3. TRANSPORTATION SYSTEM

INTRODUCTION

This chapter will provide technical background information and address specific transportation issues under five specific sections categorized as follows:

Infrastructure - This section focuses on issues primarily associated with the development and operation of capital infrastructure including roadways, bridges, the transit system, pedestrian and bicycle facilities. Maintenance, management, and operation issues will be addressed in this section. Also to be addressed are development and maintenance costs, design standards and safety issues.

Mobility - The mobility section concentrates on making the transportation system operate more effectively and efficiently. Congestion mitigation, travel demand management, transportation system management, and alternative travel mode issues will be addressed in this section. Congested transportation corridors will be identified and assessed in order to determine the nature and extent of the congestion problem.

Intermodal/Freight - The focus of this section is on freight and commercial passenger service issues as they pertain to the greater Ithaca-Tompkins metropolitan area. The section will address system-level needs required to provide efficient connections and choices between various modes of transportation, and improved communication and coordination within the transportation community.

Environmental - This section describes the concerns and issues associated with the impacts of transportation and urban development on the natural and built environments.

Financial - This section addresses the *Federal* requirement for a financial plan. The section will estimate financial resources available from federal, state, local and private resources for the development, operation, and maintenance of the transportation system and will demonstrate how the long-range transportation plan may be implemented.

While this Chapter attempts to clarify issues under each of the above sub-headings, the reader should be aware that substantial overlap does exist. Transportation issues are critically interconnected with activities in the areas of land use, housing, watershed protection, agriculture, economic development, etc. This plan focuses attention on transportation but the interdependency of transportation with other sectors cannot be overstated.

INFRASTRUCTURE

Introduction

The purpose of this section is to focus on the development and operation of the capital infrastructure system. To organize the multitude of issues that may qualify as infrastructure this section is divided into seven sub-sections.

1. Maintenance and Operations Issues

In accordance with federal regulations (23 CFR §450), one of the primary purposes of this plan is to "*ensure the preservation of the existing transportation system*" and to "*make the most efficient use of existing transportation facilities*". This broad goal pervaded all discussion of maintenance and operation issues and is reflected in the Financial section, below.

The key to improving the efficiency and lowering costs in the provision of maintenance for the transportation system is the idea of intermunicipal/interagency resource sharing. The ITCTC supports efforts that lead to equipment and personnel sharing, pooled purchasing and storing of materials and improved coordination of maintenance responsibilities. The ITCTC will also support development of facilities inventories and maintenance plans.

2. Metropolitan Transportation System

Federal regulations state that the long-range transportation plan shall, at a minimum: *"Identify transportation facilities (including but not necessarily limited to major roadways, transit, and multimodal and intermodal facilities) that should function as an integrated metropolitan transportation system, giving emphasis to those facilities that serve important national and regional transportation functions"* (Title 23 USC §134.g(2)(a)). One of the functions of this section will be to meet this legislative requirement.

a. Roadways

The City of Ithaca, located in the center of Tompkins County, is approximately 25 miles from the nearest Interstate Highway. Tompkins County has one principal arterial, New York State Route 13, which is also the only Tompkins County roadway included on the National Highway System. According to the NYSDOT Infrastructure Needs Assessment Model (INAM) database, the roadway system in Tompkins County includes approximately 432 miles of State highways. In 1992 the average condition rating for those highways was 6.3 (on a 10-point scale where higher numbers indicate better condition). The figure for 2003 was 6.8, indicating an

improvement in the pavement condition of State highways in Tompkins County over the last ten years.

The federal-aid functional classifications system, as approved by FHWA on February 26, 2001 and amended by the Policy Committee May 18, 2004, is presented in **FIGURE 7**. It presents the local roadway system and shows the roads eligible for federal aid. The Policy Committee amendment is currently being reviewed by FHWA. This functional classification scheme is legislatively required as a prerequisite to the use of federal transportation funds. The classification of roads was accomplished by local planning and NYSDOT staffs. This functional classification system is useful for planning and programming purposes for a number of reasons; first, as previously mentioned, it is required by law and is an absolute prerequisite for the use of federal aid, second, it is "regional" in scope, thus it is homogenous throughout the area and third, the process of classification is technically derived, based on the location of relative trip activity nodes and on establishment of an appropriate mix of functional classes by percentage (Source: Highway Functional Classification: Concepts, Criteria and Procedures, March 1989, Publication No. FHWA-ED-90-006). Great care was taken in developing a functional classification system that is responsive to the public and fully accommodates the technical needs of transportation officials. The functional classification of roads is usually reviewed every ten years after the decennial census, but can be updated at any time to reflect infrastructure changes. **TABLE 21** describes the mileage and relative percentages of the federal-aid system in Tompkins County.

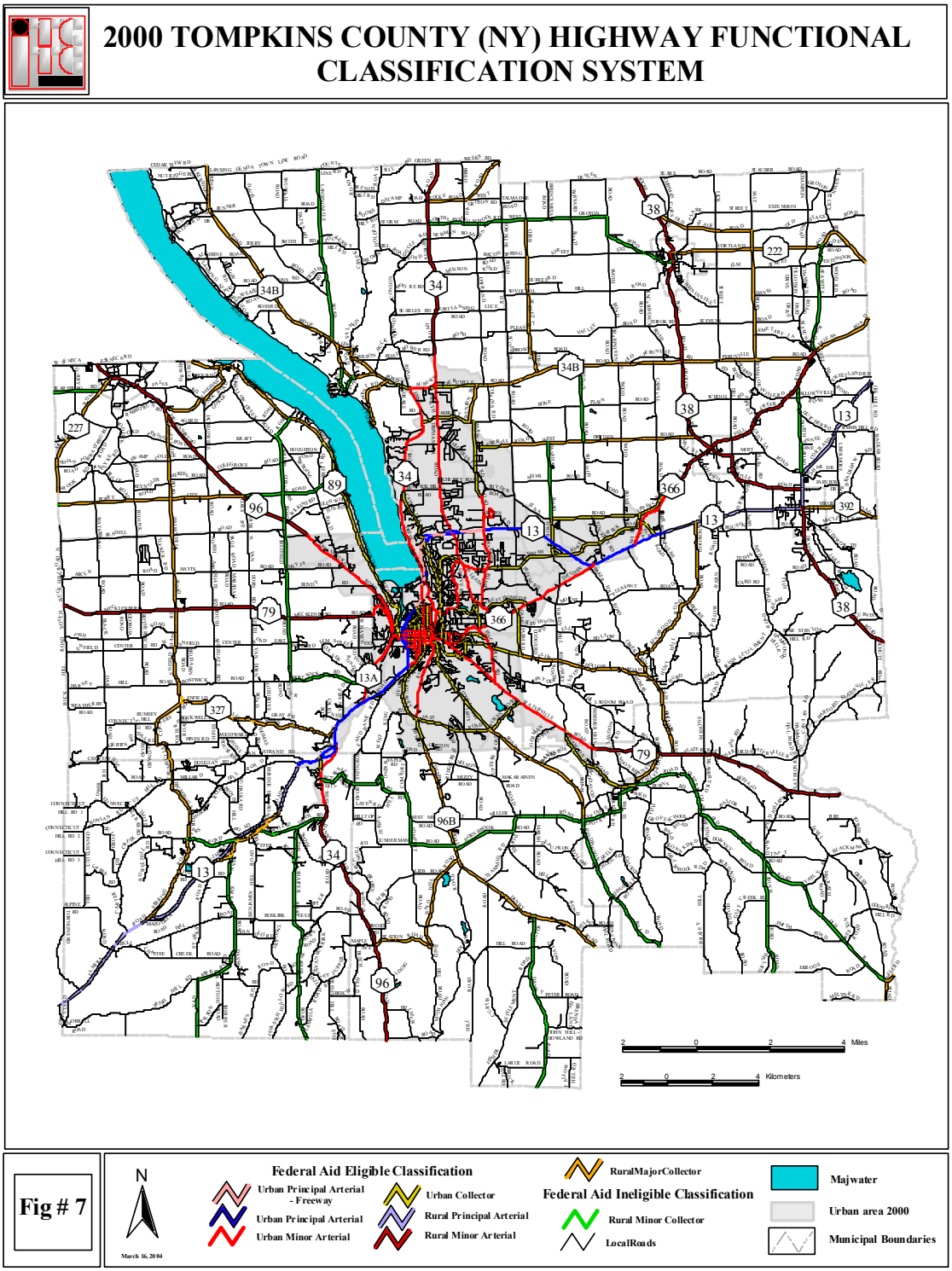

2000 TOMPKINS COUNTY (NY) HIGHWAY FUNCTIONAL CLASSIFICATION SYSTEM
Miles
Kilometers
Fig # 7
N
March 16, 2004
Federal Aid Eligible Classification
Urban Principal Arterial - Freeway
Urban Principal Arterial
Urban Minor Arterial
Urban Collector
Rural Principal Arterial
Rural Minor Arterial
RuralMajorCollector
Federal Aid Ineligible Classification
Rural Minor Collector
LocalRoads
Majwater
Urban area 2000
Municipal Boundaries

FIGURE 7

TABLE 19			
Federal Aid Road System – Descriptive Statistics 2000 System (based on Census 2000)			
Functional Class	**Centerline Miles**	**Percent**	**FHWA Guidelines**
URBAN ROADWAYS			
Urban Principal Arterial - Freeway	7.24	2.27%	
Urban Principal Arterial	16.01	5.02%	
Total Urban Principal Arterial	23.25	7.29%	5-10%
Urban Minor Arterial	57.86	18.15%	
Total Urban Arterial	81.11	25.44%	15-25%
Urban Collector	52.30	16.40%	5-10%
Urban Street	162.20	50.87%	65-80%
RURAL ROADWAYS			
Rural Principal Arterial	17.34	1.78%	2-4%
Rural Minor Arterial	57.12	5.87%	
Total Rural Arterial	74.46	7.65%	6-12%
Rural Major Collector	114.86	11.80%	
Rural Minor Collector	84.63	8.69%	
Total Rural Collector	199.49	20.49%	20-25%
Rural Local Road	699.43	71.86%	65-75%
TOTAL	**1,291.76**	**100%**	

b. Bridges

The major infrastructure issues related to bridges include maintenance and operations, traffic safety, and capacity (addressed later in this chapter).

NYSDOT performs periodic inspections of all bridges. Bridge condition ratings are assigned in a scale from 1 to 7, where 1 is a failing structure and 7 is excellent. Bridges that score less than 5 are considered deficient. According to NYSDOT's Bridge Needs Assessment Model (BNAM) database, there are 197 bridges in Tompkins County. Of these, 53 are State-owned, 135 are locally owned, and authorities and others own eleven (11). Of all the bridges, 38% are rated as deficient.

The table below shows that the percent of deficient State owned bridges has been declining over the last 10 years. The percent of deficient local bridges also decreased by 19 percentage points between 1999 and 2003. This is reflective on the large number of bridge reconstructions in the last five years, many of them TIP projects. However, the eleven bridges in the county owned by authorities and others have experienced significant decline in condition over the last ten years. BNAM figures indicate that seven out of the eleven bridges are deficient.

The ITCTC recognizes the importance of bridge maintenance as a critical factor in having a safe and efficient transportation system. Over the years many bridge projects have received funding through the TIP. The ITCTC will continue to include bridge maintenance as an important component of project development efforts.

TABLE 20

BRIDGE CONDITION

	1995		1999		2003	
Owner	% Deficient	Avg. Rating	% Deficient	Avg. Rating	% Deficient	Avg. Rating
State	35%	5.47	36%	5.88	28%	5.64
Local	48%	5.25	58%	5.05	39%	5.54
Authority	22%	5.20	66%	4.90	64%	4.73

c. Transit

Public transit service in Tompkins County is provided by TCAT. In 1996, Tompkins Consolidated Area Transit (TCAT) was authorized by the New York State Legislature. In 1998, the City of Ithaca, Cornell University and Tompkins County agreed to form TCAT as a joint venture to operate public transit service in Tompkins County. TCAT operates bus routes directly and under municipal contracts with private operators including Swarthout Coaches, Inc., Tioga Transport, Inc., and GADABOUT Transportation Services, Inc.

In 1996, TCAT introduced Route 10 the Cornell to Commons shuttle. Further, TCAT put bike racks on its bus fleet, the first system-wide application in New York State.

During 1997 to 1999, TCAT conducted a Service and Fare Consolidation Project to plan new routes, services and fares. TCAT's new fare system went into effect in June 1999. TCAT's consolidated routes and schedules went into effect in August 1999. Since then there have been other adjustments to fares and specific routes in response to evolving fiscal conditions and customer demands.

TCAT offers excellent coverage countywide and in the urbanized area in particular. Currently 49% of households and 70% of jobs in Tompkins County are within one quarter (¼) mile of a transit stop (Source: Tompkins County Planning Department). TCAT operates 36 year-long routes and 2 summer routes. All towns in Tompkins County are served by TCAT. Sunday service is available in the Ithaca urban area. Public transit routes are shown in **FIGURES 8 and 9** (Note: TCAT continuously reviews its bus routes in an effort to improve service; therefore, the bus routes shown in the maps may be changed at any given time).

FIGURE 8

TOMPKINS COUNTY
2004 PUBLIC TRANSIT ROUTES

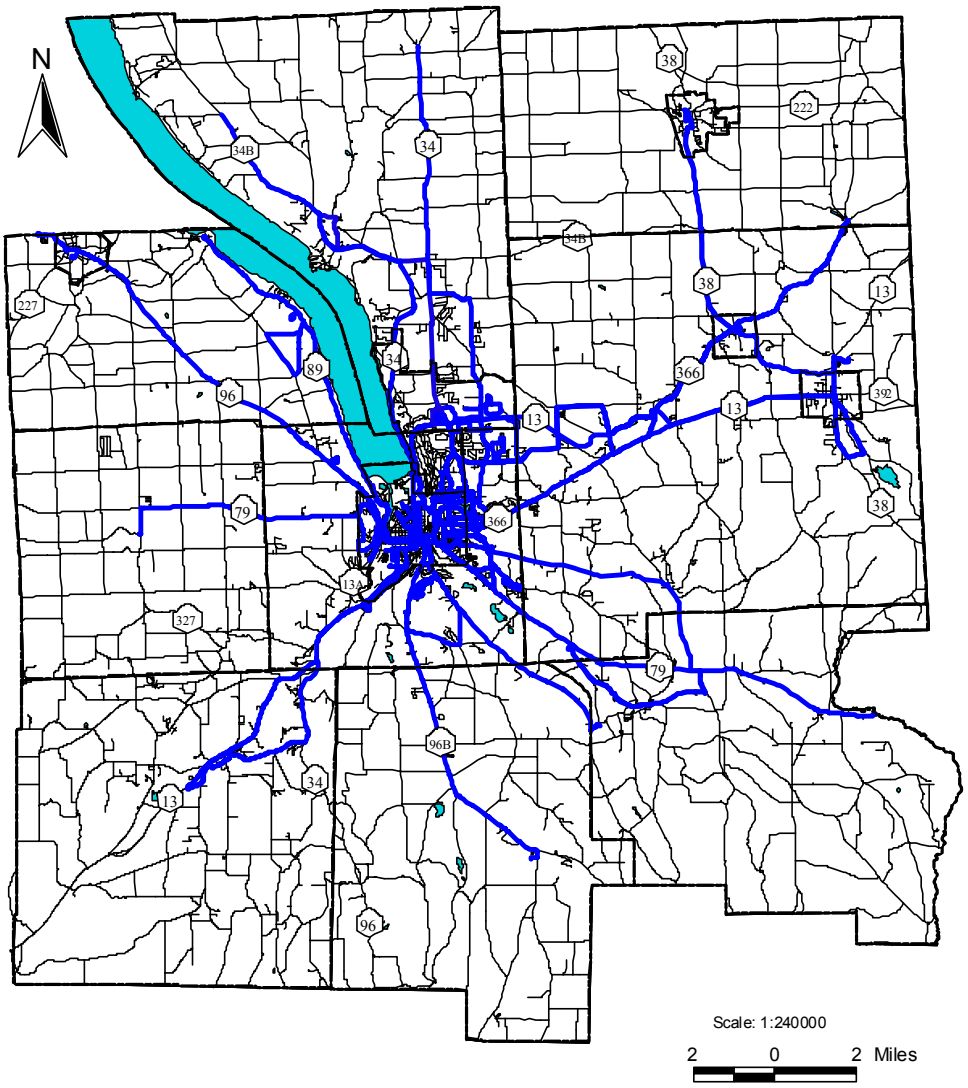


Fig. 8

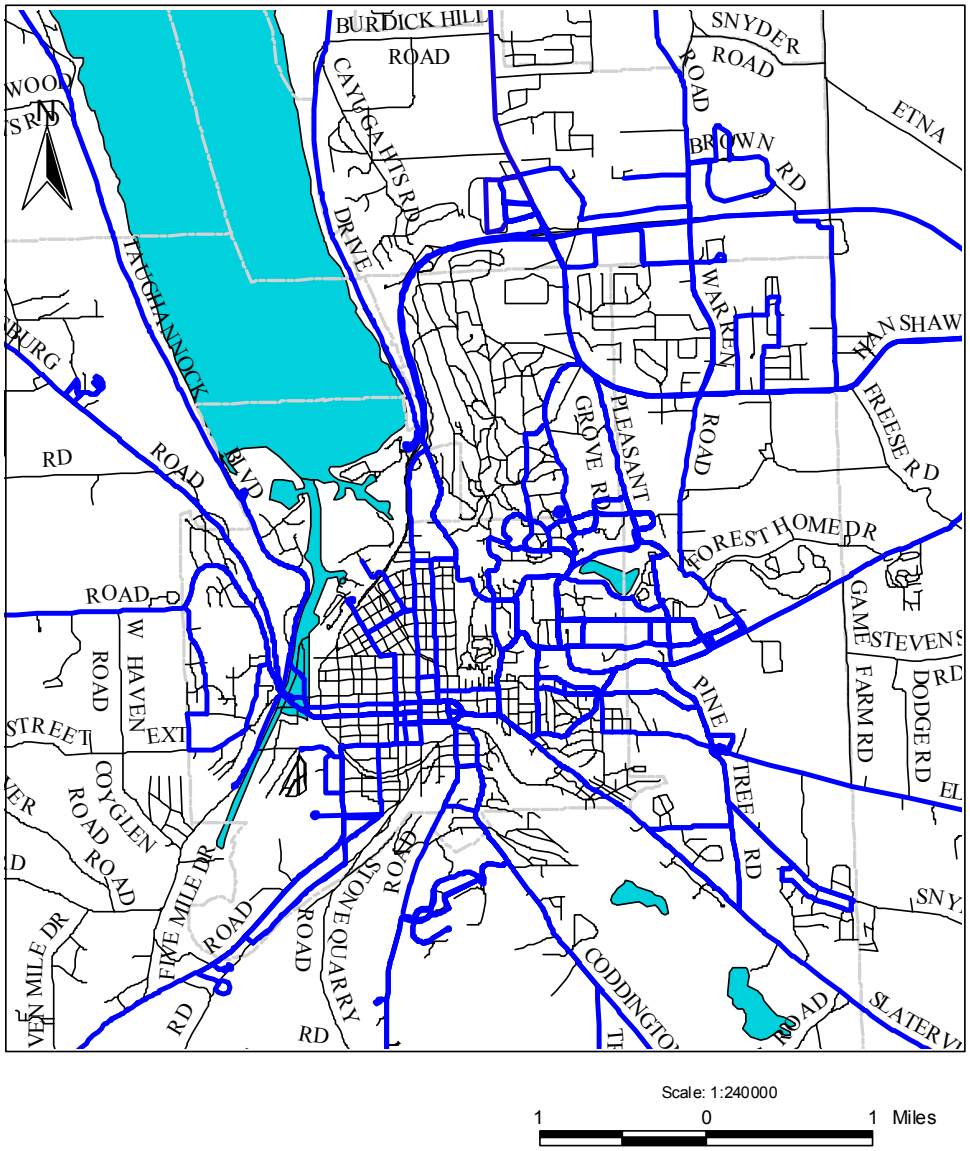
Transit Routes

Municipal Boundaries

The standard geo-referencing format for Tompkins County digital spatial data is New York State Plane Central coordinate grid system, based on the 1983 North American Datum and GRS80 Spheroid.

FIGURE 9

ITHACA AREA
2004 PUBLIC TRANSIT ROUTES



Scale: 1:240000

1 0 1 Miles

Fig. 9

Transit Routes

Municipal Boundaries

The standard geo-referencing format for Tompkins County digital spatial data is New York State Plane Central coordinate grid system, based on the 1983 North American Datum and GRS80 Spheroid.

Before consolidation in 1999, TCAT ridership peaked in 1996 at 2,141,191 passengers. Between 1996 and 1998, rider-ship declined by 2.7% to 2,085,169 passengers. The decline was primarily on rural routes, which was partially offset by suburban and urban rider-ship growth. Since 1999 TCAT has experienced strong growth. By 2000 ridership was at 2,413,150. The latest 2003 figures total 2,683,491 a 28% increase from the low point in 1997. Bus revenue miles showed a similar pattern, increasing by 16% from a low of 1,343,430 miles in 1997 to 1,564,471 miles in 2003. Total public transportation ridership, including ridership figures from Gadabout, Swarthout Coaches and Tioga Transport, totaled 2,828,265 in 2003.

Demand for increasing the scale and scope of transit service continues as evidenced by the TCAT consolidation study and the NEST study. The continuous demand for increased service from rural towns to the urban area is not fully satisfied. Further, transit service designed to provide to job access for low-income persons needs continued attention.

TCAT's critical long-term capital funding issue is for timely bus replacement. TCAT desires to introduce low-floor, hybrid electric buses into service. In addition to rolling stock needs, there will be substantial capital facility needs to be addressed in the next twenty years. These include: (a) enhanced rider information and fare collection systems to provide accurate, timely information to users and to make more efficient use of existing bus pass technologies (i.e., electronic debit/fare cards); (b) additional and renovated shelters that meet all ADA requirements and that provide increased user security and comfort; (c) new downtown passenger facilities to better accommodate user transactions (e.g., transfers, bus pass purchases, etc.); and (d) enhanced or new intercity terminal that is safe, centrally located, and provides modern passenger amenities.

Currently TCAT is advancing a project to improve their principal bus stop facilities in and around the Commons – Green Street, Aurora St., Seneca Street and Cayuga Street. This $1.6 million project will enhance the public transportation experience for all customers and will also result in improvements for pedestrians and bicyclists. All of which will help reinforce the downtown economy.

d. Multimodal and Intermodal Facilities

The issues associated with intermodal freight and commercial passenger facilities are discussed under a separate heading below. For the purposes of defining the Metropolitan Transportation System, a map of intermodal facilities is provided here (see **FIGURE 10**).

Bicycle and pedestrian facilities will be considered under the "multimodal" aspect of this section. Specific discussions of bicycle and pedestrian issues appear in section 5 below; however, for the purposes of defining the Metropolitan Transportation System, maps of the existing or proposed systems are provided below (see **FIGURES 11**, **12**, and **13**).

FIGURE 10

TOMPKINS COUNTY INTERMODAL FACILITIES

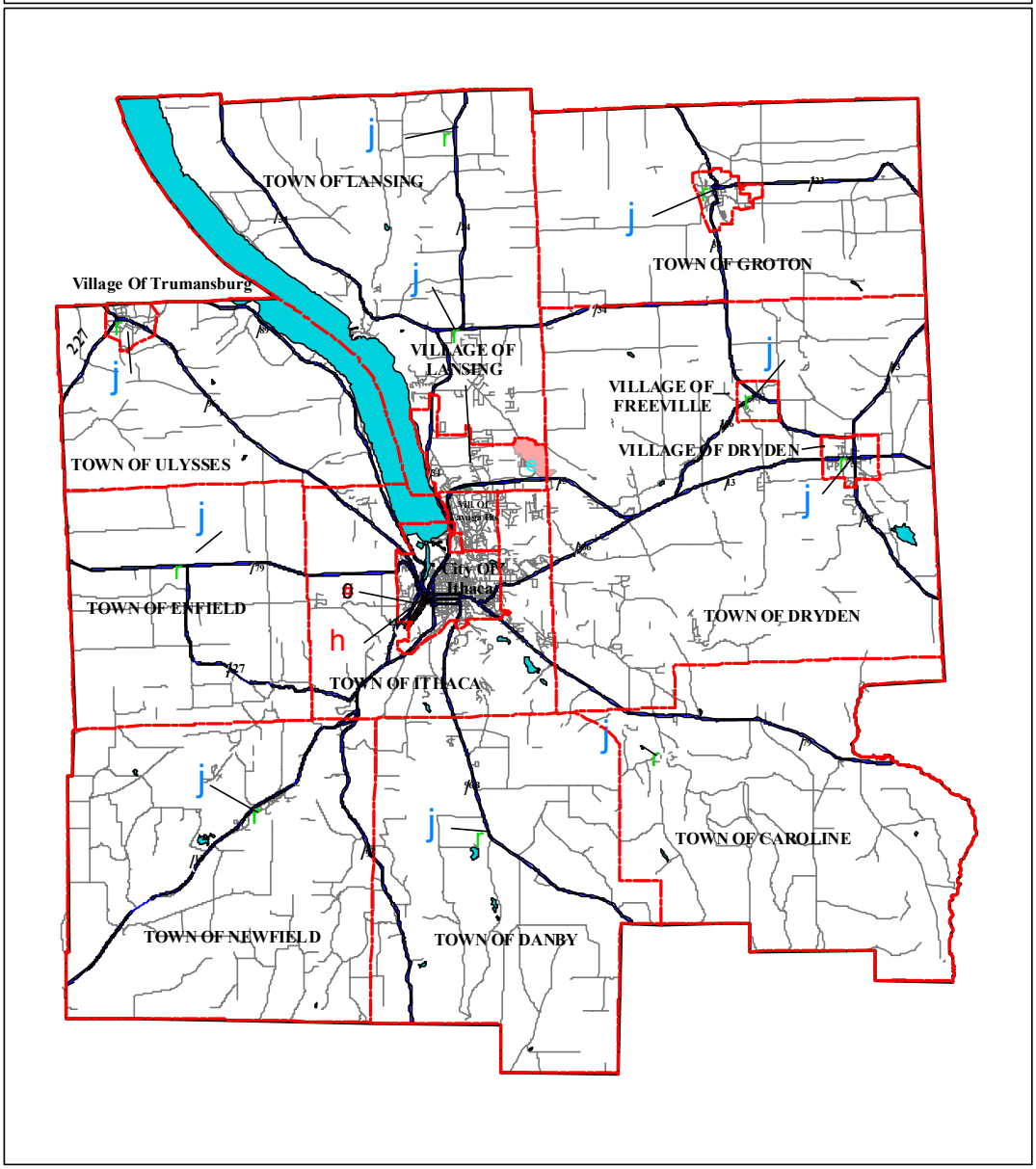
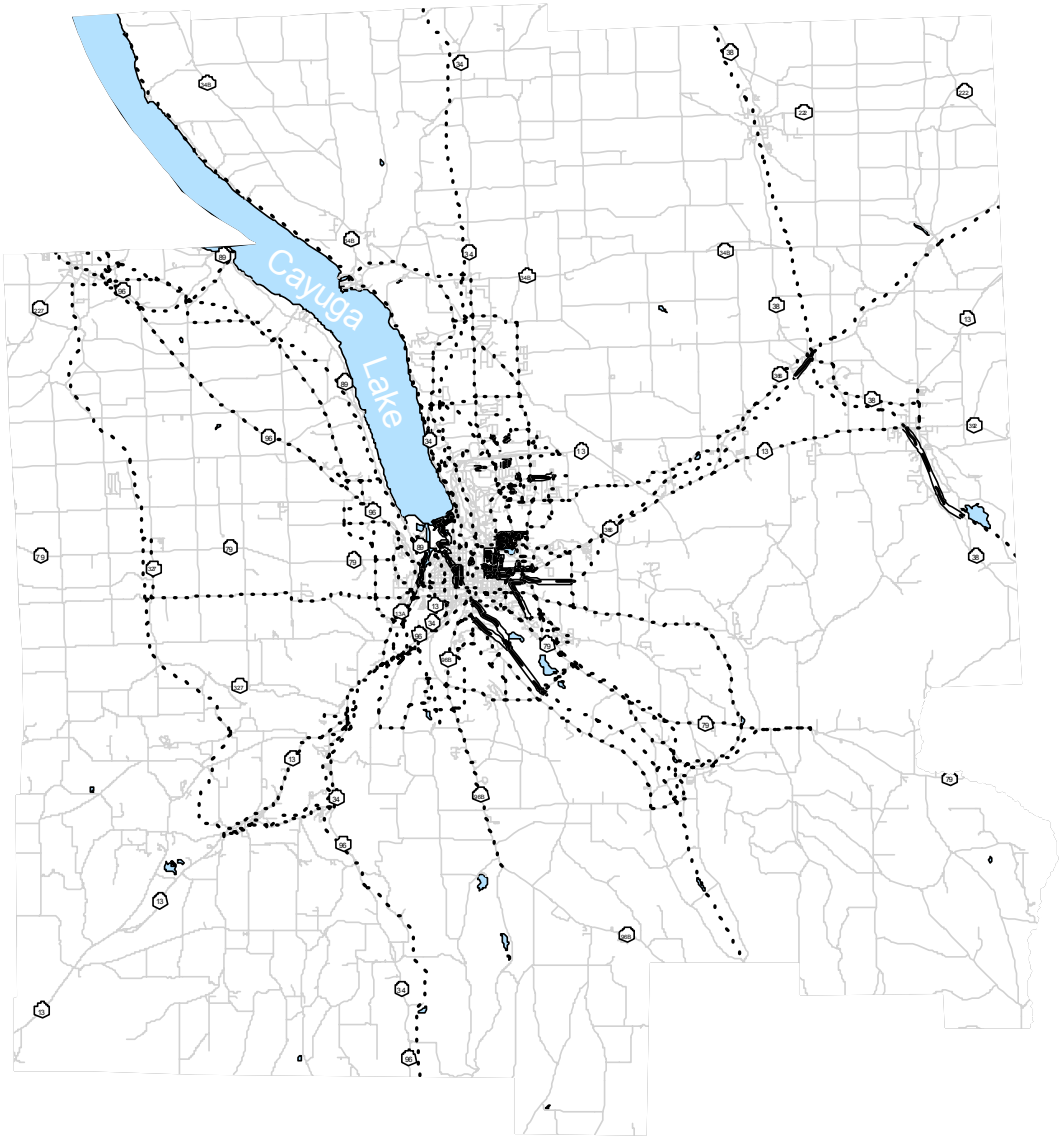


Fig. 10

j Park and Ride	r Intermodal Bus Stops	θ Rail Yard	Municipal Boundaries	N
e Airport		State Roads		
Airport Boundary	h Intercity Bus Station	Other Roads	MPO Boundary	February 12, 2004

FIGURE 11

Potential Tompkins County Bikeway Network



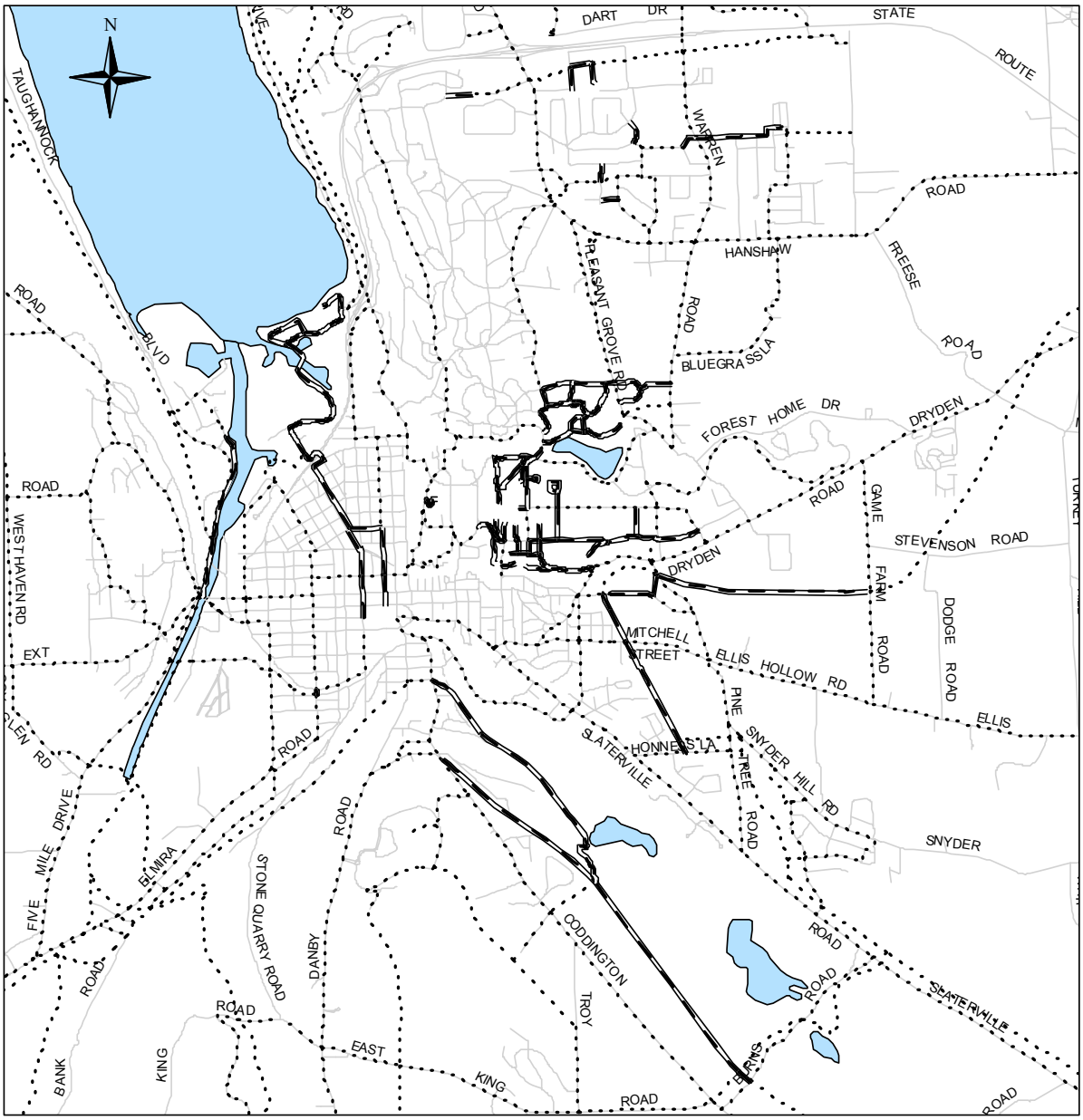
Legend

Existing bikeways
Proposed bikeways
Roads
Major Open Water

0 3 6 Miles

FIGURE 12

Potential Ithaca Area Bikeway Network

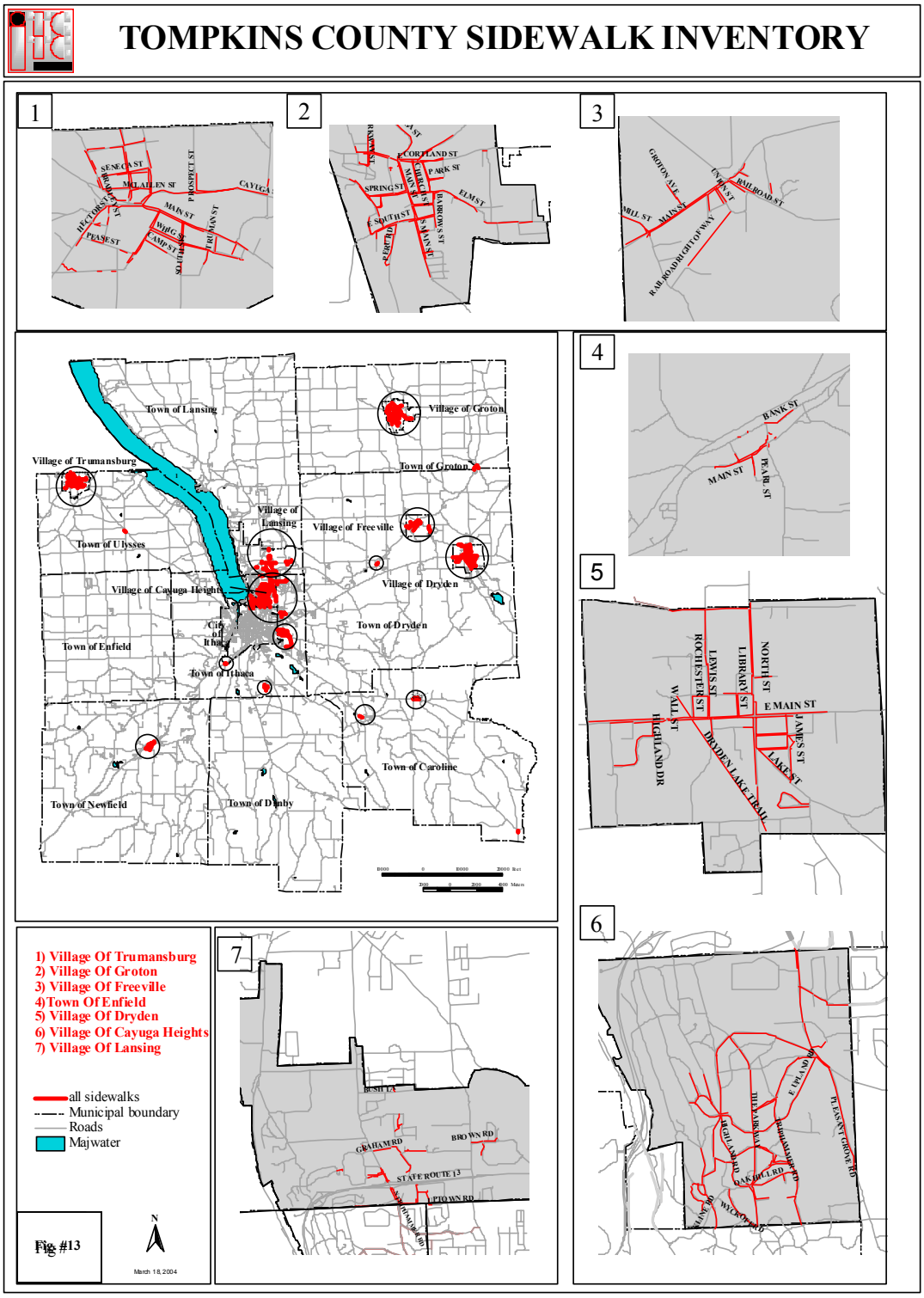


Legend

Existing bikeways
Proposed bikeways
Roads
Major Open Water

0 0.5 1 1.5 Miles

FIGURE 13


TOMPKINS COUNTY SIDEWALK INVENTORY
1
2
3
4
5
6
7
Town of Lansing
Village of Groton
Village of Trumansburg
Town of Groton
Village of Lansing
Village of Freeville
Town of Ulysses
Village of Dryden
Village of Cayuga Heights
City of Ithaca
Town of Dryden
Town of Enfield
Town of Ithaca
Town of Caroline
Town of Newfield
Town of Danby
1) Village Of Trumansburg
2) Village Of Groton
3) Village Of Freeville
4)Town Of Enfield
5) Village Of Dryden
6) Village Of Cayuga Heights
7) Village Of Lansing
all sidewalks
Municipal boundary
Roads
Majwater
Fig. #13
March 18, 2004
N

3. Parking and Circulation

Parking areas are an integral part of the transportation system. Their construction, maintenance (including snow removal), and performance must be considered as part of any planning process.

As such, the LRTP includes two important studies in its Projects for Implementation: Study of the Parking System in the City of Ithaca and Study of a Cornell Daily-Fee Parking System. The City of Ithaca and Cornell University include the principal employment centers in the Tompkins County. In addition, they generate a significant number of recreational, personal, and entertainment based trips. Parking management in these two critical areas is crucial to addressing traffic circulation and public transportation issues. The NESTS Transit Planning Project made particular mention and provided analysis of the relationship of parking to transit.

The layout and design of parking areas can have a serious impact on the circulation patterns and efficiency of adjacent roads. Major developments should provide detailed on-site circulation studies that maintain the capacity of adjacent roadways by implementing access management techniques such as, minimizing curb-cut access and promoting internal circulation. In addition, both the aesthetics of the facility and full consideration of "alternative modes" (i.e., pedestrians, bicycles, public transit vehicles) need to be integrated in the design phases of parking lots.

4. Design Issues

A significant amount of research and an ever-growing list of completed projects provide guidance in what is called Context Sensitive Design (CSD), or what NYSDOT calls Context Sensitive Solutions (CSS). This is an approach to transportation planning that recognizes that transportation has wide societal impacts and is not merely the practice of road construction to maximize vehicular movements. It can be defined 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. (Project for Public Spaces)"*

NYSDOT offers the following definition: "*Context Sensitive Solutions (CSS) is a philosophy wherein safe transportation solutions are designed in harmony with the community. CSS strives to balance environmental, scenic, aesthetic, cultural and natural resources, as well as community and transportation service needs. Context sensitive projects recognize community goals, and are designed, built and maintained to be sustainable while minimizing disruption to the community and the environment" (NYSDOT-Context Sensitive Solutions website-www.dot.state.ny.us/design/css/resources.html).*

Residents in Tompkins County have shown a strong desire to consider the aesthetics and impacts of roadway projects during the planning stages. The idea that the "infrastructure should fit the land", through consideration of geographic conditions, environmentally sensitive areas (e.g., wetlands, etc.), and respect for existing land uses, is supported by the ITCTC.

The possibility of creating a countywide scenic road system in Tompkins County has been included in past LRTP's, as was the need to identify and protect scenic areas, vistas, and corridors. This latter emphasis was also evident in the development of goals and policies for the Tompkins County Comprehensive Plan.

The New York State Scenic Byways Program designated the Cayuga Lake Scenic Byway (CLSB) as a scenic byway in 2001. The CLSB is an eighty-six mile long system of roads circumventing Cayuga Lake, including: State Roads 89, 90, 34, 34B and 5/20. Currently, the non-profit corporation Cayuga Lake Scenic Byways, Inc., serves as a facilitator agency, implementing the byway's corridor management plan, applying for funding and otherwise managing the development of the CLSB in cooperation with interested parties and all three counties with jurisdiction: Cayuga, Seneca and Tompkins. It is expected that together with the Route 90 Scenic Byway the CLSB will provide a solid foundation for the development of a broader Finger Lakes Scenic Byway network. The ITCTC will continue its participation in development of the CLSB for the benefit of residents of Tompkins County.

5. Bicycle and Pedestrian Programs

As explained below and in Chapter 1, the bicycle and pedestrian modes of transportation carry a significant percentage of the journey to work trips in the Tompkins County. Every effort should be made to maintain and enhance the trip share of these alternative modes to the automobile. The presence of a dedicated full or part-time bicycle/pedestrian coordinator for Tompkins County would help achieve this outcome. Such a person would review projects for their multimodal impact, and do training, education, outreach and provide assistance to local municipalities. The ITCTC supports the creation of a bicycle/pedestrian coordinator position in Tompkins County and will work with the County, City of Ithaca and other member agencies to determine the best administrative option to locate such a position and secure its funding.

Bicycles: The need to develop an integrated, countywide bicycle system is crucial. Various efforts have contributed to this end but better coordination is needed.

The City of Ithaca adopted a Bicycle Plan in 1997, but has found implementation difficult, primarily because of narrow street widths and potential impacts to on-street parking. Currently the City's Bicycle/Pedestrian Advisory Committee is using a Transportation Enhancement Grant to

design and implement two bike routes connecting the City's downtown with Cass Park. This effort will answer questions about the actual impacts and feasibility of installing bicycle lanes within the City's road network.

Cornell University has an active program to educate students about safe bicycle use and the network of trails and paths available to bicyclists on campus. Other municipalities around the county are advancing multiuse trail projects that eventually will interconnect and provide a comprehensive countywide system.

TCAT has instituted a popular Bikes-on-Buses program serves thousands of customers every year. This program allows riders to combine their bicycle trips with transit in those occasions were a bicycle only trip is not possible. This program is discussed further in the Intermodal/Freight section in this chapter.

FIGURE 11 and **12** are a compilation of local bicycle/trail plans and projects completed or planned in the last 10 years by the City of Ithaca (City of Ithaca Bicycle Plan), the Tompkins Coalition for Bicycle Transportation, Cornell University, the Town of Dryden, the Town of Ithaca, the Town of Lansing, the Village of Lansing, and the New York State Department of Parks Recreation and Historic Preservation-Finger Lakes District. *These maps are intended to provide only a summary presentation of local efforts and do not represent a final plan reviewed and approved by the MPO.* They are indicative of the interest and potential of developing an infrastructure for bicycling within the existing transportation system.

It is clear that additional data is necessary to complete a more detailed, regional bicycle plan. However, some recommendations for development of a bicycle transportation system include cost-effective projects such as developing a bicycling suitability map, pavement re-striping, providing bicycle parking, road shoulder condition/width improvements, and road shoulder maintenance (especially cleaning of shoulders), which can be implemented with minimum delay or as part of ongoing maintenance efforts.

The ITCTC supports the development of a "bicycle-friendly" transportation system that serves to encourage increased bicycle use and make cycling safer. The primary policy position is that bicycles are legitimate forms of transportation that should be accommodated in the design process. Doing so minimizes the potential for conflict with motorized vehicles, thus not only making the system safer but also making it more efficient (e.g., vehicles not slowed by presence of cyclists).

Pedestrians: As described in Chapter 1, Tompkins County has a large percentage of its journey-to-work trips that take place by walking (17% countywide; up to 41% in the City of Ithaca). Clearly, pedestrian movements are an extremely important component of local transportation planning. The ITCTC seeks to enhance the pedestrian experience in order to maintain and increase the number of people who choose this mode of transportation to complete their daily trips.

The City of Ithaca is served by a comprehensive network of sidewalks, though gaps do exist in the system. The ITCTC supports efforts to maintain and enhance this network. The City possesses extensive GIS data on sidewalk facilities; a recent survey of this information by City staff identified four main areas lacking in pedestrian facilities or adequate network connections:

- West Hill – lack of sidewalks, substandard conditions
- Elmira Road and Spencer Road corridors – lack of sidewalks
- East Hill and South Hill – connections need improvement, lack of sidewalks in upper sections
- Residential neighborhoods need better connections to the waterfront.

In 2002 the ITCTC completed a survey of pedestrian facilities countywide outside the City of Ithaca (see **FIGURE 13**). This information was circulated widely to serve as a resource to local planners and decision makers.

The network of multiuse trails identified in the ITCTC's Transportation Trail/Corridor Study, together with the Black Diamond Trail, will provide regional connections between many population centers in Tompkins County. The multiuse trails will provide regional pedestrian and bicycle connections that will complement local pedestrian and bicycle networks (i.e. sidewalks, bicycle lanes, etc.). The ITCTC will continue to work with local partners to enhance the network of sidewalks, trails and other pedestrian facilities to provide expanded connectivity between activity areas and improve the safety for users. The development of a pedestrian network that safely meets the needs of all persons would in itself provide an incentive for more persons to walk.

The Ithaca-Tompkins County Transportation Council also supports efforts to address pedestrian issues through design of the built environment. In particular the design of transportation facilities (i.e. roads, bridges, etc.) offer the opportunity to consider the needs of pedestrians. A number of intersection design treatments such as bulbouts, raised crosswalks, pedestrian signals, etc. should be considered for incorporation into projects. Sidewalks should be provided at every opportunity.

Educational initiatives, such as local schools providing specific training on pedestrian safety issues (to all age groups), and promotional campaigns for walking would also help in encouraging the use of this important mode of transportation.

The need to comply with ADA standards, and to consider such issues as how traffic signal (phase) timing may affect

elderly/disabled persons abilities to safely cross a street is an important consideration in pedestrian planning. The importance of this issue will continue to increase as the average age of the population increases over the next 20 years.

Unfortunately, it is evident that the "state-of-the-art" in planning is only starting to address pedestrian issues. At the local level we are still learning how to develop "pedestrian-friendly" land uses, and searching for incentives that are truly effective in getting persons to switch to walking. While the profession(s) continue to explore these and other issues, such as finding ways to calculate the benefits/costs of increased use of the pedestrian mode, it is imperative that the *ITCTC* and its local members begin to implement the cost-effective improvements necessary to fill in the "gaps" in the pedestrian network and to ensure the safety of all pedestrians. The ITCTC will work cooperatively with its local partners to promote the actions and programs that will lead to the development of walkable communities in Tompkins County.

6. Traffic Safety Issues

Traffic safety is the paramount concern of all ITCTC actions. The areas of *traffic distribution, facility design, education,* and *enforcement* emerge as the primary issues.

A recurring theme in the public meetings was that the sheer volume of traffic in residential areas was "unacceptable". More than a continuing annoyance, this is a legitimate health and safety concern. The use of a variety of traffic calming techniques to “tame” the traffic moving through residential and other built-up areas has received much attention nationwide and locally. The transportation planning profession including NYSDOT, and organizations such as the Transportation Research Board, the Institute of Transportation Engineers and the American Association of State Highway and Transportation Officials have all developed guidelines and positions that allow for the implementation of traffic calming techniques. The ITCTC will continue to support the appropriate application of traffic calming in to encourage the development of a transportation system that minimizes the negative impacts of motor vehicles without affecting overall mobility.

Education is a major component of any effort to address traffic safety. A tremendous amount of data has become available thanks to advances in electronic communications, which could support educational initiatives. The idea of promoting multi-modal transportation, offering skills training, and raising public consciousness levels regarding the presence of different modes, principally pedestrians and bicyclists, are all important. The Ithaca-Tompkins must continue and enhance existing efforts to reach more of the population. Small programs, such as safety programs in our schools need to be renewed and pursued with vigor.

Another area of constant concern regarding traffic safety is traffic law enforcement. Speeding traffic is an issue of overwhelming concern. While providing additional traffic control officers sounds like an easy solution, it is generally recognized that the costs of doing so are prohibitive. Technological solutions, such as remote radar "smart signs" and traffic light enforcement systems, might play a role in addressing this issue. Prioritized enforcement actions, based on data collected from traffic counters, offer another potential solution. The LRTP Projects for Implementation include a projects for the study of remote enforcement options and development of a priority enforcement plan. Traffic calming techniques, mentioned earlier in this chapter, also offer a variety of options to help deal with speeding traffic through roadway design.

MOBILITY

Introduction

The mobility section concentrates on making the transportation system operate more efficiently. Issues relate to the mobility impaired, travel demand management, transportation system management strategies, and related data needs are addressed here.

1. Mobility Impaired

Mobility impaired persons are generally those persons who, for one reason or another, do not have personal access to the use of an automobile. In general, these persons are elderly, disabled, youths, or economically disadvantaged. It is a stated objective of Federal legislation to provide specific consideration for the transportation needs for these groups. The ITCTC supports several strategies to enhance mobility for these persons. The ITCTC participates and/or supports data gathering efforts conducted to determine the nature and extent of resources and needs of persons in the area, considering also the effects of governmental programs, including program location, on the need for transportation (e.g., youth recreation, social services, etc.). Other ideas that merit attention include: (a) making transportation a consideration in the planning of programs and facilities serving the elderly and disabled persons; (b) studying and considering the development of day care facilities in conjunction with major activity nodes/employment centers, and (c) considering the need to link low income neighborhoods to employment opportunities, retail and service centers, and recreational facilities.

Children's activities should also be considered in order to create initiatives and programs to reduce the number of trips related to these activities. The following are possible actions: (a) work to decentralize organized activities, basing their location on neighborhood and community units; (b) provide enhanced transit service to those centralized

activities that would include security features such as advanced registration and check-in for children; and (c) improve bicycle and pedestrian facilities in order to provide better access for children to events or transit stops, d) as possible, provide comprehensive and frequent transit service to the outlying areas of Tompkins County and e) open dialogue between the transit operators and the school districts to better accommodate the youth population.

2. Transportation Demand Management

Transportation Demand Management (TDM) is the name given to a series of strategies that can be utilized singly or in tandem to create a program whose purpose is to alleviate traffic problems through reduction of automobiles on the road, especially single occupancy vehicles. The strategies include combinations of improved alternatives to driving alone, incentives to use alternative modes, disincentives for driving alone, along with work hour management. The ITCTC supports implementation of voluntary transportation demand management program(s), which targets major employers or employment areas, such as downtown Ithaca. The program should address work hours (flextime, compressed work weeks, staggered hours) telecommuting options, carpool/vanpool, guaranteed ride home, transportation allowances, and parking management. The program should also provide training and assist in start-up procedures. Benefits to employers include: reduced absenteeism, increased productivity, and reduced parking costs.

There are several other actions that are instrumental to the reduction of travel demand. For example: (a) promoting economic development and job development in locations that reduce total commuting mileage; (b) investigating the demand for teleconferencing centers at major activity nodes; and (c) implementing parking management policies that minimize the number of vehicles in specific areas (e.g., require residential permits, limit the number of on-street spaces, provide secure student parking lots, etc.) in conjunction with incentives for use of public transportation, car pools, walking or bicycling.

Other trip minimization and vehicle occupancy increases can be promoted through planning decisions and by individual behavior. It is recommended that local education and promotional programs be initiated to encourage reductions in automobile use. Further suggestions include: computerized carpool matching programs, a vanpool demonstration project, parking management policies that promote increased vehicle occupancy, and support economic incentives and disincentives that reflect the "true costs of driving".

Public transportation plays a key role within travel demand management programs. The ITCTC supports efforts that will make public transportation easier to use by overcoming some of its associated penalties (time, inconvenience, etc.). The NESTS Transit Planning Project (NTPP) proposed a series of recommendations with the aim of enhancing transit service in the most developed parts of Tompkins County. The ITCTC will work with TCAT and other MPO partner to facilitate implementation of those recommendations that show greatest promise. In addition the ITCTC will work cooperatively with other agencies to attract more commute riders to public transportation. This can be achieved through a series of strategies aimed at expanding and enhancing commuting services including: establishing a coordinated park and ride program for the urbanized area, increasing numbers of routes and frequency of service, providing discounts to commute users, and exploring programs to provide guaranteed rides back. Furthermore, amenities should be provided to ensure passenger comfort, extensive customer support, and that information is available to the public 24 hours a day.

Technological innovations now allow for telecommuting and smart bus systems. Smart bus systems improve the quality of the communication between the public transportation system and potential riders. The ITCTC supports TCAT's efforts to provide improved printed schedules, station/stop signage and state-of-the-art passenger information systems. These latter include technologies that allow for interactive communications equipment located at transit stations/stops and the use of the internet for trip scheduling and to provide real-time transit information. For example, an automated vehicle location system, utilizing global positioning technology (uses satellite signals to determine vehicle locations), can report real time positions of public transit vehicles, which are then relayed to the TCAT website. Opportunities also exist for further enhancements to the current electronic fare payment system in order to increase convenience and ease of use for customers.

The ITCTC recommends studying, developing, and implementing projects and programs that enhance the feasibility of alternatives to the private automobile as another means of reducing demand. Public transportation services, walking and bicycling should be promoted to reduce single occupancy vehicles. To achieve a higher percentage of trips made by bicycling and walking there is a need to improve/build walkway and bikeway networks with separate signage and traffic control devices for pedestrians and cyclists. It would also be possible to coordinate with area employers to offer financial or other incentives to employees who do not require parking spaces for automobiles. The ITCTC will continue to monitor new ideas and concepts such as, major employers providing "fleet bikes" for their employees to use in daily work or personal travel, that are feasible for application in Tompkins County.

3. Transportation System Management

Transportation System Management involves managing the existing transportation system to obtain increased efficiency, which relates to the "supply side" of the transportation

system equation. It often is used as a cost-effective means of reducing intersection or corridor related congestion.

The ITCTC travel demand model was used to identify links with the highest levels of congestion. The model based its analysis on estimating volume to capacity ratios (V/C ratio) for the principal roadways in the county. V/C ratios relate the traffic volumes to the roadways traffic capacity based on the road's geometry, traffic flow speeds and adjacent land uses. **FIGURE 14 and 15** displays the output from the travel demand model. The travel demand model is currently designed to model the afternoon peak hour. Therefore, the map may not highlight links that experience congestion at other times. While further, more detailed quantitative analyses are necessary, this figure provides a starting point from which to begin the process of developing strategies and projects that address the needs in these problem areas.

FIGURE 14

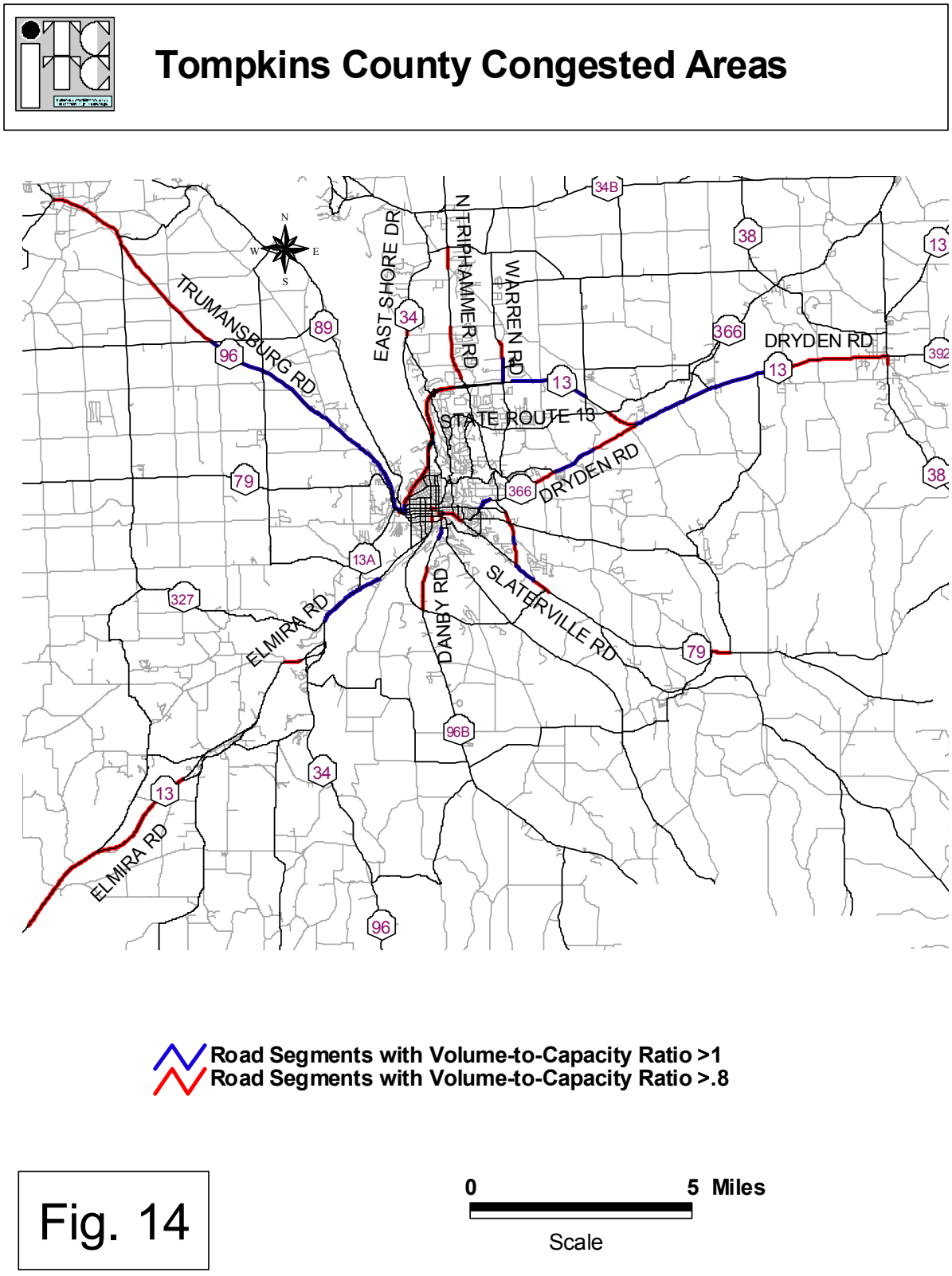
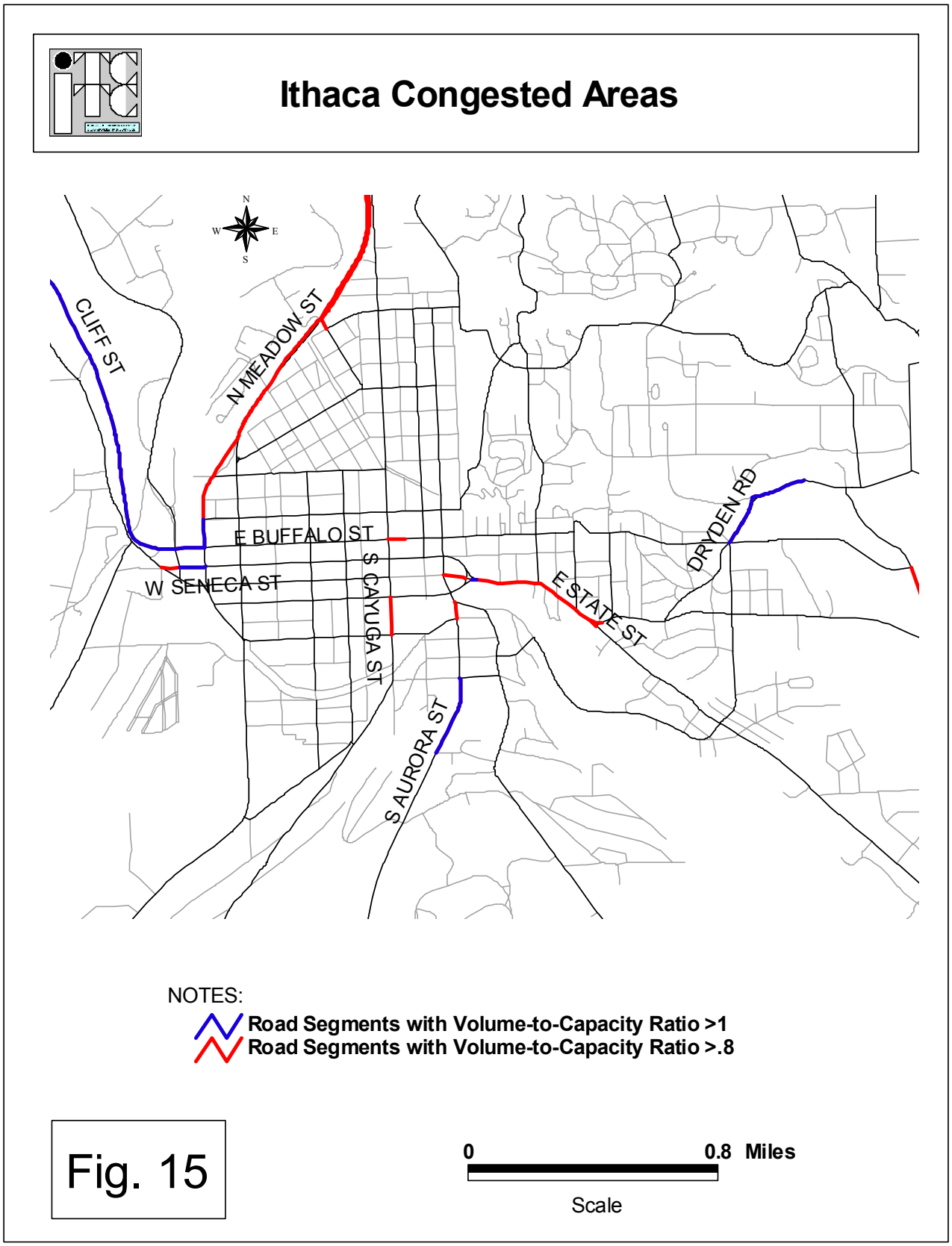


Fig. 14

FIGURE 15


Ithaca Congested Areas
N
W
E
S
CLIFF ST
N MEADOW ST
E BUFFALO ST
W SENECA ST
S CAYUGA ST
E STATE ST
DRYDEN RD
S AURORA ST
NOTES:
Road Segments with Volume-to-Capacity Ratio >1
Road Segments with Volume-to-Capacity Ratio >.8
Fig. 15
0
0.8 Miles
Scale

TSM strategies focus on upgrade to coordinated traffic signals, establishing formal traffic incident management plans addressing accidents and weather events, advanced planning for detour routes, real time information to drivers, coordinated/shared data collection. Specific roadway design changes such as alleviating bottlenecks on a road, adding a turn lane at an intersection or the use of alternative intersection designs (e.g., roundabouts) may be considered as TSM strategies. However more intensive capacity expansion – adding new lanes or new roads – is not considered TSM. The appropriate use of TSM measures should be determined on a case-by-case basis within the framework of a regional plan of action.

The ITCTC is supportive of ongoing efforts to upgrade traffic signals in the City of Ithaca, particularly in high traffic areas. Bicycle and pedestrian needs should be considered in the design of the signals upgrade. Resources should be allocated to ensure the optimal management and operation of the traffic signal system.

Other TSM strategies that may have future local applications include the following: (a) use of reversible lanes for high-volume commuting corridors; (b) use of peak-period on-road parking restrictions to obtain additional capacity; (c) use of peak-period parking surcharges to encourage mode shift or to reduce peak-period travel volumes; (d) developing better project planning methods to minimize delays, congestion, and disruption due to construction/maintenance projects; (e) removing or modifying unnecessary controls (stop signs, right turns on red, etc.); (f) use of transit and non-SOV preferential treatments for congested corridors; and (g) developing local policies to address incident management. For example, there should be a clear policy for clearing/towing procedures, particularly on the main commuter routes. Any addition of new capacity by constructing new facilities in key corridors must be carefully studied and considered a last recourse action.

4. Data Needs

Transportation data is a critical input to achieving improvements in transportation planning and the implementation of transportation projects and initiatives. There are three key areas where data is needed: traffic counts; accident reporting system; household travel survey update.

Traffic counts are a fundamental set of data used in every transportation related operation. The ITCTC has a travel demand model, which depends on traffic count data for calibration purposes and to verify its outputs. Currently in Tompkins County there is no coordinated traffic count program. Counts are generated on an as needed basis and do not provide a reliable record of changes in traffic patterns across the roadway network.

A reliable and comprehensive traffic accident reporting system is a key component of a planning process to identify and address traffic safety needs. Currently there are at least 5 different agencies collecting traffic accident informantion. They each have different reporting formats and protocols, making it impossible to have an automated data bank. Various New York State agencies have teamed-up up to develop an electronic traffic ticket and data transfer system by the name of TraCS (Traffic and Criminal Software). The ITCTC will work closely with local partners to achieve the earliest possible implementation of an accident reporting system, focusing on the possible use of TraCS in Tompkins County.

Efforts should also be undertaken to collect data on commuters and the travel behavior pattern of residents in Tompkins County. The travel behavior survey needs to be conducted to better determine local needs and preferences for transportation. This data would also be used to redefine the modeling parameters of the ITCTC's travel demand model.

INTERMODAL/FREIGHT

Introduction

Present legislation requires federal, state, and metropolitan areas to focus on intermodal planning, which involves the efficient and effective operation of the transportation system. In order to obtain the most efficient use of the system, users must be able to select the most appropriate mode for each segment of a trip. The first step is to ensure that transfers between modes are possible and that users are given the option to choose between different modes. Invariably the transfer of people and goods within a transportation system will represent costs and time delays. The emphasis of intermodal planning is to provide users with the opportunity to choose between modes and provide them with the ability to transfer to a different mode in a manner that minimizes costs and time delays.

The major intermodal (transfer) facilities in Tompkins County include: *Tompkins County Airport, intercity bus facility, park-and-ride facilities*, and a small *railroad yard* (see **FIGURE 10**.) This section is divided into two parts, freight movements and passenger movements.

1. Freight Movements

Freight movement in the Greater Ithaca-Tompkins County area must be addressed in a different manner than in larger metropolitan areas. This area does not serve as a major hub for the transport of goods, but rather serves mostly as a destination to which goods are brought. The area relies heavily on trucking and rail for the movement of freight. Coal is transported by rail to the railroad yard. A portion of

the coal is transferred to trucks for local delivery while the remaining coal continues by rail to the AES Cayuga power plant. The railroad is also used to ship salt from the Cargill, Inc. salt mine and ash from the power plant. For other freight movement the area relies on trucking.

The ITCTC coordinated implementation of a consultant based Tompkins County Freight Transportation Study (FTS). The FTS was completed on April 2002. The study provided the first comprehensive look at truck movements countywide, including:

- truck traffic counts
- a truck origin/destination survey
- surveys of area residents, highway superintendents and major shippers/receivers

The FTS included a series of public meetings, developed and analyzed alternative strategies to address concerns and finally, presented a series of recommendations and mitigation strategies. A network of recommended truck routes, consisting mostly of NY state routes, was identified to provide for the safe movement of freight while addressing the negative impacts of truck movements. Other recommendations address changes to ordinances, developing a truck route signing system, enhanced law enforcement, and creating a public education programs for truckers/shippers/carriers.

The FTS identified the long-standing generators of hazardous waste in Tompkins County. New York State does not require registration of vehicles that transport hazardous materials, nor does it have a set routing system for hazardous material hauling. State highways are deemed to be built to handle all truck traffic. Hazardous materials haulers are likely to follow the same travel patterns as the rest of the trucks.

It is recognized that commercial delivery vehicles transport hazardous material and can offer small risks; however, larger quantities of materials should be specifically routed through the area to ensure a fast and efficient response by local agencies in the event of an emergency. Municipalities may regulate the routing of hazardous materials through ordinances. Such an effort would need to be coordinated to ensure the continuity of routes. Local agencies should consider developing a hazardous materials routing plan for the greater Ithaca-Tompkins County metropolitan area.

The use of water transportation for freight in the Tompkins County area is not currently utilized by local companies due to high costs, environmental regulations, and their frequent shipments to/from land-locked southward destinations.

The FTS shows that freight movement through Tompkins County airport is very limited. Seafood was the most scheduled shipping item into the airport. The airport also receives various deliveries by truck principally fuel and deicer.

Norfolk Southern Railroad has one train a day running in Tompkins County, Sunday through Thursday. In addition, one to three days a week rail is used to deliver coal to the AES Cayuga power plant and shipping salt out of the mines of Cargill, Inc. in Lansing. Unfortunatelly, the rail line crosses one of the most congested areas of the City of Ithaca. A problem exists when trains run through the City during the morning and afternoon peak traffic periods, creating significant backups on the main area roadways. The ITCTC supports increased coordination between the railroad, the City of Ithaca and emergency response providers to minimize the impact of rail movement through the City.

2. Passenger Movements

The LRTP supports enhanced connectivity between the passenger modes of transportation available in Tompkins County: automobiles, intercity bus, public transit, bicycles, pedestrians, and air travel. There are several instances where mode choices are limited and transferability is not available or adequate.

Currently TCAT provides regular public transit service to the Ithaca-Tompkins Regional Airport terminal. In addition, there is readily available taxi service and an airport limousine service. However, access to the airport should be improved for pedestrians and bicyclists. Improvements would involve pedestrian facilities in and around the airport; and bicycle lockers that would allow secure weather-protected storage for bicycles.

Similarly, the intercity bus facility should be improved to include enhanced lighting, street furniture and parking facilities for bicycles . Currently, the intercity bus facility is served by the public transit system. Regular and frequent service should be continued. Intercity bus service in Tompkins County includes three carriers, 28 buses per day and serves approximately 179,000 passengers per year.

In 1996 Tompkins Consolidated Area Transit (TCAT) purchased 64 bike racks for installation on their buses. The use of these bike racks was monitored through October 1997. At that point the BobCAT (bikes on buses) program was deemed successful and no further data collection was pursued. Currently, all TCAT buses are equipped with bicycle racks, providing a popular and important service to riders in Tompkins County. The bike on buses program is arguably the most successful intermodal program in Tompkins County. The ITCTC will continue to work with TCAT to improve the transit systems ability to address the needs of bicyclists and pedestrians by providing safe and attractive bus shelters and secure bicycle parking at major transit stops/shelters and park-and-ride lots.

All public transit trips begin and end with a pedestrian component. Bus stops need to be evaluated to ensure the necessary pedestrian infrastructure is provided to allow for efficient movement to and from the transit stop. In addition, transit operators should ensure that all stops are within appropriate distances of origins and destinations. Transfers between the public transit system and the automobile are often made at park-and-ride lots. Actions to improve this connection include: (a) improving amenities at existing park-and-ride facilities; (b) promoting the increased use of such facilities (through such methods as encouraging local employers to participate in transportation demand management programs); (c) providing incentives to customers for using public transit; and (d) by increasing the frequency of public transit routes. Additional park-and-ride facilities should be developed based on existing and future commuting patterns.

ENVIRONMENTAL

Introduction

> *"As essential as it is to the functioning of our society, transportation also generates significant unintended and undesirable impacts."* [Source: Transportation Statistics Annual Report 1994, Bureau of Transportation Statistics, USDOT, January 1994, p.149.].

The transportation system must balance the protection of our natural, social, cultural, and historical resources with the need to address transportation demands. Environmental concerns range from the more traditional concerns (e.g., air quality, noise impact, energy use, etc.) to more community-level concerns (e.g., neighborhood preservation, jobs/housing balance, appropriate mixed-use development, etc.). There are several transportation related areas that impact the environment, these will be addressed in the following sections: *Air Quality*, *Land Use Planning*, *Energy Efficiency*, and *Minimizing Impacts and Disruptions to the Natural, Scenic, or Cultural Environment*. Any discussion of environmental issues related to transportation will necessarily result in considerable overlap between multiple planning disciplines, i.e. land use, economic development, neighborhood planning, natural areas planning, etc.

The Tompkins County Comprehensive Plan presents alternative future development scenarios, which were used as the basis for an analysis of future air quality impacts, energy consumption and greenhouse gas emissions from the transportation sector. The ITCTC travel demand model, TransCAD, was used to model future year road networks based on the proposed land use scenarios. The results of this analysis are found in Chapter 4: Future Scenario Analysis.

1. Air Quality

Currently, Tompkins County is in attainment of National Ambient Air Quality Standards. However, it is understood that failure to consider emission issues in an integrated and comprehensive manner could lead to continued and unacceptable degradations in air quality. The "Cities for Climate Protection – Local Action Plan, Tompkins County, NY" calculated the greenhouse gas emissions for Tompkins County in units of 'equivalent carbon dioxide' - eCO2 for the base year 1998. The results of this inventory indicate that "in 1998 Tompkins County produced a total of 1,223,432 tons of eCO2. The inventory shows that emissions from transportation (more specifically the combustion of gasoline and diesel) produced the majority of community emissions at 53%." **Figure 16** shows the distribution of greenhouse gas emission sources for Tompkins County.

The policies, projects and initiatives in the LRTP support the development of a transportation system that reduces its dependence on automobiles by promoting and enhancing the use of alternative modes of transportation. This is proposed through the provisions of improved service and facilities, and by encouraging land use development practices that support alternative modes of transportation. Concurrent with the above, the LRTP recommends improvements in transportation system operations that improve system efficiency, reducing congestion and idle time, also resulting in reduced emissions.

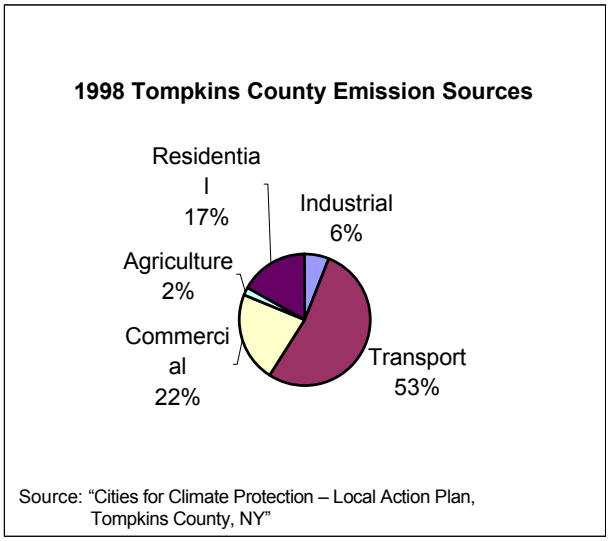


FIGURE 16

The ITCTC recommends that the impacts of proposed transportation initiatives should be assessed to determine their effects on air quality. Wherever feasible overall improvement in air quality should be attained through transportation initiatives. The ITCTC will continue to work with local, state and federal partners to develop and establish proactive and constructive evaluation criteria and

planning strategies which will have a significant influence on protecting and preserving future air quality.

2. Land Use Planning

In New York, land use and transportation planning have occurred in relative isolation from each other. In the July 1994 edition of the Land Use Law Reporter (Pace University School of Law, Albany, New York) it was stated that,

"...failure to coordinate land use and transportation planning has:

- *made it very difficult if not impossible, to predict transportation demand and plan effective regional transportation systems;*
- *created land use patterns that are automobile dependent, energy inefficient, environmentally damaging and that cannot be serviced properly by public transportation systems;*
- *generated traffic congestion that increases air pollution...".*

These statement are still valid in 2004 as communities across the New York continue to struggle with containing sprawl development, and managing congestion and air pollution issues.

Land use patterns are fundamental determinants of the number of trips that people make. Zoning ordinances have traditionally served to separate land uses. Automobiles allowed this separation to be intensified. As a result much of the development in the last sixty years has been auto oriented, often at the expense of other modes of transportation. Local municipalities are encouraged to review zoning and other land use regulations in order to allow and support mixed-use or other "clustered" development patterns. Zones that offer a mix of complementary land uses (e.g., commercial, residential, recreational), together with supporting design guidelines, would enable persons to combine trips, encourage more pedestrian and bicycle trips, reduce the number and length of automobile trips, and reduce energy consumption and congestion.

Municipalities in New York State are not required to adopt comprehensive plans, nor must these plans contain a transportation section. Until recently in Tompkins County, with a few exceptions, contemporary comprehensive land use plans did not exist or were outdated. Fortunately, this is changing. Currently most jurisdictions have existing comprehensive plans or ongoing initiatives to develop plans. This is a favorable trend that will have a significant impact on the ability of the ITCTC to conduct more effective transportation planning by improving coordination with planned future land uses. The ITCTC will support local efforts to develop comprehensive plans including making available use of the travel demand model for analysis.

Local governments are also encouraged to consider the balance of jobs and housing in their planning decisions. The "jobs-housing balance" is the ratio of suitable employment opportunities available to the working age population of a region or sub-region. A balanced jobs/housing ratio in an area can result in shorter trip lengths and encourage the shift from the single occupant automobile to other modes, thus allowing for reductions in automobile trips. This balance is best accomplished through the coordination of economic development and housing development via the local planning and development review function. The issue of housing in Tompkins County has received much attention locally in the year approaching the 2025 LRTP update. The new County Comprehensive Plan covers this topic in greater detail and provides guidance for local municipalities. The ITCTC will support land use, housing and economic development activities that lead to more efficient use of our existing transportation resources as stated in the LRTP goals and objectives.

Neighborhood preservation has repeatedly been one of the premier issues when addressing transportation planning. In both the NESTS and Freight Transportation Studies protection of residential areas became a key issue during project development. In Tompkins County many neighborhoods are crossed by roads that have grown in their traffic volumes as land was developed further out from the Ithaca urban core. Commuter and other trips use these roads to move across the area, impacting the neighborhoods.

There seems to be general agreement that traffic and traffic speed should be reduced in residential neighborhoods. This may be accomplished by implementing appropriate traffic-calming techniques and/or increasing law enforcement efforts. On rare occasions there is an opportunity to re-route traffic around neighborhoods, by providing appropriate capacity at the arterial level (to make "cut-through" trips less attractive). In all cases traffic must be managed based on the particular conditions of each neighborhood and considering the need and desires of the residents. There is no single strategy or recommendation that will serve all locations.

There are many design elements that can be incorporated into site plans and the existing infrastructure to ensure "human-scale" developments and spatial relations. Sample ordinances and development regulations can be found by investigating applicable design standards and models from other areas that address both new large-scale and smaller in-fill development projects. Residential areas should have bicycle and pedestrian friendly street networks that are visually pleasing and safe. Building mass, setbacks, signage, street lighting, landscaping, pedestrian and bicycle access, transit access, etc. can be included in guidelines to ensure consideration of these issues during project planning and review.

Also important is the subject of equity. Proposed transportation projects must be evaluated to ensure both positive and negative environmental (including social, cultural, and economic) impacts are distributed equitably across neighborhoods and communities so as not to unfairly burden or advantage any socioeconomic group or community. Transportation related technical project evaluations are important, but it is also crucial to analyze the transportation system to ensure that the principles of social and environmental justice and ecological sustainability are achieved.

3. Energy Efficiency

> *"More than one-fourth of all energy consumption in the United States is attributable to the transportation sector. Over 39% of all energy consumption is in the form of petroleum fuels. Of that, 66% of consumption occurs in the transportation sector. Cars and light duty vehicles consume 63% of all transportation related energy, which is almost totally dependent (97%) on petroleum fuels." [Sources: Compiled from various sources, as cited in U.S. Department of Transportation, Bureau of Transportation Statistics, National Transportation Statistics 2000 (Washington, DC: 2001); and data from the Energy Information Administration, US Department of Energy (1999a, 2000)].*

There are many ways to improve energy efficiency which include: reducing the number of automobile trips, reducing distances traveled, increasing the use of alternative fuels, and increasing the fuel efficiency of vehicles. The LRTP includes goals, objectives and project recommendations that seek to promote energy efficiency through transportation planning, operational enhancements and growth management strategies.

The policies and recommendations in this plan will be most influential on the number of trips and trip length factors. Issues related to increasing alternative fuel use and vehicular fleet fuel efficiency are usually regional and national in scale. Nevertheless, this plan encourages the study of the utilization of alternative fuel sources, understanding that the desirability of an alternative fuel source should be evaluated on an energy efficiency basis as well as its ability to meet the following goals: reduce dependency on oil (national security/economic reasons), reduce air pollution, and reduce global warming impacts. The use of alternative fuels should be considered for the vehicle fleets of major employers, where economies of scale may make a shift in fuel type economically feasible.

The initiatives, policies and programs mentioned in other sections of Mobility, including transportation system management and transportation demand management strategies, changes in land use regulations, and promoting transit, bicycle and pedestrian modes of transportation are aimed at improving the operational efficiency of the transportation system and reducing the number of automobile based trips. These outcomes will result in reductions in energy consumption in the transportation sector, with corresponding reductions in emissions.

The fuel efficiency of vehicles and the utilization of alternative fuels are also energy efficiency concerns; however, these are policy concerns primarily acted on at the State or national level. Locally we can support legislative actions that promote increased fuel efficiency. Through individual actions of choice, Tompkins County residents can utilize more fuel-efficient cars, such as the hybrid models that are now reaching the market. Also through individual choice, people can greatly improve the efficiency of their vehicles by keeping them well tuned and tires properly inflated. There is a distinct possibility that, over the next 20 years, petroleum prices will rise as a result of continuing/increasing demand and declining supplies. Gasoline prices will have a marked effect on consumer decisions on everything from what car to buy to where to live, and may be a major determinant on future transportation policy and funding decisions at the national level.

4. Minimizing Negative Impacts on the Natural and Scenic Environments

Although transportation projects can leave undesirable effects on the natural environment, measures can be taken to reduce and minimize these effects. While the intent of national and state legislation is to ensure this process occurs, there are other non-regulatory measures that can be considered.

Agro-ecosystems and other ecosystems such as wetlands, streams, uplands, and forests should be maintained to ensure they perform their desired services and retain their natural integrity and inherent value. Areas of high biological diversity should also be maintained. Areas with an abundance of species provide a variety of important aesthetic and genetic functions. Wise management does not always preclude activity in these areas. Routine maintenance activities such as mowing can promote species diversity. Therefore, complete protection of an area is not always the best or only management alternative. Local municipalities are encouraged to protect native flora and fauna, giving particular attention to unique natural areas, and threatened or endangered species when reviewing transportation system maintenance practices. Adequate planning and implementation of mitigation strategies should help minimize negative impacts when designing and maintaining transportation facilities.

Potential recommended actions that reduce environmental impacts include: diverting storm-water runoff to retention basins to reduce salt, silt, and thermal contamination; collecting paint chips from bridge maintenance projects to protect streams from lead contamination; minimize the use of salt in winter; ensure sedimentation and herbicidal

pollution are minimized during maintenance practices; minimize the use of defoliants and herbicides by planning for maintenance free plantings through State or National wildflower programs; and maintaining the health and effectiveness of roadside trees, shrubs and groundcover. The goal should be for highway departments to eliminate the use of herbicides. Minimizing the application of herbicides is appropriate and should be considered by the affected MPO participants. Cleaning roadside drainage systems has been identified as a major source of sedimentation in creeks feeding Cayuga Lake. Immediate reseeding of ditch sides after cleaning is an effective way of mitigating these negative impacts.

In addition, it is recommended that Tompkins County's Unique Natural Areas be preserved. These areas have been identified as having outstanding environmental qualities and deserve special attention for preservation in their natural state.

Scenic resources contribute significantly to the quality of life of Tompkins County residents. A variety of planning and regulatory tools exist to enable local governments to protect locally significant scenic areas. For example, they could adopt viewshed zoning that considers obstructions and hence attempts to maintain public access to the view; promote acquisition of land for pull-offs, overlooks and other uses that preserve the scenic nature of the area and provide access to views; and local agencies can consider urban forestry projects, volunteer maintenance, and other community-based activities to keep the roadway/transportation environment beautified.

The Cayuga Lake Scenic Byway (CLSB) includes routes State Routes 34b, 34, 34/13, 96/89 and 89 in Tompkins County. This system of roads circles the southern end of Cayuga Lake and comprises part of the tri-county scenic byway around Cayuga Lake. The Cayuga Lake Scenic Byway, Inc. non-profit organization is coordinating development of the CLSB in cooperation with Cayuga, Seneca and Tompkins County. The ITCTC has participated in the process leading to the byway designation and will continue to be an active participant in the development of this important regional transportation resource. The ITCTC encourages residents and municipalities along the byway to take action in protecting the scenic resources that make the CLSB a unique and special route and a destination for visitors to the area.

FINANCIAL

Introduction

The weakest part of any planning process is in the area of financial resource estimating and forecasting, particularly when working within a long planning horizon. One of the major problems is forecasting revenues that are dependent on the political process. The case of *TEA-21* offers a prime example, where a legislative body sets one level of funding ("authorized") but may appropriate a lesser amount. Given the vagaries of the funding process, inflation and other economic factors, it is difficult to make accurate annual projections, and impractical when projections are forecasted for twenty years. In addition, the multi-agency/governmental arena of an MPO makes it difficult to determine exact equivalencies of diverse funding streams.

This financial analysis is largely based on a continuation of of *TEA-21's* priority guidance to "preserve existing facilities". The analysis is based on past revenue and expenditure levels and does not attempt to incorporate fundamental changes that may result from the implementation of this plan. For instance, implementing some measures may lead to increased governmental expenditures (e.g., computer models, computerized traffic signals, real-time transit information, new and improved bicycle facilities, etc.), but may also result in reduced societal costs (e.g., reduction in the costs of congestion, improved air quality, improved personal health and sense of community, etc.). Others may lead to decreased government expenditure (e.g., prioritized snow removal, local roadways built to more modest design standards, less severe maintenance practices, etc.), but may lead to other undetermined costs. This type of comprehensive, cumulative analysis is beyond the scope of this plan.

1. Resource Estimation

Information on fiscal resources was gathered from three sources: the New York State Department of Transportation, Tompkins Consolidated Area Transit and the New York State Comptrollers Office. Demographic data was derived from the US Census, New York Statistical Information System and Cornell's Institute for Social and Economic Research.

The *Per-Capita Multiplier Method* was used to develop transportation expenditure projections for the 20-year plan horizon. This method links future expenditures to the population base. This approach was used in lieu of carrying out a "trend based" projection analysis because, as an estimator, applying the per capita cost multiplier method directly on the projected population, offered a smaller standard error.

Data was obtained for the eighteen local governments in Tompkins County (Tompkins County, the City of Ithaca, the Towns of Ithaca, Caroline, Danby, Dryden, Enfield, Groton, Ithaca, Lansing, Newfield and Ulysses, the Villages of Lansing, Cayuga Heights, Dryden, Groton, Trumansburg and Freeville). A ten-year average (1992 to 2001) of expenditures of local funds for transportation capital and operations was calculated using figures compiled from the State Comptrollers Office. This ten-year average equaled $27,175,948. The 2001 estimated population, 96,500, was used as the base for developing the cost multiplier. The five-year interval average projected population growth rate was 1%. This resulted in a per capita multiplier that equaled 281.62. Applying the multiplier to the annualized population growth estimates resulted in a 20-year (2005-2024) local transportation expenditures estimate of $559,458,989.

Local transportation expenditures include "Operation & Maintenance" (O&M) and "Capital Projects". Funds were disaggregated into these categories based on average percentage expenditures on O&M versus Capital Projects calculated from New York State Comptrollers Office Special Report on Municipal Affairs for 1997, 1999, 2000 and 2001.

In addition, private sector contributions were estimated at the rate of $500,000 per year. Private contributions are transportation funds that originate from a non-governmental source. These include projects such as mitigation for proposed land use development. Private contributions were assigned to capital projects for purposes of analysis of expenditure allocation. **Table 22** shows a summary of the local highway resources estimate as described in the paragraphs above.

TABLE 21			
Summary of Local Highway Resource Estimates 2005-2024			
Operations & Maintenance	Capital Projects	Private Contributions	Total
$408,685,654	$150,773,335	$10,000,000	$569,458,989

The New York State Department of Transportation (Region 3, Syracuse) provided estimates of State and Federal highway program aid for the twenty year period 2005-2024. **Table 23** includes the federal, state and local resources available to Tompkins County over the 20-year period.

The NYSDOT estimates were derived from an average County allocation based on a historical review of the federal highway program and the anticipated program growth. The estimate of available State funds, $100,000,000, includes some operations, such as materials, tree removal, bridge painting and cleaning, drainage, contract maintenance for NYSDOT bridge and pavement facilities, etc. What is not included in the State fund resource estimate is the cost of State forces that undertake these operations.

Federal aid for highway programs was estimated at $150,000,000. It is important to note that while NYSDOT did not include a set-aside for the Transportation Enhancement Program in their estimates, it was considered as part of the total federal aid by the *ITCTC* at the rate of $300,000 per year. This has the effect of reducing the amount of federal aid estimated to be available for other types of projects, adding further to the conservative nature of the fiscally constrained plan. The amount under the "State Funds" column is for NYSDOT projects and does not include any funds available to local entities. These figures are given in 2004 dollars (no present value has been calculated).

The third source of information pertains to transit funding. TCAT provided the information required to develop the transit estimates in **TABLE 23**. The local and State "matching" contributions to these funds were calculated based on current program requirements. The FTA Section 5307 (urban area transit service) figures for capital and operating assistance were based on actual Federal Fiscal Year 2003 figures. The State Dedicated Funds (SDF)-Capital funds were calculated based on the 2003 formula. The estimates from TCAT reflect the most recent changes in funding formulae and appropriate fund levels.

TABLE 24 summarizes the previous two tables and provides the estimate of total resources available.

TABLE 22				
Highway and Transit Resource Estimate 2005-2024				
Funding Program	**Local**	**State**	**Federal**	**TOTAL**
Highway Program	**$569,458,989[1]**	**$100,000,000[3]**	**$150,000,000[3]**	**$819,458,989**
Transit[2]:				
Sect. 5307 – Urban Formula (capital)	$2,138,768	$2,138,768	$17,110,143	$21,387,678
Sect. 5309 – Discretionary Capital	$2,125,000	$2,125,000	$17,000,000	$21,250,000
Sect. 5310 – Paratransit (capital)	$225,000	$0	$900,000	$1,125,000
Sect. 5311 – Rural Capital	$1,062,500	$1,062500	$8,500,000	$10,625,000
SDF – State Dedicated Funds (capital)	$0	$3,549,000	$0	$3,549,000
Subtotal Transit Capital	$5,551,268	$8,875,268	$43,510,142	$57,936,678
Transit Operations*	$121,521,201	$72,292,505	$16,833,536	$210,647,242
Transit Sub-Total	**$127,072,469**	**$81,167,772**	**$60,343,678**	**$268,583,920**
Total Transportation	**$696,531,458**	**$181,167,772**	**$210,343,678**	**$1,088,042,909**

Sources:
[1]The Local Government Data Base, New York State Office of the Comptroller (see Table 22)
[2]Tompkins Consolidated Area Transit
[3]NYSDOT
Note:
*Funds for *Transit Operations* come from the following sources:
Local – fare revenue and local subsidy, increasing at 2.5% per year after year 2005
State – New York State Transit Operating Assistance, based on 2005 budget request and increasing 3% per year
Federal – Section 5307 funds (includes transfer from 5311 to 5307), based on 2004 adopted budget, constant over planning period

TABLE 23				
Summary of Total Estimated Resources 2005-2024				
Program	**Local**	**State**	**Federal**	**TOTAL**
Highway	$569,458,989	$100,000,000	$150,000,000	**$819,458,989**
Transit	$127,072,469	$81,167,772	$60,343,678	**$268,583,920**
Total	**$696,531,458**	**$181,167,772**	**$210,343,678**	**$1,088,042,909**

In summary, for the 2005-2024 planning horizon, local resources are estimated to provide 47% of the transit funds, 69% of the highway funds, and 64% of the total transportation program funds. State resources are calculated at 30% of the transit funds, 12% of the Highway funds, and 17% of the total program funds. Federal government funds are estimated to contribute 22% of the transit funds, 18% of the highway funds, and 19% of the total transportation program funds. **FIGURE 17** provides a graphic representation of the Local/State/Federal funding splits for the Transit, Highway, and Total program resources.

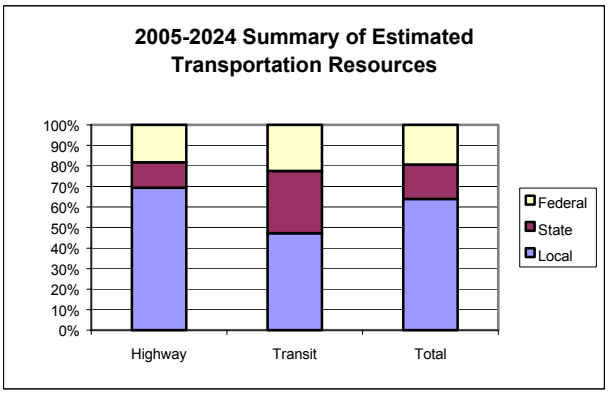


Figure 17

2. Expenditure Estimation

The estimation of expenditures is based on several factors. The issue of which federal program resource to allocate costs against is considered to be minor. Due to the flexibility of *TEA-21*, it is possible to transfer funds between programs. Thus, this section does not attempt to differentiate federal from state from local fund sources (although based on the estimation process there should not be any cases of local expenses exceeding local resources).

A clear division between "transit" and "highway" projects has been maintained for the sole purpose of making the allocation of estimated resources easier. These estimates are based on "historic trends" which are subject to variables such as annual state and federal appropriations.

Federal and state highway funds were distributed one-third to bridges, one-third to pavement projects. This is in accordance with the established practice used to allocate resources during TIP development under NYSDOT's Goal Oriented Programming process. This proportion in the distribution of funds also reflects historical trends. The last third of federal and state highway funds were distributed to cover other project categories such as safety, transportation enhancement and capacity projects.

Another major source of information came from the local government expense data. Since local operating and maintenance costs were included in these data, these were assumed as "baseline" costs and were allocated as expenditures against the resource estimate.

Transit allocations were based on expenditures proportions utilized by TCAT. The Capital Facilities include projects with a high probability of implementation.

It should be noted that, as with the resource estimates, no attempt has been made to calculate a "present value" for expenses. Also, there has been no attempt to allocate costs by individual project year. **TABLE 24** provides a summary of the estimated expenditure allocations. A brief discussion of these allocations follows the table.

TABLE 24				
Estimated Expenditure Allocations 2005-2024				
Project Type		**Expense Allocation**	**Percent Of Total***	**Percent Of Category***
Highway:	**Bridge**	$97,500,000	9.0%	12%
	Pavement	$181,071,112	16.6%	22%
	Safety	$40,472,949	3.7%	5%
	Enhancement	$6,000,000	0.6%	0.7%
	Operating & Maintenance	$408,685,654	37.6%	50%
	Multimodal Capacity	$85,729,273	7.9%	10.5%
	Subtotal	**$819,458,989**	**75.1%**	**100%**
Transit:	**Capital Facilities**	$7,560,736	0.7%	2.8%
	Operating	$210,647,242	19.5%	78.4%
	Maintenance/Misc.	$1,981,434	0.2%	0.7%
	Buses	$48,394,507	4.5%	18%
	Subtotal	**$268,583,920**	**24.9%**	**100%**
	Total	**$1,088,042,909**	**100%**	

*Discrepancies in the figures are due to rounding errors.

Highways

Bridge: NYSDOT data analysis revealed 15 state-system, 55 local-system, and 6 authority or other-owned bridges are classified as in "deficient condition", requiring work over the 20-year planning period. Additional bridges will also continue to require regular maintenance, while other bridges may need emergency work as a result of weather events, accidents, etc. The $97,500,000 allocated to bridge rehabilitation and repair in **Table 24** includes one-third of Federal and State highway resources plus a five-percent local share. In addition, an estimated $500,000 per year was added to account for locally funded bridge projects. The aim is to reduce the percentage of State deficient bridges from a current 29% to 20%, locally owned bridges from 67% to 15% and to limit deficient authority or other-owned bridges to no more than 4 out of the 9 bridges in that category.

Pavement: Following standard practice, one third of the federal and state highway resources, approximately $83.3 million over 20 years, was allocated to this category. Approximately $104.4 million in additional local capital projects was added to this figure to cover funding of local road pavement projects. As stated previously, the aim of the pavement program is to maintain and improve the condition of the highway infrastructure.

Safety: Increased safety has been a priority of the ITCTC since its initial LRTP. Even though very few projects get funded exclusively from surface transportation program "safety" funds, it does not detract from the importance of this policy. The fact is that safety features are designed and constructed as principal or incidental aspects of nearly every type of transportation project. This plan maintains the allocation of highway funds for safety projects at 5% of the total transportation program. While even at $40.5 million the funds may underestimate the "needs" for safety improvements, they also under-represents the commitment to safety that is part of every TIP project.

Enhancements: The Transportation Enhancement Program (TEP) under TEA-21 is a highly competitive program. Applicants from Tompkins County have aggressively and successfully pursued this line of funding. For purposes of this LRTP it is estimated that $300,000 per year will be available to Tompkins County from the TEP.

Operating and Maintenance: The combined estimates of 20 year O&M costs calculated for all the local governments plus Tompkins County were incorporated here. It is important to note that the NYSDOT estimate of available State funds included some operations costs, such as materials, tree removal, bridge painting and cleaning, drainage, etc.

Multimodal Capacity Projects: One of the principal objectives of *TEA-21* was to ensure the maintenance and operational capability of *existing* transportation facilities. As such, highway capacity projects received the lowest priority in the allocation of highway resources. Although the 20-year total of approximately $69 million is intended to account for capacity projects on the local roadway network, it is acknowledged that these resource levels would be insufficient to construct major new highway facilities. However, the funds provide significant funding for Transportation System Management (TSM) activities (e.g., turn-lanes, signal synchronization, traffic circles, bike lanes, "flex" to transit, etc.) and for expansion of multimodal (principally bicycle, pedestrian and transit) facilities and programs. Implementation of these non-automobile based transportation strategies, coupled with Travel Demand Management, enhanced transit, more efficient land use development patterns and strategic highway capacity expansions provide a sustainable, long-term framework for the management of congestion through increased use of alternative modes to the automobile, and by maximizing the operational efficiency of the existing transportation system.

Transit

Capital Facilities: The total of $7,560,736 includes funding for TCAT Facility rehabilitation, and replacement of passenger facilities and shelters.

Operating: The total operating budget estimate of $210,647,242 reflects an annual growth rate of 2.4-2.5% over the 20-year planning horizon. The Operating estimate includes all revenue sources: local (fare revenue and local subsidy), state transit operating assistance and federal operating assistance.

Maintenance/Miscellaneous: This "catch-all" category includes a variety of smaller projects that may range from short-range planning to communications and data processing equipment replacements to improved signage. A cost of approximately $99,000 per year was used to calculate this allocation.

Buses: The buses estimate includes urban, rural and paratransit buses operated by TCAT, its contractors, and GADABOUT. The resources estimate for purchasing buses is $48,394,507, which includes purchases for GADABOUT under the Section 5310 program. The estimate for bus acquisition assumes TCAT will be successful in getting an earmark in every future reauthorization of the federal transportation legislation. Further, the estimate assumes regular allocations from the New York State Dedicated Transportation Fund.

TCAT's biggest long term funding problem is capital funding, especially for replacement buses. The size of TCAT's bus fleet requires capital funding at a level that far exceeds its annual urban formula allocation (Sec. 5307). Therefore, TCAT must compete for discretionary capital funding from federal and state programs. The cost of not being able to replace buses in a timely fashion is reflected in the high maintenance costs of an aging bus fleet. As part of its strategic planning, TCAT will identify strategies for funding replacement buses, bus rehabilitation and re-manufacturing.