



Appendix D

Aircraft Noise Analysis



Appendix D

Noise Analysis Methodology

As part of the evaluation of proposed development at Herlong Airport, an airport noise analysis for the base year 2005 and future year 2025 was conducted. The purpose of this analysis was to determine the impact, if any, of increased operations on land use adjacent to the airfield.

LEGISLATION

The Federal Aviation Administration (FAA) 14 Code of Federal Regulations (CFR) Part 36 was first promulgated in 1969, amended in 1977 and 1991. This regulation is responsible for setting aircraft noise standards, establishing measurement procedures, “stages” of aircraft noisiness, and publishing of companion Advisory Circulars.

Federal Legislation under the United States Department of Transportation (U.S. DOT) mandated the phase out of noisier Stage 2 aircraft weighing over 75,000 pounds at all civil airports by December 1999. Exempt from this rule are military jets and aircraft weighing less than 75,000 pounds. Such aircraft would include privately owned jets, corporate, and business jets.

It should also be mentioned that there is currently a new noise standard being proposed by the U.S. DOT that would replace the quieter Stage 3 aircraft noise certification standard. This proposed rulemaking is located in the Federal Register at 14 CFR Parts 36 and 91, under the topic, *Stage 4 Aircraft Noise Standards*. This new noise standard would affect subsonic jet airplanes and subsonic transport category large airplanes. The proposed noise standard, Stage 4, would apply to any person submitting an application for a new airplane type design on and after January 2, 2006. Achieving a Stage 4 noise standard, as stated by the FAA, “would ensure that the latest available noise reduction technology is incorporated into new aircraft designs.” Current operations at HEG do not include Stage 4 aircraft. However, since all very light jets will be certified as Stage 4 compliant, it is anticipated that HEG will accommodate such aircraft within the twenty year planning period.

Further, the City of Jacksonville has also initiated a zoning ordinance, 656.1000, Part 10 of the zoning code that provides some control of land use within the 60, 65, and 70 DNL noise contours. Although land use according to the zoning map may be allowed, it use may be

modified dependent upon its specific noise zone. According to Ordinance 656.1000, Table D-1 outlines the allowable development within the specific noise zones.

TABLE D-1 CITY OF JACKSONVILLE ALLOWABLE LAND USES	Noise Zone A (> 70 DNL)	Noise Zone B (65-70 DNL)	Noise Zone C (60-65 DNL)
Land Use Category			
<i>Residential</i>			
Single Family Dwelling	X	C	C
Sing-Family Dwelling unable to meet 30 dB interior noise reduction	X	X	C
Multi Family Dwelling	X	C	C
Mobile Home Park	X	X	C
Foster care/Family Care Home	X	C	C
Group Care Home and similar uses	X	C	C
Rooming house/Boarding house	X	C	C
<i>Commercial</i>			
Retail outlets for the sale of general merchandise (including sale of food, wearing apparel and similar uses)	C	C	C
Retail sales of building materials, hardware, farm equipment, new or used automobiles, mobile homes, boats and similar uses	C	C	C
Commercial Parking Lot	C	C	C
Retail sale of furniture, home furnishings, and similar uses	C	C	C
Service establishments such as restaurants (including drive-in), service of alcoholic beverages and similar uses	C	C	C
All types of professional and business offices, personal services, professional or business including building trades, contractors and similar uses	C	C	C
Commercial indoor recreational or entertainment facilities	C	C	C
Repair services and services garages including automobile repair, radio and television repair and similar uses	C	C	C
Automobile service station	C	C	C
Motel or hotel	C	C	C

**TABLE D-1
CITY OF JACKSONVILLE
ALLOWABLE LAND USES**

Land Use Category	Noise Zone A (> 70 DNL)	Noise Zone B (65-70 DNL)	Noise Zone C (60-65 DNL)
Radio and television broadcasting offices and studios, telephone exchange and similar uses	C	C	C
Medical and other health services such as hospitals, clinics and similar uses	X	C	C
Industrial			
Wholesaling, warehousing storage or distribution establishments, assembling of components and similar uses	C	C	C
Freight, bus, traveling, shipping, or other transportation terminals	C	C	C
Manufacturing of food and kindred products, apparel, textile mill products and similar uses	C	C	C
Manufacturing of chemicals and allied products, petroleum refining and related activities, rubber and miscellaneous plastic products and similar uses	C	C	C
Manufacturing of lumber and wood products, furniture and fixtures, paper and allied products, stone, clay and glass products, primary metal including fabrication of metal products and similar uses.	C	C	C
Printing, lithography, publishing, or similar establishments	C	C	C
Manufacturing of professional, scientific and control instruments, prosthetic appliances, dentures, eyeglasses, hearing and similar products	C	C	C
Public and Quasi-public services			
Cemeteries	C	C	C
Churches	X	C	C
Governmental services, such as offices, fire stations, postal services, and prisons	C	C	C
Schools	X	X	C
Cultural activities such as libraries, museums, art galleries, and similar uses	X	X	C

**TABLE D-1
CITY OF JACKSONVILLE
ALLOWABLE LAND USES**

Land Use Category	Noise Zone A (> 70 DNL)	Noise Zone B (65-70 DNL)	Noise Zone C (60-65 DNL)
Private clubs and similar uses which provide for public assembly	X	C	C
Outdoor Recreation			
Playgrounds, neighborhood parks	X	X	C
Community and regional parks	X	X	C
Nature Exhibits	X	X	C
Spectator sports, including arenas	X	X	C
Golf courses, riding stables and similar uses	C	C	C
Private camps (including day camps)	X	X	C
Entertainment assembly, amphitheater, music shell, and similar uses	X	X	X
Resource Production, Extraction and Open Land			
Agriculture, including livestock grazing	C	C	C
Livestock farms, animal breeding	C	C	C
Agriculture related activities	C	C	C
Forestry	C	C	C
<i>Notes:</i>			
<i>A=Acceptable</i>			
<i>B= Unacceptable development</i>			
<i>C= Conditional development</i>			
<i>Source: City of Jacksonville Planning and Zoning Ordinance 656.1000 Part 10, Draft March 2007</i>			

REGULATORY AGENCIES

14 CFR FAR Part 150 – *Airport Noise Compatibility Planning*, prescribes specific standards and systems for:

- Measuring noise,
- Estimating cumulative noise exposure using computer modeling,
- Describing noise exposure,
- Coordinating noise compatibility planning with local land use planning officials,
- Documenting the analytical process,
- Submitting the documentation to FAA,
- FAA and public review processes, and
- FAA approval or disapproval process.

The Part 150 study consists of two elements: Noise Exposure Map (NEM) and Noise Compatibility Program (NCP). As part of the Master Plan Analysis, NEM for the existing conditions and the last year of the planning period were modeled.

NOISE ANALYSIS AND POTENTIAL IMPACTS

An updated aircraft noise study was conducted as part of the master planning process using standard FAA methodologies and procedures. The noise study included noise modeling and the estimation of noise exposure in terms of affected land area and associated land use. The analysis used the Day-Night Average Sound Level (L_{dn} or DNL) noise metrics as a descriptor of cumulative aircraft noise exposure. In addition, the City of Jacksonville (COJ) is in the process of rewriting the City's Zoning Code. With the assistance of Jacksonville Aviation Authority (JAA), COJ has identified land use controls within the 60 to 65 LDN contour. Preparation of Chapter 656, Ordinance Code, has been on-going for several years. The deadline for the final report and draft legislation is March 31, 2007.

Noise contours generated by the FAA Integrated Noise Model (INM) 6.2 do not depict a strict demarcation of where the noise levels end or begin but rather describe the general expected noise exposure. INM noise modeling requires the input of several variables. The noise contours represent average annual conditions rather than single event occurrences. Noise exposure on any one day may be greater or less than that of the average day. The noise model is useful for comparison of noise impacts and can provide a reasonable basis for performing airport noise compatibility planning. The noise exposure contours presented in this report do not consider operational noise abatement measures that could reduce projected noise impacts.

Assumptions

The noise environment for the Airport was modeled to determine the existing and future noise impacts on neighboring properties. Noise Exposure Maps were modeled for the Base Year

2005 and Future Year 2025 conditions. The noise model was used to generate noise contours for the 60, 65, 70 and 75 DNL.

To perform a noise analysis and generate the noise exposure maps, various input variables were required. These variables include the following:

- The number of aircraft operations by time of day and aircraft type for an average day
- Operational information, including the use of each runway end
- Departure, arrival and touch-& go flight profiles.

Fleet Mix

The existing and future fleet mix at Herlong Airport consists of primarily GA aircraft, both piston and turbine engine, with limited rotorcraft operations a sample of which is provided in **Table D-2, Aircraft Fleet Mix**.

TABLE D-2 HEG SAMPLE AIRCRAFT FLEET MIX	
2006 Aircraft Fleet	2025 Aircraft Fleet
Gliders	Gliders
Experimental Aircraft	Experimental Aircraft
Cessna 150	Cessna 150
Cessna 172	Cessna 172
Piper Navajo	Piper Navajo
Piper Commanche	Piper Commanche
Socata TB9 Tampico	Socata TB9 Tampico
Bell UN-1N Iroquois*	Bell UN-1N Iroquois*
Beech Jet 400	Beech Jet 400
King Air 90	King Air 90
Learjet 31A	Learjet 31A
Citation Jet I	Citation Jet I
	Premier Jet
	Jetstream 31
	TBM 850
	SJ30-2
	Eclipse 500 VLJ
* Associated with Cecil Field and the FARNG	
Source: HEG Airport Management and JAA, 2006	

Tables D-3 and D-4, depict the average aircraft operations per aircraft type used in INM model for the base year and final year the planning period.

**TABLE D-3
YEAR 2005 AVERAGE DAILY OPERATIONS**

CATEGORY AIRCRAFT	PERCENT	ARRIVALS		DEPARTURES		T & G
		DAY	NIGHT	DAY	NIGHT	
Single Engine - Fixed Pitch	65.00%	46.3245	1.4327	46.3245	1.4327	18.1521
Single Engine-Variable Pitch	10.00%	7.1268	0.2204	7.1268	0.2204	3.8897
Multi-Engine Piston (BE58)	15.00%	10.6903	0.3306	10.6903	0.3306	3.8897
Turboprop (Conquest II)	10.00%	7.1268	0.2204	7.1268	0.2204	
TOTAL	100.0%	71.2684	2.2042	71.2684	2.2042	25.9515

Source: THE LPA GROUP INCORPORATED, 2006

**TABLE D-4
YEAR 2025 AVERAGE DAILY OPERATIONS**

CATEGORY AIRCRAFT	PERCENT	ARRIVALS		DEPARTURES		T & G
		DAY	NIGHT	DAY	NIGHT	
Single Engine - Fixed Pitch	66.00%	60.5676	1.8732	60.5676	1.8732	23.3736
Single Engine-Variable Pitch	13.00%	11.9300	0.3690	11.9300	0.3690	5.0086
Multi-Engine Piston (BE58)	7.00%	6.4238	0.1987	6.4238	0.1987	5.0086
Turboprop (Conquest II)	9.00%	8.2592	0.2554	8.2592	0.2554	
Jet (Citation X)	5.00%	4.5885	0.1419	4.5885	0.1419	
TOTAL	100.00%	91.7691	2.8382	91.7691	2.8382	33.390

Source: THE LPA GROUP INC., 2006

Runway Utilization

The runway utilization percentage is very important in deriving the noise exposure size and direction. The runway utilization primarily depends on the prevailing wind direction and speed.

Existing runway utilization percentages were obtained from Airport Management and the local FBO as well as from local wind data and assigned to each runway end and input into INM. These percentages are shown in **Table D-5, Year 2005 Runway End Utilization**.

TABLE D-5 YEAR 2005 RUNWAY END UTILIZATION			
RUNWAY END	FLIGHT TRACK	DAY	NIGHT
7	Arrival	16.49%	0.51%
	Departure	57.23%	1.77%
25	Arrival	57.23%	1.77%
	Departure	16.49%	0.51%
11	Arrival	4.85%	0.15%
	Departure	18.43%	0.57%
29	Arrival	18.43%	0.57%
	Departure	4.85%	0.15%
TOTAL		97.00%	3.00%
<i>Source HEG Management and Weather Data</i>			

With the introduction of the Turf Runway, a percentage of activity currently using Runway 7-25 and 11-29 would likely move to the new runway. As a result, this is anticipated to increase the capacity of both Runways 7-25 and 11-29. The runway utilization percentages used to determine the noise contours for the year 2025 are shown in **Table D-6, Year 2025 Runway End Utilization**.

**TABLE D-6
YEAR 2025 RUNWAY END UTILIZATION**

RUNWAY END	FLIGHT TRACK	SINGLE-ENGINE & MULTI-ENGINE		TURBOPROP		JETS	
		DAY	NIGHT	DAY	NIGHT	DAY	NIGHT
7	Arrival	10.67%	0.33%	16.49%	0.51%	14.55%	0.45%
	Departure	70.81%	2.19%	57.23%	1.77%	82.45%	2.55%
25	Arrival	70.81%	2.19%	57.23%	1.77%	82.45%	2.55%
	Departure	10.67%	0.33%	16.49%	0.51%	14.55%	0.45%
11	Arrival	3.88%	0.12%	4.85%	0.15%		
	Departure	2.91%	0.09%	18.43%	0.57%		
29	Arrival	2.91%	0.09%	18.43%	0.57%		
	Departure	3.88%	0.12%	4.85%	0.15%		
7U	Arrival	0.00%	0.00%				
	Departure	8.73%	0.27%				
25U	Arrival	8.73%	0.27%				
	Departure	0.00%	0.00%				
TOTAL		10.67%	0.33%	16.49%	0.51%	14.55%	0.45%

Source HEG Management, Weather Data, and The LPA Group Incorporated, 2006

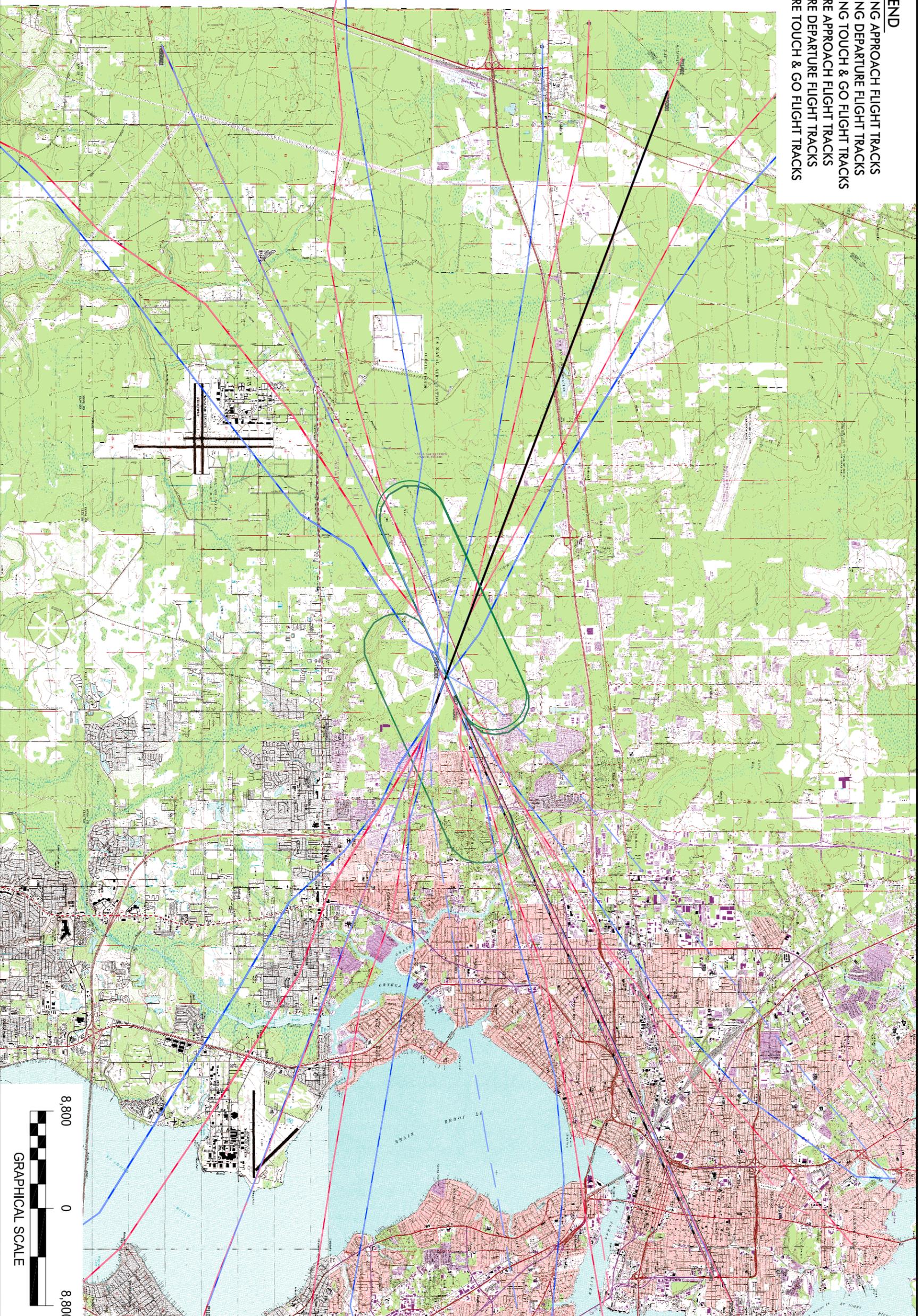
Flight Tracks

The flight track data was obtained from the previous master plan and from airport management. Flight tracks are an important input to the noise model and are shown in **Figure D-1**. Herlong Airport has specialized departure and arrival procedures in order to limit interaction with Cecil Field operations as well as military operating areas within the region. Touch-and-go flight procedures were modeled using the FAA standard, left-hand traffic pattern for Runways 7-25 and 11-29. Flight tracks for Runways 7-25 and 11-29 remain the same in the future. However, a right hand traffic pattern was implemented for the Turf Runway to avoid conflicts with Runway 7-25 operations.

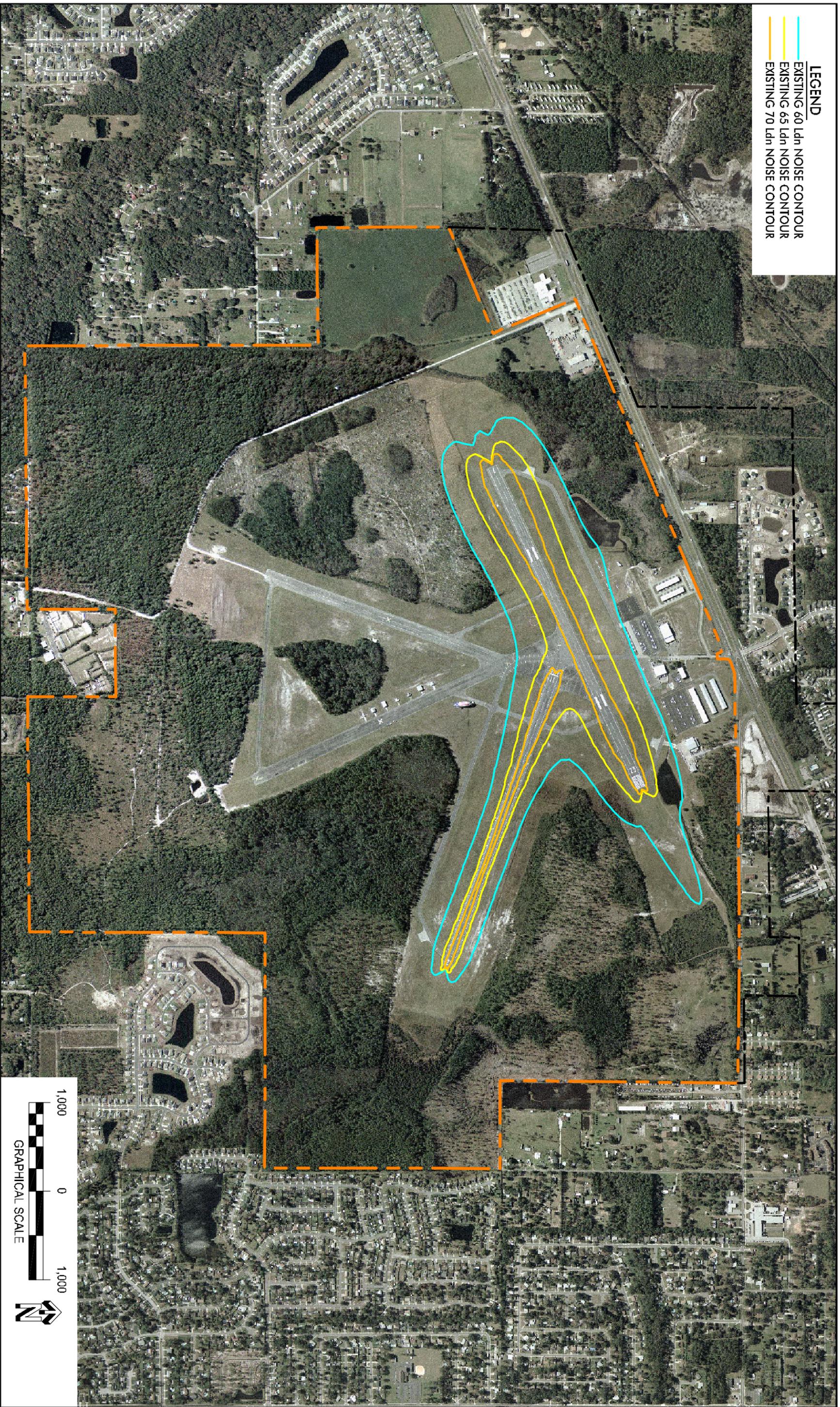
EXISTING AND FUTURE NOISE CONTOURS

Figure D-2 illustrates the noise contours for the base year, which shows that all noise contours including 65 DNL remain on existing airport property. The noise contours for the final year of the planning period is depicted in **Figure D-3**. Even with the anticipated increased use by turboprop and jet aircraft, noise contours 60-75 DNL remain on airport property. Further, the use of existing treed wetland areas and non-aviation development are anticipated to further act as a buffer between contiguous residential development and the airport.

- LEGEND**
- EXISTING APPROACH FLIGHT TRACKS
 - EXISTING DEPARTURE FLIGHT TRACKS
 - EXISTING TOUCH & GO FLIGHT TRACKS
 - FUTURE APPROACH FLIGHT TRACKS
 - FUTURE DEPARTURE FLIGHT TRACKS
 - FUTURE TOUCH & GO FLIGHT TRACKS



- LEGEND**
- EXISTING 60 Ldn NOISE CONTOUR
 - EXISTING 65 Ldn NOISE CONTOUR
 - EXISTING 70 Ldn NOISE CONTOUR



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JACKSONVILLE, FLORIDA

JACKSONVILLE
AVIATION AUTHORITY

MASTER PLAN UPDATE
EXISTING NOISE CONTOURS

FIGURE
D-2

- LEGEND**
- FUTURE 60 Ldn NOISE CONTOUR
 - FUTURE 65 Ldn NOISE CONTOUR
 - FUTURE 70 Ldn NOISE CONTOUR

