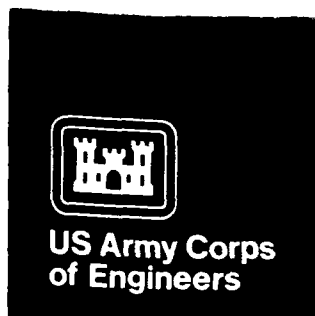




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MISCELLANEOUS PAPER GL-90-7

# CONDITION SURVEY AND PAVER IMPLEMENTATION, EDWARDS AIR FORCE BASE (NORTH BASE), CALIFORNIA

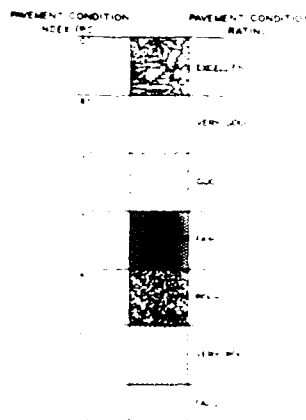
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by

Ross A. Bentsen

Geotechnical Laboratory

DEPARTMENT OF THE ARMY  
Waterways Experiment Station, Corps of Engineers  
3909 Halls Ferry Road, Vicksburg, Mississippi 39180-6199



June 1990  
Final Report

Approved for Release: Distribution Unlimited



Prepared for: DEPARTMENT OF THE AIR FORCE  
Edwards Air Force Base, California 93523-5320

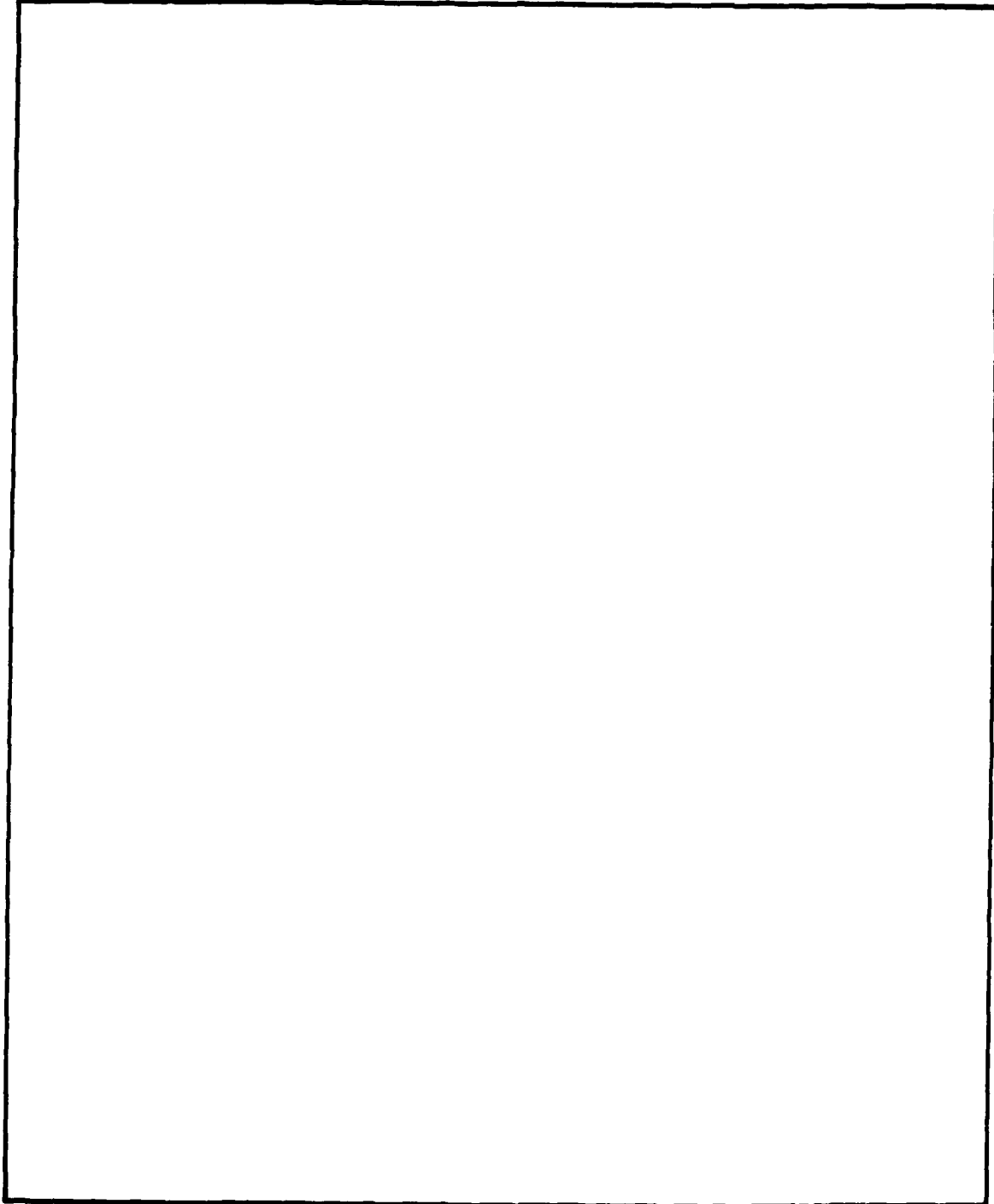
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| FIELD                                                                                                                                                                                                                                                                                                                                                                                                        | GROUP | SUB-GROUP                                          |                                                                                   |                                                    |                    |
|                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                    | Airfield pavement / Pavement condition                                            |                                                    |                    |
|                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                    | Edwards AFB (North Base) Pavement condition index                                 |                                                    |                    |
|                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                    | Micro PAVER PAVER implementation                                                  |                                                    |                    |
| 19. ABSTRACT (Continue on reverse if necessary and identify by block number)                                                                                                                                                                                                                                                                                                                                 |       |                                                    |                                                                                   |                                                    |                    |
| <p>A pavement condition survey was performed on the North Base airfield at Edwards Air Force Base, California, in August 1989 for the purpose of determining the pavement condition index of the airfield features and for performing the initial implementation of the PAVER pavement management system. The pavement identification and condition survey data were input into a Micro PAVER data base.</p> |       |                                                    |                                                                                   |                                                    |                    |
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# PREFACE

The condition survey described in this report was requested by Military Interdepartmental Purchase Request (MIPR) No. F04611-89-X-0091 dated 17 February 1989 from AFFTC/PKOS, Edwards Air Force Base, CA, to the US Army Engineer Waterways Experiment Station (WES), Vicksburg, MS.

The condition survey of the North Base Airfield at Edwards Air Force Base was performed by a WES condition survey team during the period 1 to 3 August 1989. The team consisted of Messrs. R. A. Bentsen, W. P. Grogan, G. L. Carr, Sr., D. D. Mathews, and R. T. Graham, Pavement Systems Division (PSD), Geotechnical Laboratory (GL). This report was prepared by Mr. Bentsen under the supervision of Messrs. J. W. Hall, Jr., Chief, Systems Analysis Branch, PSD, and H. H. Ulery, Jr., Chief, PSD. The work was under the general supervision of Dr. W. F. Marcuson III, Chief, GL, WES. Ms. Odell F. Allen, Visual Production Center, Information Technology Laboratory, edited the report.

Commander and Director of WES during the preparation and publication of this report was COL Larry B. Fulton, EN. Technical Director was Dr. Robert W. Whalin.

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CONVERSION FACTORS, NON-SI TO SI (METRIC)  
UNITS OF MEASUREMENT

Non-SI units of measurement used in this report can be converted to SI  
(metric) units as follows:

| <u>Multiply</u>                | <u>By</u>  | <u>To Obtain</u> |
|--------------------------------|------------|------------------|
| feet                           | 0.30489    | metres           |
| inches                         | 2.54       | centimetres      |
| pounds (force) per square inch | 6.894757   | kilopascals      |
| square feet                    | 0.09290304 | square metres    |

CONDITION SURVEY AND PAVER IMPLEMENTATION, EDWARDS AIR FORCE BASE  
(NORTH BASE), CALIFORNIA

PART I: INTRODUCTION

Background

1. This report describes the condition survey and initial implementation of a pavement management system utilizing the PAVER system of the North Base Airfield pavements at Edwards Air Force Base (AFB), CA. The implementation was performed to provide base engineers with the initial data base required for making pavement management decisions concerning costs and maintenance requirements. The condition survey was performed by the US Army Engineer Waterways Experiment Station during the period 1 to 3 August 1989.

Objective and Scope

2. The overall objective of this project was to determine the pavement condition of the North Base Airfield pavements at Edwards AFB and to input the information into a Micro PAVER data base to provide the base engineers with a permanent data base to use for future pavement management decisions. This objective was accomplished by:

- a. Performing a condition survey of the pavements in accordance with AFR 93-5.\*
- b. Inputting the pavement network and condition survey information into Micro PAVER to calculate a pavement condition index (PCI) of each of the pavement features.
- c. Producing detail drawings of the pavement features to ensure that future condition surveys will be performed at the same locations as the one performed for this report.

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\* Headquarters, Department of the Air Force. 1981 (May). "Airfield Pavement Evaluation Program," Air Force Regulation AFR 93-5, Washington, DC.

## PART II: PAVEMENT CONDITION SURVEY

### Introduction

3. A pavement condition survey is performed to determine the present surface condition of the various pavement features on an airfield. The procedure used in performing the condition survey was developed by the US Army Corps of Engineers and has been accepted as a regulation by the US Air Force.\* The knowledge of the condition survey procedures discussed in AFR 93-5 is required for the use and understanding of this report.

### Pavement Definition and Identification

4. The pavement network is divided into three specific units in order to manage the pavement network effectively. The three units of division are the feature, the section, and the sample unit. The method for dividing the pavement network is detailed in AFR 93-5 and is briefly discussed herein.

5. Airfield pavement features, or branches in some terminology, are defined by various parameters such as the pavement type, construction history, and pavement usage. The feature designations of North Base were most recently established in "Airfield Pavement Evaluation, Edwards Air Force Base (North Base), California,\*\* These feature designations, shown in Figure 1, are made under strict guidelines and any changes to them must be justified. Locating the features on the airfield itself is necessary before the performance of the condition survey can proceed. The physical property data for the features at North Base are given in Table 1.

6. After each pavement feature has been defined, further division of the feature may be required for reasons such as traffic flow. Further division of features is done into sections. For instance, a runway feature may be 150 ft† wide, but the majority of the traffic occurs in the middle of the

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\* Headquarters, Department of the Air Force. 1981. "Airfield Pavement Evaluation Program," Air Force Regulation AFR 93-5, Washington, DC.

\*\* US Air Force Engineering and Services Center. 1981 (June). "Airfield Pavement Evaluation, Edwards Air Force Base (North Base), California," Tyndall AFB, FL.

† A table of factors for converting non-SI units of measurement to SI (metric) units is presented on page 3.

feature. Therefore, a section is defined in the center of the feature with additional sections defined on either side of the middle section. Also, an apron may contain taxi lanes which the aircraft follow to their parking locations, a section which would differ from the areas used for the actual parking of the aircraft. Therefore, these elements of the feature are divided into sections. If a feature requires no division, for definition purposes it is still considered to contain one section.

7. After the pavement section definition has been completed, the section is divided into sample units, which are conveniently sized areas of pavement on which the inspection is performed. A standard sample unit on asphaltic concrete (AC) pavement is a 5,000-sq ft area, and a standard sample unit on portland cement concrete (PCC) pavement consists of 20 slabs. A pavement section is divided into sample units for condition survey purposes only. Recognizing that not all sample units can fit into the general requirement of 5,000 sq ft or 20 slabs, deviations of 25 percent on either side of these values are allowed for survey purposes.

8. When a section has been divided into sample units, it has been properly prepared for the survey. An inspection of all of the sample units within a large section could require a considerable amount of time. Therefore, the random sampling method was developed to provide an adequate calculation of the PCI while inspecting only a portion of the sample units in such a section. The method, further defined in AFR 93-5, allows for a reduction in the number of sample units surveyed without a significant loss of accuracy in the calculation of the PCI. It should be noted, however, that the inspection of all the sample units may be necessary for estimation of maintenance and repair work.

9. An essential concept in pavement management is determining the deterioration of the pavement surface over time. The PCI is used in the PAVER system to determine this deterioration. Determining the PCI of a pavement section at different time intervals requires that the same sample units of the section be surveyed to get a precise idea of the deterioration rate. Drawings of each of the pavement features and any section divisions have been included in this report to illustrate the sample units within each feature to permit future condition surveys to be conducted at these same locations. Figures 2 to 5 illustrate the sample unit layouts for each of the features and sections at North Base. The circled numbers indicate the sample units that were

surveyed. In features where no numbers are circled, the numbers shown indicate the sample units that were surveyed.

#### Pavement Inspection

10. The performance of a condition survey consists of inspecting the pavement surface of a sample unit for various types of distresses, determining the severity of each distress found, and measuring the amount of distress within the sample unit. Distress quantities on AC pavement are measured in either linear feet or square feet within the sample unit, and those on PCC pavement are measured by counting the number of slabs affected within the sample unit.

11. The product of the condition survey is the PCI of the sample unit. The PCI is a value from 0 to 100 (worst to best, respectively) of the surface condition of the pavement. The PCI is obtained by determining a deduct value for the amount of each distress type and the severity found in the inspection, determining a corrected deduct value for the combined effect of various distresses on the pavement condition, and subtracting the corrected deduct value from 100. A pavement with no distress has a PCI of 100. Varying amounts of distress decrease the PCI value to a possible low of 0. Pavement condition ratings (excellent to failed) are assigned to different levels of PCI values; these ratings and their respective PCI value definitions are shown in Figure 6. The PCI of the pavement section is calculated by averaging the PCI's of the sample units surveyed.

12. The majority of the pavement features at North Base are rated from fair to very good conditions with some features rated poor and excellent. Figure 7 illustrates the condition ratings of the features at North Base. Photos 1 through 6 show various distresses that were observed on the airfield pavements.

### PART III: MICRO PAVER DATA BASE IMPLEMENTATION

13. The use of the PAVER pavement management system requires knowledge of both computers and the PAVER system itself. Micro PAVER is a microcomputer-based version of the PAVER pavement management system. When discussing the pavement management system itself, the terms PAVER and Micro PAVER are interchangeable. Discussions concerning the Micro PAVER data base and the operations involved with the Micro PAVER programs are specific to Micro PAVER. This report does not describe the operation of a computer; it does outline the necessary Micro PAVER procedures in moderate detail. The "Micro PAVER User's Guide"\* goes into specific detail of all the procedures for setting up and using Micro PAVER and should be used as a reference when performing operations in the Micro PAVER system.

14. The Micro PAVER system consists of three different system functions. Performing each function requires the use of specific programs, files, and procedures. The three functions are data entry, report generation, and data analysis.

#### Data Entry

15. The pavement network data are entered into the Micro PAVER data base in a logical order that defines the features and sections first. The condition survey data and additional information are then entered which allows the user to perform data base related operations such as PCI calculation and report generation. Data are entered into the Micro PAVER data base through a series of menu-driven Micro PAVER programs.

16. Two ways to collect the condition survey data in the field are by recording the data manually on condition survey data sheets and later placing the data into the Micro PAVER data base, or by inputting the data directly into the FIELD program on a portable computer. The FIELD program places the data into the necessary Micro PAVER format as the data are entered into the computer and saves the data in a file that can be directly transferred to the Micro PAVER data base. The data for the North Base condition survey were collected on data sheets and later input into Micro PAVER.

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\* "Micro PAVER User's Guide," 1988 (Sep). US Army Corps of Engineers, Construction Engineering Research Laboratory.

### Report Generation and Data Analysis

17. Micro PAVER generates reports that provide a summary or specific information utilizing the data stored in the data base. It also calculates information such as budget needs from data and analysis programs provided with the Micro PAVER system. These reports can be used to generate broad information of the entire data base or to list details from a selected portion of the pavement system. Brief descriptions of the Micro PAVER reports are given in Table 2. The data report and analysis programs provide an engineer with the information required to make pavement management decisions.

18. The results of two Micro PAVER reports have been included in this report. The Inspection Report produces a detailed summary of the distresses found in each sample unit surveyed as well as an extrapolation for the entire section. Table 3 gives the summary of the extrapolated distresses for each feature and section. The majority of the North Base pavement was constructed in the 1940's. Current traffic levels are fairly low and, except for the asphalt pavements, the surface condition is remaining constant with the only distress changes being environmentally related.

19. The Inspection Schedule Report gives the section surveying requirements for the next 5 years, depending on the minimum PCI and rate of deterioration deemed allowable for each section use and rank. The results of the Inspection Schedule Report are presented in Table 4. The minimum PCI and deterioration rates input to the Inspection Schedule Report were a minimum PCI of 70 for all features and allowable time limits between inspections of 1 year for rates of deterioration above 6 points per year, 3 years for rates of deterioration between 2 and 6 points per year, and 5 years for rates of deterioration below 2 points per year. Generally, the results in Table 4 are indicative of the current feature condition. The features requiring inspection in 1990 have a PCI of less than 70, and the features not requiring inspection until 1995 have a PCI greater than 70.

Table 1

## SUMMARY OF PHYSICAL PROPERTY

| FACILITY |                      |             |            |                       | OVERLAY PAVEMENT |             |                  | PAVEMENT       |             |                  |                |                         |
|----------|----------------------|-------------|------------|-----------------------|------------------|-------------|------------------|----------------|-------------|------------------|----------------|-------------------------|
| FEATURE  | IDENTIFICATION       | LENGTH (FT) | WIDTH (FT) | GENERAL CONDITION PCI | THICKNESS (IN)   | DESCRIPTION | FLEX. STR. (PSI) | THICKNESS (IN) | DESCRIPTION | FLEX. STR. (PSI) | THICKNESS (IN) | DESCRIPTION             |
| R1A      | Runway 6-24          | 200         | 150        | Very Good             |                  |             |                  | 8              | PCC         | 750              | 9              | SI<br>Gra<br>San<br>(S) |
| R2A      | Runway 6-24          | 800         | 150        | Fair/<br>Good         |                  |             |                  | 4              | AC          |                  | 6              | SI<br>Gra<br>San<br>(S) |
| R3C      | Runway 6-24          | 3,700       | 150        | Fair/<br>Good         |                  |             |                  | 4              | AC          |                  | 6              | SI<br>Gra<br>San<br>(S) |
| R4A      | Runway 6-24          | 300         | 150        | Very Good             |                  |             |                  | 8.5            | PCC         | 740              | 9              | SI<br>Gra<br>San<br>(S) |
| R5A      | Runway 6-24          | 800         | 150        | Good                  |                  |             |                  | 4              | AC          |                  | 6              | SI<br>Gra<br>San<br>(S) |
| R6A      | Runway 6-24          | 200         | 150        | Very Good             |                  |             |                  | 9              | PCC         | 850              | 9              | SI<br>Gra<br>San<br>(S) |
| T1A      | Main Taxiway         | 1,635       | 100        | Good                  |                  |             |                  | 5              | AC          |                  | 6              | SI<br>Gra<br>San<br>(S) |
| T2A      | Main Taxiway         | 150         | 300        | Very Good             |                  |             |                  | 7.5            | PCC         | 775              | 9              | SI<br>Gra<br>San<br>(S) |
| T3A      | Apron Access Taxiway | 450         | 75         | Fair                  |                  |             |                  | 6              | PCC         | 700              | 6              | SI<br>Gra<br>San<br>(S) |

Table 1

## RY OF PHYSICAL PROPERTY DATA

| OVERLAY PAVEMENT |                  | PAVEMENT       |             | BASE             |                |                             | SUBBASE           |                | SUBGRADE    |       |                 |                   |
|------------------|------------------|----------------|-------------|------------------|----------------|-----------------------------|-------------------|----------------|-------------|-------|-----------------|-------------------|
| DESCRIPTION      | FLEX. STR. (PSI) | THICKNESS (IN) | DESCRIPTION | FLEX. STR. (PSI) | THICKNESS (IN) | DESCRIPTION                 | CBR %<br>K PSI/IN | THICKNESS (IN) | DESCRIPTION | CBR % | DESCRIPTION     | CBR %<br>K PSI/IN |
|                  |                  |                |             |                  |                |                             |                   |                |             |       |                 |                   |
|                  |                  | 8              | PCC         | 750              | 9              | Silty Gravelly Sand (SW-SM) | 125               |                |             |       | Silty Sand (SM) |                   |
|                  |                  | 4              | AC          |                  | 6              | Silty Gravelly Sand (SW-SM) | 30                |                |             |       | Silty Sand (SM) | 35                |
|                  |                  | 4              | AC          |                  | 6              | Silty Gravelly Sand (SW-SM) | 30                |                |             |       | Silty Sand (SM) | 35                |
|                  |                  | 8.5            | PCC         | 740              | 9              | Silty Gravelly Sand (SW-SM) | 150               |                |             |       | Silty Sand (SM) |                   |
|                  |                  | 4              | AC          |                  | 6              | Silty Gravelly Sand (SW-SM) | 40                |                |             |       | Silty Sand (SM) | 40                |
|                  |                  | 9              | PCC         | 850              | 9              | Silty Gravelly Sand (SW-SM) | 250               |                |             |       | Silty Sand (SM) |                   |
|                  |                  | 5              | AC          |                  | 6              | Silty Gravelly Sand (SW-SM) | 30                |                |             |       | Silty Sand (SM) | 35                |
|                  |                  | 7.5            | PCC         | 775              | 9              | Silty Gravelly Sand (SW-SM) | 150               |                |             |       | Silty Sand (SM) |                   |
|                  |                  | 6              | PCC         | 700              | 6              | Silty Gravelly Sand (SW-SM) | 250               |                |             |       | Silty Sand (SM) |                   |

(Continued)

Table 1 (Concluded)

| SUMMARY OF PHYSICAL PROPERTY |                       |             |            |                       |                  |             |                  |                |             |                  |                |    |
|------------------------------|-----------------------|-------------|------------|-----------------------|------------------|-------------|------------------|----------------|-------------|------------------|----------------|----|
| FACILITY                     |                       |             |            |                       | OVERLAY PAVEMENT |             |                  | PAVEMENT       |             |                  |                |    |
| FEATURE                      | IDENTIFICATION        | LENGTH (FT) | WIDTH (FT) | GENERAL CONDITION PCI | THICKNESS (IN)   | DESCRIPTION | FLEX. STR. (PSI) | THICKNESS (IN) | DESCRIPTION | FLEX. STR. (PSI) | THICKNESS (IN) | DI |
| T4A                          | Apron Access Taxiway  | 470         | 75         | Fair                  |                  |             |                  | 7              | PCC         | 675              | 6              | SI |
| T5C                          | Taxiway to Lakebed    | 350         | 100        | Good                  |                  |             |                  | 2              | AC          |                  |                | SI |
| T6A                          | Hangar Access Taxiway | 1,120       | 100        | Very Good             |                  |             |                  | 10.5           | PCC         | 700              |                | SI |
| A1B                          | West End Turnaround   | 200         | 50         | Very Good             |                  |             |                  | 7              | PCC         | 600              |                | SI |
| A2B                          | East End Turnaround   | 200         | 50         | Very Good             |                  |             |                  | 9              | PCC         | 590              |                | SI |
| A3B                          | Apron                 | Varies      | 175        | Poor                  |                  |             |                  | 7              | PCC         | 550              |                | SI |
| A4B                          | Maintenance Apron     | Varies      | Varies     | Poor                  |                  |             |                  | 6              | PCC         | 750              | 6              | SI |
| A5B                          | Apron                 | 1,010       | 65         | Excellent             |                  |             |                  | 9              | PCC         | 775              |                | SI |
| A7B                          | Hangar Apron          | Varies      | Varies     | Very Good             |                  |             |                  | 10             | PCC         |                  |                | SI |

Table 1 (Concluded)

## SUMMARY OF PHYSICAL PROPERTY DATA

| OVERLAY PAVEMENT       |             |                        | PAVEMENT               |             |                        | BASE                   |                                      |             | SUBBASE                |             |          | SUBGRADE           |             |
|------------------------|-------------|------------------------|------------------------|-------------|------------------------|------------------------|--------------------------------------|-------------|------------------------|-------------|----------|--------------------|-------------|
| THICK-<br>NESS<br>(IN) | DESCRIPTION | FLEX.<br>STR.<br>(PSI) | THICK-<br>NESS<br>(IN) | DESCRIPTION | FLEX.<br>STR.<br>(PSI) | THICK-<br>NESS<br>(IN) | DESCRIPTION                          | CBR<br>%    | THICK-<br>NESS<br>(IN) | DESCRIPTION | CBR<br>% | DESCRIPTION        | CBR<br>%    |
|                        |             |                        |                        |             |                        |                        |                                      | K<br>PSI/IN |                        |             |          |                    | K<br>PSI/IN |
|                        |             |                        | 7                      | PCC         | 675                    | 6                      | Silty<br>Gravelly<br>Sand<br>(SW-SM) | 250         |                        |             |          | Silty Sand<br>(SM) |             |
|                        |             |                        | 2                      | AC          |                        |                        |                                      |             |                        |             |          | Silty Sand<br>(SM) | 40          |
|                        |             |                        | 10.5                   | PCC         | 700                    |                        |                                      |             |                        |             |          | Silty Sand<br>(SM) | 250         |
|                        |             |                        | 7                      | PCC         | 600                    |                        |                                      |             |                        |             |          | Silty Sand<br>(SM) | 125         |
|                        |             |                        | 9                      | PCC         | 590                    |                        |                                      |             |                        |             |          | Silty Sand<br>(SM) | 225         |
|                        |             |                        | 7                      | PCC         | 550                    |                        |                                      |             |                        |             |          | Silty Sand<br>(SM) | 200         |
|                        |             |                        | 6                      | PCC         | 750                    | 6                      | Silty<br>Gravelly<br>Sand<br>(SW-SM) | 250         |                        |             |          | Silty Sand<br>(SM) |             |
|                        |             |                        | 9                      | PCC         | 775                    |                        |                                      |             |                        |             |          | Silty Sand<br>(SM) | 225         |
|                        |             |                        | 10                     | PCC         |                        |                        |                                      |             |                        |             |          | Silty Sand<br>(SM) |             |

Table 2  
Micro PAVER Reports

---

|                                 |                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| List                            | - Lists the branch name, number, and number of sections in each branch.                                                                               |
| Inventory                       | - Provides inventory information of the pavement sections.                                                                                            |
| PCI                             | - Provides branch and section information, last construction and inspection dates, age, and PCI for each branch/section combination.                  |
| Inspection                      | - Provides both the summary and sample unit PCI and distress information for the pavement sections.                                                   |
| PCI Frequency                   | - Provides an overall condition frequency, based on PCI, for the year requested.                                                                      |
| Budget Planning                 | - Provides a 5-year budget by estimating the costs to maintain the pavements above a given condition level.                                           |
| Budget Condition Forecasts      | - A combination of the PCI frequency and budget planning reports; this predicts the budget and pavement condition depending on the repairs performed. |
| Inspection Schedule             | - Provides a schedule of sections to be inspected during a 5-year period.                                                                             |
| Condition History               | - Provides a PCI versus time curve of a specific section, including a 5-year projection.                                                              |
| Family Curve                    | - Models and predicts pavement condition of sections of a specific type, use, and rank (a family).                                                    |
| Section Prediction              | - Uses a family curve to predict the condition of selected sections.                                                                                  |
| M & R                           | - Determines repair and overlay costs depending on the user's maintenance and repair policy.                                                          |
| Network Maintenance             | - Determines the repair costs over the entire network depending on the user's maintenance and repair policy.                                          |
| Economic Analysis               | - Provides the user with annual cost information to help determine the most economical M & R alternative.                                             |
| Pavement Performance Prediction | - Nondata base PCI prediction models for AC or PCC pavements.                                                                                         |

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Table 3  
Extrapolated Distress Summary, North Base

| <u>Feature</u> | <u>Section</u> | <u>Distress</u>  | <u>Severity</u> | <u>Extrapolated<br/>Quantity</u> | <u>Percent<br/>of Total<br/>Area</u> |
|----------------|----------------|------------------|-----------------|----------------------------------|--------------------------------------|
| R01A           | 1              | Jt* Seal Damage  | H               | 168 slabs                        | 100.00                               |
|                |                | Small Patch      | L               | 19 slabs                         | 11.36                                |
|                |                | Small Patch      | M               | 3 slabs                          | 2.27                                 |
|                |                | Joint Spall      | L               | 67 slabs                         | 40.15                                |
|                |                | Joint Spall      | M               | 1 slab                           | 0.76                                 |
|                |                | Corner Spall     | L               | 11 slabs                         | 6.82                                 |
| R02A           | 1              | Alligator Crack  | L               | 1,081 sq ft                      | 2.70                                 |
|                |                | Alligator Crack  | M               | 160 sq ft                        | 0.40                                 |
|                |                | Alligator Crack  | H               | 11 sq ft                         | 0.03                                 |
|                |                | Block Cracking   | L               | 192 sq ft                        | 0.48                                 |
|                |                | L & T** Cracking | L               | 3,627 lin ft                     | 9.07                                 |
|                |                | L & T Cracking   | M               | 1,416 lin ft                     | 3.54                                 |
|                |                | Patching         | L               | 40 sq ft                         | 0.10                                 |
|                | 2              | Alligator Crack  | M               | 400 sq ft                        | 1.00                                 |
|                |                | Block Cracking   | L               | 13,580 sq ft                     | 33.95                                |
|                |                | L & T Cracking   | L               | 2,024 lin ft                     | 5.06                                 |
|                |                | L & T Cracking   | M               | 420 lin ft                       | 1.05                                 |
|                | 3              | Block Cracking   | L               | 13,909 sq ft                     | 34.77                                |
|                |                | L & T Cracking   | L               | 2,307 lin ft                     | 5.77                                 |
|                |                | L & T Cracking   | M               | 407 lin ft                       | 1.02                                 |
|                |                | L & T Cracking   | H               | 207 lin ft                       | 0.52                                 |
| R03C           | 1              | Alligator Crack  | L               | 11,766 sq ft                     | 6.36                                 |
|                |                | Alligator Crack  | M               | 5,069 sq ft                      | 2.74                                 |
|                |                | Block Cracking   | L               | 57,905 sq ft                     | 31.30                                |
|                |                | L & T Cracking   | L               | 6,401 lin ft                     | 3.46                                 |
|                |                | L & T Cracking   | M               | 2,794 lin ft                     | 1.51                                 |
|                | 2              | Alligator Crack  | L               | 1,009 sq ft                      | 0.55                                 |
|                |                | Block Cracking   | L               | 93,428 sq ft                     | 50.50                                |
|                |                | Block Cracking   | M               | 1,682 sq ft                      | 0.91                                 |
|                |                | L & T Cracking   | L               | 7,232 lin ft                     | 3.91                                 |
|                |                | L & T Cracking   | M               | 404 lin ft                       | 0.22                                 |
|                | 3              | Block Cracking   | L               | 97,325 sq ft                     | 52.61                                |
|                |                | L & T Cracking   | L               | 5,652 lin ft                     | 3.06                                 |
|                |                | L & T Cracking   | M               | 231 lin ft                       | 0.13                                 |

(Continued)

\* Jt = joint.  
 \*\* L & T = Longitudinal and transverse.

(Sheet 1 of 5)

Table 3 (Continued)

| <u>Feature</u> | <u>Section</u> | <u>Distress</u> | <u>Severity</u> | <u>Extrapolated<br/>Quantity</u> | <u>Percent<br/>of Total<br/>Area</u> |
|----------------|----------------|-----------------|-----------------|----------------------------------|--------------------------------------|
| R04A           | 1              | Corner Break    | M               | 2 slabs                          | 1.11                                 |
|                |                | Linear Cracking | L               | 1 slab                           | 0.56                                 |
|                |                | Jt Seal Damage  | H               | 240 slabs                        | 100.00                               |
|                |                | Small Patch     | L               | 81 slabs                         | 33.89                                |
|                |                | Small Patch     | M               | 5 slabs                          | 2.22                                 |
|                |                | Joint Spall     | L               | 117 slabs                        | 48.89                                |
|                |                | Joint Spall     | M               | 1 slab                           | 0.56                                 |
|                |                | Corner Spall    | L               | 22 slabs                         | 9.44                                 |
|                |                | Corner Spall    | M               | 8 slabs                          | 3.33                                 |
| R05A           | 1              | Alligator Crack | L               | 207 sq ft                        | 0.52                                 |
|                |                | Block Cracking  | L               | 20,367 SQ FT                     | 50.92                                |
|                |                | L & T Cracking  | L               | 1,320 lin ft                     | 3.30                                 |
|                | 2              | Block Cracking  | L               | 28,400 sq ft                     | 71.00                                |
|                |                | Block Cracking  | M               | 100 sq ft                        | 0.25                                 |
|                |                | L & T Cracking  | L               | 800 lin ft                       | 2.00                                 |
|                |                | L & T Cracking  | M               | 133 lin ft                       | 0.33                                 |
|                | 3              | Alligator Crack | L               | 800 sq ft                        | 2.00                                 |
|                |                | Alligator Crack | M               | 200 sq ft                        | 0.50                                 |
|                |                | Block Cracking  | L               | 24,700 sq ft                     | 61.75                                |
|                |                | Block Cracking  | M               | 933 sq ft                        | 2.33                                 |
|                |                | L & T Cracking  | L               | 1,133 lin ft                     | 2.83                                 |
| R06A           | 1              | Corner Break    | L               | 1 slab                           | 0.76                                 |
|                |                | Linear Cracking | L               | 1 slab                           | 0.76                                 |
|                |                | Jt Seal Damage  | H               | 168 slabs                        | 100.00                               |
|                |                | Small Patch     | L               | 16 slabs                         | 9.85                                 |
|                |                | Small Patch     | M               | 3 slabs                          | 2.27                                 |
|                |                | Joint Spall     | L               | 72 slabs                         | 43.18                                |
|                |                | Joint Spall     | M               | 1 slab                           | 0.76                                 |
|                |                | Corner Spall    | L               | 7 slabs                          | 4.55                                 |
| T01A           | 1              | Alligator Crack | L               | 1,053 sq ft                      | 0.64                                 |
|                |                | Block Cracking  | L               | 160,815 sq ft                    | 97.76                                |
|                |                | Depression      | L               | 474 sq ft                        | 0.29                                 |
|                |                | L & T Cracking  | M               | 105 lin ft                       | 0.06                                 |

(Continued)

(Sheet 2 of 5)

Table 3 (Continued)

| <u>Feature</u> | <u>Section</u> | <u>Distress</u> | <u>Severity</u> | <u>Extrapolated<br/>Quantity</u> | <u>Percent<br/>of Total<br/>Area</u> |
|----------------|----------------|-----------------|-----------------|----------------------------------|--------------------------------------|
| T02A           | 1              | Corner Break    | L               | 1 slab                           | 0.56                                 |
|                |                | Linear Cracking | L               | 1 slab                           | 0.56                                 |
|                |                | Jt Seal Damage  | H               | 240 slabs                        | 100.00                               |
|                |                | Small Patch     | L               | 40 slabs                         | 16.67                                |
|                |                | Small Patch     | M               | 9 slabs                          | 3.89                                 |
|                |                | Large Patch     | L               | 1 slab                           | 0.56                                 |
|                |                | Joint Spall     | L               | 92 slabs                         | 38.33                                |
|                |                | Joint Spall     | M               | 1 slab                           | 0.56                                 |
|                |                | Corner Spall    | L               | 8 slabs                          | 0.33                                 |
|                |                | Corner Spall    | M               | 1 slab                           | 0.56                                 |
| T03A           | 1              | Corner Break    | L               | 23 slabs                         | 13.19                                |
|                |                | Corner Break    | M               | 6 slabs                          | 3.47                                 |
|                |                | Corner Break    | H               | 6 slabs                          | 3.47                                 |
|                |                | Linear Cracking | L               | 28 slabs                         | 15.97                                |
|                |                | Linear Cracking | M               | 10 slabs                         | 5.56                                 |
|                |                | Small Patch     | L               | 65 slabs                         | 36.11                                |
|                |                | Small Patch     | M               | 10 slabs                         | 5.56                                 |
|                |                | Large Patch     | L               | 12 slabs                         | 6.94                                 |
|                |                | Shattered Slab  | L               | 7 slabs                          | 4.17                                 |
|                |                | Shattered Slab  | M               | 16 slabs                         | 9.03                                 |
|                |                | Shattered Slab  | H               | 2 slabs                          | 1.39                                 |
|                |                | Shrinkage Crack | N/A             | 55 slabs                         | 30.56                                |
|                |                | Joint Spall     | L               | 7 slabs                          | 4.17                                 |
|                |                | Joint Spall     | M               | 3 slabs                          | 2.08                                 |
|                |                | Corner Spall    | L               | 5 slabs                          | 2.78                                 |
|                |                | Corner Spall    | M               | 1 slab                           | 0.69                                 |
| T04A           | 1              | Corner Break    | L               | 28 slabs                         | 15.28                                |
|                |                | Corner Break    | M               | 12 slabs                         | 6.94                                 |
|                |                | Corner Break    | H               | 16 slabs                         | 9.03                                 |
|                |                | Linear Cracking | L               | 22 slabs                         | 11.81                                |
|                |                | Linear Cracking | M               | 1 slab                           | 0.69                                 |
|                |                | Small Patch     | L               | 80 slabs                         | 43.06                                |
|                |                | Small Patch     | M               | 3 slabs                          | 2.08                                 |
|                |                | Large Patch     | L               | 1 slab                           | 0.69                                 |
|                |                | Shattered Slab  | L               | 10 slabs                         | 5.56                                 |
|                |                | Shattered Slab  | M               | 5 slabs                          | 2.78                                 |
|                |                | Shattered Slab  | H               | 2 slabs                          | 1.39                                 |
|                |                | Shrinkage Crack | N/A             | 53 slabs                         | 28.47                                |
|                |                | Joint Spall     | L               | 11 slabs                         | 6.25                                 |
|                |                | Joint Spall     | M               | 1 slab                           | 0.69                                 |
|                |                | Corner Spall    | L               | 6 slabs                          | 3.47                                 |

(Continued)

(Sheet 3 of 5)

Table 3 (Continued)

| <u>Feature</u> | <u>Section</u> | <u>Distress</u> | <u>Severity</u> | <u>Extrapolated<br/>Quantity</u> | <u>Percent<br/>of Total<br/>Area</u> |
|----------------|----------------|-----------------|-----------------|----------------------------------|--------------------------------------|
| T05C           | 1              | Alligator Crack | L               | 1,880 sq ft                      | 5.37                                 |
|                |                | Block Cracking  | M               | 7,000 sq ft                      | 20.00                                |
|                |                | L & T Cracking  | L               | 1,481 lin ft                     | 4.23                                 |
|                |                | L & T Cracking  | M               | 870 lin ft                       | 2.49                                 |
| T06A           | 1              | Corner Break    | M               | 1 slab                           | 0.27                                 |
|                |                | Linear Cracking | L               | 20 slabs                         | 3.30                                 |
|                |                | Jt Seal Damage  | M               | 616 slabs                        | 100.00                               |
|                |                | Small Patch     | L               | 74 slabs                         | 12.09                                |
|                |                | Small Patch     | M               | 6 slabs                          | 1.10                                 |
|                |                | Shrinkage Crack | N/A             | 121 slabs                        | 19.78                                |
|                |                | Joint Spall     | L               | 3 slabs                          | 0.55                                 |
|                |                | Joint Spall     | M               | 1 slab                           | 0.27                                 |
|                |                | Corner Spall    | L               | 8 slabs                          | 1.37                                 |
|                |                | Corner Spall    | M               | 1 slab                           | 0.27                                 |
| A01B           | 1              | Jt Seal Damage  | H               | 80 slabs                         | 100.00                               |
|                |                | Joint Spall     | L               | 28 slabs                         | 35.00                                |
|                |                | Corner Spall    | L               | 4 slabs                          | 5.00                                 |
| A02B           | 1              | Linear Cracking | L               | 1 slab                           | 1.25                                 |
|                |                | Linear Cracking | M               | 5 slabs                          | 6.25                                 |
|                |                | Jt Seal Damage  | H               | 80 slabs                         | 100.00                               |
|                |                | Shrinkage Crack | N/A             | 1 slab                           | 1.25                                 |
|                |                | Joint Spall     | L               | 12 slabs                         | 15.00                                |
|                |                | Corner Spall    | L               | 3 slabs                          | 3.75                                 |
| A03B           | 1              | Corner Break    | L               | 2 slabs                          | 2.08                                 |
|                |                | Linear Cracking | L               | 25 slabs                         | 25.00                                |
|                |                | Linear Cracking | M               | 5 slabs                          | 5.21                                 |
|                |                | Jt Seal Damage  | M               | 101 slabs                        | 100.00                               |
|                |                | Small Patch     | L               | 5 slabs                          | 5.21                                 |
|                |                | Large Patch     | L               | 6 slabs                          | 6.25                                 |
|                |                | Shattered Slab  | L               | 49 slabs                         | 48.96                                |
|                |                | Shattered Slab  | M               | 10 slabs                         | 10.42                                |
|                |                | Shattered Slab  | H               | 1 slab                           | 1.04                                 |
|                |                | Shrinkage Crack | N/A             | 3 slabs                          | 3.13                                 |

(Continued)

(Sheet 4 of 5)

Table 3 (Concluded)

| <u>Feature</u> | <u>Section</u> | <u>Distress</u> | <u>Severity</u> | <u>Extrapolated<br/>Quantity</u> | <u>Percent<br/>of Total<br/>Area</u> |
|----------------|----------------|-----------------|-----------------|----------------------------------|--------------------------------------|
| A04B           | 1              | Corner Break    | L               | 4 slabs                          | 3.92                                 |
|                |                | Corner Break    | H               | 2 slabs                          | 1.96                                 |
|                |                | Linear Cracking | L               | 3 slabs                          | 2.94                                 |
|                |                | Jt Seal Damage  | L               | 94 slabs                         | 86.27                                |
|                |                | Jt Seal Damage  | H               | 15 slabs                         | 13.73                                |
|                |                | Small Patch     | L               | 6 slabs                          | 5.88                                 |
|                |                | Small Patch     | M               | 1 slab                           | 0.98                                 |
|                |                | Shattered Slab  | L               | 1 slab                           | 0.98                                 |
|                |                | Shattered Slab  | M               | 22 slabs                         | 20.59                                |
|                |                | Shattered Slab  | H               | 15 slabs                         | 13.73                                |
|                |                | Shrinkage Crack | N/A             | 14 slabs                         | 12.75                                |
|                |                | Joint Spall     | L               | 2 slabs                          | 1.96                                 |
|                |                | Joint Spall     | M               | 2 slabs                          | 1.96                                 |
|                |                | Joint Spall     | H               | 3 slabs                          | 2.94                                 |
|                |                | Corner Spall    | L               | 3 slabs                          | 2.94                                 |
|                |                | Corner Spall    | M               | 3 slabs                          | 2.94                                 |
|                |                | Corner Spall    | H               | 3 slabs                          | 2.94                                 |
| A05B           | 1              | Linear Cracking | L               | 3 slabs                          | 1.15                                 |
|                |                | Small Patch     | L               | 69 slabs                         | 20.38                                |
|                |                | Small Patch     | M               | 1 slab                           | 0.38                                 |
|                |                | Large Patch     | L               | 1 slab                           | 0.38                                 |
|                |                | Shrinkage Crack | N/A             | 17 slabs                         | 5.00                                 |
|                |                | Joint Spall     | L               | 5 slabs                          | 1.54                                 |
|                |                | Joint Spall     | M               | 2 slabs                          | 0.77                                 |
|                |                | Joint Spall     | H               | 7 slabs                          | 2.31                                 |
|                |                | Corner Spall    | L               | 1 slab                           | 0.38                                 |
|                |                | Corner Spall    | H               | 1 slab                           | 0.38                                 |
| A07B           | 1              | Blowup          | L               | 2 slabs                          | 0.60                                 |
|                |                | Linear Cracking | L               | 18 slabs                         | 3.92                                 |
|                |                | Linear Cracking | M               | 1 slab                           | 0.30                                 |
|                |                | Jt Seal Damage  | M               | 480 slabs                        | 100.00                               |
|                |                | Small Patch     | L               | 56 slabs                         | 11.75                                |
|                |                | Large Patch     | L               | 11 slabs                         | 2.41                                 |
|                |                | Scaling         | L               | 5 slabs                          | 1.20                                 |
|                |                | Shrinkage Crack | N/A             | 134 slabs                        | 28.01                                |
|                |                | Joint Spall     | L               | 1 slab                           | 0.30                                 |
|                |                | Joint Spall     | M               | 4 slabs                          | 0.90                                 |
|                |                | Corner Spall    | L               | 7 slabs                          | 1.51                                 |
|                |                | Corner Spall    | M               | 2 slabs                          | 0.60                                 |

Table 4  
A 5-Year Inspection Schedule, North Base

| <u>Year to Inspect</u> | <u>Feature</u> | <u>Sections</u> |
|------------------------|----------------|-----------------|
| 1990                   | R02A           | 1, 2, 3         |
|                        | R03C           | 1, 2, 3         |
|                        | R05C           | 1, 2, 3         |
|                        | T01A           | 1               |
|                        | T03A           | 1               |
|                        | T04A           | 1               |
|                        | T05C           | 1               |
|                        | A03B           | 1               |
|                        | A04B           | 1               |
| 1995                   | R01A           | 1               |
|                        | R04A           | 1               |
|                        | R06A           | 1               |
|                        | T02A           | 1               |
|                        | T06A           | 1               |
|                        | A01B           | 1               |
|                        | A02B           | 1               |
|                        | A05B           | 1               |
|                        | A07B           | 1               |

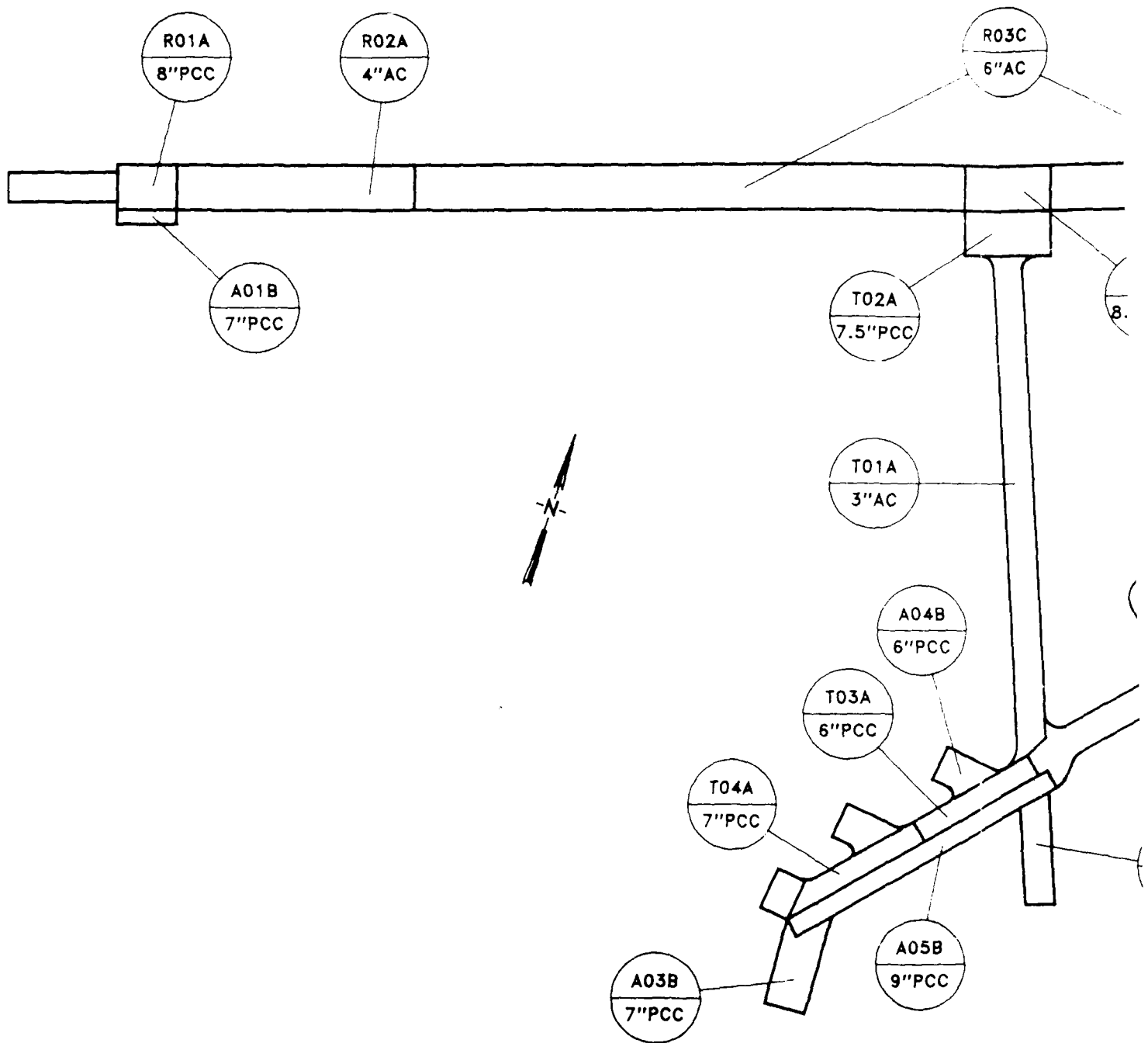
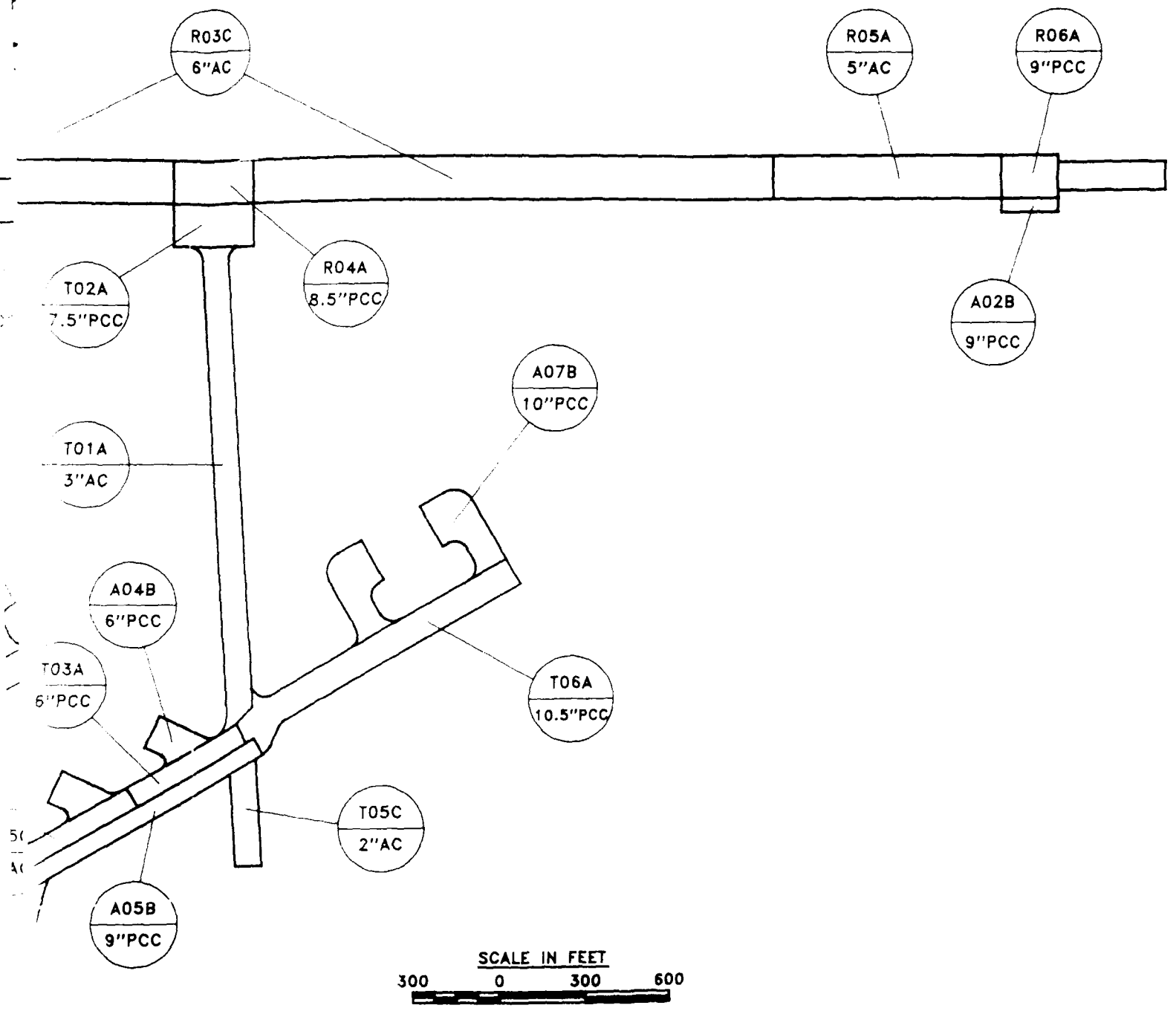


Figure 1. Airfield pavement feature ident



airfield pavement feature identifications of North Base

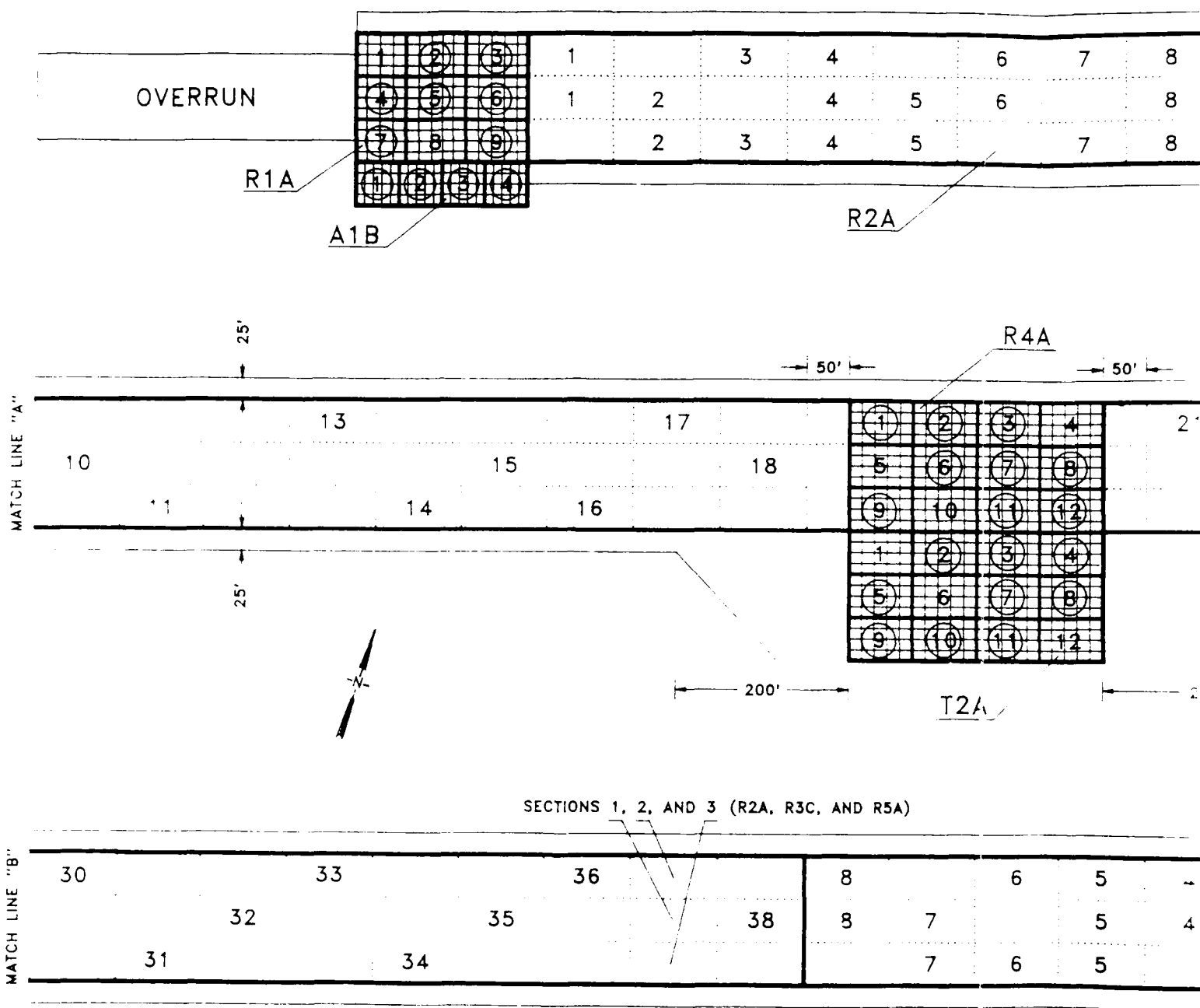
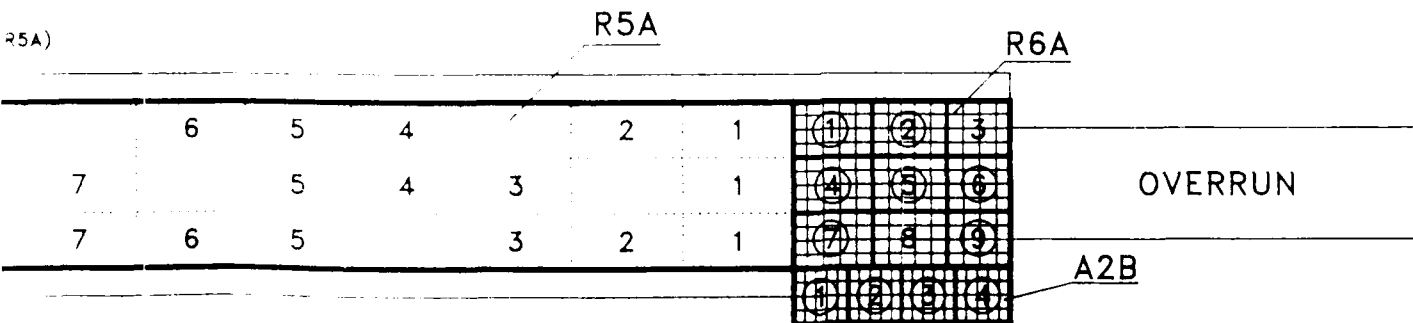
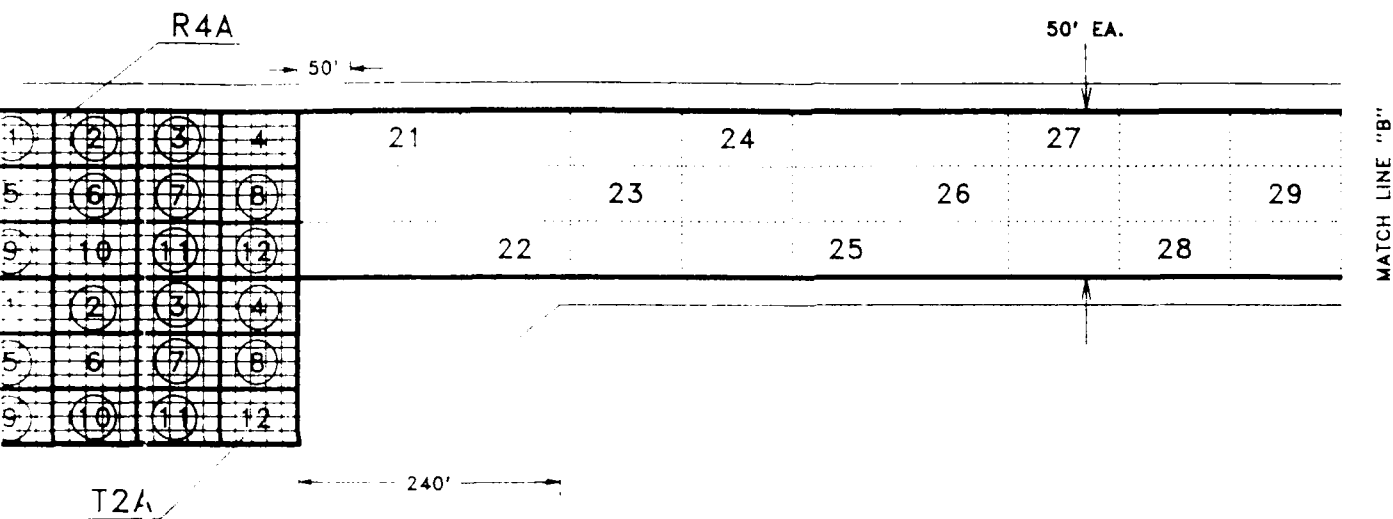
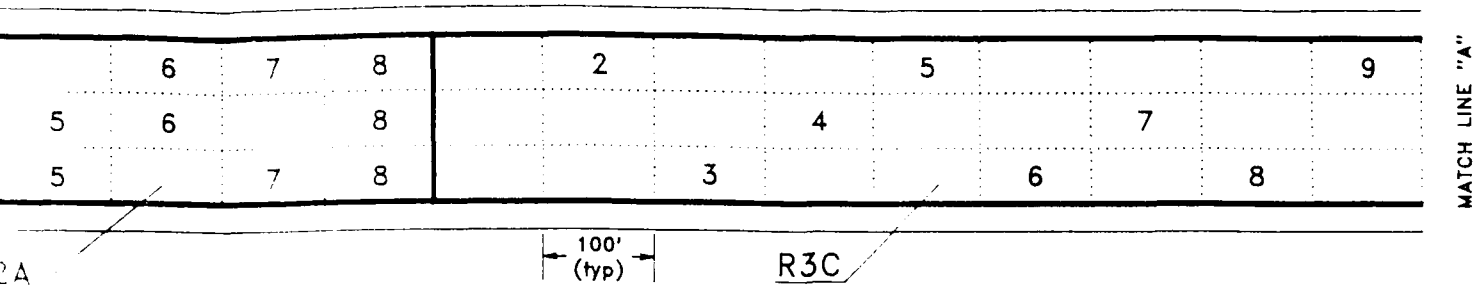
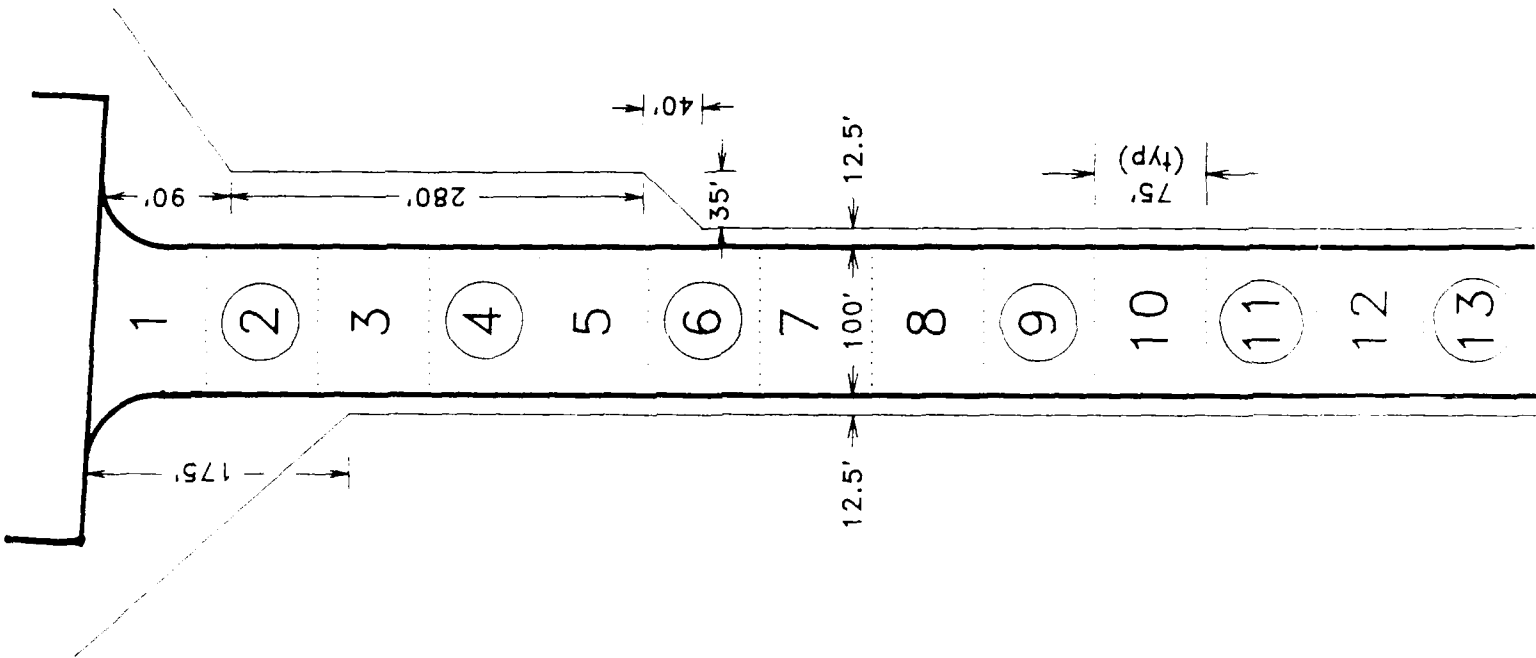


Figure 2. Sample unit layout, Runway 6-24 (features R1A, R2A, R3C, taxiway (feature T2A))



-24 (features R1A, R2A, R3C, R4A, R5A, and R6A) and the main  
 taxiway (feature T2A)



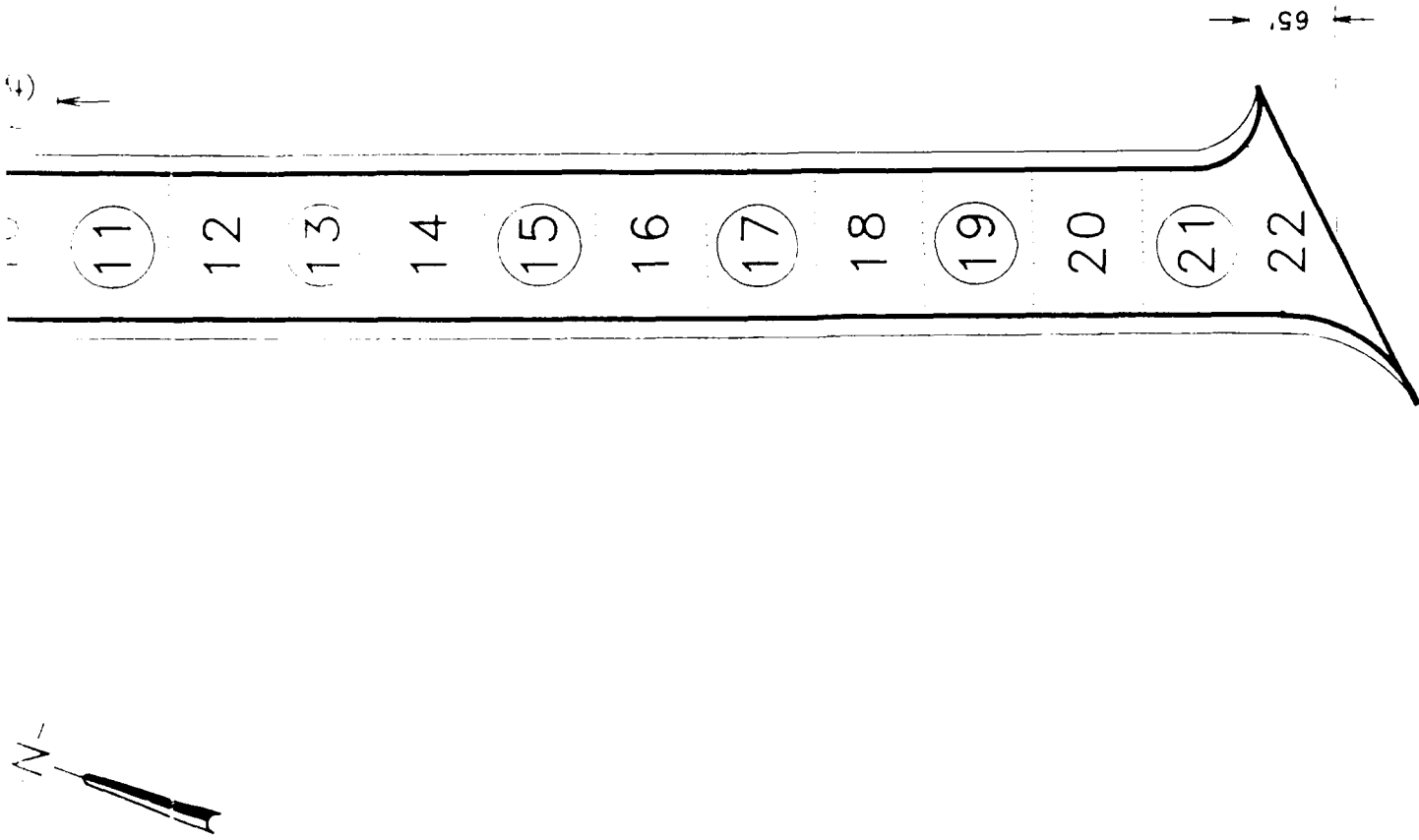


Figure 3. Sample unit layout, the main taxiway (feature T1A)

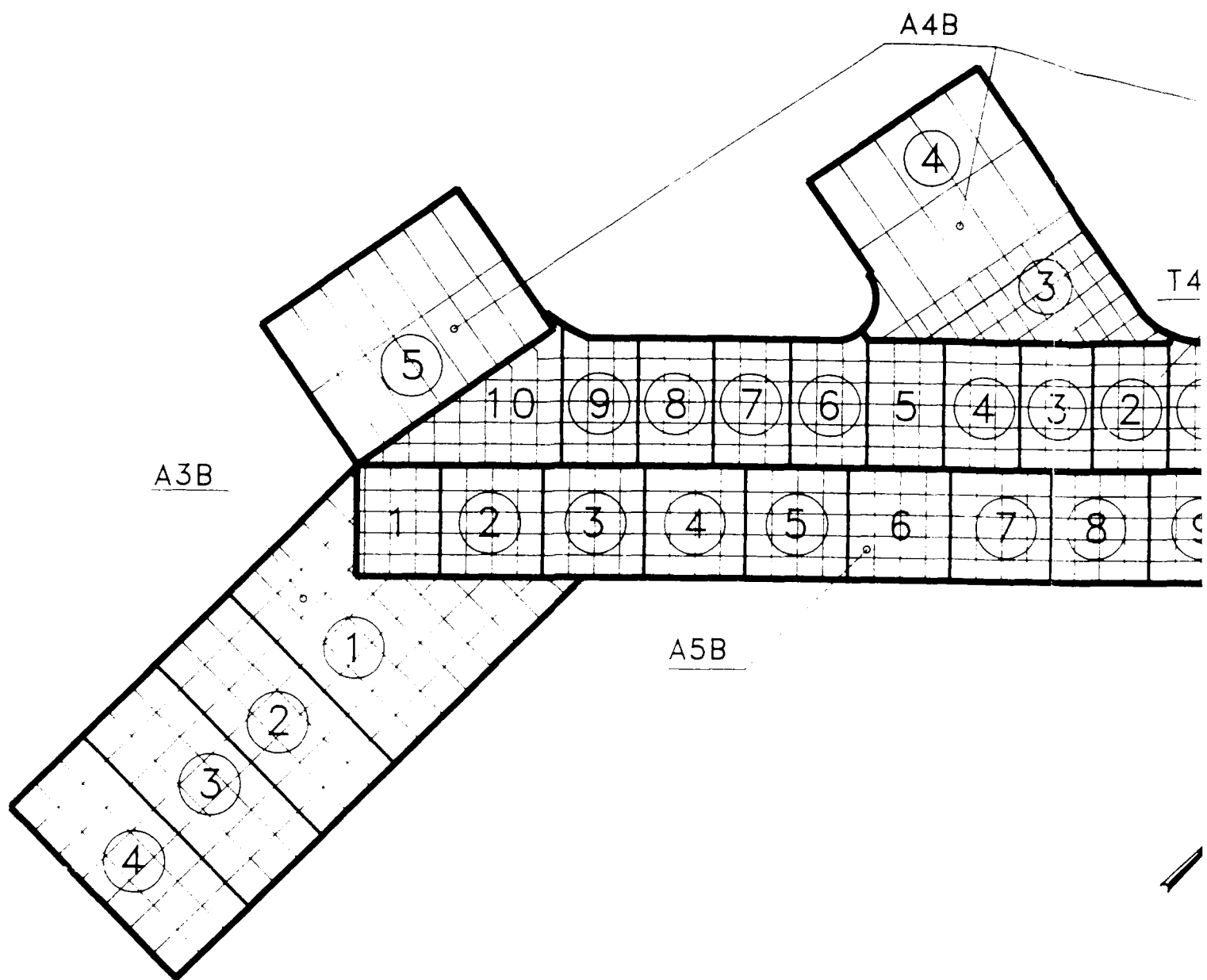
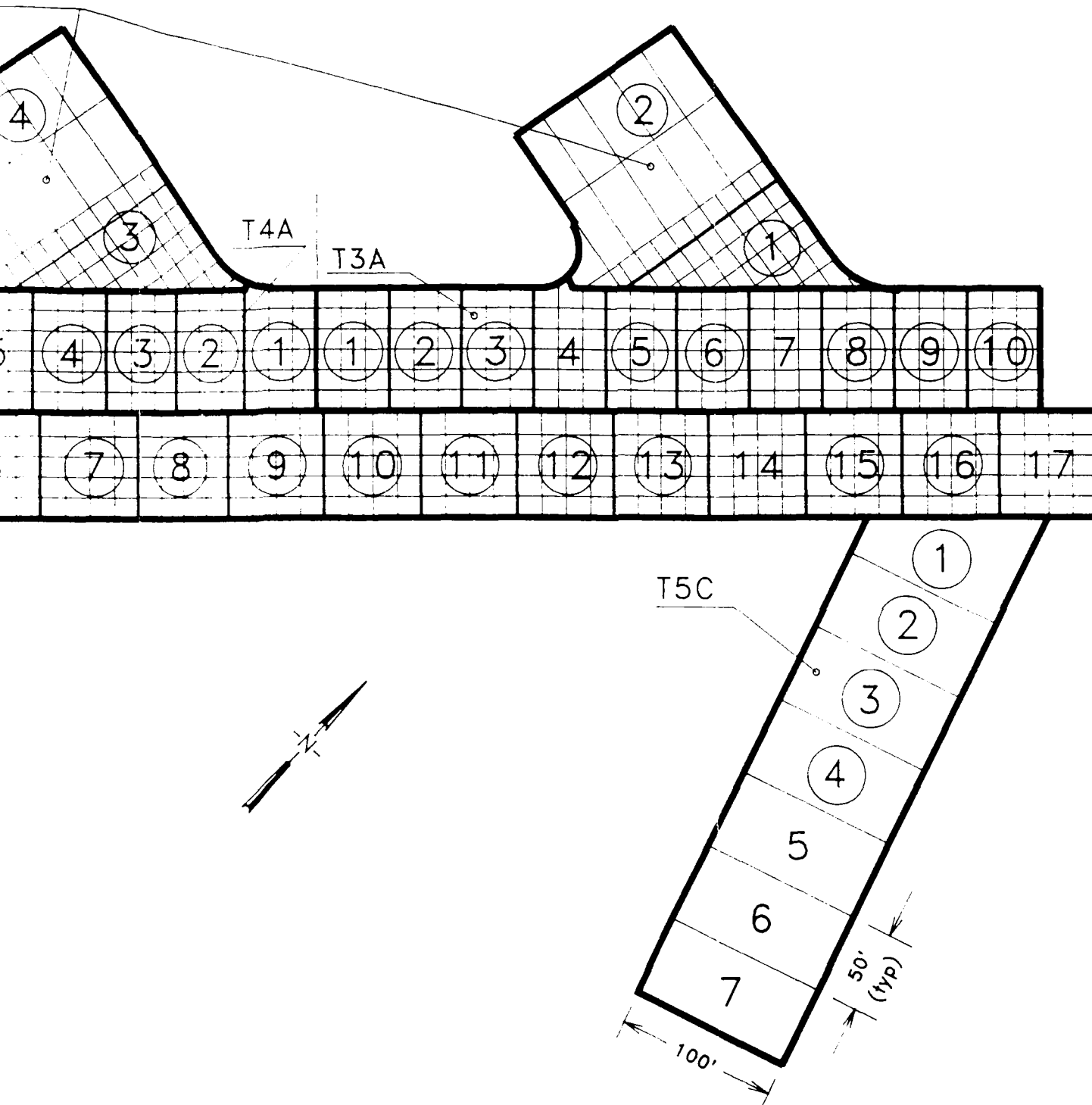


Figure 4. Sample unit layout, the apron access taxiway (features and aprons (features A3B,

A4B



access taxiway (features T3A and T4A), the taxiway to lakebed (feature T5C),  
and aprons (features A3B, A4B and A5B)

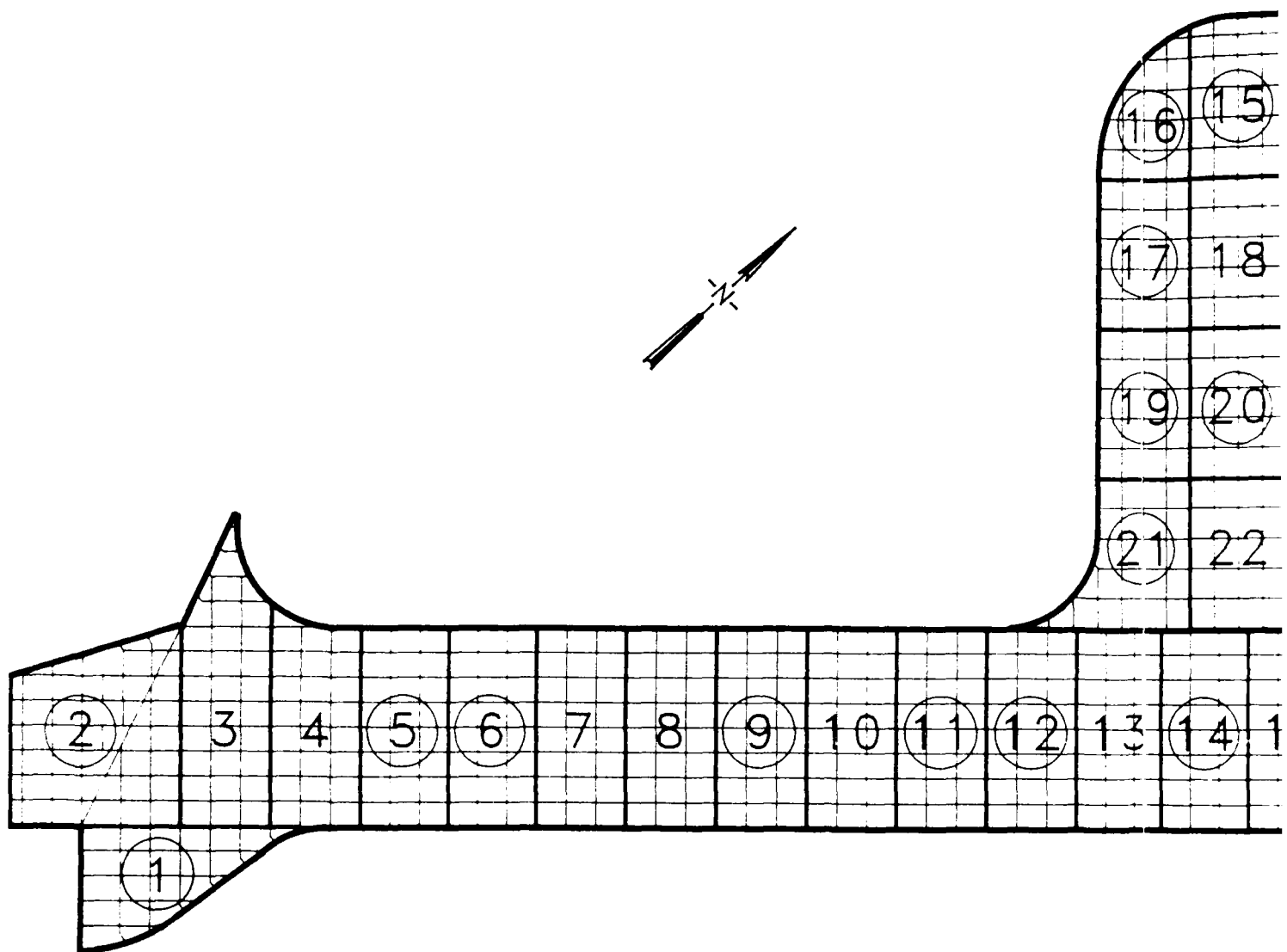
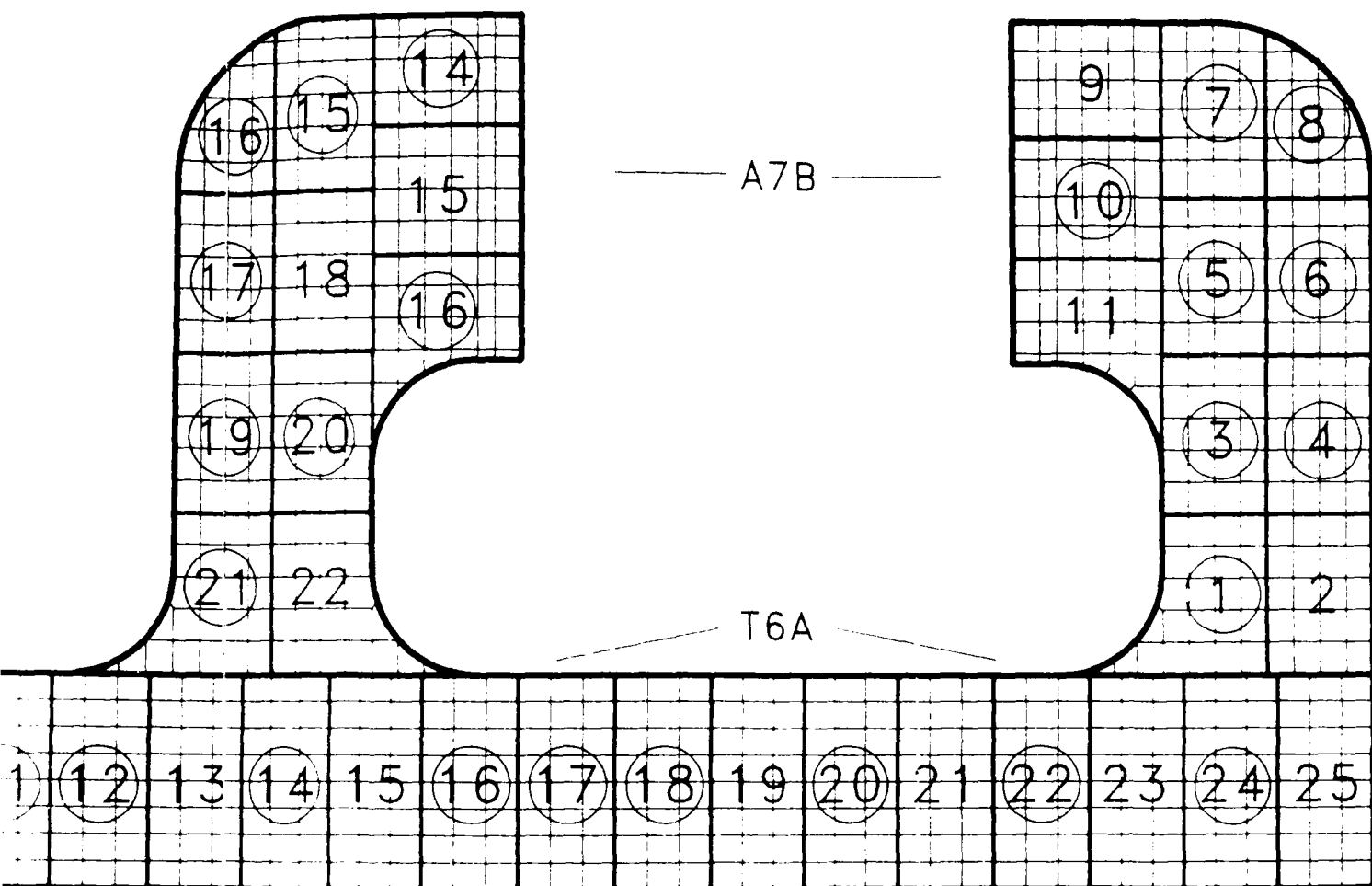


Figure 5. Sample unit layout, the hangar access taxiway



the hangar access taxiway (feature T6A) and hangar apron (feature A7B)

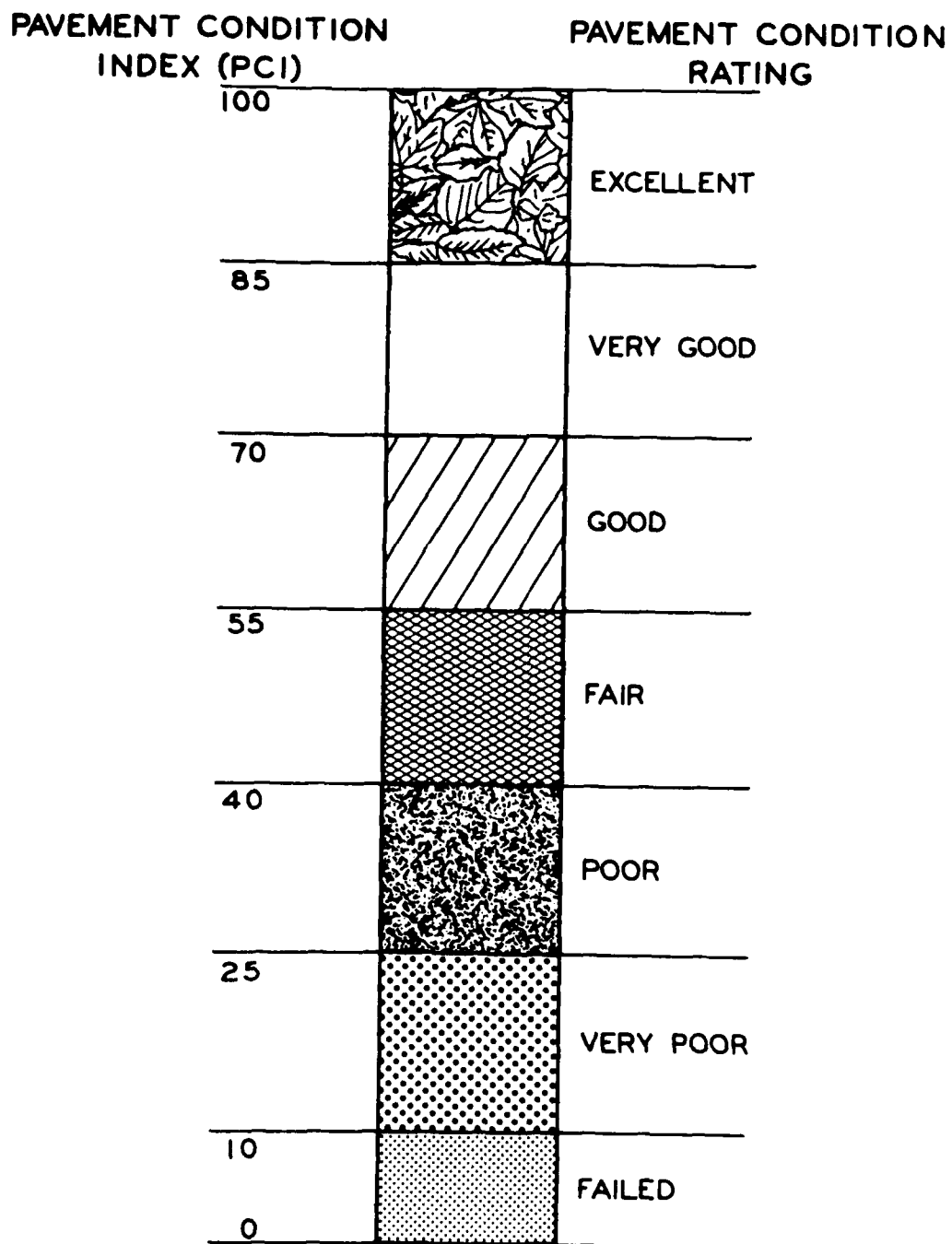


Figure 6. Scale for pavement condition ratings

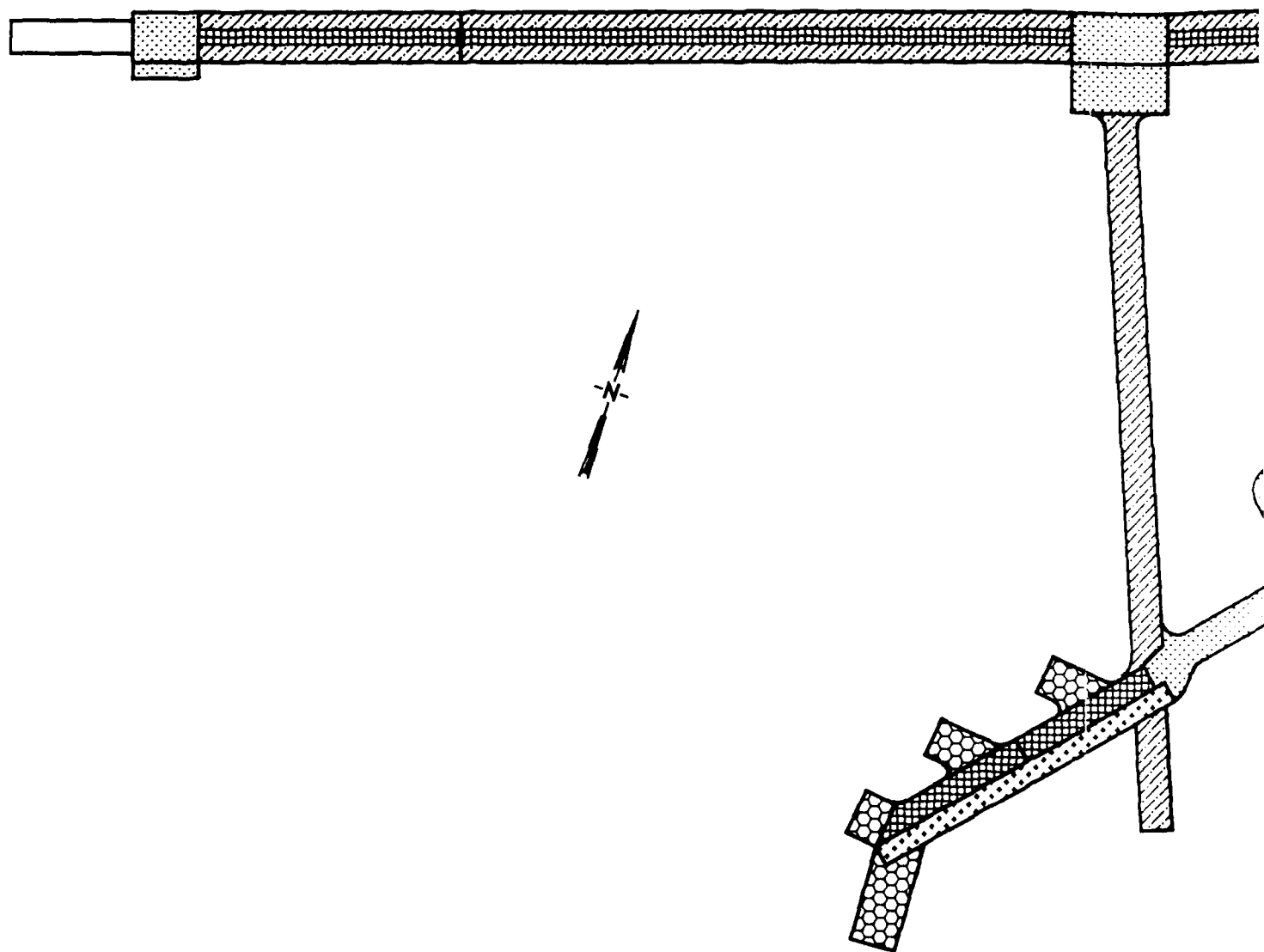
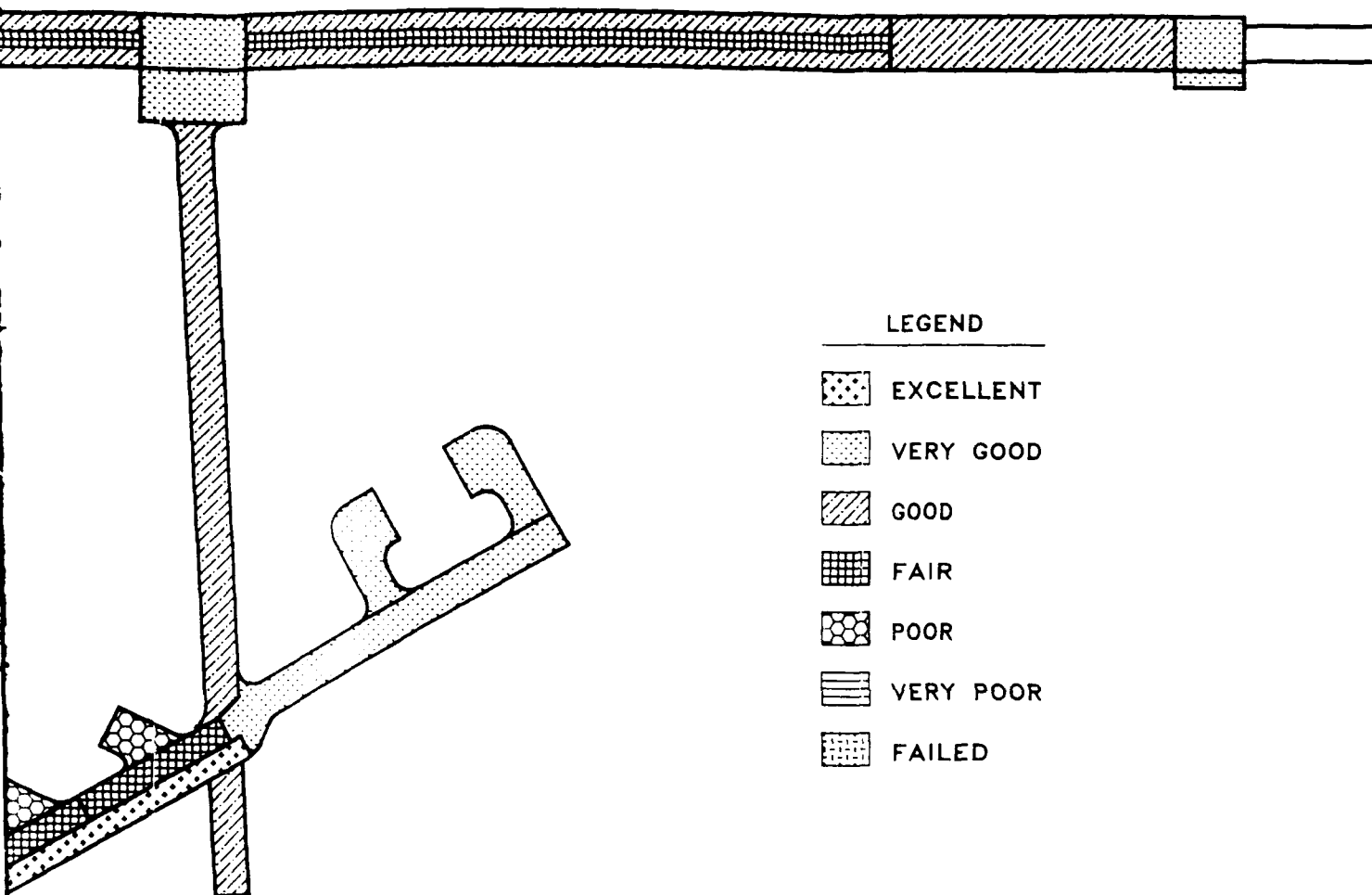


Figure 7. Pavement condition ratio



Pavement condition ratings of North Base

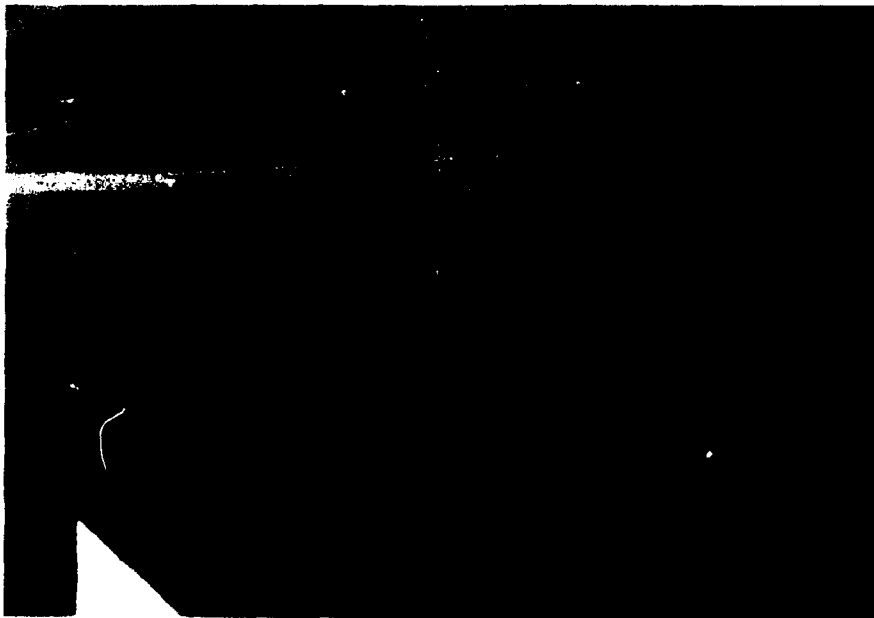


Photo 1. Medium-severity alligator cracking, Runway 6-24 (R3C)



Photo 2. Low-severity alligator cracking, Runway 6-24 (R3C)

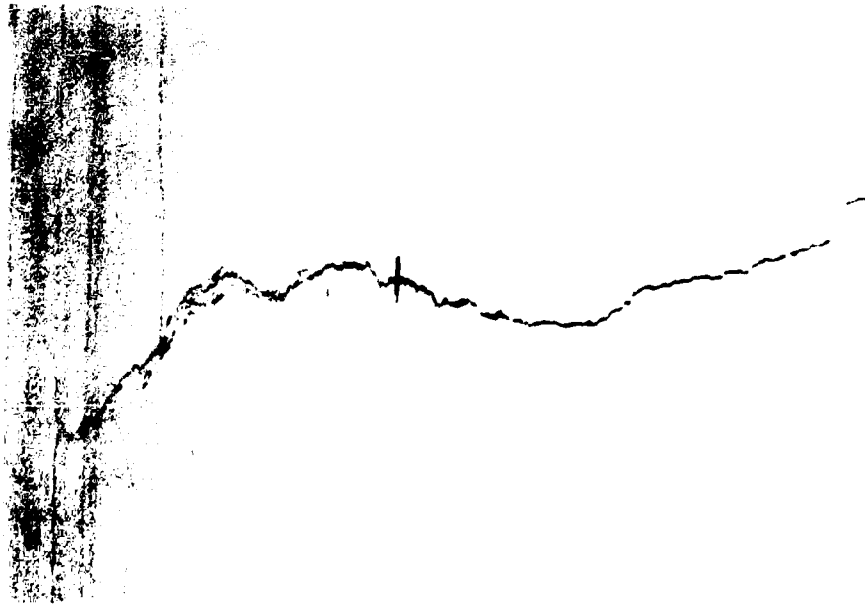


Photo 3. Medium-severity transverse  
crack, Runway 6-24 (R3C)



Photo 4. High-severity corner breaks, apron access taxiway  
(T3A)

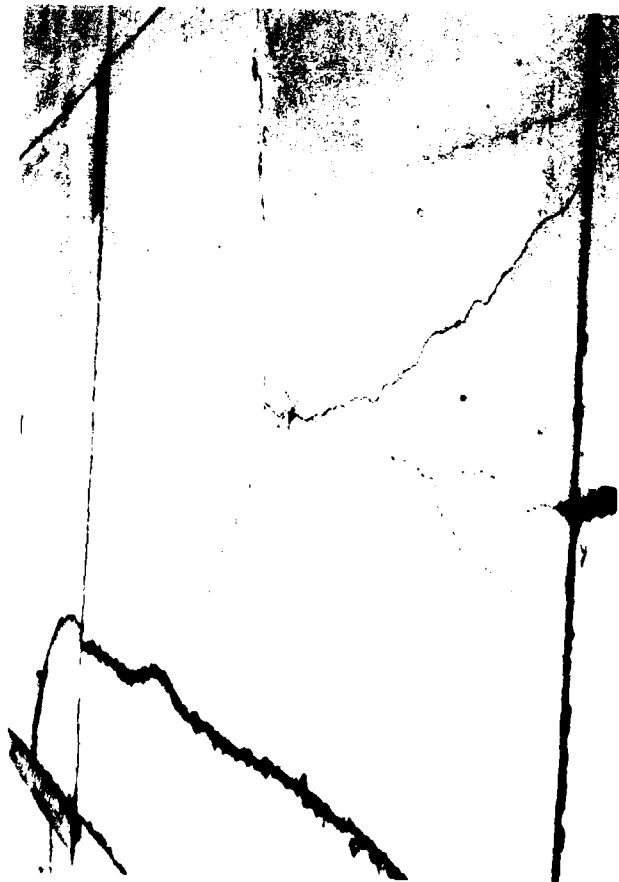


Photo 5. High-severity shattered slab, apron access taxiway  
(T4A)

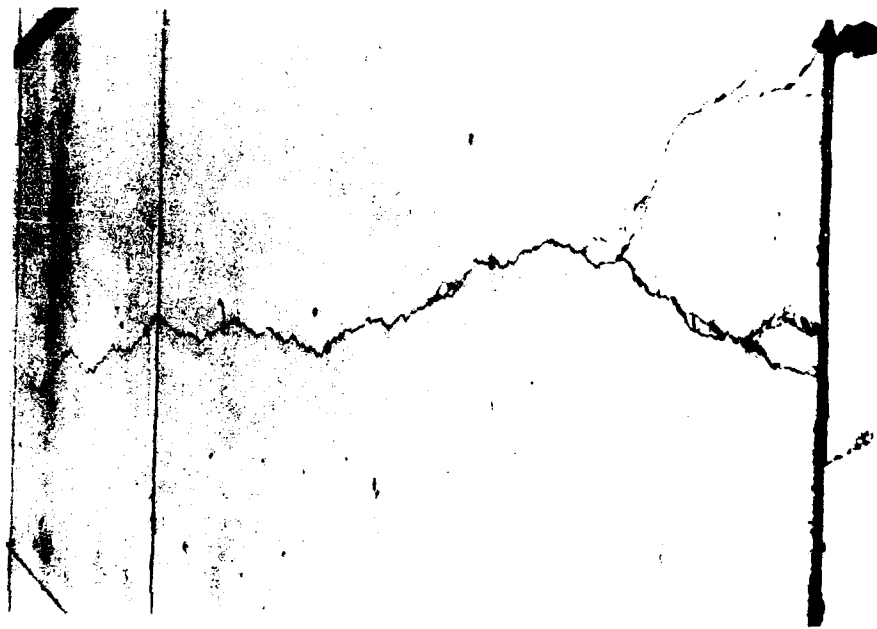


Photo 6. Medium-severity linear crack,  
apron access taxiway (T4A)