Niagara Frontier Urban Area Freight Transportation Study

Technical Memorandum No. 2

Freight Transportation System Profiles

GBNRTC

GREATER BUFFALO-NIAGARA
REGIONAL TRANSPORTATION COUNCIL
Buffalo-Niagara Falls Metropolitan Planning Organization (MPO)

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Prepared for:
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INTRODUCTION

1.1 Overview

The Niagara Frontier Urban Area Freight Transportation Study Technical Memorandum #2 is the second of five technical papers. The purpose of this document is to profile the transportation infrastructure in the Erie-Niagara region and to preliminarily identify transportation improvement opportunities. Profiles have been developed for the air cargo, highway system, rail network, maritime industry, and cross-border transportation related assets.

The infrastructure profiles have been developed from information gathered from stakeholder interviews, site inspections, published documents and internal data sources. The inventory of assets is focused more on their use in the transportation of freight in the region rather than their engineering characteristics. Engineering features relevant to performance of the assets will be profiled in Technical Memorandum #4, which evaluated future requirements based on future capacity needs and system performance.

1.2 Project Deliverables

Technical Memorandum #2 is the second of five technical papers and a final report. The papers are:

1. Technical Memorandum #1
   - Economic overview of the region

2. Technical Memorandum #2
   - Air cargo system profile
   - Highway system profile
   - Rail system profile
   - Marine system profile
   - Cross-border freight system profile
   - Preliminary identification of opportunities

3. Technical Memorandum #3
   - Rail traffic profile

- Truck traffic profile
- Marine cargo traffic profile
- Cross-border traffic flow profile
- Projected future rail volume
- Projected future truck volume
- Projected future port traffic
- Projected future cross-border flows

4. Technical Memorandum #4
   - CIMS tool development
   - Highway capacity and congestion evaluation
   - Rail capacity and congestion evaluation
   - Maritime requirements evaluation
   - Air cargo requirements
   - Air cargo diversion potential
   - Medium and long range improvement projects

5. Technical Memorandum #5
   - Public and private benefits
   - Economic analysis
   - Cost-benefit analysis
   - Sensitivity analysis

6. Final Report

AIR CARGO SYSTEM PROFILE

2.1 Air Cargo System Profile Overview

Integrated express and commercial passenger carrier (belly-space) air cargo activity within the study area is concentrated at Buffalo-Niagara International Airport (BNIA) with additional all-cargo service provided at Niagara Falls International Airport (NFIA). **Figure 2-1** illustrates the location of both airports in relation to the region's road and rail infrastructure. Both airports offer excellent access to Interstate and State highways and are near US-Canada border crossings. These border crossings provide the Buffalo and Niagara Falls International Airports with excellent access to Canadian air cargo markets, effectively extending their catchment area (geographic reach) into Ontario, Canada.

Figure 2-1: Study Area Airport Location

Through a combination of commercial passenger carriers, all-cargo and integrated express carriers, and scheduled road feeder service, these airports provide air connectivity to primary national air cargo hubs, international gateways and major metropolitan areas.

For 2006 FAA's Air Carrier Activity Information System (ACAIS), ranked Buffalo-Niagara International Airport 72nd of all U.S. airports in terms of cargo landed weight with almost 317 million lbs. Niagara Falls International Airport handled over 50 million lbs. placing it 115th in the rankings.

It is important to understand the characteristics of the broad array of carriers and carrier types operating at each airport. Each type of carrier and each market drive a different set of demands on the airport and its surrounding infrastructure. While many of these demands are centered on airside facilities, many affect air drayage patterns (trucking to and from the airport), airport access and warehouse location requirements.

In order to gauge the demand placed on Buffalo-Niagara International and Niagara Falls International Airports' air cargo facilities and their surrounding support and access infrastructure, a site visit was conducted at each airport and interviews held with representative BNIA and NFIA cargo carriers, freight forwarders, airside handlers and drayage carriers. The information garnered from these efforts is coupled with airport, carrier and market overviews as well as the *Niagara Falls International Airport: A Bi-National Air Cargo Gateway* study in order to provide a composite picture of the airside and landside cargo activity at BNIA and NFIA. This information is provided in the following sections of this chapter:

- Airport Facilities and Access
- Air Cargo Carriers
- Markets and Routes
- Development Opportunities and Challenges

2.2 Airport Facilities and Access

The following sections will detail the air cargo airside infrastructure for both Buffalo-Niagara International Airport and Niagara Falls International Airport, followed by a review of each airport's access and intermodal connectors (Interstate and State highway connections). The final sections will describe the functional categories of an air cargo airport (local market station, hub and gateway) and into which category each of the study area's airports fall.

2.2.1 Airport Facility Overview

Buffalo-Niagara International Airport houses a single airside cargo complex that handles integrated express carrier cargo, all-cargo carrier cargo and commercial passenger carrier belly-

space cargo. The cargo complex is located to the north of the passenger terminal on the opposite side of Runway 5-23. The facility houses FedEx, UPS, DHL, the US Postal Service (USPS) and cargo handler Superior Cargo Services. Prior Aviation also lists cargo as one of its services, but does not operate from the cargo complex. The air cargo complex includes seven buildings, totaling 305,000 square feet of building space. The following provides a square footage breakdown of the air cargo complex buildings:

- Multi-Tenant Building 66,250 square feet
- USPS Airmail Facility 26,000 square feet
- FedEx Building 74,000 square feet
- 301 Cayuga Road 35,000 square feet
- 303 Cayuga Road 39,200 square feet
- 305 Cayuga Road 36,300 square feet
- Flex Air Cargo Building 28,000 square feet


Multi-Tenant Building


USPS Airmail Building


FedEx Building

Note that only two of the complex's buildings (the multi-tenant building and the USPS airmail building), have direct access to the air cargo ramp (landside to airside building throughput). Buffalo-Niagara International Airport's air cargo ramp totals 87,600 square yards.


Buffalo International Air Cargo Ramp

Buffalo-Niagara International Airport supports activity from all major integrated express carriers and passenger carrier belly-space cargo. There currently are no scheduled all-cargo carriers operating at BNIA and limited ad-hoc charter activity reported. Further explanation of the operational characteristics of each type of carrier, along with facility needs, will be addressed in subsequent sections of this chapter.

Niagara Falls International Airport does not have dedicated air cargo facilities. Ad-hoc air cargo charters use NFIA's passenger terminal ramp for loading and unloading. Airside handling (loading, unloading and fueling) of these flights is done by TechAviation, a fixed-base operator (FBO) and airside service provider operating from a building adjacent the airport terminal. Kitty Hawk Air Cargo, the only scheduled air cargo carrier operating at the airport, utilizes a ramp and aircraft hangar near the Bell Aerospace and industrial facilities located on the eastern side of the airport. The hangar and ramp utilized by Kitty Hawk are not purpose-built cargo facilities. The hangar is used primarily for equipment storage, while freight processing and consolidation is done at an off-airport facility.

The Niagara Cargo Park has proposed the construction of two 35,000 square foot facilities at NFIA to expand air cargo operations.


Kitty Hawk Facility


Terminal Building

2.2.2 Access and Connectors

Unfettered mobility of freight to and from an airport, free of congestion, bottlenecks or other impediments to the movement of trucks, is essential to the viability and efficiency of an airport's air cargo operations. Of equal importance is ease of access to major highways and the Interstate system for movement of freight to and from more distant markets. This truck component of an air cargo freight movement, which either brings the freight to the airport or carries the freight

from the airport, is referred to as air drayage. Air drayage can either be local (to and from warehouses and distribution centers immediately surrounding the airport) or long distance (involving interstate truck movements of air cargo).

As illustrated in **Figure 2-2**, Buffalo-Niagara International Airport's location provides it excellent access to I-90 (the New York State Thruway) east and west, as well as I-290 to the north.

From BNIA, primary access to the Interstate network is via SR 33 (Kensington Expressway/Genesee Street). The Airport's air cargo complex is located on the western side of the Airport on Cayuga Road which connects to SR 33 to the south. SR 33 westbound connects directly to I-90 at Exit 51 for south/westbound movements, or east/northbound to connect to I-290 and I-190. I-90 eastbound can be accessed via SR 33 eastbound and SR 78 (Transit Rd.) northbound which intersects I-90 at Exit 49. SR 33 westbound also provides direct access to downtown Buffalo. The preponderance of off-airport cargo facilities (integrated express and freight forwarders) lies to the south of the Airport (south of Genesee Street and east of Dick Road)

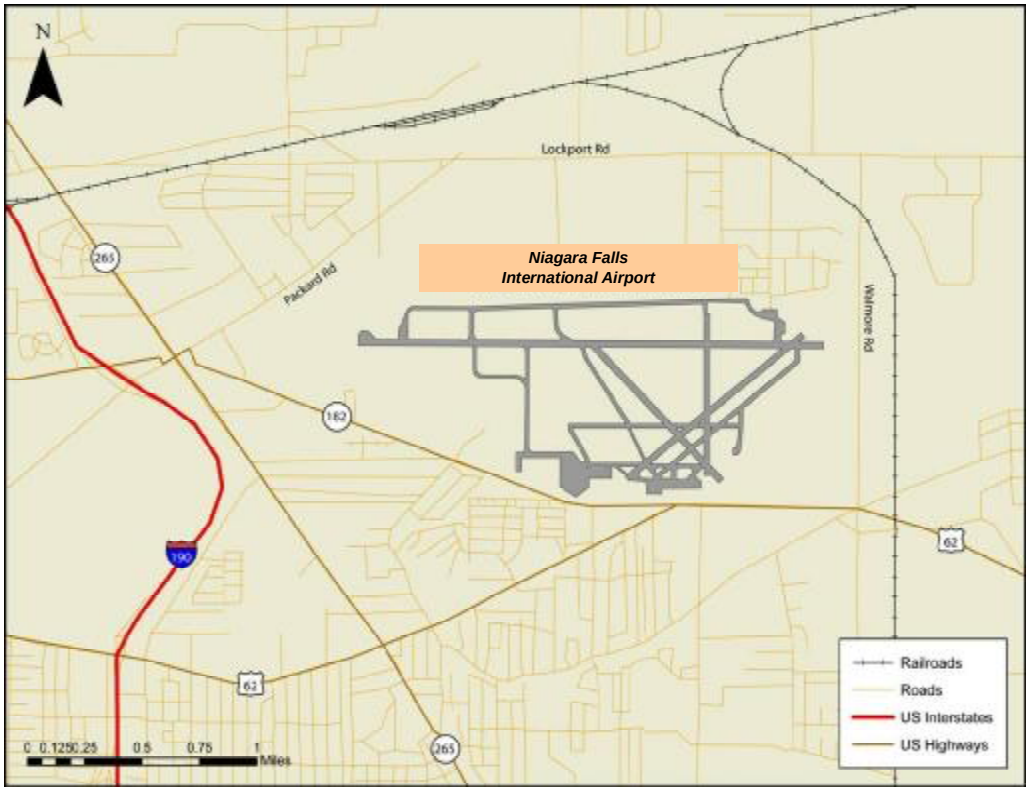
Figure 2-2: Buffalo International Airport Access

Discussions with representatives from Buffalo-Niagara International Airport, integrated express carriers and freight forwarders in the study area regarding airport access issues have yielded positive findings. Access to the Airport's air cargo facilities are generally regarded as good with no specific issues or bottlenecks reported. Airport passenger and truck traffic arriving on SR 33 from the west separate at the intersection of Genesee Street and Cayuga Road with independent access points for each (passenger terminal and cargo complex respectively). Both passenger and freight vehicles arriving on SR 33 (Genesee St.) from the east, however, share the road until passenger traffic exits for the terminal. The widening of Genesee St. near the Airport has eased congestion, improving access to both the terminal and air cargo complex. The most often cited issue has been delays caused by the construction on Highway 33 and the length of time it has taken to complete the project. At the time of this report, construction was nearing completion.

Figure 2-3 illustrates the location of Niagara Falls International Airport in relation to the nearest highways and Interstates. The airport is approximately two miles east of I-190, connected by Porter Rd. (SR 182) and Packard Road. Porter Rd. is a four-lane, signaled road through a commercial district, and is the primary access road for the passenger terminal and ramp which also accommodates ad-hoc air cargo activity. Access to the Kitty Hawk facility on the east side of the Airport is via Walmore Road, a two-lane road that connects to Porter Rd. and Niagara Falls Blvd. (U.S Rt. 62) to the south and Lockport Road to the north. Currently, there are no congestion or bottleneck issues reported for the airport's cargo operations. Scheduled cargo operations take place between midnight and 6:00 a.m., not during peak traffic periods.

Rail freight access to the airport is possible should it be necessary to serve customers located in the proximity of the airport.

Figure 2-3: Niagara Falls International Airport Access



2.2.3 Airport Market and Classification

The type of air cargo activity in relation to air cargo carrier networks dictates the function of an air cargo airport and its associated facilities. The nature of a carrier's network in relation to services provided and markets served will determine a given airport's functional classification. An air cargo airport's function can be divided into the following three categories (these functional categories are not mutually exclusive):

- Local market station
- Air cargo hub
- International gateway

Local Market Station: A local market station, or node, provides direct air cargo service (origin and destination service to an airport's surrounding market area). This function coincides with large population centers such as Buffalo, where there is a concentration of industry, commerce, and transportation infrastructure that drives air cargo demand. The local market station is the

simplest and most common type of air cargo facility. The sole function of a local market station is to collect outbound air cargo and distribute inbound air cargo to the airport's surrounding market area. As a local market station, or node, Buffalo-Niagara International Airport's role is to serve the needs of the local Buffalo-metro area market, which is typically defined as a one-hour drive from the airport. In this role, BNIA represents the end of the "spoke" in a hub-and-spoke air carrier network. Local market station operations place significant demands on access points to and from the airport since all cargo must arrive and depart the airport with limited airside dwell-time and transload operations. Both Buffalo-Niagara International and Niagara Falls International Airports' primary function is to serve the local air cargo market. The size of the market, or catchment area, is dependant on the type of carrier operating at each airport and will be examined in greater detail in subsequent sections.

Air Cargo Hub: Serving as an air cargo hub, an airport can operate independently of the surrounding market area and local demand for air cargo service. The majority of shipments to transit an air cargo hub has an origin and destination that do not coincide with that airport's surrounding market area. In effect, the hub generates artificial demand for air cargo facilities and operations at the host airport. Hub operations place an almost exclusive demand on airside facilities where sort and transload functions occur.

Neither Buffalo-Niagara International Airport nor Niagara Falls International Airport is used as a hub airport by cargo or passenger carriers. Niagara Falls International Airport experiences limited transloading (aircraft-to-aircraft transfer of freight) between the two daily Kitty Hawk flights, but no significant sort activity. Buffalo International Airport is strictly an origin and destination airport used to serve the local market.

International Gateway: To a certain extent, an international air cargo gateway is similar to an air cargo hub, in that the gateway airport is not reliant on the local market area to generate sufficient demand to justify operations. The gateway functions as a consolidation, distribution and processing point for international air cargo. As with the air cargo hub, much of the cargo moving through a gateway airport is discretionary as it does not originate from and is not destined to the gateway airport's surrounding market area. International gateway operations place stress on airside facilities and airport access roads, both local and Interstate. The economic hinterland area for an international gateway can be nationwide, depending upon the international markets served by the airport, and will generally rely more on long-haul drayage operations for consolidation and distribution of international freight. The majority of international air cargo (approximately 80 percent) is handled by freight forwarders who will move cargo by truck (air drayage) to gateway airports for air transit.

Neither Buffalo-Niagara International Airport nor Niagara Falls International Airport function as international gateways, despite the large volumes of Canadian origin and destination cargo that transit these airports. Unlike a traditional air cargo gateway where international freight arrives via air and clears customs at the airport, Canadian traffic using Buffalo and Niagara Falls for air transit arrives or departs each airport by truck and clears customs at one of the regions commercial border crossings.

2.3 Air Cargo Carriers

As would be expected at an airport with the scope of Buffalo International Airport's air cargo activity, the facility is served by multiple carriers, offering a full range of service levels. The air cargo carriers that operate from Buffalo International Airport can be divided into the following three distinct categories:

- Integrated Express Carriers
- All-Cargo Carriers
- Commercial Passenger Carriers

2.3.1 Integrated Express Carriers

Integrated express carriers, FedEx, UPS, DHL and the U.S. Postal Service (USPS), move the freight door-to-door, providing shipment pickup, transport via air or truck, and delivery. In addition to overnight service, express carriers increasingly provide deferred service or second-day and third-day time-definite service, changing the dynamics of the air cargo industry significantly (i.e., more trucking of traditional air cargo). Deferred service is predicted to surpass the overnight (express) delivery of letters, documents and packages. The lower cost deferred delivery does not mean uncertain delivery; in fact, most is "time-definite," meaning guaranteed delivery at a certain time on a certain date.

Integrated express carriers operate using a hub-and-spoke system similar to the passenger airline system. The hub is the backbone to the integrated express carrier since it provides connections to each market in the integrator's system. During each day of operation, flights from around the U.S. arrive at the hub where packages are offloaded, sorted in the hub to the appropriate destination market and then reloaded onto the aircraft.

Traditional integrated express service focuses on the small-volume, infrequent shipper or higher volume shippers moving product to multiple destinations. This market can be termed the "retail"

air cargo market and includes individual, private and business-to-consumer (B2C) shippers. However, integrated express carriers are moving into the "wholesale" market, catering to larger freight movements demanded by manufacturing and distribution operations. This traditional freight forwarder and all-cargo carrier market includes corporate, block-space (guaranteed capacity shippers) and business-to-business (B2B) customers. It is estimated that integrated express carriers account for more than 60 percent of the U.S. domestic air cargo market, yet hold only 10 to 15 percent of the international market.

Buffalo-Niagara International Airport is served by the three primary integrated express carriers, FedEx, UPS and DHL, as well as the USPS. These carriers utilize BNIA as a node in their hub-and-spoke systems (i.e., to serve the local Buffalo metro area origin and destination demand).

2.3.2 All-cargo Carriers

All-cargo carriers operate airport-to-airport air cargo services for their customers but do not offer passenger service. All-cargo air carriers include Polar Air Cargo, Kitty Hawk and Northern Air Cargo, to name a few. All-cargo carriers offer scheduled service to major markets throughout the world using containerized cargo aircraft. Freight must be dropped off at the airport by the shipper, or the shipper's freight forwarder, and must be picked up at the destination airport by the customer or the customer's freight forwarder.

All-cargo carriers generally operate scheduled widebody (international routes) or narrowbody (domestic routes) jet aircraft from one airport to another but do not offer door-to-door service. Approximately 10 to 15 percent of world air cargo traffic is moved by all-cargo carriers, primarily on long-haul international or trans-continental routes. However, Kitty Hawk Air Cargo, which serves Niagara Falls International Airport with two daily flights, operates a domestic hub-and-spoke system through their Ft. Wayne, Indiana hub. Kitty Hawk is the only all-cargo carrier to serve the region (Buffalo-Niagara International Airport does not have scheduled all-cargo carrier service).

2.3.3 Commercial Passenger Carriers

Commercial service passenger airlines are scheduled passenger airline operators. Space in the bellies of these aircraft is generally available to move cargo airport-to-airport. Commercial air carriers account for the majority of international air cargo capacity, yet provide limited domestic lift. It is estimated that 50 percent of U.S. international air cargo traffic is moved in the bellies of passenger aircraft. However, within the U.S. domestic market, commercial carriers account for only 15 to 20 percent of the domestic air cargo (approximately seven percent at Buffalo International Airport) – a market dominated by the integrated express carriers. The air cargo

market share of commercial passengers carriers, particularly on domestic routes, has declined significantly due to security measures and restrictions brought about by the September 11 terrorist attacks. Pre-September 11, it was estimated that commercial passenger carriers accounted for 25 percent of the domestic air cargo market.

An airline's aircraft fleet is a significant factor in determining the size and amount of cargo the airline can fly. A regional airline with a fleet of turboprop and regional jets cannot accommodate large, bulky shipments. Airlines operating widebody aircraft, such as the B747, B777 and A300, have containerized lower decks (which allow speed in loading and offloading) and are generally capable of handling large, bulky shipments.

The following commercial passenger airlines reported air cargo activity at Buffalo-Niagara International Airport in 2006:

- American Eagle
- Continental
- Continental Express
- Delta
- Comair
- Northwest
- Mesaba
- United
- US Airways
- US Airways Express
- JetBlue
- Southwest

Surprisingly, only 1.29% of all passenger flights to BNIA were delayed due to weather-related factors, discounting any notion that weather plays a factor in the low utilization of freight capacity on passenger flights. Overall on-time performance was 72%.

In 2006, Niagara Falls International Airport did not have scheduled commercial passenger activity. In March, 2007 daily passenger flights between NFIA and Myrtle Beach, South Carolina began utilizing narrowbody aircraft. Service to St. Petersburg, Florida is expected to begin in 2008.

NFTA is planning to build a new 69,430 square feet, 1½ story terminal at NFIA. This new terminal is expected to stimulate the growth of outbound as well as inbound flights. NFTA has solicited bids for construction of the new terminal and is actively identifying potential resources for the remaining funds required. Work is tentatively scheduled to commence in June, 2008.

2.3.4 The Role of the Freight Forwarder

Understanding the dynamics of freight forwarding operations is essential to understanding truck flows to and from the airports. The freight forwarder plays the key role in moving all-cargo carrier and commercial passenger carrier freight. Freight forwarding companies act as brokers between the shipper and the carrier (all-cargo and commercial passenger). The shipper does not deal directly with the carrier; it is the shipper's forwarder that tenders cargo to an all-cargo or commercial passenger carrier to deliver to the forwarder's agent or subsidiary at another airport. Serving a dual role, the freight forwarder is, to the shipper, an indirect carrier. It's classified as such because the forwarder receives freight from the shipper under the forwarder's own tariff, usually consolidating it into larger units that are then tendered to the airlines. From the perspective of the all-cargo carriers and commercial carriers, the freight forwarder is the shipper.

In addition to using third-party service providers to move freight from airport to airport, freight forwarders also rely heavily on third-party less-than-truck load (LTL) motor carriers to move shipments to and from the airport. Their market areas are defined by individual customers rather than large population or industrial centers. Consolidation and distribution stations are typically located on-airport or as close to the airport as possible, while for large volume customers, the customer's location may act as the station with freight being trucked directly to the airport. This decentralized structure results in significantly more truck movements over greater distances than integrated express carrier operations. Utilizing the lift provided by all-cargo carrier Kitty Hawk, freight forwarder activity is the primary driver of Niagara Falls International Airport air cargo, while the integrated express carriers dominate Buffalo-Niagara International Airport air cargo activity.

2.4 Markets and Routes

The following sections will examine carrier market share (by type) and routes (scheduled express, all-cargo, passenger and road feeder) of each airport in greater detail to provide a better understanding of the current capabilities of each airport to support and service regional air cargo demand. The assessment will include an examination of available lift to specific geographic markets.

2.4.1 Market Share by Carrier Type

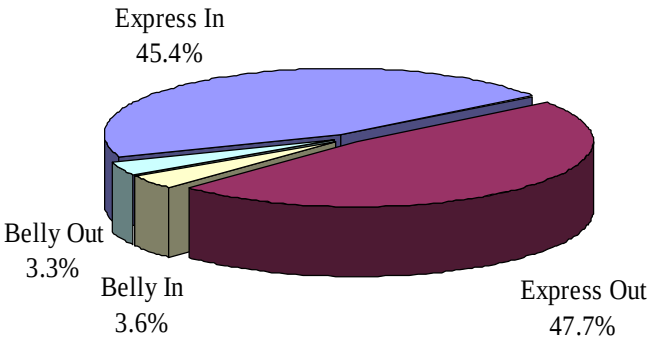
Buffalo-Niagara International Airport's air cargo market, as previously mentioned, is dominated by the integrated express carriers (FedEx, UPS and DHL) with limited amounts of cargo carried by passenger carriers. **Figure 2-4** compares the market share of the integrated

express carriers with that of the passenger carriers (belly freight). Note that inbound versus outbound freight volumes are relatively equal for both the express and belly cargo.

Figure 2-4: 2006 BNIA Air Cargo Tons by Carrier Type and Direction

	Inbound	Outbound	Total
Express	21,769	22,865	44,634
Belly	1,711	1,567	3,278
Total	**23,480**	**24,432**	**47,912**

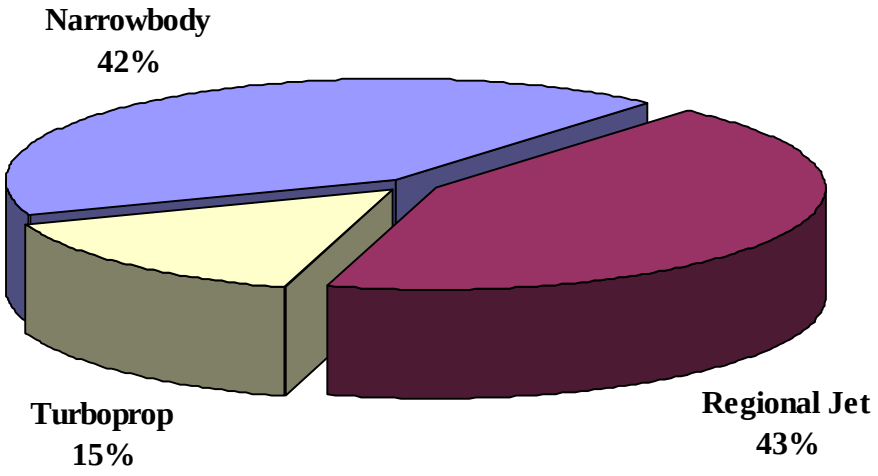
Source: NFTA, 2006 Traffic Data



The number of commercial passengers carried at BNIA has increased from 2.0 million in 2003 to over 2.5 million in 2006. The commercial passenger carrier market share of less than seven percent, however, is well below the estimated nationwide average of 15 to 20 percent market share held by passenger carriers. This low percentage in relation to the national average is due, in part, to the type of passenger aircraft operating at Buffalo-Niagara International Airport.

As illustrated in **Figure 2-5**, 58 percent of the airport's 113 daily departures are either regional jet or turboprop aircraft. These aircraft have limited to no cargo carrying capacity (zero to 250 pounds depending upon passenger loads). The remaining daily departures are narrowbody jet aircraft. Narrow body aircraft have more belly-cargo carrying capacity than regional jet or turboprop aircraft (typically 1,000 to 3,000 pounds depending upon aircraft type and passenger load), but are still limited in comparison to containerized widebody aircraft.

Figure 2-5: Buffalo-Niagara International Airport Daily Departures by Aircraft Type



Source: OAG Flight Guide, April 2007

Limited belly-space lift and the absence of all-cargo carriers at Buffalo-Niagara International Airport would appear to be the critical constraint on the ability of freight forwarders to move significant amounts of air cargo through the airport. However, comparing the available lift with the actual 2006 belly-space volume of 3,278 tons, inbound and outbound, (see **Figure 2-2**), it is apparent that the available lift is underutilized. Currently, there are 47 daily narrowbody departures. Assuming that each has an average of 1,000 pounds of belly-space lift available, there are approximately 24 tons of lift available daily. In 2006, a daily average of 4.3 tons was shipped outbound via the airport's available belly-space, or less than 20 percent of the estimated available lift. The lack of international destinations, coupled with limited non-stop service to markets beyond east coast and mid-west destinations, could account for the underutilization of the airport's available belly-space capacity. Most of the airport's non-stop passenger carrier destinations, as will be discussed in the next section, are within overnight or one day trucking distance of the Niagara Frontier region.

Integrated express carriers dominate Buffalo-Niagara International Airport air cargo because they have historically provided the greatest connectivity through their hub-and-spoke system to markets beyond the northeast and mid-west, markets where demand for air cargo service is limited due to available trucking options.

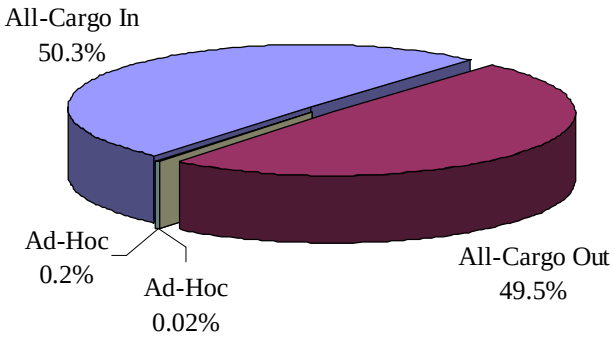
Niagara Falls International Airport air cargo is dominated by a single carrier, Kitty Hawk Air Cargo. As illustrated in **Figure 2-6**, nearly 100 percent of the air cargo transiting NFIA is

handled by Kitty Hawk. Through its hub in Ft. Wayne, Indiana, Kitty Hawk is able to connect to multiple destinations through its nationwide network.

Figure 2-6: 2006 NFIA Air Cargo Tons by Carrier Type and Direction

	Inbound	Outbound	Total
All-Cargo	6,086	5,990	12,076
Ad-Hoc	2	25	27
Total	**6,088**	**6,015**	**12,103**

Source: FAA T-100 2006 Traffic Data



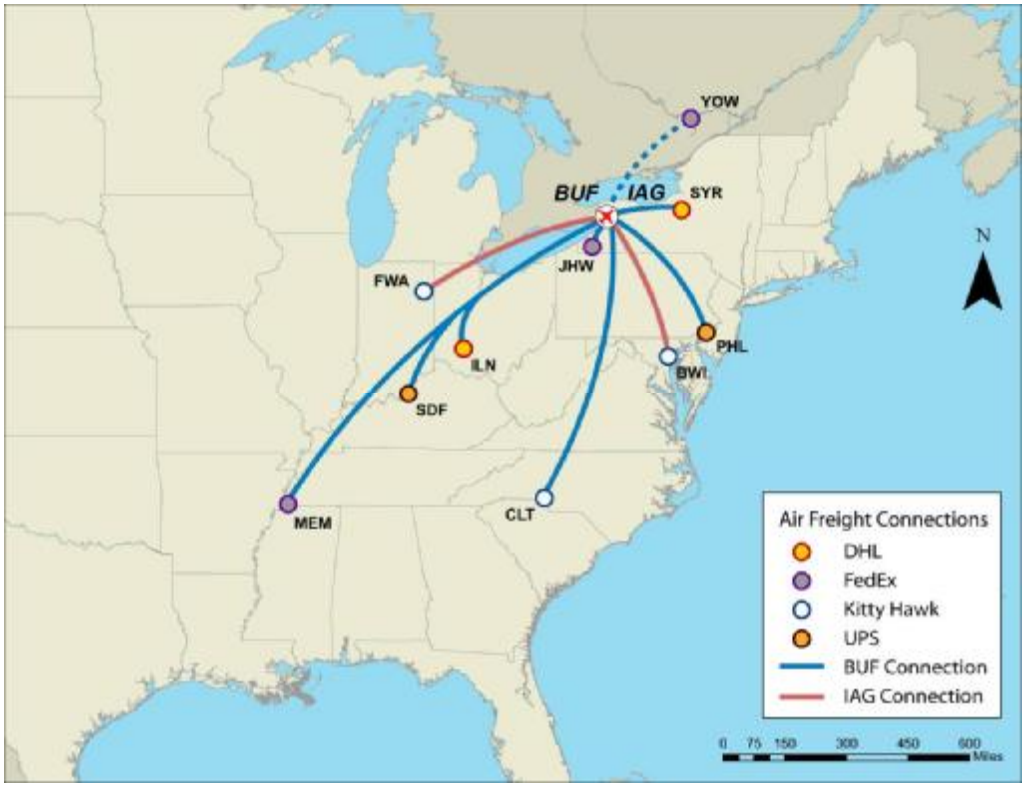
Niagara Falls International Airport air cargo activity is, and will continue to be, controlled by freight forwarder activity utilizing all-cargo and ad-hoc carriers. Opportunities to increase NFIA air cargo activity will rest in the ability to increase all-cargo capacity (i.e., larger aircraft, increased flights or new carriers) in support of freight forwarder controlled freight. As will be discussed later in this chapter, this can be achieved through expanding the airport's catchment area and/or diverting cargo from competing airports.

As new passenger services are established, especially to highly populated areas, the feasibility of utilizing belly space for cargo movements should be analyzed on a case-by-case basis.

2.4.2 Markets and Routes

Through their respective networks, the integrated express carriers operating from Buffalo-Niagara International Airport provide the region with domestic and international air cargo connectivity. As is illustrated in **Figure 2-7**, all of the national hubs (Memphis, Louisville and Wilmington) are served by Buffalo-Niagara International Airport, along with east coast regional hubs in Philadelphia and Charlotte. Ottawa is served outbound only on a circular route with a flight that starts in Memphis in the morning, arrives in Buffalo to deliver Buffalo market freight, immediately departs for Ottawa to deliver Ottawa market freight, and then returns to Memphis in the evening.

Figure 2-7: BNIA and NFIA Express/All-Cargo Network



Source: 2007 OAG Schedule Data

The Ft. Wayne hub of all-cargo carrier Kitty Hawk is also served from Niagara Falls International Airport, in addition to a flight to Baltimore (BWI). The BWI operation is a continuation of the Ft. Wayne-Niagara Falls flight, utilizing the same aircraft to serve two markets.

Air cargo connectivity provided by commercial passenger carriers is limited to 18 non-stop markets, six of which are only served by limited capacity regional jets or turboprops. **Figure 2-8** details the markets served, number of flights and aircraft used.

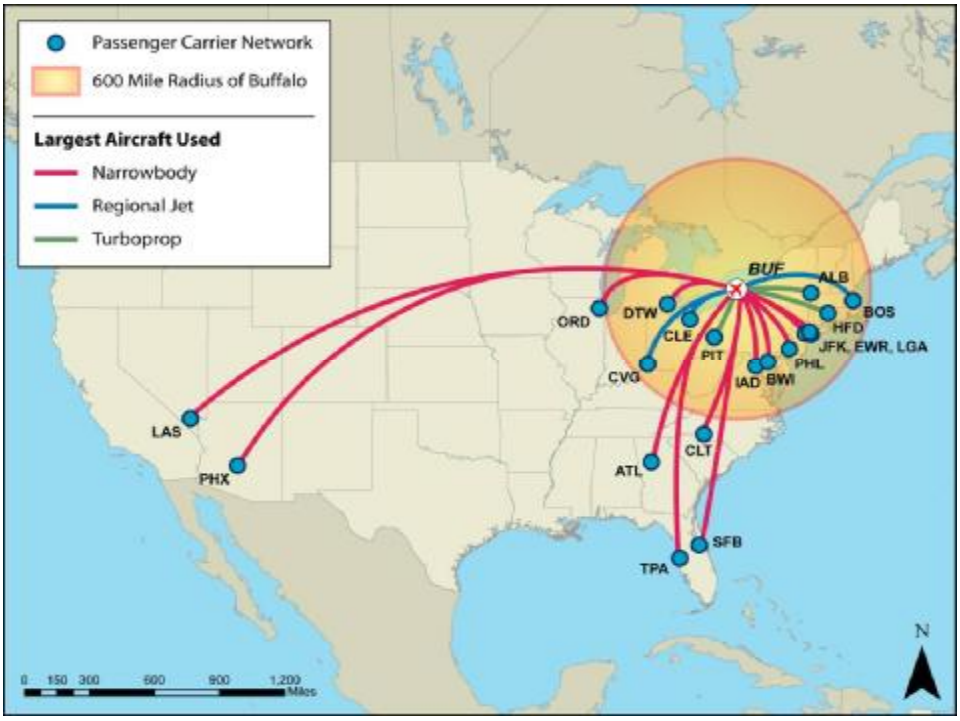
Figure 2-8: BNIA Non-Stop Passenger Routes, Aircraft Type and Frequency

Destination	Narrow-body	Regional Jet	Turbo-prop	Total Daily Flights
Albany, NY	-	-	3	**3**
Atlanta, GA	5	3	-	**8**
Baltimore, MD	7	-	-	**7**
Boston, MA	-	10	-	**10**
Charlotte, NC	4	-	-	**4**
Chicago, IL	7	6	-	**13**
Cincinnati, OH	-	3	-	**3**
Cleveland, OH	-	4	-	**4**
Detroit, MI	4	-	-	**4**
Hartford, CT	-	-	3	**3**
Las Vegas, NV	1	-	-	**1**
New York, NY*	9	16	5	**30**
Orlando, FL	4	-	-	**4**
Philadelphia, PA	1	3	3	**7**
Phoenix, AZ	1	-	-	**1**
Pittsburgh, PA	-	-	3	**3**
Tampa, FL	1	-	-	**1**
Washington DC	3	4	-	**7**
Total	**47**	**49**	**17**	**113**

Source: OAG Flight Guide, April 2007
* Includes JFK, La Guardia and Newark International Airports

Figure 2-9 illustrates the passenger carrier network from Buffalo-Niagara International Airport, indicating also the largest aircraft type operating on a given route. The network is shown in relation to a generalized 600-mile trucking radius, which is the typical one-day delivery distance for a truck. For any freight other than the most time-critical and sensitive cargo, one-day trucking options are considered a competitive, or at least acceptable, alternative to air cargo delivery. Note that all but six destinations are within the 600-mile radius where trucking is a competitive option.

Figure 2-9: BNIA Non-Stop Passenger Carrier Network



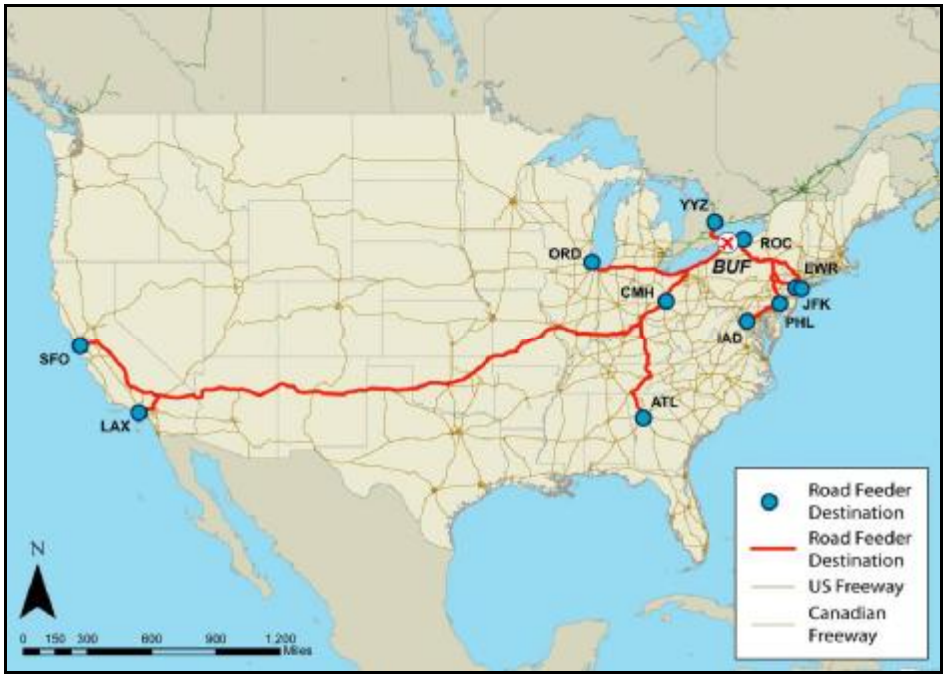
Source: 2007 OAG Schedule Data

2.4.3 Road Feeder Service (RFS)

RFS is scheduled air drayage, typically operating airport-to-airport between major markets. Freight forwarders are the primary users of road feeder service. By nature of their business, forwarders' operations are decentralized and involve more truck movements of air cargo at greater distances. Typically, forwarders will use interstate RFS to connect international air cargo to large international gateways; with few exceptions, Buffalo's RFS network follows this model. As is illustrated in **Figure 2-10**, the following 11 cities are served directly by the BNIA RFS network (all but two offer international widebody lift on passenger carrier aircraft):

- Atlanta, GA
- Chicago, IL
- Columbus, OH
- Los Angeles, CA
- New York, NY
- Newark, NJ
- Philadelphia, PA
- Rochester, NY
- San Francisco, CA
- Toronto, ONT
- Washington, DC

Figure 2-10: BNIA Scheduled RFS Network



Source: 2007 OAG Schedule Data

2.5 Next Steps - Development Opportunities and Challenges

The next steps in the air cargo sector analysis will examine air cargo development opportunities and challenges facing Buffalo-Niagara International Airport and Niagara Falls International Airport as they move forward in addressing the region's future air cargo needs. To date, several opportunities and challenges have been identified.

NFTA and local economic development agencies, including the Niagara County Center for Economic Development, Buffalo Niagara Enterprise, and others, market the Niagara Falls International Airport heavily for passenger service, charter flights and air cargo carriers building from the exposure received from the Explore Buffalo-Niagara 2007 event. NFTA is currently working with Kenny Tours and SkyBus Airlines to establish new air service. In addition, NFTA, the Niagara County for Economic Development and the Town of Niagara are also investigating the feasibility of establishing a cold storage facility for local agricultural producers at the soon-to-be vacant U.S. Army hangar adjacent to the airport.

The preliminary findings, based upon shipper, carrier and freight forwarder interviews completed to-date, are outlined below.

Preliminary Opportunities Identified to Date

1. Increased share of Canadian Market – BNIA and NFIA compete with Canadian airports for cargo originating in Southern Ontario as it allows Canadian shippers to clear customs by truck while in custody of their own goods before air shipment, as opposed to relying on agents to facilitate customs clearing on the behalf once goods arrive at the destination.
2. Direct international all-cargo operations – backhaul remains an issue.
3. Both Erie and Niagara Counties have stewarded significant investment for airport improvements to improve both passenger and cargo operations.
4. Availability of aircraft belly capacity on Myrtle Beach Direct service

Preliminary Potential Challenges Identified to Date

1. Competition from other airports. For example, Hamilton International Airport is developing a business case for runway extensions and development of a freight and distribution hub.
2. Competition from trucking
3. The lack or underutilization of cargo lift capacity on non express carriers
4. The lack of dedicated cargo facilities and other essential services, such as de-icing facilities, at Niagara Falls International Airport

The potential opportunities and challenges will be evaluated and expanded upon in Task 5 the *Assessment of the Local Transportation System's Ability to Accommodate Future Freight Growth* and Task 6 the *Development of Recommendations or Project Proposals that Address Future Freight Transportation Needs.* Air cargo opportunities are intrinsically linked to improvements as they are cargo diversions from other airports.

HIGHWAY SYSTEM PROFILE

3.1 Highway System Overview

The highway system is an instrumental part of the transportation and logistics industry in the Buffalo-Niagara region. Approximately 75 percent of the region's freight travels by truck in comparison to 70 percent of the total freight moved in the United States. Because of the region's heavy reliance on truck transportation, the highway system is paramount in the efficient movement of freight as motor carriers utilize the highway system to transport freight to consolidation points and intermodal freight facilities. Therefore, the region's 3,675 mile highway network of major interstates, state routes and local arterial roads is a critical factor in enabling effective connections for the region's economy.

For the purpose of this report, proper identification of the roadway segments that provide motor carriers with access to the region's customers is vital to analyze and determine their ability to accommodate truck transportation. This chapter profiles the primary and secondary highway system used for freight movements throughout the region and describes the relationship between the highway system and the region's economic centers.

The Primary Freight System tends to consist of major interstates or key state routes that carry the most amount of truck traffic compared to other routes in the State. From a Functional Classification standpoint, these routes are most likely to be classified as either rural or urban arterials. In addition, these routes provide connectivity across the region and typically extend beyond the study area to other states and key markets. Additional measurements that categorize a route as apart of the Primary Freight system are:

- Percentage of truck on Route (~ 10 percent or greater of AADT)
- Volume of Trucks on Route (compared to system wide traffic counts)
- Length
- Degree of Access control
- Design Standards
- Number of lanes (4 or greater)

The secondary freight system consists of major state routes and local loads that support a high amount of truck traffic compared to other routes. Typically, these are non-interstate routes and can be classified as "Collectors" or "Local Roads." Often considered the "last mile," these routes provide direct access to major freight terminals and key industrial and commercial areas. Design standards are developed for lower speeds and shorter distances with fewer lanes as the roads in

Primary Freight System; therefore, the secondary freight system will consist of more routes, making this system much more extensive, and yet its infrastructure is more vulnerable to pavement deterioration and geometric constraints with regards to large truck movement.

Additional measurements that categorize a route as apart of the Secondary Freight System are:

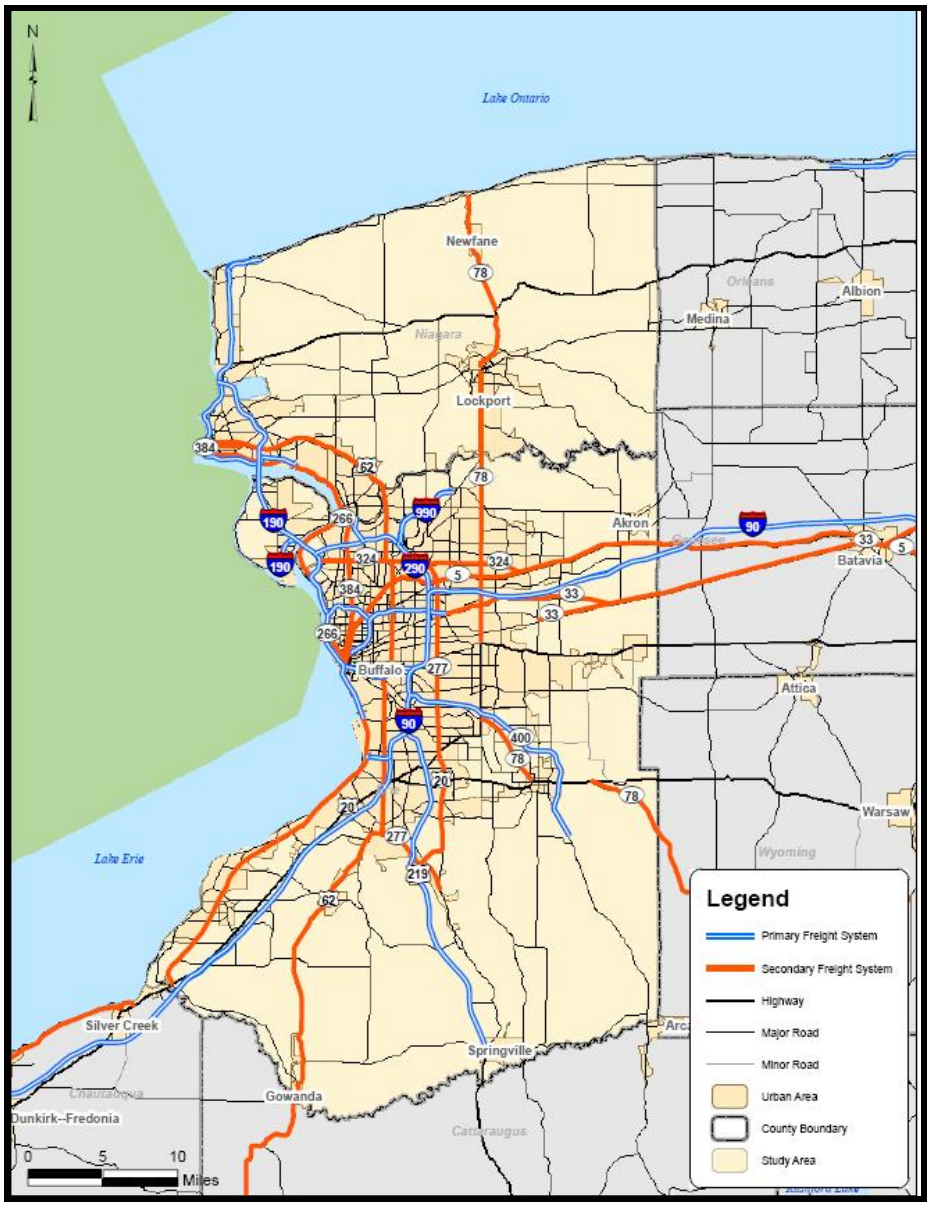
- Percentage of truck on Route (~equal or <10 percent or AADT)
- Volume of Trucks on Route(compared to system wide traffic counts)
- Length
- Design Standards
- Number of lanes (Less than 4)
- Amount of freight facilities, commercial and industrial areas along route

3.2 Primary U.S. Highway Freight System

The region's Primary Highway Freight System of Erie and Niagara counties is comprised of four major Interstate highways: Interstate 90, Interstate 190, Interstate 290, and Interstate 990. The routes are used to transport the region's inbound and outbound freight. They also serve as the primary motor carrier paths for navigating through and around the region. Detailed descriptions of the primary highway freight system follow.

Interstate 90 becomes the New York State Thruway upon entering New York from the west, follows the Lake Erie coast, and runs along the eastern edge of the City of Buffalo before continuing eastward to other upstate New York major population centers such as Rochester, Syracuse and Albany. I-90 serves as the main north-south route on the east of Buffalo and connects with SR 33, I-190 and I-290. I-90 supports the highest traffic volumes in the region while having the largest number of deficient lane-miles recording Level of Service E or F (Unstable or forced breakdown traffic flow). **Figure 3-1** shows the region's Primary and Secondary Highway Freight System.

Figure 3-1: Primary and Secondary U.S. Highway Freight System



Interstate 290, also known as the Youngmann Expressway, extends for 10 miles from I-90 to I-190 and connects Buffalo with its northern suburbs of Amherst and Tonawanda. I-290 provides a route to Niagara Falls that bypasses the city of Buffalo. I-290 also connects to Interstate 990 west of Amherst. A key interchange along the corridor is Niagara Falls Blvd. (SR 62), which provides access to commercial and retail sites directly south of Niagara Falls.

Interstate 190, also referred to as the Niagara Expressway, extends approximately 28 miles from I-90 in southeast Buffalo, and proceeds along the west edge of Buffalo, through Niagara Falls to Lewiston, New York. I-190 connects to I-290 in Tonawanda. Officially, I-190 from I-90 north to SR 384 (Robert Moses State Parkway) in Niagara Falls is named the **Niagara Thruway** and is a component of the New York State Thruway system.

Interstate 990, often called the Lockport Expressway**,** is a short interstate highway located entirely in the town of Amherst, New York. I-990 extends in a roughly north-south direction for 6 miles through the southwest and central parts of Amherst, northeast of Buffalo. The northern section connects with SR 263 (Millersport Highway) south of Millersport, while the southern section connects with Interstate 290. I-990 serves as a connection between the greater Buffalo area and the central and northeastern portions of Amherst, as well as to the Lockport industrial area.

Figure 3-2 describes the road characteristics of the Buffalo-Niagara Primary Highway Freight System

Figure 3-2: Road Characteristics (Primary Freight System)

Road	Number of Lanes	AADT[1]	Avg. Posted Speed	Peak Hour Level of Service[2]
I-90	**6-lanes** (William St. to Cleveland) **4 lanes** (I-290 to SR 78, SR 78 to Genesee County Line) **8 lanes** (SR 400 to I-190, Cleveland Dr. to I-290)	109,100	55	E/F
I-190	**4 lanes** (SR 198 to I-290, River Road to SR 104) **6 lanes** (I90 to Peace Bridge, I-290 to River road)	50,219	60	D
I-290	**6 lanes Throughout**	102,494	55	E/F
I-990	**4 lanes** (Audubon Parkway to SR 263) **8 lanes** (I-290 to UB) **6 lanes** (UB to Sweet Home Road)	33,830	60	LOS C or better

Source: Greater Buffalo-Niagara Transportation Council

[1] Calculated as Average AADT along corridor

[2] Capacity Level of Service is determined based on Daily Capacity AADT (See Appendix)

3.3 Secondary Highway Freight System

The region's Secondary Freight Transportation System consists of State Routes and key arterials that support truck movement. These roads provide direct access to freight facilities and serve as the "last mile" for the delivery of goods. An important role of the secondary freight system is that it supports freight destined for the region or serves as the road connection for outbound goods produced or distributed by businesses in the region. A clearly identified secondary road system is important as it directly influences the region's ability to move freight efficiently. More detailed descriptions of the region's secondary freight system components follow.

US Route 219 extends from south of Buffalo through the Southern Tier of New York and into Pennsylvania. This route is a four lane limited access route between Buffalo and Springville, NY and the State of New York plans to upgrade the remainder of the route over the intermediate term.

State Route 78 is most closely identified in the region with **Transit Road**, a major north-south road through the center of Erie and Niagara Counties. SR 78 bisects I-90, SR 33, SR 78 and SR 5 east of the Buffalo-Niagara International Airport. This north-south route provides access to a significant number of commercial and retail businesses situated along the corridor.

State Route 33, also known as the Kensington Expressway west of the Greater Buffalo-Niagara International Airport, is a New York State divided highway that connects the airport to Downtown Buffalo. To the east of the airport, SR 33 is known as Genesee Street and provides an alternative east-west route to I-90.

State Route 324 (Sheridan Dr.) is located entirely within Erie County, extending from I-190 near Grand Island to SR 5 in Clarence. SR 324 serves as a major commercial strip for Buffalo's northern suburbs and bisects I-190, I-290, SR 78 and SR 5.

US Route 62, known as Bailey Avenue in the City of Buffalo and Niagara Falls Boulevard in Tonawanda**,** intersects with I-290, in the town of Amherst and extends northward, where it exits Erie County and enters Niagara County, crossing the Erie Canal in Wheatfield. The highway intersects SR 425 and turns to the northwest intersecting with State Route 265 and I-190. SR 62

is a critical north/south connection as it provides access to key manufacturers in Niagara Falls such as Washington Mills and DuPont.

State Route 5 (Main St) runs in a north-south direction bordering Lake Erie south of the City of Buffalo and extending through the Downtown area as Main St. In the town of Amherst north of Buffalo, it turns eastward and continues in this direction across the state.

State Route 266, known as Niagara St**.,** starts near the Peace Bridge. It continues northbound along the Niagara River, closely paralleling the New York State Thruway's Niagara Section (I-190). This route provides secondary access to large manufacturing plants such as DuPont and the General Motors Powertrain plant.

State Route 198 is a divided highway better known as the Scajaquada Expressway. It is situated entirely within the northern section of the City of Buffalo and connects SR 33 on Buffalo's east side with I-190, the Niagara Section of the New York State Thruway.

State Route 384 is known as Buffalo Avenue in North Tonawanda. SR 384 joins with SR 265 and becomes Main Street, then River Road as the two highways extend along the Niagara River. SR 384 begins as Buffalo St, extending from the Robert Moses State Parkway in the city of Niagara Falls toward North Tonawanda. Joining SR 265, it becomes River Rd, extending through North Tonawanda along the Niagara River. As it enters Tonawanda it separates from SR265, becoming known as Main St, and eventually Delaware Ave. through Downtown Buffalo and terminates at the Skyway (Rt 5). SR 384 passes the old Nabisco Shredded Wheat plant, the existing Olin Corporation, DuPont, and the Saint-Gobain facilities. .

State Route 400, also known as Aurora expressway**,** is an expressway totally contained within Erie County. The northwest end is connected to I-90 and ends in the southeastern part of the region at SR 16 in the Town of Wales. SR 400 roughly parallels SR 16, but provides a speedier and limited access highway. SR 400 is most commonly used to carry traffic from Buffalo to the village of East Aurora, where Fisher-Price and Moog, Inc are headquartered. It is also a busy commuter route to the southern suburbs.

State Route 31, known as Whitmer Road and Saunders Settlement Road, extends from SR 104 in Niagara Falls easterly through Lockport and Rochester to SR 26 in Vernon Center. Total mileage is 209 miles.

State Route 77, known as Chestnut Ridge**,** extends 46 miles from SR 78/98 in Java Center to SR 31 in Lockport.

State Route 104, known as Ridge Road, extends from SR 384 in Niagara Falls in an easterly direction through Lockport and Rochester, ending at SR 13 in Williamstown, near Oswego. Total mileage is 294 miles.

State Route 16, also called Seneca Street**,** extends from SR5 near Buffalo south to the Pennsylvania line near Knapp Creek for a total of 79 miles. It crosses I-86 in the vicinity of Portville-Olean.

State Route 63 lies just east of Niagara County in Orleans County. It begins at SR 18 near Lake Ontario and extends south as N. Lyndonville Rd. At SR 104 it becomes N. Gravel Rd. After crossing Rt. 31, it becomes S. Gravel Rd. and Allegany Rd.

Figure 3-3 profiles the road characteristics of the Buffalo-Niagara Secondary Highway Freight System.

Figure 3-3: Erie/Niagara Co. Secondary Highway Freight System Road Characteristics

Road	Number of Lanes	AADT [1]	Posted Speed (MPH) [2]	Peak Hour Level of Service [3]
SR 78	**2 lanes** (SR 16 to SR 20, French Rd to SR 5, Erie County line to SR 20, French Rd to SR 263) **4 lanes** (SR 20 to French Rd.) **5 lanes** (SR 324 to Casey Rd.)	23,688	45	E/F
SR 33	**2 lanes** (SR 78 to Walden County line) **4 lanes** (I-90 to Genesee St.) **5 lanes** (Holtz Rd. to SR 78) **6 lanes** (Elm St. to I-90) **7 lanes** (Genesee St. to Holtz Rd.)	52,248	50	E/F
SR 324	**4 lanes** (SR 78 to SR 324) **5 lanes** (SR 240 to SR 78) **7 lanes** (SR 62 to SR 240) **8 lanes** (SR 265 to Colvin Blvd.)	23,654	45	LOS C or better

Road	Number of Lanes	AADT [1]	Posted Speed (MPH) [2]	Peak Hour Level of Service [3]
US 62	**2 lanes** (SR 438 to Buffalo St.) SR 391 to North Vill Lane, SR 179 Buffalo City line, SR 33 to Windspear, SR 263 to Eggert) **4 lanes** (Main St to Buffalo St, SR 16 to SR 33, SR to SR 263) **5 lanes** (Willow Ridge Dr. to Robinson Rd.) **6 lanes** (SR 324 to Willow Ridge Dr.)	15,064	30	E/F
SR 5	**4 Lanes Throughout** **6 lanes** (SR 75 to Buffalo City line)	29,410	55	D
SR 266	**2 lanes** (SR 325 to I-90) **4 lanes** (Kenmore Ave to Fletcher St)	15,780	40	LOS C or better
SR 198	**4 lanes except:** **6 lanes** (SR 5 to SR 33)	51,520	50	E/F
SR 384	**2 lanes** (Tonawanda City line to Niagara County Line) **5 lanes** (Delaware Rd. to Tonawanda City line)	18,407	40	LOS C or better
SR 400	**4 lanes Throughout**	25,925	65	LOS C or better
SR 219	**4 Lanes Throughout except:** **2 lanes(Erie County line to SR 39)**	28,620	55	D
SR 31	**2 lanes from Hide park to Lockport Town Line; Main St. to Orleans County line** **4 lanes from Lockport line to Main St.** **6 Lanes from Lockport bypass to Lockport City line**	9,766	40	LOS C or Better
SR 16	**2 Lanes Throughout Except:** **4 lanes (Erie Co. line to SR 39, SR 240 to Buffalo City Line)**	10,812	55	D
SR 77	**2 lanes Throughout**	2,100	55	C or Better
SR 104	**4 Lanes (Niagara Falls City Line to SR 61, SR 61 to 1-190, I-190 to SR 265, SR 265 to SR 18, SR to Robert Moses Pkwy)**	6,818	55	C or Better
SR 277	**2 lanes** (SR 391 to Ridge park) **4 lanes** (Ridge park to SR 240, Como Park Blvd. to Walden Ave.) **5 lanes** (SR 240 to Como Park Blvd.)	25,905	40	LOS C or better

Source: Greater Buffalo-Niagara Transportation Council

[1] Calculated as Average AADT along corridor

[2] MPH recorded as an average posted speed limit for the corridor

[3] Capacity Level of Service is determined based on Daily Capacity AADT

The highway system's access to the region's principal freight generators is a critical determinant of the system's strategic importance to the local economy. Consequently, it is important to understand the logistics chains of the region's industries as they drive the directional flows of the freight through the region.

Since approximately 50 percent of the region's inbound freight is from New York State and over 70 percent of the outbound freight is destined for markets within New York State, specific highway segments represent strategic freight routes that support movements from and to markets within the State. Highways extending outside the region such as SR 33 and SR 5 east of the city past the Buffalo-Niagara International Airport are key roadways that support inbound and outbound freight. The next section will focus on the relationship between the highway freight system and its key freight generators.

Supply Chain Network
Dunlop Tires Inc.

Trucks are used to transport inbound products to the region using the main east-west routes throughout the region. Dunlop Tires, as an example, receives materials such as synthetic rubber or carbon black imported through the Port of New York/New Jersey and trucked westbound across I-90 and I-290.

3.4 Key Highway Access Freight Corridors

The highway system in the Buffalo/Niagara region supports a wide spectrum of freight generators. Historically, the region had a heavy manufacturing focus with steel and automobile production as key industries. Over time, the economic landscape of the region changed. Remnants of the original economy along with new retail enterprises create a mix of freight moving through the highway network: bulk commodities and finished goods share the roadways. In a study conducted by *Logistics Today Magazine*, the Buffalo region ranked 30th out of 362 US metropolitan areas in being a "logistics friendly" city.[1] According to the analysis, Buffalo industries' Interstate access ranked 81st among all cities, comparable to Phoenix, Arizona, Daytona Beach, Florida, and Greensboro, North Carolina. This next section will profile the corridors that support different industries in the region.

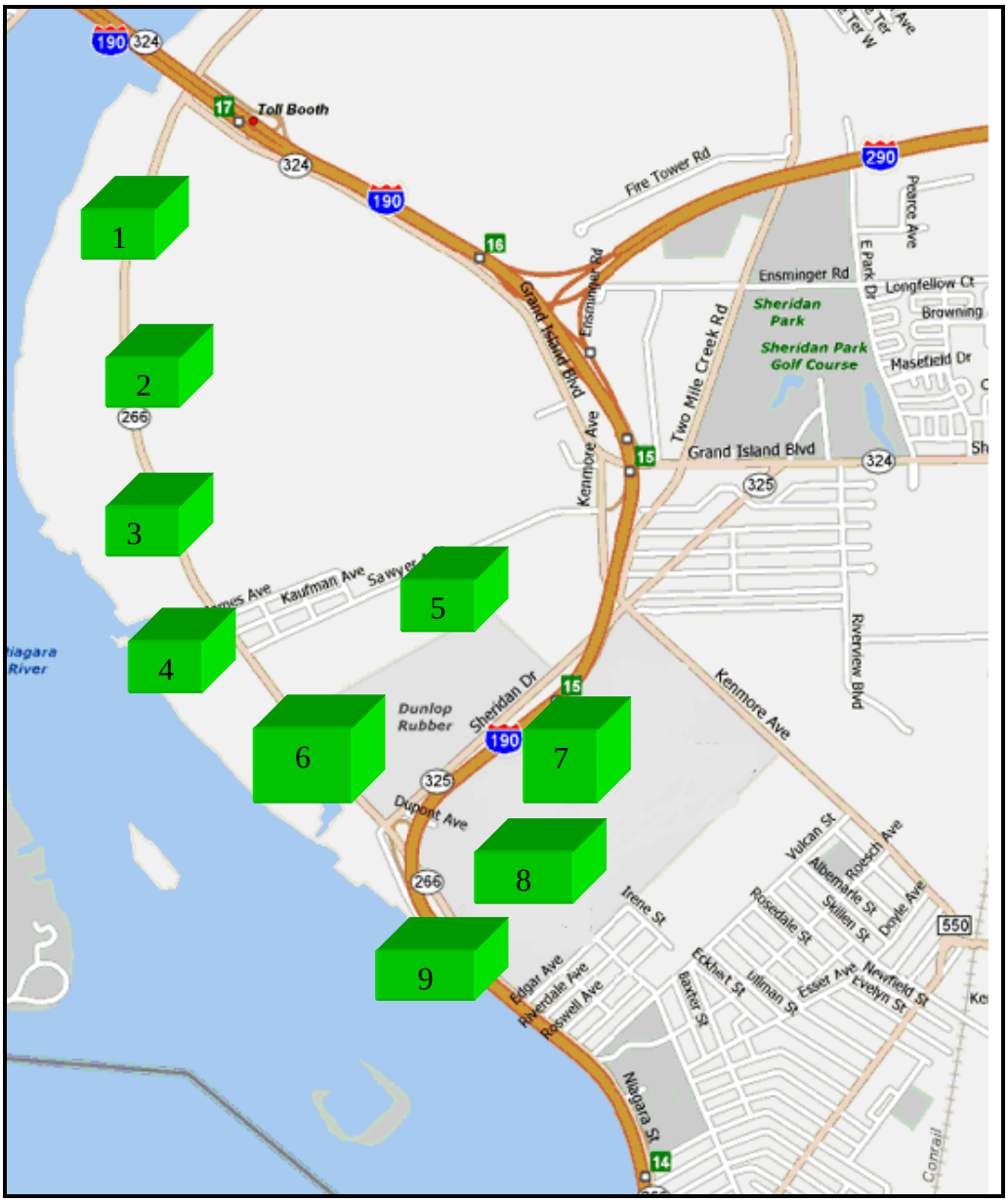
[1] *Logistics Today*, Top Metro Areas for Logistics, 2006

Erie County Large Plant Operators

The Primary Highway Freight System provides efficient access to major facilities throughout the region. Many major manufacturers and distributors are centrally located in Erie County, specifically in the City of Tonawanda. Interstates 190 and 290 provide access to these facilities along with key state highways. Trucks can access these facilities with few obstacles. In addition, these facilities have access to rail transportation service which eliminates some truck competition for highway capacity. The primary facilities located in this area are listed below and mapped in **Figure 3-4**:

- Noco Energy Corporation
- Tonawanda Coke Corporation
- Sun Company/Ashland Chemicals
- NRG Energy
- 3M/O-cel-O
- Dunlop Tires
- DuPont
- American Axle
- General Motors

Figure 3-4: Large Plants



1. Noco Energy Corporation	2. Tonawanda Coke Corporation
3. Sun Company/Ashland Chemicals	4. NRG Energy
5. 3M/O-cel-O	6. Dunlop Tires
7. DuPont	8. American Axle
9. General Motors	

It is important to note that the close proximity of these manufacturers tends to generate higher volumes of larger trucks (Class 8) and tankers to haul products across certain road segments (i.e. SR 266 (Niagara St.) and I-190). Due to its density and processing needs, many raw materials are trucked to and from other locales outside of the region. This is important to understand as additional focus should be placed on the road segments that support these heavier vehicles, as these trucks tend to cause increased pavement damage over time.

Hazardous Materials

Safe transportation of hazardous materials is highly important. With a significant focus placed on the nation's transportation system and the transport of materials that could present bioterrorism targets, recognizing the routes used to move these commodities are necessary for homeland security reasons. The Buffalo/Niagara Region has several sewage and nuclear waste facilities along I-190 and SR 198. Additionally, nuclear waste transported on I-90 from central locations in New York State is primarily generated from Rochester and Syracuse. With 80 percent of the nuclear waste generated by facilities in New York being transported by truck, this route serves as a strategic roadway segment for the transport of hazardous materials The routes used for hazardous materials generated in New York State are displayed in **Figure 3-5**.

Figure 3-5: Highway Routes for Hazardous Materials

Source: WSA Analysis

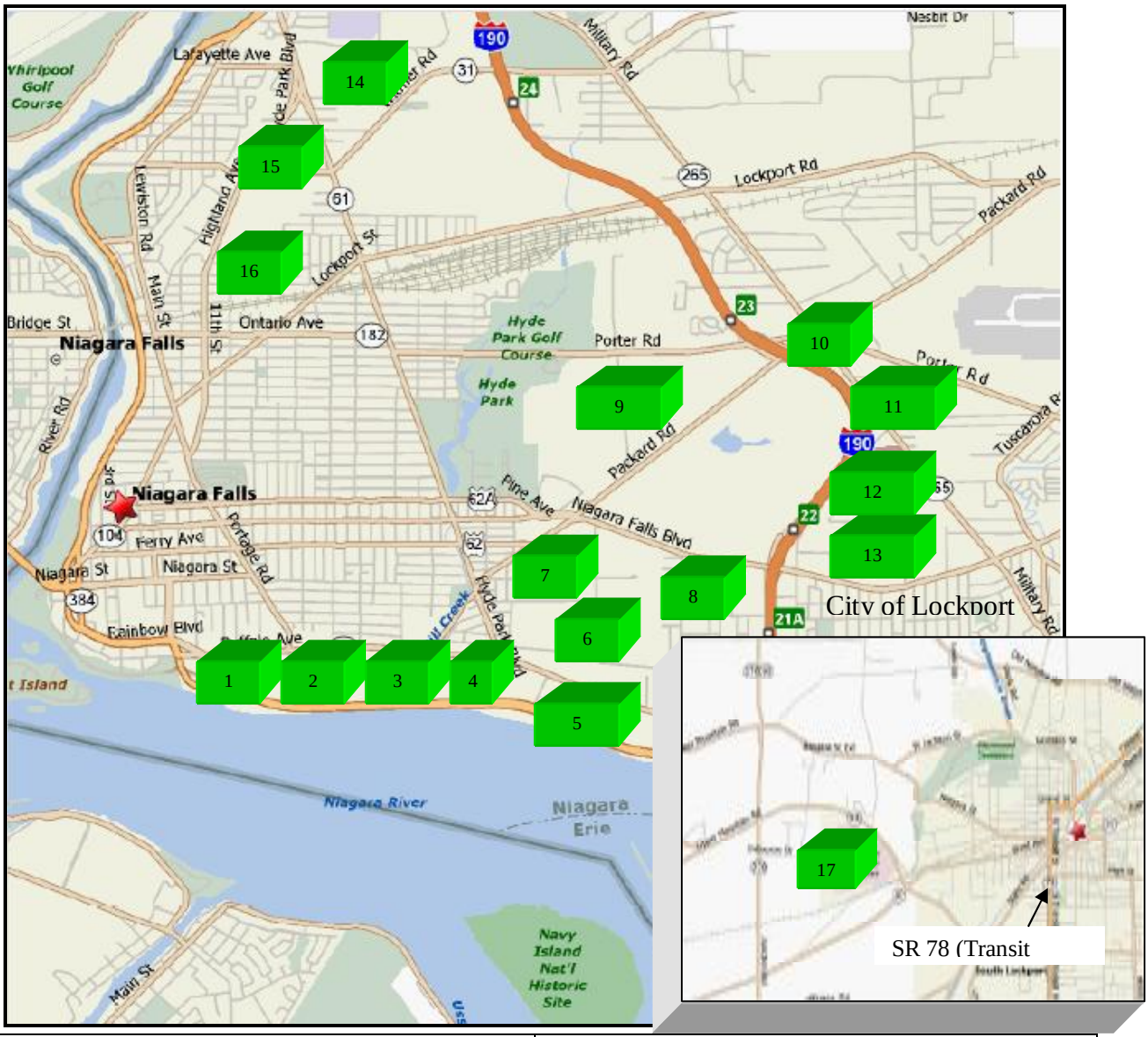
Niagara County Manufacturers and Retail Establishments

Another key highway corridor is Buffalo Avenue (SR 384) located in Niagara County. This road serves a cluster of manufacturers and large retail businesses within the City of Niagara Falls. The primary facilities located along this corridor are:

- Saint Gobain
- Washington Mills
- Olin
- DuPont
- Oxy Chemical
- Goodyear
- Niacet Corporation
- Home Depot
- Wal-Mart
- K-Mart
- Big Lots Shopping Plaza
- Niagara Outlet Mall
- Target
- Fero
- Globe Metallurgical
- Tulip Corp
- Delphi-Harrison Thermal

The relationship between the highway network and the major manufacturers and retail freight generators are displayed in **Figure 3-6**.

Figure 3-6: Niagara County Manufacture and Retail Establishments



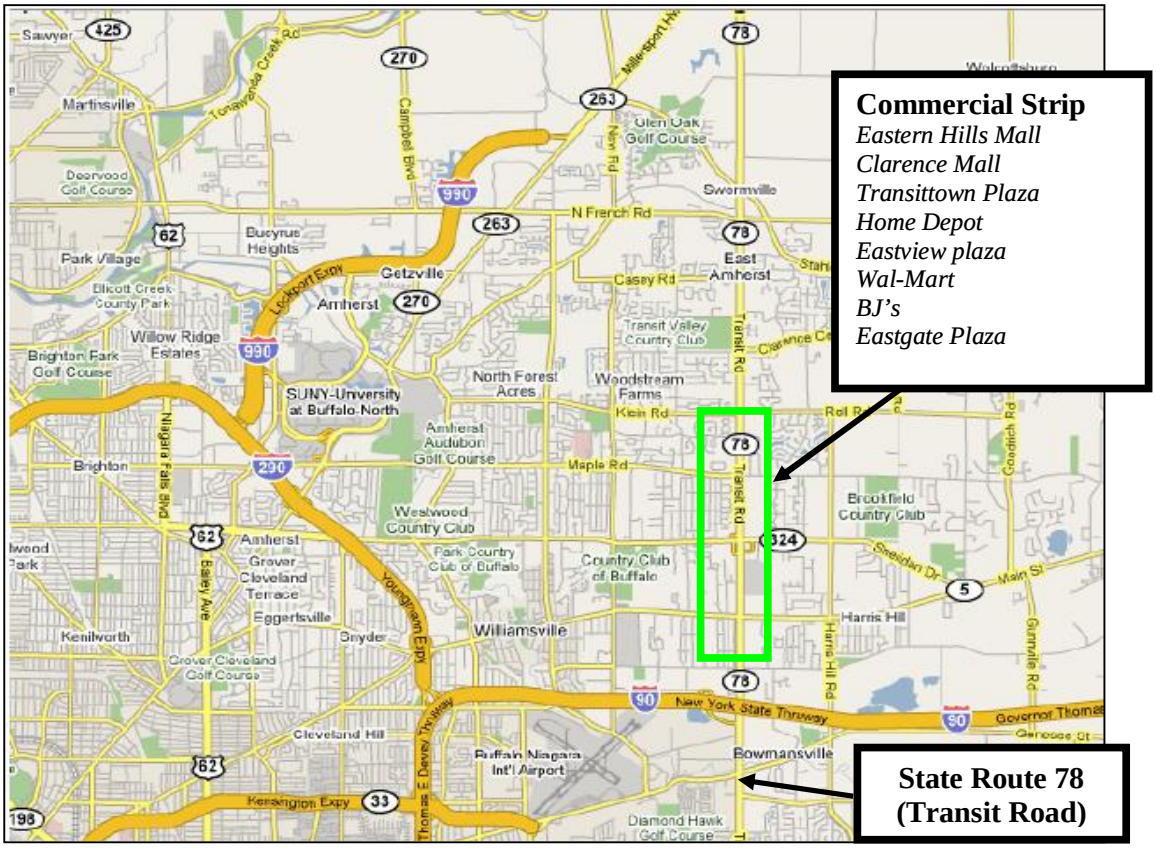
1. Saint Gobain	2. Washington Mills
3. Olin	4. DuPont
5. Oxy Chemical	6. Goodyear
7. Niacet Corporation	8. Home Depot
9. Wal-Mart	10. K-Mart
11. Big Lots Shopping Plaza	12. Niagara Outlet Mall
13. Target	14. Fero
15. Globe Metallurgical	16. Tulip Corp
17. Delphi-Harrison Thermal	

This section of the I-190 corridor connects to Buffalo Ave. (SR 384) and provides access to several major freight generators in the region. Niagara Falls Blvd. (US 62) and Buffalo Ave. provide access to the City of Niagara Falls. The roadway network supports both medium size trucks that service retail stores such as businesses located in the Prime Outlets Shopping Center and large trucks that deliver to Wal-Mart, Home Depot, and K-Mart.

Commercial Corridor

In addition, Transit Road (SR 78), the main north-south thoroughfare in the region, has expansive commercial areas along the corridor (**Figure 3-7**).

Figure 3-7: State Route 78 Commercial Corridor



These road segments play a role in providing access to freight terminals and are necessary to be constructed and maintained in a fashion that supports the movement of both large and smaller vehicles.

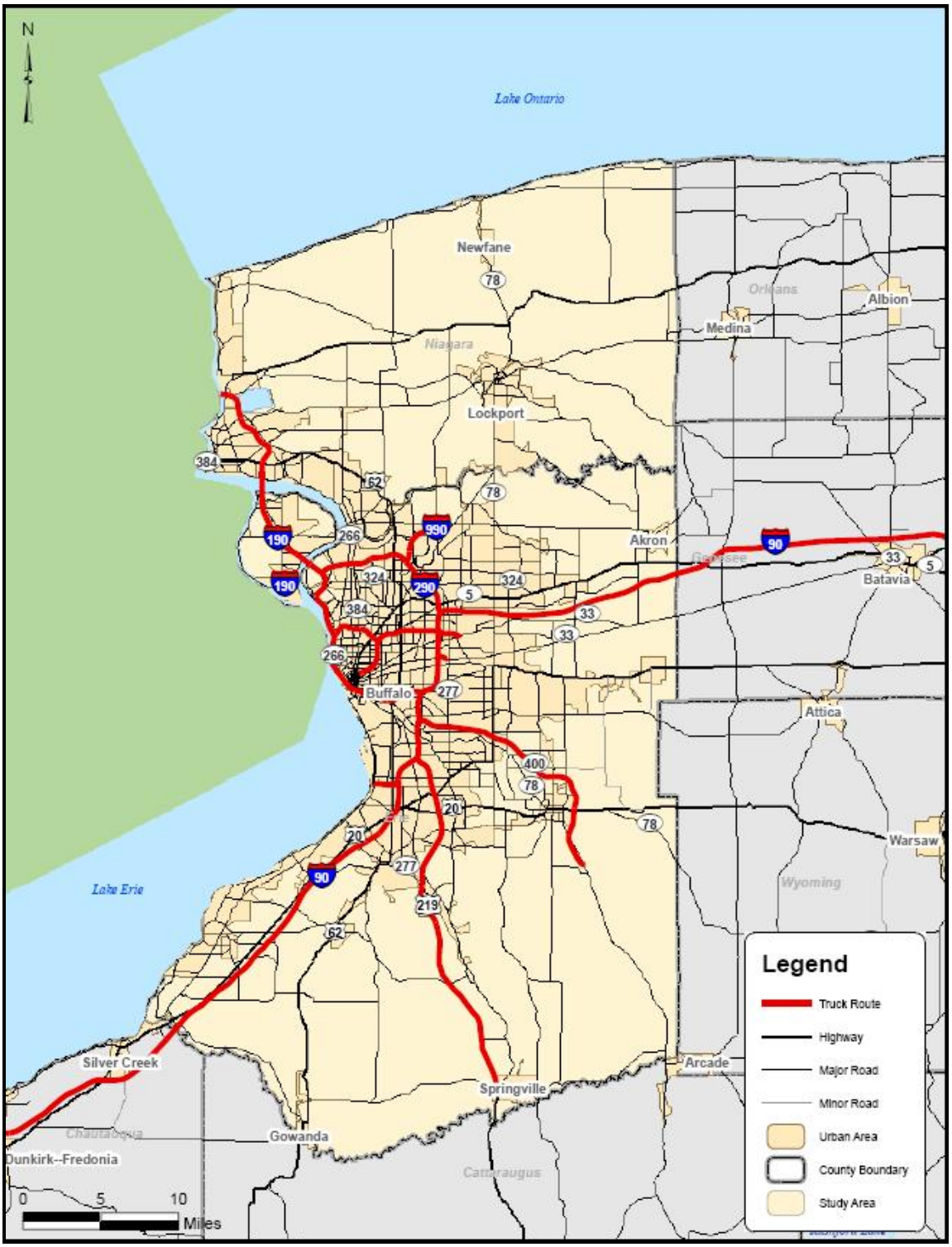
3.5 Designated Truck Routes in the U.S.

The designated roadway truck route system in the U.S. is instrumental in supporting the efficient and reliable movement of freight. Commercial vehicles rely on properly engineered and constructed roads to travel throughout the region and deliver freight in a timely and safe manner. Identifying, designating and designing truck routes can be an important component of freight mobility and the mitigation of freight-passenger conflicts. Designated truck routes consist of the following:

- Targeted design standards: Truck routes provide a means for targeting truck-supporting design standards and policies for specific corridors rather than across-the board
- Cost effective infrastructure: Improving roads to accommodate larger trucks requires significant investment. Designated routes provide a means to more rationally allocate resources to specific corridors with higher benefits. Truck routes also allow favorable opportunities to implement the use of Intelligent Transportation Systems (ITS).
- High safety standards: Improving design standards and segregating freight traffic along specific corridors reduces operating incompatibilities and diminishes the number of accidents.
- Operational productivity: Improving truck operations within trade corridors leads to increased productivity, lower truck operating costs and improved reliability.

Figure 3-8 depicts the current designated truck network in the region. Trucks are not prohibited from using most other roadways in the region, however, truck route designation establishes a preferred highway freight transportation system that optimizes investment in infrastructure and supports motor carrier transportation.

Figure 3-8: County Designated Truck Routes



Source: Global Insight, Inc. Transearch

3.6 Truck Restrictions

Despite the ability of trucks to travel freely throughout the highway network, there are road segments that are restricted from truck use, albeit few. The City of Towanda has truck route restrictions which are shown in **Figure 3-9**.

Figure 3-9: City Tonawanda Truck Weight Restrictions

Name of Street	Weight Limit (tons)	Location
Cranbrook Extension	5	East and west of Erie Railroad signs
Delton Street	5	Entire length
Enterprise Avenue	5	Entire length
Fletcher Street	5	Entire length
Frederick Road	5	Entire length
Glenwood Avenue	5	Entire length
Grant Street	5	Entire length
Grove Street	5	Entire length
Mill Street	5	Entire length
Moyle Avenue	5	Entire length
Niagara Street	5	Seymour Street to city line
Prospect Avenue	5	Entire length
Schuler Avenue	5	Entire length
State Street	5	Entire length
Tussing Lane	5	Entire length
Two Mile Creek Road	8	Entire length
Virginia Street	5	Entire length

Source: Code of Ordinances, City of Towanda (Code 1989, § 306-51)

Several local communities have designated truck routes

Town of Cheektowaga

The Code of ordinances of The Town of Cheektowaga includes the following road segments as its truck route system.

- Aero Drive, from the Town of Amherst Line to Transit Road
- Cayuga Road, from Genesee Street to the Town of Amherst Line
- Dingens Street, from the Buffalo City Line to Harlem Road
- Dick Road, from Broadway to Genesee Street
- East Delavan Avenue, from the Buffalo City Line to Pine Ridge Heritage Boulevard)
- Eggert Road, from Sugar Road to the westbound Kensington Expressway Ramps
- French Road, from Union Road to Transit Road
- Galleria Drive, from Walden Avenue to Union Road
- Holtz Drive, from Genesee Street to Aero Drive
- Kensington Avenue, from the Buffalo City Line to the Amherst Town Line
- Maryvale Drive, from Pine Ridge Heritage Boulevard to the Kensington Expressway on-ramp about 1,900 feet east of Harlem Road
- Pine Ridge Heritage Boulevard from Genesee Street to Maryvale Drive
- Richard Drive, from the Buffalo City Line to William Street
- Sugar Road, from Eggert Road to Pine Ridge Heritage Boulevard
- William Street, from the Buffalo City Line to Union Road
- Youngs Road, from Aero Drive to the Town of Amherst Line
- All state highways

As part of town regulations, all trucks having a total gross vehicle weight rating in excess of five tons are restricted to travel on all streets except on the routes listed above. Specifically, no truck is permitted to travel on William Street between Harlem Road (SR 240) and the New York State Thruway (I-90). However, these restrictions shall not deter the delivery or pickup of merchandise, therefore trucks may use roads not designated on the truck route system for delivery and pickup purposes only.

Town of Tonawanda

The Town of Tonawanda designates the following roadways as truck routes:

- Delaware Avenue, from Kenmore avenue to City of Tonawanda Line
- Military Road from Kenmore avenue to City of Tonawanda Line
- Millens road
- Copper avenue from Sheridan drive to Ensminger road
- Eggert Road from Niagara Falls Blvd to County line
- Firetower Dr
- Two mile creek from Ensminger road to Firetower Dr
- Sawyer Avenue from I-190 to River road
- River Road from Vulcan Street to County line
- Knoche Road from Military Road to Delaware Avenue
- Kenmore Avenue from Military Road to Bailey Avenue.
- Elmwood Avenue from Kenmore Avenue to Sheridan drive
- Colvin Blvd from Elliot Creek road Englewood Avenue
- Elliot Creek road from Niagara Falls Blvd to County line
- Brighton Road from Colvin Blvd to Niagara Falls Blvd
- I-190
- Niagara Falls Blvd from County line to Kenmore avenue
- Henderson Avenue from Military Road to Riverview Dr
- Woodward Avenue from Riverview Dr to Sheridan drive
- Ontario Street from Niagara St to Kenmore Avenue
- Erickson Avenue from Military Road to Ontario Street
- Beaver St. from Ontario Street to Military Road
- Vulcan Street from River road to Kenmore avenue

Trucks are restricted from use of roads excepted from the routes listed above. Posted weight limits exist within the town of Tonawanda indicating specific restrictions on weights limits

3.7 Regional Freight Highway System Strengths

The Buffalo-Niagara regional highway system provides for fluid truck movements and good accessibility to the area's economic centers. The extensive Interstate system provides reliable accessibility to the region and to external markets. Interstates 90, 190 and 290 link the region to other economic centers, specifically cities located in the central and eastern parts of the State. In addition, the secondary highway freight system provides good north/south connections within the region. These roadways provide access to major clusters of manufacturers and commercial areas, and serve as alternatives to the major interstate highways for commercial traffic.

3.8 Regional Freight Highway System Challenge

Based on discussions with major freight stakeholders, Buffalo Avenue (SR 384) is in need of significant rehabilitation. This route provides access to five major freight generating facilities in Niagara County. The roadway is in poor condition, littered with potholes, poor lane markings and has poor signage. In addition, the low clearance on the railroad bridge prevents trucks traveling westbound into the county from having direct access to Buffalo Ave from I-190. Instead, trucks are required to travel an additional three miles northbound on I-190 and use SR 62 to connect with Buffalo Ave. **Figure 3-10** shows the location of the low clearance bridge and forced truck access point.

Figure 3-10: Low Clearance Bridge/Forced Truck Access Point

A second highway network challenge to the Niagara Falls area is the fact that with the closing of the Niagara Falls bridge crossings, all rail movements serving Niagara Falls customers must now move through Buffalo. This loss of direct rail access from the west, together with the lack of rail /truck intermodal facilities in the Niagara Falls area, requires draying containers and other shipments from Buffalo intermodal facilities to Niagara Falls. This results in additional costs incurred by the shipper, and additional truck traffic on road segments such as SR 62. Any decision to re-route traffic over the Whirlpool Bridge would be made by CP Rail and would be based on rail economic opportunities in Niagara Falls or congestion over the Buffalo rail system.

In Erie County the interchange of I-90 and I-290 has been identified as a major freight chokepoint by both FHWA and NYSDOT. NYSDOT initiated a study of this area which is addressed later in this report.

Lastly, the region does not have an identified truck route system that establishes an Interstate, State and Local highway freight system which operates in conjunction with other main thoroughfares in the region. Absent is a truck route system that assists carriers in circumventing areas highly traveled by the motoring public, but still provides access to customers throughout the region. The truck routes need to be identified for both Niagara and Erie Counties to ensure coordination throughout the region. Connecting major routes from one section of the region to the other would provide more alternative routes that support freight traffic. Identifying gaps in the region's truck route system in relation to the primary and secondary highway freight systems would eventually assist in prioritizing road projects that that are significant for fluid freight movements in the region.

3.9 Current and Future Highway Projects

Several roads have been slated for reconstruction or maintenance to provide geometric design improvements and implement ITS applications. The following projects have been identified, funded, are under construction, or in the pre-engineering/planning phase (projects listed pertain to the primary or secondary highway freight system) [2]:

State Route 33
This project, nearing completion, will rehabilitate Genesee Street from Dick Road to the Buffalo - Niagara International Airport East Entrance in the Town of Cheektowaga, and provide miscellaneous minor improvements to NY 33 (Kensington Expressway segment) between NY 198 and Elm/Oak streets.

US Route 62
This project involves reconstruction and new construction on U.S. Route 62 (Niagara Falls Boulevard) from the North Tonawanda City Line to north of Krueger Road in the Town of Wheatfield.

Interstate 190
This project is located at the intersection of US Route I-190 (Niagara Expressway) and the LaSalle Expressway in the City of Niagara Falls. The project will include the complete removal of the existing four span simply supported bridges and the construction of two double span continuous steel bridges.

[2] Greater Buffalo-Niagara Transportation Council Transportation Improvement Plan

US 198/Scajaquada Corridor
This project is in the initial planning stages which several alternatives are being measured that would effectively change the roadway's functional classification, reduce operating speeds, and improve safety between I-190 and SR 33 (the Kensington Expressway). Construction would include new curbs, highway drainage, sidewalks, bicycle paths, at-grade intersections, and shared-use facilities.

State Route 5
This project is projected to improve access, safety and mobility on SR 5, Lakeshore Road, from Old Lakeshore Road to Old Big Tree Road in the Town of Hamburg, Erie County.

Interstate 90
The NYS Thruway Authority and NYSDOT have been conducting a corridor study on eight miles of I-90 near Buffalo between interchanges 49 (Transit Rd.) and 53 (I-190) and on I-290 between I-90 and Interchange 7 (Main St.). The purpose of this study is to develop a plan to address capacity, structural, safety, and operational needs for these sections of the Interstate Highway System over the next 30 years. Recent changes to the Thruway toll structure in the Buffalo area have begun to alter regional traffic patterns that could affect the magnitude of the corridor's transportation issues. The Corridor Study has been postponed until the traffic patterns have stabilized.

3.10 Immediate Improvement Initiatives

Improvements to Buffalo Ave. to eliminate bottlenecks and improve access to local industries are immediate initiatives that can be undertaken. Road condition and bridge clearance improvements would have significant benefit to the highway freight network.

Programmed improvements to the southern segment of US 219 will also improve a major north-south route for access to Buffalo and the greater Erie-Niagara counties region.

3.11 Summary

The highway freight system is an essential part of the freight transportation system. With over 75 percent of freight being moved by truck in the region, the primary and secondary freight routes

greatly influence the transportation and logistics industry in the region. The secondary freight highway system is extensive and provides additional road linkages to major freight generators throughout the region.

Despite obvious highway bottleneck areas such as the intersection of I-90/I290, according to the 2004 Urban Mobility Report developed by the Texas Transportation Institute, the Buffalo area ranks lower than all large urban areas (1-3 million population) and most medium urban areas (500,000-1 million population) in terms of annual delay per traveler, total travel delay and congestion cost. The Buffalo area ranking is slightly better than urban areas such as Cleveland, Pittsburgh, Springfield and Rochester in terms of annual delay per traveler (10 hours) and is significantly better than all other large urban areas in terms of total travel delay (5.2 million hours).

Despite the area's hours of delay rankings, increased focus on considering and implementing strategies to address deficiencies on the primary and secondary highway freight systems will be necessary to benefit, support and attract industry to the region. Policy, operational, and improved infrastructure initiatives are all available tools to improve freight routes and enhance the current freight roadway system.

RAIL SYSTEM PROFILE

4.1 Rail Profile Overview

Historically, the Buffalo-Niagara region has been a vital transportation center. Its strategic location and the opening of the Erie Canal played a key role in the economic growth of this region. However, it was not until the establishment of railroads that this area became the one of the most thriving regions in the nation. Development of the rail transportation network in early twentieth century made Buffalo-Niagara region the second largest rail center in the world, with over 600 miles of trackage and 26 classification yards.

Later, the development of faster and more cost effective highway transportation facilities, such as the Interstate Highway System, captured significant business from railroads. The opening of the St. Lawrence Seaway and the Welland Canal in the 1950s also diverted freight from the Buffalo-Niagara area and further reduced the market share and profitability of railroads in the region.

In the late 1960s, a number of corporate mergers took place with the expressed purpose of reversing the deteriorating financial condition of the Northeast rail carriers, the most prominent being the merger of the New York Central and Pennsylvania Railroads to form Penn Central. However, most of the railroad companies serving the region, including Penn Central, declared bankruptcy by 1970.

In order to safeguard the industrial and manufacturing businesses that depended on rail service, as well as to sustain the economy of Northeast, the federal government intervened and took control of railway operations. Six bankrupt railroads were consolidated to form the Consolidated Rail Corporation (Conrail). The legislation creating Conrail and subsequent legislative initiatives provided the framework for more favorable labor agreements and other operating efficiencies that improved service, allowed the rail network to be rationalized, and reduced operating costs. In addition, Congress deregulated the railroad industry which provided the opportunity to address profitability.

In the 1980s, Conrail, the dominant railroad in the region at that time, and the New York State Department of Transportation (NYSDOT) completed the Buffalo Rationalization Project that included major track and signal upgrades, connectivity improvements and the removal of redundant or underutilized infrastructure that was no longer critical to support Conrail

operations. This project was a critical step in Conrail's plan to improve rail service and realize cost efficiencies in the Buffalo-Niagara region.

By the 1990s, Conrail became profitable and companies such as CSX Transportation (CSX) and Norfolk Southern (NS) proposed to purchase its assets. After intense negotiations and Surface Transportation Board (STB) approval in 1998, NS acquired about 57 percent of Conrail's total route miles and CSX obtained the remaining 43 percent.

These historical events and circumstances have helped to define the railroad network in the Buffalo-Niagara region as it exists today. The following section provides a brief summary of the existing rail network and a profile of each railroad operator.

4.2 Rail Carriers

The Buffalo-Niagara region is currently served by four Class I railroads, one Class II (or Regional) railroad, and three Class III (or Short Line) railroads as outlined below.

4.2.1 Class I Railroads

As currently defined by the federal Surface Transportation Board, Class I Railroads are line-haul railroads earning revenues of more than $319.3 million. Four of the seven US Class I Railroads operate in this region including CSX Transportation (CSX), Norfolk Southern (NS), Canadian Pacific Railway (CP) and Canadian National Railway (CN).

4.2.2 Regional/Class II Railroads

Regional railroads, often referred to as Class II railroads, are defined by the American Short Line and Regional Railroad Association as operating over at least 350 miles or earning revenue between $40 million and the $319.3 million Class I threshold. The Surface Transportation Board defines Class II Railroads as carriers with annual operating revenue of less than $319.3 million but in excess of $25.5 million. The Buffalo & Pittsburg Railroad (BPRR), a subsidiary of the Genesee & Wyoming Railroad (GWRR) is the only Regional/Class II Railroad in the area.[3]

4.2.3 Short Line /Class III Railroads

Short line railroads, often referred to as Class III railroads, are comprised of local line-haul railroads earning revenue below Regional Railroad criteria or switching and terminal railroads which join two railroads for the purpose of transferring cars between railroads or solely within a

[3] The Genesee & Wyoming Railroad is holding company for a number of regional and short line railroads in North America.

facility or group of facilities. The Surface Transportation Board defines Class III Railroads as having annual operating revenues of less than $25.5 million. In the Buffalo-Niagara region, the Somerset Railroad (SOM), Buffalo Southern Railroad (SBOR), Falls Road Railroad (FRR), Depew Lancaster & Western Railroad (DLWR), and South Buffalo Railway (SB) are the five Short Line or Terminal Railroads operating in the region. The Somerset Railroad is owned by AES Corporation, the South Buffalo Railway (SBOR) is owned by GWRR, the Falls Road Railroad (FRR) is owned by Genesee Valley Transportation (GVT), and the Buffalo Southern and Depew, Lancaster and Western Railroads are owned by Erie County Industrial Development Agency (ECIDA).

Figure 4-1 describes the route miles operated by the railroads serving Buffalo. CSX, operating 100 route miles in the region, is the most prominent railroad serving the region followed by the NS with 76 route miles. Based on route miles, however, collectively the short line and regional railroads with 73 route miles are also an important element of rail service in the region.

Figure 4-1: Rail Operators by Class in Buffalo-Niagara Region

Class	Railroad Name	Route Miles
Class I Railroads	CSX Transportation (CSXT)	100
	Norfolk Southern (NS)	76
	Canadian National Railway (CN)	1
	Canadian Pacific Railway (CP)	0
	Subtotal Class I Route Miles	**177**
Class II Railroads	Buffalo & Pittsburgh Railroad (BPRR) [1]	10
	Subtotal Class II Route Miles	**10**
Class III Railroads	Falls Road Railroad (FRR) [2]	13
	Depew, Lancaster & Western Railroad (DLWR) [3]	4
	Somerset Railroad (SOM)	16
	South Buffalo (SB)	0
	Buffalo Southern Railroad (BSOR) [4]	30
	Subtotal Class III Route Miles	**63**
	TOTAL ROUTE MILES	**250**

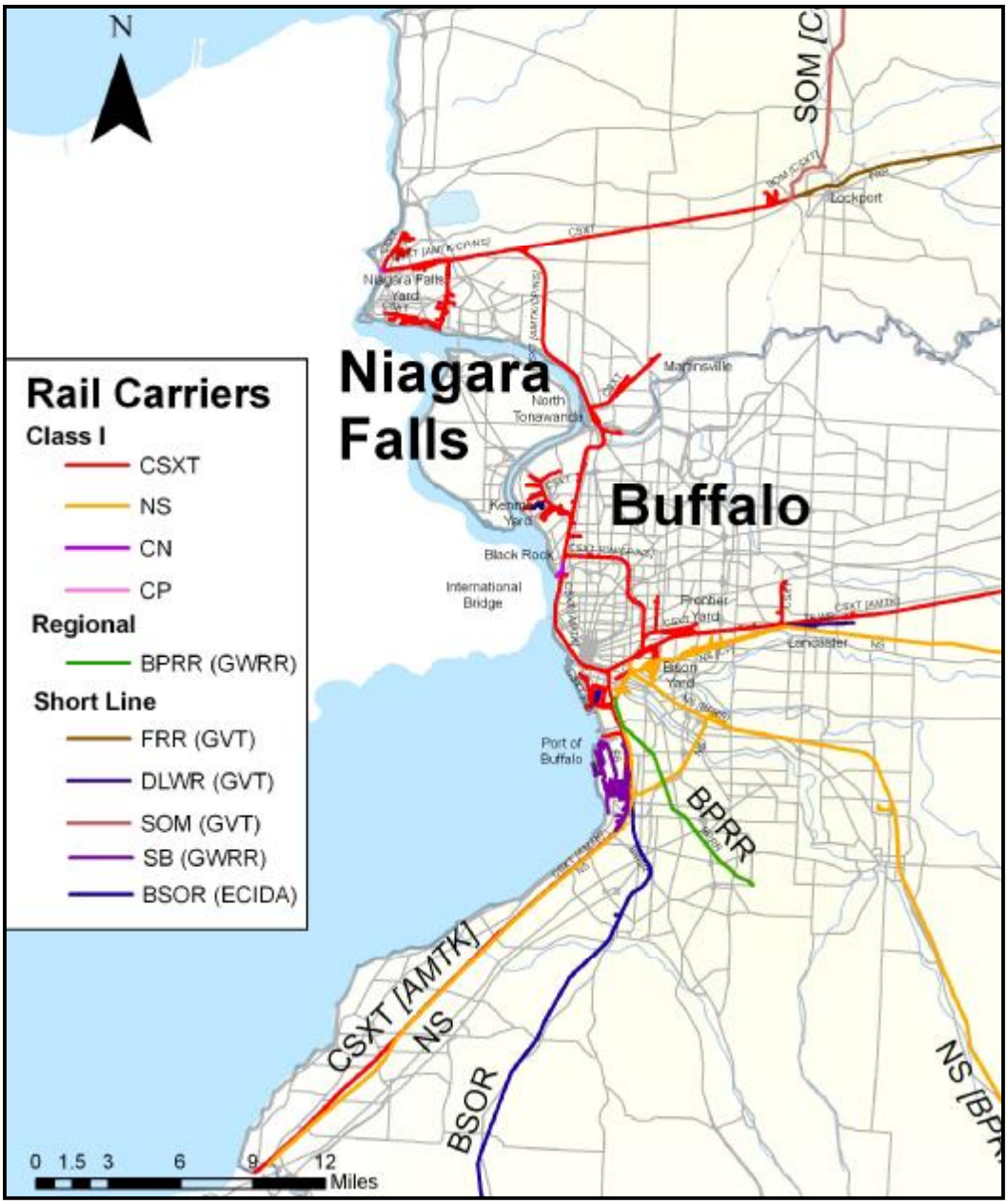
[1] Subsidiary of Genesee & Wyoming Railroad; reflects pending abandonment proceedings
[2] Subsidiary of Genesee Valley Transportation
[3] Owned by Erie County; operated by Genesee Valley Transportation
[4] Owned by Erie County

Source: New York State Department of Transportation (NYSDOT) database, 2006

4.3 Existing Railroad Network

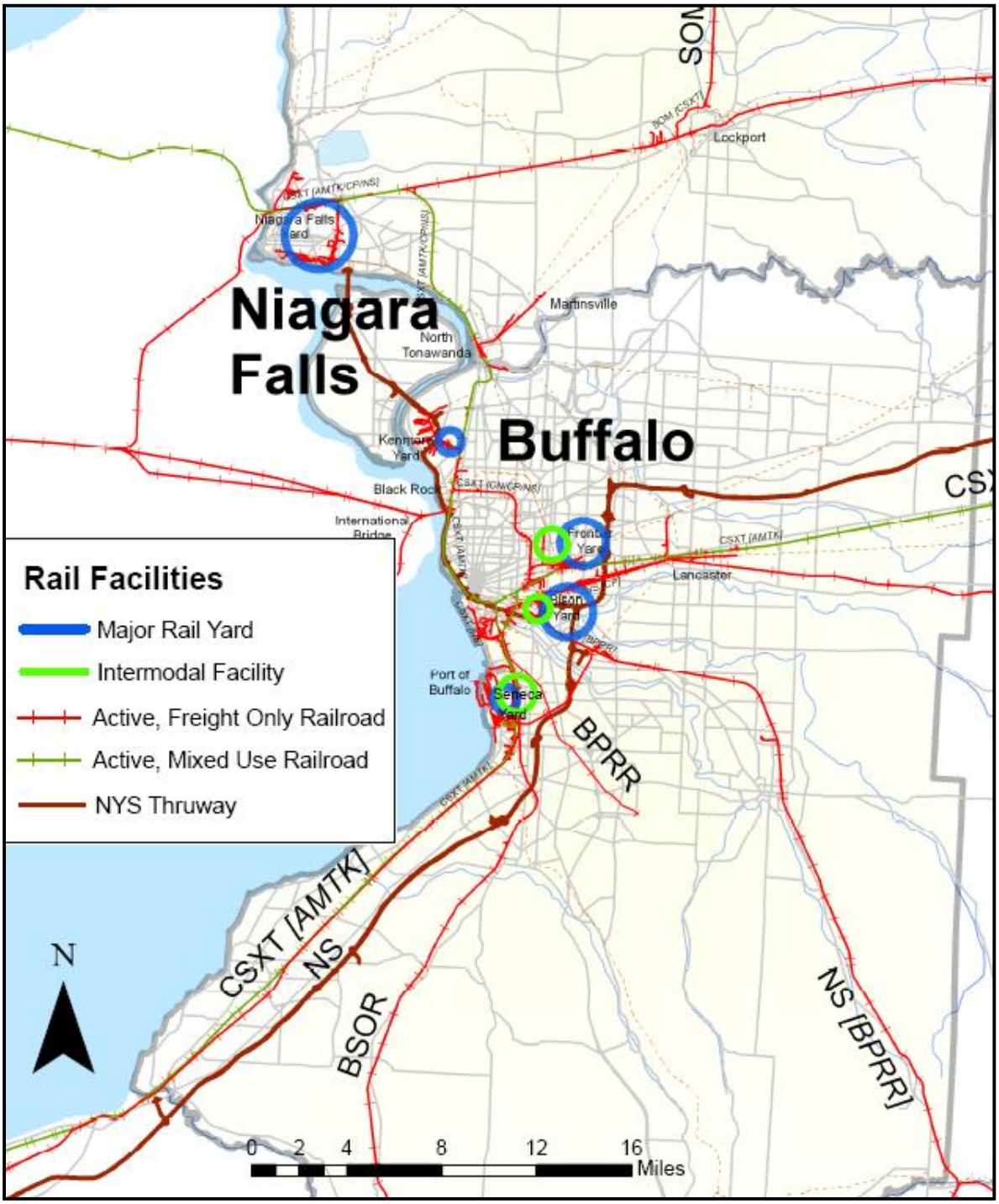
The existing railroad network in the Buffalo-Niagara region is shown below in **Figure 4-2**. The majority of the tracks are utilized on for freight movements, although most of the mainline tracks support both freight and passenger service. Although passenger services are not a subject of this study, they do compete for capacity with the freight railroads as they share available trackage.

Figure 4-2: Rail Network by Class and Carrier in Buffalo Niagara Region



The existing railroad terminals and support yards in the region are shown below in **Figure 4-3**.

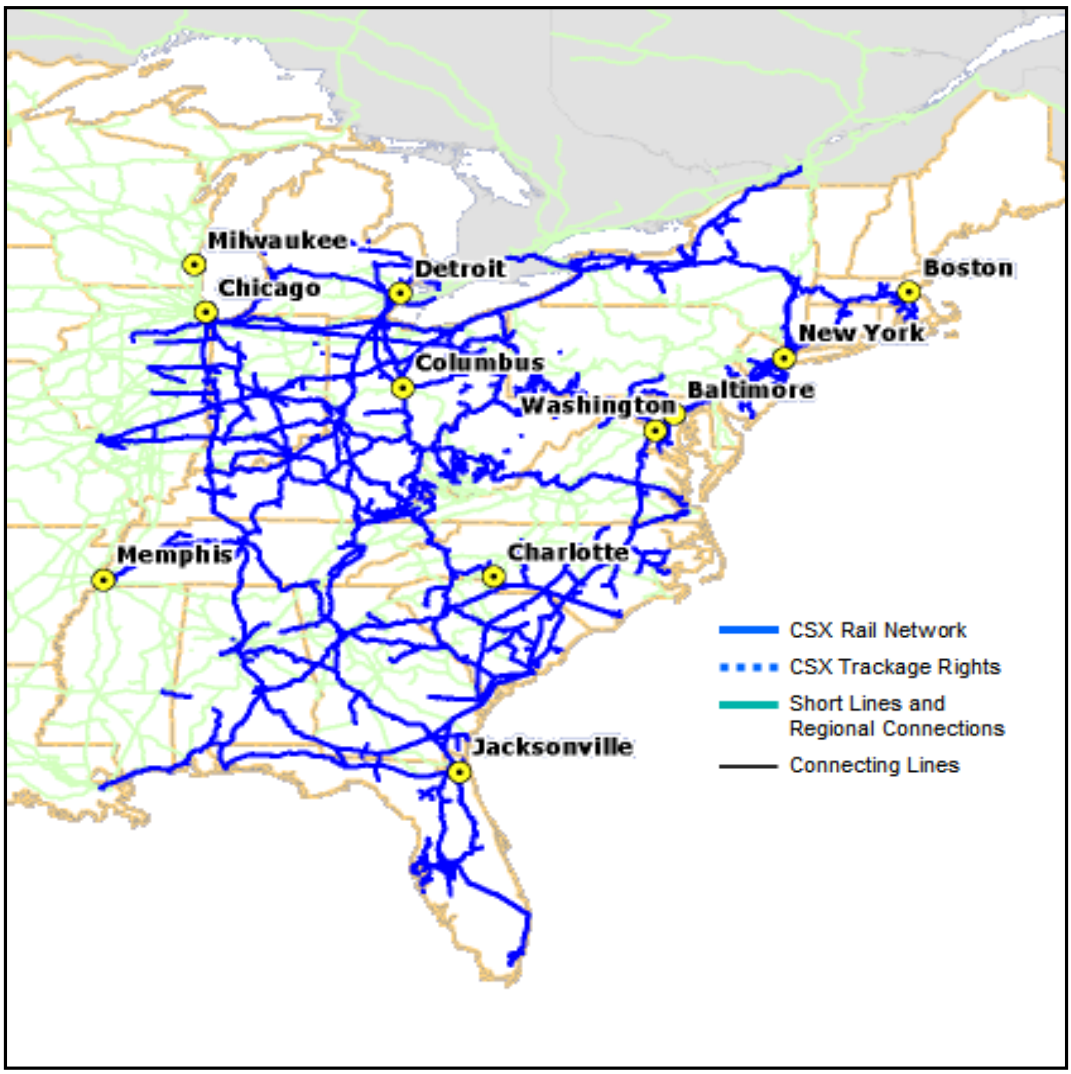
Figure 4-3: Rail Facilities and Connections in the Buffalo-Niagara Region



4.3.1 CSX Transportation

CSX has an extended rail network that covers 23 states east of the Mississippi River (see **Figure 4-4**). It operates the principal routes that connect Buffalo with Boston, New York City/New Jersey terminal area, Chicago, and via Chicago, major markets west of the Mississippi River. Within the Buffalo-Niagara region, CSX operates three mixed use freight and passenger lines, the Chicago Line (East and West), and the Niagara Branch, and a freight only line, the Belt Line. These lines and the associated support facilities are described briefly below.

Figure 4-4: CSX System Map



Source: CSX website

Chicago Line (East)
The Chicago Line (East), technically known as the Buffalo Terminal/Rochester Subdivision, connects Buffalo to the metropolitan New York/New Jersey area via Albany (Selkirk). It is a high capacity, double track line that runs east from the Buffalo Terminal and supports both freight and passenger service. This segment operates under a Traffic Control System (TCS) that is remotely controlled by a train dispatcher in Selkirk, NY. The maximum operating speed for freight trains on this segment is 60 mph and 79 mph for passenger trains. Several Class I and Class II railroads have trackage rights on this segment including Amtrak, NS, CN, CP, and BPRR. Traffic volumes on this segment are typically between 60 to 75 million gross tons (MGT) per year, except in the Buffalo terminal area where it can exceed 100 MGT annually.

Chicago Line (West)
The Chicago Line (West) or Lake Shore Subdivision is a double track line from Ripley (PA State Line) to Buffalo (CP Draw). This segment of the Chicago Line also supports freight and passenger service and operates under a Traffic Control System (TCS) that is remotely controlled by a train dispatcher in Selkirk, NY. The maximum operating speed for freight trains is 60 mph and 79 mph for passenger trains. Various Class I and Class II railroads have trackage rights on this segment including Amtrak, NS, CN, and CP. Traffic volumes on this segment are typically between 60 to 75 MGT per year.

The combined Chicago Lines constitute what is known as the Water Level Route. This route is CSX's principal line in the Northeast and Midwest. It has sufficient clearance to accommodate double stack intermodal trains, and thus, is CSX's intermodal corridor connecting the Port of New York and New Jersey with markets throughout the Midwest and beyond.

Belt Line Branch
The Belt Line Branch is a 7-mile long double track railroad that extends from Frontier Yard to Tonawanda, where it connects with the Niagara Branch. This segment operates under a Traffic Control System (TCS) that is remotely controlled by a train dispatcher in Selkirk, NY. The maximum operating speed for freight trains is 30 mph. Other class I carriers including CN, CP and NS have trackage rights on this line. Traffic volumes on this segment are between 20 to 30 MGT per year.

Niagara Branch
The Niagara Branch is a single track railroad extending from downtown Buffalo to Niagara Falls through Tonawanda. This segment operates under a Traffic Control System (TCS) that is remotely controlled by a train dispatcher in Selkirk, NY. The maximum operating speed for freight trains is 40 mph and 60 mph for passenger trains. Amtrak operates over this branch to

reach Niagara Falls. Traffic volumes on this segment are typically between 15 to 25 MGT per year. CN, CP and NS have trackage rights on the line.

Frontier Yard

Frontier Yard, located on the Chicago Line (East) in the city of Buffalo, is the region's principal railroad freight car classification facility. It is the region's only hump classification yard and its largest switching yard in the region with 63 classification tracks.[4] All other Class I and regional railroads (BPRR, CN, CP and NS) operating in the region have trackage rights into the facility to interchange cars with CSX. The yard handles cars transporting a wide variety of commodities ranging from chemicals, rubber products, steel and coal.

Kenmore Yard

Kenmore Yard is located in the city of Buffalo along the Niagara Branch. The yard has easy access to I-190 and I-290 as well as to the Niagara River. The yard primarily serves the chemical and other industries located along SR 266 (River Road).

Niagara Falls Yard

Niagara Falls Yard is a switching yard located along the Niagara Branch in the City of Niagara Falls near the Canadian border. This yard is connected to rail border crossing at the Whirlpool Bridge, but all Canadian traffic destined for Niagara Falls is currently routed via the International Bridge at Buffalo. CP and NS have trackage rights into the yard. The yard has access to I-190 and serves chemical, locomotive, and food processing industries.

Seneca Yard

Seneca Yard is located on the south side of the City of Buffalo along the Chicago Line (West). This former classification yard has been redeveloped into an intermodal facility.

The new Seneca intermodal terminal will be included in the Port Authority of New York/ New Jersey's Port Inland Distribution Network (PIDN). The PIDN concept extends the operations of the Port to satellite facilities in the Northeast. Rather than process containers at the Port itself, containers are shuttled to remote facilities for processing and distribution.

CSX Buffalo Intermodal Terminal (Williams St.)

As shown on **Figure 4-5**, CSX has an extensive intermodal rail network in the United States. Within Buffalo-Niagara region CSX, through its intermodal business unit, operates an

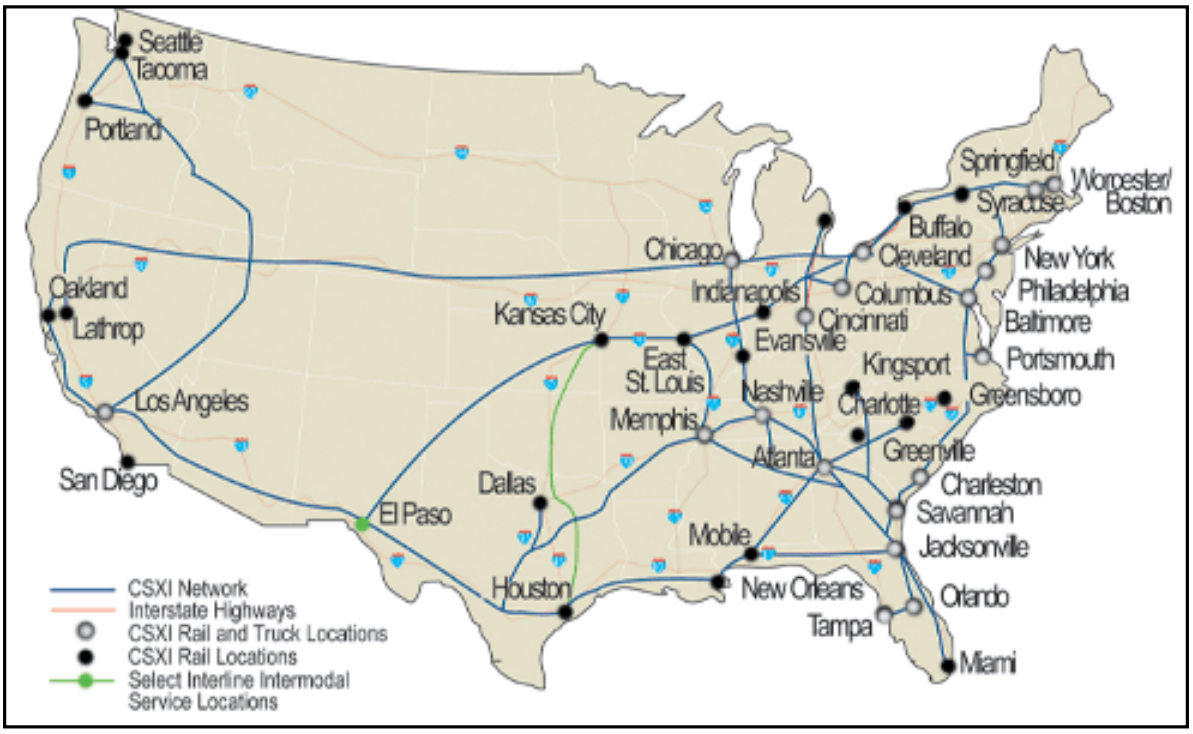
[4] Yard where gravity is used to classify freight cars. Cars are slowly pushed over a small hill, where they are uncoupled. They in turn roll down the other side of the hill with remotely-controlled switches directing them onto the proper tracks.

intermodal terminal on William Street. Currently CSX intermodal service consists of a single daily train containing domestic and international containers from Chicago, IL to Buffalo. In the reverse direction, CSX operates a single intermodal train each day for five days a week (Tuesday to Saturday) to Chicago, IL, with connections to Los Angeles and Lathrop, California, Portland, OR, and Seattle, WA. This train also handles both domestic and international containers.

CSX also operates a bulk distribution facility at Buffalo Terminal through its Transflo venture. The facility provides storage and truck-rail transloading capability for dry bulk products. The on-site rail infrastructure includes 65 car spots.

Upon completion of the intermodal facility at Seneca Yard, all intermodal container traffic will be moved from the Buffalo Terminal facility at Williams Street and the Transflo operations there will be expanded. These facilities will be described in more detail in subsequent technical memorandum

Figure 4-5: CSX Intermodal Rail Map



Source: CSXI website

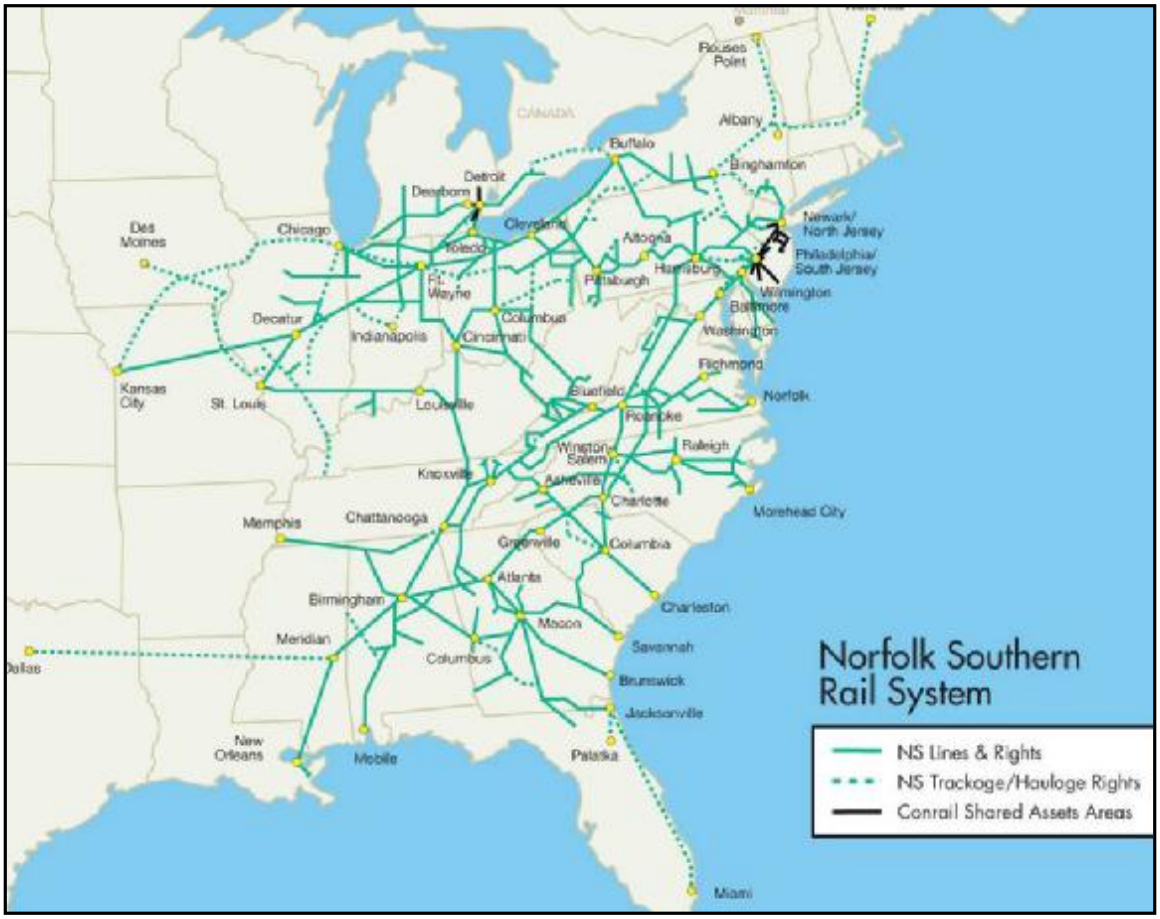
Other facilities operated by CSX in the region include locomotive servicing facilities, one car repair shop, and a major warehouse at Cheektowaga.

Recognizing the importance of CSX to the region, the Niagara County Center for Economic Development facilitates an annual meeting between CSX and its customers to discuss rail service, infrastructure and equipment issues, as well as new business development.

4.3.2 Norfolk Southern

Like CSX, NS operates extensively east of the Mississippi River. Its network connects Buffalo to every major market as shown in **Figure 4-6**.

Figure 4-6: NS System Map



Source: NS website

NS operates two principal freight only rail lines in the Buffalo-Niagara region. The Conneaut Line provides connections to markets to the west including Cleveland, Chicago, and Kansas City. The Southern Tier Line provides NS with a link east to the No. New Jersey terminal area and New England via its connections at Binghamton with the Central New York Railroad and CP respectively. NS also retains rights on its former Buffalo Line which extends from Buffalo to

Harrisburg. This line was recently leased to the Buffalo and Pittsburgh RR between Buffalo and Machias, NY and to the Western New York and Pennsylvania RR south of Machias into Pennsylvania.

Buffalo Conneaut Line

NS' Buffalo Conneaut Line parallels CSX's Chicago Line (West) from Buffalo to Ripley (PA State Line) where it continues to Cleveland and points west on the NS network. This segment operates under a train control system that is remotely controlled by a dispatcher in Harrisburg, PA. The maximum operating speed for freight trains is 60 mph. Traffic volumes run between 25 to 40 MGT per year.

Southern Tier

The Southern Tier line runs southeast from the City of Buffalo toward Binghamton, and the New York/New Jersey area. NS owns and operates the line between Buffalo and Binghamton. The line is an active freight-only line with maximum train speeds of 50 mph and has sufficient height clearances to permit the operation of double stack trains. Annual traffic volume on the line is 20 to 30 MGT. NS leased the portion of the Southern Tier line between Binghamton and Suffern near the No. New Jersey terminal area to the Central New York RR but retains through trackage rights on the line.

NS also has a haulage agreement with CP in that it will carry traffic from the Buffalo area for CP's account from Buffalo to Binghamton. CP, in turn, provides haulage rights to NS for traffic extending east of Binghamton to the Albany, NY and New England markets.

Bison Yard

Bison Yard is the main classification yard for NS in the region. CP and CN have trackage rights from the International Bridge to the yard. The yard is located near the CSX-owned Frontier Yard, and provides switching and interchange services for all NS operated trains in the region. The yard handles rail cars transporting a wide variety of commodities ranging from food articles, lumber, steel and coal.

Located close to Bison Yard, NS also operates a lumber reload facility providing lumber transloading and distribution services. It has 30 rail spots in the yard, 9,500 sq feet inside and 7 acres outside storage facility.

Buffalo Intermodal Terminal

NS' Buffalo area intermodal terminal is situated adjacent to the Bison Yard. The facility handles both domestic and international intermodal traffic. The terminal supports the Equipment Management Program (EMP) and North American Container System (NACS) service to Canada and Mexico. [5] The EMP equipment operates between NS and the Union Pacific Railroad and the NACS equipment operates between NS and the Burlington Northern Santa Fe Railroad. The terminal is configured to store maximums of 53 rail cars (89'), 308 wheeled units and 188 stacked containers.

NS operates a single intermodal train each day for five days a week (Monday to Friday) from Buffalo to Toledo, OH and Chicago, IL and points beyond. As shown in the **Figure 4-7** below, currently it takes 16.30 hours to reach Toledo and 32 hours to reach Chicago from Buffalo[6].

Figure 4-7: Buffalo schedule (NS operated trains)

Origin: Buffalo, NY Gate Hours: M-F 0700-2200								
Destination		**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**
Chicago 47th, IL	Cutoff	M 2200	Tu 2200	W 2200	Th 2200	F 2200		
	Available	W 0600	Th 0600	F 0600	Sa 0600	Su 0600		
Toledo, OH	Cutoff	M 2200	Tu 2200	W 2200	Th 2200	F 2200		
	Available	Tu 1430	W 1430	Th 1430	F 1430	Sa 1530		

Source: NS website

Thoroughbred Bulk Terminal

The Thoroughbred Bulk Terminal in Buffalo is located at 55 Bison Parkway and is used for bulk transfer and distribution. The terminal is a rail-to-truck and truck-to-rail transfer facility that is owned and managed by Norfolk Southern. The facility has a paved area runoff control, an office, truck scale, truck wash and transfer machinery. The terminal is operated by a private contractor, Bulkmatic Transport and has 80 car spots.

4.3.3 Canadian National (CN)

CN is a Canada-based Class I railway operated by the Canadian National Railway Company. It has extensive network reach in Canada and the US. The CN network connects Buffalo to various important centers in Canada (Port of Halifax, Montreal, and Winnipeg), the US (Detroit, Chicago, Memphis, and others), and Mexico. CN connects Buffalo to the Port of Halifax, which is Canada's Atlantic Gateway for international containers. The Port of Halifax, with its deep draft

[5] Equipment in these programs is owned by the participating railroads and provided to intermodal customers for a daily use fee and rail linehaul charge.
[6] Based on the 07-03-2007 schedule

levels, has the ability to accommodate the largest container vessels available for international movements.

Within the Buffalo-Niagara region, CN owns operates two single track lines across two border crossings, the Whirlpool Bridge and the International Bridge. At this time, however, only the International Bridge crossing to Buffalo is being utilized by CN. CN has trackage rights over many of the CSX operated lines and yards including the Chicago Line, Beltline, Niagara Branch, and Frontier Yard. CN also has trackage rights on the South Buffalo RR, enabling it to access a lumber transfer facility it provides under lease. The following is a brief description of the CN bridge crossings:

International Bridge Crossing (Buffalo)
The International Rail Bridge is owned by CN and provides a connection between Fort Erie, ON and Buffalo. CP also utilizes the bridge via trackage rights. This bridge is equipped with a VACUS mechanism which is operated by Customs & Immigration. The VACUS provides X-rays which can be analyzed for suspicious cargo or illegal immigrants. From the International Bridge, both CN and CP have trackage rights to CSX, NS and other rail facilities in Buffalo.

Whirlpool Bridge Crossing (Niagara Falls)
The Whirlpool Bridge is owned by the Niagara Falls Bridge Commission. The bridge has separate decks for railroad and auto traffic. CN has rights over the bridge through a long-term agreement with the Authority and owns 100 ft. of track on the east side which connects to CSX's Niagara Falls Yard. CP rail also has trackage rights it attained after abandoning its adjoining Michigan Central Rail Bridge. Neither CN nor CP currently utilize this crossing for freight movements, and direct all traffic to the International Bridge crossing. Amtrak currently is the only railroad utilizing the bridge under a traffic rights arrangement. Amtrak's Maple Leaf service (thru VIA) provides one trip in each direction between Niagara Falls, NY and Toronto. The proposed new Niagara Falls, NY passenger station would be located on the eastern approach of the bridge.

4.3.4 Canadian Pacific

The Canadian Pacific Railway is a Canadian Class I railway operated by Canadian Pacific Railway Limited with headquarter in Calgary, Alberta. Its rail network extends from Vancouver to Montreal in Canada, and many major cities in the United States such as Minneapolis, Chicago, New York City and Philadelphia.

The CP rail route into the city of Buffalo is through International Bridge border crossing with trackage rights to interchange traffic with CSX, NS and other railroads. Until recent years, CP operated within the Buffalo terminal area. It operated out of SK yard and retained employees to market and directly serve customers in the region. CP retained trackage rights over NS' Southern Tier Line to access its own line at Binghamton for movements south or east. CP entered into an arrangement with NS whereby it would continue to market its service in the Buffalo area, but NS would provide all direct service and move CP traffic via a haulage arrangement to Binghamton. In return, CP relinquished its trackage rights over the Southern Tier Line.

4.3.5 Buffalo & Pittsburgh Railroad (BPRR)

BPRR, a subsidiary of GWRR, owns and operates a single track freight line that runs from CP Draw in Buffalo southward to Eidenau, PA The 36 mile segment of the line between Orchard Park and Ashford Junction has been out of service for a number of years. BPRR utilized NS' Buffalo Line between Buffalo and Machias, NY under a trackage rights arrangement to bypass the 36 mile segment until 2007 when it reached agreement with NS to lease the Buffalo-Machias segment. BPRR may file to abandon the Orchard Park to Ashford Jct. segment with the completion of the Buffalo Line lease agreement.

BPRR owns and operates Buffalo Creek and South Buffalo RR C yards which adjoin the NS operated Tifft yard, and Buffalo Southern RR's yard. All Class I railroads of the region have trackage rights over three tracks in this yard. This trackage rights arrangement provides interchange opportunities between all railroads and provide access to privately owned industrial sidings for delivery to local customers.

BPRR also has trackage right to NS' SK yard and provides some yard switching and blocking service for NS. .

4.3.6 Falls Road RR (FRR)

FRR, a subsidiary of Genesee Valley Transportation Co., owns and operates this single track route between Lockport and Brockport. Rail carloads are interchanged with CSX at Lockport Yard. Western New York Energy is constructing a dry mill ethanol plant on this line in Shelby, Orleans County.

4.3.7 Delaware Lackawanna & Western RR (DLWR)

DLWR is owned by Erie County and operated as a subsidiary of Genesee Valley Transportation Co. The main track is about 3 miles long and runs eastward from Lancaster, NY.

4.3.8 Somerset RR (SOM)

Somerset Railroad, owned by AES Corp, is a short line railroad that extends 41 miles from Lockport to the Somerset power generation plant on the shore of Lake Ontario. The Somerset Railroad is a single track main line with a maximum operating speed of 30 mph. CSX provides all service over the line via trackage rights to deliver coal and limestone to the power plant. In the past, there have been discussions regarding the ability of this railroad to serve other industries in the vicinity of the power plant.

4.3.9 South Buffalo RR (SB)

SB is a subsidiary of the Genesee and Wyoming Inc. The terminal railroad owns 22 sidings, 2 multiple tracks and yard facilities in the South Buffalo Yard in the City of Buffalo. It interchanges with all Class I carriers in the region, with the major interchange located in CSX operated Seneca yard. SB also operates on tracks owned by Bethlehem Steel (31 sidings, 6 yards), Mittal Steel (4 sidings), Gateway Harbor (8 sidings), and Republic Technology (10 siding, 6 yard). SB provides transload facilities for lumber, metal, steel, and other commodities.

4.3.10 Buffalo Southern RR (BSOR)

BSOR operates this single track line from Tifft Street to Gowanda at the southern border of Erie County. The line is owned by the Erie County and has a maximum operating speed of 30 mph. BSOR interchanges traffic with CN, CP, CSX, and NS. .

4.3.11 NYSDOT

NYSDOT owns the Lehigh Valley Yard, located adjacent to CSX's Niagara Falls Yard. The yard was constructed in 1963 as a flat switching yard by Conrail. It covers 65 acres and contains 19 tracks with capacity ranging from 22 to 69 cars. This yard is not currently utilized for rail freight. Amtrak’s Niagara Falls station is located on the northern edge of the Yard. NYSDOT has solicited proposals for transportation purposes via sale or lease, but no acceptable proposals have been received to-date.

4.4 Strengths and Weaknesses of Current Rail Operations

Rail facilities in the Buffalo-Niagara region play a major role in connecting the north-south (Canada-USA) and east-west trade corridors. The existence of an extensive rail network, route capacities, and major rail carriers provide the requirements of a major rail gateway and add to the competitiveness of the region. As indicated in the, "*Chautauqua, Cattaraugus, Erie & Niagara Regional Rail Strategy*" published by the Erie County Industrial Development agency in March 2003, short line railroads play as important a role in the region as the Class I carriers.

In particular, the following connections are the key strengths of the region:

- **North-South connection -** The CN International Bridge in Buffalo provides the connection for all rail freight traffic between Canada and Buffalo-Niagara region. The Whirlpool Bridge in Niagara Falls, although not currently utilized for rail freight, currently provides an alternative route for cross-border traffic if emergency or capacity needs so require.

- **East-West connection –** The Chicago line (owned by CSX) and Southern Tier line (owned by NS) provide high capacity connections to the NYC Metropolitan area, New England, and points west and south.

Although the region benefits from the presence of major rail carriers with good route capacity, inadequate terminal capacity, congested bridges, and local service issues pose severe constraints to reliable and cost effective freight rail service in the Buffalo-Niagara terminal area. These limitations are detailed below:

- **Terminal capacity and switching operations -** Past studies and interviews with shippers have pointed to the existence of service problems in the local rail system[7]. Interchange arrangement between various rail carriers (especially Class I carriers), and excessive dwell times in the major terminals add to the delays and costs of delivering commodities to shippers. In a global economy where shippers demand just- in-time delivery and better overall integration of logistical services, these factors affect the sustainability and economic growth potential in the region.

[7] Erie County Industrial Development Agency, "*Rail Service Assessment and Opportunities for New Growth in the Buffalo-Niagara Region,*" by James Cartin (June 2004).

- **Bridges** - Three strategic bridges in the region tend to restrict the performance of the rail system in the Buffalo-Niagara region:

  1) Although there are two bridges over the Buffalo River, only CSX's CP Draw Bridge is operational. Adjacent NS Draw Bridge is out of service from 1980, after Conrail's Buffalo Rationalization Project. Multiple railroads use CSX's CP Draw Bridge and interchange between carriers is inconsistent. Through and interchange traffic can experience delays at this bottleneck and affect service reliability to local shippers.

  2) The other key structure that could have major implications to the regional network is NS' Portage railroad bridge over the Genesee River in Letchworth State Park on the Southern Tier Line. This aging bridge currently has a weight restriction of 273,000 lbs. requiring cars that carry today's industry standard of 286,000 lbs to be diverted to other routes.

  3) There are also concerns that freight service over the Whirlpool Bridge may eventually be formally abandoned. This could threaten the movement of US-Canadian traffic if any interruption occurs at the International Bridge. It could also threaten the continuation of Amtrak service to Toronto (and plans for a new Niagara Falls station) as Amtrak may not be able to assume the rail maintenance responsibilities involved with the bridge and service to Toronto through Buffalo is not a viable option. Although a new rail passenger station in Niagara Falls can be justified solely on the basis of Empire Corridor service terminating in Niagara Falls, usage of the new station and the associated economic development benefits are enhanced if the station serves an international crossing.

     The aforementioned study conducted by Erie County Industrial Development Agency (ECIDA) not only recommends keeping both the bridges, but also bringing them to the highest maintenance standards in order to meet the growing international rail traffic and truck diversions at the crossings.

- **Competitive Access** - Many local customers in this region do not have competitive rail access and are subject to large interchange or switching charges. If better connections and/or intermodal terminals could be established in order to facilitate or create competitive access to rail shippers, then both the reliability and cost of freight service would be improved. A long-term plan for the State's Lehigh Valley rail yard site could also be important to future rail operations in the Niagara Falls area.

4.5 Preliminary Rail Improvement Opportunities in the Buffalo-Niagara Region

Port Inland Distribution Network

The Port Inland Distribution Network (PIDN) is an initiative of the Port Authority of New York and New Jersey (PANYNJ) to accommodate the growing freight movement in the Northeast region. The PIDN is a planned system for distributing containers via barge and rail between the PANYNJ and a series of dense trade clusters. Among the major benefits of the initiative include reduced highway congestion, improved air quality, improved logistics reliability and drayage, and greater economic development opportunities for feeder ports. Inland ports will benefit by expanded logistics, warehousing opportunities, integration of distribution functions and improved services to local shippers.

As shown in **Figure 4-8**, the PIDN is envisioned as a hub and spoke system designed to move containerized cargo by barge or rail between the Port of NYNJ marine terminal facilities and regional terminals in New York, New Jersey, Connecticut, Rhode Island, Massachusetts, and Pennsylvania. Trucks will be used to deliver cargo from the inland or satellite port facilities to customers. In the state of New York, PANYNJ preliminarily identified Albany, Syracuse, Rochester, and Buffalo as potential dense trade clusters and potential inland port sites.

Figure 4-8: Rail and Barge Routes in the PIDN

Source: PANYNJ

Approximately 45 percent of the total Twenty-foot Equivalent Units (TEUs) originated or terminated in the Buffalo-Niagara region, passed through PANYNJ. The introduction of PIDN in the region would substantially increase this flow and will require new and better intermodal facilities. To fill the gap CSX, in partnership with the State of New York, has constructed a $6 million intermodal facility at Seneca Yard in Lackawanna. The intermodal facility will have a capacity of 60,000 lifts to serve east-west traffic.

Although the primary intention of the PIDN is to serve markets surrounding the network centers, the addressable market would most likely be larger in scope. Today, import containers destined for the Indiana, Ohio, and western Pennsylvania markets move on trains that terminate in Chicago, or in some cases, Columbus. From there containers are trucked to their destination. Both changing trade patterns and congestion at west coast ports and connecting rail lines are shifting container traffic from the Southern California gateway ports to the PANYNJ. As a consequence, Buffalo may serve as the end point for a micro landbridge service from PANYNJ serving the greater northeast markets.

BPRR/South Buffalo Connection

There are several initiatives available to lessen the magnitude of the CP Draw bottleneck. One is the repair or replacement of the adjacent NS-owned bridge which has been out of service in an upright position for over a decade. Another is to establish a physical connection that would provide BPRR trains operating over its newly leased Buffalo Line a more direct route to the South Buffalo RR interchange yard, thus avoiding CP Draw.

WATERBORNE FREIGHT SYSTEM PROFILE

5.1 Waterborne Freight Sector Overview

The growth of international trade has spurred the expansion of the US and global economies. In the US, international trade accounts for approximately 30 percent of the GDP with maritime transportation representing 90 percent of the international commerce. Concomitantly, maritime freight transport, container shipping as well as bulk, has grown dramatically over the past two decades. High quality freight transportation benefits local economies by making the cost of imported as well as exported goods cheaper, and done well can enhance the quality of life.

This chapter profiles the Erie-Niagara Counties maritime and port assets and discusses the opportunities for greater use of the assets. It identifies quick start actions for expanding port commerce, expanding assets, and for better utilization of existing assets.

This chapter includes:

- Description of the characteristics of the Port of Buffalo and its terminals
- Discussion of the Port of Buffalo in the context of the Great Lakes Saint Lawrence Seaway system maritime freight corridor
- Comparison of the Port of Buffalo with other Great Lakes system ports
- Suggestions for quick starts, i.e. immediately available opportunities for improving the greater Buffalo Niagara region's economy

5.1.1 Purpose

The Greater Buffalo-Niagara region’s principal waterborne commerce center is the Port of Buffalo, which is owned and operated by Gateway Metroport. The port, while not among the largest on the Great Lakes, is active and poised for growth. The Port has significant assets: its location astride two Great Lakes, its linkage by road and rail to the east coast urban megalopolis, and its location at the center of the Golden Horseshoe, the rapidly expanding portion of the Province of Ontario surrounding the western end of Lake Ontario. In addition, the region has substantial waterfront acreage dedicated to maritime freight transport, good intermodal connections, and a significant stock of available, well-located industrial space that would enable expansion of port activities in Erie and Niagara counties for the benefit of the regional economy.

5.1.2 Definition of the Port

The Port of Buffalo, as defined by the Army Corps of Engineers, encompasses the Outer Harbor, Lackawanna Canal, Union Canal, Buffalo River (from its mouth to the CSX Drawbridge), Buffalo Ship Canal, Black Rock Lock, Black Rock Channel and Tonawanda. It consists of 28 terminals including the three terminals of Gateway Trade Center – Metroport. Unlike nearly all other terminals in the Port, which are private facilities serving the owning company's business, Gateway Metroport is a third party operated terminal.[8]

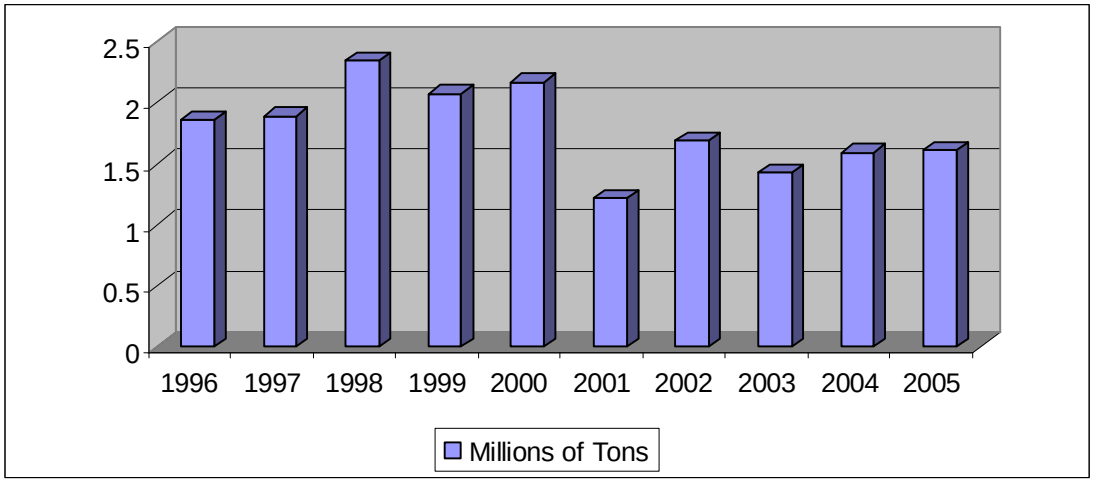
Figure 5-1: Map of the Port of Buffalo

[8] At times Gateway Metroport is referred to as the Port of Buffalo because of the private status of the other terminals. This report uses the expanded definition to include all facilities and the entire maritime geography

5.1.3 Port of Buffalo Cargo Profile

In 2005, the Port of Buffalo handled 1.6 million tons of cargo as shown in **Figure 5-2**. [9] This represents a decrease of nearly 27 percent from 1998, its peak volume year in the last decade. Although the decrease is significant, cargo volumes have remained reasonably flat since 2002.

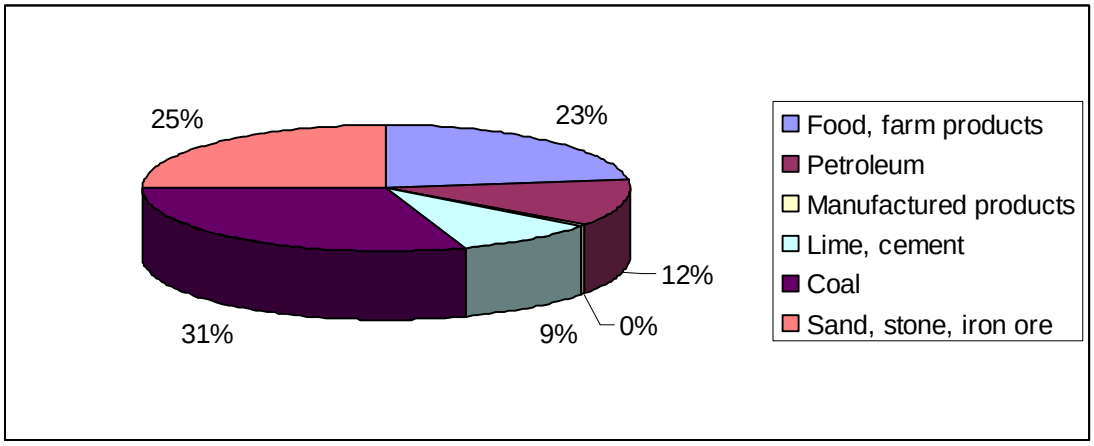
Figure 5-2: Port of Buffalo Ten-year Tonnage Profile



Source: Waterborne Commerce of the United States

Figure 5-3 shows the mix of cargo passing through the Port.

Figure 5-3: The Port of Buffalo Commodity Distribution



Source: Waterborne Commerce of the United States

[9] There is a discrepancy between the Corps of Engineers tonnage data used in this Technical Memorandum and the tonnage estimates used in Technical Memorandum #1 developed from the TranSearch database. The estimates are being reconciled

In 2005, coal was the principal commodity representing 31 percent of the cargo base. Aggregates and grain account for 25 percent and 23 percent of the traffic, respectively. The Port may finally be returning to its former growth path. In 2006, the Gateway Terminal was recognized by the St. Lawrence Seaway Development Corporation with a *Robert J. Lewis 2006 Pacesetter Award* for "increasing international tonnage shipped through the St. Lawrence Seaway." In fact the port apparently tripled its international Seaway tonnage due to the increase of coal imports from the upper lakes. In addition, there were significant landings of other cargo, specifically the windmill parts. There was additional foreign trade in cargoes at the Port of Buffalo in 2006. A tenant of RiverWorld, Hohl Industrial Services, exported water filtration units to an aluminum plant in Iceland.

5.1.4 Port of Buffalo Trade Patterns

The Port of Buffalo's trade is primarily inbound. Eighty seven percent of the Port's tonnage is inbound cargo. The limited outbound freight includes coal exported to Canada (218,000 tons), sand and stone to domestic markets (9,000 tons) and machinery to overseas markets (3,000 tons), a total of 230 thousand tons. Generally an imbalance of this magnitude produces unfavorable economics to the shipper because of the empty back haul. The effects of Buffalo's imbalance, however, are mitigated because of the availability of outbound cargo at other ports in the proximity of Buffalo. The ports of Erie, Ashtabula and Conneaut in the U. S. and Nanticoke and Port Colborne in Canada provide the opportunity for cargo to fill ships that discharge at the Port of Buffalo. A more detailed discussion of the traffic base and forecasts will be presented in Technical Memorandum #3.

5.1.5 Port of Buffalo Facilities Profile

Marine Terminals

As shown in **Figure 5-1**, the Port of Buffalo consists of 28 maritime terminals, all in Erie County. Of the 28, eight are government facilities and not engaged in maritime freight transport. The eight governmental terminals are the U.S. Army Corps dock, the U.S. Coast Guard dock, the Buffalo and Erie County Naval and Military Park Wharf, the City of Buffalo Fireboat slip, and four Niagara Frontier Transportation Authority (NFTA) terminals.

The NFTA terminals, however, are available for cargo transfer. They have over 6,900 feet of linear shoreline and 120 acres of land. NFTA's Terminals A and B are located at 901 Fuhrmann Boulevard; the NFTA's Seaway Terminals are located at 35 Fuhrman Boulevard. NFTA's Terminal A has rail tracks and connects to CSX.

Figure 5-4 describes the function and status of the twenty commercial terminals.

Figure 5-4: Commercial Maritime Terminals

Terminal	Location	Function	Berth Depth	Comments
ADM Milling-Std	Buffalo River	Inbound grain	19	Active
Buffalo Dock Forwarder	Buff Ship Canal W	Inbound sand	22	Active
Gateway (East)	Lackawanna Canal	limestone, salt, coke, coal	27	Active
Gateway (South)	Union Canal, south	slag, potash, scrap metal	22	Active
Gateway (West)	Lackawanna Canal	Inbound/outbound bulk:	27	Active
General Mills	Buffalo Ship Canal E	Inbound grain	22	Active
LaFarge	Buffalo River	Inbound cement	20	Active
Marathon	Niagara River, Tonawanda	Inbound asphalt	21	Active
NOCO Energy	Niagara River, Tonawanda	Inbound petroleum	21	Active
NRG Energy	Niagara River, Tonawanda	Inbound coal	19	Active
Toledo Dock	Buff Ship Canal W	Inbound gypsum	22	Active
United Refining	Niagara River, Tonawanda	Inbound petroleum	22	Active (Occasional)
ADM Milling-Mutual	Buffalo Ship Canal E	Milling only	21	Inactive
Cargill Salt	Outer Harbor	Inbound salt	24	Inactive
ConAgra-Riverwright	Buffalo River	Inbound grain	14	Inactive
ExxonMobil-Buckeye	Buffalo River	Inbound petroleum	15	Inactive
Killian Bulk	Buffalo River	Mooring vessels	15	Inactive
Maple Leaf-Koch	Buffalo River	Grain	22	Inactive
Maple Leaf-Peavy	Buffalo River	Grain	24	Inactive
St Lawrence Cement.	Union Canal, north	Inbound cement	18	Inactive

Source: US Corps of Engineers

Currently, eight of the twenty terminals are inactive as cargo terminals: both Maple Leaf terminals, the Killian bulk terminal (however, used for mooring vessels), St. Lawrence Cement, Cargill Salt, ADM Mutual, Exxon-Mobil (Buckeye), and ConAgra. The ConAgra terminal has been acquired by RiverWright Energy LLC and will be converted to an ethanol plant, which will receive inbound corn by water, thus reinstating maritime use of the terminal. The ADM Standard maritime terminal is inactive, although the milling plant on the property is operational and receives grain by water via the ADM-Mutual plant.

All the terminals that are active in commercial operations – receiving and/or shipping freight are at least 19 feet in depth. In addition, the Killian Bulk terminal, not currently active in commercial freight transfers but used for mooring vessels, has a depth of only 15 feet. Although most of the terminals had depths less than the vessel size limits for the St. Lawrence Seaway (26') and Welland Canal (26'), none of the terminal operators and carriers were concerned that depths at the Port would hinder operations.

Landside Access

The most efficient means to move bulk cargo between port facilities and inland markets is by rail. The economics of rail transportation favor heavier loading commodities. **Figure 5-5** describes the rail connectivity at each of the maritime terminals.

Figure 5-5: Port Terminal Rail Access

Terminal	Rail Infrastructure	Serving Railroad
ADM Milling-Mutual	Two loading tracks; two storage tracks	CSX
ADM Milling-Std	None	None
Buff Dock Forw	None	None
Cargill Salt	None	None
ConAgra - RiverWright	Three tracks	CSX
ExxonMobil - Buckeye	None	None
Gateway (East)	Three tracks on wharf; additional in rear of terminal	South Buffalo
Gateway (South)	1000 feet of track; additional in rear of terminal	South Buffalo
Gateway (West)	None	None
General Mills	One loading track; three storage tracks	CSX
Killian Bulk	None	None
LaFarge	None	None
Maple Leaf-Koch	None	None
Maple Leaf-Peavy	Two loading tracks; two storage tracks	CSX
Marathon	None	None
NOCO Energy	Storage capacity of 40 tank cars	CSX
NRG Energy	Four tracks	CSX
St Lawrence Cem.	None	None
Toledo Dock	None	None
United Refining	One track (9 cars)	CSX

Source: US Corps of Engineers

Nine of the 20 terminals in the Port of Buffalo have rail connections. They are Gateway East, Gateway South, ADM Mutual Milling, General Mills, Maple Leaf-Peavey, ConAgra-RiverWright, NRG Energy, NOCO Energy, and United Refining. Of these, three marine terminals with rail access are currently no longer operational for maritime delivery of freight: the ADM Mutual Milling, ConAgra, and Maple Leaf-Peavey terminals have been closed. The

former ConAgra site, now RiverWright, however, will produce and ship ethanol in the future, relying on rail for the outbound movement. The other maritime rail asset that is unused is NFTA's Terminal A.

Only two terminals have competitive rail alternatives. Through the short line carrier South Buffalo Railroad, the Gateway East and Gateway South terminal can access four Class I railroads, CSX, Canadian National, Canadian Pacific, and Norfolk Southern. Seven terminals are captive to a single railroad, CSX. Although CSX connects to the other three railroads, it controls the freight by virtue of its connection to the terminals, the lack of competitive connections and resultant need for interline movement usually result in less attractive rates than if competition were available.

Appendix A describes access of the port terminals to the freight highway system. According to the maritime stakeholders, existing highway connectivity posed no barriers.

5.1.6 Potential Port Terminal Development

Reactivation of the former maritime terminal at the AES Somerset power plant on Lake Ontario is being considered. The Niagara County facility currently receives coal and limestone that is delivered to the Port of Buffalo's Gateway Metroport terminals. It is then moved by the South Buffalo Railroad to a connection with CSX, and then delivered to the power plant. AES Somerset is concerned that its sole dependence on rail delivery exposes the company to significant increases in its cost of transportation. Currently only the stub of the old pier still is visible. To accommodate water deliveries, improvements would be required.

5.2 The Great Lakes St. Lawrence Seaway System

Buffalo is part of the Great Lakes St. Lawrence Seaway system. The Great Lakes St. Lawrence Seaway is an improved waterway with canals and locks and dredged channels (**Figure 5-6**). It extends 2,342 miles from the Atlantic Ocean through the St. Lawrence Seaway and Great Lakes to Duluth, Minnesota on Lake Superior. Channels are maintained at a depth of 27 feet to support waterborne commerce. Between the limitations imposed by the depth of channels and the dimensions of the locks, maximum vessel size is 740 feet in length, 78 feet in width, a draft of 26 feet 6 inches and a 116.5 foot height above water.

Figure 5-6: Great Lakes St. Lawrence Seaway System

5.2.1 Great Lakes Ports

The Port of Buffalo is not a large port by comparison with other Great Lakes ports (**Figure 5-7**). However, unlike many Great Lakes ports, which are focused on one commodity, the Port of Buffalo is highly diverse. The Port of Buffalo handles a variety of commodities, with a multiplicity of trading partners. While the volume is relatively small, the Port handles domestic and international freight, both import and export. Buffalo's diversity provides it with an economic advantage over Great Lakes ports with a more limited commodity base as maritime commerce will be more consistent**.**

Figure 5-7: Great Lakes Port Profile

Port	Tons (Millions)	Waterbody	Population (Thousands)
Ashtabula	9.7	Erie	21
Buffalo	1.6	Erie	300
Burns Harbor	9.8	Michigan	<1
Chicago	25.8	Michigan	2,840
Conneaut	7.4	Erie	12
Cleveland	13.6	Erie	452
Detroit	17.4	Huron	887
Duluth-Superior	44.7	Superior	114
Erie	1.1	Erie	100
Green Bay	2.7	Michigan	100
Hamilton	13.6	Ontario	500
Milwaukee	3.8	Michigan	600
Monroe	1.6	Erie	22
Montreal	26.0	Seaway	1,600
Nanticoke	NA	Erie	<1
Oshawa	0.2	Ontario	141
Oswego	0.7	Ontario	17
Port Colborne	NA	Erie	19
Port Maitland	NA	Erie	NA
Port Stanley	NA	Erie	NA
Toledo	10.5	Erie	300
Toronto	2.8		2,480

Source: Port Documents

Most Great Lakes Ports are governed by a port authority. Port authorities may engage in terminal operations or more frequently serve as a landlord port in which the authority owns and develops port property and markets the port's services. Although not necessarily detrimental, Buffalo has no port authority and limited membership with port promotion associations (**Figure 5-8**).

Figure 5-8: Great Lakes Ports – Institutional Profile

Port	Port Authority	Association
Ashtabula	X	
Buffalo		5
Burns Harbor	X	1, 2. 3, 4
Chicago	X	1, 2. 3, 4
Conneaut	X	
Cleveland	X	1,2 , 3, 4
Detroit	X	1.2, 3,4
Duluth-Superior	X	1,2, 3, 4
Erie	X	3
Green Bay	X	4
Hamilton	X	2, 3, 4
Milwaukee	X	1,2, 3
Monroe	X	
Montreal	X	2, 3
Nanticoke		
Oshawa		3, 4
Oswego	Yes	1, 3, 4
Port Colborne		
Port Maitland		
Port Stanley		
Toledo	X	1, 2, 3 4
Toronto	X	2, 3

Associations
1 = American Great Lakes Ports Association
2 = American Association of Port Authorities
3 = Chamber of Maritime Commerce
4 = Highway H2O
5 = Council of Upstate Ports

Source: Port Documents, Association Documents

Virtually all Great Lakes ports participate in numerous port associations. Ports are nodes in a network and these associations facilitate business arrangements between ports and enable ports operators to keep abreast of new opportunities.

Appendix B describes Great Lakes Ports according to their transportation assets, volume of business, networks with other Great Lakes ports and partnerships with public.

5.2.2 Great Lakes Cargo Profile

In 2005, the combined volume of dry and liquid bulk commodities transported on the Great Lakes was 169 million tons, as shown in **Figure 5-9**. This includes US, Canadian and foreign

shipments. By comparison, the tonnage passing through Buffalo was a little more than 1.6 million tons.

Figure 5-9: Buffalo Share of Great Lakes Traffic

Commodity	Great Lakes	Buffalo	Share
Food, farm products	5,496	373	6.8%
Petroleum	4,593	193	4.2%
Manufactured products	103	3	2.9%
Lime, cement	10,489	153	1.5%
Coal	44,773	493	1.1%
Sand, stone, iron ore	102,800	398	0.4%
Chemicals	1,077	0	0.0%
Unknown, misc	86	0	0.0%
Total	169,417	1,613	1.0%

Source: US Corps of Engineers

Buffalo represents only one percent of total Great Lakes port commerce. The Port, however, accounts for nearly seven percent of the agricultural products (grain) moving on the Great Lakes and participates in four percent of the petroleum traffic.

5.2.3 Buffalo's Great Lakes Port Relationships

To improve their operating economics, vessel operators seek back haul cargoes. Consequently, vessels make multiple port calls to load or discharge cargo. The Port of Buffalo relies on nearby Lake Erie ports to fill the holds of vessels calling on Buffalo, thus improving the economics of the Buffalo trade. Ports such as Erie, Conneaut and Ashtabula, which are 78, 107, and 119 miles from Buffalo, respectively, provide cargo for ships that would return empty. Similarly, the Canadian ports of Nanticoke, Port Colborne and Port Maitland play the same role. Choice of ports depends upon the type and availability of cargo, and the requirements of the vessel operator.

5.3 Preliminary Identification of Port of Buffalo Opportunities

Several potential opportunities exist for Buffalo to leverage its location and maritime asset base. Each will be evaluated in subsequent tasks of this project.

5.3.1 The Marine Highway --Short Sea Shipping

The greater Buffalo area was the tenth ranked US gateway in 2005, with $70.5 billion in trade passing through the region ($38 billion in imports). Congestion at the Peace Bridge decreases the

competitiveness of the Buffalo gateway and could impact Buffalo's standing as a principal gateway if it worsens. Plans are underway to expand the capacity of the bridge and build a companion bridge by 2015.

Until the companion Peace Bridge is constructed, and as a supplement even when it is complete, consideration of short sea shipping/marine highway is appropriate. Using the water mode to move freight in ocean containers or domestic truck trailers is known as marine highway/short sea shipping. Small ships or tug-barges are used to provide frequent service competitive with truck or rail. With the marine highway, congested land border crossings are avoided and competitiveness and market share of a region enhanced.

The European Union, confronted with highway congestion and constrained rail capacity, embarked on a short sea shipping program a decade ago. Currently about 40 percent of inter-European containerized freight moves by water. The US Maritime Administration, the DOT itself and the US Congress have initiated a program to promote short sea shipping, now being called the marine highway. Using the short sea shipping concept to transport international containers that are discharged at the Port of Halifax and Montreal could avoid long distance land transport, offer cost reductions and potentially enhance reliability.

In some traffic lanes, truck transport is losing its competitive advantage over the waterways. Increasing fuel costs, which are more detrimental to trucking than water transportation, hours of service rules, and significant driver turnover add to trucking costs. An integrated truck ferry system allows trucking to leverage its modal advantage of providing access for the "last mile" at the origin and the destination, while avoiding the line-haul which is better served by water carriers.

Great Lakes Short Sea Shipping Proposals

Recently, there have been several short sea shipping services proposed for the Great Lakes at various stages of planning. As shown in **Figure 5-10**, they are:

- **Marine Link** plans to operate a year round trailer ferry service across Lake Ontario from Hamilton, Ontario, to Oswego, N.Y. and across Lake Erie from Port Maitland or Nanticoke, Ontario, to Erie, PA and Ashtabula, OH. It is anticipated that two trailer ferries will transport freight overnight on Lake Ontario
- **Great Lakes Feeder Lines** plans to transship containers through the Seaway from Montreal, Quebec to Canadian and U.S. ports. Great Lakes Feeder Lines is looking to start a service from Halifax to Montreal on a weekly basis year-round by late 2007. As they add vessels to the fleet they will expand their network into the Great Lakes. It will

next likely introduce a year-round service between Toronto/Hamilton and Montreal/Halifax with a land bridge during the two-month closure over the winter. The service will be dedicated to containers, but will have the capability to handle roll-on/roll-off (truck) and break-bulk[10] cargo (such as lumber) as well. The vessel has outlets for refrigerated containers (reefer plugs) so they will be offering service for perishables in the market as well.

- **The Erie Management Group**, the major shareholder group of Great Lakes Feeder Lines, is experienced in short sea shipping. It is currently operating a feeder ship service in Europe. It is developing a waterfront biodiesel facility on the former International Paper site in Erie, PA and planning to ship biodiesel by short sea service.
- **Royal Wagenborg,** a European short sea operator is planning a service between Port Stanley, Ontario and Cleveland. At present progress has been made in Cleveland, but not in Canada.

Figure 5-10: Great Lakes Short Sea Shipping Proposals

Service	Waterbody	Ports		Type of Service	Purpose
Marine Link	Ontario	Hamilton Maitland	Oswego Erie	RORO	Avoid border congestion Avoid border
Marine Link	Erie	Nanticoke	Ashtabula	RORO	congestion
GLFL	Seaway	Halifax	Montreal	LOLO	All-water service
GLFL	Seaway Ontario	Halifax Montreal	Toronto Hamilton	LOLO	All-water service
GLFL	Other lakes	other ports		LOLO/RORO	All-water service
Wagenborg	Erie	Cleveland	*Port Stanley*	RORO	Shorter distance; avoid border

Potential opportunities for Buffalo include:

- Establish a terminal for truck trailer-on-vessel short sea shipping to avoid landside border crossings.
- Develop an international container-on-barge short sea service for export of manufactured goods and agricultural produce, and import of commodities for value-added manufacturing.
- Upgrade the Erie Canal for container or trailer cargo.

[10] Cargo can be either bulk (loose cargo) or break bulk. Break-bulk cargo comes in discrete units; lumber, autos, steel slabs, bags of cocoa are break-bulk. Containers are a subset but typically considered separately.

The Corps of Engineers undertook a study evaluating freight ferries for Niagara County. The Corps study examined whether a freight ferry for Lake Ontario could make sense and if so where it would be located. It concluded that a freight ferry was feasible, could have economic benefits, and that the Somerset site ranked highest among four sites that also included Morrison Road (Orleans County), Olcott and Porter (**Figure 5-11**). [11]

Figure 5-11: Potential Freight Ferry Ports

Obstacles to the marine highway do exist and need to be addressed: the Harbor Maintenance Tax, which applies only to goods carried on the waterways as well as the high cost of US-built vessels. Both barriers are currently being addressed by Congress with proposals to drop the tax and to restore loan guarantee programs for vessel construction.

[11] "Lake Ontario Freight Ferry" Section 107 Niagara County NY Appendix B Economic Evaluation (September 25, 2002).

5.3.2 Expand the Port of Buffalo-Niagara to Include the AES Somerset Facility

AES Somerset is proposing to reconstruct the facility's terminal on Lake Ontario. The rail links with Buffalo could make for bi-directional synergy. Goods landing at Lackawanna terminals are currently railed to Somerset; goods landed at Somerset could be railed to Buffalo. Businesses and maritime interests could take advantage of the least cost, most efficient transport option.
An AES Somerset terminal works well if an industrial park were established that attracts new businesses to the region, new businesses consistent with the power plant -- fuels and chemicals.

5.3.3 Use the Port to Support Agricultural Production

Diets are shifting toward more produce and fresher food, and sourced from locations within 500 miles of the consumer. Within New York State and nearby states, truck would be the preferred mode; however, maritime transport has a potential advantage for cross-lake shipments. Expanding markets for agricultural produce, many options for delivery, an interest in the part of the region to step up agricultural production, and the opportunity to increase two way traffic of produce are factors which could stimulate the Buffalo Niagara area to increase production and shipping. In addition to local consumption, there has been a trend over the last two decades in upstate New York for the increasing export of value-added agricultural products (fresh fruits and vegetables, meat and cheese).[12]

Competition with China has presented a challenge. In the 1990s apple juice from China supplanted locally grown juice and currently fresh apples are poised to also compete. China's recent missteps in assuring safety of products and consumers' lack of confidence in China's inability to control producers may create an opening for Western New York growers.

5.3.4 Use Available Waterfront Lands to Create Freight Villages or Logistics Parks

Freight villages, or logistics parks, are gaining in popularity as they offer clustering benefits to the commercial sector and provide density for transportation service providers. They typically are sited in places similar to Buffalo, at the junction of numerous transportation options. With development of the Seneca intermodal facility and inclusion of Buffalo in the PANYNJ's PIDN network, conditions are becoming more favorable for development of a logistics park.

[12] "How New York State's Agriculture Industry is Staying Competitive." By Richard Dietz and Margaret Cowell, Buffalo Branch, Federal Reserve Bank of New York (Spring 2005).

The benefit of the Seneca intermodal terminal and its role in the PIDN is significant. Development around the inland port at Front Royal, VA is an example of the economic stimulus offered by a remote terminal linked to a port. Development began with the locating of industries servicing the container business. It soon expanded to a logistics hub with major retailers developing distribution centers in the area.

CROSS-BORDER AND NIAGARA PENINSULA FREIGHT INFRASTRUCTURE PROFILE

6.1 Freight Infrastructure Overview

This chapter profiles the freight infrastructure at and across the border between the Niagara Frontier, New York and Ontario, Canada. The 'Niagara Peninsula' region of Ontario, which lies between Lake Erie and Lake Ontario and connects Canada and the U.S., is served by a multi-modal network, including road, rail, marine, and air facilities. Its unique geography causes the road network to be influenced by both natural and man-made structures and features, such as the Niagara River, the Welland Canal, the Niagara Escarpment and the Burlington Bay Skyway. Consequently, road operation bottlenecks occur mainly on a limited number of road corridors and border crossings.

An understanding of the Canadian and cross-border freight infrastructure is important for three reasons:

- The Niagara Peninsula also connects the Niagara Frontier and southeastern Michigan. Accordingly, delays at the border crossings and on the Canadian side impact the flow of freight between Michigan, Ontario and the Niagara Frontier. Planned improvements on the Canadian side could also influence freight flow patterns and planned improvements in the Niagara Frontier.
- The Niagara Peninsula also serves as a major access point to and from freight generators in Canada such as southern Ontario, Canada's economic engine, including the Greater Toronto Area (GTA), the largest urban market in the entire region. Accordingly, delays on the Canadian side could affect trade between Canada and the US.
- Finally, given the short distances, opportunities could be found to exist for possible collaboration between the Niagara Frontier and facility owners or other interests on the Canadian side in order to 'grow the pie' for the benefit of all.

6.2 Highway System Description

According to the Bi-National Transportation Strategy for the Niagara Frontier, four components combine to provide the road capacity at the Niagara Frontier. [13] These are:

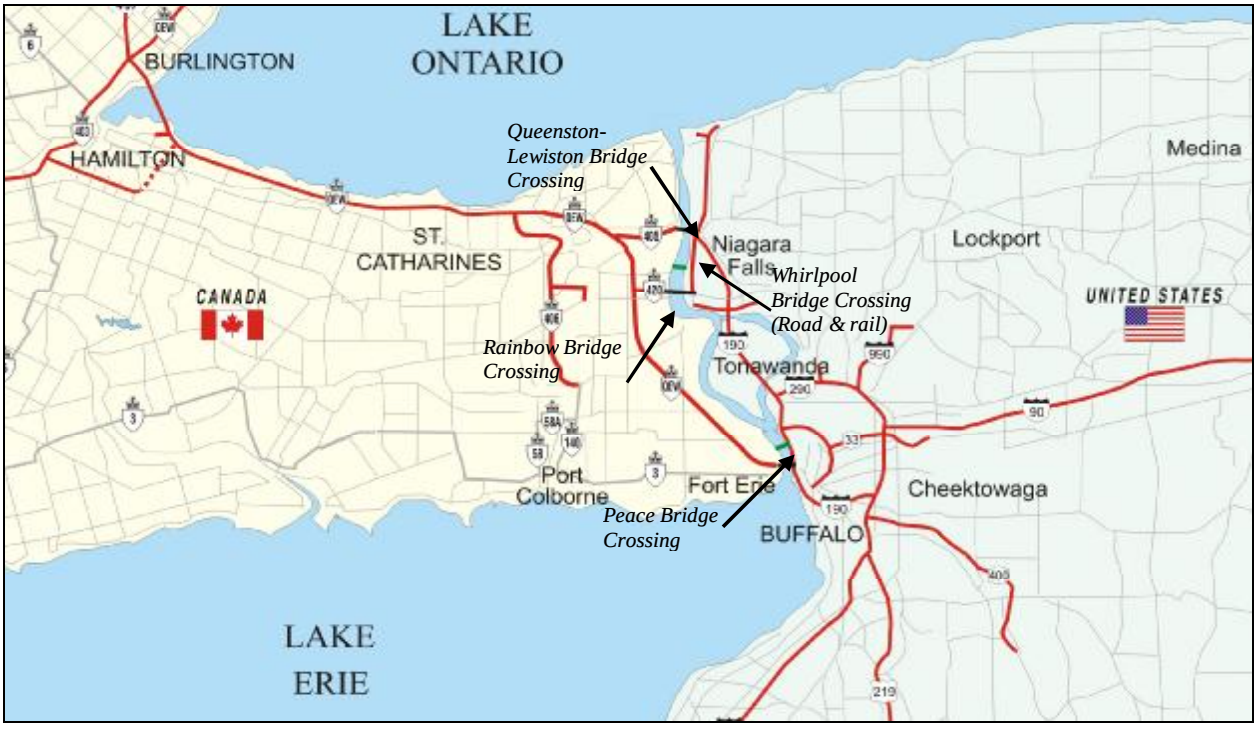
13 National Transportation Strategy for the Niagara Frontier

- The four highway international bridges
- The processing and enforcement plazas at the bridgeheads on both sides
- Canadian highway corridors approaching the border
- US highway corridors approaching the border

As suggested by the aforementioned study, these interrelated components must be considered collectively as a system. This section of the report addresses the first three elements. The American highways are addressed in a separate section. All the border crossings are served directly or indirectly by I-190, which connects to the New York State Thruway (I-90).

The Queen Elizabeth Way (QEW) is the primary expressway that connects the Greater Toronto Area (GTA) to the entire Niagara Frontier, including the four border crossings. The QEW connects directly to the Peace Bridge and indirectly, via Highway 405, to Queenston-Lewiston Bridge, and via Highway 420, to the Rainbow and Whirlpool Bridges in Niagara Falls. The cross border network and border crossings locations are shown in **Figure 6-1.**

Figure 6-1: Cross Border Network and Border Crossings



Source: Ministry of Transportation Ontario, Bi-National Transportation Strategy for the Niagara Frontier, 2005

6.2.1 Highway Levels of Service for Project Relevant Roadways

The Level of Service (LOS) concept used in Canada is similar to one defined in Highway Capacity Manual[14] with LOS levels reflecting traffic density on each analyzed segment. LOS A indicates free-flow operations with travelers unimpeded in their choices of speed and maneuverability. LOS B denotes reasonably free flow, with most of the traveling vehicles maintaining speeds close or matching free flow speed. At LOS C, freedom of speed selection and maneuverability becomes restricted. Traffic operating conditions described by LOS D indicate declining speeds and traffic density high enough to restrict vehicles ability to maneuver or change lanes. At LOS E, a roadway is at capacity and travelers are experiencing significant congestion and stop-and-go conditions. LOS F indicates a facility's breakdown and severe capacity deficiencies.

Queen Elizabeth Way (QEW)

The QEW starts at the Peace Bridge in Fort Erie, Ontario and continues 86 miles through Niagara Falls, St. Catharines, Hamilton, Burlington, Oakville and Mississauga before ending at the junction of Highway 427 and the Gardiner Expressway in Toronto.

The lane configurations on the QEW vary from section to section along the entire highway. For the most part, it is a four-lane freeway from Fort Erie through Niagara to St. Catharines, except certain sections with a six-lane configuration in the segment through Niagara Falls, as well as the segment approaching the Peace Bridge. From Highway 406 west to Hamilton, it widens to 6-lanes, and then it is further widened to eight-lanes east to Toronto. Construction is currently underway to expand the highway from four to six lanes through St. Catharines as well as a full eight to ten-lane widening through to Burlington and Oakville.

The traffic volumes on the QEW vary significantly through the different regions. In general, traffic volume on the QEW increases gradually along the corridor, from Fort Erie to Niagara Falls, St. Catharines, Hamilton and then to Toronto. In 2004, the highest volume occurred in the section from Highway 10 to Cawthra Rd. in Mississauga with an AADT (Average Annual Daily Traffic) of 175,000, while the lowest volume occurred in the section near the Peace Bridge Approach with an AADT of only 19,000.

The section-by-section AADT for the QEW in the Niagara Region for 2004 is shown in Figure 6-2. For clarity, it should be noted that east of the City of Hamilton, the Niagara Peninsula is divided into two municipal tiers, with responsibility for local roads and arterials divided between

14 Transportation Research Board, Highway Capacity Manual, 2000

the two tiers. The upper tier is the Regional Municipality of Niagara, which has general responsibility for arterials. The Region of Niagara covers the entire area east of Hamilton. The lower tier comprises cities and towns, such as Niagara Falls, Fort Erie and St. Catharines. The lower tier municipalities are responsible for collectors and local roads.

Figure 6-2: Annual Average Daily Traffic (AADT) of QEW in Niagara Region in 2004

Number	Section	AADT	Distance (Miles)
1	From Approach Peace Bridge to NIAG RD 122 - Thompson RD / Fort Erie	20,700	1
2	From NIAG RD 122 / Fort Erie to Highway 420 / Niagara Falls	24,900	17
3	From Highway 420/Niagara Falls to NIAG RD 101 - Mountain RD	56,200	3
4	From NIAG RD 101 - Mountain RD to Highway 405 / Niagara-O-T-Lake	83,400	2
5	From Highway 405 / Niagara-O-T-Lake to Highway 406	76,300	7
6	From Highway 406 to Highway 20 - Centennial PKWY / Hamilton	85,500	25
Total	Weighted Average AADT by distance	62,300	55

Source: 2004 Provincial Highway Annual Average Daily Traffic by MTO

The Niagara Region is a major tourist destination, creating different traffic demands on normal weekdays, summer tourist periods and weekends. To account for these seasonal variations, the Levels of Service presented in **Figure 6-3** are estimated for: AADT, Non-Summer Average Weekday peak hour volume (NSAWD), Summer Average Weekday (SAWD) peak hour volume (SAWD), and Summer Average Weekend (SAWE) peak hour volume.

The QEW, as it approaches the Niagara Frontier generally provides an adequate level of service during the non-summer weekday peak hours. However, congestion does occur, during peak periods in the summer months in certain sections. The section from Highway 420 to Highway 405 approaches capacity in summer peak periods, at LOS C. The portion through St. Catharines from the west end of the Garden City Skyway Bridge to Highway 406 (to the west) is operating at capacity with congestion frequently occurring during the peak tourist season. From Highway 406 west to Hamilton, the QEW generally operates at adequate service levels.

Currently, the QEW through St. Catharines is being widened from four lanes to six lanes. Upon completion, the level of service will be improved significantly, especially for the section west of the Welland Canal, as well as the section from Highway 420 to Mountain Road. Without further

improvements, it is anticipated that the QEW will be unable to provide adequate capacity between the Niagara Frontier and the Greater Toronto Area through the next 30 years.

Figure 6-3: Level of Service for the QEW within the Study Area

Section	Number of Lanes	Estimated Capacity / Lane	Estimated Capacity /Direction	AADT	NSASD - Volume	SAWD - Volume	SAWE - Volume	NSAWD Peak Hour Level of Service	SAWD Peak Hour Level of Service	SAWE Peak Hour Level of Service
From Approach Peace Bridge to NIAG RD 122 - Thompson RD / Fort Erie	3	2,200	6,600	20,700	1025	1321	1400	A	A	A
From Niag RD 122 / Fort Erie to Highway 420 / Niagara Falls	2	2,200	4,400	24,900	1233	1589	1684	A	B	B
From Highway 420/Niagara Falls to NIAG RD 101 - Mountain RD	2	2,200	4,400	56,200	2782	3586	3802	B	C	C
From NIAG RD 101 - Mountain RD to Highway 405 / Niagara-O-T-Lake	3	2,200	6,600	83,400	4128	5321	5642	B	C	C
From Highway 405 - Niagara-O-T-Lake to Highway 406	3-East Welland Canal	2,200	6,600	77,450	3834	4941	5239	B	C	C
	2-West Welland Canal	2,200	4,400	74,963	3711	4783	5071	C	F	F
From Highway 406 to Highway 20 - Centennial PKWY / Hamilton	3	2,200	6,600	85,500	4232	5455	5784	B	C	C

Note:
NSAWD – Non Summer Average Week Day Peak Hour Volume.
SAWD – Summer Average Week Day Peak Hour Volume.
SAWE – Summer Average Week End Peak Hour Volume

Highway 405

As the connection from the QEW to Queenston-Lewiston Bridge, Highway 405 is the primary commercial vehicle route. Highway 405 is a standard four-lane freeway with interchanges at Stanley Avenue and at the QEW. (All expressways that are under the jurisdiction of the Province of Ontario are designated by a 400-series number; with the exception of the QEW.) Carrying AADT of 10,800 vehicles in the east segment and 14,100 vehicles in the west segment in 2004, it operates approximately at a LOS B with a v/c ratio of 0.22.

Highway 420

Highway 420 is the main route connecting the QEW to the Rainbow Bridge. It is a primary tourist route that leads through the City of Niagara Falls between QEW and Roberts Street. It is a four-lane restricted access highway with an at-grade signalized intersection at Stanley Avenue and a full interchange at Victoria Avenue.

In 2004, Highway 420 supported more than 36,900 vehicles per day (vpd) east of Dorchester Road and 28,800 VPD west of it. With a v/c ratio of around 0.57 during the summer weekend peak period, the estimated Level of Service is between B and C.

During peak tourist season, Roberts Street through to Highway 420 occasionally experiences extensive queuing on weekends. This results from the combination of traffic backing up from the Rainbow Bridge and visitors attempting to access the Falls area via Falls Avenue.

The Niagara Frontier border crossing areas that allow commercial vehicles experience variable traffic operations due to tourists. Tourists are unfamiliar drivers, and thus may require additional guidance to ensure safe interaction with commercial vehicles.

6.2.2 Inventory of Rail/Truck Intermodal Facilities

Both Canadian Pacific Railway (CP) and Canadian National Railway (CN) operate rail-truck intermodal facilities in southern Ontario, although not in the Niagara Peninsula.

CP operates two intermodal terminals in the Greater Toronto Area (GTA). These are the Vaughan terminal, north of Toronto, and the smaller Obico Terminal in the City of Toronto. CN operates a large intermodal facility in Brampton, northwest of Toronto. The operations at Brampton International Terminal are supported by Mississauga Intermodal Service Centre (also in the GTA), which serves as an alternate pick-up centre for international cargo. Additional details on these intermodal terminals are provided in Section 6.3.

The CP and CN terminals are close to either the QEW or other major highway arteries.

Both companies provide expedited intermodal services. CP provides the Truck Trailers Expressway Service in the Montreal-Toronto-Detroit corridor and CN operates transload facilities throughout Niagara Peninsula.

6.2.3 Border Crossings

Four highway bridges cross the Niagara River, which is the international border for the Niagara Frontier. The border crossings are linked to the major highway and road networks on both sides of the river. Operations at the border crossings are constrained by throughput capacity of bridges themselves and by the processing and enforcement plazas at the bridgeheads.

Location and Highway Feeders

Each of the four bridges serving the region acts in a fairly distinct capacity. The four bridges are the Peace Bridge, the Rainbow Bridge, the Whirlpool Bridge and the Queenston-Lewiston Bridge.

The Peace Bridge is located between Fort Erie, Ontario and Buffalo, New York. It connects the two countries and two communities via the QEW in Ontario and Interstate I-190 in New York. This bridge serves both passenger and commercial vehicles.

Both the Rainbow Bridge and the Whirlpool Bridge are within the limits of the City of Niagara Falls and serve only passenger vehicles.

The Rainbow Bridge provides a connecting link between the QEW and Highway 420 in Ontario, and Interstate 190 and Routes 62 and 384 in New York.

The Whirlpool Bridge connects the commercial zones and downtown districts of Niagara Falls, New York, with Niagara Falls, Ontario. It also connects Highway 8, the QEW and River Road in Niagara Falls, Ontario to Routes 182 and 104 in Niagara Falls, New York. In the westbound direction traffic is restricted to NEXUS pass holders.

The Queenston-Lewiston Bridge is located between the towns of Niagara-on-the-Lake and Queenston, Ontario and Lewiston, New York. It connects Highway 405 and the QEW in Ontario to Interstate I-190, the Robert Moses Parkway and Routes 104 and 265 in New York. Like the Peace Bridge, this bridge serves both passenger and commercial traffic.

Lane Configuration at the Bridges

The Peace Bridge has a total width of 50 feet 6 inches, with three 12-foot wide travel lanes and a 7 foot 3 inch wide sidewalk on each side. Functionally, the bridge does not meet some of the criteria that have been set for bridges since it fails to provide the minimum shoulder width normally required for a bridge and the minimum curve radius required for a mainline roadway with an operating speed of 45 mph.

Rainbow Bridge has four lanes separated by a four-foot center median.

Whirlpool Bridge is a double-decked bridge, with the lower deck providing two lanes of vehicular capacity per direction, to a total width of 47 feet 6 inches; the upper deck is 33 feet wide and acts as a railway bridge. No commercial traffic is allowed across the bridge, although buses and non-commercial trucks may use it.

The Queenston-Lewiston Bridge is has five reversible lanes, allowing the capacity to be configured to suit prevailing directional demand.

Bridge Traffic Volumes

In 2006, 6.86 million vehicles crossed the Peace Bridge, including 1.30 million trucks. This represents an AADT of 18,751 vehicles, or a SADT (Seasonal Average Daily Traffic) of 24,762 vehicles.

In 2006, 3.35 million vehicles crossed the Rainbow Bridge. This represents an AADT of 9,162 vehicles, or a SADT of 13,034 vehicles. As noted, trucks are prohibited on this bridge.

At the Whirlpool Rapids Bridge, in 2006, there were 0.2 million vehicles crossings. This represents an AADT of 542 vehicles, or a SADT of 620 vehicles. Trucks are also prohibited on this bridge.

At the Queenston-Lewiston Bridge, in 2006, there were 4.08 million vehicles crossings, including 0.9 million trucks. This represents an AADT of 11,138 vehicles, or a SADT of 14,014 vehicles.

Level of Service and Capacity Estimation

Based on the geometric characteristics and estimated free flow speed (FFS) of each bridge, the estimated LOS for each bridge is summarized in **Figure 6-4**.[15] It should be noted that due to lack of observed information on FFS; the FFS must be estimated indirectly, based on the speed limit posted on each bridge. However, there are no speed limit signs on the Rainbow or Whirlpool Bridges. Accordingly, the base FFS (BFFS) for these two bridges are assumed the same as that of the Peace Bridge.

As noted earlier, because of the large amount of tourism in the Niagara Region, the traffic demands are different at three time periods. Similar to the process for highways in the preceding section, the Level of Service ratios will be examined for three different time periods. These are:

- NSAWD - Non-Summer Average Weekday peak hour volume
- SAWD - Summer Average Weekday peak hour volume; and
- SAWE - Summer Average Weekend peak hour volume.

The current operational level of service for each bridge is shown in **Figure 6-4**. Without considering the influence of the operation of the processing plazas, the four bridges are operating reliably over most times of the day.

The Whirlpool Bridge is operating a LOS A due to its light traffic volume. The Rainbow Bridge is also estimated to be operating at Level of A with four lanes available.

The LOS of the Queenston-Lewiston Bridge estimated to be between B and C, which would occur during the summer time. Although five lanes are available, the actual capacity of this bridge is significantly constrained by its low speed limit of only 15 miles per hour.

Based on the v/c ratio, the Peace Bridge operates at LOS B during a normal peak hour or at level of service C during a summer peak period. However, the actual operation may be worse when the traffic in both directions is peaking at the same time, since the third lane can be used for only one direction.

Figure 6-4 and the preceding discussion must be put into context. Bridge congestion conditions vary at different times of the day. In particular, it is important to note that in actual practice the functional levels of service are occasionally E-F at periods on all but the Whirlpool Bridge.

[15] the actual maximum service flow rate per lane is estimated using the 2000 Highway Capacity Manual methods and is shown in the Appendix

Figure 6-4: Current Traffic Volume (2006) to Capacity Ratio for Each Bridge

Bridges	No. of lanes In Peak Hour	Capacity / lane	Total Capacity	Traffic Volume In 2006 (AADT)	Direction Split	NSAWD Peak Hour	SAWD Peak Hour	SAWE Peak Hour	PHF-Peak Hour Factor	f_{HV} Heavy-vehicle factor	Vp NSASD 15-min passenger car flow rate	Vp SAWD 15-min passenger car flow rate	Vp SAWE 15-min passenger car flow rate	LOS NSAWD	LOS SAWD	LOS SAWE
Peace Bridge																
East Bound	2	1150	2300		0.50	7.3%	9.1%	10.2%	0.90	0.91	836	1,042	1,168	B	C	C
West Bound	2	1150	2300		0.50	9.0%	11.7%	12.3%	0.90	0.91	1,030	1,339	1,408	C	C	D
Total	3	1150	3450	18,751										C	C	D
Queenston-Lewiston Bridge																
East Bound	2	680	1360		0.45	7.3%	9.1%	10.2%	0.90	0.90	452	563	631	B	B	C
West Bound	3	680	2040		0.55	9.0%	11.7%	12.3%	0.90	0.90	681	885	930	B	C	C
Total	5		3400	11,138										B	B	B
Rainbow Bridge																
East Bound	2	1150	2300		0.53	7.3%	9.1%	10.2%	0.90	1.00	390	486	545	A	A	A
West Bound	2	1150	2300		0.47	9.0%	11.7%	12.3%	0.90	1.00	431	560	589	A	A	A
Total	4		4600	9,162										A	A	A
Whirlpool Bridge																
East Bound	1	1150	1150		0.55	7.3%	9.1%	10.2%	0.90	1.00	24	30	34	A	A	A
West Bound	1	1150	1150		0.45	9.0%	11.7%	12.3%	0.90	1.00	24	32	33	A	A	A
Total	2		2300	542										A	A	A

Note: NSAWD Factor – Non Summer Average Week Day Peak Hour Volume vs. AADT. Source: the Buffalo and Fort Erie Public Bridge Authority, 2006 traffic volume of Peace Bridge.
SAWD Factor– Summer Average Week Day Peak Hour Volume vs. AADT. Source: the Buffalo and Fort Erie Public Bridge Authority, 2006 traffic volume of Peace Bridge.
SAWE Factor– Summer Average Week End Peak Hour Volume vs. AADT. Source: the Buffalo and Fort Erie Public Bridge Authority, 2006 traffic volume of Peace Bridge.

Processing Infrastructure and Programs at Bridgeheads

The bridges are managed by two public agencies. The Buffalo and Fort Erie Public Bridge Authority manage the Peace Bridge and the Niagara Falls Bridge Commission operates the Whirlpool, Queenston-Lewiston and Rainbow bridges. Both authorities have three main responsibilities: collect tolls, reduce congestion and enhance security.

At the bridgehead of each crossing, each country has a processing and enforcement plaza operated by Canada Border Service Agency (CBSA) on the Canadian side and United States Customs and Border Protection (CBP) on the U.S.'s side. The ever-present issues of balancing border traffic flow efficiency with security are partially addressed by providing travelers with the option to enroll in either the NEXUS alternative screening program or Free and Secure Trade (FAST) border clearance programs.

NEXUS, a cooperative program between CBSA and CBP, allows low-risk, pre-screened individuals who have successfully met risk assessment requirements to pass the border quickly and efficiently, is in operation on the Peace Bridge, Rainbow Bridge and Whirlpool Bridge. NEXUS does not apply to cargo shipments.

FAST, also a result of cooperation between the CBSA and the CBP, is designed specifically to expedite cargo shipments. FAST applies to pre-approved eligible goods moved across the border by pre-approved importers, carriers and registered drivers. FAST is limited to organizations participating in Partners in Protection program (PIP), a security support initiative that builds on security tighten efforts implemented by the participating carrier.

The processing infrastructure and inspection programs available at the four existing road bridges are summarized in **Figure 6-5**.

Figure 6-5: Niagara River Border Crossing – Processing Infrastructure in 2006

		Queenston-Lewiston Bridge	Whirlpool Bridge (1)	Rainbow Bridge (2)	Peace Bridge
Customs & Immigration:					
To Canada	**Number of Auto PI Lanes**	6	1	14	14
	Number of Truck PI Lanes	3	-	-	4
To US	**Number of Auto PI Lanes**	6	1	17	13
	Number of Truck PI Lanes	4	-	-	7
Inspection Programs:					
NEXUS		No	Yes	Yes	Yes
FAST		Yes	-	-	Yes
Toll Collection:					
Direction		Westbound	Westbound	Westbound	Westbound
No. of Booths		4	2	6	6

Note: PIL refers to Primary Inspection Lanes

Source: Niagara Falls Bridge Commission

(1)Restricted to NEXUS registered automobile users only

(2) Restricted to automobiles only.

Processing Capacity and Delays at Enforcement and Processing Plazas

Border processing capacity is determined by many factors. These include the number of customs and immigration lanes in operation at a given time, the processing rates for autos and trucks, the percent of NEXUS or FAST program registrants in the traffic mix and the percent of pre-clearance paper work completed for trucks. In addition, any new national security policy, security alert or crossing programs may have a significant influence on the processing rate and on possible delays.

There are many uncertainties regarding measurement of these factors and, in turn, measurement of the processing rate. However, notwithstanding these uncertainties, an average processing time and the corresponding capacity has been estimated relying on several sources, as shown in **Figure 6-6.** Based on the available information, processing times were estimated to be 40 seconds for autos and 80 seconds for trucks.

The resultant v/c ratios for autos and trucks are calculated in **Figure 6-7** and **Figure 6-8**, respectively, using 2006 observed auto and truck volumes.

Figure 6-6: Processing Infrastructure and Processing Time and Capacity from Different Sources

Bridge	Direction	Processing Infrastructure			Process Time and Capacity Estimated							
					From Traffic and Economic Study		From Revenue Canada Customs and Excise Data					
							Average Time and Capacity based on observation. [4]		Time and Capacity based on Processing Standard [5]			
		Toll Booths[1]	C& I Booths [2]		Processing Capacity [3]		Processing Time per Veh.	Processing Capacity	Processing Time per Veh.		Processing Capacity	
			Autos	Trucks	Autos	Trucks	Autos	Autos	Auto	Truck	Auto	Truck
					(vph per booth)	(vph per booth)	(Sec)	(vph per booth)	(Sec)	(Sec)	(vph per booth)	(vph per booth)
Queenston-Lewiston	EB		6	4	120	120						
	WB	4	6	3	120	120	33	106	34	78	105	46
Whirlpool	EB		2	-	120							
	WB	2	1	-	120		43	84	43	76	84	47
Rainbow	EB		17	-	120							
	WB	6	14	-	120		34	105	34	--	106	--
Peace	EB		13	7	120	120						
	WB	6	14	4	120	120	39	92	39		92	

1. Data obtained from Bi-National Transportation Strategy for the Niagara Frontier
2. Data obtained from Niagara Falls Bridge Commission; C & I - Customs and Immigration
3. Data obtained from "Traffic and Economic Study of the Effect of the New Free Trade Agreement" (Mar. 90)
4. Data obtained from Revenue Canada Customs and Excise for Westbound direction only (source reference by NFBC)
5. Processing Standard = constant used to calculate processing time for one vehicle per minute.

Figure 6-7: Processing Capacity Analysis for Autos (2006) at Each Bridge Processing Plaza

Bridge Name	Direction	Number of Auto C&I Booths	Auto Processing Time per Veh.	Auto Processing Capacity		Traffic Volume (AADT) In 2006	Direction Split	Autos Percent	Peak Hour Volume of Autos (2006)			Ratio of Peak Hour Auto Volume (2006) vs. Auto Processing Capacity		
			(Sec vehicle)	(vph per booth)	Vph by all booths				NSAWD	SAWD	SAWE	NSAWD	SAWD	SAWE
Queenston-Lewiston	EB	6	40	90	540		0.45	77.8%	285	355	398	0.53	0.66	0.74
	WB	6	40	90	540		0.55	77.8%	429	558	586	0.79	1.03	1.09
	Total					11,138								
Whirlpool	EB	2	40	90	180		0.55	100.0%	22	27	30	0.12	0.15	0.17
	WB	1	40	90	90		0.45	100.0%	22	29	30	0.24	0.32	0.33
	Total					542								
Rainbow	EB	17	40	90	1530		0.53	100.0%	351	438	491	0.23	0.29	0.32
	WB	14	40	90	1260		0.47	100.0%	388	504	530	0.31	0.40	0.42
	Total					9,162								
Peace	EB	13	40	90	1170		0.50	80.2%	549	684	767	0.47	0.58	0.66
	WB	14	40	90	1260		0.50	81.8%	690	897	943	0.55	0.71	0.75
	Total					18,751								

Figure 6-8: Processing Capacity Analysis for Trucks (2006) at Each Bridge Processing Plaza

Bridge Name	Direction	Number of Truck C&I Booths	Truck Processing Time per Veh.	Truck Processing Capacity		Traffic Volume In 2006 (AADT)	Peak Hour Truck Volume Factor of AADT	Peak Hour Truck Volume (2006)	Ratio of Peak Hour Truck Volume (2006) vs. Truck Processing Capacity
			(Sec/vehicle)	(vph per booth)	vph by all booths				
Queenston-Lewiston	EB	4	80	45	180		1.0%	110	0.61
	WB	3	80	45	135		1.0%	107	0.79
	Total					11,138			
Peace	EB	7	80	45	315		0.8%	158	0.50
	WB	4	80	45	180		0.8%	154	0.85
	Total					18,751			

The v/c ratios show that the processing flow is almost at capacity at the Queenston-Lewiston Bridge and Peace Bridge, especially for trucks. In fact, observations indicate that processing delays do occur frequently for trucks at the former. However, the estimated v/c ratios did not exactly match the result of observed delay time, given changes in the number and operation of customs and immigration lanes, and the distribution of peak hour traffic arrival rate.

In 2004, only 3 percent to 3.5 percent of all cargo shipments were reported as being fully compliant with FAST. Between 3 and 5 percent of trucks using the Peace Bridge were registered with FAST in 2004. However, both proportions have grown significantly since then.

The actual current processing delay data for each bridge are collected through the real time traffic condition information on the Niagara Falls Bridge Commission website and are summarized in **Figure 6-9**. All bridges experience occasional delays during the peak periods except for the Whirlpool Bridge which has plaza capacity on both sides adequate for not only the present but also the future.

Figure 6-9: Summary of Processing Delay Observed at Four Bridges

	to US	**to US**	**to Canada**	**to Canada**
Total delays in minutes observed every hour in 24 hours				
Bridges	Car Delay	Truck Delay	Car Delay	Truck Delay
Rainbow	40			
Lewiston-Queenston	75	245	10	0
Peace Bridge	10	120	20	10
Number of hours delay occurred within 24 hours				
Rainbow	3			
Lewiston-Queenston	5	9	1	
Peace Bridge	1	4	1	1
Average delay in minutes during delay periods				
Rainbow	13			
Lewiston-Queenston	15	27	10	
Peace Bridge	10	30	20	10

Source: Niagara Falls Bridge Commission Website; accessed May 2007.

6.2.4 Short and Long Term Highway Freight Improvement Plans

New Border Crossing Proposals

Several proposals have been made for new highway border crossings. Proposed new crossings include a twinning of the existing Peace Bridge, or a new bridge crossing north of the Peace Bridge in the vicinity of the International Railway Bridge. Both alternatives would link Fort Erie and Buffalo.

Between Niagara Falls, NY and Niagara Falls, Ontario, recent proposals have included conversions of the Michigan Central Railway Bridge and the upper deck of the Whirlpool Rapids Bridge. [16]

Any new crossing proposals would be required to demonstrate need, connectivity with and impact on the existing road network as well as community compatibility through appropriate planning and environmental assessment approval processes.

Improvement in Processing and Enforcement Plazas

As recently as March 2007, the Niagara Falls Bridge Commission confirmed its commitment to construct a new toll/customs plaza on the Queenston side of the Queenston-Lewiston Bridge. The first phase of a $40 million (CDN) project will involve the construction of new toll, parking and commercial inspection facilities.

The recent (Spring 2007) decision of the U.S. Department of Homeland Security to discontinue its participation in the bi-national Shared Border Management pilot program and pre-clearance negotiations at the Peace Bridge has delayed Peace Bridge expansion plans, at least temporarily, although the EIS for the twinning project is now moving ahead.

Projects and Proposals in Canadian Highway Corridors Approaching the Border

As noted earlier, the QEW expansion project through St. Catharines is underway with construction expected to be completed in 2011. The first step to improve the section of the QEW involves widening the Henley Bridges across Twelve Mile Creek. Construction is underway and expected to be completed in the summer of 2007.

Design work is also underway for the remaining improvements from Highway 406 to the Garden City Skyway. These will include widening the QEW from two lanes to three in each direction, constructing a concrete median barrier, adding drainage capacity, replacing two underpasses and

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widening four overpasses. Noise walls will be installed in residential areas, and paved shoulders and lighting will also be added.

In May 2004 the governments of Canada and Ontario signed an agreement to share equally in the estimated $82.5 million cost of the QEW widening from four to six lanes between Highway 406 and the Garden City Skyway Bridge in St. Catharines.

Construction of a 1.7-mile express truck lane along Highway 405, linking the QEW to the Queenston-Lewiston Bridge was completed in 2005.

6.3 Freight Rail System Description

6.3.1 Freight Rail System and Facilities

The Niagara region is served by two Class 1 rail systems: the Canadian Pacific Railway and CN Rail. CP and CN operate on their own tracks or on shared tracks (the former Canada Southern Railway).

The region also is served by two short line railroads: Port Colborne Harbour Railway (Trillium Railway) and Southern Ontario Railway. VIA Rail operates inter-regional passenger services between Toronto and Niagara Falls, Ontario, using tracks of the Class 1 railways in the region. Passenger service between Toronto and New York City, via Niagara Falls (Ontario and New York) and Buffalo, is provided jointly by VIA and Amtrak.

Canadian Pacific Railway (CP)

CP operates in four corridors: Western, Southern, Central and Eastern. The Eastern Corridor links the major population centers of Ottawa Valley and the Greater Toronto Area with the United States Midwest and Northeast. The corridor connects with all the major railways hubs in the Midwest in Chicago, Detroit, Buffalo and Harrisburg via trackage rights shared with Norfolk Southern, and with Northwest centers at Allentown, Albany, Philadelphia and Washington D.C. due to its haulage contracts with CSX.

In Ontario, the Eastern Corridor links Montreal, Toronto, Windsor and London to Detroit and Chicago over the so-called Express corridor.

Figure 6-10: CP Rail Network

Source: 2006 CPR Website

CPR Intermodal and Transload Facilities

CPR's international services focus on bulk and containerized cargo traffic between ocean ports of Vancouver, Montreal, New York and Philadelphia and between inland points across Canada and the United States. It operates 18 intermodal facilities through Canada and US. The Vaughan Terminal, located as noted in the GTA, is the largest facility with an annual capacity of 664,000 lifts. The Obico Intermodal Terminal in Toronto has a capacity of 170,000 lifts.

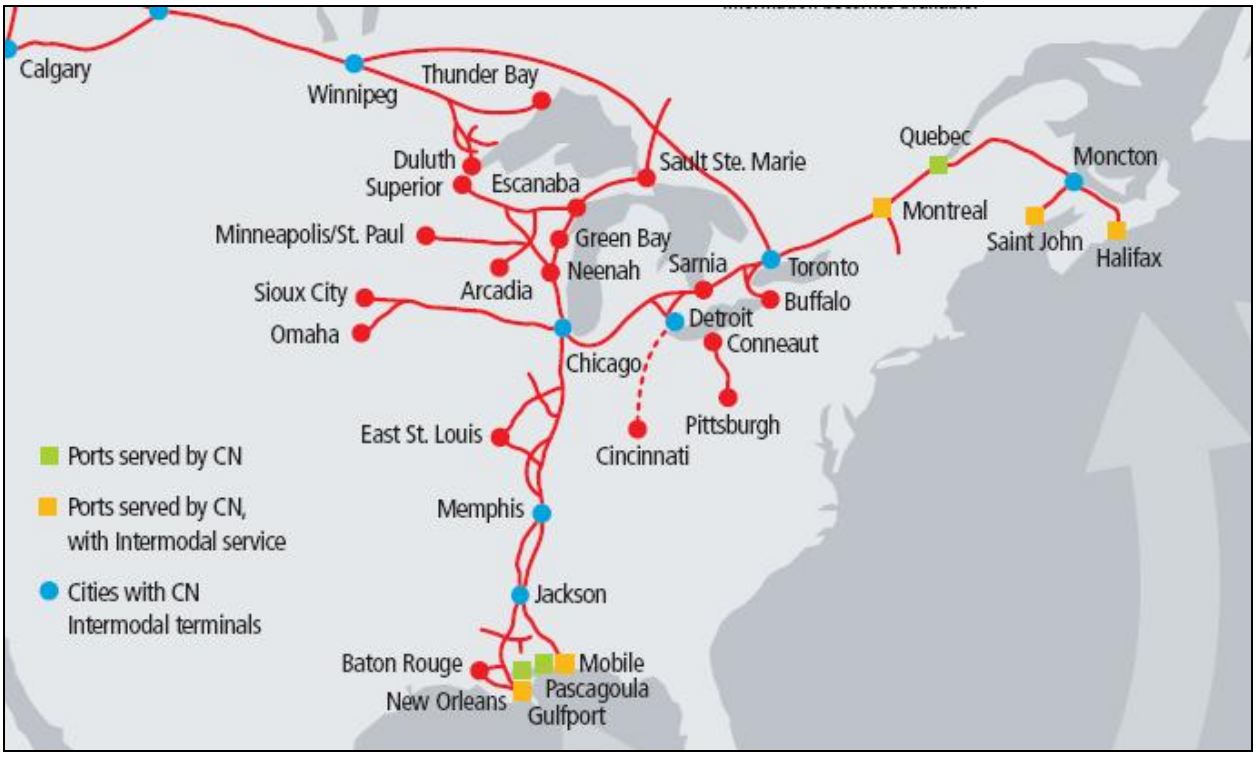
There are 18 CP rail-truck transload facilities in Ontario, of which six facilities are located in south-central Ontario (Hamilton, Puslinch, Mississauga and Toronto). Transload capabilities range from 10 cars or less to 120 cars per day. They can handle a variety of cargo such as steel, steel products, iron, chemicals, polymers, paper and paper products and lumber. The largest transload facility closest to Niagara is located in Hamilton.

Canadian National Railways

CN Rail is the largest of the Canadian railways operating 20,264 route miles in Canada and the United States. CN Rail provides coast-to-coast connectivity between Canada's Pacific and Atlantic ports. A map illustrating the extent of the CN Rail network is provided in **Figure 6-11**.

CN Rail has three regions: the Western Region, from Manitoba to the Pacific Ocean; the Eastern Region, from Manitoba to the Atlantic Ocean and south to the Ontario-Michigan border and including Buffalo; and, the Southern Region, extending from Manitoba south to the Gulf of Mexico, the northern Great Lakes states and to the Ontario-Michigan border. The Eastern Region, relevant to the study area, consists of over 4,500 route miles. The principal commodities transported by the railroad include automotive, intermodal, ferrous and non-ferrous metals, petroleum, chemicals and forest products.[17]

Figure 6-11: CN Rail Network and Intermodal Terminals



Source: CN Rail, 2006 Annual Report

CN Rail Intermodal and Transload Facilities

CN operates both intermodal and transload terminals. As noted previously, the largest intermodal terminal closest to the region is located in Brampton. The 195-acre facility has, 16,700 feet of

17 CN Rail

loading tracks and 12 storage tracks. It operates on a 24-7 schedule with the processing capabilities of 126 trains per week and nearly 582,515 units per year. The intermodal terminal is accessible from the GTA's expressway network.

The Hamilton Metals Distribution Center is a 48,000 square foot transload facility serving southwestern Ontario and the United States. The facility handles a broad range of metal products including steel products, such as plates, slabs, pipes and bars; cold-rolled and coated automotive and appliance end-use coils; and hot-rolled coil, plate, beam, pipe and structural steel.

Two CargoFlo terminals are located near the study area – one in Hamilton and the second in Toronto. The Toronto CargoFlo facility is advertised as North America's largest and most diverse liquid and dry bulk rail transfer facility. The facility, adjacent to CN's MacMillan classification yard, is accessible by expressway.

The Hamilton CargoFlo facility, located in southern Hamilton, serves western GTA, southwestern Ontario and upper New York State. It handles plastics, fertilizers, grains, and dry bulk commodities processed at over 40 transfer spots. The facility has access to major highways and expressways, including the QEW.

In addition, CN operates two lumber products distribution centers, one in Toronto and the other in Buffalo. The Toronto distribution centre is located in Vaughan and has expressway access. It handles lumber, plywood, laminated beams, drywall and engineered wood. The Buffalo distribution centre, at 1951 Hamburg Turnpike in Lackawanna, handles engineered wood and lumber.

6.3.2 Rail Border Crossings

There are two operational rail bridges crossing the Niagara River border. The most southerly crossing is the CN International Bridge. It is an exclusive freight transportation structure, owned by CN. CP and Norfolk Southern have trackage rights over this structure.

The second operational rail crossing is the Whirlpool Bridge spanning the Niagara River between Niagara Falls, Ontario and Niagara Falls, New York. This bridge accommodates vehicular traffic on the lower lever and rail traffic on the upper level. This bridge is utilized by VIA / Amtrak's Maple Leaf (Toronto – New York City) service, but is not currently used for rail freight traffic.

A third rail bridge - the Michigan Central (former Canada Southern) Railway Bridge - is located immediately to the south of the Whirlpool Bridge. Rail service over this bridge has been abandoned and tracks over the bridge and on the Ontario side have been removed.

6.3.3 Rail Border Flows

The International Bridge carried about $9 billion of goods in 2006. This represented approximately 15% of all goods crossing the Niagara Frontier.

In 2006, 1,705 trains entered the United States via the Port of Buffalo - Niagara Falls. Approximately 10 trains per day crossed the border from Canada to the U.S via the International Bridge each day.

There is sufficient capacity available on rail bridges for current rail freight border crossing. Over the past few decades, the various operating railroads serving the Niagara region have been merged and the size of the terminal operations has been reduced, leaving some rail infrastructure redundant.

In addition, there is capacity available on the rail freight border crossing for the future growth. Rail industry representatives and others indicate that railways could play a role in reducing highway congestion. Certain commodities currently transported by truck over long distances could be carried efficiently by rail thereby reducing some of the demand on highway, bridge and processing infrastructure.

However, other factors could impact the use of rail including the efficiency and predictability of customs processing for trains, particularly entering the United States; rail infrastructure to support inspections; highway access to multimodal terminals; rail access to saltwater ports; marketing by rail carriers to promote rail use; and meeting the challenges of “Just-In-Time” delivery demands of certain industries.

On the U.S side, due to the long history of railway development, there is a comprehensive transportation network, with highway and railway interwoven closely. There also are nine railroad yards adjacent to the highway system. However, there still exists a mismatch of redundant facilities and services, especially with respect to intermodal capabilities.

6.4 Waterways System Description

6.4.1 Existing Facilities

The Niagara River, Lake Erie and Lake Ontario serve as the boundary between Ontario and New York State. The Port of Buffalo is situated on the eastern end of Lake Erie and has access to Lake Ontario and the St. Lawrence Seaway via the Welland Canal. The port handles bulk commodities and raw materials for its principal customer base of regional manufacturing firms.

6.4.2 Port of Hamilton

The Port of Hamilton is the largest port facility in the area and one of the busiest of the Great Lakes ports. The port handles approximately 13 million tons of cargo and is visited by over 700 vessels annually. An estimated 73 percent of all dockings are made by domestic vessels (i.e., vessels whose origin and destination ports are both within Canada).

The port, located at the mouth of Burlington Bay, provides services to cargo ships traversing Welland Canal. It is located just 26 nautical miles from the Canal. The port also serves Seaway cargo traffic. The Port of Hamilton is located 151 nautical miles from the St. Lawrence River. The Port handles 21 percent of all cargo destined for the Canadian Great Lakes via the St. Lawrence Seaway.

The Port of Hamilton, shown in **Figure 6-12** below, encompasses 480 acres of industrial, commercial and recreational land. The port offers 15 commercial wharves, 29,000 feet of docking facilities and 36,000 feet of shipping berths.[18]

[18] The Hamilton Port Authority Land Use Plan, September 16, 2002, Introduction, p.1

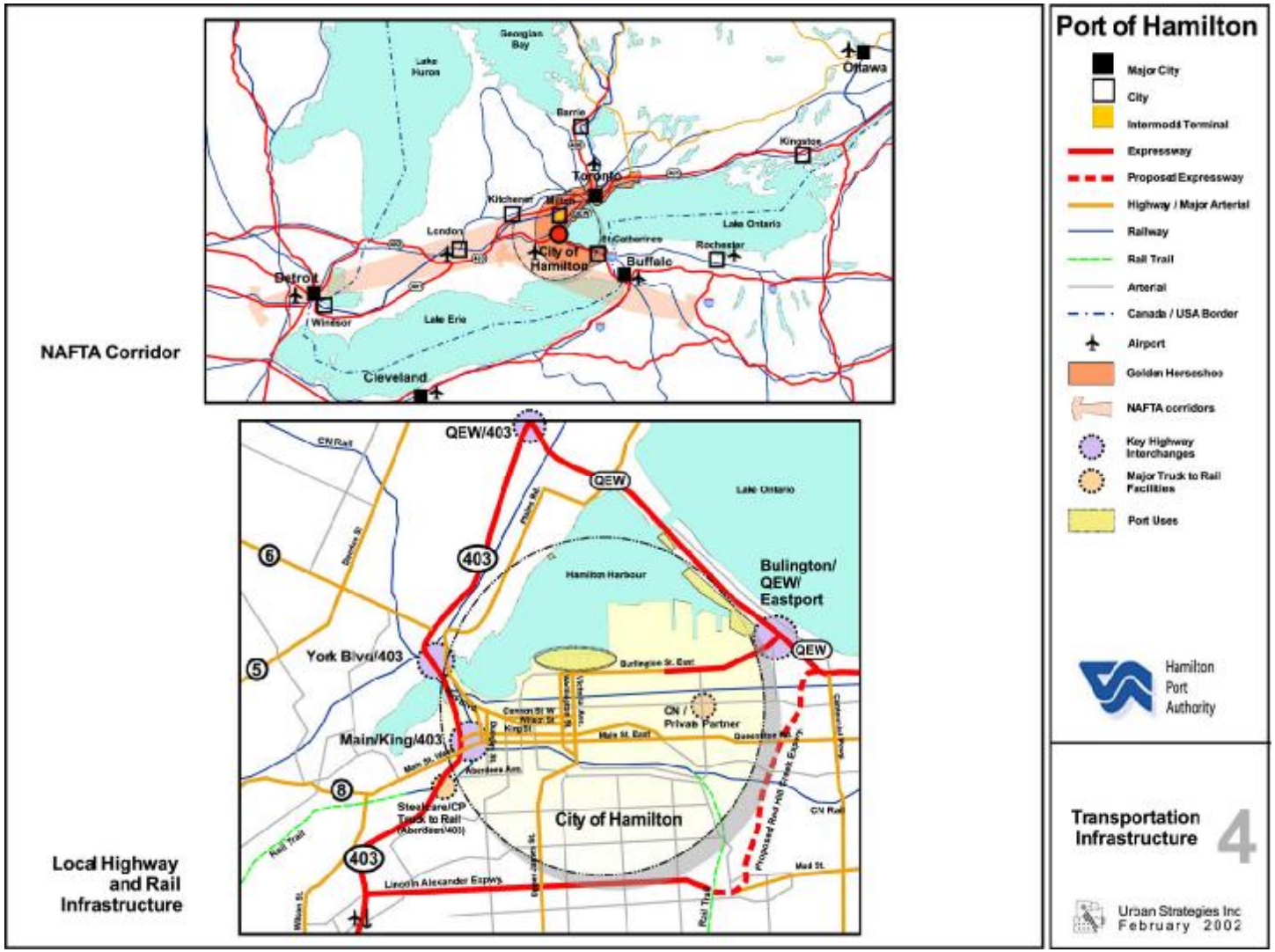
Figure 6-12: Port of Hamilton

Source: Hamilton Port Authority

The Port of Hamilton has direct access to two major travel corridors, which connect the GTA with Detroit and Buffalo. Both corridors, shown in **Figure 6-13**, play a vital role in freight cargo flows fuelled by the North American Trade Agreement (NAFTA). Access to GTA-Buffalo corridor is provided by Burlington Street, QEW, Highways 405 and 420. The GTA-Detroit corridor is accessed by Burlington St. and the QEW.

Direct connectivity to the railway system is provided by the Southern Ontario Railway. This short line railroad serves the western parts of lands owned and administered by Hamilton Port Authority. CP is extending its trackage to Pier 15 of the Port and serves the key steel producers of the area – Mittal Steel Co. (formally Dofasco) and Stelco.

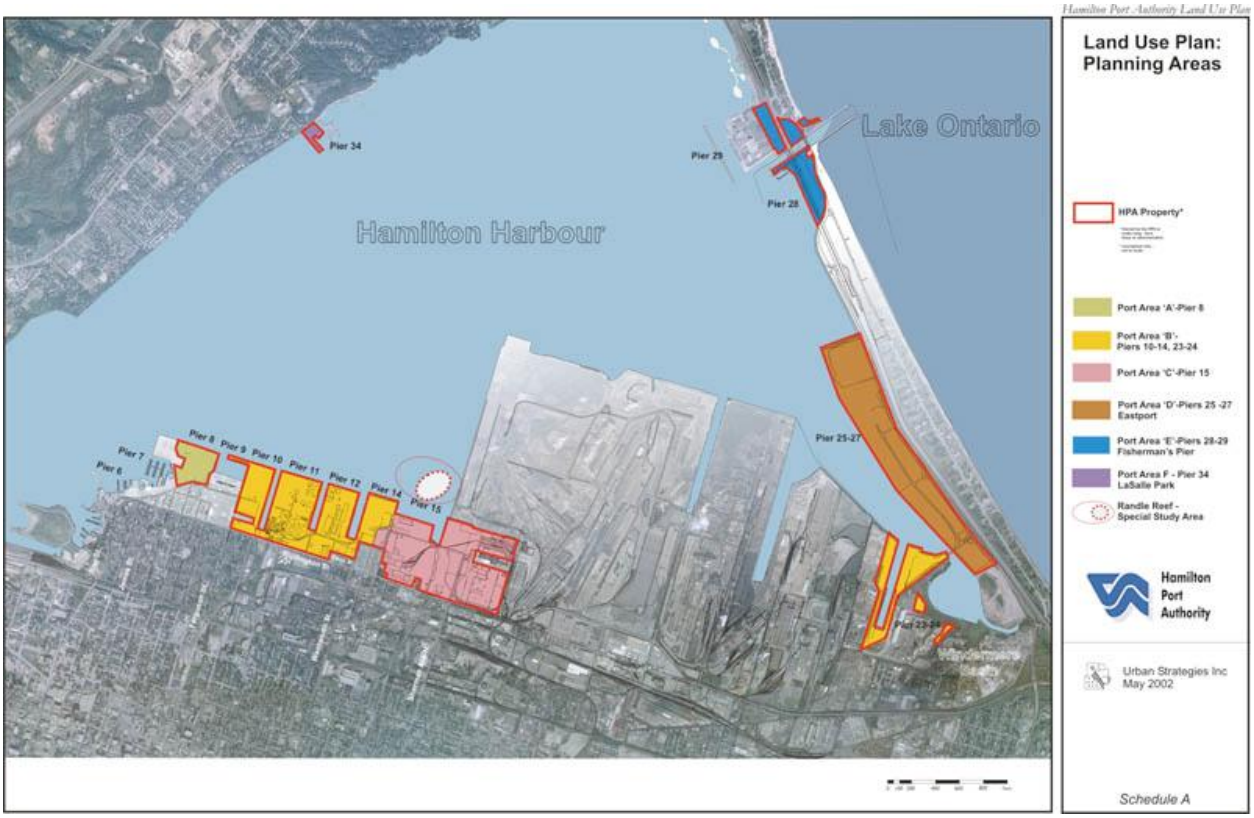
Figure 6-13: Port of Hamilton in Relation to Area Transportation Network



Source: Hamilton Port Authority Land Use Plan, Transportation. It should be noted that the "proposed" Red Hill Creek Expressway opens in fall 2007.

Expansion plans for the Port include improvements to ground transportation such as the construction of Red Hill Creek Expressway, to provide a connection between the Lincoln Alexander Parkway and the QEW; improvements to the Port's connection with the Highway 403 expressway; improvements in the connectivity to the rail network; increased level of service; and, improvements to the Port of Hamilton infrastructure. The expansion of the Port's infrastructure, illustrated in **Figure 6-14** will focus on modernization of Piers 10-11, 23-27, land use intensification and reconstruction to Pier 28-29, and the reconstruction of Pier 32.

Figure 6-14: Proposed Future Expansion of Port Hamilton



Source: Hamilton Port Authority

6.4.3 Welland Canal

The Welland Canal, a westerly part of the St. Lawrence Seaway, is 27 miles long and provides navigational connection between Lake Erie and Lake Ontario. The Canal runs through the Niagara Peninsula from Port Weller to Port Colborne and traverses 326 feet of elevation difference between both lakes. The current set of eight locks can process up to 32 ships a day. Ships that can transit through the Welland Canal can be a maximum of 740 feet long, 78 feet wide, with a maximum draft of 26.3 feet and 32,000 tons of displacement. The vessel size limitation restricts shipping to bulk cargo ships and barges carrying mostly bulk commodities

such as iron ore, wheat and other agricultural products, petroleum and fuel oil products. An expansion of the facility has long been considered. In the 1960s, land was acquired for the possible widening of the facility to a 'supercanal' that is capable of carrying a larger range of ocean-going vessels.

6.5 Airport Facilities and Access

Freight shipment by air mode between Canada and the U.S. is a small industry, when compared to other freight modes. Air cargo makes up 5.6% of all cargo shipments between the two countries, by value. This freight is moved one of three ways: in the belly-hold of passenger aircraft, in passenger / cargo combinations or in all-cargo aircraft. There are a few all-cargo airlines that provide service to international destinations from Canada, but these have little impact individually on the international markets. The most significant amount of air cargo in Canada is, therefore, in the belly-hold of passenger aircraft.

Within or adjacent to the Niagara Peninsula there are three airports – the Hamilton International Airport, the Niagara District Airport, and the Welland / Niagara Central Airport. There are also other private airstrips in the area, such as Niagara Falls / Niagara South Airport. The majority of freight movement by air in the Niagara Region is shipped from Hamilton International Airport, with very little being shipped from the local airports or from private air strips located in the area.

In addition, there are three other international airports located outside the Niagara Peninsula, but serve for the area - the Toronto Pearson International Airport, the Buffalo / Niagara International Airport, and the Niagara Falls International Airport. These three airports are reasonably close to the Niagara Frontier border, with the latter two being in the U.S.

6.5.1 Lester B. Pearson International Airport

Toronto's major airport, called the Lester B. Pearson International Airport is located in Mississauga. At a distance of 17 miles northwest of the downtown core, the airport can be accessed via the regional expressway network. The location of Pearson Airport is shown in **Figure 6-15.** The airport is operated by the Greater Toronto Airport Authority.

Lester B Pearson is Canada's busiest airport. In 2006, it moved 30.9 million passengers and 550,000 tons of cargo. There are 40 passenger carriers, 110 charters, and seven air-cargo commercial carriers that service the airport, with the majority of air cargo moved by passenger aircraft. Of the 1,810 hectares of land owned by the airport, 25 hectares are dedicated air cargo

areas. Capable of processing 1 million tons of cargo each year, the airport provides over 240 truck loading doors, 1.2 million square feet of on-airport warehouse space, four runways, and dedicated cargo apron space. The four runways have lengths between 8,500 ft and 11,050 ft.

Figure 6-15: Location of Pearson Airport

Source: Pearson Airport Master Plan

6.5.2 Hamilton International Airport

The Hamilton International Airport, which is shown in **Figure 6-16** is located on the Niagara Escarpment, is located south of the urban core of the City of Hamilton. The Airport is connected via Highways 403 and 6.

Hamilton International Airport has two runways, with lengths of 6,000 and 10,000 feet. The 10,000 ft runway can accommodate all sizes of aircraft. A major feature of this airport is its

significant dedicated apron space, allowing operational flexibility and the ability for trucks to transfer goods directly to the aircrafts. This capacity allows Hamilton International Airport to be Canada's largest integrated courier airport. Currently, 17 air cargo/courier companies utilize this airport, including major package delivery companies, such as USS, Purolator and Cargo It. In 2006, the airport transferred 84,500 tons of air cargo.

In addition to its cargo capacity, Hamilton International Airport provides daily scheduled passenger aircraft service to destinations throughout Canada and the U.S., as well as seasonal service to the Caribbean and to Europe. In 2006, 527,133 passengers used this airport.

Figure 6-16: Hamilton International Airport in Relation to Area Network

Source: http://www.flyhi.cal

6.5.3 Niagara District Airport

The Niagara District Airport is shown in **Figure 6-17**. It is located in the heart of the Niagara Region, in Niagara-on-the-Lake, Ontario. The airport is just north of the QEW and east of St. Catharines.

As one of the two smaller airports in the region, Niagara District Airport has three runways with lengths between 2,500 ft. and 5,000 ft. The airport primarily provides general aviation aircraft service. Additional facilities include a small terminal building, hangar facilities and a Flight Service Station that provide services from shipping products to providing landing facilities for

corporate aircraft. The airport encompasses an area of 321 acres, and there is additional land available for lease at reasonable rates.

Figure 6-17: Location of Niagara District Airport

Source: http://www.niagaradistrictairport.ca/

6.5.4 Welland / Niagara Central Airport

Welland / Niagara Central Airport, is located four miles west of Welland. It has two runways, with lengths of 2,670 ft. and 3,500 ft. The year-round Fixed Base Operation provides a flight school, sightseeing, charter flights, banner towing, aircraft maintenance, aircraft rental and tourist traffic service. It also offers hangar space on the Aerodrome.

7.0 Summary

The purpose of this Technical Memorandum is to profile the transportation assets of the Buffalo-Niagara region and the cross-border assets that both link the region to Canada as well as serve as competing transportation resources. Potential opportunities and challenges will be evaluated and expanded upon in Task 5 the *Assessment of the Local Transportation System's Ability to Accommodate Future Freight Growth* and Task 6 the *Development of Recommendations or Project Proposals that Address Future Freight Transportation Needs*. Identification of future

freight transportation needs and the development of initiatives that address these needs will require a close cooperation between the Steering Committee and area transportation stakeholders such as Niagara County Center for Economic Development, Economic Development Corporation of Erie County, World Trade Center Niagara, Niagara Frontier Transportation Authority, Buffalo Niagara Enterprise, Peace Bridge Authority, Niagara Falls Bridge Commission, among others.

APPENDIX A

WATERBORNE FREIGHT TERMINALS -- PORT OF BUFFALO

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Gateway Metroport is a major complex in the Port of Buffalo, and is discussed in depth.
Until the mid-1980s what is now Gateway Metroport was an ore dock servicing its facility, Bethlehem Steel. In the 1980s the land immediate inshore was blacktopped so that other products could be received and transferred.

Current commodities

- Limestone: AES/Somerset is a partner-customer –Gateway receives limestone by ship and drays the limestone a short distance to the South Buffalo rail line onsite and from which it is railed to AES Somerset. The limestone is used for the scrubbers at the coal-fired plant. The on-going contract with them is for 200,000 tons annually.
- Coal: The coal operation takes up about half the 4000-foot dock and a great deal of the facility's operations. Basically there is a mixing operation in which low sulfur western coal is blended with higher sulfur eastern coal and sent out to power plants
    - Some coal comes in from Thunder Bay by ship and goes to Dubois (PA) by rail.

Gateway Metroport has three terminals:

Name: **Gateway Metroport – West Dock**
Waterfront Location: Lackawanna Canal West Dock
Address: 2544 Clinton Street
Point of contact information: Jim Yamonaco 716 826 7310
jymanonaco@buffalocrushedstone.com; info@portofbuffalo.com
Depth at berth[19]: 27'
Activity: Maritime and rail active at Gateway
Commodities: Inbound dry bulk including limestone, salt coke, coal slag potash and slag
Rail: South Buffalo RR: Three surface tracks on wharf join additional trackage in rear
Road: NYS Route 5 to I-190
Note: Approx. 60 acres open storage area avail at rear, 40,000 sq. ft metal covered bldg.

[19] Depth at berth is from the Army Corps of Engineers Port Series 41, dated 2001 and may have changed since 2001.

Facility **Gateway Metroport - East Dock**
Waterfront Location Lackawanna Canal East Dock
Address 2544 Clinton Street
Point of contact information: Jim Yamonaco 716 826 7310
jymanonaco@buffalocrushedstone.com; info@portofbuffalo.com
Depth at berth: 27'
Activity: Maritime and rail active at Gateway
Commodities: Inbound dry bulk including limestone, salt coke, coal slag potash and slag
Rail: South Buffalo RR: Three surface tracks on wharf join additional trackage in rear
Road: NYS Route 5 to I-190
Notes: Open storage for 20,000 tons limestone. Near industrial park

Facility **Gateway Metroport**
Waterfront Location Union Canal South Dock, west of Fuhrman Blvd Bridge
Address 2544 Clinton Street
Point of contact information: Jim Yamonaco 716 826 7310
jymanonaco@buffalocrushedstone.com; info@portofbuffalo.com
Depth at berth: 22'
Activity: Maritime and rail active at Gateway
Commodities: Inbound dry bulk including limestone, salt coke, coal slag potash and slag
Rail: South Buffalo RR: One 1000-foot surface track in rear of storage area joins additional trackage in rear
Road: NYS Route 5 to I-190
Note: Approximately 11 acres open storage.

Additional note: Gateway Metroport has the advantage of proximity to Buffalo Lakeside industrial Park on the Union Ship Canal. The industrial park is over 80 acres of land for urban office and light industry.

Other Port Facilities

Facility: **St. Lawrence Cement Buffalo Terminal Wharf**
Waterfront Location: North side of Union Canal, west of Fuhrmann Blvd Bridge
Address: 1751 Fuhrmann Blvd.
Point of contact information: Tim Harper, 716 825 7084
Depth at berth: 18

Activity: No longer has even occasional Inbound of cement by self-unloading vessels.
Commodities: Cement
Rail: None
Road: NYS Route 5 to I-190

Facility: **Cargill Salt Buffalo Pier (American Rock Salt Company)**
Waterfront Location: Outer Harbor, approx. 0.7 mile south of entrance to Buffalo River
Address: 233 Fuhrmann Blvd.
Point of contact information: Ted Katra 716 824 2904
Depth at berth: 24
Activity: No maritime activity
Commodity: Salt
Rail: None
Road: NYS Route 5 to I-190
Note: Open storage area with capacity of 70,000 tons of salt located on the pier.

Facility: **Toledo Dock Exchange Buffalo Dock** (Sand Products Corporation)
Waterfront Location: West side Buffalo Ship Channel, approximately 0.8 mile above entrance
Address: (no street address given)
Point of contact information
Depth at berth: 22'
Activity:
Commodity: Gypsum
Rail: None
Road: NYS Route 5 to I-190
Note: Open storage for approximately 100,000 tons gypsum in the rear

Facility: **Buffalo Dock Forwarders Dock (Sand Products Corp.)**
Waterfront Location: West side of Buffalo Ship Canal, approximately 1 mile above entrance
Address: 608 Fuhrmann Blvd.
Point of contact information: Gary Schoenthal 716 852 0411
Depth at berth: 22'
Activity
Commodity: Sand
Rail: None.
Road: NYS Route 5 to I-190
Note: Two storage silos 1500 tons sand capacity + open storage 80,000 tons

Facility: **ADM Milling Buffalo Mutual Elevator Wharf**
Waterfront Location: East side Buffalo ship Canal, approx. 0.6 mile above entrance
Address: 250 Ganson Street
Point of contact, information: Brad Heald 716 849 7311 brad@admworld.com
Depth at berths: 21
Activity: The terminal accepts waterborne shipments –but does not mill.
Commodity: Wheat
Rail: Two surface tracks joining two additional storage tracks and connecting with CSX
Road: Local to I-190
Note: Flour and grain elevator with 2.5 million-bushel storage

Facility: **ADM Milling Standard Elevator Wharf**
Waterfront Location: Right bank Buffalo River, above Ohio Street Bridge
Address: 1 St. Clair Street
Point of contact information: Brad Heald 716 849 7311 brad@admworld.com
Depth at berths: 19'
Activity: Waterborne transport does not occur at this facility –but milling does
Commodities: Wheat, flour
Rail: Two surface tracks connecting with CSX
Road: Local to I-190
Note: Grain elevator with 140 silos and 5 million-bushel capacity

Facility: **General Mills Buffalo Elevator Wharf**
Waterfront Location: East Side Buffalo Ship Canal, approx. 1000 ft above entrance
Address: 54 South Michigan Av
Point of contact information: Becky Nelson
Depth at berth: 22
Activity: Waterborne terminal is active for Inbound of grain, what about rail?
Commodities: Wheat, oats, and flour
Rail: One surface track, plus three storage tracks, connects to CSX
Road: NYS Route 5 to I-190
Note: Flour mill and grain elevator with 4.2 million-bushel storage

Facility: **Lafarge Corp Buffalo Terminal Wharf**
Waterfront Location: Buffalo River Left bank below Ohio Street Bridge
Address: 575 Ohio Street

Point of contact information: Mark Thomas Mark.Thomas@lafarge-na.com
Depth at berth: 20
Activity: Maritime active
Commodity: cement
Rail: None
Road: Local to I-190
Note: Pneumatic hoses, 14 cement storage silos 22,250-ton capacity.

Facility: Maple Leaf Milling Co. Peavey Elevator Wharf
Waterfront Location: Left Bank Buffalo River 800 feet below Ohio Street Bridge
Address: 87 Childs Street
Point of contact information:
Depth at berth: 24
Activity: Facility is closed
Commodity:
Rail: Two surface tracks and two storage tracks, connecting to CSX; not in use.
Road: Local to I-190

Facility: **Maple Leaf Milling Co. Fred Koch Brewery Wharf**
Waterfront Location: Left Bank Buffalo River 1000 feet below Ohio Street Bridge
Address: 100 Childs Street
Point of contact information:
Depth at berth: 22
Activity: Facility is closed
Commodity:
Rail: None.
Road: Local to I-190

Facility: **ConAgra -RiverWright Energy LLC**
Waterfront Location: Buffalo River, Left bank, below foot of Ohio River
Address: 120 Childs Street
Point of contact information: Jim Watkins, Operations Manager
Depth at berths: 14 (according to Corps of Engineers 2001)
Activity: Currently inactive. Facility is being converted into an ethanol processing plant; plans to use maritime and rail.
Commodities: (Corn, ethanol in the future)
Rail: Three surface tracks connect to CSX. Plans to use.

Road: Local to I-190
Note: It estimates it will receive approximately 60 ships/year via the Buffalo Harbor and the Buffalo River. They also have rail spurs that connect to CSX[20].

Facility: **Exxon Buckeye**
Waterfront Location: Buffalo River, Right Bank, 0.4 mile above South Park Avenue Bridge
Address: 625 Elk Street
Point of contact information:
Depth at berths: 15'
Active/inactive: No longer use maritime transport
Commodity: (Petroleum)
Rail: None.
Road: Local to I-190

Facility: **Killian Bulk Transport Wharf**
Waterfront Location: Buffalo River, right bank approx 0.4 mile above Ohio Street Bridge
Address: 100 Katherine Street
Point of contact information:
Depth at berths: 14'
Activity: Used for mooring vessels
Commodity: None at site
Rail: None.
Road: Local to I-190

Facility: **NRG Energy Huntley Station Coal Wharf**
Waterfront Location: Niagara River, Right Bank, 1800 north of Sheridan Drive
Address: 3500 River Road
Point of contact information: 716 879 3916
Depth at berths: 19'
Activity:
Commodity: coal
Rail: Four surface tracks connecting to CSX.
Road: I-190

Facility: **Marathon Ashland Petroleum**
Waterfront Location: Niagara River, right Bank, 1.3 miles south of Grand Isle Bridge

[20] Jim Watkins, RiverWright Energy LLC, communication June 2 and June 3, 2007.

Address: 4000 River Road
Point of contact information: Jason Nohl jwnohl@marathonpetroleum.com; Bonnie Leto, Riverworld
Depth at berths: 21
Activity: Has maritime activity
Commodity: petroleum
Rail: None.
Road: I-190
Note: Riverworld site saw project cargo export 2006

Facility: **NOCO**
Waterfront Location: Niagara River, right Bank, 700' miles south of Grand Isle Bridge
Address: 700 Grand Isle Blvd
Point of contact information: Val Speek 716 504 3316
Depth at berths: 21
Activity
Commodity: Petroleum products
Rail: One ten-car capacity surface track, servicing plant on other side of River Road, and connecting to CSX.
Road: I-190

Facility: **United Refining Co. Tonawanda Terminal Wharf**
Waterfront Location: Niagara River, right Bank, 0.3 miles south of Grand Isle Bridge
Address: 4545 River Road
Point of contact information:
Depth at berths: 22
Activity:
Commodity: Petroleum products
Rail: One surface track with 9-car capacity connecting to CSX; not used at time of Corps survey.
Road: I-190

Newly identified asset for maritime transport of freight:

Facility: **AES Somerset**
Waterfront Location: Lake Ontario, Niagara County
Address: 7725 Lake Road, Barker, NY
Point of contact information: Kevin Pierce

Depth at berths: shallow – may build temporary structure to deepwater
Activity: terminal currently inactive
Commodities Coal, limestone, potentially chemicals and other
Rail: Yes CSX
Road: Route 78 to I-990, I-290, I-90

APPENDIX B

Great Lakes Ports: Freight Transport Volume, Networking and Plans

United States Ports:

Port: **Ashtabula**
Waterbody: Lake Erie
Governance: Ashtabula City Port Authority
Urban profile (population): 21,000
Tonnage (million tons): **9.7**
Tonnage ranking: <58>
Rail: CSX and NS
Interstates: I-90 (near)
Short sea planning: With Port Maitland or Nanticoke and Erie Pa (MarineLink)
Network--Port and maritime organizations
Note: Buffalo 'port partner'

Port: **Buffalo**
Waterbody: Lake Erie
Governance:
Urban profile (population) 300,000
Tonnage (millions): **1.6**
Tonnage ranking: <128>
Rail: CSX, BP
Interstates: I-290, I-190 to I-90
Short sea:
Network--Port and maritime organizations: Council of Upstate Ports of New York State
Note: Growth and change at Erie County terminals; possible port development in Niagara County --on Lake Ontario --could have synergistic effect.

Port: **Burns Harbor**
Waterbody: Lake Michigan and the Mississippi River system
Governance: Ports of Indiana, Indian Port Commission
Urban profile (population): < 1000
Tonnage (millions): **9.8**
Tonnage ranking: <56>

Rail: 4 lines - CSX, NS, EJE and IH
Interstates: I-80, I-90, and I-94
Short sea: (Sent steel slabs to Hamilton Ont.)
Network--Port and maritime organizations AGLPA, CMC, AAPA, HH2O
Note: "Most ocean-going trade in Great Lakes"

Port: **Chicago**
Waterbody: Lake Michigan
Governance: Port Authority: Illinois International Port District
Urban profile (population) 2.84 million (2005)
Tonnage (millions) **25.8**
Tonnage ranking: <32>
Rail: Chicago Rail Link, Elgin, Joliet, Eastern, Norfolk Southern, Chicago South Bend and South Shore Railroads
Interstates: 90, 94, 80 and 57
Short sea:
Network--Port and maritime organizations AGLPA, CMC, AAPA, HH2O

Port**: Cleveland**
Waterbody: Lake Erie
Governance: Cleveland Cuyahoga County Port Authority
Urban profile (population): 452,000 (2005)
Tonnage (millions): **13.6**
Tonnage ranking: <47>
Rail: CSX, NS
Interstates: I-90, I-77, I -71
Short sea: Wagenborg proposes Cleveland as one terminus. (Cleveland to Detroit is shorter by sea–100 vs. 140 miles).
Network--Port and maritime organizations: AGLPA, CMC, AAPA, HH2O

Port: **Conneaut**
Waterbody: Lake Erie
Governance: Conneaut Port Authority
Urban profile (population) 12,000
Tonnage (millions): **7.4**
Tonnage ranking <66>
Rail: 3 lines CSX, NS, CN

Interstates: I-90
Short sea:
Network--Port and maritime organizations
Note: Buffalo 'port partner;' the port ships out a total (all commodities) of 7.6 million tons and receives 2.9 million tons (2001) so that vessels can fill up after they discharge at the port of Buffalo. Conneaut's major commodity is coal. The city has grown 600 jobs in local manufacturing over the past 5 years. Major businesses are automotive parts companies, Venture Transportation and General Aluminum and building construction components, CW Ohio. Conneaut is 107 miles southwest of Buffalo

Port: **Detroit**
Waterbody: Lake Michigan
Governance: Detroit-Wayne County Port Authority
Urban profile (population): 887,000 (2005)
Tonnage (millions):**17.4**
Tonnage ranking: <40>
Rail: CSX, NS, CP, CN
Interstates: I- 75, 94
Short sea: Has a functioning short sea operation, the Detroit Windsor Ferry.
Network--Port and maritime organizations: AGLPA, CMC, AAPA, HH2O
Note: Port of Detroit is engaged in substantial planning, including connecting rail line to port waterfront. International tonnage increased 60% in the past year to 600,000 tons of imported steel and general cargo.

Port: **Port of Duluth-Superior**
Waterbody: Lake Superior
Governance: Duluth Seaway Port Authority
Urban profile (population): 87,000 + 27,000 = 114,000
Tonnage (millions): **44.7**
Tonnage ranking: <16>
Rail: BNSF, CN
Interstates: I -35
Short sea:
Network--Port and maritime organizations AGLPA, CMC, AAPA, HH2O
Note: Impacted by water level drop and failure to dredge

Port: **Erie**
Waterbody: Lake Erie
Governance: Erie-Western Pennsylvania Port Authority.
Urban profile (population): 102,000
Tonnage (millions): **1.1**
Tonnage ranking: <144>
Rail: CSX, NS, and Buffalo and Pittsburgh as well as Lake Erie Railroads
Interstates: I-90, I 86, and I-79
Short sea: Marine Link with Ashtabula and Port Maitland
Network--Port and maritime organizations AGLPA, CMC
Note: Port partner with Buffalo – after discharging at Buffalo, vessels can load at Erie, which is 78 miles southwest of Buffalo.
The Erie Port Authority lists on its website the aggregate investments that are being made for the port both for logistic enhancement and quality of life improvements. Among them the improvements cited for 2006 and 2007 are CSX Bayfront Yard improvements ($700,000); Shipyard improvements –robotics ($2.5 million) and dry-dock door ($2 million). Erie is said to have a diverse economy with manufacturing accounting for 25% of the jobs. Tool making and plastics are particularly strong.

Port: **Green Bay**
Waterbody: Lake Michigan
Governance: Port of Green Bay Brown County
Urban profile (population)
Tonnage (millions): **2.7**
Tonnage ranking: <104>
Rail: Escanaba and Lake Superior, CN
Interstates: I-43
Short sea
Network--Port and maritime organizations AGLPA,
Note: Looked for vacant properties suitable for port development; used Marad Port kit to evaluate economic impact of port development.

Port: **Milwaukee**
Waterbody: Lake Michigan
Governance: Port of Milwaukee (Board of Harbor Commissioners, City of Milwaukee)
Urban profile (population):
Tonnage (millions): **3.8**

Tonnage ranking: <92>
Rail: UP, CP
Interstates: I-94
Short sea: Milwaukee to Muskegon studied and judged positive in terms of competition to land.[21]
Network--Port and maritime organizations: AGLPA, AAPA, CMC
Note: Planning for an upper Midwest freight corridor –ten-state.

Port: **Monroe, Mi** <130 >
Waterbody: Lake Erie
Governance: Monroe Port Commission [22]
Urban profile (population): 150,000
Tonnage (millions) **1.6**
Tonnage ranking <130>
Rail: NS, CSX
Interstates: I-75, 275; 80/90
Short sea: no plans
Network--Port and maritime organizations AGLPA

Port: **Oswego**
Waterbody: Lake Ontario
Governance: Port of Oswego Authority[23]
Urban profile (population): 17,000
Tonnage: 700,000
Rail: CSX
Interstates I-81; I-80
Short sea: MarineLink proposal
Network--Port and maritime organizations: AGLPA, CMC, HH2O

Port: **Toledo**
Waterbody: Lake Erie
Governance: Toledo-Lucas County Port Authority
Websites: www.toledoseaport.org
www.toledoportauthority.org
Urban profile (population): 500,000 (region)

[21] "Four corridor case studies of short sea shipping services: short sea shipping business case analysis" submitted to USDOT by Global Insight, (Aug. 15, 2006)
[22] www.portofmonroe.com/
[23] www.portoswego.com

Tonnage: (millions):**10.5**
Tonnage ranking: <53>
Rail: NS, CSX, CN and Wheeling & Lake Erie
Interstates: I-75, I-80, 90
Short sea: positive:
Network--Port and maritime organizations: AGLPA, AAPA, CMC, HH2O
Notes: Port Authority took over shipyard –is busy; $800 m mostly private funding, regenerating coke plant; focus on marketing; Ferry service in planning.

Canadian Ports:

Port: **Halifax**
Waterbody: Atlantic
Governance: Halifax Port Authority[24]
Urban profile (population): 360,000
Tonnage (metric): 13.7 million, 530,000 TEUs
Rail: CN
Interstates: 101, 102, 103, 107
Short sea: Under consideration by Great Lakes Feeder Lines
Network--Port and maritime organizations: AAPA

Port: **Hamilton**
Waterbody: Lake Erie
Governance: Hamilton Port Authority[25]
Urban profile (population): 500,000
Tonnage (metric): 12.6 million
Rail: CN, CP, Southern Ontario Railway
Interstates: Can: 401, 403, 407, QEW, NY State Thruway
Short sea: MarineLink proposal; Great Lakes Feeder Lines proposal
Network--Port and maritime organizations: CMC, AAPA, HH2O
Notes: Canada's largest Great Lakes port. Good marketing program

Port: **Montreal**
Waterbody: St. Lawrence Seaway
Governance: Montreal Port Authority[26]

[24] www.portofhalifax.ca
[25] www.hamiltonport.ca

Urban profile (population): 1.6 million
Tonnage: 24 million, including intl. containers
Rail: CN, CP
Interstates: Highway 15, 117, and trans-Canada highway
Short sea: Under consideration by Great Lakes Feeder Lines
Network--Port and maritime organizations: CMC, AAPA
Notes: Year round port

Port: **Nanticoke**
Waterbody: Lake Erie
Governance: Unclear
Urban profile (population) <1000 (Haldiman County 43,000)
Tonnage: 7.5 million (1996)
Rail:
Interstates: 3, 6 to QEW, and Ontario's 400 series
Short sea: MarineLink proposal
Network--Port and maritime organizations

Port: **Oshawa**
Waterbody: Lake Ontario
Governance: Oshawa Port Authority[27]
Urban profile (population): 146,000
Tonnage: **393,000** (2006)
Rail: CN
Interstates: QEW
Short sea:
Network--Port and maritime organizations: CMC, HH2O
Note: Tonnage is growing

Port: **Port Colborne**
Waterbody: Lake Erie
Governance: unclear
Urban profile (population): 19,000
Tonnage:
Rail: CN, CP, NS

[26] www.port-montreal.com
[27] www.oshawaportauthority.ca

Interstates: 3 to QEW
Short sea:
Network--Port and maritime organizations

Port: **Port Maitland**
Waterbody: Lake Erie
Governance: unclear
Urban profile (population): <100
Tonnage: NA
Rail: CP
Interstate: #3
Short sea: MarineLink between Port Maitland and Erie, Pa and Ashtabula proposed
Network--Port and maritime organizations

Port: **Port Stanley**
Waterbody: Lake Erie
Governance: Belongs to Transport Canada, seeking to divest
Urban profile (population): 2500
Tonnage: (none –fishing village)
Rail:
Interstates: 4 to 401
Short sea: Proposed as terminus for Wagenborg
Network--Port and maritime organizations

Port: **Toronto**
Waterbody: Lake Ontario
Governance: Toronto Port Authority[28]
Urban profile (population) 2.48 million
Tonnage: 2.56 million (2005)
Rail: CN, CP
Interstates: 400, 401
Short sea: Rochester-Toronto ferry (with freight capabilities) faltered
Network--Port and maritime organizations: CMC, HH2O
Notes: Largest container terminal in the Great Lakes (containers from Montreal)

[28] www.torontoport.com

APPENDIX C

Actual Maximum Service Flow Rate Estimation for Each Bridge

Parameter	Peace Bridge	L-Q Bridge	Rainbow Bridge	Whirlpool Rapids Bridge	Note
Posted Speed Limit in Miles/hour	30	15	N/A	N/A	No Speed Limit Signs on Whirlpool & Rainbow Bridge
Converted Speed Limit in Km/Hour	48	24	48	48	Assuming same speed limit with Peace Bridge for Whirlpool & Rainbow Bridge
BFFS	58	34	58	58	Base Free-Flow Speed(km/h)
f_{LW}	0	0	0	0	Lane Width: 3.65m
f_{LC}	2	2	2	2	Assumed Lateral Clearance: 1~2m
f_M	0	0	0	0	Median Type: Divided
f_A	0	0	0	0	Access Points / Kilometre: 0
Estimated FFS	56	32	56	56	Free-Flow Speed(km/h)
Accepted LOS	D	D	D	D	Acceptable Level of Service
Maximum Density (pc/km/ln)	22	22	22	22	Density: pc/km/lm
Maximum Flow Rate per lane	**1150**	**680**	**1150**	**1150**	Maximum Service Flow Rate (pc/h/ln)

Capacity Level of Service (LOS) Threshold Values

Interstates	
4 Lanes	52600 - 62600
6 Lanes	83300- 99300
8 Lanes	111200- 132500
Arterial Roads	
2 Lanes	14500 – 16250
3 Lanes (w/turn lane)	18900 – 20650
4 Lanes	29000 – 32500
5 Lanes (w/turn lane)	33350 – 36900
6 Lanes	43400 – 48800
7 Lanes (w/turn lane)	48100 – 53500