



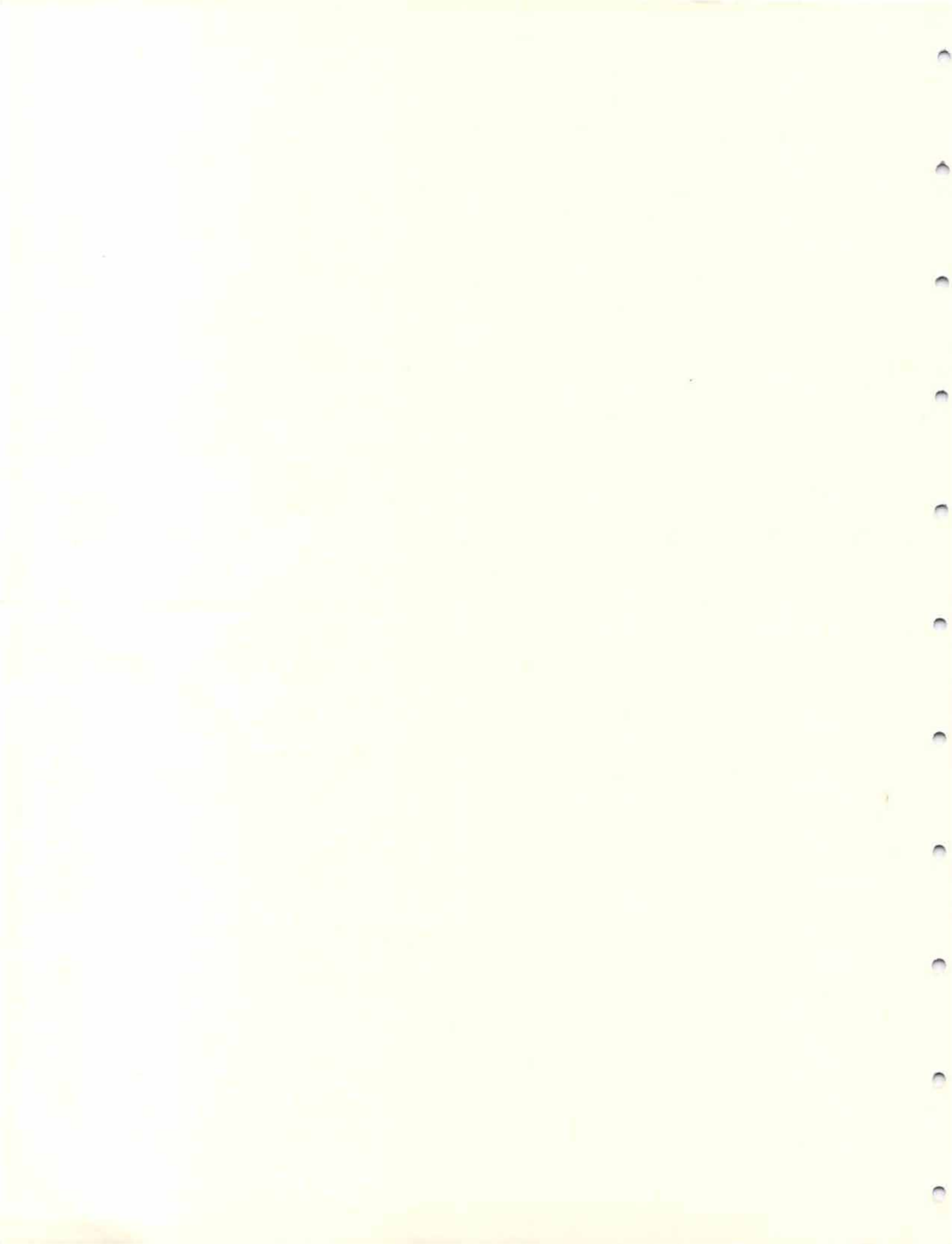
U.S. Department  
of Transportation  
Federal Aviation  
Administration

# Establishment and Discontinuance Criteria for Automated Weather Observing Systems (AWOS)

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Office of Aviation  
Policy and Plans  
Washington, D.C. 20591

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16. Abstract <b>This report develops establishment and discontinuance criteria for automated weather observing systems (AWOS) for publication in FAA Order 7031.2B, Airway Planning Standard Number One. Airway Planning Standard Number One contains the policy and summarizes the criteria used in determining eligibility of terminal locations for establishment, discontinuance and improvements of air navigation facilities and air traffic control services.</b>  <b>The criteria developed in this report are based on rigorous life-cycle cost effectiveness and benefit/cost analyses of AWOS which measure weather and environmental parameters essential to FAA operations--wind direction and speed, temperature and dew point, altimeter setting, ceiling, visibility, precipitation and thunderstorm activity.</b>					
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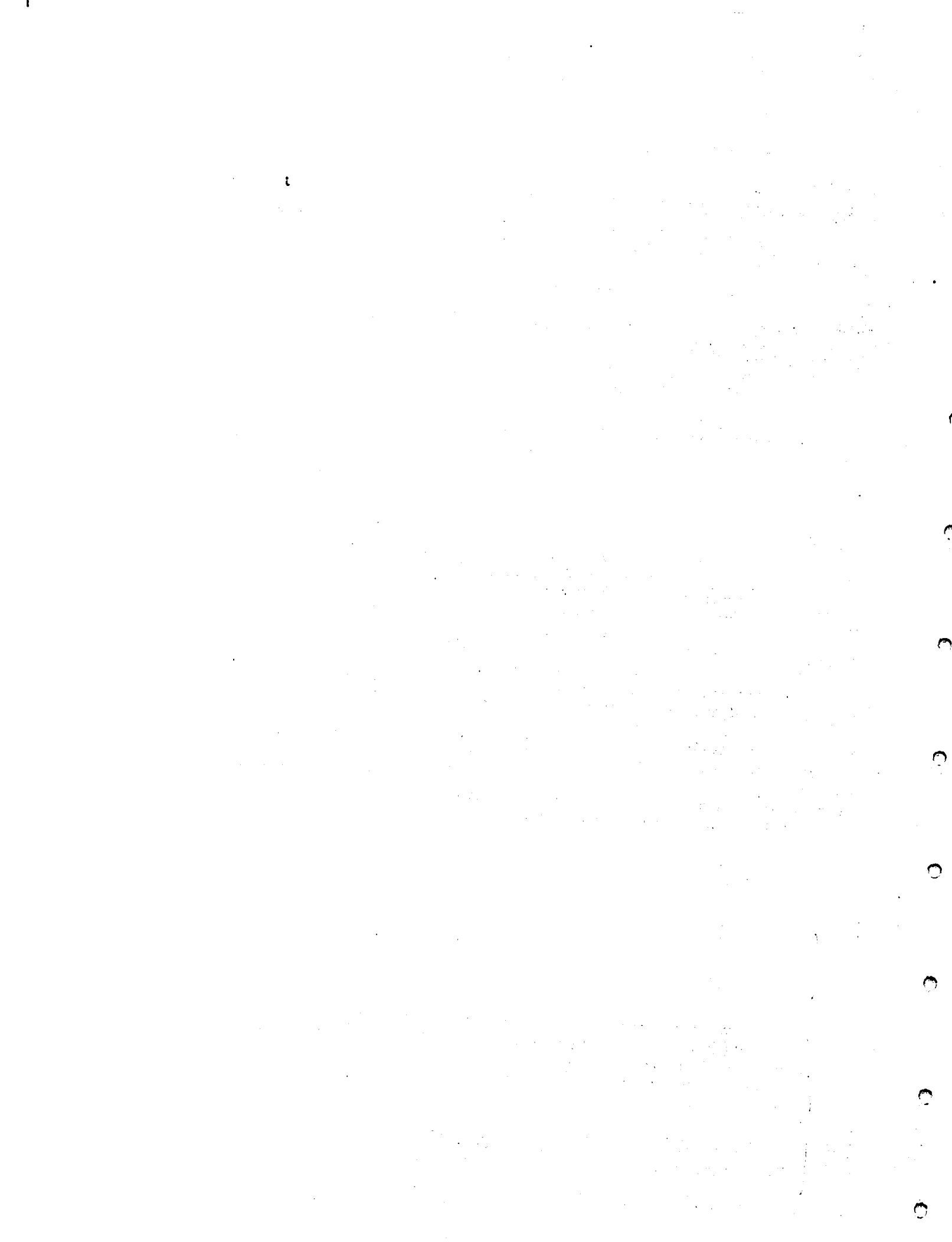


TABLE OF CONTENTS

<u>Chapter</u>	<u>Page</u>
Executive Summary . . . . .	i
I. Introduction . . . . .	1
A. Purpose . . . . .	1
B. Background . . . . .	1
C. Non-Federal AWOS . . . . .	3
D. Organization of Remainder of Report . . . . .	3
II. Summary of Establishment and Discontinuance Criteria . . . . .	5
A. FAA Towered Airports . . . . .	5
B. Flight Service Stations . . . . .	5
C. Non-Towered and Non-Federal Towered Airports . . . . .	5
1. Phase I Establishment Criteria . . . . .	5
2. Phase I Discontinuance Criteria . . . . .	7
3. Phase II Criteria . . . . .	7
D. Sensor Configuration . . . . .	8
E. Non-Federal AWOS . . . . .	8
III. Life-Cycle Costs . . . . .	9
A. Introduction . . . . .	9
B. Facilities and Equipment Costs . . . . .	9
C. Operations and Maintenance Costs . . . . .	13
D. Determining the Life-Cycle Cost of a Given System . . . . .	17
IV. Estimation and Valuation of AWOS Benefits . . . . .	19
A. Introduction . . . . .	19
B. FAA Towered Airports . . . . .	20
1. Introduction . . . . .	20
2. Justification of Weather Observation Services at FAA Towered Airports . . . . .	21
3. Costs of Manual Weather Observing Systems . . . . .	25
4. Summary . . . . .	32
C. Non-Towered and Non-Federal Towered Airports . . . . .	37
1. Introduction . . . . .	37
2. Safety Benefits . . . . .	37
3. Efficiency Benefits . . . . .	55
4. Proximity Penalty and Remoteness Premium . . . . .	66
5. Summary . . . . .	67
D. Indirect Benefits . . . . .	69
1. Introduction . . . . .	69
2. Nature of Indirect Benefits . . . . .	69

<u>Chapter</u>	<u>Page</u>
V. Development of Phase I Criteria for Non-Towered and Non-Federal Towered Airports . . . . .	71
VI. Results of Applying Criteria to Non-Towered Airports, Non-Federal Towered Airports, and ATCT Discontinuance Candidates . . . . .	75
VII. Sensitivity Analysis . . . . .	137
VIII. Impact Analysis. . . . .	141
Appx. A Statistical Summary of Accident Briefs . . . . .	142
Appx. B Critical Values. . . . .	149
Appx. C Program Logic of AWOS Establishment Criteria . . . . .	151
References. . . . .	161

## EXECUTIVE SUMMARY

The purpose of this report is to develop establishment and discontinuance criteria for automated weather observing systems (AWOS) for publication in FAA Order 7031.2B, Airway Planning Standard Number One. Airway Planning Standard Number One contains the policy and summarizes the criteria used in determining eligibility of terminal locations for establishment, discontinuance and improvements of air navigation facilities and air traffic control services.

Accurate and reliable advance weather information is essential to the safety and efficiency of aviation, and surface weather observations are the most important portion of it. There are over 1,400 surface weather observation stations in the U.S. operated by the National Weather Service (NWS), the Department of Defense, the FAA and various aircraft operators. Support for civil flight operations is currently limited primarily to major airports where observations are taken by the NWS, FAA-operated ATCT's and FSS's, and commercially-operated Supplementary Aviation Weather Reporting Stations.

Although the continuing growth of aviation has increased the demand for weather reports and forecasts at additional locations, the escalating costs of labor-intensive manual weather observing systems has prohibited their expansion to additional locations. Surface weather observing stations are widely separated in certain areas, affecting the accuracy and reliability of weather forecasts in those areas. Commercial instrument flight rule (IFR) operations under Parts 121 and 135 of the Federal Aviation Regulations (FAR) are restricted at over 1,200 airports with standard instrument approach procedures because of the absence of a local weather reporting service and at approximately 376 airports where the service is provided only part-time. Non-commercial IFR operations conducted under FAR Part 91 are authorized at locations without a local weather reporting service, but the minimum altitude of the approach procedures at these locations is increased in relation to the distance from the remote altimeter setting source to account for potential differences in barometric pressure. Of 1,733 airports currently with approved standard instrument approach procedures, IFR approaches by Part 91 operators at 1,307 locations are conducted with altitude information derived from a remote source. Full time remote altimeter setting penalties are required at approximately 931 airports.

These conditions suggest a need to maintain and expand accurate and reliable weather information services at sufficient locations to meet the needs of pilots, operators and air traffic control facilities. Automation of the surface weather observation function will meet this need by reducing the time devoted to weather observations at manned locations, providing a capability of taking observations at locations when facilities are closed, and expanding observation services to unmanned locations.

The establishment and discontinuance criteria developed in this report are based on a life-cycle cost effectiveness analysis for FAA towered airports and a life-cycle benefit/cost analysis for non-towered and

non-federal towered airports. FAA towered airports, by virtue of the fact that they constitute control zones, are required by FAR Part 91 to have an approved weather observation service. Most equipment currently installed in manual weather observing systems is on average 20 years old and reaching the end of its economic life. Given these regulatory and operating constraints, this report summarizes a life-cycle cost analysis of various alternative systems of collecting, recording and disseminating weather data. The analysis clearly shows that AWOS is the most cost effective means of providing weather observation services at FAA towered airports.

In a rigorous life-cycle benefit/cost analysis of AWOS at non-towered and non-federal towered airports, the basic benefit areas of enhanced safety and efficiency are analyzed. Official aviation activity forecasts are used to quantify the benefits independently for each year of a system's estimated 15 year economic life and discounting the benefits for each year to their present value. These are summed to represent the present value of life-cycle benefits. Capital, operations and maintenance costs are approached on a similar present value life-cycle basis. AWOS criteria for non-towered and non-federal towered airports are developed modularly to facilitate investment decisionmaking for AWOS with any configuration of wind direction and speed, temperature/dew point, altimeter setting, ceiling, visibility, liquid and freezing precipitation, and thunderstorm sensors.

It is impossible, at least with a high degree of accuracy, to assess the impact of the criteria on agency resources as required by Order 1320.1 because (1) it is presently uncertain which specific AWOS configuration will be justified for each qualifying airport, and (2) meeting candidacy levels will not mean automatic qualification for non-towered and non-federal towered airports since benefit/cost screening is but one of several inputs to the FAA decisionmaking process relative to investment in facilities and equipment. All FAA towered airports, other than tower discontinuance candidates, where the surface weather observation function is the responsibility of the FAA (as opposed to the NWS) qualify for AWOS by virtue of cost effectiveness. There are currently 254 such locations. Priority of AWOS establishment at these locations will be given to part-time facilities, followed by full-time facilities, in recognition of the relatively greater benefits of AWOS when facilities are closed. Additionally, automated flight service stations that are obligated to take weather observations automatically qualify for AWOS. Assuming installation of systems with wind, temperature/dewpoint, altimeter setting, ceiling, visibility and liquid precipitation sensors, an additional 1,120 civil airport locations where NWS aviation weather observations are not presently available meet the establishment criteria. These include 1,035 non-towered airports, 49 FAA tower discontinuance candidate locations and 36 non-federal tower locations.

At average life-cycle unit costs of approximately \$165,300 and \$150,500 per system for towered and non-towered airports respectively, these installations equate to approximately \$210.5 million (1981 dollars). Approximately 60 percent of the investment is incurred for facilities and equipment in the acquisition year, with the remainder representing operations and maintenance costs over an estimated 15-year economic life.



## CHAPTER I - INTRODUCTION

### A. Purpose

The purpose of this report is to develop establishment and discontinuance criteria for automated weather observing systems (AWOS) for publication in FAA Order 7031.2B, Airway Planning Standard Number One (Reference 1). Airway Planning Standard Number One contains the policy and summarizes the criteria used in determining eligibility of terminal locations for establishment, discontinuance and improvements of air navigation facilities and air traffic control services. AWOS is intended to cost effectively automate the weather observation function at locations where weather data is currently observed, recorded and disseminated manually and to expand weather observation services to additional locations where they are not currently available or available only part-time.

### B. Background

Accurate and reliable advance weather information is essential to the safety and efficiency of aviation, and surface weather observations are the most important portion of it. Weather information is needed by pilots, operators and air traffic control facilities for planning, safety and efficiency. Information concerning hazardous weather is especially needed due to the potentially serious impact these conditions may have on aircraft performance and structural integrity.

The Department of Commerce's National Weather Service (NWS) has the statutory responsibility to provide forecasts for navigation. While the NWS provides the nucleus of the basic weather observation program, the Departments of Transportation (DOT) and Defense (DOD) furnish resources to observe and record weather data at certain locations through mutual agreements. Support for civil flight operations is currently limited primarily to major airports where observations are taken by the NWS or by FAA-operated air traffic control towers (ATCT) or flight service stations (FSS). At many smaller airports where the government does not provide surface weather observation services or where the services are provided only part-time, commercial operators establish Supplementary Aviation Weather Reporting Stations (SAWRS) under NWS oversight to satisfy FAA regulations for commercial operations. SAWRS weather observations, however, are generally taken only when needed by the operator and are not routinely available to other users. Figure 1 categorizes surface weather observation stations located in the fifty United States, Puerto Rico and the Virgin Islands, as inventoried in 1981 (Reference 2).

Although the continuing growth of aviation has increased the demand for weather reports and forecasts at additional locations, the costs of labor-intensive manual weather observing systems has prohibited their expansion to additional locations. Although most manual weather observations are taken as a part-time task, the departments collectively expend over 1,000 personyears annually to provide these observations (Reference 3). Surface weather observing stations are widely separated in certain areas, affecting the accuracy and reliability of weather

FIGURE 1

Categories of Surface Weather Observation Stations\*

Operated By Or Under Oversight of NWS

FAA Personnel		
Flight Service Stations (FSS)	216	
Air Traffic Control Towers (ATCT)	<u>161</u>	377
NWS/NWS Contract Personnel		
Weather Service Forecast Offices (WSFO)	31	
Weather Service Offices (WSO)	176	
Weather Meteorological Offices (WSMO)	12	
Weather Service Contract Meteorological Offices (WSCMO)	15	
Synoptic Weather Observing Stations	15	
Contract Basic Weather Observation Stations	142	
Automatic Meteorological Observing Stations	66	
Coast Guard/Marine Reporting Stations	<u>184</u>	641
Supplementary Aviation Weather Reporting Stations (SAWRS)		<u>276</u> 1,294
<u>DOD</u>		<u>148</u>
<u>Total Surface Weather Observation Stations</u>		<u>1,442</u>

\*Source: Reference 2. Includes surface weather observation stations in the fifty United States, Puerto Rico and the Virgin Islands as inventoried in 1981. For those locations with two collocated facilities, only one facility is reflected in these counts.

forecasts in those areas. Commercial instrument flight rule (IFR) operations under Parts 121 and 135 of the Federal Aviation Regulations (FAR) are restricted at over 1,200 airports with standard instrument approach procedures because of the absence of a local weather reporting service and at approximately 376 airports where the service is provided only part-time (Reference 4). Non-commercial IFR operations conducted under FAR Part 91 are authorized at locations without a local weather reporting service, but the minimum altitude of the approach procedures at these locations is increased in relation to the distance from the remote altimeter setting source to account for potential differences in barometric pressure. Until 1976, the use of remote altimeter settings had been authorized by FAA regardless of the terrain between the runway and the remote altimeter setting source. However, a change (Reference 5) in the Terminal Instrument Procedures (TERPS) (Reference 6) prohibits the use of remote altimeter settings at airports in precipitous terrain. Based on the change, a case-by-case review of altimeter settings has resulted in the FAA disallowing IFR approaches or increasing the minima at some airports. Additionally, there have been some requests for authorization of new approach procedures which have not been approved due

to the lack of a local altimeter setting. Of 1,733 airports currently with approved standard instrument approach procedures, IFR approaches by Part 91 operators at 1,307 locations are conducted with altitude information derived from a remote source (Reference 4). Full time remote altimeter setting penalties are required at approximately 931 airports (Reference 4).

These conditions suggest a need to maintain and expand accurate and reliable weather information services at sufficient locations to meet the needs of pilots, operators and air traffic control facilities. Studies and experience have shown that automated systems can meet this need in the most cost effective manner by reducing the time devoted to weather observations at manned locations, providing a capability of taking observations at locations when facilities are closed, and expanding observation services to unmanned locations.

#### C. Non-Federal AWOS

There will be no takeover of AWOS purchased and installed by parties other than the Federal Government. This provision is an exception to the general policy of paragraph 10 of FAA Order 7031.2B, Airway Planning Standard Number One (Reference 1), which provides eligibility for inclusion of non-federal terminal facilities in the National Airspace System with FAA assumption of ownership, operation, maintenance and logistic support.

#### D. Organization of Remainder of Report

For convenience and simplicity, "automated weather observing systems" will be referred to in this report simply as "AWOS."

Chapter II summarizes the criteria developed in this report for the establishment and discontinuance of AWOS. These criteria will be published in FAA Order 7031.2B, Airway Planning Standard Number One (Reference 1).

Chapter III examines the life-cycle costs of AWOS. Because AWOS may be tailored to meet site-specific needs, especially those at non-towered airports, costs (as well as benefits) are developed modularly in this report.

Chapter IV outlines the methodology used to estimate and value AWOS benefits. AWOS benefits include enhanced safety, efficiency, and other indirect but important intangible benefits. Safety benefits result from reduced risk and incidence of accidents. Efficiency benefits result from cost avoidance realized by ATCT's and commercial operators whose weather observation functions would be replaced by AWOS, and reduced risk and incidence of flight disruptions of actual and would-be instrument approaches and overflight wind checks by visual approaches. Other benefits, which are indirect or intangible in that they are difficult to quantify and ascribe site-specifically, include benefits to departing and enroute aircraft, improved quality of weather information, contribution to the weather communications network, reduced workload of flight service stations, congestion relief at major airports and accident investigation. Additionally, proximity penalties and remoteness premiums are discussed.

Chapter V derives Phase I screening criteria for AWOS at non-towered and non-federal towered airports for publication in Airway Planning Standard Number One (Reference 1). As with the investment criteria for several other agency facilities, equipment and services, the criteria for AWOS at non-towered and non-federal towered airports are two-phased. Phase I is a set of simple, generalized criteria designed to initially identify potential establishment and discontinuance candidates. Phase II is a site-specific computerized benefit/cost screening process under which life-cycle benefits are computed by using official aviation activity forecasts to quantify the present value benefits independently for each year of a system's estimated 15-year economic life.

Chapter VI provides computer-generated listings of the results of applying the Phase I and II establishment criteria for non-towered and non-federal towered airports to over 3,100 non-towered, non-federal towered and FAA tower discontinuance candidate civil airports, based on Terminal Area Forecasts over the 15-year period Fiscal Years 1981 through 1995.

Chapter VII provides a sensitivity analysis of the assumptions used in this report which are uncertain or characterized by judgment.

Chapter VIII provides a "rough" assessment of the impact of the criteria on agency resources to comply with FAA Order 1320.1. The impact is "rough" because (1) it is presently uncertain which specific AWOS configuration will be justified for each qualifying airport, and (2) meeting candidacy levels for non-towered and non-federal towered airports will not mean automatic qualification since benefit/cost screening is but one of several inputs to the FAA decisionmaking process relative to investment in facilities and equipment.

Finally, there are included a number of appendices which support analyses described in the text and a list of references used in the preparation of this report.

## CHAPTER II - SUMMARY OF ESTABLISHMENT AND DISCONTINUANCE CRITERIA

This chapter summarizes the criteria for establishment and discontinuance of AWOS as developed in this report. These criteria do not apply where the National Weather Service (NWS), its agent, or the Department of Defense currently provides surface weather observation services. These newly developed criteria will be published in FAA Order 7031.2B, Airway Planning Standard Number One (APS-1) (Reference 1). APS-1 contains the policy and summarizes the criteria used in determining eligibility of terminal locations for establishment, discontinuance and improvements of air navigation facilities and air traffic control services.

### A. FAA Towered Airports

All FAA towered airports where the surface weather observation function is the responsibility of the FAA qualify for AWOS establishment, except those locations identified as tower discontinuance candidates under the provisions of Paragraph 5 of APS-1. Priority of AWOS establishment at these locations will be given to part-time facilities, followed by full-time facilities, in recognition of the relatively greater benefits of AWOS when facilities are closed. Criteria for the establishment and discontinuance of AWOS at non-federal towered airports and locations identified as tower discontinuance candidates are outlined in paragraph C below.

### B. Flight Service Stations

Where an automated flight service station is obligated to take weather observations, that location qualifies for AWOS establishment. Other locations with flight service stations qualify if they satisfy either the provisions of Paragraph A or C.

### C. Non-Towered and Non-Federal Towered Airports

Establishment and discontinuance criteria for AWOS at non-towered and non-federal towered airports are two-phased. Phase I criteria are simple, generalized criteria designed to initially identify potential candidates. Under Phase I a ratio value is computed by summing the benefits provided to each user class and dividing the sum by the life-cycle cost. If the ratio value obtained is equal to or greater than the thresholds specified below, the airport becomes a candidate for Phase II screening. Phase II is a site-specific computerized life-cycle benefit/cost evaluation of candidates identified in Phase I using the techniques described in this report.

1. Phase I Establishment Criteria

a. Non-Towered and Non-Federal Towered Airports With Existing Standard Instrument Approach Procedures (SIAP) Or With Prospective SIAP With AWOS

Air Carrier and Air Taxi (Lesser of (ACITN+ATITN) or (3,000)) x \$25.38 = \$xxxx

<u>General Aviation and Military</u>	<u>Per Itinerant Operation</u>	<u>Per Local Operation</u>
Wind Sensor	\$ 3.80	\$ 2.28
Temperature/Dew Point Sensors	.04	.02
Altimeter Sensor	2.16	
Ceiling and Visibility Sensors	15.43	
Precipitation Sensor (s)	.06	.04
Thunderstorm Sensor	.01	.01

(GAITN+MILITN)x\$TOTAL = xxxx

(GALCL+MILLCL)x\$TOTAL = xxxx

Phase I Value (If 1.0 or greater, location satisfies Phase I Establishment Criteria)

Total x AR  
LCC

where the terms are as defined below:

ACITN, ATITN, GAITN and MILITN are the respective numbers of annual air carrier (AC), air taxi (AT), general aviation (GA) and military (MIL) itinerant operations; and GALCL and MILLCL are the respective numbers of annual general aviation (GA) and military (MIL) local operations. Operations counts may be obtained from the "Terminal Area Forecasts" (published annually by FAA-APO), the Airport Master Record (FAA Form 5010-1), the Airport Master File (maintained by FAA's National Flight Data Center), the airport manager, or any other generally accepted source. Values for these activity variables in the Phase II criteria described below will be derived from the Terminal Area Forecast Data System.

LCC is the applicable life-cycle cost from Table A below.

AR is an adjusting proximity penalty or remoteness premium reciprocal. For candidate airports located in non-precipitations terrain and less than 10 nautical miles from a full-time, non-automated FAA/NWS/NWS Contract surface weather observation station with homogeneous weather, a proximity penalty reciprocal of .50 applies. For candidate airports that are located 90 or more nautical miles from the nearest full-time, non-automated FAA/NWS/NWS Contract surface weather observation station, a remoteness premium reciprocal of 1.25 applies. The adjustment reciprocal for all other candidate airports is 1.0.

**TABLE A**

**Life-Cycle Cost (LCC)**

LCC = Fixed Cost of \$49,617 + Sum of Variable  
Costs Unique to Applicable Sensing Devices\*  
+ \$21,535 if System has Longline Communications

**\*Variable Costs Unique to Sensing Devices:**

Wind	\$ 1,999
Temperature/Dew Point	1,615
Altimeter	3,974
Ceiling	41,881
Visibility	28,517
Liquid Precipitation	1,367
Freezing Precipitation	3,687
Thunderstorm	23,175

**b. Other Non-Towered and Non-Federal Towered Airports**

**Air Carrier and Air Taxi** (Lesser of (ACITN+ATITN) or (3,000)) x \$25.38 = \$xxxx

<u>General Aviation and Military</u>	<u>Per Itinerant Operation</u>	<u>Per Local Operation</u>
Wind Sensor	\$ 3.80	\$ 2.28
Temperature/Dew Point Sensors	.04	.02
Altimeter Sensor	.00	
Ceiling and Visibility Sensors	.00	
Precipitation Sensor (s)	.06	.04
Thunderstorm Sensor	.01	.01

(GAITN+MILITN)x\$TOTAL = xxxx

(GALCL+MILCL)x\$TOTAL = xxxx

**Phase I Value** (If 1.0 or greater, location satisfies Phase I Establishment Criteria) **Total x AR**  
**LCC**

where the terms are as defined above in paragraph C-1-a.

## 2. Phase I Discontinuance Criteria

To determine whether an AWOS installation at a non-towered or non-federal towered airport meets Phase I discontinuance criteria, a ratio value is calculated by the same procedure for establishment criteria described in paragraph C-1 above. If the ratio value so obtained is less than 0.45, the system meets Phase I discontinuance criteria.

## 3. Phase II Criteria

Candidate airports for AWOS identified by the above criteria will be evaluated by the computerized benefit/cost subroutine developed in this report. If a benefit/cost ratio of 1.0 or greater (for establishment) or less than .45 (for discontinuance) is computed, the airport becomes a candidate. The subroutine requires the following supplemental site-specific data:

- a. System acquisition and installation costs (FAA Form 2500-40, F&E Cost Estimate Summary).
- b. Whether or not optional longline communications are proposed, and if required, the annual cost.

### D. Sensor Configuration

The typical AWOS configuration includes sensors for wind direction and speed, temperature, dewpoint, altimeter, ceiling, visibility and liquid precipitation. However, AWOS installations may include additional or fewer sensors. For example, a cloud height (ceiling) sensor may not be justified at certain locations in close proximity to another observation site, while additional sensors, such as for freezing precipitation and thunderstorms, may be added if cost effective.

### E. Non-Federal AWOS

There will be no takeover of AWOS purchased and installed by parties other than the Federal Government. This provision is an exception to the general policy of paragraph 10 of FAA Order 7031.2B, Airway Planning Standard Number One (Reference 1), which provides eligibility for inclusion of non-federal terminal facilities in the National Airspace System with FAA assumption of ownership, operation, maintenance and logistic support.



## CHAPTER III - LIFE-CYCLE COSTS

### A. Introduction

This chapter examines the life-cycle costs of AWOS at FAA towered airports and non-towered airports. Life-cycle costs are categorized into facilities and equipment (F&E) costs, which are assumed to occur at the beginning of the installation year, and recurring operations and maintenance (O&M) costs, which are assumed to occur at mid-year and are discounted (@ 10 percent) to their present value based on an assumed economic life of fifteen years. The cost analysis in this chapter is based in large part on the Automated Weather Observing System (AWOS) Cost Analysis (Reference 2), performed by Kentron International for the FAA AWOS Program Office. While the costs outlined in Reference 2 are in mixed year dollars, the costs in this analysis are denominated in 1981 dollars to be consistent with benefit valuations and costs in other parts of this report. Certain other modifications were made to the analysis from Reference 2 to adhere to standards of the Office of Management and Budget.

Figure 2 summarizes unit life-cycle cost estimates in 1981 dollars of complete AWOS installations at FAA towered airports operating 24 hours daily and non-towered airports. For purposes of this report, non-federal towered airports are treated as non-towered airports. The cost estimates in Figure 2 reflect quantity procurement of quality equipment presently or soon to be available on the commercial market. AWOS may be tailored to meet site-specific needs. For example, at a particular site, certain weather sensors may not be necessary, certain output media may not be desired, or the telephone answering device or longline communications may not be required. In recognition of this possibility, costs (as well as benefits) are developed modularly in this report. In this way, benefits can be matched with costs and a benefit/cost ratio can be easily computed for any given AWOS configuration. Figure 3 (for FAA towered airports) and Figure 4 (for non-towered airports), by categorizing costs by fixed costs (those which remain generally fixed regardless of the number of sensing devices comprising the system) and variable costs (those which vary depending upon the sensor configuration), provide the means for computing the costs of a given AWOS configuration. The costs in Figures 3 and 4 flow directly from those in Figure 2, based on the methodology explained in the following paragraphs.

### B. Facilities and Equipment Costs

1. Sensors. The sensor costs are carried directly from Figure 2 to Figures 3 and 4, except that the average unit module costs for wind, temperature, dew point, visibility and precipitation signal conditioning are included.
2. Tower, Guys, Anchors.
3. Signal Conditioning. When the sensors are separated from the data processing equipment by large distances, the sensor output must be amplified by a translator or signal conditioning module. In some installations, because of the proximity and compatibility of the sensors with the processor, the signal conditioner may be omitted.

FIGURE 2

Estimated Unit Life-Cycle Costs of Complete AWOS Installations (1981 Dollars)

<u>FACILITIES AND EQUIPMENT<sup>1/</sup></u>	<u>FAA Towered Airports</u>		<u>Non-Towered Airports</u>	
<u>SENSORS</u>				
Wind (Direction and Speed)	\$ 880		\$ 880	
Ambient Temperature and Dew Point	470		470	
Dual Altimeter Setting Sensors	2,160		2,160	
Laser Ceilometer	22,770		22,770	
Visibility (Forward Scatter Meter)	15,300		15,300	
Liquid Precipitation (Quantity)	540		540	
Freezing Precipitation (Yes/No)	1,800		1,800	
Thunderstorm Detection/Location	12,600		12,600	
Tower, Guys, Anchors	+ 570	\$ 57,090	+ 570	\$ 57,090
<u>SIGNAL CONDITIONING</u>				
Enclosure, Rack, Power Supply	\$ 1,210		\$ 1,210	
Modules for Wind, Temperature, Dewpoint, Visibility, Precipitation	1,230		1,230	
Communications Interface Module	+ 410	2,850	+ 410	2,850
CENTRAL PROCESSOR (Including software program)		3,440		3,440
<u>OUTPUT EQUIPMENT</u>				
CRT Display	\$ 1,310		-	
Teletype Printer	1,850		-	
Voice Generator	1,800		\$ 1,800	
Telephone Answering Device	360		360	
Modem	+ 210	+ 5,530	+ 210	+ 2,370
TOTAL EQUIPMENT COST		\$ 68,910		\$ 65,750
INITIAL SPARES (@ 25% of "Total Equipment Cost")		17,230		16,440
OTHER P&E COSTS (@ 35% of "Total Equipment Cost")		+ 24,120		+ 23,010
TOTAL P&E COSTS (INSTALLED)		\$110,260		\$105,200
<u>OPERATIONS AND MAINTENANCE</u>				
<u>PERSONNEL</u>				
Observation	\$ 2,162		\$ 0	
Maintenance	+ 712	\$ 2,874	+ 2,268	\$ 2,268
SPARES INVENTORY (@ 3% of "Total Equipment Cost")		2,067		1,973
COMMUNICATIONS (with Longline) <sup>2/</sup>		2,920		2,920 <sup>2/</sup>
<u>FACILITIES</u>				
TOTAL ANNUAL O&M COSTS <sup>3/</sup>		+ 2,404		+ 1,888
x LIFE-CYCLE DISCOUNT FACTOR <sup>4/</sup>		\$ 10,625		\$ 9,049
TOTAL LIFE-CYCLE O&M COSTS		\$ 7,976		\$ 7,976
<u>TOTAL LIFE-CYCLE COST</u>		\$192,134		\$177,375

<sup>1/</sup>1982 dollars from Reference 2 discounted to 1981 dollars @ 10 percent and rounded to the nearest \$10. The application of a specific price index was considered unwarranted here, given the pro forma, preliminary nature of the estimates in Reference 2. Costs are denominated in 1981 dollars to be consistent with benefit valuations and costs in other parts of this report.

<sup>2/</sup>Optional for non-towered airports. Related to distance.

<sup>3/</sup>Source: Reference 2 (modified).

<sup>4/</sup>Sum of  $(1/(1+i)^{n-0.5})$  for  $n = 1$  to 15, where 'i' is the OMB-prescribed discount rate of 10 percent and 'n' is each year of an assumed economic life of 15 years.

FIGURE 3

Estimated Unit Life-Cycle Costs of AWOS Installations at FAA TOWERED AIRPORTS (1981 Dollars)<sup>1/</sup>

	FIXED COSTS	VARIABLE COSTS UNIQUE TO SENSING DEVICES							
		Wind (Direction & Speed)	Ambient Temperature & Dew Point	Dual Alti-meter Setting Sensors	Laser Cello-meter	Visibility (Forward Scatter Meter)	Liquid Precip. (Qty.)	Freezing Precip. (Yes/No)	Thunderstorm Detection/ Location
<b><u>FACILITIES AND EQUIPMENT</u></b>									
Sensor (including modules)		\$1,085	\$ 880	\$2,160	\$22,770	\$15,505	\$ 745	\$2,005	\$12,600
Tower, Guys, Anchors	\$ 570								
Other Signal Conditioning	1,620								
Central Processor and Software Program	3,440								
Output Equipment	5,530								
Initial Spares (@ 25%)	2,790	271	220	540	5,693	3,876	186	501	3,150
Other P&E (@ 35%)	+ 3,906	+ 380	+ 308	+ 756	+ 7,970	+ 5,427	+ 261	+ 702	+ 4,410
<b>Total</b>	<b>\$17,856</b>	<b>\$1,736</b>	<b>\$1,408</b>	<b>\$3,456</b>	<b>\$36,433</b>	<b>\$24,808</b>	<b>\$1,192</b>	<b>\$3,208</b>	<b>\$20,160</b>
<b><u>OPERATIONS AND MAINTENANCE</u></b>									
Personnel									
Observation	\$ 2,162								
Maintenance	712								
Spares (@ 3%)	335	\$ 33	\$ 26	\$ 65	\$ 683	\$ 465	\$ 22	\$ 60	\$ 378
Communications <sup>2/</sup>	2,920								
Facilities	+ 2,404								
Annual Total	\$ 8,533	\$ 33	\$ 26	\$ 65	\$ 683	\$ 465	\$ 22	\$ 60	\$ 378
x Life-Cycle Discount Factor <sup>3/</sup>	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976
<b>Total</b>	<b>\$68,059</b>	<b>\$ 263</b>	<b>\$ 207</b>	<b>\$ 518</b>	<b>\$ 5,448</b>	<b>\$ 3,709</b>	<b>\$ 175</b>	<b>\$ 479</b>	<b>\$ 3,015</b>
<b>TOTAL LIFE-CYCLE COST*</b>	<b>\$85,915</b>	<b>\$1,999</b>	<b>\$1,615</b>	<b>\$3,974</b>	<b>\$41,881</b>	<b>\$28,517</b>	<b>\$1,367</b>	<b>\$3,687</b>	<b>\$23,175</b>

\*LIFE-CYCLE COST OF A GIVEN SYSTEM = \$85,915 + SUM OF VARIABLE COSTS UNIQUE TO APPLICABLE SENSING DEVICES

<sup>1/</sup> Source: Reference 2 (modified).

<sup>2/</sup> Related to distance.

<sup>3/</sup> Sum of  $(1/(1+i)^{n-0.5})$  for n = 1 to 15, where 'i' is the OMB-prescribed discount rate of 10 percent and 'n' is each year of an estimated economic life of 15 years.

FIGURE 4

Estimated Unit Life-Cycle Costs of AWOS Installations at NON-TOWERED Airports (1981 Dollars)<sup>1/</sup>

	FIXED COSTS	VARIABLE COSTS UNIQUE TO SENSORING DEVICES							
		Wind (Direction & Speed)	Ambient Temperature & Dew Point	Dual Altimeter Setting Sensors	Laser Ceilometer	Visibility (Forward Scatter Meter)	Liquid Precip. (Qty.)	Freezing Precip. (Yes/No)	Thunderstorm Detection/Location
<b><u>FACILITIES AND EQUIPMENT</u></b>									
Sensor (including modules)		\$1,085	\$ 880	\$2,160	\$22,770	\$15,505	\$ 745	\$2,005	\$12,600
Tower, Guys, Anchors	\$ 570								
Other Signal Conditioning	1,620								
Central Processor and Software Program	740								
Output Equipment	2,370								
Initial Spares (@ 25%)	2,000	271	220	540	5,693	3,876	186	501	3,150
Other F&E (@ 35%)	+ 2,800	+ 380	+ 308	+ 756	+ 7,970	+ 5,427	+ 261	+ 702	+ 4,410
<b>Total</b>	<b>\$12,800</b>	<b>\$1,736</b>	<b>\$1,408</b>	<b>\$3,456</b>	<b>\$36,433</b>	<b>\$24,808</b>	<b>\$1,192</b>	<b>\$3,208</b>	<b>\$20,160</b>
<b><u>OPERATIONS AND MAINTENANCE</u></b>									
Personnel									
Observation	\$ 0								
Maintenance	2,268								
Spares (@ 3%)	240	\$ 33	\$ 26	\$ 65	\$ 683	\$ 465	\$ 22	\$ 60	\$ 378
Communications <sup>2/</sup>	220								
Facilities	+ 1,888								
Annual Total	\$ 4,616	\$ 33	\$ 26	\$ 65	\$ 683	\$ 465	\$ 22	\$ 60	\$ 378
x Life-Cycle Discount Factor <sup>3/</sup>	x7.976	x7.976	x7.976	x7.976	x 7.976	x 7.976	x7.976	x7.976	x 7.976
<b>Total</b>	<b>\$36,817</b>	<b>\$ 263</b>	<b>\$ 207</b>	<b>\$ 518</b>	<b>\$ 5,448</b>	<b>\$ 3,709</b>	<b>\$ 175</b>	<b>\$ 479</b>	<b>\$ 3,015</b>
<b>TOTAL LIFE-CYCLE COST*</b>	<b>\$49,617</b>	<b>\$1,999</b>	<b>\$1,615</b>	<b>\$3,974</b>	<b>\$41,881</b>	<b>\$28,517</b>	<b>\$1,367</b>	<b>\$3,687</b>	<b>\$23,175</b>

\*LIFE-CYCLE COST OF A GIVEN SYSTEM = \$49,617 + SUM OF VARIABLE COSTS UNIQUE TO APPLICABLE SENSORING DEVICES (ADD \$21,535 IF SYSTEM HAS LONGLINE COMMUNICATIONS.)

<sup>1/</sup> Source: Reference 2 (modified).

<sup>2/</sup> Does not include longline communications.

<sup>3/</sup> Sum of  $(1/(1+i)^{n-0.5})$  for  $n = 1$  to 15, where 'i' is the OMB-prescribed discount rate of 10 percent and 'n' is each year of an estimated economic life of 15 years.

4. Central Processor.
5. Output Equipment. The outputs of the central data processor can be tailored. Data may be output to a digital display, to a printer, to a voice generator for voice broadcasts to airborne aircraft, to a telephone answering device (i.e., Pilot Automatic Telephone Weather Answering Service), and/or through a modem for inclusion in the National Weather Data Bank.
6. Initial Spares. When an AWOS is installed, spare parts must be available to provide for replacement or repair of malfunctioning equipment. It is assumed that adequate spares can be made available for approximately 25 percent of the "total equipment cost" (F&E costs before costs for "initial spares" and "other F&E").
7. Other F&E Costs. Other F&E costs include system design, compatibility checks, delivery, installation and testing. These costs are estimated at approximately 35 percent of "total equipment cost" (F&E costs before costs for "initial spares" and "other F&E").

C. Operations and Maintenance Costs

1. Observation Personnel.
  - a. FAA Towered Airports. Under existing manual weather observing systems at FAA towered airports, weather observations are taken by NWS personnel, by FAA air traffic control specialists as a secondary function, or in cases where there is a collocated flight service station, by flight service specialists. Recall, however, that the criteria developed in this report for FAA towered airports are applicable only to those locations where the FAA, as opposed to the NWS or its agent, is responsible for the weather observation function. AWOS relieves the workload of the personnel performing these functions by automatically observing, recording and transmitting weather information. At this writing, state-of-the-art AWOS is not capable of measuring all weather phenomena. For example, smoke, haze, dust and fog cannot be identified by commercially available sensors. Such weather data, however, can be manually entered into AWOS as specific remarks when it becomes necessary to augment the automatic observations. Since the need for these manually entered remarks is rare, it is estimated that there will be a reduction of 95 percent in the time devoted to the weather observation function once an AWOS is installed. The NWS has found that about 25 percent of one person's time on duty is required to manually observe, record and transmit the weather (per Reference 2). This factor is the average amount of time required for these functions, taking into account routinely hourly observations during periods of good weather and greater amounts of time monitoring conditions during marginal, changing and hazardous weather. This factor was checked by Reference 2 during visits to FAA facilities and appears valid. Given these

assumptions then, only 1.25 percent of the observer's time (or 18 minutes a day) is necessary to augment AWOS  $((.25 \times (1-.95)) = .0125; .0125 \times 24 \text{ hrs./day} \times 60 \text{ mins./hr.} = 18 \text{ minutes})$ . For an AWOS-equipped towered airport operating 24 hours daily, Figure 5 derives an estimated annual cost of weather observation personnel of \$2,162.

- b. Non-towered Airports. Since there are no weather observation personnel at non-towered airports, other than those with a flight service station, there are no costs that accrue in this category. The pilot is totally dependent upon the output of the automated system.

2. Maintenance Personnel. This analysis assumes that AWOS equipment will be maintained by government-employed maintenance specialists.

- a. FAA Towered Airports. At FAA towered airports, maintenance technicians are assumed to be on site. It is assumed that 4 days annually are required for preventive maintenance and an additional 4 days annually for unprogrammed maintenance. Assuming a GS-11/5 annual salary of \$25,486 over 9 months and \$26,710 over 3 months equates to a weighted 1981 salary of \$25,792. This salary must be adjusted by a fringe benefits overhead factor of 1.26 (per Reference 7). The annual cost of maintenance personnel for AWOS can then be calculated as:

$$(8/365) \times \$25,792 \times 1.26 = \$712$$

- b. Non-towered Airports. The above analysis for FAA towered airports is also applicable to non-towered airports, except that an allowance must be made for travel to and from remote locations. Allowing 4 person-days per year to accommodate travel time and assuming transportation and related travel costs amount to \$150 for each day of travel, the annual maintenance personnel costs for AWOS at a non-towered airport can be calculated as:

$$((12/365) \times \$25,792 \times 1.26) + (8 \times \$150) = \$2,268$$

3. Spares. The costs of recurring annual spares inventories parallels that for initial spares discussed above in paragraph B-6. The estimated average annual cost to repair equipment sent to a depot or manufacturer for reconditioning is assumed to be 1 percent of "total equipment cost" (F&E costs before costs for "initial spares" and "other F&E"). Replacement of those items that are not repairable is estimated at 2 percent of the "total equipment cost."
4. Communications. At FAA towered airports, local weather observations are normally transmitted to the Weather Message Switching Center. Weather observations at non-towered airports may or may not be of such value that they must be transmitted to and collected by the central weather data network. When this information is not essential, no longline is necessary. However, when local observations are of value to the central

FIGURE 5

Estimated Annual Cost of Weather Observation Personnel at an FAA  
Towered Airport Operating 24 Hours Daily (1981 Dollars)<sup>1/</sup>

(A) Annual Hours of Operation (365 x 24)			8,760
(B) Productive Hours Per Observer			
Annual Hours Available (52 x 40)		2,080	
Less: Vacations	120		
Sick Leave	40		
Holidays	88		
Training	<u>+ 20</u>	<u>- 268</u>	1,812
(C) Net Annual Personyears (A/B)			4.83
(D) Annual Supervisory Personyears			<u>+ .61</u>
(E) Total Annual Personyears (C + D)			5.44
(F) Fraction of Observer's Time Required to Augment AWOS			<u>x .0125</u>
(G) Personyears Required Annually to Augment AWOS (E x F)			.0680
(H) Average Annual Salary after Fringe Benefits <sup>2/</sup>			<u>x31,795</u>
(I) Annual Observation Personnel Costs (G x H)			\$ 2,162

<sup>1/</sup>Source: Reference 2 (modified).

<sup>2/</sup>The median 1981 salary of surface weather observation personnel, including NWS personnel, FAA controllers and FAA flight service specialists, was \$25,234. Applying a fringe benefits overhead factor of 26 percent (per Reference 7) results in an average annual salary after fringe benefits of \$31,795.

FIGURE 6

Estimated Annual AWOS Communication Costs (1981 Dollars)

	FAA		Non-Towered Airports	
	<u>Towered Airports</u>		<u>With Longline</u>	<u>Without Longline</u>
Longline*	\$2,700		\$2,700	\$ 0
Telephone	+ 220		+ 220	+ 220
	<u>\$2,920</u>		<u>\$2,920</u>	<u>\$ 220</u>

\*Related to distance.

weather data network, the longline is desirable. Average annual communication costs associated with AWOS are summarized in Figure 6. On a site-specific basis, longline communications costs may vary since they vary with distance.

5. Facilities.

- a. FAA Towered Airports. Facility costs of AWOS include the fair market value of the realty and the costs of utilities associated with the weather observation function. Most weather sensors are mounted outdoors, while their displays and associated electronics are housed indoors. Utility costs include those for the building and power requirements for operation of the sensors, display and associated electronics. At FAA towered airports, where the FAA is responsible for the weather observation function, it is assumed that an area 8 feet by 10 feet (80 square feet) is required to accommodate the equipment. An additional area of 10 feet by 15 feet (150 square feet) is necessary for the observer, but since only 1.25 percent of the observer's time is devoted to augmenting AWOS (as explained above), only 1.25 percent of this area (or about 2 square feet) is chargeable to the weather observation function. At an average fair rental value of \$20 per square foot, the annual cost of floor space is \$1,640 (82 square feet x \$20). Assuming utility costs of \$2 per square foot for the building and \$50 per month for operation of the sensors, display and associated electronics, the annual cost of utilities is \$764 (82 square feet x \$2) + (\$50 per month x 12 months). Adding these charges together, annual facility costs for AWOS at an FAA towered airport total \$2,404.
  
- b. Non-towered Airports. At non-towered airports, total space requirements are assumed to be only 8 feet x 8 feet (64 square feet), because the CRT display and teletype printer are not installed and there is no space requirement for an observer. Assuming utility costs for operation of the sensors, display and associated electronics of \$40 per month and keeping other assumptions as for FAA towered airports, the annual facility costs for AWOS at a non-towered airport total \$1,888 ((64 square feet x \$20) + (64 square feet x \$2) + (\$40 per month x 12 months)).



#### D. Determining the Life-Cycle Cost of a Given System

Since the costs in the chapter are derived modularly, life-cycle costs can be easily estimated for various AWOS configurations. The life-cycle cost of a given AWOS installation can be determined from Figure 3 (for an FAA towered airport) and Figure 4 (for a non-towered airport) by summing the life-cycle fixed costs and the life-cycle variable costs unique to the applicable sensing devices.

For example, an AWOS installation at an FAA towered airport having all the sensors outlined in Figure 3 has a life-cycle cost in 1981 dollars of approximately \$192,000, computed as follows:

Fixed Costs		\$ 85,915
Variable Costs:		
Wind	\$ 1,999	
Temperature/Dew Point	1,615	
Altimeter	3,974	
Ceiling	41,881	
Visibility	28,517	
Liquid Precipitation	1,367	
Freezing Precipitation	3,687	
Thunderstorm	<u>+23,175</u>	
		<u>+106,215</u>
		\$192,130

An AWOS installation at a non-towered airport having all the sensors outlined in Figure 4 has life-cycle costs in 1981 dollars of approximately \$177,000 with and \$156,000 without longline communications, computed as follows:

Fixed Costs		\$ 49,617
Variable Costs:		
Wind	\$ 1,999	
Temperature/Dew Point	1,615	
Altimeter	3,974	
Ceiling	41,881	
Visibility	28,517	
Liquid Precipitation	1,367	
Freezing Precipitation	3,687	
Thunderstorm	<u>+23,175</u>	
		<u>+106,215</u>
		\$155,832
Longline communications, if applicable		<u>+ 21,535</u>
		\$177,367

At the date of this report, the typical AWOS configuration is initially projected by the FAA AWOS Program Office to include sensors for wind direction and speed, temperature, dew point, altimeter, ceiling, visibility and liquid precipitation. However, future configurations may include additional or fewer sensors. For example, a cloud height (ceiling) sensor may not be justified at certain locations in close proximity to another observation site, while additional sensors, such as for freezing precipitation and thunderstorms, may be added if cost effective. The life-cycle costs in 1981 dollars of the basic configuration are outlined below for FAA towered and non-towered airports:

	<u>FAA Towered Airports</u>	<u>Non-Towered Airports</u>
Fixed Costs (Includes longline communications for FAA towered airports)	\$ 85,915	\$ 49,617
Variable Costs:		
Wind	\$ 1,999	
Temperature/Dew Point	1,615	
Altimeter	3,974	
Ceiling	41,881	
Visibility	28,517	
Liquid Precipitation	<u>+ 1,367</u>	<u>+ 79,353</u>
		\$128,970
Longline communications, if applicable	\$165,268	<u>+ 21,535</u> \$150,505

## CHAPTER IV - ESTIMATION AND VALUATION OF AWOS BENEFITS

### A. Introduction

The establishment and discontinuance criteria for AWOS at FAA towered airports are derived in this report through a cost-effectiveness analysis, while those for non-towered and non-federal towered airports are based on a conventional benefit/cost analysis. This chapter examines, in quantitative and qualitative terms, the benefit sides of these analyses. Cost-effectiveness analysis, or more specifically least-cost analysis, concentrates on identifying the least expensive way of producing a given amount of a certain output, or as applied in this report, the most cost effective means of the continued provision of weather observation services at FAA towered airports where the FAA, as opposed to the NWS or its agent, is responsible for the weather observation function. Benefit/cost analysis, as applied in this report, is a quantitative evaluation in which the life-cycle capital, operating and maintenance costs of AWOS are compared with the dollar value of the life-cycle benefits that are expected. Intuitively, benefit/cost ratios of one or more are good investments, while those of less than one are poor investments.

Part 91 of the Federal Aviation Regulations (FAR) requires that all control zones have weather observation services. Since FAA towered airports constitute control zones, weather observations are required at FAA towered airports. Most equipment presently installed in manual weather observing systems is over 20 years old and is approaching or past the end of its economic life (Reference 2). Given these regulatory and operating constraints, Section B of this chapter summarizes a life-cycle cost-effectiveness analysis of various alternative systems of observing, recording and disseminating weather data at FAA towered airports. The analysis clearly shows that AWOS is the most cost effective means of providing weather observation services at FAA towered airports.

Unlike FAA towered airports, weather observation services are not necessarily required at non-towered and non-federal towered airports. Although the continuing growth of aviation has increased the need of and demand for weather observations at additional locations, the costs of labor-intensive weather observing systems has prohibited their expansion. At many airports where the government does not provide weather observation services, commercial operators have established self-operated Supplementary Aviation Weather Reporting Stations (SAWRS) to satisfy FAR Parts 121 and 135 which require weather observations for commercial instrument flight operations. The quantifiable benefits ascribable to the establishment and operation of AWOS at non-towered and non-federal towered airports include safety and efficiency. Safety benefits, addressed in Section C-2 of this chapter, result from reduced incidence of accidents for which unfavorable winds, density altitude, low ceiling/visibility, precipitation or thunderstorms are causes and/or factors. Efficiency benefits, addressed in Section C-3, result from cost avoidance realized by SAWRS operators whose weather observation functions would be replaced by AWOS, reduced incidence of diversions and cancellations of actual and would-be instrument approaches and overflights by visual approaches. Section C-4 outlines proximity penalty

and remoteness premium provisions which compensate for close proximity to or remoteness from a full time, non-automated FAA/NWS/NWS Contract surface weather observation station.

Section D addresses other benefits of AWOS which are termed indirect or intangible because they are difficult to quantify and ascribe site-specifically. These include benefits to departing and enroute aircraft, improved quality of weather information, contribution to the weather communications network, reduced workload of flight service stations, congestion relief at major airports and accident investigation.

AWOS installations may be tailored to meet site-specific needs. Differing requirements for various non-towered and non-federal towered airports may result in establishment of different AWOS configurations. In recognition of this possibility, benefits (as well as costs) for non-towered and non-federal towered airports are developed modularly in this report to facilitate computation of the benefit/cost ratio of the tailored system proposed for the airport in question.

## B. FAA Towered Airports

### 1. Introduction

As mentioned above, FAR Part 91 requires weather observations at FAA towered airports. Most equipment presently installed in manual weather observing systems is over 20 years old and approaching the end of or past its economic life (Reference 2). Some equipment is no longer in production and spare parts are sometimes difficult to find for others. Modern instrumentation provides easier reading with greater accuracy and less maintenance through digital displays as compared to dial instruments currently in general use. Given the state of existing weather observing systems and the regulatory requirement for weather observing services, Section B-2 justifies the regulatory requirement for weather observing systems at FAA towered airports in cost versus benefit terms and then identifies the most cost-effective system through a least-cost analysis of various alternative systems of collecting and disseminating weather data at manned weather observation stations. These alternatives range from replacing current manual weather observing systems with new manual systems to replacing them with AWOS:

#### a. Manual Weather Observing Systems

- (1) FAA or National Weather Service (NWS) Observers
- (2) Contract Observers. Under this option, NWS contracts with private companies or individuals, under NWS oversight, to obtain basic aviation-oriented weather observations (Contract Basic) or complete aviation weather observations (Weather Service Contract Meteorological Observatory or WSCMO).
- (3) Supplementary Aviation Weather Reporting Stations (SAWRS). At many locations where the government does not provide aviation weather observations or where the service is provided only part-time, commercial

operators establish these stations under NWS oversight to satisfy FAA regulations for commercial instrument operations. Equipment and personnel costs are borne by the commercial operator.

b. Automated Weather Observing Systems (AWOS)

Costs are analyzed in Section B-3 for each of the above manual weather observing systems. In Section B-4, the results of the analysis in Section B-3 and the AWOS costs developed earlier in Chapter III are combined and converted to their life-cycle cost equivalents. It will be shown that AWOS is the most cost effective means of providing weather observing services FAA at towered airports.

2. Justification of Weather Observation Services at FAA Towered Airports

As mentioned above, FAA towered airports are required to have weather observation services by virtue of FAR Part 91 which requires weather observations in control zones. Although there are several benefits to these requirements, they are essentially based on safety considerations. Later, in Section C of this chapter, safety benefits are derived for weather observations at non-towered and non-federal towered airports by comparing historic weather-related accident rates with weather observations and weather-related accident rates without weather observations available. This approach to quantifying safety benefits cannot be directly used for FAA towered airports, however, because FAA towered airports have historically had weather observation services. However, by making certain adjustments to the analysis for non-towered and non-federal towered airports, a baseline justification can be derived for the provision of weather observing systems at FAA towered airports.

Figure 7 derives safety benefits of weather observations per activity unit at FAA towered airports for each user class by weather phenomena by analogy with the analysis derived later in Section C of this chapter for non-towered and non-federal towered airports. To account for the impact of more landing aids and other factors which would bear on a comparison of weather-related accident rates with and without weather observations at FAA towered airports, all avertable accident rates are reduced by one third. Avertable wind-related accident rates are reduced an additional third for the air taxi user class and two thirds for the air carrier user class in consideration of their greater aircraft weight and lesser proneness to such accidents as compared to the general aviation user class. Figure 8 applies the results from Figure 7 to 1981 air traffic activity at FAA-operated ATCT's.

The foregoing assumptions were factored into this analysis to account for the historical accident rate differences at airports having many as opposed to few or no landing aids. While these assumptions should not be considered gospel, they do adequately

describe the relative differences in accident potential between these airport types. Thus, the requirement for weather observation services can be justified at FAA towered airports on the basis of safety alone. Of course there are benefits other than safety ones, but the purpose here is simply to ascertain whether or not mandatory weather observation services at FAA towered airports are economically justified. Having established that they are, the analysis now becomes one of cost effectiveness.

FIGURE 7

Extrapolated Safety Benefits of Weather Observations Per Operation at FAA Towered Airports (1981\$)

Weather Phenomenon and User Class	Cost Per Accident (\$000)			Adjusted Avertable Accident Rate <sup>3/</sup> x 10 <sup>-6</sup> Per		Benefit Per					
	Fatalities and Injuries <sup>1/</sup>	Aircraft Damage <sup>2/</sup>	Total	Iitin. Opn.	Local Opn.	AC Iitin Opn	AT Iitin Opn	GA Iitin Opn	GA Local Opn	ML Iitin Opn	ML Iitin Opn
Wind											
AC	\$ 892	\$2,733	\$ 3,625	.823	-	\$ 2.983					
AT	116	60	176	1.646	-		\$ .290				
GA	45	24	69	2.469	1.481			\$ .170	\$ .102		
ML	70	608	678	2.469	1.481					\$1.674	\$1.004
Density Altitude											
AC	207	2,400	2,607	.067	-	.175					
AT	27	52	79	.067	-		.005				
GA	10	21	31	.067	.040			.002	.001		
ML	16	530	546	.067	.040					.037	.022
Ceiling/Visibility											
AC	13,958	5,549	19,507	.925	-	18.044					
AT	1,809	122	1,931	.925	-		1.786				
GA	697	50	747	.925	-			.691	-		
ML	1,085	1,247	2,332	.925	-					2.157	-
Precipitation											
AC	295	3,330	3,625	.075	-	.272					
AT	38	73	111	.075	-		.008				
GA	15	30	45	.075	.045			.003	.002		
ML	23	744	767	.075	.045					.057	.035
Thunderstorms											
AC	121	2,400	2,521	.019	-	.048					
AT	16	52	68	.019	-		.001				
GA	6	21	27	.019	.011			.001	.000		
ML	9	530	539	.019	.011					.010	.006
						\$21.522	\$2.090	\$ .867	\$0.105	\$3.935	\$1.067

- 1/ Probabilities of fatalities, serious injuries and minor injuries per accident (by analogy with non-towered airport analysis in Appendix A) applied to average occupant load factors by user class (per Reference 8) and unit losses in 1981 dollars of \$580,000 per statistical life, \$42,000 per statistical serious injury and \$16,000 per statistical minor injury (per Appendix B and Reference 9).
- 2/ Probabilities of aircraft being destroyed, substantially damaged and minorly damaged per accident (by analogy with non-towered airport analysis in Appendix A) applied to unit losses in 1981 dollars of \$7,100,000, \$157,000, \$64,000 and \$1,600,000 per destroyed aircraft, \$2,400,000, \$52,000, \$21,000 and \$530,000 per substantially damaged aircraft, and \$1,200,000, \$26,000, \$11,000 and \$265,000 per minorly damaged aircraft, for the respective user classes (per Reference 9).
- 3/ Drawn by analogy with analysis for non-towered and non-federal towered airports in Section C of this chapter, except that all avertable accident rates are reduced by one third to allow for the impact of landing aids and other factors at FAA towered airports which would bear on a comparison of weather-related accident rates at FAA towered airports with and without weather observations. Additionally, avertable wind-related accident rates are reduced by one third for the air taxi user class and two thirds for the air carrier user class in consideration of their greater weight and lesser proneness to such accidents.

FIGURE 8

Results of Figure 7 Applied to FY 1981 Air Traffic Activity at Airports With PAA-Operated ATCT's (1981 Dollars)<sup>1/</sup>

	AC	AT	GA	ML	TOTAL	Annualized Cost <sup>4/</sup>	C/C Ratio
Mean, 431 ATCT's <sup>2/</sup>	\$ 473,782	\$ 23,646	\$57,590	\$14,604	\$ 569,622	\$65,653	8.7
Median <sup>2/</sup> , SBV	434,766	24,593	33,300	5,169	497,828	62,077	8.0
ORD	11,082,409	221,406	45,672	15,567	11,365,054	76,386	148.8
ATL	11,604,124	65,996	33,388	13,561	11,717,069	76,386	153.4
LAX	8,369,884	100,855	57,975	11,577	8,540,291	76,386	111.8
DEN	6,781,302	126,533	84,802	7,142	6,999,779	76,386	91.6
DFW	7,400,964	196,475	24,498	3,050	7,624,987	76,386	99.8
5 Least Busy ATCT's <sup>2/</sup> excluding ATCT discontinuance candidates <sup>3/</sup>							
FME	0	0	2,225	78,220	80,445	62,077	1.3
EWA	10,976	2,255	1,934	67,794	82,959	62,077	1.3
GPK	131,177	1,678	34,865	1,021	168,741	76,386	2.2
JLN	98,528	125	15,881	884	115,418	62,077	1.9
ADQ	196,152	138	11,305	30,379	237,974	62,077	3.8

<sup>1/</sup> Source: Reference 10, 1981 edition dated September 30, 1981.

<sup>2/</sup> In terms of 1981 itinerant aircraft operations.

<sup>3/</sup> As tentatively identified in Reference 11 as potential FAA ATCT discontinuance candidates.

<sup>4/</sup> Derived from Figure 16 using weighted costs of manual weather observing systems with PAA, MBE, or WSCIO observation personnel:  $(\$59,350 \times .13147) + (\text{Total Annual O\&M Costs} - \text{Observation Personnel Costs}) + (\text{Daily Operating Hours}/24) \times \text{Observation Personnel Costs}$ . .13147 is the capital recovery factor of a uniform series over 15 periods with present value of \$1 at 10 percent.



### 3. Costs of Manual Weather Observing Systems

#### a. Introduction

As mentioned above, this analysis assumes that since most equipment presently installed in manual weather observing systems is over 20 years old and approaching the end of or past its economic life, new equipment must be scheduled to replace the old. The cost analysis in this section is tailored in large part after the Automated Weather Observing System (AWOS) Cost Analysis (Reference 2), performed by Kentron International for the FAA AWOS Program Office. While the costs outlined in Reference 2 are in mixed year dollars, the costs in the following analysis are denominated in 1981 dollars to be consistent with benefit valuations and costs in other parts of this report. Certain other modifications were made to the analysis from Reference 2 to adhere to standards of the Office of Management and Budget. Costs are categorized into those for replacement observation equipment, observation personnel, maintenance personnel, spaces inventory, communications equipment and facilities.

#### b. Replacement Observation Equipment

Figure 9 outlines estimated observation equipment replacement costs at manned weather observing stations as they are currently structured. The equipment replacement costs outlined in Figure 9 are based on catalog or vendor estimated "off-the-shelf" prices. When appropriate, quantity discounts are taken into account. Installation costs are conservatively estimated in that they are based only on the removal of the old equipment and acquisition of and replacement with the new. Existing cables, wires, supporting structure, etc. are assumed not to require replacement. It is also assumed that transportation charges can be absorbed within the estimates made. Note that NWS-approved equipment at SAWRS facilities, as they currently exist, is far less sophisticated than that installed at FAA and NWS sites. Through austere, this equipment provides the SAWRS operator with an approved capability for obtaining necessary weather observation coverage for his operations. Equipment and personnel costs are borne by the SAWRS operator.

#### c. Weather Observation Personnel

Figure 10 outlines calculations of the estimated annual costs of observation personnel for manual weather observing stations operating 8, 16 and 24 hours per day.

As discussed earlier in Chapter II, the NWS has found that, on average, about 25 percent of one person's time on duty is required to manually observe, record and transmit the weather at airport locations with FAA or NWS observation personnel. This factor is the average amount of time required for these functions, taking into account routinely hourly observations taken during periods of good weather and greater amounts of time monitoring conditions during periods of marginal, changing and hazardous weather. This factor was checked by Reference 2 during visits to FAA facilities and appears valid.

FIGURE 9

Estimated Weather Observation Equipment  
Replacement Costs (1981 Dollars)<sup>1/</sup>

FAA, NWS and WSCMO Stations (except SAWRS-only stations)

Wind Direction and Speed	\$ 1,090
Ambient Temperature and Dew Point	610
Dual Altimeter Setting Indicators	2,300
Laser Ceilometer	22,950
Visibility	15,750
Liquid Precipitation Quantity	540
Signal Conditioning Equipment <sup>2/</sup>	2,430
Display Terminal	+ 1,810
	<u>\$47,480</u>

Contract Basic Stations

Wind Direction and Speed	\$ 1,090
Ambient Temperature and Dew Point	610
Station Pressure	840
Liquid Precipitation Quantity	540
Signal Conditioning Equipment <sup>2/</sup>	2,430
Display Terminal	+ 1,220
	<u>\$ 6,730</u>

SAWRS-Only Stations

Wind Direction and Speed	\$ 810
Ambient Temperature and Dew Point	50
Altimeter Setting Indicator	230
Sight Clinometer and Ceiling Light	+ 810
	<u>\$ 1,900</u>

<sup>1/</sup>1982 dollars from Reference 2 discounted to 1981 dollars @ 10 percent and rounded to the nearest \$10. The application of a specific price index was considered unwarranted here, given the pro forma, preliminary nature of the cost estimates in Reference 2.

<sup>2/</sup>Required for new types of sensors.

FIGURE 10

Estimated Annual Costs of Observation Personnel for Manual Weather Observing Systems (1981 Dollars)<sup>1/</sup>

24 Hour Per Day Facility	FAA		NWS			SAMBS
	ATCF	FSS	NWS Observer	WSCO	Contract Basic	
(A) Annual Hrs. of Opn. (365 x 24)	8,760	8,760	8,760	-	-	8,760
(B) Productive Hrs. Per Observer						
Annual Hrs. Available (52 x 40)	2,080	2,080	2,080	-	-	2,080
Less: Vacations, Sick Leave, Holidays and Training	- 268	- 268	- 268	-	-	- 228
Net Productive Hours	1,812	1,812	1,812	-	-	1,852
(C) Net Annual Personyears (A/B)	4.83	4.83	4.83	-	-	4.73
(D) Annual Supervisory Personyears <sup>2/</sup>	+ .61	+ .61	+ .61	-	-	+ .32
(E) Total Annual Personyears (C + D)	5.44	5.44	5.44	-	-	5.05
(F) Fraction of Time Devoted to WX Observation Function	x .25	x .25	x .25	-	-	x .25
(G) Productive Personyears for Weather Observation Function (E x F)	1.36	1.36	1.36	-	-	1.26
(H) Average Annual Salary after Fringe Benefits	\$38,948 <sup>3/</sup>	\$29,577 <sup>4/</sup>	\$26,859 <sup>5/</sup>			\$16,800
(I) Annual Personnel Costs (G x H)	\$52,969	\$40,225	\$36,528	\$84,300	\$17,520	\$21,168
<u>16 Hour Per Day Facility</u>	\$35,313	\$26,817	\$24,352	\$56,200	\$11,680	\$14,112
<u>8 Hour Per Day Facility</u>	\$17,656	\$13,408	\$12,176	\$28,100	\$ 5,840	\$ 7,056

<sup>1/</sup>Source: Reference 2 (modified). While Reference 2 used a 30 percent fringe benefits overhead factor for government observers, this analysis (as indicated below) uses a 26 percent factor to be consistent with OMB guidelines (Reference 7).

<sup>2/</sup>Ratio of supervisors to employees assumed to be approximately 1:8 for FAA and NWS and 1:15 for SAMBS.

<sup>3/</sup>Weighted GS-12/5 1981 salary of \$30,911 x 1.26 fringe benefits overhead factor (per Reference 7) = \$38,948

<sup>4/</sup>Weighted GS-10/5 1981 salary of \$23,474 x 1.26 fringe benefits overhead factor (per Reference 7) = \$29,577

<sup>5/</sup>Weighted GS-9/5 1981 salary of \$21,317 x 1.26 fringe benefits overhead factor (per Reference 7) = \$26,859

<sup>6/</sup>\$2.00 per hourly observation x 24 hours per day x 365 days per year = \$17,520.

882 P.H.

Under WSCMD contracts, under which complete aviation weather observations are provided, payment is based on the manpower necessary to fulfill the contractual requirements. The average cost of WSCMD contracts was \$88,500 in FY 1982 per Reference 2. Contract Basic agreements provide payment for each hourly weather observation taken. Special observations are not normally taken. The NWS has calculated the average cost of such contracts to be \$1.90 per observation (1980 dollars) per Reference 2. As mentioned earlier, the mixed dollar values in Reference 2 have been converted to and denominated in 1981 dollars in this section to be consistent with benefit valuations and costs in other parts of this report. At a conservative annual rate of increase in personnel costs of 5 percent, the costs cited above for WSCMD and Contract Basic agreements can be restated in 1981 dollars as approximately \$84,300 per year and \$2.00 per observation, respectively.

The primary job responsibility of SAWRS personnel usually is that of company dispatcher and ground handling of aircraft, passengers and crew. Consequently, the weather observation function is a secondary, although necessary, function. It is assumed that 25 percent of the salaries of SAWRS personnel is attributable to the weather observation function. SAWRS personnel costs are borne by the operator, while training of personnel is provided by the NWS.

#### d. Maintenance Personnel

Three levels of maintenance are performed at the observing site: preventive maintenance, repair on-site, and remove/replace/send away for depot or manufacturer repair. Preventive maintenance, which is performed on a periodic schedule, includes operations functional checks, calibration, lens cleaning, etc. On-site repairs include those actions within the capabilities of the local maintenance. Problems which cannot be solved by the local maintenance facility are resolved by replacement and shipping the defective equipment to a depot or manufacturer.

Figures 11 and 12 summarize the annualized cost of maintenance personnel (in 1981 dollars) for manual weather observing systems. Maintenance personnel at weather observing stations are responsible for other, non-weather related equipment also. As an estimate of the maintenance manpower required to maintain existing government manual weather observing systems, this analysis rests on the NWS standard that, on average, approximately 36 percent of technicians' time is devoted to weather equipment (Reference 12 as cited by Reference 2). The NWS standard does not differentiate between a one, two or three shift operation. Maintenance personnel costs under WSCMD contracts are assumed to be the same as NWS locations. Because of the equipment simplicity typical of Contract Basic stations, maintenance manpower costs at these sites are assumed to be half of those at NWS stations. Maintenance of weather equipment installed at SAWRS locations is generally accomplished by the operator or by a maintenance technician under contract.

#### e. Spares Inventory

Spares inventory costs include those of the local spares inventory, spares inventory at higher echelons in the supply system, the maintenance costs at the depot or manufacturer to restore malfunctioning equipment to operational status, and the cost of replacing irreparable equipment.

FIGURE 11

Personyears Devoted Annually to Maintain FAA/NWS/WSCMO  
Manual Weather Observing Systems<sup>1/</sup>

	<u>FAA/NWS/WSCMO</u>
(A) Annual Work Hours (365 x 8)	2,920
(B) Productive Hrs. per Technician Annual Hrs. Available (52 x 40)	2,080
Less: Vacations, Sick Leave, Holidays and Training	<u>- 268</u>
Net Productive Hours	1,812
(C) Net Annual Personyears (A/B)	1.61
(D) Annual Supervisory Personyears <sup>2/</sup>	<u>+ .20</u>
(E) Total Annual Personyears (C + D)	1.81
(F) Fraction of Time Devoted to Weather Observation Equipment <sup>3/</sup>	<u>x .36</u>
(G) Personyears Devoted Annually to Weather Observation Equipment (E x F)	.65

<sup>1/</sup>Source: Reference 2 (modified).

<sup>2/</sup>Assumes ratio of supervisors to employees of approximately 1:8.

<sup>3/</sup>See text.

FIGURE 12

Annual Costs of Maintenance Personnel for Manual  
Weather Observing Systems (1981 Dollars)<sup>1/</sup>

	<u>FAA/NWS/WSCMO</u>	<u>Contract Basic</u>	<u>SAWRS</u>
Personyears Devoted Annually to Weather Observation Equipment	.65 <sup>2/</sup>		
Average Annual Salary after Fringe Benefits	<u>x32,498<sup>3/</sup></u>		
Annual Maintenance Personnel Costs	\$21,124	\$10,562	\$300

<sup>1/</sup> Source: Reference 2 (modified).

<sup>2/</sup> From Figure 11.

<sup>3/</sup> Weighted 1981 salary of \$25,792 x 1.26 fringe benefits overhead factor = \$32,498.

Keeping with the assumption that most present manual weather observing systems are approaching the end of or past their economic lives and must be replaced, the costs of existing spares inventories for these systems are sunk. The cost of establishing an initial spares pool for new manual observing systems is estimated at 25 percent of the cost of the new replacement equipment. As time passes, this pool must be replenished as spares are used to return equipment to operating status. It is estimated that the average annual cost to repair equipment that is annually returned to a depot or manufacturer for reconditioning is 4 percent of the total equipment replacement cost. Further, the average annual cost of equipment that must be procured as replacement for equipment that is no longer repairable is estimated at 8 percent of the total equipment replacement cost. Based on these assumptions, Figure 13 summarizes the estimated costs of establishing the initial spares pool and annual repair and replacement costs.

FIGURE 13

Estimated Spares Inventory Costs for Manual Weather Observing Systems (1981 Dollars)\*

	<u>FAA, NWS and WSCMO Stations (Except SAWRS-Only)</u>	<u>Contract Basic</u>	<u>SAWRS- Only Sites</u>
Initial Spares Costs (@ 25%)	\$11,870	\$1,683	\$ 475
Annual Spares Replenishment Costs			
Repair Cost (@ 4%)	\$ 1,899	\$ 269	\$ 76
Replacement Cost (@ 8%)	+ 3,798	+ 538	+ 152
Total	\$ 5,697	\$ 807	\$ 228

\*Source: Reference 2 (modified).

f. Communications

At FAA towered airports, surface weather data is observed, recorded, communicated to local users, and inputted to the central weather data network for dissemination to other users. Annual communications costs allocable to the weather observation function are shown by station type in Figure 14. At FAA ATCT's and SAWRS locations, weather data is relayed by telephone or electrowriter to the designated FSS for input into the weather data network. Because the communications costs for the weather observing function are small for these facilities, a conservative approach is taken in this analysis of not charging or allocating any communication costs to the weather observation function at these facilities. The standard installation at the majority of FSS's is the Western Union leased Service A which includes maintenance of equipment and circuits. Because communications include not only distributing local weather observations but also receiving weather briefing information (observations, forecasts and NOTAMS) from other stations, only 10 percent of the annual communication costs of FSS's is charged to the weather

observation function in this analysis. At NWS locations, those with NWS observers or NWS contract observers, communications circuits are commercially leased. Since the NWS longline is used exclusively to transmit weather observations from these stations, 100 percent of the annual cost can be charged to the weather observation function.

FIGURE 14

Estimated Annual Communications Costs Allocable to Manual Weather Observing Systems (1981 Dollars)<sup>1/</sup>

	<u>AFCT</u>	<u>FSS</u>	<u>NWS Observer/NWS Contract Observer</u>	<u>SAWRS</u>
Longline <sup>2/</sup>		\$270	\$2,700	
Telephone/Processor/ Electrowriter		+216	216	
Maintenance			1,260	
Spares			+ .90	
Total	\$ 0	\$486	\$4,266	\$ 0

- 1/ 1982 dollars from Reference 2 discounted to 1981 dollars @ 10 percent. The application of a specific price index was considered unwarranted here, given the pro forma, preliminary nature of the estimates in Reference 2.
- 2/ Related distance.

g. Facilities

The discussion of facility costs for manual weather observing systems parallels closely with those discussed in Chapter 3 for AWOS. Facility costs include the fair market value of the realty and the costs of utilities associated with the weather observation function. While most weather sensors are mounted outdoors, their associated electronics and displays are housed indoors. Utility costs include those for the building and power requirements for operation of the sensors, display and associated electronics.

At stations with FAA, NWS or NWS contract observers (except Contract Basic stations), it is assumed that an area of 8 feet by 10 feet (80 square feet) is required to accommodate the equipment. An additional area of 10 feet by 15 feet (150 square feet) is necessary for the observer, but since only 25 percent of the observer's time is devoted to the weather observation function, only 25 percent, or approximately 37 square feet, of this floor area is chargeable to the weather observation function. The total area required is then 117 square feet. A fair market value of \$20 per square foot is assumed. Annual utility costs for the building are estimated at \$2 per square foot and those for operation of the sensors, display and associated electronics are estimated at \$30 per month. At SAWRS and Contract Basic stations, which typically have less equipment, space requirements are assumed to be 8 feet by 6 feet (48 square feet) for the equipment and 25 percent of an area 8 feet by 10 feet (or 20 square feet) for the observer, or a total of 68 square feet. The fair market rental value and annual utility costs for these facilities per square foot is assumed to be the same as those

sites above with FAA, NWS or NWS contract observers, but the costs of power requirements for operation of the sensors, display and associated electronics is assumed to be \$20 monthly. Based on these assumptions, Figure 15 summarizes the facility costs for each of the various manual weather observation alternatives.

#### 4. Summary

Figure 16 summarizes the analysis in this section by deriving unit life-cycle costs for each of the manual weather observation alternatives discussed. By further displaying the life-cycle cost of AWOS, as derived in Chapter III, Figure 16 provides a summarized cost comparison of alternatives for providing weather observation services at manned stations. The acceptable manual weather observing system options at locations with an active ATCT are those with either FAA, NWS personnel, or full-time WSCMD contract personnel taking observations. The Contract Basic option is not an acceptable alternative because its relatively lower cost is based only on limited weather observation coverage and does not reflect transmission of current weather observations to inbound aircraft. The exclusive use of SAWRS at an active ATCT is not considered an acceptable alternative since their weather observations, under current practice, are not always available to other users of the airport. Although these limitations could conceivably be overcome by contractual negotiation and higher costs, the life-cycle costs of these alternatives even with these limitations are greater than those of AWOS.

Figure 16 clearly shows that the life-cycle cost of AWOS at an airport with an active FAA ATCT is less than the life-cycle costs of any of the manual weather observing systems currently in use at manned stations. Additionally, the life-cycle cost of AWOS is less than the costs of manual systems when observations are recorded by personnel at an FSS station. The weighted average life-cycle cost of manual weather observing systems acceptable at locations with an active ATCT is nearly 4 times that for AWOS, a margin which makes AWOS cost effective even at the least active of part-time ATCT's. The comparative advantage of AWOS is even greater when considering that AWOS, when supplemented by controller input for present weather, provides at least as much and usually more service than manual weather observing systems. Therefore, locations with an active FAA ATCT where the surface weather observation function is the responsibility of the FAA automatically qualify for AWOS. Priority of AWOS establishment at these locations will be given to part-time facilities, followed by full-time facilities, in recognition of the relatively greater benefits of AWOS when facilities are closed. AWOS investment criteria for non-federal towered airports and locations that are identified as tower discontinuance candidates will be that used for non-towered airports, as developed in Section C of this chapter and summarized in Chapter II of this report.

The cost of weather observation personnel is by far the greatest single component of the life-cycle cost of each of the various manual weather observing systems. Analysis of Figure 16 shows that for the acceptable manual weather observing systems at FAA towered airports, the weighted life-cycle cost of weather observation personnel represents approximately 55 percent of the weighted total life-cycle cost. Given this materiality, the issue and nature of the costs of weather observation personnel needs to be further scrutinized.

"Cost savings" may be visualized from two perspectives--direct cost savings and efficiency gains. "Direct cost savings," as the name



FIGURE 15

Annual Facility Costs Associated With Manual Weather Observation Functions (1981 Dollars) \*

	<u>FPA and NWS Observation Stations</u> <u>(Except Contract Basic Stations)</u>		<u>SAMBS and Contract Basic Stations</u>	
<b>Building:</b>				
Equipment Space (Sq. Ft.)		80		48
Observer Space	150		60	
Fraction of Time Devoted to Wx. Obs. Function	<u>x.25</u>	<u>+ 37</u>	<u>x.25</u>	<u>+ 20</u>
Total Space Requirement		117		68
Assumed Fair Rental Value/Square Foot		<u>x 20</u>		<u>x 20</u>
		\$2,340		\$1,360
<b>Utilities:</b>				
Equipment Space	117		68	
Utility Cost/Square Foot	<u>x 2</u>	234	<u>x 2</u>	136
Power for Sensors, Display and Associated Electronics		<u>+ 360</u>		<u>+ 240</u>
<b>Total</b>		<b>\$2,934</b>		<b>\$1,736</b>

\*Source: Reference 2 (modified).

FIGURE 16

Summary of Unit Life-Cycle Costs of Weather Observing Systems at Manned Stations Operating 24 Hours Daily (1981 Dollars)

Facilities and Equipment	Automated System <sup>1/</sup>	Manual Systems					Non-Govt. SANS	
		FAA		NWS	Contract			
		ATCF	FSS	Observer	WECMO	Basic		
Equipment (Other than Initial Spares)	\$ 73,312	\$ 47,480	\$ 47,480	\$ 47,480	\$ 47,480	\$ 6,730	\$ 1,900	
Initial Spares	+ 13,576	+ 11,870	+ 11,870	+ 11,870	+ 11,870	+ 1,683	+ 475	
Total	\$ 86,888	\$ 59,350	\$ 59,350	\$ 59,350	\$ 59,350	\$ 8,413	\$ 2,375	
<u>Operations and Maintenance</u>								
Personnel:						11,680		
Observation	\$ 2,162	\$ 52,969	\$ 40,225	\$ 36,528	\$ 84,300	\$ 17,520	\$ 21,168	
Maintenance	712	21,124	21,124	21,124	21,124	10,562	300	
Spares Inventory	1,629	5,697	5,697	5,697	5,697	807	228	
Communications	2,920	0	486	4,266	4,266	4,266	0	
Facilities	2,404	+ 2,934	+ 2,934	+ 2,934	+ 2,934	+ 1,736	+ 1,736	
Total (Annual)	\$ 9,827	\$ 82,724	\$ 70,466	\$ 70,549	\$ 118,321	\$ 34,945	\$ 23,432	
x Life-Cycle Discount Factor <sup>2/</sup>	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976	
Total (15 Years)	\$ 78,380	\$ 659,807	\$ 562,037	\$ 562,699	\$ 943,728	\$ 278,721	\$ 186,894	
<u>Total Life-Cycle Cost</u>	\$ 165,268	\$ 719,157	\$ 621,387	\$ 622,049	\$ 1,003,078	\$ 287,134	\$ 189,269	
Relative Population of Acceptable Alternatives		x .25	x .36	x .37	x .02			
Contribution to Weighted Total		\$ 179,789	\$ 223,699	\$ 230,158	\$ 20,062			
<u>Weighted Total</u>		\$ 653,708						
<u>Typical Parameters</u>								
Wind Direction and Speed	X	X	X	X	X	X	X	
Ambient Temperature and Dew Point	X	X	X	X	X	X	X	
Altimeter:								
Dual Altimeter Setting Indicators	X	X	X	X	X			
Altimeter Setting Indicator							X	
Station Pressure						X		
Visibility	X	X	X	X	X			
Ceiling:								
Laser Ceilometer	X	X	X	X	X			
Sight Clinometer & Ceiling Light							X	
Liquid Precipitation Quantity	X	X	X	X	X	X		
Signal Conditioning Equipment	X	X	X	X	X	X		
Display Terminal	X	X	X	X	X	X		

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<sup>1/</sup>From Figures 2 and 3, after omitting costs associated with sensors for freezing precipitation and thunderstorm detection/location. Freezing precipitation and thunderstorm sensors are not envisioned to be included with initially implemented ANOS installations. Controller input for these and other present weather data are included in the cost of observation personnel.

<sup>2/</sup>Sum of  $(1/(1+i)^n - 0.5)$  for n = 1 to 15, where 'i' is the OMB-prescribed discount rate of 10 percent and 'n' is each year of an assumed economic life of 15 years.

implies, are where actual dollar outlays are reduced with output levels remaining at least constant. Conceptually, or theoretically, direct dollars savings can be realized through reduced staffing levels by replacing labor intensive manual weather observing systems with AWOS. Practically, however, human resources in the short-term are not as interchangeable and substitutable as other factors of production such as equipment and material. This constraint, however, is only short term. In the long-run all costs of production or output are variable. If cost savings are not desired in the direct sense by realizing actual reductions in dollars outlays, cost savings may be realized through "efficiency gains" in which output levels achievable with existing resources increase but actual costs remain constant. With reduced workload, resources can be shifted away from the weather observation function to other activities, thus increasing productivity. Theoretically, this gain should be measured by the opportunity value of the additional output or productivity which can now be realized.

Notwithstanding these "theoretical" considerations, arguments may be postulated from a "practical" sense that cloud the issue on whether or not observer cost savings should be recognized. In cases where FAA controllers perform the weather observation function, it may be argued that since staffing standards are based on peak activity periods and since weather observations are a secondary controller function and normally taken on a time-permitting basis during off-peak periods, any time savings afforded by AWOS has few if any productive alternative uses. In other words, direct cost savings may not be actually achieved since the weather observation function of controllers is only part-time and human resources aren't divisible (ignoring part-time employment), and efficiency gains aren't really achieved since the relatively small number of controller personhours released from the weather observation function wouldn't necessarily be used in a marginally productive manner (i.e., the released time may be productively idle if it is not actually channeled to additional time spent actually observing and controlling traffic). In cases where NWS personnel, NWS contract personnel or FSS personnel perform the weather observation function, these arguments are not as valid because the weather observation function in these cases is a primary rather than secondary function.

On the other hand, it can be argued that during periods of marginal, changing and hazardous weather, weather conditions must be monitored even during busy periods and, therefore, time is taken away from the primary function of controlling traffic.

Aside from the above arguments for and against the recognition of observer cost savings, AWOS can still be shown to be the most cost effective means of providing weather observation services at FAA towered airports on the basis of other cost savings. Figure 17 presents the life-cycle costs other than those for observation personnel for all of the acceptable weather system alternatives. Excluding all costs of observation personnel, the life-cycle cost of AWOS is only 48 percent of the weighted life-cycle cost of the acceptable manual weather observing systems! Even by including costs of observation personnel for AWOS and excluding them for the acceptable manual systems, AWOS still remains less costly.

Since the unit costs used to develop life-cycle costs of AWOS in this report are preliminary estimates, Chapter VII provides a sensitivity analysis of the key assumptions used in this analysis.

FIGURE 17

Unit Life-Cycle Costs of Acceptable Weather Observing Systems at Manned Stations  
Operating 24 Hours Daily Reduced by Life-Cycle Costs of Weather Observation Personnel (1981 Dollars)\*

	Automated System	FAA		NWS	
		ATCT	FSS	NWS Observer	WSCMO
Facilities and Equipment	\$ 86,888	\$ 59,350	\$ 59,350	\$ 59,350	\$ 59,350
Operations and Maintenance					
Total Annual O&M	\$ 9,827	\$ 82,724	\$ 70,466	\$ 70,549	\$118,321
Less Observation Personnel	- 2,162	-52,969	-40,225	-36,528	-84,300
Difference	\$ 7,665	\$ 29,755	\$ 30,241	\$ 34,021	\$ 34,021
x Life-Cycle Discount Factor	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976
O&M Less Observ. Personnel	\$ 61,136	\$237,326	\$241,202	\$271,351	\$271,351
Total Life Cycle Cost Less Observation Personnel	\$148,024	\$296,676	\$300,552	\$330,701	\$330,701
Contribution to Weighted Total		x .25	x .36	x .37	x .02
		\$ 74,169	\$108,199	\$122,359	\$ 6,614
Weighted Total		\$311,341			

\*From Figure 16.

## C. Non-Towered and Non-Federal Towered Airports

### 1. Introduction

Turning now from FAA towered airports to non-towered and non-federal airports, the analysis becomes one based on benefit/cost considerations rather than cost-effectiveness because weather observation services aren't necessarily and universally required or justified at non-towered and non-federal towered airports. In other words, the question becomes not one of identifying the most cost effective means of providing weather observations but rather whether to do so at all. This section explains the nature and quantitative valuation of the benefits of AWOS at non-towered and non-federal towered airports. The corresponding costs were discussed earlier in Chapter III. Safety benefits, addressed in Section C-2, result from reduced risk and incidence of accidents for which unfavorable winds, density altitude, low ceiling and/or visibility, or precipitation are causes and/or factors. Efficiency benefits, addressed in Section C-3, result from cost avoidance realized by commercial operators whose weather observation function would be replaced with AWOS, reduced risk and incidence of diversions and cancellations of actual and would-be instrument approaches and overflights by visual approaches. Section C-4 outlines proximity penalty and remoteness premium provisions which compensate for close proximity to or remoteness from a full-time, non-automated FAA/NWS/NWS Contract surface weather observation station.

### 2. Safety Benefits

#### a. Air Carrier and Air Taxi

FAR Parts 121 (for air carrier) and 135 (for air taxi) require an approved weather observation service for commercial instrument flight operations. When a Part 121 or 135 operator desires to serve an airport for which neither the FAA or the NWS have regular weather observation service or serve it during hours when the service is unavailable, operators often resort to self-operated Supplementary Aviation Weather Reporting Stations (SAWRS). An AWOS installed at an airport which theretofore had a SAWRS would result in cost avoidance to the operator since the need for SAWRS would be eliminated. This cost avoidance is the basis upon which benefits are ascribed to these user classes in this report. While SAWRS benefits lie in both the safety and flight efficiency areas, cost avoidance is an efficiency benefit and further discussion of it is deferred to Section C-3 of this chapter along with other efficiency benefits of AWOS.

#### b. General Aviation

##### (1) Introduction

The approach taken in this safety benefits assessment of AWOS for general aviation at non-towered and non-federal towered airports is (1) to isolate the number, nature and severity of historic accidents which could have been prevented if the pilots involved had prior or improved knowledge of the weather, and (2) to compute the total costs and the per activity unit costs or losses associated with these accidents, or conversely, the total and per activity unit benefits of preventing such accidents. Before addressing the accident analysis in detail, a brief statistical background of total weather-related general aviation accidents is provided to enable the reader to picture avertable general aviation accidents in their proper perspective.

In the years from 1970 through 1979, the numbers of total and fatal general aviation accidents and the numbers of total and fatal general aviation accidents involving weather have remained somewhat constant. The accident rates per operation and per hour flown, however, have decreased with increasing aviation activity over time. Figures 18 and 19 illustrate these trends.

Figure 20 highlights the most common types of weather phenomena attributed by NTSB as being causes or factors in weather-related general aviation accidents from 1975 through 1979. It is noted that unfavorable wind conditions were cited both as a cause and a factor more often than was any other weather phenomenon.

## (2) Accident Analysis

To estimate the number of accidents which might be prevented by AWOS at non-towered and non-federal towered airports, this analysis compares the historic weather-related accident rate where there were no weather observations with that where there were observations. This comparison was made by examining NTSB briefs of all U.S. general aviation accidents involving weather as a cause and/or factor that occurred in calendar year 1979 in either the approach or landing phases of operation. This examination was made by a group of experienced pilots from FAA-APO-230 and Kentron International, Inc. For each accident brief, the group ascertained whether the existence of state-of-the-art AWOS sensing devices would or would not have probably prevented the accident. Each of the above underscored parameters is discussed below in further detail.

First, general aviation accidents for which weather was cited as either a cause or a factor, or both, were taken into account in this safety benefits analysis. In addressing probable cause(s) of an accident, the NTSB considers all facts, conditions and circumstances. The object is to ascertain those cause-effect relationships in the accident sequence about which something can be done to prevent recurrence of the type of accident under consideration. The term "factor" is used, in general, to denote those elements of an accident which further explain or supplement the probable cause(s).<sup>\*</sup> Referring back to Figure 20, it is observed that all weather cause citations combined from 1975 through 1979 accounted for only 1.31 percent of the total causes cited for that period. In contrast, weather-related factors were cited with great regularity in general aviation accidents--they accounted for 31.5 percent of all factor citations. One possible explanation for this higher rate is the inability to determine exactly what part weather plays in an accident. That is to say that investigators may, with great regularity, suspect

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\*Probable Cause(s) - "Condition(s) and/or event(s), or the collective sequence of conditions and/or events that most probably caused the accident to occur. Had the conditions and/or events been omitted from the sequence the accident would not have occurred" (NTSB).

Factor(s) - "Related condition(s) or event(s) which existed or occurred coincident with the condition(s) and/or event(s) that most probably caused an accident but which may or may not have contributed significantly to the accident. The omission of factor(s) from the occurrence would not necessarily have prevented the accident" (NTSB).

FIGURE 18

General Aviation Accidents, 1970-1979

Year	GA Acti- vity (Millions)		Total GA Accidents			Fatal GA Accidents				
	Aircraft Ops. <sup>1/</sup>	Hours Flown <sup>2/</sup>	No. <sup>3/</sup>	Accident Rate		No. <sup>3/</sup>	Accident Rate		Fatalities	
				Per Mil- lion Ops.	Per Mil- lion Hrs.		Per Mil- lion Ops.	Per Mil- lion Hrs.	No. <sup>3/</sup>	No. Per Accident
1970	113.3	26.030	4,712	41.58 <sup>4/</sup>	180.98 <sup>4/</sup>	641	5.65 <sup>4/</sup>	24.59 <sup>4/</sup>	1,310	2.04
1971	109.7	25.512	4,648	42.37	182.19	661	6.03	25.91	1,355	2.05
1972	118.6	26.974	4,256	35.86 <sup>4/</sup>	157.67 <sup>4/</sup>	695	5.83 <sup>4/</sup>	25.65 <sup>4/</sup>	1,426 <sup>5/</sup>	2.05
1973	122.2	29.974	4,255	34.80 <sup>4/</sup>	141.89 <sup>4/</sup>	723	5.30 <sup>4/</sup>	24.05 <sup>4/</sup>	1,412	1.95
1974	126.8	31.413	4,425	34.88 <sup>4/</sup>	140.80 <sup>4/</sup>	729	5.73 <sup>4/</sup>	23.14 <sup>4/</sup>	1,438	1.97
1975	134.2	32.024	4,237	31.56 <sup>4/</sup>	132.24 <sup>4/</sup>	675	5.01 <sup>4/</sup>	21.02 <sup>4/</sup>	1,345	1.99
1976	138.5	33.922	4,193	30.25 <sup>4/</sup>	123.49 <sup>4/</sup>	695	4.99 <sup>4/</sup>	20.37 <sup>4/</sup>	1,320	1.90
1977	142.8	35.792	4,286	30.00 <sup>4/</sup>	119.78 <sup>4/</sup>	702	4.91 <sup>4/</sup>	19.59 <sup>4/</sup>	1,436	2.05
1978	147.0	39.409	4,494	26.98 <sup>4/</sup>	113.98 <sup>4/</sup>	793	4.75 <sup>4/</sup>	20.07 <sup>4/</sup>	1,770 <sup>5/</sup>	2.23
1979	151.3	43.340	4,023	26.59	92.82	678	4.48	15.64	1,367	2.02
Mean	130.4	32.439	4,353	33.49 <sup>4/</sup>	138.58	699	5.33 <sup>4/</sup>	22.00	1,418	2.03
Std. Dev.	-	-	214	5.48 <sup>4/</sup>	28.68	42	0.56	3.24	132	0.09
Annual Rate of Change	.0327	.0583	-.0174	-.0485	-.0715	-.0063	-.0255	-.0490	.0047	-.0011

<sup>1/</sup>Source: Reference 13.

<sup>2/</sup>Source: References 14 and 15.

<sup>3/</sup>Source: Reference 16. Data represents latest revisions. Except for 1979, accident totals exclude all U.S. registered aircraft accidents on foreign soil.

<sup>4/</sup>Suicide/sabotage accidents included in all computations except accident rates (1970-1, 1972-3, 1973-2, 1974-2, 1975-2, 1976-4, 1977-1, 1978-2).

<sup>5/</sup>Includes air carrier fatalities (1972-5, 1978-142) when in collision with general aviation aircraft.

FIGURE 19

General Aviation Weather-Related Accidents, 1970-1979

Year	GA Acti- vity (Millions)		Total GA Accidents			Fatal GA Accidents				
	Aircraft Ops. <sup>1/</sup>	Hours Flown <sup>2/</sup>	No. <sup>3/</sup>	Accident Rate		No. <sup>3/</sup>	Accident Rate		Fatalities	
				Per Mil- lion Ops.	Per Mil- lion Hrs.		Per Mil- lion Ops.	Per Mil- lion Hrs.	No. <sup>3/</sup>	No. Per Accident
1970	113.3	26.030	1,026	9.06	39.42	244	2.15	9.37	588	2.41
1971	109.7	25.512	959	8.74	37.59	255	2.32	10.00	597	2.34
1972	118.6	26.974	974	8.21	36.11	285	2.40	9.27	605	2.40
1973	122.2	29.974	967	7.91	32.26	278	2.27	9.27	619	2.23
1974	126.8	31.413	1,014	8.00	32.28	302	2.38	9.61	702	2.32
1975	134.2	32.024	1,005	7.49	31.88	287	2.14	8.96	645	2.25
1976	138.5	33.922	908	6.56	26.77	262	1.89	7.72	601	2.29
1977	142.8	35.792	952	6.67	26.60	258	1.81	7.21	608	2.36
1978	147.0	39.409	928	6.31	23.55	322	2.19	8.17	759	2.36
1979	151.3	43.340	881	5.82	20.35	276	1.82	6.37	620	2.25
Mean	130.4	32.439	961	7.48	30.68	277	2.14	8.73	642	2.32
Std. Dev.	-	-	47	1.09	6.23	24	.22	1.32	56	.06
Annual Rate of Change	.0327	.0583	.0168	-.0480	-.0708	.0138	.0183	-.0420	.0059	-.0076

<sup>1/</sup>Source: Reference 13.

<sup>2/</sup>Source: References 14 and 15.

<sup>3/</sup>Source: Reference 17. Data represents latest revisions.



FIGURE 20

Weather Phenomena as a Cause/Factor in Weather-Related Accidents, U. S. General Aviation, 1975-1979\*

Weather Phenomenon	1975		1976		1977		1978		1979		Total, 1975-1979			
	C	F	C	F	C	F	C	F	C	F	C	F	C	F
Low ceiling		222	2	199	2	196	1	241	1	235	6	1.27	1,093	22.30
Rain		85		76		93		98		89			441	9.00
Fog	2	168	3	146	2	161		172		179	7	1.48	826	16.85
Snow		53	1	46		37	1	61		52	2	.42	249	5.08
Hail		2		2	1	2		1	1		2	.42	7	.14
Icing conditions—includes sleet, freezing rain, etc.	5	47	5	38	1	31	3	46	3	46	17	3.60	200	4.24
Conditions conducive to carb/ induction system icing	2	77		58		60		53		58	2	.42	306	6.24
Unfavorable wind conditions	63	258	65	254	31	283	24	275	18	260	201	42.58	330	6.73
Wind shear	3	2	9	3	5	7		8	1	13	18	3.81	33	.67
Sudden windshift	12	22	10	11	15	20	7	13	7	15	51	10.67	81	1.65
Turbulence in flight, clear air	5	6	5	11	1	10	2	6		4	13	2.75	37	.75
Turbulence associated with clouds and/or thunderstorms	6	26	5	21	3	26	4	18	3	22	21	4.45	113	2.31
Downdrafts, updrafts	17	57	24	60	14	67	10	43	5	64	70	14.83	291	5.94
Local whirlwind	12	1	4	3	9	2	4	2	5	3	34	7.20	11	.22
Tornado			1			1	1		1	2	3	.64	3	.06
Squall line		1		1		1		3		3			9	.18
Adverse winds aloft		3	1	5	1	2		4		1	2	.42	15	.31
High temperature		14		19		27	1	28		5	1	.21	93	1.90
Obstructions to vision		14		13		16	1	17		12	1	.21	72	1.47
High density altitude (Temp./Dew Point)		87	2	83		97	2	78		81	4	.85	426	8.69
Thunderstorm activity	4	45	5	40	2	44	5	47	1	52	17	3.60	228	4.65
Other		3		5		8		5		9			30	.61
<b>Total Weather C's/F's Cited</b>	<b>131</b>	<b>1,193</b>	<b>142</b>	<b>1,094</b>	<b>87</b>	<b>1,191</b>	<b>66</b>	<b>1,219</b>	<b>46</b>	<b>1,205</b>	<b>472</b>	<b>100.00</b>	<b>4,902</b>	<b>100.00</b>
<b>Total C's/F's Cited</b>	<b>7,970</b>	<b>3,576</b>	<b>7,934</b>	<b>3,245</b>	<b>7,393</b>	<b>2,948</b>	<b>6,473</b>	<b>2,694</b>	<b>6,150</b>	<b>3,098</b>	<b>35,922</b>	<b>100.00</b>	<b>15,561</b>	<b>100.00</b>
<b>% of Total C's/F's Represented by Weather C's/F's</b>	<b>1.64</b>	<b>33.36</b>	<b>1.79</b>	<b>33.71</b>	<b>1.18</b>	<b>40.40</b>	<b>1.02</b>	<b>45.25</b>	<b>0.75</b>	<b>38.90</b>	<b>1.31</b>	<b>-</b>	<b>31.50</b>	<b>-</b>

\*Source: References 16 and 17. Data represents latest revisions. Note that these data represent the number of times the weather phenomenon was cited as a cause and factor, and not the number of related accidents. The number of cause/factor entries made for one accident varies from 1 to a maximum of 10 and averages between 2 and 3.

weather to be a cause but are unable to support such suspicions. It can be conjectured that they then resort to citing it as a factor. Furthermore, no two investigators think or code an accident in precisely the same manner. There are indications in the accident records that the problems associated with weather are not solely meteorological ones. In the cases where weather causes/factors are cited, there exists a high degree of common accident citation with pilot judgment error and operational decision error causes/factors. This observation indicates that the possible problem in this area is the lack of effectiveness of part of the general aviation pilot population to gather, interpret and make decisions about weather conditions. Aside from the cause/factor assignments in the NTSB briefs and as pointed out above, this analysis includes only those accidents which a group of experienced pilots found to be either probably preventable or probably not preventable given the existence of state-of-the-art automated weather sensing devices.

Second, the comparison of accident rates between observation and non-observation environments was limited to a single year. Because of the relatively small variance in the numbers of weather-related accidents between years, as evidenced in Figure 19, this comparison assumes 1979, the most recent year for which NTSB accident records are completed and approved for release, as being representative of an average year.

Third, and finally, this safety benefits analysis rests on general aviation accidents that occurred in either the approach or landing phases of operation. The majority of weather-related accidents occur during these phases of flight. The rationale for excluding accidents occurring during takeoff and climb is that pilots should have adequate knowledge of prevailing weather at the departure airport. While it is conceivable that AWOS might reduce the number of accidents during takeoff, climb and cruise, no benefits are directly ascribed to them in this analysis. They are qualitatively discussed in Section D of this chapter with other indirect or intangible benefits.

To summarize the approach to quantifying the expected safety benefits of AWOS at non-towered and non-federal towered airports:

Preventable Accident Rate Per Activity Unit	=	No. of WX-Related Approach/Landing Accidents w/o WX Observations in 1979 Activity without Wea- ther Observations	-	No. of WX-Related Approach/Landing Accidents with WX Observations in 1979 Activity with Weather Observations
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The numerators in the above ratios were derived by (1) examining NTSB briefs of U.S. general aviation accidents involving weather as a cause and/or factor that occurred in CY 1979 in either the approach or landing phases of operation, and (2) cross-referencing the accident sites and time of accident with an inventory of weather observing stations and their respective operating hours. A statistical summary of accidents in both "with" and "without" observation environments are summarized in Appendices A-1 and A-2, respectively.

The denominators in the above ratios are derived separately by accident cause/factor: low ceiling/visibility accident rates per general aviation itinerant operation; and all others separately per general aviation itinerant operation and local operation. Local operations are performed by aircraft which operate in the local traffic pattern of the airport or within sight of the tower, are known to be departing for, or arriving from, flight in local practice areas within 20 miles of the airport, or executing simulated instrument approaches or low passes at the airport. Itinerant operations are all operations other than local operations. Low ceiling/visibility accident rates are denominated in itinerant operation terms because AWOS sensors for ceiling and visibility would have little impact on the incidence of VFR approaches and most IFR approaches are itinerant. Information provided by AWOS on wind, temperature, dew point, precipitation and thunderstorms benefit both types of operation, but more so itinerant than local. Pilots in local flight arrivals, many of which are of a local practice or touch-and-go nature and of relatively short duration, are likely to have some foreknowledge of local prevailing weather conditions.

Operations counts at FAA towered airports are generally viewed as being more reliable than those at non-towered airports. Emphasis has historically been placed on towered airport operation counts for a number of reasons. First, towered airports represent the largest and most active airports in the country. Secondly, towered airports include most of the air carrier airports and therefore their operations data satisfies a popular area of interest, i.e., air carrier traffic. Third, FAA towered airports are the sites where FAA personnel are located and one of the objectives of operations counts is the determination of the requirements for the size of field staffs. The number of active aircraft, hours flown and pilot registrations are also, to an extent, indicators of general aviation activity in the U.S. and forecasts of such parameters are made annually by the FAA. Actual aircraft operations, however, are the truest representation of traffic for facility investment planning purposes. In light of the sensitivity of activity counts on the safety benefits estimated from weather observation systems, a review was made of alternative measures of general aviation activity rather than relying on one as being the best or preferred estimate. The results of this review are outlined in Figure 21 for calendar year 1979.

Accepting the mean in Figure 21 of 151,440,000 operations in CY 1979, the task then becomes determining how many were itinerant and how many were local and for each of these categories how many occurred with weather observations available and how many in environments with weather observations unavailable. The "weather station status," "tower," and "FSS on airport" codes of the September 1980 National Flight Data Center (NFDC) data base (Reference 22) were used to segregate locations and their respective general aviation operations with and without a weather station on site. The data base was supplemented by other agency data to enhance accuracy and completeness (Reference 21). The September 1980 NFDC data base was used because it was thought to best represent activity occurring in CY 1979. Figure 22 summarizes the analysis. Because total general aviation operations recorded in the data base did not represent the entire population (per Figure 21), the counts were proportionately inflated to represent the entire universe of operations.

FIGURE 21

Estimates of Total General Aviation Operations - CY 1979

General Aviation Pilot and Aircraft Activity Survey (Reference 18)	Survey conducted by the FAA in conjunction with the Civil Air Patrol.	158,360,000* (public use airports only)
Systems Consultants, Inc. (Reference 13)	National GA Operations = $10^6 \times (70 + 4.28 \text{ (Year-1960)})$	151,320,000
QUES'IEK Corp. (Reference 19)		<u>144,640,000</u>
Mean		151,440,000

\*155,600,000 operations in CY 1978 (per Reference 9) x 51.7/50.8 (ratio of millions of GA operations at FAA towered airports, FY 1979 to FY 1978, per Reference 20). Overstated due to inclusion of air taxi operations but understated by exclusion of non-public use airports. Assumed to be offsetting for these purposes.

As mentioned earlier, low ceiling/visibility accident rates are first denominated in terms of instrument approaches and then converted to and in terms of itinerant operations. These rates are first denominated in terms of annual instrument approaches (AIA's) because low ceiling/visibility accidents correlate best with instrument approach activity. Unfortunately, for reasons which will be explained later, reported counts of instrument approaches are unreliable for many non-towered airports. To correct for and guard against unreliable site-specific data, accident rates per instrument approach are converted to more reliable rates per itinerant operation through a generally accepted regression model. The first step of this exercise is to derive estimates of instrument approach activity with and without weather observations available. These are derived in Figure 23 for CY 1979.

FIGURE 22

General Aviation Operations With and Without Weather Observations Available, CY 1979

	<u>GA Operations<sup>1/</sup></u>			<u>Percent</u>		<u>Adjusted to Enter Universe<sup>3/</sup></u>	
	<u>Local</u>	<u>Itinerant</u>	<u>Total</u>	<u>Itinerant</u>	<u>Total</u>	<u>Itinerant</u>	<u>Total</u>
Airports With Observations Available (Where Weather Station Code and/or Tower Code and/or FSS on Site = Yes)	30,087,288	40,617,984	70,705,272	66.03	52.79	45,925,093 <sup>2/</sup>	79,945,176 <sup>4/</sup>
Airports Other Than Above	<u>42,341,634</u>	<u>20,892,670</u>	<u>63,234,304</u>	<u>33.97</u>	<u>47.21</u>	<u>23,625,313<sup>3/</sup></u>	<u>71,494,824<sup>5/</sup></u>
Total	72,428,922	61,510,654	133,939,576	100.00	100.00	69,547,580	151,440,000

<sup>1/</sup>Source: Reference 22.

<sup>2/</sup>40,617,984 x (151,440,000/133,939,576). To preclude specious accuracy, this estimate is rounded to 45,930,000 in the ensuing analysis.

<sup>3/</sup>20,892,670 x (151,440,000/133,939,576). Rounded to 23,630,000 in the ensuing analysis.

<sup>4/</sup>52.79% x 151,440,000 (from Figure 21).

<sup>5/</sup>47.21% x 151,440,000 (from Figure 21).

FIGURE 23

CY 1979 General Aviation Instrument Approaches  
With and Without Weather Observations Available

<u>Facility<sup>1/</sup></u>	<u>W/O WX Observ.</u>	<u>W WX Observ.</u>
Towered Airports, FY 1979 <sup>2/</sup>		919,457
Non-towered and Non-federal Towered Airports, FY 1979 <sup>2/</sup>	186,544	
Non-towered Airports with FSS on Site, FY 1979 <sup>3/</sup>	<del>(30,140)</del> 156,404	<del>30,140</del> 949,597
CY 1979 Adjustment Factor <sup>4/</sup>	<u>x 1.0127</u>	<u>x 1.0127</u>
Total, CY 1979 <sup>5/</sup>	158,390	961,657
Percent	14.141	85.859

<sup>1/</sup>Airports with an NWS observation facility on site but without an FAA ATCT or FSS are excluded. Operations at such airports are relatively nominal.

<sup>2/</sup>Source: Reference 23 and 24.

<sup>3/</sup>Source: References 23, 24, and 25.

<sup>4/</sup>Because the operations counts are for Fiscal Year 1979 (October 1978 - September 1979), they must be adjusted to Calendar Year 1979 (January 1979 - December 1979) to be consistent with other parts of this safety benefits analysis. For approximately 4,000 airports, the Terminal Area Forecasts (Reference 26) report 120.5 and 126.6 million national general aviation operations for Fiscal Years 1979 and 1980, respectively. This data suggests a fiscal to calendar year conversion factor of 1.0127, ignoring compounding, seasonality and other factors  $((120.5 \times 9/12) + (126.6 \times 3/12))/120.5$ .

<sup>5/</sup>To preclude specious accuracy, these estimates are rounded to 158,000 and 962,000 in the ensuing analysis.

As mentioned at the outset of this accident analysis description, the difference in rates of accidents at sites with and without weather observations available is used to estimate the effect of weather observation systems on accidents. The number of cause/factor entries made for any one accident by the NTSB is determined by the judgment of the accident analyst(s), investigator(s) or board member(s) of the NTSB itself and varies with the type of aircraft and injury level. The number of cause/factor entries per accident varies from 1 to a maximum of 10, and averages between 2 and 3. The cause/factor and other NTSB data entries, supplemented with other relevant data, provides enough information about accidents to permit a reasonable assessment of whether or not a weather observation might have prevented the accident.

But this procedure yields the expected number of accidents that might be affected, which is greater than the number that would be prevented. The difficulty with this approach is that other systems may be influencing the accident rate perhaps as much or more than the weather observation itself. One such system is the availability of a precision approach system, as it affects the accidents related to low ceiling/visibility. Airports with higher levels of traffic tend to have both precision approaches and weather observations. So it is difficult to determine which is actually lowering the rate. Although similar difficulties occur with cause/factors other than ceiling/visibility, the difficulty is especially significant here because a major portion of the safety benefit of AWOS at non-towered airports is the reduced risk and incidence of this type of accident. Besides precision approaches, other influences may include airport environment, pilot competence, etc. The unadjusted difference in low ceiling/visibility accidents (from Figure 25) is:

$$\begin{aligned}
 & \text{Acc. Rate W/O WX Obs.} - \text{Acc. Rate W WX Obs.} \\
 &= \frac{25 \text{ accidents}}{158,000 \text{ AIA's}} - \frac{27 \text{ accidents}}{962,000 \text{ AIA's}} \\
 &= .0001582 \text{ per AIA} - .0000281 \text{ per AIA} \\
 &= 1.301 \times 10^{-4} \text{ per AIA}
 \end{aligned}$$

To correct for the influence of precision approach systems and other factors on the "with" weather observation accident rate, the .0000281 value is inflated by the number of times the historic non-precision instrument approach accident rate exceeds the historic precision instrument approach accident rate (3.5 derived from References 10 and 27). The result must then be adjusted by the ratio of precision instrument approaches to total instrument approaches (.73 in 1979):

$$\frac{27 \text{ accidents}}{962,000 \text{ AIA's}} \times 3.5 \times .73 = .0000717$$

Substituting,

$$\begin{aligned}
 & .0001582 \text{ per AIA} - .0000717 \text{ per AIA} \\
 &= .865 \times 10^{-4} \text{ per AIA}
 \end{aligned}$$

It is acknowledged that precision approach systems may have influenced the "without" weather observation accident rate also, but intuitively to only a small degree since relatively few of the instrument approaches in the "without" weather observation environment were precision. It is hoped that this omission is offset by other factors that may influence accident rates but which are not accounted for in this analysis.

Historically, there have been numerous instances where inaccurate AIA counts have been obtained. Reported AIA counts of less active non-towered airports especially appear to be erratic and understated. AIA's at these sites are often obtained using pilot reports, IFR flight plan data, or counts by a neighboring airport. At smaller airports--those that fall far below establishment levels for precision approach facilities but which might otherwise be eligible for an AWOS--there has been little incentive to maintain accurate records of instrument approach activity. Another explanation for AIA inaccuracies is the ambiguity of the definition. Key questions focus on how to treat approaches when the pilot cancels an IFR flight plan while in the air and on the correct identification of the minimum initial approach altitude for each aircraft category. Lastly, it is believed that AIA reporting is typically given low priority by air traffic controllers with actual AIA counting occurring on a time-available basis.

A preferred alternative to using reported general aviation AIA's is to estimate  $AIA_G$  based on annual general aviation itinerant operations and the probability that the weather will require an instrument approach. Systems Control, Inc., (Reference 28) derived the following model for accomplishing this:

$$AIA_G = \frac{GATN}{2} \times (PIFR - P_C) \times (.8 - .5R)$$

where

GATN is the number of annual general aviation itinerant operations,

PIFR is the probability of weather below VFR minima (which is assumed here to be weather in which the visibility is 3 miles or less and/or the ceiling is at a below the minimum initial approach altitude),

P<sub>C</sub> is the probability of weather below IFR minima, and

R is the ratio of general aviation operations to total operations.

The divisor in the first term reflects the assumption that half of operations are landings. The second term (PIFR - P<sub>C</sub>) measures the portion of time that an instrument approach is necessary and can be completed. Accurate determination of this term depends on site specific values of PIFR and P<sub>C</sub>. For a national average, more than 1,000 instrument approach plates were examined and it was determined that the nonprecision approach ceiling minimum for general aviation aircraft is 700 without and 600 with an approved altimeter setting source. The frequency of instrument weather below these ceilings can be obtained from Figure 24, based on average historic distributions of hourly ceiling and visibility observations. A 700 foot ceiling and visibility of 1 mile yields a value of 4.95 percent for P<sub>C</sub> and the VFR minimum ceiling of 1500 feet and visibility of 3 miles yields a value of 13.50 percent for PIFR. The third term (.8 - 5R) tends to reflect what fraction of



Flights have pilots qualified and aircraft equipped to make instrument approaches. Note that if a location that doesn't have an approved instrument approach procedure,  $AIA_{CA}$  would equal zero since  $P_C$  would equal  $PIFR$ .

FIGURE 24

Percentage Distribution of Weather Observations  
Less than Selected Ceilings and Visibilities\*

Ceiling (feet)	Visibility (miles)							
	1/16	1/8	1/4	1/2	3/4	1	1-1/2	3
100	0.34	0.43	0.65	0.99	1.43	1.95	3.10	7.09
200	0.71	0.76	0.89	1.12	1.52	2.02	3.14	7.10
300	1.21	1.24	1.34	1.48	1.79	2.22	3.26	7.13
400	1.89	1.92	2.00	2.13	2.37	2.72	3.63	7.29
500	2.67	2.69	2.77	2.88	3.09	3.39	4.20	7.61
600	3.46	3.49	3.56	3.67	3.84	4.10	4.82	7.99
700	4.36	4.39	4.46	4.57	4.72	4.95	5.60	8.57
800	5.26	5.29	5.36	5.46	5.60	5.81	6.40	9.15
1,000	7.04	7.07	7.14	7.24	7.36	7.54	8.05	10.48
1,500	10.63	10.66	10.73	10.82	10.92	11.06	11.47	13.50
2,000	13.33	13.35	13.42	13.51	13.60	13.74	14.09	15.92
3,000	17.90	17.93	18.00	18.08	18.18	18.29	18.60	20.22

\*Source: Derived from Reference 29.

Using this regression model and national average values, the accident rate differential for low ceiling/visibility accidents can be redenominated from per AIA terms to per itinerant operation terms as follows:

$$\begin{aligned}
 & .865 \times 10^{-4} \text{ per AIA} \\
 = & .865 \times 10^{-4} \text{ per } ((GAITN/2) \times (PIFR - PC) \times (.8 - .5R)) \\
 = & .865 \times 10^{-4} \text{ per } ((GAITN/2) \times (.1350 - .0495) \times (.8 - .5(.85))) \\
 = & 1.387 \times 10^{-6} \text{ per GAITN}
 \end{aligned}$$

The above result will be applicable, of course, only to candidate sites that either already have approved standard instrument approach procedures (SIAP's) or potential SIAP's as the result of installing AWOS. For other candidate sites, this benefit will be suppressed since the benefit accrues essentially only to IFR approaches. Also, this benefit value will be used in the Phase I criteria and for cases where site-specific data are not available. When site-specific data are available, they will be used in the Phase II screening process to compute the site-specific safety benefits afforded by ceiling and visibility sensors.

In addition to low ceiling/visibility accidents, the accident rates with weather observations available for other weather phenomena must also be adjusted for the potential influence that other factors might have. Lacking more specific data, the relative adjustment made to the low ceiling/visibility accident rate with observation available is also applied to the other weather phenomena:  $((.717 \times 10^{-4}) / (.281 \times 10^{-4}))$  or approximately 2.55). These adjustments are illustrated in Figure 25 which summarizes the results of this section. As mentioned earlier, this analysis extends benefits of AWOS detection and reporting of wind, temperature, dew point, precipitation and thunderstorm information separately for itinerant and local operations. Reference 18 suggests that approximately 70 percent of general aviation itinerant operations and 40 percent of general aviation local operations (in both instances excluding air commuter and air taxi from the data base) utilize some source of inflight weather information service. By rough analogy, the ratio of 40 percent to 70 percent, or approximately 60 percent, is used as the ratio of benefits of local operations to itinerant operations.

#### c. Military

Because the characteristics of military aircraft which use civil non-towered and non-federal towered airports are reasonably akin to those of general aviation aircraft (at least within the accuracy of this analysis), the benefits derived in this chapter for the general aviation user class are also ascribed to the military user class. As with reported counts of annual AIA's of general aviation aircraft at non-towered airports, reported AIA's of military aircraft may also be questionable. To guard against this possibility, benefits attributable to reduced accidents related to low ceiling/visibility are denominated in per itinerant operation terms and will apply only to those candidate sites with existing standard instrument approach procedures (SIAP's) or potential SIAP's as the result of installing AWOS.

#### d. Accident Costs

Accident costs consist of losses associated with personal injuries and property damage. Personal injuries are categorized by fatalities, serious injuries, minor injuries and no injuries. Property damage is categorized by aircraft damage and damage to other property. Aircraft are damaged to varying degrees in aviation accidents. Some are completely destroyed, others substantially damaged, and some incur only minor damage or none at all. Because of the high degree of variability in damage to nonaircraft property, no direct allowances are made for such losses in this report. This omission is immaterial because the types of accidents pertinent to this analysis seldom result in physical damage to property other than the aircraft.

The unit values attached to these losses or "critical values" in this report are taken from Report Number FAA-APO-81-3, Economic Values For Evaluation of Federal Aviation Administration Investment and Regulatory Programs (Reference 9). Adjustment of the critical values derived in Reference 9 to 1981 dollars is outlined in Appendix B. Each critical value is briefly described below.

FIGURE 25

Summary Statistics of Avertable General Aviation Accidents Involving Weather As A Cause/Factor in CY 1979

	<u>No. of Accidents<sup>1/</sup></u>		<u>GA Activity (000)<sup>2/</sup></u>		<u>Accident Rate W/O WX</u>		<u>Accident Rate With WX</u>		<u>Difference x 10<sup>-6</sup> Per</u>	
	<u>W/O WX</u>	<u>With WX</u>	<u>W/O WX</u>	<u>With WX</u>	<u>Observ. (x 10<sup>-6</sup> Per</u>	<u>Observ. (x 10<sup>-6</sup> Per</u>	<u>Observ. (x 10<sup>-6</sup> Per</u>	<u>Observ. (x 10<sup>-6</sup> Per</u>	<u>Itin. Opn.</u>	<u>Local Opn.</u>
	<u>Observ.</u>	<u>Observ.</u>	<u>Observ.</u>	<u>Observ.</u>	<u>Itin. Opn.</u>	<u>Local Opn.<sup>3/</sup></u>	<u>Itin. Opn.<sup>4/</sup></u>	<u>Local Opn.<sup>3/</sup></u>	<u>Itin. Opn.</u>	<u>Local Opn.</u>
Unfavorable Winds and Wrong Runway	140	40	23,630 ITN	45,930 ITN	5.925	3.555	2.221	1.333	3.704	2.222
Temperature/Dew Point	5	2	23,630 ITN	45,930 ITN	.212	.127	.111	.067	.101	.060
Low Ceiling/Visibility	25 <sup>5/</sup>	27 <sup>5/</sup>	158 AIA	962 AIA	<u>6/</u>	<u>6/</u>	<u>6/</u>	<u>6/</u>	1.387 <sup>5/</sup>	-
Rain, Hydroplaning or Wet Runway	4	1	23,630 ITN	45,930 ITN	.169	.101	.056	.034	.113	.067
Thunderstorms	2	1	23,630 ITN	45,930 ITN	.085	.051	.056	.034	.029	.017

<sup>1/</sup>Source: Appendices A-1 and A-2. The numbers of accidents listed here are less than those outlined in Figure 19 because of the parameters guiding this analysis (as outlined at the outset of this accident analysis).

<sup>2/</sup>Source: Figure 22.

<sup>3/</sup>60 percent of that per itinerant operation (see text).

<sup>4/</sup>Inflated to allow for factors other than weather observations which may have influenced accident rate differentials. See text.

<sup>5/</sup>Represents only those accidents in which aircraft was on IFR approach. VFR approach accidents were excluded because the existence of an operating weather observing system would probably have had little influence on the course of events.

<sup>6/</sup>Derived in text.

- (1) Value of a Statistical Life. The somewhat subjective and conceptual construct of the value of a statistical life is a basic tool of economists, program planners and others interested in measuring the social benefits associated with investments and regulatory actions in public programs. Although life is felt to be precious and essentially invaluable, economic decisions must be made continually, either explicitly or implicitly, between safety and other competing demands for limited resources. Literature on the subject suggests values ranging from tens of thousands of dollars to several million dollars. Reference 9 outlines alternative approaches to valuing life and finds the "value to self and others" approach to be the most conceptually sound and comprehensive measure for FAA investment and regulatory decisionmaking purposes. As the name suggests, this approach takes into account the value of life to the individual as well as the value of the individual's life to the rest of society. Appendix B illustrates the derivation of the value of a statistical life of \$580,000 in 1981 dollars.
- (2) Unit Costs of Statistical Aviation Injuries. Similar to the value of a statistical life, Reference 9 finds the "value to self and others approach" to provide the most conceptually sound and comprehensive measure of the costs of statistical aviation injuries. Appendix B illustrates the derivation of the estimated unit costs of statistical serious and minor aviation injuries of \$42,000 and \$16,000, respectively, in 1981 dollars.
- (3) Unit Costs of Aircraft Damage. The loss of an aircraft completely destroyed can be taken as the market value of an equivalent replacement. By using actual market values, depreciation and obsolescence are implicitly taken into account. Insurance experience reveals that the average restoration cost of a substantially-damaged aircraft is approximately one-third of its market or replacement value. Repair costs of aircraft incurring minor damage are assumed in this report to be 50 percent of those for substantially-damaged aircraft. Appendix B illustrates the derivation of unit losses associated with various aircraft type categories and degrees of damage in 1981 dollars.

To derive the total historic accident costs associated with weather phenomena which are detectable/measurable by AWOS, the unit critical values updated in Appendix B must be matched against the numbers and severity of personal injuries and aircraft damage. This is done in Figure 26 for each relevant weather cause/factor by quantifying in dollar terms the total costs of the accidents in Appendix A. It is noted that the costs of accidents for which low ceiling or visibility was cited as a cause/factor far exceed the costs of the other accidents.

e. Derivation of Safety Benefits Per Aviation Activity Unit

Given the expected accident costs associated with the various relevant accident cause/factors and the accident statistics from Appendix A, the task now is to translate the costs per accident into costs per activity unit or conversely, the expected contributory benefit per activity unit. This is accomplished in Figure 27. Although the safety benefits derived in this section are computed only for accidents occurring in the approach

FIGURE 26

Costs of General Aviation Accidents Occurring in CY 1979 For Which Cause(s)/Factor(s) Were Cited Which Are Detectable/Measurable By AMOS (Thousands of 1981 Dollars)

Cause/Factor	Number <sup>1/</sup>			Personal Injuries			Aircraft Damage			Total Accident Costs
	Fatal	Serious	Minor	Costs			No. Destroyed x \$50	No. Substantial x \$16	No. Minor x \$8 <sup>2/</sup>	
				Fatal (\$ \$80)	Serious (\$ \$42)	Minor (\$ \$16)				
Unfavorable Winds or Wrong Runway	8	18	47	\$ 4,640	\$ 756	\$ 752	\$ 750	\$2,592	98	\$ 9,498
Temperature/Dew Point	0	0	4	0	0	64	0	112	0	176
Low Ceiling/Visi- bility <sup>3/</sup>	63	25	17	36,540	1,050	272	1,750	272	0	39,884
Rain, Hydroplaning or Wet Runway	0	2	0	0	84	0	50	64	0	198
Thunderstorms	0	0	1	0	0	16	0	48	0	64
<b>Totals</b>	<b>71</b>	<b>45</b>	<b>69</b>	<b>\$41,180</b>	<b>\$1,890</b>	<b>\$1,104</b>	<b>\$2,550</b>	<b>\$3,088</b>	<b>98</b>	<b>\$49,820</b>

<sup>1/</sup>Source: Appendix A. These data are less than those displayed in Figure 19 because this analysis includes only those accidents which a group of experienced pilots found to be probably preventable given availability of weather observations.  
<sup>2/</sup>The unit cost of an aircraft incurring minor damage is assumed to be 50 percent of that of a substantially-damaged aircraft.  
<sup>3/</sup>Includes statistics for only those accidents in which the aircraft involved was on an IFR approach.

FIGURE 27

Safety Benefits Per General Aviation and Military Activity Unit By Weather Phenomenon  
at Non-Towered and Non-Federal Towered Airports

<u>Weather Phenomenon</u>	<u>Expected Preventable Accident Rate (<math>\times 10^{-6}</math>)<sup>1/</sup></u>		<u>Expected Cost Per Accident<sup>2/</sup></u>	<u>Expected Benefit Per</u>	
	<u>Per Itinerant Operation</u>	<u>Per Local Operation</u>		<u>Itin. Opn.</u>	<u>Local Opn</u>
Unfavorable Winds and Wrong Runway	3.704	2.222	\$53,000	\$.1963	\$.1178
Temperature/Dew Point	.101	.060	25,000	.0025	.0015
Low Ceiling/Visi- bility	1.387	-	767,000	1.064	-
Rain, Hydroplaning or Wet Runway	.113	.067	40,000	.0045	.0027
Thunderstorms	.029	.017	21,000	.0007	.0004

<sup>1/</sup>From Figure 25.

<sup>2/</sup>Figure 26 divided by Figure 25, rounded to nearest thousand.

and landing phases of operation, the avertable accident rates in Figure 27 are derived in per operation terms. Denomination in these terms will facilitate application of the criteria developed in this report since aircraft activity statistics are counted and published in such terms. The "per operation" safety benefits derived in Figure 27 are applicable to both the Phase I and Phase II benefit/cost screening processes, except for avertable accidents related to low ceiling/visibility in Phase II. Benefits of avertable low ceiling/visibility accidents will be computed in Phase II using site-specific data. If site-specific data are not available, the Phase II process will use the Phase I benefit.

### 3. Efficiency Benefits

#### a. Introduction

Efficiency benefits accrue to each user class at non-towered and non-federal towered airports as the result of implementing AWOS. Commercial air carrier and air taxi operators who operate and maintain Supplementary Aviation Weather Reporting Stations (SAWRS) realize cost avoidance benefits as a result of AWOS replacing the need for SAWRS. The general aviation and military user classes benefit from the reduced risk and incidence of instrument and visual flight disruptions, thus enhancing accessibility of the airport. These benefits are developed in Section 3b for the air carrier and air taxi user classes, Section 3c for the general aviation user class, and in Section 3d for the military user class.

#### b. Air Carrier and Air Taxi

Approaches to airports in instrument weather conditions are governed by FAR Part 91 for all operators, Part 121 for air carrier operators and Part 135 for air taxi and other commercial operators. These regulations require an approved weather observation service for commercial instrument flight operations. Private operators can still use the airport without a weather observation service operating, but, as discussed later in this section, delays, cancellations, and diversions can result. For the air carrier and air taxi user classes, three alternative approaches were considered for deriving the benefits of avertable flight disruptions afforded by a weather observing system:

- o When an FAR Part 121 or 135 operator desires to serve an airport for which neither the FAA or the NWS have regular weather observations, the operator must resort to a self-operated Supplementary Aviation Weather Reporting Station (SAWRS). Therefore, one approach to assessing the benefits of AWOS to such operators is by reference to the avoided costs of operating a SAWRS. This approach is discussed below in further detail.
- o The second approach considered is based on the avoidance of costs of diversions to an alternate airport. When weather conditions at an airport receiving scheduled service are such that schedules cannot be met, air carriers often provide ground transportation from an alternate airport which is open, or reimburse passengers for meals and lodging until the

destination is accessible. This practice is most common during periods when weather falls below instrument minima. This approach assumes a benefit from avoiding these costs--the value of passengers' time plus whatever aircraft operating costs that are incurred to divert to the alternate airport. Picture, for example, an airport with visual minima of 1500 feet (ceiling) and 3 miles (visibility) and instrument minima of 600 feet and 1 mile. Figure 24, in the preceding section of this chapter, suggests that weather less than visual minima can be expected to prevail on average approximately 13.5 percent of the time and less than instrument minima approximately 4.1 percent of the time. The difference, or 9.4 percent, is the relative time that a Part 121 or 135 operator would be prohibited from serving this airport without the availability of a weather observation service. Since the costs associated with diversions are likely to be much greater than the operator's annualized cost of operating and maintaining a SAWRS, this approach was rejected.

- o The third approach assumes that in the absence of an observing capability, an operator would simply elect not to operate out of the airport. Air passengers tend to make personal or business plans which are not disrupted if the air service is unexpectedly denied them, and may not use a service at all if flights are possible only in visual conditions. Since it is not possible to put a dollar value on denial of service, this approach was rejected.

The avoided cost to an operator taking its own weather observations appears to be the most viable and encompassing approach to quantifying the benefits of AWOS to air carrier and air taxi operators. Figure 28 derives an annualized estimate of this avoided cost of \$9,548. A comparison of the 1981 inventory of SAWRS stations at airports in the fifty United States, Puerto Rico and the Virgin Islands (Reference 30) and their respective air carrier and air taxi operations from the Terminal Area Forecasts (Reference 26) suggests that the typical SAWRS station has 3,000 or more annual air carrier and air taxi operations (i.e., the sum of annual air carrier and air taxi operations is generally 3,000 or more). Therefore, it can be generally said that such airports generally have SAWRS operators which would benefit from the installation of an AWOS.

An argument can also be made for attributing efficiency benefits to the air carrier and air taxi user classes at non-towered and non-federal towered airports without a SAWRS operation on site. Implementation of AWOS at these airports may attract commercial operators over time and induce others to expand, resulting in greater utilization of the airport and potentially enhancing community and regional economic growth by drawing new businesses to the area and enhancing the ability of existing businesses to expand. Many smaller communities, in particular, are dependent upon air transportation to support their economic development. Accordingly, the criteria developed in this report recognize AWOS benefits to commercial operators, either with or without operating a



SAWRS prior to implementing AWOS. The benefits will range from a high of \$9,548 (the annualized cost of a SAWRS) to low of zero (where there are no air carrier or air taxi operations). Expressed in relation to a benefit/cost ratio,

$$\frac{\sum_{n=1}^{15} \left( \frac{\text{Lesser of } ((ACITN + ATITN) \text{ or } (3,000))}{3,000} \times \frac{\$9,548}{(1+i)^{n-.5}} \right)}{LCC}$$

where 'n' is each year of an assumed economic life of 15 years, ACITN and ATITN are the annual numbers of air carrier and air taxi operations, 3,000 is the activity level at or above which characterizes airports with SAWRS, \$9,548 is the annualized cost of a SAWRS, 'i' is the OMB-prescribed discount rate of 10 percent and LCC is the life-cycle cost of AWOS. Note that the value of 3,000 limits the benefits to \$9,548 annually.

FIGURE 28

Annualized SAWRS Operations, Maintenance and Capital Recovery Costs Allocable to Weather Observation Function (1981 Dollars)

Facilities and Equipment Costs

Equipment <sup>1/</sup>	\$ 1,900	
Initial Spares <sup>1/</sup>	+ 475	
Total	\$ 2,375	
Life-Cycle Capital Recovery Factor <sup>2/</sup>	x.13147	\$ 312

Operations and Maintenance Costs<sup>1/</sup>

Personnel		
Observation <sup>3/</sup>	\$ 7,056	
Maintenance	216	
Spares Inventory	228	
Communications	0	
Facilities	<u>1,736</u>	<u>9,236</u>

Annualized Cost \$9,548

<sup>1/</sup>From Figure 16.

<sup>2/</sup>Capital recovery for a uniform series with present value of \$1:  $i(1+i)^n / ((1+i)^n - 1)$ . Applying a 10 percent interest factor (i) and a 15 year economic life (n) yields 0.13147.

<sup>3/</sup>SAWRS are assumed to operate 8 hours daily.

### c. General Aviation

Part c(1) of this section addresses benefits of avertable flight disruptions of general aviation instrument flights. Part c(2) addresses benefits of avertable flight disruptions of general aviation visual flights.

#### (1) Instrument Flights

##### (a) Introduction

Flight disruptions to general aviation instrument flights are comprised of delays, diversions and cancellations. Reducing the risk and incidence of such flight disruptions can be realized through lowered minima requirements allowed with the availability of an on-site altimeter setting source. Delay and diversion benefits are evaluated in this analysis from the perspective of the pilot receiving information from an AWOS while airborne. It is assumed that without the weather observation, the pilot would be unable to descend low enough to see the runway and would be delayed or would fly to an alternate airport. Cancellation benefits are evaluated from the perspective of arrival flights at destination which otherwise would be cancelled if the destination airport doesn't have a weather observing capability.

##### (b) Benefit of Lowered Min.ma

As described in the previous section, each instrument approach procedure specifies a minimum altitude to which a pilot may descend, called the "decision height" (DH) or the "minimum descent altitude" (MDA). The basic criteria for setting landing minima are contained in the third edition of the United States Standard for Terminal Instrument Procedures (TERPS), Handbook 8260.3B (Reference 6). The minimum altitude of approach procedures is increased in relation to the distance from the remote altimeter setting source to account for potential differences in barometric pressure. According to TERPS, paragraph 323b, when the altimeter setting is derived from a source further than 5 miles from the runway threshold, the minima are increased by 5 feet for each mile in excess of five miles.

Until 1976, the use of remote altimeter settings had been authorized by FAA regardless of the terrain between the runway and the remote altimeter setting source. However, Notice N 8260.24 (Reference 5) changed this by prohibiting the use of remote altimeter settings at airports in precipitous terrain. In precipitous terrain or where reasonably homogeneous weather characteristics cannot be determined, the notice requires the DH to be raised 10 feet for each mile the altimeter setting is distant from the runway threshold. An MDA is increased with the same rule, or to 1,500 feet, whichever is greater. The altimeter setting must be no more distant than 50 miles.

Of 1,733 airports currently with approved standard instrument approach procedures, IFR approaches by Part 91 operators at 1,307 (or approximately 75 percent) of these locations are conducted with altitude information

derived from a remote service (Reference 4). Full time remote altimeter setting are required at approximately 931 (54 percent) airports (Reference 4).

The annual benefits to general aviation instrument flights of avoiding flight disruptions because weather observations are available can be expressed as:

$$AB_{AIFD} = AN_{AIFD} \times C_{IFD}$$

where, for avoidable instrument flight disruptions,  $AB_{AIFD}$  is the annual benefit,  $AN_{AIFD}$  is the annual number, and  $C_{IFD}$  is the avoided unit cost.

The annual number of instrument flight disruptions avoided ( $AN_{AIFD}$ ) can be approximated by the product of the annual number of instrument approaches ( $AIA_{GA}$ ) and the probability ( $P_{AIFD}$ ) that a weather observation system would allow the flight to land instead of being disrupted. Through substitution the formula becomes:

$$AB_{AIFD} = AIA_{GA} \times P_{AIFD} \times C_{IFD}$$

The following paragraphs explain the derivation of values for each of the factors in the above formula.

(i) Annual Instrument Approaches ( $AIA_{GA}$ ):

An instrument approach is an approach made to an airport by an aircraft on an IFR flight plan when the visibility is less than 3 miles or the ceiling is at or below the minimum initial approach altitude.

As explained in the previous section, reported AIA's at less active airports are often inaccurate. As in the previous section, this section relies on a regression model by Systems Control, Inc. (Reference 28) for computing  $AIA_{GA}$  in lieu of relying on reported AIA's:

$$AIA_{GA} = \frac{G_{AITN}}{2} \times (P_{IFR} - P_C) \times (.8 - .5R)$$

where

$G_{AITN}$  is the number of annual general aviation itinerant operations,  
 $P_{IFR}$  is the probability of weather below VFR minima (which is assumed here to be weather in which the visibility is 3 miles or less and/or the ceiling is at or below the minimum initial approach altitude),  
 $P_C$  is the probability of weather below IFR minima, and  
 $R$  is the ratio of general aviation operations to total operations.

The divisor in the first term reflects the assumption that half of operations are landings. The second term ( $P_{IFR} - P_C$ ) measures the portion of time that an instrument approach is necessary and can be completed. Accurate determination of this term depends on site specific values of  $P_{IFR}$  and  $P_C$ . For a national average, more than 1,000 instrument approach plates were examined and it was determined that the

nonprecision approach ceiling minimum for general aviation aircraft is 700 without and 600 with an approved altimeter setting source. The frequency of instrument weather below these ceilings can be obtained from Figure 24 in the previous section of this chapter. A 700 foot ceiling and visibility of 1 mile yields a value of 4.95 percent for  $P_C$  and the VFR minimum ceiling of 1500 feet and visibility of 3 miles yields a value of 13.50 percent for  $P_{IFR}$ . The third term (.8 - 5R) tends to reflect what fraction of flights have pilots qualified and aircraft equipped to make instrument approaches.

Using national average values for  $P_{IFR}$ ,  $P_C$  and R,  $AIA_{CA}$  can be solved as follows:

$$\begin{aligned} AIA_{CA} &= (GATN/2) \times (.1350 - .0495) \times (.8 - .5 (.85)) \\ &= .0160 \times GATN \end{aligned}$$

Note that if a candidate site doesn't have an approved instrument approach procedure (SIAP),  $AIA_{CA}$  would by definition be equal to zero because  $P_C$  would equal  $P_{IFR}$ . As indicated above, many locations cannot utilize a remote altimeter setting source and are therefore restricted from having instrument approaches. In those instances where the lack of an on-site altimeter setting source is the sole reason for the absence of an SIAP, the introduction of AWOS with an altimeter sensor could lead to approval of instrument procedures. Therefore, benefits of avertable flight disruptions will apply only to locations with actual or "would-be" standard instrument approach procedures.

The Phase I criteria developed in this report for publication in Airway Planning Standard Number One (Reference 1) are based on national average values for  $P_{IFR}$ ,  $P_C$  and R. The Phase II benefit/cost computer screening program, however, allows site-specific values for these variables. If site-specific values are not available, national averages will be used as default values.

(ii) Probability of Averting a Disruption ( $P_{AIFD}$ )

The probability of avoiding an instrument flight disruption ( $P_{AIFD}$ ) because an AWOS installation has eliminated the remote altimeter setting penalty and lowered minima requirements can be approximated by the relative increase in the percentage of time the airport is above minima for instrument approaches. Using average ceiling minima of 600 feet and 700 feet respectively for instrument approaches with and without an approved altimeter setting source, based on the survey mentioned above,  $P_{AIFD}$  can be expressed as:

$$P_{AIFD} = \frac{(\text{Probability of WX LT 700/1}) - (\text{Probability of WX LT 600/1})}{(\text{Probability of WX LT 1500/3}) - (\text{Probability of WX LT 700/1})}$$

Substituting the values from Figure 24 yields:

$$\begin{aligned} P_{AIFD} &= \frac{4.95\% - 4.10\%}{13.50\% - 4.95\%} \\ &= \frac{0.85\%}{8.55\%} \\ &= .10 \end{aligned}$$

In other words, since the availability of weather observations can be expected to reduce average minima from 700/1 to 600/1, one can expect an increase of 10% in airport utilization during instrument weather conditions and a corresponding 10% decrease in instrument flight disruptions.

(iii) Unit Cost of a Disruption (CIFD)

An FAA-APO-230 document entitled "Benefits of Reduced Flight Disruption" (Reference 31) standardizes the costs of flight disruptions by user class. For general aviation, Reference 31 provides the following:

	<u>Cost Equation</u>	<u>Weight</u>
Delay	$(0.5 V_{PT})n + 0.30 AOC_4$	0.38
Cancellation	$2 V_{PT} n$	0.55
Diversion	$(2.0 V_{PT} + V_{DVG})n + 1.5 AOC_4$	<u>0.07</u>
		1.00

where  $V_{PT}$  is the hourly value of passengers'/occupants' time,  $n$  is the average number of deplaning passengers/occupants from a general aviation flight,  $AOC_4$  is general aviation aircraft variable operating cost per airborne hour, and  $V_{DVG}$  is general aviation passenger handling expenses for diverted passengers. Appendix B derives values for  $V_{PT}$  and  $AOC_4$  of \$19.00 and \$84.00 respectively (1981 dollars). Reference 31 provides values for  $n$  and  $V_{DVG}$  of 2.4 and \$53 respectively (1981 dollars). Substituting,

Delay	$\$ 48.00 \times 0.38 = 18.24$
Cancellation	$\$ 91.20 \times 0.55 = 50.16$
Diversion	$\$344.40 \times 0.07 = \underline{24.11}$
	\$92.51,
	or
	\$93.00

(c) Summary

The formula for determining the annual benefits to general aviation instrument flights of avoiding flight disruptions because a weather observing system has eliminated the remote altimeter setting penalty and lowered minima requirements can be summarized as:

$$\begin{aligned}
 AB_{AIFD} &= AN_{AIFD} \times C_{IFD} \\
 &= AIA_{CA} \times PA_{IFD} \times C_{IFD} \\
 &= .0160 \times GATN \times .10 \times \$93 \\
 &= GATN \times \$.1488
 \end{aligned}$$

## (2) Visual Flights

### (a) Introduction

In addition to benefiting flights approaching an airport in instrument weather conditions, a weather observing system benefits approaching flights in visual conditions as well. In visual conditions it is assumed that a pilot can see the airport and the ground from at least a distance equal to the basic VFR visibility of one mile. The ceiling and visibility data of the observation are not likely to result in avoiding any disruption to the flight. However, the foreknowledge of wind information could in some cases avoid the need to fly over the airport to determine preferred landing direction. The following paragraphs outline the assumptions and methodology used to compute this delay benefit.

### (b) Benefit of Avoided Overflights

An equation similar to that used to compute the benefit of avoided instrument flight disruptions is used to determine the benefit of avoided overflights:

$$AB_{AO} = AN_{AO} \times C_{AO}$$

where, for avoidable overflights,  $AB_{AO}$  is the annual benefit,  $AN_{AO}$  is the annual number, and  $C_{AO}$  is the avoided unit cost.

The annual number of itinerant overflights avoided ( $AN_{AO}$ ) can be approximated by the product of the annual number of general aviation itinerant operations ( $G_{AITN}$ ), the fraction of those that are arrivals ( $F_A$ ), the fraction of those that are conducted in visual conditions ( $F_{VC}$ ), and the fraction of those that can be expected to overfly in the absence of a weather observation ( $F_O$ ). Through substitution the formula becomes:

$$AB_{AO} = G_{AITN} \times F_A \times F_{VC} \times F_O \times C_{AO}$$

The following paragraphs explain the derivation of values for each of the unknown factors in the above formula and derives a solution.

#### (i) Fraction of Total General Aviation Itinerant Operations that are Arrivals ( $F_A$ ):

It is assumed that half of itinerant operations are arrivals.

#### (ii) Fraction of General Aviation Itinerant Arrivals Conducted in Visual Conditions ( $F_{VC}$ ):

Applying national average values of .1350, .0495 and .85 for  $P_{IFR}$ ,  $P_C$  and  $R$  respectively to the SCI model discussed earlier suggests that approximately 3.2 percent (.0160 x 2) of general aviation itinerant arrivals are conducted in instrument conditions. Conversely, the fraction of general aviation itinerant arrivals that are conducted in visual conditions ( $F_{VC}$ ) is 1.0 less .032, or 0.968.

(iii) Fraction of General Aviation VFR Itinerant Arrivals that can be Expected to Overfly in the Absence of a Weather Observation (F<sub>0</sub>)

It is postulated that pilots need to overfly the airport to determine landing direction for some fraction of the total number of approaches to the airport (F<sub>0</sub>). Ignoring intersecting runways, the fraction was deduced in the following way. First, it is assumed that a pilot approaching an airport when the wind is equal to or greater than 15 knots will have some other way of determining the landing direction--either by non-aviation visual indications (e.g., smoke), by weather conditions at a nearby airport, or by the pilot's knowledge of the synoptic situation. For a sample of 24 airports, Reference 32 indicates that the wind is equal to or greater than 15 knots an average of 11 percent of the time.

Second, it is assumed that the pilot can call the Unicom or other aircraft operating in the airport area to determine the landing direction 70 percent of all arrivals. For the other 30 percent of all arrivals, it is assumed that the Unicom is not operating and that no other aircraft could be contacted. This assumption rests on the fact that the relatively busier non-towered airports are the most likely non-towered airports to qualify for AWOS and that these airports are likely to have Unicom and/or aircraft operating in the airport vicinity which could provide the information to the itinerant pilot.

Finally, it is assumed that if the wind is less than 5 knots, and if the pilot has a weather observation system report of that but no contact with Unicom or other aircraft operating at the airport, the pilot would need to overfly the airport anyway, because either landing direction could be used and the pilot would want to observe local conditions which could not be reported by the equipment, or other traffic and preferred direction due to obstructions, terrain, etc. Again from Reference 32, the wind is less than or equal to 5 knots 24 percent of the time.

The fraction of avoidable itinerant overflights is therefore the product of the percentage of time the wind is equal to or greater than 5 and less than 15 knots, and the time Unicom or another aircraft could not have given the landing direction to the pilot. Summarizing, the fraction of general aviation VFR itinerant arrivals that can be expected to overfly in the absence of a weather observation (F<sub>0</sub>) is:

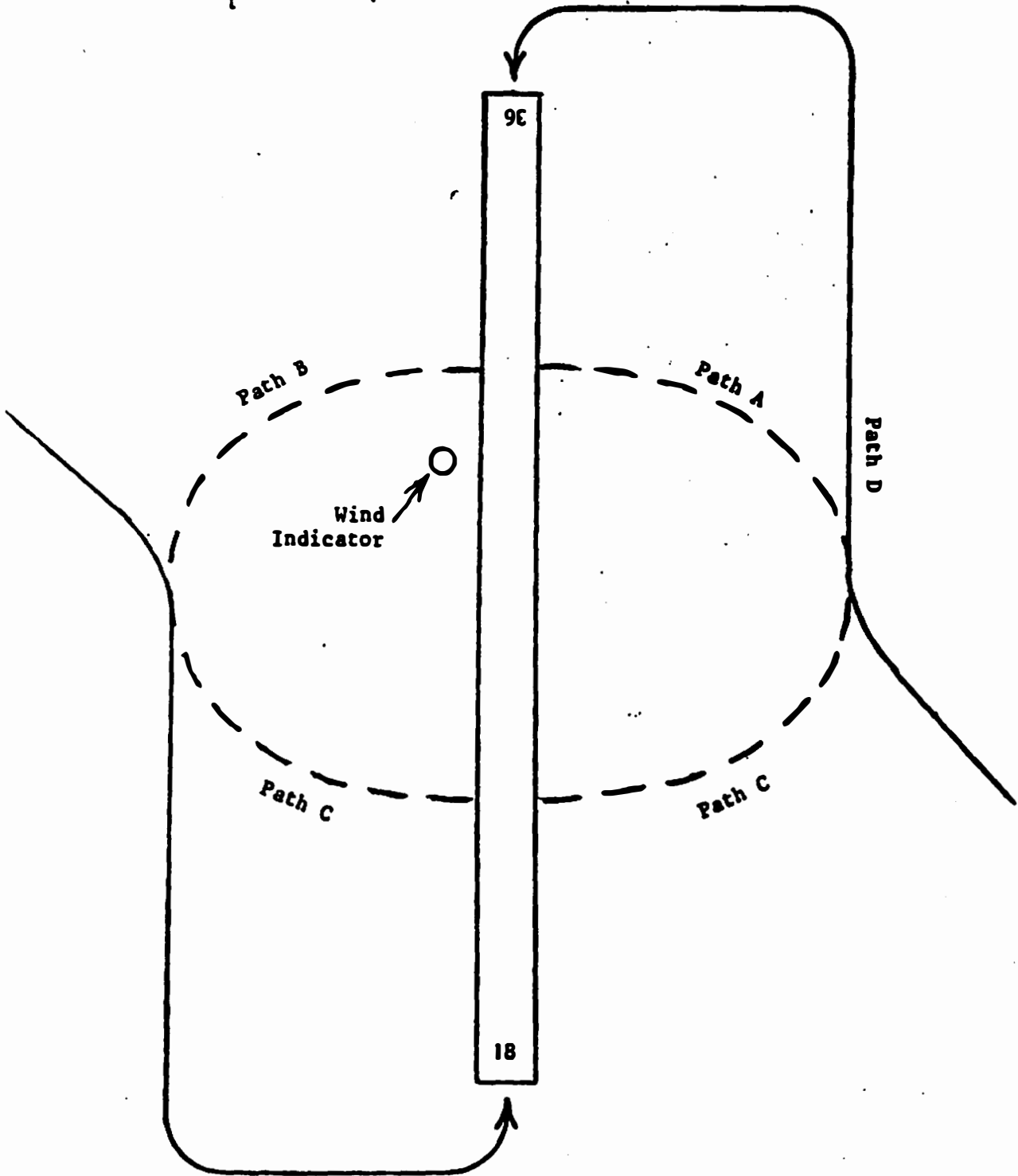
$$\begin{aligned} F_0 &= (1.00 - 0.11 - .24) \times 0.30 \\ &= 0.195 \end{aligned}$$

(iv) Unit Cost of a Disruption (C<sub>AO</sub>)

Figure 29 illustrates a typical one-runway airport with a traffic pattern as recommended in Paragraph 223 of the Airman's Information Manual (Reference 33). It is assumed that an aircraft, approaching to land in the absence of a wind advisory, will fly over the airport to view the wind indicator, as shown on Path A. If the pilot finds that Runway 18 is appropriate for the wind direction shown, no extra flight is required to

FIGURE 29

Typical One-Runway Airport





continue along Path B. If the wind indicates that Runway 36 is preferred, the pilot would have to fly along Path C to land on Runway 36. If he had prior knowledge of the landing direction, he could simply fly Path D. It is estimated that the added time in using Path C results in one extra minute of flying time and that the pilot would arrive from the side of the airport which would necessitate Path C 50 percent of the time. An average of 30 seconds per arrival applied to the weighted general aviation hourly operating cost of \$84.00 from Appendix B (including aircraft variable operating costs and the value of occupants' time of all general aviation aircraft other than turbojets/fans), yields \$.70 as the unit cost of an overflight.

(c) Summary

The formula for determining the annual benefits to general aviation itinerant visual approaches of avoiding overflights can now be solved:

$$\begin{aligned}
 \text{ABAO} &= \text{ANA O} \times \text{CAO} \\
 &= \text{GATN} \times \text{FA} \times \text{FVC} \times \text{FO} \times \text{CAO} \\
 &= \text{GATN} \times 0.50 \times 0.968 \times 0.195 \times \$.70 \\
 &= \text{GATN} \times \$.0661
 \end{aligned}$$

As in the analysis of AWOS safety benefits discussed earlier in Section C-2-b of this chapter, local approaches are likely to benefit from AWOS as well as itinerant approaches, although to a lesser extent. Pilots in many local approaches, such as local practice approaches and touch-and-go's, are likely to have some foreknowledge of prevailing winds and preferred landing direction. Based on the logic used in Section C-2-b, the benefits to local operations are accorded 60 percent of those for itinerant operations. Applying these logic, the annual benefits to general aviation visual approaches per local and itinerant operation become:

\$.0661 per GATN, and  
\$.0497 per GALCL

d. Military

Because the characteristics of military aircraft which use civil non-towered and non-federal towered airports are reasonably akin to those of general aviation aircraft (at least within the accuracy of this analysis), the benefits of reduced flight disruptions derived in this chapter for the general aviation user class are also ascribed to the military user class. As with reported counts of annual instrument approaches (AIA's) of general aviation aircraft at non-towered airports, reported AIA's of military aircraft may also be questionable. To guard against this possibility, benefits attributable to reduced military instrument flight disruptions are also denominated in per itinerant operation terms and will apply only to those candidate sites with existing standard instrument approach procedures (SIAP's) or potential SIAP's as the result of installing AWOS.

#### 4. Proximity Penalty and Remoteness Premium

##### a. Proximity Penalty

Other things being equal, the introduction of an AWOS at an airport which is relatively distant from a surface weather observing station is more beneficial than the introduction of one at an airport which is located relatively close to a surface weather observation station. For example, assume 100 miles separates Airport A from the nearest weather observation station, Site B. Further assume that only 5 miles separates Airport X from its nearest weather observation station, Site Y. Other things being equal, one would expect the actual benefits of a weather observing system at Airport A to exceed those at Airport X.

To compensate for this proximity function and to enhance the ability of the criteria developed in the report to identify the most observing candidate sites for AWOS, a "proximity penalty" is established. Under this provision, the safety and flight disruption benefits of a proposed non-towered or non-federal towered candidate airport for AWOS may be limited depending upon its proximity to neighboring surface weather observation stations. It is postulated that a non-towered or non-federal towered candidate airport for AWOS that is located less than 10 nautical miles from a full-time, non-automated FAA/NWS/NWS Contract surface weather observation station should be credited with only 50 percent of its computed safety and efficiency benefits, except in instances of precipitous terrain or non-homogeneous weather. Conversely, any candidate non-towered or non-federal towered airport that is 10 or more nautical miles from the nearest full-time non-automated surface weather observation station, or whose weather is non-homogeneous with that weather observation station, or which is located in precipitous terrain, should be given full credit for its computed safety and efficiency benefits.

##### b. Remoteness Premium

In contrast to the proximity penalty, an airport far removed from the nearest surface weather observation station will be credited with a premium in consideration of its remoteness. Provision of surface weather observations at remote locations previously without such service benefits not only aviation users but also nonaviation users since society benefits from an enhanced regional and national synoptic weather forecasting capability. It is postulated that a non-towered or non-federal towered candidate airport for AWOS that is located more distant than the current national average distance between FAA/NWS weather observation stations, or 90 miles as derived below, from the nearest full-time, non-automated FAA/NWS/NWS Contract surface weather observation station should be given a premium mark-up of 25 percent on its computed safety and efficiency benefits. In addition to this AWOS remoteness penalty, certain very remote locations may receive still more compensation for their remoteness through the remoteness compensation provisions in Airway Planning Standard Number One (Reference 1) and Remoteness-Compensation Methodology For Benefit/Cost Establishment and Discontinuance Criteria (Reference 34). These latter references provide benefit-enhancement

premiums for a very few sites where relatively large numbers of citizens are without alternative transportation links to the outside world for extended periods of time. Figure 30 derives 6,456 square miles as the national average geographic area covered per FAA and NWS weather observation station. The average distance between observation stations may be approximated by solving for the diameter of a circle representing 6,456 square miles or twice the radius:

$$\pi r^2 = 6,456 \text{ square miles}$$

$$r^2 = 6,456/3.14$$

$$r = 45.34$$

$$2r = 90.68$$

FIGURE 30

Area Covered Per FAA/NWS Weather Observation Station

FAA Region	Square Miles <sup>1/</sup>	Number of Stations <sup>2</sup>				Total	Square Miles Per Station
		ATCT		FSS			
		FAA	NWS	FAA	NWS		
Alaskan (AAL)	589,757	2	4	17	7	30	19,659
Central (ACE)	285,467	7	11	18	3	39	7,320
Eastern (AEA)	180,444	12	23	23	4	62	2,910
Great Lakes (AGL)	480,063	29	29	28	4	90	5,334
New England (ANE)	66,608	14	4	5	1	24	2,775
Northwest Mountain (ANM)	682,945	14	21	30	1	66	10,348
Southern (ASO)	386,609	24	33	36	1	94	4,113
Southwest (ASW)	560,550	22	22	33	2	79	7,096
Western-Pacific (AWP)	<u>389,592</u>	<u>37</u>	<u>13</u>	<u>26</u>	<u>1</u>	<u>77</u>	5,060
Total	3,622,035	161	160	216	24	561	6,456

<sup>1/</sup>Includes continental United States, Alaska, Hawaii, Puerto Rico, and Virgin Islands. Excludes South Pacific and Canal Zone. Source: Reference 35.

<sup>2/</sup>Source: Reference 2.

5. Summary

Figure 31 summarizes the expected annual quantified benefits of AWOS per aviation activity unit, as derived in this chapter.

FIGURE 31

Summary of Expected Annual Benefits of AWOS at Non-Towered and Non-Federal Towered Airports Per Aviation Activity Unit

<u>Nature of Benefit</u>	<u>Required Sensor</u>	<u>Benefit Per Aviation Activity Unit By User Class</u>	
		<u>Air Carrier and Air Taxi</u>	<u>General Aviation and Military</u> <u>Per Itin. Opn. Per Local Opn.</u>
<b>Safety (Prevented Accidents By Weather Phenomena)</b>			
Unfavorable Winds and Wrong Runway	Wind	\$ .1963	\$ .1178
Temperature/Dew Point	Temperature/Dew Point	\$ .0025	\$ .0015
Low Ceiling/Visibility	Ceiling/Visibility	\$1.064 <sup>1/</sup>	-
Rain, Hydroplaning, Wet Runway	Precipitation	\$ .0045	\$ .0027
Thunderstorms	Thunderstorms	\$ .0007	\$ .0004
<b>Efficiency</b>			
Avoidance of SAMS Costs		\$9,548/Number of AC + AT Operations	
Reduced Disruptions to Instrument Flights	Altimeter	\$ .1488 <sup>1/</sup>	-
Reduced Disruptions to Visual Flights	Wind	\$ .0661	\$ .0397
<b><u>Total Direct Benefits</u></b>		<b><u>Sum of Applicable Benefits x Adjustment Reciprocal<sup>2/</sup></u></b>	

<sup>1/</sup>Applies only to locations with actual or "would-be" standard instrument approach procedures.

<sup>2/</sup>Adjusting Penalty or Premium Reciprocals:

- a. Proximity Penalty Reciprocal = .50. Applies to candidate airports located in non-precipitous terrain and less than 10 nautical miles from a full-time, non-automated surface weather observation station operated by the FAA, the NWS or under NWS contract when both locations have homogeneous weather.
- b. Remoteness Premium Reciprocal = 1.25. Applies to candidate airports that are located 90 or more nautical miles from the nearest full-time, non-automated FAA/NWS/NWS contract surface weather observation station.
- c. Adjustment reciprocal for all other candidate airports = 1.

## D. Indirect Benefits

### 1. Introduction

In addition to the direct benefits of AWOS addressed up to this point--safety benefits and efficiency benefits--there remain a number of other important benefits which are termed "indirect" or "intangible" benefits in this report. These benefits include safer and more efficient route selection, improved quality of weather information, contribution to the weather communications network, benefits to departing and enroute aircraft, congestion relief at major airports and accident investigation. Attribution of these benefits to specific sites is questionable. Therefore, they are considered in this report qualitatively rather than in quantitative terms.

### 2. Nature of Indirect Benefits

- a. Benefits to Departing and Enroute Aircraft. Sections C-2 and C-3 earlier in this chapter address the safety and efficiency benefits that can be expected to accrue to approaching aircraft at non-towered and non-federal towered airports as a result of an operating AWOS. In addition to approaching aircraft, AWOS may benefit departing and enroute aircraft as well. Although departing pilots should generally have adequate knowledge of prevailing weather at the departure airport, the availability of weather observation data enhances the ability of a pilot to plan for and execute the safest and most efficient route, weather-wise. But as with the other indirect benefits described in this section, these benefits are not easily evaluated with respect to criteria application. Enroute benefits, especially, are difficult, if not impossible, to ascribe site-specifically.
- b. Improved Quality of Weather Information. AWOS, as compared with manual weather observing systems, can be expected to improve the quality of weather information. Weather information gathered and disseminated by a manual weather observation site, because of its labor intensive nature, may be unavailable if the observing site is closed, be aged depending on the frequency of observations, and be subject to variances in consistency. AWOS, on the other hand, is capable of providing continuously available, real time and consistent observations.
- c. Contribution to the Weather Communications Network. Any addition to the weather communications network benefits not only aviation users but also non-aviation users since society benefits from an enhanced regional and national synoptic weather forecasting capability.
- d. Reduced Workload of Flight Service Stations. The demand for services being levied on flight service stations (FSS's) is great and is forecast to increase over the next several years. A study of the FSS system under the joint auspices of the FAA and the Department of Defense (Reference 36) indicates that further accelerated demands on the presently constituted system could result in an unacceptable deterioration in the quality and quantity of FSS services. This condition is one of several which has led to planning for future

automation of the FSS network. It will be several years, however, until the network is fully automated. In the interim, implementation of AWOS will reduce the workload burden of FSS's. As indicated in several other parts of this report, locations with an automated flight service station which is obligated to take weather observations automatically qualify for AWOS establishment. Other FSS locations qualify if they satisfy the benefit/cost-based criteria developed in the report and published in Airway Planning Standard Number One (Reference 1).

- e. Congestion Relief at Major Airports. Airspace capacity problems exist today at several U.S. airports, primarily in the busy hub areas. Terminal airspace capacity is limited by the physical layout of many airports and by the ability of the air traffic control system to meter and space aircraft for safe operations. The expanded use of satellite or reliever airports in metropolitan areas is one of several alternatives often considered as an efficient method of relieving increasing traffic congestion at primary air terminals. Significant diversions of traffic to satellite airports are hindered, however, by the lack of incentives to draw traffic away from the primary terminals. Provision of weather observing systems at satellite airports is thought to provide some incentive to attract aircraft away from primary terminals in two ways. First, as discussed in other sections of this chapter, FAR Parts 121 (for air carrier operators) and 135 (for air taxi operators) prohibit instrument operations at airports which do not have approved weather observation services. Implementation of AWOS at a satellite airport previously without a weather observation service, therefore, would at least open and hopefully attract commercial operators to the airport. Second, private general aviation pilots may be attracted to satellite airports if they can be provided with adequate weather information. Other things being equal, they may be induced to minimize the risk of delay associated with many hub airports by utilizing satellite airports.
- f. Accident Investigation. Since AWOS is capable of storing and retrieving weather information, benefits may potentially accrue to aircraft accident investigations.

CHAPTER V - DEVELOPMENT OF PHASE I CRITERIA FOR NON-TOWERED  
AND NON-FEDERAL TOWERED AIRPORTS

In this chapter, Phase I screening criteria for non-towered and non-federal towered airports are derived for incorporation in Airway Planning Standard Number One (Reference 1). Phase I criteria are generalized criteria designed to initially identify potential candidates. These criteria are easily applied with available data and without the aid of a computer. Phase II is a site-specific computerized benefit/cost screening process against which candidates identified under Phase I are further evaluated. Figures 34-A and 34-B of Chapter VI provide computer-generated Phase I and II benefit/cost ratios (before proximity penalty or remoteness premium, if any) for over 3,100 non-towered, non-federal towered and FAA tower discontinuance candidate civil airports in the Terminal Area Forecast Data System.

AWOS may be tailored to meet site-specific needs. For example, at a particular site, certain weather sensors, certain output media, the telephone answering device or long line communications may not be required. In recognition of this possibility, both Phase I and II criteria are developed modularly in this report. In this way, a benefit/cost ratio can be easily computed for any given AWOS configuration. At the date of this report, the typical AWOS configuration is projected by the FAA AWOS Program Office to include sensors for wind direction and speed, temperature, dew point, ceiling, visibility and liquid precipitation. However, future configurations may include additional or fewer sensors. For example, a cloud height (ceiling sensor) may not be justified at certain locations in close proximity to another observation site, while additional sensors, such as for freezing precipitation and thunderstorm, may be added if cost effective.

As explained earlier, many locations cannot utilize a remote altimeter setting source and are therefore restricted from having instrument approaches. Assuming the lack of an on-site altimeter setting source is the sole reason for the absence of an approved standard instrument approach procedure, the introduction of AWOS could lead to the approval of instrument procedures. Therefore, two sets of Phase I criteria are developed in this section: one set for non-towered and non-federal towered airports with existing standard instrument approach procedures or locations currently without instrument approach procedures solely because of the absence of an on-site altimeter setting source, and another set for all other non-towered and non-federal towered airports.

For the air carrier and air taxi user classes, Section C-3-b of Chapter IV derived a range of annual benefits based on a sliding scale ranging from a high of \$9,548 (for 3,000 or more annual operations) to a low of zero (where there are no air carrier or air taxi operations). The life-cycle benefits accruing to these user classes can be expressed as:

$$\sum_{n=1}^{15} \left( \frac{\text{Lesser of } ((ACITN + ATITN) \text{ or } (3,000))}{3,000} \times \frac{\$9,548}{(1+i)^{n-.5}} \right)$$

where 'n' is each year of an assumed economic life of 15 years, ACITN and ATITN are the respective numbers of annual air carrier and air taxi itinerant operations, 3,000 is the activity level at or above which characterizes locations with SAWRS, and \$.0394 is the quotient of  $3,000 / (\$9,548 \times 7.976)$ . In the later expression 3,000 is the activity break point, \$9,548 is the annualized cost of a SAWRS, and 7.976 is the life-cycle discount factor (present value of a uniform series of \$1:  $((1+i)^n - 1) / i(1+i)^n$  for n = 1 to 15 where 'i' is the OMB-prescribed discount rate of 10 percent and 'n' is each year of an assumed economic life of 15 years).

The Phase I benefit/cost ratio life-cycle equivalent for the general aviation and military user classes is simply the quotient of (1) the product of the total first year benefits, the net discount factor with which first year benefits can be inflated to their life-cycle equivalent, and the proximity penalty or remoteness premium (if any), and (2) the life-cycle cost of the AWOS proposed for the airport in question. These procedures are displayed and summarized in Figures 32 and 33.

It is important that there be a close relationship between the results of Phase I and Phase II. If not, one or both of two undesirable situations can occur. First, locations may show up as candidates under Phase I but fail to reflect an acceptable benefit/cost ratio under Phase II, a situation which is termed "false alarm." Secondly, but more critically, locations may not show up as candidates under Phase I but attain a benefit/cost ratio of 1 or more under Phase II screening, a situation termed "non-identification." In the development of the Phase I establishment criteria, the emphasis was to minimize the non-identification rate but still maintain a reasonable relationship between the benefit/cost ratios derived from both phases.

When an AWOS installation is being considered for discontinuance, initial acquisition and installation costs are irrelevant since they are sunk costs. The only relevant costs are recurring operations and maintenance costs (ignoring salvage costs, relocation costs, etc.). To determine whether a system qualifies for discontinuance, a ratio value is calculated by the applicable approach described above for Phase I establishment criteria. If the ratio value so obtained is less than 0.45, the location satisfies Phase I discontinuance criteria. This figure is an approximation of the level where the remaining life-cycle benefits just offset recurring life-cycle operations and maintenance costs.



FIGURE 32

Methodology for Phase I Establishment Criteria for AWCs at Non-Towered and Non-Federal Towered Airports

<u>User Class</u>	<u>Total First-Year Benefits<sup>1/</sup></u>	<u>Life-Cycle Benefits Inflation</u>	<u>Product or Quotient</u>
<u>Air Carrier and Air Taxi</u>	<u>(Lesser of (ACITN+ATITN) or (3,000)) x \$9,548</u> 3,000	7.273	XXXX
<u>General Aviation and Military</u>			
Wind Sensor	\$ .2624 x (GAITN+MILITN) + \$.1575x (GALCL+MILLCL)	14.500	= \$XXXX
Temperature/Dew Point Sensors	\$ .0025 x (GAITN+MILITN) + \$.0015x (GALCL+MILLCL)	14.500	= \$XXXX
Altimeter Sensor	\$ .1488 x (GAITN+MILITN)	14.500	= \$XXXX
Ceiling and Visibility Sensors	\$1.0640 x (GAITN+MILITN)	14.500	= \$XXXX
Precipitation Sensor (s)	\$ .0045 x (GAITN+MILITN) + \$.0027x (GALCL+MILLCL)	14.500	= \$XXXX
Thunderstorm Sensor	\$ .0007 x (GAITN+MILITN) + \$.0004x (GALCL+MILLCL)	14.500	= \$XXXX

73

Phase I Value

Sum of Applicable Benefits x AR<sup>2/</sup>  
Life-Cycle Cost From Figure 4

<sup>1/</sup>Source: Figure 31

<sup>2/</sup>Adjustment Reciprocal (AR):

- a. Proximity Penalty Reciprocal = .50. Applies to candidate airports located in non-precipitous terrain and less than 10 nautical miles from a full-time, non-automated surface weather observation station operated by the FAA, the NWS or under NWS contract when both locations have homogeneous weather.
- b. Remoteness Premium Reciprocal = 1.25. Applies to candidate airports that are located 90 or more nautical miles from the nearest full time, non-automated FAA/NWS/NWS contract surface weather observation station.
- c. Adjustment reciprocal for other candidate airports = 1.

550

FIGURE 33

Phase I Establishment Criteria for ANOS at Non-Towered and Non-Federal Towered Airports

<u>User Class</u>	<u>Airports With Existing Standard Instrument Approach Procedures (SIAP) or With Prospective SIAP With ANOS</u>	<u>Other Non-Towered and Non-Federal Towered Airports</u>	<u>Product</u>
<u>Air Carrier and Air Taxi</u>	<u>Lesser of (ACITN+ATITN) or (3,000)</u> \$.0394	<u>(Lesser of (ACITN+ATITN) or (3,000)) x \$25.38</u>	= \$XXXX
<u>General Aviation and Military</u>			
Wind Sensor	\$ 3.80x (GAITN+MILITN) +\$2.28x (GALCL+MILLCL)	\$3.80x (GAITN+MILITN) +\$2.28x (GALCL+MILLCL)	= \$XXXX
Temperature/Dew Point Sensors	\$ .04x (GAITN+MILITN) +\$ .02x (GALCL+MILLCL)	\$ .04x (GAITN+MILITN) +\$ .02x (GALCL+MILLCL)	= \$XXXX
Altimeter Sensor	\$ 2.16x (GAITN+MILITN)	\$0.00x (GAITN+MILITN)	= \$XXXX
Ceiling/Visibility Sensors	\$15.43x (GAITN+MILITN)	\$0.00x (GAITN+MILITN)	= \$XXXX
Precipitation Sensor (s)	\$ .06x (GAITN+MILITN) +\$ .04x (GALCL+MILLCL)	\$ .06x (GAITN+MILITN) +\$ .04x (GALCL+MILLCL)	= \$XXXX
Thunderstorm Sensor	\$ .01x (GAITN+MILITN) +\$ .01x (GALCL+MILLCL)	\$ .01x (GAITN+MILITN) +\$ .01x (GALCL+MILLCL)	= \$XXXX
<u>Phase I Value</u>	<u>(If 1.0 or greater, location satisfies Phase I establishment criteria.)</u>		<u>(Sum of Applicable Benefits x AR Life Cycle Cost From Figure 4)</u>

**CHAPTER VI - RESULTS OF APPLYING CRITERIA TO NON-TOWERED AIRPORTS,  
NON-FEDERAL TOWERED AIRPORTS AND ATCT DISCONTINUANCE CANDIDATES**

The computer program described in Appendix C, based on the benefit/cost methodology described in Chapters III, IV-C and V, was used to compute benefit/cost ratios for approximately 3,300 non-towered and non-federal towered civil airports and 50 FAA towered airports tentatively identified as tower discontinuance candidates by Reference 11 based on the Terminal Area Forecasts (TAF) over the 15-year period Fiscal Years 1981 through 1995. The results are outlined in Figures 34-A (for non-towered and non-federal towered civil airports) and 34-B (for tentatively-identified FAA ATCT discontinuance candidates). Locations where surface weather observations are currently provided by or under contract with the National Weather Service are not listed. Figure 34-A is sequenced by Region-State and descending Phase II benefit/cost ratio and Figure 34-B is sequenced by location identifier code. Statistical summaries are provided at the ends of Figures 34-A and 34-B.

Figures 34-A and 34-B presume installation and corresponding life-cycle costs and benefits of AWOS with sensors for wind direction and speed, temperature, dew point, altimeter, ceiling, visibility and liquid precipitation. While this is the typical AWOS configuration envisioned by the AWOS Program Office as of the date of this report, future configurations may include additional or fewer sensors. For example, a cloud height (ceiling) sensor may not be justified at certain locations in close proximity to another observation site, while additional sensors, such as for freezing precipitation and thudnerstorms, may be added if cost effective.

It may be recalled from Chapter IV that while benefits of altimeter, ceiling and visibility sensors are functions of annual instrument approaches (AIA's), they are denominated in per itinerant terms in the criteria because reported AIA counts at many airports are often inaccurate and unreliable. The results in Figures 34-A and 34-B allow for these benefits as a function of itinerant operations only if the TAF reflects a positive value for AIA's. If the AIA fields in the TAF read zero, these benefits are suppressed. This same procedure will apply in actual application of the criteria. In the relatively few instances where the installation of AWOS would lead to the approval of instrument approach procedures where theretofore there were none, this suppression will not be applied in actual practice.

Finally, Figures 34-A and 34-B do not reflect any proximity penalty or remoteness premium that might be applicable as a result of the airport's proximity to or remoteness from other surface weather observation stations.

FIGURE 34-A

RESULTS OF APPLYING CRITERIA TO NON-TOWERED AND NON-FAA TOWERED CIVIL AIRPORTS  
(SITES WHERE NWS CURRENTLY OBSERVES WEATHER ARE EXCLUDED)

REG	LOCID	AIRPORT NAME	CITY	ST	LC SAFETY BENS	LC EFFICY BENS	GA+ML AIA'S YR 1	PHASE I B/C*	PHASE II B/C
ALASKAN REGION									
AAL	OTZ	RALPH WIEN MEMORIAL	KOTZEBUE	AK	1209024.	293728.	1169.	5.29	9.98
AAL	UMT	UMIAT	UMIAT	AK	442469.	179060.	413.	3.61*	4.13*
AAL	ANI	ANIAK	ANIAK	AK	229446.	141113.	233.	1.44	2.46
AAL	TKA	TALKEETNA	TALKEETNA	AK	211891.	116827.	197.	1.84*	2.18*
AAL	SXQ	SOLDOTNA	SOLDOTNA	AK	152541.	155150.	0.	6.03	2.09
AAL	PAQ	PALMER MUNI	PALMER	AK	110327.	141374.	0.	1.56	1.67
AAL	BTT	BETTLES	BETTLES	AK	104053.	139323.	0.	4.64	1.62
AAL	CDV	CORDOVA-MILE 13	CORDOVA	AK	110951.	123618.	141.	0.93	1.56
AAL	DLG	DILLINGHAM	DILLINGHAM	AK	90824.	135002.	0.	4.95	1.50
AAL	Z15	BIRCHWOOD	BIRCHWOOD	AK	99572.	119931.	0.	1.25	1.46
AAL	WSN	SOUTH NAKNEK HR 2	SOUTH NAKNEK	AK	73353.	129304.	0.	1.20	1.35
AAL	SNK	NAKNEK	NAKNEK	AK	68308.	127657.	0.	1.16	1.30
AAL	KTN	KETCHIKAN INTL	KETCHIKAN	AK	71519.	120720.	48.	2.00	1.28
AAL	HOM	HOMER	HOMER	AK	57894.	123776.	1.	2.29	1.21
AAL	SIT	SITKA	SITKA	AK	57198.	123041.	3.	3.15	1.20
AAL	ORT	NORTHWAY	NORTHWAY	AK	52122.	118244.	201.	1.81	1.13
AAL	FWL	FAREWELL	FAREWELL	AK	69152.	92377.	65.	0.74*	1.07*
AAL	PTH	PORT HEIDEN	PORT HEIDEN	AK	43567.	100364.	42.	0.41*	0.96*
AAL	GKN	GULKANA	GULKANA	AK	27050.	114192.	0.	1.55	0.94
AAL	SKE	KETCHIKAN HARBOR	KETCHIKAN	AK	26661.	114066.	0.	0.75	0.94
AAL	MTF	METRO FLD	FAIRBANKS	AK	41641.	94627.	0.	0.67	0.91
AAL	2Z0	EMMONAK	EMMONAK	AK	22164.	112569.	0.	0.72	0.90
AAL	FYU	FORT YUKON	FORT YUKON	AK	22394.	112651.	1.	1.49	0.90
AAL	ILI	ILIAMNA	ILIAMNA	AK	21562.	112402.	0.	0.71	0.89
AAL	GST	GUSTAVUS	GUSTAVUS	AK	42803.	89556.	42.	0.55*	0.88*
AAL	WRG	WRANGELL	WRANGELL	AK	20956.	112202.	0.	1.58	0.88
AAL	PII	PHILLIPS FIELD	FAIRBANKS	AK	19783.	111820.	0.	0.69	0.87
AAL	SWD	SEWARD	SEWARD	AK	15152.	110308.	0.	0.65	0.83
AAL	CKU	CORDOVA MUNI	CORDOVA	AK	12812.	109545.	0.	0.62	0.81
AAL	KDK	KODIAK MUNI	KODIAK	AK	11564.	109139.	0.	0.62	0.80
AAL	KSM	ST MARYS	ANDREAFSKY /ST MARYS/	AK	9043.	108314.	0.	0.91	0.78
AAL	ORV	ROBERT /BOB/ CURTIS MEML	NOORVIK	AK	7959.	107865.	0.	0.58	0.77
AAL	Z16	WASILLA	WASILLA	AK	8031.	107321.	0.	0.56	0.77
AAL	TAL	RALPH M CALHOUN MEML	TANANA	AK	7418.	107784.	0.	0.58	0.77
AAL	5Z2	NORTH DOUGLAS	JUNEAU	AK	8914.	107610.	0.	0.57	0.77
AAL	TSG	TANACROSS	TANACROSS	AK	6660.	107537.	0.	0.57	0.76
AAL	PIP	PILOT POINT	PILOT POINT	AK	9624.	104126.	0.	0.51	0.76
AAL	SOV	SELDOVIA	SELDOVIA	AK	6975.	107640.	0.	0.57	0.76
AAL	ENN	NEHANA MUNI	NEHANA	AK	8432.	106660.	0.	0.54	0.76
AAL	ARC	ARCTIC VILLAGE	ARCTIC VILLAGE	AK	6121.	107361.	0.	0.56	0.75
AAL	KKA	KOYUK	KOYUK	AK	4380.	106793.	0.	0.55	0.74
AAL	OLH	OLD HARBOR	OLD HARBOR	AK	4088.	106697.	0.	0.54	0.74
AAL	HLK	SELAWIK	SELAWIK	AK	1752.	105935.	0.	0.52	0.72
AAL	PUO	PRUDHOE BAY	PRUDHOE BAY	AK	1728.	105928.	0.	0.52	0.72

AAL MOS MOSES POINT  
 AAL HSL HUSLIA  
 AAL 94Z NOME CITY FIELD  
 AAL RBY RUBY  
 AAL BKC BUCKLAND  
 AAL NUL NULATO  
 AAL AK47 TATITLEK  
 AAL SHH SHISHMAREF  
 AAL SVA SAVOONGA  
 AAL PTU PLATINUM  
 AAL FLT FLAT  
 AAL GAM GAMBELL  
 AAL TOG TOGIAK  
 AAL HPB HOOPER BAY  
 AAL CLP CLARKS POINT  
 AAL KWN KWINHAGAK  
 AAL KEK EKWOK  
 AAL AK44 TALKEETNA VILLAGE STRIP  
 AAL WTK NOATAK  
 AAL TYE TYONEK  
 AAL MLL MARSHALL  
 AAL ORI PORT LIONS  
 AAL PPC PROSPECT CREEK  
 AAL VEE VENETIE  
 AAL HUS HUGHES  
 AAL OOK TOKSOOK BAY  
 AAL AUK ALAKANUK  
 AAL AK61 TUNTUTULIAK  
 AAL KYU KOYUKUK  
 AAL CHP CIRCLE HOT SPRINGS  
 AAL 5NI NIKOLAI  
 AAL WAA WALES  
 AAL AKK AKHIOK  
 AAL GLV GOLOVIN  
 AAL MOU MOUNTAIN VILLAGE  
 AAL IAN BOB BAKER MEML  
 AAL WMO WHITE MOUNTAIN  
 AAL GBH GALBRAITH LAKE  
 AAL CEM CENTRAL  
 AAL DRG DEERING  
 AAL KOT KOTLIK  
 AAL BGQ BIG LAKE STRIP NR 2  
 AAL 624 KETCHIKAN /TEMSCO H/  
 AAL IGG IGIUGIG  
 AAL GNU GOODNEWS  
 AAL AQY GIRDWOOD  
 AAL KGX GRAYLING  
 AAL AK63 TWIN HILLS  
 AAL CRC CIRCLE CITY  
 AAL Z09 AKOLMIUT  
 AAL 829 KIPNUK  
 AAL HNS HAINES  
 AAL SCM SCAMMON BAY  
 AAL TCT TAKOTHA  
 AAL AET ALLAKAKET  
 AAL KAL KALTAG  
 AAL PHO POINT HOPE  
 AAL MLY MANLEY HOT SPRINGS  
 AAL EEK EEK  
 AAL KVL KIVALINA

MOSES POINT  
 HUSLIA  
 NOME  
 RUBY  
 BUCKLAND  
 NULATO  
 TATITLEK  
 SHISHMAREF  
 SAVOONGA  
 PLATINUM  
 FLAT  
 GAMBELL  
 TOGIAK VILLAGE  
 HOOPER BAY  
 CLARKS POINT  
 KWINHAGAK  
 EKWOK  
 TALKEETNA  
 NOATAK  
 TYONEK  
 MARSHALL  
 PORT LIONS  
 PROSPECT CREEK  
 VENETIE  
 HUGHES  
 TOKSOOK BAY  
 ALAKANUK  
 TUNTUTULIAK  
 KOYUKUK  
 CIRCLE HOT SPRINGS  
 NIKOLAI  
 WALES  
 AKHIOK  
 GOLOVIN  
 MOUNTAIN VILLAGE  
 KIAHA  
 WHITE MOUNTAIN  
 GALBRAITH LAKE  
 CENTRAL  
 DEERING  
 KOTLIK  
 BIG LAKE  
 KETCHIKAN  
 IGIUGIG  
 GOODNEWS  
 GIRDWOOD  
 GRAYLING  
 TWIN HILLS  
 CIRCLE  
 AKOLMIUT  
 KIPNUK  
 HAINES  
 SCAMMON BAY  
 TAKOTHA  
 ALLAKAKET  
 KALTAG  
 POINT HOPE  
 MANLEY HOT SPRINGS  
 EEK  
 KIVALINA

AK	2939.	105012.	0.	0.49	0.72
AK	2337.	106126.	0.	0.53	0.72
AK	10235.	97966.	0.	0.44	0.72
AK	5515.	101804.	0.	0.46	0.71
AK	960.	105210.	0.	0.50	0.71
AK	1743.	105683.	0.	0.51	0.71
AK	2921.	103745.	0.	0.47	0.71
AK	3503.	101229.	0.	0.45	0.70
AK	456.	105512.	0.	0.51	0.70
AK	1857.	102095.	0.	0.44	0.69
AK	5512.	98055.	0.	0.42	0.69
AK	177.	102820.	0.	0.45	0.68
AK	6043.	95696.	0.	0.42	0.68
AK	1223.	99031.	0.	0.41	0.67
AK	3761.	96802.	0.	0.41	0.67
AK	1548.	93585.	0.	0.41	0.67
AK	2045.	99537.	0.	0.42	0.67
AK	10413.	89081.	0.	0.39	0.66
AK	2151.	97747.	0.	0.41	0.66
AK	1760.	96831.	0.	0.39	0.66
AK	1890.	96857.	0.	0.40	0.66
AK	1460.	98584.	0.	0.42	0.66
AK	13135.	86900.	0.	0.41	0.66
AK	1167.	96130.	0.	0.39	0.65
AK	1496.	96744.	0.	0.38	0.65
AK	1548.	96186.	0.	0.39	0.65
AK	1958.	95496.	0.	0.40	0.65
AK	1764.	95201.	0.	0.37	0.64
AK	876.	94768.	0.	0.37	0.64
AK	12009.	84955.	0.	0.39	0.64
AK	291.	96316.	0.	0.37	0.64
AK	347.	94053.	0.	0.36	0.63
AK	283.	94707.	0.	0.37	0.63
AK	3309.	90404.	0.	0.36	0.62
AK	1772.	91114.	0.	0.38	0.62
AK	5514.	87086.	0.	0.37	0.62
AK	2967.	90822.	0.	0.36	0.62
AK	7298.	84827.	0.	0.67	0.61
AK	1806.	90092.	0.	0.35	0.61
AK	1337.	88994.	0.	0.37	0.60
AK	1168.	89268.	0.	0.35	0.60
AK	6455.	83143.	0.	0.34	0.60
AK	2800.	86597.	0.	0.32	0.59
AK	19667.	67434.	0.	0.39	0.58
AK	5838.	81397.	0.	0.34	0.58
AK	4065.	82364.	0.	0.32	0.57
AK	3787.	82119.	0.	0.33	0.57
AK	765.	81286.	0.	0.28	0.55
AK	3787.	79173.	0.	0.31	0.55
AK	291.	81132.	0.	0.28	0.54
AK	585.	81228.	0.	0.28	0.54
AK	15134.	60658.	0.	0.33	0.50
AK	876.	72662.	0.	0.27	0.49
AK	3267.	67801.	0.	0.25	0.47
AK	3040.	67732.	0.	0.25	0.47
AK	1337.	67943.	0.	0.27	0.46
AK	1105.	66922.	0.	0.27	0.45
AK	1567.	64878.	0.	0.24	0.44
AK	2045.	63802.	0.	0.24	0.44
AK	291.	66554.	0.	0.26	0.44

AAL RDV RED DEVIL  
 AAL AK86 NAPAKIAK  
 AAL ELI ELIM  
 AAL MHM MINCHUMINA  
 AAL Z10 KONGIGANAK  
 AAL PSG PETERSBURG  
 AAL KLG KALSKAG  
 AAL RSH RUSSIAN MISSION  
 AAL AK85 KWIGILLINGOK  
 AAL DCK DAHL CREEK  
 AAL KLL LEVELOCK  
 AAL AK87 NEWTOK  
 AAL LNI LONELY DEW STATION  
 AAL KNW NEW STUYAHOK  
 AAL WKK ALEKNAGIK  
 AAL BLO BELUGA  
 AAL SHG SHUNGNAK  
 AAL DUT DUTCH HARBOR  
 AAL 225 CHENA RIVER  
 AAL SMK ST MICHAEL  
 AAL SDP SAND POINT  
 AAL KGK NEW KOLIGANEK  
 AAL MDR MEDFRA  
 AAL KKK EKUK  
 AAL CDL CANDLE 2  
 AAL 203 EGEGIK /NEW/  
 AAL EAA EAGLE  
 AAL 172 MANOKOTAK  
 AAL PKA NAPAISKAK  
 AAL VAK CHEVAK  
 AAL 952 BRADLEY SKY-RANCH  
 AAL 512 MINTO /NEW/  
 AAL 274 CHEFORNAK  
 AAL SKK SHAKTOOLIK  
 AAL KEB ENGLISH BAY  
 AAL 424 HOLY CROSS  
 AAL OBU KOBUK /WIEN/  
 AAL 260 AMBLER  
 AAL WBQ BEAVER  
 AAL SVS STEVENS VILLAGE  
 AAL AIN WAINWRIGHT DEW STATION  
 AAL CXC CHITINA  
 AAL AK54 TELLER  
 AAL AK04 PEDRO BAY  
 AAL ANV ANVIK  
 AAL AKP ANAKTUVUK PASS  
 AAL 5NN NONDALTON  
 AAL KFP FALSE PASS  
 AAL KCL CHIGNIK LAGOON  
 AAL 152 MCCARTHY NR 2  
 AAL TKJ TOK  
 AAL CYT YAKATAGA  
 AAL 246 MEADE RIVER  
 AAL PGM PORT GRAHAM  
 AAL AK10 PILOT STATION  
 AAL AK79 CHIGNIK LAKE  
 AAL RMP RAMPART  
 AAL SRV STONY RIVER 2  
 AAL SLQ SLEETMUTE  
 AAL CIK CHALKYITSIK

RED DEVIL  
 NAPAKIAK  
 ELIM  
 MINCHUMINA  
 KONGIGANAK  
 PETERSBURG  
 KALSKAG  
 RUSSIAN MISSION  
 KWIGILLINGOK  
 DAHL CREEK  
 LEVELOCK  
 NEWTOK  
 LONELY  
 NEW STUYAHOK  
 ALEKNAGIK  
 BELUGA  
 SHUNGNAK  
 DUTCH HARBOR  
 FAIRBANKS  
 ST MICHAEL  
 SAND POINT  
 NEW KOLIGANEK  
 MEDFRA  
 EKUK  
 CANDLE  
 EGEGIK  
 EAGLE  
 MANOKOTAK  
 NAPAISKAK  
 CHEVAK  
 NORTH POLE  
 MINTO  
 CHEFORNAK  
 SHAKTOOLIK  
 ENGLISH BAY  
 HOLY CROSS  
 KOBUK  
 AMBLER  
 BEAVER  
 STEVENS VILLAGE  
 WAINWRIGHT  
 CHITINA  
 TELLER  
 PEDRO BAY  
 ANVIK  
 ANAKTUVUK PASS  
 NONDALTON  
 FALSE PASS  
 CHIGNIK FLATS  
 MCCARTHY  
 TOK  
 YAKATAGA  
 ATKASUK  
 PORT GRAHAM  
 PILOT STATION  
 CHIGNIK LAKE  
 RAMPART  
 STONY RIVER  
 SLEETMUTE  
 CHALKYITSIK

AK	5247.	57431.	0.	0.23	0.42
AK	1499.	62139.	0.	0.21	0.42
AK	1460.	58017.	0.	0.22	0.40
AK	2921.	3212.	0.	0.40	0.40
AK	3503.	56862.	0.	0.22	0.40
AK	1513.	57663.	0.	0.31	0.39
AK	1567.	57733.	0.	0.25	0.39
AK	2508.	54768.	0.	0.22	0.38
AK	1460.	56195.	0.	0.20	0.38
AK	585.	55910.	0.	0.19	0.38
AK	2594.	52447.	0.	0.22	0.37
AK	438.	55862.	0.	0.19	0.37
AK	43417.	11281.	18.	9.33*	0.36*
AK	2045.	48030.	0.	0.21	0.33
AK	3180.	46961.	0.	0.20	0.33
AK	14769.	32704.	0.	0.23	0.32
AK	457.	46098.	0.	0.19	0.31
AK	349.	46269.	2.	0.21	0.31
AK	16410.	30015.	0.	0.23	0.31
AK	1134.	45550.	0.	0.18	0.31
AK	2548.	42884.	0.	0.20	0.30
AK	1752.	41313.	0.	0.18	0.29
AK	1451.	42215.	0.	0.15	0.29
AK	2508.	40287.	0.	0.17	0.28
AK	877.	39968.	0.	0.15	0.27
AK	9372.	30943.	0.	0.18	0.27
AK	4885.	35434.	0.	0.17	0.27
AK	585.	39142.	0.	0.13	0.26
AK	876.	37492.	0.	0.14	0.25
AK	876.	36070.	0.	0.15	0.25
AK	4497.	32292.	0.	0.14	0.24
AK	6357.	29959.	0.	0.15	0.24
AK	1460.	33919.	0.	0.12	0.24
AK	291.	36082.	0.	0.15	0.24
AK	1896.	34062.	0.	0.13	0.24
AK	462.	33594.	0.	0.12	0.23
AK	5247.	29458.	0.	0.15	0.23
AK	5515.	29684.	0.	0.14	0.23
AK	1460.	31916.	0.	0.14	0.22
AK	1460.	30125.	0.	0.13	0.21
AK	1776.	29743.	2.	0.13*	0.21*
AK	3114.	28901.	0.	0.12	0.21
AK	2508.	28703.	0.	0.12	0.21
AK	1607.	28408.	0.	0.11	0.20
AK	1806.	28474.	0.	0.11	0.20
AK	1460.	28363.	0.	0.11	0.20
AK	2067.	28559.	0.	0.11	0.20
AK	1607.	28408.	0.	0.11	0.20
AK	1630.	28416.	0.	0.11	0.20
AK	2033.	28548.	0.	0.11	0.20
AK	1686.	28435.	0.	0.11	0.20
AK	1633.	28424.	0.	0.11	0.20
AK	89.	27913.	0.	0.09	0.19
AK	585.	28075.	0.	0.10	0.19
AK	585.	28077.	0.	0.10	0.19
AK	620.	28087.	0.	0.10	0.19
AK	673.	23666.	0.	0.12	0.19
AK	730.	28122.	0.	0.10	0.19
AK	0.	27884.	0.	0.09	0.19
AK	438.	26674.	0.	0.11	0.18

AAL KYK KARLUK  
 AAL KWT KWETHLUK  
 AAL Z79 CHIGNIK  
 AAL Z96 PHILOS  
 AAL WBB STEBBINS  
 AAL LSR LOST RIVER 1  
 AAL 5QN THE QUEENS  
 AAL KTS BREVIG MISSION  
 AAL Z38 SKY HARBOR  
 AAL Z41 LAKE HOOD STRIP  
 AAL AK45 TUNUNAK  
 AAL AKI AKIAK  
 AAL MYU MEKORYUK  
 AAL Z13 AKIACHAK  
 AAL UGA UGASHIK  
 AAL SKW SKWENTNA  
 AAL KVC KING COVE  
 AAL TLT TULUKSAK  
 AAL HAY HAYCOCK  
 AAL CKX CHICKEN  
 AAL AK14 PORTAGE CREEK  
 AAL 24AK NIGHTMUTE  
 AAL 2AK9 INDEPENDENCE CREEK  
 AAL HNH HOONAH  
 AAL WCR CHANDALAR LAKE  
 AAL MYK MAY CREEK  
 AAL Z95 COUNCIL (PEDERSON)  
 AAL Z22 WILLOW  
 AAL WSM WISEMAN  
 AAL ZNC NYAC  
 AAL 9Z1 KLAWOCK  
 AAL STE TETLIN  
 AAL SHX SHAGELUK  
 AAL Z84 CLEAR  
 AAL BYA BOUNDARY  
 AAL AK05 PERRYVILLE  
 AAL NFV POINT BARROW  
 AAL OZ4 DILLINGHAM CITY STRIP  
 AAL SHD HOPE  
 AAL PCK PORCUPINE CREEK  
 AAL Z17 OPHIR  
 AAL PIZ POINT LAY DEW STATION  
 AAL CZN CHISANA  
 AAL TPO TANALIAN POINT  
 AAL OLI OLIKTOK DEW STATION  
 AAL AK01 BUTTE MUNICIPAL

KARLUK  
 KWETHLUK  
 CHIGNIK  
 WASILLA  
 STEBBINS  
 LOST RIVER  
 QUEENS  
 TELLER MISSION  
 ANCHORAGE  
 ANCHORAGE  
 TANUNAK  
 AKIAK  
 MEKORYUK  
 AKIACHAK  
 UGASHIK  
 SKWENTNA  
 KING COVE  
 TULUKSAK  
 HAYCOCK  
 CHICKEN  
 PORTAGE CREEK  
 NIGHTMUTE  
 INDEPENDENCE CREEK  
 HOONAH  
 CHANDALAR  
 MAY CREEK  
 COUNCIL  
 WILLOW  
 WISEMAN  
 NYAC  
 KLAWOCK  
 TETLIN  
 SHAGELUK  
 CLEAR  
 BOUNDARY  
 PERRYVILLE  
 POINT BARROW  
 DILLINGHAM  
 HOPE  
 PORCUPINE CREEK  
 OPHIR  
 POINT LAY  
 CHISANA  
 TANALIAN POINT  
 OLIKTOK POINT  
 PALMER

AK	150.	27446.	0.	0.12	0.18
AK	291.	25273.	0.	0.10	0.17
AK	4380.	20940.	0.	0.11	0.17
AK	4149.	19849.	0.	0.10	0.16
AK	291.	23742.	0.	0.10	0.16
AK	291.	22341.	0.	0.08	0.15
AK	1607.	17283.	0.	0.07	0.13
AK	150.	18666.	0.	0.08	0.13
AK	13331.	4352.	0.	0.12	0.12
AK	11645.	6891.	0.	0.12	0.12
AK	876.	17045.	0.	0.06	0.12
AK	60.	15057.	0.	0.06	0.10
AK	756.	14973.	0.	0.07	0.10
AK	1047.	14243.	0.	0.06	0.10
AK	2045.	12222.	0.	0.07	0.09
AK	5501.	8043.	5.	0.04*	0.09*
AK	876.	11727.	0.	0.05	0.08
AK	673.	12099.	0.	0.06	0.08
AK	291.	11295.	0.	0.04	0.08
AK	2594.	9141.	0.	0.05	0.08
AK	876.	11436.	0.	0.05	0.08
AK	150.	12379.	0.	0.04	0.08
AK	450.	9403.	0.	0.03	0.07
AK	8458.	2760.	0.	0.08	0.07
AK	3091.	6550.	0.	0.05	0.06
AK	585.	8504.	0.	0.03	0.06
AK	818.	8561.	0.	0.04	0.06
AK	3787.	5737.	0.	0.05	0.06
AK	425.	6824.	0.	0.03	0.05
AK	89.	6692.	0.	0.02	0.05
AK	1460.	6017.	0.	0.03	0.05
AK	526.	5713.	0.	0.02	0.04
AK	876.	5827.	0.	0.03	0.04
AK	4775.	1558.	0.	0.05	0.04
AK	438.	5684.	0.	0.02	0.04
AK	585.	5732.	0.	0.02	0.04
AK	1372.	3539.	0.	0.02	0.03
AK	2998.	978.	0.	0.03	0.03
AK	539.	3267.	0.	0.01	0.03
AK	150.	2925.	0.	0.01	0.02
AK	44.	2890.	0.	0.01	0.02
AK	224.	3286.	1.	0.01	0.02
AK	291.	2971.	0.	0.01	0.02
AK	609.	3074.	0.	0.02	0.02
AK	1180.	210.	0.	0.00	0.01
AK	1593.	520.	0.	0.01	0.01

CENTRAL REGION

ACE CBF COUNCIL BLUFFS MUNI  
 ACE MCW MASON CITY MUNI  
 ACE AMW AMES MUNI  
 ACE OTM OTTUMWA INDUSTRIAL  
 ACE BRL BURLINGTON MUNI  
 ACE FOD FORT DODGE MUNI  
 ACE MIW MARSHALLTOWN MUNI  
 ACE SPW SPENCER MUNI  
 ACE CWI CLINTON MUNI

COUNCIL BLUFFS  
 MASON CITY  
 AMES  
 OTTUMWA  
 BURLINGTON  
 FORT DODGE  
 MARSHALLTOWN  
 SPENCER  
 CLINTON

IA	1093963.	190760.	1082.	7.02*	8.54*
IA	991968.	264500.	953.	4.30	8.35
IA	937027.	268726.	927.	7.31	8.01
IA	814347.	233856.	785.	3.36	6.96
IA	694590.	216965.	693.	3.81	6.06
IA	579880.	199874.	556.	2.76	5.3
IA	566626.	157099.	745.	3.73	4.81
IA	491987.	186102.	500.	3.20	4.51
IA	404627.	173914.	364.	2.91	3.84

ACE MUT MUSCATINE MUNI  
 ACE TNU NEWTON MUNI  
 ACE CAV CLARION MUNI  
 ACE CNC CHARITON MUNI  
 ACE ICL CLARINDA MUNI  
 ACE AXA ALGONA MUNI  
 ACE IOWA IOWA CITY MUNICIPAL  
 ACE SRK SPIRIT LAKE MUNI  
 ACE OXV KNOXVILLE MUNI  
 ACE K27 FORT MADISON MUNI  
 ACE AIO ATLANTIC MUNI  
 ACE RDK RED OAK MUNICIPAL  
 ACE EBS WEBSTER CITY MUNI  
 ACE BNW BOONE MUNI  
 ACE SHL SHELDON MUNI  
 ACE DEH DECORAH MUNI  
 ACE CCY CHARLES CITY MUNI  
 ACE C23 MAQUOKETA MUNI  
 ACE ADU AUDUBON MUNI  
 ACE MXO MONTICELLO MUNICIPAL  
 ACE SLB STORM LAKE MUNI  
 ACE EST ESTHERVILLE MUNI  
 ACE LRJ LEMARS MUNI  
 ACE EFW JEFFERSON MUNI  
 ACE ORC ORANGE CITY MUNI  
 ACE DNS DENISON MUNI  
 ACE POH POCAHONTAS MUNI  
 ACE IDG IDA GROVE MUNI  
 ACE PRO PERRY MUNI  
 ACE CSQ CRESTON MUNI  
 ACE EOK KEOKUK MUNI  
 ACE MEY MAPLETON MUNI  
 ACE CIN ARTHUR W NEU  
 ACE D34 FOREST CITY MUNI  
 ACE EGQ EMMETSBURG MUNI  
 ACE HNR HARLAN MUNI  
 ACE C25 WAVERLY MUNI  
 ACE OK9 OELWEIN MUNI  
 ACE MPZ MT PLEASANT MUNI  
 ACE SKI SAC CITY MUNI  
 ACE CRZ CORNING MUNI  
 ACE K21 CENTERVILLE MUNI  
 ACE SDA SHENANDOAH MUNI  
 ACE 3Y2 GEORGE L SCOTT MUNI  
 ACE SOY SIOUX CENTER MUNI  
 ACE PEA PELLA MUNI  
 ACE K22 CHEROKEE MUNI  
 ACE 6C5 INDEPENDENCE MUNI  
 ACE FFL FAIRFIELD MUNI  
 ACE IFA IOWA FALLS MUNI  
 ACE 3Y3 WINTERSET-MADISON COUNTY  
 ACE OOA OSKALOOSA MUNI  
 ACE 8C8 FLYERS  
 ACE HPT HAMPTON MUNICIPAL  
 ACE C17 MARION  
 ACE OK7 NUMBOLDT MUNI  
 ACE Y76 NORTH FIELD /PVT/  
 ACE K28 GREENFIELD MUNI  
 ACE 5C2 ANTIQUE AIRFIELD  
 ACE 4C8 ALBIA MUNI

MUSCATINE  
 NEWTON  
 CLARION  
 CHARITON  
 CLARINDA  
 ALGONA  
 IOWA CITY  
 SPIRIT LAKE  
 KNOXVILLE  
 FORT MADISON  
 ATLANTIC  
 RED OAK  
 WEBSTER CITY  
 BOONE  
 SHELDON  
 DECORAH  
 CHARLES CITY  
 MAQUOKETA  
 AUDUBON  
 MONTICELLO  
 STORM LAKE  
 ESTHERVILLE  
 LEMARS  
 JEFFERSON  
 ORANGE CITY  
 DENISON  
 POCAHONTAS  
 IDA GROVE  
 PERRY  
 CRESTON  
 KEOKUK  
 MAPLETON  
 CARROLL  
 FOREST CITY  
 EMMETSBURG  
 HARLAN  
 WAVERLY  
 OELWEIN  
 MT PLEASANT  
 SAC CITY  
 CORNING  
 CENTERVILLE  
 SHENANDOAH  
 WEST UNION  
 SIOUX CENTER  
 PELLA  
 CHEROKEE  
 INDEPENDENCE  
 FAIRFIELD  
 IOWA FALLS  
 WINTERSET  
 OSKALOOSA  
 WATERLOO  
 HAMPTON  
 MARION  
 NUMBOLDT  
 DES MOINES  
 GREENFIELD  
 BLAKESBURG  
 ALBIA

IA	350985.	96147.	351.	2.54	2.97
IA	329095.	96207.	337.	2.14	2.83
IA	296638.	89439.	296.	2.07*	2.57*
IA	230042.	69866.	271.	1.89*	2.32*
IA	272678.	69164.	275.	1.96*	2.27*
IA	189261.	145121.	143.	1.92	2.22
IA	179542.	148547.	651.	3.91	2.18
IA	188507.	137302.	190.	1.68*	2.16*
IA	227448.	50572.	220.	1.60	1.85
IA	132174.	128165.	131.	1.30*	1.73*
IA	145551.	105079.	121.	1.56	1.67
IA	195526.	46647.	178.	2.06	1.61
IA	180943.	61610.	182.	1.23	1.61
IA	175311.	64656.	157.	2.11	1.59
IA	165485.	73220.	160.	1.24	1.59
IA	145057.	72781.	148.	1.05	1.45
IA	130971.	26947.	126.	0.99	1.45
IA	147657.	64538.	141.	1.10*	1.41*
IA	89591.	121532.	84.	1.30	1.40
IA	157304.	52556.	157.	1.11*	1.39*
IA	161987.	36789.	154.	1.20	1.32
IA	137660.	55088.	132.	1.00	1.28
IA	158809.	32630.	144.	1.66	1.27
IA	135739.	50718.	123.	1.34	1.24
IA	125467.	53346.	118.	0.99	1.19
IA	134611.	40414.	122.	1.39	1.16
IA	44755.	119971.	0.	2.18	1.09
IA	68060.	87315.	69.	0.69*	1.03*
IA	121820.	32505.	135.	1.06	1.03
IA	36363.	117232.	0.	1.87	1.02
IA	34921.	116761.	0.	0.87	1.01
IA	96011.	51802.	86.	1.04	0.98
IA	29896.	115121.	0.	1.62	0.96
IA	27928.	111688.	0.	1.54	0.93
IA	33443.	104906.	113.	1.08	0.92
IA	72097.	62041.	241.	1.70	0.89
IA	54540.	71522.	203.	1.60	0.84
IA	90809.	35892.	92.	0.52	0.84
IA	95617.	27927.	94.	0.66	0.82
IA	102281.	17776.	95.	0.62*	0.80*
IA	101268.	17444.	96.	0.65*	0.79*
IA	17221.	100745.	0.	0.55	0.78
IA	82565.	28888.	73.	0.82	0.74
IA	72818.	34846.	73.	0.58*	0.72*
IA	24059.	78507.	0.	0.49	0.68
IA	19029.	82363.	0.	0.99	0.67
IA	46087.	49190.	0.	0.57	0.63
IA	28988.	60417.	0.	0.48	0.59
IA	42569.	39327.	0.	1.68	0.54
IA	33647.	37069.	0.	0.43	0.47
IA	40042.	23939.	0.	0.44	0.43
IA	20053.	31974.	0.	0.30	0.35
IA	40085.	13083.	0.	0.40	0.35
IA	17304.	32823.	0.	0.27	0.33
IA	34470.	14070.	0.	0.37	0.32
IA	29846.	12559.	0.	0.32	0.28
IA	29539.	9644.	0.	0.31	0.26
IA	25089.	13195.	0.	0.28	0.25
IA	26222.	8559.	0.	0.26	0.23
IA	17770.	16301.	0.	0.22	0.23



ACE K44 VINTON VETERANS MEML ARPK  
 ACE 5C8 EKMAN FIELD  
 ACE 5D2 NORTHWOOD MUNI  
 ACE K25 HUSBAND FIELD  
 ACE 6C8 NICHOLS  
 ACE 4K6 BLOOMFIELD MUNI  
 ACE D02 OSAGE MUNI  
 ACE C61 WASHINGTON MUNI  
 ACE 1Y4 NEVADA MUNI  
 ACE Y00 ZANGGER  
 ACE K36 ONAWA MUNI  
 ACE K35 MISSOURI VALLEY  
 ACE Y43 ANITA MUNI-KEVIN BURKE MEMORIAL FIELD  
 ACE 0K4 EAGLE GROVE MUNI  
 ACE 6C3 BEEDS LAKE  
 ACE D03 SIBLEY MUNI  
 ACE 2Y4 ROCKWELL CITY MUNI  
 ACE 6C0 ELDORA MUNI  
 ACE 1Y9 PAULLINA MUNI  
 ACE K37 OSCEOLA MUNI  
 ACE 8C4 MATHEWS MEMORIAL  
 ACE 7C3 MONONA MUNI  
 ACE 7C5 SIG FIELD  
 ACE 0Y0 GUTHRIE CENTER MUHI  
 ACE 0Y5 HASH FIELD INDIANOLA  
 ACE Y67 ELLEN CHURCH FIELD  
 ACE K29 GRINNELL  
 ACE C27 MANCHESTER MUHI  
 ACE 0Y7 LAMONI MUNICIPAL

VINTON  
 DES MOINES  
 NORTHWOOD  
 DALLAS CENTER  
 LA PORTE CITY  
 BLOOMFIELD  
 OSAGE  
 WASHINGTON  
 NEVADA  
 LARCHWOOD  
 ONAWA  
 MISSOURI VALLEY  
 ANITA  
 EAGLE GROVE  
 HAMPTON  
 SIBLEY  
 ROCKWELL CITY  
 ELDORA  
 PAULLINA  
 OSCEOLA  
 TIPTON  
 MONONA  
 MONTEZUMA  
 GUTHRIE CENTER  
 INDIANOLA  
 CRESCO  
 GRINNELL  
 MANCHESTER  
 LAMONI

IA	21157.	11912.	0.	0.24	0.22
IA	17352.	12462.	0.	0.20	0.20
IA	17763.	11233.	0.	0.20	0.19
IA	20395.	7744.	0.	0.21	0.19
IA	21677.	7075.	0.	0.22	0.19
IA	16043.	10534.	0.	0.18	0.18
IA	19077.	7841.	0.	0.20	0.18
IA	19070.	6224.	0.	0.20	0.17
IA	17763.	7432.	0.	0.18	0.17
IA	16235.	7474.	0.	0.17	0.16
IA	17324.	5654.	0.	0.17	0.15
IA	16784.	5478.	0.	0.17	0.15
IA	15159.	4948.	0.	0.15	0.13
IA	8531.	7791.	0.	0.11	0.11
IA	11631.	3796.	0.	0.12	0.10
IA	8156.	6482.	0.	0.10	0.10
IA	10625.	3468.	0.	0.11	0.09
IA	5415.	7202.	0.	0.07	0.08
IA	8662.	2827.	0.	0.09	0.08
IA	8412.	3290.	0.	0.09	0.08
IA	9292.	3033.	0.	0.10	0.08
IA	9591.	3131.	0.	0.10	0.08
IA	6657.	2173.	0.	0.07	0.06
IA	7144.	2332.	0.	0.07	0.06
IA	6073.	3069.	0.	0.06	0.06
IA	6126.	2000.	0.	0.06	0.05
IA	5314.	2379.	0.	0.05	0.05
IA	6015.	1963.	0.	0.06	0.05
IA	1843.	602.	0.	0.02	0.02

TR

ACE IXD JOHNSON COUNTY INDUSTRIAL  
 ACE 3LA LAWRENCE MUNI  
 ACE LBL LIBERAL MUNI  
 ACE MHK MANHATTAN MUNI  
 ACE GCK GARDEN CITY MUHI  
 ACE 3KM COMOTARA AIRPARK  
 ACE 3AU AUGUSTA MUNI  
 ACE EWK HEWTON-CITY-COUNTY  
 ACE HYS HAYS MUNI  
 ACE WLD STROTHER FIELD  
 ACE EMP EMPORIA MUNI  
 ACE FSK FORT SCOTT MUNI  
 ACE PTS ATKINSON MUNI  
 ACE CFV COFFEYVILLE MUNI  
 ACE CHU CHAHUTE MARTIN JOHNSON  
 ACE CEA CESSHA ACFT FIELD  
 ACE IDP INDEPENDENCE MUNI  
 ACE GBD GREAT BEND MUNI  
 ACE BEC BEECH FACTORY  
 ACE RSL RUSSELL MUNI  
 ACE LYD LYONS-RICE COUNTY MUHI  
 ACE PHG PHILLIPSBURG MUNI  
 ACE K95 ULYSSES  
 ACE PPF TRI CITY  
 ACE 2K4 LARNED-PAWHEE COUNTY  
 ACE 3KC STATE LINE AIRPARK  
 ACE K32 RIVERSIDE  
 ACE 3JC JUNCTION CITY MUNI  
 ACE 2K3 STAHTON COUNTY MUNI  
 ACE K31 COPELAHD

OLATHE  
 LAWRENCE  
 LIBERAL  
 MANHATTAN  
 GARDEH CITY  
 WICHITA  
 AUGUSTA  
 NEWTON  
 HAYS  
 WINFIELD/ARKANSAS CITY  
 EMPORIA  
 FORT SCOTT  
 PITTSBURG  
 COFFEYVILLE  
 CHANUTE  
 WICHITA  
 INDEPENDENCE  
 GREAT BEHD  
 WICHITA  
 RUSSELL  
 LYONS  
 PHILLIPSBURG  
 ULYSSES  
 PARSONS  
 LARHED  
 LEAWOOD  
 WICHITA  
 JUNCTION CITY  
 JOHNSON  
 WICHITA

KS	1517568.	288438.	995.	6.35*	12.00*
KS	936718.	263983.	831.	5.98*	7.98*
KS	634796.	221771.	523.	5.61	5.69
KS	581753.	210398.	439.	4.39	5.26
KS	532720.	200987.	362.	3.06	4.87
KS	451762.	183679.	450.	3.30*	4.22*
KS	519681.	109632.	519.	3.55*	4.18*
KS	523942.	102422.	446.	4.05	4.16
KS	331908.	164231.	280.	2.83	3.30
KS	357800.	114482.	342.	3.38	3.14
KS	401798.	68857.	330.	2.32*	3.13
KS	292003.	66607.	284.	2.38	2.38
KS	242665.	68405.	234.	1.94	2.07
KS	174359.	108004.	161.	1.74	1.88
KS	179758.	96503.	181.	1.40*	1.84*
KS	228778.	39378.	223.	1.50*	1.78*
KS	152274.	104463.	148.	1.39	1.71
KS	102765.	138884.	1.	3.94	1.61
KS	189702.	39820.	135.	1.19*	1.53*
KS	160672.	32986.	151.	1.02*	1.29*
KS	160025.	29049.	150.	1.39	1.26
KS	101776.	58905.	98.	0.76*	1.07*
KS	107833.	45368.	81.	1.47	1.02
KS	30285.	115227.	1.	1.47	0.97
KS	109480.	24071.	108.	0.71*	0.89*
KS	100045.	32651.	0.	1.03	0.88
KS	81832.	37528.	0.	0.86	0.79
KS	44642.	70801.	0.	0.65	0.77
KS	80099.	35741.	270.	1.80	0.77
KS	89887.	18617.	85.	0.55*	0.7

ACE RPB BELLEVILLE MUNI  
 ACE 1K4 EL DORADO MUN  
 ACE PTT PRATT MUNI  
 ACE H77 WELLINGTON MUNI  
 ACE 8K4 MEADE MUNI  
 ACE K88 ALLEN COUNTY  
 ACE K78 ABILENE MUNI  
 ACE 2K9 SCOTT CITY MUNI  
 ACE K50 COOK AIRFIELD INC  
 ACE 1K2 CLAY CENTER MUNI  
 ACE CBK SHALTZ FIELD  
 ACE K74 OAKLEY MUNI  
 ACE K61 BELOIT MUNI  
 ACE 1K1 BENTON  
 ACE MPR MCPHERSON  
 ACE K75 OSBORNE MUNI  
 ACE 7K1 HERINGTON MUNI  
 ACE ANY ANTHONY MUNI  
 ACE HLC HILL CITY MUNI  
 ACE 1K8 HUGOTON MUNI  
 ACE KS04 PLAINVILLE ARPK  
 ACE K68 GARNETT MUNI  
 ACE 30T OTTAWA MUNI  
 ACE 9K8 KINGMAN MUNI  
 ACE K60 ATWOOD-RAWLINS COUNTY CITY-COUNTY  
 ACE K34 GARDNER MUNI  
 ACE K81 OSAWATOMIE-PAOLA MUNI  
 ACE K59 AMELIA EARHART  
 ACE 13K EUREKA MUNI  
 ACE K80 OBERLIN MUNI  
 ACE K73 NORTON MUNI  
 ACE 5K2 TRIBUNE MUNI  
 ACE 1K5 ELKHART-NORTON COUNTY  
 ACE 7V3 ST FRANCIS MUNI  
 ACE 2K7 NEODESHA MUNI  
 ACE 2K5 MARYSVILLE MUNI  
 ACE 69K WAMEGO MUNI  
 ACE 3TA STAFFORD MUNI  
 ACE 8K8 CIMARRON MUNICIPAL  
 ACE 3K3 SYRACUSE-HAMILTON COUNTY MUNI  
 ACE 70K MAIZE  
 ACE 56K PLAINS MUNI  
 ACE K64 VINLAND VALLEY AERODROME  
 ACE 1K3 HAMILTON FIELD  
 ACE K82 SMITH CENTER MUNI  
 ACE K71 LINCOLN MUNI

BELLEVILLE  
 EL DORADO  
 PRATT  
 WELLINGTON  
 MEADE  
 IOLA  
 ABILENE  
 SCOTT CITY  
 DERBY  
 CLAY CENTER  
 COLBY  
 OAKLEY  
 BELOIT  
 BENTON  
 MCPHERSON  
 OSBORNE  
 HERINGTON  
 ANTHONY  
 HILL CITY  
 HUGOTON  
 PLAINVILLE  
 GARNETT  
 OTTAWA  
 KINGMAN  
 ATWOOD  
 GARDNER  
 OSAWATOMIE/PAOLA  
 ATCHISON  
 EUREKA  
 OBERLIN  
 NORTON  
 TRIBUNE  
 ELKHART  
 ST FRANCIS  
 NEODESHA  
 MARYSVILLE  
 WAMEGO  
 STAFFORD  
 CIMARRON  
 SYRACUSE  
 WICHITA/MAIZE/  
 PLAINS  
 BALDWIN CITY  
 DERBY  
 SMITH CENTER  
 LINCOLN

KS 57549. 36487. 53. 0.43\* 0.62\*  
 KS 72046. 17198. 307. 1.49 0.59  
 KS 72734. 14308. 61. 0.77 0.58  
 KS 64682. 21255. 235. 1.76 0.57  
 KS 64322. 16758. 58. 0.39\* 0.54\*  
 KS 32451. 46070. 0. 0.46 0.52  
 KS 40050. 34100. 0. 0.46 0.49  
 KS 31393. 36573. 0. 0.40 0.45  
 KS 47662. 15561. 0. 0.49 0.42  
 KS 20772. 42242. 0. 0.34 0.42  
 KS 29615. 32158. 0. 1.24 0.41  
 KS 30821. 31088. 0. 0.37 0.41  
 KS 30617. 29468. 105. 0.75 0.40  
 KS 43324. 11670. 120. 0.79 0.37  
 KS 39153. 12778. 0. 1.62 0.35  
 KS 10514. 42794. 0. 0.24 0.35  
 KS 23476. 27053. 80. 0.65 0.34  
 KS 37911. 12237. 130. 0.88 0.33  
 KS 32191. 15806. 0. 0.35 0.32  
 KS 35978. 11743. 0. 0.37 0.32  
 KS 12753. 29473. 0. 0.21 0.28  
 KS 19910. 17317. 0. 0.24 0.25  
 KS 27147. 9941. 0. 0.28 0.25  
 KS 23381. 12930. 0. 0.25 0.24  
 KS 18392. 16505. 0. 0.22 0.23  
 KS 24543. 8011. 0. 0.25 0.22  
 KS 19015. 11193. 0. 0.21 0.20  
 KS 22234. 7257. 0. 0.23 0.20  
 KS 19078. 7580. 0. 0.20 0.18  
 KS 14057. 13029. 0. 0.17 0.18  
 KS 14226. 9943. 0. 0.16 0.16  
 KS 18070. 5898. 0. 0.19 0.16  
 KS 14967. 6135. 0. 0.16 0.14  
 KS 7236. 12863. 0. 0.11 0.13  
 KS 16618. 3091. 15. 0.14 0.13  
 KS 13982. 4564. 0. 0.14 0.12  
 KS 12272. 4005. 0. 0.12 0.11  
 KS 7255. 7667. 0. 0.09 0.10  
 KS 11826. 3860. 0. 0.12 0.10  
 KS 8269. 2699. 0. 0.08 0.07  
 KS 6393. 2087. 0. 0.06 0.06  
 KS 6594. 2152. 0. 0.07 0.06  
 KS 7158. 2336. 0. 0.07 0.06  
 KS 7256. 2368. 0. 0.07 0.06  
 KS 6026. 1967. 0. 0.06 0.05  
 KS 6184. 2019. 0. 0.06 0.05

ACE 3WE WEISS  
 ACE K84 MC COMAS-LEE'S SUMMIT MUNI  
 ACE 3GV EAST KANSAS CITY  
 ACE 3SZ ST. CHARLES COUNTY  
 ACE JEF JEFFERSON CITY MEML  
 ACE VIH ROLLA NATIONAL  
 ACE K07 ROLLA DOWNTOWN  
 ACE HIG HIGGINSVILLE INDUSTRIAL MUNI  
 ACE MAW MALDEN MUNI  
 ACE K48 CHILLICOTHE MUNICIPAL  
 ACE POF EARL FIELDS MEMORIAL  
 ACE AIZ LEE C FINE MEMORIAL  
 ACE M43 DEXTER MUNI

ST LOUIS  
 LEES SUMMIT  
 GRAIN VALLEY  
 ST CHARLES  
 JEFFERSON CITY  
 ROLLA/VICHY  
 ROLLA  
 HIGGINSVILLE  
 MALDEN  
 CHILLICOTHE  
 POPLAR BLUFF  
 KAISER/LAKE OZARK/  
 DEXTER

MO 1827253. 376423. 1287. 8.56\* 14.64\*  
 MO 1758036. 302987. 1151. 7.76\* 13.69\*  
 MO 1052323. 289708. 1022. 8.70 8.92  
 MO 977499. 182687. 745. 4.92\* 7.71\*  
 MO 881824. 255538. 832. 6.00\* 7.56\*  
 MO 682205. 217619. 716. 4.38 5.98  
 MO 676763. 219819. 682. 5.27\* 5.96\*  
 MO 494009. 118060. 446. 6.41 4.07  
 MO 428299. 170532. 426. 3.10 3.98  
 MO 345538. 144299. 289. 2.77 3.25  
 MO 308044. 160950. 177. 1.92 3.12  
 MO 243239. 147271. 179. 2.02 2.59  
 MO 315393. 66703. 301. 2.77 2.54

ACE 3SQ ST CHARLES  
 ACE K24 E W COTTON WOODS MEMORIAL  
 ACE L80 FLOYD W. JONES LEBANON  
 ACE M62 COUNTY MEMORIAL  
 ACE BUM BUTLER MEMORIAL  
 ACE FAM FARMINGTON REGIONAL  
 ACE MBY OMAR N BRADLEY  
 ACE H63 WEST PLAINS MUNI  
 ACE 2K2 AIR PARK SOUTH  
 ACE H22 FESTUS MEML  
 ACE 3DW DOWNTOWN  
 ACE 02K ARROWHEAD  
 ACE IRK CLARENCE CANNON MEMORIAL  
 ACE K02 PERRYVILLE MUN  
 ACE SIK SIKESTON MEML MUNI  
 ACE 82K CAMERON MUNI  
 ACE 3IP INDEPENDENCE MEMORIAL  
 ACE DMO SEDALIA MEMORIAL  
 ACE M050 WENTZVILLE  
 ACE H41 MEXICO MEMORIAL  
 ACE PLK M GRAHAM CLARK  
 ACE TRX TRENTON MUNICIPAL  
 ACE 84K CLINTON MEMORIAL  
 ACE VER JESSE VIERTEL MEMORIAL  
 ACE NVD NEVADA MUNI  
 ACE K15 LINN CREEK-GRAND GLAIZE MEML  
 ACE MNF MOUNTAIN VIEW  
 ACE EOS NEOSHO MEML  
 ACE MHL MARSHALL MEML MUNI  
 ACE 1H0 CREVE COEUR  
 ACE 9K4 SKYHAVEN  
 ACE 2H2 AURORA MEMORIAL MUNI  
 ACE M049 WASHINGTON MEMORIAL  
 ACE 3EX EXCELSIOR SPRINGS MEMORIAL  
 ACE 75K BETHANY MEMORIAL  
 ACE 94K CASSVILLE MUNICIPAL  
 ACE H19 BOWLING GREEN MUNICIPAL  
 ACE 3VS ROY OTTEN MEMORIAL AIRFIELD  
 ACE HAE HANNIBAL MUNI  
 ACE K56 MARYVILLE MEML  
 ACE H21 CAMDENTON MEMORIAL  
 ACE H20 MYERS PARK MEMORIAL MUNICIPAL  
 ACE M05 CARUTHERSVILLE MEMORIAL  
 ACE H74 CABOOL MEMORIAL  
 ACE 4K3 LEXINGTON MUNI  
 ACE 35M MISSISSIPPI COUNTY  
 ACE M010 ROOSTERVILLE  
 ACE M14 KENNETT MEMORIAL  
 ACE UBX CUBA MUNI  
 ACE M043 STOCKTON MUNI  
 ACE M008 LAKE WINNEBAGO MUNI  
 ACE M016 MEMPHIS MEMORIAL  
 ACE M12 STEELE MUNI  
 ACE H65 FULTON MUNI  
 ACE K39 ST. CLAIR MEMORIAL  
 ACE K52 MONROE CITY REGIONAL  
 ACE 34M CAMPBELL MUNI  
 ACE M085 HARRISONVILLE  
 ACE 4M04 MISSOURI CITY  
 ACE 1H5 WILLOW SPRINGS MEMORIAL

ST CHARLES  
 COLUMBIA  
 LEBANON  
 NEW MADRID  
 BUTLER  
 FARMINGTON  
 MOBERLY  
 WEST PLAINS  
 OZARK  
 FESTUS  
 SPRINGFIELD  
 ST LOUIS  
 KIRKSVILLE  
 PERRYVILLE  
 SIKESTON  
 CAMERON  
 INDEPENDENCE  
 SEDALIA  
 WENTZVILLE  
 MEXICO  
 POINT LOOKOUT /BRANSON  
 TRENTON  
 CLINTON  
 BOONVILLE  
 NEVADA  
 OSAGE BEACH  
 MOUNTAIN VIEW  
 NEOSHO  
 MARSHALL  
 ST LOUIS  
 WARRENSBURG  
 AURORA  
 WASHINGTON  
 EXCELSIOR SPRINGS  
 BETHANY  
 CASSVILLE  
 BOWLING GREEN  
 VERSAILLES  
 HANNIBAL  
 MARYVILLE  
 CAMDENTON  
 CARTHAGE  
 CARUTHERSVILLE  
 CABOOL  
 LEXINGTON  
 CHARLESTON  
 LIBERTY  
 KENNETT  
 CUBA  
 STOCKTON  
 LAKE WINNEBAGO  
 MEMPHIS  
 STEELE  
 FULTON  
 ST CLAIR  
 MONROE CITY  
 CAMPBELL  
 HARRISONVILLE  
 LIBERTY  
 WILLOW SPRINGS

MO	278257.	75229.	266.	1.91	2.35
MO	271739.	78127.	270.	1.82*	2.32*
MO	247137.	54988.	239.	1.96	2.01
MO	209169.	61235.	210.	1.52*	1.80*
MO	208872.	35943.	218.	1.41*	1.63*
MO	123614.	119145.	100.	1.94	1.61
MO	144905.	76912.	138.	1.23	1.47
MO	89785.	127280.	0.	1.29	1.44
MO	128485.	51248.	104.	0.91	1.19
MO	74991.	97917.	134.	2.37	1.15
MO	68034.	98396.	0.	0.97	1.11
MO	93103.	67518.	0.	1.10	1.07
MO	41115.	118782.	0.	1.71	1.06
MO	130021.	27508.	129.	0.87*	1.05*
MO	68599.	83507.	0.	2.64	1.01
MO	86611.	58908.	0.	1.00	0.97
MO	104191.	34008.	0.	1.08	0.92
MO	19128.	111586.	1.	1.29	0.87
MO	63325.	65653.	0.	0.80	0.86
MO	82911.	37935.	75.	0.59*	0.80*
MO	78271.	39635.	73.	0.65	0.78
MO	90148.	18762.	69.	1.36	0.72
MO	73017.	24598.	61.	0.71	0.65
MO	58894.	36073.	1.	1.78	0.63
MO	73874.	20243.	58.	1.10	0.63
MO	50108.	41305.	0.	0.61	0.61
MO	11271.	74380.	0.	0.36	0.57
MO	55150.	30516.	1.	2.27	0.57
MO	35523.	47193.	0.	0.49	0.55
MO	55762.	23236.	0.	0.59	0.52
MO	57613.	20434.	194.	1.28	0.52
MO	15637.	61336.	0.	0.34	0.51
MO	27957.	42864.	0.	0.40	0.47
MO	22698.	48099.	0.	0.38	0.47
MO	51844.	16926.	0.	0.51	0.46
MO	54921.	9452.	52.	0.35*	0.43*
MO	39525.	25938.	134.	0.94	0.43
MO	16971.	43609.	0.	0.30	0.40
MO	28095.	29613.	0.	1.18	0.38
MO	24082.	28266.	0.	0.32	0.35
MO	24553.	24329.	0.	0.30	0.32
MO	35436.	11566.	0.	0.37	0.31
MO	18717.	28602.	0.	0.27	0.31
MO	31256.	13168.	99.	0.66	0.30
MO	16726.	28300.	0.	0.25	0.30
MO	24249.	18415.	0.	0.29	0.28
MO	28508.	9306.	0.	0.29	0.25
MO	20737.	16883.	0.	0.25	0.25
MO	23484.	10393.	0.	0.24	0.23
MO	23903.	7801.	0.	0.23	0.21
MO	22882.	7469.	0.	0.24	0.20
MO	14180.	15875.	0.	0.18	0.20
MO	22318.	8408.	0.	0.22	0.20
MO	14883.	14089.	48.	0.36	0.19
MO	19884.	9308.	0.	0.22	0.19
MO	23779.	4223.	23.	0.15*	0.19*
MO	19866.	6485.	0.	0.20	0.18
MO	18896.	8698.	0.	0.20	0.18
MO	13819.	9629.	0.	0.16	0.16
MO	17283.	5641.	0.	0.17	0.15

ACE 73K BILL MARTIN MEMORIAL  
 ACE H64 LAMAR MUNI  
 ACE H62 SULLIVAN MEMORIAL  
 ACE K04 HAERR FIELD  
 ACE K57 GOULD PETERSON MUNICIPAL  
 ACE M014 MANSFIELD MUNI  
 ACE M84 BOONVILLE MUNI  
 ACE K89 MACON-FOWER MEML  
 ACE 78Y RANKIN  
 ACE H79 ELDON MODEL AIRPARK  
 ACE M48 HOUSTON MEMORIAL  
 ACE K33 SALEM MEMORIAL  
 ACE K26 CARROLLTON MEMORIAL  
 ACE 4K5 ALBANY MEMORIAL  
 ACE M003 MODERS  
 ACE M013 TWIN CITY AIRPARK  
 ACE 89K FARRIS STRIP

ACE EAR KEARNEY MUNI  
 ACE OLU COLUMBUS MUNI  
 ACE NSI HASTINGS MUNI  
 ACE MCK MCCOOK MUNI  
 ACE MLE HILLARD  
 ACE SHY SIDNEY MUNI  
 ACE AIA ALLIANCE MUNI  
 ACE FET FREMONT MUNI  
 ACE CDR CHADRON MUNI  
 ACE BIE BEATRICE MUNI  
 ACE CZD COZAD MUNI  
 ACE HDE BREWSTER FIELD  
 ACE LCG WAYNE MUNI  
 ACE OGA SEARLE FIELD  
 ACE BBW BROKEN BOW MUNI  
 ACE 3HO NORTH OMAHA  
 ACE LXN LEXINGTON MUNI  
 ACE ANW AINSWORTH MUNI  
 ACE 7K8 MARTIN FIELD  
 ACE PMV PLATTSMOUTH MUNI  
 ACE ONL O NEILL MUNI  
 ACE 09K SARGENT MUNI  
 ACE K46 FLIGHTLAND  
 ACE AUH AURORA MUNI  
 ACE GTE GOTHENBURG MUNI  
 ACE 08K HARVARD STATE  
 ACE K17 YORK MUNI  
 ACE 4V7 KIMBALL MUNI  
 ACE 30A SOUTH OMAHA  
 ACE 9V5 MODISETT  
 ACE 4V9 ANTELOPE COUNTY  
 ACE ODX EVELYN SHARP FIELD  
 ACE 0V3 PIONEER VILLAGE FIELD  
 ACE 12K SUPERIOR MUNI  
 ACE OKS OSHKOSH MUNI  
 ACE IML IMPERIAL MUNI  
 ACE HE22 TEKAMAH  
 ACE 07K CENTRAL CITY MUNI  
 ACE 84Y BLOOMFIELD MUNI  
 ACE 93Y DAVID CITY MUNI  
 ACE FNB BRENNER FIELD  
 ACE FBY FAIRBURY MUNI

AVA  
 LAMAR  
 SULLIVAN  
 TAYLOR  
 TARKIO  
 MANSFIELD  
 BOORVILLE  
 MACON  
 MARYVILLE  
 ELDOH  
 HOUSTON  
 SALEM  
 CARROLLTON  
 ALBANY  
 HOUSE SPRINGS  
 LUTESVILLE  
 FAUCETT

KEARNEY  
 COLUMBUS  
 HASTINGS  
 MCCOOK  
 OMAHA  
 SIDNEY  
 ALLIANCE  
 FREMONT  
 CHADRON  
 BEATRICE  
 COZAD  
 HOLDREGE  
 WAYNE  
 OGALLALA  
 BROKEN BOW  
 OMAHA  
 LEXINGTON  
 AINSWORTH  
 SO SIOUX CITY  
 PLATTSMOUTH  
 O NEILL  
 SARGENT  
 OMAHA  
 AURORA  
 GOTHENBURG  
 HARVARD  
 YORK  
 KIMBALL  
 OMAHA /PAPILLION/  
 RUSHVILLE  
 HELIGH  
 ORD  
 MINDEN  
 SUPERIOR  
 OSHKOSH  
 IMPERIAL  
 TEKAMAH  
 CENTRAL CITY  
 BLOOMFIELD  
 DAVID CITY  
 FALLS CITY  
 FAIRBURY

MO	15743.	5138.	0.	0.15	0.14
MO	13454.	4391.	0.	0.13	0.12
MO	12566.	4101.	0.	0.13	0.11
MO	11336.	3700.	0.	0.12	0.10
MO	11839.	3864.	0.	0.12	0.10
MO	8856.	5708.	0.	0.10	0.10
MO	10735.	3504.	0.	0.11	0.09
MO	7778.	2539.	0.	0.08	0.07
MO	6169.	4194.	0.	0.07	0.07
MO	8239.	2689.	0.	0.08	0.07
MO	7368.	2405.	0.	0.08	0.06
MO	6629.	2164.	0.	0.06	0.06
MO	5778.	1886.	0.	0.06	0.05
MO	3987.	1301.	0.	0.04	0.04
MO	3158.	1031.	0.	0.03	0.03
MO	3600.	1175.	0.	0.04	0.03
MO	1017.	332.	0.	0.01	0.01
NE	569950.	202691.	515.	4.10	5.13
NE	411588.	175893.	382.	3.15	3.90
NE	346635.	164374.	302.	2.63	3.40
NE	290425.	156788.	262.	2.76	2.97
NE	274805.	164484.	0.	5.78	2.92
NE	201984.	141458.	174.	2.80	2.28
NE	190141.	139272.	137.	1.74	2.19
NE	197005.	131372.	185.	1.73	2.18
NE	194104.	117525.	134.	2.00	2.07
NE	176602.	96760.	160.	1.36	1.82
NE	144342.	45548.	139.	0.96*	1.26*
NE	97393.	45759.	92.	0.81	0.95
NE	80045.	59049.	74.	0.63*	0.92*
NE	91388.	29604.	58.	1.53	0.80
NE	34402.	81248.	24.	0.53	0.77
NE	71371.	43112.	0.	0.79	0.76
NE	34449.	75698.	0.	1.46	0.73
NE	15151.	83065.	0.	0.66	0.65
NE	52816.	41947.	0.	0.62	0.63
NE	73630.	19262.	232.	1.49	0.62
NE	67470.	24344.	64.	0.53	0.61
NE	3670.	76475.	0.	0.30	0.53
NE	48839.	21358.	0.	0.51	0.47
NE	37512.	26549.	98.	0.90	0.43
NE	34831.	19898.	112.	0.75	0.36
NE	34770.	17554.	0.	0.38	0.35
NE	20699.	31144.	0.	0.29	0.34
NE	11929.	30222.	0.	0.21	0.28
NE	23375.	12582.	0.	0.25	0.24
NE	5866.	26613.	0.	0.14	0.22
NE	19429.	11641.	0.	0.21	0.21
NE	14239.	15483.	0.	0.18	0.20
NE	11425.	18650.	0.	0.17	0.20
NE	15752.	14530.	25.	0.26	0.20
NE	23270.	5742.	0.	0.14	0.19
NE	14977.	14095.	37.	0.29	0.19
NE	20251.	6612.	0.	0.21	0.18
NE	20253.	14435.	0.	0.15	0.18
NE	17460.	8414.	0.	0.18	0.17
NE	9705.	16243.	0.	0.14	0.17
NE	18421.	6013.	0.	0.19	0.16
NE	14731.	9443.	32.	0.25	0.16

ACE	BUB	CRAM FIELD
ACE	SCB	SCRIBNER STATE
ACE	7NE7	SEWARD MUNI
ACE	AHQ	WAHOO MUNI
ACE	K13	FAIRMONT STATE AIRFIELD
ACE	15K	ALBION MUNI
ACE	CSB	CAMBRIDGE MUNI
ACE	3GN	GRUNDMAN
ACE	NE02	HARTINGTON MUNI
ACE	6K3	CREIGHTON MUNI
ACE	5V3	THOMAS COUNTY
ACE	K03	CRETE MUNI
ACE	47V	CURTIS MUNI
ACE	GRN	GORDON MUNI
ACE	0V0	GRANT MUNI
ACE	K09	HEBRON MUNI
ACE	7V7	RED CLOUD MUNI
ACE	K01	AUBURN MUNI
ACE	NE21	TECUMSEH MUNICIPAL
ACE	NE23	FLYING V
ACE	8V2	STUART-ATKINSON MUNI

BURWELL
SCRIBNER
SEWARD
WAHOO
FAIRMONT
ALBION
CAMBRIDGE
NEBRASKA CITY
HARTINGTON
CREIGHTON
THEDFORD
CRETE
CURTIS
GORDON
GRANT
HEBRON
RED CLOUD
AUBURN
TECUMSEH
UTICA
STUART/ATKINSON

NE	10119.	11814.	9.	0.09*	0.15*
NE	13659.	9411.	0.	0.16	0.15
NE	11135.	11562.	0.	0.14	0.15
NE	15895.	6082.	10.	0.12*	0.15*
NE	12204.	10231.	0.	0.15	0.15
NE	12863.	9470.	0.	0.14	0.15
NE	11875.	8963.	0.	0.14	0.14
NE	14812.	4836.	0.	0.15	0.13
NE	6033.	13016.	0.	0.10	0.13
NE	5363.	14120.	0.	0.10	0.13
NE	8304.	9749.	5.	0.08*	0.12*
NE	8363.	10146.	0.	0.31	0.12
NE	8279.	7654.	0.	0.10	0.11
NE	7820.	7504.	0.	0.10	0.10
NE	9960.	3252.	0.	0.10	0.09
NE	7403.	4875.	0.	0.08	0.08
NE	7402.	2416.	0.	0.07	0.07
NE	5013.	4175.	0.	0.06	0.06
NE	6973.	2276.	0.	0.07	0.06
NE	5701.	1861.	0.	0.06	0.05
NE	4633.	2072.	0.	0.05	0.04

EASTERN REGION

27AEA	33N	DELAWARE AIRPARK
60AEA	GED	SUSSEX COUNTY
-61AEA	REH	REHOBOTH AIRCRAFTERS
11AEA	N92	SUMMIT AIRPARK
85	AEA	ON4 CHANDELLE ESTATES
+30	AEA	N98 MILFORD AIRPARK
	AEA	15N JENKINS
	AEA	38N SMYRNA
	AEA	N06 LAUREL
-71AEA	SBY	SALISBURY-WICOMICO COUNTY
19AEA	GAI	MONTGOMERY COUNTY ARPK
18AEA	MTN	GLENN L. MARTIN STATE
9AEA	W18	SUBURBAN
28AEA	FDK	FREDERICK MUNI
-25AEA	N80	OCEAN CITY
15AEA	ANP	LEE
38AEA	CBE	CUMBERLAND MUNI
64AEA	2G4	GARRETT COUNTY
40AEA	2W6	ST MARYS COUNTY
12AEA	W48	ESSEX SKYPARK
22AEA	W42	FALLSTON
36AEA	ESN	EASTON MUNI
14AEA	W00	FREEWAY
21AEA	W29	BAY BRIDGE INDUSTRIAL
08AEA	W32	HYDE FLD
	AEA	W54 WESTMINSTER
	AEA	CGE CAMBRIDGE MUNI
	AEA	W28 P G AIRPARK
	AEA	1W2 BALTIMORE AIRPARK
	AEA	0W3 ALDINO
	AEA	W50 DAVIS
	AEA	2W5 MARYLAND
	AEA	2W2 CLEARVIEW AIRPARK

DOVER/CHESWOLD
GEORGETOWN
REHOBOTH BEACH
MIDDLETOWN
DOVER
MILFORD
WYOMING
SMYRNA
LAUREL

DE	639262.	211667.	652.	3.29	5.65
DE	331583.	163185.	321.	2.35	3.29
DE	257095.	139130.	241.	1.91*	2.63*
DE	96944.	65996.	0.	2.96	1.08
DE	75202.	73660.	0.	0.94	0.99
DE	11217.	20145.	0.	0.17	0.21
DE	12992.	9734.	0.	0.15	0.15
DE	11626.	6551.	0.	0.12	0.12
DE	8739.	2853.	0.	0.09	0.08
MD	1424433.	338446.	0.	2.29	11.71
MD	1300322.	331389.	1263.	8.71	10.84
MD	809587.	159066.	740.	4.27*	6.44*
MD	700564.	130159.	644.	4.16*	5.52*
MD	596747.	135097.	498.	5.81	4.86
MD	506517.	193248.	0.	1.40	4.65
MD	570122.	115292.	537.	3.52*	4.55*
MD	396671.	154278.	367.	2.86*	3.66*
MD	241386.	111434.	250.	1.03	2.34
MD	261956.	72876.	0.	0.61	2.22
MD	262627.	53852.	197.	1.64*	2.10*
MD	232942.	63323.	209.	0.59*	1.97*
MD	117464.	143337.	1.	4.10	1.73
MD	116174.	48401.	0.	1.19	1.09
MD	127148.	35110.	311.	2.14	1.08
MD	112917.	42134.	0.	1.19	1.03
MD	102690.	25187.	81.	0.86	0.85
MD	38025.	69090.	0.	0.51	0.71
MD	73629.	31952.	0.	0.76	0.70
MD	69476.	25345.	0.	0.70	0.63
MD	30536.	62571.	0.	0.48	0.62
MD	63302.	20663.	0.	0.63	0.56
MD	46496.	30921.	0.	0.52	0.51
MD	56250.	11261.	44.	0.34*	0.45*

AEA CGS COLLEGE PARK  
 AEA 2W8 AQUA-LAND/CLIFFTON SKYPARK  
 AEA 2N0 CECIL COUNTY AIRPARK  
 AEA W19 PARK HALL  
 AEA W41 CRISFIELD MUNI  
 AEA 0W2 DEEP CREEK AIRPARK

COLLEGE PARK  
 NEWBURG  
 ELKTON  
 PARK HALL  
 CRISFIELD  
 CHURCHTON

MD	32813.	15990.	0.	0.34	0.32
MD	34688.	11386.	0.	0.34	0.31
MD	18545.	11333.	0.	0.20	0.20
MD	18972.	5900.	0.	0.18	0.16
MD	8924.	8205.	0.	0.11	0.11
MD	5590.	1825.	0.	0.05	0.05

AEA N87 TRENTON-ROBBINSVILLE  
 AEA 7MY BURLINGTON COUNTY AIRPARK  
 AEA WWD CAPE MAY COUNTY  
 AEA BLM MONMOUTH COUNTY  
 AEA 16N CAMDEN-BURLINGTON  
 AEA MIV MILLVILLE MUNI  
 AEA 17N CROSS KEYS  
 AEA AIY ATLANTIC CITY MUNI/SADER FIELD  
 AEA 3N9 SMITHVILLE AIRFIELD  
 AEA N44 ROBERT J. MILLER AIR PARK  
 AEA N12 LAKEWOOD  
 AEA N83 BRIDGEPORT  
 AEA LDJ LINDEN  
 AEA N52 SOMERSET  
 AEA N81 HAMMONTON MUNI  
 AEA 19N ALBION  
 AEA N63 SUSSEX  
 AEA 39N PRINCETON  
 AEA 1N7 BLAIRSTOWN  
 AEA N50 LI CALZI  
 AEA 29N KROELINGER  
 AEA 26N OCEAN CITY MUNI  
 AEA N61 COLTS NECK  
 AEA N40 SKY MANOR  
 AEA N73 RED LION  
 AEA N85 ALEXANDRIA  
 AEA N21 FORRESTAL  
 AEA 47N KUPPER  
 AEA N64 SOMERSET HILLS  
 AEA N51 SOLBERG-HUNTERDON  
 AEA 81N FLANDERS VALLEY  
 AEA N58 HANOVER  
 AEA 72H MANAHAWKIN  
 AEA 2N8 MARLBORO  
 AEA 27N SALEM AIRFIELD  
 AEA N07 LINCOLN PARK  
 AEA 12N AEROFLEX-ANDOVER  
 AEA 25N RUDYS  
 AEA N05 HACKETTSTOWN  
 AEA 1N6 NORDHEIM FLYING K AIRPARK  
 AEA 24N PITMAN  
 AEA 4N1 GREENWOOD LAKE  
 AEA N75 TWIN PINE  
 AEA 1N4 WOODBINE MUNI  
 AEA 28N VINELAND-DOWNSTOWN  
 AEA 00N BUCKS

ROBBINSVILLE  
 MOUNT HOLLY  
 WILDWOOD  
 BELMAR-FARMINGDALE  
 BERLIN  
 MILLVILLE  
 CROSS KEYS  
 ATLANTIC CITY  
 SMITHVILLE  
 TOMS RIVER  
 LAKEWOOD  
 BRIDGEPORT  
 LINDEN  
 SOMERVILLE  
 HAMMONTON  
 ALBION  
 SUSSEX  
 PRINCETON/ROCKY HILL/  
 BLAIRSTOWN  
 BRIDGETON  
 VINELAND  
 OCEAN CITY  
 COLTS NECK  
 PITTSTOWN  
 VINCENTOWN  
 PITTSTOWN  
 PRINCETON  
 MANVILLE  
 BASKING RIDGE  
 READINGTON  
 FLANDERS  
 HANOVER  
 MANAHAWKIN  
 MATAWAN  
 SALEM  
 LINCOLN PARK  
 ANDOVER  
 VINELAND  
 HACKETTSTOWN  
 BARGAINTOWN  
 PITMAN  
 WEST MILFORD  
 PENNINGTON  
 WOODBINE  
 VINELAND  
 BRIDGETON

NJ	4753774.	877609.	5133.	22.00	37.42
NJ	1475711.	364937.	1478.	9.90*	12.23*
NJ	1137595.	291583.	1314.	5.88	9.50
NJ	1033627.	303423.	944.	8.42*	8.88*
NJ	994306.	178297.	972.	6.28*	7.79*
NJ	926928.	239208.	1026.	4.88	7.75
NJ	511839.	163460.	494.	2.69	4.49
NJ	468629.	181497.	491.	2.96	4.32
NJ	442824.	86185.	421.	3.20*	3.51*
NJ	373037.	108738.	405.	2.70	3.20
NJ	384777.	64911.	403.	2.10	2.99
NJ	359062.	75688.	345.	1.74	2.89
NJ	233877.	160944.	0.	2.40	2.62
NJ	200979.	170972.	0.	2.63	2.47
NJ	285041.	59084.	256.	1.83*	2.29*
NJ	175614.	98384.	71.	1.55*	1.82*
NJ	195226.	63736.	0.	2.07	1.72
NJ	104330.	133553.	285.	1.28	1.58
NJ	145145.	56810.	0.	1.57	1.34
NJ	134043.	48980.	0.	1.37	1.22
NJ	132781.	41251.	125.	0.90*	1.16*
NJ	116897.	43448.	0.	1.25	1.07
NJ	94043.	41145.	0.	0.99	0.90
NJ	112700.	23448.	126.	0.50	0.90
NJ	93451.	26764.	62.	0.70*	0.80*
NJ	83021.	34945.	0.	0.87	0.78
NJ	0.	105363.	0.	0.51	0.70
NJ	46271.	55589.	0.	0.63	0.68
NJ	66973.	21862.	0.	0.71	0.59
NJ	64725.	22359.	0.	0.69	0.58
NJ	64490.	23488.	0.	0.69	0.58
HJ	61510.	20080.	0.	0.62	0.54
NJ	66363.	11609.	61.	0.40*	0.52*
NJ	31798.	33934.	0.	0.69	0.44
NJ	39822.	12997.	0.	0.40	0.35
NJ	21833.	26024.	0.	0.30	0.32
NJ	23192.	18071.	0.	0.28	0.27
NJ	24624.	5260.	17.	0.16*	0.20*
NJ	22954.	7493.	0.	0.24	0.20
NJ	21404.	6987.	0.	0.22	0.19
NJ	19783.	6458.	0.	0.20	0.17
HJ	16687.	6680.	0.	0.18	0.16
NJ	18204.	5943.	0.	0.18	0.16
NJ	10625.	12876.	0.	0.15	0.16
NJ	14016.	4576.	0.	0.14	0.12
HJ	9102.	2971.	0.	0.09	0.08

AEA SNF STEWART  
 AEA FOK SUFFOLK COUNTY  
 AEA 3G8 GENESEE COUNTY  
 AEA MGJ ORANGE COUNTY  
 AEA N17 TRI-CITIES  
 AEA DKK DUNKIRK MUNI.

NEWBURGH  
 WESTHAMPTON BEACH  
 BATAVIA  
 MONTGOMERY  
 ENDICOTT  
 DUNKIRK

NY	1801567.	399426.	1942.	10.39*	14.62*
NY	1658190.	289936.	1585.	8.74*	12.94*
NY	1503258.	310453.	1646.	7.53	12.05
NY	1245029.	256857.	1332.	9.66	9.98
NY	1148136.	299479.	1246.	9.50*	9.62*
HY	908703.	258701.	968.	5.10	7.76

AEA SCH SCHENECTADY COUNTY  
 AEA JHW CHAUTAUQUA COUNTY  
 AEA 9G0 BUFFALO AIRPARK  
 AEA ART WATERTOWN NEW YORK INTL  
 AEA N82 WURTSBORO-SULLIVAN COUNTY  
 AEA N69 STORMVILLE  
 AEA MSV SULLIVAN COUNTY INTL  
 AEA GFL WARREN COUNTY  
 AEA 1N1 BROOKHAVEN  
 AEA N24 RAMAPO VALLEY  
 AEA MSS RICHARDS FIELD  
 AEA OIC LT.WARREN EATON  
 AEA DSV DANSVILLE MUNI  
 AEA PLB CLINTON CO  
 AEA D35 PRIOR AVIATION SERVICE INC  
 AEA N03 CORTLAND COUNTY-CHASE FIELD  
 AEA 9G3 AKRON  
 AEA 44N SKY ACRES  
 AEA FLU FLUSHING  
 AEA SLK ADIRONDACK  
 AEA HTO EAST HAMPTON  
 AEA N22 PENN YAN  
 AEA 0B8 ELIZABETH FIELD  
 AEA N00 OSWEGO COUNTY  
 AEA 06N RANDALL  
 AEA ELZ WELLSVILLE MUNI ARPT,TARANTINE FLD  
 AEA 10N KOBELT  
 AEA 5B2 SARATOGA COUNTY  
 AEA 0G0 TRANSIT AIR PARK INC.  
 AEA 20N KINGSTON-ULSTER  
 AEA 1B1 COLUMBIA COUNTY  
 AEA 9G6 PINE HILL  
 AEA N23 SIDNEY MUNI  
 AEA 7N3 SANDS POINT  
 AEA 0G5 OGDENSBURG INTL  
 AEA 46N SKY PARK  
 AEA N66 ONEONTA MUNI  
 AEA D22 ANGOLA AIRWAYS  
 AEA 0LE OLEAH MUNI  
 AEA 0G7 SENECA FALLS AIRPORT INC  
 AEA 34D ORCHARD PARK  
 AEA LKP LAKE PLACID  
 AEA 5B7 RENSSELAER COUNTY AIRPARK INC  
 AEA D77 LANCASTER AIRPORT INC  
 AEA 1B8 CANASTOTA  
 AEA 6G3 PALMYRA AIRPARK  
 AEA 21N MATTITUCK AIRBASE  
 AEA 4G2 HAMBURG AIRDROME INC.  
 AEA 0B3 CAMILLUS  
 AEA MAL MALONE-DUFORT  
 AEA 7N1 CORNING-PAINTED POST  
 AEA 5G0 LE ROY (FREUDIGMAN FIELD)  
 AEA B24 AMA EXECUTIVE AIRSTRIP  
 AEA MTP SKY PORTEL  
 AEA 6B4 FRANKFORT-HIGHLAND INC.  
 AEA 5B8 DUFLO  
 AEA NY10 MICHAEL FIELD  
 AEA 01G PERRY-WARSAW  
 AEA N77 MAHOPAC  
 AEA D51 CLARENCE AERODROME

SCHENECTADY  
 JAMESTOWN  
 BUFFALO  
 WATERTOWN  
 WURTSBORO  
 STORMVILLE  
 MONTICELLO  
 GLENS FALLS  
 SHIRLEY  
 SPRING VALLEY  
 MASSENA  
 NORWICH  
 DANSVILLE  
 PLATTSBURGH  
 BUFFALO  
 CORTLAND  
 AKRON  
 MILLBROOK  
 NEW YORK/FLUSHING/  
 SARANAC LAKE  
 EAST HAMPTON  
 PENN YAN  
 FISHERS ISLAND  
 FULTON  
 MIDDLETOWN  
 WELLSVILLE  
 WALLKILL  
 SARATOGA SPRINGS  
 LOCKPORT  
 KINGSTON  
 HUDSON  
 ALBION  
 SIDNEY  
 PORT WASHINGTON  
 OGDENSBURG  
 RED HOOK  
 ONEONTA  
 ANGOLA  
 OLEAH  
 SENECA FALLS  
 ORCHARD PARK  
 LAKE PLACID  
 TROY  
 LANCASTER  
 CANASTOTA  
 PALMYRA  
 MATTITUCK  
 HAMBURG  
 CAMILLUS  
 MALONE  
 CORNING  
 LE ROY  
 HAMILTON  
 MONTAUK  
 FRANKFORT /UTICA/  
 NEW BREMEN  
 CICERO  
 PERRY  
 MAHOPAC  
 EAST AMHERST

NY	914023.	155002.	877.	5.58*	7.10*
NY	587206.	201677.	644.	3.14	5.24
NY	612135.	124948.	658.	3.24	4.90
NY	415483.	173092.	455.	2.02	3.91
NY	474276.	100958.	456.	3.08*	3.82*
NY	460941.	90837.	449.	2.98*	3.67*
NY	397303.	143239.	473.	2.75	3.59
NY	372351.	158732.	406.	2.98	3.53
NY	290289.	200118.	0.	9.88	3.26
NY	268422.	192776.	0.	3.28	3.06
NY	286411.	149942.	328.	1.62	2.90
NY	177279.	135444.	187.	1.66*	2.08*
NY	142702.	150216.	0.	6.46	1.95
NY	156163.	131719.	169.	1.31	1.91
NY	135869.	149703.	0.	1.91	1.90
NY	154622.	120564.	129.	3.10	1.83
NY	205029.	38557.	222.	0.99	1.62
NY	113290.	122882.	109.	1.16*	1.57*
NY	177457.	57907.	0.	1.87	1.56
NY	108833.	123641.	117.	0.95	1.54
NY	94883.	136327.	0.	1.52	1.54
NY	100193.	124520.	91.	1.41	1.49
NY	104916.	107766.	106.	1.03*	1.41*
NY	135253.	66544.	0.	5.19	1.34
NY	170044.	31125.	165.	1.09*	1.34*
NY	71045.	118467.	68.	1.00	1.26
NY	132004.	56546.	0.	1.47	1.25
NY	86964.	95598.	0.	3.52	1.21
NY	33806.	116399.	0.	0.86	1.00
NY	32651.	116021.	0.	0.85	0.99
NY	31272.	115549.	1.	1.83	0.98
NY	122240.	24496.	117.	0.77*	0.97*
NY	23796.	109782.	1.	1.12	0.89
NY	13972.	109925.	0.	0.65	0.82
NY	12503.	109444.	0.	0.97	0.81
NY	84532.	37348.	86.	0.64*	0.81*
NY	19625.	87198.	0.	0.53	0.71
NY	68251.	22277.	0.	0.67	0.60
NY	51267.	29490.	0.	1.78	0.54
NY	57587.	18797.	0.	0.62	0.51
NY	54191.	17692.	0.	0.58	0.48
NY	32267.	37455.	0.	0.45	0.46
NY	9749.	56912.	0.	0.32	0.44
NY	46529.	15192.	0.	0.49	0.41
NY	30498.	22229.	0.	0.38	0.35
NY	31841.	20896.	0.	0.38	0.35
NY	27919.	22564.	0.	0.35	0.34
NY	34774.	11351.	0.	0.36	0.31
NY	34391.	11227.	0.	0.37	0.30
NY	16560.	27966.	0.	0.27	0.30
NY	25427.	18306.	0.	0.30	0.29
NY	28815.	13009.	0.	0.31	0.28
NY	34720.	6031.	36.	0.23*	0.27*
NY	11229.	21460.	0.	0.19	0.22
NY	23750.	7752.	0.	0.25	0.21
NY	7829.	20421.	0.	0.16	0.19
NY	16986.	10547.	0.	0.20	0.18
NY	18005.	7052.	0.	0.20	0.17
NY	17411.	7571.	0.	0.19	0.17
NY	18612.	6077.	0.	0.19	0.16

AEA N72 WARWICK MUNI  
 AEA NK03 KAMP  
 AEA D70 HONEOYE FALLS  
 AEA 8G3 GIERMEK EXECUTIVE  
 AEA NY27 FULCO  
 AEA 23N EDWARDS  
 AEA 480 SOUTH ALBANY  
 AEA D38 CANANDAIGUA  
 AEA NY55 BURRELLO-MECHANICVILLE  
 AEA N89 L.H.J./CHAHNEL MASTER  
 AEA NY20 NELLIS FIELD  
 AEA 9G5 ROYALTON  
 AEA N37 MONTICELLO  
 AEA B01 GRANVILLE  
 AEA PTD POTSDAM MUNI/DAMON FLD/  
 AEA 4N2 CHENANGO BRIDGE  
 AEA 4B1 DUANESBURG  
 AEA 7N2 PEEKSKILL  
 AEA D80 PALMER  
 AEA B16 WHITFORDS  
 AEA NY23 RYDERS SKYPORT  
 AEA 41N F&F AIRPARK INC.  
 AEA NY54 COOPERSTOWN-WESTVILLE  
 AEA D79 DART  
 AEA 1N2 SPADARO  
 AEA NY03 ATHENS

WARWICK  
 DURHAMVILLE  
 HONEOYE FALLS  
 OLEAN  
 JOHNSTOWN  
 BAYPORT  
 SOUTH BETHLEHEM  
 CANANDAIGUA  
 MECHANICVILLE  
 ELLENVILLE  
 FORT PLAIN  
 GASPORT  
 MONTICELLO  
 GRAHVILLE  
 POTSDAM  
 BINGHAMTON  
 DUANESBURG  
 PEEKSKILL  
 OLCOTT  
 WEEDSPORT  
 GOUVERNEUR  
 ONEONTA  
 WESTVILLE  
 MAYVILLE  
 EAST MORICHES  
 ATHENS

NY	18669.	6095.	0.	0.20	0.16
NY	16316.	5490.	0.	0.18	0.15
NY	16555.	5405.	0.	0.17	0.15
NY	15836.	5169.	0.	0.16	0.14
NY	14944.	4878.	0.	0.16	0.13
NY	9946.	8870.	0.	0.13	0.13
NY	13078.	4270.	0.	0.14	0.12
NY	12204.	3983.	0.	0.13	0.11
NY	8905.	5417.	0.	0.10	0.10
NY	6743.	7204.	0.	0.09	0.09
NY	8012.	2615.	0.	0.09	0.07
NY	8504.	2776.	0.	0.09	0.07
NY	7048.	2480.	6.	0.05*	0.06*
NY	6513.	2597.	0.	0.07	0.06
NY	6904.	2253.	0.	0.07	0.06
NY	6505.	2123.	0.	0.07	0.06
NY	6734.	2199.	0.	0.07	0.06
NY	5354.	1748.	0.	0.06	0.05
NY	5117.	1670.	0.	0.05	0.05
NY	5592.	1825.	0.	0.06	0.05
NY	2205.	3230.	0.	0.03	0.04
NY	3710.	696.	3.	0.02*	0.03*
NY	2384.	1779.	0.	0.03	0.03
NY	1894.	618.	0.	0.02	0.02
NY	2073.	677.	0.	0.02	0.02
NY	935.	305.	0.	0.01	0.01

AEA G08 ROSTRAVER  
 AEA N25 BOB SHANNON MEMORIAL FIELD  
 AEA 40N CHESTER COUNTY G O CARLSON  
 AEA 1N9 ALLENTOWN QUEEN CITY MUNI  
 AEA LBE WESTMORELAND COUNTY  
 AEA JST JOHNSTOWN-CAMBRIA COUNTY  
 AEA N67 WINGS FIELD  
 AEA G01 BEAVER COUNTY  
 AEA BTP BUTLER-GRAHAM  
 AEA N10 PERKIOMEN VALLEY  
 AEA DUJ DU BOIS-JEFFERSON COUNTY  
 AEA 3G2 WASHINGTON COUNTY  
 AEA N57 THE NEW GARDEN FLYING FLD  
 AEA UKT QUAKERTOWN  
 AEA BFD BRADFORD REGIONAL  
 AEA N88 DOYLESTOWN  
 AEA N34 TURNER FIELD  
 AEA THV YORK  
 AEA A00 ALTOONA-BLAIR COUNTY  
 AEA N46 POTTSTOWN LIMERICK  
 AEA N47 POTTSTOWN MUNI  
 AEA N43 EASTON  
 AEA FKL CHESS-LAMBERTON  
 AEA 2G7 NEW CASTLE MUNI  
 AEA 2G9 SOMERSET COUNTY  
 AEA 2G6 PORT MEADVILLE  
 AEA HZL HAZLETON MUNI  
 AEA 8G4 CAMPBELL  
 AEA PSB MID-STATE  
 AEA UNV UNIVERSITY PARK  
 AEA MPO POCONO MOUNTAINS MUNI  
 AEA N65 3-M  
 AEA LHV W T PIPER MEML

MONONGAHELA  
 DOWNINGTOWN  
 COATESVILLE  
 ALLENTOWN  
 LATROBE  
 JOHNSTOWN  
 PHILADELPHIA  
 BEAVER FALLS  
 BUTLER  
 COLLEGEVILLE  
 DU BOIS  
 WASHINGTON  
 TOUGHKENAMON  
 QUAKERTOWN  
 BRADFORD  
 DOYLESTOWN  
 PROSPECTVILLE  
 YORK  
 ALTOONA  
 POTTSTOWN  
 POTTSTOWN  
 EASTON  
 FRANKLIN  
 NEW CASTLE  
 SOMERSET  
 MEADVILLE  
 HAZLETON  
 PITTSBURGH  
 PHILIPSBURG  
 STATE COLLEGE  
 MT POCONO  
 BRISTOL  
 LOCK HAVEN

PA	1582569.	315030.	1544.	10.04*	12.61*
PA	1119470.	227241.	1060.	6.98*	8.95*
PA	853697.	255518.	853.	4.45	7.37
PA	763764.	211316.	732.	4.98*	6.48*
PA	719481.	226791.	771.	6.49*	6.29*
PA	638572.	201590.	793.	2.16	5.58
PA	538121.	216958.	408.	3.70	5.02
PA	497904.	193863.	481.	3.49*	4.60*
PA	527346.	153260.	402.	3.65*	4.52*
PA	524507.	129302.	524.	2.43	4.34
PA	445567.	172018.	512.	1.56	4.10
PA	411433.	186666.	371.	3.27*	3.97*
PA	436355.	106074.	398.	2.31	3.60
PA	370687.	168623.	360.	2.44	3.58
PA	387965.	151560.	447.	1.27	3.58
PA	375123.	159302.	328.	2.41	3.55
PA	338315.	194751.	137.	3.16	3.54
PA	419625.	113334.	413.	2.79*	3.54*
PA	363102.	166138.	391.	3.19*	3.52*
PA	270734.	165034.	186.	2.42*	2.90*
PA	239879.	147251.	235.	1.94*	2.57*
PA	264348.	118418.	238.	1.78*	2.54*
PA	227968.	139665.	248.	0.98	2.44
PA	289890.	76468.	247.	1.91*	2.43*
PA	264440.	86029.	277.	1.07	2.33
PA	175753.	117245.	178.	0.91	1.93
PA	197516.	84497.	194.	1.19	1.87
PA	212331.	63358.	200.	0.94	1.83
PA	137727.	127486.	145.	1.12	1.76
PA	100650.	138214.	0.	1.50	1.59
PA	156764.	78615.	146.	1.14	1.56
PA	140062.	84782.	101.	1.10*	1.49*
PA	156793.	51178.	0.	1.62	1.38



AEA SEG PENN VALLEY  
 AEA N30 CHERRY RIDGE  
 AEA 4G0 PITTSBURGH-MONROEVILLE  
 AEA 8G5 ST MARYS MUNI  
 AEA IDI INDIANA COUNTY/JIMMY STEWART FLD/  
 AEA N27 TOWANDA  
 AEA W9W WILKES-BARRE WYOMING VALLEY  
 AEA N68 CHAMBERSBURG MUNICIPAL  
 AEA 5G8 PITTSBURGH BOQUET AIRPARK  
 AEA 8G7 ZELIENOPLE MUNICIPAL  
 AEA RVL MIFFLIN COUNTY  
 AEA 2G3 CONNELLSVILLE  
 AEA 9N1 VANSANT  
 AEA 4G1 GREENVILLE MUNI  
 AEA 8G2 LAWRENCE  
 AEA 9G8 EBENSBURG  
 AEA N99 BRANDYWINE  
 AEA 6G1 TITUSVILLE  
 AEA N70 PENNRIDGE  
 AEA 8N9 WARRINGTON  
 AEA WAY GREENE COUNTY  
 AEA 4G9 BEDFORD  
 AEA ZER SCHUYLKILL COUNTY /JOE ZERBEY/  
 AEA N29 HERSHEY AIR PARK  
 AEA G07 MOUNT PLEASANT-SCOTTDAL  
 AEA N31 KUTZTOWN AIRPARK  
 AEA N54 BUEHL FIELD  
 AEA 9G1 WEST PENN  
 AEA N94 CARLISLE  
 AEA 29D GROVE CITY  
 AEA N38 GRAND CANYON STATE  
 AEA N13 BLOOMSBURG MUNI  
 AEA G05 FINLEYVILLE  
 AEA 3G1 ERIE COUNTY  
 AEA 6W6 HANOVER  
 AEA N76 MILLARD  
 AEA PA21 WEST MIDDLESEX  
 AEA N79 NORTHUMBERLAND COUNTY  
 AEA N96 BELLEFONTE SKYPARK  
 AEA N74 PENNS CAVE  
 AEA 3G9 BUTLER FARM SHOW  
 AEA 11D CLARION COUNTY  
 AEA N97 CLEARFIELD-LAWRENCE  
 AEA N53 STROUDSBURG-POCONO AIRPARK  
 AEA 22N CARBON COUNTY  
 AEA 31D INTER COUNTY  
 AEA 7N8 BUTTER VALLEY GOLF PORT  
 AEA 2W7 DEVENER  
 AEA 76N SKYHAVEN  
 AEA 6W7 BATTLEFIELD  
 AEA 57N OXFORD  
 AEA 7G3 LEECHBURG  
 AEA N71 ELIZABETHTOWN-MARIETTA INC  
 AEA W05 DOERSOM  
 AEA 9W8 BAUBLITZ COMMERCIAL  
 AEA 9H3 SEAMANS FLD  
 AEA SCE STATE COLLEGE AIR DEPOT  
 AEA 22D BANDEL  
 AEA 89N CENTRAL MANOR  
 AEA 26D KEYSTONE PARK

SELINGSGROVE  
 HONESDALE  
 MONROEVILLE  
 ST MARYS  
 INDIANA  
 TOWANDA  
 WILKES-BARRE  
 CHAMBERSBURG  
 JEANNETTE  
 ZELIENOPLE  
 REEDSVILLE  
 CONNELLSVILLE  
 ERWINNA  
 GREENVILLE  
 CORRY  
 EBENSBURG  
 WEST CHESTER  
 TITUSVILLE  
 PERKASIE  
 DOYLESTOWN  
 WADSWORTH  
 BEDFORD  
 POTTSVILLE  
 HERSHEY  
 MOUNT PLEASANT  
 KUTZTOWN  
 LANGHORNE  
 TARENTUM  
 CARLISLE  
 GROVE CITY  
 WELLSBORO  
 BLOOMSBURG  
 FINLEYVILLE  
 WATTSBURG  
 HANOVER  
 ANNVILLE  
 WEST MIDDLESEX  
 SHAMOKIN  
 BELLEFONTE  
 CENTRE HALL  
 BUTLER  
 CLARION  
 CLEARFIELD  
 EAST STROUDSBURG  
 LEHIGHTON  
 IRWIN  
 BALLY  
 HANOVER  
 TUNKHANNOCK  
 GETTYSBURG  
 OXFORD  
 LEECHBURG  
 MT JOY /MARIETTA/  
 GETTYSBURG  
 BROGUE  
 FACTORYVILLE  
 STATE COLLEGE  
 EIGHTY FOUR  
 MOUNTVILLE  
 EMPORIUM

PA	111315.	81234.	97.	0.91*	1.28*
PA	155675.	35683.	130.	1.01*	1.27*
PA	119447.	63838.	0.	1.33	1.22
PA	127411.	41174.	132.	0.63	1.12
PA	46934.	120702.	0.	1.38	1.11
PA	37009.	111833.	67.	0.96	0.99
PA	67498.	81998.	0.	0.92	0.99
PA	91644.	52989.	85.	0.75*	0.96*
PA	106070.	37108.	0.	1.11	0.95
PA	101423.	38412.	0.	0.88	0.93
PA	71841.	65547.	51.	0.70*	0.91*
PA	100642.	33959.	1.	1.67	0.89
PA	98887.	32284.	0.	0.99	0.87
PA	106493.	24195.	69.	0.76*	0.87*
PA	95785.	29153.	94.	0.39	0.83
PA	97116.	21238.	68.	0.67*	0.79*
PA	84628.	30583.	0.	0.89	0.77
PA	98454.	17289.	97.	0.62*	0.77*
PA	73766.	32360.	0.	0.79	0.71
PA	179.	105422.	0.	0.51	0.70
PA	74861.	24435.	0.	0.78	0.66
PA	13375.	59524.	0.	0.32	0.48
PA	55384.	15638.	48.	0.36*	0.47*
PA	47594.	19791.	45.	0.33*	0.45*
PA	49313.	16098.	0.	0.51	0.43
PA	45713.	16030.	0.	0.46	0.41
PA	43943.	14663.	30.	0.31	0.39
PA	37948.	17328.	0.	0.41	0.37
PA	39084.	12758.	0.	0.41	0.34
PA	29793.	21650.	0.	0.80	0.34
PA	41701.	7305.	41.	0.26*	0.33*
PA	20459.	24644.	0.	0.72	0.30
PA	31386.	10246.	0.	0.33	0.28
PA	31092.	10150.	0.	0.31	0.27
PA	24342.	16230.	0.	0.27	0.27
PA	10407.	28292.	0.	0.20	0.26
PA	29616.	9669.	0.	0.30	0.26
PA	9329.	27929.	0.	0.29	0.25
PA	7009.	29867.	0.	0.17	0.25
PA	7525.	30036.	0.	0.17	0.25
PA	28688.	9365.	0.	0.29	0.25
PA	9947.	23143.	0.	0.18	0.22
PA	26835.	7027.	21.	0.16	0.22
PA	24157.	4845.	20.	0.16*	0.19*
PA	18717.	10363.	33.	0.30	0.19
PA	20749.	6774.	0.	0.21	0.18
PA	18963.	6189.	0.	0.19	0.17
PA	19153.	6253.	0.	0.20	0.17
PA	12380.	12324.	0.	0.15	0.16
PA	16109.	5260.	0.	0.16	0.14
PA	15528.	5069.	0.	0.16	0.14
PA	14370.	4692.	0.	0.14	0.13
PA	14625.	4773.	0.	0.15	0.13
PA	15035.	4909.	0.	0.15	0.13
PA	14534.	4745.	0.	0.15	0.13
PA	9163.	8507.	0.	0.11	0.12
PA	14311.	2722.	13.	0.04*	0.11*
PA	10100.	5506.	0.	0.11	0.10
PA	11476.	3747.	0.	0.12	0.10
PA	9975.	3256.	0.	0.10	0.09

AEA N16 CENTRE AIRPARK  
 AEA G06 MC VILLE  
 AEA N35 PUNXSUTAWNEY  
 AEA PA11 BROKENSTRAW  
 AEA PA22 NERMITAGE  
 AEA PA23 MIFFLINTOWN  
 AEA 07N BERMUDIAN VALLEY AIRPARK  
 AEA PA08 MOORHEAD AIRPARK  
 AEA 69N SLATINGTON  
 AEA PA17 SENECA AIRPARK INC  
 AEA N42 SHIPPENSBURG  
 AEA N32 BLUE SWAN  
 AEA 8N8 DANVILLE  
 AEA 7G4 BLUE KNOB VALLEY  
 AEA PA06 LAKEHILL  
 AEA 9N9 NALLSTEAD  
 AEA 1N3 ALBERT  
 AEA 42N LEBANON VALLEY AIRPARK  
 AEA 74N BENDIGO  
 AEA 70N SPRING HILL AIRPARK  
 AEA 8N6 CARBONDALE-CLIFFORD  
 AEA 71N SUNBURY  
 AEA 7SP SEVEN SPRINGS

AEA W09 LEESBURG MUNI/GODFREY/FIELD 09  
 AEA W98 CHESTERFIELD COUNTY 11  
 AEA W07 SHANNON 39  
 AEA SHD SHENANDOAH VALLEY 22  
 AEA W10 MANASSAS MUNI/HARRY P DAVIS FIELD 13  
 AEA LNP LONESOME PINE 51  
 AEA MFV ACCOMACK COUNTY 47  
 AEA W83 HANOVER COUNTY MUNI 13  
 AEA PVG CHESAPEAKE PORTSMOUTH 13  
 AEA FKN FRANKLIN MUNI-JOHN BEVERLY ROSE 32  
 AEA W66 WARRENTON-FAUQUIER 24  
 AEA PTB PETERSBURG MUNI 21  
 AEA W70 WILLIAMSBURG-JAMESTOWN 13  
 AEA PSK NEW RIVER VALLEY 35  
 AEA DAN DANVILLE MUNI 41  
 AEA HSP INGALLS FIELD 27  
 AEA W89 HOPEWELL 14  
 AEA W22 WOODBRIDGE 16  
 AEA SA1 MOUNTAIN EMPIRE 56  
 AEA SFQ SUFFOLK MUNI 23  
 AEA GVE GORDONSVILLE MUNI 13  
 AEA W16 WINCHESTER MUNI 17  
 AEA W92 SKY BRYCE 43  
 AEA 6A8 VIRGINIA HIGHLANDS  
 AEA W13 WAYHESBORO  
 AEA TGI TANGIER ISLAND  
 AEA W49 CULPEPER MUNI T.I.MARTIN FIELD  
 AEA W93 ORANGE COUNTY  
 AEA W97 WEST POINT MUNI  
 AEA BCB V P I  
 AEA W24 FALWELL  
 AEA W78 WILLIAM M TUCK  
 AEA W91 SMITH MOUNTAIN LAKE  
 AEA W33 SOUTH NORFOLK  
 AEA EMV EMPORIA MUHI  
 AEA MTV BLUE RIDGE

CENTRE HALL  
 FREEPORT  
 PUNXSUTAWNEY  
 PITTSFIELD  
 SHARON  
 MIFFLINTOWN  
 KRALLTOWN  
 NORTH EAST  
 SLATINGTON  
 SENECA  
 SHIPPENSBURG  
 SAYRE  
 DANVILLE  
 NEWRY  
 MARS  
 HALLSTEAD  
 PHILIPSBURG  
 MYERSTOWN  
 TOWER CITY  
 STERLING  
 CARBONDALE  
 SUNBURY  
 SEVEN SPRINGS BOROUGH

LEESBURG  
 CHESTERFIELD  
 FREDERICKSBURG  
 STAUNTON/WAYNESB/HARRI  
 MANASSAS  
 WISE  
 MELFA  
 ASHLAND  
 PORTSMOUTH  
 FRANKLIN  
 MIDLAND  
 PETERSBURG  
 WILLIAMSBURG/JAMESTOWN  
 DUBLIH  
 DANVILLE  
 HOT SPRINGS  
 HOPEWELL  
 WOODBRIDGE  
 MARION/WYTHEVILLE  
 SUFFOLK  
 GORDONSVILLE  
 WINCHESTER  
 BASYE  
 ABINGDON  
 WAYNESBORO  
 TANGIER  
 CULPEPER  
 ORANGE  
 WEST POINT  
 BLACKSBURG  
 LYNCHBURG  
 SOUTH BOSTON  
 MONETA  
 CHESAPEAKE  
 EMPORIA  
 MARTINSVILLE

PA	8617.	2813.	0.	0.09	0.08
PA	8860.	2893.	0.	0.09	0.08
PA	9067.	2960.	0.	0.09	0.08
PA	7783.	4749.	0.	0.09	0.08
PA	8755.	2858.	0.	0.09	0.08
PA	8445.	3301.	0.	0.09	0.08
PA	8842.	2886.	0.	0.09	0.08
PA	7922.	2586.	0.	0.08	0.07
PA	8034.	2622.	0.	0.08	0.07
PA	7158.	2337.	0.	0.07	0.06
PA	6882.	2247.	0.	0.07	0.06
PA	5917.	1932.	0.	0.06	0.05
PA	5968.	1948.	0.	0.06	0.05
PA	5508.	1798.	0.	0.06	0.05
PA	6110.	1995.	0.	0.06	0.05
PA	1429.	3005.	0.	0.02	0.03
PA	3699.	1208.	0.	0.04	0.03
PA	2974.	971.	0.	0.03	0.03
PA	3694.	1206.	0.	0.04	0.03
PA	2154.	703.	0.	0.02	0.02
PA	1798.	587.	0.	0.02	0.02
PA	1623.	530.	0.	0.02	0.01
PA	0.	76.	0.	0.00	0.00
VA	1066712.	197364.	907.	7.71	8.40
VA	934683.	183255.	905.	5.20	7.43
VA	656279.	196520.	604.	4.57	5.67
VA	527132.	191875.	544.	3.36	4.78
VA	346883.	208016.	0.	13.54	3.69
VA	218198.	139998.	212.	1.62	2.38
VA	282814.	72845.	276.	1.81	2.36
VA	224220.	65403.	175.	2.05	1.92
VA	168447.	112262.	0.	6.60	1.87
VA	235048.	46088.	232.	1.91	1.87
VA	197444.	63401.	131.	1.49	1.73
VA	219761.	36756.	210.	1.06	1.70
VA	152579.	78456.	0.	5.28	1.54
VA	135323.	83348.	126.	0.85	1.45
VA	147224.	59486.	0.	1.32	1.37
VA	98468.	79907.	84.	0.88	1.19
VA	151314.	25898.	141.	0.88	1.18
VA	122746.	48470.	0.	1.23	1.14
VA	110282.	59134.	99.	0.75*	1.13*
VA	54441.	113941.	0.	1.91	1.12
VA	129155.	27884.	122.	0.88*	1.04*
VA	70936.	53874.	0.	1.92	0.83
VA	27592.	86719.	0.	0.52	0.76
VA	37284.	68987.	0.	1.24	0.71
VA	14565.	86528.	0.	0.41	0.67
VA	20519.	74562.	0.	0.41	0.63
VA	52338.	31428.	0.	1.39	0.56
VA	42056.	42382.	0.	0.50	0.56
VA	56980.	20807.	53.	0.42*	0.52*
VA	28051.	46724.	0.	1.34	0.50
VA	14253.	59538.	0.	0.31	0.49
VA	30219.	37875.	0.	0.98	0.45
VA	15602.	50286.	0.	0.29	0.44
VA	48306.	15768.	0.	0.47	0.43
VA	25093.	37489.	0.	1.12	0.42
VA	40123.	22741.	135.	0.94	0.42

06  
7  
-30

AEA W90 NEW LONDON  
 AEA GDY GRUNDY MUNI  
 AEA FRR FRONT ROYAL-WARREN COUNTY  
 AEA BKT ALLEN PERKINSON MUNI  
 AEA 7A4 RICHLANDS MUNI  
 AEA W57 GLOUCESTER  
 AEA W96 NEW KENT COUNTY  
 AEA FVX FARMVILLE MUNI  
 AEA AKQ WAKEFIELD MUNI  
 AEA VBW BRIDGEWATER AIR PARK  
 AEA 8W2 NEW MARKET  
 AEA W81 CREWE MUNI  
 AEA W45 LURAY CAVERNS  
 AEA PTG LEE COUNTY  
 AEA HLX TWIN COUNTY  
 AEA LVL LAWRENCEVILLE/BRUNSWICK MUNI  
 AEA W31 LUNENBURG COUNTY

AEA BLF MERCER COUNTY  
 AEA MRB EASTERN WEST VIRGINIA REGIONAL ARPT  
 AEA SSU GREENBRIER  
 AEA W67 BUCKHANNON-UPSHUR COUNTY  
 AEA I07 SUMMERSVILLE  
 AEA 3I2 MASON COUNTY  
 AEA I16 KEE FLD  
 AEA 4I0 MINGO COUNTY  
 AEA 48I BRAXTON COUNTY  
 AEA I18 JACKSON COUNTY  
 AEA W99 GRANT COUNTY  
 AEA 4G7 FAIRMONT MUNI  
 AEA I94 MCDONALD FIELD  
 AEA W59 HINTON-ALDERSON  
 AEA 7G1 HERRON  
 AEA 74D MARSHALL COUNTY  
 AEA W35 POTOMAC AIRPARK  
 AEA I41 ROBERT NEWLON FLD  
 AEA I13 NEW RIVER GORGE  
 AEA I25 WELCH MUNI  
 AEA 55I SLATE RUN  
 AEA I89 FAYETTE

FOREST  
 GRUNDY  
 FRONT ROYAL  
 BLACKSTONE  
 RICHLANDS  
 GLOUCESTER  
 QUINTON  
 FARMVILLE  
 WAKEFIELD  
 BRIDGEWATER  
 NEW MARKET  
 CREWE  
 LURAY  
 PENNINGTON GAP  
 GALAX/HILLSVILLE  
 LAWRENCEVILLE  
 KENBRIDGE

BLUEFIELD  
 MARTINSBURG  
 WHITE SULPHUR SPRINGS  
 BUCKHANNON  
 SUMMERSVILLE  
 POINT PLEASANT  
 PINEVILLE  
 WILLIAMSON  
 SUTTON  
 RAVENSWOOD  
 PETERSBURG  
 FAIRMONT  
 TAPLIN  
 PENCE SPRINGS  
 NEW CUMBERLAND  
 MOUNDSVILLE  
 BERKELEY SPRINGS  
 HUNTINGTON  
 LANSING  
 WELCH  
 SPENCER  
 FAYETTEVILLE

VA	41991.	13708.	0.	0.40	0.37
VA	25629.	22417.	0.	0.29	0.32
VA	31909.	16198.	0.	0.33	0.32
VA	26359.	11400.	0.	0.30	0.25
VA	23390.	13420.	0.	0.25	0.24
VA	20683.	6749.	0.	1.08	0.18
VA	12583.	12642.	0.	0.15	0.17
VA	10039.	14454.	0.	0.13	0.16
VA	18256.	5957.	0.	0.88	0.16
VA	16004.	5224.	0.	0.15	0.14
VA	8717.	12267.	0.	0.11	0.14
VA	14625.	4773.	0.	0.15	0.13
VA	12036.	5635.	2.	0.52	0.12
VA	5768.	7680.	0.	0.20	0.09
VA	7363.	2403.	0.	0.22	0.06
VA	5971.	1949.	0.	0.29	0.05
VA	2762.	3699.	0.	0.04	0.04
WV	516035.	187907.	535.	2.25	4.68
WV	338940.	154776.	329.	2.64*	3.28*
WV	303597.	155689.	296.	2.54*	3.05*
WV	42789.	119328.	0.	0.93	1.08
WV	26128.	113892.	0.	1.37	0.93
WV	71175.	34531.	62.	0.49*	0.70*
WV	73836.	21370.	50.	0.51*	0.63*
WV	15715.	63033.	0.	0.36	0.52
WV	11930.	56869.	0.	0.29	0.46
WV	4966.	57331.	0.	0.24	0.41
WV	23725.	23545.	0.	0.30	0.31
WV	21292.	7455.	13.	0.16*	0.19*
WV	3795.	23523.	0.	0.11	0.18
WV	7285.	19092.	0.	0.13	0.18
WV	18100.	5909.	0.	0.18	0.16
WV	7906.	9327.	0.	0.10	0.11
WV	12075.	2070.	11.	0.09*	0.09*
WV	8657.	2826.	0.	0.09	0.08
WV	6365.	2078.	0.	0.06	0.06
WV	6783.	2215.	0.	0.07	0.06
WV	5169.	2801.	0.	0.06	0.05
WV	0.	5792.	0.	0.02	0.04

GREAT LAKES REGION

AGL UGN WAUKEGAN MEMORIAL  
 AGL LOT LEWIS UNIVERITY  
 AGL JOT JOLIET MUNI  
 AGL UIN QUINCY MUNI BALDWIN FIELD  
 AGL MVN MT VERNON-OUTLAND  
 AGL IKK GREATER KANKAKEE  
 AGL C06 ELGIN  
 AGL LWV LAWRENCEVILLE-VINCENNES MUNI  
 AGL MTO COLES COUNTY MEMORIAL  
 AGL 3HA LANSING MUNICIPAL  
 AGL C18 FRANKFORT  
 AGL 3CK CRYSTAL LAKE  
 AGL C81 CAMPBELL  
 AGL C16 ILLINI  
 AGL SQI WHITESIDE CO ARPT-JOS H BITTORF FLD

WAUKEGAN  
 ROMBOVILLE  
 JOLIET  
 QUINCY  
 MT VERNON  
 KANKAKEE  
 ELGIN  
 LAWRENCEVILLE  
 MATTOON-CHARLESTON  
 CHICAGO  
 FRANKFORT  
 CRYSTAL LAKE  
 GRAYSLAKE  
 URBANA  
 STERLING ROCKFALLS

IL	2174053.	465236.	2252.	10.11	17.54
IL	1982273.	385352.	2009.	10.20	15.73
IL	1195687.	273011.	1260.	6.62	9.76
IL	1007667.	268312.	1088.	6.17	8.48
IL	928502.	248997.	1058.	6.10	7.82
IL	828557.	154896.	865.	4.04	6.53
IL	694207.	228636.	623.	4.35	6.13
IL	725586.	167027.	721.	4.79	5.93
IL	681951.	201816.	719.	3.57	5.87
IL	610105.	216021.	553.	4.08*	5.49*
IL	680957.	130450.	723.	3.03	5.39
IL	554221.	203193.	455.	3.31	5.03
IL	586917.	120497.	547.	3.58*	4.70*
IL	489226.	164880.	446.	3.36*	4.35*
IL	357599.	165446.	376.	2.19	3.48

91

AGL	3MY	MOUNT HAWLEY AUXILIARY	PEORIA	IL	389396.	117939.	382.	2.66*	3.37*
AGL	C77	BELVIDERE LTD	BELVIDERE	IL	316982.	156924.	290.	2.25*	3.15*
AGL	C56	SANGER	MONEE	IL	397725.	71510.	393.	2.45	3.12
AGL	10C	GALT FIELD	GREENWOOD/WONDER LAKE	IL	327421.	118153.	310.	2.27*	2.96*
AGL	SLO	SALEM-LECKRONE	SALEM	IL	275834.	121688.	270.	2.13	2.64
AGL	ENL	CENTRALIA MUNI	CENTRALIA	IL	271574.	123770.	280.	1.82	2.63
AGL	1C5	CLOW INTL	PLAINFIELD	IL	235867.	149355.	0.	2.66	2.56
AGL	RSV	ROBINSON MUNI	ROBINSON	IL	301957.	80488.	312.	2.12	2.54
AGL	FEP	THE ALBERTUS	FREEPORT	IL	298911.	69176.	308.	1.61	2.45
AGL	12C	ROCHELLE MUN	ROCHELLE	IL	280115.	58893.	280.	1.84*	2.25*
AGL	IJX	JACKSONVILLE MUNI	JACKSONVILLE	IL	179372.	139787.	160.	1.65	2.12
AGL	3HW	HOWELL	CHICAGO/BLUE ISLAND/	IL	162755.	146188.	0.	2.00	2.05
AGL	C73	DIXON MUNI-CHARLES R. WALGREEN FIELD	DIXON	IL	230479.	57254.	229.	1.53*	1.91*
AGL	C09	MORRIS MUNI	MORRIS	IL	167859.	87846.	165.	1.27*	1.70*
AGL	C15	PEKIN MUNI	PEKIN	IL	102975.	138976.	0.	3.65	1.61
AGL	C45	WADDELL	MANITO	IL	198624.	35511.	195.	1.26*	1.56*
AGL	OLY	OLNEY-NOBLE	OLNEY-NOBLE	IL	115632.	114319.	109.	1.21	1.53
AGL	06C	CHICAGO/SCHAUMBURG	CHICAGO/SCHAUMBURG	IL	100005.	125712.	0.	1.41	1.50
AGL	HSB	HARRISBURG-RALEIGH	HARRISBURG	IL	159000.	62836.	152.	1.35	1.47
AGL	3LC	LOGAN COUNTY	LINCOLN	IL	163524.	43793.	160.	1.10	1.38
AGL	0C0	DACY	HARVARD	IL	149915.	48935.	0.	1.59	1.32
AGL	SAR	SPARTA COMMUNITY-HUNTER FIELD	SPARTA	IL	138244.	52038.	0.	0.32	1.26
AGL	3K6	SHAFER METRO EAST	ST JACOB	IL	107610.	68335.	0.	1.21	1.17
AGL	2H3	FAIRFIELD MUNI	FAIRFIELD	IL	128616.	35124.	110.	0.90	1.09
AGL	1H8	CASEY MUNI	CASEY	IL	102893.	46905.	72.	0.82	1.00
AGL	C75	MARSHALL COUNTY	LACON	IL	116265.	25376.	115.	0.77*	0.94*
AGL	2H0	SHELBY COUNTY	SHELBYVILLE	IL	38161.	70368.	0.	0.62	0.72
AGL	1M0	CAIRO	CAIRO	IL	24310.	83144.	0.	0.54	0.71
AGL	VLA	VANDALIA MUNI	VANDALIA	IL	81966.	24263.	80.	0.59	0.71
AGL	MQB	MACOMB MUNICIPAL	MACOMB	IL	40309.	55485.	0.	1.36	0.64
AGL	GRE	GREENVILLE	GREENVILLE	IL	64720.	26883.	58.	0.64	0.61
AGL	C80	WAGON WHEEL	ROCKTON	IL	66705.	24010.	66.	0.47*	0.60*
AGL	DKB	DEKALB MUNI	DEKALB	IL	56776.	31841.	0.	0.62	0.59
AGL	C34	GIBSON CITY MUNI	GIBSON CITY	IL	71729.	12824.	70.	0.45*	0.56*
AGL	C66	MONMOUTH MUNICIPAL	MONMOUTH	IL	28680.	55193.	0.	1.05	0.56
AGL	C48	SANDWICH	SANDWICH	IL	57079.	18632.	0.	0.58	0.50
AGL	C07	KEWANEE MUNI	KEWANEE	IL	32111.	39382.	0.	1.09	0.48
AGL	PRG	EDGAR COUNTY	PARIS	IL	25501.	46979.	0.	1.06	0.48
AGL	CTK	INGERSOLL	CANTON	IL	36595.	29345.	0.	1.18	0.44
AGL	H07	HIGHLAND-WINET	HIGHLAND	IL	44022.	19160.	0.	0.49	0.42
AGL	1H2	EFFINGHAM COUNTY MEMORIAL	EFFINGHAM	IL	28590.	33418.	0.	0.96	0.41
AGL	M30	METROPOLIS MUNI	METROPOLIS	IL	18826.	39917.	0.	0.33	0.39
AGL	3LF	LITCHFIELD MUNI	LITCHFIELD	IL	30027.	29065.	0.	0.39	0.39
AGL	PPQ	PITTSFIELD PENSTONE MUNICIPAL	PITTSFIELD	IL	19708.	35671.	0.	0.78	0.37
AGL	C13	OTTAWA	OTTAWA	IL	28087.	26515.	0.	0.36	0.36
AGL	1C8	COTTONWOOD	ROCKFORD	IL	25076.	27450.	0.	0.34	0.35
AGL	C95	WOODS FIELD	EAST MOLINE	IL	38051.	12420.	0.	0.39	0.34
AGL	CUL	CARMI MUNI	CARMI	IL	36163.	11803.	0.	1.37	0.32
AGL	H96	BENTON MUNI	BENTON	IL	29519.	17622.	0.	0.33	0.31
AGL	C54	VALLEY	SPRING VALLEY	IL	13292.	31400.	0.	0.24	0.30
AGL	DTG	DWIGHT	DWIGHT	IL	24591.	16014.	0.	0.28	0.27
AGL	STQ	ROWE AVIATION	STREATOR	IL	15015.	26186.	0.	0.23	0.27
AGL	K06	GREATER BEARDSTOWN	BEARDSTOWN	IL	16450.	15008.	0.	0.21	0.21
AGL	3TV	TAYLORVILLE MUNI	TAYLORVILLE	IL	20638.	10959.	0.	0.23	0.21
AGL	C82	BRESSON AIRPORT	COMPTON	IL	16642.	13419.	0.	0.20	0.20
AGL	C41	PIPER	PRINCETON	IL	15503.	13048.	0.	0.19	0.19
AGL	79IL	MILFORD	MILFORD	IL	13387.	15012.	0.	0.17	0.19
AGL	1C2	NEW LENOX-HOWELL	NEW LENOX	IL	18015.	11202.	0.	0.20	0.19
AGL	3KK	KANKAKEE	KANKAKEE	IL	20537.	6704.	0.	0.22	0.18
AGL	C00	MERCER COUNTY	ALEDO	IL	16006.	9976.	0.	0.19	0.17

AGL H84 FLORA MUNI  
 AGL 0C3 WILHELMI FIELD  
 AGL 0C8 SPOHNHOLTZ  
 AGL I02 MT CARMEL MUNI  
 AGL K96 TUSCOLA  
 AGL 0C7 GRANDPAS' FARM MENDOTA  
 AGL C51 HAVANA  
 AGL BDF RINKENBERGER

AGL VPZ PORTER COUNTY MUNI  
 AGL GYY GARY MUNI  
 AGL EKM ELKHART MUNI  
 AGL BAK COLUMBUS BAKALAR MUNI  
 AGL OKK KOKOMO MUNI  
 AGL RID RICHMOND MUNI  
 AGL 4I8 INDIANAPOLIS METROPOLITAN  
 AGL C65 PLYMOUTH MUNI  
 AGL AID ANDERSON MUNI  
 AGL MZZ MARION MUNI  
 AGL 3FK FRANKLIN  
 AGL GSH GOSHEN MUNI  
 AGL SMD SMITH FIELD  
 AGL 05C GRIFFITH  
 AGL MGC MICHIGAN CITY  
 AGL I22 RANDOLPH COUNTY  
 AGL 5I1 SKYWAY  
 AGL BFR VIRGIL I GRISSOM MUNI  
 AGL ANQ TRI-STATE STEUBEN COUNTY  
 AGL UWL NEW CASTLE-HENRY CO. MUNI.  
 AGL 03C HUNTINGTON MUNI  
 AGL ASW WARSAW MUNI  
 AGL C39 MICHIGAN CITY MUNI  
 AGL 3I3 SKY KING  
 AGL 3SM SHELBYVILLE MUNI  
 AGL I14 EAGLE CREEK AIRPARK  
 AGL C62 KENDALLVILLE MUNI  
 AGL RCR FULTON COUNTY  
 AGL CFJ CRAWFORDSVILLE MUNI  
 AGL SER FREEMAN MUNI  
 AGL IWH WABASH MUNI  
 AGL CEV METTEL FIELD  
 AGL 3AR ARETZ  
 AGL I99 ALEXANDRIA  
 AGL SIV SULLIVAN COUNTY  
 AGL I76 PERU MUNI  
 AGL IMS MADISON MUNI  
 AGL I21 INDIANAPOLIS BROOKSIDE AIRPARK  
 AGL 4I7 PUTNAM COUNTY  
 AGL OEA ONEAL  
 AGL HNB HUHTINGBURG  
 AGL MCX WHITE COUNTY  
 AGL I38 HAPS  
 AGL I52 INDIANAPOLIS TERRY  
 AGL DCY DAVIESS COUNTY  
 AGL TEL PERRY COUNTY MUNI  
 AGL 50I KENTLAND MUNI  
 AGL FRH FRENCH LICK MUNI  
 AGL GGP LOGANSPOUT MUNI  
 AGL 3SY SPEEDWAY  
 AGL 3HO HOBART SKY RANCH

FLORA  
 JOLIET  
 NEWARK  
 MT CARMEL  
 TUSCOLA  
 MENDOTA  
 HAVANA  
 BRADFORD

VALPARAISO  
 GARY  
 ELKHART  
 COLUMBUS  
 KOKOMO  
 RICHMOND  
 INDIANAPOLIS  
 PLYMOUTH  
 ANDERSON  
 MARION  
 FRANKLIN  
 GOSHEN  
 FORT WAYNE  
 GRIFFITH  
 MICHIGAN CITY  
 WINCHESTER  
 GREENWOOD  
 BEDFORD  
 ANGOLA  
 NEW CASTLE  
 HUNTINGTON  
 WARSAW  
 MICHIGAN CITY  
 TERRE HAUTE  
 SHELBYVILLE  
 INDIANAPOLIS  
 KENDALLVILLE  
 ROCHESTER  
 CRAWFORDSVILLE  
 SEYMOUR  
 WABASH  
 CONNERSVILLE  
 LAFAYETTE  
 ALEXANDRIA  
 SULLIVAN  
 PERU  
 MADISON  
 INDIANAPOLIS  
 GREENCASTLE  
 VINCENNES  
 HUHTINGBURG  
 MONTICELLO  
 JEFFERSONVILLE  
 INDIANAPOLIS  
 WASHINGTON  
 TELL CITY  
 KENTLAND  
 FRENCH LICK  
 LOGANSPOUT  
 INDIANAPOLIS  
 HOBART

IL	6853.	16713.	0.	0.26	0.16
IL	15458.	5046.	0.	0.16	0.14
IL	13374.	4366.	0.	0.14	0.12
IL	11018.	6100.	0.	0.13	0.11
IL	9806.	3201.	0.	0.10	0.09
IL	4097.	5336.	0.	0.06	0.06
IL	4757.	1553.	0.	0.05	0.04
IL	1089.	355.	0.	0.01	0.01
IN	1417583.	297272.	1531.	6.41	11.39
IN	1229950.	210965.	1207.	8.32*	9.57*
IN	798441.	239728.	837.	6.05*	6.90*
IN	774227.	235313.	848.	3.78	6.71
IN	618219.	208087.	641.	3.26	5.49
IN	614603.	132012.	634.	3.44	4.96
IN	483706.	186857.	498.	3.25	4.46
IN	458425.	182150.	475.	2.32	4.26
IN	405621.	174114.	415.	3.35*	3.85*
IN	372994.	165982.	386.	2.17	3.58
IN	364398.	169867.	356.	2.74*	3.55*
IN	390617.	90464.	405.	1.69	3.20
IN	316569.	150902.	303.	1.88	3.11
IN	326930.	100868.	331.	1.84	2.84
IN	229687.	143404.	240.	1.57	2.48
IN	223887.	144530.	220.	1.81*	2.45*
IN	222118.	144660.	208.	1.80*	2.44*
IN	240759.	115584.	245.	1.80	2.37
IN	230719.	115570.	224.	1.81	2.30
IN	242307.	81943.	245.	1.22	2.15
IN	262322.	53394.	260.	1.70*	2.10*
IN	222318.	87071.	230.	1.21	2.06
IN	260439.	43003.	299.	1.41	2.02
IN	191237.	111849.	164.	1.48*	2.01*
IN	226634.	68962.	221.	1.27	1.96
IN	139210.	150801.	0.	5.41	1.93
IN	199732.	86388.	186.	1.41*	1.90*
IN	210870.	42517.	216.	1.24	1.68
IN	203264.	40383.	202.	1.15	1.62
IN	110977.	126450.	99.	1.44	1.58
IN	164497.	53249.	166.	1.01	1.45
IN	124325.	83296.	110.	1.08	1.41
IN	144029.	47018.	0.	1.51	1.27
IN	151153.	28926.	141.	0.75	1.20
IN	127688.	49086.	124.	0.86	1.17
IN	135711.	35217.	133.	0.69	1.14
IN	112361.	57752.	89.	0.83	1.13
IN	129546.	37238.	98.	0.98	1.11
IN	128856.	23501.	122.	0.80*	1.01*
IN	122759.	21351.	123.	0.80*	0.96*
IN	77403.	56442.	56.	0.85	0.89
IN	86807.	45102.	85.	0.59	0.88
IN	26990.	102668.	0.	0.65	0.86
IN	87302.	40574.	83.	0.51	0.85
IN	84874.	27708.	0.	0.89	0.75
IN	58069.	48779.	0.	1.57	0.71
IN	42366.	43214.	41.	0.53*	0.69*
IN	62582.	41778.	55.	0.72	0.69
IN	47403.	44931.	0.	0.58	0.69
IN	69441.	22667.	0.	0.73	0.61
IN	61440.	27508.	0.	0.67	0.59

AGL	I01	BROWNSBURG
AGL	3LP	LAPORTE MUNI
AGL	07C	AUBURN DEKALB
AGL	FKR	FRANKFORT MUNI
AGL	5I4	SHERIDAN
AGL	C98	LAKE VILLAGE
AGL	C64	WAWASEE
AGL	0I2	ARTHUR MUNI
AGL	0V0	NORTH VERNON
AGL	3HM	HALSMER
AGL	I83	SALEM MUNI
AGL	C03	NAPPANEE MUNI
AGL	7I2	REESE
AGL	7I5	HIGHLAND
AGL	3C2	SHENK
AGL	I72	WESTFIELD
AGL	6I4	BOONE COUNTY
AGL	3I1	ELWOOD
AGL	RZL	JASPER COUNTY
AGL	PLD	STEED FLD
AGL	4C4	ARENS FIELD
AGL	6I3	RUZICKA
AGL	7I1	KELLYS AIRFIELD
AGL	C92	MENTONE
AGL	GFD	POPE FIELD
AGL	C40	MILLER
AGL	C63	NEW CASTLE MUNI
AGL	3C1	MISHAWAKA PILOTS CLUB
AGL	I13	SHAWNEE FIELD
AGL	3EV	SKYLANE
AGL	I42	PAOLI MUNI
AGL	IN02	POST-AIRE
AGL	67I	D AND R AIRPARK
AGL	I17	CLINTON
AGL	I11	JESSUP
AGL	2IN2	MT COMFORT
AGL	3AE	ACE AIRPARK
AGL	1D2	METTETAL
AGL	Y70	IONIA COUNTY
AGL	9D9	HASTINGS MUNI
AGL	D92	CUSTER
AGL	IMT	FORD
AGL	D98	ROMEO
AGL	3TR	JERRY TYLER MEML
AGL	ADG	THE LENAWEЕ COUNTY
AGL	2G5	GROSSE ILE MUNI
AGL	CMX	HOUGHTON COUNTY MEMORIAL
AGL	3HE	LIVINGSTON COUNTY
AGL	4D0	ABRAMS MUNI
AGL	7D2	OAKLAND-TROY
AGL	0D1	SOUTH HAVEN MUNI
AGL	GLR	OTSEGO COUNTY
AGL	5D3	OWOSSO CITY
AGL	PHN	ST-CLAIR COUNTY INTL
AGL	MNM	MENOMINEE-MARINETTE TWIN COUNTY
AGL	3CM	JAMES CLEMENTS MUNI
AGL	ESC	DELTA COUNTY
AGL	C19	TULIP CITY
AGL	Y47	OAKLAND SOUTHWEST

BROWNSBURG	IN	57697.	21544.	0.	0.61	0.53
LAPORTE	IN	34493.	40458.	35.	0.36*	0.50*
AUBURN	IN	40630.	34245.	25.	0.36	0.50
FRANKFORT	IN	48653.	24004.	44.	0.34	0.48
SHERIDAN	IN	16049.	54891.	0.	0.35	0.47
LAKE VILLAGE	IN	49553.	16175.	0.	0.52	0.44
SYRACUSE	IN	28194.	35976.	0.	0.38	0.43
BRAZIL	IN	8310.	8667.	47.	0.29	0.38
NORTH VERNON	IN	42784.	13968.	0.	0.45	0.38
LAFAYETTE	IN	34241.	22837.	21.	0.31*	0.38*
SALEM	IN	16013.	35050.	0.	0.28	0.34
NAPPANEE	IN	41155.	7689.	38.	0.26*	0.32*
MUNCIE	IN	28311.	13182.	0.	0.32	0.28
PERRYSVILLE	IN	28591.	11882.	0.	0.31	0.27
GARRETT	IN	22788.	11718.	0.	0.24	0.23
WESTFIELD	IN	22501.	7345.	0.	0.23	0.20
LEBANON	IN	22527.	7353.	0.	0.23	0.20
ELWOOD	IN	19440.	10363.	0.	0.21	0.20
RENSSELAER	IN	21149.	6904.	0.	0.21	0.19
PORTLAND	IN	8871.	17746.	0.	0.27	0.18
WINAMAC	IN	23468.	4237.	22.	0.15*	0.18*
KOKOMO	IN	19700.	6430.	0.	0.21	0.17
MOORESVILLE	IN	18908.	6173.	0.	0.20	0.17
MENTONE	IN	15150.	4945.	0.	0.16	0.13
GREENFIELD	IN	13049.	4260.	0.	0.14	0.12
BLUFFTON	IN	13991.	4567.	0.	0.14	0.12
NEW CASTLE	IN	13762.	4492.	0.	0.14	0.12
ELKHART	IN	10819.	2914.	30.	0.20	0.09
BLOOMFIELD	IN	9898.	3231.	0.	0.10	0.09
EVANSVILLE	IN	9879.	3225.	0.	0.10	0.09
PAOLI	IN	7318.	3469.	0.	0.08	0.07
INDIANAPOLIS	IN	5655.	1846.	0.	0.06	0.05
RUSHVILLE	IN	4082.	1333.	0.	0.04	0.04
CLINTON	IN	2951.	963.	0.	0.03	0.03
ANDERSON	IN	2730.	891.	0.	0.03	0.02
INDIANAPOLIS	IN	1093.	303.	0.	0.01*	0.01*
ANDERSON	IN	1493.	487.	0.	0.02	0.01
PLYMOUTH	MI	729407.	170340.	709.	4.71*	5.98*
IONIA	MI	560438.	179064.	591.	2.86	4.91
HASTINGS	MI	591541.	132339.	624.	4.10	4.81
MONROE	MI	512475.	186677.	540.	3.08	4.65
IRON MOUNTAIN/KINGSFOR	MI	512338.	188161.	550.	2.86	4.65
ROMEO	MI	528660.	160606.	514.	3.54*	4.58*
NILES	MI	459840.	180788.	487.	2.32	4.26
ADRIAN	MI	540741.	96411.	566.	2.89	4.23
DETROIT/GROSSE ILE	MI	518311.	112848.	369.	3.59*	4.19*
HANCOCK	MI	437813.	175751.	472.	2.02	4.08
HOWELL	MI	430884.	165340.	429.	2.56	3.96
GRAND LEDGE	MI	492496.	85765.	316.	3.07*	3.84*
TROY	MI	455087.	113131.	455.	3.04*	3.78*
SOUTH HAVEN	MI	469238.	81868.	490.	2.44	3.66
GAYLORD	MI	373971.	167864.	397.	2.45	3.60
OWOSSO	MI	451588.	80101.	458.	2.37	3.53
PORT HURON	MI	411406.	76333.	380.	1.92	3.24
MENOMINEE	MI	323328.	159026.	341.	2.28	3.20
BAY CITY	MI	333253.	135338.	323.	2.34*	3.11*
ESCANABA	MI	305723.	155491.	311.	2.05	3.06
HOLLAND	MI	297400.	132134.	295.	2.17*	2.85*
NEW HUDSON	MI	288061.	117960.	278.	2.03*	2.70*

AGL Y84 MACKINAC ISLAND  
 AGL C91 CASS COUNTY MEML  
 AGL 5G9 WAGON WHEEL  
 AGL 0G9 SALEM  
 AGL PLN EMMET COUNTY  
 AGL ACB ANTRIM COUNTY  
 AGL AMN GRATIOT COMMUNITY  
 AGL 5D8 BROOKS FIELD  
 AGL D95 DUPONT-LAPEER  
 AGL Y15 CHEBOYGAN CITY-COUNTY  
 AGL 8D4 SPARTA  
 AGL IWD GOGEBIC COUNTY  
 AGL UIZ BERZ-MACOMB  
 AGL MQT MARQUETTE COUNTY  
 AGL MOP MT PLEASANT MUNICIPAL  
 AGL MBL MANISTEE CO.-BLACKER  
 AGL 3GM GRAND HAVEN MEML AIRPARK  
 AGL 09G MASON JEWETT FIELD  
 AGL CVX CHARLEVOIX MUNI  
 AGL 07G FITCH H BEACH  
 AGL 35D PADGHAM FIELD  
 AGL 3TE AL MEYERS  
 AGL CAD WEXFORD COUNTY  
 AGL CIU CHIPPEWA COUNTY INTERNATIONAL  
 AGL 6D9 IOSCO COUNTY  
 AGL Y85 HILLSDALE MUNI  
 AGL 3BB BIG BEAVER  
 AGL 6D6 GREENVILLE MUNI  
 AGL D13 MCKINLEY  
 AGL 77D ROBEN-HOOD  
 AGL 3FM FREMONT MUNI  
 AGL D96 BRANCH COUNTY MEMORIAL  
 AGL ISQ SCHOOLCRAFT COUNTY  
 AGL SJX BEAVER ISLAND  
 AGL IRS KIRSCH MUNI  
 AGL Y93 ATLANTA MUNI  
 AGL 3BS JACK BARSTOW  
 AGL 83D MACKINAC COUNTY  
 AGL ERY LUCE COUNTY HALE  
 AGL 78D CARO MUNI  
 AGL 1MI6 ROSEDALE  
 AGL D87 HARBOR SPRINGS  
 AGL 35G HARRY W. BROWNE  
 AGL 57D MACOMB  
 AGL 76G MARINE CITY  
 AGL 43G LARSEN AIR PARK  
 AGL GDW GLADWIN  
 AGL 3NP BELFORD MAULE FIELD  
 AGL 1G4 SPENCER FIELD  
 AGL 76D HURON COUNTY MEMORIAL  
 AGL HAI THREE RIVERS MUNICIPAL DR HAINES  
 AGL C05 SOUTH KENT  
 AGL 61D OTSEGO-PLAINWELL MUNI  
 AGL LDM MASON COUNTY  
 AGL 99G CARLS  
 AGL 2D8 DAVIS  
 AGL C28 NEWAYGO  
 AGL 13C LAKEVIEW  
 AGL 37G ALMONT  
 AGL BFA BOYNE MOUNTAIN

MACKINAC ISLAND  
 DOWAGIAC  
 LAMBERTVILLE  
 SALEM  
 PELLSTON  
 BELLAIRE  
 ALMA  
 MARSHALL  
 LAPEER  
 CHEBOYGAN  
 SPARTA  
 IRONWOOD  
 UTICA  
 MARQUETTE  
 MT PLEASANT  
 MANISTEE  
 GRAND HAVEN  
 MASON  
 CHARLEVOIX  
 CHARLOTTE  
 ALLEGAN  
 TECUMSEH  
 CADILLAC  
 SAULT STE MARIE  
 EAST TAWAS  
 HILLSDALE  
 TROY  
 GREENVILLE  
 FRASER  
 BIG RAPIDS  
 FREMONT  
 COLDWATER  
 MANISTIQUE  
 ST JAMES  
 STURGIS  
 ATLANTA  
 MIDLAND  
 ST IGNACE  
 NEWBERRY  
 CARO  
 SAULT STE MARIE  
 HARBOR SPRINGS  
 SAGINAW  
 NEW HAVEN  
 MARINE CITY  
 BELLVILLE  
 GLADWIN  
 NAPOLEON  
 WIXOM  
 BAD AXE  
 THREE RIVERS  
 GRAND RAPIDS  
 PLAINWELL  
 LUDINGTON  
 SOUTH ROCKWOOD  
 EAST LANSING  
 NEWAYGO  
 LAKEVIEW  
 ALMONT  
 BOYNE FALLS

MI	292834.	107147.	297.	2.16*	2.66*
MI	312685.	77871.	314.	2.13*	2.59*
MI	301285.	53913.	291.	1.88*	2.36*
MI	300059.	54205.	290.	1.87*	2.35*
MI	209495.	137511.	239.	1.29	2.31
MI	199069.	139642.	201.	1.78	2.25
MI	208774.	129709.	213.	1.39	2.25
MI	262673.	53175.	279.	1.14	2.10
MI	256557.	57312.	251.	1.65*	2.09*
MI	179043.	134572.	209.	1.34	2.08
MI	168961.	134965.	167.	1.53*	2.02*
MI	163351.	133637.	158.	1.61	1.98
MI	227681.	59436.	227.	1.46	1.91
MI	124798.	146095.	0.	1.81	1.80
MI	224782.	43206.	229.	1.14	1.78
MI	208865.	55971.	228.	0.98	1.76
MI	197759.	54367.	191.	1.30*	1.68*
MI	206337.	36437.	203.	1.31*	1.61*
MI	130905.	102315.	135.	0.91	1.55
MI	177769.	52798.	189.	0.83	1.53
MI	178379.	42722.	194.	0.67	1.47
MI	169613.	32857.	164.	1.07*	1.35*
MI	116091.	52851.	116.	0.66	1.12
MI	49797.	116876.	0.	0.93	1.11
MI	137434.	24263.	135.	0.87*	1.07*
MI	134496.	24742.	132.	0.85*	1.06*
MI	113638.	37094.	0.	1.19	1.00
MI	36416.	113912.	0.	0.82	1.00
MI	90044.	47925.	0.	1.01	0.92
MI	95737.	35848.	94.	0.67*	0.87*
MI	103962.	23008.	109.	0.46	0.84
MI	75086.	41686.	49.	0.59	0.78
MI	93371.	20174.	98.	0.39	0.75
MI	5649.	107207.	0.	0.56	0.75
MI	34915.	68318.	0.	1.34	0.69
MI	4540.	85759.	0.	0.36	0.60
MI	67842.	22124.	1.	2.15	0.60
MI	10690.	74537.	0.	0.37	0.57
MI	59265.	16402.	50.	0.34	0.50
MI	58975.	10416.	58.	0.37*	0.46*
MI	0.	63329.	0.	0.28	0.40
MI	9591.	50568.	0.	0.28	0.40
MI	43624.	14241.	0.	1.06	0.38
MI	40684.	14594.	0.	0.42	0.37
MI	34168.	18242.	0.	0.38	0.35
MI	39888.	13020.	0.	0.41	0.35
MI	36186.	14314.	0.	0.39	0.34
MI	36883.	12039.	0.	0.38	0.33
MI	35704.	13225.	0.	0.37	0.33
MI	31894.	16034.	0.	0.35	0.32
MI	29355.	19042.	0.	0.98	0.32
MI	35031.	11435.	0.	0.37	0.31
MI	34187.	11159.	0.	0.36	0.30
MI	28477.	14171.	0.	0.87	0.28
MI	29744.	9709.	0.	0.30	0.26
MI	27724.	9049.	0.	0.28	0.24
MI	18858.	17926.	0.	0.23	0.24
MI	24434.	11566.	0.	0.27	0.24
MI	23051.	10147.	0.	0.24	0.22
MI	27392.	4812.	27.	0.17*	0.21*

AGL	Y31	WEST BRANCH COMMUNITY	WEST BRANCH	MI	23557.	7689.	0.	0.79	0.21
AGL	7Y0	TIMBERS SKY CAMP	SOUTH BRANCH	MI	8327.	23633.	0.	0.16	0.21
AGL	D15	LAKE ISABELLA LANDING AREA	WEIDMAN	MI	8236.	20997.	0.	0.15	0.19
AGL	42C	WHITE CLOUD	WHITE CLOUD	MI	18244.	8458.	0.	0.20	0.18
AGL	OGM	ONTONAGON COUNTY	ONTONAGON	MI	21845.	3910.	21.	0.14*	0.17*
AGL	39C	OSELKA	THREE OAKS	MI	19033.	6213.	0.	0.19	0.17
AGL	5D7	MILAN	MILAN	MI	18493.	6036.	0.	0.19	0.16
AGL	Y83	SANDUSKY CITY	SANDUSKY	MI	15753.	7645.	0.	0.17	0.16
AGL	Y94	EAST JORDAN CITY	EAST JORDAN	MI	13090.	9502.	0.	0.15	0.15
AGL	44G	BETZ	BLISSFIELD	MI	16651.	5435.	0.	0.17	0.15
AGL	40C	WATERVLIET MUNI	WATERVLIET	MI	15303.	5779.	0.	0.16	0.14
AGL	48D	CLARE MUNI	CLARE	MI	12582.	6610.	0.	0.14	0.13
AGL	Y91	HOME ACRES SKY RANCH	LAKE CITY	MI	12992.	6303.	0.	0.14	0.13
AGL	Y17	ACME SKYPORT	ACME	MI	13386.	4633.	0.	0.14	0.12
AGL	41C	WAYLAND MUNI	WAYLAND	MI	13667.	4461.	0.	0.14	0.12
AGL	65G	MAPLE GROVE	FOULERVILLE	MI	14104.	4604.	0.	0.14	0.12
AGL	Y66	DRUMMOND ISLAND	DRUMMOND ISLAND	MI	8469.	7640.	0.	0.11	0.11
AGL	C01	PILOT COUNTRY	COOPERSVILLE	MI	12865.	4199.	0.	0.13	0.11
AGL	45G	HYNE FIELD	BRIGHTON	MI	12795.	4178.	0.	0.13	0.11
AGL	55G	ARNOLD FIELD	CROWELL	MI	11897.	3883.	0.	0.12	0.10
AGL	88G	GRADOLPH FLD	PETERSBURG	MI	11897.	3883.	0.	0.12	0.10
AGL	HLM	PARK TOWNSHIP	HOLLAND	MI	21.	13503.	0.	0.05*	0.09*
AGL	3D4	CITY-COUNTY	FRANKFORT	MI	3569.	7438.	0.	0.06	0.07
AGL	24C	LOWELL CITY	LOWELL	MI	8327.	2718.	0.	0.08	0.07
AGL	98G	SEBEWAING	SEBEWAING	MI	6335.	2231.	0.	0.07	0.06
AGL	RCT	MILLER FIELD	REED CITY	MI	6476.	2113.	0.	0.07	0.06
AGL	3RC	ROSCOMMON CONSERVATION	ROSCOMMON	MI	6766.	2209.	0.	0.07	0.06
AGL	80D	CLARE COUNTY	HARRISON	MI	5739.	1873.	0.	0.06	0.05
AGL	09C	AUSTIN LAKE	KALAMAZOO	MI	3749.	1224.	0.	0.04	0.03
AGL	D18	DOWNWIND ACRES	WILLIS	MI	2593.	848.	0.	0.03	0.02
AGL	ANE	ANOKA COUNTY-BLAINE ARPT(JANES FIELD)	MINNEAPOLIS	MN	1685813.	402190.	1767.	11.78*	13.87*
AGL	21D	LAKE ELMO	ST PAUL	MN	1476545.	307368.	1414.	9.32*	11.85*
AGL	D97	SOUTH ST PAUL MUNI-RICHARD E FLEMING FLD	SOUTH ST PAUL	MN	987086.	184762.	945.	6.15*	7.79*
AGL	INL	FALLS INTL	INTERNATIONAL FALLS	MN	863829.	237896.	918.	3.63	7.32
AGL	HIB	CHISHOLM-HIBBING	HIBBING	MN	707556.	215566.	834.	3.47	6.13
AGL	GPZ	GRAND RAPIDS ITASCA COUNTY	GRAND RAPIDS	MN	670368.	213486.	678.	3.41	5.87
AGL	MKT	MANKATO MUNI	MANKATO	MN	586035.	201835.	612.	3.32	5.23
AGL	BRD	BRAINERD-CROW WING CO/WALTER WIELAND FLD	BRAINERD	MN	498261.	184650.	537.	2.56	4.54
AGL	AXN	CHANDLER FIELD	ALEXANDRIA	MN	385646.	159209.	346.	2.90	3.62
AGL	OWA	OWATONNA MUNI	OWATONNA	MN	373983.	166052.	374.	2.61	3.59
AGL	PKD	PARK RAPIDS MUNI	PARK RAPIDS	MN	337899.	153153.	449.	1.61	3.26
AGL	FRM	FAIRMONT MUNI	FAIRMONT	MN	311565.	156794.	317.	1.96	3.11
AGL	TVF	THIEF RIVER FALLS REGIONAL	THIEF RIVER FALLS	MN	302662.	148123.	318.	2.01	3.00
AGL	MML	MARSHALL MUNI-RYAN FIELD	MARSHALL	MN	291604.	153489.	331.	1.99	2.96
AGL	ILL	WILLMAR MUNI	WILLMAR	MN	304939.	102477.	296.	1.76	2.71
AGL	EVM	EVELETH-VIRGINIA MUNI	EVELETH	MN	308691.	76146.	312.	1.40	2.56
AGL	BDE	BAUDETTE INTL	BAUDETTE	MN	273305.	84895.	262.	2.40	2.38
AGL	BJI	BEMIDJI MUNI	BEMIDJI	MN	202343.	139028.	186.	1.37	2.27
AGL	AEL	ALBERT LEA MUNI	ALBERT LEA	MN	191553.	109156.	166.	1.29	2.00
AGL	COQ	CLOQUET CARLTON COUNTY	CLOQUET	MN	234487.	49715.	240.	1.06	1.89
AGL	OTG	WORTHINGTON MUNI	WORTHINGTON	MN	168845.	104248.	159.	1.26	1.81
AGL	AUM	AUSTIN MUNI	AUSTIN	MN	227488.	42124.	218.	1.30	1.79
AGL	ELO	ELY MUNI	ELY	MN	168027.	98171.	165.	1.08	1.77
AGL	ULM	NEW ULM MUNI	NEW ULM	MN	132102.	127183.	134.	1.18	1.72
AGL	Y12	AIRLAKE INDUSTRIAL PARK	LAKEVILLE	MN	199689.	59371.	194.	1.38*	1.72*
AGL	ROX	ROSEAU MUNI	ROSEAU	MN	135522.	83826.	128.	0.94	1.46
AGL	BBB	BENSON MUNI	BENSON	MN	139765.	76965.	117.	1.28	1.44
AGL	LXL	LITTLE FALLS-MORRISON COUNTY	LITTLE FALLS	MN	159452.	45008.	191.	1.30	1.36
AGL	MWM	WINDOM MUNI	WINDOM	MN	140481.	60064.	140.	0.90	1.33



AGL	FFM	FERGUS FALLS MUNI-EINAR MICKELSON FLD	FERGUS FALLS	MN	55305.	123415.	0.	1.06	1.19
AGL	ONA	WINONA MUNI-MAX CONRAD FLD	WINONA	MN	134402.	43481.	120.	1.11	1.18
AGL	MVE	MONTEVIDEO-CHIPPEWA COUNTY	MONTEVIDEO	MN	141848.	24601.	137.	0.97	1.11
AGL	Y25	GATEWAY NORTH INDUSTRIAL	ANOKA	MN	116423.	24699.	81.	0.74*	0.94*
AGL	PQN	PIPESTONE MUNI	PIPESTONE	MN	22263.	107328.	0.	0.63	0.86
AGL	DTL	DETROIT LAKES	DETROIT LAKES	MN	22158.	103824.	0.	0.60	0.84
AGL	MJQ	JACKSON MUNI	JACKSON	MN	101444.	17625.	98.	0.70	0.79
AGL	CKN	CROOKSTON MUNI KIRKWOOD FLD	CROOKSTON	MN	52631.	57185.	0.	0.67	0.73
AGL	MOX	MORRIS MUNI	MORRIS	MN	67118.	22240.	61.	0.47	0.59
AGL	Y39	OLIVIA MUNI	OLIVIA	MN	55181.	29095.	193.	1.34	0.56
AGL	RWF	REDWOOD FALLS MUNI	REDWOOD FALLS	MN	33231.	28701.	2.	1.23	0.41
AGL	FBL	FARIBAULT MUNI	FARIBAULT	MN	40541.	13232.	0.	1.55	0.36
AGL	SAZ	STAPLES MUNICIPAL	STAPLES	MN	43364.	7986.	39.	0.28	0.34
AGL	HCD	HUTCHINSON MUNI	HUTCHINSON	MN	30610.	20918.	0.	0.34	0.34
AGL	Y33	MAPLE LAKE MUNI	MAPLE LAKE	MN	29159.	18002.	75.	0.54	0.31
AGL	AIT	AITKIN MUNICIPAL	AITKIN	MN	31114.	10157.	0.	0.85	0.27
AGL	GRM	DEVILS TRACK MUNI	GRAND MARAIS	MN	32996.	5305.	31.	0.24	0.26
AGL	D31	RED WING MUNI	RED WING	MN	25602.	12059.	0.	0.27	0.25
AGL	10D	WINSTED MUNI	WINSTED	MN	28932.	9444.	0.	0.29	0.25
AGL	8Y6	LEADERS CLEAR LAKE	CLEAR LAKE	MN	28513.	9307.	0.	0.28	0.25
AGL	ACQ	WASECA MUNI	WASECA	MN	20034.	15321.	0.	0.71	0.23
AGL	8Y0	BLUE EARTH MUNI	BLUE EARTH	MN	26270.	8575.	0.	0.26	0.23
AGL	Y63	ELBOW LAKE MUNI	ELBOW LAKE	MN	24773.	8086.	0.	0.25	0.22
AGL	D14	FERTILE MUNI	FERTILE	MN	20739.	12233.	0.	0.23	0.22
AGL	20Y	FLYNNS FIELD	MONTICELLO	MN	23479.	7664.	0.	0.23	0.21
AGL	8Y2	BUFFALO MUNI	BUFFALO	MN	23801.	6322.	70.	0.48	0.20
AGL	14D	PRINCETON MUNI	PRINCETON	MN	23141.	7553.	0.	0.23	0.20
AGL	D36	SKY HARBOR	DULUTH	MN	21114.	6891.	0.	0.21	0.19
AGL	CBG	CAMBRIDGE MUNI	CAMBRIDGE	MN	20788.	6785.	0.	0.21	0.18
AGL	64Y	WADENA MUNI	WADENA	MN	17996.	8691.	0.	0.19	0.18
AGL	Y68	TRACY MUNI	TRACY	MN	10407.	14644.	0.	0.14	0.17
AGL	RAD	WARROAD INTL-SWEDE CARLSON FIELD	WARROAD	MN	8156.	17414.	0.	0.13	0.17
AGL	D19	LUVERNE MUNI	LUVERNE	MN	10144.	13368.	0.	0.14	0.16
AGL	25D	FOREST LAKE	FOREST LAKE	MN	17827.	5819.	0.	0.18	0.16
AGL	74Y	NORTHPORT	WHITE BEAR LAKE	MN	18577.	6063.	0.	0.19	0.16
AGL	D33	LONGVILLE MUNI	LONGVILLE	MN	17075.	5572.	0.	0.17	0.15
AGL	Y69	LITCHFIELD MUNI	LITCHFIELD	MN	16763.	5471.	0.	0.16	0.15
AGL	9Y7	FOSSTON MUNI	FOSSTON	MN	14781.	7319.	0.	0.16	0.15
AGL	SYN	CARLETON	STAHTON	MN	15513.	5064.	0.	0.15	0.14
AGL	14Y	TODD FIELD	LONG PRAIRIE	MN	12731.	6650.	0.	0.14	0.13
AGL	D24	ORTONVILLE MUNI	ORTONVILLE	MN	15250.	4978.	0.	0.15	0.13
AGL	54Y	RUSH CITY MUNI	RUSH CITY	MN	13236.	4320.	0.	0.13	0.12
AGL	CHU	HOUSTON COUNTY	CALEDONIA	MN	14794.	3793.	50.	0.33	0.12
AGL	1D6	HECTOR MUNI	HECTOR	MN	12061.	3937.	0.	0.12	0.11
AGL	Y58	SLEEPY EYE MUNI	SLEEPY EYE	MN	12762.	4166.	0.	0.13	0.11
AGL	Y29	GLENCOE MUNI	GLENCOE	MN	12201.	3983.	0.	0.12	0.11
AGL	D81	RED LAKE FALLS MUNI	RED LAKE FALLS	MN	12996.	4243.	0.	0.13	0.11
AGL	53D	GLENWOOD MUNI	GLENWOOD	MN	13222.	3181.	55.	0.29	0.11
AGL	04Y	HAWLEY MUNI	HAWLEY	MN	11008.	3593.	0.	0.11	0.10
AGL	D40	ST JAMES MUNI	ST JAMES	MN	11144.	3638.	0.	0.11	0.10
AGL	D00	NORMAN COUNTY ADA-TWIN VALLEY	ADA - TWIN VALLEY	MN	11448.	3737.	0.	0.11	0.10
AGL	03Y	HALLOCK MUNI	HALLOCK	MN	6723.	7213.	0.	0.20	0.09
AGL	12Y	LE SUEUR MUNI	LE SUEUR	MN	10373.	3386.	0.	0.10	0.09
AGL	87D	DODGE COUNTY	DODGE CENTER	MN	11132.	2864.	37.	0.24	0.09
AGL	ORB	ORR REGIONAL	ORR	MN	10295.	3360.	0.	0.34	0.09
AGL	DXX	DAWSON-MADISON-LAC QUI PARLE COUNTY	MADISON	MN	9936.	3243.	0.	0.10	0.09
AGL	49Y	FILLMORE COUNTY	PRESTON	MN	10561.	3447.	0.	0.11	0.09
AGL	D42	SPRINGFIELD MUNI	SPRINGFIELD	MN	8912.	2909.	0.	0.09	0.08
AGL	76Y	BENSON	WHITE BEAR LAKE	MN	8565.	2796.	0.	0.09	0.08
AGL	68Y	WELLS MUNI	WELLS	MN	7594.	2479.	0.	0.08	0.07

AGL	19D	MORA MUNI	MORA	MN	7914.	2583.	0.	0.08	0.07
AGL	62Y	TWO HARBORS MUNICIPAL	TWO HARBORS	MN	6334.	2067.	0.	0.06	0.06
AGL	58Y	SILVER BAY MUNI	SILVER BAY	MN	5256.	1716.	0.	0.05	0.05
AGL	70Y	WHEATON MUNI	WHEATON	MN	4339.	1416.	0.	0.04	0.04
AGL	6D1	BROOTEN MUNI	BROOTEN	MN	4552.	1486.	0.	0.05	0.04
AGL	06Y	HERMAN MUNI	HERMAN	MN	2567.	871.	0.	0.03	0.02
AGL	6MN5	MAHNOMEN COUNTY	MAHNOMEN	MN	2590.	845.	0.	0.03	0.02
AGL	JMS	JAMESTOWN MUNI	JAMESTOWN	ND	509805.	186818.	525.	3.41	4.63
AGL	DVL	DEVILS LAKE MUNI	DEVILS LAKE	ND	384053.	145141.	457.	3.17	3.52
AGL	DIK	DICKINSON MUNICIPAL	DICKINSON	ND	139674.	92378.	144.	1.24	1.54
AGL	D04	BOWMAN MUNICIPAL	BOWMAN	ND	50891.	111271.	0.	0.88	1.08
AGL	RUG	RUGBY MUNI	RUGBY	ND	47066.	14769.	37.	0.43	0.41
AGL	Y19	MANDAN MUNI	MANDAN	ND	23697.	20795.	0.	0.29	0.30
AGL	GAF	GRAFTON MUNI	GRAFTON	ND	22107.	20923.	0.	0.27	0.29
AGL	6D8	BARNES COUNTY MUNICIPAL	VALLEY CITY	ND	25935.	13588.	0.	0.28	0.26
AGL	HEI	HETTINGER MUNICIPAL	HETTINGER	ND	16180.	16239.	0.	0.20	0.22
AGL	D63	BRECKENRIDGE-WAHPETON INTERSTATE	WAHPETON	ND	18242.	11077.	0.	0.21	0.19
AGL	D60	TIOGA MUNI	TIOGA	ND	16367.	10466.	0.	0.19	0.18
AGL	D09	BOTTINEAU MUNI	BOTTINEAU	ND	8969.	15927.	0.	0.14	0.17
AGL	D55	LANGDON MUNI	LANGDON	ND	15877.	10305.	0.	0.18	0.17
AGL	06D	ROLLA MUNI	ROLLA	ND	8969.	13359.	0.	0.13	0.15
AGL	ND34	LISBON MUNI	LISBON	ND	17452.	5697.	0.	0.18	0.15
AGL	3ND0	VINCE	NORTHWOOD	ND	16180.	5281.	0.	0.16	0.14
AGL	ND31	LARIMORE MUNI	LARIMORE	ND	16180.	5281.	0.	0.16	0.14
AGL	1ND3	HAMRY FIELD	KINDRED	ND	14577.	4758.	0.	0.15	0.13
AGL	08D	STANLEY MUNI	STANLEY	ND	8969.	10739.	0.	0.12	0.13
AGL	Y36	MOHALL MUNI	MOHALL	ND	14300.	4668.	0.	0.15	0.13
AGL	PMB	PEMBINA MUNI	PEMBINA	ND	10546.	8565.	0.	0.13	0.13
AGL	ND44	MOTT MUNICIPAL	MOTT	ND	14300.	4668.	0.	0.15	0.13
AGL	S32	COOPERSTOWN MUNI	COOPERSTOWN	ND	13214.	4313.	0.	0.14	0.12
AGL	D50	CROSBY MUNI	CROSBY	ND	13214.	4313.	0.	0.14	0.12
AGL	05D	NEW TOWN MUNI	NEW TOWN	ND	5815.	12329.	0.	0.10	0.12
AGL	ND59	ST THOMAS MUNI	ST THOMAS	ND	12251.	4000.	0.	0.12	0.11
AGL	96D	WALHALLA MUNI	WALHALLA	ND	12120.	3957.	0.	0.12	0.11
AGL	D57	GLEN ULLIN MUNI	GLEN ULLIN	ND	11146.	3638.	0.	0.11	0.10
AGL	ND06	CAVALIER MUNI	CAVALIER	ND	9756.	3185.	0.	0.10	0.09
AGL	S25	WATFORD CITY MUNI	WATFORD CITY	ND	10059.	3283.	0.	0.10	0.09
AGL	D56	MAYVILLE MUNI	MAYVILLE	ND	9133.	2982.	0.	0.09	0.08
AGL	Y37	PARK RIVER MUNI	PARK RIVER	ND	8607.	2810.	0.	0.09	0.08
AGL	Y74	HANKINS FIELD	PARSHALL	ND	7926.	2587.	0.	0.08	0.07
AGL	S28	INTERNATIONAL PEACE GARDEN	DUNSEITH	ND	7994.	2609.	0.	0.08	0.07
AGL	ND12	ELLEDALE MUNI	ELLEDALE	ND	6871.	2243.	0.	0.07	0.06
AGL	ND49	OAKES MUNICIPAL	OAKES	ND	5927.	1935.	0.	0.06	0.05
AGL	ASY	ASHLEY MUNI	ASHLEY	ND	5814.	1898.	0.	0.06	0.05
AGL	20U	BEACH	BEACH	ND	4555.	1487.	0.	0.05	0.04
AGL	D64	WESTHOPE MUNI	WESTHOPE	ND	4238.	1383.	0.	0.04	0.04
AGL	90Y	LEONARD MUNICIPAL	LEONARD	ND	1778.	580.	0.	0.02	0.02
AGL	22G	LORAIN COUNTY REGIONAL	LORAIN/ELYRIA/	OH	1847813.	416113.	1898.	10.60	15.04
AGL	MGY	DAYTON GENERAL ARPT SOUTH	DAYTON	OH	1533983.	353604.	1633.	7.54	12.54
AGL	HA0	HAMILTON AIRPORT	HAMILTON	OH	914329.	263137.	909.	6.23*	7.82*
AGL	2I4	BOLTON FLD	COLUMBUS	OH	831125.	247558.	927.	5.44*	7.17*
AGL	LNN	LOST NATION	WILLOUGHBY	OH	741814.	183543.	721.	4.88*	6.15*
AGL	MW0	HOOK FIELD MUNI	MIDDLETOWN	OH	700924.	219733.	738.	4.31	6.12
AGL	MNN	MARION MUNI	MARION	OH	696627.	209299.	727.	3.88	6.02
AGL	5G7	BLUFFTON	BLUFFTON	OH	657383.	152361.	632.	3.38	5.38
AGL	1G3	ANDREW W PATON OF KENT STATE UNIV	KENT	OH	570555.	204952.	489.	3.95*	5.15*
AGL	AOH	ALLEN COUNTY	LIMA	OH	567656.	203933.	562.	3.14	5.13
AGL	PHD	HARRY CLEVER FIELD	NEW PHILADELPHIA	OH	556437.	190945.	550.	3.91*	4.97*

AGL I19 GREENE COUNTY  
 AGL 7G2 ASHTABULA COUNTY  
 AGL 14G PROGRESS FIELD  
 AGL I77 CINCINNATI-BLUE ASH  
 AGL 02G COLUMBIANA COUNTY  
 AGL GQQ GALION MUNI  
 AGL TDZ METCALF FIELD  
 AGL FDY FINDLAY  
 AGL I15 FAIRFIELD COUNTY  
 AGL I67 HARRISON  
 AGL ZZV ZANESVILLE MUNI  
 AGL USE FULTON COUNTY  
 AGL I69 CLERMONT COUNTY  
 AGL 3G4 ASHLAND COUNTY  
 AGL 16G SENECA COUNTY  
 AGL 2G1 CONCORD AIRPARK  
 AGL 17G PORT BUCYRUS-CRAWFORD COUNTY  
 AGL SKY GRIFFING SANDUSKY  
 AGL 4I3 KNOX COUNTY  
 AGL I12 SIDNEY  
 AGL TSO CARROLL COUNTY-TOLSON  
 AGL 4G3 GREAT LAKES AERO-PORT  
 AGL I23 FAYETTE COUNTY  
 AGL DFI DEFIANCE MEML  
 AGL I17 PIQUA  
 AGL UNI OHIO UNIVERSITY  
 AGL 1G5 FREEDOM FIELD  
 AGL 0G6 WILLIAMS COUNTY  
 AGL DLZ DELAWARE MUNI  
 AGL 15G WELTZIEN SKYPARK  
 AGL 1G0 WOOD COUNTY  
 AGL I78 UNION COUNTY  
 AGL 3G6 TRI-CITY  
 AGL OXD MIAMI UNIVERSITY  
 AGL 4I2 SOUTH COLUMBUS  
 AGL 2I8 NEWARK-HEATH  
 AGL GAS GALLIA-MEIGS REGIONAL  
 AGL OH17 HENRY COUNTY  
 AGL PCW CARL R KELLER FIELD  
 AGL UYF MADISON COUNTY  
 AGL 06G YOUNGSTOWN EXECUTIVE  
 AGL I40 RICHARD DOWNING  
 AGL 6G5 BARNESVILLE-BRADFIELD  
 AGL I68 LEBANON-WARREN COUNTY  
 AGL HOC HIGHLAND COUNTY  
 AGL PMH GREATER PORTSMOUTH REGIONAL  
 AGL 04G LANSDOWNE  
 AGL I54 MAD RIVER INC.  
 AGL 7I7 BELLEFONTAINE MUNI  
 AGL VNW VAN WERT MUNI  
 AGL AXV NEIL ARMSTRONG  
 AGL 29G PORTAGE COUNTY  
 AGL CYO PICKAWAY COUNTY MEMORIAL  
 AGL 2G2 STEUBENVILLE PIER  
 AGL 89D KELLEYS ISLAND LAND FLD  
 AGL 56D WYANDOT COUNTY  
 AGL 7G8 GEauga COUNTY  
 AGL 3I7 MYERS  
 AGL 8G1 WILLARD  
 AGL CQA LAKEFIELD

XENIA  
 ASHTABULA  
 FREMONT  
 CINCINNATI  
 EAST LIVERPOOL  
 GALION  
 TOLEDO  
 FINDLAY  
 LANCASTER  
 HARRISON  
 ZANESVILLE  
 WAUSEON  
 BATAVIA  
 ASHLAND  
 TIFFIN  
 PAINESVILLE  
 BUCYRUS  
 SANDUSKY  
 MOUNT VERNON  
 SIDNEY  
 CARROLLTON  
 ALLIANCE  
 WASHINGTON COURT HOUSE  
 DEFIANCE  
 PIQUA  
 ATHENS/ALBANY  
 MEDINA  
 BRYAN  
 DELAWARE  
 WADSWORTH  
 BOWLING GREEN  
 MARYSVILLE  
 SEBRING  
 OXFORD  
 COLUMBUS  
 NEWARK  
 GALLIPOLIS  
 NAPOLEON  
 PORT CLINTON  
 LONDON  
 YOUNGSTOWN  
 COSHOCTON  
 BARNESVILLE  
 LEBANON  
 HILLSBORO  
 PORTSMOUTH  
 YOUNGSTOWN  
 TREMONT CITY  
 BELLEFONTAINE  
 VAN WERT  
 WAPAKONETA  
 RAVENNA  
 CIRCLEVILLE  
 STEUBENVILLE  
 KELLEYS ISLAND  
 UPPER SANDUSKY  
 MIDDLEFIELD  
 PHILLIPSBURG  
 WILLARD  
 CELINA

OH	525331.	165270.	529.	3.03	4.59
OH	470970.	127304.	497.	2.65	3.98
OH	453845.	129132.	464.	3.37	3.87
OH	438446.	110033.	443.	2.24	3.64
OH	430110.	113303.	414.	2.02	3.61
OH	367903.	173837.	335.	2.37	3.60
OH	382623.	152559.	310.	3.14	3.56
OH	372240.	93812.	383.	1.96	3.10
OH	308698.	158290.	237.	2.40*	3.10*
OH	341742.	62577.	345.	2.45*	2.69*
OH	297361.	101900.	295.	2.00	2.65
OH	323121.	73356.	327.	2.09	2.63
OH	253676.	99921.	228.	1.76*	2.35*
OH	273536.	70996.	288.	1.20	2.29
OH	237402.	103530.	0.	0.77	2.27
OH	278077.	50950.	266.	1.72*	2.19*
OH	220987.	90048.	210.	1.54*	2.07*
OH	147984.	140344.	86.	1.67	1.92
OH	163721.	122112.	165.	1.39*	1.90*
OH	212256.	60434.	220.	1.05	1.81
OH	220993.	50966.	203.	1.45	1.81
OH	214979.	50786.	191.	1.37*	1.77*
OH	212567.	53699.	200.	1.29	1.77
OH	137859.	126948.	138.	1.19	1.76
OH	211508.	45697.	220.	1.50	1.71
OH	174817.	81050.	170.	1.21	1.70
OH	143321.	107174.	0.	1.70	1.66
OH	139941.	102362.	139.	1.15*	1.61*
OH	106887.	131079.	0.	1.45	1.58
OH	141922.	61374.	0.	1.53	1.35
OH	157792.	42722.	159.	0.83	1.33
OH	158380.	40834.	153.	1.07	1.32
OH	118277.	69776.	124.	0.59	1.25
OH	140750.	42451.	141.	0.68	1.22
OH	94690.	83209.	0.	1.17	1.18
OH	103248.	71465.	1.	3.25	1.16
OH	49949.	121669.	0.	1.02	1.14
OH	82755.	86276.	72.	0.77*	1.12*
OH	46954.	120688.	0.	0.98	1.11
OH	66615.	97586.	204.	1.60	1.09
OH	42970.	119390.	0.	1.63	1.08
OH	125387.	37593.	119.	0.84*	1.08*
OH	137219.	23188.	140.	0.67	1.07
OH	127557.	30647.	120.	0.81*	1.05*
OH	115318.	41919.	108.	0.96	1.04
OH	46419.	109061.	1.	1.62	1.03
OH	129460.	23724.	129.	0.86*	1.02*
OH	33090.	116166.	0.	0.84	0.99
OH	116942.	30252.	117.	0.74	0.98
OH	112144.	35814.	107.	0.67	0.98
OH	123566.	21270.	124.	0.84*	0.96*
OH	88342.	56799.	80.	0.69*	0.96*
OH	98026.	39999.	95.	0.65	0.92
OH	74121.	59346.	0.	0.89	0.89
OH	26673.	102749.	0.	0.64	0.86
OH	66586.	54780.	102.	1.08	0.81
OH	74775.	39605.	65.	0.56*	0.76*
OH	88808.	24365.	47.	0.65	0.75
OH	43314.	69303.	34.	0.50*	0.75*
OH	90589.	22088.	84.	0.68	0.75

AGL	BJJ	WAYNE COUNTY	WOOSTER	OH	66365.	45187.	43.	0.60*	0.74*
AGL	3DS	BORDNER AIRSTRIP	BOWLING GREEN	OH	65749.	44860.	0.	0.73	0.73
AGL	1G1	ELYRIA	ELYRIA	OH	84869.	24910.	83.	0.57*	0.73*
AGL	I73	MORAINES AIR PARK	DAYTON	OH	80064.	26135.	0.	0.83	0.71
AGL	OH30	PUT IN BAY	PUT IN BAY	OH	9979.	91169.	0.	0.43	0.67
AGL	3I9	BUCKEYE VALLEY	HEBRON	OH	63051.	27629.	62.	0.47*	0.64*
AGL	OH21	HURON COUNTY-CITY OF NORWALK	NORWALK	OH	15362.	80414.	0.	0.43	0.64
AGL	62D	WARREN	WARREN	OH	53335.	38229.	35.	0.47*	0.61*
AGL	1G6	STRONGSVILLE	STRONGSVILLE	OH	67482.	22028.	0.	0.70	0.59
AGL	10G	HOLMES COUNTY	MILLERSBURG	OH	60667.	21489.	55.	0.39	0.55
AGL	4G4	YOUNGSTOWN ELSER METRO	NORTH LIMA	OH	66390.	12201.	62.	0.41*	0.52*
AGL	37I	TROY SKYPARK	TROY	OH	65978.	12995.	64.	0.41*	0.52*
AGL	12G	SHELBY COMMUNITY	SHELBY	OH	60728.	15765.	58.	0.39*	0.51*
AGL	PVZ	CASEMENT	PAINESVILLE	OH	58787.	10405.	57.	0.37*	0.46*
AGL	I44	DAHIO	DAYTON	OH	28293.	36181.	0.	0.38	0.43
AGL	OH14	WOODRUFF	MONTPELIER	OH	41691.	18578.	0.	0.45	0.40
AGL	CDI	CAMBRIDGE MUNI	CAMBRIDGE	OH	14795.	45061.	0.	0.55	0.40
AGL	3I0	RIVERSIDE	ZANESVILLE	OH	44403.	14495.	0.	0.44	0.39
AGL	7D5	PRIEBE	FINDLAY	OH	18497.	38371.	0.	0.30	0.38
AGL	I62	BROOKVILLE AIR-PARK	BROOKVILLE	OH	39531.	18295.	0.	0.42	0.38
AGL	FZI	FOSTORIA METROPOLITAN	FOSTORIA	OH	26983.	26724.	85.	0.61	0.36
AGL	AMT	ALEXANDER SALAMON	WEST UNION	OH	18469.	35182.	0.	0.31	0.36
AGL	RZT	ROSS COUNTY	CHILlicoTHE	OH	27504.	23470.	0.	0.34	0.34
AGL	8G6	HARRISON COUNTY	CADIZ	OH	24968.	24187.	78.	0.46	0.33
AGL	I10	NOBLE COUNTY AIRPARK	CALDWELL	OH	17058.	31706.	0.	0.27	0.32
AGL	VES	DARKE COUNTY	VERSAILES	OH	37270.	11093.	130.	0.69	0.32
AGL	3G3	WADSWORTH MUNI	WADSWORTH	OH	31106.	15451.	0.	0.34	0.31
AGL	I74	GRIMES FIELD	URBANA	OH	31398.	12786.	0.	0.33	0.29
AGL	GEO	BROWN COUNTY	GEORGETOWN	OH	10231.	31581.	0.	0.23	0.28
AGL	OWX	PUTNAM COUNTY	OTTAWA	OH	25963.	15215.	0.	0.28	0.27
AGL	4G8	COLUMBIA	COLUMBIA STATION	OH	27818.	9081.	0.	0.28	0.25
AGL	OH23	BLATTER	ORRVILLE	OH	12354.	24148.	0.	0.20	0.24
AGL	I43	JAMES A RHODES	JACKSON	OH	15116.	19680.	45.	0.35	0.23
AGL	HTW	LAWRENCE COUNTY AIRPARK	CHESAPEAKE/HUNTINGTON	OH	16133.	17942.	0.	0.21	0.23
AGL	4D6	CHARDON	CHARDON	OH	24779.	8089.	0.	0.25	0.22
AGL	2D7	BEACH CITY	BEACH CITY	OH	25152.	8212.	0.	0.25	0.22
AGL	5D4	MARTIN FIELD	CANTON	OH	14109.	15383.	0.	0.18	0.20
AGL	04I	COLUMBUS SOUTHWEST	COLUMBUS	OH	22919.	7482.	0.	0.23	0.20
AGL	OH20	NORTHFIELD	NORTHFIELD	OH	22324.	7288.	0.	0.22	0.20
AGL	22I	VINTON COUNTY	MCARTHUR	OH	10874.	16212.	0.	0.16	0.18
AGL	09I	DELPHOS	DELPHOS	OH	19094.	6234.	0.	0.19	0.17
AGL	19I	BROWNIES LEBANON	LEBANON	OH	9163.	14203.	0.	0.13	0.16
AGL	1G8	DYER	TORONTO	OH	18335.	5985.	0.	0.18	0.16
AGL	I66	CLINTON FIELD	WILMINGTON	OH	9201.	13065.	0.	0.13	0.15
AGL	I71	MORGAN COUNTY	MCCONNELSVILLE	OH	5381.	16708.	0.	0.11	0.15
AGL	42I	PARR	ZANESVILLE	OH	13001.	9419.	0.	0.15	0.15
AGL	I57	PIKE COUNTY	WAVERLY	OH	8491.	12859.	0.	0.12	0.14
AGL	I95	HARDIN COUNTY	KENTON	OH	15612.	5096.	0.	0.16	0.14
AGL	0I03	ALDERMAN	ST CLAIRSVILLE	OH	15113.	4933.	0.	0.15	0.13
AGL	88D	HURON	HURON	OH	9203.	8393.	0.	0.11	0.12
AGL	40I	WAYNESVILLE	WAYNESVILLE	OH	13004.	4245.	0.	0.13	0.11
AGL	67D	BOTSFORD	WELLINGTON	OH	11945.	4439.	0.	0.12	0.11
AGL	4G5	MONROE COUNTY	WOODSFIELD	OH	6789.	8250.	0.	0.09	0.10
AGL	I70	OBERLIN	OBERLIN	OH	10715.	3498.	0.	0.11	0.09
AGL	38D	SALEM AIRPARK INC	SALEM	OH	10222.	3337.	0.	0.10	0.09
AGL	I51	TYLER	ADERDEEN	OH	4877.	6981.	0.	0.07	0.08
AGL	4I9	MORROW COUNTY	MT GILEAD	OH	9229.	3013.	0.	0.10	0.08
AGL	2D1	BARBER	ALLIANCE	OH	8963.	2926.	0.	0.09	0.08
AGL	I86	PERRY COUNTY	NEW LEXINGTON	OH	7694.	2511.	0.	0.08	0.07
AGL	6G4	WYNKOOP	MT VERNON	OH	6524.	2770.	0.	0.07	0.06

AGL OH15 MINERVA  
 AGL OH07 SUNSET STRIP  
 AGL 6D2 ASHTABULA CONNEAUT  
 AGL 52D TIFFIN  
 AGL OH09 MIDDLE BASS-EAST POINT  
 AGL 11I CRAFT  
 AGL ILN WILMINGTON INDUSTRIAL AIRPARK  
 AGL 7D6 LIBERTY AIRPARK  
 AGL 8G8 KOONS  
 AGL OH06 MILLS  
 AGL OH36 MILLER FARM LANDING STRIP  
 AGL 63D GRIESER

AGL PIR PIERRE MUNI  
 AGL ATY WATERTOWN MUNI  
 AGL MHE MITCHELL MUNI  
 AGL YKN CHAN GURNEY MUNI  
 AGL BKX BROOKINGS MUNI  
 AGL Y14 SKY HAVEN AIRPARK  
 AGL SPF BLACK HILLS  
 AGL LEM LEMMON MUNI  
 AGL PHP PHILIP  
 AGL 3VM HAROLD DAVIDSON FIELD  
 AGL MDS MADISON MUNI  
 AGL 66D STURGIS MUNI  
 AGL MBG MOBRIDGE MUNI  
 AGL SD39 BOB WILEY FIELD  
 AGL 3BF BUS FIELD  
 AGL HSR HOT SPRINGS MUNI  
 AGL CHB CHAMBERLAIN MUNI  
 AGL AGZ WAGNER MUNI  
 AGL OD8 GETTYSBURG MUNI  
 AGL 8D7 CLARK COUNTY  
 AGL 3FU FAULKTON MUNI  
 AGL 3BT BRITTON MUNI  
 AGL 1D8 REDFIELD MUNI  
 AGL 1D0 MILLER MUNI  
 AGL 8D3 SISSETON MUNI  
 AGL 1D1 MILBANK MUNI  
 AGL 9D1 GREGORY MUNI  
 AGL SD34 PRESNO MUNI  
 AGL 1D7 WEBSTER MUNI  
 AGL 9V6 MARTIN MUNI  
 AGL 6V4 WALL MUNI  
 AGL 98D ONIDA MUNI  
 AGL SD33 PARKSTON MUNI  
 AGL 5V8 KADOKA MUNI  
 AGL 9D2 HARDING COUNTY  
 AGL 6V0 EDGEMONT MUNI  
 AGL 6V2 PINE RIDGE  
 AGL 1D3 PLATTE MUNI  
 AGL SD10 CANTON MUNI  
 AGL 8D9 HOWARD MUNI

AGL ENW KENOSHA MUNI  
 AGL UES WAUKESHA COUNTY  
 AGL ETB WEST BEND MUNI  
 AGL EAU EAU CLAIRE COUNTY  
 AGL SBM SHEBOYGAN COUNTY MEMORIAL  
 AGL ISW ALEXANDER FIELD SOUTH WOOD COUNTY

MINERVA  
 MARLBORO  
 CONNEAUT  
 TIFFIN  
 MIDDLE BASS ISLAND  
 FREDERICKTOWN  
 WILMINGTON  
 FREEDOM  
 SALEM  
 MANTUA  
 BALTIMORE  
 WAUSEON

PIERRE  
 WATERTOWN  
 MITCHELL  
 YANKTON  
 BROOKINGS  
 SIOUX FALLS  
 SPEARFISH  
 LEMMON  
 PHILIP  
 VERMILLION  
 MADISON  
 STURGIS  
 MOBRIDGE  
 WINNER  
 BELLE FOURCHE  
 HOT SPRINGS  
 CHAMBERLAIN  
 WAGNER  
 GETTYSBURG  
 CLARK  
 FAULKTON  
 BRITTON  
 REDFIELD  
 MILLER  
 SISSETON  
 MILBANK  
 GREGORY  
 PRESNO  
 WEBSTER  
 MARTIN  
 WALL  
 ONIDA  
 PARKSTON  
 KADOKA  
 BUFFALO  
 EDGEMONT  
 PINE RIDGE  
 PLATTE  
 CANTON  
 HOWARD

KENOSHA  
 WAUKESHA  
 WEST BEND  
 EAU CLAIRE  
 SHEBOYGAN  
 WISCONSIN RAPIDS

OH	7258.	2370.	0.	0.07	0.06
OH	5984.	1953.	0.	0.06	0.05
OH	5051.	1649.	0.	0.05	0.04
OH	4322.	1411.	0.	0.04	0.04
OH	2606.	2062.	0.	0.03	0.03
OH	1977.	1940.	0.	0.02	0.03
OH	3178.	1037.	0.	0.03	0.03
OH	2800.	914.	0.	0.03	0.02
OH	2273.	742.	0.	0.02	0.02
OH	2757.	900.	0.	0.03	0.02
OH	1621.	529.	0.	0.02	0.01
OH	1239.	404.	0.	0.01	0.01

SD	857207.	244522.	930.	4.88	7.32
SD	800879.	235666.	844.	4.48	6.89
SD	524431.	195118.	521.	3.99	4.78
SD	425559.	177124.	440.	3.19	4.00
SD	392459.	172452.	402.	3.15	3.75
SD	355538.	74843.	345.	2.26*	2.86*
SD	42932.	34796.	0.	0.51	0.52
SD	49602.	23952.	0.	0.54	0.49
SD	42562.	24336.	0.	1.58	0.44
SD	42437.	17798.	0.	0.45	0.40
SD	32949.	26305.	0.	0.39	0.39
SD	44055.	14380.	0.	0.45	0.39
SD	33768.	25317.	0.	0.40	0.39
SD	28866.	24972.	0.	0.35	0.36
SD	23678.	28512.	0.	0.32	0.35
SD	33393.	16028.	0.	0.36	0.33
SD	32950.	12386.	0.	0.39	0.33
SD	34941.	11404.	0.	0.35	0.31
SD	33836.	11044.	0.	0.35	0.30
SD	32187.	10506.	0.	0.33	0.28
SD	28799.	9400.	0.	0.29	0.25
SD	27292.	8908.	0.	0.28	0.24
SD	27595.	9007.	0.	0.28	0.24
SD	22358.	7297.	0.	0.23	0.20
SD	19282.	8861.	0.	0.21	0.19
SD	15786.	7721.	0.	0.17	0.16
SD	10033.	13719.	0.	0.14	0.16
SD	16049.	5239.	0.	0.16	0.14
SD	11135.	3635.	0.	0.11	0.10
SD	10033.	3275.	0.	0.10	0.09
SD	4010.	6437.	0.	0.06	0.07
SD	7894.	2577.	0.	0.08	0.07
SD	7426.	2975.	0.	0.08	0.07
SD	7025.	2293.	0.	0.07	0.06
SD	6351.	2073.	0.	0.06	0.06
SD	5262.	1718.	0.	0.05	0.05
SD	4075.	1330.	0.	0.04	0.04
SD	3950.	1289.	0.	0.04	0.03
SD	2406.	785.	0.	0.02	0.02
SD	2270.	741.	0.	0.02	0.02

WI	1363976.	333945.	1406.	7.50	11.28
WI	1006748.	193139.	1008.	6.56*	7.97*
WI	820071.	241427.	780.	6.72	7.05
WI	824663.	236967.	896.	3.99	7.05
WI	733198.	204078.	819.	4.22	6.23
WI	444000.	180604.	454.	2.94	4.15

AGL FLD FOND DU LAC COUNTY  
 AGL C29 MOREY  
 AGL RHI RHINELANDER-ONEIDA COUNTY  
 AGL MFI MARSHFIELD MUNI  
 AGL ASX JOHN F KENNEDY MEMORIAL  
 AGL C31 HARTFORD MUNI  
 AGL C52 BURLINGTON MUNI  
 AGL MTW MAHITOWOC COUNTY  
 AGL CWA CENTRAL WISCONSIN  
 AGL STE STEVENS POINT MUNI  
 AGL HYR HAYWARD MUNI  
 AGL AUW WAUSAU MUNI  
 AGL C02 PLAYBOY  
 AGL 44C BELOIT  
 AGL SUW RICHARD I BONG  
 AGL ARV LAKELAND  
 AGL RAC HORLICK-RACINE  
 AGL UNU DODGE COUNTY  
 AGL RIE RICE LAKE MUNICIPAL  
 AGL CLI CLINTONVILLE MUNI  
 AGL C47 PORTAGE MUNI  
 AGL 3CU CABLE UNION  
 AGL EGV EAGLE RIVER MUNI  
 AGL C46 PLATTEVILLE  
 AGL 92C CARTER  
 AGL AIG LANGLADE COUNTY  
 AGL RRL MERRILL MUNI  
 AGL Y35 BLACK RIVER FALLS AREA  
 AGL PVB GRANT COUNTY  
 AGL C85 BARABOO WISCONSIN DELLS  
 AGL 93C RICHLAND  
 AGL WI07 WAUPUN  
 AGL OEO OSCEOLA MUNI  
 AGL PDC PRAIRIE DU CHIEN MUNI  
 AGL RYV WATERTOWN MUNI  
 AGL LNL KINGS LAND O' LAKES  
 AGL C32 IOWA COUNTY  
 AGL LNR TRI-COUNTY  
 AGL PCZ WAUPACA MUNI  
 AGL 57C EAST TROY MUNI  
 AGL 91C SAUK-PRAIRIE  
 AGL 3W0 SHAWANO MUNI  
 AGL SUE DOOR COUNTY CHERRYLAND  
 AGL D28 RUSK COUNTY  
 AGL WI12 AMERY MUNI  
 AGL 79C BRENNAND  
 AGL SSQ SHELL LAKE MUNI  
 AGL 02C CAPITOL DRIVE  
 AGL Y78 RAINBOW  
 AGL MDZ TAYLOR COUNTY  
 AGL WI10 WESTOSHA  
 AGL 81C NEILLSVILLE MUNI  
 AGL D27 PRICE COUNTY  
 AGL RNH NEW RICHMOND MUNI  
 AGL C33 MONROE MUNI  
 AGL C59 LAKE LAWN  
 AGL C89 SYLVANIA  
 AGL Y52 BURNETT COUNTY  
 AGL 8D1 NEW HOLSTEIN MUNI  
 AGL 88C PALMYRA MUNI

FOND DU LAC  
 MADISON  
 RHINELANDER  
 MARSHFIELD  
 ASHLAND  
 HARTFORD  
 BURLINGTON  
 MANITOWOC  
 MOSINEE  
 STEVENS POINT  
 HAYWARD  
 WAUSAU  
 LAKE GENEVA  
 BELOIT  
 SUPERIOR  
 MINOCQUA/WOODRUFF  
 RACINE  
 JUNEAU  
 RICE LAKE  
 CLINTONVILLE  
 PORTAGE  
 CABLE  
 EAGLE RIVER  
 PLATTEVILLE  
 PULASKI  
 ANTIGO  
 MERRILL  
 BLACK RIVER FALLS  
 PLATTEVILLE  
 BARABOO  
 RICHLAND CENTER  
 WAUPUN  
 OSCEOLA  
 PRAIRIE DU CHIEN  
 WATERTOWN  
 LAND O' LAKES  
 MINERAL POINT  
 LONE ROCK  
 WAUPACA  
 EAST TROY  
 PRAIRIE DU SAC  
 SHAWANO  
 STURGEON BAY  
 LADYSMITH  
 AMERY  
 NEENAH  
 SHELL LAKE  
 PEWAUKEE  
 FRANKLIN  
 MEDFORD  
 WILMOT  
 NEILLSVILLE  
 PHILLIPS  
 NEW RICHMOND  
 MONROE  
 DELAVAN  
 STURTEVANT  
 SIREN  
 NEW HOLSTEIN  
 PALMYRA

WI 432471. 175493. 437. 2.82 4.04  
 WI 447021. 150978. 442. 3.10\* 3.97\*  
 WI 420208. 174821. 442. 2.76 3.95  
 WI 391060. 167033. 436. 2.16 3.71  
 WI 382527. 166727. 529. 2.14 3.65  
 WI 434200. 111628. 434. 2.76 3.63  
 WI 428546. 86353. 444. 2.30 3.42  
 WI 349351. 161872. 375. 2.15 3.40  
 WI 333487. 160461. 321. 1.98 3.28  
 WI 319200. 143431. 318. 2.41 3.07  
 WI 295309. 152135. 452. 2.21 2.97  
 WI 289221. 155221. 284. 2.25\* 2.95\*  
 WI 229759. 131662. 234. 2.06 2.40  
 WI 222649. 125224. 221. 1.72\* 2.31\*  
 WI 280427. 61663. 290. 1.62 2.27  
 WI 219920. 96897. 218. 1.61 2.11  
 WI 223634. 86551. 237. 1.81 2.09  
 WI 228978. 44391. 229. 1.42 1.82  
 WI 179485. 90168. 262. 1.24 1.79  
 WI 115746. 143137. 0. 5.97 1.72  
 WI 188320. 62167. 186. 1.33\* 1.66\*  
 WI 131944. 115176. 135. 1.29\* 1.64\*  
 WI 129899. 72315. 123. 1.35 1.34  
 WI 160026. 34158. 147. 0.97\* 1.29\*  
 WI 152817. 31728. 161. 1.05\* 1.29\*  
 WI 63551. 122116. 194. 2.34 1.23  
 WI 122036. 57589. 109. 1.10 1.19  
 WI 135632. 32991. 136. 0.95\* 1.12\*  
 WI 122753. 38198. 122. 0.79 1.07  
 WI 111517. 43409. 113. 0.90\* 1.03\*  
 WI 116725. 27455. 117. 0.79\* 0.96\*  
 WI 44000. 87687. 0. 0.73 0.87  
 WI 108432. 23005. 96. 0.83 0.87  
 WI 102164. 26803. 104. 0.59 0.86  
 WI 70851. 50584. 0. 0.80 0.81  
 WI 94884. 26062. 96. 0.81 0.80  
 WI 95423. 21474. 94. 0.63\* 0.78\*  
 WI 87034. 27356. 86. 0.61\* 0.76\*  
 WI 42018. 62595. 0. 0.61 0.70  
 WI 33613. 57408. 0. 0.52 0.60  
 WI 23159. 56042. 0. 0.42 0.53  
 WI 31920. 47142. 0. 0.47 0.53  
 WI 23189. 56429. 1. 1.10 0.53  
 WI 22923. 56071. 0. 0.41 0.52  
 WI 30086. 47818. 0. 0.45 0.52  
 WI 48324. 26757. 0. 0.52 0.50  
 WI 44277. 27663. 158. 1.18 0.48  
 WI 52196. 17037. 0. 0.54 0.46  
 WI 39012. 26470. 0. 0.44 0.44  
 WI 18751. 45112. 1. 0.77 0.42  
 WI 44048. 14376. 0. 0.44 0.39  
 WI 22527. 35469. 0. 0.33 0.39  
 WI 15312. 44009. 0. 0.30 0.39  
 WI 26828. 25231. 0. 0.32 0.35  
 WI 28837. 23947. 0. 0.35 0.35  
 WI 27059. 25305. 0. 0.32 0.35  
 WI 28838. 24124. 0. 0.35 0.35  
 WI 28609. 18851. 0. 0.33 0.32  
 WI 25706. 23101. 0. 0.32 0.32  
 WI 29907. 17025. 0. 0.34 0.31

AGL	76C	AERO PARK	MENOMONEE FALLS	WI	33036.	10782.	0.	0.33	0.29
AGL	47C	BOSCOBEL	BOSCOBEL	WI	26513.	15899.	58.	0.50	0.28
AGL	73C	LANCASTER MUNICIPAL	LANCASTER	WI	15108.	24449.	0.	0.23	0.26
AGL	OCQ	OCONTO MUNI	OCONTO	WI	18012.	20589.	0.	0.24	0.26
AGL	PKF	PARK FALLS MUNI	PARK FALLS	WI	15241.	24564.	0.	0.23	0.26
AGL	D25	MANITOWISH WATERS	MANITOWISH WATERS	WI	12910.	23803.	0.	0.21	0.24
AGL	WI06	WAUNAKEE	WAUNAKEE	WI	20260.	14358.	0.	0.23	0.23
AGL	58C	TOBACCO CITY	EDGERTON/ALBION/	WI	19992.	12892.	0.	0.23	0.22
AGL	C35	REEDSBURG MUNI	REEDSBURG	WI	21026.	11697.	0.	0.75	0.22
AGL	Y50	WAUTOMA MUNI	WAUTOMA	WI	21933.	10777.	0.	0.24	0.22
AGL	C69	GONSTEAD	MT HOREB	WI	15101.	10421.	0.	0.17	0.17
AGL	96C	FOX RIVER	ROCHESTER	WI	18122.	5915.	0.	0.18	0.16
AGL	WI15	BARRON MUNI	BARRON	WI	13214.	7066.	0.	0.14	0.13
AGL	D74	SPARTA MUNI	SPARTA	WI	13460.	4393.	0.	0.13	0.12
AGL	GTG	GRANTSBURG MUNI	GRANTSBURG	WI	6525.	12183.	0.	0.10	0.12
AGL	C37	BRODHEAD	BRODHEAD	WI	12081.	5045.	0.	0.12	0.11
AGL	Y23	CHETEK MUNI-SOUTHWORTH	CHETEK	WI	9061.	5711.	0.	0.10	0.10
AGL	C76	LODI LAKE AND	LODI	WI	10959.	4678.	0.	0.11	0.10
AGL	94C	COWGILL FIELD	RIO	WI	9892.	3229.	0.	0.10	0.09
AGL	61C	FORT ATKINSON MUNI	FORT ATKINSON	WI	10697.	3492.	0.	0.11	0.09
AGL	Y72	BLOYER FIELD	TOMAH	WI	10070.	3287.	0.	0.10	0.09
AGL	WI05	BIG FOOT AIRFIELD	WALWORTH	WI	7475.	6565.	0.	0.09	0.09
AGL	52C	FLYING HOOF	COTTAGE GROVE	WI	3020.	6477.	0.	0.05	0.06
AGL	82C	MAUSTON-NEW LISBON UNION	NEW LISBON	WI	5409.	4199.	0.	0.06	0.06
AGL	3D2	EPHRAIM-FISH CREEK	EPHRAIM	WI	4200.	3805.	0.	0.05	0.05
AGL	64C	VINCENT	GENOA CITY	WI	6041.	1972.	0.	0.05	0.05
AGL	50C	GROB	CEDARBURG	WI	4656.	1520.	0.	0.05	0.04
AGL	63C	ADAMS COUNTY LEGION FIELD	FRIENDSHIP/ADAMS/	WI	4828.	1576.	0.	0.05	0.04
AGL	62C	HUNT FIELD	FRANKSVILLE	WI	4996.	1631.	0.	0.05	0.04
AGL	Y55	CRANDON MUNI	CRANDON	WI	2948.	3396.	0.	0.04	0.04
AGL	WI04	VERONA	VERONA	WI	4405.	1438.	0.	0.04	0.04

103

## NEW ENGLAND REGION

ANE	0XC	WATERBURY-OXFORD	OXFORD	CT	1074489.	295102.	1053.	5.15	9.10
ANE	N04	GRISWOLD	MADISON	CT	197278.	139502.	195.	1.68*	2.24*
ANE	5B3	DANIELSON	DANIELSON	CT	253545.	59483.	249.	1.66*	2.08*
ANE	MMK	MERIDEN MARKHAM MUNI	MERIDEN	CT	113840.	133709.	383.	2.90	1.64
ANE	4B8	ROBERTSON FIELD	PLAINVILLE	CT	81970.	106584.	0.	1.14	1.25
ANE	7B8	NEW LONDON-WATERFORD	WATERFORD	CT	58289.	124389.	0.	1.08	1.21
ANE	5B0	WINDHAM	WILLIMANTIC	CT	117141.	30006.	400.	2.60	0.98
ANE	4B9	SIMSBURY TRI-TOWN	SIMSBURY	CT	28838.	103269.	0.	0.66	0.88
ANE	22B	JOHNNYCAKE	BURLINGTON	CT	40673.	28304.	0.	0.48	0.46
ANE	7B9	ELLINGTON	ELLINGTON	CT	38279.	12495.	0.	0.38	0.34
ANE	7B6	SKYLARK AIRPARK	WAREHOUSE PT	CT	16536.	12858.	0.	0.20	0.20
ANE	0N0	ANSONIA	ANSONIA	CT	1914.	625.	0.	0.02	0.02
ANE	6B6	MINUTE MAN AIRFIELD	STOW	MA	1330966.	254029.	1346.	9.71*	10.53*
ANE	TAN	TAUNTON MUNI	TAUNTON	MA	666084.	146678.	655.	3.61	5.40
ANE	FIT	FITCHBURG MUNI	FITCHBURG	MA	607458.	202435.	583.	4.80*	5.38*
ANE	B09	TEW-MAC	TEWKSURY	MA	561909.	149490.	607.	3.62	4.73
ANE	3B2	MARSHFIELD	MARSHFIELD	MA	398501.	149973.	382.	2.79*	3.64*
ANE	PVC	PROVINCETOWN MUNI	PROVINCETOWN	MA	342121.	163012.	346.	3.13*	3.36*
ANE	GBR	GREAT BARRINGTON	GREAT BARRINGTON	MA	336389.	109635.	345.	2.23*	2.96*
ANE	0B5	TURNERS FALLS	MONTAGUE	MA	316853.	64040.	304.	1.99*	2.53*
ANE	PSF	PITTSFIELD MUNI	PITTSFIELD	MA	170245.	146820.	91.	3.32	2.11
ANE	1B9	MANSFIELD MUNI	MANSFIELD	MA	221630.	52787.	192.	1.42*	1.82*
ANE	0B6	CHATHAM MUNI	CHATHAM	MA	208922.	63987.	202.	1.40*	1.81*

ANE PYM PLYMOUTH MUNI  
 ANE 380 SOUTHBRIDGE MUNI  
 ANE GDM GARDNER MUNI  
 ANE 286 NORTH ADAMS MUNICIPAL/HARRIMAN/  
 ANE 782 LA FLEUR  
 ANE 886 HAVERHILL  
 ANE FLR FALL RIVER MUNI  
 ANE 9B1 MARLBORO  
 ANE MA07 NORFOLK  
 ANE 885 BARRE/HILLER  
 ANE 984 SHIRLEY  
 ANE 186 HOPEDALE-DRAPER  
 ANE 282 PLUM ISLAND  
 ANE PMX METROPOLITAN  
 ANE 383 STERLING  
 ANE ORE ORANGE MUNI  
 ANE 586 FALMOUTH  
 ANE MA04 HAVERHILL-RIVERSIDE  
 ANE MA03 HATFIELD-PILGRIM

PLYMOUTH  
 SOUTHBRIDGE  
 GARDNER  
 NORTH ADAMS  
 NORTHAMPTON  
 HAVERHILL  
 FALL RIVER  
 MARLBORO  
 NORFOLK  
 BARRE /BARRE PLAINS/  
 SHIRLEY  
 HOPEDALE  
 NEWBURYPORT  
 PALMER  
 STERLING  
 ORANGE  
 FALMOUTH  
 HAVERHILL  
 HATFIELD

MA 183731. 72828. 0. 1.95 1.70  
 MA 207739. 43401. 210. 1.60\* 1.67\*  
 MA 197224. 34581. 202. 1.24\* 1.54\*  
 MA 62116. 113824. 0. 1.01 1.17  
 MA 50183. 66173. 0. 0.70 0.77  
 MA 69888. 17685. 49. 0.47\* 0.58\*  
 MA 60306. 24613. 0. 1.99 0.56  
 MA 52179. 17035. 0. 0.52 0.46  
 MA 51859. 15927. 0. 0.52 0.46  
 MA 46946. 15323. 0. 0.47 0.41  
 MA 37336. 13184. 0. 0.38 0.33  
 MA 34618. 14827. 0. 0.37 0.33  
 MA 28091. 15178. 0. 0.30 0.29  
 MA 19938. 21463. 0. 0.26 0.28  
 MA 17792. 16740. 0. 0.22 0.23  
 MA 29104. 5153. 28. 0.18\* 0.23\*  
 MA 14862. 7594. 0. 0.16 0.15  
 MA 11561. 3773. 0. 0.12 0.10  
 MA 10362. 3382. 0. 0.10 0.09

ANE PQI NORTHERN MAINE REGIONAL ARPT  
 ANE AUG AUGUSTA STATE  
 ANE SFM SANFORD MUNI  
 ANE WVL WATERVILLE ROBERT LAFLEUR  
 ANE FVE NORTHERN AROOSTOOK REGIONAL  
 ANE OLD DEWITT FLD, OLD TOWN MUNI  
 ANE B19 BIDDEFORD MUNI  
 ANE B20 EASTERN SLOPES REGIONAL  
 ANE HUL HOULTON INTL  
 ANE MLT MILLINOCKET MUNI  
 ANE RKD KNOX COUNTY REGIONAL  
 ANE CAR CARIBOU MUNI  
 ANE LEW AUBURN-LEWISTON MUNI  
 ANE 2B7 PITTSFIELD MUNI  
 ANE BHB HANCOCK COUNTY-BAR HARBOR  
 ANE 3B7 BELFAST MUNI  
 ANE 3B5 TWITCHELL  
 ANE 9B9 WISCASSET  
 ANE 81B OXFORD COUNTY REGIONAL  
 ANE OWK CENTRAL MAINE ARPT OF NORRIDGEWOCK  
 ANE 3B1 GREENVILLE MUNI  
 ANE PNN PRINCETON MUNI  
 ANE 784 MACHIAS VALLEY  
 ANE 0B2 BREWER  
 ANE 1B0 SENATOR OWEN BREWSTER  
 ANE 64B LINCOLN REGIONAL  
 ANE 785 FORT KENT MUNI  
 ANE 821 SUGARLOAF REGIONAL  
 ANE 57B ISLESBORO  
 ANE 8B0 RANGELEY MUNI  
 ANE 59B NEWTON FIELD  
 ANE 0B1 COL DYKE FIELD

PRESQUE ISLE  
 AUGUSTA  
 SANFORD  
 WATERVILLE  
 FRENCHVILLE  
 OLD TOWN  
 BIDDEFORD  
 FRYEBURG  
 HOULTON  
 MILLINOCKET  
 ROCKLAND  
 CARIBOU  
 AUBURN-LEWISTON  
 PITTSFIELD  
 BAR HARBOR  
 BELFAST  
 TURNER  
 WISCASSET  
 NORWAY  
 NORRIDGEWOCK  
 GREENVILLE  
 PRINCETON  
 MACHIAS  
 BREWER  
 DEXTER  
 LINCOLN  
 FORT KENT  
 CARRABASSETT  
 ISLESBORO  
 RANGELEY  
 JACKMAN  
 BETHEL

ME 606410. 201353. 653. 2.58 5.37  
 ME 555076. 199910. 568. 3.85 5.02  
 ME 589308. 99466. 592. 2.88 4.58  
 ME 421882. 175198. 436. 2.62 3.97  
 ME 467215. 123174. 773. 5.00 3.92  
 ME 322945. 139186. 252. 1.81 3.07  
 ME 338960. 84716. 330. 2.21\* 2.82\*  
 ME 253024. 44343. 246. 1.59\* 1.98\*  
 ME 234738. 39402. 264. 1.28 1.82  
 ME 211527. 41993. 214. 1.34\* 1.68\*  
 ME 102000. 136024. 4. 4.35 1.58  
 ME 171556. 57266. 159. 1.14\* 1.52\*  
 ME 69703. 128114. 0. 3.10 1.31  
 ME 162712. 28284. 166. 1.03\* 1.27\*  
 ME 64376. 126374. 0. 1.17 1.27  
 ME 130681. 39052. 121. 0.85\* 1.13\*  
 ME 65616. 62675. 0. 0.80 0.85  
 ME 74192. 39438. 0. 2.41 0.75  
 ME 32860. 10725. 0. 0.34 0.29  
 ME 30444. 9938. 0. 0.31 0.27  
 ME 31121. 5943. 32. 0.33 0.25  
 ME 30571. 5810. 27. 0.21 0.24  
 ME 26931. 8791. 0. 0.28 0.24  
 ME 16259. 5308. 0. 0.16 0.14  
 ME 11958. 3903. 0. 0.12 0.11  
 ME 11560. 2911. 42. 0.32 0.10  
 ME 8974. 5747. 0. 0.10 0.10  
 ME 10630. 3469. 0. 0.11 0.09  
 ME 6343. 2239. 0. 0.07 0.06  
 ME 7127. 2327. 0. 0.07 0.06  
 ME 5808. 1895. 0. 0.06 0.05  
 ME 4026. 1314. 0. 0.04 0.04

ANE LCI LACONIA MUNI  
 ANE EEN DILLANT-HOPKINS  
 ANE BML BERLIN MUNI  
 ANE AFN JAFFREY MUNI-SILVER RANCH  
 ANE ASH BOIRE FIELD  
 ANE 6B1 SKYHAVEN  
 ANE CWN WHITE MOUNTAIN

LACONIA  
 KEENE  
 BERLIN  
 JAFFREY  
 NASHUA  
 ROCHESTER  
 NORTH CONWAY

NH 611119. 205315. 611. 3.46 5.42  
 NH 491982. 187843. 485. 2.96 4.52  
 NH 304836. 57600. 292. 2.01\* 2.41\*  
 NH 228754. 93195. 208. 1.53\* 2.14\*  
 NH 163334. 142558. 0. 6.76 2.03  
 NH 162771. 63514. 0. 1.64 1.58  
 NH 30621. 96466. 0. 0.60 0.84



ANE	CNH	CLAREMONT MUNI	CLAREMONT	NH	71116.	20256.	67.	0.46*	0.61*
ANE	HIE	WHITEFIELD REGIONAL	WHITEFIELD	NH	42096.	30140.	28.	0.81	0.48
ANE	7B3	HAMPTON AIRFIELD	HAMPTON	NH	19563.	6386.	0.	0.19	0.17
ANE	5B9	DEAN MEMORIAL	HAVERHILL	NH	3171.	6749.	0.	0.05	0.07
ANE	2B3	PARLIN FIELD	NEWPORT	NH	6667.	2176.	0.	0.07	0.06
ANE	2B4	NEWPORT STATE	NEWPORT	RI	639427.	205065.	723.	3.06	5.61
AHE	SFZ	NORTH CENTRAL STATE	SMITHFIELD	RI	176136.	158604.	2.	7.77	2.22
ANE	WST	WESTERLY STATE	WESTERLY	RI	77599.	130689.	0.	3.79	1.38
ANE	BID	BLOCK ISLAND STATE	BLOCK ISLAND	RI	61665.	125350.	1.	3.77	1.24
ANE	99B	QUONSET STATE	NORTH KINGSTOWN	RI	148561.	37549.	72.	1.90*	1.24*
ANE	RI04	RICHMOND	WEST KINGSTON	RI	3397.	1109.	0.	0.03	0.03
ANE	VSF	SPRINGFIELD STATE /HARTNESS/	SPRINGFIELD	VT	197252.	141772.	162.	1.59*	2.25*
ANE	MPV	EDWARD F KNAPP STATE	BARRE-MONTPELIER	VT	95648.	123778.	77.	1.26	1.46
ANE	RUT	RUTLAND STATE	RUTLAND	VT	47951.	120993.	1.	2.56	1.12
ANE	6B0	MIDDLEBURY STATE	MIDDLEBURY	VT	49290.	57935.	0.	0.64	0.71
ANE	6B8	CALEDONIA COUNTY	LYNDONVILLE	VT	75596.	13397.	71.	0.46*	0.59*
ANE	MVL	MORRISVILLE-STOWE STATE	MORRISVILLE	VT	69587.	12402.	65.	0.42*	0.54*
ANE	EFK	NEWPORT STATE	NEWFORT	VT	35555.	33664.	26.	0.48	0.46
ANE	1B7	FRANKLIN COUNTY	HIGHGATE	VT	43255.	7505.	42.	0.28*	0.34*
ANE	0B7	WARREN-SUGARBUSH	WARREN	VT	36693.	11979.	0.	0.37	0.32
ANE	2B9	POST MILLS	POST MILLS	VT	26579.	8675.	0.	0.27	0.23
ANE	6B5	CHAMPLAIN	BURLINGTON	VT	7511.	2452.	0.	0.07	0.07

NORTHWEST REGION

ANM	GXY	WELD COUNTY MUNI	GREELEY	CO	2718554.	573525.	2508.	16.91*	21.87*
ANM	3V5	DOWNTOWN FORT COLLINS AIRPARK	FORT COLLINS	CO	878760.	257953.	818.	5.68*	7.55*
ANM	FNL	FORT COLLINS-LOVELAND MUNI	FORT COLLINS/LOVELAND/	CO	414931.	213962.	1303.	8.81	4.18
ANM	EGE	EAGLE COUNTY	EAGLE	CO	405500.	177792.	343.	2.73*	3.88*
ANM	GUC	GUNNISON COUNTY	GUNNISON	CO	390384.	171297.	365.	2.85*	3.73*
ANM	SBS	ROUTT COUNTY STOL	STEAMBOAT SPRINGS	CO	309239.	156520.	296.	2.49*	3.09*
ANM	DRO	DURANGO-LA PLATA COUNTY	DURANGO	CO	235780.	163774.	113.	1.83	2.65
ANM	48V	TRI-COUNTY	ERIE	CO	235903.	106037.	0.	2.35	2.27
ANM	LHX	LA JUNTA MUNI	LA JUNTA	CO	272240.	66021.	222.	2.86	2.25
ANM	MTJ	MONTROSE COUNTY	MONTROSE	CO	163954.	148272.	65.	5.19	2.07
ANM	STK	CROSSON FIELD	STERLING	CO	205554.	102993.	171.	2.01	2.05
ANM	2V2	LONGMONT MUNI	LONGMONT	CO	225767.	79039.	0.	1.93	2.03
ANM	TAD	LAS ANIMAS COUNTY	TRINIDAD	CO	184592.	84770.	175.	1.45*	1.79*
ANM	1V5	BOULDER MUNI	BOULDER	CO	172139.	76101.	0.	1.81	1.65
ANM	01V	COLUMBINE	AURORA	CO	179048.	58441.	0.	1.75	1.58
ANM	LAA	LAMAR MUNI	LAMAR	CO	92215.	122514.	64.	1.82	1.43
ANM	GWS	GLENWOOD SPRINGS MUNI	GLENWOOD SPRINGS	CO	60904.	121436.	0.	1.02	1.21
ANM	HDN	YAMPA VALLEY	HAYDEN	CO	58840.	109667.	20.	2.53	1.12
ANM	00V	MEADOW LAKE	FALCON	CO	107842.	40545.	0.	1.08	0.99
ANM	CEZ	CORTEZ-MONTEZUMA COUNTY	CORTEZ	CO	28303.	112036.	15.	0.65	0.93
ANM	AKO	AKRON-WASHINGTON CO	AKRON	CO	107443.	19921.	93.	1.10	0.85
ANM	5C00	ANIMAS AIR PARK	DURANGO	CO	53197.	65257.	0.	0.69	0.79
ANM	2V5	WRAY MUNI	WRAY	CO	48773.	62381.	0.	0.62	0.74
ANM	2V1	STEVENS FIELD	PAGOSA SPRINGS	CO	34998.	67654.	0.	0.53	0.68
ANM	7V2	NORTH FORK VALLEY	PAONIA	CO	14448.	82930.	0.	0.41	0.63
ANM	2V3	MEEKER	MEEKER	CO	30238.	63006.	0.	0.48	0.62
ANM	CAG	CRAIG-MOFFAT	CRAIG	CO	65042.	25837.	0.	0.65	0.60
ANM	2V6	YUMA MUNI	YUMA	CO	42316.	45685.	0.	0.52	0.58
ANM	1V9	BLAKE FIELD	DELTA	CO	27132.	54057.	0.	0.44	0.54
ANM	CO12	BRIGHTON VAN-AIRE ESTATES	BRIGHTON	CO	59259.	19339.	0.	0.60	0.52
ANM	GNB	GRANBY-GRAND COUNTY	GRANBY	CO	13833.	58318.	0.	0.33	0.48

ANM RIL GARFIELD COUNTY  
 ANM 4V0 RANGELY  
 ANM 08V SAN LUIS VALLEY  
 ANM 0V2 HARRIET ALEXANDER FIELD  
 ANM LXV LAKE COUNTY  
 ANM 1V8 LEACH  
 ANM 3V4 FORT MORGAN MUNI  
 ANM 3V1 BURLINGTON MUNI  
 ANM 6V3 LITTLETON  
 ANM 7V9 CITY AND COUNTY  
 ANM 8V5 HOLYOKE  
 ANM 20V KREMMLING  
 ANM 6V6 HOPKINS-MONTROSE COUNTY  
 ANM 1V6 FREMONT COUNTY  
 ANM C050 ELLICOTT INTL  
 ANM 5V4 CALHAN  
 ANM 7V5 BRUSH MUNI  
 ANM Q39 MINERAL COUNTY MEMORIAL  
 ANM 7V8 JULESBURG MUNI  
 ANM 33V WALDEN-JACKSON COUNTY  
 ANM 8V7 SPRINGFIELD MUNI  
 ANM 9V7 EADS MUNI  
 ANM 09V FOWLER  
 ANM 7V1 BUENA VISTA MUNI  
 ANM 8V1 DEL NORTE MUN AND CO  
 ANM 4V1 JOHNSON FIELD  
 ANM 29V VALLEY AIRPORT  
 ANM 04V SAGUACHE MUNI

RIFLE  
 RANGELY  
 MONTE VISTA  
 SALIDA  
 LEADVILLE  
 CENTER  
 FORT MORGAN  
 BURLINGTON  
 SEDALIA  
 LAS ANIMAS  
 HOLYOKE  
 KREMMLING  
 NUCLA  
 CANON CITY  
 ELLICOTT  
 CALHAN  
 BRUSH  
 CREEDE  
 JULESBURG  
 WALDEN  
 SPRINGFIELD  
 EADS  
 FOWLER  
 BUENA VISTA  
 DEL NORTE  
 WALSENBURG  
 SILVER CLIFF  
 SAGUACHE

CO	31665.	36899.	0.	0.40	0.46
CO	44682.	19928.	0.	0.43	0.43
CO	29180.	25493.	0.	0.34	0.36
CO	22180.	28519.	0.	0.29	0.34
CO	35057.	16788.	0.	0.36	0.34
CO	31907.	13122.	0.	0.33	0.30
CO	36415.	9438.	119.	0.77	0.30
CO	23237.	15580.	0.	0.25	0.26
CO	28733.	9379.	0.	0.28	0.25
CO	20544.	17334.	0.	0.24	0.25
CO	21948.	13626.	0.	0.24	0.24
CO	12444.	14689.	0.	0.16	0.18
CO	20244.	6607.	0.	0.20	0.18
CO	18775.	6128.	0.	0.18	0.17
CO	18326.	5983.	0.	0.18	0.16
CO	18447.	6021.	0.	0.18	0.16
CO	15239.	7791.	0.	0.15	0.15
CO	12121.	3956.	0.	0.12	0.11
CO	10827.	6240.	0.	0.11	0.11
CO	8130.	2653.	0.	0.08	0.07
CO	6727.	2196.	0.	0.07	0.06
CO	6948.	2316.	0.	0.07	0.06
CO	6730.	2197.	0.	0.07	0.06
CO	6097.	1990.	0.	0.06	0.05
CO	3320.	1084.	0.	0.03	0.03
CO	3572.	1166.	0.	0.04	0.03
CO	2997.	978.	0.	0.03	0.03
CO	1159.	378.	0.	0.01	0.01

101

ANM COE COEUR D ALENE AIR TERM  
 ANM SUN FRIEDMAN MEMORIAL  
 ANM U35 CALDWELL INDUSTRIAL  
 ANM S67 NAMPA MUNI  
 ANM MYL MC CALL  
 ANM S73 KAMIAH MUNI  
 ANM BYI BURLEY MUNI  
 ANM SMN SALMON  
 ANM U02 MCCARLEY FLD  
 ANM U11 REXBURG-MADISON COUNTY  
 ANM S68 OROFINO MUNI  
 ANM S80 IDAHO COUNTY  
 ANM S86 COUNTY-CITY  
 ANM S87 WEISER MUNI  
 ANM U76 MOUNTAIN HOME MUNI  
 ANM 65S BOUNDARY COUNTY  
 ANM U59 TETON PEAKS/DRIGGS MUNI/  
 ANM U01 AMERICAN FALLS  
 ANM S83 SHOSHONE COUNTY  
 ANM U15 CHALLIS  
 ANM U73 JEROME COUNTY  
 ANM U12 ST ANTHONY MUNI  
 ANM GNG GOODING MUNI  
 ANM 1S1 ECKHART INTL  
 ANM S89 CRAIGMONT MUNI  
 ANM S78 EMMETT MUNI  
 ANM U57 ARCO-BUTTE COUNTY  
 ANM U03 BUHL MUNI  
 ANM U10 PRESTON  
 ANM U56 RIGBY  
 ANM U82 COUNCIL MUNI

COEUR D ALENE  
 HAILEY  
 CALDWELL  
 NAMPA  
 MC CALL  
 KAMIAH  
 BURLEY  
 SALMON  
 BLACKFOOT  
 REXBURG  
 OROFINO  
 GRANGEVILLE  
 SANDPOINT  
 WEISER  
 MOUNTAIN HOME  
 BONNERS FERRY  
 DRIGGS  
 AMERICAN FALLS  
 KELLOGG  
 CHALLIS  
 JEROME  
 ST ANTHONY  
 GOODING  
 PORTHILL  
 CRAIGMONT  
 EMMETT  
 ARCO  
 BUHL  
 PRESTON  
 RIGBY  
 COUNCIL

ID	780993.	239949.	690.	4.97*	6.78*
ID	124990.	146154.	0.	1.60	1.80
ID	111008.	135721.	0.	1.33	1.64
ID	116434.	94512.	0.	1.36	1.40
ID	73252.	129269.	0.	1.13	1.35
ID	63431.	106219.	0.	0.96	1.13
ID	83833.	75472.	0.	3.65	1.06
ID	34489.	116619.	0.	0.86	1.00
ID	56830.	90255.	0.	0.83	0.98
ID	68932.	69492.	129.	1.83	0.92
ID	25625.	71310.	0.	0.49	0.64
ID	33237.	59277.	0.	0.51	0.61
ID	43816.	42232.	0.	0.48	0.57
ID	47585.	17976.	0.	0.49	0.44
ID	44497.	19341.	0.	0.47	0.42
ID	29636.	33850.	0.	0.39	0.42
ID	19584.	42705.	0.	0.33	0.41
ID	35710.	25142.	0.	0.40	0.40
ID	29596.	27874.	0.	0.30	0.38
ID	13849.	40831.	0.	0.27	0.36
ID	32296.	15358.	0.	0.35	0.32
ID	18230.	30168.	0.	0.27	0.32
ID	25385.	19531.	0.	0.30	0.30
ID	7687.	37560.	0.	0.20	0.30
ID	30961.	10104.	0.	0.31	0.27
ID	23849.	7784.	0.	0.24	0.21
ID	19066.	11041.	0.	0.21	0.20
ID	20454.	7968.	0.	0.18	0.19
ID	15217.	7410.	0.	0.16	0.15
ID	14636.	5861.	0.	0.15	0.14
ID	10578.	9076.	0.	0.13	0.13

ANM	S75	PAYETTE MUNI	PAYETTE	ID	11628.	3796.	0.	0.12	0.10
ANM	S62	HENLEY AERODROME	ATHOL	ID	10628.	3469.	0.	0.10	0.09
ANM	S66	HOMEDALE MUNI	HOMEDALE	ID	8941.	2918.	0.	0.09	0.08
ANM	U78	SODA SPRINGS MUNI	SODA SPRINGS	ID	5554.	4256.	0.	0.07	0.07
ANM	S61	ATHOL	ATHOL	ID	7721.	2520.	0.	0.08	0.07
ANM	U36	ABERDEEN MUNI	ABERDEEN	ID	7930.	2588.	0.	0.08	0.07
ANM	1U7	BEAR LAKE COUNTY	PARIS	ID	4923.	2627.	0.	0.05	0.05
ANM	1S6	PRIEST RIVER MUNI	PRIEST RIVER	ID	5292.	1727.	0.	0.05	0.05
ANM	DBS	DUBOIS MUNI	DUBOIS	ID	3333.	1088.	0.	0.03	0.03
ANM	MLS	FRANK WILEY FIELD	MILES CITY	MT	300836.	98617.	261.	3.99	2.65
ANM	OLF	WOLF POINT INTL	WOLF POINT	MT	283622.	110533.	288.	0.74*	2.62*
ANM	CTB	CUT BANK MUNI	CUT BANK	MT	248884.	71447.	228.	2.74	2.13
ANM	SDY	SIDNEY-RICHLAND MUNI	SIDNEY	MT	202255.	89058.	186.	2.48	1.94
ANM	DLN	DILLON	DILLON	MT	206166.	47367.	209.	1.51*	1.68*
ANM	BZN	GALLATIN FLD	BOZEMAN	MT	95617.	128828.	50.	1.88	1.49
ANM	BTM	BERT MOONEY	BUTTE	MT	78559.	131000.	0.	4.55	1.39
ANM	LWT	LEWISTOWN MUNI	LEWISTOWN	MT	117864.	59719.	284.	3.67	1.18
ANM	LVM	MISSION FIELD	LIVINGSTON	MT	40588.	89089.	0.	1.07	0.86
ANM	S01	CONRAD	CONRAD	MT	96557.	31908.	80.	1.23	0.85
ANM	GDV	DAWSON COMMUNITY	GLENDIVE	MT	55565.	65067.	0.	2.49	0.80
ANM	SBX	SHELBY	SHELBY	MT	41847.	43987.	0.	1.67	0.57
ANM	WYS	YELLOWSTONE	WEST YELLOWSTONE	MT	11001.	63035.	0.	0.35	0.49
ANM	S27	KALISPELL CITY	KALISPELL	MT	48761.	15915.	0.	0.51	0.43
ANM	6S5	HAMILTON	HAMILTON	MT	34711.	27821.	0.	0.42	0.42
ANM	4U5	CHOTEAU	CHOTEAU	MT	31987.	28223.	0.	0.40	0.40
ANM	PWD	SHER-WOOD	PLENTYWOOD	MT	34285.	23809.	0.	0.40	0.39
ANM	RED	RED LODGE	RED LODGE	MT	31972.	22114.	0.	0.37	0.36
ANM	MLK	MALTA	MALTA	MT	28141.	19336.	0.	0.33	0.32
ANM	S71	CNINOOK MUNI	CHINOOK	MT	32946.	15748.	0.	0.36	0.32
ANM	32S	STEVENSVILLE	STEVENSVILLE	MT	35470.	11579.	0.	0.37	0.31
ANM	MT02	FAIRGROUNDS AIRPARK	HARDIN	MT	24230.	18877.	0.	0.28	0.20
ANM	6S8	LAUREL MUN	LAUREL	MT	33285.	10863.	0.	0.34	0.29
ANM	3U6	BAKER MUNI	BAKER	MT	24531.	18158.	0.	0.29	0.28
ANM	S85	BIG SKY FIELD	CULBERTSON	MT	31110.	10154.	0.	0.32	0.27
ANM	4U6	CIRCLE TOWN COUNTY	CIRCLE	MT	29395.	9594.	0.	0.30	0.26
ANM	BDX	BROADUS	BROADUS	MT	22439.	14901.	0.	0.26	0.25
ANM	6S0	BIG TIMBER	BIG TIMBER	MT	20253.	16687.	0.	0.25	0.25
ANM	S59	LIBBY	LIBBY	MT	17609.	18367.	0.	0.23	0.24
ANM	4U3	LIBERTY COUNTY	CHESTER	MT	23131.	12544.	0.	0.26	0.24
ANM	U05	RIDDICK FIELD	PHILIPSBURG	MT	15635.	18915.	0.	0.21	0.23
ANM	8S1	POLSON	POLSON	MT	23598.	7702.	0.	0.24	0.21
ANM	9S2	SCOBEY	SCOBEY	MT	23888.	7796.	0.	0.25	0.21
ANM	3U3	ANACONDA	ANACONDA	MT	18373.	10991.	0.	0.21	0.20
ANM	1S3	TILLITT FIELD	FORSYTH	MT	21195.	6918.	0.	0.22	0.19
ANM	38S	DEER LODGE-CITY-COUNTY	DEER LODGE	MT	19323.	8820.	0.	0.21	0.19
ANM	8U8	TOWNSEND	TOWNSEND	MT	19823.	6470.	0.	0.21	0.17
ANM	9U0	TURNER	TURNER	MT	16641.	5966.	0.	0.18	0.15
ANM	6S3	COLUMBUS	COLUMBUS	MT	10499.	8421.	0.	0.13	0.13
ANM	40S	EUREKA	EUREKA	MT	13117.	4281.	0.	0.14	0.12
ANM	7S7	VALIER	VALIER	MT	9089.	2967.	0.	0.09	0.08
ANM	3U4	ST LABRE MISSION	ASHLAND	MT	3795.	6723.	0.	0.06	0.07
ANM	8U6	TERRY	TERRY	MT	5414.	1767.	0.	0.06	0.05
ANM	5U2	EKALAKA	EKALAKA	MT	5284.	1724.	0.	0.05	0.05
ANM	48S	HARLEM	HARLEM	MT	4958.	1618.	0.	0.05	0.04
ANM	S64	STANFORD	STANFORD	MT	4711.	1538.	0.	0.05	0.04
ANM	29S	GARDINER	GARDINER	MT	3724.	1215.	0.	0.04	0.03
ANM	42S	POPLAR	POPLAR	MT	2873.	938.	0.	0.03	0.03
ANM	3U8	BIG SANDY	BIG SANDY	MT	3450.	1126.	0.	0.04	0.03
ANM	5U3	BIG SKY	ENNIS	MT	1450.	473.	0.	0.01	0.01

ANM	3S2	AURORA STATE	AURORA	OR	2861942.	597135.	2639.	17.77*	22.98*
ANM	0TH	NORTH BEND MUNI	NORTH BEND	OR	1970991.	437321.	1982.	6.74	16.00
ANM	4S5	MC MINNVILLE MUNI	MC MINNVILLE	OR	1146481.	303476.	1049.	7.33*	9.63*
ANM	CVO	CORVALLIS MUNI	CORVALLIS	OR	666785.	225747.	518.	4.49	5.93
ANM	154	SCAPPOOSE INDUSTRIAL AIRPARK	SCAPPOOSE	OR	514667.	194922.	422.	3.16*	4.71*
ANM	S07	BEND MUNI	BEND	OR	409943.	186542.	335.	4.74	3.96
ANM	LGD	LA GRANDE MUNI	LA GRANDE	OR	402081.	165349.	388.	3.04*	3.77*
ANM	DLS	THE DALLES MUNI	THE DALLES	OR	425002.	141167.	405.	3.03*	3.76*
ANM	RDM	ROBERTS FIELD	REDMOND	OR	362245.	175710.	316.	4.84	3.57
ANM	ONP	NEWPORT MUNI	NEWPORT	OR	269098.	113113.	264.	2.25	2.54
ANM	LKV	LAKE COUNTY-LAKEVIEW	LAKEVIEW	OR	249750.	122707.	245.	2.16*	2.47*
ANM	S12	ALBANY MUNI	ALBANY	OR	161124.	157953.	0.	2.07	2.12
ANM	3S8	JOSEPHINE COUNTY /GRANTS PASS/	GRANTS PASS	OR	125129.	145904.	0.	1.71	1.80
ANM	ONO	ONTARIO MUNI	ONTARIO	OR	104988.	135877.	0.	4.91	1.60
ANM	2S6	SPORTSMAN AIRPARK	NEWBERG	OR	136655.	93507.	0.	1.40	1.53
ANM	RBG	ROSEBURG MUNI	ROSEBURG	OR	93078.	135700.	2.	4.26	1.52
ANM	S03	ASHLAND MUNI-SUMNER PARKER FIELD	ASHLAND	OR	87940.	134066.	0.	1.34	1.48
ANM	S05	BANDON STATE	BANDON	OR	77677.	130714.	0.	1.27	1.38
ANM	4S1	GOLD BEACH MUNI	GOLD BEACH	OR	73072.	129210.	0.	1.23	1.34
ANM	BNO	BURNS MUNI	BURNS	OR	67557.	127410.	0.	1.26	1.30
ANM	61S	COTTAGE GROVE STATE	COTTAGE GROVE	OR	61602.	125467.	0.	1.10	1.24
ANM	S22	HERMISTON MUNICIPAL	HERMISTON	OR	73022.	107764.	2.	2.99	1.20
ANM	7S5	INDEPENDENCE STATE	INDEPENDENCE	OR	59170.	86748.	0.	0.84	0.97
ANM	0S2	OREGON CITY AIRPARK	OREGON CITY	OR	87960.	46978.	0.	0.87	0.90
ANM	7S3	STARK'S TWIN OAKS AIRPARK	HILLSBORO	OR	93951.	30660.	0.	0.91	0.83
ANM	BOK	BROOKINGS STATE	BROOKINGS	OR	55297.	64579.	0.	0.61	0.80
ANM	4S2	HOOD RIVER	HOOD RIVER	OR	49411.	62653.	0.	0.69	0.74
ANM	S21	SUNRIVER	BEND	OR	38000.	66059.	0.	0.56	0.69
ANM	BKE	BAKER MUNI	BAKER	OR	41221.	51575.	0.	1.66	0.62
ANM	7S9	LENHARDT AIRPARK	HUBBARD	OR	61552.	20086.	0.	0.60	0.54
ANM	77S	HOBBY FIELD	CRESWELL	OR	43060.	32034.	0.	0.40	0.50
ANM	4S9	MULINO	MULINO	OR	53045.	17315.	0.	0.52	0.47
ANM	S30	LEBANON STATE	LEBANON	OR	37619.	33788.	0.	0.45	0.47
ANM	9S9	LEXINGTON	LEXINGTON	OR	28952.	37010.	0.	0.38	0.44
ANM	6S2	FLORENCE MUNI	FLORENCE	OR	18907.	47385.	0.	0.34	0.44
ANM	8S4	ENTERPRISE MUNI	ENTERPRISE	OR	16887.	40632.	0.	0.33	0.38
ANM	S45	SILETZ BAY STATE	GLENEDEN BEACH	OR	18174.	38076.	0.	0.30	0.37
ANM	3S9	CONDON STATE	CONDON	OR	24097.	29076.	0.	0.33	0.35
ANM	56S	SEASIDE STATE	SEASIDE	OR	18015.	34413.	0.	0.28	0.35
ANM	S33	CITY-COUNTY	MADRAS	OR	31955.	16370.	3.	1.21	0.32
ANM	16S	TRI-CITY STATE	MYRTLE CREEK	OR	30554.	15974.	0.	0.33	0.31
ANM	S39	PRINEVILLE	PRINEVILLE	OR	26255.	18417.	0.	0.30	0.30
ANM	5S9	ESTACADA	ESTACADA	OR	32707.	10675.	0.	0.32	0.29
ANM	U33	JOHN DAY STATE	JOHN DAY	OR	21056.	19966.	0.	0.23	0.27
ANM	26U	MC DERMITT STATE	MC DERMITT	OR	18716.	15664.	0.	0.22	0.23
ANM	2S7	CHILOQUIN STATE	CHILOQUIN	OR	10173.	24829.	0.	0.19	0.23
ANM	03S	RICHS	SANDY	OR	24178.	7890.	0.	0.23	0.21
ANM	46S	JOE CARDS AIRPARK	DALLAS	OR	15907.	10750.	0.	0.17	0.18
ANM	OR78	DANIELS FIELD	HARRISBURG	OR	11471.	15349.	0.	0.16	0.18
ANM	10S	HUTCHINSON	MOLALLA	OR	19730.	6438.	0.	0.19	0.17
ANM	S48	COUNTRY SQUIRE AIRPARK	SANDY	OR	18814.	6140.	0.	0.18	0.17
ANM	3S4	ILLINOIS VALLEY /USFS/	CAVE JUNCTION	OR	18200.	5939.	0.	0.18	0.16
ANM	S49	MILLER MEMORIAL AIRPARK	VALE	OR	12918.	9775.	0.	0.14	0.15
ANM	5S0	OAKRIDGE STATE	OAKRIDGE	OR	4533.	18158.	0.	0.10	0.15
ANM	S47	TILLAMOOK	TILLAMOOK	OR	10068.	6798.	0.	0.12	0.11
ANM	62S	CHRISTMAS VALLEY	CHRISTMAS VALLEY	OR	7532.	8017.	0.	0.09	0.10
ANM	5S1	GEORGE FELT	ROSEBURG	OR	9523.	3108.	0.	0.09	0.08
ANM	OR62	CROW-MAG	ELMIRA	OR	8375.	2733.	0.	0.08	0.07
ANM	6S4	DAVIS	GATES	OR	4834.	1577.	0.	0.05	0.04

ANM	OR06	INLAND HELICOPTERS	GRANTS PASS	OR	762.	5808.	0.	0.03	0.04
ANM	S15	TROH'S MEMORIAL AIRPARK	PORTLAND	OR	2810.	917.	0.	0.03	0.02
ANM	415	ROGUE-AIR	SHADY COVE	OR	2240.	1399.	0.	0.02	0.02
ANM	PVU	PROVO MUNI	PROVO	UT	195080.	169036.	0.	7.27	2.42
ANM	VEL	VERNAL	VERNAL	UT	168945.	139895.	125.	2.52	2.05
ANM	LGU	LOGAN-CACHE	LOGAN	UT	121033.	144870.	0.	4.13	1.77
ANM	BTF	SALT LAKE SKYPARK	BOUNTIFUL	UT	93920.	136023.	0.	1.42	1.53
ANM	BMC	BRIGHAM CITY	BRIGHAM CITY	UT	123832.	105920.	84.	1.78	1.53
ANM	U42	SALT LAKE CITY MUNI 2	SALT LAKE CITY	UT	134209.	80020.	0.	1.51	1.42
ANM	SGU	SAINT GEORGE MUNI	ST. GEORGE	UT	66300.	126983.	1.	2.72	1.28
ANM	CDC	CEDAR CITY MUNI	CEDAR CITY	UT	57536.	122871.	8.	2.63	1.20
ANM	RIF	RICHFIELD MUNI	RICHFIELD	UT	55785.	123571.	0.	1.07	1.19
ANM	PUC	CARBON COUNTY	PRICE	UT	48095.	121025.	0.	0.97	1.12
ANM	BDG	BLANDING MUNI	BLANDING	UT	48203.	106673.	22.	1.35	1.03
ANM	KNB	KANAB MUNI	KANAB	UT	27864.	114457.	0.	0.77	0.95
ANM	69V	HUNTINGTON MUNI	HUNTINGTON	UT	27865.	114458.	0.	0.77	0.95
ANM	DTA	DELTA MUNI	DELTA	UT	25188.	111480.	0.	0.69	0.91
ANM	U20	GREEN RIVER	GREEN RIVER	UT	10418.	105966.	0.	0.55	0.77
ANM	U77	SPANISH FORK-SPRINGVILLE	SPANISH FORK	UT	45446.	69571.	0.	0.62	0.76
ANM	U43	SAN JUAN COUNTY	MONTICELLO	UT	8901.	99237.	0.	0.45	0.72
ANM	U69	DUCHESNE MUNI	DUCHESNE	UT	64706.	38877.	58.	0.46*	0.69*
ANM	36U	HEBER VALLEY	HEBER	UT	56317.	42889.	0.	0.65	0.66
ANM	BCE	BRYCE CANYON	BRYCE CANYON	UT	53543.	35399.	50.	0.54*	0.59*
ANM	74V	ROOSEVELT MUNI	ROOSEVELT	UT	7228.	81696.	0.	0.33	0.59
ANM	CNY	CANYONLANDS FIELD	MOAB	UT	21855.	61895.	0.	0.69	0.56
ANM	U55	PANGUITCH MUNI	PANGUITCH	UT	4393.	61589.	0.	0.24	0.44
ANM	ENV	WENDOVER	WENDOVER	UT	34145.	24688.	0.	0.40	0.39
ANM	41U	MANTI-EPHRAIM	MANTI	UT	10556.	41789.	0.	0.23	0.35
ANM	U27	TREMONTON MUNI	TREMONTON	UT	26871.	11581.	0.	0.27	0.26
ANM	U07	BULLFROG BASIN	GLEN CANYON NATL REC A	UT	8826.	24779.	0.	0.16	0.22
ANM	U26	BOLINDER FIELD-TOOELE VALLEY	TOOELE	UT	20648.	6741.	0.	0.20	0.18
ANM	U14	NEPHI MUNI	NEPHI	UT	12166.	3242.	0.	0.12	0.10
ANM	42U	MORGAN MUNI	MORGAN	UT	9731.	5341.	0.	0.10	0.10
ANM	44U	SALINA-QUINNISON	SALINA	UT	8637.	4329.	0.	0.09	0.09
ANM	HVE	HANKSVILLE	HANKSVILLE	UT	7665.	2502.	0.	0.07	0.07
ANM	1L9	PAROWAN	PAROWAN	UT	7666.	2502.	0.	0.07	0.07
ANM	40U	MANILA	MANILA	UT	7665.	2502.	0.	0.07	0.07
ANM	U22	HALLS CROSSING	GLEN CANYON NATL REC A	UT	5606.	3277.	0.	0.06	0.06
ANM	U52	BEAVER MUNI	BEAVER	UT	5837.	1905.	0.	0.06	0.05
ANM	1L8	HURRICANE	HURRICANE	UT	4707.	1536.	0.	0.05	0.04
ANM	1L7	ESCALANTE MUNI	ESCALANTE	UT	4580.	1495.	0.	0.04	0.04
ANM	38U	WAYNE WONDERLAND	LOA	UT	2037.	1223.	0.	0.02	0.02
ANM	PWT	KITSAP COUNTY	BREMERTON	WA	2173096.	455431.	2148.	9.53	17.46
ANM	KLS	KELSO-LONGVIEW	KELSO	WA	1134135.	196488.	987.	6.51*	8.84*
ANM	EPH	EPHRATA MUNI	EPHRATA	WA	913816.	167440.	738.	6.73	7.18
ANM	RLD	RICHLAND	RICHLAND	WA	680080.	244497.	419.	8.51	6.14
ANM	HQM	BOWERMAN	HOQUIAM	WA	593344.	199012.	503.	4.44	5.26
ANM	PWU	PULLMAN/MOSCOW REGIONAL	PULLMAN/MOSCOW, ID	WA	522310.	194358.	336.	2.48	4.76
ANM	S50	AUBURN MUNI	AUBURN	WA	448766.	251836.	0.	3.97	4.66
ANM	BLI	BELLINGHAM INTL	BELLINGHAM	WA	492608.	195431.	469.	5.11	4.57
ANM	S88	ARLINGTON	ARLINGTON	WA	402942.	235427.	0.	13.51	4.24
ANM	150	PUYALLUP INDUSTRIAL AIRPARK	PUYALLUP	WA	339359.	216125.	0.	3.18	3.69
ANM	59S	EVERGREEN FIELD	VANCOUVER	WA	333433.	110209.	0.	3.26	2.95
ANM	EAT	PANGBORN FIELD	WENATCHEE	WA	186394.	165129.	2.	6.76	2.34
ANM	CLM	WILLIAM R FAIRCHILD INTL	PORT ANGELES	WA	155750.	156074.	6.	5.21	2.07
ANM	60S	PEARSON AIRPARK	VANCOUVER	WA	216835.	70782.	0.	5.40	1.91
ANM	SHN	SANDERSON FIELD	SHELTON	WA	136387.	111303.	426.	2.85	1.65
ANM	S19	FRIDAY HARBOR	FRIDAY HARBOR	WA	101958.	138637.	0.	1.17	1.60

ANM	S44	SPANAWAY	SPANAWAY	WA	186129.	47180.	119.	1.35*	1.55*
ANM	75S	SKAGIT REGIONAL/BAY VIEW	BURLINGTON/MT VERNON/	WA	70736.	128451.	0.	1.18	1.32
ANM	CLS	CHEHALIS-CENTRALIA	CHEHALIS	WA	133046.	43424.	0.	1.09	1.17
ANM	ELN	BOWERS FIELD	ELLENSBURG	WA	147862.	26034.	138.	0.90*	1.16*
ANM	S17	ORCAS ISLAND	EAST SOUND	WA	37425.	117577.	0.	0.81	1.03
ANM	76S	OAK HARBOR AIR PARK	OAK HARBOR	WA	27391.	114304.	0.	0.59	0.94
ANM	S43	HARVEY FIELD	SNOHOMISH	WA	103645.	33830.	0.	0.96	0.91
ANM	S31	LOPEZ ISLAND	LOPEZ	WA	35908.	100787.	0.	0.61	0.91
ANM	056	CLARK COUNTY	ORCHARDS	WA	99219.	36077.	0.	1.04	0.90
ANM	07S	DEER PARK MUNI	DEER PARK	WA	100903.	32929.	0.	0.69	0.89
ANM	WA12	DE VERE FIELD	CLE ELUM	WA	18880.	98108.	0.	0.55	0.78
ANM	S95	MARTIN FIELD	COLLEGE PLACE	WA	69859.	33587.	0.	0.74	0.69
ANM	058	PORT ORCHARD	PORT ORCHARD	WA	78374.	25580.	0.	0.81	0.69
ANM	WA10	PORT OF CAMAS-WASHOUGAL	CAMAS	WA	67673.	22085.	0.	0.37	0.60
ANM	S60	KENMORE AIRHARBOR	KENMORE	WA	62481.	20392.	0.	0.60	0.55
ANM	BVU	BELLEVUE AIRFIELD	BELLEVUE	WA	56899.	22490.	0.	1.02	0.53
ANM	74S	ANACORTES	ANACORTES	WA	59322.	19366.	0.	0.53	0.52
ANM	14S	WESTPORT	WESTPORT	WA	13553.	58345.	0.	0.33	0.48
ANM	WA40	MOSES LAKE MUNI	MOSES LAKE	WA	54825.	17897.	0.	0.57	0.48
ANM	059	JEFFERSON COUNTY INTL	PORT TOWNSEND	WA	25395.	35251.	0.	0.35	0.40
ANM	S13	MARTHA LAKE	ALDERWOOD MANOR	WA	43431.	14180.	0.	0.44	0.38
ANM	S97	ANDERSON FIELD	BREWSTER	WA	31456.	17487.	0.	0.32	0.33
ANM	WA22	ELMA MUNICIPAL	ELMA	WA	29106.	20152.	0.	0.28	0.33
ANM	S42	APEX AIRPARK	SILVERDALE	WA	36383.	11877.	0.	0.37	0.32
ANM	S18	FORKS	FORKS	WA	26102.	20601.	0.	0.29	0.31
ANM	OMK	OMAK	OMAK	WA	29969.	9781.	0.	0.25	0.26
ANM	WA05	GOHEEN	BATTLE GROUND	WA	29388.	9592.	0.	0.29	0.26
ANM	S36	CREST AIRPARK	KENT	WA	29843.	10010.	0.	0.30	0.26
ANM	S40	PROSSER	PROSSER	WA	29518.	9635.	0.	0.30	0.26
ANM	S52	INTERCITY	WINTHROP	WA	26717.	8719.	0.	0.17	0.24
ANM	S70	OTHELLO MUNI	OTHELLO	WA	25417.	8296.	0.	0.25	0.22
ANM	63S	COLVILLE MUNI	COLVILLE	WA	24558.	8016.	0.	0.25	0.22
ANM	S26	OCEAN SHORES MUNI	OCEAN SHORES	WA	23935.	7810.	0.	0.24	0.21
ANM	WA51	R & K SKYRANCH	ROCHESTER	WA	21814.	7659.	0.	0.22	0.20
ANM	15S	SUNNYSIDE MUNI	SUNNYSIDE	WA	19072.	11044.	0.	0.21	0.20
ANM	852	CASHMERE-DRYDEN	CASHMERE	WA	20312.	9583.	0.	0.21	0.20
ANM	S94	WHITMAN CO MEMORIAL	COLFAX	WA	21437.	6997.	0.	0.20	0.19
ANM	WA56	KURTZER FLYING SERVICE	SEATTLE	WA	20051.	6544.	0.	0.17	0.18
ANM	11S	SEKIU	SEKIU	WA	20274.	6616.	0.	0.20	0.18
ANM	TDO	TOLEDO-WINLOCK MUNI	TOLEDO	WA	19098.	6234.	0.	0.19	0.17
ANM	254	NEW WARDEN	WARDEN	WA	17932.	5853.	0.	0.18	0.16
ANM	S98	VISTA FIELD	KENNEWICK	WA	18679.	6098.	0.	0.19	0.16
ANM	S10	CHELAN MUNI	CHELAN	WA	13584.	9253.	0.	0.14	0.15
ANM	WA77	ENUMCLAW	ENUMCLAW	WA	17068.	5571.	0.	0.16	0.15
ANM	057	DOROTHY SCOTT	OROVILLE	WA	16564.	5406.	0.	0.15	0.15
ANM	WA09	BLAINE MUNI	BLAINE	WA	15687.	7370.	0.	0.17	0.15
ANM	WA14	CONNELL CITY	CONNELL	WA	16313.	5325.	0.	0.16	0.14
ANM	WAO	(NEW)	BLAINE	WA	15355.	5012.	0.	0.04	0.14
ANM	S35	OKANOGAN LEGION	OKANOGAN	WA	10354.	8772.	0.	0.12	0.13
ANM	WA38	FLYING F RANCH	MONROE	WA	15228.	4971.	0.	0.15	0.13
ANM	68S	DAVENPORT	DAVENPORT	WA	13643.	4453.	0.	0.13	0.12
ANM	WA33	LYNDEN	LYNDEN	WA	13436.	4386.	0.	0.13	0.12
ANM	25S	WATERVILLE	WATERVILLE	WA	13075.	4268.	0.	0.13	0.12
ANM	70S	MEAD FLYING SERVICE	MEAD	WA	13062.	4264.	0.	0.13	0.12
ANM	33S	PRU FIELD	RITZVILLE	WA	13285.	4336.	0.	0.13	0.12
ANM	WA69	WAX ORCHARDS	VASHON	WA	12295.	4013.	0.	0.11	0.11
ANM	2S1	VASHON ISLAND	VASHON	WA	11498.	3753.	0.	0.12	0.10
ANM	WA72	WESTERN AIRPARK INC	YELM	WA	10826.	3533.	0.	0.11	0.10
ANM	WA24	FRIDAY HARBOR SPB	FRIDAY HARBOR	WA	10039.	3276.	0.	0.08	0.09
ANM	WA31	WHIDBEY AIR PARK	LANGLEY	WA	8717.	3928.	0.	0.09	0.08

ANM 73S WILLARD FIELD  
 ANM S23 IONE MUNI  
 ANM WA20 SWANSON  
 ANM 2S8 WILBUR  
 ANM WA43 ODESSA MUNI  
 ANM WA21 GRAND COULEE DAM  
 ANM 80WA QUINCY MUNI  
 ANM WA35 CEDAR GROVE AIRPARK  
 ANM S93 CLE ELUM  
 ANM 2S9 WILLAPA HARBOR  
 ANM WA4 FERRY COUNTY  
 ANM WA15 COULEE CITY

TEKOA  
 IONE  
 EATONVILLE  
 WILBUR  
 ODESSA  
 ELECTRIC CITY  
 QUINCY  
 MAPLE VALLEY  
 CLE ELUM  
 SOUTH BEND/RAYMOND/  
 REPUBLIC  
 COULEE CITY

WA	8971.	2928.	0.	0.09	0.08
WA	8524.	2782.	0.	0.09	0.08
WA	7775.	2538.	0.	0.08	0.07
WA	8114.	2648.	0.	0.09	0.07
WA	8353.	2726.	0.	0.08	0.07
WA	8101.	2644.	0.	0.06	0.07
WA	7190.	2347.	0.	0.06	0.06
WA	5268.	1720.	0.	0.05	0.05
WA	6198.	2023.	0.	0.05	0.05
WA	5020.	1638.	0.	0.04	0.04
WA	3503.	1143.	0.	0.03	0.03
WA	523.	171.	0.	0.01	0.00

ANM GCC GILLETTE-CAMPBELL COUNTY  
 ANM COD CODY MUNI  
 ANM SHR SHERIDAN COUNTY  
 ANM RKS ROCK SPRINGS-SWEETWATER COUNTY  
 ANM JAC JACKSON HOLE  
 ANM RWL RAWLINS MUNI  
 ANM RIW RIVERTON REGIONAL  
 ANM LAR GENERAL BRES FIELD  
 ANM GEY SOUTH BIG HORN COUNTY  
 ANM EVW EVANSTON MUNI  
 ANM BPI BIG PINEY MUNI  
 ANM DGW CONVERSE COUNTY  
 ANM WRL WORLAND MUNI  
 ANM AFO AFTON MUNI  
 ANM POY POWELL MUNI  
 ANM TOR TORRINGTON MUNI  
 ANM BYG BUFFALO MUNI  
 ANM U68 NORTH BIG HORN COUNTY  
 ANM PNA RALPH WENZ FIELD  
 ANM ECS MONDELL FIELD  
 ANM SAA SHIVELY FIELD  
 ANM EAN PHIFER AIRFIELD  
 ANM FBR FORT BRIDGER  
 ANM LSK LUSK MUNI  
 ANM THP HOT SPRINGS CO-THERMOPOLIS MUNI  
 ANM EMM KEMMERER MUNI  
 ANM HAD HARFORD FIELD  
 ANM 46U ALPINE  
 ANM U25 DUBOIS MUNI  
 ANM 79V EVANS

GILLETE  
 CODY  
 SHERIDAN  
 ROCK SPRINGS  
 JACKSON  
 RAWLINS  
 RIVERTON  
 LARAMIE  
 GREYBULL  
 EVANSTON  
 BIG PINEY  
 DOUGLAS  
 WORLAND  
 AFTON  
 POWELL  
 TORRINGTON  
 BUFFALO  
 COWLEY/LOVELL/BYRON  
 PINEDALE  
 NEWCASTLE  
 SARATOGA  
 WHEATLAND  
 FORT BRIDGER  
 LUSK  
 THERMOPOLIS  
 KEMMERER  
 CASPER  
 ALPINE  
 DUBOIS  
 LARAMIE

WY	774168.	234677.	779.	5.70*	6.70*
WY	375192.	166536.	375.	2.90*	3.60*
WY	330111.	167556.	291.	4.02	3.31
WY	332127.	164702.	314.	3.36	3.30
WY	301308.	160165.	280.	3.16	3.07
WY	243656.	146368.	244.	2.07*	2.59*
WY	214949.	143896.	203.	2.40	2.38
WY	207849.	143611.	190.	2.15	2.34
WY	78587.	131012.	0.	1.31	1.39
WY	60628.	125150.	0.	1.12	1.23
WY	62842.	108255.	50.	1.29	1.14
WY	46586.	105878.	0.	0.82	1.01
WY	23116.	112907.	0.	0.74	0.90
WY	24370.	98657.	0.	0.59	0.82
WY	21150.	97503.	0.	0.56	0.79
WY	28419.	80736.	0.	0.55	0.73
WY	40926.	60042.	57.	1.48	0.67
WY	21085.	61427.	0.	0.40	0.55
WY	22704.	55231.	0.	0.40	0.52
WY	29996.	44517.	70.	0.96	0.50
WY	19230.	54290.	0.	0.37	0.49
WY	38997.	12728.	0.	0.40	0.34
WY	28284.	9019.	27.	0.19*	0.25*
WY	11653.	18167.	0.	0.17	0.20
WY	19668.	6401.	0.	0.20	0.17
WY	13468.	4395.	0.	0.14	0.12
WY	11119.	3630.	0.	0.11	0.10
WY	6403.	2090.	0.	0.06	0.06
WY	6203.	2024.	0.	0.06	0.05
WY	4977.	1625.	0.	0.05	0.04

SOUTHERN REGION

ASO BFM BROOKLEY  
 ASO DCU PRYOR FIELD  
 ASO MSL MUSCLE SHOALS  
 ASO ANB ANNISTON-CALHOUN COUNTY  
 ASO 21A SHELBY COUNTY  
 ASO GAD GADSDEN MUNI  
 ASO AUO AUBURN-OPELIKA  
 ASO ASN TALLADEGA MUNI  
 ASO TOI TROY MUNI  
 ASO 71J BLACKWELL FIELD  
 ASO 39J MIDDLETON FIELD  
 ASO 08A WETUMPKA MUNI

MOBILE  
 DECATUR  
 MUSCLE SHOALS  
 ANNISTON  
 ALABASTER  
 GADSDEN  
 AUBURN  
 TALLADEGA  
 TROY  
 OZARK  
 EVERGREEN  
 WETUMPKA

AL	1125059.	241534.	1135.	7.06*	9.08*
AL	848074.	257420.	743.	5.31	7.35
AL	848344.	245244.	831.	5.60	7.27
AL	640729.	207344.	692.	3.19	5.63
AL	541328.	165803.	491.	3.43*	4.70*
AL	437185.	185995.	379.	2.66	4.14
AL	375827.	173357.	342.	2.66	3.65
AL	427894.	96414.	410.	2.85	3.58
AL	405232.	72941.	396.	3.56*	3.18*
AL	314398.	101285.	277.	2.04	2.76
AL	290377.	93519.	61.	12.31	2.55
AL	313436.	63146.	274.	1.95	2.50

112

ASO 1A8 WALKER COUNTY  
 ASO EUF WEEDON FIELD  
 ASO SCD LEE MERKLE FLD  
 ASO ALX THOMAS C RUSSELL FLD  
 ASO 12J BREWTON MUNI  
 ASO M82 HUNTSVILLE AIRPORT NORTH  
 ASO 1R8 BAY MINETTE MUNI  
 ASO 2A3 BESSEMER  
 ASO 1A9 AUTAUGA COUNTY  
 ASO 8A0 ALBERTVILLE MUNI  
 ASO PLR ST CLAIR COUNTY  
 ASO EDN ENTERPRISE MUNI  
 ASO 4R4 FAIRHOPE MUNI  
 ASO 7A2 DEMOPOLIS MUNI  
 ASO SEM CRAIG FIELD  
 ASO HAB MARION COUNTY  
 ASO A04 CENTRE MUNI  
 ASO 06A MOTON FIELD  
 ASO 3A1 FOLSOM FIELD  
 ASO 1M4 POSEY FIELD  
 ASO PRN GREENVILLE MUNI  
 ASO M22 RUSSELLVILLE MUNI  
 ASO 0R1 ATMORE MUNI  
 ASO 79J ANDALUSIA-OPP  
 ASO MVC MONROE COUNTY  
 ASO 5M0 ROUNDTREE FIELD  
 ASO 26A ASHLAND/LINEVILLE  
 ASO 8A1 GUNTERSVILLE MUNI  
 ASO 7A3 LANETT MUNI  
 ASO M38 HAZEL GREEN  
 ASO 33J GENEVA MUNI  
 ASO 0J6 HEADLAND MUNI  
 ASO 5R4 FOLEY MUNI  
 ASO 20A ROBBINS FIELD  
 ASO AL15 JACK EDWARDS  
 ASO 02A GRAGG FIELD  
 ASO 09A BUTLER-CHOCTAW COUNTY  
 ASO 7A0 GREENSBORO MUNI  
 ASO 4A9 ISBELL FIELD  
 ASO AIV GEORGE DOWNER  
 ASO 4A6 SCOTTSBORO MUNI  
 ASO 0A8 BIBB COUNTY  
 ASO 14J ELBA MUNI  
 ASO AL08 VAIDEN FIELD  
 ASO M95 RICHARD ARTHUR FIELD  
 ASO 4R3 JACKSON MUNI  
 ASO 4R9 DAUPHIN ISLAND  
 ASO 23A MALLARD

ASO TIX TITUSVILLE-COCOA  
 ASO 34J NEW SMYRNA BEACH MUNI  
 ASO 81J DESTIN-FT WALTON BEACH  
 ASO SFB SANFORD  
 ASO LAL LAKELAND MUNI  
 ASO NTH MARATHON FLIGHT STRIP  
 ASO FPR ST LUCIE COUNTY  
 ASO GIF WINTER HAVEN'S GILBERT  
 ASO X47 FLAGLER COUNTY  
 ASO SGJ ST AUGUSTINE  
 ASO CEM BOB SIKES

JASPER  
 EUFAULA  
 SYLACAUGA  
 ALEXANDER CITY  
 BREWTON  
 HUNTSVILLE  
 BAY MINETTE  
 BESSEMER  
 PRATTVILLE  
 ALBERTVILLE  
 PELL CITY  
 ENTERPRISE  
 FAIRHOPE  
 DEMOPOLIS  
 SELMA  
 HAMILTON  
 CENTRE  
 TUSKEGEE  
 CULLMAN  
 HALEYVILLE  
 GREENVILLE  
 RUSSELLVILLE  
 ATMORE  
 ANDALUSIA & OPP  
 MONROEVILLE  
 HARTSELLE  
 ASHLAND/LINEVILLE  
 GUNTERSVILLE  
 LANETT  
 HAZEL GREEN  
 GENEVA  
 HEADLAND  
 FOLEY  
 ONEONTA  
 GULF SHORES  
 CLANTON  
 BUTLER  
 GREENSBORO  
 FORT PAYNE  
 ALICEVILLE  
 SCOTTSBORO  
 CENTREVILLE  
 ELBA  
 MARION  
 FAYETTE  
 JACKSON  
 DAUPHIN ISLAND  
 YORK

TITUSVILLE  
 NEW SMYRNA BEACH  
 DESTIN  
 SANFORD  
 LAKELAND  
 MARATHON  
 FORT PIERCE  
 WINTER HAVEN  
 BUNNELL  
 ST AUGUSTINE  
 CRESTVIEW

AL 299022. 51804. 279. 1.74 2.33  
 AL 279933. 45546. 276. 1.47 2.16  
 AL 253004. 68050. 217. 1.52# 2.13#  
 AL 149109. 134281. 120. 1.47# 1.88#  
 AL 195548. 79953. 137. 3.26 1.83  
 AL 197757. 60530. 161. 1.23# 1.72#  
 AL 195109. 34904. 175. 1.01 1.53  
 AL 137208. 59500. 0. 5.24 1.31  
 AL 106206. 34665. 0. 1.03 0.94  
 AL 116217. 22174. 96. 0.68# 0.92#  
 AL 110886. 24963. 66. 1.15# 0.90#  
 AL 100643. 32858. 0. 0.94 0.89  
 AL 43111. 61148. 5. 1.78 0.69  
 AL 85963. 15642. 76. 0.49# 0.68#  
 AL 64698. 28111. 0. 0.62 0.62  
 AL 65479. 18928. 53. 0.57 0.56  
 AL 63133. 11859. 53. 0.46 0.50  
 AL 30580. 42033. 12. 0.60 0.48  
 AL 54597. 14296. 171. 1.03 0.46  
 AL 55570. 10889. 44. 0.38 0.44  
 AL 44040. 19452. 41. 0.31# 0.42#  
 AL 44865. 14643. 0. 0.43 0.40  
 AL 44369. 14483. 0. 0.41 0.39  
 AL 20786. 23654. 0. 0.27 0.30  
 AL 36674. 8239. 23. 0.30 0.30  
 AL 24992. 17012. 0. 0.27 0.28  
 AL 11535. 24745. 0. 0.17 0.24  
 AL 16753. 17274. 0. 0.20 0.23  
 AL 23824. 7276. 79. 0.52 0.21  
 AL 21240. 6933. 0. 0.21 0.19  
 AL 16712. 11078. 0. 0.20 0.18  
 AL 19311. 6304. 0. 0.19 0.17  
 AL 18958. 6188. 0. 0.19 0.17  
 AL 16614. 5424. 0. 0.16 0.15  
 AL 16716. 5456. 0. 0.15 0.15  
 AL 16983. 5543. 0. 0.17 0.15  
 AL 15566. 5081. 0. 0.15 0.14  
 AL 14367. 4690. 0. 0.14 0.13  
 AL 12226. 3991. 0. 0.12 0.11  
 AL 12286. 4010. 0. 0.12 0.11  
 AL 10904. 3559. 0. 0.11 0.10  
 AL 11893. 3882. 0. 0.12 0.10  
 AL 9976. 3256. 0. 0.10 0.09  
 AL 9401. 3069. 0. 0.09 0.08  
 AL 6790. 5034. 0. 0.08 0.08  
 AL 7229. 2359. 0. 0.07 0.06  
 AL 5667. 1850. 0. 0.05 0.05  
 AL 3963. 1294. 0. 0.04 0.03

FL 1592981. 346963. 1524. 10.02# 12.89#  
 FL 1142448. 229706. 1013. 6.45# 9.12#  
 FL 1139186. 222809. 1412. 7.17# 9.05#  
 FL 947404. 176231. 867. 5.51# 7.47#  
 FL 778472. 272770. 504. 10.93 6.98  
 FL 734861. 227505. 683. 4.71# 6.39#  
 FL 677898. 221222. 0. 3.66 5.97  
 FL 682839. 126278. 626. 4.24# 5.38#  
 FL 675748. 126748. 592. 3.84# 5.33#  
 FL 645825. 149669. 532. 4.84 5.29  
 FL 533884. 101560. 723. 3.02# 4.22#



ASO	OCF	OCALA MUNI /JIM TAYLOR FIELD/	OCALA	FL	419037.	187460.	374.	5.39	4.03
ASO	OMN	MUNICIPAL AIRPORT, ORMOND BEACH	ORMOND BEACH	FL	474992.	108607.	396.	4.07	3.88
ASO	LNA	PALM BEACH COUNTY PARK	WEST PALM BEACH	FL	344749.	187701.	178.	5.96	3.54
ASO	TPF	PETER O KNIGHT	TAMPA	FL	331886.	90357.	275.	4.11	2.81
ASO	APF	NAPLES MUNI	NAPLES	FL	195195.	169066.	0.	8.81	2.42
ASO	COI	MERRITT ISLAND	COCOA	FL	207236.	136809.	0.	2.19	2.29
ASO	MAI	MARIANNA MUNI	MARIANNA	FL	269371.	62583.	319.	1.30	2.21
ASO	VNC	VENICE MUNI	VENICE	FL	228693.	97978.	0.	2.24	2.17
ASO	BCT	BOCA RATON PUBLIC	BOCA RATON	FL	181367.	141778.	0.	1.99	2.15
ASO	MKY	MARCO ISLAND	MARCO ISLAND	FL	178638.	134398.	166.	1.58*	2.08*
ASO	SUA	WITHAM FIELD	STUART	FL	180617.	133059.	0.	1.95	2.08
ASO	X26	SEBASTIAN MUNI	SEBASTIAN	FL	227274.	77005.	0.	2.17	2.02
ASO	X51	HOMESTEAD GENERAL AVIATION	HOMESTEAD	FL	225542.	73620.	0.	2.15	1.99
ASO	X17	PLANT CITY MUNI	PLANT CITY	FL	204762.	55517.	136.	2.05	1.73
ASO	BKV	HERNANDO COUNTY	BROOKSVILLE	FL	181406.	65864.	133.	2.05	1.64
ASO	PGD.	CHARLOTTE COUNTY	PUNTA GORDA	FL	105108.	139667.	0.	4.65	1.63
ASO	CLW	CLEARWATER EXECUTIVE	CLEARWATER	FL	178216.	66885.	0.	1.71	1.63
ASO	PHK	PALM BEACH CO GLADES	PAHOKEE	FL	164075.	73055.	92.	3.12	1.58
ASO	X46	OPA LOCKA WEST	MIAMI	FL	163285.	53301.	0.	1.55	1.44
ASO	DED	DELAND MUNI-SIDNEY H TAYLOR FLD	DELAND	FL	145860.	65096.	0.	3.93	1.40
ASO	23J	HERLONG	JACKSONVILLE	FL	145903.	59295.	0.	1.42	1.36
ASO	ISM	KISSIMMEE MUNI	KISSIMMEE	FL	79836.	122863.	1.	3.24	1.35
ASO	X16	VANDENBERG	TAMPA	FL	144031.	55723.	0.	1.39	1.33
ASO	SEF	SEBRING AIRPORT AND INDUSTRIAL PARK	SEBRING	FL	153315.	45345.	0.	0.66	1.32
ASO	LEE	LEESBURG MUNI	LEESBURG	FL	107793.	75985.	0.	1.15	1.22
ASO	X59	VALKARIA	VALKARIA	FL	135494.	44234.	0.	0.59	1.19
ASO	68J	TALLAHASSEE COMMERCIAL	TALLAHASSEE /HAVANA/	FL	134493.	44295.	118.	0.82*	1.19*
ASO	BOW	BARTON MUNI	BARTON	FL	98666.	73009.	0.	1.07	1.14
ASO	82J	FERGUSON	PENSACOLA	FL	113639.	45780.	0.	1.11	1.06
ASO	24J	SUWANNEE COUNTY	LIVE OAK	FL	27408.	114310.	0.	0.77	0.94
ASO	31J	LAKE CITY MUNI	LAKE CITY	FL	39254.	94367.	19.	1.52	0.89
ASO	X21	ARTHUR DUNN AIR PARK	TITUSVILLE	FL	72862.	25373.	0.	0.70	0.65
ASO	AVO	AVON PARK MUNI	AVON PARK	FL	52050.	31539.	0.	0.54	0.56
ASO	28J	KAY LARKIN	PALATKA	FL	46878.	32784.	0.	0.50	0.53
ASO	55J	FERNANDINA BEACH MUNI	FERNANDINA BEACH	FL	53383.	26110.	0.	0.53	0.53
ASO	2J9	QUINCY MUNI	QUINCY	FL	58290.	21902.	0.	0.56	0.53
ASO	OBE	OKEECHOBEE COUNTY	OKEECHOBEE	FL	46289.	26815.	0.	0.47	0.49
ASO	2R4	MILTON T FIELD	MILTON	FL	50313.	22273.	0.	0.50	0.48
ASO	X07	LAKE WALES MUNI	LAKE WALES	FL	37521.	35469.	0.	0.43	0.48
ASO	X39	TAMPA DOWNS	LUTZ	FL	42515.	19728.	0.	0.42	0.41
ASO	X06	ARCADIA MUNI	ARCADIA	FL	44385.	16269.	0.	0.43	0.40
ASO	IMM	IMMOKALEE	IMMOKALEE	FL	43673.	17132.	0.	0.43	0.40
ASO	X53	CLEWISTON	CLEWISTON	FL	32308.	16803.	0.	0.31	0.33
ASO	CTY	CROSS CITY	CROSS CITY	FL	34707.	9761.	26.	0.55	0.30
ASO	X14	LABELLE MUNICIPAL	LABELLE	FL	28076.	14983.	0.	0.28	0.29
ASO	ZPH	ZEPHYRHILLS MUNI	ZEPHYRHILLS	FL	27479.	11870.	0.	0.27	0.26
ASO	40J	PERRY-FOLEY	PERRY	FL	15277.	22470.	0.	0.70	0.25
ASO	X33	SILVER SPRINGS FLY-N STRIP	SILVER SPRINGS	FL	25134.	9985.	0.	0.24	0.23
ASO	42J	KEYSTONE AIRPARK	KEYSTONE HEIGHTS	FL	24805.	9296.	0.	0.27	0.23
ASO	X10	BELLE GLADE STATE/MARPT/	BELLE GLADE	FL	24463.	7985.	0.	0.23	0.22
ASO	54J	DEFUNIAK SPRINGS	DEFUNIAK SPRINGS	FL	21594.	8217.	0.	0.21	0.20
ASO	X60	WILLISTON MUNI	WILLISTON	FL	18986.	9105.	0.	0.19	0.19
ASO	CDK	GEORGE T LEWIS	CEDAR KEY	FL	18552.	8929.	0.	0.18	0.18
ASO	X01	EVERGLADES	EVERGLADES	FL	12635.	4123.	0.	0.12	0.11
ASO	01J	HILLIARD AIRPARK	HILLIARD	FL	11095.	3621.	0.	0.11	0.10
ASO	0J9	CALHOUN COUNTY	BLOUNTSTOWN	FL	9357.	5929.	0.	0.10	0.10
ASO	X22	WAUCHULA MUNI	WAUCHULA	FL	10652.	3477.	0.	0.10	0.09
ASO	X13	CARRABELLE FLIGHT STRIP	CARRABELLE	FL	6787.	2215.	0.	0.06	0.06
ASO	AAF	APALACHICOLA MUNI	APALACHICOLA	FL	5459.	3068.	0.	0.06	0.06
ASO	2IS	AIRGLADES	CLEWISTON	FL	2343.	765.	0.	0.02	0.02

ASO WDR WINDER  
 ASO 8A4 MCCOLLUM  
 ASO SBO EMANUEL COUNTY  
 ASO AMG BACON COUNTY  
 ASO RMG RICHARD B RUSSELL  
 ASO DNL DANIEL FIELD  
 ASO 02J CRISP COUNTY-CORDELE  
 ASO 17A GWINNETT COUNTY  
 ASO AYS WAYCROSS-WARE COUNTY  
 ASO 4A4 CORNELIUS-MOORE FIELD  
 ASO BQK GLYNCO JETPORT  
 ASO LGC CALLAWAY  
 ASO MAC HERBERT SMART DOWNTOWN  
 ASO PIM CALLAWAY GARDENS-HARRIS COUNTY  
 ASO TOC TOCCOA  
 ASO CCO NEWNAN COWETA COUNTY  
 ASO CTJ WEST GEORGIA REGIONAL  
 ASO VDI VIDALIA MUNI  
 ASO GVL LEE GILMER MEMORIAL  
 ASO MGR MOULTRIE MUNICIPAL  
 ASO DNN DALTON MUNI  
 ASO DBN DUBLIN MUNI  
 ASO 6A0 CARTERSVILLE  
 ASO 2A9 FALCON FLD  
 ASO 9A1 COVINGTON MUNI  
 ASO ACJ SOUTHER FIELD  
 ASO TBR STATESBORO MUNI  
 ASO 9A7 SOUTH EXPRESSWAY  
 ASO 54A PERRY-FORT VALLEY  
 ASO 52A MADISON MUNI  
 ASO TVI THOMASVILLE MUNI  
 ASO CZL TOM B. DAVID FLD  
 ASO 48A COCHRAN  
 ASO 18J DOUGLAS MUNI  
 ASO 2A4 WASHINGTON-WILKES COUNTY  
 ASO TMA HENRY TIFT MYERS  
 ASO 09J JEKYLL ISLAND  
 ASO 27A ELBERT COUNTY-PATZ FIELD  
 ASO CXU CAMILLA-MITCHELL COUNTY  
 ASO 4J2 BERRIEN CO  
 ASO MLJ BALDWIN COUNTY  
 ASO 84A MATHIS  
 ASO 2A2 REGINALD GRANT MEMORIAL  
 ASO 2J3 LOUISVILLE MUNICIPAL  
 ASO 20J COMMODORE-DECATUR  
 ASO 46J HAZLEHURST  
 ASO 75J TURNER COUNTY  
 ASO 70J CAIRO-GRADY COUNTY  
 ASO 50A HABERSHAM COUNTY  
 ASO 16J DAWSON MUNI  
 ASO FZG FITZGERALD MUNI  
 ASO 07J EASTMAN-DODGE COUNTY  
 ASO 2J7 BURKE COUNTY  
 ASO 8A9 SOUTH FULTON SKY PORT  
 ASO 5A2 WARNER ROBINS AIRPARK  
 ASO 15J COOK COUNTY  
 ASO 4J6 ST MARYS  
 ASO 11J EARLY COUNTY  
 ASO 30J BAXLEY MUNI

WINDER  
 MARIETTA  
 SAINSBORO  
 ALMA  
 ROME  
 AUGUSTA  
 CORDELE  
 LAWRENCEVILLE  
 WAYCROSS  
 CEDARTOWN  
 BRUNSWICK  
 LA GRANGE  
 MACON  
 PINE MOUNTAIN  
 TOC  
 YEW  
 CARRULLTON  
 VIDALIA  
 GAINESVILLE  
 MOULTRIE  
 DALTON  
 DUBLIN  
 CARTERSVILLE  
 PEACHTREE CITY  
 COVINGTON  
 AMERICUS  
 STATESBORO  
 JONESBORO  
 PERRY  
 MADISON  
 THOMASVILLE  
 CALHOUN  
 COCHRAN  
 DOUGLAS  
 WASHINGTON  
 TIFTON  
 JEKYLL ISLAND  
 ELBERT  
 CAMILLA  
 NASHVILLE  
 MILLEDGEVILLE  
 CUMMING  
 THOMASTON  
 LOUISVILLE  
 BAINBRIDGE  
 HAZLEHURST  
 ASHBURN  
 CAIRO  
 CORNELIA  
 DAWSON  
 FITZGERALD  
 EASTMAN  
 WAYNESBORO  
 FAIRBURN  
 WARNER ROBINS  
 ADEL  
 ST MARYS  
 BLAKELY  
 BAXLEY

GA	408643.	67449.	341.	2.34	3.16
GA	335324.	97184.	956.	6.19	2.87
GA	343522.	61878.	288.	1.87*	2.69*
GA	300431.	52397.	260.	1.71	2.34
GA	187233.	142301.	137.	2.37	2.19
GA	186376.	115569.	158.	1.27*	2.01*
GA	246533.	45558.	200.	1.56	1.94
GA	220721.	67654.	437.	4.60	1.92
GA	205189.	67606.	172.	1.19*	1.81*
GA	229544.	39764.	202.	1.33*	1.79*
GA	122448.	141056.	0.	1.49	1.75
GA	208997.	39429.	184.	1.24	1.65
GA	184622.	58165.	153.	1.08*	1.61*
GA	185729.	31923.	170.	1.36	1.45
GA	168158.	35150.	121.	2.05	1.39
GA	155517.	40148.	515.	3.52	1.30
GA	142485.	50292.	362.	4.30	1.28
GA	149371.	27214.	123.	0.92	1.17
GA	129640.	46494.	12.	3.59	1.17
GA	74791.	96950.	222.	1.67	1.14
GA	96335.	49900.	0.	3.32	0.97
GA	115964.	22130.	90.	0.95	0.92
GA	113105.	24259.	72.	0.75*	0.91*
GA	103062.	27106.	317.	2.12	0.86
GA	101542.	27777.	261.	1.92	0.86
GA	83427.	28618.	0.	0.77	0.74
GA	64427.	45594.	0.	1.34	0.73
GA	83154.	27145.	0.	0.77	0.73
GA	72690.	23728.	0.	1.75	0.64
GA	76255.	13095.	68.	0.46*	0.59*
GA	67481.	19632.	116.	1.33	0.58
GA	64646.	21099.	0.	0.59	0.57
GA	67299.	14968.	40.	0.44	0.55
GA	45356.	31675.	0.	1.07	0.51
GA	57049.	10044.	49.	0.37	0.45
GA	49392.	14352.	86.	0.77	0.42
GA	52077.	9064.	46.	0.45*	0.41*
GA	48912.	13496.	120.	0.81	0.41
GA	45115.	14729.	0.	0.66	0.40
GA	34937.	24438.	0.	0.36	0.39
GA	47817.	9223.	37.	0.39	0.38
GA	42726.	13948.	0.	0.40	0.38
GA	48826.	8407.	43.	0.29*	0.38*
GA	41757.	13630.	0.	0.38	0.37
GA	37553.	18463.	0.	0.36	0.37
GA	38283.	12496.	0.	1.01	0.34
GA	32064.	19692.	0.	0.32	0.34
GA	33741.	17248.	17.	0.25*	0.34*
GA	37116.	12115.	0.	1.12	0.33
GA	32547.	10624.	0.	0.30	0.29
GA	33045.	10787.	0.	0.78	0.29
GA	37024.	6847.	30.	0.20*	0.29*
GA	29260.	9552.	0.	0.27	0.26
GA	28200.	9206.	0.	0.26	0.25
GA	28468.	9294.	0.	0.27	0.25
GA	26087.	8514.	0.	0.24	0.23
GA	25003.	8160.	0.	0.23	0.22
GA	24577.	8022.	0.	0.23	0.22
GA	24491.	7993.	0.	1.06	0.22

ASO A06 MONROE MUNI  
 ASO 46A BLAIRSVILLE  
 ASO SYV SYLVESTER  
 ASO 6A2 GRIFFIN-SPALDING COUNTY  
 ASO 53A MONTEZUMA MUNI  
 ASO 17J DONALSONVILLE MUNI  
 ASO 2J2 LIBERTY COUNTY  
 ASO MQW TELFAIR-WHEELER  
 ASO 4J5 QUITMAN BROOKS COUNTY  
 ASO 65J WRENS MEMORIAL  
 ASO BGE DECATUR COUNTY INDUSTRIAL AIR PARK  
 ASO 56J PLANTATION ARPK  
 ASO 19A JACKSON COUNTY  
 ASO 2J4 METTER MUNI  
 ASO 5A9 ROOSEVELT MEMORIAL  
 ASO 6A1 BUTLER MUNI  
 ASO 19J HOMERVILLE  
 ASO 9A5 BARWICK LAFAYETTE  
 ASO RVJ REIDSVILLE  
 ASO 2J1 CLAXTON-EVANS COUNTY  
 ASO 18A FRANKLIN COUNTY  
 ASO 2J5 MILLEN  
 ASO 25J CUTHBERT-RANDOLPH  
 ASO 4J1 BRANTLEY COUNTY  
 ASO 47A CHEROKEE COUNTY  
 ASO 49A GILMER COUNTY  
 ASO JES JESUP-WAYNE COUNTY

ASO LOZ LONDON-CORBIN ARPT-MAGEE FLD  
 ASO FFT CAPITAL CITY  
 ASO I26 HENDERSON CITY-COUNTY  
 ASO BWG BOWLING GREEN-WARREN COUNTY  
 ASO 0I9 BEN FLOYD FIELD  
 ASO 2I0 MADISONVILLE MUNI  
 ASO GLW GLASGOW MUNI  
 ASO 0I6 TAYLOR COUNTY  
 ASO SME SOMERSET-PULASKI COUNTY  
 ASO I31 GOODALL FIELD  
 ASO 5I0 PIKEVILLE-PIKE COUNTY  
 ASO 1A6 MIDDLESBORO-BELL COUNTY  
 ASO 6M5 HANCOCK AIRFIELD  
 ASO I37 HAZARD  
 ASO I28 ASHLAND-BOYD COUNTY  
 ASO 1M8 NOPKINSVILLE-CHRISTIAN COUNTY  
 ASO BRY SAMUELS FIELD  
 ASO FGX FLEMING-MASON  
 ASO 0I3 MT STERLING-MONTGOMERY COUNTY  
 ASO M25 MAYFIELD GRAVES COUNTY  
 ASO 4M7 RUSSELLVILLE-LOGAN COUNTY  
 ASO 3I6 PAINTSVILLE-PRESTONSBURG-COMBS FIELD  
 ASO M21 MUHLENBERG COUNTY  
 ASO M34 KENTUCKY DAM STATE PARK  
 ASO 0I8 CYNTHIANA-HARRISON COUNTY  
 ASO BRG WHITESBURG MUNI  
 ASO I35 TUCKER-GUTHRIE MEMORIAL  
 ASO I39 MADISON  
 ASO CEY MURRAY-CALLOWAY COUNTY  
 ASO 9I0 WAYNE COUNTY  
 ASO I05 STURGIS MUNI  
 ASO I32 MOREHEAD-ROWAN COUNTY

MONROE  
 BLAIRSVILLE  
 SYLVESTER  
 GRIFFIN  
 MONTEZUMA  
 DONALSONVILLE  
 HINESVILLE  
 MCRAE  
 QUITMAN  
 WRENS  
 BAINBRIDGE  
 SYLVANIA  
 JEFFERSON  
 METTER  
 WARM SPRINGS  
 BUTLER  
 HOMERVILLE  
 LAFAYETTE  
 REIDSVILLE  
 CLAXTON  
 CANON  
 MILLEN  
 CUTHBERT  
 NAHUNTA  
 CANTON  
 ELLIJAY  
 JESUP

LONDON  
 FRANKFORT  
 HENDERSON  
 BOWLING GREEN  
 ELIZABETHTOWN  
 MADISONVILLE  
 GLASGOW  
 CAMPBELLSVILLE  
 SOMERSET  
 DANVILLE  
 PIKEVILLE  
 MIDDLESBORO  
 HAWESVILLE  
 HAZARD  
 ASHLAND  
 HOPKINSVILLE  
 BARDSTOWN  
 FLEMINGSBURG  
 MOUNT STERLING  
 MAYFIELD  
 RUSSELLVILLE  
 PAINTSVILLE  
 GREENVILLE  
 GILBERTSVILLE  
 CYNTHIANA  
 WHITESBURG  
 HARLAN  
 RICHMOND  
 MURRAY  
 MONTICELLO  
 STURGIS  
 MOREHEAD

GA	22818.	7448.	0.	0.21	0.20
GA	21626.	7059.	0.	0.20	0.19
GA	20506.	6695.	0.	0.19	0.18
GA	20695.	6756.	0.	0.19	0.18
GA	20481.	6685.	0.	0.19	0.18
GA	19748.	6446.	0.	0.18	0.17
GA	11338.	14201.	0.	0.14	0.17
GA	19518.	4598.	10.	0.15	0.16
GA	18288.	5971.	0.	0.17	0.16
GA	14629.	4775.	0.	0.13	0.13
GA	14950.	4879.	0.	0.15	0.13
GA	14389.	4697.	0.	0.13	0.13
GA	13895.	4535.	0.	0.13	0.12
GA	12922.	4218.	0.	0.12	0.11
GA	12679.	4139.	0.	0.12	0.11
GA	11550.	3771.	0.	0.11	0.10
GA	11313.	3692.	0.	0.10	0.10
GA	11019.	3597.	0.	0.10	0.10
GA	10483.	3421.	0.	0.43	0.09
GA	8633.	2817.	0.	0.08	0.08
GA	5411.	1766.	0.	0.05	0.05
GA	6024.	1966.	0.	0.06	0.05
GA	5484.	1790.	0.	0.05	0.05
GA	6094.	1989.	0.	0.06	0.05
GA	4810.	1570.	0.	0.04	0.04
GA	3170.	1035.	0.	0.03	0.03
GA	2535.	828.	0.	0.07	0.02

KY	1363390.	313811.	1320.	8.20	11.14
KY	1013889.	288060.	918.	9.72	8.65
KY	287105.	103273.	249.	1.77*	2.59*
KY	202625.	144266.	159.	1.76	2.30
KY	211288.	114647.	197.	1.62*	2.17*
KY	185268.	122064.	172.	1.50	2.04
KY	174992.	109391.	152.	1.49	1.89
KY	149409.	116644.	136.	1.22*	1.77*
KY	84109.	74300.	0.	3.65	1.05
KY	36024.	117120.	0.	0.85	1.02
KY	44321.	96202.	0.	0.69	0.93
KY	24837.	88374.	0.	0.49	0.75
KY	90954.	15769.	83.	0.54*	0.71*
KY	33443.	68011.	0.	0.49	0.67
KY	50599.	31494.	92.	0.97	0.55
KY	31076.	50540.	0.	0.42	0.54
KY	16186.	63749.	0.	0.77	0.53
KY	30189.	39007.	0.	1.27	0.46
KY	17960.	43817.	0.	0.29	0.41
KY	23392.	35358.	70.	0.53	0.39
KY	39851.	18952.	139.	1.06	0.39
KY	34209.	12946.	0.	0.33	0.31
KY	27591.	17687.	0.	0.95	0.30
KY	31512.	10284.	0.	0.30	0.28
KY	25467.	14237.	0.	0.26	0.26
KY	18698.	17775.	0.	0.21	0.24
KY	17083.	17815.	0.	0.20	0.23
KY	24620.	9515.	83.	0.57	0.23
KY	20550.	12632.	0.	0.85	0.22
KY	20238.	9528.	0.	0.20	0.20
KY	22083.	7209.	0.	0.22	0.19
KY	20887.	6817.	0.	0.20	0.18

ASO 1M7 FULTON  
 ASO I50 STANTON  
 ASO I30 BEREAS-RICHMOND  
 ASO 2M0 PRINCETON-CALDWELL COUNTY  
 ASO I33 MARSHALL FLD  
 ASO I49 ARNOLDS  
 ASO I93 BRECKINRIDGE COUNTY  
 ASO 511 BOSS  
 ASO KY07 BLUE LICK

FULTON  
 STANTON  
 BEREAS  
 PRINCETON  
 GEORGETOWN  
 SPRINGFIELD  
 HARDINSBURG  
 BURNSIDE  
 LOUISVILLE

KY	18264.	5961.	0.	0.17	0.16
KY	16996.	6178.	0.	0.16	0.15
KY	14708.	6491.	0.	0.15	0.14
KY	13008.	4245.	0.	0.12	0.11
KY	5550.	9431.	0.	0.03	0.10
KY	9426.	3077.	0.	0.09	0.08
KY	8111.	2647.	0.	0.08	0.07
KY	6507.	2124.	0.	0.06	0.06
KY	2149.	702.	0.	0.02	0.02

ASO M80 BRUCE CAMPBELL FIELD  
 ASO HBG HATTIESBURG MUNI  
 ASO TUP C.D. LEMONS MUNI  
 ASO OLV OLIVE BRANCH  
 ASO PGL JACKSON COUNTY  
 ASO HEZ. HARDY-ANDERS FIELD NATCHEZ-ADAMS COUNTY  
 ASO PIB PINE BELT REGIONAL  
 ASO LUL HESLER-NOBLE FIELD  
 ASO GWO GREENWOOD-LEFLORE  
 ASO VKS VICKSBURG MUNI  
 ASO RNV CLEVELAND MUNI  
 ASO MCB MCCOMB-PIKE COUNTY  
 ASO CKM FLETCHER FIELD  
 ASO 1R7 BROOKHAVEN-LINCOLN COUNTY  
 ASO UOX UNIVERSITY-OXFORD  
 ASO GTR GOLDEN TRIANGLE REGIONAL  
 ASO CRX ROSCOE TURNER  
 ASO IDL INDIANOLA MUNICIPAL  
 ASO 5R2 GULFPARK  
 ASO M16 JOHN BELL WILLIAMS  
 ASO M37 RULEVILLE-DREW  
 ASO LMS LOUISVILLE WINSTON COUNTY  
 ASO 3R6 STENNIS INTERNATIONAL  
 ASO PCU PICAYUNE PEARL RIVER COUNTY  
 ASO 2M7 DESOTO AIRPARK  
 ASO 2M6 TWINKLE TOWN  
 ASO 0R0 COLUMBIA-MARION COUNTY  
 ASO UBS COLUMBUS-LOWNDES COUNTY  
 ASO 0SX KOSCIUSKO-ATTALA COUNTY  
 ASO STF GEORGE M BRYAN  
 ASO M40 MONROE COUNTY  
 ASO M41 HOLLY SPRINGS-MARSHALL COUNTY  
 ASO M42 GRENADA MUNI  
 ASO 22M PONTOTOC COUNTY  
 ASO 20M MACON MUNI  
 ASO 25M RIPLEY  
 ASO M23 OKEEFE FIELD  
 ASO 1M2 BELZONI MUNI  
 ASO 14M HOLLANDALE MUNI  
 ASO MS06 DEAN GRIFFIN MEMORIAL  
 ASO M72 NEW ALBANY-UNION CO  
 ASO M68 DORR FIELD  
 ASO 8M1 BOONEVILLE-BALDWIN  
 ASO 0M6 PANOLA COUNTY  
 ASO M83 MCCHAREN FIELD  
 ASO M44 HOUSTON MUNI  
 ASO M17 PHILADELPHIA MUNI  
 ASO 3A8 STINSON FIELD MUNI  
 ASO 08M CARTHAGE-LEAKE COUNTY  
 ASO 5A6 WINONA-MONTGOMERY COUNTY

MADISON  
 HATTIESBURG  
 TUPELO  
 OLIVE BRANCH  
 PASCAGOULA  
 NATCHEZ  
 LAUREL/HATTIESBURG  
 LAUREL  
 GREENWOOD  
 VICKSBURG  
 CLEVELAND  
 MC COMB  
 CLARKSDALE  
 BROOKHAVEN  
 OXFORD  
 COLUMBUS/W POINT/STARK  
 CORINTH  
 INDIANOLA  
 OCEAN SPRINGS  
 RAYMOND  
 DREW  
 LOUISVILLE  
 BAY ST LOUIS  
 PICAYUNE  
 HORN LAKE  
 WALLS  
 COLUMBIA  
 COLUMBUS  
 KOSCIUSKO  
 STARKVILLE  
 ABERDEEN/AMORY  
 HOLLY SPRINGS  
 GRENADA  
 PONTOTOC  
 MACON  
 RIPLEY  
 NEWTON  
 BELZONI  
 HOLLANDALE  
 WIGGINS  
 NEW ALBANY  
 MERIGOLD  
 BOONEVILLE-BALDWIN  
 BATESVILLE  
 WEST POINT  
 HOUSTON  
 PHILADELPHIA  
 ABERDEEN  
 CARTHAGE  
 WINONA

MS	802016.	213337.	645.	5.04	6.75
MS	707197.	126511.	529.	4.87	5.54
MS	586576.	206777.	509.	4.08	5.27
MS	588775.	157627.	502.	3.58	4.96
MS	605588.	108536.	514.	3.57	4.74
MS	407921.	174117.	367.	2.29	3.87
MS	364959.	164447.	345.	2.11	3.52
MS	408045.	68989.	365.	1.91	3.17
MS	335159.	119789.	303.	2.31	3.02
MS	356211.	61632.	316.	2.10*	2.78*
MS	276033.	48286.	241.	2.10	2.15
MS	274228.	47838.	254.	1.44	2.14
MS	238096.	42545.	203.	2.01	1.86
MS	155283.	26563.	139.	1.05*	1.21*
MS	57019.	109298.	0.	2.12	1.11
MS	45432.	120192.	0.	0.92	1.10
MS	127576.	24294.	100.	1.31	1.01
MS	125098.	23219.	101.	0.76	0.99
MS	89836.	23446.	285.	1.78	0.75
MS	70318.	22953.	0.	0.65	0.62
MS	74263.	13729.	60.	0.41*	0.58*
MS	68326.	12681.	56.	0.68	0.54
MS	57734.	18842.	0.	2.40	0.51
MS	64506.	11407.	56.	0.36*	0.50*
MS	24127.	49507.	0.	0.34	0.49
MS	61732.	10770.	0.	0.10	0.48
MS	52021.	16980.	0.	1.56	0.46
MS	51599.	16839.	0.	0.47	0.45
MS	49709.	9226.	40.	0.49	0.39
MS	43216.	14107.	0.	0.40	0.38
MS	36667.	11966.	0.	0.34	0.32
MS	40779.	7648.	33.	0.28	0.32
MS	34681.	11320.	0.	0.32	0.31
MS	30174.	9850.	0.	0.28	0.27
MS	30039.	9805.	0.	0.28	0.26
MS	33811.	5840.	30.	0.20*	0.26*
MS	28837.	9411.	0.	0.26	0.25
MS	25415.	7200.	53.	0.42	0.22
MS	24407.	7967.	0.	0.23	0.22
MS	23952.	7817.	0.	0.22	0.21
MS	19796.	6460.	0.	0.18	0.17
MS	14873.	4854.	0.	0.14	0.13
MS	13638.	4451.	0.	0.12	0.12
MS	12082.	3944.	0.	0.11	0.11
MS	10991.	3588.	0.	0.10	0.10
MS	11369.	3710.	0.	0.10	0.10
MS	10991.	3588.	0.	0.10	0.10
MS	11306.	3690.	0.	0.10	0.10
MS	8970.	2927.	0.	0.08	0.08
MS	9092.	2967.	0.	0.08	0.08

ASO 07M HASTING AIRPARK  
 ASO M51 OKTIBBEHA  
 ASO MS04 PRENTISS-JEFFERSON DAVIS COUNTY  
 ASO 01M TISHOMINGO COUNTY  
 ASO 2M4 FOREST MUNI  
 ASO T36 TYLERTOWN  
 ASO 4R1 I H BASS JR MEMORIAL

BRUCE  
 STARKVILLE  
 PRENTISS  
 BELMONT  
 FOREST  
 TYLERTOWN  
 LUMBERTON

MS	9488.	3097.	0.	0.09	0.08
MS	9520.	3107.	0.	0.09	0.08
MS	8056.	2630.	0.	0.07	0.07
MS	6444.	2103.	0.	0.06	0.06
MS	4544.	1483.	0.	0.04	0.04
MS	2293.	748.	0.	0.02	0.02
MS	1516.	495.	0.	0.01	0.01

25 ASO LBT LUMBERTON MUNI  
 27 ASO MEB LAURINBURG-MAXTON  
 31 ASO W03 WILSON MUNI  
 30 ASO OCH WARREN FIELD  
 19 ASO EQY MONROE  
 34 ASO RWI ROCKY MOUNT-WILSON  
 23 ASO BUY BURLINGTON MUNI  
 TOWER ASO ECG ELIZABETH CITY MUNI  
 10 ASO 0A6 GASTONIA MUNI  
 28 ASO MRH BEAUFORT-MOREHEAD CITY  
 12 ASO MRN MORGANTON-LENOIR  
 62 ASO RZZ HALIFAX COUNTY  
 11 ASO 45J ROCKINGHAM-HAMLET  
 23 ASO EDE EDENTON MUNI  
 30 ASO W77 SANFORD-LEE COUNTY BRICK FIELD  
 18 ASO ASJ TRI-COUNTY  
 29 ASO SOP PINEHURST-SOUTHERN PINES  
 26 ASO W44 ASHEBORO MUNI  
 25 ASO CTZ SAMPSON COUNTY  
 22 ASO PGV PITT-GREENVILLE  
 14 ASO W52 HORACE WILLIAMS  
 31 ASO 0AJ ALBERT J ELLIS  
 117 33 ASO RUQ ROWAN COUNTY  
 ASO GWN GOLDSBORO-WAYNE MUNI  
 ASO 8W5 BILLY MITCHELL  
 ASO CPC COLUMBUS COUNTY MUNICIPAL  
 ASO 3A3 ANSON COUNTY  
 ASO SVH STATESVILLE MUNI  
 ASO 1A5 MACON COUNTY  
 ASO 6A3 ANDREWS-MURPHY  
 ASO IKB WILKES COUNTY  
 ASO MQI MANTEO  
 ASO 57A RUTHERFORD COUNTY  
 ASO 4W8 HENDERSON-OXFORD  
 ASO W46 ERWIN  
 ASO MHK MT AIRY-SURRY COUNTY  
 ASO 24A JACKSON COUNTY  
 ASO W27 JOHNSTON COUNTY  
 ASO 0A7 HENDERSONVILLE-WINKLER  
 ASO MCZ MARTIN COUNTY  
 ASO 4A8 ALBEMARLE  
 ASO PMZ PLYMOUTH MUNICIPAL  
 ASO SUT BRUNSWICK COUNTY  
 ASO ACZ HENDERSON FIELD  
 ASO ZEF ELKIN MUNI  
 ASO DPL P. B. RAIFORD  
 ASO W40 MT OLIVE MUNI  
 ASO W95 OCRACOKE ISLAND  
 ASO LFN FRANKLIN COUNTY  
 ASO 43A MONTGOMERY COUNTY  
 ASO 5W4 RAEFORD MUNI  
 ASO EXX LEXINGTON MUNI

LUMBERTON  
 MAXTON  
 WILSON  
 WASHINGTON  
 MONROE  
 ROCKY MOUNT  
 BURLINGTON  
 ELIZABETH CITY  
 GASTONIA  
 BEAUFORT  
 MORGANTON  
 ROANOKE RAPIDS  
 ROCKINGHAM  
 EDENTON  
 SANFORD  
 AHOSKIE  
 SOUTHERN PINES  
 ASHEBORO  
 CLINTON  
 GREENVILLE  
 CHAPEL HILL  
 JACKSONVILLE  
 SALISBURY  
 GOLDSBORO  
 HATTERAS  
 WHITEVILLE  
 WADESBORO  
 STATESVILLE  
 FRANKLIN  
 ANDREWS  
 WILKESBORO  
 MANTEO  
 RUTHERFORDTON  
 OXFORD  
 ERWIN  
 MT AIRY  
 SYLVA  
 SMITHFIELD  
 HENDERSONVILLE  
 WILLIAMSTON  
 ALBEMARLE  
 PLYMOUTH  
 SOUTHPORT  
 WALLACE  
 ELKIN  
 KENANSVILLE  
 MT OLIVE  
 OCRACOKE  
 LOUISBURG  
 STAR  
 RAEFORD  
 LEXINGTON

NC	651670.	108557.	630.	3.74	5.05
NC	498365.	190100.	489.	3.42	4.57
NC	519176.	101491.	477.	3.29*	4.12*
NC	466840.	105985.	419.	2.78*	3.81*
NC	376893.	162498.	340.	2.83	3.58
NC	346352.	161248.	340.	2.12	3.37
NC	335908.	94152.	271.	2.22	2.86
NC	357893.	58667.	349.	1.61*	2.77*
NC	284039.	129322.	202.	1.94*	2.75*
NC	343139.	59979.	0.	0.61	2.68
NC	231282.	144233.	201.	1.65	2.50
NC	201746.	142868.	203.	2.19	2.29
NC	268658.	64406.	243.	1.61	2.21
NC	238111.	70835.	220.	1.60	2.05
NC	252071.	45017.	229.	1.39	1.97
NC	190695.	80479.	176.	1.42*	1.80*
NC	124787.	142921.	2.	5.37	1.78
NC	203020.	35924.	181.	1.16*	1.59*
NC	111813.	106067.	82.	1.07	1.45
NC	73772.	129414.	1.	3.44	1.35
NC	142918.	32113.	124.	0.82*	1.16*
NC	43252.	119480.	0.	0.94	1.08
NC	111282.	48423.	289.	1.97	1.06
NC	63635.	80847.	0.	2.03	0.96
NC	96620.	22221.	88.	0.79*	0.79*
NC	41446.	73603.	0.	0.58	0.76
NC	21055.	90176.	0.	0.47	0.74
NC	60583.	37824.	0.	1.82	0.65
NC	23328.	67691.	0.	0.41	0.60
NC	44087.	44511.	0.	0.51	0.59
NC	35179.	41604.	0.	0.97	0.51
NC	49815.	25296.	1.	1.05	0.50
NC	53993.	17620.	0.	2.36	0.48
NC	53101.	17332.	0.	1.74	0.47
NC	58591.	12141.	41.	0.35*	0.47*
NC	37557.	27745.	0.	0.40	0.43
NC	18331.	44698.	0.	0.29	0.42
NC	45217.	14761.	0.	1.02	0.40
NC	40795.	19405.	0.	0.41	0.40
NC	20553.	36828.	0.	0.29	0.38
NC	16051.	37500.	0.	0.25	0.36
NC	35807.	11689.	0.	0.77	0.32
NC	39070.	6717.	36.	0.31*	0.30*
NC	25059.	20214.	0.	0.28	0.30
NC	28313.	9241.	0.	0.89	0.25
NC	28790.	9397.	0.	1.07	0.25
NC	21737.	13187.	0.	0.35	0.23
NC	25026.	8167.	0.	0.24	0.22
NC	24539.	8011.	0.	0.23	0.22
NC	19735.	6441.	0.	0.19	0.17
NC	15473.	5051.	0.	0.25	0.14
NC	12004.	3283.	31.	0.20	0.10

ASO FFA FIRST FLIGHT  
 ASO NC16 HIATT  
 ASO 5W8 SILER CITY MUNI  
 ASO 6A6 STANLY COUNTY  
 ASO 7A8 AVERY COUNTY/MORRISON FIELD/  
 ASO NC67 ASHE COUNTY

ASO BQN BORINQUEN  
 ASO X63 HUMACAO  
 ASO VQS VIEQUES  
 ASO CPX CULEBRA /RESTRICTED/  
 ASO ABO ARECIBO AIRFIELD

ASO 49J HILTON HEAD  
 ASO GRD GREENWOOD COUNTY  
 ASO CEU CLEMSON-O'CONNOR COUNTY  
 ASO CUB OWENS FIELD  
 ASO CDN WOODWARD FIELD  
 ASO BNL BARNWELL COUNTY  
 ASO 88J ALLENDALE COUNTY  
 ASO AND ANDERSON COUNTY  
 ASO 61J J.E. LOCKLAIR MEMORIAL  
 ASO JZI JOHNS ISLAND  
 ASO 29J BRYANT FIELD  
 ASO SMS SUMTER MUNI  
 ASO RBW WALTERBORO MUNI  
 ASO MAO MARION COUNTY  
 ASO 27J NEWBERRY MUNI  
 ASO 50J BERKELEY COUNTY  
 ASO 04J DARLINGTON COUNTY  
 ASO 9A6 CHESTER MUNI  
 ASO HVS HARTSVILLE MUNI  
 ASO 47J CHERAW MUNI  
 ASO FDW FAIRFIELD COUNTY  
 ASO AIK AIKEN MUNI  
 ASO LQK PICKENS COUNTY  
 ASO NYW CONWAY-HORRY COUNTY  
 ASO GGE GEORGETOWN COUNTY  
 ASO OGB ORANGEBURG  
 ASO 58J HUGGINS  
 ASO 35A UNION COUNTY  
 ASO CKI WILLIAMSBURG COUNTY  
 ASO DLC DILLON COUNTY  
 ASO 73J BEAUFORT COUNTY  
 ASO 34A LAURENS COUNTY  
 ASO LKR LANCASTER COUNTY  
 ASO BBP MARLBORO COUNTY  
 ASO 5J9 TWIN CITY  
 ASO 3J1 RIDGELAND MUNI  
 ASO 35J PAGELAND  
 ASO 52J BISHOPVILLE MUNI

ASO CSV CROSSVILLE MEMORIAL  
 ASO MKL MCKELLAR FIELD  
 ASO SYI BOMAR FLD-SHELBYVILLE MUNI  
 ASO THA WILLIAM NORTHERN FIELD  
 ASO MOR MOORE-MURRELL  
 ASO CKV OUTLAW FIELD  
 ASO SRB SPARTA-WHITE COUNTY  
 ASO PHT HENRY COUNTY

KILL DEVIL HI  
 THOMASVILLE  
 SILER CITY  
 ALBEMARLE  
 SPRUCE PINE  
 WEST JEFFERSON

AGUADILLA  
 HUMACAO  
 ISLA DE VIEQUES  
 ISLA DE CULEBRA  
 ARECIBO

HILTON HEAD ISLAND  
 GREENWOOD  
 CLEMSON  
 COLUMBIA  
 CAMDEN  
 BARNWELL  
 ALLENDALE  
 ANDERSON  
 SUMNERVILLE  
 CHARLESTON  
 ROCK HILL  
 SUMTER  
 WALTERBORO  
 MARION  
 NEWBERRY  
 MOHICKS CORNER  
 DARLINGTON  
 CHESTER  
 NARTSVILLE  
 CHERAW  
 WINNSBORO  
 AIKEN  
 PICKENS  
 CONWAY  
 GEORGETOWN  
 ORANGEBURG  
 TIMMONSVILLE  
 UNION  
 KINGSTREE  
 DILLON  
 BEAUFORT  
 LAURENS  
 LANCASTER  
 BEHNETTSVILLE  
 LORIS  
 RIDGELAND  
 PAGELAND  
 BISHOPVILLE

CROSSVILLE  
 JACKSON  
 SHELBYVILLE  
 TULLAHOMA  
 MORRISTOWN  
 CLARKSVILLE  
 SPARTA  
 PARIS

NC	6894.	8340.	0.	0.08	0.10
NC	11398.	3721.	0.	0.11	0.10
NC	8639.	2820.	0.	0.08	0.08
NC	7437.	2427.	0.	0.07	0.07
NC	6715.	2191.	0.	0.06	0.06
NC	5515.	1800.	0.	0.05	0.05
PR	113053.	142269.	0.	1.68	1.70
PR	17968.	111227.	0.	0.69	0.86
PR	7731.	107887.	0.	0.58	0.77
PR	7002.	105232.	0.	0.52	0.75
PR	18954.	6185.	0.	0.19	0.17
SC	942575.	264348.	823.	7.25*	8.02*
SC	362261.	160295.	312.	2.84	3.47
SC	373202.	137950.	326.	2.31*	3.40*
SC	297272.	169969.	0.	2.95	3.10
SC	321520.	88852.	278.	2.35	2.73
SC	209680.	101070.	175.	1.31*	2.06*
SC	217536.	81515.	161.	1.33*	1.99*
SC	102673.	117682.	0.	1.21	1.46
SC	93832.	114795.	0.	1.13	1.39
SC	74605.	120703.	0.	2.68	1.30
SC	104275.	85511.	0.	2.57	1.26
SC	91919.	93226.	0.	1.02	1.23
SC	144779.	32449.	122.	1.04	1.18
SC	143868.	29686.	126.	0.92	1.15
SC	136679.	24061.	118.	0.77*	1.07*
SC	33039.	116147.	0.	0.81	0.99
SC	113418.	33681.	110.	0.64*	0.98*
SC	115086.	27925.	70.	0.75	0.95
SC	94943.	19023.	69.	0.77	0.76
SC	76594.	32241.	51.	0.52	0.72
SC	58600.	37527.	48.	0.44*	0.64*
SC	34765.	56477.	0.	0.45	0.61
SC	64410.	24277.	0.	1.70	0.59
SC	52364.	36441.	0.	1.26	0.59
SC	19137.	63837.	0.	0.33	0.55
SC	49186.	18345.	0.	1.24	0.55
SC	42788.	8229.	33.	0.24*	0.34*
SC	12168.	36153.	0.	0.20	0.32
SC	35488.	11583.	0.	1.08	0.31
SC	30798.	10052.	0.	0.28	0.27
SC	9183.	30089.	0.	0.16	0.26
SC	20883.	13276.	0.	0.21	0.23
SC	19702.	6432.	0.	0.43	0.17
SC	12836.	6994.	0.	0.12	0.13
SC	12375.	4040.	0.	0.24	0.11
SC	11353.	3706.	0.	0.11	0.10
SC	4752.	1551.	0.	0.04	0.04
SC	1641.	824.	0.	0.02	0.02
TN	1270273.	226335.	1230.	7.66	9.94
TN	534892.	195652.	499.	3.58	4.85
TN	506581.	104907.	468.	3.38	4.06
TN	384592.	71800.	320.	2.64	3.03
TN	277516.	73473.	173.	6.35	2.33
TN	109558.	141123.	0.	1.55	1.67
TN	126698.	83059.	106.	1.08	1.39
TN	69480.	127998.	2.	3.38	1.31

ASO	2M8	CHARLES W. BAKER	MILLINGTON	TN	119803.	68883.	0.	1.23	1.25
ASO	GCV	GREENEVILLE MUNI	GREENEVILLE	TN	74466.	107117.	1.	3.17	1.21
ASO	UCY	EVERETT-STEWART	UNION CITY	TN	72060.	106703.	0.	2.23	1.19
ASO	TGC	GIBSON COUNTY	TRENTON	TN	134205.	24250.	117.	1.03	1.05
ASO	3A9	SEVIER-GATLINBURG	SEVIERVILLE	TN	61679.	90475.	0.	2.77	1.81
ASO	GHM	CENTERVILLE MUNI	CENTERVILLE	TN	55639.	93356.	48.	0.64	0.99
ASO	M52	FRANKLIN WILKINS	LEXINGTON	TN	121474.	21358.	109.	0.84	0.95
ASO	0A9	ELIZABETHTON MUNI	ELIZABETHTON	TN	78766.	55495.	0.	0.85	0.89
ASO	MBT	MURFREESBORO MUNI	MURFREESBORO	TN	98429.	32134.	0.	1.56	0.87
ASO	DYR	DYERSBURG MUNI	DYERSBURG	TN	53193.	76289.	0.	1.92	0.86
ASO	M01	GENERAL DEWITT SPAIN	MEMPHIS	TN	89115.	29757.	0.	0.85	0.79
ASO	M88	CORNELIA FORT AIRPARK	NASHVILLE	TN	89137.	29099.	0.	0.86	0.79
ASO	HDI	HARDWICK FIELD	CLEVELAND	TN	68531.	49483.	0.	1.97	0.78
ASO	M54	LEBANON MUNI	LEBANON	TN	39385.	75164.	0.	1.58	0.76
ASO	0M4	BENTON COUNTY	CAMDEN	TN	23098.	90720.	0.	1.11	0.76
ASO	CJE	PUTNAM COUNTY	COOKEVILLE	TN	43984.	63579.	0.	1.26	0.75
ASO	SNH	SAVANNAH-HARDIN COUNTY	SAVANNAH	TN	34949.	70913.	0.	1.38	0.70
ASO	0M5	HUMPHREYS COUNTY	WAVERLY	TN	24872.	78464.	0.	0.87	0.69
ASO	MRC	MAURY COUNTY	COLUMBIA/MT PLEASANT	TN	45382.	50562.	0.	1.54	0.64
ASO	1M5	PORTLAND MUNICIPAL	PORTLAND	TN	36424.	59477.	0.	1.32	0.64
ASO	M33	GALLATIN MUNI	GALLATIN	TN	34631.	58893.	0.	0.98	0.62
ASO	SZY	ROBERT SIBLEY	SELMER	TN	25826.	67935.	0.	1.16	0.62
ASO	MMI	MCMINN COUNTY	ATHENS	TN	51106.	40417.	0.	2.01	0.61
ASO	RNC	WARREN COUNTY MEMORIAL	MCMINNVILLE	TN	36252.	54677.	0.	1.23	0.60
ASO	2A0	MARK ANTON	DAYTON	TN	33762.	52676.	0.	1.31	0.57
ASO	M08	BOLIVAR-HARDEMAN COUNTY	BOLIVAR	TN	55782.	24128.	0.	0.55	0.53
ASO	LHC	ARLINGTON MUNI	ARLINGTON	TN	53347.	23338.	0.	1.08	0.51
ASO	M04	COVINGTON MUNI	COVINGTON	TN	56807.	18543.	0.	1.53	0.50
ASO	BGF	WINCHESTER MUNI	WINCHESTER	TN	31514.	40068.	0.	0.39	0.48
ASO	FYM	FAYETTEVILLE MUNI	FAYETTEVILLE	TN	36759.	29820.	0.	1.39	0.44
ASO	JAU	CAMPBELL COUNTY	JACKSBORO	TN	32988.	28590.	0.	0.98	0.41
ASO	M91	SPRINGFIELD MUNI	SPRINGFIELD	TN	38448.	22977.	0.	0.40	0.41
ASO	RKW	ROCKWOOD MUNI	ROCKWOOD	TN	30272.	27702.	0.	1.27	0.39
ASO	M53	HUMBOLDT MUNI	HUMBOLDT	TN	35925.	17586.	3.	1.35	0.36
ASO	APT	MARION COUNTY-BROWN FLD	JASPER	TN	18962.	33007.	0.	0.64	0.35
ASO	LUG	ELLINGTON	LEWISBURG	TN	29464.	21456.	0.	0.96	0.34
ASO	RVN	HAWKINS COUNTY	ROGERSVILLE	TN	25046.	23012.	0.	0.78	0.32
ASO	MNV	MONROE COUNTY	MADISONVILLE	TN	29181.	9524.	0.	0.28	0.26
ASO	0M1	SCOTT FIELD	PARSONS	TN	28776.	9391.	0.	0.27	0.25
ASO	M29	HASSELL FIELD	CLIFTON	TN	27556.	5025.	24.	0.16*	0.22*
ASO	8A3	LIVINGSTON MUNI	LIVINGSTON	TN	23396.	7636.	0.	0.22	0.21
ASO	M02	DICKSON MUNI	DICKSON	TN	20734.	8548.	0.	0.58	0.19
ASO	3A2	TAZEWELL'S-CLAIBORNE COUNTY	TAZEWELL	TN	19788.	6458.	0.	0.19	0.17
ASO	GZ5	ABERNATHY FIELD	PULASKI	TN	19834.	6473.	0.	0.19	0.17
ASO	2M2	LAWRENCEBURG MUNI	LAWRENCEBURG	TN	18669.	7613.	0.	0.18	0.17
ASO	2A1	JAMESTOWN MUNI	JAMESTOWN	TN	17944.	5857.	0.	0.17	0.16
ASO	1A3	MARTIN CAMPBELL FIELD	COPPERHILL	TN	12911.	10788.	0.	0.14	0.16
ASO	3M7	LAFAYETTE MUNICIPAL	LAFAYETTE	TN	16770.	5474.	0.	0.16	0.15
ASO	U05	FRANKLIN COUNTY	SEWANEE	TN	7505.	14289.	0.	0.11	0.14
ASO	6A4	JOHNSON COUNTY	MOUNTAIN CITY	TN	13524.	5250.	0.	0.13	0.12
ASO	0M2	REELFOOT LAKE	TIPTONVILLE	TN	8914.	3194.	0.	0.08	0.08
ASO	1A7	JACKSON COUNTY	GAINESBORO	TN	1958.	639.	0.	0.02	0.02
ASO	SCX	SCOTT MUNI	ONEIDA	TN	162.	49.	0.	0.00	0.00

SOUTHWEST REGION

ASW	JBR	JONESBORO MUNI	JONESBORO	AR	1656932.	386449.	1420.	10.81	13.58
ASW	1M1	NORTH LITTLE ROCK MUNI	NORTH LITTLE ROCK	AR	730429.	161124.	621.	4.57	5.92

ASW	ARG	WALNUT RIDGE REGIONAL
ASW	H37	SPRINGDALE MUNI
ASW	FLP	MARION COUNTY REGIONAL
ASW	M39	MENA MUNICIPAL
ASW	H00	BENTONVILLE MUN
ASW	2M9	MOUNTAIN HOME MUNI
ASW	M07	SEARCY MUNI
ASW	HBZ	HEBER SPRINGS MUNI
ASW	PGR	PARAGOULD MUNI
ASW	CDH	HARRELL FIELD
ASW	SGT	STUTTGART MUNI
ASW	M06	RUSSELLVILLE MUHI
ASW	M76	MONTICELLO MUNICIPAL
ASW	M03	CONWAY MUNI
ASW	HKA	BLYTHEVILLE MUNI
ASW	M18	HOPE MUNICIPAL
ASW	SLG	SMITH FIELD
ASW	M32	LAKE VILLAGE MUNI
ASW	BVX	BATESVILLE REGIONAL
ASW	ELD	GOODWIN FIELD
ASW	M19	NEWPORT MUNI
ASW	M89	ARKADELPHIA MUNI
ASW	7M1	MCGEEHEE MUNI
ASW	M73	ALMYRA MUNI
ASW	M99	SALINE COUNTY
ASW	H35	CLARKSVILLE MUNI
ASW	4M3	CARLISLE MUNI
ASW	HRO	BOONE COUNTY
ASW	M70	POCAHONTAS MUNI
ASW	F90	SEVIER COUNTY
ASW	F43	DOWHTOWN
ASW	CRT	CROSSETT MUNI
ASW	HEE	THOMPSON-ROBBINS
ASW	ROG	ROGERS MUNI ARPT-CARTER FLD
ASW	3M9	WARREN MUNICIPAL
ASW	FCY	FORREST CITY MUNI
ASW	7M5	OZARK-FRANKLIN COUNTY
ASW	4M1	CARROLL COUNTY
ASW	AGO	MAGNOLIA MUNI
ASW	M78	MALVERN MUNICIPAL
ASW	M36	FRANK FEDERER MEMORIAL
ASW	4M9	CORNING MUNI
ASW	MXA	MANILA MUNI
ASW	7M4	OSCEOLA MUNI
ASW	CVK	CHEROKEE VILLAGE
ASW	7M2	HARRY E WILCOX MEMORIAL FIELD
ASW	6M8	MARKED TREE MUNI
ASW	4M4	CLINTON MUNI
ASW	M77	HOWARD COUNTY
ASW	M65	WYNNE MUNI
ASW	5M1	DE WITT MUNI
ASW	M27	WALDRON MUNI
ASW	MPJ	PETIT JEAN PARK
ASW	5M4	FORDYCE MUNI
ASW	6M7	LEE COUNTY-MARIANNA
ASW	5M5	CRYSTAL LAKE

ASW	HUM	HOUMA-TERREBONNE
ASW	RSN	RUSTON MUNI
ASW	OR9	HAMMOND MUNI

WALNUT RIDGE
SPRINGDALE
FLIPPIN
MENA
BENTONVILLE
MOUNTAIN HOME
SEARCY
HEBER SPRINGS
PARAGOULD
CAMDEN
STUTTGART
RUSSELLVILLE
MONTICELLO
CONWAY
BLYTHEVILLE
HOPE
SILOAM SPRINGS
LAKE VILLAGE
BATESVILLE
EL DORADO
NEWPORT
ARKADELPHIA
MCGEEHEE
ALMYRA
BENTON
CLARKSVILLE
CARLISLE
HARRISON
POCAHONTAS
DEQUEEN
EL DORADO
CROSSETT
HELENA/WEST HELENA
ROGERS
WARREN
FORREST CITY
OZARK
BERRYVILLE
MAGNOLIA
MALVERN
BRINKLEY
CORNING
MANILA
OSCEOLA
CHEROKEE VILLAGE
MOUNTAIN VIEW
MARKED TREE
CLINTON
NASHVILLE
WYNNE
DE WITT
WALDRON
MORRILTON
FORDYCE
MARIANNA
DECATUR

HOUMA
RUSTON
HAMMOND

AR	596366.	181540.	531.	4.02	5.17
AR	535617.	216444.	363.	8.33	5.00
AR	551246.	200482.	479.	3.50*	4.99*
AR	439345.	179402.	384.	3.53*	4.11*
AR	334906.	163552.	288.	2.27*	3.31*
AR	317669.	159707.	277.	2.20*	3.17*
AR	313710.	153082.	277.	2.25*	3.10*
AR	358907.	62347.	313.	2.05*	2.80*
AR	238937.	128297.	186.	2.65	2.44
AR	190788.	116789.	161.	1.75	2.04
AR	241684.	48061.	194.	1.42	1.93
AR	187971.	98940.	165.	1.23*	1.91*
AR	231777.	47951.	197.	1.29*	1.86*
AR	209028.	41434.	185.	1.31*	1.66*
AR	99668.	121596.	0.	1.21	1.47
AR	139599.	73848.	122.	1.08	1.42
AR	108424.	99271.	90.	0.82*	1.38*
AR	160274.	43105.	142.	1.01*	1.35*
AR	146317.	56433.	122.	1.22	1.35
AR	130400.	66698.	105.	0.78	1.31
AR	120619.	56051.	101.	1.07	1.17
AR	101613.	70771.	0.	1.04	1.15
AR	70596.	102839.	50.	0.72*	1.15*
AR	123649.	46888.	106.	0.74*	1.13*
AR	120189.	46735.	102.	0.74*	1.11*
AR	43733.	113683.	34.	0.74*	1.05*
AR	74226.	76791.	0.	0.82	1.00
AR	32125.	115848.	0.	1.79	0.98
AR	102979.	43156.	89.	0.67	0.97
AR	105582.	37374.	91.	0.66	0.95
AR	43318.	97362.	0.	0.66	0.93
AR	107699.	32161.	88.	0.68	0.93
AR	50009.	88897.	0.	1.28	0.92
AR	48035.	87317.	2.	1.80	0.90
AR	68179.	16923.	59.	0.40*	0.57*
AR	58863.	23276.	0.	0.22	0.55
AR	35425.	39679.	0.	1.08	0.50
AR	18869.	53138.	0.	0.30	0.48
AR	15399.	50093.	0.	0.57	0.44
AR	35166.	17804.	0.	0.34	0.35
AR	28005.	24816.	0.	0.30	0.35
AR	25391.	25156.	0.	0.29	0.34
AR	22154.	21294.	0.	0.25	0.29
AR	25391.	14614.	0.	0.25	0.27
AR	21776.	17116.	14.	0.42	0.26
AR	18370.	12323.	0.	0.19	0.20
AR	15932.	10823.	0.	0.16	0.18
AR	14537.	11627.	0.	0.15	0.17
AR	18548.	6093.	0.	0.17	0.16
AR	12223.	10280.	0.	0.13	0.15
AR	16430.	5363.	0.	0.15	0.14
AR	14537.	4745.	0.	0.13	0.13
AR	13383.	4368.	0.	0.54	0.12
AR	12073.	3941.	0.	0.11	0.11
AR	12073.	3941.	0.	0.11	0.11
AR	7966.	2600.	0.	0.25	0.07

LA	1574430.	391109.	1360.	17.26	13.06
LA	685919.	187233.	635.	3.98	5.80
LA	444350.	79052.	425.	2.96*	3.48*



ASW 6R0 SLIDELL  
 ASW 6R1 WELSH  
 ASW 0R3 ABBEVILLE MUNI  
 ASW PTN HARRY P WILLIAMS MEMORIAL  
 ASW OPL ST LANDRY PARISH  
 ASW ARA ACADIANA REGIONAL  
 ASW LA37 THIBODAUX MUNI  
 ASW 5R8 DE QUINCY INDUSTRIAL AIRPARK  
 ASW DRI BEAUREGARD PARISH  
 ASW 4R0 MCFILLEN AIR PARK  
 ASW 3R4 HART  
 ASW 3R8 NATCHITOCHEs MUNI  
 ASW 3R2 LE GROS MEMORIAL  
 ASW 3F4 VIVIAN  
 ASW LA23 LEEVILLE  
 ASW LA96 OAKLAWN  
 ASW M79 RAYVILLE MUNI  
 ASW 2F8 MOREHOUSE MEMORIAL  
 ASW BXA GEORGE R CARR MEMORIAL AIR FLD  
 ASW LA08 RICHARD PRIVETTE SR  
 ASW 3R7 JENNINGS  
 ASW 0M8 BYERLEY  
 ASW 0R4 CONCORDIA PARISH  
 ASW LA18 JONESVILLE  
 ASW 9LA6 PINEVILLE MUNICIPAL  
 ASW 4R5 EAST LAKE CHARLES  
 ASW F87 FARMERVILLE  
 ASW 9M6 KELLY  
 ASW 4R7 EUNICE  
 ASW 2R1 JEANERETTE  
 ASW 3F3 DESOTO PARISH  
 ASW SPH SPRINGHILL  
 ASW 0R5 DAVID G JOYCE  
 ASW 0M9 DELHI MUNI  
 ASW F24 MINDEN-WEBSTER  
 ASW F88 JONESBORO  
 ASW M80 SCOTT  
 ASW 2R3 WESTWEGO ARPT INC  
 ASW F89 WINNSBORO MUNI  
 ASW 2R7 FRANKLINTON  
 ASW 1R1 JENA

ASW ALM ALAMOGDRDO-WHITE SANDS REGIONAL  
 ASW LRU LAS CRUCES-CRAWFORD  
 ASW 4AC CORONADO  
 ASW Q64 ALAMEDA  
 ASW TCC TUCUMCARI MUNI  
 ASW CNM CAVERN CITY AIR TRML  
 ASW GUP SENATOR CLARKE FIELD  
 ASW CVN CLOVIS MUNI  
 ASW RUI RUIDOSO MUNI  
 ASW LAM LOS ALAMOS  
 ASW Q34 PORTALES MUNI  
 ASW LVS LAS VEGAS MUN  
 ASW SVC SILVER CITY & GRANT CO  
 ASW DMN DEMING MUNI  
 ASW SKX TAOS MUNI  
 ASW RTN CREWS FLD  
 ASW ONM SOCORRO MUNI  
 ASW ATS ARTESIA MUN

SLIDELL  
 WELSH  
 ABBEVILLE  
 PATTERSON  
 OPELOUSAS  
 NEW IBERIA  
 THIBODAUX  
 DE QUINCY  
 DE RIDDER  
 LAKE CHARLES  
 MANY  
 NATCHITOCHEs  
 CROWLEY  
 VIVIAN  
 LEEVILLE  
 FRANKLIN  
 RAYVILLE  
 BASTROP  
 BOGALUSA  
 COVINGTON  
 JENNINGS  
 LAKE PROVIDENCE  
 VIDALIA  
 JONESVILLE  
 PINEVILLE  
 LAKE CHARLES  
 FARMERVILLE  
 OAK GROVE  
 EUNICE  
 JEANERETTE  
 MANSFIELD  
 SPRINGHILL  
 WINNFIELD  
 DELHI  
 MINDEN  
 JONESBDRO  
 TALLULAH  
 WESTWEGO  
 WINNSBORO  
 FRANKLINTON  
 JENA

LA	376435.	65613.	354.	2.29*	2.94*
LA	254105.	43796.	242.	1.29	1.98
LA	241793.	53090.	224.	1.47*	1.96*
LA	143464.	142739.	459.	4.35	1.90
LA	228136.	39765.	214.	1.39*	1.78*
LA	130153.	108754.	339.	2.71	1.59
LA	176791.	30815.	166.	1.08*	1.38*
LA	136880.	23858.	129.	0.83*	1.07*
LA	136350.	23590.	138.	0.80	1.06
LA	132304.	23068.	123.	0.79*	1.03*
LA	77196.	13198.	74.	0.61	0.60
LA	59323.	23428.	171.	1.64	0.55
LA	69039.	14395.	50.	0.43*	0.55*
LA	26477.	51881.	0.	0.40	0.52
LA	49474.	16153.	0.	0.49	0.44
LA	44892.	14652.	0.	0.50	0.40
LA	46677.	11023.	26.	0.33*	0.38*
LA	40139.	13101.	0.	1.30	0.35
LA	32983.	10766.	0.	0.32	0.29
LA	26134.	8530.	0.	0.26	0.23
LA	26015.	8492.	0.	0.68	0.23
LA	22308.	7283.	0.	0.22	0.20
LA	22530.	7354.	0.	0.22	0.20
LA	22101.	7215.	0.	0.22	0.19
LA	20059.	6547.	0.	0.19	0.18
LA	18310.	5977.	0.	0.18	0.16
LA	16380.	4243.	54.	0.35	0.14
LA	15505.	5061.	0.	0.15	0.14
LA	15679.	5118.	0.	0.52	0.14
LA	15335.	5006.	0.	0.15	0.14
LA	14218.	4641.	0.	0.14	0.13
LA	14287.	4663.	0.	0.14	0.13
LA	14634.	4777.	0.	0.14	0.13
LA	13856.	4523.	0.	0.13	0.12
LA	12081.	3943.	0.	0.12	0.11
LA	11726.	3076.	37.	0.23	0.10
LA	10455.	3412.	0.	0.10	0.09
LA	10454.	3412.	0.	0.10	0.09
LA	9294.	3034.	0.	0.09	0.08
LA	8446.	2757.	0.	0.08	0.07
LA	5317.	1735.	0.	0.05	0.05

NM	608483.	198397.	574.	1.58*	5.36*
NM	582285.	198175.	560.	3.97*	5.19*
NM	379985.	229390.	0.	4.33	4.05
NM	217470.	92235.	0.	2.26	2.06
NM	233029.	47798.	205.	2.27	1.87
NM	134964.	123317.	82.	1.50	1.72
NM	109465.	133324.	48.	3.72	1.61
NM	100103.	130116.	2.	4.45	1.53
NM	78355.	130932.	0.	1.29	1.39
NM	37067.	117460.	0.	0.88	1.03
NM	131726.	23299.	124.	0.80*	1.03*
NM	43637.	88141.	17.	1.55	0.88
NM	16241.	109690.	1.	1.01	0.84
NM	64938.	32948.	27.	1.76	0.65
NM	45241.	33088.	142.	0.98	0.52
NM	41541.	8408.	33.	0.51	0.33
NM	27491.	14282.	0.	0.87	0.28
NM	30704.	10006.	17.	0.60	0.27

ASW	E06	LEA COUNTY-LOVINGTON	LOVINGTON	NM	30925.	10093.	0.	0.31	0.27
ASW	GNT	GRANTS-MILAN MUNI	GRANTS	NM	20081.	17131.	0.	0.24	0.25
ASW	E98	MID VALLEY AIRPARK	LOS LUNAS	NM	7109.	18265.	0.	0.13	0.17
ASW	TCS	TRUTH OR CONSEQUENCES MUNI	TRUTH OR CONSEQUENCES	NM	15762.	4818.	0.	0.48	0.13
ASW	5V5	SHIPROCK AIRSTRIP	SHIPROCK	NM	14131.	4611.	0.	0.14	0.12
ASW	1E6	TURNER RIDGEPORT	SILVER CITY	NM	983.	17509.	0.	0.07	0.12
ASW	Q14	ESPANOLA MUNI	ESPANOLA	NM	14156.	4621.	0.	0.14	0.12
ASW	Q19	AZTEC MUNI	AZTEC	NM	12365.	4036.	0.	0.12	0.11
ASW	E26	LEA COUNTY/JAL	JAL	NM	11709.	3822.	0.	0.12	0.10
ASW	0E0	MORIARTY	MORIARTY	NM	8782.	2367.	0.	0.09	0.08
ASW	E91	ANGEL FIRE	EAGLE NEST	NM	0.	10501.	0.	0.04	0.07
ASW	LSB	LORDSBURG MUNI	LORDSBURG	NM	7487.	2444.	0.	0.08	0.07
ASW	Q16	RESERVE	RESERVE	NM	1444.	3348.	0.	0.02	0.03
ASW	Q58	SANTA ROSA MUNICIPAL	SANTA ROSA	NM	3641.	1189.	0.	0.04	0.03
ASW	FSU	FORT SUMNER MUNI	FORT SUMNER	NM	2952.	964.	0.	0.03	0.03
ASW	Q37	CARRIZOZO MUNI	CARRIZOZO	NM	2166.	707.	0.	0.02	0.02
ASW	Q42	SPRINGER MUNI	SPRINGER	NM	632.	206.	0.	0.01	0.01
ASW	E89	CONCHAS STATE PARK	CONCHAS DAM	NM	820.	268.	0.	0.01	0.01
ASW	NM01	DULCE	DULCE	NM	820.	268.	0.	0.01	0.01
ASW	66E	FORT STANTON	RUIDOSO	NM	61.	20.	0.	0.00	0.00
ASW	SWO	STILLWATER MUNI	STILLWATER	OK	841270.	253133.	790.	6.07	7.27
ASW	DUC	HALLIBURTON FIELD	DUNCAN	OK	494585.	190931.	519.	3.45	4.55
ASW	GUY	GUYMON MUNI	GUYMON	OK	534405.	117037.	441.	5.58	4.33
ASW	OUN	MAX WESTHEIMER	NORMAN	OK	376704.	225811.	6.	13.71	4.00
ASW	SNL	SHAWNEE MUNI	SHAWNEE	OK	379536.	176775.	319.	4.41	3.69
ASW	ADH	ADA MUNI	ADA	OK	379163.	164155.	388.	2.91*	3.61*
ASW	F29	CLARENCE E PAGE MUNI	OKLAHOMA CITY	OK	456752.	85566.	434.	2.90*	3.60*
ASW	GOK	GUTHRIE MUNI	GUTHRIE	OK	436002.	100385.	341.	3.26	3.56
ASW	AXS	ALTUS MUNI	ALTUS	OK	346826.	131815.	326.	2.32*	3.18*
ASW	MKO	DAVIS FIELD	MUSKOGEE	OK	345286.	130090.	311.	3.60	3.16
ASW	BVO	FRANK PHILLIPS	BARTLESVILLE	OK	290883.	157492.	262.	3.07	2.98
ASW	OKM	OKMULGEE MUNI.	OKMULGEE	OK	313241.	75701.	209.	2.12*	2.58*
ASW	1H6	HARVEY YOUNG	TULSA	OK	263182.	85902.	0.	2.60	2.32
ASW	H45	SEMINOLE MUNI	SEMINOLE	OK	262920.	58739.	250.	1.68*	2.14*
ASW	FDR	FREDERICK MUNI	FREDERICK	OK	226642.	85017.	0.	2.59	2.07
ASW	CUH	CUSHING MUNI	CUSHING	OK	259255.	48799.	229.	3.14	2.05
ASW	PNC	PONCA CITY MUNI	PONCA CITY	OK	123908.	145637.	2.	6.28	1.79
ASW	3K1	ALVA MUNI	ALVA	OK	213132.	54207.	198.	1.42	1.78
ASW	ELK	ELK CITY MUNI	ELK CITY	OK	149440.	107277.	134.	1.45	1.71
ASW	F91	THOMAS P STAFFORD	WEATHERFORD	OK	154899.	60519.	143.	1.03*	1.43*
ASW	OK14	GOLDSBY	NORMAN	OK	81718.	131107.	0.	1.28	1.41
ASW	2EJ	EXPRESSWAY AIRPARK	OKLAHOMA CITY	OK	100391.	99048.	0.	1.21	1.33
ASW	CLK	CLINTON MUNI	CLINTON	OK	138547.	57662.	120.	1.17	1.30
ASW	F61	PAULS VALLEY MUNI	PAULS VALLEY	OK	153580.	35934.	960.	2.02	1.26
ASW	0F8	WILLIAM R. POGUE MUNI	SAND SPRINGS	OK	145366.	31675.	139.	0.94*	1.18*
ASW	2DT	DOWNTOWN AIRPARK	OKLAHOMA CITY	OK	78417.	91873.	0.	0.99	1.13
ASW	F62	IDABEL	IDABEL	OK	125853.	40470.	107.	1.41	1.11
ASW	CHK	CHICKASHA MUNI	CHICKASHA	OK	85240.	71991.	0.	1.00	1.04
ASW	1F0	DOWNTOWN ARDMORE	ARDMORE	OK	65869.	76692.	6.	2.82	0.95
ASW	MLC	MC ALESTER MUNI	MC ALESTER	OK	43621.	97629.	3.	2.33	0.94
ASW	1H7	GROVE MUNI	GROVE	OK	38756.	93189.	0.	0.65	0.88
ASW	GAG	GAGE MUNI	GAGE	OK	99048.	22562.	96.	0.76*	0.81*
ASW	5F2	DOWNTOWN AIRPARK	TULSA	OK	88438.	31546.	0.	0.88	0.80
ASW	WWR	WEST WOODWARD	WOODWARD	OK	65795.	50177.	0.	2.34	0.77
ASW	F28	MUSTANG FIELD	EL RENO	OK	79441.	25928.	0.	0.78	0.70
ASW	F10	HENRYETTA MUNI	HENRYETTA	OK	83031.	16167.	68.	1.15	0.66
ASW	RKR	ROBERT S KERR	POTEAU	OK	44034.	51157.	92.	1.44	0.63
ASW	H71	PRYOR	PRYOR CREEK	OK	49716.	43774.	0.	2.05	0.62
ASW	HBR	HOBART MUNI	HOBART	OK	75255.	18372.	73.	0.52	0.62

ASW DUA EAKER FIELD  
 ASW F31 LAKE TEXOMA STATE PARK  
 ASW MIO MIAMI MUNI  
 ASW HAX HATBOX FIELD  
 ASW H73 TAHLEQUAH MUNI  
 ASW 6K4 FAIRVIEW MUNI  
 ASW F36 CORDELL MUNI  
 ASW H05 WILBURTON MUNI  
 ASW 2F6 SKIATOOK MUNI  
 ASW F22 PERRY MUNI  
 ASW OK56 BLACKWELL-TONKAWA MUNI  
 ASW OK08 HILL TOP PVT  
 ASW 17K BOISE CITY  
 ASW OK68 MEDFORD MUNI  
 ASW 6F3 EAGLES NEST  
 ASW H68 WAGONER AIRSTRIP  
 ASW SUD STROUD MUNI  
 ASW 2M3 SALLISAW MUNI  
 ASW 7F4 SEQUOYAH PARK  
 ASW OK78 WATONGA  
 ASW 95F CLEVELAND MUNI  
 ASW F99 HOLDENVILLE MUNI  
 ASW H76 PAWHUSKA MUNI  
 ASW 3F7 JONES MEML  
 ASW 93F MIGNON LAIRD MUNI  
 ASW K92 HI-WAY  
 ASW F30 SULPHUR MUNI  
 ASW 92F CHATTANOOGA SKY HARBOR  
 ASW 1F4 MADILL MUNICIPAL  
 ASW OK70 MOORELAND MUNI  
 ASW OK73 SEILING  
 ASW OK60 CHEROKEE MUNI  
 ASW 0F7 FOUNTAINHEAD LODGE AIRPARK  
 ASW OK26 TIPTON MUNI  
 ASW H04 VINITA MUNI  
 ASW H66 NOWATA MUNI  
 ASW H01 CHANDLER MUNI  
 ASW Q44 BEAVER MUNI  
 ASW F53 NASH MUNI  
 ASW 1F1 LAKE MURRAY STATE PARK  
 ASW 86F CARNEGIE MUNI  
 ASW 91F ARROWHEAD  
 ASW F32 HEALDTON MUNI  
 ASW 87F 81ST STREET AIRPARK  
 ASW F38 CANEY CREEK  
 ASW K49 MUNICIPAL  
 ASW 4F1 KEYSTONE AIR PARK

DURANT  
 KINGSTON  
 MIAMI  
 MUSKOGEE  
 TAHLEQUAH  
 FAIRVIEW  
 CORDELL  
 WILBURTON  
 SKIATOOK  
 PERRY  
 BLACKWELL  
 LAWTON  
 BOISE CITY  
 MEDFORD  
 SAND SPRINGS  
 WAGONER  
 STROUD  
 SALLISAW  
 WAGONER  
 WATONGA  
 CLEVELAND  
 HOLDENVILLE  
 PAWHUSKA  
 BRISTOW  
 CHEYENNE  
 BARTLESVILLE  
 SULPHUR  
 CHATTANOOGA  
 MADILL  
 MOORELAND  
 SEILING  
 CHEROKEE  
 EUFAULA  
 TIPTON  
 VINITA  
 NOWATA  
 CHANDLER  
 BEAVER  
 HUGO  
 OVERBROOK  
 CARNEGIE  
 CANADIAN  
 HEALDTON  
 BROKEN ARROW  
 KINGSTON  
 TEXHOMA  
 CLEVELAND

OK 45846. 48114. 0. 1.21 0.62  
 OK 13845. 76025. 0. 0.37 0.60  
 OK 54301. 19008. 44. 0.63 0.49  
 OK 40991. 31028. 0. 0.46 0.48  
 OK 40896. 24964. 0. 0.44 0.44  
 OK 42604. 22240. 0. 0.45 0.43  
 OK 34723. 22830. 111. 0.76 0.38  
 OK 19805. 34012. 0. 0.29 0.36  
 OK 27568. 23062. 0. 0.32 0.34  
 OK 33486. 17550. 0. 0.35 0.34  
 OK 38655. 9888. 132. 0.97 0.32  
 OK 34589. 11291. 0. 0.34 0.30  
 OK 28214. 14775. 0. 0.30 0.29  
 OK 20914. 23453. 0. 0.26 0.29  
 OK 31627. 10323. 0. 0.31 0.28  
 OK 30258. 10485. 0. 0.30 0.27  
 OK 16563. 22033. 0. 0.22 0.26  
 OK 22664. 12962. 0. 0.24 0.24  
 OK 21771. 12672. 0. 0.23 0.23  
 OK 20942. 12514. 0. 0.23 0.22  
 OK 23477. 7662. 0. 0.23 0.21  
 OK 10796. 20638. 0. 0.16 0.21  
 OK 23762. 7755. 0. 0.23 0.21  
 OK 21852. 10095. 0. 0.22 0.21  
 OK 16829. 13827. 0. 0.19 0.20  
 OK 13959. 16361. 0. 0.17 0.20  
 OK 12775. 12504. 0. 0.15 0.17  
 OK 14434. 10614. 0. 0.16 0.17  
 OK 11587. 12116. 0. 0.14 0.16  
 OK 12939. 9790. 0. 0.15 0.15  
 OK 15028. 7688. 0. 0.16 0.15  
 OK 11245. 9729. 0. 0.13 0.14  
 OK 11619. 9357. 0. 0.13 0.14  
 OK 15330. 5004. 0. 0.15 0.14  
 OK 13479. 5581. 0. 0.14 0.13  
 OK 10376. 8952. 0. 0.12 0.13  
 OK 14388. 4696. 0. 0.14 0.13  
 OK 8257. 9316. 0. 0.10 0.12  
 OK 11278. 4863. 0. 0.12 0.11  
 OK 12158. 3968. 0. 0.12 0.11  
 OK 10066. 3285. 0. 0.10 0.09  
 OK 9643. 3147. 0. 0.09 0.08  
 OK 4821. 7139. 0. 0.07 0.08  
 OK 8706. 2841. 0. 0.08 0.08  
 OK 5579. 1821. 0. 0.05 0.05  
 OK 6170. 2014. 0. 0.06 0.05  
 OK 242. 79. 0. 0.00 0.00

ASW SGR HULL FIELD  
 ASW ILE KILLEEN MUNI  
 ASW MDD MIDLAND AIRPARK  
 ASW TDW TRADEWIND  
 ASW HPY HUMPHREY  
 ASW DTO DENTON MUNI  
 ASW TPL DRAUGHON-MILLER MUNI  
 ASW AAP ANDRAU AIRPARK  
 ASW F42 PHIL L HUDSON FIELD  
 ASW SPX HOUSTON GULF  
 ASW F54 ARLINGTON MUNI  
 ASW T02 CLOVER FIELD

HOUSTON  
 KILLEEN  
 MIDLAND  
 AMARILLO  
 HOUSTON  
 DENTON  
 TEMPLE  
 HOUSTON  
 MESQUITE  
 LEAGUE CITY  
 ARLINGTON  
 HOUSTON

TX 2466429. 522147. 2310. 14.74 19.86  
 TX 1964283. 445407. 1859. 11.59\* 16.01\*  
 TX 1943066. 374619. 1821. 12.04\* 15.40\*  
 TX 1503804. 327026. 1399. 9.27\* 12.16\*  
 TX 1497868. 261223. 1394. 9.03\* 11.69\*  
 TX 1228634. 227671. 1122. 7.24\* 9.68\*  
 TX 1117432. 291292. 1137. 6.48 9.36  
 TX 1167602. 199804. 1110. 8.60\* 9.09\*  
 TX 1012519. 203616. 942. 6.17\* 8.08\*  
 TX 727633. 125654. 685. 4.17 5.67  
 TX 645358. 152069. 585. 4.82 5.30  
 TX 529242. 215960. 0. 5.31 4.95

ASW LFK ANGELINA COUNTY  
 ASW F60 MCGREGOR MUNI  
 ASW MWL MINERAL WELLS  
 ASW T27 BURNET MUNI KATE CRADDOCK FIELD  
 ASW T39 HUNTSVILLE MUNI  
 ASW 3R3 TIMS AIRPARK  
 ASW GVT MAJORS  
 ASW E02 SCHLEMEYER FIELD  
 ASW F18 CLEBURNE MUNI  
 ASW F67 GRAND PRAIRIE MUNI  
 ASW ALI ALICE INTERNATIONAL  
 ASW T47 KICKAPOO DOWNTOWN AIRPARK  
 ASW T41 LA PORTE MUNI  
 ASW BWD BROWNWOOD MUNI  
 ASW 21XS BIG SPRING  
 ASW PRX COX FLD  
 ASW DHT DALHART MUNI  
 ASW F26 DALLAS NORTH  
 ASW 3R0 BEEVILLE MUNI  
 ASW F70 MANGHAM FLD  
 ASW T69 SINTON  
 ASW T29 PEARLAND  
 ASW DRT DEL RIO INTL  
 ASW TRL TERRELL MUNICIPAL  
 ASW BMT BEAUMONT MUNI  
 ASW T17 WEISER AIR PARK  
 ASW CNW JAMES CONNALLY  
 ASW CRS CORSICANA MUNI  
 ASW 3R1 BAY CITY MUNI  
 ASW GLE GAINESVILLE MUNI  
 ASW T86 LAKESIDE  
 ASW LJN BRAZORIA COUNTY  
 ASW PSX PALACIOS MUNI  
 ASW 4R2 HORSESHOE BAY  
 ASW F03 MT PLEASANT MUNI  
 ASW PEQ PECOS MUNI  
 ASW LNC LANCASTER  
 ASW F82 TOWN & COUNTRY AIRPARK  
 ASW WEA PARKER COUNTY  
 ASW JAS JASPER COUNTY AIRPORT-BELL FIELD  
 ASW F69 AIR PARK-DALLAS  
 ASW ASL HARRISON COUNTY  
 ASW F05 WILBARGER COUNTY  
 ASW OCH EAST TEXAS REGIONAL  
 ASW SNK WINSTON FIELD  
 ASW BGD HUTCHINSON COUNTY  
 ASW ELA EAGLE LAKE  
 ASW PPA PERRY LEFORS FIELD  
 ASW PSN PALESTINE MUNI  
 ASW FST PECOS COUNTY  
 ASW T98 SAN MARCOS MUNI  
 ASW CDS CHILDRESS MUNI  
 ASW T04 GEORGETOWN MUNI  
 ASW F46 ROCKWALL MUNI  
 ASW F14 WICHITA VALLEY  
 ASW F39 GRAYSON CO  
 ASW F72 OAK GROVE  
 ASW SWI SHERMAN MUNICIPAL  
 ASW 7F3 CADDO MILLS MUN  
 ASW Q70 STRATFORD FIELD

LUFKIN TX 515024. 187054. 486. 3.24 4.66  
 MCGREGOR TX 478781. 162514. 432. 3.52 4.26  
 MINERAL WELLS TX 502177. 87601. 482. 3.11 3.92  
 BURNET TX 447658. 116112. 424. 3.11\* 3.75\*  
 HUNTSVILLE TX 484499. 79339. 483. 2.18 3.75  
 AUSTIN TX 433810. 119263. 1085. 7.34 3.67  
 GREENVILLE TX 444622. 979866. 486. 2.45\* 3.48\*  
 ODESSA TX 367429. 156826. 834. 9.21 3.48  
 CLEBURNE TX 429151. 74757. 400. 2.60\* 3.35\*  
 GRAND PRAIRIE TX 304398. 196112. 0. 3.55 3.33  
 ALICE TX 426824. 71041. 3316. 2.05 3.31  
 WICHITA FALLS TX 393232. 86893. 353. 2.33\* 3.19\*  
 LA PORTE TX 375417. 101058. 1043. 6.76 3.17  
 BROWNWOOD TX 303703. 161395. 279. 3.87 3.09  
 BIG SPRING TX 390310. 69776. 360. 2.32\* 3.06\*  
 PARIS TX 299977. 155820. 289. 2.41 3.03  
 DALHART TX 315878. 116966. 262. 2.74 2.88  
 PLANO TX 243494. 184839. 0. 2.88 2.85  
 BEEVILLE TX 342328. 60529. 328. 2.00\* 2.68\*  
 FORT WORTH TX 282869. 97698. 0. 2.78 2.53  
 SINTON TX 322499. 54670. 179. 1.67 2.51  
 PEARLAND TX 194307. 168784. 0. 2.40 2.41  
 DEL RIO TX 226473. 135097. 866. 3.98 2.40  
 TERRELL TX 296631. 54806. 257. 2.33 2.34  
 BEAUMONT TX 221281. 84509. 716. 4.77 2.03  
 HOUSTON TX 226577. 73955. 0. 2.17 2.00  
 WACO TX 233522. 46084. 192. 1.43\* 1.86\*  
 CORSICANA TX 234539. 43326. 220. 1.36 1.85  
 BAY CITY TX 236195. 41192. 220. 1.42\* 1.84\*  
 GAINESVILLE TX 228685. 43336. 209. 1.80 1.81  
 HOUSTON TX 219921. 52108. 955. 4.17 1.81  
 LAKE JACKSON TX 122533. 141221. 201. 1.73 1.75  
 PALACIOS TX 224414. 34282. 92. 0.60 1.72  
 MARBLE FALLS TX 210184. 36974. 190. 1.75 1.64  
 MT PLEASANT TX 204265. 35633. 190. 1.24 1.59  
 PECOS CITY TX 181886. 36999. 141. 1.84 1.45  
 LANCASTER TX 184255. 33440. 164. 1.93 1.45  
 LUBBOCK TX 154565. 50450. 0. 1.51 1.36  
 WEATHERFORD TX 154758. 45493. 517. 3.41 1.33  
 JASPER TX 171108. 28340. 169. 0.90 1.33  
 DALLAS TX 150818. 49228. 0. 1.47 1.33  
 MARSHALL TX 167077. 29138. 155. 1.01\* 1.30\*  
 VERNON TX 163036. 28507. 151. 1.00\* 1.27\*  
 NACOGDOCHES TX 62343. 125712. 0. 2.70 1.25  
 SNYDER TX 154040. 30152. 120. 1.47 1.22  
 BORGER TX 78646. 101566. 152. 2.11 1.20  
 EAGLE LAKE TX 137064. 23465. 130. 0.71 1.07  
 PAMPA TX 129820. 28535. 85. 1.15 1.05  
 PALESTINE TX 122193. 26892. 114. 0.75 0.99  
 FORT STOCKTON TX 122850. 26290. 87. 1.60 0.99  
 SAN MARCOS TX 119796. 29535. 465. 2.28 0.99  
 CHILDRESS TX 126985. 21244. 124. 0.61 0.98  
 GEORGETOWN TX 107036. 29546. 262. 1.84 0.91  
 ROCKWALL TX 102339. 33405. 0. 1.00 0.90  
 WICHITA FALLS TX 94221. 41595. 0. 3.13 0.90  
 SHERMAN-DENISON TX 68992. 65720. 0. 2.41 0.90  
 FORT WORTH TX 113181. 20777. 99. 0.65\* 0.89\*  
 SHERMAN TX 102327. 29720. 89. 0.83 0.88  
 CADDO MILLS TX 100014. 32648. 0. 0.98 0.88  
 STRATFORD TX 109636. 21875. 102. 0.67\* 0.87\*

ASW ORG ORANGE COUNTY  
ASW T80 KLEBERG COUNTY  
ASW ERV KERRVILLE MUNI/LOUIS SCHREINER FLD  
ASW E15 GRAHAM MUNI  
ASW MRF MARFA MUNI  
ASW 4F2 PANOLA COUNTY  
ASW 1F9 BRIDGEPORT MUNI  
ASW F71 LUCK FIELD  
ASW CZT DIMMIT COUNTY  
ASW F44 ATHENS MUNICIPAL  
ASW T30 MC KINLEY FIELD  
ASW CLC CLEAR LAKE METROPORT  
ASW SWW SWEETWATER MUNI  
ASW CXO MONTGOMERY COUNTY  
ASW F51 WINNSBORO MUNI  
ASW 30F LAKE VIEW  
ASW F55 GRANBURY MUNI  
ASW F12 RUSK COUNTY  
ASW 3R5 NEW BRAUNFELS MUNI  
ASW 6R7 COLUMBUS  
ASW 15R KARDYS  
ASW Q28 HEREFORD MUNI  
ASW T82 GILLESPIE COUNTY  
ASW Q27 DUMAS MUNI  
ASW RKP ARANSAS CO  
ASW T99 WESTSIDE AIRPARK  
ASW 6R9 LLANO MUNI  
ASW 0F2 BOWIE MUNI  
ASW SEP CLARK FIELD MUNI  
ASW Q55 DIMMITT MUNI  
ASW 8F7 DECATUR MUNI  
ASW F17 CENTER MUNI  
ASW PYX PERRYTON OCHILTREE COUNTY  
ASW 20R CRYSTAL CITY MUNI  
ASW 15F HASKELL MUNI  
ASW INK WINKLER COUNTY  
ASW CFD COULTER FIELD  
ASW E16 SHALLOWATER  
ASW T89 CASTROVILLE MUNI  
ASW T18 BROOKS COUNTY  
ASW Q47 SPEARMAN  
ASW UVA GARNER FIELD  
ASW T15 MARLIN  
ASW OZA OZONA MUNI  
ASW T65 MID VALLEY  
ASW Q26 TERRY COUNTY  
ASW 6F4 ELMDALE AIRPARK  
ASW 3F9 MINEOLA WISENER FIELD  
ASW 2F5 LAMESA MUNI  
ASW 23F GOODE  
ASW TX04 WEST TEXAS  
ASW Q24 LEVELLAND MUNI  
ASW COT COTULLA MUNICIPAL  
ASW T97 CALHOUN COUNTY  
ASW E38 ALPINE MUNI  
ASW Q06 CITY OF TULIA/SWISHER COUNTY MUNI  
ASW 84R SMITHVILLE MUNI  
ASW 9R5 HUNT  
ASW F49 SLATON MUNI  
ASW F41 ENNIS MUNI

ORANGE  
KINGSVILLE  
KERRVILLE  
GRAHAM  
MARFA  
CARTHAGE  
BRIDGEPORT  
FORT WORTH  
CARRIZO SPRINGS  
ATHENS  
PEARSALL  
CLEAR LAKE CITY  
SWEETWATER  
CONROE  
WINNSBORO  
LAKE DALLAS  
GRANBURY  
HENDERSON  
NEW BRAUNFELS  
COLUMBUS  
CIBOLO  
HEREFORD  
FREDERICKSBURG  
DUMAS  
ROCKPORT  
SAN ANTONIO  
LLANO  
BOWIE  
STEPHENVILLE  
DIMMITT  
DECATUR  
CENTER  
PERRYTON  
CRYSTAL CITY  
HASKELL  
WINK  
BRYAN  
SHALLOWATER  
CASTROVILLE  
FALFURRIAS  
SPEARMAN  
UVALDE  
MARLIN  
OZONA  
WESLACO  
BROWNFIELD  
ABILENE  
MINEOLA  
LAMESA  
KELLER  
EL PASO  
LEVELLAND  
COTULLA  
PORT LAVACA  
ALPINE  
TULIA  
SMITHVILLE  
PORTLAND  
SLATON  
ENNIS

TX 75902. 55333. 231. 1.59 0.87  
TX 106916. 20070. 720. 0.88 0.84  
TX 93760. 31985. 67. 2.80 0.84  
TX 102460. 21370. 74. 1.28 0.82  
TX 104548. 19583. 89. 0.87 0.82  
TX 103338. 18428. 0. 0.21 0.81  
TX 98328. 22501. 91. 0.61\* 0.80\*  
TX 87145. 28444. 0. 0.83 0.77  
TX 97942. 17081. 91. 0.59\* 0.76\*  
TX 88750. 19577. 77. 0.71 0.72  
TX 89063. 16253. 78. 0.52\* 0.70\*  
TX 0. 105363. 0. 0.51\* 0.70\*  
TX 37987. 66463. 0. 0.55 0.69  
TX 75885. 24767. 0. 2.81 0.67  
TX 80639. 14063. 75. 0.49\* 0.63\*  
TX 69130. 22564. 0. 0.67 0.61  
TX 77223. 13368. 74. 0.47\* 0.60\*  
TX 72068. 18915. 224. 1.44 0.60  
TX 59285. 30192. 0. 0.61 0.59  
TX 73742. 12644. 70. 0.49\* 0.57\*  
TX 61002. 19911. 0. 0.58 0.54  
TX 61668. 20131. 0. 1.48 0.54  
TX 69146. 12059. 64. 0.42\* 0.54\*  
TX 61229. 19986. 0. 0.60 0.54  
TX 60325. 18894. 33. 2.01 0.53  
TX 57734. 18844. 0. 0.55 0.51  
TX 65287. 11383. 60. 0.39\* 0.51\*  
TX 61743. 11612. 52. 0.52 0.49  
TX 46581. 27716. 0. 1.57 0.49  
TX 54935. 17934. 0. 0.54 0.48  
TX 61888. 10955. 57. 0.36\* 0.48\*  
TX 28583. 40859. 0. 0.39 0.46  
TX 51411. 16782. 0. 1.30 0.45  
TX 57601. 10045. 54. 0.35\* 0.45\*  
TX 56581. 11874. 40. 0.69 0.45  
TX 56597. 10586. 52. 0.58 0.45  
TX 52849. 13717. 172. 1.11 0.44  
TX 50108. 16355. 0. 0.48 0.44  
TX 48700. 15896. 0. 0.47 0.43  
TX 55172. 9990. 103. 0.39 0.43  
TX 47883. 15629. 0. 0.47 0.42  
TX 47199. 15408. 0. 1.07 0.42  
TX 52052. 9087. 48. 0.32\* 0.41\*  
TX 30703. 31680. 0. 0.37 0.41  
TX 46810. 15279. 0. 0.46 0.41  
TX 37053. 22935. 0. 0.40 0.40  
TX 45751. 14933. 0. 0.44 0.40  
TX 51016. 9028. 46. 0.29\* 0.40\*  
TX 45665. 14905. 0. 1.42 0.40  
TX 43990. 14362. 0. 0.42 0.39  
TX 43963. 14353. 0. 0.42 0.39  
TX 38111. 17806. 0. 0.39 0.37  
TX 47449. 8111. 61. 0.38\* 0.37\*  
TX 46065. 8034. 43. 0.28\* 0.36\*  
TX 27552. 24793. 0. 0.98 0.35  
TX 38786. 12662. 0. 0.38 0.34  
TX 38126. 12444. 0. 0.36 0.34  
TX 38126. 12444. 0. 0.36 0.34  
TX 38905. 12700. 0. 0.38 0.34  
TX 38005. 12403. 0. 0.37 0.33

ASW F04 SAGINAW  
 ASW T92 MASON COUNTY  
 ASW F13 CHEROKEE COUNTY  
 ASW 69R EDWARDS COUNTY  
 ASW RFG ROOKE FIELD  
 ASW Q54 BENDER AIR PARK  
 ASW 1E5 HEMPHILL COUNTY  
 ASW SR5 WHARTON MUNI  
 ASW T00 CHAMBERS COUNTY  
 ASW T90 GUADALUPE COUNTY  
 ASW 6R4 BIRD'S NEST  
 ASW 52F AERO VALLEY  
 ASW 61F KEZER AIR RANCH  
 ASW 2F7 COMMERCE MUNI  
 ASW EGP EAGLE PASS MUNI  
 ASW Q41 FLOYDADA MUNI  
 ASW F00 JONES FIELD  
 ASW BKD STEPHENS COUNTY  
 ASW E52 VEGA-OLDHAM COUNTY  
 ASW T53 NUECES COUNTY  
 ASW T72 HEARNE MUNI  
 ASW ONY OLNEY MUNI  
 ASW Q43 SUNRAY  
 ASW ECE EL CAMPO METRO AIRPORT INC  
 ASW 40F FLYING TIGERS  
 ASW E11 ANDREWS COUNTY  
 ASW T78 LIBERTY MUNI  
 ASW T31 PORT ISABEL-CAMERON COUNTY  
 ASW TX05 AERO COUNTRY  
 ASW VHN CULBERSON COUNTY  
 ASW SLR SULPHUR SPRINGS MUNI  
 ASW 31R GIDDINGS-LEE COUNTY  
 ASW E35 FABENS  
 ASW ATA ATLANTA MUNI  
 ASW E13 CRANE COUNTY  
 ASW E29 SONORA MUNI  
 ASW Q46 EDWARD WARREN FLD  
 ASW 59F SEAGOVILLE  
 ASW E01 ROY HURD MEMORIAL  
 ASW 3F6 DAN E RICHARDS MUNICIPAL  
 ASW 26R JACKSON COUNTY  
 ASW 2R9 KARNES COUNTY  
 ASW 3R9 LAKEWAY AIRPARK  
 ASW F06 MARIAN AIRPARK  
 ASW 07R BISHOP MUNI  
 ASW 00R LIVINGSTON MUNI  
 ASW 11R BRENHAM MUNI  
 ASW BBD CURTIS FIELD  
 ASW F56 ARLEDGE FIELD  
 ASW 3F0 BLUE MOUND  
 ASW COM COLEMAN MUNI  
 ASW 1F3 HARTLEE FIELD  
 ASW TX80 FOLLETT/LIPSCOMB COUNTY  
 ASW JCT KIMBLE COUNTY  
 ASW ETN EASTLAND MUNI  
 ASW E57 DENVER CITY  
 ASW F25 OBRIEN AIRPARK  
 ASW 2F9 TOM DANAHAR  
 ASW 07F GLADEWATER MUNI  
 ASW 1E9 GARTRELL FIELD

FORT WORTH  
 MASON  
 JACKSONVILLE  
 ROCKSPRINGS  
 REFUGIO  
 FRIONA  
 CANADIAN  
 WHARTON  
 ANAHUAC  
 SEGUIN  
 AUSTIN  
 ROANOKE  
 SPRINGTOWN  
 COMMERCE  
 EAGLE PASS  
 FLOYDADA  
 BONHAM  
 BRECKENRIDGE  
 VEGA  
 ROBSTOWN  
 HEARNE  
 OLNEY  
 SUNRAY  
 EL CAMPO  
 PARIS  
 ANDREWS  
 LIBERTY  
 PORT ISABEL  
 MCKINNEY  
 VAN HORN  
 SULPHUR SPRINGS  
 GIDDINGS  
 FABENS  
 ATLANTA  
 CRANE  
 SONORA  
 MULESHOE  
 SEAGOVILLE  
 MONAHANS  
 PADUCAH  
 EDNA  
 KENEDY  
 AUSTIN  
 WELLINGTON  
 BISHOP  
 LIVINGSTON  
 BRENHAM  
 BRADY  
 STAMFORD  
 FORT WORTH  
 COLEMAN  
 DENTON  
 FOLLETT  
 JUNCTION  
 EASTLAND  
 DENVER CITY  
 WAXAHACHIE  
 WICHITA FALLS  
 GLADEWATER  
 CANYON

TX	37037.	12089.	0.	0.35	0.33
TX	39330.	9521.	37.	0.26*	0.32*
TX	36553.	11931.	0.	1.21	0.32
TX	42065.	6604.	138.	0.16	0.32
TX	37004.	9748.	113.	0.73	0.31
TX	34421.	11236.	0.	0.34	0.30
TX	35405.	9524.	12.	0.73	0.30
TX	33878.	11058.	0.	1.11	0.30
TX	33929.	11075.	0.	0.33	0.30
TX	33878.	11058.	0.	0.33	0.30
TX	35479.	9233.	114.	0.74	0.30
TX	33270.	10862.	0.	0.32	0.29
TX	31487.	10278.	0.	0.30	0.28
TX	34559.	6027.	32.	0.21*	0.27*
TX	29645.	9768.	0.	0.29	0.26
TX	29644.	9676.	0.	0.29	0.26
TX	29644.	9576.	0.	0.29	0.26
TX	29755.	9691.	1.	0.97	0.26
TX	28833.	9413.	0.	0.28	0.25
TX	27527.	8985.	0.	0.27	0.24
TX	27526.	8984.	0.	0.27	0.24
TX	24812.	11802.	81.	0.54	0.24
TX	26687.	8711.	0.	0.26	0.24
TX	27632.	9019.	0.	0.27	0.24
TX	22297.	13163.	0.	0.23	0.24
TX	27527.	3985.	0.	0.90	0.24
TX	26463.	8637.	0.	0.26	0.23
TX	26882.	7237.	75.	0.49	0.23
TX	26214.	8555.	0.	0.25	0.23
TX	26462.	8637.	0.	0.87	0.23
TX	18428.	15725.	0.	0.76	0.23
TX	29676.	5174.	27.	0.18*	0.23*
TX	25054.	8178.	0.	0.24	0.22
TX	25408.	8293.	0.	0.83	0.22
TX	25408.	8293.	0.	0.25	0.22
TX	23689.	7461.	13.	0.73	0.21
TX	23393.	7636.	0.	0.23	0.21
TX	23965.	7822.	0.	0.23	0.21
TX	24350.	7948.	0.	0.24	0.21
TX	23323.	7613.	0.	0.23	0.21
TX	22234.	7257.	0.	0.22	0.20
TX	23135.	6296.	61.	0.40	0.20
TX	23065.	7527.	0.	0.22	0.20
TX	22198.	7246.	0.	0.22	0.20
TX	21786.	7111.	0.	0.21	0.19
TX	21344.	6967.	0.	0.20	0.19
TX	22478.	5896.	70.	0.58	0.19
TX	21170.	6910.	0.	0.21	0.19
TX	21170.	6910.	0.	0.21	0.19
TX	19608.	7290.	0.	0.19	0.18
TX	21541.	5513.	74.	0.50	0.18
TX	20525.	6700.	0.	0.20	0.18
TX	21501.	5708.	64.	0.41	0.18
TX	23048.	4020.	21.	0.14*	0.18*
TX	20274.	5276.	65.	0.42	0.17
TX	19057.	6220.	0.	0.19	0.17
TX	18518.	6044.	0.	0.18	0.16
TX	18518.	6044.	0.	0.18	0.16
TX	17624.	5752.	0.	0.17	0.16
TX	18518.	6044.	0.	0.18	0.16

ASW TX06 MEXIA-LIMESTONE CO.  
 ASW 74R HORIZON  
 ASW T28 LAMPASAS  
 ASW F75 KNOX CITY MUNI  
 ASW 23R DEVINE MUNI  
 ASW 7F6 CLARKSVILLE-RED RIVER CO  
 ASW 7R9 BAILES  
 ASW T03 GENOA  
 ASW 3F2 CISCO MUNI  
 ASW T42 BALL  
 ASW 45R NARDIN COUNTY  
 ASW 6R3 CLEVELAND MUNI  
 ASW T74 TAYLOR MUNI  
 ASW 64R PEARLAND  
 ASW F98 YOAKUM COUNTY  
 ASW Q00 MUNICIPAL  
 ASW 5F1 POST-GARZA COUNTY MUNI  
 ASW F85 COCHRAN COUNTY  
 ASW T96 EL CAMPO AIRPARK  
 ASW E45 IRAAN MUNI  
 ASW T12 KIRBYVILLE  
 ASW 9F9 SYCAMORE STRIP  
 ASW 81R SAN SABA COUNTY MUNICIPAL  
 ASW 31F GAINES COUNTY  
 ASW PEZ PLEASANTON MUNI  
 ASW F21 MEMPHIS MUNI  
 ASW 77F WINTERS MUNI  
 ASW 7F7 CLIFTON MUNI  
 ASW 60F SEYMOUR MUNI  
 ASW 60R NAVASOTA MUNI  
 ASW T26 BAY CITY  
 ASW F83 ABERNATHY MUNI  
 ASW T56 HOUSTON COUNTY  
 ASW F97 SEAGRAVES  
 ASW E34 CLARENDON MUNI  
 ASW 7F9 COMANCHE COUNTY-CITY  
 ASW T21 HAMILTON MUNI  
 ASW 4F4 GILMER-UPSHUR COUNTY  
 ASW 54R ZUEHL  
 ASW 8F4 FOARD COUNTY  
 ASW T94 TWIN-OAKS  
 ASW F64 FLYING OAKS  
 ASW 21F JACKSBORO MUNI  
 ASW TX07 PRESIDIO LELY INTL  
 ASW F01 QUANAH MUNI  
 ASW E30 BRUCE FIELD  
 ASW 8F3 CROSBYTON MUNI  
 ASW 05F CITY-COUNTY  
 ASW 28F ALTA VISTA  
 ASW 9R4 TANNER'S  
 ASW F66 CARROLL AIR PARK  
 ASW T33 FLYING L RANCH  
 ASW 34R HALLETTSVILLE MUNI  
 ASW 37F MUNDAY MUNICIPAL  
 ASW 1E4 PALO DURO  
 ASW 70F FLYING HEART RANCH  
 ASW 9Fu DUBLIN MUNICIPAL  
 ASW 68F TEAGUE MUNICIPAL  
 ASW 46F LAVON NORTH  
 ASW 63F MUNI

MEXIA  
 SAN ANTONIO  
 LAMPASAS  
 KNOX CITY  
 DEVINE  
 CLARKSVILLE  
 ANGLETON  
 GENOA  
 CISCO  
 VICTORIA  
 KOUNTZE/SILSBEE  
 CLEVELAND  
 TAYLOR  
 PEARLAND  
 PLAINS  
 LITTLEFIELD  
 POST  
 MORTON  
 EL CAMPO  
 IRAAN  
 KIRBYVILLE  
 FORT WORTH  
 SAN SABA  
 SEMINOLE  
 PLEASANTON  
 MEMPHIS  
 WINTERS  
 CLIFTON  
 SEYMOUR  
 NAVASOTA  
 BAY CITY  
 ABERNATHY  
 CROCKETT  
 SEAGRAVES  
 CLARENDON  
 COMANCHE  
 HAMILTON  
 GILMER  
 MARION  
 CROWELL  
 SAN ANTONIO  
 FORT WORTH  
 JACKSBORO  
 PRESIDIO  
 QUANAH  
 BALLINGER  
 CROSBYTON  
 GATESVILLE  
 KELLER  
 PORT LAVACA  
 DE SOTO  
 BANDERA  
 HALLETTSVILLE  
 MUNDAY  
 AMARILLO  
 WACO  
 DUBLIN  
 TEAGUE  
 DALLAS  
 STANTON

TX	18502.	4874.	57.	0.36	0.16
TX	17873.	5833.	0.	0.17	0.16
TX	19066.	4841.	67.	0.38	0.16
TX	17191.	5611.	0.	0.16	0.15
TX	16708.	5453.	0.	0.16	0.15
TX	16938.	5528.	0.	0.16	0.15
TX	17445.	5694.	0.	0.17	0.15
TX	16253.	5306.	0.	0.16	0.14
TX	11646.	9168.	0.	0.13	0.14
TX	15998.	5222.	0.	0.15	0.14
TX	15830.	5183.	0.	0.15	0.14
TX	14819.	4837.	0.	0.14	0.13
TX	14218.	4641.	0.	0.14	0.13
TX	16463.	3798.	77.	0.20	0.13
TX	14161.	4622.	0.	0.14	0.12
TX	13761.	4492.	0.	0.13	0.12
TX	13903.	4538.	0.	0.14	0.12
TX	13367.	4363.	0.	0.13	0.12
TX	12504.	4082.	0.	0.12	0.11
TX	10893.	3556.	0.	0.10	0.10
TX	10893.	3556.	0.	0.10	0.10
TX	10952.	3575.	0.	0.11	0.10
TX	10893.	3556.	0.	0.10	0.10
TX	11645.	3801.	0.	0.11	0.10
TX	11646.	3801.	0.	0.11	0.10
TX	10585.	3455.	0.	0.10	0.09
TX	11355.	2941.	37.	0.24	0.09
TX	10585.	3455.	0.	0.10	0.09
TX	10585.	3455.	0.	0.10	0.09
TX	11870.	2070.	11.	0.07*	0.09*
TX	10076.	3289.	0.	0.10	0.09
TX	9055.	2956.	0.	0.09	0.08
TX	8927.	2914.	0.	0.09	0.08
TX	9446.	3083.	0.	0.09	0.08
TX	8715.	2844.	0.	0.08	0.08
TX	9589.	3130.	0.	0.09	0.08
TX	9527.	3110.	0.	0.09	0.08
TX	7414.	2420.	0.	0.07	0.07
TX	8254.	2695.	0.	0.08	0.07
TX	8465.	2763.	0.	0.08	0.07
TX	8476.	2767.	0.	0.08	0.07
TX	7999.	2611.	0.	0.08	0.07
TX	8484.	2769.	0.	0.08	0.07
TX	8272.	2700.	0.	0.08	0.07
TX	7415.	2420.	0.	0.07	0.07
TX	8466.	2763.	0.	0.08	0.07
TX	6352.	2073.	0.	0.06	0.06
TX	6352.	2073.	0.	0.06	0.06
TX	6552.	2139.	0.	0.06	0.06
TX	5701.	1861.	0.	0.05	0.05
TX	5531.	1806.	0.	0.05	0.05
TX	5447.	1778.	0.	0.05	0.05
TX	6203.	2024.	0.	0.06	0.05
TX	6122.	1998.	0.	0.06	0.05
TX	6194.	2022.	0.	0.06	0.05
TX	4000.	1306.	0.	0.04	0.04
TX	4237.	1383.	0.	0.04	0.04
TX	3064.	1000.	0.	0.03	0.03
TX	2129.	695.	0.	0.02	0.02
TX	1606.	524.	0.	0.02	0.01

ASW TA41 SUNLAND AIRPARK

EL PASO

TX

1702.

556.

0. 0.02

0.01

WESTERN PACIFIC REGION

AWP P16 FALCON FIELD  
 AWP PRC PRESCOTT MUNI  
 AWP P08 COOLIDGE FLORENCE MUNI  
 AWP P37 GLENDALE MUNI  
 AWP FHU SIERRA VISTA MUNI  
 AWP INW WINSLOW MUNI  
 AWP P10 CHANDLER MUNI  
 AWP PGA PAGE MUNICIPAL  
 AWP LHU LAKE HAVASU CITY  
 AWP P06 BULLHEAD CITY  
 AWP E63 GILA BEND MUNI  
 AWP P14 HOLBROOK MUNI  
 AWP P34 WINDOW ROCK  
 AWP RYN RYAN FIELD  
 AWP SOW SHOW LOW MUNI  
 AWP DUG BISBEE DOUGLAS INTL  
 AWP SEZ SEDONA  
 AWP P33 COCHISE COUNTY  
 AWP SJN ST JOHNS MUNI  
 AWP E14 AVRA VALLEY  
 AWP E18 CAREFREE  
 AWP Q35 SPRINGVILLE-EAGAR MUNI  
 AWP P32 WILLIAMS MUNI  
 AWP SAD SAFFORD MUNI  
 AWP CGZ CASA GRANDE MUNI  
 AWP IGM MOHAVE COUNTY  
 AWP E51 BAGDAD  
 AWP P52 COTTONWOOD  
 AWP P20 PARKER MUNI  
 AWP L07 MEMORIAL AIRFIELD  
 AWP 4PH POLACCA  
 AWP 4E0 TAYLOR  
 AWP P13 GLOBE-SAN CARLOS REGIONAL AIR FACILITY  
 AWP E55 PIERCE  
 AWP P19 STELLAR AIRPARK  
 AWP OLS NOGALES INTL  
 AWP E69 PAYSON  
 AWP MZJ MARANA AIRPARK  
 AWP E60 ELOY MUNI  
 AWP DGL DOUGLAS MUNI  
 AWP E19 TURF  
 AWP TBC TUBA CITY  
 AWP P04 BISBEE MUNI  
 AWP BXK BUCKEYE MUNI  
 AWP E25 WICKENBURG MUNI  
 AWP 01E HEREFORD  
 AWP E78 SELLS  
 AWP E24 WHITERIVER  
 AWP E64 FRAM  
 AWP CFT GREENLEE COUNTY  
 AWP 0V7 KAYENTA  
 AWP U30 TEMPLE BAR  
 AWP E58 THREE POINT  
 AWP E76 RIMROCK

MESA  
 PRESCOTT  
 COOLIDGE  
 GLENDALE  
 SIERRA V  
 WINSLOW  
 CHANDLER  
 PAGE  
 LAKE HAVASU CITY  
 BULLHEAD CITY  
 GILA BEND  
 HOLBROOK  
 WINDOW ROCK  
 TUCSON  
 SHOW LOW  
 DOUGLAS BISBEE  
 SEDONA  
 WILLCOX  
 ST JOHNS  
 TUCSON  
 CAREFREE  
 SPRINGVILLE  
 WILLIAMS  
 SAFFORD  
 CASA GRANDE  
 KINGMAN  
 BAGDAD  
 COTTONWOOD  
 PARKER  
 CHANDLER  
 POLACCA  
 TAYLOR  
 GLOBE  
 BUCKEYE  
 CHANDLER  
 NOGALES  
 PAYSON  
 MARANA  
 ELOY  
 DOUGLAS  
 PHOENIX  
 TUBA CITY  
 BISBEE  
 BUCKEYE  
 WICKENBURG  
 SIERRA VISTA  
 SELLS  
 WHITERIVER  
 GLENDALE  
 CLIFTON-MORENCI  
 KAYENTA  
 TEMPLE BAR  
 CASA GRANDE  
 RIMROCK

AZ 509984. 271816. 0. 6.45 5.19  
 AZ 475662. 259389. 3. 15.69 4.89  
 AZ 336338. 109791. 0. 3.88 2.96  
 AZ 310413. 115502. 0. 2.97 2.83  
 AZ 216665. 149470. 264. 1.57\* 2.43\*  
 AZ 178958. 147198. 97. 4.51 2.17  
 AZ 184867. 112980. 0. 1.92 1.98  
 AZ 116369. 143344. 0. 4.66 1.73  
 AZ 101116. 138343. 1. 4.57 1.59  
 AZ 100047. 138013. 0. 1.44 1.58  
 AZ 127504. 94376. 0. 1.36 1.47  
 AZ 140048. 63293. 0. 1.37 1.35  
 AZ 73574. 120591. 51. 0.94\* 1.29\*  
 AZ 138564. 48129. 0. 1.31 1.24  
 AZ 59512. 116346. 0. 0.92 1.17  
 AZ 86827. 85256. 11. 2.92 1.14  
 AZ 74106. 74318. 66. 0.60\* 0.99\*  
 AZ 94333. 42037. 0. 0.92 0.91  
 AZ 41718. 93371. 152. 1.40 0.90  
 AZ 98464. 32148. 0. 0.93 0.97  
 AZ 16956. 110897. 0. 0.66 0.85  
 AZ 15091. 110289. 0. 0.65 0.83  
 AZ 9712. 108533. 0. 0.60 0.79  
 AZ 58650. 45509. 0. 0.64 0.69  
 AZ 72976. 23823. 0. 0.69 0.64  
 AZ 37659. 57816. 1. 1.00 0.63  
 AZ 25910. 64677. 0. 0.42 0.60  
 AZ 23854. 66364. 0. 0.41 0.60  
 AZ 43694. 46465. 0. 0.51 0.60  
 AZ 63325. 20675. 0. 0.58 0.56  
 AZ 7315. 71961. 0. 0.29 0.53  
 AZ 7339. 66628. 0. 0.27 0.49  
 AZ 38120. 24136. 0. 0.39 0.41  
 AZ 45850. 14969. 0. 0.42 0.40  
 AZ 41402. 13515. 0. 0.38 0.36  
 AZ 38715. 12635. 0. 0.36 0.34  
 AZ 24814. 14381. 0. 0.25 0.26  
 AZ 27759. 9131. 0. 0.26 0.25  
 AZ 14188. 22201. 0. 0.19 0.24  
 AZ 22373. 7304. 0. 0.22 0.20  
 AZ 22115. 7219. 0. 0.22 0.19  
 AZ 14159. 4621. 0. 0.13 0.12  
 AZ 7907. 8205. 0. 0.09 0.11  
 AZ 11469. 3744. 0. 0.11 0.10  
 AZ 9062. 5101. 0. 0.09 0.09  
 AZ 7862. 2566. 0. 0.07 0.07  
 AZ 7002. 2285. 0. 0.06 0.06  
 AZ 6376. 2081. 0. 0.06 0.06  
 AZ 5175. 1689. 0. 0.05 0.05  
 AZ 6239. 2036. 0. 0.06 0.05  
 AZ 3901. 1273. 0. 0.04 0.03  
 AZ 1484. 3302. 0. 0.02 0.03  
 AZ 2433. 794. 0. 0.02 0.02  
 AZ 1572. 513. 0. 0.01 0.01



AWP	Q32	CHINLE	CHINLE	AZ	1609.	525.	0.	0.02	0.01
AWP	PRB	PASO ROBLES MUNI	PASO ROBLES	CA	1610708.	372034.	1759.	9.73*	13.17*
AWP	RBL	RED BLUFF MUNI	RED BLUFF	CA	1488074.	322699.	1688.	4.65	12.03
AWP	ACV	ARCATA	ARCATA/EUREKA/	CA	1171275.	300033.	1235.	3.69	9.78
AWP	CC8	CABLE	UPLAND	CA	1124527.	226931.	988.	4.59	8.98
AWP	VIS	VISALIA MUNI	VISALIA	CA	796231.	255095.	722.	8.20	6.99
AWP	L47	SANTA YNEZ	SANTA YNEZ	CA	691418.	157397.	707.	5.38*	5.64*
AWP	103	LODI	LODI	CA	662685.	118174.	677.	4.86*	5.19*
AWP	L66	CORONA MUNI	CORONA	CA	550587.	179718.	0.	17.66	4.85
AWP	PTV	PORTERVILLE MUNI	PORTERVILLE	CA	559086.	153088.	447.	8.34	4.73
AWP	WVI	WATSONVILLE MUNI	WATSONVILLE	CA	548224.	143677.	579.	3.69*	4.60*
AWP	WLW	WILLOWS-GLENN COUNTY	WILLOWS	CA	556337.	88185.	615.	1.93	4.28
AWP	008	COLUSA COUNTY	COLUSA	CA	475847.	82761.	484.	3.31*	3.71*
AWP	CMA	CAMARILLO	CAMARILLO	CA	398449.	154109.	0.	4.25	3.67
AWP	SBP	SAN LUIS OBISPO COUNTY	SAN LUIS OBISPO	CA	301185.	203580.	4.	12.94	3.35
AWP	056	GROSS FLD	NOVATO	CA	294359.	201457.	0.	3.53	3.29
AWP	CPM	COMPTON	COMPTON	CA	342422.	123896.	0.	3.27	3.10
AWP	000	ALTURAS MUNI	ALTURAS	CA	303514.	144371.	311.	2.71*	2.98*
AWP	LSN	LOS BANOS MUNI	LOS BANOS	CA	357623.	76392.	329.	4.05	2.88
AWP	UDD	BERMUDA DUNES	BERMUDA DUNES	CA	366382.	63077.	372.	2.51*	2.85*
AWP	SBT	TRI CITY	SAN BERNARDINO	CA	316282.	108686.	331.	2.27	2.82
AWP	WHP	WHITEMAN	LOS ANGELES	CA	293680.	105501.	0.	2.74	2.65
AWP	022	COLUMBIA	COLUMBIA	CA	220440.	177307.	0.	2.81	2.64
AWP	Q60	SIERRA SKY PARK	FRESNO	CA	208582.	159745.	0.	2.43	2.45
AWP	CEC	JACK MC NAMARA FIELD	CRESCENT CITY	CA	276808.	84203.	325.	0.87	2.40
AWP	L67	RIALTO MUNI /MIRO FLD/	RIALTO	CA	265160.	92181.	0.	2.59	2.37
AWP	SIY	SISKIYOU COUNTY	MONTAGUE	CA	208638.	141705.	208.	1.80*	2.33*
AWP	0VE	OROVILLE MUNI	OROVILLE	CA	182915.	165067.	0.	2.42	2.31
AWP	LPC	LOMPOC	LOMPOC	CA	212049.	132019.	0.	2.46	2.29
AWP	045	NUT TREE	VACAVILLE	CA	256466.	83695.	0.	12.93	2.26
AWP	011	PHOENIX FIELD	FAIR OAKS	CA	167845.	160145.	0.	2.26	2.18
AWP	TRK	TRUCKEE-TAHOE	TRUCKEE	CA	165454.	159363.	0.	7.41	2.16
AWP	085	BENTON FIELD	REDDING	CA	157396.	156738.	0.	2.15	2.09
AWP	PVF	PLACERVILLE	PLACERVILLE	CA	159959.	145247.	0.	2.03	2.03
AWP	017	NEVADA COUNTY AIR PARK	GRASS VALLEY	CA	186331.	109139.	0.	2.13	1.96
AWP	BLH	BLYTHE	BLYTHE	CA	130579.	145340.	16.	5.48	1.83
AWP	L16	MEADOWLARK	HUNTINGTON BEACH	CA	206151.	67302.	0.	1.92	1.82
AWP	Q99	SOUTH COUNTY ARPT OF SANTA CLARA COUNTY	SAN MARTIN	CA	204216.	66661.	0.	2.14	1.80
AWP	041	WOODLAND-WATTS FLD	WOODLAND	CA	150645.	116627.	0.	5.22	1.78
AWP	FOT	ROHHERVILLE	FORTUNA	CA	223286.	40572.	216.	1.75	1.75
AWP	307	HOLLISTER MUNI	HOLLISTER	CA	160014.	100508.	0.	1.85	1.73
AWP	AVX	CATALINA	AVALON	CA	125765.	118596.	0.	1.60	1.62
AWP	EED	NEEDLES	NEEDLES	CA	206533.	35196.	300.	1.57*	1.61*
AWP	2Q3	YOLO COUNTY	WINTERS/DAVIS/WOODLAND	CA	183236.	59814.	0.	1.92	1.61
AWP	DLO	DELANO MUNI	DELANO	CA	156387.	78129.	118.	2.14	1.56
AWP	SZP	SANTA PAULA	SANTA PAULA	CA	164459.	68148.	0.	1.59	1.55
AWP	RIR	RIVERSIDE FLA-BOB	RIVERSIDE/RUBIDOUX/	CA	175708.	57360.	0.	1.64	1.55
AWP	BWC	BRAWLEY MUNI	BRAWLEY	CA	149334.	77739.	0.	1.67	1.51
AWP	Q33	MAINE PRAIRIE	DIXON	CA	165120.	53910.	0.	1.66	1.46
AWP	027	OAKDALE	OAKDALE	CA	171746.	44689.	138.	1.58	1.44
AWP	Q59	FREMONT	FREMONT	CA	144072.	71083.	0.	1.60	1.43
AWP	Q53	FRANKLIN FIELD	FRANKLIN	CA	158964.	51874.	0.	1.66	1.40
AWP	UKI	UKIAH MUNI	UKIAH	CA	79867.	131429.	0.	4.02	1.40
AWP	001	SANTA ROSA AIR CENTER	SANTA ROSA	CA	157217.	51316.	0.	1.64	1.39
AWP	HAF	HALF MOON BAY	HALF MOON BAY	CA	152180.	56904.	0.	1.62	1.39
AWP	HMT	HEMET-RYAN	HEMET	CA	149230.	48792.	0.	1.56	1.32
AWP	SRU	SKYPARK	SANTA CRUZ	CA	104906.	92164.	0.	1.31	1.31
AWP	MNH	MAMMOTH LAKES	MAMMOTH LAKES	CA	67158.	127282.	0.	1.21	1.29
AWP	105	MONTAGUE-YREKA	MONTAGUE	CA	65125.	126617.	0.	1.18	1.27

AWP CLG COALINGA MUNI  
 AWP 005 CHESTER  
 AWP 053 CALISTOGA AIRPARK  
 AWP L12 REDLANDS MUNI  
 AWP 005 UNIVERSITY  
 AWP CXL CALEXICO INTL  
 AWP 089 FALL RIVER MILLS  
 AWP 036 TRACY MUNI  
 AWP 102 LAMPSON  
 AWP BIH BISHOP  
 AWP 069 PETALUMA SKY RANCH  
 AWP AUN AUBURN MUNI  
 AWP OCN OCEANSIDE MUNI  
 AWP 018 HANFORD MUNI  
 AWP TSP TEHACHAPI-KERN COUNTY  
 AWP 012 ANTIOCH  
 AWP MHV MOJAVE  
 AWP 093 SONOMA VALLEY  
 AWP 048 MENDOCINO COUNTY  
 AWP L45 BAKERSFIELD AIRPARK  
 AWP IYK INYOKERN-KERN COUNTY  
 AWP TLR TULARE MUNICIPAL  
 AWP MAE MADERA MUNI  
 AWP L39 RAMONA  
 AWP L08 BORREGO VALLEY  
 AWP Q68 PINE MOUNTAIN LAKE  
 AWP TRM THERMAL  
 AWP 088 RIO VISTA MUNI  
 AWP L49 SKYLARK FIELD  
 AWP 034 CALAVERAS COUNTY  
 AWP 206 CHOWCHILLA  
 AWP 070 WESTOVER FLD AMADOR COUNTY  
 AWP BNG BANNING MUNI  
 AWP L71 CALIFORNIA CITY MUNI  
 AWP L35 BIG BEAR CITY  
 AWP L70 AGUA DULCE AIRPARK  
 AWP L65 PERRIS VALLEY  
 AWP 2L0 RANCHO CALIFORNIA  
 AWP 094 SELMA  
 AWP 052 SUTTER COUNTY  
 AWP SVE SUSANVILLE MUNI  
 AWP SFR SAN FERNANDO  
 AWP 061 CAMERON AIRPARK  
 AWP 054 WEAVERVILLE  
 AWP L52 OCEANO-COUNTY  
 AWP 051 LINCOLN MUNI  
 AWP 042 WOODLAKE  
 AWP 209 PEARCE FIELD  
 AWP Q94 RIO LINDA  
 AWP 037 HAIGH FIELD  
 AWP APV APPLE VALLEY  
 AWP KIC MESA DEL REY  
 AWP L69 EL MIRAGE FLD  
 AWP L01 CRYSTAL  
 AWP 031 HEALDSBURG MUNI  
 AWP 201 GANSNER FIELD  
 AWP DAG BARSTOW-DAGGETT  
 AWP 291 GREEN ACRES  
 AWP CA35 SMITH RANCH  
 AWP Q49 FIREBAUGH

COALINGA  
 CHESTER  
 CALISTOGA  
 REDLANDS  
 DAVIS  
 CALEXICO  
 FALL RIVER MILLS  
 TRACY  
 LAKEPORT  
 BISHOP  
 PETALUMA  
 AUBURN  
 OCEANSIDE  
 HANFORD  
 TEHACHAPI  
 ANTIOCH  
 MOJAVE  
 SCHELLVILLE-SONOMA  
 LITTLE RIVER  
 BAKERSFIELD  
 INYOKERN  
 TULARE  
 MADERA  
 RAMONA  
 BORREGO SPRINGS  
 GROVELAND  
 THERMAL  
 RIO VISTA  
 ELSINORE  
 SAN ANDREAS  
 CHOWCHILLA  
 JACKSON  
 BANNING  
 CALIFORNIA CITY  
 BIG BEAR  
 AGUA DULCE  
 PERRIS  
 TEMECULA  
 SELMA  
 YUBA CITY  
 SUSANVILLE  
 SAN FERNANDO  
 SHINGLE SPRINGS  
 WEAVERVILLE  
 OCEANO  
 LINCOLN  
 WOODLAKE  
 LOWER LAKE  
 RIO LINDA  
 ORLAND  
 APPLE VALLEY  
 KING CITY  
 ADELANTO  
 LLANO  
 HEALDSBURG  
 QUINCY  
 DAGGETT  
 VISALIA  
 SAN RAFAEL  
 FIREBAUGH

CA 60785. 123023. 0. 1.09 1.22  
 CA 133514. 46782. 136. 1:18\* 1.20\*  
 CA 135955. 44384. 0. 1.42 1.20  
 CA 90665. 87412. 0. 1.17 1.18  
 CA 134753. 43518. 491. 3.47 1.18  
 CA 89183. 87015. 0. 1.15 1.17  
 CA 52559. 122550. 0. 1.06 1.16  
 CA 117954. 50630. 0. 3.13 1.12  
 CA 102386. 57625. 0. 1.16 1.06  
 CA 41230. 118819. 0. 2.44 1.06  
 CA 99591. 56112. 0. 1.13 1.03  
 CA 87327. 62241. 0. 1.03 0.99  
 CA 103093. 45776. 0. 1.12 0.99  
 CA 109548. 35757. 0. 3.86 0.97  
 CA 54551. 90167. 0. 0.84 0.96  
 CA 107424. 35064. 0. 1.12 0.95  
 CA 32304. 108357. 0. 0.74 0.93  
 CA 104906. 34239. 0. 1.10 0.92  
 CA 22017. 112550. 0. 0.74 0.89  
 CA 99591. 32506. 0. 1.04 0.88  
 CA 19647. 111775. 0. 0.71 0.87  
 CA 92764. 33680. 0. 0.98 0.84  
 CA 85154. 35025. 0. 4.61 0.80  
 CA 90205. 29447. 0. 0.94 0.80  
 CA 65206. 51497. 0. 0.79 0.78  
 CA 34129. 83631. 0. 0.63 0.78  
 CA 88195. 28784. 0. 0.92 0.78  
 CA 84951. 28898. 0. 0.89 0.76  
 CA 86162. 28131. 0. 0.90 0.76  
 CA 58611. 54512. 0. 0.71 0.75  
 CA 69263. 37069. 0. 0.78 0.71  
 CA 62965. 39858. 0. 0.73 0.68  
 CA 68258. 31939. 0. 0.75 0.67  
 CA 68276. 31929. 0. 0.75 0.67  
 CA 72598. 23692. 0. 0.76 0.64  
 CA 73134. 23869. 0. 0.76 0.64  
 CA 71359. 23296. 0. 0.72 0.63  
 CA 51676. 43671. 0. 0.61 0.63  
 CA 58780. 34986. 0. 0.67 0.62  
 CA 63512. 26356. 0. 0.68 0.60  
 CA 39351. 49017. 0. 0.55 0.59  
 CA 66840. 21818. 0. 0.63 0.59  
 CA 58243. 28655. 0. 0.64 0.58  
 CA 29375. 57871. 0. 0.49 0.58  
 CA 65068. 21236. 0. 0.65 0.57  
 CA 26686. 56891. 0. 0.46 0.56  
 CA 46161. 37559. 0. 0.56 0.56  
 CA 60872. 19867. 0. 0.64 0.54  
 CA 57627. 20022. 0. 0.61 0.52  
 CA 54494. 22573. 0. 0.59 0.51  
 CA 58417. 19068. 0. 0.61 0.51  
 CA 41960. 34898. 0. 0.52 0.51  
 CA 55390. 18083. 0. 0.58 0.49  
 CA 54309. 17729. 0. 0.55 0.48  
 CA 52796. 19927. 0. 0.54 0.48  
 CA 21056. 50333. 0. 0.38 0.47  
 CA 51734. 16200. 11. 1.77 0.45  
 CA 17664. 47571. 0. 0.33 0.43  
 CA 49264. 16077. 0. 0.49 0.43  
 CA 46016. 15017. 0. 0.46 0.41

AWP 059 CEDARVILLE  
 AWP 023 RANCHAERO  
 AWP Q31 SEQUOIA FIELD  
 AWP L00 ROSAMOND  
 AWP 060 CLOVERDALE MUNI  
 AWP Q96 NATOMAS FLD  
 AWP TNP TWENTYNINE PALMS  
 AWP L06 DEATH VALLEY  
 AWP 020 KINGDON AIRPARK  
 AWP 002 BECKWOURTH  
 AWP 007 RANCHO MURIETA  
 AWP 026 LONE PINE  
 AWP 004 CORNING MUNI  
 AWP 203 ANGIN  
 AWP 046 WEED  
 AWP 015 TURLOCK MUNI  
 AWP L84 LOST HILLS-KERN COUNTY  
 AWP Q38 DOS PALOS  
 AWP 016 GARBERVILLE  
 AWP CA06 SCOTT VALLEY  
 AWP 068 MARIPOSA-YOSEMITE  
 AWP L94 FANTASY HAVEN  
 AWP MIT SHAFTER-KERN COUNTY  
 AWP 301 GUSTINE  
 AWP Q61 GEORGETOWN  
 AWP 028 ELLS FIELD-WILLITS MUNI  
 AWP 032 GREAT WESTERN  
 AWP Q93 ENTERPRISE SKYPARK  
 AWP L05 KERN VALLEY  
 AWP 365 HAPPY CAMP  
 AWP 010 ALTA  
 AWP 086 TRINITY CENTER  
 AWP Q72 HAYFORK  
 AWP L80 HI DESERT  
 AWP Q40 SUNSET SKYRANCH  
 AWP L72 TRONA  
 AWP 014 TURLOCK AIRPARK  
 AWP Q84 MENDOTA  
 AWP Q88 PARADISE SKYPARK  
 AWP L22 YUCCA VALLEY  
 AWP L19 WASCO-KERN COUNTY  
 AWP 029 PATTERSON  
 AWP CLR CALIPATRIA MUNI  
 AWP 097 RICHVALE  
 AWP 033 EUREKA MUNI  
 AWP CRO CORCORAN  
 AWP 009 ROUND VALLEY  
 AWP 081 TULELAKE MUNI  
 AWP 005 SHELTER COVE  
 AWP 009 SONOMA SKYPARK  
 AWP Q80 LODI AIRPARK  
 AWP L68 LAKE WOHLFORD RESORT  
 AWP L26 HESPERIA AIR LODGE  
 AWP L18 FALLBROOK COMMUNITY AIRPARK  
 AWP L02 SANTA SUSANA  
 AWP Q97 JENSEN FIELD  
 AWP L17 TAFT-KERN COUNTY  
 AWP RZH QUARTZ HILL  
 AWP 101 ECKERT FIELD  
 AWP Q21 BROWNSVILLE

CEDARVILLE  
 CHICO  
 DINUBA  
 ROSAMOND  
 CLOVERDALE  
 SACRAMENTO  
 TWENTYNINE PALMS  
 DEATH VALLEY NATL MONU  
 LODI  
 BECKWOURTH  
 RANCHO MURIETA  
 LONE PINE  
 CORNING  
 ANGIN  
 WEED  
 TURLOCK  
 LOST HILLS  
 DOS PALOS  
 GARBERVILLE  
 FORT JONES  
 MARIPOSA  
 TEHACHAPI  
 SHAFTER  
 GUSTINE  
 GEORGETOWN  
 WILLITS  
 REEDLEY  
 REDDING  
 KERNVILLE  
 HAPPY CAMP  
 DINUBA  
 TRINITY CENTER  
 HAYFORK  
 JOSHUA TREE  
 ELK GROVE  
 TRONA  
 TURLOCK  
 MENDOTA  
 PARADISE  
 YUCCA VALLEY  
 WASCO  
 PATTERSON  
 CALIPATRIA  
 RICHVALE  
 EUREKA  
 CORCORAN  
 COVELO  
 TULELAKE  
 SHELTER COVE  
 SONOMA  
 LODI  
 ESCONDIDO  
 HESPERIA  
 FALLBROOK  
 SIMI VALLEY  
 SACRAMENTO  
 TAFT  
 QUARTZ HILL  
 STRATHMORE  
 BROWNSVILLE

CA	9840.	51495.	0.	0.29	0.41
CA	25586.	35155.	0.	0.35	0.40
CA	44483.	14521.	0.	0.47	0.39
CA	44492.	14526.	0.	0.45	0.39
CA	35693.	21295.	0.	0.41	0.38
CA	43447.	14183.	0.	0.44	0.38
CA	41960.	13695.	0.	0.44	0.37
CA	32061.	21708.	0.	0.37	0.36
CA	40420.	13192.	0.	0.40	0.36
CA	28239.	26115.	0.	0.36	0.36
CA	40838.	13326.	0.	0.41	0.36
CA	14837.	38582.	0.	0.27	0.35
CA	28368.	23721.	0.	0.35	0.35
CA	36649.	13086.	0.	0.39	0.33
CA	28644.	20594.	0.	0.34	0.33
CA	36702.	11979.	0.	0.38	0.32
CA	36592.	11946.	0.	0.38	0.32
CA	34714.	11333.	0.	0.35	0.31
CA	33569.	10956.	0.	0.35	0.30
CA	17851.	25133.	0.	0.26	0.29
CA	25737.	14231.	0.	0.29	0.27
CA	30095.	9825.	0.	0.30	0.27
CA	29318.	9570.	0.	0.31	0.26
CA	29375.	9588.	0.	0.31	0.26
CA	28723.	9974.	0.	0.30	0.26
CA	29934.	9769.	0.	0.31	0.26
CA	28815.	9405.	0.	0.30	0.25
CA	28219.	9212.	0.	0.28	0.25
CA	20477.	16329.	0.	0.25	0.24
CA	14718.	19266.	0.	0.21	0.23
CA	26201.	8551.	0.	0.26	0.23
CA	24675.	8053.	0.	0.26	0.22
CA	7358.	23771.	0.	0.15	0.21
CA	23476.	7662.	0.	0.23	0.21
CA	23458.	7656.	0.	0.23	0.21
CA	23553.	7689.	0.	0.25	0.21
CA	23568.	7691.	0.	0.23	0.21
CA	22548.	7359.	0.	0.24	0.20
CA	10999.	18053.	0.	0.17	0.19
CA	22061.	7200.	0.	0.23	0.19
CA	21219.	6926.	0.	0.21	0.19
CA	21724.	7092.	0.	0.22	0.19
CA	20112.	6566.	0.	0.21	0.18
CA	20715.	6761.	0.	0.21	0.18
CA	16786.	5479.	0.	0.18	0.15
CA	17033.	5561.	0.	0.18	0.15
CA	16786.	5479.	0.	0.18	0.15
CA	15160.	5981.	0.	0.16	0.14
CA	14131.	5167.	0.	0.14	0.13
CA	15229.	4971.	0.	0.15	0.13
CA	13146.	4292.	0.	0.13	0.12
CA	11784.	3845.	0.	0.12	0.10
CA	10460.	3415.	0.	0.11	0.09
CA	9460.	4309.	0.	0.10	0.09
CA	8853.	2892.	0.	0.09	0.08
CA	8667.	2830.	0.	0.09	0.08
CA	9238.	3016.	0.	0.09	0.08
CA	8146.	2660.	0.	0.09	0.07
CA	7603.	2482.	0.	0.08	0.07
CA	7328.	2392.	0.	0.08	0.06

AWP	074	REDDING SKY RANCH	REDDING	CA	4446.	3864.	0.	0.06	0.06
AWP	L93	VALLEY VIEW AIRPARK	RIDGECREST	CA	5179.	1690.	0.	0.05	0.05
AWP	Q17	BOONVILLE	BOONVILLE	CA	4099.	1338.	0.	0.04	0.04
AWP	Q82	ALPINE COUNTY	MARKLEEVILLE	CA	4103.	1339.	0.	0.04	0.04
AWP	Q69	OCEAN RIDGE	GUALA	CA	3287.	2362.	0.	0.04	0.04
AWP	L53	SUN HILL RANCH	ADEWANTO-HELENDL-SLVR LKS	CA	1224.	399.	0.	0.01	0.01
AWP	062	CARMEL VALLEY	CARMEL VALLEY	CA	1310.	428.	0.	0.01	0.01
AWP	Q92	RED FLAT AIR STRIP	RED BLUFF	CA	549.	179.	0.	0.01	0.00
AWP	NPS	FORD ISLAND ALF	HONOLULU	HI	299630.	97828.	0.	2.98	2.64
AWP	HDH	DILLINGHAM AIRFIELD	MOKULEIA	HI	289109.	94364.	0.	2.98	2.55
AWP	LNJ	LANAI	LANAI CITY	HI	21697.	112443.	0.	0.73	0.89
AWP	HNM	HANA	HANA	HI	4161.	106721.	0.	0.55	0.74
AWP	MUE	WAIMEA-KOHALA	KAMUELA	HI	939.	105670.	0.	0.52	0.71
AWP	LUP	KALAUPAPA	KALAUPAPA	HI	1425.	105828.	0.	0.52	0.71
AWP	HKP	KAANAPALI	LAHAINA	HI	399.	105494.	0.	0.51	0.70
AWP	UPP	UPOLU	HAWI	HI	622.	98348.	0.	0.40	0.66
AWP	JON	JOHNSTON ATOLL	JOHNSTON ISLAND	HI	0.	21043.	0.	0.09	0.14
AWP	PAK	PORT ALLEN	HANAPEPE	HI	2546.	831.	0.	0.03	0.02
AWP	EKO	ELKO MUNI-J.C. HARRIS FIELD	ELKO	NV	625643.	211516.	605.	4.60*	5.56*
AWP	TPH	TONOPAH	TONOPAH	NV	155311.	131175.	151.	1.50*	1.90*
AWP	L15	LAS VEGAS-HENDERSON SKY HARBOR	LAS VEGAS	NV	200116.	75794.	0.	2.00	1.83
AWP	004	CARSON	CARSON CITY	NV	163381.	83721.	0.	1.71	1.64
AWP	WMC	WINNEMUCCA MUNI	WINNEMUCCA	NV	49496.	121519.	0.	2.00	1.14
AWP	4SD	RENO/STEAD	RENO	NV	106267.	54906.	0.	1.14	1.07
AWP	MEV	DOUGLAS COUNTY	MINDEN	NV	99282.	57696.	0.	1.07	1.04
AWP	BLD	BOULDER CITY MUNI	BOULDER CITY	NV	39398.	116672.	0.	0.84	1.04
AWP	LWL	HARRIET FIELD	WELLS	NV	75773.	43232.	73.	0.62*	0.79*
AWP	LOL	DERBY FIELD	LOVELOCK	NV	26019.	84242.	0.	0.53	0.73
AWP	BAM	LANDER COUNTY	BATTLE MOUNTAIN	NV	36020.	70555.	12.	0.47	0.71
AWP	HTH	HAWTHORNE MUNI	HAWTHORNE	NV	17114.	81479.	0.	0.44	0.66
AWP	FLX	FALLON MUNI	FALLON	NV	29300.	60236.	0.	0.47	0.59
AWP	043	YERINGTON MUNI	YERINGTON	NV	26373.	59278.	0.	0.44	0.57
AWP	05U	EUREKA	EUREKA	NV	8089.	68468.	0.	0.32	0.51
AWP	9U3	AUSTIN	AUSTIN	NV	2778.	28822.	0.	0.13	0.21
AWP	U08	OVERTON MUNI	OVERTON	NV	5522.	6956.	0.	0.07	0.08
AWP	BTY	BEATTY	BEATTY	NV	1926.	5579.	0.	0.04	0.05
AWP	0L9	ECHO BAY	OVERTON	NV	1410.	3137.	0.	0.02	0.03
AWP	10U	OWYHEE	OWYHEE	HV	113.	596.	0.	0.00	0.00
AWP	GSN	SAIPAN INTERNATIONAL	OBYAN	SP	1025.	105698.	0.	0.52	0.71
AWP	PPG	PAGO PAGO INTL	PAGO PAGO	SP	1607.	105888.	0.	0.52	0.71
AWP	TNI	WEST TINIAN	PEIPEINIMARU	SP	9.	105366.	0.	0.51	0.70
AWP	GRO	ROTA INTL	ROTA ISLAND	SP	18.	105369.	0.	0.51	0.70
AWP	PNI	PONAPE INTL	PONAPE ISLAND	SP	2065.	54862.	0.	0.21	0.38
AWP	YAP	YAP	YAP ISLAND	SP	2711.	51459.	0.	0.27	0.36
AWP	ROR	BABELTHAUP/KOROR	BABELTHUAP ISLAND	SP	895.	53725.	0.	0.19	0.36
AWP	Z07	TRUK INTL	MOEN ISLAND	SP	55.	36183.	0.	0.13	0.24
AWP	MAJ	MARSHALL ISLANDS INTL	MAJURO ATOLL	SP	322.	33687.	0.	0.15	0.23
AWP	Z08	OFU	OFU VILLAGE	SP	0.	26732.	0.	0.09	0.18

\* BENEFIT/COST RATIO BEFORE PROXIMITY PENALTY OR REMOTENESS PREMIUM, IF ANY.

\* AIRPORTS WITH INSTRUMENT APPROACH PROCEDURES FOR WHICH GENERAL AVIATION AND MILITARY ANNUAL INSTRUMENT APPROACHES (AIA'S) WERE COMPUTED WITH THE SCI MODEL USING NATIONAL NORMS FOR PIFR (13.5%) AND PC (4.95%) ARE IDENTIFIED BY '\*'. FOR OTHER AIRPORTS WITH INSTRUMENT APPROACH PROCEDURES, AIA'S WERE COMPUTED WITH THE SCI MODEL USING VALUES FOR PIFR AND PC BASED ON SITE-SPECIFIC MINIMA IN THE SCI FILE. FOR AIRPORTS WITHOUT RECORDED AIA'S IN THE TAF, THE SCI MODEL USED TO PREDICT AIA'S WAS SUPPRESSED.

RECAP - FIGURE 34-A

Number of Sites With Phase II Benefit/Cost Ratios of

<u>Region</u>	<u>State</u>	<u>Less than .50</u>	<u>.50 to .99</u>	<u>1.00 to 1.49</u>	<u>1.50 to 1.99</u>	<u>2.00 or Greater</u>	<u>Total</u>
AAL	AK	114	79	8	4	5	210
ACE	IA	40	18	16	7	17	98
	KS	40	13	4	6	13	76
	MO	45	17	9	3	16	90
	NE	<u>41</u>	<u>11</u>	<u>1</u>	<u>1</u>	<u>9</u>	<u>63</u>
		166	59	30	17	55	327
AEA	DE	4	1	1	0	3	9
	MD	7	7	3	2	11	30
	NJ	13	11	4	3	15	46
	NY	46	11	8	9	18	92
	PA	62	16	7	6	25	116
	VA	23	9	8	6	7	53
	WV	<u>14</u>	<u>4</u>	<u>1</u>	<u>0</u>	<u>3</u>	<u>22</u>
		169	59	32	26	82	368
AGL	IL	32	11	7	6	27	83
	IN	34	15	9	6	24	88
	MI	51	11	8	9	33	112
	MN	57	7	7	6	19	96
	ND	36	0	1	1	2	40
	OH	59	26	18	12	28	143
	SD	33	1	0	0	6	40
	WI	<u>45</u>	<u>16</u>	<u>8</u>	<u>5</u>	<u>23</u>	<u>97</u>
		347	87	58	45	162	699
ANE	CT	4	2	2	1	3	12
	MA	12	3	1	5	9	30
	ME	14	2	4	5	7	32
	NH	4	2	0	1	5	12
	RI	1	0	3	0	2	6
	VT	<u>5</u>	<u>3</u>	<u>2</u>	<u>0</u>	<u>1</u>	<u>11</u>
		40	12	12	12	27	103

<u>Region</u>	<u>State</u>	<u>Less than .50</u>	<u>.50 to .99</u>	<u>1.00 to 1.49</u>	<u>1.50 to 1.99</u>	<u>2.00 or Greater</u>	<u>Total</u>
ANM	CO	29	12	3	3	12	59
	ID	27	5	5	2	1	40
	MT	38	4	3	2	3	50
	OR	31	9	6	4	12	62
	UT	17	11	6	3	2	39
	WA	55	12	4	4	13	88
	WY	10	8	4	0	8	30
		<u>207</u>	<u>61</u>	<u>31</u>	<u>18</u>	<u>51</u>	<u>368</u>
ASO	AL	31	9	1	4	11	60
	FL	22	7	11	6	23	69
	GA	52	14	7	7	6	86
	KY	24	7	2	2	6	41
	MS	33	7	4	1	12	57
	NL	26	9	5	4	14	58
	PR	1	3	0	1	0	5
	SC	13	10	8	1	6	38
	TN	25	23	7	1	6	62
		<u>227</u>	<u>89</u>	<u>45</u>	<u>27</u>	<u>88</u>	<u>476</u>
ASW	AR	19	10	13	4	12	58
	LA	27	4	4	5	4	44
	NM	23	4	3	4	4	38
	OK	45	13	9	3	16	86
	TX	154	39	13	9	38	253
		<u>268</u>	<u>70</u>	<u>42</u>	<u>25</u>	<u>74</u>	<u>479</u>
AWP	AZ	24	15	6	4	6	55
	CA	76	41	22	14	33	186
	HI	2	6	0	0	2	10
	NV	5	7	4	3	1	20
	SP	6	4	0	0	0	10
		<u>113</u>	<u>73</u>	<u>32</u>	<u>21</u>	<u>42</u>	<u>281</u>
GRAND TOTAL		1,651	589	290	195	586	3,311
1,071							

FIGURE 34-B

RESULTS OF APPLYING AWOS CRITERIA FOR NON-TOWERED AIRPORTS TO TENTATIVELY-IDENTIFIED ATCT DISCONTINUANCE CANDIDATES ##

LOCID	AIRPORT NAME	CITY	ST	LC SAFETY BENS	LC EFFICY BEHS	GA+ML AIA'S YR 1	PHASE I B/C#	PHASE II B/C#
ADM	ARDMORE MUNI	ARDMORE	OK	758371.	133080.	556.	3.33	5.92
AKR	AKRON FULTON INTERNATIONAL	AKRON	OH	894317.	155667.	764.	5.28	6.93
ALW	WALLA WALLA CITY COUNTY	WALLA WALLA	WA	969453.	263311.	741.	5.23	8.22
AWM	WEST MEMPHIS MUNI	WEST MEMPHIS	AR	870401.	150900.	690.	4.60	6.79
BEH	ROSS FIELD	BENTON HARBOR	MI	454976.	171286.	357.	2.78	4.16
BMG	MONROE COUNTY	BLOOMINGTON	IN	197102.	155152.	698.	5.22	2.34
CGI	CAPE GIRARDEAU MUNI	CAPE GIRARDEAU	MO	735777.	230695.	613.	4.55	6.42
CGX	MERRILL C MEIGS	CHICAGO	IL	177269.	162590.	0.	2.36	2.26
CIC	CHICO MUNI	CHICO	CA	1048300.	283375.	902.	6.31	8.85
CKB	BENEDUM	CLARKSBURG	WV	727561.	229499.	659.	4.59	6.36
CRE	GRAND STRAND	NORTH MYRTLE BEACH	SC	1151664.	271688.	838.	6.36	9.46
CSM	CLINTON-SHERMAN	CLINTON	OK	353282.	83487.	352.	2.09	2.90
DBQ	DUBUQUE MUNI	DUBUQUE	IA	970361.	269761.	861.	6.06	8.24
DKX	KNOXVILLE DOWNTOWN ISLAND	KNOXVILLE	TN	918902.	164780.	692.	4.89	7.20
DNV	VERMILION COUNTY	DANVILLE	IL	405923.	174191.	341.	2.70	3.85
ESF	ESLER REGIONAL	ALEXANDRIA	LA	556003.	197194.	478.	3.57	5.00
EWN	SIMMONS NOTT	NEW BERN	NC	487996.	191669.	375.	3.00	4.52
FCH	FRESNO-CHANDLER DOWNTOWN	FRESNO	CA	990545.	271524.	743.	5.83	8.39
FLO	FLORENCE CITY-COUNTY	FLORENCE	SC	790317.	237298.	650.	4.18	6.83
GBG	GALESBURG MUNI	GALESBURG	IL	566238.	200551.	504.	3.78	5.09
HKY	HICKORY MUNI	HICKORY	NC	661797.	216508.	551.	4.12	5.84
HLG	WHEELING OHIO CO	WHEELING	WV	699725.	214815.	478.	3.33	6.08
HOB	LEA COUNTY/HOBBS/	HOBBS	NM	505771.	189994.	472.	4.09	4.62
HOT	MEMORIAL FIELD	HOT SPRINGS	AR	774110.	235475.	543.	4.38	6.71
IDA	FANNING FIELD	IDAHO FALLS	ID	619977.	209414.	573.	4.08	5.51
ISO	EASTERN RGNL JETPORT AT STALLINGS FLD	KINSTON	NC	579932.	201877.	580.	3.78	5.19
LEB	LEBANON REGIONAL	LEBANON	NH	588202.	205464.	521.	3.77	5.27
LRD	LAREDO INTERNATIONAL	LAREDO	TX	769474.	236046.	648.	5.10	6.68
LWB	GREENBRIER VALLEY	LEWISBURG	WV	292801.	154220.	236.	2.09	2.97
MAZ	MAYAGUEZ AIRFIELD	MAYAGUEZ	PR	207532.	139680.	142.	0.69	2.31
MGW	MORGANTOWN MUNI-WALTER L. BILL HART FLD	MORGANTOWN	WV	719720.	226662.	694.	4.89	6.29
MOT	MINOT INTL	MINOT	ND	665622.	214999.	552.	3.99	5.85
MVY	MARTHAS VINEYARD	MARTHAS VINEYARD	MA	545746.	195888.	416.	3.63	4.93
MWA	WILLIAMSON COUNTY	MARION	IL	826841.	247738.	669.	4.79	7.14
MYV	YUBA COUNTY	MARYSVILLE	CA	1033805.	253318.	911.	6.65	8.55
OWB	OWENSBORO-DAVISS COUNTY	OWENSBORO	KY	767315.	234754.	680.	5.18	6.66
PAH	BARKLEY REGIONAL	PADUCAH	KY	482785.	185554.	387.	2.96	4.44
PBF	GRIDER FIELD	PINE BLUFF	AR	635914.	176968.	602.	4.67	5.40
PSE	MERCEDITA	PONCE	PR	209297.	137780.	148.	1.24	2.31
PVW	HALE COUNTY	PLAINVIEW	TX	984155.	164955.	746.	3.21	7.64
SAF	SANTA FE COUNTY MUNI	SANTA FE	NM	956932.	261370.	835.	6.03	8.09
SPA	SPARTANBURG DOWNTOWN MEMORIAL	SPARTANBURG	SC	859682.	249829.	627.	4.91	7.37
SSI	MALCOLM MCKINNON	BRUNSWICK	GA	355961.	63246.	231.	2.19	2.79
STJ	ROSECRANS MEMORIAL	ST JOSEPH	MO	848617.	180073.	640.	3.10	6.83

TNT DADE-COLLIER TRAINING AND TRANSITION  
 TUT PAGO PAGO INTL  
 TXK TEXARKANA MUNI-WEBB FLD  
 VDZ VALDEZ NR 2  
 VLD VALDOSTA MUNI  
 WDG ENID WOODRING MUNI

MIAMI  
 PAGO PAGO  
 TEXARKANA  
 VALDEZ  
 VALDOSTA  
 ENID

FL	210605.	38641.	129.	0.96	1.66
SP	21813.	108600.	61.	0.68	0.87
AR	728486.	227537.	743.	5.25	6.35
AK	88310.	120234.	63.	0.85	1.39
GA	678779.	217985.	525.	4.16	5.96
OK	892061.	252859.	838.	6.20	7.61

RECAP

TOTAL LOCATIONS HAVING PHASE II BENEFIT/COST RATIOS OF LESS THAN .50	0.
TOTAL LOCATIONS HAVING PHASE II BENEFIT/COST RATIOS FROM .50 TO .99	1.
TOTAL LOCATIONS HAVING PHASE II BENEFIT/COST RATIOS FROM 1.00 TO 1.49	1.
TOTAL LOCATIONS HAVING PHASE II BENEFIT/COST RATIOS FROM 1.50 TO 1.99	1.
TOTAL LOCATIONS HAVING PHASE II BENEFIT/COST RATIOS OF 2.00 OR GREATER	47.
TOTAL LOCATIONS	50.

\* BENEFIT/COST RATIO BEFORE PROXIMITY PENALTY OR REMOTENESS PREMIUM, IF ANY.

\*\* THE FOLLOWING LOCATIONS ARE EXCLUDED FROM THIS LIST BECAUSE THE NATIONAL WEATHER SERVICE IS CURRENTLY RESPONSIBLE FOR THE WEATHER OBSERVATION FUNCTION: ACT, AHN, MCN AND PDT.



## CHAPTER VII - SENSITIVITY ANALYSIS

### A. Introduction

In the cost-effectiveness analysis of AWOS at FAA towered airports (described in Section B of Chapter IV) and the benefit/cost analysis of AWOS at non-towered and non-federal towered airports (described in Section C of Chapter IV), there are a number of constants and variables which are used to quantify benefits and costs. While some of these parameters are known with relative certainty, others are uncertain and may be characterized by judgment. This chapter addresses the sensitivity of the results of these analyses to variations in those parameters which appear to be the most significant or sensitive.

### B. FAA Towered Airports

FAA towered airports where the surface weather observation function is the responsibility of the FAA automatically qualify for AWOS establishment, except locations identified as ATCT discontinuance candidates. This policy rests on the fact that weather observations are required by regulation in control zones and the life-cycle cost of AWOS at such locations is less than those of acceptable manual weather observation system alternatives. Priority of AWOS establishment at these locations will be given to part-time facilities, followed by full-time facilities, in recognition of the relatively greater benefits of AWOS when facilities are closed.

Because the unit costs used to develop the life-cycle costs of AWOS in this report are preliminary estimates, it is important that a sensitivity analysis be conducted to support the policy of automatic qualification for AWOS at these airports. This sensitivity analysis was approached by asking the question: "What would happen to the life-cycle costs of AWOS if the investment and annually recurring operations and maintenance costs were more than anticipated?" Assuming as much as a 50 percent increase in investment cost and a 200 percent increase in annual recurring costs of AWOS, a life-cycle cost of \$365,472 results, a value still approximately 44 percent less than other acceptable options of collecting and disseminating weather data at locations with an active FAA ATCT. Even after ignoring the costs and alleged cost savings of observation personnel in light of the arguments outlined in Chapter IV and applying the same variations, the life-cycle cost of AWOS is still approximately 20 percent less than the acceptable manual options.

### c. Non-Towered and Non-Federal Airports

In the case of the benefit/cost analysis for establishment of AWOS at non-towered and non-federal towered airports, the sensitivity of the following parameters were examined: probability of weather below VFR minima, probability of weather below IFR minima, number of projected annual general aviation instrument approaches, probability of a ceiling/visibility-related accident, probability of a wind-related accident, annual benefit to existing commercial weather observation service (SAWRS) operation, probability of averting an instrument flight disruption, life-cycle cost, and the value of a statistical life. The results of introducing specific percentage increases and decreases to each of these parameters, while holding all other parameters constant, for a sample of selected airports with Phase II benefit/cost ratios of .80 (LNL), .90 (SJN), 1.00 (SMN), 1.10 (GTR) and 1.20 (BGD) are outlined below in Figure 35. Additionally, Figure 35 outlines the aggregate number of qualifying non-towered and non-federal towered airports corresponding to each parameter variation.

FIGURE 35

Sensitivity Analysis

	<u>Airport With B/C Ratio Of:</u>					<u>Total Number of Qualifying</u>	
	<u>.80</u>	<u>.90</u>	<u>1.00*</u>	<u>1.10*</u>	<u>1.20</u>	<u>Non-Towered/Non-Federal Towered</u>	<u>Civil Airports (B/C = 1.0 or more)</u>
<u>Life-Cycle Cost</u>							
50% decrease	1.61	1.80	2.01	2.20	2.39	1,638	(+53%)
20% decrease	1.00	1.12	1.26	1.38	1.50	1,239	(+16%)
10% decrease	.89	1.00	1.12	1.22	1.33	1,147	(+ 7%)
No Change (\$150,505)	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.73	.82	.91	1.00	1.09	989	(- 8%)
20% increase	.67	.75	.84	.92	1.00	914	(-15%)
50% increase	.54	.60	.67	.73	.80	768	(-28%)
<u>Annual Benefit to Air Carrier and Air Taxi User Classes</u>							
50% decrease	.77	.62	.65	.75	.93	954	(-11%)
20% decrease	.79	.79	.86	.96	1.09	1,013	(- 5%)
10% decrease	.80	.84	.93	1.03	1.14	1,036	(- 3%)
No Change	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.81	.95	1.07	1.17	1.25	1,084	(+ 1%)
20% increase	.82	1.01	1.14	1.24	1.30	1,115	(+ 4%)
50% increase	.84	1.17	1.35	1.45	1.46	1,207	(+13%)
<u>Probability of Weather Below VFR Minima</u>							
50% decrease	**	.80	1.00	1.10	1.08	319	(-70%)
20% decrease	.17	.86	1.00	1.10	1.15	580	(-46%)
10% decrease	.38	.88	1.00	1.10	1.17	781	(-27%)
No Change	.80	.90	1.00	1.10	1.20	1,071	
10% increase	1.71	.92	1.00	1.10	1.22	1,346	(+26%)
20% increase	3.80	.94	1.00	1.10	1.24	1,426	(+33%)
50% increase	46.21	1.00	1.00	1.10	1.31	1,468	(+37%)
<u>Value of a Statistical Life</u>							
50% decrease	.54	.81	.95	1.03	1.05	897	(-16%)
20% decrease	.70	.86	.98	1.07	1.14	995	(- 7%)
10% decrease	.75	.88	.99	1.09	1.17	1,034	(- 3%)
No Change (\$580,000)	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.86	.92	1.00	1.11	1.23	1,090	(+ 2%)
20% increase	.91	.93	1.03	1.13	1.26	1,112	(+ 4%)
50% increase	1.07	.99	1.06	1.17	1.35	1,193	(+11%)

**Total Number of Qualifying  
Non-Towered/Non-Federal Towered  
Civil Airports (B/C = 1.0 or more)**

**Airport With B/C Ratio Of:**  
.80   .90   1.00\*   1.10\*   1.20

**No. of Projected Annual  
GA Instrument Approaches**

	.80	.90	1.00*	1.10*	1.20		
50% decrease	.50	.83	1.00	1.10	1.13	928	(-13%)
20% decrease	.68	.87	1.00	1.10	1.17	1,007	(- 6%)
10% decrease	.74	.88	1.00	1.10	1.18	1,031	(- 4%)
No Change	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.86	.91	1.00	1.10	1.21	1,079	(+ 1%)
20% increase	.92	.92	1.00	1.10	1.22	1,093	(+ 2%)
50% increase	1.10	.96	1.00	1.10	1.26	1,134	(+ 6%)

**Probability of Averting  
a GA Wind-Related Accident**

	.80	.90	1.00*	1.10*	1.20		
50% decrease	.75	.82	.89	.95	1.00	914	(-15%)
20% decrease	.78	.87	.96	1.04	1.12	1,015	(- 5%)
10% decrease	.79	.88	.98	1.07	1.16	1,034	(- 3%)
No Change (3.704 x 10 <sup>-6</sup> per GAITN or MILITN)	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.81	.91	1.03	1.13	1.24	1,082	(+ 1%)
20% increase	.82	.93	1.05	1.16	1.28	1,113	(+ 4%)
50% increase	.85	.98	1.11	1.25	1.40	1,183	(+10%)

**Probability of Averting  
a GA Ceiling/Visibility-  
Related Accident**

	.80	.90	1.00*	1.10*	1.20		
50% decrease	.54	.84	1.00	1.10	1.14	950	(-11%)
20% decrease	.70	.88	1.00	1.10	1.17	1,018	(- 5%)
10% decrease	.75	.89	1.00	1.00	1.19	1,034	(- 3%)
No Change (1.387 x 10 <sup>-6</sup> per GAITN or MLITN)	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.86	.91	1.00	1.10	1.21	1,077	(+ 1%)
20% increase	.91	.92	1.00	1.10	1.22	1,091	(+ 2%)
50% increase	1.07	.95	1.00	1.10	1.25	1,130	(+ 6%)

**Probability of Weather  
Below IFR Minima**

	.80	.90	1.00*	1.10*	1.20		
50% decrease	1.15	.93	1.00	1.10	1.25	1,278	(+19%)
20% decrease	1.05	.91	1.00	1.10	1.22	1,245	(+16%)
10% decrease	.97	.90	1.00	1.10	1.21	1,205	(+13%)
No Change	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.44	.89	1.00	1.10	1.19	825	(-23%)
20% increase	**	.88	1.00	1.10	1.18	394	(-63%)
50% increase	**	.86	1.00	1.10	1.15	214	(-80%)

	<u>Airport With B/C Ratio Of:</u>					<u>Total Number of Qualifying</u>	
	<u>.80</u>	<u>.90</u>	<u>1.00*</u>	<u>1.10*</u>	<u>1.20</u>	<u>Non-Towered/Non-Federal Towered</u>	<u>Civil Airports (B/C = 1.0 or more)</u>
<u>Probability of Averting an Instrument Flight Disruption</u>							
50% decrease	.77	.89	1.00	1.10	1.19	1,044	(- 3%)
20% decrease	.79	.89	1.00	1.10	1.19	1,051	(- 2%)
10% decrease	.80	.90	1.00	1.10	1.20	1,054	(- 2%)
No Change (.10)	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.81	.90	1.00	1.10	1.20	1,072	( 0%)
20% increase	.82	.90	1.00	1.10	1.20	1,077	(+ 1%)
50% increase	.84	.91	1.00	1.10	1.21	1,088	(+ 2%)
<u>Proximity Penalty and Remoteness Premium (Applied to All Sites)</u>							
Proximity Penalty (50%)	.40	.45	.50	.55	.60	569	(-47%)
No Penalty/Premium	.80	.90	1.00	1.10	1.20	1,071	
Remoteness Premium (25%)	1.00	1.12	1.26	1.38	1.50	1,239	(+16%)
<u>Annual Aircraft Operations</u>							
50% decrease	.75	.79	.95	1.08	1.07	1,001	(- 7%)
20% decrease	.78	.86	1.00	1.09	1.15	1,040	(- 3%)
10% decrease	.79	.88	1.00	1.10	1.17	1,047	(- 2%)
No Change	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.81	.92	1.01	1.11	1.22	1,084	(+ 1%)
20% increase	.82	.94	1.01	1.11	1.25	1,094	(+ 2%)
50% increase	.86	1.00	1.02	1.12	1.32	1,128	(+ 5%)

\* SMN and GTR do not have approved instrument approach procedures. This fact explains why their benefit/cost ratios do not change with variations in certain parameters.

\*\* Negative or nonsensical results produced because interrelationship between PIFR and PC in the SCI regression model used to predict number of annual instrument approaches.

## CHAPTER VIII - IMPACT ANALYSIS

It is impossible, at least with a high degree of accuracy, to assess the impact of the criteria on agency resources as required by Order 1320.1 because (1) it is presently uncertain which specific AWOS configuration will be justified for each qualifying airport (i.e., differing requirements for various airports may result in implementation of various AWOS sensor configurations), and (2) meeting candidacy levels will not mean automatic qualification since benefit/cost screening is but one of several inputs to the FAA decisionmaking process relative to investment in facilities and equipment. Aside from these uncertainties, this impact analysis is based on installations of AWOS with sensors for wind, temperature, dew point, altimeter setting, ceiling, visibility and liquid precipitation. While this is the typical AWOS configurations envisioned by the AWOS Program Office as of the date of this report, future configurations may include additional or fewer sensors. For example, a cloud height (ceiling) sensor may not be justified at certain locations in close proximity to another observation site, while additional sensors, such as for freezing precipitation and thunderstorms, may be added if cost effective.

Based on these assumptions, extrapolations of the Terminal Area Forecasts and ignoring the impact of any proximity penalties or remoteness premiums as provided for in Chapter IV-C-4, Figure 34-A shows 1,071 non-towered and non-federal towered airports locations with benefit/cost ratios of 1.0 or greater. All FAA towered airports where the surface weather observation function is the responsibility of the FAA, other than tower discontinuance candidates, or approximately 254 airports, automatically qualify for AWOS. Priority of AWOS establishment at FAA towered airports will be given to part-time facilities, followed by full-time facilities, in recognition of the relatively greater benefits of AWOS when facilities are closed. Figure 34-B shows 49 of 50 tentatively-identified FAA ATCT discontinuance candidates with benefit/cost ratios of 1.0 or more. Applying average respective life-cycle costs of approximately \$165,300 and \$150,500 to 254 towered and 1,120 non-towered, non-federal towered, and ATCT discontinuance candidate locations results in approximately \$210.5 million (1981 dollars). Approximately 60 percent of the investment is incurred for facilities and equipment in the acquisition year. The remainder represents discounted operations and maintenance costs over an estimated 15 year economic life. These impact assessments may be understated after allowing for remoteness premiums and may be overstated after allowing for proximity penalties.

APPENDIX A-1

Statistical Summary of Accident Briefs-Weather Observation Unavailable<sup>1/</sup>

(Calendar Year 1979 ; Approach or Landing Phases of Operation)

"Modified" Cause/ Factor <sup>2/</sup>	NTSB File No.	No. of Injuries				Degree of Aircraft Damage			
		Fatal	Ser- ious	Minor	None	Destroyed	Substantial	Minor	None
Unfavorable	0008				1		X		
Winds or	0069				2		X		
Wrong Runway	0117				1		X		
	0128				1		X		
	0134				1		X		
	0154				3		X		
	0176				2		X		
	0204				1		X		
	0205				1		X		
	0228				2		X		
	0251				4		X		
	0259				1		X		
	0267				2		X		
	0300				1		X		
	0334				1		X		
	0335				2		X		
	0336				2		X		
	0341				3		X		
	0350				2		X		
	0423				1		X		
	0458				2		X		
	0464				1		X		
	0495				1		X		
	0590	2				X			
	0633				1		X		
	0669				2		X		
	0685				1		X		
	0711				1		X		
	0718			2			X		
	0721				1		X		
	0725				1		X		
	0753				3		X		
	0762				1		X		
	0784				1		X		
	0813				3		X		
	0831				2		X		
	0845				1		X		
	0860				3		X		
	0905		1	4			X		
	0918				1		X		
	0921				2		X		
	0937		1		2				X
	0972				1		X		
	0996				4		X		
	1008				1		X		

45

APPENDIX A-1 (Continued)

"Modified" Cause/ Factor 2/	NTSB File No.	No. of Injuries				Degree of Aircraft Damage			
		Fatal	Ser- ious	Minor	None	Destroyed	Substantial	Minor	None
Unfavorable	1009				3		X		
Winds or	1013				2		X		
Wrong Runway	1015				1		X		
(Cont'd.)	1016				1		X		
	1028				1		X		
	1042	2				X			
	1046	1	1			X			
	1103				1			X	
	1142				1			X	
	1161				1			X	
	1183				1			X	
	1185				1			X	
	1233			2		X			
	1252		1					X	
	1339				1			X	
	1363				1			X	
	1365				2			X	
	1375				2			X	
	1416				1			X	
	1443				4			X	
	1450				2			X	
	1473			4				X	
	1483			1	2			X	
	1574				2			X	
	1624				1			X	
	1636				2			X	
	1637				1			X	
	1661				1			X	
	1674		1			X			
	1701				1			X	
	1746				2			X	
	1817				4			X	
	1829			1		X			
	1830				2			X	
	1849				1			X	
	1873			4		X			
	1881				1			X	
	1896				1	X			
	1910				1			X	
	1914		2					X	
	1922				2			X	
	1944		1	1				X	
	2006			3	3			X	
	2021				3			X	
	2127			1				X	
	2202				1			X	
	2205			3				X	
	2251				1			X	
	2271				6			X	
	2309				4			X	
	2318				1			X	
	2329				2			X	
	2402				1			X	
	52								
					143				

APPENDIX A-1 (Continued)

"Modified" Cause/ Factor <sup>2</sup> / <u>Factor</u>	NTSB File No.	<u>No. of Injuries</u>				<u>Degree of Aircraft Damage</u>			
		<u>Fatal</u>	<u>Ser- ious</u>	<u>Minor</u>	<u>None</u>	<u>Destroyed</u>	<u>Substantial</u>	<u>Minor</u>	<u>None</u>
Unfavorable	2412				3		X		
Winds or	2440				1		X		
Wrong Runway	2457				1		X		
(Cont'd)	2514				2		X		
	2537	1				X			
	2561				2		X		
	2598				1		X		
	2632			1	1		X		
	2636				3		X		
	2660				1		X		
	2747				2		X		
	2750				1		X		
	2812			1	2		X		
	2911				1		X		
	2918				2		X		
	3023				3		X		
	3202		1			X			
	3204				1		X		
	3214				2		X		
	3221		1				X		
	3287		2				X		
	3312			1	2		X		
	3314				1	X			
	3315				2		X		
	3385				2		X		
	3397				1		X		
	3408				2		X		
	3489				1		X		
	3494				2	X			
	3505			1		X			
	3527				1		X		
	3548				2		X		
	3555				2	X			
	3578				3		X		
	3687		2				X		
	3711				1		X		
	3731				1		X		
	3771				1		X		
	3775				2		X		
	3868				2		X		
	3939				1		X		
	4016								
Subtotals	140	2 8	1 15	30	200	X 15	124	0	1
Low Ceiling/	0091 ✓				2		X		
Visibility:	0119 ✓				5		X		
IFR Approach	0139 ✓		1			X			
	0564 ✓	1				X			
	0607 ✓	4				X			
	0778 ✓			2			X		
	0808 ✓	4					X		
	0913 ✓		4		2	X			
	1086 ✓	1				X			
	1951			2	1	X			



APPENDIX A-1 (Continued)

"Modified" Cause/ Factor <sup>2</sup> /	NTSB File No.	No. of Injuries				Degree of Aircraft Damage			
		Fatal	Se- rious	Minor	None	Destroyed	Substantial	Minor	None
Low Ceiling/	2148 ✓				4		X		
Visibility:	2423 ✓				4		X		
IFR Approach	2595 ✓				5		X		
(Cont'd)	3266 ✓	3				X			
	3366 ✓	4				X			
	3529 ✓	1				X			
	3620 ✓	2	1			X			
	3712 ✓	1				X			
	3858 ✓				4		X		
	3905 ✓	2				X		X	
	3988		1				X		
	3989 ✓	2				X			
	3993 ✓	1				X			
	4006	2				X			
	4010	2				X			
Subtotals	25	30	<i>1</i> 8	<i>4</i> 4	<i>27</i> 27	16	<i>9</i> 9	<i>0</i> 0	<i>0</i> 0
Thunder-	1700			1	1		X		
storms	2591				4		X		
Subtotals	2	0	0	1	5	0	2	0	0
Temperature/ Dew Point	1376				4		X		
	1536			2			X		
	1771			2			X		
	3252				2		X		
Subtotals	3378	5	0	4	7	0	5	0	0
Rain, Hydro- planing, or Wet Runway	1261		2			X			
	2122				8		X		
	2903				2		X		
Subtotals	3025	4	2	0	12	1	3	0	0
Totals	176	38	25	39	251	32	143	0	1

NTSB -  
M. Henning 382-6536  
Mr. Scott

APPENDIX A-2

Statistical Summary of Accident Briefs - Weather Observation Available<sup>1/</sup>

(Calendar Year 1979; Approach or Landing Phases of Operation)

"Modified" Cause/ Factor <sup>2/</sup>	NTSB File No.	No. of Injuries				Degree of Aircraft Damage			
		Fatal	Ser- ious	Minor	None	Destroyed	Substantial	Minor	None
Unfavorable	0106				1		X		
Winds or	0153				1		X		
Wrong Runway	0165				3		X		
	0212				1		X		
	0269				1		X		
	0343				1		X		
	0383				1		X		
	0386				1		X		
	0490			1	2		X		
	0567				1		X		
	0680				1		X		
	0742				1		X		
	0881				3		X		
	0904				1		X		
	0979			1			X		
	1024				2		X		
	1041			1	1		X		
	1057				1		X		
	1104		1						X
	1113				4		X		
	1184			3	1		X		
	1211			1			X		
	1341				1		X		
	1364			1	2		X		
	1722				2		X		
	1828			2			X		
	2043				2		X		
	2176				1		X		
	2260			4			X		
	2343				1		X		
	2413			1			X		
	2693		2						X
	2804				1		X		
	2808				1		X		
	2855				2		X		
	3311				1		X		
	3455				2		X		
	3566			1	1		X		
	3641				1		X		
	<u>3690</u>				<u>4</u>		<u>X</u>		
Subtotals	40	0	3	17	50	0	38	1	1

APPENDIX A-2 (Continued)

"Modified" Cause/ Factor <sup>2</sup> /	NTSB File No.	No. of Injuries				Degree of Aircraft Damage			
		Fatal	Ser- ious	Minor	None	Destroyed	Substantial	Minor	None
Low Ceiling/ Visibility: IFR Approach	0109			3	3		X		
	0112		3			X			
	0313			1		X			
	0542		4				X		
	0879	3				X			
	0888	2				X			
	0911	1				X			
	1430		1				X		
	1459			3			X		
	1808	1				X			
	2114	4				X			
	2153	3					X		
	2658	3	2			X			
	2780	2				X			
	2831			3	2		X		
	2966			2		X			
	2996	3				X			
	3038	2				X			
	3231	1				X			
	3390	3	2			X			
	3392				2	X			
	3499		2			X			
	3644			1	7	X			
	3692	1				X			
	3886				1	X			
	3974	2	3			X			
	<u>3981</u>	<u>2</u>							
Subtotals	27	33	17	13	15	19	X 8	0	0
Thunderstorms	3375				1		X		
Subtotals	1	0	0	0	1	0	1	0	0
Temperature/ Dew Point	2627				4		X		
Subtotals	3362				2		X		
	2	0	0	0	6	0	2	0	0
Rain, Hydro- planning, or Wet Runway	3329				2		X		
Subtotals	1	0	0	0	2	0	1	0	0
Totals	71	33	20	30	74	19	50	1	1

APPENDIX A-3 - RECAP

247 total accidents (176 without WX observation; 71 with weather observation)  
71 fatalities (.287 per accident or .139 probability per occupant)  
45 serious injuries (.182 per accident or .088 probability per occupant)  
69 minor injuries (.279 per accident or .135 probability per occupant)  
325 no injuries (1.316 per accident or .637 probability per occupant)  
51 aircraft totally destroyed (.206 probability per accident)  
193 aircraft substantially damaged (.777 probability per accident)  
1 aircraft minor damage (.004 probability per accident)  
2 aircraft no damage (.008 probability per accident)

1/Source: Reference 37.

2/Modified in the sense that only one cause or factor was used to categorize an accident. Whenever more than one cause or factor was cited, that which appeared to have weighed most heavily in the accident sequence was used.

APPENDIX B

Critical Values

<u>Critical Value Element</u>	<u>Base Year Value<sup>1/</sup></u>	<u>Inflator Ratio</u>	<u>1981 Value</u>
Value of a Statistical Life	\$530,000 (80\$)	138.9 <sup>2/</sup> /127.3 <sup>3/</sup>	\$ 580,000 <sup>6/</sup>
Unit Costs of Statistical Aviation Injuries:			
Serious	38,000 (80\$)	See Footnote 5.	\$ 42,000
Minor	15,000 (80\$)	See Footnote 6.	16,000
Unit Replacement and Restoration Costs of General Aviation Aircraft (Excluding Turbojets/Fans):			
Replacement	\$ 37,000 (78\$)	235.4 <sup>7/</sup> /173.5 <sup>8/</sup>	\$ 50,000 <sup>9/</sup>
Restoration	12,000 (78\$)		16,000 <sup>2/</sup>
Value of Time of Air Travelers Per Hour	17.50 (80\$)	138.9 <sup>2/</sup> /127.3 <sup>3/</sup>	19.00 <sup>10/</sup>
Variable Operating Costs of General Aviation Aircraft (Per Airborne Hour)			
	<u>Fuel &amp; Main-Oil</u>		
Single-engine piston, 1-3 seats	\$ 9.93 + \$ 6.24 (78\$)	See Footnote 11.	\$ 29.00 <sup>12/</sup>
Single-engine piston, 4 + seats	\$ 12.41 + \$ 9.53 (78\$)	See Footnote 11.	\$ 38.00 <sup>12/</sup>
Twin-engine piston, under 12,500 TOGW	\$ 25.12 + \$ 41.02 (78\$)	See Footnote 13.	\$ 104.00 <sup>12/</sup>
Twin-engine turboprop, under 12,500 TOGW	\$ 54.61 + \$ 77.35 (78\$)	See Footnote 14.	\$ 216.00 <sup>12/</sup>
Twin-engine turboprop, over 12,500 TOGW	\$198.25 + \$180.30 (78\$)	See Footnote 14.	\$ 655.00 <sup>12/</sup>
Twin-engine turbojet/fan, under 20,000 TOGW	\$252.05 + \$162.28 (78\$)	See Footnote 14.	\$ 748.00 <sup>12/</sup>
Twin-engine turbojet/fan, over 20,000 TOGW	\$354.10 + \$203.76 (78\$)	See Footnote 14.	\$1,020.00 <sup>12/</sup>
Multi-engine turbojet/fan, over 20,000 TOGW	\$388.26 + \$461.22 (78\$)	See Footnote 14.	\$1,421.00 <sup>12/</sup>
Piston rotorcraft	\$ 13.73 + \$ 25.19 (78\$)	See Footnote 13.	\$ 61.00 <sup>12/</sup>
Turbine rotorcraft	\$ 22.44 + \$ 55.79 (78\$)	See Footnote 14.	\$ 119.00 <sup>12/</sup>
Weighted Total			\$ 84.00 <sup>15/</sup>

Footnotes to Appendix B

1/ Source: Reference 9.

2/ BLS index of adjusted hourly earnings, 1981 (1977=100).

3/ BLS index of adjusted hourly earnings, 1980 (1977=100).

4/ Rounded to nearest \$10,000.

5/ Labor or earnings related cost in 1980 (\$28,480) x Ratio of 1981 to 1980 index of adjusted hourly earnings where 1977=100 (138.9/127.3) = \$31,075. Medical related costs in 1980 (\$9,634) x Ratio of 1981 to 1980 consumer price index for total medical care where 1967=100 (295.1/267.2) = \$10,640. Total equals \$41,715, or \$42,000 rounded to the nearest \$1,000.

6/ Labor or earnings related costs in 1980 (\$13,080) x Ratio of 1981 to 1980 index of adjusted hourly earnings where 1977=100 (138.9/127.3) = \$14,272. Medical related costs in 1980 (\$1,587) x Ratio of 1981 to 1980 consumer price index for total medical care where 1967=100 (295.1/267.2) = \$1,753. Total equals \$16,025 or \$16,000 rounded to the nearest \$1,000.

7/ BLS producer price index for total transportation equipment, 1981 (12/68=100).

8/ BLS producer price index for total transportation equipment, 1978 (12/68=100).

9/ Rounded to nearest \$1,000.

10/ Rounded to nearest \$.50.

11/ For fuel and oil: Ratio of 1981 to 1978 mean 80/87 aviation gas costs per gallon (\$1.85/\$.89). Source: Reference 38. For maintenance: Ratio of 1981 to 1978 BLS indices of adjusted hourly earnings where 1977=100: 138.9/108.4.

12/ Rounded to nearest \$1.00.

13/ For fuel and oil: Ratio of 1981 to 1978 mean 100/130 aviation gas costs per gallon (\$1.90/\$.91). Source: Reference 38. For maintenance: Same as footnote 11 above.

14/ For fuel and oil: Ratio of 1981 to 1978 mean jet type A fuel costs per gallon (\$1.70/\$.79). Source: Reference 38. For maintenance: Same as footnote 11 above.

15/ Weighted by airborne hours per Reference 9.

## APPENDIX C

### Program Logic of AWOS Establishment Criteria

The AWOS establishment criteria developed in this report for non-towered and non-federal towered airports will be integrated as a FORTRAN subroutine into the Terminal Area Forecast Data System. This appendix outlines the program logic used to compute the Phase I and II benefit/cost ratios in Figures 34-A and 34-B of Chapter VI. Note that benefits and costs relating to freezing precipitation and thunderstorm detection/location are set equal to zero. At the date of this report, the typical AWOS installation is not envisioned by the FAA AWOS Program Office to initially include these sensors. The program also relies on national average values for PIFR and PC and assumes no proximity penalties or remoteness premiums. In actual practice, site-specific values for PIFR and PC will be used and proximity penalties and remoteness premiums will be imposed, if applicable.

```

C      THIS PROGRAM (DSN=AWOS.FORT) IS DESIGNED TO COMPUTE BATCH      00000040
C      BENEFIT/COST RATIOS FOR AUTOMATED WEATHER OBSERVING          00000050
C      SYSTEMS (AWOS) AT NON-TOWERED AND NON-FEDERAL TOWERED       00000060
C      AIRPORTS. WITH MINOR MODIFICATIONS, THIS PROGRAM CAN        00000070
C      ALSO BE APPLIED TO AIRPORTS DESIGNATED AS ATCT DISCON-      00000080
C      TINUANCE CANDIDATES. BENEFIT/COST LOGIC IS INCLUDED          00000090
C      FOR WIND, TEMPERATURE, DEW POINT, ALTIMETER, CEILING,        00000100
C      VISIBILITY AND LIQUID PRECIPITATION SENSORS. WHILE           00000110
C      THE BENEFIT/COST LOGIC FOR FREEZING PRECIPITATION AND        00000120
C      THUNDERSTORM SENSORS ARE ALSO INCLUDED, THEIR VALUES       00000130
C      ARE SUPPRESSED IN THIS PROGRAM APPLICATION.                  00000140
C                                                                    00000150
C      ALL DOLLAR VALUES IN THIS PROGRAM ARE 1981 DOLLARS.        00000160
C                                                                    00000170
C      REAL LCC,MINOR,MIN,MLITN,MLLCL,INSBEN,MLAP,NUMER            00000180
0001    DATA NINES/'9999'/                                         00000190
0002    INTEGER Y,TOWRCD,SLOCID                                       00000200
0003    REAL*8 STATE,REG                                              00000210
0004    DIMENSION CITY(7)                                            00000220
C                                                                    00000230
C      ----FE = FACILITIES AND EQUIPMENT COSTS UNIQUE TO EACH      00000240
C      WIND, TEMPERATURE/DEWPOINT, ALTIMETER, CEILING, VISIBILITY, 00000250
C      LIQUID PRECIPITATION, FREEZING PRECIPITATION AND THUNDER-   00000260
C      STORM. WHILE PREFE = 3208 AND THUNFE = 20160, THEY          00000270
C      ARE SUPPRESSED IN THIS PROGRAM APPLICATION.                  00000280
C                                                                    00000290
0006    WINDFE=1736.                                                  00000300
0007    TPDPFE=1408.                                                 00000310
0008    ALTMFE=3456.                                                 00000320
0009    CEILFE=36433.                                               00000330
0010    VISIFE=24808.                                               00000340
0011    PRELFE=1192.                                                00000350
0012    PREFE=0.                                                    00000360
0013    THUNFE=0.                                                  00000370
C                                                                    00000380
C      ----OM = LIFE-CYCLE OPERATIONS AND MAINTENANCE COSTS       00000390
C      UNIQUE TO EACH SENSOR: WIND, TEMPERATURE/DEWPOINT,          00000400
C      ALTIMETER, CEILING, VISIBILITY, LIQUID PRECIPITATION,        00000410
C      FREEZING PRECIPITATION AND THUNDERSTORM. WHILE PREFOM =     00000420
C      479 AND THUNOM = 3015, THEY ARE SUPPRESSED IN THIS PROGRAM 00000430
C      APPLICATION.                                                  00000440
C                                                                    00000450
0014    WINDOM=263.                                                  00000460
0015    TPDPOM=207.                                                 00000470
0016    ALTMOM=518.                                                 00000480
0017    CEILOM=5448.                                               00000490
0018    VISIOM=3709.                                               00000500
0019    PRELOM=175.                                                 00000510
0020    PREFOM=0.                                                  00000520
0021    THUNOM=0.                                                  00000530
C                                                                    00000540
C      ----LC = LIFE-CYCLE COST UNIQUE TO EACH SENSOR: WIND,      00000550

```



	C	TEMPERATURE/DEWPOINT, ALTIMETER, CEILING, VISIBILITY, LIQUID	00000560
	C	PRECIPITATION, FREEZING PRECIPITATION AND THUNDERSTORM.	00000570
	C		00000580
0022		WINDLC=WINDFE+WINDOM	00000590
0023		TPDPLC=TPDPFE+TPDPOM	00000600
0024		ALTMLC=ALTMFE+ALTMOM	00000610
0025		CEILLC=CEILFE+CEILOM	00000620
0026		VISILC=VISIFE+VISIOM	00000630
0027		PRELLC=PRELFE+PRELOM	00000640
0028		PREFLC=PREFFE+PREFOM	00000650
0029		THUNLC=THUNFE+THUNOM	00000660
	C		00000670
	C	FIXED = FIXED LIFE-CYCLE COSTS COMMON TO ANY SYSTEM	00000680
	C		00000690
0030		FIXED = 49617.	00000700
	C		00000710
	C	COMM = OPTIONAL COMMUNICATIONS	00000720
	C		00000730
0031		COMM=21535.	00000740
	C		00000750
	C	LCC = TOTAL LIFE-CYCLE COST OF A GIVEN SYSTEM	00000760
	C	OVER A 15-YEAR ECONOMIC LIFE.	00000770
	C		00000780
0032		LCC=WINDLC+TPOPLC+ALTMLC+CEILLC+VISILC+PRELLC+PREFLC	00000790
		&+THUNLC+FIXED+COMM	00000800
	C		00000810
	C	D = OMB-PREScribed DISCOUNT RATE	00000820
	C		00000830
0033		D=.10	00000840
	C		00000850
	C	--ITN = ANNUAL ITINERANT OPERATIONS BY USER CLASS	00000860
	C	PER TAF. --LCL = ANNUAL LOCAL OPERATIONS BY USER	00000870
	C	CLASS PER TAF. AP = TOTAL ANNUAL INSTRUMENT APPROACHES	00000880
	C	PER TAF. GAAP = GA ANNUAL INSTRUMENT APPROACHES PER	00000890
	C	TAF. MLAP = MILITARY ANNUAL INSTRUMENT APPROACHES PER	00000900
	C	TAF.	00000910
	C		00000920
0034		DIMENSION ACITN(15),ATITN(15),GAITN(15),MLITN(15),	00000930
		&GALCL(15),MLLCL(15),AP(15),GAAP(15),MLAP(15)	00000940
	C		00000950
	C	ARPORT = AIRPORT NAME	00000960
	C		00000970
0035		DIMENSION ARPORT(11)	00000980
	C		00000990
	C	CRITICAL VALUES: VALUE OF A STATISTICAL	00001000
	C	LIFE (VALLIF), UNIT COST OF A STATISTICAL SERIOUS INJURY	00001010
	C	(CSTSIN), UNIT COST OF A STATISTICAL MINOR INJURY	00001020
	C	(CSTMIN), REPLACEMENT VALUE OF A GA AIRCRAFT, NET OF	00001030
	C	TURBOJETS/FANS (DESTRY), RESTORATION COST OF A	00001040
	C	SUBSTANTIALLY-DAMAGED GA AIRCRAFT, NET OF TURBOJETS/	00001050
	C	FANS (SUBDAM), RESTORATION COST OF A MINORLY-DAMAGED	00001060
	C	GA AIRCRAFT, NET OF TURBOJETS/FANS (MINOR).	00001070

0036	C	VALLIF=580000.	00001090
0037		CSTSIN=42000.	00001090
0038		CSTMIN=16000.	00001100
0039		DESTRY=50000.	00001110
0040		SUBDAM=16000,	00001120
0041		MINOR=8000.	00001130
			00001140
	C		00001150
	C	PAIFD = PROBABILITY OF AVERTING A GA INSTRUMENT FLIGHT	00001160
	C	DISRUPTION (DECIMAL)	00001170
	C		00001180
0042		PAIFD=.10	00001190
	C		00001200
	C	CIFD = UNIT COST OF A GA INSTRUMENT FLIGHT DISRUPTION	00001210
	C		00001220
0043		CIFD=93.	00001230
	C		00001240
	C	FIA = FRACTION OF TOTAL GA ITINERANT OPERATIONS THAT ARE	00001250
	C	ARRIVALS (DECIMAL)	00001260
	C		00001270
0044		FIA=.50	00001280
	C		00001290
	C	FVC = FRACTION OF GA ITINERANT ARRIVALS CONDUCTED IN	00001300
	C	VISUAL CONDITIONS (DECIMAL)	00001310
	C		00001320
0045		FVC=.968	00001330
	C		00001340
	C	FO = FRACTION OF GA ITINERANT ARRIVALS THAT CAN	00001350
	C	BE EXPECTED TO OVERFLY IN THE ABSENCE OF A	00001360
	C	WEATHER OBSERVATION (DECIMAL)	00001370
	C		00001380
0046		FO=.195	00001390
	C		00001400
	C	CAO = UNIT COST OF AN OVERFLIGHT	00001410
	C		00001420
0047		CAO=.70	00001430
	C		00001440
	C	QUAL- = COUNTERS FOR NUMBER OF LOCATIONS HAVING	00001450
	C	PHASE II B/C RATIOS OF LESS THAN .50, .50 TO .99,	00001460
	C	1.00 TO 1.49, 1.50 TO 1.99, AND 2.00 OR GREATER.	00001470
	C		00001480
0048		QUALA=0.	00001490
0049		QUALB=0.	00001500
0050		QUALC=0.	00001510
0051		QUALD=0.	00001520
0052		QUALE=0.	00001530
	C		00001540
	C	LOCID AND SLOCID = LOCATION IDENTIFIER CODES FROM TAF	00001550
	C	AND SCI FILES, RESPECTIVELY. TOWERCD = TOWER CODE.	00001560
	C	PIFR AND RPIFR = PROBABILITY (%) OF WEATHER BELOW VFR MINIMA.	00001570
	C	PC AND RPC = PROBABILITY (%) OF WEATHER BELOW IFR MINIMA.	00001580
	C	TAF IDENT: DD DSN=FAA114.TAF80.FINAL.OCT1882.LOCID.DATA,	00001590

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C      UNIT=3400-4,VOL=SER=W54244,LABEL=(,NL),DISP=(OLD,KEEP),      00001600
C      DCB=(RECFM=F,LRECL=7420,BLKSIZE=7420,DEN=3)                  00001610
C      SCI IDENT: DD DSN=FAA116.SAM.P341.VFRIFR.NONTWR.SCI.DATA,    00001620
C      DISP=SHR                                                       00001630
C                                                                           00001640
0053  READ(10,10)SLOCID,RPIFR,RPC                                     00001650
0054  10 FORMAT(A4,F5.2,1X,F5.2)                                     00001660
0055  PRINT20                                                         00001670
0056  20 FORMAT('- ',60X,'FIGURE 34-A')                             00001680
0057  PRINT30                                                         00001690
0058  30 FORMAT('- ',28X,'RESULTS OF APPLYING CRITERIA TO ',      00001700
      E'NON-TOWERED AND NON-FEDERAL TOWERED AIRPORTS')
      PRINT40                                                         00001710
0059  40 FORMAT('- ',95X,'LC',7X,'LC',4X,'GA+ML')                 00001720
0060  PRINT50                                                         00001730
0061  50 FORMAT(' ',93X,'SAFETY',3X,'EFFICY',2X,'AIAS',3X,      00001740
      E'PHASE',3X,'PHASE')
      PRINT60                                                         00001750
0062  60 FORMAT(' ',7X,'REG',3X,'LOC',6X,'AIRPORT NAME',30X,'CITY', 00001760
      E'19X,'ST',5X,'BENS',5X,'BENS',3X,'YR 1',3X,'I B/C#',2X,
      E'II B/C#')
      PRINT70                                                         00001770
0063  70 FORMAT('- ')                                               00001780
0064  80 CONTINUE                                                  00001790
                                                                           00001800
                                                                           00001810
                                                                           00001820
                                                                           00001830
C      BCI = PHASE I BENEFIT/COST RATIO.  INITIALIZED AT 0.        00001840
C                                                                           00001850
0068  BCI=0.                                                         00001860
                                                                           00001870
                                                                           00001880
C      COUNT = SUM OF GA AND MILITARY ANNUAL INSTRUMENT            00001890
C      APPROACHES IN YEAR 1.  INITIALIZED AT 0.                    00001900
C                                                                           00001910
0069  COUNT=0.                                                       00001920
                                                                           00001930
C      Y = EACH YEAR OF A SYSTEM'S ASSUMED USEFUL LIFE           00001940
C      OF 15 YEARS                                                  00001950
C                                                                           00001960
0070  Y=1.                                                            00001970
                                                                           00001980
C      COMBEN = ANNUAL BENEFIT TO EITHER THE AIR CARRIER         00001990
C      OR, REPEAT OR, AIR TAXI USER CLASSES.  INITIALIZED AT 0.  00002000
C                                                                           00002010
0071  COMBEN=0.                                                      00002020
                                                                           00002030
C      AIA- = PROJECTED ANNUAL INSTRUMENT APPROACHES OF GA        00002040
C      AND MILITARY USER CLASSES.  INITIALIZED AT 0.              00002050
C                                                                           00002060
0072  AIAG=0.                                                         00002070
0073  AIAM=0.                                                         00002080
                                                                           00002090
C      ANSAFB = GA AND MILITARY SAFETY BENEFITS IN YEAR Y.        00002100
C      INITIALIZED AT 0.                                            00002110

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0074      C      ANSAFB=0.                                00002120
          C      ANDELB = GA AND MILITARY FLIGHT DISRUPTION BENEFITS 00002130
          C      IN YEAR Y.  INITIALIZED AT 0.                    00002140
          C      ANDELB=0.                                        00002150
0075      C      ANDBEN = SUM OF ANSAFB AND ANDELB.  INITIALIZED AT 0. 00002160
          C      ANDBEN=0.                                        00002170
          C      ANDBEN=0.                                        00002180
          C      ANDBEN = SUM OF ANSAFB AND ANDELB.  INITIALIZED AT 0. 00002190
0076      C      ANDBEN=0.                                        00002200
          C      ---LCY = LIFE-CYCLE BENEFITS FOR EFFICIENCY (DELLCY), 00002210
          C      SAFETY (SAFLCY) AND TOTAL (TOTLCY).  INITIALIZED AT 0. 00002220
          C      DELLCY=0.                                        00002230
          C      SAFLCY=0.                                        00002240
          C      TOTLCY=0.                                        00002250
0077      C      DELLCY=0.                                        00002260
0078      C      SAFLCY=0.                                        00002270
0079      C      TOTLCY=0.                                        00002280
          C      90 READ(11,100,END=260)REG,STATE,CITY,ARPORT,LOCID,TOWRCD, 00002290
          C      EACITN,ATITN,GAITN,GALCL,MLITN,MLLCL,GAAP,MLAP,AP      00002300
0080      C      90 READ(11,100,END=260)REG,STATE,CITY,ARPORT,LOCID,TOWRCD, 00002310
          C      EACITN,ATITN,GAITN,GALCL,MLITN,MLLCL,GAAP,MLAP,AP      00002320
0081      C      100 FORMAT(A5,A5,6A4,42,10A4,A2,A4,10X,I1,17(100X),92X, 00002330
          C      E15F9.0,45X,15F9.0,45X,15F9.0,45X,15F9.0,45X, 00002340
          C      E15F9.0,45X,15F9.0,9(100X),45X,15F9.0,45X, 00002350
          C      E15F9.0,45X,15F9.0) 00002360
          C      MIN = CONTROL FOR AVAILABILITY OF MINIMA FROM 00002370
          C      SCI DATA FILE: 0 = NO; 1 = YES. 00002380
          C      MIN=1. 00002390
0082      C      MIN=1. 00002400
          C      IF(TOWRCD.NE.0.AND.TOWRCD.NE.7.AND.TOWRCD.NE.9) GO TO 90 00002410
0083      C      110 IF(LOCID.LT.SLOCID) GO TO 130 00002420
0084      C      110 IF(LOCID.EQ.SLOCID) GO TO 140 00002430
0085      C      READ(10,10,END=120) SLOCID,RPIFR,RPC 00002440
0086      C      GO TO 110 00002450
0087      C      120 SLOCID=NINES 00002460
0088      C      GO TO 110 00002470
0089      C      130 CONTINUE 00002480
0090      C      MIN = 0. 00002490
0091      C      PIFR=13.5 00002500
0092      C      PC=4.95 00002510
0093      C      GO TO 150 00002520
0094      C      140 CONTINUE 00002530
0095      C      PIFR=RPIFR 00002540
0096      C      PC=RPC 00002550
0097      C      TOTOPS = TOTAL AIRCRAFT OPERATIONS IN YEAR Y 00002560
          C      150 TOTOPS=ACITN(Y)+ATITH(Y)+GAITH(Y)+GALCL(Y)+MLITH(Y)+MLLCL(Y) 00002570
          C      IF(TOTOPS.NE.0) GO TO 160 00002580
0098      C      IF(TOTOPS.NE.0) GO TO 160 00002590
0099      C      IF(TOTOPS.NE.0) GO TO 160 00002600
          C      IF(TOTOPS.NE.0) GO TO 160 00002610
          C      IF(TOTOPS.NE.0) GO TO 160 00002620
          C      IF(TOTOPS.NE.0) GO TO 160 00002630
          C      IF(TOTOPS.NE.0) GO TO 160 00002640
          C      IF(TOTOPS.NE.0) GO TO 160 00002650
    
```

0100	GO TO 210	00002660
0101	160 CONTINUE	00002670
0102	AIAG = (GAIN(Y)*.5)*((PIFR-PC)/100)*(.8-(.5*(GAIN(Y) &/TOTOPS)))	00002680
0103	IF(AIAG.EQ.0.OR.GAAP(Y).EQ.0) GO TO 170	00002690
0104	GO TO 180	00002700
0105	170 AIAM=MLAP(Y)	00002710
0106	GO TO 190	00002720
0107	180 CONTINUE	00002730
0108	AIAM=(AIAG/GAAP(Y))*MLAP(Y)	00002740
0109	190 CONTINUE	00002750
0110	IF(AP(Y).NE.0) GO TO 200	00002760
0111	AIAG=0.	00002770
0112	AIAM=0.	00002780
0113	MIN=1.	00002790
0114	200 CONTINUE	00002800
0115	IF(Y.EQ.1) COUNT=AIAG+AIAM	00002810
	C	00002820
	C	00002830
	C	00002840
	C	00002850
	C	00002860
	C	00002870
	C	00002880
	C	00002890
0116	WINSAF=(((8*VALLIF)+(18*CSTSIN)+(47*CSTMIN)+(15*DESTRY) E+(162*SUBDAM)+(1*MINOR))/180)*((.000003704*(GAIN(Y)+ EMLITN(Y)))+(0.00000222*(GALCL(Y)+MLLCL(Y))))	00002900
0117	CLVSAF=(((63*VALLIF)+(25*CSTSIN)+(17*CSTMIN)+(35*DESTRY) E+(17*SUBDAM)+(0*MINOR))/52)*.0000865*(AIAG+AIAM)	00002910
0118	THNSAF=(((0*VALLIF)+(0*CSTSIN)+(1*CSTMIN)+(0*DESTRY) E+(3*SUBDAM)+(0*MINOR))/3)*((.000000029*(GAIN(Y)+ EMLITN(Y)))+(0.000000017*(GALCL(Y)+MLLCL(Y))))	00002920
0119	TPDSAFA=(((0*VALLIF)+(0*CSTSIN)+(4*CSTMIN)+(0*DESTRY) E+(7*SUBDAM)+(0*MINOR))/7)*((.000000101*(GAIN(Y)+ EMLITN(Y)))+(0.00000006*(GALCL(Y)+MLLCL(Y))))	00002930
0120	PRESAF=(((0*VALLIF)+(2*CSTSIN)+(0*CSTMIN)+(1*DESTRY) E+(4*SUBDAM)+(0*MINOR))/5)*((.000000113*(GAIN(Y)+ EMLITN(Y)))+(0.000000067*(GALCL(Y)+MLLCL(Y))))	00002940
0121	THNSAF=0.	00002950
	C	00002960
	C	00002970
	C	00002980
	C	00002990
0122	ANSAFB=WINSAF+TPDSAFA+CLVSAF+PRESAF+THNSAF	00003000
	C	00003010
	C	00003020
	C	00003030
	C	00003040
	C	00003050
	C	00003060
	C	00003070
0123	NUMER=ACITN(Y)+ATITN(Y)	00003080
	C	00003090
	C	00003100
	C	00003110
	C	00003120
0124	IF(NUMER.GT.3000) NUMER=3000	00003130
0125	COMBEN=(NUMER/3000)*9548	00003140
	C	00003150
	C	00003160
	C	00003170

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C     INSBEN = ANNUAL BENEFITS OF AVERTED GA AND MILITARY
C     INSTRUMENT FLIGHT DISRUPTIONS
C     0126     INSBEN=(AIAG+AIAM)*PAIFD*CIFD
C     VISBEN=ANNUAL BENEFITS OF AVERTED GA AND MILITARY VISUAL
C     FLIGHT DISRUPTIONS
C     0127     VISBEN=FIA*FVC*FO*CAO*((GAITN(Y)+MLLCL(Y))+((GALCL(Y)+
C     EMLLCL(Y))*6))
C     ANDELB = TOTAL EFFICIENCY BENEFITS
C     0128     ANDELB=COMBEN+INSBEN+VISBEN
C     ANDBEN = TOTAL ANNUAL BENEFITS
C     0129     ANDBEN=ANSAFB+ANDELB
C     0130     SAFLCY=SAFLCY+(ANSAFB*(1/((1+D)**Y-.5)))
C     0131     DELLCY=DELLCY+(ANDELB*(1/((1+D)**Y-.5)))
C     0132     TOTLCY=TOTLCY+(ANDBEN*(1/((1+D)**Y-.5)))
C     AR = RECIPROCAL OF PROXIMITY PENALTY OR REMOTENESS
C     PREMIUM. FOR PURPOSES OF THIS PROGRAM APPLICATION,
C     AR IS ASSUMED EQUAL TO 1.
C     0133     AR=1.
C     0134     IF(Y.NE.1) GO TO 210
C     --BEN = PER OPERATION BENEFITS (FOR PHASE I), APPLIED
C     TO LIFE-CYCLE INFLATOR FACTOR, BY SENSOR: WIND, TEMP-
C     ERATURE/DEW POINT, ALTIMETER, CEILING/VISIBILITY, PRE-
C     CIPITATION AND THUNDERSTORM. FOR PURPOSES OF THIS PROGRAM
C     APPLICATION, THNBEN IS SUPPRESSED.
C     0135     WINBEN=(.2624*(GAITN(1)+MLITN(1)))+( .1575*(GALCL(1)+MLLCL
C     E(1)))
C     0136     TPDBEN=(.0025*(GAITN(1)+MLITH(1)))+( .0015*(GALCL(1)+MLLCL
C     E(1)))
C     0137     ALTBEN=.1488*(GAITN(1)+MLITN(1))
C     0138     IF(GAAP(1).EQ.0.AND.MLAP(1).EQ.0) ALTBEN=0.
C     0139     CLVBEN=1.064*(GAITN(1)+MLITN(1))
C     0140     IF(GAAP(1).EQ.0.AND.MLAP(1).EQ.0) CLVBEN=0.
C     0141     PREBEN=(.0045*(GAITN(1)+MLITN(1)))+( .0027*(GALCL(1)+MLLCL
C     E(1)))
C     0142     THNBEN=(.0007*(GAITN(1)+MLITN(1)))+( .0004*(GALCL(1)+MLLCL
C     E(1)))
C     0143     THNBEN=0.
C     0144     BCI=(((COMBEN*7.976)+(WINBEN+TPDBEN+ALTBEN+CLVBEN+PREBEN+

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      (ETHNBEN)*14.5))*AR)/LCC
0145      210 CONTINUE
0146          Y=Y+1.
0147          IF(Y.LE.15) GO TO 150
          C
          C      BCII = PHASE II BENEFIT/COST RATIO
          C
          C      BCII=(TOTLCY/LCC)*AR
0148
0149      220 CONTINUE
0150          IF(BCII.LT..5) QUALA=QUALA+1.
0151          IF(BCII.GE..5.AND.BCII.LT.1) QUALB=QUALB+1.
0152          IF(BCII.GE.1.AND.BCII.LT.1.5) QUALC=QUALC+1.
0153          IF(BCII.GE.1.5.AND.BCII.LT.2) QUALD=QUALD+1.
0154          IF(BCII.GE.2) QUALE=QUALE+1.
0155          IF(MIN.NE.0) GO TO 240
0156          PRINT230,REG,LOCID,ARPORT,CITY,STATE,SAFLCY,DELLCY,COUNT,BCI,BCII
0157      230 FORMAT(' ',7X,A5,1X,A4,1X,10A4,A2,6A4,A2,1X,A5,F8.0,1X,F8.0,1X,
      &F5.0,1X,F5.2,'*',2X,F5.2,'*')
0158          WRITE(14,235)REG,LOCID,ARPORT,CITY,STATE,SAFLCY,DELLCY,COUNT,
      &BCI,BCII
0159      235 FORMAT(A5,A4,10A4,A2,6A4,A2,A5,F8.0,F8.0,1X,F5.0,F5.2,'*',F5.2,
      &'*')
0160          NUMER=0.
0161          GO TO 80
0162      240 PRINT250,REG,LOCID,ARPORT,CITY,STATE,SAFLCY,DELLCY,COUNT,BCI,BCII
0163      250 FORMAT(' ',7X,A5,1X,A4,1X,10A4,A2,6A4,A2,1X,A5,F8.0,1X,F8.0,1X,
      &F5.0,1X,F5.2,3X,F5.2)
0164          WRITE(14,255)REG,LOCID,ARPORT,CITY,STATE,SAFLCY,DELLCY,COUNT,
      &BCI,BCII
0165      255 FORMAT(A5,A4,10A4,A2,6A4,A2,A5,F8.0,F8.0,F5.0,F5.2,1X,F5.2)
0166          GO TO 80
0167      260 CONTINUE
0168          PRINT270
0169      270 FORMAT('1')
0170          DO 280 K=1,5
0171      280 PRINT290
0172      290 FORMAT('-')
0173          PRINT300
0174      300 FORMAT('- ',59X,'RECAP')
0175          PRINT310,QUALA
0176      310 FORMAT('- ',25X,'TOTAL LOCATIONS HAVING PHASE II ',
      &'BENEFIT/COST RATIOS OF LESS THAN .50',5X,F5.0)
0177          PRINT320,QUALB
0178      320 FORMAT('0 ',25X,'TOTAL LOCATIONS HAVING PHASE II ',
      &'BENEFIT/COST RATIOS FROM .50 TO .99',6X,F5.0)
0179          PRINT330,QUALC
0180      330 FORMAT('0 ',25X,'TOTAL LOCATIONS HAVING PHASE II ',
      &'BENEFIT/COST RATIOS FROM 1.00 TO 1.49',4X,F5.0)
0181          PRINT340,QUALD
0182      340 FORMAT('0 ',25X,'TOTAL LOCATIONS HAVING PHASE II ',
      &'BENEFIT/COST RATIOS FROM 1.50 TO 1.99',4X,F5.0)

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159

0183	PRINT350,QUALE	00004220
0184	350 FORMAT('0',25X,'TOTAL LOCATIONS HAVING PHASE II ',	00004230
	&'BENEFIT/COST RATIOS OF 2.00 OR GREATER',3X,F5.0)	00004240
0185	TOTAL = QUALA+QUALB+QUALC+QUALD+QUALE	00004250
0186	PRINT360,TOTAL	00004260
0187	360 FORMAT('0',25X,'TOTAL LOCATIONS',58X,F5.0)	00004270
0188	PRINT370	00004280
0189	370 FORMAT('-',8X,'BENEFIT/COST RATIO BEFORE PROXIMITY PENALTY ',	00004290
	&'OR REMOTENESS PREMIUM IF ANY.')	00004300
0190	PRINT380	00004310
0191	380 FORMAT('-',7X,'* AIRPORTS WITH INSTRUMENT APPROACH PROCEDURES ',	00004320
	&'FOR WHICH GENERAL AVIATION AND MILITARY ANNUAL INSTRUMENT ',	00004330
	&'APPROACHES'/11X,'(AIAS) WERE COMPUTED WITH THE SCI MODEL ',	00004340
	&'USING NATIONAL NORMS FOR PIFR (13.5%) AND PC (4.95%) ARE ',	00004350
	&'IDENTIFIED BY *./11X,'FOR OTHER AIRPORTS WITH INSTRUMENT ',	00004360
	&'APPROACH PROCEDURES AIAS WERE COMPUTED WITH THE SCI ',	00004370
	&'MODEL USING VALUES FOR PIFR')	00004380
0192	PRINT390	00004390
0193	390 FORMAT(' ',10X,'AND PC BASED ON SITE-',	00004400
	&'SPECIFIC MINIMA IN THE SCI FILE. FOR AIRPORTS WITHOUT ',	00004410
	&'RECORDED AIAS IN THE TAF THE SCI MODEL'/	00004420
	&11X,'USED TO PREDICT AIAS WAS SUPPRESSED.')	00004430
0194	STOP	00004440
0195	END	00004450



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