

New York State Department of Transportation

Intelligent Transportation System (ITS) Study for the Buffalo and Niagara Falls Metropolitan Area Erie and Niagara Counties, New York

**Transportation Systems and Deficiencies
Working Paper # 1
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1.0 INTRODUCTION

This document has been prepared as part of the New York State Department of Transportation (NYSDOT) Buffalo and Niagara Falls Intelligent Transportation Systems Study. The primary objective of this working paper is to define and document transportation planning initiatives, and existing transportation facilities and transportation systems. The effort consisted of data collection, evaluation/consolidation and documentation of existing plans, studies and other information concerning:

- roadways
- public transit
- traffic volumes
- demographics
- commercial vehicle operations
- tourism and other activity centers
- border crossing initiatives
- high incident locations
- existing intelligent transportation systems (existing ITS)
- agency coordination
- public outreach.

The information discussed in this memorandum will be used as a basis to evaluate the existing transportation facilities and the challenges associated with the system. This information is crucial in defining issues that may contribute to the opportunities and constraints in providing integrated and comprehensive ITS user services and a strategic deployment plan for the Niagara Frontier.

The project study area consists of Erie and Niagara Counties as well as the Niagara Region of Southern Ontario. The major population centers include: Buffalo, Niagara Falls and Niagara Falls, Ontario and the towns of Amherst, Tonawanda, and Cheektowaga (see Figure 1-1). The study area has a population in excess of 1.5 million people.

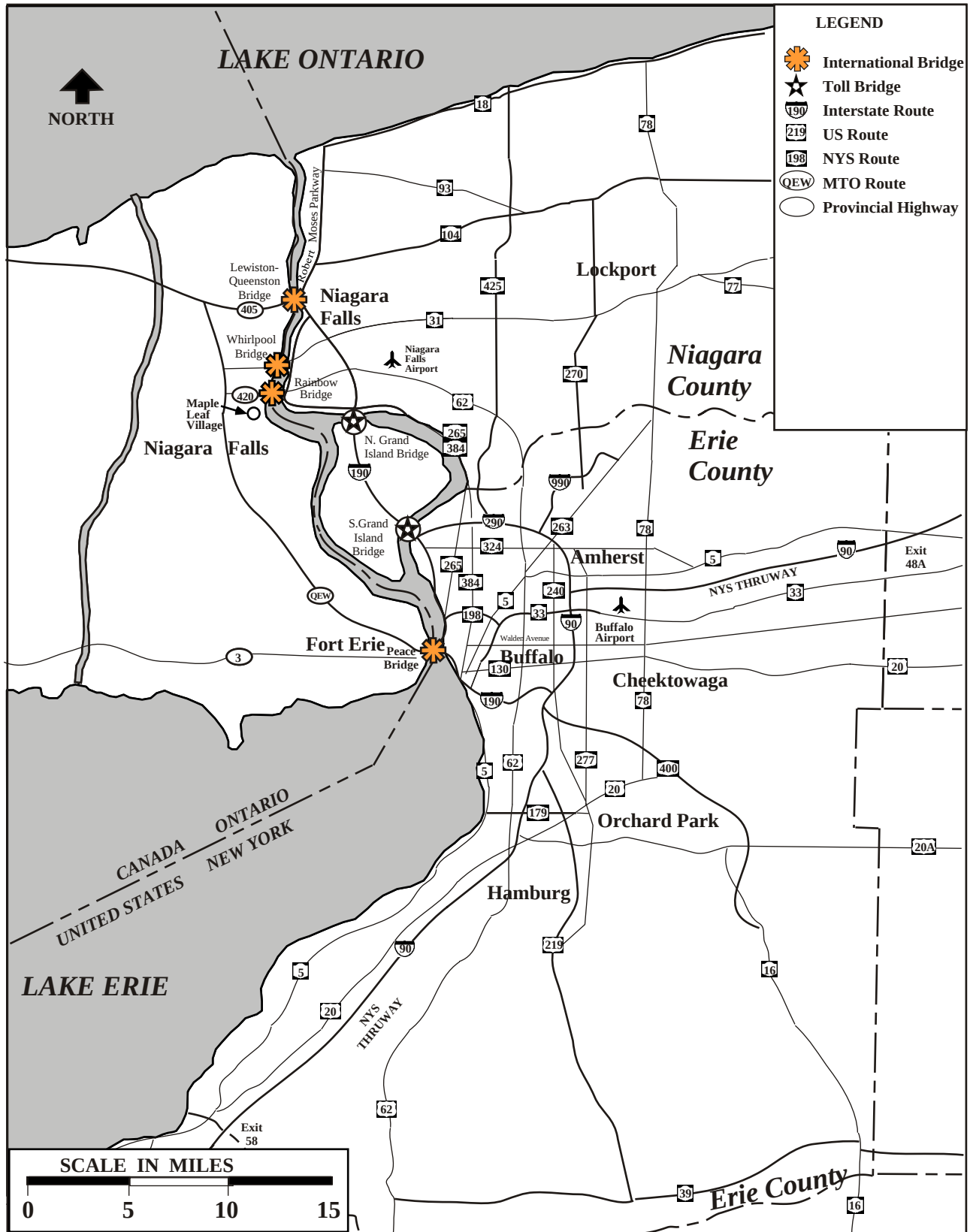


Figure 1-1 Regional Project Area



2.0 TRANSPORTATION SYSTEMS IN THE BUFFALO AND NIAGARA FALLS REGION

This section presents a discussion of the characteristics of the transportation system in the Buffalo, Niagara Falls, and Southern Ontario region, commonly referred to as the Niagara Frontier. The system descriptions depict the existing facilities, services and technological infrastructure within the region as well as ongoing implementation projects, plans and programs. The primary interest is characteristics of the region where improvement opportunities exist. The system attributes provide the necessary background information to reveal the limitations of the existing transportation system and develop specific objectives that respond to the regional needs. The following sections provide an overview of the area with a listing of National Highway System routes followed by descriptions of major roadways in the region.

2.1 The Niagara Frontier

The Niagara Frontier is strategically located at the eastern end of Lake Erie. The Region has played a dominant role in shaping the Great Lakes economy and its associated transportation systems. The Niagara Frontier has historically been a major transportation hub within the United States. Presently, the Niagara Frontier handles more traffic than the entire Mexican/U.S. border. The Region is one of the busiest border crossings in the world. The Peace Bridge, located between Buffalo and Fort Erie, is the second busiest border crossing in North America. The City of Niagara Falls is an international tourist attraction, drawing approximately 10 million people annually.

The Buffalo/Niagara Falls regional transportation system consists of major transportation links. The New York State Thruway and various major interstate highways and expressways provide the opportunity for significant international travel by connecting four USA/Canada international bridge crossings with the rest of the State to the east, south and southeast. The New York State Thruway (I-90) provides an important connection between New York State/New England and destinations west for both commercial and private vehicles.

There are over one million people residing in Erie County and nearly one-third of these are residents of the City of Buffalo. The City of Buffalo represents the central location of the urbanized area for the Niagara Frontier region. Erie County ranks first among the counties in the state in having the largest number of high volume state maintained lane miles, with approximately 1,724 lane miles in the non-toll interstate category.

The development of the Buffalo urban transportation network is unique. It was designed by Joseph Ellicott, as a wheel with spokes radiating outward from the downtown Buffalo area. The New York State Thruway (I-90) and Niagara Section (I-190), plus the NYSDOT Youngmann Expressway (I-290) form an outer loop. The NYSDOT Scajaquada Expressway (NY198) and the Kensington Expressway (NY33) form the inner loop. The Kensington Expressway provides the primary connection between Downtown Buffalo and the Greater Buffalo International Airport.



The Niagara Falls area can be accessed from the American side via I-190 and the Robert Moses Parkway as well as local arterial streets. In addition to being an international tourist attraction and major retail center, Niagara Falls maintains an international airport (charter flights and general aviation) and an active U.S. Air Force Reserve Base.

2.2 National Highway System (NHS)

The National Highway System (NHS) includes major highways, such as urban and rural principal arterials and strategic highway connectors as well as all interstate routes. A National Highway System was designated in accordance with the Intermodal Surface Transportation Efficiency Act (ISTEA), by September 30, 1995. The recommended NHS, as proposed by the Niagara Frontier Transportation Planning & Coordinating Committee (NFTPCC), is as follows (see Figure 2-1):

- NYS Thruway (I-90)
- Niagara Section (I-190)
- Youngmann Highway (I-290)
- Lockport Expressway (I-990)
- Kensington Expressway (NY 33)
- Scajaquada Expressway (NY 198)
- Main Street (NY 5) - from Scajaquada Expressway to Niagara Falls Blvd.
- US 219 from Ridge Road in West Seneca to NY 39 Springville
- NY 5 - from Ridge Road to I-190
- Ridge Road - from NY 5 to NY 20 (Southwestern Blvd.)
- US 20
- Aurora Expressway (NY 400) - from I-90 to Transit Road
- NY 78 (Transit Road) - from US 20/NY 78 intersection to NY 31 in Lockport
- Robert Moses Parkway in Niagara Falls
- NY 31 - from Robert Moses Parkway through Lockport to the Niagara County line
- NY 62 (Niagara Falls Blvd.) - from Main Street to I-190 in Niagara Falls
- Pine Avenue (Route 62) - from I-190 to Robert Moses Parkway
- Peace Bridge
- Rainbow Bridge
- Whirlpool Bridge
- Lewiston - Queenston International Bridge.

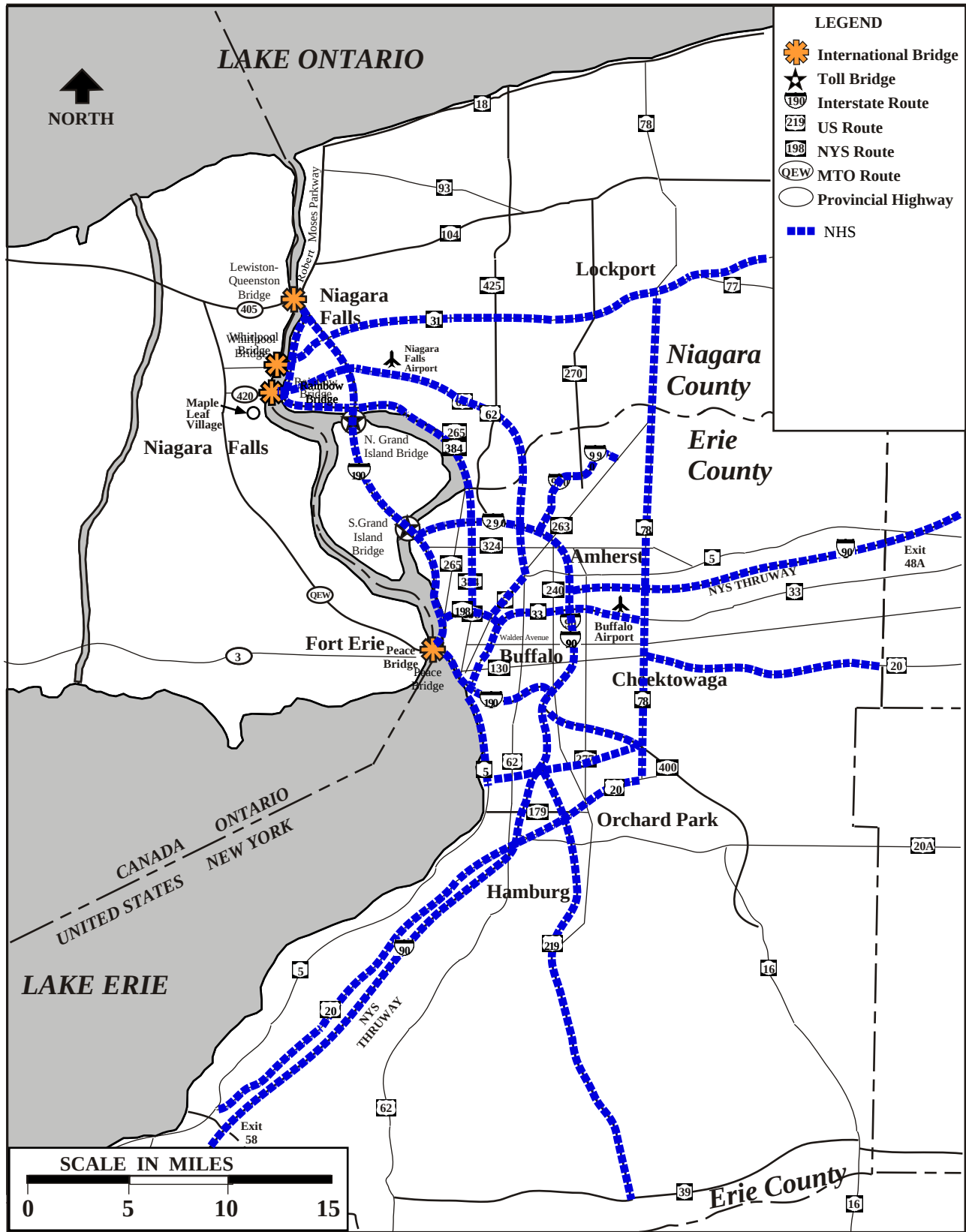


Figure 2-1 National Highway System (NHS)



2.3 Freeways

Freeways are major travel facilities with interchanges or grade separations at intersecting roads and complete access control. These facilities allow free-flowing traffic across multiple jurisdictions within a region. Operating speeds on the freeways are generally higher than on other roadways. The major freeways in the Niagara Frontier are described below.

2.3.1 I-90 (New York State Thruway)

The New York State Thruway extends from the Pennsylvania border to Albany and is a main thoroughfare for travelers in the Niagara region, where it is primarily a four-lane toll facility. For this project, the portion of I-90 located within the bounds of Erie County will be studied. The I-90 runs from the southwest corner of Erie County to the eastern border of the county. The approximate length of this branch of the NYS Thruway from Exit 48A to Exit 58 (Silver Creek) is 66 miles. There are several full interchanges along this length which include: Transit Road (Exit 49); NY 33 (Exit 51); William Street (Exit 52A); Walden Avenue (Exit 52); I-190 (Exit 53); Seneca Street/NY 400 (Exit 54); Ridge Road (Exit 55); Milestrip Road (Exit 56); Hamburg-Camp Road (Exit 57); and Silver Creek (Exit 58). Traffic delays occur during peak periods at the toll booths, particularly at the Williamsville Toll facility (see Figure 6-1 for toll booth locations). The 15-mile segment from Exit 50 to Exit 55 is untolled. EZ-Pass is installed at the Williamsville and Lackawanna Toll Barriers. The Thruway owns and operates two VMS along the I-90; upstream of the Lackawanna Toll Barrier and upstream of the westbound Williamsville Toll Barrier.

2.3.2 I-190

The I-190 is a major north-south facility connecting the City of Niagara Falls and the City of Buffalo. From its southern junction with I-90 through the North Grand Island Bridge, the I-190 is the Niagara Section of the NYS Thruway. From the North Grand Island Bridge to its terminus at the Lewiston-Queenston Bridge in Niagara Falls, NY, it is a NYSDOT facility. Portions of the I-190 are tolled, with toll collection at the North Grand Island Bridge, South Grand Island Bridge, Breckenridge Road ("Black Rock Toll Barrier") and Ogden Street ("Buffalo Toll Barrier") at the southern terminus. All of these locations presently have both conventional toll collection and "EZ-Pass" (electronic toll collection) lanes. A set toll is charged at all toll booths regardless of where a vehicle accesses the interstate. Currently the toll is \$0.50 for automobiles.

Variable Message Signs (VMSs) are present at two locations along the length of Interstate I-190, for use by vehicles traveling in the northbound direction. One VMS is located upstream of the Buffalo Toll Barrier, and the other is located across from the Dunlop Building. A graphic showing the location of VMSs within the project area is shown in Figure 6-5.

The upper portion of the I-190 from Niagara Falls to the connection with Niagara Street in downtown Buffalo is four lanes. The I-190 is six lanes from the Niagara Street access to its southern terminus with the I-90.



There are numerous exits along the entire length of I-190. The north end in Niagara Falls has four interchanges: Witmer Road (Exit 24); Porter/Packard Roads (Exit 23); Niagara Falls Boulevard (Exit 22); and Buffalo Avenue & Robert Moses Parkway (Exit N21). At this point, the I-190 crosses the North Grand Island Bridge and enters into the Town of Grand Island. There are three interchanges for the I-190 located on Grand Island as follows: Long Road (Exit N20); Whitehaven Road (Exit N19); and Grand Island Boulevard (Exit N18). Immediately after the Grand Island Boulevard exit is the South Grand Island Bridge which crosses into the Town of Tonawanda.

There are three interchanges located within Tonawanda serving four major employers: General Motors, Dunlop Tire, DuPont Chemical Co. and Praxair/Linde Chemical. They are as follows: River Road (Exit N17); I-290 Interchange (Exit N16); and Sheridan Drive/Kenmore Avenue (Exit N15). The remainder of I-190 is located within the City of Buffalo in which there are numerous interchanges including: Ontario Street (Exit N14); Austin Street (Exit N13); Amherst Street (Exit N12); Scajaquada Expressway (Exit N11); Porter Avenue (Exit N9); Niagara Street/Carolina Street (Exit N8); Church Street (Exit N7); Elm Street (Exit N6); Hamburg/Louisiana Street (Exit N5); Smith Street (Exit N4); Seneca Street (Exit N3); Ogden Street (Exit N2); and I-90 Interchange (Exit N1). The Black Rock Barrier Toll facility is located between Exits N11 & N9 and the Buffalo Barrier Toll facility is near Exit N1.

Various traffic delays occur on the I-190. The areas where delay is most common include I-190/Sheridan Drive and the toll plazas.

2.3.3 I-290

Interstate 290 is a major NYSDOT east-west facility located entirely within the municipalities of Tonawanda and Amherst. The majority of traffic using I-290 is vehicles traveling to and from Niagara Falls, Grand Island and Cheektowaga. This facility is primarily composed of six travel lanes, with eight lanes near the I-990 interchanges. I-290 is currently not equipped with any ITS hardware. The I-290 interchange with I-90 (commonly referred to as the Blue Water Tower) frequently experiences congestion and queuing during peak periods.

The I-290 originates with Exit N16, the interchange with I-190, and continues easterly with many interchanges along the way. The interchanges are as follows: Delaware Avenue (Exit 1); Colvin Blvd./Eggert Road (Exit 2); Niagara Falls Boulevard (Exit 3); I-990 Interchange (Exit 4); Millersport Highway (Exit 5); Sheridan Drive/Harlem Road (Exit 6); and Main Street (Exit 7).

2.3.4 NY 33 (Kensington Expressway)

The Kensington Expressway is a major east-west facility that connects the City of Buffalo to the Greater Buffalo International Airport in the Town of Cheektowaga. This facility has exhibited major growth in traffic volumes over the past decade. Presently, the Kensington Expressway has three travel lanes in each direction, dropping to two at the Scajaquada Expressway interchange. It has already undergone major reconstruction and its right-of-way and physical limitations restrict any



further lane expansion. Currently, it experiences congestion and queuing problems mainly during morning and evening peak hours.

2.3.5 I-990

Interstate 990 is a major north-south facility of the NYSDOT. I-990 is located entirely within the Town of Amherst. This facility is composed of four travel lanes in each direction from I-290 to about Sweet Home Road, and two lanes to Millersport Highway. Presently, there are no tolls or ITS technologies in use on the roadway.

The I-990 serves as a major freeway for access to North Amherst and Niagara County, mainly the City and Town of Lockport. The corridor southern terminus is located at the interchange with I-290 (Exit 4). The northern terminus occurs at Millersport Highway (Route 263) in the northern section of Amherst. There is easy access to the State University of New York at Buffalo and there are major commercial and technology facilities along I-990. The extension of the I-990 to Millersport Highway was completed in 1991. There are a few interchanges located along the facility: Sweet Home Road (Exit 1); State Campus (Exit 2); Audubon Parkway (Exit 3); French Road (Exit 4), and finally Millersport Highway where all traffic must exit.

2.3.6 US Route 219

The US 219 is a major north-south freeway linking many municipalities south of the City of Buffalo. It is a four-lane divided facility. The northern terminus lies at the New York State Thruway (I-90) north of the Ridge Road (Exit 55) interchange. The southern terminus is located at NY 39 in Springville. The US 219 continues as a two-lane roadway beyond the project limits. Within the general project limits, US 219 has seven interchanges, including Milestrip Road, Big Tree Road, Armor-Duells Road, NY 391, Rice Hill Road, Genesee Road, and NY 39.

The NYSDOT is presently studying alternatives to extend the freeway or upgrade US 219 to the Pennsylvania Border. This facility serves as a major trade route and provides access to western New York ski areas. The preliminary studies are expected to be completed in early 1997.

2.3.7 NY 400 (Aurora Expressway)

The Aurora Expressway is a major four-lane facility linking the municipalities of West Seneca, Elma and Aurora with the New York State Thruway. This roadway carries high volumes of traffic during the morning and evening peak hours, and congestion problems are evident near the New York State Thruway interchange. There is a steady pattern of increasing traffic volumes for this roadway.

NY 400 begins in the north at a connection with the I-90 and continues southerly to the southeast border of the Town of Aurora. There are seven interchanges along the facility as follows: Seneca Street, Union Road, NY 20/78 (Transit Road), Jamison Road, Maple Street, NY 20A (Big Tree Road), and NY 16.



2.3.8 Queen Elizabeth Way (QEW)

The QEW is a major Canadian freeway located within the Niagara Frontier. It serves as a major connector from the City of Niagara Falls, NY as well as Buffalo to prominent cities in Canada (e.g., Toronto, Hamilton). The QEW is a six-lane facility from Toronto to St. Catharines and a four-lane facility from St. Catharines through to Niagara Falls and Fort Erie.

2.3.9 Provincial Highway 405 (PH 405)

PH 405 is an east-west four lane facility interconnecting the QEW with the Lewiston-Queenston bridge. A single interchange is located at Stanley Avenue.

2.4 Expressways

Expressways are major travel facilities that include parkways and toll roads allowing free flow of traffic across multiple jurisdictions within a region. They are divided arterial highways for through traffic with full or partial control of access, and are generally grade separated or have interchanges at intersections. Operating speeds on expressways are higher than on arterials, but sometimes less than on freeways.

2.4.1 NY 198 (Scajaquada Expressway)

The Scajaquada Expressway is a NYSDOT east-west facility which connects I-190 with NY 33 (Kensington Expressway). NY 198 has a traffic signal located at the intersection of Parkside Avenue. It is a four-lane facility except near the NYSDOT Parkside intersection where it widens to six lanes. The expressway traverses through a historic park and was initially designed as a parkway. Presently, NY 198 has congestion and queuing problems mainly during morning and evening peak hours, particularly near the signalized Parkside intersection.

2.4.2 Provincial Highway 420 (PH 420)

PH 420 is an east-west four-lane facility interconnecting the QEW with the Rainbow Bridge. Arterial interchanges are located at Drummond Road, Dorchester Road, and Niagara Road 106/Montrose Avenue.

2.5 Major Arterials

Major arterial roadways carry high volumes of traffic within the region and provide connections to serve freeway traffic and access from minor arterials. Intersections between major arterials are typically signalized.



2.5.1 Transit Road (NY 78)

Transit Road is a north-south facility extending into both Erie and Niagara Counties. The roadway originates to the north in Niagara County, specifically in the Town of Lockport, and continues southerly to its southern terminus at Jewett-Holmwood in Orchard Park. This facility is primarily a five-lane major arterial connector with links to the New York State Thruway and the Aurora Expressway. Transit Road runs through minor residential development, but its primary adjacent land use is commercial/retail.

2.5.2 Union Road (NY 277)

Union Road is similar to Transit Road. It is a north-south facility originating to the north at Sheridan Drive and continuing southerly to US 20 in northern Orchard Park. The primary land use along Union Road is commercial/retail.

2.5.3 Main Street (NY 5)

Main Street is a principal thoroughfare into the City of Buffalo. The Niagara Frontier Transportation Authority (NFTA) Light Rail Rapid Transit (LRRT) has eliminated the use of motorized vehicles from South Park to Tupper Street in Downtown Buffalo. This roadway serves numerous land use functions but primarily commercial uses.

2.5.4 Provincial Highway 3 (PH 3)

This Canadian roadway is similar to Transit Road. The facility begins near the Peace Bridge in the Town of Fort Erie and continues westerly throughout Fort Erie. Its primary adjacent land use is for commerce with many retail shops, food establishments and lodging facilities. PH 3 is also a main thoroughfare during the summer months for many American visitors who enjoy the numerous beaches and lakefront activities.

2.6 Commercial Vehicle Routes

The ISTEA calls for the development of methods to enhance the efficient movement of passengers and freight. An effort is being made to involve new strategies through the next decade that will maximize the movement of people and goods while reducing the number of vehicles on the system.

The Niagara Falls Transportation Committee's commitment to efficient freight mobility is reflected in the development of a preferred truck route system. This system encompasses a 395-mile network identifying the most efficient routes among major industrial and commercial sites, while also providing access to adjacent regions. The recommended NHS and its intermodal connections to water ports, airports, border crossings, and intermodal passenger and freight facilities will be another consideration in future evaluations of freight needs.



The preferred truck route system basically follows the recommended NHS. As shown in Figure 2-2, the trunk lines consist mainly of existing interstates and freeways.

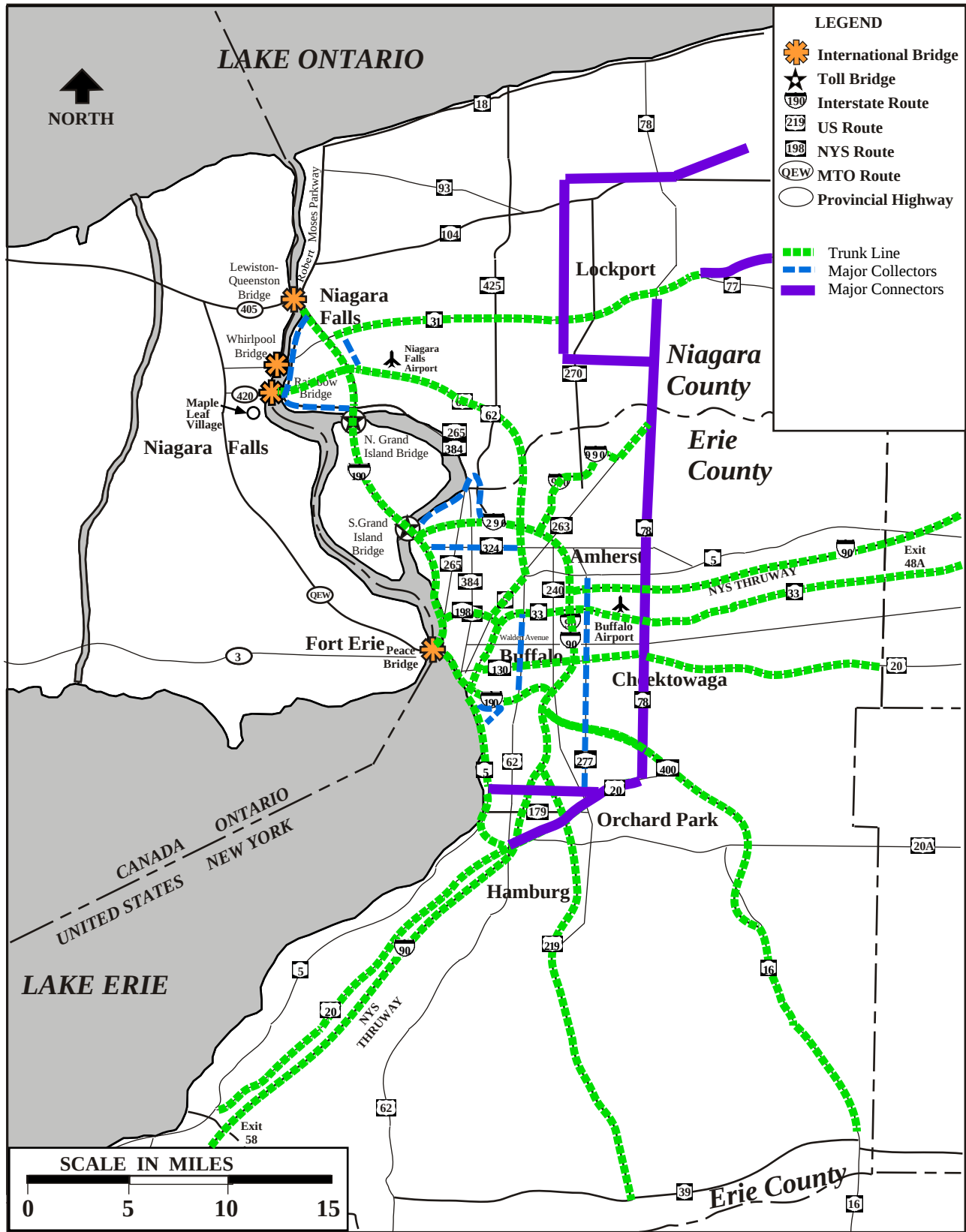


Figure 2-2 Preferred Truck Route System



3.0 DATA RECONNAISSANCE AND MAPPING

Information for this task was gathered from a wide variety of agencies. The agencies were requested to provide data pertaining to their role in the transportation network as well as existing and planned transportation facilities. The Niagara Frontier Transportation Committee (NFTC), the area's Metropolitan Planning Organization (MPO), was particularly helpful in the data reconnaissance effort. Other agencies providing information included:

- Federal Highway Administration
- New York State Department of Transportation
- New York State Thruway Authority
- Niagara Frontier Transportation Authority
- Ontario Ministry of Transportation
- Niagara County
- Erie County
- City of Niagara Falls, Ontario
- City of Buffalo
- Niagara Frontier Transportation Committee
- Niagara Falls Bridge Commission
- Buffalo and Fort Erie Public Bridge Commission
- New York Division of State Police
- Greater Buffalo Partnership
- American Automobile Association
- Tower Group International
- Region of Niagara, Ontario.

3.1 Niagara Frontier Transportation Committee (NFTC)

The NFTC has the responsibility under the provisions of the ISTEA for developing and carrying out a continuing, cooperative and comprehensive transportation planning process for the Niagara Frontier. The NFTC was formed in 1971 to:

- serve as the transportation policy and planning organization for Erie and Niagara Counties
- provide a specific regional decision-making forum to meet changing area needs.

The NFTC has shared responsibility with NYSDOT to cooperatively develop transportation plans, and to program Federal highway and transit funds in a manner that ensures an adequate and coordinated transportation system for the Niagara Frontier. The membership of the NFTC includes:

- New York State Department of Transportation
- New York State Department Thruway Authority
- Niagara Frontier Transportation Authority
- Erie County
- Niagara County



- City of Buffalo
- City of Niagara Falls
- Erie and Niagara Counties Regional Planning Board.

The 2010 Transportation System Plan for Erie and Niagara Region was developed by the NFTC with the cooperation of its members. In accordance with ISTEA requirements, the plan identifies the policy goals and objectives, capital improvements, studies, actions and strategies the region proposes to be implemented by the year 2010. The charge of the long range plan is:

"...the Niagara Frontier Long Range Plan shall identify transportation facilities (including but not necessarily limited to major roadways, transit and multi-modal and inter-modal facilities) that should function as an integrated metropolitan transportation system, giving emphasis to those facilities that serve important national and regional transportation functions. In formulating the long range plan, the metropolitan planning organization shall consider fifteen planning factors as such factors relate to a 20-year forecast period."

The goal of the NFTCs 2010 Transportation System Plan for Erie and Niagara Region is to strengthen the region's competitiveness and attractiveness in terms of moving people and goods in the most acceptable and cost-effective manner. Objectives of the Long Range Plan are described in the Table 3-1, and Figure 3-1 summarizes the overall plan.

3.2 Buffalo and Fort Erie Public Bridge Authority (PBA)

3.2.1 Existing Conditions

The Peace Bridge is an international link between the United States and Canada,. The organization that runs the Peace Bridge is known as the Buffalo and Fort Erie Public Bridge Authority (PBA), with operational and advisory leadership drawn equally from both countries. The Peace Bridge generates income from toll revenue and does not utilize public funds for its operation. According to The Assessment of Border Crossings and Transportation Corridors for North American Trade, a report to Congress pursuant to the ISTEA, more than \$23 billion worth of trade crosses the Peace Bridge each year. In 1995, this equates to \$65 million worth of raw materials and commercial goods crossing the bridge each day.

The benefits of the Peace Bridge in the Western New York and Southern Ontario economy are many. Canadian influence on the economies of the City of Buffalo and the metropolitan region is nearly \$200 million. Canadians influence the Western New York economy in a variety of ways including:

- shopping at Buffalo area malls
- staying at Buffalo area hotels
- visiting attractions
- attending sporting events
- studying at local colleges and universities.

Table 3-1



15 Factors Used to Develop the 2010 Transportation System Plan for the Region

1. Preservation of existing transportation facilities and, where practical, ways to meet transportation needs by using existing transportation facilities more efficiently.
2. Consistency of transportation planning, with applicable Federal, State and local energy conservation programs, goals and objectives.
3. Need to relieve congestion and prevent congestion from occurring where it does not yet occur.
4. The effect of transportation policy decisions on land use and development and the consistency of transportation plans and programs with the provisions of all applicable short and long term land use and development plans.
5. The programming of expenditure on transportation enhancement activities as required in Section 133.
6. The effects of all transportation projects to be undertaken within the metropolitan area, without regard to whether such projects are publicly funded.
7. International border crossings and access to ports, airports, intermodal transportation facilities, major freight distribution routes, national parks, recreation areas, monuments and historic sites, and military installations.
8. Need for connectivity of roads within the metropolitan area with roads outside the metropolitan area.
9. Transportation needs identified through the use of the management systems required by section 303 of Chapter 3 of Title 23, United States Code (effective 10/94).
10. Preservation of rights-of-way for construction of future transportation projects, including identification of unused rights-of-way which may be needed for future transportation corridors for which action is most needed to prevent destruction or loss.
11. Methods to enhance the efficient movement of passengers and freight.
12. The use of life-cycle costs in the design and engineering of bridges, tunnels or pavement.
13. Overall social, economic, energy and environmental effects of transportation decisions.
14. Methods to expand and enhance transit services and to increase the use of such services.
15. Capital investments that would result in increased security in transit systems.

Source: 2010 Transportation System Plan for Erie and Niagara Region, December 1994.

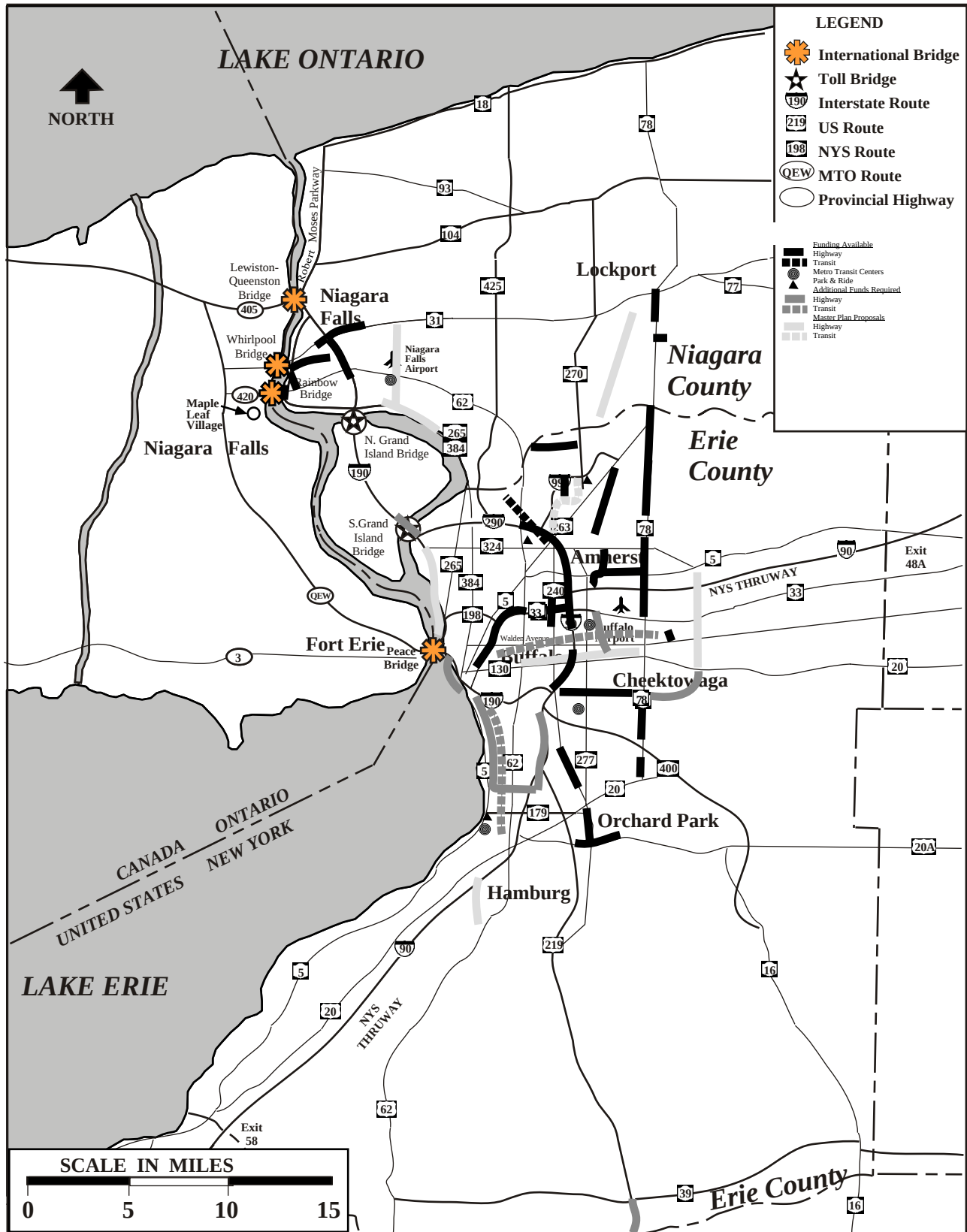


Figure 3-1 NFTC 2010 Long Range Plan



Presently, the Peace Bridge plays an increasingly vital role in commerce, transportation, tourism and communications technology. Also, the passing of the General Agreement on Trades and Tariffs (GATT) and the North American Free Trade Agreement (NAFTA) have increased its importance even further by identifying Buffalo as a key link in the global economy. In 1994 about 6 million cars crossed the Peace Bridge into the United States from Canada, along with more than a million commercial vehicles.

The Peace Bridge brings \$4.9 billion to the City of Buffalo economy and approximately \$7.2 billion to the Western New York region. The three primary sources of income are:

- Commercial goods and raw materials imported into and exported from the Buffalo area
- Expenditures made by Canadians visiting the Buffalo area
- Direct expenditures of the PBA and other organizations and businesses dependent on the Peace Bridge.

3.2.2 Proposed Peace Bridge Improvements

By the year 2020, commercial crossings are expected to reach 9,000 vehicles/day. It is possible this number will increase even more due to the recently planned casino development in downtown Niagara Falls (Maple Leaf Village). The PBA is aggressively preparing the Peace Bridge to meet the demands of the next century. Renovations to the bridge encompass overhauls on both ends of the bridge and are estimated at \$120 million.

Objectives of the renovations to the U.S. Plaza are:

- eliminate vehicular conflicts and relieve traffic congestion
- alleviate or remove the use of Front Park as a Peace Bridge entry/exit point
- provide improved transportation service for all vehicles
- minimize traffic on local streets
- develop improvements to address present and future traffic problems
- adequately accommodate pedestrians and bicyclists.

The following improvements are currently planned or underway.

Bridge Plaza & Connecting Roadways - The PBA is continuing to advance plans to redevelop the U.S. Plaza. Planning stages have been developed to define logical ways to organize the buildings on the plaza. The buildings, consistent with U.S. Customs and Immigration needs, have been considered in various configurations to eliminate vehicle conflicts and provide more efficient operations. Six (6) alternatives have been evaluated, with three of the more promising alternatives to be studied in more detail. Completion of the engineering/environmental studies is expected by November 1997.

Preliminary findings suggest that the PBA has three broad scenarios for proceeding with U.S. Plaza redevelopment:



- 1) Expand the perimeter of the U.S. Plaza - This option is expected to improve traffic flow through the utilization of redesigned traffic patterns. There are expected to be fewer vehicles passing through adjacent neighborhood streets, in addition to lower impacts of the Peace Bridge on area residents. The expansion is expected to allow the bridge to best meet the projected increase of traffic and to process vehicles crossing the bridge more efficiently.
- 2) Stay with the existing perimeter of the U.S. Plaza - This option could make conditions worse for the immediate neighborhood because the existing plaza may not be able to meet the increased traffic projections, resulting in more traffic congestion and increased noise and air pollution for the area.
- 3) Move the Commercial Vehicle Processing Center off-site - Possibly move those operations to the Canadian side of the Peace Bridge or elsewhere. This would free up some room on the existing U.S. Plaza to better expedite traffic flow, however, there is no guarantee that the area can sufficiently handle the projected traffic.

As a complement to the plaza re-configuration, a series of connecting roadway alternatives are also under study. Issues include new or relocated ramps to I-190, closure of two city-owned thoroughfares in Front Park and consideration of future bridge capacity improvement impacts on the connecting roadway scheme. The timing of these studies is consistent with the bridge plaza redevelopment.

Peace Bridge Capacity Improvements - During September 1994, the PBA held an engineering conference consisting of a bi-national group of consultants representing both Canada and the United States to determine future needs for improvements to the bridge. The primary objectives were to assess the following:

- possible needs and options for widening, re-decking or making a twin structure
- available funding resources
- environmental, regulatory and permitting requirements, and
- scheduling and implementation logistics.

The conference found that the existing Peace Bridge is in generally fair to good condition. The existing bridge deck is expected to provide adequate service for approximately 10 years, assuming that an appropriate level of maintenance is continued. However, based on current traffic volumes and a low forecast annual growth rate of 2%, additional roadway capacity will be required by the year 2000.

Re-decking the existing bridge without increasing its traffic capacity was determined to be infeasible due to the difficulties of maintaining adequate traffic capacity on the bridge during construction. Widening the existing three-lane bridge to five lanes would be neither cost effective nor functionally desirable. For a nominal increase in cost, the widening could be carried out to six lanes.

Based on the results of this preliminary study, the options of providing six lane capacity by either widening the existing bridge or constructing a new parallel structure were both determined to be



feasible and viable. The total design and construction costs (1994) for these two options were found to be comparable (U.S. \$73 million for widening; U.S. \$77 million for a new parallel structure). The two bridge option provides operational advantages over the widening scheme, but this option requires the construction of additional piers within the river, which may lead to a substantial environmental study and permitting requirements. The PBA therefore is proceeding with an environmental assessment and preliminary engineering study that would carry both the widening and two bridge options to a more detailed level of design that includes permitting requirements, a schedule for implementation and project costs.

3.3 Niagara Falls Bridge Commission (NFBC)

3.3.1 Existing Conditions

The NFBC owns and operates three international bridges described as follows.

Rainbow Bridge, Niagara Falls - The Rainbow Bridge is the southern-most crossing of the three international bridges located in Niagara County. This bridge connects the U.S. and Canada between Niagara Falls, New York and Niagara Falls, Ontario. Due to its proximity to Niagara Falls and other recreational attractions, the Rainbow Bridge is mainly utilized by tourist traffic. The NFBC discourages loaded freight trucks from using the Rainbow Bridge. The bridge carries two lanes of traffic in each direction of travel, with three toll lanes into Canada and six toll lanes into the United States. These tolls are currently in a temporary stage as the American side is undergoing reconstruction.

Access to the Rainbow Bridge can be gained on the U.S. side near the convergence of Niagara Street and Main Street, and on the Canadian side by way of PH 420/QEW.

Whirlpool Bridge, Niagara Falls - The Whirlpool Bridge also connects the two cities of Niagara Falls but closer to their northern borders. The Whirlpool Bridge is used more for local traffic than tourist traffic, compared to the Rainbow Bridge. This is due in part to limited knowledge by tourists of the bridge and the connecting roadways, which are local streets. As with the Rainbow Bridge, loaded freight truck usage is discouraged except as a relief to congestion on the Lewiston-Queenston Bridge. Access to the Whirlpool Bridge is gained by using Ontario Avenue on the U.S. side and Bridge Street (PH 20) on the Canadian side.

The Whirlpool Bridge is the oldest of the NFBC bridges and presently carries one lane of vehicular traffic in each direction on the lower level and one active railroad track on the upper level. There are three toll lanes into Canada and three toll lanes into the United States. The vehicular traffic capacity on the bridge in its current configuration is 980 vehicles per hour one-way, and the bridge has one lane for each direction of travel. Space is extremely limited at each bridgehead on the lower level due to the physical layout of existing approach piers and the close proximity of parallel roadways along the escarpment. Therefore, terminal capacities are small, and current truck traffic is negligible.



Lewiston-Queenston Bridge- The Lewiston-Queenston Bridge is the northern-most crossing of the four international bridges. In terms of volume, it is second to the Peace Bridge in both passenger vehicles and truck crossings on two lanes in each direction of travel, with four toll lanes into Canada and four toll lanes into the United States. The Lewiston-Queenston Bridge provides easy access for cross-border traffic due to its linking of two major thoroughfares, the NYS Thruway (I-190) on the U.S. side and PH 405 on the Canadian side.

The traffic capacity of the Lewiston-Queenston Bridge in its present configuration is 2,520 vehicles per hour one-way, and demand is expected to reach this level by the year 2015.

3.3.2 Proposed Bridge Improvements

In September of 1990, Hardesty & Hanover developed A Thirty Year Plan for the NFBC. This plan was a feasibility study for the expansion of facilities for the years 1990 - 2020. The plan is the result of studies of several options open to the NFBC and evolves from two basic facts readily verified by cost analysis and traffic studies. The first is that it is more cost effective to increase traffic capacity by enlarging terminal facilities than by building new bridges. The second is that travelers faced with a choice of routes across the Niagara River will normally follow the route involving the least expenditure of resources, time, money or some combination of these factors.

Each of these two basic facts do have some limitations. Sufficient available property to effect the terminal expansion may not be available. As for route choices, traffic that may be diverted is necessarily limited to those travelers who know the different route choices and are not seeking a destination unique to a single corridor.

The plan will be implemented in four different phases, with each phase timed to provide capacities equal to or greater than the projected traffic demand, and scheduled to result in a construction sequence with minimum traffic disruption and maximum economy. The plan is based on the concept that auto tolls will only be collected in one travel direction, while truck tolls may continue to be collected in both directions.

Phase I - Expansion of the Rainbow Bridge Corridor - Phase I, which is currently under construction, involves expansion of both the Canadian and United States terminals and will increase the capacity of the corridor to the ultimate practicable capacity of the sites. It involves terminal construction and the widening of the concrete bridge approach spans in both the United States and Canada. No main span work is contemplated. This expansion will enable the Rainbow corridor to handle traffic projected to the year 2015. Beyond the year 2015, travelers will be diverted to the Whirlpool corridor, which will have been fully developed by the year 2005.

Phase II - Expansion of the Whirlpool Bridge Corridor - This interim phase will consist of expanding the traffic capacity of the corridor to the limit of the structural capacity of the existing bridge, and will include the expansion of terminal facilities and approach roadways to match.



The work involved with Phase II will extend from the intersection of Whirlpool Road and the Queenston-Chippewa Power Canal in Canada to the Lockport Road overpass in the United States. This work includes:

- Re-decking the upper level of the existing Whirlpool Bridge, including relocating the single railroad track for Amtrak to the south side,
- Reconstruction and construction of overpass structures in both Canada and the United States,
- Highway approach work,
- Construction of terminal facilities in both the United States and Canada,
- Reconstruction of terminal facilities at the lower level of the existing bridge in the United States side, and
- Railroad track relocation work on the approaches.

Phase II will increase corridor capacity to adequately handle traffic projected to the year 2005.

Phase III - Expansion of the Lewiston-Queenston Corridor - Phase III will consist of expanding both the United States and Canadian terminals of the Lewiston-Queenston corridor to the ultimate practicable capacity of the sites. It includes on-site terminal construction in both the United States and Canada. No approach or main span work is contemplated. This expansion will enable the corridor to handle traffic projected to the year 2015. Beyond the year 2015 traffic, particularly commercial vehicles, will be attracted or diverted to the Whirlpool corridor.

Phase IV - Expansion of the Whirlpool Corridor - Phase IV covers the expansion of the Whirlpool corridor to the extent necessary to satisfy traffic projections across the entire Niagara Frontier from Niagara Falls north to Lake Ontario to at least the year 2020. This expansion will provide sufficient capacity for the corridor to handle its own projected traffic plus the overflow of reasonably diverted traffic from both the Rainbow and Lewiston-Queenston corridors. Diversions of carriers with hazardous materials from the Lewiston-Queenston corridor to this more urbanized corridor will be restricted. This Whirlpool Corridor improvement is planned to be completed by the year 2005.

Under Phase IV, a new four-lane international bridge will be constructed two hundred feet to the north of the existing Whirlpool Bridge. Terminal facilities constructed under Phase II will be enlarged, and approach roadways will be widened and extended under this phase to the I-190 in the United States and to PH 405 in Canada.

It is anticipated that traffic will begin to divert from the Rainbow and Lewiston-Queenston corridors to the Whirlpool corridor as soon as the Phase II work is completed, since an alternate route of improved capacity will have been provided. This diversion can be expected to grow dramatically upon completion of Phase IV since the Whirlpool corridor will then provide an alternate route of comparable attractiveness to the Lewiston-Queenston corridor.



3.4 Ontario Ministry of Transportation (MTO)

The Ontario Ministry of Transportation's plans and programs are significant to the Niagara Frontier. The Ministry's Transfocus 2021 study, completed in April 1995, addresses future movement of people and goods across the Niagara-Lake Erie area and recommends improvements within a capital spending framework that is both sensitive to community needs and recognizes fiscal realities.

Transfocus recognizes the significance of international trade in promoting the economic development of the region. The study calls for improved processing time and capacity for international truck and auto travelers at border crossings, as well as improved access to and from the bridges to the existing highway network. The Ministry endorses initiatives of the NFBC and the Buffalo and Fort Erie Public Bridge Authority that respond to growing cross-border transportation demands. Some of the Ministry's recommended improvements, with no specific time frame, which are designed to support international trade include:

- widening the Queen Elizabeth Way (QEW) to eight lanes from Hamilton to St. Catharines, and to six lanes through St. Catharines and Niagara Falls,
- providing a four-lane highway alternative to the QEW from St. Catharines south to Port Colborne and east to Fort Erie using Provincial Highways 406, 140 and 3.

3.5 Niagara Frontier Transportation Authority (NFTA)

The NFTA is the regional public transit service serving both Erie and Niagara Counties. The NFTA owns and operates an extensive public bus service (Metro Bus), a 6.2-mile Light Rail Rapid Transit (Metro LRRT) system, and a paratransit fleet of 18 vehicles. The NFTA also owns a majority of property along the Buffalo waterfront, two airports (Greater Buffalo International Airport and Niagara Falls International Airport) as well as Buffalo's Small Boat Harbor (1,000 slips).

NFTA's transit mission is to improve the quality of life in the Niagara Frontier and enhance the personal mobility of residents and visitors by providing high quality, safe, reliable, convenient and cost-effective public transportation service. The long-range ideals of NFTA is to provide a comprehensive range of mobility services including traditional bus and rail lines, paratransit, vanpools and ridesharing services, bicycle programs and pedestrian enhancements.

NFTA provides comprehensive urban and suburban public transportation services within the Erie and Niagara County service area. There are 322 fixed route buses and 27 rail cars which operate up to 20 hours a day, seven days a week, to serve nearly 1,000,000 residents of the urbanized area. Paratransit service to the disabled is provided in certain areas and is being expanded in accordance with a plan approved by NYSDOT and Federal Transit Administration. There are 57 local and express bus routes on which NFTA operates 8.6 million annual bus miles. There is one rapid transit rail route, 6.2 miles in length, with annual car miles of approximately 950,000. Each weekday, NFTA handles approximately 80,000 passengers on fixed route buses and 28,000 on trains, resulting in an annual local transit ridership of 37 million passengers.



The Metro Bus service standards have been divided into four categories as follows:

- 1) **Primary** - Erie County routes with trunk portions generally operated along major travel corridors in the City of Buffalo.
- 2) **Supporting** - Erie County routes with trunk portions generally operated along secondary travel corridors. For purposes of the service standards policy, segments of primary routes outside the City of Buffalo are treated as supporting routes.
- 3) **Niagara County** - Routes operated exclusively in Niagara County.
- 4) **Express Routes** - Thruway/Expressway trips operated on several Metro routes.

The NFTA follows a comprehensive set of service standards comprised of four primary categories: service coverage, patron convenience, fiscal condition and passenger comfort. With these standards in mind, Figure 3-2 presents the transit element of the long-range regional transportation plan. Figure 3-3 identifies principal transit corridors for future LRRT service.

3.6 New York State Department of Transportation (NYSDOT)

The NYSDOT is responsible for planning and implementing a safe, efficient and balanced regional transportation system to address local, regional and statewide needs in a cost-effective manner. The NYSDOT is a decentralized organization with 11 Regional offices. The Buffalo Regional office (Region 5) includes the Counties of Cattaraugus, Chautauqua, Erie and Niagara. The region is responsible for 3,675 miles of state highways and 875 state highway bridges. The transportation engineering responsibilities for the region are covered by six major groups: Planning, Traffic Engineering & Safety, Real Estate, Design, Construction and Transportation Maintenance.

Characteristics of the western New York area under the responsibility of the Region 5 office are:

- Regional population: 1.5 million
- Motor vehicle ownership: 545,000 (1980 census)
- Area : 4,104 sq. mi.
- Total centerline miles of streets and highways: 10,524
- Federal Aid lane miles: 6,800 (4,084 are NYSDOT responsibility)
- Independent units of government: 155, and
- Three (3) independent Indian reservations.

3.7 New York State Thruway Authority (NYSTA)

The Buffalo Division of the NYSTA is headquartered in Cheektowaga, NY and is responsible for administering all transportation engineering functions within its boundaries (Pennsylvania State line to Albany). These include: highway maintenance, traffic operations, toll operations and automation,



construction and policy implementation. The Buffalo Division includes 696 lane miles and 295 bridges.

The NYSTA operates two toll roadways within the Niagara Frontier, I-90 and I-190. The mainline of the Thruway (I-90) and Niagara Section (I-190) are strategically located. The Thruway serves as the only highway access to the Town of Grand Island. Interstate I-190 is the main commuter link between the cities of Niagara Falls and Buffalo and passes through the Central Business District of Buffalo.

Vehicle miles traveled (VMT) by segment are as follows:

<u>Segment</u>	<u>Annual VMT</u>
• I-90 (Williamsville to Lackawanna Toll Barriers)	254,413,022
• I-190 (Grand Island Bridges (North to South))	174,823,650
• I-190 (Buffalo Barrier (Toll))	86,941,042
• I-190 (Black Rock Barrier (Toll))	115,013,629



Transit Development Program Recommended Master Plan

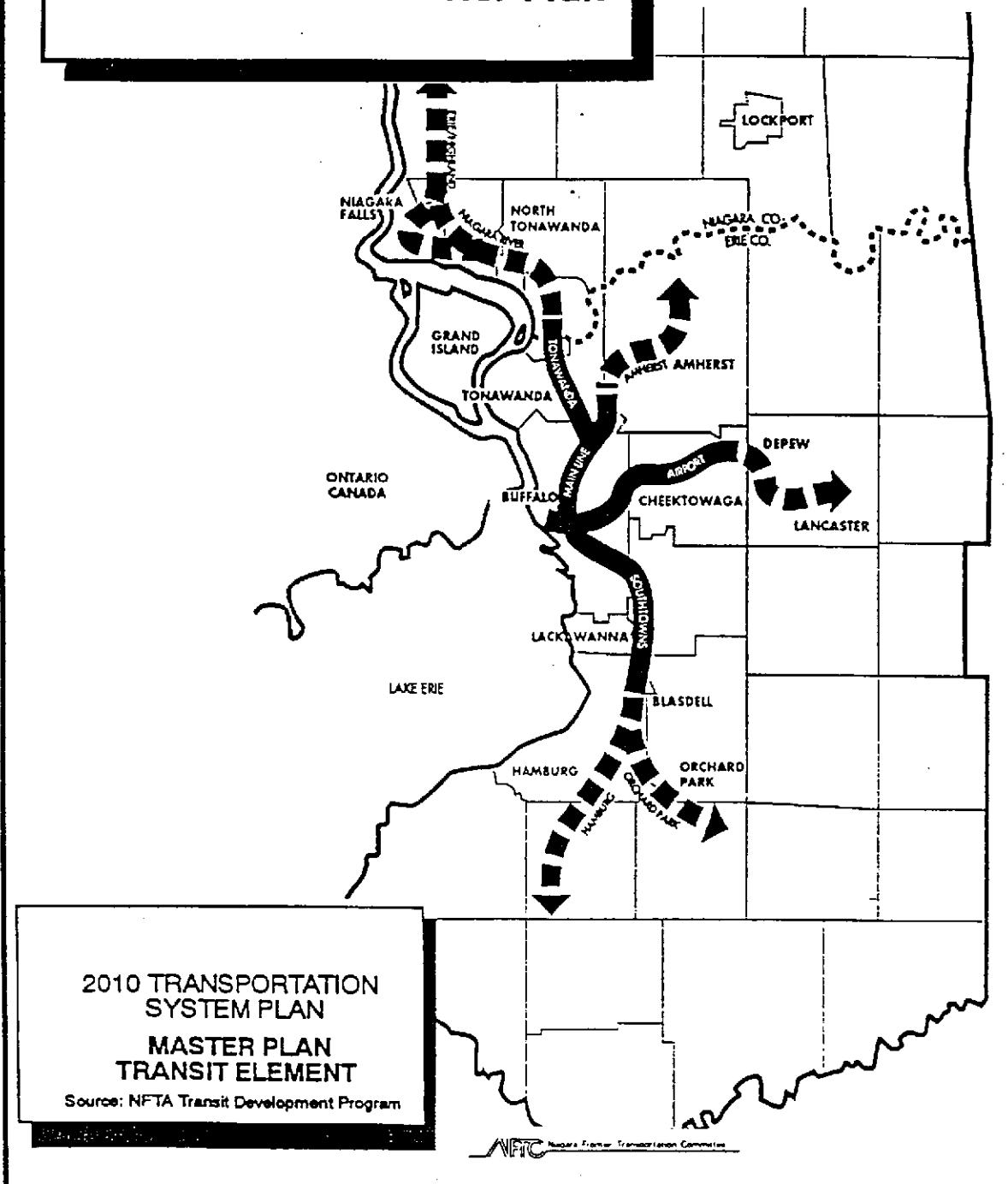


Figure 3-2: Transit Element Master Plan

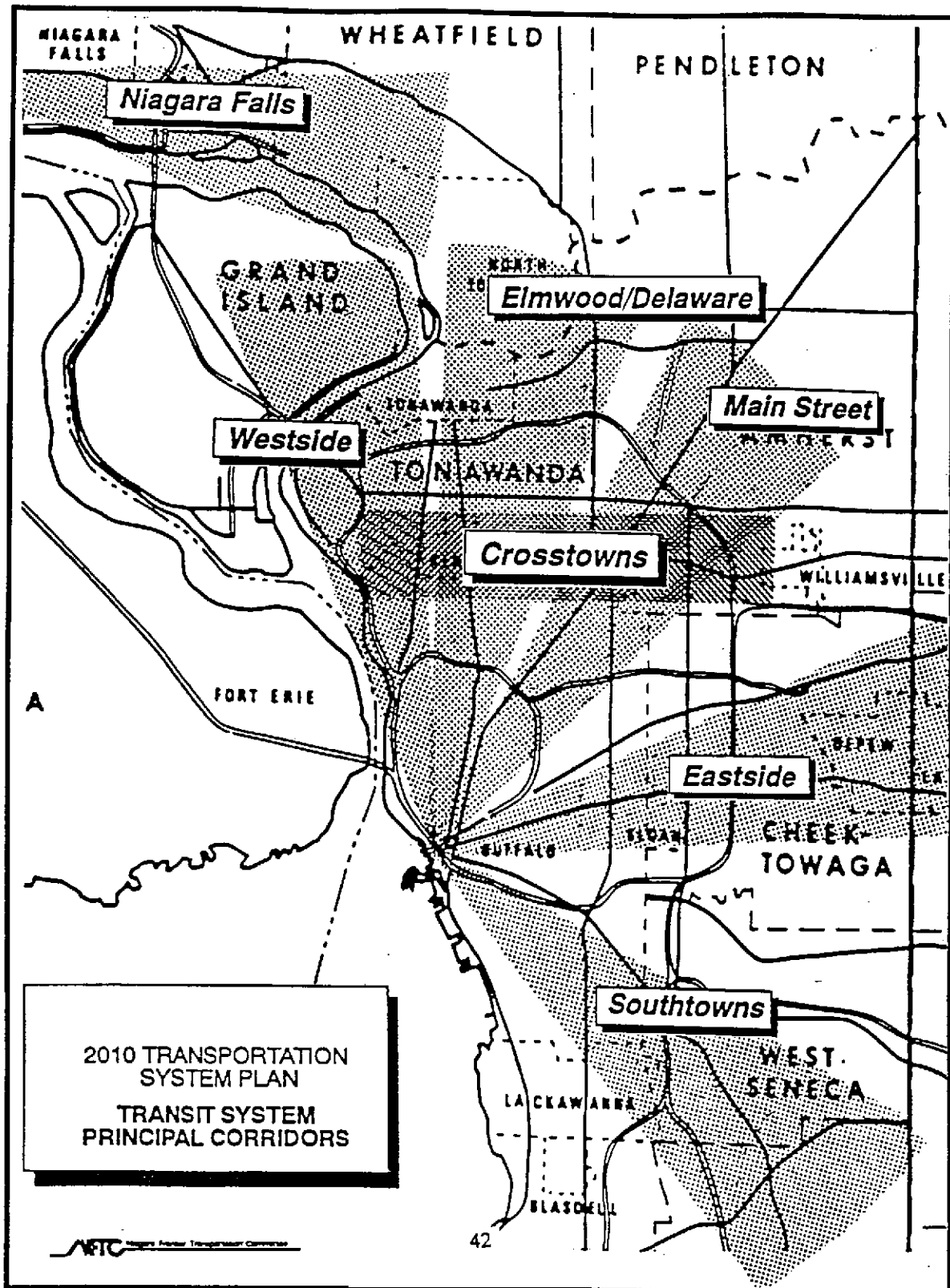


Figure 3-3: NFTA Principal Transit Corridors



4.0 EXISTING AND FORECASTED TRAFFIC VOLUMES

4.1 Existing Volumes and Capacity Deficiencies

The NFTC monitors present traffic volumes by maintaining a database designed to store all existing and past traffic counts. In addition to traffic counts, information such as highway surface conditions, speed limits, number of driving lanes and lane widths are also available for all Federal Aid eligible roadways in both Erie and Niagara Counties. This continuous assessment of physical and operating characteristics is important in providing information for investment planning decisions. The actual volumes for all Federal Aid roads are counted once every three years.

Traffic counts obtained for state highways are adjusted by daily, monthly and seasonal factors to compute an Average Annual Daily Traffic (AADT) volume. The only exception to this occurs where permanent traffic counters operate continuously. There are 90 (40 NYSDOT two-way and 10 NYSTA one-way) permanent count stations in the region, but only three of these operate continuously.

Transportation system performance is evaluated using Level of Service (LOS) standards defined in the 1994 Highway Capacity Manual (Transportation Research Board Special Report 209). Though the measure of LOS varies by facility type (e.g., measured by density on freeways, by average stop delay at signalized intersections), the result in all cases is an LOS value ranging from A to F. LOS A corresponds essentially to free-flow conditions with little delay, while LOS F represents breakdown conditions. Desirable minimum LOS typically varies by metropolitan area size, with larger metropolitan areas tolerating lower minimums. For the medium size Buffalo/Niagara region, LOS C is a desirable minimum, though LOS D may sometimes be acceptable.

Figure 4-1 shows the 25 highest volume roadway segments in the Niagara Frontier and the corresponding LOS. Nine segments presently operate at LOS F, eight at LOS E and seven at LOS D. Further segment details are provided in Table 4-1.

4.2 Existing and Future Land Use

4.2.1 Major Activity Centers

The Niagara Frontier offers an opportunity for U.S. and Canadian interaction at a variety of activities and events. The major tourist destination is Niagara Falls. Niagara Falls and its associated parks, shopping areas, lodging and convention facilities attract over 10 million people annually. Southern Ontario is also known for wineries and recreational facilities. Figure 4-2 identifies major activity and shopping centers. Recently, Ontario opened a 75,000 ft² gaming casino in Downtown Niagara Falls (Maple Leaf Village). This facility will act as a temporary casino until major construction efforts are complete. Also included in the plans is a 3,000 car parking lot.

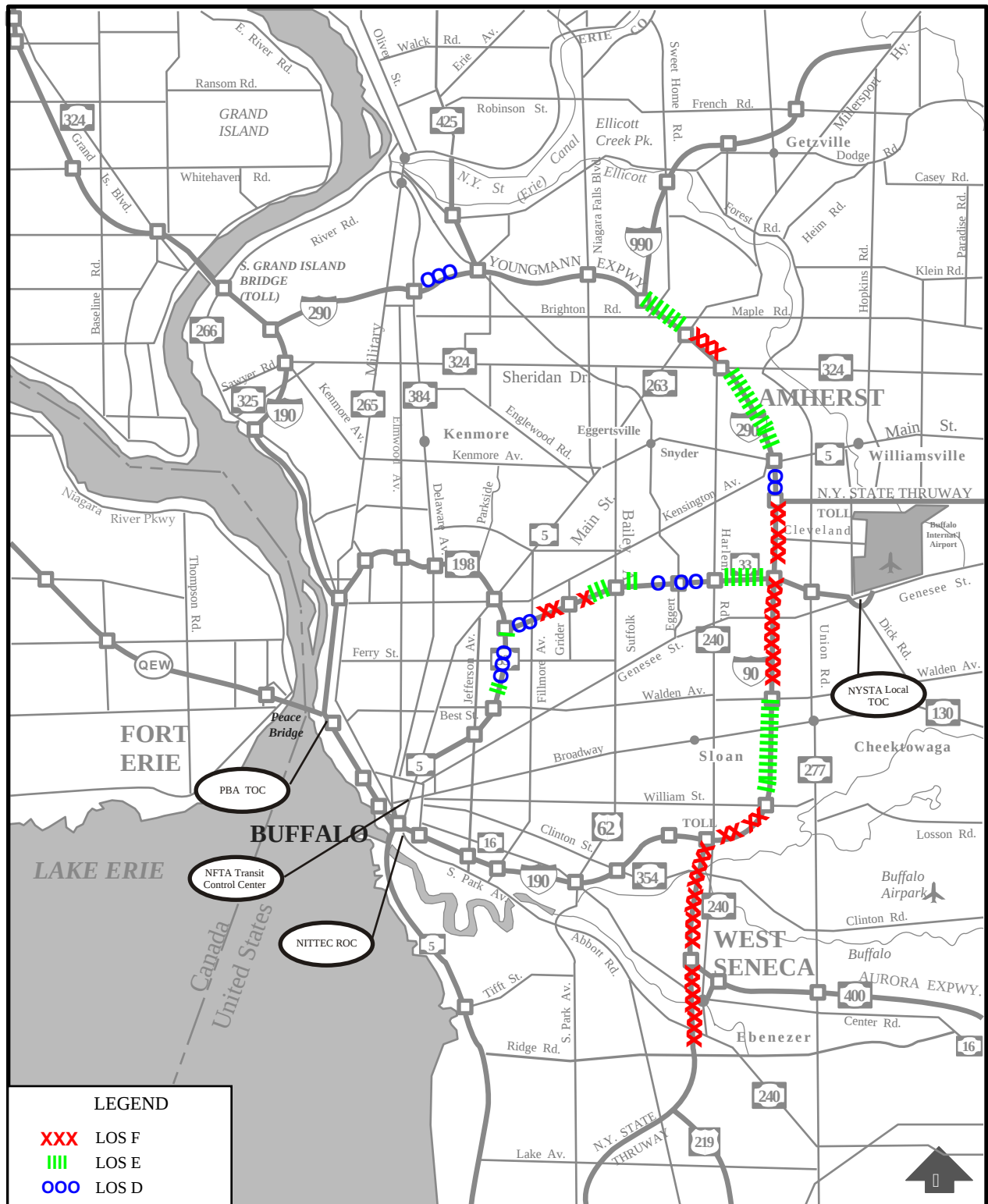


Figure 4-1 Level of Service for the 25 Most Traveled Roadway Segments



Table 4-1
Most Recent Traffic Counts for Highest Volume Segments in Erie and Niagara Counties

Route No.	Route Name	Route Segment	Length (mi.)	No. of Lanes	Largest Daily Traffic Count	Count Year	Level of Service (1)
I-290	NYS THRUWAY	KENSINGTON EXPWY TO CLEVELAND	0.87	6	106800	91	F
NY 33	KENSINGTON EXPWY	FILLMORE TO GRIDER	0.50	6	106700	91	F
I-90	NYS THRUWAY	NY 400 TO I-190	1.90	6	103800	91	F
I-90	NYS THRUWAY	WALDEN TO KENSINGTON EXPWY	1.62	4	102600	91	F
I-90	NYS THRUWAY	CLEVELAND TO I-290	0.36	4	101800	91	F
I-290	YOUNGMANN EXPWY	MILLERSPORT TO SHERIDAN	1.00	6	98700	92	F
NY 33	KENSINGTON EXPWY	GRIDER TO OLYMPIC	0.50	6	98500	92	F
I-290	YOUNGMANN EXPWY	SHERIDAN TO MAIN	1.50	6	93900	92	E
NY 33	KENSINGTON EXPWY	OLYMPIC TO BAILEY	0.24	6	93400	92	E
NY 33	KENSINGTON EXPWY	BAILEY TO SUFFOLK	0.19	6	91700	93	E
NY 33	KENSINGTON EXPWY	HARLEM TO I-90	1.00	6	90800	91	E
I-290	YOUNGMANN EXPWY	I-990 TO MILLERSPORT	1.50	6	90700	92	E
I-90	NYS THRUWAY	I-190 TO WILLIAM	0.40	4	90600	91	F
I-90	NYS THRUWAY	WILLIAM TO WALDEN	1.77	6	90600	91	E
NY 33	KENSINGTON EXPWY	BEST TO NORTHHAMPTON	0.27	6	89600	91	E
I-290	YOUNGMANN EXPWY	NIA FALLS BLVD TO I-990	0.60	10	89100	93	(2)
NY 33	KENSINGTON EXPWY	NORTHLAND TO NY 198	0.07	6	88500	91	E
NY 33	KENSINGTON EXPWY	EGGERT TO PINE RIDGE	0.51	6	86600	92	D
NY 33	KENSINGTON EXPWY	PINE RIDGE TO HARLEM	0.50	6	86600	92	D
I-290	YOUNGMANN EXPWY	MAIN TO I-90	0.40	6	86300	92	D
NY 33	KENSINGTON EXPWY	SUFFOLK TO EGGERT	0.73	6	85700	92	D
NY 33	KENSINGTON EXPWY	NY 198 TO FILLMORE	0.49	6	85300	91	D
NY 33	KENSINGTON EXPWY	NORTHHAMPTON TO NORTHLAND	0.81	6	82300	91	D
I-90	NYS THRUWAY	RIDGE TO NY 400	1.00	4	78900	91	F
I-290	YOUNGMANN EXPWY	DELAWARE TO COLVIN	0.80	6	78000	94	D

(1) Level of Service based on daily traffic volumes.

(2) Level of Service was not determined for this section. Although it has a high traffic volume, it runs efficiently due to number of lanes.

Source: NFTC

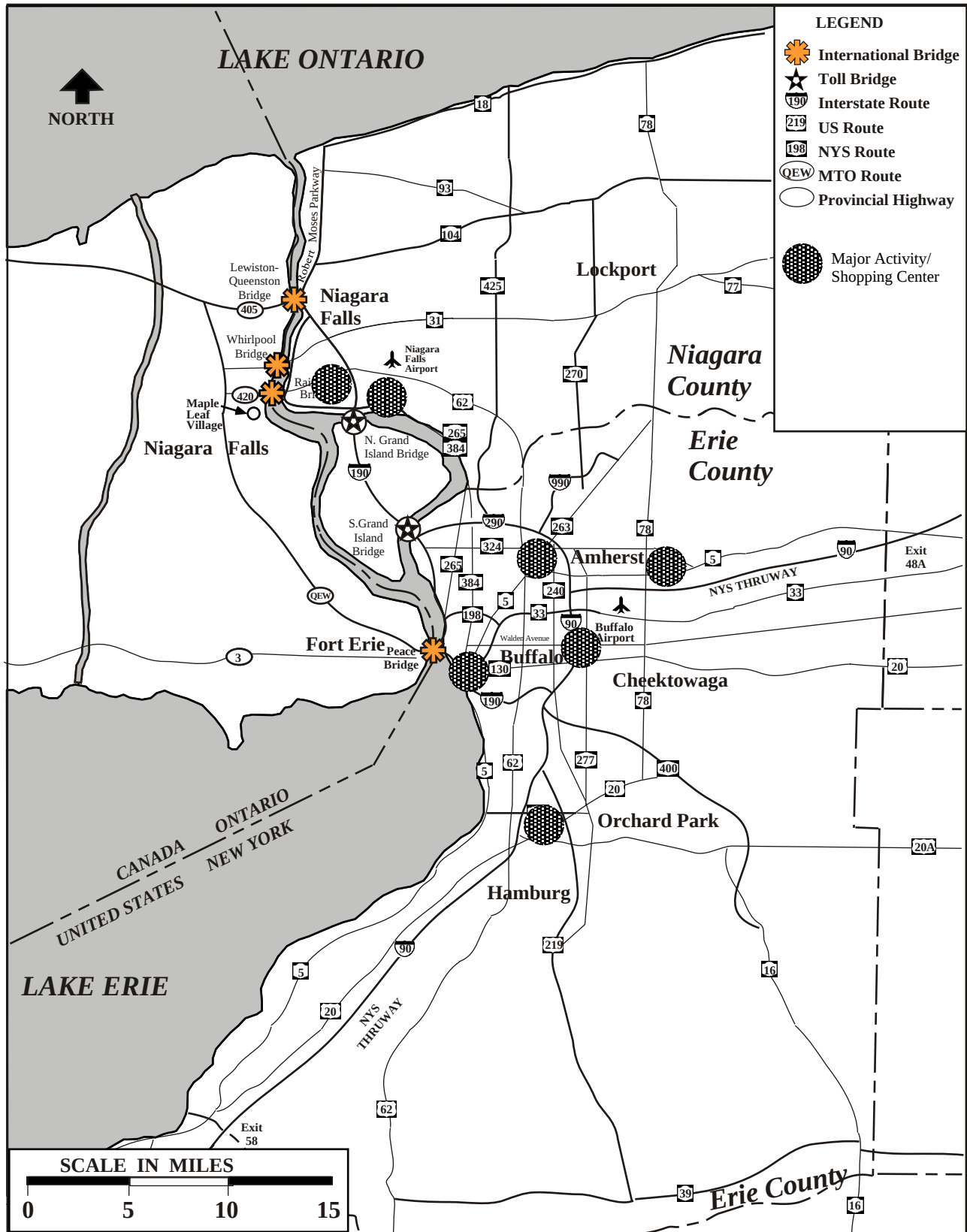


Figure 4-2 Major Activity Centers and Shopping Centers



Considering just the major malls in the Buffalo area, the total regional economic impact from Canadian shoppers amounts to more than \$155 million. This figure reflects those shopping at the major malls and does not incorporate tourists who may shop at the many smaller retail establishments throughout the Niagara Frontier.

Buffalo's sporting events, entertainment and nightlife also attract many visitors. Buffalo has five professional sports franchises that sponsor events throughout the entire year. The Buffalo Bills (National Football League) play their home games at Rich Stadium, Orchard Park, N.Y. (80,000 cap.). The Buffalo Sabres (National Hockey League) are located downtown in the new Marine Midland Arena (20,000 cap.) along with the World Indoor Lacrosse Champion Buffalo Bandits and professional indoor soccer Buffalo Blizzard. It is estimated the arena will be in use 225-250 times per year. The Buffalo Bison minor league baseball team plays at North American Park (21,000 capacity), near the Marine Midland Arena.

Other major destinations include the University of Buffalo (25,000 students), Canisius College, Buffalo State College, the Buffalo Theatre District, and Roswell Park Cancer Research Institute.

Portions of Southern Ontario also have attractions that accommodate Canadians, U.S. tourists and visitors. During the summer months, the Canadian shoreline supports many beaches and summer homes. There are many clubs and bars that draw visitors on a daily basis.

4.2.2 Land Use Forecasting

The travel demand forecasting process depends on acceptable demographic and economic projections that reflect, with as much accuracy as possible, the likely totals, distribution and density of households, population (household size), employment and auto ownership. These projections are spread over a defined planning area, which generally includes all developed land plus the undeveloped land that the urban area is expected to encompass within the next 20 years.

The demographic projections currently being used for transportation planning purposes are those contained in the NFTC report Year 2010 Demographic Forecasts for Transportation Evaluations, completed in December, 1994. These projections are direct disaggregations of municipal projections developed and enumerated by the Erie and Niagara Counties Regional Planning Board (ENCRPB) in their report Demographic Forecasts for Transportation Planning in Erie and Niagara Counties. In disaggregating municipal household and employment levels, attention was given to the individual capacity of each Traffic Analysis Zone to absorb additional development. Environmental factors which may constrain development, such as the existence of extensive wetlands or agricultural districts, were also considered in this process.

4.2.3 Households

The total number of households, not population, is the key factor in travel demand forecasting since the household unit generates travel activity. In the NFTC area, the total number of households is expected to increase. The 1990 Census figures have total households for Erie and Niagara Counties



at 461,800, with an NFTC projected increase of approximately 12%, to about 516,700 by the year 2010. The growths reflect a trend toward smaller household sizes caused by varying social factors.

The number of households is increasing primarily along the outer boundary of the urbanized area away from the older and long established suburban and urban centers. Municipalities in the Southtowns, Niagara River and Amherst/Lockport sub-regional sectors are currently experiencing new housing development and will continue to see the greatest increase in households. Figure 4-3 illustrates current household tallies and year 2010 forecasts.

4.2.4 Population

The 1990 Census figures show that total population for Erie and Niagara Counties has continued to decline, but at a decreasing rate. The population loss appears to be primarily due to out-migration.

The NFTC has given a 2010 population forecast of a modest 1.6% increase in total population from 1990 (1,189,300 persons to 1,208,600 persons). This forecast also reflects a trend of relocating away from older urban and suburban areas to outlying suburbs.

4.2.5 Employment

Employment throughout Erie and Niagara Counties has diversified substantially over the last several years. Western New York's economic base has shifted from manufacturing and heavy industry with large areas of employment concentration to a smaller service economy with lesser concentrations. The passage of the North American Free Trade Agreement (NAFTA) is expected to affect the employment opportunities. It is anticipated that Canadian firms looking to expand in the United States market will choose to locate in border cities such as Buffalo and Niagara Falls. When the Year 2010 forecasts were developed, the NAFTA was not a consideration, thus employment forecasts may be slightly low.

The region's employment locations are shifting from the central cities to suburban business centers. This is evident by the growing number of newly developed industrial parks that operate independently from the central city. Changes in the regional employment will have a direct impact on travel to work patterns. Trips toward Buffalo's industrial areas have declined while suburb-to-suburb work trips have increased substantially. Regional employment is expected to increase by 11%, with a year 2010 employment forecast of about 544,000. The comparable figure for 1990 was 491,000.

4.2.6 Auto Ownership

To produce year 2010 auto forecasts, the NFTC estimated 2010 population density per district and estimated 2010 median household income to determine the percent of households likely in each auto ownership class. The resulting year 2010 forecast is 714,000 vehicles, a 31% increase, as compared to the 1980 total of 545,000 vehicles. This is a much higher rate of growth than is expected for population, reflecting more autos per capita.



Overall, the automobile is expected to continue as the dominant and preferred mode of travel by many, although some travel habits will change and alternative modes of transportation will be offered. Increased auto ownership makes it more difficult for transit to compete as an alternative transportation mode.

4.3 Future Traffic Volumes and Capacity Deficiencies

Future travel forecasts are prepared by the NFTC as a function of the land use changes and network characteristics. The NFTC uses the Urban Transportation Planning System (UTPS) for this effort, first calibrating the model to match existing volumes. The volume forecasts are 24-hour volumes for each defined road segment.

The results of the forecasting are summarized in Figure 4-4, presenting changes in future travel patterns. The large "hour-glass" symbols indicate intra-sector trips (e.g., entirely within the Southtowns sector in the southeast), while the two-headed arrows indicate trips between sectors. The large residential and employment growth in the eastern corridor results in major trip-making in the corridor, from the Southtowns area north through the Lockport area.

Year 2010 forecasts by the NFTC have been loaded onto the future road system to identify congested segments, and the results are presented in Figure 4-5, along with current congested segments. The model used to predict these forecasts included the "funding available" improvements presented in Figure 3-1.

4.4 High Incident/Accident Locations Areas

The NYSDOT has developed criteria to classify accident information into three (3) classifications:

- High Accident Locations (HAL)
- Priority Investigation Locations (PIL), and
- Safety Deficient Locations (SDL).

All accident, traffic and highway data are merged to identify locations statewide that are "accident prone." Table 4-2 identifies the top 27 accident locations in western New York, and these are located geographically on Figure 4-6 (not all are located in the Buffalo/Niagara Falls region).

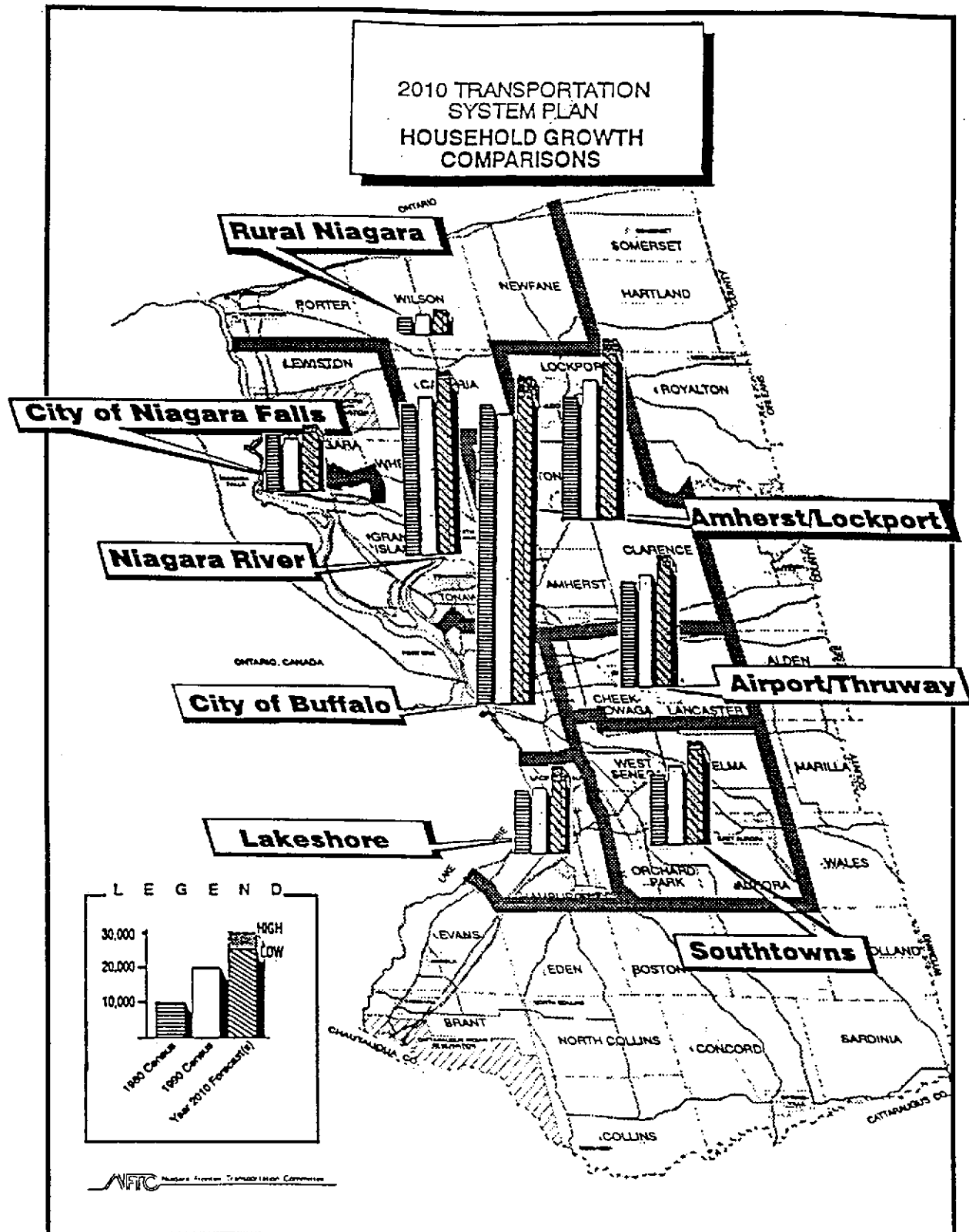


Figure 4-3: Household Growth Comparisons

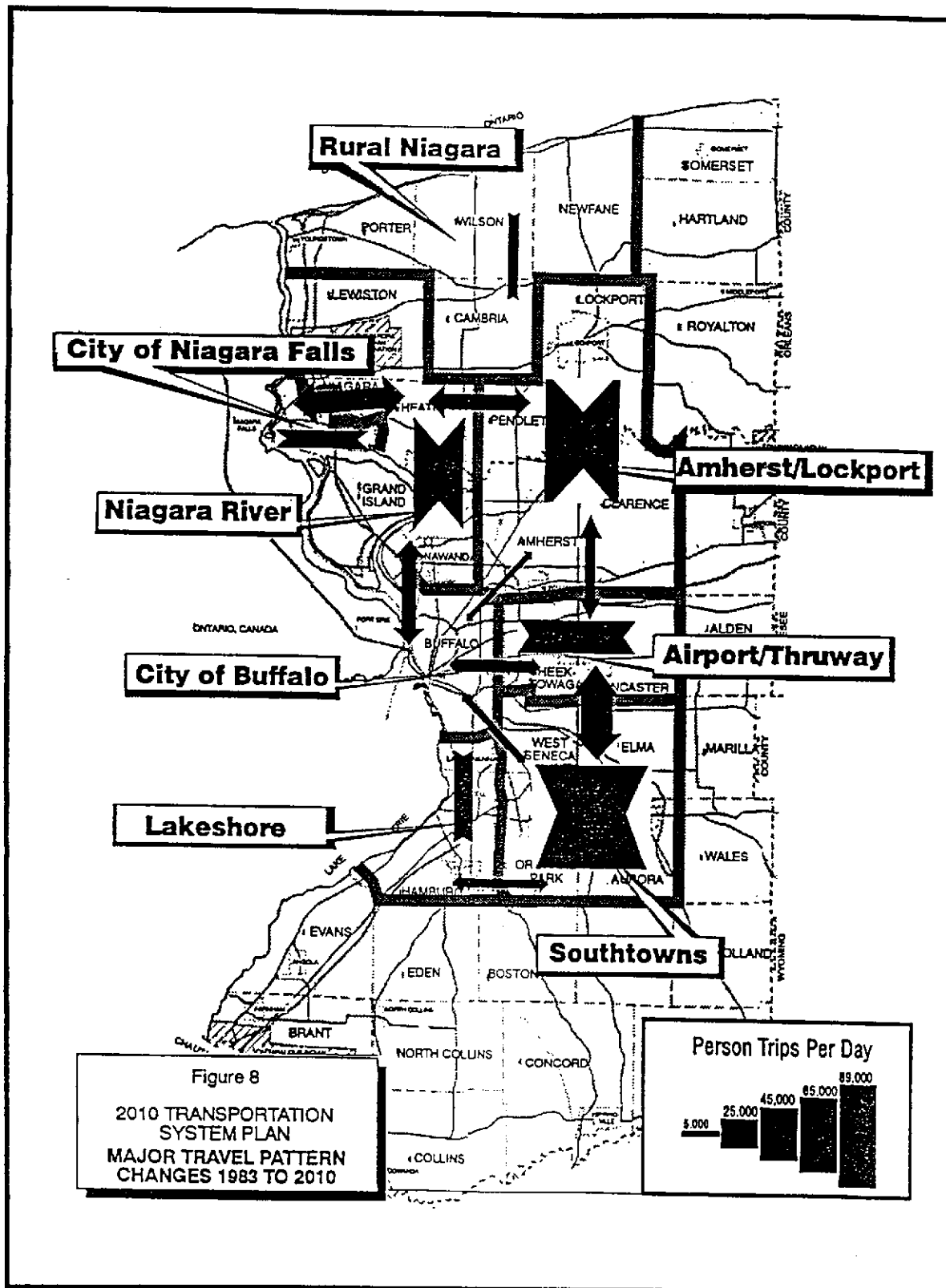


Figure 4-4: Future Travel Patterns

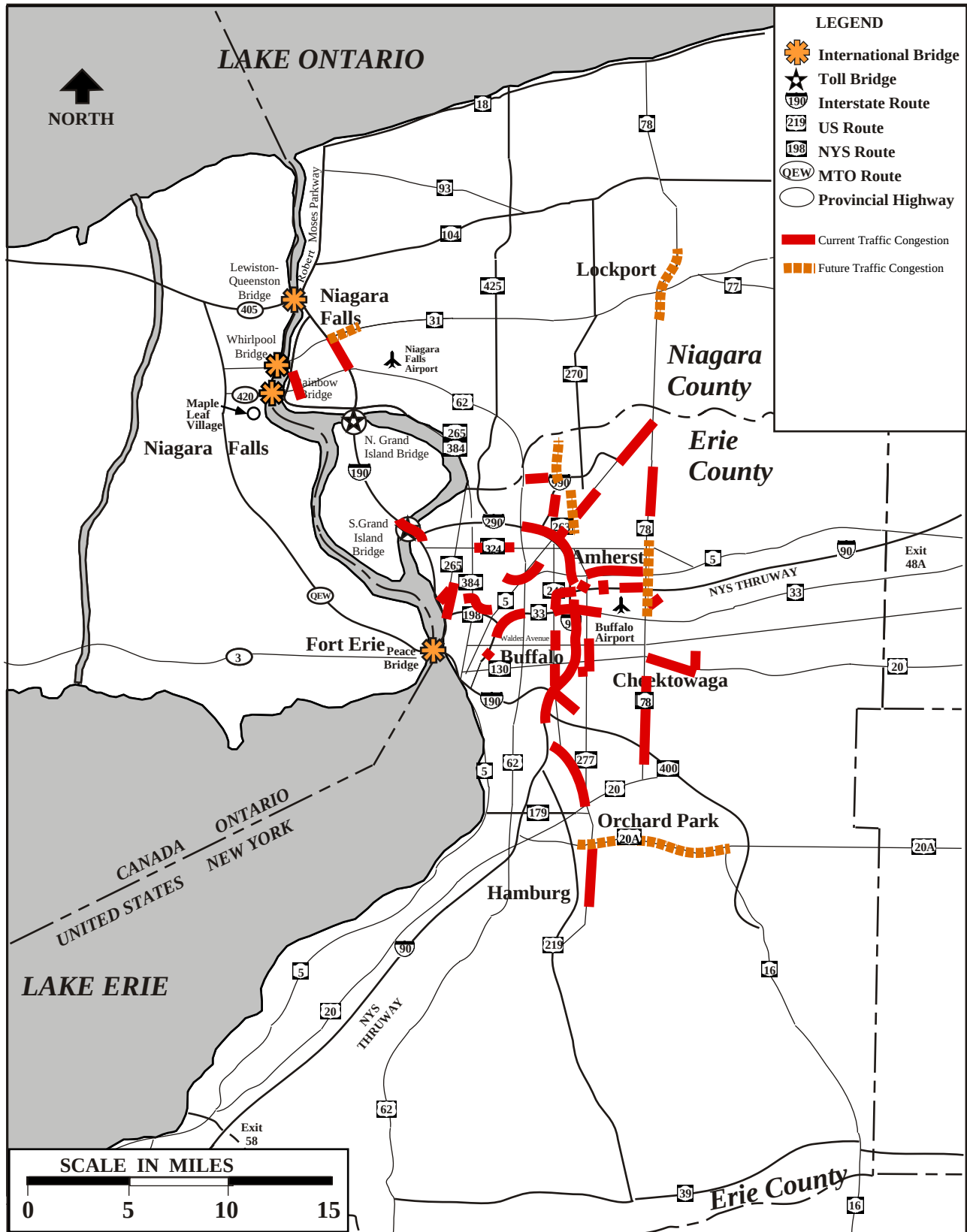


Figure 4-5 Forecast Congested Areas

**Table 4-2****Top 27 Accident Locations in 1995 - Total Accident Basis**

Route	Location	Number of Accidents
198	Parkside - Off Ramp	115
33	Interchange with NY 198	98
33	WB from Best/EB to Humboldt	81
198	Interchange with NY 33	79
198	Under Route 5 - Main Street	79
33	Michigan - Elm/Oak Interchange	63
33	Union Road Interchange	62
33	NY 198 Interchange	57
33	On/Off Ramp at Grider (WB)	52
33	NY 33 WB to Best Street	49
33	I-90 Interchange (Easterly Ramp)	49
33	NY 33 EB to Best	47
33	NY 33 at Genesee Buell	46
I-290	Main Street Interchange	45
198	On/Off Ramp (Easterly) to Main Street	44
33	Dick Road Exit	43
198	Parkside On Ramp	40
33	I-90 Interchange (Westerly Ramp)	39
33	NY 33 EB to Pine Ridge	37
33	On/Off Ramp Suffolk Street (Easterly)	36
198	I-190 Interchange	35
33	Elm/Oak arterial	33
I-190	Lewiston-Queenston Approach	29
I-990	I-290 Interchange	24
5	Fuhrmann Boulevard, Rte.5 EB to Tifft Street	22
219	Milestrip Interchange (Northerly Ramp)	21
400	NB Ramp to Seneca Street	16

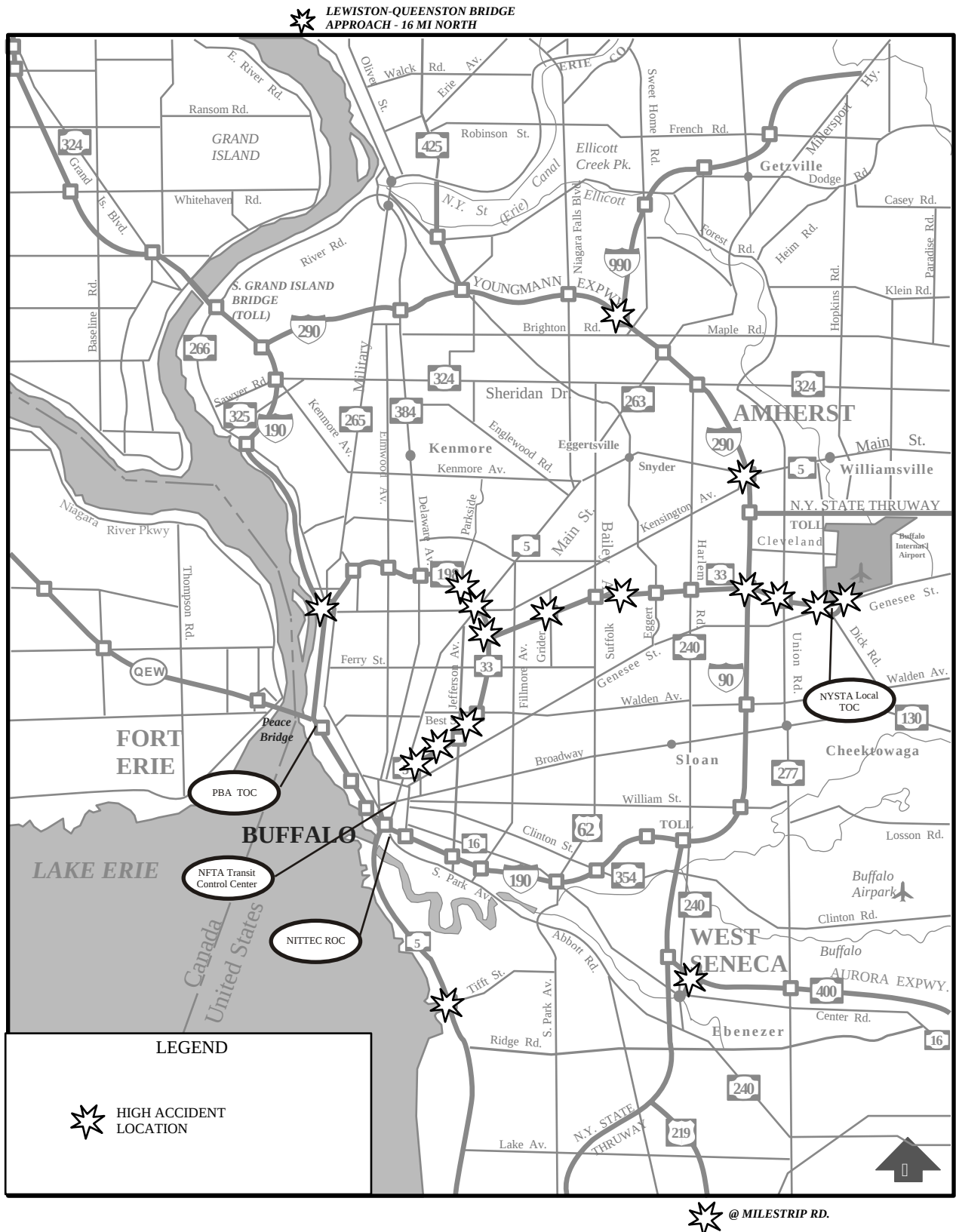


Figure 4-6 High Accident Locations (HAL)



Table 4-3 lists the latest available daily traffic volumes and accident occurrence along Canadian provincial highways in the project area. The accident data are not directly comparable to the previous table because roadway segments are listed here, as opposed to spot locations in Table 4-2.

Table 4-3
Ontario Provincial Highway Volumes and Accident Occurrence - 1992

Highway	Highway Link	AADT (veh.)	Link Length (mi.)	Total Accidents
QEW	Goderich St. - Peace Br. Plaza to Niagara Rd. 124	15,400	0.1	13
	Niagara Rd. 124 to Niagara Rd. 122	14,200	0.7	3
	Niagara Rd. 122 to Niagara Rd. 19	13,000	1.6	5
	Niagara Rd. 19 to Niagara Rd. 21	15,100	1.3	7
	Niagara Rd. 21 to Niagara Rd. 25	15,800	3.4	13
	Niagara Rd. 25 to Niagara Rd. 116	15,100	2.1	4
	Niagara Rd. 116 to Niagara Rd. 47	17,400	4.0	21
	Niagara Rd. 47 to Niagara Rd. 49	21,300	2.8	18
	Niagara Rd. 49 to Hwy. 420	27,900	1.9	7
	Hwy. 420 Interchange to Niagara Rd. 57	42,200	1.2	12
	Niagara Rd. 57 to Niagara Rd. 101	40,300	1.5	25
	Niagara Rd. 101 to Hwy. 405	44,150	1.6	42
	Hwy. 405 Interchange to Glendale Ave.	55,600	0.8	22
	W. End Garden City Skyway Br.	55,300	2.5	57
PH 405	Lewiston - Queenston Br. Plaza to Stanley Ave.	15,500	2.0	15
	Stanley Ave. to QEW	15,700	3.5	17
PH 420	Niagara Falls - Rainbow Br. to Victoria Ave.	14,300	0.3	3
	Niagara Falls - Victoria Ave. to Niagara Rd. 102	18,100	0.6	10
	Niagara Rd. 102 to Drummond Rd.	24,800	0.7	49
	Drummond Rd. to Dorchester Rd.	24,400	0.7	5
	Dorchester Rd. to QEW	25,100	0.4	1
PH 3	Concession Rd. to Pettit Rd.	16,500	1.9	27
	Pettit Rd. to Ridge Rd.	10,600	4.0	20



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5.0 TRANSPORTATION IMPROVEMENT PROGRAM

The Transportation Improvement Program (TIP) is the capital programming component of the overall planning process. This program consists of a listing of specific federally funded highway and transit projects being considered for implementation in the next five-year period. It is updated each year based on the continual re-evaluation of long and short range planning activities. Those projects of high priority are selected each year for funding and implementation. Table 5-1 lists major TIP program areas under consideration for funding in the region in the current 5-year cycle.

The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) provide the majority of the financing for transportation projects on Federal Aid roadways. The ISTEA consolidated the highway programs into the National Highway System (NHS), the Surface Transportation Program (STP) and also the Bridge Program. Federally funded components of the TIP are termed the "Required" program. Other projects are included in the TIP for "informational purposes," to ensure the coordination of all major transportation projects within the region as well as to provide a comprehensive picture of regional transportation improvements.

Two specific projects of note are the ITS Early Implementation project programmed for \$2.44 million (PIN 5803.38), which began in Fall 1996 (see Sections 6.5, 6.6.3, & 6.7 for details) and the ITS/Incident Management Study/Implementation project programmed for \$3.65 million (PIN 5804.08). This Buffalo/Niagara Falls ITS Study is the first component of the second project, which will include specific construction projects and detailed design.

A 1996 to 2000 TIP list is pending from the area planning process.



Table 5-1

1995 - 1999 ALLOCATIONS
TRANSPORTATION IMPROVEMENT PROGRAM SUMMARY BY PROGRAM AREA
(Millions of Dollars)

FUND SOURCE	Annual Element 94-95	2nd 95-96	3rd 96-97	4th 97-98	5th 98-99	5-Year Total
STP (URBAN) - Urban Area	7.1	12.1	12.1	10.0	10.0	51.3
STP (FLEXIBLE) - NYSDOT Region 5	4.6	18.4	31.4	15.2	22.4	92.0
STP (SAFETY) - NYSDOT Region 5	0.0	0.4	0.3	1.2	1.0	2.9
STP (RAIL) - Erie/Niagara County	0.0	0.0	0.0	0.0	0.0	0.0
STP (RURAL) - NYSDOT Region 5	0.3	0.4	0.2	0.2	1.3	2.4
STP (ENHANCEMENT) - Erie/Niagara County	0.0	0.0	0.0	0.0	0.0	0.0
SCENIC BYWAYS - Erie/Niagara County	0.0	0.0	0.0	0.0	0.0	0.0
NHS - NYSDOT Region 5	24.6	14.3	22.4	20.2	11.2	92.7
INTERSTATE (NYSDOT) - NYSDOT Region 5	3.6	3.6	3.6	3.4	3.4	17.6
INTERSTATE (NYSTA) Federal Aid Interstate	0.0	91.5	0.0	0.0	0.0	91.5
HBRR (BRIDGE) - Allocation (NYSDOT Region 5)	31.7	30.1	27.5	27.0	17.9	134.2
FED.DEMO. (1991 ISTEA) - Allocation (NYSDOT Region 5)	44.1	12.9	12.9	0.0	0.0	69.9
CMAQ - Allocation	6.0	0.0	0.0	0.0	0.0	6.0
TRANSIT SECTION 3 - Allocation (NFTA)	*	*	*	*	*	0.0
TRANSIT SECTION 9 - Allocation (NFTA)	15.1	15.1	15.1	22.1	22.1	89.5
FTA SECTION 16 - Allocation	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL ALLOCATION	137.1	198.8	125.5	99.3	89.3	650.0

*Allocation Varies



6.0 EXISTING INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

6.1 Electronic Toll Collection

Automated toll collection initiatives are being pursued by the toll collecting agencies within the area, as shown on Figure 6-1. Automated toll collection is being implemented to reduce congestion, reduce pollution, provide customer convenience, improve traffic management and minimize collection costs.

The New York State Thruway Authority (NYSTA) has EZ-Pass, which consists of a windshield mounted module that transmits information to and from the EZ-Pass station. The system allows users to pass through the toll plaza at speeds of up to 5 mph, based on toll booth configuration rather than technology constraints. The system collects information such as toll plaza used, lane used, and time of pass and automatically charges the toll amount to the user's account. The existing system is for automobiles only, though a truck and bus system is presently under development. Currently, EZ-Pass lanes are in use at the Grand Island Bridges (north & south), the Black Rock Toll Barrier, Buffalo Toll Barrier, Lackawanna Toll Barrier and the Williamsville Toll Barrier.

As part of the EZ-Pass Interagency Group (a coalition of seven toll authorities in New York, New Jersey, Delaware, and Pennsylvania), the NYSTA is deploying electronic toll collection and traffic management on its facilities. The NYSTA's aggressive program has resulted in the application of Automatic Vehicle Identification (AVI) technology for toll collection to all 63 toll plazas of the Thruway's 641 mile system (completed early December 1996). To accommodate this system, the NYSTA has contracted with MFS Communications Company. MFS is designing, integrating and supporting a fiber optic communications system along the entire Thruway length. In the agreement, NYSTA is allowing MFS to install the COM system within NYSTA right-of-way in return for use of several fiber optic strands. This agreement is essentially a public-private partnership.

The Buffalo and Fort Erie Public Bridge Authority (PBA) has modified the toll collection on the Peace Bridge to one direction of travel, Canada-bound on the US side.

The Niagara Falls Bridge Commission (NFBC) has token/exact change bins available in both directions of travel at the Rainbow Bridge and the Whirlpool Bridge.

6.2 Expedited Customs and Immigration

Congestion occurs along the project area US/Canada border crossings (Peace Bridge, Rainbow Bridge, Whirlpool Bridge and Lewiston-Queenston Bridge) during the morning, evening and weekend peak hours. Expedited customs and immigration techniques are used to help reduce congestion and delay at border crossings, as follows.

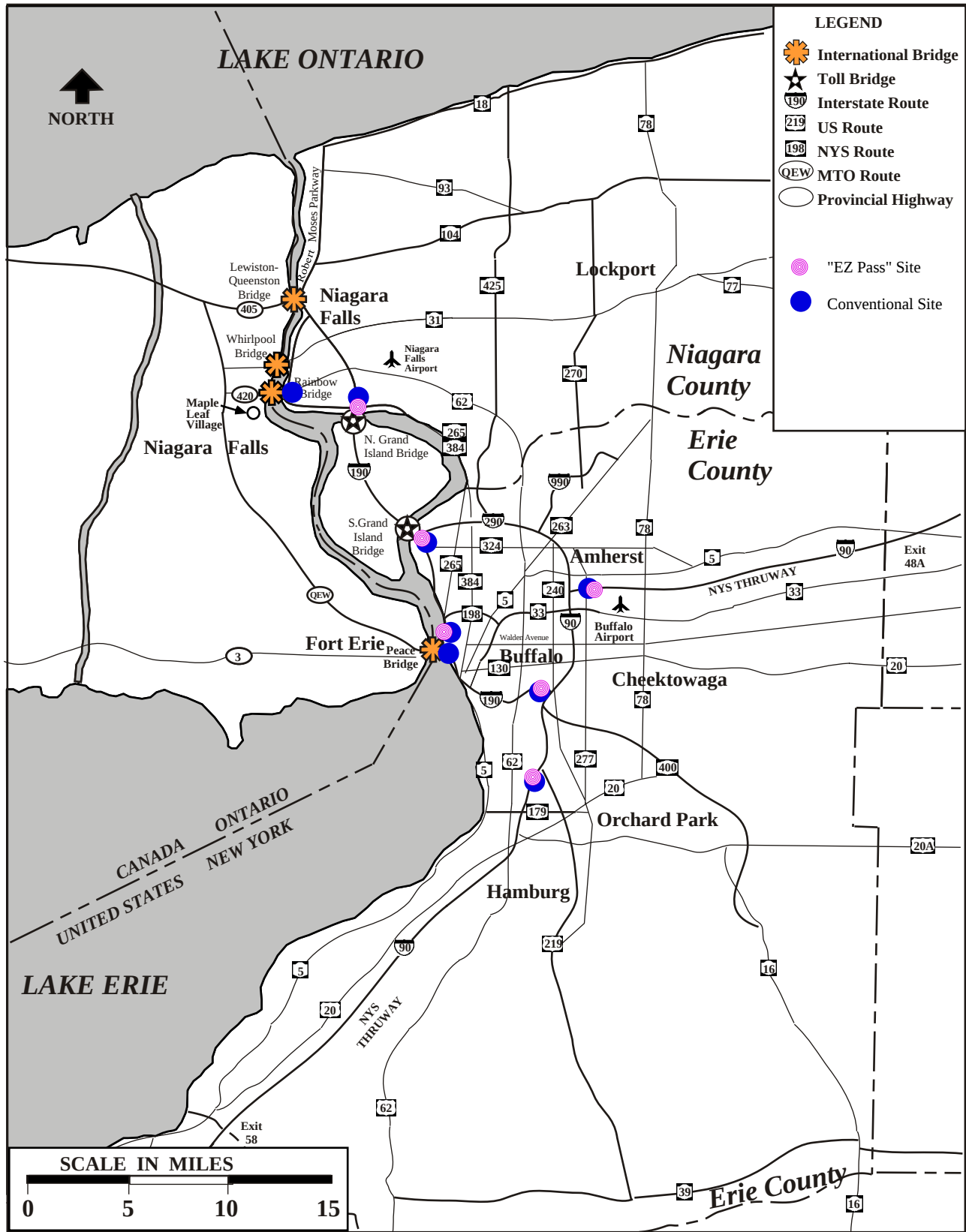


Figure 6-1 Conventional & Electronic Toll Collection ("EZ Pass") Sites



6.2.1 Customs Pre-Clearance

Canadian and American citizens can apply for immigration passes for "pre-approved" border crossing into the U.S. at the Peace Bridge (Auto-Pass). This system eliminates the need for the inspection personnel to completely question the user. However, the use of such cards is very specific. They are intended for registered vehicles occupied by the cardholder(s) with nothing to declare and are typically used by persons frequently crossing the border. Auto-Pass users are subject to random inspections.

6.2.2 Customs Nationality Lanes

The Canadian Customs, Naturalization and Immigration Agency has introduced designated lane(s) for the exclusive use of Canadian citizens who are re-entering Canada at the Peace Bridge crossing.

6.2.3 Surveillance Cameras

The Canadian Customs, Naturalization and Immigration Agency uses surveillance cameras to record license plate numbers at the Peace Bridge crossing. The plate number is transmitted to the inspector's lane computer screen during questioning and is then forwarded to a database with a time stamp. The database downloads a 'hot list' of plate numbers to the lane computers in order to detect violators. This system, known as the Primary Automated Lookout System (PALS), is being tested at the Peace Bridge. If found to be effective, it will be used on all border crossings.

6.3 Commercial Vehicle Operations

Much of the congestion at the Peace Bridge and the Lewiston-Queenston Bridge is caused by long queues of commercial vehicles. Congestion at the Whirlpool Bridge is also caused by truck traffic. Long commercial vehicle queues are caused by the extra processing time required for inspection of imported goods in transport.

6.3.1 US/Canada Border Crossing Pre-Clearance

International cross-border trade has been hampered by the need to wait until a truck arrives at the border crossing before beginning the process to determine if the goods can enter the country. Under the current process, trucks arrive, customs is presented with documentation regarding the shipment, the documentation is reviewed, and the determination is made to admit the truck, the driver and the shipment.

This system is currently undergoing further refinement. A pilot study (Intelligent Transportation Bridge Crossing System (ITBCS)) is being conducted to eliminate the need for exchange of paperwork at the border crossing. The commercial traffic will electronically transmit the documentation prior to arrival at the border crossing so that an instantaneous clearance can be made at the border crossing. Trucks will be equipped with a transponder which will store and transmit data regarding the shipment, origin, and destination. The transponder would also allow the



commercial vehicle to be traced throughout its journey. It is anticipated that the pre-clearance operational test will commence at the Peace Bridge during late 1996 or early 1997.

6.3.2 Other Commercial Vehicle Operations

To increase safety and decrease road wear, New York State law limits the weight that a commercial vehicle can carry (gross weight per axle). To enforce this, the New York State Police Division is utilizing portable weigh stations to perform random inspections of commercial vehicles along major roadways.

6.4 Park-and-Ride Facilities

Park-and-Ride facilities provide parking for commuters who use a personal vehicle to commute to a common meeting place, and then ride public transit or carpool to their final destination. Existing Park-and-Ride facilities offer the potential to be integrated into the ITS infrastructure by providing traveler information displays. Following is a list of major Park-and-Ride facilities within the project area, six of which are shown in Figure 6-2.

- Exit 49 (Transit Rd./Depew Exit) off the I-90 for Buffalo to and from Rochester commuters
- Summit Park Mall Transit Center
- Thruway Mall Transit Center
- Appletree Business Park Transit Center
- Southgate Plaza Transit
- Athol Springs Transit Center
- Various locations along the Light Rail Rapid Transit (LRRT)
- Various locations along primary NFTA Metro bus routes.

6.5 Skyway Closing System

Due to low visibility and high winds, the raised portion of NY 5 adjacent to Lake Erie (the Skyway) is occasionally closed to traffic. When such poor driving conditions exist, the Skyway is closed by a semi-automated system controlled by the NYSDOT, Region 5 Traffic and Safety Department. The Buffalo Police Department calls into a NYSDOT computer, which via modem and radio activates fixed message signs at both ends of the Skyway (see Figure 6-5). These signs, framed by flashing amber lights, direct travelers to "Use Alternate Route." The computer also sends a fax message to emergency service providers, the media and businesses affected by the closing. The police department typically dispatches a patrol car to block the entrances and ensure the Skyway is clear. The NYSDOT has contracted a project (PIN 5803.38) to be constructed in the summer of 1997 which will expand the coverage of the Skyway closing system to include signs that notify motorists from Southtowns.

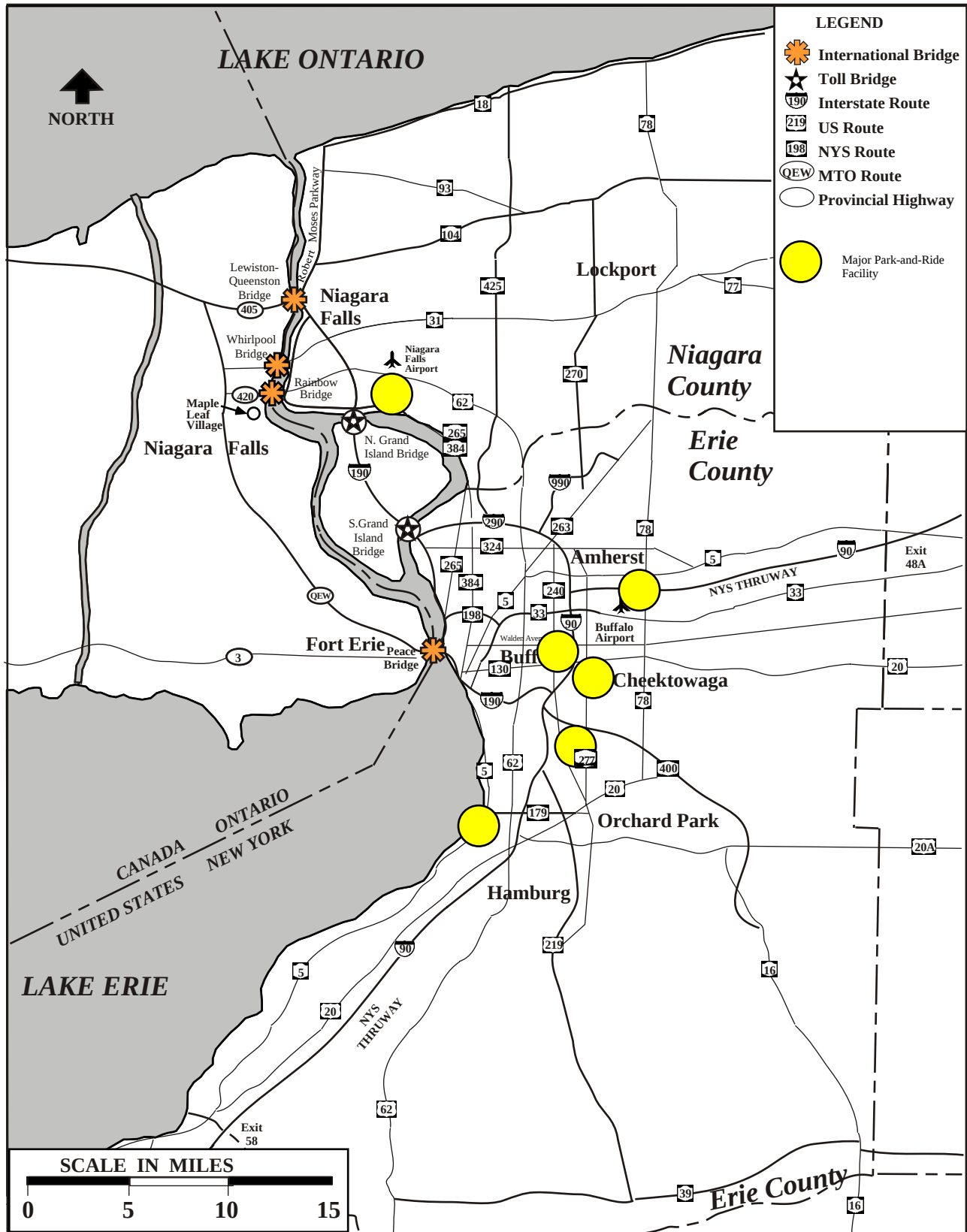


Figure 6-2 Major Park-and-Ride Facilities



6.6 Traffic Surveillance Systems

Traffic surveillance systems are used to detect roadway use, traveling conditions, and incidents. This information is useful for planning, operation and emergency dispatch.

6.6.1 Video Surveillance & Closed Circuit TV (CCTV)

Within the project area, CCTV is currently used by the PBA and NFBC to monitor traffic conditions along the US/Canada border crossings (see Figure 6-3). The PBA has eleven cameras located at the Peace Bridge. Cameras are located at the approach ramp (Ramp B) to the US side, Porter Avenue, at the US Plaza, along the bridge, at the Canadian Plaza, and at the Canadian truck yard. The NFBC has cameras located at the Rainbow Bridge to monitor traffic conditions. Additionally, each international bridge crossing is currently utilizing other CCTV cameras for security purposes only.

The NYSDOT and NYSTA have jointly planned to install two surveillance cameras feeding three operations centers (at the General Donovan Building in downtown Buffalo and the NYSTA at the local headquarters in Cheektowaga and in Albany). The cameras are to be installed at the Carolina interchange along I-190 and at the top of the General Donovan Building, for surveillance of the raised section of the I-190 and the northern section of the Skyway.

6.6.2 Permanent Vehicle Detector Stations (PVDS)

PVDS (loop detectors) have been installed over the last few years by the NYSDOT and the NYSTA. Most of the detectors require the use of a portable unit to record the counts, for this reason only three operate continuously. These three are connected to NYSDOT headquarters in Albany via modem. Recent field inspections indicate that some of the units are damaged and in need of repair. Figure 6-4 shows the locations of the detector stations.

6.6.3 Roadway/Weather Information Sensors

As part of the upcoming NYSDOT ITS project (PIN 5803.38) planned for construction in 1997, roadway/weather information sensors are to be installed along the I-290, I-190, NY 219, and NY 5, as shown in Figure 6-5. The system consists of weather stations that record humidity, atmospheric pressure, temperature, visibility, wind speed, and wind direction. Roadway sensors include surface sensors to determine the solidity of water mixture on the pavement and subsurface sensors to determine the temperature. The temperature/solidity information will be used to determine the potential of freezing. This information will then be transferred to the developing Regional Operations Center (ROC) via modem (see Section 6.12.2).

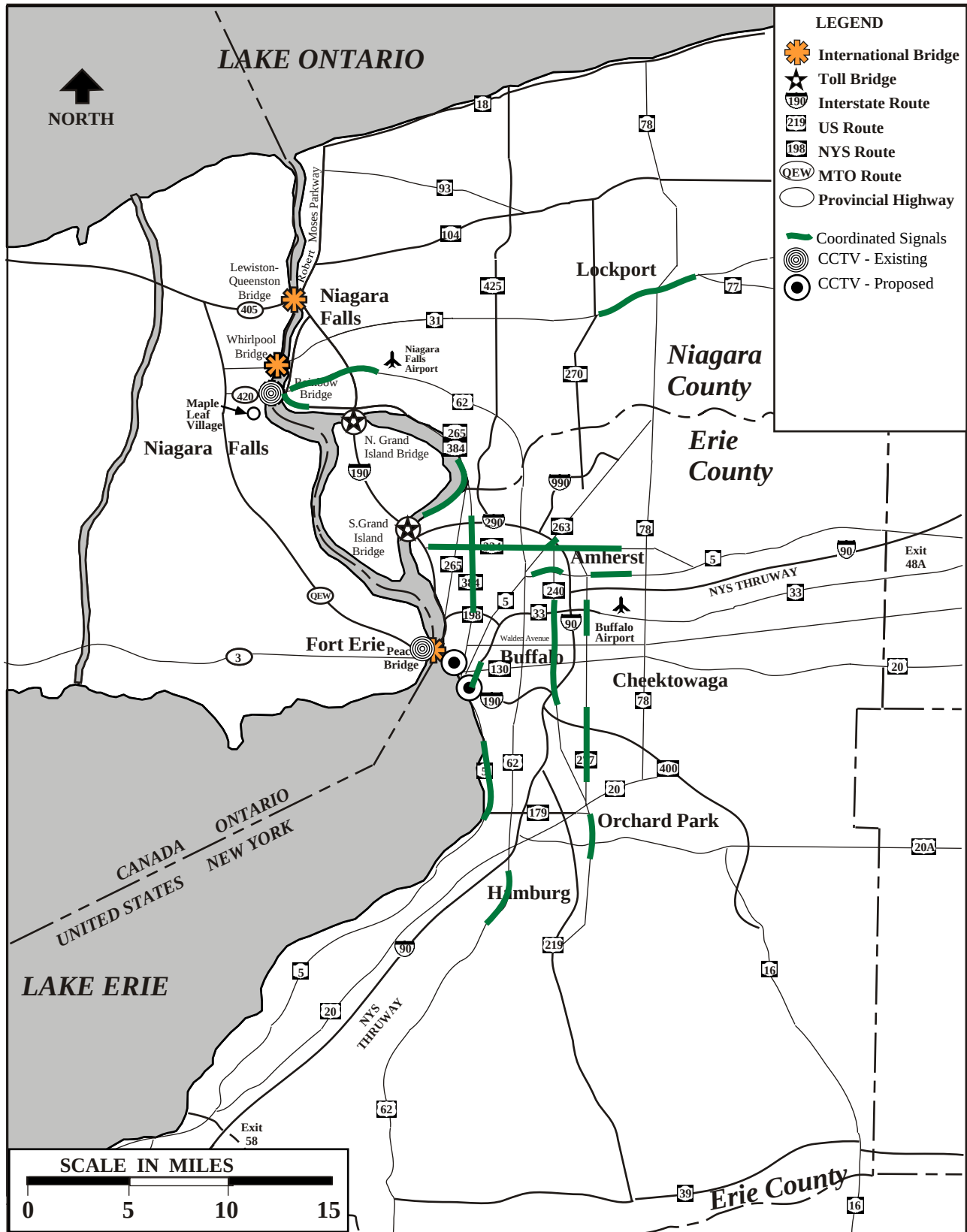


Figure 6-3 Locations of Traffic Surveillance (CCTV-NYSDOT) and Coordinated Traffic Signals

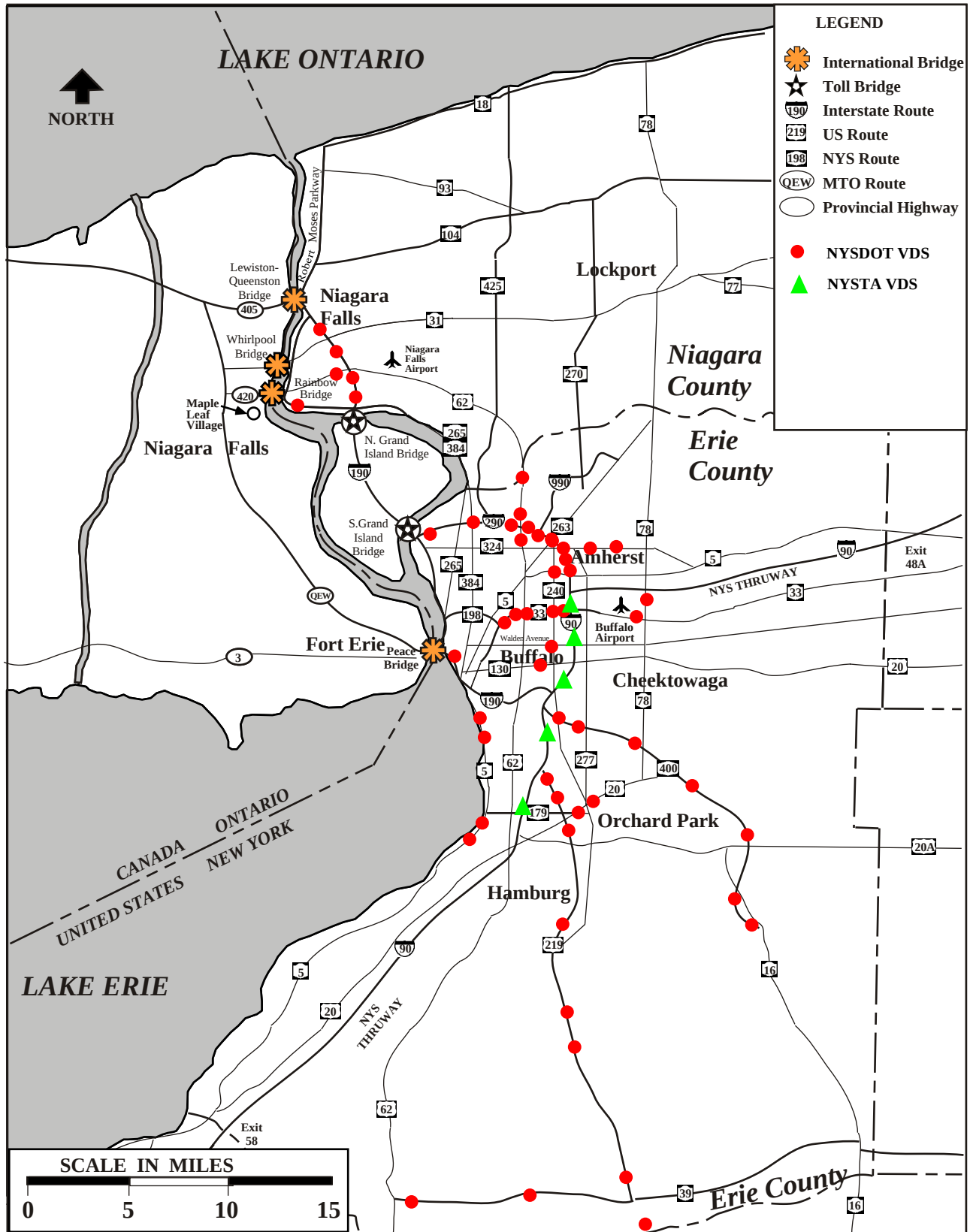


Figure 6-4 Permanent Traffic Count Locations



6.7 Variable Message Signs (VMSs)

VMSs are currently being installed throughout the project area. Most of the signs are not yet fully functional. Their future use will be to inform roadway users of an incident and to ultimately provide suggested alternate travel routes. Figure 6-5 shows the locations of existing and planned (funded) VMSs by organization within the project limits.

The NYSTA owns and operates four VMS; upstream of the Lackawanna Toll Barrier (I-90), upstream of the westbound Williamsville Toll Barrier (I-90), upstream of the Buffalo Toll Barrier (I-190), and across from the Dunlop Building (I-190). These signs are operated by modem from the local NYSTA headquarters. At present, there are no automatic mechanisms to monitor the roadways or detect incidents, such as CCTV cameras or loop detectors, though over time this capability will be developed. The NYSTA currently operates a small traffic operations center and utilizes external sources to report incidents to the center. These external sources include dedicated State Police, toll collectors (who receive information from motorists), and wrecker services. All of these sources utilize a common radio system to report incidents to a 24-hour communication center. The information, if necessary, is dispatched to the appropriate emergency service. Incident information is posted on the pertinent VMS.

The PBA owns and operates 2 VMS located along northbound I-190 just south of the Porter Avenue exit. Two fixed message signs are located along the access ramp to the Peace Bridge. There are fixed message signs along the bridge which regulate the peak hour bi-directional flow. Two lanes are allocated to the heavier flow direction, with the third lane assigned to the opposite flow direction. Fixed message signs are also used to direct traffic to various toll booths (exact change, token, receipt), customs inspection booths and weigh stations, though lane delineation and direction is not always clear.

Nine additional VMS signs are currently being constructed by the NYSTA along I-90 and I-190 within the project area. The NYSDOT has also contracted the installation of an Intelligent Transportation System (PIN 5803.38) which includes the installation of six additional VMSs to be constructed in 1997 along with 3 additional Fixed Message Signs (FMS) for notification of closures on the Skyway due to adverse weather conditions.

Not illustrated are NFBC FMS used to direct traffic to the appropriate toll and customs inspection booths. A FMS, with flashing amber lights is used along the northern section of I-190 (near the Witmer Road exit) to alert drivers of congestion at the Lewiston-Queenston Bridge crossing. The sign suggests an alternate route for non-bridge related traffic: west on NY 31 to NY 104.

6.8 Coordinated Signals

Coordinated signals are used to minimize stops and delay along major arterials. Properly coordinated signals can reduce travel times, vehicle queuing, traveler costs and negative environmental effects. Figure 6-3, previously presented, illustrates existing and committed coordinated signal corridors.



The NYSDOT has several coordinated signals along the Elm/Oak section of NY 33 in the City of Buffalo. The Walden/Ferry and Niagara Falls Boulevard sections along US 62 in Niagara Falls, New York also have a series of coordinated signals. Other small sections of interconnected signals exist throughout the project area. Some of these systems are in need of retiming for optimal operation.

A NYSDOT coordinated signal system is currently under construction along NY 5 (Fuhrmann Boulevard through Woodlawn, New York). This system will utilize cameras, fiber optic cable and microprocessors to control the signal timing. Six controllers were initially planned to be placed along Fuhrmann Boulevard, but now it is expected that only three will be used. The remaining three controllers are to be salvaged and used elsewhere, and one may be placed at the Parkside Avenue intersection with the Scajaquada Expressway (NY 198).

A major NYSDOT signal coordination study is currently being conducted by the NYSDOT for several hundred signalized intersections throughout the region, both inside and outside the City of Buffalo. The study will propose systems to be implemented in 1997, using time based coordination. Major roadways within the study include NY 5, NY 277, NY 20A, NY 78, NY 62, NY 324, NY 263, NY 354, and NY 384 in Erie County and NY 31, NY 62, NY 265, NY 425 and Rainbow Boulevard in Niagara County. The City of Buffalo has also initiated a signal coordination study along the Franklin / Linwood arterial consisting of approximately six signals.

Erie County, NY is currently in the engineering phase of collecting three time based signal corridors. The corridors are William Street, from I-90 to Union; Borden Road, from French Road to Como Park; and Dick Road, from George Urban to Broadway.

6.9 Highway Advisory Radio / Weather Advisory Radio

The NYSTA operates a Highway Advisory Radio station on 1610 AM. Broadcast coverage includes I-90 from the Hamburg area to the east Erie County line, I-190 from Buffalo through Niagara Falls, the ends of the I-290, the north ends of US219 and NY400, and the ends of the Kensington Expressway.

The National Oceanic and Atmospheric Administration weather radio station, funded and operated by the United States Department of Commerce at the Buffalo Airport (KEB98 @ 1625.5 AM), reports weather conditions for the area with coverage of an approximate 40-mile radius.

The NYSDOT has contracted the installation of an Intelligent Transportation System which includes the installation of road weather information systems. This is in conjunction with the previously mentioned construction, in 1997, of six new VMSs and detour signs being installed for the possible closures of the Skyway (PIN 5803.38).

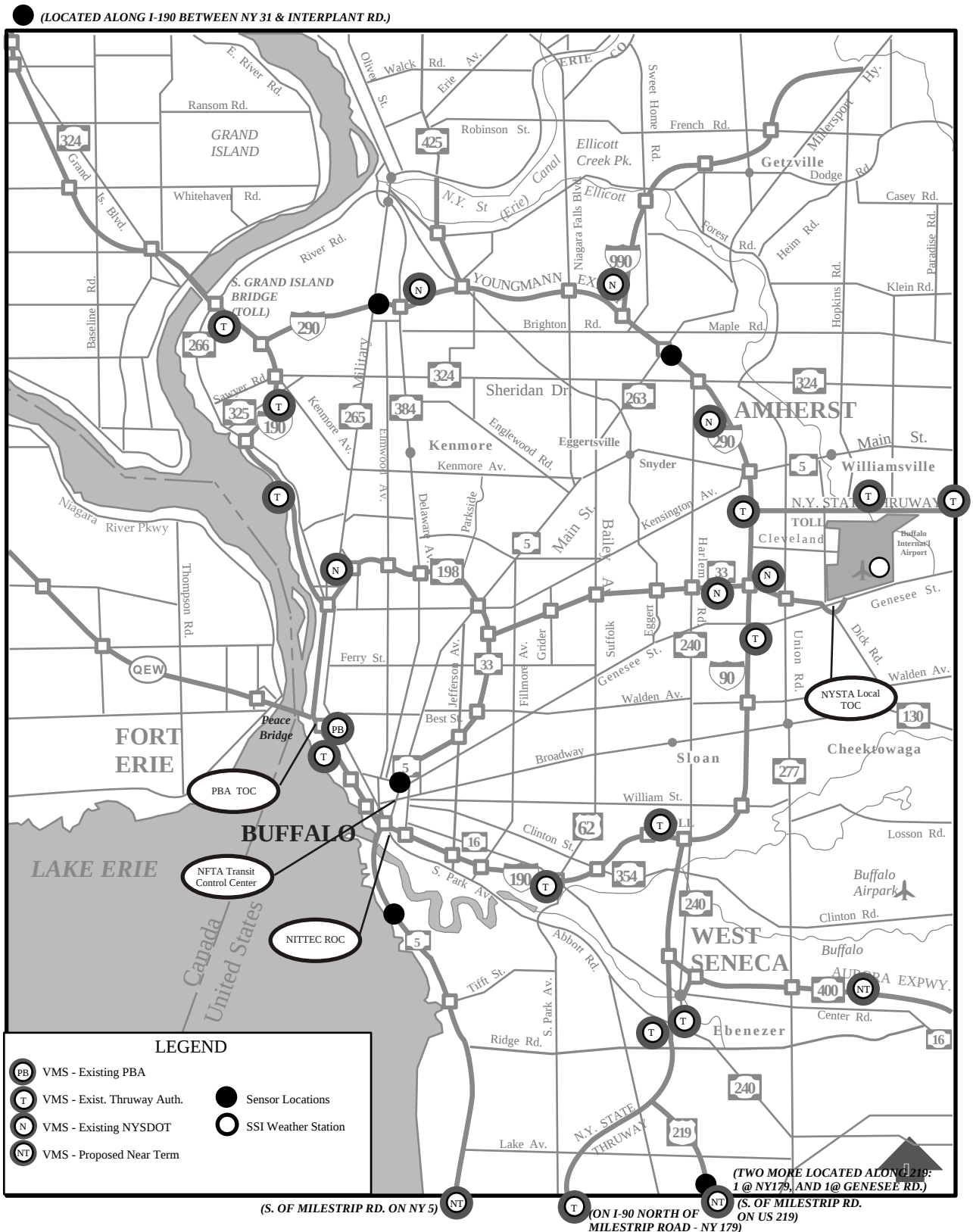


Figure 6-5 Road Weather Information Sensors (RWIS) and Variable Message Signs (VMS)



The Niagara Parks Commission and the Niagara Falls Bridge Commission jointly operate a Traveler Traffic Information Radio Station (Travel Advisory Radio), CFLZ 91.9 FM. The station broadcasts from the Skylon Tower in Niagara Falls, Ontario at 35 watts. This station has been cleared to double its wattage, which would enable it to reach into the Southtowns of Buffalo.

6.10 Traffic Conditions Monitoring and Reporting

Metro Networks Traffic Reporting is a privately owned national company. Metro Networks generates funds by purchasing air time from local radio and television stations for its traffic reports and then selling a portion of the air time to advertisers or sponsors. Information is gathered from a traffic reporter located in a fixed wing aircraft, the New York Division of State Police, Erie and Niagara County Sheriff Departments, local police and from private vehicles with cellular phones (*TIP - sponsored by NYNEX). Metro Networks provides traffic reporting services to major television stations and to most of the radio market in western New York. Other telephone call-in systems are also operated throughout the region:

- 911 - Erie County Sheriff
- *AAA(Cellular) - American Automobile Association (AAA)
- 1-800-847-8929 - New York State Thruway Authority
- 1-888-648-3262 - Niagara International Transportation Technology Coalition (NITTEC)
- 1-716-847-3973 - NITTEC (Local Buffalo Area).

The Niagara Frontier Transportation Authority (NFTA) traffic data and information dissemination is a free service of this non-profit organization. Information is gathered from Metro bus operators, the New York Division of State Police, Erie and Niagara County Sheriff Departments, and local police (by use of a scanner). Information is released to one television station and approximately ten small market radio stations. In this manner, the NFTA competes with Metro Networks.

The NFTA has plans to implement a surveillance system at key locations along the major travel routes to/from the City of Buffalo. The cameras would take still shots which would be transferred to a NFTA "home page" on the Internet. The home page could be used by local travelers to view traffic conditions and plan their route to/from the city.

The NYSDOT collates region-wide roadway construction activity and provides monthly Construction Activity Reports to the media. This is one of the first steps in developing a Regional Operations Center (ROC), to be jointly implemented by Niagara International Transportation Technology Coalition (NITTEC) members. Future plans for the NITTEC ROC include the integration and operation of existing and near future VMSs and CCTVs, as discussed in Section 6.12.

6.11 Advanced Public Transportation Systems

The NFTA's automated pre-trip notification system is available for NFTA bus and light rail. This automated system can be used by calling the service by phone and punching in the route number and



direction of travel. The next available departure and arrival times are reported to the user. The NFTA also has information monitors located at the platforms of the LRRT. These monitors provide users with a variety of announcements and information.

The NFTA is installing Automatic Vehicle Location (AVL) devices on all NFTA buses, paratransit vehicles, internal police cars, supervisor cars and money trucks (over 370 vehicles altogether). All vehicles are to be equipped by the Summer of 1997. Using Global Position Satellite technology over microwave radio, the AVL system will locate vehicles to within 50 feet and yield travel time performance information to one-minute resolution. This information will provide "on-time" performance records and emergency response, with public phone-in access slated as a future improvement.

Niagara Falls Transit, Ontario automated ticketing and payments (CUBIC Precision Fast Fare System) speeds up fare collection and expedites the movement of public transportation. First implemented in 1991, Fast Fare is currently installed on 25 buses and uses "swipe" pass cards to dynamically compute fares and travel demand. Transfer capabilities are now being added.

6.12 Traffic Operations Centers (TOCs)

6.12.1 Existing Facilities

Traffic is currently monitored or controlled by the owners of each of the following systems:

- **NYSTA** operations are controlled from the Cheektowaga Office. The Regional Traffic Supervisor is charged with the responsibility of operating the VMSs and HAR. Modems are used to communicate between the TOC and the field. Information on incidents is identified by the New York Division of State Police or NYSTA employees. Once an incident has been confirmed, a message is displayed on one of the four signs. No CCTV or loop detectors are part of the current system. The NYSTA is studying the possibility of creating a central TOC that would operate their entire system statewide. This TOC would be located at the headquarters office in Albany.
- The **NYSDOT** operates the Skyway Closing System, previously described in Section 6.5.
- The **PBA** operates out of the Peace Bridge American Plaza in downtown Buffalo. Surveillance cameras and CCTV are used to identify and report incidents at the approaches to, and along the Peace Bridge. This system has one VMS and two fixed message signs. These signs can also be operated by the NYSTA.

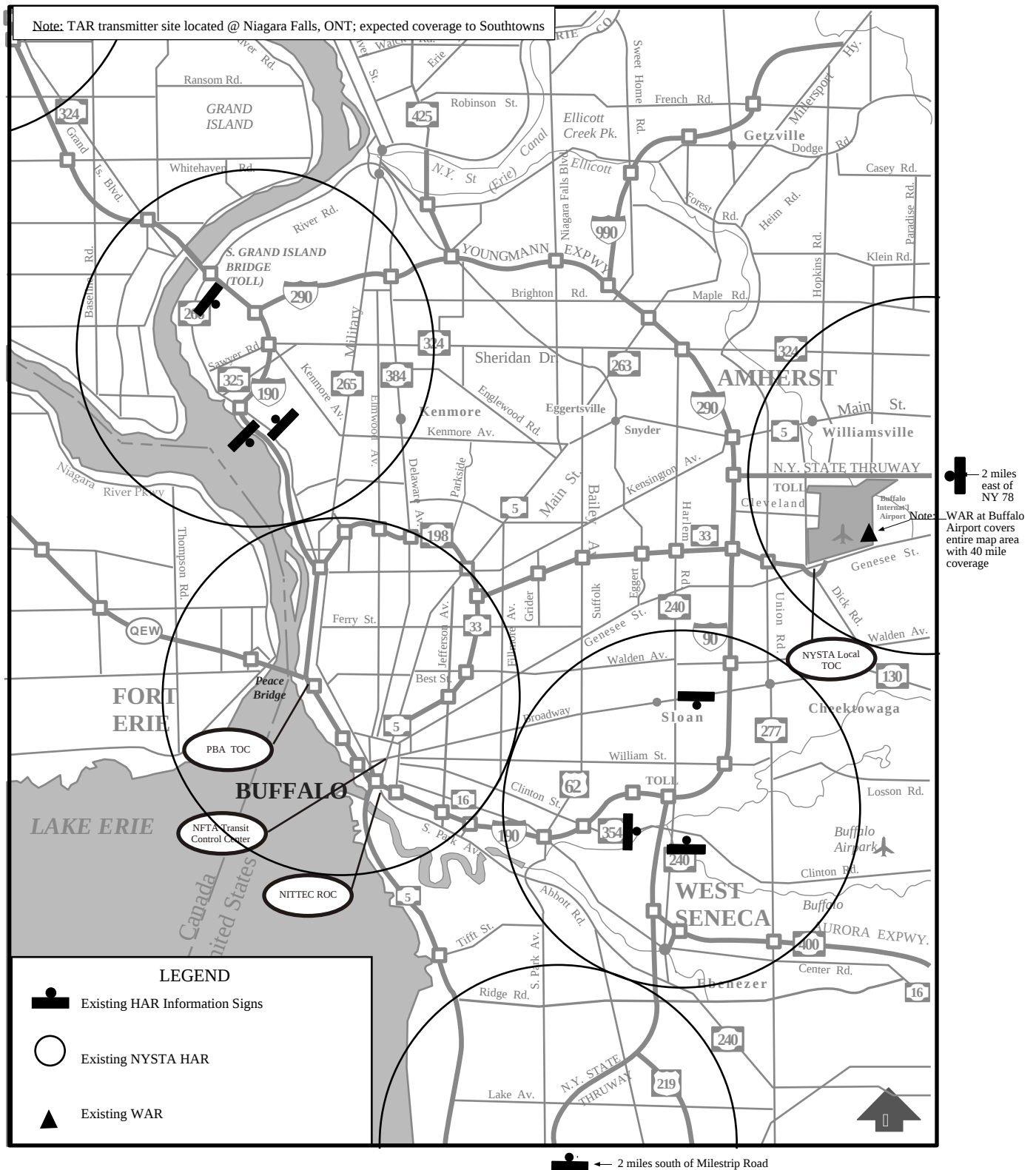


Figure 6-6 Highway Advisory Radio (HAR)



- The **NFBC** utilizes surveillance cameras, CCTV and FMSs to identify and report incidents along the Rainbow Bridge. This system is operated from the Canadian side of the Rainbow Bridge.
- The **NFTA** has a transit control center to operate the bus and LRRT systems, located on Oak Street in downtown Buffalo. The center includes train operation controls, signal controls, CCTV and an extensive communications system. The LRRT system informs train operators of headways and preempts signals along the 1-mile above ground section of the LRRT. The control center maintains constant communications with bus operators throughout western New York. The control center monitors route times and dispatches buses to assist in routing performance or emergency situations. The buses act as probes to identify traffic conditions and incidents and report delays in service.

6.12.2 Proposed Regional Operations Center (ROC)

The Niagara International Transportation Technology Coalition (NITTEC; see Section 7.2) is coordinating the creation of a central ROC on the 4th floor of the NYSDOT General Donovan Building. The ROC will include the participation of the NITTEC members and integrate existing and proposed systems as they develop. The following agencies are currently involved with the interim ROC:

- New York State Thruway Authority (NYSTA)
- New York State Department of Transportation (NYSDOT)
- Buffalo and Fort Erie Public Bridge Authority (PBA)
- Niagara Falls Bridge Commission (NFBC)
- Niagara Frontier Transportation Authority (NFTA)
- Ministry of Transportation Ontario (MTO).

The NITTEC is planning to coordinate the NYSDOT, NYSTA and PBA, NFBC systems. The ROC would enable integrated and coordinated control and operation of the four existing VMSs and HAR plus the nine additional VMSs currently under construction by the NYSTA, as well as NYSDOT's six VMS signs. The ROC would also allow integration and coordinated control of the PBA and NFBC VMSs and utilize CCTV/ surveillance cameras. Additionally the ROC would coordinate control of other ITS elements currently being installed, including weather stations, roadway surface/subsurface sensors and two CCTV/surveillance cameras along the elevated section of I-190.



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7.0 WESTERN NEW YORK ITS STAKEHOLDERS

7.1 Critical Stakeholders

To improve inter-agency coordination and fully understand area-wide issues, a critical stakeholder group has been identified. This group includes representatives from public and private agencies. Many of the involved agencies are also active members of NITTEC or the WNYIMT, which are also described below. The stakeholder working group is presented in Table 7-1.

Critical stakeholders were contacted individually to discuss a variety of ITS issues and initiatives in early 1996. These interviews were helpful in revealing a variety of institutional challenges, as summarized in Section 8.3.

7.2 Niagara International Transportation Technology Coalition (NITTEC)

NITTEC is an organization of agencies in the Niagara Frontier region of New York State and Ontario. Its mission is to improve regional, and thereby international, transportation mobility, promote economic competitiveness, and minimize adverse environmental effects related to the regional transportation system, including the four highway border crossings between Canada and the United States. This mission is to be accomplished by improving safety and operations, reducing congestion on the transportation network, and coordinating transportation incident notification and response, construction projects and deployment of ITS elements.

NITTEC members are:

- Buffalo and Fort Erie Public Bridge Authority
- City of Buffalo
- City of Niagara Falls, New York
- City of Niagara Falls, Ontario
- Erie County
- Federal Highway Administration
- Ministry of Transportation Ontario
- New York State Department of Transportation
- New York State Thruway Authority
- Niagara County
- Niagara Falls Bridge Commission
- Niagara Frontier Transportation Authority
- Niagara Parks Commission
- Region of Niagara, Ontario and
- Town of Fort Erie.



**Table 7-1
Buffalo/Niagara Falls ITS
Critical Stakeholder Listing**

Federal Highway Administration
New York State Department of Transportation
New York State Thruway Authority
Niagara Frontier Transportation Authority
Ministry of Transportation Ontario
Niagara County
Erie County
City of Niagara Falls, Ontario
City of Buffalo
Niagara Frontier Transportation Committee
Niagara Falls Bridge Commission
Buffalo and Fort Erie Public Bridge Authority
New York Division of State Police
Greater Buffalo Partnership
Automobile Association of America
Tower Group International
Region of Niagara, Ontario
Metro Networks
U.S. Customs and Immigration and Naturalization Service



7.3 Western New York Incident Management Team (WNYIMT)

This consortium of public and private agencies has been established to assist in emergency response across jurisdictional boundaries, and to enact a “clear road” policy. The team has integrated cooperation from nearly all emergency response providers and transportation agencies. The list of member agencies is as follows:

- Buffalo Police Department
- Erie County Department of Public Works
- Erie County Fire Training Academy
- Erie County Sheriff Department
- Niagara County Emergency Services
- Niagara County Department of Public Works
- NYS Department of Transportation
- Troop "T", NYS Police
- NYS Thruway Authority
- Troop "A", NYS Police
- NYS Police - Traffic
- NYS Department of Conservation
- Federal Highway Administration
- Yearke Graphics
- Adelphia Cable Communications
- Metro Networks
- Niagara Frontier Transportation Authority
- Niagara Frontier Transportation Committee
- Empire State Towing & Recovery Association
- AAA Western & Central NY, and
- Buffalo/Niagara Frontier Safety Council.



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8.0 SURVEYS

8.1 Overview

As part of the Buffalo/Niagara Falls ITS Study, surveys were conducted in the spring of 1996 to determine perceptions of traffic problems and the ability of various ITS subsystems and communication systems to address the problems. Two surveys were developed, one for agencies involved in transportation and the other for more general distribution to a cross-section of persons from various backgrounds.

The full survey for agencies involved in transportation is presented in Appendix A. This survey was distributed to the critical stakeholders, members of the WNYIMT, members of the NITTEC and major employers in western New York. Just over 100 of these surveys were distributed and 33 were completed and returned, for a response rate of 32%. The list of respondents is also presented in Appendix A.

For the more general audience, a shorter, less technical version of the survey was prepared, and a copy is presented in Appendix B. The initial intent was to distribute this survey to various members of the general public, using the media to highlight the project and asking readers of the resulting articles to fill out the survey. Also, several large employers (e.g., Marine Midland Bank, Ford Stamping Plant, American Axle) were contacted, to get a broad sample. The scope of distribution, however, turned out to be limited essentially to NFTA bus operators and primarily engineering personnel from a few engineering and research firms. None of the media responded to the survey, plus setting up and distributing surveys to large area employers did not fit into the survey time frame. The actual respondents were fairly disperse geographically, however, and Table 8-1 lists the final distribution and response rates of the survey.

**Table 8-1****General Survey: Distribution and Response Rates**

Group	No. of Surveys Distributed	No. Returned / Response Rate
NFTA Bus Operators	450	40 / 9%
Ecology & Environment (environmental engineering consultant, Lancaster)	100	17 / 17%
URS Consultants (engineering consultants, downtown Buffalo)	50	28 / 56%
Calspan Employees (technical/research corporation, Cheektowaga)	125	34/27%
Media	5	0 / 0%
Miscellaneous	6 (on request only)	6
TOTAL	736	125/17%

8.2 Transportation Agency Survey Results

For the agency survey, the 33 respondents generally indicated moderate to high familiarity with ITS, as expected, though a few were not familiar with it at all. Two-thirds of the respondents were members of NITTEC, and about one-half were in the WNYIMT. The most common agency functions were maintenance, public works and public safety.

An overall theme, in terms of both current function and potential ITS applications, was that funding and adequate staffing were major problems, followed closely by inter-agency cooperation and communication, and jurisdictional barriers.

Specific locations causing operational problems included major border crossings and bridges, much of the I-190 and the Kensington Expressway, plus various interchanges or ramps, including the Scajaquada Expressway at Parkside and at Main Street, the I-290/I-90 interchange and I-90 at NY 400.

With respect to system objectives and performance measures, the respondents rated congestion reduction/travel time improvements and safety benefits as most important, while de-emphasizing



bicycle and pedestrian facilities, transit system performance and environmental measures such as air quality and energy savings. Thus improved incident management and expedited border crossings and pre-clearance of commercial vehicles ranked high. Improvements to standard transit service (buses and light rail transit) were viewed as somewhat helpful to relieving congestion, but not specialized transit such as "dial-a-ride" or shuttle service.

Traveler information relating to congestion, weather and incidents was viewed positively, but lodging and retail information was ranked low, though a survey directed at tourists might have had different results. The recommended communication media of this information to the public was commercial and highway advisory radio, plus variable message signs. Such information was judged most effective at roadside stations, retail/shopping centers and tourist centers, but not effective via the Internet, computer bulletin boards or cable TV.

To relieve congestion, the most important actions were identified to be signal timing and coordination work, incident management and traffic control centers. Lesser importance was assigned to ramp metering, courtesy patrols and vehicular probes.

The easiest traffic management and traveler information items to implement were judged to be electronic toll collection, incident detection and obstruction removal, information sharing and improvement of staff capabilities. Consistent with previous responses, however, funding and making staff available were cited as problem areas, along with general data collection and processing, which tends to confirm difficulties with inter-agency cooperation.

In the area of advanced safety and warning systems, weather and pavement advisories plus de-icing programs were seen to be most beneficial, while vision enhancement and visibility warnings were viewed as moderately helpful. Least important were railroad and pedestrian crossing improvements, crossing advisories, in-vehicle "mayday" devices and emergency vehicle signal pre-emption.

The most beneficial technologies to encourage mass transit system use were identified to be bus signal pre-emption, timed transfers, "on-time" displays and schedule information, all of which can be seen as minimizing travel or wait time. Other transit elements (see Appendix A, Question 19) were rated as moderately effective.

In the area of commercial vehicle operations, respondents viewed electronic credential checking and "one-stop" shopping as most beneficial, while other potential actions were generally rated moderately beneficial (Question 20).

The best known existing ITS installations were the NYSTA "EZ-Pass" toll collection and variable message signs on the Peace Bridge, I-190 and I-90. Other existing items, including weather advisory radio and closed circuit TV cameras were moderately well known.

With respect to funding, respondents saw state gas/commercial vehicle taxes and federal dollars as primary sources. Less desired were a variety of locally based sources such as head taxes, bonds, city/county funds and congestion pricing/toll monies.



A general point seen through several question responses was that actions related to railroads such as freight line relocation or crossing advisories ("train approaching" radio signal sent to commercial vehicles and buses) were not seen as particularly useful. This result largely reflects the fact that rail-highway conflicts are not very severe in the region.

Finally, this group of respondents viewed ITS favorably. They indicated a willingness to support ITS via planning and design efforts, advisory roles and agency cooperation, even though they indicated their organizations lacked financial resources. They found highway transportation to be much more important than public transportation, though this may have been reflective of the particular audience.

8.3 Critical Stakeholder Interviews

The project team attempted to contact all of the critical stakeholders listed in Table 7-1 to conduct follow-up phone or in-person interviews to the agency survey. A question outline is included in Appendix A, with the purpose of gaining further insight into issues, problems and solutions. In all, twelve interviews were conducted, three by telephone and the rest in person.

Overall the interviews re-enforced the results of the written surveys. Several stakeholders indicated that funding, staffing and inter-agency coordination issues were the biggest barriers to ITS. There was a fair level of interest in developing a Regional Operations Center, though institutional control issues must be addressed. Stakeholders look to this project to provide an overall ITS vision, improve agency cooperation and lay out a system architecture.

Other points are as follows:

- Several agencies intend to continue installing ITS components as funding allows.
- NITTEC and the WNYIMT are useful organizations, at a minimum, to foster cooperative efforts. NITTEC, however, needs to accomplish some concrete results or it is in danger of losing a role in the region.
- Though one stakeholder indicated the real border crossing competition is the Detroit/Windsor area, other stakeholders indicated that there is a good deal of competition between the two regional bridge authorities, the NFBC and the PBA.
- Conflicting views are similarly expressed regarding customs and immigration services on both sides of the border and their impact on operations. Overall, stakeholders recognize the different missions of customs and immigration (i.e. security and enforcement), and work with them as best as possible.
- Construction of the Niagara Falls gaming casino this year may provide a good opportunity for inter-agency cooperation in traffic management to address the major traffic impacts.



8.4 General Survey Results

The 85 general survey respondents who were not NFTA bus operators indicated an unusually high familiarity with ITS; 70% said they were somewhat familiar or very familiar. Considering their typical engineering background, however, this rate was not that surprising (this question was edited out of the NFTA bus operator survey by NFTA management). Over half of the 85 classified themselves as engineers or related-field personnel, such as land surveyor or systems analyst. Perhaps because of this background as well, most (about 60%) felt advanced technology could help improve transportation, and another 30% said maybe.

Forty-two additional respondents were NFTA bus operators, for a total of 127 respondents. The vast majority of the 127 normally drove to work alone (77%) or with another person (10%), with the remainder taking transit, walking or bicycling. Average commute time was 22 minutes, which is fairly typical of medium size metropolitan areas in the U.S.

The respondents identified the following major transportation system "trouble spots": I-290/I-90 interchange, the Peace Bridge, the Kensington/Scajaquada interchange, the Rich Stadium area, the Scajaquada on/off ramps at Parkside and I-90 at Galleria. The entire NY 33/Kensington Expressway from Transit Road to downtown was also identified, along with I-190 from I-90 to downtown.

With respect to objectives and actions for improving regional transportation, coordinating traffic signals, relieving day-in/day-out congestion and improving safety ranked as most important, which was similar to the agency survey. Improvement to conventional transit service also was ranked as important. The only items clearly ranked as minor were "dial-a-ride" transit service, and instituting truck time restrictions, while all other actions fell in between.

Regarding real-time traveler information broadcasts, use of radio and VMSs ranked high as in the agency survey, while the Internet and computer bulletin boards again ranked low. Most preferred locations for information display kiosks were the airport, tourist centers, transit stops and roadside stations. The lowest rankings, though still in the moderate range, were assigned to duty free shops and office/government buildings.

Familiarity with existing ITS projects was about the same as the agency survey, with highest knowledge of the EZ-Pass and moderate knowledge of all other items (e.g., Skyway closing system, VMSs). Only CCTVs were not very well known.

Also much like the agency survey, federal and state dollars were the most favored funding sources. Congestion pricing/tolls and user fees were ranked as "moderate" sources, and local sources fell below the others.

The general survey also drew out a wide variety of comments on several issues, which are tabulated in Appendix B. Main points were:



- Additional "trouble spots" include Transit Road at Main and at Genessee, and; Niagara Falls Boulevard at Sheridan, Maple and I-290.
- A number of respondents noted that traffic problems in Buffalo were not that bad, particularly compared to other metropolitan areas of the northeast U.S.
- Several respondents commented on the need or desirability of improving transit service in Buffalo.
- Several respondents indicated the need to spend more money on basic road maintenance (road surfaces, potholes, bridge maintenance, side streets), often in preference to ITS actions.
- Better signal coordination and toll booth elimination/electronic toll collection received a few supportive comments.



9.0 EXECUTIVE SUMMARY

This working paper provides an overview of the existing transportation system in the Buffalo/Niagara region, considering both physical features and institutional characteristics. This is the first of several in a series that together will constitute a strategic plan for Intelligent Transportation Systems (ITS) in the region.

Major roads are described in terms of functional classification, laneage and operating difficulties. The National Highway System routes, designated truck routes, and the long range transportation plan including highway and transit facilities are discussed.

Regional transportation agencies are reviewed in terms of characteristics, role and operating facilities. Working relationships of the various agencies are initially explored, covering several entities on both sides of the international border.

The 5-year Transportation Improvement Program (TIP) for the metropolitan area is summarized. In total, about \$650 million dollars have been allocated over the 1994-99 time frame, pending current revisions. Two ITS related projects are on-going, including this ITS Study.

Existing ITS facilities in the region can be characterized as basic, covering individual components that are not coordinated in any systematic way. These components include electronic toll collection facilities, automated border crossing capabilities, traffic surveillance on primary international border crossings and a handful of variable message signs. Coordinated signal operations are just beginning to be used on a wide area basis, while traffic operations centers are similarly at an early stage of development, including one such regional effort by the Niagara International Transportation Technology Coalition. There is a fair amount of interest across agencies in constructing and operating a regional center that may ultimately coordinate traffic operations, incident management and travel information, plus serve other functions.

Existing traffic volumes on 25 major traveled roadway segments are listed and resulting Levels of Service (LOS) are presented. Overall, there are nine segments operating at LOS F (worst), eight at LOS E, seven at LOS D and at one segment at an acceptable LOS; LOS C to D is a desirable minimum. High accident locations have been similarly identified and located on a graphic.

Major players with an interest in ITS are the Niagara International Transportation Technology Coalition (NITTEC) and the Western New York Incident Management Team (WNYIMT). From these two multi-agency organizations and others, a list of critical stakeholders in ITS has been developed. These stakeholders have provided key input over the course of this project.

Two surveys of people in the region have been completed: one for personnel involved in transportation planning or operations, and the other a less technical version for a more general audience. In general the surveys identify major ITS implementation barriers to be funding, staffing and inter-agency cooperation. Specific "trouble spots," potential ITS actions and preferred funding sources are some of the other issues covered in the surveys. Follow-up interviews with the critical



stakeholders essentially re-iterate the survey results and provide more insight into the detailed operational and institutional issues.

Overall, this working paper lays the groundwork for conceiving, discussing and evaluating ITS actions in the Buffalo/Niagara region. Subsequent working papers will build on this work so that an overall vision for ITS can be developed, and a plan for implementation including specific projects and priorities can be spelled out.



APPENDIX A

TRANSPORTATION AGENCY SURVEY,

LIST OF RESPONDENTS

&

FOLLOW-UP QUESTIONS FOR CRITICAL STAKEHOLDERS

Intelligent Transportation System Study - Buffalo /Niagara Falls **SURVEY**

The New York State Department of Transportation has initiated a consultant study to provide the Erie and Niagara County area with an Intelligent Transportation System (ITS) Architecture. The study objective is to identify traffic congestion and safety problem areas and then define available ITS strategies that reduce the vehicle hours of delay, or reduce or eliminate the potential of vehicle conflicts and / or accidents.

Why this survey...as explained in our introductory letter to you, for a successful system, it is important that your input be obtained to ensure that the proposed system architecture encompasses your needs and desires. As the terms included in this survey are specifically related to Intelligent Transportation Systems, a glossary is attached to help familiarize you with these terms.

GENERAL INFORMATION

1. What is your current level of knowledge regarding ITS? *[check one]*

_____ This is the first I have heard of ITS.
_____ I am aware of the general technologies and applications.
_____ I am very familiar with ITS technologies and applications.

2. Do you think advanced technology applications can help manage, operate, and/or maintain transportation systems?
[check one]

_____ Yes _____ No _____ Maybe

3. What are **your** responsibilities within your organization? *[check all that apply]*

_____ Advisory	_____ Review	_____ Decision Making
_____ Policy	_____ Strategic Planning	_____ Goal-Setting
_____ Public Relations	_____ Resource Allocation	
_____ Other _____		

4. What type of organization do you represent? *[check one]*

_____ Federal Agency	_____ State Agency	_____ County Agency
_____ Municipal Agency	_____ Bridge Authority	_____ Tollway Authority
_____ University/College	_____ Planning Agency	_____ Manufacturer
_____ Commercial Vehicle Operation	_____ Tourism Service	_____ Recreational Service
_____ Emergency Response Service	_____ Other _____	

5. What is the primary function of your organization? *[check all that apply]*

_____ Planning	_____ Design	_____ Operations
_____ Maintenance	_____ Policy	_____ Review
_____ Public Works	_____ Law Enforcement	_____ Emergency Services
_____ Public Transportation	_____ Public Safety	_____ Commercial Vehicle Operations
_____ Aeronautics	_____ Freight Movement	_____ Passenger Transport
_____ Environmental	_____ Customs	_____ Immigration
_____ Toll Operations	_____ Other _____	

Intelligent Transportation System Study - Buffalo /Niagara Falls

SURVEY

SYSTEM STATUS

6. What major obstacles are you currently encountering related to the function and operation of transportation systems?
[check all that apply]

☐ Funding	☐ Maintenance	☐ Staffing
☐ Border Delays	☐ Information Exchange	☐ Organizational Structure
☐ Public Perception	☐ Technical Expertise	☐ Equipment Shortages
☐ Jurisdictional Barriers	☐ Enforcement	☐ Laws/Regulations
☐ Response Time	☐ Land Use Planning	☐ Ridership
☐ Communications/Cooperation (between members of your organization)		
☐ Communications/Cooperation (between your organization and external entities)		
☐ Other _____		

7. Are there specific locations or segments of the existing transportation system in the Niagara Frontier that hinder your organization's operation? [check all that apply]

☐ I-190 (Niagara Falls)	☐ Route 33 from Transit Road to I-90
☐ I-190 (Upper Niagara Section)	☐ Kensington Expwy (Rt. 33) from I-90 to SH 198
☐ I-190 (Lower Niagara Section)	☐ Kensington Expwy (Rt. 33) from SH 198 to Downtown
☐ I-190 (Downtown to I-90)	☐ I-90 @ Galleria
☐ Route 198 Interchange with I-190	☐ I-90 @ SH 400
☐ Route 198 On & Off Ramps at Parkside	☐ Kensington Expwy (Rt. 33) Interchange with Route 198
☐ Route 198 On/Off Ramps to Main St.	☐ Kensington Expwy (Rt. 33) Interchange with I-90
☐ I-290 Interchange with I-90	☐ Kensington Expwy (Rt. 33) Inter.w/ Michigan/Elm/Oak
☐ I-290 Interchange with Main St.	☐ Kensington Expwy (Rt. 33) On/Off Ramp at Grider (west)
☐ I-219 @ I-90	☐ Kensington Expwy (Rt. 33) Interchange with Union Rd.
☐ I-219 Interchange with Milestrip	☐ Kensington Expwy (Rt. 33) Exit at Dick Road
☐ Route 400 NB Ramp to Seneca	☐ Rainbow Bridge
☐ Peace Bridge	☐ Grand Island Bridges
☐ Queenston-Lewiston Bridge	☐ Main St. @ _____
☐ Rich Stadium	☐ Niagara Falls Blvd. @ _____
☐ Transit Road @ _____	☐ Other _____

Comments: _____

8. For Agencies having a transportation-related purpose please provide a brief *Mission Statement* regarding your agency/division/department. All other agencies/firms please skip to the next question.

Be as specific as possible and include performance measures if applicable. More than one statement is legitimate.
[Examples: "to maintain average speeds on all arterials within the city limits at 24 mph or greater;" "to reduce rear-end collisions by 20 percent;" "to respond to all incidents within 5 minutes;" "to increase ridership by 5 percent per year;" "to respond to complaints within 24 hours;" "to meet mobile source emission standards by 1997;" "reduce transportation demand by 10% by Year 2000;" "reduce single occupancy vehicle usage by 1%."]

Intelligent Transportation System Study - Buffalo /Niagara Falls **SURVEY**

9. From your organization's perspective, what major concerns and/or issues are you facing that can impose barriers to accomplishing your mission and goals? *[list all, whether transportation-related or not]*

- a. _____
- b. _____
- c. _____

10. Rate *[1=imperative; 2=important; 3=minor; 4=insignificant; 5 = do not know]* the following systems objectives for improving the movement of people and goods within the Niagara Frontier:

- | | |
|---|--|
| _____ Increase Roadway Capacity | _____ Relieve Roadway Congestion |
| _____ Increase Traveler Safety | _____ Enhance Traveler Mobility |
| _____ Preserve/Protect Environment | _____ Decrease Single Occupancy Vehicle Use |
| _____ Encourage Transit Use | _____ Provide Better Traveler/User Information |
| _____ Customs/Immigration Pre-Clearance | _____ Expand Bicycle/Pedestrian Trail System |
| _____ Improve Emergency Response | _____ Manage Recurrent/Non-Recurrent Incidents |
| _____ Manage Commercial Vehicle Travel | _____ Manage Recurrent/Non-Recurrent Congestion |
| _____ Manage/Control Growth | _____ Provide Comprehensive Communications Systems |
| _____ Alter Land Use Patterns | _____ Monitor Hazardous Materials Transport |
| _____ Provide Electronic Toll Systems | _____ One Stop Shopping (CVO) at Customs or Weigh Stations |
| _____ Other _____ | |
| _____ Other _____ | |

11. What are your organization's specific transportation needs? *[check all that apply--please provide specific comments as appropriate]*

- | | |
|--|-----------------------------------|
| _____ Enhanced Communications Systems (Physical Plant) | |
| _____ Accurate/Reliable Data | _____ Capital Improvement Dollars |
| _____ Operating Dollars | _____ Training |
| _____ Staff | _____ Equipment Upgrades |
| _____ Data Processing Systems | _____ Better Staff Relationships |
| _____ Interagency Coordination | _____ Legislative Changes |
| _____ Policy & Procedure Revisions | _____ Other _____ |
| _____ Other _____ | |

Comments: _____

12. What current and potential challenges may be encountered in developing a transportation system that meets (or exceeds) your agency's needs? *[check all that apply]*

- | | | |
|------------------------------|-------------------------|--------------------------------|
| _____ Institutional Barriers | _____ Public Acceptance | _____ Federal/State Compliance |
| _____ Cooperative Efforts | _____ Laws/Regulations | _____ Capital Funds |
| _____ Operating Funds | _____ Other _____ | _____ Other _____ |

Intelligent Transportation System Study - Buffalo /Niagara Falls **SURVEY**

PRIMARY INFORMATION NEEDS

13. What types of "real-time" and static information are useful to the general traveling public to make better decisions regarding trip making? *[use the 10 point scale to rate each type of information, where "1" means "very useful" and "10" means "not useful."]*

Airline Schedules	Tourist Information	Weather Conditions
Transit Schedules	Special Events	Ski Conditions/Snow Reports
Route Guidance	Lodging/Retail Information	Bike/Pedestrian Routes
"How To Get There" Instructions	Government Services	Emergency Services
Traffic Congestion (Roads)	Travel Times (Roads)	Travel Speeds (Roads)
Traffic Congestion (Bridges)	Travel Times (Bridges)	Travel Speeds (Bridges)
Alternate Routes (Roads)	Road Surface Conditions	Accident Locations
Alternate Routes (Bridges)	Maintenance Zones (e.g. pothole patching)	
Construction Zones (e.g. roadway widening)	Other	

INTELLIGENT TRANSPORTATION SYSTEMS

14. If an area-wide Advanced Traffic Management System (ATMS) were to be proposed, rate the potential of the following subsystems to ease your traffic congestion problems? *[1=imperative; 2=important; 3=minor; 4=insignificant; 5 = do not know] [check all that apply]*

Improved Signal Coordination & Timing	Ramp Metering
Video Surveillance	Accident Management
Courtesy Patrols	Pavement/Weather Sensors
Communications Links	Vehicular Probes
Emergency Call-In Programs	Traffic Control Centers
Changeable Roadside Message Signs	Electronic Toll Systems
Commercial Vehicle Pre-Clearance	One Stop Shopping (CVO)
Other	

15. Rate the following systems for their ability to relieve Niagara Frontier transportation problems: *[1=imperative; 2=important; 3=minor; 4=insignificant; 5 = do not know]*

Arterial Roadway Improvements	Improved Accident/Breakdown Management
Day-in/Day-out Congestion Management	Enhanced Air Passenger Transport
Information Systems	Regional Commuter Rail
Freight Rail Relocation	Light Rail Transit
Enhanced Law Enforcement	Private Shuttle Services
Intermodal Facilities	Enhanced Bus Service
Enhanced Bicycle/Pedestrian Facilities	"Dial-a-ride" Transit Service
Hazardous Materials Monitoring	Pre-Clearance Customs & Immigration
Commercial Vehicle Pre-Clearance	One-Stop Shopping (CVO Credentials)
Commercial Vehicle Delivery Time Restrictions	
Other	
Other	

Intelligent Transportation System Study - Buffalo /Niagara Falls **SURVEY**

16. How difficult do you expect implementation to be for the following areawide Advanced Traffic Management System (ATMS)/Advanced Traveler Information System (ATIS) items? *[rate each on a scale from 1 to 10 where "1" means "not difficult at all," and "10" means "extremely difficult"]*

Staff Availability - Operations	Staff Capability - Operations
Staff Availability - Maintenance	Staff Capability - Maintenance
Staff Retraining/Cross-Training	Communications Systems (Physical Plant)
Staffing Funds	Hardware/Software Compatibility betw. systems
Data Collection/Processing	Information Dissemination
Planned Responses	Jurisdictional Responsibilities
Freeway vs. Arterial Operation Tradeoff	Obstruction Removal
Alternate Routing	Data Interfaces/Protocols
Incident Identification	Dispatch Authority
Information Sharing	Interagency Cooperation
Interagency Agreements	Program Funds
Public Education/Outreach	Centralized Control Vs. Autonomy
Electronic Toll Systems	Collection of Tolls
Distribution of Tolls	Expedited Customs & Immigration
Other _____	

Comments: _____

17. What Advanced Safety and Warning Systems (ASWS) would improve travel conditions in your jurisdiction? *[rate each on the 10 point scale, where "1" means "significant improvement," and "10" means "no improvement"]*

Visibility Warning	Weather Advisory
Pavement Condition Advisory	Deicing Programs
In-Vehicle Mayday Devices	Incident Investigation Sites
Improved Roadway Delineation	Pedestrian Crossing Advisory
In-Vehicle Collision Sensor/Warning Devices	Improved Incident Response
Railroad Crossing Advisory	In-Vehicle Vision Enhancements
Emergency Vehicle Signal Preemption	Highway Advisory Radio
Provide "Delays Ahead" Warning	
Other _____	

18. Real-time Advanced Traveler Information Systems (ATIS) can help travelers make more informed decisions regarding their trip-making. What systems do you think would be appropriate in the Region? *[use the 10 point scale to rate each system, where "1" means "highly effective" and "10" means "not effective."]*

Real-time traffic, weather, road condition information broadcast via:

Cable TV	AM/FM Radio Stations	Computer Bulletin Board
Internet	In-Vehicle Devices	Changeable Roadside Message Signs
Highway Advisory Radio	Other _____	Other _____

Computerized information displays (kiosks) at:

Buffalo Int'l Airport	Resorts/Recreation Areas	Government Buildings
Tourism Centers	Roadside Stations	Commercial Office Buildings
Bus Stops	Park-Ride/Light Rail Stations	Retail/Shopping Centers
Duty Free Shops	Railroad Stations	Other _____

Intelligent Transportation System Study - Buffalo /Niagara Falls SURVEY

19. What Advanced Public Transportation Systems (APTS) can improve service to encourage travelers onto mass transit? *[use the 10 point scale to rate each system, where "1" means "highly effective" and "10" means "not effective."]*

☐ Automated Dispatch	☐ Automated Vehicle Tracking	☐ On-Board Schedule Information
☐ "On-Time" Displays	☐ Signal Preemption	☐ Timed Transfers
☐ Remote Site Schedule Info		
☐ Data/Voice Communications, Traffic Operations Center to from vehicles		
☐ Other _____		

20. Commercial Vehicle Operations (CVO) within the Niagara Frontier are highly regulated. What systems would benefit CVO? *[use the 10 point scale to rate each system, where "1" means "highly effective" and "10" means "not effective."]*

☐ Electronic Credential Checking	☐ "Portable" Ports of Entry
☐ Hazardous Materials Transport Routing	☐ Hazardous Materials Incident Response
☐ Open Cargo Restrictions/Monitoring	☐ CVO Incident Management Systems
☐ Peak Period Road Use Pricing	☐ Weigh-In-Motion vs. Static Weigh Stations
☐ One Stop Shopping (CVO Credentials)	☐ Automated Fuel Tax Enforcement
☐ Automated Truck Rollover Advisory	☐ Other _____

21. The following are a list of some current ITS projects already operating within the Niagara Frontier. Please rank your knowledge of these projects *[use a 10 point scale to rate each project, where "1" means "I am very well informed on this project and its benefits" and "10" means "I am not familiar with this project and its benefits."]*

☐ Initial Changeable Roadside Message Signs on I-190 and I-90
☐ Changeable Roadside Message Signs Buffalo & Fort Erie Public Bridge Authority (BFE PBA)
☐ Closed Circuit Television Cameras Buffalo & Fort Erie Public Bridge Authority
☐ Automatic Toll Collection (EZ-Pass) New York State Thruway Authority (NYSTA)
☐ Weather Advisory Station 1610 AM Band NYSTA
☐ Automatic Toll Collection / Border Inspection (Canadian Side) BFE PBA (FUTURE)

22. Are you aware of the Niagara International Transportation Technology Coalition (NITTEC)? _____ Yes _____ No

Do you or your organization actively participate in NITTEC? _____ Yes _____ No

23. Are you aware of the Western New York Incident Management Team (WNYIMT)? _____ Yes _____ No

Do you or your organization actively participate in WNYIMT? _____ Yes _____ No

IMPLEMENTATION BARRIERS

24. What do you think of Intelligent Transportation System (ITS) initiatives? *[check one]*

☐ I support ITS.
☐ I think ITS has potential.
☐ I am skeptical.
☐ I am against ITS.

25. Are you willing to participate in and educate others about the benefits of ITS? *[check one]*

_____ Yes _____ No _____ Maybe

Intelligent Transportation System Study - Buffalo /Niagara Falls **SURVEY**

26. What might your organization provide that has potential to improve the movement of people and goods?

[check all that apply]

☐ Legislative Action	☐ Management Support	☐ System Data
☐ Communication Links	☐ Cooperative Agreements	☐ Equipment
☐ Maintenance	☐ Marketing	☐ Production
☐ Planning/Design Assistance	☐ Manpower	☐ Monetary Support
☐ Advise	☐ Policy Making	☐ Other _____
☐ Other _____		

27. Would your agency be willing to share in the cost to implement Intelligent Transportation Systems? *[check one]*

☐ Yes ☐ No ☐ Maybe

How? *[check all that apply]*

☐ Provide Personnel	☐ Provide Equipment
☐ Allocate Revenue	☐ Provide Technical Assistance
☐ Perform System Evaluations	☐ Make Infrastructure Improvements
☐ Other _____	

28. Where do you think dollars should come from to implement ITS projects? *[For each, indicate ITS obligation; "1=major", "2=moderate", "3=minor", "4=no opinion"]*

☐ Federal Sources (programs, grants, legislation)
☐ State Tax Dollars (gas tax; commercial vehicle tax)
☐ Local County/Municipal Cooffers (property/commercial/sales tax levies; parking/moving violation fines)
☐ Bonds
☐ Transportation Impact Fees / User Fees
☐ Transportation Head Tax
☐ Congestion Pricing/Road Tolls / Bridge Tolls
☐ Other _____

29. The performance of Intelligent Transportation System applications (how well each subsystem performs individually and in relation to others) is vital. How that system performance is evaluated is an issue. Rank the importance of the following performance measures as appropriate and reasonable. *[use a 5 point scale where "1" means "very important" and "5" means "not important"]*

☐ Day-in/Day-out Congestion Travel Time	☐ Incident-Related Vehicle Hours of Delay
☐ Day-in/Day-out Throughput (Vehicles Served)	☐ Total Vehicle Hours of Delay
☐ Mode Split	☐ Number/Severity of Accidents
☐ Level of Service	☐ Number of Secondary Incidents
☐ Accident/Breakdown Response Time	☐ Life Cycle Cost
☐ Capital Cost	☐ Pollutant Levels
☐ Energy Usage	☐ ITS Facility Usage (Frequency)
☐ Generated Revenue	☐ Public Acceptance
☐ Number of Equipment Failures	☐ Subsystem/system required maintenance effort
☐ Other _____	☐ Other _____

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

City: _____ Zip: _____ Telephone: _____ Fax: _____



RESPONDENTS TO TRANSPORTATION AGENCY SURVEY:

PARTICIPATING AGENCIES

AAA Western & Central New York
Adelphia Cable Communications
Buffalo and Fort Erie Public Bridge Authority
Buffalo Department of Public Works
Buffalo Police Department
CJ Tower Inc. (Tower Group International)
Erie County Fire Training Academy
Erie County Department of Public Works
Greater Buffalo Partnership
Ministry of Transportation Ontario
Niagara County
Niagara County Department of Public Works
Niagara Frontier Transportation Authority
Niagara Falls Bridge Commission
Niagara Falls, New York
Niagara Falls, Ontario
Niagara Parks Commission
New York State Department of Conservation
New York State Department of Transportation
New York Division of State Police
New York State Thruway Authority

DRAFT PHONE INTERVIEW QUESTIONNAIRE

March 25, 1996

Follow-Up to Agency Written Survey

5. Please describe in more detail what your job responsibilities are.
6. Can you tell me a little more about the major obstacles that you are currently encountering related to the function and operation of transportation systems?
7. At each specific location, what are the problems, what time of day, and in what direction do you encounter them?
12. Please describe further the challenges you perceive that may be encountered in developing a system that meets your needs. Especially focus on institutional issues.
16. Please describe ATMS/ATIS difficulties further and why they are a problem.
22. If yes (NIITEC), what do you get out of it; likes, dislikes - would like to see more of anything?
23. If yes (WNYIMT), what do you get out of it; likes, dislikes - would like to see more of anything?
24. If skeptical, why? If against, why?
25. If yes, how would you like to participate? (We may tell him/her how we would like to participate.)
27. If yes, how could your agency share in cost?
30. Expand on any cryptic/interesting comments.



APPENDIX B
GENERAL SURVEY
&
SUMMARY OF GENERAL COMMENTS

Intelligent Transportation Systems Study - Buffalo/Niagara Falls SURVEY

The New York State Department of Transportation has initiated a study to provide the Erie and Niagara County area with an Intelligent Transportation Systems (ITS) plan. The study objective is to identify traffic congestion and safety problem areas and then define ITS strategies that reduce travel delay, vehicle conflicts and / or accidents. See the attached glossary if you are unfamiliar with some of the terms used here.

Why this survey...to create a successful transportation system, it is important that we obtain your input.

GENERAL INFORMATION

1. What is your current level of knowledge regarding ITS? *[check one]*

☐ This is the first I have heard of ITS.
☐ I am aware of the general technologies and applications.
☐ I am very familiar with ITS technologies and applications.

2. Rate *[1=imperative; 2=important; 3=minor; 4=insignificant; 5 = do not know]* the following objectives and actions for improving the movement of people and goods within the Niagara Frontier:

☐ Increase Roadway Capacity	☐ Relieve Day-In/Day-out Congestion
☐ Increase Traveler Safety	☐ Manage/Control Growth & Land Use Patterns
☐ Preserve/Protect Environment	☐ Decrease One-Person Vehicle Use
☐ Improve Transit Service (Bus,Metro Rail)	☐ Enhance Law Enforcement on the Road
☐ Encourage Transit Use	☐ Provide Better Traveler/User Information
☐ Speed Up Customs/Immigration	☐ Expand Bicycle/Pedestrian Trail System
☐ Improve Emergency Response	☐ Better Manage Incidents (accidents / breakdowns)
☐ Provide Electronic Toll Systems	☐ Monitor Hazardous Materials Transport for Emergency Preparedness
☐ Enhance Air Passenger Transport	☐ Provide "Dial-a-ride" Transit Service
☐ Institute Truck Delivery Time Restrictions	☐ Coordinate Traffic Signals in the Metro Area
☐ Provide Commuter Rail	☐ Other _____
☐ Speed Up Commercial Vehicle (Truck) travel through Customs & Weigh Stations	☐ Other _____

3. Real-time Advanced Traveler Information Systems (ATIS) can help travelers make more informed decisions regarding their trip-making. What systems do you think would be appropriate in the area? *[use the 10 point scale to rate each system, where "1" means "highly effective" and "10" means "not effective."]*

Real-time traffic, weather, road condition information broadcast via:

☐ Cable TV	☐ Radio Stations	☐ Computer Bulletin Board
☐ Internet	☐ In-Vehicle Devices	☐ Variable Message Signs
☐ Highway Advisory Radio	☐ Other _____	☐ Other _____

Computerized information displays of maps/schedules, services and delay points at:

☐ Buffalo Int'l Airport	☐ Resorts/Recreation Areas	☐ Government Buildings
☐ Tourism Centers	☐ Roadside Stations	☐ Commercial Office Buildings
☐ Bus Stops	☐ Park-Ride/Light Rail Stations	☐ Retail/Shopping Centers
☐ Duty Free Shops	☐ Railroad Stations	☐ Other _____

Intelligent Transportation Systems Study - Buffalo/Niagara Falls

SURVEY

4. The following is a list of some current ITS projects already operating within the Niagara Frontier. Please rank your knowledge of these projects *[use a 10 point scale to rate each project, where "1" means "I am very well informed on this project and its benefits" and "10" means "I am not familiar with this project and its benefits."]*

☐ Variable Message Signs on I-190 (@ Dunlop Plant, @ Ogden Toll Plaza) and
 I-90 (@ Williamsville Toll Plaza/Thruway) (Presently not in full operation)
☐ Peace Bridge Customs Lane Delineation Signs
☐ Electronic Toll Collection (EZ-Pass) on the New York State Thruway (Grand Island bridges, Breckenridge
 and Ogden Toll Booths)
☐ Weather Advisory Station 1610 AM Band on the New York State Thruway
☐ Coordinated Signals (e.g. Elm/Oak Arterials in downtown Buffalo)
☐ Skyway Closing and Notification System
☐ Closed Circuit Television Cameras on the Buffalo & Fort Erie Public Bridge Authority Bridges

5. Where do you think dollars should come from to implement ITS projects? *[For each, indicate ITS obligation; "1=major", "2=moderate", "3=minor", "4=no opinion"]*

☐ Federal Sources (programs, grants, legislation)
☐ State Tax Dollars (gas tax; commercial vehicle tax)
☐ Local County/Municipal Coffers (property/commercial/sales tax levies; parking/moving violation fines)
☐ Bonds
☐ Transportation Impact Fees / User Fees
☐ Transportation Head Tax
☐ Congestion Pricing/Road Tolls / Bridge Tolls
☐ Other _____

6. Please identify locations or segments of the existing transportation system that are "trouble spots" for you? *[check all that apply]*

☐ I-190 (Niagara Falls)	☐ Route 33 from Transit Road to I-90
☐ I-190 (Upper Niagara Section)	☐ Kensington Expwy (Rt. 33) from I-90 to SH 198
☐ I-190 (Lower Niagara Section)	☐ Kensington Expwy (Rt. 33) from SH 198 to Downtown
☐ I-190 (Downtown to I-90)	☐ Kensington Expwy (Rt. 33) Interchange with I-90
☐ I-290 Interchange with I-90	☐ Kensington Expwy (Rt. 33) Inter.w/ Michigan/Elm/Oak
☐ I-290 Interchange with Main St.	☐ Kensington Expwy (Rt. 33) On/Off Ramp at Grider (west)
☐ I-219 @ I-90	☐ Kensington Expwy (Rt. 33) Interchange with Union Rd.
☐ I-219 Interchange with Milestrip	☐ Kensington Expwy (Rt. 33) Exit at Dick Road
☐ Route 400 NB Ramp to Seneca	☐ Kensington Expwy (Rt. 33) Inter. w/ Scajaquada Expwy(Rt. 198)
☐ I-90 @ Galleria	☐ Rainbow Bridge
☐ I-90 @ SH 400	☐ Grand Island Bridges
☐ Peace Bridge	☐ Main St. @ _____
☐ Queenston-Lewiston Bridge	☐ Niagara Falls Blvd. @ _____
☐ Rich Stadium	☐ Rt. 5 Skyway Complex
☐ Transit Road @ _____	☐ Rt. 5 Woodlawn to Lackawanna
☐ Scajaquada Expwy. (Rt. 198) On/Off Ramps to Main St.	
☐ Scajaquada Expwy. (Rt. 198) On & Off Ramps at Parkside	
☐ Scajaquada Expwy. (Rt. 198) Interchange with I-190	
☐ Other _____	
☐ Other _____	

Comments: _____

7. What is your current occupation? _____

Intelligent Transportation Systems Study - Buffalo/Niagara Falls ***SURVEY***

8. Where do you start your daily commute (major cross-streets and city)? _____

9. If you work outside your home, where is your employer located (major cross-streets and city or address and city)? _____

10. How long is your average commute to work (in minutes)? _____

11. How do you normally get to work:

_____ By car, alone _____ Walk
_____ By car, with others _____ Other (please specify) _____
_____ By public transit

12. Do you think advanced technology applications can help manage, operate, and/or maintain transportation systems?

[check one]

_____ Yes _____ No _____ Maybe

13. Additional comments on any transportation issues regarding Niagara Frontier: _____

Thank You For Your Cooperation and Assistance
Please Return Your Survey By April 15, 1996

If you are interested in learning more about ITS initiatives being studied for Western New York or would like to participate in future ITS workshops, please check here _____ and provide your name and address below. If you have any questions, please call 716-847-3669.

The following information is optional:

Name: _____

Address: _____

City, Zip: _____

Tel. #: _____

[Fold Here]

Postage
Required
if Mailing

Mr. Keith Travis, P.E.
De Leuw, Cather & Company
300 Cathedral Park Tower
37 Franklin Street
Buffalo, New York 14202

[Staple Here]

Intelligent Transportation Systems Study - Buffalo/Niagara Falls

Survey Glossary

What is ITS? ITS is electronic, computer and communications technology applied to surface transportation, including private automobiles, trucks and buses, to increase safety, reduce congestion, enhance mobility, minimize environmental impact, increase energy efficiency and promote economic productivity for a healthier economy.

Presently, ITS applications in the vehicles we drive today include cruise control and anti-lock brakes. Today's highways are also utilizing ITS applications. A few examples are variable roadside message signs, closed-circuit television, and electronic toll collection ("E-Z Pass").

Accident (or Incident) Management - helps police, fire and rescue teams respond more quickly to accidents and also better manage traffic flow through the accident site; also provides accident information to other travelers to reduce the use of the roadway near the accident.

Advanced Traveler Information Systems (ATIS) - A collection of technologies aimed at providing real time information about traffic conditions, schedules and routes. The information helps travelers in planning routes. Examples: broadcast information and computerized information displays (kiosks).

Commercial Vehicle Operations (CVO) - The technologies and fleet control operations intended to improve the efficiency of trucks and other commercial vehicles.

Pre-Clearance - Such systems improve the efficiency of regulatory compliance, vehicle inspection and fleet monitoring operations by providing electronic transfer and receipt of vehicle information automatically. For example, these systems allow trucks that have been previously weighed to bypass truck scales.

One Stop Shopping (CVO Credentials) - Allows the coordination of data collected by various agencies involved in the regulation of Commercial Vehicle Operations. One Stop Shopping allows commercial vehicles to obtain the necessary paperwork and safety checks once and then electronically demonstrate compliance to other regulatory agencies.

Computer Bulletin Board - Any electronic bulletin board where travelers can use computers to receive real time or historical traffic system information, (e.g., maps). The bulletin board can be maintained by any transportation provider or groups of providers, such as the New York State Department of Transportation or a public/private bus agency.

Congestion Management - A set of plans or strategies to help transportation providers, such as the New York State Department of Transportation, better manage traffic flow on the existing transportation system. Congestion management includes capacity management, demand management and incident management.

Congestion Pricing - A strategy sometimes used to manage traffic congestion where drivers are charged a fee to use their vehicles during periods of high traffic congestion.

Coordinated Signals - Traffic signals that are timed ("synchronized") to improve a driver's chances of having a green light at traffic signals along a route.

"Dial-a-ride" Transit Service - With this transit service, users call in and request a ride, then vehicles are scheduled and routed based on demand.

Electronic Toll Systems - (ETC) An automatic means of collecting a toll to speed up the transaction.

Intelligent Transportation Systems Study - Buffalo/Niagara Falls *Survey Glossary*

ETC typically uses passes or "readers" to charge the toll fee.

Highway Advisory Radio - A traffic information radio system. Drivers are alerted to tune their car radios to a specific channel to receive traffic information.

Incidents - Accidents and breakdowns that are spontaneous, non-predictable and do not occur day-in and day-out. ITS helps detect and manage these incidents quicker so the roadway can be cleared sooner.

Intelligent Transportation Systems (ITS) - *see Glossary beginning.*

Lane Delineation Signs - Signs over the roadway that tell you which lanes may be used.

Buffalo and Niagara Falls ITS General Survey Comments

General Comments

Additional Comments
Signal Coordination should be used on many more roadways in WNY.
Efforts are needed to enhance Buffalo! The image from the airport to downtown (Route 33) is an embarrassment. Creates a very poor image to corporate executives who may think in terms of where to relocate. First impressions at major entry points (ex. airport, Peace Bridge) are critical to enhancing the image of WNY.
Fix the Streets
Coordinate municipalities to work better together.
The basic idea is not very effective and will waste more money.
Need to increase Federal & State funding for mass transportation to increase bus service and extend rail service.
This bus system is constantly shrinking due to lack of funds. It needs additional funds by all levels of government. NFTA is too management and supervisory. No concern for drivers, mechanics or general public!
Cleaner riding buses for passengers. Better maintained brakes, doors and shocks.
Need to expand rail with existing rail right-of-ways above ground.
Improve the bus system
When driving in very bad conditions or icy roads and an accident can not be avoided, a driver should not be charged or given points.
Please put up No-Standing signs at Main & North (Westbound) to North Pearl. Also, the above at Pearl & Church (East) to Main (next to the church). It's getting out of hand.
I think NFTA loses its focus on its purpose and that is bus service.
More Bus Service, which should be a public service system and not a money making system.
Service Suburban areas 2 to 3 hours at a time.
We need to keep Cold Springs Station open.
Additional police riding on buses especially during school time and nights.
Need left turn signals at major intersections on Main Street. Prohibit traffic to merge from Fillmore Ramp to Kensington Expressway.
Increase service to all night, eliminate Thruway and Expressway trips. Reduce routes that pick up only 1 or 2 people. Place buses on main roads and remove them from narrow roads like Mineral Springs.
Too many single occupancy vehicles. Carpooling should be encouraged. Perhaps a toll for SOVs while carpoolers could drive on highways for free.
Teach the public how to drive. Use center turn lanes. How to use acceleration lanes. Understanding "yield" and "exit only" signs.
Before any monies are spent on ITS, funds should be allocated for upgrading road surfaces and side streets.
Controlled merging into major arteries from feeder routes should help reduce log-jams and bottlenecks.
Major mass transit to decrease auto use.
Need Advanced warning so alternative routes can be utilized.
Put welfare recipients to work repairing parks, roads and infrastructure. Have them clean-up around the Niagara Frontier. It is an embarrassing condition.

Buffalo and Niagara Falls ITS General Survey Comments

Eliminate toll booths. Signal Timing. Peace Bridge. Route 198 to Rt. 33 to airport, always backed-up.
More resources should be placed on conserving existing capacity, planning and expansion of Transit system, particularly Light Rail.
Routine road maintenance a major problem and not addressed soon enough.
Roads need repair and the "Quick-fix" does not work!
Buffalo does not have the major traffic problems of other major Northeast Cities. Money could be best spent keeping the existing highway/road system in good repair.
Carpooling is not regarded as a good idea in this area. Would like to see a managed carpooling program.
NFTA must reorganize to make best use of available facilities.
Computerized ITSS are solely for the purpose of getting people in & out of the City faster. This will further degrade the quality of life in Buffalo, exacerbate the urban/rural split and further any number of regional ills.
Government should invest more in maintenance of roadways. When roads or bridges are upgraded they tend to break down sooner then they should. Better quality control.
Need more consistent road repairs.
I wish there was a bus/rail route towards Springville.
More coordinated signals along Main Street. Queuing problems along Main Street.
Commuting in this area is relatively trouble-free. I=d like to see an increase in the gas tax and elimination of Thruway Tolls. It seems like that would be more cost-effective. More coordinated signal systems.
NFTA is too political of a working agency. In comparison to a lot of other cities with rail transportation, we have not thought out the rail issues. Our rail line operates entirely within the City of Buffalo limits which is scarce of commercial activity.
I believe ITS could help in facilitating traffic movement, however; I believe there are more important area to focus funding. I believe in transit, although I realize there is insufficient densities to utilize this mode. Mass transit is viewed more as a service to captive riders instead of a true transportation alternative.
In general, roads are in poor condition. "Patch jobs" are poor and road work during rush hour traffic is a nuisance.
Road conditions have deteriorated to a point where travel by bicycle is dangerous. Motor vehicles are not always willing to share lane usage and adequately paved shoulders would alleviate this concern..
Believe County and Towns need more support to maintain side roads.
The basic infrastructure is adequate for the traffic volumes on average. ITS technologies are helpful, but NYSDOT should not get caught up in the "gadget environment" that has been the drawback to many new technologies. Get people out of their cars and into mass transit.
Electronic toll systems would save significant tax dollars.
Very disappointed with public transportation system in WNY. Its services are very limited.
I think we're spending too much money to improve the airport with uncertain payback.
The roads are horrible. Potholes & constant construction are a killer.
The Niagara Frontier has little, if any, pressing need for most ITS technologies concerned with relieving congestion. Safety and information systems could benefit this area.
The I-190 & I-290 and major arterials are all difficult during rush hours.
Extra time and money must be spent in this area for highway maintenance due to our severe weather conditions.