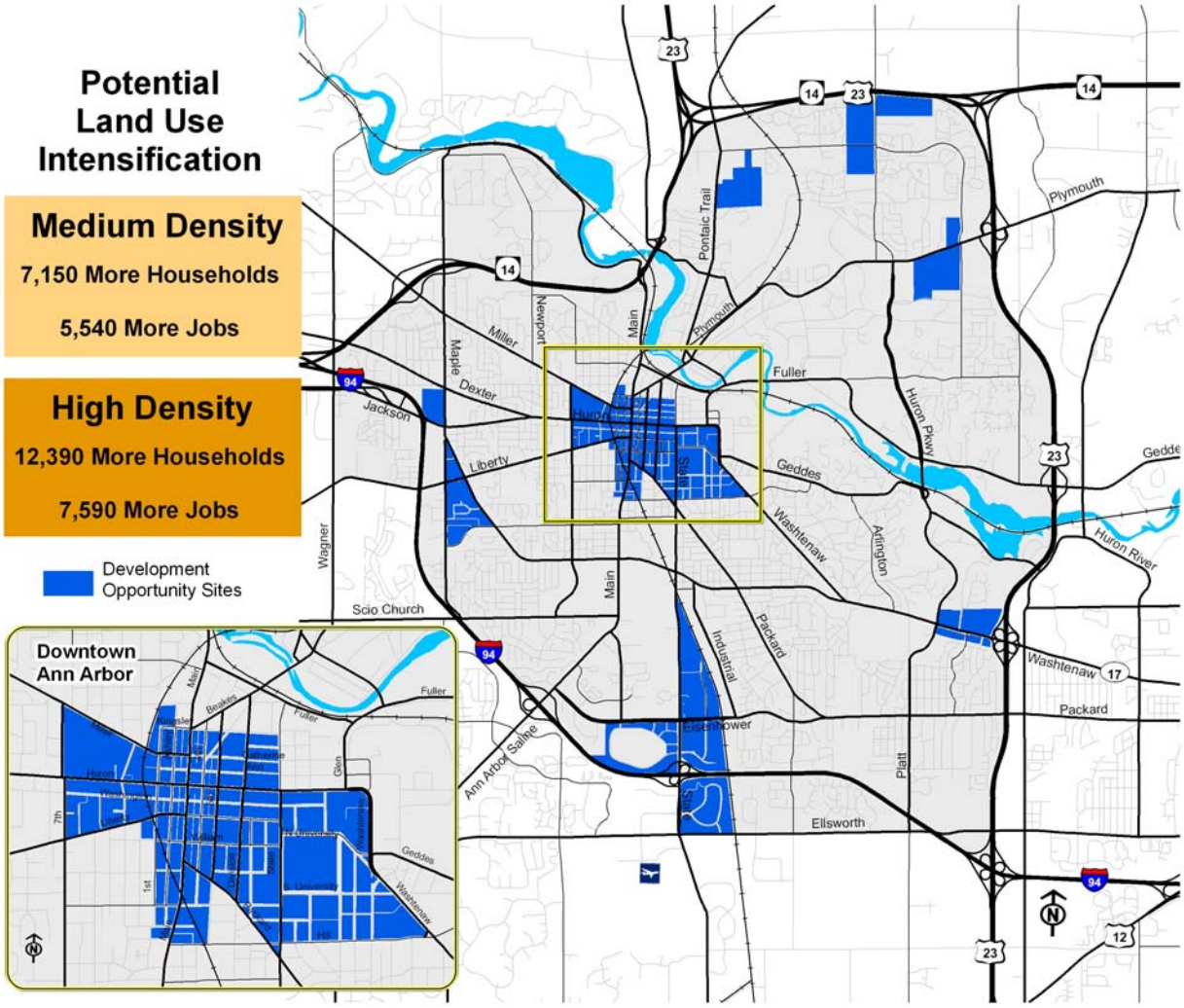
Land Use Updates

As part of the future conditions analysis, the land use utilized in the current 2030 travel demand forecasting model was reviewed. This process involved several agencies; City of Ann Arbor Staff, WATS, AATA, and the University of Michigan. Various meetings were held with the City Staff to assess the work of many recent plans and studies within the City of Ann Arbor. A list of various land use changes were provided to update the 2030 travel demand forecasting model to better reflect the recent studies and approvals of plans since the last travel model land use update. The detailed list of land use changes provided by the City of Ann Arbor Planning Staff is provided in Appendix D.

Meetings were also held with the University of Michigan Planning, Construction, Medical Center, Administration, and Transportation Staff to better understand land use potential changes planned, as well as to better understand the interaction between the North Campus, Central Campus, South Campus, East Medical Campus, and the sports facilities.

These meetings provided the data to update the travel model land use data. Figure 5-1 provides the potential land use intensifications for a medium density and for a high density growth based on the land use information provided. Based on these land use variations that differ by density there are three land use alternatives assessed.

Figure 5-1: Potential Land Use Intensification Sites for Medium and High Density



For purpose of this plan, the 2030 No-Build data was updated with the land use information provided. The three main land use alternatives are as follows:

- Alternative 1: 2030 No-Build + approved additional land use intensity (Base situation)
- Alternative 2: 2030 No-Build + medium range of additional land use intensity
- Alternative 3: 2030 No-Build + high range of additional land use intensity

Table 5-1 shows the total population and employment for the Ann Arbor Transportation Plan (AATP) study area under the three land use alternatives as compared to the 2005 data. Population growth ranges from 4.5% to 19.6%, and employment growth ranges from 20.5% to 28.3% under the base situation (low), medium, and high density alternatives.

Table 5-1: Changes in Ann Arbor Population and Employment by Land Use Alternative

	2005	2030					
		Land Use #1		Land Use #2		Land Use #3	
		Total	Percent Growth	Total	Percent Growth	Total	Percent Growth
Population	103,710	108,333	4.5%	115,093	11.0%	124,085	19.6%
Employment	96,621	116,452	20.5%	121,790	26.0%	123,944	28.3%

Figure 5-2 shows the 2030 Land Use Alternative #1 population and employment density and the development opportunity locations. Figures 5-3 and 5-4 (Land Use Alternatives #2 and #3) provide the 2030 medium and high land use alternative land use densities and development opportunity locations.

Travel Demand Forecasting

Transportation demand forecasts for the 2030 planning horizon year in the City of Ann Arbor were developed using the WATS travel demand forecasting model. The WATS travel demand model is a macroscopic regional planning tool, covering Washtenaw County. Regional travel demand models provide a macroscopic tool to forecast future travel demands on the roadway network based on land use and socio-economic projections. While the model is an invaluable tool for understanding high-level travel demands throughout the county, it is limited in its sensitivity to detailed traffic operations, such as at individual intersections.

The land use and socio-economic data that dictate travel demand and trip decisions within the model are defined over a discrete area, known as a Traffic Analysis Zone (TAZ). The trips produced within or attracted to the TAZ are then distributed onto the roadway network via links known as centroid connectors, which generally represent the local roadway system and driveways not explicitly included in the model. The model takes into account growth for all areas throughout the county, the growth in Dexter is considered differently than the growth in Ann Arbor. The 2030 future year No-Build model includes projects identified in the WATS TIP. While recent economic events have caused regional traffic volumes to decrease within the past few years, a longer term 2030 forecast assumes that the economy will rebound and employment and population will continue to increase in the future.

The 2030 model was then run for the three updated future alternative land use alternatives based on the information provided from the City of Ann Arbor Planning Staff. The WATS model has some sensitivity to the various modes. A transportation “mode” is a type of travel, which can be as a pedestrian (walk), a bicycle, an auto, a bus, transit or any other means of transportation. The model is currently being updated to be more robust, but the current model was able to provide useful information on current walk, bike, transit, and vehicular potential. Table 5-2 provides the 2030 person trips within Washtenaw County and the percent increase in person trips by mode with each land use alternative from the 2005 data.

Table 5-2: 2030 Land Use Alternatives Person Trips in Washtenaw County by Mode

Mode	2005	Land Use #1*	Land Use #2*	Land Use #3*
Walk	181,750	200,825 (+10%)	212,000 (+17%)	223,550 (+23%)
Bike	10,830	11,950 (+10%)	12,325 (+14%)	12,650 (+17%)
Transit	17,905	31,790 (+78%)	34,985 (+95%)	38,090 (+113%)
Vehicular Travel	1,114,810	1,558,585 (+40%)	1,592,590 (+43%)	1,634,310 (47%)
Total	**1,325,295**	**1,803,150 (+36%)**	**1,851,900 (+40%)**	**1,908,600 (+44%)**

**Number of Trips (Percent Increase from 2005)*

Figure 5-2: 2030 Land Use #1 Residential and Employment Density and Development Opportunity Locations

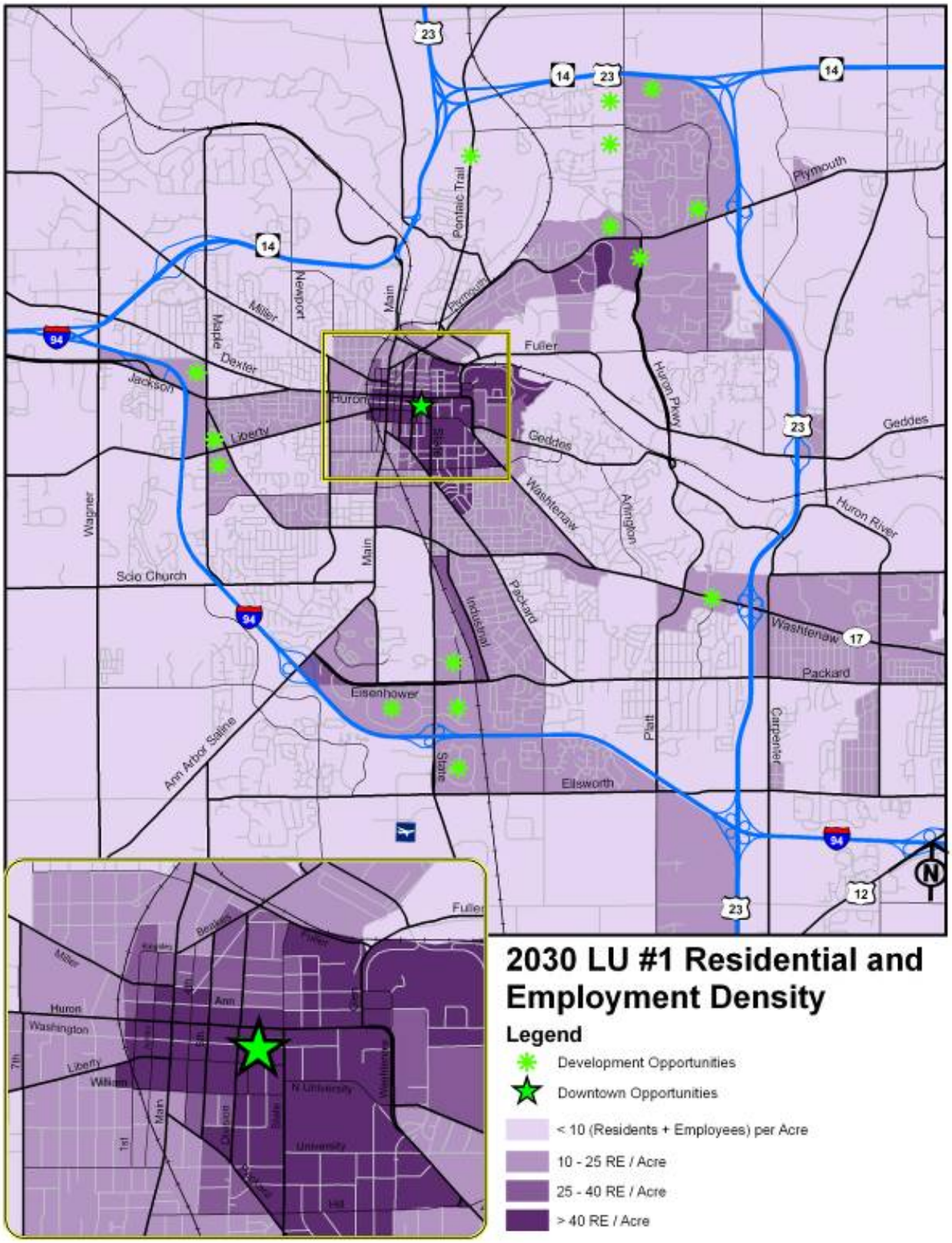


Figure 5-3: 2030 Land Use #2 Residential and Employment Density and Development Opportunity Locations

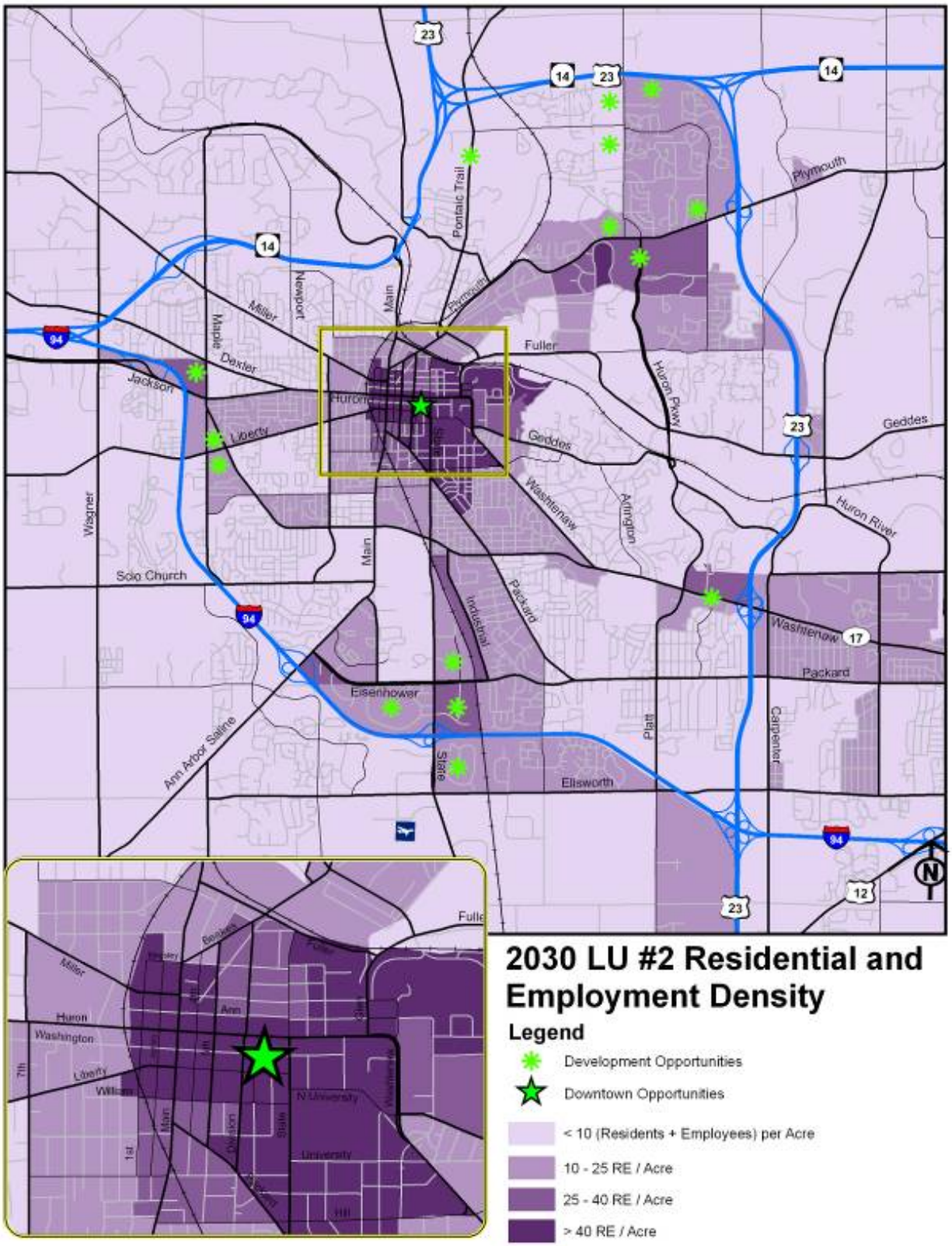
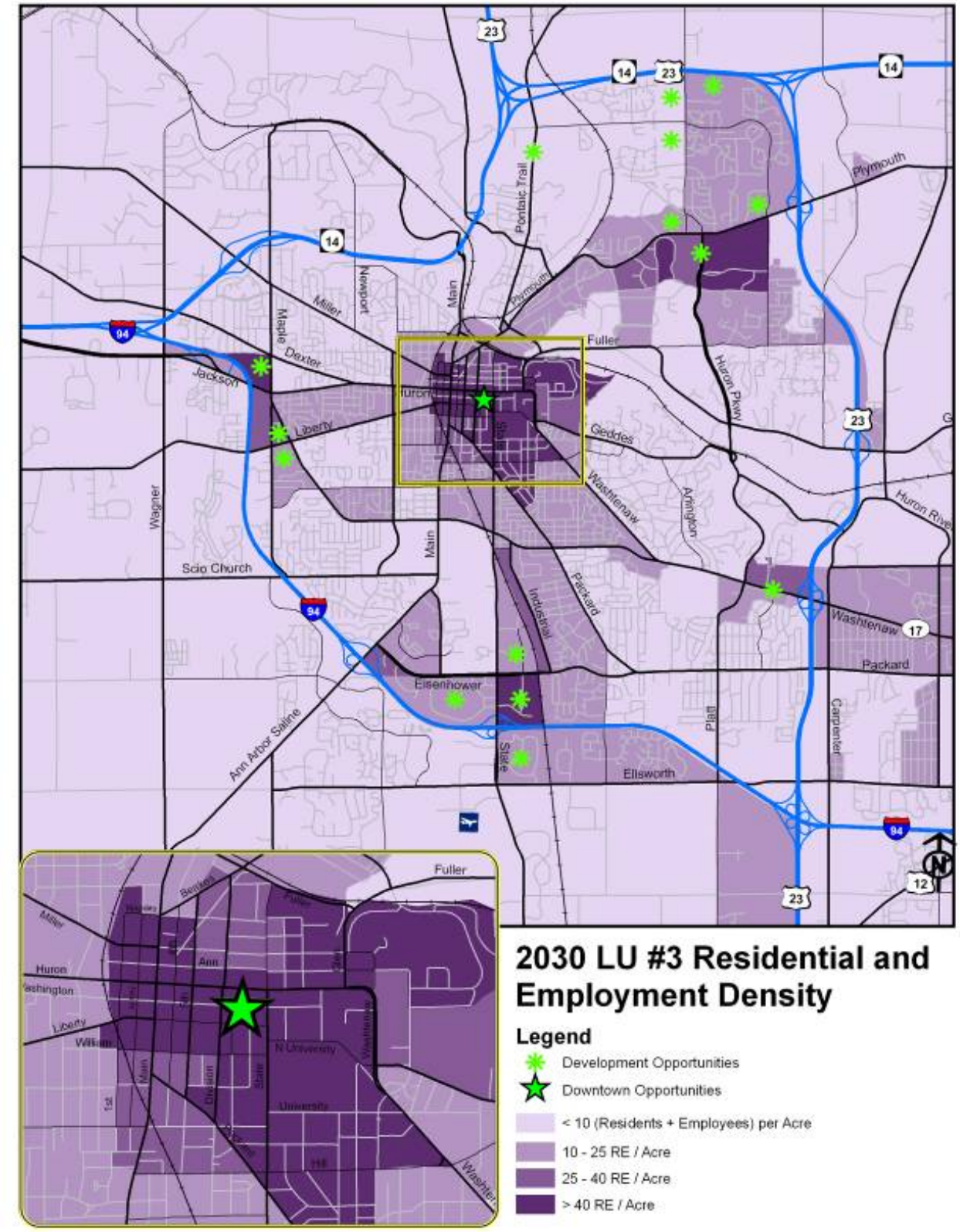


Figure 5-4: 2030 Land Use #3 Residential and Employment Density and Development Opportunity Locations



There are expected increases in person trips with the intensified land use projections compared with the existing 2005 data. Table 5-3 provides the percent by mode projected across each individual land use alternative for the year 2005 and the three 2030 land use alternatives.

Further transportation enhancements will be needed to encourage mode shift in the future from drive alone and to accommodate the person trips by mode. This mode share assessment assumes only additional land use changes, but no additional transportation or non-motorized improvements over what exists today.

Table 5-3: 2005 and 2030 Mode Share Percentages for Washtenaw County

Mode	2005	2030		
		Land Use #1	Land Use #2	Land Use #3
Walk	13.7%	11.1%	11.4%	11.7%
Bicycle	0.8%	0.7%	0.7%	0.7%
Transit	1.4%	1.8%	1.9%	2.0%
Vehicular	84.1%	86.4%	86.0%	85.6%
Total	**100%**	**100%**	**100%**	**100%**

The number of trips coming into, within, and going out of the city of Ann Arbor changes significantly with each land use alternative. The Table 5-4 shows the number of person trips by mode for those trips that either originate or are destined to the City of Ann Arbor.

Table 5-4: Number of Trips Going in, within, and Going out of Ann Arbor

Mode	Going out	Within	Coming in	Total
Land Use #1				
Walk	2,775	106,569	4,331	113,675
Bicycle	906	6,110	675	7,691
Transit	2,408	13,340	3,063	18,811
Vehicular	121,383	213,098	280,834	615,315
Total	**127,472**	**339,117**	**288,903**	**755,492**
Land Use #2				
Walk	2,947	117,632	4,593	125,172
Bicycle	923	6,456	700	8,079
Transit	2,515	15,398	3,192	21,105
Vehicular	130,798	239,537	287,011	657,346
Total	**137,183**	**379,023**	**295,496**	**811,702**
Land Use #3				
Walk	3,233	127,633	5,021	135,887
Bicycle	430	21,241	85	21,756
Transit	2,687	17,488	3,296	23,471
Vehicular	145,966	264,310	280,264	690,540
Total	**152,316**	**430,672**	**288,666**	**871,654**

As shown in Table 5-4, the total number of person trips is expected to increase from 755,492 with Land Use #1 to a total of 871,654 with Land Use Alternative #3. This is an increase of approximately 15%. However, the number of trips coming into Ann Arbor from outside of the City is actually expected to decrease with Land Use Alternative #3 as compared with #1 and the number of trips exiting the City is expected to increase significantly with Land Use #3. This indicates that there may need to be more emphasis on creating employment opportunities in Land Use #3 within the City of Ann Arbor. Additionally, the number of bicycle trips in Land Use

#3 increases significantly, which relates to the congestion of the roadways and that more people will opt to travel by bicycle than other modes of transportation.

The number of vehicle miles traveled (VMT) and vehicle hours traveled (VHT) were also determined from the 2030 model. Table 5-5 shows how the VMT and VHT within the City of Ann Arbor varies between the three different land use alternatives and also compares that back to the 2005 model. These values quoted also do not yet consider any additional transportation enhancements to the current system.

Table 5-5: 2030 Vehicle Miles of Travel and Vehicle Hours of Travel

	2005	2030		
		Land Use #1	Land Use #2	Land U #3
Vehicle Miles of Travel (VMT)	1,529,938	1,867,207	1,939,575	2,001,639
Vehicle Hours of Travel (VHT)	46,968	62,024	65,795	69,231
Congested VMT*	426,614	734,115	822,069	906,180
Congested VHT*	14,783	27,789	32,066	36,044

**Congested indicates any roadway with a LOS E or F*

Table 5-6 below shows the increase in VMT and VHT from 2005 to the three Land Use Alternatives in 2030.

Table 5-6: Percent Increase of VMT and VHT from 2005

	2005	2030		
		Land Use #1	Land Use #2	Land Use #3
Vehicle Miles of Travel (VMT)	1,529,938	22%	27%	31%
Vehicle Hours of Travel (VHT)	46,968	32%	40%	47%
Congested VMT*	426,614	72%	93%	112%
Congested VHT*	14,783	88%	117%	144%

**Congested indicates any roadway with a LOS E or F*

As shown in the table above, the vehicle hours of travel are expected to increase from 2005 by 22-31% between Land Uses #1 through #3. However, the vehicle hours of travel are expected to grow even more, with a percent increase between 32% with Land Use #1 to 47% with Land Use #3. The larger increases are due to the amount of congested roadways within the city of Ann Arbor. Table 5-7 compares the percent of congested roadways in 2005 and 2030 with the varying Land Use Alternatives.

Table 5-7: Percent Congested VMT and VHT of Travel

	2005	2030		
		Land Use #1	Land Use #2	Land Use #3
Percent Congested VMT*	28%	39%	42%	45%
Percent Congested VHT*	31%	45%	49%	52%

**Congested indicates any roadway with a LOS E or F*

In 2005, the percent of congested roadways was approximately 28%, but by 2030 the percentage of congested roadways is expected to be between 39- to 52-percent. The higher percentage of congested roadways occurs with the higher density land uses. The amount of time that vehicles spend on congested roadways is a little bit higher than the percentage of congested roadways, if no additional transportation improvements are made. It is expected that the amount of time spent in congested roadways will increase as well.

Roadway Network Capacity

Roadway network capacity is typically measured by looking at a volume-to-capacity ratio. As anticipated, future growth in Ann Arbor without mitigation or enhancements to the transportation network will result in more congested roadways. Figure 5-5 illustrates the daily congestion within Ann Arbor with Land Use Alternative #3.

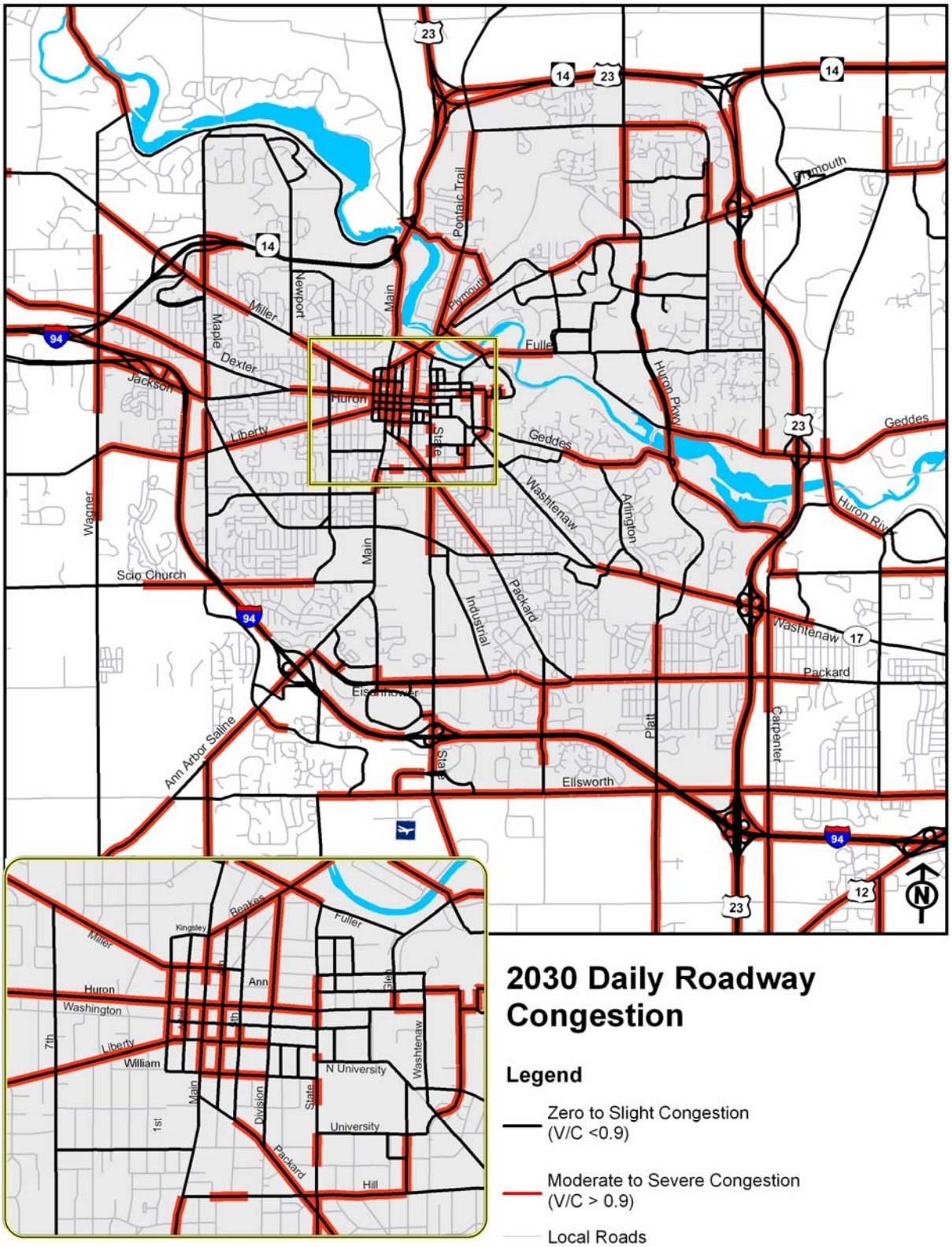
Based on the 2030 Daily Roadway Congestion with the intensified land use, the areas of concern are as follows:

- Main corridors in downtown (Huron Street, Main Street, State Street, Liberty Road, Division Street, etc.);
- Plymouth Road;
- Geddes Avenue;
- Packard Street;
- Washtenaw Avenue;
- Fuller Street;
- Miller Road;
- Ann Arbor-Saline;
- Huron Parkway;
- Dexter Road; and
- Jackson Road.

Intersection concerns include the following:

- Ann Arbor-Saline at Eisenhower Parkway
- Ann Arbor-Saline at I-94 WB Off Ramp
- Main Street at Depot Street
- Main Street at Scio Church
- State Street at Eisenhower Parkway
- State Street at Ellsworth Road
- State Street at I-94 EB Off-Ramp
- State Street at I-94 WB Off-Ramp
- State Street at Hilton/Victors Way

Figure 5-5: 2030 Daily Roadway Congestion with Intensified Land Use



Projected Traffic Volumes for Intersection Analysis

In order to evaluate detailed intersection operations for future conditions, forecasted intersection turning-movement volumes for 2030 conditions were developed using estimates from the refined WATS travel demand forecasting model. A multi-step approach was utilized to refine the model estimates based on actual field counts, volume balancing, and adjustments of discrepancies with the base-year traffic forecast.

Step 1: Volumes were compared between the 2005 and 2030 model forecasts to determine the percentage growth anticipated at each intersection approach.

Step 2: The anticipated percentage growth was adjusted to account for the growth already encountered between the 2005 base year and the 2007 existing conditions year.

Step 3: The reduced anticipated growth percentage was applied to the existing conditions volume to produce a raw volume forecast.

Step 4: Minor adjustments were conducted to balance volumes.

Projected Traffic Operations and Identified Deficiencies

Congestion along roadways can be determined using the average daily traffic volumes and the capacity that is available along a roadway. Roadways can typically carry approximately 2,000 to 2,400 vehicles per lane per hour, at a maximum, without any signalization and at optimal roadway conditions. Once signals and driveways are added along the roadways, capacity is reduced significantly. Higher classification roadways have a greater capacity due to less signals and driveways, while local roadways have the least capacity per lane.

The projected volumes along with the network improvements included in the TIP and CIP were input into Synchro, a traffic engineering software, for the sixteen intersections throughout Ann Arbor to determine the anticipated control delay and level of service for each intersection. Intersection delay and level of service results for the 2030 AM and PM peak hour analyses are summarized in Tables 5-8 and 5-9. Appendix C-3 provides the existing (2007) AM and PM peak hour intersection levels of service.

While the analysis of existing conditions showed varying levels of service, future conditions show the majority of intersections operating under poor levels of service in one or both peak hours of the day. Figures 5-6 through 5-8 provide the level of service for the study intersections for the AM and PM peak hours for Land Use Alternatives #1, #2, and #3, respectively.

Table 5-8: 2030 AM Peak Hour Intersection Level of Service and Delay by Land Use Alternative

Intersection	Land Use 1		Land Use 2		Land Use 3	
	Delay*	Level of Service	Delay*	Level of Service	Delay*	Level of Service
Ann Arbor-Saline at Eisenhower Pkwy	29.5	C	32.0	C	84.8	F
Ann Arbor-Saline at I-94 WB	24.6	C	22.8	C	23.7	C
Eisenhower Pkwy at Boardwalk Street	12.4	B	13.1	B	14.1	B
Liberty Road at Seventh Street	21.8	C	22.3	C	22.7	C
Main Street at Depot Street	67.0	E	73.6	E	74.4	E
Main Street at Scio Church	19.5	B	21.3	C	21.4	C
Main Street at Summit Street	24.2	C	32.4	C	38.8	D
Miller Street at Seventh Street	32.2	C	36.9	D	39.8	D
Packard Road at Jewett	6.7	A	6.8	A	6.9	A
Packard Road at Stone School	10.5	B	11.5	B	12.2	B
State Street at Eisenhower Pkwy	41.1	D	44.9	D	47.5	D
State Street at Ellsworth Road	81.0	F	85.9	F	90.1	F
State Street at I-94 EB Off-Ramp	91.6	F	105.8	F	119.5	F
State Street at I-94 WB Off-Ramp	80.6	F	91.5	F	107.7	F
State Street at NB Victors Way**	24.6	C	27.9	C	25.4	C
State Street at SB Hilton**	5.9	A	6.2	A	4.5	A

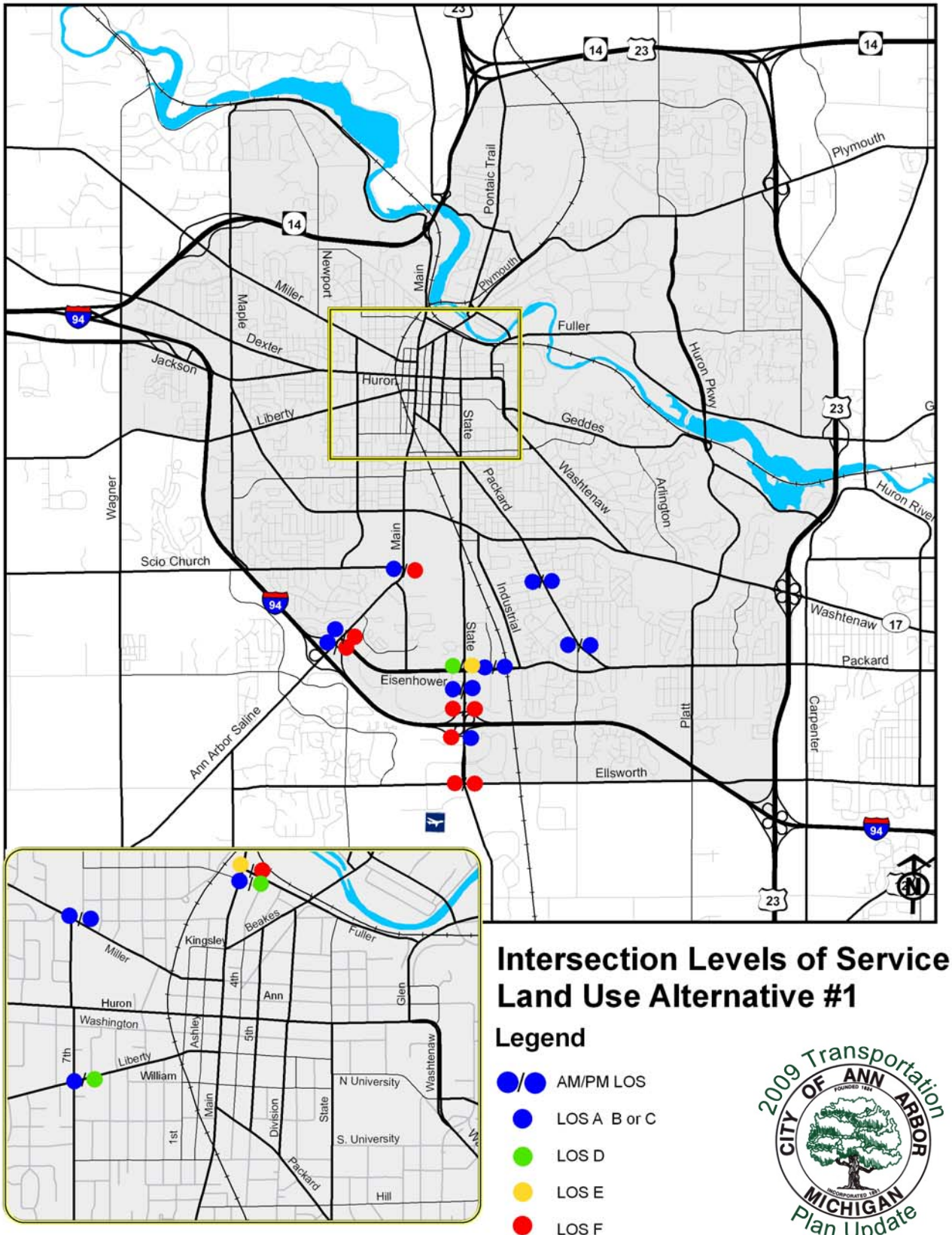
**Delay is reported in seconds per vehicle*
***State at Victors/Hilton is assumed to be signalized under future conditions*

Table 5-9: 2030 PM Peak Hour Intersection Level of Service and Delay by Land Use Alternative

Intersection	Land Use 1		Land Use 2		Land Use 3	
	Delay (sec / veh*)	Level of Service	Delay (sec / veh*)	Level of Service	Delay (sec / veh*)	Level of Service
Ann Arbor-Saline at Eisenhower Pkwy	102.7	F	197.9	F	109.4	F
Ann Arbor-Saline at I-94 WB	92.2	F	101.8	F	107.0	F
Eisenhower Pkwy at Boardwalk Street	25.3	C	33.1	C	38.2	D
Liberty Road at Seventh Street	37.6	D	41.5	D	43.9	D
Main Street at Depot Street	93.3	F	103.4	F	110.4	F
Main Street at Scio Church	80.4	F	104.3	F	123.9	F
Main Street at Summit Street	39.7	D	37.7	D	42.0	D
Miller Street at Seventh Street	24.5	C	30.3	C	32.5	C
Packard Road at Jewett	8.6	A	8.7	A	8.8	A
Packard Road at Stone School	9.6	A	10.1	B	10.6	B
State Street at Eisenhower Pkwy	78.8	E	90.9	F	100.1	F
State Street at Ellsworth Road	146.3	F	172.2	F	188.2	F
State Street at I-94 EB Off-Ramp	93.8	F	43.3	D	47.4	D
State Street at I-94 WB Off-Ramp	29.0	C	37.4	D	44.7	D
State Street at NB Victors Way**	22.7	C	21.0	C	23.9	F
State Street at SB Hilton**	14.2	B	64.8	E	63.2	E

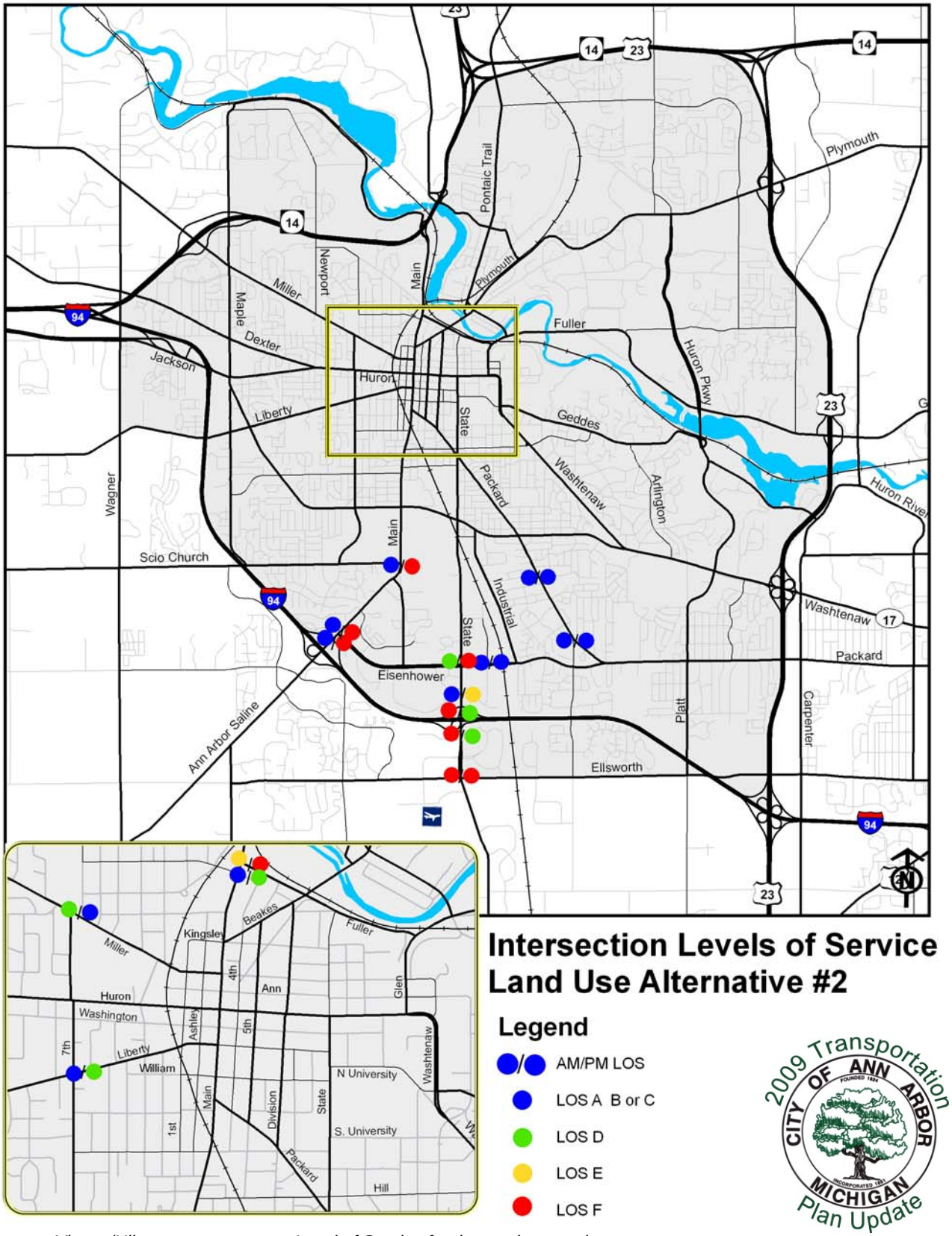
**Delay is reported in seconds per vehicle*
***State at Victors/Hilton is assumed to be signalized under future conditions*

Figure 5-6: 2030 Land Use #1 Intersection Level of Service Map



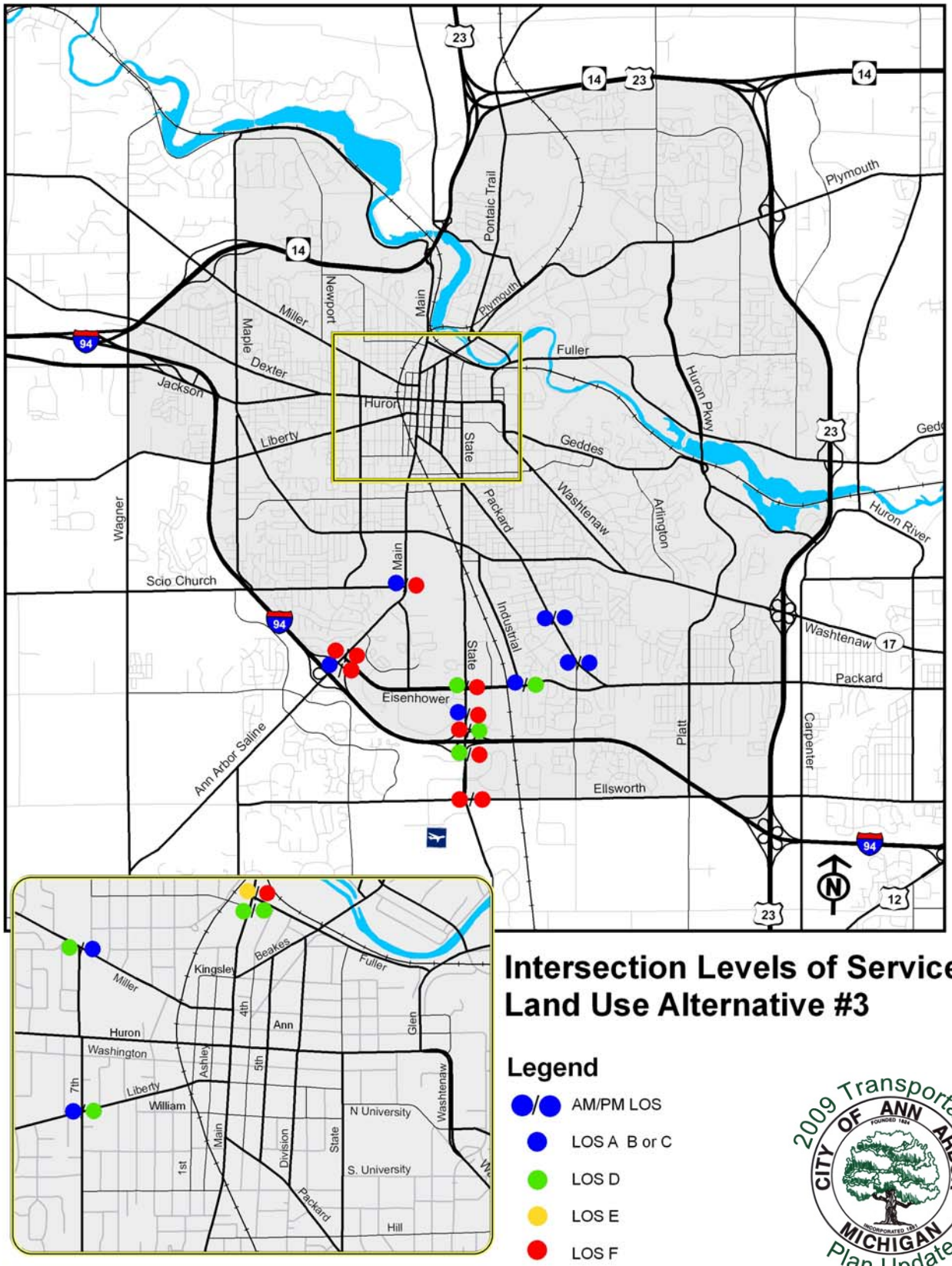
**State at Victors/Hilton assumes worse Level of Service for the two intersections*

Figure 5-7: 2030 Land Use #2 Intersection Level of Service Map



**State at Victors/Hilton assumes worse Level of Service for the two intersections*

Figure 5-8: 2030 Land Use #3 Intersection Level of Service Map



**State at Victors/Hilton assumes worse Level of Service for the two intersections*

In the future 2030 AM peak hour, it is expected that Main Street at Depot Street will be at a LOS E for any of the three land use alternatives. State Street between Ellsworth and Eisenhower Parkway has increased congestion and operational issues if no improvements are made in this corridor. In Land Use Alternative #3 the intersection of Ann Arbor-Saline Road/Eisenhower Parkway is anticipated to operate at a poor level of service with no improvements.

For the future 2030 PM peak hour, over half of the studied intersections are expected to operate at a LOS D or worse in the three land alternatives. Those intersections along Ann Arbor-Saline Road / Main Street are expected to fail, as well as intersections around State Street near Briarwood Mall. The intersection of Main Street at Depot Street is also expected to operate at a poor level of service in all three land use alternatives.

Future 2030 Transit Conditions

With energy costs rising, the environmental movement broadening its base, and the overall growth in the region, it is anticipated that ridership will continue to increase on AATA routes for both in-town and commuter trips.

Currently a number of AATA routes – including the #2 Plymouth and #4 Washtenaw corridors – are experiencing standing room only in the AM and PM peaks. Without transit investment, it is expected that ridership will increase between by 4,000 to 10,000 riders due to future population and employment growth, which the AATA system would not be able to handle based on the existing service. Buses that accommodate all the riders comfortably with two buses an hour just a few years ago would be standing room only or denying transit riders during AM and PM peaks if current trends continue with no changes to the AATA schedule or transit investment by the community.

Exacerbating the problem is the fact all AATA bus routes run on regular surface streets and deal with the same traffic conditions as motor vehicles. As traffic conditions within the city worsen, transit as a mode choice will fall farther and farther behind due to deteriorating traffic conditions unless specific investment is made to give transit an efficient advantage over the automobile.

It is expected that those routes that are standing room only currently will likely see the increase in ridership. This is due to the expected land use intensifications shown in Figure 5-1 of this report. The Land Use Intensifications are expected along Plymouth Road, Washtenaw Avenue, State Street, Liberty Road and within Downtown Ann Arbor.

Future 2030 Non-Motorized Transportation Conditions

As shown in Table 5-2 of this report, the percentage of people that will be walking and biking within Washtenaw County is expected to increase by 10% with Land Use Alternative #1 and continue to increase further with more land use intensifications. For Land Use #3, the increase in walking trips is expected to increase by 23% while the bicycle trips would increase by 17%. As the roadways become more congested, the non-motorized options become more attractive to travelers, especially for trips that are shorter than two miles. While Table 5-3 shows that the percentage of mode share for the county does not change that much with each Land Use Alternative, Table 5-4 breaks those percentages down into those travelling within the City of Ann Arbor. Table 5-10 summarizes only those trips within the City of Ann Arbor and how those trips are expected to change with each Land Use Alternative.

Table 5-10: 2030 Land Use Alternatives Person Trips by Mode within the City of Ann Arbor

Mode	Land Use #1	Land Use #2	Land Use #3
Walk	106,569 (31%)	117,632 (31%)	127,633 (30%)
Bike	6,110 (2%)	6,456 (2%)	21,241 (5%)
Transit	17,887 (5%)	20,649 (5%)	23,274 (5%)
Vehicular Travel	208,551 (62%)	234,286 (62%)	258,524 (60%)
Total	**339,117**	**379,023**	**430,672**

Table 5-10 shows that with the higher intensity land use alternative (#3), there is more of a propensity to switch to non-motorized travel than vehicular travel. The non-motorized and transit trips will increase as a result of increased utility of the systems, based on the number of people and jobs accessible by these modes. There will also be an increased attention to design and density creating environments that attract people to such modes. Some individuals will chose an “active” lifestyle and walk or bike as a movement to better human health.

Chapter 6: Future Alternatives

Chapter 5 detailed what conditions would be in Ann Arbor if no infrastructure improvements or changes to policy were implemented for all three of the land use alternatives. It appears that there will be increased congestion, with a reduction to mobility and accessibility for the future citizens of the city, unless further steps are taken as part of the transportation plan update.

This chapter details various alternatives and opportunities to address the travel needs for the future for each of the three different land use alternatives detailed in Chapter 5. The methodology used to determine the recommendations can be found in Appendix D of this report. The goal of the alternatives considered is to ensure that transportation accessibility and mobility is guaranteed for the citizens of Ann Arbor in the future no matter the future land use density chosen. The recommendations found in Chapter 3 of this plan come from the analyses in this chapter.

Analysis Results

The goals of the transportation plan, which are outlined in Chapter 2 of this report, are also shown below:

1. Provide effective access and mobility for people and goods, with minimal negative impacts for all.
2. Protect and enhance the natural environment and energy resources, and the human and built environment.
3. Promote a safe, secure, attractive, and productive transportation system.
4. Invest in transportation infrastructure in a manner consistent with other goals, and within the financial constraints of public/private resources.
5. Promote cooperation between the City of Ann Arbor and other governmental entities, particularly the surrounding townships and municipalities and the University of Michigan, in support of transportation initiatives in a manner consistent with the other goals.
6. Ensure that meaningful public involvement will be part of any transportation project in the City of Ann Arbor.
7. Promote a transportation system supportive of and integrated with land use decisions.
8. Promote green transportation improvements to reduce vehicle emissions.

These goals, along with previous plans and reports, and the existing and future conditions, paved the way for recommendations by time frame. Each mode was assessed applying the analysis methodology and also a Complete Streets concept. The Complete Streets concept means that roadways are designed and operated to enable safe and attractive access for all users. Pedestrians, bicyclists, motorists and bus riders of all ages and abilities are able to safely move along and across a complete street. This provides a more balanced transportation approach. Each mode of travel is analyzed and assessed to balance the overall transportation system. It is understood that some mode improvements are more costly than others, but it is acknowledged that to have a truly balanced overall transportation system the decisions need to be made to provide connectivity, continuity, and have an overall prioritization. This chapter is broken into several mode components: vehicular, transit, and pedestrian and bicycle analysis.

Vehicular

Vehicular elements include corridor congestion, intersection operations, safety, truck routes and access management. As discussed in Chapter 5, congestion will be a major problem for Ann Arbor in the future. This section details what improvements would be needed to relieve existing and future congestion in Ann Arbor.

Corridor Congestion

As can be seen in Chapter 5 (Figure 5-5), various corridors show increased congestion for the future. To accommodate the projected increased growth certain corridors would need to be widened if no other potential mode shift or improvements were made. Those corridors requiring improvement include:

- Main corridors in downtown (Huron Street, Main Street, State Street, Liberty Road, Division Street, etc.);
- Plymouth Road;
- Geddes Avenue;
- Packard Street north of Stadium Boulevard;
- Washtenaw Avenue;
- Fuller Street;
- Miller Road;
- Ann Arbor-Saline;
- Huron Parkway;
- Dexter Road; and
- Jackson Road.

Widening all these roadway facilities to accommodate future travel is not the ideal solution to solving congestion, and it would not meet the goals of this Plan. Therefore, other opportunities to reduce congestion on these corridors were pursued with other transportation modes, other than the automobile, to provide options for future mobility and to connect the various modes of the transportation network.

There are currently three roadway projects listed in the WATS TIP for 2008 – 2011 within the city boundaries. These projects include adding center turn lanes on Nixon Road, Scio Church Road, and Ellsworth Road. These three projects are intersection improvements which make the roadway network more efficient while still discouraging increases in automobile trips. These intersection improvements listed in the WATS TIP are still recommended in addition to the additional intersection improvements shown in the next section.

Intersection Improvements

Sixteen key intersections throughout the city were analyzed for existing conditions (Chapter 4 and Appendix C) and future conditions (Chapter 5). These intersections were also analyzed to determine what future improvements would be needed for each of the future land use alternatives. Tables 6-1 through 6-3 compare the level of service and delay at each intersection under each future land use with and without intersection improvements. Once the growth rate was applied, the Synchro models were modified until LOS D or better could be obtained at each intersection. Improvements included optimizing cycle lengths splits, and offsets, left-turn phasing, additional turn pockets, dual turn lanes, and/or widening of the roadway. These improvements are listed in Table 6-4.

Table 6-1: Level of Service and Delay Comparison for Land Use Alternative #1

Intersection	AM Peak Hour				PM Peak Hour			
	Future Conditions		Optimized Future Conditions		Future Conditions		Optimized Future Conditions	
	Delay*	Level of Service	Delay*	Level of Service	Delay*	Level of Service	Delay*	Level of Service
Ann Arbor-Saline at Eisenhower Parkway	29.5	C	26.9	C	102.7	F	37.2	D
Ann Arbor-Saline at I-94 WB	24.6	C	20.9	C	92.2	F	35.7	D
Eisenhower Parkway at Boardwalk	12.4	B	12.5	B	25.3	C	21.1	C
Liberty Street at Seventh Street	21.8	C	21.8	C	37.6	D	32.7	C
Main Street at Depot Street	67.0	E	30.1	C	93.3	F	40.9	D
Main Street at Scio Church Road	19.5	B	18.5	B	80.4	F	43.4	D
Main Street at Summit Street	24.2	C	21.3	C	39.7	D	21.5	C
Miller Road at Seventh Street	32.2	C	32.2	C	24.5	C	24.5	C
Packard Street at Jewett Street	6.7	A	6.7	A	8.6	A	8.6	A
Packard Street at Stone School	10.5	B	10.5	B	9.6	A	9.6	A
State Street at Eisenhower Parkway	41.1	D	9.9	A	78.8	E	19.0	B
State Street at Ellsworth Road	81.0	F	17.6	B	146.3	F	17.8	B
State Street at I-94 EB Off-Ramp	91.6	F	27.6	C	93.8	F	33.2	C
State Street at I-94 WB Off-Ramp	80.6	F	34.8	C	29.0	C	20.0	B
NB State Street at Victors Way	24.6	C	16.2	B	22.7	C	22.6	C
SB State Street at Hilton	5.9	A	9.8	A	14.2	B	26.7	C

**Delay is reported in seconds per vehicle*

Table 6-2: Level of Service and Delay Comparison for Land Use Alternative #2

Intersection	AM Peak Hour				PM Peak Hour			
	Future Conditions		Optimized Future Conditions		Future Conditions		Optimized Future Conditions	
	Delay*	Level of Service	Delay*	Level of Service	Delay*	Level of Service	Delay*	Level of Service
Ann Arbor-Saline at Eisenhower Parkway	32.0	C	18.5	B	197.9	F	38.7	D
Ann Arbor-Saline at I-94 WB	22.8	C	25.5	C	101.8	F	40.2	D
Eisenhower Parkway at Boardwalk	13.1	B	26.7	C	33.1	C	25.0	C
Liberty Street at Seventh Street	22.3	C	22.3	C	41.5	D	41.5	D
Main Street at Depot Street	73.6	E	25.3	C	103.4	F	48.2	D
Main Street at Scio Church Road	21.3	C	19.3	B	104.3	F	53.2	D
Main Street at Summit Street	32.4	C	29.8	C	37.7	D	23.2	C
Miller Road at Seventh Street	36.9	D	36.9	D	30.3	C	30.3	C
Packard Street at Jewett Street	6.8	A	6.8	A	8.7	A	8.7	A
Packard Street at Stone School	11.5	B	11.5	B	10.1	B	10.1	B
State Street at Eisenhower Parkway	44.9	D	29.6	C	90.9	F	21.3	C
State Street at Ellsworth Road	85.9	F	16.3	B	172.2	F	18.4	B
State Street at I-94 EB Off-Ramp	105.8	F	47.5	D	43.3	D	24.9	C
State Street at I-94 WB Off-Ramp	91.5	F	66.0	E**	37.4	D	22.4	C
NB State Street at Victors Way	27.9	C	16.3	B	21.0	C	38.2	D
SB State Street at Hilton	6.2	A	5.8	A	64.8	E	32.9	C

**Delay is reported in seconds per vehicle*
***Issues at the I-94/State Street interchange could not be completely addressed with only signal optimization and additional lanes. See discussion below about interchange redesign.*

As discussed in Chapter 5, when the future traffic volumes are applied to the existing network, a number of the study intersections operate at a failing level of service. Under Land Use Alternative #3, traffic growth is higher than under Land Use Alternatives #1 and #2. The increased volumes have an impact on delay at the study intersections, and under future conditions many of the intersections are operating at a failing level of service with even higher delays under Land Use Alternative #3 than under Land Use Alternatives #1 and #2.

Table 6-3: Level of Service and Delay Comparison for Land Use Alternative #3

Intersection	AM Peak Hour				PM Peak Hour			
	Future Conditions		Optimized Future Conditions		Future Conditions		Optimized Future Conditions	
	Delay*	Level of Service	Delay*	Level of Service	Delay*	Level of Service	Delay*	Level of Service
Ann Arbor-Saline at Eisenhower Parkway	84.8	F	20.3	C	109.4	F	41.2	D
Ann Arbor-Saline at I-94 WB	23.7	C	19.9	B	107.0	F	36.2	D
Eisenhower Parkway at Boardwalk	14.1	B	29.1	C	38.2	D	25.7	C
Liberty Street at Seventh Street	22.7	C	22.7	C	43.9	D	43.9	D
Main Street at Depot Street	74.4	E	23.5	C	110.4	F	49.4	D
Main Street at Scio Church Road	21.4	C	21.7	C	123.9	F	39.2	D
Main Street at Summit Street	38.8	D	31.9	C	42.0	D	22.2	C
Miller Road at Seventh Street	39.8	D	39.8	D	32.5	C	32.5	C
Packard Street at Jewett Street	6.9	A	6.9	A	8.8	A	8.8	A
Packard Street at Stone School	12.2	B	12.2	B	10.6	B	10.6	B
State Street at Eisenhower Parkway	47.5	D	30.8	C	100.1	F	26.0	C
State Street at Ellsworth Road	90.1	F	16.2	B	188.2	F	18.9	B
State Street at I-94 EB Off-Ramp	119.5	F	55.2	E**	47.4	D	25.9	C
State Street at I-94 WB Off-Ramp	107.7	F	75.1	E**	44.7	D	24.5	C
NB State Street at Victors Way	25.4	C	18.0	B	23.9	F	28.8	C
SB State Street at Hilton	4.5	A	6.0	A	63.2	E	54.0	D

**Delay is reported in seconds per vehicle*
***Issues at the I-94/State Street interchange could not be completely addressed with only signal optimization and additional lanes. See discussion below about interchange redesign.*

Table 6-4 shows the recommended improvements by intersection to accommodate future traffic by Land Use Alternative. Applying these timing and roadway improvements to the Synchro models resulted in all intersections operating at LOS D or better with the exception of the I-94/State Street interchange signals.

The Ann Arbor-Saline/Eisenhower Parkway/I-94 section of roadway is anticipated to need an additional southbound (SB) through lane. This widening may not be needed if the implementation of Express Bus from Ann Arbor to Saline is implemented and the traffic volumes in the future do not warrant it. This location should be monitored in the future to ensure the projected need. Also any roadway widening needs to ensure to accommodate the non-motorized needs along this roadway as well.

Table 6-4: Recommended Improvements by Land Use Alternative

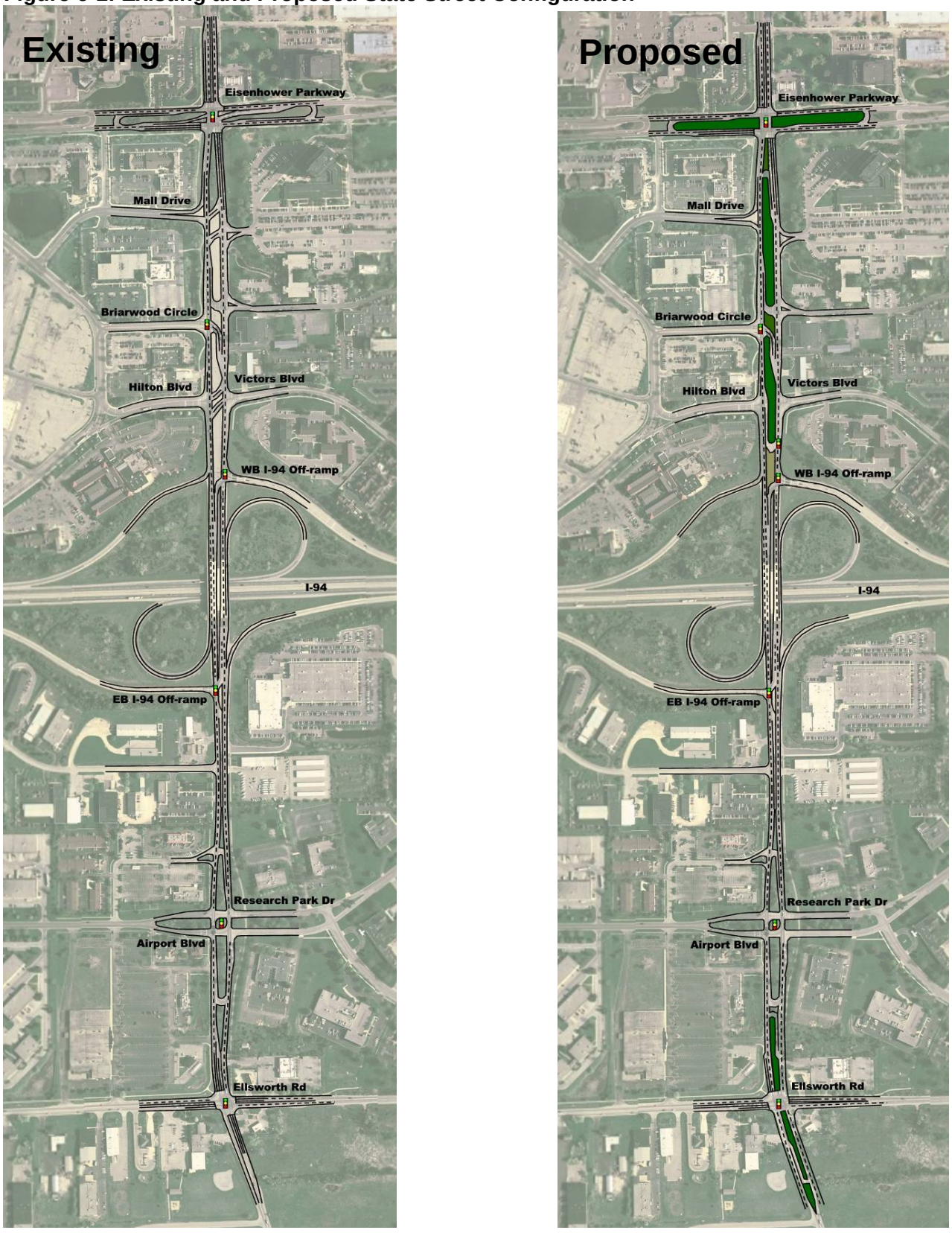
Intersection*	Timings**	Laneage**
Ann Arbor-Saline at Eisenhower Parkway		Add SB shared right/through lane (1-3), add WB dual left-turn lane (1-3), add NWB right-turn lane+ (3)
Ann Arbor-Saline at I-94 WB		Add third SB through lane+ (1-3)
Eisenhower Parkway at Boardwalk	No changes recommended	
Liberty Street at Seventh Street	No changes recommended	
Main Street at Depot Street	Optimize timing for AM and PM peak hour (1-3), change SB left-turn phase to protected only to accommodate dual turn lane (2-3)	Add NB right-turn pocket (1-3), add SB dual left-turn lane (2-3)
Main Street at Scio Church Road	Optimize timing for AM and PM peak hour (1-3)	Add SB right turn pocket (1-2), Add SB right/through lane (3), add EB dual left-turn lane (2-3)
Main Street at Summit Street	Optimize timing for AM and PM peak hour (1-3)	
Miller Road at Seventh Street	No changes recommended	
Packard Street at Jewett Street	No changes recommended***	
Packard Street at Stone School	No changes recommended***	
State Street at Eisenhower Parkway		Boulevard with indirect lefts (1-3)_
State Street at Ellsworth Road	Optimize timing for AM and PM peak hour, install SCOOT (1-3)	Boulevard with indirect lefts (1-3)
State Street at I-94 EB Off-Ramp	Optimize timing for AM and PM peak hour, install SCOOT (1-3)	Add EB right-turn lane (1-3)
State Street at I-94 WB Off-Ramp	Optimize timing for AM and PM peak hour, install SCOOT (1-3)	Add NB thru lane (1-3)
NB State Street at Victors Way	Signalize and coordinate with adjacent signals, install SCOOT (1-3)	Boulevard with indirect lefts (1-3)
SB State Street at Hilton	Signalize and coordinate with adjacent signals, install SCOOT (1-3)	Boulevard with indirect lefts (1-3)

**suggested improvements do not address all issues; see discussion below regarding interchange reconstruction*
*** NB=northbound; SB=southbound; EB=eastbound; and WB=westbound*
****see Packard Road road diet section below.*
+ This recommendation needs to be monitored in the future to see if it is still warranted if Express Bus from Ann Arbor to Saline is implemented.

On State Street, one major geometric change to accommodate the additional traffic is the implementation of a boulevard with indirect lefts between Ellsworth Road and Eisenhower Parkway. At the intersections of State Street at Ellsworth Road and State Street at Eisenhower Parkway, removing the direct lefts from the intersection eliminates the need for left-turn phases and increases capacity at these intersections. Figure 6-1 illustrates the existing State Street configuration and proposed State Street configuration with a boulevard with in-direct left-turns. Other geometric changes could also reduce congestion along the corridor. These changes could include eliminating some of the driveways, roundabouts at major intersections, or adding additional lanes. The implementation of signature transit along the corridor could also reduce

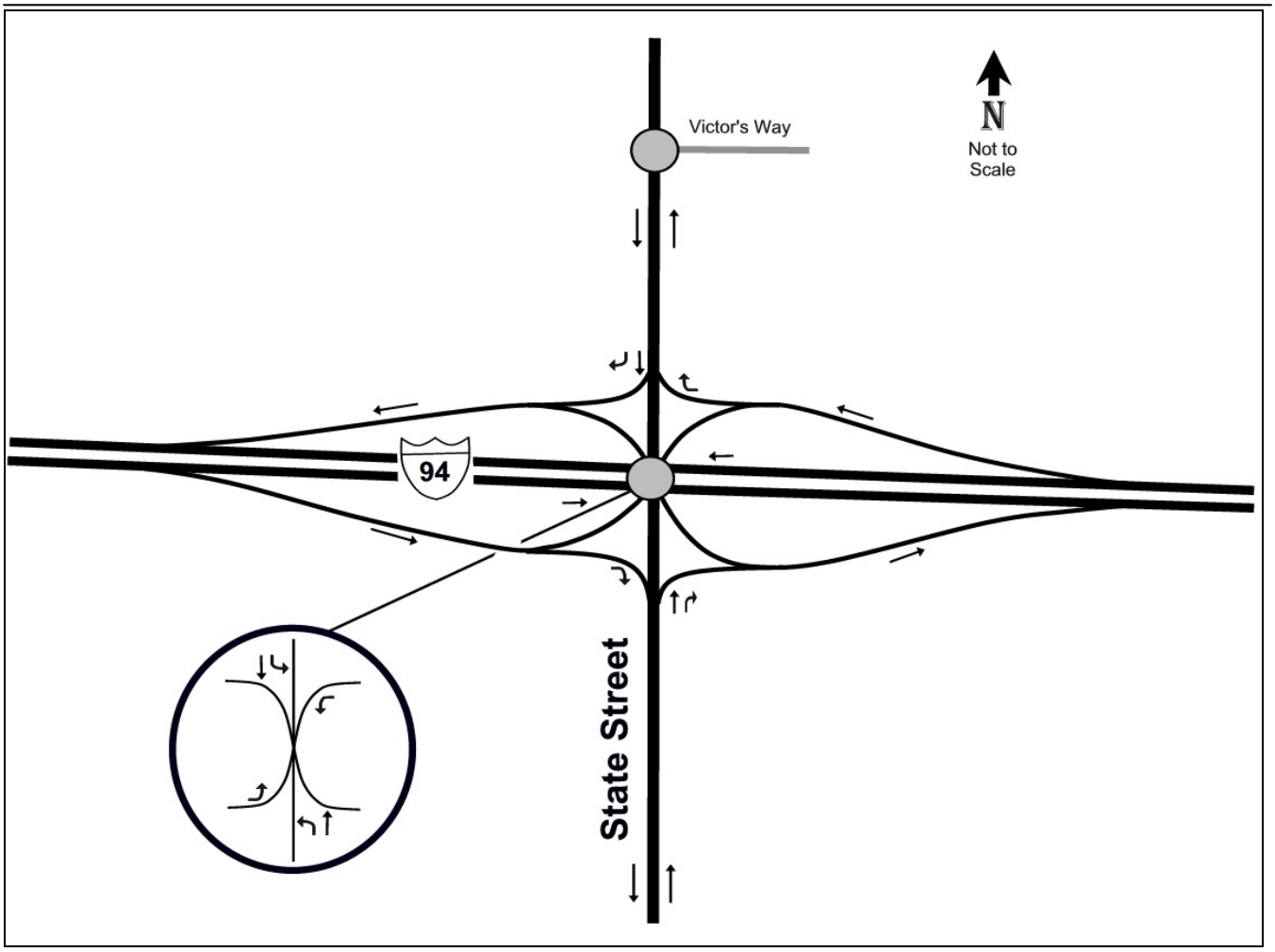
the amount of congestion as well. It is recommended that a corridor study be conducted to review all options along this well utilized corridor.

Figure 6-1: Existing and Proposed State Street Configuration



While evaluating alternatives, it was determined that the increased volumes at the I-94/State Street interchange could not be served by additional lanes and signal optimization alone. If traffic volumes increase as predicted in the travel demand model, a complete reconstruction of the interchange may be needed. A Single Point Urban Interchange (SPUI) was analyzed and found to be an effective mitigation strategy for this interchange. In particular, with the SPUI geometry, the heavy right-turn volume from westbound I-94 to northbound State Street would become a free-flow movement which would greatly reduce delay at the interchange. Figure 6-2 shows the typical geometry of a SPUI. This interchange design would need to also be balanced with the non-motorized needs in the corridor and ensure safe crossing of any potential free flow movement ramps.

Figure 6-2: Single Point Urban Interchange Geometry



At two intersections, Packard Street at Jewett Street and Packard Street at Stone School Road, the Level of Service was either A or B for the AM and PM time period for all three future land uses. The feasibility of a "road diet" for Packard Street between Stadium Boulevard and Stone School Road was evaluated. Currently, Packard Street in this area has two lanes in both directions, totaling to four lanes. A road diet is applied by reducing the number of lanes of a roadway typically from an even number of lanes to an odd number of lanes. This is done by removing one of the lanes and creating a center left-turn lane. The capacity of the roadway

decreases slightly, however, the safety of the roadway is improved significantly. The by-product is also an extra lane that can be converted to bike lanes. Reducing the overall width of the roadway can result in lower vehicle speeds, a reduction in induced traffic, and promotion of other modes of transportation such as cycling and walking. According to the growth model, this section of Packard Street does not appear to have future congestion issues.

To evaluate the impact of a road diet, Packard Street was reduced from two lanes in each direction to one lane in each direction, with left-turn pockets at major intersections. The intersection of Packard Street and Stadium Boulevard was not studied, due to insufficient data. However, Tables 6-5 and 6-6 provides the level of service and delay for the two study intersections under existing conditions and with the reduced laneage. Delay increased only slightly, and level of service remained the same.

Table 6-5 Packard Street Level of Service Comparison for Lane Reduction – AM Peak Hour

Intersection	Laneage	Land Use 1		Land Use 2		Land Use 3	
		Delay*	Level of Service	Delay*	Level of Service	Delay*	Level of Service
Packard at Jewett	Two Lanes	6.7	A	6.8	A	6.9	A
	One Lane with turn pockets	7.9	A	8.3	A	8.7	A
Packard at Stone School	Two Lanes	10.5	B	11.5	B	12.2	B
	One Lane with turn pockets	12.9	B	14.4	B	15.3	B

Table 6-6 Packard Street Level of Service Comparison for Lane Reduction – PM Peak Hour

Intersection	Laneage	Land Use 1		Land Use 2		Land Use 3	
		Delay*	Level of Service	Delay*	Level of Service	Delay*	Level of Service
Packard at Jewett	Two Lanes	8.6	A	8.7	A	8.8	A
	One Lane with turn pockets	12.8	B	13.5	B	15.8	B
Packard at Stone School	Two Lanes	9.6	A	10.1	B	10.6	B
	One Lane with turn pockets	10.2	B	10.8	B	11.5	B

High Crash Location Safety Recommendations

Thirteen high crash locations were evaluated in the city based on the assessment done in Chapter 4. Safety recommendations were made for these high crash locations for short- and mid-term time frames depending on the work recommended and ease of implementation. No long-term recommendations are made, as the crash patterns at these locations will need to be monitored after short- and mid-term recommendations have been implemented. Table 6-7 outlines the safety recommendations for the study intersections. A full description of suggested improvements can be found in Appendix D.

Table 6-7: Safety Recommendations for Study Intersections

Intersection	Short-Term (0-5 years)	Mid-Term (5-10 years)
First Street at Huron Street	Corridor to be served by SCOOT	
Fifth Avenue at William Street	Observe westbound approach for parking interference, monitor	Traffic calming measures
Church Street at North University Avenue	Advanced signing, signal warrant analysis	
Eisenhower Parkway at Northbrook Place	Signal warrant analysis	Indirect lefts
Eisenhower Parkway at Plaza Drive	Signal warrant analysis	
Fletcher Street at Huron Street	Signal warrant analysis updated to monitor temporary signal being installed due to the North Quad development	
Hill Street at State Street	Corridor signal optimization; Assess northbound flow and potential to assess the removal of parking on northbound State Street between Hill Street and North University to make a bus lane	
Huron Street at Main Street	Corridor to be served by SCOOT	
Maple Road at M-14 WB Off-Ramp	Roundabout currently being constructed, no recommendations at this time.	
Packard Road at Stadium Boulevard	Corridor signal optimization, monitor	Other congestion mitigation such as additional laneage
Platt Road at Washtenaw Avenue	Physical barriers to left turns, signal warrant analysis	
State Street at South University Avenue	Signal warrant analysis studied and possible signal is warranted, but declined at this time. Continue to monitor for additional items.	
State Street at Victors Way/Hilton Boulevard	Signalization planned by the end of 2008, monitor crashes once signalized	Indirect lefts

Downtown Public Parking Improvements Needed

In June 2007, Nelson\Nygaard, on behalf of the City and Ann Arbor's Downtown Development Authority (DDA), completed a Phase II parking study that looked at parking and transporation to the downtown area. As a result, several immediate and short-term actions were recommended in regard to parking. Providing free or discounted rideshare parking would provide a reduction in the amount of parking spaces that would be needed in the near future downtown, a second action of installing additional multi-space meters increases patron convenience and enables the City to pursue more strategic parking strategies by gathering more detailed parking usage. Since its inception in 1982, the DDA has actively promoted walking, biking, and transit ridership, as the DDA recognizes that these alternative transportation options are good for the environment, reduce the number of downtown parking spaces needed, and lessen traffic congestion. For the past two decade the DDA has pursued the expansion of an enhanced

"menu of downtown transportation options", with funding of bike, pedestrian, and transit programs, as well as the construction of parking, with the understanding that patrons will select the transportation mode that best meets their needs for convenience, availability, and cost.

In November 2006, according to Nelson\Nygaard, on average 62% of the privately owned parking spaces were being utilized. It is in the DDA's parking plan to manage existing downtown parking to maximize its availability and effectiveness to support downtown vitality and work to support the development of new enhanced transportation alternatives while developing additional public parking spaces where appropriate. However, as Ann Arbor continues to grow, its demand for available parking will also increase. The key in increasing the density in downtown will be to provide adequate parking such that the users of downtown are confident that parking will be available when they need it. Strategies such as shared commuter parking, providing signature transit service to downtown, in-time parking information, increased valet service, and increasing the amount of zip cars, could result in a reduction in the amount of parking spaces needed in downtown.

Truck Routes

Existing truck routes were compared to existing roadway classification (Figures C-2 and C-1 in Appendix C), and found to be appropriately located. Most truck routes follow major or minor arterials with the exception of a few locations in the downtown grid. Truck Routes on Ashley Street and William Street are on collector roads but are necessary so that trucks can navigate the one-way street system.

The impacts of increased congestion due to intensified land use on truck routes was evaluated by comparing the existing truck route map to the 2030 daily roadway congestion map (Figure 5-5). Congestion on the following roadways will have an impact on the movement of commercial goods:

- Huron Street, Main Street, and Division Street downtown
- Main Street, from downtown to M-14;
- Plymouth Road, from downtown to US-23;
- Packard Street, from downtown to Stadium Boulevard;
- Washtenaw Avenue, from Stadium Boulevard to US-23;
- Eisenhower Parkway, from State Street to US-23;
- Ellsworth Road, from State Street to I-94;
- State Street, from Eisenhower Boulevard to Ellsworth Road
- Ann Arbor Saline Road from Scio Church Road to I-94

Intelligent Transportation Systems (ITS)

Intelligent Transportation Systems (ITS) is the application of information technology to manage the traffic operations on a transportation network. Rather than building additional capacity to accommodate increases in traffic, many transportation agencies have turned to ITS applications to help use the roadway capacity that is already available more efficiently. The City of Ann Arbor already has a traffic operations center (TOC), vehicle detection equipment, and an advanced adaptive signal system known as SCOOT (Split Cycle Offset Optimization Technique). Figure 6-3 shows the location of both regular and SCOOT system traffic signals in Ann Arbor for both the existing and the proposed locations.

In 2007, the Michigan Department of Transportation (MDOT) developed a regional ITS architecture and deployment plan for the SEMCOG region. This architecture fits into MDOT's Statewide ITS Strategic Plan, which includes eventual statewide connectivity and a statewide

ITS center. ITS development by MDOT or other agencies in the Ann Arbor region could one day be connected to this statewide system. Therefore, any ITS applications that are considered must be implemented by coordinating with state, regional, and local agencies. Coordination is a key element for ITS and for emergency planning services, as having quarterly or bi-annual meetings with state, regional, and emergency services groups can allow for better planning and coordination. Thus, in case of emergency individuals know each other and have a plan. Also, as technologies evolve agency coordination can allow for connectivity, cost savings, and better coordination.

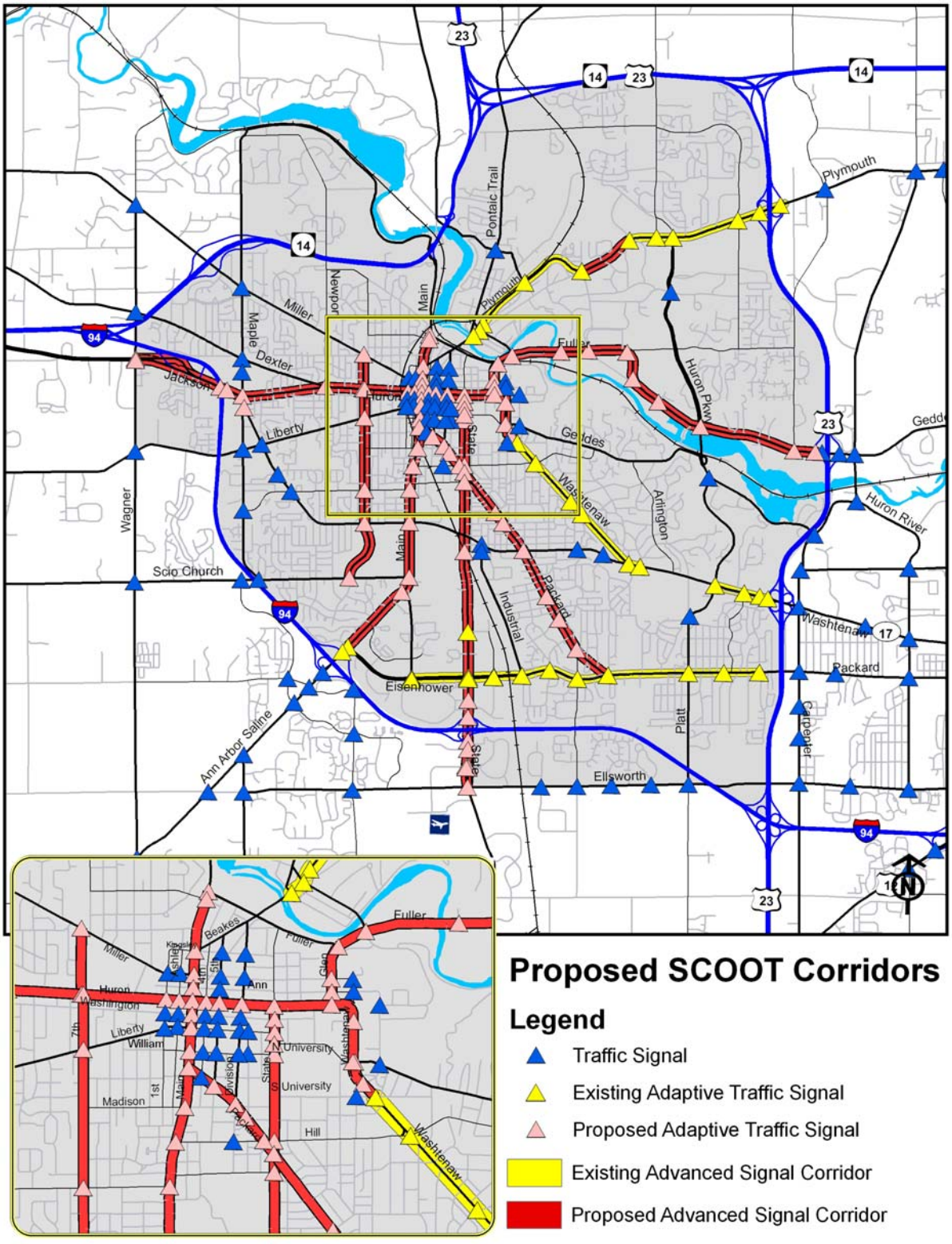
Examples of ITS applications that may be considered in order to improve efficiency in the Ann Arbor area regardless of the land use density include:

- Advanced Traffic Management Systems (ATMS) – can be used to coordinate traffic signals for special events such as University of Michigan football games.
- Incident management – coordination of police, fire, and towing operations to clear traffic incidents off freeways and major arterials faster.
- Advanced Traveler Information Systems (ATIS) – web-based or call-in systems, such as 511, can be used to provide roadway users with real-time information about congestion, incidents, or weather that may impact their travel. Information relayed to motorists indicating number of parking spaces available or when the next bus will be arriving at a park and ride lot.
- Public Transportation Management Systems - transit automated vehicle location (AVL), transit travel information systems, and electronic fare collection can help public transportation agencies provide more efficient on time service.

Expansion of Ann Arbor's existing adaptive signal system, SCOOT, is another ITS application that may help to reduce congestion on major roadways without the need for additional capacity. Figure 6-3 shows the existing proposed corridors for SCOOT application. Proposed expansion corridors include Main Street, State Street, Huron Street, and Fuller Road. These recommendations were based on future forecasted congestion on major roadways entering and leaving the city.

While adding SCOOT to the transportation system does not change the number of vehicles using the system, it does make the system more efficient thereby reducing the vehicle hours of travel. It has been estimated that adding SCOOT onto a corridor increases the capacity of a corridor by approximately 10% due to increase in progression. By adding SCOOT to the corridors shown in Figure 6-3, the vehicle hours of travel within the City of Ann Arbor is expected to decrease between 10-20% for each land use alternative.

Figure 6-3: Existing and Proposed SCOOT Expansion Locations



Traveler Choices

As seen in Chapter 5, the current roadway system is not capable of supporting the increase in trips that comes along with the anticipated growth under Land Use Alternatives #1, #2, or #3. A sensitivity analysis was performed to determine how many future trips would need to be removed from the system in order to avoid widening corridors in the area. Table 6-8 shows the approximate number of vehicles that would need to be removed from the system during the peak hour under Land Use #3 in order to maintain LOS D or better at the 16 intersections studied.

Table 6-8: Estimated Required Trip Reduction by Peak Hour

Study Corridor	Trip Reduction	
	AM	PM
State Street Corridor	250	450*
Main Street Intersections	300	500
Ann Arbor Saline Intersections	300*	600*

*Level of Service for at least one movement at one intersection is less than LOS D, but the V/C ratio is less than 1.

There are many ways to reduce the number of vehicles (or trips) on a roadway; one way is through Transportation Demand Management (TDM) programs which are employer based incentive programs designed to help reduce demand for transportation resources. Employees are encouraged to change their travel mode, time, destination, or route in an effort to reduce overall congestion. Some examples are:

- Promoting walking and cycling as alternatives modes;
- Providing transit and vanpool opportunities;
- Promoting flextime or alternative work schedules to modify commuter travel times;
- Promoting telecommuting and/or living near where you work;
- Providing advanced route information and real-time commuter services;
- Providing workforce housing near employment.

Currently, the getDowntown partnership has a TDM Coordinator for downtown businesses which is successful. This program was designed primarily to help reduce the number of parking spaces being used by employees and assist getting employees into and out of downtown without the use of an automobile. The roadways shown in Table 6-9 are roadways leading into Downtown Ann Arbor, however, they are also affected by users not going into Downtown. An expanded travel choices (TDM) program to businesses outside of downtown along these congested corridors is being recommended to reduce the number of automobile trips. If, through an expanded travel choices program, the Ann Arbor community can reduce the number of trips on these key corridors during the peak hours, roadway widening can be avoided.

Access Management

While the highly developed nature of much of the City's commercial corridors makes it difficult to implement optimal access spacing standards outlined in the access management standards section of the city's zoning ordinance, vigilance in preparing access management plans for corridors prior to the final design stage of street projects will facilitate city efforts to minimize the number of driveways as much as possible with additional consideration of the interaction between access points and non-motorized and transit users. The standards in the city's access management section of the zoning ordinance are based on MDOT standards for minimum spacing, determined by posted speed. Examination of spacing and design of driveways should be especially detailed for street projects and private development along corridors where additional transit facilities are planned within the existing right-of-way. The need to limit traffic

turns across transit lanes or lines, further reduce the number of conflict points, and promote efficient flow of traffic with reduced lane width or number of lanes should all be strongly supported by aggressive, creative implementation of access management. By combining driveways and reducing the number of conflict points along the roadway, the capacity and safety of the roadway increases allowing the roadway to become more efficient.

In addition to the specific recommendations identified in the Washtenaw County Access Management Plan (WCAMP), the standards established in the City's draft access management ordinance should be consulted early in the process of major development proposals, street design, master land use plan updates, street improvements or reconstruction, non-motorized transportation projects, streetscape enhancements, and other projects along the city's main corridors. The short term recommendations of this plan include amending the city's zoning ordinance with a comprehensive access management ordinance drafted as part of the WCAMP project.

Another short-term recommendation of this plan is to establish protocol for an access management study to be prepared prior to the design phase of any street project to identify specific access management improvement opportunities that would support a safer and more efficient transportation system. Recommendations from those plans should then be incorporated into the street design to increase convenience and ensure recommended changes are implemented.

For the Jackson – Huron – Washtenaw corridor in the city, the Washtenaw County Access Management Plan, includes site-specific recommendations for improving access patterns, and should be used in street design and private development reviews. Additionally, the plan's access, non-motorized, and transit standards and implementation measures should be used in concert with the city-wide access management section of the zoning ordinance to determine if any of the following access management concepts should be applied to design for capital projects on all of the city's major streets (collectors and arterials):

- Driveway Removal/Consolidation
- Driveway Spacing Changes
- Restricted Turning Movements
- Raised Median/Travel-Lane Separation
- Traffic Signals removal, installation or retiming
- Increase Pathway Setbacks
- Design

A mid-term recommendation of this plan includes adding a line item in standard street improvement project budgets with specific funding for access-related improvements in and near the right-of-way. Incentivizing implementation by making funds available for voluntary compliance or improvement of access spacing and design as part of a street project is one proven method of speeding up the access management process.

Long-term recommendation for access management is the continued development of access plans prior to street project design, and the establishment and expansion of programs to assist with the cost and increase the speed of implementation for identified access modification recommendations citywide.

More information on access management benefits, techniques, and standards can be found in Chapter 2 and Appendix A.

Roadway and Intersection Improvements Conclusions

Increasing the capacity of a roadway through the addition of lanes and coordinated traffic signals has commonly in the past been a strategy used to address additional traffic due to growth. However, this can be an expensive, short-term fix that may not ultimately relieve congestion and address all transportation problems facing the City of Ann Arbor.

While roadway improvements can increase mobility, it does not necessarily ensure accessibility to destinations. Certain desirable places such as downtown Ann Arbor and U of M Central Campus do not have the room to expand roadways or parking lots in order to accommodate areas additional trips. Widening the roads in these areas could also destroy the very character that makes them desirable in the first place. As a result, accessibility to destinations must come from a balance of transportation choices.

Additional laneage can relieve congestion for the number of vehicles that are using the road when the improvement is implemented, but the social and environmental impacts are costly and many times undesirable. However, this does not account for the number of induced trips that will shift to the roadway once congestion is relieved. Even if a roadway is widened beyond what is currently needed, at some point in the future traffic will be attracted to the widened roadway to the point of overburdening the corridor, resulting in congestion once again.

Finally, the cost of roadway widening can be prohibitive, depending on the right-of-way needed to implement the improvements. A number of the intersection and safety improvements can improve operations and safety, but the congestion element is one that will apply more of a Complete Streets strategy.

Transit

Applying the Complete Streets concept to transit began with a review of which corridors are important to the transportation system and prioritizing the improvements to them. Transit improvements were based on this concept for prioritization and a list of selection criteria was provided in the transit methodology section.

Based on the selection criteria listed in the methodology section and the information gathered in Chapter 4 (Basis for the Plan), several radial corridors were selected for transit improvements within the city. These corridors are the most important, carry the most people, and generally run in a radial pattern, connection the downtown/UM core to the outer fringes of the city.

The seven Priority Corridors selected for analysis were:

- State Street
- Washtenaw Avenue
- Plymouth Road
- S. Main Street/Ann Arbor-Saline Road
- Jackson Road/W. Huron Street
- Miller Road
- Liberty Street

Service Frequency Assessment

Analysis of the network of bus routes running through Ann Arbor focused on increasing frequencies of the priority corridors, with a goal of ten or fifteen minutes between buses because it is typically agreed upon that at these frequencies transit service can be used without a

schedule and is competitive with travel by private automobile. Two of the corridors already have high frequency service, mostly due to the composite headway of more than one route running on the corridor – State Street and Plymouth Road. Thus, five corridors ended up being part of the assessment – Miller, Liberty, Jackson/W. Huron, S. Main/Ann Arbor-Saline, and Washtenaw.

From the information on existing conditions listed in Chapter 4, recommendations to increase frequencies on certain routes were made. The specific changes were:

- Route 4 Washtenaw: Reduce peak headway from 15 to 10 minutes
- Route 16 Ann Arbor-Saline: Reduce peak headway from 30 to 15 minutes (this provides a composite headway of 10 minutes on much of the corridor)
- Route 9 Jackson-Dexter: Reduce peak headway from 30 to 15 minutes (again, reduces composite headway to 10 minutes)
- Route 12 UM and 12 UL: Reduced peak headway from 30 to 15 minutes (same as above)

Queue Jump Assessment

Queue jumps or transit by-pass lanes allow a bus or transit vehicle to have a dedicated lane at an intersection to allow the transit vehicle to move to the front of the intersection and make it through the next green phase at a traffic signal. It allows the transit vehicle to not be stuck at intersections in the back of a queue of vehicles. It gives the transit vehicle an advantage and saves on fuel and time for the transit vehicle along the route. Figure 6-4 illustrates an example of how a queue jump could be implemented at an intersection.

Figure 6-4: Example of a Queue Jump

Potential queue jump locations were selected first by prioritizing the transit corridors in the city and selecting corridors that act as gateways into the city, run radially from the freeway fringe to downtown, and carry the most transit riders. Additionally, corridors where service improvements are proposed were also considered, as queue jumps can contribute to a higher quality of service on those routes. From these criteria six corridors were selected for a more in-depth look.

The queue jump assessment was completed by identifying congested areas of each corridor, the signalized intersections located in these congested areas, and assessing whether a queue jump facility would be feasible. Since queue jump lanes are typically easier to construct in suburban areas with a less-dense development pattern, most of the analysis focused on these areas of Ann Arbor, although urban intersections can be found in the list below.

In the end, eighteen intersections were identified that had congestion during certain times of day from automobile traffic and were also of a certain land use character to allow for a relatively easy implementation. Table 6-9 details the number of proposed queue jump facilities for each corridor. Figure 6-5 provides the potential locations for the queue jump facilities in each corridor.

Table 6-9: Proposed queue jump facilities by corridor

Corridor	Number of intersections
Plymouth	5
Washtenaw	5
State	2
S. Main/Ann Arbor-Saline	4
N. Main	2
Jackson	2
Murfin / Fuller	2
Maiden Lane / Fuller / Glen	1

The following intersections are potentials for queue jump locations. The italicized intersections in the list are those where facilities might be beneficial, but probably not feasible due to their urban nature or other physical limitations.

<u>Plymouth Road/Murfin/Fuller Road Corridor</u>
Plymouth/Green
Plymouth/Huron Parkway
Plymouth/Nixon
Plymouth/Traverwood
Plymouth/Murfin
Murfin/Bonisteel
Fuller/Bonisteel
Fuller/Maiden Lane
Glen/Catherine
Glen/Ann
Glen/E. Huron

<u>Washtenaw Avenue Corridor</u>
US-23/Washtenaw interchange
Washtenaw/Yost
Washtenaw/Pittsfield

Washtenaw/Huron Parkway
Washtenaw/Stadium

N. Main
N. Main/Depot
N. Main/Summit

State Street
I-94/State interchange
State/Eisenhower
State/Packard
State/Hill
State/S. University
State/N. University

Ann Arbor-Saline/S. Main
Ann Arbor-Saline/Oak Valley
I-94/Ann Arbor-Saline interchange
Ann Arbor-Saline/Eisenhower
S. Main/Scio Church
S. Main/Stadium

Jackson
Jackson/Wagner
Jackson/Maple

In particular, the potential for a queue jump at the intersection of Fuller Road, Maiden Lane, and North Medical Center Drive was evaluated. Based on the intersection geometry it was determined that the biggest issue is that three of the four intersection legs have bridges in close proximity to the intersection. Widening these bridges would likely be cost prohibitive.

There is some potential for the westbound approach to move the right turn lane further north and add a Queue Jumping lane between the right turn and through lanes. Using 2004 data from a recent intersection operations study, it appears a Queue Jump lane could be implemented, as the projected queue is 300-feet at the worst time of the day and there are approximately 500-feet between the intersection and the proposed crossover. However, in the design year 2010, it is projected that the PM queue would reach 600 feet. At that point, queuing traffic would start to block access to the Queue Jumping lane rendering it less effective.

The bridges on the other approaches appear to be 200-feet or closer to the intersection and some of that distance would be lost to tapers if an additional lane was added. The projected queues reach 220-feet or more on each approach based on existing volumes. In the 2010 design year, they reach at least 380-feet. To implement Queue Jumping lanes on these approaches would require short awkward tapers and would still be rendered less effective due to queues blocking access to the Queue Jumping lane. During key times of the day, transit would likely be receiving little or no benefits on these approaches.

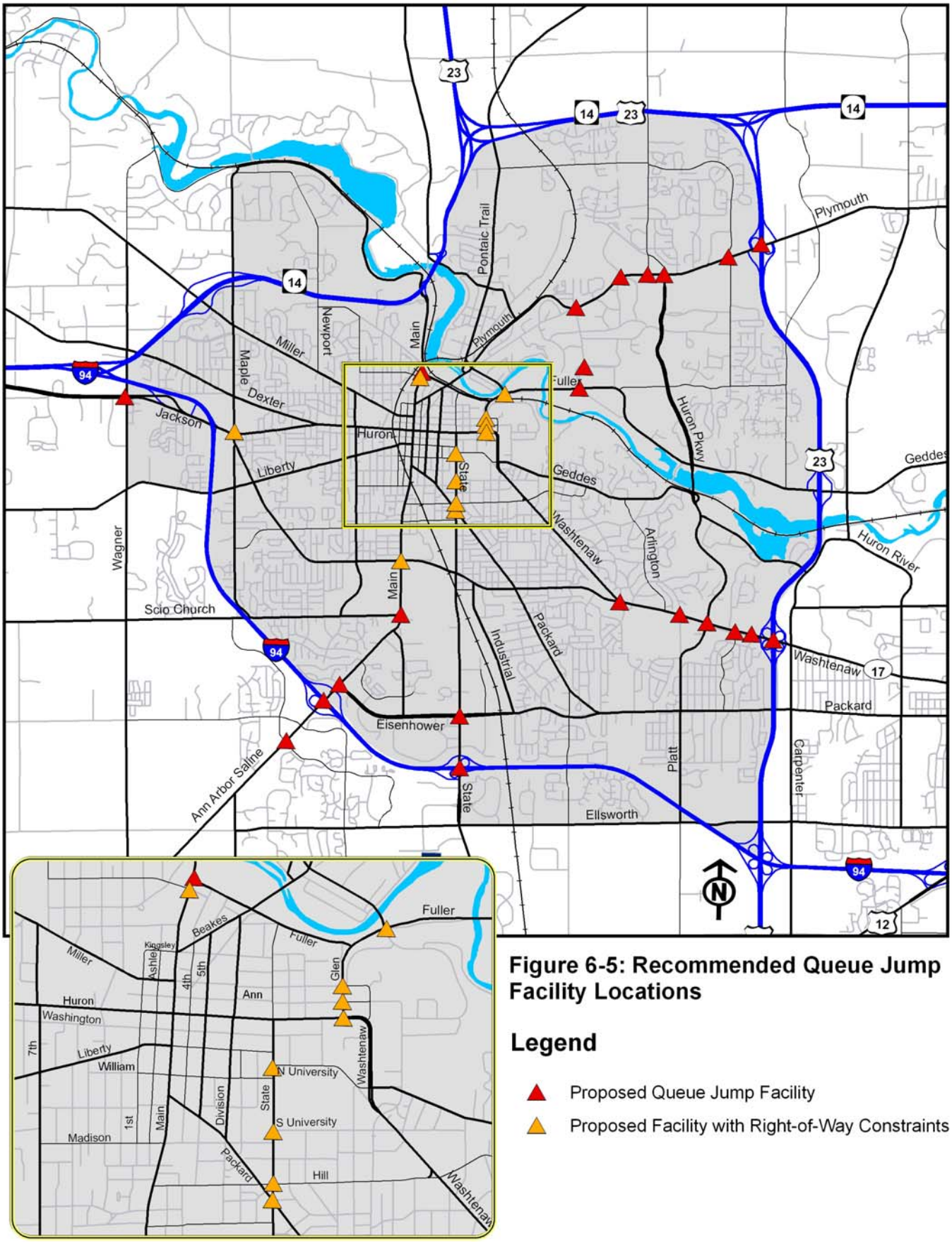


Figure 6-5: Recommended Queue Jump Facility Locations

Legend

- Proposed Queue Jump Facility
- Proposed Facility with Right-of-Way Constraints

Given that this analysis was conducted on 2004 data, it is recommended that the City conduct turning movement counts at this intersection and compare those to the 2004 data. If the volumes have not increased significantly, a Queue Jump lane would be beneficial to transit going through this intersection in the short-term.

Implementing queue jump locations at congested intersections essentially creates a time savings advantage for those riding transit over those travelling by car. By creating this time savings, it is expected that a shift in mode will occur where trips that were travelling by vehicle will travel by transit. Entering the queue jump locations into the 2030 WATS model indicated that there was an additional 5% transit trips within the Washtenaw County area.

Signature Transit Analysis

Based on the methodology of Pushkarev and Zupan, as described in Appendix D of this report, Table 6-10 was developed to detail the densities with which different types of transit can be supported.

Table 6-10: Density of Residents and Employees per Acre and the Types of Potential Transit

Density	Residents + Employees per Acre	Type of Transit
Low	< 10	No transit/bus service
Medium	10-25	Bus service/BRT
High	25-40	Streetcar/LRT
Very High	> 40	LRT/Commuter Rail

Based on the land use densities analyzed there are candidate corridors that could support some sort of high frequency service (bus or bus rapid transit system) or signature transit (light rail, streetcar or bus rapid transit system) in Ann Arbor. Many of these corridors are supported due to the presence of the University of Michigan and other educational institutions in the area. University students, faculty and staff offer a potentially large and reliable source of public transit users. Among the factors related to the University that favor the development of high capacity transit services in the community are:

- The large number of students who are without access or have limited access to automobiles and are fully or partly dependent on transit.
- The need for students to travel within the campus and between the main south and north campus locations, which is now served by the University's transit system
- The need for students, faculty and staff to travel between campus and downtown Ann Arbor.
- Demand generated by University of Michigan sporting events and other special events throughout the year.

In addition, the presence of the University and other institutions in the community insures that the population includes a large number of people—students, faculty, and staff, as well as those from other walks of life who have located in Ann Arbor seeking a "college town lifestyle", who may be more likely to use public transit—and to support it financially through taxes—due to social or ideological factors: environmental concerns, commitment to social justice, thrift, or lack of financial resources. The Ann Arbor and University of Michigan communities already support high quality and relatively frequent public transit service through the AATA and the University of Michigan's bus system. These systems, and the willingness of the community and institutions to support them through funding and ridership, and to make the land use changes necessary to

support future transit, are strong indications of the potential for development of high capacity transit in Ann Arbor.

Figures 6-6 through 6-8 illustrate the residents, including students, plus employees per acre based on the various land use alternatives. These densities show precisely where high frequency service or signature transit service can be supported within Ann Arbor.

Transit-Oriented Design

In concert with the other element of Complete Streets, strategies for Transit-Oriented Design (TOD) and development were evaluated as means to create a more livable and walkable community. Effective TOD, which supports the goals and recommendations of this plan, consists of land use patterns that promote travel by transit, bicycle, walking and ridesharing, and concentrating mixed use development near transit centers along transportation corridors. The different land use alternatives embedded in this plan will require effective strategies to regulate a land use pattern and non-motorized network which provides access and mobility between living and working environments and the transit system. Incrementally increasing the size and density of TOD nodes throughout the implementation process of this plan will result in a heightened sense of community throughout the city. Increased pedestrian and bicycle activity and development at a more human scale will further promote the attractiveness of transportation options other than single-occupancy automobiles. More detail on the Transit-Oriented Design recommendation and policy can be found in Chapter 2 of this report.

Park and Ride Options

AATA already runs a successful park and ride system in the Ann Arbor area. This system primarily is for residents outside of the city itself, with all park and ride lots located within the freeway ring around Ann Arbor.

The transit recommendations listed above emphasize a list of priority transit corridors, with the idea that these transit corridors can facilitate the movement of commuters and visitors into the activity areas of the city. Necessary to this philosophy are park and ride lots on the fringe of the city where commuters and visitors can leave their car in order to take transit into the city.

Four corridors: Plymouth/Fuller, State, Jackson, and Washtenaw, have the highest priority for transit improvements. Currently, the State Street Park and Ride lot, located north of Eisenhower Parkway, is sufficient for intercepting visitors and commuters for transit.

The Plymouth/Fuller corridor does not have a Park and Ride interceptor lot at the outer end of the corridor, although one is currently being planned at the US 23/Plymouth interchange. This Park and Ride lot should be considered in the short-term time period in order to intercept commuters on this corridor and make it easier for them to switch to a transit-based mode.

The Ann Arbor-Saline corridor is served by the Pioneer High School Park and Ride lot near the S. Main and Stadium intersection. This is too far from the I-94/Ann Arbor-Saline interchange to be an effective interceptor lot. It is recommended that a new Park and Ride interceptor lot be considered closer to the I-94/Ann Arbor-Saline interchange, where there is an existing MDOT carpool lot.

Figure 6-6: Residential and Employment Density for Land Use #1 With Transit Opportunities

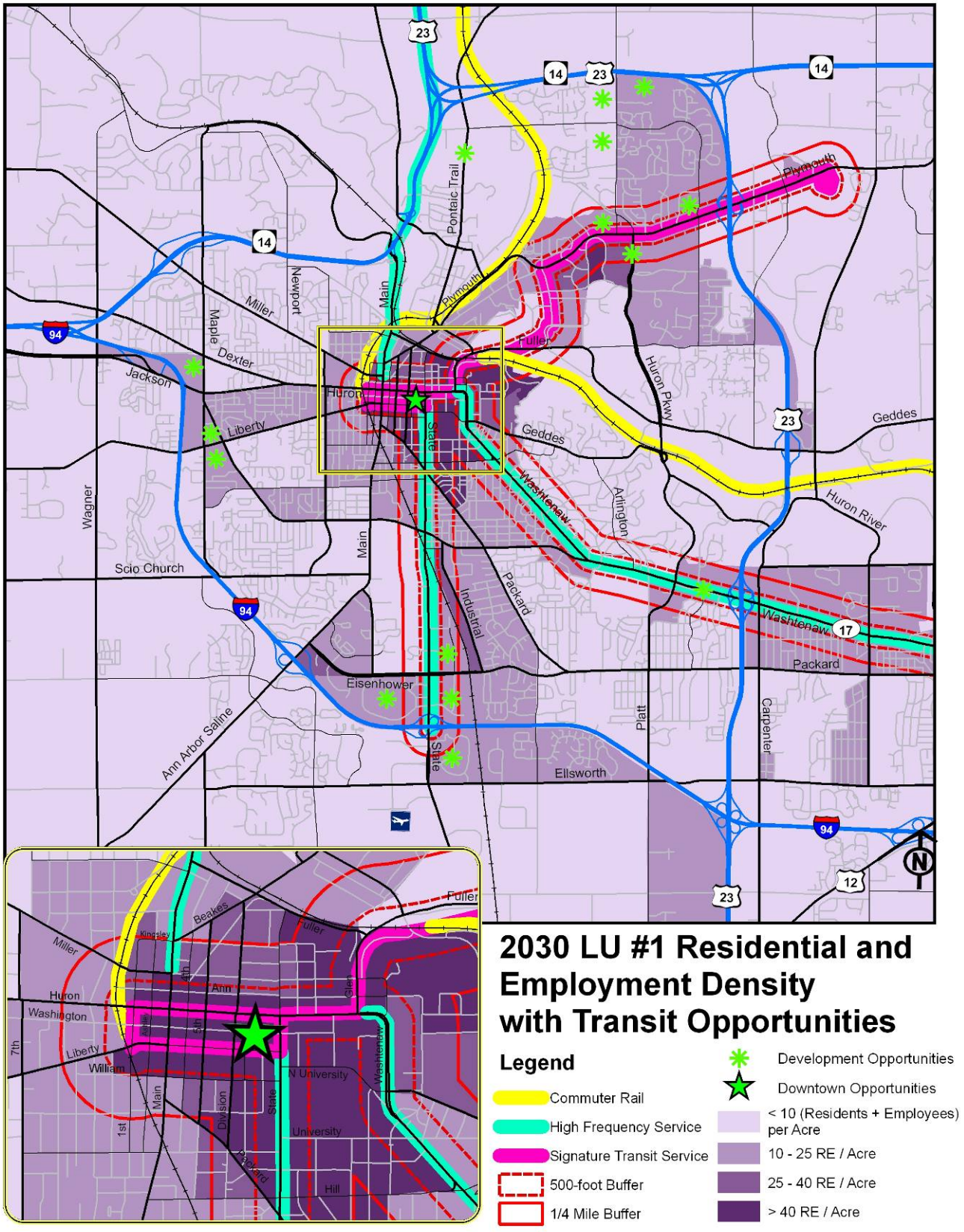


Figure 6-7: Residential and Employment Density for Land Use #2 With Transit Opportunities

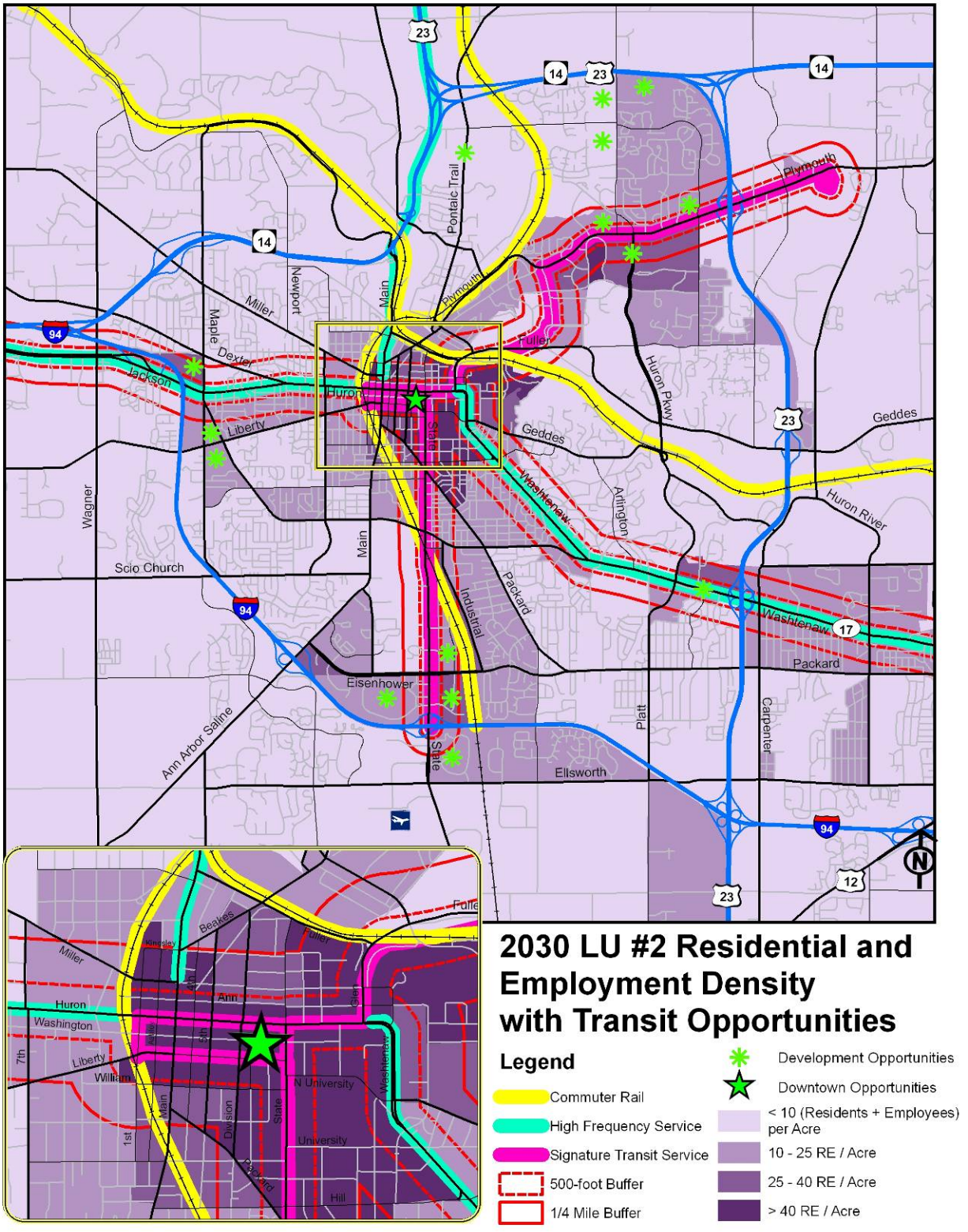
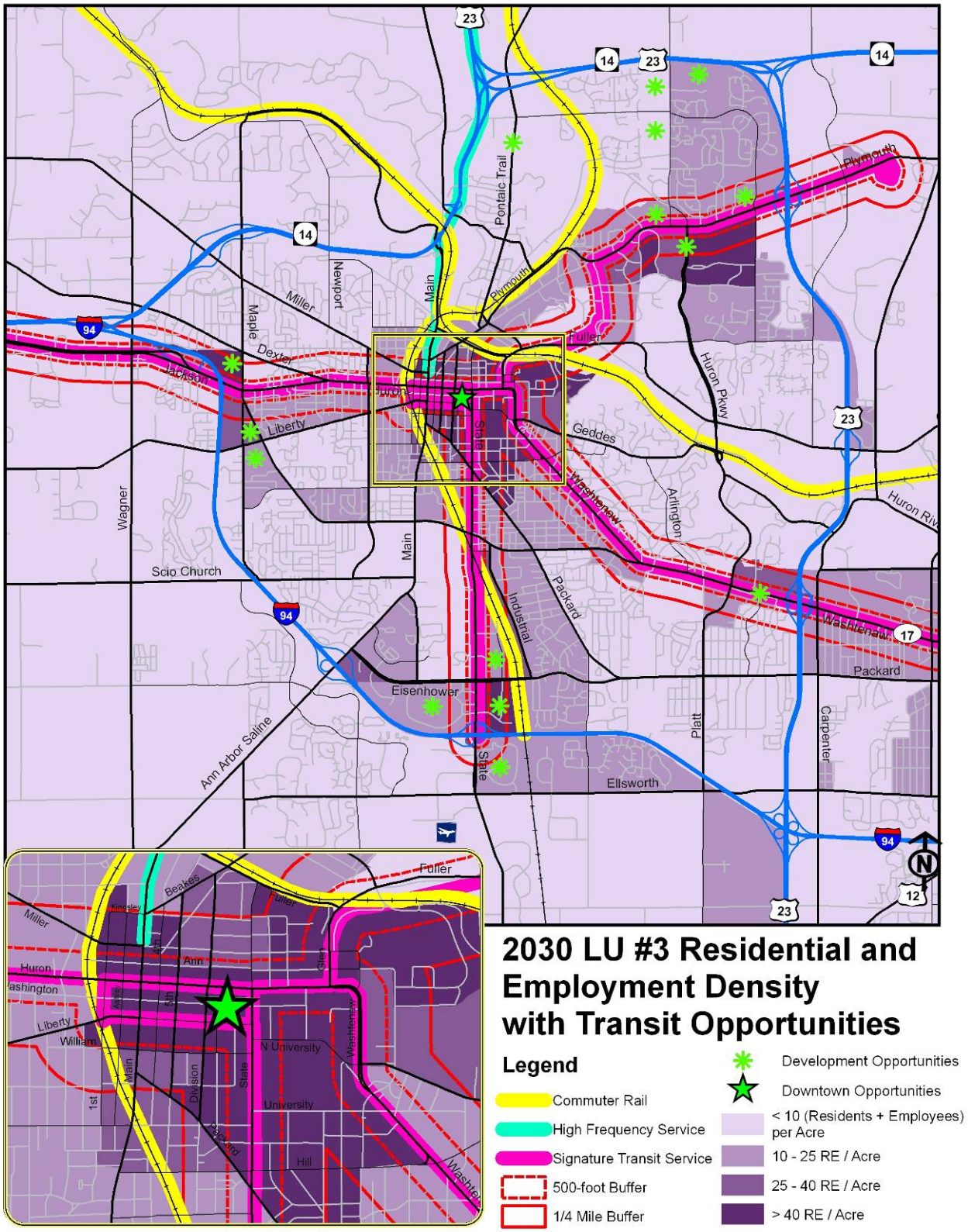


Figure 6-8: Residential and Employment Density for Land Use #3 With Transit Opportunities



The Jackson Road corridor was previously served by a Park and Ride lot at the Maple Village Shopping Center, but this arrangement has ended. A permanent Park and Ride facility should be considered near the Jackson/I-94 interchange to serve both Jackson Road transit patrons and also to intercept commuters using I-94 from western Washtenaw and Jackson Counties. The location of this Park and Ride lot also will be essential to the signature transit improvements constructed along this corridor in later time periods.

A Park and Ride facility is currently available at the Arborland shopping center parking lot just west of the US 23/Washtenaw interchange. However, this lot is not fully advertised as a Park and Ride facility due to the small number of spaces, and is not considered a long-term solution by AATA. Because of the inadequacy of the Park and Ride facility, and that Washtenaw Avenue will most likely have upgrades transit facilities in the future, with the opportunity through an possible US-23/Washtenaw interchange reconfiguration, a permanent Park and Ride facility should be constructed at or near the interchange. This facility will assist visitors and commuters on the Washtenaw corridor who want to take transit to access Ann Arbor's core.

Lastly, a Park and Ride facility is currently located off of State Street north of Eisenhower Road is near capacity. It is recommended that either an additional or new Park and Ride facility be considered by the State Street/I-94 interchange. This Park and Ride facility should coordinate with the proposed signature transit route along State Street as well.

While neither the county-wide transit service nor the Park and Ride lots will be developed by the City of Ann Arbor, it is in the best interest of the city to fully support these services, as it will further Ann Arbor's goal of supporting transit as a way to commute and access destinations within the city. Coordination between Ann Arbor, AATA, Washtenaw County and other stakeholders should occur during development of these outer-city transit services in order to ensure that the new service will support city goals.

Transit Conclusions

Recommendations for transit corridor enhancements can be made based on the corridor criteria, daily boardings assessment, park and ride coordination, and the projected land use along each of the corridors within the City of Ann Arbor. The results of the analysis include:

Corridors to receive high-frequency and signature transit improvements

- Plymouth Road/Fuller Road
- State Street
- Washtenaw Avenue
- Jackson Road

Although the Washtenaw corridor has the second highest existing ridership, the development potential identified along State Street moved State Street into the second position. There is significant development potential outside the City of Ann Arbor on Washtenaw, but that is outside the potential transit corridors within the City. The daily boarding analysis showed that Jackson/Huron and Miller Road corridors have a similar number of AATA daily boardings. The Jackson Road corridor is preferred for signature transit because it has an interchange with I-94 west of downtown Ann Arbor which would appeal to intercepting motorists accessing Ann Arbor. The Jackson Road corridor also serves more diverse land uses than Miller Road.

Corridors to receive high-frequency improvements

- Miller Road
- Liberty Street

- S. Main Street/Ann Arbor-Saline Road
- N. Main Street

Typically, transit improvements are implemented in an order that incrementally improves transit quality and service along the corridor in an effort to increase ridership. However, not all corridors in Ann Arbor are at the same point developmentally. The recommended strategy should be tailored to fit the characteristics of each corridor.

Of the four corridors that are recommended to receive signature transit improvements, the Plymouth/Fuller and State Street corridors currently have the best potential to support signature transit. This recommendation stems from the fact that these corridors have some of the highest ridership in the AATA system, connect to high-use activity centers, have existing park and ride facilities, and have potential redevelopment opportunities that could be driven by transit improvements. Thus, the next step incrementally for each of these corridors would be signature transit.

The remaining six corridors, including the two other proposed signature transit corridors, need smaller, incremental improvements to their existing transit service. The first step would be improvements to the existing bus service in the form of stop amenities and service frequency. The second step would be improvements to give buses traffic signal priority and queue jumping lanes in congested areas, as well as the construction of Park and Ride facilities where needed. Locations for Park and Ride facilities are contained in the AATA Ann Arbor Transit System Development Report. This analysis utilized the SEMCOG travel demand forecasting model to assess remote park and ride lots in the surrounding areas of Ann Arbor and provided recommendations along US-23, I-94 to the west and east, and along M-14. The third step (for the Jackson/W. Huron and Washtenaw corridors) would be the development of signature transit. Lastly, Park and Ride bus service should also be monitored to ensure that a Saturday or weekend service needs to be implemented or there needs to be increased frequency during peak weekday times.

Changes to land use and development patterns in each of the corridors should occur as service along the corridor improves/increases. The ultimate result will be a network of radial arterial corridors with high frequency or signature transit service. This network will allow commuters and visitors to leave their vehicles at the fringe and access important destinations and events in the city via public transit. Service changes may also be needed at a future time period in order to support the circulation of commuter rail passengers arriving in Ann Arbor. This service, either through the Link, existing fixed route bus service, or a new circulator service, should make timed connections with proposed commuter rail stations.

Commuter Rail Analysis

There are two proposals for commuter rail services that would have terminals in Ann Arbor. One would run north-south on the Great Lakes Central Railroad and the Ann Arbor Railroad between downtown Ann Arbor and the City of Howell in southern Livingston County and is currently named the WALLY line. The other would run east-west on the Norfolk-Southern alignment between Ann Arbor and downtown Detroit. Figure 6-9 shows the alignment of both the WALLY and Ann Arbor to Detroit proposed service.

Currently Ann Arbor has a single train station located at 325 Depot Street. The station is located on the Norfolk-Southern alignment, and is not accessible by the WALLY line. This station has other deficiencies, such that it is not within easy walking distance of downtown of UM Central Campus, it has limited parking, is currently not served by an AATA route, does not

have a bus waiting area for commuters desiring to transfer, and is considered aesthetically unpleasing. Building a new signal station in the area where the Great Lakes Central and Norfolk-Southern alignments intersect is not desirable due to its distance from downtown Ann Arbor and UM Central and Medical campuses. The ownership and topography of the potential sites at the intersection of the two lines could also make locating a station there infeasible. This means that Ann Arbor most likely would need to construct two new commuter rail stations in the downtown/UM core – one to serve WALLY passengers and one to serve Ann Arbor to Detroit passengers. Figure 6-9 details the potential location of each of these proposed stations.

Strategically, the location of each of these stations should consider multimodal transportation connections:

- Easy walking distance from downtown Ann Arbor
- Easy walking distance from UM Central/Medical campus
- Interaction with proposed Signature Transit corridors
- Interaction with AATA fixed bus routes
- Bicycle accommodations and lanes
- Parking accommodations

Once the WALLY is up and running, the next step would be to extend the line south of downtown Ann Arbor. The proposed extension of the WALLY commuter rail line would be from downtown Ann Arbor to the UM Football Stadium. This would make a connection from downtown to the UM South Campus and the many sporting activities. The time frame for this would be 5-15 years.

WALLY Stations

A feasibility study report from RL Banks on the WALLY line suggests locations for three stations in Ann Arbor. The first of these would be located at the intersection of Plymouth Road and Barton Road. This station would be at the end of the commuter rail line in the initial service concept, this was recommended due to the complexity and cost of constructing a downtown station. Passengers bound for downtown Ann Arbor or UM would transfer to AATA buses at this station – either to the #2X serving the downtown area or the #2, which goes to UM Medical and Central campuses before terminating downtown. Coordination of AATA bus schedules may be possible for the routes to better serve commuter rail passengers at this station. Three downtown Ann Arbor station sites are being considered on the west side of downtown Ann Arbor, but would not be constructed immediately due to cost and site logistics. One location is at First and Liberty Streets, another is on Washington Street just west of First, and a third at First and William are being considered for the downtown station. Consideration should be given to ease of access to downtown and access to AATA bus routes. A third station is proposed near Hoover Street and would serve the University of Michigan stadiums. Given that employment is small in this area, special event trains are being considered for the WALLY with this station being utilized as a station.

It is unclear at this point the how the proposed high quality transit corridor for Jackson/W. Huron and the WALLY station would connect. While the improvement is proposed for the W. Huron corridor, no routing has been designated and construction of such an improvement may be years in the future. Coordination should occur between the two projects to ensure that this proposed station will be served by signature transit or will be within close proximity.

Ann Arbor to Detroit Station

Construction of a new station for the Ann Arbor to Detroit line could be considered less of a necessity since the current Depot Street station serves the line. However, because of the

deficiencies listed above for the current station and the desire to support multimodal connections, a new station is proposed. The location of this station is proposed for the area near the Fuller Road/Maiden Lane intersection (see Figure 6-7). The proximity of the station location to the UM Medical campus would allow for easy access to this destination for commuters, patients, staff, and visitors, to name a few. Relocating this station to this location puts the largest worksite in Ann Arbor and a significant medical center at the station itself. The station is also close to the proposed signature transit along the Plymouth/Fuller corridor, which would give commuters' access to downtown, UM North Campus, and Plymouth Road. The integration of the station and the signature transit corridor could include a skywalk connection from the rail station/multimodal center directly into the hospital. The skywalk would also serve to connect the commuter rail to the connector service or signature transit service directly. There may be a system of skywalks with vertical mobility devices, i.e. elevators, escalators, and stairs. Coordination between the construction of this station and the Plymouth/Fuller signature transit corridor is essential to ensure a smooth connection between the commuter rail and signature transit service.

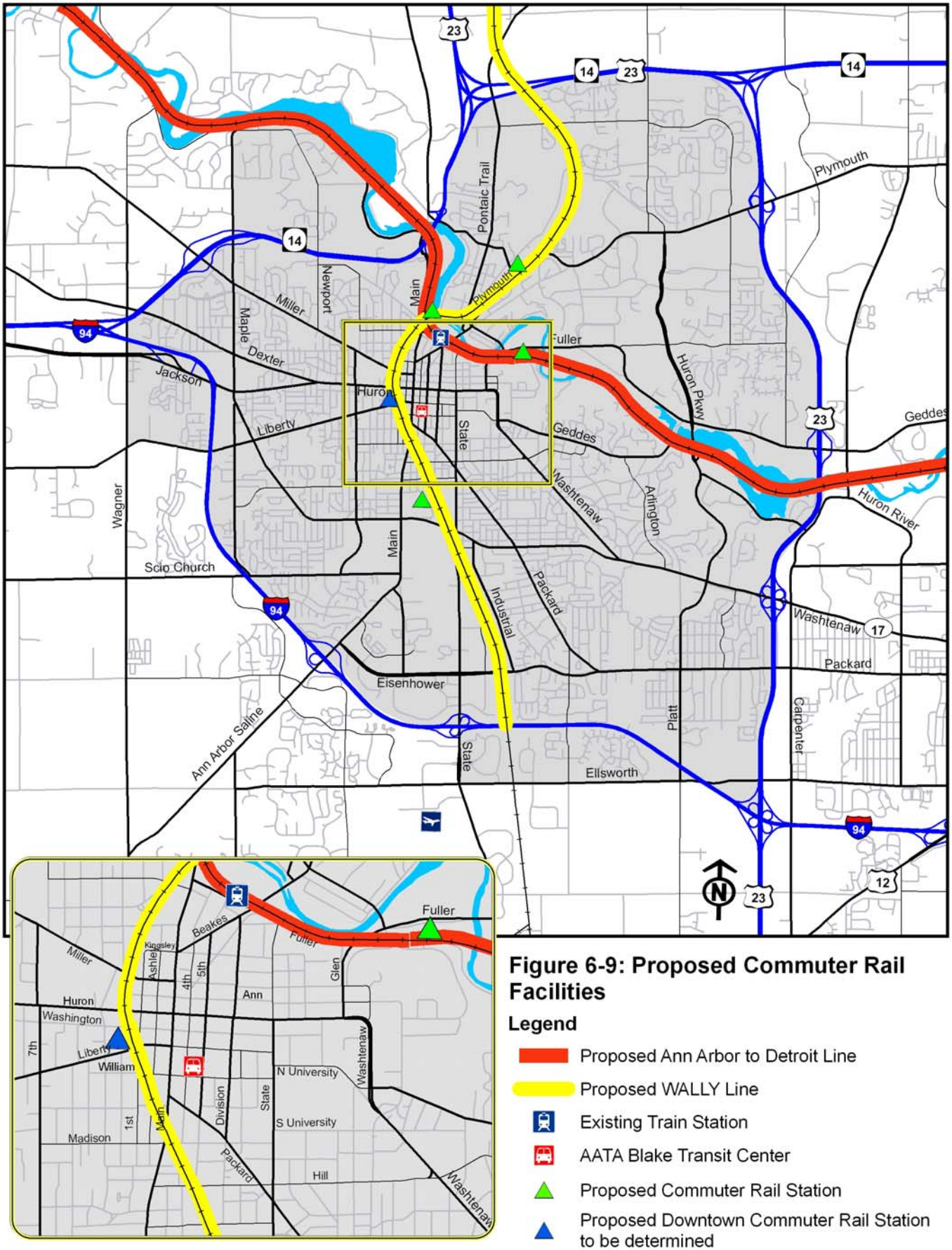


Figure 6-9: Proposed Commuter Rail Facilities

Legend

- Proposed Ann Arbor to Detroit Line
- Proposed WALLY Line
- Existing Train Station
- AATA Blake Transit Center
- Proposed Commuter Rail Station
- Proposed Downtown Commuter Rail Station to be determined

Pedestrian and Bicycle Analysis

Data presented in Chapter 5 demonstrates the positive impacts increasing density in the city is projected to have on increasing the number of non-motorized trips. In response to this projected increase, the City of Ann Arbor has completed a Non-Motorized Transportation Plan to recommend additional investment of resources into the non-motorized transportation system. The Plan identifies a need for over 38 miles of on-road bicycle lanes, 25 miles of sidewalks, and 129 mid-block crossings. The City published a follow-up memo to provide additional guidance for prioritizing the recommendations based on a technical analysis of non-motorized travel potential, illustrated in Figure 6-10. The non-motorized travel potential was determined by determining locations of land uses that would be accessed by non-motorized travel such as schools, parks, and the university and buffering those with bus routes and stop locations. The non-motorized travel potential was then assigned to a corridor. The prioritization outline in the memo weighed the travel potential of each corridor, cost to implement improvements, existing traffic conditions, safety, existing facilities, and overall connectivity to the system. Table 6-11 summarizes the data created for the memo. The corridors with the highest total score were identified as highest priority for capital investment. These priorities also coincide with the Complete Streets strategy, as the main transit corridors proposed in this plan (Plymouth/Fuller and State) are two of the five highest priority improvement corridors. Design and implementation of transit improvements should connect all existing and new transit stops to non-motorized facilities and fill gaps in the corridor's sidewalk system.

Table 6-11: Prioritization of Non-Motorized Corridors^

Corridors	Travel Potential Score*	Cost Score**	Condition Score***	Total
Liberty Street	4.90	4.00	2.5	11.40
Packard Street	4.38	4.00	3	11.38
State Street	4.94	3.00	3	10.94
Main Street	4.87	3.00	2.5	10.37
Plymouth Road	3.98	4.00	2.25	10.23
Stadium Boulevard	4.14	3.00	2.25	9.39
Ann Arbor-Saline Road	4.41	3.00	1.75	9.16
Platt Road	3.53	4.00	1.5	9.03
Scio Church Road	3.30	4.00	1.5	8.80
Maple Road	3.90	3.00	1.75	8.65
Jackson Avenue	3.52	3.00	2	8.52
Miller Avenue	3.99	2.00	2.25	8.24
Newport Road	2.30	4.00	1	7.30
Fuller Road	3.53	2.00	1.5	7.03
Washtenaw Avenue	4.22	1.00	1.75	6.97
Pontiac Trail	3.19	2.00	1.75	6.94
Dexter Road	3.31	2.00	1.5	6.81
Stone School Road	3.76	2.00	1	6.76
Nixon Road	3.25	2.00	1.5	6.75
Huron River Drive	1.48	4.00	1	6.48
E. Huron River Drive	1.18	3.00	1.5	5.68
Geddes Road	2.53	1.00	1.25	4.78

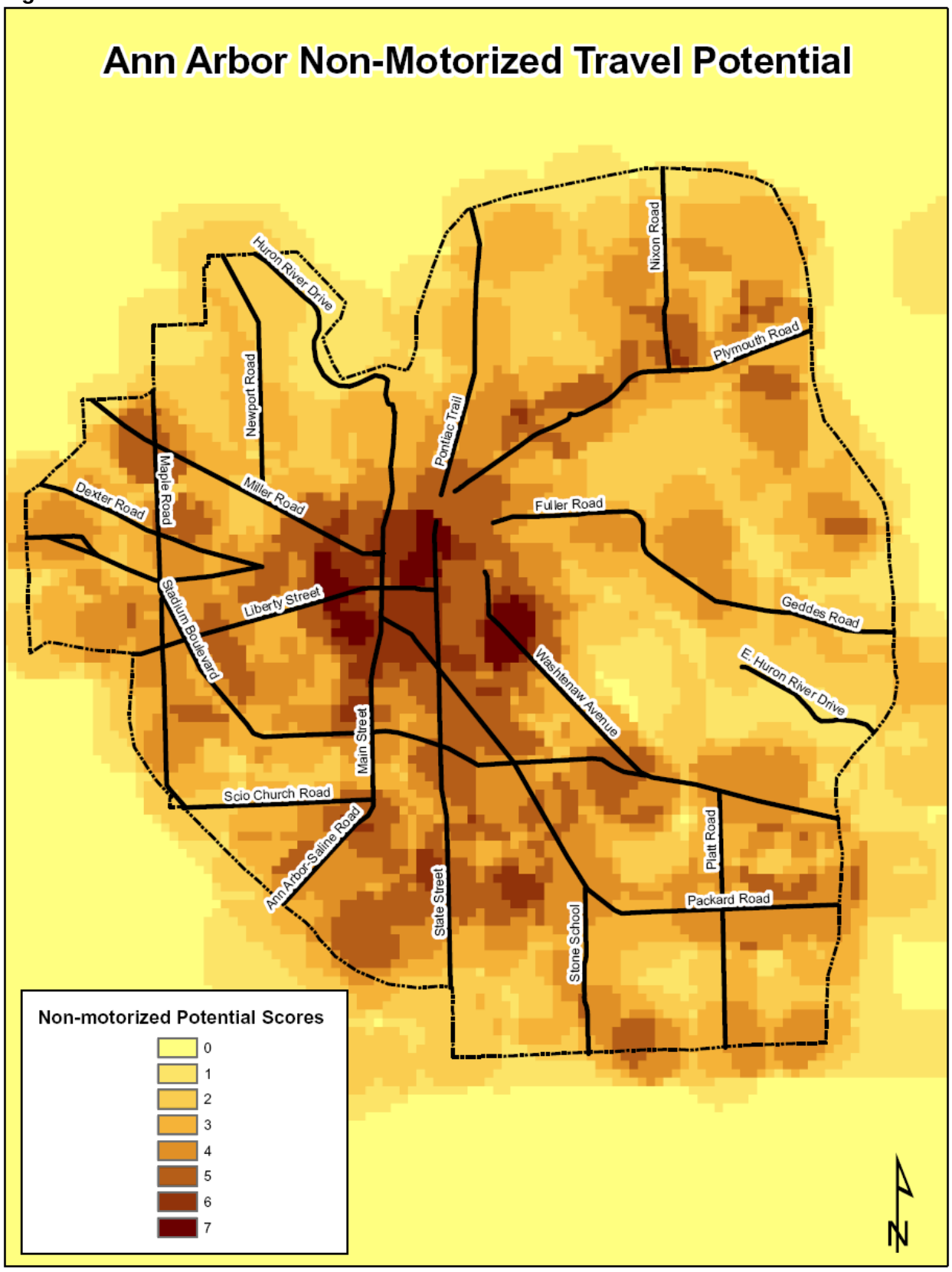
**Travel Potential is based on the amount of non-motorized land uses surrounding the road – 0 is lowest and 7 is highest*

*** Cost is scored from 0-4 with 0 being the lowest cost and 4 being the highest cost*

****Condition is a weighted score with 0 being lower and 3 being the highest*

^ City of Ann Arbor Prioritization Memorandum

Figure 6-10: Non-Motorized Travel Potential



Glossary of Terms

Access Management: Includes design elements such as medians, signal spacing, shared driveways, service roads, and commercial driveway spacing from intersections and other driveways to improve traffic flow and increase the road carrying capacity without the need for costly roadway widening.

Active Transportation: Includes non-motorized transportation systems; such as walking and biking.

Bus Rapid Transit (BRT): BRT is a broad term given to a variety of transportation systems that, through improvements to infrastructure, vehicles and scheduling, attempt to use buses to provide a service that is of a higher quality than an ordinary bus line. Each BRT system uses different improvements, although many improvements are shared by many BRT systems. The goal of such systems is to at least approach the service quality of rail transit while still enjoying the cost savings of bus transit. The expression *BRT* is mainly used in North America; in Europe and Australia, it is often called a **busway**, while elsewhere, one may speak of **quality bus** or simply **bus** service while raising the quality.

Bus Stop Amenities: Includes items such as shelters, lighting, benches, route maps, etc. that are provided at bus stops to provide comfort and information to transit riders.

Complete Streets: Complete Streets are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists, and bus riders of all ages and abilities are able to safely move along and across a complete street.

Congestion: Congestion occurs when there are delays in travel time, most commonly due to higher volumes than an intersection or street segment were designed to accommodate, but may also be due to construction, a crash, weather, or other incident. Congestion is measured by comparing the volume of traffic using the road to the volume the road was designed to accommodate.

Context Sensitive Solutions (CSS): A collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist.

Density: Residential density represents the number of dwelling units per area of land. A dwelling unit can be a house, apartment, townhome, or any other place that houses a single family. Employment density represents the number of employees per area of land. Density is most often represented in units or employees per acre. In the Ann Arbor Transportation Plan, a composite density is used, Residents + Employees per Acre (R+E/AC), which is the sum of the two densities for a common land area.

Farside Transit Stop Location: Farside stop locations are located on the departure side of an intersection (located in the curb lane once the bus has cleared an intersection). They are preferred for pedestrian safety, as pedestrians are encouraged to cross behind the bus, and the bus can leave without having to wait for pedestrians to cross. It allows for right-turn on red movements on the nearside of the intersection.

Form-Based Code (FBC): FBC is a means of regulating development to achieve a specific urban form. Form-based codes create a predictable public realm by controlling physical form primarily, with a lesser focus on land use, through city or county regulations. Form-based codes are a new response to the modern challenges of urban sprawl, deterioration of historic neighborhoods, and neglect of pedestrian safety in new development. Tradition has declined as a guide to development patterns, and the widespread adoption by cities of single-use zoning regulations has discouraged compact, walkable urbanism. Form-based codes are a tool to address these deficiencies, and to provide local governments the regulatory means to achieve development objectives with greater certainty.

Headway: The distance in time or space of two vehicles traveling the same route.

High-Frequency Service: Based on land use densities of 10-25 residents/employees per acre, this would be bus or bus rapid transit type service being provided in a corridor.

Intelligent Transportation Systems (ITS): ITS is the application of information technology to manage traffic operations on a roadway network. Rather than building additional capacity to accommodate increases in traffic, many transportation agencies have turned to ITS applications to help use the roadway capacity that is already available more efficiently.

Level of Service (LOS): Intersection delay is measured by level of service (LOS), which is an intuitive scale of "grades" from A to F that measure how a roadway is operating. The level of service is defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. There are different values of control delay for signalized and unsignalized intersections.

Light Rail or **light rail transit (LRT):** LRT is a form of urban rail public transportation that generally has a lower capacity and lower speed than heavy rail and metro systems, but higher capacity and higher speed than street-running tram systems. The term is typically used to refer to rail systems with rapid transit-style features that usually use electric rail cars operating mostly in private rights-of-way separated from other traffic but sometimes, if necessary, mixed with other traffic in city streets.

Mode: A transportation "mode" is, simply put, a type of travel. A mode can be a pedestrian, a bicycle, an auto, a bus, transit, or any other means of transportation.

Nearside Transit Stop Location: Nearside stop locations are located on the approach side of an intersection (located in the curb lane prior to the bus entering an intersection). They are preferred by some, as the bus can load/unload while stopped at a red light. They are not deemed as safe for pedestrians; as the bus blocks the pedestrian's view of traffic and pedestrians cross in front of the bus.

Parking Management: Uses careful analysis of parking supply and demand to strike the best balance of supply and cost that discourages auto use due to high parking fees, yet still providing reasonable facilities for visitors and transient users.

Pedestrian-Friendly Crossings: Incorporates design elements such as raised medians, sharp corners, flared sidewalks, textured materials, continuous curbs, and fully connected walks that cater to pedestrian needs over vehicular needs.

Pedestrian-Oriented Design: Includes development standards intended to encourage pedestrian and bicycle activity as an alternative to motorized transportation. Standards focus on building arrangement, intensity and design as they related to the type and location of pedestrian amenities.

Pedestrian-Oriented Signals & Signalized Crossings: Involves new concepts and technology such as extended “walk” durations, pedestrian “walk” count-downs and audible elements to improve safety and the pedestrian environment at crosswalks, and includes the three signals (HAWK, TOCAN and PELICAN).

Pervious pavement: Concrete, asphalt or pavers that allow water to pass through and percolate into the ground, which reduces the volume and speed of runoff and thus the extent of stormwater detention areas.

Queue Jump: A queue jump is a type of roadway geometry typically found in bus rapid transit systems. It consists of an additional travel lane on the approach to a signalized intersection. This lane is often restricted to transit vehicles only, though some variations may permit bicyclists, mopeds, and/or motorcycles. The intent of the lane is to allow the higher-capacity vehicles to cut to the front of the queue, reducing the delay caused by the signal and improving the operational efficiency of the transit system. A queue jump lane is generally accompanied by a signal which provides a phase specifically for vehicles within the queue jump. Such a signal reduces the need for a designated receiving lane, as vehicles in the queue jump lane get a "head-start" over other queued vehicles and can therefore merge into the regular travel lanes immediately beyond the signal.

Road Diet: Converts multiple-lane roads into roads with fewer lanes. Can be used to convert 4 lane roads to three lanes (two one-ways with a two-way left turn lane), or to reduce road width (either one-way or two-way roads) by converting one lane into bike lanes, on-street parking, landscaping, and/or sidewalks, all which reduce vehicle speeds, improve mobility, and reduce crashes.

Signature Corridor: Signature corridors are among the primary corridors considered in this Plan. They have the ability to accommodate increased growth and development, since they can be served by higher levels of public transit such as bus rapid transit or streetcars. They are based on land use densities of 25 to 40 residents/employees per acre and have streetcar, light rail, or bus rapid transit service being provided in a corridor.

Streetcar: Streetcar is a rail vehicle of lighter weight and construction than a train, designed for the transport of passengers (and, very occasionally, freight) within, close to, or between villages, towns and/or cities, on tracks running primarily on streets

Traffic Calming: Traffic calming is a set of strategies used by urban planners and traffic engineers which aim to slow down or reduce traffic, thereby improving safety for pedestrians and bicyclists as well as improving the environment for residents.

Transit-Friendly and Walkable Streets: Incorporates design elements of smaller blocks, human-scale street and building design, safer pedestrian-oriented street crossings, varied public spaces, continuous sidewalks with building connections, interesting architecture and public art, to create a more walkable environment, which encourages use of non-auto transportation.

Transit-Oriented Design: Transit-oriented development includes design, densities, uses and amenities that support and can increase use of transit. This includes proximity of buildings to each other and streets, transit-supportive densities, interesting pedestrian-scale areas and well-placed and safe transit stops which make the area desirable for transit users.

Transportation Demand Management (TDM): Traditionally, TDM involved policies and programs to reduce the number of vehicle trips, especially single-occupant vehicle trips on the peak hour. Newer techniques include strategies such as transit-oriented design (TOD), Context Sensitive Solutions (CSS), non-motorized systems, access management, and Transportation Impact Analyses.

Traveler Choices: Using effective strategies to provide an efficient multi-modal transportation system, and is an updated term for Transportation Demand Management (TDM).

Zipcar: Local rental car facility.

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