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Report to Congress

Effects of Airport Noise on a Neighboring State

October 1980

Required by Section 8 of the
Quiet Communities Act of 1978
(Public Law 95-609)

Jointly Conducted By:

Office of Noise Abatement
and Control
Environmental Protection
Agency

Office of Environment and Energy
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DEPARTMENT OF TRANSPORTATION
UNITED STATES OF AMERICA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

NOV 6 1980

THE ADMINISTRATOR

Honorable Walter F. Mondale
President of the Senate
Washington, D. C. 20510

Dear Mr. President:

I am pleased to transmit to you, in conjunction with the Secretary of Transportation, the enclosed report entitled "Effects of Airport Noise on a Neighboring State". This document is required by Section 8 of the Quiet Communities Act of 1978 (Public Law 95-609) which asks that the Secretary of Transportation and I jointly prepare the report.

As a result of this effort, the Secretary and I have concluded that there are practical measures which, if adopted, can reduce airport noise effects. These measures are specific to the facility considered in this report which is Philadelphia International Airport. The Environmental Protection Agency and the Department of Transportation will be considering what further actions we may jointly take to promote implementation of the report's findings.

Sincerely yours,

Douglas M. Costle

Enclosure

THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

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Sincerely,

Neil Goldschmid

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EXECUTIVE SUMMARY

This report is submitted to Congress in response to Section 8 of the Quiet Communities Act of 1978 (P.L. 95-609) which resulted from Congressional concern that aircraft noise from some airports may impact communities located in another State. The question was whether the communities in the other State could effect change at the airport to provide relief for their citizens. The Secretary of Transportation and the Administrator of the Environmental Protection Agency were directed to study jointly this issue and determined that Philadelphia International Airport satisfied the selection criteria in the Act. The Act further directed that the study be conducted in cooperation with the airport operator, appropriate Federal, State, and local officials, and the Metropolitan Planning Organization which, in this case, is the Delaware Valley Regional Planning Commission (DVRPC). This led to formation of an Advisory Committee under the auspices of the DVRPC to assist the Environmental Protection Agency and the Federal Aviation Administration. This study illustrates that regional advisory bodies can work effectively on problems which cross political boundaries.

The study included three semi-independent programs: (1) Noise Measurement, (2) Noise Modeling, and (3) Community Response. The objective of the measurement program was to obtain actual aircraft noise levels in selected residential areas around the Philadelphia International Airport. These data were used to verify the results of the Noise Modeling Program. The FAA's Integrated Noise Model (INM), a computerized noise simulation, was used to predict aircraft noise levels around the airport as a function of all of the pertinent parameters, i.e., types and numbers of aircraft operating at the airport (both current and forecast for 1990 and 2000), flight tracks, operating procedures, and time of day of aircraft operations. The Community Response Program made the public aware of the noise study through standard public information techniques, a toll-free telephone complaint service, conduct of a community opinion survey to determine how people feel about the airport and its environmental impact, and establishment of an Advisory Committee to assist in the selection of noise control options.

The telephone complaint service registered 296 complaints during the 118 days in which it was operated. One thousand seven hundred and twenty-three interviews were conducted among residents within approximately 20 miles of Philadelphia International Airport, of whom 447, or 26.0 percent, lived in New Jersey and the remainder in Pennsylvania. Crime was identified most often as the most serious environmental problem, while noise (from all sources including aircraft) was fifth among the eight categories specified.

The noise exposure conditions, and the relative effectiveness of alternative noise control actions, were investigated for the existing 1980 operations and for projected 1990 and 2000 operations. Alternative noise control actions were grouped into five categories: airport layout; airport

and airspace use; aircraft operations; land use; and noise program management. Detailed results of these analyses are reported, in terms of the population impacted by several values of Average Day-Night Sound Level (Ldn), which includes a 10-decibel added penalty on nighttime aircraft operations. On this basis, the most effective noise control option for Philadelphia International Airport appears to be a reduction in nighttime operations, in combination with a preferential runway use program to keep the remaining nighttime flights away from populated areas. These actions would reduce aircraft noise impacts in the affected areas of both Pennsylvania and New Jersey. Before any such use restrictions should be considered by the operator of Philadelphia International Airport, however, a more detailed study should be made to account for all economic factors which could be affected by those restrictions. Any aviation-related options should be complemented by a continuing citizen involvement program and a broad land-use planning program.

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I. INTRODUCTION

A. Authority

This report responds to the legislative mandate of Section 8 of the Quiet Communities Act of 1978, which states:

> "(a) The Secretary of Transportation and the Administrator of the Environmental Protection Agency shall jointly study the aircraft noise effects from an airport on communities located in a State other than the State in which the airport is located. The criteria to be used in selecting the airport to be studied shall include:
>
> (1) The airport shall be operated by a State, a unit of general purpose local government of a State, or a special purpose entity constituted for the purpose of operating an airport, and
>
> (2) The airport shall have a point on the airport boundary within one nautical mile from a State boundary, and
>
> (3) The airport shall have had in excess of sixty thousand scheduled air carrier departures during the preceding calendar year.
>
> (b) The study shall be conducted in cooperation with the airport operator, appropriate Federal, State, and local officials, and the appropriate Metropolitan Planning Organization.
>
> (c) The Secretary and the Administrator shall prepare and submit to Congress a report within nine months of the conclusion of the study, but not later than twenty-four months after enactment of this section."

B. Participation

The Office of Noise Abatement and Control (ONAC) of the Environmental Protection Agency (EPA) and the Office of Environment and Energy (AEE) of the Federal Aviation Administration (FAA), acting for the Administrator and the Secretary, respectively, determined that Philadelphia International Airport (PHL) uniquely met the selection criteria of Section 8 of the Act. Therefore, the local Metropolitan Planning Organization, the Delaware Valley Regional Planning Commission (DVRPC), was requested to assist the EPA and FAA in conducting the study. In addition to assuming prime responsibility for the coordination and conduct of the Community Response phase of the study, the DVRPC organized and chaired an Advisory Committee to provide guidance, technical advice and assistance during the course of the study. Membership on this committee included Federal and state agencies, city and county departments and commissions, including the airport operators, local elected officials, environmental and health organizations, commercial air carriers, and interested citizens.

Advisory committee meetings, open to the public, were held in the Philadelphia metropolitan area, both in New Jersey and in Pennsylvania. Through these coordinative and consultative procedures, the provisions of paragraph (b) of Section 8 have been fully complied with in spirit and in principle.

C. Methodology

The study included three semi-independent programs: (1) Noise Measurement, (2) Noise Modeling, and (3) Community Response. The objective of the measurement program was to obtain actual noise levels in selected residential areas around the Philadelphia International Airport. These data, including ambient noise levels as well as noise due to aircraft operations, were used to verify the results of the Noise Modeling program. The FAA's Integrated Noise Model (INM), a computerized noise simulation, was used to predict aircraft noise levels around the airport by taking into account all pertinent parameters, i.e., types and numbers of aircraft operating at the airport (both current and forecast for 1990 and 2000), flight tracks, operating procedures, and time of day of aircraft operations. The Community Response Program made the public aware of the noise study through standard public information techniques, a toll-free telephone complaint service, conduct of a community opinion survey to determine how people feel about the airport and its environmental impact, and operation of the Advisory Committee.

II. AIRPORT SELECTION

Section 8 states that the criteria to be used in selecting the airport to be studied shall include:

1. The airport shall be operated by a state, a unit of general purpose local government of a state, or a special purpose entity constituted for the purpose of operating an airport.

2. The airport shall have a point on the airport boundary within one nautical mile from a state boundary.

3. The airport shall have had in excess of 60,000 scheduled air carrier departures during the preceding calendar year.

The following airports had more than 60,000 scheduled air carrier departures in 1978 as required in Item 3 above:

Chicago O'Hare International
Atlanta International
Los Angeles International
Dallas Fort Worth Regional
John F. Kennedy International
LaGuardia
San Francisco International
Denver Stapleton International
Miami International

Boston Logan International
Washington National
Pittsburgh Greater International
St. Louis International
Detroit Metropolitan Wayne County
Philadelphia International
Minneapolis St. Paul International
Houston Intercontinental
Newark International
Cleveland Hopkins International
Memphis International
Kansas City International
Seattle-Tacoma International
Tampa International

Two of the airports listed above also meet selection criterion in Item 2. They are:

Washington National
Philadelphia International

Since Washington National is operated by the FAA, it does not meet the selection criterion in Item 1. Since Philadelphia International is operated by the Director of Aviation for the City of Philadelphia, it uniquely meets the selection criteria of the Act.

III. STUDY SETTING

A. Regional Area

Philadelphia International Airport is located within the Delaware Valley region which covers a total of 3,833 square miles in the center of the eastern seaboard "megalopolis" which encompasses the Philadelphia and Trenton Standard Metropolitan Statistical Areas, and includes Bucks, Chester, Delaware, Montgomery and Philadelphia Counties in Pennsylvania; and Burlington, Camden, Gloucester and Mercer Counties in New Jersey (see Figure 1). The region includes a number of airports in addition to Philadelphia International. Figure 2 illustrates the location and primary runway configurations of each airport in the region.

Climatically speaking, the Delaware Valley region has been described as "amorphic." Weather conditions rarely differ drastically from north to south. The proximity to the Delaware Bay and the Atlantic Ocean has a moderating effect on the region's weather, with sustained periods of very high or low temperatures seldom lasting more than three or four days. January is the coldest month with an average temperature of 32.3 degrees F. July is the hottest month with an average temperature of 75.6 degrees F. Winds are also moderate and generally blow from west to east.

Within the region there are a number of intensely developed locations containing a mix of activities, such as commercial, cultural, recreational, governmental, industrial and residential, that provide a focus for community

FIGURE 1

THE DELAWARE VALLEY REGION

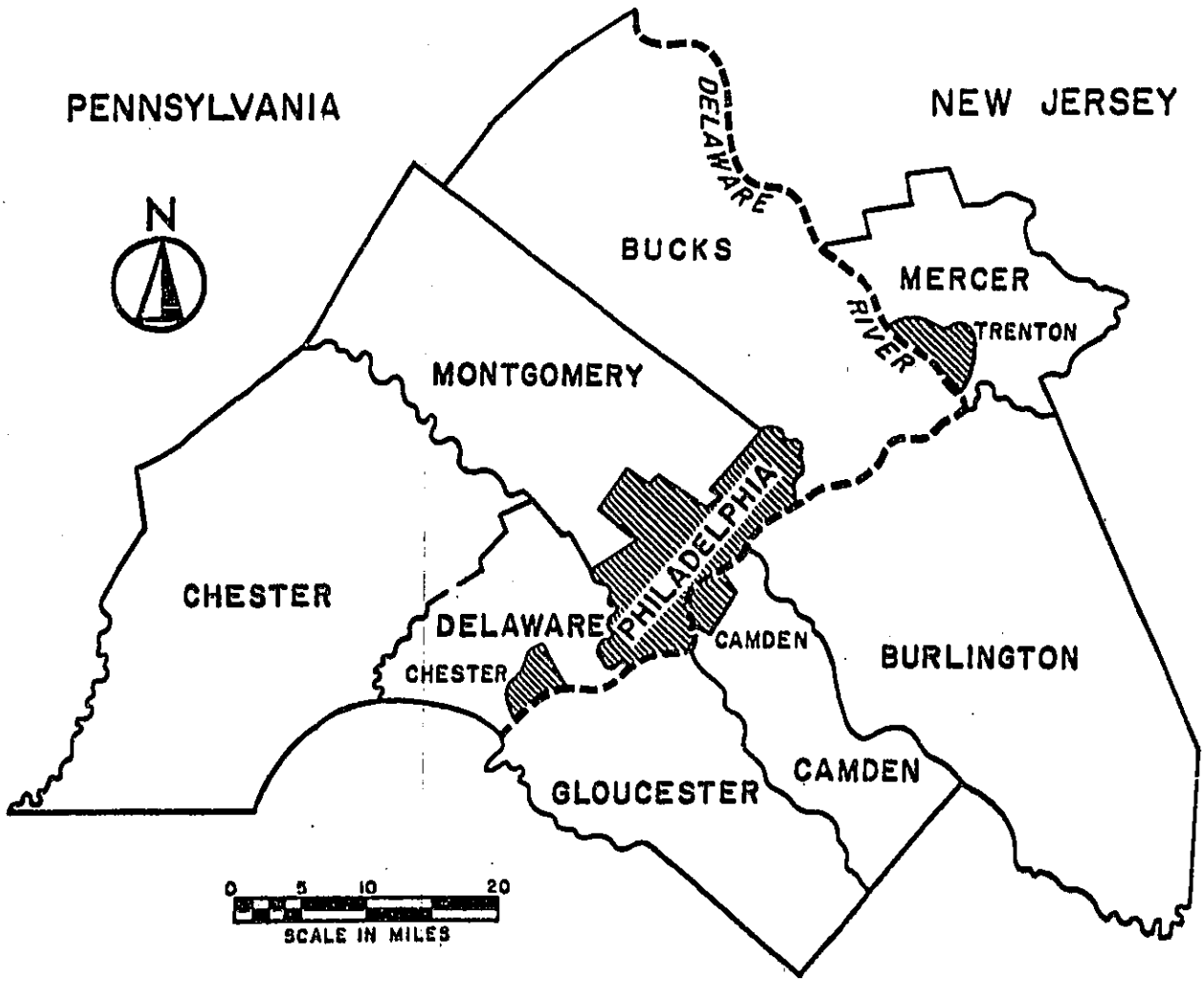
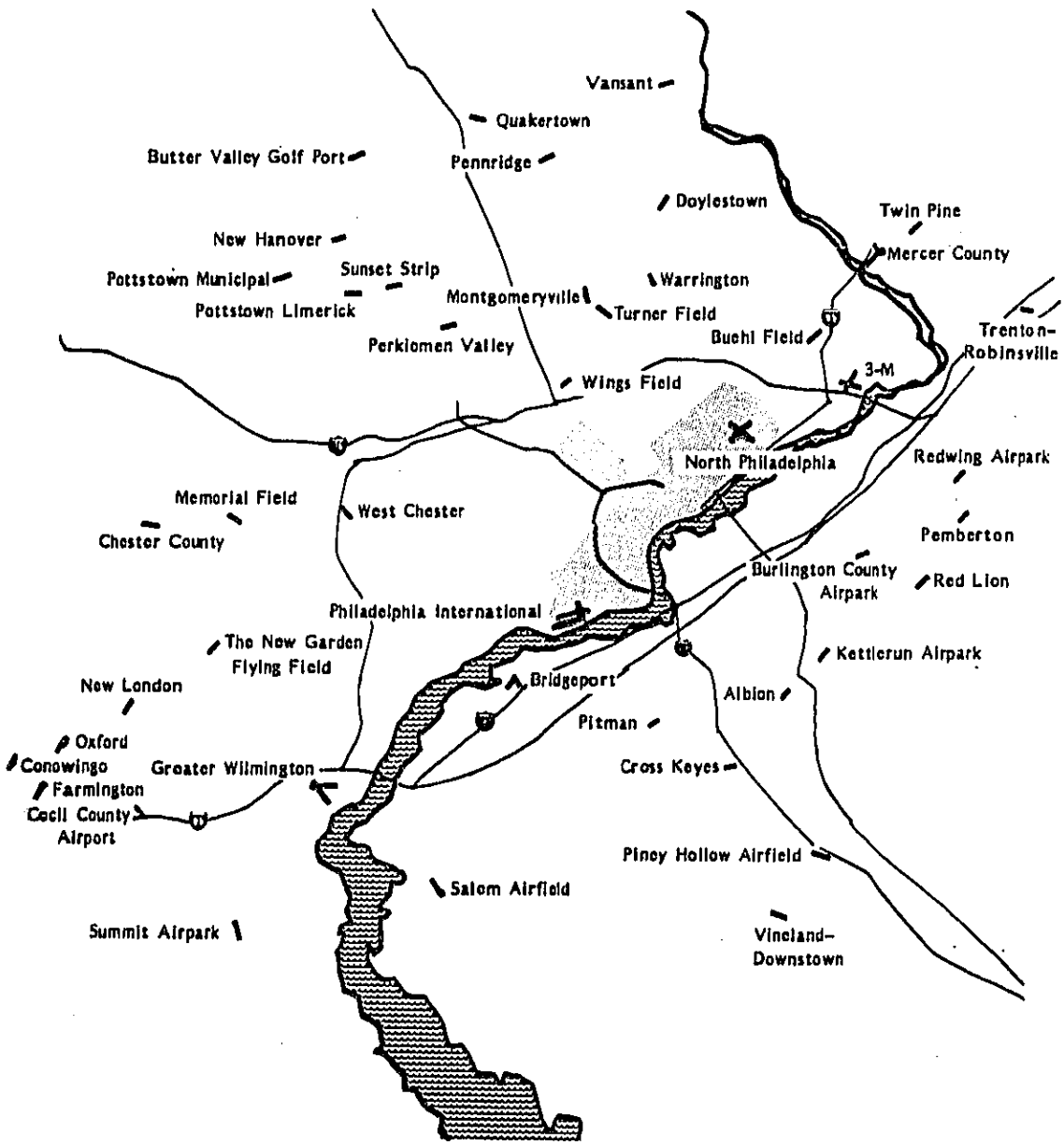


FIGURE 2
Airport Locations



life. Their intensity of development also make it possible to provide public services (especially public transportation) more efficiently than if their activities were spread out over a larger area.

The Philadelphia central business district (CBD) is the principal concentration and focus of activity in the region. Its major importance is as an economic and cultural center. The CBD is the hub of the region's economic activity, with its concentration of business and financial headquarters, government offices, retail, service and research establishments. The Philadelphia CBD accounted for over 12 percent of the region's jobs in 1970, the largest concentration of employment in the region. The maintenance of a center of such importance is considered necessary for the continued health and vitality of the entire region.

Regional centers, identified in Table 1, serve a county or major portion thereof and contain most of the types of activities mentioned above. They are frequently the central business areas of the region's older cities and include all the county seats. Subregional centers, also shown on Table 1, generally serve more specialized activities and/or smaller areas of the region. Typically they contain a more limited selection of activities than regional centers, and may be focused on a major shopping center, strip development, or market town.

The Philadelphia Standard Consolidated Statistical Area (SCSA), a major transportation hub in the Nation's Northeast Corridor, is served by an extensive network of highways, inter-city and commuter rail lines, air carriers, and ocean-going ships. Two of the busier modes of transportation are rail and air transportation.

B. Population

The United States population increased by 34 percent from 151.2 million in 1950 to 203.7 million in 1970. Following the national trend during these population boom years, the Philadelphia SCSA population increased 34 percent from 4.2 million in 1950 to 5.6 million in 1970. By growth rate, the Philadelphia SCSA and national populations are growing at the same rate. As shown in Table 2, the SCSA's population is expected to reach 6.7 million by 1990, a projected 19 percent increase over 1970. Comparatively, the 1990 national population is forecast at 246 million, a projected 20 percent increase over 1970.

C. Governmental Structure

The organization of government in the Delaware Valley region is quite complex with 891 units of local government in the Philadelphia-Trenton area. These include 9 counties, 144 cities and boroughs, 207 townships, 193 school districts, and 338 special districts, as shown in Table 3.

TABLE 1

REGIONAL AND SUBREGIONAL CENTERS BY COUNTY

County	Regional Centers	Subregional Centers
Bucks	Doylestown	Neshaminy Oxford Valley Perkasie-Sellersville Quakertown
Chester	West Chester	Coatesville Downingtown Exton Phoenixville Upper Main Line
Delaware	Chester City Media	Granite Run Springfield St. Davids 69th Street
Montgomery	Norristown Pottstown	Abington-Willow Grove Ardmore City Line (part) Jenkentown-Cheltenham King of Prussia Lansdale-North Penn Plymouth Meeting
Philadelphia		City Line (part) Cottman-Bustleton Germantown Kensington & Allegheny South Philadelphia Temple-North Broad University City
Burlington	Mt. Holly	Burlington City Moorestown
Camden	Camden City	Berlin-Lindenwold Cherry Hill Echelon
Gloucester	Woodbury	Beckett Deptford Glassboro-Pitman
Mercer	Trenton City	Hightstown Princeton Quaker Bridge

TABLE 2
DECENNIAL CENSUS POPULATION TOTALS
Hub and National
The Philadelphia Hub: 1950-1990

	Philadelphia SCSA	United States
1950	4,213,500	151,237,000
1960	5,042,280	179,937,000
1970	5,638,300	203,794,000
1980	6,205,600	223,532,000
1990	6,733,800	246,039,000

TABLE 3
LOCAL GOVERNMENTS IN THE DELAWARE VALLEY REGION: 1972

Types of Local Governments		Number
Counties		8
Cities and Boroughs		145
Townships		207
School Districts		193
Special Districts		338
School Building	114	
Fire Protection	34	
Highways	3	
Hospitals	1	
Housing and Urban Renewal	16	
Irrigation, Water Conservation	1	
Soil Conservation	4	
Parks and Recreation	4	
Sewerage	92	
Water Supply	13	
Transit	1	
Sewerage and Water Supply	24	
Other	31	
Total		891

Source: 1972 Census of Governments

Of the 338 special districts, 34 have property taxing powers; and all but one of these are located in the New Jersey counties. In addition, 154 of the special districts involve more than one township or borough and eleven are multi-county districts.

Functional planning takes place at all these levels of government and this fragmentation of governmental authority creates a multitude of difficulties in the determination and implementation of public policies and programs. However, the need for regional cooperation has been recognized and communication among local, state and Federal governments, and between governments and citizens is firmly established.

Among these is the Delaware Valley Regional Planning Commission (DVRPC), a bi-state agency formed in 1967 by interstate compact between Pennsylvania and New Jersey. Fourteen member governments are represented: the two states, plus the eight counties and four cities shown on Figure 1. The Federal Government also has non-voting membership on the DVRPC Board. Membership and participation in DVRPC is voluntary. The Commission is an advisory body and operates essentially through cooperation and consensus.

D. Air Transportation

International, domestic, and commuter air service in Philadelphia, as well as general aviation (GA), is handled by 42 airports located within the SCSA. Of these 42 airports, 4 are FAA towered and 1 is non-FAA towered.

The six foreign flag and three U.S. flag international air carriers serving the SCSA significantly contribute to Philadelphia's reputation as a major transportation hub in the United States. Domestic and international air service is offered by 19 airlines. All major air support services, including those of 56 air freight agents, are available in the Philadelphia hub. In addition, Philadelphia is the headquarters of Altair Commuter Airlines.

Based on travel data for all transportation modes collected by the U.S. Census Bureau in a 1972 national survey of 24,000 households, people traveling to Philadelphia for business or pleasure fly more often than the average traveler for all SCSAs and SMSAs. Similarly, people traveling from Philadelphia for business or pleasure purposes choose air travel more often than the average traveler for all SCSAs and SMSAs. The findings of this national travel survey in absolute number of trips as well as the modal share percentages for air travel trips (as opposed to travelers) for the Philadelphia SCSA are presented in Table 4.

IV. PUBLIC INVOLVEMENT PROGRAM

The EPA/FAA study team was unanimous in its belief that a strong program of public involvement would be critical to the success of this study. Furthermore, based upon experience accumulated in other airport planning and environmental analysis programs, it was agreed that the public involvement program must be operated by an organization located within the greater Philadelphia area.

In their application to EPA for a grant to study the noise impacts resulting from operations of Philadelphia International Airport (PHL), the DVRPC proposed that they undertake a public information program. The focus of the program would be to disseminate information regarding the noise study to

TABLE 4

PERCENT OF TRIPS OVER 200 MILES COMPLETED BY AIR:

FROM 1972 NATIONAL HOUSEHOLD SAMPLE SURVEY
Philadelphia Hub

Purpose/Miles	To Philadelphia		From Philadelphia		Total U.S.
	(000)	%	(000)	%	%
Business					
200-399	186.1	61.9	122.3	45.5	28.9
400-599	50.5	90.1	106.6	73.2	53.2
600-799	44.1	78.8	65.7	90.8	69.2
800-999	9.1	42.7	113.7	94.7	74.0
1000-	81.4	100.0	160.3	92.6	82.9
Pleasure					
200-399	28.4	7.9	40.9	8.4	4.7
400-599	12.4	23.3	35.2	18.6	18.1
600-799	21.3	28.1	19.6	19.4	21.8
800-999	21.3	64.5	12.6	23.3	28.7
1000-	30.1	31.1	202.9	60.2	44.9

Source: 1972 National Transportation Survey, Census Bureau

the public through all standard public information techniques. The effort was intended to encourage citizen participation in the study. The DVRPC further proposed that they establish an advisory committee to provide policy and technical advice and assistance to their study. The EPA/FAA study team agreed that the DVRPC should establish an Advisory Committee and that this organization would become the primary instrument of the public involvement program.

A. Advisory Committee

The Advisory Committee was established to provide policy guidance and technical advice and assistance to the DVRPC, its consultants, and the EPA/FAA study team during the DVRPC's program. Membership on the Advisory Committee included: Federal and state agencies, city and county departments and commissions, local elected officials, environmental and health organizations, lobbying groups, industry and trade organizations, community groups, and interested citizens. Meetings of the Committee were open to the public. The functions of the Advisory Committee included:

- Review and discussion of community response survey for content, format, methodology and evaluation of working papers and data received.
- Review of noise monitoring and modeling results.
- Assist with interim planning decisions required while noise study is in progress.
- Assist in selecting and screening noise control strategies, based upon supporting analysis performed by consultants and Federal agencies.
- Review reports.
- Coordinate the noise study with other on-going planning activities in the area and adjoining areas.
- Review public participation structure and serve as a communications channel to residents of the study area, both in Pennsylvania and New Jersey.

The Advisory Commitee first met on Monday, December 17, 1979, in Cherry Hill, New Jersey and reconvened in Cherry Hill on February 20, 1980. The third and fourth meetings of the Committee were held at Philadelphia International Airport on March 26, 1980, and May 7, 1980, respectively. The fifth and last major meeting of the Committee took place in Cherry Hill, New Jersey on Monday, June 16, 1980. Attendance and participation at all of the Committee meetings was excellent, reflecting the high level of community interest in the noise study and the airport; a membership list is included herein as Appendix A.

The activity of the Advisory Committee, especially with regard to the selection of alternative noise control strategies for detailed analysis is reflected throughout the remainder of this report. Again, the importance of the Committee to the successful completion of this unique program cannot be overemphasized.

B. News Letter

An integral part of the public involvement program was the production and distribution of a newsletter called "Noise News" which is a bulletin of the Philadelphia International Airport Noise Study. The newsletter was published on a monthly basis during the peak activity period of the study, i.e., March through July, and was distributed by mail. Approximately 600 copies of each newsletter were sent out to a mailing list developed from DVRPC lists of local officials and citizen group representatives. Any individual wishing to receive the newsletter was added to the mailing list. The newsletters are included as Appendix B.

C. Complaint Reception Program

The impacted area surrounding Philadelphia International Airport consists of several counties in two states. Elected representatives of several of these jurisdictions indicated that their constituents were disturbed by the noise from aircraft operations at Philadelphia International Airport. Yet the airport management maintained that it had received almost no complaints. In an attempt to resolve this difference of experience it was noticed that in many areas where one would expect noise complaints to come from, the airport was a toll call. This led the study team to consider initiation of a toll-free number for receiving airport noise complaints.

The Delaware Valley Regional Planning Commission instructed its contractor, CSR, Incorporated, to develop and operate a Complaint Reception Program which was referred to as the "Hotline." The Hotline program was operated on a round-the-clock basis, seven days a week, from December 8, 1979, to April 3, 1980. This type of coverage, in order to be effective, required that an answering service be established to receive the calls and log the information on a standardized reporting sheet; the Hotline complaint form is included herein as Appendix C. Operators were trained to record complaint information and, on December 8, 1979, the Hotline was started, using the toll free number 1-800-424-5145. At the close of the service on April 3, 1980, 296 complaints had been received during the 118-day period. Since the Hotline was operated during the winter months, complaint levels may be lower than would be experienced during summer months.

The existence of the Hotline was publicized via public service announcements, newspaper articles, and the Newsletter. Hence, there was some degree of "study effect" internal to the Hotline results, i.e., it can be expected that some portion of the complaints received by the Hotline were due only to the existence of the Hotline itself. However, the primary importance of the Hotline lies not in the number of calls received but in the geographic distribution of those calls. The geographic distribution of callers and the rate at which calls are generated in specific areas should mirror the results of the other analytic techniques, e.g., social survey and noise predictions. The level of confidence in the overall analysis is dramatically increased by the correlation of results.

Figure 3 represents the Hotline results at the highest level of aggregation, i.e., all complaints are displayed without regard to specific details of the individual complaint. The greatest density of complaint response is clustered in New Jersey in the Camden, Gloucester City area with lower response extending out into Cherry Hill. The high level of response is also evident to the north of the cross-wind runway (Runway 17-35) in the Eastwick redevelopment area. Significant response also occurs on the west side in Essington. The three geographic areas noted above account for the vast majority of the Hotline complaints. Of the remaining complaints, the complaint nature and its location often indicated that the triggering activity was not Philadelphia International Airport but rather from Moorestown Airport, North Philadelphia Airport, Woodbourne Airport, and Delaware County Airport. The response area did not extend into the State of Delaware and so none of the Hotline complaints can be attributed to Greater Wilmington Airport which is south of the City of Wilmington.

As will be seen in later sections of the report, the geographic distribution and density of Hotline complaints very accurately reflect the primary social survey results and the base line noise monitoring and prediction program.

D. Community Opinion Survey

1. Background

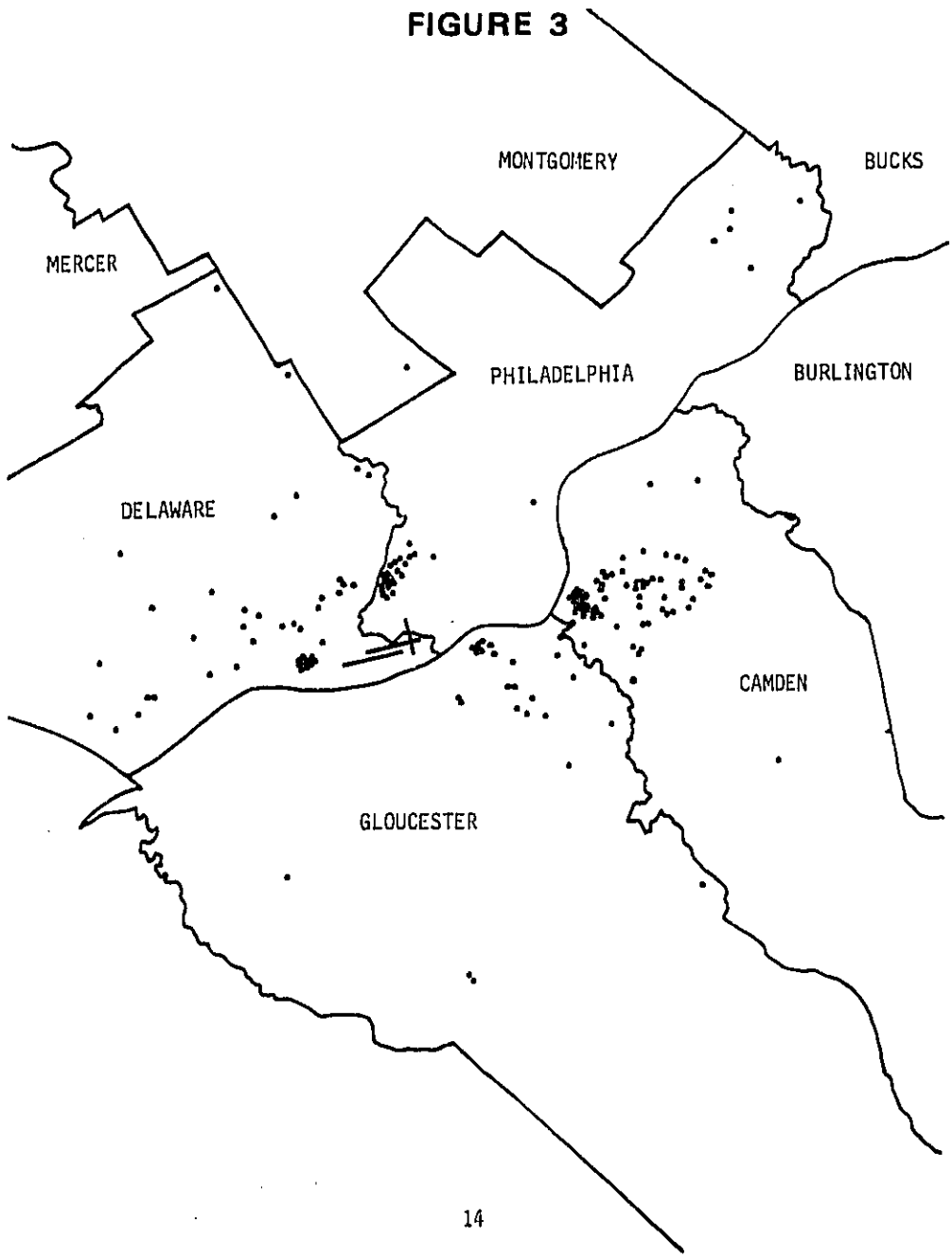
Section 8 of the Quiet Communities Act directed that "The Secretary of Transportation and the Administrator of the Environmental Protection Agency shall jointly study the aircraft noise effects from an airport on communities . . ." The impact of aircraft noise on communities has been extensively studied over the past 25 years. The primary method used in those studies has been an opinion survey in which attitudes about the airport, airplane noise, agencies concerned with the airport and its operations, and other factors have been solicited. Frequently, surveys have sought opinions on other environmental factors in order to develop a context for the aircraft noise specific responses.

An opinion survey was developed for this study of the impact of operations of Philadelphia Airport. The questionnaire used in this survey (Appendix D) was derived in large measure from similar questionnaires used in other aircraft noise surveys. The methodologies of these earlier surveys have been evaluated and refined over the past several years and were synthesized for use in the Philadelphia opinion study.

The intent of the survey was to obtain a body of information from a representative sample of residents living within an approximate 20 mile radius of Philadelphia International Airport. A smaller area for independent statistical analysis was also established within the 20 mile radius to represent the area of highest predicted noise impact. The information obtained in the survey concerned citizen attitudes about noise and other community problems with emphasis on aviation related noise problems. Other environmentally oriented information was also sought from survey respondents

TELEPHONE HOTLINE COMPLAINTS
PHILADELPHIA INTERNATIONAL AIRPORT NOISE STUDY

FIGURE 3



concerning specific noise problems and other community problems in order to put the aircraft noise problem into perspective. Results of the survey were used to assess impacts of the operation of the airport and to guide the development of noise control options.

2. Survey Procedures

The respondent sample was selected from the City of Philadelphia and Montgomery and Delaware Counties in Pennsylvania and from Gloucester and Camden Counties in New Jersey. The sample was further restricted to those portions of these Counties lying within an approximate 20 mile radius of Philadelphia International Airport.

The survey was to be conducted over the telephone, therefore, the involved Pennsylvania and New Jersey telephone companies were contacted for assistance in identifying telephone exchanges within the desired sampling area. Figure 4 shows the sampling area broken down by aggregated telephone exchange boundaries.

A random digit dialing method was used to contact households in the sampling area. Random lists of four digit numbers were generated for identified exchange prefixes. Then numbers from these resulting lists of complete telephone numbers were randomly selected for calling potential respondents. Once a household had been contacted and cooperation assured, a respondent over 18 years of age was randomly selected from those living in the residence. All of these selection procedures were done to minimize selection biases. Table 5 shows the distribution of respondents by residence and compares the sample with population distributions in the sampling area.

TABLE 5

PERCENT AND NUMBER OF THE SAMPLE HOUSEHOLDS AND THE PERCENT AND NUMBER OF HOUSEHOLDS AND POPULATION LIVING WITHIN THE PARTS OF THE FIVE COUNTIES WHICH WERE SURVEYED

County	Sample of Households		Household Population	
	Number of Households	Percent	Number of Residents	Percent
Pennsylvania				
Montgomery	229	13.3	623,799	16.4
Delaware	297	17.2	600,035	15.8
Philadelphia	750	43.5	1,948,609	51.8
New Jersey				
Gloucester	77	4.5	172,681	4.5
Camden	370	21.5	456,291	12.0

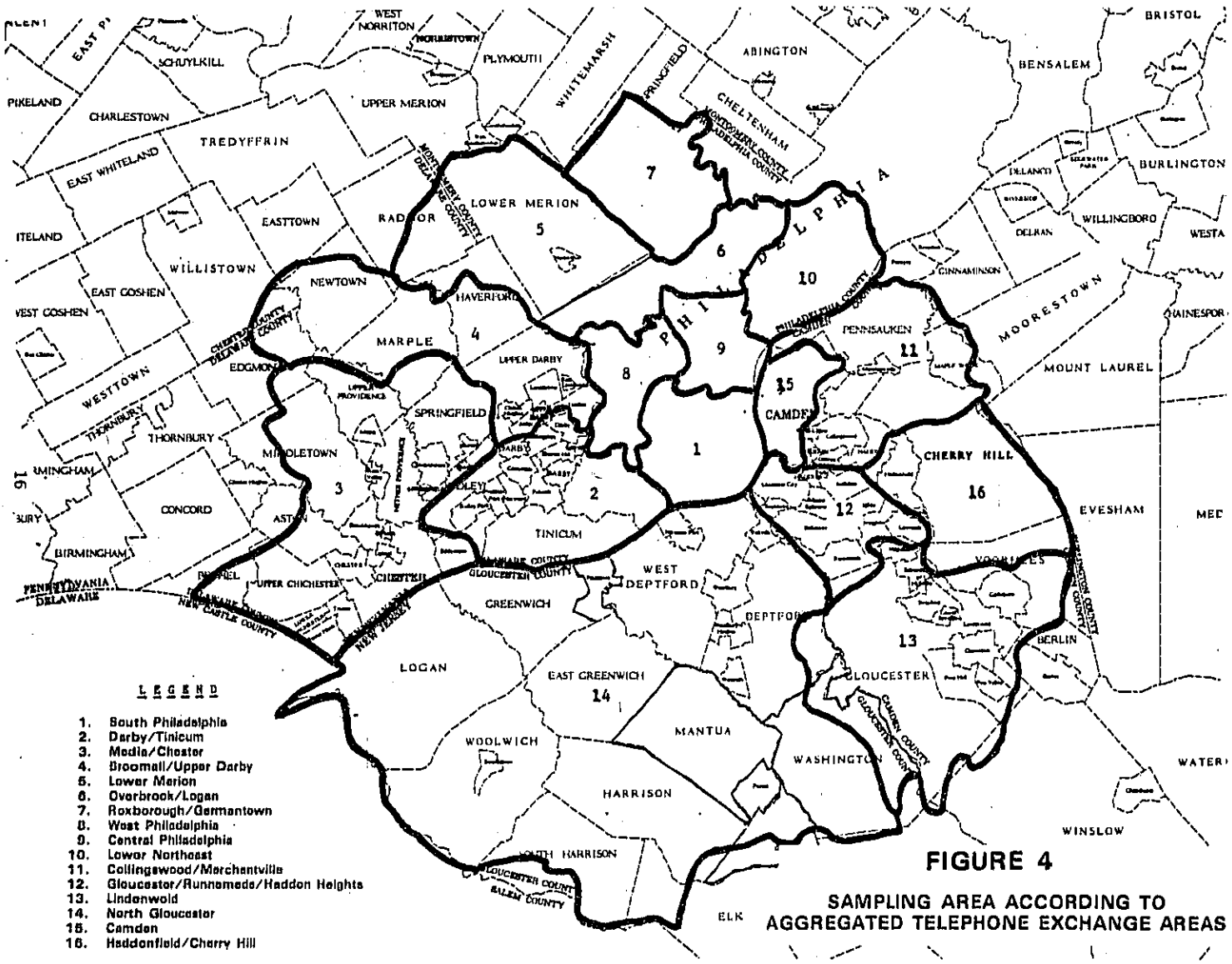


FIGURE 4

SAMPLING AREA ACCORDING TO AGGREGATED TELEPHONE EXCHANGE AREAS

TABLE 6
FINAL DISPOSITION OF TELEPHONE NUMBERS*

Category	Number	Percent
1. Ineligibles		
Wrong number (unassigned # in exchange)	19	0.2
Disconnected/Not in service/New # provided	3,886	43.8
Nonresidential number (business, government, hospital, nursing home, dormitory, pay phone, etc.)	1,342	15.1
Other (no adult 18 or over lives there or not in survey area)	62	0.7
Subtotal	5,309	59.8
2. Unknown Eligibility		
No answer (minimum of 4 calls)	431	4.9
Line busy (minimum of 4 calls)	22	0.2
Answering service/Recorded message (could not determine if residential # or in survey area)	10	0.1
Language barrier (could not determine if residential number or in survey area)	27	0.3
Callback arranged (breaks 3 appointments before determining eligibility)	5	0.1
Initial contact refused (before determining eligibility)	890	10.0
Other	42	0.5
Subtotal	1,427	16.1
3. Eligible But Not Interviewed		
R not available (breaks 3 appointments or gone during survey period)	70	0.8
Language barrier (non-English speaking R)	9	0.1
Initial contact refused (includes refusing for R)	114	1.3
R refuses (completed screening: respondent refuses)	101	1.1
Terminated (R terminates interview before completing)	22	0.2
Incapable (mentally or physically)	50	0.6
Other	45	0.5
Subtotal	411	4.6
4. Completed Interviews Subtotal	1,723	19.4
Grand Total	8,870	99.9

*Excludes approximately 400 additional telephone numbers for which the required number of callbacks had not been made at the time the quota of interviews was completed.

Grand total of calls: 15,781
Average number of calls per interview: 9.2
Average number of interviews per hour: 1.5

A total of 1,723 interviews were conducted between November 9 and December 8, 1979. The weather during this period was unseasonably warm; hence, the opinion data are expected to be representative of a time when windows might be open during the day and some outdoor activity would be taking place.

Interviewers were experienced from previous telephone social surveys and were especially trained for this project using materials 1/ prepared for this purpose.

A total of 8,870 telephone numbers were called in order to complete the 1,723 interviews. The disposition of these 8,870 numbers is shown in Table 6. Interview time ranged from seven to fifteen minutes. All interviews were conducted in English with the exception of six Spanish language interviews. A Spanish speaking interviewer was retained for these latter interviews.

3. Survey Results - General

The data in the following sections were obtained from the report "Philadelphia International Airport Noise Study: Community Opinion Survey" prepared for the Delaware Valley Regional Planning Commission (DVRPC) by its contractor, CSR, Incorporated, of Washington, D.C. DVRPC was responsible for the overall conduct of the study of community reaction and used part of its grant from the EPA and FAA for this purpose.

The initial sections of the survey questionnaire dealt with respondent opinions of the area in which they lived including opinion of environmental factors such as noise, traffic congestion and air pollution. Table 7 shows the distribution of resident's ratings of their local areas.

TABLE 7

PERCENT OF RESPONDENTS, BY COUNTY, RATING THE AREA IN WHICH THEY LIVED (Column Percentages)

Rating	County				
	Montgomery PA	Delaware PA	Philadelphia PA	Gloucester NJ	Camden NJ
Very Good	52.8%	38.0%	22.5%	49.4%	33.2%
Good	33.2%	43.4%	35.5%	28.6%	36.8%
Fair	10.9%	14.1%	30.1%	19.5%	20.0%
Poor	1.7%	2.7%	7.7%	1.3%	7.8%
Very Poor	1.3%	1.7%	4.1%	1.3%	2.2%

1/ Community Noise Assessment Manual. Wyle Research Report WR77-4. Wyle Research and Institute for Social Science Research of the University of California at Los Angeles, July 1978.

This table shows that people surveyed were generally favorable about their area. With the exception of the city of Philadelphia and Camden County, relatively few people rated their area poorly.

Table 8 shows the percentages of respondents who identified various factors as problems in their area, and breaks down the degree of seriousness for these problems. Crime was identified most often, while noise (from all sources including aircraft) was fifth among the eight categories specified. Table 9 shows a county breakdown of percentages identifying these problems. The percentage of respondents identifying noise as a problem is consistent with the results of a 1978 Gallup Poll, done for the National League of Cities, which revealed that about 40 percent of urban residents considered noise to be a serious problem. These numbers are also compatible with Census Bureau data (Annual Housing Survey, 1975; Part B, Indicators of Housing and Neighborhood Quality, February 1977) in which noise is identified as an undesirable neighborhood condition by 35-40 percent of the respondents in SMSA's in the Northeast and in the U.S. as a whole.

TABLE 8

PERCENTAGE OF RESPONDENTS IDENTIFYINGE SPECIFIC ENVIRONMENTAL PROBLEMS AND THE SERIOUSNESS OF EACH PROBLEM

Environmental Problems (Listed in Order Presented to Respondents)	Respondents Identifying Problem		Manner in Which Respondents Rated Seriousness of Problem				
	Number	Percent of Sample	Extremely Serious	Serious	Moderately Serious	Not Very Serious	Don't Know
			(Percentage Below Relate to "Number" shown at Left)				
Traffic Congestion	675	39.2%	16.0%	23.3%	42.8%	17.8%	0.1%
Polluted Water	316	18.3%	17.5%	23.5%	30.5%	27.3%	1.3%
Noise	607	35.2%	13.0%	16.5%	39.9%	30.4%	0.2%
Crime	795	46.1%	11.8%	19.4%	38.4%	30.1%	0.4%
Run-down areas in need of improvement	547	31.7%	19.6%	23.9%	30.5%	25.4%	0.5%
Unclean air	638	37.0%	15.8%	17.2%	41.7%	24.6%	0.6%
Parking	628	36.4%	25.0%	24.0%	35.2%	15.8%	--
Inadequate low-income housing	354	20.5%	24.9%	23.4%	30.8%	17.8%	3.1%

TABLE 9

PERCENTAGE OF RESPONDENTS, BY COUNTY,
WHO IDENTIFIED PROBLEMS IN THEIR AREA
(Multiple Response Permitted)

Problems in Community	County				
	Montgomery PA	Delaware PA	Phila. PA	Gloucester NJ	Camden NJ
Traffic congestion	38.9%	43.8%	38.1%	20.8%	41.6%
Polluted water	16.2%	14.1%	18.1%	20.8%	23.0%
Noise	25.8%	29.0%	41.9%	20.8%	35.7%
Crime	40.2%	47.5%	51.1%	22.5%	41.6%
Run-down areas in need of improvement	13.1%	22.6%	44.7%	18.2%	27.3%
Unclean air	21.4%	30.6%	46.4%	22.1%	35.9%
Parking	20.1%	35.7%	50.5%	15.6%	23.0%
Inadequate low-income housing	17.9%	14.5%	26.3%	14.3%	16.8%

Respondents were asked specifically about noise in general and its annoyance in their area. Tables 10 and 11 show the percentages of respondents rating their areas quiet or noisy.

TABLE 10

PERCENT OF RESPONDENTS, BY COUNTY,
WHO RATED THE EXTENT TO WHICH THEIR AREA WAS QUIET OR NOISY
(Column Percentages)

Rating	County				
	Montgomery PA	Delaware PA	Phila. PA	Gloucester NJ	Camden NJ
Very Noisy	1.3%	3.7%	7.3%	5.2%	4.6%
Noisy	18.3%	21.9%	31.6%	9.1%	21.9%
Quiet	51.5%	55.9%	49.9%	57.1%	55.1%
Very Quiet	28.8%	18.5%	11.2%	28.6%	18.4%

TABLE 11

PERCENT OF RESPONDENTS LIVING IN VARIOUS TELEPHONE EXCHANGE AREAS WHO RATED THE EXTENT TO WHICH THEIR AREA WAS QUIET OR NOISY AND THE PERCENT OF RESPONDENTS ANNOYED BY AIRCRAFT NOISE
(Row Percentages)

Exchange Area	Very Noisy	Noisy	Quiet	Very Quiet	Annoyed By Aircraft Noise
South Philadelphia	12.0%	41.4%	40.6%	6.0%	23.3%
Darby	4.1%	29.7%	59.5%	6.8%	24.3%
Media-Chester	5.7%	16.1%	59.8%	18.4%	28.7%
Broomall-Upper Darby	1.1%	21.8%	48.3%	28.7%	11.5%
Lower Merion	0	0	67.3%	32.7%	13.5%
Overbrook-Logan	4.6%	26.4%	58.6%	10.3%	5.7%
Roxborough-Germantown	4.0%	21.3%	61.3%	13.3%	6.7%
West Philadelphia	8.2%	40.8%	41.8%	9.2%	5.1%
Central Philadelphia	10.6%	42.4%	40.0%	7.1%	8.2%
Lower N.E. Philadelphia	7.8%	31.4%	53.9%	6.9%	7.8%
Collingswood/Merchantville	3.6%	32.1%	51.2%	13.1%	39.3%
Gloucester-Runnemede-Haddon Heights	10.4%	23.4%	49.4%	16.9%	49.4%
Lindenwold	2.6%	10.5%	64.5%	22.4%	7.9%
North Gloucester	3.4%	6.8%	59.3%	30.5%	20.3%
Camden	6.3%	27.8%	53.2%	12.7%	17.7%
Haddonfield-Cherry Hill	1.4%	9.7%	58.3%	30.6%	30.6%

It is important to note that these questions referred to noise in general without identifying specific noise sources. These tables show that ratings of "noisy" or "very noisy" were given by 15 to 25 percent of residents of areas other than Philadelphia. However, about 40 percent of Philadelphia residents rated their areas as noisy or very noisy. Also, it can be seen from Table 11 that a higher percentage of Philadelphia residents give higher noise annoyance ratings than other areas.

The area consisting of Lower Darby, Eastwick, Camden, South Philadelphia, Collingswood, Gloucester, Haddonfield and Haddon Heights was defined as a potentially high impact area based on the flight patterns of aircraft operating from Philadelphia Airport. Table 12 shows that a higher percentage of residents in close proximity to the airport consider their area to be noisy than do residents of the remaining survey area.

TABLE 12

PERCENT OF RESPONDENTS LIVING IN POTENTIALLY HIGH IMPACT AREA OR OUTLYING AREA WHO RATED THE EXTENT TO WHICH THEIR AREA WAS QUIET OR NOISY
(Column Percentages)

Rating	Potentially High Impact Area	Remaining Areas
Very Noisy	7.8%	4.4%
Noisy	28.2%	24.1%
Quiet	49.3%	53.6%
Very Quiet	14.8%	17.8%

Survey respondents were asked for the effect of noise on various activities. Table 13 shows that noise disturbance of sleep and rest is considered to be most important while communication of various types is next in importance in all counties. These effects mirror those found in most other studies of noise impacts.

TABLE 13

PERCENT OF RESPONDENTS, BY COUNTY, WHO INDICATED NOISE IN THEIR AREA INTERFERES WITH VARIOUS ACTIVITIES

Rating	County				
	Montgomery PA	Delaware PA	Phila. PA	Gloucester NJ	Camden NJ
Sleeping	17.0%	24.6%	35.7%	23.4%	24.6%
Talking or listening to radio, watching TV, etc.	11.4%	16.2%	25.7%	11.7%	20.8%
Reading	10.9%	14.1%	19.5%	15.6%	14.9%
Resting	14.0%	19.5%	26.7%	19.5%	22.4%
Outdoor activities	10.0%	12.5%	14.5%	7.8%	11.9%

Table 14 shows that a substantial number of people feel that noise contributes to health related disturbances. Approximately 22 percent of those interviewed felt that noise caused irritability.

TABLE 14

NUMBER AND PERCENTAGE OF RESPONDENTS WHO COMPLAIN THAT NOISE CAUSES THEM SPECIFIC HEALTH PROBLEMS

Specific Health Problems	Number	Percent
Headaches	149	8.6
Tiredness	181	10.5
Irritability	381	22.2
Hearing loss or difficulties	75	4.4
An existing health problem to get worse	76	4.4

Another survey question on noise dealt with the annoyance caused by specific noise sources. Table 15 shows that traffic and motorcycles contribute to annoyance to a greater degree than other noise sources. Jet airplanes were judged more annoying than small airplanes or helicopters. This ranking of aircraft types may be partly due to the rate of their appearance over the affected communities.

TABLE 15

PERCENT OF RESPONDENTS WHO ARE ANNOYED, BY LEVEL OF ANNOYANCE, AND THOSE WHO ARE NOT ANNOYED BY SPECIFIC NOISE SOURCES (Row Percentages)

Noise Source	Not at all Annoyed	Slightly Annoyed	Moderately Annoyed	Very Annoyed	Extremely Annoyed
Traffic	55.5%	22.1%	12.5%	6.0%	3.8%
Motorcycles	53.6%	18.3%	10.7%	9.2%	8.1%
Trucks	60.8%	16.5%	10.8%	7.3%	4.6%
Buses	75.9%	10.5%	7.6%	3.3%	2.7%
Automobiles	63.7%	19.7%	11.0%	3.8%	1.9%
Emergency vehicles/ sirens	66.5%	16.0%	9.1%	4.8%	3.6%
Garbage trucks	80.2%	10.3%	4.6%	3.1%	1.78%
Pets/animals	72.3%	12.2%	7.3%	5.0%	3.3%
Air conditioners	90.9%	4.8%	2.6%	1.0%	0.6%
Jet airplanes	73.1%	13.6%	7.7%	3.1%	2.6%
Small airplanes	88.5%	7.4%	2.9%	0.6%	0.7%
Helicopters	89.2%	6.2%	2.9%	0.8%	0.8%
Trains	86.7%	7.4%	2.9%	1.6%	1.3%
Construction	86.5%	6.6%	3.3%	2.0%	.7%
Commercial or industrial equipment	89.2%	5.3%	3.2%	1.3%	1.0%
Neighbors	74.1%	12.1%	7.2%	3.8%	2.8%

Respondents were asked if they thought their community should have a noise control program to specifically work on reducing noise levels. Table 16 shows percentages of respondents who replied affirmatively to this question. This shows that in most cases the largest percentages in favor of such a program reside in Pennsylvania.

TABLE 16

PERCENT OF RESPONDENTS, BY TELEPHONE EXCHANGE AREA WHO SUPPORT A NOISE CONTROL PROGRAM

Telephone Exchange Area	Percent
South Philadelphia	43.6
Darby-Tinicum	35.1
Media-Chester	41.4
Broomall-Upper Darby	27.6
Lower Merion	13.5
Overbrook-Logan	34.5
Roxborough-Germantown	41.3
West Philadelphia	31.6
Central Philadelphia	58.8
Lower N.E. Philadelphia	40.2
Collingswood/Merchantville	40.5
Gloucester-Runnemede-Haddon Heights	33.8
Lindenwold	39.5
North Gloucester	20.3
Camden	35.4
Haddonfield-Cherry Hill	33.3

Those who did not feel their community should have a noise control program were asked for their reasons for this judgment. Table 17 shows the breakdown of these reasons. Most of this group felt there was no need for a noise control program.

TABLE 17

NUMBER AND PERCENT OF RESPONDENTS NOT SUPPORTING NOISE CONTROL PROGRAMS, WHO GAVE VARIOUS REASONS FOR NOT SUPPORTING A NOISE CONTROL PROGRAM

Reason	Number	Percent
There is no need for a noise control program	909	82.6
Nothing can be done about noise	120	10.9
It is not the responsibility of the community	20	1.8
It is too costly	20	1.8

Respondents were asked how much additional taxes they would be willing to pay for each household member if there was a noise control program. Table 18 shows the responses to this question.

TABLE 18

NUMBER AND PERCENT OF RESPONDENTS WILLING TO ASSUME VARIOUS LEVELS OF TAXATION TO SUPPORT A NOISE CONTROL PROGRAM IN THEIR COMMUNITY

Level of Support	Number	Percent
Would not be willing to pay anything	777	45.1
Would pay 25¢ per person per year	274	15.9
Would pay 50¢ per person per year	186	10.8
Would pay $1.00 per person per year	262	15.2
Would pay more than $1.00 per person per year	180	10.4
Don't know	40	2.3
Refused to answer	4	0.2

As shown in this table, the majority of residents (52.3 percent) would be willing to pay some additional taxes to support a community noise control program, although only 10.4 percent expressed a willingness to pay more than $1.00 per year for such benefits.

4. Summary of General Results

- Almost 70 percent (69.2 percent) of the respondents rated the area in which they lived as "good" or "very good."
- Certain environmental problems were identified more frequently than others, particularly crime, traffic congestion, unclean air, parking, and general noise (in order of identification).
- Residents of Philadelphia County were more vocal than residents of other counties surveyed in complaining about a wide range of community problems.
- Thirty percent (30.3 percent) of the sample described the area in which they lived as "noisy" or "very noisy."
- Residents of Philadelphia and Camden Counties were more inclined than residents of the other counties surveyed to be highly annoyed by noise.
- Direction and distance of residence from the airport relate significantly to the extent which respondents feel noise interferes with various day-to-day activities.
- Thirty-five percent (35.4 percent) of the respondents supported a noise control program to work specifically on reducing noise levels in their community.

5. Survey Results - Aircraft Noise

Several interview questions dealt with the topic of airplane noise rather than noise from all sources. Respondents were asked in the context of several other noise sources if they were annoyed at home by aircraft noise. Table 19 breaks the responses down by impact area for jet airplanes.

TABLE 19

PERCENT OF RESPONDENTS LIVING ADJACENT TO AIRPORT AND IN OUTLYING AREAS BY THE EXTENT TO WHICH THEY ARE ANNOYED BY JET AIRPLANES

Rating	Areas Adjacent to Airport	Remaining Areas
Not at all annoyed	59.2%	77.4%
Slightly annoyed	16.7%	12.7%
Moderately annoyed	11.9%	6.3%
Very annoyed	5.6%	2.3%
Extremely annoyed	6.6%	1.3%

This table shows that as expected, greater percentages of people are annoyed in the areas adjacent to the airport than in other areas.

Later in the interview, respondents were asked specifically if they were annoyed at home by aircraft noise. Again, in this case a greater percentage of respondents in areas adjacent to the airport expressed annoyance than other area residents (30.8 percent for the airport adjacent area versus 13.6 percent for other area residents). To further break down aircraft noise annoyance, 49.4 percent of respondents from the Gloucester-Runnemede-Haddon Heights area are annoyed by aircraft noise compared to 5.1 percent of respondents from West Philadelphia.

Respondents were asked whether aircraft regularly fly near their home. Of those who replied affirmatively, 29.2 percent also reported annoyance with aircraft noise compared to 3.8 percent annoyed among those who do not have regular flights near their home. Thus, without regard to noise level of frequency of operation, almost one-third of the persons exposed to aircraft overflight are annoyed by them. Also, those annoyed generally by noise are more inclined to be annoyed by aircraft noise, as shown in Table 20.

TABLE 20

PERCENT OF RESPONDENTS ANNOYED BY NOISE IN GENERAL WHO ARE ALSO ANNOYED BY AIRCRAFT NOISE (Column Percentages)

Extent to Which Annoyed By Noise in General in Area	Annoyed By Aircraft Noise	Not Annoyed By Aircraft Noise
Not at all annoyed	28.2%	49.5%
Slightly annoyed	39.7%	29.1%
Moderately annoyed	19.5%	14.3%
Very annoyed	8.5%	5.4%
Extremely annoyed	4.3%	1.6%

Those who responded "yes" to the aircraft annoyance question were asked what times of day they were annoyed. Table 21 breaks the day down into four periods. Respondents were free to identify more than one time period, so that the percentages tabulated in Table 21 add to more than 100 percent. As shown in this table, more people are annoyed in the evening hours than other parts of the day. Almost 80 percent (78.9 percent) of those living in the areas adjacent to the airport who are annoyed by aircraft noise find the evening hours to be most sensitive compared to 63.8 percent of those in the remaining survey areas. The large number of reports of annoyance during evening hours, compared with nighttime hours, contradicts somewhat the data shown earlier in Table 13, in which sleeping was most often identified as the activity with which noise interfered.

TABLE 21

NUMBER AND PERCENT ANNOYED BY AIRCRAFT NOISE REPORTING TIME PERIOD DURING WHICH THEY ARE ANNOYED

Time Period	Number	Percent
Morning (7:00 a.m. - Noon)	76	24.9
Afternoon (Noon - 6:00 p.m.)	107	35.1
Evening (6:00 p.m. - 10:00 p.m.)	214	70.2
Nighttime (10:00 p.m. - 7:00 a.m.)	119	39.1

Those who are annoyed by aircraft noise were asked to what extent they have become accustomed to the noise. Table 22 shows that most responded they had become moderately accustomed although relatively few stated they were highly accustomed to the noise.

TABLE 22

NUMBER AND PERCENT OF THE RESPONDENTS BY THE EXTENT TO WHICH THEY HAVE BECOME ACCUSTOMED TO AIRCRAFT NOISE

Extent to Which Accustomed	Number	Percent
Highly accustomed	53	17.4
Considerably accustomed	73	23.9
Moderately accustomed	116	38.0
Not very accustomed	38	12.5
Not at all accustomed	25	8.2

Those annoyed by aircraft noise were asked to describe any actions they had taken to reduce aircraft noise in their home. Table 23 shows various actions taken by either respondents. This table shows that most people taking some sort of action closed their doors or windows or turned up their radios, TV's, or stereos to block out the noise. More than 10 percent considered moving while nearly as many used insulation or soundproofing.

TABLE 23

NUMBER AND PERCENT OF THOSE ANNOYED BY AIRCRAFT NOISE WHO HAD TAKEN VARIOUS ACTIONS TO REDUCE NOISE FROM AIRCRAFT IN THEIR HOMES

Action Taken	Number	Percent
Used insulation or soundproofing	25	8.2
Closed doors or windows	169	55.4
Turned on or turned up radio, TV, or stereo to block out noise	111	36.4
Wore earplugs	8	2.6
Changed location of sleeping quarters	10	3.3
Considered moving	34	11.1

Finally, those annoyed by aircraft noise were asked who they thought should be responsible for reducing aircraft noise. Table 24 shows that most thought government should be responsible for this function, followed by manufacturers, airlines and airports.

TABLE 24

NUMBER AND PERCENT OF RESPONDENTS, ANNOYED BY AIRCRAFT NOISE, WHO IDENTIFIED VARIOUS GROUPS WHO SHOULD BE RESPONSIBLE FOR REDUCING AIRCRAFT NOISE
(Multiple Responses Permitted)

Group Responsible	Number	Percent
Airplane manufacturers	186	61.2
Airlines	151	49.7
Airports	151	49.7
Government	205	67.4
Federal	169	82.4*
State	91	44.4*
Local	87	42.4*
Someone else	20	6.6

*Percent of total government number.

6. Summary of Aircraft Noise Results

- Fifty-five percent (54.9 percent) of the sample reported that aircraft regularly fly near their house.
- When asked indirectly (Q. 9 on the questionnaire) about various noise sources including aircraft noise, 27.0 percent expressed some degree of annoyance with jet airplanes; 11.5 percent with small airplanes, and 10.8 percent with helicopters.
- When asked directly about aircraft noise (Q. 12 on the questionnaire), 17.7 percent of the sample expressed some degree of annoyance.
- Place of residence is significantly related to whether someone is annoyed with aircraft noise.
- Respondents' perceptions of whether aircraft regularly fly near their home are positively related to their annoyance with aircraft noise.
- Many who are annoyed by aircraft noise have, to some degree, become accustomed to the noise.
- Those annoyed by aircraft noise most often identified Government as the group responsible for reducing aircraft noise and, within the broad categorization of Government, the Federal Government was most often singled out.

V. IDENTIFICATION OF EXISTING CONDITIONS

A. Airport Layout and Operation

The Philadelphia International Airport, located on the north shore of the Delaware River, seven miles southwest of the city center, is the area's primary air carrier airport and air cargo facility. Philadelphia International provides services for all domestic and international carriers (including supplementals) and all-cargo carriers serving the Philadelphia hub. 2/ Facilities for commuter aircraft are also available for the numerous communities serving the hub.

Airfield facilities at Philadelphia International Airport include parallel east-west runways and a north-south runway. Table 25 contains the dimensions and ratings of these runways; Figure 5 shows the airport layout.

TABLE 25

RUNWAY CHARACTERISTICS

Runway	Length (Ft)	Width (Ft)	Effective Gradient (Percent)	Dual Tandem Ratings (lbs)	Double Dual Tandem Ratings (lbs)
9R-27L	10,500	200	0.12	340,000	600,000
9L-27R	9,500	150	0.05	150,000	250,000
17-35	5,460	150	0.04	125,000	200,000

Runway 17-35 is used primarily for general aviation and commuter traffic while the east-west parallels are used primarily by air carrier aircraft. Simultaneous IFR operations on the parallel runways are precluded since the runways are only 1,400 feet apart.

Aircraft operating under Instrument Flight Rules (IFR) may use one of several instrument approaches. These include a nondirectional radio beacon approach procedure to runway 27L, Category I Instrument Landing System (ILS) to runways 9R, 27L and 27R, a Category II ILS to runway 9R and Area Navigation (RNAV) approaches to runways 17 and 35. There is also a visual approach up the river to runway 9R.

2/ The Philadelphia hub is the 12-county Standard Consolidated Statistical Area (SCSA) of Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties in Pennsylvania; Burlington, Camden, Alamesta, Mercer, and Salem Counties in New Jersey; Cecil County in Maryland; and New Castle in Delaware.

RUNWAY DATA

	R/W 9L-27R		R/W 9R-27L		R/W 17-35	
	EXISTING	ULTIMATE	EXISTING	ULTIMATE	EXISTING	ULTIMATE
PHYSICAL LENGTH & WIDTH	8,800' X 150'	SAME	10,500' X 200'	12,000' X 200'	5,482' X 150'	7,000' X 150'
EFFECTIVE GRADIENT (%)	0.4	SAME	1.1	1.0	0.4	0.3
INSTRUMENT RUNWAYS	9L - NONE	9L - CAT I	9R - CAT II	9R - CAT III	17 - RNAV	17 - LOC
	27R - CAT I	SAME	27L - CAT I	SAME	35 - RNAV	SAME
APPROACH SURFACES	9L - 50 : 1	9L - 50 : 1	9R - 50 : 1	SAME	17 - 34 : 1	SAME
	27R - 50 : 1	SAME	27L - 50 : 1	SAME	35 - 34 : 1	SAME
LANDING AIDS	9L - NONE	9L - ILS & MALSR	9R - ILS & MALSR	SAME	17 - NONE	17 - ILS OR MIRL-LOC
	27R - ILS	27R - ILS & MALSR	27L - ILS	27L - ILS & MALSR	35 - NONE	35 - VASI/PAPI
RUNWAY LIGHTING	MIRL	MIRL-CL	MIRL-CL/TDZ	SAME	MIRL	SAME
RUNWAY MARKING	PREC INST	SAME	PREC INST	SAME	BASIC	NON-PREC INST
PAVEMENT STRENGTH	90,000/DC	100,210,350	200,210,340	200,210,350	60,80,125	100,170,300
RUN. GROOVING OR SURFACE TREATMENT	NO	YES	NO	YES	NO	YES

AIRPORT DATA

		EXISTING	ULTIMATE
AIRPORT REFERENCE POINT	LONGITUDE	75° 14' 43"	75° 14' 39"
	LATITUDE	39° 52' 12"	39° 53' 14"
MEAN MAXIMUM TEMPERATURE HOTTEST MONTH		89°F	SAME
AIRPORT & TERMINAL NAVIGATIONAL AIDS		ASR	SAME
AIRPORT ELEVATION		23' MSL	SAME

LEGEND

	EXISTING	ULTIMATE
AIRFIELD PAVEMENT		
PROPERTY LINE		
EASEMENT		
BUILDINGS		
BUILDINGS TO BE REMOVED		
BUILDING RESTRICTION LINE		
CLEAR ZONE		
PENNSYLVANIA GRID	209,000	
AIRCRAFT PARKING LIMIT LINE		
BUILDING LIMIT LINE		
FENCE		
GROUND CONTOUR	80	

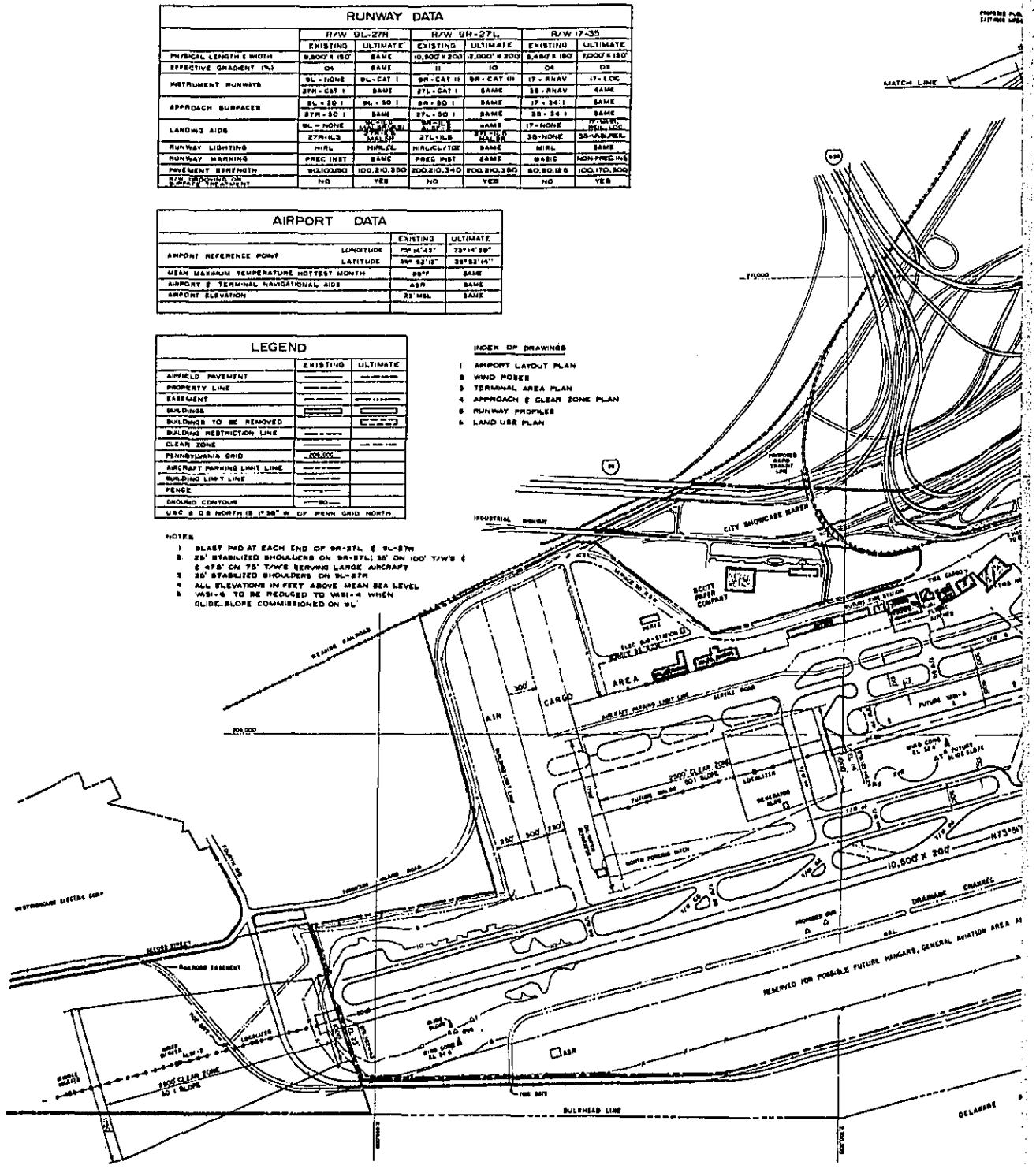
USC & GS NORTH IS 1° 38' W OF PENN GRID NORTH

NOTES

1. BLAST PAD AT EACH END OF 9R-27L & 9L-27R
2. 25' STABILIZED SHOULDERS ON 9R-27L; 35' ON 100' T/W'S & & 45' ON 75' T/W'S SERVING LARGE AIRCRAFT
3. 35' STABILIZED SHOULDERS ON 9L-27R
4. ALL ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL
5. VASI-6 TO BE REDUCED TO VASI-4 WHEN GLIDE-SLOPE COMMISSIONED ON 9L

INDEX OF DRAWINGS

1. AIRPORT LAYOUT PLAN
2. WIND ROSES
3. TERMINAL AREA PLAN
4. APPROACH & CLEAR ZONE PLAN
5. RUNWAY PROFILES
6. LAND USE PLAN



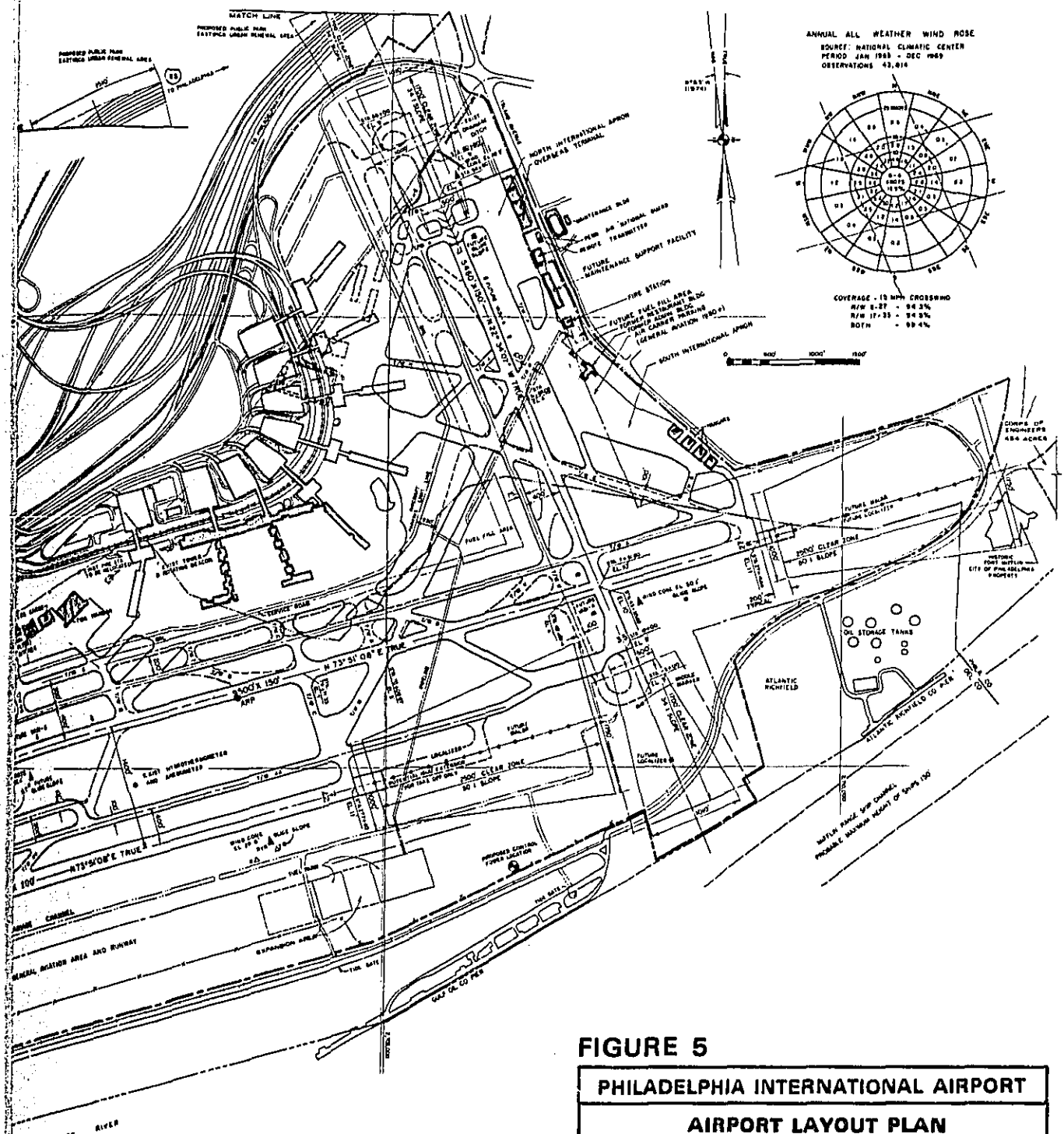


FIGURE 5

PHILADELPHIA INTERNATIONAL AIRPORT

AIRPORT LAYOUT PLAN

B. Airspace Analysis

Philadelphia International Airport (PHL) lies within the Northeast Corridor, a high density air traffic area extending southward from Boston, Massachusetts, to the Washington, D.C. area. In addition, approximately 30 percent of all operations at the airport are to or from airports within the Northeast Corridor. Moreover, the airport is located proximate to a non-hub area air carrier airport, Greater Wilmington Airport (ILG): four military air bases; North Philadelphia Airport (PNE), a major general aviation airport; and several smaller general aviation facilities (Figure 6, Airspace Structure). This high level of activity in the airspace within a 25 nautical mile radius of the airport requires well defined approach, departure, and overfly procedures. To this end, PHL and neighboring control facilities have developed Letters of Agreement defining respective responsibilities in maintaining control of aircraft operations. Several aspects of these Letters are discussed below.

With two exceptions, departure procedures are detailed in Standard Instrument Departures (SIDs) except for traffic to the New York area airports, Newark (EWR), LaGuardia (LGA), and John F. Kennedy International (JFK). These departures are handled by Terminal En Route Control, proceeding direct to the Yardley (ARD) or Robbinsville (RBV) VORTAC where they are handed off to the New York Common IFR room. This is generally low altitude traffic at or below 6,000 feet Mean Sea Level.

Aircraft arriving at PHL and operating under Instrument Flight Rules (IFR) are directed by the appropriate radar control facility to one of several holding fixes before a clearance to the final approach fix is given. Holding fixes are primarily used to regulate the flow of air traffic into an airport, especially during peak-hour periods. In addition, holding fixes are used to keep aircraft within short range of the airport during such times as when a disabled aircraft is on the runway, or when weather is below minimums, etc. Arriving aircraft are stacked at 1,000-foot intervals with the latest arriving aircraft entering the stack at the next highest altitude. The aircraft at the bottom of the stack is the first to receive clearance to the final approach fix. As that aircraft exits the holding fix, the remaining aircraft descend 1,000 feet to maintain the sequencing procedure. Each holding fix has restrictions as to the number of aircraft that may be held at one time. The designated holding fixes for arrival operations at PHL are also shown in Figure 6. They are Turner Intersection, Bucktown Intersection, New Castle VORTAC (EWT), and Woodstown VORTAC (OOD). These holding fixes may be stacked to 8,000 feet MSL. On occasion, aircraft may be held over the outer marker to 6,000 feet MSL.

Flights arriving from the New York area airports are cleared to Turner Intersection at or below 7,000 feet MSL. Flights arriving from other directions are cleared to appropriate holding fixes. Further approach to PHL is directed by PHL approach control according to primary operating conditions at PHL.

Operations to and from the Baltimore area (BAL) are conducted at or below 7,000 feet MSL, with approaches to PHL cleared to the New Castle holding area. Operations between the New York area airports and Baltimore (overflying traffic) are maintained at or below 6,000 feet MSL and are usually routed along Victor Airway 157 (V-157) or V-433 to the Princeton Intersection or RBV VORTAC, respectively. Continued flight to the New York area is controlled by the New York Common IFR Room.

IFR operations to and from the Greater Wilmington Airport are handled by Philadelphia approach and departure controls. The Wilmington Tower hands off all departures at time of departure and accepts control of arriving aircraft approximately three miles from the approach fix.

IFR departure operations from the North Philadelphia Airport are handled by the New York Center with Philadelphia Terminal Radar Approach Control Facilities (TRACON) advised. Instrument approaches to PNE are vectored by Philadelphia TRACON to a point approximately three miles from the approach fix. Aircraft operations to and from PHL are kept above 2,000 feet MSL in the PNE control zone.

In summary, coordination of aircraft activity by the various control facilities in accordance with the respective Letters of Agreement should serve to insure that airspace capacity is not constrained.

It should be noted that other jet routes traverse the PHL area, however, these are at altitudes at or above 14,500 feet MSL and, therefore, do not affect arrival or departure operations at PHL.

Another aspect of the airspace analysis concerned simultaneous operations at PHL--specifically, the investigation of potential airspace conflicts due to the required missed approach areas.

Simultaneous IFR operations, such as an arrival on Runway 9R and departure on Runway 9L, or an arrival on Runway 27R and departure on runway 27L, may not be conducted at PHL due to insufficient lateral separation between the parallel runways. Therefore, to preclude conflicts between missed approach and departure airspace, a departure must be held until the arriving aircraft has touched down on the landing runway.

C. Meteorological Conditions

The effect of meteorological conditions at Philadelphia International Airport was analyzed based on weather record summaries obtained from the National Climatic Center, Asheville, North Carolina. These data consisted of hourly measurements of ceiling, forward visibility, and wind velocity, and were recorded for the five-year period of January 1959 through December 1963.

It is essential to analyze weather conditions at an airport since these parameters determine when and where various types of operations are to be made on the field. From the planning point of view, analysis of weather conditions aids in determining the number and direction of runways required, the most

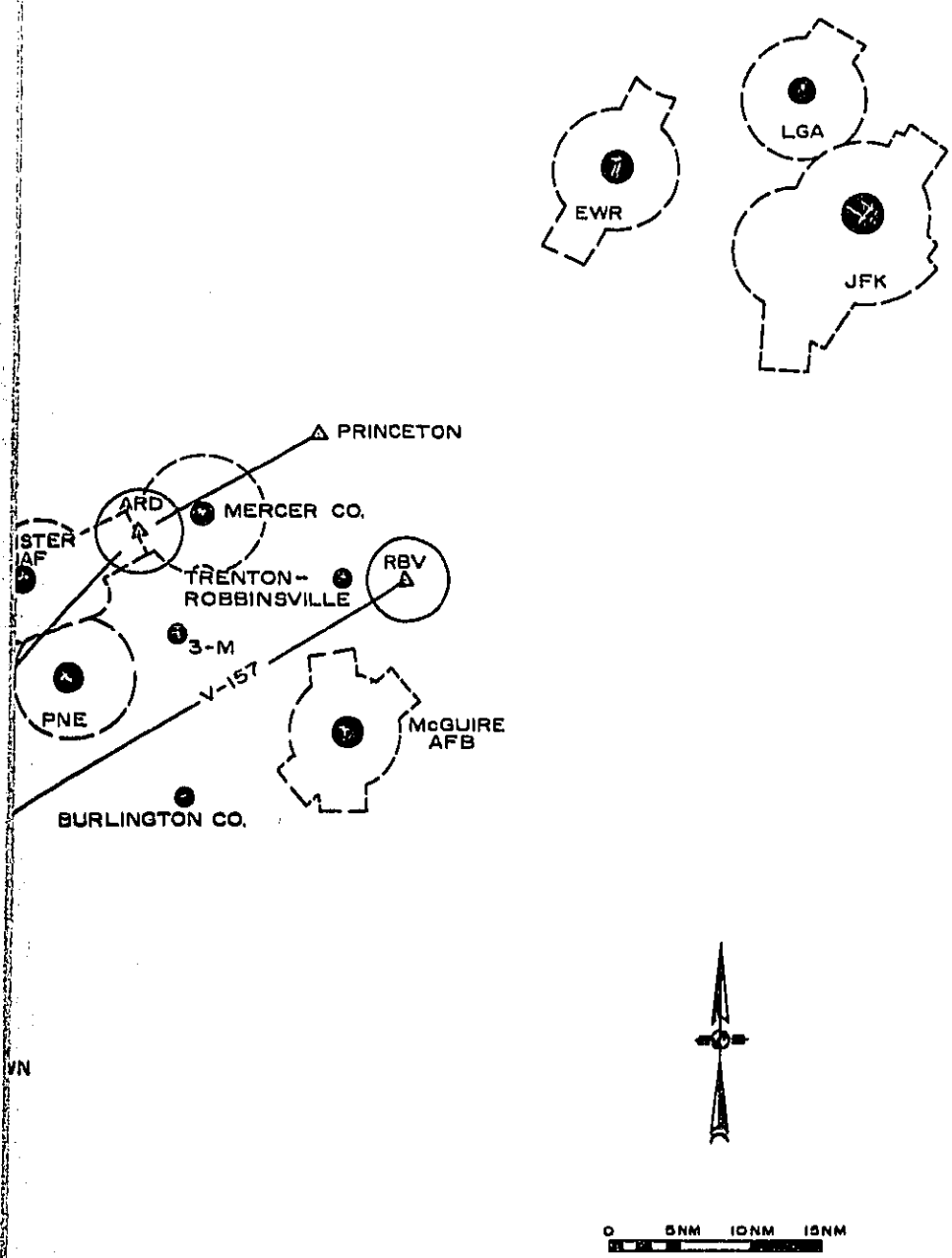


FIGURE 6

PHILADELPHIA INTERNATIONAL AIRPORT
AIRSPACE STRUCTURE

CORRECTION!

THE PREVIOUS DOCUMENT(S) MAY HAVE BEEN FILMED INCORRECTLY . . .

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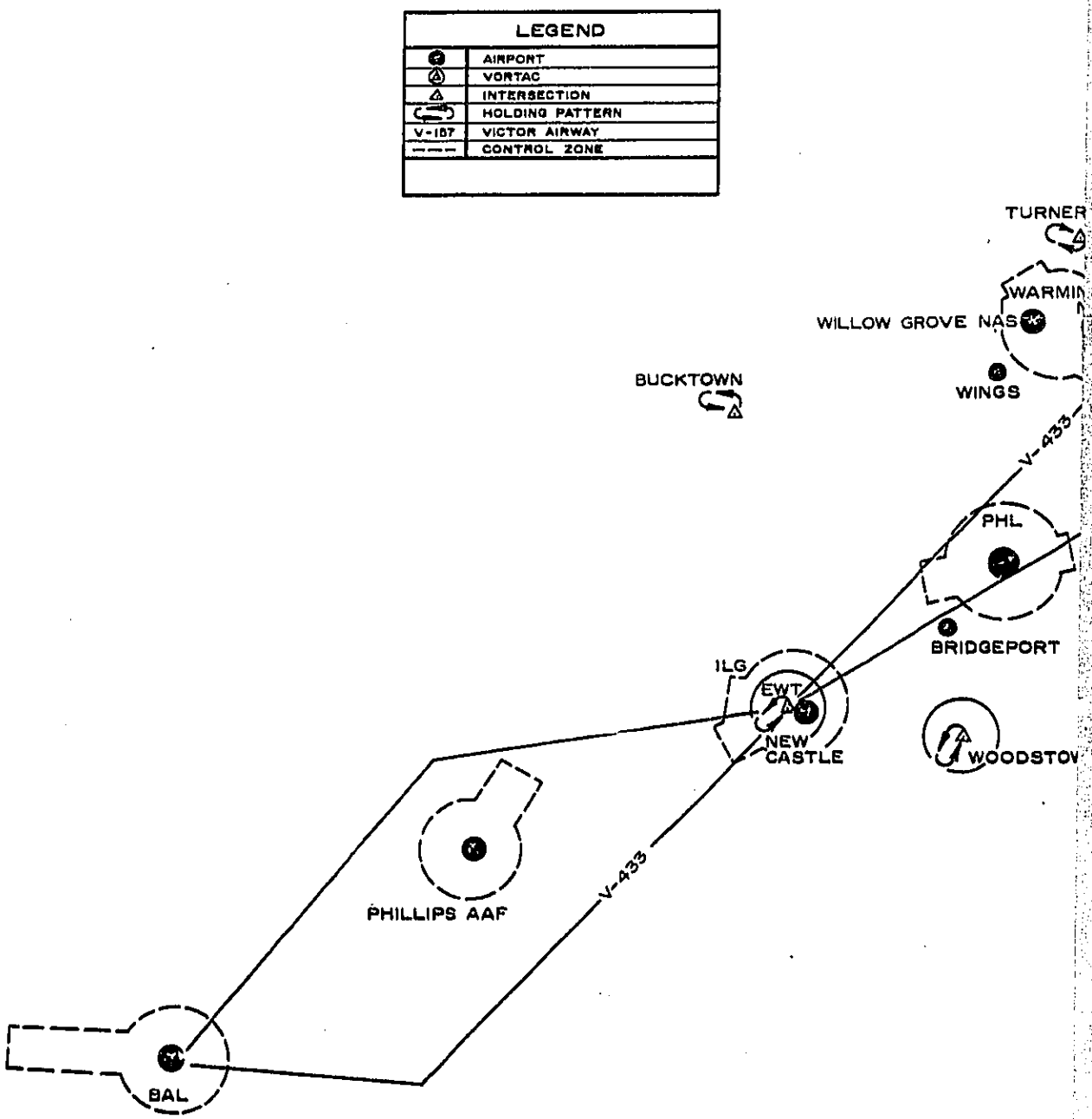


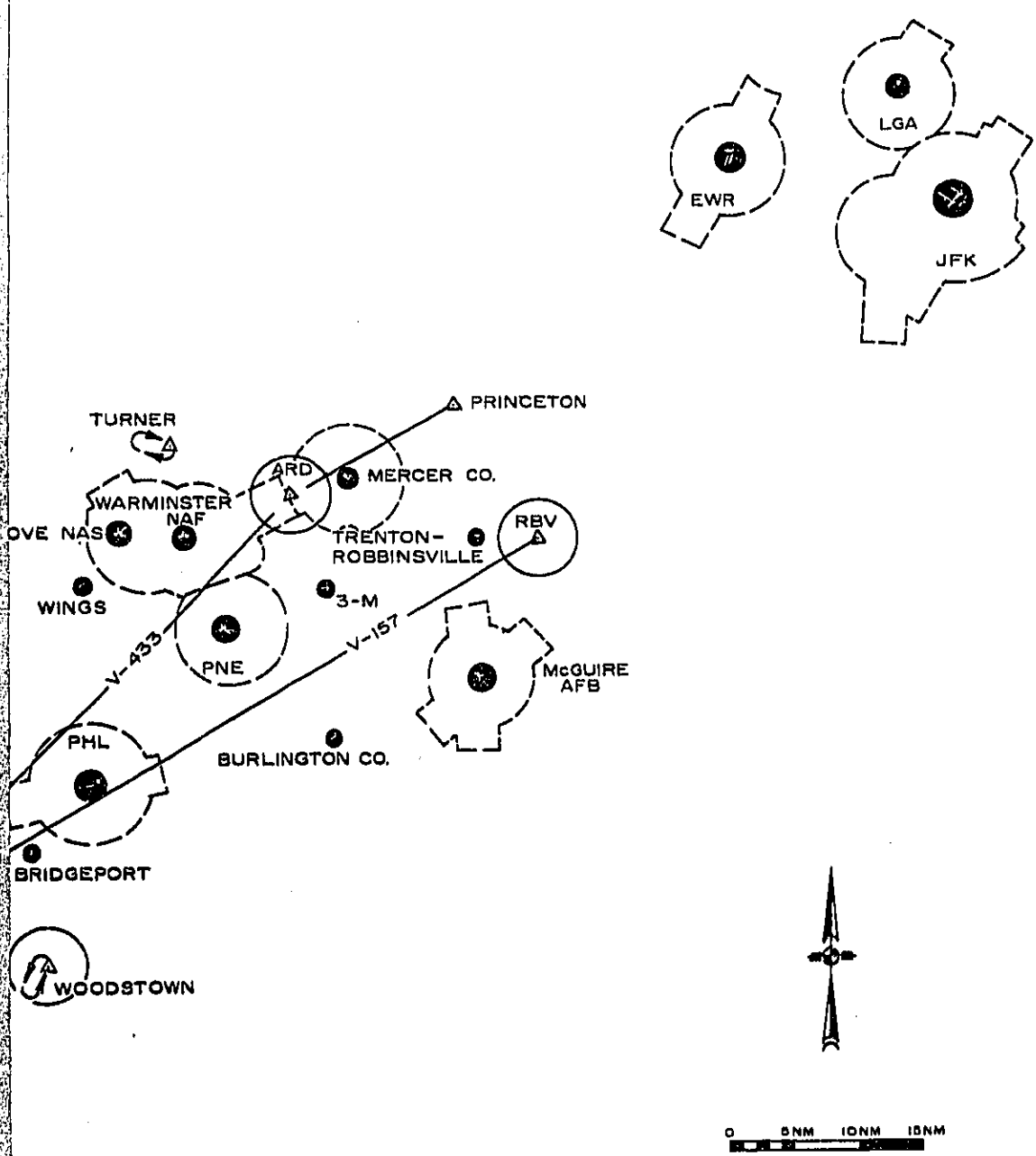


FIGURE 6

PHILADELPHIA INTERNATIONAL AIRPORT
AIRSPACE STRUCTURE

efficient use of the airport and the requirements for certain navigational aids (NAVAIDS). By comparing the adequacy of the existing system with the additional benefits of future construction programs and implementation of various NAVAIDS with respect to wind-weather coverage, one may determine whether such an upgrading of airport facilities is warranted.

Ceiling and visibility greatly affect the flow of air traffic. When the visibility is at least three statute miles and the ceiling is at least 1,000 feet, aircraft may operate under visual flight rules (VFR). If either the ceiling or the visibility falls below these specified minimums, the airport is forced to operate under instrument flight rules (IFR). This requires that approaches to the airport be cleared of obstructions above a specified plane and that landing aircraft and runways be equipped with specific navigational aids.

There are generally five different types of IFR approaches which are made, dependent upon various ceiling-visibility minima. 3/ These minima are established by the Federal Aviation Administration and are based upon the navigational equipment available and any fixed obstructions within the approach area. Landing minima are normally expressed in terms of visibility and Minimum Descent Altitude (MDA) for non-precision approaches and visibility and Decision Height (DH) for ILS or precision approaches. Both MDA and DH are indicated in feet above the elevation of the landing threshold and represent the lowest altitude to which an aircraft may descend until visual contact is made with the runway/approach light environment. MDA and DH can vary slightly according to type of aircraft. Representative values and a description of the various procedures used at Philadelphia International Airport are as follows:

1. Circling - Visibility 1 1/2 miles and MDA 600 feet. An aircraft approaches the airport on a localizer beam or VOR radial and, at a specified altitude, may circle the airport and make a visual landing on another runway.

2. Back Course - Visibility 1 mile and MDA 400 feet. An aircraft approaches the airport on the localizer beam (either in front or in back) and continues straight in to land without the aid of a glide slope.

3. Category I ILS - Visibility 1/2 mile and DH 200 feet. An aircraft makes a straight-in approach using the front of the localizer beam and, also, the glide slope beam. The runway must also be equipped with special approach lights, runway lights, and runway markings.

4. Category II ILS - Visibility 1/4 mile and DH 100 feet. The runway must be equipped with centerline and touchdown zone lighting and various other sophisticated features. Presently, only a few of the very large airports, PHL included, have this capability.

3/ Other approaches, such as Nondirectional Beacon (NDB) and Very High Frequency Omnidirectional Range (VOR), are available but rarely used at a major air carrier airport.

5. Category III ILS - Category III approaches have been divided into three types dependent on forward visibility. Type A requires 700 feet forward visibility, Type B requires 150 feet, and Type C has no minimum.

The above minima were obtained from published FAA procedures for Philadelphia International Airport.

Analysis of ceiling, visibility, and wind data was facilitated through the use of a wind rose, which is a graphical representation of wind velocity. Utilizing the data obtained from the National Climatic Center, a plot was made of the percentage of wind at various velocities. From these plots, the average percentage of time that winds of various speeds originate from each direction was determined.

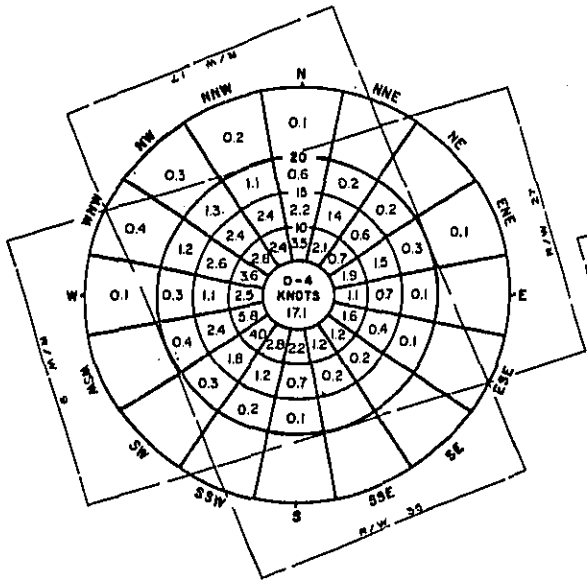
Wind roses for VFR, Circling, Back Course, Category I ILS, Category II ILS, and Category III ILS conditions were developed by computer analyses and are depicted on Figure 7. An all-weather wind rose is shown on Figure 5.

Wind affects the operation of an airport in that pilots will usually prefer to operate into the wind in order to reduce aircraft ground speed. During landing, it is especially desirable to keep the crosswind component at a low velocity, thus requiring only a minimum of correction for wind during the final approach and landing.

Crosswind limitations are a function of an aircraft's stall speed, pilot proficiency and airline policy. For general planning purposes, a crosswind limit of 13 knots (15 mph) for air carrier aircraft and 10.5 knots (12 mph) for general aviation aircraft has been established by the FAA. When the crosswind to the primary runway(s) at an air carrier airport exceeds 13 knots (15 mph) more than 5 percent of the time on an annual basis, construction or lengthening of a crosswind runway is eligible for ADAP funding. At Philadelphia International the 15 mph crosswind coverage of Runway(s) 9-27 is 94.3 percent. In order to allow maximum use of the parallel runway system and to avoid, to the extent possible, noise-sensitive areas north of the airport, a 20 knot crosswind criteria was selected to reflect current air carrier operating conditions. While it is desirable to land into the wind, a 4 knot tailwind is considered acceptable when estimating preferential runway usage.

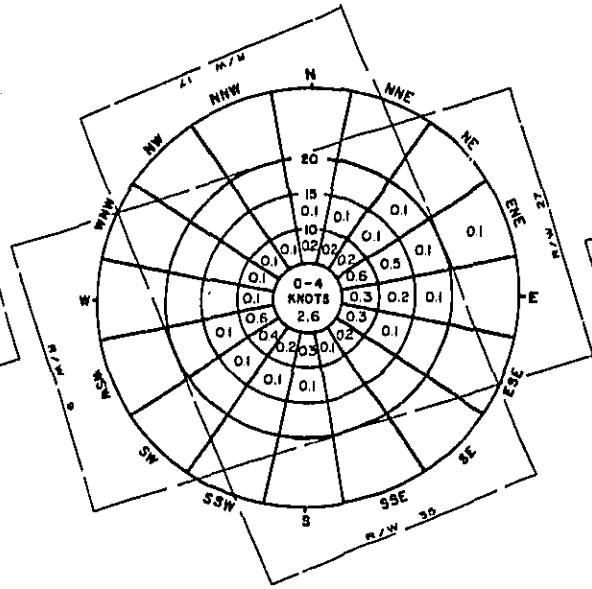
Applying the aforementioned guidelines to all-weather conditions, it was determined that Runways 9R-27L and 9L-27R provide 99.7 percent wind coverage for air carrier aircraft and 85.0 percent wind coverage for general aviation aircraft.

The overall wind coverage of the airport's three-runway system is quite adequate, with 100.0 percent and 98.4 percent coverages with a 20-knot and 10.5-knot crosswind limit, respectively. An analysis of the all-weather and IFR wind roses was made to determine which runway provides the greatest coverage during these conditions. The results are shown in the following table:



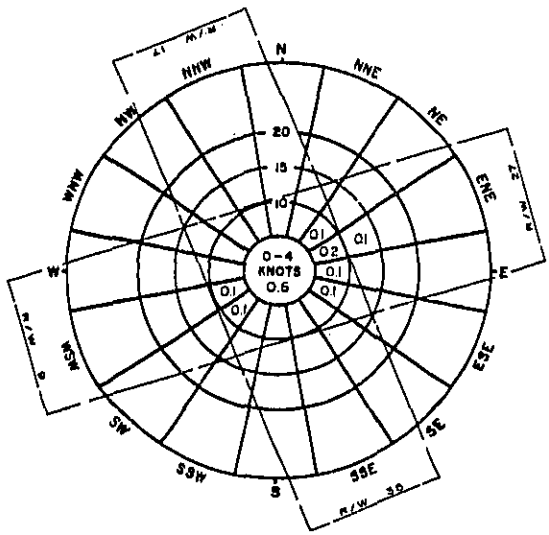
VISUAL FLIGHT RULES

VISIBILITY: 3+ MILES AND CEILING: 1000'+
85.96% ANNUAL OCCURRENCE, 7,530 HRS/YR



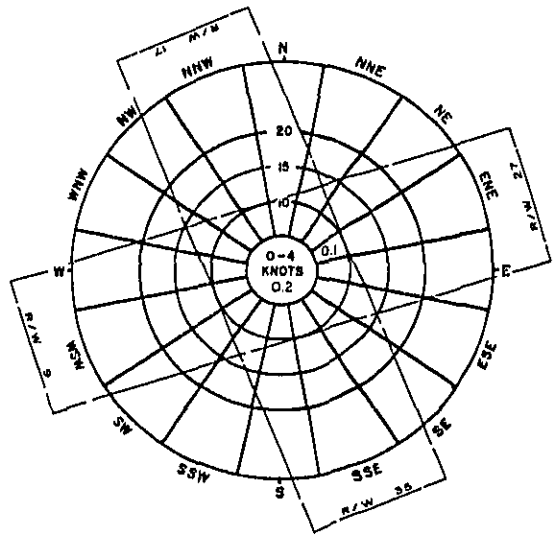
CIRCLING

VISIBILITY: 1½-3 MILES AND/OR CEILING: 600'-1000'
8.7% ANNUAL OCCURRENCE, 762 HRS/YR



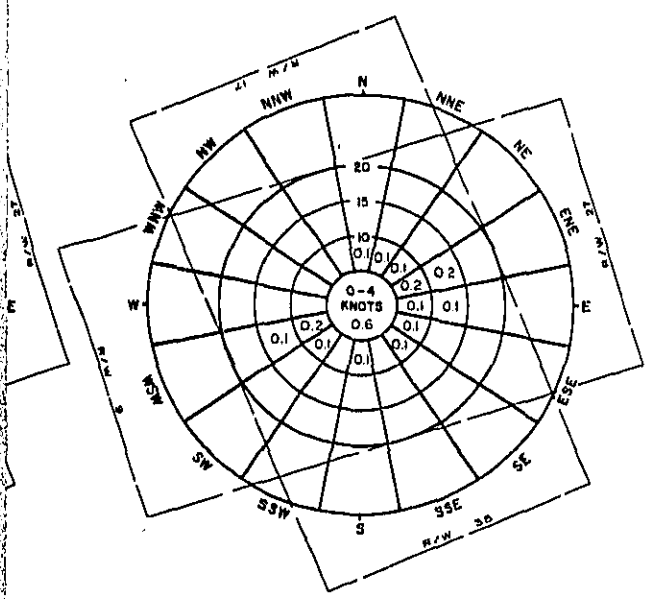
CATEGORY I ILS

VISIBILITY: ½-1 MILES AND/OR CEILING: 200'-400'
1.7% ANNUAL OCCURRENCE, 149 HRS/YR



CATEGORY II ILS

VISIBILITY: 3/16-½ MILES AND/OR CEILING: 100'-200'
0.61% ANNUAL OCCURRENCE, 53 HRS/YR



BACK COURSE

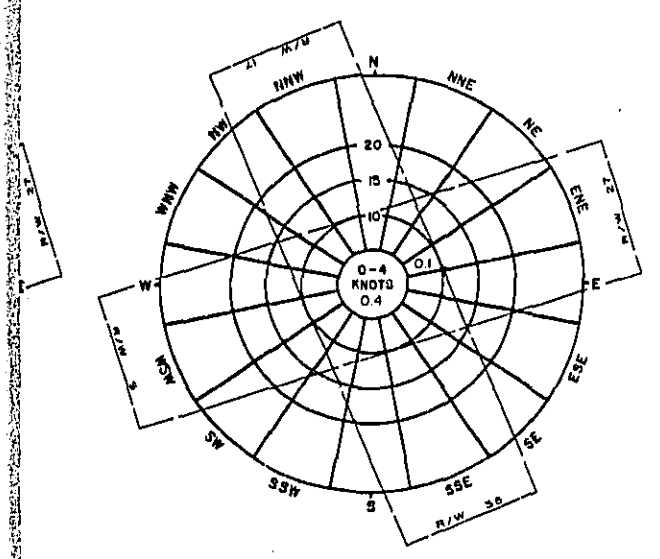
VISIBILITY: 1-1½ MILES AND/OR CEILING: 400'-600'
2.43% ANNUAL OCCURRENCE, 213 HRS/YR

DATA SOURCE: NATIONAL CLIMATIC CENTER
PERIOD COVERED: JAN 1959 - DEC 1963
OBSERVATIONS: 43,814
CROSS WIND LIMIT: 20 KTS-VFR, CIRC, LOCALIZER
10 KTS-ALL OTHERS
TAIL WIND LIMIT: 4 KTS

CURRENT WIND-WEATHER COVERAGE BY CATEGORY OF OPERATIONS

R/W	VFR	CIRC.	BC	CAT. I	CAT. II	CAT. III
9R/9L	42.8	59.9	*	78.2	78.7/*	*
27R/27L	76.7	57.9	52.3/*	52.4	*	*
17	33.2	64.9	*	*	*	*
35	63.8	61.0	*	*	*	*
ALL	99.9%	99.9%	52.3%	99.4%	78.7%	*

* LANDING AIDS NOT AVAILABLE



CATEGORY III ILS

VISIBILITY: 0-3/16 MILES AND/OR CEILING: 0-100'
0.6% ANNUAL OCCURRENCE, 53 HRS/YR

AMOUNT OF TIME WHEN WIND-WEATHER LIMITS ARE EXCEEDED

CATEGORY	% OF YR	HRS/YR
VFR	0.04	3
CIRCLING	0.01	0
LOCALIZER	0.01	1
CAT I ILS	0.01	1
CAT II ILS	0.13	11
CAT III ILS	0.60	53
TOTAL	0.80	69

FIGURE 7

PHILADELPHIA INTERNATIONAL AIRPORT

WIND ROSE ANALYSIS

TABLE 26

PERCENT WIND COVERAGE
(4-Knot Tailwind)

Runway	Percent Coverage	
	All-Weather 20 Kt (23 mph) Crosswind	IFR 10 Kt (11.5 mph) Crosswind
9R, 9L	47.0	71.6
27L, 27R	74.0	53.4
17	54.7	61.1
35	63.6	23.0

Runways 27L and 27R provide best coverage during all-weather conditions; however, during IFR conditions, Runways 9R, 9L cover more of the wind. This indicates that NAVAIDs are properly provided for landings to the east.

D. Runway Requirements

The length of the parallel runways are such that every aircraft currently in the fleets of, or on option to, the air carriers serving the airport can operate into and out of the airport at or very near their maximum payload-range capabilities. The forecast aircraft mix is such that the vast majority of air carrier flights will be able to operate on the shorter of the two parallel runways (9L-27R) without a payload restriction. Only intercontinental flights by large aircraft will be required to use the longer of the two parallel runways. Most of these flights will be operational with a full complement of passengers and their baggage. For these reasons, the lengthening of either Runway 9R-27L or 9L-27R is not required at this time.

In the future, however, if it becomes operationally desirable and is economically feasible, the eastern end of Runway 9R-27L could be extended 1,500 feet. The runway would then be 12,000 feet long and all aircraft with the exception of the DC-8-63 could take off from it at their maximum structural takeoff weights. The maximum takeoff weight of a DC-8-63 from a 12,000-foot runway at a temperature of 89°F would be 345,000 pounds, which is only 10,000 pounds less than its maximum structural limit.

The crosswind runway (17-35) is of sufficient length to accommodate all utility class aircraft and most basic transport class operations without any restrictions. The length of 5,460 feet is adequate for all current air taxi aircraft. Two- and three-engine air carrier aircraft can currently operate on Runway 17-35 at practical operational weights with zero wind conditions. Virtually all air carrier operations on this runway will, however, be

conducted when relatively strong headwinds (20 knots or greater) are present. Under these wind conditions and if the runway were to be lengthened to 7,000 feet, 4/ most air carrier aircraft could land at their maximum structural landing weights. Many two- and three-engine air carrier aircraft could also take off at or near their maximum structural takeoff weights. Therefore, the capability of lengthening runway 17-35 to 7,000 feet should be maintained.

Current runway usage data contained in Table 27 provided by FAA Air Traffic Control Tower personnel was used in the development of the 1980 aircraft noise contours.

TABLE 27

RUNWAY UTILIZATION
PHILADELPHIA INTERNATIONAL AIRPORT

Runway	G.A.* Landings (Percent)	Air Carrier Landings (Percent)	G.A. Takeoffs (Percent)	Air Carrier Takeoffs (Percent)
9L				28
9R		28		
27L				72
27R		72		
17	70		70	
35	30		30	

*General Aviation

E. Existing Noise Abatement Procedures

The location of Philadelphia International Airport on a cape-like protrusion into the Delaware River minimizes the noise impact of air carrier operations on the east-west parallel runways. Normally, air traffic controllers instruct landing aircraft to maintain 3,000 feet or above until intercepting the ILS glide slope, thus reducing the noise impact throughout the terminal control area.

4/ Due to obstructions north and south of the airport, displaced thresholds would be required thus reducing available landing length from 7,000 feet to 6,500 feet.

Whenever the ceiling is at least 4,500 feet and the visibility is at least 3 miles, aircraft approaching from the west may be cleared for a river approach (Figure 8). When cleared for this approach, aircraft will be able to descend from 4,000 feet over the Delaware River and follow the river to the airport. Similarly, on departures to the west, all aircraft make a 15^{o} left turn to 255^{o} immediately after takeoff and follow the river downstream until cleared en route by air traffic control (ATC). These procedures lessen the noise from arriving and departing aircraft in Essington and Chester and other communities west of the airport.

Except under severe crosswind conditions, all air carrier operations are conducted on the east-west parallel runways. Atlhough general aviation jet aircraft frequently use the parallels, most general aviation operations are on runway 17-35.

The discussion of the existing noise abatement program is noteworthy for two basic reasons. First, the existing procedures were found to be effective in minimizing existing levels of aircraft noise impact. It is expected that these procedures would be retained in any ongoing noise abatement program. The second reason they are discussed is that the existing procedures and their effectiveness affects the range of other possible alternate noise abatement measures which would be considered for the future.

F. Existing Operational Data

Existing noise exposure in the airport vicinity was defined in order to assess current impact and provide a basis for comparison with predicted future conditions and with current and future alternative noise abatement options. Data describing the existing operation (1980) at the airport were accumulated to develop the necessary impact for the noise modeling methodology. Data were collected regarding flight tracks, runway utilization and the number of day and night operations.

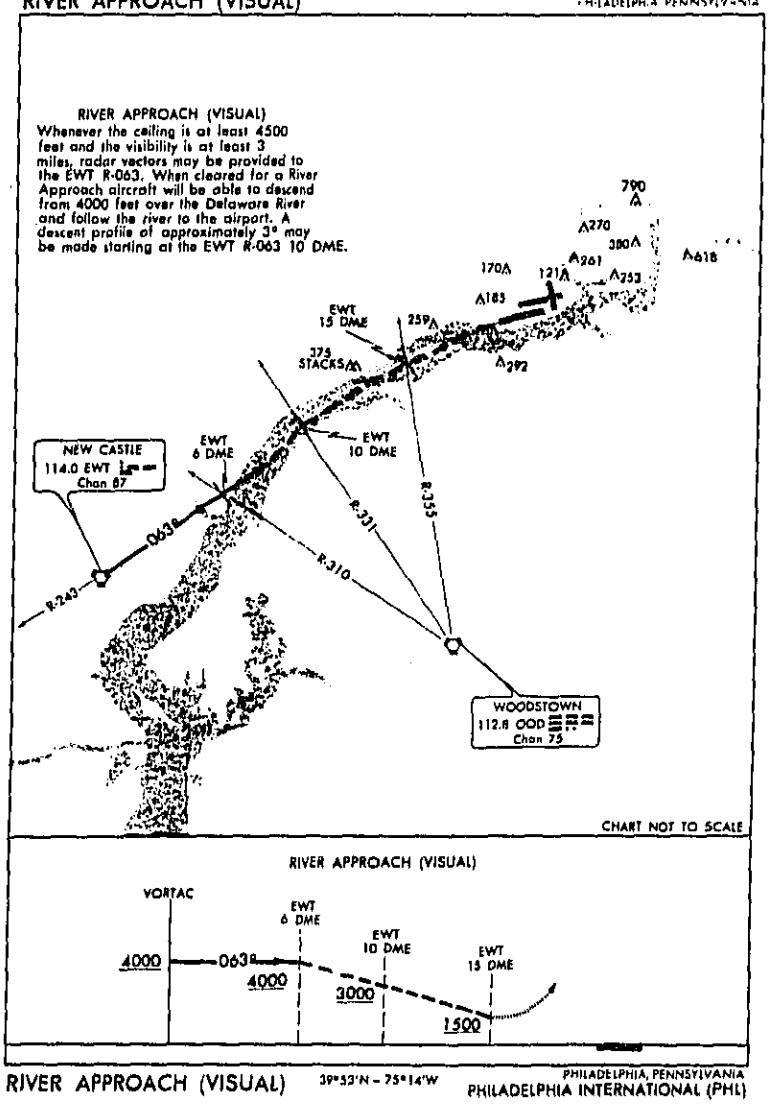
The flight tracks used for assignment of air carrier and general aviation operations were based on aircraft track data obtained from the Automated Radar Terminal System at Philadelphia International. Figures 9 and 10 show the tracks for east and west operations, respectively. Figure 11 depicts the consolidated track data which were used as input for the FAA's Integrated Noise Model.

Aircraft operations were assigned to designated flight tracks based on wind rose data and estimates by air traffic personnel of runway utilization. The destination of departing aircraft (or the city of origin of arriving aircraft) determined air carrier track usage away from the immediate vicinity of the airport. General aviation operations on runway 17-35 were based on a two-day tower traffic count during February 1980. Table 27, which presents a summary of the annual average runway utilization percentages, shows that most of the time (72 percent of the time) the airport is in a "west operation," whereby air carrier landings and takeoffs are to the west.

FIGURE 8

RIVER APPROACH (VISUAL)

PHILADELPHIA INTERNATIONAL (PHL)
PHILADELPHIA, PENNSYLVANIA



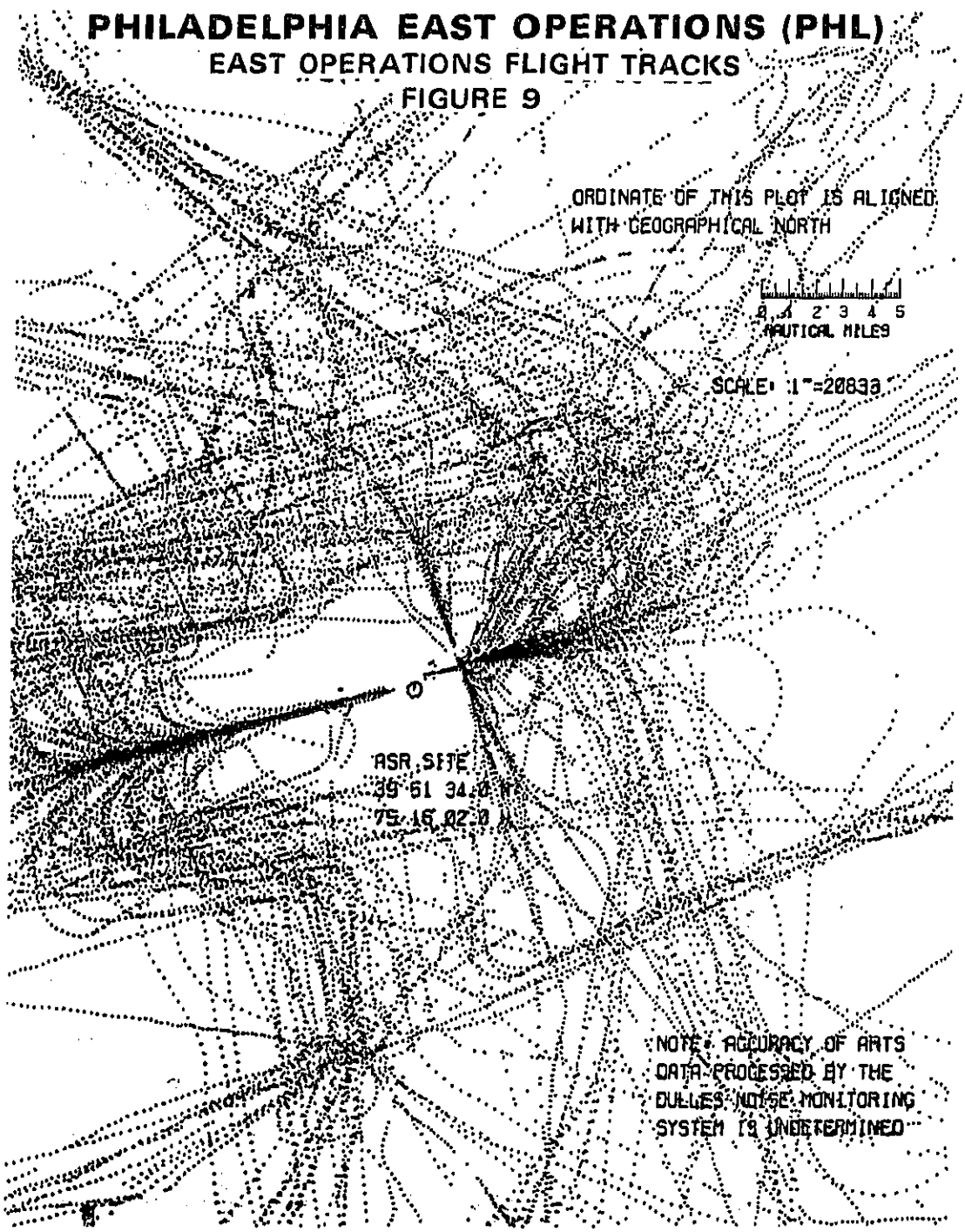
RIVER APPROACH (VISUAL) 39°53'N – 75°14'W

PHILADELPHIA, PENNSYLVANIA
PHILADELPHIA INTERNATIONAL (PHL)

PHILADELPHIA EAST OPERATIONS (PHL)

EAST OPERATIONS FLIGHT TRACKS

FIGURE 9



PHILADELPHIA WEST OPERATIONS (PHL)

WEST OPERATIONS FLIGHT TRACKS

FIGURE 10

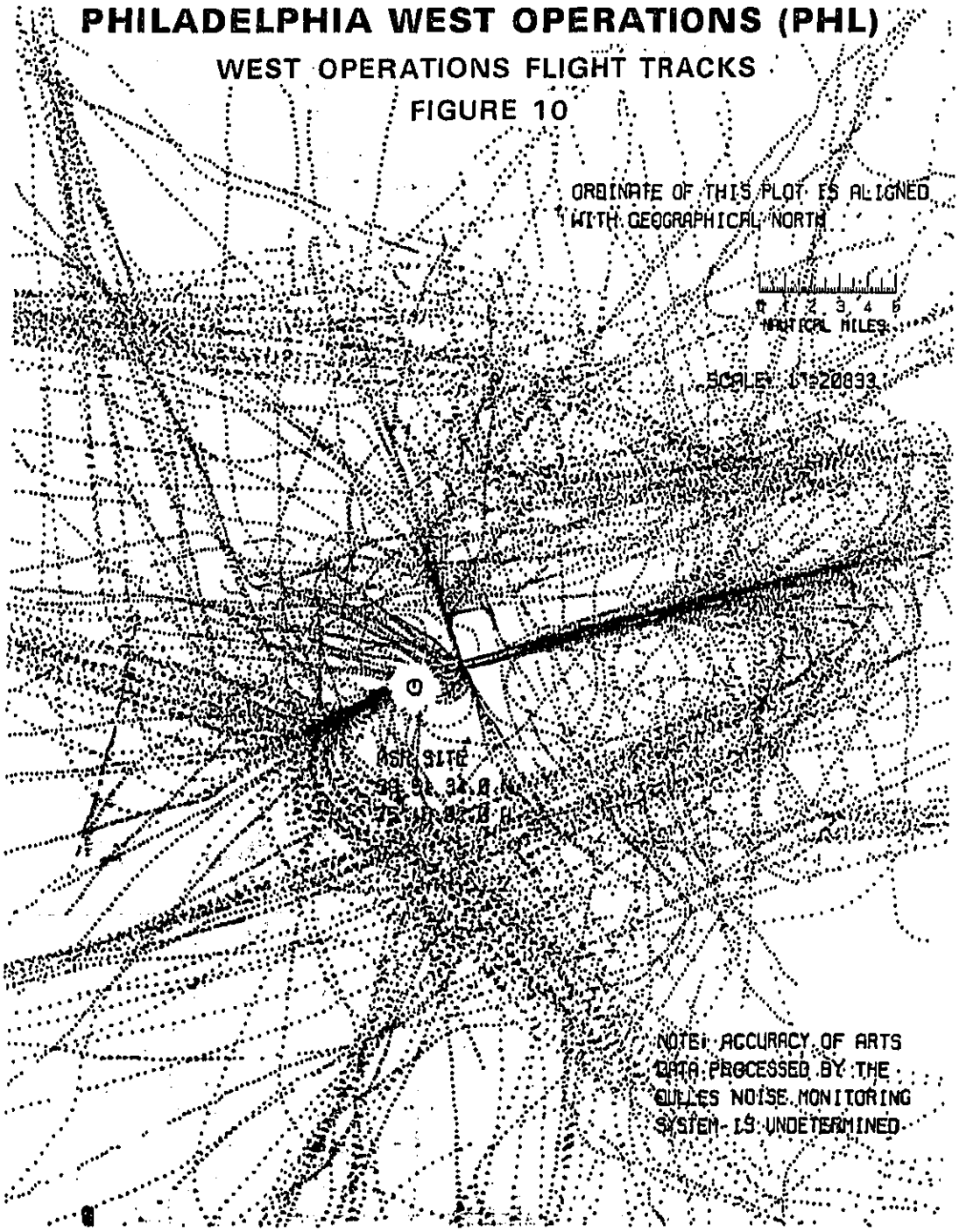
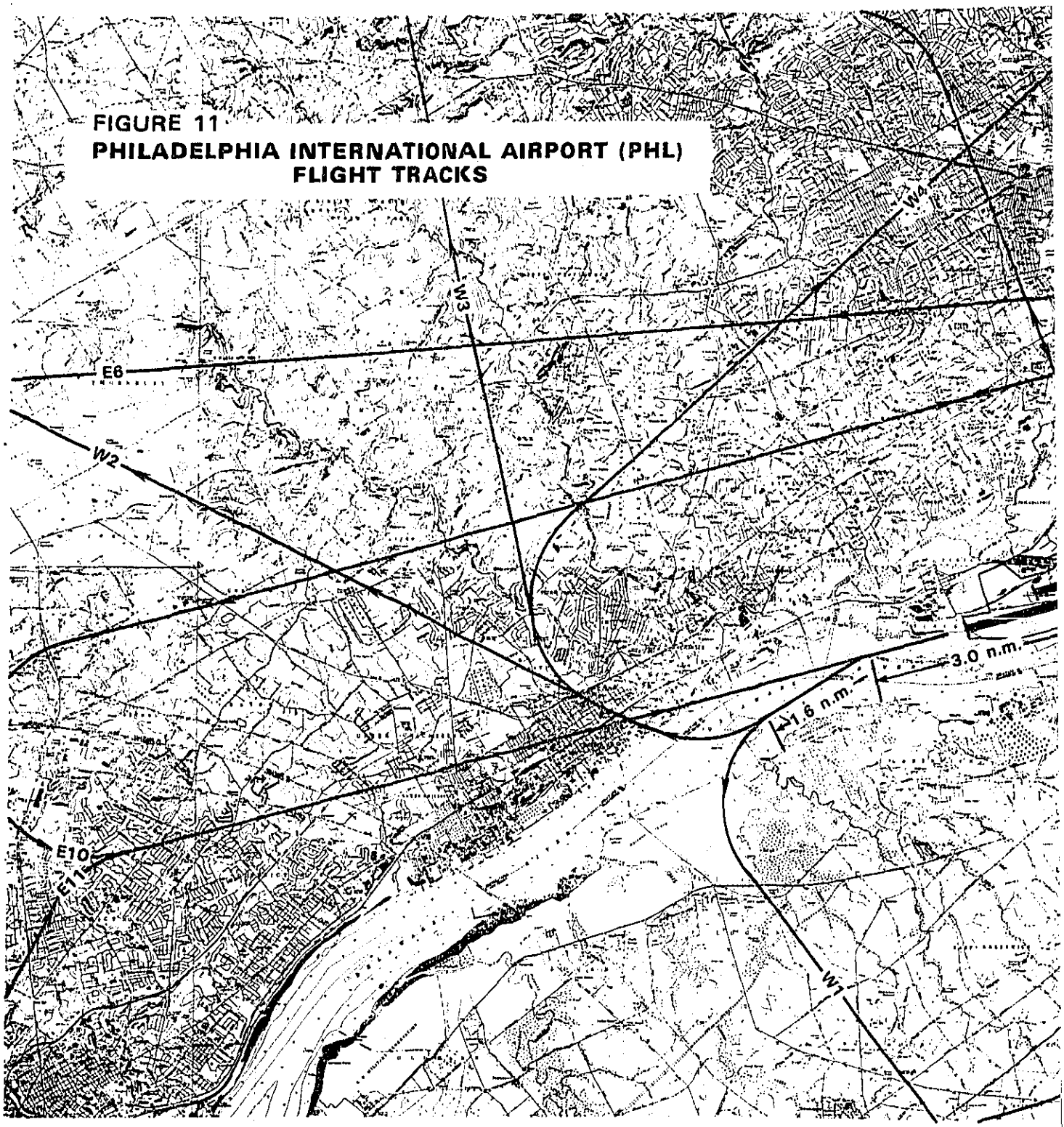
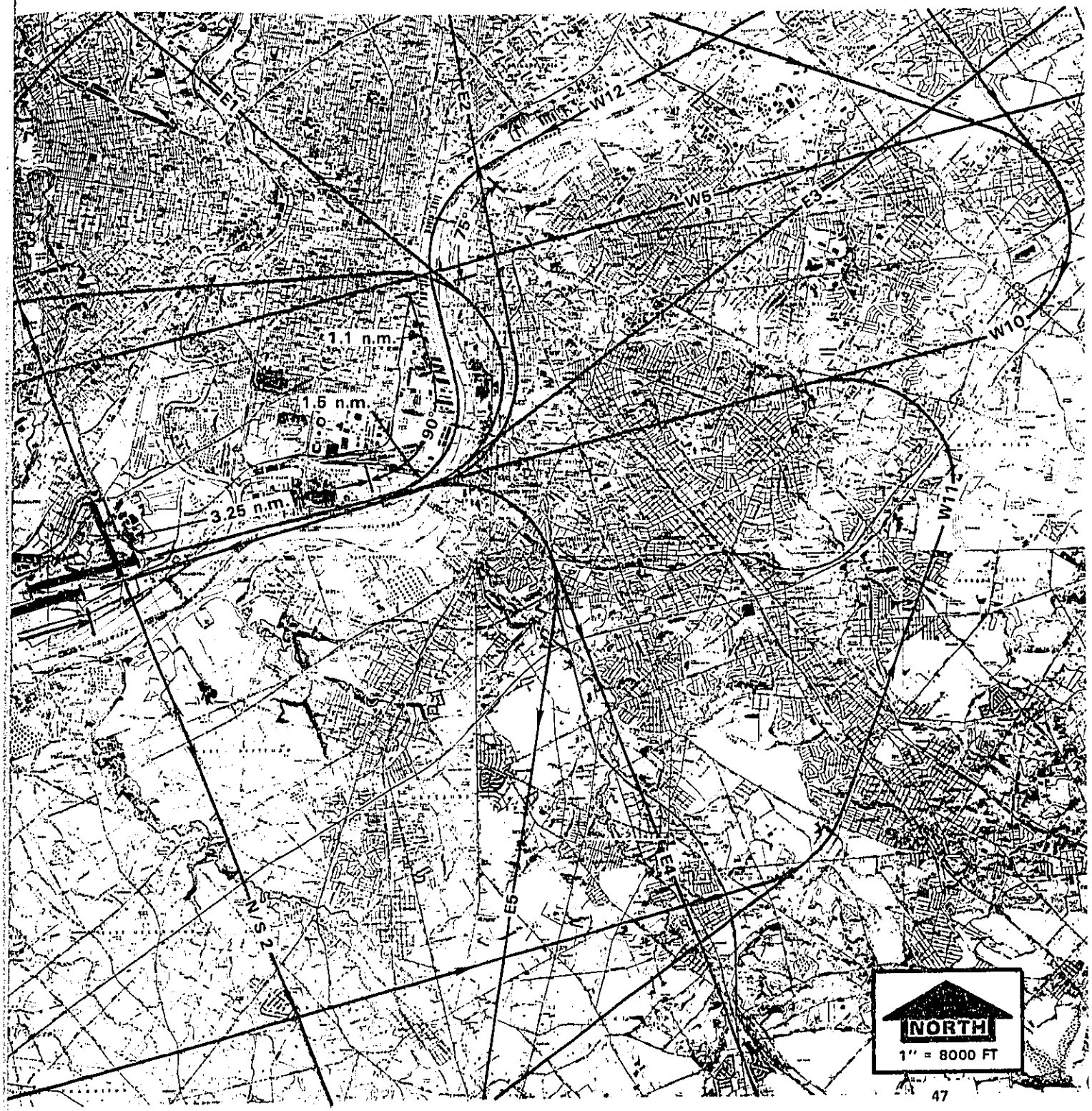


FIGURE 11

PHILADELPHIA INTERNATIONAL AIRPORT (PHL)
FLIGHT TRACKS





The total number of scheduled operations used in the evaluation of existing conditions were obtained from the Official Airline Guide (OAG). The breakdown of daytime/nighttime operations and the necessary stage length information required for air carrier operations were also obtained from the airline schedules in the OAG. Table 28 presents a summary of the operational data used to describe the existing noise conditions at the airport.

G. Existing Noise Exposure

1. Noise Methodology

In order to define the noise environment resulting from aircraft operations in the vicinity of an airport, an appropriate measure of cumulative noise exposure must be selected.

The day-night sound level (Ldn) was selected as the measure for describing the cumulative noise exposure resulting from aircraft operations at Philadelphia International Airport. The Ldn measure is especially significant in that it can be related directly to a wide variety of other community noise environments. In addition, the U.S. Air Force, the Federal Aviation Administration, and the Environmental Protection Agency have selected this metric for the purpose of measuring cumulative noise exposure. It is presently being used in numerous noise and land use studies for airports around the country.

a. Ldn Noise Metric

Ldn can be defined as the average A-weighted sound level during a 24-hour period with a 10dB penalty applied to nighttime sound levels (2200 to 0700 hours). Ldn describes the relationship between daytime and nighttime equivalent sound levels (Leq). Leq is formulated in terms of the equivalent "steady" noise level which in a given period of time would contain the same noise energy as the time-varying noise during the same time period.

Historically, almost every scientific investigation of airport/community noise, regardless of the country or origin, shows that the impact of aircraft/airport noise is a function not only of the noise intensity of a single event, but also a function of its duration and the number of events occurring throughout the day and night. The method of measurement of Ldn is shown in Figure 12.

b. Purpose of Noise Contours

Ldn noise levels are indicated by means of contour lines superimposed on a map. These levels are computed for each designated point on the ground around the airport from the weighted summation of the effect of each aircraft operation. Some operations are far enough away from the point being considered that their contributions are minimal. Conversely, other operations are close enough and noisy enough to dominate the noise exposure at that location.

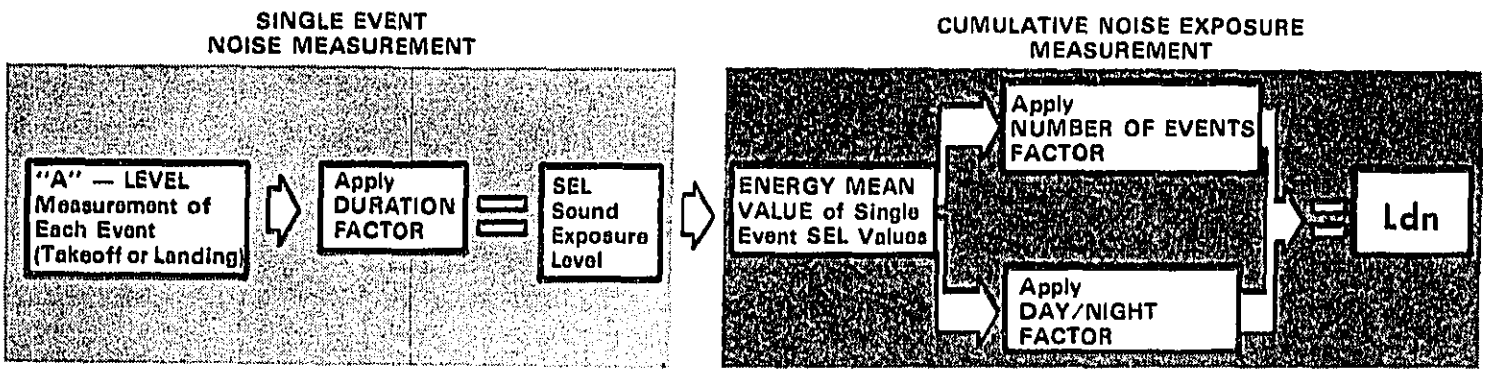
TABLE 28

1980 BASE AIRCRAFT DAILY OPERATIONS FOR PHILADELPHIA INTERNATIONAL AIRPORT

Aircraft Type	Day/ Night	Arrivals	Departures by Stage Length (Nautical Miles) 0 500	500 1000	1000 1500	1500 2500	2500 3500	3500 4500	4500 +
747	D	3	1	1				1	
	N								
DC-10	D	11	4	6		2			
	N	1							
L-1011	D	11	1	4	2	3	1	1	
	N	1							
DC-8	D	5		1		2	1	1	
	N	1		1					
707	D	15	4	6	2	3	1		
	N	3	1	1					
A-300	D	2		2	1				
	N	1							
727-100	D	27	13	7	5				
	N	2	2	2					
727-200	D	43	17	19	7				
	N	8	3	4	1				
727 Adv.	D								
	N								
DC-9	D	64	49	14	2				
	N	3	1	1					
737-100/-200	D	6	4	2	1				
	N	1							
STOL	D								
	N								
BizJet	D	25	14	9	3				
	N	2	1						

FIGURE 12

DAY—NIGHT SOUND LEVEL (Ldn)
METHOD OF MEASUREMENT



This summation of noise levels, as shown in Figure 12, is on an energy basis. Thus, one might think of the acoustical energy of the noise from the passing aircraft as a passing snow storm with the distribution of snowfall in proportion to the distribution of the aircraft noise. Therefore, if each homeowner has a snow or noise energy gauge, at the end of the day his gauge will indicate the total noise energy or Ldn received at his location. Final lines or contours can then be drawn through points of equal gauge level.

Noise exposure contours are developed primarily as a planning tool to be used by those who plan aircraft operations at an airport and those who plan the growth of the communities in the vicinity of an airport. It is important to understand that the noise contours developed in this study do not constitute definitive standards for enforcement of land use controls, nor do they represent any absolute boundaries of noise tolerance.

The measured range of day-night sound levels outside dwelling units is quite large. The measured range goes from 40dB on a typical farm to 90dB outside an apartment next to a freeway. Ldn levels of 65 dB will result in sleep and speech interference and adverse response. Ldn levels below 65 have generally been considered as the acceptable range for residential uses even though some sleep and speech interference still exists. Also, all of the Federal agencies which operate in the aircraft noise field and which have developed criteria for compatible land use, agree that residential uses are acceptable at Ldn levels less than 65 dB. The EPA has recommended that 55 Ldn is requisite to protect public health and welfare with an adequate margin of safety. Thus, between Ldn 55 and 65, some noise controls may also be needed. Restrictive costs may impede the development of such controls but that does not mitigate against their necessity.

For these reasons, most noise analyses concentrate on the land areas within the Ldn 65 and up since this range has been accepted as the area in which land use controls and operational modifications should be addressed. However, since many of the complaints regarding aircraft noise from Philadelphia International Airport were from outside the Ldn 65 contours, the Ldn 60 contours were also developed for this study.

2. Development of Noise Contours

As stated before, the methodology used to develop the aircraft noise exposure contours was the FAA's Integrated Noise Model (INM), 5/ a noise simulator computer-based program. The INM describes and defines the levels of aircraft noise around the airport by taking into account all pertinent parameters, including types and numbers of aircraft operating at the airport, flight tracks, operating procedures, and time of day of aircraft operations. The existing noise exposure (1980) for the airport vicinity is presented and discussed in terms of Day-Night Average Sound Level (Ldn) contours.

5/ A detailed description of the INM is contained in report No. FAA-EE-79-09 "Integrated Noise Model Version 2 User's Guide," which is available upon request from the Director, Office of Environment and Energy, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591.

Selected scenarios were also analyzed according to the EPA's Aircraft Noise Evaluation Process (ANEP). 6/ This technique is used to determine the incremental contribution of aircraft noise, over and above background levels, and the results are presented for discrete land areas such as census tracts. The ANEP indicates where aircraft noise levels intrude above background levels, which are predicted as a function of population density, and so ANEP recognizes the lower background level of lower density development.

a. Annual Average Day-Night Sound Levels

The Ldn contours for the 1980 existing conditions are shown in Figure 13. The contours reflect the high percentage use of the parallel east-west runways and are wider on the west side of the airport than on the east, since the general landing/departing pattern for air carrier aircraft is from east to west. The contours caused by general aviation aircraft using runway 17-35 are considerably smaller than the contours extending from the parallel runways.

As shown in Figure 13, areas exposed to Ldn 75 are all on airport property or the Delaware River except for a segment of Essington, west of the airport, where about 290 people reside. The areas exposed to Ldn 65 extend approximately 6 1/4 miles to the east along the river into the Gloucester City area of New Jersey. To the west, the Ldn 65 contour encloses all of Essington, the industrial waterfront of Chester and branches inland from the river 1.6 miles to the north in the Faltonville area and about 2 miles south near the Bridgeport area of New Jersey. The Ldn 65 contour from the primary general aviation runway, 17-35, extends 2.2 miles north from the airport in the Eastwick area and about the same distance south of the river into the sparsely populated area of West Deptford. Population centroids identified from Bureau of the Census data indicate that there are 37,574 people in 11,478 homes within the Ldn 65 contour. Recent developments such as in the Eastwick area are not included.

Ldn 60 contours are also shown on Figure 13. This contour encompasses 188,133 people in 59,935 residences, about five times as many as within the Ldn 65 contour, and extends 3.6 miles east of the river into the Oaklyn/Haddon area with lobes into Camden on the north and Bellmawr on the south. West of the airport, the Ldn 60 contour extends northwest past Chester nearly to the Middletown/Fisher Corners area and south into New Jersey past the Cedar Swamp nearly to the Turnpike. The contour from runway 17-35 reaches 5.6 miles north to the Highland Park area and south into New Jersey a mile past the Turnpike.

6/ A detailed description of the ANEP is contained in "Airport Noise Regulatory Process," Notice of Proposed Rule Making, EPA, October 1976.

b. Daily Day-Night Sound Levels

The DRVPC requested that "worst case" noise levels be investigated, i.e., daily Ldn contours assuming west operations for all air carrier aircraft and again assuming all east operations for the day. These contours are shown in Figures 14 and 15 while the associated population information is presented in Table 29.

TABLE 29

COMPARISON OF EXISTING ANNUAL DAY-NIGHT NOISE LEVEL CONTOURS WITH "WORST CASE"

Day-Night Noise Level (Ldn)	Population Within Contours		
	Annual Average	East Operations	West Operations
75	290	290 (0%)	1,446 (+900%)
65	37,574	55,102 (+47%)	43,303 (+15%)
60	188,133	343,990 (+83%)	173,279 (-8%)

( ) Percent change from Annual Average.

As can be seen from the "worst case" contours, departure noise dominates except for the narrow approach corridors. Therefore, during the 28 percent of the time that all air carrier operations take off to the east, many more people are impacted by aircraft noise. When the wind is from the west, the departures down the Delaware River and south over the sparsely populated Cedar Swamp area minimize the number of people impacted even though about one-half of the departures proceed to the northwest, overflying the relatively densely populated area north of the river. On the other hand, people in New Jersey living directly under or adjacent to the approach flight path are subjected to noise from every air carrier aircraft landing at PHL.

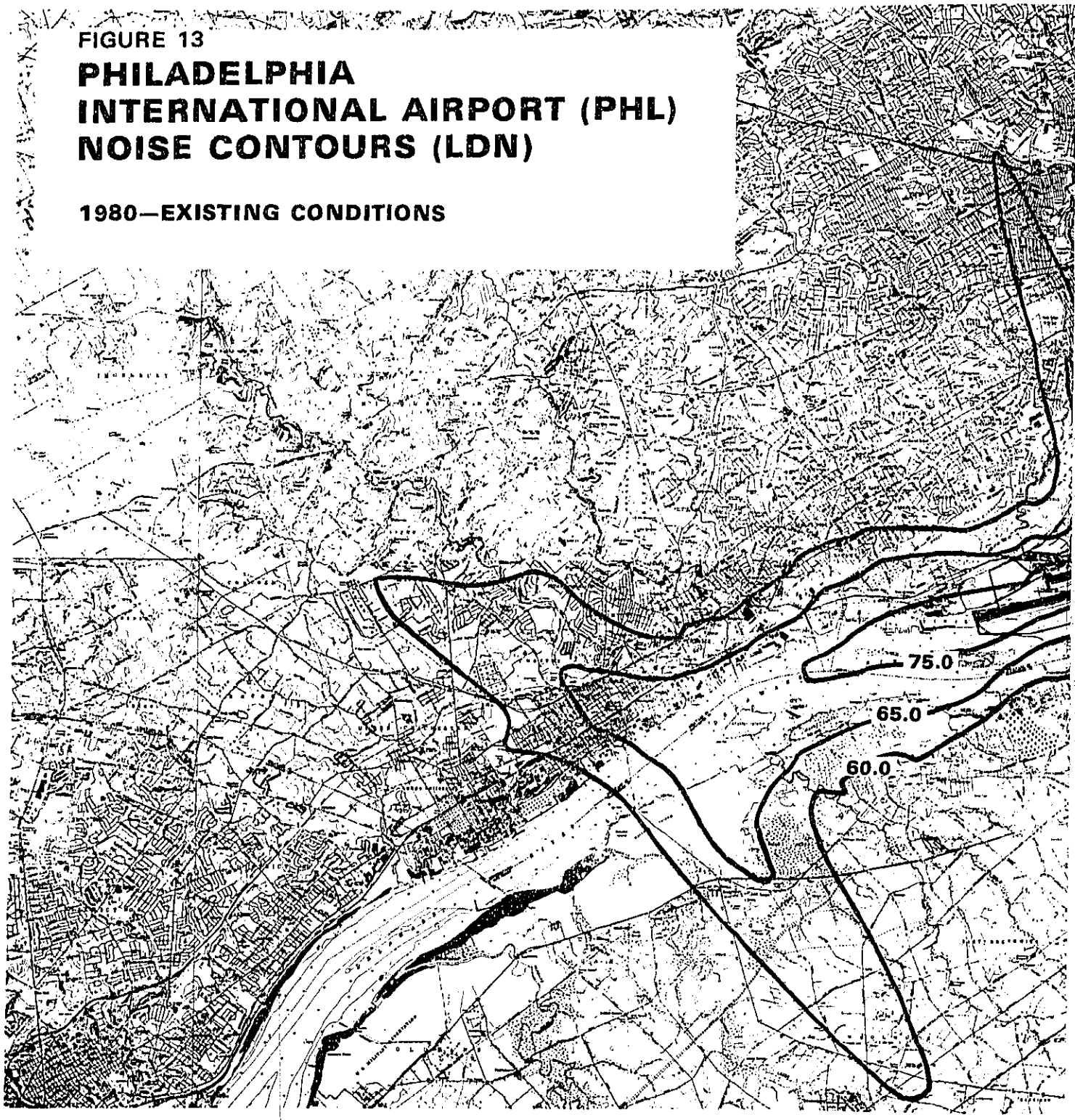
c. Aircraft Incremental Impact - 1980 Base Case

The study area surrounding PHL was divided into approximately 400 individual study units. Each study unit is a census tract, or portion thereof, which contains residential development; Figure 16 illustrates the array of study units. For each study unit, a background or indigenous noise level was predicted according to the ANEP process, and an aircraft noise level was also developed via the same type of computer model used to produce the noise contours; indigenous and aircraft levels are illustrated in Figures 16 and 17. In the ANEP process the predicted aircraft and indigenous noise levels are added logarithmically to obtain a total noise level and then the indigenous level is subtracted arithmetically from the total level to

FIGURE 13

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

1980—EXISTING CONDITIONS



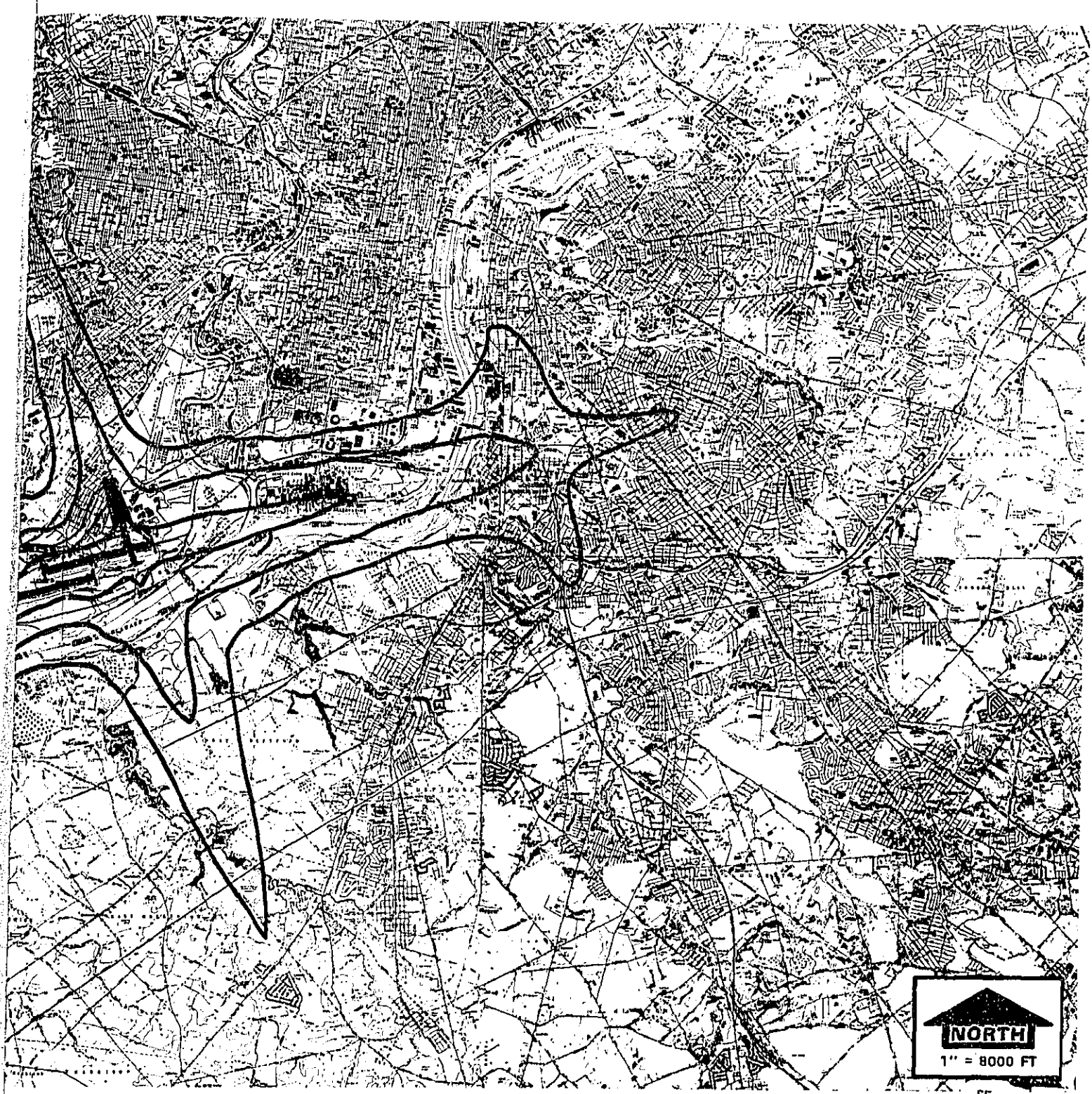
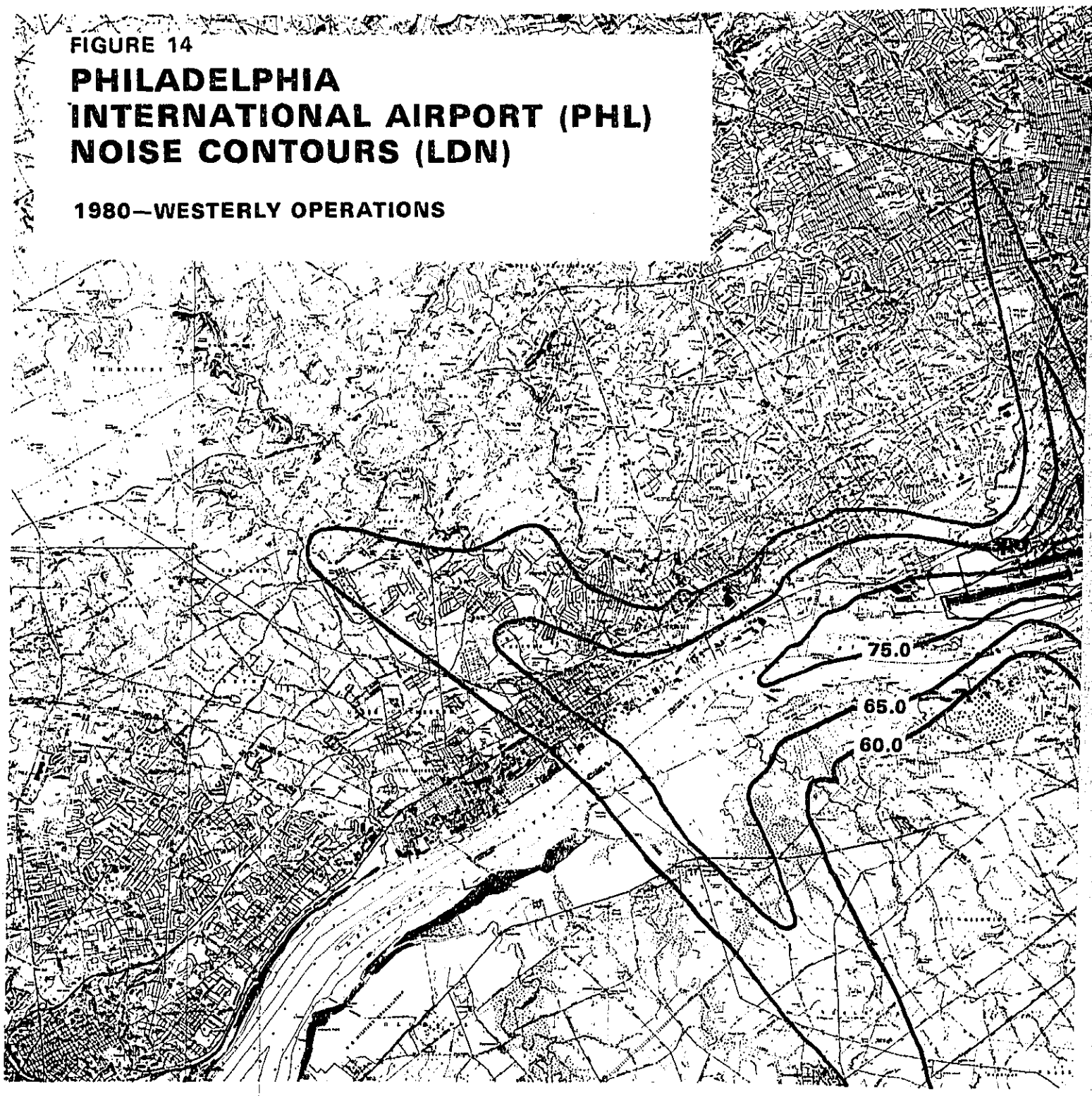


FIGURE 14

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

1980—WESTERLY OPERATIONS



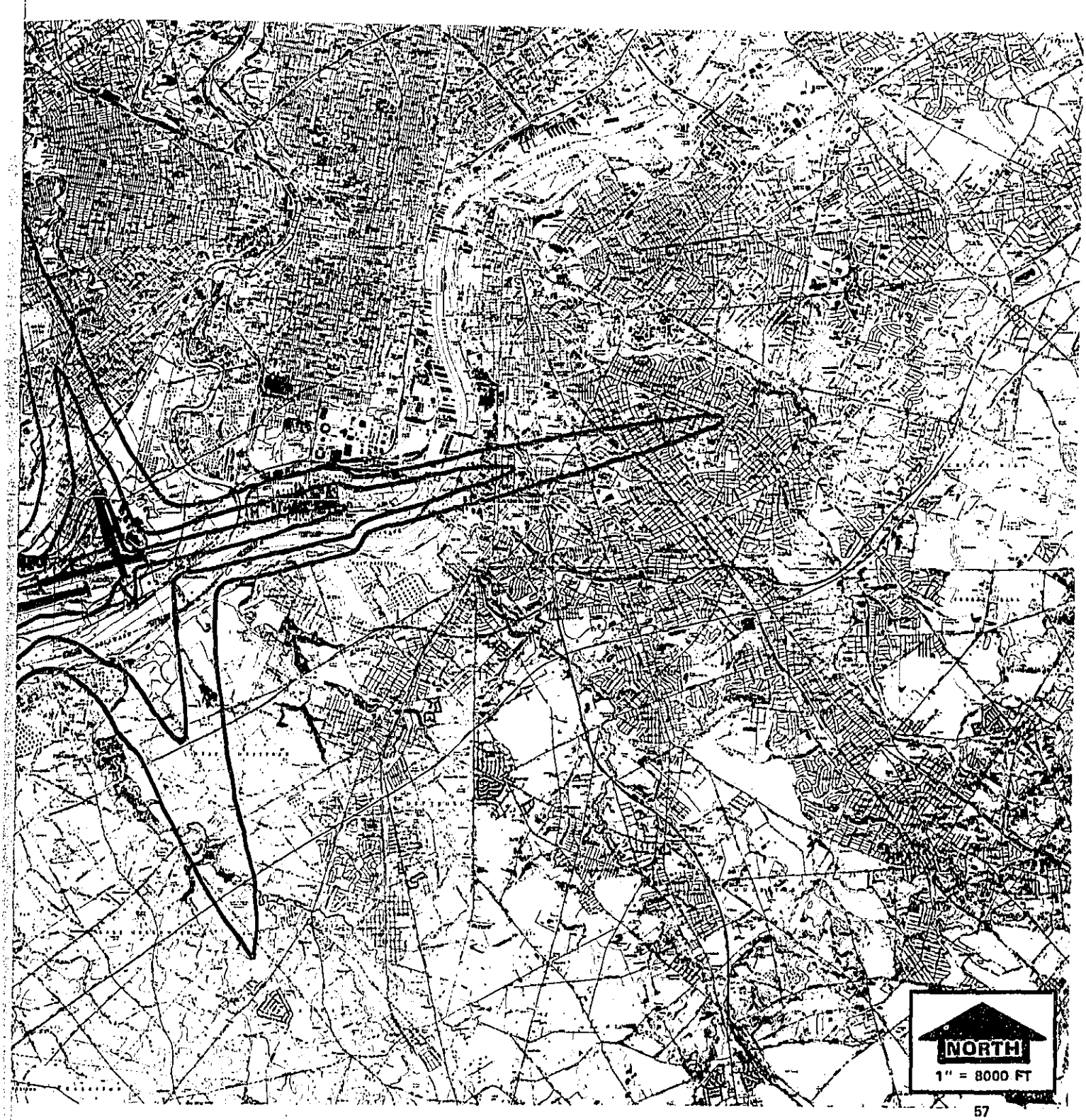
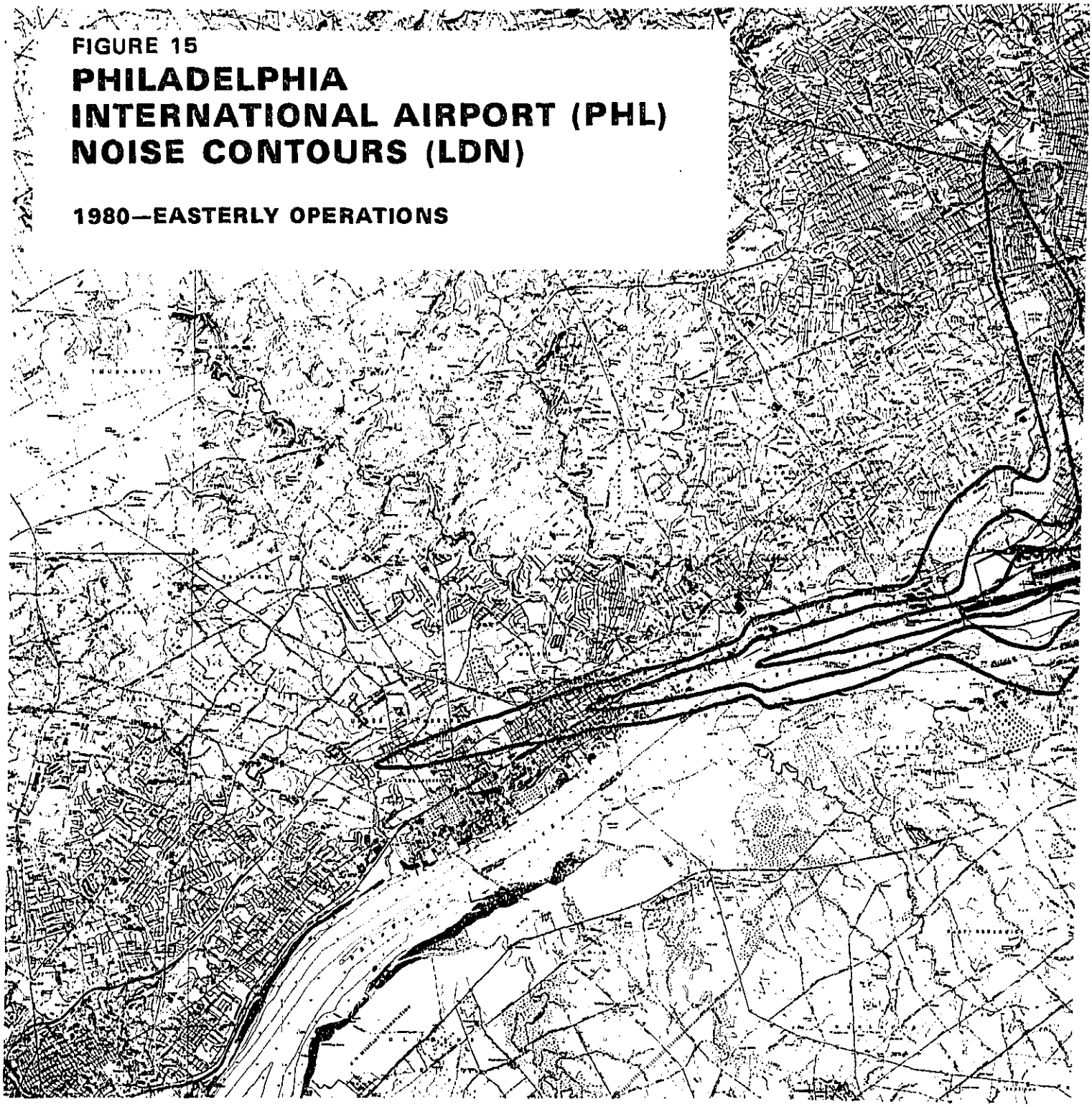
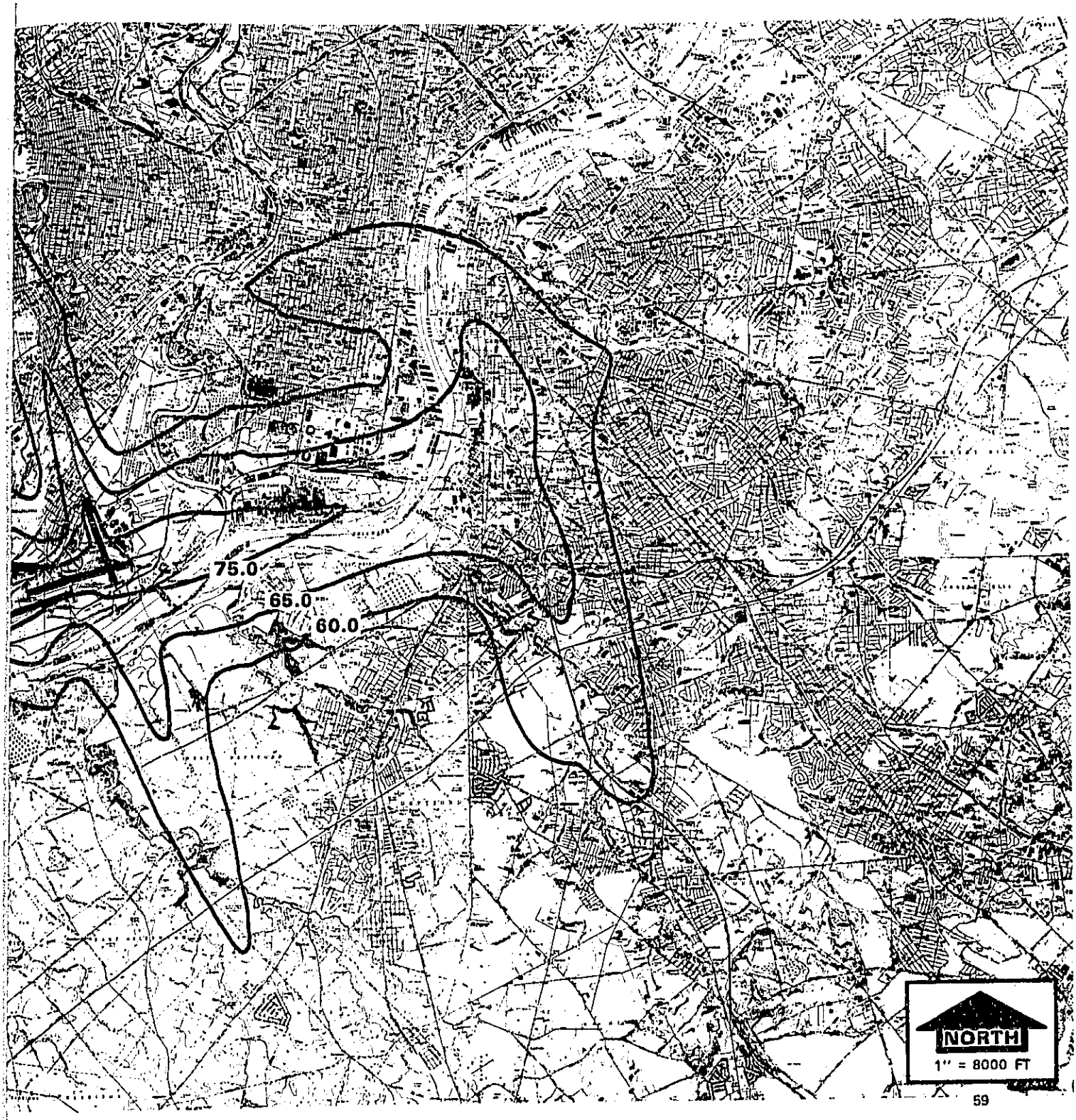


FIGURE 15

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

1980—EASTERLY OPERATIONS

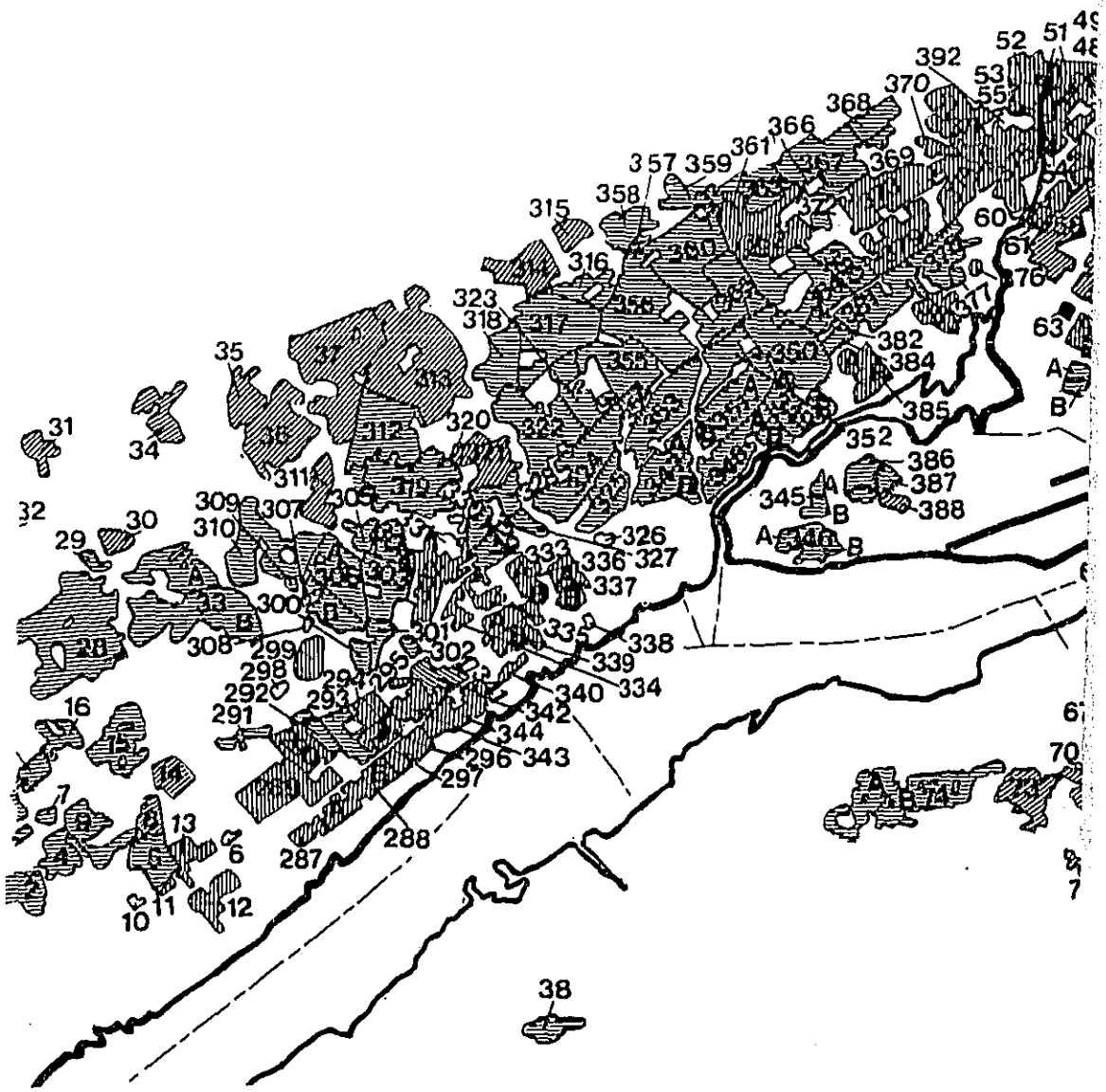




59

FIGURE 16

PHILADELPHIA INTERNATIONAL AIRPORT (PHL)



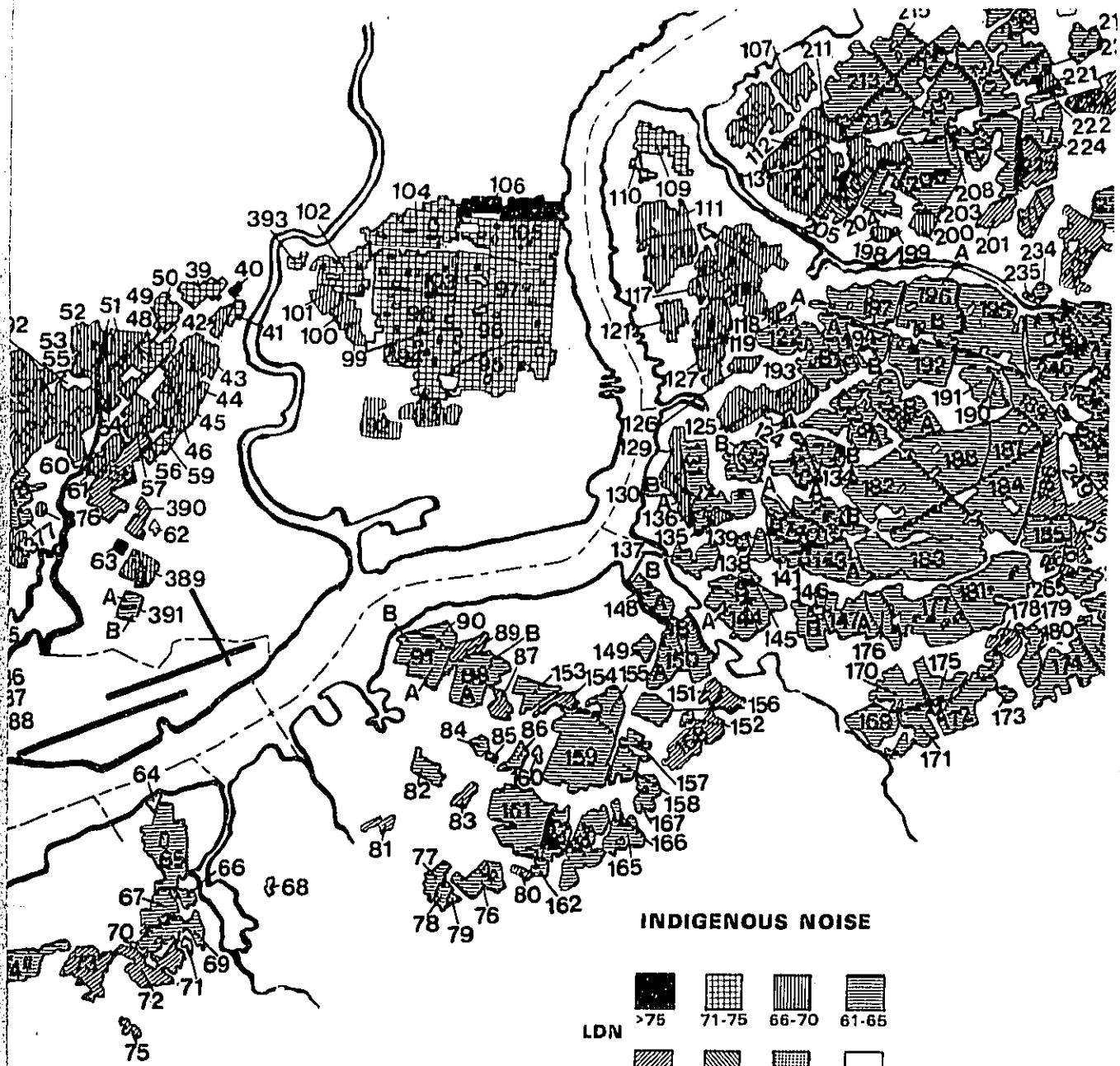
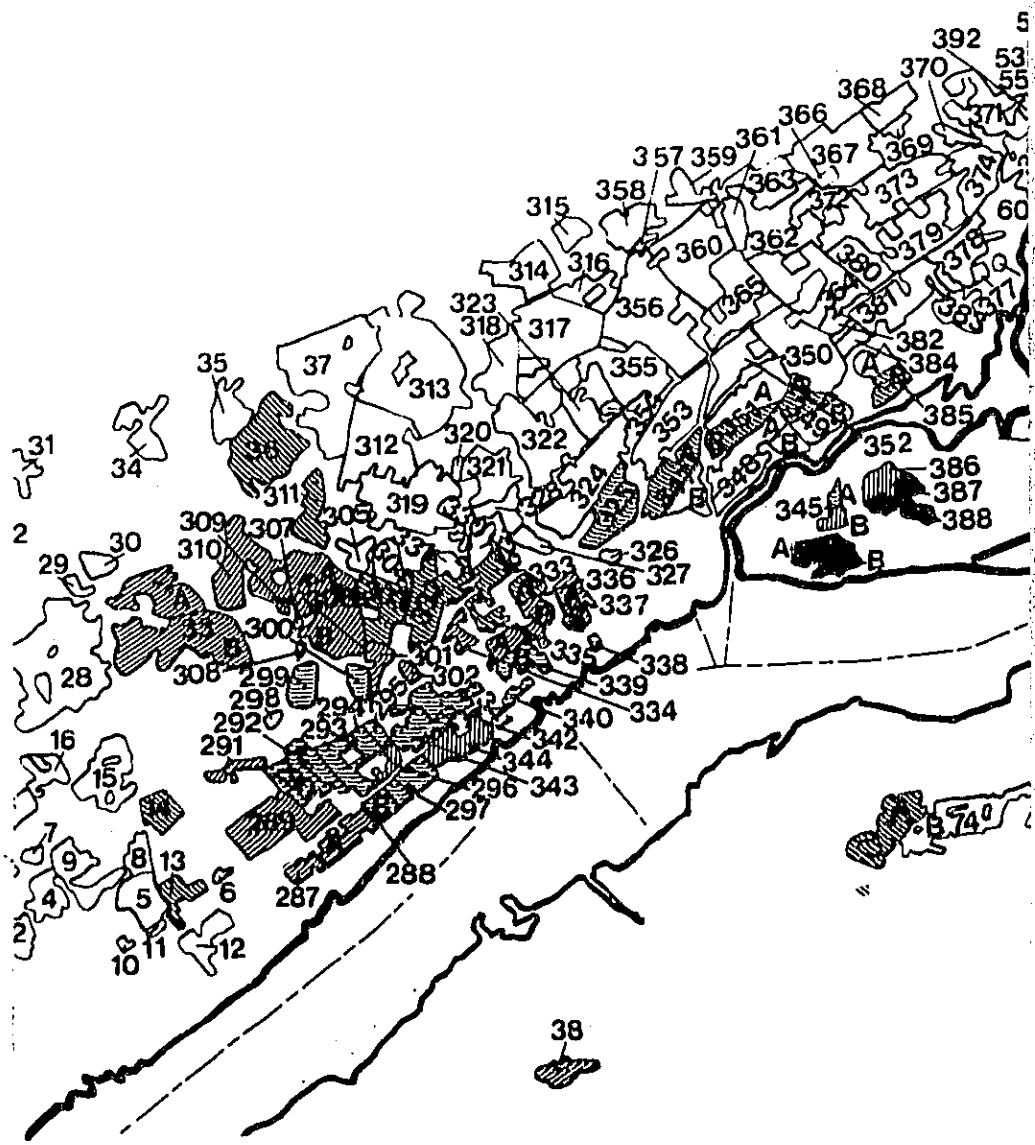
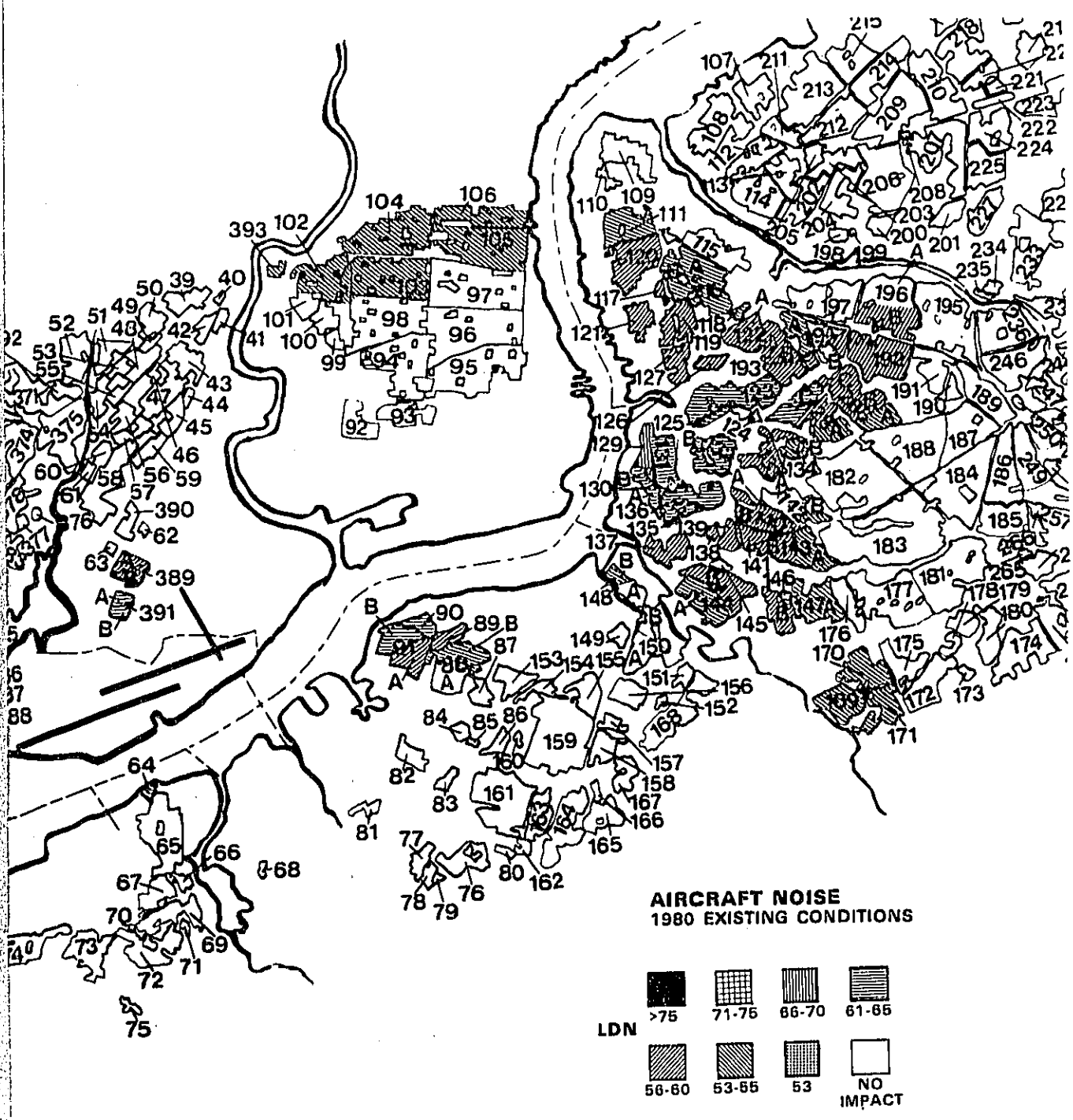


FIGURE 17

PHILADELPHIA INTERNATIONAL AIRPORT (PHL)





determine the aircraft increment. It should be noted that since Day-Night sound levels, expressed in decibels, are logarithmic quantities, they cannot be added in the usual arithmetic manner. Figure 18 provides a simple means for adding two sound levels.

FIGURE 18

RULES FOR DECIBEL ADDITION

To add together two noise levels, L_1 and L_2, where L_2 is higher than L_1:

1. Subtract L_1 from L2
2. Determine L from the following table:

L_2-L_1, dB	L, dB
0 or 1/2	3
1 or 1-1/2	2-1/2
2 to 3	2
3-1/2 to 4-1/2	1-1/2
5 to 7	1
7-1/2 to 12	1/2
13 or more	0

3. Add L to L_2.
4. L_2 + L is the decibel sum of L_1 and L_2.

For example, if the aircraft and indigenous levels were both 60dB, their total would be 63dB and if one subtracted the indigenous level from the total level, the results would be 3dB, i.e., the aircraft increment is 3dB. The process just described was accomplished for each of the study units and the results are shown in Figure 19 for only those study units to which there is an incremental impact due to the operations of aircraft at PHL. As can be seen, the most significant increments occur in the close-in areas just west of the airport, e.g., Ridley, Ridley Park, while the most extensive occurrence of incremental impact is in New Jersey, e.g., Camden, Collingswood, Gloucester City. The moderate values of incremental impact in New Jersey reflect the distance from the airport to the New Jersey shore of the river. However, the incremental values shown in Figure 19 are sufficient to trigger public awareness and complaint. The geographic distribution of Hotline calls shown in Figure 3 and the location of incrementally impacted areas is highly correlated.

3. Noise Measurement Program

An aircraft noise measurement program was conducted during the week of June 4, 1979, to obtain actual data to compare with modeling results. Three stations east of the airport in New Jersey and one west of the airport in Essington, Pennsylvania, monitored both east and west operations. Table 30 compares the calculated equivalent noise level (Leq) with the results of the measurements. 7/

TABLE 30

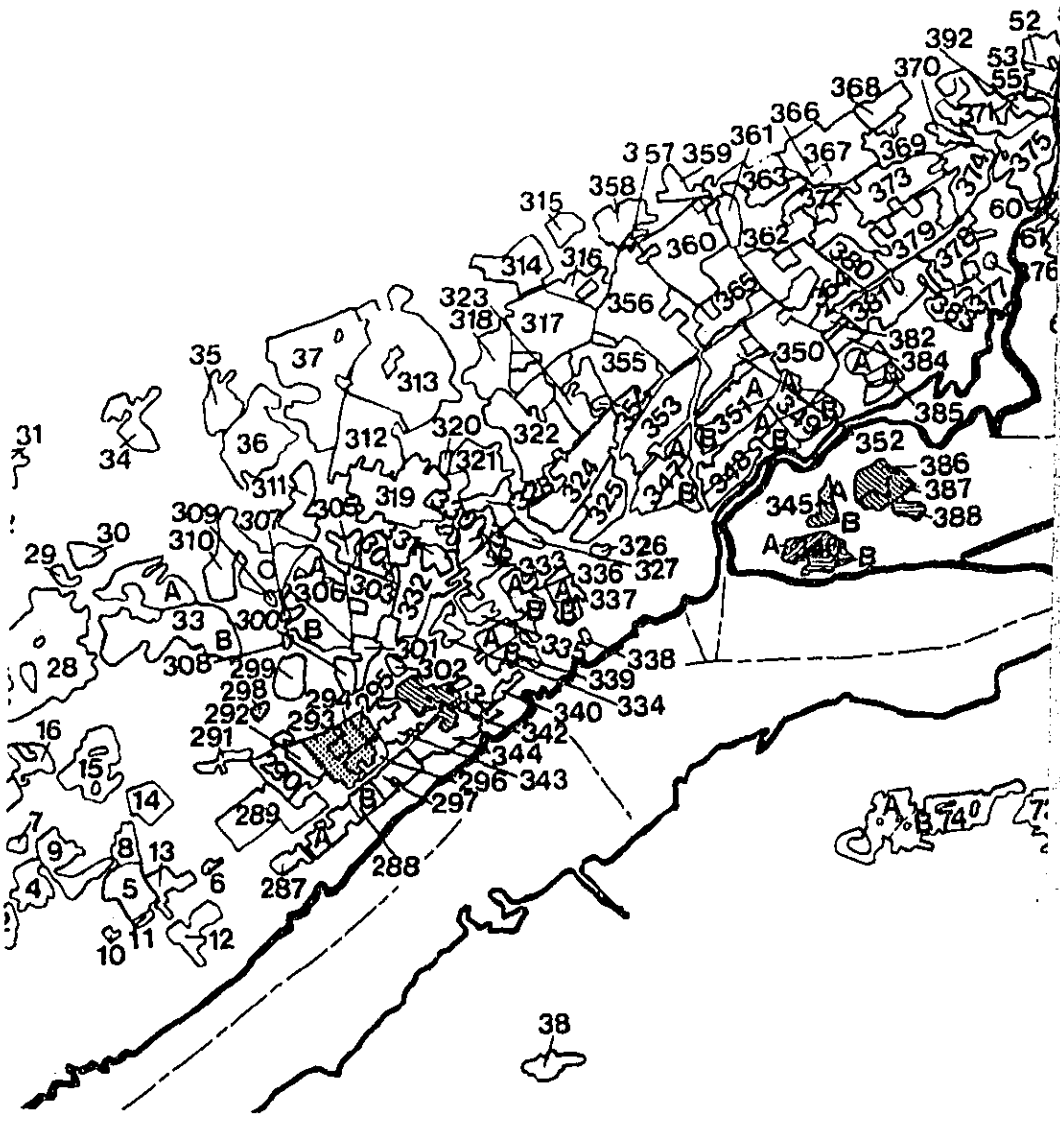
CALCULATED VS MEASURED
EQUIVALENT NOISE LEVELS

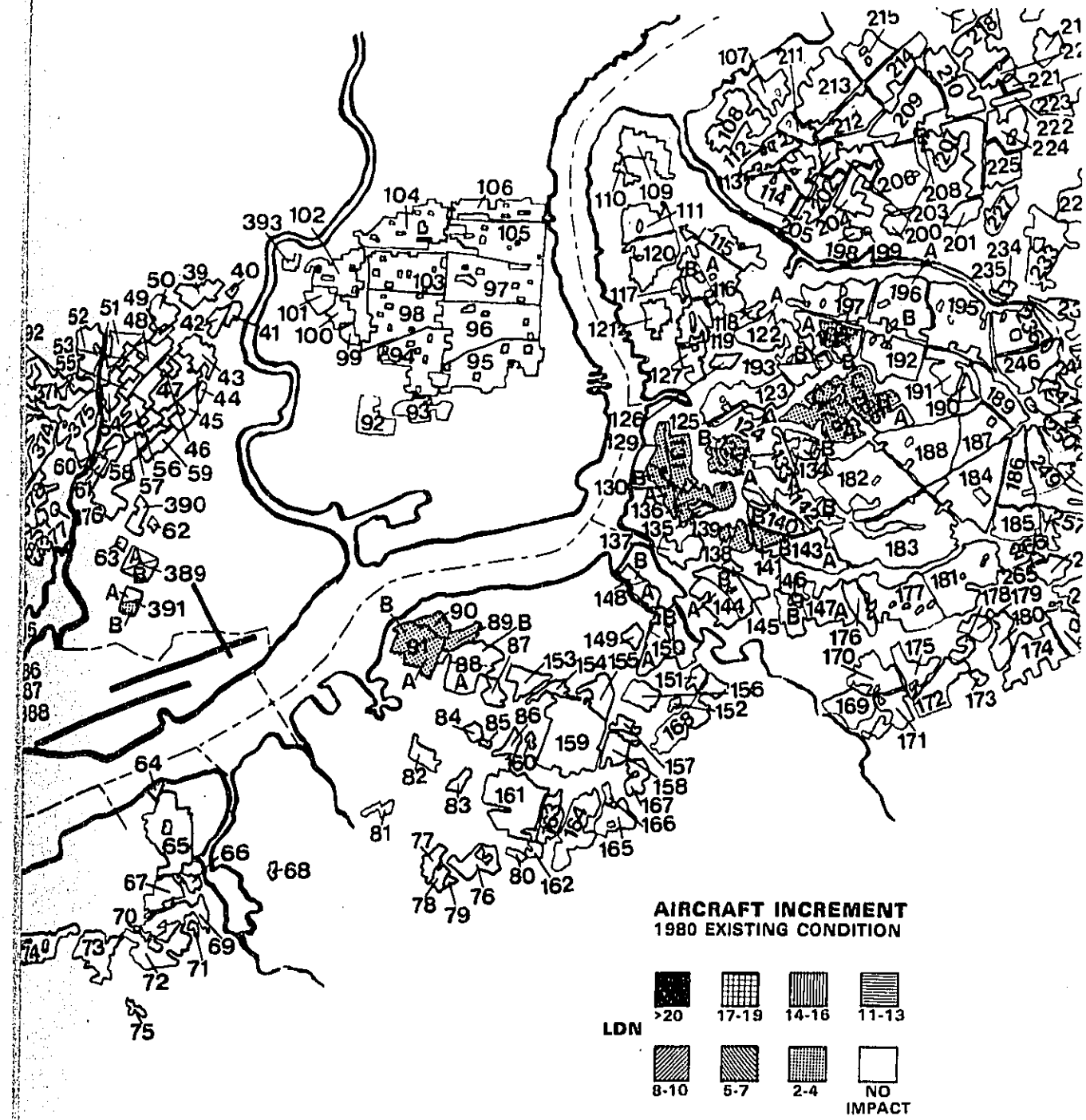
Location	Leq Calculated	Leq Measured	Difference	Remarks
Gloucester City, N.J.	63.6dB	64.1dB	+0.5dB	
Audubon, N.J.	54.2dB	60.9dB	+6.7dB	Considerable Background Noise
Cherry Hill, N.J.	52.6dB	57.2dB	+4.6dB	Some Background Noise
Essington, Pa.	72.0dB	68.4dB	-3.6dB	

The measured level at Gloucester City is very close to that calculated and verifies that the relatively high noise level at that location is aircraft dominated. The measured levels at Audubon and Cherry Hill, further from the airport, indicate that the equivalent noise levels in these areas are probably not aircraft dominated. The operators of the noise monitoring equipment noted several noise sources such as a power lawn mower and a trail bike that understandably biased the measurements. The difference between the calculated and measured levels west of the airport at Essington exceeded the tolerance expected at that location by 0.6dB. A check of both the calculated and measured values showed no systemic error and the data extracted from the radar tapes could not resolve the difference. However, the noise measurement team had no way to verify aircraft takeoff weight or engine power settings; these factors could account for the difference.

7/ The report on the Noise Measurement Program, DOT-TSC-FA053-LR-80-1, is available upon request to the Director, Office of Environment and Energy, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591.

FIGURE 19
PHILADELPHIA INTERNATIONAL AIRPORT (PHL)





VI. NOISE ABATEMENT ALTERNATIVES

A. Selecting Possible Actions

Potential noise abatement actions for the Philadelphia International Airport should reflect airport master planning considerations, the existing noise condition, the existing abatement program, and the noise reduction benefit of additional options. Data were collected from a variety of sources regarding many potential noise abatement options; the options were then assessed by the Advisory Committee as to their applicability to and potential effectiveness at Philadelphia International.

All of the operational options identified were combined into several categories to simplify their review and application to Philadelphia International.

* Airport Plan
* Airport and Airspace Use
* Aircraft Operation
* Land Use
* Noise Program Management

These categories of options were discussed and screened at length by the Noise Study Advisory Committee. Table 31 presents a listing of the specific options considered under each category.

At Philadelphia International, most of the area impacted by noise from air carrier aircraft is not "close-in" but is several miles away under the approach and departure paths. However, there is a "close-in" noise problem in Eastwick due to general aviation aircraft and also at Essington from air carrier aircraft.

B. Airport Plan Alternatives

1. Displaced Threshold - A displaced threshold is a runway marking that identifies the point on a runway beyond which landing aircraft may touch down. Since the displaced threshold is located down the runway and not at the physical end of the runway, aircraft on the landing approach maintain a higher altitude to reach the touchdown point than would be necessary if the threshold were not displaced.

At Philadelphia International, the south parallel is the runway primarily used for landing jet aircraft. The residential area under the approach path to runway 9R in Chester, Pennsylvania, is 4.4 miles from the runway. At this location, an aircraft on the approach glide slope would be at an altitude of 1,250 feet. Displacing the landing threshold 1,000 feet would result in a 0.3dB decrease in noise. Similarly, Gloucester City is 5.5 miles from the approach end of runway 27L and would receive even less benefit from a displaced threshold. At Essington, about one mile from the runway, the benefit from displacing the threshold 1,000' or 2,000' recorded would be 1.3 and 2.5 decibels, respectively.

TABLE 31

SELECTING POSSIBLE ACTIONS

CONSIDER THIS ACTION ▼			IF YOU HAVE THIS PROBLEM ➤ NOISE FROM:	TAXIING	DEPARTURE	APPROACH	LANDING ROLL	TRAINING FLIGHTS	MAINTENANCE	GROUND EQUIPMENT
AIRPORT PLAN	DISPLACED THRESHOLDS	1			●		●		
	RELOCATED OR ADDED RUNWAY	2	●	●	●	●	●		
	CHANGE IN LENGTH OR STRENGTH OF RUNWAY	3	●	●	●	●	●		
	HIGH SPEED EXIT TAXIWAYS	4	●			●			
	RELOCATED TERMINALS	5	●					●	●
	LOCATIONS FOR MAINTENANCE RUNUPS TEST STAND NOISE SUPPRESSORS AND BARRIERS	6	●					●	●
AIRPORT AND AIRSPACE USE	PREFERENTIAL OR PRIORITY RUNWAY USE ROTATIONAL RUNWAY USE	7	●	●	●	●	●		
	PREFERENTIAL FLIGHT TRACK USE APPROACH AND DEPARTURE PROCEDURES	8		●	●		●		
	LIMITED REPOSITIONING OF AIRCRAFT	9	●						
	RESTRICT TIMES FOR MAINTENANCE RUNUPS CONTROL OF GROUND EQUIPMENT	10						●	●
	LIMITED NUMBER OR TYPES OF OPERATIONS LIMITED TYPES OF AIRCRAFT	11	●	●	●	●	●	●	●
	CURFEW RESCHEDULING MOVE FLIGHTS TO ANOTHER AIRPORT	12	●	●	●	●	●	●	●
AIRCRAFT OPERATION	POWER AND FLAP MANAGEMENT	13		●	●		●		
	RAISE GLIDE SLOPE ANGLE OR INTERCEPT	14			●		●		
	LIMITED USE OF REVERSE THRUST	15				●			
LAND USE	LAND ACQUISITION EASEMENT ACQUISITION	16	● ●	● ●	● ●	● ●	● ●	● ●	● ●
	JOINT DEVELOPMENT OF AIRPORT PROPERTY	17	●	●	●	●	●	●	●
	COMPATIBLE USE ZONING	18	●	●	●	●	●	●	●
	BUILDING CODE PROVISIONS SOUND INSULATION OF BUILDINGS	19	●	●	●	●	●	●	●
	REAL PROPERTY NOISE NOTICES	20		●	●	●	●	●	●
	PURCHASE ASSURANCE	21		●	●	●	●	●	●
NOISE PROGRAM MANAGEMENT	NOISE RELATED LANDING FEES	22	●	●	●	●	●		
	NOISE MONITORING	23		●	●		●	●	
	ESTABLISH CITIZEN COMPLAINT MECHANISM ESTABLISH COMMUNITY PARTICIPATION PROGRAM	24	●	●	●	●	●	●	●

2. Relocated or Added Runway - The size and location of Philadelphia International rule out this potential noise control action. Operations from the primary runways, the east-west parallels, are directed over the Delaware River to minimize the noise impact. Relocation or addition of a runway, if there were sufficient real estate, would not reduce the number of people exposed to aircraft noise.

3. Change in Length or Strength of Runway - The primary runways (9L, 9R, 27L, 27R) at PHL, are of sufficient strength and the minor runway extensions possible would not materially reduce the noise impact. However, extensions at both ends of runway 17-35 are under consideration in order to provide a "crosswind runway" at PHL. According to windrose data, crosswind conditions requiring the use of the lengthened runway (to 7,000') exist about 5 percent of the time. Use of extended runway 35 for takeoff, except when wind conditions mandate, would unnecessarily impact the Eastwick area; therefore, such usage is not under consideration.

4. High Speed Exit Taxiways - The runways used primarily by air carrier aircraft already have high speed exit taxiways. Therefore, this alternative was not given further attention.

5. Relocated Terminals - The terminal and associated buildings such as the parking garages tend to shield aircraft generated noise from the nearest residential areas to the north while the river provides a buffer zone between the airport and the New Jersey shore. Thus, the current location of the terminal appears to be optimal for noise abatement.

6. Test Stand Noise Suppressors and Barriers - Although there are currently no restrictions on maintenance run-ups, there apparently is not a significant noise problem from this source. The run-up area is at the west end of the airport and the usual practice is to point the tail of the aircraft toward the river. As maintenance which requires high power run-up is infrequent at Philadelphia International, installation of noise suppressors or barriers is not considered necessary at this time.

C. Airport and Airspace Use

1. Runway Use Program - The current informal runway usage program in which air carrier aircraft use the east-west parallels and most general aviation aircraft are directed to the north-south runway appears to be nearly optimum for both airport capacity and for noise abatement. However, Air Traffic Control personnel are considering a restriction on the use of Runway 9L-27R from 2200 to 0700. This would keep approaches from the west and departures to the west further from Essington.

2. Preferential Flight Track Use - The current flight tracks up and down the Delaware River effectively minimizes the noise impact from operations at PHL. At the request of the Noise Study Advisory Committee, noise contours were developed to show the change in noise impact if, during west operations under visual flight rules, arriving air carrier aircraft followed the Delaware River from Palmyra to the airport instead of using the current

straight-in-approach over Cherry Hill. As is shown in Figure 20, the noise impact on Collingswood and Haddon is decreased at the expense of added impact on Camden. The number of persons within the Ldn 60 contour changed less than 2 percent, from 188,133 to 184,763.

Another example of preferential flight track use that was examined in this study was head-to-head nighttime operations; i.e., all air carrier operations between 2200 and 0700 would land from the west and take off to the west. Such operations would only be initiated during periods of low traffic when weather conditions permit. The population within the Ldn 60 and Ldn 65 contours would be reduced by about 15,700 (8.3 percent) and 1,300 (3.5 percent), respectively (Figure 21). The contours would shrink east of the airport but would expand in the Chester area west of the airport.

3. Limiting Number or Types of Operations - Noise abatement restrictions currently in effect at PHL include prohibition of practice instrument approaches and touch and go landings. Air carrier aircraft operate from the east-west parallel runways except during severe crosswind conditions when they may use runway 17-35. Additional limitations on numbers or types of aircraft do not appear appropriate as there is no nearby airport from which air carrier aircraft can operate nor is PHL operating at capacity.

4. Curfews, Rescheduling and Moving Flights to Another Airport - The use of other airports is not considered to be a reasonable alternative as any airport in the Philadelphia area capable of handling large transport aircraft already has a noise problem that would be exacerbated by traffic diverted from PHL.

An analysis of the change in noise impact which would result from a full nighttime curfew (2200-0700) showed that, with such a curfew, about 105,000 people would no longer reside within the Ldn 60 contour and the number of people within the Ldn 65 contour would be reduced from 37,574 to 11,250 (Figure 22).

Using the Aircraft Noise Evaluation Process, an analysis of the 1980 full curfew scenario was undertaken to determine the change in impact severity. The indigenous levels used for the analysis are the same as those used in the 1980 base case incremental impact analysis (see Figure 16). Aircraft noise levels, by study unit, for the curfew scenario are shown in Figure 23 and the incremental impact due to those levels, over and above indigenous noise, is shown in Figure 24.

A comparison of Figures 19 and 24, the incremental contribution of aircraft noise without and with the curfew, respectively, indicates the effectiveness of this option for noise impact mitigation. Close in to the airport, in those areas just west of the main runway complex, there is a marked reduction in the level of incremental impact. Further out, both east and west of the airport, there is also a noticeable reduction in impact level and, more important, there are now many study areas which receive no incremental impact even though they were impacted without the curfew. This is perhaps most noticeable in the Camden and Gloucester City areas just east of the river. Thus, the curfew will substantially reduce the extent and severity of the noise impacts of aircraft operations at PHL.

FIGURE 20

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

1980—RIVER APPROACH

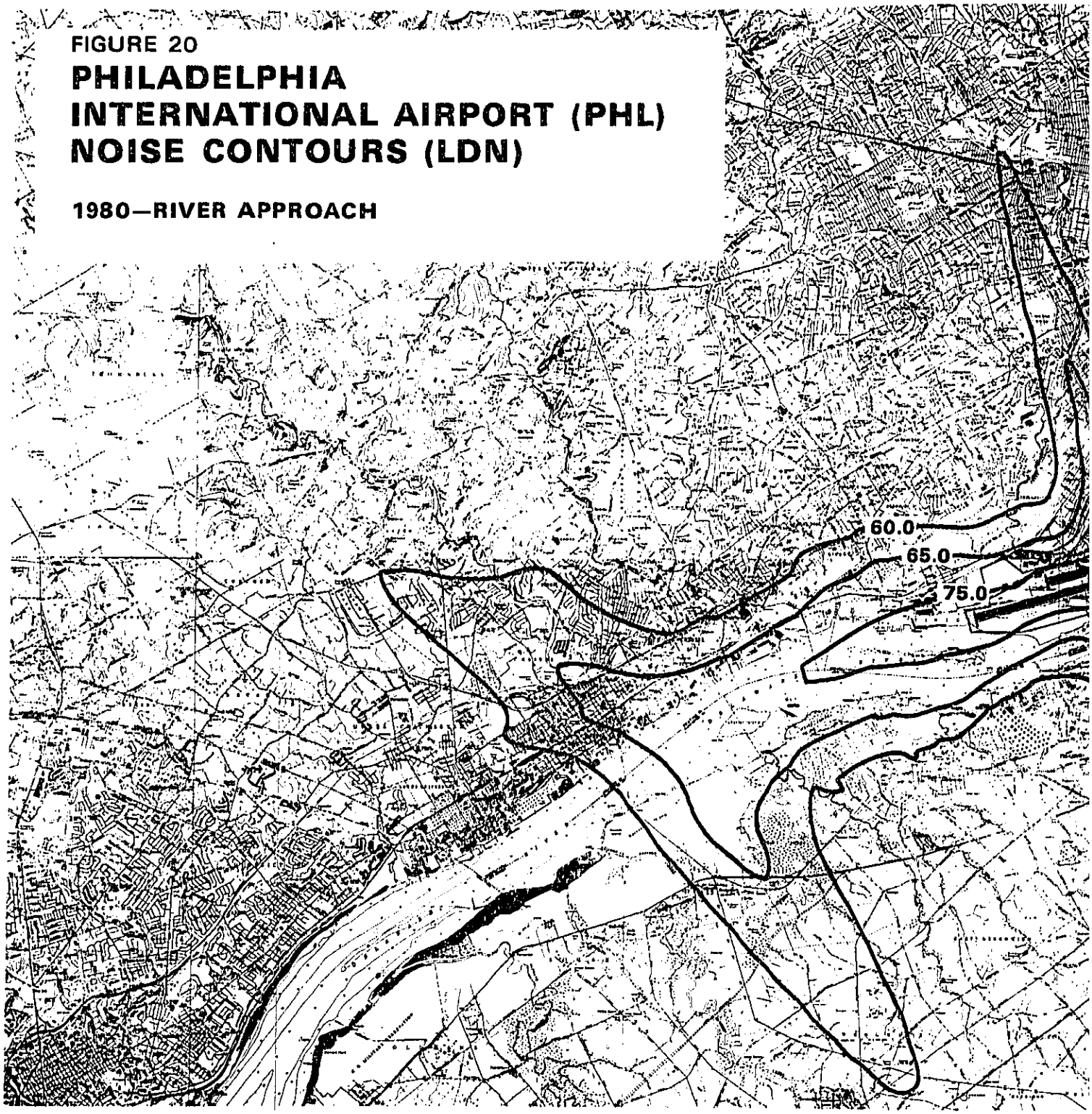


FIGURE 21

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

1980—HEAD TO HEAD NIGHT OPERATIONS

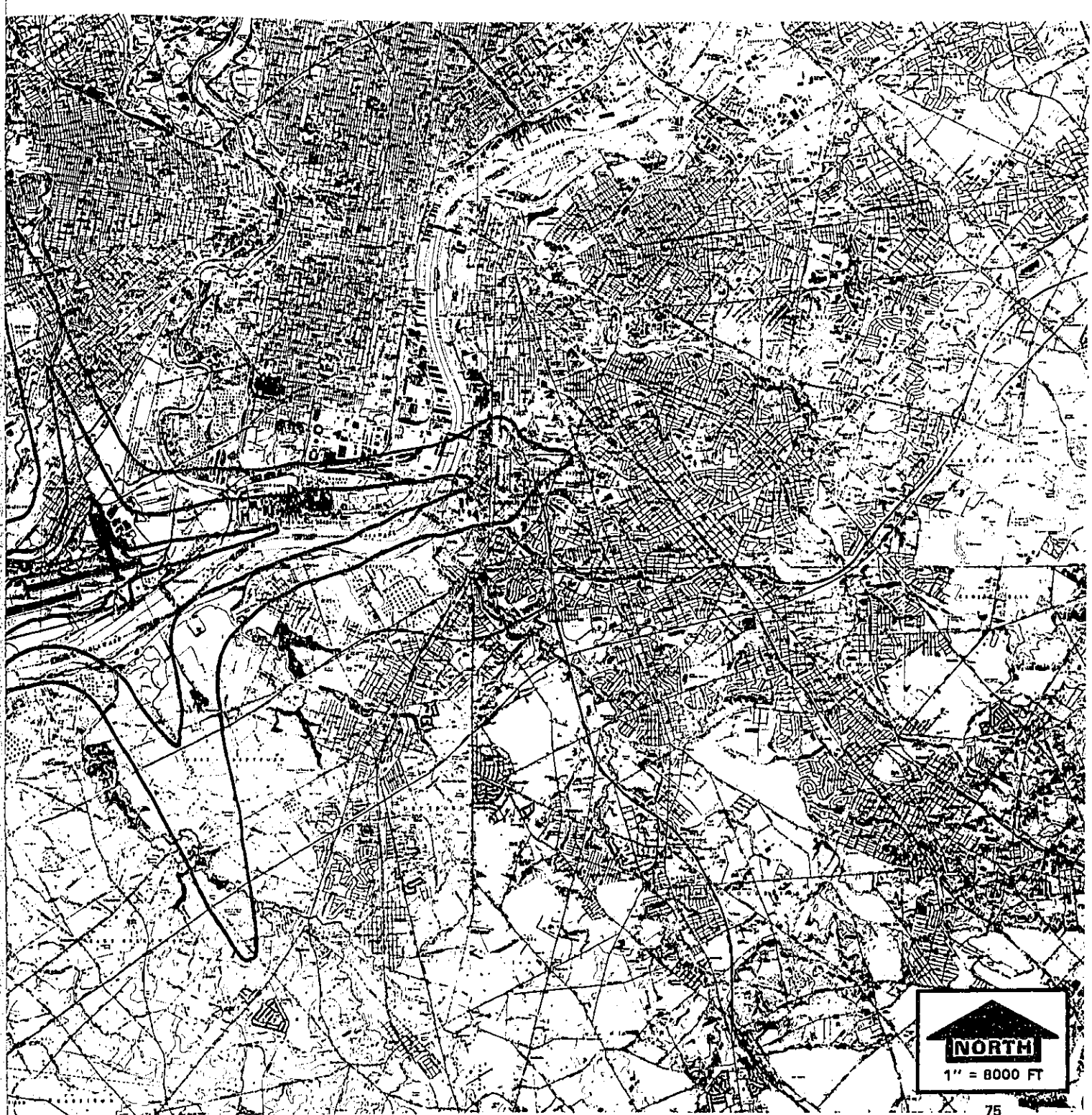
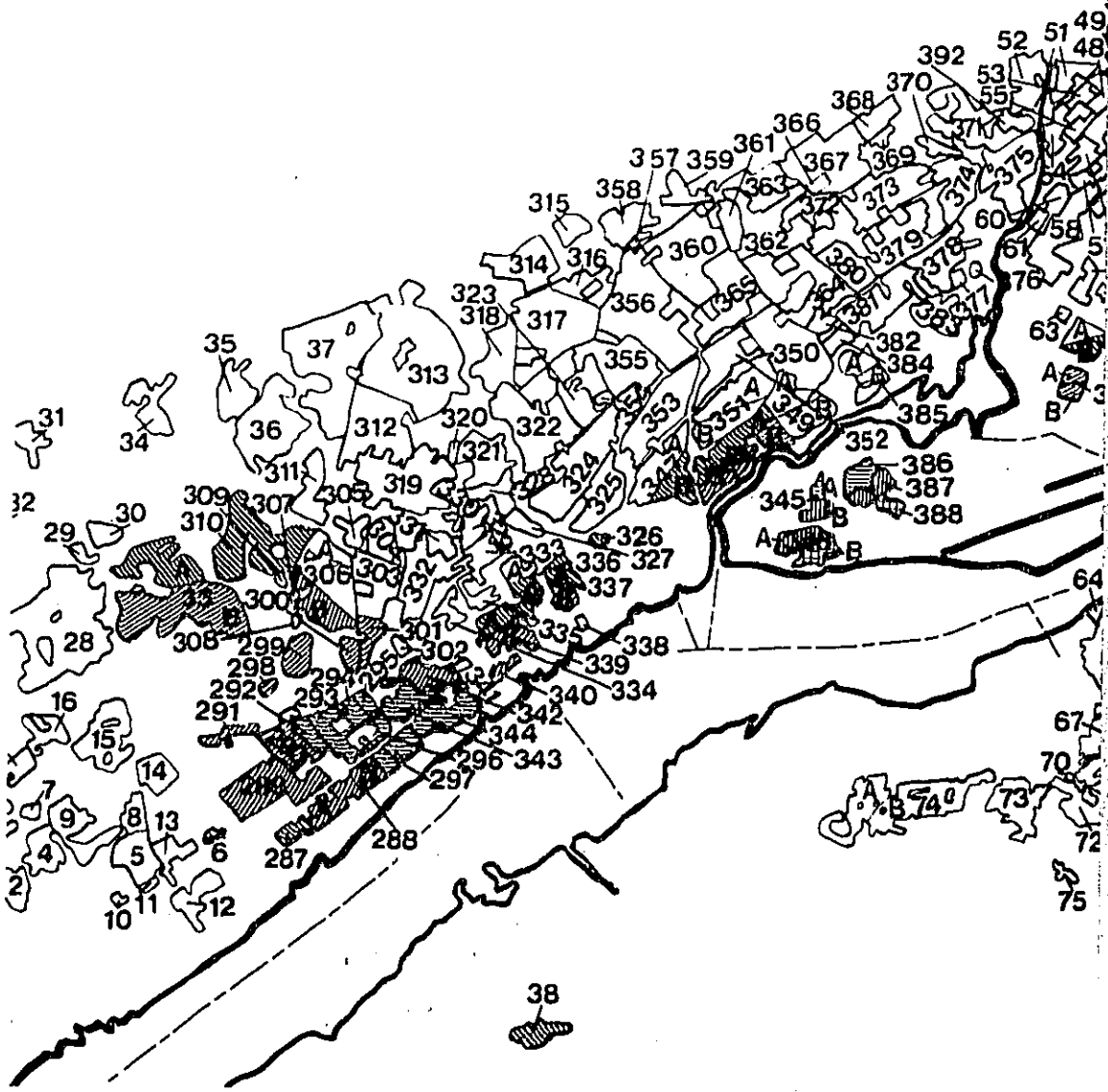


FIGURE 22

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

1980—NIGHT CURFEW (2200—0700)

FIGURE 23
PHILADELPHIA INTERNATIONAL
AIRPORT (PHL)



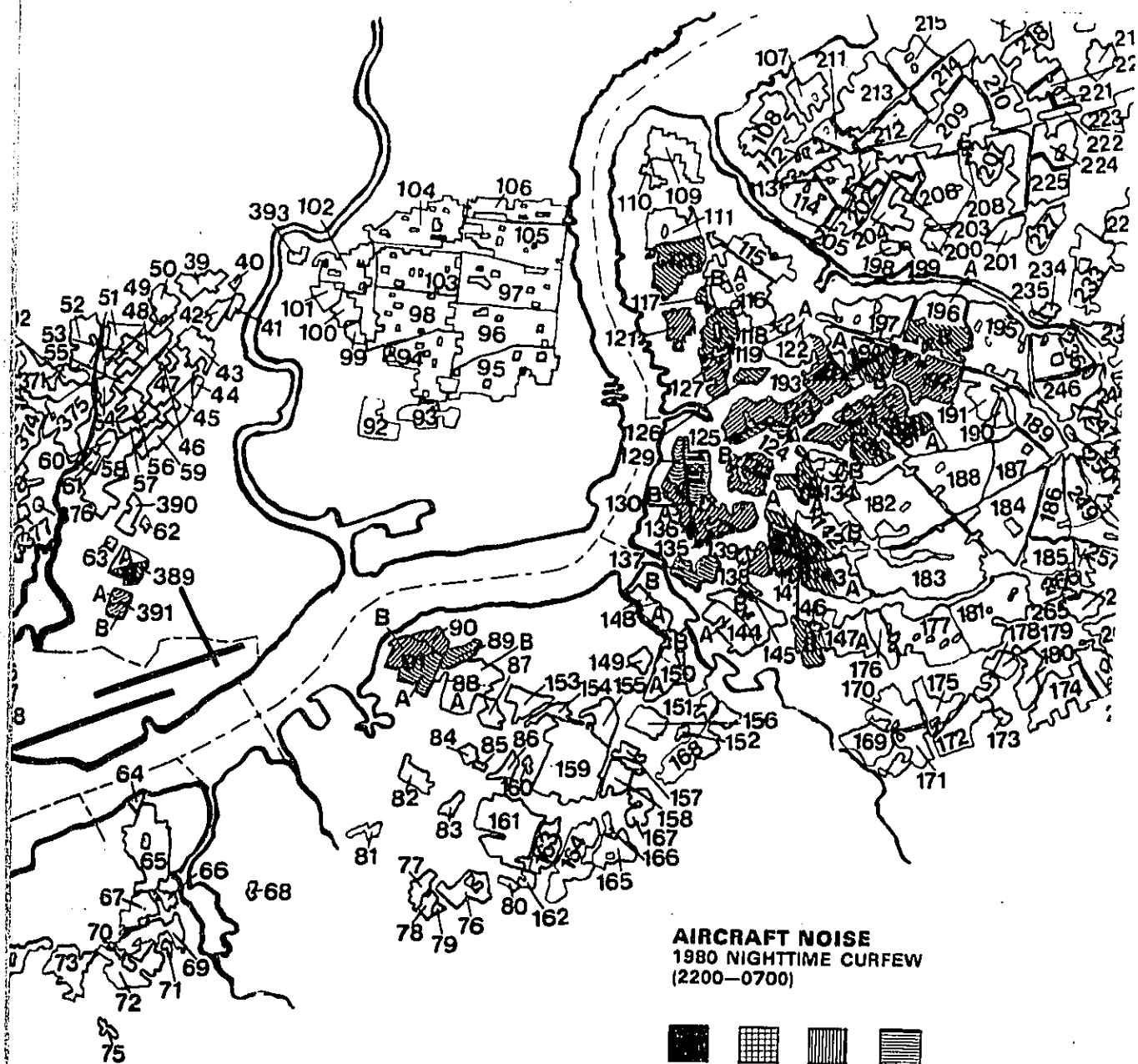
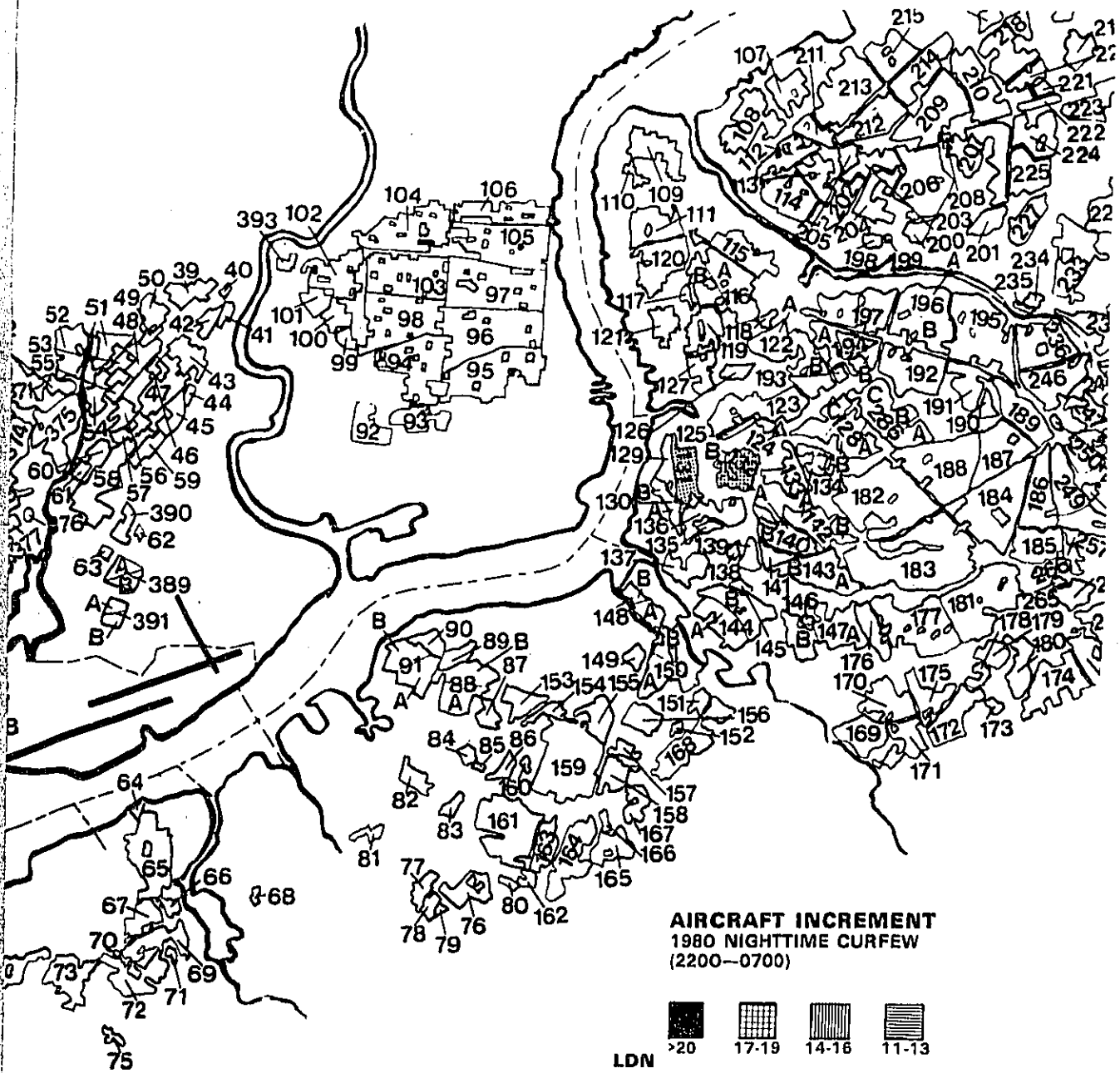


FIGURE 24

PHILADELPHIA INTERNATIONAL AIRPORT (PHL)



D. Aircraft Operation

1. Power and Flap Management - Power and flap management is a general noise abatement technique concerned with basic flight procedures and pilot techniques. The takeoff procedure described in FAA Advisory Circular 91-53 recommends takeoff power to 1,000' followed by acceleration to zero flap speed after which:

(a) The thrust for airplanes with low bypass ratio engines should be reduced to below normal climb thrust but not lower than that necessary to maintain the final takeoff engine-out climb gradient.

(b) The thrust for airplanes with high bypass ratio engines should be reduced to normal climb thrust.

The Air Transport Association (ATA) procedure calls for acceleration to zero-flap speed at 1,000' and reduction to climb power. Northwest Airlines follows a similar procedure but the power reduction is greater than for the ATA procedure. The effect on noise exposure will differ since the larger the power cutback, the less noise the airplane produces but the lower its altitude will be as it gets further from the airport. The two factors are counterproductive for reducing noise on the ground. At PHL, air carrier aircraft taking off to the west follow the center of the Delaware River until vectored on course toward their destination. Takeoffs to the east pass over Gloucester City at an average altitude of over 3,000 feet. Since the distance from the airport to Gloucester City is about 5 miles, a deep thrust cut close in would not benefit residents in New Jersey.

Power and flap management can also be utilized during landing, although, for noise abatement, turbojet-powered airplanes are already required to use the minimum certificated landing flap setting on final approach to the runway, safety permitting.

2. Raise Glide Slope Angle or Intercept - An aircraft on a 3 degree glide slope 4 miles from a runway would be approximately 184 feet higher than an aircraft on a 2 1/2 degree approach. The higher aircraft at that distance would be about 1 1/2 dB quieter directly under the approach path and less than that off to the side or closer to the runway. The glide slopes at PHL are set at 3 degrees, the maximum glide slope angle the FAA has determined to be safe for normal instrument approaches.

Although the published instrument approach procedures specify a glide slope intercept altitude of about 2,000' over the outer marker (about 6 miles from the runway), in practice the intercept altitude is much higher, normally over 3,000' and this will reduce noise levels on the ground below those which would occur with the 2,000' intercept altitude.

3. Limited Use of Reverse Thrust - Due to the distance from the airport to residential communities, this action would not materially improve the noise situation at PHL.

E. Land Use

1. Acquisition of Land or Easement - Land acquisition and purchase of noise easements are noise control methods that have been successfully used at several U.S. airports to solve "close in" noise problems. The location of Philadelphia International Airport on the Delaware River minimizes the "close in" problem for air carrier operation on the primary runways.

2. Joint Development of Airport Property - The limited acreage under the control of the airport effectively precludes development of airport land for non-airport related uses.

3. Compatible Use Zoning - Zoning for compatible use is the responsibility of the city or town zoning authority. The designation of the area adjacent to the western side of the airport as a wildlife refuge should preclude any residential use of the area. The industrial zoning near the airport minimizes the number of people subjected to severe aircraft noise.

4. Building Code Provisions and Sound Insulation - Building code provisions, as zoning, are the responsibility of local jurisdictions. In this case, building codes could insure that sites near airports would not be developed for sensitive uses, or that sites, as they are developed, would incorporate adequate sound insulation construction techniques, to keep interior noise at acceptable levels. Obtaining comparable noise reduction from sound insulation of existing structures is usually more difficult. The Aviation Safety and Noise Abatement Act of 1979 authorizes Federal grants for the soundproofing of public buildings but no such assistance is available for private buildings or residences. However, FAA objections to residential development north of the airport resulted in a Housing and Urban Development condition for that development to require soundproofing.

5. Real Property Noise Notices - Real property noise notices serve to notify prospective buyers of homes near airports that they will be living in a noise-impacted area. Again, such a requirement would be the responsibility of the local jurisdiction. While present home owners are often opposed to real property noise notices because of their potential effect on future sales of property, such notices are effective in channeling noise sensitive individuals away from high noise zones. Not all prospective home buyers are noise sensitive.

6. Purchase Assurance - This would be a guarantee from the airport proprietor that, if a homeowner is unable to sell his house, the airport will buy the property at its appraised value or pay the difference between the appraised value and the amount the owner is actually able to get on the market. Purchase assurance, in select areas, is an effective mechanism for disarming opposition to land use activities which might have some negative economic impact on present home owners.

F. Noise Program Management

1. Noise Related Landing Fees - One approach to this charge would be to levy an extra landing fee for aircraft not meeting Federal Aviation Regulation (FAR) Part 36 (Stage 2)) noise levels. However, in response to the Aviation Safety and Noise Abatement Act of 1979, all air carrier aircraft must meet Stage 2 noise levels by 1985 (except two-engine aircraft with less than 100 seats).

2. Noise Monitoring - Installation of noise monitors allows identification of those aircraft that contribute most to a community's cumulative noise exposure. Several airports in the U.S. have continuous noise monitoring. The effectiveness of a noise monitoring system depends upon what the airport proprietor does with the information. Relations with the surrounding communities tend to improve and if the airport proprietor works with the noisiest airlines or pilots, since some noise reduction can be achieved on a voluntary basis.

3. Establish Citizen Complaint Mechanism and Community Participation Program - A citizen complaint mechanism such as the telephone "hotline," especially in conjunction with a noise monitoring system, allows identification of the aircraft, getting in touch with the pilot to obtain additional information, and calling the complainant back. Such a positive response to callers should help community relations.

Airport communities provide valuable inputs to airport planning. The FAA requires that they be invited to participate in the Master Planning process so that airport development plans are coordinated with community interests. Regular meetings between the airport operator and community organizations allow for an open exchanges of ideas and concerns and keeps all parties informed.

VII. FUTURE NOISE EXPOSURE

A. 1990 and 2000 Baseline Contours

Future aircraft noise estimates form the basis for any planning program since one must jointly consider the solution of existing problems with the prevention of new ones. Thus, noise analyses were developed for the years 1990 and 2000 (recognizing that a 20-year forecast is tenuous). Tables 32 and 33 present summaries of the aircraft operational data used to describe the future noise conditions at PHL. These tables indicate 29 percent and 49 percent increases in commercial jet operations for 1990 and 2000, respectively. General aviation operations are expected to remain relatively constant in total numbers but the smaller aircraft types will tend to be phased out as the airport runway capacity is approached by air carrier operations alone.

Figures 25 and 26 present the Ldn contours associated with these operations. The elimination of those aircraft that do not meet FAR Part 36, Stage 2 noise levels and the introduction of new, quieter aircraft will shrink the contours so that the population impacted by Ldn 65 or more is reduced by 18 percent and 37 percent in 1990 and 2000, respectively, from the 1980 levels.

TABLE 32

1990 BASE AIRCRAFT DAILY OPERATIONS FOR
PHILADELPHIA INTERNATIONAL AIRPORT

Aircraft Type	Day/ Night	Arrivals	Departures by Stage Length (Nautical Miles) 0 500	500 1000	1000 1500	1500 2500	2500 3500	3500 4500	4500 +
747	D	4	1	1		1		1	
	N	1		1					
DC-10	D	21	4	7	2	6	2	1	
	N	1							
L-1011	D	22	3	6	4	5	2	2	
	N	2			1	1			
DC-8	D	1					1		
	N								
707	D								
	N								
A-300	D	14	4	6	5				
	N	3		1	1				
727-100	D	2	1	1					
	N	2	1	1					
727-200	D	33	15	15	3				
	N	5	2	2	1				
727 Advanced	D	35	9	19	8				
	N	4	1	2					
DC-9	D	36	29	7					
	N	1	1						
737-100/-200	D	3	3	1					
	N	1							
757/DC-9-80	D	54	30	20	4				
	N	4	2	2					
BizJet	D	44	23	15	5	2			
	N	4	2	1					

TABLE 33

2000 BASE AIRCRAFT DAILY OPERATIONS FOR
PHILADELPHIA INTERNATIONAL AIRPORT

Aircraft Type	Day/ Night	Arrivals	Departures by Stage Length (Nautical Miles) 0 500	500 1000	1000 1500	1500 2500	2500 3500	3500 4500	4500 +
747	D	9	1	1		2	1	3	1
	N	2		1		1			
DC-10	D	27	4	8	4	7	3	2	
	N	1							
L-1011	D	25	3	7	4	6	3	2	
	N	2			1	1			
DC-8	D								
	N								
707	D								
	N								
A-300	D	27	10	11	6				
	N	4	1	2	1				
727-100	D								
	N								
727-200	D	6	2	4	1				
	N	1							
727 Advanced	D	59	18	30	12				
	N	8	2	4	1				
DC-9	D	11	9	2					
	N	1	1						
737-100/-200	D								
	N								
757/DC-9-80	D	86	50	30	5				
	N	6	3	4					
BizJet	D	68	35	21	8	3			
	N	7	4	3	1				

B. Impact of Noise Abatement Alternatives

1. River Approach - As for 1980, noise contours were developed for 1990 and 2000 to compare the change in noise impact of air carrier aircraft following the Delaware River from Palmyra to the airport. Figures 27 and 28 show that, within the L_{dn} 65 contours, there would be about 4,100 (2 percent) fewer residents in 1990 and 7,500 (5 percent) fewer in the year 2000.

2. Night Curfew (2200-0700) - The effectiveness of this noise control option is as marked in 1990 and 2000 as it was in 1980. There would be 19,545 (63 percent) fewer persons within the L_{dn} 65 contour in 1990 (Figure 29) and 19,395 (82 percent) fewer in 2000 (Figure 30).

3. Head to Head Nighttime Operations - These cases assume that all night departures will be to the west and all night arrivals from the west. Although this option would relieve residents of the Gloucester City/Haddonfield area, at the expense of people west of the airport, the total population within the noise contours would not change appreciably (Figures 31 and 32).

4. Extended Crosswind Runway - Consideration is being given to lengthening runway 17-35 for use by air carrier aircraft when the crosswind component on the parallel runways exceeds 15 knots (estimated to be 5.7 percent of the time). Although not a noise abatement option, the impact of extending runway 17-35 to 7000' has been assessed. About 15,000 (40 percent) more people would be within the Ldn 65 contour in 1990 (Figure 33) than in the 1990 baseline case, and 24,687 or 105 percent more people in the Ldn 65 contour in the year 2000 (Figure 34).

5. Extended Crosswind Runway With Additional Two- and Three-Engine Air Carrier Aircraft Landing on Runway 35 - This option would maximize the number of landings on runway 35 if it were extended to 7000'. In addition to the use of runway 17-35 by air carrier aircraft as a crosswind runway, all two- and three-engine aircraft approaching from the south that would normally land on runway 27R would be directed to use runway 35. Although this option would place more traffic over the sparsely populated area of New Jersey under the approach path to runway 35, it would not materially change the population impacted by aircraft noise when compared with the case of air carrier aircraft using the extended runway strictly for severe crosswind conditions. The Ldn 65 contours for this option would encompass about 51,000 people in 1990 (Figure 35) and 49,000 in the year 2000 (Figure 36). This is less than a 2 percent change from the previous case.

FIGURE 25

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

1990—BASELINE CASE

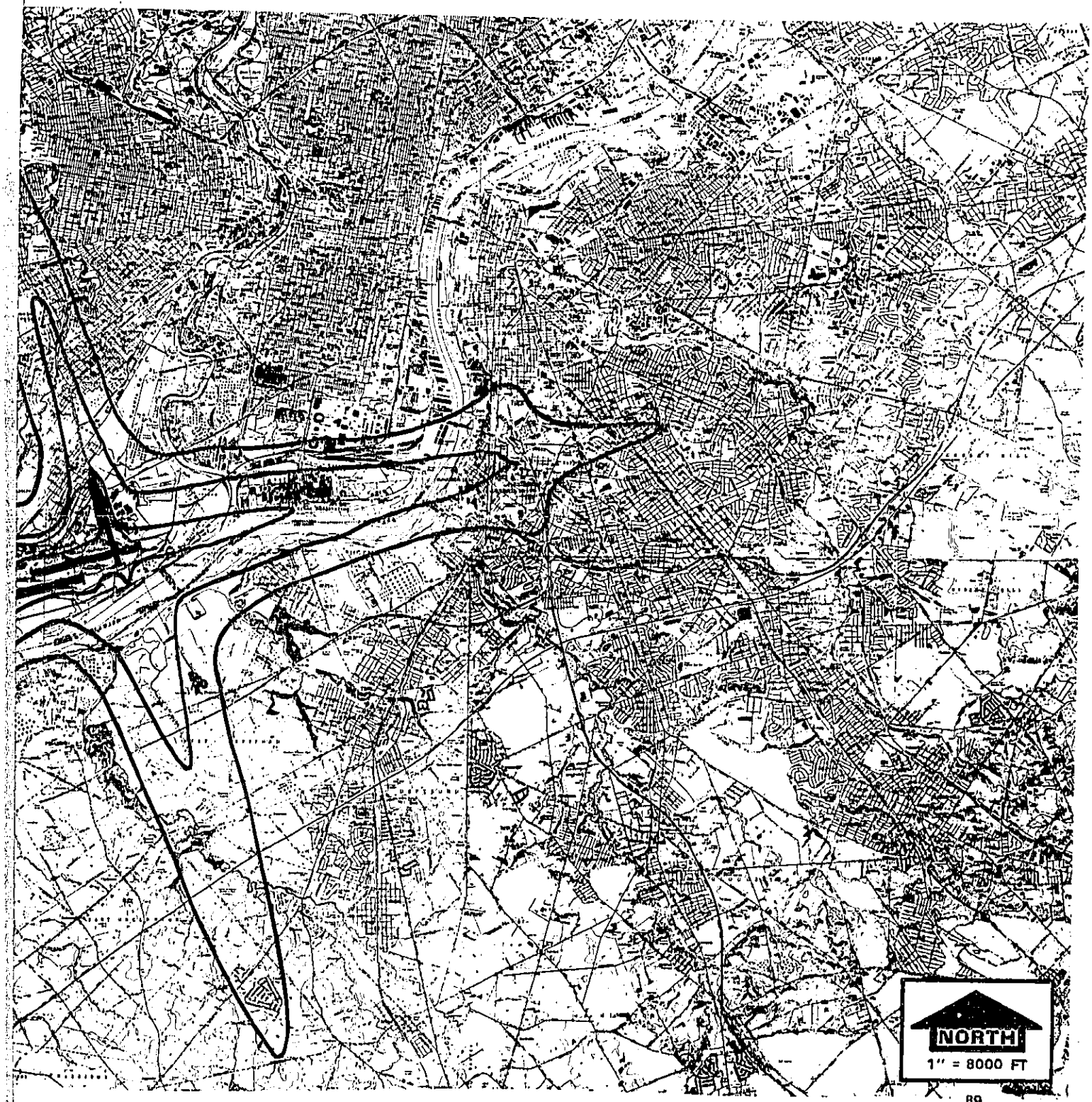


FIGURE 26

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

2000—BASELINE CASE

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FIGURE 27

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

1990—RIVER APPROACH

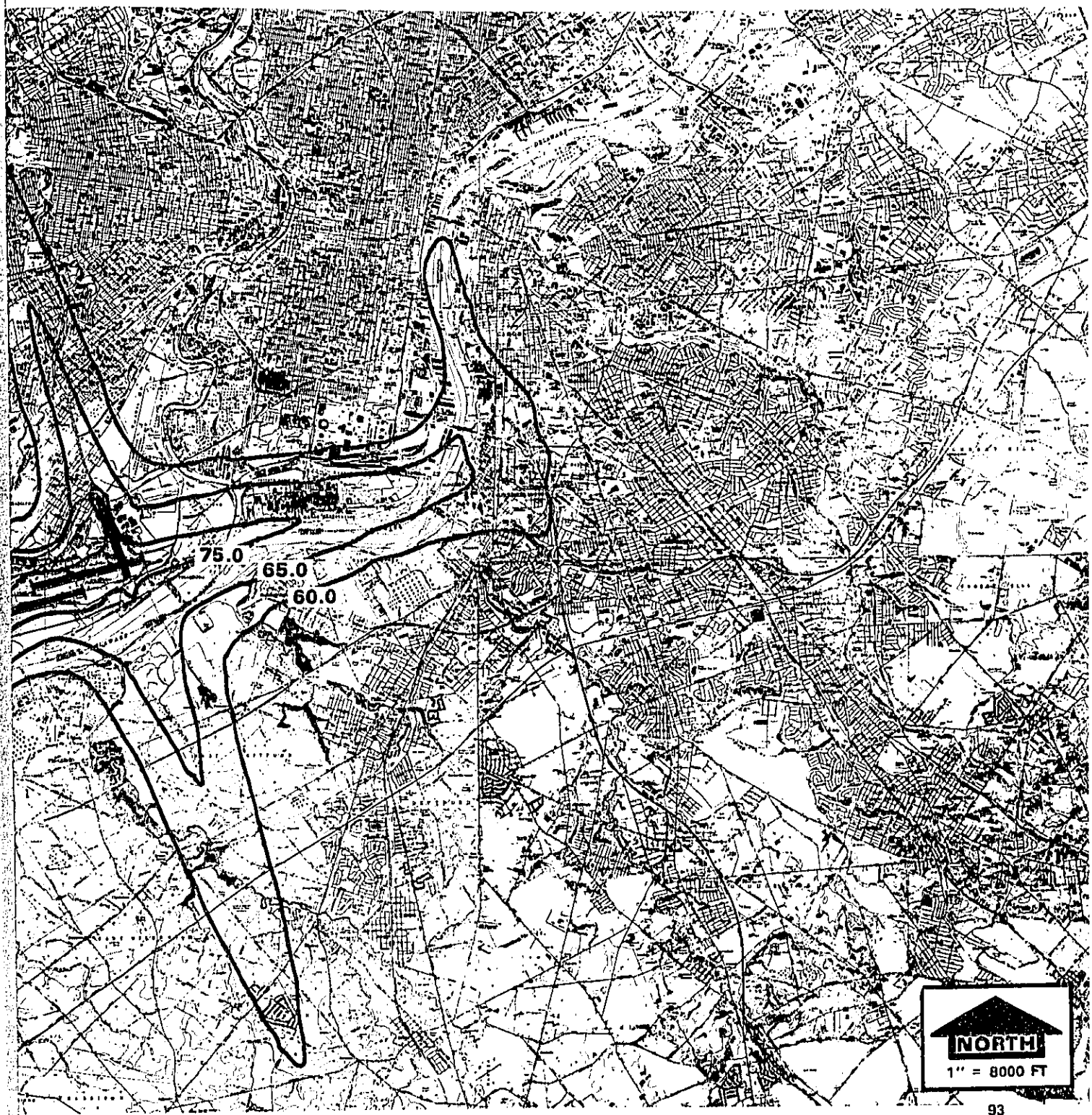

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FIGURE 28

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

2000—RIVER APPROACH

FIGURE 29

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

1990—NIGHT CURFEW (2200—0700)

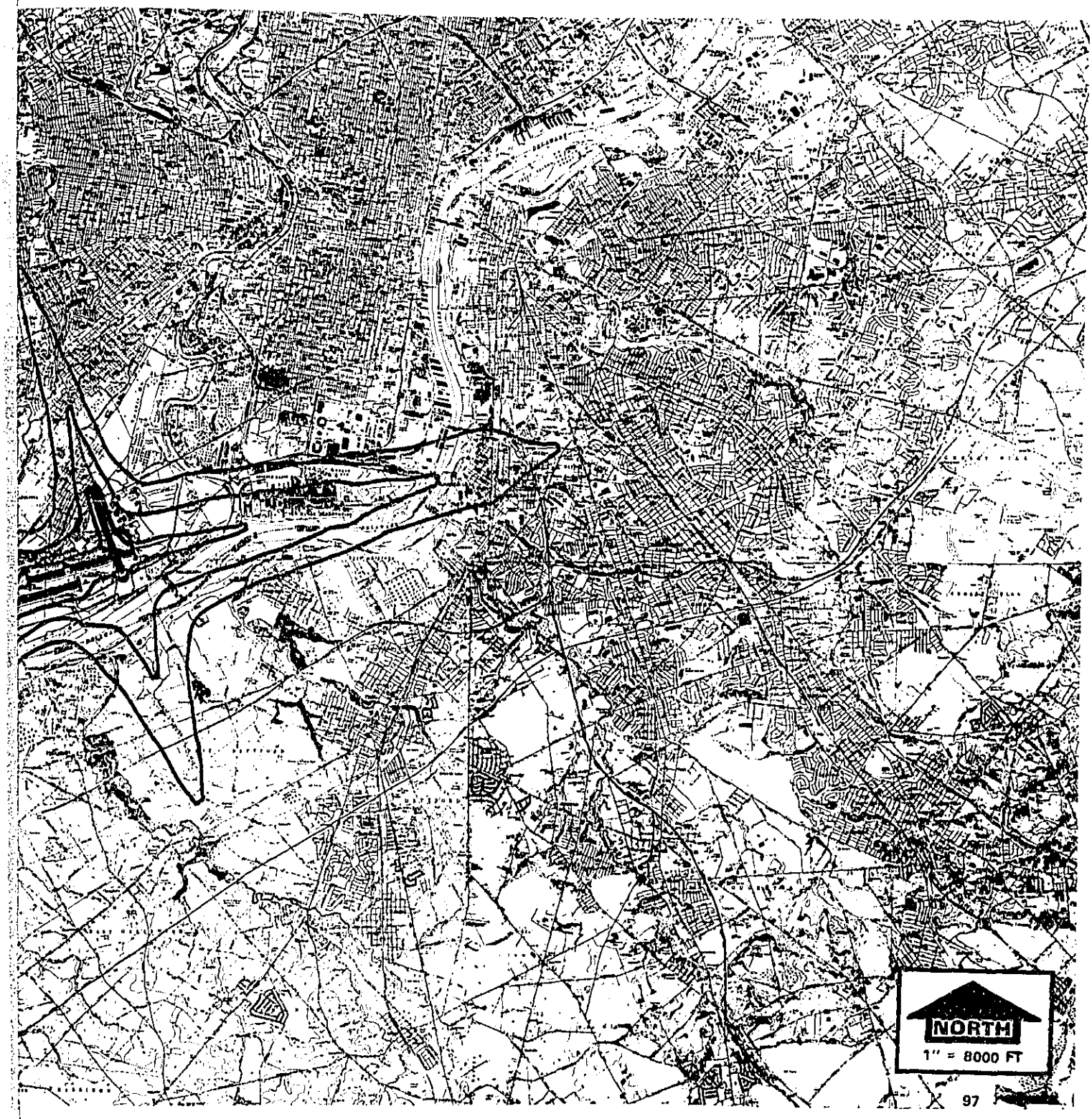


FIGURE 30

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

2000—NIGHT CURFEW (2200—0700)

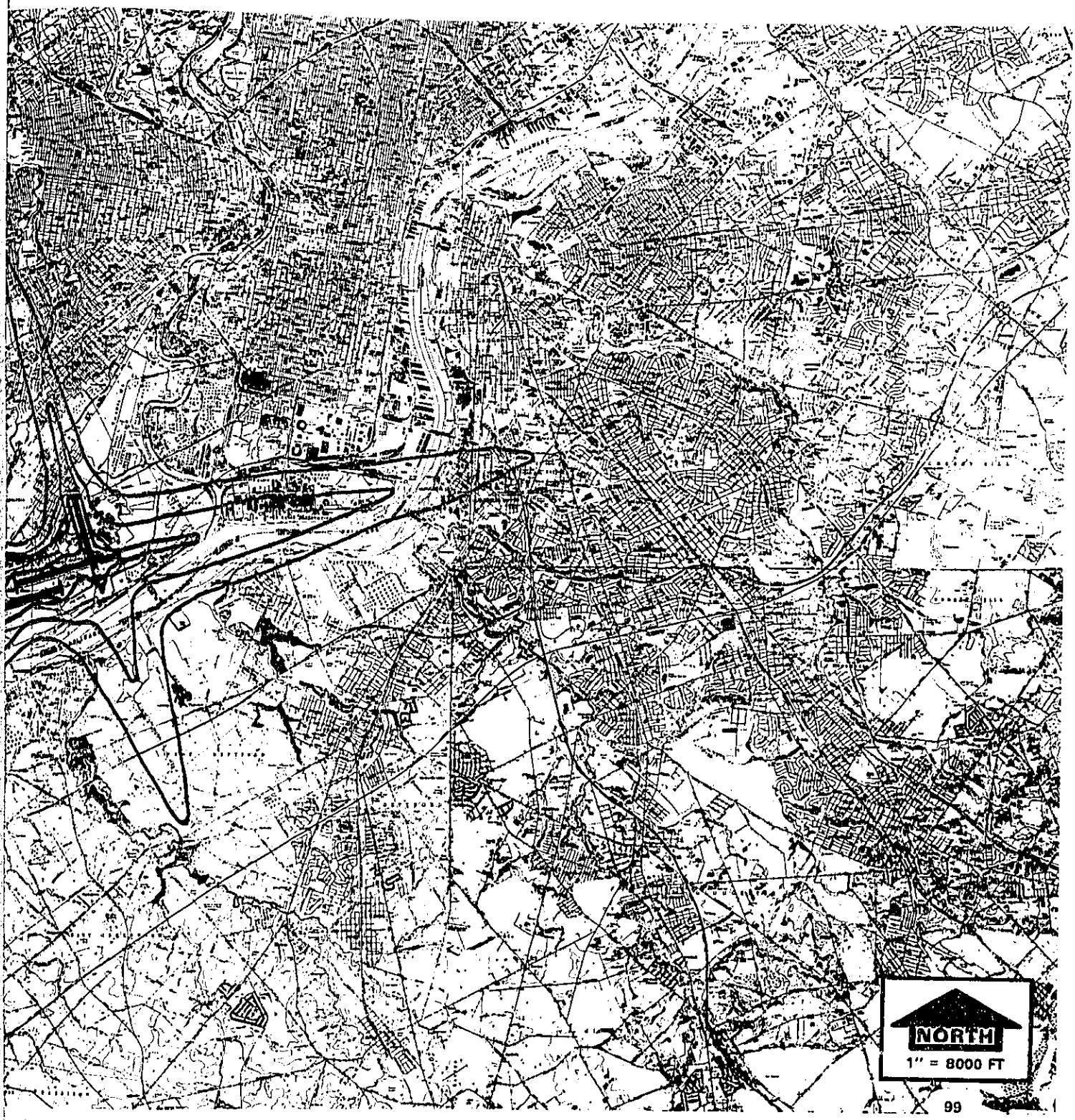
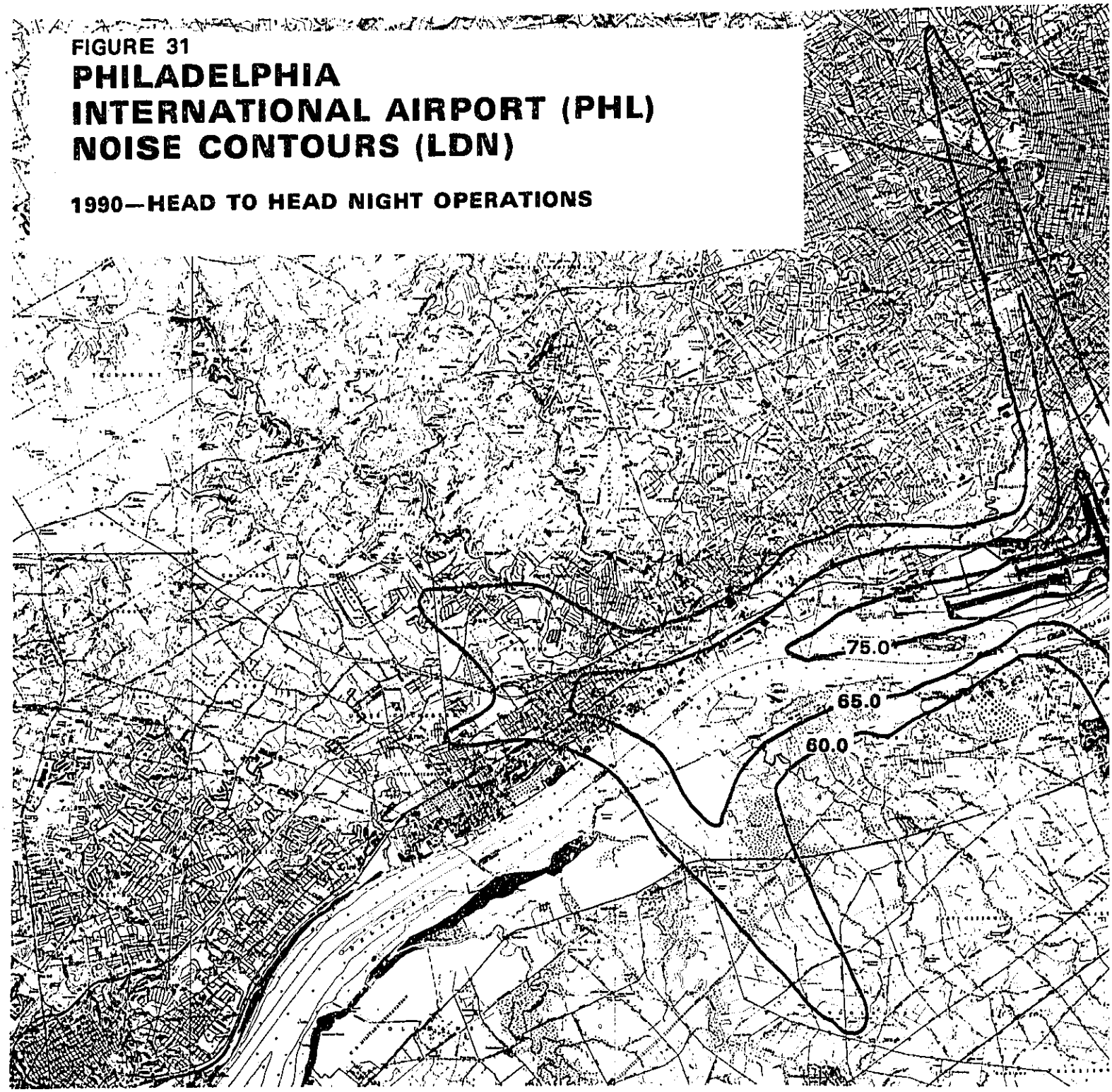


FIGURE 31

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

1990—HEAD TO HEAD NIGHT OPERATIONS



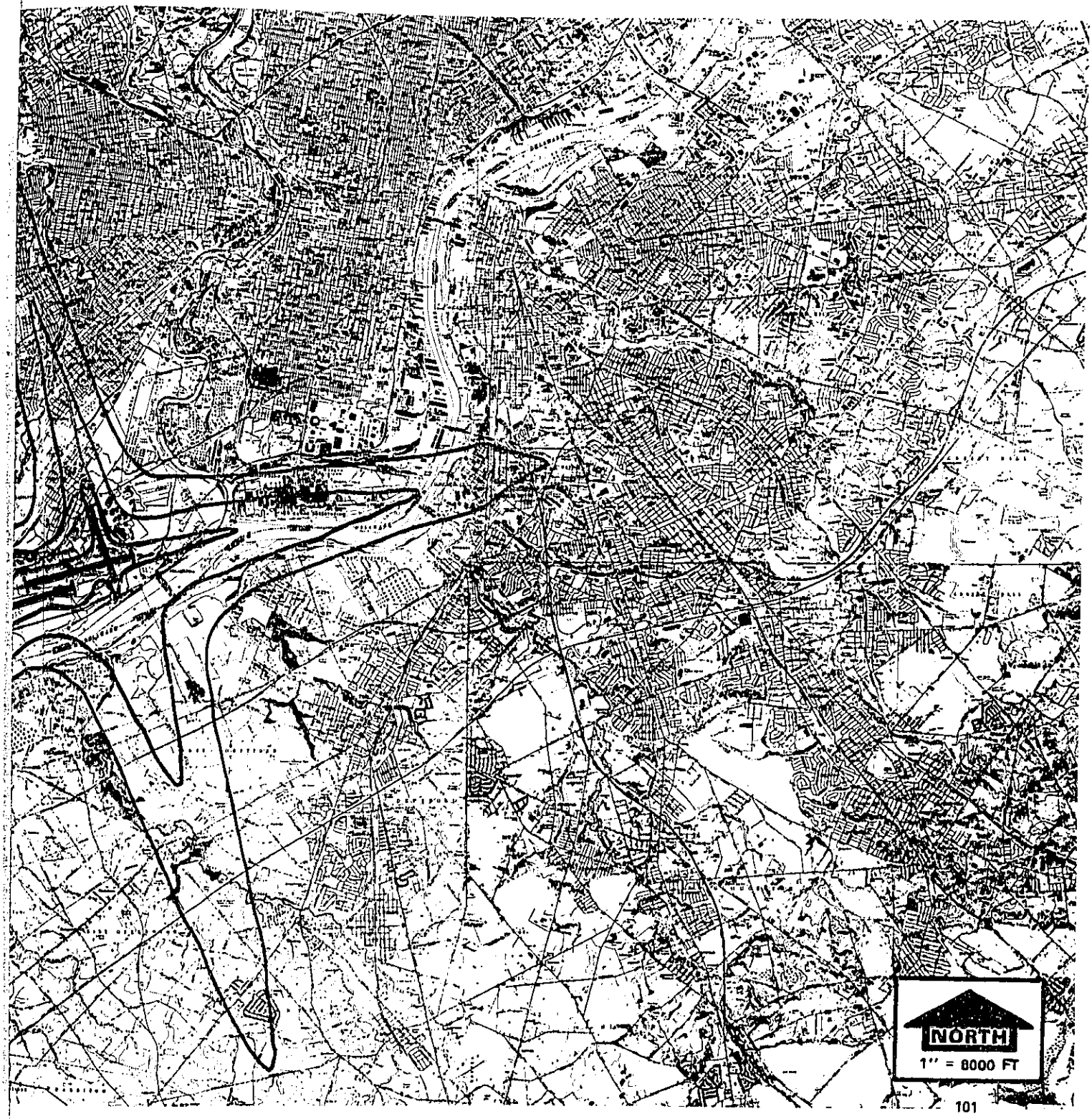


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FIGURE 32

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

2000—HEAD TO HEAD NIGHT OPERATIONS

FIGURE 33

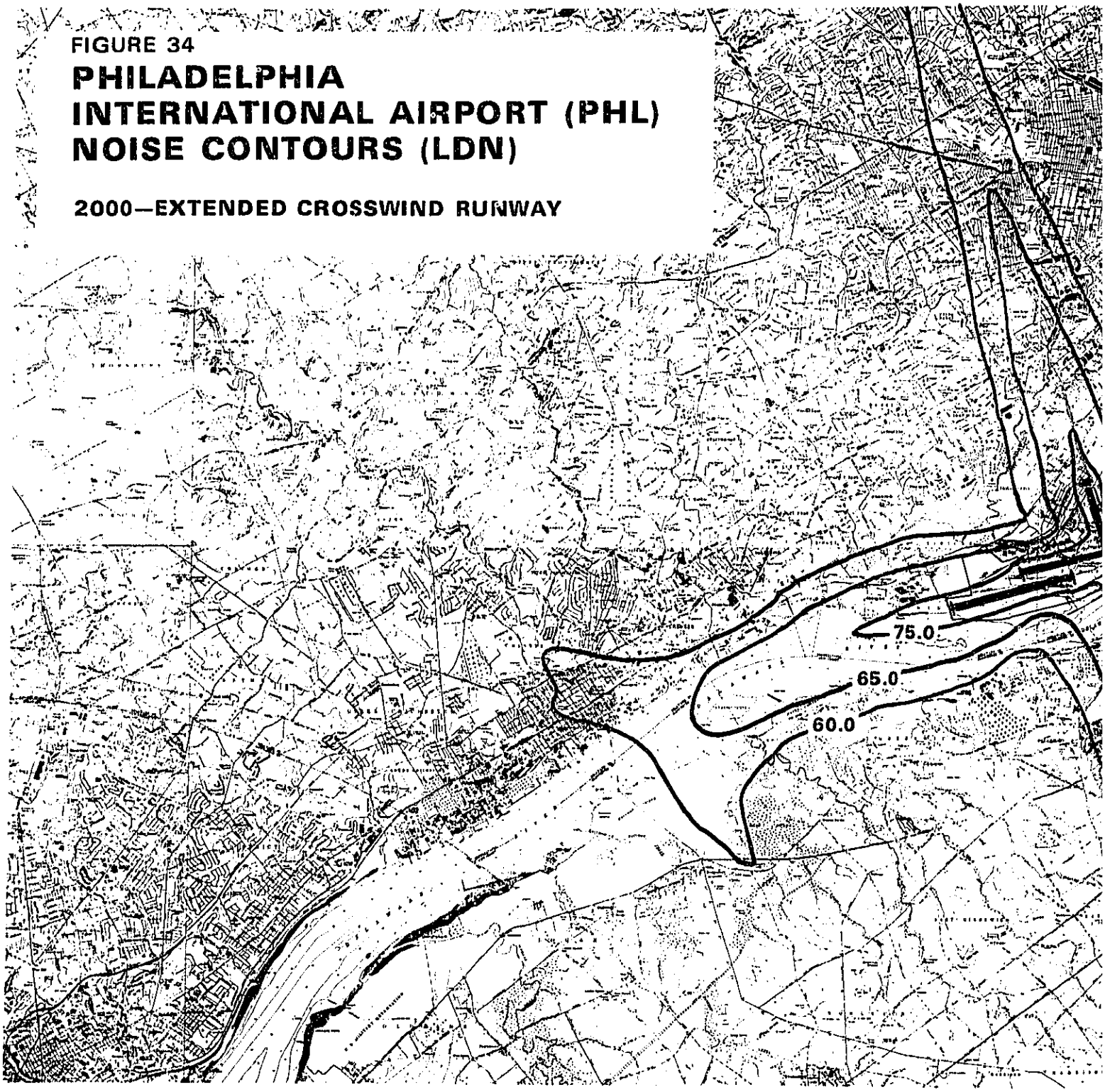
PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

1990—EXTENDED CROSSWIND RUNWAY

FIGURE 34

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

2000—EXTENDED CROSSWIND RUNWAY



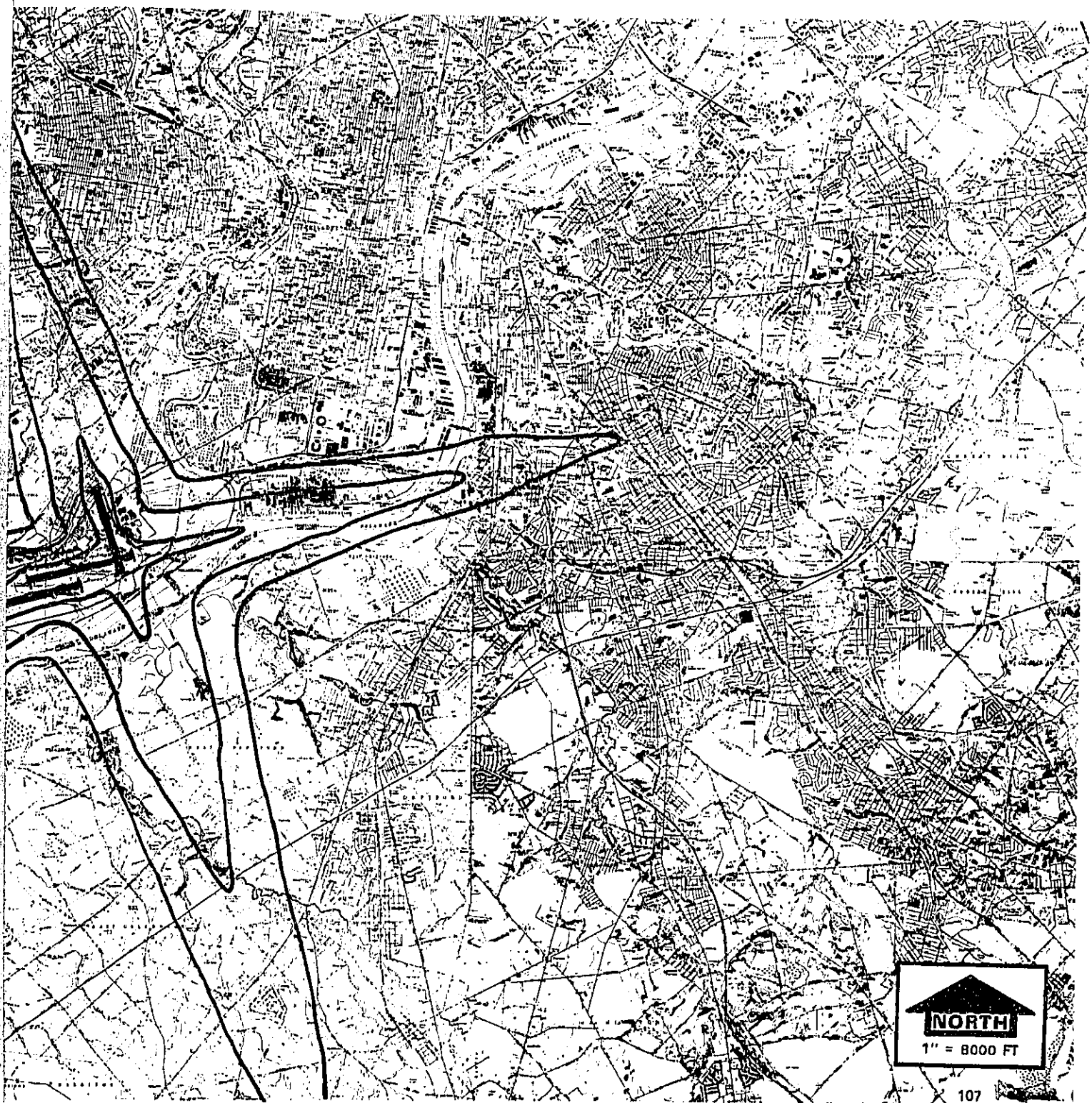


FIGURE 35

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

1990—EXTENDED CROSSWIND RUNWAY, TWO AND THREE ENGINE AIR CARRIER AIRCRAFT LAND ON RUNWAY 35

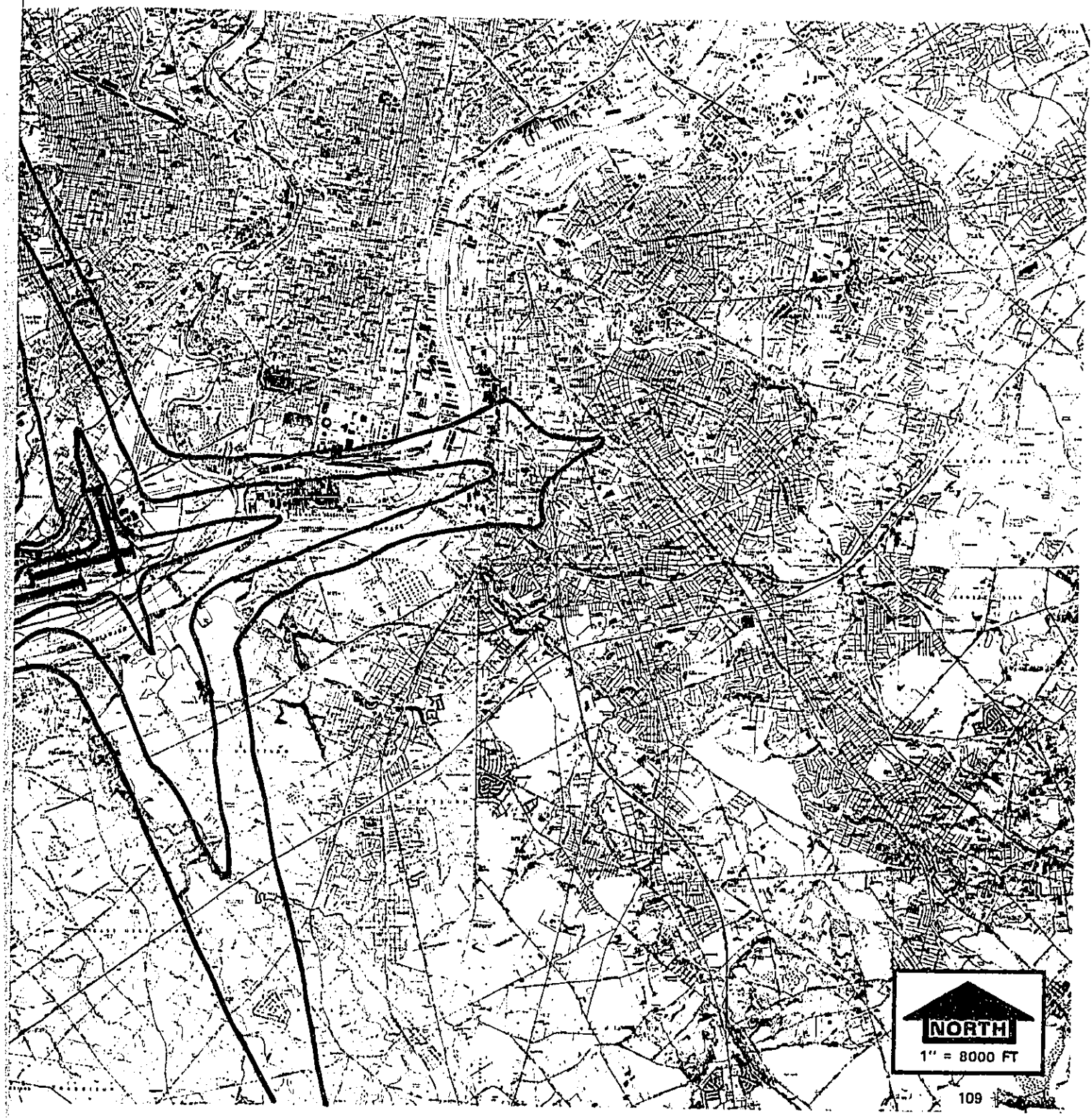
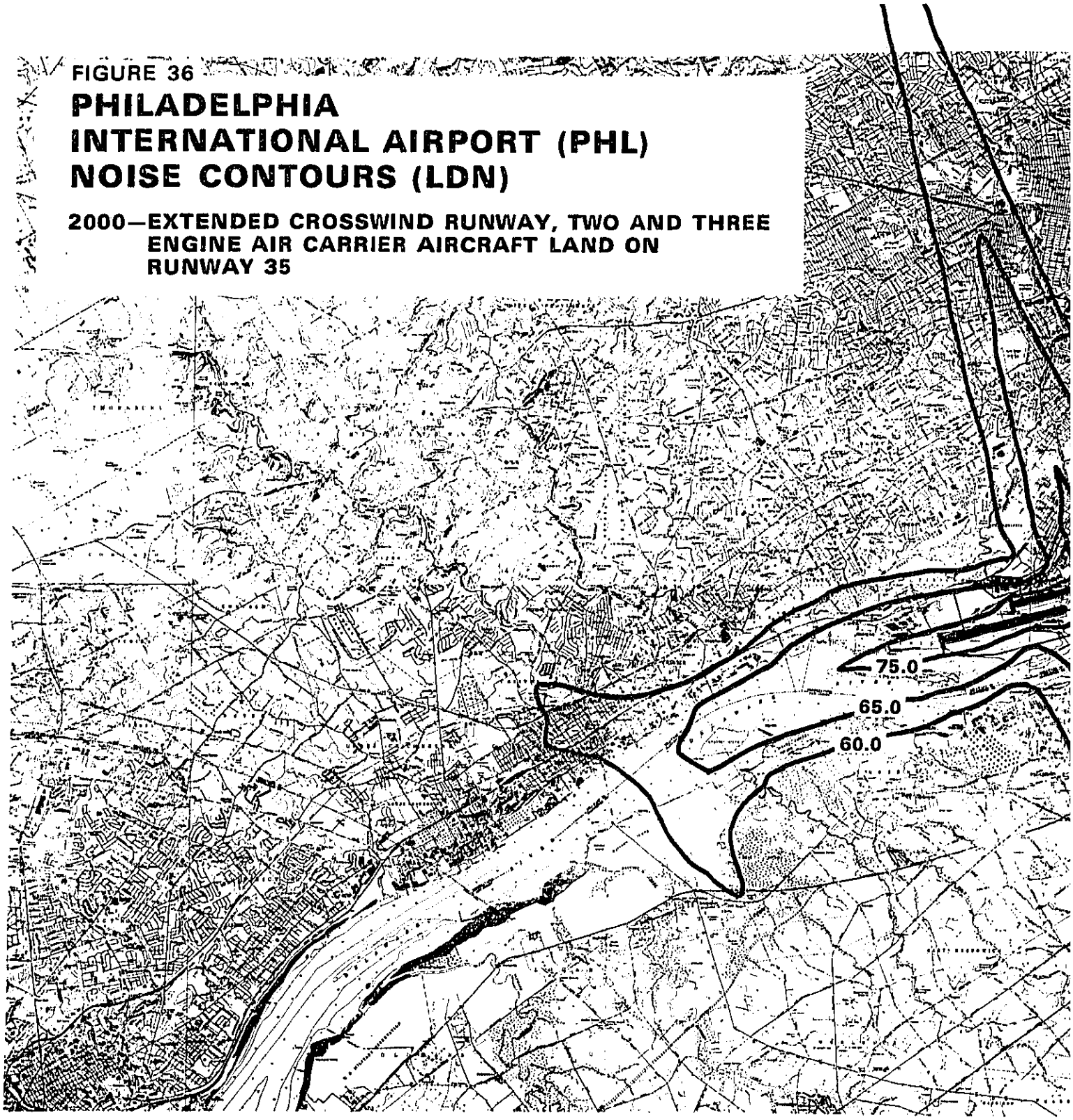
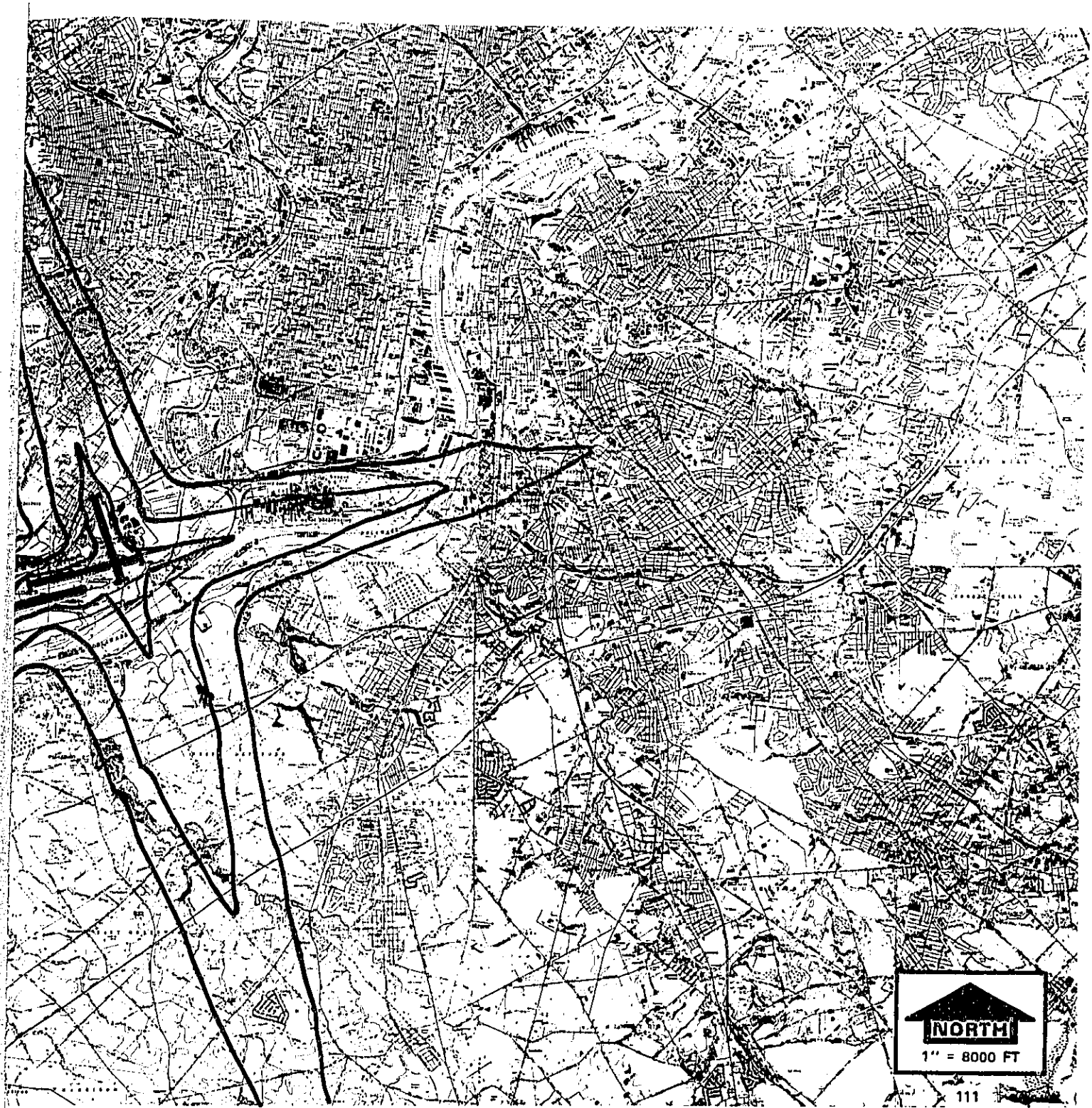


FIGURE 36

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) NOISE CONTOURS (LDN)

2000—EXTENDED CROSSWIND RUNWAY, TWO AND THREE ENGINE AIR CARRIER AIRCRAFT LAND ON RUNWAY 35





VIII. FINDINGS

The results of the EPA/FAA analysis of the five major scenarios, i.e., (1) baseline, (2) river approach, (3) head-to-head nighttime operations, (4) nighttime curfew, and (5) additional use of runway 17-35, for Philadelphia International Airport are illustrated in Table 34 which lists population impacted for each Ldn level, scenario, and analysis year. The data presented in this table clearly show that a night curfew coupled with a highly tailored preferential runway system would provide the best noise control mode for operation of the facility. While the analysis only considered a full curfew from 2200 to 0700 hours, a flight by flight investigation should be undertaken prior to the imposition of operational restrictions. This analysis should be done in conjunction with the preferential runway use system development, e.g., head to head operation and/or air carrier landings on runway 35, if that runway is extended. The combination of specific operational restrictions and preferential runway uses can then be "fine-tuned" to minimize both the noise impacts and the potential disruptions to the airport's normal operating mode. Prior to imposition of any operational restriction, a detailed analysis of the resultant economic impacts, as well as any effects on international and interstate commerce, must be accomplished. It should be noted that the current airline fuel situation may make restrictions on numbers of operations for noise control more palatable to the carriers. The scope of this analysis precluded the requisite flight by flight analysis for actual curfew design. However, this analysis has laid the groundwork for such a program.

All of the descriptive material pertaining to the full range of noise abatement alternatives listed in Table 31, along with the scenarios submitted to detailed analysis, were given to the Advisory Committee for their review. Additionally, the committee was asked to rank all of the possible alternatives. This ranking exercise was accomplished in a two step procedure.

- A noise abatement strategy fact sheet and evaluation matrix was prepared by the Delaware Valley Regional Planning Commission staff and submitted to the committee members.

- At its final meeting, the Advisory Committee came to a general agreement on ranking each of 17 specific alternatives as being of high priority for further study and implementation, low priority for further study and implementation, or not recommended. The committee's recommendations were not unanimous and minority positions on several of the alternatives were submitted at a later date. Unless otherwise specified, the Federal Government takes no position on the findings of the Advisory Committee or on the minority reports.

The Advisory Committee ranking of alternatives is as follows:

High Priority

- Sound Insulation of Buildings
- Noise Monitoring
- 9R-27L Departures and Arrivals at Night (Preferential Runway Use)
- Preferential Runway Use in General
- Power and Flap Management
- Real Property Noise Notices
- Land Use Controls

TABLE 34

NOISE ABATEMENT SUMMARY

Case	Ldn Contour	Population Impacted
1980 Base	60	188,133
	65	37,574
1990 Forecast	60	179,185
	65	30,795
2000 Forecast	60	149,783
	65	23,619
1980 River Approach	60	187,237
	65	37,574
1990 River Approach	60	175,079
	65	30,795
2000 River Approach	60	142,206
	65	21,979
1980 Head to Head	60	172,446
	65	36,260
1990 Head to Head	60	172,887
	65	31,035
2000 Head to Head	60	161,207
	65	26,751
1980 Night Curfew	60	82,270
	65	11,250
1990 Night Curfew	60	62,071
	65	5,507
2000 Night Curfew	60	47,675
	65	4,224
1990 Crosswind Runway	60	215,261
	65	52,627
2000 Crosswind Runway	60	183,241
	65	48,306
1990 Max. # of Landings on Runway 35	60	214,569
	65	50,907
2000 Max. # of Landings on Runway 35	60	161,791
	65	49,192

Low Priority

- River Approach
- Two- and Three-Engine Air Carrier Aircraft Approaching from the South Will Land on Runway 35 (applicable if runway is lengthened)
- Distributing Noise Impacts Around Airport
- Specific Curfew (less than the full curfew analyzed)

Not Recommended

- Full Night Curfew
- Displaced Threshold
- Raise Glide Slope
- Head-to-Head Nighttime Operations
- Lengthen Runway 17-35

The committee eliminated any consideration of noise related landing fees based upon recently enacted legislation which established a compliance schedule for all air carrier aircraft to satisfy Federal aircraft noise standards.

The deliberations and conclusions of the Advisory Committee indicate that--in general--they favor a fine-tuning approach to noise reduction coupled with a broad based array of ground side activities to ensure no further encroachment upon the hopefully noise optimized airport. Perhaps one reason that the committee did not favor any complex aviation option is the common realization that the airport is already doing much of what can be done, considering the nature of the problem and the available courses of action. For example, of the seven high priority items, two are related to preferential runway use, one is a refinement of operating procedures, and the remainder relate to land-use activities and continuing citizen involvement. The four lower priority items all represent more complex operational changes and the five options not recommended by the committee represent even more complex aviation operational issues.

The rankings of the committee were based upon majority votes of the members present at the end of a marathon eight-hour meeting and, as such, may not represent the perspective of the entire committee. In fact, several members felt strongly enough about the issues to submit "minority reports."

The representative of the New Jersey Department of Environmental Quality disagreed with the high priority placed on sound insulation and felt that source noise control should have received much greater emphasis. The EPA/FAA study team is in general agreement with this view of the importance of source noise control. However, recent legislation has established noise levels and compliance dates for all certificated air carrier aircraft and it is unrealistic to expect additional legislative action.

A second minority report was received from the representative of Eastwick, which is the area just north of the airport. The Eastwick report disagreed with the overall committee findings on several specific issues. First, they would prefer that any additional use of runway 17-35 not be recommended. Second, they disagreed with the committee's opinion that raising the glide slope not be investigated. Third, they strongly disagreed with the high priority given to real property noise notices feeling that such an action might depress real estate values in areas close to the airport. Finally, the Eastwick delegation disagreed with the low priority ranking given to the specific or limited night curfew.

A letter from the Air Transport Association of America questioned the benefit of any type of noise distribution or the river approach and noted that "A third item, limited curfew, still cannot be accepted in any way by the air carriers or, we believe, by the passengers and shippers who depend on Philadelphia International Airport."

Congressman Robert W. Edgar (7th District, Pennsylvania) and the Commissioners of Tinicum Township commented on the limited curfew in the following manner. "It is the opinion of both myself and my constituents from Tinicum that a limited curfew should be included in the high priority category. In addition to being one of the more effective abatement strategies, it would cause little or no economic disruption." In a separate communication the Tinicum Township Planning Board called for a detailed economic study of the curfew question along with Congressional approval of Airport-Airway-Trust-Fund monies to finance sound insulation of buildings in Ldn 75 areas. Later communicaton from the Commissioners of Tinicum Township expanded on the earlier comments and called for lengthening and greater use of Runway 35 for jet approaches from the south, noise distribution and adherence to voluntary preferential runway use plans developed in the 1960's and 1970's.

A group of twelve individuals from several New Jersey communities submitted a revised ranking of strategies which they felt would be in the best interests of the affected southern New Jersey areas; the revised list is reproduced below.

"HIGH PRIORITY

- Limited Curfew*
- Noise Distribution
- Modified River Approach
- Use of Runway 35 for Jets Approaching from the South (south river approach; lengthening of runway may be necessary)
- Preferential Runway Use

*Provided that the limited curfew is combined with one or more alternate strategies of noise abatement or noise distribution.

LOW PRIORITY

- o Sound Insulation of Buildings
- o Noise Monitoring
- o Night Operations on 9-R, 27-L on River Side
- o Power and Flap Management
- o Real Property Noise Notices
- o Land Use Controls

Any other strategies are not recommended."

The Delaware County Planning Department submitted comments on several noise abatement options as well as calling for further analysis of the limited curfew noting that "Although the limited curfew was only judged a low priority by the committee, we suspect that it may have ranked higher had more contours for the condition been developed. We feel that the case was made for a further analysis of this procedure and urge that this be given a high priority for further study."

Simple abstracting of the minority reports and study comments, as included in the preceeding discussion, cannot do justice to the efforts of many members of the Advisory Committee. So that a permanent record of those substantial efforts be made a part of this study, all of the Advisory Committee communications pertaining to minority reports and study comments are included herein as Appendix E.

The activities of the Advisory Committee, both in its majority findings and the efforts of individual members to develop minority reports, speaks most highly of the involvement of these individuals and the organizations which they represent. Based upon the Advisory Committee findings, including minority reports, and the analyses developed by the EPA/FAA study team, it appears that the most effective noise control option for Philadelphia International Airport is a reduction in nighttime operations in combination with a preferential runway use program to keep the remaining nighttime flights away from populated areas. Before any such use restrictions should be considered, however, a more detailed study should be made to account for all economic factors which could be affected by those restrictions. These activities should be augmented, in parallel, with a program of land use controls, perhaps including sound insulation, noise monitoring, and real property notices.

The EPA/FAA study team strongly recommends that the activities of the Advisory Committee be continued to advance the development of both an airport noise abatement plan and local land use activities. Both agencies would be pleased to provide technical assistance in the translation of the study into actual noise impact mitigation measures suitable for implementation at Philadelphia International Airport and in the surrounding environs.

APPENDICES

A. PARTICIPATION - PHILADELPHIA INTERNATIONAL AIRPORT NOISE STUDY ADVISORY COMMITTEE

B. DELAWARE VALLEY REGIONAL PLANNING COMMISSION NEWSLETTERS

C. AIRPORT NOISE COMPLAINT CENTER FORM

D. COMMUNITY OPINION SURVEY QUESTIONNAIRE

E. ADVISORY COMMITTEE COMMUNICATION

APPENDIX A

PARTICIPATION

PHILADELPHIA INTERNATIONAL AIRPORT

NOISE STUDY ADVISORY COMMITTEE

Achitoff, Louis	FAA Eastern Region, N.Y.
Ackroyd, Eileen	Citizen
Aitken, Sherrie	CSR, Incorporated
Anderson, Diann	Citizen
Anderson, Patrick	EPA, Region III, Philadelphia
Barrett, Barbara	CSR, Incorporated
Barrett, Carol	Sierra Club
Bay, John	Staff of Congressman Edgar
Billera, Domenick	New Jersey Department of Transportation
Billingsley, Judy	Citizen
Binder, Lois	Delaware County Planning Department
Borak, Barbara	Camden Courier Post
Borden, Ernest	Citizen
Burkins, Frederick	Air Traffic Controller
Callahan, Joseph	Air Traffic Controller (Retired)
Coscia, John	Delaware Valley Regional Planning Commission
Curci, Joseph	Penrose Park Residents Association
Currie, Richard	Eastwick Project Area Committee
Cutler, Maury	Citizen
Dahms, Siegfried	Pilot
DiPolvere, Edward	New Jersey Department of Transportation

Dommermuth, Rita	Delaware Valley Regional Planning Commission
Elliott, Charles	Citizen
Evangelista, Albert	Penrose Park Resident Association
Farley, Barbara	Eastwick Project Area Committee
Glezerman, David	Camden Courier Post
Green, William	Philadelphia Air Management Services
Hargens, C. William	Franklin Institute
Hargens, Mary	Citizen
Hauser, Frank	West Deptford Township Planning Board
Hubbell, Richard	Delaware Valley Regional Planning Commission
Jacobs, Susan	Citizen
Kaiser, John	New Jersey Department of Transportation
Korzeniowski, Bohdan	Philadelphia International Airport
Levine, Leon	Delaware County Planning Department
Lisicky, Anton	Cherry Hill Planning Board
Madrack, Bernard	Staff of Congressman Florio
Martin, Frederick	City of Camden
McMullen, James	Councilman, City of Gloucester
McVey, Harry	City of Camden
Melia, Peter	FAA, Harrisburg, Pa.
Neal, Jack	Air Traffic Controller
O'Hare, Emmett	Air Transport Association
Paris, Allan	Innovative System Research, Inc.
Patermo, Joseph	Camden County Planning Department
Pembleton, Mary	Camden Courier Post

Poloncarz, Norman	Tinicum Township Planning board
Randalls, Leon	Philadelphia Air Management Service
Robinson, Bill	Pilot
Rogers, Charles	Philadelphia International Airport
Schrock, Roy	EPA, Region III, Philadelphia
Sellman, Edmund	FAA, Washington, D.C.
Shephard, William	FAA, Washington, D.C.
Sheridan, Michael	City of Gloucester
Starley, Steven	EPA, Washington, D.C.
Stuck, John	FAA, Philadelphia Control Tower
Summer, Elliott	FAA, Eastern Region, N.Y.
Van Cleve, Earl	Citizen
Vodges, Judson	Citizen
Wilk, David	Eastwick Project Area Committee
Wolf, Michael	Delaware Valley Regional Planning Commission

APPENDIX B

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

NEWSLETTERS

NOISE NEWS

A BULLETIN OF THE PHILADELPHIA INTERNATIONAL AIRPORT NOISE STUDY

MARCH, 1980

WELCOME READERS

Welcome to the first issue of Noise News, the newsletter of the Philadelphia International Airport Noise Study. We hope to provide a timely update on the events of the study. If you have questions or need more information, please call Michael Wolf, Program Manager at LO7-3000, Ext. 189.

NOISE STUDY BEGINS

DVRPC has received funds under Section 8 of the 1978 Quiet Communities Act to evaluate aircraft noise generated at Philadelphia International Airport. The study will determine to what degree aircraft noise is a problem for the surrounding community. For this effort, a noise complaint telephone "hotline" has been set up; a community response survey has been completed (see accompanying articles); and noise monitoring was conducted by the Federal Aviation Administration at selected sites in Pennsylvania and New Jersey. Based on this information, alternative noise control strategies will be developed and reviewed; the results will be presented to community leaders and the airport operator. The final objective of the study is the preparation of a report to go to Congress documenting the severity of the problem and recommending certain noise control strategies. This report will be submitted to Congress by November, 1980.

COMMUNITY SURVEY COMPLETED

To learn more about how people are affected by aircraft noise, a Community Response Survey was conducted by CSR, Inc. for DVRPC during November, 1979. Questions were asked of households within a twenty-mile radius of Philadelphia International Airport; telephone numbers were selected at random according to the exchange area. It was hoped that the survey would contact a cross-section of people, and in fact, the respondents ranged in age from 18 to 92.

After 15,781 calls, 1,727 interviews were completed. Each interview lasted about twenty minutes, and included general questions about community problems and more specific inquiries about aircraft noise.

Of those spoken to, 35% felt that noise was a problem in their neighborhoods. The same percentage favored a community noise control program. Eighteen percent reported that they were bothered at home by aircraft noise, and 11% said they had considered moving because of the noise. Most of those annoyed by the noise of airplanes felt that government should be responsible for improving the situation.

The data will be further analyzed in order to determine which communities are most severely affected, what times of day are most critical, and whether variables such as background levels of noise, age of respondent, or length of residence are statistically significant.

HOTLINE REGISTERS COMPLAINTS

Rarely are complaints desired commodities; currently, the Philadelphia International Airport Noise Study is the exception to the rule. A telephone complaint hotline has been operating 24 hours a day, 7 days a week, since December 8, 1979, to accept complaints about aircraft noise. The toll-free number is 1-800-424-5145. All complaints received are being forwarded to the FAA and the airport.

A Washington-based consultant, CSR, Inc., is coordinating the hotline effort for DVRPC. Approximately 150 complaints have been received since its inception. People have reported rattling windows, interrupted conversation, and television interference caused by planes flying overhead. Most of the complaints received so far have originated in Camden County — areas such as Gloucester City, Audubon, Oaklyn, and Camden City. Other complaints have been registered from Eastern Delaware County, Gloucester County, and the Eastwick section of Philadelphia. The hotline will remain in service until April, 1980.

ADVISORY COMMITTEE ESTABLISHED

An Advisory Committee has been formed as part of the Airport Noise Study. The committee's role is to provide policy guidance and technical advice to the FAA, EPA, and DVRPC. It will evaluate a "shopping list" of potential noise abatement strategies to determine which would be most practical for the Philadelphia area. The committee's recommendations will be included in the report submitted to Congress at the conclusion of the study.

Because the committee handles both policy and technical questions, it is comprised of a variety of groups and interests. Among those represented are county and city agencies in the study area, the airport, air traffic controllers, pilots, neighborhood organizations, citizens, and the federal agencies. In addition, Congressmen James S. Florio of the 1st District of New Jersey and Robert W. Edgar of Pennsylvania's 7th District — both key regions in the study area — have sent representatives to the committee. Congressman Florio was instrumental in securing federal funds for the study and was present at the first meeting, December 17, 1979, to welcome participants.

A second meeting of the Advisory Committee was held on February 20, 1980 to review various types of data collected to date.

The third meeting has been scheduled for March 26, 1980. The next issue of this newsletter will contain highlights of that meeting.

DELAWARE VALLEY REGIONAL PLANNING COMMISSION
1819 J.F. Kennedy Boulevard
Philadelphia, Pa 19103

NOISE NEWS

APRIL, 1980 NO. 2

A BULLETIN OF THE PHILADELPHIA INTERNATIONAL AIRPORT NOISE STUDY

SECOND ADVISORY MEETING HELD

The Philadelphia International Airport Noise Study Advisory Committee continued its work on February 20, 1980 in Cherry Hill, New Jersey. At the meeting, the committee learned more about the Community Response Survey and the noise modeling currently being conducted by the FAA. In addition, the committee took its first look at the list of potential noise abatement strategies, some of which have been implemented at other airports.

Ms. Sherrie Aitken of CSR, Incorporated, the firm which performed the Community Response Survey for DVRPC, presented some of the highlights. She explained that the current data is only preliminary and will be further broken down by telephone exchange, distance from the airport, age, education and length of residence, to determine if trends and relationships are evident.

Mr. Steven Starley of EPA displayed a large map of the noise "footprint" created by the Integrated Noise Model. Information concerning current airport operations are fed into a computer, he said, producing noise impact contours. To predict how future changes in the operation of the airport or the use of quieter planes would affect the surrounding communities, new data is placed into the computer and new noise contours are generated. Mr. Starley explained that background noise will also be taken into account, as any sort of noise will seem more severe in a quiet area. He said that a map of what the aircraft noise situation will look like in the year 1990 and 2000 should be ready by the next committee meeting in March.

Mr. Emmett O'Hare of the Air Transport Association of America spoke about some of the noise abatement strategies presently in use by the airlines such as modified take-off, landing and ground operations. He described fleet modernization as one of the most successful but costly approaches. The committee recognized that the list of potential noise control measures needs thorough evaluation, keeping in mind the advantages and disadvantages of each measure. Further comments and suggestions will be made at the next meeting of the Advisory Committee which will be held March 26, 1980, 7:30 p.m., at the Best Western Airport Inn, Philadelphia, Pa.

TELEPHONE COMPLAINT UPDATE

By mid-March almost 250 complaints had been received by the telephone complaint "hotline." The toll-free number has been available 24-hours a day since December 8, 1979. In New Jersey complaints continue to be concentrated in Gloucester City, Oaklyn and National Park. In Pennsylvania many calls have originated in Eastwick, Southwest Philadelphia and Essington.

The telephone complaint number, 1-800-424-5145, will be discontinued April 3, 1980 when this phase of the noise study is complete.

FAA OUTLINES POTENTIAL NOISE CONTROL ACTIONS

At Philadelphia International Airport, the area affected by aircraft noise is located several miles from the airport under the approach and departure flight paths. The following list, developed by the FAA, was presented to the Advisory Committee on February 20, 1980. The list includes some of the noise control strategies which might be explored as part of the Airport Noise Study:

- o Displaced Threshold — This measure would involve moving the point of landing further from the end of the runway to ensure that aircraft are higher when passing over residential areas.
- o Lengthening Runways 17-35 — The FAA will study the effects of expanding the crosswind runway, in order to accommodate the landings of 2 and 3 engine air carrier jets approaching from the south and southwest.
- o Preferential Flight Track Use — Some of the current flight tracks lie along the Delaware River. The effect of using a river track, instead of the present straight-in-approach over Cherry Hill, for aircraft arriving from the north will be analyzed.
- o Curfew — 8.7% of current airport operations are between 10:00 p.m. and 7 a.m. If requested by the committee, the FAA could evaluate changes in noise impacts resulting from a curfew.
- o Power and Flap Management — According to the FAA, procedures have already been instituted at Philadelphia Airport to minimize noise.
- o Sound Insulation of Buildings — Public buildings in noiser areas may be eligible for federal funds for soundproofing.
- o Real Property Noise Notices — Prospective buyers of homes near airports would be notified of the noise impacts. Local governments would be responsible for implementing this measure.
- o Noise Related Landing Fees — This proposed action would have the airport charge an extra landing fee for aircraft exceeding federal standards. However this strategy has been rendered unnecessary by the safety and Noise Abatement Act of 1979, which was signed into law February 19, 1980. The Act requires air carrier aircraft to comply with federal noise limits by 1985, with some exceptions for 2-engine aircraft with less than 100 seats.
- o Noise Monitoring — Pinpoint the most severe noise sources in a community.

DELAWARE VALLEY REGIONAL PLANNING COMMISSION
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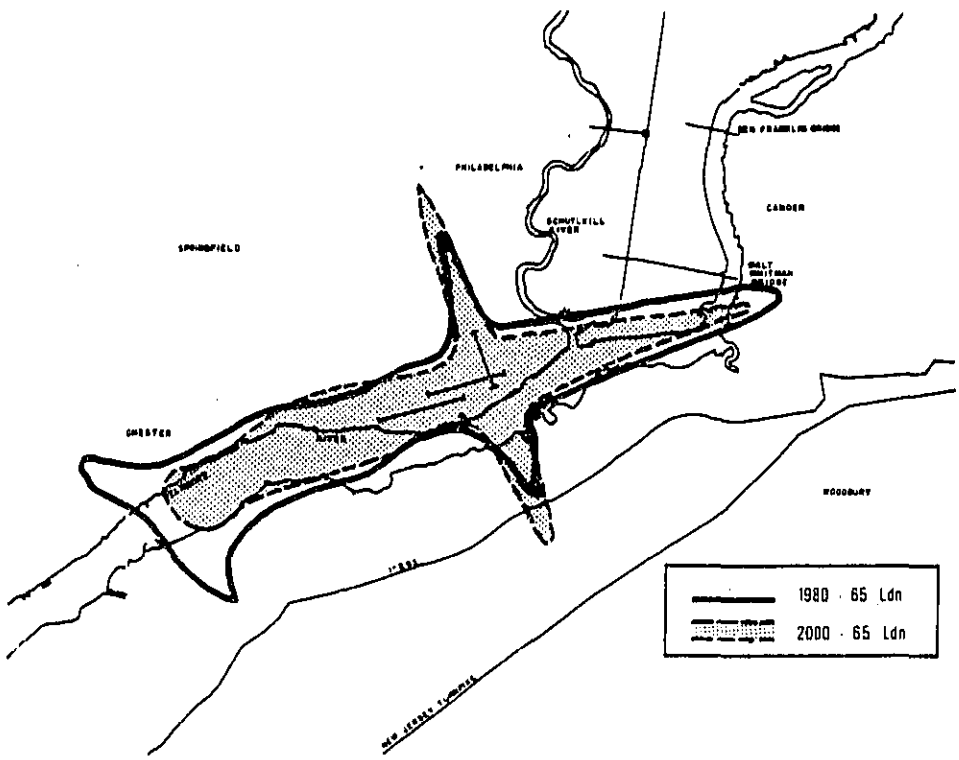
NOISE NEWS

NOISE NEWS

MAY, 1980 NO. 3

A BULLETIN OF THE PHILADELPHIA INTERNATIONAL AIRPORT NOISE STUDY

FAA NOISE CONTOUR MAPS ILLUSTRATE ALTERNATIVES



This noise contour map indicates areas that will experience noise levels of 65 Ldn or higher in 1980 and 2000. According to FAA and EPA, 65 Ldn is the sound level at which complaints commonly begin to occur. The map reveals that by 2000 the noise impact will shrink in the east-west direction. However in the north-south direction the area experiencing 65 Ldn or above will increase in size.

The Federal Aviation Administration (FAA) presented the first noise contour maps to the Advisory Committee on March 26. The 1980 "annualized average operations" contour is based on current flight schedules. The projected contours for 1990 and 2000 incorporate forecasts of air traffic growth and the use of quieter planes.

continued

NOISE CONTOURS continued

The FAA also modelled several potential aircraft noise abatement strategies. Some of the results include:

- Use of a flight track along the Delaware River: According to the FAA, this action does not seem feasible because it can create air traffic problems, and it reduces the noise for a minimal number of people.

- Head to head nighttime operations, with night flights both arriving and departing from the West: Again, this action involves potential air traffic and economic problems, and it reduces by 9% the number of people affected by aircraft noise.

- Night curfew: The curfew modelled improves the situation for over 50% of those affected. However, the economic impact this measure would have on the airport makes necessary the consideration of less stringent curfews.

The pros and cons of each of the proposed noise control actions (for a complete list, see Noise News, April, 1980) will be evaluated before determining which are practical for Philadelphia.

ADVISORY COMMITTEE MEETING

The Philadelphia International Airport Noise Study Advisory Committee held its third meeting on March 26, at the airport. The committee was brought up to date on the analysis of the Community Response Survey and the progress of the noise complaint telephone "hotline." In addition, participants viewed the noise model contours depicting present and future airport operations and those forecasting the effects of several proposed control strategies. Finally, the committee learned how aircraft noise impacts are determined according to already existing noise levels.

Discussion of the potential noise control actions will continue at the next meeting of the Advisory Committee which has been tentative scheduled for May 7, 1980, at the Best Western Airport Inn, Philadelphia.

SURVEY ANALYSIS COMPLETED

The draft final analysis of the Community Response Survey should be available in early May and it will be distributed to the Advisory Committee. Committee members should send their written comments to Noise Study Project Manager Michael Wolf at DVRPC, 1819 John F. Kennedy Blvd., Philadelphia, Pa. 19103.

Questions about the Noise Study? Call Michael Wolf or Michelle Manoff at (215) LO7-3000, Ext. 189 or 198, respectively.

DELAWARE VALLEY REGIONAL PLANNING COMMISSION
1819 J F Kennedy Boulevard
Philadelphia, Pa 19103

NOISE NEWS

NOISE NEWS

JUNE, 1980 NO. 4

A BULLETIN OF THE PHILADELPHIA INTERNATIONAL AIRPORT NOISE STUDY

NOISE MEASURED AT ELEVEN SITES

At the beginning of the Noise Study, in June, 1979, the Federal Aviation Administration (FAA) monitored noise at four sites surrounding the airport. To supplement this information, monitoring at 11 additional sites was conducted last month by members of the DVRPC and EPA staffs with equipment borrowed from the FAA. The 11 locations were chosen based on the preliminary results of the Community Response Survey, the sources of the noise telephone "hotline" complaints, and the recently developed noise contour maps.

Large waterproof enclosures were placed in Camden, Haddonfield, Cherry Hill, West Collingswood, and Thorofare, New Jersey; Wallingford, Swarthmore, and Essington in Pennsylvania; and the Eastwick section of Philadelphia. Inside each box was the machine that actually measured and recorded the noise, the Community Noise Analyzer (CNA). A microphone assembly was attached to each box and hooked up to the CNA inside. The CNA monitored noise levels for 72 hours at each site.

There were some limitations to the latest monitoring. The noise analyzer measures all noise in the environment, not just that caused by aircraft. Therefore, it is possible that certain high sound level readings were caused by barking dogs, motorcycles or children.

When the FAA measured noise levels in June, 1979, the units were attended by field personnel who noted the type of aircraft involved in each event and who documented the source of noise not related to airport operations.

Jim Hare, Environmental Specialist with FAA, mans a noise monitoring station in Essington, Pa. Similar equipment was recently used at eleven unmanned monitoring locations in New Jersey and Pennsylvania. (See article)

Most of the Ldn's (Ldn = day/night, 24-hour average sound level with a 10 db penalty applied to night noise) that were recorded fell between 61 and 65 decibels. Interestingly, the highest average recorded in the recent round of measurements was 72 Ldn on May 7, 1980 in West Deptford, near National Park Borough. On that day, the CNA recorded a maximum level (Lmax) of 101 decibels.

In general, Michael Wolf, Noise Study Project Manager, was pleased with the results of the monitoring. "We didn't find anything which widely differed from the other findings" of the telephone hotline, the noise contour maps, and the Community Response Survey. "The data is within the expected range."

ADVISORY COMMITTEE MEETING

The Noise Study Advisory Committee met for the fourth time on May 7, at the airport. At the meeting, participants heard a presentation by the Deputy Chief of the Philadelphia Control Tower on actual airport arrival and departure operations. Committee members also discussed the supplemental noise monitoring conducted in late April and early May. (See accompanying article).

More importantly, the Advisory Committee received the Evaluation Matrix developed to assess the proposed noise abatement strategies. Rating the noise control actions and making recommendations for the final Congressional report are the most vital tasks of the Advisory Committee. Due to time constraints, the committee will be finalizing these recommendations at its last meeting, which will be held in June.

To prepare for this final and most crucial meeting, it is requested that Advisory Committee members:

- o Review the criteria used for strategy evaluation.
- o Complete the matrix, analyzing the proposed noise control actions.
- o Consider the need for a weighting system for the evaluation criteria.

All of the technical documentation necessary for committee members to judge the noise abatement strategies will be distributed in advance of the June meeting. Those with questions should contact Noise Study Project Manager Michael Wolf at (215) LO7-3000, Ext. 189.

NOISE STUDY MILESTONE SCHEDULE

Early June, 1980: Final analysis of the Community Response Survey and the Telephone Complaint Hotline completed by CSR, Inc. and distributed to the Advisory Committee.

June 16, 1980: Last meeting of the Advisory Committee to finalize its recommendations on noise abatement strategies for the report that will be submitted to Congress.

July 18, 1980: Draft final report developed by the FAA and EPA.

July 18 to August 1, 1980: Written comments on the draft final report, forwarded to DVRPC.

August 1, 1980: Begin 90-day internal review of the draft final report by the federal agencies.

November, 1980: Final report submitted to Congress.

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NOISE NEWS

NOISE NEWS

JULY, 1980 NO. 5

A BULLETIN OF THE PHILADELPHIA INTERNATIONAL AIRPORT NOISE STUDY

COMMITTEE EVALUATES ABATEMENT STRATEGIES

HIGH PRIORITY	LOW PRIORITY	NOT RECOMMENDED
Preferential Runway Use (in effect)	River Approach	Head-to-Head Night Operations
Power and Flap Management (in effect)	Use of Runway 35 for Jets Approaching from South	Complete Night Curfew
Sound Insulation of Buildings	Noise Distribution	Lengthen Runway 17-35 for Use Under Crosswind Conditions
Real Property Noise Notices	Limited Curfew	Displaced Threshold
Noise Monitoring		Raise Glide Slope Angle
Land Use Controls		
Night Operations on River Side of Runways 9-Right, 27-Left		

For a fact sheet containing detailed descriptions of the strategies, call (215) LO7-3000, Ext. 198.

The Philadelphia International Airport Noise Study Advisory Committee held its final meeting on June 16. At this meeting, the committee discussed sixteen proposed noise abatement strategies and grouped them into three categories — "High Priority," "Low Priority," and "Not Recommended." (See Summary Chart). The assessment will be included in a report prepared jointly by the Federal Aviation Administration (FAA) and the Environmental Protection Agency (EPA) and submitted to Congress in early November, 1980. Based on this report, Congress will designate some of the strategies as meriting further study, and eventually, implementation.

The Advisory Committee also discussed the general findings of the study. One thing everyone agreed on is that aircraft noise is a significant problem, especially for certain, smaller neighborhood "hotspot" areas such as Tinicum Township and Gloucester City. "When you live with a problem daily, constantly, that's a problem of great magnitude," said Susan Jacobs, a resident of Tinicum. The extent of the noise affecting these "hotspots" has been reflected in all of the study data.

Committee members also expressed reservations about engine retrofitting and substitution of quieter planes mandated by the Safety and Noise Abatement Act proceeding entirely on schedule. Other noise abatement strategies should be implemented, said the committee; the new legislation should not be depended upon entirely.

During the course of the discussion, the committee voted to consider Noise Distribution — spreading the noise so that it is "shared" by areas not now affected — among the list of abatement strategies. However, it was placed in the Low Priority category. According to Fred Martin of the City of Camden, shifting noise impacts to different people "is not a viable solution." Barbara Farley of the Eastwick Project Area Committee explains that "we went in with a specific objective — to protect our community. But we became aware that we did not want to foist

Continued

any untenable situation on any other community.

"The study gave us (the Eastwick PAC) a broader perspective on airport activities and planning, and on the noise problem in general in the region," said Ms. Farley.

A RECAP

The Philadelphia International Airport Noise Study was funded under Section 8 of the Quiet Community Act to determine how local communities are affected by aircraft noise and to recommend certain noise abatement strategies, to Congress. A variety of activities were undertaken to learn about the extent of the noise problem in the area:

o In June, 1979, the FAA monitored noise at four sites surrounding the airport. To supplement this information, DVRPC and EPA conducted additional monitoring at 11 different sites in New Jersey and Pennsylvania during the spring of 1980.

o In November, DVRPC's consultant, CSR Inc., made 15,781 calls to obtain 1,727 interviews with local residents concerning noise problems in general and aircraft noise in particular for the Community Response Survey.

o Almost 300 aircraft noise complaints were registered on the toll-free telephone hotline from December, 1979, to early April, 1980.

o Through its Integrated Noise Model, the FAA developed noise contour maps predicting the aircraft noise impacts in 1980, 1990, and 2000 if some of the proposed abatement strategies were implemented.

All of this data has been presented to the Advisory Committee and will be included in the final report.

Persons not members of the Advisory Committee who wish to review the report should call Noise Study Project Manager Michael Wolf at (215) LO7-3000, Ext. 189.

NOISE STUDY SCHEDULE

July 18, 1980: Draft final report developed by the FAA and EPA.
July 18 to August 1, 1980: Written comments on the draft final report forwarded to DVRPC.
August 1, 1980: Begin 90-day internal review of the draft final report by the federal agencies.
November, 1980: Final report submitted to Congress

TO OUR READERS

As the Noise Study is drawing to a close, this is the last issue of Noise News. We would like your reaction to the bulletin. Was the format appropriate? Have the articles been informative? Too technical? Too dull? Please be honest! Your comments will help in the design and planning of future newsletters and public information efforts. Please call or write Michelle Manoff at DVRPC, 1819 J.F. Kennedy Blvd., Phila., PA 19103; (215) LO7-3000, Ext. 198.

DELAWARE VALLEY REGIONAL PLANNING COMMISSION
1819 J.F. Kennedy Boulevard
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APPENDIX C

AIRPORT NOISE COMPLAINT CENTER FORM

APPENDIX C
AIRPORT NOISE COMPLAINT CENTER

DATE:_____ DAY:_____ TIME OF CALL:_____ AM PM

Good Morning/Afternoon/Evening, Aircraft Noise Complaint Center. May I help you?

1. PLEASE DESCRIBE THE NATURE OF YOUR COMPLAINT:

_____

_____

_____

_____

2. DAY(S) AND TIME(S) OF DAY PROBLEM OCCURRED (SPECIFY PRECISELY):

_____

3. DID THE NOISE OCCUR DURING AN AIRCRAFT LANDING OR TAKEOFF? (CIRCLE ONE ANSWER)

1. LANDING
2. TAKEOFF
3. BOTH
4. OTHER (Specify) _____
5. DON'T KNOW

4. COMPLAINANT'S NAME (ASK IF NOT VOLUNTEERED):_____

In order to determine the areas where aircraft noise problems occur, we need to know your address.

ADDRESS:_____
(IF COMPLAINANT REFUSES TO PROVIDE EXACT BLOCK NUMBER, ASK FOR IT IN HUNDREDS, FOR EXAMPLE, "800 BLOCK OF CHERRY STREET")

TOWN:_____
(IF COMPLAINANT REFUSES TO PROVIDE STREET ADDRESS, ASK FOR NAMES OF STREETS FORMING NEAREST INTERSECTION:

_____

The Delaware Valley Regional Planning Commission currently is conducting a study to determine the extent of problems related to aircraft noise. Your complaint will be forwarded immediately to the Delaware Valley Regional Planning Commission and, ultimately, to the Philadelphia International Airport. If you would like information about the study, or if you have further comments, you may call the Commission at 215-567-3000. We appreciate your call. Thank you very much.

OPERATOR'S NAME:_____

TIME ENDING:_____ AM PM

APPENDIX D

INTERVIEW QUESTIONNAIRE

ATTACH TO TELEPHONE SCREENER

I.D.#:_____

COMMUNITY ENVIRONMENT QUESTIONNAIRE

CONFIDENTIAL

INTRODUCTION. READ EXACTLY AS WORDED.

Good morning/afternoon/evening. I'm (...) from CSR, Incorporated. We are conducting an opinion survey for the Delaware Valley Regional Planning Commission on the environment and its impact on people in your community. The information you give us will be helpful in developing better environmental planning.

Your participation in this survey is entirely voluntary. However, your cooperation is very important because your opinion will represent thousands of other households in the Delaware Valley area.

Your phone number was randomly selected from the exchange in your area, therefore, we do not have your name and we won't ask for it. You may be assured that your answers are strictly confidential.

INTERVIEWER ACKNOWLEDGES READING INFORMED CONSENT STATEMENT.

I ACKNOWLEDGE THAT I HAVE READ THE INTRODUCTION EXACTLY AS WRITTEN.

_____ _____

INTERVIEWER SIGNATURE DATE

(1)

COMMUNITY ENVIRONMENT QUESTIONNAIRE

I.D.#:_____ TELEPHONE #:_____/_____
AREA CODE

1. How long have you lived at your present address?

ENTER ACTUAL NUMBER OF YEARS, ROUNDED TO NEAREST YEAR (1/2 YEAR OR MORE ROUNDED UP).

RECORD YEARS:_____

LESS THAN 6 MONTHS..... 95

39 40
Q1: [ ]

2. How would you rate the area in which you live, that is, within a few blocks of your home? Would you say it was:

Very good,..... 5
Good,..... 4
Fair,..... 3
Poor, or..... 2
Very poor?..... 1

41
Q2: [ ]

(1)

3. Now, thinking of the area you live in, as I read the following list, please tell me whether any of these are problems in your area? FIRST: INSERT a-h FOR (...). CIRCLE APPROPRIATE CODE IN COLUMN A.

FOR EACH "YES" IN COLUMN A, ASK: How serious a problem is (...)? Would you say it was Extremely serious, Quite serious, Moderately serious, or Not Very serious? INSERT EACH PROBLEM WITH "YES" ANSWER FOR (...). CIRCLE APPROPRIATE CODE IN COLUMN B.

	A.		B.					
Would you say that (...) is a problem?	YES	NO	EX-TREMELY SERIOUS	QUITE SERIOUS	MODE-RATELY SERIOUS	NOT VERY SERIOUS	DON'T KNOW	
a. Traffic Congestion?	1	2	6	5	4	3	8	Q3: a: 42 43
b. Polluted Water?	1	2	6	5	4	3	8	b: 44 45
c. Noise?	1	2	6	5	4	3	8	c: 46 47
d. Crime?	1	2	6	5	4	3	8	d: 48 49
e. Run-Down Areas in Need of Improvement?	1	2	6	5	4	3	8	e: 50 51
f. Unclean Air?	1	2	6	5	4	3	8	f: 52 53
g. Parking?	1	2	6	5	4	3	8	g: 54 55
h. Inadequate Low-Income Housing?	1	2	6	5	4	3	8	h: 56 57

A. Are there any (other) important problems facing the residents of your area today?

YES.....LIST UP TO THREE MENTIONS..... 1
NO.....SKIP TO Q4..... 2

Q3A: 58

→ 1) _____ FIRST MENTION — 1ST: 59 60

2) _____ SECOND MENTION — 2ND: 61 62

3) _____ THIRD MENTION — 3RD: 63 64

(1)

Now, in the following questions I will be asking you about the noise in the area you live; that is, within a few blocks or so of your address.

4. How quiet or noisy do you consider this area to be? Would you say: CIRCLE APPROPRIATE CODE.

Very quiet,.....	4
Quiet,.....	3
Noisy, or.....	2
Very noisy?.....	1

65
Q4: ☐

5. To be annoyed by noise is to be disturbed, stressed or upset by the repeated occurrence of noise. Using this definition, how annoyed would you say you are by noise in your area? Are you: CIRCLE APPROPRIATE CODE.

Not at all annoyed,.....	1
Slightly annoyed,.....	2
Moderately annoyed,.....	3
Very annoyed, or.....	4
Extremely annoyed?.....	5

66
Q5: ☐

(1)

6. I'd like to know whether noise interferes with any of the following activities. Does noise interfere with (...): READ a-e. INSERT FOR (...). CIRCLE APPROPRIATE CODE FOR EACH MENTION.

Q6:

	YES	NO	
a. Sleeping?	1	2	a: 67
b. Talking or Listening to the Radio, Watching TV, etc.?	1	2	b: 68
c. Reading?	1	2	c: 69
d. Resting?	1	2	d: 70
e. Outdoor activities?	1	2	e: 71

I'd like to ask you a couple of questions about your health.

7. Generally speaking, do you think noise is affecting your physical or emotional health and well-being?

YES..... 1
NO..... 2
MAYBE..... 3
DON'T KNOW..... 8

Q7: 72

8. Is noise affecting you in any of the following ways? Is noise causing (...): READ a-e. INSERT FOR (...). CIRCLE APPROPRIATE CODE.

Q8:

	YES	NO	
a. Headaches?	1	2	a: 73
b. Tiredness?	1	2	b: 74
c. Irritability?	1	2	c: 75
d. Hearing loss or difficulties?	1	2	d: 76
e. An existing health problem to get worse?	1	2	e: 77

(2)

START CARD 2

ID#
1 2 3 4

CARD: 5 [2]

Now I'd like to explore some specific noise sources that may or may not annoy you in the area you are living.

9. As I read the following list of noise sources, tell me how annoyed you are by each noise source in this area (over the past year). Would you say you are Not At All annoyed, Slightly annoyed, Moderately annoyed, Very annoyed, or Extremely annoyed by noise from (...)? READ a-p. INSERT a-p FOR (...). CIRCLE APPROPRIATE COLUMN.

	NOT AT ALL ANNOYED	SLIGHTLY ANNOYED	MODER-ATELY ANNOYED	VERY ANNOYED	EX-TREMELY ANNOYED	Q9:
a. Traffic?	1	2	3	4	5	a: [6]
b. Motorcycles?	1	2	3	4	5	b: [7]
c. Trucks?	1	2	3	4	5	c: [8]
d. Buses?	1	2	3	4	5	d: [9]
e. Automobiles?	1	2	3	4	5	e: [10]
f. Emergency Vehicles/ Sirens?	1	2	3	4	5	f: [11]
g. Garbage Trucks?	1	2	3	4	5	g: [12]
h. Pets/Animals?	1	2	3	4	5	h: [13]
i. Air Conditioners?	1	2	3	4	5	i: [14]
j. Jet Airplanes?	1	2	3	4	5	j: [15]
k. Small Airplanes?	1	2	3	4	5	k: [16]
l. Helicopters?	1	2	3	4	5	l: [17]
m. Trains?	1	2	3	4	5	m: [18]
n. Construction?	1	2	3	4	5	n: [19]
o. Commercial or Industrial Equipment?	1	2	3	4	5	o: [20]
p. Neighbors(e.g. Noisy stereo, loud talking)?	1	2	3	4	5	p: [21]

(2)

A. Are there any (other) noise sources that annoy you?

Q9A: 22 ☐

YES.....LIST UP TO THREE MENTIONS..... 1

NO..... 2

→1) _____ FIRST MENTION — 1ST: 23 24 ☐☐

2) _____ SECOND MENTION — 2ND: 25 26 ☐☐

3) _____ THIRD MENTION — 3RD: 27 28 ☐☐

(2)

10. Do you think your community should have a noise control program to specifically work on reducing noise levels?

YES.....SKIP TO Q11.....	1	Q10: 29 ☐
NO.....ASK A.....	2	

A. Why do you feel that there should not be a noise control program in your community? Would you say:

There is no need for a noise control program,.....	1	Q10A: 30 ☐
Nothing can be done about noise,.....	2	
It is not the responsibility of the community,.....	3	
It is too costly, or.....	4	
Some other reason?.....	5	
→ SPECIFY:_____		

11. If there were a noise control program, keeping in mind your present level of taxes, how much in additional taxes would you be willing to pay for each member of your household for a noise control program each year? Would you be willing to pay: CIRCLE APPROPRIATE CODE.

IF UNSURE ABOUT TYPE OF TAX, SAY: A tax that everyone would be willing to pay.

25¢ for each person a year,.....	1	Q11: 31 ☐
50¢ for each person a year,.....	2	
$1.00 for each person a year, or.....	3	
More than $1.00 for each person a year?.	4	
WOULD NOT BE WILLING TO PAY EXTRA TAXES FOR A NOISE CONTROL PROGRAM.....	0	

Now I'd like to ask you some questions about aircraft noise in this area.

12. You may have mentioned this before, but are you annoyed at home by aircraft noise?

YES.....ASK A..... 1 — Q12: [32]

NO.....SKIP TO Q14..... 2

A. During which time periods does aircraft noise annoy you? Is it in the: — Q12A:

	YES	NO	
Morning? (7AM - NOON).....	1	2	M: [33]
Afternoon? (NOON - 6PM).....	1	2	A: [34]
Evening? (6PM - 10PM).....	1	2	E: [35]
Nighttime? (10PM - 7AM).....	1	2	N: [36]

B. To what extent have you become accustomed to aircraft noise? Would you say: — Q12B: [37]

Highly accustomed,..... 5

Considerably accustomed,..... 4

Moderately accustomed,..... 3

Not very accustomed, or..... 2

Not at all accustomed?..... 1

C. To reduce noise from aircraft in your home, have you or any member of your household taken any of the following actions? Have you: — Q12C:

	YES	NO	
Used insulation or soundproofing?..	1	2	U: [38]
Closed doors or windows?.....	1	2	CL: [39]
Turned-on or turned-up the radio, TV or stereo to block out noise?...	1	2	TU: [40]
Worn earplugs?.....	1	2	W: [41]
Changed location of sleeping quarters?.....	1	2	CH: [42]
Considered moving?.....	1	2	CO: [43]
Have you taken any other actions?..	1	2	HA: [44] 2ND:
→SPECIFY: _____			1ST: [45] [46]

(2)

D. Have you ever actually written, telephoned or visited an official about aircraft noise?

YES.....SKIP TO Q13..... 1
NO.....ASK E..... 2

Q12D: 47

E. Have you ever felt like doing something about aircraft noise in this area, for example like contacting a local official or newspaper?

YES..... 1
NO..... 2

Q12E: 48

13. As I read the following, please tell me who do you think should be responsible for reducing aircraft noise in this area? Should: READ a-e. CIRCLE APPROPRIATE CODE.

Q13:

	YES	NO	
a. The Airplane Manufacturers?	1	2	a: 49
b. The Airlines?	1	2	b: 50
c. The Airports?	1	2	c: 51
d. Government?	1	2	d: 52
— Which level:			
→ Federal?	3	4	df: 53
→ State?	3	4	ds: 54
→ Local?	3	4	dl: 55
e. Someone else?	1	2	e: 56
→ SPECIFY:_____			

14. Do aircraft regularly fly near your home?

YES..... 1
NO..... 2

1ST: 57 2ND: 58

Q14: 59

(2)

15. Please tell me the main intersection near your home?

IF NO MAIN INTERSECTION NEARBY, ASK: What is the nearest main road?

MAIN INTERSECTION:

a)_____

b)_____

IF NO MAIN INTERSECTION - MAIN ROAD:_____

A. What street do you live on?

STREET:_____

SURVEY AREA: 60 ☐

SUB-AREA: 61 62 ☐☐

NOISE ZONE: 63 64 ☐☐

(2)

Now, Id like to ask you a few final questions about your background.

16. What was the month and year of your birth? Q16: 65 66

MONTH:_____ YEAR:_____

17. What was the highest grade in school you completed and received credit for? CIRCLE ONE. Q17: 67 68

00 01 02 03 04 05 06 07 08 09 10 11 12

COLLEGE/OTHER POST HIGH SCHOOL SCHOOLING: 13 14 15 16

POST GRADUATE SCHOOL: 17 18 19 20 OR MORE (21)

18. Now, thinking of your entire family, all those related to you living in this household, was the total family income of your family last year, 1978, before taxes, greater than $15,000 or less than $15,000? (Please include your (and your spouse's) income. Do not include unrelated people). CIRCLE APPROPRIATE CODE.

IF UNCERTAIN, ASK: What would be your best guess?

GREATER THAN $15,000.....ASK a..... F

LESS THAN $15,000.....SKIP TO b..... E

a. Was your total family income last year greater than $25,000 or less than $25,000? CIRCLE APPROPRIATE CODE.

GREATER THAN $25,000.....SKIP TO Q19.... D

LESS THAN $25,000.....SKIP TO Q19.... C

b. Was your total family income last year greater than $7,500 or less than $7,500? CIRCLE APPROPRIATE CODE.

GREATER THAN $7,500..... B

LESS THAN $7,500..... A

(2)

19. In telephoning you we selected your number randomly. I would like to know if you have more than one telephone number at this residence?

YES.....ASK a..... A

NO.....SKIP TO Q20..... B

a. Aside from this telephone number that I've reached you on, how many additional telephone numbers do you have?

ONE..... C

TWO..... D

THREE OR MORE..... E

20. Finally, my supervisor may wish to verify that I completed this interview or I may have to call back if I missed any questions. Is that alright?

YES..... 1

NO..... 2

Q20: 69 [ ]

I would like to thank you on behalf of the Delaware Valley Regional Planning Commission for taking the trouble to provide us with some very valuable information.

TIME ENDING:_____ AM PM

(2)

INTERVIEWER: COMPLETE IMMEDIATELY

C1. REFER TO Q18 - HOUSEHOLD INCOME:

SUMMARY TABLE
HOUSEHOLD INCOME

INCOME CATEGORY	LETTER CODE	NUMERIC CODE
UNDER $7,500	A	1
$7,500 - $15,000	B	2
$15,000 - $25,000	C	3
GREATER THAN $25,000	D	4

C1: 70 ☐

C2. REFER TO Q19 - NUMBER OF TELEPHONE NUMBERS:

SUMMARY TABLE
OF TELEPHONE NUMBERS

TOTAL OF TELEPHONE NUMBERS (Q19+1)	LETTER CODE	NUMERIC CODE
ONE	B	1
TWO	C	2
THREE	D	3
FOUR OR MORE	E	4

C2: 71 ☐

(2)

C3. SEX OF RESPONDENT:

MALE..... 1
FEMALE..... 2

C3: 72 ☐

C4. SEX OF INTERVIEWER:

MALE..... 1
FEMALE..... 2

C4: 73 ☐

C5. LANGUAGE OF INTERVIEW:

ENGLISH..... 1
SPANISH..... 2
OTHER..... 3
→SPECIFY:_____

C5: 74 ☐

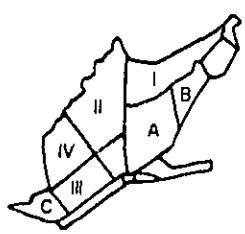
END CARD 2

APPENDIX E

ADVISORY COMMITTEE COMMUNICATIONS

EASTWICK
Project Area Committee
7381 ELMWOOD AVENUE
PHILADELPHIA, PA. 19153
(215) 365-8826

REPRESENTING:
Blue Bell Civic Association
Clearview Community Organization
Conservation Area
Eastwick Businessmen's Association
Eastwick Community Organization
Elmwood Park Civic Association



Forrest Creek Community Association
Hedgerow Residents' Association
Meadows Community Association
Middle Southwest Community Organization
Penrose Park Residents Association
Towne Gardens Civic Association

Mr. Michael Wolf
Project Manager
Philadelphia International
Airport Noise Study
Delaware Valley Regional Planning Commission
1819 J.F. Kennedy Boulevard
Philadelphia, Pa. 19103

June 17, 1980

Dear Mr. Wolf:

As requested at the final meeting of the Airport Noise Study Advisory Committee on June 16, the delegation from the Eastwick Project Area Committee is hereby submitting for inclusion in the draft report the following general comments, as well as minority opinion comments on several of the noise abatement alternatives considered:

1. "Abatement" versus "Displacement" - While all of the strategies considered might "abate" noise to some degree or other according to the technical use of this word, to the laymen/women from Eastwick, the strategies here should more correctly be described as noise "displacement" alternatives. These tend to spread noise around, in some locales, thinly, in others, thickly, with the resulting creation of what we privately have dubbed "the peanut butter sandwich syndrome". Someone is relieved, but someone else must suffer a bit more as the eventual outcome.

   We mention this concern as an introduction to what we feel, in the long run, can be the most effective, equitable and universally rewarding noise abatement strategy, in the strictest definition of the term. This is the implementation of regulations aimed at controlling aircraft noise at its source: the aircraft itself. Careful and constant vigilence on the part of our members of Congress, our local planning agencies, our community organizations and individual concerned citizens, however, is imperative. We are aware of the equally careful and constant pressure exerted by certain special interest lobbies in rolling back certain of these proposed controls. Nevertheless, in the end, we feel that the costs in terms of human health and community social and economic stability underscore the importance to each of us of remaining constant to a clear course: prod, promote, and, when necessary, regulate to ensure that the strides made in the field of aircraft technology be made to serve, rather than victimize, man.

2. Comments on Suggested Abatement Strategies-

CASE 1: RIVER APPROACH
PAC delegation concurs with the priority ranking given to this alternative by the majority of the advisory committee.

CASE 2: HEAD-TO-HEAD NIGHT OPERATIONS
PAC delegation concurs with not recommended ranking given to this alternative by the majority of the advisory committee.

CASE 3: FULL NIGHT CURFEW
PAC delegation concurs with not recommended ranking given to this alternative by the majority of the advisory committee. We feel strongly about the economic effect.

CASE 4: LENGTHENING 17-35, CROSSWIND USE
PAC delegation concurs with not recommended ranking given to this alternative by the majority of the advisory committee. We also strongly recommend that no value judgement be noted in the report as to the high safety ranking which this alternative received. While all responsible committee members did consider safety as a necessary component of each possible alternative, we emphasize that the intent of the study was to focus on airport noise, not airport safety. Airport safety strategies should, and will, we believe, be adequately addressed in future studies aimed at that factor. This factor was eliminated by the committee due to its failure on the subject of net (population-based) noise reduction potential.

CASE 5: LENGTHENING 17-35, 2 & 3 ENGINE APPROACH FROM SOUTH
PAC delegation disagrees with the low priority ranking given to this alternative by the majority of the advisory committee. We view this, as Mr. Korzeniowski pointed out, as being inconsistent, as far as real-life future expectations are concerned, with the committee's decision in CASE 4. Both cases presuppose the lengthening of this runway, and once this situation exists, there will be very real pressures, we believe, to implement CASE 4, with the liklihood of further consideration to, if not eventual implementation of, CASE 5, as well. Therefore, it is our minority opinion that CASE 5 be ranked as not recommended, as was CASE 4.

CASE 6: DISPLACED THRESHOLD
PAC delegation concurs with the not recommended ranking given to this alternative by the majority of the advisory committee.

CASE 7: PREFERENTIAL RUNWAY USE

PAC delegation concurs with the high priority ranking given to this alternative, in slightly amended form, by the majority of the advisory committee. As the current use patterns generally are thought to provide the most relief possible currently (use of east-west versus north-south), we emphasize with the other committee members the efficacy of more stringent adherence by pilots and traffic controllers, whenever possible, to optimum use, for noise abatement purposes, of preferential east-west runway use.

CASE 8: POWER AND FLAP MANAGEMENT

PAC delegation concurs with the high priority ranking given to this alternative by the majority of the advisory committee. We understand that this strategy already is in effect, and we emphasize the necessity for maintaining these proceedures.

CASE 9: RAISE GLIDE SLOPE ANGLE (to greater than 3^0)

PAC delegation disagrees with the not recommended ranking given to this alternative by the majority of the advisory committee. Despite the insistence by representatives of FAA on the committee, we feel that, at some future date, further investigation into this alternative might be warranted as a contributing factor to noise reduction. It was noted at the last committee meeting that, in the past, FAA had once considered $2\frac{1}{2}^0$ as the maximum safe glide slope angle. Perhaps with changes in aircraft design and safety features, a greater than 3^0 slope might be deemed safe.

CASE 10: SOUND INSULATION OF BUILDINGS

PAC delegation agrees with the high priority ranking given this alternative by the majority of the advisory committee. However, it must be pointed out that one of the Eastwick neighborhoods most impacted at the present time by aircraft noise would be the very section of Eastwick with the highest percentage of residents least likely to afford comprehensive home insulation. Also, there is a significant number of rental units under the flight paths of 17-35. This renders a significant percentage of our population at the mercy of their landlord (the Korman Corp.) for supplying sound insulation to these units. Our past experience with this developer indicates that it is in the habit of supplying the absolute minimum of insulation allowed under current Philadelphia codes, and we cannot realistically envision Korman willingly adding insulation retroactively to its rental units in Eastwick.

CASE 11: REAL PROPERTY NOISE NOTICES

PAC delegation strongly disagrees with the high priority ranking given to this alternative by the majority of the advisory committee. While it must be emphasized that this is not a vote for deceptive real estate sales practices or suppression of information, we must stress, from an admittedly parochial concern, that this is viewed by us with trepidation. Our neighborhoods have, over the past several years, been the victims of blockbusting and, more recently, a massive campaign of personal, mail and telephone solicitation by realtors from as far away as West Oak Lane and South Jersey. Any factor which might tend to further depress the already-deflated real estate values in our less than five year old communities would, obviously, not receive broad-based community support in Eastwick. We object, further, that current homeowners be saddled with a "one-time (financial) hardship" in any attempt to sell their homes under such regulations. In our minds, a "one-time hardship" is one too many. We also envision serious problems in the efficient monitoring and policing of such regulations. If it is to be done in much the same manner that the Philadelphia Human Relations Commission and the Philadelphia Board of Realtors jointly "monitor" and "police" blockbusting and unethical solicitation, this alternative will be reduced to a sham. We also suspect that there might be legal problems related with the above-mentioned "hardship". Does this constitute a partial confiscation by the regulating levels of government of an individual's property? What our fellow committee members seemingly view as a benign and helpful alternative is viewed by us as fraught with unanswered questions and with menace to the stability of our community.

CASE 12: NOISE-RELATED LANDING FEES

Due to the fact that this consideration seems to be adressed in regulations that are to take effect in 1985, this alternative has been eliminated by the advisory committee from further consideration.

CASE 13: NOISE MONITORING

PAC delegation concurs with the high priority ranking given to this alternative by the majority of the advisory committee.

CASE 14: NOISE DISTRIBUTION

PAC delegation concurs with the low priority ranking given to this alternative by the majority of the advisory committee.

CASE 15: LIMITED NIGHT CURFEW (PASSENGER ONLY)

PAC delegation disagrees with the low priority ranking given to this alternative by the majority of the advisory committee. As noted under CASE 3, we are aware of possible economic disadvantages, but we feel that this alternative should be a high priority for future in-depth study.

CASE 16: LAND USE CONTROLS
PAC delegation concurs with the high priority ranking given to this alternative by the majority of the advisory committee. This will not apply to our area, but is a strategy that might be helpful to currently sparsely-developed communities in South Jersey.

CASE 17: 9R-27L DEPARTURE AND ARRIVAL AT NIGHT
PAC delegation concurs with the high priority ranking given to this alternative by the majority of the advisory committee.

In addition, we feel it is constructive to add a number of comments regarding the constraints of this study, our general philosophy as to the noise problem in this community (present and future) and suggestions for further study not included in the considered alternatives.

It is our feeling that what noise problem exists in Eastwick is due to traffic on 17-35, not the east-west runways, which, due to their carrying the bulk of this traffic, were the primary focus of alternatives suggested as part of this study. Our community concerns regarding the impact of aircraft noise here must be defined not only in terms of noise, but also in terms of height of approaching and departing aircraft as it travels over our area, the present and projected amount of traffic over our area, the safety aspects of these two features, and, lastly noise, and HOW THESE FACTORS IN COMBINATION MIGHT TEND TO ACT ON REAL ESTATE VALUES IN EASTWICK, especially in our residential communities. It was our understanding that this topic was outside the realm of this study. However, we strongly emphasize our feeling that this factor must be given its due consideration in any further study regarding possible changes in traffic patterns to, volume of traffic on, or changes in the capability of, runway 17-35.
It also was stated at the outset of this study that this effort would not and could not look into the healthrelated effects of noise, including the impact of noise and vibrations on the health of residents in presently noise-impacted areas. We are unsure whether or not the funding mechanism was responsible for setting out this ground rule as being applicable here. We dispute to some degree that such deliberations did not have a place here. However, we strongly urge that this health-related aspect of noise and related phenomena be considered as a topic worthy of further consideration, either singly or in combination with studies regarding the implementation of noise abatement strategies proposed here.

We ask of our members of Congress, the appropriate Congressional committees and federal agencies **very**,very careful consideration to both the positive and negative assessments made by members of the advisory committee and evaluation of all possible future action in the reflected light of the deliberations made here by this committee.

Sincerely,

Barbara Farley

Barbara Farley
Eastwick Project Area Committee staff representative to
Philadelphia International Airport Noise Study Advisory Committee

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
JOHN FITCH PLAZA, P. O. BOX 2807, TRENTON, N. J. 08625

June 23, 1980

Delaware Valley Regional Planning Commission
Penns Towers Building
1819 J.F. Kennedy Blvd.
Philadelphia, PA 19103

ATTN: Michael Wolf

RE: Philadelphia Airport Study

Minority Report by Edward J. DiPolvere

Chief of the New Jersey Office of Noise Control

for New Jersey Division of Environmental Quality

This is a minority report on the high priority ranking for sound insulation of buildings as an airport noise abatement strategy. Most people on the committee want to solve the Philadelphia airport noise problem. Congress, instead, authorized the study so that it could learn about the impact of noise on, and possible abatement strategies for American airports. This solution is extremely costly; for the approximately 14,000 commercial airports alone, it could easily cost billions, if not tens of billions, of dollars. This, for a strategy that does not even meet the evaluation criteria of the committee itself. "Noise Reduction Potential" should be evaluated as zero, (0), if it is unlikely to reduce noise in the "environment". When not modified by other adjectives, the environment has traditionally been defined as a person's total living space, his total property, his "castle" if you will. This strategy does not improve his environment; it instead shields part of his environment form the rest of his total environment which has not been made one dB quieter. There is no guarantee that, should this be done at any particular airport neighborhood, operational or other changes at future times would not cause a new set of properties to become impacted and require this treatment.

Early in the deliberations, the staff of the Delaware Valley Regional Planning Commission suggested that, the "noise impact"

of the airport was not severe, and I concur with this assessment. The detailed survey shows while there are pockets or hot spots of severe airport noise impacts, traffic and roadway noise is the most pervasive problem in the regional area selected. This is for a survey near and around an airport; this finding is more striking when areas that don't include airports are included, as has been done in a myriad of other studies and surveys throughout the country and in other countries. Roadway noise is the most pervasive noise source. It is therefore unconscionable to recommend to congress that a high priority be give to the insulation strategy that would cost tens of billions of dollars for a noise problem that is not the most severe problem, as determined by analysis of this very survey.

The entire Environmental Protection Agency budget for noise control is $12.8 million. For these funds they:

1. Do research in that ever elusive tie between health effects - learning disabilities and environmental noise.

2. Promulgate regulations for various interstate carriers and many noisy products.

3. Fund technical centers where state and local personnel can be trained and have their equipment calibrated.

4. Give assistance grants to state and local governments in ECHO.

5. Give demonstration grants to state and local governments.

6. Do studies on airport noise.

History throughout the environmental field has shown that money spent on enforcement practices has had the most beneficial result in abatement and mitigation of pollutants. Putting a high priority on a partial fix that doesn't require anyone to do anything about the problem or source noise, but rather deal with the involuntary receiver is not proper. It has been acknowledged that in other than occupational noise, the most effective way of controlling noise is to deal with it at the source. Next path or operational/administrative controls work best. Treatment of receiver is virtually never used as a strategy for environmental noise. We in the regulation and enforcement business would never attempt to issue ear plugs or muffs to abate environmental noise. Why punish or in any way, deprive the receiver of part of his property to solve a problem created by others. This insulation approach is truly a receiver control and not a path control. Path controls, (barriers, berms, deflector, etc.), intercept the noise before it invades a person's total environment.

In summary, the writer strongly disagrees with the high priority ranking of sound insulation of buildings as an airport noise abate-

ment strategy. Rather, emphasis should be put on source controls, (quieter craft and quieter engines retrofitted are more viable today, because of their increased fuel efficiency), operational and administrative measures; many of which have been successful at airports across the country. Even new and innovative operational and administrative measures should be encouraged for existing built-up areas and land use planning controls for areas not yet built up.

Very truly yours,

Edward J. DiPolvere, Chief
Office of Noise Control

EJDP/jc

MINORITY REPORT

TO THE

PHILADELPHIA INTERNATIONAL AIRPORT

NOISE STUDY ADVISORY COMMITTEE'S

FINAL RECOMMENDATIONS AND PRIORITIES

JUNE 30, 1980

In reviewing the minutes of the final meeting of the Philadelphia International Airport Noise Study Advisory Committee which was held on Monday, June 16, 1980, we would like to submit the following comments:

With respect to the Community Opinion Survey conducted by CSR, Inc., we must express concern over the aggregation of telephone exchange areas, a strategy employed by CSR. We do not feel that this method gives an accurate picture of the intensity of the aircraft noise problem in those particularly troubled communities in South Jersey (Gloucester City, Audubon, Collingswood, Haddonfield, etc.). Also, there is some question as to the timing of the survey. Since the survey was conducted in November when the weather is colder and many windows are closed, we do not feel that CSR was able to obtain an accurate assessment of how the problem is perceived in southern New Jersey. In addition, with respect to the recommendations of the committee as to the noise abatement strategies which should be employed, many of the members from South Jersey question the accuracy of these recommendations as they were finally approved at this meeting.

The meeting of June 16, 1980 began at approximately 3 p.m. and lasted until approximately 11 p.m. Many of those present and voting were not citizens or municipal officials living in South Jersey, but rather government employees. In many cases their votes were the deciding ones as to how high a priority a strategy was given. Also, voting on these strategies was last on the agenda for this meeting. Therefore, many of the interested South Jersey members who have attended meetings were not able to stay throughout the entire 8-hour session and had to leave prior to voting on the strategies. In addition, many members were mentally fatigued by the time the voting actually took place, thus hindering a true discussion and evaluation of each. For the most part the strategies that received high priority by the committee were cosmetic ones which do not have

the capability to measureably reduce aircraft noise on those affected communities in southern New Jersey.

For all these reasons, we as members of the Philadelphia International Airport Noise Study Advisory Committee from southern New Jersey hereby submit this minority report for consideration by FAA and EPA in the drafting of their report to Congress. We would like to recommend the following strategies as those which are capable of addressing the aircraft noise problem from the Philadelphia International Airport as it affects southern New Jersey in the fairest possible manner.

HIGH PRIORITY

15. Limited Curfew *
13. Noise Distribution
1. Modified River Approach
5. Use of Runway 35 for Jets Approaching from the South (south river approach; lengthening of runway may be necessary)
7. Preferential Runway Use

* Provided that the limited curfew is combined with one or more alternate strategies of noise abatement or noise distribution.

LOW PRIORITY

(Since these strategies are merely of cosmetic value or are already in existence, we would like to avoid giving the impression that we feel these strategies are capable of bringing about significant changes in the environment.)

10. Sound Insulation of Building
13. Noise Monitoring
17. Night Operations on 9-R, 27-L on River Side
9. Power and Flap Management
11. Real Property Noise Notice
16. Land Use Controls

Any other strategies are not recommended.

Judson Vodges, Haddonfield, NJ 08033

Maury Cutler, Esq., Collingswood, NJ 08108

Anton J. Lisicky, Cherry Hill, NJ 08003

Brenda Brennan, Audubon Park, NJ 08106

Michael J. Sheridan, Gloucester City, NJ 08030

Judy Billingsley, Voorhees, NJ 08043

Bernard C. Madrack, Laurel Springs, NJ 08021

Dan Ciechanowski, Councilman, Camden, NJ 08104

Earl E. Van Cleve, Haddonfield, NJ 08033

Carol Barrett, N. Collingswood, NJ 08107

Eileen Ackroyd, Westmont, NJ 08108

James R. McMullin, Councilman, Gloucester City, NJ 08030

Air Transport Association ata OF AMERICA

Eastern Regional Office
181 South Franklin Avenue
Room 601
Valley Stream, New York 11581
Phone (212) 656-4777
(516) 791-3444

June 30, 1980

Mr. John Coscia
Director
Environmental Planning Division
Delaware Valley Regional Planning Commission
Penn Towers Building
1819 J. F. Kennedy Boulevard
Philadelphia, Pennsylvania 19103

Dear Mr. Coscia:

The results of the marathon meeting, June 16, 1980, concerning the Philadelphia Airport Noise Study were rather encouraging. Many of the items of questionable validity, and several which would have had serious adverse impact on the entire Delaware Valley, were dropped. Several of those remaining are, in our view, questionable at best, and could be overall more detrimental than beneficial. They include noise distribution, and the River Approach. A third item, limited curfew, still cannot be accepted in any way by the air carriers or, we believe, by the passengers and shippers who depend on Philadelphia International Airport. No curfew can be designed which does not have a serious, if not severe, adverse economic impact on the region.

I believe it is obvious that the airlines want to be good neighbors, and are extremely interested in noise abatement, where possible, to reduce community noise impact. Their efforts will continue in this regard as we evaluate further the recommended alternatives for implementation, including night usage of Runway 9R/27L; continuation of the power and flap management programs; continuation and/or improvement to the Preferential Runway System.

We agree with your study summarization that aircraft and airport noise is not a great problem, either in extent or magnitude, but there are several locations that do perceive a noise problem. Although some of the noise abatement alternatives mentioned above may not help in these locations, we will make every effort to relieve those noise impacted areas.

Sincerely,

Emmett N. O'Hare

Emmett N. O'Hare
Deputy Director

ROBERT W. EDGAR
7TH DISTRICT, PENNSYLVANIA

407 CANNON HOUSE OFFICE BUILDING
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(215) TR 6-6258

Upper Darby Office
July 9, 1980

John Coscia, Director
Environmental Planning Division
Delaware Valley Regional Planning Commission
Penn Towers Building
1819 J. F. Kennedy Boulevard
Philadelphia, PA 19103

Dear Mr. Coscia:

I am writing in regard to the Executive Summary of the Fifth Meeting of the Philadelphia International Airport Noise Study Committee.

As a member of the Committee, I would like to comment on the fact that the limited curfew noise-abatement strategy has been assigned a low priority. It is the opinion of both myself and my constituents from Tinicum that a limited curfew should be included in the high priority category. In addition to being one of the more effective abatement strategies, it would cause little or no economic disruption.

With kind regards, I am
Cordially,

Bob Edgar

ROBERT W EDGAR

RE:jbm

TINICUM TOWNSHIP PLANNING BOARD

10 July 1980

Delaware Valley Regional Planning Commission
Philadelphia International Airport Noise
Study Advisory Committee
Penn Towers Building
1819 J. F. Kennedy Blvd.
Philadelphia, PA 19103

Gentlemen:

We have completed our review of the DVRPC Executive Summary of noise abatement strategies and our comments are as follows:

LIMITED CURFEW: It is our opinion that the "Economic Impact Statement" presented to the Noise Study Advisory Committee indicating a loss of 2,500 to 3,000 jobs unrealistic, has not been justified, and should be considered unacceptable until it is properly verified and reviewed. Based on a realistic economic impact statement it is recommended that the FAA reconsider and present a modified night curfew which would be beneficial to the entire community.

SOUND INSULATION OF BUILDINGS: It is recommended that this committee request Congress to approve funding from the Airport-Airways-Trust-Fund to finance costs in affected areas where aircraft noise levels exceed 75 Ldn. (Based on FAA data presented to this Committee noise levels above 75 Ldn are unsatisfactory for a residential area.)

Respectfully,

Norbert J. Poloncarz

Norbert J. Poloncarz
Secretary

Copy to:
Tinicum Township Board of Commissioners

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

AIR TRAFFIC CONTROL TOWER
PHILADELPHIA INTERNATIONAL AIRPORT
PHILADELPHIA, PENNSYLVANIA 19153

July 23, 1980

John J. Coscia, P.E.
Director
Environmental Planning Division
Delaware Valley Regional Planning Commission
1819 J.F. Kennedy Blvd
Philadelphia, PA 19103

Dear John:

We have reviewed the Philadelphia International Airport Noise Study and can offer no comments contrary to the work and recommendations of the committee.

We feel that the residents involved showed a level headed, fair minded approach to the problem. Specifically in protecting their communities they did not want to force any untenable situation on other communities.

Philadelphia Tower will do it's utmost to cooperate with surrounding communities and the airport sponsor in controlling noise.

ROBERT J. BECKELMAN, JR.
Facility Chief

ROBERT W. EDGAR
7TH DISTRICT, PENNSYLVANIA

407 CANNON HOUSE OFFICE BUILDING
WASHINGTON, D.C. 20515
(202) 225-2011

Congress of the United States
House of Representatives
Washington, D.C. 20515

DISTRICT OFFICES:
204 LONG LANE
UPPER DARBY, PENNSYLVANIA 19082
(215) FL 2-0790

604 AVENUE OF THE STATES
CHESTER, PENNSYLVANIA 19013
(215) TR 6-8250

Upper Darby Office
July 24, 1980

John Coscia, Director
Environmental Planning Division
Delaware Valley Regional Planning Commission
Penn Towers Building
1819 J. F. Kennedy Boulevard
Philadelphia, PA 19103

Dear Mr. Coscia:

I and the Commissioners of Tinicum Township would like to have several points added to the Draft Report on the Philadelphia International Airport Study.

The specific curfew noise abatement strategy should be categorized as high priority rather than low priority, as it would not only be effective but would not be disruptive economically.

Sound insulation of buildings should indeed be a high priority strategy, and the necessary funding could be drawn from the FAA's Airport-Airways-Trust Fund. Thus, I request that the FAA recommend to Congress that Tinicum and other such areas benefit from funding from the above source. I will contact my colleagues in Congress in regard to furthering this process.

With kind regards, I am
Cordially,

Bob Edgar
ROBERT W. EDGAR

RE:jbm

CITY OF CAMDEN
CITY HALL
CAMDEN, N.J. 08101

July 29th, 1980.

Mr. John J. Coscia, P.E.,
Director, Environmental Planning Division,
Delaware Valley Regional Planning Commission,
1819 J.F. Kennedy Boulevard,
Philadelphia, Pa. 19103

Dear Mr. Coscia:

We have been involved in the Airport Noise Study since the beginning. We are pleased to see our comments and suggestions reflected in the draft report. We realize that the study primarily makes recommendations to Congress and that before any of the recommendations can be implemented, additional studies will be required.

The City of Camden takes the position that any future studies must address the inter-relationship of weather conditions, resident complaints and monitoring. Failure to do so will not give a valid model of noise problems, nor wil it allow evaluation of strategies which will only affect operation under ideal weather conditions.

The City proposes that any noise level of greater than 75db should constitute a primary standard violation, and only be sanctioned at times of severe operational necessity.

The City is opposed to any "redistribution strategy" which causes previously unaffected areas to be adversely impacted.

Each of the affected municipalities should be encouraged to review their land use and zoning patterns and, where possible, adopt use patterns more compatible with the airport location.

Although additional work remains to be done, this study represents a good first step in dealing with the airport noise problem. The ability of government agencies, private industry and the public in working together in developing this study is to be commended.

Sincerely,

Harry W. McVey

Harry W. McVey
Supervising Planner

jdf

COMMISSIONERS OF TINICUM TOWNSHIP
MEMORIAL BUILDING
ESSINGTON
DELAWARE COUNTY, PENNSYLVANIA
P.O. ADDRESS
629 N. GOVERNOR PRINTZ BLVD., ESSINGTON, PA. 19029
(215) 521-3530

July 29, 1980

Mr. John Coscia
Environmental Planning Division
Delaware Valley Regional Planning Commission
Penn Towers Building
1819 John F. Kennedy Boulevard
Philadelphia, Pennsylvania 19103

Dear Mr. Coscia:

This letter is in response to the draft copy of "REPORT TO CONGRESS: EFFECTS OF AIRPORT NOISE ON A NEIGHBORING STATE" dated July 1980, and to the work of the Philadelphia International Airport Noise Study Advisory Committee.

Although this five-member Board of Commissioners was unable to attend the June 16th, meeting of the Advisory Committee which was held in Cherry Hill, New Jersey, due to other important prior committments, Mr. Edward Keyser, Zoning Officer, and Mrs. Susan P. Jacobs, concerned citizen, were present. We want to go on record as stating that the following should be given high priority catagorization:

1. Night Curfew
2. Noise distribution
3. Increased use of runway 17-35
4. Lengthening Runway 17-35
5. Airport operations consistent with the agreements of the 1960's and 1970's
6. Soundproofing of buildings

The reasons for high priority catagorization are as follows:

1. Night Curfew. This is a most effective noise abatement strategy as indicated in the "Report to Congress...", notably on pages 105 and 117. A modified night curfew would entail little economic hardship.

2. Noise distribution. It is our opinion that this option is the fair way to deal with the problem of noise pollution.

3 & 4. Use of runway 17-35 for jets approaching from the South and lengthening 17-35 for use under crosswind conditions—these two go hand-in-hand. This type of action would offer the greatest relief to Tinicum as it would reduce the number of operations which currently overfly Tinicum Township. Although this would result in increased noise levels over Eastwick, Philadelphia is the owner and operator of the airport and as such derives the direct economic benefits from its operation. We, therefore, feel that it is proper for Philadelphia to assume the greatest share of the burden of airport noise.

5. Airport operations consistent with the agreements made in the 1960's and 1970's. When Philadelphia wanted to expand the parallel east-west runway in Tinicum, certain agreements were made as to the use of those runways to provide relief from airport noise for Tinicum Township. Philadelphia has consistently ignored those agreements with the result being that Tinicum has been subjected to intolerable amounts of noise from the airport.

6. Soundproofing of homes. This abatement procedure has already received a high priority rating. Sound insulation would help to shut out some of the most pervasive problem in Tinicum, airport noise. This is, of course, only a partial solution in that it offers no relief for those who are out of doors.

We are absolutely opposed to <u>any</u> head-to-head operations over Tinicum Township. We also feel that real property noise notices should be given low priority or not recommended ratings because they offer <u>no</u> relief from noise pollution. This is <u>not</u> a noise abatement strategy but rather a "complaint abatement" strategy.

It is our opinion that the majority of the items currently placed in the high priority catagory offer no real relief to our Township, which has borne the brunt of airport noise for the last twenty years. It indicates a lack of awareness of the real situation here and is a half-hearted approach to resolving the problems of noise pollution in the highest noise impacted area. As indicated on Page 70 of the draft report, all of Tinicum Township lies within the 65 LDN contour, except for one section which is in the 75 LDN contour.

It has come to our attention that the manner in which the various items were voted into catagories deserves some comment. It is our understanding that the assignment of the priorities to each of the three catagories was determined by a show of hands-one man, one vote. Unfortunately, only Mr. Keyser and Mrs. Jacobs were able to attend the June 16 meeting, and each could cast but one vote on the various issues acted upon. Therefore, we do not feel that the voting represents the interests of those areas which have the greatest noise problem, but rather those which sent the greater number of representatives, or since the meeting lasted late into the evening, those who were able to stay. There should have been a weight factor attached to the voting, so that those individuals representing people in areas most adversely affected by airport noise could at least equal the votes of community groups whose noise problems were minimal by comparison.

Under the Quiet Communities Act of 1978, the major emphasis of this study has been on airport noise. We are also concerned about airport safety, and we favor those procedures which tend to keep aircraft from flying directly over residential portions of our township.

Yours very sincerely,

TINICUM TOWNSHIP BOARD OF COMMISSIONERS

Thomas Giancristoforo
President

mrm

Air Transport Association ata OF AMERICA

Eastern Regional Office
181 South Franklin Avenue
Room 601
Valley Stream, New York 11581
Phone (212) 656-4777
(516) 791-3444

August 1, 1980

Mr. Steven E. Starley
Airport Program Manager
Office of Noise Abatement & Control
Environmental Protection Agency
1921 Jefferson Davis Highway
Building 2 - Crystal Mall
Washington, D. C. 20460

Dear Mr. Starley:

The airlines serving the Delaware Valley Region, through Philadelphia International Airport, have a major commitment to achieve noise abatement, wherever possible, to reduce community noise impacts. I believe this is obvious from our active participation on this study's Technical Advisory Committee. These efforts are continuing, as noted by "Currently in Effect" on two of the three high priority recommendations involving operations in the study document. The final high priority operational item, Night Use of Runway 9R/27L, is being considered at this time for earliest implementation by the users.

As part of our Technical Advisory Committee activities, we have reviewed the July 1980 draft report to Congress. Several areas require clarification, change or additional comment.

The proposed Limited Night Curfew was selected by the committee as a low priority recommendation. Without any explanation it has been elevated for primary consideration. This is totally inconsistent with the findings of the committee as the meeting minutes and the committee's vote clearly show. For example, the second paragraph on page 121 states, "Based upon the majority and minority reports and the analyses developed by the EPA/FAA study team, it is still clear that limited curfew and preferential runway use constitute the primary avenues of noise control open to Philadelphia International Airport." We submit that it is not clear that the limited curfew is a primary avenue of noise control. It was not studied or analyzed, and, in fact, the committee recommended it as a low priority proposal. Unless corrected to reflect lack of analysis and the actual positions of the committee membership, the discussion above of the curfew proposal is entirely inaccurate.

A similar comment is made in the Executive Summary: "The detailed results of these analyses are reported at great length herein, but, in summary, the most effective options for Philadelphia International Airport consist of restricting the numbers of nighttime operations (partial curfew) along with a preferential runway use program to keep aircraft away from populated areas." This too is incorrect and misleading and requires correction.

It has been and remains our position that the limited night curfew cannot be accepted in any way by the air carriers, or, we believe, by the passengers and shippers who depend on Philadelphia International Airport. No curfew can be designed which does not have,at least, a serious adverse economic impact on the region.

Several of the other recommendations listed as low priority are questionable at best, and could be, overall, more detrimental than beneficial. These include Noise Distribution and The River Approach. Extreme care must be used in any further discussion of these proposals to insure that they are properly evaluated before implementation is considered. Such a caveat should be added in the body of the study report.

We have appreciated the opportunity to participate in the study, but continue to be deeply concerned over any suggestion that limited curfew can be a workable proposal for noise abatement at Philadelphia International Airport.

Sincerely,

E. N. O'Hare

Emmett N. O'Hare
Deputy Director

cc: E. W. Sellman, Chief Noise Technology Branch
Office of Environment & Energy, FAA

L. Tondel, Cleary, Gottlieb, Steen & Hamilton
M. A. Wolf, DVRPC
M. A. Verville, ATA Public Affairs Coordinator (NJ)(EA)
J. B. Reagan, Chairman PHL AAAC (TW)
S. J. Slade, ATA Public Affairs Coordinator (PA)(TW)
J. D. Collier, ATA/DCA
J. V. McGinn, ATA/DCA

COUNTY OF DELAWARE
COURT HOUSE
MEDIA, PENNSYLVANIA 19063

A C 215-891-2301

August 1, 1980

Mr. Steven Starley
1419 Fallsmead Way
Potomac, Md. 20854

REF: Philadelphia International
Airport Noise Study

Dear Mr. Starley:

The Delaware County Planning Department has reviewed the EPA/FAA report to Congress on the Philadelphia International Airport Noise Study, and we wish to submit the following comments for your consideration. Our comments are divided into general remarks on the nature of the study and resulting document and specific comments concerning selected alternatives.

STUDY/DOCUMENT COMMENTS

While this study did not employ an elaborate citizen participation process, we were pleased to see that the committee structure did contain a broad cross-section of interest groups and that it seemed to function well. We were especially pleased to see that our local municipal representatives and citizen groups actively participated since we gained valuable insights from them. In the future, an attempt should be made to provide a mechanism to allow this to happen in an on-going manner.

While we feel that the methodology used to develop the study was basically sound, we would strongly suggest for any future studies that every attempt be made to provide a time frame for study such that the telephone hotline complaint service and the community opinion survey can be conducted over the summer months when airport noise impacts are most critical.

Although we are generally satisfied with the content of the document, we feel that its one major shortcoming is that it does not identify any future course of action or set out further steps toward implementation. The last paragraph of the report alludes to the point that there should be further action, but it gives no guidance to Congress as to its options. If the advisory committee is to be continued through further study and implementation, and we agree that it should, some funding source and coordinative body must be identified to support this activity.

SPECIFIC ALTERNATIVE COMMENTS

9R-27L Departures and Arrivals at Night

We strongly urge the restriction on use of Runway 9R-27L from 10 pm to 7 am to keep approaches from the west and departures to the west further from Essington. Since the airport does not operate near capacity during these hours, this would seem to be an alternative that could be easily implemented without creating complicated negative impacts on existing operating procedures.

Sound Insulation of Buildings

We recommend that sound insulation of buildings be actively pursued. We recognize that retrofitting existing homes with adequate sound insulation will be a difficult and expensive undertaking. However, we know that even with improved technological developments leading toward reduced airplane noise in the coming years, there will still be high impact areas where jet noise will be a routine problem. We recommend that EPA/FAA urge Congress to explore the funding opportunities and institutional arrangements necessary to provide sound proofing to those high target areas.

Since this is a nationwide problem involving a federally funded system, we feel that it is appropriate that there be a federal source of funding to address this problem. One possible source of such funding might be the Airport-Airways Trust Fund. Since this broadbased fund derives its revenues from airport use, directing these funds toward the correction of problems caused by this use seems reasonable. Therefore,

sound proofing might be a viable use of these monies. Because it is difficult to lay the blame for the problem solely on either the airport or the adjacent municipalities and their residents, it would seem to be appropriate for both bodies to assume some responsibility in combatting the problem. Perhaps this fund could be used to provide low interest loans for sound proofing to residents in impact areas. This would stretch the federal funds and would allow more people to benefit from their availability.

In conjunction with this, EPA/FAA may want to take a more active role in working closely with local municipalities to encourage them to institute land use controls and building code provisions sensitive to airport impacts.

Noise Monitoring

We also recommend that noise monitoring be further explored. It is critical that the noise monitoring program developed be one where the information gathered is acted upon in an expeditious manner. We are sure that some noise complaints and airport claims are not entirely valid. This would seem to be a good method of pinpointing the source of those problems that are real and would get the airport and its neighboring municipalities communicating so that they could jointly address those problems that are correctable. In this way, the number of problem events could be minimized.

Limited Curfew

While we recognize the serious economic considerations involving a full night curfew, a limited curfew suggests the potential for striking a better trade-off between these negative economic impacts and the noise reduction that would occur through implementation of this procedure. Although the limited curfew was only judged a low priority by the committee, we suspect that it may have ranked higher had noise contours for this condition been developed. We feel the case was made for a further analysis of this procedure and urge that this be given a high priority for further study.

Thank you for the opportunity to present these comments.

Very truly yours,

Leon Levine

Leon B. Levine, AICP
E-33 Director, DCPD

cc: EPA Noise Office
Michael Wolf