



May 6, 1993

THE FUTURE OF WORCESTER AIRPORT

EXECUTIVE SUMMARY

In order to determine the future of Worcester Airport, the Research Bureau tried to answer two fundamental questions:

1. Is the potential demand for air service from the Worcester area sufficient to be able to attract regular, reliable service to Worcester Airport?

2. If the demand is sufficient, how can Worcester Airport capture it? In other words, what steps are necessary to provide an airport which offers sufficiently frequent, adequate, and reliable service.

Based on several studies analyzing air travel demand from the Worcester area, the Research Bureau concluded that the potential demand for Worcester Airport is currently over 300,000 enplanements per year, and would increase to well over 400,000 enplanements very early in the next century. In order to capture that demand, however, investments of at least \$26 million would have to be made in existing airport facilities, access routes, and parking facilities. These improvements would overcome some of the difficulties presented by poor weather conditions and access to the Airport, and should result in greater reliability and frequency of flights. Although some of these improvements are eligible for substantial funding from the Federal Aviation Administration (FAA), others are not. If the City, because of its financial constraints is unable to give priority to funding improvements at the Airport, then alternative forms of governing the Airport should be considered. The options include establishing an authority, leasing the facility to Massport or a private company, contracting with a private company for management of the Airport, and selling the Airport to run it as a private facility. The City Manager should hire a consultant to determine which of these options is best to secure the future of Worcester Airport.

INTRODUCTION

Worcester Municipal Airport was established in 1946 as a municipal department to provide general aviation and regular,

reliable commercial air service to the Worcester community. Since FY90, the Airport has been operated on an enterprise account, requiring that its expenditures be covered by its own revenues. The enterprise account was established in order to avoid tax levy subsidies of the Airport during this period of serious financial constraints on the City resulting from Proposition 2 1/2 and declining local aid from the state, since tax levy revenues are needed to support vital services such as public schools and public safety. The Airport, however, has not been self-supporting: during the years under study, FY87-FY92, its expenditures have exceeded its revenues. In FY92, for example, expenditures of \$1.7 million exceeded revenues by \$325,000. Moreover, even with the tax levy subsidy, the City has not been able to support the expenditures necessary for a strong Airport program, such as access improvements or a marketing program.

Yet Worcester Airport is vital to the City's future. According to David Forsberg, the City's Chief Development Officer, "Worcester Airport is an important, if not a critical, ingredient to the economic development of downtown and elsewhere in the City. The type of industries and businesses we are interested in attracting, those related to the medical and bio-tech fields, for example, are time-sensitive and require good access to air transportation. A successful Convention Center will also depend, in part, on convenient air travel. Therefore, aviation is an important element in a balanced transportation system for the City that links us to the rest of the world."

Air travel is no less important to the well-being of the City's colleges and universities. According to WPI's President, Jon Strauss, "Air service is essential to attracting the best students from geographically diverse regions as well as outstanding faculty whose research and professional development frequently require links to colleagues in distant parts of the country and, not uncommonly, throughout the world."

Recognition of the Airport's importance to the City, however, does not ensure its future. This will depend on improvements to existing facilities, which should lead to an increase in air service, passengers, and revenue. Two basic questions must be answered in order to determine the future of Worcester Airport:

1. Is the potential demand for air service from the Worcester area sufficient to be able to attract regular, reliable service to Worcester Airport?
2. If the demand is sufficient, how can Worcester Airport capture it? In other words, what steps are necessary to provide an airport which offers sufficiently frequent, adequate, and reliable service?

AIRPORT CHARACTERISTICS

A. Airfield

Worcester Municipal Airport is situated on Airport Hill, 4 miles from downtown Worcester. It occupies 1,200 acres, 700 of which contain the airfield itself. The airfield has two runways: Runway 11-29, 7,000 feet long, and Runway 15-33, 5,500 feet long. The largest commercial aircraft the field can accommodate is a Boeing 767 or DC-8 seating about 190 and 250 passengers, respectively. (A more typical aircraft for an airport of Worcester's size is the Boeing 737-200 jet averaging 90-100 seats.) Because of the Airport's topography, runways cannot be expanded nor is there a need to do so to accommodate aircraft that serve Worcester Airport. Runway 11 is equipped with a Category I Instrument Landing System (ILS) which allows aircraft to land when the ceiling (height of the lowest layer of clouds above the earth's surface) is at or above 300 feet and visibility is reported at or above three-quarters of a mile. The FAA, which installs and maintains the ILS, has commissioned a second Category I ILS on Runway 29, which will increase the airfield's safety and operational reliability.

A Category II ILS, which allows commercial carriers to land when the visibility is as low as one-quarter mile, would be highly desirable to reduce the number of flight cancellations and diversions due to poor weather conditions. In order for the FAA to fund the installation of a Category II ILS, however, an airport must meet a number of qualifications. These include 2,500 air carrier instrument approaches annually for three consecutive fiscal years. In 1991, Worcester had only 244 ILS landings. Because of the additional ILS on Runway 29, there will be an increase in the number of ILS landings in the future.

There are several other airfield improvements that are planned for the immediate future:

1. The airfield is scheduled to get an Automated Surface Observing System (ASOS) in FY94. This is installed by the National Weather Service to provide automated observations of weather conditions.
2. The FAA will fund and construct a new tower in FY94. The Airport Commission has recommended a site at the north end of the airfield to provide air traffic controllers with a less congested location and excellent field visibility.
3. The Airport will install guidance signs on the airfield in FY94, as mandated by the FAA. The cost is \$700,000.

B. Terminal

The present terminal building was completed in 1952, and is scheduled to be demolished when the new terminal opens by the fall of 1993. The new terminal covers 67,000 square feet, making it more than three times larger than the old one. It has separate entrances and areas for arriving and departing passengers. It was designed with the capacity to expand to handle 500,000 enplaning passengers per annum. It will have two baggage carousels, giving it capacity for four times more baggage handling than the old terminal. There are holding areas for passengers after they have checked in, and enough counters for five air carriers and four car rental agencies. The tenant space is six times larger than in the old terminal, with capacity for a full-service restaurant, a news/gift shop, and other specialty concessions as well as an ATM. Airside, the new terminal will have capacity for four jetways (loading bridges) and two commuter gates.

C. Passenger Air Service

Five years ago, Worcester Airport was served by six carriers: Piedmont, USAir, Continental, Eastern Express, Northwest, and Presidential, three of which are no longer in business. For the last three years, Worcester Airport has been served by USAir, USAir Express and Continental Express. Until May 1, there were 15 departures daily, with nonstop service to LaGuardia, Newark, Philadelphia and Pittsburgh. After May 1, there will be 14 departures daily. USAir Express will provide turboprop service to LaGuardia and Philadelphia: four departures daily to each of these airports. Continental Express is expected to maintain four turboprop flights to Newark. The Florida Shuttle, a public charter, which began no-frills service in March, offers one daily round trip to West Palm Beach, Florida via Hartford. Skybus, a second public charter, began offering similar service in late March to Tampa/St. Petersburg and Fort Lauderdale via Newark.

D. Cargo Terminal

Four years ago, Euro-American Air Freight constructed a cargo terminal with 45,000 square feet of warehouse space and 10,000 square feet of office space. Airside, the building has three 22-foot-high bays, which can accommodate unloading cargo from three Boeing 727's. Landside, there are ten truck bays. Currently, the building is used only as a long-term storage facility rather than as a transfer point for goods regularly being moved in and out by truck.

According to Euro-American Air Freight management, certain cargo carriers, whose cargo is time-sensitive, (e.g., overnight package delivery services) will not consider using an airport that does not have a Category II ILS. Reliability of service is critical:

if a plane cannot land, the company's truckers would have to drive to another airport to pick up the cargo. Since the U.S. Postal Service opened its plant in Shrewsbury, all mail from the area is trucked to Logan Airport. According to postal employees, that decision was based on the lack of nonstop flights from Worcester to East Coast destinations, and the lack of reliability of flights due to weather conditions. Thus, the only cargo at Worcester Airport consists of small packages that are loaded on commercial flights.

According to officials of the Air Transport Association, Worcester has one of the highest percentages of low visibility (Category II) weather in New England. Euro-American officials believe, however, that with a category II ILS, Worcester Airport would be attractive to "small package express" carriers for the following reasons:

1. There is much less airport congestion than Boston, so that carriers can arrive and depart at will, rather than being limited to fixed time slots.
2. There is a cargo apron which is adjacent to both the runways and the cargo terminal for easy unloading.
3. Worcester's central location in New England makes it attractive for distribution purposes.

E. Ground Transit

1. There is no Worcester Regional Transit Authority (WRTA) service to Worcester Airport. The closest bus route ends on Pleasant Street at the turnoff for Worcester Airport.
2. There is cab and limousine service to the airport.
3. There are three car rental agencies located in the terminal building and 40 parking spaces for storage of ready rental cars. Only National Car Rental has facilities at the Airport for washing and refueling cars and making minor repairs. Avis and Hertz store additional cars and make all repairs at their distribution centers in Boston. Refueling is done at local gas stations.

F. Parking

There are currently 348 surface parking spaces. After the terminal is completed, there will be 560 surface parking spaces. There will not be any covered parking. The parking fee is \$7 per day. Logan Airport charges \$13 for the first day, \$11 for the second day and a maximum of \$50 per week. Manchester Airport charges \$4.50 per day. Green Airport in Providence charges \$9.50 per day or \$27.50 per week for outdoor parking, and Bradley

Airport charges \$14 per day or \$39 per week:

Weekly Parking Charges

Logan	\$50
Worcester	\$49
Bradley	\$39
Manchester	\$31.50
Providence	\$27.50

G. Ground Access

There are currently three main approaches to Worcester Airport from the Interstate highway system:

1. Lincoln Square, Highland Street, Pleasant Street, Airport Drive.
2. Madison Street, Chandler Street, Mill Street, Airport Drive.
3. Auburn Interchange (Mass. Pike), Oxford Street, Pinehurst Street, South Ludlow Street, James Street, Stafford Street, Main Street, Curtis Parkway, Goddard Memorial Drive.

According to the 1988 terminal development study prepared by Edwards and Kelcey, the Airport's engineering consultants, the existing streets were adequate to meet the airport demand at that time. The study cited the need for improvements to these streets based not on growth in Airport demand but on projected "regional growth." This growth is caused by population increase and land use changes such as business and residential development, and the changing business and residential patterns both within the City and the surrounding region, independent of any changes at the Airport. According to the study, any increase in traffic generated by additional airport usage under a maximum airport growth scenario would be less than 5% of the total expected highway traffic growth on these access routes. Therefore, increases in traffic generated by an increase in demand at the Airport would not be of sufficient magnitude to require significant highway improvements. The report concluded, however, that improved access from the interstate highway system would be desirable.

H. Airport Administration and Finance

Worcester Municipal Airport is a department of the City operating under Chapter 90, Section 51J of the Massachusetts General Laws. The department is run by a seven-member volunteer commission

appointed by the City Manager for three-year terms. The City Manager also appoints an Airport Director upon recommendation by the Airport Commission. The Commission is responsible for setting policy for the Airport, including promulgating rules and regulations for the use of Worcester Airport, and selling or leasing land that is part of Airport property. The Airport Director is the chief operations officer of the Airport, and as such, is responsible for the day-to-day administration of the Airport. The Director is responsible to both the Airport Commission and the City Manager.

Since FY90, Worcester Airport has been operating on an enterprise account, which means that its revenues are supposed to meet or exceed its expenditures so that the operation is self-supporting and does not require tax levy subsidy. When a municipal department is on an enterprise account, all employee fringe benefits and services provided by other departments like data processing and auditing are charged to the enterprise account. As Table A indicates, there has been no year in the last six when Airport revenues exceeded expenditures, and only two years when there was a positive fund balance at the end of the year due to the transfer of General Fund revenues from land sales at the Airport Industrial Park. During the last six years, about \$1.8 million was transferred from the General Fund to subsidize Worcester Airport.

The Airport currently has 20 employees who are responsible for the parking facilities as well as airport operations. At present, there are only two custodians to clean the entire terminal. Airport staff can provide only the minimum level of service to carriers or to the traveling public that is required by state and federal regulations. There is no staff specifically assigned to marketing the facility.

WHAT IS THE DEMAND FOR WORCESTER AIRPORT?

Since 1958, the history of airline service at Worcester Airport and the ensuing number of enplanements¹ per year has been very uneven (see Appendix A). In 1982, enplanements were at a record low of 8,630. In 1989, enplanements reached a record high of 177,861. By 1992, enplanements had dropped by 39% from that peak to 109,114. Over the years, the number of commercial air carriers has ranged from 1 to 6.

According to the 1988 Edwards and Kelcey study prepared in connection with the development of the new terminal, the ups and downs of Worcester Airport have been the result, in part, of swings in the national economy, the 1978 Airline Deregulation

¹ Enplanements represent the number of passengers getting on planes, or about half the total passengers served by the airport.

TABLE A

AIRPORT ENTERPRISE FUND
STATEMENT OF REVENUES AND EXPENDITURES
BUDGET AND ACTUAL (BUDGETARY BASIS)
LAST SIX FISCAL YEARS

	1987	1988	1989	1990 (1)	1991	1992
REVENUES:						
AIRFIELD	\$160,698	\$197,924	\$258,553	\$309,570	\$235,576	\$251,578
AIRFIELD SUPPORT	176,130	156,261	189,471	172,014	160,693	125,364
TERMINAL BUILDING (2)	128,772	158,650	431,947	942,761	885,059	883,049
MISCELLANEOUS	79,161	61,916	65,691	96,769	117,778	126,817
TOTAL REVENUES	544,761	574,751	945,662	1,521,114	1,399,106	1,386,808
EXPENDITURES:						
SALARIES	406,393	468,055	512,785	581,951	612,875	646,879
ORDINARY MAINTENANCE	236,365	274,593	631,545	661,086	709,474	408,518
CAPITAL ACQUISITION	151,544	471,795	46,353	133,521	2,007	
DEBT SERVICE	41,485			28,933	333,703	307,687
FRINGE BENEFITS	115,852	150,618	151,282	158,495	200,974	305,120
INDIRECT COSTS	25,000	25,000	25,000	28,233	43,663	43,631
TOTAL EXPENDITURES	976,639	1,390,061	1,366,965	1,592,219	1,902,696	1,711,835
EXCESS (DEFICIENCY) OF REVENUES OVER EXPENDITURES	(431,878)	(815,310)	(421,303)	(71,105)	(503,590)	(325,027)
OTHER FINANCING SOURCES (USES):						
TRANSFER FROM GENERAL FUND	431,878	558,810	522,906		175,000	100,883
TRANSFER FROM RESERVE REVENUE					102,965	
LAND SALES		256,500		198,693		
	431,878	815,310	522,906	198,693	277,965	100,883
EXCESS (DEFICIENCY) OF REVENUE AND OTHER FINANCING SOURCES OVER EXPENDITURES	0	0	101,603	127,588	(328,590)	(224,144)
BEGINNING FUND BALANCE (DEFICIT)				101,603	229,191	(99,399)
ENDING FUND BALANCE	\$0	\$0	\$101,603	\$229,191	(\$99,399)	(\$323,543)

(1) FIRST YEAR OF ENTERPRISE ACCOUNT

(2) INCREASE IN REVENUES IN 1990 REPRESENTS PARKING FEES

SOURCE: AUDITOR'S OFFICE, CITY OF WORCESTER

PREPARED BY: WORCESTER MUNICIPAL RESEARCH BUREAU

Act, the nature of airlines like Mohawk and Northeast and their successors that served the area, and airline scheduling policies. But Worcester Airport traffic levels did not always reflect national economic trends. For example, during the recession of the late 1970's, enplanements were increasing. Although national trends affect the overall demand for air travel, the ability to capture local market demand is strongly affected by conditions at the Airport such as the availability and reliability of flights. While the number of passengers using Worcester Airport has been declining since 1989, comparable declines have not occurred at other small airports in the Northeast. New England's regional airports as a group gained 4.1% in enplanements between 1991-1992. Since 1985, Manchester Airport's enplanements have increased sixfold. Table B indicates a decrease in the number of passengers at New York's major airports since 1985 and a dramatic increase in passengers at smaller airports such as MacArthur (Islip, Long Island), Westchester County (White Plains, N.Y.), Bridgeport, and Stewart (New Windsor, N.Y.).

AIRPORT	NEW YORK AREA AIRPORTS		PERCENT CHANGE '85 TO '91
	ARRIVING/DEPARTING AIRLINE PASSENGERS		
	1985	1991	
KENNEDY	28,900,000	26,300,000	- 9.0
NEWARK	28,600,000	22,300,000	- 22.0
LA GUARDIA	20,500,000	19,700,000	- 3.9
MacARTHUR	800,000	1,600,000	+100.0
STEWART*		800,000	-
WESTCHESTER COUNTY	400,000	750,000	+ 87.5
SIKORSKY-BRIDGEPORT	66,000	130,000	+ 97.0

* COMMERCIAL SERVICE BEGAN IN 1990

SOURCES: FEDERAL AVIATION ADMINISTRATION; NEW YORK PORT
AUTHORITY (AS CITED IN THE NEW YORK TIMES)

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According to the New York Times (September 27, 1992), these smaller airports are growing because they offer daily flights to most East Coast cities and hub airports for virtually all major airlines. Passengers flying from these airports prefer their convenient location (avoiding long commutes), less expensive parking, and reduced air traffic congestion (avoiding the long runway delays characteristic of large airports). But commercial service at these smaller airports is limited compared to that provided at their larger counterparts. These small airports are usually served by smaller jets like Boeing 737's, and most of the flights are on turboprops seating 30 to 50 passengers.

Is there potential demand for expanded regional air service in Central Massachusetts? Can this demand be served by or attracted to Worcester Airport? Will this demand increase as the construction of the Central Artery/Tunnel Project in Boston

produces additional delays for commuters from west of Boston trying to reach Logan Airport?

A survey conducted in connection with the 1988 Edwards and Kelcey study discovered that each passenger flying out of Worcester also made an average of 1.7 additional flights out of other airports. If all these flights had been made out of Worcester, then the total number of enplanements at Worcester in 1987 would have been $108,623 + (1.7 \times 108,623)$ or 293,300. This estimate is within 10% of the 305,000 enplanements predicted for the Worcester area by Massport in its 1984 study. Therefore, a reasonable measure of Worcester Airport's total 1987 passenger market potential would be about 300,000 enplanements. The potential demand for air travel from the Worcester area, however, is different from the one that Worcester Airport could actually capture.

In 1984, 18,228 passengers enplaned at Worcester Airport, or only 7.7% of the estimated potential. This percentage rose to 37.7% in 1987. Since the frequency and number of destinations accessible directly from Logan will never be matched at Worcester, a 100% capture of the market will not be possible. However, based on the experience recorded by Edwards & Kelcey of other nearby smaller airports, the study concluded that Worcester Airport's market capture might approach 50%.

After studying the demographics of the Worcester Airport market and factors which might inhibit or promote growth of that market, the Edwards and Kelcey study forecasted that enplanements would reach 195,000 by 1990 and 460,000 by 2010. It is important to note, however, that since this study was conducted, overall demand for air travel nationally leveled off for several years. Therefore, it would be appropriate to add a 3-5 year delay to the Edwards & Kelcey projections.

Numbers similar to those of the Edwards and Kelcey study regarding unconstrained demand (no limitations on serving demand such as frequency or availability of flights) for air travel in the Worcester area and Worcester Airport's market potential are now being generated by the Massachusetts Aeronautics Commission's Strategic Assessment Report (SAR). The purpose of this study is to review the need for a second major airport in Massachusetts by ascertaining the long-term needs for inter-regional and international air service from Massachusetts, and to determine the appropriate role for the Commonwealth's aviation system in relation to alternative means of transportation, such as high-speed rail, in meeting these travel needs. The Research Bureau staff defined Worcester Airport's market as the area within a half-hour's drive from the Airport (Table C lists the towns included in that driving time). Based on an analysis of the demographics of those towns, including population and employment projections and per capita income, the SAR consultants

TABLE C

2010 DOMESTIC O&D FORECAST
WORCESTER, MA AREA

RESEARCH BUREAU FORECAST: WORCESTER AIRPORT CATCHMENT AREA (1/2 HR. DRIVING)			SAR FORECAST: WORCESTER AREA		
MUNICIPALITY	POPULATION (1990)	UNCONSTRAINED DEMAND (2010)*	MUNICIPALITY	POPULATION (1990)	UNCONSTRAINED DEMAND (2010)*
AUBURN	15,005	42,502	ASHBURNHAM	5,433	23,570
BARRE	4,546	12,235	ASHBY	2,717	11,211
BERLIN	2,293	8,642	ATHOL	11,451	19,638
BOYLSTON	3,134	18,612	GARDNER	20,125	38,761
BROOKFIELD	2,968	8,838	HARDWICK	2,385	5,055
CHARLTON	9,576	35,634	MILLVILLE	2,236	29,505
CLINTON	13,222	32,300	NORTHBRIDGE	13,371	27,258
DOUGLAS	5,438	18,872	PETERSHAM	1,131	2,440
DUDLEY	9,540	20,083	PHILLIPSTON	1,485	2,285
EAST BROOKFIELD	2,033	1,436	ROYALSTON	1,114	1,820
FITCHBURG	41,194	50,841	SOUTHBRIDGE	17,816	15,958
HOLDEN	14,628	53,187	STURBRIDGE	7,775	38,439
HUBBARDSTON	2,797	15,798	TEMPLETON	6,438	14,001
LANCASTER	6,661	20,208	UPTON	4,667	15,456
LEICESTER	10,191	28,735	WARREN	4,437	12,789
LEOMINISTER	38,145	79,213	WEST BROOKFIELD	3,532	15,789
LUNENBURG	9,117	30,268	WESTMINSTER	6,191	19,825
MILLBURY	12,228	31,517	WINCHENDON	8,805	18,078
NEW BRAINTREE	881	1,490			
NORTHBORO	11,929	88,698	TOTAL	121,109	311,878
NORTH BROOKFIELD	4,708	6,374			
OAKHAM	1,503	3,032			
OXFORD	12,588	48,775			
PAXTON	4,047	20,368			
PRINCETON	3,189	23,805			
RUTLAND	4,936	13,191			
SHREWSBURY	24,146	84,000			
SPENCER	11,645	33,999			
STERLING	6,481	34,613			
SUTTON	6,824	34,328			
WEBSTER	16,196	30,886			
WESTBORO	14,133	163,988			
WEST BOYLSTON	6,611	16,035			
WEST BROOKFIELD	3,532	15,789			
WORCESTER	169,759	270,469			
TOTAL	505,824	1,398,761	TOTAL	626,933	1,710,639

* PRELIMINARY ESTIMATES

SOURCE: LANDRUM AND BROWN, INC., CHICAGO

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estimated that the unconstrained demand for air travel from these towns would be about 1.4 million trips per year, or 700,000 enplanements, by 2010. Assuming that Worcester Airport will capture only 50% of the market, that would mean approximately 350,000 enplanements per year. In their own estimates, however, the SAR consultants included a number of additional communities when defining the Worcester area market (see Table C for additional towns). When those additional communities are included, the unconstrained demand for air travel from this area is 1.7 million trips per year, or 850,000 enplanements, in 2010. Again, assuming capture of about 50% of the market demand, Worcester Airport could have up to 425,000 enplanements in 2010. This figure approximates the data in the Edwards and Kelcey study when the delay in their projections is included. Since population in this area is expected to increase by less than 10% between 1990 and 2010, the current potential demand for air travel from the Worcester area is probably only about 10% less than what is projected for 2010. Whether one uses the Research Bureau's more conservative estimate of Worcester Airport's market or the more expansive definition of the SAR consultants, the potential demand for Worcester Airport is at least three times greater than the 109,000 enplanements that occurred in 1992.

If Worcester Airport had 400,000 enplanements per year or 1,100 enplanements per day, what would be the extent of air traffic? With a 60% load factor (percentage of seats filled to actual capacity of aircraft), there would be about 1,760 departing seats each day. If, for example, Worcester Airport were served by small jets averaging 100 seats and commuter aircraft averaging 35 seats, there would be a need for about 10 jet departures and 25 commuter flights per day for a total of 35 departures.

PROBLEMS CONFRONTING WORCESTER AIRPORT

What seems to prevent Worcester Airport from capturing a greater share of this demand for air service in the Worcester area?

1. Unreliability of scheduled flights due to weather conditions

Service to the Airport suffers as a result of a high incident rate of poor visibility and ceilings. Fog is a significant operational problem at Worcester Airport. Rapidly moving weather systems occasionally cause abrupt zero-zero conditions (zero visibility and zero ceiling) following a sharp wind shift and a drop in temperatures. According to airline officials, climatological summaries for the New England area indicate that fog prevents 45-90 scheduled late-evening arrivals per year from taking place.

Although Airport records for 1992 indicate that during the summer months very few flights were cancelled, this is not the case during a good part of the year. For example, in November, 1992,

15% of scheduled flights were cancelled. During December, cancellations climbed to 31% as a result of a record-breaking storm, and in February, 1993, the percentage of cancellations was 14% (see Table D).

TABLE D	CANCELLATIONS DUE TO ORH WEATHER		
	TOTAL SCHEDULED FLIGHTS	TOTAL CANCELLED FLIGHTS	PERCENTAGE
NOVEMBER 1991	420	22	5.2%
DECEMBER "	412	15	3.6%
JANUARY 1992	382	24	6.3%
FEBRUARY	374	12	3.2%
MARCH	408	26	6.4%
APRIL	319	5	1.6%
MAY	415	5	1.2%
JUNE	403	2	0.5%
JULY	420	4	1.0%
AUGUST	412	4	1.0%
SEPTEMBER	402	12	1.3%
OCTOBER	402	15	3.7%
NOVEMBER	371	56	15.0%
DECEMBER	268	83	31.0%
JANUARY 1993	336	31	4.0%
FEBRUARY	344	48	14.0%

SOURCE: WORCESTER AIRPORT
 PREPARED BY: WORCESTER MUNICIPAL RESEARCH BUREAU

A random survey of Worcester area travel agents responsible for corporate travel bookings and arrangements for frequent travelers confirms there is a perception of an unacceptably high number of flight cancellations due to weather (see Appendix B for travel agents surveyed). Passengers whose flights have been cancelled or diverted due to poor weather conditions are reluctant to use Worcester Airport again. As noted earlier in the report, cargo carriers are reluctant to use Worcester Airport for similar reasons.

2. Lack of flights

After May 1, Worcester Airport will have fourteen daily departures by four carriers serving seven destinations: four nonstop flights to LaGuardia, Newark and Philadelphia, and one flight each to West Palm Beach via Hartford, and Fort Lauderdale and Tampa/St. Petersburg via Newark. This schedule stands in contrast with Manchester Airport, which has 66 departures each day by nine airlines serving eleven destinations including Boston, Chicago, Hartford, Newark, LaGuardia, Kennedy, Philadelphia, Pittsburgh, Portland, Syracuse, and Washington, D.C. In brief, Worcester lacks both frequency of flights and variety of destinations. This situation is exacerbated by flight

cancellations. Under the present schedule, if a flight is cancelled due to weather conditions, a passenger may have to wait hours or even overnight for the next flight to the same destination. According to the Research Bureau survey of travel agents, the lack of options discourages people from utilizing Worcester Airport, especially if their schedules are unable to accommodate long delays.

3. Higher price of tickets from Worcester Airport compared with other area airports to the same destinations

Airlines seem to have two fundamental operating strategies, one for small, non-competitive markets and the other for larger competitive markets. In the competitive markets, they compete vigorously, matching fares and promoting their service. In small, isolated markets where there is no other carrier, they seem to price their service as a monopoly operation. Airlines apparently use the "small market" strategy at Worcester Airport for pricing and promotion. Many travelers report being quoted significantly higher fares to travel from Worcester than from Logan, Green, and Bradley to the same destinations. This strategy in all probability hurts the load factors in Worcester. Since Worcester is not an isolated market, but is actually competing with Logan, Bradley, and Green, the "small market" strategy does not seem justifiable.

4. Lack of information about Worcester Airport

Worcester Airport has no budget to market the facility. Without funds to promote use of the Airport, Worcester is at a serious competitive disadvantage. Last fall, Bradley International Airport posted numerous billboards in the Worcester area in the hope of attracting additional passengers, even though its marketing survey indicated that only 1.4% of its passengers came from Worcester and its immediate environs. Although Worcester Airport is not competing with the Manchester market, it is interesting to note that Manchester Airport is spending \$250,000 a year to encourage passengers to take advantage of its convenience, inexpensive parking (half the cost of Logan) and parking security (compared to Logan). In some cases, state governments are assisting airports with their marketing efforts. For example, the Michigan Department of Transportation is providing grants for marketing purposes to airports with fewer than 150,000 enplanements.

5. Difficulty in getting to Worcester Airport

Users of Worcester Airport and local travel agents agree that the routes to Worcester Airport are not well-marked. The signs are small and difficult to follow and lack a distinctive logo. The signs do not appear far enough away from the Airport, for example, at the I-290 connection of the Massachusetts Turnpike.

According to some travel agents, routes are not "user-friendly" to the passenger not already familiar with the Airport's location.

6. Lack of covered parking

Winter weather conditions in New England indicate the desirability of having a covered parking garage. Both Logan and Green Airport have such facilities for long-term parking for which they charge more than their outdoor parking facilities.

7. Noise impact from Airport

There is a perception that noise from Worcester Airport will prevent its full development as a regional airport because of its proximity to residential housing. Studies indicate that this is not the case. In 1991, the City of Worcester undertook a Noise Compatibility Study and developed a Noise Compatibility Program for Worcester Airport which is still awaiting FAA approval. The program consists of a number of operational changes and land-use restrictions designed to minimize the impact of noise on the area surrounding the Airport. The study plotted noise-level contours based on the level of traffic in 1989 and for the projected level of traffic at the Airport in 1994. The 1994 projected noise contours were based on full implementation of the recommended Noise Compatibility Program. The impacted areas were then analyzed to determine the area and population affected. The results are shown on Table E.

TABLE E

	OFF - AIRPORT NOISE IMPACT STUDY					
	1989			1994		
	60-65 Ldn*	65-70 Ldn	70+ Ldn	60-65 Ldn	65-70 Ldn	70+ Ldn
AREA (acres)	460	50	0	1094	337	7
DWELLING UNITS	23	0	0	216	1	0
POPULATION	60	0	0	571	3	0

* Ldn=DAY-NIGHT AVERAGE SOUND LEVEL WAS DEVELOPED AS A SINGLE NUMBER MEASUREMENT OF COMMUNITY NOISE EXPOSURE IN AIRCRAFT, NOISE MEASUREMENT Ldn REPRESENTS ALL OF THE SOUND PRESSURE PRESENT IN A 24 HOUR PERIOD INCLUDING TIMES WHEN AIRCRAFT ARE BUSY AND TIMES WHEN THEY ARE NOT BUSY.

The Advisory Committee for the study, which was composed of representatives of public agencies, businesses, and citizens was instrumental in evaluating noise mitigation measures that would minimize the impact of air traffic-related noise on the community. The final report indicates that when the Noise Compatibility Program is fully implemented following FAA approval, only one dwelling unit would be affected by Ldn greater than 65, in other words, an unacceptable noise level, and that

dwelling unit may be eligible for an FAA-subsidized soundproofing program. In addition, it should be noted that the introduction of aircraft equipped with Stage 3 engines will mitigate substantially the noise impact from airplanes.

PROPOSALS TO ADDRESS THE PROBLEMS OF WORCESTER AIRPORT

There are a number of steps that should be taken to address the difficulties listed above. This package of proposals should provide the necessary conditions to bring more flights to Worcester Airport so that the facility can begin to meet the potential demand for service in the Worcester area. These proposals are discussed in order of their relative priority.

A. Suggestions for improving reliability of service

1. Center Line Lighting and Touchdown Zone Lighting

According to airport officials, center-line lighting for Runway 11-29, that is, in-ground lighting down the center of the runway, and touchdown zone lighting are included in the five-year capital improvement plan for Worcester Airport. This system is necessary as a visual reference for take-off and landing during low visibility conditions, and would reduce the number of delays and cancellations caused by poor visibility. Runway center line lights and touchdown zone lights alone do not reduce landing minimums. However, they are a requirement for Category II operations. The cost is about \$1.2 million, for which the Airport is responsible. (Other requirements for a Category II ILS are a runway visual range and an upgrade of the approach lights.)

2. Category II ILS

Category II would replace the Category I ILS currently in place on Runway 11 at the airport. It would allow aircraft to land when visibility is as low as 1,200 feet and to take off when visibility is as low as 600 feet. According to FAA officials, a Category II ILS should reduce delays and cancellations by 50%. The cost of installing the complete system, which would be entirely borne by the FAA, is \$2-2.5 million. In addition, there are yearly maintenance costs of the lighting system, which must be borne by the City.

As noted earlier, Worcester Airport has not been able to qualify for this upgrade due to the presently limited number of ILS landings. Since this situation is unlikely to change in the foreseeable future, the City should request the FAA to waive the minimum-number requirements, especially if the State decides not to build a second major airport and opts to make better use of regional airports as part of its overall transportation policy.

If the FAA still holds that Worcester Airport is not eligible for FAA funds, the City should consider paying the total cost of the Category II ILS. In addition to increasing the reliability of landing commercial flights, having a Category II ILS is apparently the only way of attracting regularly scheduled cargo flights. (Hence, a Category II ILS may pay for itself in the long run.)

3. Parallel Taxiway

Under the current configuration, aircraft landing on Runway 29 must back-taxi to get to the gate to deplane passengers. A taxiway running parallel to Runway 29 would allow aircraft to taxi to or from the terminal without interfering with aircraft using the runway, thus increasing safety and efficiency. Less time would be needed between operations, allowing for an increase in the number of flights scheduled. According to Airport officials, the estimated cost of a parallel taxiway is \$9.4 million. The FAA would pay for 90% of the costs.

4. Tree Clearance and Monitoring Land Use

There are high trees at the approach end to Runway 11. It is the responsibility of the Airport to keep these cut down so that the FAA does not increase the landing minimums, which might result in additional flight cancellations. The City must also continue to monitor land use near the Airport to ensure its compatibility with Airport purposes.

5. Fencing to Secure Airport

Since the Airport is surrounded by wooded area, it is important to enclose the area with fences for security purposes and to ensure that animals cannot obstruct the runway and interfere with operations. The cost of 3-4 miles of perimeter fencing is estimated at \$500,000 by Airport officials, and is the responsibility of the Airport.

6. Reconstruction of Apron

In order to allow for proper drainage, which is especially critical during bad weather, the apron (the paved area adjacent to the terminal where aircraft are parked for loading and unloading) needs to be reconstructed. The estimated cost by Airport officials is \$2.2 million. The project is eligible for 90% funding by FAA.

7. Reconstruction of Runway 15-33

Runway 15-33 is more than 20 years old, and according to Airport officials, should be reconstructed. They estimate this would cost about \$2 million. Overlay coating, costing about \$30,000,

could be used as an interim measure. This project is eligible for 90% funding by FAA.

B. Suggestions for Attracting Air Service and Passengers

1. Marketing program.

The Airport needs to develop an intensive marketing program, in conjunction with the airlines, to persuade potential passengers that the improvements currently being made and those planned will provide many advantages to using Worcester Airport. The studies previously cited indicate that the potential demand for air service within Worcester Airport's catchment area is substantial. If the Airport makes the capital improvements necessary to overcome the problems noted, and combines that with a marketing effort, more passengers should be attracted and the airlines should increase their service.

2. Cooperative business ventures with airlines

In order to attract airlines, the Airport should enter into cooperative ventures with airlines whereby their rent is based on a dollar amount per passenger or a percentage of the ticket price for flights originating in Worcester. To attract concessionaires, the Airport should enter into short-term lease agreements charging minimal rent plus a percentage of revenues. (If it is necessary for the Airport to provide subsidies initially in order to attract airlines and concessionaires, and the Airport, as a municipal department, is not in a position to do so, then the City needs to consider alternative forms of ownership/management of the Airport.) These kinds of cooperative ventures have been successful elsewhere. In Michigan, for example, the State Department of Transportation has established an Air Service Incentive Program to attract commercial carriers to unserved areas of the State. After financing market analyses and preparing business plans that indicate the profitability of a new route, the Michigan Department of Transportation enters into an agreement with an airline promising to cover its losses if its revenues do not meet its costs. The state will pay 80% and the municipality 20% of the losses incurred by the airline. Government subsidy has been paid in only one case since the inception of the program. Perhaps the Commonwealth should consider instituting a similar program if a decision is made not to build a second major airport.

3. Pursue airline service

The airport management should pursue air connections to major hubs and destinations served by major and regional carriers that are necessary for business travelers. In addition, given the current financial difficulties of the major airlines and the Clinton Administration's apparent willingness to protect the

newer small airlines in getting started, Airport management should also pursue public charter carriers like the Florida Shuttle and Skybus.

C. Suggestions for Improving Ground Access

As noted earlier in the report, there are three major access routes from the interstate highway system to Worcester airport: Highland/Pleasant Streets (I-190, I-290 North & East), Chandler/Mill Streets (I-290, South & East), and Auburn/James/Stafford/Goddard Memorial Drive (I-90 South and Southwest). The Edwards and Kelcey study projected less than 5% increase in traffic attributable to increased demand for the Airport. In addition, the expense and environmental impact do not justify construction of a major limited access highway connecting the Airport with the Interstate Highway System, or constructing a monorail or a satellite terminal some distance from the Airport. However, there are some low-cost, small-scale operational improvements to the existing street system that could be made that would improve access to Worcester Airport. These include improved route designations, parking restrictions, intersection improvements, synchronized timing of traffic lights, repaving, pavement markings, and street widening in selected areas.

A study conducted by WPI civil engineering students in 1987 under the auspices of WPI's Center for Municipal Studies and the Worcester Municipal Research Bureau made a number of recommendations which are included with the Research Bureau's proposals:

1. At present, the signs indicating the way to Worcester Airport are small and do not seem to be strategically placed. Worcester Municipal Airport's name, logo and directional arrow pointing towards the Airport should be included on a larger sign for better visibility. The Airport logo could even be painted on the streets as well, providing a visible "path" to the Airport.

2. Consideration should be given to designating Chandler Street as the preferred route to the Airport from downtown and I-290. It is wider and less congested than Highland Street, which is currently the preferred route. Improvements along this route should be tied to downtown street improvements currently underway. The WPI study recommended better signs, improved route designation, repaving, and improved pavement markings. The estimated cost of these improvements is \$574,000. (See Appendix C for cost analysis.) In addition, when MBTA commuter rail service is extended to Worcester and the intermodal transportation center is built at the former Union Station, there could be shuttle service from the train to the plane. That service could even be provided by a special-purpose lane during peak hours. The service could be started with a low-cost van and

increased as demand merits. Lights should be synchronized and parking restricted, especially during peak hours.

3. Highland and Pleasant Streets should be repaved between Lincoln and Tatnuck Squares. Other improvements include widening of Highland at the West Street intersection. Restricted parking during peak hours should be considered. The estimated cost of these suggestions is \$1.5 million. (See Appendix C for cost analysis.)

4. Finally, the traffic flow problems between James Street and Goddard Memorial Drive should be addressed. The corridor originating from the Massachusetts Turnpike in Auburn, and continuing north along Oxford, Pinehurst, South Ludlow and James Streets, provides smooth and direct access to Stafford Street. Improving the corridor from Grandview Avenue, crossing Stearn Street, passing adjacent to the New Ludlow School, and intersecting Main Street across from the entrance to Goddard Memorial Drive provides a relatively straight, uninterrupted flow of traffic between James Street and Goddard Memorial Drive. Construction costs are lower than alternatives because the land along the corridor is fairly level and the New Ludlow School would not have to be replaced. Implementation would require extensive widening along portions of Grandview Avenue and approximately one-quarter-mile of new roadway. The necessary right-of-way for such a project would probably require the acquisition of twenty houses and two businesses. The total cost would be about \$7 million. (See Appendix C for cost analysis.)

D. Suggestions for Parking Improvements

1. Maintenance of surface parking

When the new terminal is completed, there will be 560 parking spaces. Since convenient and inexpensive parking should be one of Worcester Airport's marketing advantages, it is critical that parking areas be well-maintained, free of snow, and priced competitively. Worcester charges \$7 per day with no weekly rate. Manchester charges \$4.50 per day. Providence charges \$27.50 per week. Worcester should consider establishing a lower daily rate and a weekly rate to maintain competitiveness with other regional airports.

2. Construction of additional parking

According to the 1988 Edwards and Kelcey study, 460,000 enplanements per year would generate a demand for 1,650 parking spaces or almost three times the current supply. The cost of surface parking is about \$3,500 per space, or \$3.5 million for 1,000 spaces.

3. Construction of covered parking

Since the snow and cold temperatures during Worcester's winters are not favorable to outdoor parking, construction of a covered parking facility should be considered. The cost of such a facility is about \$7,000 per space, or \$7 million for 1,000 spaces.

FINANCING AIRPORT IMPROVEMENTS

Financing all the airside capital improvements mentioned above would cost about \$18.3 million. (This may represent an incomplete list. There may be other improvements discussed in the Airport's 5-year capital investment plan, to which the Research Bureau has not received access.) If parking facilities and ground access improvements were undertaken as well, the cost could be somewhere between \$13-\$16.5 million additional. The Research Bureau suggests that all the proposed airside improvements, covered parking, and improvements to Chandler Street be undertaken. The total cost of all these improvements would be more than \$26 million (See Table F). These costs do not include yearly operational costs, such as airport marketing or proper maintenance of the terminal and parking areas.

TABLE F WORCESTER AIRPORT-CAPITAL IMPROVEMENTS* (MILLIONS)

	OPTION I	OPTION II	RESEARCH BUREAU PREFERRED OPTION	FINANCING SOURCE
GUIDANCE SIGNS ON AIRFIELD	\$0.7	\$0.7	\$0.7	AIP**
CENTER LINE LIGHTING AND TOUCHDOWN ZONE LIGHTING	1.2	1.2	1.2	AIRPORT/AIP
CATEGORY II ILS	2.5	2.5	2.5	FAA
PARALLEL TAXIWAY	9.4	9.4	9.4	AIP
RECONSTRUCTION OF APRON	2.0	2.0	2.0	AIP
RECONSTRUCTION OF RUNWAY 15-33	2.0	0.5	2.0	AIP
FENCING	0.5		0.5	AIRPORT/AIP
CHANDLER STREET	1.0	1.0	1.0	CITY
HIGHLAND STREET	1.5	1.5		CITY
GRANDVIEW AVENUE	7.0	7.0		CITY
COVERED PARKING	7.0		7.0	AIRPORT
SURFACE PARKING		3.5		AIRPORT
TOTAL	\$34.8	\$31.3	\$26.3	

* THESE FIGURES DO NOT INCLUDE A YEARLY EXPENDITURE OF ABOUT \$250,000 FOR MARKETING OR MAINTENANCE COSTS FOR LIGHTING, TREE REMOVAL, ETC.

** AIRPORT IMPROVEMENT PROGRAM (90% FUNDING FROM FAA)

SOURCE: WORCESTER AIRPORT, WPI CENTER FOR MUNICIPAL STUDIES,

AND WORCESTER MUNICIPAL RESEARCH BUREAU

PREPARED BY: WORCESTER MUNICIPAL RESEARCH BUREAU

HOW CAN THE CAPITAL PROJECTS BE FINANCED?

1. All projects related to improved safety and capacity of Worcester Airport are eligible for 90% funding under the FAA's Airport Improvement Program (AIP), which is funded by aviation taxes and user fees collected in the Aviation Trust Fund. Distribution of these entitlement funds is based on a formula largely determined by the number of passenger enplanements. The Massachusetts Aeronautics Commission provides 7% of the cost of AIP-eligible programs, while the local share is 3%. In recent years, however, the Federal government has not appropriated or expended all the revenues from this Aviation Trust Fund, which now has a \$7 billion surplus. While FAA officials believe that Worcester Airport has been supported to the extent legally possible, the appropriation of additional funds from the Trust Fund might provide supplementary capital for projects at Worcester Airport.

2. The FAA also has discretionary funds in addition to entitlement funds to finance airport improvements.

3. Worcester Airport collects a Passenger Facility Charge (PFC) of \$3 per passenger enplanement to be used to finance the Airport's capital improvements. Worcester was authorized to collect PFCs as of October 1, 1992. Approximately \$101,600 has been collected to date.

Assuming the Airport does get some entitlement and discretionary money from the FAA, and that its PFCs cover some of the local share, the City would still have to make a substantial investment in Airport improvements such as center-line lighting and fencing, as well as parking and ground access improvements, in the near future so the Airport is upgraded to the level where it can serve the potential demand in the Worcester area. The recent ten-year projections of the City's revenues and expenditures developed by the City Administration, the City Council's Municipal Operations Committee, and the City Auditor indicate that the City would have considerable difficulty supporting such investments at the Airport. In the past, the City has not had the revenue to fund a substantial marketing program, to say nothing of the millions of dollars required for capital projects.

WHAT ARE THE OPTIONS FOR THE AIRPORT?

1. Municipal Department

Although the City has not made such substantial investments from its own resources in the past, it could choose to do so in the future. As an enterprise account, the Airport should be entitled to the yearly taxes generated by companies that have bought or leased land that was originally part of Airport property. The tax revenues generated by these properties were more than

\$325,000 in FY93. The City could also finance a substantial bond program and assume the yearly debt service. If it were in the State's interest to improve utilization of Worcester Airport, the State should be willing to underwrite some of the borrowing, and subsidize payment of debt service until Airport revenues are sufficient to cover both operating costs and debt service.

2. Worcester Airport Authority

Creating an independent authority to run the Airport would allow the Airport to borrow money on its own to make the necessary investments to attract airlines and passengers. Its assets would consist of all Airport property, including buildings in the Airport Industrial Park that are located on Airport land. Special legislation by the State is necessary to create an authority. (Manchester Airport is governed by an authority.) A determination would have to be made as to whether the assets of the Airport are sufficient to borrow against them.

3. Worcester County Transportation Authority

The plans to create an intermodal transportation center at the former Union Station could serve as a focal point for the development of a more general transportation authority comprising that facility, the Worcester Regional Transit Authority (WRTA), and the Worcester Municipal Airport. The goal of combining several entities under one authority would be to increase the assets of the entire authority for borrowing purposes. It also creates an entity which could coordinate transportation services in Central Massachusetts.

4. Acquisition by Massport

Massport, which operates Logan Airport and Hanscom Field, could acquire Worcester Municipal Airport. The City should be compensated for this transfer. The advantage of such an arrangement would be that Massport has substantial financial resources as well as expertise in airport management which it could invest in Worcester Airport. While the City would lose control of the Airport under this arrangement, Massport operates under same laws (including Federal and state environmental laws) as any airport operator. In addition, Massport is under constant scrutiny by the State Administration and the State Legislature.

5. Lease to Massport

Under this option, the City could lease the Airport to Massport. The City would still own the Airport, and the degree of control granted to Massport could be negotiated between Massport and the City. Massport, however, could make the necessary investments to operate the Airport profitably. For this plan to work, the lease would have to be for an initial term long enough for

Massport to capitalize its investment. (This means at least a 20-year lease.) The City could then get a percentage of the profits from which the capitalization of Massport's investments would be deducted.

6. Lease to private firm

There are airports with commercial airline service that are operated by the private sector under lease-management contracts. In 1986, Atlantic City signed 10-year lease agreements (with the option for a 15-year extension in each case) with Pan Am World Services (Johnson Controls World Services since 1989) for the operation of its two airports, Baker Field and Atlantic City International. The former has commuter airline operations in addition to general aviation, while the latter has both commuter and larger jet airliner operations. At Atlantic City International, World Services is leasing some 83 acres, encompassing the terminal, commercial aircraft apron, parking lots, and other civilian activities. Under both lease agreements, Atlantic City receives either a base amount or a percentage of the airports' gross revenues, whichever is greater.

7. Contract with a private firm

Lockheed Corporation has a contract to operate Stewart International Airport, a former Air Force base north of the New York City metropolitan area. New York State, which owns Stewart, is responsible for capital investments. In addition, the Westchester County/White Plains (N.Y.) Airport is operated under contract with Johnson Controls World Services. The County, which owns that airport, retains responsibility for capital investments. The airport is served by several commercial airlines, as well as handling extensive general aviation traffic. It is interesting to note that Westchester County and Stewart are two of the smaller airports cited in Table B that have been most successful in recent years.

8. Sale of Worcester Municipal Airport

While no airports in the United States have yet been sold outright, these sales have occurred in Great Britain with considerable success for airport operations. Last year's Presidential Executive Order (No. 12803) regarding privatization of transportation facilities made privatization easier to accomplish. The advantage of such an arrangement for the City would be a one-time infusion of cash for capital investments plus yearly revenues from an entity which does not pay taxes now. While privatization raises many questions about capital investment, operating costs, pricing policy, noise abatement, and passenger satisfaction, among others, there is now enough experience for the City to evaluate such a proposal should any company be interested in buying the Airport. (See Appendix D for

a list of companies currently owning, managing and leasing airports.)

CONCLUSIONS

All of these options may provide the opportunity for the influx of capital necessary to make Airport improvements, to promote Worcester Airport, and to make it a self-supporting entity providing regular, reliable service. All of these options should be attractive to the Commonwealth if the Massachusetts Aeronautics Commission Strategic Assessment Report concludes that a second major airport is not necessary in the immediate future, and that some air traffic would be better served by expanding services at regional airports like Worcester's. Maintaining the status quo at the Airport is not among the City's options if we expect the Airport to be a self-sufficient entity providing regular, reliable service. The City's public officials must decide whether they can make the financial and political commitment to develop a viable airport. If they cannot, there needs to be more analysis of which of the above-mentioned alternatives is feasible, both financially and politically. Toward this end, the City Manager, in collaboration with Worcester area residents and businesses, all of which depend on the Airport for economic growth, should contract with a consultant as soon as possible to explore these options, and to determine which one is best to ensure the Airport's future - and Worcester's.

APPENDIX A

WORCESTER AIRPORT ACTIVITY

YEAR	ENPLANEMENTS	DEPLANEMENTS	TOTAL PASSENGERS
----	-----	-----	-----
1958	39,981	37,825	77,806
1959	38,220	36,441	74,661
1960	32,647	31,143	63,790
1961	27,774	27,408	55,182
1962	22,866	23,577	46,443
1963	20,420	19,852	40,272
1964	22,363	22,406	44,769
1965	22,928	24,257	47,185
1966	26,131	26,635	52,766
1968	28,426	29,123	57,549
1969	25,901	26,208	52,109
1970	23,714	22,377	46,091
1971	11,968	12,496	24,464
1972	12,277	13,118	25,395
1973	16,420	17,666	34,086
1974	18,678	18,397	37,075
1975	19,805	18,925	38,731
1976	17,333	17,077	34,410
1977	23,787	23,139	46,926
1978	29,192	28,073	57,265
1979	37,360	35,421	72,781
1980	24,083	24,649	48,732
1981	13,929	13,771	27,700
1982	8,630	8,709	17,339
1983	20,734	19,788	40,522
1984	18,228	18,452	36,680
1985	29,022	29,040	58,062
1986	52,700	52,151	104,851
1987	109,527	103,231	212,758
1988	163,075	161,702	324,777
1989	177,861	164,551	342,412
1990	145,299	142,557	287,856
1991	114,411	113,100	227,511
1992*	109,114	109,114	218,228

(ESTIMATED)*

SOURCE: WORCESTER AIRPORT

PREPARED BY: WORCESTER MUNICIPAL RESEARCH BUREAU

Appendix B

Travel Agent Survey

AAA Travel

Four Seasons Travel

Fox Travel

Garber Travel

Holden Travel

Millbury Travel

Rosenlund Travel

Shrewsbury Travel

Spencer Travel

Thomas Cook Travel

Uniglobe - Westboro

Westboro Travel

West. Boylston Travel

Corporate Travel Consultants

Allmerica Financial

Norton Company

Wyman-Gordon

Appendix C

COST ANALYSIS DATA

Highland/Pleasant St. Corridor

1. Realign Rt. 9/Lancaster & Rt. 9/Harvard St Intersections	\$250,000 each Allowance	\$500,000
2. Rework Rt. 9/West St. Intersection	Allowance	\$500,000
3. Paving - Lincoln Sq. to Tatnuck Sq.	158,400sy x \$3.54/sy	\$561,000
TOTAL		\$1,561,000

COST ANALYSIS DATA

Route 122 (Chandler Street) Corridor

<u>Alteration Description</u>	<u>Cost Analysis</u>	<u>Final Cost</u>
1. Paving from I-290 to Tatnuck Sq.	158,400sy x \$3.54/sy	\$561,000
2. Pavement Markings	\$.10/lf x 5,280lf/mi. x 21 miles	\$ 11,000
TOTAL		\$572,000

COST ANALYSIS DATA

Grand View/Goddard Memorial Dr. Corridor

<u>Alteration Description</u>	<u>Cost Analysis</u>	<u>Final Cost</u>
1. Rework Stafford/James St. intersctn	Allowance	\$ 100,000
2. Acquisitions	22 x \$250,000 each	\$5,500,000
3. Paving	2100lf x \$380/lf	\$ 800,000
4. Acquisition of School property	Allowance	\$ 50,000
5. Engineering/Design	Allowance	\$ 450,000
TOTAL		\$6,900,000

Source: WPI Center for Municipal Studies, "A Study of Alternatives to the Worcester Airport Access Problem," December, 1987.

Appendix D

Partial List of Companies Owning, Leasing and Managing Airports

BAA International Ltd.
London, England

Ballast Needham
Kent, England

Bechtel Enterprises
San Francisco, California

D. M. Airport Developers, Inc.
Morristown, New Jersey

E-Systems, Inc.
Greenville, Texas

Hughes Airport Systems
Fullerton, California

Johnson Controls World Services
Teterboro, New Jersey

Lockheed Air Terminal
Burbank, California

Paxport, Inc.
Ottawa, Ontario, Canada

Trafalgar House Corporate Development
London, England

Westinghouse Electric Corporation
Baltimore, Maryland



Assumption College
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P.O.Box 15005
Worcester, MA 01615-0005

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