



ARA-ES-00-0335

AIRFIELD ENGINEERING ASSESSMENT AND PAVEMENT CONDITION SURVEY

EXECUTIVE SUMMARY

KEESLER AIR FORCE BASE, MISSISSIPPI

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April 2001

Final Report

Contract No. F08637-98-C-6001
Supplemental Support Group Task: 22.00.41

Prepared for **Air Force Civil Engineering Support Agency**
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EXECUTIVE SUMMARY

ERES Consultants, a Division of Applied Research Associates, Inc. performed the pavement condition survey for Keesler Air Force Base (KAFB), Mississippi, in February 2001.

The primary purpose of the survey was to:

- Conduct an airfield pavement Engineering Assessment (EA) of both rigid and flexible pavements and use the MicroPAVER pavement management system to identify maintenance and repair (M&R) requirements and conduct cost planning.

The objectives of the pavement condition survey were to:

- Obtain and record important pavement data to determine the present condition of the airfield pavements.
- Establish a pavement management database by entering the condition survey data into the MicroPAVER 4.2 program and provide the base civil engineer with the database for use in making airfield pavement management decisions.
- Provide input to determine the EA rating of the airfield pavement’s ability to support mission aircraft.
- Develop a 5-year work plan for M&R cost planning for the airfield pavements.

The basic elements of the EA assessment are Pavement Condition Index (PCI), foreign object damage (FOD) potential, structural capability in terms of the Aircraft Classification Number/Pavement Classification Number (ACN/PCN) ratio, and skid/hydroplane potential. EA ratings of “Adequate,” “Degraded,” or “Unsatisfactory” are assigned to each airfield feature based on criteria in the Statement of Work.

Table 1 provides a summary of the EA results for KAFB.

Table 1 Airfield EA Rating Summary, KAFB						
Facility	Pavement Total Area, ft²	Area Weighted Ratings				EA Rating
		Area Weighted PCI	FOD Potential (Area Weighted)	Skid Hydroplaning Potential	Structural Deficiency (Area Weighted ACN/PCN)	
Runway 03/21	846,090	70 (Low)	Moderate	Moderate	Low	Degraded
Overruns	301,148	79 (Low)	Moderate	Low	Low	Degraded
Taxiways	699,101	72 (Low)	Moderate	N/A	Low	Degraded
Aprons	1,999,861	63 (Mod)	Moderate	N/A	Moderate	Degraded
Shoulders	47,975	56 (Mod)	N/A	N/A	N/A	Degraded
Overall	3,894,174	67 (Mod)	Moderate	N/A	Moderate	Degraded

The results of the pavement condition survey at KAFB revealed the following:

Runway 03/21. The runway has a total area of 846,090, sq. ft. and an area weighted PCI of 70. The pavement condition survey indicates that 34% of the runway pavement has a PCI greater than 70, 36% has a PCI between 55 and 69, and 30% has a PCI of less than 55. The EA rating is Degraded due to moderate FOD potential and moderate skid/hydroplaning potential.

Taxiways. The taxiways have a total area of 699,101 sq. ft. and an area weighted PCI of 72. The pavement condition survey indicates that 59% of the taxiway pavements have a PCI greater than 70, 5% have a PCI between 55 and 69, and 36% have a PCI of less than 55. The EA rating is Degraded due to moderate FOD potential.

As indicated in Table 2, Taxiway “D” has an EA rating of unsatisfactory. The unsatisfactory EA rating is due to the ACN/PCN being greater than 1.50. In Tables 3 and 4 no M&R costs are indicated for Taxiway “D” M&R due to the PCI being greater than the critical PCI of 55; however, further analysis of the requirements to upgrade the structural deficiency may be warranted.

Aprons. The aprons have a total area of 1,999,861 sq. ft. and an area weighted PCI of 63. The pavement condition survey indicates that 59% of the apron pavements have a PCI of greater than 70, 3% have a PCI between 55 and 69, and 38% have a PCI less than 55. The EA rating is Degraded due to moderate FOD potential and moderate structural deficiency.

Shoulders. The shoulders have a total area of 47,975 sq. ft. and an area weighted PCI of 56. The pavement condition survey indicates that 100% of the shoulder pavements have a PCI between 40 and 65. The EA rating is Degraded due to moderate PCI deficiency.

Overruns. The overruns have a total area of 301,148 sq. ft. and an area weighted PCI of 79. The pavement condition survey indicates that 60% of the shoulder pavements have a PCI of greater than 70, 20% has a PCI between 55 and 69, and 20% have a PCI less than 55. The EA rating is Degraded due to moderate FOD potential.

During take-off operations, thresholds are displaced on the runway ends such that pavements that would normally be considered as overruns are trafficked. For the reason, the overruns are considered to be primary pavements and assigned a critical PCI of 70.

Overall Airfield. The overall airfield has a total area of 3,894,174 sq. ft. and an area weighted PCI (excluding shoulders) of 67. The pavement condition survey indicates that 52% of the airfield pavements have a PCI greater than 70, 12% have a PCI between 55 and 69, and 35% have a PCI less than 55. The EA rating is Degraded due to moderate FOD potential and moderate structural deficiency.

The area weighted averages of PCI, ACN/PCN, and FOD potential of the feature/sections of a facility are combined to produce the EA rating for each facility. The EA for the airfield facilities is shown in Table 2.

Table 2 Engineering Assessment Rating by Facilities KAFB					
Airfield Facility	Area Weighted PCI (Deficiency Rating)	FOD Potential (Area Weighted)	Skid Hydroplaning Potential	Structural Deficiency (Area Weighted ACN/PCN)	Engineering Assessment
Runway					
Runway 03/21	70 (Low)	Moderate	Moderate	Low	Degraded
Overruns					
Overruns	79 (Low)	Moderate	Low	Low	Degraded
Taxiways					
Taxiways Alpha, Bravo and Foxtrot	83 (Low)	Moderate	N/A	Low	Degraded
Taxiway Charlie	55 (Mod)	Moderate	N/A	High	Unsatisfactory
Taxiway Delta	64 (Mod)	Moderate	N/A	High	Unsatisfactory
Taxiway Echo	51 (High)	Moderate	N/A	High	Unsatisfactory
Overflow Apron Taxiway	25 (High)	Moderate	N/A	High	Unsatisfactory
Taxiway 1	35 (High)	Moderate	N/A	No Data	Unsatisfactory
Aprons					
Warm-up Aprons	98 (Low)	Low	N/A	Low	Adequate
Overflow Apron	26 (High)	Moderate	N/A	High	Unsatisfactory
Aircraft Parking Pads	97 (Low)	Low	N/A	Low	Adequate
Parking Apron 2	63 (Mod)	Moderate	N/A	Low	Degraded
Taxi-lanes Aprons 1,2 & Maintenance	79 (Low)	Moderate	N/A	Low	Degraded
Parking Apron 1 & Maintenance Apron	46 (High)	Moderate	N/A	High	Unsatisfactory
Nose Docks	62 (Mod)	Low	N/A	No Data	Degraded
Additional Parking Apron 2	84 (Low)	Moderate	N/A	Low	Degraded
Wash Rack	31 (High)	High	N/A	High	Unsatisfactory
Parking Apron 3	73 (Low)	Moderate	N/A	Moderate	Degraded
Hangar Access	14 (High)	Moderate	N/A	High	Unsatisfactory
Hangar Apron (A25B)	78 (Low)	High	N/A	Moderate	Unsatisfactory
Alpha Apron	67 (Mod)	Moderate	N/A	High	Unsatisfactory
Shoulders					
Warm-up Aprons	56 (Mod)	N/A	N/A	N/A	Degraded
(N/A= Not Applicable)					

One of the most effective ways of assuring quality pavements capable of supporting mission requirements is a comprehensive maintenance program. A maintenance program based on scheduled maintenance activities, materials, and suitable equipment can be accomplished by in-house maintenance

forces or contracts. A preventive maintenance program will extend pavement life and reduce extensive repairs at a later date.

M&R recommendations for the KAFB mission essential airfield facilities and M&R costs are summarized in Table 3. This table gives cost recommendations to maintain the PCI at or above the critical PCI. The M&R costs are taken from MicroPAVER outputs and are based on the current PCI levels and unlimited funds. With unlimited funds available, Major M&R and Preventive M&R are selected, no Stopgap M&R is selected for this alternative. Figures 1 and 2 are color-coded presentations of the PCI results and EA ratings of the KAFB airfield pavements.

Table 4 illustrates the case where funds are not available to accomplish the required Major M&R and only Stopgap and Preventive M&R are to be accomplished. There is no improvement in the PCI under this alternative.

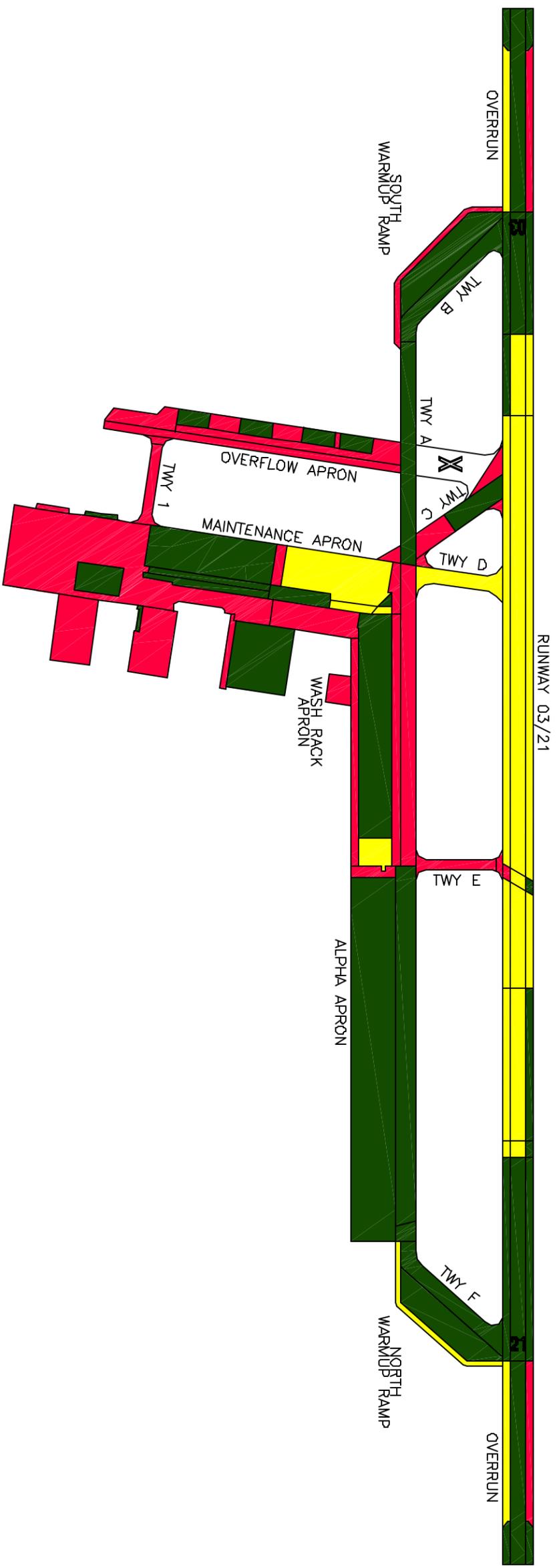
Table 3 M&R Guide for KAFB Airfield Pavements (Unlimited Funding)						
Facility	Total Area, sq. ft	M&R Costs		Total Funds	* PCI	
		Preventive	Major		Before	After
Runway 03/21						
Runway 03/21	846,090	\$14,620	\$1,863,853	\$1,878,473	71	95
Overruns						
Overruns	301,148	\$5,173	\$96,672	\$102,085	80	98
Taxiways						
Alpha South, Bravo, Alpha North and Foxtrot	493,422	\$12,612	\$472,855	\$485,467	85	94
Taxiway Charlie	68,914	0	\$189,677	\$189,677	41	96
Taxiway Delta	33,985	0	0	0	64	64
Taxiway Echo	23,585	0	\$90,240	\$90,240	39	100
Overflow Apron Taxiway	55,128	0	\$314,097	\$314,097	24	100
Taxiway 1	24,067	0	\$119,558	\$119,558	30	100
Aprons						
North and South Warm-up Aprons	151,450	\$4,539	0	\$4,539	98	98
Overflow Apron	102,525	0	\$579,121	\$579,121	25	100
Aircraft parking Pads	48,000	\$9,249	0	\$9,249	97	97
Parking Apron 2 and Alpha Apron south	470,430	\$45,052	\$858,238	\$903,290	50	93
Taxi-lanes 1, 2 and Maintenance Apron	55,970	\$8,088	\$33,285	\$41,345	75	92
Marking Apron 1 and Maintenance Apron	360,050	\$1,157	\$1,451,827	\$1,483,023	73	100
Nose Dock Apron	7,872	\$498	\$16,420	\$16,918	62	89
Additional Parking apron 2	104,792	\$13,944	\$54,224	\$68,167	61	95
Wash-rack	16,108	0	\$83,973	\$83,973	31	100
Parking Apron 3	404,393	0	\$915,970	\$915,970	55	100
Hangar Access	129,778	\$172	\$827,293	\$827,465	35	94
Hangar Apron (A25B)	126,094	\$26,037	0	\$26,037	78	78
Alpha Apron	22,400	0	\$59,856	\$59,856	67	100
Shoulders						
North and South Warm-up Apron	47,975	\$7,480	0	\$7,480	56	56
Total Airfield Pavements						
Runway 03/21	846,090	\$14,620	\$1,863,853	\$1,878,473	71	95
Overruns	301,148	\$5,412	\$96,672	\$102,085	80	98
Taxiways	699,101	\$12,612	\$1,186,427	\$1,199,040	55	95
Aprons	1,999,861	\$108,829	\$4,021,145	\$5,018,773	59	95
Shoulders	47,975	\$7,480	0	\$7,480	56	56
All Pavements	3,894,174	\$148,953	\$7,168,097	\$8,205,851	64	95
(* Before and After PCI Values are from MicroPAVER Work Plan)						

Note: Costs may vary due to differences in local unit costs, in-house maintenance/repair capability, contract availability, and job size.

Table 4 M&R Guide for KAFB Airfield Pavements (Funds Limited to Stopgap & Preventive)						
Facility	Total Area, sq. ft	M&R Costs		Total Funds	* PCI	
		Stopgap	Preventive		Before	After
Runway						
Runway 03/21	846,090	\$45,491	\$14,620	\$60,111	71	71
Overruns						
Overruns	301,148	\$11,408	5,413	\$16,821	80	80
Taxiways						
Alpha South, Bravo, Alpha North and Foxtrot	493,422	\$4,825	\$12,612	\$17,437	85	85
Taxiway Charlie	68,914	\$29,240	0	\$29,240	41	41
Taxiway Delta	33,985	0	0	0	64	64
Taxiway Echo	23,585	\$2,216	0	\$2,216	39	39
Overflow Apron Taxiway	55,128	\$42,989	0	\$42,989	24	24
Taxiway 1	24,067	\$6,819	0	\$6,819	30	30
Aprons						
North and South Warm-up Aprons	151,450	0	\$4,359	\$34,359	98	98
Overflow Apron	102,525	\$80,315	0	\$80,315	25	26
Aircraft parking Pads	48,000	0	\$9,249	9,249	97	97
Parking Apron 2 and Alpha Apron south	470,430	\$53,780	\$45,052	\$98,832	50	50
Taxi-lanes 1, 2 and Maintenance Apron	55,970	\$1,197	\$8,061	\$9,258	75	75
Marking Apron 1 and Maintenance Apron	360,050	\$166,595	\$5,625	\$172,220	73	73
Nose Dock Apron	7,872	0	\$498	\$498	62	62
Additional Parking apron 2	104,792	\$10,707	\$13,944	\$24,650	61	61
Wash-rack	16,108	\$16,277	0	\$16,277	31	31
Parking Apron 3	404,393	\$4,131	\$77,945	\$82,076	55	55
Hangar Access	129,778	\$92,016	\$172	\$92,188	35	35
Hangar Apron (A25B)	126,094	0	\$26,037	\$26,037	78	78
Alpha Apron	22,400	\$4,121	0	\$4,120	67	67
Shoulders						
North and South Warm-up Apron	47,975	0	\$7,480	\$7,480	56	56
Total Airfield Pavements						
Runway 03/21	846,090	\$45,491	\$14,620	\$60,111	71	71
Overruns	301,148	\$11,409	\$5,412	\$16,821	80	80
Taxiways	699,101	\$86,089	\$12,612	\$98,701	55	55
Aprons	1,999,861	\$429,138	\$190,942	\$620,080	59	59
Shoulders	47,975	0	\$7,480	\$7,480	56	56
All Pavements	3,894,174	\$572,127	\$231,067	\$803,193	64	64
(* Before and After PCI Values are from MicroPAVER Work Plan)						

Note: Costs may vary due to differences in local unit costs, in-house maintenance/repair capability, contract availability, and job size.

PAVEMENT CONDITION INDEX (PCI)	
	70 - 100
	55 - 69
	0 - 54
	NOT EVALUATED



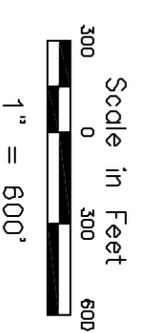
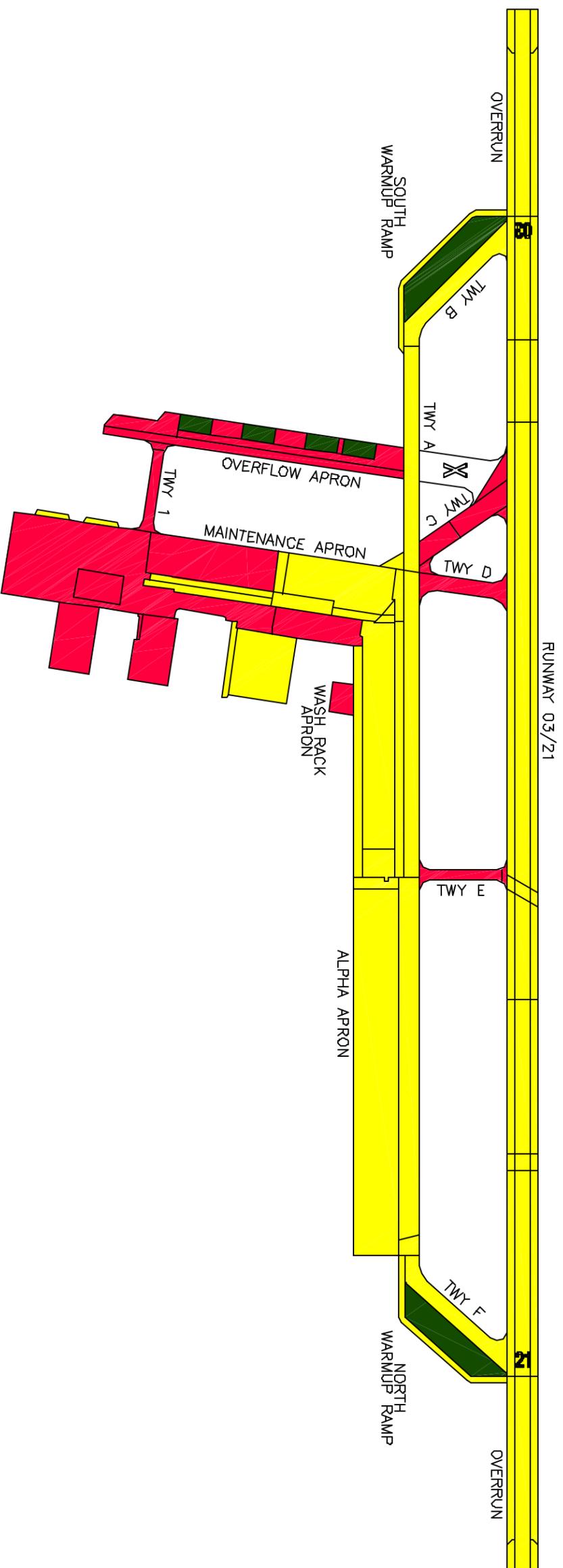
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Pavement Condition Index
Keesler Air Force Base

ENGINEER:	DRAWN BY:	DATE:	SHEET NO.:
J. HALL	GH, JC, JK	02/15/01	1 of 2

Figure 1. PCI Summary by Feature for Keesler Air Force Base Airfield Pavements.

ENGINEERING ASSESSMENT	
	ADEQUATE
	DEGRADED
	UNSATISFACTORY
	NOT EVALUATED



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Engineering Assessment Rating
Keesler Air Force Base

ENGINEER:	DRAWN BY:	DATE:	SHEET NO.:
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Figure 2. Engineering Assessment Rating by Facility for Keesler Air Force Base Airfield Pavements.