

City of Hamilton
Airport Employment Growth District
- Phase 2
Airport Market Analysis and Land Needs



AUGUST 2009



AECOM
Aquafor Beech
CN Watson and Assoc.
Cumming+Co.
Eco-Industrial Inc.
LPS AVIA Consulting
Sorenson Gravely Lowes
&Co

Executive Summary

The Airport Market Analysis and Land Needs Study serves as a key part of both the Hamilton International Airport's (YHM) future land use planning, and integrated land use planning for the Airport Employment Growth District (AEGD). It identifies a range of activities that the Airport could or might perform. In conjunction with the projections, the study quantifies future activity levels and projects the future aggregate land requirements and land use classifications for an expanded airport in the future.

The study recognizes TradePort International Corporation's vision for Hamilton International predicated on achieving the Airport's full potential by being: "one of Canada's 5 busiest passenger airports; and the #1 air freighter gateway in Canada". In addition the study recognizes that in the 2004 Master Plan a Principal Recommendation for the Federal Government, was a need to "encourage the future development and expansion of Hamilton International Airport to maintain (its) role as the main reliever airport to Pearson".

Hamilton International Airport has established its credibility as a scheduled service gateway. In addition integrated carriers United Parcel Service, DHL and Purolator have developed YHM into an important nodal collection point for air cargo, and CargoJet has become a major air freight presence on the airport. The study examines how the group of airports in the Golden Horseshoe and the full Oshawa-Toronto-Hamilton-Fort Erie community affect the future of Hamilton International Airport. It focuses on likely growth in high volume passenger and cargo services, because these segments are very large, will have an important bearing on future airport land needs, and pose the largest uncertainties.

Airline economics strongly favor one-airport communities. However, other forces can be sufficiently strong for a community to support more than one airport with scheduled services.

The study considers the forces favoring multiple scheduled service airports, and which may affect whether YHM emerges as a strong secondary airport including: Saturation of the Primary Airport; Primary Airport Obsolescence; Bilateral Agreements; Administrative Controls; Air Cargo; Local Geography; Geographical and Facility Constraints; Uniquely Appealing Locations; New Entrant Strategies; Preemptive Strategies; Cost Advantages; and Subsidies.

Factors inhibiting growth at secondary airports and considered in the study include Habit; Airline Operations and Station Costs; Revenue and Traffic Dilution; Benefits of Concentration; Downline Airport Congestion; Connections; Local Airport Control; and Environmental Issues.

Hamilton Airport has demonstrated the volatility characteristic of secondary airports located close to a larger competitor. Between 2001 and 2004, traffic increased from 243,000 passengers to over one million. In 2008 traffic grew by 17.7 percent to 546,000. Airports in similar situations have shown similarly abrupt changes in traffic.

The dynamic of multi-airport regions is central to the future of the Hamilton Airport. The study examines three regions which demonstrate the dynamics of inter-airport competition and which may be relevant to determining growth projections for Hamilton Airport, namely: Washington Area; Southern New England; and San Francisco Bay airports. Based on statistical analyses and modeling of the growth of secondary airports in these regions, projections for the growth of Hamilton Airport as a Secondary Airport were determined. The analysis suggested that a target of 9.4 million passengers per year would be appropriate for Hamilton by the year 2030.

This traffic target serves as a guideline for allocating additional land to airport use within the AEGD. Should this estimate be too high, it would prompt the City of Hamilton to reserve too much land for airport-related activities. The land could be reassigned to non-airport uses. If the estimate is too low, the AEGD might quickly encroach on the Airport. Both developments would suffer, and the Airport might fail to attain its full potential. This dilemma would be difficult to reverse and calls for a calculated target that would be more inclined to overstate, rather than understate future traffic.

Estimated land needs are derived from three sources in the study: projections of developments which may occur based on past experience and future vision and marketing initiatives; industry experience with respect to commercial aviation land requirements in each aviation industry sub-segment; and a review of comparable secondary airports and facilities land occupancy.

Based on maintaining the current 2-runway configuration, the Hamilton Airport will likely require most of the future airside infrastructure contemplated in the 2004 Master Plan by the time the 9.4 million passenger target is achieved.

The existing runway configuration will, with suitable improvements, likely be capable of development to serve the future traffic levels contemplated without resorting to developing a third runway outside the current airport boundary. Provision will have to be made however to extend Runway 12-30, in addition to extending Runway 06-24, based on passenger and cargo traffic growth. Additional land needs for airfield operations are therefore limited to land for runway extensions and related infrastructure.

When nine major Canadian airports were surveyed and statistically modeled, they displayed a strong relationship between passenger traffic and available gates. When applied to Hamilton's projected 2030 traffic, the model predicted the need for 33 gates to support 9.4 million passengers, based on current Canadian experience. This estimate was then compared to other airports, and using other methodologies. The 2004 Master Plan for Hamilton includes an air terminal concept featuring 12 gates. It would be prudent to allow sufficient land for a future air terminal of approximately three times this size (or approximately 90,000 sq.m.) by the year 2030.

To facilitate Hamilton Airport's expansion as a Secondary Airport, it is recommended that all land north of Airport Road, south of the runway taxiway system, east of West Cargo Road and west of East Cargo Road be reserved for future air terminal and apron development. This area falls within the existing airport boundary. However the study recommends that approximately 30 ha. of land be reserved for future airport parking south of Airport Road by the year 2030. This area falls outside the existing airport boundary.

The 2004 Master Plan contemplates expanding the Airport Firehall and Maintenance Facility sites/yards in their current locations within the airport boundary, relocating Ground Support Equipment Facilities in the vicinity of the air terminal, and developing a Fuel Farm south of Airport Road connected to the Nanicoke pipeline. The fuel farm has since been constructed on current airport lands accessed from East Cargo Road. Consequently no additional lands must be acquired for Airport Support uses.

Notwithstanding vigorous attempts to interview tenants and solicit input on long term growth expectations in the air cargo sector, few tenants volunteered information. Consequently a list of hypothetical projects which the air freight community might consider at Hamilton was prepared and included: an additional sorting facility for a new integrated carrier, potential expansion of Purolator and UPS facilities to accommodate growth; development of up to three large general cargo terminals; and construction of two smaller multi-user air cargo centres.

For purposes of estimating future airport land needs, three hypothetical air carrier developments were identified and included: a major expansion of a locally based carrier; a new low cost carrier base at Hamilton, as is sometimes the case at Secondary Airports; and development of a moderate size maintenance repair and overhaul facility (MRO).

As Hamilton Airport undergoes major passenger growth and continued air cargo growth, commercial and general aviation will also expand significantly. Based on experience at other large airports, a list of potential developments was projected under five classifications including: Large FBO / Large GA Operations; Small GA Operations; Small FBO; Corporate/Private facilities and Recreational flying facilities.

A total of 88.9 ha. of new commercial lands was projected to be needed to which a factor of 1.6 was applied to account for the extensive amount of land needed primarily for airside and also for groundside access and circulation. This is a necessary requirement on certified airports where large aircraft operate and large safety clearances are mandatory.

The study presents a recommended land management strategy to guide expansion of the airport boundary southerly to accommodate runway expansion, air carrier facilities development and airport parking; westerly to accommodate general aviation development and runway expansion; and easterly to accommodate increased air cargo activity.

A series of potential aviation-related commercial developments are identified for consideration within the AEGD. Lastly it should be noted that AEGD lands bordering the northern boundary of the airport could be ideally situated for businesses wanting to own their land and facilities and have occasional access to the airport.

The study projects a need for approximately 210 ha. of additional land if, and when the YHM becomes a Secondary Airport to Toronto Pearson International Airport. Acquisition of some of these lands on the south side is already well advanced.

The total expansion will increase the overall area of the airport by about 36% from 590 ha. to about 800 ha. The study includes a table of comparable airport characteristics showing that after expansion of its boundaries, Hamilton Airport will still occupy one of the smallest land areas of comparable airports in North America.

Table of Contents

Executive Summary	i
Table of Contents.....	vi
1.0Introduction	1
1.1 Purpose.....	1
1.2 Study Process.....	1
1.3 Stakeholder Consultations	1
1.4 Airport Role	1
1.5 Current Situation	2
1.6 YHM as a Secondary Airport.....	4
2.0Scheduled Services at Secondary Airports.....	8
2.1 Saturation of the Primary Airport.....	8
2.2 Primary Airport Obsolescence	9
2.3 Bilateral Agreements.....	9
2.4 Administrative Controls	10
2.5 Air Cargo.....	12
2.6 Local Geography.....	12
2.7 Geographical and Facility Constraints	13
2.8 Uniquely Appealing Locations.....	13
2.9 New Entrant Strategies	14
2.10 Preemptive Strategies.....	15
2.11 Cost Advantages.....	16
2.12 Subsidies.....	16
2.13 Factors Affecting Hamilton International Airport.....	17
3.0Factors Inhibiting Growth at Secondary Airports.....	19
3.1 Habit.....	19
3.2 Airline Operations and Station Costs	20
3.3 Revenue and Traffic Dilution.....	21
3.4 Benefits of Concentration.....	21
3.5 Downline Airport Congestion.....	21
3.6 Connections	22

3.7	Local Airport Control	22
3.8	Environment	23
4.0Dynamics of Inter-airport Competition.....	24
4.1	Washington Area.....	25
4.2	Southern New England	26
4.3	San Francisco Bay	28
4.4	Other Airports	29
5.0YHM Secondary Airport Growth Projections	31
5.1	Demographics and Market	31
5.2	Secondary Airport Passenger Targets	35
5.3	YHM Growth Conclusions	38
6.0Future Passenger and Cargo Characteristics	40
6.1	Introduction	40
6.2	Global Economy	41
6.3	Passenger Growth	42
6.4	Airline Industry Structure	44
6.5	Institutional Framework	44
6.6	Airline Equipment	46
6.7	Passenger Traffic Volumes	48
6.8	Passenger Service Growth	49
6.9	Air Cargo Volumes	51
6.10	Air Cargo Growth	57
6.11	Future Outlook	59
7.0Future Airport Land Needs	61
7.1	Approach.....	61
7.2	Potential Land Requirements	62
7.2.1	Future Airfield Lands	62
7.2.2	Future Passenger Terminal Lands	63
7.2.3	Airport Support Lands	68
7.2.4	Air Cargo Facilities Projection	68
7.2.5	Air Carrier Facilities Projection	71
7.2.6	General Aviation Projections	72

7.2.7	Commercial Aviation Land Requirements	73
7.2.8	Aggregate Airport Land Needs	76
7.3	Land Management Strategy	77
7.3.1	Airport Lands 77	
7.3.2	Airport Businesses in the AEGD	78
7.4	Future Servicing Commentary	81
7.4.1	Air Terminal Servicing Issues	81
7.4.2	General Aviation Servicing Issues.....	82

List of Figures

Figure 1-1	- YHM Catchment Area and Competitive Airports	5
Figure 4-2	- Air Traffic Growth in Southern New England.....	27
Figure 4-3	- Air Traffic Growth in San Francisco Bay Area	29
Figure 5-1	- Scheduled Airports per Capita	33
Figure 5-2	- Scheduled Airports per Passenger.....	34
Figure 7-1	- Future Land Needs.....	80

List of Tables

Table 5-1	- Multiple Airport Communities in Canada and the United States.....	32
Table 5-2	- Market Share of Hamilton International Airport	35
Table 5-3	- Proposed Air Passenger Traffic Targets for Hamilton - 2030	36
Table 6-1	- International Origin-Destination Traffic	48
Table 6-2	- Air Cargo Traffic at Canadian Airports, 2007.....	53
Table 6-3	- Air Freight Yields, U.S. Dollars per Revenue Tonne-Kilometer	55
Table 6-4	- Air Freight on Selected Toronto/Hamilton-U.S. Routes (Tonnes)	56
Table 6-5	- Transborder Directional Air Freight Traffic (Tonnes).....	56
Table 7-2	- Typical Commercial Aviation Land Requirements*	74
Table 7-3	- Potential YHM Airside Commercial Land Needs	75
Table 7-4	- Hamilton Airport Land Projection 2030.....	76

1.0 Introduction

1.1 Purpose

The Airport Market Analysis and Land Needs Study serves as a key part of both the Hamilton International Airport's (YHM) future land use planning, and integrated land use planning for the Airport Employment Growth District (AEGD). It identifies a range of activities that the Airport could or might perform. In conjunction with the projections, the study quantifies future activity levels and projects the future aggregate land requirements and land use classifications for an expanded airport in the future.

1.2 Study Process

The study process included a review of historical activity, competitive airports, current airline industry trends and operating fundamentals, regional and national economics, airport opportunities, potential development strategies and priorities and augmented traffic forecasts. This was followed by assessment of future airport real estate requirements and recommended land uses with respect to expanded public facilities and commercial development.

1.3 Stakeholder Consultations

An extensive stakeholder consultation process was undertaken in order to update the Airport Economic Impact Statement. This process was augmented with additional questions and discussions with stakeholders concerning the long term business outlook, and new facilities and service development initiatives, which could be foreseen by airport tenants. Due to the depressed condition of the aviation industry in 2008-9, a limited amount of information was offered up by industry and consequently the future market and land needs assessment has relied more heavily on other sources of information and means of projecting demand growth.

1.4 Airport Role

The role of Hamilton International Airport as defined in the Airport Master Plan 2004 is “to serve as a regional commercial and general aviation airport capable of providing scheduled and charter passenger services, air cargo and courier activities and corporate/ general aviation services”.

The document further states that “TradePort International Corporation’s vision for Hamilton International is predicated on achieving the Airport’s full potential by being:

- One of Canada’s 5 busiest passenger airports; and
- The #1 air freighter gateway in Canada.”

Notably, the Master Plan also includes as a Principal Recommendation for the Federal Government, a need to “encourage the future development and expansion of Hamilton International Airport to maintain (its) role as the main reliever airport to Pearson”.

1.5 Current Situation

An airport's revenue, traffic, facilities and land needs depend on the business it serves. The management of its business mix drives all aspects of its long term and short term planning. Market development ultimately will drive its land and facility needs, and the long term planning process must ultimately be guided by the market.

Hamilton International Airport has established its credibility as a scheduled service gateway and is attracting new flights. In the Fall of 2007, WestJet boosted frequencies to Orlando, and added nonstop flights to Fort Lauderdale, Tampa and Nassau. Globespan now offers seasonal charter services to the United Kingdom and Ireland. Furthermore the airport is now one of Canada’s top air cargo airports. Integrated carriers United Parcel Service, DHL and Purolator have developed YHM into an important nodal collection point for air courier/express cargo and Cargojet has a rapidly expanding air freight operation. Wide body freighters are now based at the airport.

In the past the airport has encountered challenges in attracting and retaining scheduled air services. It has a lengthy history of air service operations.

- In the 1970s, Nordair started nonstop Montreal/Ottawa-Hamilton-Pittsburgh services. The license for the route prohibited service to Toronto as part of a policy to protect Air Canada. Nordair shifted the flights to Toronto in the early 1980s shortly after obtaining the necessary traffic rights.
- A Pan Am Express service operated Hamilton-New York Kennedy in 1988 and 1989.
- A US Airways Express service to Pittsburgh was inaugurated in 1987 and was discontinued in 2001.

- During 1992-1993 a Northwest Airlink service was established to Detroit.
- A Continental Express service to Cleveland operated briefly in 2000.
- Carriers such as Tempus made short-lived and unsuccessful attempts to re-establish nonstop flights to Montreal and Ottawa in the 1980s and 1990s;
- WestJet originally chose Hamilton as its gateway for southern Ontario. However, it shifted most of its flights to Toronto - Pearson in 2004. It offered discounts to passengers using Hamilton. It clearly did not view YHM as an acceptable gateway for the critically important Toronto (GTA) market. Its decision to serve the Region of Waterloo Airport suggests that it does not view Hamilton as an effective gateway to tap the Kitchener-Waterloo-Cambridge market.
- Air Canada regional affiliate Jazz inaugurated nonstop regional jet services from Hamilton to Montreal and Ottawa in the fall of 2005. It originally offered four weekday flights to Montreal and three to Ottawa, both with regional jets. It later downgraded the Ottawa flights to two turboprop aircraft flights daily and reduced Montreal frequencies to three daily. In September 2008 it discontinued all services from Hamilton.

The key to long term planning at YHM rests with the following factors:

- the airport's historical and current lines of business and scales of activity;
- population and business growth in Hamilton-Niagara;
- the role of the airport within the Hamilton-Toronto-Kitchener region, specifically the extent to which it becomes an alternative to Toronto Pearson;
- regional economic concerns, such as USX's temporary shut downs at the Hilton Works and Nanticoke;
- airline strategies, such as their willingness to establish airline stations at YHM (NB: carriers are usually reluctant to incur the costs of a second ground operation in a single region, however, they will do so if they view it necessary for serving the market);
- user charges and congestion at Toronto Pearson;
- competition from other airports, particularly Toronto Pearson, Waterloo, London and Buffalo;
- dynamics of the airline industry (NB: this includes factors such as the growth of low cost carriers, airline restructuring, consolidation such as Delta-Northwest which could affect prospects for restoring the Detroit route);
- air freight industry issues, such as competition between integrated and heavy cargo carriers, the roles and locations of freight forwarder consolidation gateways; and

- other factors.

The relationship between the Hamilton and Toronto airports is especially important. Compared to other multi-airport regions (e.g. London, New York, Washington), Toronto-Hamilton has a smaller population. In other communities, market inertia drives the choice of airports. A facility seeking scheduled service could languish unused for many years until population, delays and congestion at other airports, and new airline strategies bring it flights. It could then experience very rapid growth. Until it reaches this critical stage, its future remains uncertain. Secondary airports that share these experiences include Palmdale (Los Angeles), Everett (Seattle), Williams (Phoenix), Detroit City, Niagara Falls (Buffalo), Lunken (Cincinnati), Portsmouth/Worcester (Boston) and Dulles (Washington). Canadian examples of multi-airport communities include Toronto-Hamilton, Montreal Dorval - Mirabel and Vancouver-Abbotsford.

Projecting the ultimate future land requirements of YHM so that a smooth and mutually beneficial relationship will exist between YHM and the AEGD must recognize the future opportunities available to the airport, the City, and the Region.

1.6 YHM as a Secondary Airport

The simplest view of YHM depicts it as a single facility serving the needs of Greater Hamilton and the Niagara region. Under this view, the Airport's traffic depends primarily on the needs of the adjacent communities.

However, many airports, including YHM, have complex relationships with their surrounding areas. The presence of other airports, differences in ground transportation facilities, and varying passenger preferences can make the traffic at a specific airfield both ambiguous and volatile. The presence of competing airports eliminates any clear and simple relationship between an airport's traffic and its immediate catchment area.

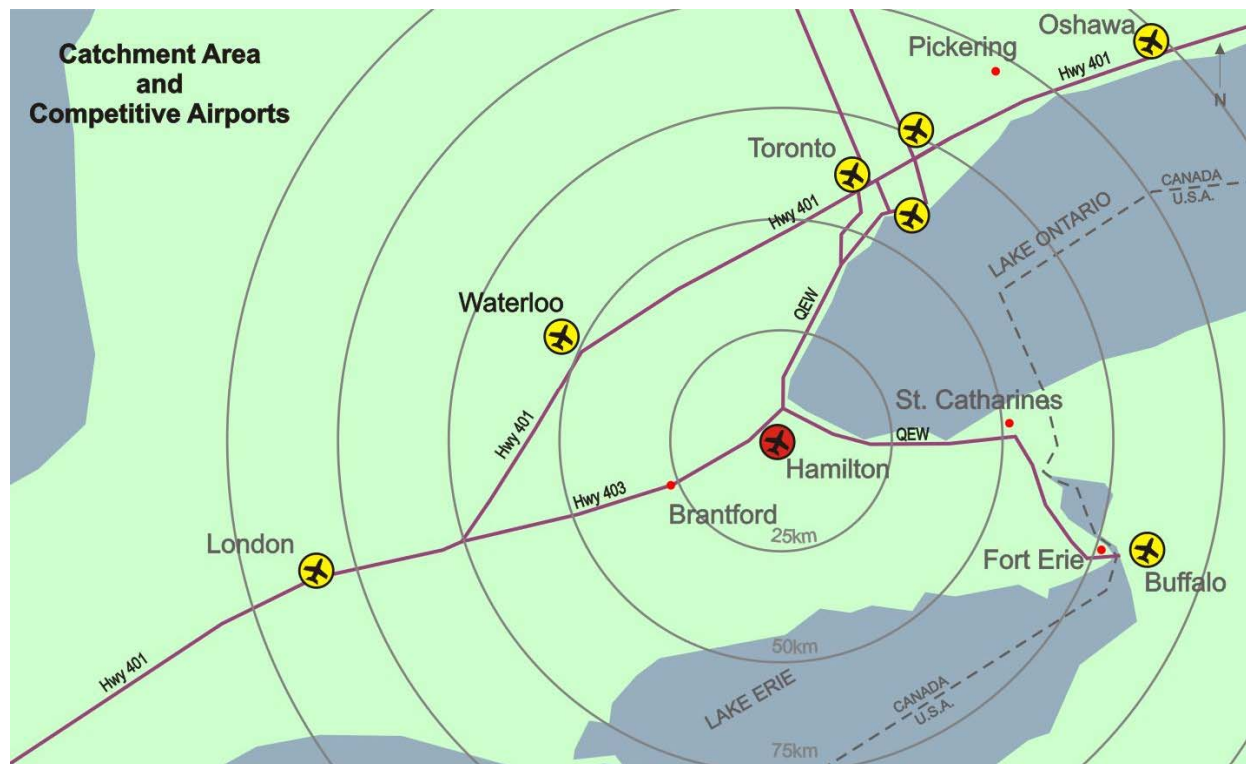
Hamilton Airport is one member of a group of airports serving Hamilton, the Greater Toronto Area, the Niagara Region and south-central Ontario. Airports that have or once had scheduled service include:

- Toronto Pearson International Airport;
- Region of Waterloo International Airport;
- Oshawa Airport; ¹
- Buttonville Airport; ²
- Toronto City Centre Airport.

Other airports in the region include the Niagara Region, Maple, Niagara Falls and other small general aviation facilities. The proposed airport at Pickering would further expand the group.

The London and Buffalo airports, while lying outside the traditional definition of the Toronto-Hamilton-Golden Horseshoe region, affect the periphery. Low cost carrier services at Buffalo attract transborder passengers from much of the Greater Toronto Area. The location of Hamilton Airport in relation to the regional catchment area and to competitive airports is illustrated in Figure 1-1.

Figure 1-1 - YHM Catchment Area and Competitive Airports



¹ In the late 1980s and early 1990s, Skycraft Airways connected Oshawa with Ottawa, Montreal, Windsor and the Detroit City Airport.

² Buttonville has received modest commuter services to Ottawa and Montreal.

To call these airports a “system” is perhaps a misnomer. Their traffic does not behave in concert, and no airport has a clearly defined or mutually exclusive role. Rather, their relationships are sometimes complementary, sometimes competitive, and often totally independent. Every traffic segment at every airport is undergoing a process of evolution with corresponding changes to the distribution of traffic, the airport’s role, the behavior of its clientele, and its needs for infra-structure. Instead of a “system”, the airports might collectively be referred to as a “group” of undetermined size, sharing a common geography, and for some discussions requiring a collective term.

This study examines how this group of airports, and the full Oshawa-Toronto-Hamilton-Fort Erie community, may impact the future of Hamilton International Airport. It focuses on high volume passenger and cargo services because these segments are very large, will have an important bearing on future land needs, and pose the largest uncertainties. Through being the airport of first choice for much of the Fort Erie-Toronto axis, the Hamilton Airport could capture a very large volume of traffic. While this may be considered a likely outcome by many in the industry, it is not necessarily assured and it must be recognized that YHM could serve a very wide range of traffic levels in the future.

An optimistic case would see the Airport serving as the primary gateway to Hamilton, the Niagara region, and the western parts of the Greater Toronto area. Its traffic would far exceed that of the Greater Hamilton market alone. In the worst case, most traffic might use Toronto Pearson and Hamilton Airport would capture only a very modest share. The difference between these opposing roles is large enough to affect future facilities, environmental impacts, and land requirements.

Airports in multi-airport communities can experience particularly volatile traffic³. The junior airports are often first served on an experimental basis. Well established operators may view their flights to secondary airports as being less important than those to the largest airport.

³ *In late 2001, AirTran launched Boston-Baltimore flights. Between 2001 and 2002, traffic on this city-pair grew by 59 percent, from 322,000 to 514,000 passengers. In the same period, Providence-Baltimore passengers fell 27 percent, from 965,000 to 702,000. These changes result primarily from passengers choosing to use different southern New England airports. Source: United States Department of Transportation Report 28DM, 1996-2007*

Sometimes, small or poorly capitalized airlines serve the smaller airport. The junior airports' traffic, which already may be modest, can experience wide swings⁴. These conditions apply with equal strength to Hamilton. Depending on its total share of the region's traffic, its future volumes can vary by orders of magnitude. To understand the key drivers of its traffic, the best point of departure is to view it as part of a multi-airport system.

Market behavior underlying multi-airport urban communities, including mechanisms for distributing traffic between each airport, is complex and volatile. However, many conditions can allow the secondary airports to grow beyond a limited scheduled role, and become widely accepted, high volume scheduled service gateways. For Hamilton, such a robust role would likely involve domestic and transborder services by Air Canada, an expanded schedule by WestJet and transborder services by several U.S. legacy carriers. Hamilton Airport might receive daily, year-round scheduled flights to major European destinations perhaps operated by new low cost carriers, and international cargo services may grow with business globalization.

Hamilton Airport has seen considerable volatility in air services, with entry and exit by scheduled carriers. This is characteristic of Secondary Airports. It illustrates that powerful forces operate to concentrate scheduled services at only one airport in even a very large and populous urban community. Other forces disperse traffic to secondary airports. YHM's future depends on the balance of the two sets of forces in the region.

⁴ See Richard de Neufville/Amedeo Odoni, *Airport Systems: Planning, Design and Management*, McGraw Hill, (New York, 2003) Chapter 5 "Multi-Airport Systems" for additional discussion of the concepts examined in this Chapter.

2.0 Scheduled Services at Secondary Airports

Airline economics strongly favor one-airport communities. However, several forces can be sufficiently strong for a community to support more than one airport with scheduled services. The forces usually work in combination, and several may affect any one airport. The leading forces favoring multiple scheduled service airports, and therefore which may potentially affect whether YHM emerges as a strong secondary airport in the future include the following:

- Saturation of the Primary Airport;
- Primary Airport Obsolescence;
- Bilateral Agreements;
- Administrative controls;
- Air Cargo;
- Local Geography;
- Geographical and Facility Constraints;
- Uniquely Appealing Locations;
- New Entrant Strategies;
- Preemptive Strategies;
- Cost Advantages; and
- Subsidies.

These are further described below.

2.1 Saturation of the Primary Airport

Some large communities have one dominant airport that has, over many decades, been the continuing focus of local air travel. The secondary airports have arisen slowly over time. Their traffic volumes and services do not rival those of the senior airport. They have services only to very high volume destinations. Virtually all of these destinations already have very robust services to the primary airport. The primary airport lacks the capacity to accommodate all traffic generated by the region, and the other airports serve as relievers.

The Los Angeles International Airport served 59.8 million passengers in 2008. Four other satellite airports, handled a total of 23.5 million passengers. It would be very difficult for the International Airport to handle the combined volume of 83.3 million passengers.

Similar situations prevail at New York Kennedy, London Heathrow and other large airports. Toronto Pearson can accommodate many years of growth. However, the airside and airspace congestion affects airline economics. Flight paths into and out of Pearson are often circuitous, to avoid traffic conflicts. Hamilton's airspace is not as busy, and aircraft can usually follow the most direct and lowest cost flight paths to and from the Airport. This advantage favors Hamilton, but it is not decisive.

2.2 Primary Airport Obsolescence

The most common rationale for a two-airport community is the obsolescence of the primary airport. The primary airport may be saturated, and unable to expand because of nearby urban development or topography. The community will then build a new, high capacity airport, leaving the older facility in operation. It must often then reconcile the roles of each airport.

Many such cases arose during the late 1950's. Some older airports could not be expanded to accommodate the new intercontinental jets then entering service, and required much longer runways. Other airports could handle the new jets, but had insufficient land for the traffic levels forecast. Examples include Chicago, New York, Washington, Edmonton, Dallas-Fort Worth, Denver, Hong Kong, Paris, Sao Paulo, Denver, Seoul, Jakarta, Kuala Lumpur, Austin, Paris, Montreal, Tokyo, Osaka and Singapore. Most of these communities elected to leave the older airports in operation. Recognizing the factors that oppose new scheduled service airports, many communities imposed traffic distribution rules designed to direct passengers to the new facilities. Some cities closed the older airport to scheduled services.

2.3 Bilateral Agreements

Bilateral air agreements sometimes encourage development at specific airports. Many of the United Kingdom's bilateral agreements allow almost free entry by carriers to London's Stansted and other provincial airports. Access to Gatwick and Heathrow airports is strictly limited.

This policy is not necessarily designed to promote Stansted, rather it reflects the very high value of route authority at the two large London Airports. The U.K. expects commensurate privileges for its own carriers before it will cede Gatwick and Heathrow rights to foreign operators. This policy could therefore shift traffic from Gatwick and Heathrow to Stansted and other London area airports.

Before the 2007 European Union-United States air agreement, the U.K. barred several U.S. airlines from serving Heathrow. They could serve Gatwick, and had automatic rights to Stanstead. All affected airlines coveted access to Heathrow. This policy shifted transatlantic traffic from Heathrow to Gatwick, and greatly contributed to the latter airport's traffic.

Restrictive bilateral agreements reinforced but did not originally cause multi-airport communities. Negotiators exploited the existence of two-airport communities to extract more and larger concessions from their opponents.

In 1986, Canada and the United States concluded the Experimental Transborder Air Services Agreement which encouraged traffic at "underutilized" airports. Canada designated Montreal Mirabel for the program. Canada and the United States had reached a stalemate for a new bilateral agreement, and the program was one of the few mechanisms for airlines to begin new transborder routes. The trial provision temporarily increased Mirabel's transborder traffic.

Current bilateral agreements, carrier designation policies and domestic regulations allow virtually any airline "fit, willing and able" to serve Hamilton from any other airport⁵. However, the Airport has been favored in the past by the Federal Government. Nordair once had a licence to fly from Hamilton to Montreal, Ottawa, Windsor and Pittsburgh. It was not permitted to offer such services from Toronto. When it obtained Toronto authority Hamilton flights were discontinued.

A commuter affiliate of the former Pan American Airlines obtained rights to a Hamilton-New York route, although the service violated some of the constraints of the Regional, Local and Commuter Services Exchange of letters under the 1966 Canada-United States air services agreement.

2.4 Administrative Controls

In some circumstances, government-imposed constraints limit the scale and scope of services at certain airports. These rules seek to overcome the forces favoring one-airport communities by forcing traffic to a new, less popular, and often struggling airport. Examples include:

⁵ *Aviation is not a free market. Some bilateral agreements still include routing or capacity constraints. No foreign airline may carry purely Canadian domestic traffic. However, in a purely practical sense, artificial government restrictions on trade do not affect the Airport.*

- Tokyo, where all international services except those of Taiwanese airlines must use the Narita Airport. Haneda Airport is much closer to the downtown, and serves domestic traffic. The distribution rules ensure that Narita serves a significant volume of traffic, despite its less convenient location.
- Montreal Mirabel where until 1996, Aeroports de Montreal required that only Canadian and transborder flights could serve the Dorval International Airport. All European, Caribbean, Latin American, and heavy cargo flights had to serve the less convenient Mirabel Airport. These controversial rules directed significant volumes of international traffic to Mirabel, but did not affect North American flights. The airport's unpopular location contributed to an overall erosion of international service.
- Dulles International Airport which serves Washington DC and opened in 1962. Many passengers considered its location remote and inconvenient, especially compared to the proximity of the existing Washington National Airport. Airport managers at National imposed a perimeter rule, barring any nonstop flight longer than 1,100 miles. The purpose was to encourage long haul traffic to use Dulles. National was also subject to legal limits on the number of operations. Dulles' long runways, urban growth in the Virginia suburbs, and United Airlines' choice of Dulles as a hub have caused rapid growth. In 2008, it accommodated 23.9 million passengers, 32.8% more than the 18.0 million at National (now renamed Reagan).
- New York La Guardia's 1,500 mile perimeter rule enforces its short haul role. The rule has shifted long haul traffic to the Newark Liberty and Kennedy Airports.
- Under the former Soviet Union, international flights and domestic flights to northwestern Russia and the Baltics were required to use the Sheremetyevo Airport. Flights to Siberia, central Russia and Kazakhstan operated from the Domodedovo Airport, and Vnukovo Airport served flights to the Ukraine, southern Russia and the Caucasus.
- The Edmonton Airports Authority imposes severe aircraft seating capacity and destination restrictions on scheduled flights at the City Centre Airport.
- The Toronto City Centre Airport forbids jet flights, but this is in response to local objections to airport activity in general, and somewhat outdated concerns with aircraft noise, rather than as a market control mechanism.

2.5 Air Cargo

Sometimes a secondary airport may be well adapted for all-cargo services. It may have longer runways than the primary airport or a curfew-free operation. At times it may have sufficient vacant land and airside capacity to support the hub requirements of an integrated carrier. It will therefore attract pure freighter flights. One example includes the Rickenbacker Airport at Columbus. As a former air force base it has long runways able to accommodate intercontinental cargo aircraft that carry hanging garments to a local distribution centre. The Port of Columbus Airport serves the region's passenger traffic, however it lacks space for a large cargo complex. Rockford Airport, 130 km. northwest of Chicago, offers the land and uncongested airfield for a United Parcel Service hub which isn't readily available at other Chicago airports.

Hamilton Airport benefits from its proximity to urbanized areas, its lack of congestion, the availability of land, and the more stringent limits on aircraft noise at Toronto Pearson, especially the night curfew.

Unlike the other airports, which process large quantities of heavy cargo, YHM serves mostly integrated cargo carriers⁶. In 2007, Hamilton was Canada's fifth busiest airport for air freight⁷. Only Toronto Pearson, Vancouver, Montreal and Calgary processed larger volumes. At the other airports, the air freight business depends heavily on passenger capacity as significant volumes of cargo are transported in the lower belly compartments of passenger aircraft operating scheduled services.

2.6 Local Geography

Sometimes, the local geography and topography of a community may favor multiple scheduled service airports. The Hampton/Norfolk/Newport News/Virginia Beach area has a smaller population than many single-airport regions.

⁶ *The air freight market consists of two primary segments. The passenger airlines and freight forwarders transport large items, primarily in the otherwise empty bellies of passenger aircraft. Delivery standards are higher than for surface modes, but still have considerable flexibility. The "integrators" such as Purolator and UPS carry very high value items on dedicated aircraft specifically scheduled around shipper needs. The items tend to be relatively small, and have strict delivery standards. These two cases represent polar extremes, and shippers can choose from a continuum of intermediate options.*

⁷ *Source: Statistics Canada Report 51-203, Air Carrier Traffic at Canadian Airports -2007 Table 2-1, (Ottawa, 2009). The Statistics Canada report excludes some carriers and operations.*

However, this region occupies a complicated network of peninsulas, estuaries, bays and inlets. Surface transportation routes linking Newport News to the region's primary airport at Norfolk are often congested. Many Newport News travelers use their smaller but more convenient community airport. In another example the Hudson and East Rivers have encouraged growth of multiple airports for New York City.

To some extent, this factor applies to southern Ontario. The presence of Lake Ontario forces the urban region into a horseshoe shape. Surface travel times are much longer than if the region lay on an isotropic plain. The Airport's position at the apex of the horseshoe will promote growth, particularly if there is any westward shift in the population of the region.

2.7 Geographical and Facility Constraints

Before the jet age began in the late 1950s, many cities built airports capable of accommodating propeller-driven aircraft. The airports could not be expanded to handle intercontinental jets, which needed much longer runways. These cities needed new airports, more distant from the centre of population, to maintain long distance air routes. Many cities have retained the small airport, close to population centres, while keeping a much larger airport on the periphery. Sometimes the communities impose traffic distribution rules that dictate the roles of each airport.

2.8 Uniquely Appealing Locations

Some airports enjoy very unique locations, which permit them to serve specialized traffic segments. The Toronto City Centre Airport is located close to downtown. In the U.K. the London City Airport is ideally located to serve the financial district. Ellington Airport, south of Houston, Texas is especially convenient to the National Aeronautics and Space Administration complex. Vancouver and Victoria have scheduled services at downtown floatplane airports for short haul traffic. The need for ferries makes competing ground transportation time-consuming and awkward. An air shuttle between the primary Vancouver and Victoria airports would be considerably less convenient than the downtown-to-downtown float planes. Reykjavik has a downtown airport for domestic flights. International services use the more distant airport at Keflavik.

2.9 New Entrant Strategies

The airline industry is very hostile to new entrants. Recent arrivals that have become established, including WestJet, AirTran, JetBlue, Asiana and Virgin Atlantic, are a small minority. Failures such as Royal Air, Zoom, Jetsgo, Legend, Western Pacific, Independence Air, Greyhound, Canjet, Vanguard and Canada 3000 are more typical.

Incumbent airlines employ many defensive strategies to eliminate new entrants at key airports. For example they can often out-schedule a new entrant, bracketing its departures because they have a larger fleet of aircraft. They may lower their fares, as they usually have greater financial capacity than a start-up. By selectively discounting their seats in certain markets, they can undercut the new entrant while maintaining favorable revenues for their service as a whole.

By avoiding an incumbent airline's hub, and serving another airport in the community, a new entrant can defuse the threat of reprisals, and minimize some of the defensive moves available to the incumbents. Retaliation can be very expensive even for a large and well established carrier. Serving a secondary airport reduces both the perceived threat to the incumbent and the effectiveness of any retaliation. In the 1980's, Midway Airlines started an airline based at the Midway Airport on the south side of Chicago. Until then, Midway Airport saw minimal use. Repeated efforts to start scheduled services from Midway had failed. The airline flew to many of the same destinations that United and American served from Chicago O'Hare. By serving Midway Airport, the new entrant differentiated itself sufficiently from the large competitors at O'Hare to avoid catastrophic retaliation. The airline still managed its schedules and pricing so that it would not become a target.

Midway Airlines ultimately failed, but still popularized the Midway Airport. This airport has become a highly popular gateway to Chicago for Southwest Airlines and other airlines. Western Pacific developed a hub at Colorado Springs in 1995, purportedly a "safe" distance from the United Airlines hub at Denver. The Colorado Springs Airport was not popular with Denver passengers, so the airline moved to Denver in 1997. The move provoked vigorous retaliation from entrenched hub carriers, and Western Pacific Airlines declared Chapter 7 bankruptcy in 1998. In the 1980's City Express made the Toronto City Airport the core of its growth plan. Porter Airways is now following similar tactics.

Perhaps the best-known success story is Ryan Air, which inaugurated services to many secondary airports throughout Europe. This approach has been central to its success and those of the airports it serves. Many of its services benefited from generous financial incentives. The airline serves Frankfurt through Hahn Airport, London through Stansted and Brussels through Charleroi for example. The airline depends on absolute minimum costs at each secondary airport it serves, and does not hesitate to withdraw services if costs increase.

WestJet originally chose Hamilton as its primary hub for southern Ontario rather than Toronto Pearson. While several factors likely prompted its choice, the decision may have partially insulated it from Air Canada's retaliation. Greyhound's similar choice in the 1990's may have followed the same rationale.

New entrants have proven especially important to secondary airports. Most instances of a secondary airport receiving a rapid infusion of new capacity, experiencing a large increase in traffic, and becoming an established high volume gateway to its community, can be attributed to startup carriers. Any factors that constrain competition or promote industry concentration could be detrimental to secondary airports.

2.10 Preemptive Strategies

A community sufficiently large to consider having two airports for scheduled services can be a lucrative source of traffic. One or a few airlines will often dominate the primary airport. They may view any airline serving the secondary airport as an entry strategy as a threat. It might capture some of their traffic or, often more seriously, dilute their average fares. Sometimes, the dominant carriers at the primary airports will serve the secondary airport to discourage new entrants.

American Airlines has always vigorously defended its large local traffic base and high fares at the Dallas-Fort Worth hub. When Legend Airlines launched competing services from the Dallas-Love Airport, American retaliated with its own flights. Even after it drove Legend out of business, it maintained token services and a few gates at Dallas-Love to inform competitors of its ability and resolve to protect its local franchise.

Air Canada/Air Canada Jazz services at Hamilton, eliminated in 2008, may have played a similar role in protecting its Toronto-Pearson hub. This conclusion is speculation, although circumstances suggest some motivating factor beyond routine business development. Shortly after its 1999 acquisition of Canadian Airlines International, Air Canada publicly proposed establishing a low cost subsidiary at Hamilton.

2.11 Cost Advantages

Hamilton Airport has significantly lower fees and charges than its principle competitor, Toronto Pearson. This is considered to be a significant strategic advantage driving future growth. Airport user charges can affect airline services. Low cost carriers are very sensitive to airport user charges, and may even refuse to serve high cost airports. In August 2009 for example, Ryanair announced its withdrawal from Manchester Airport and the switching of 10 routes and up to 60,000 passengers, to nearby lower cost airports over the issue of airport charges.

Airlines usually have very slender margins, and are sensitive to cost differences. Airport fees and charges have become very controversial, and carriers aggressively pressure airport managers for lower rates. Despite the growing emphasis on costs, the airline industry is still primarily revenue-driven. WestJet's 2004 transfer of many flights from Hamilton to Pearson showed that it valued Pearson's potential revenue advantages more highly than Hamilton's lower cost advantages. Other low cost carriers may not reach the same conclusion as Westjet, who have coincidentally, continued to operate at Hamilton Airport, as well as at Pearson. Some carriers may be expected to focus on Hamilton to the exclusion of Pearson. DHL recently cited the cost advantage as one reason for locating its new air courier operation at Hamilton Airport.

2.12 Subsidies

Some countries subsidize domestic air services. The United States has pledged that every community served before deregulation in 1978 would continue to receive scheduled services, subsidized if necessary. This pledge has meant that Reading PA (84 km. from Philadelphia), Lancaster PA (90 km. from Philadelphia) and Hagerstown MD (88 km. from Washington) have received subsidized air services. As government budgets come under pressure, the United States has had to be more selective in its subsidies. Many airports located close to a large facility, including those three mentioned, have recently lost scheduled air services.

2.13 Factors Affecting Hamilton International Airport

Despite strong forces favoring one-airport communities, YHM has established a clear and distinct role for serving southern Ontario. It has been favored by:

- Air cargo - The Airport offers a curfew-free facility. It is sufficiently close to Toronto that courier companies can meet exacting pickup and delivery requirements.
- New entrant strategies - New entrants have been crucial to Hamilton's growth. The Airport allowed WestJet, Greyhound, CanJet, Nationair and Flyglobespan to access the southern Ontario market, while distancing themselves from retaliation by the incumbents at Pearson;
- Local geography - The presence of Lake Ontario has forced the southern Ontario urban complex into a horseshoe-shaped configuration. Surface travel times have grown accordingly. Hamilton Airport offers shorter surface transportation times for residents of Hamilton and the Niagara region.
- Pre-emptive Strategies - These factors may apply to Air Canada. It has developed a large franchise at Toronto-Pearson, and may be reluctant to see Hamilton become a second gateway to the region. By offering services of its own to Hamilton, it may be sending signals to potential competitors. No public pronouncements by Air Canada have suggested such a stance, although the possibility remains.
- Bilateral Agreements/Administrative Controls - These forces, while once active, no longer affect Hamilton Airport as international regulatory regimes have moved to Open Skies.

Future growth of Hamilton Airport will likely result from:

- Air cargo - The advantages are well established.
- New entrant strategies - This could include new domestic carriers. Foreign airlines that would already face head-to-head competition at Pearson may also consider Hamilton.
- Low costs - U.S. LCCs (low cost carriers) such as Southwest, JetBlue, AirTran, Spirit and Frontier are very sensitive to airport user charges. They may consider serving Hamilton rather than Pearson, should they decide to serve Canada. They may be able to obtain superior gates and operating times at Hamilton. Pearson could still be attractive because it remains the premier gateway to the region, and passenger inertia dominates the airport choice decision. Also, Pearson already has non-stop services to most of the destinations that might be served from Hamilton. Hamilton flights might undermine U.S. low cost carriers' flights at Buffalo.

- Local Geography - Carriers serving Pearson might offer parallel flights from Hamilton to protect their market shares and boost their yields. A high volume destination might support flights from both Pearson and Hamilton. An example would be a Hamilton-Ottawa/Montreal service that competes with a similar route from Pearson.
- Curfew-free services - Some passenger flights are best operated during the night. Nonstop flights to the Far East that depart in the early morning “window” arrive just as inspection services are opening at dawn. Flights from India and the Middle East arrive in Canada at dawn.

A late evening departure time from western Canada and the United States will result in early morning arrivals in southern Ontario. The absence of a curfew at Hamilton could benefit these flights.

- Pre-emptive strategies - Airlines with profitable operations at Pearson may launch flights at Hamilton to discourage new entrants. The cost of these flights would be considerable, and few airlines could afford such an outlay merely to send a signal to competitors. An airline might offer Hamilton flights to demonstrate its commitment to defending its Pearson operation, while requiring some acceptable level of profitability.
- Pearson congestion issues - Pearson can support a substantial increase in traffic. However, as volume builds, the level of service may decline. Passengers will encounter longer queues for immigration, customs and security. Aircraft will experience longer delays, and air traffic control will impose circuitous vectors. There will be a growing shortage of airport land. While airport managers can anticipate these problems and take remedial actions, the sheer size of the airport may deter traffic. Some passengers may consider using other airports

These factors may drive growth at the Hamilton Airport.

3.0 Factors Inhibiting Growth at Secondary Airports

Most communities, even the largest, have only one airport with scheduled service. Examples include Denver, Atlanta, Amsterdam, Sydney, Singapore, and Madrid. Many large communities have satellite airports to accommodate general aviation and most are physically capable of serving scheduled flights. Their communities could easily generate sufficient traffic for scheduled services at several airports. General aviation airports would be convenient for many passengers. The absence of scheduled flights at such airports results from several factors:

- Habit;
- Airline Operations and Station Costs;
- Revenue and Traffic Dilution;
- Benefits of Concentration;
- Downline Airport Congestion;
- Connections;
- Local Airport Control; and
- Environment;

These are described below.

3.1 Habit

Passengers and airlines are to a large extent driven by inertia. Passengers become accustomed to a particular airport, and their habits will remain long after the community has become capable of supporting scheduled services at other airports in the community. They will show a bias against accepting a new airport. If scheduled services begin at a second airport, passengers may be reluctant to switch through force of habit. This factor was partly responsible for the limited acceptance of Montreal's Mirabel Airport. Domestic and transborder passengers were fully satisfied with the Dorval (now Trudeau) airport. They saw no reason to change to Mirabel especially at its less convenient and distant location.

After Denver opened its new airport in 1995, it immediately decommissioned the old Stapleton International Airport. The city was determined that services at the old airport not undermine the new facility. It expected that market inertia would keep many flights at Stapleton.

It took firm action to avoid what it viewed as an undesirable situation of operating two competing airports.

Edmonton had a prolonged struggle to move all scheduled services out of the City Centre Airport, which persisted for decades after the opening of the International Airport. Even today, a token scheduled service is still permitted at the City Centre Airport. Passengers, especially commuters between Edmonton and Calgary, were used to the exceptional convenience offered by the downtown airport and were loath to drive some 30 km south to a new airport.

3.2 Airline Operations and Station Costs

An airline serving two airports in one urban community must usually offer a larger number of total departures than if it served only one airport. One large aircraft usually involves lower flying costs than two smaller aircraft that together offer a similar total capacity. With most airline load factors in the 65-85 percent range, the costs of carrying additional passengers at an existing station may be almost zero.

An airline must incur large fixed costs to establish a new station. It must hire ground staff, sign an agreement with the airport, and secure the necessary gates, counter space, offices and baggage facilities. Its flights will, themselves, generate large costs independent of their traffic. While the carrier can reduce many costs by subcontracting the outlays can still be significant.

At minor stations, the airline must spread its high fixed costs over low volumes of traffic, often making the flights unprofitable. If it discontinues the flights its contractual obligations may continue for several years. The fixed costs increase the risk facing the company and reduce its ability to match its resources to its revenue potential. In contrast, new capacity at an existing station can often be accommodated by the current labor force, with no need to obtain new facilities or equipment. Under these circumstances, airlines are usually reluctant to begin serving a new station. Some airlines use rules of thumb, such as a minimum of four daily flights, to consider serving a new airport.

3.3 Revenue and Traffic Dilution

An airline starting service to a second airport in a large urban region faces the danger of diverting traffic and revenue from its existing operation. Often, the decreased volumes at the established airport will bring only negligible reductions in costs.

3.4 Benefits of Concentration

Passengers, particularly high fare business travelers, place a very large value on flight frequencies, to accommodate their preferred work schedules. A high frequency schedule offers both the greatest choice of timing when planning the journey, and the most flexibility to change the itinerary in response to unforeseen circumstances. Many airlines regard high frequency schedules as essential to commanding a fare premium. These airlines, typically legacy carriers, depend on this premium to maintain overall profitability.

The benefits of high frequency is greatest when all flights operate from the same airport. A passenger will value the opportunity to change itinerary, returning home on a different flight. However, most of the benefit is lost if their car is parked at one airport, and the return flight brings them to a different airport. The airlines have responded by concentrating their schedules at one airport.

3.5 Downline Airport Congestion

Most hub and spoke systems operate according to a series of flight “banks.” At the beginning of each bank, many flights converge on the hub from a wide area. Passengers make their connections, and the outbound flights depart almost simultaneously. Most large hubs have 5-6 banks in each direction daily, while a small regional hub might have 1-3 banks each day.

A hub system allows airlines to offer multiple daily one-stop connections between many city-pairs, even those of very low volume. However, the growth of the hub is limited by the number of flights in each bank. As the size of the bank grows, airspace and runway congestion grow. The terminal needs more gates to accommodate the growing number of flights. Average walking distances between gates increases. Connecting times increase, harming aircraft utilization. The probability of cascading flight delays grows.

Eventually, the hub becomes so large as to be unwieldy. To meet its connecting banks, an airline serving a multiple airport urban region must offer virtually identical flight timings. Thus a large urban area may have nearly simultaneous flights to and from all hub airports. Whatever the individual merits of each flight, they collectively contribute to congestion and erode the performance of the hub.

3.6 Connections

At a community served by multiple airports with scheduled services, connecting passengers must often make surface transfers between airports. This problem is especially common when one airport serves domestic passengers, and another provides intercontinental services. The airlines have sometimes tried to respond with a basic schedule of domestic flights at the international airport. Montreal (before 1996), New York⁸, Sao Paulo, Tokyo, Taipei, Seoul, Moscow and Osaka have faced such problems. The split operations contributed to the relative decline of Montreal and New York as international gateways.

3.7 Local Airport Control

In addition to large benefits, airports also impose certain costs on their communities. Noise, air pollution and congestion of surface arteries are common concerns. The amount of land occupied by an airport is often substantial, and any efforts to expand the footprint can be politically difficult. The land occupied by the airport could see other uses.

The community has a strong incentive to control the number and size of its airports. Since most airports operate on a cost recovery basis, they provide little direct tax revenue to the community⁹. For efficiency, and to attract a critical mass of airlines and support services, locally based airport managers often favor a concentration of airport activity.

⁸ *The La Guardia Airport has extensive domestic flights, while overseas flights operate from Kennedy. Since 2000 Kennedy, which once had minimal domestic services, has obtained greatly improved domestic flights. The Newark Liberty Airport has both domestic and intercontinental services.*

⁹ *The hotels, warehouses and industries surrounding the airport can be very lucrative. Canadian airports must make payments to their communities in lieu of taxes. The presence of an airport does not necessarily imply a shortage of property tax revenues.*

Aéroports de Montreal allowed intercontinental flights to serve the Dorval (now Trudeau) International Airport, and Edmonton Airports Authority. The City of Chicago closed Meigs Field in 2003 and the City of Denver closed the Stapleton Airport immediately after the new airport opened.

3.8 Environment

Communities surrounding a general aviation airport may oppose any plan to establish scheduled services. A strong lobby opposes the Toronto City Centre Airport. The Airport faces a strict operations curfew and is barred to jet aircraft. Partly for environmental reasons, the city has decided not to construct a bridge to the airport across the Western Gap in Toronto Harbour.

These centripetal forces have been sufficiently strong that most communities throughout the world have only one airport with scheduled services. They have caused the concentration of southern Ontario's scheduled services at Toronto Pearson International Airport. Other airports in the region, including Hamilton and Toronto City Centre, have experienced very volatile traffic and air services. While Hamilton has made many accomplishments, it has not yet become the preferred airport for Greater Hamilton and the Niagara District.

4.0 Dynamics of Inter-airport Competition

Several factors can encourage multiple scheduled service airports in large urban communities where certain forces may promote fragmentation. The traffic at the Hamilton Airport depends on a complicated set of forces. As part of the Golden Horseshoe's aviation system, the Airport is affected by other facilities, particularly Toronto's Pearson International Airport. While simplicity suggests viewing the Airport in isolation, virtually all of Hamilton's services have been affected by Pearson. The Airport has obtained new services because carriers judged it superior to Pearson, or lost flights because carriers considered it less advantageous or redundant to Pearson. As the population and air traffic of the Golden Horseshoe grow, and Pearson absorbs additional traffic, the interdependency of Hamilton and Pearson will grow stronger. The indeterminacy of traffic will increase.

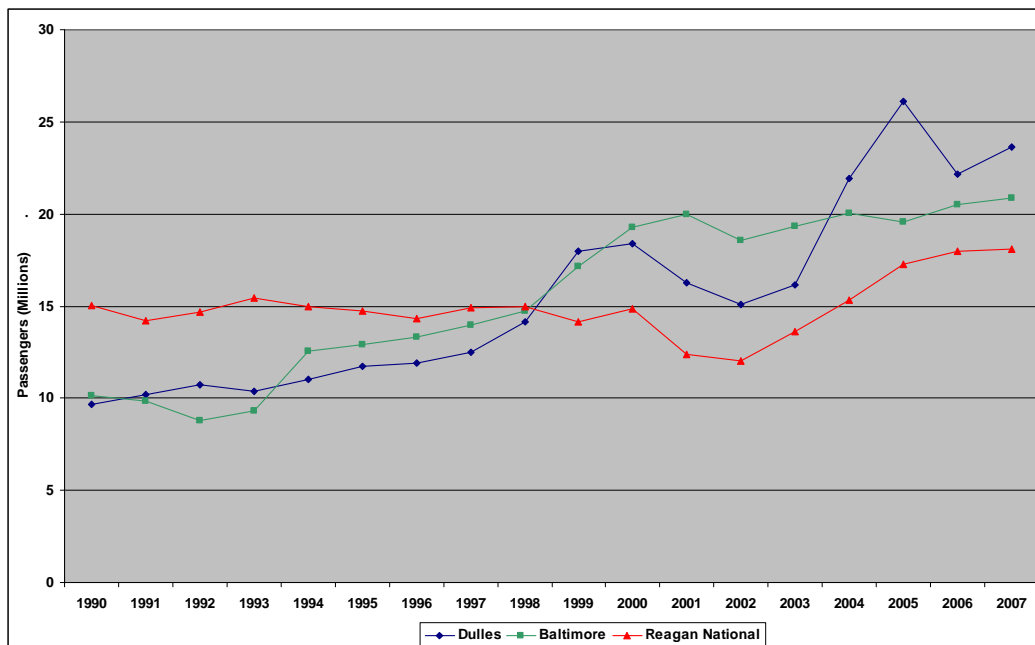
Hamilton Airport has demonstrated the volatility characteristic of secondary airports located close to a larger competitor. Between 2001 and 2004, traffic increased from 243,000 passengers to over one million. In 2008 traffic grew by 17.7 percent, to 546,000. Airports in similar situations have shown similarly abrupt changes in traffic. The characteristic growth pattern for such airports involves decades or more of temporary growth, steep declines, experimentation and volatility. However, such an airport may reach a stage at which the community is prepared to direct a large volume of traffic to it. The airlines recognize that they can and, for market reasons must, serve this particular airport. Whether the community changes first, or the airlines originally anticipate the change, is moot. The secondary airport then experiences a rapid rise in traffic. Several new carriers could begin service. Eventually, the traffic will reach a plateau and, following a classic "S" shape growth curve, grow at nominal rates thereafter.

Three airport clusters in particular demonstrate the dynamics of inter-airport competition which may be relevant to determining growth projections for Hamilton International Airport, namely: Washington Area; Southern New England; and San Francisco Bay.

4.1 Washington Area

Washington is served by three airports whose respective roles and share of the growing market have changed form over the last 25 years. Dulles is now the dominant hub with Reagan National Airport also providing extensive services, and Baltimore-Washington growing from a secondary airport into the number two position in overall passenger market share. The Washington Dulles International Airport entered service in 1962. The long distance from downtown Washington made it unpopular, despite the fact that it accommodated most of the region’s international flights. The United States imposed a rule barring long distance flights from National Airport in an effort to promote the underutilized Dulles. Figure 4-1 illustrates the growth of Dulles, and its major competitors Reagan National and Baltimore-Washington. Dulles expressed a strong growth surge in the 1980's (not shown on the graph) when selected as a hub for United Airlines. In the late 1990's, additional air services, the growing population of northern Virginia, and the large technology-oriented employment district surrounding Dulles promoted rapid traffic growth. Although the 9-11 terrorist attacks, United Airlines’ 2002 bankruptcy and the 2003 invasion of Iraq caused a temporary decline, new low cost carriers prompted rapid growth after 2005.

Figure 4-1 - Air Traffic Growth in the Washington Area



Baltimore-Washington, originally a secondary airport, experienced rapid growth between 1993 and 2005. A strong LCC, Southwest Airlines chose the airport as the focus for its east coast expansion, and added nonstop flights to cities throughout its network. Its expansion more than compensated for the loss of US Airways' hub. Dulles and Baltimore airports both grew despite Reagan-National's more convenient location.

4.2 Southern New England

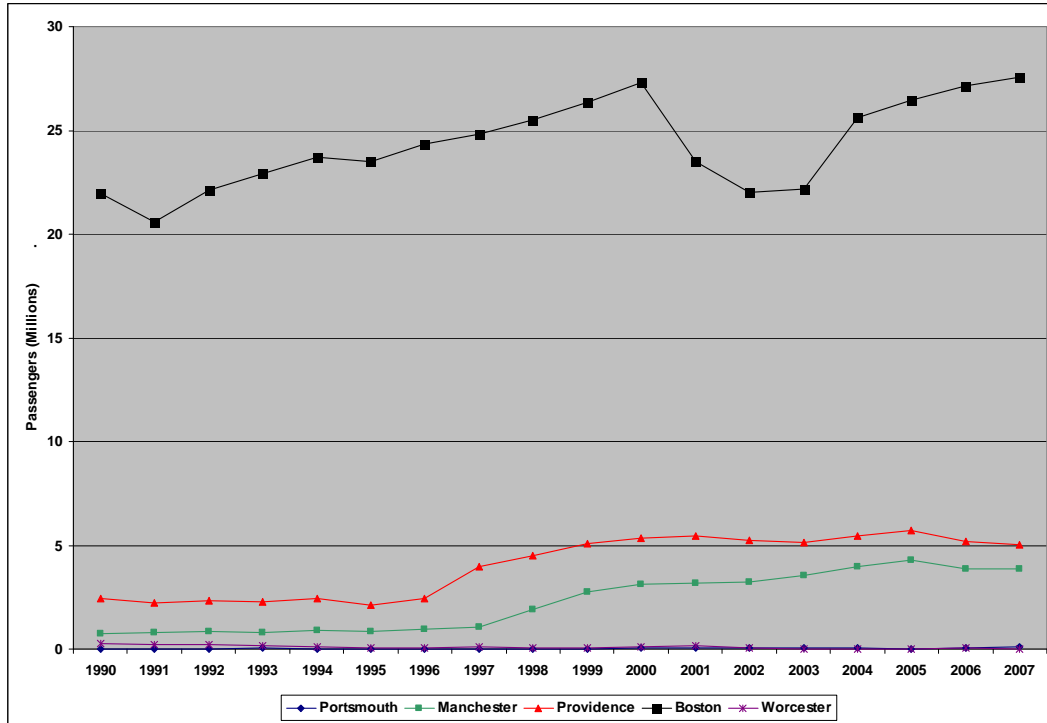
Out of a group of four potential secondary airports in New England, two have developed into strong positions in the region. Boston's Logan International Airport has always been the leading gateway to New England. The airport had few low cost carriers, and fares were relatively high. As Boston has grown, its surface transportation became increasingly congested. Large technology-based firms located in the periphery, and suburban communities saw fast growth. During the 1990's, Greater Boston grew to encompass nearby areas of Rhode Island and New Hampshire. Providence RI and Manchester NH became increasingly integrated with the Boston complex.

The Providence and Manchester secondary airports had very limited service. In 1990, passenger counts were 2.4 million and 0.75 million, respectively, compared to Boston Logan's 22 million¹⁰. Southwest Airlines initiated high volume, low cost services to Providence in 1996 and to Manchester in 1998, promoting both stations as gateways to Greater Boston. Both airports had recently constructed new terminals. Other airlines quickly added flights to both airports. Traffic grew rapidly with the onset of new flights, and eventually stabilized. By 2007, Manchester served 3.9 million passengers and Providence 5.0 million¹¹. In contrast, neither Worcester MA nor Portsmouth NH obtained more than very limited air services, despite concerted marketing efforts. Figure 4-2 summarizes the experience at the five airports.

¹⁰ Source: United States Department of Transportation Report 28DM.

¹¹ Source: *Ibid*

Figure 4-2 - Air Traffic Growth in Southern New England



The growth at Manchester and Providence resulted from socioeconomic changes in urban New England, airport facility improvements, and the entry of an LCC, Southwest Airlines. Boston Logan, while congested, and with surface access encumbered by a lengthy construction project, could still absorb additional flights.

The four potential secondary airports have had widely differing outcomes. They highlight the problems of predicting Hamilton’s traffic. The Hamilton Airport is 16 km. closer to Pearson than Providence is to Boston. The New England airports generated 38 million passengers in 2008, compared to Toronto/Hamilton’s 32 million. “Leakage” to the Buffalo, Waterloo and London airports further complicates the analogy. However, Hamilton’s proximity to Burlington, Kitchener-Waterloo and the Niagara region increase its potential traffic base. It is also well positioned to serve passengers traveling between upstate New York and the United Kingdom.

4.3 San Francisco Bay

The San Francisco Bay area example shows that both the primary and multiple secondary airports can expand. San Francisco's international traffic suffered from the 9-11 terrorist attacks, the 2001 correction in the technology industry, the Sudden Acute Respiratory Syndrome (SARS) outbreak of 2003, and the growth of competing airports as gateways to the Far East. The near-parallel runway configuration constrains traffic, especially in adverse weather. Large capital expenditures forced the airport to raise landing fees, and LCCs such as Southwest Airlines discontinued service.

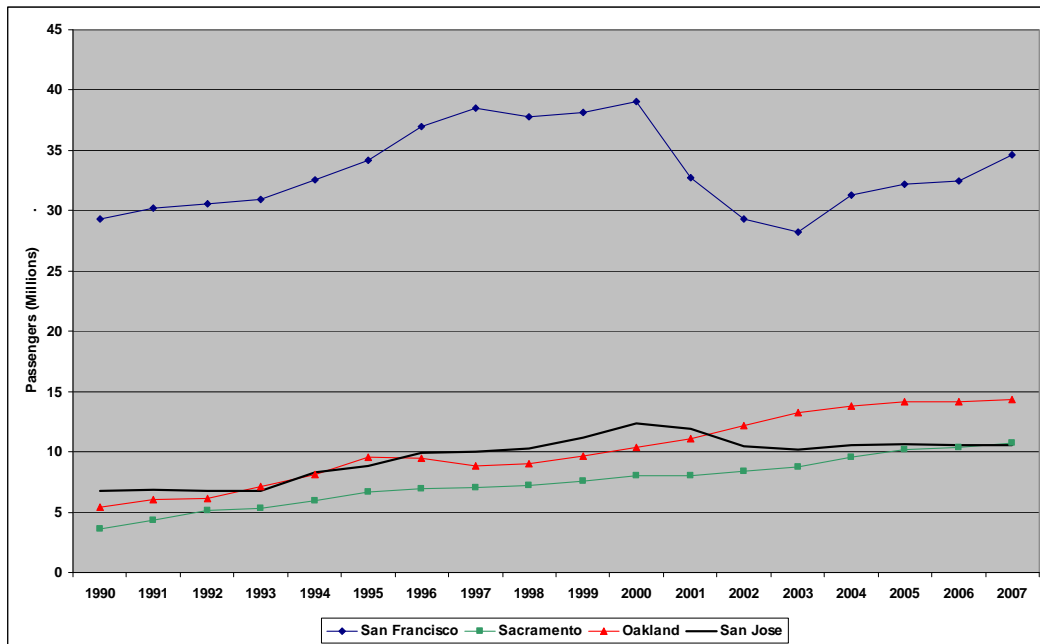
Low cost carriers help account for the growth of other airports in the region. Sacramento and Oakland experienced particularly robust growth. During the 1990-2007 period, traffic at Oakland and Sacramento almost tripled. The other airports continued to grow. San Francisco's traffic began rebounding in 2004. Low cost carriers restored services, international traffic grew, and a rapid transit station opened at the airport. Most domestic carriers served all four airports, sometimes with identical schedules. By 2007, only San Francisco had intercontinental services. The other have had mixed success in recruiting Mexican and Canadian flights.

Figure 4-3 portrays traffic at the four airports serving the San Francisco Bay area. The fast growth of the secondary airports suggests that Hamilton could also experience sustained growth, despite the proximity of Pearson.

All three examples show that the secondary airport's traffic can remain small and volatile for a lengthy period. When growth finally occurs, the traffic can grow much faster than for the community as a whole because of changes in market shares.

No analogies or case histories provide information on when the rapid growth begins, when the airport reaches stability, and its ultimate volume of traffic.

Figure 4-3 - Air Traffic Growth in San Francisco Bay Area



4.4 Other Airports

Both London and New York are worthy of mention. In London England, Heathrow is the primary hub with Gatwick, Stansted and Luton serving as secondary airports. Both Stansted and Luton airports originally saw limited use, as carriers preferred to serve Gatwick and, particularly, Heathrow airports. The United Kingdom gave foreign airlines virtually unrestricted access to Stansted, then Luton but still exacted a heavy price for traffic rights to Gatwick or Heathrow. This policy had only limited results.



London Heathrow caters to network carriers while LCCs have moved to the secondary airports. (Source: LPS AVIA)

Low cost carrier Ryan Air chose Stansted as its London terminus and other LCCs developed new operations Stansted and Luton at Luton. Ryan Air needed a low cost facility with far more capacity available than at either Heathrow or Gatwick.

Both Stansted and Luton are now very busy airports and the British Government has ordered the divestiture of some of the British Airports Authority airports in the area to promote greater competition and improvements in levels of service to passengers among all four airports. Divestiture may also distribute growth more evenly among all four airports, instead of focusing on Heathrow with its congestion and constraints.



*Monarch and EasyJet are two of the larger LCCs.
(Source: LPS AVIA)*

In the 1970's, the Newark Liberty Airport saw limited use. The New York City market primarily used La Guardia for short distance flights and Kennedy for longer journeys.

In 1980, new entrant People Express chose the underutilized Newark airport as its hub and volumes grew rapidly. People Express ultimately failed, from over-expansion, a loss of focus, and network strategies which attracted retaliation from the established airlines.

Continental Airlines acquired People Express, and then developed Newark into a major hub. Now, most of Kennedy's foreign carriers perceive the need to serve Newark. The airport now has nonstop flights to Beijing, Hong Kong, New Delhi and Singapore.

5.0 YHM Secondary Airport Growth Projections

As identified in many previous plans and the YHM Master Plan, Hamilton Airport is well situated as a secondary airport for Toronto-Pearson, and planning should reflect its eventual development in this capacity.

5.1 Demographics and Market

Many communities have multiple airports. Most communities also experience some degree of “traffic leakage” in which passengers use airports of other communities, with experiences varying widely. On the one hand Chicago’s Midway Airport, although clearly a secondary airport subordinate to O’Hare, handles over 15 million passengers yearly. On the other hand Worcester Airport near Boston has suffered a series of failing air services, and handles almost no scheduled traffic. The factors that determine a region’s demand for air services, and distribute the demand among different airports, include population, income, fares, topography, surface transportation links, and many variables identified in earlier chapters.

Table 5-1 lists key multi-airport communities in Canada and the United States. The population variable is especially important.

Figure 5-1 compares the Toronto-Hamilton area to the 25 other most populous communities in North America¹² in terms of scheduled service airports per population. It excludes airports with less than 200,000 passengers, such as Worcester MA and Portsmouth NH. The red bar shows Toronto-Hamilton as a three airport community, the orange bar shows similar airports per person data with two airports¹³.

¹² For population purposes, the “Toronto-Hamilton” includes Brant, Dufferin, Durham, Haldimand, Haliburton, Kawartha Lakes, Muskoka, Niagara, Norfolk, Northumberland, Parry Sound, Simcoe and Wellington Counties, and intervening areas.

¹³ The Toronto City Centre Airport poses analytical questions. It serves passengers travelling to and from downtown Toronto who wish to pay a premium for the convenience. Facility constraints will limit its volumes and restrict it to routes sufficiently short for propeller aircraft. The airport’s traffic peaked in 1987 at 400,000 passengers when served by City Express. Porter Airlines presently has a monopoly. It has proposed building a new \$45 million passenger terminal. The City Centre Airport will likely continue serving only a small and specialized niche. It is improbable that it will attain the volumes of other secondary airports, such as Montreal Mirabel, Akron-Canton or Sarasota. Furthermore, startup airlines such as Porter have a very poor history of success. Porter’s new terminal (which will expose it to competition from Air Canada Jazz) and its new routes could be shrewd business moves, but may also be an instance of the over-expansion, excessive leverage, and attracting the unwanted attention from competitors that have destroyed most start-ups. These factors mean that we must consider the Toronto-Hamilton region as having either two or three scheduled service airports, depending on the future of Toronto City Centre.

Table 5-1 - Multiple Airport Communities in Canada and the United States

City	Hub Airport	Passengers	Secondary Airport(s)	Passengers	Dist. to Hub Airport (km)
Chicago	O'Hare	76,182,025	Midway	19,378,855	25.6
Los Angeles	International	62,438,583	Orange County	9,979,699	57.6
			Ontario	7,207,150	75.2
			Burbank	5,896,323	28.8
			Long Beach	2,818,716	27.2
			Palmdale	11,112	81.6
Dallas	Dallas/Fort Worth	59,786,476	Dallas Love	7,956,569	17.6
New York	John F. Kennedy	48,977,858	Newark Liberty	37,364,692	33.6
			La Guardia	25,717,110	17.6
			Islip	2,339,366	59.2
			White Plains	1,639,054	48
Houston	Bush Intercont'l	42,979,207	William P. Hobby	8,819,521	38.4
San Francisco	San Francisco	35,790,746	Oakland	14,613,486	17.6
			San Jose	10,658,389	48
			Sacramento	10,766,386	140.8
Miami	International	33,740,416	Fort Lauderdale	22,151,134	33.6
Toronto	Pearson	31,452,748	Hamilton Munro	545,800	62.4
			City Centre	<79,427	19.2
Boston	Logan	28,102,455	Providence	5,019,342	78.4
			Manchester	3,836,103	72
			Portsmouth	116,097	80
			Worcester	852	72
Washington	Dulles	24,737,528	Baltimore-Washington	21,040,000	72
			Reagan National	18,679,343	38.4
Tampa	Tampa Intl.	19,256,288	St. Petersburg	723,801	16
			Sarasota	1,557,212	64
Vancouver	International	17,495,049	Abbotsford	502,197	62.4
			Harbour	404,708	19.2
Cleveland	Hopkins Intl.	11,145,567	Akron-Canton	1,377,838	64
Norfolk	International	3,714,323	Newport News	1,028,093	36.8

Figure 5-1 shows that, whether with three scheduling service airports or two, the Toronto-Hamilton region does not have an excessive number of airports.

On a per capita measure, it has fewer airports than Tampa, Boston or San Francisco. With two airports, it has fewer airports per capita than Miami, Washington-Baltimore, Dallas-Fort Worth or Los Angeles.

Figure 5-1 - Scheduled Airports per Capita

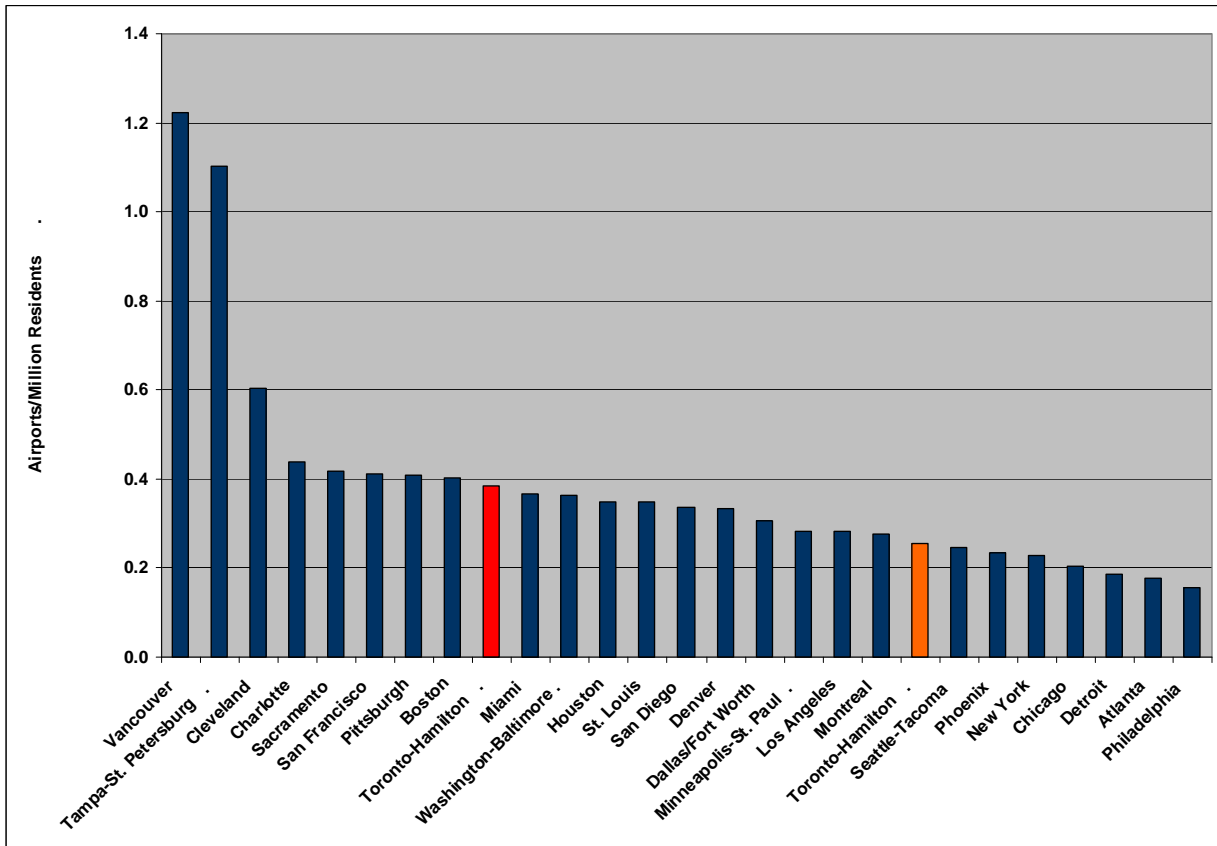
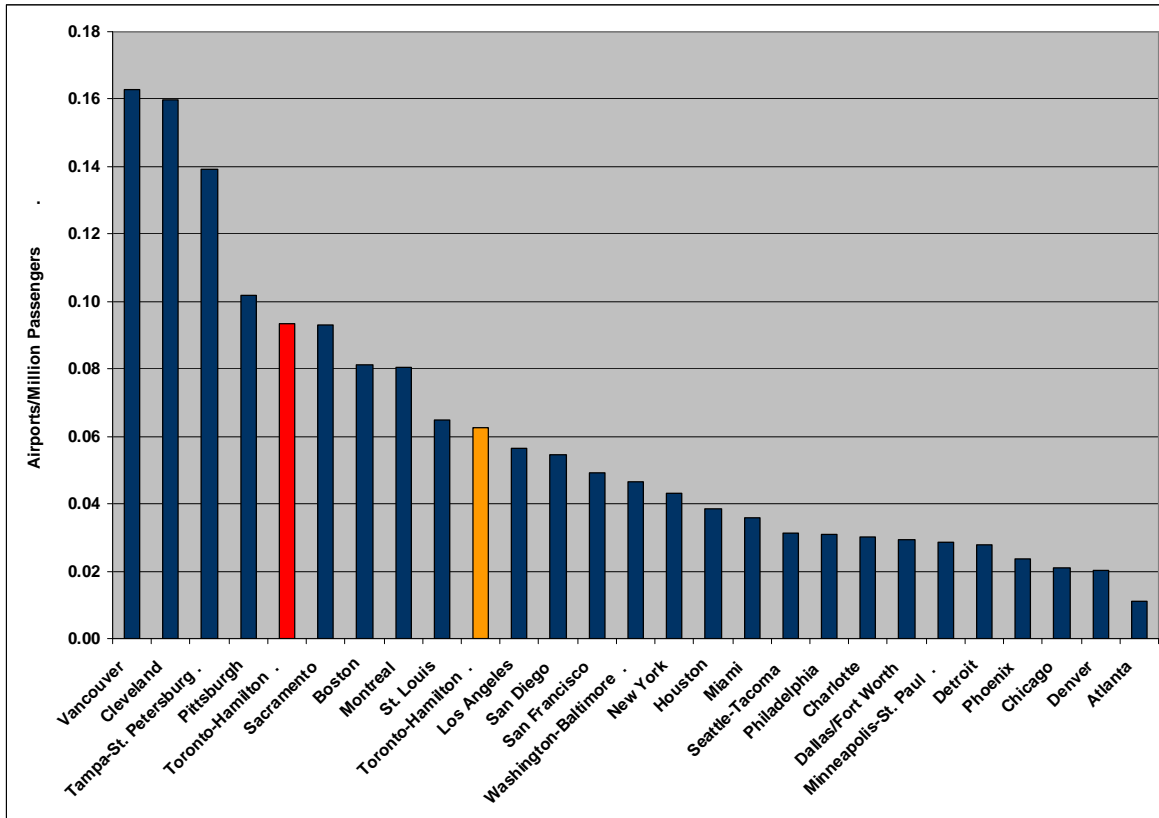


Figure 5-2 compares the number of Scheduled Airports on a per passenger basis.

Figure 5-2 - Scheduled Airports per Passenger



This analysis indicates that the Toronto-Hamilton-Niagara Region, when served by the Hamilton, Toronto City Centre and Toronto Pearson airports, would have an appropriate number of scheduled service airports commensurate with its population and traffic. The eventual growth of Hamilton Airport into a major secondary airport, does not result in more airports than the region can support.

This finding reflects a cross-section of the largest urban complexes in North America. Some have concentrated traffic at one airport and others have several thriving airports. A three scheduled service airport system for the Toronto-Hamilton-Niagara is appropriate and does not suggest superfluous facilities.

5.2 Secondary Airport Passenger Targets

Multi-airport systems can involve complicated changes in market share. Some secondary airports have been able to capture large volumes of traffic, and even overtake the former leaders. However, other airports, despite concerted marketing, serve almost no passengers. These conditions define a very wide range of traffic volumes for Hamilton.

The Airport's passenger traffic has shown the volatility that is characteristic of a secondary airport. Table 5-2 shows abrupt changes in traffic, many associated with new services or pullbacks by startup carriers.

Table 5-2 - Market Share of Hamilton International Airport

Year	Toronto (passengers)	Hamilton (passengers)	Hamilton Share
1995	20,909,173	29,566	0.14%
1996	22,669,189	93,097	0.41%
1997	24,808,497	131,649	0.53%
1998	25,560,627	25,829	0.10%
1999	26,653,588	22,561	0.08%
2000	28,929,918	243,205	0.83%
2001	28,042,692	553,555	1.94%
2002	25,930,363	845,960	3.16%
2003	24,739,312	1,041,204	4.04%
2004	28,615,981	613,842	2.10%
2005	29,914,750	438,912	1.45%
2006	30,794,581	527,133	1.68%
2007	31,452,748	662,855	2.06%
2008	32,334,831	545,800	1.66%

Estimates for Hamilton's future passenger traffic have been developed based on two methodologies:

- Four multi-airport regions were selected, Southern New England, San Francisco Bay and Chicago;
- The market share of the airport with the second largest passenger volume was calculated;

- First Method - The share was applied to the combined Hamilton and Pearson traffic for 2008 (NB: the analysis excluded the City Centre Airport on the basis that it serves a specialized market). The traffic volume determined was grown to 2030 at a compounded annual rate of 2.5 percent. The resulting volume defines the Hamilton target for 2030.
- Second Method - A second method examined the secondary airports' market shares in 1990 and 2007. It took the change in market share of the second airport and redistributed the corresponding traffic volume to the Hamilton Airport. Traffic totals were escalated to provide results for 2030.

The results are shown in Table 5-3.

Table 5-3 - Proposed Air Passenger Traffic Targets for Hamilton - 2030

Region:	Southern New England	San Francisco	Washington	Chicago	Total
Secondary Airport:	Providence	Oakland	Baltimore	Midway	All
Passengers 2007					
Region	36,433,365	70,182,219	62,600,700	91,453,436	260,669,720
Secondary Airport	5,004,911	14,300,826	20,853,337	18,296,306	58,455,380
Passengers 1990					
Region	25,099,869	45,042,893	34,857,209	63,516,126	168,515,916
Secondary Airport	2,407,727	5,364,421	10,160,720	7,896,866	25,829,734
2030 Target					
Method 1	8,292,505	12,300,498	20,108,748	12,076,805	13,537,004
Method 2	3,503,926	6,099,852	3,514,424	5,573,887	5,282,772
Average	5,898,216	9,200,175	11,811,586	8,825,346	9,409,888

In 2008, the Toronto Pearson and Hamilton Airports accommodated 32,880,631 passengers, with 545,800 at Hamilton. Depending on the example and the method, Table 5-3 shows a wide range of potential targets for Hamilton; from 3.5 to 20.1 million. The average of the two methods for the four cases is **9.4 million passengers**. This will serve as “the” target for the Hamilton Airport in 2030.

Traffic volumes at secondary airports are customarily very volatile, and often depend on strong competition from new entrants. No case history was truly analogous to this particular situation. Hamilton's future as an LCC passenger airport depends at this time on WestJet, which in 2004 shifted many flights to Pearson. Westjet is developing an alliance with Southwest Airlines, the strongest and most successful U.S.- based LCC. Another successful new entrant LCC could also emerge and become critical to the growth of Hamilton Airport.

The analysis suggests that a target of 9.4 million passengers per year would be appropriate. The 2004 Master Plan forecast 2.3 million passengers in 2009 and 4.8 million in 2027¹⁴. The target statistic derived above recognizes that a secondary airport may see a lengthy period of minimal traffic growth and considerable air service volatility. It can then experience very rapid growth, since even a small change in market share when applied to a large regional market will generate impressive growth rates.

The traffic target of 9.4 million passengers in 2030 serves as a guideline for allocating land to airport use within the AEGD. Should this estimate be too high, it would prompt the City of Hamilton to reserve too much land for airport-related activities. The land could be reassigned to non-airport uses. If the estimate is too low, the AEGD might quickly encroach on the Airport. Both developments would suffer, and the Airport might fail to attain its full potential. This mistake would be difficult to reverse. This situation calls for a calculated target that would be more inclined to overstate, rather than understate future traffic.

In a Master Plan, an overly ambitious forecast could lead to excessive and premature investments, high overhead costs, and financial difficulties for an airport. A forecast that underestimates future traffic may lead to tight capacity but would not be likely to jeopardize financial performance. Since an overly pessimistic forecast has less serious consequences than an excessively bullish forecast, good master plan forecasts should have a pessimistic bias.

¹⁴ *Source: Hamilton International Airport, Hamilton International: 2004 Master Plan Update*

The different purposes of the two predictors and the considerable volatility of a secondary airport in a multi-airport community make large differences virtually certain. The latest 9.4 million passenger target for 2030 and the earlier 4.8 million Master Plan forecast for 2010 do not necessarily disagree.

5.3 YHM Growth Conclusions

The dynamic of multi-airport regions is central to the future of the Hamilton Airport. The large southern Ontario market implies that a slightly larger share for Hamilton would result in a greatly increased traffic volume. Facility needs and land requirements would grow correspondingly.

Hamilton Airport has seen considerable activity by new entrants. Its passenger traffic has been very volatile. In any air market, powerful forces tend to concentrate traffic at one airport. Several factors have prompted a modest dispersion of the region's traffic to Hamilton including:

- Hamilton's strength as an airfreight hub, with a curfew-free airport, uncongested airspace, and proximity to major markets;
- Attraction of new entrants, specifically WestJet and flyGlobespan, wherein the Airport was central to each carrier's original Ontario strategies, although WestJet shifted most flights to Pearson in 2004;
- Local geographic proximity to Greater Hamilton, Burlington, and the Niagara region; and
- Pre-emptive strategies where carriers might serve Hamilton to defend their Pearson traffic.

The population and total traffic of the Toronto-Hamilton-Niagara Region are both sufficiently large to support the Toronto Pearson, Toronto City Centre and Hamilton airports. Measures to develop Hamilton as a high volume passenger airport would not result in superfluous airports in the region.

No analogy, case history or model can provide a rigorous and widely acceptable estimate of "the" market share or corresponding traffic volumes that are appropriate for the Hamilton Airport. Any such estimates would have a wide range of uncertainty. At a 2.8 percent annual growth rate, Hamilton's current traffic would reach 1.0 million passengers by 2030.

The Airport lies within a very large regional market. If southern Ontario sees changes in airport market shares comparable to those experienced in other communities, ***Hamilton International could grow to 9.4 million passengers.*** However, some situations could also result in minimal volumes.

6.0 Future Passenger and Cargo Characteristics

6.1 Introduction

In 2008, Hamilton International Airport handled 545,800 passengers and 103,428 tons of air cargo¹. As traffic grows, the Airport and its tenants may need additional land. Competition for land with the Airport Employment Growth District (AEGD) could harm both the Airport and the AEGD. Both entities are important for the economic growth and diversification of Hamilton-Wentworth.

The Airport's share of the region's total passenger traffic results from a complicated dynamic involving airline competitive practices, surface transportation facilities, the distribution of population and business activity, and market inertia. The Airport's share of the regional total is inherently volatile, and could span a very wide range. There are a number of key drivers of growth at the Airport. Macroeconomic and industry factors will drive commercial aviation and must be examined to determine the characteristics of the Airport's long term future, the framework for future planning of the Airport, and its relationship with the AEGD.

The following analysis primarily addresses passenger traffic, although air freight currently accounts for a much larger share of Airport resources and activity. The Airport has developed a clear leadership role for air freight which will likely expand as air freight grows. Passenger services pose larger uncertainties, and the span of possible outcomes is accordingly greater.

¹Source: John C. Munro Hamilton International Airport, *Annual Report 2008* (Hamilton, 2009)

6.2 Global Economy

The economic weaknesses that surfaced in 2007 have placed the global financial system under severe stress. The contraction of 2008-2009 differs from an “ordinary” recession in three ways:

- Most nations, including the United States, the European Union, Russia, Australia, Japan and China have experienced almost simultaneous contractions. In previous recessions, the different economies were less synchronized. The strong performers helped lesson the length and severity of the recession in the weaker ones.
- The economic contraction originated in the correction of real estate markets, with problems greatly exacerbated by questionable loans and the securitization of mortgages. Through acting on individual households, it has affected behaviour at the very grass-roots level.
- The financial sector has been placed under severe stress, with the failure of several high profile companies. Financial firms have been reluctant to extend credit for those projects being undertaken despite the weak economy. Large government payments to stabilize the system pose the risk of inflation.

The current contraction is only temporary, and will have no long term relevance for the quantity of total traffic at Hamilton Airport. However, recessions usually include an adjustment process. The business failures, corrections of asset values, and changes in relative prices represent a culling process by which the economy adjusts to long term change. The following trends appear most likely to affect the Hamilton Airport going forward:

- Continued increase in energy prices, as high volume oil fields reach exhaustion, and extraction shifts to more costly reservoirs. Prices of energy and commodities will increase. The Canadian dollar will appreciate. This change will suppress heavy manufacturing. Ontario could experience weakness because of its reliance on U.S. markets. Traffic “leakage” through Buffalo may grow because of the Canadian dollar’s appreciation and U.S. domestic fares denominated in local currency.
- The large U.S. current account deficit and the aftermath of the 2008 financial crises will reduce the popularity of the U.S. dollar as a key currency. The U.S. dollar could depreciate, and the United States will be less able to incur large and continuing current account deficits. This would further frustrate Ontario’s exports to the U.S.

- Canada's growing exports of oil and commodities and the changes in the Canadian dollar could "crowd out" the advanced manufacturing, services, and technology-based industries;
- The world will experience a growing shortage of commodities. Canadian exports and the Canadian dollar will benefit accordingly.
- The appreciating Canadian dollar will stimulate outbound foreign travel. Inbound traffic from the United States could be constrained.
- The Ontario automotive sector may encounter continuing problems of the Detroit Three. The problems of heavy industry sector will increase the urgency for Hamilton to diversify its industrial base.
- Many nations have excellent growth prospects. China, Brazil, Mexico, Russia, Eastern Europe, Turkey, Southeast Asia, India and much of Africa will see continued growth. Their long term prospects will be tied to internal political and economic reforms. Air travel and increasing air cargo traffic between Canada and these markets will reflect their strengths.

These changes will result in a relatively prosperous Canada, increasingly tied to primary resources. Southern Ontario may not grow as quickly as the energy-rich provinces. Manufacturing may suffer, particularly within industries closely linked to the United States. While Ontario's manufacturing may weaken, the Greater Toronto Area (GTA) will likely remain the focus of the Canadian economy. The City of Hamilton will benefit to the extent that it becomes more closely integrated with the greater region.

6.3 Passenger Growth

Passenger air travel has grown quickly in the last half-century. Economic growth has increased the number of persons able to afford air travel. Frequent travel by air has become crucial for many businesses. However, the most important factor promoting air travel growth has been the relative decline of airfares, in comparison to income. Between 1960 and 2007, constant dollar yields for U.S. carriers fell by 70 percent².

²Source: Air Transport Association, Washington D.C.

Improved technology, such as low maintenance jet engines versus two-person flight crews, twin-engine aircraft for even long range services, and the widespread application of computer technology have all helped to reduce costs dramatically. Market liberalization has caused the airlines to pass the savings on to the traveling public. Traffic growth has resulted, not from low fares in themselves, but from falling fares that continually encourage more people to travel. However, fares will likely stabilize, and traffic growth rates will moderate in the future.

The airline industry has been chronically unprofitable, and fuel price increases or recessions have led to periodic industry-wide crises. The crises testify, not to harmful external factors, but to the airlines' inherent financial vulnerability. Corporate margins during the "good" years have been insufficient to ensure long term profitability or to cover the cost of capital. Given current cost levels, there is limited room for cutting fares further.

As aircraft become more efficient, the opportunities for further cost reductions decline. Innovations such as blended winglets have reduced drag, and new materials that maintain strength at high temperatures promote engine efficiency. However, physics imposes absolute limits on performance.

Distribution costs have also plummeted. The change from brick-and-mortar travel agencies to web-based distribution systems is now complete, and the benefits are fully reflected in ticket prices. These circumstances mean that costs and ticket prices will likely decline much more slowly than they have in the recent past. This in turn will result in slower growth for air travel.

The most recent forecasts of the Boeing Commercial Airplane Company call for traffic within North America to grow at 2.8 percent per year through to 2027³. This contrasts with the 4.6 percent annual rate for U.S. domestic traffic since 1970⁴. The 2030 traffic targets for Hamilton Airport are based on the 2.8 percent annual rate.

³Source: Boeing Commercial Airplane Company, *Current Market Outlook*, (Chicago, 2008)

⁴Source: United States Department of Transportation Form 41, as reported by the Air Transport Association, Washington D.C.

6.4 Airline Industry Structure

Since the 1986 mergers creating Canadian Airlines International, a largely duopolistic industry has served southern Canadian routes. Several attempts by new airlines to enter the industry, including Greyhound, CanJet, Intair, JetsGo, Nationair, Astoria, Canada 3000 and City Express have failed. The long term survival of Porter Airlines will depend partly on its ability to avoid head-to-head competition with established carriers.

The uncertainties facing the airline industry could result in the loss of some carriers and the appearance of new ones. However, it is unlikely that Canada will be able to support more than two comprehensive network trunk airlines for the foreseeable future. Industry experts have suggested that the Canadian market is only large enough to support one and a half network carriers. There is a possibility that Canada's mainline routes could become almost a monopoly.

Hamilton Airport's future growth depends heavily on continued airline competition. As shown in previously, a common strategy of new entrants has been to serve the secondary airport in an urban region. New entrants have operated most of Hamilton's passenger services. If competition disappears for any reason, the remaining domestic carrier will continue flights at Toronto-Pearson and will have only weak incentives to serve Hamilton.

6.5 Institutional Framework

The air traffic targets for 2030 assume no change in the institutions governing commercial aviation. The Chicago Convention signed in 1944, has repeatedly been cited as an archaic, restrictive, and outdated framework for international aviation. However, the Convention is very versatile, and provides a framework for both very restrictive and the most pro-competitive agreements. A new multilateral framework would greatly simplify the negotiation of other rights.

The most likely international routes to and from Hamilton would involve the United States, Caribbean, Mexico and the European Union. Liberal bilateral agreements govern the U.S. and EU routes. Bilaterals with Caribbean countries and Mexico still include restrictions, but have nevertheless permitted expanding links. These agreements will likely see further liberalization.

Barring a major change in Canadian and foreign government policies, the agreements with many countries in South America and Asia will remain highly restrictive.

While the bilaterals will constrain traffic at Montreal, Toronto-Pearson, Calgary and Vancouver, most other airports will not be directly affected. The restrictive bilaterals in the long run will curb a “trickle down” process, in which carriers start international services from the largest gateways. As the first destinations attain maturity, the carriers will extend services to smaller gateways. The process works over decades. These considerations suggest that bilateral agreements and airline designation policies are unlikely to prove serious impediments to the Hamilton Airport’s growth through to 2030.

Proponents of liberalization have advocated the exchange of cabotage rights. Granting foreign carriers intra-Canada rights could counteract any growing market concentration. The Canada-European Union agreement includes long term provisions for cabotage, and these rights have also been a discussion point with the United States. Vested interests in the U.S. strenuously oppose any exchange of cabotage rights. However, Canada would likely prefer to see two Canadian carriers offering competition, rather than a Canadian and a foreign airline. Granting foreign airlines cabotage rights to counterbalance a domestic monopoly in Canada would be unlikely.

The long term outlook for Hamilton therefore assumes a very traditional approach to the institutions of aviation. Canada will experience a “creeping liberalization,” but the airlines will retain broad discretionary powers of determining the terms under which they compete internationally.

The institutions will adhere to traditional approaches, through retaining the Chicago Convention, negotiating agreements bilaterally, with few exchanges of additional rights and cabotage. Air cargo services will remain a test bed for liberalization, with relatively liberal capacity and third country stipulations. Since the most restrictive agreements apply to relatively undeveloped markets, they would likely constrain only Canada’s largest gateways.

6.6 Airline Equipment

The technology of aircraft design will be relatively mature. The industry through to 2030 will not experience the rapid pace of innovation of the last two decades. Cost pressures will favor steady increases in passenger capacity. Single-aisle narrow body aircraft of 90-200 seats will prevail on most North American routes.

Both Airbus and Boeing are contemplating replacement aircraft for their current major narrow-body lines, namely the Boeing B737-700/800/900 series and the Airbus A319/320/321 series. Dates for introduction of these new environmentally friendly, fuel efficient aircraft, possibly incorporating new engine technologies, have been steadily delayed in recent years and are currently estimated to be in 2015 or later.

Regional jets face increasing cost pressures. Bombardier has discontinued production of 50 seat regional jets. Even 70 seat aircraft now involve relatively high costs which impose difficulties on the airlines. Recent incidents involving regional aircraft have highlighted the need for more rigorous training and crew experience. Any ensuing changes in regulations will increase crew costs of regional aircraft. The minimum size of cost-effective regional jets will increase. Air Canada makes extensive use of 90 seat aircraft on low volume but long haul routes. The minimum economic size of aircraft, while a function of the particular route, will likely drift upwards. Trans-Canada routes could likely witness aircraft of at least 110 seats.

Small turboprop airlines face a particularly uncertain future. Many regional carriers are retiring aircraft of less than 50 seats because of high operating costs.

The long term success of Bombardier's 70 seat Q400 is still a matter for speculation. Current economics would likely preclude the restoration of turboprop services to Cleveland, Pittsburgh, Ottawa and Detroit from Hamilton. However, they could also adversely affect Delta's Waterloo-Detroit and Bearskin's Waterloo-Ottawa services. The air service gap that results might be filled by larger aircraft operating from Hamilton. Despite the generally poor economics of small turboprops, there could be a role for Porter Airlines' Q400 flights to Ottawa and Montreal from Hamilton.

Aircraft preferences have oscillated on long haul international services. The Boeing B777 and Airbus A330 have now supplanted the B767 as the dominant aircraft on transatlantic services. These aircraft have 300 or more seats, and by their size, have discouraged long haul air services growth at non-traditional gateways. The B757 has seen a limited application on U.S.-Europe services, especially by charter operators. It has primarily, but not exclusively, operated between large U.S. gateways and small destinations in Europe.

Boeing has ceased production of the B757, and this aircraft now has a limited future. The new B787 Dreamliner with 280 seats will support ultra-long haul flights. Boeing believes that it will fragment trans-Pacific routes, flying long, low density markets such as Toronto-Osaka/Taipei, Chicago-Guangzhou, San Diego-Tokyo and Denver-Beijing. Many established routes will obtain multiple daily flights. On the North Atlantic, the B787 will tend to reduce the average aircraft size. It could permit new services such as Edmonton-Frankfurt, Toronto-Brussels/Cairo/Copenhagen/ Vilnius/London Gatwick, and Newark-Lyons.

From Hamilton, the **B787** aircraft could provide the basis for **year-round nonstop services to London**. Air Canada and Virgin Atlantic have ordered the aircraft, as has Globespan which currently serves Hamilton.

These factors suggest that Hamilton Airport should expect 180-200 seat narrow body aircraft as the largest equipment routinely deployed on high frequency domestic routes. Twin-aisle 280 seat aircraft such as the B787 will predominate on transatlantic routes. Aircraft as large as the 350 seat **B777 may see intermittent use** at Hamilton Airport in the future.



Ryan Air, seen here at London Stansted Airport, announced plans to provide LCC services on North Atlantic routes. (Source: LPS AVIA)

In the short to medium term aircraft such as the **Boeing 737-900**, which has Extended Twin Engine Operations (ETOPS) capability for trans-Atlantic operations, may be used by a low cost carrier to serve Hamilton from a destination in the **United Kingdom**.

6.7 Passenger Traffic Volumes

Statistics Canada no longer publishes domestic origin-destination statistics. It still participates in a data exchange program with the United States, under which it distributes transborder traffic statistics. Canada considers international traffic data as very sensitive, and provides only minimal information. Airports must rely on other sources of data, including the “Marketing Information Decision Table” (MIDT) data produced by global distribution systems. Table 6-1 displays traffic data for Hamilton and selected destinations.

Table 6-1 - International Origin-Destination Traffic

	Airport (passengers)	Airport (passengers)	Stats Canada 51-205
	Toronto Core	Hamilton/Niagara/ London Core	Toronto, 2007
London	428,020	178,810	
Frankfurt	75,230	37,020	
Paris	115,060	56,770	
Amsterdam	77,780	36,170	
Rome	60,810	31,490	
Milan	21,900	11,390	
New York	495,620	245,200	1,051,950
Chicago	254,250	121,010	398,490
Boston			266,380
Los Angeles			413,700
Other US Connections	3,612,130	1,786,590	4,051,870
U.S. Vacation Destinations			
Ft. Lauderdale/Miami	304,000	138,720	447,010
Tampa/St. Petersburg	97,750	54,040	122,260
Las Vegas	240,150	122,320	286,900
Holguin	51,030	12,780	
Cayo Coco	39,750	10,000	
Port of Spain	101,330	32,050	
Mexico City	59,140	31,460	
Central American Hub	139,490	61,770	
Japan	107,430	56,750	
China/Hong Kong	297,520	154,170	
Taiwan	24,740	13,140	
Korea	71,490	37,430	
India	92,650	47,690	

Source: Hamilton Airport, Statistics Canada Report 51-205, Air Passenger Origin and Destination, Canada-United States Report, (Ottawa, 2009)

The table reveals several high potential destinations from Hamilton Airport. New York, Chicago and Los Angeles could support flights. London volumes are sufficient to suggest a year-round service. Although not shown, the Bahamas and Dominican Republic could pose seasonal opportunities.

6.8 Passenger Service Growth

Tradeport manages an aggressive and highly effective program for developing air services. In 2008, it was awarded the OAG – Routes Airport Marketing Award for the Americas at the Routes conference in Kuala Lumpur. Prospects for new services supporting a 9.4 million passenger target of 2030 are evaluated below.

Canadian Destinations

Arguably the greatest need is for a high frequency service to Ottawa and Montreal. These routes involve high volumes and have a large business clientele. They could potentially be the highest volume destinations from Hamilton. Without these services, Hamilton would likely be regarded only as a niche airport. The routes could be operated by WestJet or Porter. Despite its 2008 discontinuation of flights, Air Canada/Jazz remains a prospect. Other potential destinations include:

- Additional WestJet frequencies to western Canada and Atlantic Canada;
- Nonstop services to Saskatoon and Regina;
- Air Canada/Air Canada Jazz services to points throughout Atlantic and western Canada;
- Nonstop services to Sudbury, Thunder Bay and Sault Ste Marie.

These would provide travelers to and from the Niagara area and Greater Hamilton considerable time savings compared to flights from Pearson. Services could be operated by Air Canada Jazz, Porter or Bearskin.

The Canadian routes involve relatively large volumes, and would not suffer leakage through the Buffalo Airport.

United States Destinations

Potential new destinations include:

- Increased activity to high volume “sun” destinations. More frequencies to Orlando and Fort Lauderdale.
- Flights to St. Petersburg, Fort Myers, Sarasota, Panama City, Las Vegas, Gulfport/Biloxi and Myrtle Beach. Flights would be operated by WestJet and Allegiant.
- Nonstop services on the high volume route to Los Angeles by Allegiant or Alaska.
- Non-stop services by a Canadian or U.S. carrier on the high volume route to Boston. This would be especially attractive to high technology businesses in Kitchener-Waterloo.
- Nonstop services to Newark by Continental/Continental Express. Toronto/ Hamilton-New York is a very high volume route (see next section). The Continental hub would provide scheduled services to points throughout the eastern United States, Europe, South America, Asia and the Subcontinent. Hamilton’s large volume of international traffic would offer a major inducement for Continental. For Hamilton/Niagara, a one-stop routing overseas via Newark might be competitive with a nonstop routing from Pearson. The Airport should assess how such flights might affect its prospects for direct international services.
- Other U.S. hub destinations such as: Detroit, Cleveland, Washington Dulles, Dallas/Fort Worth, Atlanta, Denver, Cincinnati, Houston, Memphis, Minneapolis/St. Paul, Charlotte, Philadelphia, Phoenix and Salt Lake City. All have nonstop service to Pearson, and some could be prospects for Hamilton Airport.

These opportunities do not include potential direct services by Jet Blue, Southwest, AirTran, Spirit, Frontier and other low cost carriers. While such services would greatly increase Hamilton’s traffic, none of these operators currently serves Canada.

Notwithstanding the high user charges, Toronto-Pearson is still very attractive to a low cost carrier starting flights to Canada. For some airlines, Hamilton also poses a risk of cannibalizing traffic at Buffalo. Total traffic at the Airport in 2030 therefore does not depend on obtaining a U.S. low cost carrier. However the benefits of such a success should still make it a major goal for the Airport.

European and the Caribbean Destinations

Potential new destination initiatives include:

- Expansion to additional Globespan points of service, but exercise caution in attracting competitors (including one-stop connections by U.S. airlines);
- Year-round services to London including potential services by Air Canada, British Airways or Virgin Atlantic;
- Additional summer-only destinations in Europe.
- European low cost carrier destinations (particularly Ryanair) and seek transatlantic low cost carriers as applicable. One worthwhile approach could be to position YHM as a premier low cost destination.
- Services to new sun destinations in Caribbean, Mexico and Central America.

6.9 Air Cargo Volumes

Air cargo will continue to shape the growth of the Airport. The Airport has become a leading air cargo gateway to southern Ontario as well as a national nodal point, and trans-border point for cargo entry. Its air freight business is large, well established and mature. Opportunities for growth will come from growth in the industry as a whole, increased market share, and expansion to potential international markets.

“Air cargo” consists of two major types of services. The courier/express segment consists mostly of small items, such as documents, samples, small consumer goods and machine parts. Values per unit weight tend to be very high and most shipments are time-sensitive. Shippers insist on rapid and reliable delivery, usually over night. The “integrated carriers” or “integrators” control most of this traffic.

They provide a single, seamless door-to-door service, and perform the sales solicitation, pickup and delivery, sorting, ramp operations, intercity transport, customs brokerage, insurance and all other functions in-house. The integrators own their own fleets of aircraft. They can control the scheduling to meet their overnight requirements.

Through controlling all steps of the transportation process, they can offer the fast and reliable services that shippers demand and that enable the carriers to charge a premium.

The “general cargo” or air freight stream consists mostly of larger items, such as machinery, perishables and consumer products. Individual shipments range in size up to full planeloads. Although values per unit weight are significantly higher than for surface modes, they are considerably less than for the courier/express segment. Delivery standards vary, but are usually more lenient than the guaranteed-overnight requirements of the courier/express segment.

Many businesses may participate in a single general cargo shipment. Although shippers may work directly with the airline, forwarders usually provide the interface. They control the routing and choice of airline. Truckers, customs brokers, ramp handlers, airlines and sufferance warehouses may also participate in the process. The air freight travels mostly in the bellies of passenger aircraft. A flight with a full load of passengers will have empty space which can be sold as a by-product. On some high volume sectors, passenger airlines and general cargo specialists may also operate pure freighter services.

The actual air freight boundaries are not as clear as this idealization. Some integrators specialize in large shipments of the type associated with general cargo. Most integrators operate daylight services for large items and low priority cargo, using otherwise idle aircraft. Many airlines carry items for integrated carriers on a contractual basis. The integrators freely substitute between air and surface modes, and use trucks for short intercity sectors. At Hamilton Airport, Cargojet carries both courier/express traffic on behalf of integrators, and traditional general cargo traffic.

The integrators are especially strong on intra-North America sectors. The airlines have eliminated domestic pure freighters, reduced the availability of high capacity wide body passenger flights, and eliminated many of the late evening services so valuable to air cargo. They still carry respectable volumes of air freight within North America, but have a lower profile than previously. At some airports, especially those served by regional jets of negligible capacity, the traditional airlines do not pursue air freight traffic.

On long distance international routes, the airlines offer considerable capacity using wide body aircraft. These can accommodate the standard containers that are popular with shippers. The schedules of passenger flights sometimes meet the requirements of the air freight industry. General cargo therefore remains very strong on international services. Often, so much by-product capacity is available on wide body flights that air freight rates fall below the level that can sustain dedicated freighter aircraft. Table 6-2 illustrates these patterns for major airports in Canada.

Table 6-2 - Air Cargo Traffic at Canadian Airports, 2007
Metric Tonnes

	All Cargo Flights	Domestic	Transborder	International	Total
Toronto-Pearson	6,069	84,441.50	140,746.10	220,142.90	445,330.50
Vancouver	7,810	88,404.00	48,762.00	91,649.90	228,815.90
Montreal -Trudeau	1,100	31,080.50	6,138.40	70,622.80	107,841.70
Calgary	5,956	33,731.60	33,782.10	23,754.20	91,267.90
Hamilton	7,175	73,288.60	9,097.60	570.30	82,956.40
Winnipeg	9,016	55,105.30	9,496.10	1,912.90	66,514.30
Montreal-Mirabel	N/A	20,022.90	42,838.70	1,411.00	64,272.50
Edmonton	1,483	17,138.60	191.70	2,779.50	20,109.80
Halifax	1,606	17,447.30	539.9	8,619.20	26,606.40

Source: Statistics Canada Report 51-203, Air Carrier Traffic at Canadian Airports 2007, (Ottawa, 2009)

Statistics Canada appear to under-report traffic at Hamilton Airport as local records suggest that it accommodated 107,400 tonnes of air freight in 2007. Similar anomalies likely exist for other airports. Despite the statistical discrepancies, the table illustrates several important patterns:

- Hamilton Airport has a large number of operations by all-cargo flights in relation to its total tonnage. Pure freighter operations exceed those of Pearson, although Pearson's tonnage is over five times that of Hamilton.
- Hamilton's cargo consists largely of high priority courier/express traffic that requires dedicated capacity. Toronto relies heavily on belly capacity, and the widebody aircraft serving international routes offer abundant space for containerized freight.
- Hamilton's domestic traffic is very large, reflecting the Purolator and Cargojet scheduled flights.

- Despite all-cargo flights by integrated carriers, the Airport's transborder volumes are modest⁶.
- International traffic at Hamilton is limited. The Flyglobespan services to Ireland and the United Kingdom operate only during the summer, a low season for transatlantic cargo. The passenger aircraft use high density seating, leaving only small volumes of belly space for air freight. International routes account for the largest share of traffic at Toronto Pearson, Montreal Trudeau and Vancouver. These airports have many wide body intercontinental flights offering abundant cargo capacity. Cargolux, Lufthansa, Korean Air and Cathay Pacific offer pure freighter international flights from Pearson.
- Measured by weight, Hamilton's total cargo throughput was one quarter that of Pearson. However, Hamilton's air freight business is based on courier/express shipments carried by integrated carriers. Although integrated carriers have large operations at Pearson, Toronto traffic is mostly general cargo, carried in the bellies of passenger aircraft. The value per unit weight of Hamilton's cargo is therefore significantly higher than that of Toronto, and likely generates higher unit revenues for the carriers.

The United States Department of Transportation publishes statistics of air freight revenues and volumes by airline and route. The integrators tend to obtain much larger revenues per unit weight than the traditional airlines.

Table 6-3 shows the difference in yields for 2008. It shows company averages, and does not isolate the very high revenues of integrated carriers' domestic nightly prime-time courier/express services. The integrators' international flights convey large volumes of low yield general cargo to fill otherwise empty space. The raw statistics therefore understate the premiums commanded by high priority courier/express shipments.

⁶ According to the United States Department of Transportation's Report 28IM, Hamilton handled 17,605 tonnes of transborder air freight in 2007. Over 16,000 tonnes was flown to or from Louisville KY or Toledo OH by UPS or Cargojet, respectively. UPS and FedEx together carried almost 100,000 tonnes of air freight to or from Toronto Pearson.

**Table 6-3 - Air Freight Yields, U.S. Dollars per Revenue Tonne-Kilometer
 Integrated Carriers and Airlines**

	Domestic	Atlantic	Latin America	Pacific	All
FedEx	\$0.832	\$0.738	\$1.282	\$0.573	\$0.769
UPS	\$0.475	\$0.388	\$0.669	\$0.499	\$0.477
Airborne	\$0.814	NA	NA	NA	\$0.814
Integrators	\$0.709	\$0.613	\$0.981	\$0.539	\$0.661
American	\$0.363	\$0.189	\$0.286	\$0.198	\$0.240
Northwest	\$0.312	\$0.292	\$0.000	\$0.229	\$0.248
United	\$0.358	\$0.211	\$0.207	\$0.255	\$0.252
Delta	\$0.425	\$0.245	\$0.215	\$0.251	\$0.273
Continental	\$0.671	\$0.203	\$0.221	\$0.263	\$0.278
US Airways	\$1.366	\$0.051	\$1.978	NA	\$0.453
jetBlue	\$0.390	NA	NA	NA	\$0.390
Alaska	\$0.780	NA	\$1.083	NA	\$0.795
Southwest	\$0.594	NA	NA	NA	\$0.594
Frontier	\$0.388	NA	NA	NA	\$0.388
Airlines	\$0.438	\$0.209	\$0.262	\$0.237	\$0.260

Source: United States Department of Transportation Form 41, Year Ending December 31, 2008

Table 6-4 provides a breakdown of air freight from Hamilton and Toronto to selected US destinations for the past 6 years.

Table 6-5 provides a breakdown of principle air freight traffic by direction.

Table 6-4 - Air Freight on Selected Toronto/Hamilton-U.S. Routes (Tonnes)

	2003	2004	2005	2006	2007	2008
Hamilton						
Louisville KY	18,699.90	17,110.96	9,567.87	9,084.11	10,361.28	9,809.11
Toledo OH	10.46	3.01	5.46	1,451.89	6,373.57	6,670.79
Wilmington OH	2,747.83	2,765.36	196.32	0.00	172.82	499.63
Ypsilanti MI	414.75	303.50	241.18	324.36	309.36	200.86
Syracuse NY	518.70	513.84	621.32	700.75	0.00	11.66
Philadelphia PA	1,919.64	0.00	0.00	0.00	0.00	0.00
Toronto						
Memphis TN	20,864.97	19,599.96	26,174.35	30,160.70	38,023.98	37,445.43
Louisville KY	15.77	5,043.06	13,334.21	17,786.92	20,265.71	18,684.29
Indianapolis IN	8,830.46	13,046.20	14,722.14	15,644.02	16,221.93	16,533.02
New York Kennedy NY	129.76	243.79	46.19	3,838.19	12,960.19	13,739.34
Newark NJ	12,767.09	11,221.36	10,018.07	9,175.17	10,803.95	10,378.66
Wilmington OH	31.09	31.49	0.00	5,873.40	7,993.54	7,290.11
Ypsilanti MI	354.05	260.52	545.22	212.34	183.99	157.09
Cincinnati KY	8,361.35	8,197.42	3,472.33	82.18	1.95	4.62
Dayton OH	15,938.91	17,061.55	15,089.51	6,575.15	1.52	1.84
Rochester NY	5,413.04	7,574.63	4,615.20	3,888.29	477.98	0.00

Source: United States Department of Transportation Report 28IS

Table 6-5 - Transborder Directional Air Freight Traffic (Tonnes)

Origin	Hamilton		Toronto					
	Louisville	Syracuse	Indianapolis	Memphis	Newark	Rochester	Other	Louisville
Carrier	UPS	UPS	FedEx	FedEx	FedEx	FedEx	FedEx	UPS
Southbound								
2005	4,800	-	6,234	4,012	5,379	3,945	-	6,864
2006	4,041	-	6,328	7,239	4,988	3,891	28	9,003
2007	4,191	-	6,929	14,716	4,425	478	16	9,937
2008	3,790	-	6,969	14,909	4,056	-	148	9,004
Northbound								
2005	4,773	622	8,459	10,645	4,390	674	-	6,365
2006	5,036	701	9,232	17,931	3,837	-	10	8,740
2007	5,972	-	9,302	23,095	5,958	-	26	10,341
2008	6,020	12	9,477	22,555	5,993	-	68	9,696

Source: United States Department of Transportation Report 28IS

6.10 Air Cargo Growth

The growth of airfreight at Hamilton depends heavily on its competitive relationship with Toronto-Pearson. Hamilton Airport has a very strong position in domestic courier traffic. However, Pearson still processes significantly more transborder courier/express freight. Hamilton's cost and curfew-free advantages over Pearson, and ongoing traffic development efforts might encourage the integrators to relocate to, or consolidate domestic and transborder flights at the Airport. International courier/express services will depend on traffic volumes and the logistics strategies of the integrators.

Both Cargojet and Kelowna Flightcraft (Purolator) have introduced wide body equipment, namely B767-200 and DC-10 freighter aircraft respectively based at Hamilton. These aircraft, assigned primarily to trans-Canada routes, could operate international scheduled or charter flights for general cargo during the weekend slack period. These flights could benefit from the liberalization of bilateral agreements, many with permissive clauses for all-cargo services.

The recent concentration of wide body equipment at Hamilton makes the Airport arguably the best positioned to obtain international freighter services by a Canadian carrier.

The freight forwarder consolidation centres for general cargo are clustered around Toronto Pearson. Toronto's extensive international flights, diversity of carriers, and wide choice of nonstop foreign destinations makes it attractive for international air freight forwarders. Although the locations of the forwarders favor Pearson, companies in Mississauga could still purchase general cargo space out of Hamilton. Freight forwarders and expeditors in the GTA have expressed interest in using Hamilton Airport, if suitable air services are made available.

Hamilton could compete for general cargo freighter flights of foreign carriers. Lower landing fees and less congested facilities could be inducements. However, some cargo airlines also operate passenger flights at Pearson and can obtain benefits by consolidating their operations at one airport.

General cargo volume growth (apart from traffic carried as a by-product on courier/express flights) may depend on the availability of belly cargo space on passenger flights. WestJet's B737s provide useful cargo capacity on domestic routes. The air freight could require additional ground staff, and the service could be valuable for the community. The additional revenues might justify additional flights. However, the effects, whether measured in cargo throughput or economic impacts, would be modest. Hamilton's air freight business could grow through several processes:

- Routine growth of the market whereby the projected 2.5 percent annual growth rate⁷ would increase air freight throughput from 103,428 tonnes in 2008 to 178,059 tonnes in 2030;
- Scheduled and charter weekend flights for general cargo by Purolator/Kelowna Flightcraft and Cargojet wide body freighters;
- Increased transborder and domestic traffic, through the integrated carrier's shifting or consolidating Toronto Pearson operations to Hamilton Airport;
- Expanded belly capacity of passenger flights accompanying increased passenger operations; and
- Introduction of new international general cargo services operating aircraft up to the B747-400 in size

The supply of land suitable for air cargo operations may prove insufficient, especially in the longer term. Progressive growth in cargo tonnage and new facilities for expanding integrated carrier operations (possibly as the result of shifting operations from Pearson) will draw down the existing supply of available land at the Airport. Additional belly capacity on passenger flights will require cargo warehouse and office space. As general air freight traffic builds, cargo airlines and freight forwarders will require warehouse space. Forwarders do not necessarily need apron access, and some agents could locate off the Airport. The adjacent AEGD could be an ideal alternate location for freight forwarders.

⁷Source: Boeing Commercial Airplane Company, *Current Market Outlook - Air Cargo 2009-2028*, (Chicago, 2009)

6.11 Future Outlook

1. The future of the Hamilton Airport depends primarily on the share of the Toronto-Hamilton-Niagara region's traffic that it can capture. The Airport's position with respect to Pearson will enter into almost all new passenger or cargo service activities and strategies.
2. The 2008-9 recession will shape short term passenger opportunities. Bolstered by high commodity prices, Hamilton-Western Canada traffic will remain strong. High frequency flights to Ottawa and Montreal will be important to popularizing the Airport. A high Canadian dollar will encourage southbound transborder traffic. Hamilton has good prospects for year round services to London.
3. Cost pressures will cause a steady increase in the size of passenger aircraft. The environment will be strongly detrimental to small regional jets (<70 seats) and turboprop commuter aircraft. Canada's domestic market will remain largely a duopoly. The institutions of international aviation will undergo a creeping liberalization.
4. A growth target of 9.4 million passengers by the year 2030 is considered reasonable for Hamilton Airport, and will need to be served by a new passenger terminal.
5. Cargo traffic at Hamilton will continue to grow. The Airport is very strong in the domestic courier/express segment. Total traffic growth as well as increased market share will contribute to expansion. The Airport has good opportunities to increase its courier/express traffic to the United States. Current international air freight opportunities in the global business environment could potentially lead to significant growth. Air freight, whether in the bellies of passenger aircraft or on freighters cross-utilized during schedule downtime, offers strong growth prospects. The freighter services would first use existing facilities, and then if growth continues will require additional land on the Airport.

6. Maximum aircraft size and performance factors affect requirements and specifications for runways, taxiways, aprons, building configurations and ultimately airport land requirements.
- Based on the **B777-200** and **B787** (and the equivalent Airbus A350), a **Code E** aircraft size is recommended for future passenger services planning.
 - For air cargo, the maximum aircraft size anticipated is the **B747-400**, also a **Code E** category aircraft.



Existing tenants must be able to upgrade capacity to Code E aircraft like this UPS B747. (Source: LPS AVIA)



EVA Air Cargo's B777 is a typical Code E aircraft which may serve YHM in the future. (Source: LPS AVIA)

7.0 Future Airport Land Needs

7.1 Approach

The Airport Employment Growth District (“AEGD”) will be a major employment area in the City of Hamilton. It will help the City develop a new and dynamic economic base. The Airport will also contribute to the development process. By 2030, it could serve up to 9.4 million passengers, and 178,000 tonnes of air freight each year. The two entities could grow symbiotically, with each strengthening the other.

Employment growth near an airport can initiate a sharp increase in traffic. The potential synergies depend on careful and far-sighted land use planning. An on-airport location, with airside access, will be essential to many prospective aviation and support industry tenants. Development of the Airport will require enough land to accommodate a wide variety of future tenants. If the allowance is insufficient, the Airport could be unable to develop to its full potential. Conflicting land uses could negate any synergies between the Airport and the AEGD.

The land area needed to allow the Airport to pursue new services, tenants and business sectors without being constrained by the supply of land is projected in the following sections.

Airport land needs are derived from three sources:

- Estimation of specific future developments which may occur at YHM, based on past experience and the future vision and marketing initiatives;
- Industry experience with respect to commercial aviation land requirements in each aviation industry sub-segment; and
- A review of comparable secondary airports and facilities land occupancy.

The uncertainty of future traffic volumes at YHM has been emphasized previously. Robust passenger traffic growth would require that a carrier adopt YHM as a core part of its strategy for southern Ontario. Significant growth of air freight traffic will depend primarily on a few large integrated carriers and all-cargo specialists. The plans of individual businesses are inherently difficult to predict.

The estimation process takes the current configuration of airport activity and current land use patterns as given. It considers the incremental traffic to be accommodated through to 2030, and calculates the additional land area required. This additional land would include presently vacant Airport land, and adjacent properties that would become part of the Airport's operations.

Cargo carried in the lower holds of passenger aircraft serves as only one of several factors guiding the land needs for air cargo. Some integrated carriers may want eventually to establish new cargo terminals at Hamilton while some of the integrated cargo carriers' functions, such as sorting traffic for local delivery, can be performed off-airport.

A review of other airports helps determine the ultimate passenger terminal size, and the requirements for access. While the passenger analysis suggests a 33-gate terminal, no attempt has been made to forecast cargo, FBO or MRO construction on a statistical model basis. Rather, a series of hypothetical projects was prepared. Each such project represents a type of activity, a scale of operation, and a need for airside access that the Airport could or might encounter in the future.

The list of hypothetical projects is likely beyond the expectations for the Airport. However, the Airport, as a current and future driver of the Hamilton economy, must have the resources to market itself to prospective users. This exercise is not meant to permit a particular operator to build facilities at Hamilton, but to allow Airport management to offer potential operators an attractive package for establishing a business on the YHM site.

7.2 Potential Land Requirements

7.2.1 Future Airfield Lands

The Airport Master Plan 2004 included an Airside Development Phasing Plan (Fig. 6.7) incorporating an extension to Runway 06-24, and an elaborate series of taxiways serving all portions of the current and future runway system and current airside lands. The Development Concept (Fig.6.1B) identified an air terminal reserve centered on the existing air terminal location and expanding towards both groundside and airside.

In the likely eventuality that YHM develops into a Secondary Airport for the region, a traffic target of 9.4 million passengers has been projected. A passenger throughput of this magnitude will require considerable runway capacity. The number of runways required at an airport is based on peak periods of utilization under specified weather conditions, usually incorporating anticipated and acceptable levels of delay. As future air services are not known, and the characteristics and operational requirements for airlines transferring to Hamilton from Toronto Pearson are not known, the likelihood of needing a third runway cannot be modeled. A conclusive case cannot be made at this time to justify the expansion of the airfield to include a third runway. Requirements for additional runways vary widely, often because of airline schedules catering to specific markets, and also based on the efficiency of the air traffic control procedures and infrastructure at the airport. For example, Gatwick Airport outside London processed 35 million passengers last year and is the world's busiest single runway airport. Meanwhile Toronto Pearson processed 30 million passengers last year using 5 runways.

Based on a 2-runway configuration, the Hamilton Airport will likely require most of the future taxiway infrastructure contemplated in the 2004 Master Plan by the time the 9.4 million passenger target is achieved.

The existing runway configuration will, with suitable capacity modeling and progressive improvements, likely be capable of development to serve the future traffic levels contemplated without resorting to developing a third runway. Provision will have to be made however to extend Runway 12-30, in addition to extending Runway 06-24. Additional land needs for airfield operations are therefore limited to land for runway extensions.

7.2.2 Future Passenger Terminal Lands

The 9.4 million passengers projected in 2030 is considerably in excess of the 3.6 million passengers contemplated in the 2004 Master Plan and a major new air terminal facility will be required. The key issue of concern to the AEGD Plan is whether sufficient land is available within the current airport boundary to accommodate this growth. It is assumed that the new terminal will likely serve low cost carriers and their clientele which differs in some respects from air terminals catering to network carriers.

The 2004 Master Plan included a 2-phase expansion concept on the current site providing a total of 12 bridged gates, nominally by the year 2014. There are a variety of methodologies available to estimate the number of gates required at an air terminal. Passenger volumes are an important determinant of the number of gates a terminal requires. Some other factors include:

- the seating capacity of the aircraft using the gates;
- the degree to which flight operations peak at an airport;
- average gate occupancies, which depend on scheduling factors;
- gate assignment patterns between carriers, such as common use versus exclusivity;
- international air service concerns, which may force an airport to use certain gates only for domestic, transborder or other international services; and
- the design of bridges and aprons, which may constrain the types of aircraft using certain gates.

These factors complicate any relationship between traffic volumes and the number of gates required. However, when nine major Canadian airports were surveyed and statistically modeled, they displayed a strong relationship between traffic and available gates. A regression of the number of gates on traffic suggested an additional million passengers requires 3.6 gates. This result was highly significant. The model as a whole generated an r-square of .986, reflecting a very strong fit. When applied to YHM's projected 2030 traffic, the model predicted the need for **33 gates** to support **9.4 million passengers**, based on current Canadian experience.

Canadian airports do not achieve the highest levels of gate utilization for a variety of reasons, including the scheduling and behavior patterns of Canada's airlines.

If one were to estimate the number of gates required based on a high efficiency LCC gate utilization scenario, then a lower number could be justified. Considering an average size of aircraft of 140 seats, a 75 percent load factor, and seven departures per gate, YHM could potentially require an air terminal with approximately 18 passenger gates by 2030, a ratio of only 1.9 gates per million passengers. This number appears highly optimistic. Some gates would need to accommodate wide body aircraft up to the size of the current B777-300. The Airport will need domestic, transborder and international gates. While "swing" gates would reduce facility needs, security and inspection service constraints could increase the required number of gates.

Experience at a comparable US airport is worth noting. The new Austin International Airport processes 8.5 million passengers per annum with a new passenger terminal which incorporates 25 gates, a ratio of 2.9 gates per million passengers. And the experience of Luton Airport outside London is even more revealing where some 10 walkout /bus gates supported 9.8 million passengers in 2007, albeit at an extremely low level of service while active construction was ongoing at the time. As a secondary airport, traffic has grown from 3 million over a 10 year period and air terminal development had not kept pace.

The 2004 Master Plan for YHM includes an air terminal concept featuring 12 gates. It would be prudent to allow sufficient land for a future air terminal of approximately three times this size (or approximately 90,000 sq.m.) by the year 2030. This will likely necessitate expanding the air terminal core area northerly, westerly and southerly, potentially occupying not only the general aviation hangars (Nos. 2, 3, 4) but also lands currently occupied by commercial tenants south of Hangar Road over the next 20 years. The ultimate relocation of existing commercial tenants in this zone may generate an additional need for 3 ha. of air cargo related land and 3 ha. of general aviation land within overall new land requirements.

To facilitate Hamilton Airport’s expansion as a Secondary Airport, it is recommended that all land north of Airport Road, south of the runway taxiway system, east of West Cargo Road and west of East Cargo Road be reserved for future air terminal and apron development. This area falls within the existing airport boundary.



All three secondary airports serving London have rail transit available to passengers. . (Source: LPS AVIA)



Groundside access at large secondary airports is simple offer and efficient. . (Source: LPS AVIA)



New air terminals at secondary airports offer low cost facilities with flexible interiors. . (Source: LPS AVIA)



LCC terminals are known for their austere construction and no frills, functionality. . (Source: LPS AVIA)

Parking and groundside access requires a significant amount of land at most airports. In particular, airports supporting low cost carrier operations often provide long term parking for passengers who have driven for considerable distances from an extended catchment area to access a specific low cost carrier. In Canada, passengers have been known to drive up to 6 hours to reach a WestJet point of service for example.



Rapid growth of LCC services at London Luton Airport (10 million passengers 2007) generated extensive demand for new surface parking facilities. . (Source: LPS AVIA)

While specific airport market demographics may vary, a planning ratio of 1 parking stall per 1,000 enplaned/deplaned passengers has been frequently used in Canada. Based on a passenger target of 9.4 million passengers by 2030, **9,400 parking stalls** would be required at YHM. Assuming 30 sq.m. per stall (including lane and access allowances), a land parcel of some 28.2 ha. will be needed to accommodate parking by 2030.

As a point of reference the new Austin International Airport provides 2,419 short term parking spaces and 7,733 economy parking spaces for a total of 10,152 suggesting a ratio of 837 enplaned/deplaned passengers per stall. Projecting Hamilton Airport's parking requirements in 2030 using this ratio results in a requirement for 33.7 ha. of land.

It is recommended that approximately 30 ha. of land be reserved for future airport parking south of Airport Road by the year 2030. This area falls outside the existing airport boundary.

Table 7-1 on the following page illustrates airport passenger traffic, the number bridged gates, airport land area, airport location and the consequent constraints on development for 10 Canadian Airports with over 1 million passengers per annum. Also included in the list are three US airports which currently have traffic levels comparable to the targeted 9.4 million passengers at YHM by 2030. Hamilton Airport's land area appears low in comparison, although some airports are carrying have land reserves for additional runways and/or are located on the edge of urban areas.

Table 7-1 - Typical Airport Land Areas 2009

Canadian Airports	Passengers 1 million+/p.a.	Bridged Gates	Airport Area (ha.)	Airport Location	Expansion Constraints
Toronto	31.5 m.	115	1,792	Urban	Yes
Vancouver	17.5 m.	61	1,340	Urban	Yes
Montreal	12.4 m.	45	1,300	Urban	Yes
Calgary	12.3 m.	34	2,082	Suburban	Limited - urban Parallel runway reserve
Hamilton (2030)	Target 9.4 m.	33	524 + ?	Rural	No AEGD Limited to 2 runways
Edmonton	6.9 m.	16	2,893	Rural	No Parallel runway reserve
Ottawa	4.1 m.	15	2,100	Suburban	Includes excess land parcel + Parallel runway reserve
Winnipeg	3.6 m.	9	1,732	Rural	No
Halifax	3.5 m.	13	950	Rural	Limited –topography
Saskatoon	1.0 m.	5	1,084	Rural	No
Comparable U.S. Airports					
Nashville	9.9 m.	35	1,784	Urban	Limited-urban
Pittsburgh	9.8 m.	76	3,763	Sub-urban	Limited - joint military use Former US Air hub
Houston-Hobby	8.8 m.	25	527	Urban	Yes

7.2.3 Airport Support Lands

The 2004 Master Plan contemplates expanding the **Airport Firehall** and **Maintenance Facility** sites/yards in their current locations and relocating **Ground Support Equipment Facilities** in the vicinity of the air terminal. Neither will require acquisition of additional airport lands.

7.2.4 Air Cargo Facilities Projection

Air freight facilities vary considerably. A single cargo building may house both integrated and general cargo operators. Some integrator terminals perform sorting on-site. Others use off-airport sorting facilities. Some tenants do not require apron access, and could even locate off the airport altogether. Sometimes, an integrator located on the airport will primarily service trucks and low volume shipments.

Terminal demands vary greatly among general cargo carriers, depending on whether they have freighter aircraft docking at the terminal, wide body passenger aircraft, or if they must rely on trucks to access aircraft at more distant airports. Inbound-outbound ratios, the volume of perishables, the mix between international and domestic traffic, loose and pre-palletized, etc. will also affect the scale and configuration of facilities. These considerations mean that there is no “average” terminal to apply to estimate future land requirements at Hamilton Airport as evidenced below:

- At Toronto Pearson Canada’s busiest airport, there are some 23 ha. of aprons devoted solely to air cargo. Other cargo handling facilities, including warehouses, Canada Border Services and facilities for live animals occupy 11 ha. FedEx alone operates a 32,000 sq. m. sorting facility at Toronto Pearson for domestic and transborder shipments.
- At Calgary, Canada’s 4th busiest airport the McCall North Tradepark offers some 13,000 sq.m. of warehouse space, 2,600 sq. m. of office space and a 4.6 ha. dedicated cargo apron.
- The Deerfoot South Tradepark has 48,000 sq.m. of warehouse space, over 3,000 sq. m. of office space and an apron of some 4.6 ha. It primarily serves integrated carriers.
- Purolator’s sorting facility at the Hamilton Airport has a building area of 8,600 sq.m. The parcel of land itself occupies an area of some 2.1 ha. UPS operates a 4,400 sq.m. sorting facility. This installation has an apron of unknown size.

Discussions with the facility operators and carriers at Hamilton considered their long term plans in relation to the AEGD. However, none offered detailed, long range perspectives on their facility needs or outlook at Hamilton. This was likely due to several factors, including the ongoing world-wide retrenchment in the air cargo industry (down by up 30% in some markets) and due to the extremely competitive nature of the industry. Consequently a list of hypothetical projects which the air freight community might consider at Hamilton is presented below:

- Tradeport may wish to attract an **additional sorting facility** for an integrated carrier such as FedEx. The building would occupy 32,000 sq.m. and the apron would occupy an additional 3.2 ha. The total size of the parcel of land would be 9.6 ha.

- **Purolator may expand** its facilities to accommodate growth. It might construct a facility double the size of the current sorting centre. The new development would include 17,000 sq.m. of floor space and an apron of 3.5 ha. on a parcel of 7.7 ha. The apron would be twice the area of the sorting building.
- A **new UPS installation** of 13,000 sq.m. would be constructed. It would have an apron of 5.6 ha. The total footprint would be 8.8 ha.
- Tradeport may wish to attract general cargo services, both by pure freighter aircraft and in the belly holds of passenger flights. Up to **three large cargo terminals** might be developed each of 12,000 sq.m. Each could have an apron of 1.5 ha. Each terminal would have an additional 3,000 sq.m. for vehicle parking and other functions. Total land needs could amount to 3.0 ha. per cargo terminal.
- An investor might construct **two smaller multi-user air cargo centres** including 6,000 sq.m. buildings with 0.75 ha. aprons. Each centre might have 1,500 sq. m. of parking space. Total land needs could be 1.5 ha. to 2.0 ha. per terminal.



Future land requirements for air cargo will be influenced by the increasing size of aircraft serving the airport such as this DC-10 now based in Hamilton by Kelowna Flightcraft. . (Source: LPS AVIA)



CargoJet introduced the first Code D aircraft, a B767, to YHM however the future airport must be able to handle Code E cargo aircraft. . (Source: LPS AVIA)

7.2.5 Air Carrier Facilities Projection

Airline Support facilities typically include hangars, maintenance support facilities, shops, offices, training facilities and ancillary infrastructure depending on the nature of the carrier's operations. Maintenance, repair and overhaul (MRO) facilities are more specialized facilities that cater to advanced aircraft support activities and usually employ significant numbers of skilled workers. For example, Cascade Aerospace operates a large scale MRO facility of 23,000 sq. m. at Abbotsford Airport in B.C.

Among air carriers based at YHM, Kelowna Flightcraft operates a 50,000 square foot hangar. The total area of land occupied and the size of the apron are not known. Cargojet has recently expanded its infrastructure with a 6,000 sq.m. hangar, 1,100 sq.m. of shop space, offices and a parts warehouse, with a 7,000 sq.m. apron.

For purposes of estimating future airport land needs, three hypothetical developments might be realized at YHM by 2030:

- A major **expansion of a locally based carrier** over the next 20 years might be contemplated with for example, a 14,000 sq.m. hangar and an apron of 1.4 ha. With additional facilities and amenities the total tract might have an ultimate area of 4.8 ha.
- A **low cost carrier base** could be established at Hamilton, as is sometimes the case at Secondary Airports, and significant facilities developed. A provisional land estimate of some 10.0 ha. would not be inappropriate to accommodate such a base operation.
- A moderate size **MRO facility** might conceivably locate at YHM including for example, a 10,000 sq.m. building, 2.5 ha. apron and 12,000 sq.m. of parking requiring a land parcel of 5.0 ha.

7.2.6 General Aviation Projections

As Hamilton Airport undergoes major passenger growth and continued air cargo growth, commercial and general aviation will also expand significantly. The facilities which will develop will do so in response to local and regional demand. Based on experience at other larger airports, a list of potential developments can be projected. For the purpose of assessing future land needs at Hamilton Airport, operating as a large Secondary Airport, five sizes of general aviation facilities developments can be considered.

Large FBO / Large GA Operation – This is a large private terminal, hangar and office complex with significant apron areas, large parking lots and typically supports aircraft up to the B737-800 in size. Scheduled charters for sports teams, large corporations, as well as a wide variety of smaller regional size aircraft operations could be accommodated. An FBO is a fixed base operation which typically supports locally based and transient aircraft. By 2030, YHM might conceivably have several of these facilities in operation.

Small GA Operation – A smaller version of the facilities described above, this type of facility could be the home base for a commercial flying training organization, perhaps offering advanced commercial, multi-engine training, and IFR training as well as simulator training. YHM might have two of these types of operations in 2030.

Small FBO - This type of operation supports smaller corporate aircraft and occasionally scheduled charters typically providing services with air taxi (9 seat) or commuter (19 seat) aircraft. The predominant business will support corporate and high-end private aircraft operations and will likely be branded fuel suppliers. Three of these facilities might be in operation by 2030 representing the three primary suppliers of aviation fuel in this market namely: ESSO, Shell and Air BP.

Corporate/Private – Corporations and high end private users frequently develop and maintain their own hangar facilities at airports, prompted by the high value of their assets, a need for security and convenience, and often for privacy. An allowance for at least a dozen of these types of developments over the next 21 years would not be inappropriate.

Recreational – Demand for small aircraft storage by recreational flyers may develop as the airport becomes increasingly active. A modest provision for small aircraft parking and storage for two dozen light recreational aircraft might be inappropriate. As a significant secondary airport, Hamilton will not likely wish to encourage large numbers of light aircraft to be based onsite due to potential conflicts with larger aircraft operations. These types of flyers typically gravitate to local airparks which can accommodate their operations at low cost.



Calgary's Shell Aerocentre is the largest FBO/GA Facility of its type in Canada and is used as a home base for Regional Jet services by energy company aircraft . . . (Source: LPS AVIA)



Ottawa's Shell Aerocentre is an example of a medium size FBO facility, originally developed by LPS Aviation Inc. to support regional turboprop aircraft such as the Dash 8-300. . (Source: LPS AVIA)

7.2.7 Commercial Aviation Land Requirements

Table 7-2 provides typical land area requirements for commercial aviation facilities on airports based on recent experience, in the categories described previously.

Table 7-3 provides a summary of Potential YHM Airside Commercial Land Needs based on the lists of potential developments which may occur at YHM as it grows to become a significant secondary airport to Toronto Pearson International Airport.

Significant additional land is needed to provide the necessary groundside and airside access to the above lands. In particular, requirements for airside taxiways and taxiway strip protection areas will significantly increase the land requirements noted in Table 7-3. **An additional allowance of 60% is recommended in the absence of a development plan for each parcel.**

Table 7-2 - Typical Commercial Aviation Land Requirements*

* Source: LPS AVIA Consulting / LPS Aviation Inc.

Type of Operation	Typical Use	Building Requirements	Airside Requirements	Groundside Requirements	Land Requirement
Maintenance Repair Overhaul MRO	Large Aircraft Maintenance and Overhaul	Hangar, Stores, Shops, Offices, Specialty Facilities (10,000 m ²) 250- 500 employees	15,000 – 25,000 m ² apron	200 - 400 parking stalls	3.0 - 5.0 ha.
Air Cargo	Air Freight Air Courier Air Mail	Warehouse, Office (6,000 -12,000 m ²) 75-150 employees	7,500 - 15,000 m ² apron	50 – 100 parking stalls	2.0 – 3.0 Ha
Large FBO/ Large GA Operation	Scheduled Charters + Corporate Charters	Terminal, Office, Hangar (6,000 m ²) 100 employees	4,700 m ² apron (2 x B738, 1 x B1900D)	250 parking stalls (per major user)	2.0 Ha
Small GA Operation	Casual Charters + Small Sched. Service	Hangar, Office, Flight Lounge (1,500 m ²) 40 employees	3,600 m ² apron (2 x DH83, 1 x B1900D)	100 parking stalls (per major user)	0.75 – 1.0 Ha
Small FBO	Itinerant Support	Hangar, Flight Lounge (1,200 m ²) 20 employees	2,600 m ² apron (1 x FA50, 1 x B1900D, 1 x C208)	30 parking stalls	0.5 Ha
Corporate / Private	Private Hangar	Small Hangar (800 m ²)	1,000 m ² apron (1 x C550)	10 parking stalls	0.5 Ha
Recreational	Small Aircraft Storage	Aircraft Shelter (200 m ²)	400 m ² apron (1 x C172)	5 parking stalls	0.25 Ha

Table 7-3 - Potential YHM Airside Commercial Land Needs

Hypothetical Facility	Buildings	Aprons	Other Land	Total
New FedEx	32,000	32,000	32,000	9.6 ha.
Purolator Doubling	17,000	35,000	25,000	7.7 ha.
UPS Doubling	13,000	56,000	19,000	8.8 ha.
Large General Cargo x 3	Per Table 7-2			9.0 ha.
Small General Cargo x 2	Per Table 7-2			4.0 ha.
Relocation from Core Area				3.0 ha.
Cargo Sub-total				42.1 ha.
Cargojet Airline Doubling	14,000	14,000	20,000	4.8 ha.
One New Airline Base Facility	Equivalent to 2 MRO facilities per Table 7-1			10.0 ha.
Maintenance Repair Overhaul	Per Table 7-2			5.0 ha.
Airline Support Sub-total				19.8 ha.
Large GA Operation x 2 (eg: air charter companies)	Per Table 7-2			5.0 ha.
Small GA Operation x 2 (eg: commercial flying training)	Per Table 7-2			4.0 ha.
Small FBO x 3 (eg: Shell, Esso, Air BP)	Per Table 7-2			1.5 ha.
Corporate / Private x 15 (eg: hangars)	Per Table 7-2			7.5 ha.
Recreational x 24	Per Table 7-2			6.0 ha.
Relocation from Core Area				3.0 ha.
General Aviation Sub-total				27.0 ha.
Total Commercial Aviation Land Requirement Estimate				88.9 ha.

7.2.8 Aggregate Airport Land Needs

The future land needs of Hamilton International Airport are summarized below in Table 7-4.

Table 7-4 - Hamilton Airport Land Projection 2030

	Projected New Req't (Ha)	Additional Airport Land Needs (Ha)	Land Growth Strategy
Airfield Reserve	70	70	<ol style="list-style-type: none"> 1. Expand boundary westerly to accommodate extension of Runway 12-30 including Runway End Safety Area, approach lighting. 2. Expand boundary southerly to accommodate extension of Runway 06-24 including Runway End Safety Area, approach lighting.
Air Terminal Reserve	26	26	<ol style="list-style-type: none"> 1. Expand existing Air Terminal site westerly and southerly displacing old hangars, parking areas, buildings to West cargo Road. 2. Develop major Parking facilities south of Airport Road, and east of East Cargo Road.
Airport Support	8	0	<ol style="list-style-type: none"> 1. Expand Airport Firehall and Maintenance facility sites/yards in current location. 2. Relocate ground support in vicinity of air terminal.
Airport Commercial*	90 x 1.6 =144	114	<ol style="list-style-type: none"> 1. Expand boundary southerly beyond Airport Road to Highway #6 to accommodate Airline Support facilities and MRO facilities. 2. Expand Boundaries of East Cargo Area to accommodate additional Air Cargo facilities 3. Expand boundary westerly towards Glancaster Road to accommodate General Aviation facilities and to segregate traffic by type, size, and operational requirements. 4. Provide commercial reserve east of existing boundary to accommodate overflow from airline and air cargo zones if required.
Total Area	248	210	Note: Airport lands could be further expanded to protect integrity of electronic navigation aids, or appropriate municipal land use restrictions could be used to achieve the same purpose.

* excludes commercial land outside and adjoining northern boundary of airport

7.3 Land Management Strategy

7.3.1 Airport Lands

Figure 7-1 provides an illustration of how the future land needs of the airport may be achieved through modest expansion of the airport boundary on the west, south and east sides. It also complies with the zoning requirements as stated in the “Airport Zoning Preferred Option 3” Report. In comparison to other comparable airports (ref. Table 7-1) Hamilton Airport will, even after this expansion still be one of the smallest airports in its projected class as a secondary airport. The following strategy is used in establishing the suggested land expansion program:

Airfield Reserve – Additional land should be acquired west of the threshold of Runway 12 to accommodate a runway extension with accompanying approach lighting and infrastructure. Similarly, additional land is also required south of the threshold of Runway 06 (across Airport Road) to accommodate extension of this runway.

Air Terminal Reserve – Due to the potentially large size of a future 33 gate air terminal complex, all land north of Airport Road and bounded by the East and West Cargo Roads should be designated for potential air terminal development, in accordance with “highest and best use” principles of airport planning. More detailed studies could be undertaken to identify specific air terminal, apron and access road development concepts to more accurately define potential land use in this area. In addition the Air Terminal Reserve should be expanded southerly across Airport Road to accommodate future airport surface parking facilities, consistent with the practices of secondary airports with large low cost carrier operations.

Airport Support – The airport support reserve will likely require enlargement which can be accommodated within existing boundaries and adjacent to existing operational support facilities.

Airport Commercial – Among the essential strategies in planning successful commercial facilities are the need to provide good airside access, easy and appropriate groundside access for the types of operations, practical land areas easy to develop at moderate cost, consolidation of similar activities to encourage support businesses and services, and compatible land use and operational requirements with neighboring tenants. These factors, among others, have been considered in the following land expansion program:

- Air Cargo development should be expanded through the addition of new lands on the east side of the airport, adjacent to the extent possible, with existing operations. Detailed analysis has shown that land previously considered un-developable in the vicinity of NAV CANADA's RAMP Radar site could in fact be developed, subject to certain technical requirements, as an expanded air cargo zone. Air cargo facilities are relatively low in height and suitable for various site orientations necessitated by the presence of the radar. In addition, existing airport land at the north east corner of the airport property could also be used for this purpose.
- Airline Support facilities development should be expanded on newly acquired lands south of Airport Road and adjacent to the proposed extension of Runway 06-24. These facilities are apt to be larger than air cargo facilities and therefore are preferably located further from the radar site.
- General Aviation facilities should be developed on existing land, and with the acquisition of additional new land, west of Runway 06-24 towards Glanaster Road. This area provides good independent access for tenants and good segregation of smaller aircraft and irregular operations from the larger aircraft operations on the south and east sides of the airport.

7.3.2 Airport Businesses in the AEGD

Many air transportation businesses do not need a location directly on an airport. They do need to locate within a few minute's surface transportation time of an airport. Freight forwarders operate warehouses for processing pickup and delivery vehicles, cargo acceptance, consolidation, buildup of unit load devices and other activities. The loaded airfreight containers move by truck to the airport to be tendered to the airline. The forwarders often do not need a location on the Airport. They frequently move shipments by trucks hundreds of kilometres to large international airports, where they operate consolidation gateways (often off the airport). A location close to a major airport, with useful airfreight capacity, is advantageous.

However, forwarders often locate in industrial areas surrounding an airport where rents are lower. For example, many forwarders serving Toronto have warehouses in Mississauga and transport items to Pearson or other airports (which could include Hamilton) by truck.

Major Chicago forwarders are clustered in Wooddale, northwest of O'Hare, and many Cleveland firms work in Middleberg Heights. Such an operation would be as much a prospect for the AEGD as for the Airport.

Other companies that would consider an off-airport location include hotels, parking and car rental firms. Integrated carriers might develop sorting and consolidation centres some distance from the Airport. They would move air freight containers to and from the Airport by truck.

These interactions suggest that a portion of the AEGD could be assigned to airport-related uses. There would be no simple on-airport/off-airport dichotomy, rather there would be a wide choice of Airport and AEGD land, with several levels of dependence on the Airport. Several specific examples are noted below:

- Airport hotels are typically successful near airports supporting significant amounts of connecting traffic where passengers may overnight to catch connecting flights by other airlines. This is not likely to be the case at Hamilton. As it grows as a secondary airport it is most likely to attract low cost carriers offering same day connecting, and origin-destination services. Modest demand for a small number of hotels may occur to accommodate airline industry needs and on-airport and off-airport businesses.
- Private parking lots frequently spring-up around airports which either have a shortage of parking, or where the prices charged by the airport are considered too high by the consumer. Low cost carrier patrons in particular will seek low cost parking alternatives.
- Car rental firms seek prime competitive locations within the air terminal precinct but may also seek low cost off-airport locations for fleet storage and to perform daily car maintenance and rental support activities.

Lastly it should be noted that AEGD lands bordering the northern boundary of the airport could be ideally situated for businesses wanting to own their land and facilities outright, and are prepared to pay a fee for direct access to the airside operational areas of the airport. An aerospace-related manufacturer might be an example of such a business.

7.4 Future Servicing Commentary

The 2004 Master Plan presents utility and servicing requirements for the airport as contemplated at that time. These will require significant updating as the airport grows. The selected information below is presented as general guidance only on the increased demand which Hamilton Airport will place on the overall municipal servicing infrastructure as the Airport becomes a Secondary Airport to Toronto Pearson and the AEGD is developed. The commentary does not address all the likely servicing requirements and issues which should be investigated as part of a formal engineering services study.

7.4.1 Air Terminal Servicing Issues

As a rough order-of-magnitude estimate, it has been determined that Hamilton Airport may develop as a secondary airport serving a target level of 9.4 million passengers per year by 2030. It may have as many as 33 gates and could have a size of some 90,000 sq.m. Servicing requirements for a public institution of this size may vary significantly depending on the type and quality of the facility and the level of service to be delivered.

The US Department of Energy commissioned a study by the Clean Airports Partnership Inc., published in 2003, which surveyed Energy Consumption in Terminal Buildings at 10 large US airports as of 2001. The results varied greatly and were not necessarily related to climatic conditions, or the age of facilities. The highest winter season natural gas consumption was found to be 14.36 Mbtu/sq.ft. at the older Pittsburg Airport Terminal while electrical consumption varied from a low of 2.52 Kwh/sq.ft. at Portland Airport to a high of 7.03 Kwh/sq.ft. at Washington Dulles Airport.

Based on the wide variations above, energy planning norms for a large Hamilton Air Terminal should be studied in greater detail. Other servicing requirements should follow public institutional practices for similar facilities

7.4.2 General Aviation Servicing Issues

While a detailed Servicing Study should more precisely define the needs for these facilities there are unique requirements which may include, but are not limited to, the following:

- water requirements for a large hangar may be driven by insurance requirements which may dictate the type of sprinkler system to be provided (deluge vs. conventional sprinkler system);
- electrical services for a large FBO / Large GA Operation may include 1,200 A - 347/600V 3P service;
- electrical services for Small GA Operations, Small FBO Operations and Corporate Hangars may include 200 A - 120/208 3P or 400 A - 120/240V 1P services; and
- other specialty requirements.