

## PART 2: QUANTIFYING BENEFITS OF GENERAL AVIATION AIRPORTS

### AN APPROACH TO ANALYZING FINANCIAL FEASIBILITY OF A GENERAL AVIATION AIRPORT

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#### Introduction

This paper presents an approach to analyzing the financial feasibility of a general aviation airport. Specifically, the approach defined was utilized in examining the annual and cumulative financial impact on the city budget of Garland, Texas, a municipality in Dallas County, of building and operating a proposed reliever airport for Dallas/Fort Worth Regional Airport.

In most cases, the local development costs of a municipal general aviation airport are financed through the use of general obligation bonds. Traditionally, projects funded by general obligation bonds have been considered as serving the community's general benefit. As such, whether the project generated revenues sufficient to offset its costs was not an issue in securing voter approval for the project.

The proposed means of securing the local share of the development costs for the proposed Garland airport was a general obligation bond. However, as has been the experience nationally, the concept that the proposed airport served the general benefit of the community came under attack by those opposed to the airport primarily due to concerns over airport noise. As such, airport revenues versus costs become a potential source of controversy.

In determining the desirability of pursuing development of the proposed airport, city officials asked whether (and when) annual revenues derived from the airport would exceed its annual expenses. In framing this question, the city defined airport expenses as not only the annual airport operating expenses, but also the city's annual debt service deriving from bonds issued for required land acquisition and capital improvements.

In preparing a response to the city's question, a review of financial sections of past general aviation airport master plan studies was conducted. Unfortunately, the record presented by those studies, and echoed by many federal, state, and local officials, suggested that general aviation airports do not generate revenues sufficient to cover their costs. This information, if presented in a public forum, could have been the death knell of any proposed airport development.

Therefore, in addition to examining past general aviation airport studies, financial/economic studies of non-aviation projects (to be financed by general obligation bonds) were examined. This examination suggested that the approach used in most general aviation studies to analyze financial/economic feasibility was inappropriate when general obligation bonds were the financing mechanism.

The financial sections of most general aviation airport studies examined quantified airport operating revenues and expenses and determined annual net income (loss). Net income (loss) was then compared to annual bond debt service. If net income exceeded debt service, it was suggested that the airport was self-sufficient. If debt service exceeded net income, it was suggested that the airport was not self-sufficient.

This approach is, in fact, the one presented in Chapter 12, "Economic Feasibility," of the Federal Aviation Administration's Advisory Circular

150/5070-6: Airport Master Plans. Such an approach, however, is only appropriate when revenue bonds are the debt instruments to be used in financing the airport improvements. A careful reading of Chapter Chapter 12 suggests this as well. When utilizing revenue bonds as a financial mechanism, the issuer must, in fact, demonstrate that revenues derived from direct operations of the proposed facility will support direct operating expenses plus required debt coverage.

When utilizing general obligation bonds, the issue (municipality) must demonstrate that total (municipal) revenues will cover total (municipal) expenses. Total revenues are defined to include all taxes, interest, user fees, etc. Total expenses include operating expenses, existing debt service, and new debt service created by the bond issue for a specific project.

The financial/economic analysis used in the non-aviation studies recognized as revenues offset operating and debt service expenses, not only operating revenues derived from the proposed project but also property and sales taxes generated as a result of the proposed project's development. As such, the approach used in analyzing the proposed general aviation airport attempted to quantify annual operating and tax revenues and compare them to annual operating and debt service expenses. This, in turn, served as the basis of determining whether, and when, annual airport revenues exceeded airport expenses.

#### Analytical Framework

In order to perform the airport financial analysis, it was necessary to define the length of time to be covered by the analysis, and the types of costs and revenues to be estimated over that time period. The length of time of the analysis should, at a minimum, be determined by the length of time the municipality will be paying off the general obligation bonds. This, in turn, will be determined by the planned staging of airport development and the proposed financing program. The types of costs and revenues to be estimated can be defined by prevailing state and local tax laws and the management concept to be used in operating the facility.

The airport master plan or airport site selection study is a prime source of data for performing the financial analysis. Based aircraft and operational forecast data as well as forecasts of fuel sales and facility requirements were utilized in projecting airport related revenues. Planned airport improvements and staging of those improvements are also defined by these studies and were utilized to define airport development costs and bond requirements. The municipal operating budget was also utilized to determine such expenses as administration and fire and police protection. Finally, data from both local and national airport/aviation surveys were utilized.

#### Northeast Dallas/South Collin County Airport Description

The proposed Northeast Dallas/South Collin County Airport, in terms of forecast demand, facility requirements, and alternative potential sites, was described fully in a report entitled Northeast Dallas/South Collin County Airport Site Selection Study, dated January, 1981. To summarize this report, forecasted aviation activity indicated sufficient demand to support a general aviation airport capable of accepting aviation activity up

to and including business jet aircraft. By the year 2000, an estimated 584 aircraft were anticipated to be based at the airport and total operations would be approximately 383,000 for the year. Table 1 provides a summary of the aviation forecasts.

The type and level of aviation activity forecasted indicate demand for two runways: one runway of sufficient length and strength to support business jet aircraft and one of sufficient length and strength to support multi-engine piston aircraft. The second smaller runway was necessitated by forecasted aircraft operations in the 1990-2000 time period and would not be part of the initial airport development. Landside requirements are delineated in Table 2.

Originally, six potential sites were identified and subjected to detailed evaluation in terms of costs, engineering feasibility, and environmental acceptability. One site was rejected due to issues related to all three of these major categories. Of the remaining five sites, the most expensive site to develop was selected for use in planning the financial analysis. Parenthetically, this was also the consultant's preferred site. Table 3 presents the airport development cost estimate for the site.

For the purpose of this analysis, it was assumed that the Airport Development Aid Program would be extended and that federal participation would remain as proposed in legislation that was under consideration at that time in Congress. That

Table 1. Forecast summary, Northeast Dallas/South Collin County site.

GENERAL AVIATION	1977	FORECAST		
		1985	1990	2000
<u>Based Aircraft</u>				
Single Engine	--	120	216	439
Multi-Engine	--	13	50	85
Turboprop	--	6	7	22
Turbojet	--	14	27	38
Total Based Aircraft	--	153	300	584
<u>Aircraft Movements</u>				
Single Engine	--	75,700	136,300	77,100
Multi-Engine	--	8,800	33,800	57,500
Turboprop	--	5,700	6,700	21,000
Turbojet	--	10,000	19,500	27,400
Total Movements	--	100,300	196,300	383,000
Local Movements (Based)	--	56,800	107,900	217,100
<u>Itinerant Movements</u>				
Based	--	17,400	35,400	66,400
Transient	--	26,100	53,000	99,500
<u>Fuel Flowage</u>				
Gallons Sold	--	1,057,200	2,051,900	3,472,500
<u>Peak Hour--ADPM</u>				
Aircraft Movements	--	17	35	66

Table 2. Landside facility requirements.

	FORECAST		
	1985-1990	1990-1995	1995-2000
<u>FACILITIES DESIGN DEMAND</u>			
Based Aircraft	300	442	584
Busy Hour Transient Aircraft	<u>35</u>	<u>50</u>	<u>66</u>
Total Aircraft Parking Positions Required	335	492	650
Busy Hour Pilots and Passengers (E)	130	200	250
<u>FIXED BASED OPERATORS</u>			
Conventional Hangars	6	9	12
Conventional Hangar Spaces	54	81	108
Tee Hangar Spaces	96	140	184
Aircraft Tiedown Positions	185	271	358
Terminal Building (SF)	6,300	9,800	12,000
Auto Parking Spaces	170	260	325
Auto Parking Area (SY)	6,035	9,230	11,540

(E) = Estimated

legislation continued 90 percent participation of the federal government in eligible development. Navigational aids were funded 100 percent. Some development items associated with airport development (off-airport roads, automobile parking, terminals) are not eligible for federal assistance.

The State of Texas also has an airport development aid program. The program is substantially smaller in terms of annual funds available to municipal airports. State participation is up to 50 percent of eligible development items and traditionally has been used to support the local share of a federal grant request. The state program was fully committed through Fiscal Year 1981 and was potentially facing major changes during the next session of the state legislature. Therefore, for the purposes of this analysis, it was assumed that no major state participation would occur in the development of the airport under analysis.

Development costs reflected in Table 3 include all facility requirements generated by the demand forecasts. Clearly, not all items will be required as part of the initial airport development. As such, a development program was defined for the airport which included Phase I (initial development) and Phase II (follow-on development). The development scenario was assumed to be as follows:

o Based on the findings and recommendations of the consultant's reports and on deliberations of the participating cities, a specific site is selected for development of a proposed airport. A study is funded in the February-March 1981 time-frame to prepare a detailed master (development) plan, associated cost estimates, and an Environmental Assessment Report (EAR). The detailed reports would be completed by November 1981, at which time, review and comment on the EAR would be initiated. This would include the required opportunity for a public hearing.

o It was assumed that following the review and comment period, the Airport Master Plan and EAR would be submitted to the Federal Aviation Administration for their required administrative actions. These actions can take from three months to over one year, depending on the significance of environmental issues associated with airport development. Assuming the documents are submitted to FAA in the February-March 1982 time frame, it could be March 1983 before the FAA could make a formal determination of federal participation in airport development.

Table 3. Cost estimate, North Garland site.

<u>LAND</u>	
Land (Fee Simple) 550 AC @ \$12,000/AC	\$ 6,600,000
Land (Easements) 55 AC @ \$3,000/AC	165,000
Homes (Relocations) 2 @ \$70,000/Home	140,000
	<u>\$ 6,905,000</u>
<u>AIRFIELD IMPROVEMENTS</u>	
BT Runway 6,000' x 100' @ \$22.50/SY	\$ 1,500,000
GU Runway 4,000' x 75' @ \$14.50/SY	483,333
BT Taxiways 7,200' x 40' @ \$22.50/SY	720,000
GU Taxiways 4,600' x 40' @ \$14.50/SY	296,444
Connecting Taxiways 2,000' x 40' @ \$14.50/SY	128,888
Grading 100,000 CY @ \$2/CY	200,000
BT Runway & Taxiway Lighting	146,400
GU Runway & Taxiway & Lighting	119,200
Lighted Wind Cone, Beacon, Segmented Circle	22,000
GU Pavement Marking	1,800
BT Pavement Marking	21,000
	<u>\$ 3,639,065</u>
<u>NAVIGATIONAL AIDS</u>	
VASI-2 (GU Runway)	\$ 15,000
VASI-4 (BT Runway)	30,000
REILS	14,400
NDB	9,000
ILS-Glide Slope	250,000
MALSR	100,000
	<u>\$ 418,400</u>
<u>UTILITIES &amp; DRAINAGE</u>	\$ 345,000
<u>TERMINAL SITE IMPROVEMENTS</u>	
New Road 7,600' @ \$40/LF	\$ 304,000
Access Road 200' @ \$40/LF	8,000
Terminal 18,000 SF @ \$60/SF	1,080,000
Fencing 20,600 LF @ \$6/LF	123,600
Auto Parking 325 SP @ \$450/SP	146,250
Apron 35 SP @ \$13/SY	32,500
	<u>\$ 1,694,350</u>
<u>RELOCATIONS</u>	
Relocate Pleasant Valley Road 4,400 LF @ \$40/LF	\$ 176,000
Relocate Electrical Substation (Proposed)	4,500,000
	<u>\$ 4,676,000</u>
	Subtotal \$17,677,815
	10% Contingency \$ 1,767,782
	<u>Total \$19,445,597</u>

o Assuming it is March 1983 before an FAA decision is made and further assuming that decision is favorable, a bond election could be held to provide the local share of development costs and grant applications submitted for initial development. Assuming a June 1983 bond election is held and passes, an initial grant for land acquisition could be funded in FY 1983. Physical construction for Phase I could be funded in FY 1984 with actual construction commencing in January 1984. Under this scenario, then, the airport could be open for operation by January 1986.

o Finally, based on the demand forecasts, Phase II development (to include the second runway) would be required in the 1992-1994 time-frame. It was assumed a second bond

election would be held in 1992 with construction completed by 1994.

Table 4 outlines the Phase I and Phase II development costs for the airport site by federal, local, and total costs. The tables provide costs in constant (1980) dollars. That is, the costs are provided in terms of development occurring today and does not take into account inflation between 1980 and 1984 or 1980 and 1992. Consideration of inflation were treated in this study and will be described later in this paper.

The most recent bond issue by the City of Garland was assigned an interest rate of 7.836 percent. Table 5 reflects the bonds, debt, and annual debt service for the North Garland site based on that interest rate. Each bond is normally assumed over 20 years. For Phase I, it was assumed

Table 4. Phase I and Phase II development costs (constant (1980) dollars).

	<u>Federal</u>	<u>Local</u>	<u>Total</u>
Phase I	14,972,697	1,691,384	16,664,631
Phase II	1,059,415	533,550	1,592,965

grass cutting, etc. In the Dallas/Fort Worth area, there are two basic revenue sources used by communities running their own airports. The first is called a fuel flowage fee and typically is 4¢ for every gallon of gas sold. One city (Arlington) currently sells fuel on its airport. The second source of revenues are land rental charges. These currently range from 8¢ to 25¢ per square foot per

Table 5. Forecasted bond, debt, and annual debt service by site (constant (1980) dollars).

<u>Site</u>	<u>Bond</u>	<u>Debt*</u>	<u>Annual Debt Service**</u>
North Garland			
Phase I	\$1,691,384	\$4,341,986	\$239,054.78
Phase II	533,550	1,369,469	68,473.45
	\$2,224,934	\$5,711,455	

\*Debt assumed over 20 years @ 7.8356% interest.

\*\* Phase I - Debt service paid over 18 years.

Phase II - Debt service paid over 20 years.

that there would be a two year deferral on initiation of payment of the debt. Therefore, the debt service would be over an 18 year period. The two year deferral allows the airport to begin operations (and therefore generate revenues) the same year as the first bond payment is due. Recognizing that the airport would be in operation when the second bond is issued, it was assumed that the debt for the Phase II bond would be paid over the full 20 year period.

Under the above scenario, the Phase I bond payments would begin in 1986 and end in 2003. Phase II bond payments would begin in 1993 and end in 2012. It is noted that the original aviation forecasts were carried only to the year of 2000. In order, therefore, to provide estimates through 2012, the annual growth rate in aviation activity from 1990-2000 was applied to the 2000 forecasts and carried through 2012.

#### Determination of Airport Operating Costs and Revenues

The costs a municipality may incur through airport operations are a function, in part, of the type of airport management structure employed. Two basic alternatives used in the Dallas/Fort Worth area were 1) a city-operated airport, and 2) a contractor-operated airport.

Under the city-operated alternative, the city establishes an aviation function within the city government. The aviation unit assumes responsibility for daily airport operation and maintenance activities. The city budget, therefore, includes funds for labor and overhead costs associated with the airport staff. It also includes funds to pay utility bills (water and electricity) and funds for airport maintenance such as pavement maintenance,

year. Several communities are now including escalation clauses in rental agreements based on the consumer price index.

It is noted that these are not the only possible sources of revenues. For example, concessionaire fees could be charged to auto rental firms, etc., for the right to operate on the airport. However, fuel flowage and land rental charges were the only types in use locally at the time of the analysis.

Under the contractor-operated alternative, the city contracts with an airport management firm or a fixed based operator (FBO) to run the airport. The city charges the operator a base rate or a percent of the operator's gross revenues, whichever is greater. The operator assumes responsibility for the costs of airport operations and maintenance. In turn, the operator can sub-lease the land and establish whatever charges are appropriate for services provided. The operator can both sell fuel and charge others for the right to sell fuel on the airport. The city's costs become strictly those associated with administering the contract and providing public safety services, i.e., police and fire protection.

For the purposes of this study, it was assumed that the airport management would be handled through a contractor. The city costs for operating and maintaining the airport are therefore restricted to administrative costs. The base rate the city receives from the operator was set as the equivalent it would receive from a four cent fuel flowage fee plus an eight cent land rental fee. Potential fuel sales were forecasted in the airport site selection report. Similarly, the facility requirements defined in that report were used to determine land absorption on the airport related to aviation activity.

In addition to direct airport operating costs, the sponsoring municipality must provide the normal

public safety services, including fire and police protection. These costs were estimated from current data in the 1980-81 City of Garland Budget.

Administrative costs were assumed to be approximately \$7,500 annually over the period of initial airport planning. It was further assumed that those costs would jump to \$15,000 in 1986 and would grow, in real terms at a rate of 2 percent per annum. Real growth in administrative costs is assumed due to growth in aviation activity.

Fire protection costs were estimated from the 1980-81 City of Garland budget. One-fourth of the budget for the nearest fire station assigned to the North Garland site for a cost of \$62,440 per year. Police protection costs were based on the estimated cost for one additional patrol (24-hour) or \$74,470 per year. The total \$136,910 per annum costs were assumed to begin in 1985 and continue at a constant level.

#### Determination of Property Tax Impacts

The primary sources of property tax revenues on an airport are the aircraft based on the facility and the taxable business inventory. In Texas, private buildings built on airport leased land typically convey to city ownership at the end of the lease agreement. As such, the buildings (or real property) are not subject to property tax, only their contents. No attempt was made to estimate the value of business inventory due to a lack of survey or other base data. Rather, a major effort was made to estimate the potential total value of the forecasted based aircraft at the airport and, from that, potential property tax revenues.

It can be argued that any property tax revenues generated on the airport should be adjusted for the lost tax revenues currently received from the current use of the land. This factor was considered and rejected for two reasons. First, the majority of the potential sites were either partially or totally outside the current city limits of any municipality. Therefore, little or no property tax was being received from many of the sites. For those sites partially or totally within some city's limits, the sites were zoned for, and in use as, agricultural land. In Texas, should the long-term expectation of the property owner be to continue to use the land for agricultural activities, he can apply for an exemption which substantially reduces the appraised value of the land.

It was recognized that in the case of the North Garland site, such an exemption had not been sought and the property owner was paying taxes on the higher appraised value. It was assumed this is being done based on the anticipated sale and development of the tract for some other use. To determine that potential use and forecast its net property tax impact on the City of Garland was considered to be beyond the scope of the study.

For estimating property tax revenues, the current tax data was sought from the cities and school districts within which the proposed site was located.

Potential aircraft value was estimated from the forecast of based aircraft, the historical trends of new aircraft values and depreciation, and estimates of the based aircraft mix as a function of age. Aircraft value was estimated by major aircraft group, i.e., single-engine piston, multi-engine piston, turboprop, and business jets and derived from a review of aircraft values published in the Aircraft Bluebook for the years 1970-1980 inclusive.

The current municipal tax rate was then applied to the estimated total aircraft value to

Table 6. Forecast of revenues from property tax on aircraft by city (in constant (1980) dollars).

Year	Aircraft Value	Garland Property Tax .0066	GISD Property Tax .01224
1986	\$ 20,286,184	\$133,889	\$ 248,303
1987	22,152,334	146,205	271,145
1988	26,059,044	171,990	318,963
1989	29,547,819	195,016	361,665
1990	33,487,229	221,016	409,884
1991	33,709,022	222,480	412,598
1992	34,333,734	226,603	424,838
1993	35,050,715	231,335	429,021
1994	36,306,256	239,621	444,389
1995	37,621,819	248,304	460,491
1996	39,749,360	262,346	486,532
1997	41,904,098	276,567	512,906
1998	43,860,767	289,481	536,856
1999	48,392,613	319,391	592,326
2000	50,747,687	334,935	621,152
2001	53,853,242	355,431	659,164
2002	58,121,605	383,603	711,408
2003	61,067,202	403,044	747,463
2004	65,712,499	433,702	804,321
2005	68,546,236	452,405	839,006
2006	73,783,687	486,972	903,112
2007	77,115,256	508,961	943,891
2008	82,939,816	547,403	1,015,183
2009	88,818,113	586,200	1,087,134
2010	94,586,933	624,274	1,157,744
2011	99,675,270	657,857	1,220,025
2012	<u>107,197,786</u>	<u>707,505</u>	<u>1,312,101</u>
		\$9,666,536	\$17,931,621

determine potential tax revenues. Recognizing that aircraft property taxes are also a potential source of revenues for the affected Independent School District, the tax revenues for the school district were also estimated. Table 6 presents the estimated tax revenues.

#### Determination Of Sales Tax Impacts

There are two sources of sales taxes as a result of airport activity. First, most expenditures by individuals on the airport are subject to sales tax, the major exception being fuel sales. Secondly, individuals on itinerant (visiting) aircraft will spend dollars in the local community that are subject to sales tax. Recognizing that one out of every five cents of sales tax collected by the State of Texas is returned to the municipality within which it was collected, these two sources of tax income can be significant.



Table 7. Addison Airport survey (March 1980).

Total operators	32
Total employees	450
Payroll	\$ 5.1 million
Expenditures	51.6 million
Estimated visitor expenditures	3.9 million

With respect to airport expenditures, data was sought from local airports on expenditures by the general aviation community. The only readily available source of data was Addison Airport. A survey was conducted of airport tenants on March 1980. Table 7 reflects the results of that survey. It was estimated that there were approximately 573 aircraft based at Addison at that time. Therefore, airport

expenditures were approximately \$90,300 per based aircraft. Recognizing that this figure included fuel sales and further recognizing the dynamic nature of the Addison Airport, a figure of \$45,150 per based aircraft was used to determine airport expenditures for the Northeast Dallas/South Collin County airport. Sales taxes could then be estimated from that figure.

Visitor expenditures can be estimated using the results of a survey conducted in South Florida and reported by the Aircraft Owners and Pilots Association. That survey determined that on an average, there were 3.2 passengers on each itinerant aircraft and that each spent \$80 locally. Applying these factors to the forecast of itinerant aircraft movements, visitor expenditures and sales tax revenues can be estimated.

Table 8. North Garland site airport revenue (constant (1980) dollars).

Year	Aircraft Property Tax	Land Rental	Fuel Flow Fee	Visitors Expenditure Sales Tax	Airport Expenditure Sales Tax	Business Property Tax	Total
1986	\$ 133,889	\$ 51,854	\$ 48,282	\$ 22,912	\$ 75,250	Not	\$ 332,187
1987	146,205	51,854	55,134	26,399	86,000	Estimated	365,592
1988	171,990	51,854	62,953	30,418	98,470		415,685
1989	195,016	51,854	71,881	35,047	112,660		466,458
1990	221,016	51,854	82,076	40,381	129,000		524,327
1991	222,480	76,317	86,510	43,006	138,030		566,343
1992	226,603	76,317	91,183	45,802	147,490		587,395
1993	231,335	76,317	96,109	48,780	157,380		609,921
1994	239,621	76,317	101,300	51,951	168,560		637,749
1995	248,304	76,317	106,772	55,329	180,170		666,892
1996	262,346	100,711	112,540	58,926	192,210		726,733
1997	276,567	100,711	118,620	62,757	205,540		764,195
1998	289,481	100,711	125,027	66,837	219,730		801,786
1999	319,391	100,711	131,781	71,182	234,780		857,845
2000	334,935	100,711	138,900	75,810	251,120		901,476
2001	355,431	132,771	146,403	80,738	268,320		983,663
2002	383,603	132,771	154,312	85,987	286,810		1,043,483
2003	403,044	132,771	162,648	91,577	306,590		1,096,630
2004	433,702	132,771	171,434	97,532	324,650		1,160,089
2005	452,405	132,771	180,695	103,872	341,850		1,211,593
2006	486,972	174,101	190,457	110,625	360,340		1,322,495
2007	508,961	174,101	200,745	117,817	379,690		1,381,314
2008	547,403	174,101	211,589	125,477	400,760		1,459,330
2009	586,200	174,101	223,020	133,635	423,120		1,540,076
2010	624,274	174,101	235,067	142,325	445,910		1,621,675
2011	657,857	228,072	247,766	151,575	469,990		1,755,260
2012	707,505	228,072	261,150	161,430	497,080		1,855,237
	\$9,666,536	\$3,134,914	\$3,814,354	\$2,138,125	\$6,901,500		\$25,655,429

Table 9. North Garland site airport expenses (constant (1980) dollars).

Year	Administration	Fire & Police	Debt Service		Total
			(Phase I)	(Phase II)	
1983	\$ 7,500				\$ 7,500
1984	7,500				7,500
1985	7,500	\$ 136,910			144,410
1986	15,000	136,910	\$ 239,054		390,964
1987	15,375	136,910	239,054		391,339
1988	15,760	136,910	239,054		391,724
1989	16,153	136,910	239,055		392,118
1990	16,557	136,910	239,054		392,521
1991	16,971	136,910	239,054		392,935
1992	17,395	136,910	239,054		393,359
1993	17,830	136,910	239,055	\$ 68,473	462,268
1994	18,276	136,910	239,054	68,473	462,713
1995	18,732	136,910	239,054	68,474	463,170
1996	19,201	136,910	239,054	68,473	463,638
1997	19,681	136,910	239,055	68,474	464,120
1998	20,173	136,910	239,054	68,473	464,610
1999	20,678	136,910	239,054	68,474	465,116
2000	21,195	136,910	239,054	68,473	465,632
2001	21,724	136,910	239,055	68,474	466,163
2002	22,268	136,910	239,054	68,473	466,705
2003	22,824	136,910	239,054	68,473	467,261
2004	23,395	136,910		68,474	228,779
2005	23,980	136,910		68,473	229,363
2006	24,579	136,910		68,474	229,962
2007	25,194	136,910		68,473	230,577
2008	26,469	136,910		68,474	231,208
2009	25,824	136,910		68,473	231,852
2010	27,131	136,910		68,474	232,515
2011	27,809	136,910		68,473	233,192
2012	28,504	136,910		68,474	233,888
	<u>\$591,178</u>	<u>\$ 3,833,480</u>	<u>\$4,302,976</u>	<u>\$1,369,469</u>	<u>\$10,097,103</u>

#### Total Revenues And Expenses And Net Income

Table 8 presents a summary of total airport revenues for the North Garland site. Total revenues, excluding taxes on business inventory, are estimated at \$332,187 in 1986 and is expected to grow to \$1,855,237 by 2012. Table 9 presents the estimated airport expenses, to include debt service, for the North Garland site. These costs grow from \$7,500 in 1983 to \$467,261 in 2003. In 2004, the total costs drop to \$228,779 as debt service on Phase I development ends. By 2012, the costs will have grown to \$233,888.

Table 10 presents the net fiscal impact (in constant dollars) resulting from airport development at the North Garland site. Recognizing that this site was the most expensive to develop, it was

believed to be representative of the net fiscal impact resulting from development an airport at any of the sites.

Based on the forecast of airport revenues and expenses, it was anticipated the airport would initially generate a net deficit for the sponsoring municipality. By the third year of operation (1988), however, the airport begins to generate an annual surplus. This surplus grows from a low of approximately \$24,000 in 1986 to over \$1.6 million in 2012. The maximum deficit that a sponsoring municipality may anticipate is approximately \$144,400.

On a cumulative basis, the airport will initially build a net deficit. (It is recognized that, by law, municipalities cannot have deficit budgets. Any municipal operation which is anticipated



Table 10. North Garland site forecast of net income/(deficit) from airport development (constant (1980) dollars).

Year	Total Revenues	Total Expenses	Annual Income/(Deficit)	Cummulative Income/(Deficit)
1983		\$ 7,500	(7,500)	
1984		7,500	(7,500)	(15,000)
1985		144,410	(144,410)	(159,410)
1986	332,187	390,964	( 58,777)	(218,187)
1987	365,592	391,339	( 25,747)	(243,934)
1988	415,685	391,724	23,961	(219,973)
1989	466,458	392,118	74,340	(145,633)
1990	524,327	392,521	131,806	(13,827)
1991	566,343	392,935	173,408	159,581
1992	587,395	393,359	194,036	353,617
1993	609,921	462,268	147,653	501,270
1994	637,749	462,713	175,036	676,306
1995	666,892	463,170	203,722	880,028
1996	726,733	463,638	263,095	1,143,123
1997	764,195	464,120	300,075	1,443,198
1998	801,786	464,610	337,176	1,780,374
1999	857,845	465,116	392,729	2,173,103
2000	901,476	465,632	435,844	2,608,947
2001	983,663	466,163	517,500	3,126,447
2002	1,043,483	466,705	576,778	3,703,225
2003	1,096,630	467,261	629,369	4,332,594
2004	1,160,089	228,779	931,310	5,263,904
2005	1,211,593	229,363	982,230	6,246,134
2006	1,322,495	229,962	1,092,532	7,338,666
2007	1,381,314	230,577	1,150,737	8,489,403
2008	1,459,330	231,208	1,228,122	9,717,525
2009	1,540,076	231,852	1,308,224	11,025,749
2010	1,621,675	232,515	1,389,160	12,414,909
2011	1,755,260	233,192	1,522,068	13,936,977
2012	<u>1,855,237</u>	<u>233,888</u>	<u>1,621,349</u>	<u>15,558,326</u>
	\$25,655,429	\$10,097,103		

to be not self-supporting must be supported through other revenues.) By 1991, the deficit is eliminated and a net surplus begins to build. By the year 2012, the net surplus is almost \$15.6 million. More significantly, if the surplus could be set aside each year, it would cover the local cost of the Phase II development.

#### Impact Of Reduced Demand On Net Income

An additional consideration was the potential fiscal impact should airport revenues be less than those originally forecasted. It was noted that this was not to say that the revenue forecast was considered to be unreasonable. On the contrary, it was

believed that the revenue forecasts reflected the minimum potential revenue generated by the airport. What was being considered was the net effect of delayed development, a more stagnant economic situation than that used to make the original projections, or the possibility of not capturing 100 percent of the forecasted market.

For the purposes of this analysis, two scenarios were evaluated: the net fiscal impact of capturing only 75 percent or 50 percent of the forecasted market. Tables 11 and 12 present the results of these alternative scenarios. With only 75 percent of the market, the airport owner would potentially be facing three years with deficits of over \$100,000 from airport operations. An annual net

Table 11. North Garland site annual and cumulative income (75 percent of market).

<u>Year</u>	<u>75% Revenues</u>	<u>Expenses</u>	<u>Annual Income/(Deficit)</u>	<u>Cummulative Income/(Deficit)</u>
1983		\$ 7,500	(7,500)	
1984		7,500	(7,500)	(15,000)
1985		144,410	(144,410)	(159,410)
1986	249,140	390,964	(141,824)	(301,234)
1987	274,194	391,339	(117,145)	(418,379)
1988	311,764	391,724	(79,960)	(498,339)
1989	349,844	392,118	(42,274)	(540,613)
1990	393,245	392,521	724	(539,889)
1991	424,757	392,935	31,822	(508,067)
1992	440,546	393,359	47,187	(460,880)
1993	457,441	393,795	63,646	(397,234)
1994	478,312	394,240	84,072	(313,162)
1995	500,169	394,696	105,473	(207,689)
1996	545,050	463,638	81,412	(126,277)
1997	573,146	464,120	109,026	(17,251)
1998	601,340	464,610	136,730	119,479
1999	643,384	465,116	178,268	297,747
2000	676,107	465,632	210,475	508,222
2001	737,747	466,163	271,584	779,806
2002	782,612	466,705	315,907	1,095,713
2003	822,473	467,261	355,212	1,450,925
2004	870,067	228,779	641,288	2,092,213
2005	908,695	229,363	679,332	2,771,546
2006	991,871	229,963	761,908	3,533,453
2007	1,035,986	230,577	805,409	4,338,862
2008	1,094,498	231,208	863,290	5,202,152
2009	1,155,057	231,852	923,205	6,125,357
2010	1,216,256	300,988	915,268	7,040,625
2011	1,316,445	301,665	1,014,780	8,055,405
2012	<u>1,391,428</u>	<u>302,362</u>	<u>1,089,066</u>	<u>9,144,471</u>
	\$19,241,574	\$10,097,103		

surplus is generated by 1990 or in the fifth year of operation. With only 50 percent of the forecasted market, the airport sponsor would be facing a potential of seven years with annual deficits exceeding \$100,000; two of these years the deficit would exceed \$200,000. The first year of net surplus would not be until 1998 or the thirteenth year of operation.

It is noted that given reduced aviation demand forecasts, both scenarios include delays in the initiation of Phase II development. Under the 75 percent scenario, Phase II development is not initiated until 1996. Under the 50 percent scenario, by 2012 there is still insufficient demand to justify initiation of Phase II.

#### Impact Of Inflation On Airport Expenses And Revenues

Inflation clearly can impact the estimated potential costs and revenues from airport operations. Estimating that impact requires that a forecast of anticipated inflation be prepared and applied to the estimates made assuming no inflation.

Expectations of inflationary trends suggested that inflation would continue at an annual rate of 10 percent through 1983. From 1983 to 1986, inflation was expected to decline gradually to 7.5 percent. It was then expected to continue at 7.5 percent through 1989. From 1990 through the end of our forecast period, an inflation, rate of 5 percent per annum was assumed.

Table 12. North Garland site annual and cumulative income (50 percent market).

<u>Year</u>	<u>50% Revenues</u>	<u>Expenses</u>	<u>Annual Income/(Deficit)</u>	<u>Cummulative Income/(Deficit)</u>
1983		\$ 7,500	(7,500)	
1984		7,500	(7,500)	(15,000)
1985		144,410	(144,410)	(159,410)
1986	166,093	390,964	(224,871)	(384,281)
1987	182,796	391,339	(208,543)	(592,824)
1988	207,842	391,724	(183,882)	(776,706)
1989	233,229	392,118	(158,889)	(935,595)
1990	262,164	392,521	(130,357)	(1,065,952)
1991	283,171	392,935	(109,764)	(1,175,716)
1992	293,698	393,359	(99,661)	(1,275,377)
1993	304,961	393,795	(88,834)	(1,364,211)
1994	318,874	394,240	(75,366)	(1,439,577)
1995	333,446	394,696	(61,250)	(1,500,827)
1996	363,367	395,165	(31,798)	(1,532,625)
1997	382,097	395,646	(13,549)	(1,546,174)
1998	400,893	396,137	4,756	(1,541,418)
1999	428,923	396,642	32,281	(1,509,137)
2000	450,738	397,159	53,579	(1,455,558)
2001	491,832	397,689	94,143	(1,361,415)
2002	521,741	398,232	123,509	(1,237,906)
2003	548,315	398,788	149,527	(1,088,379)
2004	580,045	160,305	419,740	( 668,639)
2005	605,796	160,890	444,906	(223,733)
2006	661,248	161,489	499,759	276,026
2007	690,657	162,104	528,553	804,579
2008	729,665	162,734	566,931	1,371,510
2009	770,038	163,379	606,659	1,978,169
2010	810,838	164,041	646,797	2,624,966
2011	877,630	164,719	712,911	3,337,877
2012	<u>927,618</u>	<u>165,414</u>	<u>762,204</u>	<u>4,100,081</u>
	\$12,827,715	\$8,727,634		

In forecasting airport development costs based on anticipated inflation, it was assumed that development costs will grow at a rate 2 percent higher than the forecasted base-level inflation rate. This assumption has a significant impact on estimated bond requirements, debt and debt service. The total bond requirement to develop the North Garland site increases from approximately \$2.210 million to almost \$4.338 million. Other airport expenses can be expected to grow at a rate equal to the anticipated inflation rate. A comparison of Table 9 and Table 13 indicates that the cumulative total airport expenses grow from an estimated inflation-free \$10 million to an inflation-induced \$27 million.

In contrast to airport expenses, not all airport revenues increase at a rate equal to or greater

than inflation. Revenues from the fuel flowage fee, for example, will not increase at all. Land rental agreements which include escalation clauses usually do not provide for an annual adjustment. Rather, they provide for adjustments after a period of two or more years. For this analysis, it was assumed that rental fees would be increased every third year based on the consumer price index. The other sources of revenues, property taxes and sales taxes, will generally increase with the inflation rate. Table 14 presents the forecasted airport revenues with inflation considered. A comparison of these figures with Table 8 indicates that forecasted cumulative revenues range from an inflation-free \$25.7 million to an inflation-induced \$97.2 million.

Table 13. North Garland site airport expenses (current dollars).

Year	Administration	Fire & Police	Debt		Total
			Service		
			(Phase I)	(Phase II)	
1983	\$ 9,983				\$ 9,983
1984	10,883				10,883
1985	11,753	\$ 200,026			211,779
1986	25,260	214,538	\$ 372,695		612,493
1987	27,844	247,944	372,695		648,483
1988	30,669	266,427	372,696		669,792
1989	33,792	286,416	372,695		692,903
1990	36,376	300,791	372,695		709,862
1991	39,135	315,714	372,696		727,545
1992	42,131	331,596	372,695		746,422
1993	45,342	348,162	372,695	\$ 221,351	987,550
1994	48,797	365,550	372,696	221,352	1,008,395
1995	52,506	383,759	372,695	221,352	1,030,312
1996	56,528	403,063	372,695	221,352	1,053,638
1997	60,834	423,189	372,696	221,352	1,078,071
1998	65,461	444,273	372,695	221,352	1,103,781
1999	70,471	466,589	372,695	221,352	1,131,107
2000	75,836	489,864	372,696	221,352	1,159,748
2001	81,617	514,371	372,695	221,352	1,190,035
2002	87,847	540,110	372,695	221,352	1,222,004
2003	94,537	567,081	372,696	221,352	1,255,666
2004	101,745	595,422		221,352	918,519
2005	109,517	625,268		221,352	956,137
2006	117,856	656,483		221,352	995,691
2007	126,852	689,342		221,352	1,037,546
2008	136,531	723,843		221,352	1,081,726
2009	146,929	759,987		221,352	1,128,268
2010	158,147	798,048		221,352	1,177,547
2011	170,191	837,889		221,352	1,229,432
2012	<u>183,168</u>	<u>879,784</u>		<u>221,353</u>	<u>1,284,305</u>
	\$2,258,538	\$13,675,529	\$6,708,516	\$4,427,040	\$27,069,623

Table 15 presents the airport net income adjusted for anticipated inflation. Again, by 1988, the airport is generating a net surplus. The maximum deficit would be \$212,000 (1985) and the maximum surplus is over \$9 million (2012).

#### Conclusion

The financial analysis suggested that, given the use of either constant or current dollars and the existence of a federal aid program, a high activity reliever airport would, over the long-term generate significantly greater revenues than expenses for the sponsoring municipality. Additionally, it would generate significant revenues for the local school district.

At the time the original financial analysis was performed, the Airport Development Aid Program (ADAP) had expired. However, in December 1980, there was still substantial optimism that a new program would soon be forthcoming. As of December 1981, such optimism was not as evident. As such, a re-examination of the original analysis for the North Garland site was accomplished with an eye toward examining the impact on financial feasibility of the airport with no federal aid program similar to ADAP.

Specifically, total revenues were compared to total expenses less the debt service on bonds supporting the local share of capital improvements. The resulting amount represents, in effect, the potential debt service coverage generated by the

Table 14. North Garland site airport revenue (current dollars).

Year	Aircraft		Visitors		Airport	Business	
	Property		Expenditure		Expenditure	Property	
	Tax	Land Rental	Fuel Flow Fee	Sales Tax	Sales Tax	Tax	Total
1986	\$ 225,469	\$ 87,322	\$ 48,282	\$ 38,584	\$ 126,721	Not	\$ 526,378
1987	264,777	87,322	55,134	47,809	155,746	Estimated	610,788
1988	334,693	100,908	62,953	59,193	191,623		749,370
1989	407,973	100,908	71,881	73,318	235,685		889,765
1990	485,572	113,923	82,076	88,717	283,413		1,053,701
1991	513,039	170,335	86,510	99,113	318,297		1,187,294
1992	548,832	182,002	91,183	110,932	357,221		1,290,170
1993	588,285	187,799	96,109	124,048	400,217		1,396,458
1994	639,788	200,659	101,300	138,710	450,055		1,530,512
1995	695,996	207,020	106,772	155,087	505,017		1,669,892
1996	772,347	293,044	112,540	173,477	565,866		1,917,274
1997	854,869	300,089	118,620	193,981	635,324		2,102,883
1998	939,366	323,040	125,027	216,885	713,024		2,317,342
1999	1,088,485	330,795	131,781	242,587	800,130		2,593,778
2000	1,198,397	356,185	138,900	271,246	898,507		2,863,235
2001	1,335,354	485,172	146,403	303,334	1,008,078		3,278,341
2002	1,513,314	513,155	154,312	339,219	1,131,466		3,651,466
2003	1,669,408	534,916	162,648	379,313	1,269,896		4,016,181
2004	1,886,170	565,721	171,434	424,167	1,411,903		4,459,395
2005	2,066,134	589,744	180,695	474,383	1,561,229		4,872,185
2006	2,335,031	821,928	190,457	530,447	1,727,830		5,605,693
2007	2,562,619	848,380	200,745	593,209	1,911,739		6,116,692
2008	2,894,120	906,228	211,589	663,397	2,118,818		6,794,152
2009	3,253,996	935,394	223,020	741,808	2,348,739		7,502,957
2010	3,638,893	999,121	235,067	829,612	2,599,209		8,301,902
2011	4,026,085	1,361,585	247,766	927,639	2,876,339		9,439,414
2012	<u>4,546,427</u>	<u>1,431,779</u>	<u>261,150</u>	<u>1,037,349</u>	<u>3,194,236</u>		<u>10,470,941</u>
	\$41,285,439	\$13,034,474	\$3,814,354	\$9,277,564	\$29,796,328		\$97,208,159

Table 15. North Garland site forecast of net income/(deficit) from airport development (current (1980) dollars).

<u>Year</u>	<u>Total Revenues</u>	<u>Total Expenses</u>	<u>Annual Income/(Deficit)</u>	<u>Cummulative Income/(Deficit)</u>
1983		\$ 9,983	(9,983)	
1984		10,883	(10,883)	(20,866)
1985		211,779	(211,779)	(232,645)
1986	526,378	612,493	( 86,115)	(318,760)
1987	610,788	648,483	( 37,695)	(356,455)
1988	749,370	669,792	79,578	(276,877)
1989	889,765	692,903	196,862	(80,015)
1990	1,053,701	709,862	343,839	263,824
1991	1,187,294	727,545	459,749	723,573
1992	1,290,170	746,422	543,748	1,267,321
1993	1,396,458	987,550	408,908	1,676,229
1994	1,530,512	1,008,395	522,117	2,198,346
1995	1,669,892	1,030,312	639,580	2,837,926
1996	1,917,274	1,053,638	863,636	3,701,562
1997	2,102,883	1,078,071	1,024,812	4,726,374
1998	2,317,342	1,103,781	1,213,561	5,939,935
1999	2,593,778	1,131,107	1,462,671	7,402,606
2000	2,863,235	1,159,748	1,703,487	9,106,093
2001	3,278,341	1,190,035	2,088,306	11,194,399
2002	3,651,466	1,222,004	2,429,462	13,623,861
2003	4,016,181	1,255,666	2,760,515	16,384,376
2004	4,459,395	918,519	3,540,876	19,925,252
2005	4,872,185	956,137	3,916,048	23,841,300
2006	5,605,693	995,691	4,610,002	28,451,302
2007	6,116,692	1,037,546	5,079,146	33,530,448
2008	6,794,152	1,081,726	5,712,426	39,242,874
2009	7,502,957	1,128,268	6,374,689	45,617,563
2010	8,301,902	1,177,547	7,124,355	52,741,918
2011	9,439,414	1,229,432	8,209,982	60,951,900
2012	<u>10,470,941</u>	<u>1,284,305</u>	<u>9,186,636</u>	<u>70,138,536</u>
	\$97,208,159	\$27,069,623		



Table 16. Local debt capacity/cost coverage assuming no ADAP.

	Debt Service Coverage	Debt	Airport Development Costs	Debt/Cost Ratio
1980 constant dollars	\$21,230,771	\$8,270,655	\$19,445,597	.425
1980 current dollars	81,274,092	31,661,119	30,895,477	1.025

airport. From that amount, an estimate of actual debt (or capital improvements) that could be supported was estimated. Finally, this figure was compared to airport development costs to determine what percent of total costs could be supported.

Table 16 presents the results of that analysis. Using the constant dollar scenario, the airport generates funds sufficient to cover only 42.8 percent of its development costs. Under the current dollar scenario, the airport generates funds sufficient to cover 102.5 percent of its costs.

Depending, therefore, on which scenario one feels is more valid, one could argue that, for the airport under question, a federal aid program is, or is not, required to support development. If one supports the current dollar scenario, the analysis suggests no federal aid is necessary. If one supports the constant dollar scenario, the analysis

suggests federal aid is required. However, it also suggests a 60/40 proportion of federal/local participation could be supported by locally generated revenues.

It is the author's contention that such arguments are appropriate only to the airport in question. Refinements to the approach used herein are needed as well as an application of such an approach to a broader range of general aviation airports before a more specific conclusion as to the appropriate level of federal participation in general aviation airports can be developed. It is suggested, however, that such an approach can be used at the local level to evaluate the financial feasibility of proposed general aviation airport improvements and at the state and federal level to evaluate appropriate levels of participation in local general aviation airport development.