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PRELIMINARY DRAFT

ENVIRONMENTAL ASSESSMENT OF THE REALIGNMENT OF UNITS AT McCHORD AIR FORCE BASE, WASHINGTON

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ABBREVIATIONS AND ACRONYMS

AAMRL	Armstrong Aerospace Medical Research Laboratory
AFB	Air Force Base
AFRES	Air Force Reserves
ANL	Argonne National Laboratory
ARTS	Air Reserve technicians
BAI	backup aircraft inventory
Bldg.	building
BOS	base operating support
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
Co.	company
dB	decibels
DOD	Department of Defense
EA	environmental assessment
EIS	environmental impact statement
EPA	Environmental Protection Agency
FICUN	Federal Interagency Committee on Urban Noise
Fig.	figure
FIS	Fighter Interceptor Squadron
ft	feet
ft^2	square feet
FY	fiscal year
gal	gallons
HA	highly annoyed
HC	hydrocarbons
Inc.	incorporated
J.	journal
JP-4	jet fuel
km	kilometers
L_{dn}	day/night average sound level
MAC	Military Airlift Command
MAW	Military Airlift Wing
mi	miles
$\mu g/m^3$	micrograms per cubic meter
mg/m^3	milligrams per cubic meter
m/s	meters per second
NEPA	National Environmental Policy Act of 1969
NO_x	nitrogen oxides
NRHP	National Register of Historic Places
O_3	ozone
PM_{10}	particulate matter, particles with a diameter of less than 10 micrometers
POL	petroleum, oil, and lubricants
ppm	parts per million
Sec.	Section

SEL	sound exposure level
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
TAC	Tactical Air Command
TAS	Tactical Airlift Squadron
TSP	total suspended particulates
U.S.	United States
USAF	U.S. Air Force
Wash.	Washington
yd^2	square yards

ENVIRONMENTAL ASSESSMENT OF THE REALIGNMENT OF UNITS AT McCHORD AIR FORCE BASE, WASHINGTON

SUMMARY

It is proposed that the 63rd Military Airlift Wing (MAW) be moved from Norton Air Force Base in California and reassigned to the existing 62nd MAW at McChord Air Force Base in Tacoma, Washington. In addition, the 445th MAW of the Air Force Reserves at Norton AFB would be combined with the 446th MAW at McChord. In the same time frame, the 36th Tactical Airlift Squadron (TAS) and the 318th Fighter Interceptor Squadron (FIS) at McChord would be deactivated. Some facility construction and modification projects would be associated with these changes. This environmental assessment evaluates the potential environmental impacts of the proposed action.

The primary impacts of the project would be positive. Noise modeling indicates that removal of F-15 aircraft would substantially reduce noise impacts in the vicinity of McChord AFB. Aircraft emissions of nitrogen oxides, total suspended particulates, and sulfur dioxide would also be reduced, but emissions of carbon monoxide and hydrocarbons would increase . Predicted increases in ambient pollutant levels at the base boundary are small and the concentrations would be well within air quality standards.

No deterioration in the quality of land, groundwater, or surface water resources would result from the proposed action. Small areas of vegetation would be removed by activities associated with the construction activities, but this removal would not jeopardize any threatened or endangered species. No effects are expected on known archeological sites. However, impacts of the proposed modification of Hangar 1 need to be considered further.

Although some minor impacts would occur during facility construction and modification activities associated with the proposed action, no federal, state, or local laws or requirements imposed for the protection of the environment are expected to be violated, and no major adverse environmental impacts are expected.

1 INTRODUCTION

1.1 SCOPE AND PURPOSE OF THE PROPOSED ACTION

On May 3, 1988, the Secretary of Defense chartered a special commission to evaluate military installations and recommend changes to increase efficiency and reduce overall costs. The commission, which completed its work in December 1988, reviewed current and planned military base structure and established criteria for realigning and closing installations. The recommendation was for the closure of 86 bases.

One of the recommendations was for the partial closure of Norton Air Force Base (AFB) in California and realignment of units from Norton to March AFB, Travis AFB, and McClellan AFB in California; McChord AFB in Washington; and Kirtland AFB in New Mexico. This environmental assessment (EA) evaluates the proposed unit realignment to McChord AFB. Additional EAs will be prepared for the other realignments mentioned above, and two environmental impact statements (EISs) will be prepared -- one to analyze the impacts caused by the withdrawal of units from Norton AFB and one to assess the disposal of properties at Norton AFB.

In addition to evaluating the realignment actions at McChord AFB related to withdrawal of units from Norton AFB, this assessment will evaluate other basing changes projected for McChord AFB.

1.2 SUMMARY OF ENVIRONMENTAL-STUDY REQUIREMENTS

Under the National Environmental Policy Act of 1969 (NEPA), federal agencies are required to take into consideration the environmental consequences of proposed actions in the decision-making process. The intent of NEPA is to protect, restore, or enhance the environment through well-informed federal decisions. The Council on Environmental Quality (CEQ) was established under NEPA to implement and oversee federal policy in this process. To this end, CEQ has issued Regulations for Implementing

the Procedural Provisions of the National Environmental Policy Act (40 CFR 1500-1508). The CEQ regulations specify that an environmental assessment serves to:

- Provide brief discussions of the need for the proposed action and discussions of impacts associated with the proposed action and alternatives.
- Briefly provide evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact;
- Aid in an agency's compliance with the Act (NEPA) when no environmental impact statement is necessary; and
- Facilitate preparation of a statement when one is necessary.

To comply with NEPA and to assess impacts on the environment, the decision-making process for the proposed realignment includes a study of the environmental issues related to the proposed action, including those issues related to construction of new facilities and modification of existing buildings at McChord AFB.

The Base Realignment and Closure Act (Public Law 100-526) makes the following changes to the normal process that the U.S. Air Force (USAF) follows to comply with NEPA and the regulations put forward by CEQ:

- The EA will not consider the need, purpose, or reason for the realignment.
- The EA will not consider alternative locations for the realigned unit.

These two considerations are not applicable, however, to those additional basing changes at McChord AFB that are not related to the realignment.

2 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 CHANGES RESULTING FROM THE REALIGNMENT

Two units would be transferred to McChord AFB as a result of the closure of Norton AFB. One flying squadron, the 63rd Military Airlift Wing (MAW), would be moved and the active-duty personnel would be reassigned to the existing 62nd MAW. The 445th MAW of the Air Force Reserves (AFRES) would be combined with the existing 446th MAW (AFRES).

The transfer would include 12 primary aircraft authorized (PAA) C-141B aircraft and approximately 16,700 annual flying hours. The basic mission of the affected units would remain unchanged, as would the land and airspace usage at McChord.

Approximately 630 full-time military and civilian personnel and an additional 405 part-time (AFRES drill) personnel would be transferred from Norton to McChord. Table 2.1 shows the staffing requirements.

Some new facilities would be constructed and some existing facilities would be modified or upgraded to provide adequate support functions for the proposed unit realignments at McChord. These efforts, estimated to cost $32 million, would include construction of 11 additional refueling hydrants, a parking apron (with an area of 51,500 yd^2), an aerospace ground equipment (AGE) facility (15,000 ft^2), an aerial delivery facility (33,400 ft^2), an active-duty squadron operations building (5,500 ft^2), an AFRES squadron operations building (8,400 ft^2), maintenance administrative space (21,000 ft^2); and alteration of two nose docks and a supply complex. In addition, the 22nd Air Force Non-Commissioned Officers Leadership School would be relocated to McChord. This would require an additional 12 full-time military personnel and a school facility (9,000 ft^2), including a 60-person dormitory.

TABLE 2.1 Staffing Requirements for the Relocation of the 63rd MAW and the 445th MAW to McChord

Employment Category	Staffing (number of people)		
	Military	Civilian	Total
Active Duty	482	1	483
Air Reserve Technicians (ARTs)	0	70	70
Base Operating Support (BOS)	55	22	77
Total	537	93	630

Source: Department of the Air Force 1989.

2.2 OTHER BASING CHANGES PROPOSED FOR McCHORD AFB

In addition to the changes resulting from the partial closure of Norton AFB and related unit realignments, other changes anticipated at McChord AFB within the same time frame are evaluated in this EA. These other basing changes are as follows:

- Deactivation of the 36th Tactical Airlift Squadron (TAS), effective the first quarter of FY90. The removal of 8 PAA C-130E aircraft and 2 backup aircraft inventory (BAI) C-130E aircraft would result in a manpower reduction of 60 officers, 403 enlisted personnel, and 18 civilian personnel. Annual flying time would be reduced by 5,768 hours.
- Transfer of two PAA C-141B aircraft from Travis AFB to McChord AFB. This would allow the formation of a third C-141B operational squadron from existing personnel and the addition of 12 officers, 74 enlisted, one civilian, and 12 BOS personnel. Of these 99 positions, 83 would transfer from Travis AFB. In addition to the active force changes, approximately 56 Associate Reserve manpower positions would transfer to McChord. The annual C-141 flying time would increase by approximately 2,350 hours.
- Deactivation of the 318th Fighter Interceptor Squadron (FIS), effective the first quarter of FY90. The removal of 18 PAA F-15A/B aircraft would result in a reduction of 635 personnel at McChord AFB, as shown in Table 2.2.

TABLE 2.2 Personnel Reductions from the Deactivation of the 318th FIS

Category	Permanent	BOS	Total
Officer	-38	-2	-40
Enlisted	-510	-55	-565
Civilian	-12	-18	-30
Total	-560	-75	-635

2.3 ALTERNATIVES TO THE PROPOSED ACTION

2.3.1 Alternatives to the Realignment

The description of the affected environment presents the existing environmental conditions associated with the installation, and these same conditions would prevail under the no-action alternative.

2.3.2 Alternatives to the Additional Basing Changes

Alternative to Deactivating the 36th TAS

Other C-130 squadrons provide for rotation to Europe every 65 days. A squadron that participates in this rotation requires 16 aircraft. Because the 36th TAS has only 10 aircraft, it cannot participate in this rotation. Thus, deactivation of a different C-130 squadron would reduce the availability of squadrons for rotation and affect this overseas responsibility.

Because funding for the 36th TAS has been removed for Fiscal Year 1990 (FY90), the no-action alternative would require that funding be removed from some other MAC mission and be redirected to fund continuation of the 36th TAS activity.

Alternative to Transferring Two C-141B Aircraft from Travis to McChord

The two C-141B aircraft could be transferred from a base other than Travis AFB. Also, a plane other than the C-141B could be transferred to McChord AFB. However, this would not achieve the objective of completing a third active-duty C-141 squadron. The no-action alternative also would prevent the formation of a third squadron from existing personnel and equipment at McChord.

Alternative to Deactivating the 318th FIS

An F-15 training squadron could be deactivated instead of a combat squadron. However, support of F-15 units for general purpose and strategic defense require that dedicated training aircraft equal 25% of combat coded assets, so reduction (drawdown) of a training unit would require drawdown of three combat units. The resulting effect on USAF F-15 units worldwide would not be acceptable. This alternative will not be considered further in this EA.

Because the funding for the 318th FIS has been removed from the FY90 budget, the no-action alternative would required that funding be removed from some other Tactical Air Command (TAC) mission and be redirected to fund continuation of the 318th FIS activity.

2.4 ENVIRONMENTAL CONSEQUENCES

2.4.1 Proposed Action

Implementation of the proposed actions would result in a slight net reduction in permanent staff (full-time and part-time) at McChord AFB. Temporary employment would be required for the various construction and alteration projects associated with the proposed action.

Calculations show that emissions of nitrogen oxides (NO_x), total suspended particulates (TSP), and sulfur dioxide (SO_2) would be reduced, but emissions of carbon monoxide (CO) and hydrocarbons (HC) would increase with the proposed realignment and basing changes. Increases in ambient pollutant levels at the base boundary are projected to be small, and the concentrations would be well within air quality standards. Construction activities, however, would cause a short-term increase in fugitive dust emissions. Aircraft noise would be reduced by about 10 dB in communities near the base as a consequence of the proposed elimination of the F-15 aircraft at McChord.

Single-event sound exposure levels would be reduced by about 15 dB. The reductions in noise would constitute the most important environmental benefit of the proposed action.

Construction associated with the conversion would generate routine volumes of nonhazardous wastes that would be removed as specified in construction contracts. Operations involving hazardous materials would be carried out in accordance with appropriate state and federal regulations and are not expected to result in adverse impacts.

Minimal impacts are expected in the following areas: groundwater quality, vegetation and wildlife resources, socioeconomic factors, and land use compatibility. No impacts are expected to threatened and endangered species or cultural resources.

2.4.2 No-Action Alternative

If the proposed realignment and other basing changes are not implemented, the present mission and current operations at McChord AFB would remain unchanged, and no new perturbations would occur to the environment around the base. It is not known where the funding for those activities proposed to be ended would be obtained. The reduction in noise projected to occur with the proposed action would not be achieved under the no-action alternative.

3 AFFECTED ENVIRONMENT

3.1 PHYSICAL AND DEMOGRAPHIC SETTING

McChord AFB is located in western Washington, about 5 mi east of Puget Sound and 1 mi south of the city limits of Tacoma in Pierce County (Fig. 3.1). Interstate 5, which is west of the base, serves as a major access route to McChord. A number of unincorporated communities are located around the base, including Lakewood, Tillicum, Ponders, Brookdale, Spanaway, Parkland, and Steilacoom.

The city of Tacoma had a 1980 population of 158,501; Spanaway had a population of 8,868; Parkland 23,355; and Steilacoom 4,886. The other communities had less than 2,500 residents. Seattle, about 30 mi to the north in King County, had a 1980 population of 493,846.

The primary mission of McChord AFB is that of the 62nd MAW, which provides for the airlift of troops, equipment, passengers, and mail during peacetime or wartime. Secondary or tenant missions include those of the 25th North American Aerospace Defense Command; 318th FIS; 446th MAW; 1905th Communications Squadron; Detachment 11 of the 17th Weather Squadron; Detachment 11 of the 1369th Photographic Squadron; Field Training Detachment 502; and the 52nd, 53rd, and 86th Aerial Port Squadrons. The base maintains one operational runway (Runway 16/34), which is 10,100 ft long and 150 ft wide.

McChord AFB occupies an area of approximately 4,600 acres (Fig. 3.2). The southern border of the base is contiguous to Fort Lewis Military Reservation, a large Army installation occupying 86,000 acres.

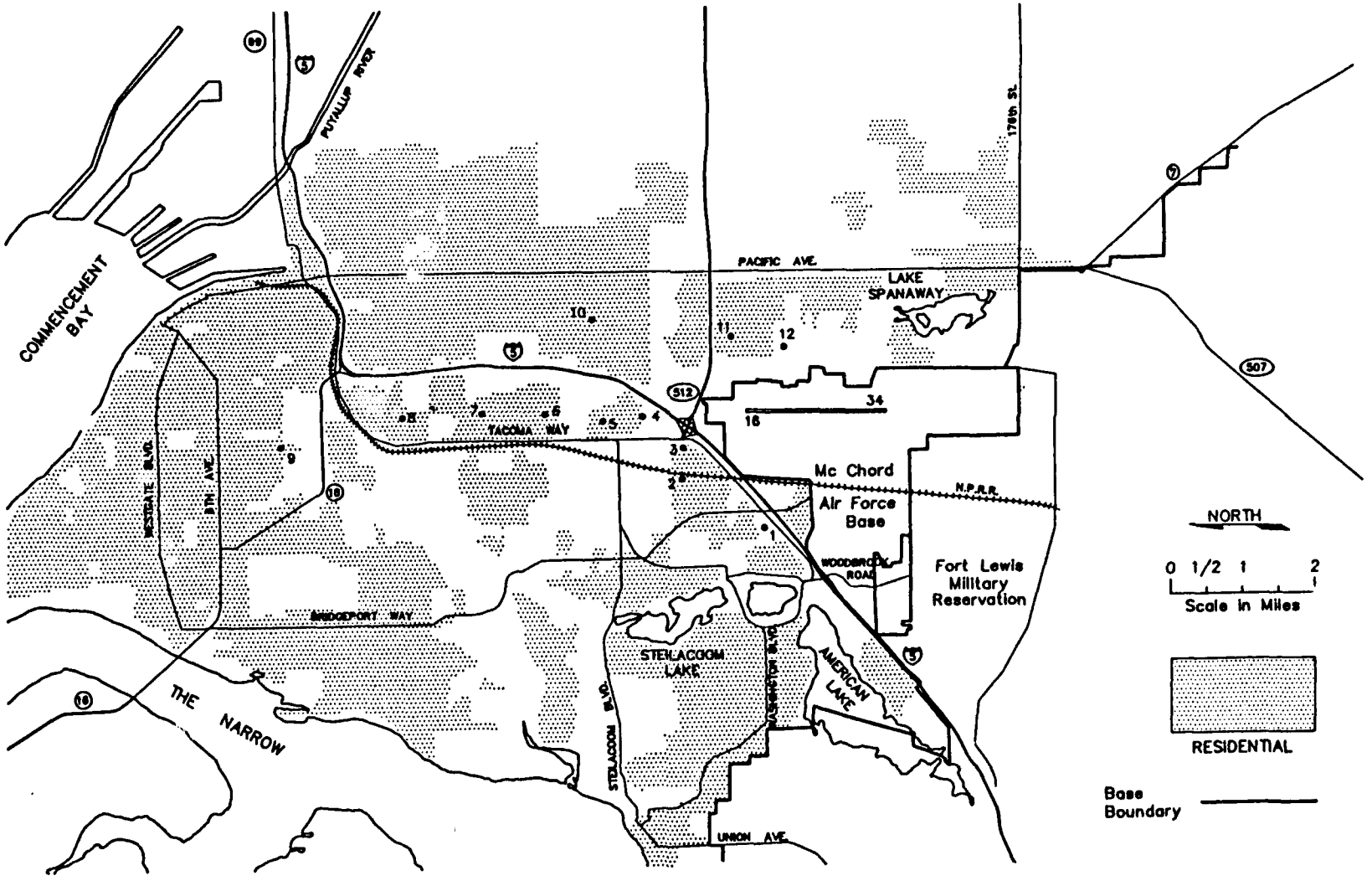

FIGURE 3.1 Regional Location of McChord AFB

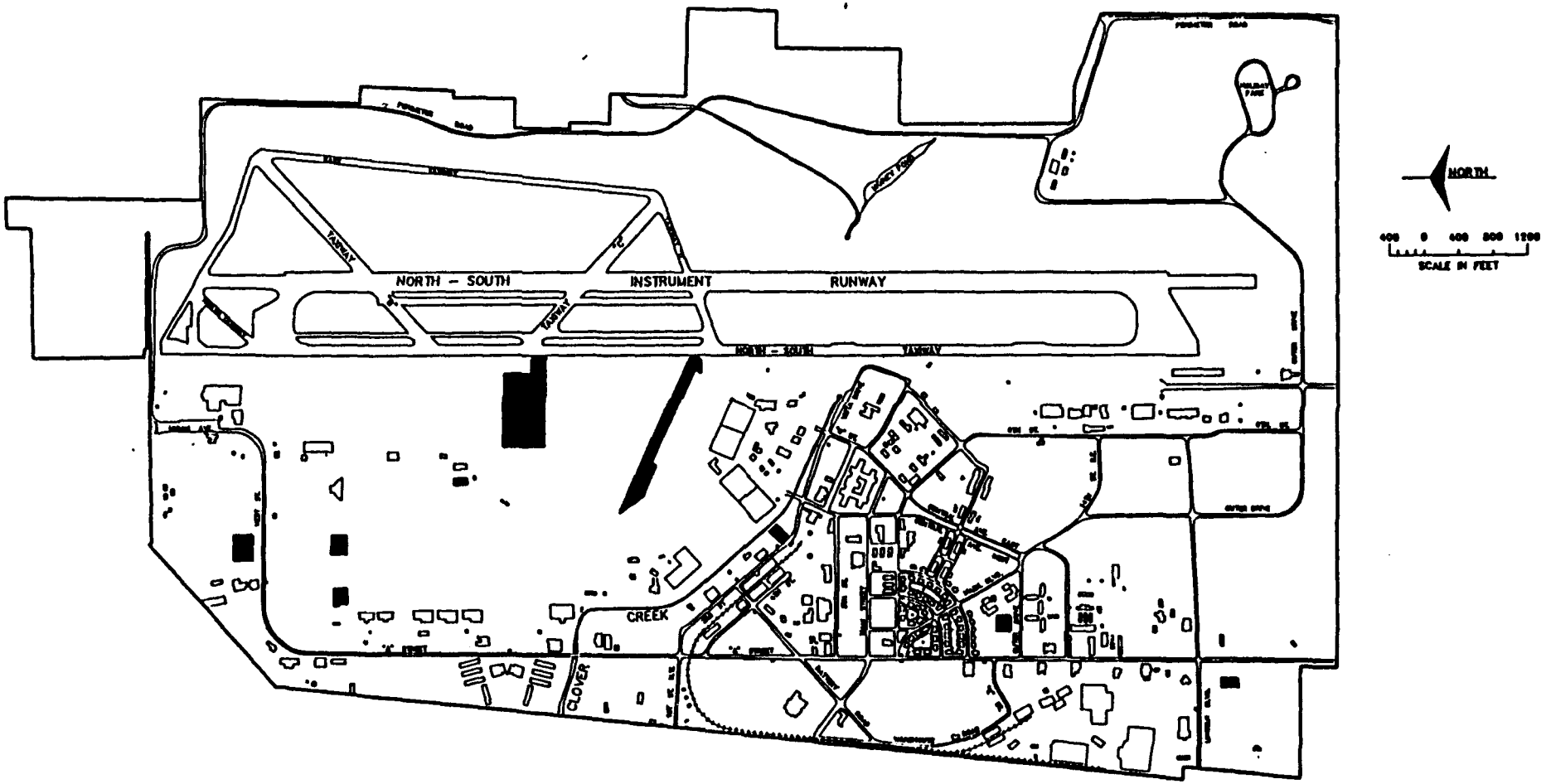

FIGURE 3.2 Layout of McChord AFB

3.2 ENVIRONMENTAL SETTING

3.2.1 Air Quality

Air quality standards in the state of Washington are regulated by the Washington Department of Ecology in Olympia, and the Puget Sound Air Pollution Authority is responsible for air quality enforcement in the Seattle-Tacoma area. Ambient air quality standards for the state, as well as national primary and secondary standards, are compared with ambient levels in the McChord AFB area in Table 3.1. The primary standard is required to protect public health with an adequate margin of safety. Secondary standards are set to protect the public welfare. Welfare, in this context, relates to damage to buildings, plants, and animals, as well as impairment of visibility.

No air quality monitoring station is located at McChord AFB. Consequently, ambient pollutant levels measured at other appropriate stations were selected for purposes of this assessment. Table 3.1 identifies the most representative nearby stations to the base and the 1987 ambient pollutant levels measured at those stations. The representative stations were selected on the basis of discussions with the Washington Department of Ecology (Krug 1989). Stations selected were thought to have air quality conditions similar to those at McChord (similar types of sources in the area) or to have air pollutant concentrations higher than those at McChord (thus providing a conservative measure of conditions at the base).

All ambient values listed in Table 3.1 are within air quality regulations. The nearest nonattainment area (area not achieving standards) is for carbon monoxide (CO) and ozone (O_3) in metropolitan Tacoma. The nonattainment status there is due principally to automobile traffic in the metropolitan area and the pervasive use of wood-burning stoves. Activities at McChord AFB are only insignificant contributors to those conditions.

TABLE 3.1 National and State Ambient Air Quality Standards and Estimated Ambient Pollutant Levels in Vicinity of McChord AFB

Pollutant	Averaging Time	Standards			Ambient Level
		National			
		Primary	Secondary	Washington	
PM_{10} ($\mu g/m^3$)	Annual	50	50	50	43[a]
	24 hours	260	150	150	101
Total suspended particulates ($\mu g/m^3$)	Annual	75	60	60	57[b]
	24 hours	260	150	150	
Sulfur dioxide ($\mu g/m^3$)[e]	Annual	80	-[c]	0.02 ppm	0 ppm[d]
	24 hours	365	-[c]	0.1 ppm	0.01 ppm
	3 hours	-[c]	1,300	-[c]	0.02 ppm
	1 hour	-[c]	-[c]	0.4 ppm	0.02 ppm
Carbon monoxide (mg/m^3)	8 hours	10	10	10	-[f]
	1 hour	40	40	40	-[f]
Nitrogen dioxide	Annual	100	100	100	-[g]

[a]Monitor located in town of Kent, at James and Central Streets, annual mean, 24-hour maximum.

[b]Monitor located at Auburn Health Department in town of Auburn.

[c]No standard set.

[d]Annual mean, 24-hour maximum, 3-hour maximum, 1-hour maximum at Mt. Tahoma High School in Tacoma.

[e]Except as noted.

[f]Nearest monitoring locations are not representative of the McChord area and reveal levels that exceed standards.

[g]Between 4 and 5 years ago levels were approximately 20 $\mu g/m^3$. No monitoring has been carried out since then because levels were so low and NO_x sources remain few in number.

Source: Washington Department of Ecology 1988.

The closest point sources of air pollution to McChord AFB are the emissions (especially the new incinerator) at Fort Lewis, located 11 km from the base; the wood-fueled boiler at Boise Cascade Co., 8 km from the base; the Woodwork Rock Crushing Co., 3 km from the base; and the Spodoni Asphalt Co., 20 km from the base.

3.2.2 Noise

General

Noise from jet aircraft operations has received national attention for many years because the relatively great acoustic power generated by jet aircraft can cause various stressful effects on residents of communities near airports and military air fields. These effects can include sleep interference, speech interference, startle, and other forms of irritation. The major sources of noise at McChord AFB are the flight operations of assigned and transient military aircraft. Four military organizations fly aircraft or perform ground maintenance operations on aircraft at McChord AFB: 62nd MAW, 446th MAW (AFRES), 36th TAS, and 318th FIS. As of March 1989, flight operations were performed with 9 C-130 aircraft, 36 C-141 aircraft, and 21 F-15 aircraft. This combination of aircraft constitutes the *baseline* conditions for purposes of this assessment.

During 1988, Runways 16 and 34 were used for 25% and 75%, respectively, of all flight operations. Aircraft engine ground run-up operations at high power are currently performed at seven general locations on the airfield: C-141 aircraft run-up operations are conducted at Ramps B and J, immediately west of the northern end of Runway 34, and in the Ramp D area at the edge of the apron in front of Hangars 3 and 4; C-130 run-up operations are conducted at Ramp C in front of Hangar 1178 and Hangars 1164 to 1167; F-15 aircraft run-up operations are conducted at Ramp E opposite Bldgs. 308 and 309 and Hangar 301, as well as in the hush house (Bldg. 346); and F-15 engines are run up

out of frame at Bldg. 300. All of the F-15 run-up areas are immediately west of the southern end of Runway 16.

Frequency of Flight Operations and Ground Tracks

Table 3.2 lists the average daily number of flight operations by organizational category (assigned military, transient military, and transient civilian contractors) and, within each category, by aircraft type. The numbers of average daily flight operations listed in Table 3.2 were obtained by dividing the total number of flight operations in 1988 by 365 flying days for assigned C-130 and C-141 aircraft; by 252 flying days per year for assigned F-15 aircraft; and by 350 flying days per year for all types of transient aircraft. These data indicate that in 1988, assigned C-141 operations accounted for 42% of total yearly activity; assigned C-130 for 8%; assigned F-15 for 31%; transient military for 16%; and transient civilian contractors for 3%. Of the total, 92% occurred in the daytime and 8% at night.

Ground-plane projections of the nominal flight tracks used by all aircraft traffic to and from McChord AFB are illustrated in Fig. 3.3.

Day-Night Average Sound Level

The USAF NOISEMAP computer program was used to prepare noise-level contours representing the existing (baseline) conditions at McChord AFB. The resulting noise exposure estimates are expressed in terms of the day-night average sound level (L_{dn}). This methodology takes into account the effect of an aircraft single event (the variations of source acoustic power, altitude, and air speed), the number of times such events occur during a 24-hour period, and the time of day that they occur. The L_{dn} is the 24-hour average sound level, in A-weighted decibels (dB), for the period from midnight to midnight, obtained after adding 10 dB to sound levels occurring during the

TABLE 3.2 Baseline Average Daily Fixed-Wing Aircraft Operations at McChord Air Force Base

Unit and Aircraft Type	Departures	Arrivals	Closed Patterns	Total Takeoffs	Total Landings	Total Operations
Assigned Military						
F-15	15.1/1.8[a]	15.1/1.8	16.5/1.8	31.6/3.6	31.6/3.6	63.2/7.2
C-130	2.41/0.41	2.41/0.41	5.70/1.12	8.11/1.53	8.11/1.53	16.22/3.06
C-141	13.15/0.31	13.15/0.31	34.42/0.80	47.57/1.11	47.57/1.11	95.14/2.22
Total Assigned						174.56/12.48 (187.04)[b]
Transient Military						
Fighter/Trainer						
A-4	0.23/0	0.23/0	0.02/0	0.25/0	0.25/0	0.50/0
A-6	0.59/0.01	0.59/0.01	0/0	0.59/0.01	0.59/0.01	1.18/0.02
A-7	0.14/0	0.14/0	0.02/0	0.16/0	0.16/0	0.32/0
A-10	1.42/0	1.42/0	0.02/0	1.44/0	1.44/0	2.88/0
F-4	0.35/0.03	0.35/0.03	0.02/0	0.37/0.03	0.37/0.03	0.74/0.06
F-14	0.03/0	0.03/0	0/0	0.03/0	0.03/0	0.06/0
F-15	0.28/0	0.28/0	0/0	0.28/0	0.28/0	0.56/0
F-16	0.65/0	0.65/0	0.02/0	0.67/0	0.67/0	1.34/0
F-18	0.08/0	0.08/0	0/0	0.08/0	0.08/0	0.16/0
F-86	0.14/0	0.14/0	0/0	0.14/0	0.14/0	0.28/0
F-106	0.07/0	0.07/0	0/0	0.07/0	0.07/0	0.14/0
F-111	0.04/0	0.04/0	0/0	0.04/0	0.04/0	0.08/0
T-33	0.30/0	0.30/0	0.02/0	0.32/0	0.32/0	0.64/0
T-37	0.12/0	0.12/0	0/0	0.12/0	0.12/0	0.24/0
T-38	0.36/0	0.36/0	0.10/0	0.46/0	0.46/0	0.92/0
T-43	0.05/0	0.05/0	0/0	0.05/0	0.05/0	0.10/0
T-114	0.11/0	0.11/0	0/0	0.11/0	0.11/0	0.22/0
Subtotal						10.36/0.08

TABLE 3.2 (Cont'd)

Unit and Aircraft Type	Departures	Arrivals	Closed Patterns	Total Takeoffs	Total Landings	Total Operations
Cargo/Transport						
TC-4	0.04/0	0.04/0	0/0	0.04/0	0.04/0	0.08/0
C-5	0.73/0.33	0.73/0.33	0/0	0.73/0.33	0.73/0.33	1.46/0.66
C-9	1.11/0.09	1.11/0.09	0/0	1.11/0.09	1.11/0.09	2.22/0.18
DC-10	0.04/0.03	0.04/0.03	0/0	0.04/0.03	0.04/0.03	0.08/0.06
KC-10	0.29/0.06	0.29/0.06	0/0	0.29/0.06	0.29/0.06	0.58/0.12
VC-10	0.11/0.01	0.11/0.01	0/0	0.11/0.01	0.11/0.01	0.22/0.02
C-12	0.22/0	0.22/0	0/0	0.22/0	0.22/0	0.44/0
C-21	0.22/0.02	0.22/0.02	0.01/0	0.23/0.02	0.23/0.02	0.46/0.04
C-130	2.69/0.37	2.69/0.37	0.20/0	2.89/0.37	2.89/0.37	5.78/0.74
C-131	0.17/0	0.17/0	0/0	0.17/0	0.17/0	0.34/0
C-135	0.18/0	0.18/0	0.02/0	0.20/0	0.20/0	0.40/0
C-140	0.04/0	0.04/0	0/0	0.04/0	0.04/0	0.08/0
C-141	4.85/1.39	4.85/1.39	0/0	4.85/1.39	4.85/1.39	9.70/2.78
E-3	0.11/0.01	0.11/0.01	0/0	0.11/0.01	0.11/0.01	0.22/0.02
P-3	0.06/0.01	0.06/0.01	0/0	0.06/0.01	0.06/0.01	0.12/0.02
Subtotal						22.18/4.64
Transient Civilian[c]						
B-707	0.04/0.05	0.04/0.05	0/0	0.04/0.05	0.04/0.05	0.08/0.10
B-747	0.13/0.22	0.13/0.22	0/0	0.13/0.22	0.13/0.22	0.26/0.44
C-402	0.40/0.02	0.40/0.02	0/0	0.40/0.02	0.40/0.02	0.80/0.04
L-188	1.11/0.03	1.11/0.03	0/0	1.11/0.03	1.11/0.03	2.22/0.06
L-382	0.06/0.65	0.06/0.65	0/0	0.06/0.65	0.06/0.65	0.12/1.30
N-265	0.30/0	0.30/0	0/0	0.30/0	0.30/0	0.60/0
Subtotal						4.08/1.94

TABLE 3.2 (Cont'd)

Unit and Aircraft Type	Departures	Arrivals	Closed Patterns	Total Takeoffs	Total Landings	Total Operations
Total Transient						43.28
Airport Total						211.18/19.14 (230.32)[b]

[a]Indicates day/night operations.

[b]Day plus night operations.

[c]Contractors.

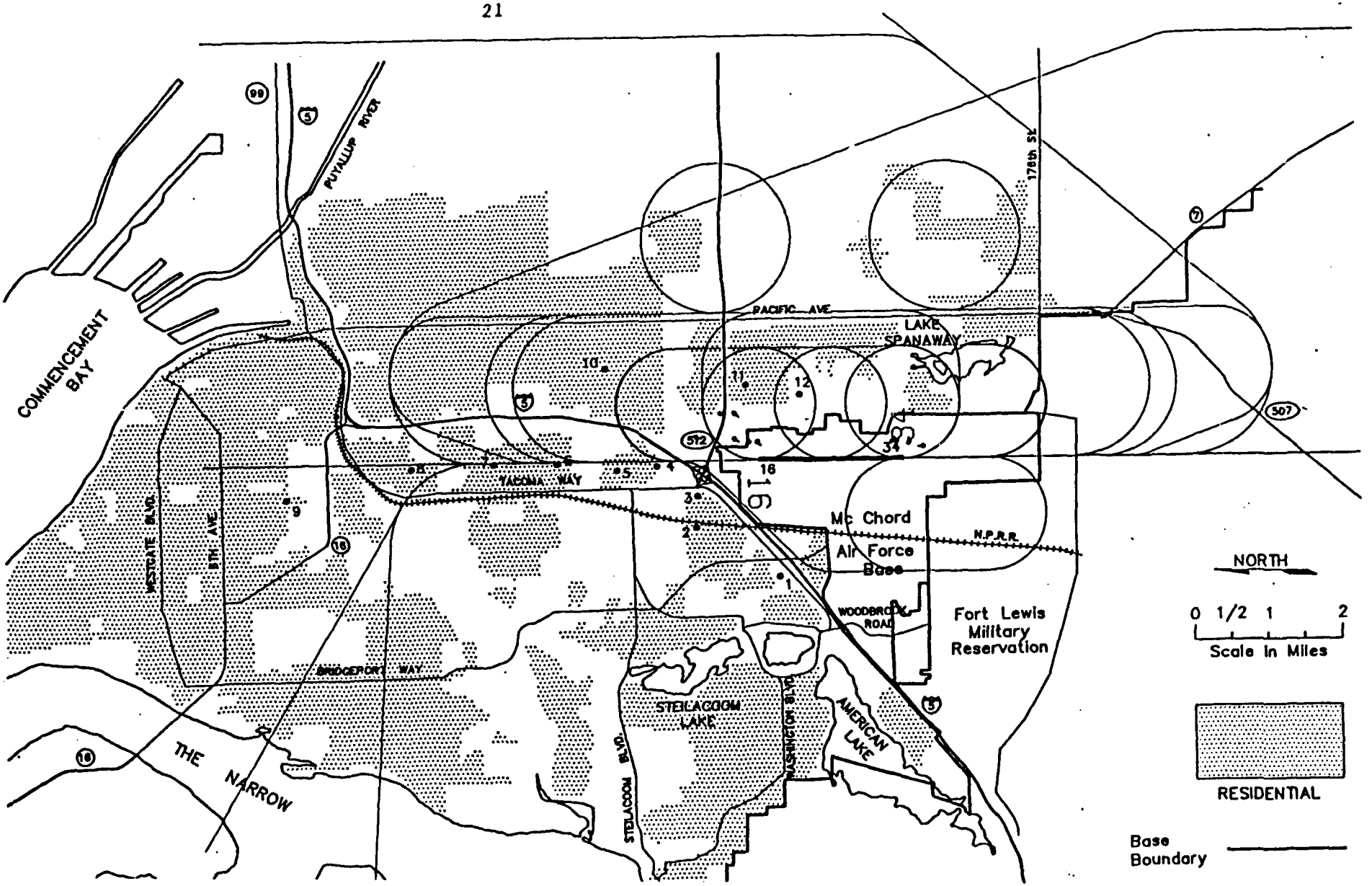

FIGURE 3.3 Ground-Plane Projections of Flight Paths (tracks) for All Baseline Flight Operations

night (from 10 p.m. to 7 a.m.). The NOISEMAP methodology uses the following flight data: aircraft type, altitude profiles, engine power settings vs. aircraft speed schedules, flight-track locations, number of operations per track, runway utilization schedules, and run-up (ground engine-testing) data. A more detailed description of the L_{dn} contour computation methodology is given in Appendix A.

Noise-Level Contours

The noise-level contours generated from the NOISEMAP model for the existing flight activity at McChord AFB are shown in Fig. 3.4. These contours define the location of noise levels on and around the airfield at L_{dn} values of 65, 70, 75, 80, and 85 dB. The values on the noise contours can be interpreted to represent different levels of community reaction and are often used as guidelines for zoning by local communities in the vicinity of military airfields.

The Federal Interagency Committee on Urban Noise (FICUN), which includes the USAF and the U.S. Department of Housing and Urban Development, considers L_{dn} levels below 65 dB compatible with residential land use. Residential land use is discouraged for areas with noise levels in the range 65-70 dB on the L_{dn} scale, is strongly discouraged for areas in the 70-75 dB range, and is unacceptable for areas that exceed 75 dB.

The L_{dn} contours in Fig. 3.4 represent the sum of all existing (baseline) aircraft activities. The L_{dn} values at 12 noise-sensitive community locations around McChord AFB, indicated by the numbered bold dots in all noise-level-contour figures, range from 59 to 76 dB. These locations were selected for analysis of noise impacts because they are those residential areas, schools, and hospitals located closest to sources of noise from McChord AFB aircraft activities. Nine of the 12 locations are exposed to L_{dn} noise levels of 65 dB or greater.

The size and shape of the contours shown in Fig. 3.4 for all operations combined may be better understood by examining separate sets of contours for each of the primary

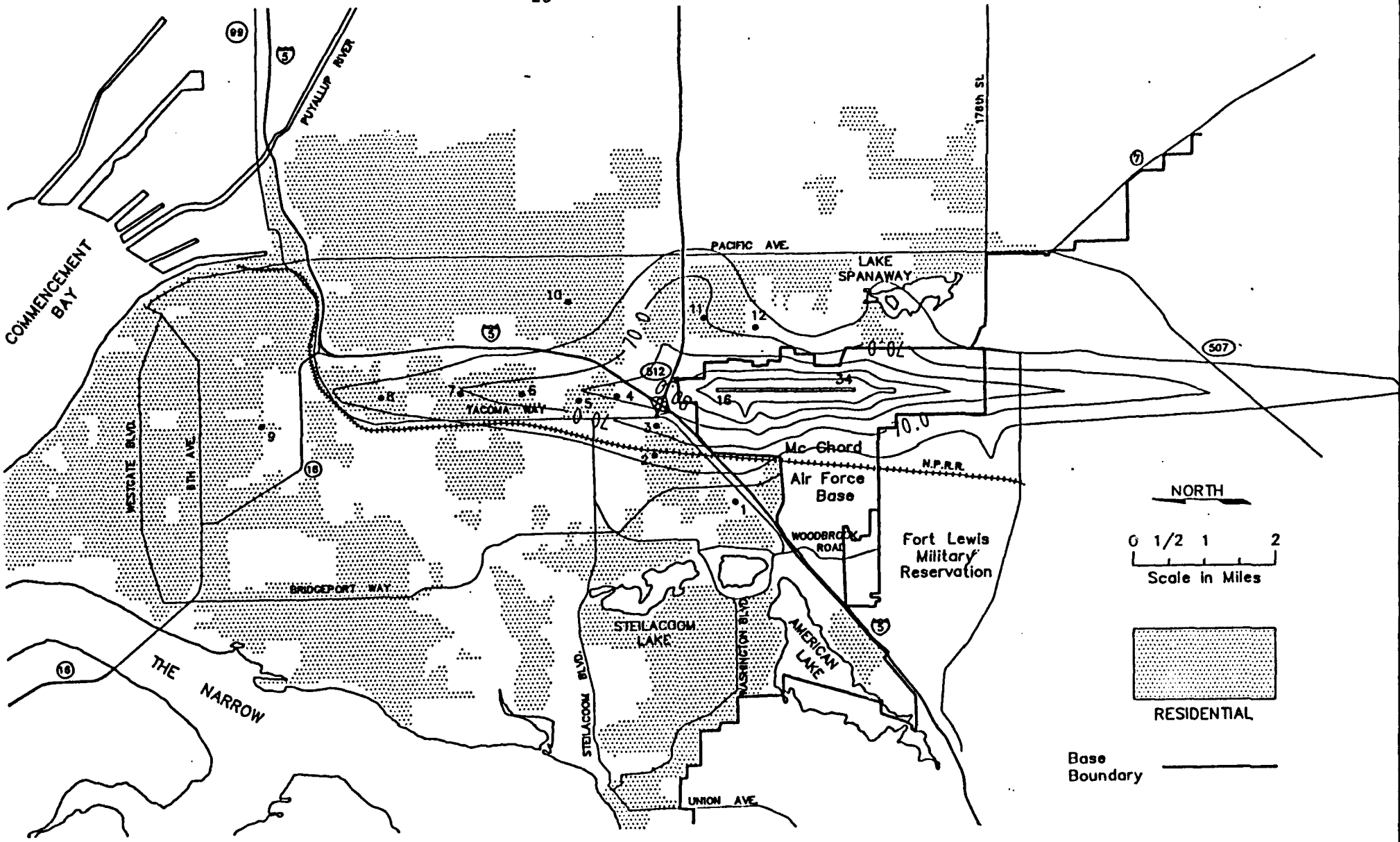

FIGURE 3.4 Baseline L_{dn} Contours for All Flight Operations

sources of aircraft noise at McChord AFB. Figures B.1 through B.3 in Appendix B illustrate the component contours for C-141, F-15, and transient flight operations, respectively. Figure B.4 illustrates the component contours for the ground run-up operations. The component contour figures collectively indicate that F-15 flight operations produce the greatest noise impact on the community, followed by transient aircraft, C-141 aircraft, and ground run-up operations, in that order. Operations by C-130 aircraft do not generate enough noise to warrant separate presentation.

Single-Event Analysis

The noise levels produced by an individual aircraft operation is best characterized by the sound exposure level (SEL), i.e., the level of a constant noise source that would emit an equivalent amount of sound energy in a period of 1 second. The SEL provides a convenient basis for comparing noise events that have different durations and vary in intensity (within one or a few seconds). It should be noted that there is no general relationship between the SEL value and either the maximum or average noise levels that would be measured during an aircraft flyover. In areas relatively near the flight tracks, noise intrusions resulting from aircraft operations would typically last 20-30 seconds, and the maximum noise levels would be 5-7 dB lower than the indicated SEL value. Equivalent noise levels for the duration of the event would typically be 13-15 dB lower than the SEL value. In areas farther away from the flight tracks, durations would typically be 30 seconds or more; maximum noise levels would be 7-10 dB lower than the SEL value; and the equivalent noise levels would be 15-20 dB lower.

Although typical community-annoyance reaction to noise is generally assessed by calculation of 24-hour average values (L_{dn}), sleep interference effects of noise, in particular, have been correlated with outdoor SEL values to estimate the percentage of neighborhood residents who would be awakened by a single aircraft noise event.

For each type of assigned aircraft, its noisiest flight operation at each of the selected noise-sensitive locations has been calculated and listed in Table 3.3. It characterizes the worst-case short-term impact of a particular aircraft's operation at the designated location and can be caused by either an approach or a departure. The term "maximum SEL" refers to the greatest value of SEL compared for each of the aircraft operations under consideration at a particular location; i.e., the "maximum" SEL taken over all possible flight operations, and not over time.

The results of these computations for the presently assigned C-130, C-141, and F-15 aircraft, listed in Table 3.3, indicate that single-event levels range from as low as 64 dB (SEL) at Tyee Park School for C-130 departures to as high as 108 dB (SEL) at residential area #2 for C-141 approaches. Two-ship formation takeoffs and landings were assumed for the F-15 calculations (i.e., two F-15 aircraft fly side-by-side) since this formation produces the noisiest single-event F-15 departure operation (3 dB noisier than single-ship or trailing formations). Some general conclusions to be drawn from Table 3.3 are that in regions near the runway centerline (and its extensions), the SEL values for C-130 approaches exceed the departure values by approximately 3 dB (SEL), and the SEL values for C-141 approaches exceed the values for departures by about 11 dB (SEL). However, at all locations, maximum SEL values for F-15 departures exceed values for approaches by about 10 dB (SEL).

Noise-Abatement Procedures

McChord AFB has instituted several noise-abatement procedures for flight operations to reduce community noise impacts. These procedures can be summarized as follows:

- No training or practice flights of assigned aircraft are normally permitted between 11 p.m. and 6 a.m.

TABLE 3.3 Maximum Single-Event Sound Exposure Levels (maximum SELs) at Community Locations[a] near McChord AFB

Location	Description	Maximum Sound Exposure Level in dB (SEL)					
		C-130		C-141		F-15	
		Departure	Approach	Departure	Approach	Departure[b]	Approach
1	Tyee Park Elementary School	64	80	77	91	95	77
2	Southgate Elementary School	73	77	87	85	102	85
3	Residential Area No. 1	83	82	93	92	106	90
4	Residential Area No. 2	95	93	94	108	107	97
5	Oakwood Elementary School	89	90	92	105	104	94
6	Arlington Elementary School	84	87	92	103	102	93
7	Gray Middle School and Edison High School	81	84	91	99	100	93
8	Madison Elementary School	78	83	86	97	99	92
9	Humana Hospital	68	76	76	82	94	86
10	Baker Junior High School	70	68	80	86	94	87
11	Sales Elementary School	70	69	85	84	100	89
12	Keithley Middle School and Washington High School	68	66	85	86	101	85

[a]Locations are indicated in all figures showing noise contours.

[b]Two-ship side-by-side formation takeoffs and landings were assumed for all F-15 aircraft single-event levels.

- Winds permitting, essential military takeoffs between 11 p.m. and 6 a.m. generally are to the south (Runway 16) and essential landings are to the north (Runway 34) so as to minimize noise impacts in Tacoma.
- No maintenance ground run-up testing is normally permitted between 11 p.m. and 6 a.m.

Noise Complaints

Complaints regarding aircraft noise are handled by the 62nd MAW Public Affairs Office. Each complaint is documented on a complaint worksheet. Flight operations staff are consulted to determine the most likely category (assigned or transient) and type of aircraft involved. If initial investigation indicates that F-15 assigned aircraft are involved, the complaint is referred to the Public Affairs Office of the 25th Air Division (incorporating the 318th FIS) for further disposition. If it is not initially obvious that McChord AFB assigned or transient traffic is involved, the Public Affairs Office will contact other appropriate air bases to determine if the complaint factors can be correlated with any of their flight operations.

Upon completion of the internal investigation and determination of the most probable cause of the complaint, a personal response is made to the complainant by the Public Affairs Office. If it is found that the complaint was a result of McChord AFB assigned aircraft operations, the necessary corrective actions are taken and assurances given to the complainant that steps have been taken to prevent a recurrence. If the investigation reveals that the problem arose from transient aircraft or other aircraft passing through the region, the situation is explained to the complainant. All complaints and corresponding actions taken by McChord personnel are ultimately documented in the community relations log.

The Public Affairs Officer periodically reviews the complaint worksheet log to determine if any trends can be detected. Apparent trends are reviewed with the Deputy Commander for Flight Operations.

McChord AFB receives an average of nine noise complaints per month, with about 80% attributable to assigned aircraft.

3.2.3 Wastes and Stored Fuel

All domestic and most industrial sewage generated at McChord AFB is transported through sewer lines to the Fort Lewis wastewater treatment facility. After treatment, effluent from that facility is discharged into Puget Sound. Nonhazardous solid wastes generated at McChord AFB are disposed of in a sanitary landfill on the base.

A number of potentially hazardous materials are used, stored, or have been consumed at the base. These hazardous materials are handled in accordance with federal, state, and local regulations and standards. Operations involving the use or disposal of hazardous materials or waste at the MAC facility include maintenance of aircraft, aerospace ground equipment, and ground vehicles; and management and distribution of petroleum, oil, and lubricants (POL). The materials include waste oils; recovered fuels; spent cleaners; paint removers, thinners, and strippers; and cleaning solvents. JP-4 jet fuel is the most plentiful hazardous material on the base. Some wastes are turned in to base supply for recovery, but most are disposed of through the Defense Reutilization and Marketing Office.

McChord AFB has implemented a hazardous materials and dangerous waste management plan (Department of the Air Force 1985) that details methods for containment, storage, packaging, visual inspection, preventative maintenance, housekeeping, material compatibility, security, monitoring, handling, transporting, and

disposing of hazardous wastes. The plan is based on regulations promulgated by the USAF and other federal and state agencies.

Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Public Law 96-510), as amended, the Department of Defense (DOD) has initiated an Installation Restoration Program to investigate any environmental contamination present at DOD facilities as a result of past waste-disposal activities. Phase 1 and Phase 2 of this program have been completed at McChord AFB (Department of the Air Force 1986).

3.2.4 Water Resources

Clovis Creek and Morey Creek are the primary surface water features at McChord AFB. Morey Creek originates at Spanaway Lake east of the base and merges with Clovis Creek at a marsh on the eastern portion of the base. Clovis Creek has been extensively modified throughout its entire 10-mi length. It flows through pipes under the McChord runway, and the creek bed has been straightened and diked throughout the remainder of its course through the base.

Several small ponds on the base provide recreational opportunities or serve as sources for irrigation water. In addition, several marshlands on the base provide surface water and groundwater recharge.

Groundwater is found at depths of 10-20 ft below surface. Because soils consist primarily of glacial outwash, infiltration rates are high, and groundwater levels fluctuate as a function of seasonal rainfall amounts. Water supply is provided by deep wells on the base. Well depths vary from 30 to 550 ft below the surface.

3.2.5 Vegetation and Wildlife Resources

The original vegetation occupying the site of McChord AFB consisted of tall-grass prairie with scattered stands of oak, ponderosa pine, and Douglas-fir. The prairie

was maintained by periodic fires. Changes in land use patterns and the control of fires has resulted in a reduction of the tall grass prairie and an increase in the number of Douglas-fir stands. Approximately 900 acres of forest now occur on the base. Most of the remaining natural vegetation is located in the southern quarter of the base. Managed vegetation and landscaped areas dominate the industrial, community, and airfield portions of the base.

The forested and grassland areas provide habitat for red-tailed hawk, coyote, deer, bear, and numerous small mammals and song-bird populations. McChord wildlife populations benefit from the presence of large undeveloped areas on Fort Lewis, which borders the southern portion of McChord AFB. Several marshlands on McChord provide habitat for waterfowl.

3.2.6 Threatened and Endangered Species

According to the U.S. Fish and Wildlife Service (1984), the bald eagle is found within the region that contains McChord AFB. However, occurrence of bald eagles on the base has not been confirmed, and any eagles sighted on the base would most likely be residents of large undeveloped areas located on Fort Lewis. McChord AFB supports a large population of the state-protected western grey squirrel. The range of two state-protected plant species -- the giant trillium and the white-topped aster -- includes the McChord AFB area, but the presence of those species on the base has not been confirmed.

3.2.7 Socioeconomics

McChord AFB is located on the southern edge of the city of Tacoma in Pierce County. The city had an estimated 1986 population of 158,950 people. This represented an increase of less than 1% from the 1980 population of 158,501. A small rate of increase (2.7%) also was experienced from 1970 to 1980. With an area of 47.7 mi^2,

Tacoma had a population density of about 3,332 people/mi^2 in both 1980 and 1986 (U.S. Bureau of the Census 1983, 1987).

No other large cities occur in the immediate vicinity of McChord AFB, but the unincorporated towns of Lakewood, Tillium, Ponders, Brookdale, Spanaway, Parkland, and Steilacoom are located around the base. These towns are part of the suburban Tacoma area.

Pierce County occupies 1,675 mi^2 and consists primarily of urban and suburban development, with remaining pockets of forest and agricultural land located along Puget Sound and in the eastern portion of the county. The 1985 county population was 523,500, a 7.8% increase from 1980 (U.S. Bureau of the Census 1983, 1986). This rate of growth was slightly greater than that experienced by the state of Washington as a whole. The population density of the county was about 313 people/mi^2 in 1985.

Civilian employment in Pierce County exceeded 181,000 in 1981 (U.S. Bureau of the Census 1983). Employment at McChord AFB is 5,271 military and 2,543 civilian personnel. Total annual payroll at McChord is estimated at $166.5 million (Department of the Air Force 1988).

3.2.8 Cultural Resources

In the area within and adjacent to McChord AFB, there is evidence of a number of homesteads/farmsteads that were in use before the purchase of the land in 1919 for Fort Lewis (Pittman 1989). A Hudson Bay farm was located near what is now the eastern edge of the base; however, the site is so disturbed that the exact location has yet to be determined. None of these homesteads/farmsteads is in areas to be affected by the proposed action. A number of historic buildings constructed prior to 1939 also occur in the area, but only one of these (Hanger 1, constructed in 1938) would be affected by the proposed action. None of these sites or structures is listed in the *National Register of*

Historic Places (NRHP). However, Hanger 1 is currently under evaluation for NRHP eligibility by the Washington State Historic Preservation Officer.

A cultural resources survey was recently conducted at McChord AFB by the National Park Service (Pittman 1989; Calliot 1989); however, a report on the findings and recommendations of that survey have not yet been issued.

3.2.9 Land Use

The Fort Lewis Military Reservation is located along the southern boundary of McChord AFB. The areas to the north, east, and northwest of the base are zoned for commercial, residential, and light industrial uses. Commercial strip development has occurred in locations next to the base near Interstate 5 along the eastern border of the base and along Highway 512 along the northern border. The American Lake Garden residential area is an island of housing that exist along part of the southern border of the base next to Fort Lewis.

A Burlington Northern Railroad right-of-way easement divides the base into eastern and western sections. The western portion of the base contains family housing, a golf course, and other recreational areas. The eastern area of the base includes all aircraft mobilization and maintenance facilities. In addition, almost all administrative and support functions are located on the eastern portion of the base. Although there is no agricultural activity on McChord AFB, past forest management practices have included the harvest of forest products. The primary undeveloped portion of McChord is south of the runway along the border with Fort Lewis.

3.2.10 Land Traffic

The primary entrance into the McChord is the Bridgeport Highway, which connects Lakewood, Oregon, with the base. A major interchange at Interstate 5 and the Bridgeport Highway allows access to the base from the Tacoma-Seattle metropolitan

areas. Other gates into McChord are located on Steele Street (North Gate), Wood Brook Drive (South Gate) and next to Spanaway Loop Road (East Gate). Family housing is connected to the base via Lincoln Boulevard.

4 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

4.1 DIRECT AND INDIRECT CONSEQUENCES OF THE PROPOSED ACTION

4.1.1 Air Quality

Air pollution emissions expected to occur in the year 1990 after the removal of the F-15 and C-130 aircraft and the increase in the number of C-141 aircraft at McChord AFB were compared with 1989 emissions to evaluate the potential impacts of the proposed action on air quality. Military Airlift Command personnel estimated that there would be a daily average of about 18 landing-takeoffs and 47 closed patterns for the assigned C-141 aircraft, with 365 flying days per year. Annual emissions for all military aircraft were obtained from a report by Seitchek (1985).

Table 4.1 shows that compared with current conditions, the removal of F-15 and C-130 aircraft and the increase in C-141 aircraft would reduce emissions of nitrogen oxides (NO_x), total suspended particulates (TSP), and sulfur dioxide (SO_2) but increase emissions of carbon monoxide (CO) and hydrocarbons (HC).

To estimate the impact on air quality at the base boundary from the projected emissions of CO, SO_2, TSP, NO_x, additional air quality analyses were carried out using the methods in Seitchek (1985). The impact of the full squadron of C-141 aircraft was estimated by examining the worst hour of the day for air emissions (between 10 a.m. and 11 a.m.). That hour would include an average of 1.25 departures, 1.875 arrivals, and 6.6 closed patterns by the C-141 aircraft, and an equivalent of 1.12 takeoffs and 1.12 landings by transient aircraft (also represented by C-141 aircraft). The use of conservative meteorological conditions (F atmospheric stability class, 1 m/s wind speed) led to predictions of pollutant concentration increments that appear in Table 4.2. Estimates of 3-hour and 24-hour concentrations were made using correlations found in

TABLE 4.1 Comparison of Existing Aircraft Emission Levels (1989) with Emission Levels Expected after Removal of F-15 and C-130 Aircraft and Increase of C-141 Aircraft in 1990

Source	Emissions (metric tons per year)				
	CO	HC	NO_x	TSP	SO_2
Existing Conditions (1989)					
Assigned Military					
C-141	529.03	400.59	100.1	7.821	15.914
C-130	55.596	34.613	13.675	1.942	2.478
F-15	67.79	8.145	43.944	1.272	7.326
Transients	448.455	302.894	62.255	5.698	11.004
Total	1,100.871	746.242	219.974	16.733	36.722
Future Conditions (1990)					
Assigned Military (C-141)	705.13	533.94	133.44	10.425	21.214
Transients	448.455	302.894	62.255	5.698	11.004
Total	1,153.585	836.834	195.695	16.123	32.218

TABLE 4.2 Predicted Increases in Ambient Pollutant Levels at the McChord AFB Boundary due to the Operation of C-141 and Military Transient Aircraft in 1990

Pollutant	Averaging Time	Federal and State Standard	Ambient Level	Worst-Case Contribution	Worst-Case Total
Total suspended particulates ($\mu g/m^3$)	Annual	60	-	-	-
	24 hours	150	57[a]	0.379	57.379
Sulfur dioxide ($\mu g/m^3$)[b]	Annual	0.02 ppm	0.00 ppm[c]		
	24 hours	0.1 ppm (260)[d]	0.01 ppm (26)	0.649	26.649
	3 hours	0.5 ppm (1,300)	0.02 ppm (52)	0.455	52.455
	1 hour	0.4 ppm (1,040)	0.02 ppm (52)	1.114	53.114
Carbon monoxide (mg/m^3)	8 hours	10	-	0.035	-
	1 hour	40	-	0.05	-
Nitrogen dioxide ($\mu g/m^3$)	Annual	100	-[e]	5.137	-

[a]Monitor located at Auburn Health Department in Auburn.

[b]Except as noted.

[b]Annual mean, 24-hour maximum, 3-hour maximum recorded at Mt. Tahoma High School monitor in Tacoma.

[d]Values in parentheses are micrograms per cubic meter.

[e]Four to five years ago levels were approximately 20 $\mu g/m^3$. No monitoring has been carried out since then because levels were so low and NO_x sources remain few in number.

Seitchek (1985). Annual average levels would be less than the maximum 24-hour prediction. The increments in Table 4.2 from the C-141 aircraft and transients are small and are only a small fraction of the air quality standards. The addition of existing air pollutant levels and these increments leads to concentrations that are well within the air quality standards.

The increase in hydrocarbons (from 746 to 837 metric tons per year) would have some effect on the production of ozone in the area. However, an annual increase of 91 metric tons is very small compared with regional releases, and the decrease in NO_x from 220 to 196 metric tons per year would help counteract the effect of increased hydrocarbon emissions.

Various construction activities associated with the proposed action would cause short-term emissions of small amounts of fugitive dust at McChord AFB. With implementation of appropriate control measures (such as periodic watering or application of chemical dust suppressants), the concentration of total suspended particulates at the base boundary would be only minimally elevated.

4.1.2 Noise

Frequency of Flight Operations and Ground Tracks

Before the partial closure of Norton AFB, all F-15 and C-130 aircraft presently at McChord AFB would have been reassigned to other air bases, and after the proposed action (1990), 12 additional C-141 aircraft would have been reassigned to McChord. Thus, the net assigned aircraft complement at McChord AFB would be 48 C-141 aircraft only. As a result, assigned C-141 flight and ground run-up operations would increased by 33% from current levels, but all assigned F-15 and C-130 operations would have ceased. It is assumed that transient operations would remained unchanged from the existing levels. These changes are summarized in Table 4.3. The increased C-141 ground run-up

TABLE 4.3 Average Daily Fixed-Wing Aircraft Operations at McChord Air Force Base after Realignment of Norton AFB Units

Unit and Aircraft Type	Departures	Arrivals	Closed Patterns	Total Takeoffs	Total Landings	Total Operations
Assigned Military						
(C-141)	17.53/0.41[a]	17.53/0.41	45.89/1.07	63.43/1.48	63.43/1.48	126.85/2.96 (129.81)[b]
Transient Military						
Fighter/Trainer						
A-4	0.23/0	0.23/0	0.02/0	0.25/0	0.25/0	0.50/0
A-6	0.59/0.01	0.59/0.01	0/0	0.59/0.01	0.59/0.01	1.18/0.02
A-7	0.14/0	0.14/0	0.02/0	0.16/0	0.16/0	0.32/0
A-10	1.42/0	1.42/0	0.02/0	1.44/0	1.44/0	2.88/0
F-4	0.35/0.03	0.35/0.03	0.02/0	0.37/0.03	0.37/0.03	0.74/0.06
F-14	0.03/0	0.03/0	0/0	0.03/0	0.03/0	0.06/0
F-15	0.28/0	0.28/0	0/0	0.28/0	0.28/0	0.56/0
F-16	0.65/0	0.65/0	0.02/0	0.67/0	0.67/0	1.34/0
F-18	0.08/0	0.08/0	0/0	0.08/0	0.08/0	0.16/0
F-86	0.14/0	0.14/0	0/0	0.14/0	0.14/0	0.28/0
F-106	0.07/0	0.07/0	0/0	0.07/0	0.07/0	0.14/0
F-111	0.04/0	0.04/0	0/0	0.04/0	0.04/0	0.08/0
T-33	0.30/0	0.30/0	0.02/0	0.32/0	0.32/0	0.64/0
T-37	0.12/0	0.12/0	0/0	0.12/0	0.12/0	0.24/0
T-38	0.36/0	0.36/0	0.10/0	0.46/0	0.46/0	0.92/0
T-43	0.05/0	0.05/0	0/0	0.05/0	0.05/0	0.10/0
T-114	0.11/0	0.11/0	0/0	0.11/0	0.11/0	0.22/0
Subtoal						10.36/0.08

TABLE 4.3 (Cont'd)

Unit and Aircraft Type	Departures	Arrivals	Closed Patterns	Total Takeoffs	Total Landings	Total Operations
Cargo/Transport						
TC-4	0.04/0	0.04/0	0/0	0.04/0	0.04/0	0.08/0
C-5	0.73/0.33	0.73/0.33	0/0	0.73/0.33	0.73/0.33	1.46/0.66
C-9	1.11/0.09	1.11/0.09	0/0	1.11/0.09	1.11/0.09	2.22/0.18
DC-10	0.04/0.03	0.04/0.03	0/0	0.04/0.03	0.04/0.03	0.08/0.06
KC-10	0.29/0.06	0.29/0.06	0/0	0.29/0.06	0.29/0.06	0.58/0.12
VC-10	0.11/0.01	0.11/0.01	0/0	0.11/0.01	0.11/0.01	0.22/0.02
C-12	0.22/0	0.22/0	0/0	0.22/0	0.22/0	0.44/0
C-21	0.22/0.02	0.22/0.02	0.01/0	0.23/0.02	0.23/0.02	0.46/0.04
C-130	2.69/0.37	2.69/0.37	0.20/0	2.89/0.37	2.89/0.37	5.78/0.74
C-131	0.17/0	0.17/0	0/0	0.17/0	0.17/0	0.34/0
C-135	0.18/0	0.18/0	0.02/0	0.20/0	0.20/0	0.40/0
C-140	0.04/0	0.04/0	0/0	0.04/0	0.04/0	0.08/0
C-141	4.85/1.39	4.85/1.39	0/0	4.85/1.39	4.85/1.39	9.70/2.78
E-3	0.11/0.01	0.11/0.01	0/0	0.11/0.01	0.11/0.01	0.22/0.02
P-3	0.06/0.01	0.06/0.01	0/0	0.06/0.01	0.06/0.01	0.12/0.02
Subtotal						22.18/4.64
Transient Civilian[c]						
B-707	0.04/0.05	0.04/0.05	0/0	0.04/0.05	0.04/0.05	0.08/0.10
B-747	0.13/0.22	0.13/0.22	0/0	0.13/0.22	0.13/0.22	0.26/0.44
C-402	0.40/0.02	0.40/0.02	0/0	0.40/0.02	0.40/0.02	0.80/0.04
L-188	1.11/0.03	1.11/0.03	0/0	1.11/0.03	1.11/0.03	2.22/0.06
L-382	0.06/0.65	0.06/0.65	0/0	0.06/0.65	0.06/0.65	0.12/1.30
N-265	0.30/0	0.30/0	0/0	0.30/0	0.30/0	0.60/0
Subtotal						4.08/1.94

TABLE 4.3 (Cont'd)

Unit and Aircraft Type	Departures	Arrivals	Closed Patterns	Total Takeoffs	Total Landings	Total Operations
Total Transient						43.28
Airport Total						163.47/9.62 (173.09)[b]

[a]Indicates day/night operations.

[b]Day plus night operations.

[c]Contractors.

operations would be accommodated by preparation of three additional parking spaces at the southern end of Ramp J, as well as additions to the Ramp D area apron to permit C-141 aircraft to taxi into all parking locations opposite Hangars 3 and 4. Existing maintenance locations at Ramp C and in the F-15 areas at the southern end of the runway (Bldgs. 300 and 346) would cease to be used for ground run-up operations.

Flight tracks are assumed to remain essentially unchanged from current tracks, as illustrated in Fig. 3.3.

Noise-Level Contours

The effect of the 33% increase in assigned C-141 operations would produce negligible change in the component C-141 L_{dn} noise-level contours, as can be seen by comparing Fig. B.5 with Fig. B.1 (Appendix B). Similarly, the net change in ground-maintenance component L_{dn} contours would have no significance for community locations (Fig. B.6 compared with Fig. B.4 in Appendix B). However, elimination of the predominant F-15 component (Fig. B.2 in Appendix B) would result in a major reduction of total L_{dn} levels in the neighborhoods east of the base, as can be seen by comparing Fig. 4.1 with Fig. 3.4. The communities directly east and northeast of the runway (locations 10 through 12) would have day-night noise levels (L_{dn}) reduced by 10 dB or more. Reductions almost as great would occur in the communities west and northwest of the runway (locations 1 and 2). The number of sensitive-receptor locations within the 65-dB L_{dn} contour would be reduced from 9 (existing) to 6 (after realignment of Norton units).

Single-Event Sound Exposure Levels

Because no new types of aircraft would be assigned to McChord AFB (i.e., only the C-141 would be assigned to McChord), changes in maximum sound exposure levels (maximum SELs) can be analyzed from the data presented in Table 3.3. Table 4.4 lists

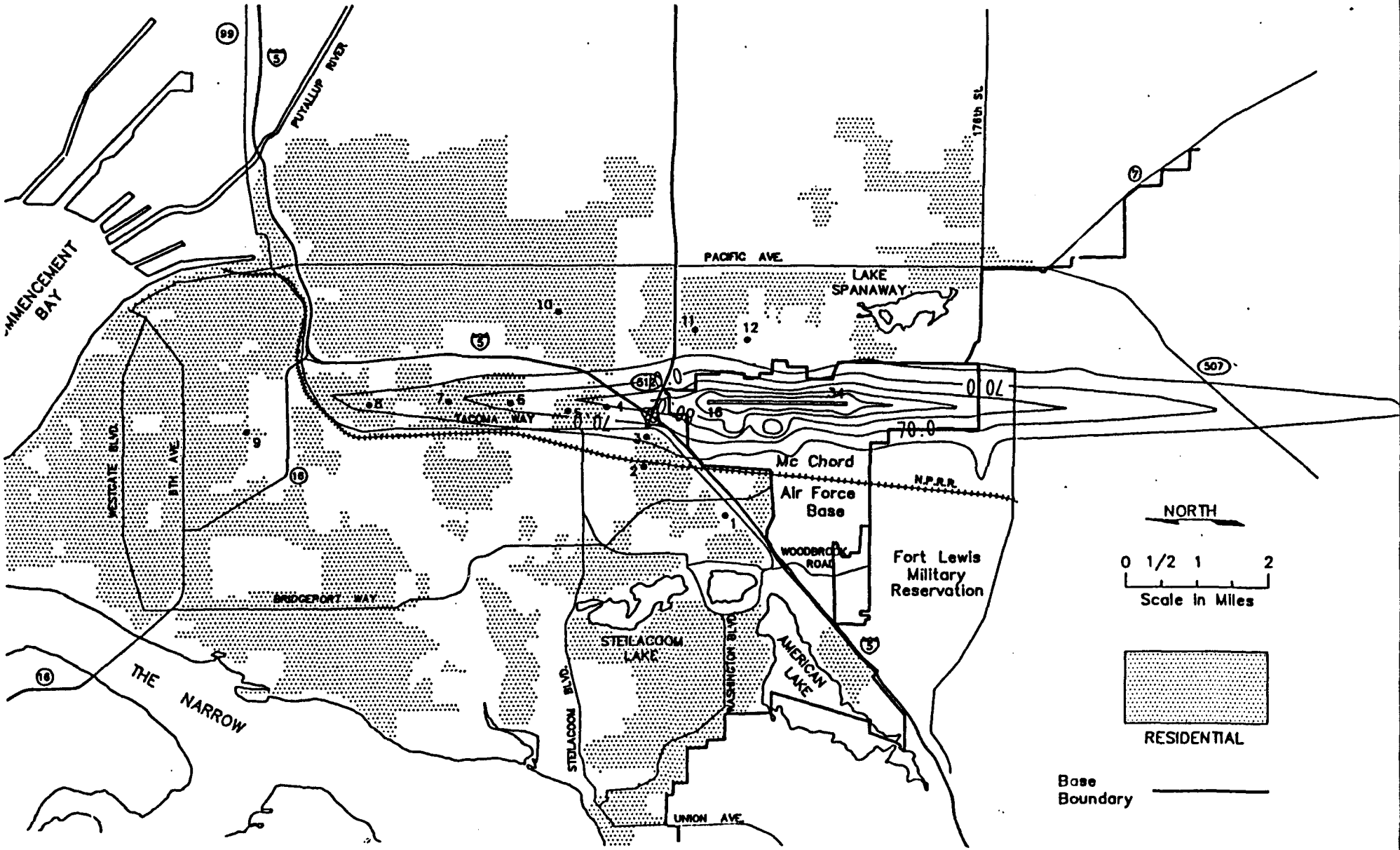

FIGURE 4.1 L_{dn} Contours for All McChord AFB Flight Operations after Realignment of Norton Units

TABLE 4.4 Changes in Maximum Single-Event Sound Exposure Levels (maximum SELs) at Community Locations near McChord AFB after Realignment of Norton AFB Units[a]

Location	Description	Baseline		After Realignment		Change	
		Departure	Approach	Departure	Approach	Departure	Approach
1	Tyee Park Elementary School	95	91	77	91	-18	0
2	Southgate Elementary School	102	85	87	85	-15	0
3	Residential Area No. 1	106	92	93	92	-13	0
4	Residential Area No. 2	107	108	94	108	-13	0
5	Oakwood Elementary School	104	105	92	105	-12	0
6	Arlington Elementary School	102	103	92	103	-10	0
7	Gray Middle School and Edison High School	100	99	91	99	-9	0
8	Madison Elementary School	99	97	86	97	-13	0
9	Humana Hospital	94	86	76	82	-18	-4
10	Baker Junior High School	94	87	80	86	-14	-1
11	Sales Elementary School	100	89	85	84	-15	-5
12	Keithley Middle School and Washington High School	101	86	85	86	-16	0

[a]Two-ship (side-by-side) formation takeoffs and landings were assumed for calculation of F-15 aircraft single-event noise levels.

under the column headed "Baseline" the maximum SEL values of all departures and approaches, by location, that now occur at McChord (from Table 3.3). The column headed "After Realignment" lists the maximum SEL values of all C-141 operations that now occur and that would occur at McChord after realignment of Norton units (from Table 3.3). The column headed "Change" compares future C-141 maximum single-event levels with existing (baseline) levels. As shown, future levels would all be the same or less than current levels. It is apparent from Table 4.4 that the absence of F-15 departures would reduce takeoff maximum SEL values by approximately 12 dB or more at most neighborhood locations. However, C-141 approaches would produce the same maximum single-event levels as are currently experienced in community locations near the northern extension of the runway centerline (e.g., locations 3-8).

4.1.3 Wastes and Stored Fuel

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The proposed transfers and force reductions at McChord considered in this EA would result in a net reduction of approximately 380 full-time personnel (see Secs. 2.1 and 2.2). Thus, when all proposed actions are completed, there should be a minor reduction in the amount of sanitary wastewater generated on the base (assuming a generation rate of 60 gal/day per person x 380 people, the reduction would be about 22,800 gal/day). However, depending on the timing of the transfers and force reductions and during the construction activities associated with the proposed actions, small increases in sanitary wastewater generation could occur over a period of 12-18 months.

Construction of the proposed facilities would generate a measurable volume of nonhazardous wastes, such as scrap lumber, metal, and masonry. The collection and disposal of such wastes would be specified in the construction contract. While the transfer of the 63rd MAW and the 445th MAW to McChord AFB would increase the amount of nonhazardous waste generated by the 62nd MAW and 445th MAW, the deactivation of the 36th TAS and the 318th FIS would result in a net reduction of

personnel and equipment on the base and an overall small reduction of nonhazardous waste generated during routine base operations.

The hazardous wastes generated at McChord AFB are managed in accordance with applicable federal and state laws and USAF regulations (see Sec. 3.2.3). While the use of JP-4 would increase with transfer of the 63rd MAW and 445th MAW to McChord, the deactivation of the 36th TAS and 318th FIS would partially offset these increases in fuel use. After all the proposed actions are completed, the kinds of hazardous wastes generated at the base would remain essentially unchanged.

4.1.4 Water Resources

Because the proposed actions would cause a net reduction in the number of personnel at the base, the need for potable water would decrease by a very small amount. Water requirements for servicing the aircraft brought in from Norton AFB would increase, but this would be offset by the removal of 10 C-130E aircraft and 18 F-15A/B aircraft. The actions are not expected to adversely affect groundwater.

The construction program associated with the addition of 14 C-141B aircraft could cause some minor disruption of soil during excavation and grading of building, apron, and parking areas. Subsequent erosion could cause some minor degradation of the on-site drainages, primarily from the introduction of sediments. In addition, runoff from the construction areas would have the potential to contaminate drainages with motor oil, hydraulic fluid, or other petroleum products used in construction machinery. The degree of degradation would depend in part on the effectiveness of the established stormwater runoff system and measures to contain sediments before they reach permanent stream channels. Additionally, any of these above impacts would be short-term, pending stabilization of the disturbed sites.

4.1.5 Vegetation and Wildlife Resources

None of the proposed construction activities would alter natural vegetation or forest cover on the base. Impacts would be limited to mowed or landscaped vegetation that occurs on the industrial and aircraft mobilization portion of McChord AFB (Department of the Air Force 1987). Because animal habitat on the base would not be altered, impacts to wildlife would be minimal. Although the number of C-141B sorties would increase, the removal of the C-130E and F-15A/B aircraft would result in little change in potential for or frequency of bird-aircraft strikes.

4.1.6 Threatened and Endangered Species

The destruction of small areas of vegetation within the industrial and aircraft mobilization areas of McChord would not affect federal or state threatened and endangered species.

4.1.7 Socioeconomics

The proposed actions would result in the loss of approximately 380 full-time personnel at the base. However, because of staffing requirements, there would be a net gain of 13 civilian employees after all proposed changes occur. It is most likely that all active military personnel not required at McChord AFB would be transferred to other USAF bases. Given the large size of the civilian employment in Pierce County, these changes would result in minimal impact to the local economy. The construction activities associated with the conversion would provide some short-term economic benefits to the area in the form of employment and the local purchase of building supplies.

4.1.8 Cultural Resources

A cultural resources survey was recently conducted at McChord AFB by the National Park Service (Pittman 1989; Calliot 1989). The report and recommendations from that survey are currently being assembled. Once completed, the information will be sent to the Washington State Historic Preservation Officer (SHPO), who will determine if McChord AFB will be given cultural resource clearance for the proposed construction/modification projects. It appears likely that the SHPO will grant clearance, because the affected areas have been subject to a significant degree of prior ground disturbance (Pittman 1989).

Because of the degree of prior disturbance, it is unlikely that any significant archaeological sites, i.e., sites that would meet eligibility criteria for the NRHP, would be adversely affected. However, the impacts of the proposed modification of Hanger 1 need to be considered further. The hanger was constructed in 1938 and the modification entails the addition of a T-tail door. The SHPO has yet to determine whether this building is eligible for inclusion in the NRHP, and, if so, whether mitigative action is necessary.

4.1.9 Land Use

Construction of the new facilities would occur in areas already used to support the MAC aircraft mission at McChord AFB. This part of the base contains all facilities involved in aircraft mobilization and maintenance activities. Current land use plans at McChord designate this area of the base as suitable for continued industrial-type development. Family housing and recreation areas at the base would not be impacted by the construction of new aircraft staging areas or support buildings.

The Federal Interagency Urban Noise Committee (FIUNC) has delineated several basic types of land use areas that are defined numerically by average noise levels (L_{dn}) and accident potential zones, and for which it is suggested that either restrictions or

caution be exercised with regard to their use. The delineation of compatible land use zones is designed to assist local planning boards in minimizing noise impacts to the population.

The most restrictive land use category for residential areas is defined by average L_{dn} noise levels above 75 dB. Land in such an area requires the strictest zoning controls and the possibility of additional navigation easements. The second most restrictive land use zone for residential areas is defined as areas with L_{dn} noise levels between 65 and 75 dB. The FIUNC recommends that careful zoning control measures be implemented for land use in these areas to minimize noise impacts in newly developed residential areas. The controls recommended by FIUNC include the use of specialized acoustic building materials when constructing new residences. The third restriction zone is defined as land areas that do not currently fall within incompatible land uses but are close enough to require the exercise of caution in land use planning to ensure that development in these areas does not encroach on incompatible land use zones in the future.

Since the L_{dn} noise levels for McChord AFB after realignment of Norton units would be less than existing levels, causing a shrinkage of the noise contours in all directions, the realignment would result in a reduction of the number of people and occupied housing units exposed to noise levels above 65 dB. Additionally, the more noise-sensitive areas in the vicinity of McChord AFB would be exposed to lower average noise levels as a result of the realignments.

4.1.10 Land Traffic

Although construction activities would generate minor, temporary increases in traffic volumes on Bridgeport Avenue, these increases would not cause adverse effects on traffic flow. The reduction of over 380 full-time personnel when all proposed mergers and transfers are completed would have a beneficial effect on traffic flow at all gates and on the base.

4.2 MITIGATIVE MEASURES

The only necessary mitigative measures identified are those routinely implemented to control generation of fugitive dust and to minimize runoff and erosion during the construction activities associated with the proposed actions. Final results of the cultural resources survey recently conducted on the base will indicate whether any mitigative measures are necessary for potential impacts to such resources.

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APPENDIX A:

L_{dn} METHODOLOGY

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L_{dn} METHODOLOGY

A.1 NOISE ENVIRONMENT DESCRIPTOR (L_{dn})

The day-night average sound level (L_{dn}) metric for describing the noise environment was used to produce the noise contours presented in this assessment (Acoustical Society of America 1980). Efforts to provide a national uniform standard for noise assessment have resulted in adoption of L_{dn} by the U.S. Environmental Protection Agency (EPA) as the standard measure of noise for this procedure. It is used by numerous federal agencies, including the Department of Defense, Department of Housing and Urban Development, and the Federal Aviation Administration.

Use of the L_{dn} descriptor is a method of assessing the amount of exposure to aircraft noise and predicting the percentage of residents in a well-populated community that are "highly annoyed" (% HA) by the various levels of exposure (Committee on Hearing, Bioacoustics, and Mechanics 1977; Schultz 1978). The L_{dn} values used for planning purposes and for which contours are presented in this assessment are 65, 70, 75, 80, and 85 dB. Land use guidelines are based on the compatibility of various land uses with these exposure levels (U.S. Department of Defense 1964).

It is generally recognized that a noise environment descriptor should consider, in addition to the annoyance of a single event, the effect of repetition of such events and the time of day in which these events occur. Computation begins with a single-event energy descriptor and adds corrections for the number of events and the time of day. Since the primary noise impact relates to residential areas, nighttime events are considered more annoying than daytime events and are weighted 10 dB accordingly. The L_{dn} values are computed by first logarithmically summing the single-event energy values for all of the flight operations in a typical 24-hour day (after adding the 10 dB penalty to all nighttime-operation levels); then the average sound level is calculated for a 24-hour period.

As part of an extensive data-collection process, detailed information is gathered on the flight tracks flown by each type of aircraft assigned to the base and the number and time of day of flights on each of these tracks during a typical day. This information is used in conjunction with the single-event noise descriptor to produce L_{dn} values. These values are combined on an energy-summation basis to provide single L_{dn} values for the mix of aircraft operations at the base. Equal value points are connected to form the contour lines.

A.2 SINGLE-EVENT NOISE EVENT DESCRIPTOR (SEL)

The single-event noise energy descriptor used in the L_{dn} system is the sound exposure level (SEL). The SEL measure is an integration of the A-weighted sound pressure level over the time interval of a single event (such as an aircraft flyover), corrected to equivalent level for a reference period of 1 second. Frequency, magnitude,

and duration vary according to aircraft type, engine type, and power setting. Therefore, individual aircraft noise data are collected for various types of aircraft/engines at different power settings and phases of flight. SEL versus slant range values are derived from noise measurements made according to a source noise data acquisition plan developed by Bolt, Beranek and Newman, Inc., in conjunction with the Armstrong Aerospace Medical Research Laboratory (AAMRL) and carried out by AAMRL (Bishop and Galloway 1975). These standard-day, sea-level values form the basis for the individual-event noise descriptors at any location and are adjusted to the location by applying appropriate corrections for temperature, humidity, altitude, and variations from standard aircraft operating profiles and power settings.

Ground-to-ground sound propagation characteristics are used for ground run-up activities. Air-to-ground propagation characteristics are used whenever the aircraft is airborne and the line-of-sight from observer to aircraft is 7 degrees or greater above horizontal; if the line-of-sight is 4 degrees or less, ground-to-ground propagation characteristics are used. Between these angles, propagation characteristics are interpolated (Speakman et al. 1977).

In addition to use for assessing aircraft flight operations, the L_{dn} metric can also be used to assess aircraft and engine run-up noise emissions resulting from engine/aircraft maintenance checks on the ground. Sounds such as aircraft/engine ground run-up noise are essentially constant in level during each test run at a given power setting. Data on the orientation of the noise source, type of aircraft or engine, number of test runs on a typical day, the power settings used and their duration, and use of suppression devices are collected for each ground run-up test position. This information is processed along with "mean sound pressure level" (average-energy level) data to yield equivalent 1-second sound exposure levels, which are added (on an energy-summation basis) to the SEL levels generated by flight operations to produce L_{dn} contours reflecting the overall noise environment produced by both air and ground operations of aircraft.

A.3 NOISE CONTOUR PRODUCTION

Data describing flight tracks, flight profiles, power settings, flight paths and profile utilization, and ground run-up information by type of aircraft/engine are assembled and processed for input into a central computer. L_{dn} contours are generated by the computer using the airfield-supplied operational data and the standard source-noise data corrected to local conditions. The computer system plots these contours, which are provided in the text.

A.4 NOISEMAP COMPUTER PROGRAM

The L_{dn} methodology is implemented by use of the NOISEMAP computer program for military flight operations of fixed-wing aircraft. NOISEMAP was initially developed in 1974 by the Air Force (Horonjeff et al. 1974) and utilizes subsidiary codes (OMEGA and OMEGA 11) to provide a file of military flight and ground maintenance operational data by aircraft type.

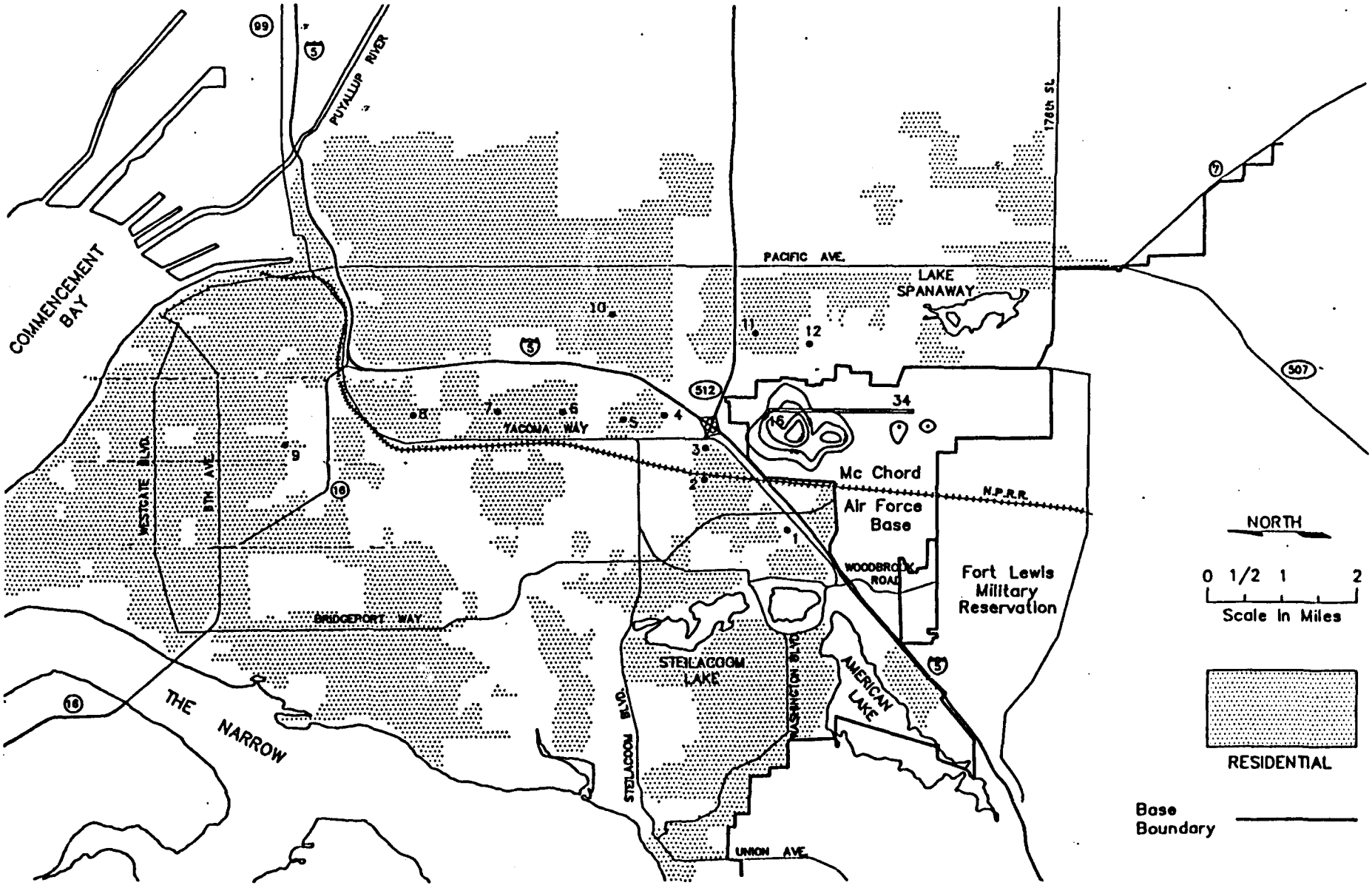

FIGURE B.4 Baseline L_{dn} Contours for Ground Run-Up Operations Only

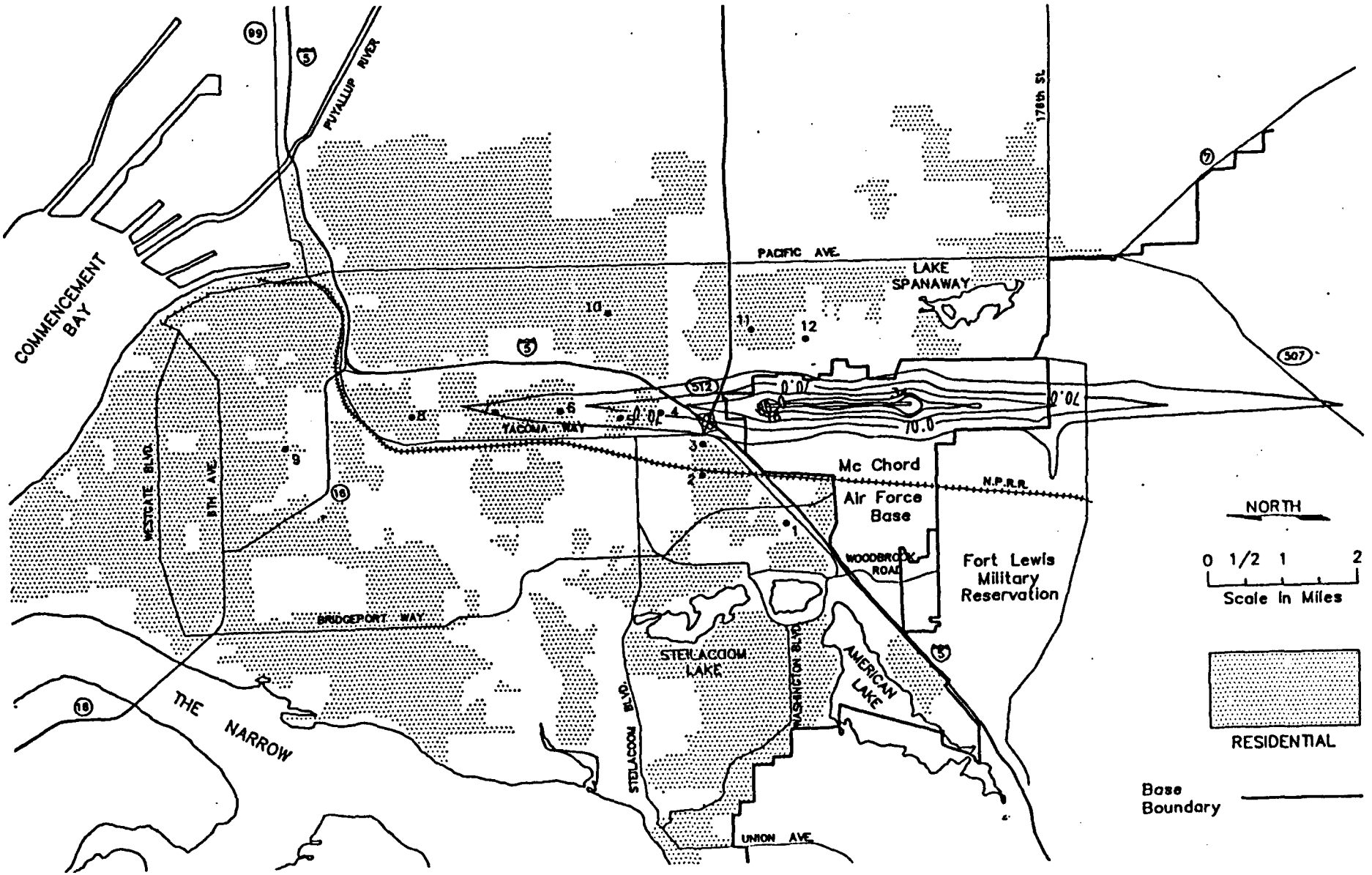

FIGURE B.5 L_{dn} Contours for McChord AFB C-141 Aircraft Only after Realignment of Norton Units

A.5 REFERENCES

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APPENDIX B:

COMPONENT L_{dn} CONTOUR PLOTS

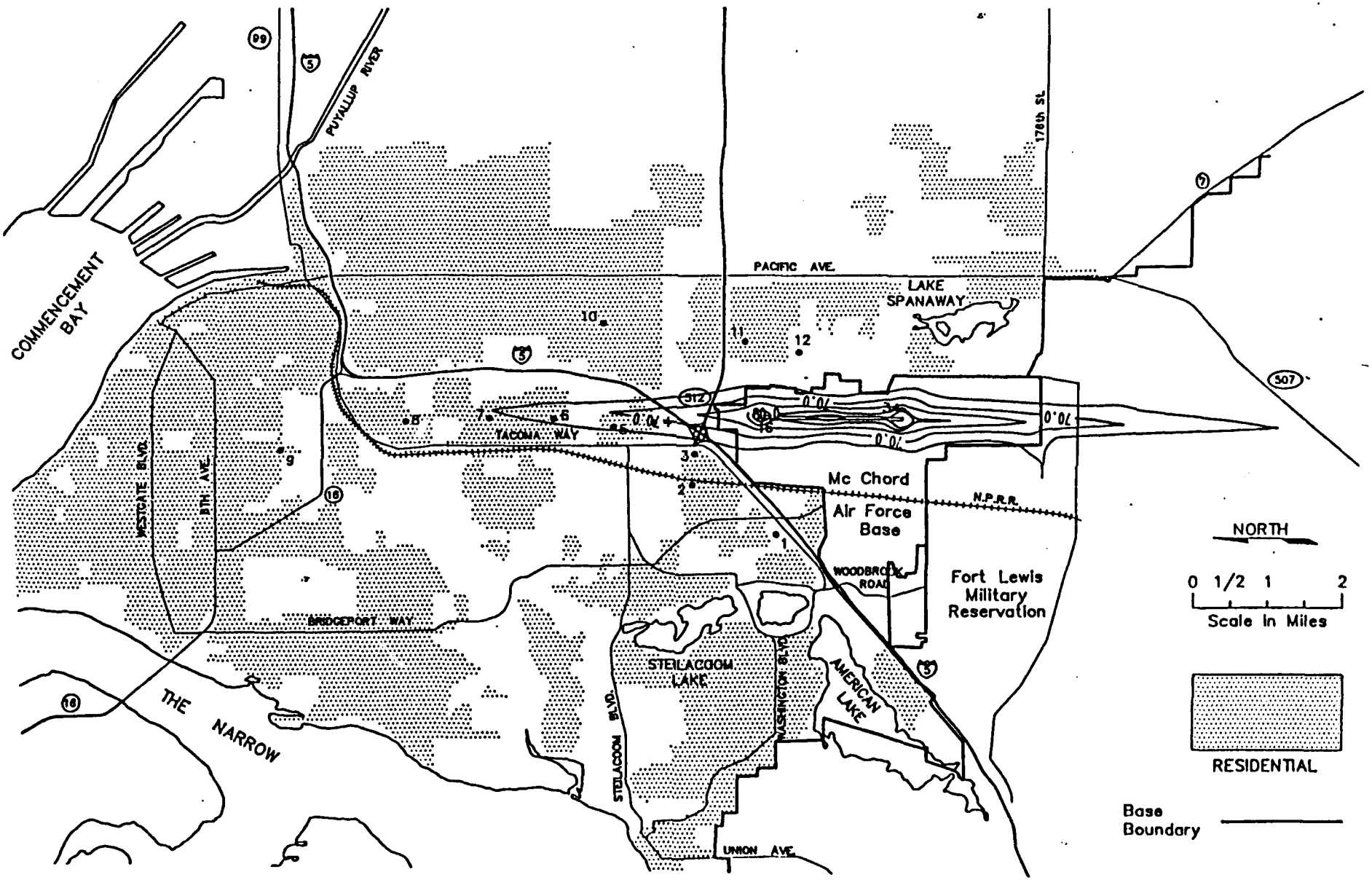

FIGURE B.1 Baseline L_{dn} Contours for C-141 Aircraft Operations Only