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Draft
Clean Air Act
General Conformity Analysis

Dysart Drain Flood Channel Improvement Project

Luke Air Force Base, Arizona

May 1994

DEPARTMENT OF THE AIR FORCE
Air Education & Training Command

ENGINEERING-SCIENCE, INC.

8000 Centre Park Drive, Suite 200 • Austin, Texas 78754 • (512) 719-6000 • Fax: (512) 719-6009

May 23, 1994

Robert Sheahan
HQ AETC/CEVC
266 F Street West, Building 901
Randolph AFB, TX 78150

Re: Contract F33615-89-D-4003, Order 144
Draft Clean Air Act General Conformity Analysis
Dysart Drain Flood Channel Improvement Project
Luke AFB, Arizona

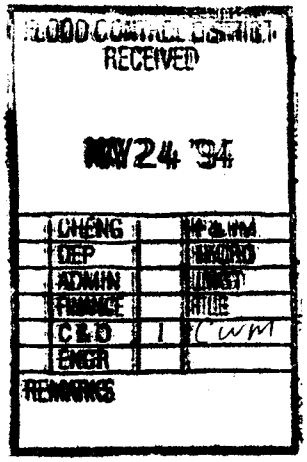
Dear Mr. Sheahan:

Enclosed are ten copies of the subject document. Five copies of the document have been sent to Capt Mike Ray at 58 CES/CEV, Luke AFB. In addition, one copy each has been sent to the Flood Control District of Maricopa County and Armstrong Laboratory.

Sincerely,

James A. Jamison for RMP
Randy M. Palachek
Project Manager

xc: Capt Mike Ray, 58 CES/CEV
Flood Control District of Maricopa County
Armstrong Laboratory/OEB



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Clean Air Act
General Conformity Analysis
Dysart Drain Flood Channel
Improvement Project

Luke Air Force Base, Arizona

Prepared for

Department of the Air Force
Air Education and Training Command

Prepared by

Engineering-Science, Inc.
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Austin, Texas 78754

May 1994

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EXECUTIVE SUMMARY

The United States Air Force (USAF) in conjunction with the Flood Control District of Maricopa County (FCDMC) is proposing to reconstruct and improve the existing Dysart Drain Flow Channel at Luke Air Force Base (AFB). The Dysart Drain is located along the northerly limit of Luke AFB, and flows in an easterly direction from the northwest corner of the base to the Agua Fria River, about one and one quarter mile east of Luke AFB. The existing channel was constructed by the US Army Corps of Engineers in the late 1950;s to intercept and convey storm runoff to the Agua Fria River.

Over the past 35 years the capacity of the channel has been significantly reduced due to local ground subsidence caused primarily by intensive ground water pumping. The present channel invert has a negative slope away from the Agua Fria River, flowing back towards Luke AFB. Therefore, storm runoff from the area north of Luke AFB exceeds the capacity of the channel, over tops the channel, and contributes to the flooding on Luke AFB. Flooding has impacted base operations, base housing, and other base support services. Flooding has been a chronic problem and caused extensive damage to the base in 1955, 1979, 1992, and 1993. Damage from flooding in September 1992 and January 1993 caused an estimated $3, 500,000 in damages.

In the fall of 1992, Luke AFB and FCDMC entered into discussions to develop a joint project to resolve the chronic flooding problems caused by the inadequate and non-functional Dysart Drain Flood Channel. To correct the flooding problem, the USAF and FCDMC propose to reconstruct and improve the conveyance capacity of the Dysart Drain. The Dysart Drain will be improved so that it will effectively intercept the 100-year storm event runoff from the watershed north of Luke AFB and convey it to the Agua Fria River. The proposed action includes channel reconstruction and the addition of a retention basin and spoil area.

Luke AFB is located in the central part of the State of Arizona in Maricopa County. Maricopa County has been designated as the Maricopa Intrastate Air Quality Control Region (AQCR). Luke AFB is located in portions of the AQCR designated by the US Environmental Protection Agency (EPA) as moderate nonattainment for carbon monoxide (CO), ozone (O_3), and particulate matter with an aerodynamic diameter equal to or less than 10 microns (PM_{10}). The ozone precursors of concern are volatile organic compounds (VOCs) and nitrogen oxides (NO_x).

The conformity analysis conducted by the USAF pursuant to EPA's general conformity rule and Section 176(c) of the Clean Air Act shows that the peak-year air pollutant emissions associated with the proposed action are substantially less than

the 100 tons per year (tpy) threshold emission levels that trigger EPA's requirement for the USAF to conduct a formal conformity determination. During any 12-month period of the project buildout (buildout will take approximately 18 months), the total net emissions resulting from the proposed action will be 2.32 tpy of VOCs, 23.17 tpy of NO_x, 11.47 tpy of CO, and 17.64 tpy of PM_{10}. Once the drain improvement project is completed, no further pollutants will be emitted.

Unless the proposed action is subsequently modified in such a manner that results in a substantial net increase of CO, VOCs, NO_x, or PM_{10} emissions, no further conformity analysis is needed for approval or implementation of the proposed action.

CHAPTER 1

INTRODUCTION

1.1 PURPOSE

Headquarters Air Education and Training Command (AETC) is in the process of executing the environmental impact analysis process (EIAP) and development of related studies and documentation to identify impacts from activities associated with the proposed improvements to the Dysart Drain Flood Channel at Luke Air Force Base (AFB), Arizona. This effort will consist of the preparation of an environmental assessment (EA) to consider the cumulative impacts of the proposed action. As part of the EIAP process, an air emission impact analysis will be conducted to determine what, if any, air quality impacts result from the proposed action. The purpose of this conformity analysis is to document whether the pollutant emissions from the proposed improvement to the Dysart Drain conform to the current portions of the Maricopa County state implementation plan (SIP) approved by the US Environmental Protection Agency (EPA). Using the parameters of EPA's final general conformity rule, published in 58 Federal Register 63214 (November 30, 1993) and codified at 40 CFR part 93, subpart B, this document analyzes whether the applicable criteria air pollutant emissions associated with the project equal or exceed the threshold emission limits that trigger the need to conduct a formal conformity determination.

1.2 SCOPE

The analysis is limited to the criteria pollutants for which Maricopa County is designated as nonattainment. Those criteria pollutants are ozone (O_3), carbon monoxide (CO), and particulate matter having an aerodynamic diameter less than or equal to 10 microns (PM_{10}). The ozone precursors of concern are volatile organic compounds (VOCs) and nitrogen oxides (NO_x). The analysis follows the requirements imposed by section 176(c) of the Clean Air Act and 40 CFR part 93, subpart B.

1.3 GENERAL CONFORMITY

Section 176(c) of the Clean Air Act, codified at 42 USC 7506(c), prohibits a federal agency from implementing, approving, or supporting any activity that fails to conform to an approved SIP or EPA-promulgated federal implementation plan (FIP). The statute provides that conforming to a SIP or FIP means that the activity will not:

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 non-transportation 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.

1.4 CONFORMITY PROCESS UNDER EPA'S GENERAL CONFORMITY RULE

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 doesn't 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 1-1. The federal agency calculates the total of direct and indirect emissions for each type of nonattainment pollutant resulting from the project on a tpy 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 don't 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).

Fourth, if the entire federal action hasn't 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.

1.5 SUMMARY OF CONFORMITY ANALYSIS, PROPOSED ACTION

Portions of Maricopa County, where Luke AFB is located are 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 1-1 lists EPA's de minimis emission rates for criteria pollutants based on the severity of nonattainment in any given area.

The analysis indicates the proposed action will result in de minimis levels of VOCs, NO_x, CO, and PM_{10} emissions. Additionally, the proposed action is not considered a regionally significant action by EPA's definition. An action is defined as a regionally significant action when the total of direct and indirect emissions of any pollutant from a federal Action does not exceed the de minimis levels but represents 10 percent or more of a nonattainment area's total emissions of that pollutant. Therefore, the proposed action is exempt from the need to conduct any further conformity analysis or formal conformity determination.

The Dysart Drain improvement project is expected to take approximately 18 months to complete and it is assumed that construction activity will be spread evenly over this time period. Therefore, any 12-month period will accurately represent annual emissions from the project due to buildout activities. During a 12-month period during project buildout, the total net emissions are estimated to be

Table 1-1. De Minimis Emission Levels

Pollutant	Emission Rate (tpy)
Ozone (VOCs or NO_x):	
Serious NAAs[a]	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

2.32 tpy of VOCs, 23.17 tpy of NO_x, 11.47 tpy of CO, and 17.64 tpy of PM_{10}. These estimates include emissions from off-road and on-road mobile sources. Project-related mobile source emissions include net increases in fugitive dust and combustive emissions from construction equipment at the site and employee motor vehicle commutes.. Table 1-2 lists the net increase in pollutant emissions by emission source category for the proposed action's peak emissions one-year period. The annual emissions experience during the proposed action's operational phase are well below EPA's 100 tpy de minimis level for the pollutants of concern. It should be noted that all pollutant emissions associated with the improvement project will cease when the project is completed.

Table 1-2. PROPOSED ACTION EMISSIONS

INVENTORY	EMISSIONS (tons/year)				
	CO	VOC	NOx	SOx	PM_{10}[a]
CONSTRUCTION					14.95
CONSTRUCTION EQUIPMENT	8.28	1.80	22.74	2.27	2.02
ON-ROAD MOBILE	3.19	0.52	0.43		0.67
TOTAL:	11.47	2.32	23.17	2.27	17.64
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	0.00	0.04	0.04	0.04

CHAPTER 2

PROPOSED ACTION

2.1 SUMMARY

The proposed action is to reconstruct and improve the conveyance capacity of the Dysart Drain Flood Channel. The Dysart Drain will be improved so that it will effectively intercept the 100-year storm event runoff from the watershed north of Luke AFB and convey it to the Agua Fria River. Part of the Dysart Drain improvement project will be the construction of a detention basin and spoil area at the upstream end of the improved channel. The detention basin and spoil area are used to minimize the size of the reconstructed channel and reduce the right-of-way and utility impacts and their associated costs.

2.2 PROJECT LOCATION

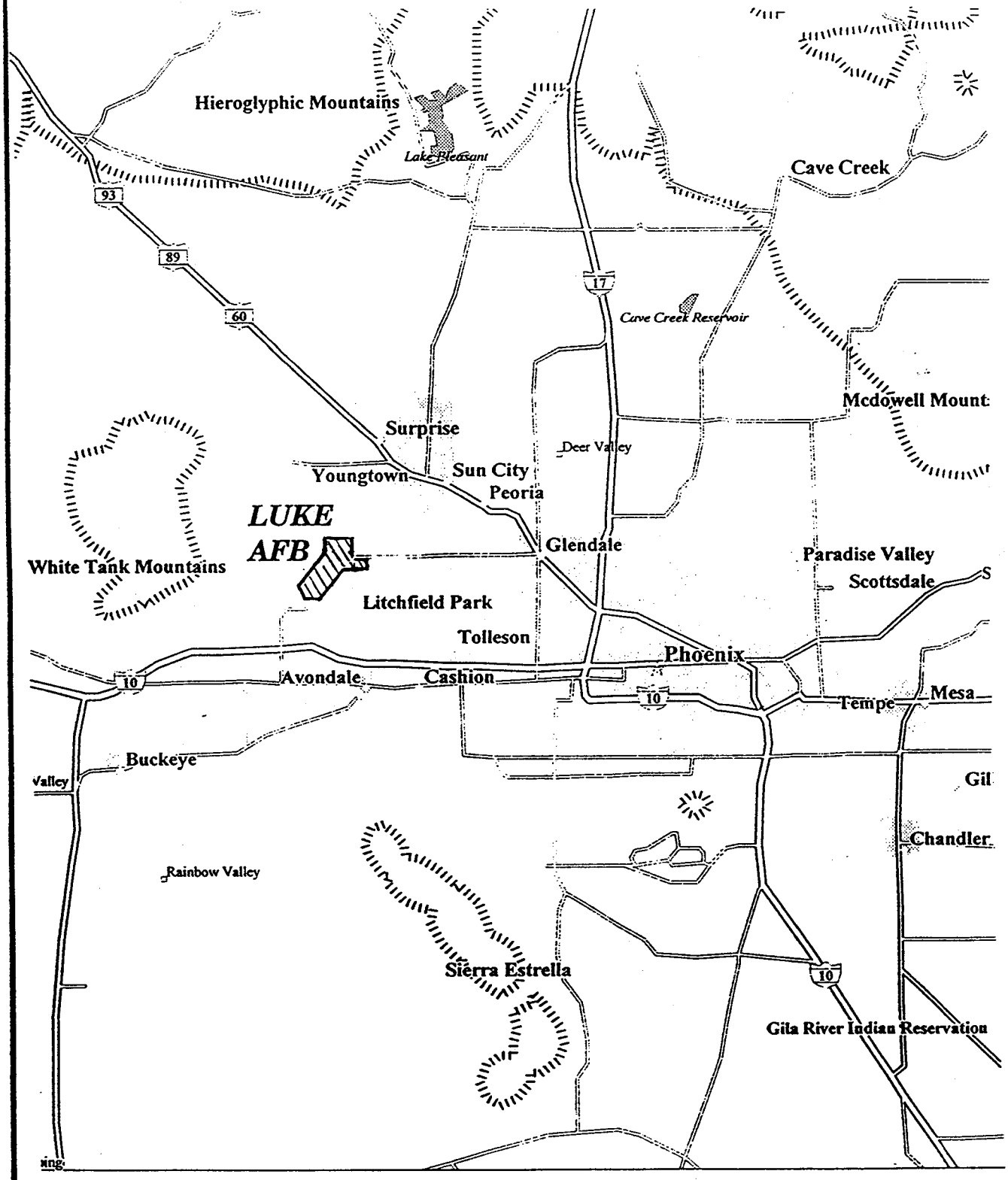
Luke AFB is located in Maricopa County in the central part of the State of Arizona. The base is located approximately 25 miles northwest of Phoenix, just outside of the city limits.. Figure 2-1 provides a general location map for Luke AFB. The Dysart Drain Flood Channel is located along the northerly limit of Luke AFB and flows in an easterly direction from about one half mile west of the base to the Agua Fria River. The length of the drain system is approximately 4 miles. The relative location of the Dysart Drain with respect to Luke AFB is shown in Figure 2-2.

2.3 BACKGROUND

The Dysart Drain was constructed by the US Army Corps of Engineers in 1958 to collect off-site stormwater runoff and to protect Luke AFB property from flooding. The entire Dysart Drain lies within property owned by the 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 flood Luke AFB. The floodwaters impounded by the dam are discharged to the Agua Fria River.

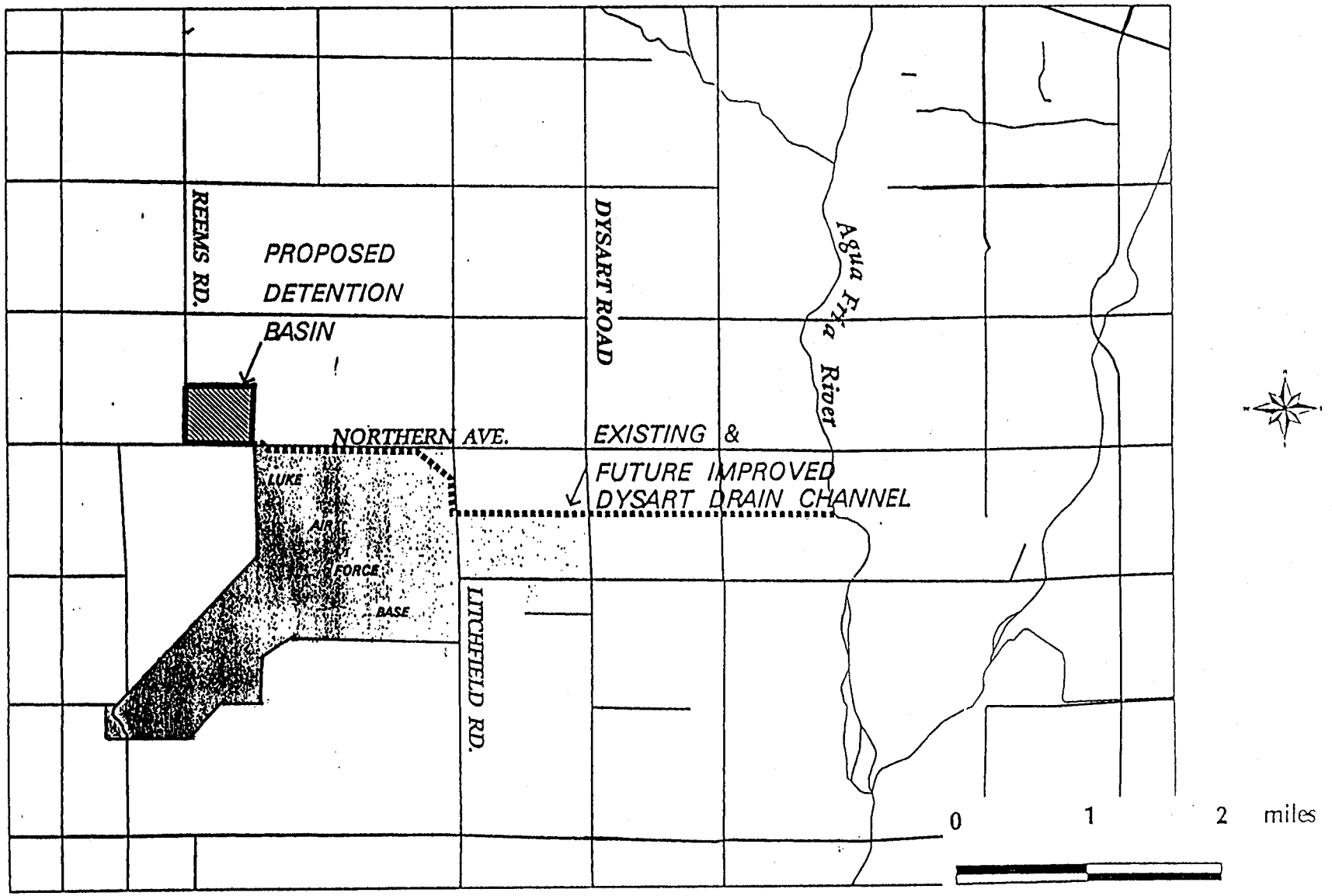
The purpose of the Dysart Drain is to collect and convey runoff from the contributing drainage area downstream of McMicken Dam (approximately 50 miles). The drainage area is primarily agricultural land. Stormwater runoff travels overland via sheet flow, roadways, and farm ditches. The flow generally follows a mild slope in a southeasterly direction. Almost no stormwater runoff from Luke AFB enters the Dysart Drain, since the base lies down slope from the channel.

FIGURE 2-1
GENERAL LOCATION MAP
LUKE AFB



Scale 1:500,000 (at center)
10 Miles

FIGURE 2-2
GENERAL LOCATION MAP
DYSART DRAIN IMPROVEMENT PROJECT



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McMicken Dam and the Dysart Drain were built in response to a large flood that occurred in August of 1951 when subtropical storm system dropped a large amount of rain on the upstream watershed which resulted in heavy flooding. Luke AFB suffered extensive damage, as did surrounding agricultural lands. Chronic flooding has occurred in 1955, 1979, 1992, and 1993, causing extensive damage at Luke AFB and disruption to base operations. Flooding in September 1992 and January 1993 produced an estimated $3,500,000 in damages to base facilities.

Land subsidence in the area around Luke AFB has occurred for a number of years. The subsidence is believed to be primarily due to groundwater pumping. The problem for the Dysart Drain is that the drain has experienced differential land subsidence at various point along its run. Almost no subsidence has occurred just east of Dysart Road. However, the land has subsided approximately 12 feet at Litchfield Road and about 14 feet at the upstream end of the drain at Reems Road. Refer to Figure 2-2. This differential subsidence has resulted in the loss of conveyance capacity in the drain. A 5-year frequency rain event now exceeds the conveyance capacity of the channel and floods the base. The conveyance capacity has been decreased from an original design flow of 1,100 cubic feet per second (cfs) to the current capacity of approximately 300 cfs.

In additions to the problem of land subsidence along the drain, three separate areas exist where stormwater flows are no longer contained within the channel. When the carrying capacity of the channel is exceeded, water overflows to the south onto Luke AFB property. These breakout flows deposit sediment on runways and impair operations and flood base housing.

The Arizona Department of Water Resources regulates the Arizona Groundwater Management Code, a law that was established to actively manage groundwater withdrawal and replenishment. Active Management Areas (AMAs) were set up in regions where severe overdrafts occurred. The Dysart Drain water shed lies within the Phoenix AMA. The primary management goal of the AMAs is to reach a point where there will be no net withdrawal of groundwater, in other words, the amount of artificial and natural recharge equals the groundwater withdrawal. Therefore, this program may alleviate future land subsidence problems.

In the fall of 1992, Luke AFB and the Flood Control district of Maricopa County (FCDMC) agreed to develop a joint project to resolve the chronic flooding problems caused by the inadequate and nonfunctional Dysart Drain Flood Channel. Out of these discussions came the proposal to reconstruct the Dysart Drain. As evidenced in 1992 and 1993, significant storm runoff is generated from the watershed north of Luke AFB and has caused damage to facilities and disruption to operations on Luke AFB. The proposed action to improve the Dysart Drain Flood Channel will prevent this type of flooding on the base.

2.4 PROJECT DESCRIPTION

The goal of the project is to reconstruct and improve the conveyance capacity of the Dysart Drain Flood Channel so that it can effectively intercept runoff from a 100-year storm event and convey this runoff to the Agua Fria River.

2.4.1 Channel Reconstruction

The 4-mile-long Dysart Drain is located on US Government and US Air Force property. The channel will be reconstructed on 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 design 100-year storm flows (estimated to be 4,000 cfs at the Agua Fria River outlet). 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 any construction activities which may occur adjacent to or within the waters of the United States, as delineated by the US Army Corps of Engineers at the outlet.

The channel depth to the top of the bank will vary from about 8 feet to about 28 feet, as a function of the topography along the alignment and the channel bottom slope. The typical channel cross section will be a concrete-lined trapezoidal section with 1.5:1 side slopes. The bottom width varies from approximately 15 feet to about 25 feet, and the channel top width varies from about 50 feet to about 100 feet. The invert will have a varying slope, with an average slope of about 0.08 percent. The elevation at the top of the spillway to the Agua Fria River will remain at approximately Elevation 1,050 feet.

Other features associated with the channel improvements will be 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.

2.4.2 Detention Basin and Spoil Area

To reduce the magnitude of storm flows entering at the upstream end of the Dysart Drain, and thereby reducing the size of the reconstructed channel, a detention basin will be constructed. The basin will also significantly reduce the stormwater flows along the west side of Luke AFB, which also causes flooding along the southern end of the runway. The basin and associated spoil area will be located northwest and across from Luke AFB, on the northeast corner of Reems Road and Northern Avenue (Figure 2-2). The basin will be placed on existing agricultural land which is privately owned and must be acquired. This land is presently used to grow vegetable crops and rose bushes. The basin and spoil area property will occupy an estimated 155 acres. This basin will also be used for future recreational improvements by Luke AFB.

The basin will have an average depth of about 10 feet, with 6:1 side slopes. The spoil areas will have an average fill height of about 11 feet, with 6:1 side slopes. The basin will discharge flows into the reconstructed Dysart Drain via a culvert running under Northern Avenue.

The basin and associated collector channels will be designed to intercept the 100-year design storm flows, to detain the flows, and to control the discharge at a maximum of 550 cfs into the Dysart Drain. The total storage volume of the deten-

tion basin is estimated to be 550 acre-feet. The basin will be designed to convey the more frequent, less intense storm flows via a low flow channel through the basin and directly to the outlet culvert. This will significantly reduce the need for operation and maintenance activities, curtail the growth of unwanted vegetation, and reduce the occurrence of storm flows interrupting the recreational uses of the basin area.

Associated with the construction of the basin and spoil area, will be the reconstruction required for both a portion of Reems Road, along the west side of the basin and spoil area, and a portion of Northern Avenue, along the south side of the basin and spoil area. This reconstruction is necessary to ensure that stormwater runoff is effectively captured by the basin.

CHAPTER 3

EXISTING AIR QUALITY AND BASELINE

3.1 METEOROLOGY

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. 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. Most of the rainfall occurs from November through March and during the months of July and August. The prevailing wind direction is from the west with the average monthly wind speeds ranging from 3 to 5 knots.

3.2 AIR POLLUTANTS AND REGULATIONS

The EPA has established primary and secondary National Ambient Air Quality Standards (NAAQS) under the provisions of the Clean Air Act (CAA) of 1970. The CAA required states to develop a state implementation plan for the implementation, maintenance, and enforcement of the NAAQS within each state. The CAA also required states to develop special programs for prevention of significant deterioration of air quality in attainment areas, and "reasonable further progress" towards achievement of the NAAQS in nonattainment areas.

The EPA classifies the air quality within each air quality control region (AQCR) as to whether the region meets federal primary and secondary NAAQS. Primary air quality standards were set at levels to protect public health, whereas secondary air quality standards were set at levels to protect public welfare. The criteria pollutants for which NAAQS have been established include:

- Carbon monoxide (CO)
- Lead (Pb)
- Nitrogen oxides (NO_x), measured as 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)

3.3 REGIONAL AIR QUALITY

Luke AFB is located in the Maricopa Intrastate Air Quality Control Region (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 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 3-1. 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} and the CO, and O_3 nonattainment areas are shown on the map in Figure 3-2. It is expected that the PM_{10} nonattainment area will be redesignated as a serious nonattainment area in the near future. 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 3-2.

3.4 BASELINE ACTIVITY LEVELS

The most recent Luke AFB baseline emission inventory is the *Baseline Emissions Inventory, Luke Air Force Base* (1993) by Dames & Moore and is presented in Table 3-1. This inventory included the storage and transfer of JP-4 jet fuel rather than the less volatile JP-8 jet fuel which is in use. Also, the inventory did not include aerospace ground equipment (AGE).

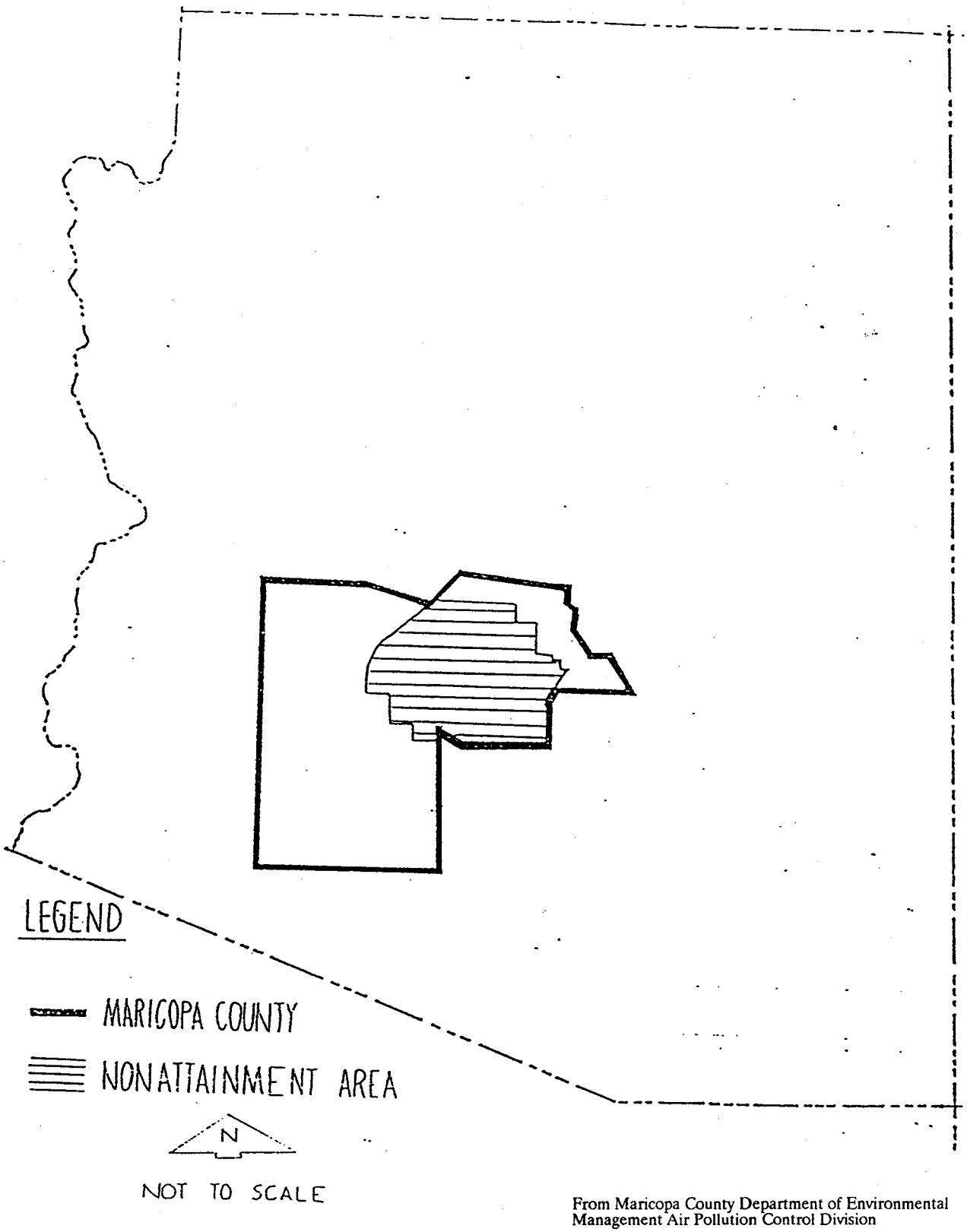
Since the Luke AFB 1993 baseline emissions inventory provided only JP-4 fugitive emissions from the jet fuel storage and distribution system, the inventory was revised to account for JP-8 emissions from the storage and distribution system. Data files for 19 storage tanks were obtained from the Luke AFB emissions inventory contractor and revised to account for the change in fuel types. The 1993 fuel throughput was used to determine baseline fugitive emissions. The fuel switch from JP-4 to JP-8 provided a net reduction in fugitive VOC emissions from jet fuel storage and distribution operations of 70.31 tpy.

The inventory was also revised to account for emissions from AGE. The number and type of AGE units for 1993 were determined using the number of aircraft assigned during 1993 and the AGE requirements package for each aircraft. Emissions were based on predicted hours of operation for each equipment type and added to the inventory.

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 is compared to determine if the action constitutes a regionally significant action under the conformity analysis (as discussed in Section 1.4) are the following Maricopa

FIGURE 3-1
CO INVENTORY PLANNING AREA FOR
MARICOPA COUNTY NONATTAINMENT AREA 1990



From Maricopa County Department of Environmental Management Air Pollution Control Division

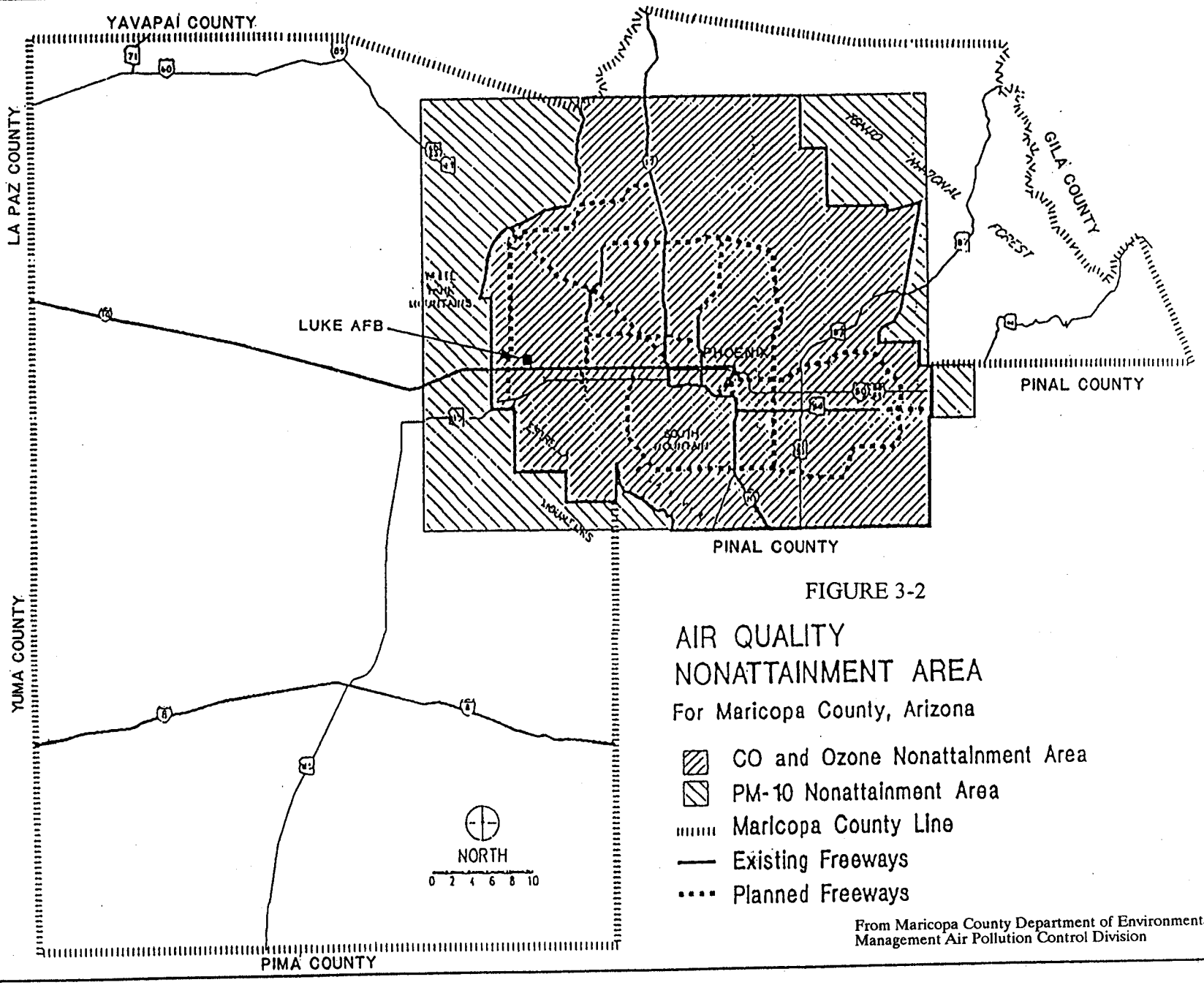

YAVAPAI COUNTY
LA PAZ COUNTY
YUMA COUNTY
PIMA COUNTY
PINAL COUNTY
PINAL COUNTY
GILA COUNTY
LUKE AFB
PHOENIX
SOUTH MOUNTAIN
NORTH
0 2 4 6 8 10
AIR QUALITY
NONATTAINMENT AREA
For Maricopa County, Arizona
CO and Ozone Nonattainment Area
PM-10 Nonattainment Area
Maricopa County Line
Existing Freeways
Planned Freeways
From Maricopa County Department of Environmental Management Air Pollution Control Division

FIGURE 3-2

Table 3–1. 1993 LUKE AFB BASELINE EMISSIONS INVENTORY

INVENTORY	EMISSIONS (tons/year)				
	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 & Moorem
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 tons/yr) are replaced with JP–8 storage/distribution fugitive emission loses (0.79 tons/yr)

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 PM_{10} for 1989 Maricopa County Nonattainment Area*. Table 3-2 provides the 1990 base year emission inventories for Maricopa County.

Table 3–2. 1990 MARICOPA COUNTY BASE YEAR EMISSIONS INVENTORY

INVENTORY[a,b]	EMISSIONS (tons/year)				
	CO	VOC	NOx	SOx	PM_{10}
POINT, AREA, AND NON–ROAD MOBILE	181940	68100	38878		43869
ON–ROAD MOBILE[d]	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

CHAPTER 4

ANALYSIS OF PROPOSED ACTION EMISSIONS

4.1 METHODOLOGY

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 for the conformity analysis was any 12-months 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 track-type loaders, off-highway trucks, and rollers and compactors.
- On-road mobile sources: combustive emissions and roadway fugitive dust emissions from employee vehicles.

Significant atmospheric dust arises from the mechanical disturbance of granular material exposed to air. Dust generated from open sources is called "fugitive dust" because it is not discharged to the atmosphere in a confined flow stream. Common sources of fugitive emissions are those activities associated with construction operations such as land clearing and earth moving. The dust generation process is caused by two basic physical phenomena: 1) pulverization and abrasion of surface materials and 2) entrainment of particulate matter by the action of mechanical force through implements (wheels, blades).

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 (particulate matter) 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 project is assumed to be made up of three distinct areas: 1) the 155-acre detentions basin, 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), and 3) a 15-foot service road running the length of the channel and providing 7 acres of surface area (assumption). Based on these areas, 204 acres will be disturbed over the life of the project. Since the conformity analysis considers annual emissions, two thirds or 136 acres will be disturbed during any 12-month period.

Construction for the proposed action would disturb a total of approximately 136 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} is calculated as follows:

Average daily disturbed acreage

136 acres disturbed/year x 4 acre-days of disturbance/acre x 1 year/115 days = 4.73 acres

Average daily PM_{10} emissions

4.73 acres x 55 lb PM_{10}/acre-day = 260.15 lb PM_{10}/day

= 14.95 tpy.

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 4-1 provides the construction equipment categories and the emissions attributed to each. Estimates for the numbers and types of equipment to be used was obtained from FCDMC.

Emissions for on-road mobile sources were determined by: 1) estimating the number of employees at the site, 2) estimating the average daily trips per employee, 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.

Table 4-1. PROPOSED CONSTRUCTION EQUIPMENT 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

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 were taken from the Maricopa Association of Governments publication *MAG 1993 Ozone Plan for the Maricopa County Area.* Table 4-2 provides the categories of employee-owned vehicles and the emissions attributed to the project from these sources.

4.2 DESCRIPTION OF NET CHANGES IN EMISSIONS BY MAJOR SOURCE

Table 4-3 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.

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 1-1). 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.

Table 4-2. PROPOSED ACTION ON-ROAD VEHICLE EMISSIONS

VEHICLE TYPE[a]	VEHICLE MILES TRAVELED[b]	EMISSION FACTOR (grams/mile)[c]			EMISSIONS (tons/year)		
		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:	3.19	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
A9-17-5-A-2

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

Table 4-3. PROPOSED ACTION EMISSIONS

INVENTORY	EMISSIONS (tons/year)				
	CO	VOC	NOx	SOx	PM_{10}[a]
CONSTRUCTION					14.95
CONSTRUCTION EQUIPMENT	8.28	1.80	22.74	2.27	2.02
ON-ROAD MOBILE	3.19	0.52	0.43		0.67
TOTAL:	11.47	2.32	23.17	2.27	17.64
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	0.00	0.04	0.04	0.04

[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

CHAPTER 5

CONCLUSION

Pursuant to EPA's general conformity rule at 40 CFR part 93, subpart B, the proposed Dysart Drain Flood Channel improvement project does not require further conformity analysis or determinations.

The conformity status of the relevant criteria pollutants is as follows:

Ozone: Analysis of precursor pollutant (VOCs and NO_x) emissions shows that the emissions from the proposed action are de minimis through the buildout of the project.

Carbon monoxide (CO): Analysis of CO pollutant emissions shows that the emissions from the proposed action are de minimis through the buildout of the project.

Particulate matter (PM_{10}): Analysis of PM_{10} pollutant emissions shows that the emissions from the proposed action are de minimis through the buildout of the project.