RCAA

Regional Commission on Airport Affairs

Book #3

RCAA
Regional Commission on Airport Affairs

801 S.W. 174th St.
Normandy Park, WA 98166
(206) 248-7603

RCAA ENDORSING ORGANIZATIONS

Airport Noise Action Council
Aircraft Noise Coalition
Aircraft Noise Group
Beverly Park Community Club
Brown's Point Improvement Club
Citizen's Ad-Hoc Committee
Citizens to Save Puget Sound
Citizens Alternatives to Sea-Tac Expansion
City of Burien
City of Des Moines
City of Normandy Park
City of Tukwila
Communities Against Noise - Beacon Hill
Friends of Lincoln Park Community Council
Greater Des Moines Chamber of Commerce
Haller Lake Community Club
The Highline Community Council
Highline Hospital District
Highline School District
Highline Community College
Hurstwood Community Club
Lakewood/Seward Park Community Club
Montlake Community Club
Mt. Baker Community Club
North Hill Community Club
Ocean View Community Beach Club
Portage Bay /Roanoke Park Community Council
Ravenna-Bryant Community Association
Redondo Community Club
Salmon Creek Community Council
Seahurst Community Club
Seattle Citizens For Quality Living
Shorewood Community Council
Southeast Area Action Council
WAAR
Wesley Terrace Center
White Center Chamber of Commerce
White Center Ad Hoc Committee
White Center Youth Task Force

January 28, 1993

Dear Members Transportation Policy and Executive Board:

We are pleased to, once again, provide you with the work of our RCAA consultants.

We have presented, over the course of three weeks, three volumes of material for your consideration. We will conclude next week, with a final compilation of all related material for your review.

RCAA has spent its limited resources on consultants and other research specialists to offer you new independent data to help you reach a decision about how to best maintain air capacity for the Puget Sound region.

We invite you to call upon our consultants with any questions regarding their work.

Best regards,

Jim Murphy

James T. Murphy

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ARCHDIOCESE OF SEATTLE
910 MARION STREET
SEATTLE, WASHINGTON 98104
(206) 382-4375

OFFICE OF THE ARCHBISHOP

October 19, 1992

Mr. John C. Schuster
Principal, Kennedy High School
140 S. 140th Street
Seattle, Washington 98168

Dear Mr. Schuster,

I have received your letter regarding the efforts of yourself, Father Philip D. Wallace, pastor of St. Francis of Assisi Parish, and members of your respective communities to address the proposed development of a third runway at Sea-Tac International Airport. I fully support these efforts.

While I cannot comment on the particular dimensions of all the issues raised by members of your community, the Archdiocese does have four concerns it shares with you.

First, the Archdiocese feels a special concern for people in the community for which we take direct responsibility. I am thinking here of children who attend our schools and residents of housing projects we have developed. You and I must speak out for their interests. They must not be subjected unnecessarily to the noise, disruption and pollution attendant on the proposed development. The Port District must be allowed to proceed only if the protection of those people directly impacted is provided for as a matter of first priority. It is unjust if these people are taken care of after the fact and only after prolonged struggle.

Secondly, justice does require mitigation and full compensation for real losses. Such compensation must be swift and sure. Slow and begrudging compensation procedures can become in themselves a violation of this responsibility. The record on previous airport expansions does not give much encouragement on this score.

Thirdly, we have a concern that everybody affected by this decision be accorded their right to participate. Given the broad impacts of the decisions involved, we believe that these decisions are beyond the scope of the mandate and public accountability of the Port District. Other, more representative governmental institutions, must be involved and should be the primary decision maker.

Finally, the decisions made regarding this project must not be simply for the good of the clients of the Port District, it must be for the common good. This is, of course, a central tenet of Catholic social teaching. On this issue, as any other, we must collectively come to a decision which takes into account all those affected.

In this case, it is not only those who are directly impacted or those who directly benefit from the planned action. It is all of us in this state who may benefit from a transportation development program which protects our environment and secures for us, especially those most in need, the economic goods possible from a wisely planned system.

I would appreciate it if you would convey my concerns along with yours to the Port District at its hearing on October 20.

Sincerely yours in Christ,

Thomas J. Murphy

Thomas J. Murphy
Archbishop of Seattle

John F. Kennedy MEMORIAL HIGH SCHOOL
140 SOUTH 140th, SEATTLE, WASHINGTON 98168-3496
246-0500

October 20, 1992

STATEMENT OF JOHN C. SCHUSTER, PRINCIPAL OF JOHN F. KENNEDY MEMORIAL HIGH SCHOOL CONTINUED

As for my concerns, I have been a high school teacher and administrator for 25 years. This is my 16th year as a high school principal. I love my job because in spite of what you might read about teenagers, the vast majority are responsible, caring and talented young men and women. They are our future and from where I stand, the future is bright.

Governmentally, however, we sometimes throw up roadblocks that make teaching them more difficult than is necessary. The proposed runway at Sea-Tac will make it more difficult because of increased noise, pollution and disruption of neighborhoods.

Presently, Kennedy, Highline, Tyee, Foster, Seattle Christian, and Mount Rainier High Schools are directly impacted by airport noise along with numerous elementary schools and junior highs, both public and private. I do not think that the plan before you today will be adequate for the future of air transportation in our area. Why not accept that fact and make a decision to build an additional airport away from populated areas. Connect it to Seattle with high speed rail service. Demonstrate to our young people and the Highline community that you are concerned about their future as much as you are about the future of air transportation.

John C. Schuster
Principal

ERROL NELSON

Environmental Analyst

AREAS OF EXPERTISE

Environmental Checklists/EIS's
Engineering/Permit Assistance
Air/Noise/Traffic Analysis
Storm Drainage Systems

EXPERIENCE

28 Years

EDUCATION

B.S. Chemistry
Seattle Pacific College

M.S. Forestry
University of Washington

REGISTRATION

Civil Engineer - Washington

PROFESSIONAL AFFILIATION

Air and Waste Management Ass'n

National Association of
Environmental Professionals

PUBLICATIONS

Automated Data Handling for Small Authorities, 1971

Problems Encountered by Small Authorities in Implementing Diffusion Modeling, 1972

Modeling Indirect Sources - Determining the Parameters, 1974

Technical Presentations: To Enlighten or Obscure, 1977

Environmental Requirements and Their Impact on a Surface Mine, 1977

Indoor Air Pollution: Treating the Symptoms or Curing the Problem, 1989

During the past twenty-eight years Mr Nelson has been involved in several areas of environmental analysis. For the past nine years Mr Nelson has been self-employed and has been conducting air quality, noise, water traffic and storm drainage analysis, and general environmental services (Checklists and Environmental Impact Statements) for a variety of private and public clients. He has developed an inexpensive method of stormwater control for homes and small business using landscaping and sand and gravel flow control.

Prior to that Mr Nelson spent twelve years as an environmental analyst for two consulting firms. During the past twenty-one years he has participated in over 300 environmental studies under the National and Washington State Environmental Policy Acts. Responsibilities included air quality analysis, noise analysis, other technical analysis, general project management, proposal preparation, budgeting and scheduling, and client and agency liaison. Projects included residential, industrial and commercial development, roads, comprehensive plans, parks and surface mines. Follow-up work often included presentations and attendance at public hearings and permit acquisition for the project.

Mr Nelson was also employed for five years with an air pollution control agency. Responsibilities included industry source registration, the emission inventory, the air monitoring and data handling programs, and construction and supervision of the authority lab. Prior to that he spent two years with a forest products company conducting original research in organic chemistry relating to the utilization of tree and pulp waste.

Volunteer activities include over 30 years involvement (two as president) with the Mountaineers, and 11,000 member outdoor club. He has also served on numerous volunteer committees for schools, counties and the State. He presently serves on the Citizens Water Quality Advisory Committee to METRO, and the Washington State Winter Recreation Commission. He has also been a soccer referee since 1978. He is presently involved in area youth soccer officiating and assigning, and is responsible for the distribution of over 1500 officiating assignments each year.

Analysis of Noise Impacts
The Flight Plan Project FEIS
The Puget Sound Regional Council

Prepared for

City of Federal Way
33530 - 1st Way S.
Federal Way, WA 98003

Prepared by

Errol Nelson P.E.
Optimum Environment
P.O. Box 114
Issaquah, WA 98027
Tel/Fax (206) 391-8292

January 15, 1993

INTRODUCTION

The flight plan project FEIS proposes to institute capacity improvements at Sea-Tac International Airport between now and 2020. The proposed alternatives to achieve flight system improvements are:

1) a broad system management plan.
2) a dependent third runway at Sea-Tac.
3) capacity relief incorporating other airports.
4) no-action

This noise analysis focuses primarily on the existing and future noise impacts at Sea-Tac airport (alternatives 2 and 4), their presentation in the EIS and any deficiencies in the noise analysis. It should be noted that alternative impacts cannot be properly evaluated unless the existing conditions are accurately described.

This analysis incorporates by reference the January 10, 1993 testimony of James Chalupnik related to noise descriptors and regulations.

FEIS DEFICIENCIES

Deficiency #1: The existing noise conditions in the vicinity of Sea-Tac airport have been underestimated.

In December 1992, the Regional Commission on Airport Affairs (RCAA), of which the City of Federal Way is a member, undertook a study to evaluate existing noise conditions in the vicinity of Sea-Tac Airport. Noise levels were monitored at five sites, plus a remote site, over six week period from December 1, 1992 to January 7, 1993. Noise levels were monitored for a 24 hour period at each site between 1 PM Tuesday and 1 PM Wednesday, except for the remote site. One site was monitored twice. Additionally, each aircraft event was noted, and the noise levels were recorded on a chart recorder. The complete data summaries for all the monitoring sites are attached to this analysis.

Table I summarizes the Ldn noise levels taken at each of the monitoring sites over each 24 hour period.

Table I
Ldn Noise Levels Near Sea-Tac Airport

Date	Location	No of Aircft Operations	Ldn dBA	'Average'* Operatns	Av Ldn** dBA
Dec 1/2 '92	S192 & 8S	855	71.8	970	72.2
Dec 8/9 '92	SW162 & 9SW	788	59.8	970	60.7
Dec 15/16 '92	S308 & 23S	782 (391X2)	68.3	970	69.2
Dec 22/23 '92	S248 & 13S	774 (387X2)	68.3	970	69.3
Dec 29/30 '92	S186 & 4S	759	69.8	970	70.8
Jan 5/6 '93	S192 & 8S	733	71.3	970	72.7

* Average operations (arrivals and departures) were derived from

page 2-4 of the FEIS. Operations are increasing at the rate of approximately 8000/year. Therefore 338,600 operations in 1991, is expected to increase to 354,000 operations in 1993. 354,000/365 = 970 average daily operations.

** The average Ldn noise level was derived from the acoustical energy generated by the daily aircraft operations. e.g. the total acoustical energy generated by aircraft operations is proportional to the number of operations. Data collected at S192 & 8S appears to confirm this within 0.3 dB. The Ldn for the two days at S192 & 8S is estimated at 72.5 dBA.

The FEIS does not include (See Appendix C - FEIS) a map of the existing noise contours. Based on the data shown in Table I and the attached data summaries, the existing noise contours are estimated using a 1990 noise contour working draft map (the only one available to me). The 24 X 36 map is attached. The existing noise contours have been modified to reflect the data shown in Table I. The monitoring locations and the Ldn noise levels based on 'average' daily aircraft operations are shown. The 1990 noise contours are modified (dashed lines) to show the existing (1993) noise contours based on the collected noise data. As shown, the existing noise contours west and south of Sea-Tac airport are wider and longer than described in the FEIS. It can be surmised that the noise contours north and east of Sea-Tac airport are similarly affected.

This means that the area and population impacts described in the FEIS under the various flight plan alternatives are greater than predicted in the FEIS. Tables 4-1, 4-2, 4-3 and 4-4 incorrectly portray the existing population and the area impacted by aircraft noise, underestimating them significantly. Therefore, the predicted impacts of the flight plan alternatives are similarly underestimated. The noise study should be redone to provide a more realistic appraisal of the noise impacts of the proposed Flight Plan Project.

Since it appears that the information on noise impacts being provided to the decision makers is inadequate: any decision on the flight plan project should be postponed until adequate information is available.

Deficiency #2: Existing noise conditions in the vicinity of Sea-Tac are higher than the noise contours show.

The noise contours predicted by the Flight Plan FEIS form an 'hourglass' configuration parallel to the runways. The data, as shown in the attached drawing, shows that a bulge occurs parallel to the runways that is much wider than predicted by the INM model. What is not taken into account is the continuous pervasive noise that occurs around the clock from taxiing aircraft, baggage trucks, maintenance, and other airport activity. As shown in the attached data summaries, the minimum noise levels at S 192 & 8th S rarely drop below 45 dBA, even during the night.

None of this ancillary airport activity is factored into the predicted noise impacts. In order to get the true noise impacts of

the proposed alternatives, noise from support activity must be considered as part of the noise contribution from Sea-Tac airport.

Deficiency #3: The noise impacts of the third runway alternative are greater than predicted.

As indicated by the RCAA data, the addition of a third runway is predicted to cause an even greater bulge in the noise contours on the west side of the airport than is described in the FEIS. This is from a combination of factors: the higher existing noise levels described in deficiency #1; and the noise from general airport activity in deficiency #2. These will combine to create noise levels on the west side of the airport much higher than predicted in the FEIS.

Deficiency #4: The use of Sound Exposure Levels (SEL) as a single aircraft event descriptor is misleading and does not describe the true noise impacts experienced by residents living in the vicinity of the airport.

Sound exposure level is a measure of accumulated sound energy over a specified period of time. It is, therefore, time and event dependent. In the attached data summaries, column 7 is listed as the sound exposure level. The sound exposure level described in the summary, as collected by the noise meter (Quest 2800), is defined as "the accumulated sound averaged over one second." So, the sound exposure level shown in column 7 of the data summaries is the level associated with the time shown in column 2. Sound exposure level is a cumulative measure of noise and can only increase.

Sound exposure level can be better described via an analogy:

> Picture a person in a shower with the water flowing over them and the drain closed. The noise level is equivalent to the rate of water flow - the louder the noise the faster the water flows. The sound exposure level is equivalent to the water filling up in the tub. A loud noise causes a faster flow, while a quiet noise has a slow flow: but, the flow never stops and the tub continues to fill - the sound exposure level continually increases.
>
> At some point in time the tub must be emptied and permitted to start over. However, what is the best time has not been determined. The SEL metric described on page 4-8 is equivalent to standing in the shower for 1-3 minutes, with the water flowing rapidly (loud noise event) and then emptying the tub and starting over. It has no meaning as a cumulative noise descriptor over longer periods of time. It is, therefore, questionable as to what the SEL metric really means, and what the FEIS is really describing.

To provide a comparison, the sound exposure level data collected by the RCAA, and included in the attached data summaries is evaluated. Table II shows the sound exposure levels, and the amount of time the 80 SEL level is exceeded every day at each noise measurement site.

Table II
Daily Sound Exposure Levels
dBA

Date	Location	Sound Exposure Levels 1 sec	1 min	1 hr	>80 SEL hr:min
Dec 1/2 '92	S192/8S	117.3	99.5	81.7	1:29
Dec 8/9	SW162/9SW	104.5	86.7	68.9	:05
Dec 15/16	S308/23S	112.9	95.1	77.3	:32
Dec 22/23	S248/13S	114.4	96.6	78.8	:46
Dec 29/30	S186/4S	114.9	97.1	79.3	:51
Jan 5/6 '93	S192/8S	115.7	97.9	80.1	1:01
Jan 6/7 Rmt	SE30/243SE	99.9	82.1	64.3	:02

The data show that the 80 SEL level is exceeded for over an hour each day at S192/8S site, while the 80 SEL level at the remote site is exceeded for about 2 minutes each day. The exposure varies with proximity to the aircraft approach and departure patterns. What it means is that the people living close to the airport activity live in a noisier environment - which we already know.

Relating the SEL to single event patterns is shown in Table III. Table III is a compilation of one hour chart recorder data taken between Noon and 1PM. The chart recordings for the time period are attached.

Table III
Hourly Sound Exposure Levels
dBA

Date	Location	Sound Exp Levels 1 sec	1 hr	>80 SEL min:sec	No of Ops	Events >80dBA
Dec 1 '92	S192/8S	104.6	69.1	4:48	52	5
Dec 8 '92	SW162/9SW	90.5	54.9	0:11	57	2
Dec 15 '92	S308/23S	101.2	65.6	1:45	22	2
Dec 22 '92	S248/13S	99.9	64.4	1:40	30	NA
Dec 29 '92	S186/4S	101.6	66.0	2:24	60	8
Jan 5 '93	S192/8S	102.1	66.7	2:42	55	8
Jan 6 Rmt	SE30/243SE	86.7	51.1	0:05	NA	1

As shown, the sound exposure level is variable, and is dependent on several factors: including distance from the airport, number of flights, noise level of each flight, etc. The only "trend" is that the closer one is to the airport and the flight path, the higher the SEL and the longer the exposure. This noise metric appears to repeat what we already know with the existing noise contours. Why do we need it?

The whole notion of using SEL appears somewhat confusing. Until the functional purpose of using SEL as a single event descriptor is clarified, its value is meaningless.

Deficiency #5: The issue of the impacts of low frequency noise from existing and future aircraft and departures was not even addressed. The noise mitigation measures were not evaluated in any detail.

A large portion of the noise problem comes from the low frequency noise generated by jet aircraft. Sound levels are close to the vibration ranges. A series of octave band filter readings were taken at the S192 & 8S site during general airport activity and aircraft operations on Jan 6, 1993. Measurements were taken on linear scale and fast response, and show that of 14 sets of readings:

8 - had a peak at 16 Hertz with a dB range of 68.7 - 82.4.
5 - had a peak at 63 Hertz or less with a dB range of 68.6 - 84.
1 - had a peak at 160 Hertz at 76.4 dB.

These are extremely low frequencies - close to the vibration range. The noise mitigation program is based on using materials where the sound insulation properties are measured at 500 Hertz. At lower frequencies their effectiveness is totally lost. It is stated on page 4-21 that the quieter aircraft and the Noise Remedy Program will bring more residential uses back into land use compatibility with the future airport activities. The noise remedy program does not solve the existing noise problem and will not solve the future noise problem at Sea-Tac airport. The entire issue of low frequency noise from aircraft activity needs to be explored in much more detail.

Deficiency #6: The noise abatement measures are not evaluated in any detail.

The noise abatement measures listed on page 4-22 are just that, a list of measures that can be taken, with little or no detail on how they would be accomplished. The data summaries show that some very noisy aircraft arrive and depart in the middle of the night, affecting sleep. Yet, nothing is proposed to describe the noise abatement procedures in any detail.

RECOMMENDATIONS TO THE HEARINGS EXAMINER FOR FURTHER STUDY

Based on recent noise data taken in the vicinity of Sea-Tac airport, the Flight Plan FEIS has not accurately described the existing conditions. Therefore, the impacts of the proposed alternatives have not been properly evaluated to make an informed decision. Under the SEPA Guidelines the lead agency shall adequately describe the affected environment, significant impacts and mitigation measures. This has not been done. Therefore, before an informed decision can be made by the PSRC, the EIS must adequately describe these items.

The following tasks are recommended to adequately analyze noise:

1) Noise levels need to be monitored not only in the vicinity of the airport, but also for a significant distance along the approach and departure routes. The program should be of sufficient duration to verify and calibrate the INM model.

2) All noise from airport activity needs to be included in the noise model, not just arrivals and departures from aircraft.

3) Use noise metrics that properly describe the sound levels and impacts. The descriptive metrics should be easily understood by the public.

4) The true impacts of low frequency noise need to be more fully evaluated. The noise remedy program should truly mitigate noise, not provide a false sense of hope that the noise problems will be alleviated: to escape a legal obligation with a solution of negligible short-term and long-term value. A proper noise remedy program, taking into account the effects of low frequency noise on homes, should then be implemented.

5) The noise abatement procedures should be specific enough to be implemented. A program of implementation should be described to mitigate the existing noise problems, not wait until some unspecified future date.

Submitted by:

Errol Nelson P.E.

January 15, 1993

2) All noise from airport activity needs to be included in the noise model, not just arrivals and departures from aircraft.

3) Use noise metrics that properly describe the sound levels and impacts. The descriptive metrics should be easily understood by the public.

4) The true impacts of low frequency noise need to be more fully evaluated. The noise remedy program should truly mitigate noise, not provide a false sense of hope that the noise problems will be alleviated: to escape a legal obligation with a solution of negligible short-term and long-term value. A proper noise remedy program, taking into account the effects of low frequency noise on homes, should then be implemented.

5) The noise abatement procedures should be specific enough to be implemented. A program of implementation should be described to mitigate the existing noise problems, not wait until some unspecified future date.

NOTE TO THE EXAMINER: As a professional, I have been involved in the preparation of EIS's since their inception in 1970. The following is an observation about the proposal described in the FEIS. Until the PSRC Flight Plan EIS realistically and comprehensively looks at the problem of airport noise, its impacts and methods of mitigation, any program of airport expansion will meet severe resistance from adjacent governmental jurisdictions and residents. It has been demonstrated time and time again, from the I-90 floating bridge, to nuclear power plants, that failure to fully disclose the existing conditions, the environmental impacts and describe mitigation measures that work is a recipe for disaster. The deficiencies I have found in the EIS noise section and noted above, with just a modest noise measurement program appear to bear this out.

Submitted by:

Errol Nelson P.E.

January 15, 1993

DATA SUMMARY - SEA TAC NOISE STUDY

DATE: Tue Dec 1 & Wed Dec 2, 1992 LOCATION: 290' N & 340' E of Intersection of S. 192nd St and 8th Ave S.

Hour	Run Time h:m:s	NOISE DATA Leq dBA	Ln dBA	Lmax dBA	Lmin dBA	Snd Exp Level	Calb'n dBA	AIRCRAFT OBSERVATIONS Dir	TO	L	TOT	WEATHER OBSERVATIONS Temp F	Wd Spd mph	Wind Dir	Sky	Comments
12-1 PM	27:38	71.5		89.4	48.9	103.8	110.2	NB	22	8	30	40	7-12	N	CDY	
1-2 PM	59:45	69.4		92.8	44.8	104.8		NB	27	11	38	40	7-12	N	CDY	
2-3 PM	58:14	70.7		94.3	53.1	106.0		NB	23	16	39	40	5-6	N	CDY	
3-4 PM	42:16	67.6		88.7	54.2	101.6		NB	22	25	47	40	5	NE	CDY	
4-5 PM	58:22	66.4		87.9	54.2	101.7		NB	22	18	40	40	8	N	CDY	
5-6 PM	58:46	70.8		92.1	55.3	106.2	110.1	NB	29	36	65	38	7-8	N	CDY	
6-7 PM	59:26	69.7		92.1	55.3	105.1		NB	32	40	72	38	7-8	N	CDY	
7-8 PM	55:49	70.4		88.7	50.4	105.5		NB	26	29	55	38	7	N	CDY	
8-9 PM	58:34	66.8		89.8	51.6	102.1		NB	21	28	49	38	5	N	CDY	
9-10 PM	58:31	65.5		88.7	51.9	100.8		NB	8	26	34	40	5	N	CDY	
10-11 PM	58:39	65.4	75.4	87.9	50.4	100.8		NB	13	10	23	40	7	N	P/C	
11-12 PM	1:00:20	68.5	78.5	94.3	49.7	104.0	110.1	NB	13	6	19	42	6	N	P/C	
12-1 AM		57.2	67.2	83.4	-			NB	1	5	6	42	7-8	N	OC	AMBIENT - 50dBA
1-2 AM		56.4	66.4	79.3	-			NB	3	3	6	40	6	N	OC	AMBIENT - 51dBA
2-3 AM		67.4	77.4	92.4	-			NB	2	2	4	40	5	N	OC	AMBIENT - 50dBA
3-4 AM		56.3	66.3	74.1	-			NB	0	2	2	39	5	N	OC	
4-5 AM		61.3	71.3	87.2	-			NB	2	5	7	38	5	N	P/C	AMBIENT - 49dBA
5-6 AM		59.8	69.8	80.2	-			NB	2	6	8	38	4	N	P/C	AMBIENT - 53dBA
*12-6 AM	5:52:40	60.7		92.4	45.2	103.8	110.1									
6-7 AM	56:14	64.9	74.9	83.8	46.7	100.0		NB	16	14	30	35	7	N	P/C	
7-8 AM	57:54	73.4		95.1	56.4	108.7		NB	34	15	49	36	3	N	P/C	
8-9 AM	59:03	71.9		94.3	54.9	107.3		NB	41	11	52	38	8-10	N	CLR	
9-10 AM	58:30	69.7		93.6	52.7	105.0		NB	16	24	40	40	8-10	N	CLR	
10-11 AM	58:39	67.7		87.9	50.4	103.1		NB	24	27	51	45	8-10	N	CLR	
11-12 AM	58:55	66.5		87.6	50.8	101.8		NB	25	42	67	49	10-12	N	CLR	
12-1 PM	58:46	69.2		91.3	50.4	104.6	110.1	NB	29	23	52	50	8-10	N	CLR	
TOTALS	23:09:23	68.3				117.3			431	424	855					
*1PM-1PM		73.4	HI	95.1	56.9											
		56.3	LOW	80.2	45.2											
Ldn = 71.8		17.1	RNG	14.9	11.7											

*NOTES: Only 1PM-1PM values used in the data analysis. Midnight to 6 AM: hourly Leq's derived from cumulative Leq read at the top of each hour; Lmax derived from loudest observed aircraft operation that hour: Lmin shown is the lowest for the 6 hour measurement period. No chart recorder data available for the midnight - 6 AM period.

DATA SUMMARY - SEA TAC NOISE STUDY

DATE: Tue Dec 8 & Wed Dec 9, 1992 **LOCATION:** 200' E of Intersection of SW 162nd St and 9th Ave SW

Hour	Run Time h:m:s	NOISE DATA Leq dBA	Ln dBA	Lmax dBA	Lmin dBA	Snd Exp Level	Calb'n dBA	AIRCRAFT OBSERVATIONS Dir	TO	L	TOT	WEATHER OBSERVATIONS Temp F	Wd Spd mph	Wind Dir	Sky	Comments
12-1 PM	14:55	58.7		75.9	50.4	88.1	110.0	SB	21	15	36	45	3	N	OC	
1-2 PM	51:04	59.0		77.4	48.6	93.7		SB	20	8	28	45	<3	-	OC	RAIN
2-3 PM	57:05	56.3		77.4	46.3	91.6		SB	16	6	22	43	<3	-	OC	RAIN
3-4 PM	58:24	56.4		74.8	48.2	91.7		SB	21	13	34	43	<3	-	OC	RAIN
4-5 PM	58:04	54.5		79.7	47.4	89.8		SB	19	23	42	45	<3	-	OC	
5-6 PM	58:02	56.1		76.7	48.2	91.4	110.1	SB	19	30	49	40	<3	-	OC	RAIN
6-7 PM	55:03	57.7		75.2	36.9	92.8		SB	26	31	57	40	<3	-	OC	OCC GUSTS
7-8 PM	59:26	57.5		73.7	47.4	92.8		SB	25	31	56	40	7	S	OC	RAIN
8-9 PM	58:44	56.5		75.2	47.1	91.9		SB	13	24	37	40	7-8	S	OC	
9-10 PM	58:08	53.6		68.4	47.1	89.0		SB	10	27	37	40	5-7	S	OC	
10-11 PM	58:41	54.5	64.5	69.9	43.1	89.9		SB	9	11	20	40	3-4	SE	OC	RAIN
11-12 PM	55:04	56.8	66.8	66.6	44.4	91.9	110.1	SB	9	11	20	40	5-7	S	OC	RAIN
12-1 AM		54.2	64.2	73.3	45.5			SB	6	9	15	39	4-5	S	OC	RAIN
1-2 AM		50.7	60.7	69.4	44.0			SB	3	1	4	38	3-5	S	OC	RAIN
2-3 AM		51.6	61.6	65.8	42.2			SB	0	3	3	40	<3	-	OC	
3-4 AM		49.1	59.1	71.4	43.0			SB	1	0	1	40	<3	-	OC	
4-5 AM		48.7	58.7	72.6	43.5			SB	2	2	4	40	5-6	S	OC	
5-6 AM		48.4	58.4	66.6	44.5			SB	2	4	6	39	3-5	S	OC	
*12-6 AM	5:53:24	50.7		83.4	42.2	93.9	110.1									
6-7 AM	54:25	53.1	63.1	74.4	40.7	88.2		SB	9	18	27	40	<3	-	OC	
7-8 AM	58:59	58.9		75.6	48.2	94.2		SB	40	15	55	40	<3	-	OC	
8-9 AM	58:34	56.5		77.1	45.2	91.8		SB	32	10	42	41	<3	-	OC	
9-10 AM	59:04	54.8		74.1	44.8	90.2		SB	15	21	36	45	<3	-	CDY	
10-11 AM	58:05	54.7		73.7	45.6	90.0		SB	22	27	49	45	<3	-	P/C	
11-12 AM	59:30	56.2		76.3	45.9	91.6		SB	21	32	53	45	4-6	-	P/C	
12-1 PM	58:27	55.1		75.9	44.4	90.5	110.0	SB	29	28	57	45	4-6	-	CDY	
TOTALS	23:08:13	55.5				104.5			391	397	788					
*1PM-1PM		59.0	HI	83.4	48.6											
		48.4	LOW	68.4	36.9											
Ldn = 59.8		11.6	RNG	15.0	11.3											

*NOTES: Only 1PM-1PM values used in the data analysis. Midnight to 6 AM: hourly Leq's derived from cumulative Leq read at the top of each hour; Lmax derived from loudest observed aircraft operation that hour: Lmin shown is the lowest from the chart recorder data.

DATA SUMMARY - SEA TAC NOISE STUDY

DATE: Tue Dec 15 & Wed Dec 16, 1992 **LOCATION:** Approx 100' W of (Intersection)* of S. 308th St and 23rd Ave S.

Hour	Run Time h:m:s	NOISE DATA Leq dBA	Ln dBA	Lmax dBA	Lmin dBA	Snd Exp Level	Calb'n dBA	AIRCRAFT OBSERVATIONS Dir	TO	L	TOT	WEATHER OBSERVATIONS Temp F	Wd Spd mph	Wind Dir	Sky	Comments
12-1 PM	1:01:25	69.0		93.6	39.5	104.4	110.0	SB	25	0	25	42	<3	-	CLR	
1-2 PM	57:12	68.3		90.9	41.4	103.6		SB	25	0	25	39	<3	-	CLR	
2-3 PM	58:00	67.4		93.9	40.7	102.6		SB	26	0	26	39	<3	-	CLR	
3-4 PM	58:51	60.9		*105.6	44.8	96.3		SB	24	0	24	38	<3	-	CLR	
4-5 PM	58:36	60.0		78.2	46.3	95.3		NB	0	20	20	36	<3	-	CLR	
5-6 PM	58:12	62.2		79.7	50.4	97.5	110.1	NB	0	31	31	36	<3	-	CLR	
6-7 PM	58:02	61.9		78.2	42.9	97.2		NB	0	24	24	36	<3	-	CLR	
7-8 PM	59:26	62.0		77.1	52.3	97.4		NB	0	23	23	35	<3	-	CLR	
8-9 PM	1:01:14	60.6		78.2	51.6	96.1		SB	0	14	14	31	<3	-	CLR	
9-10 PM	57:27	61.5		81.6	51.2	96.8		SB	6	0	6	30	<3	-	CLR	
10-11 PM	58:19	62.9	72.9	85.3	45.6	98.2		SB	9	0	9	30	<3	-	CLR	
11-12 PM	57:08	58.6	68.6	81.2	45.2	93.8	110.1	SB	7	0	7	30	<3	-	CLR	
12-1 AM		63.7	73.7	87.5	44.8	99.3		SB	2	0	2	30	<3	-	CLR	
1-2 AM		61.4	71.4	77.8	40.3	97.0		SB	4	0	4	30	<3	-	CLR	
2-3 AM		58.0	68.0	74.0	40.8	93.6		SB	1	0	1	30	<3	-	CLR	
3-4 AM		58.5	68.5	70.4	41.6	94.1		SB	1	0	1	30	<3	-	CLR	
4-5 AM		60.3	70.3	79.4	44.5	98.1		NB	0	7	7	29	<3	-	CLR	
5-6 AM		62.0	72.0	81.9	54.4	97.6		NB	4	1	5	30	<3	-	CLR	
*12-6 AM		61.1		87.5	40.3		110.1									
6-7 AM	53:38	61.2	71.2	83.1	46.3	96.2		SB	8	0	8	30	<3	-	CLR	
7-8 AM	58:34	67.4		84.9	54.6	102.7		SB	32	0	32	32	3	-	CLR	
8-9 AM	58:45	67.4		86.8	50.4	102.7		SB	28	0	28	30	3	-	CLR	
9-10 AM	58:48	63.9		85.3	46.3	99.3		SB	15	0	15	32	<3	-	CDY	
10-11 AM	58:59	65.3		88.3	45.9	100.6		SB	18	0	18	32	<3	-	CDY	
11-12 AM	58:52	64.2		84.2	44.1	99.5		SB	14	0	14	34	<3	-	CDY	
12-1 PM	58:51	65.8		87.9	42.2	101.2	110.2	SB	22	0	22	34	<3	-	CDY	
TOTALS	17:28:54	64.2				112.9			271	120	391					
*1PM-1PM		68.3	HI	93.9	54.6											
		58.0	LOW	70.4	40.7											
	Ldn = 68.3	10.3	RNG	23.5	13.9											

*NOTES: Only 1PM-1PM values used in the data analysis. Intersection of S 308th and 23rd S is end of road at west boundary of Steel Lake park. 3-4 PM: 105.6 dB Lmax due to electrical power surge - not a noise reading. Midnight to 6 AM: Had a momentary power failure at 2:40 AM. Hourly Leq's, Lmin's and SEL's derived from chart recorder data; Lmax derived from loudest observed aircraft operation that hour:

DATA SUMMARY - SEA TAC NOISE STUDY

DATE: Tue Dec 22 & Wed Dec 23 1992 **LOCATION:** Approx 150' S of Intersection of S. 248th St and 13th Ave S.

Hour	Run Time h:m:s	NOISE DATA Leq dBA	Ln dBA	Lmax dBA	Lmin dBA	Snd Exp Level	Calb'n dBA	AIRCRAFT OBSERVATIONS Dir	TO	L	TOT	WEATHER OBSERVATIONS Temp F	Wd Spd mph	Wind Dir	Sky	Comments
12-1 PM	57:00	66.8		83.8	45.2	102.1	110.1	SB	28	0	28	50	7-9	S	OC	
1-2 PM	59:28	64.7		87.9	44.8	100.1		SB	26	0	26	50	5	S	OC	
2-3 PM	57:41	66.8		89.8	43.7	102.1		SB	21	0	21	50	2-5	S	OC	
3-4 PM	1:00:07	62.8		85.7	44.1	98.3		SB	18	0	18	48	6	S	OC	
4-5 PM	56:01	64.3		85.7	39.9	99.4		SB	17	0	17	48	5-7	S	OC	GUSTS TO 10 MPH
5-6 PM	58:08	63.3		86.8	40.7	98.7	110.1	SB	17	0	17	50	5	S	OC	
6-7 PM	50:24	67.6		92.9	46.8	102.3		SB	22	0	22	48	<3	S	OC	
7-8 PM	59:41	69.0		89.1	38.4	104.4		SB	24	0	24	48	5-6	S	OC	
8-9 PM	58:30	68.3		92.8	38.4	103.7		SB	17	0	17	48	<3	S	OC	
9-10 PM	57:30	63.3		86.8	36.6	98.5		SB	11	0	11	45	4-5	S	OC	
10-11 PM	57:01	61.8	71.8	89.8	35.4	97.0		SB	9	0	9	45	3-6	S	OC	
11-12 PM	57:46	58.4	68.4	82.7	35.1	93.7	110.1	SB	9	0	9	45	<3	S	OC	
12-1 AM		60.8	70.8	90.6	-			SB	3	0	3	45	<3	S	OC	
1-2 AM		59.3	69.3	83.1	-			SB	2	0	2	45	<3	S	OC	
2-3 AM		56.3	66.3	*	-			SB	0	0	0	45	<3	S	OC	
3-4 AM		55.2	65.2	*	-			SB	0	0	0	45	<3	S	OC	
4-5 AM		60.5	70.5	80.4	-			SB	1	0	1	45	<3	S	OC	
5-6 AM		58.0	68.0	87.2	-			SB	1	0	1	45	<3	S	OC	
*12-6 AM	5:57:32	58.7		105.6*	33.2	101.8	110.1	SB								
6-7 AM	55:15	64.2	74.2	88.7	41.4	99.3		SB	11	0	11	47	<3	S	P/C	
7-8 AM	58:56	69.4		89.4	41.4	104.8		SB	30	0	30	47	<3	S	P/C	
8-9 AM	58:35	68.5		92.8	42.1	103.8		SB	34	0	34	47	8-12	S	CDY	
9-10 AM	1:02:11	66.6		92.4	41.8	102.2		SB	22	0	22	47	3-5	S	CDY	
10-11 AM	56:00	65.6		87.6	39.9	100.8		SB	16	0	16	50	3-5	S	CDY	
11-12 AM	1:00:15	66.7		90.9	40.3	102.1		SB	18	0	18	50	3-5	S	CDY	
12-1 PM	57:32	64.7		90.2	41.8	99.9	110.1	SB	30	0	30	48	3-5	S	CDY	THIN CLOUDS/SUN
TOTALS	23:18:33	65.1				114.4			387	0	387					
*1PM-1PM		69.4	HI	92.9	46.8											
		55.2	LOW	82.7	33.2											
Ldn = 68.3		14.2	RNG	10.2	13.6											

*NOTES: Only 1PM-1PM values used in the data analysis. Chart recorder failure - No chart recorder data taken during this monitoring period. Midnight to 6 AM: 105.6 dB Lmax due to electrical power surge - not a noise reading. Hourly Leq's derived from cumulative Leq read at the top of each hour; Lmax derived from loudest observed aircraft operation that hour - there were no aircraft overflights between 2 and 4 AM.; Lmin shown is the lowest for the 6 hour measurement period.

DATA SUMMARY - SEA TAC NOISE STUDY

DATE: Tue Dec 29 & Wed Dec 30, 1992 **LOCATION:** 70' S and 50' W of Intersection of S. 186th St & 4th Ave S.

Hour	Run Time h:m:s	NOISE DATA Leq dBA	Ln dBA	Lmax dBA	Lmin dBA	Snd Exp Level	Calb'n dBA	AIRCRAFT OBSERVATIONS Dir	TO	L	TOT	WEATHER OBSERVATIONS Temp F	Wd Spd mph	Wind Dir	Sky	Comments
12-1 PM	58:43	64.4		84.6	47.1	99.8	110.0	SB	29	15	44	44	3	NE	CLR	
1-2 PM	57:44	63.5		86.8	48.9	98.8		NB	28	18	46	44	3	NE	CLR	
2-3 PM	58:50	63.1		82.7	48.2	98.4		NB	25	19	44	44	<3	E	CLR	
3-4 PM	58:07	67.3		89.4	44.8	102.6		NB	24	22	46	43	<3	E	CLR	
4-5 PM	58:42	66.7		86.8	52.3	102.1		NB	23	13	36	40	<3	N	CLR	
5-6 PM	58:24	67.1		91.7	51.9	102.5	110.1	NB	13	27	40	37	<3	-	P/C	
6-7 PM	55:46	69.6		87.9	54.2	104.8		NB	32	22	54	35	<3	-	CDY	
7-8 PM	57:01	70.0		89.1	50.4	105.2		NB	23	18	41	35	<3	-	P/C	
8-9 PM	58:02	68.5		87.9	47.8	103.8		NB	20	23	43	34	<3	-	SNW	
9-10 PM	59:49	63.3		86.4	47.8	98.7		NB	8	15	23	33	<3	-	SNW	
10-11 PM	58:26	62.7	72.7	85.3	45.6	98.0		NB	11	7	18	31	<3	-	SNW	
11-12 PM	53:04	62.2	72.2	84.6	45.2	97.1	110.1	NB	7	3	10	31	<3	-	SNW	
12-1 AM		64.9	74.9	88.7	45.0			NB	4	6	10	31	<3	-	SNW	
1-2 AM		62.9	72.9	91.7	44.5			NB	1	4	5	31	<3	-	SNW	
2-3 AM		60.9	70.9	85.3	41.4			*	0	1	1	31	<3	-	SNW	
3-4 AM		59.3	69.3	88.3	45.9			*	1	2	3	31	<3	-	CDY	
4-5 AM		58.0	68.0	84.6	48.5			*	2	2	4	31	<3	-	CDY	
5-6 AM		62.5	72.5	87.6	49.5			SB	3	2	5	31	<3	-	CDY	
*12-6 AM	6:00:13	62.0		91.7	41.4	105.2	110.0									
6-7 AM	55:14	64.3	74.3	90.9	50.1	99.2		SB	9	9	18	30	<3	-	CDY	
7-8 AM	58:58	68.7		*105.6	51.2	104.1		SB	39	7	46	30	<3	-	OC	
8-9 AM	58:53	65.8		83.8	48.6	101.2		SB	27	3	30	32	<3	-	OC	
9-10 AM	58:54	66.7		84.9	47.4	102.1		SB	27	15	42	33	<3	-	OC	
10-11 AM	58:49	63.8		82.7	45.2	99.2		SB	19	20	39	35	<3	-	OC	
11-12 AM	58:58	66.2		86.1	47.4	101.6		SB	20	31	51	40	<3	-	OC	
12-1 PM	58:57	66.3		85.3	45.6	101.6	109.9	SB	34	26	60	40	<3	-	OC	
TOTALS	23:22:51	65.4				114.9			429	330	759					
*1PM-1PM		70.0	HI	91.7	54.2											
		58.0	LOW	82.7	41.4											
	Ldn = 69.8	12.0	RNG	9.0	12.8											

*NOTES: Only 1PM-1PM values used in the data analysis. Midnight to 6 AM: hourly Leq's derived from cumulative Leq read at the top of each hour; Lmax derived from loudest observed aircraft operation that hour; Lmin shown is derived from the chart recorder data. Aircraft direction not noted on 2-5 AM observation sheets. 7-8 AM: 105.6 dB Lmax due to an electrical power surge - not a noise reading.

DATA SUMMARY - SEA TAC NOISE STUDY

DATE: Tue Jan 5 & Wed Jan 6, 1993 **LOCATION:** 290' N & 340' E of Intersection of S. 192nd St and 8th Ave S.

Hour	Run Time h:m:s	NOISE DATA Leq dBA	Ln dBA	Lmax dBA	Lmin dBA	Snd Exp Level	Calb'n dBA	AIRCRAFT OBSERVATIONS Dir	TO	L	TOT	WEATHER OBSERVATIONS Temp F	Wd Spd mph	Wind Dir	Sky	Comments
12-1 PM	58:51	70.9		95.4	54.5	104.6	110.1	NB	27	12	39	29	8-15	N	CLR	
1-2 PM	57:46	65.6		87.6	53.1	100.9		NB	22	19	41	29	8-15	N	CLR	
2-3 PM	58:05	66.7		89.4	51.6	102.0		NB	19	17	36	32	8-15	N	CLR	
3-4 PM	59:05	67.0		89.1	51.2	102.4		NB	30	22	52	32	5-10	N	CLR	
4-5 PM	*	67.0		90.6	54.5	102.4		NB	18	10	28	32	6-12	N	CLR	
5-6 PM	57:02	65.2		86.8	51.6	100.4	109.9	NB	13	13	26	28	6-16	N	CLR	
6-7 PM	59:15	65.9		87.9	52.7	101.3		NB	24	35	59	28	5-12	N	CLR	
7-8 PM	57:32	69.1		90.2	52.3	104.3		NB	25	24	49	28	6-8	N	CLR	
8-9 PM	57:22	67.9		90.6	50.1	103.2		NB	23	22	45	27	4-6	N	CLR	
9-10 PM	58:02	62.0		84.9	48.2	97.3		NB	10	22	32	27	5-10	N	CLR	
10-11 PM	58:13	64.7	74.7	90.6	48.2	100.0		NB	10	12	22	25	4-6	N	CLR	
11-12 PM	57:12	62.0	72.0	90.2	47.1	97.2	109.9	NB	10	9	19	25	<3	-	CLR	
12-1 AM		68.1	78.1	94.7	50.5			NB	4	7	11	25	<3	-	CLR	
1-2 AM		63.6	73.6	84.6	44.1			NB	4	2	6	25	<3	-	CLR	
2-3 AM		65.4	75.4	91.7	50.5			NB	1	0	1	22	<3	-	CLR	
3-4 AM		58.3	68.3	90.6	51.0			NB	1	2	3	22	<3	-	CLR	
4-5 AM		63.7	73.7	84.9	52.8			NB	2	4	6	22	6	N	CLR	
5-6 AM		60.0	70.0	84.9	54.5			NB	1	9	10	22	4	N	CLR	
*12-6 AM	5:57:51	64.1		94.7	44.1	107.3	110.0									
6-7 AM	1:01:31	64.6	74.6	85.3	54.7	100.2		NB	11	13	24	25	5-8	N	CLR	
7-8 AM	54:01	72.7		*105.6	54.9	107.7		NB	24	17	41	25	5-8	N	CLR	
8-9 AM	58:00	70.8		94.3	53.4	106.1		NB	30	12	42	28	5-8	N	CLR	
9-10 AM	58:47	67.1		90.9	52.3	102.4		NB	17	12	29	32	6-10	N	CLR	
10-11 AM	57:46	64.4		87.2	49.3	99.6		NB	21	23	44	35	4-9	N	CLR	
11-12 AM	58:48	64.6		87.9	48.6	100.0		NB	17	35	52	35	4-7	N	CLR	
12-1 PM	58:48	66.8		89.1	51.2	102.1	109.8	NB	36	19	55	35	4-7	N	CLR	
TOTALS	22:25:06	66.7				115.7			373	360	733					
*1PM-1PM		72.7	HI	94.7	54.9											
		58.3	LOW	84.9	44.1											
Ldn = 71.3		14.4	RNG	9.8	10.8											

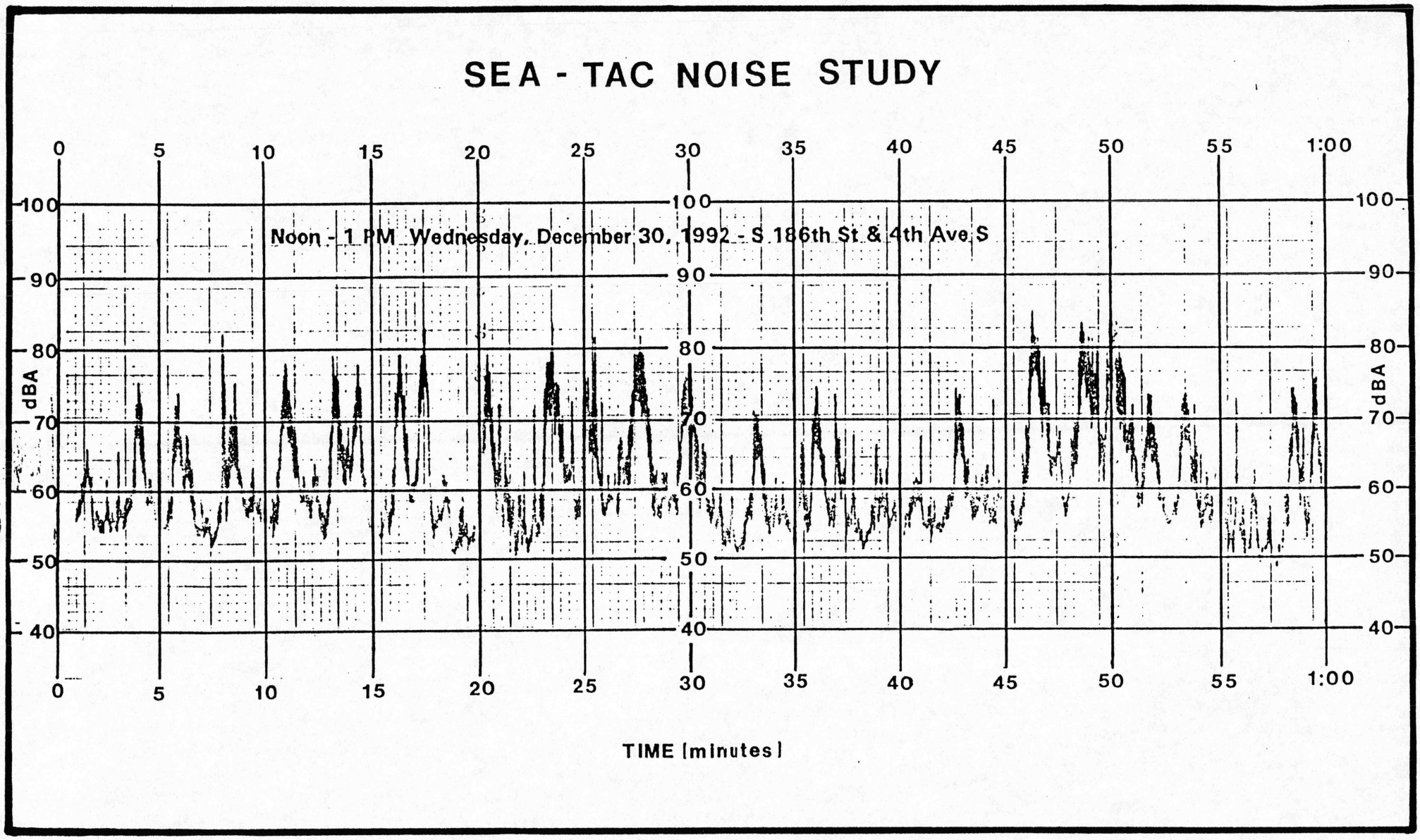
*NOTES: Only 1PM-1PM values used in the data analysis. 4-5 PM: Had a momentary power failure at 4:50 PM - hourly Leq, Lmax, Lmin and SEL derived from chart recorder data. Midnight - 6 AM: hourly Leq's derived from cumulative Leq read at the top of each hour; Lmax derived from loudest observed aircraft operation that hour: Lmin derived from chart recorder data. 7-8 AM: 105.6 dB Lmax due to electrical power surge - not a noise reading.

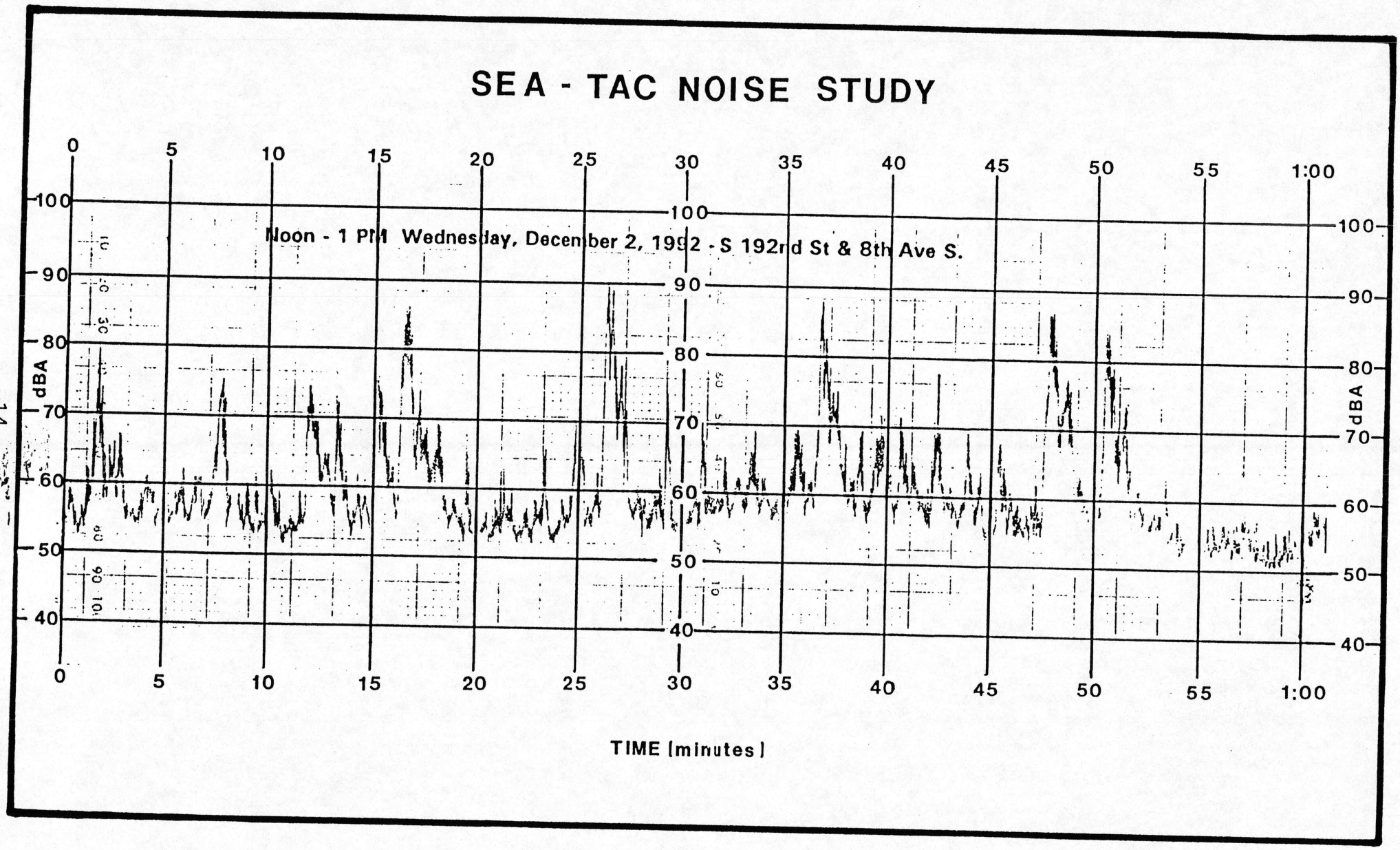
DATA SUMMARY – SEA TAC NOISE STUDY

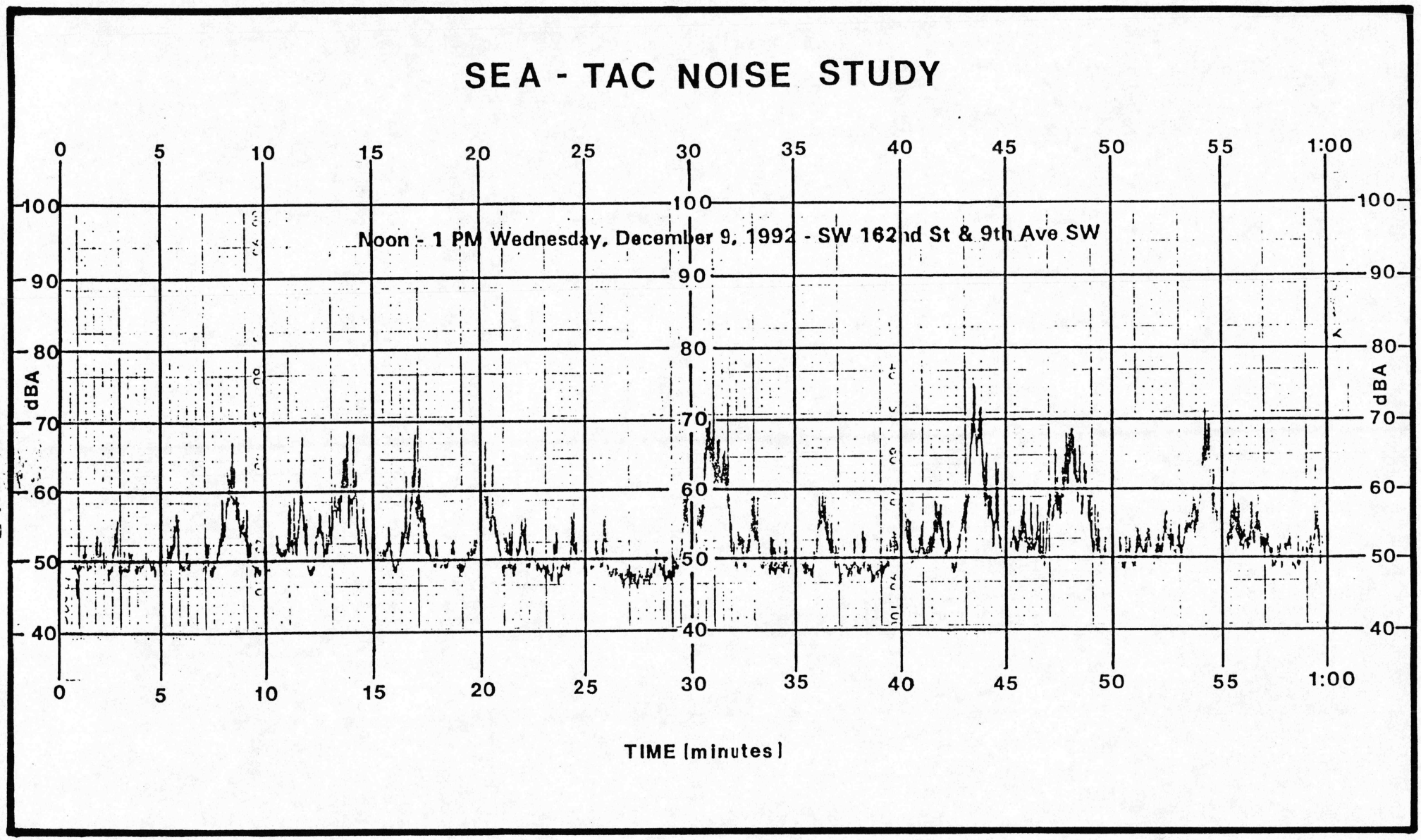
DATE: Wed Jan 6 & Thu Jan 7, 1993 **LOCATION:** (REMOTE) SE 30th St and 243rd Ave SE (Issaquah)

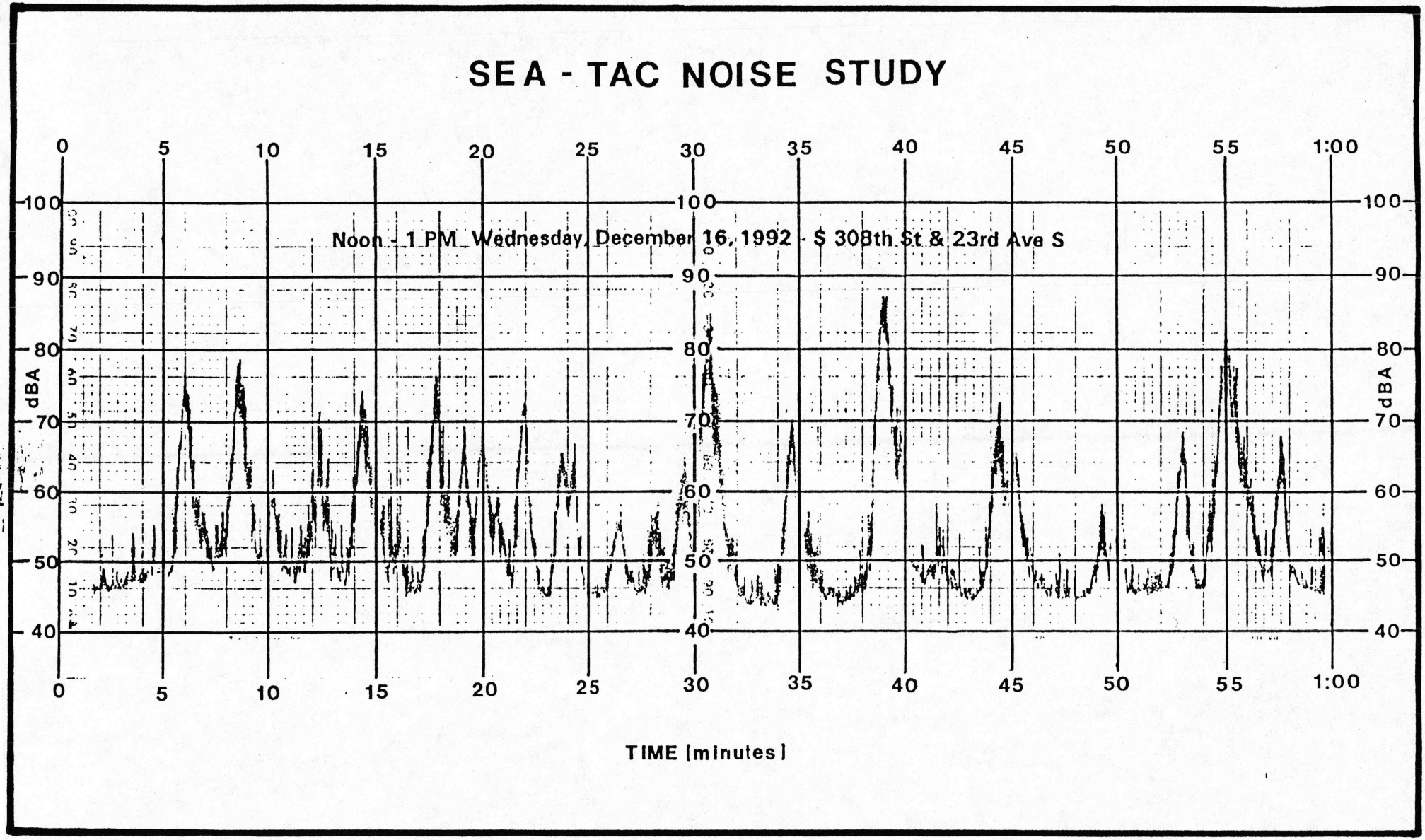
Hour	Run Time h:m:s	Leq dBA	Ln dBA	NOISE DATA Lmax dBA	Lmin dBA	Snd Exp Level	Calb'n dBA	AIRCRAFT OBSERVATIONS Dir	TO	L	TOT	WEATHER OBSERVATIONS Temp F	Wd Spd mph	Wind Dir	Sky	Comments
5-9 PM	4:00:07	49.8		71.3	34.2	91.2	110.0					29	<3	-	CLR	
9-10 PM	57:40	45.7		65.3	35.0	81.0						23	<3	-	CLR	
10-11 PM	58:57	47.0	57.0	71.7	32.7	82.4						23	<3	-	CLR	
11-12 PM	58:56	41.9	41.9	62.3	33.1	77.3						23	<3	-	CLR	
12-6 AM	5:58:56	42.8	52.8	78.1	31.2	86.0						23	<3	-	CLR	
6-7 AM	58:46	48.3	58.3	68.3	37.2	83.7						23	<3	-	CLR	
7-8 AM	58:58	51.0		72.1	39.1	86.3						24	<3	-	CLR	
8-9 AM	59:02	50.4		66.8	41.7	85.7						24	<3	-	CLR	
9-10 AM	58:50	49.0		67.6	40.2	84.3						24	<3	-	CLR	
10-12 AM	1:58:59	54.6		80.3	36.5	93.0						24	<3	-	CLR	
12-1 PM	58:34	52.3		74.7	36.8	87.6						24	<3	-	CLR	
1-2 PM	58:59	56.2		78.5	35.7	91.5						26	<3	-	CLR	
2-4 PM	1:58:51	54.3		80.3	36.8	92.7						26	<3	-	CLR	
4-5 PM	58:56	51.4		72.5	40.2	86.7	109.9					25	<3	-	CLR	
TOTALS	23:44:31	50.7				99.9										
*5PM-5PM		56.2	HI	80.3	41.7											
		41.9	LOW	65.3	31.2											
Ldn = 53.2		14.3	RNG	15.0	10.5											

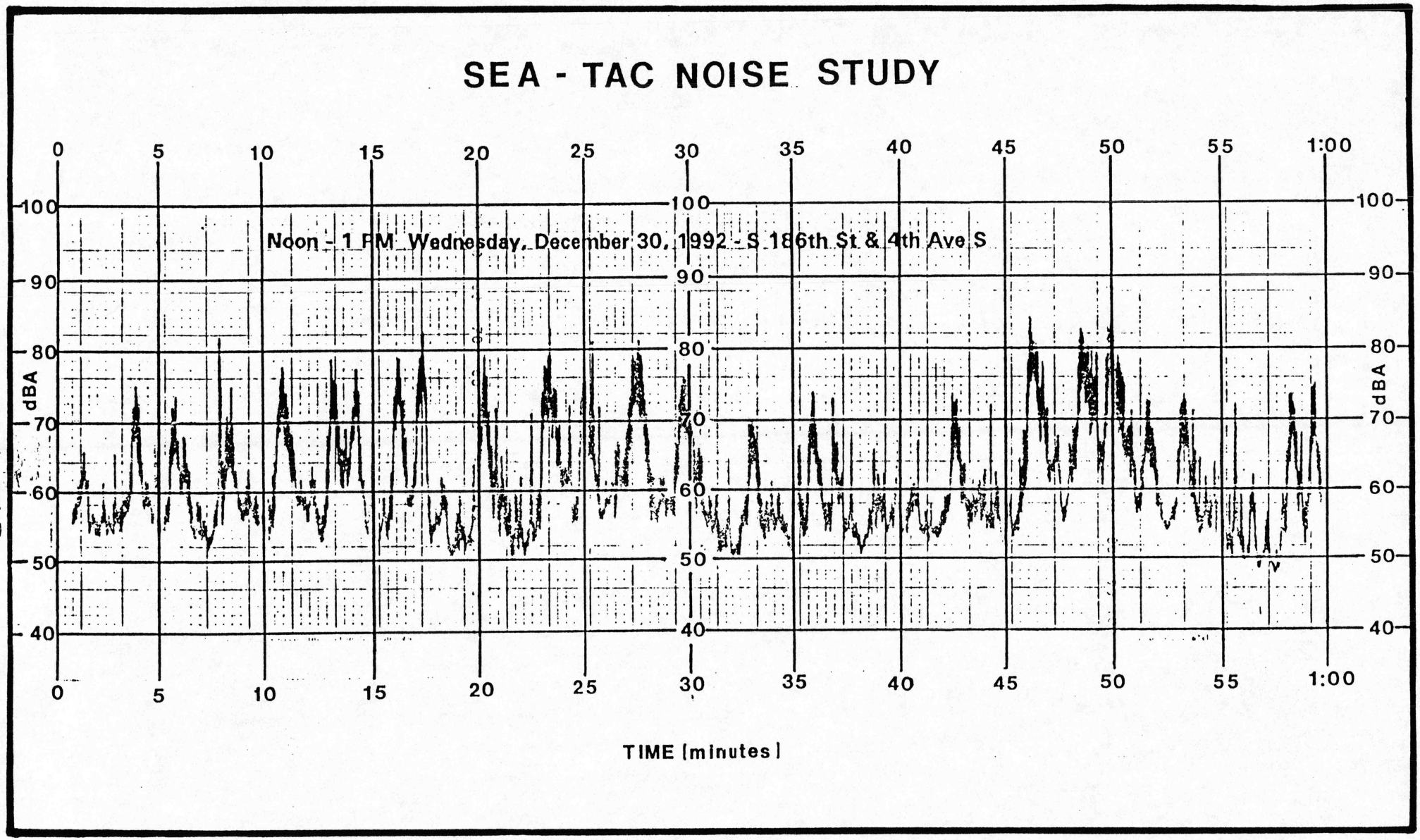
*NOTES: Data taken fron 5PM Wed to 5PM Thurs. Noise included aircraft overflights outbound from Sea-Tac heading east and south. Other sources of noise included cars, barking dogs, sirens and other noises normally associated with suburban residential activity.


SEA - TAC NOISE STUDY
Noon - 1 PM Wednesday, December 30, 1992 - S 186th St & 4th Ave S
dBA
TIME (minutes)
0
5
10
15
20
25
30
35
40
45
50
55
1:00
100
90
80
70
60
50
40

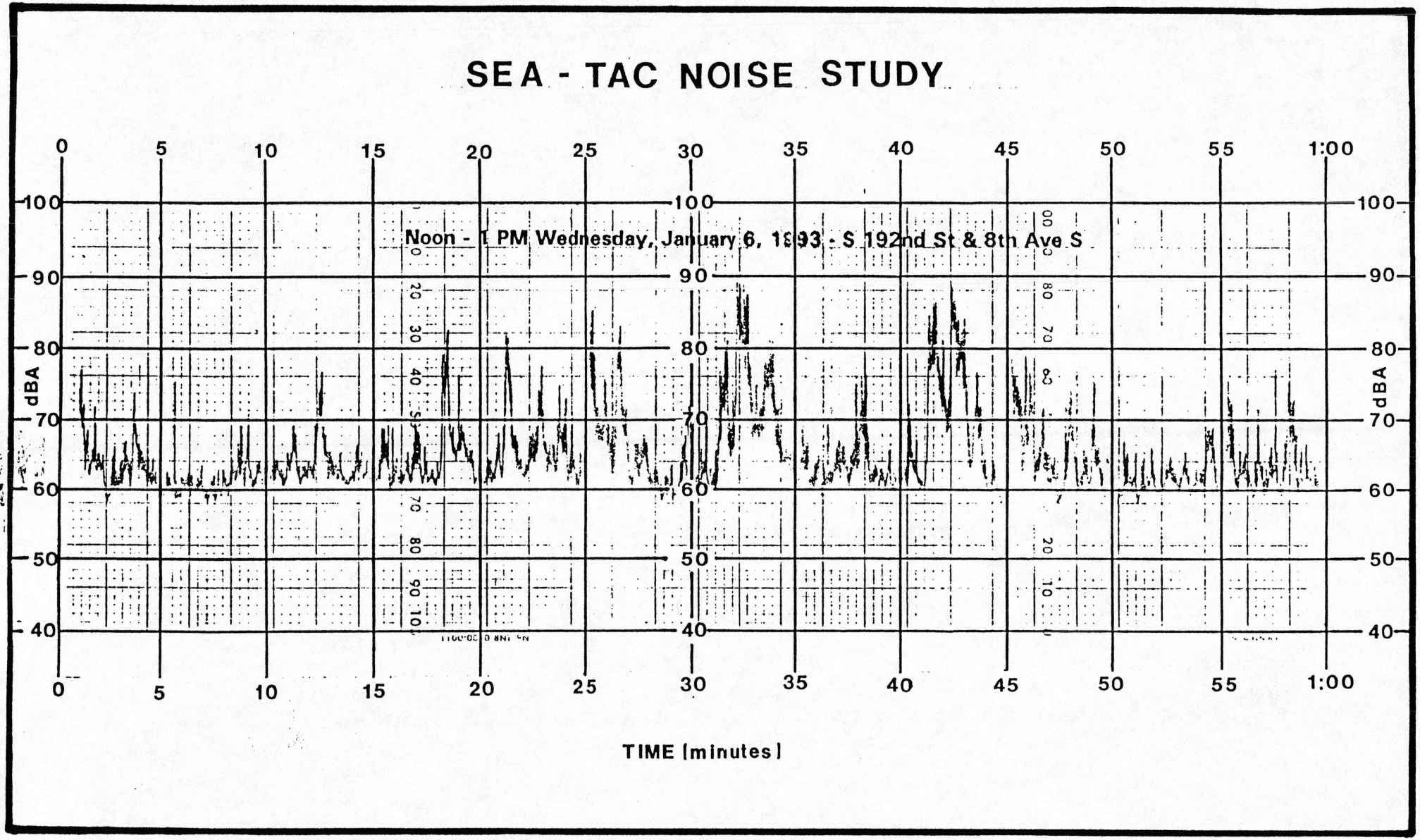

SEA - TAC NOISE STUDY
Noon - 1 PM Wednesday, December 2, 1992 - S 192nd St & 8th Ave S.
dBA
TIME (minutes)
0
5
10
15
20
25
30
35
40
45
50
55
1:00
100
90
80
70
60
50
40

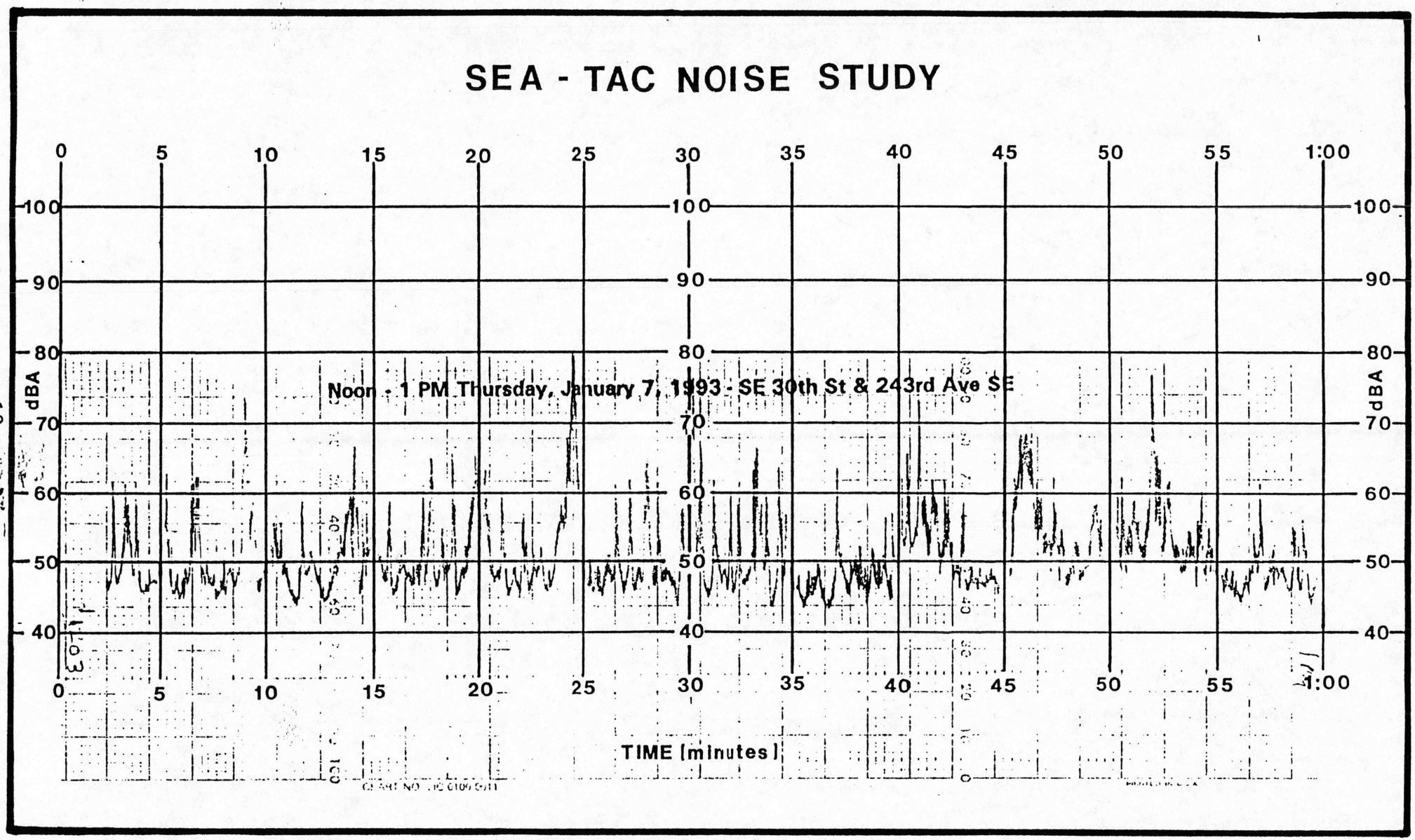

SEA - TAC NOISE STUDY
Noon - 1 PM Wednesday, December 9, 1992 - SW 162nd St & 9th Ave SW
dBA
100
90
80
70
60
50
40
0
5
10
15
20
25
30
35
40
45
50
55
1:00
TIME (minutes)


SEA - TAC NOISE STUDY
Noon - 1 PM Wednesday, December 16, 1992 - S 308th St & 23rd Ave S
dBA
TIME [minutes]
0
5
10
15
20
25
30
35
40
45
50
55
1:00
100
90
80
70
60
50
40


SEA - TAC NOISE STUDY
Noon - 1 PM Wednesday, December 30, 1992 - S 186th St & 4th Ave S
dBA
dBA
100
90
80
70
60
50
40
0
5
10
15
20
25
30
35
40
45
50
55
1:00
TIME [minutes]

SEA - TAC NOISE STUDY




SEA - TAC NOISE STUDY
0
5
10
15
20
25
30
35
40
45
50
55
1:00
100
90
80
70
60
50
40
dBA
Noon - 1 PM Thursday, January 7, 1993 - SE 30th St & 243rd Ave SE
TIME [minutes]

CITY OF NORMANDY PARK

RESOLUTION NO. 627

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF NORMANDY PARK, WASHINGTON, calling for the timely completion of noise mitigation obligations promised by the Port of Seattle (POS or the Port) in conjunction with the second runway at Seattle-Tacoma International Airport and requesting that the 1991 Noise Exposure Map (NEM) be used to establish boundaries of the Noise Remedy Program area.

WHEREAS, the 1973 award winning Sea-Tac Communities Plan presented a comprehensive written commitment by the Port of Seattle (POS) to mitigate Sea-Tac's noise pollution impacts on the surrounding community [Sea-Tac Communities Plan Ch. 5.2, 6.2], and

WHEREAS, the federal standard for aircraft noise establishes the area within the 75 Ldn (average day/night noise level) noise contour as totally incompatible for residential and public land use and establishes the area from 65 to 75 Ldn as incompatible for those same residential and public land uses unless noise attenuation is incorporated into the design and construction of the structures [14 C.F.R. (Code of Federal Regulations), Part 150, Appendix A, Table 1], and

WHEREAS, after operational implementation of the second runway at Sea-Tac International Airport in 1972, the Port of Seattle claimed that aircraft noise had peaked in 1973 and that noise exposure contours would decrease in the future [Sea-Tac Communities Plan Ch. 7.2.1], and

WHEREAS, POS predictions that noise exposure contours would shrink have proven false. [From a compilation of official Port of Seattle noise contour maps 1973, 1984/85 and 1991. Also letter from Diane Summerhays, Sea-Tac Noise Abatement Program Manager dated 17, Aug. 1992.], and

WHEREAS, over 67,000 people have for 20 years been subjected daily to aircraft noise levels deemed incompatible with human habitation [1991 NEM], and

WHEREAS, POS represented that it would include all noise exposure areas "permanently" above ANE 40 in land acquisition programs (Adjusted Noise Exposure 40 translates to 75 Ldn) [Sea-Tac Communities Plan Ch. 6.2.4, p.3 and Federal Aviation Administration (FAA) document "The Sea-Tac Success Story", April 1978, pp. 41-51], and

WHEREAS, to date, the majority of lands purchased by POS under the Noise Remedy Program have actually been for Federally mandated clear zones or other safety criteria [Sea-Tac Area Update, Sept. 1989, Part III, p. 15], and

WHEREAS, certain areas which have been within the 75 Ldn noise contour for twenty years have not been eligible for buyout under the POS Noise Remedy Program [comparison of noise exposure maps for 1973 and 1991], and

WHEREAS, POS, in its 1973 Noise Remedy Program, represented that it would fully or partially insulate 5,790 single family (SF) homes in the immediate airport area [1973 Sea-Tac Communities Plan, Plan Summary, Noise Remedies Section], and

WHEREAS, POS did not take any action on noise insulation for the next thirteen years [Earl Mundy, Manager of Noise Remedy, Sea-Tac International Airport], and

WHEREAS, POS expanded the Noise Remedy Program in 1985 to 10,000 SF homes roughly within the 65+ Ldn noise contours projected for the year 200 [14 C.F.R., part 150 and POS brochure "Jet Aircraft Noise and You"], and

WHEREAS, from 1985-1991 the average rate of insulation was 80 homes per year. At that rate it would have taken 125 years to insulate the 10,000 SF homes within the Noise Remedy Program boundaries, and

WHEREAS, in 1991, as part of the locally negotiated "Mediated Agreement," POS again expanded the Noise Remedy Program by promising to fully pay for all insulation in the 10,000 SF homes within the Noise Remedy Program boundaries [Final package of mediated noise abatement actions for Sea-Tac International Airport (also known as "Mediated Agreement") Mar. 31, 1990], and

WHEREAS, to date POS has insulated fewer than 700 of the 10,000 SF homes. At the present rate of insulation of 350 homes per year (established in 1992) it will take over 26 years, until the year 2019, to insulate the remaining 9,300 homes [Earl Mundy], and

WHEREAS, the public are often unaware of the many changes to the insulation program and are generally fearful of the unlimited avigation easement used by the Sea-Tac program, and

WHEREAS, since 1973 POS has recognized an obligation to insulate public schools and multi-family residential property and since 1988 to insulate all public buildings within the Noise Remedy Program area, yet POS has never insulated any of these structures [1973 Sea-Tac Communities Plan, Section 6.2.4, Other Use Categories and "Mediated Agreement", Sec III, Part H, and 1988 POS List of Public Buildings dated 6/27/88], and

WHEREAS, numerous funding sources for noise mitigation exist including FAA funding, a federally authorized and locally levied Passenger Facility Charge (PFC) and bonding authority authorized by Washington State. [C.F.R. 14 Parts 150 and 158, and Title 53 RCW, Ch. 53.54], and

WHEREAS, the POS plans to use PFCs primarily to further expand the Sea-Tac International Airport facilities rather than to meet promises and obligations to mitigate airport noise in the surrounding community, [Sea-Tac Int'l Airport, application to impose and use passenger facility charges, 13 Apr 92, 1992-1993 PFC plan P. 70], and

WHEREAS, POS has maintained a 20 year planning period as a locally imposed criterion for establishing eligibility for buyout or insulation and has implied that program completion would be attained within that planning period or sooner. [Sea-Tac Communities Plan Ch. 5.2, 6.2, in particular 6.2.4, and POS Resolution No. 2626, section 4], and

WHEREAS, the 1973-1993 planning period is about to end without completion of POS promised noise mitigation; now therefore,

THE CITY COUNCIL OF THE CITY OF NORMANDY PARK RESOLVES AS FOLLOWS:

Sec. 1. **The Port should fulfill its commitment to deal with "permanent" Sea-Tac area aircraft noise impacts as promised in 1973.** POS should use the true and approved 1991 Noise Exposure Map to establish the boundaries of the Noise Remedy Program. POS should abandon the year 2000 predicted noise contours which are the basis for the current program and which uses a 27-year noise exposure period in violation of POS policy.

Sec. 2. **The Port should fulfill its commitment to buyout noise impacted areas.** POS should commit funds to buyout all areas proven to have been "permanently" within 75 Ldn for the 1973-1993 planning period. Buyout should be completed by the end of calendar year (CY) 1993 and should be extended to all residential structures and public buildings within the buyout area. The decision on which of these areas to buyout should be made by local governments through their land use planning process.

Sec. 3. **The Port should fulfill its commitment to insulate single family (SF) residences.**

A. POS should complete insulation of the 5,790 SF homes promised in 1973, by the end of CY 1993.

B. POS should complete insulation of the remaining 4,210 SF homes promised in 1985, by the year 2000.

C. POS should foster a proactive Noise Remedy Program that would:

1. Advertise the current program to dispel public confusion about the program changes and to alleviate fear of the program.

2. Lobby the Washington State legislature to change the current unlimited avigation easement to a limited avigation easement as used by many other airports.

D. POS should expand the insulation program to all SF residences within the new program boundaries established by the 1991 NEM.

Sec. 4. The Port should fulfill its commitment to insulate public buildings.

A. POS should insulate all public schools and multi-family residences within the 1973-1993 Noise Remedy Program area by end of calendar year 1993.

B. POS should complete insulation of the other public buildings identified for mitigation in 1988, by the year 2000.

C. POS should expand the Noise Remedy Program to include all multi-family residences and public buildings within the 65+ Ldn noise contours of the 1991 NEM.

Sec. 5. For future mitigation programs, the Port should revise its timing criteria for eligibility to and completion of Noise Remedy Programs. It is unacceptable that the POS Noise Remedy Program should use a 20-year exposure period to establish program eligibility given that the future noise exposure maps have been incorrect and have unfairly excluded eligible properties. It is unconscionable that the current program for second runway mitigation will not be completed within the 20-year planning period.

Sec. 6. The Port should not rely solely on Federal monies to fund noise mitigation commitments. The Port should dedicate a sufficient portion of PFC's to guarantee the interest stream for general obligation bonds that would fund its noise mitigation commitments within the applicable planning periods.

Sec. 7. The Port should meet all previous mitigation obligations prior to any other sizeable capital expenditures. POS should not undertake further runway or facility expansion at Sea-Tac International Airport until all properties qualifying for buyout or insulation under current programs have been purchased or insulated.

ADOPTED BY the City Council of the City of Normandy Park, Washington this 8th day of September 1992 and signed in authentication thereof this 8th day of September, 1992.

Stuart Creighton, Mayor

ATTEST:

Brenda Trent, City Clerk/Treasurer

NOISE REPORT

SEA-TAC NOISE STUDY

Prepared for:

Regional Commission on Airport Affairs
City of Normandy Park
801 S.W. 174th St
Normandy Park, WA 98166

Prepared by:

Optimum Environment
P.O. Box 114
Issaquah, WA 98027
Tel/Fax (206) 391-8292

January 1993

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INTRODUCTION

This report is a summary of the noise readings, and procedures used to monitor noise from aircraft activity at the Seattle-Tacoma International Airport. Noise levels were monitored over a five week period from December 1, 1992 to January 7, 1993 at five locations near the airport, plus a remote site in Issaquah. Octave band noise levels were also taken at one site (S 192nd St and 8th Ave S) to determine the frequency of noise from airport activity. All sites were monitored for 24 hour periods: from 1 PM Tuesday to 1 PM Wednesday of each week. Observations of takeoffs and landings were noted, along with peak sound level observed for each operation. Noise levels were also recorded on a chart recorder. All the recorded data, observations and chart recorder information is found on the Appendix to this report.

SITE CHARACTERISTICS

The five monitoring sites were selected using the following general criteria:

1) The monitoring location should be in line-of-sight of the airport, or its approaches, so arriving and departing aircraft can be observed.
2) The site should be located were other noise sources are minimal from vehicle traffic, commercial, industrial or other noise producing activity.
3) The site should be secure.
4) The site should be able accessible 24 hours a day and able to provide electricity to power a motor home lights and equipment.

All of the chosen locations were in quiet residential neighborhoods where aircraft activity was the dominant source of noise.

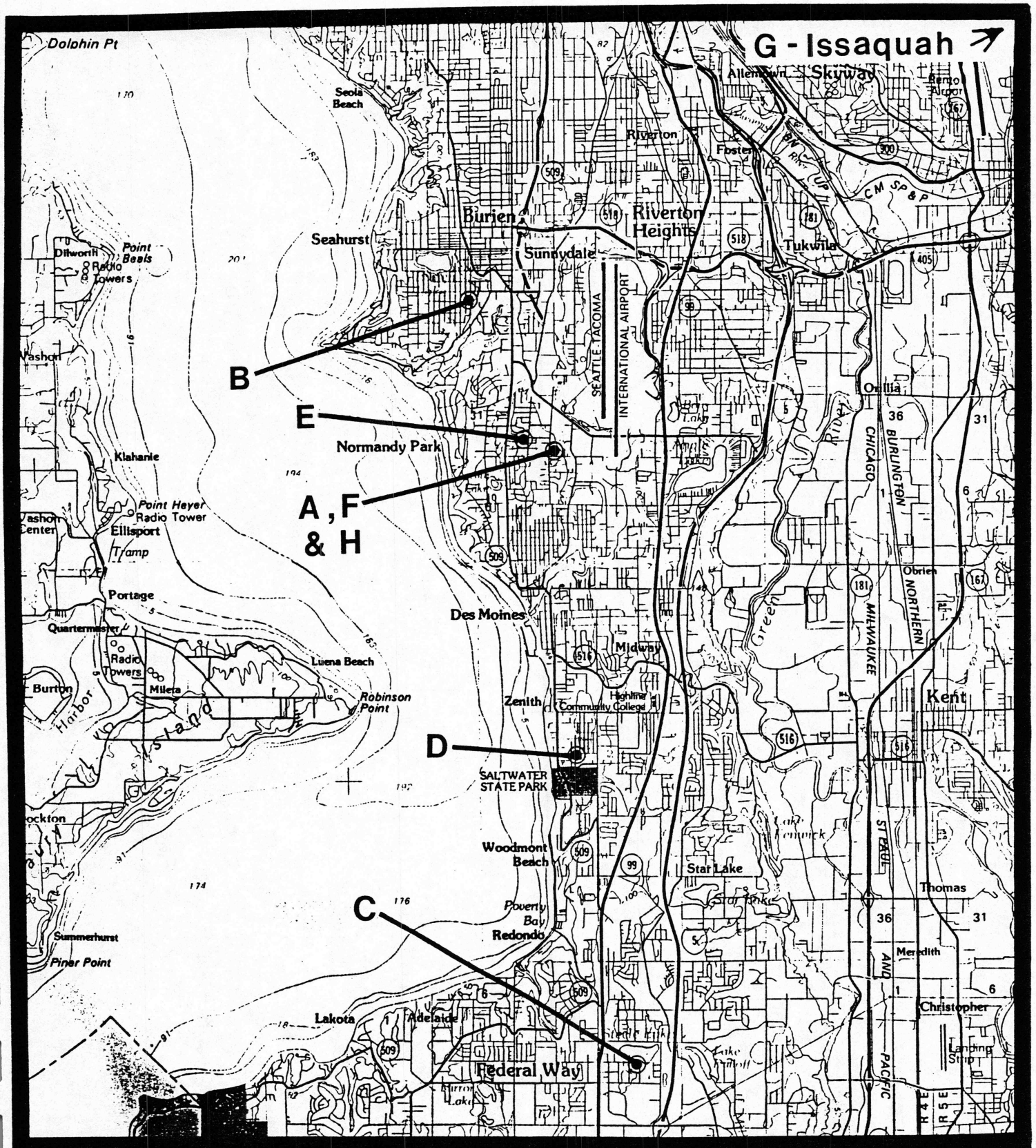
Figure 1 shows the monitoring locations. The site designations correspond with the letter of the Appendix where the data may be found.

Site A, F and H - S. 192nd St and 8th Ave S.

Site was located in the back parking lot of the Prince of Peace Lutheran Church directly west of the south end of the main runway (34R). S. 188th St was in sight of monitor about 1/2 mile away. Des Moines Memorial Dr was below the brow of the hill.

Site B - SW 162nd St and 9th Ave SW

Site was located in SW 162nd St between 8th and 9th Ave SW. Highline Community Hospital was just east of the site. There was moderate traffic on 8th Ave SW, both through traffic, and entering and leaving the hospital. The airport was in direct view of the site.



Noise Monitoring Sites

SEA - TAC NOISE STUDY

Figure 1

Site C - S. 308th St and 23rd Ave S.

Site was located just off S. 308th (2246) about 100 feet west of boundary of Steel Lake Park on the south side of Steel Lake. The site was removed from the airport so only overflights were observed. The site has no unusual sources of noise. I-5, about 1/2 mile east and over a hill was not noticeable except in the early morning hours, when an inversion layer reflected the sound and increased the background levels.

Site D - S. 248th St and 13th Ave S.

Site was located in front of 24808 - 13th Pl S, a dead end street in a single family residential area of Huntington Park. There were no arterials nearby. The site was removed from the airport so only overflights were observed.

Site E - S. 186th St and 4th Ave S.

Site was located in the front yard of 18607 - 4th Ave S, a single family residential area. The site was in view of the airport. 4th Ave S. was a typical residential street.

Site G - SE 30th St and 243rd Ave SE (Issaquah) REMOTE SITE

Site was located in the front yard of Errol Nelson, the principal author of this report. The site is in a single family suburban residential area on the East Sammamish Plateau. outbound flights from the northbound arrivals and departures were part of the noise generated at the site. Traffic and barking dogs were the typical sources of noise. Site was monitored to establish noise levels in a typical suburban residential area with minimal influence from aircraft activity.

EQUIPMENT AND OPERATING PARAMETERS

Noise measurements were taken with a Quest 2800 Type II Integrating Impulse Sound Level Meter and 1/3 Octave Band Analyzer. The meter was factory calibrated by Quest on June 29, 1992. The meter has a digital readout and memory storage for cumulative readings. Figure 2 shows a sample printout of the collected data from the noise and the octave band analyzer. Noise meter data involving aircraft activity was collected using 'A' scale weighting and fast response. Fast response has a 125 millisecond rise time in the meter, and is used to record single noise events, such as aircraft takeoffs and landings. Recorded data includes:

Leq - The average sound level energy level in weighted decibels (dB) recorded during the measurement period (run time).
Lmax - The maximum sound level, in weighted dB recorded during the measurement period.
Lmin - The minimum sound level, in weighted dB, recorded during the measurement period.

Figure 2

Sample Printout - Quest Noise Meter

QUEST MODEL 2800 IMPULSE INTEGRATING SOUND LEVEL METER
DATE:_____ SERIAL NO. _____ CALIBRATED: _____

LINEAR WEIGHTING / FAST RESPONSE

LEQ(dB)	MAX(dB)	MIN(dB)	SEL(dB)	RUN-TIME	OL-TIME
49.3	57.6	33.6	49.8	:00:01	

EXCEEDANCE LEVELS(dB)

	0	1	2	3	4	5	6	7	8	9
L00	58	58	58	58	58	58	57	57	57	56
L10	56	56	54	54	54	54	54	53	53	53
L20	52	52	52	51	51	50	50	50	50	50
L30	50	49	49	49	48	48	48	47	47	46
L40	46	46	45	45	45	44	44	44	44	44
L50	42	42	42	42	42	42	41	41	41	40
L60	40	40	40	40	39	39	39	38	38	38
L70	38	38	38	37	37	37	37	37	36	36
L80	36	36	36	36	35	35	35	35	35	35
L90	35	35	35	35	35	34	34	34	34	34

MODEL OB-300 1/1-1/3 OCTAVE FILTER SET - SERIAL NO. _____

FREQ(Hz)	LEQ(dB)	MAX(dB)	MIN(dB)	SEL(dB)	RUN-TIME	OL-TIME
12.5	79.6	85.7	65.4	84.9	:00:03	
16	71.1	77.1	62.4	76.5	:00:03	
20	76.6	82.3	62.1	82.0	:00:03	
25	77.1	84.2	67.7	82.5	:00:03	
31.5	69.5	73.7	63.9	74.8	:00:03	
40	67.2	75.6	59.4	72.6	:00:03	
50	70.9	75.9	66.6	76.3	:00:03	:00:01
63	65.5	71.4	59.8	70.9	:00:03	
80	60.0	63.9	56.8	65.4	:00:03	
100	63.3	66.2	61.7	68.6	:00:03	
125	75.7	77.1	72.2	81.1	:00:03	
160	54.2	56.4	53.1	59.5	:00:03	
200	49.1	52.7	46.7	54.5	:00:03	
250	56.0	57.9	54.9	61.4	:00:03	
315	50.7	58.7	47.1	56.1	:00:03	
400	54.0	56.8	52.3	59.3	:00:03	
500	55.5	58.3	53.1	60.9	:00:03	
630	54.0	56.1	52.7	59.4	:00:03	
800	50.5	53.4	44.1	55.8	:00:03	
1,000	47.8	50.1	44.8	53.1	:00:03	
1,250	45.6	50.1	44.4	51.0	:00:03	
1,600	43.4	45.2	42.2	48.7	:00:03	
2,000	41.8	45.2	40.3	47.2	:00:03	
2,500	34.6	36.6	32.4	40.0	:00:03	
3,150	49.3	57.6	33.6	49.8	:00:01	
4,000	30.1	34.3	27.2	35.4	:00:03	
5,000	31.2	43.3	23.1	36.5	:00:03	
6,300	25.1	27.2	23.4	30.5	:00:03	
8,000	24.6	25.7	24.2	30.0	:00:03	
10,000	22.3	23.8	21.6	27.6	:00:03	
12,500	21.8	22.7	21.2	27.2	:00:03	
16,000	21.7	27.9	16.7	27.1	:00:03	:00:01
20,000	20.9	22.3	17.8	26.2	:00:03	

SEL - The Sound Exposure Level. The total sound energy, in weighted dB, averaged to a period of one second during the measurement period.

RUN TIME - The period, in hours minutes and seconds, in the measurement period.

OL TIME - Overload time. The period, in hours, minutes and seconds, the meter exceeded the maximum permissible level on the scale setting.

The printout shown in Figure 2 also the percent exceedance levels, in dB, for each measurement period.

The octave filter set, either octave band or 1/3 octave band, gives the same information at each frequency setting.

The meter was field calibrated before and after the monitoring periods and at three intervals, 6 PM, midnight and 6 AM during the monitoring period. A foam windscreen was used on the microphone during the entire monitoring period. The microphone was pointed at the source of airport noise during all measurements. The direction angle varied from 20 to 90 degrees depending on the geometry between the between the airport and the monitoring site and the 'average' aircraft altitude in the direction of the microphone.

The noise data was also recorded on a Linear 142 analog chart recorder. The chart recorder provides a continuous paper record of noise activity at each monitoring location. The recorder was also calibrated when the noise meter was calibrated.

Data collected from the noise meter was printed at the top of each hour during the monitoring period, reset and started for another hour. The meter was left running during the midnight to 6 AM period with the Leq noted at the top of each hour during the night. Mr Steve Adler was present from noon to midnight for each Tuesday monitoring period and Mr Errol Nelson was present from 6 AM to 1 PM for each Wednesday monitoring period. Only Mr Adler and Mr Nelson operated the noise meter, chart recorder, printer and calibrated the instruments.

In the data summaries there are several instances where the noise meter exceeded the maximum setting on the scale, usually 105.6 dB. All of these exceedances were very brief and were due to electrical surges. There were no sources of noise that caused these anomalies. There were, on several occasions, power failures, and some accumulated data was lost from the noise meter. In those cases, it was possible to reconstruct much of the necessary noise levels from the chart recorder data.

The noise data was supplemented by manually recording the observations of each arriving and departing aircraft using volunteers from RCAA. They recorded the time, type and peak sound level for each aircraft activity for the entire 24 hour period at each site. The ability of the observers to correctly identify aircraft type ranged from very good to so-so. Therefore, some of the observations record the general class of aircraft.

Table A

DATA SUMMARY - SEA TAC NOISE STUDY

DATE: Tue Dec 1 & Wed Dec 2, 1992 **LOCATION:** 290' N & 340' E of Intersection of S. 192nd St and 8th Ave S.

Hour	Run Time h:m:s	NOISE DATA Leq dBA	Ln dBA	Lmax dBA	Lmin dBA	Snd Exp Level	Calb'n dBA	AIRCRAFT OBSERVATIONS Dir	TO	L	TOT	WEATHER OBSERVATIONS Temp F	Wd Spd mph	Wind Dir	Sky	Comments
12-1 PM	27:38	71.5		89.4	48.9	103.8	110.2	NB	22	18	40	40	7-12	N	CDY	
1-2 PM	59:45	69.4		92.8	44.8	104.8		NB	27	11	38	40	7-12	N	CDY	
2-3 PM	58:14	70.7		94.3	53.1	106.0		NB	23	16	39	40	5-6	N	CDY	
3-4 PM	42:16	67.6		88.7	54.2	101.6		NB	22	25	47	40	5	NE	CDY	
4-5 PM	58:22	66.4		87.9	54.2	101.7		NB	22	18	40	40	8	N	CDY	
5-6 PM	58:46	70.8		92.1	55.3	106.2	110.1	NB	29	36	65	38	7-8	N	CDY	
6-7 PM	59:26	69.7		92.1	55.3	105.1		NB	32	40	72	38	7-8	N	CDY	
7-8 PM	55:49	70.4		88.7	50.4	105.5		NB	26	29	55	38	7	N	CDY	
8-9 PM	58:34	66.8		89.8	51.6	102.1		NB	21	28	49	38	5	N	CDY	
9-10 PM	58:31	65.5		88.7	51.9	100.8		NB	8	26	34	40	5	N	CDY	
10-11 PM	58:39	65.4	75.4	87.9	50.4	100.8		NB	13	10	23	40	7	N	P/C	
11-12 PM	1:00:20	68.5	78.5	94.3	49.7	104.0	110.1	NB	13	6	19	42	6	N	P/C	
12-1 AM		57.2	67.2	83.4	-			NB	1	5	6	42	7-8	N	OC	AMBIENT - 50dBA
1-2 AM		56.4	66.4	79.3	-			NB	3	3	6	40	6	N	OC	AMBIENT - 51dBA
2-3 AM		67.4	77.4	92.4	-			NB	2	2	4	40	5	N	OC	AMBIENT - 50dBA
3-4 AM		56.3	66.3	74.1	-			NB	0	2	2	39	5	N	OC	
4-5 AM		61.3	71.3	87.2	-			NB	2	5	7	38	5	N	P/C	AMBIENT - 49dBA
5-6 AM		59.8	69.8	80.2	-			NB	2	6	8	38	4	N	P/C	AMBIENT - 53dBA
*12-6 AM	5:52:40	60.7		92.4	45.2	103.8	110.1									
6-7 AM	56:14	64.9	74.9	83.8	46.7	100.0		NB	16	14	30	35	7	N	P/C	
7-8 AM	57:54	73.4		95.1	56.4	108.7		NB	34	15	49	36	3	N	P/C	
8-9 AM	59:03	71.9		94.3	54.9	107.3		NB	41	11	52	38	8-10	N	CLR	
9-10 AM	58:30	69.7		93.6	52.7	105.0		NB	16	24	40	40	8-10	N	CLR	
10-11 AM	58:39	67.7		87.9	50.4	103.1		NB	24	27	51	45	8-10	N	CLR	
11-12 AM	58:55	66.5		87.6	50.8	101.8		NB	25	42	67	49	10-12	N	CLR	
12-1 PM	58:46	69.2		91.3	50.4	104.6	110.1	NB	29	23	52	50	8-10	N	CLR	
TOTALS	23:09:23	68.3				117.3			431	424	855					
*1PM-1PM		73.4	HI	95.1	56.9											
		56.3	LOW	80.2	45.2											
Ldn = 71.8		17.1	RNG	14.9	11.7											

*NOTES: Only 1PM-1PM values used in the data analysis. Midnight to 6 AM: hourly Leq's derived from cumulative Leq read at the top of each hour; Lmax derived from loudest observed aircraft operation that hour: Lmin shown is the lowest for the 6 hour measurement period. No chart recorder data available for the midnight - 6 AM period.

Table B

DATA SUMMARY - SEA TAC NOISE STUDY

DATE: Tue Dec 8 & Wed Dec 9, 1992 **LOCATION:** 200' E of Intersection of SW 162nd St and 9th Ave SW

Hour	Run Time h:m:s	NOISE DATA Leq dBA	Ln dBA	Lmax dBA	Lmin dBA	Snd Exp Level	Calb'n dBA	AIRCRAFT OBSERVATIONS Dir	TO	L	TOT	WEATHER OBSERVATIONS Temp F	Wd Spd mph	Wind Dir	Sky	Comments
12-1 PM	14:55	58.7		75.9	50.4	88.1	110.0	SB	21	15	36	45	10	N	OC	
1-2 PM	51:04	59.0		77.4	48.6	93.7		SB	20	8	28	45	<3	-	OC	RAIN
2-3 PM	57:05	56.3		77.4	46.3	91.6		SB	16	6	22	43	<3	-	OC	RAIN
3-4 PM	58:24	56.4		74.8	48.2	91.7		SB	21	13	34	43	<3	-	OC	RAIN
4-5 PM	58:04	54.5		79.7	47.4	89.8		SB	19	23	42	45	<3	-	OC	
5-6 PM	58:02	56.1		76.7	48.2	91.4	110.1	SB	19	30	49	40	<3	-	OC	RAIN
6-7 PM	55:03	57.7		75.2	36.9	92.8		SB	26	31	57	40	<3	-	OC	OCC GUSTS
7-8 PM	59:26	57.5		73.7	47.4	92.8		SB	25	31	56	40	7	S	OC	RAIN
8-9 PM	58:44	56.5		75.2	47.1	91.9		SB	13	24	37	40	7-8	S	OC	
9-10 PM	58:08	53.6		68.4	47.1	89.0		SB	10	27	37	40	5-7	S	OC	
10-11 PM	58:41	54.5	64.5	69.9	43.1	89.9		SB	9	11	20	40	3-4	SE	OC	RAIN
11-12 PM	55:04	56.8	66.8	66.6	44.4	91.9	110.1	SB	9	11	20	40	5-7	S	OC	RAIN
12-1 AM		54.2	64.2	73.3	45.5			SB	6	9	15	39	4-5	S	OC	RAIN
1-2 AM		50.7	60.7	69.4	44.0			SB	3	1	4	38	3-5	S	OC	RAIN
2-3 AM		51.6	61.6	65.8	42.2			SB	0	3	3	40	<3	-	OC	
3-4 AM		49.1	59.1	71.4	43.0			SB	1	0	1	40	<3	-	OC	
4-5 AM		48.7	58.7	72.6	43.5			SB	2	2	4	40	5-6	S	OC	
5-6 AM		48.4	58.4	66.6	44.5			SB	2	4	6	39	3-5	S	OC	
*12-6 AM	5:53:24	50.7		83.4	42.2	93.9	110.1									
6-7 AM	54:25	53.1	63.1	74.4	40.7	88.2		SB	9	18	27	40	<3	-	OC	
7-8 AM	58:59	58.9		75.6	48.2	94.2		SB	40	15	55	40	<3	-	OC	
8-9 AM	58:34	56.5		77.1	45.2	91.8		SB	32	10	42	41	<3	-	OC	
9-10 AM	59:04	54.8		74.1	44.8	90.2		SB	15	21	36	45	<3	-	CDY	
10-11 AM	58:05	54.7		73.7	45.6	90.0		SB	22	27	49	45	<3	-	P/C	
11-12 AM	59:30	56.2		76.3	45.9	91.6		SB	21	32	53	45	4-6	-	P/C	
12-1 PM	58:27	55.1		75.9	44.4	90.5	110.0	SB	29	28	57	45	4-6	-	CDY	
TOTALS	23:08:13	55.5				104.5			391	397	788					
*1PM-1PM		59.0	HI	83.4	48.6											
		48.4	LOW	68.4	36.9											
	Ldn = 59.8	11.6	RNG	15.0	11.3											

*NOTES: Only 1PM-1PM values used in the data analysis. Midnight to 6 AM: hourly Leq's derived from cumulative Leq read at the top of each hour; Lmax derived from loudest observed aircraft operation that hour: Lmin shown is the lowest from the chart recorder data.

Table C

DATA SUMMARY - SEA TAC NOISE STUDY

DATE: Tue Dec 15 & Wed Dec 16, 1992 **LOCATION:** Approx 100' W of (Intersection)* of S. 308th St and 23rd Ave S.

Hour	Run Time h:m:s	NOISE DATA Leq dBA	Ln dBA	Lmax dBA	Lmin dBA	Snd Exp Level	Calb'n dBA	AIRCRAFT OBSERVATIONS Dir	TO	L	TOT	WEATHER OBSERVATIONS Temp F	Wd Spd mph	Wind Dir	Sky	Comments
12-1 PM	1:01:25	69.0		93.6	39.6	104.4	110.0	SB	25	0	25	42	<3	-	CLR	
1-2 PM	57:12	68.3		90.9	41.4	103.6		SB	25	0	25	39	<3	-	CLR	
2-3 PM	58:00	67.4		93.9	40.7	102.6		SB	26	0	26	39	<3	-	CLR	
3-4 PM	58:51	60.9		*105.6	44.8	96.3		SB	24	0	24	38	<3	-	CLR	
4-5 PM	58:36	60.0		78.2	46.3	95.3		NB	0	20	20	36	<3	-	CLR	
5-6 PM	58:12	62.2		79.7	50.4	97.5	110.1	NB	0	31	31	36	<3	-	CLR	
6-7 PM	58:02	61.9		78.2	42.9	97.2		NB	0	24	24	36	<3	-	CLR	
7-8 PM	59:26	62.0		77.1	52.3	97.4		NB	0	23	23	35	<3	-	CLR	
8-9 PM	1:01:14	60.6		78.2	51.6	96.1		SB	0	14	14	31	<3	-	CLR	
9-10 PM	57:27	61.5		81.6	51.2	96.8		SB	6	0	6	30	<3	-	CLR	
10-11 PM	58:19	62.9	72.9	85.3	45.6	98.2		SB	9	0	9	30	<3	-	CLR	
11-12 PM	57:08	58.6	68.6	81.2	45.2	93.8	110.1	SB	7	0	7	30	<3	-	CLR	
12-1 AM		63.7	73.7	87.5	44.8	99.3		SB	2	0	2	30	<3	-	CLR	
1-2 AM		61.4	71.4	77.8	40.3	97.0		SB	4	0	4	30	<3	-	CLR	
2-3 AM		58.0	68.0	74.0	40.8	93.6		SB	1	0	1	30	<3	-	CLR	
3-4 AM		58.5	68.5	70.4	41.6	94.1		SB	1	0	1	30	<3	-	CLR	
4-5 AM		60.3	70.3	79.4	44.5	98.1		NB	0	7	7	29	<3	-	CLR	
5-6 AM		62.0	72.0	81.9	54.4	97.6		NB	4	1	5	30	<3	-	CLR	
*12-6 AM		61.1		87.5	40.3		110.1									
6-7 AM	53:38	61.2	71.2	83.1	46.3	96.2		SB	8	0	8	30	<3	-	CLR	
7-8 AM	58:34	67.4		84.9	54.6	102.7		SB	32	0	32	32	3	-	CLR	
8-9 AM	58:45	67.4		86.8	50.4	102.7		SB	28	0	28	30	3	-	CLR	
9-10 AM	58:48	63.9		85.3	46.3	99.3		SB	15	0	15	32	<3	-	CDY	
10-11 AM	58:59	65.3		88.3	45.9	100.6		SB	18	0	18	32	<3	-	CDY	
11-12 AM	58:52	64.2		84.2	44.1	99.5		SB	14	0	14	34	<3	-	CDY	
12-1 PM	58:51	65.8		87.9	42.2	101.2	110.2	SB	22	0	22	34	<3	-	CDY	
TOTALS	17:28:54	64.2				112.9			271	120	391					
*1PM-1PM		68.3	HI	93.9	54.6											
		58.0	LOW	70.4	40.7											
	Ldn = 68.3	10.3	RNG	23.5	13.9											

*NOTES: Only 1PM-1PM values used in the data analysis. Intersection of S 308th and 23rd S is end of road at west boundary of Steel Lake park. 3-4 PM: 105.6 dB Lmax due to electrical power surge - not a noise reading. Midnight to 6 AM: Had a momentary power failure at 2:40 AM. Hourly Leq's, Lmin's and SEL's derived from chart recorder data; Lmax derived from loudest observed aircraft operation that hour:

Table D

DATA SUMMARY - SEA TAC NOISE STUDY

DATE: Tue Dec 22 & Wed Dec 23 1992 **LOCATION:** Approx 150' S of Intersection of S. 248th St and 13th Ave S.

Hour	Run Time h:m:s	NOISE DATA Leq dBA	Ln dBA	Lmax dBA	Lmin dBA	Snd Exp Level	Calb'n dBA	AIRCRAFT OBSERVATIONS Dir	TO	L	TOT	WEATHER OBSERVATIONS Temp F	Wd Spd mph	Wind Dir	Sky	Comments
12-1 PM	57:00	66.3		93.8	45.2	102.1	110.1	SB	28	0	28	50	7-8	S	OC	
1-2 PM	59:28	64.7		87.9	44.8	100.1		SB	26	0	26	50	5	S	OC	
2-3 PM	57:41	66.8		89.8	43.7	102.1		SB	21	0	21	50	2-5	S	OC	
3-4 PM	1:00:07	62.8		85.7	44.1	98.3		SB	18	0	18	48	6	S	OC	
4-5 PM	56:01	64.3		85.7	39.9	99.4		SB	17	0	17	48	5-7	S	OC	GUSTS TO 10 MPH
5-6 PM	58:08	63.3		86.8	40.7	98.7	110.1	SB	17	0	17	50	5	S	OC	
6-7 PM	50:24	67.6		92.9	46.8	102.3		SB	22	0	22	48	<3	S	OC	
7-8 PM	59:41	69.0		89.1	38.4	104.4		SB	24	0	24	48	5-6	S	OC	
8-9 PM	58:30	68.3		92.8	38.4	103.7		SB	17	0	17	48	<3	S	OC	
9-10 PM	57:30	63.3		86.8	36.6	98.5		SB	11	0	11	45	4-5	S	OC	
10-11 PM	57:01	61.8	71.8	89.8	35.4	97.0		SB	9	0	9	45	3-6	S	OC	
11-12 PM	57:46	58.4	68.4	82.7	35.1	93.7	110.1	SB	9	0	9	45	<3	S	OC	
12-1 AM		60.8	70.8	90.6	-			SB	3	0	3	45	<3	S	OC	
1-2 AM		59.3	69.3	83.1	-			SB	2	0	2	45	<3	S	OC	
2-3 AM		56.3	66.3	*	-			SB	0	0	0	45	<3	S	OC	
3-4 AM		55.2	65.2	*	-			SB	0	0	0	45	<3	S	OC	
4-5 AM		60.5	70.5	80.4	-			SB	1	0	1	45	<3	S	OC	
5-6 AM		58.0	68.0	87.2	-			SB	1	0	1	45	<3	S	OC	
*12-6 AM	5:57:32	58.7		105.6*	33.2	101.8	110.1	SB								
6-7 AM	55:15	64.2	74.2	88.7	41.4	99.3		SB	11	0	11	47	<3	S	P/C	
7-8 AM	58:56	69.4		89.4	41.4	104.8		SB	30	0	30	47	<3	S	P/C	
8-9 AM	58:35	68.5		92.8	42.1	103.8		SB	34	0	34	47	8-12	S	CDY	
9-10 AM	1:02:11	66.6		92.4	41.8	102.2		SB	22	0	22	47	3-5	S	CDY	
10-11 AM	56:00	65.6		87.6	39.9	100.8		SB	16	0	16	50	3-5	S	CDY	
11-12 AM	1:00:15	66.7		90.9	40.3	102.1		SB	18	0	18	50	3-5	S	CDY	
12-1 PM	57:32	64.7		90.2	41.8	99.9	110.1	SB	30	0	30	48	3-5	S	CDY	THIN CLOUDS/SUN
TOTALS	23:18:33	65.1				114.4			387	0	387					
*1PM-1PM		69.4	HI	92.9	46.8											
		55.2	LOW	82.7	33.2											
Ldn = 68.3		14.2	RNG	10.2	13.6											

*NOTES: Only 1PM-1PM values used in the data analysis. Chart recorder failure - No chart recorder data taken during this monitoring period. Midnight to 6 AM: 105.6 dB Lmax due to electrical power surge - not a noise reading. Hourly Leq's derived from cumulative Leq read at the top of each hour; Lmax derived from loudest observed aircraft operation that hour - there were no aircraft overflights between 2 and 4 AM.; Lmin shown is the lowest for the 6 hour measurement period.

Table E

DATA SUMMARY - SEA TAC NOISE STUDY

DATE: Tue Dec 29 & Wed Dec 30, 1992 **LOCATION:** 70' S and 50' W of Intersection of S. 186th St & 4th Ave S.

Hour	Run Time h:m:s	NOISE DATA Leq dBA	Ln dBA	Lmax dBA	Lmin dBA	Snd Exp Level	Calb'n dBA	AIRCRAFT OBSERVATIONS Dir	TO	L	TOT	WEATHER OBSERVATIONS Temp F	Wd Spd mph	Wind Dir	Sky	Comments
12-1 PM	58:43	64.4		84.6	47.1	99.8	110.0	SB	29	15	44	44	5	NE	CLR	
1-2 PM	57:44	63.5		86.8	48.9	98.8		NB	28	18	46	44	3	NE	CLR	
2-3 PM	58:50	63.1		82.7	48.2	98.4		NB	25	19	44	44	<3	E	CLR	
3-4 PM	58:07	67.3		89.4	44.8	102.6		NB	24	22	46	43	<3	E	CLR	
4-5 PM	58:42	66.7		86.8	52.3	102.1		NB	23	13	36	40	<3	N	CLR	
5-6 PM	58:24	67.1		91.7	51.9	102.5	110.1	NB	13	27	40	37	<3	-	P/C	
6-7 PM	55:46	69.6		87.9	54.2	104.8		NB	32	22	54	35	<3	-	CDY	
7-8 PM	57:01	70.0		89.1	50.4	105.2		NB	23	18	41	35	<3	-	P/C	
8-9 PM	58:02	68.5		87.9	47.8	103.8		NB	20	23	43	34	<3	-	SNW	
9-10 PM	59:49	63.3		86.4	47.8	98.7		NB	8	15	23	33	<3	-	SNW	
10-11 PM	58:26	62.7	72.7	85.3	45.6	98.0		NB	11	7	18	31	<3	-	SNW	
11-12 PM	53:04	62.2	72.2	84.6	45.2	97.1	110.1	NB	7	3	10	31	<3	-	SNW	
12-1 AM		64.9	74.9	88.7	45.0			NB	4	6	10	31	<3	-	SNW	
1-2 AM		62.9	72.9	91.7	44.5			NB	1	4	5	31	<3	-	SNW	
2-3 AM		60.9	70.9	85.3	41.4			*	0	1	1	31	<3	-	SNW	
3-4 AM		59.3	69.3	88.3	45.9			*	1	2	3	31	<3	-	CDY	
4-5 AM		58.0	68.0	84.6	48.5			*	2	2	4	31	<3	-	CDY	
5-6 AM		62.5	72.5	87.6	49.5			SB	3	2	5	31	<3	-	CDY	
*12-6 AM	6:00:13	62.0		91.7	41.4	105.2	110.0									
6-7 AM	55:14	64.3	74.3	90.9	50.1	99.2		SB	9	9	18	30	<3	-	CDY	
7-8 AM	58:58	68.7		*105.6	51.2	104.1		SB	39	7	46	30	<3	-	OC	
8-9 AM	58:53	65.8		83.8	48.6	101.2		SB	27	3	30	32	<3	-	OC	
9-10 AM	58:54	66.7		84.9	47.4	102.1		SB	27	15	42	33	<3	-	OC	
10-11 AM	58:49	63.8		82.7	45.2	99.2		SB	19	20	39	35	<3	-	OC	
11-12 AM	58:58	66.2		86.1	47.4	101.6		SB	20	31	51	40	<3	-	OC	
12-1 PM	58:57	66.3		85.3	45.6	101.6	109.9	SB	34	26	60	40	<3	-	OC	
TOTALS	23:22:51	65.4				114.9			429	330	759					
*1PM-1PM		70.0	HI	91.7	54.2											
		58.0	LOW	82.7	41.4											
	Ldn = 69.8	12.0	RNG	9.0	12.8											

*NOTES: Only 1PM-1PM values used in the data analysis. Midnight to 6 AM: hourly Leq's derived from cumulative Leq read at the top of each hour; Lmax derived from loudest observed aircraft operation that hour; Lmin shown is derived from the chart recorder data. Aircraft direction not noted on 2-5 AM observation sheets. 7-8 AM: 105.6 dB Lmax due to an electrical power surge - not a noise reading.

Table F

DATA SUMMARY - SEA TAC NOISE STUDY

DATE: Tue Jan 5 & Wed Jan 6, 1993 **LOCATION:** 290' N & 340' E of Intersection of S. 192nd St and 8th Ave S.

Hour	Run Time h:m:s	Leq dBA	Ln dBA	NOISE DATA Lmax dBA	Lmin dBA	Snd Exp Level	Calb'n dBA	AIRCRAFT OBSERVATIONS Dir	TO	L	TOT	WEATHER OBSERVATIONS Temp F	Wd Spd mph	Wind Dir	Sky	Comments
12-1 PM	59:51	70.9		95.4	54.5	104.6	110.1	NB	27	12	39	29	8-15	N	CLR	
1-2 PM	57:46	65.6		87.6	53.1	100.9		NB	22	19	41	29	8-15	N	CLR	
2-3 PM	58:05	66.7		89.4	51.6	102.0		NB	19	17	36	32	8-15	N	CLR	
3-4 PM	59:05	67.0		89.1	51.2	102.4		NB	30	22	52	32	5-10	N	CLR	
4-5 PM	*	67.0		90.6	54.5	102.4		NB	18	10	28	32	6-12	N	CLR	
5-6 PM	57:02	65.2		86.8	51.6	100.4	109.9	NB	13	13	26	28	6-16	N	CLR	
6-7 PM	59:15	65.9		87.9	52.7	101.3		NB	24	35	59	28	5-12	N	CLR	
7-8 PM	57:32	69.1		90.2	52.3	104.3		NB	25	24	49	28	6-8	N	CLR	
8-9 PM	57:22	67.9		90.6	50.1	103.2		NB	23	22	45	27	4-6	N	CLR	
9-10 PM	58:02	62.0		84.9	48.2	97.3		NB	10	22	32	27	5-10	N	CLR	
10-11 PM	58:13	64.7	74.7	90.6	48.2	100.0		NB	10	12	22	25	4-6	N	CLR	
11-12 PM	57:12	62.0	72.0	90.2	47.1	97.2	109.9	NB	10	9	19	25	<3	-	CLR	
12-1 AM		68.1	78.1	94.7	50.5			NB	4	7	11	25	<3	-	CLR	
1-2 AM		63.6	73.6	84.6	44.1			NB	4	2	6	25	<3	-	CLR	
2-3 AM		65.4	75.4	91.7	50.5			NB	1	0	1	22	<3	-	CLR	
3-4 AM		58.3	68.3	90.6	51.0			NB	1	2	3	22	<3	-	CLR	
4-5 AM		63.7	73.7	84.9	52.8			NB	2	4	6	22	6	N	CLR	
5-6 AM		60.0	70.0	84.9	54.5			NB	1	9	10	22	4	N	CLR	
*12-6 AM	5:57:51	64.1		94.7	44.1	107.3	110.0									
6-7 AM	1:01:31	64.6	74.6	85.3	54.7	100.2		NB	11	13	24	25	5-8	N	CLR	
7-8 AM	54:01	72.7		*105.6	54.9	107.7		NB	24	17	41	25	5-8	N	CLR	
8-9 AM	58:00	70.8		94.3	53.4	106.1		NB	30	12	42	28	5-8	N	CLR	
9-10 AM	58:47	67.1		90.9	52.3	102.4		NB	17	12	29	32	6-10	N	CLR	
10-11 AM	57:46	64.4		87.2	49.3	99.6		NB	21	23	44	35	4-9	N	CLR	
11-12 AM	58:48	64.6		87.9	48.6	100.0		NB	17	35	52	35	4-7	N	CLR	
12-1 PM	58:48	66.8		89.1	51.2	102.1	109.8	NB	36	19	55	35	4-7	N	CLR	
TOTALS	22:25:06	66.7				115.7			373	360	733					
*1PM-1PM		72.7	HI	94.7	54.9											
		58.3	LOW	84.9	44.1											
Ldn = 71.3		14.4	RNG	9.8	10.8											

*NOTES: Only 1PM-1PM values used in the data analysis. 4-5 PM: Had a momentary power failure at 4:50 PM - hourly Leq, Lmax, Lmin and SEL derived from chart recorder data. Midnight - 6 AM: hourly Leq's derived from cumulative Leq read at the top of each hour; Lmax derived from loudest observed aircraft operation that hour: Lmin derived from chart recorder data. 7-8 AM: 105.6 dB Lmax due to electrical power surge - not a noise reading.

Table G

DATA SUMMARY - SEA TAC NOISE STUDY

DATE: Wed Jan 6 & Thu Jan 7, 1993 **LOCATION:** (REMOTE) SE 30th St and 243rd Ave SE (Issaquah)

Hour	Run Time h:m:s	NOISE DATA Leq dBA	Ln dBA	Lmax dBA	Lmin dBA	Snd Exp Level	Calb'n dBA	AIRCRAFT OBSERVATIONS Dir TO L TOT	WEATHER OBSERVATIONS Temp F	Wd Spd mph	Wind Dir	Sky	Comments
5-9 PM	4:00:07	49.8		71.3	34.2	91.2	110.0		29	<3	-	CLR	
9-10 PM	57:40	45.7		65.3	35.0	81.0			23	<3	-	CLR	
10-11 PM	58:57	47.0	57.0	71.7	32.7	82.4			23	<3	-	CLR	
11-12 PM	58:56	41.9	41.9	62.3	33.1	77.3			23	<3	-	CLR	
12-6 AM	5:58:56	42.8	52.8	78.1	31.2	86.0			23	<3	-	CLR	
6-7 AM	58:46	48.3	58.3	68.3	37.2	83.7			23	<3	-	CLR	
7-8 AM	58:58	51.0		72.1	39.1	86.3			24	<3	-	CLR	
8-9 AM	59:02	50.4		66.8	41.7	85.7			24	<3	-	CLR	
9-10 AM	58:50	49.0		67.6	40.2	84.3			24	<3	-	CLR	
10-12 AM	1:58:59	54.6		80.3	36.5	93.0			24	<3	-	CLR	
12-1 PM	58:34	52.3		74.7	36.8	87.6			24	<3	-	CLR	
1-2 PM	58:59	56.2		78.5	35.7	91.5			26	<3	-	CLR	
2-4 PM	1:58:51	54.3		80.3	36.8	92.7			26	<3	-	CLR	
4-5 PM	58:56	51.4		72.5	40.2	86.7	109.9		25	<3	-	CLR	
TOTALS	23:44:31	50.7				99.9							
*5PM-5PM		56.2	HI	80.3	41.7								
		41.9	LOW	65.3	31.2								
Ldn = 53.2		14.3	RNG	15.0	10.5								

*NOTES: Data taken fron 5PM Wed to 5PM Thurs. Noise included aircraft overflights outbound from Sea-Tac heading east and south. Other sources of noise included cars, barking dogs, sirens and other noises normally associated with suburban residential activity.

Weather information, temperature, wind speed, wind direction and sky conditions were also recorded at the top of each hour by the observers. The December 1992 weather information from Sea-Tac is shown in Figure 3, as reported in the Seattle Times.

All of the noise data, aircraft observations, and weather observations are summarized for each site on the attached data summary sheets for each hour of the monitoring period, along with totals, averages and ranges where appropriate. A complete record of the data is provided in the Appendices. Data in each summary and Appendix corresponds to the letter designations shown in Figure 1.

SUMMARY OF COLLECTED DATA AND CONCLUSIONS

Table I summarizes the Ldn noise levels taken at each of the monitoring sites over each 24 hour period.

Table I
Ldn Noise Levels Near Sea-Tac Airport

Date	Location	No of Aircft Operations	Ldn dBA	'Average'* Operatns	Av Ldn** dBA
Dec 1/2 '92	S192 & 8S	855	71.8	970	72.2
Dec 8/9 '92	SW162 & 9SW	788	59.8	970	60.7
Dec 15/16 '92	S308 & 23S	782 (391X2)	68.3	970	69.2
Dec 22/23 '92	S248 & 13S	774 (387X2)	68.3	970	69.3
Dec 29/30 '92	S186 & 4S	759	69.8	970	70.8
Jan 5/6 '93	S192 & 8S	733	71.3	970	72.7

* Average operations (arrivals and departures) were derived from the Flight Plan FEIS. Operations are increasing at the rate of approximately 8000/year. Therefore 338,600 operations in 1991, is expected to increase to 354,000 operations in 1993. 354,000/365 = 970 average daily operations.

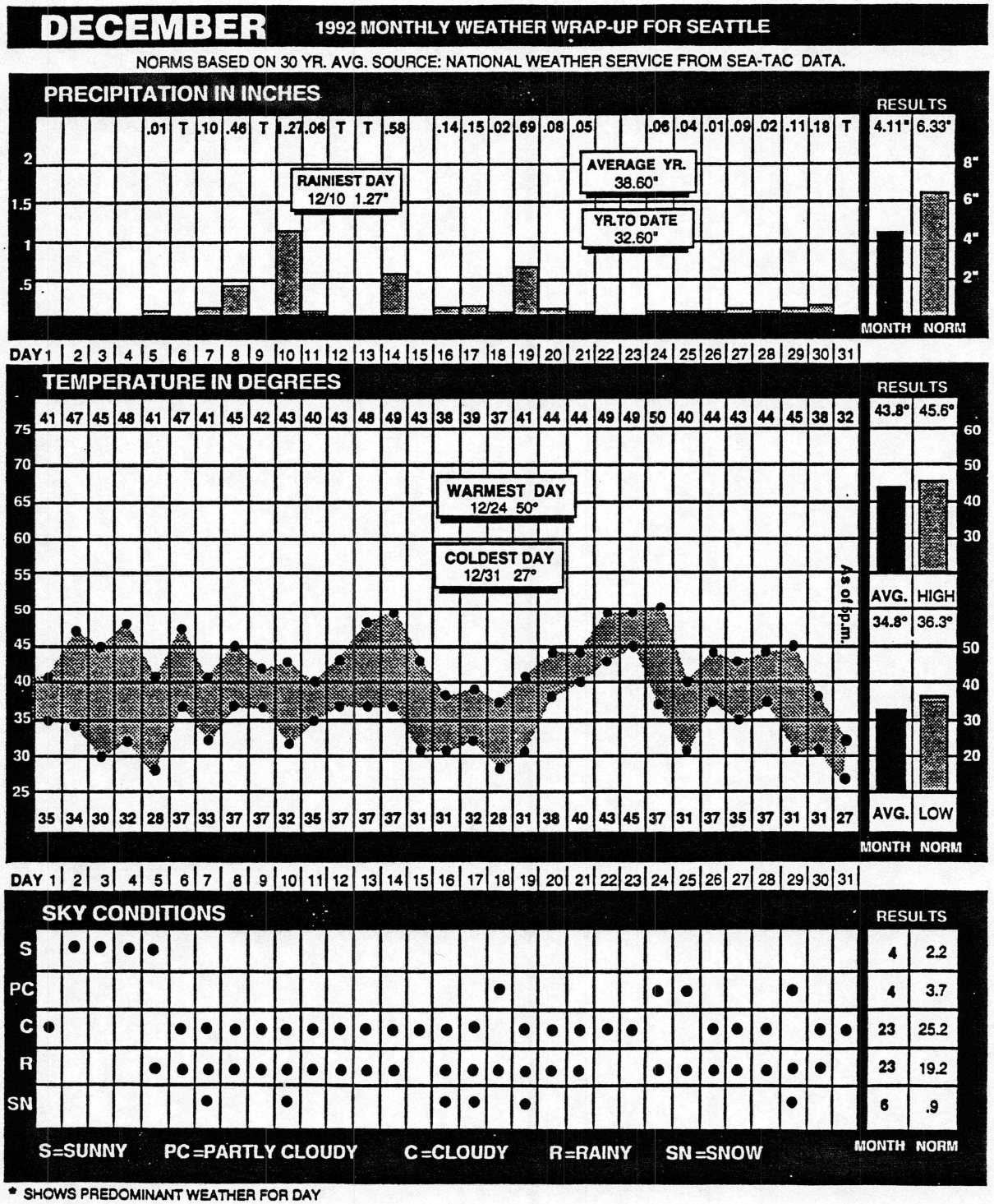
** The average Ldn noise level was derived from the acoustical energy generated by the daily aircraft operations. e.g. the total acoustical energy generated by aircraft operations is proportional to the number of operations. Data collected at S192 & 8S appears to confirm this within 0.3 dB. The Ldn for the two days at S192 & 8S is estimated at 72.5 dBA.

The Ldn noise levels based on 'average' daily aircraft operations were compared to the 1990 noise contours from the Flight Plan EIS. The data indicate that the existing noise contours west and south of Sea-Tac airport are wider and longer than described in the EIS. Three of the sites within the 65 Ldn contour, S192 & 8S, S186 & 4S and S308 & 23S, have Ldn noise levels approximately 3 dBA higher than the Sea-Tac contour maps indicate. This is with aircraft arrivals and departures approximately 20 percent below the daily 'average' number of operations. A 3 dB difference in noise levels is associated with doubling (or halving) the number of operations. e.g. if the number

Figure 3

Dec 1992 Weather - Sea-Tac Airport

Friday, January 1, 1993 The Seattle Times C 1



of cars, with the same general noise properties, on a road doubles, the noise levels increase 3 dBA. Therefore, the noise produced from existing Sea-Tac operations are significantly higher than the EIS has described. If the existing conditions described in the EIS are incorrect, the predicted future conditions, under the various airport alternatives, are also incorrect. The trend is clear, unmistakable and noise levels are significantly different.

From Table I it can also be surmised that the noise contours north and east of Sea-Tac airport are similarly affected. They form a bulge, rather than an hourglass, adjacent to the airport runways. The addition of a third runway will increase the 'bulge' even further to the west than predicted.

Another factor contributing to noise immediately adjacent to the airport is the continuous pervasive noise that occurs around the clock from taxiing aircraft, baggage trucks, maintenance, and other airport activity. As shown in the attached data summaries, the minimum noise levels at S 192 & 8th S rarely drop below 45 dBA, even during the night.

Table J shows the sound exposure levels (SEL), and the amount of time the 80 SEL, from the Flight Plan EIS is exceeded every day at each noise measurement site.

Table J
Daily Sound Exposure Levels
dBA

Date	Location	Sound Exposure Levels 1 sec	1 min	1 hr	>80 SEL hr:min
Dec 1/2 '92	S192/8S	117.3	99.5	81.7	1:29
Dec 8/9	SW162/9SW	104.5	86.7	68.9	:05
Dec 15/16	S308/23S	112.9	95.1	77.3	:32
Dec 22/23	S248/13S	114.4	96.6	78.8	:46
Dec 29/30	S186/4S	114.9	97.1	79.3	:51
Jan 5/6 '93	S192/8S	115.7	97.9	80.1	1:01
Jan 6/7 Rmt	SE30/243SE	99.9	82.1	64.3	:02

The data show that the 80 SEL level is exceeded for over an hour each day at S192/8S site, while the 80 SEL level at the remote site is exceeded for about 2 minutes each day. The exposure varies with proximity to the aircraft approach and departure patterns. This is another measure that the people living close to the airport activity live in a noisier environment.

Relating the SEL to single event patterns is shown in Table K. Table K is a compilation of one hour chart recorder data taken between Noon and 1PM each Wednesday.

Table K
Hourly Sound Exposure Levels
dBA

Date	Location	Sound Exp Levels 1 sec	1 hr	>80 SEL min:sec	No of Ops	Events >80dBA
Dec 2 '92	S192/8S	104.6	69.1	4:48	52	5
Dec 9 '92	SW162/9SW	90.5	54.9	0:11	57	2
Dec 16 '92	S308/23S	101.2	65.6	1:45	22	2
Dec 23 '92	S248/13S	99.9	64.4	1:40	30	NA
Dec 30 '92	S186/4S	101.6	66.0	2:24	60	8
Jan 6 '93	S192/8S	102.1	66.7	2:42	55	8
Jan 7 Rmt	SE30/243SE	86.7	51.1	0:05	NA	1

As shown, the sound exposure level is variable, and is dependent on several factors: including distance from the airport, number of flights, noise level of each flight, etc. The only "trend" is that the closer one is to the airport and the flight path, the higher the SEL and the longer the exposure to high noise levels.

A series of octave band filter readings were taken at the S 192 & 8 S site during general airport activity and aircraft operations on Jan 6, 1993. Measurements were taken on linear scale and fast response, and show that of 14 sets of readings:

8 - had a peak at 16 Hertz with a dB range of 68.7 - 82.4.
5 - had a peak at 63 Hertz or less with a dB range of 68.6 - 84.
1 - had a peak at 160 Hertz at 76.4 dB.

These are extremely low frequencies - close to the vibration range. The noise mitigation program is based on using materials where the sound insulation properties are measured at 500 Hertz. At lower frequencies their effectiveness is totally lost.

Based on the noise measurements taken by the monitoring program, some conclusions that can be reached are:

1) The actual noise levels are higher, approximately 3 dBA, than predicted in the Flight Plan EIS. The noise contours created by airport and other activity are wider adjacent to the runways and longer on the approaches than predicted.
2) There is a continuous level of noise that occurs from general airport activity, not just departures and landings, that keep minimum noise levels in the vicinity of the airport at a level up to 10 dB higher than found in suburban residential neighborhoods some distance from the airport.
3) Peak sound levels can exceed 90 dBA from individual aircraft.
4) Sound exposure levels are substantially higher in the vicinity of the airport.
5) Sound levels from departing aircraft are at such low frequencies that the noise remedies currently in use are of little effectiveness in reducing sound levels in homes.

The RCAA noise monitoring program has established that the existing noise generated from Sea-Tac aircraft operations is significantly higher than the described in documents prepared by the Port of Seattle. This difference also affects the predicted impacts of the proposed alternatives, the size of the area affected by the 65 Ldn contour and its future rate of reduction. Substantial additional noise monitoring is needed to adequately describe noise from Sea-Tac airport activity, and to effectively mitigate aircraft sound levels from existing and future operations.

HANS ASCHENBACH

4540 Eighth Avenue Northeast, Suite 305
Seattle, Washington 98105
(206) 632-5039

OBJECTIVE

To provide testimony to the Executive and Transportation Policy Boards of the Puget Sound Regional Council on the Flight Plan FEIS.

EXPERIENCE

PLANNER CITY OF DES MOINES: 1991 to Present
ASSISTANT PLANNER Apr 92- Present
EXECUTIVE DIRECTOR RCAA Jan 92- Apr 92
Created and implemented strategy to deal with impact mitigation of Sea-Tac Int'l Airport on surrounding community. Organized Regional Commission on Airport Affairs.
PLANNING INTERN Jun 91- Dec 91
Worked on comprehensive plan and other long range planning issues; graphic presentations.

SELF-EMPLOYED:
CONSULTANT 1986 to Present
German-American business, real estate negotiations, land use planning.
- negotiated preservation of Seattle's Blue Moon Tavern.

UNITED STATES AIR FORCE (USAF):
OPERATIONS OFFICER, Technical Training Group 1981-85
CONTRACT PROGRAMMER, Base Civil Engineering 1980-81
CHIEF, USAF SURVIVAL SCHOOL -- EUROPE 1977-80

- programmed numerous base facilities rehabilitation projects.
- planned and managed construction projects built by German firms on US air base.
- served as operations and engineering project officer for $1M security police training facility.
- negotiated interservice agreements.
- managed daily operational activities for a unit of over 300 personnel.
- administered budgets of up to $1,500,000.
- organized major air show at Frankfurt International Airport including airspace negotiations with West German FAA (BFS).

EDUCATION

UNIVERSITY OF WASHINGTON Seattle, WA
MASTER OF URBAN PLANNING In progress
57 credits completed; thesis in progress
Concentrations: Land Use Planning; Real Estate Finance
MASTER OF BUSINESS ADMINISTRATION June 1989
Concentrations: Finance; International Business; Negotiations

UNIVERSITY OF WASHINGTON
BACHELOR OF ARTS
Majors: Economics; German.
Additional Study: Phillips Universität Marburg, Germany

COMMUNITY INVOLVEMENT AND HONORS

SEATTLE:

Roosevelt Neighbor's Alliance (RNA)
President 1989-92
Land Use Chairman 1988-89

- led RNA in numerous projects addressing land use, urban design, neighborhood revitalization, and finance issues.
- negotiated neighborhood interests in Blue Moon Tavern Compromise and other projects.
- developed and wrote RNA technical transportation analysis of University Center phase II DEIS. RESULTS: recommendations became major revisions incorporated into the FEIS and changed city traffic assumptions for U - District.
- have had other major impacts on transportation and traffic mitigation in the University District through work on U-Pass, Residential Parking Zones, traffic circles, and other issues.
- worked with and provided technical analysis to Dennis McLerran, Director DCLU, regarding city policy for off-site parking in NC zoned projects.
- worked with Washington State DOT and Rep. Dick Nelson on construction of I-5 sound barrier.

University District Study, Citizen Advisory Board
- chaired subcommittee on light rail transit; routing recommendation adopted by Seattle City Council resolution.

Outstanding Young Men of America - 1989

APA/PAW Merit Award for planning project - 1992

USAF:

NATO Survival Competition, Team Captain.
Air Force Amigo Program award for sponsoring Asian and African students.

UW:

MBA International Business Association, President
Phi Eta Sigma (national honor society in scholarship)

LANGUAGES

GERMAN native fluency
FRENCH working knowledge
COMPUTER numerous software programs including ARC/INFO

REFERENCES Furnished upon request.

ESTIMATED REMAINING MITIGATION COSTS for the SECOND RUNWAY at SEA-TAC INT'L AIRPORT

These costs are based on a variety of mitigation promises made by officials of Sea-Tac Int'l Airport (STIA) to the surrounding community. Many of the promises date back to the Sea-Tac Communities Plan of 1973. The area covered by these promises is within the current Noise Remedy Program, the extent of which is allegedly based on the 65 Ldn noise contour predicted for year 2000. The 1991 65 Ldn noise contour is substantially greater.

Estimates are by Port of Seattle (POS)

1. Outright Acquisition

Only includes the currently defined buyout area	$ 1 M*
Does not include land "permanently" under 75 Ldn but not offered buyout due to incorrect noise contours.	
A conservative estimate would be $100M+ (Aschenbach).	

2. Sound Insulation

a. Custom insulation- single family (SF) houses	
$18,000 per house for construction	
+$ 2,000 per house for administration	
$20,000 per house x 2,700 houses =	$ 54 M
b. Cost share insulation SF houses	
$ 8,000 per house for construction	
+$ 2,000 per house for administration	
$10,000 per house x 6,600 houses =	$ 66 M
c. Public buildings (68 buildings identified)	
Public Schools	$ 50 M
Other (includes churches, private schools public & private hospitals, nursing homes, libraries etc.	$ 22.5 M

d. Multi-family residences	
$4,000 per unit x 11,000 units	$ 44 M
e. Mobile homes	
$6,000 per unit moving costs x 500 units	$ 3 M
Estimate for next five years only	
3. Transaction Assistance	
a. Special purchase option	
75 SF expected to participate x $12,000	$ 900K*
(350 eligible)	
b. Regular transaction assistance	
500 SF expected to participate x $7,000	$ 3.5 M
(2,000 eligible)	
$7,000 is the average cost to reach full market value	=========
Total POS estimate	$255,9 M

* M = million; K = thousand

THE COSTS OF NOISE MITIGATION AT SEA-TAC INT'L AIRPORT

Mitigation paper #1 - Broken Promises

By: Hans Aschenbach M.B.A.
Assistant Planner City of Des Moines

24 January 1993

	PROMISE TO MITIGATE SECOND RUNWAY	REALITY
1973	Sea-Tac Communities Plan--plan period 1973-1993. Acquire all property: • currently in 80 Ldn. • permanently* in 75 Ldn. Insulate 5,790 single family homes permanently* in 70 Ldn. Insulate public schools and multifamily residences permanently* in 70 Ldn.	Acquisition of property commences primary reason: federal and local safety criteria.
1979	Federal Government authorizes Part 150 Program.	
1984		Acquisition: • $36.2 million spent, program not complete. Insulation: • $0 expended.
1985	Sea-Tac Part 150 Program--plan period 1980-2000. Insulate additional 4,000 single family homes permanently* in 65 Ldn.	Insulation: • 21 single family homes from 1985-1987.
1988	Revise public building insulation to include hospitals, private schools, nursing homes, churches, libraries, etc.	
1990	Mediated Agreement--plan period 1980-2000. Insulate all public buildings permanently* in 65Ldn. Pay full insulation costs for all single family homes in program.	Acquisition: • Additional $41.6 million spent. Insulation: • 229 single family homes.
1992	Port plans third runway.	Acquisition program not complete: • 30 parcels remaining. • Expend. to date = $90 million • Many eligible properties not in program due to inaccurate noise predictions. Insulation: • less than 700 single family homes. • no schools. • public buildings--demo only. • no multifamily buildings.

*Minimum of twenty (20) years.

attachment 1

THE COSTS OF NOISE MITIGATION AT SEA-TAC INT'L AIRPORT

Mitigation paper #2 - Bad Noise Contour Predictions

By: Hans Aschenbach M.B.A.
Assistant Planner City of Des Moines

24 January 1993

This paper will contend that noise contour maps for Sea-Tac International Airport (STIA) presented in the Flight Plan FEIS are not accurate. The maps in question are Figures C-6 through C-16 and in particular figure C-7. These maps give predicted noise contours for STIA with and without the third runway for years 2000, 2010 and 2020. Because of inconsistencies in their presentation these maps are not useful in assessing the potential environmental noise impact on the surrounding communities. The maps also inaccurately depict no increase in noise impact on the surrounding community and so mask the true cost of the project by ignoring these significant mitigation costs.

One might ask, what is the importance of these noise contours to the cost issue anyway. The noise contour maps are used to define the boundaries of the Port of Seattle (POS) Noise Remedy Program (NRP). Thus these contours will govern which properties are eligible for an outright buyout and which would be eligible for lesser degrees of mitigation including insulation or nothing at all.

Most airport authorities base their program on a current year noise map. They fund the worst problems first and work outwards as more funds become available. POS has set its program up differently. It has committed to mitigate all properties within a 'permanent' noise contour. Permanent is defined as being at a certain noise exposure for a twenty year period. So the STIA program boundary is based on a twenty year future outyear. In actuality STIA's program is no different from any other. STIA doesn't have enough funds to fully mitigate the problem either the current exposure area or the much smaller future one. So STIA funds the worst areas first placing others on a long waiting list. But because of its program design STIA deals with a much smaller area than it would if it used the current year map.

It is important to note though that the problem at STIA is one of the worst in the country. Thus the assumptions that go into creating the POS future noise contour predictions become all important. By using a smaller future noise contour POS can de-emphasize the enormity of today's noise externality problem at STIA. The costs of mitigating

the noise problem around STIA are huge in any case. The costs run into the hundreds of millions of dollars since the area surrounding this small airport has always been residential right up to its boundary. But shrinking the twenty year future noise contour means a difference of millions of dollars of program costs.

In order to know the future, it is sometimes best to look at the past. Before we examine the FEIS maps for the year 2000 and beyond, we will explore the history of STIA noise contour predictions for the past twenty years.

STIA NOISE CONTOUR PREDICTIONS 1973 TO PRESENT:

In 1973 the Port of Seattle and King County produced the Sea-Tac Communities Plan (SCP). This plan had several purposes or effects that are important to note for this paper.

1) The STIA second runway became operational in 1972. The SCP was designed to allay public fears on the seemingly permanent environmental noise effects.

2) It promised to mitigate the environmental noise effects that had a life longer than twenty years.

3) But more important to our discussion, it assured the public that noise was at its peak in 1973; the next twenty years would see significant decreases that would leave noise levels at tolerable levels in the surrounding residential communities.

To that end POS produced a series of noise exposure maps in 1973.[1] The series is typified by:

1) a current year map based on current noise levels[2] and

2) a series of future year noise contour projections based on assumptions made or directed by Port staff.

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[1] Sea-Tac Communities Plan; Port of Seattle and King County; undated; ch. 5,2 Noise Exposure pp. 11-14.

[2] Note: The current year map and the methodology used to determine it are not the subject of this paper. It is the future year projections and the assumptions behind them in which we are interested.

A similar series was produced in the early 80's.[3] Finally the 90's series is the map recently produced for the Part 150 update.[4]

These map series all express a consistent theme: "Forget the past, its a new day and the future noise contours are shrinking.". This message is not quite true. But before we get into the issue of why the Port would rather look forward to new noise contour projections than back to old ones, let us examine the three different series of maps that have been presented and then discuss the comparability between them.

There is in fact a lack of comparability between these series that makes drawing any conclusions about the accuracy of the predictions very difficult---but not impossible. As an example I have selected the 90's map from each of the series. (atch 1-3)

The first clue - the maps don't even look alike. Let's decompose this further. We have had differences in no less than seven significant areas.

1) Noise Metric	ANE (70's series) vs. Ldn (80's & 90's series) [ANE + 35 = Ldn] [5]
2) Methodology	Actual sound measurement (70's series) vs. INM computer model (80's & 90's)[6]
3) Map Design	Noise value per quarter section (70's series) vs. continuous curve noise contour (80's & 90's series)
4) Computer Model	INM model change by FAA eliminated east/west bulges from 80's series.

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[3] Sea-Tac International Airport Noise Exposure Update; Port of Seattle; June 1982; Exhibits 6-3 thru 6-6.

[4] Existing Noise Exposure Map 1991; Sea-Tac International Airport; Working Draft.

[5] Ldn is an annualized, average, cumulative noise level. It has a built in penalty for night disturbances.
ANE is an older noise metric but is similar to Ldn. ANE can be made roughly equivalent to Ldn by using the formula: ANE + 35 = Ldn.

[6] INM stands for Integrated Noise Model. It is a computer model to develop noise contours used by the FAA in the Part 150 program. Part 150 sets minimum planning standards for airport noise compatibility.

5)	Scale of Base Map	Different for all three series
6)	Planning Period	1973 to 1993 (70's series) vs.1980 to 2000 (80's & 90's series)
7)	Map Year	Map years of different series are not parallel

To make the map series comparable has been a difficult conversion. It was more than a conversion of apples to oranges; a whole basket of fruit had to be sorted. But as the comparisons were made one consistent truth has emerged: "In twenty years of trying the Port has never gotten its contours right.". POS has always predicted future noise contours smaller than was actually realized.

I created composite maps to compare the three map series. (atch 4 & 5) These two maps give a history of POS noise contour predictions (in dotted lines) and the actual contour when the year is reached (in solid color).

A brief word on methodology is appropriate here. We converted the 1973 series from ANE to Ldn and then converted all three series to a common scale. We made comparisons only of the 75 Ldn contour for simplicity. Wherever the record is complete, the pattern of underprediction is the same for 75, 70, and 65 Ldn. The comparisons between prediction and actuality were made for the area south of the airport. Two thirds of take-offs are to the south, consequently the southern noise contours are larger and the differences easier to depict.

The maps show, for example, that POS completely missed its projection for 1993 that was made in the 1973 series. (on atch 4, look at 1993 Prediction [referred to as projection] & on atch 5 look at 1991 Actual) Missing these predictions by underestimating them of course has very positive consequences for POS in terms of noise mitigation commitments and program dollars; the programs have a smaller area and therefore cost less.

Atch 4: This map gives the 1973 base year contour in yellow. 75 Ldn reached as far south as S. 255th Pl.. POS predicted that the contour would shrink to S. 210th St. over the twenty year planning period.(depicted by small dots) POS was relying on a federally mandated phase-out of Stage 1 aircraft by 1985 This didn't occur until 1986. POS also relied on an early phase out of stage 2 aircraft which didn't occur at all.

This map also depicts the 1984/85 noise contour in orange. Although some shrinkage of the contour occurred from 1973, the rate was not fast enough to attain future predictions made in 1973.
POS realized that it would miss targets set for 1993. So when POS passed Resolution 2943 implementing the Part 150 program, it also changed the Noise Remedy Program planning period outyear from 1993 to the year 2000. POS did not count on the overall rise in operations due to deregulation and hubbing at STIA. POS revised its target to S. 229th St. for 1990, from the 1993 target of S. 210th St.

Since the methodologies are different between the two series it is questionable as to whether the systems can even be compared. The point is made however that the future predictions made in 1973 were completely unrealistic.

Atch 5: The newest layer in grey is the actual 75 Ldn contour of the 1991 Noise Exposure Map. The east/west bulges that previously covered parts of SeaTac City and Burien have disappeared.[7]

This contour also illustrates that in the previous five years the noise problem actually got worse due to increased air traffic at STIA. The noise contour grew on the north /south axis (in the south from S. 242nd St to S 244th St.). This may seem a small

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[7] Letter from POS Planner Diane Summerhays to Eric Shields, Planning Director, City of Des Moines; dated 17 Aug 1992. In the letter Ms. Summerhays attributes the disappearance of the bulges to a change in the INM without further explanation.

change, but please recall that POS had predicted shrinkage to 229th St.. Not only was the magnitude of the change wrong but the direction of the change was wrong as well.

The final element on this map shows where POS believes 75 Ldn will be in the year 2000.(depicted in dots) Year 2000 is the contour on which the current Noise Remedy Program (NRP) is based and the prediction made in 84/85 is its basis.

POS predicts that in the next seven years, 75 Ldn will shrink from S. 244th St. to S. 214th St.. This prediction which was made in1985 continues to stand. POS has not revised it despite the following facts:

A. All Stage 1 aircraft operations have now been discontinued, so no gain can be made there.

B. Sixty-three percent of the jet fleet currently operating at STIA are already Stage 3. STIA is relying on the conversion of the remaining 37% of the Stage 2 fleet to achieve these gains. Even if the full phase out of stage 2's occurred by year 2000 we are not sure that this contour shrinkage would occur. Many Stage 3 aircraft are not much quieter than the Stage 2. But a federal waiver already allows for an extension of 15% of the stage 2 fleet until the year 2004. (see explanation below) So POS can rely at best on a further reduction of only 22% of the stage 2 fleet by year 2000.

STIA is also relying on the reduction of Stage 2 night flights to achieve some of the goal but has recently granted variances to that 'voluntary' program. Due to airline financial troubles we believe that the variances will continue.

In light of 1) the current enlarging trend of the noise contours; 2) currently increasing number of aircraft operations; and 3) industry resistance to Stage 2 phase-out which has already been supported by the federal government (see below), we don't believe that the predicted year 2000 noise contour is realistic.

CONCLUSION to STIA Noise Contour Predictions -1973 to Present:

For twenty years, POS has been predicting that the noise contours around STIA would shrink in a substantial way. When POS found that its 1993 targets would not be achieved, it changed the rules and set the achievement date to the year 2000. The result has been a serious underestimation of costs and mitigation measures for buy-out and insulation.

Our research has found that minimal shrinkage has taken place during the period in which the bulk of aircraft conversion from Stage 1 to Stage 3 has already taken place.

In light of the current noise contour expansion trend and other facts presented, we do not believe that the Port of Seattle can achieve its current goal for year 2000.

THE CURRENT SITUATION of NOISE CONTOUR MAPS in FLIGHT PLAN:

The previous discussion of historical noise contour predictions serves to establish that something is amiss in POS ability to predict accurate noise contours. The inaccuracy of past predictions sheds grave doubt on year 2000 and other contours presented in the Flight Plan EIS. In fact Flight Plan states on P. C-24: "The primary time period for analysis was 2020, which is representative of the long term noise environment.". This is the first deficiency. The analysis should have concentrated on the year 2000 where at least some some credible assumptions could have been made. The idea that anyone could make accurate noise projections 30 years into the future for purposes of serious analysis , is absolutely ludicrous. The way POS has handled the past twenty years of predictions is only further reason to give no credibility to these year 2020 predictions and to judge the entire analysis inadequate.

Furthermore the most significant contours for predicting noise impacts on the surrounding community are the year 2000 contours because they will add to an existing noise environment that has been

in place well past the twenty year exposure criterion used by POS. The year 2000 contours were not even presented in the DEIS. Thus the public has not yet been given the opportunity to even comment on them.

FIGURE C-7 of FLIGHT PLAN FEIS

Figure C-7 shows two 65 Ldn noise contours at STIA for the year 2000: 1) STIA without the project and 2) STIA with the third runway. However the third runway contour shown is for the runway used in a "mitigated" fashion. Flight Plan p. C-26 states that: "Under the mitigation assumption, the runway would handle daytime arrivals only.".

This 'mitigation assumption' is absolutely ridiculous. It is analogous to a developer saying that a 400,000 square foot (sf) addition to an existing million sf office complex will not have any effect on LOS for surrounding streets. When asked to justify the statement the developer states: "Yes I'm building it but I'm not going to use it much." Every use has a projected traffic demand. POS cannot define its demand in order to mask the effects of the noise externality on the surrounding community.

On the other hand if we accept the mitigated scenario then we must again ask the question posed by airport planner Jerry Bogan: "How much bang are we going to get for our buck on the third runway". If we use the third runway for daytime landings only, Bogan's contention is proved.[8] The third runway will not give us any significant capacity over that which we would gain by installing a new set of navaides on the second runway.

Flight Plan only presents limited information about the map in figure C-7 and the mitigation scenario. The following points must be

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[8] "Discussion of Airspace and Runway Capacity Issues and Alternatives" by Gerald Bogan in Regional Commission on Airport Affairs document dated 21 Jan 1993. A copy of this document was presented to each of the members of the PSRC Transportation Policy and Executive Boards.

addressed in order to get to the true story behind the 'mitigated' third runway.

1) All assumptions underlying the two contours must be presented in detail. It is difficult to imagine how Flight Plan was able to get the contour for the third runway scenario entirely contained within the 'no project' contour. Given the right assumptions however black can become white and three runways can have less noise impact than two.

2) It is known that on previous noise contour maps, that POS has assumed away all Stage 2 flights by the end of 1999. POS has done this despite the history of federal waivers extending Stage 1 aircraft. And, incredibly, POS has made this assumption in the face of federal policy defined in CFR 14 Part 91.873 that allows U.S. air carriers an unretrofitted Stage 2 waiver of up to 15% of their fleets until the year 2004. POS argues that its 'voluntary' Mediated Agreement calls for a local Stage 2 phase out by the end of 2001. On some noise maps POS has made a 5% Stage 2 adjustment for year 2000 contour predictions. We don't know if they have done that on map C-7 and in any case it is not enough. In light of airline financial problems we expect the airlines to take full advantage of the 15% federal waiver beyond year 2000.

Furthermore POS was recently unable to get the airlines to even reschedule Stage 2 flights away from the nighttime hours of midnight to 6 AM as called for under the Mediated Agreement. If POS is unable to get a schedule change, one wonders how POS will be able to achieve a 'voluntary' phaseout of aircraft that still have substantial economic life.

This 15% Stage 2 assumption change alone would expand both noise contours presented in Figure C-7 and would give a truer picture of the extent of the noise problem and the associated mitigation costs.

3) POS must expound on the "mitigated" runway scenario if it wishes to use it as the basis of a noise contour. POS must declare what legal guarantees it will give that the 'mediated' scenario will be used, for

how long, and what the maximum number of daytime arrivals would be. POS also must explain how it can justify expenditure of half a billion taxpayer dollars to construct a limited use 'mediated' runway.

4) A more likely scenario for the third runway would be full utilization. The FEIS should have shown such a map under two scenarios: 1) three runways with equal distribution of landings and takeoffs and 2) the third runway with its likely more than 33% of operations; probably 50% of operations.

A number of operational situations exist that point to the third runway getting as many as half of STIA operations. 1) The first and second runways are too close together. 2) the proposed new generation of jumbo jets are projected to be too heavy to operate on the existing runways. A third runway built to a higher strength standard will likely receive all new jumbo jet operations. It is likely that operations on either the first or second runways will dwindle to a spillover status.

5) A much more detailed set of year 2000 noise contour maps must be produced also showing 70 and 75 Ldn. STIA is unique among all of the proposed Flight Plan sites in that it will have many times the noise mitigation costs of any of the sites. These costs must be taken into account if an adequate cost comparison between sites is to be made. The $50 million[9] built into Flight Plan for STIA noise mitigation is for second runway mitigation only and is totally inadequate in light of recent cost revelations by POS. Not only will the third runway evaluated under the National Environmental Protection Act (NEPA) force POS to assume left over second runway mitigation, but the third runway will also shift noise westward by several thousand feet potentially forcing POS to reinsulate residential property and institutions to a higher standard than is currently being done i.e. custom insulation ($18,000 per home)vs. standard insulation ($8,000 per home).

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[9] PSATC Flight Plan Project DEIS; PSRC and POS; dated Jan 1992; Table 2 Flight Plan Phase III Capital Cost Estimates p. C-84.

SUMMARY

POS has been able to mask the enormity of the noise mitigation problem by basing its Noise Remedy Program on future noise contours. Other airports have based their programs on the current year noise map and funded the worst problems first. STIA has always projected out twenty years. In theory the results might be the same for both types of programs if the noise contours shrink as predicted. Not only have the contours at STIA not shrunk, but STIA has never had to discuss the true costs of the noise problem in the Highline Community area as a result of its clever program design.

Only recently has POS released estimates for potential insulation obligations within the existing Noise Remedy Program Area (NRPA) that total $255.9 million.[10] We estimate that the current NRPA contains half or less of the residential and institutional properties currently eligible for insulation under federal Part 150 guidelines. Dealing with the current (1991) boundaries of 65 Ldn could swell potential insulation obligations to $500+ million. This figure does not include potential buyout areas that qualify under the POS criterion that they be located in 75 Ldn for at least twenty years. Obviously POS does not want to discuss noise mitigation costs of half a billion dollars and still present STIA as the low cost expansion site.

FINAL CONCLUSION:

By using inaccurate and meaningless noise contours for the third runway in year 2000, Flight Plan has been able to mask noise mitigation costs at STIA. The Flight Plan consultant has somehow made the year 2000 contour with the third runway smaller than the contour without the runway. This deceptive contour makes it seem that the third runway will not have any associated noise mitigation costs. The National Environmental Policy Act will make any rise in

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10 "Estimated Remaining Mitigation Costs for the Second Runway at Sea-Tac Int'l Airport" by Hans Aschenbach. This information was developed from POS documents distributed to members of the Port's Technical Review Committee and through personal interviews with Earl Mundy, Manager of Noise Remedy, POS.

noise a mitigable item. Given the size and density of the residential community in the Highline area, noise mitigation for the STIA third runway could run into the hundreds of millions of dollars. Those costs would be mandatory under NEPA, not voluntary as Part 150 noise mitigation is.

Those hundreds of millions of dollars added to the already inflated cost of the third runway might lead to a different project decision. Of all the Flight Plan sites considered only STIA is surrounded by such a dense residential community. For other sites buyout of all noise affected properties within 65 Ldn has actually been proposed. A proposal of that sort for STIA would cost many BILLIONS of dollars. Among all the Flight Plan site alternatives, noise mitigation costs are only a significant cost item for the STIA site. By avoiding a discussion of those costs, the STIA site has been inappropriately presented as a lower cost site.

Thus the entire Flight Plan recommendation is suspect and quite probably has led to adoption of an uneconomic project decision.

1993 ANE

Adjusted Noise Exposure Values For Each 1/16 Section Within The Study Area

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1											29	31	33	32	32	30	28	25						
2											29	31	33	33	33	30	28	25	22					
3			15	16	17	19	21	23	26	28	29	31	33	33	33	31	29	25	22					
4			15	16	17	19	20	22	25	28	29	31	33	34	34	31	29	26	23	21				
5			15	16	17	19	20	22	25	27	29	31	33	34	35	32	29	26	23	21				
6			15	16	17	19	20	22	24	27	29	31	33	35	36	32	29	26	23	22	20			
7			15	16	17	19	20	22	24	27	29	31	33	35	37	32	29	27	24	22	20	19		
8			15	16	17	19	20	22	23	26	29	31	33	36	37	33	30	27	24	22	21	20		
9				16	17	19	20	22	23	26	28	31	33	36	38	33	30	27	25	23	21	20	19	
10				16	18	19	20	22	23	25	28	31	33	36	39	34	30	28	25	23	22	21	19	
11					18	19	20	22	23	25	28	31	33	36	40	34	31	28	26	24	23	21	20	
12					18	19	21	22	24	26	28	31	33	37	41	34	31	28	26	25	23	22		
13					18	19	21	22	24	26	28	31	33	37	42	35	32	29	27	25	24	23		
14					18	20	21	23	24	26	28	31	34	37	43	36	32	30	28	26	25	23		
15				17	19	20	21	23	25	26	28	31	34	38	45	37	33	31	29	27	25	24	22	
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18				13	14	16	17	19	20	22	25	27	31	38	49	43	32	28	25	23	21	19	18	16
19			11	13	14	15	17	18	20	22	24	27	30	37	49	43	32	28	25	23	21	19	17	16
20			11	12	13	15	16	18	20	22	24	26	30	37	50	42	32	27	25	23	20	19	17	15
21	9	10	11	12	13	15	16	18	20	21	24	26	29	36	51	43	32	28	25	23	21	19	17	
22			11	12	14	15	17	18	20	22	24	26	30	36	51	44	33	28	26	23	21	19	18	
23						16	17	19	21	22	25	27	30	36	51	44	34	29	26	24	22	20	18	
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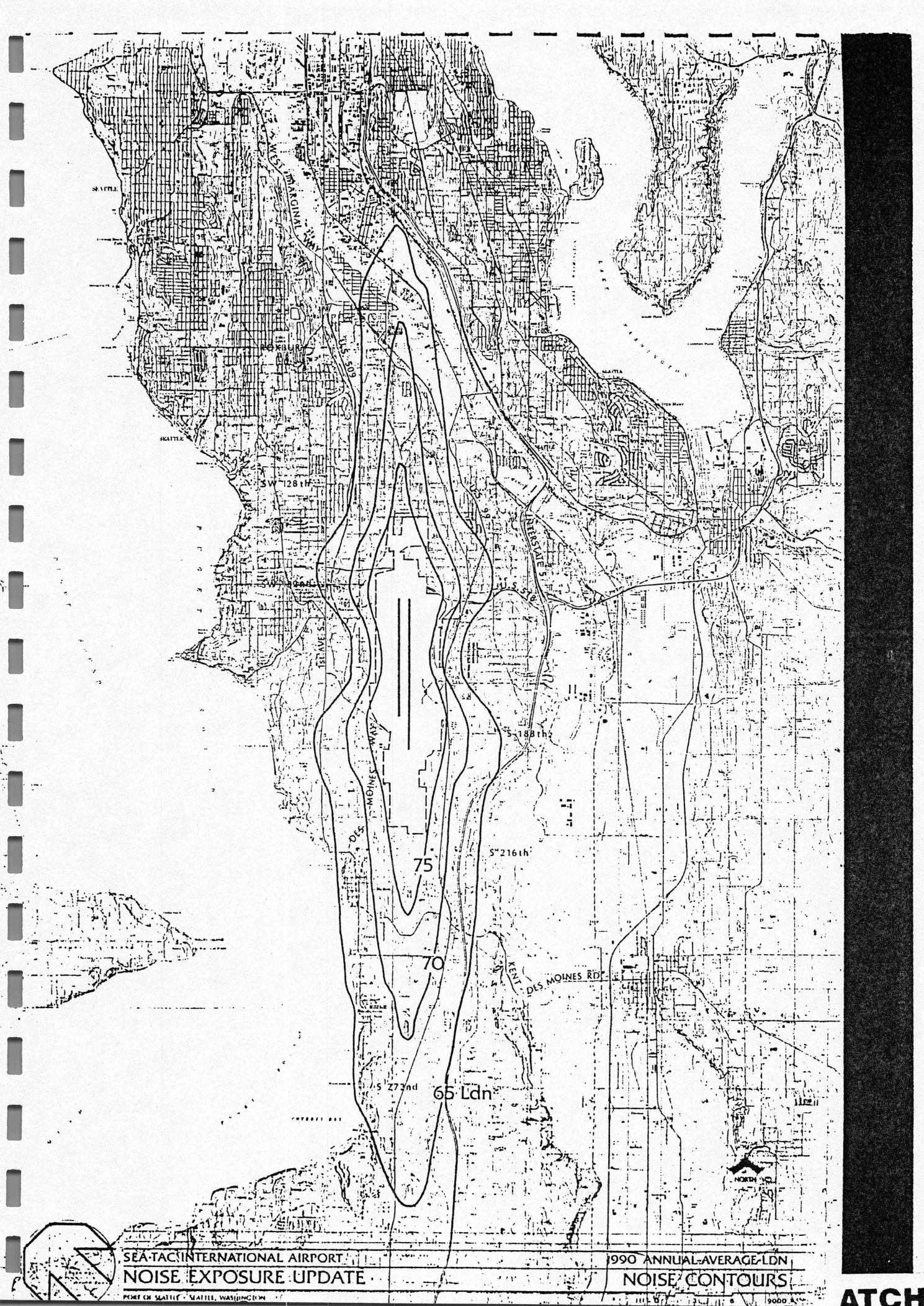
46												29	31	32	33	33	32	31	30	29	27	26		
47												29	30	32	33	33	32	31	30	29	28	27		
48												28	30	31	32	33	32	31	30	29	28	28		
49												28	30	31	32	32	31	30	30	29	28	28		
50												28	30	31	32	32	31	30	29	29	28	28		

Airport Boundary Outlined

ATTACHMENT 1



SEA-TAC INTERNATIONAL AIRPORT

NOISE EXPOSURE UPDATE

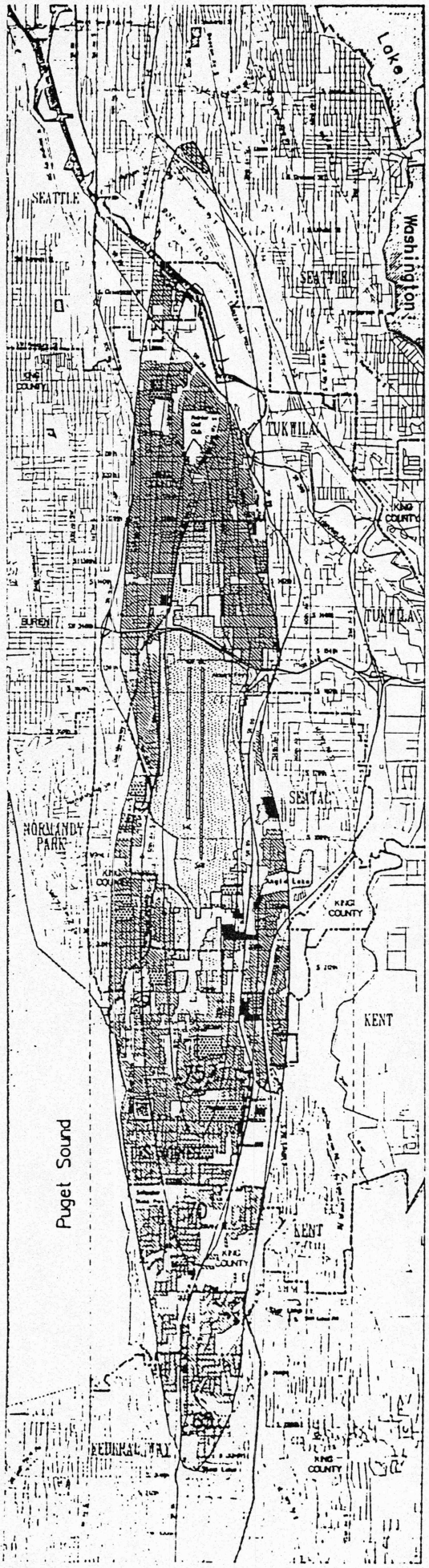
PORT OF SEATTLE · SEATTLE, WASHINGTON

1990 ANNUAL AVERAGE LDN

NOISE CONTOURS

9000 A

ATCH 2



WORKING DRAFT

FOR DISCUSSION PURPOSES ONLY

Sea-Tac International Airport

Existing Noise Exposure Map 1991

- Residential
- Mobile Home Park
- School
- Hospital, Nursing Home
- Airport
- Historic Site
- Study Area Boundary
- Jurisdictional Boundary
- Ldn Noise Contour

NOTE: Only noncompatible land uses as defined in Table 1, Appendix A, of FAR Part 150 are designated within the noise contours.

The Ldn 65 contour contains approximately 14,128 acres and 67,030 people.

The Ldn 70 contour contains approximately 7,106 acres and 28,979 people.

The Ldn 75 contour contains approximately 3,254 acres and 7,337 people.

Flight tracks and noise monitoring sites are depicted on the regional and study area INM flight track exhibits.

The Noise Exposure Map and accompanying documentation for the Noise Exposure Map for Seattle Tacoma International Airport, submitted in accordance with F A R. Part 150 with the best available information, are hereby certified as true and complete to the best of my knowledge and belief. Adequate opportunity has been afforded to the public for review of all relevant information and comments received from interested persons are included in this submission. A copy of this submission, including copies of all written comments have been filed with the Regional Director, Federal Aviation Administration.

Signed _____ Date _____

Title _____

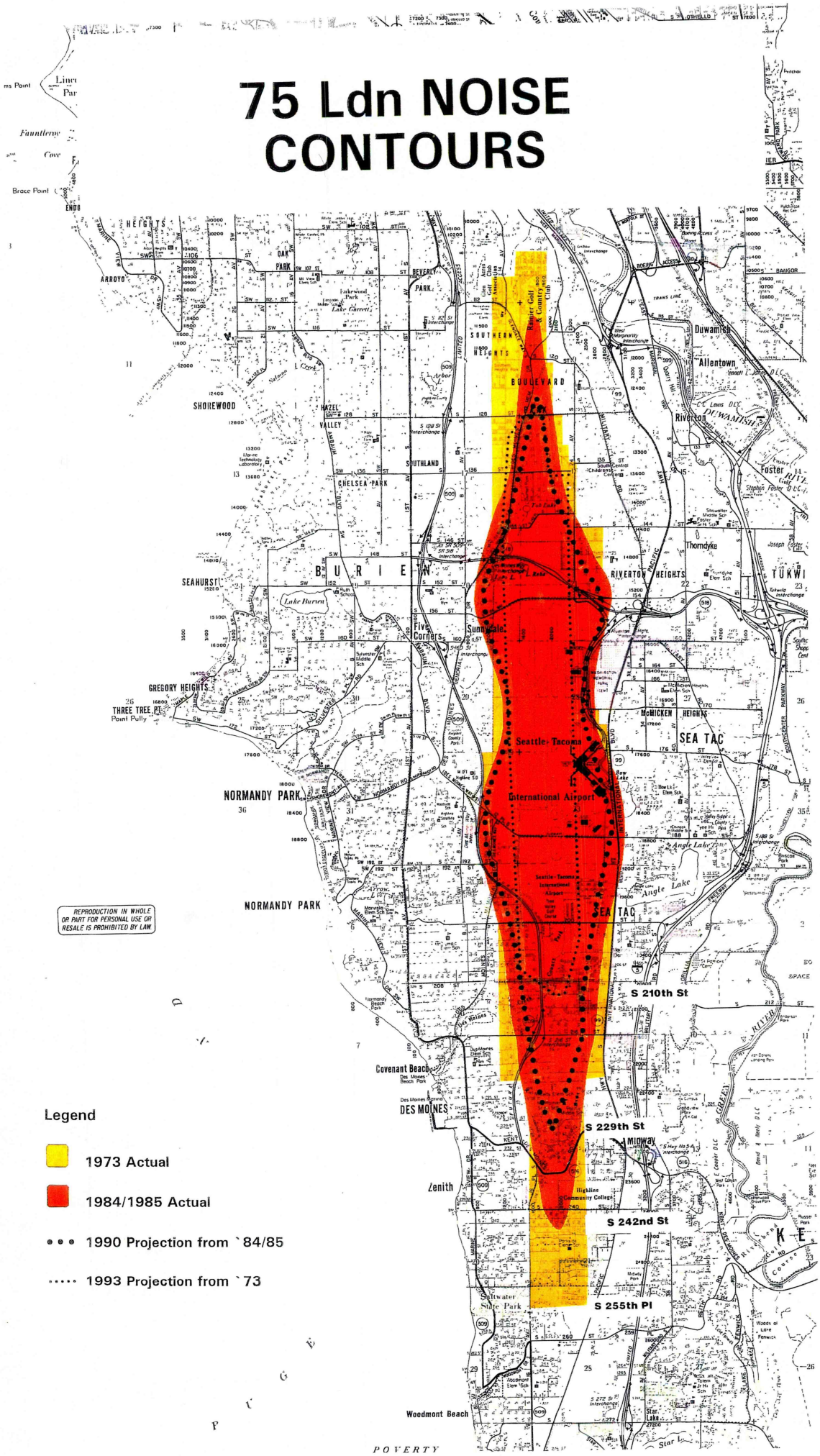
Mr. Joseph Sutte
Director, Aviation Planning
Seattle-Tacoma International Airport
Port of Seattle

N

Scale 1:36,000
1" = 3,000'

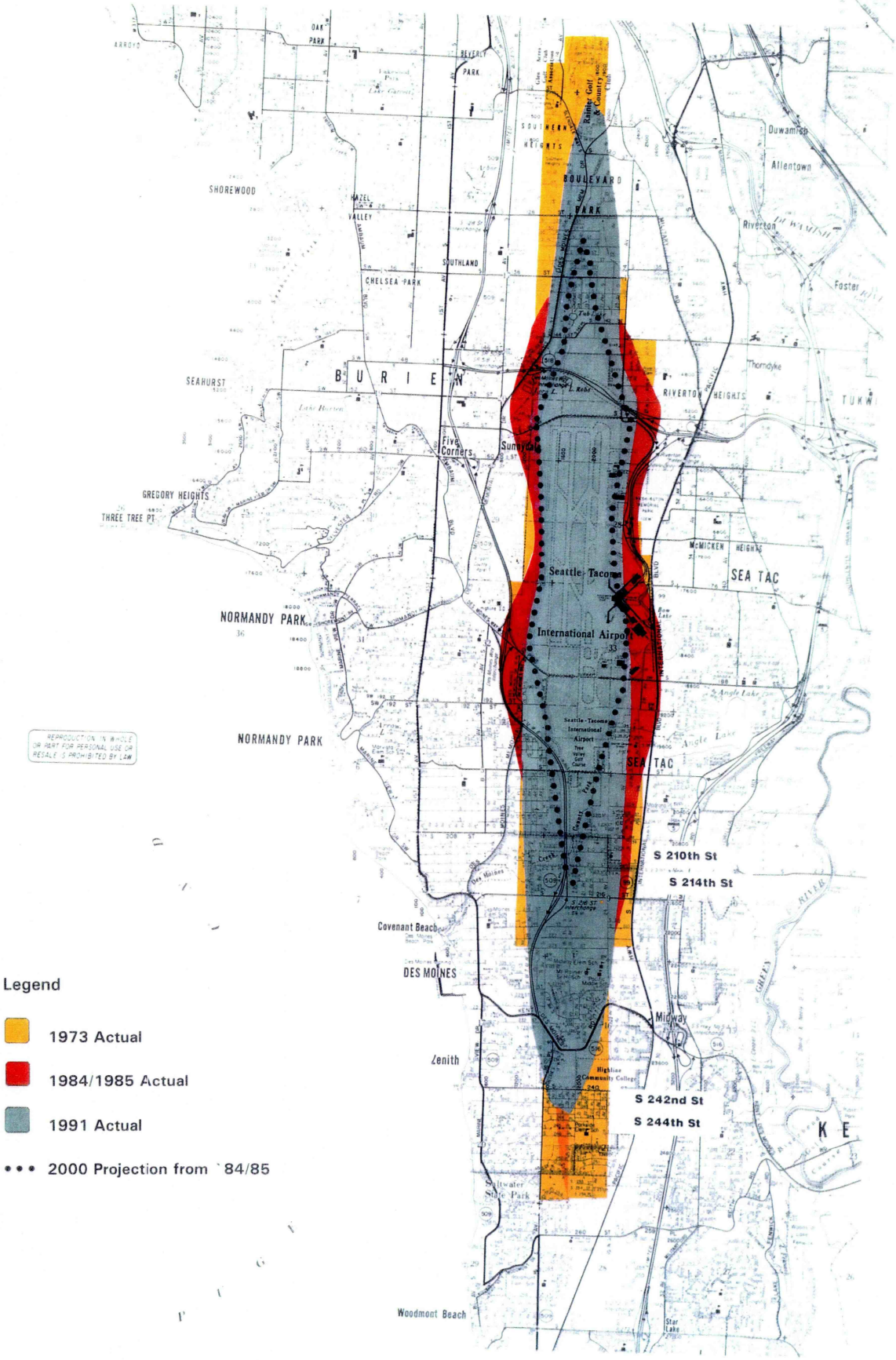
ATTACHMENT 3

75 Ldn NOISE CONTOURS



ATCH 4

75 Ldn NOISE CONTOURS



Legend

- 1973 Actual
- 1984/1985 Actual
- 1991 Actual
- • • • 2000 Projection from `84/85