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CONDITION SURVEY, MARCH AIR FORCE BASE, CALIFORNIA.(U)
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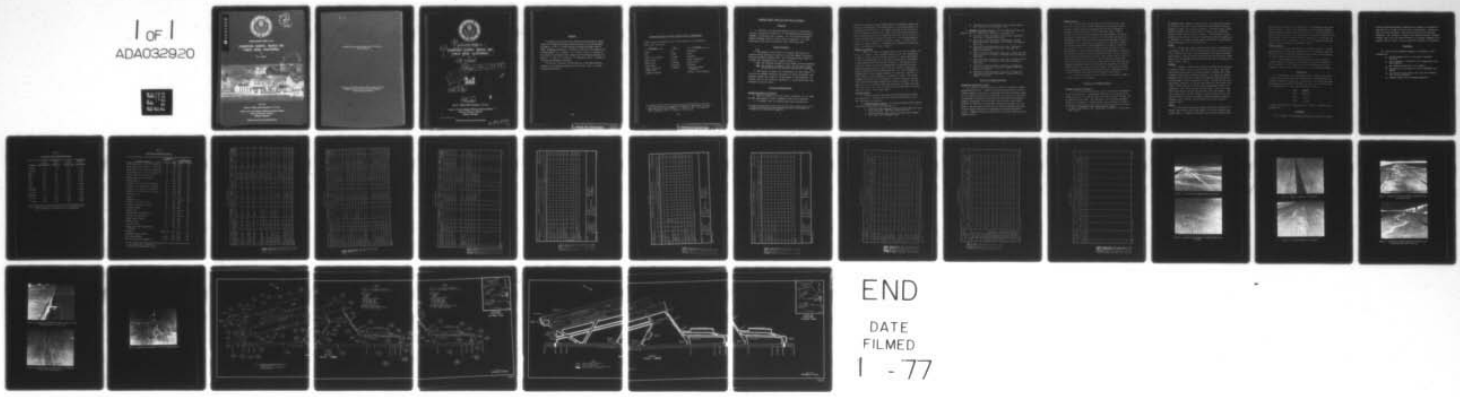

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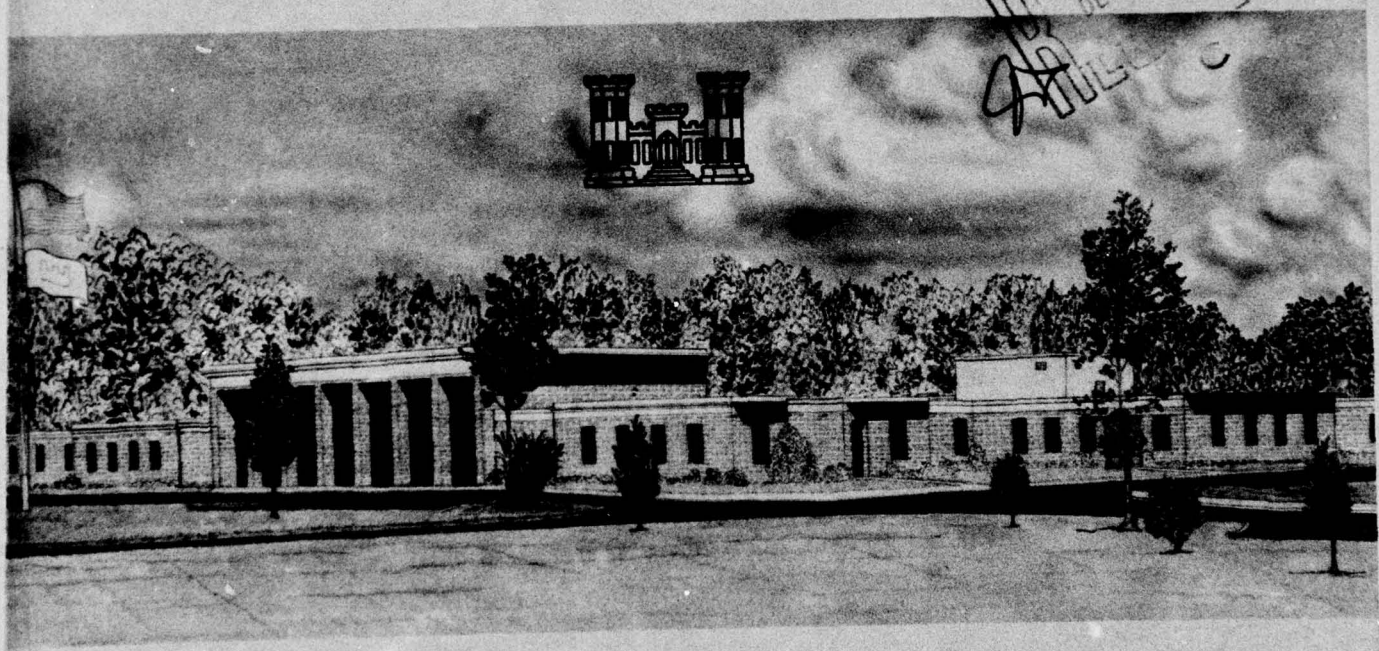
MISCELLANEOUS PAPER S-73-38

CONDITION SURVEY, MARCH AIR FORCE BASE, CALIFORNIA

by

R. D. Jackson



June 1973

Sponsored by Office, Chief of Engineers, U. S. Army

Conducted by U. S. Army Engineer Waterways Experiment Station
Soils and Pavements Laboratory
Vicksburg, Mississippi

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by

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(14) WES-MP-S-73-38

(12) 33p.

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Soils and Pavements Laboratory
Vicksburg, Mississippi

Foreword

The study reported herein was conducted under the general supervision of the Engineering Design Criteria Branch, Soils and Pavements Laboratory, of the U. S. Army Engineer Waterways Experiment Station (WES), Vicksburg, Mississippi. Personnel involved in the condition survey were Messrs. R. D. Jackson, K. A. O'Connor, and S. R. Rowland, Jr. This report was prepared by Mr. Jackson under the general supervision of Messrs. J. P. Sale, R. G. Ahlvin, R. L. Hutchinson, and P. J. Vedros of the Soils and Pavements Laboratory.

COL Ernest D. Peixotto, CE, was Director of the WES during the conduct of the study and preparation of the report. Mr. F. R. Brown was Technical Director.

Conversion Factors, British to Metric Units of Measurement

British units of measurement used in this report can be converted to metric units as follows:

Multiply	By	To Obtain
inches	2.54	centimeters
feet	0.3048	meters
miles (U. S. statute)	1.609344	kilometers
square inches	6.4516	square centimeters
square yards	0.8361274	square meters
pounds (mass)	0.45359237	kilograms
pounds (force) per square inch	0.6894757	newtons per square centimeter
Fahrenheit degrees	*	Celsius or Kelvin degrees

* To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use the following formula: $C = (5/9)(F - 32)$. To obtain Kelvin (K) readings, use: $K = (5/9)(F - 32) + 273.15$.

CONDITION SURVEY, MARCH AIR FORCE BASE, CALIFORNIA

Authority

1. Authority for conducting condition surveys at selected airfields is contained in amendment to FY 1972 RDTE Funding Authorization (MFS-MC-5, 16 February 1972), subject: "Air Force Airfield Pavement Research Program," from the Office, Chief of Engineers, U. S. Army, Directorate of Military Construction, dated 18 February 1972.

Purpose and Scope

2. The purpose of this report is to present the results of a condition survey performed at March Air Force Base (MAFB), California, during 30 November-6 December 1972. The following two major areas of interest were considered in this condition survey:

(1) The structural condition of the primary airfield pavements.

(2) The condition of pavement repairs and the types of maintenance materials that have been used at this airfield.

3. This report is limited to a presentation of visual observations of the pavement conditions, discussion of these observations, and pertinent remarks with regard to the performance of the pavements. No physical tests of the pavements, foundations, or patching materials were performed during this survey.

Pertinent Background Data

General description of airfield

4. MAFB is located in Riverside County, California, on U. S. Highway 395, approximately 8 miles* southeast of the city of Riverside.

5. In November 1972, the airfield facilities consisted of a

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* A table of factors for converting British units of measurement to metric units is presented on page vii.

NW-SE (13-31) runway, a large parking apron with extensions, maintenance and hangar access aprons, four warm-up aprons, connecting taxiways, and a heavy-duty alert facility. The runway was 13,300 ft long and 300 ft wide; the parking apron was about 1,900 ft wide and 8,500 ft long; and the heavy-duty alert facility included an apron that was 250 by 2,050 ft and two taxiways that were each 75 by 800 ft. The connecting taxiways were 75 and 150 ft wide and were of various lengths. A layout of the airfield is shown in plate 1. A pavement plan indicating the type pave ment on each facility is shown in plate 2.

Climate and drainage

6. MAFB is located in a semiarid region, with hot, dry summers and cool, rainy winters. Record monthly average low and high temperatures occurred in January and July and are 38 and 92 F. The record extreme low and high temperatures are 21 and 118 F, respectively. Temperature and precipitation data are presented in table 1. The amounts of departure from normal for the 1971 temperatures and precipitation were determined using periods of record of 90 and 91 years, respectively. Annual precipitation averages approximately 11 in. The topography surrounding MAFB is rather rugged; however, the airfield is located on a rather flat area and consequently is difficult to drain. The surface drainage of the airfield is collected in a system of ditches and catch basins and then discharged through storm sewers and ditches. The subgrade soils at the airfield range from sandy silts to sandy clays with some silty sands. The area is semiarid, and the water table is located some 160 to 190 ft below ground level.

Previous reports

7. Previous reports concerning the airfield pavements at MAFB are listed below. Pertinent data were extracted from them for use in this condition survey report.

8. Condition survey reports. The following reports were prepared by the Ohio River Division Laboratories, CE:

a. "Report of Rigid Pavement Condition Survey, March Air Force Base, California," May 1956, Cincinnati, Ohio.

b. "Condition Survey Report, March Air Force Base, California," June 1959, Cincinnati, Ohio.

c. "Condition Survey Report, March Air Force Base, California," November 1962, Cincinnati, Ohio.

9. Pavement evaluation reports. The following reports were prepared by the U. S. Army Engineer District, Los Angeles, CE:

a. "Airfield Pavement Evaluation, March Field, California," June 1944, Los Angeles, California.

b. "Airfield Pavement Evaluation, Addendum No. 1, March Field, Riverside, California," October 1947, Los Angeles, California.

c. "Airfield Pavement Evaluation Report No. 2, March Air Force Base, Riverside, California," June 1956, Los Angeles, California.

d. "Airfield Pavement Evaluation Report No. 3, March Air Force Base, Riverside, California," September 1958, Los Angeles, California.

e. "Airfield Pavement Evaluation Report No. 4, March Air Force Base, Riverside, California," July 1959, Los Angeles, California.

f. "Airfield Pavement Evaluation Report No. 5, March Air Force Base, Riverside, California," December 1960, Los Angeles, California.

g. "Airfield Pavement Evaluation Report No. 6, March Air Force Base, Riverside, California," November 1963, Los Angeles, California.

History of Airfield Pavements

Design and construction history

10. Pavements constructed prior to 1951 were designed to support medium-weight aircraft. Pavements constructed during 1951-57 were designed to support a 100,000-lb, single-gear load with twin wheels spaced 37 in. center to center and a tire contact area of 267 sq in. per wheel. The pavements constructed during 1958, 1959, and 1963 were designed to support a single-gear load of 265,000 lb on twin-twin wheels spaced 37-62-37 in., with each wheel having a contact area of 267 sq in. Details of the construction history of the airfield pavements (extracted from the reports referenced in paragraphs 8 and 9) are presented in table 2. Pavement thicknesses, descriptions, and other details are presented in table 3.

Traffic history

11. Prior to 1951, the airfield was used by B-25, B-26, B-29, B-50, and other smaller aircraft. During the period 1952-62, B-47's were the heaviest aircraft operating at the airfield, although an occasional B-52 used the airfield in a transient status. Traffic records for the period 1957-62 indicate that approximately 390 cycles* per month of B-47 traffic, 160 cycles of KC-97 traffic, 100 cycles of heavy-cargo traffic, and 490 cycles of light-cargo and fighter traffic were applied. It is reasonable to assume that the amounts of traffic for the 5-yr period 1952-57 were approximately the same as those for the period of 1957-62. Traffic records were not available for the period 1963-64. Records indicate that the following amounts of traffic were applied at MAFB from January 1965-December 1972: B-52's, 8,200 cycles; KC-135's, 15,570 cycles; KC-97's, 5,235 cycles; C-135's, C-141's, and C-123's, 2,343 cycles; C-124's, 5,292 cycles; and all other aircraft, 53,654 cycles. In addition to this traffic, alert exercises were conducted during this period by B-52 and KC-135 aircraft that involved taxiing from the alert facility to the runway, taxiing down the length of the runway, and returning to the alert facility. Approximately 150 of these movements were made by both B-52 and KC-135 aircraft.

12. More than 95 percent of the takeoffs and landings at MAFB are from the south end of the runway.

Conditions of Pavement Surfaces

Pavement inspection procedure

13. The following procedure was used in conducting the inspection of the rigid pavements. Representative features were selected for detailed inspection. The features were then inspected slab** by slab, and the defects were recorded. The locations of the individual pavement features, the inspection starting points, and the directions in which

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* A cycle of operation is one takeoff and one landing.

** A slab is the smallest unit, containing no joints, of a given pavement feature.

the pavements were inspected (shown by arrows) are indicated in plate 1. The results of the rigid pavement survey for those features that were inspected in detail are presented in table 4. This table shows a quantitative breakdown of the various types of defects and a condition rating for each feature inspected in detail. The procedures used for determining the condition rating of a pavement are given in Appendix III of Department of the Army Technical Manual TM 5-827-3, "Rigid Airfield Pavement Evaluation," dated September 1965.

Runway

14. The portland cement concrete (PCC) portions of the NW-SE runway (features R1A, R2B, R3C, R4C, R6B, and R7A) were in excellent structural condition, with only a small percentage of the slabs containing major defects. Only four major defects were noted in the entire runway. Feature R5D, the asphaltic concrete (AC) portion, was in very good condition (photos 1 and 2).

Taxiways

15. Taxiway 1 (features T1A, T2A, T3A, and T4A) was in excellent structural condition, since no major defects were noted. Only seven minor defects were found in the entire taxiway. Features T5A and T6A (taxiway 5) were also in excellent condition. The outer ramp taxiway (features T7A and T8A) was in excellent structural condition based on the percentage of slabs containing no defects. Feature T9A (the outer ramp taxiway extension) was in very good condition. This feature contained 18 major defects, of which 17 were longitudinal cracks in one paving lane. The taxi stripe runs down the edge of this lane, a fact which would seem to indicate that the cracks were load related. Taxiway 5 (features T5A and T6A) contained no major defects and only one minor defect and therefore was rated as being in excellent condition. Taxiways 3 and 4 (features T15C and T16C) were in fair condition (photos 3 and 4).

Aprons

16. The apron areas were in either very good or excellent condition. Major defects were widely spaced, and the minor defects were usually spalls. Considerable shoving of the shoulder pavements along

the south and east sides of the south end of the parking apron was noted (photos 5 and 6). Photo 7 shows the upheaval of the shoulder pavement along the east side of the south end of this apron. The shoving and upheaval occurred during 1972 and were apparently caused by expansion of the PCC pavement. Typical cracking of the AC pavement in the refueling area of the apron is shown in photo 8. Photo 9 shows the typically poor condition of the AC pavement on the transient apron.

Alert facilities

17. The SAC alert taxiways were in excellent condition. The SAC alert apron was in very good condition; however, if the major defects in the two 12.5- by 12.5-ft lanes along the eastern edge were disregarded, the apron could be rated in excellent condition.

18. The secondary (12-30) runway has been closed to aircraft traffic, except for a portion of the south end which is utilized as a part of taxiway 2. Those features not specifically mentioned in the preceding paragraphs were in either very good or excellent condition.

Maintenance

19. Maintenance of the airfield pavements at MAFB has generally consisted of repairing spalls and sealing joints of PCC pavements and coal-tar sealing of AC pavements. The majority of the spalls have been repaired with epoxy and PCC, although some repairs have been made with AC. Maintenance costs since 1964 have been as follows:

Year	Amount
1965	$172,900
1969	61,500
1970	40,100

A joint sealing project is being planned for 1973 for a portion of the parking apron.

Evaluation

20. A summary of the pavement evaluation is presented in table 5.

Previously published pavement evaluations were updated to eliminate aircraft that are no longer in the Air Force inventory and to include aircraft that have been added to the inventory since the last pavement evaluation. The evaluation is based on the pavement thickness, flexural strength (PCC), base and subbase thickness and strength, strength of the subgrade (CBR or K value), and the structural condition of the pavement.

Conclusions

21. The following statements summarize the findings of this investigation:

a. The PCC pavements were in very good to excellent condition.

b. The AC pavement on the NW-SE (13-31) runway was in very good condition.

c. The transient apron was in poor condition.

d. The majority of the defects in the PCC pavements were spalls.

e. In some areas of the aprons, the joint seal materials were in poor condition.

f. Pavement repairs were performing adequately.

Table 1

Temperature and Precipitation Data

Month	1971 Average Temperature, F	Departure from Normal, F	1971 Precipitation, in.	Departure from Normal, in.
January	53.3	2.0	0.66	-1.31
February	53.8	0.7	0.40	-1.89
March	57.9	1.6	0.08	-1.67
April	59.4	-1.1	0.24	-0.73
May	62.9	-1.9	0.27	0.05
June	70.5	0.9	0.00	-0.04
July	78.1	2.2	0.00	-0.06
August	80.4	4.9	0.00	-0.16
September	74.8	1.5	0.00	-0.09
October	63.6	-2.1	0.61	0.08
November	55.8	-2.3	0.16	-0.67
December	48.5	-4.8	3.45	1.32
Annual	63.3	1.6	5.87	-5.17

Note: Highest temperature in 1971 was 113 F on September 13; lowest temperature in 1971 was 28 F on December 14.

Table 2

Airfield Construction History

Pavement Facility	Pavement Thickness in.	Type	Construction Year(s)	Agency
NW-SE runway, sta 11+11.93 to 21+11.93	13	PCC	1963	CE*
NW-SE runway, sta 21+11.93 to 134+11.93	13	PCC	1963	CE
NW-SE runway, sta 134+11.93 to 139+11.93	13	PCC	1963	CE
NW-SE runway, sta 139+11.93 to 144+11.93	14	PCC	1963	CE
NW-SE runway, AC adjacent to PCC	5	AC	1963	CE
NW-SE runway, AC outer portion	3	AC	1963	CE
Warm-up apron 1	17	PCC	1955	CE
Taxiway 1, sta 1+50.74 to 40+06.24	25	PCC	1963	CE
Taxiway 1, sta 40+06.24 to 50+06.24	24	PCC	1959	CE
Taxiway 1, sta 50+06.24 to 61+56.24	25	PCC	1963	CE
Taxiway 1, sta 61+56.24 to 72+85.11	23	PCC	1963	CE
Warm-up apron 3	17	PCC	1955	CE
Taxiway 2	19	PCC	1955	CE
Taxiways 3 and 4	3	AC	1938-39	QC**
Taxiway 5, sta 5+44 to 9+25	25	PCC	1963	CE
Taxiway 5, sta 9+25 to 16+00	23	PCC	1963	CE
NW warm-up apron	11	PCC	1951	CE
Parking apron	11	PCC	1944-51	CE
Parking apron strengthening	11	PCC	1956	CE
Parking apron extensions	17	PCC	1953-55	CE
Hangar access taxiway	15	PCC	1954	CE
Hangar aprons	15	PCC	1954	CE
Transient apron	4	AC	1951	CE
SE apron and outer ramp taxiway extensions	17	PCC	1955	CE
Taxiway 1A	18-11-18	PCC	1945	CE
Secondary runway (12-30)	4	AC	1945	CE
Outer ramp taxiway	13-16	PCC	1958	CE
SAC alert apron and taxiways	8-21	PCC	1959	CE

* CE denotes Corps of Engineers.
** QC denotes Quartermaster Corps.

Table 3

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY				OVERLAY PAVEMENT			PAVEMENT			BASE			SUBGRADE		GENERAL CONDITION OF AREA CONSIDERED
March AFB, Calif.															
FACILITY NUMBER AND IDENTIFICATION		LENGTH FT	WIDTH FT	THICK. IN.	DESCRIPTION	FLEX. STR PSI	THICK. IN.	DESCRIPTION	FLEX. STR PSI	THICK IN.	CLASSIFICATION	CBR OR K	CLASSIFICATION	CBR OR K	
R1A	NW-SE runway; 1st 500 ft, 13 end, sta 11+11.93 to 16+11.93	500	Varies	13	Portland cement concrete	700	4	Asphaltic concrete	k=450	7 6 14 6	Dry bound macadam Gravelly sand Disintegrated granite Subgrade (ML)	80 65 20 8	Subsoil (ML)	4	Excellent
R2B	NW-SE runway; 2nd 500 ft, 13 end, sta 16+11.93 to 21+11.93	500	Varies	13	Portland cement concrete	700	4	Asphaltic concrete	k=450	7 6 14 6	Dry bound macadam Gravelly sand Disintegrated granite Subgrade (ML)	80 65 20 8	Subsoil (ML)	4	Excellent
R3C	NW-SE runway interior, sta 21+11.93 to 112+11.93 and intersection of taxiway 2 and runway	9,100 750	75 60	13	Portland cement concrete	700	4	Asphaltic concrete	k=450	7 6 11 6	Dry bound macadam Gravelly sand Disintegrated granite Subgrade (ML)	80 65 20 8	Subsoil (ML)	4	Excellent
R4C	NW-SE runway interior, sta 112+11.93 to 134+11.93	2,200	Varies	13	Portland cement concrete	700	4	Asphaltic concrete	k=450	7 9 10 12 18	Dry bound macadam Gravelly sand Disintegrated granite Subgrade Subgrade (CL-SM-ML)	80 65 25 12 8	Subsoil	4	Excellent
R5D	NW-SE runway interior; AC portion adjacent to PCC, west side and east side	11,600 11,200	Varies Varies	3-5 over 10	Asphaltic concrete Stab. aggregate BC		4	Asphaltic concrete		7 9 10 12	Dry bound macadam Gravelly sand Disintegrated granite Subgrade	80 65 25 12	Subgrade Subsoil	7 4	Very good
R5D	NW-SE runway interior, AC edges; west edge and east edge	13,300 13,000	50 50				3	Asphaltic concrete		6 9 6	Stab. aggregate BC Flexible subbase Select borrow	100 65 20	Subgrade Subsoil	7 4	Very good
R6B	NW-SE runway, 31 end; 2nd 500 ft, sta 134+11.93 to 139+11.93	500	200	13	Portland cement concrete h_E = 24.7	700	17	Portland cement	680	6	Disintegrated granite	100	Subgrade (CL-ML)		Excellent
R7A	NW-SE runway, 31 end; 1st 500 ft, sta 139+11.93 to 144+11.93	500	Varies	14	Portland cement concrete h_E = 25.5	700	17	Portland cement concrete	680	6	Disintegrated granite	100	Subgrade (CL-ML)		Excellent
R8C	Secondary runway 12-30 (abandoned)	6,980	150				4	Asphaltic concrete		6 23 6	Dry bound macadam Silty sand-sandy silt (SM-GM) Sandy silt	80 65 8	Sandy clay	4	Poor
R9B	Secondary runway 12-30 end used as part of taxiway 1A		150				11	Portland cement concrete	650	6	Disintegrated granite	150	Sandy silt (ML)		Excellent
T1A	Taxiway 1, sta 1+50.74 to 40+06.24	3,855.5	50				25	Portland cement concrete	700	4	Compacted in-place material	150			Excellent
T2A	Taxiway 1, sta 40+06.24 to 50+06.24	1,000	75				24	Portland cement concrete	765	18	Disintegrated granite	200	Sandy clay (CL)		Excellent

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MAR 1958

(1 of 3 sheets)

Table 3 (Continued)

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY March AFB, Calif.		LENGTH FT	WIDTH FT	OVERLAY PAVEMENT			PAVEMENT			BASE			SUBGRADE		GENERAL CONDITION OF AREA CONSIDERED
FACILITY NUMBER AND IDENTIFICATION				THICK. IN.	DESCRIPTION	FLEX. STR PSI	THICK. IN.	DESCRIPTION	FLEX. STR PSI	THICK. IN.	CLASSIFICATION	CBR OR K	CLASSIFICATION	CBR OR K	
T3A	Taxiway 1, sta 50+06.24 to 61+56.24	1,150	50				25	Portland cement concrete	700	18	Disintegrated granite	150	Subgrade		Excellent
T4A	Taxiway 1, sta 61+56.24 to 72+85.11	1,128.8	Varies				23	Portland cement concrete	700	4	Compacted in-place material	150	Subgrade		Excellent
T5A	Taxiway 5, sta 5+44 to 9+25	381	75				25	Portland cement	700	18	Disintegrated granite	150	Sandy clay (CL)		Excellent
T6A	Taxiway 5, sta 9+25 to 16+00	675	75				23	Portland cement concrete	700	4	Compacted in-place material	150	Sandy clay (CL)		Excellent
T7A	Outer ramp taxiway	6,625	150	13-16 5	Portland cement concrete Asphaltic concrete	830 k=500	6	Portland cement concrete	650				Silty sand-sandy silt (SM-ML)		Excellent
T8A	Outer ramp taxiway	3,950	85				20	Portland cement concrete	830	6	Disintegrated granite	100	Silty sand-sandy silt (SM-ML)		Excellent
T9A	Outer ramp taxiway extension	1,725	150				17	Portland cement concrete	680	6	Disintegrated granite	100	Subgrade (CL-ML)		Very good
T10A	SAC alert taxiways	800	75				21	Portland cement concrete	765	30	Disintegrated granite	200	Clayey sand-silty sand (CL-ML)		Excellent
T11C	Taxiway 2, sta 1+16 to 3+11	195	Varies	13 to 7	Portland cement concrete h_E = 17.7	680	19	Portland cement concrete		6	Disintegrated granite	100	Silty sand-sandy silt (SM-ML)		Excellent
T12C	Taxiway 2, sta 3+11 to 4+61	150	75				26 to 20	Portland cement concrete	680	6	Disintegrated granite	100	Silty sand-sandy silt (SM-ML)		Excellent
T13C	Taxiway 2, sta 4+61 to 25+00	2,039	75				17-19-17	Portland cement concrete	680	6	Disintegrated granite	100	Silty sand-sandy silt (SM-ML)		Excellent
T14C	Taxiway 1A connecting outer ramp taxiway with taxiway 2	750	Varies				18-11-18	Portland cement concrete	650	6	Disintegrated granite	150	Sandy silt (ML)		Very good
T15C	Taxiway 3	1,700	150				3	Asphaltic concrete		6	Gravel	80	Fine gravel	4	Fair
T16C	Taxiway 4	2,000	150							7.5	Disintegrated granite	30	Fine sand (GP-SP)		
										6	Fine gravel and fine sand (GP-SP)	8			
T17B	Hangar access taxiway	1,243	75				15	Portland cement concrete	670	12	Disintegrated granite	100	Sandy clay (CL)		Excellent
A1B	Warm-up apron 1 (13,300 sq yd)	Varies	Varies				17	Portland cement concrete	680	6	Disintegrated granite	100	Clayey sand-sandy silt (CL-ML)		Excellent
A2B	Warm-up apron 3 (24,000 sq yd)	Varies	Varies				17	Portland cement concrete	680	6	Disintegrated granite	100	Silty sand-sandy silt (SM-ML)		Excellent
A3B	NW warm-up apron and parking apron	Varies Varies	Varies Varies				11	Portland cement concrete	650	6	Disintegrated granite	150	Sandy silt (SM)		Excellent
A4B	Parking apron SE extension	Varies	Varies				17	Portland cement concrete	700	6	Disintegrated granite	100	Clayey sand-sandy silt		Excellent
A5B	Parking apron NW extension	Varies	Varies				17	Portland cement concrete	680	6	Disintegrated granite	100	Subgrade (CL-CM)		Excellent

WES FORM 1000
MAR 1958

(2 of 3 sheets)

Table 3 (Continued)

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY				OVERLAY PAVEMENT			PAVEMENT			BASE			SUBGRADE		GENERAL CONDITION OF AREA CONSIDERED
March AFB, Calif.															
FACILITY NUMBER AND IDENTIFICATION		LENGTH FT	WIDTH FT	THICK. IN.	DESCRIPTION	FLEX. STR PSI	THICK. IN.	DESCRIPTION	FLEX. STR PSI	THICK. IN.	CLASSIFICATION	CBR OR K	CLASSIFICATION	CBR OR K	
A6B	Parking apron eastern half	Varies	Varies				11	Portland cement concrete	720	6	Disintegrated granite	150	Clayey sand-sandy silt (CL-ML)		Excellent
A7B	Parking apron refueling areas	Varies	Varies				11	Portland cement concrete	650	6	Disintegrated granite	100	Clayey sand-sandy silt (CL-ML)		Excellent
A8B	Parking apron strengthening	2,575	85				11	Portland cement concrete	700	6	Disintegrated granite	100	Clayey sand-sandy silt (CL-ML)		Excellent
A9B	Parking apron formerly part of runway 3	450	150				10	Portland cement concrete	650	6	Disintegrated granite	100	Clayey sand-sandy silt (CL-ML)		Very good
A10B	Transient apron	840	1,440				4	Asphaltic concrete		7 6 6 6	Dry bound macadam Gravelly sand Disintegrated granite Compacted subgrade (CL-CM)	80 65 20 8	Subsoil (CL-ML)	4	Poor
A11B	Parking apron formerly taxiway 1A Parking apron formerly taxiway 2	2,200	75				11	Portland cement concrete	650	6	Disintegrated granite	150	Sandy silt (ML)		Excellent
A12B	SAC alert apron	2,100	270				21 8	Portland cement concrete	765	30	Disintegrated granite	200	Sandy clay (CL)		Very good
A13B	Hangar aprons	372	238				15	Portland cement concrete	650	12	Disintegrated granite	100	Sandy clay (CL)		Excellent
R10X	Blast pads ends	150	300				2	Bituminous surface course		6 2	Stab. aggregate BC Flexible pavement				Good
R11X	Overruns ends	850	300					Double bituminous surface treatment		6 6-1/4 6	Stab. aggregate BC Flexible subbase BC Select borrow				Good

Table 4

DATE: December 1972

SUMMARY OF DATA - RIGID PAVEMENT CONDITION SURVEY

AIRFIELD: March AFB, Calif.

FEATURE NO.	FEATURE DESIGNATION	SLAB SIZE FT	APPROX NO. OF SLABS	PAVE. THICK. IN.	NO. OF SLABS CONTAINING INDICATED DEFECTS																% OF SLABS NO DEFECTS	% OF SLABS NO MAJOR DEFECTS	CONDITION
					I	—	\	Δ	*	K	~	S	J	↓	J	◈	M	P	O	C	D			
R1A	NW-SE runway;1st 500 ft,13 end	25 by 25 75 by 25	90	13		1							5						1			92.2	98.8	Excellent
R2B	NW-SE runway;2nd 500 ft,13 end	25 by 25 75 by 25	71	13									2		2							94.3	100.0	Excellent
R3C R4C	NW-SE runway interior	25 by 25 75 by 25	1,311	13		2							16	5	15				22			95.8	99.8	Excellent
R6B	NW-SE runway;2nd 500 ft,31 end	25 by 25	160	13															1			99.4	100.0	Excellent
R7A	NW-SE runway;1st 500 ft,31 end	25 by 25	160	14	1								1		1							98.1	99.4	Excellent
R9B	Secondary runway 12-30 portion used as taxiway	12-1/2 by 15	180	11		1											20					88.3	99.4	Excellent
T1A T2A T3A T4A	Taxiway 1	25 by 25	1,005	23 to 25									1	3	2				1			99.3	100.0	Excellent
T5A T6A	Taxiway 5	25 by 25	153	23, 25															1			99.3	100.0	Excellent
T7A	Outer ramp taxiway	25 by 25	1,644	13-16	1	2		1			12		12	3	14		17		24			95.1	99.8	Excellent
T8A A7B	Outer ramp taxiway Parking apron refueling areas	12-1/2 by 15	8,857	20 11	5	26	14	30	1		27		25	42	113		13		22			96.4	99.1	Excellent

REMARKS:

LEGEND:

I	LONGITUDINAL CRACK	~	SHRINKAGE CRACK	M	MAP CRACKING
—	TRANSVERSE CRACK	S	SCALING	P	PUMPING JOINT
\	DIAGONAL CRACK	J	SPALL ON TRANSVERSE JOINT	O	POP-OUT
Δ	CORNER BREAK	↓	SPALL ON LONGITUDINAL JOINT	C	UNCONTROLLED CONTRACTION CRACK
*	SHATTERED SLAB	J	CORNER SPALL	D	"D" CRACKING
K	KEYED JOINT FAILURE	◈	SETTLEMENT		

WES FORM NO. 2004
JUN 1972

(1 of 3 sheets)

Table 4 (Continued)

DATE: December 1972

SUMMARY OF DATA - RIGID PAVEMENT CONDITION SURVEY

AIRFIELD: March AFB, Calif.

FEATURE NO.	FEATURE DESIGNATION	SLAB SIZE FT	APPROX NO. OF SLABS	PAVE. THICK. IN.	NO. OF SLABS CONTAINING INDICATED DEFECTS																% OF SLABS NO DEFECTS	% OF SLABS NO MAJOR DEFECTS	CONDITION
					I	—	\	Δ	*	K	~	S	J	↓	J	◈	M	P	O	C	D			
T9A	Outer ramp taxiway extension	25 by 25	414	17	17	1					14						1		14			92.8	95.8	Very good
T10A	SAC alert apron taxiways	25 by 25	465	21											1				18			95.9	100.0	Excellent
T11C T12C T13C	Taxiway 2	25 by 25	396	13-7 26-20 17-19-17		6		1			2		1	1	6				18			91.7	98.5	Excellent
T14C	Taxiway 1A connecting ramp with taxiway 2	12-1/2 by 12-1/2	403	18-11-18		2	9				1			1			76		3			77.9	97.5	Very good
T17B	Hangar access taxiway	25 by 25	57	15		1													1			96.4	98.2	Excellent
A1B	Warm-up apron 1	25 by 25	268	17									3		2				1			97.7	100.0	Excellent
A2B	Warm-up apron 3	25 by 25	319	17							1		4	1	4							96.8	100.0	Excellent
A3B	NW warm-up apron and parking apron	12-1/2 by 15	887	11	1			3			1		1	1	4		6		2			98.0	99.6	Excellent
A4B A11B	Parking apron SE extension	25 by 25	1,306* 2,480	17	15	1	1				62		2	2	2		63		93			96.9	99.3	Excellent
A5B	Parking apron NW extension	25 by 25	1,102	17		7							3	7	5				2	1		97.7	99.3	Excellent

REMARKS: * Slabs not surveyed because of parked aircraft.

LEGEND:

I	LONGITUDINAL CRACK	~	SHRINKAGE CRACK	M	MAP CRACKING
—	TRANSVERSE CRACK	S	SCALING	P	PUMPING JOINT
\	DIAGONAL CRACK	J	SPALL ON TRANSVERSE JOINT	O	POP-OUT
Δ	CORNER BREAK	↓	SPALL ON LONGITUDINAL JOINT	C	UNCONTROLLED CONTRACTION CRACK
*	SHATTERED SLAB	J	CORNER SPALL	D	"D" CRACKING
K	KEYED JOINT FAILURE	◈	SETTLEMENT		

(2 of 3 sheets)

WES FORM NO. 2004
JUN 1972

Table 4 (Continued)

DATE: December 1972

SUMMARY OF DATA - RIGID PAVEMENT CONDITION SURVEY

AIRFIELD: March AFB, Calif.

FEATURE NO.	FEATURE DESIGNATION	SLAB SIZE FT	APPROX NO. OF SLABS	PAVE. THICK. IN.	NO. OF SLABS CONTAINING INDICATED DEFECTS																	% OF SLABS NO DEFECTS	% OF SLABS NO MAJOR DEFECTS	CONDITION
					I	—	\	Δ	*	K	~	S	J	↓	J	⊕	M	P	O	C	D			
A6B	Parking apron	12-1/2 by 15	16,010	11	9	2	15	6			23		21	67	243		20		14			97.3	99.7	Excellent
A8B	Parking apron strengthening	12-1/2 by 15	832	11	15								6	9	5				5	1		95.3	98.1	Excellent
A9B	Parking apron formerly part of runway 3	12-1/2 by 15	288	10	5									5			16					90.9	98.2	Very good
A12B	SAC alert apron	12-1/2 by 12-1/2 25 by 25	1,095	8 21	33	13	13	6	3		38		9	72		2	4		6			85.9	95.7	Very good
A13B	Hangar aprons	25 by 25	279	15		1							2						1			98.5	99.6	Excellent

REMARKS:

LEGEND:

I	LONGITUDINAL CRACK	~	SHRINKAGE CRACK	M	MAP CRACKING
—	TRANSVERSE CRACK	S	SCALING	P	PUMPING JOINT
\	DIAGONAL CRACK	J	SPALL ON TRANSVERSE JOINT	O	POP-OUT
Δ	CORNER BREAK	↓	SPALL ON LONGITUDINAL JOINT	C	UNCONTROLLED CONTRACTION CRACK
*	SHATTERED SLAB	J	CORNER SPALL	D	"D" CRACKING
K	KEYED JOINT FAILURE	⊕	SETTLEMENT		

WES FORM NO. 2004
JUN 1972

(3 of 3 sheets)

Table 5

SUMMARY OF PAVEMENT EVALUATION

NAME OF AIRFIELD: March AFB, Calif. DATE OF EVALUATION MONTH: December YR: 1972			LOAD-CARRYING CAPACITY IN LB OF GROSS PLANE LOAD FOR INDICATED LANDING GEAR TYPES AND CONFIGURATIONS										
			TRICYCLE ARRANGEMENT									BICYCLE	
FEATURE		PAVEMENT OPERATIONAL USE	SINGLE 100-PSI TIRE PRESSURE	SINGLE 100-SQ-IN. CONTACT AREA	SINGLE 241-SQ-IN. CONTACT AREA	TW 28-IN. C-C 226-SQ-IN. CONTACT AREA EACH TIRE	SINGLE TANDEM 60-IN. SPACING 400-SQ-IN. CONTACT AREA	TW 37-IN. C-C 267-SQ-IN. CONTACT AREA EACH TIRE	TW 44-IN. C-C 630-SQ-IN. CONTACT AREA EACH TIRE	TWIN TANDEM 33-IN. × 48-IN. 208-SQ-IN. CONTACT AREA EACH TIRE	C-5A GEAR CONFIGURATION	TWIN TWIN SPCG 37-62-37 267-SQ-IN. CONTACT AREA EACH TIRE	REMARKS
NO.	DESIGNATION		1	2	3	4	5	6	7	8	9	10	
R1A	NW-SE runway 1st 500 ft 13 end	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	225,000	320,000	380,000+	800,000+	360,000	
R2B	NW-SE runway 2nd 500 ft 13 end	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	270,000	330,000+	380,000+	800,000+	380,000	
R3C R4C	NW-SE runway interior	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	330,000+	330,000+	380,000+	800,000+	510,000	
R6B	NW-SE runway 2nd 500 ft 31 end	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	330,000+	330,000+	380,000+	800,000+	550,000	
R7A	NW-SE runway 1st 500 ft 31 end	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	330,000+	330,000+	380,000+	800,000+	540,000	
T1A T3A T5A	Taxiway 1	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	330,000+	330,000+	380,000+	800,000+	560,000	
T2A	Taxiway 1 replacement	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	330,000+	330,000+	380,000+	800,000+	600,000+	
T4A T6A	Taxiway 1	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	330,000+	330,000+	380,000+	800,000+	490,000	
T7A	Outer ramp taxiway	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	310,000	330,000+	380,000+	800,000+	490,000	
T8A	Outer ramp taxiway	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	310,000	330,000+	380,000+	800,000+	440,000	
T9A	Outer ramp taxiway extension	Capacity	155,000+	85,000+	155,000+	210,000	200,000+	200,000	250,000	330,000	800,000+	290,000	
T10A	SAC alert taxiways	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	330,000+	330,000+	380,000+	800,000+	520,000	

Note: + sign denotes allowable gross loading greater than maximum gross weight of any existing aircraft having indicated gear configuration.
(a) denotes allowable gross loading less than minimum gross weight of any existing aircraft having indicated gear configuration.

Table 5 (Continued)

SUMMARY OF PAVEMENT EVALUATION

NAME OF AIRFIELD: March AFB, Calif. DATE OF EVALUATION MONTH: December YR: 1972			LOAD-CARRYING CAPACITY IN LB OF GROSS PLANE LOAD FOR INDICATED LANDING GEAR TYPES AND CONFIGURATIONS										
			TRICYCLE ARRANG MENT									BICYCLE	
FEATURE		PAVEMENT OPERATIONAL USE	SINGLE 100-PSI TIRE PRESSURE	SINGLE 100-SQ-IN. CONTACT AREA	SINGLE 241-SQ-IN. CONTACT AREA	TW 28-IN. C-C 226-SQ-IN. CONTACT AREA EACH TIRE	SINGLE TANDEM 60-IN. SPACING 400-SQ-IN. CONTACT AREA	TW 37-IN. C-C 267-SQ-IN. CONTACT AREA EACH TIRE	TW 44-IN. C-C 630-SQ-IN. CONTACT AREA EACH TIRE	TWIN TANDEM 33 IN. × 48 IN. 208-SQ-IN. CONTACT AREA EACH TIRE	C-5A GEAR CONFIGURATION	TWIN TWIN SPCG 37-62-37 267-SQ-IN. CONTACT AREA EACH TIRE	REMARKS
NO.	DESIGNATION		1	2	3	4	5	6	7	8	9	10	
T11C	Taxiway 2 sta 1+15 to 3+11	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	215,000	270,000	350,000	800,000+	310,000	
T12C	Taxiway 2 sta 3+11 to 4+61	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	255,000	320,000	380,000+	800,000+	360,000	
T13C	Taxiway 2 sta 4+61 to 25+00	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	235,000	300,000	380,000+	800,000+	340,000	
T15C T16C	Taxiway 3 Taxiway 4	Capacity	65,000	50,000	(a)	(a)	100,000	85,000	(a)	(a)	(a)	(a)	
T17B A13B	Hangar access taxiway and hangar aprons	Capacity	125,000	85,000+	155,000+	175,000	200,000	195,000	240,000	330,000	800,000+	255,000	
A1B A2B A5B	Warm-up apron 1 Warm-up apron 3 Parking apron	Capacity	155,000+	85,000+	155,000+	215,000	200,000+	235,000	295,000	380,000+	800,000+	310,000	
A3B A11B	NW warm-up apron Parking apron	Capacity	75,000	60,000	105,000	110,000	170,000	125,000	165,000	235,000	680,000	(a)	
A4B	Parking apron SE extension	Capacity	155,000+	85,000+	155,000+	220,000	200,000+	245,000	300,000	380,000+	800,000+	320,000	
A6B	Parking apron eastern half	Capacity	85,000	65,000	120,000	125,000	190,000	140,000	185,000	265,000	760,000	(a)	
A7B	Parking apron refueling areas	Capacity	75,000	60,000	100,000	105,000	165,000	120,000	155,000	220,000	640,000	(a)	
A8B	Parking apron strengthening	Capacity	80,000	65,000	110,000	115,000	175,000	130,000	165,000	235,000	690,000	(a)	
A9B	Parking apron formerly part of runway 3	Capacity	70,000	60,000	100,000	105,000	160,000	120,000	155,000	220,000	630,000	(a)	

(2 of 3 sheets)

WES FORM NO. 999 JUNE 1972 EDITION OF AUG 1960 IS OBSOLETE.

Table 5 (Continued)

SUMMARY OF PAVEMENT EVALUATION

NAME OF AIRFIELD: March AFB, Calif. DATE OF EVALUATION MONTH: December YR: 1972			LOAD-CARRYING CAPACITY IN LB OF GROSS PLANE LOAD FOR INDICATED LANDING GEAR TYPES AND CONFIGURATIONS										
			TRICYCLE ARRANGEMENT									BICYCLE	
FEATURE		PAVEMENT OPERATIONAL USE	SINGLE 100-PSI TIRE PRESSURE	SINGLE 100-SQ-IN. CONTACT AREA	SINGLE 241-SQ-IN. CONTACT AREA	TW 28-IN. C-C 226-SQ-IN. CONTACT AREA EACH TIRE	SINGLE TANDEM 60-IN. SPACING 400-SQ-IN. CONTACT AREA	TW 37-IN. C-C 267-SQ-IN. CONTACT AREA EACH TIRE	TW 44-IN. C-C 630-SQ-IN. CONTACT AREA EACH TIRE	TWIN TANDEM 33 IN. × 46 IN. 208-SQ-IN. CONTACT AREA EACH TIRE	C-5A GEAR CONFIGURATION	TWIN TWIN SPCG 37-62-37 267-SQ-IN. CONTACT AREA EACH TIRE	REMARKS
NO.	DESIGNATION		1	2	3	4	5	6	7	8	9	10	
A10B	Transient apron	Capacity	70,000	60,000	65,000	85,000	105,000	65,000	(a)	(a)	340,000	(a)	
A12B	SAC alert apron	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	330,000+	330,000+	380,000+	800,000+	550,000	

WES FORM NO. 999 JUNE 1972 EDITION OF AUG 1960 IS OBSOLETE.

(3 of 3 sheets)

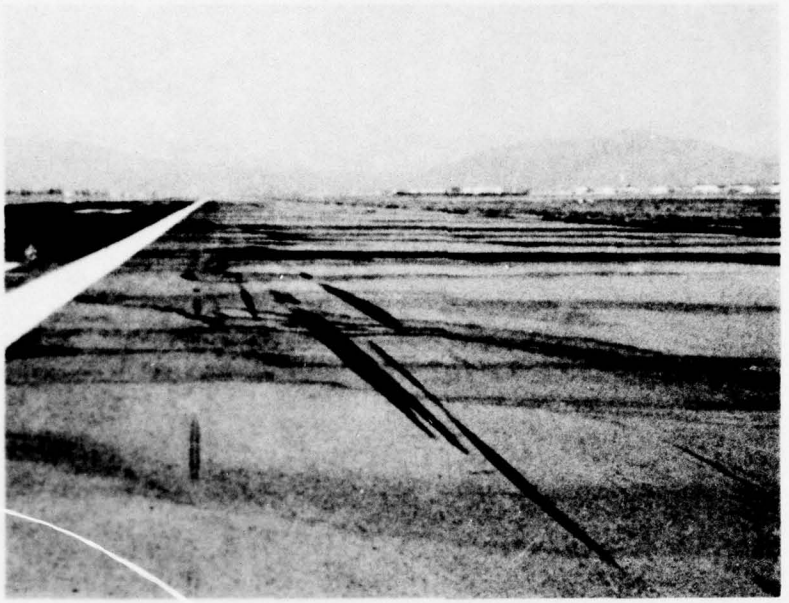


Photo 1. AC portion of NW-SE runway near SE end

Photo 2. Close-up of AC portion of NW-SE runway near SE end

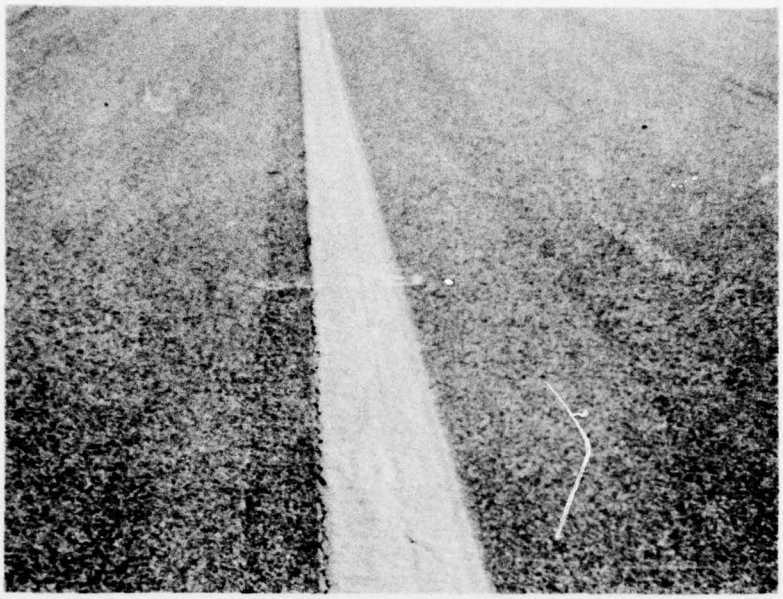


Photo 3. Typical condition of taxiway 3

Photo 4. Typical condition of taxiway 4

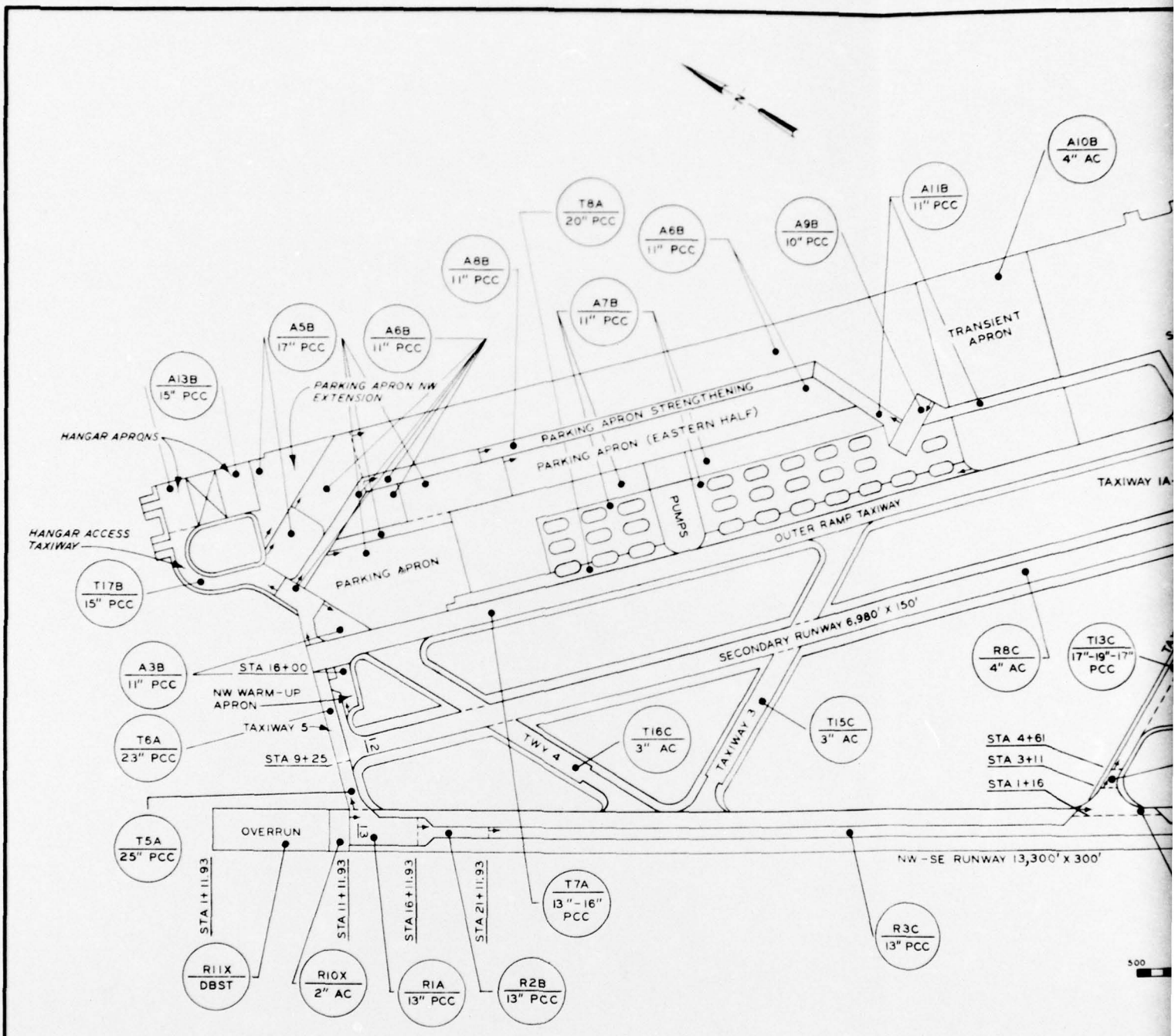
Photo 5. Shoving of shoulder pavement along south end of parking apron

Photo 6. Shoving of shoulder pavement along east side of parking apron near south end

Photo 7. Upheaval of shoulder pavement along east side of parking apron near south end

Photo 8. Typical cracks in AC pavement of refueling portion of parking apron

Photo 9. Typical poor condition of AC of transient apron

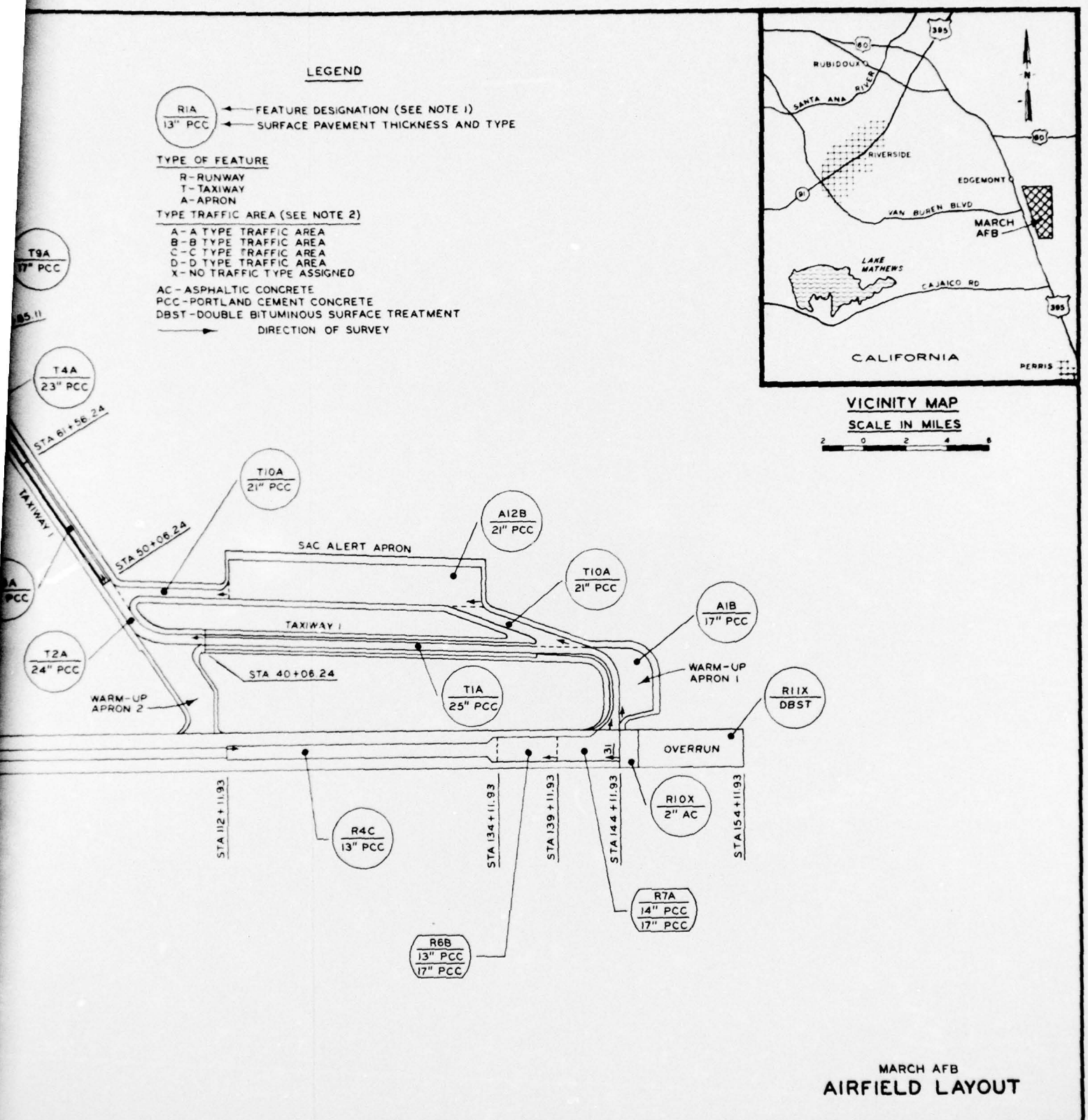


NOTES: 1. FEATURE DESIGNATION DENOTES TYPE OF FEATURE, NUMBER OF FEATURE FOR GIVEN TYPE, AND TYPE TRAFFIC AREA.

2. TRAFFIC AREA DESIGNATIONS ARE BASED ON HEAVY-LOAD CRITERIA.

LEGEND
R1A / 13" PCC
FEATURE DESIGNATION (SEE NOTE 1)
SURFACE PAVEMENT THICKNESS AND TYPE
TYPE OF FEATURE
R - RUNWAY
T - TAXIWAY
A - APRON
TYPE TRAFFIC AREA (SEE NOTE 2)
A - A TYPE TRAFFIC AREA
B - B TYPE TRAFFIC AREA
C - C TYPE TRAFFIC AREA
D - D TYPE TRAFFIC AREA
X - NO TRAFFIC TYPE ASSIGNED
AC - ASPHALTIC CONCRETE
PCC - PORTLAND CEMENT CONCRETE
DBST - DOUBLE BITUMINOUS SURFACE TREATMENT
DIRECTION OF SURVEY
A10B / 4" AC
A4B / 17" PCC
T14C / 11" PCC
T9A / 17" PCC
SE APRON EXTENSION
STA 72+85.11
T4A / 23" PCC
STA 61+56.24
TAXIWAY 1A
OVERRUN
STA 25+00
R9B / 11" PCC
R11X / DBST
TAXIWAY 2
TAXIWAY 1
T10A / 21" PCC
STA 50+06.24
A12B / 21" PCC
SAC ALERT APRON
T10A / 21" PCC
T13C / 17"-19"-17" PCC
A2B / 17" PCC
WARM-UP APRON 3
T3A / 25" PCC
A1B / 17" PCC
TAXIWAY 1
T2A / 24" PCC
STA 40+06.24
WARM-UP APRON 1
T1A / 25" PCC
T12C / 26" - 20" PCC
WARM-UP APRON 2
OVERRUN
T11C / 13" - 7" PCC / 19" PCC
R5D / 3-5" AC
STA 112+11.93
R4C / 13" PCC
STA 134+11.93
STA 139+11.93
STA 144+11.93
STA 154+11.93
R10X / 2" AC
R7A / 14" PCC / 17" PCC
R6B / 13" PCC / 17" PCC
SCALE IN FEET
500 0 500 1000

2



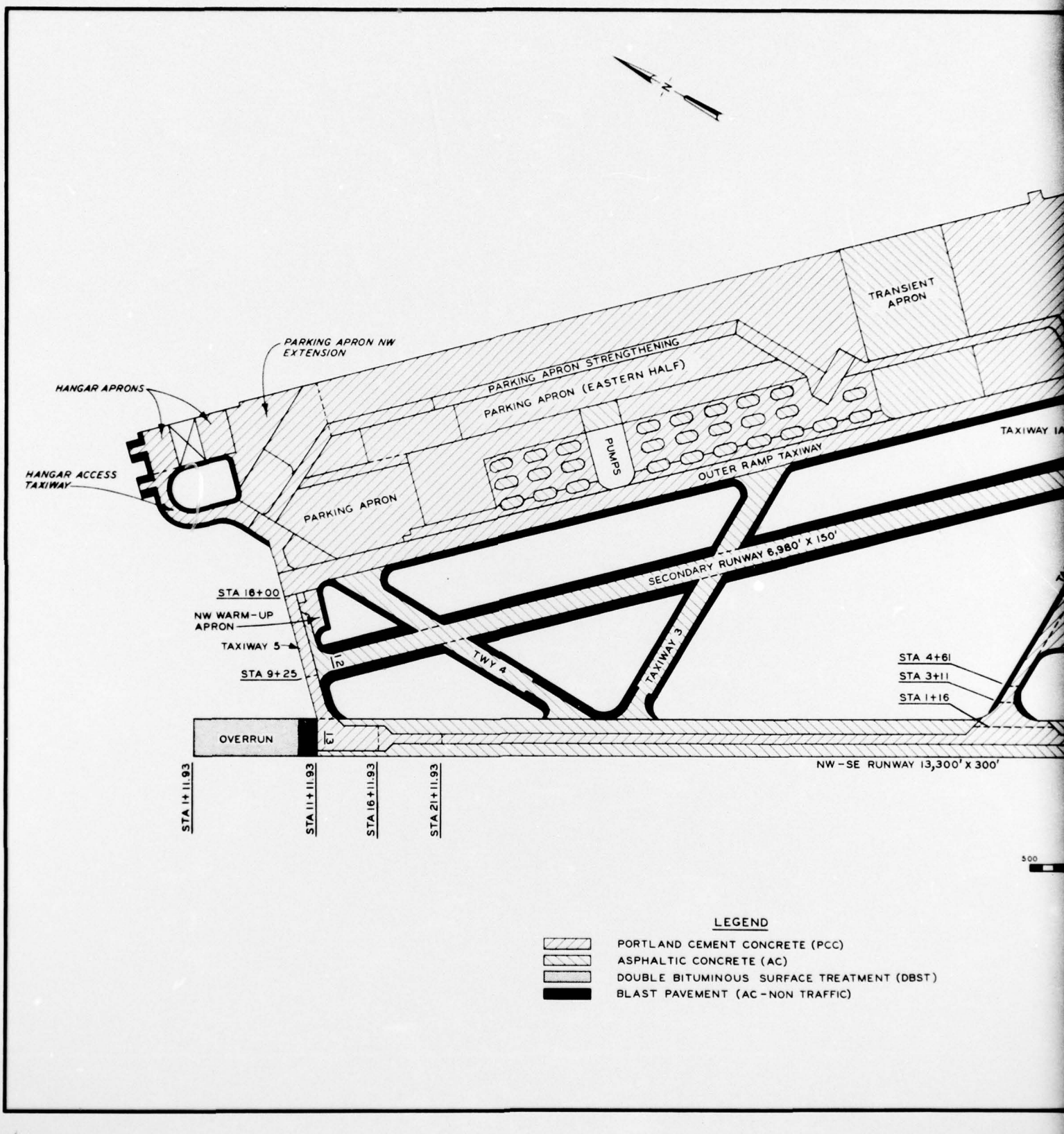
VICINITY MAP

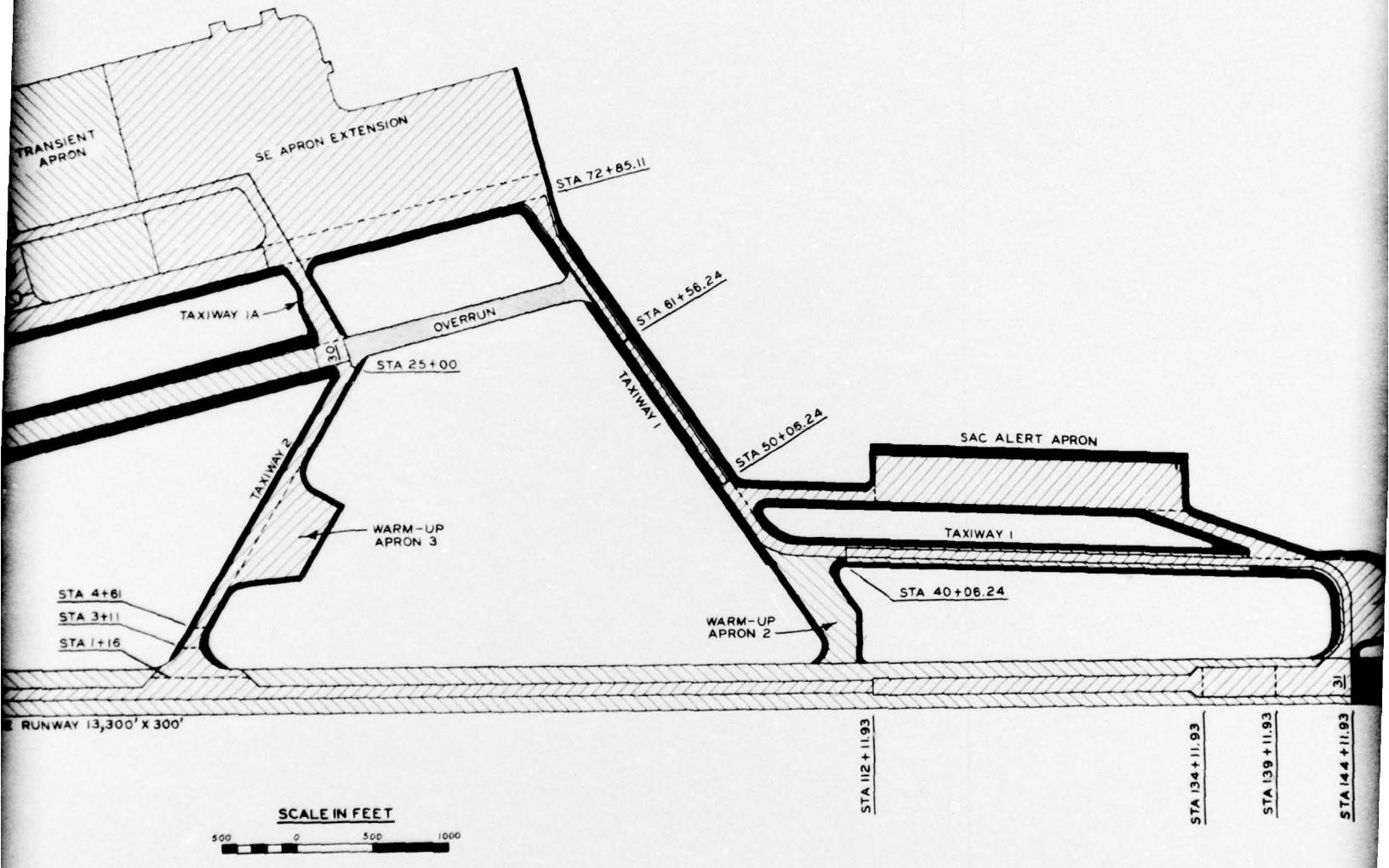
SCALE IN MILES

MARCH AFB

AIRFIELD LAYOUT

PLATE 1


N
TRANSIENT APRON
PARKING APRON NW EXTENSION
PARKING APRON STRENGTHENING
PARKING APRON (EASTERN HALF)
HANGAR APRONS
HANGAR ACCESS TAXIWAY
PUMPS
OUTER RAMP TAXIWAY
TAXIWAY 1A
PARKING APRON
SECONDARY RUNWAY 6,980' X 150'
STA 16+00
NW WARM-UP APRON
TAXIWAY 5
STA 9+25
TWY 4
TAXIWAY 3
STA 4+61
STA 3+11
STA 1+16
OVERRUN
NW-SE RUNWAY 13,300' X 300'
STA 1+11.93
STA 11+11.93
STA 16+11.93
STA 21+11.93
500
LEGEND
PORTLAND CEMENT CONCRETE (PCC)
ASPHALTIC CONCRETE (AC)
DOUBLE BITUMINOUS SURFACE TREATMENT (DBST)
BLAST PAVEMENT (AC-NON TRAFFIC)

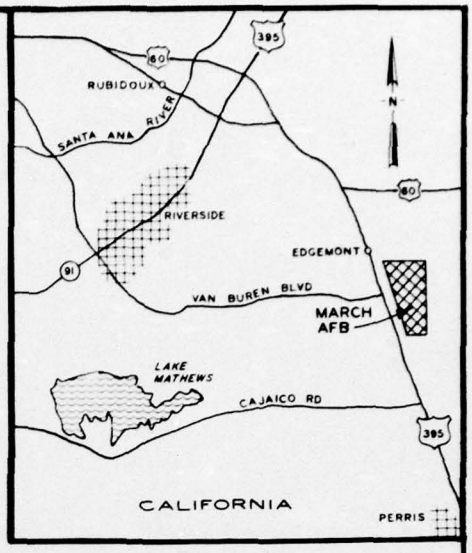


SCALE IN FEET

500 0 500 1000

TMENT (DBST)

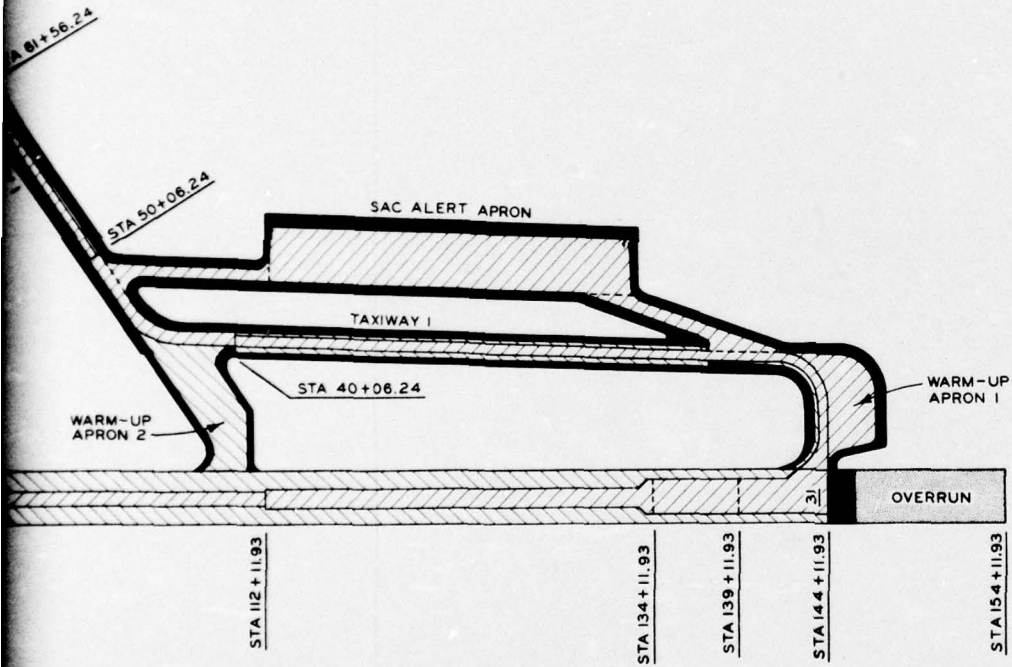
2



VICINITY MAP

SCALE IN MILES

2 0 2 4 6



MARCH AFB

PAVEMENT PLAN

PLATE 2

3