Environmental Impact Analysis Process

Environmental Assessment
United States Air Force, Air Education and Training Command

Dysart Drain Improvement Project

Luke Air Force Base, Arizona
June 1994

DEPARTMENT OF THE AIR FORCE

FINDING OF NO SIGNIFICANT IMPACT (FONSI)
DYSART DRAIN IMPROVEMENT PROJECT

Agency: United States Air Force (USAF), Headquarters Air Education and Training Command (HQ AETC)

Background: Pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the Act (40 CFR 1500-1508), Department of Defense (DOD) Directive 6050.1, and Air Force Regulation (AFR) 19-2, which implements the CEQ regulations, the USAF has conducted an assessment of potential environmental consequences of the proposed action, an alternative action, and the no-action alternative.

Proposed Action: The Air Force proposes, in conjunction with the Flood Control District of Maricopa County, Arizona, to reconstruct the Dysart Drain to improve its flow capacity. This project, a joint venture with the Flood Control District of Maricopa County, Arizona, will improve the storm water drain's effectiveness by increasing its flow capacity and characteristics to effectively handle a 100-year storm event.

Summary: The Dysart Drain was constructed in 1958 to collect and convey runoff from the drainage area west and north of Luke Air Force Base (AFB) and to protect base property from flooding. Land subsidence in the area around Luke AFB, primarily the result of groundwater withdrawal, has caused differential subsidence along the drain. This differential subsidence has resulted in the loss of conveyance capacity in the Dysart Drain. A 15-year frequency rain event now exceeds the conveyance capacity of the channel, which was originally designed for a 100-year flood event. The reduced flow capacity of the drain causes flooding conditions at the airfield and family housing areas on Luke AFB.

To improve the effectiveness of the drain and to alleviate chronic flooding problems at the base, the Air Force proposes the Dysart Drain Improvement Project. This project includes construction of a new concrete-lined channel along the existing concrete and earthen-lined channel to the Agua Fria River. The channel invert will be lowered to correct past and projected subsidence and to accommodate a larger design flow. A detention basin will be constructed northwest of Luke AFB to intercept flows north and west of the base and direct them into the Dysart Drain. Incidental improvements include three new bridge crossings (two county-owned and one private) and associated pavements, and new box culverts.

The channel will be reconstructed on the existing alignment, a typical channel cross section will be a continuous concrete-lined trapezoid section. The channel will be deepened and widened to provide the capacity to convey the runoff from the 100-year storm event, which is estimated to be 4,000 cubic feet per second (cfs) at the outlet to the Agua Fria River. At this location, the Agua Fria River is within a Federal Emergency Management Agency delineated 100-year floodplain. Pursuant to executive order 11988, a separate document found that there is no practicable

alternative to this action, and that the proposed action includes all practicable measures to minimize harm.

The profile and cross-section of the channel invert will be designed to accommodate future anticipated subsidence. Minimal reconstruction of the existing channel outlet into the Agua Fria River will be required. This will minimize construction activities which may occur adjacent to or within waters of the United States, as delineated by the US Army Corps of Engineers.

A detention basin will be constructed to reduce the magnitude of storm flows entering the upstream end of the Dysart Drain, thereby reducing the size of the reconstructed channel. About 155 acres will be used for the basin and associated spoil area. The basin and associated collector channels will be designed to intercept the 100-year design storm flow, to detain the flow, and to control the discharge into the Dysart Drain at a maximum of 550 cfs. Total storage volume of the detention basin is estimated to be 550 acre-feet of water. Average base depth will be about 10 feet, and average spoil area height will be about 11 feet. The basin will discharge flows into the reconstructed Dysart Drain via a culvert.

Alternative Action: Reconstruct the Dysart Drain to effectively convey the 100-year storm runoff, utilizing only channel modifications. No detention basin would be constructed.

No-action Alternative: The Dysart Drain would not be modified. Continued subsidence will further reduce the conveyance capacity of the existing channel, which eventually will be unable to contain a 15-year frequency rain event. The result will be continued flooding at the base, causing damages and disruption of base operations.

Summary of Potential Environmental Impacts: During the analysis of the proposed action and the alternative action, environmental surveys were conducted to examine which biophysical attributes would be affected by the actions. Resource areas examined were land use, community setting, cultural resources, biological resources, water resources, environmental management, transportation, air quality, and noise.

Construction associated with either the proposed or alternative action will not impact historic sites, wetlands, or endangered, threatened, or special-status species.

Land Use: The proposed and alternative actions are consistent with current base and surrounding area land uses. A small increase in right-of-way is required to accommodate the modified channel and detention basin. Agriculture use will be the predominant land use withdrawn from service. The alleviation of runway flooding will enhance land use at Luke AFB by eliminating disruption of base activities that occur when the base is flooded. Under the alternative, the basin will not be constructed, thus not affective use at the proposed basin site.

Community Setting: Impacts of the proposed or alternative actions will have no long-term impacts on the communities surrounding Luke AFB. Temporary construction jobs will have a slight short-term positive impact on the economic sector of the community.

Cultural Resources: The proposed or alternative actions will not impact archaeological or historical resources.

Biological Resources: No biological communities will be significantly impacted as a result of the proposed or alternative actions.

Water Resources: Under the proposed or alternative actions, water resources will experience a slight positive impact because the quantity of sediments discharged to the Agua Fria River will be reduced because of the continuous concrete liner. During construction activities there will be a minimal increase in sediment transport; however, this impact will be temporary in nature.

Environmental Management: Environmental management at Luke AFB will not be impacted by the proposed or alternative actions because no hazardous wastes are anticipated to be generated, treated, or stored in conjunction with the project.

Transportation: The base's transportation infrastructure will not be impacted by the proposed or alternative action. Minor traffic delays will be experienced for short periods when the bridges over the drain at Dysart and El Mirage Roads are reconstructed, causing traffic rerouting and increased flows on the alternative routes while the bridges are closed. Similar delays may be experienced at Litchfield Road under the alternative in addition to the two other bridge reconstructions.

Air Quality: Air emissions will not be permanently increased by the proposed or alternative actions. A minor increase in emissions (de minimis levels of PM^{10}, CO, and ozone) will occur during the construction phase. A separate conformity analysis, completed by AETC based on actual expected air emissions resulted in a finding that the proposed action will result in a de minimis impact, as defined in 40 CFR Part 93, subpart B, and conform with the purpose of the Maricopa County State Implementation Plan (SIP) for attainment of the National Ambient Air Quality Standards (NAAQS).

Noise: Under the proposed and alternative actions, there will be no significant changes, either positively or negatively, in noise levels from baseline conditions at Luke AFB. Equipment operation noise during the construction phase will increase slightly. However the noise levels in the vicinity of the project will be temporary.

Conclusion: Following a review of the environmental assessment (EA), I find that the proposed action will not produce significant environmental impacts. The same finding applies to the alternative action, if implemented. Based upon this finding, an environmental impact statement is not required for this action. This document, and the supporting EA, fulfill the requirements of NEPA, the CEQ regulations, and AFR 19-2.

HENRY VICCELLIO, JR.
General, USAF
Chairperson, Environmental Protection Committee

_____
Date

Environmental Assessment

Dysart Drain Improvement Project

Luke Air Force Base, Arizona

Prepared for
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Headquarters Air Education and Training Command
Directorate of Civil Engineering
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and

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Occupational and Environmental Health Directorate
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Contract F33615-89-D-4003, Order 144

June 1994

Printed on recycled paper

COVER SHEET
ENVIRONMENTAL ASSESSMENT
DYSART DRAIN IMPROVEMENT PROJECT

Responsible Agency: Headquarters (HQ) Air Education and Training Command (AETC)

Contact for Further Information: Robert Sheahan, HQ AETC/CEVC, Randolph AFB, Texas, 78150, 210/652-3240.

Action: Reconstruct the Dysart Drain to improve its drainage performance and to effectively intercept and convey runoff from a 100-year storm event, utilizing both a storm water detention basin and channel modifications.

Abstract: Flooding in September 1992 and January 1993 caused over $3.5 million in total damages at Luke Air Force Base (AFB). Therefore, the Air Force proposes the Dysart Drain Improvement Project. The project includes the construction of a new concrete-lined channel along the alignment of the existing partially concrete and earthen-lined channel from Reems Road to the Agua Fria River. The channel invert will be lowered to correct past and projected subsidence and to accommodate a larger design flow. A detention basin will be constructed northwest of Luke AFB at the northeast corner of Reems Road and Northern Avenue to intercept flows north and west of the base and direct them into the Dysart Drain. Incidental improvements include three new bridge crossings (two county-owned and one private) and associated pavements and new box culverts. This environmental assessment (EA) was prepared to analyze impacts associated with construction of the Dysart Drain and detention basin. The EA also analyzed the impacts associated with an alternative action of modifying the Dysart Drain, utilizing only channel modifications to effectively convey the 100-year storm runoff. There would be no detention basin under the alternative action. The no-action alternative is to not modify the Dysart Drain, which has been rendered ineffective because of subsidence.

As a separate task, an air emissions analysis was conducted using EPA and Air Force approved emission estimation techniques (e.g., emission factors, mass balance calculations, etc.) to determine the emissions that may result during the reconstruction of the Dysart Drain. The air emission analysis was used to determine if the proposed repair of the Dysart Drain conforms with Arizona's State Implementation Plan.

This assessment was conducted in accordance with the National Environmental Policy Act of 1969; the Council on Environmental Quality Regulations; and Air Force Regulation 19-2, the Environmental Impact Analysis Process.

No significant environmental impacts will result from either the proposed action or the alternative action at Luke AFB, or in the surrounding area. Parameters considered in the impact analysis were: land use, community setting, cultural resources, biological resources, water resources, environmental management, transportation, air quality, and noise.

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ACRONYMS AND ABBREVIATIONS

°F	Degrees Fahrenheit
ACHP	Advisory Council on Historic Preservation
ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
AETC	Air Education and Training Command
AFB	Air Force Base
AFR	Air Force Regulation
AGE	Aerospace ground equipment
AGFD	Arizona Game & Fish Department
AHPA	Archaeological and Historic Preservation Act
AIRFA	American Indian Religious Freedom Act
AMA	Active Management Area
AQCR	Air Quality Control Region
ARPA	Archaeological Resources Protection Act
AT&SF	Atchison, Topeka, and Santa Fe (Railroad)
BACT	Best available control technology
BDT	Best demonstrated technology
BMP	Best management practice
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CO	Carbon monoxide
COE	US Army Corps of Engineers
CUD	Compatible use district
CWA	Clean Water Act
dB	Decibels
dB(A)	A-weighted sound level
DOD	Department of Defense
DOT	Department of Transportation
DPDO	Defense Property Disposal Office
EA	Environmental assessment
EIAP	Environmental impact analysis process
EIS	Environmental impact statement
EO	Executive order
EPA	US Environmental Protection Agency

ERNS	Emergency Response Notification System
ESA	Endangered Species Act
EWRA	Emergency Wetlands Resources Act
FAA	Federal Aviation Administration
FCDMC	Flood Control District of Maricopa County
FEMA	Federal Emergency Management Agency
FFCA	Federal Facilities Compliance Act
FIP	Federal Implementation Plan
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FONSI	Finding of no significant impact
FS	Fighter squadron
ft	Feet
FWPCA	Federal Water Pollution Control Act
gpd	Gallons per day
HBGL	Health based guidance level
HQ	Headquarters
HSWA	Hazardous and Solid Waste Amendments
HUD	Department of Housing and Urban Development
IRP	Installation Restoration Program
JP-8	Jet aviation fuel (jet kerosene)
lb	Pounds
L_{dn}	Day/night average sound level
LDGT	Light duty gasoline-powered truck
LDGV	Light duty gasoline-powered vehicle
LOS	Level of service
MACT	Most achievable control technology
mgd	Million gallons per day
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
NAAQS	National Ambient Air Quality Standards
NAC	Noise abatement criteria
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NO_2	Nitrogen dioxide
NOI	Notice of intent
NOV	Notice of violation
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
O_3	Ozone
OSHA	Occupational Safety and Health Administration
Pb	Lead
PCB	Polychlorinated biphenyl

PL	Public law
PM_{10}	Particulate matter equal to or less than 10 microns in diameter
POL	Petroleum, oil, and lubricant
PPA	Pollution Prevention Act
ppm	Parts per million
PPP	Pollution prevention plan
PSC	Potential source of contamination
PSD	Prevention of significant deterioration
RCRA	Resource Conservation and Recovery Act
ROI	Region of influence
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SHPO	State historical preservation office
SIP	State implementation plan
SPCC	Spill prevention, control, and countermeasures
SO_x	Sulfer oxides
SWP3	Storm water pollution prevention plan
SWDA	Solid Waste Disposal Act
TCLP	Toxicity characteristic leaching procedure
TNT	Trinitrotoluene
TPH	Total petroleum hydrocarbons
TSCA	Toxic Substances Control Act
TSD	Treatment, storage, and disposal
US	United States
USAF	United States Air Force
USC	United States Code
USFWS	US Fish and Wildlife Service
UST	Underground storage tank
VMT	Vehicle miles traveled
VOC	Volatile organic compound
WQA	Water Quality Act
WQARF	Water Quality Assurance Revolving Fund
WSRA	Wild and Scenic Rivers Act
μg/kg	Micrograms per kilogram

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FIGURES

Section 1

Purpose of and Need for Action

SECTION 1

PURPOSE OF AND NEED FOR ACTION

This section has five parts: an introduction, a statement of the purpose of and need for action, a statement of the decision to be made, a summary of the environmental impact analysis process (EIAP), and a description of the organization of the environmental assessment (EA).

1.1 INTRODUCTION

Luke Air Force Base (AFB) is located in Maricopa County, in the central part of Arizona, located just west of the Phoenix city limits (Figure 1.1). The existing Dysart Drain Flood Channel is located along the northern boundary of Luke AFB. The Dysart Drain flows in an easterly direction from approximately one-half mile west of the base to the Agua Fria River, which is approximately 1.9 miles east of Luke AFB. The locations of the Dysart Drain and Luke AFB are shown in Figure 1.2.

The Dysart Drain was constructed by the US Army Corps of Engineers (COE) in 1958 to collect off-site storm water runoff and to protect Luke AFB property from flooding. The entire Dysart Drain lies within property owned by the federal government. The Dysart Drain was built in conjunction with McMicken Dam, which is located upstream of Luke AFB. McMicken Dam retains flow from a 320-square mile drainage area that would otherwise inundate Luke AFB. The storm water runoff impounded by the dam is discharged to the Agua Fria River, upstream of the confluence of the Dysart Drain with the Agua Fria River.

The purpose of the Dysart Drain is to collect and convey runoff from the contributing drainage area downstream of McMicken Dam (approximately 50 square miles). This drainage area is composed predominantly of agricultural land. Storm water runoff travels overland via sheet flow, roadways, or farm ditches, generally following a mild slope (0.005 ft/ft) in a southeasterly direction. Very little storm water runoff from Luke AFB enters the Dysart Drain, since the base lies downslope from the channel.

Both McMicken Dam and Dysart Drain were built in response to a large flood that occurred in August of 1951. A subtropical storm system dropped a large amount of rain in the upstream watershed, which resulted in heavy flooding. Luke AFB suffered extensive damage, as did surrounding agricultural fields.

Land subsidence in the area around Luke AFB has occurred for a number of years, which is believed to be primarily the result of groundwater withdrawal. Subsidence in the area has produced differential settlement at various points along the Dysart Drain, reducing its flow capacity. Almost no subsidence has occurred at the Luke salt body, located east of Dysart Road. Approximately 12 feet of subsidence has occurred at Litchfield Road, and about 14 feet has occurred at the upstream end of the drain, at Reems Road. The differential subsidence has resulted in the loss of conveyance capacity in the Dysart Drain. Runoff from a 15-year frequency rain event now exceeds the conveyance capacity of the channel, which was originally designed to

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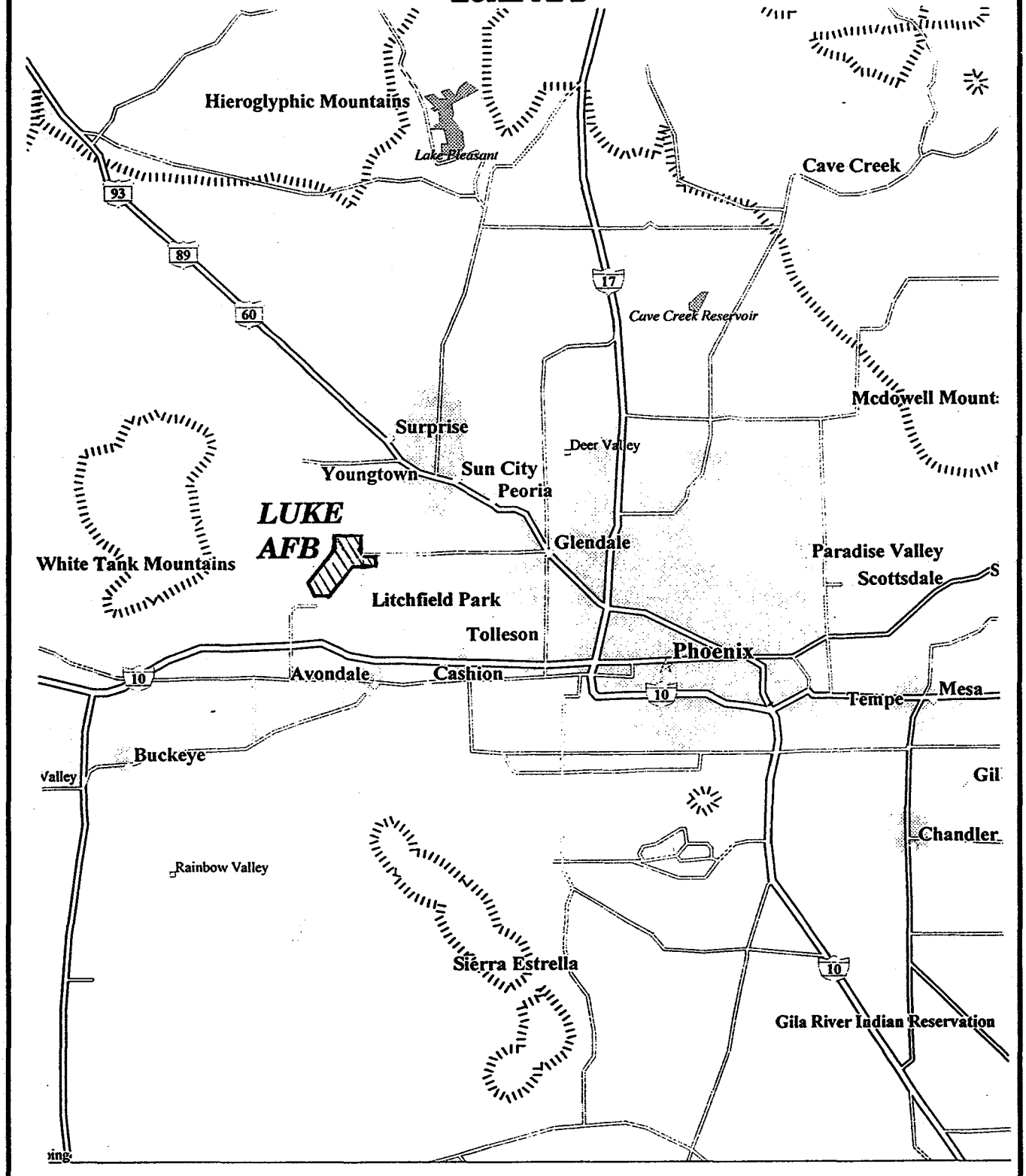
FIGURE 1.1
GENERAL LOCATION MAP
LUKE AFB



Scale 1:500,000 (at center)

10 Miles

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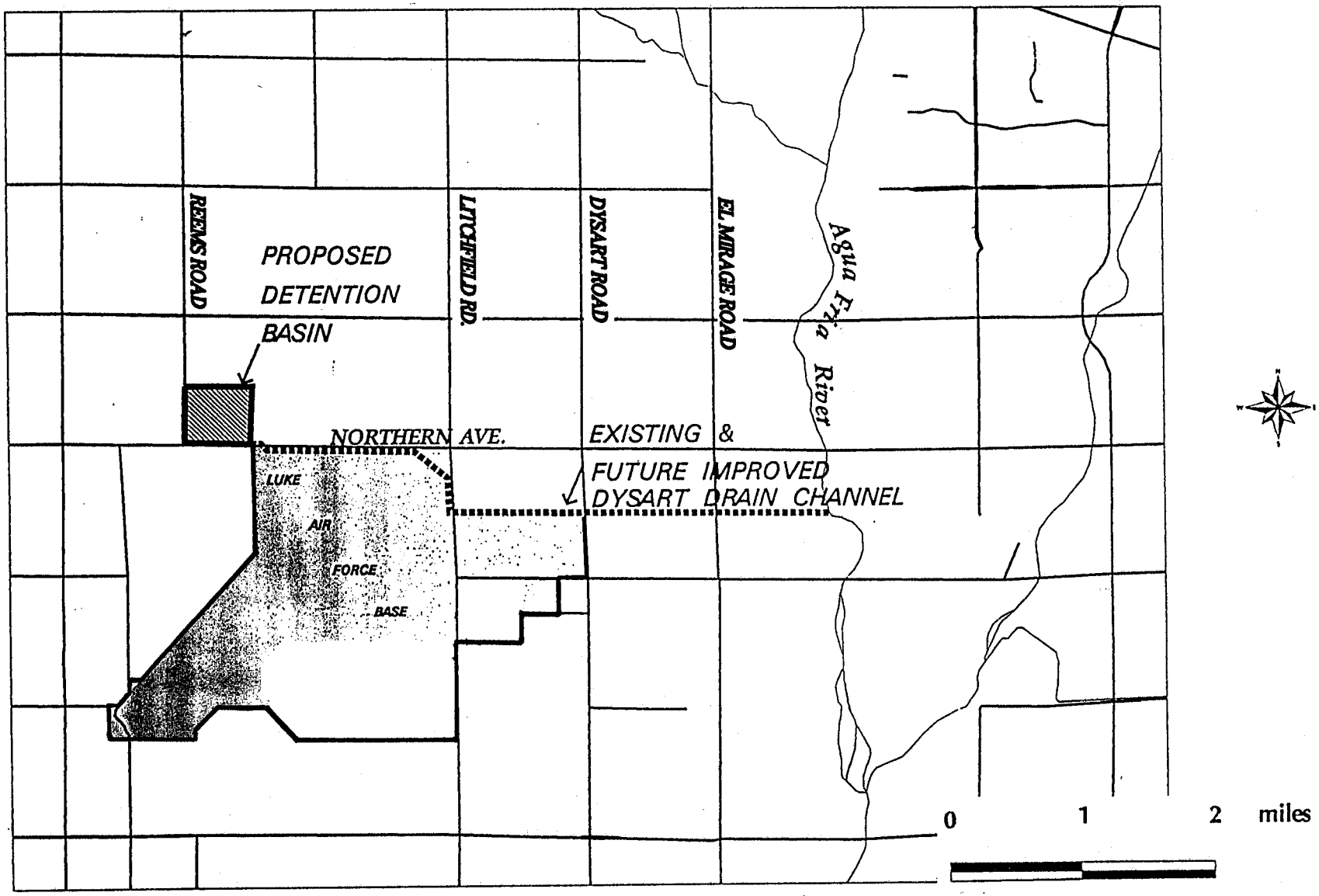
FIGURE 1.2
DYSART DRAIN IMPROVEMENT PROJECT



LUKE 6/6/94

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convey the 100-year flood. The conveyance capacity has been decreased from the original design flow of 1,100 cubic feet per second (cfs) to the current capacity of approximately 300 cfs.

Three separate areas exist where storm water runoff is no longer contained within the conveyance channel. When the capacity of the channel is exceeded, water overflows to the south, onto Luke AFB property. This breakout flow deposits sediment on runways, impairs operations, and floods base housing.

Chronic flooding occurred in 1951, 1955, 1979, 1992, and 1993, causing extensive damage at Luke AFB as well as disruption to base operations. The Flood Control District of Maricopa County (FCDMC) maintains rain gauges in the west valley area. The closest rain gauge maintained by FCDMC is approximately 19 miles from Luke AFB. Based on data from these gauges and other local rainfall information, the September 1992 storm event was estimated to be equivalent to a 75-year storm. In the fall of 1992, Luke AFB and the FCDMC agreed to develop a joint project to resolve the chronic flooding problems caused by the reduced capacity of the Dysart Drain Flood Channel. An evaluation of the base's flooding problems was accomplished in late 1992.

The Arizona Department of Water Resources (ADWR) implements the Arizona Groundwater Management Code, a law that was established to actively manage groundwater withdrawal and replenishment. Additionally, the law provides for Active Management Areas (AMAs), which are implemented in regions where severe overdrafts occurred. The Dysart Drain watershed lies within the Phoenix AMA. The primary management goal of the AMA is to reach a point where there will be no net withdrawal of groundwater, such that the amount of artificial and natural recharge equals the groundwater withdrawals. Therefore, this program may alleviate future land subsidence problems.

As experienced during the 1992 and 1993 storms, significant storm water runoff is generated from the watershed north of Luke AFB. No portion of Luke AFB is located within a Federal Emergency Management Agency (FEMA) delineated 100-year floodplain. The existing delineation occurs at the outlet structure of the drain to the Agua Fria River. However, in April 1994, FCDMC conducted surveys to modify the existing 100-year flood plain area. This information is currently being evaluated to present to FEMA.

1.2 PURPOSE OF AND NEED FOR PROPOSED ACTION

The Dysart Drain improvement project is needed to reduce flooding on Luke AFB which can result in extensive damage to the base resources and possible disruption of the mission. Flooding in September 1992 and January 1993 produced an estimated total of $3,500,000 in damages at the base. The proposed action would improve the conveyance of the Dysart Drain and prevent flooding at Luke AFB. The proposed action would improve the storm water conveyance of the Dysart Drain and prevent flooding at Luke AFB. If the Dysart Drain Improvements Project is not implemented and the existing Dysart Drain Flood Channel is not improved, the potential for future flooding will continue, causing further damage at Luke AFB and disruption to the base's mission.

1.3 THE DECISION TO BE MADE

The decision to be made is whether to:

- Reconstruct the Dysart Drain to effectively convey the 100-year storm runoff, utilizing both a storm water detention basin and channel modifications (proposed action); or
- Modify the Dysart Drain to effectively convey the 100-year storm runoff, utilizing only channel modifications (alternative action); or
- Take no action to alleviate flooding issues.

1.4 SCOPE OF THE ENVIRONMENTAL IMPACT ANALYSIS PROCESS

Federal agencies are required to take into consideration the environmental consequences of proposed actions in the decision-making process under the National Environmental Policy Act (NEPA) of 1969. The intent of NEPA is to protect, restore, or enhance the environment through well-informed federal decisions. The Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA (40 CFR 1500-1508, 1978) require that an EA:

- Briefly provide evidence and analysis to determine whether the proposed action might have significant effects that would require preparation of an environmental impact statement (EIS). If the analysis determines that the environmental effects will not be significant, a Finding of No Significant Impact (FONSI) will be prepared.
- Facilitate the preparation of an EIS, when required.

This EA is part of the environmental impact analysis process (EIAP) for the proposed project as set forth in Air Force Regulation (AFR) 19-2, which implements NEPA, CEQ regulations, and Department of Defense (DOD) directive 6050.1, July 30, 1979.

This EA identifies, describes, and evaluates the potential environmental impacts that could result from the Dysart Drain Improvements Project. It also identifies all required environmental permits relevant to the proposed and alternative actions. As appropriate, the affected environment and environmental consequences of the action may be described in terms of a regional overview or a site-specific description. Finally, the EA identifies mitigation measures to prevent or minimize environmental impacts.

The following biophysical resources were identified for study: land use, community setting, cultural resources, biological resources, water resources, environmental management, transportation, air quality, and noise.

The EIAP also included an air emissions impact analysis for a conformity determination. This determination was issued as a separate document.

1.5 ORGANIZATION OF THIS ENVIRONMENTAL ASSESSMENT

This EA is organized into eight major sections. Section 1 contains an introduction, a description of the purpose of and need for the action, a description of the decision to be made, a statement of the scope of the EIAP, and a description of the organization of the EA. Section 2 states the proposed action, details the project description and alternatives to the proposed action, states a brief description of another action, and summarizes the environmental impacts. Section 3 contains a general description of the biophysical resources that could be potentially affected by

the proposed action or alternatives. Section 4 is an analysis of the environmental consequences. Section 5 addresses regulatory review and permit requirements, and lists the laws relevant to the proposed action. Section 6 lists persons and agencies consulted in the preparation of this EA. Section 7 is a list of source documents relevant to the preparation of this EA. Section 8 lists preparers of this document.

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Section 2

Description of Proposed Action and Alternatives

SECTION 2

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This section addresses five areas: the proposed action, a project description, an alternative to the proposed action, a listing of alternatives eliminated from further consideration, and a summary of environmental impacts.

2.1 PROPOSED ACTION

The proposed action is to reconstruct and improve the storm water conveyance capacity of the Dysart Drain Flood Channel. The Dysart Drain will be improved to effectively intercept and convey the 100-year storm event runoff from the watershed north of Luke AFB to the Agua Fria River. A detention basin and spoil area will be constructed at the upstream end of the improved channel to minimize the size of the reconstructed channel and to reduce right-of-way and utility impacts and associated costs.

2.2 PROJECT DESCRIPTION

The channel improvements will correct the effects of differential subsidence along the channel alignment. A schematic depicting the original channel invert, capable of conveying the 100-year flood, and the existing channel invert, capable of conveying the 15-year flood, is shown in Figure 2.1. This schematic demonstrates the differential subsidence that occurred between 1955 and 1990. The channel improvements also accounts for the projected subsidence expected to occur through the year 2035 (WLB, 1993b).

2.2.1 Channel Reconstruction

The existing 4.5-mile-long Dysart Drain lies within property owned by the federal government. The channel will be reconstructed on federal property along the existing alignment to minimize construction costs and the need for additional property acquisition along the channel.

The channel will be deepened and widened to provide adequate capacity to convey the runoff from the design 100-year storm event, which is estimated to be 4,000 cfs at the outlet to the Agua Fria River. The channel invert profile and the cross section will be designed to accommodate future anticipated subsidence. Only a minimum amount of reconstruction of the existing channel outlet into the Agua Fria River will be required. This will minimize construction activities that may be necessary to areas adjacent to the outlet or within the COE delineated waters of the United States.

The channel depth to top of bank will vary from approximately 8 to 28 feet as a function of topography along the alignment and channel bottom slope. The typical channel cross section will be a continuous concrete-lined trapezoidal section with 1.5:1 sideslopes. Bottom width of the

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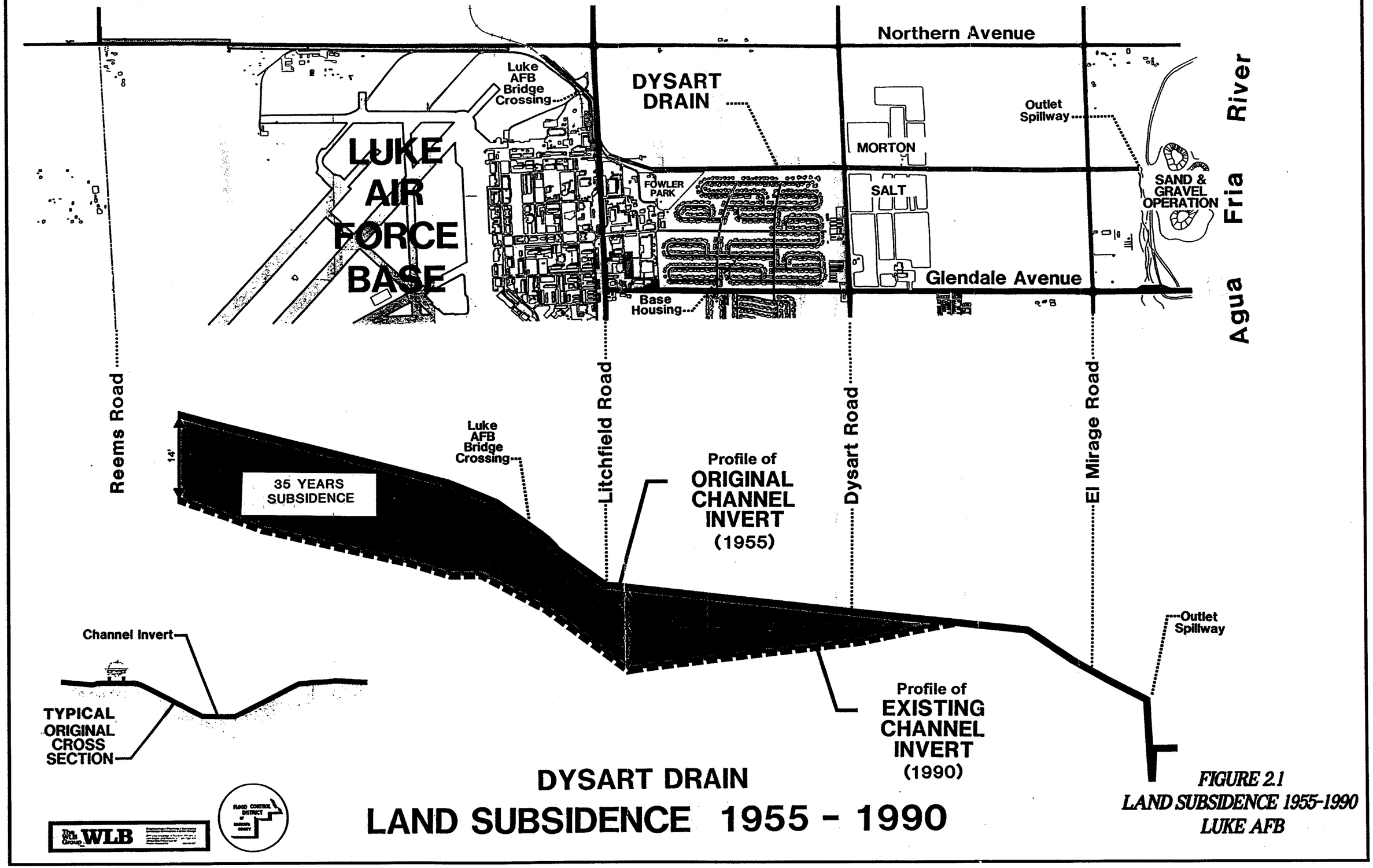

FIGURE 2.1
LAND SUBSIDENCE 1955-1990
LUKE AFB

drain varies from about 50 feet to approximately 100 feet. The invert slope will vary, averaging about 0.16 percent. The elevation at the top of the spillway to the Agua Fria River will be approximately 1,053 feet above sea level.

In addition to the channel improvements, other actions include the reconstruction of two existing Maricopa County bridges (at El Mirage and Dysart Roads), one bridge at the Morton International Salt Facility, and one culvert on Luke AFB.

2.2.2 Detention Basin and Spoil Area

A detention basin will be constructed at the upstream end of the Dysart Drain to reduce the magnitude of storm flows entering the drain, thereby reducing channel reconstruction. Once completed, the basin will also reduce storm water flows along the west side of Luke AFB, that, in the past, caused flooding along the southern end of the runway. The basin and associated spoil area will be located northwest of Luke AFB, on the northeast corner of Reems Road and Northern Avenue (Figure 1.2). The basin will be sited on privately owned agricultural land that will be acquired. This land is presently used to grow vegetable crops and rose bushes. An estimated 155 acres will be used for the basin and spoil area (WLB, 1993a,b,c). An Environmental Baseline Survey (EBS) will be conducted prior to land acquisition.

Average basin depth will be about 10 feet, with 6:1 side slopes and the spoil areas will have an average height of fill of about 11 feet, with 6:1 sideslopes. By placing the excavated material (spoil) on site, the earthwork operation can be accomplished with short hauls, minimizing the work effort. Hauling the material off-site would be significantly more expensive than purchasing the extra land area necessary to spoil the material on-site (WLB, 1993a,b,c).

The basin will discharge flows into the reconstructed Dysart Drain via a culvert undercrossing of Northern Avenue. The basin and associated collector channels will be designed to intercept the 100-year design storm flow, to detain the flow, and to control the discharge at a maximum of 550 cfs into the Dysart Drain. The total storage volume of the detention basin is estimated to be 550 acre-feet. Basin design will convey runoff from the more frequent, less intense storms via a low-flow channel through the basin. This will reduce the need for operation and maintenance activities, and will curtail the growth of unwanted vegetation (WLB, 1993a,b,c).

Construction of the basin and spoil area requires reconstruction of a portion of Reems Road, along the west side of the basin and spoil area, and a section of Northern Avenue, along the south side of the basin and spoil area. This reconstruction is necessary to ensure that storm water runoff is effectively captured by the basin.

2.3 ALTERNATIVES TO THE PROPOSED ACTION

2.3.1 Channel Reconstruction Alternative

Under this alternative, the channel will be deepened and widened to provide adequate capacity to convey runoff from the design 100-year storm event. Channel improvements will correct the impacts of differential subsidence along the channel. This alternative does not require construction of a detention basin and minimizes the need for additional property acquisition for the basin. However, additional property will be required the length of the drain due to a wider channel.

The channel invert profile and the cross section design will accommodate future anticipated subsidence. Only a minimum reconstruction of the existing channel outlet into the Agua Fria River

will be required. This will minimize any construction activities that may be necessary adjacent to the outlet or within the COE delineated waters of the United States.

Measured from existing grade through the varying topography along the channel alignment, channel depth will vary from approximately 8 feet to about 28 feet. Typical channel cross section will be a concrete-lined trapezoidal section with 2:1 side slopes. Bottom width varies from about 50 feet to about 135 feet. The bottom width of the channel is 20 feet. The invert slope will vary, averaging about 0.15 percent. Elevation at the top of the spillway to the Agua Fria River will remain approximately 1,051 feet above sea level.

Other features associated with the channel improvements under the alternative are reconstruction of three Maricopa County bridges (at El Mirage, Dysart, and Litchfield Roads), one bridge at the Morton International Salt Facility, one culvert at Luke AFB, and one spillway at the head of the Dysart Drain (at Reems Road).

2.3.2 No-action Alternative

As future subsidence occurs, the Dysart Drain will continue to loose storm water conveyance capacity. If the proposed action is not implemented, storm water runoff from the watershed north of Luke AFB will continue to exceed channel capacity and cause flooding problems on the base. This flooding impacts the mission of Luke AFB, and Luke AFB personnel living in base housing. Costly repair and clean-up efforts may continue to be required following flood events on the airfield and in base housing areas.

2.4 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

After the agreement between Luke AFB and FCDMC in the fall of 1992, to improve the drain, several alternatives were developed to alleviate flooding on the base. These alternatives were examined and eliminated from further consideration for the reasons explained in the paragraphs below (FCDMC, 1994).

A. Improvements to existing channel, continued split flow to Luke AFB, no detention basin.

   Under this alternative, storm water flow would continue to be split at Reems Road and Northern Avenue. Currently the Dysart Drain has insufficient capacity at Reems Road, which is the upstream end of the channel. The result is a split flow with approximately 800 cfs flowing east in Dysart Drain and 1,500 cfs flowing south over Northern Avenue and along the west and south sides of Luke AFB. This alternative was eliminated from further consideration because it does not remove the split flows which would flood the west and south side of Luke AFB.

B. Improvements to existing channel, flows to Bullard Wash and Agua Fria River, and no detention basin.

   This alternative consists of collecting the runoff at Reems Road and Northern Avenue and conveying it south, under Northern Avenue, and around the west side of the base to Bullard Wash. The remainder of the flows are collected in Dysart Drain and conveyed east to the Agua Fria River. The effect of constructing the channel on the west side of the base is a significantly reduced flow in the Dysart Drain.

   This alternative includes significant channel reconstruction from Luke AFB west along the frontage of Northern Avenue to Reems Road and along the west side of Luke AFB to the

south of the base. Although this alternative eliminated the split flows at Reems Road, it was eliminated from further consideration because it was the highest cost alternative and added more than three miles of channel length.

C. Improvements to existing channel, and construction of a 290-acre detention basin along the frontage of Northern Avenue.

   The 290-acre basin would extend approximately 1.5 miles from the northeast corner of Reems Road and Northern Avenue to the Atchison, Topeka, and Santa Fe (AT&SF) railroad. The basin would detain all of the runoff from the 100-year flood that currently reaches the Dysart Drain between Reems Road and the AT&SF track. The outflow of the detention basin is conveyed to the Agua Fria River in the Dysart Drain. This alternative was eliminated because it had significant impacts to private property and roadway frontage, and was the second highest alternative in cost.

D. Improvements to existing channel and construction of two large detention basins along the frontage of Northern Avenue.

   In this alternative, a 125-acre detention basin would be located at Reems Road and Northern Avenue, and a 116-acre detention basin would be located at Northern Avenue and the AT&SF railroad track.

   The 125-acre basin would detain runoff from the 100-year flood and would discharge at a reduced flow into a proposed channel to Bullard Wash. This would require significant new channel construction along the west side of Luke AFB to the southern end of the runway.

   The 116-acre basin was designed to reduce the 100-year peak discharge in the Dysart Drain down to the capacity of the existing culverts under the AT&SF railroad tracks. The reduced outflow would be metered into the Dysart Drain and conveyed east to the Agua Fria River.

   This alternative, which eliminates the split flow at Reems Road, was eliminated from further consideration because it was not the least cost option, requires substantial land acquisition, and creates additional channel length of more than three miles.

2.5 SUMMARY OF ENVIRONMENTAL IMPACTS

Table 2.1 summarizes the impacts of the proposed action and alternative action. No significant impacts are expected from either the proposed action or alternative action.

Table 2.1
Summary of Environmental Impacts

Resource Category	Proposed Action	Alternative Action
Land use	Small increase in right-of-way required to accommodate channel and detention basin. No land use impacts. Requirements and facility usage consistent with current base land use.	Minimal increase in right-of-way required to accommodate channel. No land use impacts. Requirements and facility usage consistent with current base land use.
Transportation	Although affected streets will experience increased vehicle traffic for short periods, the level of services will not be significantly impacted.	Same as proposed action. However, an additional bridge at Litchfield Road would require reconstruction.
Biological resources	No significant impacts to natural habitats or threatened or endangered species.	Same as proposed action.
Water resources	Improved conveyance will significantly reduce damage from flood events. Temporary, minimal increase in sediment transport during construction activities.	Same as proposed action, but less sediment transport as a result of no basin construction during construction phase.
Community setting	No impacts to community setting. Temporary construction jobs will not affect long-range setting.	Same as proposed action.
Cultural resources	No impacts to historical or archaeological resources.	Same as proposed action.
Noise	Temporary noise during construction.	Same as proposed action.
Air quality	Impact to air quality within air quality control region is insignificant given the minor increase in emissions. De minimis levels of PM_{10}, CO, and ozone emitted.	Same as proposed action.
Environmental management	No addition to hazardous waste generated.	Same as proposed action.

Section 3

Affected Environment

SECTION 3

AFFECTED ENVIRONMENT

This section provides baseline environmental resources that could potentially be affected by Dysart Drain activities. The level of detail of the baseline data presented reflects the likelihood and significance of potential impacts, which are discussed in Section 4.

3.1 PROPOSED ACTION

3.1.1 Mission of Luke Air Force Base

Luke AFB is the largest fighter pilot training base in the free world and has been an important facility for the training of pilots in air-to-air and air-to-ground combat since 1941 (USAF, 1994a). The Luke AFB region is highly valued for its climate, which is suitable for year-round flying, and its expansive, unencumbered air and land space, which can accommodate a variety of military training needs.

Command of Luke AFB is assigned to the Air Education and Training Command. The 56th Fighter Wing is the host command at Luke AFB and provides command and operational control of six Fighter Squadrons (FS) and the Barry M. Goldwater Air Force Range. The 63rd, 310th, 311th, 314th, and 425th FS and the 461st/555th FS are responsible for training F-16 and F-15 aircrews, respectively.

3.1.2 Land Use

3.1.2.1 Installation Land Use

Current functional land uses on Luke AFB are: industrial, administration, community, medical, housing, airfield, outdoor recreation, open space, and mission. The 4,157-acre base is shown in Figure 3.1. On-base land use can also be defined by geographic subareas. Major geographic subareas of Luke AFB are as follows: south base, north-south apron, central mall, medical center, community center, and military family housing. Further base expansion is physically constrained by two active runways, existing airfield pavements, and Litchfield Road, which bisects the base (USAF, 1987a).

3.1.2.2 Adjacent Land Uses

Luke AFB is located in the western portion of Maricopa County, approximately 20 miles from downtown Phoenix. Although the area surrounding the installation is generally defined as rural, the adjacent communities are rapidly growing. Land uses surrounding the installation are agricultural, residential, commercial, industrial, public, and parks and recreation, as depicted in Figure 3.2. The growth of the cities of Phoenix and Glendale has extended towards the east end of the base due to transportation improvements (Grand Avenue, I-10, and arterials). Development east of the base is more dense and urbanized than west of the base. Commercial activity is generally located near

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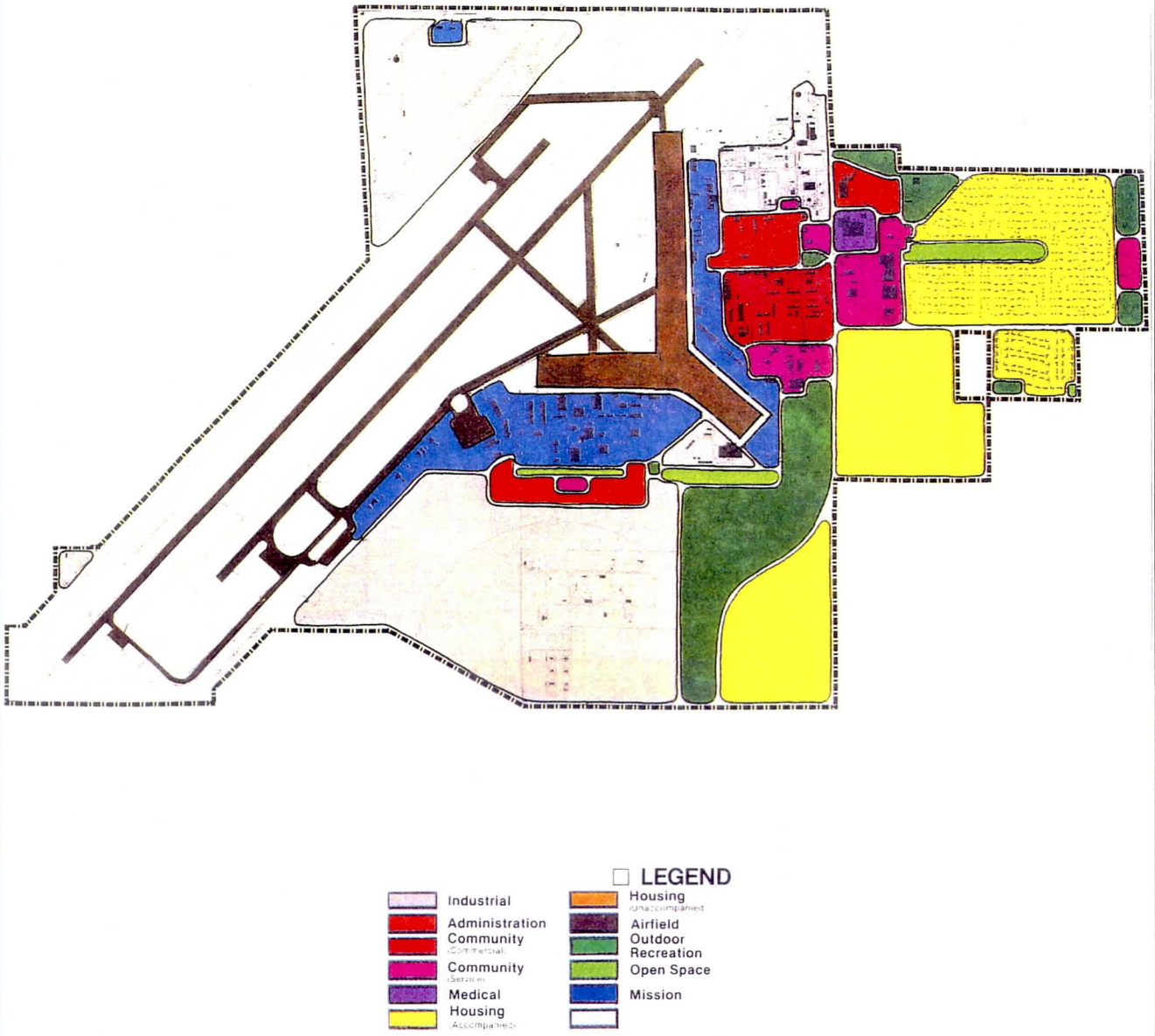
FIGURE 3.1
EXISTING LAND USE ON LUKE AFB



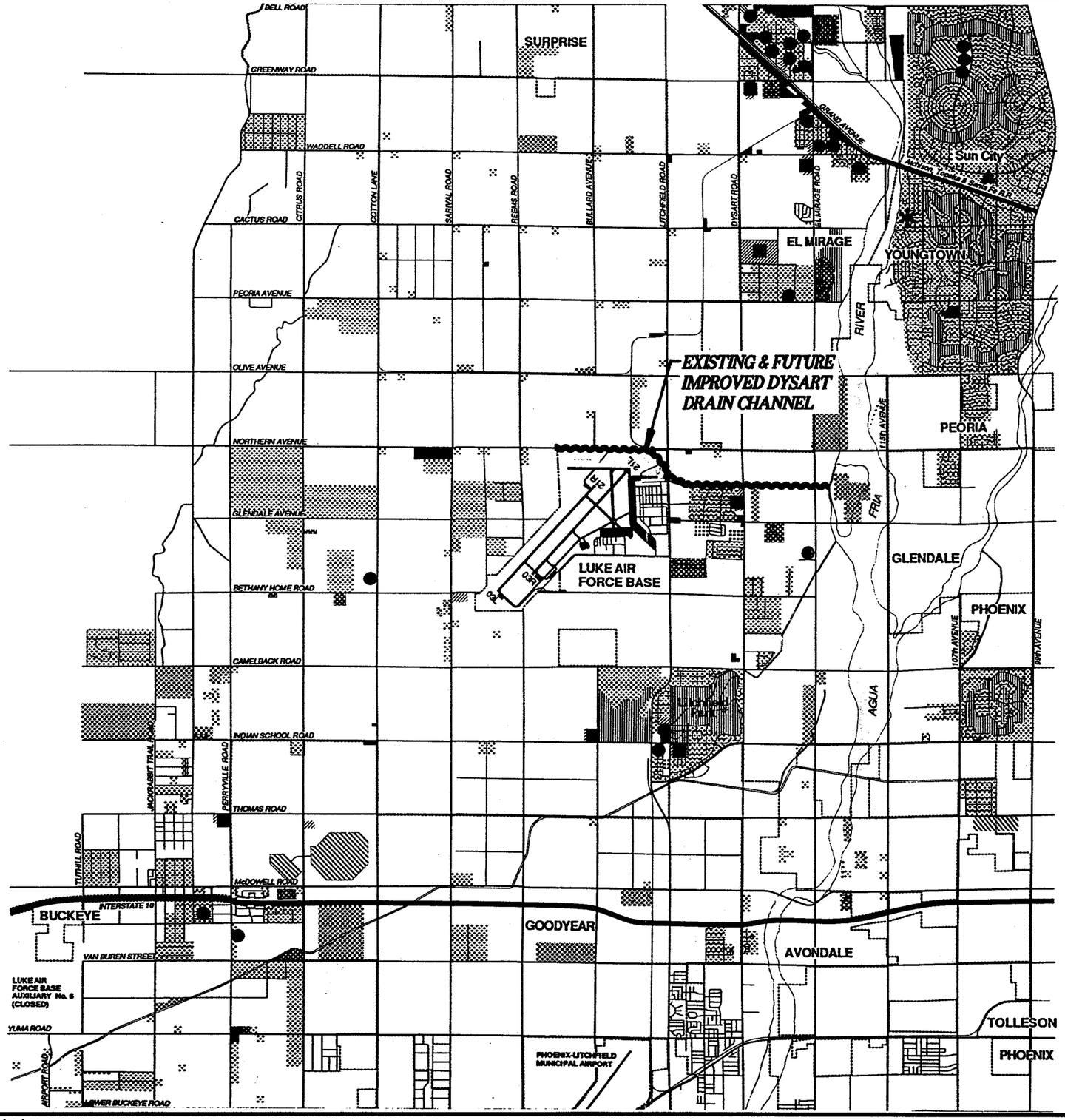


FIGURE 3.2
GENERALIZED EXISTING LAND USE SURROUNDING LUKE AFB

Glendale Avenue, east of the base. The majority of the industrial development in this area is farm related (MCDPD, 1991).

Communities and unincorporated portions of Maricopa County have adopted zoning ordinances to control land use development and promote compatibility (MAG, 1988). Figure 3.3 shows general zoning.

3.1.3 Transportation

Litchfield Road is the main access to the base and can be accessed from the east and north by US Highway 93 or from the south by Interstate 10. The main gate operates 24 hours per day, and allows traffic to enter and exit the base from Litchfield Road. The base can also be accessed on weekdays through the north gate, from 6 A.M. to 5 P.M. and the south gate from 6 A.M. to 6 P.M. These two gates also open onto Litchfield Road. Because the area surrounding Luke AFB is predominantly rural, traffic circulation proceeds without congestion or delays during peak traffic flow (Rerick, 1994a).

The average daily traffic (ADT) counts for traffic on roads located in the vicinity of Luke AFB are shown in Table 3.1.

Table 3.1
Traffic Flow

Street	Direction	Count	LOS[1]	Source
Dysart Road	North & South	5,239	C	Rerick, 1994a
El Mirage Road	North & South	1,620	C	Rerick, 1994a
Reems Road	North & South	695	B	Smith, 1994
Sarival Road	North & South	295	A	Smith, 1994
Litchfield Road	North & South	6,650	C	MCDOT, 1994
Glendale Avenue	East & West	10,800	C	MCDOT, 1994
Northern Avenue	East & West	1,700	B	MCDOT, 1994

[1] Level of service from MCDOT, 1994

3.1.4 Biological Resources

3.1.4.1 Ecology

Luke AFB and the surrounding area is located on the northern edge of the Sonoran Desert. Two vegetation subdivisions occur in the vicinity, the Arizona Upland and the Lower Colorado River. Luke AFB contains disturbed desert scrub, disturbed grassland, and landscaped vegetation communities (COE, 1993).

A vegetation survey was conducted recently on the project area (FCDMC, 1994). Vegetation within and adjacent to the Dysart Drain area is dominated by weedy species. Continued maintenance activities in the channel have prevented establishment of native perennial vegetation. The approximate vegetative cover in this area is 10 percent of the land surface. Weedy species in this area include black mustard (*Brassica nigra*), nut-grass (*Cyperus rotundus*), skeleton-weed (*Eriogonum deflexum*), redstem filaree (*Erodium cicutarium*), wild barley (*Hordeum leporinum*), little mallow (*Malva parviflora*), black medic (*Medicago lupulina*), yellow sweetclover (*Melilotus indicus*), Russian thistle (*Salsola iberica*), Johnson grass (*Sorghum halepense*), globe mallow

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FIGURE 3.3
GENERAL ZONING IN ADJACENT AREAS
LUKE AFB

(*Sphaeralcea ambigua*), bermuda grass (*Cynodon dactylon*), and cocklebur (*Xanthium saccharatum*) (FCDMC, 1994).

An additional portion of the project area consists of a concrete-lined drainage channel, maintenance right-of-way, and an additional 25 feet north of the north right-of-way fence. Some residual native vegetation remains along the right-of-way fence. Land surface coverage for this area is approximately five percent. Species encountered include creosote bush (*Larrea tridentata*), triangle-leaf bursage (*Ambrosia deltoidea*), three-awn (*Aristida spp.*), desert broom (*Baccharus sarathroides*), sweet bush (*Bebbia juncea*), four-wing saltbush (*Atriplex canescens*), and desert saltbush (*Atriplex polycarpa*) (FCDMC, 1994).

Disturbed desert scrub communities also exist along the drain area to the Agua Fria River. This community is characterized by a few widely scattered shrubs and grasses. The approximate vegetative cover for this area is 25 percent of the land surface. The dominant species established on the channel bank is desert broom. Additional species established on the bank area include canyon ragweed (*Ambrosia ambrosioides*), sweet bush, desert straw (*Stephenameria pauciflora*), and burro bush (*Hymenoclea monogyra*). One palo verde tree (*Cercidium floridum*) occurs on the bank of the northern edge of the right-of-way. The vegetation established on the top of the bank is predominantly composed of creosote bush with an understory of triangle-left bursage, globe mallow, and three-awn. Vegetation within the river channel at this location is predominantly burro-bush and one stand of giant reed (*Arundo donax*).

The northeast corner of Northern Avenue and Reems Road where the detention basin will be constructed is presently under active cultivation. No native vegetation occurs in the project area.

Much of Luke AFB has been developed by construction of buildings, paving of runways or parking areas, and base housing. In addition, the area around Luke AFB is developed or highly disturbed agricultural land. This continuing use of agricultural land has limited riparian areas and, thus, limited the numbers of species and diversity of wildlife on or adjacent to the project area. A few amphibians, birds, and small mammals were observed on Luke AFB in a recent biological survey (COE, 1993). These included frogs, European starlings (*Sturnus vulgaris*), great-tailed grackles (*Quiscalus mexicanus*), horned larks (*Eremophilia alpestris*), house sparrows (*Passer domestiicus*), morning doves (*Zenaida macroura*), and house finches (*Carpodacus mexicanus*). Other observed species included roadrunner (*Geococcyx californianus*), Gambel's quail (*Callipepla gambelii*), burrowing owl (*Athene cunicularia*), red-winged blackbird (*Agelaius phoeniceus*), and northern mockingbird (*Mimus polyglottus*). Small rodents and desert cottontails (*Sylvilagus audobonii*) were observed only near the ditches of the disturbed grassland vegetation community (COE, 1993). The majority of mammals present in the vicinity of Luke AFB consist of a variety of bats, mice, and rats. Most of these species are nocturnal due to high daytime temperatures in the area. Approximately 60 mammalian species are known to occur in the area (USAF, 1987a).

3.1.4.2 Endangered, Threatened, and Special-status Species

The Endangered Species Act (ESA) of 1973, amended in 1982 and 1987, is intended to prevent further decline of endangered and threatened plant and animal species, and to help in the restoration of populations of these species and their habitats. The act requires that each federal agency consult with the US Fish and Wildlife Service (USFWS) to determine whether endangered

or threatened species are known to exist or have critical habitats on or in the vicinity of proposed action.

The Arizona Game and Fish Department (AFGD) also categorizes threatened native wildlife. These are divided into four categories (extinct, endangered, threatened, and candidate), depending on the degree of threat to the species and the probability of its expiration from Arizona (AGFD, 1988).

The State of Arizona also has a classification system for categorizing plant species. Plants are classified as highly safeguarded, salvage restricted, export restricted, salvage assessed, and harvest restricted. Plants listed as highly safeguarded typically include the federal designation of endangered, threatened, or candidate Category 1 species (ADA, 1991).

Two endangered, one proposed endangered, and six Candidate Category 2 federally listed species potentially occur in the vicinity of the proposed project. In addition, one endangered and four state candidate species are listed by the State of Arizona in the vicinity (USAF, 1994). These are presented in Table 3.2. The USFWS (1994) and the AGFD (1993) have indicated that no endangered or threatened species occur in the project area. This is primarily due to the lack of suitable habitat in the project area.

3.1.5 Water Resources

3.1.5.1 Surface Water

In 1972, the US Congress passed the Federal Water Pollution Control Act Amendments, "to restore and maintain the chemical, physical, and biological integrity," of the nation's waters. In 1974, when the COE issued regulations to implement the Section 404 program, it limited the program's jurisdiction to traditionally navigable waters, including adjacent wetlands, but excluded many small waterways and most wetlands. In 1977, the COE issued final regulations and effectively included, "isolated wetlands and lakes, intermittent streams, prairie potholes, and other waters that are not part of a tributary system to interstate waters or to navigable waters of the United States." Section 404 of the Clean Water Act establishes a program to regulate the discharge of dredge and fill material into waters of the United States, including wetlands.

Three areas in the Dysart Drain project have been identified through correspondence with the COE as being with or adjacent to waters of the US. These are located at the existing outfall of the Dysart Drain channel into the Agua Fria River, on the north side of the present channel, about 1,450 feet west of El Mirage Road, and on the south side of the channel approximately 1,450 feet west of El Mirage Road (FCDMC, 1994b). This correspondence is provided in the appendix.

Surface water in the project area is in the Middle Gila River Basin of the Lower Colorado Hydrologic Region. The Middle Gila River Basin encompasses an area of approximately 12,150 square miles and includes the Phoenix metropolitan area. Almost two-thirds of the State's population resides in this basin. Surface water diversions in the Gila River and the Salt River for agricultural and urban uses have left the streambeds in the Phoenix area dry. The basin receives limited rainfall. Surface water flow in this basin is attributable to releases from upstream impoundments, effluents from wastewater treatment plants, or agricultural return flows (ADEQ, 1992).

The ground surface at Luke AFB slopes from northwest to southeast at a rate of about 25 feet per mile, creating a natural drainage pattern across the base. Runoff from rainfall at Luke AFB is

Table 3.2
Habitat Requirements and Reasons for Decline of Federal or State Endangered, Threatened, and Candidate Category Species Potentially Occurring in the vicinity of Luke Air Force Base

Common/Scientific Name	Federal Status	State Status	Habitat Requirements/Reasons for Decline
REPTILES AND AMPHIBIANS			
Desert tortoise, Sonoran population (*Gopherus agassizii*)	C	C	Rock outcrops, rocky hillsides, and washes with steep walls/habitat destruction, genetic contamination by escaped captives, illegal collection, disease
Chuckwalla (*Sauromalus obesus*)	C	-	Creosote bush communities in lava flows, rocky hillside, and rock outcrops/habitat destruction
BIRDS			
Yuma clapper rail[1] (*Rallus longirostris yumanensis*)	E	-	Freshwater or brackish streamsides and marshlands with heavy riparian and/or swamp vegetation, requires wet substrate/habitat destruction
American peregrine falcon (*Falco peregrinus anatum*)	E	C	Cliffs and steep terrain near water or woodlands/pesticides
Southwestern willow-flycatcher (*Empidonax traillii extimus*)	PE	E	Willows, baccharus, tamarisk, and Russian olive thickets near water/brood parasitism by brown-headed cowbirds, loss of habitat to agriculture, and introduced vegetation
Loggerhead shrike (*Lanius ludovicianus*)	C	-	Open or brushy areas with short to mid grasses, fencelines, and roadsides/unknown
MAMMALS			
Spotted bat (*Euderma maculatum*)	C	C	Little is known, but apparently lives primarily in crevices of rocky cliffs and canyons, riparian areas appear to be important/habitat destruction
California leaf-nosed bat (*Macrotus californicus*)	C	C	Colonial roosts in mines and caves, desertscrub habitats/susceptibility to low temperatures, limited warm winter roost sites, and vandalism at roosts
Yavapai Arizona pocket mouse (*Perognathus amplus amplus*)	C	-	Arid desert with scattered vegetation/habitat destruction

Legend:E = Endangered, PE = Proposed Endangered, C = Category Two
Source: USAF 1994

1 Wetland-dependent species

channeled into a network of surface drainage ditches and storm drains. However, as a result of the arid environment and resultant evapotranspiration rate, runoff from small rainfall events infiltrates or evaporates and never reaches discharge points into natural surface streams.

The Dysart Drain collects storm water runoff from the watershed north of Luke AFB and conveys the runoff to the Agua Fria River. No permanent sources of surface water enter the Dysart Drain. Intermittent sources of surface water entering the drain include the return flows from agricultural fields that are irrigated using a flooding technique.

The Agua Fria River drains into the Gila River approximately 10 miles south of Luke AFB. The Gila then flows west to Arlington, south towards Gila Bend, and then west before emptying into the Colorado River near the Arizona-California border. Both the Agua Fria River and some sections of the Gila River are dry throughout most of the year. However, in rare wet years or after summer monsoon rains, these dry stream beds convey a significant flow of storm water runoff. The FCDMC estimates the 100-year storm flow for the Agua Fria River near the discharge of the Dysart Drain to be approximately 68,000 to 70,000 cfs (FCDMC, 1994c). This flow reduction is due to operation of the Waddell Dam, approximately 25 miles upstream of Luke AFB. The dam was constructed to increase the conservation storage capacity of the Lake Pleasant Drinking Water Supply Reservoir. The Waddell Dam began operations in early 1994. Prior to construction of the Waddell Dam, the Agua Fria River discharged approximately 100,000 cfs during the 100-year storm event.

According to the Arizona Department of Environmental Quality (ADEQ, 1992), some of the stream segments that were assessed and monitored in the project area cannot fully support their uses. Water quality assessments for the project area indicate the major causes of stream/riverine nonattainment include metals, ammonia, low dissolved oxygen, turbidity, total dissolved solids, and fecal coliform bacteria. The potential sources contributing to nonattainment of assigned uses in streams and rivers include: municipal point sources, range management, mining (including sand and gravel operations), and nonpoint sources. Preliminary information gathered by FCDMC indicates that the quality of runoff conveyed by the Dysart Drain is not substantially different from the quality of runoff from surrounding areas. The sediment that has accumulated in the Dysart Drain may contain minor concentrations of pesticides or herbicides from associated agricultural fields. Two sediment samples collected in November 1993 indicate the presence of low concentrations of 4,4'DDE, an aerobic degradive product of the pesticide DDT, total petroleum hydrocarbons (TPH), and metals (CEC/WRA, 1993; 1994d). The detected levels of 4,4'DDE were 31 and 34 μg/kg and TPH concentrations were 23 and 35 mg/kg. The only metal detected was barium at 1.0 and 0.95 mg/L using EPA's toxicity characteristic leaching procedure (TCLP) (CEC, 1993). The detected levels of these substances were well below established minimum accepted values for each contaminant. The ADEQ health-based guidance level (HBGL) is 5,000 μg/kg for 4,4-DDE, the screening level for TPH is 100 mg/kg, and the TCLP value for barium is 100 mg/L. Four composite surface soil samples were taken from the area to be used for the detention basin and analyzed for organochlorine and organophosporus pesticides and herbicides. Only 4,4'DDE was detected between 34 and 170 μg/kg. The levels are similar to background levels of DDT and its breakdown products commonly seen areas of the Salt River Valley where cotton or other crops were grown from the 1940s and 1960s. The levels of contaminants were well below the established HBGL set by ADEQ of 5,000 μg/kg (CEC/WRA, 1993).

Arizona is separated into six physiographic regions according to their distinctive climates, assemblages of aquatic plants, and characteristic uses by waterfowl. The project area falls within the South-Central Arizona Region. According to Region 2 of the USFWS, there are no priority or candidate wetlands in the immediate project area that qualify for acquisition under the Emergency Wetland Resources Act of 1986 (USFWS, 1990). The State of Arizona has developed a critical streams and wetlands program to protect streams and wetlands in Arizona, which have significant resource or recreational value. No critical streams and wetlands have been identified for the project area.

3.1.5.2 Groundwater

Three major aquifers supply most of the groundwater in Arizona. The major source of groundwater in the project area occurs within unconsolidated alluvial deposits consisting of interfingering sand, gravel, silt, and clay. This unconsolidated alluvium is composed of three hydraulic units, detailed in Table 3.3.

Table 3.3
Unconsolidated Alluvium Aquifer of the Luke AFB Area, Arizona

Hydraulic Unit	Description
Upper alluvial unit	Major source of groundwater in the Luke AFB vicinity. Groundwater occurs under unconfined aquifer or water table conditions. Deposits are generally unconsolidated.
Middle fine-grained unit	Sedimentary deposits exhibiting low permeability, ranging from clay and silt comprising the upper section to gypsum and sand in the lower section
Lower conglomerate unit	Heterogeneous mixture of sand, gravel and some clays

Source: USAF, 1987

Groundwater in the middle fine-grained unit is impeded from downward migration due to the presence of gypsum and sand in the lower section. Although groundwater occurs in this section, it is generally under artesian or confined conditions. Groundwater is also present in the lower conglomerate unit; however, it is generally under artesian conditions as it is confined by the overlying middle fine-grained unit (USAF, 1987).

Groundwater withdrawal in the vicinity of Luke AFB has shown a steady increase over the past 20 years. This has resulted in a decrease in the level of the water table at a rate of approximately 5 feet per year. The increased utilization of groundwater, primarily due to agricultural withdrawals, has resulted in a large cone of depression around the area. The increase in groundwater usage has also resulted in land subsidence and fissures in the area surrounding Luke AFB. Most of the fissures are tensional with no vertical displacement. The presence of compressible strata, such as salt, has also contributed to the formation of fissures in the area (USAF, 1994).

The Dysart Drain has been impacted by differential subsidence caused by the groundwater withdrawal detailed above. Large withdrawals of groundwater also cause other significant changes

in geologic and hydrogeologic regimes. The withdrawal of groundwater, primarily, has caused land subsidence and fissures in the area around Luke AFB for a number of years. Most of these fissures are tensional with no vertical displacement. The occurrence of compressible strata, such as salt, also contributes to the formation of fissures within the area. Land subsidence has damaged or reduced the effectiveness of structures, increasing the rate of soil erosion.

Differential subsidence has caused deterioration of the Dysart Drain. Almost no subsidence has occurred at the Luke salt body, located east of Dysart Road. Approximately 12 feet of subsidence has occurred at Litchfield Road, and about 14 feet has occurred at the upstream end of the drain at Reems Road (Figure 2.1). The differential subsidence has resulted in the loss of conveyance capacity in the Dysart Drain. A 15-year frequency rain event now exceeds the conveyance capacity of the channel that was originally designed to convey the 100-year flood. The conveyance capacity has been decreased from an original design of 1,100 cubic feet per second (cfs) to the current capacity of approximately 300 cfs.

The Arizona Department of Water Resources regulates the Arizona Groundwater Management Code, a law that was established to actively manage groundwater withdrawal and replenishment. Arizona is divided into four AMAs and 46 groundwater basins, which have been grouped into six Water Resources Planning Areas. The Dysart Drain watershed lies within the Phoenix AMA. The goal of the AMAs is to reach and maintain a point where there will be no net withdrawal of groundwater conditions, such that the amount of artificial and natural recharge equals the groundwater withdrawals. Therefore, this program may alleviate future land subsidence problems.

Groundwater assessments in the area indicate that the most common sources for potential contamination are:

- High nitrate concentrations from municipal wastewater treatment facilities, individual septic systems, and agricultural activities;
- Pesticides from agricultural and domestic applications;
- Petroleum products from gasoline stations, highway spills, and leaking underground storage tanks;
- Hazardous wastes, e.g., volatile organic compounds from Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), Resource Conservation and Recovery Act (RCRA), Installation Restoration Program (IRP), and Water Quality Assurance Revolving Fund (WQARF) sites (ADEQ, 1992).

3.1.6 Community Setting

This section details recent socioeconomic trends in the region of influence. Luke AFB and the surrounding communities depend on one another for employment, goods, and services. The following discussion describes these relationships.

3.1.6.1 On Base

The total number of personnel at Luke AFB (as of September 1993) included approximately 5,409 active duty military personnel, 1,775 civilians, and 1,185 reserves, for a total base population of approximately 8,369. There are 21,372 military retirees in the area (USAF, undated).

For FY 93, the Luke AFB budget was approximately $355.5 million, while the total FY 93 economic impact of Luke AFB to the region was estimated to be $703.2 million. Additionally, an

estimated 5,326 secondary jobs were created in the area during FY 93 due to Luke AFB activities (USAF, undated).

There are 874 on-base family housing units at Luke AFB. Additionally, the installation has a total of 1,559 beds in non-commissioned officers (NCO) dormitory quarters, 171 spaces in visiting airmen quarters, 166 beds for visiting officers, and 215 beds in temporary lodging facilities (USAF, 1994). Approximately 5,861 military personnel and dependents live in the fully occupied on-base housing.

3.1.6.2 Region of Influence Description

The residence patterns of Luke AFB personnel were used to determine which counties should be included in the socioeconomic region of influences (ROIs). The Maricopa Association of Governments estimated that almost 100 percent of Luke AFB personnel reside in Maricopa County. Given these findings, the socioeconomic region of influence has been limited to Maricopa County.

The Phoenix metropolitan area was defined as the Phoenix Metropolitan Statistical Area (MSA) for the 1990 Census. Metropolitan Phoenix includes all of Maricopa County; therefore, the ROI has a large and diverse population and economy. The 9,226 square mile Phoenix MSA had over 2.1 million residents in 1990 (DOC, 1990). Phoenix is one of the fastest-growing major metropolitan areas in the country. In 1970, the Phoenix MSA was ranked the 33rd metropolitan area by population, and had moved up to 20th in 1990 (MAG, 1988). From 1980 to 1990, the population increased from 1,509,262 to 2,122,1001, a growth rate of 4.1 percent. Some of the growth in population can be attributed to the annexation of property by municipalities. Table 3.4 details the population history of the communities in Maricopa County. Most of the communities near Luke AFB experienced overall growth. The communities of Avondale, Glendale, Goodyear, and Surprise had average growth rates of over 5 percent over the past decade (ADOC, 1992).

Maricopa County's 1990 civilian labor force was 1,005,925 persons with an unemployment rate of 6.0 percent (DOC, 1990). According to the 1990 Census, the largest employment sector was services, which provided jobs for approximately 33 percent of the total employed labor in Maricopa County. Retail trade and manufacturing are both important employment sectors, each accounting for over 15 percent of employment. Total employment in Maricopa County has increased from approximately 693,400 to 975,037 in 1990 (MAG, 1993). This annual increase of 4.1 percent is consistent with the population growth for the area.

Per capita income in Maricopa County was $14,970 in 1989, which is slightly higher than the US per capita income of $14,420. The median family income of Maricopa County residents was $36,078 in 1989.

The 1990 census reflects a total of 952,041 housing units in Maricopa County and a housing vacancy rate of 15 percent. Over 63 percent of housing units are owner-occupied. There were 144,481 vacant housing units in 1990. Median rent for renter-occupied units was $466 per month. The median value of all owner-occupied housing units was $84,700 (DOC, 1990).

3.1.7 Cultural Resources

Cultural resources are prehistoric and historic sites, structures, districts, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, or religious purposes.

Table 3.4
Population History by Municipality
1960 - 1990

Municipality	Total Resident Population 1970	Change 1960 - 1970 Annual % Growth	Total Resident Population 1980	Change 1970 - 1980 Annual % Growth	Revised Total Resident Population 1990*	Change 1980 - 1990 Annual % Growth
Avondale	6,626	0.7	8,168	2.1	16,169	7.1
Buckeye	2,599	1.3	3,434	2.8	4,436	2.6
Carefree	n/a	n/a	964	n/a	1,657	5.6
Cave Creek	n/a	n/a	1,712	n/a	2,925	5.5
Chandler	13,763	3.7	29,673	8.0	89,862	11.7
El Mirage	3,258	6.6	4,307	2.8	5,001	1.5
Fountain Hills	n/a	n/a	n/a	n/a	10,030	n/a
Gila Bend	1,795	-0.1	1,585	-1.2	1,747	1.0
Gila River	n/a	n/a	n/a	n/a	2,675	n/a
Gilbert	1,971	0.7	5,717	11.2	29,122	17.7
Glendale	36,228	8.6	97.172	10.4	147,864	4.3
Goodyear	2,140	2.6	2,747	2.5	6,258	8.6
Guadalupe	n/a	n/a	4,506	n/a	5,458	1.9
Litchfield Park	1,664	n/a	3,657	8.2	3,303	-1.0
Mesa	63,049	6.4	152,453	9.2	288,104	6.6
Paradise Valley	6,637	n/a	11,085	5.3	11,773	0.6
Peoria	4,792	6.3	12,307	9.9	50,675	15.2
Phoenix	584,303	2.9	789,704	3.1	983,392	2.2
Queen Creek	n/a	n/a	n/a	n/a	2,667	n/a
Scottsdale	67,823	21.1	88,622	2.7	130,075	3.9
Surprise	2,427	n/a	3,723	4.4	7,122	6.7
Tempe	63,550	9.8	106,920	5.3	141,993	2.9
Tolleson	3,881	0.0	4,433	1.3	4,434	0.0
Wickenburg	2,698	1.0	3,535	2.7	4,515	2.5
Youngtown	1,886	n/a	2,254	1.8	2,542	1.2
Maricopa County Unincorporated	100,138	-0.6	170,584	5.5	168,302	-0.1

Source: US Bureau of the Census.
Prepared by the Maricopa Association of Governments, March 1993.

* The US Bureau of the Census reported revisions to the 1990 resident population in January and February 1993.

Historic properties, under 36 CFR 800, are defined as, "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP)." This term includes, for the purposes of these regulations, artifacts, records, and remains that are related to and located within such properties. The term, "eligible for inclusion in the National Register," includes properties formally determined as such by the Secretary of the Interior and all other properties that meet National Register listing criteria. Therefore, sites not yet evaluated are considered potentially eligible to the NRHP and, as such, afforded the same regulatory consideration as nominated historic properties.

3.1.7.1 Archaeological Resources

An archaeological survey of the Dysart Drain project area produced five isolated lithic artifacts, but no prehistoric or historic sites. The closest significant archaeological site to the project area is AZ T:7:25 (AJM), and its archival location occurs more than 0.25 miles north of the far eastern end of the drain area (SAS, 1993; SAS, 1994).

A previous environmental assessment identified two other archaeological sites on an undeveloped portion of Luke AFB. These sites (AZ T:7:47 and AZ T:7:48) are near the southern boundary fence and are far from the proposed action (USAF, 1994).

3.1.7.2 Historical Resources

Buildings 684, 685, and 686 on Luke AFB have been declared eligible by the Arizona State Historic Preservation Officer (SHPO) for nomination to the National Register of Historic Places (NRHP) (USAF, undated). These buildings are located outside the proposed project area. No other eligible structures exist in the project area.

3.1.8 Noise

3.1.8.1 Effects of Noise Exposure

Noise is most often defined as unwanted sound. Sound levels are easily measured, but the variability is subjective, and physical response to sound complicates the analysis of its impact on people. People judge the relative magnitude of sound sensation by subjective terms such as *loudness* or *noisiness*. Physically, sound-pressure magnitude is measured and quantified in terms of a logarithmic scale in units of decibels (dB).

The human hearing system is not equally sensitive to sound at all frequencies. Because of this variability, a frequency-dependent adjustment called A-weighting has been devised so that sound may be measured in a manner similar to the way the human hearing system responds. The use of A-weighted sound levels is abbreviated "dB(A)." Figure 3.4 depicts typical A-weighted noise levels measured for various sources and human responses to these levels.

When sound levels are recorded at distinct intervals over a period of time, they indicate the distribution of the overall sound level in a community during the measurement period. The most common parameter derived from such measurements is the energy-equivalent sound level (L_{eq}). This is a noise descriptor that represents the average sound-energy level produced when the actual noise level varies with time.

For airport noise, the Federal Aviation Administration (FAA) and the Air Force have adopted the day-night average sound level (L_{dn}). L_{dn} is the A-weighted L_{eq} over a 24-hour period, with a 10 dB nighttime penalty applied to noise events from 10:00 P.M. to 7:00 A.M. The penalty for

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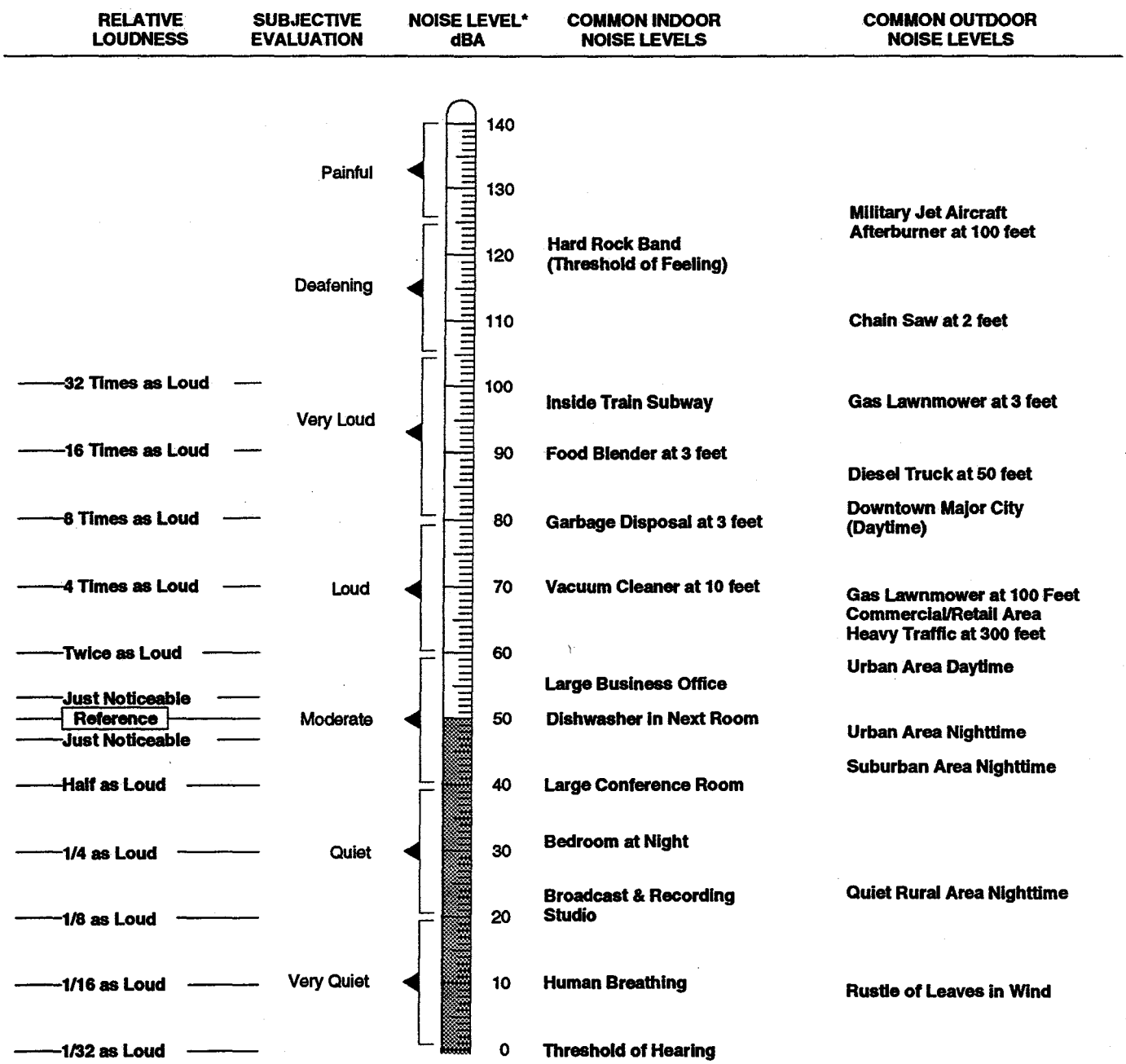

* Noise levels are sound pressure levels referenced to 20 micropascals (standard reference pressure)

SOURCE: Engineering-Science

Figure 3.4
Examples of Typical Sound Levels

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nighttime noise events accounts for the increased sensitivity of most people to noise in the quiet nighttime hours. Developed by the EPA, L_{dn} is the metric for determining the cumulative exposure of individuals to noise. The US Department of Housing and Urban Development (HUD) uses L_{dn} as the standard for measuring outdoor noise environments.

For purposes of this assessment, existing neighborhood noise levels can be assumed typical of a urban residential area near a major airport setting. Statistical A weighted sound levels (L_{dn}) measured in such an area during the daytime average approximately 59 dBA, whereas nighttime A-weighted sound levels average about 51 dBA. Noise levels during aircraft engine power-up and takeoff can exceed 160 dBA (Harris, 1991).

3.1.8.2 Noise Criteria and Regulations

According to HUD, FAA, and Air Force criteria, residential units and other noise-sensitive land uses are "clearly unacceptable" in areas where the noise exposure exceeds 75 L_{dn}, "normally unacceptable" in regions exposed to L_{dn} of 65 to 75 dB(A), and "normally acceptable" in areas exposed to a L_{dn} of 65 dB(A) or less.

The following subsection briefly explains the noise policies of agencies having jurisdiction over this project (Maricopa County and the Air Force). Other agencies' policies are presented for informational and comparative purposes.

Air Force Regulations: Land use recommendations for the Air Force are divided into thirteen compatible use districts (CUD) and are used to classify noise zones from a L_{dn} of 65 to 70 dB(A) (CUD 13) to a L_{dn} of 85 dB(A) and above (CUD 1). For example, it is recommended that no residential uses such as homes, multifamily dwellings, hotels, and mobile home parks be located where the noise levels are expected to exceed a L_{dn} of 65 dB(A). Some commercial and industrial uses are considered acceptable where the L_{dn} does not exceed 75 dB(A). However, in such instances, a 25 to 30 dB(A) noise level reduction should be incorporated into the design of noise sensitive structures.

Truck Noise Regulations: The Federal Highway Administration (FHWA) has established noise standards for traffic noise on federal highways. When these standards or noise abatement criteria (NAC) are approached or exceeded, noise impact occurs. The NAC for most sensitive receptors (including parks, residences, schools, churches, libraries, and hospitals) is 67 dB(A) at the receptor location or the boundary (FHWA, 1982).

Local Land Use Noise Regulations: Luke AFB is located in an unincorporated area of Maricopa County. Therefore, there are no city ordinances which have been established for noise control. In addition, Maricopa County does not have any regulations pertaining to noise issues.

3.1.8.3 Baseline Noise Levels

The primary source of noise at Luke AFB is flying activities associated with aircrew training conducted by the 58th Fighter Wing and the 944th Tactical Fighter Group. Noise levels vary daily and depend on many factors, including type of aircraft, number of missions, number of aircraft, time of day, load weight, etc. (USAF, 1994). Several EAs have established noise contours in the vicinity of Luke AFB. Recent evaluations have included the EAs for the beddown of the F-15s (USAF, 1987b), the drawdown of aircraft (USAF, 1990), and for the use of F-16s (USAF, 1994). The common methodology involves computer modeling (NOISEMAP) to convert estimated single-event noise into day/night average sound levels. The purpose of these evaluations was to

estimate the degree to which people living or conducting activities in a particular area could be affected by aircraft noise (USAF, 1994).

A study conducted in October 1993 estimated the land acreage under specific noise contours around Luke AFB (USAF, 1994). The area within each contour band is presented in Table 3.5, and Figure 3.5 presents a visual representation of the noise contours present at Luke AFB during the October 1993 study.

Table 3.5
Land Acreage Under Specific Noise Contours in the Vicinity of Luke AFB - October 1993

Contour	Acres	Square Miles
65 L_{dn}	27,029	42.23
70 L_{dn}	16,198	25.31
75 L_{dn}	9,321	14.56
80 L_{dn}	5,4410	8.45
85 L_{dn}	2,902	4.53

L_{dn} Day-night average noise level [dB(A)]
Source:USAF, 1994.

The entire Dysart Drain falls within the L_{dn} of 65 dB(A) and higher contours. The length of the drain can be divided into four areas for noise analysis. The area near the proposed detention basin, located at the corner of Reems Road and Northern Avenue, is contained within the L_{dn} contour of 75 to 80 dB(A) (segment A). The area of the drain along the north and northeast portions of the base is included in the L_{dn} contour of 80 to 85 dB(A) (segment B). Approximately 2,000 feet of drain is located in L_{dn} contour of 75 to 80 dB(A) which contains administrative, medical, and community services for the base (segment C). Base housing and the remainder of the drain to the river is located in the L_{dn} contour of 65 to 75 dB(A) (segment D). This last section also runs through commercial, industrial, and agricultural areas to the east of the base. L_{dn} contour of 65 to 75 dB(A).

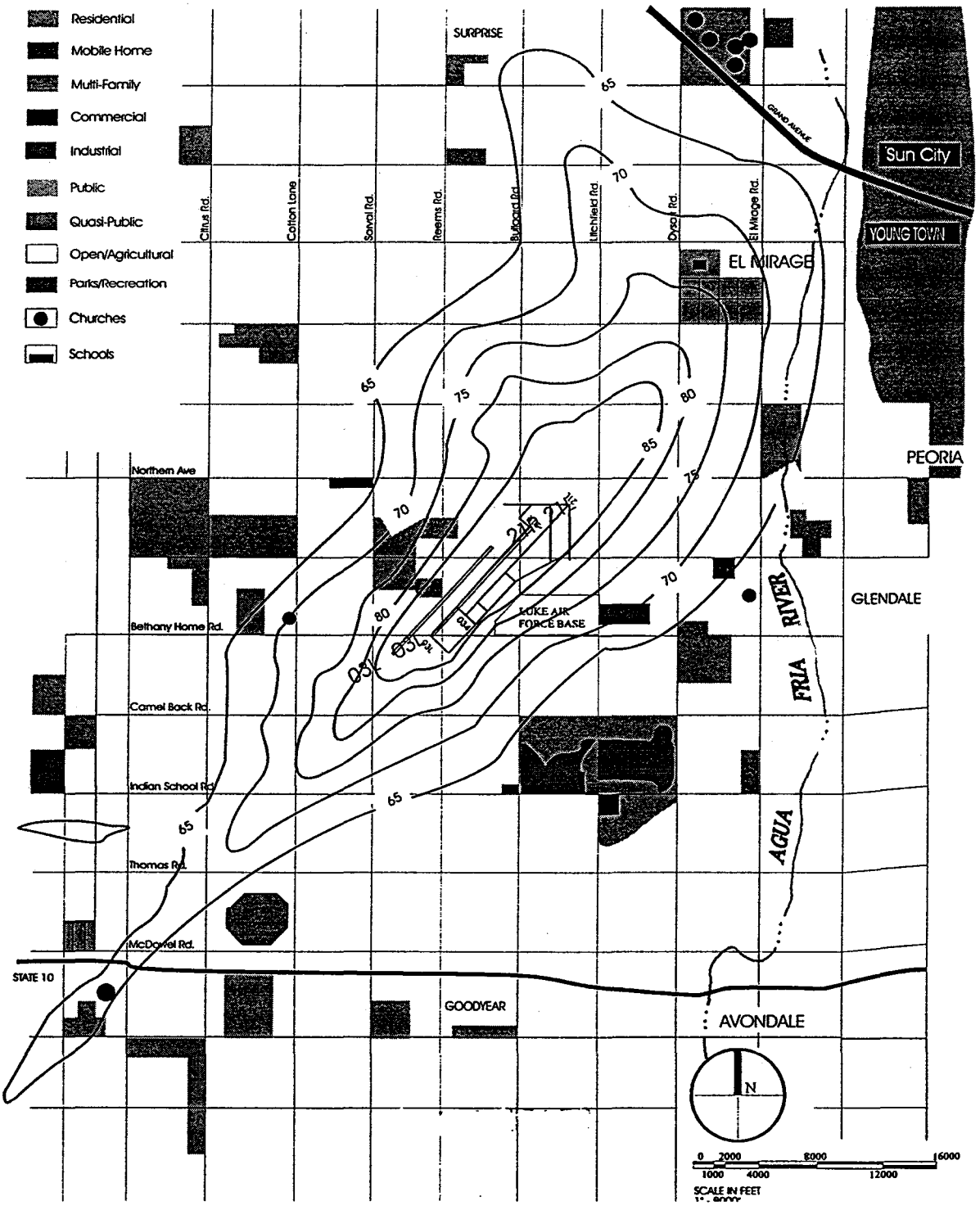
3.1.9 Air Quality

3.1.9.1 Air Pollutants and Regulations

The Clean Air Act (CAA) establishes a framework for the attainment and maintenance of air quality standards. The principal regulatory program established under the CAA is made up of two parts: nationwide ambient air quality goals and state implementation plans to meet these goals. The cornerstone of the CAA is the national ambient air quality standards (NAAQS) promulgated by the US Environmental Protection Agency (EPA). Even though the NAAQS are not directly enforceable, they form the benchmark for emission limitations established by the states for those pollutants that EPA determines may endanger public health and welfare. The NAAQS prescribe the maximum permissible concentration of a harmful pollutant in the ambient air.

The EPA is required to established primary and secondary NAAQS for "criteria" pollutants under the provisions of the CAA. Primary standards define levels of air quality necessary to protect public health with an adequate margin of safety. Secondary standards define levels of air quality necessary to protect public welfare (i.e., soils, vegetation, wildlife) from any known or anticipated adverse effects of a pollutant.

FIGURE 3.5
(U) NOISE CONTOURS IN THE VICINITY OF LUKE AFB



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The EPA classifies the air quality within each air quality control region (AQCR) as to whether the region meets federal primary and secondary NAAQS. National ambient air quality standards are currently in place for six criteria pollutants:

- Carbon monoxide (CO)
- Lead (Pb)
- Nitrogen dioxide (NO_2)
- Ozone (O_3)
- Particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10})
- Sulfur oxides (SO_x), measured as sulfur dioxide (SO_2)

Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions involving previously emitted pollutants or precursors. Ozone precursors are mainly NO_x and volatile organic compounds (VOCs). VOCs are organic compounds containing at least carbon and hydrogen that participate in atmospheric photochemical reactions, and include carbonaceous compounds except metallic carbonated, metallic carbides, ammonium carbonate, CO, carbon dioxide, and carbonic acid. Some VOCs are considered nonreactive under atmospheric conditions and include methane, ethane, and other nonreactive methane and ethane derivatives.

The Clean Air Act gives states the authority to establish air quality rules and regulations. The adopted state standards must be equivalent to, or more stringent than, the federal level. The State of Arizona has adopted the NAAQS. National Ambient Air Quality Standards are presented in Table 3.6.

The CAA required states to develop a state implementation plan (SIP) for the implementation, maintenance, and enforcement of the NAAQS within each AQCR in the state. Once the SIP is approved by EPA, it becomes enforceable as a matter of federal as well as state law. The CAA also required states to develop special programs for prevention of significant deterioration of air quality in attainment areas, and "reasonable further progress" or annual incremental reductions towards achievement of the NAAQS in nonattainment areas. The nondegradation program in attainment areas is called the "Prevention of Significant Deterioration of (PSD) Air Quality" and requires preconstruction review of major sources and modifications to ensure that deterioration has been prevented and that appropriate control technology is used. In areas which have failed to meet the NAAQS for one or more criteria pollutants, states are required to make annual incremental reductions in emissions towards achievement of the standards. In addition, sources in nonattainment areas are required to go through a strict preconstruction review and permitting program and obtain offsetting emissions reductions and to achieve the lowest achievable emission rate.

Section 176(c) of the CAA, codified at 42 USC 7506(c) provides the basis for the relationship between the SIP and federal projects. It states that no federal department or agency shall support or approve any activity or action that does not conform to a SIP or EPA-promulgated federal implementation plan (FIP). The statute provides that conforming to a SIP or FIP means that the activity won't:

1. Cause or contribute to any new violation of the national ambient air quality standard (NAAQS) for any criteria air pollutant;

Table 3.6
National Ambient Air Quality Standards

Pollutant	Averaging Time	National Standards[a,b,c] Primary[e]	Secondary[f]
Sulfur dioxide	Annual	80 $\mu g/m^3$ (0.03 ppm)	
	24-hour	365 $\mu g/m^3$ (0.14 ppm)	
	3-hour		1300 $\mu g/m^3$ (0.50 ppm)
Particulate matter (PM_{10})	Annual	50 $\mu g/m^3$[d]	50 $\mu g/m^3$[d]
	24-hour	150 $\mu g/m^3$[d]	150 $\mu g/m^3$[d]
Carbon monoxide	8-hour	10 mg/m^3 (9 ppm)	
	1-hour	40 mg/m^3 (35 ppm)	
Ozone	1-hour	235 $\mu g/m^3$ (0.12 ppm[d])	235 $\mu g/m^3$ (0.12 ppm)[d]
Nitrogen dioxide	Annual	100 $\mu g/m^3$ (0.053 ppm)	100 $\mu g/m^3$ (0.053 ppm)
Lead	Quarterly	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$

Notes:

a. National standards, other than ozone and those based on an annual/quarterly arithmetic mean, are not to be exceeded more than once per year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than 1.
b. All measurements of air quality are corrected to a reference temperature of 25°C and to a reference pressure of 760 millimeters of mercury. $\mu g/m^3$ refers to micrograms per cubic meter. PPM refers to parts per million of volume.
c. Arithmetic average.
d. Attainment determinations will be made on the criteria contained in 40 CFR 50 (Appendix H).
e. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than 3 years after the state's implementation plan is approved by the EPA.
f. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Each state must attain the secondary standards within a "reasonable time" after the implementation plan is approved by the EPA.

2. Increase the frequency or severity of any existing violation of any standard in the area; or
3. Delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

On November 30, 1993, EPA promulgated a final rule on conformity of federal projects that are not related to transportation programs, plans, or projects. Such nontransportation projects are referred to as "general" projects, and hence, conformity of such projects are referred to as "general conformity." The general conformity rule establishes an elaborate process for analyzing and determining whether a proposed federal project in a nonattainment area conforms to the SIP or FIP. EPA also promulgated a separate rule on conformity of transportation-related projects that is not relevant to the proposed improvement to the Dysart Drain and related activities at Luke AFB.

3.1.9.2 Regional Air Quality

The climate in the area of Luke AFB is arid continental, exhibiting extreme ranges in daily temperatures. The average annual temperature at Luke AFB is 71 degrees Fahrenheit (°F) and the average monthly temperatures range from 53°F in December and January to 92°F in July. Daily maximum temperatures range from 105°F in July to 65°F in December and January. The sun shines approximately 86 percent of the time.

Average annual rainfall is 7.7 inches per year with the maximum occurring in August at a monthly average of 1.1 inches. Afternoon humidities range from about 30 percent in winter to only about 10 percent in June. Rain occurs mostly during two seasons. From about the end of November to early April there are periodic rains from Pacific storms. Moisture from the south and southeast results in a summer thunderstorm peak in July and August (NOAA, 1992).

The area is characterized by light winds. High winds associated with thunderstorms occur periodically in the summer. These occasionally create dust storms which move large distances across the deserts. Strong thunderstorm winds occur any month of the year, but are rare outside the summer months. Persistent strong winds of 30 miles per hour or more are rare except for two or three events in an average spring due to Pacific thunderstorms. Winter storms rarely bring high winds due to the relative stable air in the area during the winter season.

The prevailing wind direction is from the west with the average monthly wind speeds ranging from 3 to 5 knots. The morning direction for the prevailing winds is generally from east to west; however the wind direction can change in the afternoon to a more westerly direction. A wind rose for Luke AFB is presented in Figure 3.6. The wind rose provides a graphical description of the prevailing winds giving the frequency of occurrence of the wind speed and direction. In this case, the wind rose provides frequencies averaged over the years 1984-1992. The wind rose is sometimes used to graphically represent the dominant transport direction for winds in an area. However, due to influences of local terrain, temporal variability of the wind, and exposure of the meteorological instruments, the wind rose statistics may not accurately represent the true picture of transport direction.

Luke AFB is located in the Maricopa Intrastate AQCR #15. The AQCR consists of Maricopa County. According to the EPA, an area not meeting air quality standards is classified as nonattainment depending on which standard has been violated. Parts of the AQCR are designated nonattainment for CO, O_3, and PM_{10}. The Maricopa County CO nonattainment area is classified as moderate and is approximately 1,962 square miles or approximately 20 percent of the county land

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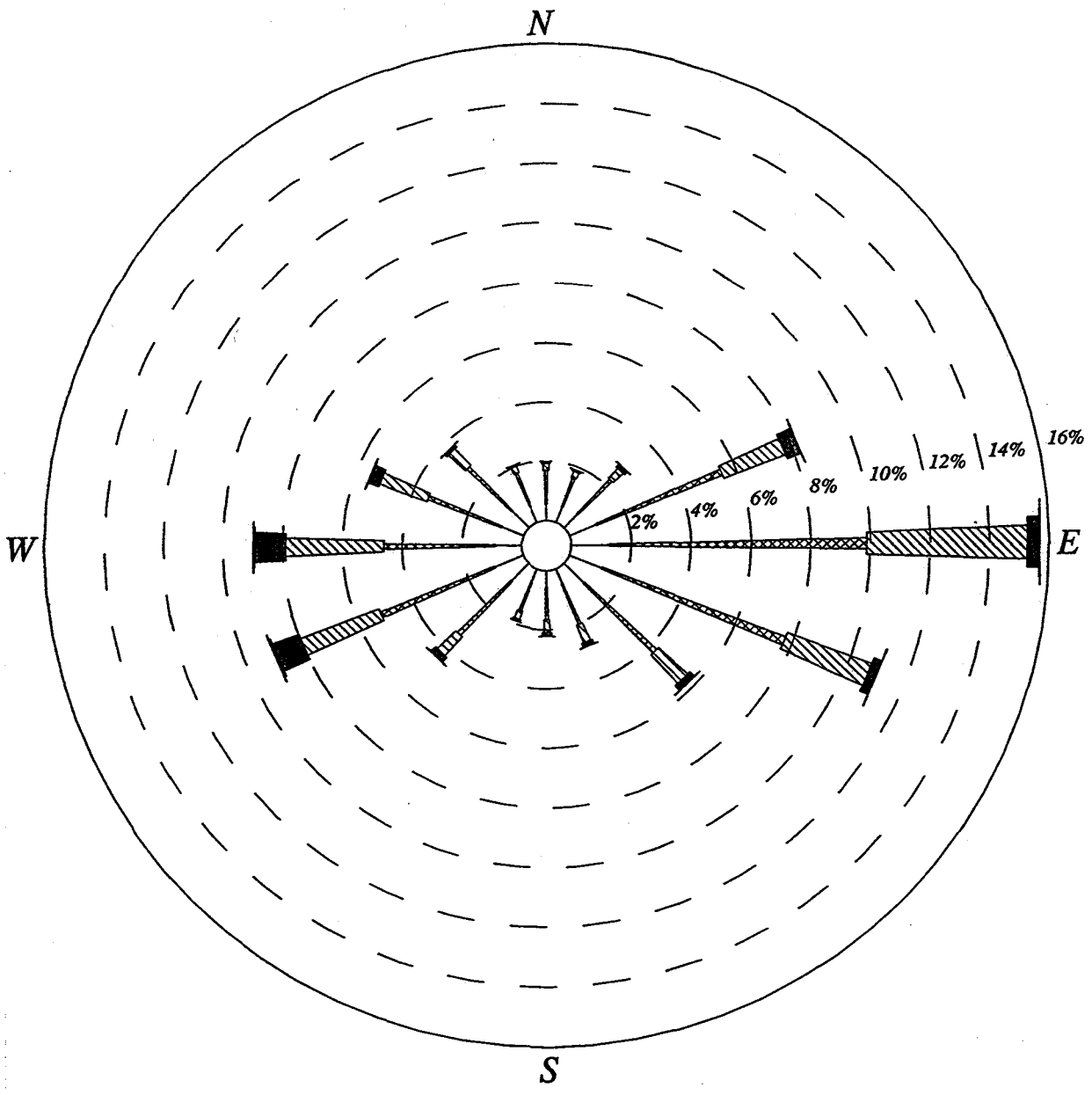
FIGURE 3.6
WINDROSE
LUKE AFB

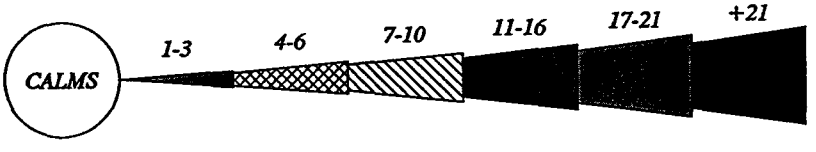
1984–1992



CALM WINDS 11.51%

WIND SPEED (KNOTS)

NOTE: Frequencies indicate direction from which the wind is blowing.



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area. The O_3 nonattainment area is classified as moderate and occupies the same area as the CO nonattainment area. The geographic boundaries of the CO and O_3 nonattainment areas are shown on the map in Figure 3.7. The PM_{10} nonattainment is classified moderate and is approximately 2,200 square miles or approximately 22 percent of the county land area. The geographic boundaries of the PM_{10}, the CO, and the O_3 nonattainment areas are shown on the map in Figure 3.8. It is expected that the PM_{10} nonattainment area will be redesignated as a serious nonattainment area in the near future (see later discussion in Sections 4.1.9. and 4.2.9 with regards to conformity). All nonattainment areas are roughly centered on the city of Phoenix. Luke AFB lies in the CO, O_3, and PM_{10} nonattainment areas as shown on the map in Figure 3.8.

3.1.9.3 Baseline Activity Levels

The most recent Luke AFB baseline emissions inventory is the "Baseline Emissions Inventory, Luke Air Force Base" (1994). This inventory has been updated to include the use of JP-8 jet fuel and emissions from aerospace ground equipment. The emissions inventory is presented in Table 3.7.

The 1993 baseline inventory does not provide a measure of construction activity for the year. However, emissions data were available for the combined category of construction and facility support equipment emissions and included in the inventory.

The historical baseline activity levels against which the proposed action and alternative action are compared to, determine if they constitute a regionally significant action under the conformity analysis (as discussed in Section 4) are the following Maricopa County emission inventories: 1) 1990 Maricopa County Base Year Carbon Monoxide Emission Inventory, 2) the 1990 Base Year Ozone Emission Inventory, and 3) the Report of PM10 for 1989 Maricopa County Nonattainment Area. Table 3.8 provides the 1990 base year emission inventories for Maricopa County.

3.1.10 Environmental Management

Materials and waste management activities at Luke AFB are regulated by the EPA, the Arizona Department of Environmental Quality (ADEQ), and the Department of Defense (DOD). Section 5 contains a summary of the applicable sections of the Clean Water Act (CWA), Resource Conservation and Recovery Act (RCRA), Toxic Substances Control Act (TSCA), Hazardous Materials Transportation, Federal Facilities Compliance Act, and the Spill Prevention, Control and Countermeasures (SPCC) Plan.

3.1.10.1 Hazardous Materials/Waste Management

Aircraft maintenance and other aircraft support functions generate a variety of hazardous substances. These include acids, contaminated oils, paints, solvents, thinners, and some waste petroleum products. The greatest volume of hazardous waste was historically generated by contaminated oil/water separators, contaminated used oil, and absorbent material saturated with jet fuel from cleaning up spills (USAF, 1994).

Luke AFB aircraft maintenance facilities generated 45,139 pounds of hazardous waste in calendar year 1991 (USAF, 1994). During the same period, Luke AFB aircraft flew a total of 39,091 flying hours, resulting in the generation of approximately 1.2 pounds of hazardous waste per flying hour. Table 3.9 gives hazardous waste amounts generated by aircraft maintenance at the base in 1991. Luke AFB generated 119,800 and 63,100 pounds of hazardous waste from all sources in 1991 and 1992, respectively (Martinez, 1994a).

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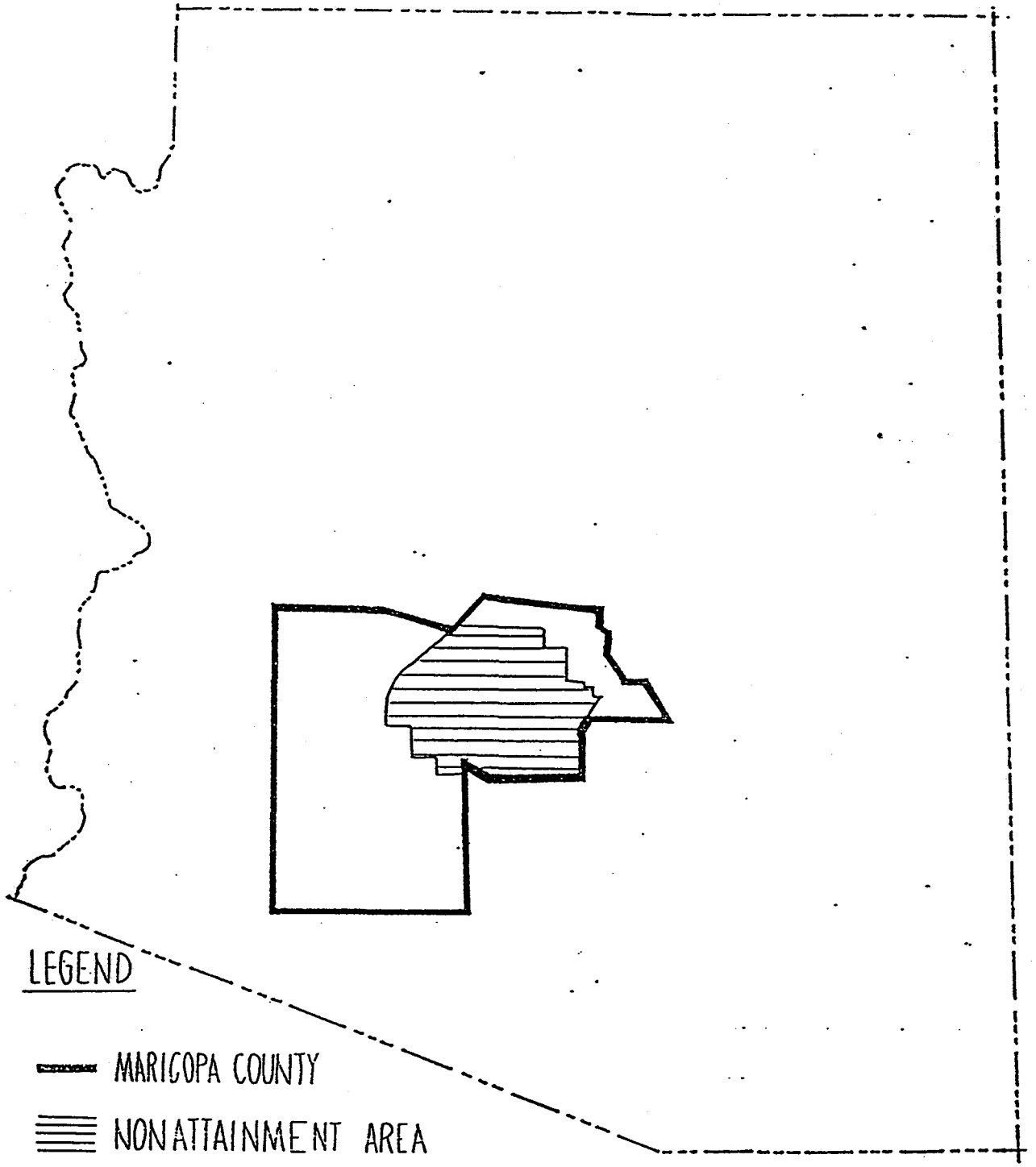
FIGURE 3.7
CO INVENTORY PLANNING AREA FOR MARICOPA COUNTY NONATTAINMENT AREA 1990



From Maricopa County Department of Environmental Management Air Pollution Control Division

LUKE 6/8/94

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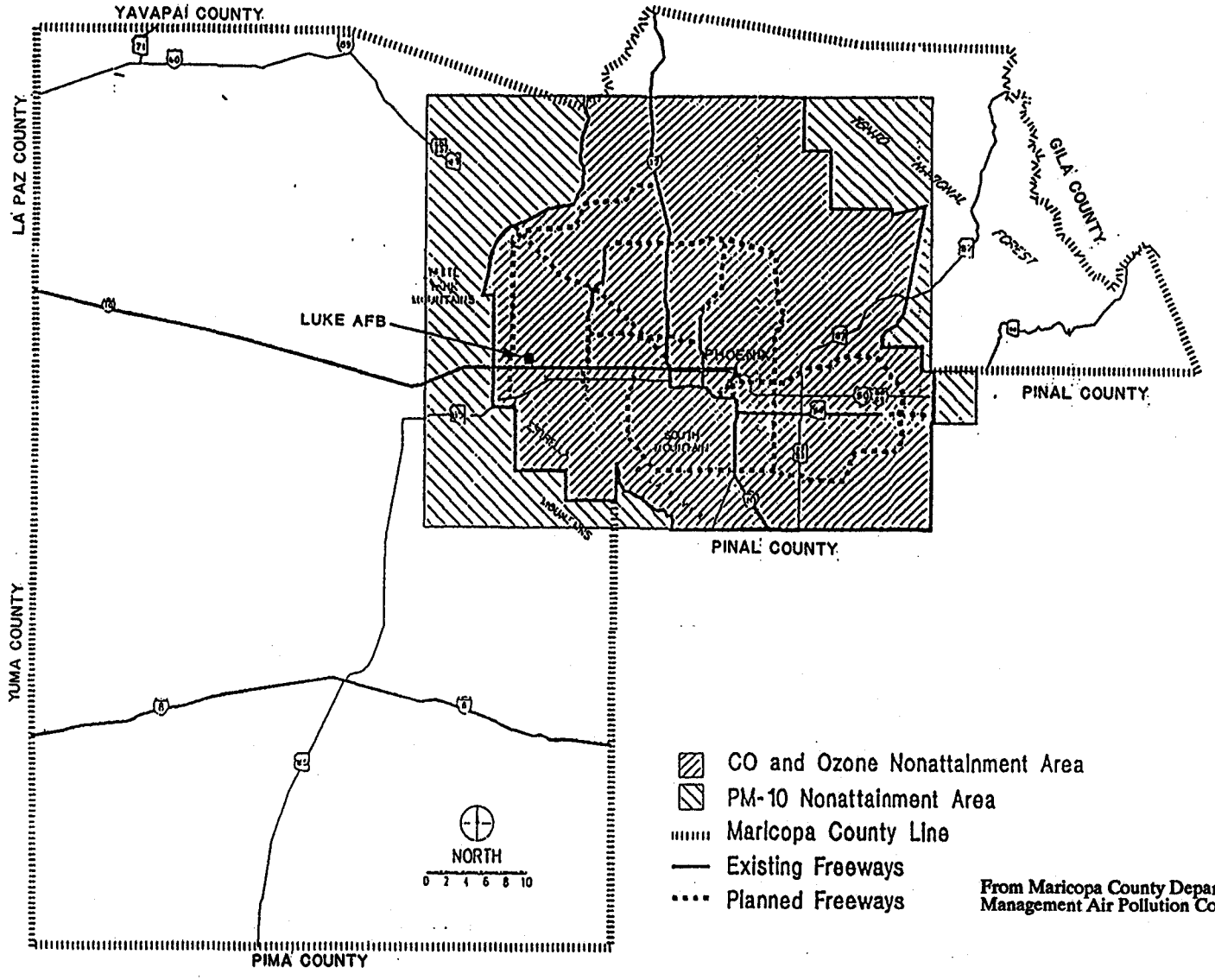
FIGURE 3.8
AIR QUALITY NONATTAINMENT AREA FOR MARICOPA COUNTY, ARIZONA



From Maricopa County Department of Environmental Management Air Pollution Control Division

LUKE 6/8/94

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Table 3.7 1993 LUKE AFB BASELINE EMISSIONS INVENTORY

INVENTORY	EMISSIONS (tpy)				
	CO	VOC	NOx	SOx	PM_{10}
1993 INVENTORY[a,b]	801.28	159	510.05	13.1	9.85

[a] Luke AFB 1993 emission inventory data provided by Dames & Moore
Ref: Dames & Moore. "Draft Baseline Emissions Inventory, Luke Air Force Base", January 25, 1994.
Emissions from ground support equipment on hand in 1993 added to 1993 Baseline inventory since this data not originally included in the inventory.

[b] With conversion to JP–8, JP–4 storage/distribution fugitive emission loses (71.32 tpy) are replaced with JP–8 storage/distribution fugitive emission loses (0.79 tpy)

tpy = tons per year

1993BASE.WK1

Table 3.8 1990 MARICOPA COUNTY BASE YEAR EMISSIONS INVENTORY

INVENTORY[a]	EMISSIONS (tpy)				
	CO	VOC	NOx	SOx[b]	PM_{10}
POINT, AREA, AND NON–ROAD MOBILE	181940	68100	38878		43869
ON–ROAD MOBILE[c]	167550	13959	13308		2470
TOTAL:	349490	82059	52186	6160	46339

[a] Ref: Maricopa County Environmental Quality & Community Services Agency, Division of Air Pollution Control.
- "1990 Base Year Ozone Emission Inventory for Maricopa County, Arizona, Nonattainment Area", Final Submittal, July 1993
- "1990 Base Year Carbon Monoxide Emission Inventory for Maricopa County, Arizona Nonattainment Area", Final Submittal, August 1993
- "Report of PM_{10} Emissions for 1989, Maricopa County Nonattainmemt Area".

[b] Source specific information for SOx not available.
Ref: Final Environmental Assessment for the Consolidation of F–16 Training and Other Force Structure Changes at Luke Air Force Base, Arizona, February 1994

[c] On–road VOC and NOx emission calculated only for the ozone season (July, August, September). CO emissions calculated for both ozone season and CO season (November, December, January).
Ref: Maricopa County Environmental Quality & Community Services Agency, Division of Air Pollution Control. "1990 Base Year Ozone Emission Inventory for Maricopa County, Arizona Nonattainment Area", Final Submittal, July 1993

TBL3–8.WK1

Table 3.9
Hazardous Waste Generated Historically by Aircraft Maintenance at Luke AFB in 1991

Building No.	Building Name	Maintenance Function	Hazardous Material	Pounds
400	Wheel/Tire	Wheel Replacement	Citrikleen	5,326
492/926	Armament	Cleaning	Citrikleen	1.966
		Retooling	Paclei	766
			PD 680	3,120
906	Wash Rack	Cleaning	Oil	Unknown
913	Aircraft Maintenance	General	Hydraulic fluid	667
			Jet fuel	10,807
			Waste oil	815
922	Corrosion	Painting	Bead Blast	1,062
			Citrikleen	550
			Paint remover	506
			Methyl ethyl ketone	6,991
			Polyurethane	1,530
931/1004	Engine Shop Pneudraulics	Testing		0
		Repair	Methyl ethyl ketone	417
			PD 680	1,679
			Petroleum	862
			Petroleum Oil	2,294
			Wprm	326
966	Non-destructive	Inspect	Developer	600
		Structural	Remover	511
		Fuel/Oil	Penetrant	900
			Prepared bath	301
Unknown	Model Repair		Citrikleen	3,140

Source: *Environmental Assessment for Consolidation of F-16 Training and Other Force Structure Changes at Luke Air Force Base, Arizona*, US Air Force Air Combat Command, Langley AFB, Virginia, February 1994, page 3-74.

Under current legal regulations, Luke AFB is classified as a fully-regulated generator (EPA No. AZ0570024133) and is responsible for complying with all laws regulating the generation and storage of hazardous wastes. Compliance with these laws is guided by the *Hazardous Waste Management Plan, Luke AFB, Arizona, 1991*. This plan covers hazardous waste management and the operating procedures for collection, containerization, labeling, marking, record keeping, temporary storage, transfer, and disposal of hazardous wastes. It should be noted that the Luke AFB DRMO (not the base) is operating as a fully permitted hazardous waste storage facility with a RCRA Part B permit (EPA No. AZ4572190029). Final removal and disposal of the waste to an off-base location is performed by a subcontractor.

3.1.10.2 Solid Waste

Solid waste from Luke AFB is collected by private contractors and transported to the City of Glendale Landfill. The landfill is located on a 190-acre site and was expanded by 120 acres in May 1994. The current capacity is approximately 35 years. The landfill receives an average of 664 tons of solid waste per day (Flynn, 1994).

3.1.10.3 Wastewater

Wastewater from Luke AFB is treated on-base at the wastewater treatment facility. The dewatered sludge was disposed at the base landfill prior to 1970 and at the Glendale Landfill from 1970-1979. Since 1979, the sludge has been stockpiled at the Waste Treatment Annex (USAF, 1987b).

The plant design capacity is one million gallons per day (mgd). The majority of this flow consists of domestic sewage with industrial wastewater comprising approximately five percent of the total daily flow. In addition, industrial wastewater is pretreated in 14 oil/water separators prior to discharge to the sanitary sewer system (USAF, 1987b). The effluent from the plant was discharged directly to the Agua Fria River. However, the plant has recently been upgraded from a secondary to a tertiary treatment facility. The upgraded plant is designed for no discharge and was completed in May 1994. The upgrade will ensure compliance with all federal, state, and local standards.

3.1.10.4 Pollution Prevention

Luke AFB has a Pollution Prevention Plan (PPP) that is modeled after the Arizona DEQ Pollution Prevention Plan/Program. The Luke AFB PPP contains a summary and description of pollution prevention options, and descriptions of process modifications, design changes, specification changes, material substitutions, procedures, or other means selected to reduce or eliminate the use or release of toxic substances and the generation of hazardous waste. In addition, the PPP identifies specific performance goals for the base and for individual processes, and the associated rationales.

A baseline study was conducted in 1990 which showed that the greatest volume of hazardous waste was being generated by contaminated oil/water separators, contaminated used oil, and absorbent material saturated with jet fuel from cleaning up spills. Consequently, these were the areas that the PPP program focused on first. Improved management practices were instituted, as described briefly below, that resulted in a reduction in the amount of waste produced at the base (Martinez, 1994a).

- Improved maintenance (pumping and cleaning) of the 50 oil/water separators, performed four times per year, removes the majority of oil and contaminants from the system before they can be flushed out by any storm event and possibly contaminate the environment. An aggressive education program through hazardous waste management training classes and inspection of base shops has helped prevent jet fuels and solvents from entering the system, which formerly made the oil a hazardous waste. There has been no hazardous waste generated from the oil/water separator system since mid-1991.
- Improved petroleum, oil, and lubricant (POL) management by preventing the used oil storage tank from becoming contaminated with solvents and/or jet fuels. A POL recovery facility, consisting of four 5,000-gallon above-ground storage tanks, collects used oil,

"waste" jet fuel, and reclaimable jet fuel. Prevention methods included improved screening procedures, engineering controls, and education for generators.

- Improved fuel capture procedures prevent cleaning up jet fuel spilled at engine shut-down, which prevents pollution and recycles approximately 1,000 gallons of fuel per month. In addition, the fuel capture essentially eliminated the use of granular absorbent, which was subsequently disposed of as hazardous waste. Accidental fuel spills have been significantly reduced by education and awareness programs.
- Process modifications, substitutions, and completely new processes have necessitated new equipment to facilitate implementation. New equipment at Luke AFB includes aerosol can crushers, Freon recovery units, brake cleaning machines (for asbestos), dustless sanders, jet washers, silver recovery units, high-volume low-pressure pint spray guns, spray gun cleaners, portable oil skimmers, and bench-type jet washers.
- Other measures currently being implemented or investigated include collecting spent shot at small arms firing range, recycling batteries (lead acid, nicad, mercury, lithium), replacing cleaning tanks with jet washers and gun washers, more effective measures for oil recovery, and design modifications to the waste water treatment facility.

According to base records, hazardous waste generation at the base declined from 223,300 pounds in 1990 to 119,800 pounds in 1991, and then to 63,100 pounds in 1992. These reductions averaged almost 50 percent per year. (Data for 1993 are not available.)

3.1.10.5 Site Restoration Management

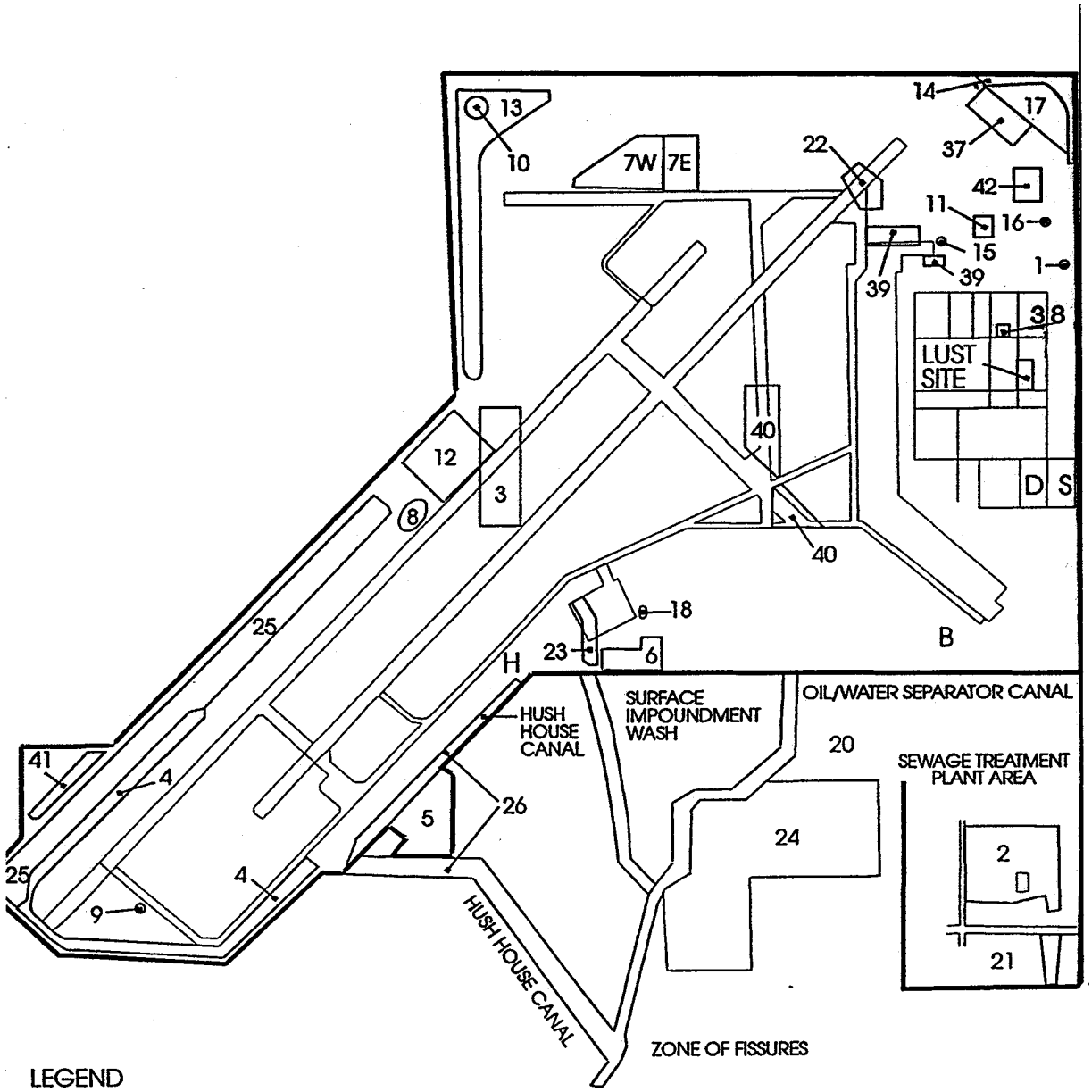
The EPA list of Superfund program National Priorities List (NPL) sites in Arizona was reviewed on June 20, 1993. This review indicated that Luke AFB is a listed Superfund site (CEC/WRA, 1993). Currently, thirty-three sites at the base are considered Potential Sources of Contamination (PSCs) and are included in the base Installation Restoration Plan (IRP). The location of the PSC/IRP sites at Luke AFB is illustrated in Figure 3.9 and listed in Table 3.10. Nine of these sites are located near the Dysart Drain. In addition, one site is an underground storage tank (UST) site (Building 353) and in the vicinity of the drain.

Of the thirty-three sites identified, eight have been closed (with decision documents prepared), seven will have no further action (decision documents in preparation, estimated completion by June 30, 1994), sixteen are in remedial investigation, and one is in remedial design. All known IRP sites are scheduled for closure in the next 2 to 3 years.

Of the nine IRP sites located near the existing Dysart Drain, three have been dropped from further investigation (OT-01, OT-10, and SS-16), one has been remediated, and five remain open for investigation. One of the open sites, the Drainage Ditch Disposal Area (DP-13), is located at the northwest corner of the base adjacent to the existing channel. This site was a former drainage ditch used for landfilling general refuse during the 1940s. Buried materials reportedly included concrete rubble, wire, fencing, and scrap lumber. Isolated areas of subsurface hydrocarbon contamination have been detected in this area. In addition, the detection of trinitrotoluene (TNT) at very low levels in isolated spots suggests that munitions residues may have been buried in this area.

A followup investigation (limited subsurface soil sampling and analysis) at this site showed that low levels of some VOCs and arsenic were detected; however, the observed concentrations

FIGURE 3.9
IRP SITE LOCATIONS AT LUKE AFB



LEGEND

Proposed Construction Sites

B - Base Supply Addition
D - Dormitory
H - Hush House Foundation
S - Student Pilot Quarters

N

(Not to Scale)

Adapted from USGS 1975, 1982

N

Source: Environmental Assessment for Consolidation of F-16 Training and Other Force Structure Changes at Luke Air Force Base, Arizona, USAF, February, 1994

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Table 3.10
List of Known IRP Sites at Luke AFB

Site No.	Site Location
OT-01	Old Incinerator Site
RW-02	Waste Treatment Annex Landfill
LF-03	Outboard Runway Landfill
OT-04	Perimeter Pd. POL Waste Site
DP-05	POL Waste Disposal Trench
FT-06	South Fire Training Area
FT-07W	North Fire Training Area - West
FT-07E	North Fire Training Area - East
OT-08	F-15 Burial Site
OT-09	Canberra Burial Site
OT-10	Concrete Rubble Burial Site
SS-11	Former Outside Transformer Storage
OT-12	Old EOD (Explosive Ordnance Disposal) Burial Pit
DP-13	Drainage Ditch Disposal Area
LF-14	Old Salvage Yard Burial Site
SS-15	Facility 328 Spill Site
SS-16	Facility 321 USTs Storage
SS-17	Former DPDO Yard
ST-18	Facility 993
ST-19	BX (Benzene and Xylene) Leaking USTs
SD-20	Oil/Water Separator Canal and Earth Fissures
SD-21	Sewage Treatment Plant Effluent Canal
DP-22	POL Trench Northeast Runway
DP-23	Old Surface Impoundment, West of 999
DP-24	Base Ammo Storage Area
LF-25	Northwest Landfill
SD-26	Hush House Canal
LF-37	Northeast Landfill
SD-38	Southwest Oil/water Separator at the Auto Hobby Shop
SD-39	Waste Discharge at the Old Lockheed Site
SD-40	Taxiway Fuel Discharge
OT-41	Skeet Range
SS-42	Bulk Fuels Storage

[a] POL = Petroleum, oils, and lubricant

were well below the ADEQ's Health Based Guidance levels (HBGLs). The FCDMC'S environmental consultant concluded that no further environmental investigation or remedial action is warranted (CEC/WRA, 1994b).

Three other IRP sites being investigated are grouped together in the extreme northeast corner of the base, 300 to 400 feet from the Dysart Drain. The fifth site is Facility 351 discussed below. The old salvage yard disposal site (LF-14) was reportedly used for the burial of tools and aircraft parts, and may have been used for the disposal of transformer fluids. According to the *Management Action Plan*, (Radian 1993), PCBs have been detected at low levels in subsurface soils approximately 15 to 25 feet below ground surface. Further investigation of this area is planned in the second phase of the Environmental Site Assessment (CEC/WRA, 1993).

The Former Defense Property Disposal Office (DPDO) yard, site SS-17, was used for the storage of hazardous wastes, munitions, and transformers, among other materials (Radian, 1993). During the Phase 1 investigation, hydrocarbons were detected at low levels in shallow subsurface soils in this area (CEC/WRA, 1993). VOCs were not detected. The Radian report states that the extent of hydrocarbon contamination appears to have been defined, and further investigation of site SS-17 is not planned (CEC/WRA, 1993).

The Northeast Landfill, site LF-37, was used for general landfill operations. During the Phase 1 investigation, hydrocarbons were detected at low levels in shallow subsurface soils in the area. The Radian report (Radian, 1993) states that the extent of the hydrocarbons appears to have been defined, and further investigation of site LF-37 is not planned (CEC/WRA, 1993).

Two subsurface petroleum releases have occurred near the drain right-of-way. One is associated with Building 353, a facility which was used for the maintenance of large fuel-tanker trucks for many years. The lateral and vertical extent of soil contamination resulting from the release at Building 353 have been determined, and the contamination does not appear to have extended onto the right-of-way. Remediation of the site by soil vapor extraction is ongoing.

The second subsurface petroleum release is a recently-discovered release from a large above-ground jet fuel storage tank known as Facility 351 (Bulk Fuel Storage Area SS-42). The extent of the release from Facility 351 has not yet been determined. Soil contamination has been confirmed to a depth of greater than 200 feet (CEC/WRA, 1993). The spill occurred approximately 400 feet downgradient from the Dysart Drain channel.

The EPA Emergency Response Notification System (ERNS) stores information on releases of oil and hazardous substances. Releases are recorded in ERNS when they are initially reported to the federal government by any party. A review of the ERNS database in January of 1993 indicated that six incidents at Luke AFB were listed without specific locations. Five incidents were recorded as miscellaneous aviation fuel releases ranging from 200 to 650 gallons. One incident was a waste oil release of unrecorded quantity.

The only other recorded incident was an asbestos release from a cooling tower fire in 1988 near Building 1150. Base environmental personnel stated that the incident primarily resulted in an airborne release (CEC/WRA, 1993).

3.2 ALTERNATIVE ACTION

Baseline conditions presented in section 3.1 for the proposed action apply to the alternative action because the project areas are the same for both actions. One exception is that the

alternative action requires the acquisition of an additional 35 feet of right-of-way adjacent to the channel. This is due to the lack of a detention basin and the need to contain higher peak flows. No unique or special species have been identified in this area (USFWS, 1994; AGFD, 1993). In addition, no prehistoric or historic cultural resources were found in the area (Gasser, 1994a,b).

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Section 4

Environmental Consequences

SECTION 4

ENVIRONMENTAL CONSEQUENCES

This section describes potential impacts that could occur if the proposed or alternative action is implemented. Potential impacts are addressed for the proposed action, the alternative action, no action, and any irreversible or irretrievable resource commitments are noted.

4.1 PROPOSED ACTION

4.1.1 Mission

The mission of Luke AFB would be enhanced by the proposed action because the channel improvements will prevent flood damage to the airfield and housing area, thus not interrupting the pilot combat training, as well as routine daily base operations.

4.1.2 Land Use

Under the proposed action, the reconstruction and improvements to the existing Dysart Drain Flood Channel, including the addition of a detention basin and spoil area will be accomplished. The proposed action is not expected to change land use in the vicinity of the project. Project land use is compatible with current land uses along the existing drain, as well as on and near the land that will be acquired under the project. Figure 4.1 depicts the location of the project, to include the detention basin.

Total area impacts are estimated at approximately 240 acres. The following is a breakdown of the area impacts and the current land use in the project area:

- Existing right-of-way east of Litchfield Road: 35 acres, agricultural/industrial
- Existing right-of-way on base: 18.5 acres industrial
- Additional right-of-way along present channel alignment: 10 acres, agricultural
- Basin and spoil area plus collector channel: 169 acres, agricultural
- Roadway improvements (Reems, Northern, Dysart, El Mirage): 8 acres, agricultural.

4.1.3 Transportation

The proposed action requires that two public bridges, one on Dysart Road and one on El Mirage Road, be removed and replaced. Dysart Road then El Mirage Road will be closed for approximately 120 days, each in a sequential manner for a total of 240 days. When the Dysart Road bridge is closed, motorists are likely to be routed to El Mirage Road via Northern Avenue or Glendale Avenue. When the El Mirage Road bridge is closed, traffic will be routed to Dysart Road via Northern Avenue or Glendale Avenue. Northern Avenue parallels the Dysart Drain to the north and Glendale Avenue parallels the Dysart Drain to the south.

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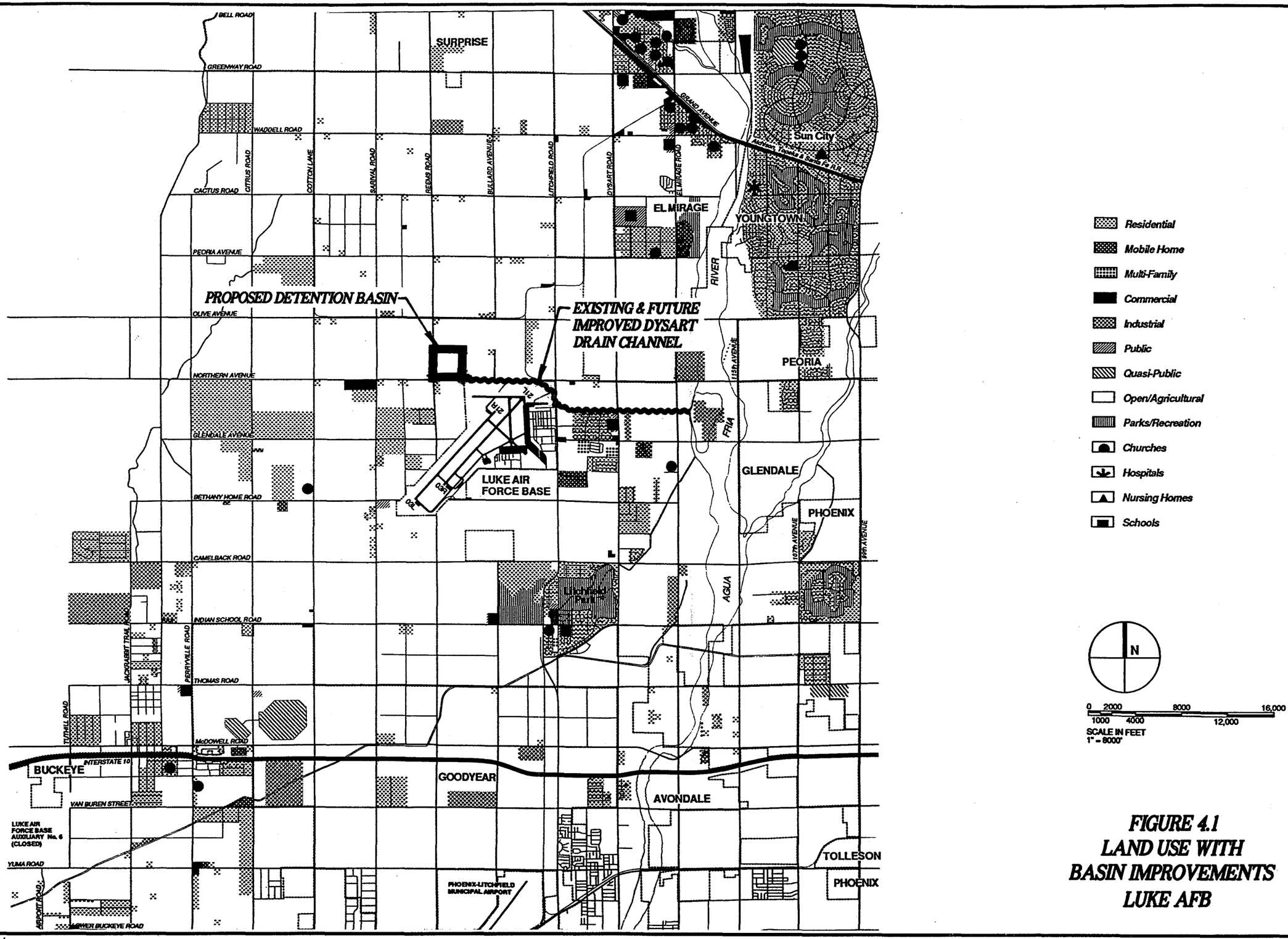

FIGURE 4.1
LAND USE WITH
BASIN IMPROVEMENTS
LUKE AFB

Accordingly, a two-way ADT of 5,239 vehicles potentially may be diverted from Dysart Road to El Mirage Road during the proposed construction activities on the Dysart Road bridge. This will result in a two-way ADT on El Mirage Road of 6,859 vehicles, an increase of approximately 323 percent. El Mirage Road is described as a major collector with a desired level of service (LOS) rating of "C", or a stable flow zone, but most drivers are restricted in freedom to select their own speed. Roadways given the classification of major collector experience a two-way ADT range between 600 and 7,000 vehicles (MCDOT, 1994). The two-way ADT of 6,859 vehicles is within the current LOS "C" classification for El Mirage Road.

Glendale Avenue is described as minor arterial with a LOS rating of "C" which is the desired LOS rating for the roadway. The addition of the El Mirage Road or Dysart Road traffic may result in a two-way ADT on Glendale Avenue of approximately 16,039 vehicles, an increase of about 49 percent. The LOS and road classification would remain unchanged.

Northern Avenue is classified as a minor collector with a LOS rating of "B" which is the desired LOS for the roadway. A LOS "B" road has reasonably free flow, but speeds beginning to be restricted by traffic conditions (MCDOT, undated). The addition of traffic from El Mirage Road and Dysart Road may result in a two-way ADT on Northern Avenue of about 6,739 vehicles, an increase of approximately 296 percent. The LOS rating would increase to "C" and Northern Avenue would be classified as a major collector. Although it is desirable for a LOS rating to remain unchanged, temporary increases are tolerated for short-term construction activities which, when completed, allow the roadway to return to the original LOS rating (Beeman, 1994).

Conversely, a two-way ADT of 1,620 vehicles potentially may be diverted from El Mirage Road to Dysart Road resulting in a two-way ADT of 6,859 vehicles, or an increase of approximately 31 percent. Dysart Road is also described as a major collector with a desired LOS rating of "C" (MCDOT, undated). Again, the potential increase of vehicle traffic to 6,859 would not result in a change in the road classification or LOS rating.

Additionally, a 1/2-mile section of Reems Road (1/2 mile north of Northern Avenue) will be closed for approximately 120 days. Traffic can be rerouted to Sarival Road, which parallels Reems Road. This will result in an increased traffic flow on Sarival Road of approximately 236 percent. Sarival Road is described as a local roadway with a LOS rating of "A", or a roadway experiencing free flow, with low volumes and high speeds (MCDOT, undated). The addition of vehicle traffic from Reems Road, increasing the two-way ADT to approximately 990 vehicles, would change the LOS rating of Sarival Road to "B" and the classification to that of a minor collector. As previously stated, temporary increases are tolerated for short-term construction activities which, when completed, allow the roadway to return to the original LOS rating (Beeman, 1994). Additionally, the proposed construction of a two-lane detour along Reems Road should serve to alleviate the demand on Sarival Road.

FCDMC personnel have had several meetings with MCDOT to obtain the appropriate traffic control requirements, road closure and action information, verbal approval of Dysart and El Mirage Road bridges reconstruction, road closure for Reems Road, and information concerning a traffic control plan that must be approved by MCDOT (Rerick, 1994a).

A farm bridge on private property will be removed and replaced; however, this will have no effect on transportation.

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4.1.4 Biological Resources

No endangered, threatened, or special-status species are known to exist within the project area. No special biological habitats will be impacted by the proposed action (AGFD, 1993; USFWS, 1994).

4.1.5 Water Resources

The quantity and quality of water resources in the project area will not be impacted by the proposed action. Surface water and groundwater are described separately below.

4.1.5.1 Surface Water

Currently, there are three separate areas where storm water flows breakout to the south onto base property when the capacity of the channel is exceeded. These areas were described in section 1. Overflow water at the three breakout areas will be contained by the proposed channel improvements. Containment of these breakout flows will result in an increased discharge to the Agua Fria River at the outfall. The increased discharge will not significantly change the quantity of flow in the river. The predicted 100-year discharge from the Dysart Drain is 3,962 cfs, and the flow in the Agua Fria River upstream of the Dysart Drain is 98,750 cfs. Therefore, the quantity of storm water runoff discharged from the Dysart Drain to the Agua Fria River during the 100-year storm event will increase total river flow downstream from the outfall by approximately 5.8 percent (WLB, 1993a,b,c and FEMA, 1993). No downstream impacts are anticipated from the small increase in flow, as this water is currently reaching the Agua Fria River; however, slightly downstream from the project area through other flow routes. If rainfall occurs during the channel reconstruction and basin excavation activities, there will be increased sediment transported to the Agua Fria River. The use of best management practices (BMP) during construction activities will minimize erosion and sediment transport, and moreover, these effects will be temporary in nature. A beneficial effect of the continuous concrete liner under the proposed action will be a reduced quantity of sediments discharged to the river compared to the existing partially-lined channel.

Construction plans indicate reuse of excavated drain sediment as fill material in the detention basin or in berms along the channel. Although soil samples from drain sediment and the detention basin area indicate the presence of 4,4'DDE, TPH and some metals. The detected levels are well below regulatory standards for each contaminant. It was the opinion of CEC (1993, 1994) that the presence of low levels of a few compounds in the samples collected, combined with the extensive data obtained through the Luke AFB superfund investigation, suggest that widespread contamination of the Dysart Drain by surface runoff is not likely. In addition, further investigation of the proposed basin area or surface sediment is not warranted. The low levels of identified contaminants should not prevent use of sediment soils for basin fill or other project uses.

The quality of water entering the Agua Fria River from the improved Dysart Drain should not be substantially different than the flows being currently conveyed by the river, and will be undifferentiated from the quality of water now entering the Dysart Drain. The detention basin in the proposed project may capture sediments that would otherwise enter the Dysart Drain and be conveyed to the Agua Fria River.

A total impacted jurisdictional area of waters of the US is projected at 21,300 square feet or less than one-half of an acre. Three areas make up this total acreage as discussed in Section 3.1.5.1 which will be impacted by the project. These areas are described in a letter to COE

dated 31 March 1994 from the FCDMC (FCDMC, 1994). A nationwide 404 permit would be required by the COE for areas affected less than 1 acre.

4.1.5.2 Groundwater

The groundwater under Luke AFB will not be affected by the proposed action. Surface water is only present in the unlined portions of the drain for a very short period of time immediately following heavy rains. Therefore, historical recharge from the drain has been very minimal, if any. Under the proposed action, water will stay in the detention basin less than 36 hours due to continuous release. Thus, the proposed action will not have an affect on the groundwater or potential recharge area.

4.1.6 Community Setting

Maricopa County is expected to experience steady growth for the next two decades. Population projections are shown in Table 4.1. From 1990 to 2000, the county is expected to add almost 600,000 residents, an average annual growth rate of 2.8 percent.

Table 4.1
Population Projections for Maricopa County

	1990	1995	2000	2005	2010
Maricopa County Residents	2,122,101	2,399,600	2,715,100	3,031,350	3,362,685

Estimated expenditures for the proposed action total over $9 million. Increased employment and material expenditures represent a minor direct, economic benefit to the Phoenix MSA economy. Secondary income and jobs would be approximately the same magnitude as the primary income and jobs. However, the total primary and secondary benefits generated by construction activities would be relatively small relative to the Phoenix MSA economy (less than 1/10 of 1 percent for total jobs and income). Construction personnel needed for the proposed action can be drawn from the current Phoenix MSA labor force. Therefore, no change is anticipated in the size or composition of the local population associated with construction.

No change in population is anticipated and, consequently, no related changes in housing and public services are anticipated.

4.1.7 Cultural Resources

No significant archaeological or historical resources have been identified within the project area. A study concluded that AZ T:7:25 (AJM) is situated well north of the proposed project area, and none of the five isolated lithic artifacts appear to meet any of the Arizona or National Register eligibility criteria of 365 CFR 60.6 (SAS, 1993; SAS, 1994). Therefore, the proposed action or alternative is not anticipated to impact cultural resources. The appendix contains documentation of SHPO concurrence with this evaluation (Gasser, 1994a,b).

4.1.8 Noise

Noise generated by this project will be from construction activities only. Construction will last for an estimated 18 months for the entire project, but will be of a transitory nature and be of short duration (less than 30 days) in any one location, with the exception of the basin construction. The

most sensitive receptor for the project will be residential areas adjacent to the drain at Northern Avenue and Reems Road and base housing. These sensitive receptors are located an estimated 100 and 300 feet from the construction site and are acclimated to elevated background levels due to aircraft noise.

Noise impacts from construction activities at the project area are a function of the noise generated by construction equipment, the location and sensitivity of nearby land use, and the timing and duration of the noise-generating activities. Heavy earth-moving and construction equipment are a recognized noise source with potential adverse impacts to sensitive receptors. To assess potential impacts from construction noise, the procedures and guidelines of the Construction Engineering Research Laboratory have been utilized (CERL, 1978).

Normally, construction activities are carried out in stages, each of which has its own mix of equipment and noise characteristics. The maximum construction noise is expected to be generated during excavation of the basin, channel, and road work activity. A typical mix of construction equipment has been identified for use at the various stages of construction. Proposed equipment and their noise levels are presented in Table 4.2.

Table 4.2
Construction Equipment Noise Levels at 50 ft

Equipment Type	dB(A)
Backhoe	70.0
Bulldozer	88.8
Cement truck	75.0
Compactor	82.0
Grader	76.0
Loader	82.0
Scraper	88.6
Water truck	85.0

Source: CERL, 1978

Based on these estimates, earth-moving and road work construction noise at the nearest sensitive receptor sites have been estimated for four sections of the project as discussed in section 3.1.8.

Table 4.3 presents the noise levels anticipated at the closest receptor. These levels were conservatively calculated using all anticipated equipment for the construction activity. It should be noted that noise generated from aircraft flying operations (Figure 3.5) are greater or equal to noise levels generated from proposed construction activities. Receptors are used to greater levels than will be generated in the proposed action. All construction generated noise for this project is cumulative and are activities anticipated to occur from 0700 hours to 1700 hours. In addition, the predicted level is averaged over the particular construction activity which generates the greatest projected levels for the segment. No noise impacts are anticipated from the proposed action. However, minor inconveniences for short durations (one to three days) may be associated with particular equipment the contractor may choose to conduct an activity.

Table 4.3
Predicted Noise Exposure Levels Proposed Action

Segment	Activity[1]	Duration	Nearest Receptor	Predicted Level[2]
A	Basin Construction	90 days	300 ft	78.2 dB(A)
B	Road Work	8 days	200 ft	67.3 dB(A)
C	No Major Activity	--	--	--
D	Channel Excavation	75 days	100 ft[3]	72.5 dB(A)

[1] Highest anticipated noise generating activity per segment as described in section 3.1.8.
[2] Using method described in Construction Engineering Research Laboratory, 1978.
[3] To base housing property line (estimated).

4.1.9 Air Quality

Air quality impacts could occur during the construction activities associated with the reconstruction of the Dysart Drain. Construction related impacts could result from fugitive dust (particulate matter) and construction equipment and privately owned vehicle combustive emissions.

The methods selected to analyze air quality impacts depend on the type of emission sources being examined. The primary emission source categories associated with the proposed action and the alternative action are construction activities and vehicle traffic associated with workers at the site. Because construction phase emissions are generally considered to be temporary, analysis is limited to estimating the amount of uncontrolled fugitive dust that may be emitted from disturbed areas during construction activities and vehicle travel on roadways and the amount of combustive emissions that may be emitted from construction equipment and vehicle operation.

Fundamental steps in the evaluation of environmental impacts on air quality are to identify the sources of the impact, identify the quantitative measures for evaluating the extent of the impact, and develop formulas for computing and assessing those measures. These formulations are based on the types of data that are generally available or can easily be collected for the land use scenarios. For the purpose of the proposed action and alternative action, those emissions sources anticipated to significantly contribute to ambient air quality impacts have been targeted for analysis: i.e., construction activity and vehicle traffic.

Fugitive dust from construction activities and vehicle traffic and combustive emissions from construction equipment and vehicle operation would be generated during the Dysart Drain project, including existing facility demolition, roadway reconstruction, and new facility construction. Dust generated from open sources is called "fugitive dust" because it is not discharged to the atmosphere in a confined flow stream. Fugitive dust is generated by 1) the pulverization and abrasion of surface materials through mechanical force such as land clearing, equipment traffic, excavation, and demolition/construction of the drain itself; and 2) entrainment of dust particles by the action of the wind on exposed surfaces (minor compared to construction). These emissions would be greatest during site clearing and grading activities, blasting, cut and fill operations, and equipment operation. Emissions would vary significantly from day to day depending on the type of operation, level of activity, and the prevailing weather conditions. A large portion of the emissions results from equipment traffic over temporary roads at the site.

Fugitive dust is also generated whenever vehicles travel over a paved surface, such as a road or parking lot. In general, particulate emissions from paved roads originate from the loose material present on the surface. Particulate emissions from paved surfaces vary with the "silt loading" or loose material present on the road surface and the vehicle weight.

The Dysart Drain Flood Channel improvement project is expected to span an 18-month period. It was assumed that all construction associated with the project would be distributed evenly over the buildout period. Therefore, the period analyzed to evaluate air quality impacts and conformity analysis with respect to the SIP was any 12-month period during the life of the improvement project.

The source categories chosen for analysis represent those sources that have the greatest emissions impact on the surrounding ambient environment. Emission sources evaluated include the following:

- Fugitive dust generating operations: construction activities such as land clearing, drilling and blasting, ground excavation, cut and fill operations (earth moving), and construction.
- Non-road mobile sources: combustive emissions from construction equipment such as track-type tractors, dozers, scrapers, motor graders, wheeled and tracktype loaders, off-highway trucks, and rollers/compactors.
- On-road mobile sources: combustive emissions and roadway fugitive dust emissions from employee vehicles.

The principal pollutant of interest is PM_{10} - particulate matter with an aerodynamic diameter less than or equal to 10 microns. PM_{10} is the size basis for the current NAAQS for particulate matter, and therefore, represents the size range of greatest interest with respect to ambient air quality regulations.

Construction activities would generate both combustive emissions from heavy equipment usage and fugitive dust emissions from ground disturbing activities. These emissions would be greatest during site clearing and grading activities. Uncontrolled fugitive dust emissions from ground-disturbing activities are emitted at a rate of 110 pounds per acre per day. This factor is taken from the EPA publication *AP-42, Compilation of Air Pollution Emission Factors, Volume I, Stationary Point and Area Sources, September 1985.* The PM_{10} fraction of the total fugitive dust is assumed to be 50 percent, or 55 pounds per acre per working day.

Total acreage attributed to the Proposed Action is assumed to be made up of four distinct areas: 1) the 169-acre detention basin, spoil area, and collector channel; 2) the 4-mile long Dysart Drain providing approximately 42 acres of surface area (following assumptions: depth = 18 feet, channel width at top = 75 feet, channel width at bottom = 20 feet); 3) existing right-of-ways associated with the drain providing a surface area of 64 acres; and 4) roadway improvement areas providing 8 acres of surface area. Based on these areas, 283 acres will be disturbed over the life of the project. Since the conformity analysis considers annual emissions, two thirds or 189 acres will be disturbed during any 12-month period.

Construction for the proposed action would disturb a total of approximately 189 acres over a one-year period during the 18-month project buildout. The analysis assumes that, on average, there are 230 working days per year and that half of these days would be used for site preparation. Additionally, 4 acre-days of disturbance are assumed per acre, which represents the area and

duration of disturbing activities. Thus, for the proposed action, the amount of PM_{10} from ground disturbing activities is calculated as follows:

Average daily disturbed acreage

189 acres disturbed/year x 4 acre-days of disturbance/acre x 1 year/115 days = 6.6 acres

Average daily PM_{10} emissions

6.6 acres x 55 lb PM_{10}/acre-day = 363 lb PM_{10}/day

= 20.8 tpy

In addition to ground disturbing activities, a portable concrete batch plant will be operated for approximately 8 days during the construction phase of the project. During this time, the plant is expected to produce 2450 cubic yards of product. Fugitive dust is the pollutant of concern from an operation such as this. Based on emission factors provided in AP-42 and the expected volume of product, the batch plant is expected to produce 0.25 tons of fugitive dust. As a conservative estimate, it is assumed that the fugitive dust is equal to PM_{10}.

These calculations are conservative in that they consider all available surface area associated with the drain as being disturbed during construction. Also, the fugitive emission calculations do not consider any mitigation measures such as an effective wet suppression program which is estimated by EPA to reduce emissions by 50 percent.

Combustive emissions from construction equipment associated with project activities were calculated based on type of equipment and use factor or equipment days of operation. It was assumed that one equipment day equals 8 hours. Emission factors were then applied to each category of equipment and annual hours of operation. Emission factors were obtained from the EPA document *AP-42, Compilation of Air Pollution Emission Factors, Volume II: Mobile Sources, September 1985.* Table 4.4 provides the construction equipment categories and the emissions attributed to each.

Fugitive and combustive emissions from on-road mobile sources were calculated based on vehicle miles traveled (VMT) and the class of vehicle driven. These input parameters were determined by: 1) estimating the number of employees at the site (37), 2) estimating the average daily trips per employee (1.37), 3) assuming that each employee makes a 20-mile round-trip commute to work, 4) assuming that each employee will come to work 230 days during the year, and 5) assuming that 78 percent of the commute miles traveled will be in light duty gasoline powered vehicles and 22 percent will be light duty gasoline powered trucks. The number of employees and the average daily trips per employee were obtained from the South Coast Air Quality Management District publication *California Environmental Quality Act (CEQA) Air Quality Handbook.* The fleet mix percentages and vehicle emission factors were taken from the Maricopa Association of Governments publication *MAG 1993 Ozone Plan for the Maricopa County Area.*

Fugitive dust is generated whenever vehicles travel over a paved surface, such asa road or parking lot. In general, particulate emissions from paved roads originate from the loose material present on the surface. Particulate emissions from paved surfaces vary with the "silt loading" or loose material present on the road surface and the vehicle weight. Silt loading refers to the mass of silt-size material (less than or equal to 75 microns in physical diameter) per unit area of travel surface. The quantity of PM_{10} particulate emissions was calculated using predictive emission factor equations in AP-42 with estimated input parameters of 1) VMT (233,174 miles) from project

Table 4.4 PROPOSED CONSTRUCTION EQUIPMENT COMBUSTIVE EMISSIONS

EQUIPMENT TYPE	USE FACTOR[a]		EMISSION FACTORS (pounds/hour)[b]					EMISSIONS (tons/year)				
	equipment days	hours/year	CO	VOC	NOx	SOx	PM_{10}	CO	VOC	NOx	SOx	PM_{10}
CONCRETE TRUCK	288.70	2309.60	0.66	0.15	1.69	0.14	0.14	0.76	0.18	1.95	0.17	0.16
DUMP TRUCK	810.67	6485.36	0.66	0.15	1.69	0.14	0.14	2.14	0.49	5.48	0.46	0.45
DOZER	120.00	960.00	1.79	0.19	4.17	0.35	0.17	0.86	0.09	2.00	0.17	0.08
SCRAPER	608.00	4864.00	1.26	0.28	3.84	0.46	0.41	3.06	0.68	9.34	1.12	1.00
GRADER	154.30	1234.40	0.15	0.04	0.71	0.09	0.06	0.09	0.02	0.44	0.06	0.04
LOADER	49.00	392.00	0.57	0.25	1.89	0.18	0.17	0.11	0.05	0.37	0.04	0.03
COMPACTOR	23.40	187.20	0.30	0.07	0.86	0.07	0.05	0.03	0.01	0.08	0.01	0.00
HOE 245	170.70	1365.60	0.66	0.15	1.69	0.14	0.14	0.45	0.10	1.15	0.10	0.10
WATER PULL	242.00	1936.00	0.66	0.15	1.69	0.14	0.14	0.64	0.15	1.64	0.14	0.14
FENCE TRUCK	16.00	128.00	0.66	0.15	1.69	0.14	0.14	0.04	0.01	0.11	0.01	0.01
UTILITY VEHICLE	27.33	218.64	0.66	0.15	1.69	0.14	0.14	0.07	0.02	0.18	0.02	0.02
							TOTAL:	8.26	1.80	22.74	2.27	2.02

[a] One equipment day equals 8 hours.

[b] Ref: Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources, AP-42, Fourth Edition, September 1985

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employees, 2) average vehicle weight of 3 tons, and the worst-case silt loading factor for the Phoenix area of 0.528 grams per square meter of travel surface. It is estimated that 0.78 tons of PM_{10} will be generated during any 12-month period.

Combustive emissions from on-road vehicles are based on VMT and emission factors for the specific classes of vehicles considered. Table 4.5 provides the categories of employee-owned vehicles and the combustive emissions attributed to the project from these sources.

Table 4.6 provides emissions by source type over the conformity analysis period of the proposed action. It can be seen from this table that fugitive dust generating activities are the largest contributor to PM_{10} emissions and construction equipment are the largest contributors to combustive emissions.

Mitigation for potential air quality impacts would be directed at reducing the overall emission inventory. Abatement strategies to mitigate air pollutant impacts should be implemented during the buildout of the project. Abatement strategies implemented during the construction phase are straight-forward and, as a rule, a matter of enforcement (MCAPC III, Rule 310, 1993). Mitigation of fugitive particulate matter emissions may include:

- Paving and maintenance of roads, parking lots, and yards;
- Application of water or chemicals to control emissions from such activities as demolition, grading, construction, and land clearing;
- Application of asphalt, water, oil, chemicals or other dust suppressants to unpaved roads, yards, open stock piles, and similar sources;
- Removal of particulate matter from roads and other paved areas under the control of the owner or operator of the source to prevent reentrainment, and from work areas to prevent particulates from becoming airborne;
- Landscaping or planting of vegetation;
- Use of hoods, fans, filters, and similar equipment to contain, capture, or vent particulate matter;
- Confining abrasive blasting where possible;
- Enclosure or covering of conveyor systems.

Combustive emissions from construction vehicles/equipment could be mitigated by efficient scheduling of equipment use, implementing a phased construction schedule to reduce the number of units operating simultaneously, and performing regular vehicle engine maintenance.

As stated earlier, Luke AFB is located in an area designated as moderate nonattainment for O_3, CO, and PM_{10}. Based on the moderate nonattainment category, the de minimis emission rates for ozone precursors (VOCs and NO_X), CO, and PM_{10} are 100 tpy (Table 3.7). When the conformity analysis period (12-month period) is compared to the de minimis thresholds, it is readily apparent that project emissions are well below the applicable de minimis values. In addition, the project does not constitute a regionally significant action since annual emissions are less than 10 percent of the AQCR inventory for each nonattainment pollutant. It is also apparent that if the PM_{10} nonattainment area were to be redesignated as serious nonattainment, the more restrictive de minimis threshold of 70 tpy would still be well above expected PM_{10} emissions. Note also that

Table 4.5. PROPOSED ACTION ON-ROAD VEHICLE COMBUSTIVE EMISSIONS

VEHICLE TYPE[a]	VEHICLE MILES TRAVELED[b]	EMISSION FACTOR (grams/mile)[c]			EMISSIONS (tpy)		
		CO	VOC	NOx	CO	VOC	NOx
LDGV	181876	11.66	1.95	1.61	2.34	0.39	0.32
LDGT	51298	15.18	2.34	1.83	0.86	0.13	0.10
				TOTAL:	3.20	0.52	0.43

[a] LDGV = Light duty gasoline powered vehicle
LDGT = Light duty gasoline powered truck

[b] Milage based on: 1) Average of 37 employees at job site
2) 20 miles roundtrip to work
3) Average of 1.37 daily trips per employee
Ref: California Environmental Quality Act (CEQA) Air Quality Handbook
South Coast Air Quality Management District
Tables: A9-17
A9-17-A
A9-17-B
A9-5-A-2

[c] Ref: MAG 1993 Ozone Plan for the Maricopa County Area
The Maricopa Association of Governments

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Table 4.6 ALTERNATIVE ACTION EMISSIONS

INVENTORY	EMISSIONS (tons/year)				
	CO	VOC	NOx	SOx	PM_{10} [a]
CONSTRUCTION					21.05
CONSTRUCTION EQUIPMENT	8.26	1.80	22.74	2.27	2.02
ON-ROAD MOBILE	3.19	0.52	0.43		0.78
TOTAL:	11.45	2.32	23.17	2.27	23.85
1990 MARICOPA COUNTY BASE YEAR EMISSIONS	349490.00	82059.00	52186.00	6160.00	46339.00
PROPOSED ACTION EMISSIONS AS A PERCENT OF THE 1990 MARICOPA COUNTY EMISSIONS INVENTORY	0.00[b]	0.00[b]	0.04	0.04	0.05

[a] On-road mobile PM_{10} emissions based on following equation:

$E = k \times (sL/2)^{.65} \times (W/3)^{1.5}$

where: E = particulate emission factor, lb/VMT

k = Base emissions factor for particle size range (0.016 lb/VMT)

sL = Road surface silt loading (0.528 g/m^2 – Phoenix, AZ)

W = Average weight of vehicles traveling road (2 tons)

Ref: Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources AP-42, Fourth Editionm September 1985

[b] Both CO and VOC emissions are approximately 0.003% of the county base year emissions for the respective pollutants. This value rounds to 0.00% when carried out to two decimal places.

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these are one-time emissions and are generated only during the reconstruction of the Dysart Drain. Once construction is complete, there will be no "operational" emissions associated with the drain.

4.1.10 Environmental Management

4.1.10.1 Hazardous Materials/Waste Management

The proposed project will not affect Luke AFB's current waste management practices. No additional hazardous wastes will be generated as a result of the Dysart Drain improvements project. Based on existing data, the quality of sediments in the Dysart Drain should not constrain utilization of the excavated sediment as fill material in the detention basin or in berms along the length of the channel. According to Luke AFB, the contractor, not the base would be responsible for properly disposing of all solid and hazardous (if any) waste associated with the project (Martinez, 1994b).

4.1.10.2 Solid Waste

Construction debris produced will be nonhazardous. There will be no temporary storage of construction debris by the contractor on Luke AFB or in areas near the construction site.

4.1.10.3 Wastewater

Wastewater from Luke AFB will not be affected by the proposed action since on base facilities will not receive additional flows from either domestic or industrial sources.

4.1.10.4 Pollution Prevention

Under the proposed action current waste minimization practices would not be impacted.

4.1.10.5 Site Restoration Management

The proposed action is not anticipated to affect any of the PSC/IRP sites at Luke AFB. The old landfill (Drainage Ditch Disposal Area DP-13) does not appear to extend onto the right-of-way of the Dysart Drain, and is not expected to impact the channel reconstruction. It has been determined that the contamination around building 353 is not likely to extend into the right-of-way and, therefore, will not be impacted by the proposed action. The subsurface petroleum release at Facility 351 (Bulk Fuel Storage Area SS-42) is unlikely to affect the channel reconstruction. This release occurred approximately 400 feet downgradient from the Dysart Drain. Lateral migration of soil contamination more than 400 feet is not likely. If it has occurred, it is not likely to be encountered during the shallow excavation required for improving the channel (CEC/WRA, 1993).

As discussed in affected environment (3.1.10.3), three IRP sites under investigation are located 300 to 400 feet from the Dysart Drain. For sites SS-17 (DPDO Yard) and LF-37 (Northeast Landfill), the extent of contamination appear to have been defined and further investigations are not planned (Radian, 1993). For site LF-14 (the Old Salvage Yard Disposal), further investigation is planned in Phase II of the Environmental Site Assessment and Limited Soil Sampling and Analysis. The site may have been used for the disposal of transformer fluids, and low levels of PCBs have been detected 15 to 25 feet subsurface. Subsequent sampling was conducted in the drain sediments and revealed low concentrations of 4,4-DDE, TPH, and barium. No PCBs were detected in the sediments (CEC/WRA, 1993).

4.2 ALTERNATIVE ACTION

The alternative action would not include the construction of a basin area, but would require additional right-of-way and channel width as well as reconstruction of one additional bridge on Litchfield Road.

4.2.1 Mission

The mission of Luke AFB would be enhanced because the channel improvements will prevent flood damage to the runway and housing area, thereby alleviating disruption to pilot combat training and other routine base operations.

4.2.2 Land Use

Land use associated with the alternative action is consistent with current land uses and is not expected to change land use in the vicinity of the project. The alternative would have less impact on private land as the detention basin would not be constructed; however, more right-of-way along the channel would be required.

4.2.3 Transportation

The alternative action will have an additional road closure, as well as those detailed in section 4.1.3. A bridge on Litchfield Road, located north of Luke AFB near the north gate, would require removal and replacement. Traffic flow on Litchfield Road potentially may be diverted to Dysart Road resulting in an two-way ADT on Dysart Road of 11,889 vehicles, an increase of approximately 127 percent. This would result in a change of roadway classification to minor arterial with no change in the LOS.

Traffic transitioning from Litchfield Road to Dysart Road likely would use Northern Avenue or Glendale Avenue. Glendale Avenue is described as minor arterial with a LOS rating of "C", which is the desired LOS rating for the roadway (MCDOT, 1994). The addition of the Litchfield Road traffic may result in a two-way ADT of 17,450 vehicles, or an increase of approximately 62 percent. The LOS and road classification for Glendale Avenue would remain unchanged.

Northern Avenue is classified as a minor collector with a LOS rating of "B" which is the desired LOS for the roadway (MCDOT, undated). The addition of traffic from Litchfield Road may result in a two-way ADT of 8,350 vehicles on Northern Avenue, an increase of approximately 391 percent. The road classification would change to that of a minor arterial and the LOS would increase to a "C" rating. As described in 4.1.3, it is desirable for a LOS rating remain unchanged; however, temporary increases are tolerated for short-term construction activities which, when completed, allow the roadway to return to the original LOS rating (Beeman, 1994).

No information is available for exact gate counts; however, the north gate is the least used gate of the three. Generally, in situations involving the closing of the north and south gate, the traffic flow through the main gate is not impacted to any major extent (Wales, 1994).

4.2.4 Biological Resources

No endangered, threatened, or special-status species are known to exist within the project area. No special biological habitats will be impacted by the alternative action.

4.2.5 Water Resources

The quantity and quality of water resources in the project area will not be impacted under the alternative action.

4.2.5.1 Surface Water

Surface water impacts under the alternative action will be virtually identical to those of the proposed action. The exception is that there will be no detention basin to potentially capture sediments that would otherwise enter the Dysart Drain and be conveyed to the Agua Fria River. The sediment load will be slightly higher for the alternative action than for the proposed action due to the lack of a basin structure.

An estimated additional 9,150 square feet of waters of the US would be impacted by the alternative action when compared to the proposed action. A total of 30,450 square feet (0.7 acres) of waters of the US would be affected. A nationwide 404 permit would be required by the COE for areas affected less than 1 acre.

4.2.5.2 Groundwater

Groundwater impacts for the alternative action would be the same as for the proposed action.

4.2.6 Community Setting

Community setting impacts would be the same for the alternative action as for the proposed action.

4.2.7 Cultural Resources

No archaeological or historical resources have been identified within the project area. Therefore, the alternative action is not anticipated to impact cultural resources.

4.2.8 Noise

Table 4.7 presents the noise levels anticipated at the closest receptor. These levels were conservatively calculated using all anticipated equipment for the construction activities. All areas, with the exception of area D (base housing to the Agua Fria River), were within the existing noise contours for aircraft noise associated with the base (Figure 3.5). All the construction equipment which was used for the calculations are not anticipated to be used for the entire length of the drain. In fact, much of the excavation work will be in the area between Dysart Road and El Mirage (through the Morton Salt property), which is the area of least subsidence. The section must be excavated to allow unrestricted conveyance of stormwater to the river. There are no sensitive receptors within this section, as it is all industrial property. Work on the upper section of the segment which includes base housing will not be substantially different than the proposed action. Therefore, noise levels of 72.5 dB(A) are expected in the upper sections by base housing and other residential areas. It should be noted that noise generated from aircraft flying operations are greater than or equal to any noise levels generated from construction activities. Minor inconveniences for short durations (one to three days) may be associated with particular equipment the contractor may choose to conduct an activity. All construction generating noise is anticipated to occur from 0700 hours to 1700 hours.

Table 4.7
Predicted Noise Exposure Levels - Alternative Action

Segment	Activity[1]	Duration	Nearest Receptor	Predicted Level[2]
A	No Major Activity	–	–	–
B	Channel Excavation	30 days	200 ft[3]	75.8 dB(A)
C	Channel Excavation	15 days	200 ft[3]	68.4 dB(A)
D	Channel Excavation	75 days	100 ft[4]	80 dB(A)

[1] Highest anticipated noise generating activity per segment as described in section 3.1.8.
[2] Using method described in Construction Engineering Research Laboratory, 1978.
[3] Residential areas are approximately 200 ft.
[4] To base housing property line, estimated.

4.2.9 Air Quality

The same general assumptions were made for the Alternative Action as was done for the Proposed Action with regards to methods of analysis and sources analyzed. Refer to Section 4.1.9.

Total acreage attributed to the project is assumed to be made up of 3 distinct areas (the basin and spoilage area are not part of this alternative): 1) the approximate 4.5-mile long Dysart Drain providing approximately 49 acres of surface area (following assumptions: depth = 19 feet, channel width at top = 77 feet, channel width at bottom = 20 feet); 2) existing right-of-ways associated with the drain providing a surface area of 64 acres; and 3) roadway improvement areas providing 8 acres of surface area. Based on these areas, 121 acres will be disturbed over the life of the project. Since the conformity analysis considers annual emissions, two thirds or 81 acres will be disturbed during any 12-month period.

Construction for the Proposed Action would disturb a total of approximately 81 acres over a one-year period during the 18-month project buildout. The analysis assumes that, on average, there are 230 working days per year and that half of these days would be used for site preparation. Additionally, 4 acre-days of disturbance are assumed per acre, which represents the area and duration of disturbing activities. Thus, for the Alternative Action, the amount of PM_{10} from ground disturbing activities is calculated as follows:

Average daily disturbed acreage

81 acres disturbed/year x 4 acre-days of disturbance/acre x 1 year/115 days = 2.8 acres

Average daily PM_{10} emissions

2.8 acres x 55 lb PM_{10}/acre-day = 155 lb PM_{10}/day

= 8.9 tpy

These calculations are conservative in that they consider all available surface area associated with the drain as being disturbed during construction. Also, the fugitive emission calculations do not consider any mitigation measures such as an effective wet suppression program which is estimated by EPA to reduce emissions by 50 percent.

Combustive emissions from construction equipment associated with project activities were calculated based on type of equipment and use factor or equipment days of operation. It was assumed that one equipment day equals 8 hours. Emission factors were then applied to each category of equipment and annual hours of operation. Emission factors were obtained from the EPA document AP-42, Compilation of Air Pollution Emission Factors, Volume II: Mobile Sources, September 1985. Table 4.8 provides the construction equipment categories and the emissions attributed to each.

Fugitive and combustive emissions from on road mobile sources were calculated based on VMT and the class of vehicle driven. These input parameters were determined by: 1) estimating the number of employees at the site (42), 2) estimating the average daily trips per employee (1.37), 3) assuming that each employee makes a 20-mile round-trip commute to work, 4) assuming that each employee will come to work 230 days during the year, and 5) assuming that 78 percent of the commute miles traveled will be in light duty gasoline powered vehicles and 22 percent will be light duty gasoline powered trucks. The number of employees and the average daily trips per employee were obtained from the South Coast Air Quality Management District publication California Environmental Quality Act (CEQA) Air Quality Handbook. The fleet mix percentages and vehicle emission factors were taken from the Maricopa Association of Governments publication MAG 1993 Ozone Plan for the Maricopa County Area. Table 4.9 provides the categories of employee -owned vehicle and the emissions attributed to the project from these sources.

The quantity of PM_{10} particulate emissions was calculated using predictive emission factor equations in AP-42 with estimated input parameters of 1) VMT (264,684 miles) from project employees, 2) average vehicle weight of 3 tons, and the worst-case silt loading factor for the Phoenix area of 0.528 grams per square meter of travel surface. It is estimated that 0.89 tons of PM_{10} will be generated during any 12-month period.

Combustive emissions from on-road vehicles are based on VMT and emission factors for the specific classes of vehicles considered. Table 4.9 provides the categories of employee-owned vehicles and the combustive emissions attributed to the project from these sources.

Table 4.10 provides emissions by source type over the conformity analysis period of the proposed action. It can be seen from this table that fugitive dust generating activities are the largest contributor to PM10 emissions and construction equipment are the largest contributors to combustive emissions.

Mitigation for potential air quality impacts would be directed at reducing the overall emission inventory. Abatement strategies to mitigate air pollutant impacts should be implemented during the buildout of the project. Abatement strategies implemented during the construction phase are straight-forward and, as a rule, a matter of enforcement. Mitigation of fugitive particulate matter emissions may include:

- paving and maintenance of roads, parking lots, and yards;
- application of water or chemicals to control emissions from such activities as demolition, grading, construction, and land clearing;
- application of asphalt, water, oil, chemicals or other dust suppressants to unpaved roads, yards, open stock piles, and similar sources;

Table 4.8 ALTERNATIVE ACTION CONSTRUCTION EQUIPMENT COMBUSTIVE EMISSIONS

EQUIPMENT TYPE	USE FACTOR[a]		EMISSION FACTORS (pounds/hour)[b]					EMISSIONS (tons/year)				
	equipment days	hours/year	CO	VOC	NOx	SOx	PM_{10}	CO	VOC	NOx	SOx	PM_{10}
CONCRETE TRUCK	344.67	2757.36	0.66	0.15	1.69	0.14	0.14	0.91	0.21	2.33	0.20	0.19
DUMP TRUCK	621.33	4970.64	0.66	0.15	1.69	0.14	0.14	1.64	0.38	4.20	0.36	0.35
DOZER	60.00	480.00	1.79	0.19	4.17	0.35	0.17	0.43	0.05	1.00	0.08	0.04
SCRAPER	17.33	138.64	1.26	0.28	3.84	0.46	0.41	0.09	0.02	0.27	0.03	0.03
GRADER	49.33	394.64	0.15	0.04	0.71	0.09	0.06	0.03	0.01	0.14	0.02	0.01
LOADER	333.33	2666.64	0.57	0.25	1.89	0.18	0.17	0.76	0.33	2.52	0.24	0.23
COMPACTOR	2.66	21.28	0.30	0.07	0.86	0.07	0.05	0.00	0.00	0.01	0.00	0.00
HOE 245	147.67	1181.36	0.66	0.15	1.69	0.14	0.14	0.39	0.09	1.00	0.08	0.08
WATER PULL	0.00	0.00	0.66	0.15	1.69	0.14	0.14	0.00	0.00	0.00	0.00	0.00
ASPHALT LAY DOWN	1.00	8.00	0.66	0.15	1.69	0.14	0.14	0.00	0.00	0.01	0.00	0.00
UTILITY VEHICLE	0.00	0.00	0.66	0.15	1.69	0.14	0.14	0.00	0.00	0.00	0.00	0.00
							TOTAL:	4.25	1.09	11.47	1.01	0.93

[a] One equipment day equals 8 hours.

[b] Ref: Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources, AP-42, Fourth Edition, September 1985

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Table 4.9 ALTERNATIVE ACTION ON-ROAD VEHICLE COMBUSTIVE EMISSIONS

VEHICLE TYPE[a]	VEHICLE MILES TRAVELED[b]	EMISSION FACTOR (grams/mile)[c]			EMISSIONS (tons/year)		
		CO	VOC	NOx	CO	VOC	NOx
LDGV	206454	11.66	1.95	1.61	2.65	0.44	0.37
LDGT	58230	15.18	2.34	1.83	0.97	0.15	0.12
				TOTAL:	3.62	0.59	0.48

[a] LDGV = Light duty gasoline powered vehicle
LDGT = Light duty gasoline powered truck

[b] Milage based on: 1) Average of 42 employees at job site
2) 20 miles roundtrip to work
3) Average of 1.37 daily trips per employee

Ref: California Environmental Quality Act (CEQA) Air Quality Handbook
South Coast Air Quality Management District
Tables: A9-17
A9-17-A
A9-17-B
A9-5-A-2

[c] Ref: MAG 1993 Ozone Plan for the Maricopa County Area
The Maricopa Association of Governments

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Table 4.10 ALTERNATIVE ACTION EMISSIONS

INVENTORY	EMISSIONS (tons/year)				
	CO	VOC	NOx	SOx	PM_{10}[a]
CONSTRUCTION					8.90
CONSTRUCTION EQUIPMENT	4.25	1.09	11.47	1.01	0.93
ON-ROAD MOBILE	3.62	0.59	0.48		0.89
TOTAL:	7.87	1.68	11.95	1.01	10.72
1990 MARICOPA COUNTY BASE YEAR EMISSIONS	349490.00	82059.00	52186.00	6160.00	46339.00
PROPOSED ACTION EMISSIONS AS A PERCENT OF THE 1990 MARICOPA COUNTY EMISSIONS INVENTORY	0.00[b]	0.00[b]	0.02	0.02	0.02

[a] On-road mobile PM_{10} emissions based on following equation:

$E = k \times (sL/2)^{.65} \times (W/3)^{1.5}$

where: E = particulate emission factor, lb/VMT
k = Base emissions factor for particle size range (0.016 lb/VMT)
sL = Road surface silt loading (0.528 g/m^2 – Phoenix, AZ)
W = Average weight of vehicles traveling road (2 tons)

Ref: Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources AP-42, Fourth Editionm September 1985

[b] Both CO and VOC emissions are approximately 0.002% of the county base year emissions for the respective pollutants. This value rounds to 0.00% when carried out to two decimal places.

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- removal of particulate matter from roads and other paved areas under the control of the owner or operator of the source to prevent reentrainment, and from work areas to prevent particulates from becoming airborne;
- landscaping or planting of vegetation;
- use of hoods, fans, filters, and similar equipment to contain, capture, and/or vent particulate matter;
- confining abrasive blasting where possible;
- enclosure or covering of conveyor systems.

Combustive emissions from construction vehicles/equipment could be mitigated by efficient scheduling of equipment use, implementing a phased construction schedule to reduce the number of units operating simultaneously, and performing regular vehicle engine maintenance.

As stated earlier, Luke AFB is located in an area designated as moderate nonattainment for O_3, CO, and PM_{10}. Based on the moderate nonattainment category, the de minimis emission rates for ozone precursors (VOCs and NO_x), CO, and PM_{10} are 100 tpy (Table 5.2). When the conformity analysis period (12-month period) is compared to the de minimis thresholds, it is readily apparent that project emissions are well below the applicable de minimis values. It is also apparent that if the PM_{10} nonattainment area were to be redesignated as serious nonattainment, the more restrictive de minimis threshold of 70 tpy would still be well above expected PM_{10} emissions. Note also that these are one-time emissions and are generated only during the reconstruction of the Dysart Drain. Once construction is complete, there will be no "operational" emissions associated with the drain.

4.2.10 Environmental Management

Environmental management issues are the same for the alternative action as for the proposed action. However, the alternative action, may require a slightly larger channel through the base property.

4.2.10.1 Hazardous Materials/Waste Management

The proposed project will not affect Luke AFB's current waste management practices. No additional hazardous waste will be generated as a result of the Dysart Drain improvements project. Based on existing data, the quality of sediments in the Dysart Drain should not constrain utilization of the excavated sediment as fill material in the detention basin or in berms along the length of the channel. According to Luke AFB, the contractor, not the base would be responsible for properly disposing of all solid and hazardous (if any) waste associated with the project (Martinez, 1994b).

4.2.10.2 Solid Waste

Construction debris produced will be nonhazardous. There will be no temporary storage of construction debris by the contractor on Luke AFB or in areas near the construction site.

4.2.10.3 Wastewater

Wastewater from Luke AFB will not be affected by the proposed alternative since on base facilities will not receive additional flows from either domestic or industrial sources.

4.2.10.4 Pollution Prevention

Under the alternative action, current waste minimization practices would not be impacted. Construction debris produced will be nonhazardous and will be disposed of as nonhazardous waste by the contractor.

4.2.10.5 Site Restoration Management

The alternative action will not affect any of the PSC/IRP sites at Luke AFB, as discussed in 4.1.10.3 for the proposed action. Likewise, no NOVs or other incidents of noncompliance are anticipated to occur as a result of the alternative action.

4.3 NO-ACTION ALTERNATIVE

As future subsidence occurs, the Dysart Drain will continue to lose conveyance capacity. Storm water runoff from the watershed north of Luke AFB will continue to exceed the capacity of the channel and cause flooding problems on the base.

4.3.1 Mission

The mission of Luke AFB will continue to be impacted if no action is taken to improve the Dysart Drain. The Dysart Drain will continue to flood Luke AFB property and damage the runway, thereby potentially interrupting the pilot combat training. Funds will be needed to repair flood damage.

4.3.2 Land Use

Land use surrounding the project area will be negatively impacted under the no-action alternative, since continued base flooding by the unimproved Dysart Drain will continue to disrupt base operations and prevent full utilization of available land.

4.3.3 Transportation

The no-action alternative would not impact transportation at or around the base since no road or bridge construction would occur.

4.3.4 Biological Resources

Biological resources will not be affected under the no-action alternative. No endangered, threatened, or special-status species will be impacted under the no-action alternative.

4.3.5 Water Resources

If the no action alternative is taken, subsidence may continue in the area decreasing the drain's capacity. This would result in continued or increased flooding problems. There will be no impacts to groundwater for the no-action alternative.

4.3.6 Community Setting

The community setting would experience slight negative impacts under the no-action alternative since there would be no temporary construction jobs provided from channel modifications.

4.3.7 Cultural Resources

No archaeological or historical resources in the project area will be impacted under the no-action alternative.

4.3.8 Noise

No environmental impacts to noise are associated with the no-action alternative. Noise levels would remain the same as the baseline levels.

4.3.9 Air Quality

No changes to air quality are associated with the no-action alternative.

4.3.10 Environmental Management

Environmental management at Luke AFB would not be affected for the no-action alternative. Luke AFB's status as a generator would not be altered or modified. No changes to the environmental management status or hazardous waste handling practices of Luke AFB would be required. Current waste minimization practices would not be affected. The no-action alternative would not affect any of the PSC/IRP sites at Luke AFB.

4.4 MITIGATIVE ACTIONS

A storm water pollution prevention plan (SWP3) will be required to identify BMPs that will be implemented to minimize soil erosion during construction activities.

Construction-related impacts are considered temporary. Construction effects can be mitigated by best construction management practices, scheduling of heavy equipment to avoid early morning and late evening hours, and by the use of rubber-tired vehicles, where appropriate. Dust suppression, such as watering, will be required as a mitigation measure during construction activities, and equipment should be provided with adequate mufflers to reduce noise.

In the unlikely event that any nearby PSC/IRP site is encountered during construction activities, all construction activities should be halted. An evaluation of the excavation, soils and air, should be accomplished. If necessary, excavated material should be analyzed to ensure that waste are managed or disposed of correctly.

The Arizona Game and Fish Department and the US Fish and Wildlife Service were consulted concerning the potential for threatened or endangered species being affected during the project. Both agencies replied that no listed or proposed threatened or endangered species would likely exist in the vicinity of the proposed project (AGFD, 1993, and USFWS, 1994). This correspondence is provided in the appendix. A 1994 vegetation survey concluded that no listed endangered or threatened federal or state plant species were observed to occur within the project area (FCDMC, 1994b).

The State Historic Preservation Office (SHPO) was consulted concerning potential archaeological and cultural resources in the project area. A survey was conducted which determined no significant artifacts to be present, which was concurred by the SHPO (Gasser, 1994a,b).

4.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The proposed and alternative actions involve reconstruction and improvement of the conveyance capacity of the Dysart Drain Flood Channel. The Dysart Drain will be improved so that it will effectively intercept and convey the 100-year storm event runoff from the watershed north of Luke AFB to the Agua Fria River. In the proposed action, a detention basin and spoil area will be constructed at the upstream end of the improved channel to minimize the size of the reconstructed channel and to reduce the right-of-way and utility impacts and associated costs. The alternative action does not include the detention basin.

Resources that will be irreversibly committed are the expenditure of funds to purchase the additional right-of-way for the channel improvements and detention basin for the proposed action or the right-of-way for only the channel improvements (no detention basin) under the alternative action.

Subsequent to the implementation of the proposed or alternative action, the resource that will be irretrievably committed is the fuel that will be consumed during construction activities.

Other commitments of natural resources are dependent on the final plans and the materials selected to construct the improvements of the Dysart Drain, these commitments are expected to be relatively small. Moreover, the commitment of resources is expected to be temporary, as no long-term resources have been identified for the improvements of the Dysart Drain.

Section 5

Regulatory Review and Permit Requirements

SECTION 5

REGULATORY REVIEW AND PERMIT REQUIREMENTS

This section lists the relevant laws that pertain to the proposed and alternative actions and addresses regulatory review and permit requirements. Environmental regulatory requirements with which the proposed improvements to the Dysart Drain Flood Channel would comply are listed in Table 5.1.

5.1 RELEVANT FEDERAL, STATE, AND LOCAL STATUTES, REGULATIONS, AND GUIDELINES

This EA has been prepared to satisfy the environmental review requirements as set forth in the National Environmental Policy Act of 1969 (NEPA) Title 42, United States Code, Section 4321 et seq. (42 USC 4321 et seq.). NEPA is the basic charter for protection of the environment. Under NEPA, federal agencies that fund, support, permit, or implement major programs and activities are required to assess the environmental impact of implementing their actions early in the planning process. This EA provides the basis for a determination of the significance of environmental impacts of the proposed action.

Regulations implementing NEPA are detailed in Title 40, Code of Federal Regulations (CFR), Parts 1500-1508 (40 CFR 1500-1508) and Air Force Regulation (AFR) 19-2. In addition to the requirements of NEPA, a series of other federal requirements are considered in the preparation of an EA. These regulations comprise an important subset of the NEPA process. Several of these environmental laws and regulations are applicable to the improvements of the Dysart Drain under the proposed and alternative actions. Environmental laws with which the proposed action must comply, either directly or indirectly, are described below.

5.1.1 Endangered Species Act (16 USC 1531-1542)

The Endangered Species Act (ESA) of 1973, amended 1982 and 1987, is intended to prevent the further decline of endangered and threatened plant and animal species and to help in the restoration of populations of these species and their habitats. The act, jointly administered by the Department of Commerce and the Department of the Interior, requires that each federal agency consult with the US Fish and Wildlife Service (USFWS) to determine whether endangered or threatened species are known to exist or have critical habitats on or in the vicinity of the site of a proposed action.

Table 5.1
Major Environmental Laws Applicable to Federal Projects

Environmental Parameter	Federal Regulation
Air	Clean Air Act (CAA) of 1970 and Amendments of 1977 (P.L. 9595) and 1990 (P.L. 91-604)
Noise	Noise Control Act of 1972 (P.L. 92-574) and Amendments of 1978 (P.L. 95-609)
Water	Federal Water Pollution Control Act (FWPCA) of 1972 (P.L. 92-500) and Amendments: Clean Water Act (CWA) of 1977 (P.L. 95-217) and Water Quality Act (WQA) of 1987 (P.L. 100-4)
	Safe Drinking Water Act (SDWA) of 1972 (P.L. 95-523) and Amendments of 1986 (P.L. 99-339)
	Wild and Scenic Rivers Act (WSRA) of 1968 (P.L. 90-542)
Land	Wilderness Act of 1964 (P.L. 88-577)
	Farmland Protection Policy Act of 1981 (P.L. 97098)
	Floodplain Management of 1977 Executive Order 11988
Biological Resources	Fish and Wildlife Coordination Act of 1965 (P.L. 85-624)
	Endangered Species Act (ESA) of 1973 (P.L. 93-205) and Amendments of 1988 (P.L. 100-478)
Wetlands	Section 10 of Rivers and Harbor Act of 1899
	Section 404 of FWPCA of 1972 (P.L. 92-500)
	Protection of Wetlands of 1977 Executive Order 11990
	Emergency Wetlands Resources Act (EWRA) of 1986

Table 5.1, continued

Environmental Parameter	Federal Regulation
Cultural/Native Resources	National Historic Preservation Act (NHPA) of 1966 (P.L. 89-665) and Amendments of 1980 (P.L. 96-515)
	Protection and Enhancement of the Cultural Environment of 1971 Executive Order 11593
	Archaeological and Historic Preservation Act (AHPA) of 1974 (P.L. 93-291)
	American Indian Religious Freedom Act (AIRFA) of 1978 (P.L. 95-341)
	Archaeological Resources Protection Act (ARPA) of 1979 (P.L. 96-95)
	Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (P.L. 101-601)
Solid/Hazardous Wastes	Solid Waste Disposal Act (SWDA) of 1965 and Amendments of 1980 (P.L. 96-463)
	Resource Conservation and Recovery Act (RCRA) of 1976 (P.L. 94-580)
	Hazardous and Solid Waste Amendments (HSWA) of 1984 (P.L. 98-616)
	Underground Storage Tank (UST) Program
	Comprehensive, Environmental Response, Compensation and Liability Act (CERCLA) of 1980 (P.L. 96-510)
	Superfund Amendments and Reauthorization Act (SARA) of 1986 (P.L. 99-499)
	Toxic Substances Control Act (TSCA) of 1976 (P.L. 94-469) and Amendments of 1981 (P.L. 92-129)

Section 7(c) of the ESA authorizes the USFWS to review proposed major federal actions to assess potential impacts on listed species. In accordance with Section 7(c) of the ESA, the Air Force, in consultation with the USFWS, must identify potential species in areas of concern.

Section 9(a) of the EA prohibits "take" of individuals of endangered species. "Take," as defined in the Act, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Habitat modification can be considered "take" if death or injury of wildlife occurs from removing essential habitat components or impairing essential behavior patterns, such as breeding, feeding, or sheltering.

5.1.2 Clean Water Act (33 USC 1251 et seq.)

The Federal Water Pollution Control Act (FWPCA) of 1972, as amended by the Clean Water Act (CWA) and the Water Quality Act (WQA) of 1987, forms the legal framework to support maintenance and restoration of water quality. The FWPCA establishes the NPDES as the regulatory mechanism to achieve water quality goals by regulating pollutant discharge to navigable streams, rivers, and lakes.

Section 404 of the CWA establishes a program to control the discharge of dredged or fill materials into waters of the United States (including wetlands). The WQA places emphasis on best management practices (BMPs), monitoring and control of toxic constituents in wastewater, permitting of outfalls composed entirely of storm water, and regulations governing sewage sludge disposal. The act also requires storm water pollution prevention plans for industrial facilities.

Implementing regulations are detailed in 40 CFR, Subchapters D and N. Executive Order (EO) 12088 (Federal Compliance with Pollution Standards) directs federal facility compliance. AFR 19-7 and AFR 86-4 implement the USAF programs.

5.1.3 National Historic Preservation Act (16 USC 470-470t)

The National Historic Preservation Act (NHPA) of 1966, as amended, establishes historic preservation as a national policy and defines it as the protection, rehabilitation, restoration, and reconstruction of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, or engineering. It also expands the National Register of Historic Places (NRHP) (36 CFR 60) to include resources of state and local significance, and establishes the Advisory Council on Historic Preservation (ACHP).

NHPA Section 106, implemented by regulations issued by the ACHP (36 CFR 800), requires federal agencies to consult with the State Historic Preservation Office (SHPO) regarding impacts that a proposed action may have on cultural resources. Direction for undertakings that affect properties listed, or eligible for listing, on the NRHP include those which are formally determined as eligible by the Secretary of the Interior and any properties that meet the listing criteria of the National Register. According to Section 106, all structures and sites greater than 50 years of age must be evaluated in an EA. The Programmatic Memorandum of Agreement signed in 1986, amended in 1991, specifically covers actions for the demolition of World War II (1939-1946) temporary buildings.

5.1.4 Noise Control Act (42 USC 4901 et seq.)

The Noise Control Act of 1972 establishes that federal agencies, when engaged in an activity resulting in the emission of noise, should comply with federal, state, interstate, and local requirements respecting control and abatement of environmental noise to the same extent as

private entities. The primary operational interest of this legislation, as well as the Aviation Safety and Noise Abatement Act, is directed toward aircraft and airports, though the principles involved are applicable to other activities that produce sufficient nose to result in noncompatible land uses in the surrounding community (40 CFR 209).

In 1978, the Noise Control Act was amended by the Quiet Communities Act. This amendment provided for greater involvement by state and local authorities in controlling noise. Among its objectives are to: develop and implement a national noise environmental assessment program to identify trends in noise exposure, set ambient levels of noise, set compliance data, and assess the effectiveness of noise abatement.

5.1.5 Clean Air Act (42 USC 7401 et seq.)

The Clean Air Act (CAA) of 1970 is a broad federal statute which establishes National Ambient Air Quality Standards (NAAQS) and sets emission limits for certain air pollutants from specific sources. Major provisions of the act are intended to set a goal for cleaner air by setting national primary and secondary ambient air quality standards. Primary standards define levels of air quality necessary to protect public health, while secondary standards define levels necessary to protect public welfare from any known or anticipated adverse effects of a pollutant.

Under the CAA, EPA is required to set New Source Performance Standards (NSPS) based on best demonstrated technology (BDT) and to establish National Emission Standards for Hazardous Air Pollutants (NESHAP). EPA is also required to develop programs for Prevention of Significant Deterioration (PSD) of air quality in attainment areas. Air pollution permits in attainment areas mandate installation of pollution controls that represent the best achievable control technology (BACT).

The CAA also requires states to develop and submit a State Implementation Plan (SIP) for achieving NAAQS within each state. The SIP must establish state Air Quality Control Regions (AQCRs) and specify emission limits, schedules, and timetables for compliance from both stationary and mobile sources. The CAA requires federal facilities to comply with state air pollution requirements. EO 12088 directs federal agency compliance. DOD Instruction 4120.14 implements EO 12088 for the USAF.

The Clean Air Act Amendments (CAAA) of 1990 place renewed emphasis on controlling emissions of hazardous air pollutants. The CAAA require that the EPA set new NESHAP constituents based on installation of maximum achievable control technology (MACT). Regulations implementing the CAAA are detailed in 40 CFR, Subchapter C.

To facilitate compliance and enforcement of the CAA established a new federal permit program to be administered by the states. Under the program, operating permits will be required for a variety of sources, including all stationary sources defined as "major sources" under various provisions of the CAA.

Section 176(c) of the CAA, codified at 42 USC 7506(c) provides the basis for the relationship between the SIP and federal projects. It states that no federal department or agency shall support or approve any activity or action that does not conform to a SIP or EPA-promulgated federal implementation plan (FIP). The statute provides that conforming to a SIP or FIP means that the activity won't:

1. Cause or contribute to any new violation of the national ambient air quality standard (NAAQS) for any criteria air pollutant;
2. Increase the frequency or severity of any existing violation of any standard in the area; or
3. Delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

On November 30, 1993, EPA promulgated a final rule on conformity of Federal projects that are not related to transportation programs, plans, or projects. Such nontransportation projects are referred to as "general" projects, and hence, conformity of such projects are referred to as "general conformity." EPA promulgated a separate rule on conformity of transportation-related projects that is not relevant to the proposed improvement to the Dysart Drain and related activities at Luke AFB.

EPA's general conformity rule establishes an elaborate process for analyzing and determining whether a proposed Federal project in a nonattainment area conforms to the SIP or FIP. The process generally involves the following steps.

First, the Federal agency must determine whether all or part of the Federal action is specifically exempted from the conformity rule pursuant to 40 CFR 93.153(c) to (e). EPA's rule exempts certain types of actions that clearly would result in no or little emissions or that undergo an air quality analysis, due to requirements of other laws and regulations, where the analysis is functionally equivalent to a conformity determination under EPA's rule.

Secondly, the Federal agency must determine whether all or part of the Federal action is presumed to conform pursuant to 40 CFR 93.153(f). EPA's rule allows each Federal agency to establish special categories of actions, based on past experience, that presumptively don't result in nonconforming pollutant emissions or emissions exceeding certain threshold ("de minimis") amounts. These categorical presumptions must be proposed and eventually published in the Federal Register by the Federal agency prior to use. The presumption that a Federal action conforms under this procedure is rebuttable upon demonstration that the Federal action doesn't actually conform to the SIP or FIP. Additionally, a Federal action that otherwise might meet the presumption criteria but results in total emissions equaling or exceeding 10 percent of the air quality control area's emissions inventory for any criteria pollutant is considered a "regionally significant action" and cannot be presumed to conform.

Third, if the entire action does not qualify for an exemption or presumption described above, then the Federal agency must determine whether the Federal action can be excluded as a de minimis project. A de minimis project is one where the total of direct and indirect emissions for each type of nonattainment pollutant resulting from the project falls below certain de minimis levels described in 40 CFR 93.153(b). The de minimis emission rates are listed in Table 5.2. The Federal agency calculates the total of direct and indirect emissions for each type of nonattainment pollutant resulting from the project on a tons per year basis. In computing the total, the emissions resulting from portions of the project that can be exempted or presumed to conform are excluded. The total direct and indirect emissions means the sum of direct and indirect emissions increases and decreases, or "net" emissions, caused by the Federal action. Indirect emissions means those emissions reasonably foreseen to be caused by the Federal action that the Federal agency can practicably control and can continue to control due to a continuing program responsibility of the Federal agency. The calculated total emission rates are compared to the de minimis levels. If the

total falls below the de minimis levels, the action is exempted from further conformity analyses pursuant to 40 CFR 93.153(c) so long as the project's emissions do not equal or exceed 10 percent of the air quality control area's emissions inventory for each nonattainment criteria pollutant (i.e., not a regionally significant action).

Table 5.2
De Minimis Emission Levels

Pollutant	Emission Rate (tpy)
Ozone (VOCs or NO_x):	
Serious NAAs	50
Severe NAAs	25
Extreme NAAs	10
Other ozone NAAs outside an ozone transport region	100
Marginal and moderate NAAs inside an ozone transport region:	
VOC	50
NO_x	100
CO: all NAAs	100
SO_2 or NO_2: all NAAs	100
PM_{10}	
Moderate NAAs	100
Serious NAAs	70
Pb: all NAAs	25

NAAs = Nonattainment areas
VOCs = Volatile organic compounds
NO_x = Nitrogen oxides
CO = Carbon monoxide
SO_2 = Sulfur dioxide
NO_2 = Nitrogen dioxide
PM_{10} = Particulate matter with an aerodynamic diameter equal to or less than 10 microns
Pb = lead

Fourth, if the entire Federal action has not satisfied any of the aforementioned exemptions or presumptions, the Federal agency must conduct a full scale conformity analysis culminating in a conformity determination after allowing opportunity for review and comment by the public and other interested Federal, state, and local agencies. The analysis must demonstrate that the project satisfies the criteria in 40 CFR 93.158 and 93.159. If the action doesn't satisfy the criteria in 40 CFR 93.158, the Federal agency must take mitigation measures pursuant to 40 CFR 93.160 to arrive at a positive conformity determination.

5.1.6 Resource Conservation and Recovery Act (42 USC 6901 et seq.)

5.1.6.1 Hazardous Waste

The Resource Conservation and Recovery Act (RCRA) was enacted in 1976, with regulations promulgated in 1980. The regulations are intended to ensure that hazardous wastes are disposed of in an environmentally safe manner, and that facilities that store, treat, or dispose of hazardous waste do so in a way that protects human health and the environment. The Hazardous and Solid Waste Amendments (HSWA) of 1984 created a set of restriction on land disposal of hazardous wastes unless certain treatment standards can be satisfied. HSWA regulations place increased emphasis on waste minimization activities and serve as a mechanism to enforce cleanup.

RCRA directs federal facilities to comply with federal, state, and local hazardous waste management requirements. EO 12088 directs federal facilities to comply with RCRA. AFR 19-11 requires each major command to manage hazardous wastes in accordance with federal and state hazardous waste regulations. Implementing regulations for RCRA and HSWA are detailed in 40 CFR, Subchapter I.

RCRA Subtitle I governs underground storage tanks (USTs) containing hazardous materials, including petroleum substances. RCRA authorizes enforcement of state UST programs in lieu of EPA requirements provided state requirements are as stringent as, or more stringent than, federal requirements. The law is administered by EPA through 40 CFR 280 and 281.

5.1.6.2 Nonhazardous Waste

RCRA Subtitle D governs nonhazardous waste management. Guidelines for state use have been issued by EPA (40 CFR 240-259). RCRA directs federal facilities to comply with state and local requirements. AFR 19-1 directs installations to use municipal or regional waste disposal systems for solid waste disposal whenever feasible.

5.1.7 Hazardous Materials Transportation Act

The US Department of Transportation (DOT) has promulgated standards and developed programs intended to ensure safe transportation of hazardous materials and hazardous wastes. Regulations for DOT hazardous materials shipment standards are detailed in 49 CFR, Subchapters B and C.

5.1.8 Federal Facilities Compliance Act

The Federal Facilities Compliance Act (FFCA) of 1992 waives the sovereign immunity of federal facilities, including DOD installations, with regard to enforcement of RCRA and its implementing regulations governing hazardous waste management practices at federal facilities. The FFCA requires annual facility inspections; provides for fines and administrative orders against federal facilities; and although it protects government employees from civil penalties, it allows prosecution of government employees for violation of federal and state hazardous waste laws.

5.1.9 Occupational Safety and Health Act

The Occupational Safety and Health Act (OSHA) forms the framework for a body of regulations which, among other things, are intended to ensure worker safety and health through regulation of work practices and work environments. OSHA specifically addresses hazardous waste operation, emergency responses, toxic and hazardous substance operations, and communication of information concerning occupational hazards, specifying appropriate protective

measures for all employees. The US Occupational and Health Administration administers OSHA. Regulations are detailed in 29 CFR 1910.

5.1.10 Spill Prevention, Control, and Countermeasures Plan; Contingency Plan

Under 40 CFR 112, facilities that manage oil and oil products are generally required to prepare and implement a spill prevention, control, and countermeasures (SPCC) plan. Certain facilities are exempt from the requirement based on facility oil storage capacity. Exempt facilities are those that have underground storage capacity of 42,000 gallons or less and above-ground storage capacity of 1,320 gallons or less, provided no single above-ground storage container capacity exceeds 660 gallons.

The facility SPCC plan should describe equipment, processes, and operations that may pose a threat of oil discharge. It should also describe structures, procedures, policies, and programs for safety standards, pollution, and fire prevention. The plan should meet applicable state guidelines for management of oil and hazardous substance spills.

Title 40 CFR 264 (or 265), Subparts C and D, require that owners and operators of hazardous waste treatment, storage, and disposal (TSD) facilities prepare an emergency contingency plan describing equipment, procedures, and programs to minimize emergency situations such as fire, explosion, or hazardous substance release, and to respond to any emergencies that may occur. Facilities exempt from the TSD permitting requirements because of the less-than-90-day storage exemption (40 CFR 262.34) are also required to prepare and implement an emergency contingency plan per 40 CFR 262.34(a)(4).

The SPCC plan and contingency plan establish specific notification and reporting procedures and training programs based on the requirements of 40 CFR 117 and 302, and 29 CFR 1910.120. Regulations in 40 CFR 117 and 302 establish chemical-specific reportable quantities in case of a spill or a release. Title 29 CFR 1910.120 establishes regulations regarding training and protection of personnel involved in routine hazardous waste operations or emergency response action.

5.1.11 Pollution Prevention Act

The Pollution Prevention Act (PPA) of 1990 presents Congressional findings on the need for pollution prevention and source reduction programs. It further states that it is "the national policy of the United States that pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible."

5.2 PERMIT REQUIREMENTS

Under the proposed action, Luke AFB's generator status would not be altered or modified, since no hazardous wastes are anticipated to be generated, treated, or stored in conjunction with the project. Certain permits would need to be obtained before commencement of the project.

5.2.1 National Pollution Discharge Elimination System General Permit

A NPDES general permit for storm water discharge from construction sites, including a Notice of Intent (NOI) and a storm water pollution prevention plan (SWP3) that implements Best Management Practices (BMPs) will be required.

5.2.2 Section 404 Dredge and Fill Permit

A Section 404 dredge and fill permit from the COE (currently undergoing permit process) will be required. The COE has a nationwide permit for areas affected less than 1 acre in size. However, one must apply to obtain the permit.

5.2.3 Air Permits

The Maricopa County air pollution program is managed by the Maricopa Management & Transportation Agency, Division of Air Pollution Control under authority of the Arizona Revised Statutes, Title 49 - The Environment; Chapter 3 - Air Quality; Articles 1-7 and the Maricopa County Air Pollution Control Regulations. The Maricopa County Air Pollution Control Regulations have been adopted to implement the policy set forth in Title 49 of the Arizona Revised Statues and to fulfill the State's responsibility under the CAA to provide a legally enforceable SIP for the attainment and maintenance of the NAAQS.

According to the Maricopa County Air Pollution Control Regulations, Regulation II - Permits and Fees, Rule 200, Section 300 states that no person shall engage in any earth moving operation that disturbs a total surface area of 0.10 acre or more without first obtaining an Earth Moving Permit. In addition to the permit, a control plan must be formulated to minimize fugitive dust. The Earth Moving Permit will be issued for a period of one year. The permit can be renewed annually if the project lasts longer than one year. The renewal application must be submitted at least 14 calendar days prior to the expiration of the original permit.

Regulation III - Control of Air Contaminants, Rule 310 - Open Fugitive Dust Sources also requires an Earth Moving Permit prior to commencing any earth moving operation or dust generating operation. This rule was developed to limit the emission of particulate matter into the ambient air from any property, operation, or activity that may serve as an open fugitive dust source. The effect of this rule is to minimize the amount of PM_{10} entrained into the air as a result of human activities by requiring measures to prevent, reduce, or mitigate particulate emissions.

These rules require the submission of a control plan with the permit application. The control plan is one of the measures used to mitigate fugitive dust emissions. The control plan is a written report describing all reasonably available control measures to be implemented at a project site for any earth moving and/or dust generating operation. In addition to standard information such as names, addresses, and phone numbers, the plan requires a plot plan which describes the total land surface to be disturbed; operation/activities to be carried out at the site; all actual and potential sources of fugitive particulate emissions on site; and delivery, transport, and storage areas for the site, including the types of materials stored and size of piles. The plan also requires a description of:

- Reasonably available control measures or combination of measures to be applied during all periods of dust generating operations to each dust source. At least one control measure must be implemented for each source;
- Dust suppressants to be applied, including product specifications or label instructions for approved usage; the method, frequency and intensity of application; the type, number and capacity of application equipment; information on environmental impacts and approvals or certifications related to appropriate and safe use for ground applications;

- Specific surface treatments and/or reasonable available control measures to control material track-out and sedimentation to paved surfaces;
- One auxiliary reasonably available control measure designated as a contingency measure should an original control measure in the Control Plan prove ineffective.

Rule 310 also addresses unpaved parking areas or staging areas, unpaved haul and access roads, disturbed surface areas, material handling, material transport, haul trucks, and roadways.

5.2.4 Transportation Plan

A traffic control plan must be submitted to MCDOT by the contractor for review and approval of signage, detours, and road closures.

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Section 6

Persons and Agencies Contacted

SECTION 6

PERSONS AND AGENCIES CONTACTED

The following individuals were consulted during the preparation of this environmental assessment:

6.1 US AIR FORCE

Eilerts, Bruce, Luke AFB
Hamlin, Geoffrey, Luke AFB
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Rothrock, Jeff, Luke AFB
Sheahan, Robert, HQ AETC/CEVC, Randolph AFB
Wales, Jeff, Lt, Luke AFB

6.2 FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (FCDMC)

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Gardner, Dave
Moore, Catesby
Motamedi, Amir
Rerick, Don

6.3 MARICOPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT, AIR POLLUTION CONTROL DIVISION

Crumbaker, Jo
Terrin, Trace

6.4 MARICOPA COUNTY COUNCIL OF GOVERNMENTS

Bauer, Lindy
Eberhart, Doug
Herzog, Roger
Wolfe, Harry

6.5 ARIZONA DEPARTMENT OF ECONOMIC SECURITY

Jeffries, Betty

6.6 ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Biaz, Lupe
Kulton, Jeff
Steel, Tim

Section 7

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SECTION 7

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Section 8

List of Preparers

SECTION 8

LIST OF PREPARERS

Name	Degree	Professional Discipline	Years of Experience
Teresa Anderson	B.S., physical and applied geography	Environmental scientist	2
Anthony C. Davis, P.E.	B.S., civil engineering	Civil and environmental engineer	17
C. Keith Ganze	M.S., civil engineering	Civil and environmental Engineer	6
James A. Garrison	M.Eng. environmental, engineering	Air quality specialist	26
Carolyn Kelly	B.S., environmental management	Environmental scientist	5
J. David Latimer	M.Engr., environmental engineering	Civil and environmental engineer	3
Randy Palachek	M.S., aquatic biology	Environmental scientist	12
John M. Wallin	B.A., biology	Environmental scientist	23
Kent Wells	M.S., industrial hygiene	Environmental scientist	8
Rutherford C. Wooten	Ph.D., ecology/ biology	Environmental scientist	30

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Appendix
Agency Comment Letters

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

58 CES/CEVN
14002 West Marauder St.
Luke AFB, AZ 85309-1125

2 February 1994

Mr. Sam Spiller
U.S. Fish and Wildlife Service
Ecological Services
3616 West Thomas, Suite 6
Phoenix, AZ 85019

Dear Mr. Spiller:

The Air Force is aware that under 50 CFR Part 17, Section 402, formal consultation with your office is required when a federal action is likely to adversely affect threatened and endangered species.

The Flood Control District of Maricopa County is proposing to reconstruct a flood control canal and construct a settling basin on lands partially owned by the Air Force near Luke Air Force Base (AFB), Arizona. The project will consist of the reconstruction of the existing Dysart Drain channel located along the north side of Luke AFB from Reems Road to the Agua Fria River. East of the base, the channel is located on the half-section line between Northern Avenue and Glendale Avenue. A 160-acre detention basin is proposed for construction as part of the project, and will intercept the 100-year storm event run-off from the watershed area north of the channel and convey flows to the Agua Fria River.

Although no candidate and/or listed threatened and endangered species are known to occur within, or transit the proposed project area, informal consultation with your agency was considered necessary for environmental documentation purposes. The Air Force wishes to announce the intentions of all involved parties in order to minimize future potential impacts to any candidate and/or listed threatened and endangered species which may be adversely impacted by the proposed project.

The proposed project site presently consists of developed and highly disturbed agricultural land adjacent to a county road. The proposed project entails the removal of vegetation, grading and reconstruction of a flood control canal and settling basin. The settling basin is being designed to accommodate flood waters which will rarely inundate the proposed canal and will not retain standing water for more than a few days out of a year. The proposed project is not expected to create desirable habitat containing standing water which would be attractive to migratory birds and threatened and endangered species. Should such species utilize the proposed project site for foraging or loafing, it is anticipated that habitat utilization will be of a temporary nature.

A review copy of a letter from a previous consultation with Arizona Game and Fish and maps depicting the location of the proposed project, are provided in attachments 1 and 2 for your information and review. It is requested that you review this action to determine if further consultation regarding impact on candidate and/or threatened and endangered species is warranted.

Should you require further information concerning this request, please contact our Natural Resources Management staff at telephone, (602) 856-3621 or facsimile transmission at (602) 856-3817.

Sincerely,

2 Atch
1 AZ G&F Ltr, 7 Dec 93
2 Project maps

Bruce D. Eilerts

BRUCE D. EILERTS
Natural Resources Planner

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
ARIZONA ECOLOGICAL SERVICES STATE OFFICE
3616 West Thomas Road, Suite 6
Phoenix, Arizona 85019

Telephone: (602) 379-4720 FAX: (602) 379-6629

2-21-94-I-178

February 28, 1994

Bruce Eilerts
Department of the Air Force
58 CES/CEVN
14002 West Marauder Street
Luke AFB, Arizona 85309-1125

Dear Mr. Eilerts:

This letter is in response to your February 2, 1994, request for information on listed or proposed threatened or endangered species and candidate species that may occur in the area of Townships 2 & 3 North, Range 1 West, Maricopa County, Arizona, for proposed reconstruction of Dysart Road Channel and construction of a settling basin.

Our data indicate that no listed or proposed threatened or endangered species would likely be affected by the proposed action.

If any proposed action may affect riparian areas, the following concerns should be noted. The Service is concerned about the protection of riparian habitats because they are rare and declining in the southwestern United States. Because many plant and animal species only occur or are more abundant in riparian areas, protecting and conserving riparian areas is critical to preserving genetic, species, population, and community diversity throughout Arizona. Maintaining hydrologic and other environmental conditions that support healthy riparian ecosystems is essential to the maintenance of healthy populations of plants, invertebrates, fish, amphibians, reptiles, birds, and mammals. Riparian areas also provide linear corridors critical to migratory species such as neotropical birds, waterfowl, and certain bats. The Service recommends that effects to riparian areas be avoided or mitigated.

From information provided on the proposed projects, it appears that placement of fill into waterways of the United States may be required. The Army Corps of Engineers (Corps) regulates this activity under Section 404 of the Clean Water Act. We suggest that you contact the Regulatory Branch of the Corps early in the planning process so they may determine if you need to obtain a Section 404 permit.

In future communications on this project, please refer to consultation number 2-21-94-I-178. If we may be of further assistance, please contact Brenda Andrews or Tom Gatz.

Sincerely,

for Sam F. Spiller
State Supervisor

cc: Director, Arizona Game and Fish Department, Phoenix, Arizona
Regulatory Branch, U.S. Army Corps of Engineers, Phoenix, Arizona

THE STATE OF ARIZONA

GAME & FISH DEPARTMENT

2221 West Greenway Road, Phoenix, Arizona 85023-4399 (602) 942-3000

Governor
Fife Symington

Commissioners:
Larry Taylor, Yuma, Chairman
Elizabeth T. Woodin, Tucson
Arthur Porter, Phoenix
Nonie Johnson, Snowflake
Michael M. Golightly, Flagstaff

Director
Duane L. Shroufe

Deputy Director
Thomas W. Spalding

Region VI
7200 East University, Mesa, Arizona 85207 (602) 981-9400

December 7, 1993

Catesby Moore, Environmental Program Manager
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009

Dear Ms. Moore:

Re: Reconstruction of Dysart Road Channel, East of Luke A.F.B.

The Arizona Game and Fish Department (Department) has reviewed the above referenced project. As proposed, this project is not expected to result in significant adverse impacts to wildlife resources. In addition, the Department's Heritage Data Management System has been accessed and at this time current records do not indicate the presence of any Endangered, Threatened, or other special status species in the vicinity of T2N, R1W, Sections 1-4, and T3N, R1W, Section 32.

Thank you for the opportunity to comment on this proposed reconstruction project.

Sincerely,

Thomas R. McMahon
Habitat Evaluation Specialist
Mesa Region

TRMc:trMc

cc: Kelly Neal, Region VI Supervisor
Dave Walker, Habitat Branch, Phoenix
Jim Wegge, Wickenberg East District Wildlife Manager
Sam Spiller, USFWS, Ecological Services, Phoenix

AGFD# 11/22/93 (03)

DJR

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
ARIZONA-NEVADA AREA OFFICE
3636 NORTH CENTRAL AVENUE
PHOENIX, ARIZONA 85012-1936

REPLY TO
ATTENTION OF:

MAR - 2 1993

Office of the Chief
Regulatory Branch

Flood Control District of Maricopa County
ATTN: Olin S. Sutton, Jr.
2801 West Durango Street
Phoenix, Arizona 85009

File Number: 93-324-CL

Dear Mr. Sutton,

Reference is made to your letter of January 25, 1993, in which you inquired as to the jurisdictional limits of the Clean Water Act, ordinary high water mark and/or wetland boundary, of the Agua Fria River at the intersection of the Agua Fria River and the Dysart Drain (Section 1, Township 2 North, and Range 1 West) in the City of Glendale, Maricopa County, Arizona.

The Corps of Engineers has no permit authority under Section 404 of the Clean Water Act in the area(s) outside of the ordinary high water mark or outside wetlands designated on the enclosed aerial photograph or map. However, any activity that discharges dredged or fill material into the designated jurisdictional area(s) requires a Section 404 permit. This jurisdictional determination will remain in effect for three years from the date of this letter unless an unusual flood event occurs. After this three year period or after an unusual flood event alters stream conditions, the Corps of Engineers reserves the authority to retain the original jurisdictional limits or to establish new jurisdictional limits as conditions warrant.

Please include a copy of this letter and the corresponding jurisdictional delineation with any application to the Corps of Engineers for a Section 404 permit.

The receipt of your letter is appreciated. If you have any questions please contact me at (602) 640-5385.

Sincerely,

Cindy J. Lester

Cindy J. Lester
Acting Chief, Arizona Field Office
Regulatory Branch

Enclosure(s)

FLOOD CONTROL DISTRICT
of
Maricopa County

2801 West Durango Street • Phoenix, Arizona 85009
Telephone (602) 506-1501
Fax (602) 506-4601
TDD (602) 506-5897

Neil S. Erwin, P.E., Chief Engineer and General Manager

3/31/94

Ms. Cindy Lester
U.S. Army Corps of Engineers
3636 North Central Avenue, Suite 760
Phoenix, Arizona 85012-1936

SUBJECT: Dysart Drain Improvements Project (proposed impacts to less than 1 acre)

Dear Cindy:

The Flood Control District has initiated the design of flood control improvements for the Dysart Drain, which is located approximately 0.5 miles north of Glendale Avenue between Luke Air Force Base and the Agua Fria River. The limits of the waters of the U.S. at the Agua Fria River were delineated by your office in March 1993 (copy enclosed) and provided to the District. In February of this year, District staff completed a proposed delineation of a "blue line" wash that crosses the project alignment about 1,450 feet west of El Mirage Road. Enclosed for your review and concurrence are 1" = 200' scale aerial photos of the proposed delineation.

The Dysart Drain Improvements Project, which serves as the outfall for Luke Air Force Base, will have minor impacts to three areas within waters of the U.S. The total area disturbed is less than one acre of land. Enclosed are 30% plan sheets (numbers 20 and 22), which show the previously-approved and proposed locations of the waters of the U.S. as well the areas of impact. Descriptions of the three disturbance areas are provided below.

AREA 1 - Located at the existing outfall of the Dysart Drain channel into the Agua Fria River. The total area impacted is less than 11,000 square feet. Grouted rip rap will be placed at the end of the existing outlet spillway for a distance of about 30'. The remaining area will be used for construction access.

AREA 2 - Located along the north side of the present Dysart Drain channel, and about 1,450 feet west of El Mirage Road. The total area impacted is less than 8,500 square feet. This area will be used for construction of a new spillway and a gravel operation and maintenance access road. The remaining area will be used for construction access.

AREA 3 - Located along the south side of the present Dysart Drain channel, and about 1,450 feet west of El Mirage Road. The total area impacted is less than 1,800 square feet. This area will be used for construction of a gravel operation and maintenance road. The remaining area will be used for construction access.

The total area impacted is approximately 21,300 square feet, or less than one half of an acre. The jurisdictional areas will be clearly indicated on the construction plans, with clear direction given to the contractor that no construction activities of any kind will be permitted beyond these boundaries.

We request that your office review these areas and provide us with the appropriate permit authority to proceed with the project as described above. In order to keep this project on track, we request your response by May 1, 1994.

Please call me if you have any questions.

Sincerely,

David Meinhart, AICP
Flood Control Planner

Enclosures

ARIZONA STATE PARKS

1300 W. WASHINGTON
PHOENIX, ARIZONA 85007
TELEPHONE 602-542-4174

February 9, 1994

Geoffrey R. Hamlin
Program Manager, Environmental Assessments
58 CES/CEV
14002 W. Marauder
Luke Air Force Base, AZ 85309-1125

RE: Luke AFB, Dysart Drain Improvement Project, FCDMC and DOD-AF

Dear Mr. Hamlin:

Thank you for consulting with us about the above proposed project that will involve a joint venture between Luke Air Force Base and the Flood Control District of Maricopa County (FCDMC). I have reviewed your submittal and have the following comments pursuant to 36 CFR Part 800:

I note that a cultural resource inventory of the 218 acre project area did not locate any significant cultural remains. In my opinion, the survey report was very thorough and certainly meets the Secretary of the Interior's standards for such investigations.

Given the negative finding of the survey, it is my opinion that the reviewed project should have no effect on any National Register listed or eligible properties.

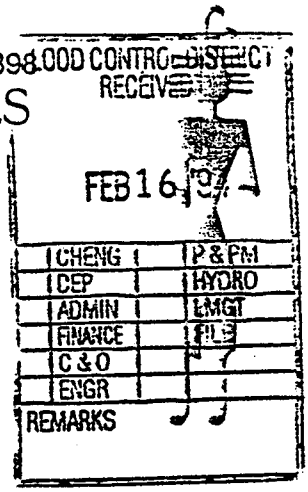
We appreciate your continued cooperation with this office in complying with the historic preservation requirements for Federal undertakings. If you have any questions, please contact me at 542-7137 or 542-4009.

Sincerely,

Robert E. Gasser
Compliance Coordinator
State Historic Preservation Office

2542 W. Monterey Way • Phoenix, Arizona 85017-5104 • (602) 257-8398

SCIENTIFIC ARCHEOLOGICAL SERVICES



SUMMARY PROJECT DATA *

PROJECT TITLE: Dysart Drain Addendum Inventory Project

SPONSOR: Flood Control District of Maricopa County (FCDMC)

LEAD AGENCY: U.S. Air Force at Luke Air Force Base (LAFB)

PROJECT UNDERTAKING: The FCDMC and LAFB plan to enhance the flood control capabilities of the Dysart Drain, as it crosses the northern boundary of the base. This will require the impact of three contiguous areas, designated Parcels A, B, and C.

ARCHEOLOGICAL PROJECT DESCRIPTION: Two types of archival research: a literature search and a site records check, were earlier performed for the entire Dysart Drain project area, and in intensive survey was then made of Parcels B and C. This addendum project thus required only the additional intensive survey of Parcel A.

LOCATION: As indicated on the USGS 7.5' quad map of El Mirage, Arizona, Parcel A occurs immediately south of Olive Avenue, east of Reems Road, north of Northern Avenue, and west of undeveloped Bullard Avenue. It is thus located in the E2 of the E2 of the SE4 of the NW4 and the W2 of the NE4 of Sec 32 in T3N,R1W (G&SRB&M).

NUMBER OF SURVEYED ACRES: 30.30

NUMBER OF PREHISTORIC-HISTORIC ISOLATED ARTIFACTUAL LOCI: 0

NUMBER OF PREHISTORIC-HISTORIC SITES/ELIGIBLE SITES: 0/0

LIST OF ELIGIBLE SITES: NA

LIST OF INELIGIBLE SITES: NA

COMMENTS: Absolutely no prehistoric or historic archeological sites and no isolated artifacts were encountered during either the former archival research investigation or the present intensive survey of Parcel A.

RECOMMENDATIONS: SAS suggests that the proposed development of Parcel A will have no effect upon any prehistoric or historic property and, thus, recommends that official clearance be issued to permit all planned development of the Dysart Drain Improvements Project.

* This sheet is to accompany the project report sent to the SHPO; it should be removed immediately thereafter.

ARIZONA STATE PARKS

1300 W. WASHINGTON
PHOENIX, ARIZONA 85007
TELEPHONE 602-542-4174

April 5, 1994

Bruce D. Eilerts
Natural Resources Planner
58 CES/CEVN
14002 West Marauder Street
Luke Air Force Base, AZ 85309-1125

RE: Luke AFB, Dysart Drain Improvements, Maricopa County Flood Control and DOD-AF

Dear Mr. ~~Eilerts~~:

Thank you for consulting with us about the above proposed project and sending us a copy of the cultural resources inventory report prepared by James Rodgers from Scientific Archaeological Services. I have reviewed your submittal, which is very thorough and consistent with the Secretary of the Interior's standards for such investigations, and have the following comments pursuant to 36 CFR Part 800:

I note that the approximate 30 acre project area was surveyed and absolutely no prehistoric or historic cultural resources were found. Since no historic properties were found, it is my opinion that the reviewed project should have no effect on any National Register eligible properties.

In the event that subsurface archaeological remains be encountered during project ground disturbing activities, work should cease in the area of the discovery and this office be notified immediately, pursuant to 36 CFR 800.11.

We appreciate your continued cooperation with this office in complying with the historic preservation requirements for federal undertakings. If you have any questions, please contact me at 542-4174 or 542-4009.

Sincerely,

Robert E. Gasser
Compliance Coordinator
State Historic Preservation Office