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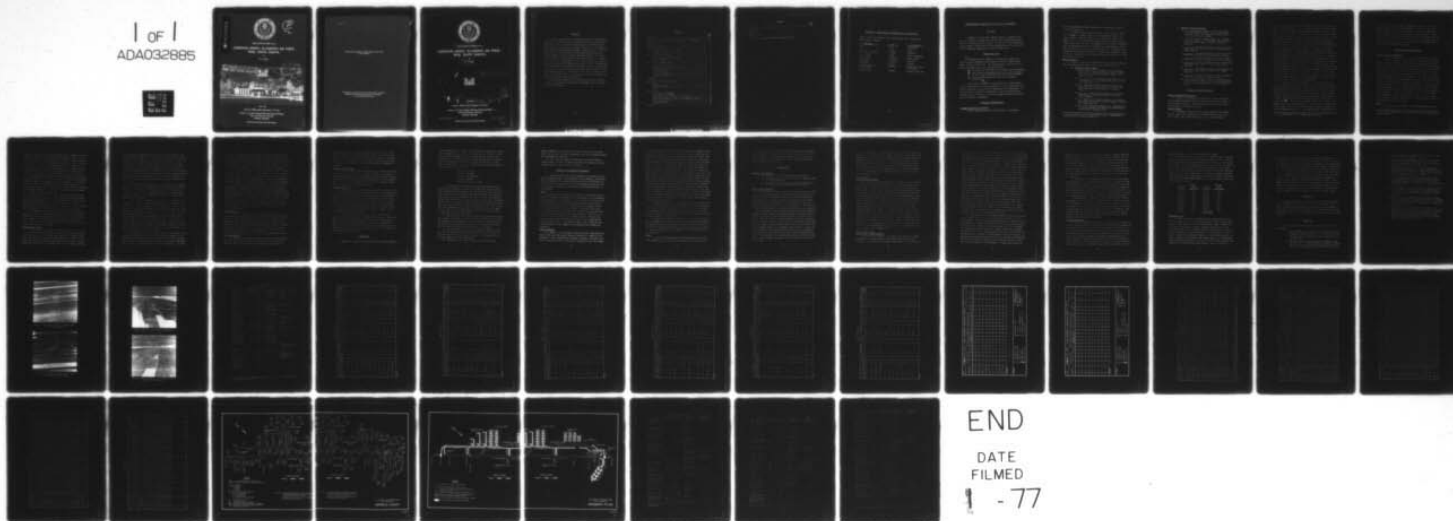
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CONDITION SURVEY, ELLSWORTH AIR FORCE BASE, SOUTH DAKOTA. (U)
APR 73 P J VEDROS

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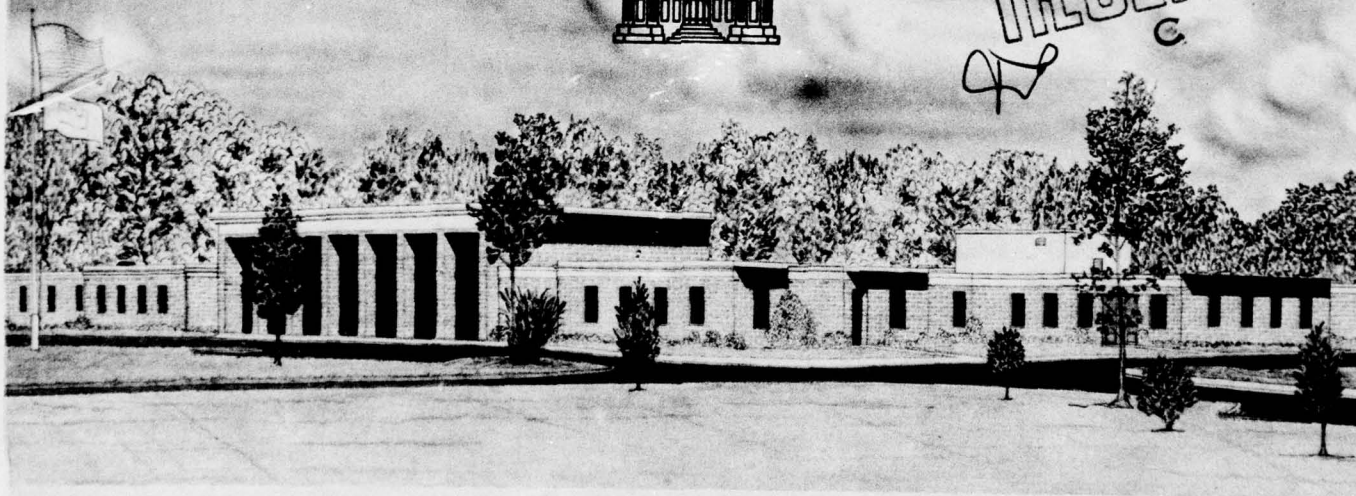
by

P. J. Vedros

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

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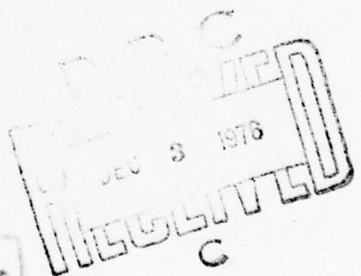
6 CONDITION SURVEY, ELLSWORTH AIR FORCE
BASE, SOUTH DAKOTA.

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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 from the U. S. Army Cold Regions Research and Engineering Laboratory (CRREL), Hanover, New Hampshire; the U. S. Army Construction Engineering Research Laboratory (CERL), Champaign, Illinois; and the WES participated in this study. Personnel involved in the condition survey were Messrs. P. J. Vedros, R. D. Jackson, H. T. Thornton, Jr., S. J. Alford, and K. A. O'Connor of the WES; T. C. Johnson of CRREL; and G. Schanz of CERL. The main text of this report was prepared by Mr. Vedros under the general supervision of Messrs. J. P. Sale, R. G. Ahlvin, and R. L. Hutchinson of the Soils and Pavements Laboratory. The section of the report concerning frost action was prepared by Messrs. Johnson and G. D. Gilman of CRREL. Appendix A was obtained from the Air Force.

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.

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Conversion Factors, British to Metric Units of Measurement

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

<u>Multiply</u>	<u>By</u>	<u>To Obtain</u>
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
kips (mass)	453.59237	kilograms
pounds (force) per square inch	0.6894757	newtons per square centimeter
miles per hour	1.609344	kilometers per hour

CONDITION SURVEY, ELLSWORTH AIR FORCE BASE, SOUTH DAKOTA

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 Ellsworth Air Force Base (EAFB), South Dakota, during 6-9 April 1972. The following three 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 Any detrimental effects of frost to the pavement facilities.

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 pavements, foundations, or patching materials were performed during this survey. The annual pavement maintenance plan for EAFB is presented in Appendix A.

Pertinent Background Data

General description of airfield

4. EAFB, formerly Rapid City Air Force Base, is located in

Pennington and Meade Counties, South Dakota, approximately 6 miles* northeast of Rapid City.

5. In April 1972, the airfield facilities consisted of a NW-SE (12-30) runway, a parallel taxiway, a large operational apron, two warm-up aprons, a connecting taxiway to the runway and aprons, nine hangar access taxiways and aprons, two washracks, a missile loading facility, and an alert facility. The runway was 300 ft wide and 13,497 ft long; the operational apron was 850 ft wide and approximately 4,160 ft long; and the taxiways were 100 ft wide, except for a 75-ft-wide taxiway through the old ADC alert apron. A layout of the airfield is shown in plate 1. A pavement plan indicating the type pavement on each facility is shown in plate 2.

Previous reports

6. Previous reports concerning EAFB are listed below. Pertinent data were extracted from them for use in this condition survey.

a. Condition survey reports.

- (1) Ohio River Division Laboratories, CE, "Preliminary Report on Rigid Pavement Condition Survey of Rapid City Air Force Base, South Dakota," August 1947, Cincinnati, Ohio.
- (2) _____, "Report of Rigid Pavement Condition Survey, Rapid City Air Force Base, South Dakota," July 1950, Cincinnati, Ohio.
- (3) U. S. Army Engineer Division, Missouri River, CE, "Rigid Pavement Condition Survey of Ellsworth Air Force Base, South Dakota," April 1956, Omaha, Nebraska.
- (4) _____, "Rigid Pavement Condition Survey, Ellsworth Air Force Base, South Dakota," June 1959, Omaha, Nebraska.
- (5) U. S. Army Engineer District, Omaha, CE, "Report of Investigation of Flexible Airfield Pavement," October 1959, Omaha, Nebraska.
- (6) Ohio River Division Laboratories, CE, "Condition Survey Report, Ellsworth Air Force Base, South Dakota," February 1965, Cincinnati, Ohio.

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

b. Pavement evaluation reports.

- (1) U. S. Army Engineer Division, Missouri River, CE, "Pavement Evaluation Report, Rapid City Air Force Base, Rapid City, South Dakota (Evaluation No. I)," December 1944, Omaha, Nebraska.
- (2) U. S. Army Engineer District, Omaha, CE, "Pavement Evaluation Report No. II, Ellsworth Air Force Base, Rapid City, South Dakota," October 1955, Omaha, Nebraska.
- (3) _____, "Pavement Evaluation Report No. III, Ellsworth Air Force Base, South Dakota," November 1956, Omaha, Nebraska.
- (4) _____, "Pavement Evaluation Report No. IV, Ellsworth Air Force Base," July 1957, Omaha, Nebraska.
- (5) _____, "Pavement Evaluation Report No. V, Ellsworth Air Force Base," December 1957, Omaha, Nebraska.
- (6) _____, "Airfield Evaluation Report, Ellsworth Air Force Base, South Dakota," November 1959, Omaha, Nebraska.
- (7) _____, "Airfield Evaluation Report, Ellsworth Air Force Base, South Dakota," December 1960, Omaha, Nebraska.
- (8) _____, "Airfield Evaluation Report, Ellsworth Air Force Base," January 1962, Omaha, Nebraska.
- (9) Civil Engineering Center, Wright-Patterson Air Force Base, "Airfield Pavement Evaluation Report, Ellsworth Air Force Base, South Dakota," June 1971, Dayton, Ohio.

History of Airfield Pavements

Design and construction history

7. Details of the design and construction history of the airfield pavements (extracted from the reports referenced in paragraph 6) are presented in table 1. Pavement thicknesses, descriptions, and other details are presented in table 2.

Traffic history

8. A detailed traffic record was not available for this study; however, some traffic information was available from previous condition surveys and pavement evaluations. B-52 aircraft started

operating at EAFB in March 1957. Prior to that time, the heaviest aircraft using the field was the B-36. It was estimated that, in the last three years of operations by B-36 aircraft, approximately 7,000 coverages of channelized traffic were applied on the primary taxiway. Traffic at that time averaged about 1,000 cycles* per month, of which 40 percent was from fighters; 20 percent, C-124; 20 percent, B-36; and 20 percent, miscellaneous aircraft. During the period April 1957-March 1958, there were 404 cycles of B-47 traffic, 317 cycles of B-52 traffic, 23 cycles of KC-97 traffic, 178 cycles of C-124 traffic, and 6,239 cycles of miscellaneous aircraft traffic. From April-August 1958, a total of 454 cycles of B-52 traffic were applied. Traffic records for the period April-May 1959 indicate that 230 cycles of B-52, 3 cycles of KC-97, 11 cycles of KC-135, 23 cycles of C-124, and 800 cycles of miscellaneous aircraft traffic were applied. The average number of cycles per month during March-May 1964 was 585 for transports, cargoes, and tankers; 360 for fighters; and 89 for B-52's. Traffic records for heavy aircraft during the period 1 January 1971-31 December 1971 indicate that the total number of cycles was as follows: 1, C-5A; 96, C-141; 1,961, KC-135; 612, EC-135; and 828, B-52. The operating load of the B-52 for a basic mission was 410,000 lb; operating loads for the KC-135 and the EC-135 were 235,000 and 260,000 lb, respectively.

9. Based on the above information, it is estimated that there have been approximately 10,000-12,000 cycles of B-52 traffic applied to the airfield pavements at EAFB. The SE runway end is used for approximately 75 percent of the takeoffs and landings. The primary taxiway leading to this end of the runway and the runway end have, therefore, received approximately 5,000 coverages of channelized traffic from B-52 aircraft. Some portions of the apron taxiway receive 100 percent of these operations. Taxiway 26 (the primary taxiway to the NW end of the runway), which has developed distress at the joints, has received about 1,500 coverages from B-52 aircraft. The takeoff weight of these aircraft has averaged 400,000 lb. It was reported that, at present, about

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

8 to 10 practice alert aircraft per month taxi down the length of the runway, travel along the primary taxiway, and return to the parking stubs. The aircraft weigh about 488,000 lb during these exercises. These movements have not been included in the total number of cycles listed above. Assuming that these practice alerts have been occurring since B-52's have been at the field, there have been approximately 700 additional coverages of this heavy load applied on the full length of the runway and primary taxiway system.

Conditions of Pavement Surfaces

Pavement inspection procedure

10. 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 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 3. This table shows a quantitative breakdown of the various types of defects and a condition rating for each pavement 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. The pavement defect identified as a keyed joint failure in table 3 was not included in the reference manual, because this type defect has only recently been observed. It results from traffic by extremely heavy aircraft and is considered to be a major defect.

Runway

11. In general, the condition of the pavement surface on the

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

runway was considered to be excellent. The 1000-ft runway ends were in excellent condition with only two major structural defects recorded (table 3). The 75-ft inlay section of the interior portion of the runway from sta 40+06 to 65+06 (features RL2C, RL4C, and RL5C), which consisted of 18-in. reinforced portland cement concrete (PCC), had nine slabs that contained transverse cracks. The crack openings were very small and appeared to be held tightly together by the reinforcement (photo 1). The condition of this inlay section was rated as good.

12. An asphaltic concrete (AC) overlay was placed on the runway from sta 135+30 to 160+03 in 1966 and from sta 65+06 to 135+30 in 1969; and, at the time of this survey, the overlay pavement was in excellent condition. There was evidence of some reflection cracking at the joints, with some free water in the cracks, probably from frost melting. The overlay was feathered at sta 165+03, and the edges of the overlay were raveling at this point (photo 2).

13. The 17-in. PCC in the center 50 ft of the runway from sta 135+30 to 155+03 was replaced with 19-in. PCC in 1963 due to failures that had been experienced in the 17-in. pavement. The surface of the 19-in. PCC was reported to have become rough and an AC overlay was placed in 1966 to correct this condition. It was not possible to determine the performance of the 19-in. PCC because of the AC overlay.

14. Structurally, the pavements seem to be performing satisfactorily under the loads imposed by the B-52's now using the pavements. Sixteen B-52 pilots and thirty-six KC-135 pilots were asked to rate the riding quality of the runway, and only five B-52 pilots rated it as rough. The roughness was indicated to be on the northwest end of the runway, especially during landings.

Primary taxiway system

15. The primary taxiway system consists of taxiways 26, 21, and 17. The northwest end of taxiway 26 (feature TLA), which was constructed in 1956, was designed for channelized traffic of 100,000-lb wheel loads. The outer lanes are 19 in. thick, and the center lane is 22 in. thick, with a transition between the center and outer lanes. A condition survey performed in 1959 reported that, at that time, approximately

40 slabs contained longitudinal spalls that were the result of keyed joint failures. During the 1972 survey, it was estimated that approximately 163 slabs in the center lane contained longitudinal spalls that were considered to have resulted from keyed joint failures. These failed areas have been sawed out and replaced by hot-mix AC patches. The patches vary in length from several feet to the full length of a slab, and frequently the joints on both sides of the slab require patching. There were 23 slabs in this taxiway that had been replaced because they had reached a shattered condition. This feature was rated as being in fair condition, based on the defects that were recorded in the 1972 survey.

16. The next portion of taxiway 26 (feature T2A) is of flexible pavement construction. This area had developed distress from B-52 operations, so the center 50 ft of the taxiway was overlaid with 4 to 6 in. of AC in 1971. At the time of this survey, this feature was in excellent condition, with no evidence of grooving or cracking from the heavy aircraft operations.

17. The portion of taxiway 26 adjacent to the operational apron (feature T4A), which was constructed in 1953 of 21-in.-thick PCC, is 100 ft wide. Failures occurred in the two middle lanes, and, in 1963, the Air Force replaced the center 50 ft of this taxiway with PCC pavement of the same thickness. This new pavement was placed in three lanes with slabs that were 16 ft 8 in. wide and 12 ft 6 in. long. The as-built drawings show that the longitudinal joints contained dowels instead of keyed joints. The 1972 survey indicated that about 14 slabs in the center 50-ft section contained longitudinal spalls that had been patched as well as about 6 other major structural defects (see photos 3 and 4). The center section of the taxiway was in good condition, and the outer edges were in excellent condition.

18. Taxiway 21 is the taxiing area through the operational apron. Originally, the portion of the taxiway identified as feature T5A was constructed as part of the apron, and an area was marked off for taxiing purposes. It was reported that failures in the form of rutting developed in the tar concrete surface under B-52 operations, so, in 1967,

the 4-in. bituminous pavement (1-1/2-in. tar concrete and 2-1/2-in. AC) was removed and replaced with 4-in. AC. All aircraft operations from the apron area funnel onto this taxiway for alert movements or for take-offs. The surface of the taxiway pavement in 1972 showed evidence of slight rutting and longitudinal cracking from B-52 operations; however, the pavement is presently considered to be in very good condition.

19. A portion of taxiway 21 (feature T6A) crosses the area which was part of the old N-S runway. It was reported that, in two instances in the past, aircraft wheels have broken through the apron surface in areas just adjacent to the underlying old N-S runway. This portion of taxiway 21 consists of 23-in.-thick PCC and was in excellent condition.

20. The portion of taxiway 17 leading off the south edge of the operational apron through the old ADC alert apron (features T7A and T8A) consists of 23-in.-thick PCC and was rated very good during this survey. The remaining portion of taxiway 17 to the southeast end of the runway (feature T9A) consists of 21-in. reinforced PCC. There were some structural defects in this feature, such as transverse cracks, but they were held tightly together by the reinforcement. There were a number of slabs in this feature that contained corner spalls, and about half of these spalls had been patched with AC. The condition of this feature was rated as good.

Operational apron

21. The large operational apron, which is constructed of bituminous pavement (feature A2B), was in fair condition. The tar concrete surface contained some random cracking that was not associated with overloading. The tar concrete surface has received a number of slurry seal coats (coal tar pitch emulsion and sand) over the years. The most recent coat was applied in about 1967. This treatment had tended to keep surface cracks sealed. It was reported that, during hot summer days, the tar surface softens and cracking of the seal material occurs.

SAC alert facility

22. The SAC alert facility consists of a taxiway (feature T11B) and nine parking stubs (feature A5B). The taxiway was in very good condition, and the parking stubs, except stubs 6 and 9, were in

excellent condition. There were two corner breaks observed in stub 6 and four structural cracks (longitudinal, corner, and transverse) in stub 9. These two facilities were in very good condition. The alert facility is constructed mostly on a deep fill, but there was evidence of only one or two slabs near stub 2 where some slight settlement had occurred.

NW and SE warm-up aprons

23. The NW warm-up apron (feature A1B) and SE warm-up apron (feature A4B) are constructed of 19-in.-thick PCC pavement. A number of longitudinal spalls, which had been patched and are attributed to keyed joint failures, were observed on the NW warm-up apron. The SE warm-up apron did not have joint defects but did have a few structural breaks. Both apron areas were in very good condition.

Secondary facilities

24. The taxiways in the maintenance hangar areas (taxiways 7-11) were in fair to very good condition. Taxiways 8 and 9 have 50-ft-wide center sections of 23-in. PCC, and taxiways 10 and 11 are constructed of 21-in. PCC. Taxiway 10 received an AC overlay in 1966. These four taxiways (8-11) contained only a few structural defects in the taxiing areas, and the pavements were all in very good condition. Taxiway 7 was surfaced with an AC overlay over 19-in. PCC; a considerable amount of reflection cracking was evident in the overlay. However, the reflection cracks have all been sealed.

25. The 13-in. PCC in the nose dock apron areas was badly spalled, cracked, scaled, and in generally poor condition. Taxiways 22 and 27, which are ladder taxiways off the runway, are paved with AC. Both were in fair condition. There was evidence of some overload cracks, but most of the cracking in the surface was random cracking resulting from aging and climatic conditions. The pavements appeared to be performing satisfactorily.

Maintenance

26. Maintenance at EAFB had consisted of crack sealing, replacing

shattered slabs, slurry sealing, joint resealing, patching joint spalls, and repairing localized failed areas on the aprons. A copy of the annual pavement maintenance plan was obtained from the Air Force and is included in this report as Appendix A. This maintenance plan indicates the type and amount of maintenance that had been performed at EAFB through November 1969. The costs of maintenance for airfield pavements were reported to be as follows:

FY 1968 - \$122,815
FY 1969 - \$146,849
FY 1970 - Not available
FY 1971 - \$90,091
FY 1972 - \$232,111 (to date)

27. Maintenance of the longitudinal spalls on the north end of taxiway 26 has consisted of sawing to a minimum depth of 2 in. in the sound concrete beyond the spalled area and chipping out the unsound concrete to the depth of the keyway. The exposed surface is then brushed with a tack coat, and hot-mix AC is used in the patch. When existing patches have settled 1/2 in. or more below the adjacent slab, additional hot-mix AC has been applied. These patches have been performing fairly well for the past 10 years. It was reported that, in the area of taxiway 26 that contained dowels, patching the spalls required the removal of only about 4 in. of unsound concrete (i.e., the depth of the patch was less than the depth of the dowel).

28. Maintenance of the operational apron has consisted of repairing two areas where towed aircraft were reported to have broken through the pavement surface adjacent to the old N-S runway. A slurry seal of tar emulsion and sand was placed on the apron area during about 1967, and this repair has helped to seal the cracks in the surface.

29. At the present time, there is a maintenance problem in the sod area just adjacent to the paved area where the B-52's perform engine run-up checks. The sod, along with parts of the adjacent edge of the paved surface, is being eroded away.

30. Pop-outs are not a major problem at this base, because

crushed limestone has been used as the coarse aggregate for the PCC. Some of the pop-outs have been patched with epoxy resin materials, which have performed satisfactorily.

31. The joint seal material generally was in fair condition. However, there are some areas where the joint seal material is in poor condition, and the joints need to be resealed.

Comparisons of Pavement Performances

32. The latest evaluation of the pavements was reported in June 1971 (see paragraph 6b). The thicknesses of the pavements, the physical property data, and the evaluation loads presented in the referenced report were used for a comparison of the past pavement performances with the performances indicated by the results of the condition survey reported herein.

Runway

33. Based on the evaluation loads (table 4) and present design criteria for normal operations, none of the pavements of the runway have been overloaded from B-52 operations. In consideration of the practice alert operations at 488,000-lb gross loads and under the assumption (based on the traffic data) that approximately 700 coverages of this load have been applied to the full length of the runway, the first 1,000 ft of the northwest (12) end of the runway is approaching the design criteria requirements for loads and coverages. On the basis of the 5,000 coverages applied, the southeast (30) end is in about the minimum-to-full operational category for aircraft with approximately 400,000-lb gross loads. As is noted in table 4, the evaluation gross load for this end of the runway for the minimum-to-full category is 600,000 lb.

Primary taxiways

34. Taxiway 26 in the primary taxiway system has experienced distress in the rigid and flexible pavement sections as a result of B-52 operations. These pavements were designed to support a 100,000-lb gear load on twin wheels, which at the time of construction were the loading

and gear configuration of B-47 aircraft. The flexible pavement section (feature T3A) was overlaid after distress had developed; and, with the additional overlay thickness and the present intensity of traffic, this area is not presently being overloaded by B-52 operations. The north end of taxiway 26 (feature T1A) was constructed in 1956 of 22-in.-thick PCC; shortly after B-52 operations started in about 1959, distress occurred in the longitudinal joint in the middle lane in the form of a longitudinal spall. The keyed joints on each side of the middle lane were failing. At the present time, about 96 percent of the slabs in the middle lane contain asphalt patches as a result of the keyed joint failures. This is the only type of defect noted in these slabs; thus the 22-in.-thick pavement is carrying the load of the B-52 aircraft without the benefit of a load-transfer device. The other portion of taxiway 26 (feature T4A), which was reconstructed by the Air Force in 1963, consists of 21-in.-thick, 50-ft-wide PCC with doweled joints. This pavement is experiencing longitudinal spalls in the 50-ft-wide reconstructed area. At the time of this survey, 68 percent of the slabs in the center 50-ft-wide section of this taxiway contained asphalt patches required because of the joint spalls.

35. Taxiway 21 through the operational apron was reconstructed of 4-in. AC in 1967, because the existing pavement (1-1/2-in. tar concrete and 2-1/2-in. AC) was rutting under B-52 operations. The replacement of the pavement surface did not change the load-carrying capability, and the AC surface is showing signs of longitudinal cracking and grooving from overloads of B-52 traffic.

36. Features T7A and T8A of taxiway 17 consist of 23-in.-thick PCC. According to the evaluation, this area is not being overloaded by present B-52 operations. The 21-in. reinforced section of taxiway 17 (feature T9A) contained some defects, but the reinforcement is keeping the cracks tightly closed. This pavement is not being overloaded by B-52 operations.

Aprons

37. All of the apron pavements (except the heavy-bomber alert apron hardstands) are overloaded by operations of the B-52 at gross

loads of approximately 400,000 lb. The large operational apron appears to be performing satisfactorily under present B-52 operations. There was little evidence of overloading in the areas where the planes are parked. Distress from overloads was, however, noted in the taxiing lanes and near the fueling pits.

Frost Action

Objectives of inspection

38. The objectives of the inspection were to determine:
 - a. Any adverse effects of frost heave to the pavements during the winter months.
 - b. Any traffic-induced failures that might be related to thaw weakening of the subgrades or base courses.

Frost heave of pavements

39. The airfield pavements (traffic and nontraffic areas of flexible and rigid pavements) were inspected to identify any localized or generalized surface irregularities that might indicate differential frost heaving. The inspection, which was conducted on 6 and 7 April, was believed to have coincided with or followed shortly after the period of thawing of frozen base courses and subgrades. Therefore, the effects of any detrimental nonuniform heave should have been apparent.

40. Personnel in the Base Civil Engineering Office were queried regarding the development of undesirable surface unevenness during the winter, and pilots were asked to rate the degree of roughness of the runway. Fifty-two pilots of B-52 and KC-135 aircraft were canvassed; only five rated the runway as rough, and only six considered the runway to be less smooth during the winter months. The engineers stated that the 1969 runway overlay was constructed partly to correct a rough surface. Evidently, the overlay accomplished this purpose; furthermore, frost action since that time has not caused surface irregularities to recur. The consensus of the condition survey team was that the runway did not exhibit roughness detectable in a passenger car at speeds of up to 60 mph.

41. The taxiways and aprons were not found to have suffered settlements or other vertical displacements, except for the extremely overloaded 13-in. PCC hangar access pavements and slight surface rutting in certain AC taxiways. No evidence of differential frost heave was observed, even on pavements of 20- to 25-in. combined thicknesses (pavement and base course). In fact, differential frost heave was not evident even in the old ADC alert apron, which has a 2-1/2-in. AC overlay on a 7-in. PCC pavement, for a combined thickness of 9-1/2 in. above a frost-susceptible subbase.

Thaw weakening of
subgrades or base courses

42. The extent of thaw weakening of the subgrade and base courses could not be readily determined by inspection of the pavements. Pavements usually are repaired or otherwise corrected (as with overlays) when failures occur and usually are not easily examined during a condition survey. However, even if the failed pavements can be examined, it is often impossible to determine by visual observations whether a failure is the result of thaw weakening or of deficiencies in the thickness of the subgrade, base, or pavement. In general, the depletion of the fatigue resistance of a pavement system in a frost area is progressive under repeated load applications and is inevitably related to thaw weakening, whether the evidence of fatigue or failure becomes visible during the frost-melting period or at some other time of year. Accordingly, the degree of thaw weakening and its effects, if any, on the condition of the pavements at EAFB could not be appraised merely by an inspection of the pavements. Some limited perception of the severity of frost effects at the base can be gained, however, by comparing the performance of certain pavements with what might have been expected in the light of current frost design criteria.

Pavement performances
versus frost condition criteria

43. Many of the pavements are severely deficient in slab thickness and/or in combined thickness when compared with current frost criteria or even with normal (nonfrost) design criteria. However, most

of the pavements were in good to excellent condition, and the pavements that showed distress or had been overlaid (indicating prior distress) were not necessarily those with severe thickness deficiencies. The following paragraphs contain brief comments regarding several of the pavements.

44. At the northwest end of taxiway 26 (feature T1A), nearly continuous longitudinal keyed joint failures have occurred along both edges of the center slab, thereby eliminating effective load transfer to adjoining slabs. The design is severely deficient for either frost or normal (nonfrost) design. Yet slabs in which the keyed joints have failed have not cracked further; thus it seems very doubtful that the subgrade modulus at this location has decreased during thawing seasons to the level of the magnitude assumed by current frost design criteria for the thawing season. The pavements of feature T1A, the adjoining taxiway through the northwest warm-up apron, and the northwest end of the runway (feature R3A) are of identical design and apparently experience identical traffic, yet the latter two pavements show little or no distress. A comparison of feature T1A with feature T4A (a part of the same taxiway) shows that feature T4A has a combined thickness of 62 in. and therefore must surely have a high subgrade modulus even in the spring. Yet the pavement of feature T4A shows distress only slightly less severe than feature T1A. Thus, it is believed that the pattern of distress in these pavements is not dependent on frost action, which indeed can have an insignificant effect upon them.

45. The center 50 ft of the runway interior (traffic area C) consists of 19-in. PCC over 34 in. of gravel from sta 135+30 to 155+03 (feature R7C). This structure was not considered to be deficient in design thickness for this type of facility; however, it had been overlaid with 2 in. of AC, yielding a combined thickness of 55 in. Presumably, the overlay was applied because the original pavement had manifested severe distress. The AC overlay pavement from sta 65+06 to 130+04 (feature R11C), with a combined thickness ranging from 27-1/2 to 30-1/2 in., appeared to be performing as well as the 55-in. pavement of feature R7C. The overlay was placed in 1969 and was in excellent condition at the time of this inspection. This performance is surprising, because the

combined thickness of 27-1/2 to 30-1/2 in. should be severely deficient according to current criteria (even for the normal condition) for sub-grade CBR values of 5 to 8, as are reported for EAFB in the 1971 pavement evaluation report. Possibly, the relatively good performance of the 27-1/2- to 30-1/2-in. section results from the composition of the individual layers, most of which are asphalt- or cement-stabilized materials. At any rate, the condition of the pavements in the interior of the runway suggests that they have not been significantly affected by frost action.

46. The edges of the runway have relatively thin sections (combined thickness of 20 in. from sta 40+06 to 130+04), yet roughness from frost heave was not reported nor was it observed during the inspection. Similarly, there was no evidence of differential frost heave along the edges of the taxiways, where taxiway pavements with thicknesses of 25 to 62 in. adjoin shoulder pavements with thicknesses of 17 to 20 in. Again, frost action apparently has not significantly affected the pavements.

47. The comments in paragraphs 43-46 presuppose that a significant amount of B-52 traffic has been applied at this airfield, and some of the comments would be invalid were this not so. However, the data presented in this report show that significant B-52 traffic has occurred over the years (even though the cumulative number of coverages is somewhat less than the total assumed in the design criteria) and that the coverages were applied at significantly lower loads than the 265-kip assembly load currently used for design.

Design freezing index

48. A design freezing index of 1439 degree-days has been cited in previous condition surveys and pavement evaluation reports (paragraph 6). This value is the average of the three coldest winters in the 1921 to 1954 period (1935-36, 1948-49, and 1949-50). The design freezing index reflecting the average of the three coldest years in the past 30 years (1941-1971) is 1360 degree-days. The latter determination also includes the 1948-49 and 1949-50 winters, with the winter of 1968-69 replacing 1935-36. Both design indices are based on records of the Rapid City Weather Station and consider average daily temperatures for the

transition months at both ends of the freezing seasons.

49. Seasonal indices since 1956-57 are tabulated below, together with the mean freezing index for the 1931-60 period. These values from Rapid City Weather Station records are based entirely on average monthly temperatures and are generally somewhat lower than indices that consider average daily temperatures for the transition months. On a seasonal basis, this numerical difference may vary from an essentially negligible amount to more than 150 degree-days. The values do, however, indicate the relative severity of the freezing seasons and show that several substantially colder-than-normal winters have occurred during the period of B-52 aircraft operations.

<u>Freezing Season</u>	<u>Freezing Index degree-days</u>	<u>Freezing Season</u>	<u>Freezing Index degree-days</u>
1957-58	323	1965-66	907
1958-59	794	1966-67	417
1959-60	839	1967-68	694
1960-61	363	1968-69	1230
1961-62	997	1969-70	731
1962-63	730	1970-71	1026
1963-64	578	1971-72	957
1964-65	1125	30-year Mean (1931-1960)	678

Groundwater table

50. The most logical explanation for the scant evidence of differential frost heave and of significant pavement distress during spring thaws is the existence of a very deep groundwater table. Evidence on this point is conflicting, however. Engineers attached to the Base Civil Engineering Office at EAFB expressed the opinion that at times the groundwater table is located no more than 2 to 3 ft below the ground surface. There were several references to a lake that was formerly located in the area now occupied by the runway, and it has been reported that free water was found in the base course when various pavements were excavated to install stronger inlay sections. Logs of a number of

borings taken at various locations on the base were examined. The groundwater table in most cases was not mentioned; but, in some cases, it was shown to be at depths of 20 to 30 ft. Groundwater investigations at EAFB reported by the U. S. Army Engineer District, Omaha, in April 1951, found that groundwater generally was not present within less than about 20 ft below the surface. These investigations appear to be quite conclusive. The reports that water has been found near the surface apparently refer to localized perched water, possibly from infiltration through pavement joints and cracks, and evidently such sources do not supply an ample amount of water to support extensive frost action. Possibly, this condition might be more generalized except that the landform at and surrounding the base, with well defined water courses and other topographic relief, is favorable for runoff of surface water.

Evaluation

51. The latest evaluation report for this airfield was prepared in 1971 (see paragraph 6b). The load-carrying capabilities for the various features have been taken from the 1971 report and presented in this report in table 4. This material has been repeated to provide the reader with as much of the latest pavement information as possible under one cover.

Conclusions

52. The following remarks summarize the findings of the 1972 inspection:

- a. The pavements on the northwest end of the runway are designed for 100,000-lb gear loads and are not being overloaded by present operations, since the majority of heavily loaded aircraft use the southeast end of the runway for takeoff.
- b. The keyed joint failures occurring on taxiway 26 have only recently been identified in heavy-load test sections and are failures that occur fairly rapidly. Methods of repairing or strengthening those pavements that contain

keyed joints are being investigated by the U. S. Army Engineer Waterways Experiment Station.

- c. The satisfactory performance of the 22-in. slabs after failure of the keyed joints indicates that further studies are required to determine if the present thickness requirements are too conservative.
- d. The hot-mix AC patches in the areas of longitudinal spalls on the taxiway have performed satisfactorily as a temporary form of maintenance. However, the patches settle and roughen under taxiing aircraft, and more material must be added to the patch as a filler.
- e. The recent overlay work on the runway appears to have eliminated the objectionable roughness experienced by operational personnel. However, there is still some minor roughness on the northwest end of the runway during landings.
- f. The AC overlay (4 to 6 in.) placed on taxiway 26 (feature T2A) in 1971 increased the load-carrying capability of this facility by approximately 25 percent. This overlay was placed after the most recent evaluation report was prepared.
- g. While several substantially colder-than-normal winters have been experienced in recent years at the base and the subgrade soils are classified as highly frost susceptible, it is not evident that the pavements have been adversely affected by frost heave.
- h. Features with a combined thickness of pavement and nonfrost-susceptible base that is substantially less than what is required under current design criteria have performed well. It appears that subgrades have not been severely weakened by freezing and thawing. It is believed, however, that the absence of a high groundwater table has restricted frost action.

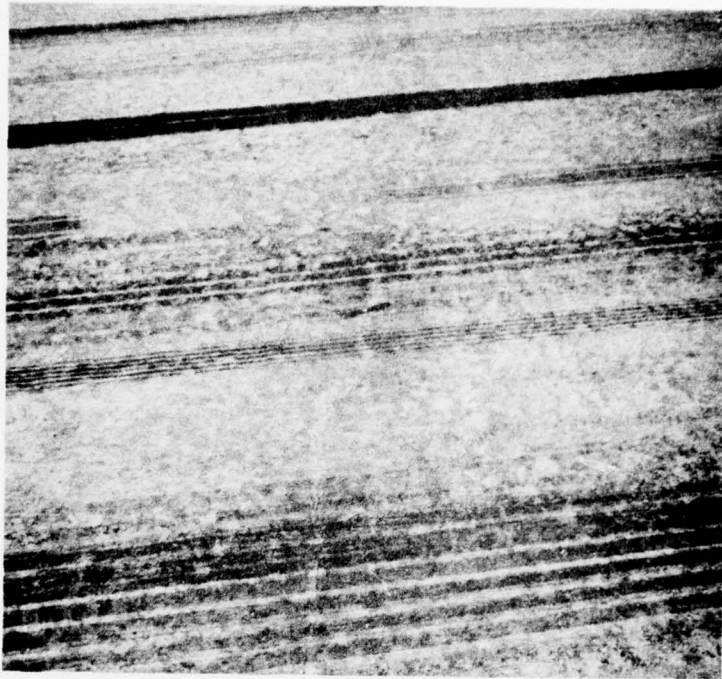


Photo 1. Transverse crack in reinforced PCC slab of NW-SE runway



Photo 2. Raveling of feathered edge of AC at sta 165+03 of NW-SE runway



Photo 3. Patched joint spalls on taxiway 26 near parking apron. Note that patches are on each side of joint



Photo 4. Patched joint spalls near north end of taxiway 26 (feature T4A)

Table 1
Airfield Construction History

Pavement Facility	Pavement		Date(s) of Construction	Design Loading	Remarks
	Thickness in.	Type			
N-S runway*	1-1/2 to 1-1/2	AC	1942	80,000-lb gross plane load	Abandoned
E-W runway*	1-1/2 to 1-1/2	AC	1942	80,000-lb gross plane load	Abandoned
NW-SE runway	1-1/2 to 1-1/2	AC	1942	80,000-lb gross plane load	
Taxiways A, B, C,** D,** and F*	7	PCC	1942-43	78,000-lb gross plane load	Taxiways A, C, D, E, and F abandoned
Taxiway E**	7	PCC	1942	78,000-lb gross plane load	Abandoned
Taxiway G**	4	AC	1942	78,000-lb gross plane load	Abandoned
Old N-S operational apron*	7	PCC	1942	80,000-lb gross plane load	North portion abandoned
N-S runway, overlay*	7	PCC	1943		
E-W runway, overlay*	7	PCC	1943		
NW-SE runway, overlay	7	PCC	1943		
NW-SE runway					
Sta 30+00 to 47+40	3	HP	1950	80,000-lb gross plane load	
Sta 130+53 to 135+30	3	AC	1950	80,000-lb gross plane load	
Sta 130+53 to 135+30, overlay	3	AC	1950		
Taxiway K	4	HP	1950	120,000-lb gross plane load	Redesignated taxiway 17
Taxiway E	4	AC	1950	120,000-lb gross plane load	Redesignated taxiway 22
Operational apron	4	HP	1950	120,000-lb gross plane load	
Heavy maintenance apron	4	HP	1950	120,000-lb gross plane load	
Heavy-bomber hangar aprons	4	HP	1950	200,000-lb gross plane load	
Connecting taxiway	4	HP	1950	200,000-lb gross plane load	
Taxiway G	4	HP	1950	200,000-lb gross plane load	
Taxiways J-1 and J-2	4	HP	1950	180,000-lb gross plane load	Incorporated in operational apron
NW-SE runway, overlay	5	AC	1951	100,000-lb twin gear load	
N-S runway, south end; overlay	5	AC	1951		
ADC alert taxiway and apron	3	AC	1951-52	25,000-lb single-wheel load	
ADC operational apron extension	3	AC	1951-52	25,000-lb single-wheel load	
Old N-S operational apron, south end; overlay	3-1/2	AC	1953	25,000-lb single-wheel load	
Taxiways A and B, overlay	2-1/2	AC	1953		
Maintenance aprons taxiways L-1, L-2, L-3, and L-4	4	AC	1953	100,000-lb twin gear load	Redesignated taxiways 25 and 19
Multipurpose dock aprons M-2 and M-3	13	PCC	1953	25,000-lb single-wheel load	Redesignated taxiways 13, 14, 15, and 16
Taxiways M-1, M-2, and M-3	21	PCC	1953	100,000-lb twin gear load	Redesignated taxiways 26, 11, and 10
Calibration platform (overlay)*	13	PCC	1954		Abandoned
Connecting taxiway (overlay)*	5	AC	1954		Abandoned
Aircraft resurace	17 and 18	PCC	1954	80,000- and 25,000-lb gear load	
Maintenance aprons M-4 and M-5	17	PCC	1955	80,000-lb gear load	
Taxiways M-1, M-4, and M-5	4	AC	1955	100,000-lb gear load	Redesignated taxiways 26, 9, and 8
NW-SE runway extension	22-19 and 17	PCC	1955	100,000-lb twin gear load	
Primary taxiway	19 and 22	PCC	1955	100,000-lb twin gear load	Taxiway 26
3 and 2 warm-up aprons	19	PCC	1955	100,000-lb twin gear load	
Maintenance aprons M-2 and M-5 (extension)	19	PCC	1955	80,000-lb gear load	
Taxiways M-4 and M-5 (extension)	19	PCC	1955	100,000-lb twin gear load	Taxiways 7 and 8
Maintenance dock aprons L-1A, L-2A, and L-3A	19	PCC	1955	80,000-lb gear load	
Taxiways L-1A, L-2A, and L-3A	19	PCC	1955	100,000-lb twin gear load	Redesignated aprons
South apron (ready shelters)	19	PCC	1955	100,000-lb twin gear load	
Heavy-bomber hangar apron extension	19	PCC	1958	160,000-lb twin-twin gear load	
Heavy-bomber alert apron	22	PCC	1958	265,000-lb twin-twin gear load	
Heavy-bomber alert taxiway	22	PCC	1958	265,000-lb twin-twin gear load	
NW-SE runway reconstruction, sta 50+00 to 40+00	22 and 23	PCC	1958	265,000-lb twin-twin gear load	
Through taxiway on operational apron and parking apron	22 and 23	PCC	1958	265,000-lb twin-twin gear load	Taxiway 21
Taxiway M-4 and M-5	23	PCC	1959		
NW-SE runway, sta 40+00 to 65+00	18	PCC†	1960	265,000-lb twin-twin gear load	Air Force replaced 50 ft of flexible pavement with two 25-in. lanes of rigid pavement, taxiways 9 and 8
NW-SE runway (overlay), sta 65+00 to 130+00	2 to 5	AC	1960		Center 75 ft
NW-SE runway, sta 130+00 to 135+30	17	PCC†	1960	265,000-lb twin-twin gear load	Center 75 ft
Taxiway K	21	PCC†	1961	265,000-lb twin-twin gear load	Replaced center 50 ft, taxiway 17
Taxiway M-2 apron access	21	PCC	1963		Air Force replaced two lanes, 50 ft wide, taxiway 11
NW-SE runway extension blwy, sta 0+00 to 20+00	19	PCC	1963		Air Force replaced two 50-ft-wide center lanes, edges thickened to 24 in.
Taxiway M-1 adjoining taxiways M-2 and M-3	21	PCC	1963		Air Force replaced three 50-ft-wide lanes, taxiway 26
Missile loading/unloading facility and taxiway P3	3	AC	1965		
Pad	17	PCC	1965		
Hangar access apron off taxiway 14	4	AC	1966		
Taxiway 10 (overlay)	2	AC	1966		
NW-SE runway (overlay) sta 135+30 to 160+00	2	AC	1966		
NW-SE runway (overlay) sta 65+00 to 135+30	1-1/2	AC	1969		
Taxiway 26 (old taxiway M-1) center 50 ft	4 to 6	AC	1971		

* Portion of abandoned or partly abandoned pavement that is shown in plate 1.
 ** Abandoned pavement that is not shown in plate 1.
 † Bituminous pavement.
 ‡ Reinforced.

Table 2
SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY NUMBER AND IDENTIFICATION	FACILITY		OVERLAY PAVEMENT		PAVEMENT		BASE		SUBGRADE		GENERAL CONDITION OF AREA CONSIDERED	
	LENGTH FT.	WIDTH FT.	THICK. IN.	DESCRIPTION	FLEX. STR. PSI.	THICK. IN.	DESCRIPTION	FLEX. STR. PSI.	THICK. IN.	CLASSIFICATION		CBR OR K
81X Overpass	350	300					Double bituminous surface treatment	650	6	Crushed limestone (M) = 80	CBR = 80	Excellent
82X Road areas at 8A-2E runway ends	150	300	2			Asphaltic concrete	650	35	Gravel subbase (M)	Frost Op P-3	CBR = 5	Excellent
83A 8A-2E runway, 1M end; Sta 135+03 to 135+50	500	300	22			Portland cement concrete	650	33	Gravel subbase (M) Frost Op P-3	Clay (CH or CL)	CBR = 80	Excellent
84B 8A-2E runway, 1M end; 100'-175' center, Sta 125+03 to 125+03	300	100	19			Portland cement concrete	650	4	Gravel filter course (M)	Frost Op P-3	CBR = 25	Excellent
85-1A 8A-2E runway, 2E end; 75'-75' center, Sta 137+00 to 137+00	140	75	13			Reinforced portland cement concrete	750	12 to 17	Gravel subbase (M)	Clay (CH or CL)	CBR = 5	Good
810 8A-2E runway, 2E end; outside edges, Sta 137+00 to 137+00	140	112.5	0 to 5			Asphaltic concrete	750	12	Crushed limestone (M) = 80	Clay (CH or CL)	CBR = 5	Good
812C 8A-2E runway; 75'-75' center, Sta 137+00 to 137+00	176	75	13			Reinforced portland cement concrete	750	9	Gravel subbase (M)	Frost Op P-3	CBR = 5	Good
811C 8A-2E runway; 75'-75' center, Sta 135+00 to 135+00	619	75	9 to 12			Asphaltic concrete	750	3-1/2	Asphaltic concrete	Frost Op P-3	CBR = 55	Excellent
811D 8A-2E runway; outside edges, Sta 137+00 to 137+00	256	112.5	5			Asphaltic concrete	750	8	Gravel base course	Clay (CH or CL)	CBR = 200	Good
86C 8A-2E runway; 75'-75' center, Sta 135+04 to 135+50	526	75	2			Asphaltic concrete	750	15	Gravel base course	Frost Op P-3	CBR = 75	Excellent
86D 8A-2E runway; outside edges, Sta 135+04 to 135+50	526	112.5	6-8			Asphaltic concrete	750	12	Gravel base	Clay (CH or CL)	CBR = 160	Good
85D 8A-2E runway, 1M end; outside edges, Sta 125+03 to 125+03	500	100	19			Portland cement concrete	650	15	Crushed limestone (M)	Frost Op P-3	CBR = 80	Excellent

Table 2 (Continued)

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY NUMBER AND IDENTIFICATION	FACILITY		OVERLAY PAVEMENT		PAVEMENT		BASE		SUBGRADE		GENERAL CONDITION OF AREA CONSIDERED	
	LENGTH FT	WIDTH FT	THICK IN	DESCRIPTION	FLEX IN PSI	THICK IN	DESCRIPTION	FLEX IN PSI	THICK IN	CLASSIFICATION		CBR OR A
80D 30-SE runway, outside edges, sta 139+25 to 159+03	1973	125	2	Asphaltic concrete		17	Portland cement concrete	650	4	Gravel filler course (OK)	50 Kf = 25	Excellent
87C 30-SE runway, SE end, center, sta 139+35 to 159+03	1973	50	2	Asphaltic concrete		19	Portland cement concrete	650	24	Crushed limestone (OK)	F = 60 Kf = 25	Excellent
813B 30-SE runway, SE end; 75-ft center, sta 10+06 to 13+00	294	75				18	Reinforced portland cement concrete	780	12	Gravel base course (OK)	F = 125 Kf = 70	Good
814D 30-SE runway, SE end; outside edges, sta 10+06 to 13+00	294	111.5				3	Asphaltic concrete		12	Crushed limestone (OK)	CBR = 80	Good
817B 30-SE runway, SE end; 100-ft center, sta 39+06 to 40+06	500	100				22	Portland cement concrete	665	15	Gravel subbase (OK)	50	Excellent
818D 30-SE runway, SE end; outside edges, sta 39+06 to 40+06	500	100				15	Portland cement concrete	665	32	Gravel base (OK)	F = 160 Kf = 140	Excellent
819A 30-SE runway, SE end; sta 39+06 to 39+06	500	300				23	Portland cement concrete	665	24	Gravel base (OK)	F = 140 Kf = 140	Excellent
T1A Taxiway 26	3330	50 to 75				19-22-19	Portland cement concrete	690	4	Gravel filler course (OK)	F = 60 Kf = 25	Fair
T2A Center 20 ft of taxiways 26 and 27	2450	50	4 to 6	Asphaltic concrete		4	Asphaltic concrete		6	Crushed limestone (OK)	CBR = 80	Excellent
T12B Taxiway 7	763	75	2	Asphaltic concrete		19	Portland cement concrete	680	4	Sand (OK) Frost Op F-2	F = 55 Kf = 25	Fair
T13B 50-ft wide in taxiway 8	1300	50				20-21-22	Portland cement concrete	700	20	Gravel base course (OK)	F = 120 Kf = 150	Very good

Table 8 (continued)
SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY			OVERLAY PAVEMENT			PAVEMENT			BASE			SUBGRADE		GENERAL CONDITION OF AREA CONSIDERED
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	
T27B Outside 25 ft. of taxiway 9	1300	25				4	Asphaltic concrete		6	Crushed limestone (10-40), P-2	CBR = 80 K = 45	Clay (Cl or Cl)	CBR = 80 K = 45	Good
T14B 50-ft. heel in taxiway 9	1450	50	23-22	Portland cement concrete	700	20	Gravel base course (10)	700	20	Gravel base course (10)	K = 120 K ₂ = 150	Frost Op P-3	CBR = 80 K = 45	Very good
T28B Outside 25 ft. of taxiway 9	1650	25	4	Asphaltic concrete		4	Asphaltic concrete		6	Crushed limestone (10-40), P-1	CBR = 80 K = 45	Clay (Cl or Cl)	CBR = 80 K = 45	Good
T15B ladder taxiways off taxiway 10	300	75	21	Portland cement concrete	670	4	Gravel filter course (10)	670	4	Gravel filter course (10)	K = 60 K ₂ = 25	Frost Op P-3	CBR = 80 K = 45	Good
T16B Taxiway 10	2000	75	21	Portland cement concrete	670	4	Gravel filter course (10)	670	4	Gravel filter course (10)	K = 60 K ₂ = 25	Clay (Cl or Cl)	CBR = 80 K = 45	Fair
T18B 50-ft. heel section in taxiway 11	1075	50	21	Portland cement concrete	700	4	Gravel filter course (10)	700	4	Gravel filter course (10)	K = 120 K ₂ = 150	Clay (Cl or Cl)	CBR = 80 K = 45	Very good
T15B Outside 25 ft. of taxiway 11	1975	25	4	Asphaltic concrete		4	Asphaltic concrete		6	Crushed limestone (10-40), P-1	CBR = 80 K = 45	Clay (Cl or Cl)	CBR = 80 K = 45	Very good
T17B Taxiway to warehouse	250	75	17	Portland cement concrete	600	12	Gravel base course	600	12	Gravel base course	K = 100 K ₂ = 50	Clay (Cl or Cl)	CBR = 80 K = 45	Fair
T22B ladder taxiways off taxiway 11	Varies	Varies	21	Portland cement concrete	600	4	Gravel base course	600	4	Gravel base course	K = 100 K ₂ = 50	Frost Op P-3	CBR = 80 K = 45	Good
T14 Taxiway 26	1225	75	21	Portland cement concrete	660	21	Portland cement concrete	660	21	Crushed limestone (10-40), P-1	K = 120 K ₂ = 150	Clay (Cl or Cl)	CBR = 80 K = 45	Good
T5A Taxiway 21	4200	50	4	Asphaltic concrete		4	Asphaltic concrete		27	Crushed limestone (10-40), P-1	CBR = 80 K = 45	Clay (Cl or Cl)	CBR = 80 K = 45	Very good

Table 2 (Continued)
SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY				OVERLAY PAVEMENT			PAVEMENT			BASE			SUBGRADE		GENERAL CONDITION OF AREA OR CONSIDERED
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	CLASSIFICATION	CBR OR K
T23B Taxiways 26 and 27, outside edges	2450	47, 37-5				4	Asphaltic concrete	665	6	Crushed limestone (M), Sand subbase (M), Frost Op P-2	CBR = 50 K = 55	Clay (CH or CL), Frost Op P-3	CBR = 8 K = 8	Clay (CH or CL)	Fair
T24A Taxiway 23, through old taxiway runway	448	100	22-22	Portland cement concrete	665	22-22	Portland cement concrete	665	25-25	Gravel base (M), Gravel subbase (M), Frost Op P-3	K = 140 K _f = 140	Clay (CH or CL)		Clay (CH or CL)	Excellent
T27A Taxiway 17 (through old ADC alert apron)	799	75	23	Portland cement concrete	665	23	Portland cement concrete	665	24	Gravel base (M)	K = 140 K _f = 140	Clay (CH or CL)		Clay (CH or CL)	Very good
T28A Taxiway 17 (through old ADC alert apron)	597	75	22-22	Portland cement concrete	665	22-22	Portland cement concrete	665	25-25	Gravel base (M)	K = 140 K _f = 140	Clay (CH or CL)		Clay (CH or CL)	Very good
T29A Center 90 ft of taxiway 17	1810	50	21	Reinforced portland cement concrete	790	21	Reinforced portland cement concrete	790	24	Gravel base (M)	K = 140 K _f = 140	Clay (CH or CL)		Clay (CH or CL)	Good
T212B Outside edges of taxiway 17	1810	Varies	4	Asphaltic concrete		4	Asphaltic concrete		12	Crushed limestone (M)	CBR = 80 K _f = 100	Clay (CH or CL)		Clay (CH or CL)	Good
T212B Center 25 ft of ADC alert apron and taxiway	2897	25	22	Portland cement concrete	665	22	Portland cement concrete	665	24	Gravel subbase (M), P-3, Gravel base (M)	K = 140 K _f = 140	Clay (CH or CL)		Clay (CH or CL)	Very good
T220C Taxiway 22	850	100	4	Asphaltic concrete		4	Asphaltic concrete		12	Crushed limestone (M), Gravel subbase (M), P-2	CBR = 50 K = 50	Clay (CH or CL)		Clay (CH or CL)	Good
T223B Center 150 ft of taxiway 25	1100	150	7	Asphaltic concrete	690	7	Portland cement concrete	690	3-1/2	Asphaltic concrete	K = 300 K _f = 75	Clay (CH or CL)		Clay (CH or CL)	Good
T24B Outside edges of taxiway 25	1100	75	7	Asphaltic concrete	690	7	Portland cement concrete	690	1-1/2	Asphaltic concrete	K = 200 K _f = 75	Clay (CH or CL)		Clay (CH or CL)	Fair
T222B Center 25 ft of taxiways 13, 14, 15, and 16	678.5	25	4	Asphaltic concrete		4	Asphaltic concrete		12	Crushed limestone (M), Gravel subbase (M)	CBR = 80 K = 80	Clay (CH or CL)		Clay (CH or CL)	Good
			29	Gravel subbase (M)		29	Gravel subbase (M)								

Table 2 (Continued)
SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY			OVERLAY PAVEMENT		PAVEMENT		BASE			SUBGRADE		GENERAL CONDITION OF AREA CONSIDERED	
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	CBR OR K	
222B Taxiway 23	775	75				3	Asphaltic concrete		6	Crushed limestone (M)	CBR = 80	CBR = 5	Excellent
222B Taxiway 5	771	75				3	Asphaltic concrete		28	Gravel subbase	45		
						4	Gravel filter course		4	Gravel filter course			
A/B Apron with taxiway 7	522	287.5	2	Asphaltic concrete	600	15	Portland cement concrete	600	15	Crushed limestone (M)	CBR = 80	CBR = 5	Closed
						19	Portland cement concrete		15	Gravel subbase	50		
						17	Portland cement concrete		15	Gravel filter course (M)	K = 60		Fair
A/F Apron with taxiway 8	1000	287.5				17	Portland cement concrete	700	4	Gravel filter course (M)	K = 60		Good
						19	Portland cement concrete		4	Gravel filter course (M)	K = 60		Good
A/B North end of apron with taxiway 9	336	300				17	Portland cement concrete	650	4	Gravel filter course (M)	K = 60		Good
						17	Portland cement concrete		4	Gravel filter course (M)	K = 60		Good
A/B Apron with taxiway 9	1360	242				13	Portland cement concrete	650	4	Gravel filter course (M)	K = 60		Good
						12	Portland cement concrete		4	Gravel filter course (M)	K = 60		Good
A12B Apron with taxiway 10	Varies	Varies				13	Portland cement concrete	620	4	Gravel filter course (M)	K = 60		Good
						12	Portland cement concrete		4	Gravel filter course (M)	K = 60		Good
A12B Runways	Varies	Varies				13	Portland cement concrete	620	4	Gravel filter course (M)	K = 60		Good
A11B Apron with taxiway 11	Varies	Varies				4	Tar concrete		12	Crushed limestone (M-OM), F-1	CBR = 80	CBR = 5	Fair
						8	Portland cement concrete		27	Gravel subbase (OF), F-1	K = 35		Fair
A2B Operational apron	Varies	850				8	Portland cement concrete	650		Play (OH or OI)	CBR = 5		Good
A13B Old AOC alert apron	Varies	600	2-1/2	Asphaltic concrete						Play (OH or OI)	CBR = 5		Good

Table 2 (Continued)
SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY			OVERLAY PAVEMENT			PAVEMENT			BASE			SUBGRADE		GENERAL CONDITION OF AREA CONSIDERED
FACILITY NUMBER AND IDENTIFICATION	LENGTH FT	WIDTH FT	THICK. IN.	DESCRIPTION	FILEX STR. PSI	THICK. IN.	DESCRIPTION	FILEX STR. PSI	THICK. IN.	CLASSIFICATION	CBR OR K	CLASSIFICATION	CBR OR K	
A12B Hanger access aprons 13, 14, and 15	308.5	140				19	Portland cement concrete	680	4	Gravel filter course (OK)	K = 60 K _f = 25	Clay (CH or CL) Frost Op F-3	60	Very good
A12B Apron access taxways 13, 14, 15, and 16, outside	687.5	Varies				4	Asphaltic concrete		12	Crushed limestone (OK)	CBR = 80	Clay (CH or CL)	CBR = 5	Fair
A12B Old B-2 runway used as part of parking apron (center 150 ft)	1000	150	4	Asphaltic concrete		7	Portland cement concrete	750	3-1/2	Asphaltic concrete	K = 200 K _f = 75	Clay (CH or CL) Frost Op F-3	45	Good
A20B Old B-3 runway used as part of parking apron (outside 75 ft)	1200	75	4	Asphaltic concrete		7	Portland cement concrete	750	1-1/2	Asphaltic concrete	K = 100 K _f = 50	Clay (CH or CL) Frost Op F-3	45	Good
A13B South apron	783	394	19			19	Portland cement concrete	680	4	Gravel filter course (OK)	K = 60 K _f = 25	Clay (CH or CL) Frost Op F-3	60	Good
A15B ABC alert apron	310	190	3			3	Asphaltic concrete		6	Crushed limestone	CBR = 80	Clay (CH or CL)	CBR = 5	Fair
A16B SAC alert apron	2897	Varies	22			22	Portland cement concrete	665	15	Gravel subbase (F-1)	K = 45	Frost Op F-3	45	Excellent
A17B Loading pad, center portion			17			17	Portland cement concrete	670	13	Gravel base (OK)	K = 120 K _f = 120	Clay (CH or CL) Frost Op F-3	120	Excellent
A15B Loading pad, exterior portion	25		2			2	Asphaltic concrete		4	Filter course	K = 100 K _f = 100	Clay (CH or CL) Frost Op F-3	100	Excellent
A16B warm-up apron	Varies	Varies	19			19	Portland cement concrete	630	4	Gravel filter course (OK)	CBR = 80	Clay (CH or CL)	CBR = 5	Excellent
A16B warm-up apron	700	225	19			19	Portland cement concrete	630	4	Gravel filter course (OK)	K = 60 K _f = 25	Clay (CH or CL) Frost Op F-3	60	Very good

DATE: APR 11 1970		SUMMARY OF DATA - RIGID PAVEMENT CONDITION SURVEY											AIRFIELD: <u> </u>								
FEATURE	SLAB SIZE FT	APPROX NO OF SLABS	PAVE THICK IN	NO OF SLABS CONTAINING INDICATED DEFECTS													% OF SLABS NO MAJOR DEFECTS	% OF SLABS NO MAJOR DEFECTS	CONDITION		
				I	-	\	Δ	*	~	S	J	J	J	C	M	K				O	
3078 30x30 runway, 01-15-68, 10+00 to 12+50+00	30x30	260	21	1				3				5	2					25	90.0	99.0	Excellent
3079 30x30 runway, 01-15-68, 12+50+00 to 15+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3080 30x30 runway, 01-15-68, 15+00+00 to 17+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3081 30x30 runway, 01-15-68, 17+50+00 to 20+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3082 30x30 runway, 01-15-68, 20+00+00 to 22+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3083 30x30 runway, 01-15-68, 22+50+00 to 25+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3084 30x30 runway, 01-15-68, 25+00+00 to 27+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3085 30x30 runway, 01-15-68, 27+50+00 to 30+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3086 30x30 runway, 01-15-68, 30+00+00 to 32+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3087 30x30 runway, 01-15-68, 32+50+00 to 35+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3088 30x30 runway, 01-15-68, 35+00+00 to 37+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3089 30x30 runway, 01-15-68, 37+50+00 to 40+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3090 30x30 runway, 01-15-68, 40+00+00 to 42+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3091 30x30 runway, 01-15-68, 42+50+00 to 45+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3092 30x30 runway, 01-15-68, 45+00+00 to 47+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3093 30x30 runway, 01-15-68, 47+50+00 to 50+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3094 30x30 runway, 01-15-68, 50+00+00 to 52+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3095 30x30 runway, 01-15-68, 52+50+00 to 55+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3096 30x30 runway, 01-15-68, 55+00+00 to 57+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3097 30x30 runway, 01-15-68, 57+50+00 to 60+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3098 30x30 runway, 01-15-68, 60+00+00 to 62+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3099 30x30 runway, 01-15-68, 62+50+00 to 65+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3100 30x30 runway, 01-15-68, 65+00+00 to 67+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3101 30x30 runway, 01-15-68, 67+50+00 to 70+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3102 30x30 runway, 01-15-68, 70+00+00 to 72+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3103 30x30 runway, 01-15-68, 72+50+00 to 75+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3104 30x30 runway, 01-15-68, 75+00+00 to 77+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3105 30x30 runway, 01-15-68, 77+50+00 to 80+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3106 30x30 runway, 01-15-68, 80+00+00 to 82+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3107 30x30 runway, 01-15-68, 82+50+00 to 85+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3108 30x30 runway, 01-15-68, 85+00+00 to 87+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3109 30x30 runway, 01-15-68, 87+50+00 to 90+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3110 30x30 runway, 01-15-68, 90+00+00 to 92+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3111 30x30 runway, 01-15-68, 92+50+00 to 95+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3112 30x30 runway, 01-15-68, 95+00+00 to 97+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3113 30x30 runway, 01-15-68, 97+50+00 to 100+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3114 30x30 runway, 01-15-68, 100+00+00 to 102+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3115 30x30 runway, 01-15-68, 102+50+00 to 105+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3116 30x30 runway, 01-15-68, 105+00+00 to 107+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3117 30x30 runway, 01-15-68, 107+50+00 to 110+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3118 30x30 runway, 01-15-68, 110+00+00 to 112+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3119 30x30 runway, 01-15-68, 112+50+00 to 115+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3120 30x30 runway, 01-15-68, 115+00+00 to 117+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3121 30x30 runway, 01-15-68, 117+50+00 to 120+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3122 30x30 runway, 01-15-68, 120+00+00 to 122+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3123 30x30 runway, 01-15-68, 122+50+00 to 125+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3124 30x30 runway, 01-15-68, 125+00+00 to 127+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3125 30x30 runway, 01-15-68, 127+50+00 to 130+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3126 30x30 runway, 01-15-68, 130+00+00 to 132+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3127 30x30 runway, 01-15-68, 132+50+00 to 135+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3128 30x30 runway, 01-15-68, 135+00+00 to 137+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3129 30x30 runway, 01-15-68, 137+50+00 to 140+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3130 30x30 runway, 01-15-68, 140+00+00 to 142+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3131 30x30 runway, 01-15-68, 142+50+00 to 145+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3132 30x30 runway, 01-15-68, 145+00+00 to 147+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3133 30x30 runway, 01-15-68, 147+50+00 to 150+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3134 30x30 runway, 01-15-68, 150+00+00 to 152+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3135 30x30 runway, 01-15-68, 152+50+00 to 155+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3136 30x30 runway, 01-15-68, 155+00+00 to 157+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3137 30x30 runway, 01-15-68, 157+50+00 to 160+00+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3138 30x30 runway, 01-15-68, 160+00+00 to 162+50+00	30x30	260	22	1				5				4	1					6	93.0	99.0	Excellent
3139 30x30 runway, 01-15-68, 162+50+00 to 165+00+00	30x30	260	22	1				5													

Table 1
SUMMARY OF PAVEMENT EVALUATION

NAME OF AIRFIELD: KILBROOK AFB, TX		DATE OF EVALUATION: April 1972		LOAD-CARRYING CAPACITY IN LB OF GROSS PLANE LOAD FOR INDICATED LANDING GEAR TYPES AND CONFIGURATIONS										REMARKS			
NO.	FEATURE DESIGNATION	PAVEMENT OPERATIONAL USE	SINGLE 100 PSI TIRE PRESSURE CONTACT AREA	SINGLE 10000 LB CONTACT AREA	SINGLE 24000 LB CONTACT AREA	TRICYCLE ARRANGEMENT					BICYCLE						
						1	2	3	4	5	6	7	8	9	10	TAN TAN 30 IN. TAN 30 IN. TAN 30 IN. CONTACT AREA EACH TIRE	TAN TAN 30 IN. TAN 30 IN. CONTACT AREA EACH TIRE
R3A	HW-GE runway, 100-ft center, sta 150+03 to 165+03	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	230,000+ 230,000+	230,000+ 230,000+	230,000+ 230,000+	230,000+ 230,000+	380,000+ 350,000+	380,000+ 350,000+	800,000+ 800,000+	800,000+ 800,000+	360,000 340,000	
R4B	HW-GE runway, HW end, 100-ft center, sta 155+03 to 160+03	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	230,000+ 230,000+	230,000+ 230,000+	230,000+ 230,000+	230,000+ 230,000+	380,000+ 340,000+	380,000+ 340,000+	800,000+ 800,000+	800,000+ 800,000+	370,000 330,000	
R7C	HW-GE runway, 50-ft center, sta 135+50 to 155+03	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	230,000+ 230,000+	230,000+ 230,000+	230,000+ 230,000+	230,000+ 230,000+	380,000+ 380,000+	380,000+ 380,000+	800,000+ 800,000+	800,000+ 800,000+	480,000 440,000	
R8C	HW-GE runway, 75-ft center, sta 130+04 to 135+50	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	230,000+ 230,000+	230,000+ 230,000+	230,000+ 230,000+	230,000+ 230,000+	380,000+ 380,000+	380,000+ 380,000+	800,000+ 800,000+	800,000+ 800,000+	470,000 450,000	
R11C	HW-GE runway, 75-ft center, sta 65+06 to 130+04	Capacity Frost capacity	155,000+ 115,000	85,000+ 85,000+	155,000+ 155,000+	220,000+ 165,000	200,000+ 200,000+	230,000+ 230,000+	230,000+ 230,000+	230,000+ 230,000+	230,000+ 230,000+	380,000+ 380,000+	380,000+ 380,000+	800,000+ 800,000+	800,000+ 800,000+	350,000 250,000	
R12C	HW-GE runway, 75-ft center, sta 47+40 to 65+06	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	230,000+ 230,000+	230,000+ 230,000+	230,000+ 230,000+	230,000+ 230,000+	380,000+ 380,000+	380,000+ 380,000+	800,000+ 800,000+	800,000+ 800,000+	600,000+ 500,000	
R13C	HW-GE runway, 85-ft center, sta 43+00 to 47+40	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	230,000+ 230,000+	230,000+ 230,000+	230,000+ 230,000+	230,000+ 230,000+	380,000+ 380,000+	380,000+ 380,000+	800,000+ 800,000+	800,000+ 800,000+	600,000+ 510,000	
R15C	HW-GE runway, 85-ft center, sta 40+06 to 43+00	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	230,000+ 230,000+	230,000+ 230,000+	230,000+ 230,000+	230,000+ 230,000+	380,000+ 380,000+	380,000+ 380,000+	800,000+ 800,000+	800,000+ 800,000+	600,000+ 510,000	

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

Table 4 (Continued)

SUMMARY OF PAVEMENT EVALUATION

NAME OF AIRFIELD, ELLENBORO AFB, S. Dak.		LOAD-CARRYING CAPACITY IN LB OF GROSS PLANE LOAD FOR INDICATED LANDING GEAR TYPES AND CONFIGURATIONS										REMARKS
DATE OF EVALUATION MONTH April YR 1972		TRICYCLE ARRANGEMENT										
NO.	DESIGNATION	PAVEMENT OPERATIONAL USE	1	2	3	4	5	6	7	8	9	
			SINGLE 100-PSI THICKNESS CONTACT AREA	SINGLE 100-PSI THICKNESS CONTACT AREA	SINGLE 24-PSI THICKNESS CONTACT AREA	TR 28 IN. C-C 28-30 IN. CONTACT AREA EACH TIRE	SINGLE TANDEM 80 IN. SPACING CONTACT AREA EACH TIRE	TR 37 IN. C-C 28-30 IN. CONTACT AREA EACH TIRE	TR 44 IN. C-C 30-30 IN. CONTACT AREA EACH TIRE	TR 48 IN. C-C 30-30 IN. CONTACT AREA EACH TIRE	TR 54 IN. C-C 30-30 IN. CONTACT AREA EACH TIRE	TR 60 IN. C-C 30-30 IN. CONTACT AREA EACH TIRE
RL7B	36-42 runway, SE end; 100-ft center, sta 35+46 to 40+06	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	330,000+ 330,000+	230,000+ 230,000+	380,000+ 380,000+	500,000+ 500,000+	450,000 460,000
RL3A	36-42 runway, SE end; sta 30+06 to 35+46	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	330,000+ 330,000+	230,000+ 230,000+	380,000+ 380,000+	500,000+ 500,000+	460,000 460,000
TL1A	Taxiway 56	Capacity Frost capacity	155,000+ 145,000	85,000+ 85,000+	155,000+ 145,000	215,000 190,000	200,000+ 200,000+	195,000 170,000	230,000+ 210,000	300,000 245,000	800,000+ 750,000	275,000 235,000
TL2A	Center 50 ft of taxiways 56 and 57	Capacity Frost capacity	155,000+ 30,000	85,000+ 30,000	155,000+ (a)	220,000+ (a)	200,000+ (a)	330,000+ (a)	230,000+ (a)	380,000+ (a)	500,000+ (a)	550,000 (a)
TL2B	Taxiway 7	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	300,000 300,000	230,000+ 230,000+	380,000+ 380,000+	500,000+ 500,000+	380,000 370,000
TL3B	50-ft keel in taxiway 8	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	330,000+ 330,000+	230,000+ 230,000+	380,000+ 380,000+	500,000+ 500,000+	510,000 510,000
TL4B	50-ft keel in taxiway 9	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	330,000+ 330,000+	230,000+ 230,000+	380,000+ 380,000+	500,000+ 500,000+	510,000 510,000
TL5B	Leader taxiway off taxiway 10	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	300,000 280,000	230,000+ 230,000+	380,000+ 380,000+	500,000+ 500,000+	380,000 350,000
TL6B	Taxiway 10	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	330,000+ 330,000+	230,000+ 230,000+	380,000+ 380,000+	500,000+ 500,000+	430,000 340,000
TL8B	50-ft keel in taxiway 11	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	330,000+ 330,000+	230,000+ 230,000+	380,000+ 380,000+	500,000+ 500,000+	460,000 460,000
TL7B	Taxiway to washrack	Capacity Frost capacity	150,000 130,000	85,000+ 85,000+	155,000+ 155,000+	210,000 175,000	200,000+ 200,000+	235,000 195,000	230,000+ 230,000+	380,000+ 300,000	500,000+ 500,000+	310,000 245,000
TL6B	Leader taxiways off taxiway 11	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	300,000 280,000	230,000+ 230,000+	380,000+ 380,000+	500,000+ 500,000+	380,000 350,000

Table 4 (continued)
SUMMARY OF PAVEMENT EVALUATION

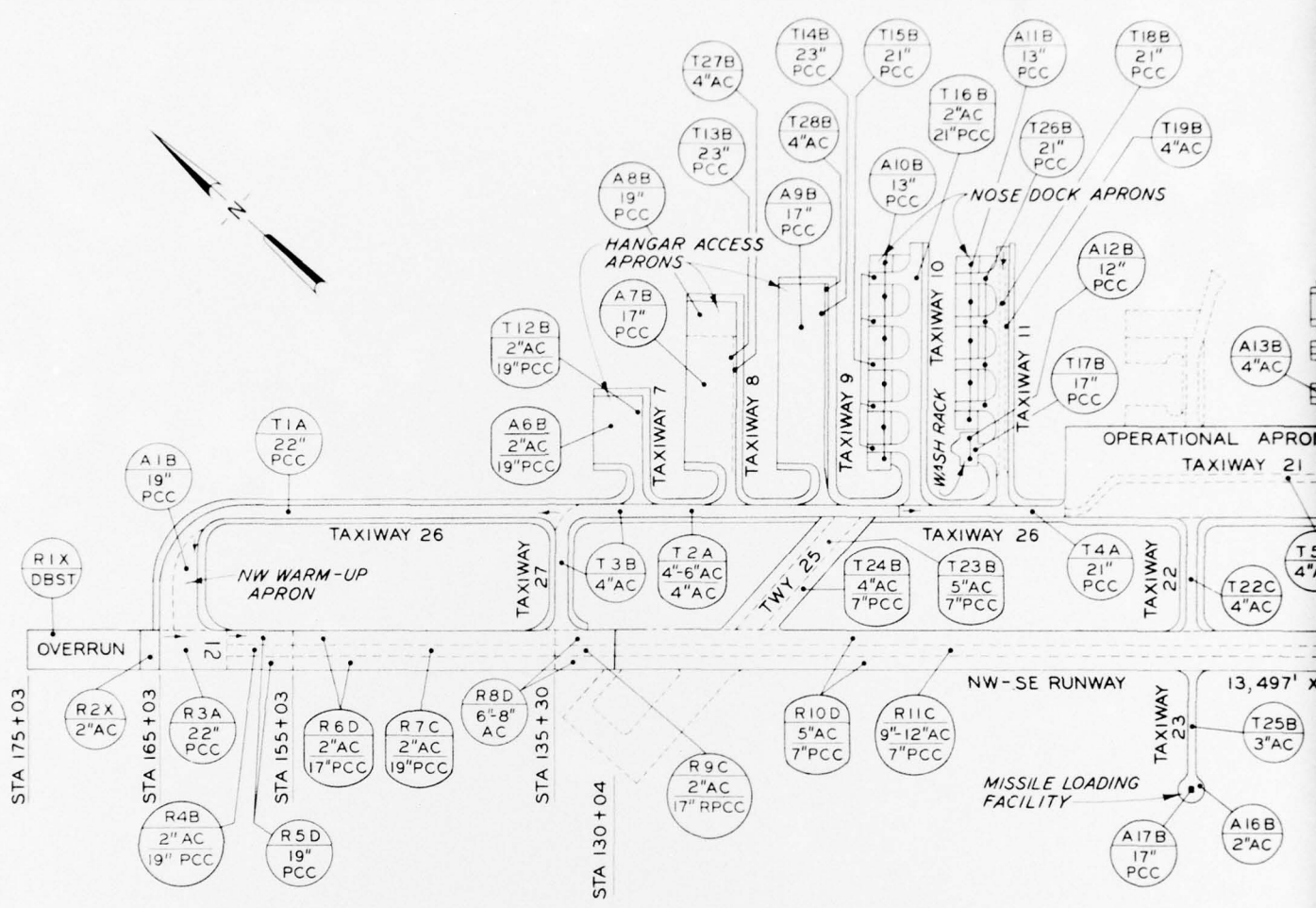
NAME OF AIRFIELD: ELLSWORTH AFB, S. Dak. DATE OF EVALUATION MONTH: April YR: 1972		LOAD-CARRYING CAPACITY IN LB OF GROSS PLANE LOAD FOR INDICATED LANDING GEAR TYPES AND CONFIGURATIONS										REMARKS			
NO.	DESIGNATION	PAVEMENT OPERATIONAL USE	TRICYCLE ARRANGEMENT										BICYCLE		
			1 SINGLE 100-PSI TIRE PRESSURE CONTACT AREA	2 SINGLE 100-PSI CONTACT AREA	3 SINGLE 241-PSI CONTACT AREA	4 TR 28 IN. C-C 28 IN. SPACING CONTACT AREA EACH TIRE	5 SINGLE TANGENT 40 IN. SPACING CONTACT AREA	6 TR 37 IN. C-C 28 IN. SPACING CONTACT AREA EACH TIRE	7 TR 48 IN. C-C 48 IN. SPACING CONTACT AREA EACH TIRE	8 TR 37 IN. C-C 28 IN. SPACING CONTACT AREA EACH TIRE	9 TR 37 IN. C-C 28 IN. SPACING CONTACT AREA EACH TIRE	10 TR 37 IN. C-C 28 IN. SPACING CONTACT AREA EACH TIRE			
T6A	Taxiway 06	Capacity Frost capacity	155,000+	85,000+	155,000+	220,000+	200,000+	270,000	230,000+	350,000+	800,000+	800,000+	800,000+	350,000	
T7A	Taxiway 21	Capacity Frost capacity	155,000+	60,000	110,000	140,000	130,000	200,000	230,000+	280,000	770,000	770,000	770,000	280,000	(a)
T6A	Taxiway 21 (through old B-3 runway)	Capacity Frost capacity	155,000+	85,000+	155,000+	220,000+	200,000+	270,000	230,000+	350,000+	800,000+	800,000+	800,000+	350,000	
T7A	Taxiway 17 (through old ADC alert apron)	Capacity Frost capacity	155,000+	85,000+	155,000+	220,000+	200,000+	270,000	230,000+	350,000+	800,000+	800,000+	800,000+	350,000	
T6A	Taxiway 17 (through old ADC alert apron)	Capacity Frost capacity	155,000+	85,000+	155,000+	220,000+	200,000+	270,000	230,000+	350,000+	800,000+	800,000+	800,000+	350,000	
T9A	Center 50 ft of taxiway 17	Capacity Frost capacity	155,000+	85,000+	155,000+	220,000+	200,000+	270,000	230,000+	350,000+	800,000+	800,000+	800,000+	350,000	
T11B	Center 25 ft of ADC alert apron and taxiway	Capacity Frost capacity	155,000+	85,000+	155,000+	220,000+	200,000+	270,000	230,000+	350,000+	800,000+	800,000+	800,000+	350,000	
T12C	Taxiway 22	Capacity Frost capacity	155,000+	85,000+	155,000+	220,000	200,000+	270,000	230,000+	350,000+	800,000+	800,000+	800,000+	350,000	
T23B	Center 150 ft of taxiway 25	Capacity Frost capacity	75,000	50,000	110,000	110,000	80,000	175,000	130,000	245,000	700,000	700,000	700,000	245,000	
T20B	Center 25 ft of taxiways 13, 14, 15, and 16	Capacity Frost capacity	155,000+	60,000	110,000	140,000	200,000+	200,000+	230,000+	300,000+	800,000+	800,000+	800,000+	300,000	
T25B	Taxiway 23	Capacity Frost capacity	120,000	45,000	95,000	105,000	160,000	165,000	200,000	235,000	670,000	670,000	670,000	235,000	
T21B	Taxiway 5	Capacity Frost capacity	65,000	45,000	70,000	80,000	95,000	100,000	120,000	170,000	500,000	500,000	500,000	170,000	

Table 4 (Continued)
SUMMARY OF PAVEMENT EVALUATION

NO.	FEATURE DESIGNATION	PAVEMENT OPERATIONAL USE	LOAD-CARRYING CAPACITY IN LB OF GROSS PLANE LOAD FOR INDICATED LANDING GEAR TYPES AND CONFIGURATIONS										REMARKS
			TRICYCLE ARRANGEMENT										
			1	2	3	4	5	6	7	8	9	10	
			SINGLE 100 PSI CONTACT AREA	SINGLE 200 PSI CONTACT AREA	SINGLE 200 PSI CONTACT AREA	TW 2IN. C-C TRIPLE TANDUM ARRANGING CONTACT AREA EACH TIME	TW 2IN. C-C CONTACT AREA EACH TIME	TR 4IN. C-C CONTACT AREA EACH TIME	TW 4IN. C-C CONTACT AREA EACH TIME	TWIN TANDUM 3IN. x 46 IN. CONTACT AREA EACH TIME	C-5A GEAR CONFIGURATION	BICYCLE TWIN 2IN. SPRG 2x42 IN. 207 SQ IN. CONTACT AREA EACH TIME	
A6B	Apron with taxiway 7	Capacity Frost capacity	85,000+ 85,000+	155,000+ 155,000+	250,000+ 200,000+	250,000+ 200,000+	300,000 290,000	300,000 290,000	350,000+ 360,000	350,000+ 360,000	800,000+ 800,000+	380,000 310,000	
A7B	Apron with taxiway 8	Capacity Frost capacity	85,000+ 85,000+	150,000 140,000	200,000 180,000	200,000+ 200,000	230,000 230,000	230,000 230,000	230,000+ 300,000	230,000+ 300,000	800,000+ 800,000+	290,000 240,000	
A8B	North end of apron with taxiway 8	Capacity Frost capacity	85,000+ 85,000+	155,000+ 155,000+	200,000+ 200,000	200,000+ 200,000	245,000 215,000	245,000 215,000	245,000+ 300,000	245,000+ 300,000	800,000+ 800,000+	310,000 270,000	
A9B	Apron with taxiway 9	Capacity Frost capacity	85,000+ 85,000+	150,000 150,000	170,000 165,000	170,000 165,000	180,000 180,000	180,000 180,000	205,000 205,000	205,000 205,000	800,000+ 800,000+	260,000 (a)	
A10B	Apron with taxiway 10	Capacity Frost capacity	70,000 65,000	115,000 100,000	130,000 110,000	130,000 150,000	130,000 150,000	135,000 145,000	170,000 190,000	170,000 190,000	670,000 550,000	(a) (a)	
A12B	Warehouse	Capacity Frost capacity	60,000 55,000	100,000 85,000	105,000 95,000	155,000 135,000	155,000 135,000	115,000 100,000	145,000 145,000	200,000 165,000	590,000 430,000	(a) (a)	
A11B	Apron with taxiway 11	Capacity Frost capacity	70,000 65,000	110,000 95,000	120,000 105,000	175,000 150,000	130,000 117,000	130,000 140,000	280,000 150,000	280,000 150,000	650,000 520,000	(a) (a)	
A2B	Operational apron	Capacity Frost capacity	60,000 (a)	110,000 (a)	140,000 (a)	100,000+ (a)	220,000 (a)	230,000 (a)	300,000 (a)	300,000 (a)	800,000+ (a)	290,000 (a)	
A13B	Old ABC alert apron	Capacity Frost capacity	45,000 30,000	60,000 50,000	70,000 60,000	95,000 85,000	70,000 60,000	70,000 60,000	130,000 110,000	130,000 110,000	380,000 320,000	(a) (a)	
A15B	Hanger access aprons 13, 14, and 15	Capacity Frost capacity	85,000+ 85,000+	155,000+ 155,000+	220,000+ 210,000	100,000+ 200,000	225,000 225,000	230,000+ 230,000	380,000+ 330,000	380,000+ 330,000	800,000+ 800,000+	360,000 280,000	
A3B	Old B-8 runway used as part of parking apron (center 150 ft)	Capacity Frost capacity	70,000 50,000	125,000 90,000	130,000 95,000	200,000+ 145,000	145,000 105,000	145,000 105,000	280,000 200,000	280,000 200,000	800,000+ 580,000	(a) (a)	

Table 4. (Continued)
SUMMARY OF PAVEMENT EVALUATION

NAME OF AIRFIELD: Ellsworth AFB, S. Dak. DATE OF EVALUATION MONTH: April YR: 1972		LOAD-CARRYING CAPACITY IN LB OF GROSS PLANE LOAD FOR INDICATED LANDING GEAR TYPES AND CONFIGURATIONS										REMARKS	
NO.	FEATURE DESIGNATION	PAVEMENT OPERATIONAL USE	TRICYCLE ARRANGEMENT										
			1	2	3	4	5	6	7	8	9		10
			SINGLE WHEELS CONTACT AREA	SINGLE WHEELS CONTACT AREA	SINGLE WHEELS CONTACT AREA	TR 28 IN. C-C 228-50 IN. CONTACT AREA EACH TIME	SINGLE TANDEM 80-N. SPACING 400-50 IN. CONTACT AREA EACH TIME	TR 37 IN. C-C 282-50 IN. CONTACT AREA EACH TIME	TR 44 IN. C-C 340-50 IN. CONTACT AREA EACH TIME	TR TANDEM 37 IN. C-C 340-50 IN. CONTACT AREA EACH TIME	CIA CONFIGURATION	TR 48 IN. SPECIFIED CONTACT AREA EACH TIME	
A20B	011 R-S runway used as part of parking apron (outside 75 ft)	Capacity Frost capacity	75,000 60,000	60,000 45,000	105,000+ 80,000	110,000 80,000	170,000 125,000	170,000 125,000	170,000 150,000	240,000 165,000	680,000 490,000	(a) (a)	
A14B	South apron	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 210,000	200,000+ 200,000+	255,000 225,000	230,000+ 230,000+	350,000+ 330,000	800,000+ 800,000+	300,000 280,000	
A15B	ADC alert apron	Capas. v Frost capacity	65,000 (a)	45,000 (a)	70,000 (a)	80,000 (a)	100,000 (a)	85,000 (a)	(a) (a)	115,000 (a)	330,000 (a)	(a) (a)	
A5B	SAC alert apron	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	330,000+ 330,000+	230,000+ 230,000+	380,000+ 380,000+	800,000+ 800,000+	470,000 450,000	
A16B	Loading pad, exterior portion	Capacity Frost capacity	50,000 (a)	30,000 (a)	55,000 (a)	70,000 (a)	90,000 (a)	75,000 (a)	(a) (a)	(a) (a)	(a) (a)	(a) (a)	
A17B	Loading pad, center portion	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	210,000 210,000	200,000+ 200,000+	235,000 235,000	230,000+ 230,000+	380,000+ 380,000+	800,000+ 800,000+	300,000 300,000	
A4B	GE warm-up apron	Capacity Frost capacity	155,000+ 155,000+	85,000+ 85,000+	155,000+ 155,000+	220,000+ 220,000+	200,000+ 200,000+	280,000 280,000	230,000+ 230,000+	380,000+ 380,000+	800,000+ 800,000+	360,000 360,000	
A1B	HW warm-up apron	Capacity Frost capacity	155,000+ 145,000	85,000+ 85,000+	155,000+ 155,000+	215,000 190,000	200,000+ 200,000+	230,000 205,000	230,000+ 230,000+	360,000 300,000	800,000+ 800,000+	295,000 255,000	



LEGEND

- (R2X) ← FEATURE DESIGNATION (SEE NOTE 1)
- (2"AC) ← SURFACE PAVEMENT THICKNESS AND TYPE

TYPE OF FEATURE

- R - RUNWAY
- T - TAXIWAY
- A - APRON

TYPE TRAFFIC AREA (SEE NOTE 2)

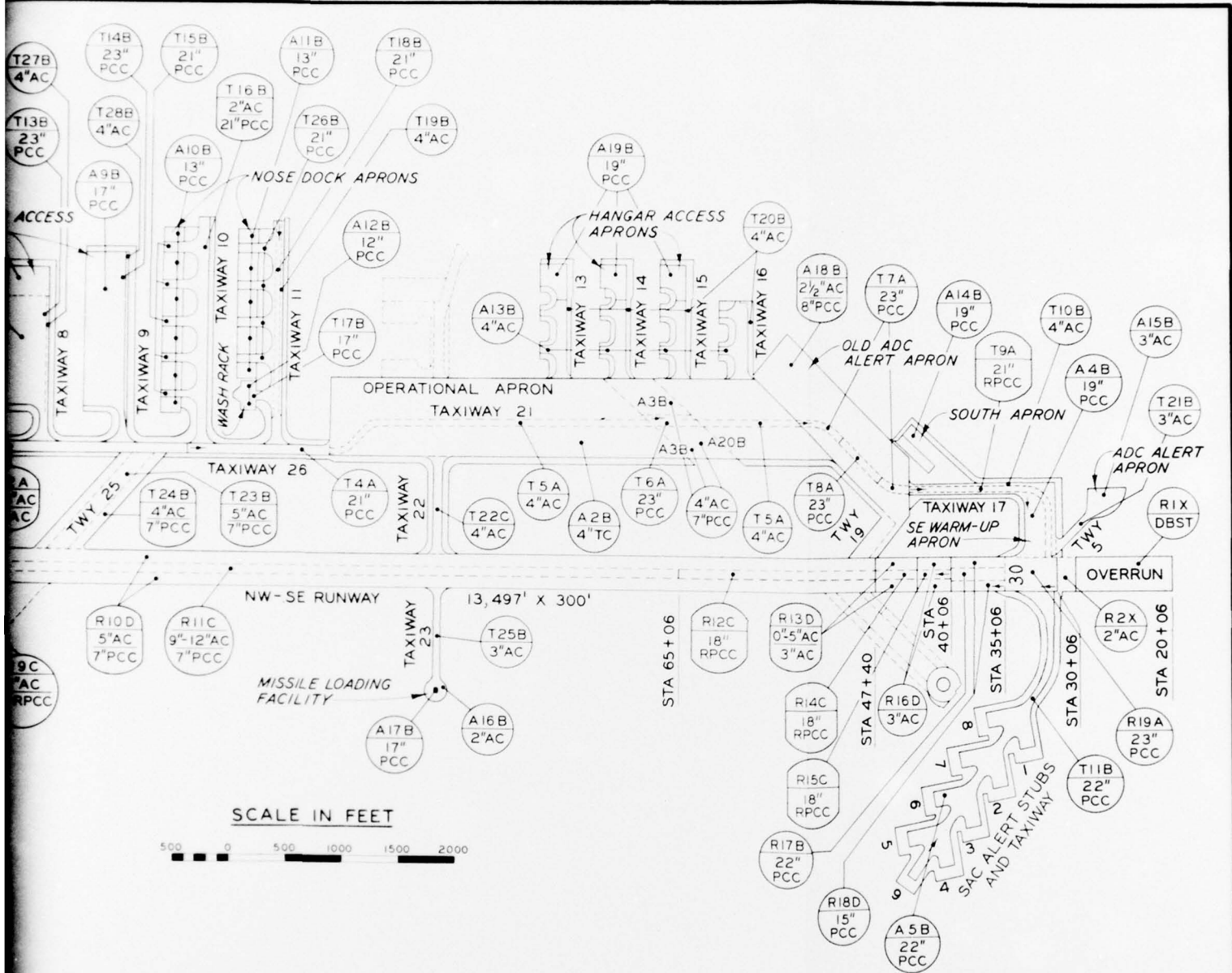
- A - A TYPE TRAFFIC
- B - B TYPE TRAFFIC
- C - C TYPE TRAFFIC
- X - NO TRAFFIC TYPE ASSIGNED

- AC - ASPHALTIC CONCRETE
- TC - TAR CONCRETE
- PCC - PORTLAND CEMENT CONCRETE
- RPCC - REINFORCED PORTLAND CEMENT CONCRETE
- DBST - DOUBLE BITUMINOUS SURFACE TREATMENT
- - DIRECTION OF SURVEY

SCALE IN FEET



- 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.



SCALE IN FEET

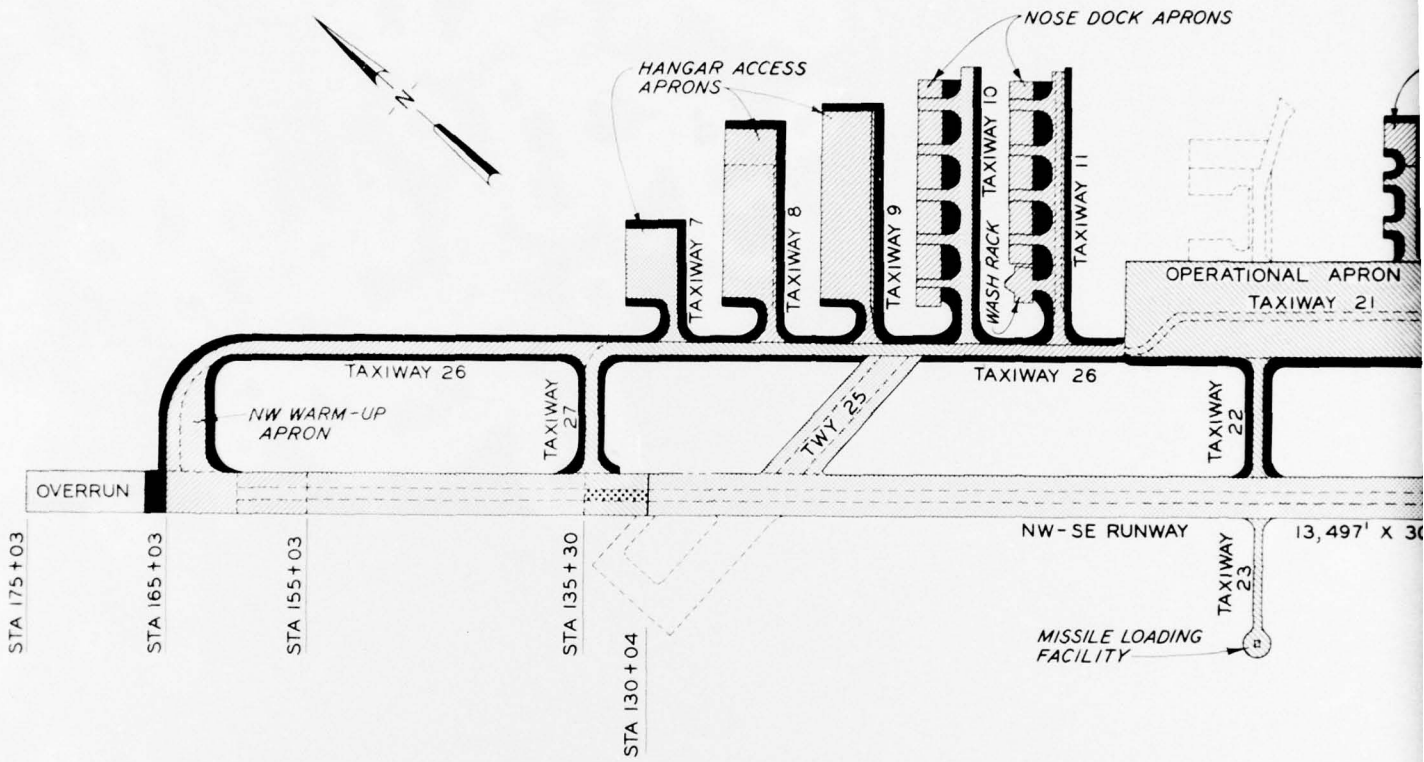


- NOTES: 1. FEATURE DESIGNATION DENOTES TYPE OF FEATURE, NUMBER OF FEATURE FOR GIVEN TYPE, AND TYPE TRAFFIC AREA.
 2. TRAFFIC AREA DESIGNATIONS ARE BASED ON HEAVY-LOAD CRITERIA.

ELLSWORTH AIR FORCE BASE
 SOUTH DAKOTA

AIRFIELD LAYOUT

2

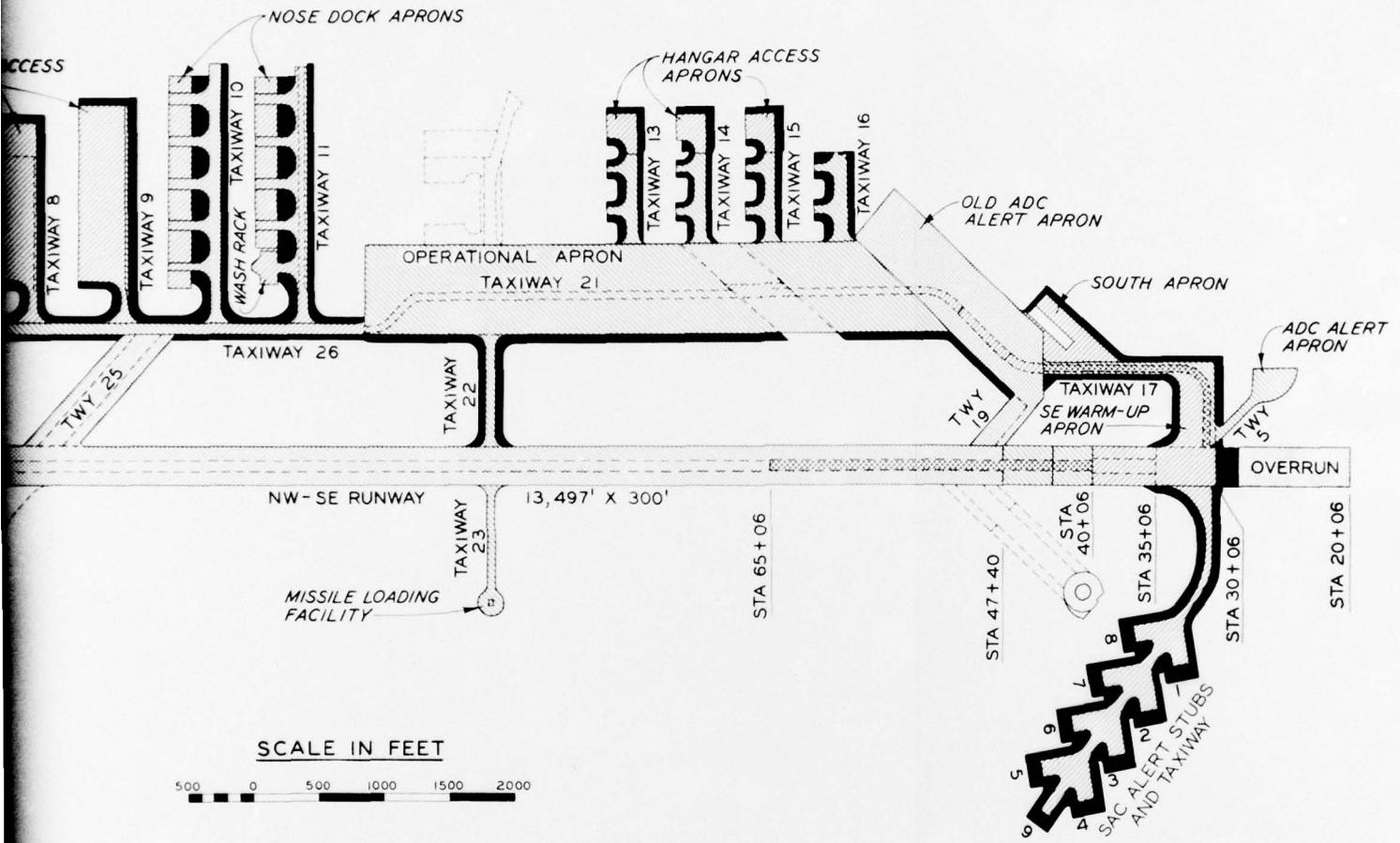


SCALE IN FEET



LEGEND

- BITUMINOUS CONCRETE (AC OR TAR)
- PORTLAND CEMENT CONCRETE (PCC)
- ASPHALTIC CONCRETE (AC) OVER PORTLAND CEMENT CONCRETE (PCC)
- REINFORCED PORTLAND CEMENT CONCRETE (RPCC)
- ASPHALTIC CONCRETE (AC) OVER REINFORCED PORTLAND CEMENT CONCRETE (RPCC)
- DOUBLE BITUMINOUS SURFACE TREATMENT (DBST)
- BLAST PAVEMENT (AC-NONTRAFFIC AREA)



ELLSWORTH AIR FORCE BASE
SOUTH DAKOTA
PAVEMENT PLAN

Appendix A: BAFB Annual Pavement Maintenance Plan

Facility Description	Pavement Type	Year Const.	Existing Condition	Maintenance and Repair History	Treatment or Proposed Maintenance and Repair
T/W, Apron Access 13, 374 SY Total: 7800 SY of 30-ft-wide Keel (22- to 23-in. PCC & 24- to 25-in. subbase) 2700 SY (17-in. PCC & 4-in. filter) 25-ft edge - 4-in. AC 4-in. base and 40-in. subbase)	PCC Heavy	1960	Satisfactory	Slurry Sealed Shoulder Stab 1966	Spall Repair Required
T/W, Apron Access 14, 118 SY Total: (50-ft Keel Section of 22- to 23-in. PCC on 24- to 25-in. subbase, (25-ft Section of 17-in. PCC 4-in. filter) 20-ft section of 4-in. AC 4-in. base & 40-in. subbase	PCC Heavy	1960	Satisfactory	Slurry Sealed Shoulder Stab 1966	
T/W Apron Access, 20, 165 SY Total: (2-in. AC on 21-in. PCC on 4-in. filter). The area between the access to stub parking and the stub parking is light-duty concrete.	PCC	1953	Satisfactory	Cracks in overlay	
Apron Access 10, Access Apron to Stub Parking	PCC	1953	Satisfactory	Apron overlaid panels 1966, Slurry sealed Shoulder Stab 66 and Pads	
T/W Apron Access 26, 135 SY Total: (10,000 SY of 20-ft Keel in 1952, 5 LF 23-in. PCC on 24-in. Base, Remainder is 21-in. PCC on 4-in. Base). The area between the Access to stub parking is light-duty concrete.	PCC	1963	Satisfactory	Pads restriped 1965 Slurry sealed Shoulder Stab 1966	
Runway N End, S End and Keel 160,000 SY (Keel-19 in. concrete, 24-in. Base and 10 in. Filter) (Shoulders-17-in. concrete and 4-in. filter)	Rigid Heavy	Ext 40	Satisfactory	Laid Keel Section 1962, Overlaid 33,000 sq yds Asphaltic Concrete July 1966, re-striped Sep 1966 and in 1968, Repaired 1,500 S.F. of spalls	ELS 18-0 to resal 3,500 ft of cracks in South end
Edges and Center Section 290, 456 SY 7-in. AC, on 7-in. PCC & 8-in. Base	Flex Heavy		Satisfactory	Slurry Sealed 252,000 SY July 1966, Sealed 56,000 LF Joints in July 1966, Restriped 1966 and 1968	ELS 70-0 Overlay Center 6,500 ft Route 018 Crack and fill with slurry seal. Oct 1969
Runway Overruns 66,666 SY Total: (10,000 SY of 2-in. AC on 6-in. base and 33-in. subbase). (56,666 SY of 6-in. base and 36-in. subbase).	Flex Light	1956	Satisfactory	Chips Sealed 50,000 SY 1966, Flush Sealed 16,700 SY 1968, Restriped Chevrons 1964	
Alert T/W 17,8 Total: (22-in. PCC on 24-in. base)	Rigid Heavy	1958	Satisfactory	Sealed Joints with POCA 1968, Slurry Sealed Shoulder 1966	
Alert T/W 3,230 SY Total: (3-in. AC on 6-in. Base and 15-in. subbase). Not used for Aircraft).	Flex Light	1951	Satisfactory	No recent maintenance or repair	ELS 184-2 to seal cracks
T/W Apron Access 7,396 SY Total: (2-in. AC Overlay on 10-in. PCC on 4-in. filter)	PCC	1956	Satisfactory	Slurry Sealed Shoulder Pads with AC Overlay 1966	ELS 184-2 to seal cracks
T/W, Apron Access, 14,632 SY Total: (4 in. AC on 18 in. reinf. PCC with 12-in. 17-in. subbase). Abandoned as TW used as road and parking.	Flex	1952	Satisfactory		
T/W, Apron Access 9,941 SY Total: (4-in. AC on 12-in. base and 29-in. subbase).	Flex	1953	Fair	Slurry Sealed 1966	
T/W, Apron Access 8,941 base and 29-in. subbase	Flex	1953	Fair	Slurry Sealed 1966	
T/W, Apron Access 8,491 SY Total: 4-in. AC on 12-in. base and 29-in. subbase	Flex	1953	Fair	Slurry Sealed 1966 30 Sq Ft spalls repaired in-house FY 67	
T/W, Apron Access 6,725 SY Total: (4-in. AC on 12-in. base and 29-in. subbase).	Flex	1953	Satisfactory	Slurry Seal 1966	
T/W, Access 22, 497 SY Total: (12,497 SY of Flex 4-in. AC on 12-in. Base and 22-in. subbase). 10,000 SY of 21-in. reinf. PCC on 25-in. base).	Flex Heavy	1950	Satisfactory	Joints Sealed 1968 Slurry Sealed Shoulder Stab 1966	
T/W, Runway Access 12,004 SY (22-in. PCC on 24-in. Base).	PCC Heavy	1958	Satisfactory	Slurry Sealed Shoulder Stab 1966, Sealed Joints 1962	
T/W, Runway Access 9,700 SY Total: (22-in. PCC on 4-in. Filter). Not used by heavy aircraft.	Flex	1954	Satisfactory	Slurry Sealed in 1966	

(Continued)

Facility Description	Pavement Type	Year Const.	Existing Condition	Maintenance and Repair History	Present or Proposed Maintenance and Repair
T/W Runway Access 40,131 SY Total: 7-in. PCC, 3-1/2 AC on 6-in. base-center). Occasionally used for C-47 Runway.	Flex	1940	Abandoned for Heavy Aircraft	Slurry Sealed in 1965	Pavement to be removed (In-house)
T/W Runway Access 19,70 SY	Rigid Heavy	1958	Satisfactory	Restriped 1965	
Runway Access 139,894 SY (4-in. AC on 12-in. base and 28-in. subbase).	Flex Heavy	1958	Unsatisfactory	Restriped FY 65 Replaced 30-in. and 70-in. wide strip on center for entire length in FY 68	
Runway Access 9,693 SY (4-in. on 12-in. base and 28-in. subbase).	Flex	1950	Satisfactory	Slurry Sealed in 1966	
Runway Access 6,100 SY Total:	AC Heavy	1955	Satisfactory	Rebuilt to Accommodate Unloading Missiles 1965	
Runway Access 14,985 SY Total: (3-in. AC on 6-in. base and 15-in. subbase). Used by SAC Aero Club.	Flex Light	1952	Satisfactory	No recent maintenance or repair	ELS 108-0 to repair
Runway Access 38,127 SY Total: (4-in. AC, 7-in. PCC, 1-1/2-in. AC).	Flex Overlay Pavement	1940	Satisfactory	Slurry Sealed in June 1966. Slurry Seal 1966. Large failure at T/W 25 and 26 repaired 1967.	
Runway Access 80,926 SY Total: (56,000 SY of 19-in. and 28-in. PCC on 12-in. base and 29-in. subbase)	Rigid	1953	Satisfactory	Repaired Longitudinal Fractures and replace 9 fractured slabs in 1965 Minor patching in-house 1967. Repaired spalls in-house FY 68.	ELS 108-0 to repair spalls slabs are moving at one spot and will require repair
Runway Access (26,916 SY of 4-in. AC on 6-in. base and 40-in. subbase)	Flex	1956	Fair	Slurry Seal Shoulder Stab 1966.	
Runway Access 11,585 SY Total: (4-in. AC on 6-in. base and 40-in. subbase).	Flex	1953	Fair	Slurry Sealed 1966	
T/W 1,370 SY Total: (17-in. PCC on 4-in. filter).	Heavy	1962	Satisfactory	Wash Rack 30-ft Heavy Duty Keel Section Laid 1962	Joints to be sealed by Contracts
Runway Access 18,388 SY Total: Used only in Emergencies.	3-1/2-in. AC 7-in. PCC	Orig 1940	Satisfactory	No recent major maintenance or repair	To be removed completely (In-house)
T/W Support 7,170 SY (7-in. PCC on 8-in. base)	Rigid Light	1943	Unsatisfactory	No recent major repair	To be removed completely (In-house)
T/W Support 5,889 SY Total: (5-in. AC on 7-in.).	Rigid Light	1943	Unsatisfactory	No recent major maintenance or repair	To be removed completely (In-house)
Hangar Access and Stub Parking 16,117 SY Total: (19-in. PCC on 4-in. Filter).	Rigid	1956	Satisfactory	Placed 2-in. AC Overlay 1966	ELS 108-0 to seal cracks
Hangar Access and Stub Parking 41,878 SY Total: (11-in. PCC and 17-in. PCC on 4-in. Filter)	Rigid	1955	Satisfactory	No recent Maintenance or repair	
Hangar Access and Stub Parking 37,013 SY Total: (17-in. PCC on 4-in. Filter).	Rigid	1955	Satisfactory	No Recent Maintenance Replaced Repair	
Hangar Access and stub Parking 38,309 SY Total: (13-in. PCC on 4-in. filter), (21-in. PCC on 4-in. filter).	Rigid	1953	Satisfactory	Placed 2-in. AC Overlay Replaced Broken Slabs 1966. Replaced 50 x 50 AC Pad 1968	
Hangar Access and Stub Parking 30,734 SY Total: (13-in. PCC on 4-in. Filter) (21-in. PCC on 4-in. Filter).	Rigid	1953	Unsatisfactory	Replaced Broken Slabs 1966	ELS 108-0 to seal joints
Apron, Hangar Access 9,109 SY Total: (4-in. AC on 12-in. base and 28-in. subbase).	Flex Heavy	1950	Satisfactory		
Apron Hangar Access 12,082 SY (19-in. PCC on 4-in. Filter) Used for M. Men Vehicle Parking	Rigid	1962	Satisfactory	No recent major repair	
Apron Hangar Access 9,109 SY (4-in. AC on 12-in. base and 27-in. subbase). Used for M. Men Vehicle Parking	Flex	1950	Satisfactory	Slurry Sealed 1966	
Hangar Access Apron 1,688 SY Total: (4-in. AC on 12-in. base and 29-in. subbase).	Flex-Med	1966	Satisfactory	Slurry Sealed 1966	
Apron, Hangar Access 1,688 SY Total: (4-in. AC on 12-in. base and 29-in. subbase).	Flex-Med	1966	Satisfactory	Slurry Sealed 1966	

(Continued)

Facility Description	Pavement Type	Year Const.	Existing Condition	Maintenance and Repair History	Present or Proposed Maintenance and Repair
Apron, Hangar Access 1,003 SY Total: (19-in. PCC on 4-in. Filter)	Rigid-Med	1956	Satisfactory	No recent major repairs	
Hangar Access Apron 1,008 SY Total (4-in. AC on 12-in. base and 29-in. subbase).	Flex-Med	1956	Satisfactory	Slurry Sealed	
Apron, Hangar Access 1,008 SY Total: (4-in. AC on 12-in. base and 29-in. subbase).	Flex-Med	1955	Satisfactory	Slurry Sealed 1966	
Apron, Hangar Access 2,003 SY Total: (19-in. PCC on 4-in. Filter)	Rigid-Med	1956	Satisfactory	No recent major repair	
Hangar Access Apron 2,003 SY Total: (19-in. PCC on 4-in. Filter)	Rigid-Med	1956	Satisfactory	No recent Maintenance	
Hangar Access Apron 1,008 SY Total: (4-in. AC on 12-in. base and 29-in. subbase).	Flex	1955	Satisfactory	Slurry Sealed in 1966	
Loading Apron 14,092 SY Total:	Rigid	1963	Satisfactory	No Recent Maintenance or Repair	
Loading Apron 34,081 SY Total: (7-in. PCC, 3-1/2-in. or 1-1/2-in. AC on 6-in. - 8-in. base) To be Abandoned	Rigid-Lt	1943	Unsatisfactory	No Recent Maintenance Repair	To be Completely removed (In-house)
Operational Apron 21,258 SY Total: (4-in. AC on 12-in. base and 27-in. base)	Flex Heavy	1950	Satisfactory	Constructed 14 Hardstands 1965, Slurry Sealed shoulder Stab 1966. Slurry Sealed.	Asphalt at Parking Spots need repairing.
Operational Apron 79,444 SY Total: (2-1/2-in. AC on 7-in. PCC)	Rigid-Over laid with AC Heavy	1942	Unsatisfactory	Slurry Sealed 1967. Repaired Keel transition 1968	
Base Flight 21,676 SY Total: (4-in. AC on 12-in. Base and 27-in. subbase)	Flex Heavy	1950	Satisfactory	No Recent Maintenance or Repair	
Trans Int 20,891 SY Total: (4-in. AC on 12-in. base and 27-in. subbase)	Flex Heavy	1950	Satisfactory	No Recent Maintenance or Repair	
Shoulder Stab 365,914 SY Total: (2-in. AC on 6-in. base and 9-in. - 15-in. subbase)	Flex-Lt	1948 1950	Satisfactory		
Hardstand Collb 6,683 SY Total: (20-in. PCC or 3-1/2-in. AC on 8-in. Base) Used in Emergencies Only.	Rigid Overlaid	1954	Satisfactory		To be Completely removed (In-house)
Hangar Access Apron 1,008 SY Total: (4-in. AC on 12-in. Base and 29-in. Subbase)	Rigid-Med	1955	Satisfactory	Slurry Sealed 1966	
Hangar Aprons 1,688 SY Total: (4-in. AC on 12-in. Base and 29-in. subbase)	Flex-Med	1955	Satisfactory	Slurry Sealed 1966	
Hangar Aprons (Access) 1,688 SY Total: (3-in. AC on 6-in. base and 15-in. subbase)	Flex-Med	1955	Satisfactory	Slurry Sealed 1966	
Apron Hangar Access 3,250 SY Total: (3-in. AC on 6-in. base and 15-in. subbase)	Flex-Med	1952	Satisfactory	Slurry Sealed 1967	
Apron Hangar Access 19,409 Total: (19-in. PCC on 4-in. Filter)	Rigid	1957	Satisfactory	Slurry Sealed 1967	
Apron Hangar Access 7,369 SY Total: (3-in. AC on 6-in. base and 15-in. subbase)	Flex-Med	1951	Satisfactory	No Recent Major Repair	ESC 104-0 to seal cracks
Apron Hangar Access 16,609 SY Total: (7-in. PCC and 4-in. AC) Hangar and Apron used by SAC Aero Club.	Flex	1950	Unsatisfactory	No Recent Major Repair	ESC 104-0 to repair
Power Check Pad 14,613 SY (19-in. PCC on 4-in. Filter)	Rigid-Med	1956	Satisfactory	Sealed Joints 1961 Slurry Sealed Shoulder Stab 1966	ESC 104-0 to repair spalls
Power Check Pad 11,900 SY (19-in. PCC on 4-in. Filter)	Rigid-Med	1956	Satisfactory	Sealed Joints 1961 Slurry sealed shoulder Stab 1966	ESC 104-0 to repair spalls
Corrosion Control 4,579 SY Total: (12-in. PCC on 4-in. Filter)	Rigid-Med	1954	Satisfactory		