NOISE CONTROL AND LAND USE COMPATIBILITY STUDY

PHASE THREE REPORT

VOLUME II

Los Angeles Internationational Airport

Participants:

Los Angeles County AIRPORT LAND USE COMMISSION

City of Los Angeles DEPARTMENT OF AIRPORTS

County of Los Angeles
City of El Segundo
City of Hawthorne

City of Inglewood
City of Los Angeles
Federal Aviation Administration

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LOS ANGELES INTERNATIONAL AIRPORT

NOISE CONTROL/LAND USE COMPABILITY STUDY

PHASE THREE REPORT

VOLUME II

ANALYSIS OF LAND USE ALTERNATIVES

AND

AIRPORT OPERATION STRATEGIES

MARCH 1984

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VOLUME II
ANALYSIS OF LANDUSE ALTERNATIVES
AND
AIRPORT OPERATION STRATEGIES

INTRODUCTION

The contents of this Volume II, a part of the LAX-ANCLUC Phase Three Report describes the alternative land use actions and airport operational strategies developed and analyzed by the LAX-ANCLUC Joint Technical Committee (JTC). The report is divided into two main sections with the related supporting information included as appendices.

The first part of Section One--Land Use Alternative Report--describes the degree of land use conflict between the surrounding communities and the Airport, defines incompatible land use in terms of noise impact zones, provides a description of the compatibility conflict, identifies the potential for land use change, current development trends and existing related public policy. The second part of Section One describes land use conflict mitigation techniques including; land use change, acoustical insulation and shielding, avigation easements and potential legislative and/or administrative actions.

Section Two, an analysis of Airport Operational Alternative Strategies, provides a detailed description of the noise impact evaluation methodology, discusses the utilization of this methodology in the LAX-ANCLUC study process and includes a cause/effect assessment of 19 airport operational alternative strategies, which compare the change in impact from each alternative against the projected 1987 Comparison Case.

SECTION ONE

LAND USE ALTERNATIVE REPORT

SECTION ONE

LAND USE ALTERNATIVE REPORT

I. INTRODUCTION

A. Description of the Problem

1. Problem Statement

a. Identified Problems

As part of Phase II of the ANCLUC Study, considerable effort was devoted to identifying specific airport/community compatibility issues. Through a process involving both technical staff analysis and community participation, three basic land use related problem areas were articulated. First, it was recognized that a significant amount of incompatible land use presently exists within the known airport noise impact area. Second, much of the impact area consists of sound, stable residential neighborhoods where no trend toward recycling to airport compatible use exists or can be anticipated. Third, it was noted that new noise sensitive uses continue to be developed within the known noise impact area, contrary to the intent of California State noise regulations.

b. Community Comment

During a series of community workshops, local residents voiced a number of related concerns. Some felt that local communities were not adequately controlling new development. While generally agreeing, others felt that the demand for housing will make it difficult to reduce airport/community compatibility conflicts. Schools were a commonly cited area of concern, particularly those which are directly overflown. Many parents were concerned that such schools are not adequately insulated, and that aircraft noise disrupts normal classroom and playground activities.

Other community residents noted that land use conflicts are resulting from the expansion of airport related activities in proximity to residential neighborhoods (i.e., freight forwarding facilities, etc.), and feared that additional traffic and congestion might accompany the airport's proposed Northside and West End development projects.

The full range of community comment has been documented in the final Phase II Report, and need not be reiterated here. Instead, the introductory portion of this paper is intended to define and quantify the extent of the airport/community compatibility problem, and provide a foundation for evaluating alternative land use conflict mitigation strategies.

2. Definition of Incompatible Land Use

The definition of incompatible (noise sensitive) land use involves both the degree of noise exposure, as measured in terms of the Community Noise Equivalent Level (CNEL), and the specific nature of the land use affected. Recognizing that related standards and definitions vary in existing local, state and federal regulations, it is necessary to clearly define the concept of incompatible land use as it is employed within the LAX ANCLUC Study.

a. Noise Impact Zones

The LAX noise impact area is defined based upon the Community Noise Equivalent Level (CNEL) measurement technique. This technique essentially describes the average annual noise exposure of an area, assigning different weights to measured or calculated noise impacts occuring in daytime, evening and nighttime periods.

For purposes of the ANCLUC Study, the noise impact area is divided into three zones as follows.

Zone I - 75+ dB CNEL
Zone II - 70 to 75 dB CNEL
Zone III - 65 to 70 dB CNEL

While these zones provide a general indication of average noise exposure and are useful for purposes of definition and comparison, there remains a need to further analyze the precise character of noise impacts, including single event impacts, during the process of evaluating specific mitigation programs. This need is further addressed in a a series of technical papers dealing with specifia airport "ground noise" and "single event" noise sources (see Phase III, Volume 3).

b. Incompatible Land Use

As mentioned above, the definition of incompatible land use varies from one community to another, as well as within the regualtions of local, state and federal agencies. Such variation is appropriate since it reflects the value or import placed on noise sensitivity by differing agencies and jurisdictions. For purposes of this Study, incompatible land uses are defined as follows.

- mobile homes within a 65 dB or greater CNEL*
- non-acoustically treated single and multi-family residential uses within a 65 dB or greater CNEL*
- all single and multi-family residential uses within a 75 dB or greater CNEL*

- non-acoustically treated transient lodgings within a 65 dB or greater CNEL*
- all transient lodgings within a 75 dB or greater CNEL*
- schools within a 65 dB or greater CNEL**
- churches, temples and places of worship within a 65 dB or greater CNEL**
- hospitals, rest homes and convalescent homes within a 65 dB or greater CNEL**

While the above are specifically defined as noise incompatible land uses, it should not be infered that all other uses can be located in airport environs without regard to potential noise exposure. Instead, this definition is designed to encompass the primary and most prevalent noise sensitive land uses within the study area.

3. Description of Compatibility Conflict

Having defined the concept of incompatible land use, it is now possible to describe and quantify the magnitude of existing and anticipated airport/community compatibility conflicts. Three cases are described below, including the airport noise impact area as it existed in 1979 (1979 Base Case), the impact area as it existed in 1982 (1982 Case), and the noise impact area as it will presumably exist in 1987 (1987 Case).

The 1979 Base Case has been generated as background data for the ANCLUC Study. The 1982 Case essentially represents existing conditions, and further constitutes the baseline noise exposure data submitted to the Federal Aviation Administration as part of the Airport Noise Compatibility Planning program (Part 150). The 1987 Case reflects the anticipated noise impact area assuming existing local, state and federal noise abatement policies are implemented within the currently established timeframe. This case provides a basis for comparative analysis of the effectiveness of additional noise mitigation alternatives to be evaluated as part of Phase III of the ANCLUC Study.

For each case, basic assumptions regarding the level and nature of operations at LAX are set forth, the geographic extent of the noise impact area is described, and the dwelling units and population affected are quantified.

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* Not subject to an avigation easement.

** Not acoustically treated and subject to an avigation easement.

a. 1979 Base Case

In 1979, the level of activity at LAX reached approximately 387,580 operations (take offs and landings), serving nearly 33.8 million annual passengers (MAP). The utilization of north and south runway complexes was imbalanced with 68% of all operations occuring on the south runways. Over-ocean operation procedures for both take offs and landings were in effect from midnight to 6:30 a.m. The fleet mix, i.e., the type of aircraft serving LAX, included approximately 40% Part 36 compliant (quieter) aircraft.

The noise impact area resulting from LAX operations is shown on Figure I. As can be seen, the impact area associated with north runway complex operations primarily affects the communities of north Inglewood, Westchester and Playa Del Rey. The "tail" of the 65 dB CNEL contour extended as far easterly as Western Avenue, primarily affecting neighborhoods south of Manchester Avenue. The "sideline bulge" in the contour extended northerly in the Emerson Manor area to approximately 82nd Street.

Operations on the south runway complex impact communities in southwest Los Angeles, the southern portions of Inglewood, the unincorporated communities of Lennox and Del Aire, and neighborhoods in the cities of Hawthorne and El Segundo.

The 65 dB CNEL contour extends easterly to approximately Avalon Boulevard, with the sideline contour dipping southerly to 23rd Street in the Del Aire area, and to Grand Avenue and below in western El Segundo.

The following chart describes the impact area in terms of dwelling units and population affected.

CHART I - 1979 Base Case

	Dwelling Units	Population
Zone I: 75+ dB CNEL	6,585	18,270
Zone II: 70 to 75 dB CNEL	11,221	27,115
Zone III: 65 to 70 dB CNEL	23,126	57,264
Totals	40,932	102,649

b. 1982 Noise Impact Area

The 1982 noise exposure map (Figure II) reflects a reduced operational level at LAX. Aircraft traffic volumes were at 364,000 annual operations, with approximately 32.2 million passengers passing through the airport. This dip in operations was the result of several factors, including the air traffic controlers strike and general economic conditions.

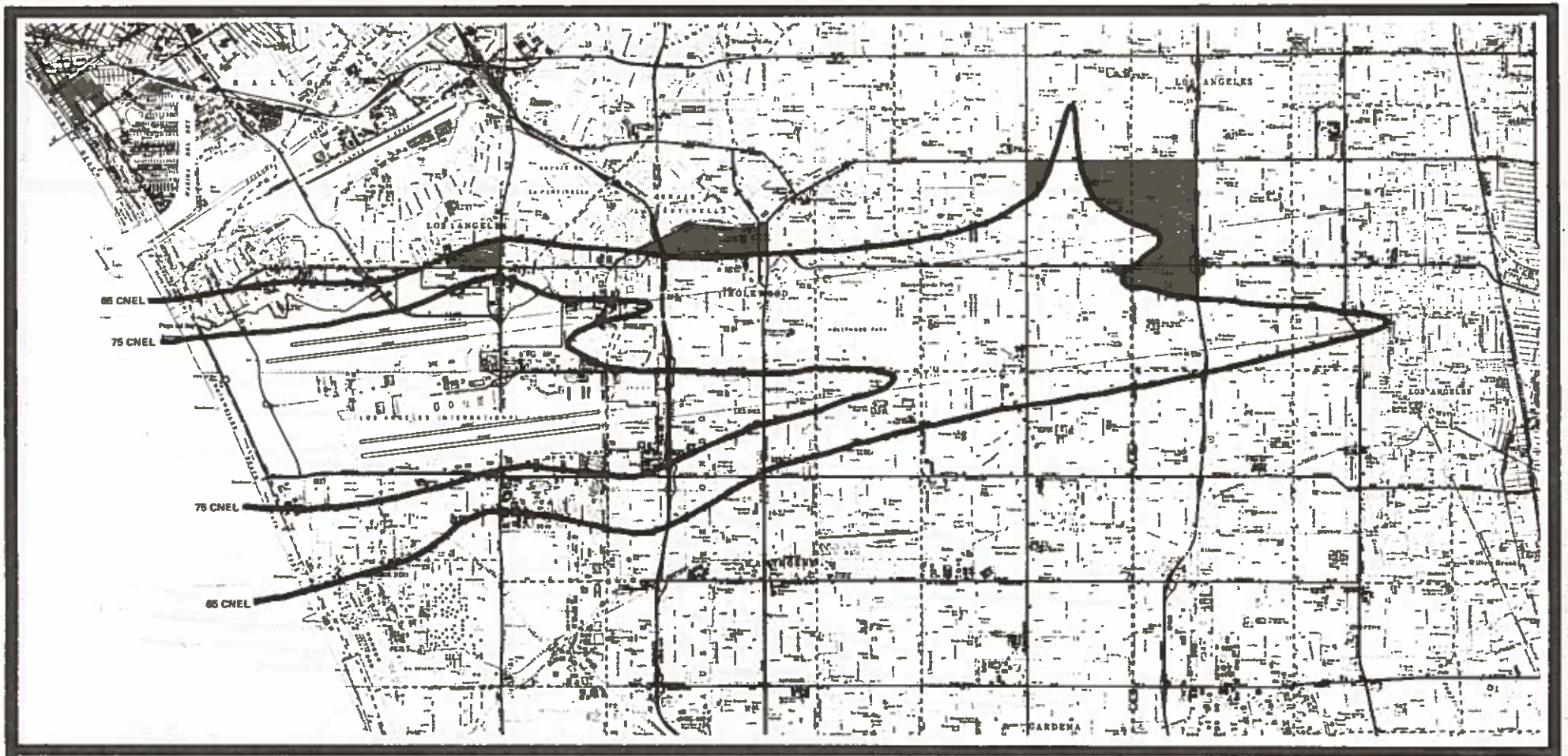

FIGURE I

1979 AIRPORT NOISE IMPACT AREA

Participants:

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County of Los Angeles
City of El Segundo
City of Hawthorne
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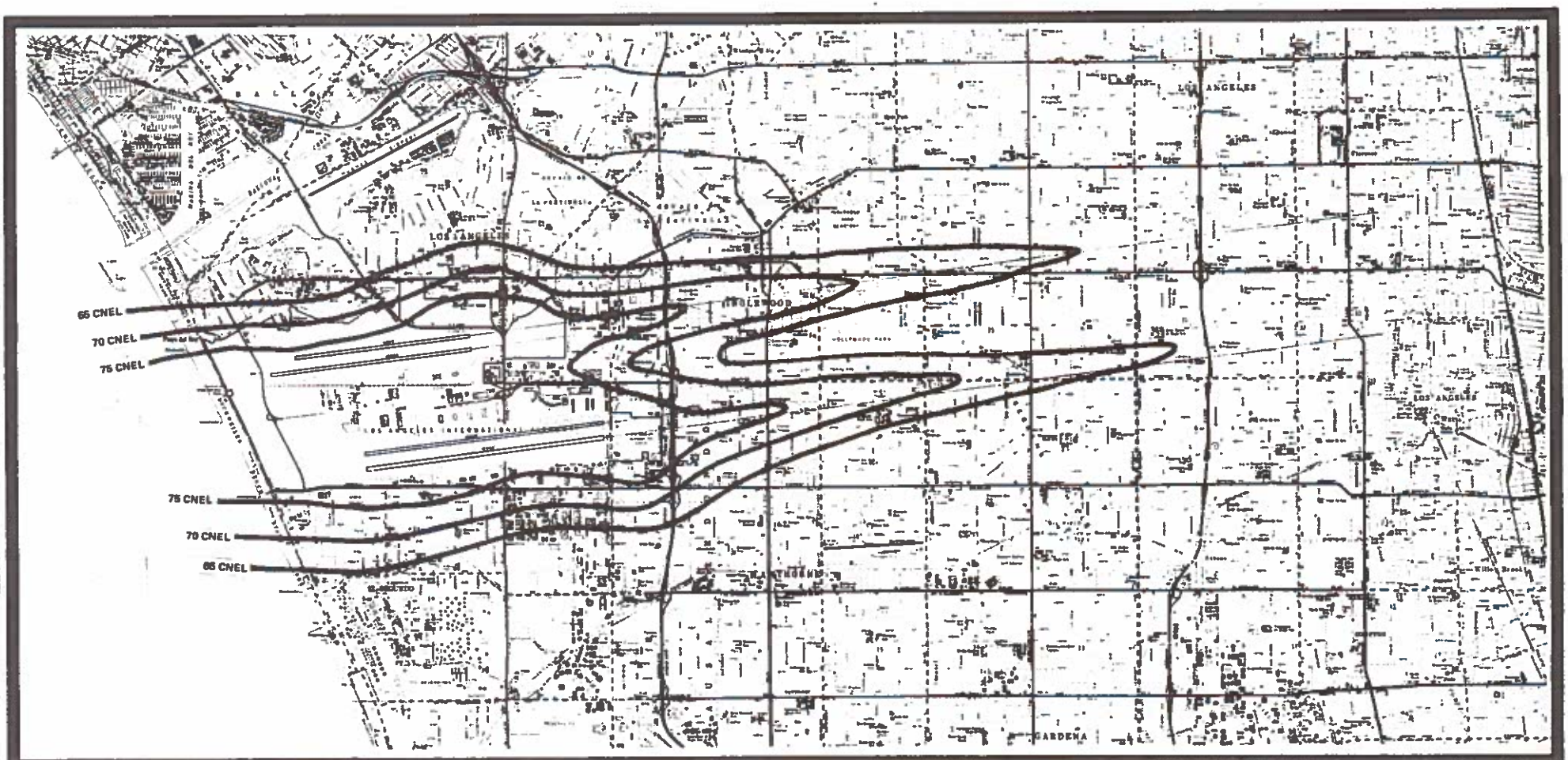

FIGURE II

1982 AIRPORT NOISE IMPACT AREA

Participants:

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Reconstruction activity to strengthen the Sepulveda Tunnel crossing on runway 25R (southerly inboard) resulted in an imbalanced runway usage, with landings of heavier aircraft diverted to the north runway complex. Approximately 60% of total landings took place on the northerly two runways. Take off operations remained essentially balanced, although an increased number of departures were assigned to the outboard south runway (25L).

During part of the 1982 period, over ocean operations (i.e., night time noise abatement procedures) were suspended due to air traffic control constraints caused by the controllers strike.

The 1982 contours illustrated on Figure II are based upon the quarterly readings compiled as part of the airport's noise monitoring program. Due to the increased number of jet aircraft landings assigned to the north runway complex, the tail of the northerly 65dB CNEL contour grew in both length and width. The expanded noise impact area primarily affected residential neighborhoods within the City of Inglewood, both north of Manchester Avenue and east of Crenshaw Boulevard.

The associated sideline bulge increased somewhat in the Westchester area, again related to landing aircraft and the use of thrust reversers for braking.

Further to the west in Playa Del Rey, the sideline contour shrank. This area is not primarily impacted by normal landing operations, and probably benefited from the general reduction in total operations from 1979 levels, as well as from the increased percentage (80%) of Part 36 Stage II compliant aircraft operating at LAX. In addition, the suspension of night time over ocean operations may have benefited the westerlymost communities, both north and south of the airport.

The shift of landing operations to the north, the increased percentage of quieter aircraft, and the suspension of night time over ocean operations combined to reduce the noise impact area associated with the south runway complex. The easterly tail was shorter and narrower than that which existed in 1979, and the sideline niose impact area was reduced in the communities of Del Aire and El Segundo.

Chart II quantifies the dwelling units and population within the 1982 noise impact area.

CHART II - 1982 Case

	Dwelling Units	Population
Zone I: 75+ dB CNEL	3,391	8,564
Zone II: 70 to 75 dB CNEL	13,862	36,005
Zone III: 65 to 70 dB CNEL	19,389	47,722
Totals	36,642	92,291

c. Projected 1987 Case

The anticipated 1987 airport noise impact area has been projected utilizing a computer modeling technique known as the Integrated Noise Model (INM). Basic assumptions regarding future operating characteristics of the airport are programed and run to produce estimated future noise contours.

The 1987 Case assumes an annual activity level of 500,000 operations and 40.0 million annual passengers. Runway utilization is essentially balanced, and the operating fleet mix is 100% Part 36 Stage II compliant, including 16% Stage III (new generation quiet) aircraft. Over ocean operations remain in effect from midnight to 6:30 a.m.

Figure III displays the projected noise impact area. The northerly tail of the 65 dB CNEL contour is considerably reduced in both length and width, when compared to the to the 1982 Case. The sideline bulge however, is somewhat increased in the Westchester and Playa Del Rey communities. These changes reflect a balanced runway utilization, projected increase in the number of quieter aircraft, reducing noise impacts under normal approach paths, and a projected increase in the total number of operations, causing a slight expansion of the northerly sideline contour.

The noise exposure contour for the southerly runway complex is similarly reduced in its easterly extent and width, again due to the projected increase in Part 36 compliant aircraft. Here, the sideline contour is only slightly enlarged in the communities of Hawthorne and Del Aire, while there is no increased noise exposure in the City of El Segundo.

In quantifying projected 1987 noise impacts, it was assumed that land use patterns would remain the same as those in the 1979 and 1982 cases. Chart III indicates the projected impacts for 1987, and shows the change from 1982 conditions.

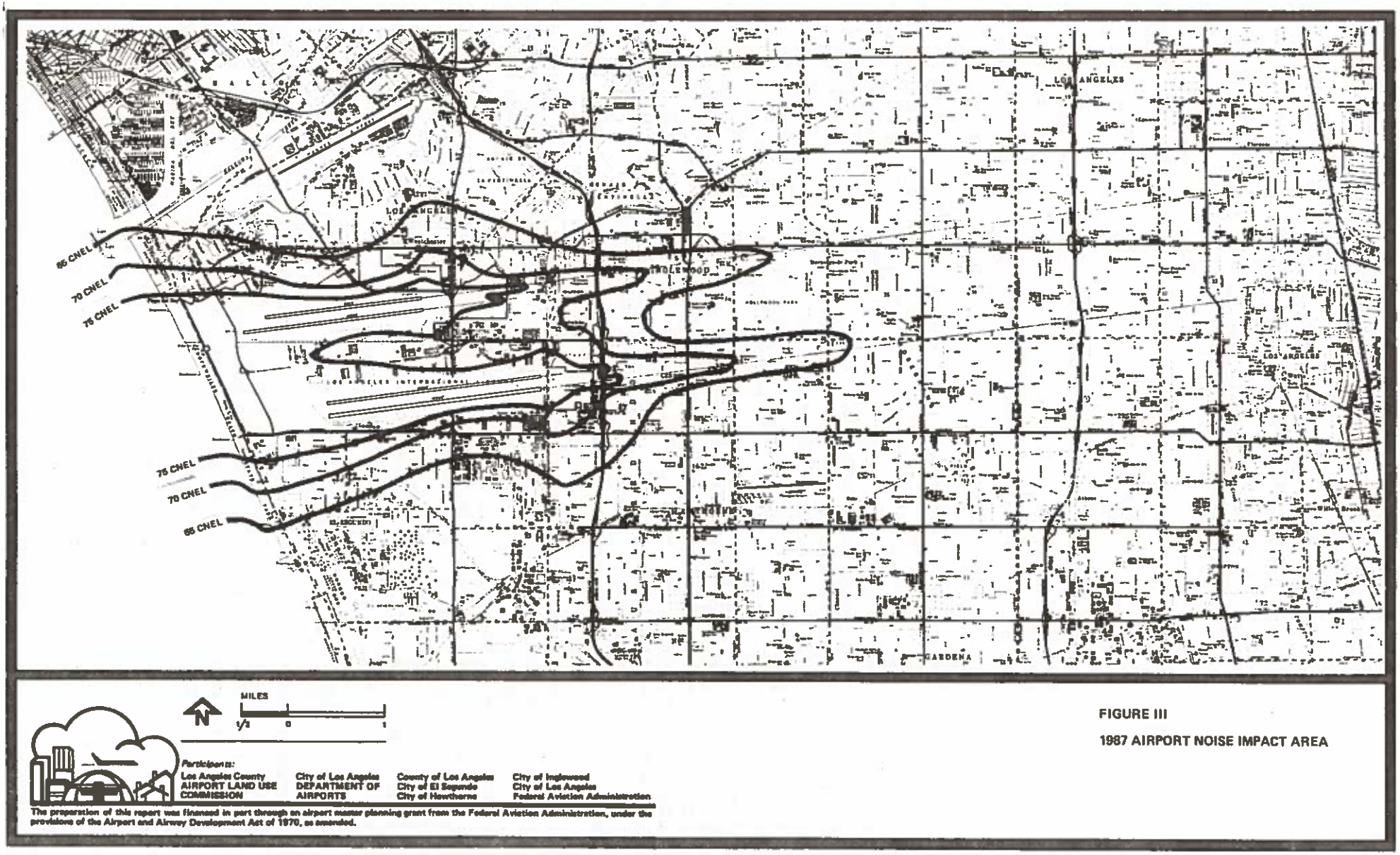

FIGURE III

1987 AIRPORT NOISE IMPACT AREA

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Chart III - Projected 1987 Case

	Dwelling Units	Population
Zone I: 75+ dB CNEL	973	2,128
1982-87 Change	-2,418	-6,436
Zone II: 70 to 75 dB CNEL	7,272	17,336
1982-87 Change	-6,590	-18,669
Zone III: 65 to 70 dB CNEL	20,616	50,188
1982-87 Change	+1,227	+2,466
Total	28,861	69,652
Total 1982-87 Change	-7,781	-22,639
	(21%)	(25%)

As with any projection of future conditions, there are uncertainties associated with the estimated 1987 noise impact contours. First, the projected volume of airport activity (i.e., 40 MAP) and the related number of aircraft operations are based on current airport policy, and are underlain by assumptions regarding future travel demands, industry practices in terms of aircraft loading, as well as national and international economic conditions. Second, the estimated 1987 fleet mix (i.e., the percentage of new generation quieter aircraft) is highly dependent on the airline industry's ability to replace or re-engine older, more noisy aircraft. Such replacement and retrofit programs are extremely costly. If, due to econoimic conditions, the industry is delayed in its efforts to modernize present fleets, pressures to postpone current Part 36 compliance deadlines and related local noise abatement policies will most certainly increase.

Despite the uncertainties noted above, an underlying assumption of the LAX ANCLUC Study is that present noise abatement policies at both the federal and local levels will be implemented within the established schedule. As a result, the noise contours reflected by the 1987 projection constitute a baseline for comparing the cost/effectiveness of additional noise impact mitigation strategies. Further, the analysis of land use alternatives will be focused on specific areas within this contour.

4. Potential Land Use Change

Approximately 8,690 acres, or 13.58 square miles are encompassed within the projected 1987 65 dB CNEL contour. In 1987, approximately 32% (4.33 sq. mi.) will remain devoted to noise sensitive (i.e., airport incompatible) land use. It is possible however, that present and future development trends within the projected noise impact area may, to some degree, alter such presumed conditions. Similarly, governmental intervention in terms

of development regulation and enforcement practices (which can be either trend or counter-trend in nature) may also influence future conditions. It is therefore, important to explore both trend and public policy as a prelude to evaluating alternative strategies to increase present airport/community compatibility and avoid creation of new conflicts.

a. Development Trends

Indicators of land use trends include, among other factors, the inventory and anticipacted disposition of vacant lands, apparent or anticipated patterns of land use intensification or conversion, and signs of re-investment in, and maintenance of existing community and neighborhood land use patterns. The following discussion briefly addresses these and other trend related factors for each of the noise impacted communities surrounding LAX.

El Segundo

The City of El Segundo lies immediately south of Los Angeles International Airport. In 1980, the city had a population of 13,752. It's housing stock consisted of 6,310 dwelling units, of which 63% were single family residences. Fifty six percent (56%) of the single family dwellings were owner occupied, and the citywide median dwelling unit value was $126,400.

El Segundo's residential community is located in the northwestern portion of the city, adjacent to the airport's south runway complex (Figure IV, Area 1). Over half of this area (4,360 dwelling units) lies within the projected 1987 65 dB CNEL, and is impacted primarily by "sideline" noise associated associated with aircraft arrivals and departures. Most of this area is comprised of stable, well maintained neighborhoods developed during the 1930s.

Within the city's residential area, there is little vacant land. That which does exist (approximately 6 acres) consists of scattered vacant lots and parcels. Despite the limitted amount of land available, and the overall stability of the community, some development activity is evident. Between 1981 and 1983, 76 building permits were issued for the construction of 348 new dwelling units. Of these, 311 were apartment and condominium units. Construction of the 37 single family units absorbed the city's remaining supply of vacent, R-1 zoned paracels. All but 20 of the residential units authorized during this period are located with the projected 1987 65 CNEL contour.

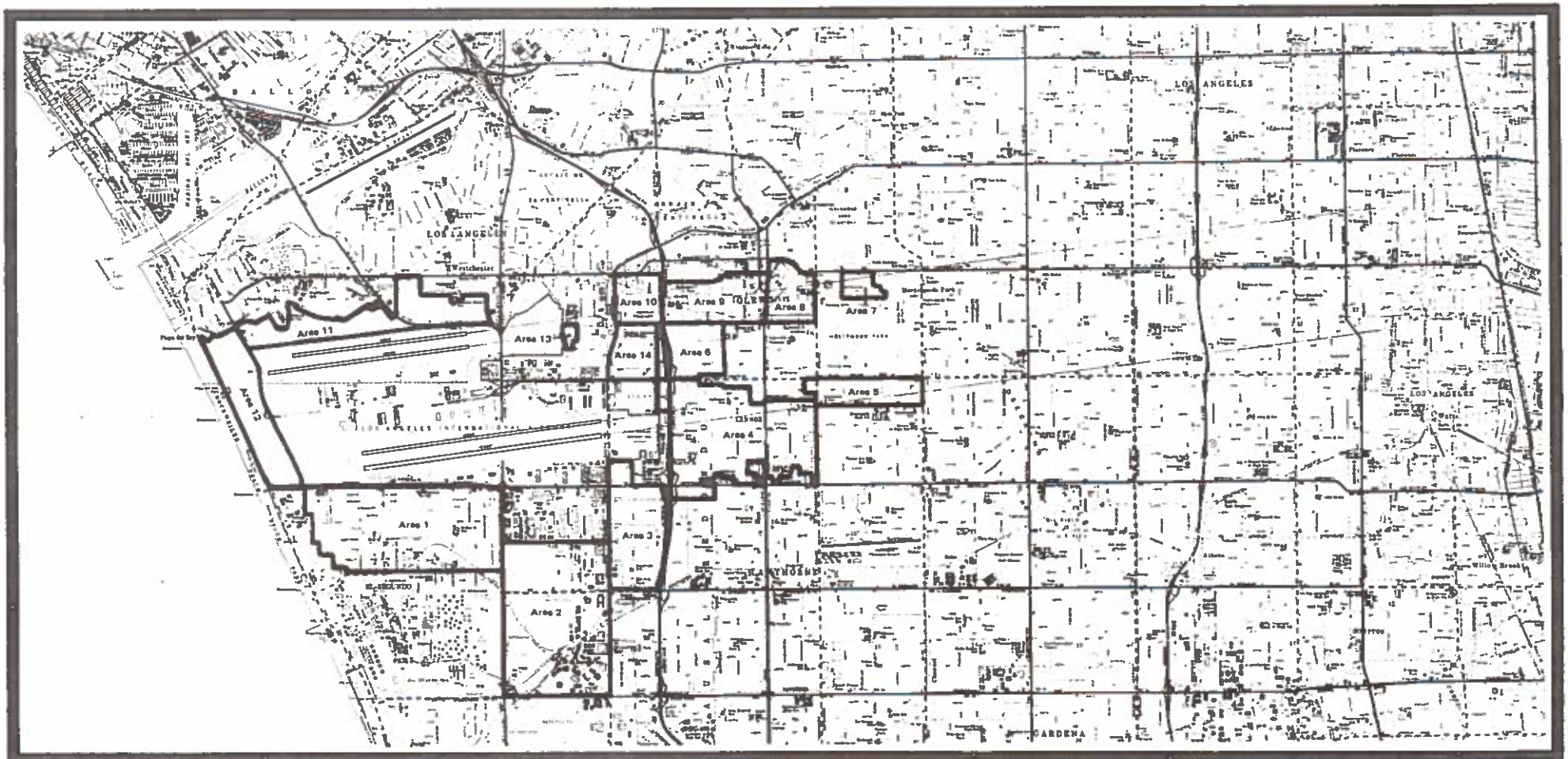

FIGURE IV

DEVELOPMENT TRENDS

Participants:

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One site is presently available for redevelopment within the City's residential sector. The El Segundo Unified School District, in cooperation with a citizen advisory group, is exploring alternative development concepts for the 5.66-acre site of the Imperial Avenue Elementary School. One proposal involving construction of a 90-unit townhouse development was considered by the City, but rejected as a result of strong community opposition. A scaled down proposal involving approximately fifty units, including single family residences and duplexes, is currently being explored. The site lies within the 70 to 75dB and 75db + CNEL contours, and both a zone change and general plan amendment will be required prior to its redevelopment for residential use.

Most of the City's vacant land and development potential is located in the southeasterly portion of El Segundo, and lies outside of the ANCLUC study area boundary (Figure IV, Area 2). However, future development in this area will undoubtably influence the City's residential community.

A recent traffic circulation study, prepared by ASL Consulting Engineers for the City of El Segundo, indicates that based upon current city policy, there is a potential for nearly 12.5 million square feet of new office, commercial, research and development, and industrial office space on presently zoned, vacant and/or underutilized land. Employment generated by such development could substantially increase the City's current 75,000 member (predominately non-resident) labor force, dramatically increasing the already high demand for housing in El Segundo and other nearby communities.

Based upon present indicators, there is little to suggest that the noise impacted residential neighborhoods of El Segundo will recycle to airport compatible non-residential uses. Instead, current trends seem to indicate that such areas will remain essentially stable, with continued neighborhood maintenance and limited residential intensification likely.

Del Aire

Del Aire is an unincorporated community of 8,522 residents, located immediately east of El Segundo, and south of the proposed alignment of the Century Freeway. It is primarily a residential community consisting of just over 3,000 dwelling units, 86% of which are single family homes with an owner occupancy rate of 79%.

1980 Census data and recent field inspections indicate that Del Aire is a stable, well maintained community. Factors contributing to this image include a relatively high median income level, minimal population change between 1970 and

1980, high median housing values and owner occupancy rates, and a low (1.9%) vacancy rate.

There has been only limitted development activitiy in the north Del Aire area (Figure IV, Area 3). However, additional new construction can be anticipated in the coming years due to; 1) the availability of buildable vacant lands within the community; and, 2) the impact of the Century Freeway and associated transit facilities once constructed.

Approximately 30 acres of land, originally purchased and cleared by CalTrans as part of the Century Freeway Project, have since been declared excess property, available for sale and development. Current County planning and zoning policy would allow development of single family residential units on the majority of this property. However, a dialogue has recently been initiated between County planning staff and community representatives to explore alternative uses for these vacant parcels.

One concept now being considered involves development of a low rise, well buffered business park on vacant lands adjacent to the proposed freeway in the northerly portion of the community. The Los Angeles County Economic Development Corporation (EDC) has been authorized by the Board of Supervisors to pursue this concept in negotiations with CALTRANS and other interested parties relative to specific site development plans.

One additional item should be noted in connection with future development in the Del Aire area. Within the City of Los Angeles, just north of Del Aire and immediately adjactent to LAX, development of a major commercial office/hotel complex has been proposed for a 28.8 acre parcel, located on the northeast corner of Aviation Boulevard and Imperial Highway. The proposed project, referred to as Continental City, lies within the 1987 70 dB CNEL contour, and if not properly designed and constructed, could constitute an additional airport compatibility conflict. The compatibility issue not withstanding, development of this nature and magnitude might also serve as a catalyst for new development and redeveloment in the surrounding area. While seperated from the bulk of Del Aire's residential neighborhoods by the Century Freeway corridor, the Continental City proposal, in combination with the north Del Aire business park concept, may increase pressures for additional land use conversion and intensification in the northern portions of this unincorporated communtiy.

Lennox

The unincorporated community of Lennox lies immediately east of the LAX south runway complex, and is bordered by the cities of

Inglewood on the north and east, and Hawthorne on the south (Figure IV, Area 4). Between 1970 and 1980 the community's population grew by 14.4% to a present total of nearly 18,500 residents. At the same time, the community suffered a net loss (9%) of housing units, leaving the current housing stock at approximately 5,700 dwellings. Of these, 72% are single family residences, nearly a third were built prior to 1933, and only 24% are owner occupied. Over-crowding and general deterioration of residential units are key concerns in the Lennox community. Despite these conditions however, property values (as reflected in median unit values) remain relatively high, most likely reflecting the communities "westside" location and proximity to LAX and major office and industrial centers.

Little vacant land remains in Lennox (approximately 10 acres), which is undoubtably one reason why so little development activity is evident. The vacant land that does exist consists of small scattered lots and parcels, over 40% of which are zoned for single family residential use.

While current development activity is almost non-existent, several factors may change this picture in future years. The proposed alignment of the Century Freeway transects the southern portion of the community. The clearance associated with its construction, and the subsequent impacts on land use patterns (i.e., the disposition of excess lands not needed for right-of-way, improved access and transit service, etc.) will no doubt constitute a major stimulus for new growth.

Another factor involves the anticipated closure of Lennox High School by 1987. This facility occupies a 32.8 acre parcel located immediate north of the Century Freeway alignment. Based upon factors such as location, access, size and the limitted supply of available lands in the surrounding community, this property will be well suited for redevelopment.

Lastly, new development is now taking place along Century Boulevard, adjacent to the northerly boundary of Lennox. There is reason to expect that such new commercial, hotel and office development will continue to expand easterly along the Century corridor. In fact, the concept of a commercial redevelopment district encompassing areas both within the City of Inglewood and the unincorporated community of Lennox is currently being explored.

In summary, Lennox does not display the image of a stable residential community. While in general, it can be expected to maintain its overall residential character, pressures are mounting for land use conversion, particularly in its westernmost sectors.

Inglewood

The City of Inglewood lies immediately east of LAX, and is impacted by aircraft operations on both the south and north runway complexes. Approximately 25% of the city's 38,000+ dwelling units are within the projected 1987 65 dB CNEL noise exposure area.

The Lockhaven area, located south of Century Boulevard and roughly bounded by Prairie Avenue on the west and Crenshaw Boulevard on the east, is directly beneath the normal approach path to the southern runways and falls within both the current and projected 65 dB CNEL contour (Figure IV, Area 5). This area contains approximately 2,500 dwellings, 70% of which are apartment units, and houses a population of nearly 7,000.

Due to environmental conditions and declining neighborhood quality, a portion of this area has been included within the City's Century Redevelopment Project area. The remaining portion has been rezoned for light manufacturing use. Both actions reflect the City's desire to encourage future conversion from residential to commercial and industrial land use. The availability of several vacant parcels within the area, may serve as an additional catalyst for such future development.

Residential communities further to the east are essentially stable and well maintained. Neighborhoods to the south of 104th Street are showing signs of reinvestment and rehabilitation, and present indicators suggest a trend toward preservation and enhancement of the area's residential character.

The current 65dB CNEL contour encompasses most of the residential community located west of Eucalyptus Avenue, between Century Boulevard and Arbor Vitae Street (Figure IV, Area 6). Although this areas is not normally overflown by commercial jet aircraft, and some reduction in noise exposure is anticipated, it is projected that approximately 1,060 dwelling units and 2,675 residents will remain within the 1987 65 dB CNEL contour. Never-the-less, these low to middle income neighborhoods, comprised mainly of single family dwelling units, are considered viable and no significant trend toward use conversion or intensification is foreseen.

Residential communities to the north are over-flown by aircraft approaching the airport's northern runway complex. Within both the present and projected noise impact area, some new development is taking place. Immediately east of the Inglewood Forum and south of Manchester Avenue, development of approximately 500 dwelling units on a 44.6 acre parcel has been proposed (Figure IV, Area 7). Because the site lies within the airport noise impact area, the City is requiring the project to be accoustically

insulated. However, under State law as presently interpreted, such residential development is not considered an airport-compatible use, even if through acoustical treatment, interior noise levels are reduced to 45 dB or less.

To the west of Prairie Avenue lies the Manchester-Prairie Redevelopment District (Figure IV, Area 8). Although most of the project area is designated for commercial and hospital-related uses, a 9 block area is slated for future residential redevelopment. Since much of the district is within the 1987 projected 65 dB CNEL contour, the redevelopment plan requires all new residential uses to comply with State acoustical insulation standards.

Further to the west are stable, low to moderate income neighborhoods, some of which lie within the 1987 projected 70 dB CNEL contour. This area is fully committed to single family residential use, and will likely remain so in the foreseeable future (Figure IV, Area 9).

West of the San Diego Freeway, between Manchester Avenue and Arbor Vitae Street is an area of mixed residential and industrial use (Figure IV, Area 10). A portion is within Inglewood's La Cienega Redevelopment Project area, and all is planned and/or zoned for future industrial use. While at present the area contains over 800 dwelling units and a residential population of approximately 2,600, the deteriorating condition of residential structures and ongoing construction of new industrial facilities are strong signals of eventual conversion to airport compatible use.

In summary, development trends within the City of Inglewood, some of which are influenced by City redevelopment programs, indicate a potential future reduction in noise sensitive land use. Approximately one third of the dwelling units within the current 65 dB CNEL contour are located in areas slated for future commercial or industrial use. It is equally as apparent however, that much of the residential area within the projected 1987 noise contour will remain essential unchanged in the coming decades.

Westchester - Playa del Rey

The Los Angeles City communities of Westchester and Playa del Rey are located to the east and north of Los Angeles International Airport. Neighborhoods to the east of the north runway complex are exposed to noise from landing jet aircraft and are partially within the projected 1987 70 dB CNEL contour. Those to the north are exposed to 'sideline noise', while the southerly portion of Playa del Rey is primarily effected by noise from departing aircraft and is wholly within the 70 dB CNEL contour.

These communities have a combined population of over 43,700 residents, and a housing stock of 19,221 dwelling units. 10,785 units fall within the projected 1987 65 CNEL contour, of which 41% are single family residences. This area, and particularly its westerlymost neighborhoods, reflect the highest median housing values within the ANCLUC study area.

Most of the vacant land that exists in the area is within the boundaries of LAX. Approximately 360 acres on the airport's north side is planned for future commercial office and light industrial use (Figure IV, Area 11). An additional 300 acres immediately west of the airfield is also in the aiport's ownership, and is to be developed as a coastal recreation and conservation area (Figure IV, Area 12). The southerlymost 92 acres of this area will be designated as the habitat conservancy of the rare and endangered El Segundo Blue Butterfly.

A significant inventory of vacant land exists in the west Westchester and Playa del Rey area. The bulk of this lies the north of Manchester Avenue and west of Lincoln Boulevard, just outside of the present noise impact area. The two major parcels here are designated for future low density residential development.

Sizable vacant parcels also exist to the west, near the intersection of Manchester Avenue and Falmouth Street and within the projected 65 dB CNEL contour. These are adjacent to a medium-high density residential area, with one major condominium project under construction just north of the airport boundary. The proposed extention of Falmouth Street will provide a through connection from the airport's northside project to the Marina del Rey area, and will most certainly influence future development in this area.

To the east, and slightly south of the northern runway complex, lie two noise impacted Los Angeles City neighborhoods. The first is a small multiple residential enclave, generally situated south of Arbor Vitae Street and east of Airport Boulevard (Figure IV, Area 13). This neighborhood, comprised of approximately 580 dwelling units and 1,255 residents, is commonly overflown by low altitude, landing aircraft, and is wholly within the the 1987 projected 70 dB CNEL contour.

Developed to residential use in the mid-1950s, the area is now boardered on the north, east and south by intensive industrial and commercial/hotel uses. Further, peripheral residential structures on the west are immediately adjacent to the airport's remote parking lot "C" and automobile rental facilities, while those on the north front immediately upon Arbor Vitae Street, a major traffic artery proposed for future upgrading and improvement.

While no overt signs of structural deterioration and/or land use conversion are evident, due to the severity of noise impact and general growth pressures in the immediate vicinity, this area does not appear appropriate nor viable, in the long term, for continued residential use.

The second neighborhood, located to the east of Aviation Boulevard between Arbor Vitae Street and Century Boulevard, is somewhat larger in size, although less intensely developed (Figure IV, Area 14). This residential area, built in the late 1940s, consists of approximately 1120 dwellings, with single family units and duplexes being predominant. The majority of the areas nearly 2,750 residents are subject to a current noise exposure level of 70 to 75 dB CNEL, with only limitted improvement projected by 1987.

Some indication of residential intensification is evidenced by the recent construction of medium density apartment units on the northern and eastern periphery of this neighborhood. Such intensification is consistent with current City planning and zoning policies. With appropriate design and construction standards, continued new construction of this type may offer a means of mitigating present and projected noise impacts.

To summarize, Los Angeles City communities adjacent to LAX are primarily comprised of sound, stable residential neighborhoods. As in Inglewood and El Segundo, limited prospects for redevelopment and/or residential intensification do exist, particularly in neighborhoods northeasterly of the airport. However, unlike other local communities, significant new construction on presently vacant lands, both on and adjacent to airport property, is also planned and occuring. Here, future development should be carefully planned to avoid creating new compatibility conflicts, as well as to buffer existing residential areas from airport related noise.

b. Public Policy

Phase I of the ANCLUC Study documents in some detail the adopted plans and policies of local jurisdictions neighboring LAX. It is not the intent to repeat that effort here, but rather to identify the implications of such policies relative to futrure growth and development within the airport's noise impact area. The following discussion briefly touches upon both general development policy and the enforcement of State mandated acoustical insulation standards.

Planning Policy

By and large, the adopted general plans of most jurisdictions surrounding LAX reflect a policy of preserving and protecting

established land use and development patterns. Of course, within this broad context there is variation from one community to the next.

The City of El Segundo maintains a policy to preserve the basic low density character of it residential community. The City's plan does, however, support the concept of utilizing medium/high density residential development to buffer single family residences from airport noise impacts. The Plan specifically recommends rezoning parcels along Imperial Avenue to encourage development of medium-rise, acoustically insulated, multiple family units.

Interestingly, El Segundo is the only community in the vicinity of LAX whose adopted plan defines and discourages development of new noise-sensitive land uses within the airport noise impact area. Never-the-less, under existing planning and zoning policy, there exists a buildout potential for nearly 200 additional dwelling units within the 1987 projected 65 dB CNEL contour.

Los Angeles County's General Plan, adopted in late-1980, essentially reflects the status quo in terms of future development patterns in the unincorporated communities of Lennox and Del Aire. The Plan does however recognize the impact of airport noise, and supports the preparation of detailed land use and revitalization plans for these communities.

While existing County planning policy does not encourage residential intensification in areas adjacent to LAX, it should be noted that the majority of Lennox is zoned for duplex and multiple residential development. Despite the apparent absence of trends toward such construction, the existing zoning pattern would permit approximately 1,700 additional dwelling units within the projected 1987 airport noise impact area.

Inglewood's current policy, reflected by its General Plan and redevelopment activities, supports both land use conversion and acoustical insulation as means of mitigating airport noise impacts. In terms of conversion, the Century and La Cienega Redevelopment projects, together with associated rezoning actions, have targeted residential areas for future commercial and industrial development. While there does exist some potential for residential expansion and intensification within areas impacted by airport noise, current city zoning and redevelopment policies, if fully implemented, would result in a net reduction of over 2,400 housing units within the projected 1987 65 CNEL contour.

Los Angeles City's community plan for the Westchester/Playa del Rey district basically supports retention of the current low density residential development pattern north of Manchester Boulevard. The Plan does however, envision significant residential

intensification and industrial recycle activities adjacent to the northern and northeasterns boundaries of LAX.

In the westerlymost portion of Weschester and Playa Del Rey, i.e., west of Westchester High School, new construction is taking place in areas planned and zoned for multiple residential use. Under current City policy, there is a potential buildout capacity for approximately 1,700 additional dwelling units. Although there exists some vacant, buildable parcels, most of this area is committed to relatively new, high quality residential development. Assuming normal economic considerations would preclude demolition of such high cost housing units to provide for reconstruction at the maximum densities allowable, the calculated buildout capacity vastly overstates probable development potentials. However, given current City land use regulations, it is likely that additional airport-incompatible development will take place in this area.

The City's plan advocates formulation of a Specific Plan for portions of Emerson Manor located south of Manchester Avenue, and east of the Westchester Golf Course. While no specific use or density standards are prescribed, the Specific Plan is to provide for a mixture of high/medium density residential and commercial uses. At such time as a Specific Plan is prepared, and zoning adjusted accordingly, there will be a potential for development of additional noise sensitive residential uses within the airport's projected 65 to 70, and 70 to 75 dB CNEL contours.

The neighborhoods east of La Tijera Boulevard, south of Manchester Avenue, and west of Airport Boulevard are primarily devoted to single family residential use. The Westchester-Playa Del Rey District Plan designates this area for future high/medium density residential development as a means of providing replacement housing for units lost as a result of airport expansion. Should redevelopment occure at the maximum densities permitted by the Plan, an additional 4,700 dwelling units might be constructed within the airport's noise impact area.

A similar situation exists immediately east of Airport Boulevard, and south of Manchester Avenue. While this area is presently developed with older multifamily residential structures, under existing plan policy there is a theoretical buildout potential for 300 additional dwelling units.

The District Plan does recommend conversion from residential to industrial use for an area located to the east of Airport Boulevard, both north and south of Arbor Vitae Street. Such future industrial redevelopment would result in the elimination of nearly 900 dwelling units within the airport's present and projected noise impact area.

Finally, the City's plan would permit residential intensification within the area bounded by Arbor Vitae Street on the north, Aviation Boulevard on the west, Century Boulevard on the south, and La Cienega Boulevard on the east. Under the plan's medium density residential desigation, up to 3,300 additional dwelling units might be permitted.

In summary, under existing City planning policy, there is a maximum buildout capacity for more than 9,000 additional dwelling units within the present and projected airport noise impact area. As mentioned previously, this figure is undoubtably a vast overstatement of actual development potentials. It does however, indicate a real need to review present planning and land use policies to assure that future development does not exaccerbate existing airport/community compatibility conflicts.

Building Codes

The California State Administrative Code (Title 21, Part 6, Division T25-1092) establishes uniform acoustical insulation performance standards for new hotels, motels, apartment houses, and dwelling units other than detached single family residences, where those structures are to be located within a noise impact area of 60dB CNEL or greater.* The State Health and Safety Code requires that all local jurisdictions adopt and enforce these standards.

While specific procedures vary, most jurisdictions in the airport noise impact area implement the state mandated standards. Enforcement is generally accomplished by requiring a project developer to perform the necessary acoustical analysis and submit insulation plans as part of the building permit process. Field testing and verification is seldom conducted by the local jurisdiction. The triggering mechanisim for enforcement of insulation standards also differs among jurisdictions. Some have conducted independent studies to determine the noise impact areas within which insulation standards will be enforced, while others rely on the quarterly noise monitoring reports produced by the airport in response to State airport noise regulations.

It should be noted again that under present State regulations, new acoustically treated residential development, with the exception of highrise, is not considered an airport compatible use.

* These standards are discussed in greater detail in later sections of this report dealing with acoustical insulation.

Summary

The above overview of development trends within the airport noise impact area seems to support two initial, and perhaps obvious, observations. First, the majority of the area is comprised of sound, stable and well maintained neighborhoods which are not likely to undergo significant change for the next several decades. The major implications of this in terms of future airport/community compatibility include the following.

1) There will be approximately 29,000 dwelling units affected in 1987 by noise exposure of 65 dB CNEL or greater;

2) Some residential areas and schools are now exposed to 70 dB CNEL and will continue to be in 1987; and

3) LAX is not now in compliance with State Airport Noise Standards, nor will it be in 1987 without additional noise impact mitigation actions, on airport or in the adjacent communities.

Second, and somewhat at odds with the first observation, the airport area is by no means stagnent. The dynamaic changes that are occuring or projected will undoubtably offer opportunities to mitigate the impact of airport noise and achieve greater airport/community compatibility. Conversely, if such future growth and development is not carefully guided, the potential does exists for creation of additional airport/community land use conflicts.

B. Overview of the Land Use Alternatives Technical Report

Having defined and quantified current and anticipated airport noise impacts, and speculated as to how potential land use trends and policies might influence future conditions, the remaining sections of this report will focus on alternative means of achieving greater airport/community compatibility. The remaining portions of this report identify and explore basic mitigation alternatives which may be employed in the community to reduce airport noise impacts.

II. LAND USE CONFLICT MITIGATION ALTERNATIVES

A. Overview

1. Basic Alternatives

There are of course many possible combinations of actions that can be employed, in terms of both airport operations and community design and planning programs, to achieve real, or at least "legal" airport/community compatibility. However, those actions that might be implemented within a community can generally be categorized within four basic alternatives.

The first and most obvious is Land Use Regulation/Change, i.e., the regulation of new development on presently vacant or under utilized lands in order to prevent additional airport/community conflicts, and the redevelopment of residential and other noise sensitive areas to airport compatible land use. The second involves Insulation/Shielding techniques, including acoustical insulation of existing and new dwelling units, and the construction of noise barriers designed to shield sensitive uses from the adverse effects of aircraft noise. Both of these alternatives can provide real benefits to community residents in terms of reduced noise exposure.

A third basic alternative stems from the California Administrative Code, which provides for the use of Avigation Easements as a means of achieving compliance with State noise regulations. Areas subject to such easements are defined as airport compatible under current State law.

The fourth alternative again relates to the State airport noise regulations. Provisions of the Administrative Code define various land uses that are not compatible within an airport noise impact zone.* Legislative/Administrative action might be employed to modify current State regulations to provide additional means for achieving increased airport/community compatiblity.

While the third and fourth basic alternatives may not appear to provide the same direct noise reduction benefits as do Land Use Regulation/Change and Insulation/Shielding activities, they may in fact offer real opportunities to resolve existing airport/community compatibility issues, and avoid the creation of new conflicts in the future.

Each of the basic alternatives identified can potentially contribute to an effective airport/community compatibility program. Similarly, each has associated with it a particular set of costs and constraints. Subsequent sections of this

* Title 21, Chapter 2.5, Subchapter 6, Article 2, Section 5014.

report will explore more fully the characteristics and potential applications of these alternatives.

2. Implementation Tools and Financing Mechanisms

While the basic alternatives have been conceptually grouped into four categories, there is a much broader array of implementation tools and financing mechanisms that used to effectuate a particular strategy.

For example, Land Use Regulation/Change might be pursued through a combination of implementation activities, including long range community planning, Specific Plans, rezoning, public redevelopment, private recycle activities, code enforcement programs, private/public joint venture projects, and Development Agreements, to name a few. Such activities may be privately sponsored, or supported through programs involving public acquisition, Tax Increment Financing, special assessment districts, purchase guarantees, or airport user fees.

A similar number of implementation and financing devises may be available to require or encourage acoustical insulation or provide noise shielding, and the same holds true with respect to easement acquisition and legislative/administrative action.

The availability of implementation tools and financing mechanisms is a major factor in the development of an effective airport noise control/land use compatibility program. However, a specific implementation plan cannot be formulated until the preferred program strategy has been tentatively selected.

B. Discussion of Basic Alternatives

1. Land Use Regulation/Change

Local communities are vested with broad powers to regulate new development in order to protect the public's health, safety, and general welfare. Where vacant or under-utilized lands exists, a community's authority to adopt and implement long rang general plans, and to regulate the type and design of new development on specific parcels, constitutes an effective means of ensuring airport/community compatibility.

In this regard, California State planning and zoning law requires each local jurisdiction to adopt a comprehensive General Plan to guide future growth and development. Counties and general law cities are further required to act as necessary to bring existing zoning patterns and ordinances into conformance with adopted plan policy.

One mandatory component of the local General Plan is a Noise Element, prepared and adopted in compliance with guidelines developed by the State Office of Noise Control (Section 46050.1, California State Health and Safety Code). These guidelines require that the Noise Element contain detailed information pertaining to community noise exposure levels from such sources as major transportation facilities (including airports), arterials and major local streets, and industrial plants. It is the expressed intent that such detailed information be employed as a guide in the formulation of local land use plans, with the objective of achieving noise compatible development patterns.

Of course, local jurisdicitions are subject to a variety of public mandates relative to future growth and development. For example, cities and counties are required to provide for the development of housing, adequate to meet the needs of all community residents. Where a substantial portion of a local jurisdiction lies within an airport noise impact area, as is the case surrounding LAX, the need to satisfy housing demand often competes with the need to maintain or attain airport compatible land use patterns. Such competing priorities must be continuously weighed and resolved as part of the local planning process.

Where airport incompatible land use patterns already exist, land use change, through either public redevelopment or private recycle, is undoubtedly the most effective way to mitigate existing airport/community land use conflicts. In many instances, it is also the most expensive and least feasible.

At the grossest level, wholesale conversion of 4.3 square miles (2770 acres) of residential use falling within the airport's projected 1987 noise impact area, and the associated displacement of 70,000+ residents, would entail costs in the magnitude of 2 to 3 billion dollars. Given the concomitant range of social, economic, environmental, political, and other impacts, such a notion cannot be seriously considered. There are however, limitted areas where land use change, or recycling, can be viewed as a viable strategy.

A primary catalyst for both public and private development and redevelopment in the vicinity of LAX, is the airport itself. As an international center of air transportation, LAX is both a major employer, and an attractant to other major commercial and industrial employers. This fact has, and will continue to provide an impetus for the conversion of less intensively developed, noise-sensitive residential areas to airport compatible commercial and industrial uses.

In turn, the resulting increase in job opportunities can be expected to increase the demand for adequate housing within the airport's environs. Given the limitted supply of suitable vacant lands, trends towards intensification of existing residential areas may be accelerated. In the period between 1970 and 1980, residential intensification (i.e., increased densities) was a prevalent form of new development in many "west-side" and coastal communities.

The current and anticipated trend toward residential intensification both offers an opportunity for achieving airport compatible land use patterns, and poses a dilema. The opportunity lies in the ability to design and acoustically insultate new residential units so as to effectively mitigate aircraft noise impacts, without significantly increasing construction costs. While this approach may likely involve the granting or acquistion of noise easements, and/or a modification of the State regulations defining "compatible use", it remains a viable concept.
The dilema posed by such intensification involves the prospect of increasing population densities within known noise impact areas, regardless of the mitigation measures employed. The implication here is that residential intensification may only be appropriate in areas where potential public safety issues are not raised or aggravated (i.e., areas not subject to direct overflight), and where noise mitigation techniques can in fact be effective given the degree and character of noise impacts (i.e., CNEL and SENEL values and frequencies).

The preceeding comments have addressed pontential land use change in areas where the airport provides a positive catalyst for such change. A final observation relates to the adverse effects that aircraft operations have had on community stability.

Within the projected CNEL contours, particularly to the east of LAX, there are areas where aircraft noise has contributed to reduced environmental quality and deteriorating community conditions. In these neighborhoods, a recycle strategy is not viewed as a positive opportunity for achieving airport/community compatibility, but rather as the only viable means of reducing blight and (airport operational changes not withstanding) eliminating unacceptable noise exposure. This suggests that in evaluating the potential for land use change, both the opportunity and necessity for such change must be considered.

2. Insulation/Shielding

The mitigation of aircraft noise impacts through acoustical insulation of noise-sensitive uses appears to be one of the

most promising alternatives avialable. Noise barriers, on the other hand, perform a similar shielding function, although their effectiveness is dependent on a number of factors, including the specific noise source and local terrain, among others.

a. Acoustical Insulation

Acoustical insulation has been, and continues to be seriously studied as a means of reducing airport noise impacts. In 1983, the City of South San Fransico has received a Federal 'Part 150' grant of approximately $813,000 for acoustical insulation of 128 dwelling units and two schools within neighborhoods impacted by noise from San Fransico Airport. The purpose of this pilot program is to assess the effectiveness of such insulation within the airport's 65dB and 70dB+ CNEL contours.

A more detailed analysis of acoustical insulation as a potential airport niose mitigation strategy is set forth in Appendix A of this report. As a result of that analysis, a series of recommendations have been formulated, and are summarized below.

1. Local jurisdicitions surrounding LAX should adopt insulation standards to limit interior noise levels in all residential units to a maximum of 45 dBa.

2. An opinion survey should be conducted to gage community acceptance of an acoustical insulation program as a means of mitigating airport noise impacts.

3. Procedures and guidelines should be developed for the acquisition of avigation easements as a component of an acoustical insulation program.

4. A pilot insulation program should be initiated to further evaluate the feasibility and acceptability of an expanded communitywide program.

5. The energy costs and conservation benefits associated with acoustical insulation should be further investigated.

6. The 1987 projected 65+ dB CNEL impact area should be further analyzed to determine specific noise characteristics (high vs. low frequency energy

content) and the implication of such characteristics relative to the effectiveness and costs of acoustical insulation.

7. Enforcement of present State noise insulation standards should be strengthened.

8. The California State Airport Noise Regulations should be reviewed, and if appropriate, amended to provide for innovative approaches to foster airport-compatible land use patterns.

In addition to the issues of community acceptance, effectiveness, easement acquisition, and energy consumption, the feasibility of a communitywide acoustical insulation program also hinges upon its relative cost/effectiveness. This matter has recently been explored in greater detail through a study conducted by the LAX Ofiice of Noise Control. Preliminary estimates are that average insulation costs will range from $2,700 to $6,400 for multifamily units, and from $3,700 to $13,600 for single family residences. Based upon these estimates, acoustical insulation of all dwelling units within the projected 1987 noise impact area would entail a program costing in the neighborhood of $142 million.

b. Sound Barriers

In the early 1970's, the Los Angeles City Department of Airports commissioned a study by Cambridge Collaborative to determine if the construction of sound barriers in the Emerson Manor and West Westchester communities could effectively reduce aircraft noise impacts. The study specifically focused on the Emerson Manor area, and was designed to determine if a barrier could provide the same sound attenuation benefits to adjacent neighborhoods as did the existing single family residences which the airport planned to acquire and clear.

It was determined that removal of the residential structures within the area roughly bounded by Sepulveda Boulevard on the east, Westchester Golf Course on the west, Lincoln Bloulevard on the South, and Eighty Eighth Street on the north, would increase noise exposure levels by approximately 5.5 dBa in adjacent neighborhoods to the north of Eighty Eighth Street. Utilizing an elaborate and sophisticated modeling technique, various barrier configurations were tested to determine their specific sound attenuation capabilities. The tests indicated that a twenty foot high reflecting wall, constructed along the the airport acquisition boundary (e.i. adjacent and parallel to Eighty Eighth Street) would provide the same level of noise shielding as did the exisitng single family neighborhood of approximately four blocks in depth.

Apendix B of this report contains the study issued by Cambridge Collaborative in April of 1974. Two of the study's general conclusions and observations deserve mention here.

First, it was determined that construction of a sound barrier would not significantly reduce average community noise levels resulting from jet aircraft operations. It was noted however, that such a barrier does create a local quiet zone, reducing noise levels 5 to 7 dBa in immediately adjacent areas opposite from the noise source.

Second, it was concluded that the effectiveness of any sound barrier will vary depending upon the topographical characteristics of the area in which it is to located. Local topography can of course, cause the top of a barrier to vary in height above the airport runway and land uses within the community.

Based upon the Cambridge Study, the Department of Airports proceeded with construction of a sound barrier now known as the Westchester Wall. The barrier consists of a twelve foot high concrete wall constructed atop an eight foot high, landscaped earth berm. It is approximately 1,550 feet in length, running south of and parallel to Eighty Eighth Street between Emerson Avenue and the Westchester Golf Course.

The actual effectiveness of the wall in terms of noise attenuation has been questioned by some, although most agree that it does provide aesthetic visual seperation between the airport and adjacent residential neighborhoods.

The Cambridge study provides a useful analysis of sound barriers in the Emerson Manor area, and its conclusions are in part, applicable to other locations within the ANCLUC Study area. There are however, a number of additional questions which may yet merit further exploration.

For example, further analysis is needed to identify other specific areas, both north and south of LAX, where due to local topographic and land use characteristics, sound barriers may constitute a feasible and effective noise mitigation measure. In addition, new development on and adjacent to airport properties, if properly designed, may provide some noise shielding benefits to adjacent residential areas. Similarly, construction of major transportation facilities, such as the elevated Century Freeway, may shield residential areas presently impacted by jet aircraft noise. The only conclusion that can be reached based upon information presently available is that opportunities to shield noise sensitive areas, be it by construction of specifically designed sound barriers, or other forms of airport compatible development, should not be overlooked.

3. Avigation Easements

Title 21 of the California Administrative Code identifies land uses deemed to be legally compatible within an airport noise impact area, and includes as compatible any use subject to an avigation easement.*

In general, an easement can be defined as an acquired privilege or right of use which one person may have in the land of another. More specifically, an avigation easement embodies the right to navigation of air space over designated land, and to the use of land as incident to air navigation. Such easement are often specifically worded to include the right to discharge noise, vibrations, fumes and particulate matter over the burdened parcel.

Easements may be broken down into two classes, appurtenant easements and easements in gross. An easement is appurtenant when the primary beneficiary is another tract of land. For example, when an airport acquires an aviagation easement on adjacent lands, that easement is said to be appurtenant to the airport parcel.

The major components of an appurtenant easement are known as the Dominant and the Servient Tenements. The parcel of land that receives the benefit of an avigation easement, i.e., the airport, is the Dominant Tenement, while the parcel impacted, or burdened, is the Servient Tenement. A key characteristic of such an easement is that it runs with the title to the affected parcels, and can only be extinguished under pre-determined conditions or at the will of the holder.

An easement in gross may benefit an individual whether or not he owns a benefiting tract of land. This class of easement is personal, and does not run with the title of land. For example, a property owner can grant another individual the right to operate aircraft over, or in a manner that adversely impacts his lands. While avigation easements are normally appurtenant, some are constructed as both appurtenant and easements in gross.

The remainder of this section will provide a brief description of the typical format and content of avigation easements, a review of how such easements have been acquired and employed at various airports, and an identification key issues related to the use of easements as a means of acheiving airport/community compatibility.

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* California Administrative Code, Public Works, Division of Aeronautics, Title 21, Chapter 2.5, Subchapter 6, Article 2, Section 5014.

a. Format and Content

The evolution of avigation, or noise easements as they are sometimes called, has generally followed the pattern of traditional legal documentation of rights to be obtained or granted, which define the restriction of development rights on, or permission to operate aircraft over a subject property. As such, the format of an easement basically includes:

An identification of the parties granting and receiving the easement;

A definition of the right to be acquired (operation of aircraft) or the right to be restricted (prohibition of certain land uses); and,

A legal description of the property affected by the easement.

Of course, such easements can be more complex in terms of defining specific rights and restrictions, establishing an effective timeframe (i.e., "in perpetuity", or to expire at a specific time or event), and providing criteria or other means to assure that the easement is not over burdened (i.e., the rights granted are not exceeded by the holder of the easement).

As with many legal documents, the intent is not so much to change the physical conditions of cause and effect, but rather to create an "equitable remedy" or "compensation" for the rights granted or restricted.

b. Acquistion of Easements - Experience at Various Airports

The use of avigation easements at airports throughout the nation varies both in terms of the means of acquisition, as well as the specific format and content. Easements have been acquired by several means including condemnation/purchase, as a condition of land development or airport subsidized acoustical insulation, and as a result of voluntary grants or legal action. The easements included in Appendix C and discussed briefly below vary with regard to specific rights and restrictions, and are offered as being representative examples.

<u>NAS Mirmar - Naval Facilities Engineering Command Easement Deed</u>

In the mid-1970, the United States Navy initiated the Air Installations Compatible Use Zones (AICUZ) program with a

study at Miramar Naval Air Station. This jet facility, north of San Diego, involves major training and operational activity with established flight tracks over existing residential communities.

The goal of improving land use compatibility with air operations was significant in that new residential development was rapidly encroaching on the air station. The AICUZ program which was developed included the planned acquisition of easements which precluded future development of specified incompatible land uses. Over $10 million has been spent by the Navy to date in protection of the most critical areas adjacent to the air station.

In addition to easement acquisition, the AICUZ program also included the re-planning of future development patterns to meet specific land use compatibility guidelines (see Appendix C, exhibit 1).

Based on its experience, the Navy has expressed general satisfaction with the effectiveness of avigation easements, although some difficulties with the precise application of AICUZ compatibility guidelines to individual development proposals has occured. In addition, there appears to be a need for earlier involvement of NAS Miramar staff in the local development review process. Incompatible development proposals sometimes reach an advanced state involving heavy design expenditures before Navy personnel have an opportunity to comment.

City of Los Angeles

To date, the City of Los Angeles has acquired approximately 850 avigation easements in communities adjacent to LAX, at a total cost of nearly $29 million.

In general, the easements acquired by the City fall into three categories. The first involves easments granting the right to conduct unlimitted air operations over specific burdened parcels. The second category involves easements specifying the number and type of aircraft operations the airport may conduct on each of the runway complexes at LAX. Finally, the City has acquired easements which define the maximum aircraft noise impact (as measured in terms of CNEL values) permitted at a specific site or 'burdened parcel'. Examples of each are included in Appendix C, exhibit 2.

Virtually all of the noise easements held by the City were acquired as a result of litigation. The Aaron Case and the School Districts Case produced two of the most significant judgements. The Aaron case addressed the noise impacted area to the east of the airport's south runway complex. The

litigation proceeded to the appellate level, and resulted in the court ordered acquisition of 550 easements, at a cost of approximately $600,000.

The School District Case involved the Los Angeles Unified, Inglewood Unified, El Segundo Unified, Lennox, and Centinela Valley Union High School Districts. The decision rendered in early 1980, awarded 63 easements to the airport at a cost of nearly $21 million, making this law suit the most expensive yet encountered by LAX.

Oakland International Airport

The 1977 case of the Bay Farm Island development within the Oakland Airport impact area was significant in that it involved the first major utilization of noise easements to achieve 'compatibility' under the California State airport noise regulations. The document recorded granted both an appurtenant easement to the airport, and an easement in gross to its users. It further protected the airport and its users from actions involving inverse condemnation, as well as nuisance and personal injury claims (Appendix C, exhibit 3).

City and County of Denver, Colorado

An avigation easement granted to the City and County of Denver provides an example of where the deed of easement was accompanied by a Subordination Agreement signed by the bank holding a lien on the burdened parcel. This agreement formally seperated the 'avigation' rights from the remaining bundle of property rights constituting the burdened parcel. Essentially, the lien holder agreed that subsequent foreclosure on, or sale of the subject property would in no way effect the validity of the easement granted to the City and County of Denver, Colorado (Appendix C, exhibit 4).

City of Ontario - Avigation and Noise Easement

As one of the few cities to wholly contain a major commercial airport and the significant impact area within its own jurisdictional boundaries, Ontario has established a City policy to acquire noise easements within the airport's projected 65 CNEL contour. Ordinance No. 2038, effective April 19, 1979, requires such easements as a condition of development approval within the noise impact area. Applicants for development permits receive an easement form (Appendix C, exhibit 5) for completion and recordation prior to project approval. It is estimated that over 700 dwelling units and other noise sensitive uses are now covered by such easements.

Model Easements

A publication recently released by the State Division of Aeronautics, entitled Airport Land Use Planning Handbook, includes as an appendix a model noise easement and release which may be used to achieve legally defined compatibility in communities adjacent to California airports.

The grant of easement allows the level of aircraft noise impinging on a burdened parcel to be the lesser of:

1) The annual CNEL level reflected on the most current validated map filed with the Division of Aeronautics (in accordance with Section 5050, Title 21 of the California Administrative Code) prior to the grant of easement; or,

2) The annual CNEL level reflected on any map subsequently developed, validated and filed with the State.

This provision establishes a ratcheting effect relative to future noise exposure levels in that, as airport noise is reduced via operational or technological improvements, the rights granted by easement are also reduced.

The model easement also provides owners of a burdened parcel the right to seek injunctive relief if permitted noise levels are exceeded by 1.5 dB CNEL, and declares the easement null and void if such levels are exceeded by an amount equal to or greater than 3.0 dB CNEL.

The format of the easement is similar to others which have been, and are being employed in the San Francisco Bay area. In addition achieving legal compatibility and protecting the airport operator from legal action, it also provides assurance to owners of affected parcels that noise exposure will not increase, and in all likelyhood, will diminish over time (Appendix C, exhibit 6).

c. Issues Related to the Use Of Avigation Easements

While the use of avigation easement do constitute a legally prescibed means of achieving airport/community compatibility, there are a number of related issues which must yet be recognized and addressed. Some of the most apparent are briefly discussed below.

Effectiveness

The usefulness of avigation easements as a means of achieving increased airport/community compatibility is related to the net objectives and perceived purposes of their application within a specific local setting.

For example, if the local emphasis is on achieving legal compatibility, then clearly easements can serve well. Conversely, if the major goal is to reduce the physical reception of noise by people within the impact area, such easements are generally not effective. Exceptions to this latter observation do exists however, and include instances where: 1) easements are employed to restrict development of sensensitive uses in areas impacted by airport noise; or, 2) easements are granted in return for acoustical insulation or other real noise mitigation activities supported by an airport operator.

Equity

Avigation easements provide less than a complete solution to those affected by aircraft noise. Compensation for loss in property values, while laudable, is directed only at property owners. Appartment dwellers and other renters, school children, hospital and convalescent home patients, and those who work or play in areas exposed to high noise levels obtain no relief. Even the property owner who receives financial compensation must still bear the noise. In effect, the owner is merely paid to suffer. In addition, subsequent property owners who may have received no compensation, may be unaware that their rights of redress are affected by a previously granted easement.

The equity issues touched on above can only be resolved in the context of an easement acquisition program structured so that the benefits offered in exchange for the rights granted are of value to the community as a whole.

Value

A common problem associated with the aquisition of avigation easements is establishing the value, in monetary terms, of the rights granted. In the absence of a recognized 'market' for such easements, this issue is often resolved in somewhat arbitrary fashion by the courts.

A related issue involves the potential impact of a communitywide easement acquisition program on local property tax revenues. If property values are in fact reduced by an amount equivalent to the purchase price of an easement, local tax revenues

may be adversely affected, impinging upon a local jurisdictions ability to provided the range of needed services. As with the equity issue, this concern might best be addressed through a program which offers real noise mitigation (i.e., value added) in exchange for the avigation rights granted by easement.

Ease of Application

The history of easement acquisition around LAX reflects a spotty pattern of acquisition resulting from sporadic episodes of litigation. In some cases, properties for which easements were acquired have been subsequently purchased in fee and cleared for airport related purposes. In other instances, the affected parcels are no longer within the airports current or projected noise impact area.

A more deliberate and organized program of easement acquisition could certainly be expected to produce more effective results. However, such a program, designed to benefit both the airport and the adjacent communities, would necessarily require effective understanding, agreement, and cooperation amoung all involved parties.

Necessity

The use of avigation easements as a means of achieving airport/community compatibility is of course related to the airport's need to ultimately meet State airport noise regulations, and to secure protection from potential litigation. However, there may exist other more viable means of achieving the same results.

Alternative approaches to achieving compliance with the intent of the California State noise regulations are discussed in the following section of this report, and need not be addressed here.

The issue of an airport's ongoing liability for noise impacts has been addressed by recent legislation at both the state and federal levels. Assembly Bill 2920 was enacted by the California State Legislature and became effective in early 1983. The bill clarifies and strengthens the role of the County Airport Land Use Commission (ALUC) in preparing and implementing land use compatibility plans for areas adjacent to public use airports. It further requires that local jurisdictions amend their general plans to achieve consistency with the adopted ALUC plan. Most significantly, this new legislation provides that an airport proprietor is not liable for noise impacts on new development projects approved by a local jurisdiction, where such projects are inconsistent with the ALUC plan.

In short, an adopted ALUC plan can limit an airport's liability for noise impacts on new incompatible development, and thereby reduce the need for acquisition of avigation easements. A complete summary and analysis of the current State legislation pertaining to the functions of the Airport Land Use Commission is set forth in Appendix D of this report.

Federal legislation has similarly addressed the liability issue with regard to existing incompatible land use. The Airport Safety and Noise Abatement Act of 1980 (ASNA) provides that an airport proprietor may develop and submit to the Secretary of Transportation a noise exposure map indictating areas impacted by current and projected airport noise. The process for development and submittal of such a map is administered by the FAA under the Part 150 Airport Noise Compatibility Planning Program. Section 107 of the ASNA Act further provides that once a 'Part 150' map has been submitted, accepted and published, persons who subsequently purchase property within the noise impact area are barred from seeking damages for airport noise.

It should be noted that, while both the state and federal legislation appear to offer an airport operator protection from liability, neither has yet been challenged and tested in the courts. However, to the degree that both laws are sustained, either in practice or in the courts, they presumably can limit an airports need to acquire avigation easements.

In summary, the usefulness of avigation easements as a means of addressing airport noise is directly related to the specific objectives and local circumstances involved in their application. In communities surrounding LAX, they have been primarily employed as a means of limiting liability for airport noise impacts.

However, in other instances they have been utilized to achieve legal compatibility under the State airport noise regulations, to restrict development of incompatible land uses within noise impact areas, and as a quid-pro-quo for airport sponsored acoustical insulation of schools and residences. It is within this latter context that an easement acquisition program might be considered a viable component of noise mitigation strategy for LAX and adjacent communities.

4. Legislative/Administrative Action

The California State regulations pertaining to airport noise are set forth in Title 21, Chapter 2.5, Subchapter 6 of the Administrative Code. These regulations were initially adopted by the State Aeronuatics Board in November of 1970, although

subsequent legislation delayed their full implementation until December 1, 1972. The following discussion briefly summarizes current provisions of the State regulations, and explores potential revisions which may offer opportunities to increase airport/community compatibility.

a. Current Provisions

The State noise regulations require each county to identify those airports within its jurisdiction deemed to have a noise problem. The criterion employed for such identification is the existence of residential areas adjacent to the airport, impacted by noise levels of 70 dB CNEL or greater. Once a noise problem has been identified, the airport proprietor is required to initiate a continuous noise monitoring program to determine the extent of the noise impact area, and to take action to reduce that impact area. It is the intent of the State regulations that the noise impact area of an airport be reduced to zero (i.e., no incompatible land uses impacted) by the year 1986.

The concept of a noise impact area involves both the level of noise, as measured in terms of CNEL values, and the types of land use exposed to aircraft noise. The regulations establish a criterion of 65 dB CNEL to define noise impacted areas, and list those land uses determined to be compatible within such areas.

Under present regulations, compatible land uses include agriculture, airport property, industrial property, commercial property, property with an avigation easement for noise, and property zoned for open space use. In addition, highrise residential structures, acoustically insulated to reduce interior noise levels to 45 dB, and similarly insulated single family residences built prior to December 1, 1972, are also defined as compatible uses.

While various minor revisions have been made, only one significant change to the State noise regulations has occurred since their adoption in 1970. The original provisions regulating single noise events were repealed in 1979 as a result of litigation brought by the Air Transport Association.*

* Air Transport Association of America vs Crotti (N.D. Cal. 1975) 389 F. Supp. 58

b. Pending Revisions

As have other State agencies, the Division of Aeronautics has been charged with the responsibility of reviewing the various regulations within its purview, and identifying revision appropriate and necessary for the purposes of reducing duplication and streamlining the administrative process. This "in-house" review and revision cycle is now underway and will culminate in the Spring of 1984.

As part of that process, two concepts have been tentatively offered for consideration as potential revisions to the airport noise regulations. Both relate to, and expand the definition of, airport compatible land use.

The first addresses the definition of acoustically insulated multiple residential development as an airport compatible use. As mentioned previously, the current definition includes only such units within "highrise" structures, and presumably excludes typical two and three story garden apartments.

The rationale supporting the current definition is twofold. It is known that highrise structures, due to normal construction characteristics, can be acoustically insulated to achieve acceptable interior noise levels. Further, it is assumed that highrise residents are primarily oriented to an "indoor living environment", absent the private yard space associated with lower density residential development.

It may be appropriate to expand the current definition to include any multiple residential development, regardless of structure height, where the same rationale apply. In other words, it may be desirable to define as a compatible use, any multiple residential development that: 1) is acoustically insulated to reduce interior noise levels to 45 dB or less; 2) is primarly designed to accommodate an indoor lifestyle; and, 3) is designed and oriented so as to shield common outdoor recreation areas from excessive noise exposure, i.e., 65 dB CNEL or greater.

Such a revision, if deemed appropriate, would be consistent with the philosophy and rationale of the present State noise regulation. At the same time, it could provide an opportunity to avoid additional conflicts and achieve increased compatibility as older, lower density neighborhoods recycle to more intensive apartment and condominium development.

A second potential revision to the definition of airport compatible land use involves the concept of a "Compliance District". As presently envisioned, a Compliance District

would consist of a designated geographic area within the airport noise impact zone, presently devoted to incompatible land use, within which there is an active and ongoing program to mitigate noise impacts through acoustical insulation, redevelopment, or such other means as may be appropriate. State regulations would be revised to recognize such Districts as compatible within an airport noise impact area.

The designation of a Compliance District would likely entail a formal agreement between the airport proprietor and the involved local jurisdiction as to the area encompassed, as well as to the specific components, timing and financing of the noise mitigation program. Further, formal acknowledgement by the State Department of Transportation, as the enforcement agency of the airport noise regulations, may be appropriate.

The specific noise mitigation program associated with a formally designated Compliance District could be either active or passive. For example, an active program may involve public redevelopment activities, jointly sponsored by the local jurisdiction and the airport proprietor. In contrast, a passive program might involve a voluntary, and again jointly sponsored program, to acoustically insulate dwelling units within a designated District at the request of the owners.

The key ingredient of both an active or passive progam is a formal, cooperative agreement which assures that within an established timeframe, an appropriate noise mitigation program would be carried out, or would be available to community residents on a voluntary basis.

A Compliance District would be dissolved at such time as the noise mitigation program has been fully implemented, or the offer to implement a voluntary program has been withdrawn. If the District is dissolved as a result of full implementation of the noise mitigation program, then the subject area would presumably be in compliance with the State noise regulations. If, on the other hand, the District is dissolved prior to full implementation, the areas remaining exposed to unmitigated noise impacts would again become non-compliant.

The concepts briefly described above are only two examples of how regulatory and/or legislative actions might contribute to the process of achieving greater airport/community compatibility. There are undoubtably other similar actions that may be necessary to support implementation activities associated with a specific airport noise impact mitigation program.

C. Summary

The preceeding discussion has addressed four basic land use conflict mitigation alternatives that can, in combination with airport operational practices, form the components of a comprehensive noise control/mitigation strategy. In considering these alternatives, it is clear that the first two, i.e., land use regulation/change and insulation/shielding, constitute the primary and concrete courses of action that can be taken within a community to reduce noise exposure.

While the use of avigation easements and the amendment of various legislative/admistrative regulations can contribute to the objective of achieving greater airport/community compatibility, they are supportive of, and secondary to the primary alternatives.

Volume 4 of the Phase III ANCLUC final report focuses on the the potential application of programs involving land use change and acoustical insulation within the airport's noise impact area, and identifies in a geographically specific manner where each might be appropriate.

SECTION TWO

AIRPORT OPERATIONAL ALTERNATIVE STRATEGIES ANALYSIS

SECTION TWO

AIRPORT OPERATIONAL ALTERNATIVE STRATEGIES ANALYSIS

I. INTRODUCTION

The primary thrust of the Los Angeles International Airport Noise Control and Land Use Compatibility (LAX ANCLUC) study is to determine the best combination of airport operational strategies and alternative land use policies that when integrated will minimize noise impact on the communities surrounding LAX.

Local land use policies are formulated and implemented by each of the five separate affected local jurisdictions around LAX Therefore, it is necessary to measure the effect of each different airport operational strategy as it impacts each jurisdictional entity.

Section II describes the methodology used to provide decision makers a quantitative assessment of each airport operation strategy and the process used to determine variations in the total number of dwelling units impacted.

Section III describes the anticipated noise impact reduction between the years 1982 and 1987, and also describes the major reasons for the noise reduction.

Section IV summaries the alternative airport operational strategy used for each comparison case and describes changes in airport noise impact on each local jurisdiction around LAX.

II. NOISE IMPACT EVALUATION METHODOLOGY

A. The Integrated Noise Model

The Integrated Noise Model (INM) was developed by the United States Federal Aviation Administration (FAA) to aid planners, and decision makers in measuring airport noise impacts. Inputs to the model include data describing aircraft operations in terms of types of aircraft, when they fly into and out of the airport, and how they fly into and out of the airport. From this information, the model calculates the noise exposure values at specific points, or lines of equal noise exposure (contours) around the airport.

A universal concern of hub airports the United States is the reduction of noise impact. The INM is useful in providing a standard for measuring noise impacts. The FAA requires the INM be used to forecast impacts because it is an effective tool for the evaluation of alternative aircraft operational strategies.

B. Goal of the INM Model in the LAX ANCLUC Study

The INM has been used in the LAX ANCLUC study to develop the noise contours for various runway configurations and operational adjustments. The goal has been to identify the most compatible airport operational scheme in terms of noise impact reduction in the surrounding communities, while maintaining aircraft/airport safety standards. To this end, the INM has been used to develop noise contours that reflect the noise exposure levels within the LAX environs. Airport operational data describing the 1982 Base Case, the 1987 comparison case and each of 19 case models have been prepared and modeled to produce noise contour calculations for the community noise equivalent level (CNEL) metric. These contours were next overlaid onto land use maps of the surrounding areas to measure their respective impacts.

C. Development of the Impact Base

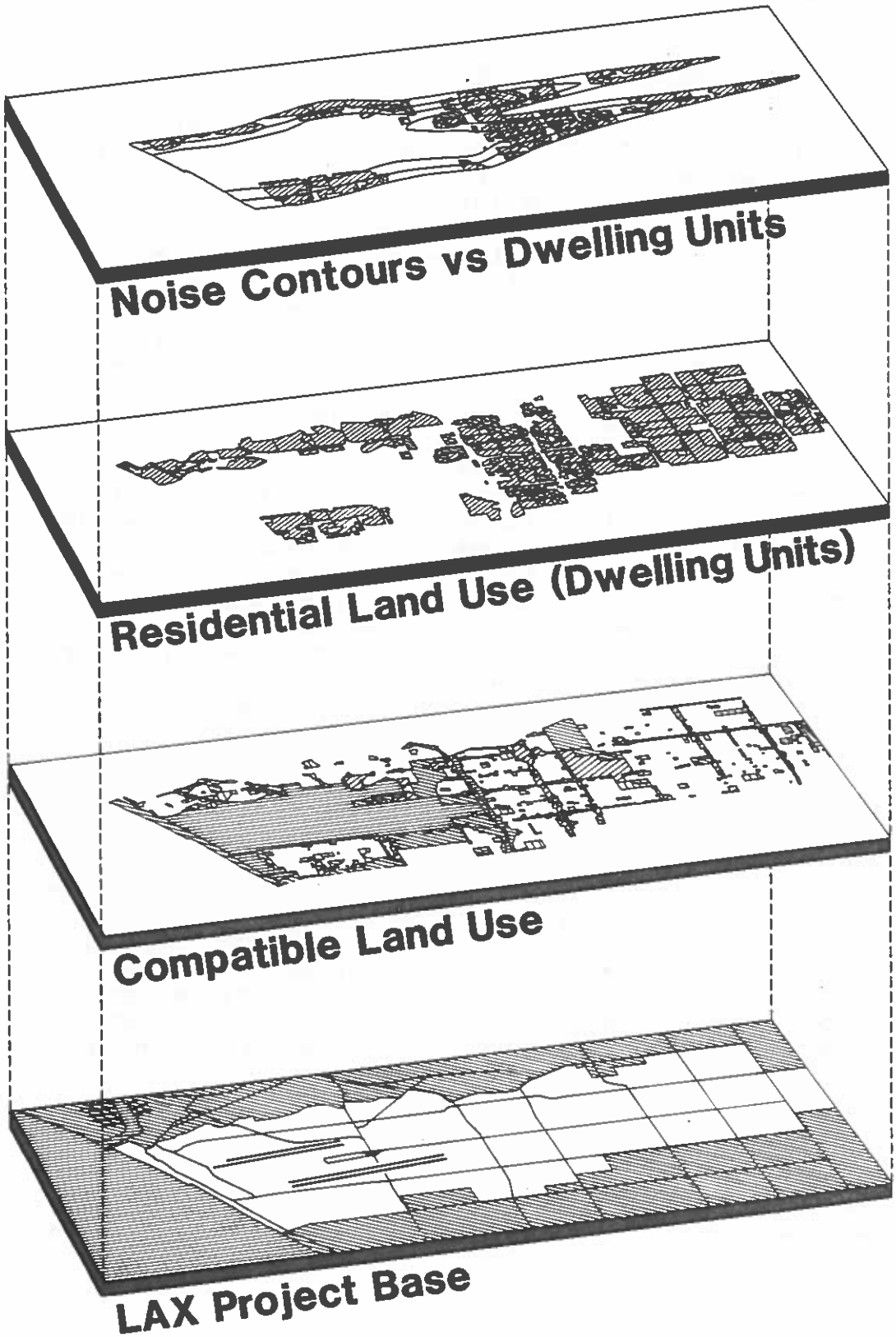
The first step in the formulation of the impact map is the development of an airport environs base map. This base map is made up of U.S. Geological Survey maps of the area around LAX. Included on the base map is the LAX airport boundary, streets, public buildings and other important landmarks. The noise contours that are created by the INM calculations can be directly overlaid onto this map to allow identification of the areas affected by airport noise.

The next step in the development of the land use map is the digitizing of the land use information (see Figure II-1) into a computer data base. This means that the boundaries of various types of land use in the area immediately surrounding the airport were converted into numerical (x and y coordinates) data that can be stored in computer files. In the LAX ANCLUC study, land use maps of the area were provided to each participating city or county agency who in turn checked and corrected the maps as required. On this map, the various land use areas are identified under several categories including residential, industrial, institutional, etc. Residential land use is further divided by the dwelling unit types (i.e., single family, duplexes, multi-family and trailer parks). After the land use maps are checked, all boundary locations and land use types are then digitized for storage in the computer. Once this information is entered into the computer, the contours produced by the INM runs can be overlaid by the computer onto the digitized land use map to; measure the impact of the contour on the incompatible (noise sensitive) areas, calculate the size of the areas impacted and determine the number of dwelling

Figure 11-1

LOS ANGELES INTERNATIONAL AIRPORT

LAX ANCLUC COMPUTER DATA LAYERS



units and people impacted within each jurisdiction surrounding LAX. This information makes it possible to identify shifts in the noise exposure due to the operational adjustments modeled in each scenario. The impact information is plotted by the computer in map form and in a tabular report (see Table II-1) to expedite comparing the effects of the various operational adjustments.

D. Development of the INM Contours

A great deal of information concerning the airport is required to run the INM computer program. Initially, the configuration of the runways and the flight tracks used by aircraft flying into and out of the airport must be determined and read into the computer. Next, the operational information for each of the aircraft types that fly into and out of the airport must be included. Also, any special flight tracks or special changes to aircraft operations for noise abatement during evening and nighttime hours (such as over the ocean operations) must be entered into the computer. Finally, the actual numbers of each type of aircraft that follow the various flight tracks at various times of the day are entered into the model file. Human reaction to aircraft noise is highly sensitive to the time of day of aircraft operations. For that reason, noise events are weighted to reflect relative annoyance. One evening (defined as 7 pm - 10 pm) operation is equivalent to three daytime (defined as 7 am - 7 pm) operations. One nighttime (defined as 10 pm - 7 am) operation is equivalent to ten daytime operations. These penalty weightings reflect the fact that people are more sensitive to noise during evening and nighttime hours due to the nature of evening and nighttime activities and lower ambient noise levels during these hours.

After the model file has been created, it is run through the INM computer program to produce the noise contours. The output from the INM run is a table of points that are equally impacted by aircraft noise. These points are then connected by a plotting program to create contour lines of equal noise impact around the airport. This process is carried out to generate three CNEL contours (65, 70, and 75) for each operational scenario. Since these contours already exist in a digitized form (numerical x, y coordinate data), they are ready to be overlaid onto the land use maps.

The INM produces noise exposure values and contours based on an average cumulative noise impact and do not account for the perceived noise attributable to a limited number of events occuring over realtively short term periods. For example, an area under an infrequently

Table 11-1
ANCLUC CASE 14

COMPUTER GENERATED TABULAR REPORT

DWELLING UNITS AFFECTED BY VARIOUS NOISE LEVELS
Dwelling units within communities by landuse -- Noise in db CNEL

COMMUNITY Landuse	65-70	70-75	75+	COMMUNITY TOTAL Subtotal
City of LOS ANGELES				
RS	3596	573	84	4253
RD	946	191	0	1137
RT	0	0	0	0
RML	3073	1615	0	4688
RMM	0	0	0	0
RMH	0	0	0	0
Subtotal	7615	2379	84	10078
INGLEWOOD				
RS	1087	0	0	1087
RD	62	0	0	62
RT	117	0	0	117
RML	2165	0	0	2165
RMM	0	0	0	0
RMH	0	0	0	0
Subtotal	3431	0	0	3431
EL SEGUNDO				
RS	1477	369	38	1884
RD	168	0	0	168
RT	0	0	0	0
RML	905	91	403	1399
RMM	0	0	0	0
RMH	0	0	0	0
Subtotal	2550	460	441	3451
HAWTHORNE				
RS	0	0	0	0
RD	0	0	0	0
RT	0	0	0	0
RML	0	0	0	0
RMM	0	0	0	0
RMH	0	0	0	0
Subtotal	0	0	0	0
County of LOS ANGELES				
RS	1454	347	0	1801
RD	167	78	0	245
RT	0	0	0	0
RML	467	127	0	594
RMM	0	0	0	0
RMH	0	0	0	0
Subtotal	2088	552	0	2640
TOTALS:	15684	3391	525	19600

LEGEND

RS = Single Family Residential
RD = Duplex Residential
RT = Trailer Court
RML = Low Rise Apartments/Condos
RMM = Medium Rise Apartments (3-4 stories)
RMH = High Rise Apartments/Condos

used bad weather approach may not be included within a particular noise exposure contour. However, for a period during which conditions require the use of the approch path, the residents of the area may be impacted by airport noise. The INM does not pinpoint all areas that are impacted at any specific instant, but estimates the overall average noise exposure around the airport.

E. Noise Impact Overlay Process

The overlay process can be visualized once again by examining Figure II-1. The contours shown on the top diagram of Figure II-1 can be thought of as a graph of the points of equal noise impact calculated by the INM run. The incompatible land use map shown in the second diagram from the top can be thought of as a graph of the digitized land use information as described earlier in this section. To create the land use impact map as shown in the top diagram of Figure II-1, the two graphs are plotted on the same piece of paper with only the incompatible land use areas lying inside the contours being plotted. Using the information stored in the files, the computer then calculates the size of the area impacted and the number of dwelling units and people affected by airport noise.

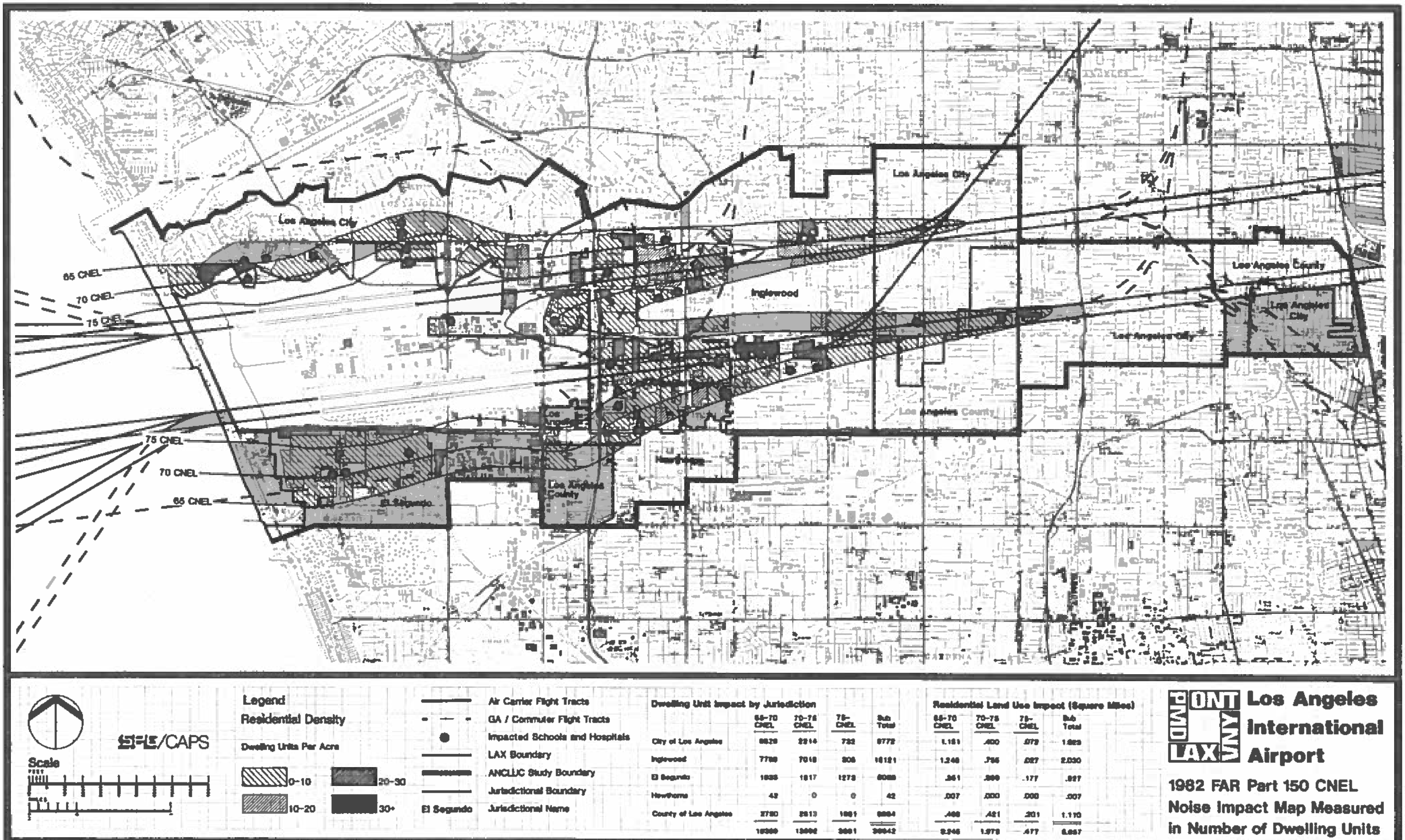
III. ANTICIPATED NOISE IMPACT REDUCTION 1982-1987

A. 1982 Noise Impact Map

The 1982 BASE CASE contour set represents existing conditions at LAX, and further constitutes the baseline noise exposure data submitted to the Federal Aviation Administration as part of the Airport Noise Compatibility Planning program (FAR Part 150).

The 1982 noise exposure map (Figure III-1) results from 389,455 total annual aircraft operations, with approximately 32.2 Million Annual Passengers (MAP) passing through the airport. The 1982 noise contours are based upon the cumulative quarterly readings of the Los Angeles Department of Airports noise monitoring system compiled as part of the airport's noise monitoring program required by the State of California. This data was validated by a review of the Airline Revenue Landing Reports filed with Department of Airports Accounting Bureau. The fleet mix and level of operations used to compute the 1982 Noise Exposure is summarized in Table III-1.

Reconstruction activity to strengthen the Sepulveda Boulevard Tunnel beneath runway 25R (southerly inboard) resulted in imbalanced runway use, with landings of heavier aircraft diverted to the north runway complex. In 1982 approximately 65 percent of all landings occurred on the two northerly runways.



Dwelling Unit Impact by Jurisdiction

	65-70 CNEL	70-75 CNEL	75- CNEL	Sub Total
City of Los Angeles	6826	2214	732	9772
Inglewood	7788	7018	808	16121
El Segundo	1835	1817	1273	6085
Hawthorne	42	0	0	42
County of Los Angeles	2780	2813	1061	6654
	16999	13066	3661	38642

Residential Land Use Impact (Square Miles)

65-70 CNEL	70-75 CNEL	75- CNEL	Sub Total
1.151	.400	.072	1.623
1.248	.756	.027	2.030
.361	.399	.177	.937
.007	.000	.000	.007
.488	.421	.201	1.110
3.246	1.976	.477	5.697

PMD ONT LAX VNY Los Angeles International Airport

1982 FAR Part 150 CNEL Noise Impact Map Measured in Number of Dwelling Units

Figure III-1

TABLE III-1 - 1982 FLEET MIX AND LEVEL OF OPERATIONS

Aircraft Types	Daily Operations* Percent	Number
4EWB (B747)	8	85
3EWB-MR (DC-10)	9	96
3EWB-LR (L1011)	4	43
2EWB (B767,A300)	1	11
4ENB P36 (DC-8RE)	0	0
NP36 (B707,DC-8)	4	43
3ENB P36 (B727-200A)	30	320
NP36 (B727-100/200)	6	64
2ENB P36 (DC9-80)	4	43
NP36 (B737,DC-9,BAC-111)	12	128
Air Taxi/Commuter	20	213
Business Jet	2	21
	100%	1067

SYMBOLS

E = Engine
WB = Wide Body
NB = Narrow Body
MR = Medium Body
LR = Long Range

P36 = Part 36 Compliant
NP36 = Non-Part 36 Compliant
RE = Re-Engine
A = Advanced

ACTIVITY LEVELS

Total Annual Operations = 389,455

Daily Operations Split:

Day	7:00 a.m. - 7:00 p.m.	= 70%
Evening	7:00 p.m. - 10:00 p.m.	= 16%
Night	10:00 p.m. - 7:00 a.m.	= 14%

*Note: Assignment of an aircraft to a particular operation and time was based upon review of the Official Airline Guide (OAG) for actual performance during 1982.

Takeoff operations remained essentially balanced, although an increased number of departures were assigned to the outboard south runway (25L).

During part of the 1982 period, over ocean operations (night time noise abatement procedures) were suspended due to air traffic control personnel constraints caused by the controllers' strike.

The 1982 noise impact area associated with north runway complex operations, as shown on Figure III-1, primarily affects north Inglewood, Westchester, and Playa Del Rey. The "tail" of the 65 CNEL contour extends as easterly to Normandie Avenue, primarily affecting neighborhoods south of Manchester Avenue. The "sideline bulge" in the contour extends northerly in the Emerson Manor area of Westchester to approximately 82nd Street.

Operations on the south runway complex impact communities in southwest Los Angeles, the southern portions of Inglewood, the unincorporated communities of Lennox and Del Aire, and neighborhoods in the cities of El Segundo and Hawthorne. The effect of the 1982 noise impact is summarized in Table III-2.

TABLE III-2 - 1982 EXISTING OPERATIONS CASE

CNEL Levels	Acreage	Dwelling Units	Population
65 to 70 dB CNEL	2,048	19,389	47,722
70 to 75 dB CNEL	1,267	13,862	36,005
75+ dB CNEL	308	3,391	8,564
TOTALS	3,623	36,642	92,291

B. PROJECTED 1987 COMPARISON CASE

The forecasted 1987 airport noise impact area has been projected utilizing the INM computer modeling technique. The assumptions regarding future aircraft operational characteristics for LAX are used as input for the model to produce projected future noise impact in terms of CNEL noise contours. The operational scenarios (1-19) are based on the assumptions modeled in the 1987 Comparison Case. Each operational scenario represents a single adjustment or a combination of adjustments to the 1987 Comparison Case. The effect of each operational adjustment has been quantified in this manner.

1. Description of Assumed 1987 Operational Characteristics

The 1987 Noise Exposure Map (see Figure III-2) is based on a projected level of activity associated with the 40 million annual passenger service level and 100 percent fleet compliance with FAR Part 36 and balanced aircraft operations between the two runway complexes. Table III-3 describes the anticipated 1987 fleet mix. The projected fleet mix includes 16 percent Stage III Part 36 compliant aircraft, which is considered a conservative estimate based on recent aircraft acquisitions and production levels.

2. Description of the Projected 1987 Noise Exposure

Approximately 2,770 acres, or 4.32 square miles of incompatible land are contained within the projected 1987 65 dB CNEL contour. Table III-4 summarizes the acreage, dwelling units and population impacted under the projected 1987 Base Case. When the projected 1987 Comparison Case (Figure III-1) is contrasted with the 1982 Base Case (Figure III-2) the overall reduction in noise impact noted is a result of a higher percentage of Part 36 compliant aircraft.

The northerly tail of the 1987 65 dB CNEL contour is considerably reduced in both length and width, when compared to the 1982 Base Case. However, the sideline departure bulge increased in the Westchester and Playa Del Rey and reduced in El Segundo. These changes reflect the projected increase in the number of quieter aircraft (reducing noise impact under normal approach paths); the projected increase in the total number of operations; and the shifting of operating to the north runway complex to achieve an equal operational balance causing the northerly sideline contour to expand. The impact within the City of Los Angeles from 1982 increased by approximately 870 dwelling units due to the operational parameters established for 1987.

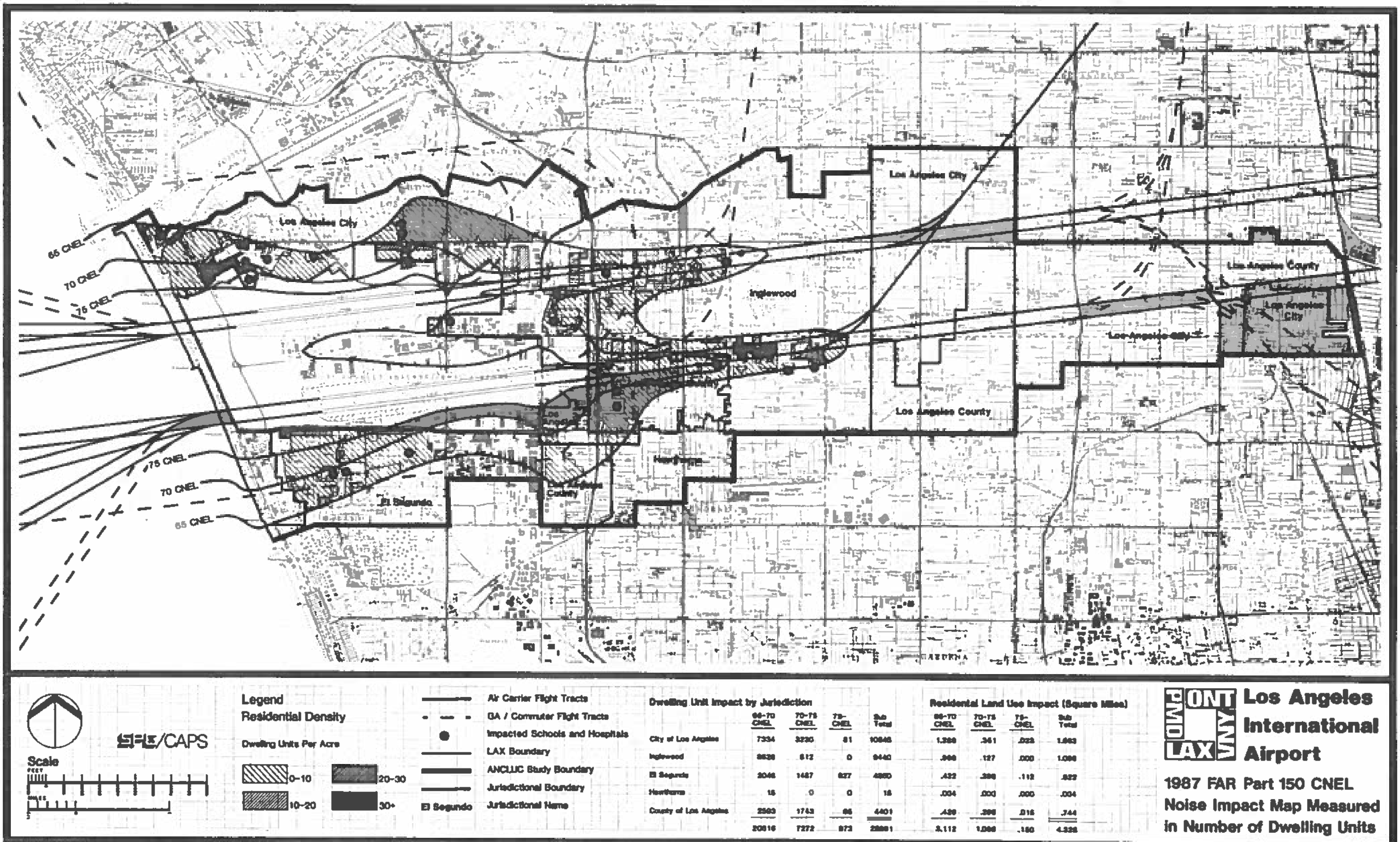
The noise exposure contour for the south runway complex is similarly reduced in its easterly extent and width, again due to the increase in FAR Part 36 compliant aircraft. Here, the sideline contour is also reduced in the communities of Hawthorne, Del Aire and El Segundo.

In quantifying the projected noise impacts, it was assumed that the existing land use patterns would remain essentially unchanged from the 1982 and 1987 cases. Table III-4 describes projected impacts for 1987.

C. COMPARATIVE ANALYSIS

1982 vs. 1987 Noise Reduction

The most important factor in reducing aviation generated noise between the existing 1982 case and the projected 1987 comparison is the elimination of all noisy (e.g. non FAR Part 36) aircraft.



Dwelling Unit Impact by Jurisdiction

	65-70 CNEL	70-75 CNEL	75- CNEL	Sub Total
City of Los Angeles	7334	3230	81	10645
Inglewood	8628	812	0	9440
El Segundo	2046	1487	827	4360
Hawthorne	15	0	0	15
County of Los Angeles	2593	1743	65	4401
	20616	7272	973	28861

Residential Land Use Impact (Square Miles)

65-70 CNEL	70-75 CNEL	75- CNEL	Sub Total
1.280	.361	.022	1.663
.969	.127	.000	1.096
.422	.288	.112	.822
.004	.000	.000	.004
.430	.298	.016	.744
3.112	1.088	.150	4.328

Figure III-2

TABLE III-3 - 1987 PROJECTED FLEET MIX AND LEVELS OF OPERATION

Aircraft Types	Daily Operations* Percent	Number
4EWB (B747)	10	127
3EWB-MR (DC-10)	16	203
3EWB-LR (L1011)	6	76
2EWB (B767,A300)	6	76
4ENB P36 (CD-8RE)	2	25
NP36 (B707,DC-8)	0	0
3ENB P36 (B727-200A)	27	343
NP36 (B727-100/200)	0	0
2ENB P36 (DC9-80,B757,B737-300)	10	128
NP36 (B737,DC-9,BAC1-11)	0	0
Air Taxi/Commuter	20	254
Business Jet	3	38
	100%	1270

SYMBOLS

E = Engine
WB = Wide Body
NB = Narrow Body
MR - Medium Body
LR = Long Range

P36 = Part 36 Compliant
NP36 = Non-Part 36 Compliant
RE = Re-engine
A = Advanced

ACTIVITY LEVELS

Daily Operations Split:

Day	7:00 a.m.	- 7:00 p.m.	=	70%
Evening	7:00 p.m.	- 10:00 p.m.	=	16%
Night	10:00 p.m.	- 7:00 a.m.	=	14%

1987 Projected Operations:

Annual Operations	= 474,500
Average Daily Operations	= 1,300
Air Carrier/Air Taxi	= 1,000
Commuter	= 270
General Aviation	= 30

*Note: Aircraft assignments were allocated proportionally based upon the daily operations split.

TABLE III-4 - 1987 LAX ANCLUC BASE MAP

CNEL Levels	Acreage	Dwelling Units	Population
65 to 70 dB CNEL	1,992	20,616	50,188
70 to 75 dB CNEL	682	7,272	17,336
75+ dB CNEL	96	973	2,128
TOTALS	2,770	28,861	69,652

Since the introduction of the jet transport aircraft, each new generation of aircraft has been more fuel efficient, quieter and less expensive (per passenger service mile) to operate. The aircraft modeled in the 1987 Comparison Case are quieter primarily on landing. The airlines have had two incentives to introduce quieter aircraft; first to enhance profitability with lower operating cost aircraft, and secondly comply with FAA and the Department of Airports regulations that mandate the introduction of quieter aircraft on a phased basis. Apparently the incentives and regulations are working. In 1978, 41 percent of aircraft flying into and out of LAX were in compliance with Stage II of the FAA noise regulation FAR Part 36. By 1982, the compliance level had reached 80 percent. The Board of Airport Commissioners requires that all aircraft comply with at least Stage II of FAR Part 36 by January 1, 1985. However, the FAA allows two engine jet powered aircraft engaged in small community service to continue until the end of 1987.

By comparing two earlier tables (III-2 and III-4; 1982 vs. 1987) the net effect of 100 percent compliance with Stage II of FAR Part 36 noise regulation can be shown. This comparison is shown. This comparison is shown in Table III-5.

The underlying assumption of the LAX ANCLUC Study is that present noise abatement policies will be fully implemented. As a result, the noise contours reflected by the 1987 projection constitute a baseline for comparing the cause/effectiveness of additional noise impact mitigation strategies. Further, the focus of the land use alternatives analysis will be within the specific areas of these contours.

TABLE III-5 - COMPARISON OF NOISE IMPACTS 1982 vs. 1987

CNEL Levels	Acreage	Dwelling Units	Population
65 to 70 dB CNEL	- 56	+1,227	+ 2,466
70 to 75 dB CNEL	-585	-6,590	-18,669
75+ db CNEL	-212	-2,418	- 6,436
TOTALS	-853	-7,781	-22,639

IV. COMPARATIVE SCENARIOS ANALYSIS

At this point in the ANCLUC Study, nineteen aircraft operational strategies have been analyzed to determine which operational adjustments or variables would be most effective in reducing aviation noise around LAX. The first four operational strategies (Cases 1 through 4) involve a change to only one operational variable (e.g. hours of over ocean operations, percent of easterly takeoffs or percentage of landings/takeoffs on the north and south runway pairs). The remaining fifteen operational strategies (Cases 5 through 19) change more than one variable (for example, in Case 5 adjustments are made to both hours of over ocean operations and percentages of landings/takeoffs on the north and south runway pairs).

The operational strategies, including the variables used to generate noise contours and the resultant change in dwelling unit impacts for cases 1, 2, 3 and 4 are shown in Table IV-1. The City of Hawthorne has only 15 dwelling units in the 1987 comparison case. Because of this extremely small number of dwelling units, relatively minor changes in number of dwelling units will cause a major change in the percent of dwelling units impacted (7 dwelling units being a change of at least 50 percent). Accordingly, Hawthorne is not included in further analysis.

Table IV-2 summarizes all operational variables tested, shows the changes in actual number of dwelling units impacted and the change in percent of total impact.

Cases 1 through 19 (appearing at the end of Section IV) include a thumb nail summary of the aircraft operational changes (various operational strategies) and their corresponding effect on dwelling units impacted.

TABLE IV-1 - CAUSE/EFFECT SUMMARY FOR SINGLE VARIABLES (CASES 1, 2, 3 and 4) AND 1987 COMPARISON

VARIABLE TESTED		1987 COMPARISON CASE	CASE 1	CASE 2	CASE 3	CASE 4
Hours of Over Ocean Operations		12a-630a	10p-7a	12a-630a	12a-630a	12a-630a
Easterly Takeoffs (%)		0	0	0.5%	0	0
Runway Utilization (%)						
Landing	R24L & R	50/50	50/50	50/50	25/75	50/50
Takeoff	R24L & R	50/50	50/50	50/50	75/25	50/50
Landing Threshold Displacement (Westerly in Feet)	R24L & R	0	0	0	0	0
	R25L & R	600	600	600	600	2600
Change in Dwelling Unit IMpact within 65 CNEL Contour by Jurisdiction Compared Against 1982 Base and 1987 Base						
L.A. City	1982		-7800	-8900	-7600	-8200
	1987		-1500	+ 224	- 377	- 577
Inglewood	1982		+ 870	+ 840	+ 890	+ 770
	1987		- 30	- 100	+ 12	+ 240
El Segundo	1982		-7000	-5500	-6600	-6200
	1987		-1300	+ 150	- 950	- 500
Hawthorne	1982		- 680	- 700	- 650	- 850
	1987		- 20	- 30	+ 8	- 190
L.A. County	1982		- 30	- 30	- 30	- 40
	1987		- 5	- 4	- 2	- 9
	1982		-2400	-2100	-1700	-2400
	1987		- 100	+ 212	+ 600	- 100

Positive sign (+) indicates an increase in number of dwelling units impacted.

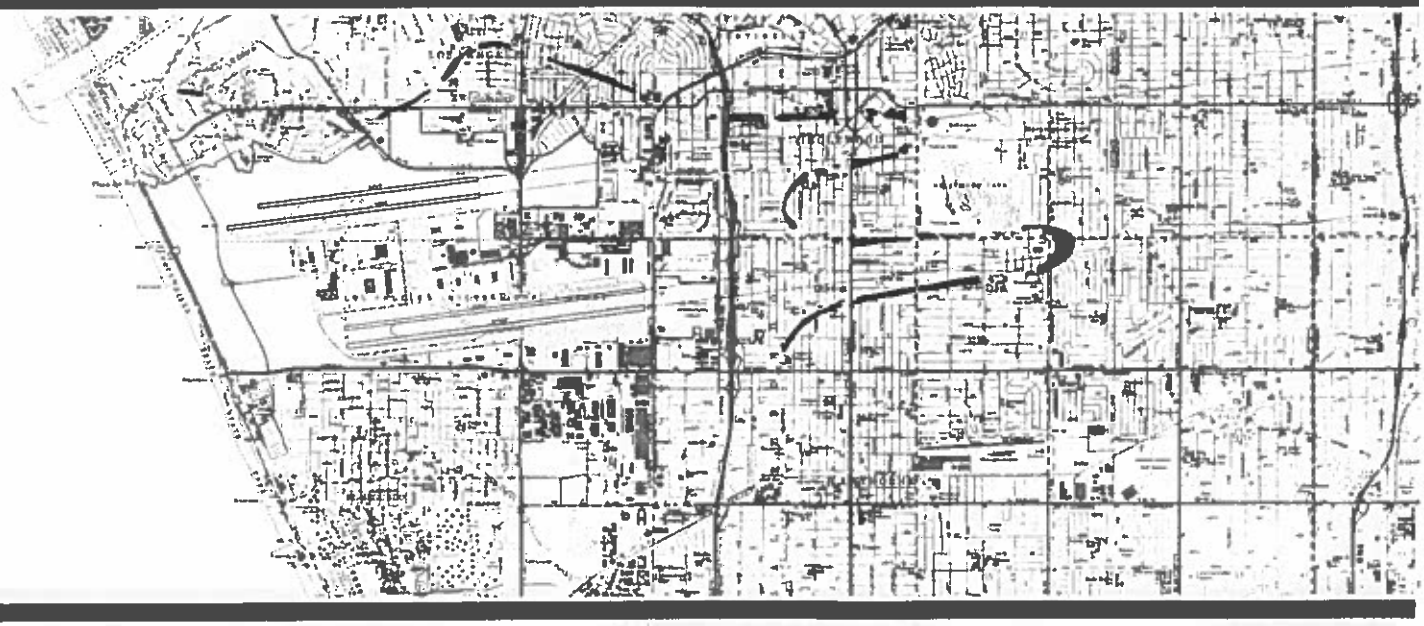
Negative sign (-) indicates a decrease in number of dwelling units impacted.

Table IV-2
LAX ANCLUC Operational Strategy Summary Matrix

VARIABLES TESTED	1982 BASE CASE	1987 COMPARISON CASE	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	CASE 7	CASE 8	CASE 9	CASE 10	CASE 11	CASE 12	CASE 13	CASE 14	CASE 15	CASE 16	CASE 17	CASE 18	CASE 19
Level of Operations (MAP)	32	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
FAR Part 36 Compliant (%)	72	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
FAA Part 36 Stage 3 (%)	3	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	100	16
Hours of Over Ocean Operations	12a-630a	12a-630a	10p-7a	12a-630a	12a-630a	12a-630a	10p-7a	10p-7a	12a-630a	10p-7a	12a-630a	12a-630a	10p-7p	12a-630a	12a-12a	10p-7a	10p-7a	12a-630a	10p-7a	12a-630a	12a-630a
Easterly Takeoffs (%)	0	0	0	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Runway Utilization (%) R24L&R	55/55	50/50	50/50	50/50	25/50	50/50	50/50	25/50	50/50	25/50	50/50	50/50	25/50	50/50	50/50	25/50	25/25	25/50	25/50	50/50	50/25
Landing / Takeoff R25L&R	45/45	50/50	50/50	50/50	75/50	50/50	50/50	75/50	50/50	75/50	50/50	50/50	75/50	50/50	50/50	75/50	75/75	75/50	75/50	50/50	50/75
Landing Threshold Displacement (Westerly) (Feet) R24L&R	0	0	0	0	0	0	0	0	0	0	0	0	1900	1900	0	0	0	0	0	0	0
R25L&R	600	600	600	600	600	2600	600	600	5000	4600	4600	4500	5000	600	600	5000	4600	4600	4600	600	600
Reduction in Nighttime (10p-7a) Overflows (%)	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	50	0	0
Westerly Runway Extension (Feet) R24L&R	0	0	0	0	0	0	0	0	1300	0	0	0	1900	1900	0	0	0	0	0	0	0
R25L&R	0	0	0	0	0	0	0	0	4400	2000	2000	2000	4400	0	0	4400	2000	2000	2000	0	0
Takeoff Threshold Relocation R24L&R	0	0	0	0	0	0	0	0	1900	0	0	0	1900	1900	0	0	0	0	0	0	0
R25L&R	0	0	0	0	0	0	0	0	4400	0	2300	2600	4400	0	0	4400	2000	2000	2000	0	0
No. of Dwelling Units Impact within 65 CNEL Contour/Jurisdiction	36642	28851	27371	29085	28284	28284	23709	26379	21255	21851	24673	24336	17763	26902	19060	19600	21431	24658	18287	11201	28610
City of Los Angeles	9772	10645	10645	10541	10657	10888	9331	10714	9223	10678	10527	10560	8795	9189	10818	10078	8124	10509	8646	1396	8050
Inglewood	15121	9440	8113	9554	8487	8932	7400	6729	5913	4237	7185	7377	2769	8856	4292	3431	4930	6862	3930	6354	9963
El Segundo	5023	4360	4337	4326	4308	4169	3943	4375	3575	3566	3518	3307	3547	4431	4289	3451	4369	3583	2935	1511	5078
Hawthorne	42	15	9	11	13	6	0	11	5	7	8	0	5	8	7	0	0	0	0	0	393
County of Los Angeles	6684	4401	4297	4613	4959	4289	3466	4550	2509	3463	3441	3032	2647	4418	2754	2640	4008	3704	2776	1940	5126

LOS ANGELES INTERNATIONAL AIRPORT

LAX ANCLUC CAUSE/EFFECT ANALYSIS



LEGEND: **Decrease** ■ **Increase** □

Operational Changes

CASE 1

° Over-ocean operations hours extended to 2200-0700 (10pm - 7am)

Cause/Effect

As a result of the 2-1/2 hour increase in over ocean operations, the aircraft landings during this period are shifted from runways 24/25 to runway 6/7. This change in nighttime operations causes the contours over Inglewood and the County of Los Angeles to be uniformly reduced in size at the outer boundary of the 65 CNEL contour, which shifts towards the west. These communities also benefit from an additional 2-1/2 hours of single event relief. The effect of this 2-1/2 hour extension in over ocean operations to both the City of Los Angeles and El Segundo is modified by the fact that both of these communities are impacted primarily by take-off noise and by the thrust reversal after landing on runways 24 and 25. An increase in the lengths of the westerly tips of the noise contours, for approaches to runways 6R and 7L, would occur over the Pacific Ocean (outside the study area).

The decrease in total dwelling units impacted is approximately 1490 dwelling units. Please refer to Table IV-1 for the dwelling unit change in the individual jurisdictions.

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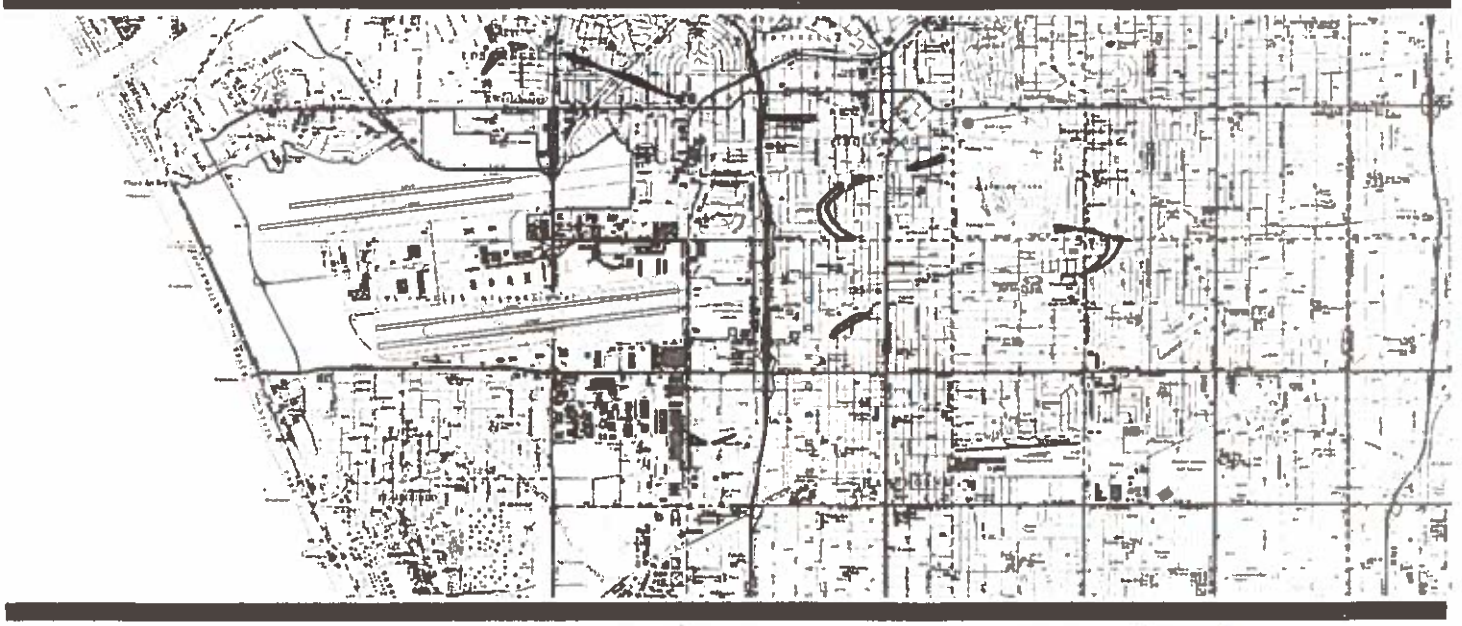


LEGEND: **Decrease** ■ **Increase** □

Operational Changes

CASE 2

° 0.5% easterly takeoffs

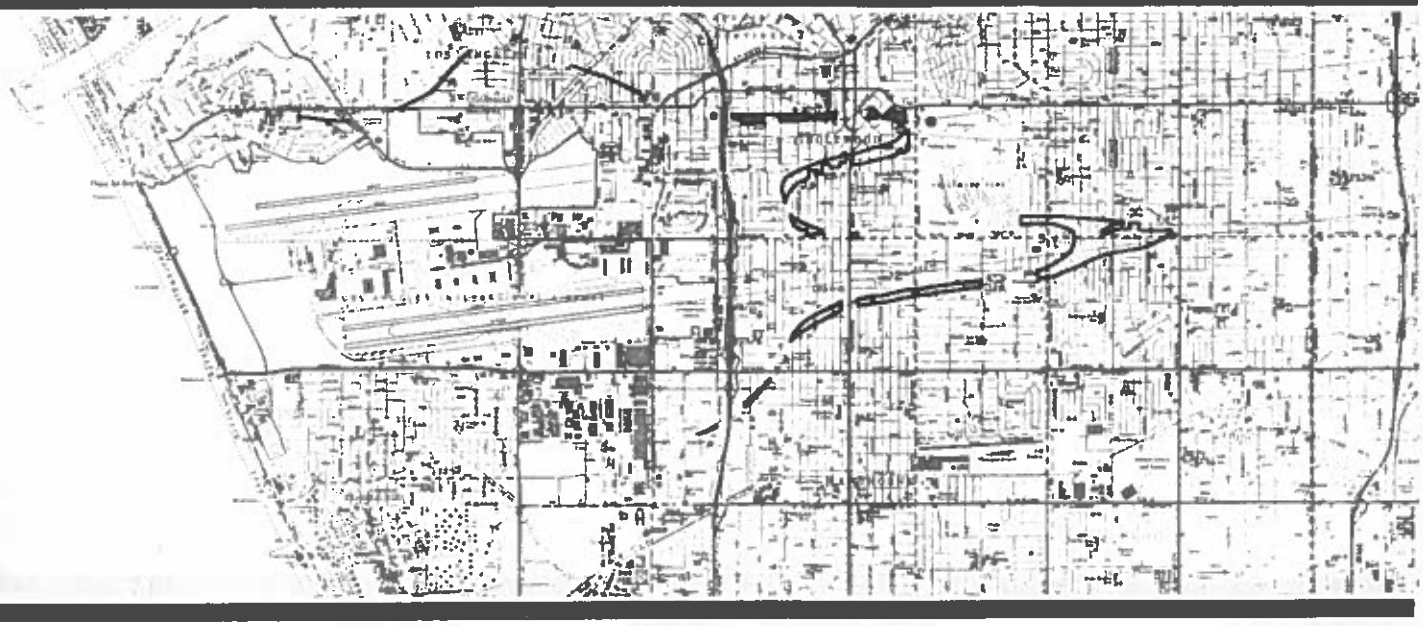
Cause/Effect

Results of this change are small, but measurable, by shifting of the 65 CNEL contour slightly toward the east. This shift has the greatest impact on Inglewood where the total number of dwelling units impacted by the 65 CNEL contour increases by 150 Dwelling Units. The City of Los Angeles experiences both increases to the east and decreases to the north as a result of the change. (The decrease is from the slight decrease in size of the departure bulge at the east end of the airport.) The County of Los Angeles experiences an increase of 212 dwelling units in the Lennox area due to the additional departure noise. El Segundo is unaffected by this small reduction in take-offs over the community (0.5% shifted to easterly departures).

The increase in total dwelling units impacted is 224 dwelling units. Please refer to Table IV-1 for the dwelling unit impact change in the individual jurisdictions.

LOS ANGELES INTERNATIONAL AIRPORT

LAX ANCLUC CAUSE/EFFECT ANALYSIS



LEGEND: Decrease ■ Increase □

Operational Changes

CASE 3

° Arrivals: 25% on North Runways, 75% on South Runway

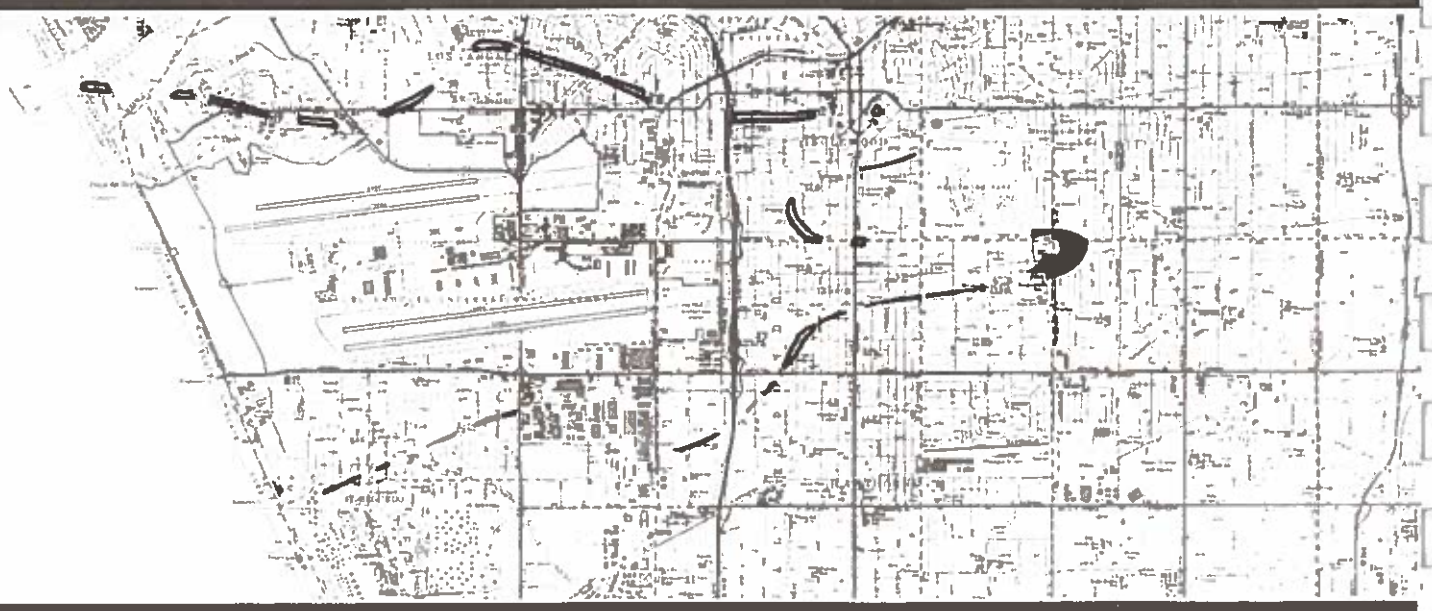
Cause/Effect

This operational strategy redistributes a portion of the landing noise associated with the northerly runways 24 L&R and adds it to the landing noise associated with southerly runways 25 L&R. A portion of Inglewood's noise impact is redistributed from north to south and reduces its total dwelling unit impact count by 953 dwelling units. In this case, El Segundo and the City of Los Angeles are not sufficiently impacted by landing noise on runways 24/25 L&R to cause significant changes in their impact areas.

The decrease in total dwelling units impacted is 377 dwelling units. Please refer to Table IV-1 for the dwelling unit impact change in the individual jurisdictions.

LOS ANGELES INTERNATIONAL AIRPORT

LAX ANCLUC CAUSE/EFFECT ANALYSIS



LEGEND: **Decrease** ■ **Increase** □

Operational Changes

CASE 4

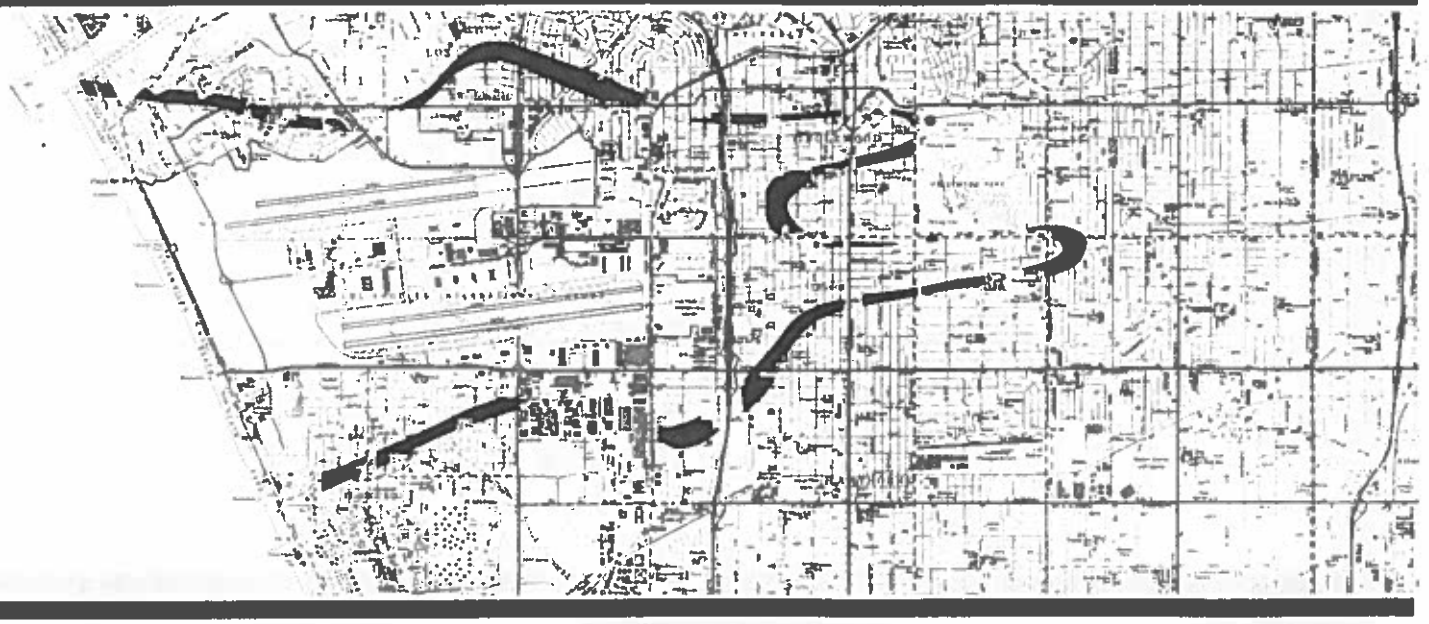
- Landing threshold South Runways displaced 2,600 feet West

Cause/Effect

The major effect of this operational change is a westerly shift of the landing noise for runways 25 L&R. This shift caused a 408 dwelling units reduction in the dwelling unit count for Inglewood. The aircraft reverse thrust noise moves in a westerly direction 2,000 feet. This shifting in position of the reverse thrust causes the 65 CNEL contour in El Segundo to be repositioned slightly to the west, impacting about 200 fewer dwelling units than in the 1987 Comparison Case. The increase of about 240 dwelling units in the City of Los Angeles north of the airport is a peculiar phenomena related to the reflective properties of sound energy and the manner in which the Integrated Noise Model (INM) averages aircraft noise from both runway complexes. The decrease in total dwelling units impacted is 577 dwelling units. Please refer to Table IV-1 the dwelling unit impact change in each jurisdiction.

LOS ANGELES INTERNATIONAL AIRPORT

LAX ANCLUC CAUSE/EFFECT ANALYSIS



LEGEND: **Decrease** ■ **Increase** □

Operational Changes

CASE 5

- Over ocean operation hours extended to 2200 - 0700 (10p.m. - 7a.m.)
- 50% reduction in nighttime operations (remaining 50% of the nighttime operations redistributed to day and evening hours).

Cause/Effect

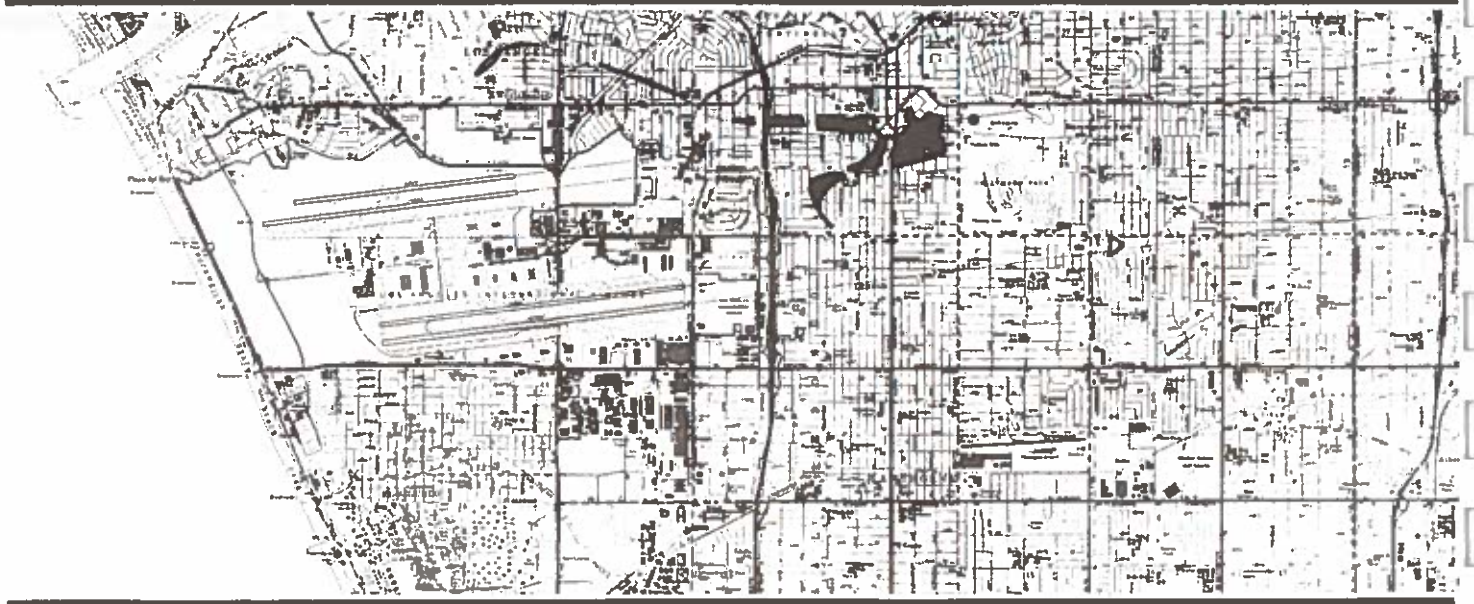
The extension of over ocean operations from 12 midnight to 6:30 am to the 10 pm to 7 am time period produces beneficial effects within the communities of Inglewood and Lennox (LA County) as described in Case 1. In addition, the arbitrary reduction of nighttime departures specified in Case 5 reduces backblast and sideline takeoff noise exposure within the communities of El Segundo and Los Angeles. The reduction in sideline noise results in a slightly more narrow takeoff noise sideline bulge, but does not influence the landing noise contours whose lengths are the same in Case 5 as in Case 1. The total decrease in dwelling units is 5137, the change in each jurisdiction is summarized below:

LA City	-1314 Dwelling Units
Inglweood	-2040 Dwelling Units
El Segundo	-848 Dwelling Units
LA County	-935 Dwelling Units

For additional information, please refer to Table IV-2.

LOS ANGELES INTERNATIONAL AIRPORT

LAX ANCLUC CAUSE/EFFECT ANALYSIS



LEGEND: Decrease ■ Increase □

Operational Changes

CASE 6

° Over ocean operation hours extended to 2200 - 0700 (10p.m. - 7a.m.)
° Arrivals: 25% on North Runways, 75% on South Runways

Cause/Effect

The decrease in use of the north runways for landings plus the effect of extending over ocean operations for 2-1/2 hours reduced the size of the noise impact in North Inglewood.

The southern tail of the contour is virtually unchanged, as the increased over ocean operations noise reduction is continued by the overall increase in aircraft landing on the south runway pair by the 75% allocation of landing to the South Runways.

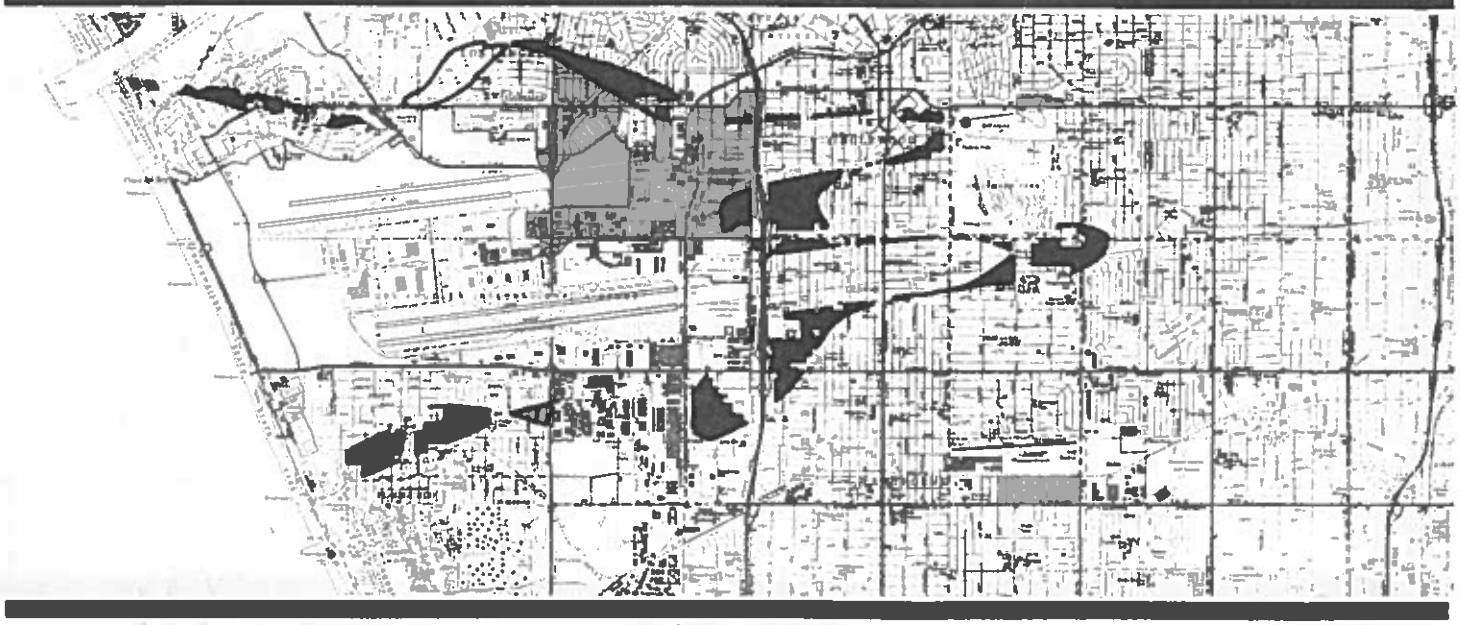
The total decrease in dwelling units is about 2478. The change in each jursidiction is summarized below:

LA City	+ 69 Dwelling Units
Inglewood	-2711 Dwelling Units
El Segundo	+ 15 Dwelling Units
LA County	- 149 Dwelling Units

For additional information, please refer to Table IV-2.

LOS ANGELES INTERNATIONAL AIRPORT

LAX ANCLUC CAUSE/EFFECT ANALYSIS



LEGEND: **Decrease** ■ **Increase** □

Operational Changes

CASE 7

- North Runways extended 1,900 feet West and Takeoff threshold displaced 1,900 feet West
- South Runways extended 4,400 feet West and Takeoff threshold displaced 4,400 feet West
- Landing threshold South Runways displaced 5,000 feet West

Cause/Effect

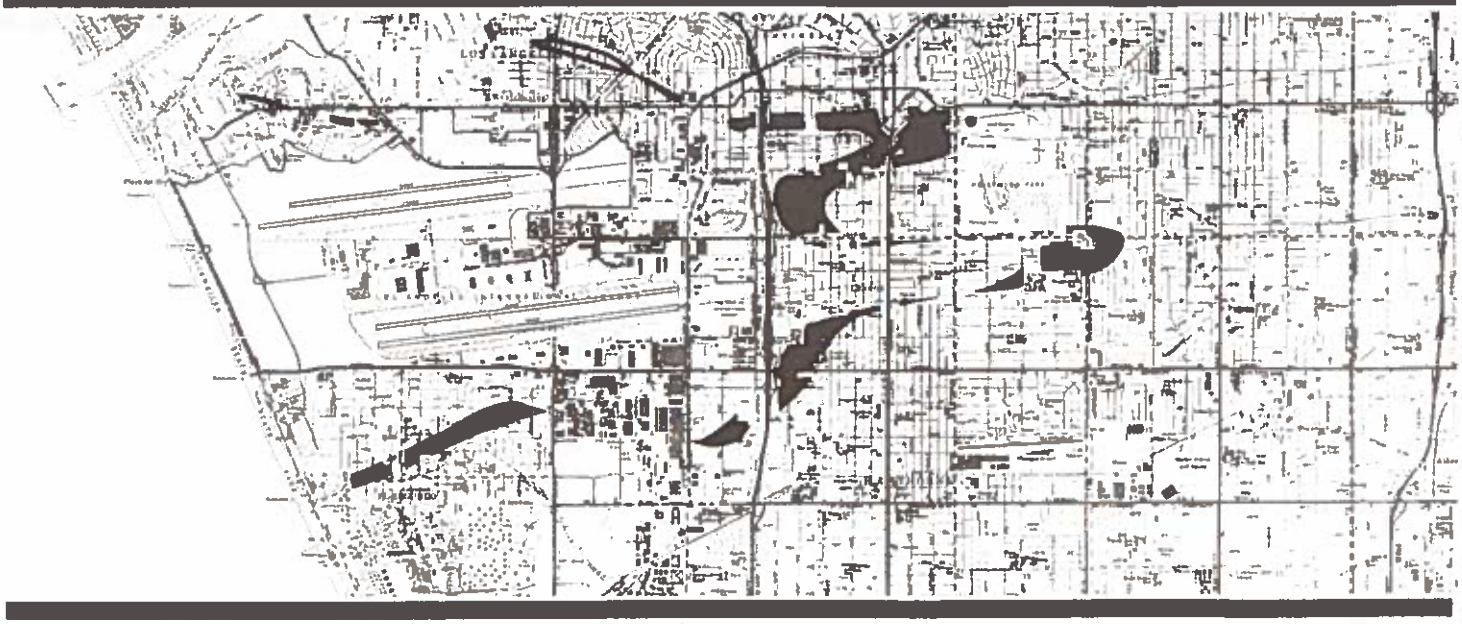
Case 7 indicates the improvement caused by the westward shift of the takeoff bulge approximately 2,000 feet on the north runways and 4,500 feet on the south runways. The relocation of the runways to the west shifts the noise impact areas westward in all study areas, reducing the length of the northern tail of the contours by 2,000 feet and the southern tail of the contours by 4,500 feet. This reduces the size of the impact area in Inglewood and LA County to the greatest extent. The relocation of the total contour in a westward direction also shifts the impact areas to compatible land use in both north and south Inglewood. The total decrease in dwelling units is about 7596 the change in each jurisdiction is summarized below:

LA City	-1422 Dwelling Units
Inglewood	-3527 Dwelling Units
El Segundo	- 835 Dwelling Units
LA County	-1812 Dwelling Units

For additional information, please refer to Table IV-2.

LOS ANGELES INTERNATIONAL AIRPORT

LAX ANCLUC CAUSE/EFFECT ANALYSIS



LEGEND: **Decrease** ■ **Increase** □

Operational Changes

CASE 8

- Over ocean operation hours extended to 2200 - 0700 (10p.m. - 7a.m.)
- Arrivals: 25% on North Runways, 75% on South Runways
- South Runways extended 2,000 feet West
- Landing threshold South Runways displaced 4,600 feet West
- South Runway Takeoff Threshold Displaced 2000 feet West

Cause/Effect

The increase in the time period of over ocean operations reduces the impact area in all study areas by reducing the size of the contour with reductions in the lengths of both the northern and southern tails of the contours, reducing the size of the impact area of Inglewood. The decreased use of the north runways for landings reduces the length of the northern tail of the contour. The extension of the south runways to the west shifts the sideline departure noise impact areas south of the airport in El Segundo and LA County westward toward more compatible area. Case 8, when compared to Case 6, shows the additional effect of the south runway comlex extension 2,000 feet to the west. The total decrease in dwelling units is about 7002, the change is each jurisdiction is summarized below:

LA City	+ 33 Dwelling Units
Inglewood	-5303 Dwelling Units
El Segundo	- 794 Dwelling Units
LA County	- 938 Dwelling Units

For additional information, please refer to Table IV-2.

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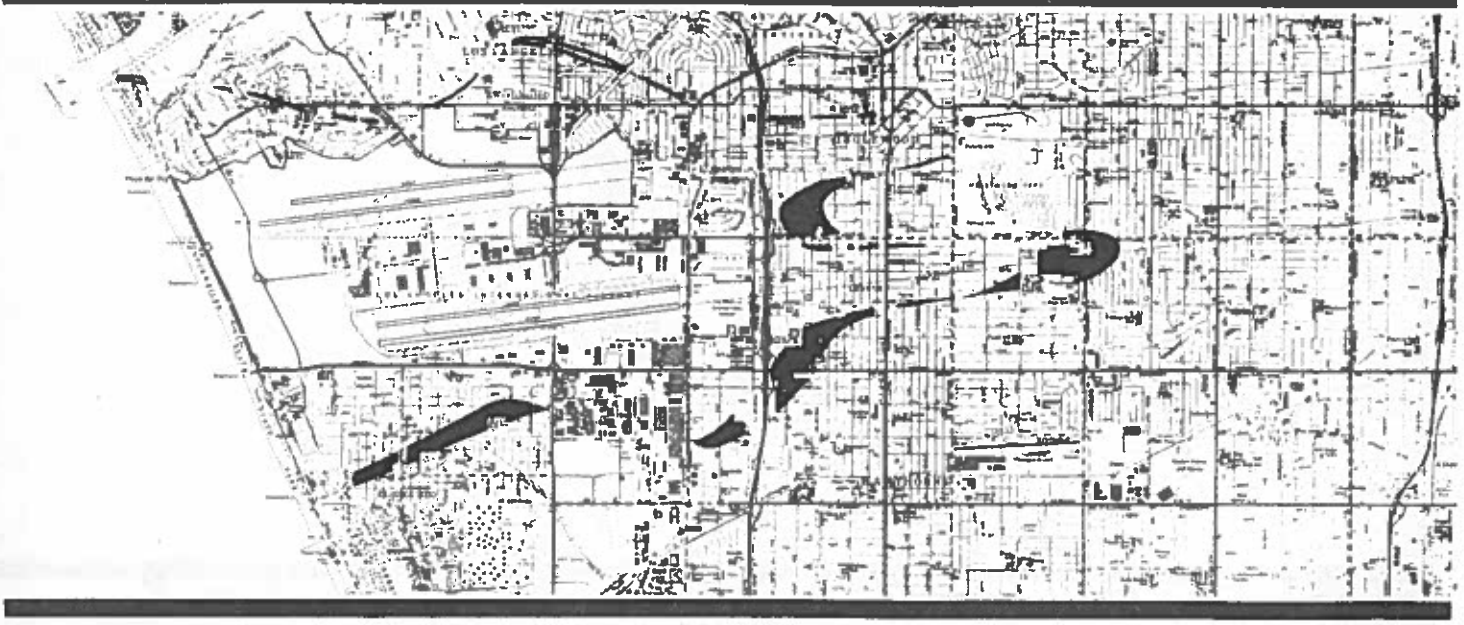
LAX ANCLUC CAUSE/EFFECT ANALYSIS



LEGEND: **Decrease** ■ **Increase** □

Operational Changes

CASE 9

- South Runways extended 2,000 feet west
- Landing threshold South Runways displaced 4,600 feet west
- Takeoff threshold displaced 2,000 additional feet west

Cause/Effect

The extension of the south runways to the west shifts the impact areas south of the airport in El Segundo and LA County westward toward more compatible areas causing small additions and deletions in LA City which end up cancelling each other out for no change.

The westerly shift also decreases the length of the southern tail of the contour reducing the size of the impact area in Inglewood. The effect of this shift is not as great as in Case 8 as a result of only 50% of the aircraft utilizing the extended runways.

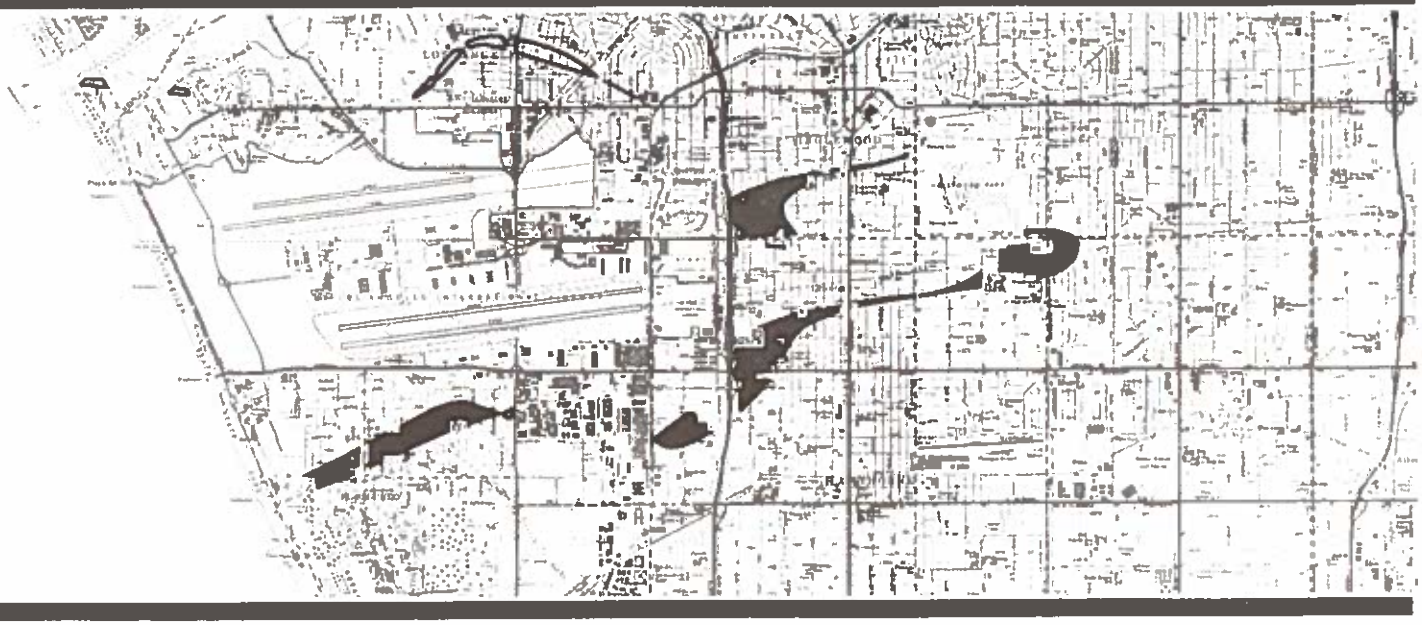
The total decrease in dwelling units is about 4175, the change in each jurisdiction is summarized below:

LA City	- 118 Dwelling Units
Inglewood	-2255 Dwelling Units
El Segundo	- 842 Dwelling Units
LA County	- 960 Dwelling Units

For additional information please refer to Table IV-2.

LOS ANGELES INTERNATIONAL AIRPORT

LAX ANCLUC CAUSE/EFFECT ANALYSIS



LEGEND: **Decrease** ■ **Increase** □

Operational Changes

CASE 10

- South Runways extended 2,000 feet West
- Takeoff threshold South Runways displaced 2,600 feet West
- Landing threshold South Runways displaced 4,500 feet West

Cause/Effect

Case 10, when compared with Case 9, indicates the effect of a minor (600 feet) westward shift of the takeoff threshold location for the south runway complex. The relocation of the south runways to the west shifts the impact areas south of the airport in El Segundo and LA County westward to more compatible areas. The contour shift also increases the impact within the City of Los Angeles. This is a result of the same phenomena experienced in Case 4. The reflective properties of sound energy and the parameters within the computer model to average the noise from both runway complexes identifies an increase of about 215 dwelling units. The total decrease in dwelling units impacted is about 4512, the change in each jurisdiction is summarized below:

LA City	+ 215 Dwelling Units
Inglewood	-2363 Dwelling Units
El Segundo	-1055 Dwelling Units
LA County	-1309 Dwelling Units

For additional information please refer to Table IV-2.

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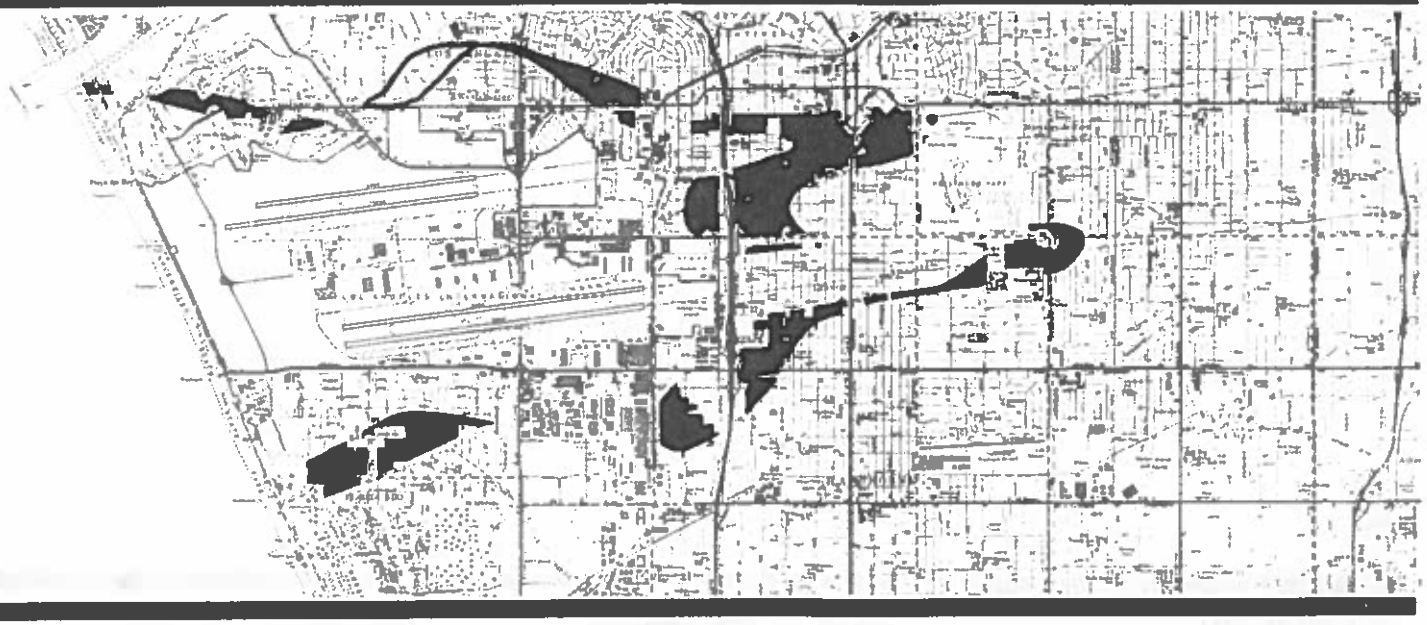
LAX ANCLUC CAUSE/EFFECT ANALYSIS



LEGEND: **Decrease** ■ **Increase** □

CASE 11

Operational Changes

- Over ocean operation hours extended to 2200 - 0700 (10p.m. - 7a.m.)
- Arrivals: 25% on NOrth Runways, 75% on South Runway
- North Runways extended 1,900 feet West and takeoff and landing threshold displaced 1,900 feet West
- South Runways extended 4,400 feet West and takeoff threshold displaced 4,400 feet West
- Landing threshold South Runways displaced 5,000 feet West

Cause/Effect

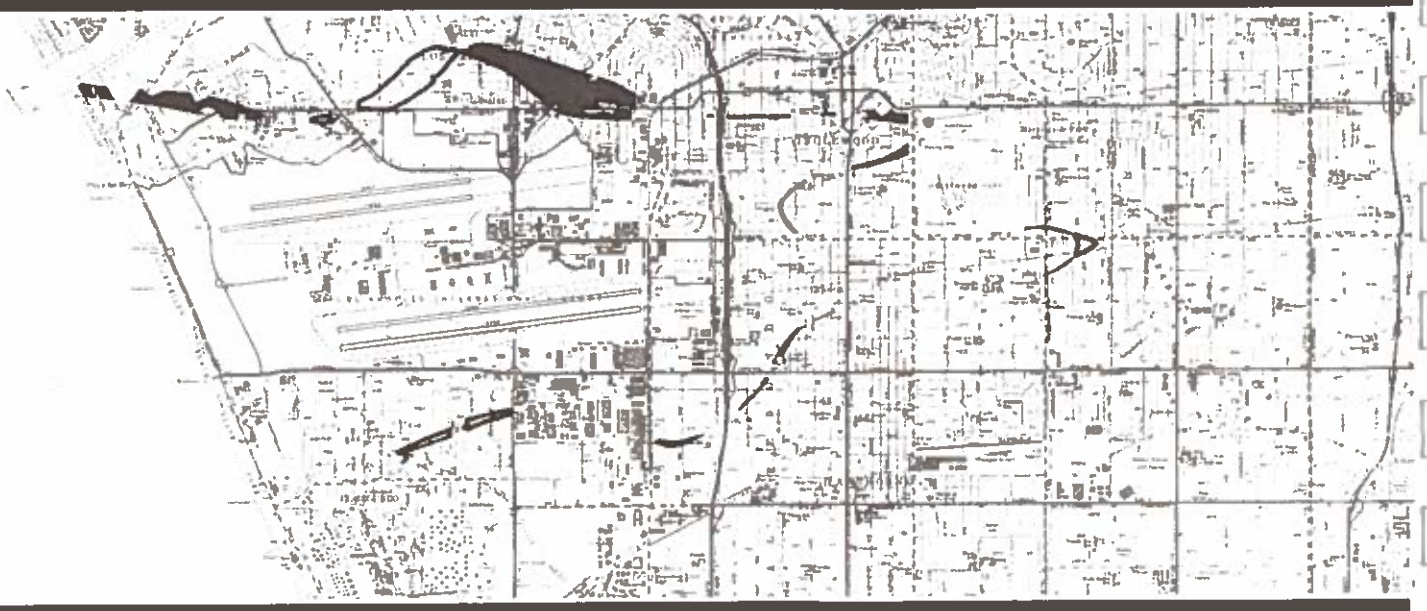
Case 11, when compared to Case 8, shows the effect of an additional westerly shift of both the north and south runway pairs. The extension of the runways to the west reduces the lengths both the northern and southern tails of the contour, substantially reducing the size of the impact area in Inglewood. The extension also shifts the impact areas north and south of the airport in LA City and County and El Segundo westward to compatible areas. The increase in the time period for over ocean operations reduces the overall size of the contour in over land areas reducing the size of all impact areas. The total decrease in dwelling units is about 11,088, the change in each jurisdiction is summarized below:

LA City	-1850 Dwelling Units
Inglewood	-6671 Dwelling Units
El Segundo	- 813 Dwelling Units
LA County	-1754 Dwelling Units

For additional information, please refer to Table IV-2.

LOS ANGELES INTERNATIONAL AIRPORT

LAX ANCLUC CAUSE/EFFECT ANALYSIS



LEGEND: **Decrease** ■ **Increase** □

Operational Changes

CASE 12

- North Runways extended 1,900 feet West
- Takeoff and landing thresholds North Runways displaced 1,900 feet West

Cause/Effect

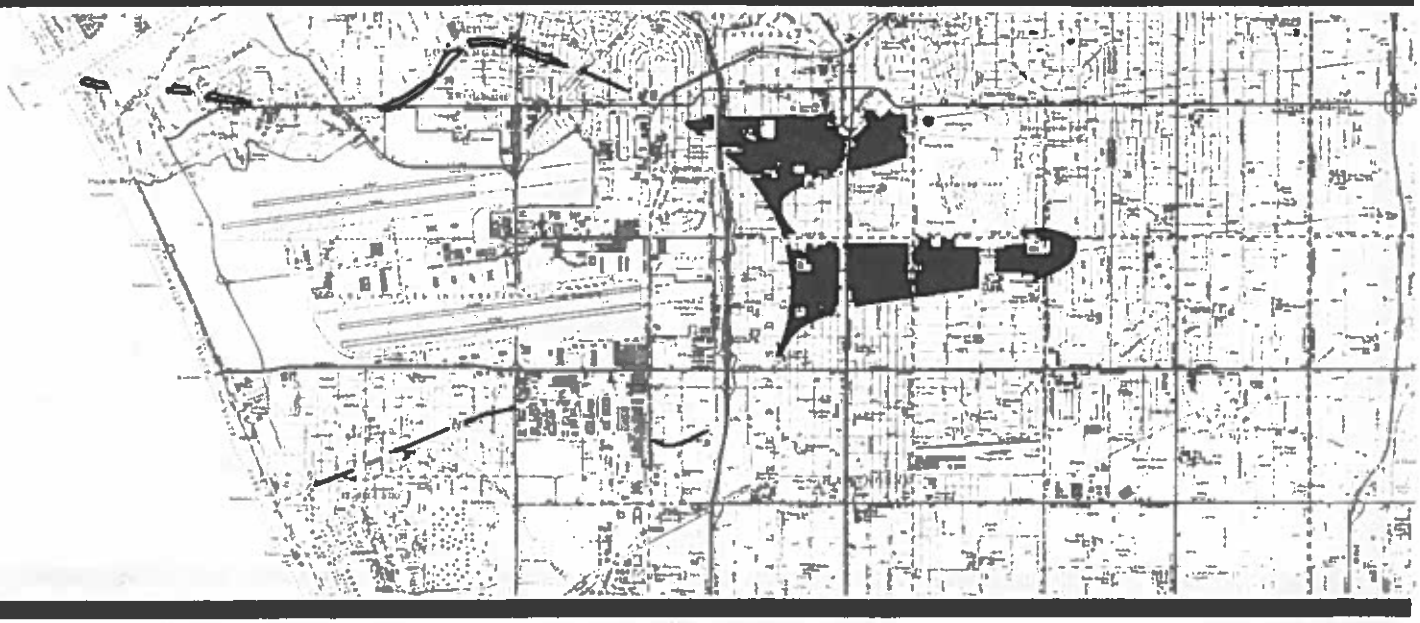
Case 12, compared to Case 2, shows the effect of a 1,900 foot westerly displacement of the north runways 24L & R. The relocation of the north runways to the west shifts the impact area north of the airport in LA City westward to more compatible areas with slight shifts in other areas. The contour shift indicates an increase in both El Segundo and LA County. This is a result of the phenomena which occurred in Cases 4 and 10. Once again the reflective properties of sound energy and the parameters within the computer model to average the noise from both runway complexes identifies an increase of about 89 dwelling units in the aforementioned jurisdictions. The shift also reduces the length of the northern tail of the contour, decreasing noise impacts in Inglewood. The total decrease in dwelling unit impact is about 1952, the change per jurisdiction is summarized below:

LA City	-1456 Dwelling Units
Inglewood	- 584 Dwelling Units
El Segundo	+ 71 Dwelling Units
LA County	+ 17 Dwelling Units

For additional information, please refer to Table IV-2.

LOS ANGELES INTERNATIONAL AIRPORT

LAX ANCLUC CAUSE/EFFECT ANALYSIS



LEGEND: **Decrease** **Increase**

Operational Changes

CASE 13

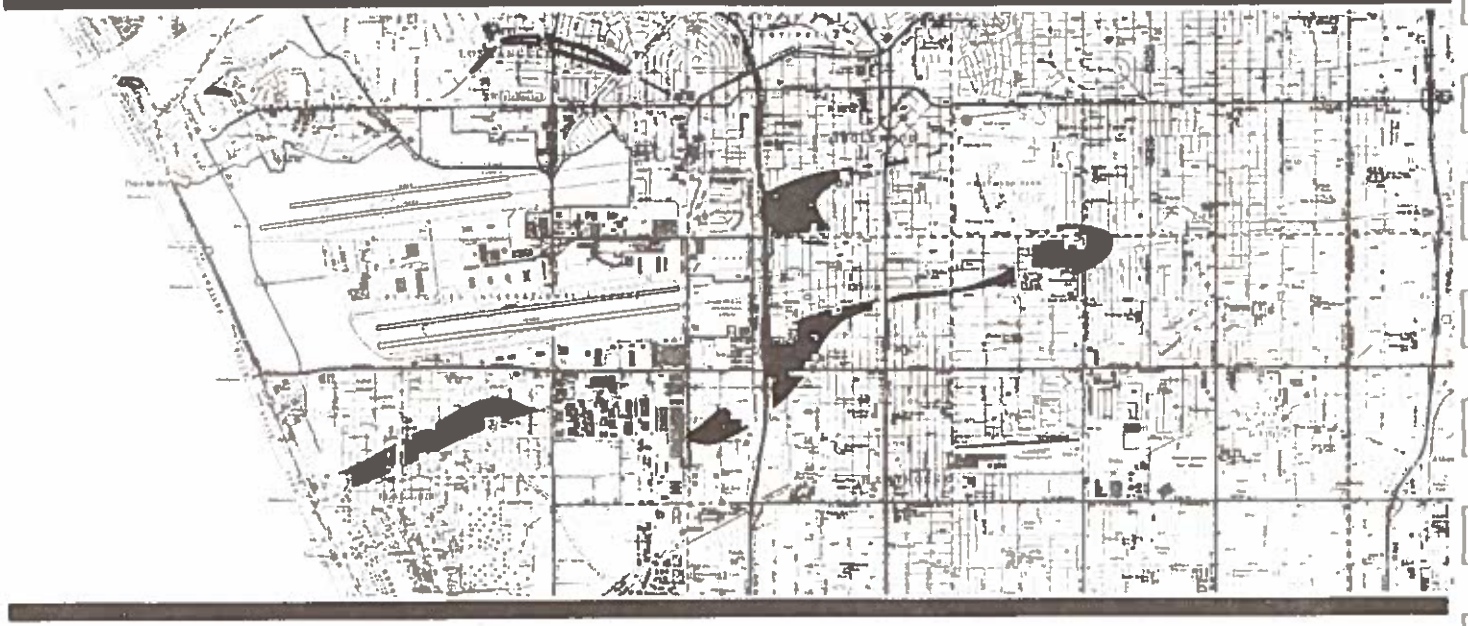
° 24-hour over the ocean operations.

Cause/Effect

The requirement for all operations to use over ocean flight tracks eliminates both the northern and southern tails of the contour, substantially reducing the size of the impact area east of the airport in Inglewood and LA County. LA City and El Segundo, to the north and south of the airport are affected only slightly. To ensure comparability with the other alternatives a 40 MAP level of operations was maintained even though the actual airspace constraints would drastically reduce that level of service. LA City experiences an increase due to increased reverse thrust events and the balanced operations assumption. The total decrease in dwelling units is about 9,793, the change per jurisdiction is summarized below:

LA City	+ 173 Dwelling Units
Inglewood	-8148 Dwelling Units
El Segundo	- 171 Dwelling Units
LA County	-1647

For additional information, please refer to Table IV-2.



LEGEND: **Decrease** ■ **Increase** □

CASE 14

Operational Changes

- Over ocean operation hours extended to 2200 - 0700
- Arrivals: 25% on North Runways, 75% on South Runways
- South runways extended 4,400 feet West and takeoff threshold displaced 4,400 feet West
- Landing threshold South Runways displaced 5,000 feet West

Cause/Effect

The westward shift of the South Runways decreases the length of the southern tail of the contour reducing noise impact areas in Inglewood, El Segundo (due to the shift of the sideline departure bulge), and LA County. Case 14 shows the additional benefits of further shifting the South Runways to the West.

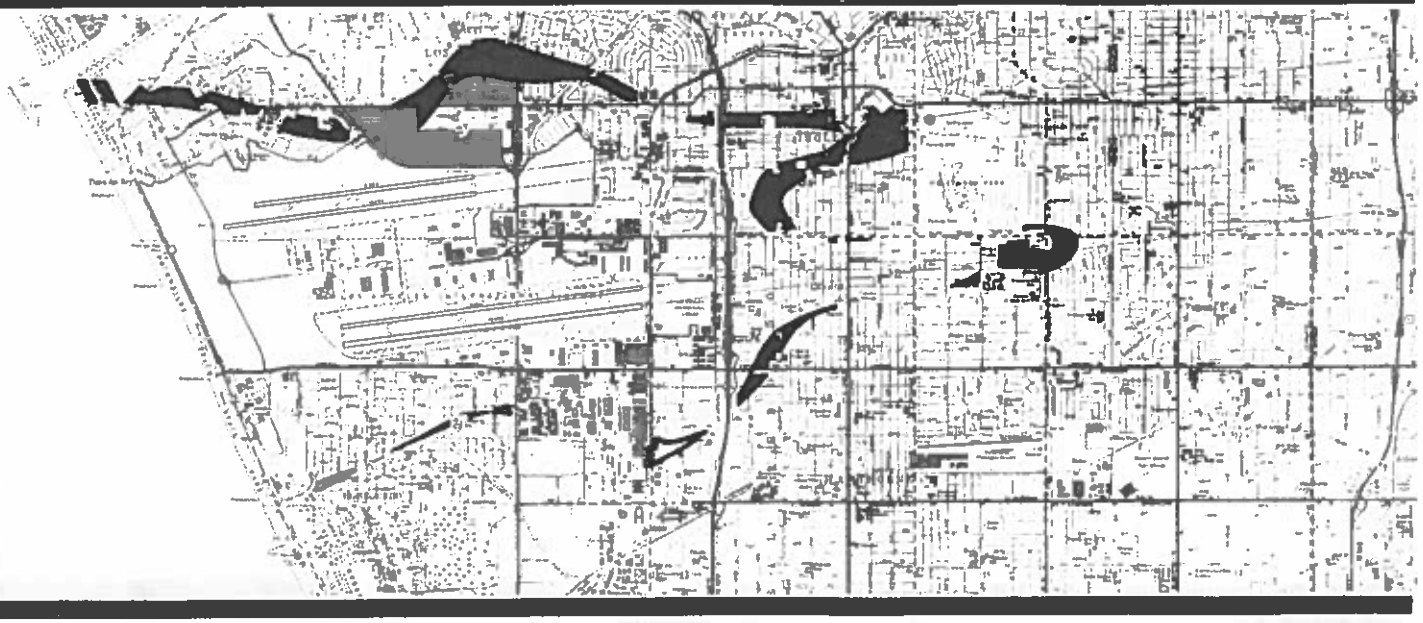
The total decrease in dwelling unit impact is about 9246. The change per jurisdiction is summarized below:

LA City	- 567 Dwelling Units
Inglewodd	-6009 Dwelling Units
El Segundo	- 909 Dwelling Units
LA County	-1761 Dwelling Units

For additional information, please refer to Table IV-2.

LOS ANGELES INTERNATIONAL AIRPORT

LAX ANCLUC CAUSE/EFFECT ANALYSIS



LEGEND: **Decrease** **Increase**

Operational Changes

CASE 15

- Over ocean operation hours extended to 2200 - 0700
- Arrivals and Departures: 25% on North Runways, 75% on South Runways
- South Runways extended 2,000 feet West, and takeoff threshold displaced 2,000 feet West
- Landing threshold South Runways displaced 4,600 feet West

Cause/Effect

Case 15, when compared to Case 8, shows the advantage to the City of Los Angeles gained by shifting half of the departures on the North Runways to the South Runways. The reduction in the communities gained in Case 8 are maintained by this shift except the sideline noise relief benefit shifts to Los Angeles from El Segundo which experiences a slight impact increase. The total decrease in dwelling units impacted is about 7415; the change per jurisdiction is summarized below:

LA City	-2521 Dwelling Units
Inglewood	-4510 Dwelling Units
El Segundo	+ 9 Dwelling Units
LA County	393 Dwelling Units

For additional information, please refer to Table IV-2.

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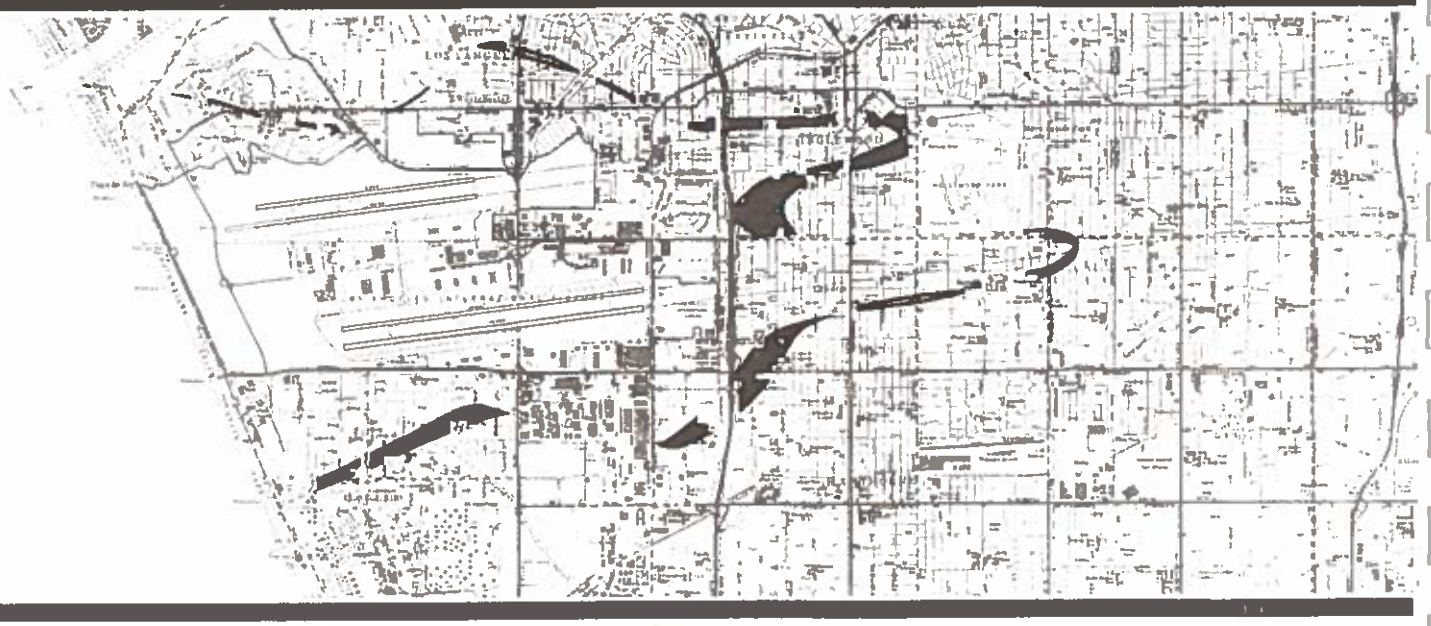
LAX ANCLUC CAUSE/EFFECT ANALYSIS



LEGEND: Decrease ■ Increase □

Operational Changes

CASE 16

- Arrivals: 25% on North Runways, 75% on South Runways
- South Runways extended 2,000 feet West and takeoff threshold displaced 2,000 feet West
- Landing threshold South Runways displaced 4,600 feet West

Cause/Effect

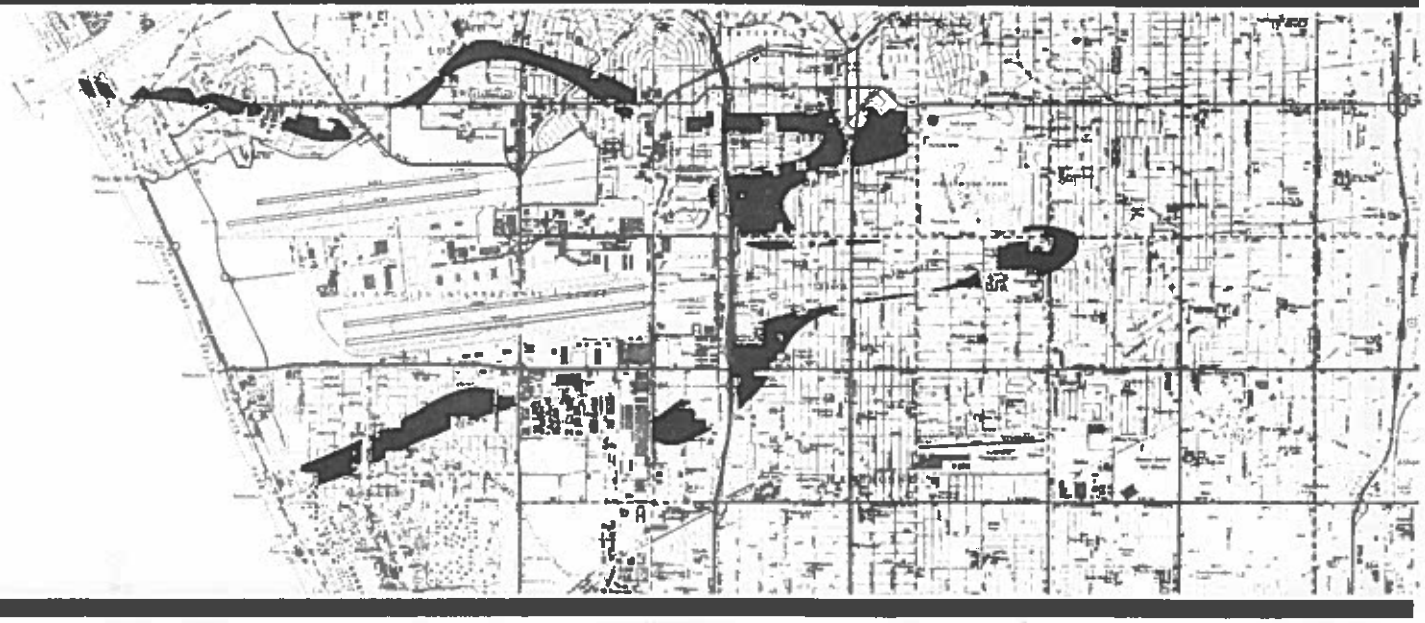
The advantages in Case 8 of increased over ocean operation hours are lost in Case 16 in Inglewood and LA County. The impact in El Segundo is virtually unchanged from Case 8 as the major impact in El Segundo is from the sideline departure bulge from the South Runays. Reduced arrivals on the north runways decreases the impact in LA City. The total decrease in dwelling units is about 4156; the change per jurisdiction is summarized below:

LA City	- 90 Dwelling Units
Inglewood	-2172 Dwelling Units
El Segundo	- 840 Dwelling Units
LA County	-1054 Dwelling Units

For additional information, please refer to Table IV-2.

LOS ANGELES INTERNATIONAL AIRPORT

LAX ANCLUC CAUSE/EFFECT ANALYSIS



LEGEND: Decrease ■ Increase □

Operational Changes

CASE 17

- Over ocean operation hours extended to 2200 - 0700
- Arrivals: 25% on North Runways, 75% on South Runways
- 50% of nighttime operations redistributed to daytime hours
- South Runways extended 2,000 feet West and takeoff threshold displaced 2,000 feet West
- Landing threshold South Runway displaced 4,600 feet west

Cause/Effect

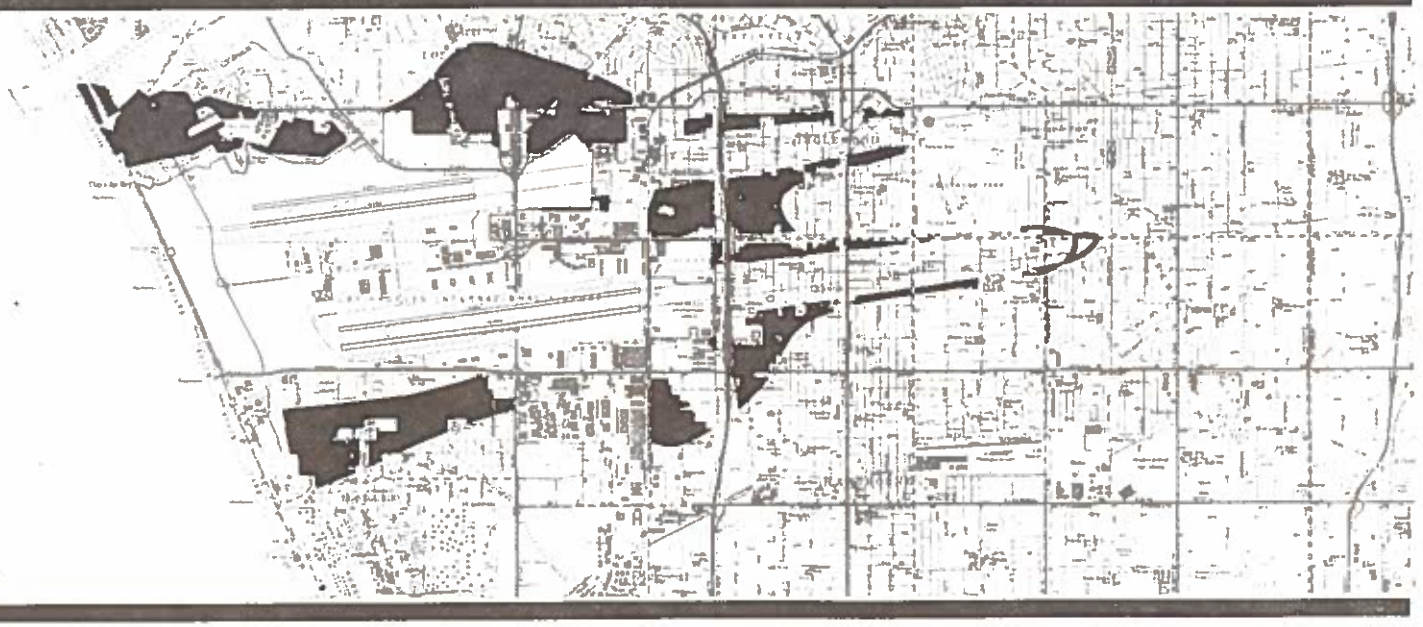
The advantages gained in Case 8 are enhanced by the reduction in nighttime operations. Each nighttime operation is perceived as 10 daytime operations by the model used to develop the contours. The advantage of a 50% reduction in nighttime operations is then obvious. The total decrease in dwelling units is about 10559, change per jurisdiction are summarized below:

LA City	-1999 Dwelling Units
Inglewood	-5510 Dwelling Units
El Segundo	-1425 Dwelling Units
LA County	-1625 Dwelling Units

For additional information, please refer to Table IV-2.

LOS ANGELES INTERNATIONAL AIRPORT

LAX ANCLUC CAUSE/EFFECT ANALYSIS



LEGEND: **Decrease** **Increase**

Operational Changes

CASE 18

° 100% Part 36, Stage 3 compliance

Cause/Effect

Case 18 shows the great reductions in overall noise impacts brought about by the sole use of FAR Part 36 Stage III aircaft. The new aircraft types include the DC9-82, MD-100 (updated DC-10), B-757, B-767, B-737-300, DC8-70R (re-engined model), re-engined B-727, and Airbus 310. The reductions are primarily in sideline impacts.

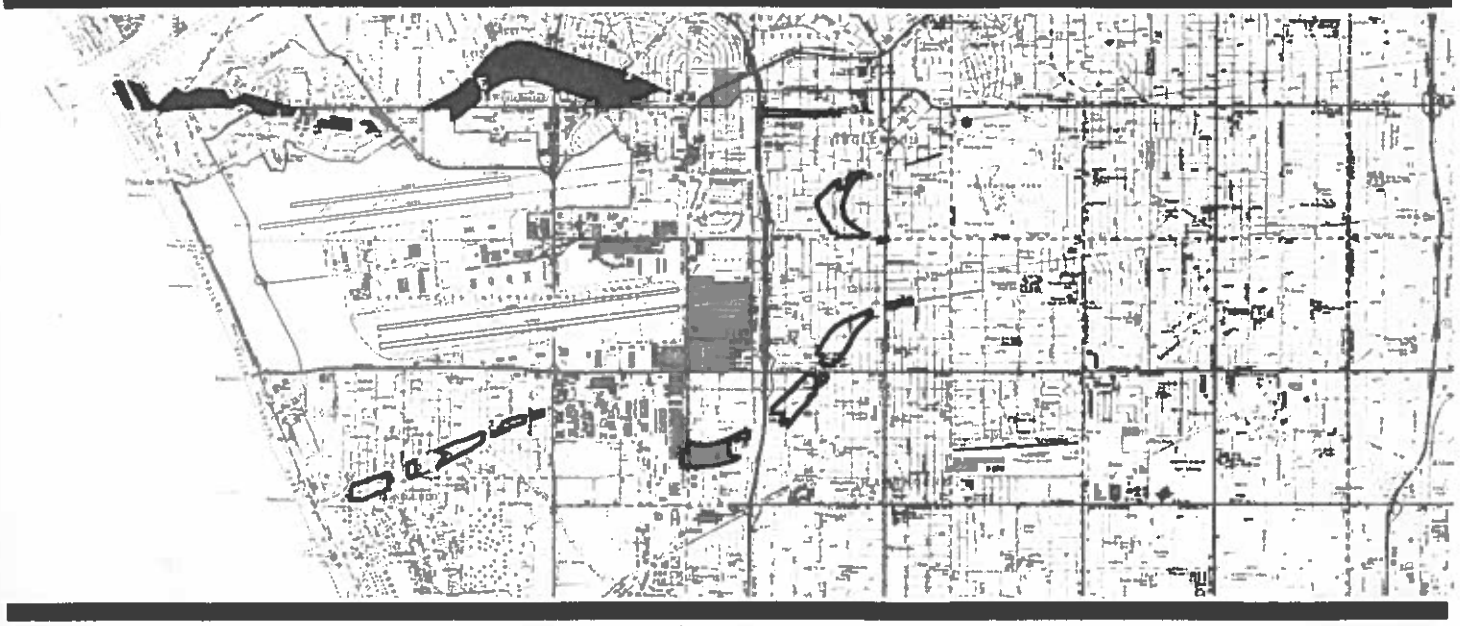
The total decrease in dwelling units impact is about 17,645; the change per jurisdiction is summarized below:

LA City	-9249 Dwelling Units
Inglewood	-3086 Dwelling Units
El Segundo	-2849 Dwelling Units
LA County	-2461 Dwelling Units

For additional information, please refer to Table IV-2.

LOS ANGELES INTERNATIONAL AIRPORT

LAX ANCLUC CAUSE/EFFECT ANALYSIS



LEGEND: **Decrease** **Increase**

Operational Changes

CASE 19

° Departures: 25% on North Runways, 75% on South Runways

Cause/Effect

The shifting of departures from the North Runways to the South Runways reduces the size of the north sideline departure bulge and increases the size of the south sideline departure bulge. The result is a decrease in the impacts to LA City to the north, and increases in impacts to the South, particularly in El Segundo and LA County which are both impacted primarily by the expanded South Runway sideline departure bulge. The total decrease in dwelling units impacted is about 629, the change per jurisdiction is summarized below:

LA City	-2595 Dwelling Units
Inglewood	+ 523 Dwelling Units
El Segundo	+ 718 Dwelling Units
LA County	+ 725 Dwelling Units

For additional information, please refer to Table IV-2.

APPENDICES

APPENDIX A

ACOUSTICAL INSULATION WHITE PAPER

ACOUSTICAL INSULATION WHITE PAPER

I. Introduction

A. Purpose

The Airport Noise Control and Land Use Compatibility Study (ANCLUC) is designed to achieve solutions to aircraft noise affecting residential areas subject to an annual Community Noise Equivalent Level (CNEL) of 65 dB or greater. These areas primarily include residential neighborhoods within the Cities of El Segundo, Inglewood, and Los Angeles, and within the unincorporated communities of Lennox and Del Aire. The intent of the Study is to prepare a program of feasible measures to mitigate the impact of noise on these communities. Such measures, either singly or in combination include: airport operational changes, land use recycling to airport compatible uses, and acoustical insulation of noise sensitive uses to reduce interior noise levels. Technical issues related to these measures are being evaluated in the study. As part of that evaluation, this working paper provides information pertaining to technical and other considerations involved with acoustical insulation.

B. Scope

Due to the extent of existing residential land use which will remain in the projected 1987 noise contour, acoustical insulation is thought to be a potentially viable approach to provide relief to community residents impacted by aircraft noise. This paper provides a basis for further evaluation of acoustical insulation. The paper summarizes experience in acoustical insulation, direct and indirect cost estimates, and opinions of occupants of insulated homes and their neighbors. It then outlines questions related to the feasibility of an acoustical insulation project. The last section provides recommendations for further study and action.

II. Description of the Noise Problem

A. Noise Impacted Communities

The exposure to noise produced by Los Angeles International Airport (LAX) operations is one of the most severe environmental problems confronting the communities underlying airport approach and takeoff paths. Areas of the cities of El Segundo, Inglewood, and Los Angeles and the County

of Los Angeles are, and will remain, within the CNEL 65 noise contour. The noise impacted area includes a variety of land uses including residential, commercial, industrial/ manufacturing, and institutional uses. Residential uses within the 65 CNEL are considered to be incompatible with airport operations, unless specific mitigation measures have been taken to reduce interior noise levels to an acceptable range (and/or if an avigation easement has been granted.) More than 40,000 residential units are estimated to be within the 1979 - 65 CNEL noise contour.

B. Characteristics of the Noise Problem

The type of aircraft operating at LAX and existing operational procedures produce an ambient noise environment in residential areas ranging from CNEL 65 to over CNEL 75 closer to the airport. As a result of compliance with FAR Part 36 noise reduction requirements, an increasing percentage of aircraft operating at LAX are quieter than earlier planes, reducing the amount of land area impacted by aircraft noise. However, even assuming projected increases in Part 36 aircraft operating at LAX, there will remain a significant land area impacted by aircraft noise.

The frequency characteristic of aircraft noise is related to whether the aircraft is landing or taking off and should be considered in the development of an acoustical insulation program. The noise generated by an aircraft during a takeoff has great low frequency acoustic energy content whereas the dominant energy in landing operations is of a higher frequency. Low frequency energy is more readily passed to the interior of a house than high frequency energy because of its interaction with the basic building structure. Except when operational changes due to weather conditions cause easterly takeoffs from LAX, the residential areas east of the airport are most affected by landing noise, while the residential areas north and south of the airport are most affected by takeoff generated noise. However, some areas immediately bordering the airport are affected equally by landing and takeoff noise.

Specific measurement of high and low frequency energy components of noise in these generalized areas is warranted. Analysis of the dominant frequency characteristic impacting residential areas would provide important information related to the design and costs of an acoustical insulation problem.

III. Noise Attenuation Requirements

A. State Noise Insulation Standards

1. The California Administrative Code (Title 24, Part 6, Division T25, Chapter 1, Subchapter 1, Article 4, Section T25-1092) establishes uniform noise insulation performance standards for new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings, where those buildings are located within an annual CNEL contour of 60 dB or greater. Residential locations having a CNEL greater than 60 dB require an acoustical analysis showing that the structure has been designed to meet an interior CNEL of 45 dB in any habitable room with all doors and windows closed. These regulations apply to all applications for building permits made subsequent to the effective date (August 22, 1974) of these regulations. The Health and Safety Code, Section 17922.7, requires local jurisdictions to adopt these requirements. (See Appendix E-1).

2. Housing and Community Development Code (Title 25, Article 4, Section T25-28) essentially reflects the acoustical insulation standards and requirements set forth in Title 24 of the State Administrative Code. Consistent with land use standards, proper design techniques for new buildings, constructed after August 22, 1974, include but are not limited to, orientation of the structure, set-backs, shielding, and sound insulation of the building. Interior CNEL attributable to exterior sources with windows closed, shall not exceed a CNEL of 45 dB in any habitable room. (See Appendix E-2.)

B. State Noise Standards

The California Administrative Code (Public Works, Division of Aeronautics, Title 21, Chapter 2.5, Subchapter 6) provides noise standards governing the operation of aircraft and aircraft engines for all airports operating under a valid permit. These regulations control and reduce noise in communities in the vicinity of airports. The regulations require airports to limit noise in residential areas to an annual CNEL of 65 dB after December 31, 1985. In Article 2, Section 5011 outlines the methodology for controlling and reducing noise problems; Section 5012 outlines airport noise criteria, including the timeframe for meeting the criterion CNEL; Section 5013 summarizes the procedure for determining the noise impact boundary; and, Section 5014 outlines compatible land uses within

the noise impact boundary. (See Appendix E-3 for more detail.)

Compatible land uses may include high-rise apartments and single-family homes. For high-rise apartments adequate protection against noise means that the interior CNEL in all habitable rooms does not exceed 45 dB during aircraft operations.

The acoustical performance of high-rise apartments must be verified by calculation or measurement by qualified officials of the building department of the city or county in which the building is located.

CALTRANS, Division of Aeronautics, has interpreted these regulations, specifically Section 5014, Subsection H, to include single-family homes. According to their interpretation, single-family homes may be considered compatible with airport operations if certain conditions are met.

1. Single-family homes constructed prior to December 1, 1972 could be considered a compatible land use if the inherent noise reduction performance of the unit results in the unit meeting the interior CNEL criterion of 45 dB. Subsection H defines a value of 20 decibels which is the assumed noise level reduction of the average normal residence. Given the annual CNEL 65 dB limitation imposed by these regulations, the difference between the exterior CNEL 65 dB less the 20 dB noise level reduction capability equals an interior level of 45 dB. Any unit subject to an annual CNEL ranging from 65 to 80 dB could be made a compatible use through appropriate acoustical insulation.

   This interpretation does not require avigation easements in addition to acoustical treatment for pre-1972 constructed units.

2. For units constructed after December 1, 1972, State law does not provide for acoustical insulation as a means of achieving compatibility. Instead, such newer units may be considered compatible with or without acoustical insulation, if they are subject to an avigation easement for noise.

C. Compatibility Concept

While the focus of this paper is on acoustical insulation, it should be noted that there are a number of means by which noise sensitive land uses may be converted to

airport compatible use types. Insulation and avigation easements are two which have been mentioned. Acquisition is another. Any land use within an airport's ownership is by definition considered aiport compatible. In addition, land use conversion from noise sensitive to non-sensitive uses is another obvious means. Such alternatives are mentioned here only to acknowledge the broader context in which airport compatible uses may be defined. It is beyond the scope of this paper to explore these various alternatives in any depth.

IV. Acoustical Insulation

A. Where Acoustical Insulation Has Been Tried

Pilot acoustical insulation projects to test the feasibility of insulating residences against aircraft noise have been implemented in the vicinity of a number of airports including LAX, San Jose, Seatle, and St. Louis. These projects involved modifications to a small number of selected dwelling units. The intent of the projects was to assess the effectiveness of a given level of insulation in reducing interior noise to an acceptable level. Insulation techniques in these selected communities ranged from standard thermal insulation in Seattle (1978) to major modification of structural elements and exterior wall insulation in San Jose (1982) and in the LAX vicinity. Estimated costs per house range from about $3,210 to $12,550. Table I shows data from the four pilot insulation projects and from the recently completed computer model sound insulation study done for Inglewood (1982).

1. Results of Previous Acoustical Insulation Efforts

This section summarizes the results of previous acoustical insulation projects.

LAX - 1970

- acoustical modification of dwelling units was technically feasible, and did provide significant relief to residents;
- modification improved the noise reduction capability of dwelling units by an average of 13 dB, thereby achieving a habitable interior environment;

TABLE 1

Acoustical Insulation Experience Summary

Airport/Area	LAX: 1970	San Jose	Seattle	St. Louis	LAX: 1980
# of Dwelling Units	20	10	2	6	N/A
Avg. $ Cost per Unit:					
Minor	$3,210	$5,000	$1,250	N/A	$1,700
Moderate	$4,820	$10,000	-	$7,500	$4,300
Major	$12,550	$25,000	-	$14,000	$7,400
dB NR:					
Pre-Mod	27-31	13-24	22-26	20-30	16-29
Post-Mod	40-44	N/A	23-28	27-35	20-33
Insulation, Modifications, Replacement					
Thermal	X	X	X	X	X
Walls	X	X	X		X
Doors	X	X		X	X
Windows	X	X	X	X	X
Roof/Cieling	X	X	X	X	X
External Openings	X			X	X
Air Circulation	X				X

N/A: Unknown or unavailable.

- where the average exterior noise levels were between 70 dB and 80 dB, Stage 2 (moderate) soundproofing was sufficient;

- Stage 1 (minor) soundproofing was not recommended for owner-occupied homes unless a minimum change of 6 dB could be achieved and the exterior noise noise was below 70 dB.

San Jose - 1982

- the soundproofing effectiveness (followup measurements) has not been measured to date.

- Phase II of the acoustical program is in the planning stage; this would involve analysis of soundproofing effectiveness for approximately 50 to 100 dwelling units. This step would be used to refine the cost estimate for the full scale program.

Seattle - 1978

- A 1-2 dB change represented little overall improvement in the noise environment of test dwelling units.

- the resident's subjective assessment of change in the noise level however was considerable because of substantial improvement in the mid and high frequency ranges. Lower frequencies were not affected by insulation.

St. Louis - 1981

- effective noise reduction (ENR) of dwelling units improved from pre-modification range of 20-30 dB to post-modification range of 27-35 dB.

- ENR is dependent on whether the aircraft operation was a takeoff or a landing (high frequency vs. low frequency).

- improvements to doors and windows are much more effective against landing noise than against takeoff noise.

- to reduce interior CNEL to 45 or less, homes within the 75 CNEL contour would be required to be insulated to an ENR greater than 30 dB for takeoff operation. To achieve the required ENR for takeoff noise requires modifications to walls and roofs.

2. Other Local Experience

The cities of El Segundo, Inglewood and Los Angeles permit construction of multi-family dwelling units in noise zones of CNEL 65 and above by enforcing the California Noise Insulation Standards requiring CNEL 45 in habitable rooms. In 1978, the City of El Segundo imposed a CNEL 45 limit in all bedrooms and CNEL 55 in other rooms for a 61 unit single-family new construction project. Compliance with the El Segundo conditions was determined by sound measurements taken by an acoustical engineer after construction to confirm the results. Calculations were carried out for each design type, orientation, exterior level and individual rooms. The selling price of the homes ranged from $140,000 to $180,000. The additional cost for noise control was estimated to average $5,000 per house.

B. Costs of Acoustical Insulation

The Wyle Laboratories 1982 study, "Residential Sound Insulation Retrofit Cost-Effectiveness Analysis", done for the City of Inglewood estimated costs of various degrees of acoustical insulation required to achieve the CNEL 45 interior noise criterion. For six Inglewood neighborhoods, the Wyle optimization computer program selected the most cost-effective combinations of potential retrofit insulation "fixes" in order to achieve the CNEL 45 indoors for each type of housing. The costs and level of treatment differ on the basis of the type of unit and its location relative to a specific exterior CNEL level. Estimates of per square foot cost to increase noise reduction by a given number of decibels are shown in Table 2. These estimates range from as little as 1 cent per square foot for a multi-family, lower level interior unit to achieve a NR of 20 dB, to $4.96/sq. ft. for a single family unit to achieve a NR of 32.5 dB.

C. Los Angeles International Airport Soundproofing Project - 1982

In September 1982, LAX contracted with Wyle Laboratories to develop a plan for sound insulation of structures on incompatible land within the projected 1987 CNEL 65 noise contour. This study is compromised of two phases:

Phase 1 - Program definition and preliminary cost estimates; and,
Phase 2 - Development of detailed cost data and preliminary implementation plan.

Table 2

Optimized Costs in 1981 Dollars/Ft^2 of Floor Area to Achieve Given Noise Reduction Levels in the Inglewood Study Area

Dwelling Unit Type	Zone	Cost per Sq. Ft. to Increase NR to:					
		20 dB	22.5 dB	25 dB	27.5 dB	30 dB	32.5 dB
Single-Family, One Story	2	0.14	0.70	1.26	2.40	3.54	4.68
	3	0.08	0.43	0.77	2.14	3.51	4.83
	4	0.08	0.45	0.82	2.10	3.37	4.65
	5	0.08	0.45	0.82	2.10	3.37	4.65
	6	0.08	0.53	0.98	2.31	3.63	4.96
Multi-Family, Lower, Interior	1	0.05	0.19	0.32	0.61	0.90	1.19
	2	0.01	0.09	0.16	0.38	0.60	0.82
	3	0.01	0.06	0.10	0.31	0.51	0.72
	4	0.01	0.06	0.10	0.31	0.51	0.72
	5	0.01	0.06	0.10	0.31	0.51	0.72
	6	0.02	0.14	0.26	0.59	0.91	0.24
Multi-Family, Lower, End	1	0.24	0.42	0.59	1.25	1.90	2.56
	2	0.06	0.17	0.28	0.79	1.29	1.80
	3	0.03	0.12	0.21	0.66	1.10	1.55
	4	0.03	0.12	0.21	0.66	1.10	1.55
	5	0.03	0.12	0.21	0.66	1.10.	1.55
	6	0.05	0.24	0.42	0.99	1.56	2.13
Multi-Family, Top, Interior	1	0.05	0.22	0.39	1.03	1.67	2.31
	2	0.01	0.12	0.22	0.72	1.21	1.71
	3	0.01	0.09	0.17	0.60	1.03	1.46
	4	0.01	0.09	0.17	0.60	1.03	1.46
	5	0.01	0.09	0.17	0.60	1.03	1.46
	6	0.02	0.18	0.34	0.87	1.39	1.92
Multi-Family, Top, End	1	0.24	0.49	0.74	1.86	2.97	4.09
	2	0.07	0.25	0.43	1.35	2.27	3.19
	3	0.04	0.20	0.36	1.20	2.03	2.87
	4	0.04	0.20	0.36	1.20	2.03	2.87
	5	0.04	0.10	0.36	1.20	2.03	2.87
	6	0.09	0.35	0.61	1.52	2.43	3.34

A Phase III is proposed that will conduct a pilot sound-proofing program of actual application of sound insulation materials and techniques determined in Phase II to eight selected family dwelling units.

The expected major outcomes of this project are:

1. Detailed descriptions of building characteristics in each zone and jurisdiction.

2. Economic and financial considerations including construction, program and administrative costs; and,

3. Methods of implementation and program related criteria.

A more detailed description is found in the appendix of this paper.

D. Energy Conservation/Cost Analysis and Considerations

The 1982 Wyle Laboratories sound insulation study for Inglewood recommended the sealing of openable windows and the installation of an air circulation system in residences in the CNEL 65 or greater. Although the Wyle study did not detail energy costs associated with the installation of the recommended improvements as part of the initial study, Table 3 on the following page estimates annual costs for a forced air ventilation system (single fan and associated duct work). The costs are based on an assumed average 1,000 square foot residence with a volume of 8,000 cubic feet and the need to have a minimum of two air changes per hour. The costs have not been confirmed by actual measurements, however, they are based on research by Wyle Laboratories and Inglewood Planning Division staff. That research indicates that the 1/10 horsepower motor should be sufficient for most residences within the noise contour. Based on information provided by mechanical engineers and the utility company, continuous 24 hour operation of such a motor would cost the consumer approximately $240 annually or $20 monthly.

It must be noted that the sound insulation package should be expected to also have an energy conservation benefit so that some of the additional electricity costs will be offset by the reduction in heating costs. An analysis of the potential savings through conservation is, therefore, recommended.

ESTIMATED ANNUAL ENERGY COSTS FOR A FORCED AIR VENTILATION SYSTEM

Rated Motor Brake Horsepower	Volume Flow Rate (CFM)	Air Changes Per Hour	Motor Electrical Power (KW)	Annual Operating Cost(@ $.0868/KW)
1/20	300	2	.23	$175
1/10	600	4	.32	$243
1/8	800	6	.40	$304
1/6	1,000	8	.46	$350
1/3	2,000	16	.69	$525

Adapted from Wyle Laboratories Special Report 8-18-82

Formula: C = Pe R x 8,760 hours/year

Where C = Annual Operating Cost

Pe = Kilowatts Consumed in Operation

R = Residential Utility Rate (Southern California Edison Co. - @ 8.68¢/KW-hi)

V. Survey Results

A. Survey of Occupants of Homes Insulated by LAX in 1970 and Their Neighbors

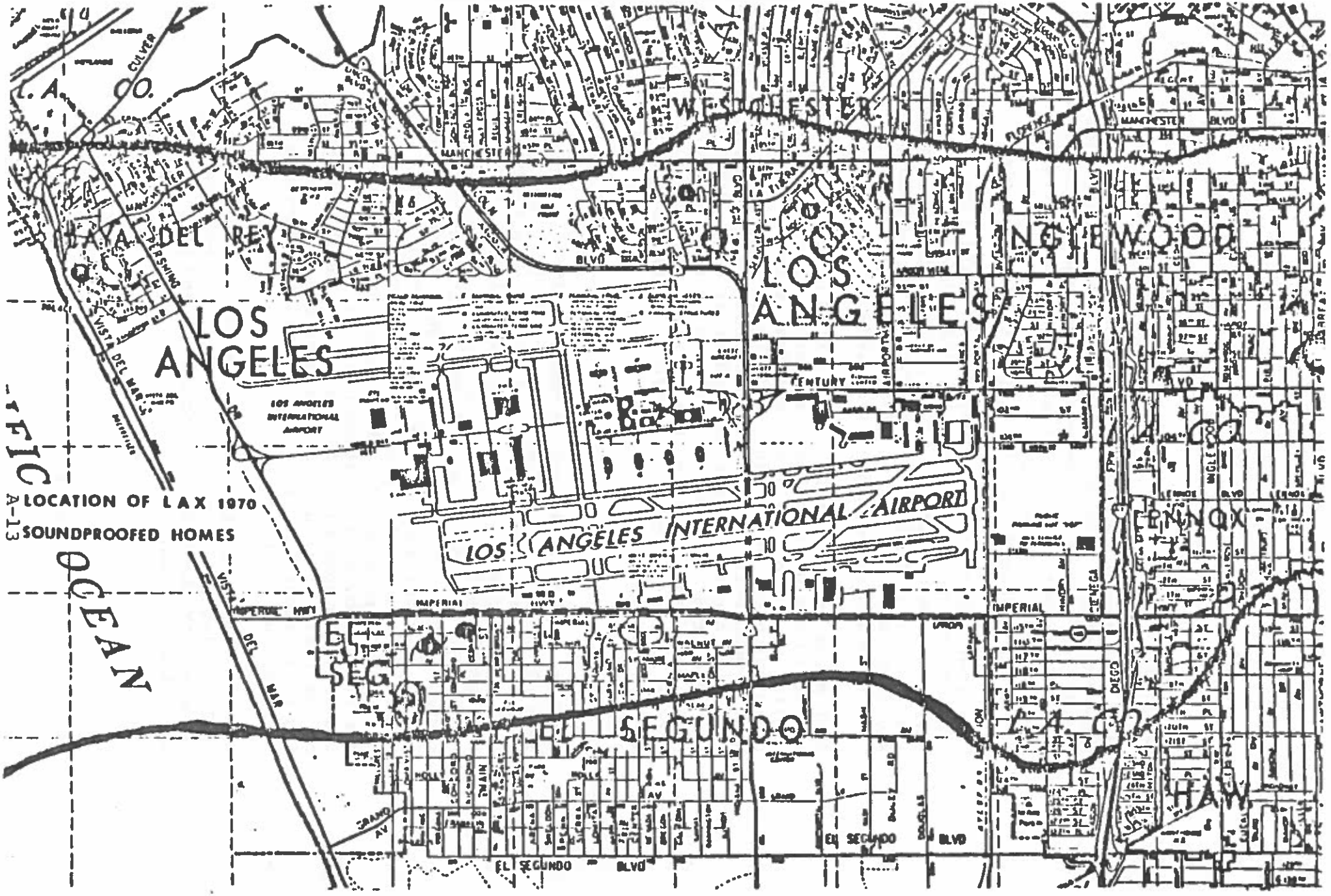
The 1970 LAX pilot acoustical insulation project soundproofed twenty homes scattered throughout the noise impacted area. As of August 1982, eleven units remained, the rest having been acquired and removed by the airport. A followup survey was developed to obtain occupant opinions on a range of questions related to aircraft noise and the effectiveness of the acoustical insulation. A second survey was developed which focused on the perception of aircraft noise by residents of homes near the pilot homes and their interest in having their homes soundproofed.

Because of the sample size, neither of these surveys can be said to he representative of total community attitudes. However, the results do provide insights to those attitudes and raise questions about community acceptance of acoustical insulation. Following are some general observations drawn from the results of these surveys. The full results of the surveys and additional comments can be found in Exhibits I through II-B in the Appendix. The map on the following page indicates the location of the remaining homes that were insulated in 1970.

1. Occupants of Insulated Homes

The occupants of eight homes consented to be interviewed. Of the eight interviews conducted, five families purchased the home after it had been insulated, with three families occupying their homes before they were insulated. All three of the latter families indicated that the insulation made a noticeable improvement in the interior environment.

Five families indicated that aircraft is most noticeable in the evening between 5 p.m. and 10 p.m., which seems to correspond to the time of day they are usually home. Two households indicated that such noise is most disturbing between 10 p.m. and 7 a.m. Seven households indicated a preference for opening their windows, but indicated the interior of the house is noisier as a result. Only two families indicated that the soundproofing was a factor in the decision to buy the house. Similarly, only two felt that the soundproofing would help make the house more marketable if they wanted to sell.


LOCATION OF LAX 1970
SOUNDPROOFED HOMES
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LOS ANGELES INTERNATIONAL AIRPORT
LOS ANGELES
PLAYA DEL REY
WESTCHESTER
EL SEGUNDO
INGLEWOOD
LENNOX
HAWTHORNE
OCEAN
PACIFIC

2. Neighbors

Eleven neighbors near the insulated homes were interviewed during the survey. The majority (seven) indicated that aircraft noise does bother them, indicating that the effects of noise such as interference with T.V. reception, conversation and vibration of the house often caused them to keep their windows closed.

Only four respondents indicated they would like to have their home insulated; of these, three indicated they would be willing to pay a portion of the cost of insulation, up to $3,000. However, five respondents would not want insulation if it meant that their windows would be permanently sealed.

Most suggested that they did not know how other people in the neighborhood felt about aircraft noise. Similarly, the majority did not feel that they or their neighbors would want their homes insulated. Most respondents (8) didn't know that their neighbors home was insulated while six had never been inside the insulated home. Six respondents felt that if their home was insulated that it would have a positive effect on its market value while four respondents disagreed.

3. Conclusion

These results are limited in their usefulness for gauging community attitudes and desire for insulation of their homes. The additional comments in Exhibit II-B indicate an even more complex picture. However, the responses to the survey do suggest possible steps that could be undertaken. First, a more thorough survey of the attitudes of the noise impacted community should be undertaken before implementation of an acoustical insulation project. This would provide information related to either acceptance of, or resistance to, an insulation project. As well, insight into community willingness to pay for a part of the costs of insulation could be obtained, which may be an important variable in developing methods of financing the project.

Second, these results suggest that some type of public relations or marketing effort may be necessary in order for the community to accept and participate in such a program.

B. El Segundo Survey Results

It was previously noted that the City of El Segundo, in 1978, permitted the construction of 61 single family dwelling units in the noise impacted area. The project was approved on condition of achieving an interior CNEL 45 for bedrooms and CNEL 55 for other habitable rooms. A survey of the occupants was taken to ascertain the viewpoints of the persons living in units in which acoustical insulation was a major design consideration. Of the 61 surveys mailed out to residents, 28 (45.9%) were returned. Below is a description of the results. A full tabulation and additional comments can be found in Exhibit III-A and III-B.

1. Results

Most of the respondents (23) indicated that the fact that the homes were soundproofed to some degree influenced their decisions to buy the home. While most (23) stated that it is noisier than where they lived before, the responses are split relative to particular time periods that are most annoying.

Twenty-four respondents indicated that they liked to open their windows. Four responded that the noise level deters them from doing so. All respondents noticed a change in the noise level inside the house when the windows were open. The responses were equally split as to the time of day the noise is louder when the windows are open.

The additional comments by the respondents provides insight into the perception of noise and the effectiveness of soundproofing. Consistently brought out in the responses is that the effectiveness of soundproofing is diminished because the windows are not sufficient to retard the entry of noise into the home, and second, the limitations which the noise level imposes on usage of outdoor amenities may influence the overall perception of noise.

C. Conclusions

These survey results seem to confirm the findings in the St. Louis program that structures affected by the low infrequency noise generated in takeoff operations require more extensive treatment of windows, doors, and walls than do structures primarily affected by landing noise.

As was found in other surveys, people feel some restriction on their use of outdoor amenities because of the noise level. Such unmitigated impacts could have important implications for an acoustical insulation program, particularly in terms of a home owner's willingness to share the cost of insulation through direct monetary contributions, the granting of an avigation easement, or both.

VI. Acoustical Insulation Feasibility Issues

A. Availability of Technology

Sufficient technical expertise in acoustical insulation appears to be available. This expertise can be generally divided into two categories. First, is the technical skill and equipment required to perform accurate sound measurements. The second category would consist of available construction trade skills and building materials, and detailed building plans for each dwelling unit that will be insulated. In the Southern California market it can be reasonably assumed that the analytic and construction skills and necessary building materials are readily available and would be over the term of the project.

B. Costs Per Decibel of Noise Reduction

Optimized costs (in 1981 dollars) per square foot of floor area required to increase dwelling unit noise reduction by a given number of decibels are shown in Table 2. The table indicates a strong cost correlation between unit type and its location relative to a given exterior CNEL. Also indicated is an exponential rate of increase cost/square foot for each successive increase in noise reduction. The costs per square foot to insulate a single family unit in a CNEL 65 area is $.14; in a CNEL 70 area it is $1.26, and in a CNEL 75 area it is $3.54. Comparatively, insulation costs are nine times greater in a CNEL 70 area than in a CNEL 65 area, and 25 times greater in a CNEL 75 area than in a CNEL 65 area.

C. Estimated On-Going Energy Costs

Assuming the installation of an electrically powered ventilation system, a major concern is the avoidance of either over-or-under capacity in the type of unit selected. Table 3 indicates estimated energy costs for various sized motors associated with ventilation systems. Given the standard of a minimum of two (2) complete air changes

per hour, housing unit size should be calculated and matched with an appropriately sized motor. On the one hand, an over-designed system is likely to substantially increase normal annual energy costs. On the other hand an under-designed ventialtion system is likely to require continuous operation, thereby maximizing the cost to operate that sized motor and subject that motor to a shorter life span.

Another consideration is the expected offset of electricity costs by savings in heating costs due to the energy conservation benefit of the noise insulation. No estimates of this offset are available at this time, although it is recommended that such an analysis be conducted as part of the evaluation.

D. Acceptance of Sealed Windows and Ventilation System

At this time, no conclusion can be drawn regarding this question. The results from the existing surveys, which are included in this paper, suggest a preference for openable windows, and a resistance to the continuous use of a ventilation system. Such community attitudes would, of course, influence the success of any insulation program instituted, and would best be explored early-on through an in-depth community opinion survey.

E. Financing of Acoustical Insulation

A number of alternative financing mechanisms should be investigated. However, the sheer number of units involved indicates that the project would require several years to fully implement. Financing of the project could, therefore, be pursued on a multi-level approach involving: grants from FAA (including Airport Improvement Program funds), airport sponsored funding programs, federal tax credits for energy insulation, state income tax legislation approving tax credits for sound insulation in noise impacted areas, and coordination of these with home rehabilitation loans and grants from the impacted jurisdiction.

F. Easements

The questions of avigation easements and their relationship to a sound insulation program is subject to the interpretation of the State Noise Standards by the Caltrans Division of Aeronautics. This interpretation (see Section III and Appendix E for further information) differentiates between pre-1972 and post-1972 constructed units. Dwelling units existing before December 1, 1972 are considered

compatible if they are acoustically treated so that the interior noise levels do not exceed 45 dB. Pre-1972 units meeting this standard do not require an avigation easement in order to be considered compatible with airport operations.

Post-1972 constructed units may be considered compatible, with or without acoustical insulation, if they are subject to an avigation easement for noise.

The subject of avigation easements, their format, content and guidelines for acquisition, should be further explored as part of the Phase III ANCLUC effort.

G. Selecting Areas to be Insulated

Nearly 41,000 dwelling units are estimated to be within the 1979 CNEL 65+ noise contour which, assuming all of these units should be insulated, suggests total program costs in the order of $150-250 million. A more realistic approach would be to assume that certain operational changes and increased compliance with FAR Part 36 will substantially reduce the number of impacted residences. The projected 1987 base case estimates that approximately 29,000 dwelling units will remain within the CNEL 65 noise contour. This reduction in the number of units by 12,000 could reduce total program costs by approximately $44-72 million, or result in a program costing between $105 and $178 million. The Wyle Laboratories study for LAX is expected to produce detailed cost estimations for an acoustical insulation program assuming the 1987 base case.

Given the above assumption, areas eligible to participate in a future insulation program should be prioritized on the basis of certain criteria. Some of the most logical criteria would be: proximity to LAX; CNEL; type of noise impact (high or low frequency); degree of community acceptance; and, availability of other options to reduce noise impact.

VII. Conclusions

- Sufficient technology exists to insulate homes in areas as high as CNEL 75.
- The costs of retrofit acoustical insulation increase exponentially as the noise level rises. Retrofit costs may be greater than the cost of insulation included in original construction of a dwelling unit.

- Based on other studies it can be concluded that there is a difference in the frequency of noise associated with landing and takeoff operations and that residential units affected by takeoff noise require more substantive modification than units affected by landing noise.

- Insulation programs requiring sealed windows will increase annual energy costs, however the increased thermal benefits will offset some of the increased cost.

- No true conclusions can be drawn from the survey of occupants of homes insulated by LAX in 1979, particularly regarding community acceptance of sealed environments, willingness to participate in paying for acoustical insulation, or the increased energy costs as a result of such a program.

- State Noise Standards are interpreted by the Caltrans Division of Aeronautics. The existing interpretation differentiates between pre-1972 and post-1972 constructed units. Pre-1972 units may be considered compatible if they meet the interior noise level standard of 45 dB for all habitable rooms. Acoustical insulation may be employed in meeting this standard and thereby achieving compatibility. Post-1972 units may not achieve compatible status soley through the use of acoustical insulation. Other means, such as the acquisition of avigation easements, must be employed in order for such newer units to be considered a compatible land use.

VIII. Recommendations

Based upon the analysis presented herein, a series of recommendations have been developed. These are listed below together with those specific and immediate actions necessary for their ultimate implementation.

1. All ANCLUC jurisdictions should adopt standards to limit interior noise levels to 45dB for all habitable rooms in new single family as well as multi-family dwellings.

   Action:

   - Each local jurisdiction within the projected 1987 65 CNEL to prepare a summary statement identifying the following:

     - existing local policies and ordinances which must be amended to establish appropriate interior noise limitation standards

- nature of necessary amendments (i.e., new ordinance provisions, expansion of existing ordinance provisions, strengthen enforcement practices, etc.)

- amendment process (i.e., lead agency, review bodies, approval body, estimated timing, etc.)

- draft resolution to initiate amendment process

2. A more thorough survey of community attitudes regarding issues related to sound insulation, such as cost sharing, avigation easements, and the acceptability of a "sealed environment", should be undertaken before an acoustical insulation program is designed and implemented.

   Action:

   - In conjunction with phase two of the Wyle Laboratories Study, contract with a professional consultant to design and conduct a community opinion survey relative to the acceptability of an acoustical insulation program.

3. Procedures and guidelines for the acquisition of avigation easements tied to specific maximum noise limitations should be developed.

   Action:

   - Create a task force consisting of legal and professional planning staff from each involved local jurisdicition to develop the appropriate format, content, procedures and guidelines for avigation easements to be acquired by LAX in return for its participation in an acoustical insulation program.

4. A pilot acoustical insulation program should be initiated to further evaluate the feasibility and acceptability of an expanded communitywide program. The pilot program should involve a number of units located in each impacted jurisdiction and in varying noise impact zones.

   Action:

   - Create a subcommittee of the ANCLUC Joint Technical Committee to design and explore funding for an acoustical insulation pilot program to be initiated at the earliest possible date.

5. The energy costs and conservation benefits associated with acoustical insulation should be further investigated.

Action:

- In conjunction with phase two of the Wyle Laboratories Study, contract with an appropriate firm or agency to assess the potential energy costs and conservation benefits associated with acoustical insulation.

6. 1987 projected 65 CNEL impact areas should be analyzed to determine specific noise characteristic (high vs. low frequency energy content). Further analysis should be conducted to relate such characteristics to the effectiveness and costs of acoustical insulation.

Action:

- Expand the scope of work for phase two of the LAX sponsored Wyle Laboratories Study to include investigation of the effectiveness and costs of acoustical insulation, given the noise characteristics within the projected 65 CNEL impact area.

7. Enforcement of State noise insulation requirements should be strengthened.

Action:

Create a subcommittee of the ANCLUC Joint Technical Committee investigate and recommend means of stengthening local enforcement of State noise insulation standards.

8. The California Administrative Code (Public Works, Division of Aeronautics, Title 21, Chapter 2.5, Subchapter 6) should be amended to provide for innovative approaches to fostering airport-compatible land use patterns.

Action:

Create a subcommittee of the ANCLUC Joint Technical Committee to review State airport noise regulations and recommend appropriate amendments to encourage innovative airport noise/ land use compatibility techniques.

APPENDIX B

CAMBRIDGE COLLABORATIVE SOUND BARRIER STUDY

City of Los Angeles
Department of Airports
Tom Bradley, Mayor

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Los Angeles, California 90009
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Los Angeles
Ontario
Van Nuys
Palmdale

Board Mtg - 21

June 14, 1974

MEMO TO: BOARD OF AIRPORT COMMISSIONERS
Stephen C. Bilheimer
Alexander H. Pope
Elizabeth K. Armstrong
Robert E. Collins
Sam Greenberg

FROM: Maurice Z. Laham

SUBJECT: Sound Barrier Study

Attached is the "Model Study to Determine the Effectiveness of Barriers in Reducing Aircraft Noise in the Emerson Manor and West Westchester Communities of Los Angeles" prepared by Cambridge Collaborative of Cambridge, Massachusetts.

The community of Westchester is adversely affected by aircraft noise. Most of this noise is the result of aircraft either on or off the ground. When this study was initiated two years ago, it was felt that a sound barrier with an appropriate location, size, mass, height, and composition might be cost-effective in reducing noise in the Westchester community from aircraft on the ground. The three main aircraft operations performed on the ground are, landing with considerable power during thrust reversal, taxiing, and full power for take-off.

The study was conducted with simulation techniques using computers, a physical model, plus electronic instrumentation. The results concerning the effectiveness of various types of barriers are indicated in Page 27 of the attached report.

It is requested that you review the report to be considered and discussed at the Board meeting of June 21. Then, if appropriate, instruct the General Manager to initiate a study to determine the economical feasibility of this project.

MZL:bw
Attachment

bcc: C. A. Moore
R. C. Davidson
W. M. Schoenfeld

A MODEL STUDY TO DETERMINE THE EFFECTIVENESS OF BARRIERS IN REDUCING AIRCRAFT NOISE IN THE EMERSON AND WEST WESTCHESTER COMMUNITIES OF LOS ANGELES

RICHARD G. CANN
JEROME E. MANNING

CC REPORT NO. 74-4
JOB NUMBER 52004
APRIL, 1974

CAMBRIDGE COLLABORATIVE

238 MAIN STREET CAMBRIDGE, MASSACHUSETTS 02142 (617) 876-5777

A MODEL STUDY TO DETERMINE THE EFFECTIVENESS OF BARRIERS IN REDUCING AIRCRAFT NOISE IN THE EMERSON AND WEST WESTCHESTER COMMUNITIES OF LOS ANGELES

Richard G. Cann
Jerome E. Manning

CC Report No. 74-4
Job Number 52004
April, 1974

Submitted To:

Department of Airports
Number One World Way
City of Los Angeles
Los Angeles, California 90009

SUMMARY

The construction of a new runway at the Los Angeles International Airport necessitated the acquisition of nearby property in some communities. In response to citizen concern that removal of houses in the acquisition area would increase community noise levels, the Department of Airports of the City of Los Angeles commissioned Cambridge Collaborative to conduct a study to provide quantitative data on the effectiveness of sound barriers and the extent to which house removal might affect community noise levels.

To carry out the study, Cambridge Collaborative, Inc. built a detailed scale model of the communities surrounding the airport. Using scaled sound sources, miniature measurement, microphones and sophisticated scaling techniques, Cambridge Collaborative conducted numerous acoustical tests and measurements. Model tests were made with all houses in place and with certain houses removed. Also, various types of sound barriers in a number of locations were tested. The results for the actual community and the predictive accuracy of the model was verified by actual field tests.

The major conclusions are: (a) That removal of the houses increases average sound levels in the community by

5.5 dB(A); (b) That barriers of the same height, whether made of earth, concrete or special acoustic materials, provide essentially the same amount of shielding; (c) That barriers of more than 20 feet in height provide as much or more sound attenuation than all the original houses; (d) That a single row of houses in any location provides less sound attenuation than all the original houses.

INTRODUCTION

The Department of Airports of the City of Los Angeles is undertaking a program to acquire land and remove houses along the northern and western boundaries of Los Angeles International Airport. The communities involved are Emerson Manor, West Westchester and Playa Del Ray. Citizens north of the acquisition area expressed concern that the removal of houses might result in an increase in sound levels in the communities. In response to this concern, the Department of Airports commissioned a thorough study of the problem by Cambridge Collaborative, Inc. of Cambridge, Massachusetts.

The study had two primary goals: first, to provide quantitative information on the extent to which sound levels in the communities might be affected by removal of the houses; second, to provide data for evaluating the effectiveness of sound barriers in shielding communities from the noise of airport ground operations. This second goal was of particular importance in view of the substantial disagreement among experts concerning the effectiveness of sound barriers.

To achieve the goals of the study program, Cambridge Collaborative employed the novel, yet highly effective technique of scale modeling. We built a precise model of the

communities near the airport. The modeled area is shown in Figures 1 and 2. We conducted numerous acoustical tests and measurements on the model, varying the locations of houses, removing certain houses, and with different kinds of sound barriers in place. Data from these model tests were then appropriately "scaled up" to give information for evaluating and predicting sound level in the actual communities. The predictive accuracy of the model was verified by measurements in the community.

In the sections that follow, we explain why we chose to employ scale modeling techniques; we summarize how these techniques work; and we present the results and conclusions of the study.

THE CASE FOR PHYSICAL MODELING

A number of theories have been developed to predict the performance of sound barriers for certain idealized cases -- for example, a wall on an unobstructed flat, paved surface [1]*. However, the actual conditions in which barriers are used bear little resemblance to the ideal assumed in the theories. Trees, houses, changes in terrain, and other deviations from the ideal can greatly affect the way sound travels and thus have a marked effect on barrier

*Numbers in parenthesis refer to references at end of report.

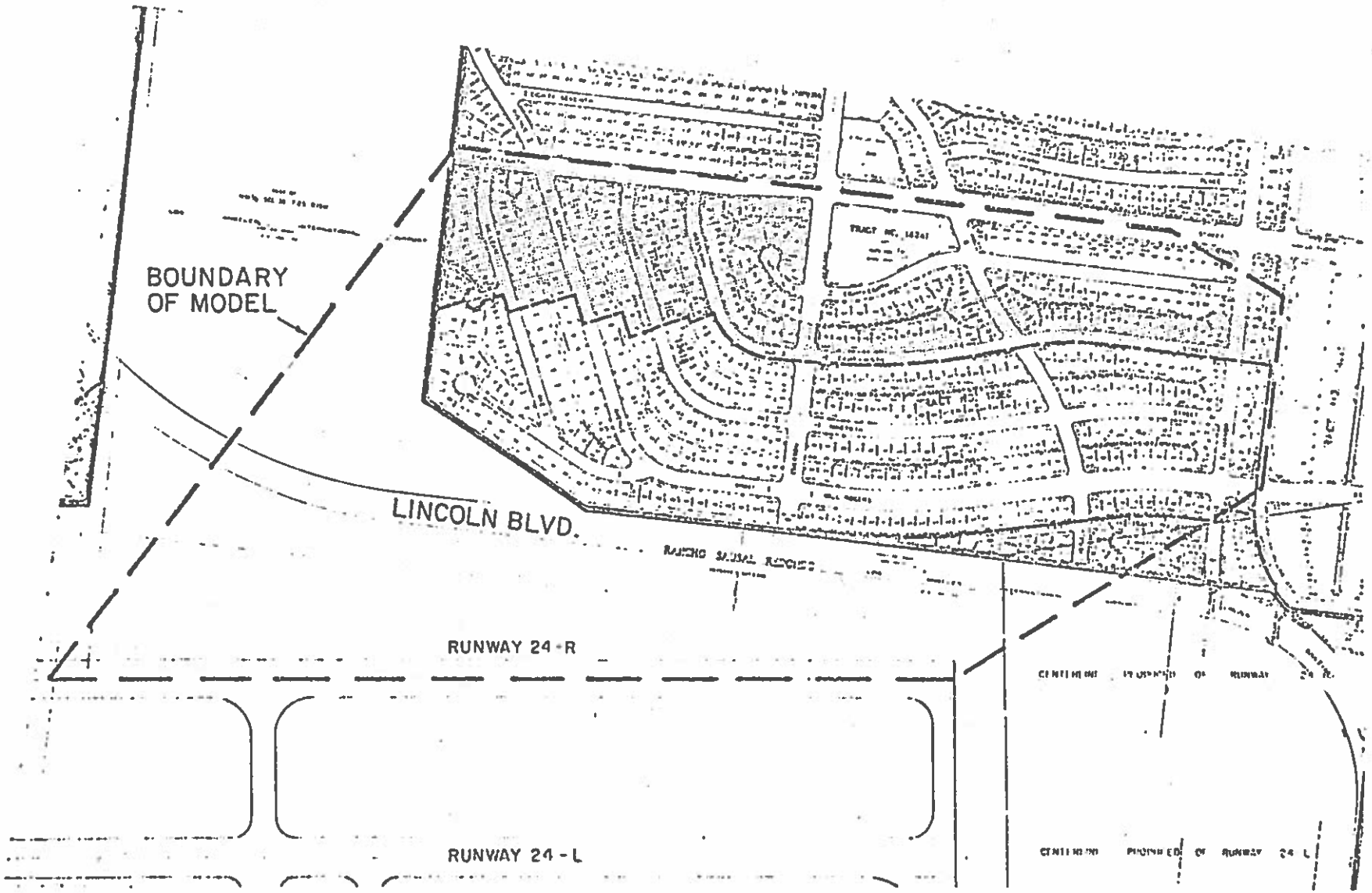


FIG. 1 PROPERTY MAP – EMERSON MANOR

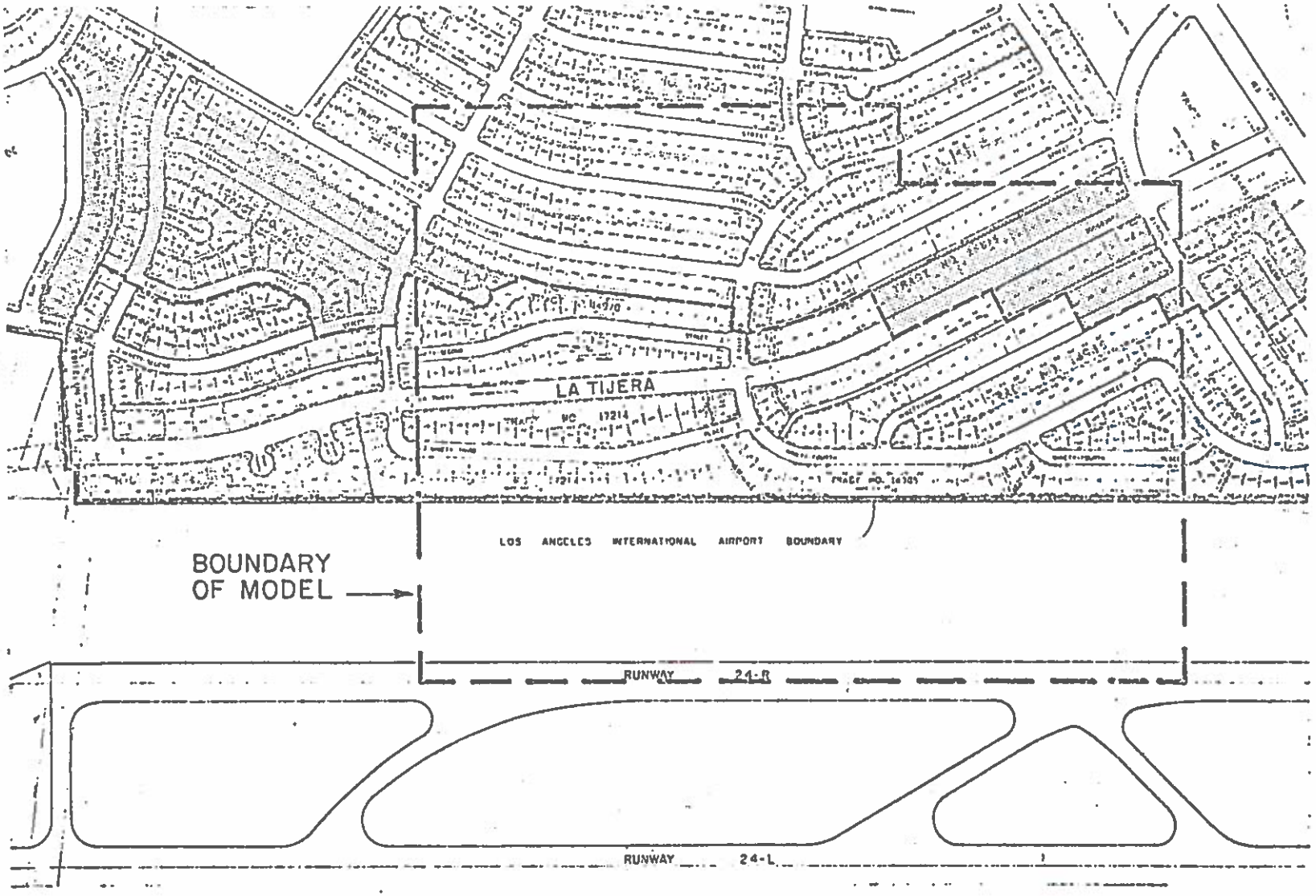


FIG. 2 PROPERTY MAP - WEST WESTCHESTER

performance. These effects are far too complex to predict by theory alone. Indeed, in many cases, theoretical predictions of barrier performance have been shown to estimate greater amounts of sound reduction than is achieved in practice [2].

Physical modeling of sound barriers and the surrounding community offers an effective means of studying a problem too complex for theoretical analysis. Modeling techniques have been used to evaluate acoustic design of auditoriums and concert halls [3,4,5]. These techniques have also been used to predict sound levels around houses caused by motor vehicle traffic [6,7]. Two model studies have recently been carried out at the Massachusetts Institute of Technology under the supervision of Professor Richard H. Lyon. The first of these dealt with motor vehicle noise in a city street [8] and the second was concerned with noise in urban areas caused by V/STOL aircraft [9]. Reference [10] exemplifies the extent to which data from model studies agree with data from field measurements.

Two advantages of physical modeling are readily apparent. The approach provides accurate and reliable data for estimating sound attenuation by barriers. Further, it facilitates the study of alternative barrier designs by per-

mitting one type of barrier to be substituted for another in the model. An example can be seen in Figure 3. At the request of the Department of Airports, Cambridge Collaborative studied several alternative barrier designs:

1. Earth berms 30 and 50 feet high;
2. Reflective walls (such as brick, steel, or concrete) 15, 20, 30 and 50 feet high;
3. Absorptive walls (made of acoustic paneling material) 15, 20, 30 and 50 feet high;
4. Elevated freeway, 30 feet high, 200 feet wide.

HOW MODELING WORKS

Scale modeling techniques require that all the relevant features of a physical process be appropriately scaled. This means that in addition to making a detailed scale model of the communities, the source of sound and the sound-measuring microphone also had to be correspondingly scaled. The interaction between sound waves and objects, such as houses and trees, depends on the ratio between the size of the objects and the wavelength of the sound impinging on them. If this ratio is the same in the model as in the real situation; the results of the interaction are the same. This means that if the community dimensions are scaled down by a given factor, the sound frequencies are scaled up by the

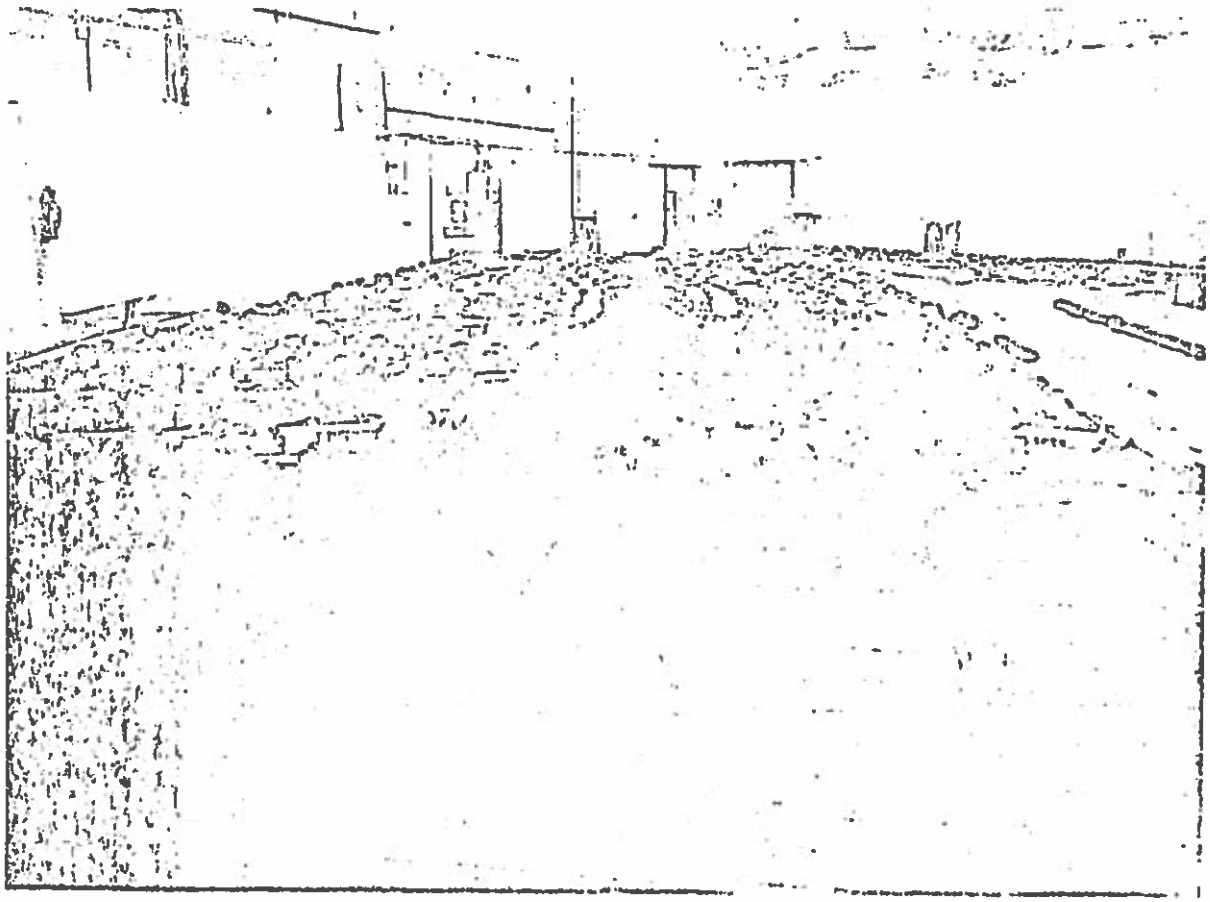


FIG. 3 FIFTY FOOT BERM AND WALL INSTALLED PART WAY ALONG AIRPORT BOUNDARY

same factor.

The scaled sound source used to represent the sound of aircraft is an ultrasonic spark. When the spark is activated, sound propagates across the model. Measurements taken on the model show how sound levels are distributed within the community and how various changes of barriers, houses and trees, affect the levels. The model measurements are then converted by means of the scaling factor to give results for the full-scale community.

Figure 4 shows schematically how the scaled model of the communities is used to predict sound levels in the community for different barrier configurations. The frequency bands referred to in the figure are explained in the next two paragraphs.

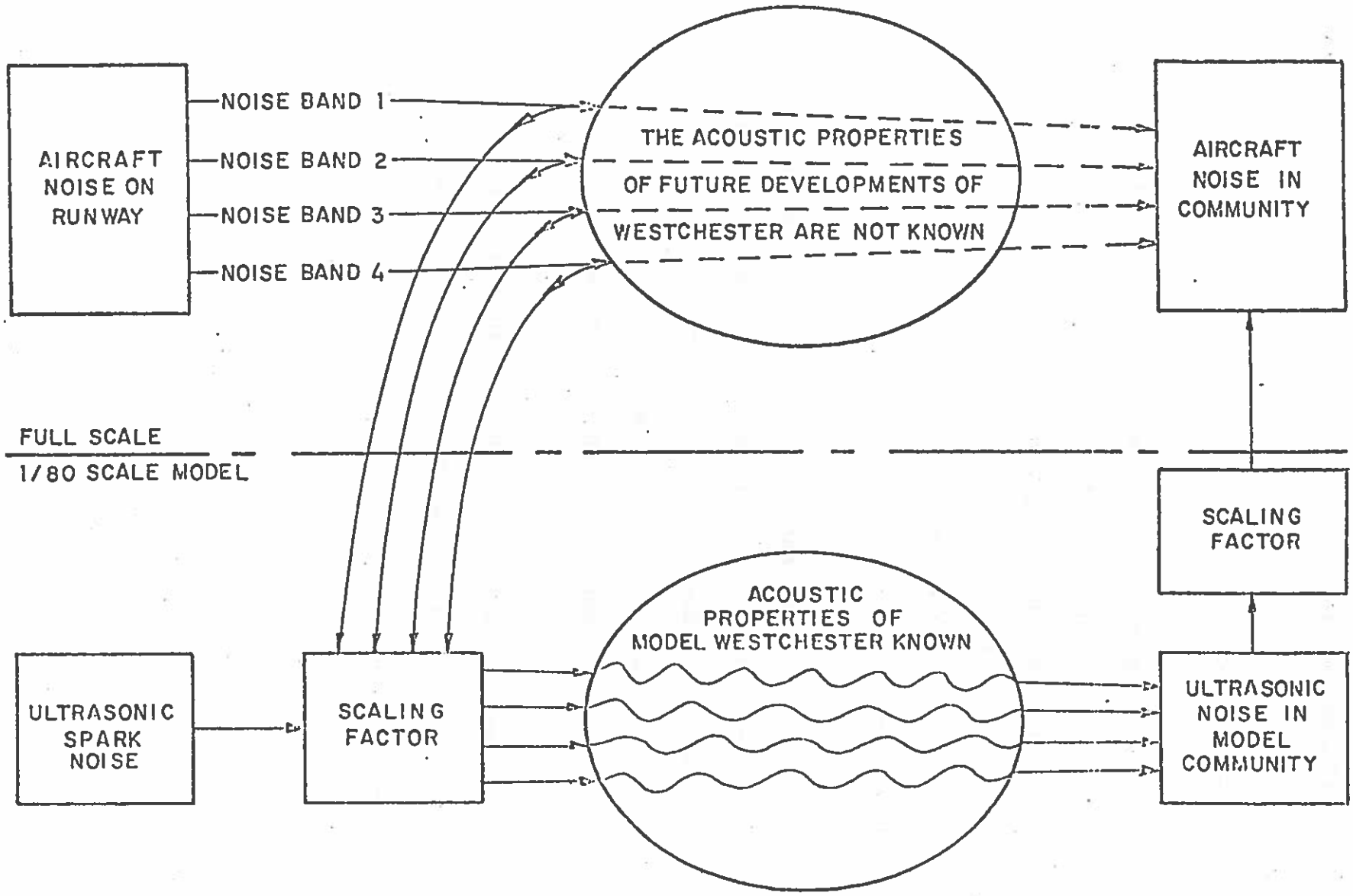


FIG. 4 METHOD OF NOISE PREDICTION BY MODELING

FREQUENCY BANDS

The sound produced by an aircraft is not of a single frequency. Rather, the sound that is heard is a composition of many frequencies. Humans perceive sounds in the low frequency bands as low-pitched rumbles. High frequency bands are characterized by a high-pitched whine. Human speech lies predominantly in the middle frequency bands.

To determine the range of frequencies that should be measured in the model, we first recorded existing sound levels in the actual communities. Measurements showed that the loudest sound was in the frequency band centered at about 500 cycles per second, technically referred to as Hertz (Hz.). The frequencies at the center of each band, in the model were 10,000 Hz, 20,000 Hz, 40,000 Hz and 80,000 Hz corresponding to 125 Hz, 250 Hz, 500 Hz and 1000 Hz. in the community.

SELECTING A SCALE

The scale of the physical model is 1:80, which is to say one foot in the model represents 80 feet in the community. The choice of a scaling factor was determined primarily by the requirement for electronic equipment, especially a microphone, to perform at the scaled high frequencies of interest, and the derived size of the resulting model.

BUILDING THE MODEL

A 3000 square foot underframe was constructed to support the model. The layout of the communities was obtained from survey maps and aerial photographs showing the location of houses, roads, and trees. Land elevations were represented on the maps by contours at 1 foot intervals. Slide photographs of the maps were projected onto the construction surface and all features were outlined in chalk.

Since most of the houses in the communities were similar in height and construction, individual house models could be assembled from a basic selection of modular blocks. Trees of average height were placed exactly as shown on maps and aerial photographs.

Some 120 color slides were used to coordinate the building of the model. Some of these were taken obliquely from a helicopter 100 to 250 feet above the northern boundary of the airport. Others were taken at ground level along the street. These visual aids enabled us to assemble an accurate model of the communities.

SELECTION OF MODELING MATERIALS

For accurate modeling it is necessary for the scaled acoustic properties of the materials to match the acoustical properties of the actual communities.

In selecting the modeling material to represent the ground, great care was taken to simulate what is known as "ground effect". Sound traveling across open ground reaches a listener not only by a line-of-sight path, but also by a reflected path from the ground. At low frequencies, the sound waves from each path interfere significantly reducing the total sound level. After testing many materials we choose a fiber-board with a flocked paper surface to simulate the ground.

Houses and other buildings reflect most of the sound that strikes them. These structures were modeled with painted styrofoam. Paved streets, driveways, and sidewalks were modeled with a heavy simi-rigid sheet of plastic. Tests showed that heavy cardboard used on the model for walls and fences effectively simulated stone, brick, wood, and other highly reflective materials.

Trees and shrubs were also an important part of the model because of their sound scattering properties, which have been shown in various field tests. After testing several materials, we selected nails for the trunks and finely shredded paper for the branches and leaves.

The four barrier types were modeled as follows: Earth berms were made of the same material as the ground; reflective barriers were made of heavy cardboard; acoustically absorptive barriers were made of cardboard covered with urethane foam; elevated highways were made of the same material as earth berms and topped with semi-rigid plastic for the road surface.

At the high frequencies used in the model, atmospheric absorption is substantially greater than that required for proper scaling. Because it was not considered practical to use another gas other than air for the model atmosphere, the accuracy of the model was maintained by the removal of excess absorption through electronic data processing.

MODELING THE NOISE SOURCE

A high voltage spark was the sound source we used to represent the sound produced by ground operations of an aircraft. Because the spark produced a single sharp pulse of sound, with a repeatable magnitude at all frequencies, we could easily compute any sound reflection from walls of the room where the model was housed and mathematically eliminate their effects from our results.

MEASURING SOUND LEVELS ON THE MODEL

The choice of a microphone to measure sound levels on the model was dictated by two considerations. It had to be sensitive enough to pick up the sound of the spark, and it also had to have a high enough frequency response to encompass all the frequency bands of interest. Also, it had to be small enough not to interfere with the very sounds it was measuring. Figure 5 shows the microphone located on the model at one of the measurement points, the intersection of Emerson and 88th Place.

The microphone was used on the model at many measurement points well distributed throughout an area some 2-3 blocks deep on the north side of the intended airport boundary. The points were located in various positions relative to houses, trees, and roads. At each point a special microphone holder was installed so that the microphone could be moved and later returned to precisely the same position on the model.

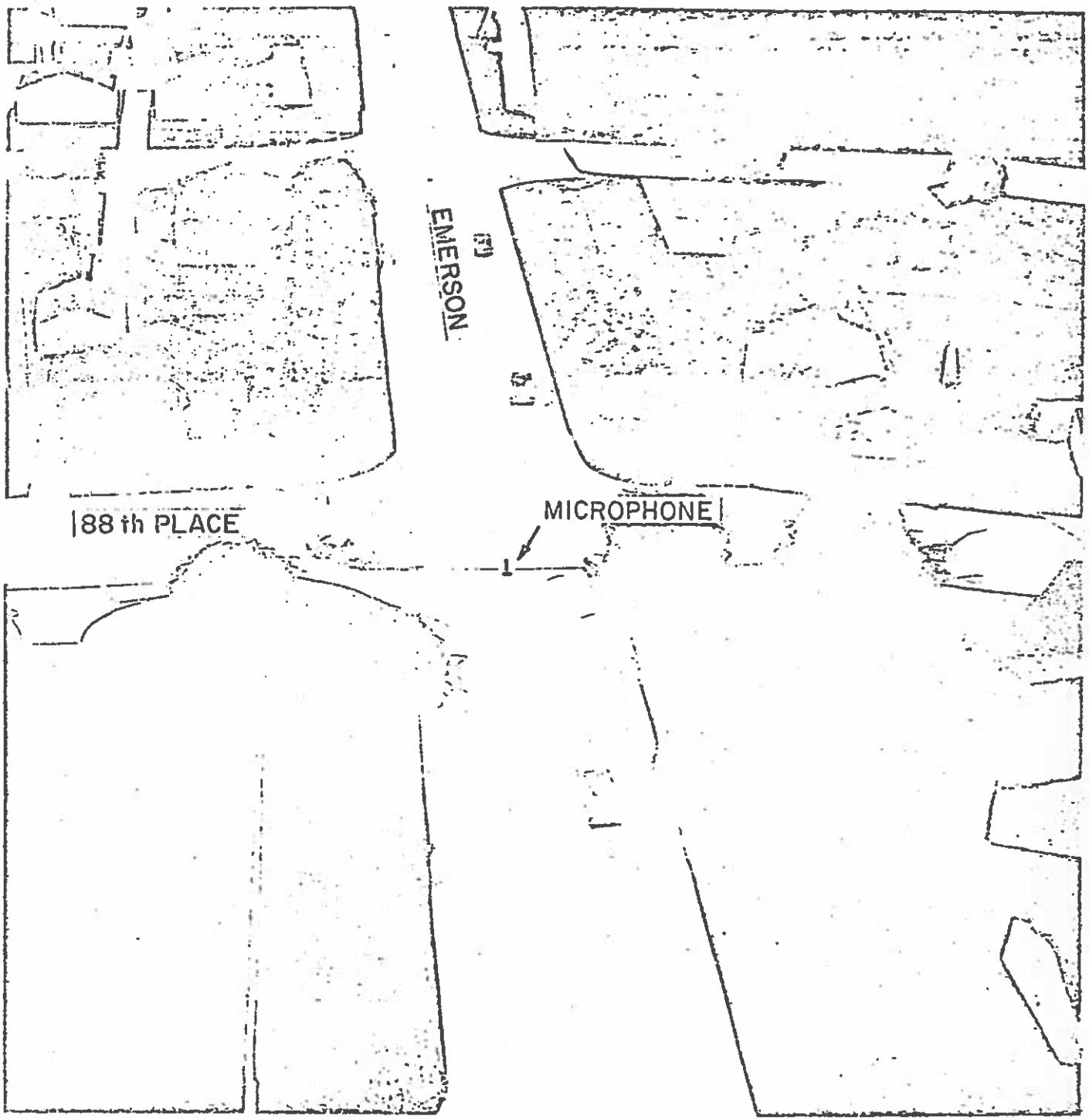
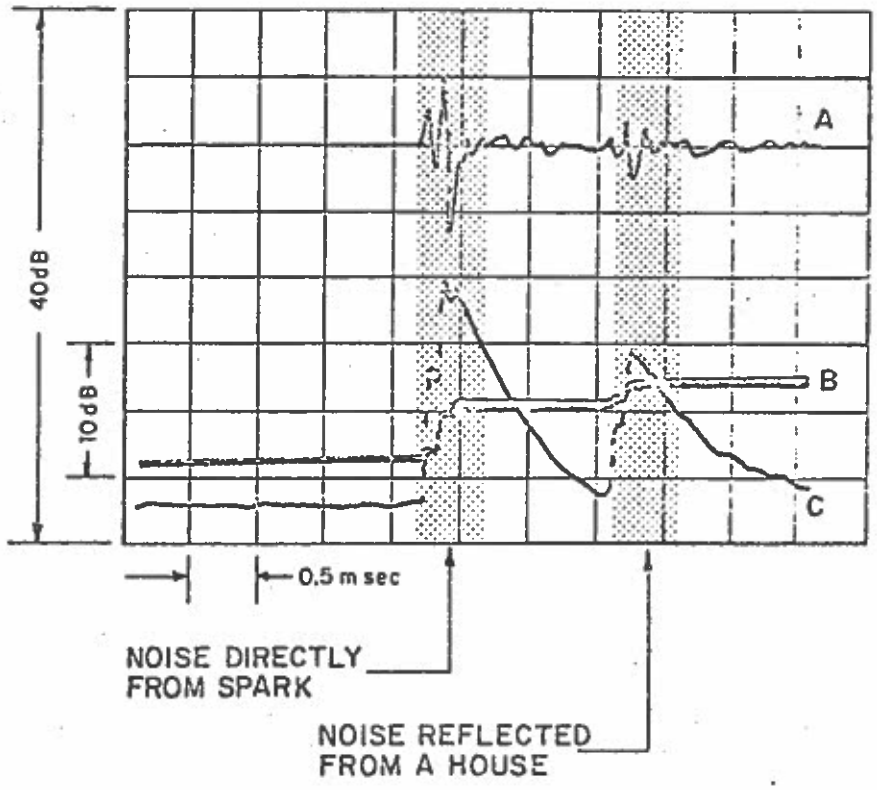


FIG. 5 MICROPHONE AT THE INTERSECTION OF EMERSON & 88th PLACE

SIGNAL PROCESSING

A signal processing system was designed to convert the sound signal at the microphone into useful data. The signal processor automatically converted the brief spark sound into a steady sound equivalent (since aircraft produce a steady sound). This steady sound equivalent was shown on a display screen, as shown in Figure 6, from which sould levels could be read in decibels. These data were later scaled up and analyzed on a computer to give full-scale results applicable to community sound levels.

Since atmospheric absorption could not be scaled on the model the sound received by the microphone was electronically processed to achieve proper scaling.



A – NOISE IN 80 kHz BAND BEFORE SIGNAL PROCESSING

B – EQUIVALENT STEADY LEVEL

C – NOISE LEVEL OF SPARK IN MODELLED COMMUNITY

FIG. 6 TYPICAL DISPLAY OF SPARK NOISE OBTAINED FROM MODEL

RESULTS AND CONCLUSIONS OF THE MODEL STUDY

The major quantitative results of this study are presented in Table I. Our principal conclusions are briefly summarized and discussed below.

1. Sound Levels in the Communities Are, on the Average, 5.5 dB(A) Higher with the Houses Inside the Acquisition Area Removed.

Measurements were taken with all houses and trees in their proper location - the "original" community configuration. Measurement locations were within a strip of dwellings 2 to 3 blocks wide, adjacent to and north of the take-line acquisition area. Additional measurements were taken with all houses, trees, and roads removed within the acquisition area. Comparison of the measurements shows an average increase in community sound levels of 5.5 dB(A) with the houses, trees and roads removed.

The increase in sound level is not uniform throughout the community. While it is larger near the boundary of the acquisition area and very small at points in the model furthest from the airport, no specific relationship exists between the increase in sound level and the distance from the runway.

2. 20, 30 and 50 Foot High Barriers Provide as Much or More Sound Attenuation as the Houses Inside the Acquisition Area.

A series of measurements were taken with different types of acoustical barriers placed along the take-line. The locations of the measuring microphones were the same as were used for measurements with the houses in place. The community sound levels measured with the various barriers in place on the model were compared with sound levels for the model of the original community. The comparison is shown in Table I. The 20 foot, 30 foot and 50 foot high barriers without trees on top replace the sound attenuation provided by all houses within the take-line.

Further measurements were taken with the 30 foot high barrier located various distances from the runway within the acquisition area. The average sound levels in the communities did not vary noticeably with barrier location.

3. A Single Row of Houses Provides Less Sound Attenuation Than All the Houses in the Original Communities.

A series of measurements was taken to determine the sound attenuating capability of a single row of houses within

the acquisition area. Measurements were made with the row of houses located at various distances from the runway. As the results in Table I show, a single row of houses does not replace the sound attenuation provided by all houses within the take-line. The average sound levels in the community did not significantly vary with the location of this row within the acquisition area.

4. Average Sound Levels Not Affected by Engine Height of Jet Aircraft

Model measurements showed that increasing the height of the noise source from that equivalent to a low engine jet to that equivalent to a high engine jet did not change the average sound level at points in the communities.

5. Sound Levels Affected by Wind Direction

The effects of a warm or cold wind blowing across the model were observed. When wind blew from the airport, community sound levels increased. Approximately the same increase was observed in tests with the model of the original community and with each of the barriers on the model.

6. General Observations from Model Results

a) A barrier attenuates sound in a different manner than do the houses of a community. A barrier is continuous and roughly parallel to the runway. Houses have spaces between them for sound to travel through and they run in many directions with respect to the runway. Streets from which aircraft on the ground can be seen, such as Emerson Avenue or Rayford Drive, provide channels for sound to penetrate into the community. A barrier crossing at the end of these streets would provide greater-than-average noise reduction along the street.

b) In general, the effectiveness of a barrier will be more variable in West Westchester than in Emerson Manor because the land contours cause the top of the barrier to vary in height above the runway and the community.

c) Average community sound levels did not vary significantly as a row of houses or a barrier was moved across the acquisiton area (Conclusion 2). However, houses and barriers form a local quiet zone on the side opposite from the noise source. This zone does not significantly influence the community average, but it may be used to reduce sound levels by 5 to 7 dB(A) in areas immediately

adjacent to the houses or barriers.

7. General Observations from Field Data

a) Noise measurements made in the communities with a cannon were in good agreement with model data.

b) Data show that barriers will perform about the same for a take-off roll as for a thrust reversal.

c) Classical barrier theory predicts sound level attenuations much larger than those determined by the model. The discrepancy can be explained by the fact that barriers installed on open ground, as theory assumes, perform differently than barriers in residential areas.

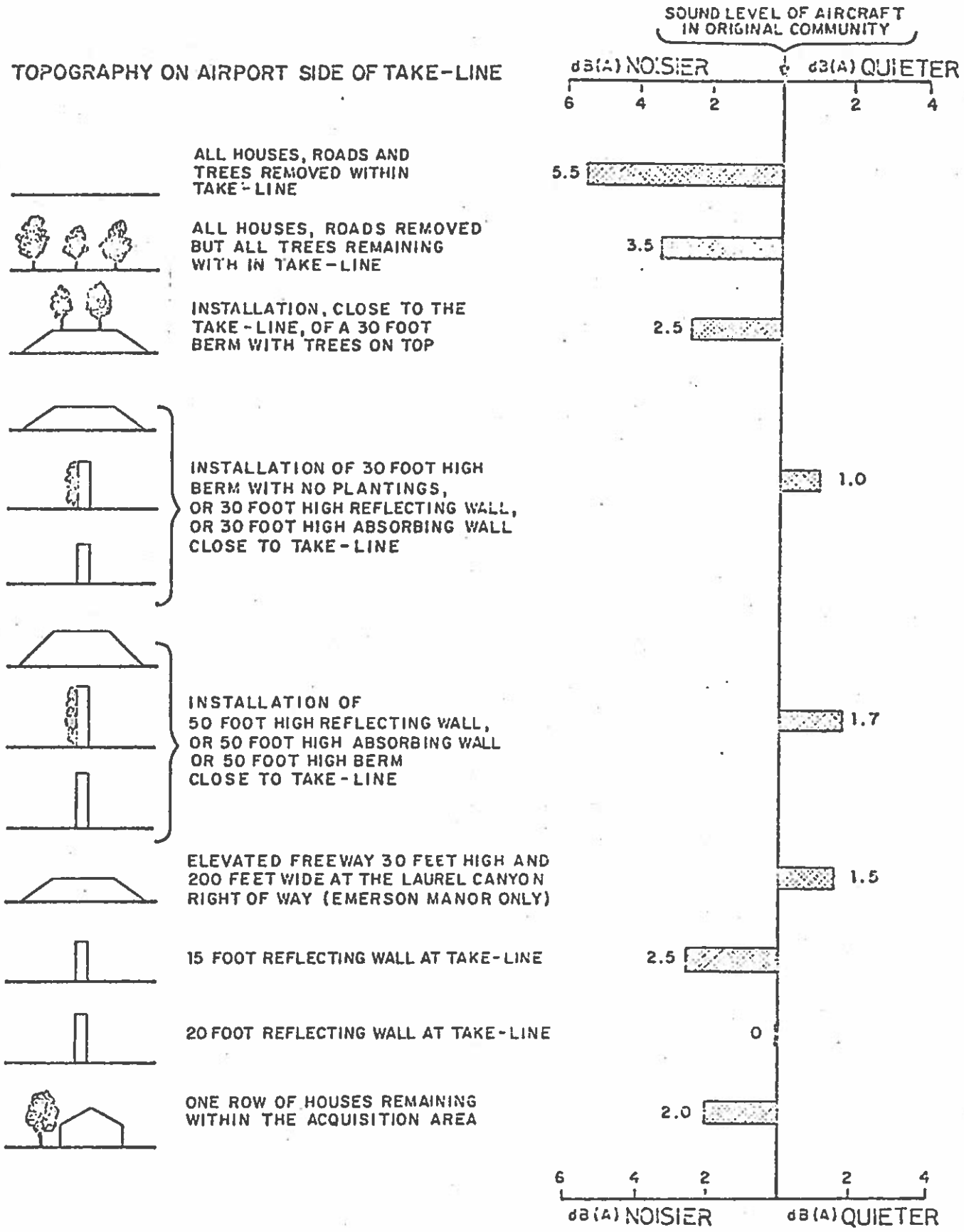


TABLE 1. THE ATTENUATION OF SOUND BY BARRIERS AT THE TAKE-LINE COMPARED TO THAT OF THE ORIGINAL COMMUNITY FOR A TYPICAL TAKE-OFF ROLL

APPENDIX I VERIFICATION OF THE MODEL BY MEANS OF COMMUNITY NOISE MEASUREMENTS.

Every effort was made to insure the acoustic accuracy of the model by accurately scaling dimensions and materials. To verify the acoustical accuracy of the model, we conducted field measurements in the community and compared the results with data from the model.

The model spark source noise was generated in the field with a small yachting cannon. The noise was picked up by a microphone in various locations throughout the community. The sound of the shots was recorded on a tape recorder and later processed with instrumentation similar to that at the model to convert impulsive noise to an equivalent steady noise. The results are shown in Figure A1 in which excess attenuation is plotted against distance from the source for both spark and cannon. Excess attenuation is obtained by subtracting the dB(A) level measured at a point from the level it would be if no hills, houses, trees or ground intervened.

The first measurements were made across the hilliest part of the terrain in West Westchester as shown in Fig. A2.

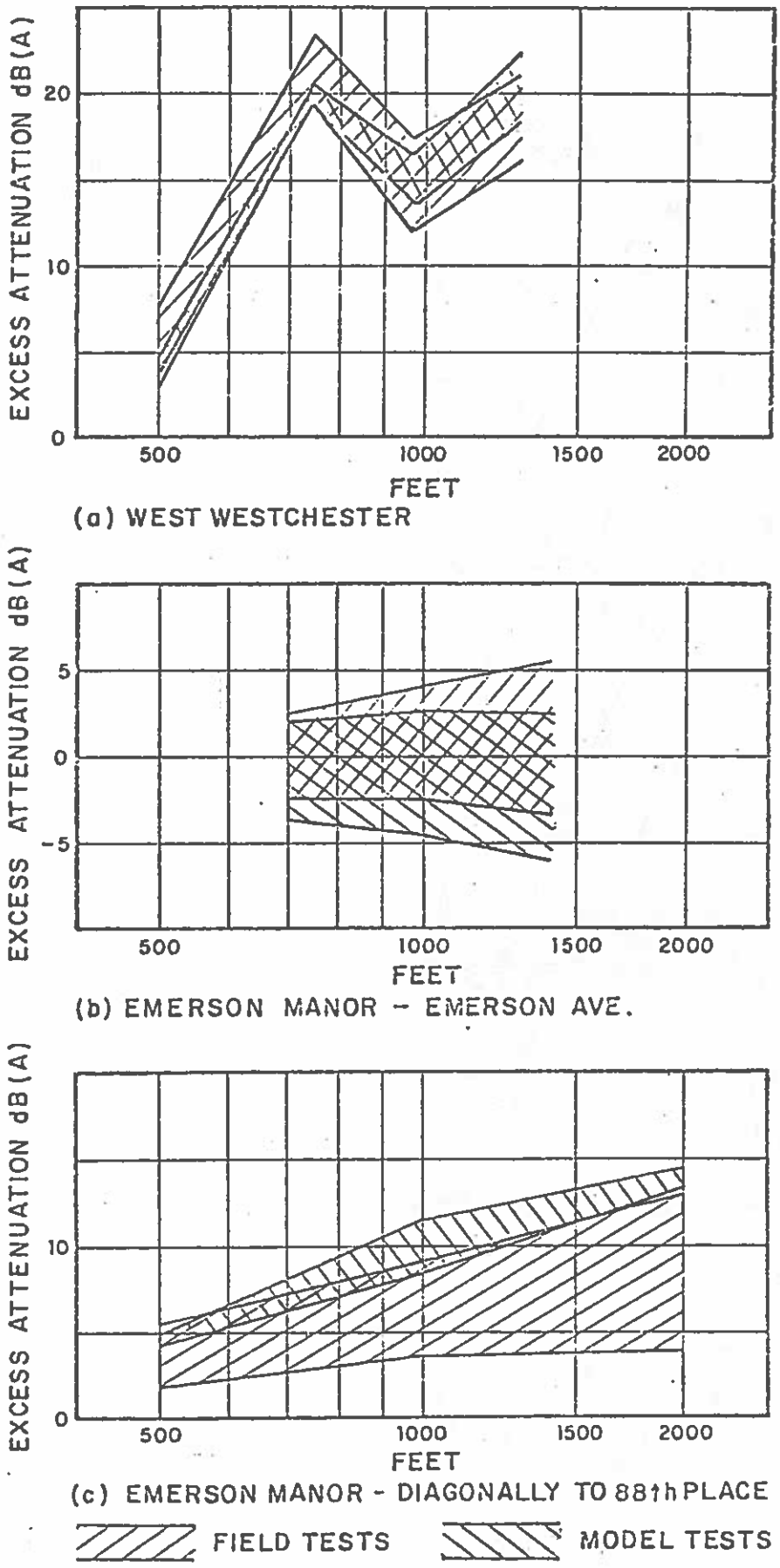


FIG. A1 COMPARISON OF EXCESS ATTENUATIONS OBTAINED FROM MODEL & FIELD DATA

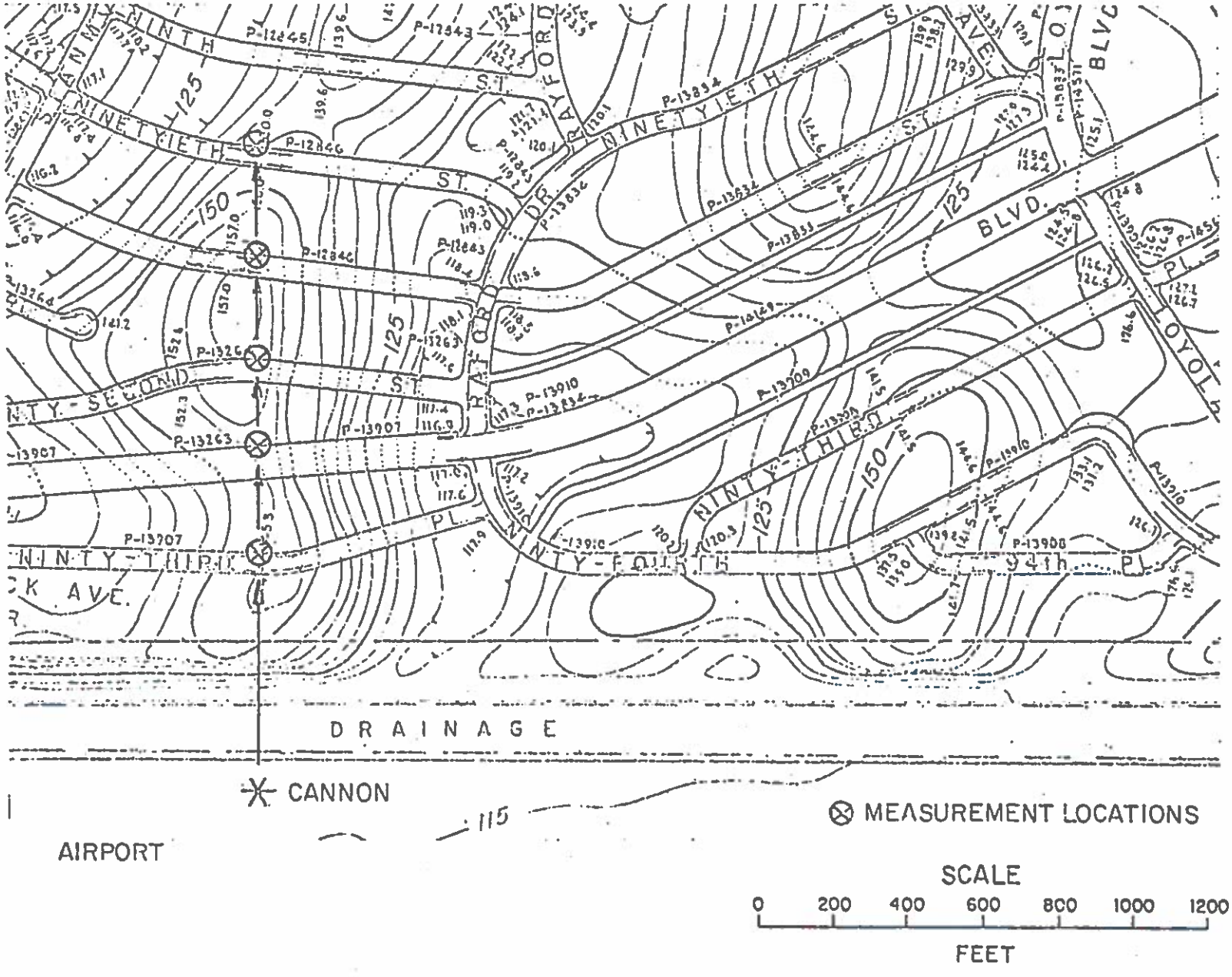


FIG. A2 LOCATION OF CANNON TESTS IN WEST WESTCHESTER

The second measurements, Fig. A3, were made with the cannon located in line with Emerson Avenue. The results show an average excess attenuation close to zero for line-of-sight propagation along the road to 88th Street. The results show higher sound levels being measured above the road than above the grass a few feet away, both in the communities and on the model.

The third series of measurements were made across flat terrain along a path that diagonally cuts the cuty blocks. as shown in Fig. A3. We believe that the cross-wind of 7 mph caused the excess attenuation to be lower than on the model. See diagram (c) of Fig. A1.

The field data shows that the excess attenuation observed in the community can be accurately predicted at distances up to a quarter of a mile using the model. We believe that under still atmospheric conditions the model can be used to predict excess attenuation at even greater distances.

In conclusion the acoustic models of Emerson Manor and West Westchester are shown to be satisfactory for determining the effectiveness of sound barriers.

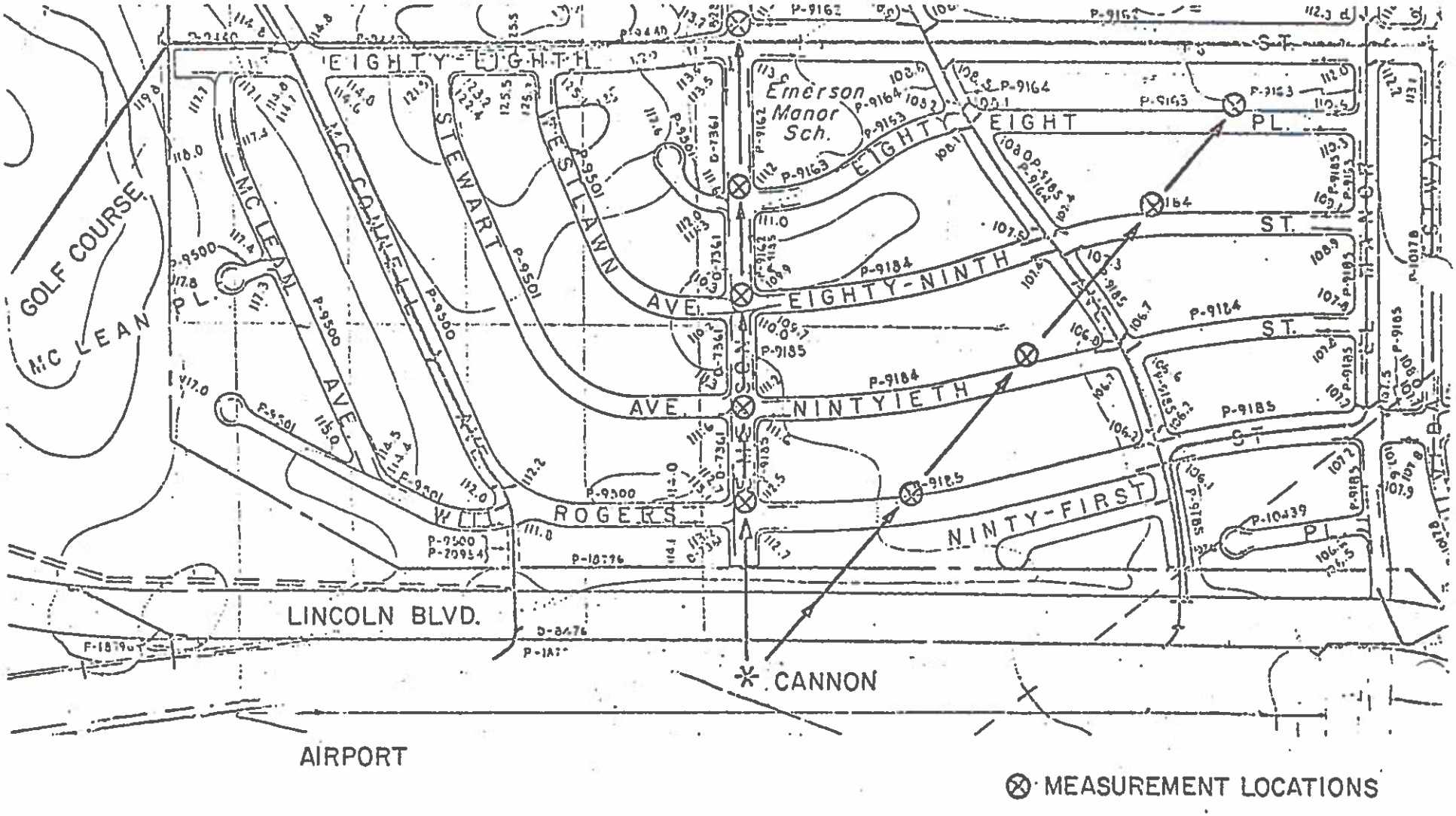


FIG. A3 LOCATIONS OF CANNON AND TESTS IN EMERSON MANOR.

APPENDIX II DEFINITION OF TERMS

Decibel - The decibel (abbreviated "dB") is a measure, on a logarithmic scale, of the magnitude of a particular quantity (such as sound pressure, sound power, etc.) with respect to a standard reference value.

dB(A) [A-weighted Sound Level] - The human ear does not respond equally to sounds of all frequencies. It is less efficient at low and high frequencies than it is at medium or speech range frequencies. To obtain a single number that represents the sound level of a noise containing a wide range of frequencies in a manner consistent with the ear's response, the effects of the low and high frequencies must be reduced, or "weighted", with respect to the mid-range frequencies. The resulting sound level is said to be A-weighted, and the units are dB. The standard abbreviation of A-weighted decibels is dB(A). The A-weighted sound level is also called the noise level. Sound level meters have an A-weighted network for measuring A-weighted sound level.

REFERENCES

1. H. G. Jonasson, "Sound Reduction by Barriers on the Ground", J. Sound Vibration, Vol. 22 (1), 1972, pp. 113-126.

2. W. E. Scholes, A. C. Salvidge and J. W. Sargent, Field Performance of a Noise Barrier, Building Research Station Current Paper CP 24/71.

3. V. O. Knudsen, "Model Testing of Auditoriums", J. Acoust. Soc. Am. 47, No. 2 (Part I) February, 1970 pp. 401-407.

4. B. G. Watters, "Instrumentation for Acoustic Modeling", J. Acoust. Soc. Am. 47, No. 2 (Part I) pp. 413-418 (February 1970).

5. P. S. Veneklasen, "Model Techniques in Architectural Acoustics", J. Acoust. Soc. Am. 47, No. 2 (Part I) pp. 419-423 (February 1970).

6. M. E. Delany, A. J. Rennie and K. M. Collins, Scale Model Investigations of Traffic Noise Propagation, National Physical Laboratory Acoustics Report Ac58, Department of Trade and Industry, September, 1972.

7. A. R. Soffel, Highway Noise Modeling Technique, Advanced Technology Center, Report No. FH-11-7453-1, September, 1971.

8. W. Schlatter, "Measurement of Sound Power in a Semi-Reverberant Space". M.Sc. Thesis, MIT Department of Mechanical Engineering, June, 1971.

9. R. H. Lyon, L. Pande, W. Kinney, "Model Studies of V/STOL Noise in City Streets", MIT Department of Mechanical Engineering Summary Report DOT-TSC-93, November, 1971.

10. A. D. Pierce and W. A. Kinney, "Field Measurements of Helicopter Noise in City Streets". Progress Reports No. 10, 11. Contract: DOT/TSC-93. Massachusetts Institute of Technology.

BIBLIOGRAPHY

M. E. Delany, A. J. Rennie and K. M. Collins, Scale Model Investigations of Traffic Noise Propagation, National Physical Laboratory Acoustics Report Ac58, Department of Trade and Industry, September, 1972.

H. G. Jonasson, "Sound Reduction by Barriers on the Ground", J. Sound Vibration, Vol. 22 (1), 1972, pp. 113-126.

V. O. Knudsen, "Model Testing of Auditoriums", J. Acoust. Soc. Am. 47, No. 2 (Part I) February, 1970, pp. 401-407.

R. H. Lyon, L. Pande, W. Kinney, "Model Studies of V/STOL Noise in City Streets", MIT Department of Mechanical Engineering Summary Report DOT-TSC-93, November, 1971.

A. D. Pierce and W. A. Kinney, "Field Measurements of Helicopter Noise in City Streets". Progress Reports No. 10, 11. Contract: DOT-TSC-93. Massachusetts Institute of Technology.

W. Schlatter, "Measurement of Sound Power in a Semi-Reverberant Space". M.Sc. Thesis, MIT Department of Mechanical Engineering, June, 1971.

W. E. Scholes, A. C. Salvidge and J. W. Sargent, Field Performance of a Noise Barrier, Building Research Station Current Paper CP 24/71.

A. R. Soffel, Highway Noise Modeling Technique, Advanced Technology Center, Report No. FH-11-7453-1, September, 1971.

P. S. Veneklasen, "Model Techniques in Architectural Acoustics", J. Acoust. Soc. Am. 47, No. 2 (Part I) pp. 419-423 (February, 1970).

B. G. Watters, "Instrumentation for Acoustic Modeling", J. Acoust. Soc. Am. 47, No. 2 (Part I) pp. 413-418 (February, 1970).

APPENDIX C-2

CITY OF LOS ANGELES AVIGATIONAL EASEMENT TYPES

City Attorney
When Recorded Mail to:
John M. Werlich
Assistant City Attorney
1 World Way
Los Angeles, CA 90009

81-5041 (2)

RECORDED IN OFFICIAL RECORDS
OF LOS ANGELES COUNTY, CA
JUN 11 1981 AT 8 A.M.
Recorder's Office

RECEIVED
MAR 16 1983
BELAND/ASSOCIATES, INC.

FEE $8

5

GRANT OF EASEMENT

AGREEMENT

This Agreement made this 9th day of April, 1981, by and between WALDER DEVELOPMENT CO., INC., a California corporation (hereinafter referred to as "Grantor") and the CITY OF LOS ANGELES, a municipal corporation, acting by and through its Board of Airport Commissioners (hereinafter referred to as "Grantee")

WHEREAS, Grantor is the owner of certain real property commonly known as 929-941 Main Street, El Segundo, California 90245 (hereinafter referred to "Serient Tenement" and described as follows: Lot 1 of Tract No. 37386, in the City of El Segundo, as per Map recorded in Book 979, Pages 97 & 98 of Maps in the Office of County Recorder of said County; nad

WHEREAS, Grantee is the owner of certain real property commonly known as Los Angeles International Airport, located in the City of Los Angeles, California (hereinafter referred to "Dominant Tenement", and

SEE Exh. b. 7"B"

G72180

WHEREAS, Grantee desires to acquire certain rights in Servient Tenement;

NOW, THEREFORE, it is agreed as follows:

1. Grantor hereby grants to Grantee an avigation easment as hereinafter described.

2. The avigation easement granted herein is appurtenant to the Dominant Tenement.

3. The avigation easement granted herein is for the right to discharge noise, vibrations and fumes over the Servier Tenement running to the benefit of Grantee and the Dominant Tenement as a result of any and all aircraft utilizing (includi takeoffs, landings and approaches) the Dominant Tenement. Said avigation easement is more specifically defined as follow:

A. An avigation easement for the use of the air-spaces over, through or adjacent to the Servient Tenement. Such easement shall be for air avigation purposes and shall include, but not be limited to, the right of Grantee and any aircraft utilizing the Dominant Tenement to discharge noise, fumes and vibrations on the Servient Tenement and its occupants as a result of aircra (not limited to jet aircraft) landing and taking off fro the Dominant Tenement as follows:

a. As to the eight runways located on the Dominant Tenement (24L, 6R, 24R, 6L, 25L, 7L, 25R and 7R) 300 aircraft 300 takeoffs and 300 aircraft landings as to each runway shall be permitted.

b. This avigation easement includes the resultant noise, fumes and vibrations from any aircraft currently operating from Dominant Tenement and any other aircraft that may subsequently be permitted to be used on Dominant Tenement by the United States of America or any of its agencies and/or departments.

c. Said easement includes any flight track said aircraft now or in the future may utilize.

4. Grantor and its successors of interest are forever barred from bringing any noise suit against Grantee under any theory of recovery so long as the avigation easement herein is not exceeded.

5. This instrument shall bind and inure to the benefit of the respective heirs, personal representatives, successors, and assigns of the parties hereto.

81- 582661

IN WI[illegible]SS WHEREOF, the partic[illegible] have executed this instrument the day and year first above written indicating the Grantor's grant and the Grantee's acceptance of said avigat[illegible] easement.

APPROVED AS TO FORM
BURT PINES
CITY ATTORNEY
April 9, 1981

By John M. Werllich
John M. Werllich
Assistant City Attorney

CITY OF LOS ANGELES

By Clifton G. Moore
General Manager
Department of Airports

ATTEST:

By Trudy W. Smith
Secretary

[SEAL]

WALDER DEVELOPMENT, CO., I[illegible]

By _____
(Signature)

JULES L. WALDER
(Print Name)

PRESIDENT
(Print Title)

81- 582661

STATE OF CALIFORNIA }
COUNTY OF Los Angeles } ss.

On this 6th day of May, 1981, before me, the undersigned, a Notary Public in and for said County and State, personally appeared Jules Walder known to me to be the _____ President, and Trudy W. Smith known to me to be the _____ Secretary of the corporation that executed the within instrument, and known to me to be the persons who executed the within instrument on behalf of the corporation therein named, and acknowledged to me that such corporation executed the same, pursuant to its laws, or a resolution of its Board of Directors.

WITNESS my hand and official seal.

Signature Cathy R Steffen

Cathy R. Steffen
Name (Typed or Printed)

OFFICIAL SEAL
CATHY R. STEFFEN
NOTARY PUBLIC - CALIFORNIA
LOS ANGELES COUNTY
My Commission Expires June 10, 1983

(This area for official seal)

ACKNOWLEDGMENT — CORPORATION

ity of Los Angeles Department of Airports 1 World Way, Los Angeles, California 90009 • (213) 646-5252 Telex 65-3413
m Bradley, Mayor

card of
irport Commissioners
ary Lou Cunningham
President
obert E. Collins
Vice President
izabeth K. Armstrong
amuel Greenberg
mmett C. McGaughey

ilton A. Moore
eneral Manager

Exhibit "B"

RESOLUTION NO. 12506

WHEREAS, on recommendation of Management, there was presented for app Acceptance of an Avigation Easement from Walder Development Co., Inc 18-unit condominium project in El Segundo; and

WHEREAS, upon the request of the California Department of Real Estate, I Development Co., Inc. has offered the City of Los Angeles, Departme Airports, an Avigation Easement over its recently developed 18 unit cond ium complex in El Segundo, California. Inasmuch as the project is lo within the 65 CNEL contour, the Acceptance of the Avigation Easement convert what would normally be an incompatible use within said area compatible use according to the California Noise Standards; and

WHEREAS, this Acceptance of an Avigation Easement, as a continuing ac strative activity, is exempt from the requirements of the California Env mental Quality Act as provided by Article III, Section 2.f. of th Angeles City CEQA Guidelines;

NOW, THEREFORE, BE IT RESOLVED that the Board of Airport Commissioners d mined that this action is exempt from CEQA requirements, approved the Ac ance of the Avigation Easement, and authorized the General Manager to ex said Acceptance, upon approval as to form by the City Attorney.

oOo

I hereby certify that the above is a true and correct copy of Resolution No. 12506 adopted by the Board of Airport Commissioners at a regular meeting held Wednesday, April 8, 1981.

Elaine E. Staniec

Elaine E. Staniec - Secretary
BOARD OF AIRPORT COMMISSIONERS

RECORDING REQUESTED BY AND MAIL TO

IRA REINER, City Attorney
JAMES H. PEARSON, Senior Assistant City Attorney
JAMES L. SPITSER, Assistant City Attorney
1 World Way
Los Angeles, California 90009
(213) 646-3260

Attorneys for Defendant,
CITY OF LOS ANGELES

81-1035021

FILED

OCT 6 - 1981

John J. Corcoran, County Clerk
By H. H. MENDE Deputy

SUPERIOR COURT OF CALIFORNIA, COUNTY OF LOS ANGELES

FREE L

112

KIM D. ALFORD McGRATH, et al.,

Plaintiffs,

vs.

CITY OF LOS ANGELES, a municipal corporation,

Defendant.

NO. C-150,568

JUDGMENT AND FINAL ORDER

KENNETH O. BARBER, et al.,

Plaintiffs,

vs.

CITY OF LOS ANGELES, a municipal corporation,

Defendant.

NO. CA-000438

RECORDED IN OFFICIAL RECORDS
RECORDER'S OFFICE
LOS ANGELES COUNTY
CALIFORNIA
17 MIN. PAST. 2 P.M. OCT 20 1981

LOS ANGELES COUNTY CLERK
CENTRAL DISTRICT
FILED
BOOK
PAGE
Oct 6 '81 7768 221

WHEREAS, the Plaintiffs, FAY M. CROSS, MAURICE L. and DOROTHY SHEERER, STANLEY and KATHRYN G. YAGIELA, KENNETH O. and JANE A. BARBER, IRVING J. and ISABELLE S. KING, SEYMOUR S. and NORMA J. STEIN, RONALD and ARLENE MILROT, NUNZIO and ELVIRA A. DiGENOVA, KIM D. ALFORD McGRATH, ROBERT G. and CATHERINE M. McCORKLE, DEAN G. METCALF, JAMES R. and JEAN C. RICHARDS,

ROBERT O. and HELEN L. RICHARDSON, SHIRLEY WATSON, JAMES and RUTH SKLAROFF, EUGENE and CARRIE MELLONE, RICHARD and LILLIAN LIVINGSTON, JEAN and LEON SCHWARTZ, JOSEPH and HELEN BERNHARDT, CHARLES F. and MARJORIE WHITE, MANFRED C. TUTTLE, MR. & MRS. ROBERT S. BOYD, RICHARD S. MUSELLA, MARVIN and MARIANNE ADRIAN, and H. E. RUMENAPP, have brought actions for damage to real property and personal injuries and emotional distress, allegedly caused by the Defendant CITY OF LOS ANGELES in the operation of Los Angeles International Airport; and

WHEREAS, since the year 1967 and for some time prior thereto and continuing to the present, the Defendant CITY OF LOS ANGELES has owned, operated and maintained the Los Angeles International Airport, and that such ownership, operation and maintenance of said Los Angeles International Airport facility has annually resulted in the landing and takeoff of a substantial number of jet aircraft; and

WHEREAS, all Plaintiffs herein have previously received awards from the Defendant for alleged property damage; and

WHEREAS, the parties desire to dispose of all claims in the above-entitled actions arising from alleged additional property damage and alleged personal injuries and emotional distress; and

WHEREAS, the Defendant, CITY OF LOS ANGELES, desires to acquire an air easement interest in Plaintiffs' properties by condemnation and to receive releases from the Plaintiffs for all personal injury and emotional distress claims; and

.....

WHEREAS, the purpose of the air easements and releases granted hereunder for noise, vibrations, smoke and fumes over and around Plaintiffs' certain parcels of real property running to the benefit of Defendant CITY OF LOS ANGELES is for the purpose of resolving all questions between the parties arising out of the Defendant CITY OF LOS ANGELES' operation of that certain facility known as the Los Angeles International Airport and of the consequent overflight or fly-by of jet aircraft with the attendant consequences of noise, vibrations, smoke and fumes interfering with Plaintiffs and with the use of Plaintiffs' certain parcels of real property; and

WHEREAS, it appears to the Court that a Stipulation has been filed by and between the Plaintiffs and the City of Los Angeles, through their respective attorneys of record providing for the entry of a Judgment and Final Order and a waiver of findings of fact and conclusions of law, and the Court being fully advised in the premises;

NOW, THEREFORE, in accordance with said Stipulation, and the records and files herein, IT IS HEREBY ORDERED, ADJUDGED AND DECREED:

1. That the Defendant CITY OF LOS ANGELES shall be awarded an air easement in the following-described properties, located in the City of Los Angeles, County of Los Angeles:

Cross Property--7318 W. 88th Place--Lot 98 of Tract 14439, as per map recorded in Book 378, pages 37 to 40, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

Sheerer Property--7359 W. 88th Street--Lot 53 of Tract 14439, as per map recorded in Book 378, pages 37 to 40, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

Yagiela Property--7400 W. 89th Street--Lot 141 of Tract 14439, as per map recorded in Book 378, pages 37 to 40, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

Barber Property--7428 W. 89th Street--Lot 146 of Tract 14439, as per map recorded in Book 378, pages 37 to 40, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

King Property--7263 W. 90th Street--Lot 88 of Tract 14904, as per map recorded in Book 412, pages 12 to 14, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

Stein Property--7344 W. 90th Street--Lot 179 of Tract 14439, as per map recorded in Book 378, pages 37 to 40, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

Milrot Property--7314 W. 91st Street--Lot 215 of Tract 14439, as per map recorded in Book 378, pages 37 to 40, inclusive, of Maps, in the office of the

County Recorder of Los Angeles County.

Di Genova Property--7330 W. 91st Street--Lot 218 of Tract 14439, as per map recorded in Book 378, pages 37 to 40, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

McGrath Property--7338 W. 91st Street--Lot 220 of Tract 14439, as per map recorded in Book 378, pages 37 to 40, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

McCorkle Property--7540 W. 91st Street--Lot 25 of Tract 18843, as per map recorded in Book 478, pages 23 to 27, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

Metcalf Property--7546 W. 91st Street--Lot 24 of Tract 18843, as per map recorded in Book 478, pages 23 to 27, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

Richards Property--7606 W. 91st Street--Lot 21 of Tract 18843, as per map recorded in Book 478, pages 23 to 27, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

.....

.....

Richardson Property--7612 W. 91st Street--Lot 20 of Tract 18843, as per map recorded in Book 478, pages 23 to 27, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

Watson Properties--9406 Belford Avenue--Lot 19 of Tract 17844, as per map recorded in Book 457, pages 41 to 43, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

and

634 W. Glasgow Avenue--The North 54.8 feet of the South 110.12 feet of Lot 22 in the South Half of the Northwest Quarter of Section 32, Township 2 South, Range 14 West, as recorded in Book 36, Page 3, of Miscellaneous Records in the office of the County Recorder of Los Angeles County.

Sklaroff Property--9017-9019 1/2 Reading Ave.--Lot 112 of Tract 15283, as per map recorded in Book 327, pages 31 to 33, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

Mellone Property--9418 Belford Ave.--Lot 21 of Tract 17844, as per map recorded in Book 457, pages 41 to 43, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

.....

.....

Livingston Property--9426 Belford Ave.--Lot 22 of Tract 17844, as per map recorded in Book 457, pages 41 to 43, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

Schwartz Property--9501 Belford Ave.--Lot 43 of Tract 17844, as per map recorded in Book 457, pages 41 to 43, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

Bernhardt Property--9612 Belford Ave.--Lot 29 of Tract 17844, as per map recorded in Book 457, pages 41 to 43, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

White Property--9010-9012-9014 Reading Ave.--Lot 52 of Tract 15283, as per map recorded in Book 327, pages 31 to 33, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

Tuttle Property--9050-9058 Reading Ave.--South 88.25 feet measured at a right angle to the South line of Lot 45 of Tract 15283 as per map recorded in Book 327, pages 31 to 33, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

Boyd Property--7278 W. 91st Street--Lot 105 of Tract 14904, as per map recorded in Book 412, pages

12 to 14, inclusive of Maps, in the office of the County Recorder of Los Angeles County.

Musella Property--8869 Earhart Avenue--Lot 167 of Tract 12574, as per map recorded in Book 247, pages 13 to 20, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

Adrian Property--9008-9008 1/2 -- 9010-9010 1/2 Ramsgate--Lot 123 of Tract 15283, as per map recorded in Book 327, pages 31 to 33, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

Rumenapp Property--5424-26 W. Arbor Vitae--Lot 222 of Tract 14225, as per map recorded in Book 319, pages 20-24, inclusive, of Maps, in the office of the County Recorder of Los Angeles County.

2. The following Plaintiffs shall each file with this Court a Release releasing the Defendant CITY OF LOS ANGELES from any and all claims said Plaintiffs have had, have now, or may hereafter have, with respect to alleged property damage at their respective properties, and any personal injuries and/or emotional distress, by reason of any jet aircraft operations to, from or at Los Angeles International Airport:

.....

1. Fay M. Cross;
2. Maurice L. and Dorothy Sheerer;
3. Stanley and Kathryn G. Yagiela;
4. Kenneth O. and Jane A. Barber;
5. Irving J. and Isabelle S. King;
6. Seymour S. and Norma J. Stein;
7. Ronald and Arlene Milrot;
8. Nunzio and Elvira A. DiGenova;
9. Kim D. Alford McGrath;
10. Robert G. and Catherine M. McCorkle;
11. Dean G. Metcalf;
12. James R. and Jean C. Richards;
13. Robert O. and Helen L. Richardson;
14. Shirley Watson;
15. James and Ruth Sklaroff;
16. Eugene and Carrie Mellone;
17. Richard and Lillian Livings
18. Jean and Leon Schwartz;
19. Joseph and Helen Bernhardt;
20. Charles F. and Marjorie Whi
21. Manfred C. Tuttle;
22. Mr. & Mrs. Robert S. Boyd;
23. Richard S. Musella;
24. Marvin and Marianne Adrian; and
25. H. E. Rumenapp;

A copy of each of said Releases is attached hereto, marked Exhibit "A1" through "A25."

3. The Defendant CITY OF LOS ANGELES is hereby awarded an air easement interest in each of the Plaintiffs' properties, described above, as follows:

A. As to Runway 24L/6R, an unlimited number of takeoffs and an unlimited number of landings each day of any type of aircraft;

B. As to Runway 24R/6L, an unlimited number of takeoffs and an unlimited number of landings each day of any type of aircraft.

.....

4. The fair market value of the above-described air easements, per property, and the amount of the personal injury/emotional distress damages, per family, in the total sum of $50,000, are as follows:

Name	Address	Additional Property Damage	Personal Injury/ Emotional Distress	Total
Cross	7318 W. 88th Pl.	$ 1500	$ 500	$ 2000
Sheerer	7359 W. 88th St.	1500	500	2000
Yagiela	7400 W. 89th St.	1500	500	2000
Barber	7428 W. 89th St.	1500	500	2000
King	7263 W. 90th St.	1500	500	2000
Stein	7344 W. 90th St.	1500	500	2000
Milrot	7314 W. 91st St.	1500	500	2000
DiGenova	7330 W. 91st St.	1500	500	2000
McGrath	7338 W. 91st St.	1500	500	2000
McCorkle	7540 W. 91st St.	1500	500	2000
Metcalf	7546 W. 91st St.	1500	500	2000
Richards	7606 W. 91st St.	1500	500	2000
Richardson	7612 W. 91st St.	1500	500	2000
Watson	9406 Belford Ave. and 634 W. Glasgow Ave.	1500	500	2000
Sklaroff	9017-9019 1/2 Reading Ave.	1500	500	2000
Mellone	9418 Belford Ave.	1500	500	2000
Livingston	9426 Belford Ave.	1500	500	2000
Schwartz	9501 Belford Ave.	1500	500	2000
Bernhardt	9612 Belford Ave.	1500	500	2000
White	9010-9012-9014 Reading Ave.	1500	500	2000
Tuttle	9050-9058 Reading Ave.	1500	500	2000

Name	Address	Additional Property Damage	Personal Injury/ Emotional Distress	Total
Boyd	7278 W. 91st St.	$ 1500	$ 500	$ 2000
Musella	8869 Earhart Ave.	1500	500	2000
Adrian	9008-9008 1/2 - 9010-9010 1/2 Ramsgate	1500	500	2000
Rumenapp	5424-26 W. Arbor Vitae	1500	500	2000

5. Upon the payment of the total sum of $50,000 to the attorneys for the Plaintiffs, in trust, the Defendant CITY OF LOS ANGELES shall be awarded the air easements described herein, and all of the claims by said Plaintiffs for the taking of an avigation easement in, and damage to, their said properties, and for personal injuries and emotional distress, in the above-captioned actions, are fully satisfied. Said sum shall be paid to the Plaintiffs' attorneys as follows:

SCHIMMENTI, MULLINS & BERBERIAN,
as Trustee
Suite 602 Airport Imperial Towers
999 North Sepulveda Boulevard
El Segundo, California 90245

6. The Plaintiffs are barred forever from bringing additional property damage, personal injury and emotional distress suits against the City of Los Angeles arising from the use of the air easements described above, respecting operations of jet aircraf to and from and at Los Angeles International Airport, under any theory of recovery.

7. The purpose for which the above-described air easements are condemned is for an airport, a public use authorized by law, and the taking of said property is necessary for such use.

8. The amount to be paid by the Defendant CITY OF LOS ANGELES to the Plaintiffs' attorneys, in trust, for the benefit of the Plaintiffs, as described herein and through the procedures as set forth herein, includes all of Plaintiffs' attorneys' fees, appraiser's fees, expert witness fees, litigation costs and interest granted for the Plaintiffs and totally satisfies Plaintiffs' claims as to property damage and/or the taking of an interest in the Plaintiffs' said properties and Plaintiffs' claims as to personal injuries and emotional distress, by the Defendant CITY OF LOS ANGELES.

9. The date of the taking of the air easements awarded herein to the City of Los Angeles shall be deemed to have been on December 31, 1971.

10. The legal descriptions contained herein are presumed to be correct. If after entry and recordation of this Judgment and Final Order, discrepancies in any legal description are found, this Order may be modified by an order nunc pro tunc to correct the error or errors.

DATED: OCT 6 - 1981, 1981

MAX F. DEUTZ

Max F. Deutz
Judge of the Superior Court

THE DOCUMENT TO WHICH THIS CERTIFICATE IS ATTACHED IS A FULL, TRUE AND CORRECT COPY OF THE ORIGINAL ON FILE AND OF RECORD IN MY OFFICE.
ATTEST OCT 20 1981, 19
County Clerk and Clerk of the Superior Court of the State of California for the County of Los Angeles.
BY _____ DEPUTY

81- 1035021

DRAFT

BURT PINES, City Attorney
LAWRENCE M. NAGIN, Senior Assistant City Attorney
JAMES H. PEARSON, Assistant City Attorney
#1 World Way
Los Angeles, California 90009
(213) 646-3260

80- 55139

ORIGINAL

FILED

JAN 17 1980

By Marie Frores Deputy

Attorneys for Defendant,
CITY OF LOS ANGELES

SUPERIOR COURT OF CALIFORNIA, COUNTY OF LOS ANGELES

LOS ANGELES UNIFIED SCHOOL DISTRICT, Plaintiff, vs. CITY OF LOS ANGELES, and DOES 1 through 100, inclusive, Defendants.	NO. 965,067 AMENDED JUDGMENT AND FINAL ORDER IN CONDEMNATIO
INGLEWOOD UNIFIED SCHOOL DISTRICT, Plaintiff, vs. CITY OF LOS ANGELES, and DOES 1 through 100, inclusive, Defendants.	NO. 986,442
CENTINELA VALLEY UNION HIGH SCHOOL DISTRICT, Plaintiff, vs. CITY OF LOS ANGELES, and DOES 1 through 100, inclusive, Defendants.	NO. 986,447

FREE (2A)

RECORDED IN OFFICIAL RECORDS
OF LOS ANGELES COUNTY, CALIF.
27 Min. Past 11 A.M. JAN 15 1980
Registrar-Recorder

EL SEGUNDO UNIFIED SCHOOL DISTRICT, Plaintiff, vs. CITY OF LOS ANGELES, and DOES 1 through 100, inclusive, Defendants.	NO. 986,444
LENNOX SCHOOL DISTRICT, Plaintiff, vs. CITY OF LOS ANGELES, and DOES 1 through 100, inclusive, Defendants.	NO. 986,446

WHEREAS, the plaintiffs Los Angeles Unified School District, Inglewood Unified School District, Centinela Valley Union High School District, El Segundo Unified School District and Lennox School District have brought these consolidated actions under the theories of inverse condemnation, trespass, nuisance, dangerous condition of public property and negligence against the defendant City of Los Angeles seeking damages for the alleged injuries to plaintiffs' real property and interference with plaintiffs' educational programs caused by noise, vibrations and fumes emanating from the jet aircraft using defendant's Los Angeles International Airport facility; and

WHEREAS, the plaintiffs allege that the landing and takeoff operations of the jet aircraft using the Los Angeles International Airport facility have caused substantial levels of noise, vibrations and fumes to enter and interfere with the quiet enjoyment of

plaintiffs' parcels of real property and the school operations conducted on those certain parcels of plaintiffs' real property set forth in paragraph 1 below; and

WHEREAS, since the year 1970 and for some time prior thereto and continuing to the present, the defendant City of Los Angeles, has owned, operated and maintained the Los Angeles International Airport, and that such ownership, operation and maintenance of said Los Angeles International Airport facility has annually resulted in the landing and takeoff of a substantial number of jet aircraft; and

WHEREAS, disposition is now to be made of all claims in this action arising from the alleged taking and damaging of plaintiffs' said parcels of real property by the defendant City of Los Angeles and that the defendant City of Los Angeles is to acquire air easements in plaintiffs' certain parcels of real property; and

WHEREAS, the purpose of the air easements granted hereunder for noise, vibrations and fumes over plaintiffs' certain parcels of real property running to the benefit of defendant City of Los Angeles is for the purpose of resolving all questions between the parties arising out of the defendant City of Los Angeles' operation of that certain facility known as the Los Angeles International Airport and of the consequent overflight or fly-by of jet aircraft with the attendant consequences of noise, vibrations and fumes interfering with plaintiffs' certain parcels of real property; and

WHEREAS, a written stipulation having been duly executed

and filed herein by and between the plaintiffs, LOS ANGELES UNIFIED SCHOOL DISTRICT, INGLEWOOD UNIFIED SCHOOL DISTRICT, CENTINELA VALLEY UNION HIGH SCHOOL DISTRICT, EL SEGUNDO UNIFIED SCHOOL DISTRICT and LENNOX SCHOOL DISTRICT, by and through John H. Larson, County Counsel and Charles Vinson Tackett, Deputy County Counsel, attorneys of record for said plaintiffs, and the defendant CITY OF LOS ANGELES, by and through Burt Pines, City Attorney, Milton N. Sherman, Chief Assistant City Attorney - Airports Division, and James H. Pearson, Assistant City Attorney, attorneys of record for said defendant, and the court being fully advised in the premises;

NOW, THEREFORE, in accordance with said stipulation, records and files herein, IT IS HEREBY ORDERED, ADJUDGED AND DECREED:

1. The plaintiff Los Angeles Unified School District is the owner of certain parcels of real property operated for school purposes and commonly described as:

Airport Junior High School	9000 Airport Boulevard Los Angeles, California
Century Park School	10935 South Spinning Avenue Los Angeles, California
Emerson Manor School	8810 Emerson Avenue Los Angeles, California
Figueroa Street School	510 West 111th Street Los Angeles, California
John C. Fremont High School	7676 South San Pedro Street Los Angeles, California
Samuel Gompers Junior High School	234 East 112th Street Los Angeles, California

Bret Harte Junior High School	9301 South Hoover Street Los Angeles, California
Kentwood School	8401 Emerson Avenue Los Angeles, California
La Salle Avenue School	8715 La Salle Avenue Los Angeles, California
Alain Leroy Locke High School	325 East 111th Street Los Angeles, California
Loyola Village School	8821 Villanova Avenue Los Angeles, California
Manchester Avenue School	661 West 87th Street Los Angeles, California
Manhattan Place School	1850 West 96th Street Los Angeles, California
Horace Mann Junior High School	7001 St. Andrews Place Los Angeles, California
McKinley Avenue School	14431 Stanford Avenue Compton, California
Loren Miller School	830 West 77th Street Los Angeles, California
Ninety-Fifth Street School	1101 West 96th Street Los Angeles, California
Ninety-Eighth Street School	5431 West 98th Street Los Angeles, California
Ninety-Ninth Street School	920 East 99th Street Los Angeles, California
Ninety-Second Street School	9211 Grape Street Los Angeles, California
Ninety-Seventh Street School	400 West 97th Street Los Angeles, California
Ninety-Sixth Street School	1477 East 96th Street Los Angeles, California
Ninety-Third Street School	330 East 93rd Street Los Angeles, California
One Hundred Ninth Street School	10911 McKinley Avenue Los Angeles, California
One Hundred Seventh Street School	147 East 107th Street Los Angeles, California

80- 55139

Parmelee Avenue School	1338 East 76th Place Los Angeles, California
Paseo Del Rey School	7751 Paseo Del Rey Playa Del Rey, California
Raymond Avenue School	7511 Raymond Avenue Los Angeles, California
Seventy-Fifth Street School	142 West 75th Street Los Angeles, California
Seventy-Fourth Street School	2132 West 74th Street Los Angeles, California
South Park School	430 East 85th Street Los Angeles, California
George Washington High School	10860 Denker Avenue Los Angeles, California
Westchester High School	7400 West Manchester Avenue Los Angeles, California
Woodcrest School	1151 West 109th Street Los Angeles, California

and legally described as set forth in Exhibit "A" attached hereto and incorporated by reference herein.

The plaintiff Inglewood Unified School District is the owner of certain parcels of real property operated for school purposes and commonly described as:

Hudnall Elementary School	331 West Olive Street Inglewood, California
Inglewood High School	231 South Grevillea Avenue Inglewood, California
William E. Kelso Elementary School	809 East Kelso Street Inglewood, California
Kelso Children Center	817 East Kelso Street Inglewood, California

Crozier Junior High School	151 North Grevillea Avenue Inglewood, California
Center Park School	11101 Yukon Avenue Inglewood, California
Warren Lane Elementary School	9330 South Eighth Avenue Inglewood, California
Monroe Junior High School	10711 Tenth Avenue Inglewood, California
Morningside High School	10500 South Yukon Avenue Inglewood, California
Oak Street Elementary School	633 South Oak Street Inglewood, California
Payne Elementary School	215 West Ninety-Fourth Street Inglewood, California
Woodworth Elementary School	3200 West 104th Street Inglewood, California
Orthopedic Unit	10409 Tenth Avenue Inglewood, California
Education Center	401 South Inglewood Avenue Inglewood, California

and legally described as set forth in Exhibit "B" attached hereto and incorporated by reference herein.

The plaintiff Centinela Valley Union High School District is the owner of a certain parcel of real property operated for school purposes and commonly described as:

Lennox High School	11033 South Buford Avenue Lennox, California

and legally described as set forth in Exhibit "C" attached hereto and incorporated by reference herein.

The plaintiff El Segundo Unified School District is the owner of certain parcels of real property operated for school purposes and commonly described as:

Administrative Office	203 Richmond Street El Segundo, California
Center Street School	700 Center Street El Segundo, California
Imperial School	540 Imperial Avenue El Segundo, California
Richmond Street School	615 Richmond Street El Segundo, California
Junior High School	332 Center Street El Segundo, California
High School	640 Main Street El Segundo, California
Ada L. Jones Work Training Center	901 Hillcrest Street El Segundo, California
Development Center for Handicapped Minors	759 Acacia Street El Segundo, California
Curriculum Materials Laboratory	219 Franklin Avenue El Segundo, California

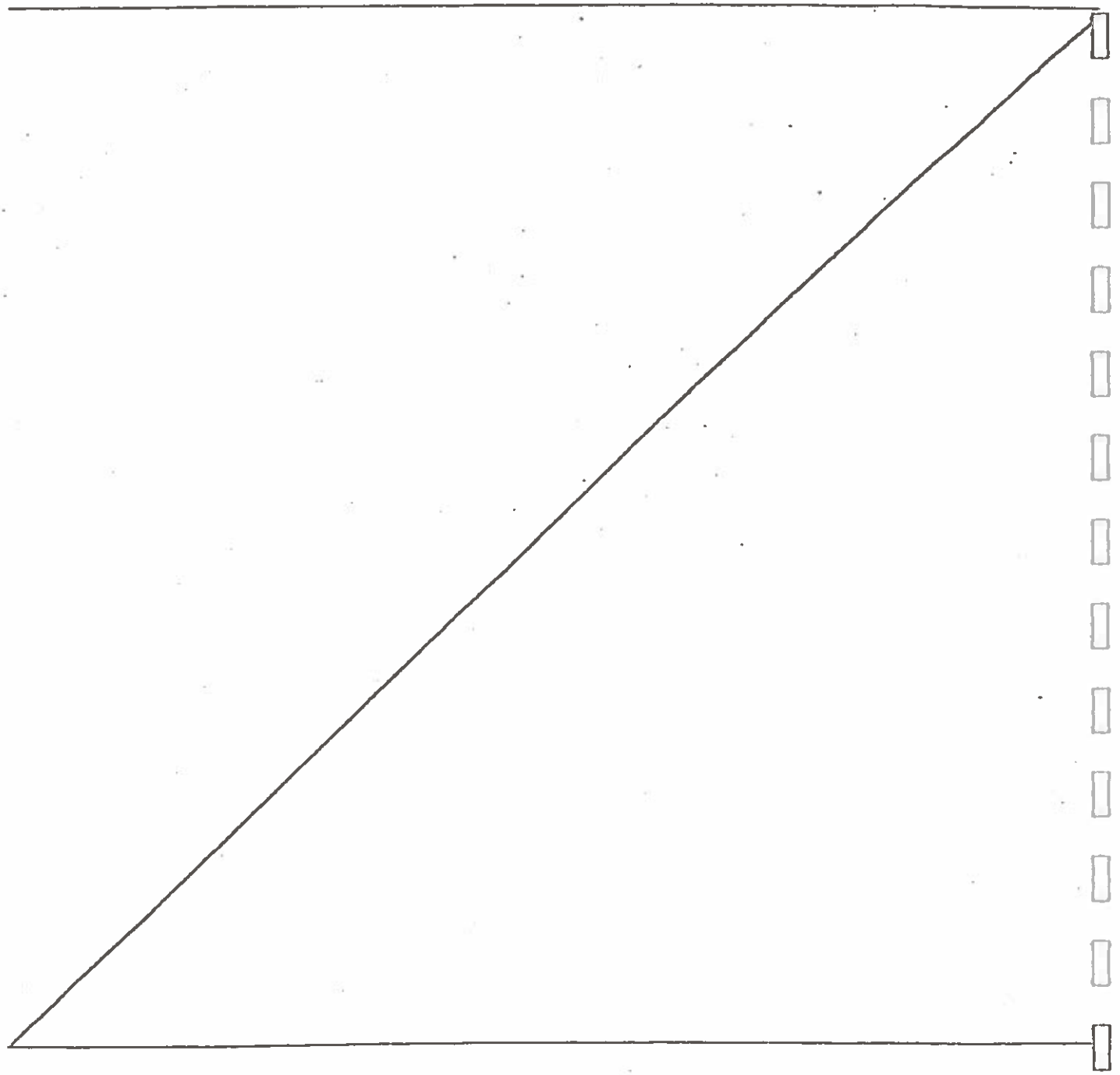
and legally described as set forth in Exhibit "D" attached hereto and incorporated by reference herein.

The plaintiff Lennox School District is the owner of certain parcels of real property operated for school purposes and commonly described as:

Buford Avenue School	4919 West 109th Street Inglewood, California
Felton Avenue Intermediate School	10417 Felton Avenue Inglewood, California

Jefferson School	10322 Condon Avenue Inglewood, California
Larch Avenue School	11200 Larch Avenue Inglewood, California
Whelan School	4125 West 105th Street Inglewood, California

and legally described as set forth in Exhibit "E" attached hereto and incorporated by reference herein.



2. The defendant City of Los Angeles is the owner of certain parcels of real property operated by it for airport purposes under the name Los Angeles International Airport, and bearing the commonly known address for administrative purposes of 1 World Way, Los Angeles, California.

3. In determining the nature and extent of the air easements to be granted to defendant pursuant to this Judgment and Final Order, it is necessary that the description of such air easements be made in quantitative engineering terms setting forth specific levels of noise exposure that will be permitted within the scope of the air easements. The criterion or quantitative measure of noise exposure used for the purpose of describing and establishing the air easements granted herein shall be the Community Noise Equivalent Level (CNEL) methodology as authorized by Article 3, Chapter 4, Part 1, Division 9, Public Utilities Code of the State of California and as contained in the California Administrative Code, Title 4, Subchapter 6, Noise Standards. Said noise standards are those in effect on June 24, 1975. The CNEL values for the air easements shall be measured, calculated and established by the procedures contained in the "Statement of Procedures for Determining CNEL and any Surcharge Thereon" which is attached hereto as Exhibit "F" and made a part hereof. Further, the procedures and information that are to be used to determine actual CNEL values at each of the individual parcels of real property are set forth in said Exhibit "F." In the event there is a claimed surcharge on one or more of the easements granted herein, the parties shall use only the procedures set forth in Exhibit "F" to determine the

validity of such claim. Vibration and fume levels are not quantitatively described for the purpose of the distribution of the air easements but it is agreed that those levels of vibration and fumes which accompany the agreed-to CNEL values shall not be a burden of the easements.

4. The defendant City of Los Angeles does acquire by this Judgment and Final Order air easements as follows:

a. An air easement for the use of all of the air space over or through each of the parcels of real property of the plaintiffs as set forth in Paragraph 1 of this Judgment and Final Order and legally described in Exhibits "A" through "E" attached hereto and made a part hereof. Such air easements shall be for air navigation purposes including landing and takeoff operations such that the Community Noise Equivalent Levels experienced at the site of each of the several parcels of property of the plaintiffs shall not exceed the respective values set forth in the fourth column, entitled Maximum CNEL, db, of Table I attached to and made a part of Exhibit "F" or as modified by those values contained in Table II of said Exhibit "F" should the defendant exercise the option set forth below in this subparagraph a. If the defendant burdens or surcharges the easement at any given site of plaintiffs' properties, it shall only be a surcharge to that individual site. However, the defendant may in the future deem it necessary to modify the distribution of aircraft operations between the two runway complexes

(South Complex Runways 25L/7R and 25R/7L and North Complex Runways 24L/6R and 24R/6L) by attempting more evenly to balance the number of such operations conducted to and from each runway complex. The defendant shall have the option to so modify its operations in the future and shall be awarded the easements necessary to accommodate such more balanced operations. In the event the defendant exercises this option, the air easements at each of the several parcels of property of the plaintiffs shall not exceed the respective values set forth in the fourth column, entitled Maximum CNEL, db, of Table II attached to and made a part of Exhibit "F." Defendant shall give plaintiffs sixty (60) days' notice in writing of its intention to exercise this option. If the defendant exercises the option as set forth above, that exercise shall represent an irrevocable determination of the easements granted herein and defendant shall not be allowed to return to the easements as set forth in Table I attached to and made a part of Exhibit "F."

b. The easements granted herein specifically exclude the operation at Los Angeles International Airport of (1) supersonic transport category aircraft; and (2) any new type or class of aircraft manufactured after January 1, 1974 that exceed the noise standards in effect on June 24, 1975 for the issuance of type certificates for subsonic transport category aircraft in Title 14, Code of Federal Regulations, Chapter 1, Part 36, or in the International Standards and Recommended Practices - Aircraft Noise pursuant to Annex 16,

VARIANCE PROCEDURE STATUS?

Part II of the International Civil Aviation Organization (ICAO). If such type or class of aircraft is authorized to operate at Los Angeles International Airport without approval of the defendant, plaintiffs prior to initiating any action alleging a surcharge of the easements granted herein shall join defendant in seeking to bar such operations by all appropriate judicial means. Further, the parties shall seek indemnification and/or damages from the authorizing authority prior to resolving any claims for alleged surcharge.

5. The fair market value of the air easements being acquired by the defendant City of Los Angeles over plaintiffs' certain parcels of real property is $20,942,298.00.

6. The air easements acquired herein by defendant City of Los Angeles are to be interpreted, for purposes of any claimed surcharge of the air easements, using the standard of reasonableness. Exhibit "F" attached hereto establishes 0.5 db as the minimum deviation necessary to be exceeded before a surcharge can be claimed.

7. From time to time, repairs, improvements and construction on the Airport site and other operational requirements may cause deviations from the easements granted herein. Such deviations are to be temporary and not permanent and any and all repairs, improvements and construction or other operational requirements shall be carried on in a diligent manner so as to minimize any temporarily increased noise impaction resulting from such repairs, improvements and construction or other operational

requirements. It is anticipated that the defendant will in the future perform extensive construction modifications to the south runways (Runways 25L/7R and 25R/7L) and the Sepulveda tunnel. Such construction will require the closure of both runways, however not at the same time. While each of the south runways is closed, additional traffic by necessity will be placed upon the north runways (Runways 24L/6R and 24R/6L). The overall construction period is scheduled to encompass several months and shall be recognized as a deviation within the provisions of this Judgment and Final Order.

8. The air easements awarded herein to the City of Los Angeles shall extend to any new schools constructed or additions to existing schools by the various school districts represented in the suit and the respective plaintiff school districts have the responsibility to so construct such new facilities in such a manner as to exclude in the classroom any objectionable levels of noise created by the operation of the defendant's Los Angeles International Airport to the extent of the easements granted herein. The extent of any such air easements applicable to such new schools shall be mutually determined by the parties hereto using the procedures set forth in Exhibit "F."

9. Upon payment of the total sum of $20,942,298.00 to the Clerk of this Court for the benefit of the plaintiffs, the defendant City of Los Angeles shall be awarded the air easements described herein. Said total sum shall be distributed by the Clerk of the Court in warrants as follows:

TO: LOS ANGELES UNIFIED SCHOOL DISTRICT
c/o John H. Larson, County Counsel and Charles Vinson Tackett, Deputy County Counsel the sum of $10,257,957.40.

TO: INGLEWOOD UNIFIED SCHOOL DISTRICT
c/o John H. Larson, County Counsel and Charles Vinson Tackett, Deputy County Counsel the sum of $5,884,733.66.

TO: CENTINELA VALLEY UNION HIGH SCHOOL DISTRICT
c/o John H. Larson, County Counsel and Charles Vinson Tackett, Deputy County Counsel the sum of $789,918.91.

TO: EL SEGUNDO UNIFIED SCHOOL DISTRICT
c/o John H. Larson, County Counsel and Charles Vinson Tackett, Deputy County Counsel the sum of $1,480,923.36.

TO: LENNOX SCHOOL DISTRICT
c/o John H. Larson, County Counsel and Charles Vinson Tackett, Deputy County Counsel the sum of $2,528,764.67.

10. The money paid by the City of Los Angeles for the air easements awarded herein shall only be used by the respective school districts to complete necessary construction or structural

modifications of their facilities so as to reduce the noise levels in the classrooms resulting from the operation of commercial jet aircraft to and from and at Los Angeles International Airport.

11. Upon payment of said sum into Court for the benefit of the plaintiffs, all of the claims made by said plaintiffs for property damage and/or the taking of an interest in their respective properties in this action are fully satisfied.

12. The school districts herein are barred forever from bringing additional suits against the City of Los Angeles arising from the use of the air easements respecting operations of jet aircraft to and from and at Los Angeles International Airport under any theory of recovery so long as the City of Los Angeles does not exceed the air easements granted herein.

13. The purpose for which said air easements are condemned is for an airport, a public use authorized by law, and a taking of said property is necessary for such use.

14. The amount to be deposited into Court for the benefit of the plaintiffs as described herein and through the procedures as set forth herein includes all of plaintiffs' attorney fees, litigation costs and interest granted for the plaintiffs and totally satisfies plaintiffs' claim as to property damage or the taking of an interest therein.

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15. The date of the taking of the air easements awarded herein shall be deemed to have been on December 8, 1969.

16. The legal descriptions contained in Exhibits "A" through "E" attached hereto are presumed to be correct. If after entry and recordation of this Judgment and Final Order, discrepancies in any legal description are found, this Order may be modified by an order nunc pro tunc to correct the error or errors.

Dated: 1-7-80

WILLIAM P. HOGOBOOM

Judge of the Superior Court

EXHIBIT F

STATEMENT OF PROCEDURES FOR DETERMINING

CNEL AND ANY SURCHARGES THEREON

This exhibit sets forth the maximum community noise equivalent level (CNEL) at the site of each of the several parcels of real property of the plaintiffs (hereafter referred to as school sites) that is granted by the air easements. This exhibit also describes the basis upon which the maximum CNEL values have been developed, the airport operational data from which the CNEL values were computed, and the procedures that are to be used to determine when a burdening of the easement may exist.

A. Maximum CNEL Values at School Sites

The maximum CNEL values at each school site granted by the easements are given in Table I. These limits apply, until modified, for operations at Los Angeles International Airport requiring non-balanced North-South runway usage. If the City of Los Angeles adopts a balanced North-South runway usage at the Los Angeles International Airport, as set forth in Paragraph 4 of the Judgment and Final Order in Condemnation, the alternate maximum CNEL values for each school site given in Table II shall apply.

The maximum CNEL levels of Tables I and II are modifications of the levels contained in Exhibit "F" of the original Judgment and Final Order in Condemnation. These modifications followed a

reevaluation of such CNEL values mutually undertaken by the parties hereto.

Section C of this Exhibit describes measurements and calculations that were used by the parties in determining the modified maximum CNEL values for each school site. Tables I and II herein reflect the modified CNEL values for each school site mutually agreed upon by the parties listing the appropriate CNEL values for each site.

B. Procedures Used to Determine Maximum CNEL Limits at Each School Site

The community noise equivalent level (CNEL) values established for each of the school sites are based upon the annual CNEL values calculated for the noise generated by aircraft operations at the Los Angeles International Airport for the calendar year 1970, plus an increase of 2 dB. This increase of 2 dB in CNEL values represents an allowance for the increase in aircraft operations at the Los Angeles International Airport necessary to accommodate 40,000,000 passengers annually.

The CNEL values for the calendar year 1970 at each school site for non-balanced North-South runway usage are based upon the set

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of CNEL contours shown (in reduced size) as Figure 1 of this exhibit. The CNEL contours shown in Figure 1 are based upon the following:

(a) The number of takeoffs per day listed in Figure 2.

(b) The number of landings per day listed in Figure 3.

(c) The flight paths and flight path utilizations shown in Figure 4.

The CNEL values for the calendar year 1970 at each school site for balanced North-South runway operations are based upon the set of CNEL contours shown (in reduced size) as Figure 5 of this exhibit. The CNEL contours shown in Figure 5 are based upon:

(a) The number of takeoffs per day listed in Figure 6.

(b) The number of landings per day listed in Figure 7.

(c) The flight paths and flight path utilizations shown in Figure 8.

C. Measurement of Annual CNEL Values and Procedures for Modification of CNEL Values at Each School Site

Because of the considerable costs and technical complexities incurred in measuring the annual CNEL at each of the school sites in accordance with the provisions of the Noise Regulations for California Airports* (hereafter referred to as noise regulations), CNEL data and other information concerning aircraft operations acquired by the noise monitoring system that is

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*California Administrative Code, Title 4, Subchapter 6, Noise Standards.

maintained and operated by the City of Los Angeles in accordance with the noise regulations shall be used to obtain the annual CNEL values at each of the school sites for the purposes of determining compliance with the easements. Because measured annual CNEL values are not available for any of the school sites or the monitoring system stations for the calendar year 1970, a number of calculations were necessary to establish the CNEL limits at each school site shown in Tables I and II. The steps followed to determine the modified CNEL limits are outlined as follows:

(1) Determine the annual CNEL value for 1970 operations at each of the school sites and at each monitoring station utilizing the appropriate CNEL contours of Figure 1 or Figure 5. Monitoring station locations are shown in Figure 9.

(2) Add an adjustment of +2 dB to the CNEL values for each school site and for each monitoring station obtained in Step 1 above. This results in an adjusted maximum calculated CNEL value for each school site and monitoring station.

(3) For each school site, determine the difference between the CNEL value at that school site and the CNEL value at the nearest monitoring position using the CNEL values determined in Step 2. This difference represents the calculated difference

between school and monitoring station CNEL values for the operations in 1970 as adjusted. Tables I and II identify the monitoring station nearest each school site.

(4) The City of Los Angeles shall furnish to the plaintiffs or their designate(s) the average CNEL values for each monitoring station as measured during a "calibration period." Until further notice, the City of Los Angeles shall furnish said data to the respective School Districts, the Office of the County Counsel of Los Angeles and Paul S. Veneklasen & Associates. The City of Los Angeles shall also furnish information on the average number of operations per runway and the types of aircraft operating at the airport during this calibration period. The calibration period shall consist of the first two complete calendar quarters (6 calendar months) following final acceptance of the monitoring system by the City of Los Angeles and for which CNEL information is submitted to the California Division of Aeronautics by the City of Los Angeles in compliance with the noise regulations.

(5) Calculate CNEL contours for aircraft operations for the calibration period based upon the noise and operational information furnished in Step 4 above. The contours are to be calculated utilizing the same calculation procedures and noise data as employed in the development of the CNEL contours of Figures 1 and 5. The noise data and a description of the calculations procedures shall be furnished to the plaintiffs upon request.

(6) For each monitoring station, determine the difference between the CNEL values measured during the calibration period and the CNEL values calculated under Step 5.

(7) For each monitoring station, add the differences determined in Step 6 to the calculated value obtained for 1970 operations adjusted, determined in Step 2. The resulting values establish the annual maximum CNEL limits at each monitoring station, as interpreted in terms of the noise actually measured by the airport monitoring system.

(8) For each school site, add the difference between calculated CNEL levels at school sites and monitoring station locations, determined in Step 3, to the CNEL limits at each monitoring station established in Step 7. The resulting numbers are the maximum CNEL limits at each school site, interpreted in terms of the noise actually measured by the airport monitoring system.

The maximum CNEL limits at each school site together with the maximum CNEL limits established at each monitoring station shall be listed in two tables which shall constitute revisions of the Tables I and II contained in this exhibit.

D. Evidence of a Burdening of Easement

Each calendar quarter, the City of Los Angeles shall furnish to the plaintiffs or their designate(s) six-month average CNEL values for each monitoring station. Until further

notice, the City of Los Angeles shall furnish said data to the respective School Districts, the Office of the County Counsel of Los Angeles and Paul S. Veneklasen & Associates. The six-month average CNEL values shall be the average of the monthly CNEL values for the preceding six-month period, calculated in accordance with the following:

$$\text{Six-month CNEL} = 10 \log \left[\frac{1}{6} \sum_{1}^{6} \text{antilog} \left(\frac{\text{CNEL (i)}}{10} \right) \right]$$

where CNEL(i) = monthly CNEL value for each of the six preceding months

An apparent burdening of the easements shall be evidenced when a six-month CNEL value, as determined above, exeeds the maximum CNEL value at a monitoring station, established under Step (7), by more than 0.5 dB. The apparent burdening of the easements shall apply only to the school sites nearest the particular monitoring station where the maximum CNEL value was exceeded. (Tables I and II identify the monitoring stations nearest each school site.)

Upon evidence of an apparent burdening of easements, the defendant, at its own expense, shall undertake noise measurements at one or more of the school sites in order to determine the degree of burdening at the individual school sites. The measurements shall be made in accordance with the procedures described in Section E of this exhibit. The measurements shall be made at a sufficient number of the school sites so as to reasonably

determine the extent to which maximum CNEL values may be exceeded for all school sites for which an apparent burdening exists.

The plaintiffs or their designates shall be informed prior to undertaking measurements at the individual school sites. The City of Los Angeles and the plaintiffs, or their designates, shall jointly select the school sites at which measurements are to be made, and shall jointly determine the measurement locations at each school site.

E. CNEL Measurements at Individual School Sites

In the event that either of the following occur:

(a) That the City of Los Angeles ceases to maintain an operating noise monitoring system in accordance with the noise regulation, or

(b) that there is an apparent burdening of the easements, as described in Section D above,

CNEL measurements may be made at any of the school sites to determine a burdening of the easement. In order to determine a burdening of the easement, the CNEL measurements shall meet the following:

(a) The noise measurement system and data acquisition procedures shall meet the performance requirements of the noise regulations.

(b) At any school for which a determination is to be made, daily CNEL measurements shall be made during a minimum of two non-consecutive 7-day periods.

The beginning and end of the daily measurements shall extend over a period of at least 30 calendar days.

(c) The daily CNEL measurements used for purposes of determining a burdening of the easement shall be made during periods of normal airport operations.

The average (on an energy basis) of the daily CNEL values obtained in accordance with the above, shall be the value used to determine a burdening of the easement. A burdening shall be evidenced for the particular school site when the average CNEL value, so determined, exceeds the maximum CNEL limits determined in Step 8, Section C above by more than 0.5dB. The burdening of the easement shall apply only to the school site for which measurements were obtained, and the degree of the burdening shall be the difference between the measured average CNEL value and the limits determined in Step 8 of Section C of this exhibit.

FIGURE 1 AND FIGURE 5

Figure 1 and Figure 5 attached to this Exhibit "F" are reduced for purposes of convenience. Full scale originals, from which CNEL material was derived, have been executed by counsel for the parties and by representatives of Bolt, Beranek & Newman and Paul S. Veneklasen & Associates and are on file in their respective business offices.

TABLE I-R

COMMUNITY NOISE EXPOSURE LIMITS -
NORTH-SOUTH NON-BALANCED RUNWAY USAGE

School District	School	Nearest Monitor Station	Maximum CNEL Limits, dB
Los Angeles Unified School District	Airport Jr. H.S.	W-3	82.8
	Century Park	I-2	69.1
	Emerson Manor	W-2	74.1
	Figueroa St.	I-2	60.1
	John C. Fremont H.S.	I-1	63.7
	Samuel Gompers Jr. H.S.	I-2	57.1
	Bret Harte Jr. H.S.	I-2	72.1
	Kentwood	W-2	65.1
	LaSalle Avenue	I-1	69.7
	Alain Leroy Locks H.S.	I-2	60.1
	Loyola Village	W-1	69.8
	Manchester Ave.	I-1	67.7
	Horace Mann Jr. H.S.	I-1	63.7
	McKinley Ave.	I-1	64.7
	98th Street	W-4	75.1
	99th Street	I-2	69.1
	97th Street	I-2	73.1
	96th Street	I-2	70.1
	92nd Street	I-2	70.1
	93rd Street	I-2	72.1
	109th Street	I-2	59.1
	107th Street	I-2	65.1
	95th Street	I-2	75.1
	Manhattan Place	I-2	76.1
	Parmalee Avenue	I-1	62.7

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TABLE I-R (CONTINUED)

COMMUNITY NOISE EXPOSURE LIMITS -
NORTH-SOUTH NON-BALANCED RUNWAY USAGE

School District	School	Nearest Monitor Station	Maximum CNEL Limits, dB
Los Angeles Unified School District (Cont'd)	Paseo Del Rey	W-1	71.8
	Raymond Avenue	I-1	65.7
	75th Street	I-1	61.7
	74th Street	I-1	62.7
	South Park	I-1	65.7
	George Washington H.S.	I-2	66.1
	Westchester H.S.	W-1	69.8
	Woodcrest School	I-2	65.1
	Loren Miller	I-1	62.7
Inglewood Unified School District	Hudnall Elementary	I-1	68.7
	Inglewood H.S.	I-1	69.7
	Wm. E. Kelso	I-1	74.7
	Kelso Children Center	I-1	74.7
	Warren Lane	I-2	72.1
	Monroe Jr. H.S.	I-2	74.1
	Morningside H.S.	I-2	79.1
	Crozier Jr. H.S.	I-1	64.7
	Center Park	I-2	68.1
	Oak Street	I-1	76.7
	Payne Elementary	I-1	71.7
	Woodworth	I-2	78.1
	Orthopedic Unit	I-2	77.1
	Education Center	I-1	73.7

TABLE I-R (CONTINUED)

COMMUNITY NOISE EXPOSURE LIMITS -
NORTH-SOUTH NON-BALANCED RUNWAY USAGE

School District	School	Nearest Monitor Station	Maximum CNEL Limits, dB
El Segundo Unified School District	Administration Office	E-2	69.5
	Center Street	E-2	71.5
	Imperial School	E-2	81.5
	Richmond Street	E-1	75.7
	Junior H.S.	E-2	66.5
	High School	E-2	75.5
	Ada L. Jones Work Training Center	E-1	81.7
	Development Center for Handicapped Minors	E-1	81.7
	Curriculum Materials Laboratory	E-2	67.5
Lennox School District of Los Angeles County	Buford Avenue	L-2	82.2
	Felton Ave. Inter.	L-1	86.8
	Jefferson School	L-1	84.8
	Larch Avenue	L-2	67.2
	Whelan School	I-2	82.1
Centinella Valley High School District of L.A. County	Lennox High School	L-2	75.2

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TABLE I-R *(Continued)*

COMMUNITY NOISE EXPOSURE LIMITS -

NORTH-SOUTH NON-BALANCED RUNWAY USAGE

Monitor Station	Maximum CNEL Limits, dB
A-1	90.2
A-2	91.2
W-1	79.3
W-2	73.1
W-3	83.0
W-4	81.6
E-1	79.9
E-2	74.0
L-1	86.3
L-2	85.7
I-1	74.7
I-2	80.1

TABLE II-R

COMMUNITY NOISE EXPOSURE LIMITS -
BALANCED NORTH-SOUTH RUNWAY USAGE

School District	School	Nearest Monitor Station	Maximum CNEL Limits, dB
Los Angeles Unified School District	Airport Jr. H.S.	W-3	84.8
	Century Park	I-2	67.1
	Emerson Manor	W-2	73.1
	Figueroa St.	I-2	59.1
	John C. Fremont H.S.	I-1	64.7
	Samuel Gompers Jr. H.S.	I-2	56.1
	Bret Harte Jr. H.S.	I-2	71.1
	Kentwood	W-2	67.1
	LaSalle Avenue	I-1	69.7
	Alain Leroy Locks H.S.	I-2	59.1
	Loyola Village	W-1	70.8
	Manchester Ave.	I-1	68.7
	Horace Mann Jr. H.S.	I-1	63.7
	McKinley Ave.	I-1	65.7
	98th Street	W-4	75.1
	99th Street	I-2	68.1
	97th Street	I-2	72.1
	96th Street	I-2	69.1
	92nd Street	I-2	69.1
	93rd Street	I-2	71.1
	109th Street	I-2	59.1
	107th Street	I-2	64.1
	95th Street	I-2	73.1
	Manhattan Place	I-2	74.1
	Parmalee Avenue	I-1	64.7

TABLE II-R (CONTINUED)

COMMUNITY NOISE EXPOSURE LIMITS -
BALANCED NORTH-SOUTH RUNWAY USAGE

School District	School	Nearest Monitor Station	Maximum CNEL Limits, dB
Los Angeles Unified School District (Cont'd)	Paseo Del Rey	W-1	72.8
	Raymond Avenue	I-1	65.7
	75th Street	I-1	62.7
	74th Street	I-1	62.7
	South Park	I-1	66.7
	George Washington H.S.	I-2	64.1
	Westchester H.S.	W-1	70.8
	Woodcrest School	I-2	64.1
	Loren Miller	I-1	63.7
Inglewood Unified School District	Hudnall Elementary	I-1	68.7
	Inglewood H.S.	I-1	71.7
	Wm. E. Kelso	I-1	75.7
	Kelso Children Center	I-1	75.7
	Warren Lane	I-2	71.1
	Monroe Jr. H.S.	I-2	72.1
	Morningside H.S.	I-2	78.1
	Crozier Jr. H.S.	I-1	66.7
	Center Park	I-2	67.1
	Oak Street	I-1	78.7
	Payne Elementary	I-1	72.7
	Woodworth	I-2	77.1
	Orthopedic Unit	I-2	76.1
	Education Center	I-1	73.7

TABLE II-R (CONTINUED)

COMMUNITY NOISE EXPOSURE LIMITS -
BALANCED NORTH-SOUTH RUNWAY USAGE

School District	School	Nearest Monitor Station	Maximum CNEL Limits, dB
El Segundo Unified School District	Administration Office	E-2	68.5
	Center Street	E-2	70.5
	Imperial School	E-2	79.5
	Richmond Street	E-1	74.7
	Junior H.S.	E-2	65.5
	High School	E-2	73.5
	Ada L. Jones Work Training Center	E-1	79.7
	Development Center for Handicapped Minors	E-1	81.7
	Curriculum Materials Laboratory	E-2	66.5
Lennox School District of Los Angeles	Buford Avenue	L-2	80.2
	Felton Ave. Inter	L-1	84.8
	Jefferson School	L-1	82.8
	Larch Avenue	L-2	66.2
	Whelan School	I-2	81.1
Centinella Valley High School Dist. of L.A. County	Lennox High School	L-2	73.2

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TABLE II-R *(Continued)*

COMMUNITY NOISE EXPOSURE LIMITS -

BALANCED NORTH-SOUTH RUNWAY USAGE

Monitor Station	Maximum CNEL Limits, dB
A-1	90.2
A-2	89.3
W-1	80.8
W-2	74.6
W-3	84.8
W-4	83.1
E-1	78.7
E-2	72.7
L-1	85.3
L-2	84.7
I-1	76.5
I-2	79.0

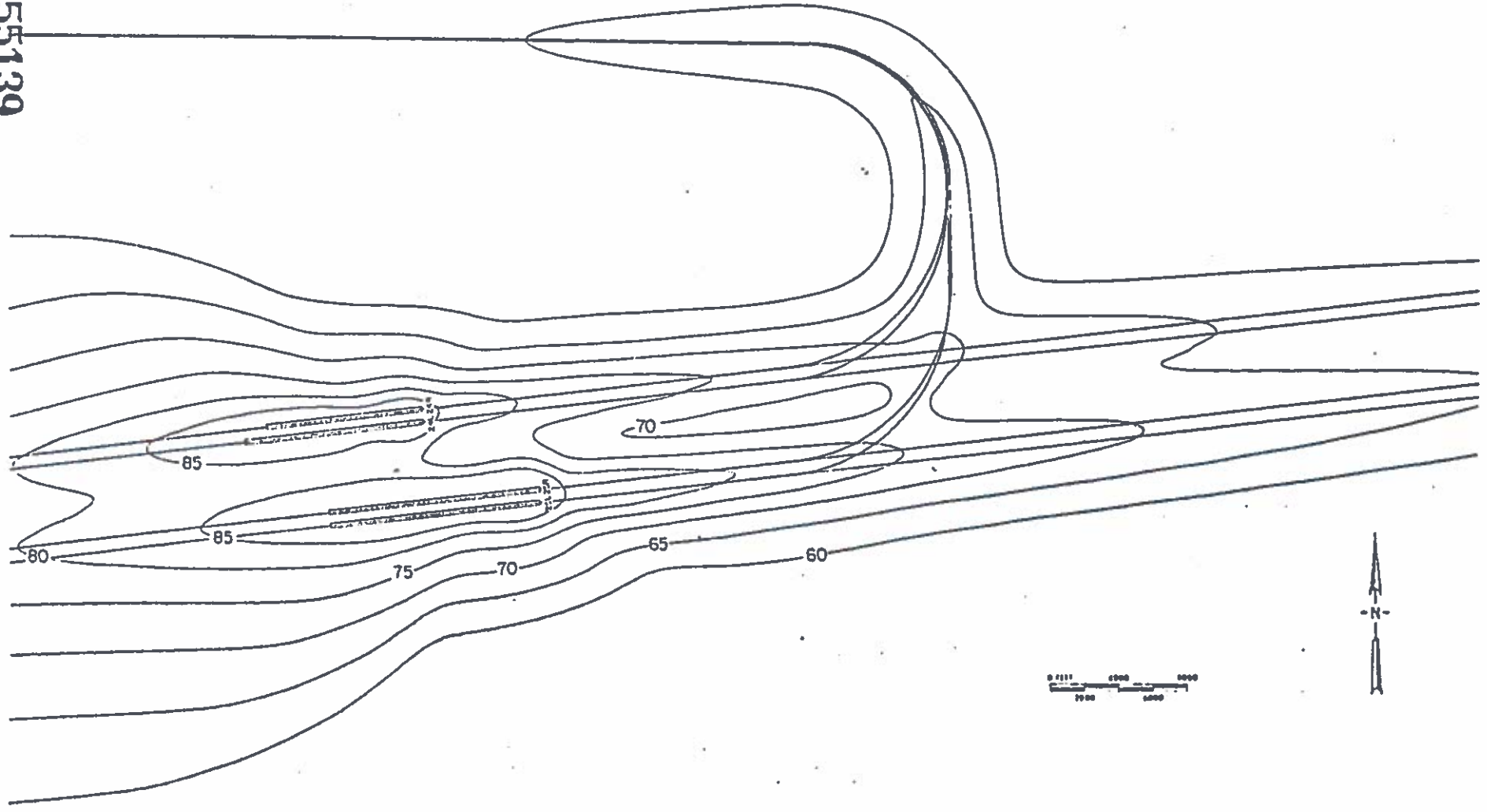

FIGURE 1. CNEL CONTOURS FOR 1970 OPERATIONS AT LOS ANGELES INTERNATIONAL AIRPORT - NON-BALANCED NORTH-SOUTH RUNWAY USAGE

FIGURE 2

COMMERCIAL JET DEPARTURE TRAFFIC BY RUNWAY AND AIRCRAFT TYPE -
- LAX 1970, NON-BALANCED RUNWAY UTILIZATION

Runway	Time	AIRCRAFT MIX FOR CNEL CONTOURS				
		4 Engine Turbojet & Turbofan	3 Engine Turbofan	2 Engine Turbofan	4 Engine Wide Body	Total per Runway
24R	Day	9.2	9.0	2.8	2.4	23.4
	Evening	3.8	2.5	0.7	1.0	8.0
	Night	2.9	1.6	0.4	0.7	5.6
	Total	16.0	13.0	3.9	4.1	37.0
24L	Day	37.1	35.9	11.1	9.9	94.1
	Evening	15.3	9.9	2.8	4.2	32.2
	Night	11.5	6.2	1.7	3.1	22.6
	Total	64.1	52.0	15.6	17.1	148.8
25R	Day	87.3	66.7	20.6	0	174.5
	Evening	36.1	18.4	5.2	0	59.7
	Night	27.1	11.6	3.2	0	41.1
	Total	150.5	96.6	29.0	0	276.1
25L	Day	21.8	16.7	5.2	0	43.6
	Evening	9.1	4.6	1.3	0	14.9
	Night	6.8	2.9	0.8	0	10.5
	Total	37.6	24.2	7.3	0	69.0
TOTAL AIRCRAFT		268.2	185.8	55.8	21.2	531.0

FIGURE 3

COMMERCIAL JET ARRIVAL TRAFFIC BY RUNWAY AND AIRCRAFT TYPE -
- LAX 1970, NON-BALANCED RUNWAY UTILIZATION

Runway	Time	AIRCRAFT MIX FOR CNEL CONTOURS				
		4 Engine Turbojet & Turbofan	3 Engine Turbofan	2 Engine Turbofan	4 Engine Wide Body	Total per Runway
24R	Day	27.9	26.9	8.3	7.4	70.5
	Evening	11.5	7.4	2.1	3.1	24.1
	Night	8.6	4.7	1.3	2.3	16.9
	Total	48.0	39.0	11.7	12.8	111.5
24L	Day	18.6	18.0	5.5	4.9	47.0
	Evening	7.7	4.9	1.4	2.0	16.1
	Night	5.8	3.1	0.9	1.5	11.3
	Total	32.0	26.0	7.8	8.4	74.3
25R	Day	43.6	33.3	10.3	0	87.3
	Evening	18.0	9.2	2.6	0	29.8
	Night	13.5	5.8	1.6	0	20.9
	Total	75.2	48.3	14.5	0	138.1
25L	Day	65.5	50.0	15.4	0	130.9
	Evening	27.1	13.8	3.9	0	44.8
	Night	20.3	8.7	2.4	0	31.4
	Total	112.9	72.5	21.7	0	207.1
TOTAL AIRCRAFT		268.1	185.8	55.8	21.2	531.0

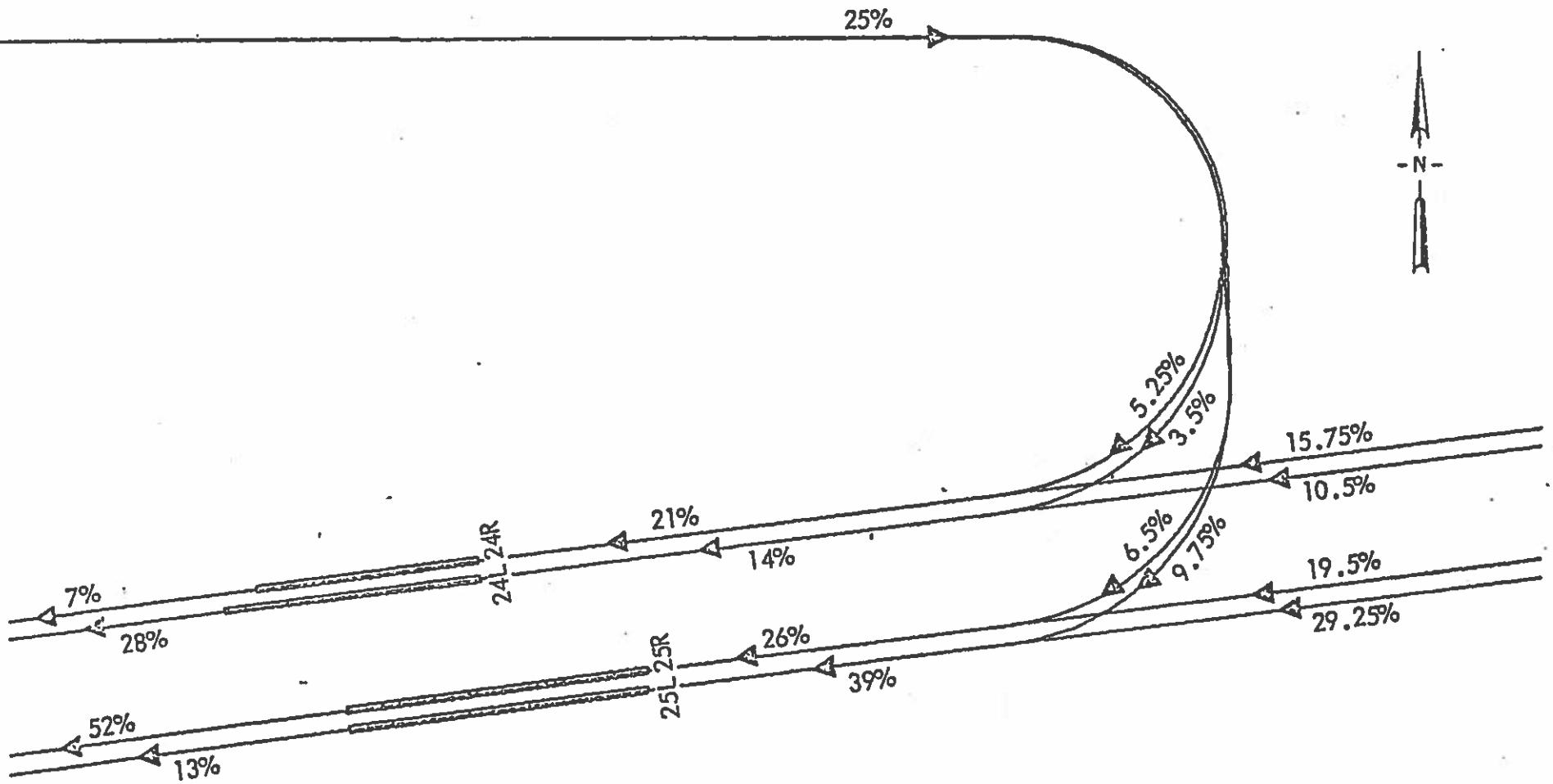

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FIGURE 4. FLIGHT PATH UTILIZATION FOR LAX 1970 OPERATIONS - NON-BALANCED NORTH-SOUTH RUNWAY USAGE

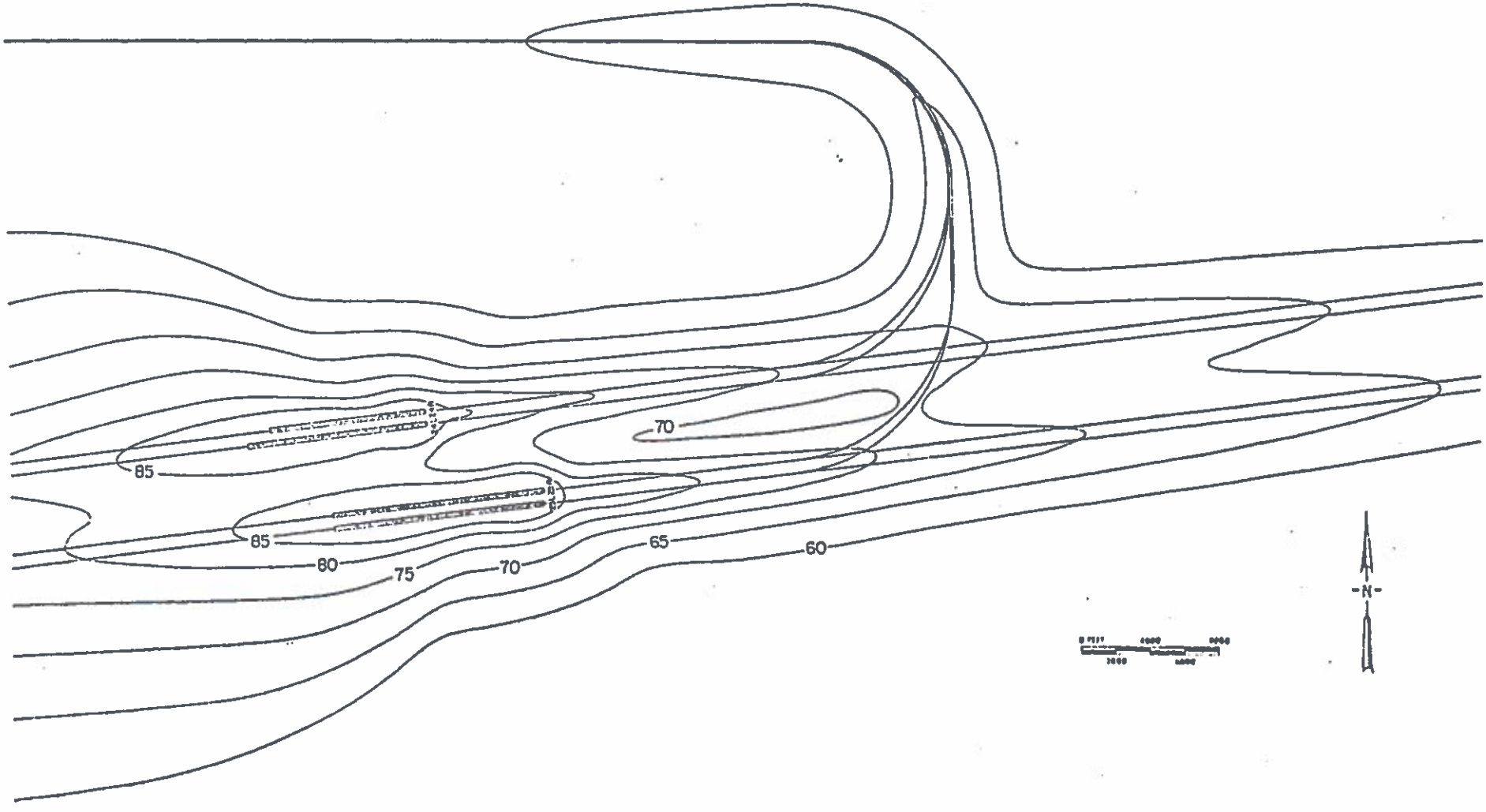

FIGURE 5. CNEL CONTOURS FOR 1970 OPERATIONS AT LOS ANGELES INTERNATIONAL AIRPORT - BALANCED NORTH-SOUTH RUNWAY USAGE

FIGURE 6

COMMERCIAL JET DEPARTURE TRAFFIC BY RUNWAY AND AIRCRAFT TYPE
- LAX 1970, BALANCED NORTH-SOUTH RUNWAY UTILIZATION

Runway	Time	AIRCRAFT MIX FOR CNEL CONTOURS				
		4 Engine Turbojet & Turbofan	3 Engine Turbofan	2 Engine Turbofan	4 Engine Wide Body	Total per Runway
24R	Day	15.6	12.8	4.0	1.1	33.5
	Evening	6.4	3.5	1.0	0.5	11.4
	Night	4.8	2.2	0.6	0.3	8.0
	Total	26.8	18.6	5.6	1.9	52.9
24L	Day	62.2	51.3	15.8	5.0	134.4
	Evening	25.7	14.1	4.0	2.1	46.0
	Night	19.3	8.9	2.5	1.6	32.3
	Total	107.3	74.3	22.3	8.7	212.6
25R	Day	62.2	51.3	15.8	5.0	134.4
	Evening	25.7	14.1	4.0	2.1	46.0
	Night	19.3	8.9	2.5	1.6	32.3
	Total	107.3	74.3	22.3	8.7	212.6
25L	Day	15.6	12.8	4.0	1.1	33.5
	Evening	6.4	3.4	1.0	0.5	11.4
	Night	4.8	2.2	0.6	0.3	8.0
	Total	26.8	18.6	5.6	1.9	52.9
TOTAL AIRCRAFT		268.2	185.8	55.8	21.2	531.0

FIGURE 7

COMMERCIAL JET ARRIVAL TRAFFIC BY RUNWAY AND AIRCRAFT TYPE - LAX 1970, BALANCED NORTH-SOUTH RUNWAY UTILIZATION

Runway	Time	AIRCRAFT MIX FOR CNEL CONTOURS				
		4 Engine Turbojet & Turbofan	3 Engine Turbofan	2 Engine Turbofan	4 Engine Wide Body	Total per Runway
24R	Day	46.7	38.5	11.9	3.7	100.7
	Evening	19.3	10.6	3.0	1.5	34.4
	Night	14.5	6.7	1.8	1.1	24.2
	Total	80.4	55.8	16.7	6.4	159.3
24L	Day	31.1	25.6	7.9	2.5	67.1
	Evening	12.9	7.1	2.0	1.0	23.0
	Night	9.7	4.5	1.2	0.8	16.1
	Total	53.6	37.2	11.2	4.2	106.2
25R	Day	31.1	25.6	7.9	2.4	67.1
	Evening	12.9	7.1	2.0	1.0	23.0
	Night	9.7	4.5	1.2	0.8	16.1
	Total	53.6	37.2	11.2	4.2	106.2
25L	Day	46.7	38.5	11.9	3.7	100.7
	Evening	19.3	10.6	3.0	1.5	34.4
	Night	14.5	6.7	1.8	1.1	24.2
	Total	80.4	55.8	16.7	6.4	159.3
TOTAL AIRCRAFT		268.2	185.8	55.8	21.2	531.0

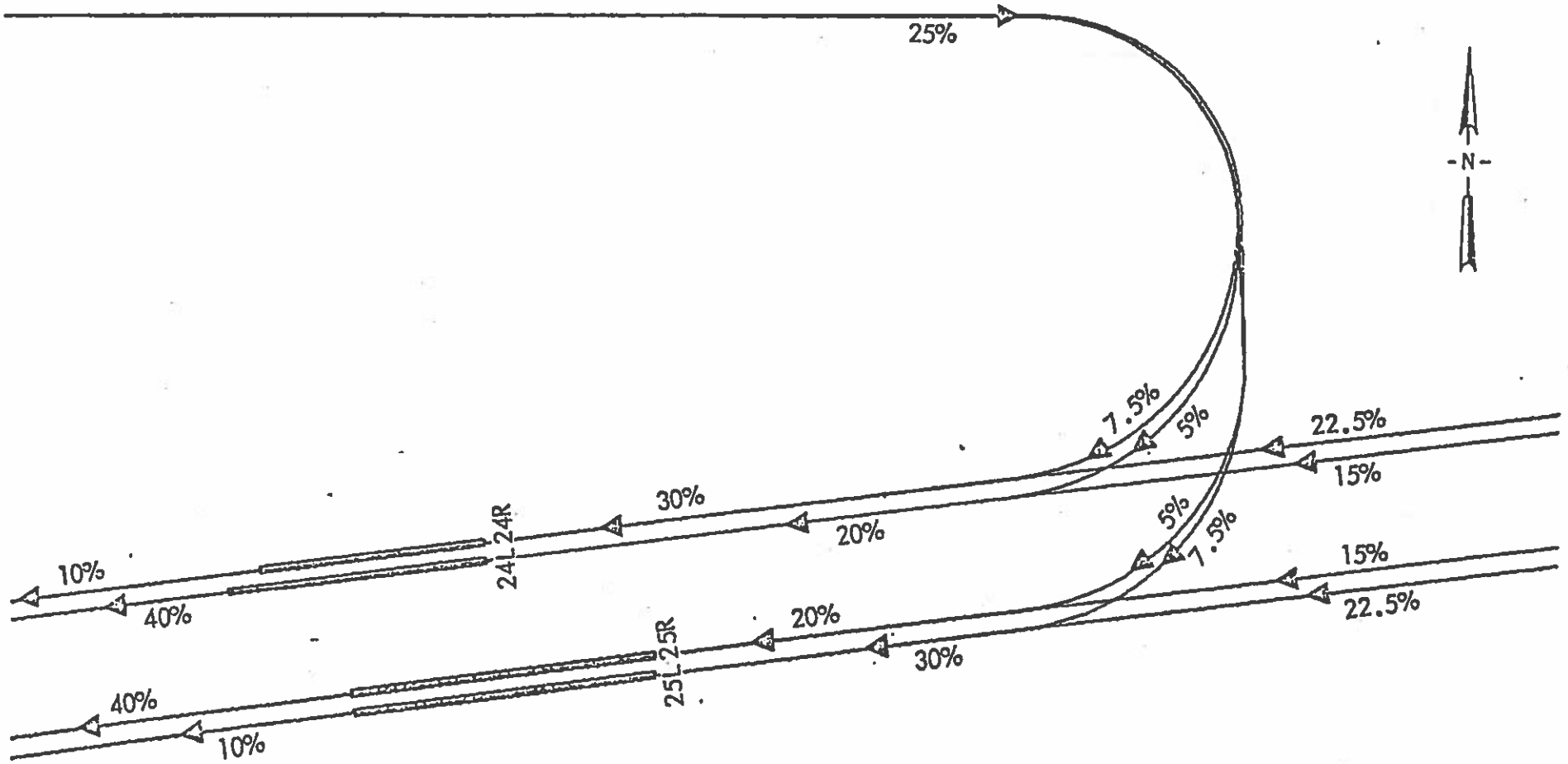

FIGURE 8. FLIGHT PATH UTILIZATION FOR LAX 1970 OPERATIONS - BALANCED NORTH-SOUTH RUNWAY USAGE

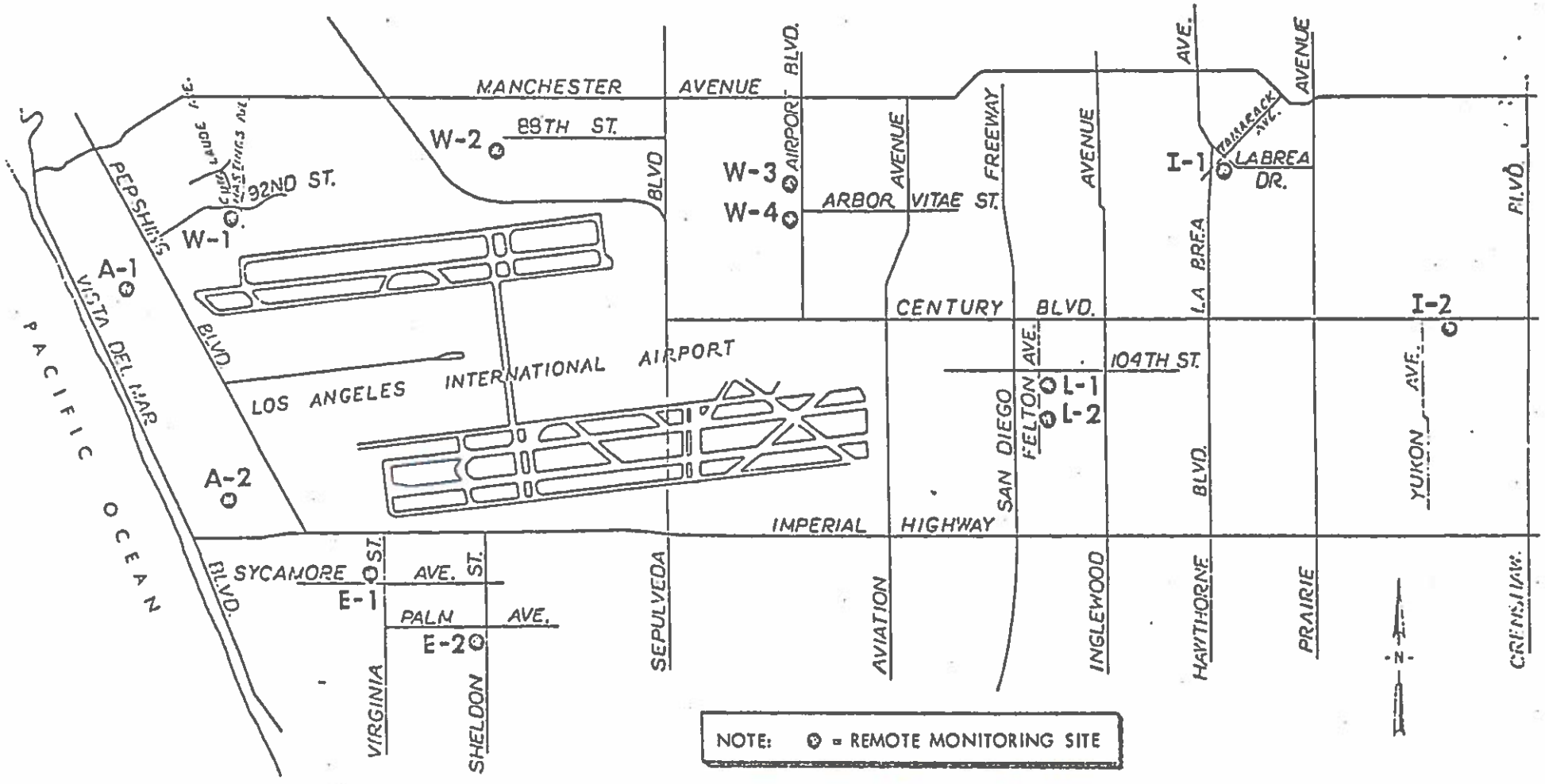

FIGURE 9. LOCATION OF AIRCRAFT NOISE MONITORING STATIONS AROUND LOS ANGELES INTERNATIONAL AIRPORT

APPENDIX C-1

NAVAL FACILITIES ENGINEERING COMMAND EASEMENT DEED
MIRAMAR NAVAL AIR STATION

(1)

Navy Parcel No.
Escrow No.

EASEMENT DEED

THIS INDENTURE, made by and between _____
_____,
hereinafter called the GRANTOR, and the UNITED STATES OF AMERICA, (acting by and through the Department of the Navy) hereinafter called the GOVERNMENT,

W I T N E S S E T H:

For and in consideration of the sum of _____
_____, _____
_____, receipt of which is hereby acknowledged, the GRANTOR does hereby grant unto the GOVERNMENT and its assigns, an easement in perpetuity for the establishment, maintenance, operation and use of a safety area or compatible use zone in connection with the operation of the Naval Air Station, Miramar, San Diego, California in, upon, over and across all that certain property situated in the City of San Diego, County of San Diego, State of California, described as follows:

This grant of easement is and shall be subject to the following conditions:

1. GRANTOR, for itself, its heirs, successors and assigns, convenants, as a convenant running with the land, that it:

a. Will not, except as to pre-existing dwellings, use or permit the use of the Premises for construction of dwellings or for human habitation.

b. Will not, except as to pre-existing uses and improvements, use or permit the use of the premises, or their development and the location or construction of improvements thereon, except as permitted in that document entitled "Land Use Criteria", marked Exhibit "A", attached hereto and made a part hereof.

c. Will clear and keep clear the Premises from any man-made structure or natural growth extending above the height of feet above the existing ground level of said premises at its highest point, including the cutting to ground level or any intermediate level below said height of any trees, shrubs and other natural growths which extend, or which in the future may extend, above such height. Should GRANTOR fail to remove or alter any

such structure or growth to comply with this provision within thirty (30) days' written notice from the GOVERNMENT to do so, the GOVERNMENT shall have the right to remove same to GRANTOR'S cost and expense.

d. Will restrict gross site coverage (i.e., land area used for buildings and required parking facilities) to 25% of the surface area of the Premises.

e. Will not make or permit any use of the Premises, whether or not otherwise prohibited by the conditions hereof, involving the production, concentration or storage of petrochemicals or nuclear material, except the storage of fossil fuels used for energy production, heating or industrial processes.

2. The GOVERNMENT, and its authorized representatives, shall have the right of ingress and egress to, over, and across the Premises at reasonable times and upon reasonable notice, to determine compliance with the easement conditions and for exercise of its rights hereunder.

3. The easement herein granted is subject to all existing easements for public roads and highways, public utilities, railroads and pipelines.

4. GRANTOR reserves to itself, its heirs, successors and assigns all such rights and privileges in the Premises as may be used and enjoyed without interfering with or abridging the rights granted to the GOVERNMENT by this easement, specifically including the right of the GRANTOR to develop and use the Premises in accordance with the LAND USE CRITERIA set forth in "Exhibit A".

IN WITNESS WHEREOF, the GRANTOR has executed this Grant of Easement this _____ day of_____, 19____.

_____

LAND USE CRITERIA

SLUM*	LAND USE(S)	DEVELOPMENT** Conditions 6 and 7	NO NEW DEVELOPMENT
	RESIDENTIAL		
11x	Single Family		X
11x	2-4 Family		X
11x	Multi-Family Dwellings		X
12	Group Quarters		X
13	Residential Hotels		X
14	Mobile Home Parks or Courts		X
15	Transient Lodgings		X
	INDUSTRIAL/MANUFACTURING		
21	Food and Kindred Products		X
22	Textile Mill Products		X
23	Apparel		X
24	Lumber and Wood Products	Permitted	
25	Furniture and Fixtures	Permitted	
26	Paper & Allied Products	Permitted	
27	Printing & Publishing	Permitted	
28	Chemicals and Allied Products		X
283	Drug Manufacturing	Permitted	
29	Petro. Refining & Related		X
31	Rubber & Misc. Plastic Products		X
32	Stone Clay & Glass Products	Permitted	
33	Primary Metal Industries	Permitted	
34	Fabricated Metal Products	Permitted	
35	Prof., Scientific & Control Instr.	Permitted	
39	Product Assembly	Permitted	
39	Motor Freight/Warehousing	Permitted	
	TRANSPORTATION, COMMUNICATION AND UTILITIES		
41	Railroad, Rapid Rail Transit (on grade)	Permitted	
45	Highway and Street Right of way	Permitted	
46	Automobile Parking	Permitted	
47	Communications	Permitted	
48	Utilities (except above ground transmission lines)	Permitted	
48x	Above Ground Transmission Lines		X
	COMMERCIAL/RETAIL TRADE		
51	Wholesale Trade	Permitted	
52	Building Materials, Hardware, Farm Equipment-Retail	Permitted	

LAND USE CRITERIA
(Continued)

SLUM*	LAND USE(S)	DEVELOPMENT** Conditions 6 and 7	NO NEW DEVELOPMENT
53	General Merchandise - Retail		X
54	Food - Retail		X
55	Automotive, Marine, Aviation - Retail Sales	Permitted	
56	Apparel & Accessories - Retail		X
57	Furniture, Homefurnishings - Retail		X
58	Eating and Drinking Places		X
	PERSONAL AND BUSINESS SERVICES		
61	Finance, Insurance, Realestate		X
62	Personal Services		X
63	Business Services		X
633	Duplicating Mailing and Stenographic Services	Permitted	
64	Repair Services	Permitted	
64x	Automobile Service Stations		X
65	Professional Services		X
6514	Medical Laboratory Services	Permitted	
6515	Dental Laboratory Services	Permitted	
66	Contract Construction Services	Permitted	
69	Indoor Recreation Services		X
	PUBLIC AND QUASI-PUBLIC SERVICES		
67	Government Services		X
68	Educational Services		X
711	Cultural Activities		X
651	Medical & Other Health Services		X
624	Cemetaries	Condition 1	
69x	Non-Profit Organ., incl. Churches		X
	OUTDOOR RECREATION		
761	Playgrounds, Neighborhood Parks		X
762x	Community & Regional Parks	Condition 2	
712	Nature Exhibits	Permitted	
722	Spectator Sports, incl. Arenas		X
741x	Golf Courses, Riding Stables	Conditions 3, 4	
743-4	Water-Based Recreational Areas	Condition 3	
75	Resorts and Group Camps		X
721	Entertainment Assembly		X
721x	Amphitheater, Music Shell		X
	RESOURCE PRODUCTION, EXTRACTION AND OPEN LAND		
81	Agriculture, incl. Livestock		

LAND USE CRITERIA
(Continued)

SLUM*	LAND USE(S)	DEVELOPMENT**	NO NEW DEVELOPMENT
		Conditions 6 and 7	
	Grazing	Condition 5	
815-17	Livestock Farms, Animal Breeding		X
82	Agricultural Related Activities	Condition 5	
83	Forestry Activities	Permitted	
84	Fishing Activities	Permitted	
85	Mining Activities	Permitted	
91	Undeveloped and Unused Land Area and Permanent Open Space	Permitted	
93	Water Areas	Permitted	

**Standard Land Use Coding Manual, Urban Renewal Administration, HHFA Bureau of Public Roads, Dept. of Commerce, Washington, DC

**CONDITIONS AFFECTING DEVELOPMENT

Condition 1. Chapels not permitted.

Condition 2. Development is subject to the condition that spectator stands are not built at athletic fields.

Condition 3. Development is subject to the condition that clubhouses are not built as part of this land use operation.

Condition 4. Development is subject to the condition that concentrated rings with classes larger than 25 are not built as part of this land use operation.

Condition 5. Residential structures not permitted.

Condition 6. Freestanding eating and drinking places are not allowed. Employee cafeterias are allowed as an accessory use within the company building.

Condition 7. Corporate headquarter offices are not allowed. However, small offices, directly related to the function of the building and in direct support of the company are allowed.

APPENDIX C-3

OAKLAND INTERNATIONAL AIRPORT
AVIGATION EASEMENT

(3)

RECEIVED

MAY 17 1977

Community Division of Aeronautics

RECORDED AT THE REQUEST OF:
AFTER RECORDING MAIL TO:

NOISE EASEMENT AND RELEASE

HARBOR BAY ISLE ASSOCIATES, a partnership composed of Bay Farm Island, Inc., a corporation, and Doric Development, Inc., a corporation ("Grantor"), in consideration of the execution of a Settlement Agreement effective _____ by, among others, Grantor, City of Alameda and City of Oakland, a municipal corporation acting by and through its Board of Port Commissioners (referred to herein as "Grantee"), and other valuable consideration, hereby grants to Grantee a perpetual easement on the following terms:

1. Description. The easement shall be an easement on, over and upon that certain real property situated on Bay Farm Island within the City of Alameda, County of Alameda, State of California and the air space above said real property which property is described in Exhibit 1 attached hereto and by this reference incorporated herein. The air space being formed by a plane parallel to and at a datum point of sea level or the surface of the real property, whichever is lower, having the same boundaries as those described in Exhibit 1 attached hereto and extending the boundaries of the plane perpendicular to the plane upwards to the limits of the atmosphere of the earth.

2. Benefit. The easement shall be appurtenant to and for the benefit of all of the real property comprising the Metropolitan Oakland International Airport ("Airport"), a legal description of which is attached hereto designated Exhibit 2 and by this reference incorporated herein, and such other additional property or interest therein as shall be subsequently acquired or designated from time to time by Grantee or its successors as constituting a part of the Airport, and the easement shall be in gross for the benefit of Grantee and all other persons and entities who directly or indirectly use the easement as a result of any type of use of the property and facilities constituting the Airport, including aviation ground and flight operations.

3. Use and Purpose. The easement shall be used for the existence on, over, upon and within the described easement, of all noise, vibration, air currents, natural or artificial illumination and such matter, emissions, activities or other things that may occur or result directly or indirectly from the operations of the Airport, now and in the future, including but in no way limited to ground and flight operations of aircraft at, over, on or about the Airport. The easement shall not be used for the passage and flight of aircraft, however, this easement shall not affect such rights for the passage

Exhibit

and flight of aircraft as such rights existed prior to the date of the easement and as are now or may be provided or permitted by law.

All of such uses shall be without any liability of Grantee or of any other person or entity entitled to the benefits of this easement, to Grantor, Grantor's heirs, assigns or successors in interest to all or any part of the property or any interest therein or to any other person or entity using or located on or in the area subject to the easement, for damage to property or physical or emotional injury to persons, animals or any other living thing, the diminution in value of any personal or real property, discomfort or inconvenience of any type or kind to any person or thing, or interference with television, radio or other types or kinds of electrical reception, transmissions or activities in the easement; and Grantor, for itself and on behalf of the Grantor's heirs, assigns or successors in interest to all or any part of the property, or any interest therein and each person or entity using or located on or in the area subject to this easement, hereby releases and discharges Grantee and all persons and entities entitled to the benefits of the easement from all claims, demands, actions and causes of action of all types or kinds, known or unknown, existing or which might be created hereafter by statute or case decision, arising out of any of the foregoing described injuries or damages resulting from the use of this easement by Grantee and any other person or entity entitled to the benefits of this easement.

4. This easement and release and the uses authorized herein shall run with the property described in Exhibit 1.

DATED: _____, 197_.

HARBOR BAY ISLE ASSOCIATES, a partnership

BY: BAY FARM ISLAND, INC., a corporation

By: _____

By: _____

BY: DORIC DEVELOPMENT, INC., a corporation

By: _____

By: _____

Constituting all of the Partners of
HARBOR BAY ISLE ASSOCIATES

APPENDIX C-4

CITY AND COUNTY OF DENVER, COLORADO
AVIGATION EASEMENT

(5)

DEED OF EASEMENT

1975 JUL -3

KNOW ALL MEN BY THESE PRESENTS:

That ROGER A. WOLFORD of the of the County of Adams, State of Colorado, for his heirs, executors, administrators, successors and assigns (hereinafter referred to as "Grantor"), for and in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, the receipt and sufficiency of which are hereby confessed and acknowledged, hereby grant, bargain, sell and convey unto the CITY AND COUNTY OF DENVER, a municipal corporation of the State of Colorado, its successors and assigns forever, a perpetual public use easement or right-of-way for the free and unobstructed passage and flight of aircraft, of whatever ownership and whether now known or hereafter used for navigation of or flight in the air, in, through, over and across the air space above the following described parcel of real property, lying, being, and situate in the County of Adams, and State of Colorado, to-wit:

Lots 19 and 20, Block 64, Aurora,
except the rear 8 feet of said lots.

The rights herein granted shall include the right in such air-space to allow, make and emit such noise as may be inherent to the operation of aircraft now known or hereafter used for navigation of or flight in the air; reserving, however, to the grantor, during the term of said easement, such use, rights, and privileges in said land or real property as may be exercised and enjoyed without interference with or abridgement of the rights hereby granted.

The grantor, and for and on behalf of the grantor's heirs, executors, administrators, successors and assigns, covenants, bargain and agrees that the grantor is the owner in fee simple of the above described premises and that at the time of ensealing and delivery of these presents has full ownership right and power to grant, bargain, sell and convey the easement as aforesaid free and clear from all other grants, bargains, sales, liens, taxes, assessments and

encumbrances of whatever kind or nature, and the grantor covenants and agrees with the grantee, its successors and assigns, to warrant and forever defend against all and every person or persons claiming any right or title adverse to the easement herein granted.

IN WITNESS WHEREOF, the grantor has caused this instrument to be executed and sealed this 21 day of January, 1968.

Roger A. Wolford (SEAL)

(SEAL)

STATE OF COLORADO)
) ss.
COUNTY OF Denver)

The foregoing instrument was acknowledged before me this 21 day of January, 1968, by Roger A. Wolford.

Witness my hand and official seal.

My Commission Expires: 10-6-69

NOTARY PUBLIC

NOTARY PUBLIC STATE OF COLORADO

CLYDE L. MILLER
ADAMS COUNTY
COLORADO

FEB 11 8 16 PM '69

855784

SUBORDINATION AGREEMENT

KNOW ALL MEN BY THESE PRESENTS, That, Whereas ROGER A. WOLFORD of the County of Adams, State of Colorado, did execute and deliver to the Public Trustee in the said County of Adams, a Deed of Trust covering the following described tract or parcel of land situate in the County of Adams, Colorado, to-wit:

Lots 19 and 20, Block 64, Aurora, except the rear 8 feet of said Lots, Adams County, Colorado

Said Deed of Trust being recorded on the 15th day of January A. D. 1963, in Book 1040 at page 504 of the records of the County Clerk and Recorder in the said County of Adams, to secure payment of a certain indebtedness, as is more fully set out in said Deed of Trust, reference to which is here made, and

WHEREAS, the present owner of the said land and premises has executed and delivered to the City and County of Denver, a municipal corporation duly organized and existing under and by virtue of the Constitution of the State of Colorado, a Deed of Easement for the passage and flight of aircraft in, through, over, and across the above described real property, and further desires that said Easement shall be superior to the said Deed of Trust lien,

NOW, THEREFORE, the undersigned, the present legal holder of the said indebtedness and lien, for and in consideration of One Dollar ($1.00) in hand paid, receipt of which is hereby acknowledged, does hereby agree that the said lien shall be, and is hereby made, subordinate, subject and inferior to the aforesaid Deed of Easement, and in the event of foreclosure of said lien, and the sale of said land pursuant to such foreclosure, or in the event of sale of said land by the Public Trustee under the powers of sale in the said Deed of Trust, it is agreed that the easement created by the said Deed of Easement shall in no wise be affected or diminished thereby and shall remain superior to said lien.

Dated this 22nd day of January A. D. 19 69.

ALBANY SAVINGS BANK

By _____
Vice President

ATTEST:

_____
Assistant Secretary

STATE OF New York)
) ss.
COUNTY OF Albany)

The foregoing instrument was acknowledged before me this 22nd day of January A. D. 19 69, by Gilbert O. Robert as Vice President and by Robert S. Monshower as Assistant Secretary of Albany Savings Bank, a corporation.

Witness my hand and official seal.

My Commission Expires: _____

_____
Notary Public

855784
CLYDE L. MILLER
ADAMS COUNTY
COLORADO
'69 MAR 16 AM 8 11

APPENDIX C-5

CITY OF ONTARIO AVIGATION AND NOISE EASEMENT

File No. _____
Recording Requested By:
DeLoris E. Arterburn, City Clerk
CITY OF ONTARIO

When Recorded Mail To:
CITY OF ONTARIO - BUILDING DEPARTMENT
303 East "B" Street
Ontario, California 91764

(6)

AVIGATION AND NOISE EASEMENT

_____ (Grantors) for valuable consideration, receipt of which is hereby acknowledged, do hereby grant and convey to THE CITY OF ONTARIO and THE CITY OF LOS ANGELES the following easements: A right of flight for the passage of aircraft in the air space above the surface of the hereinafter described premises, together with the right to cause in said air space such noise as may be inherent in the operation of aircraft, now known or hereafter used for navigation of, or flight in the air, using said air space for landing at, or taking off from, or operating at, or on, Ontario International Airport.

The real property in the City of Ontario, County of San Bernardino, State of California, across which the aforesaid easement is granted, is described as follows:

DATED: _____, 19_____.

_____
(Grantors)

_____
(Grantors)

ACKNOWLEDGEMENT OF GRANTOR

STATE OF CALIFORNIA)
) SS:
COUNTY OF _____)

On _____, 19____, before me, the undersigned, _____, a Notary Public in and for said County and State, personally appeared _____, _____, known to me to be the person____ whose name ____ _____ subscribed to the within instrument, and acknowledged to me that _____ executed the same.

WITNESS my hand and official seal.

_____
Notary Public in and for said
County and State

_____
(Name Typed)

My commission expires:_____

****

THIS IS TO CERTIFY that the interest in real property conveyed by the within instrument to the CITY OF ONTARIO, CALIFORNIA, a municipal corporation, is hereby accepted by order of the City Council, and the Grantee consents to the recordation thereof by its duly authorized officer.

DATED: _____, 19____.

CITY OF ONTARIO, CALIFORNIA,
a municipal corporation

BY:_____
(Name)
(Title)

ATTEST:

_____
(Name)
(Title)

THIS IS TO CERTIFY that the interest in real property conveyed by the within instrument to the CITY OF LOS ANGELES, CALIFORNIA, a municipal corporation, is hereby accepted by order of the City Council, and the Grantee consents to the recordation thereof by its duly authorized officer.

DATED: _____, 19____.

CITY OF LOS ANGELES, CALIFORNIA,
a municipal corporation

BY: _____
(Name)
(Title)

ATTEST:

_____
(Name)
(Title)

ORDINANCE NO. 2197

AN ORDINANCE OF THE CITY OF ONTARIO, CALIFORNIA, REPEALING SECTION 9-3.2425 OF CHAPTER 3, TITLE 9, OF THE ONTARIO MUNICIPAL CODE, AND ENACTING NEW SECTION 9-3.2425 OF CHAPTER 3, TITLE 9, OF THE ONTARIO MUNICIPAL CODE REGARDING AVIGATION EASEMENTS.

The City Council of the City of Ontario, California, does hereby ordain as follows:

SECTION 1: Section 9-3.2425 of Chapter 3, Title 9, of the Ontario Municipal Code is hereby repealed.

SECTION 2: New Section 9-3.2425 of Chapter 3, Title 9, of the Ontario Municipal Code is hereby enacted to read as follows:

"Sec. 9-3.2425. Avigation easements required (SA).

"For all development proposed to be located in the 'Area of Concern for Future Development', as established by resolution of the Council, either adopted prior or subsequent to the adoption of this section, and corresponding to the sixty-five (65) CNEL area, the owner shall grant an unlimited avigation and noise easement to the City and to such other municipality or other governmental agency which may own and/or operate an airport within the City, in form and content satisfactory to the City.".

SECTION 3: The Mayor shall sign this Ordinance and the City Clerk shall attest to the same, and the City Clerk shall cause the same to be published within fifteen (15) days after its passage, at lease once in *The Daily Report*, a newspaper of general circulation, published and circulated in the City of Ontario, California.

APPROVED and ADOPTED this 20th day of October, 1982, by the following vote:

AYES: Abel, Briggs, Dastrup, Medlin; Mayor Ellingwood

NOES: None

ABSENT: None

/s/ R. E. ELLINGWOOD
Mayor

ATTEST:

/s/ DE LORIS E. ARTERBURN
City Clerk

no materials or equipment shall be stored to a height greater than eight (8') feet. Where the storage area is visible from a public street or from adjoining residential properties, the storage area shall be screened from view by the use of a sign-obscuring wall or fence, a compact evergreen hedge, or other suitable plant materials at least eight (8') feet in height.

(c) *Landscaping.* Subject to the availability of the required amount of space free and clear of buildings, and provided that fulfilling the requirement does not reduce off-street parking or off-street loading spaces to fewer than are prescribed in Article 25 of this chapter, landscaping shall be provided and permanently maintained in the following areas:

(1) Not less than ten (10') feet adjoining the front property line, except for necessary walks and access drives, not less than ten (10') feet adjoining the rear property line of a through lot, and not less than ten (10') feet adjoining the side property line on the street side of a corner lot, provided that where a space of less than ten (10') feet is available in any of these areas, the full depth of the available space shall be landscaped and permanently maintained.

(2) Where the side or rear property line of a site adjoins a residential use, a solid fence or wall not less than six (6') feet in height shall be provided at the side or rear property line, and an area of not less than five (5') feet adjoining the fence or wall shall be landscaped and permanently maintained.

(3) Off-street parking lots shall be landscaped as prescribed in Article 25 of this chapter.

(§ 2, Ord. 2038, eff. April 19, 1979)

Sec. 9-3.2420. Time for compliance (SA).

The requirements of subsections (a) and (b) of Section 9-3.2415 of this article shall be met within ninety (90) days following the classification of the site in the SA Special Area Combined District, and the requirements of subsection (c) of said Section 9-3.2415 shall be met within one year following the classification of the site in said District.

(§ 2, Ord. 2038, eff. April 19, 1979)

Sec. 9-3.2425. Avigation easements required (SA).

For all development proposed to be located in the "Area of Concern for Future Development", as established by resolution of the Council, either adopted prior or subsequent to the adoption of this section, and corresponding to the sixty-five (65) CNEL area, the owner shall grant an unlimited avigation and noise easement to the City and to such other municipality or other governmental agency which may own and/or operate

an airport within the City, in form and content satisfactory to the City.

(§ 2, Ord. 2038, eff. April 19, 1979 as amended by § 1, Ord. 2197)

Article 24A. SP Specific Plan District

Sec. 9-3.2450. Purposes (SP).

The SP Specific Plan District is established in order to enable land to be planned and developed as coordinated, comprehensive projects that will provide for the systematic implementation of the general plan. Regulations for specific plans contained in this article and in resolutions adopted pursuant hereto are intended to provide for the classification and development of land as a specific plan land use designation.

(§ 2 (part), Ord. 2124, eff. March 17, 1981)

Sec. 9-3.2455. Adoption of specific plans.

Procedures for adoption of a specific plan shall be as provided in Sections 65450, et seq., of the Government Code of the State of California. The City Council may, by resolution, provide guidelines for the format and content of specific plans.

(§ 2 (part), Ord. 2124, eff. March 17, 1981)

Sec. 9-3.2460. Administration of specific plans.

The development standards and regulations contained in a specific plan shall replace and supplement the development standards contained elsewhere in this chapter, except where specifically provided in the specific plan. Any matters not specifically addressed in the specific plan will be governed by other applicable regulations and standards of the City.

(§ 2 (part), Ord. 2124, eff. March 17, 1981)

Sec. 9-3.2465. Reimbursement and payment of fees.

Reimbursement of the costs of preparation of specific plans may be required in accordance with Section 65453 of the Government Code of the State of California.

(§ 2 (part), Ord. 2124, eff. March 17, 1981)

Article 25. Off-Street Parking and Loading

Sec. 9-3.2500. Purposes.

In addition to the objectives prescribed in Section 9-3.105 of Article 1 of this chapter, requirements and standards for off-street parking facilities and off-street loading facilities are established by this article in order to achieve the following purposes:

APPENDIX C-6

MODEL AVIGATION AND NOISE EASEMENT

APPENDIX N

MODEL AVIGATION AND NOISE EASEMENT

WHEREAS, [property owner][1], hereinafter called Grantor, is the owner in fee of that certain parcel of land situated in the [City, County, State] more particularly described and identified in Exhibit A (legal description of property) attached hereto and made a part hereof, hereinafter called "PARCEL" and

WHEREAS, [ ] hereinafter called Grantee, is the [owner and/or operator] of certain properties upon which [airport], described in Exhibit B attached hereto, is located, said properties lying within [City, County, State] and furthermore being in close proximity to said PARCEL; and

WHEREAS, Grantor and Grantee wish to establish provisions so that aircraft using the [airport] shall have the right of flight and the right to cause noise, light, and other effects associated with the operation of aircraft in the airspace over and above said PARCEL.

NOW, THEREFORE, Grantor, for its heirs, executors, administrators, successors and assigns, for and in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, receipt and sufficiency of which are hereby acknowledged, hereby grants and conveys to Grantee, its successors and assigns forever:

1. A perpetual public-use avigation/noise easement subject to termination as expressly provided herein, and right-of-way for the free and unobstructed passage and flight of aircraft, of any and all kinds now known or hereafter invented, used or designed for navigation or flight in the air, of the class, size and category operationally compatible with [airport]. Said easement shall be in, through, over and across the airspace of said PARCEL in an airspace as described and depicted in Exhibit C (map of areas protected by easement including description of imaginary surfaces and elevations).

2. The rights herein granted shall include the right in such airspace to allow, make and emit such noise, light, vibrations, fumes, exhaust, smoke, air currents, dust, fuel particles, radio, television, and other electromagnetic interferences, and all other effects as may be inherent to the operation of aircraft for navigation or flight in the air.

[1] Insert appropriate names, titles, etc. in brackets used throughout the model.

3. Grantor hereby fully waives, remises and releases any right or cause of action that it may now have or that it may have in the future against Grantee, its successors, and assigns, and covenants not to sue due to such noise, light, vibrations, fumes, exhaust, smoke, air currents, dust, fuel particles, radio, television, and other electromagnetic interferences, and all other effects that may be caused or may have been caused by the operation of aircraft landing at, or taking off from, or operating at or on [airport]. Said release and covenant shall include, but not be limited to claims, known or unknown, for damages for physical or emotional injuries, discomfort, inconvenience, property damage, death, interference with use and enjoyment of property, diminution of property values, nuisance, or inverse condemnation or for injunctive or other extraordinary or equitable relief.

4. It is further agreed that Grantee as [owner and/or operator] of [airport] shall have no duty to avoid or mitigate such damages by, without limitation, setting aside or condemning buffer lands, rerouting air traffic, erecting sound or other barriers, establishing curfews, noise or other regulations, except to the extent, if any, that such actions are validly required by governmental authority. Grantor reserves such use, rights and privileges in said PARCEL as may be exercised and enjoyed without interference with or abridgment of the rights hereby granted.

5. (a) This grant of easement allows the level of aircraft noise impinging on Grantor's PARCEL to be the <u>lesser</u> of:

(1) The annual CNEL reflected on the latest map validated by the [County of] and filed with the California Department of Transportation, Division of Aeronautics in accordance with §5050 of Title 21 of the California Administrative Code, or
(2) The annual CNEL reflected on any subsequent map validated by the [County of] and filed with the California Department of Transportation, Division of Aeronautics in accordance with §5050 of Title 21 of the California Administrative Code.

(b) There is hereby created an irrebutable presumption that this grant of easement is overburdened by unreasonable use if the noise which impinges on the burdened property exceeds the easement by an amount equal to or greater than 1.5 dB CNEL, and Grantor may seek injunctive relief from the unreasonable use of the easement.

(c) There is hereby created an irrebutable presumption that this grant of easement is so overburdened by unreasonable use that its purpose is defeated if the noise which impinges on the burdened property exceeds the easement by an amount equal to or greater than 3.0 dB CNEL, and Grantor may seek a court finding that the easement is extinguished.

(d) The provisions of subdivisions (b) or (c) shall not apply under the following circumstances: [specify exceptions, if desired].

6. This grant of avigation/noise easement shall not operate to deprive the Grantor, his successors or assigns, of any rights that it may from time to time have against any individual or private operator for negligent or unlawful operation of aircraft.

7. For and on behalf of itself, its successors and assigns, Grantor hereby covenants with Grantee for the direct benefit of the real property constituting [airport] that neither Grantor nor its successors in interest or assigns shall hereafter construct or permit the construction or growth of any structure, tree or other object that penetrates an approved transitional, horizontal, or control surface as described and depicted in Exhibit C or that constitutes an obstruction to air navigation under FAA Part 77, or that obstructs or interferes with the use of the flight easements and rights of way herein granted or that creates electrical interference with radio communication between any installation upon said airport and aircraft, or as to make it difficult for pilots to distinguish between airport lights and other lights, or as to impair visibility in the vicinity of the airport, or as otherwise to endanger the landing, take-off or maneuvering of aircraft. Grantee reserves the right to mark and light as obstructions to air navigation any such building, structure, tree or other object now upon, or that in the future may be upon Grantor's property, together with the right of ingress to, egress from, and passage over Grantor's property for the above purpose.

8. All promises, covenants, conditions and reservations contained in this document are made and entered into for the benefit of [owner and/or operator] of [airport]. These promises, covenants, conditions and reservations shall run with the PARCEL, described and identified on Exhibit A attached, and bind Grantor's heirs, administrators, executors, successors and assigns to the maximum extent now or hereafter permitted by statute or case law and are intended by the parties to comply with California Civil Code §1468. The real property first hereinabove described as the PARCEL is the servient tenement and said [airport] is the dominant tenement. Grantor for itself and its successors and assigns waives all rights under Civil Code §1542. "Successors and assigns" as used in this paragraph includes without limitation: invitees, licensees, permittees, tenants, lessees, and others who may use easement rights reserved herein or use or be upon said PARCEL, and/or their respective officers, agents, and employees.

9. Grantor agrees to defend at its own cost, hold harmless and indemnify Grantee from any liability for or based upon the exercise of the easement rights granted herein.

10. The avigation/noise easement, covenants and agreements described herein shall continue in effect until [airport] shall be abandoned and shall cease to be used for public airport purposes.

Dated: _____

Signed: _____

_____

(Signatures of Grantor)

Source: Derived from Reference 47 and other examples of easements in current use.

APPENDIX D

AIRPORT LAND USE COMMISSION LEGISLATION

DEPARTMENT OF TRANSPORTATION
DIVISION OF AERONAUTICS

AB 2920: An Analysis
Amendments and Additions
Affecting Airport Land Use Commission Legislation

The enabling legislation for Airport Land Use Commissions is found in Article 3.5, Sections 21670-21677 of the Public Utilities Code. However, the effects of AB 2920 were not limited to the Public Utilities Code. Indeed, perhaps the most significant change brought about by the legislation was the addition of Section 65302.3 to the Government Code. The 65300 Sections of the Government Code pertain to General Plans, the basic foundations for local planning.

Since this change in the law is found outside the framework of Article 3.5 but represents the main thrust for achieving compatibility between an airport and its surrounding communities, it should be looked at before going on to the changes affecting the ALUC directly. Briefly, Section 65302.3 mandates the following criteria for local planning:

> "The General Plan and any applicable Specific Plan prepared pursuant to Section 65450 shall be consistent with the plan adopted or amended pursuant to Section 21675 of the Public Utilities Code" (emphasis added).
> Section 21675 is the ALUC Plan.

In the existing legislation there is only one date specified by which time an action must occur, and that relates to the creation of the Commission. There are no deadlines for any other actions specified in the act.

Section 65302.3(b), however, does contain dates. The first of these specifies that the General Plan and any applicable Specific Plan shall be amended no later than December 31, 1983 to be consistent with the ALUC Plan as such Plan may provide on July 1, 1983.

In the event a local legislative body does not concur with the ALUC plan or determinations of consistency, it may override the Commission by adopting findings pursuant to revised Section 21676, the so-called override provision which is often cited as a weakness in the law. However, the new legislation makes significant changes in this provision which are discussed later in this paper.

Section 65302.3 is repealed on 1/1/84 (by which time all General Plans and Specific Plans are to be consistent with the ALUC Plan) and then reenacted to require that the General Plan and any applicable Specific Plan shall be amended within 180 days of any amendment to the ALUC Plan.

In essence, by 12/31/83 the General Plan and any applicable Specific Plan will be consistent with the ALUC Plan and from that day forward any amendment to the ALUC Plan will result in an amendment, within 180 days, of the General Plan or Specific Plans. As noted initially, these requirements will now be found in the Government Code. Don't look for them in the ALUC legislation--there is no reference to them in either the existing or amended versions of Article 3.5.

Moving on to Article 3.5 itself, considerable changes were made to strengthen and clarify the role of the ALUCs. Beginning with Section 21670 the Legislature declared, via the new amendments, a "public interest" and a "purpose" for the Commission's task. These two elements are inserted at the very beginning of the article and state that:

"(1) It is in the public interest to provide for the orderly development of each public-use airport and the area surrounding such airports in such a manner, among other things, to promote the overall noise standards adopted pursuant to Section 21669 and prevent the creation of new noise and safety problems."

"(2) It is the purpose of this article to protect public health, safety, and welfare by ensuring the orderly expansion of airports and the adoption of land use measures that minimize the public's exposure to excessive noise and safety hazards within areas around public airports to the extent that such areas are not already devoted to incompatible uses."

These two amendments are quoted verbatim because despite their innocuous sounding generalities, any override must make specific findings that the proposed action is consistent with <u>these</u> purposes. A "silent" override is no longer possible; its rationale must be explicity stated. But more on the override provision in a few moments.

Except for paragraph identifiers, the remainder of Section 21670 is identical to the existing legislation. That is, the requirement to create an ALUC and the makeup of the Commission as determined by what is often called the "PUC formula". This formula calls for a seven-member panel, two representing the cities in the county, two representing the county, two representing airports within the county and one representing the general public (the public representative is appointed the the other six members).

The designation of other bodies to function as the ALUC remains undisturbed. A bit of cleanup removes the reference to the Public Utilities Commission in Section 21671 which pertains to ALUC membership (per the P.U.C. formula) for an airport owned by a jurisdiction not in the same county as the airport (i.e., San Francisco International Airport).

Section 21674, Powers and Duties of the Commission, is totally rewritten in the new legislation. Whereas the current statutes lists five specific "powers and duties", including recommendations for height restrictions on building near airports, uses of land surrounding airports to assure safety of air navigation and "...to achieve by zoning compatible land uses in the vicinity of all new airports and in the vicinity of existing airports to the extent that the land in the vicinity of such airports is not already devoted to incompatible uses...", the amended section proposes a coordinated/cooperative approach with local government. Rather than achieving compatibility through zoning powers, the Commission is directed "...to assist local agencies in ensuring compatible land uses in the vicinity of..." and "...to coordinate planning at the State, regional, and local levels so as to provide for the orderly development of air transportation, while at the same time protecting the public health, safety, and welfare...." The latter task, of course, refers to the purpose of ALUCs as voiced by the Legislature in Sections 21670(a) and 21670(b).

A new "Power and Duty" directs the Commission "to review the plans, regulations, and other actions of local agencies and airport operators pursuant to Section 21676", the statute containing the override

provisions. By linking this power and duty to the override, it appears that the Legislature has indicated any ALUC determination resulting from its review is final unless overturned per the provisions in Section 21676.

The Legislature specifically prohibited Commission jurisdiction over the operations of any airport.

No changes were made to Section 21675 which provides some guidelines for the ALUC plan as well as specifying that the Commission may include in its plan the area within its jurisdiction surrounding a military airport.

It should be noted that although the amendments to the powers and duties section deleted "height restrictions" and "recommendations for the use of land surrounding airports", the guidelines in Section 21675 indicate that "the Commission may develop height restrictions on buildings, may specify use of land, and may determine building standards, including soundproofing adjacent to airports, within the planning area".

For years complaints have been voiced that airport land use commissions have been effectively neutralized in any conflict with a local jurisdiction because of the "silent" override provision, that the "four-fifths vote" weapon was of dubious value when faced with the resources available to aggresive developers and the pressures that could be brought to bear on local officials. Regardless of the merits in these criticisms, the fact remains that ALUC decisions have been overriden time after time. Section 21676, as amended, significantly strengthens ALUC determinations and expands on the relationship between the

Commission plan and local general plans. First, we'll address the override and then the new relationship between the plans.

In current law, if the ALUC determines that an action or regulation of any public agency within its boundaries is inconsistent with its plan, it must then hold a hearing to determine if the inconsistency is "harmful" with respect to the airport and the adjacent area. A negative determination results in the proposal being returned to the public agency for another public hearing to reconsider its action. The public agency proposing the action or regulation, however, may overrule the Commission after such hearing by a four-fifths vote of its governing body. Period. No explanation necessary. Just four-fifths vote; that was the law until January 1, 1983.

AB 2920 made changes to this procedure. After the ALUC makes a determination of inconsistency on a proposed action, the local agency is notified and it (the public agency) will then hold another hearing to reconsider its plan. The ALUC no longer will hold a hearing to determine if the proposal is "harmful". It is at this point that the significant changes enter the picture.

> "The local agency may overrule the commission after such hearing by a two-thirds vote of its governing body if it makes specific findings that the proposed action is consistent with the purposes of this article stated in Section 21670."

Note these changes: the required vote to override is reduced from four-fifths to two-thirds. Thus it becomes a little less difficult to round up the necessary votes where a governing body has more than five numbers. However, the requirement for specific findings of consistency with the purposes of the ALUC legislation--to protect the public health,

safety, and welfare by ensuring the orderly expansion of airports and the adoption of land use measures that minimize the public's exposure to excessive noise and safety hazards within areas around public airports--introduces the missing elements which made the earlier override a weakness, as its critics have charged. These two elements are: rationality and responsibility.

Let me take a moment to explain that the override, in and of iteself, is not a weakness in the process. There are often alternative ways to resolving a problem and the override allows for this difference in viewpoints and interests. The "weakness" perceived by critics in the current process is due not to the fact that the governing body may overrule but due to the fact it may never have uttered a single word in the reconsideration hearing. Its members' vote may have been influenced by a personal dislike for the chairman of the ALUC, or the individual presenting the item may be wearing a pink shirt and it's a Tuesday evening. The genesis of the vote may or may not have any relationship to the issue of land use compatibility. And so there was little basis for a recourse or appeal.

"Specific findings" is something of a legal nature. Specific findings may be the basis for an appeal and adjudicated through the courts. So at this point AB 2920 opens up to public scrutiny the thought process or rationality for the override vote.

But the change goes further than just baring the rationality behind the vote--it insists that the rationality be consistent with the purposes of Article 3.5, the same guiding light that is to be followed by the ALUC. In essence the amendment is saying:

"You may differ with the ALUC in your solution but your purpose must remain the same." And that purpose is spelled out in the law.

As indicated earlier, a second element--responsibility--was added to the process. The requirement for consistency of purpose, of course, brings into being a sense of responsibility, but the Legislature did not stop there. A new Section--21678--was added to the code which makes the cheese a bit more binding. New Section 21678 states that if a public agency which does not operate the airport in question "overrides a Commission's action or recommendation, the operator of such airport shall be immune from liability for damages to property or personal injury caused by or resulting directly or indirectly from the public agency's decision to override the Commission's action or recommendation." Note that the amendment does not indicate who <u>is</u> responsible for liability but it does clearly indicate who <u>is not</u> responsible. No longer will an airport be faced with liability for poor land use decisions over which it had no control.

While the changes in the override are significant in terms of past practices vis-a-vis ALUCs, they are certainly not punitive, harsh or biased. It merely requires an agency to act in a rational and responsible manner.

Although Section 21676 contains the override provision, it is not limited to this one item nor are its AB 2920 amendments. Expanding on the amendment to Government Code Section 65302.3 discussed earlier, this section sets a date of July 1, 1983 for submittal of the General Plan to the Commission for consistency determinations and imposes

a two-month limit (until August 31, 1983) on the ALUC for its determinations.

Paragraph (b) of Section 21676 requires that prior to amending a General Plan or a Specific Plan, or the adoption or approval of a zoning ordinance or building regulation within the ALUC planning boundary, the local agency shall first refer the proposed action to the Commission for a determination of consistency, subject, of course, to the override provision. So, even though the power to achieve compatibility by zoning has been deleted from the ALUC's powers and duties (a source of conflict between local governments and airport land use commissions), AB 2920 does give the Commission the right to have local government show that its zoning is consistent with the purpose of protecting the public health, safety, and welfare.

Section 21676(c) is the second side of a double-edged sword. Basically, the same requirements imposed for land use planning in areas around an airport are extended to an airport in terms of the airport's master plan. Prior to modifying its master plan, the airport is required to refer proposed changes to the Commission, for a consistency determination, subject to the override provisions. In Section 21674 the statute is careful to indicate that the powers of the Commission shall in no way be construed to give the Commission jurisdiction over the operational aspects of any airport.

To avoid bureaucratic delays, the ALUC has 60 days within which time it must make consistency determinations. Failure to do so deems the proposal(s) as consistent, which seems fair enough.

In summary, what we will now have for land use planning in the vicinity of airports is a legislative linkage involving the ALUC Plan, the General Plan and the Airport Noise Standards. This tie-in fills a void which has preculded effective implementation of the ALUC function.

Assembly Bill No. 2920

CHAPTER 1041

An act to add and repeal Section 65302.3 of the Government Code, and to amend, repeal, and add Sections 21670, 21671, 21674, and 21676 of, and to add and repeal Section 21678 of, the Public Utilities Code, relating to airports.

[Approved by Governor September 14, 1982. Filed with Secretary of State September 15, 1982.]

LEGISLATIVE COUNSEL'S DIGEST

AB 2920, Rogers. Airports: land use planning.

(1) Under existing law, in various counties containing an airport operated for the benefit of the general public and served by a certified air carrier, the county airport commission or other designated body is required to formulate a comprehensive land use plan that will provide for the orderly growth of each public airport and the area surrounding the airport and which will safeguard the general welfare of the inhabitants within the vicinity of the airport and the public in general. Each public agency having representation on the commission is required to file its land use plans and any changes with the commission for approval, except that the public agency may overrule the commission by a ⅔ vote of the governing body under certain circumstances.

Existing law also requires each city and county to adopt a general land use plan containing specified elements for the territory in its jurisdiction.

This bill would require that the general plan, and any applicable specific plan, of a city or county be consistent with the airport land use plan adopted by the county airport commission or other designated commission, unless by ⅔ vote, the governing body finds that the action is consistent with the purposes of airport land use law and overrides the commission. The bill would require the submission to the commission of proposed amendments to the general or specific plan, zoning ordinances or building regulations within the airport land use commission planning boundary or a modification of an airport master plan. However, ⅔ vote of the proposing body that finds its proposals consistent with the purposes of the airport land use law would override the commission. The bill would provide to the operator of a publicly owned airport immunity from liability for damages or personal injury caused by or resulting directly from the public agency decision to override the commission when the public agency does not operate the airport.

This bill would also add findings of a legislative purpose.

(2) Existing law empowers commissions to achieve by zoning, compatible land uses around airports.

This bill would revise this provision to, instead, authorize commissions to ensure that local agencies achieve compatible land uses around airports, to coordinate planning efforts, and to review any land use plan submitted to it for comment on compatibility.

(3) Article XIII B of the California Constitution and Sections 2231 and 2234 of the Revenue and Taxation Code require the state to reimburse local agencies and school districts for certain costs mandated by the state. Other provisions require the Department of Finance to review statutes disclaiming these costs and provide, in certain cases, for making claims to the State Board of Control for reimbursement.

This bill would provide that no appropriation is made by this act for the purpose of making reimbursement pursuant to the constitutional mandate or Section 2231 or 2234, but would recognize that local agencies and school districts may pursue their other available remedies to seek reimbursement for these costs.

(4) This bill, in compliance with Section 2231.5 of the Revenue and Taxation Code, would also repeal, as of January 1, 1989, the provisions contained in the bill for which state reimbursement is required.

The people of the State of California do enact as follows:

SECTION 1. Section 65302.3 is added to the Government Code, to read:

65302.3. (a) The general plan, and any applicable specific plan prepared pursuant to Section 65450, shall be consistent with the plan adopted or amended pursuant to Section 21675 of the Public Utilities Code.

(b) The general plan, and any applicable specific plan prepared pursuant to Section 65450, shall be amended pursuant to subdivision (a) not later than December 31, 1983, to be consistent with provisions of the plan required under Section 21675 of the Public Utilities Code, as such plan may provide on July 1, 1983.

(c) In the event that the legislative body does not concur with any provision of the plan required under Section 21675 of the Public Utilities Code, it may satisfy the provisions of this section by adopting findings pursuant to Section 21676 of the Public Utilities Code.

This section shall remain in effect only until January 1, 1984, and on that date is repealed, unless a later enacted statute, which is chaptered before January 1, 1984, deletes or extends that date.

SEC. 2. Section 65302.3 is added to the Government Code, to read:

65302.3. (a) The general plan, and any applicable specific plan prepared pursuant to Section 65450, shall be consistent with the plan adopted or amended pursuant to Section 21675 of the Public Utilities Code.

(b) Notwithstanding the provisions of Section 65361, the general

plan, and any applicable specific plan, shall be amended within 180 days of any amendment to the plan required under Section 21675 of the Public Utilities Code.

(c) In the event that the legislative body does not concur with any provision of the plan required under Section 21675 of the Public Utilities Code, it may satisfy the provisions of this section by adopting findings pursuant to Section 21676 of the Public Utilities Code.

This section shall become operative January 1, 1984, and remain in effect only until January 1, 1989, and as of that date is repealed, unless a later enacted statute, which is chaptered before January 1, 1989, deletes or extends that date.

SEC. 3. Section 21670 of the Public Utilities Code is amended to read:

21670. (a) The Legislature hereby finds and declares that:

(1) It is in the public interest to provide for the orderly development of each public use airport in this state and the area surrounding such airports in such a manner among other things, promote the overall goals and objectives of the California airport noise standards adopted pursuant to Section 21669, and prevent the creation of new noise and safety problems.

(2) It is the purpose of this article to protect public health, safety, and welfare by ensuring the orderly expansion of airports and the adoption of land use measures that minimize the public's exposure to excessive noise and safety hazards within areas around public airports to the extent that such areas are not already devoted to incompatible uses.

(b) In order to achieve the purposes of this article, there is hereby created, in each county subject to this article and containing at least one airport operated for the benefit of the general public and served by an air carrier certificated by the Civil Aeronautics Board, an airport land use commission, hereinafter referred to as the "commission." Each commission shall consist of seven members to be selected as follows:

(1) Two representing the cities in the county, appointed by a city selection committee comprised of the mayors of all the cities within that county; provided, however, that, if there are any cities contiguous or adjacent to the qualifying airport, at least one such representative shall be appointed therefrom. If there are no cities within a county, the number of representatives provided for by paragraphs (2) and (3) shall each be increased by one.

(2) Two representing the county, appointed by the board of supervisors.

(3) Two representing the airports within that county, appointed by a selection committee comprised of the managers of all of the public airports within that county; however, one such representative shall be appointed from an airport operated for the benefit of the general public.

(4) One representing the general public, appointed by the other

six members of the commission.

(c) Public officers, whether elected or appointed, may be appointed and serve as members of the commission during their terms of public office.

(d) Each member shall promptly appoint a single proxy to represent him in commission affairs and to vote on all matters when the member is not in attendance. The proxy shall be designated in a signed written instrument which shall be kept on file at the commission offices, and the proxy shall serve at the pleasure of the member who appointed him. A vacancy in the office of proxy shall be filled promptly by appointment of a new proxy.

This section shall remain in effect only until January 1, 1989, and as of that date is repealed, unless a later enacted statute, which is chaptered before January 1, 1989, deletes or extends that date.

SEC. 4. Section 21670 is added to the Public Utilities Code, to read:

21670. There is hereby created, in each county subject to this article and containing at least one airport operated for the benefit of the general public and served by an air carrier certified by the Public Utilities Commission or the Civil Aeronautics Board, an airport land use commission, hereinafter referred to as the "commission." Each commission shall consist of seven members to be selected as follows:

(a) Two representing the cities in the county, appointed by a city selection committee comprised of the mayors of all the cities within that county; provided, however, that, if there are any cities contiguous or adjacent to the qualifying airport, at least one such representative shall be appointed therefrom. If there are no cities within a county, the number of representatives provided for by subdivisions (b) and (c) shall each be increased by one.

(b) Two representing the county, appointed by the board of supervisors.

(c) Two representing the airports within that county, appointed by a selection committee comprised of the managers of all of the public airports within that county; however, one such representative shall be appointed from an airport operated for the benefit of the general public.

(d) One representing the general public, appointed by the other six members of the commission.

Public officers, whether elected or appointed, may be appointed and serve as members of the commission during their terms of public office.

Each member shall promptly appoint a single proxy to represent him in commission affairs and to vote on all matters when the member is not in attendance. The proxy shall be designated in a signed written instrument which shall be kept on file at the commission offices, and the proxy shall serve at the pleasure of the member who appointed him. A vacancy in the office of proxy shall be filled promptly by appointment of a new proxy.

This section shall become operative January 1, 1989.

SEC. 5. Section 21671 of the Public Utilities Code is amended to read:

21671. In any county where there is an airport operated for the general public, and served by an air carrier certificated by the Civil Aeronautics Board, which is owned by a city or district in another county or by another county, one of the representatives provided by paragraph (1) of subdivision (b) of Section 21670 shall be appointed by the mayors of the cities of the county in which the owner of that airport is located, and one of the representatives provided by paragraph 2 of subdivision (b) of Section 21670 shall be appointed by the board of supervisors of the county in which the owner of that airport is located.

This section shall remain in effect only until January 1, 1989, and as of that date is repealed, unless a later enacted statute, which is chaptered before January 1, 1989, deletes or extends that date.

SEC. 6. Section 21671 is added to the Public Utilities Code, to read:

21671. In any county where there is an airport operated for the general public, and served by an air carrier certified by the Public Utilities Commission or the Civil Aeronautics Board, which is owned by a city or district in another county or by another county, one of the representatives provided by subdivision (a) of Section 21670 shall be appointed by the mayors of the cities of the county in which the owner of that airport is located, and one of the representatives provided by subdivision (b) of Section 21670 shall be appointed by the board of supervisors of the county in which the owner of that airport is located.

This section shall become operative January 1, 1989.

SEC. 7. Section 21674 of the Public Utilities Code is amended to read:

21674. The commission shall have the following powers and duties, subject to the limitations upon its jurisdiction set forth in Section 21676:

(a) To assist local agencies in ensuring compatible land uses in the vicinity of all new airports and in the vicinity of existing airports to the extent that the land in the vicinity of such airports is not already devoted to incompatible uses.

(b) To coordinate planning at the state, regional and local levels so as to provide for the orderly development of air transportation, while at the same time protecting the public health, safety, and welfare.

(c) To prepare and adopt an airport land use plan pursuant to Section 21675.

(d) To review the plans, regulations, and other actions of local agencies and airport operators pursuant to Section 21676.

(e) The powers of the commission shall in no way be construed to give the commission jurisdiction over the operation of any airport.

This section shall remain in effect only until January 1, 1989, and as of that date is repealed, unless a later enacted statute which is chaptered before January 1, 1989, deletes or extends that date.

SEC. 8. Section 21674 is added to the Public Utilities Code, to read:

21674. The commission shall have the following powers and duties, subject to the limitations upon its jurisdiction herein set forth:

(a) To study conditions and make recommendations concerning the need for height restrictions on buildings near airports;

(b) To make recommendations for the use of the land surrounding airports to assure safety of air navigation and the promotion of air commerce.

(c) To hold public hearings regarding the subject matter in subdivisions (a) and (b) and make findings of fact thereon which would be advisory only to the involved jurisdiction.

(d) To make and enforce rules and regulations for the orderly and fair conduct of such hearings which shall conform as nearly as possible to the provisions applicable to hearings conducted by local agency formation commissions.

(e) To achieve by zoning compatible land uses in the vicinity of all new airports and in the vicinity of existing airports to the extent that the land in the vicinity of such airports is not already devoted to incompatible uses, and to this end the commissions shall require that all new construction in such areas shall conform to such standards as the department may from time to time adopt.

The powers of the commission shall in no way be construed to give the commission jurisdiction over the operation of any airport.

This section shall become operative January 1, 1989.

SEC. 9. Section 21676 of the Public Utilities Code is amended to read:

21676. (a) Each local agency whose general plan includes areas covered by an airport land use commission plan, shall, by July 1, 1983, submit a copy of its plan or specific plans to the airport land use commission. The commission shall determine by August 31, 1983, whether the plan or plans are consistent or inconsistent with the commission's plan. If the plan or plans are inconsistent with the commission's plan, the local agency shall be notified and that local agency shall have another hearing to reconsider its plans. The local agency may overrule the commission after such hearing by a two-thirds vote of its governing body if it makes specific findings that the proposed action is consistent with the purposes of this article stated in Section 21670.

(b) Prior to the amendment of a general plan or specific plan, or the adoption or approval of a zoning ordinance or building regulation within the planning boundary established by the airport land use commission pursuant to Section 21675, the local agency shall first refer the proposed action to the commission. If the commission determines that the proposed action is inconsistent with the

commission's plan, the referring agency shall be notified. The local agency may, after a public hearing, overrule the commission by a two-thirds vote of its governing body if it makes specific findings that the proposed action is consistent with the purposes of this article stated in Section 21670.

(c) Each public agency owning any airport within the boundaries of an airport land use commission plan, shall, prior to modification of its airport master plan, refer such proposed change to the airport land use commission. If the commission determines that the proposed action is inconsistent with the commission's plan, the referring agency shall be notified. The public agency may, after a public hearing, overrule the commission by a two-thirds vote of its governing body if it makes specific findings that the proposed action is consistent with the purposes of this article stated in Section 21670.

(d) Each commission determination pursuant to subdivision (b) or (c) shall be made within 60 days from the date of referral of the proposed action. If a commission fails to make the determination within that period, the proposed action shall be deemed consistent with the commission's plan.

This section shall remain in effect only until January 1, 1989, and as of that date is repealed, unless a later enacted statute, which is chaptered before January 1, 1989, deletes or extends that date.

SEC. 10. Section 21676 is added to the Public Utilities Code, to read:

21676. Each public agency having representation on the commission shall assist in the development of an area plan. All such plans shall be filed with the commission for its approval. If in the determination of the commission, an action or regulation of any public agency within the boundaries of the area plan is inconsistent with the commission plan, then the commission shall hold a hearing to determine whether or not the proposed action is in the best interest of the airport and the adjacent area. If it is determined that the action would be harmful, then the public agency shall be notified and the public agency shall have another hearing to reconsider its action. The public agency proposing the action or regulation, however, may overrule the commission after such hearing by a four-fifths vote of its governing body.

Each public agency owning any airport within the boundaries of the area plan shall file any substantive change in development plans with the commission for its approval. If such plans are inconsistent with the commission plan, then the public agency shall be notified and shall have another hearing to reconsider its action. Such public agency, however, may overrule the commission by a four-fifths vote of its governing body.

This section shall become operative January 1, 1989.

SEC. 11. Section 21678 is added to the Public Utilities Code, to read:

21678. With respect to a publicly owned airport that a public

agency does not operate, if such public agency pursuant to Section 21676 overrides a commission's action or recommendation, the operator of such airport shall be immune from liability for damages to property or personal injury caused by or resulting directly or indirectly from the public agency's decision to override the commission's action or recommendation.

This section shall remain in effect only until January 1, 1989, and as of that date is repealed, unless a later enacted statute, which is chaptered before January 1, 1989, deletes or extends that date.

SEC. 12. Notwithstanding Section 6 of Article XIII B of the California Constitution and Section 2231 or 2234 of the Revenue and Taxation Code, no appropriation is made by this act for the purpose of making reimbursement pursuant to these sections. It is recognized, however, that a local agency or school district may pursue any remedies to obtain reimbursement available to it under Chapter 3 (commencing with Section 2201) of Part 4 of Division 1 of that code.