Pavement Condition Report

Indianapolis - Eagle Creek Airpark

Project 1480370

Prepared for:
Indiana Department of Transportation
Office of Aviation
100 N. Senate Ave.
Indianapolis, IN 46204
Indiana Department of Transportation

Prepared by:
Applied Research Associates, Inc.
6314 Odana Rd.
Madison, WI 53719
(608) 274-6409

January 2014

Executive Summary

Background

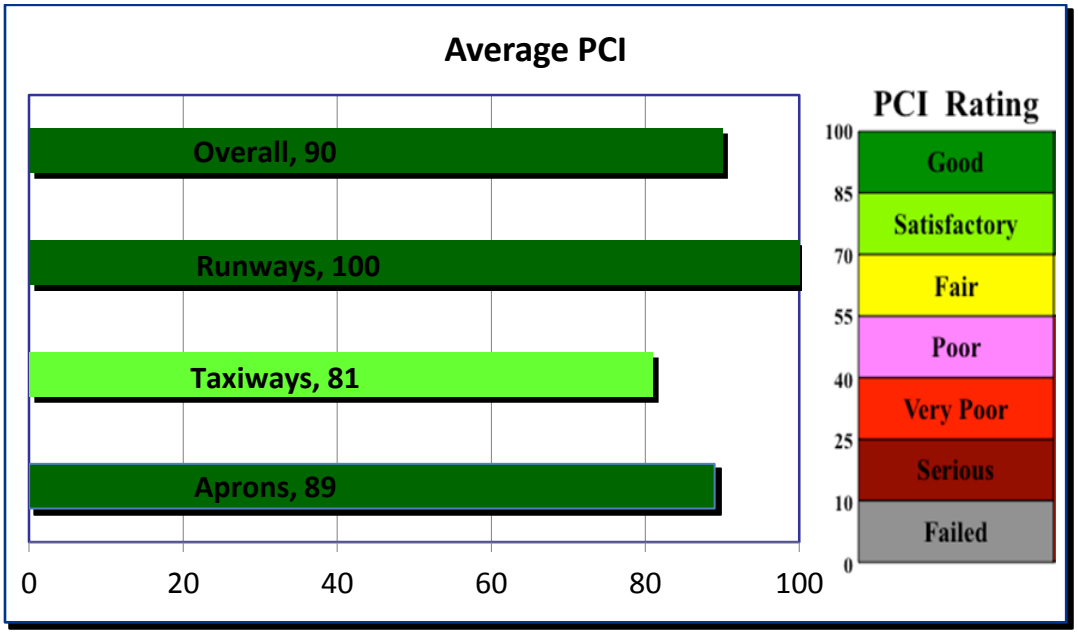
Since 1995, airports have been required to implement a pavement maintenance-management program to receive funding for any project constructed using Federal money. To assist individual airports in meeting this requirement and help improve airport pavement conditions statewide, the Indiana Department of Transportation, Office of Aviation contracted with Applied Research Associates, Inc. to provide pavement evaluation surveys at local airports. This report documents pavement condition at Eagle Creek Airpark in September 2013.

A primary objective of the pavement management program is to determine maintenance and rehabilitation needs by comparing pavement condition to a standardized benchmark called the minimum service level (MSL), defined as the minimum pavement condition acceptable in managing Indiana's airfield pavements. The benchmark MSL values used to trigger rehabilitation are shown below.

Runway	Taxiway	Apron
60	55	55

Pavement Condition

The overall Pavement Condition Index (PCI) for the airfield pavements was 90. Runways had an average inspected PCI of 100 and were above the desired MSL of 60. Taxiways had an average inspected PCI of 81, and ramps had an average inspected PCI of 89.



Capital Improvement Program

The table below provides a summary of the projected pavement rehabilitation needs for the next 5 years of the capital improvement program, starting in 2013. The estimated cost for the rehabilitation actions that provide the greatest increase in pavement service life is approximately $280,000 in 2013 dollars. If no action is taken, the overall PCI is projected to drop to 82 by 2017.

Project Year	Calendar Year	Amount
Year 1	2013	$55,197
Year 2	2014	-
Year 3	2015	$188,901
Year 4	2016	$36,175
Year 5	2017	-
	5-Year Total	**$ 280,273**

Maintenance

Analysis of potential maintenance projects identified approximately 940 square feet of patching needs and approximately 6,100 linear feet of crack sealing and crack repair needs, at an estimated total cost of approximately $19,000.

Specific recommendations to help prioritize airfield maintenance are found in chapter 4 of this report. A summary of all identified maintenance needs is shown in the table below and in the figure on the following page.

Work Item	Quantity	Unit	Cost
AC PATCH	34	SF	$299
AC RESTORATIVE CRACK REPAIR	3,671	LF	$4,522
AC SUSTAINING CRACK REPAIR	2,450	LF	$2,120
PCC SLAB REPAIR/REPLACEMENT	807	LF	$10,079
PCC PATCHING	96	SF	$1,606
Total:			**$18,626**

AC = asphalt concrete; PCC = portland cement concrete; S.F. = square feet; L.F. = linear feet

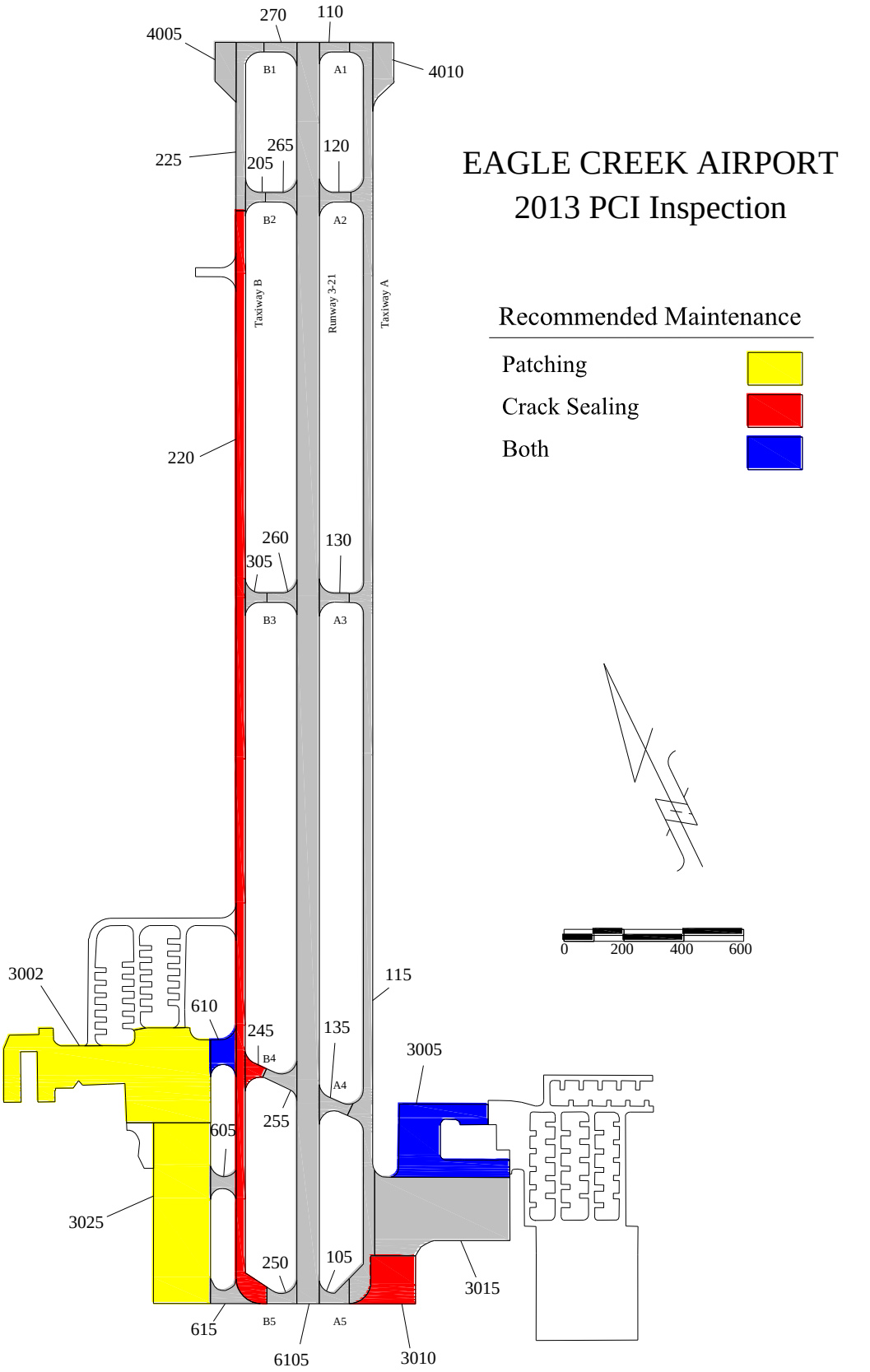

EAGLE CREEK AIRPORT
2013 PCI Inspection
Recommended Maintenance
Patching
Crack Sealing
Both
Taxiway B
Runway 3-21
Taxiway A
B1
A1
B2
A2
B3
A3
B4
A4
B5
A5
4005
270
110
4010
225
265
205
120
220
260
305
130
115
3002
610
245
135
3005
605
255
3025
250
105
3015
615
6105
3010
0
200
400
600

Table of Contents

Table of Figures

Table of Tables

GLOSSARY OF ABBREVIATIONS

AC	-	asphalt concrete
ACC	-	asphalt overlay on existing asphalt
APC	-	asphalt overlay on existing concrete
APMS	-	airport pavement management system
ARA	-	Applied Research Associates, Inc.
CADD	-	computer-aided design and drafting
CIP	-	capital improvement program
FAA	-	Federal Aviation Administration
FOD	-	foreign object damage
GIS	-	geographic information system
INDOT	-	Indiana Department of Transportation
L&T	-	longitudinal and transverse
LTD	-	longitudinal, transverse, and diagonal
M&R	-	maintenance and rehabilitation
MSL	-	minimum service level
PCC	-	portland cement concrete
PCI	-	Pavement Condition Index
PCN	-	Pavement Classification Number
PDF	-	portable electronic document

1. Introduction

1.1 Objective and Scope

The Indiana Department of Transportation, Office of Aviation (INDOT) retained Applied Research Associates, Inc., (ARA) to provide airfield pavement inspection, pavement evaluation, and pavement management services for Indiana's statewide network of airfield pavements. The pavement evaluations documented in this report were performed under purchase order number 14803170.

A primary objective of INDOT's ongoing pavement evaluation and management program is to determine maintenance and rehabilitation (M&R) needs by comparing the Pavement Condition Index (PCI) to a standardized benchmark called the minimum service level (MSL). The MSL is defined as the minimum pavement condition acceptable in managing INDOT's airside pavement. The benchmark MSL values used to trigger rehabilitation vary by airport classification and are shown in Table 1-1.

Table 1-1. Minimum Service Levels

Facility	Primary	Commercial Service	Large GA > 3600'Rwy	Large GA < 3600'Rwy
Runway	70	65	60	55
Taxiway	65	60	55	50
Apron	65	60	55	50

Additional goals of this project were to implement a software program to manage the pavement network, develop performance curves based on historical rates of pavement deterioration, forecast future pavement conditions, identify and recommend specific M&R actions to address the root cause of the documented pavement distress, and estimate the cost and ideal timing of the recommend M&R. The following tasks were performed in support of the project goals:

- Review record documents
- Define the pavement network
- Conduct an airfield condition survey
- Update the AIRPAV database & software
- Develop a 5-year airfield M&R work plan
- Report findings to INDOT

1.2 Description of Tasks Performed

1.2.1 Records Review

A detailed records review was performed to determine the airport's construction history and the as-built cross section for each pavement feature. Plan sets for recent projects were provided to ARA in computer-aided design and drafting (CADD) format. Older plans sets were provided as hard copies or in portable electronic document (PDF) format.

1.2.2 Define Pavement Network

Prior to the field survey, a pavement network map was developed using available aerial photography and construction plans. The map was divided into facilities, features, and sample units. A facility is defined as a complete area of the airfield that is used for a particular type of operation. Facilities are typically named for complete functional elements of pavement, such as Runway 11-29, Taxiway A, or North Terminal Apron. After facilities are defined, they are divided into features based on pavement type, construction, structure, and usage. Note that the terms branch and section may be used interchangeably with facility and feature throughout this report.

Features are divided into sample units as prescribed by ASTM D5340-12, *Standard Test Method for Airport Pavement Condition Index Surveys*. A sample unit is a subdivision of a section used exclusively to aid in the inspection process and reduce the effort needed to determine distress quantities and the PCI. The specified sample unit size for an asphalt concrete (AC) pavement is 5,000 ft² ± 2,000 ft². Sample units on portland cement concrete (PCC) pavements contain 20 ± 8 slabs.

To allow users to search, sort, and identify airport pavement quickly, a numbering system is used in conjunction with the facility, feature, and sample unit convention. The format starts with facility, then feature, and finally identifies the sample unit. The number 1605.300 is parsed as an example in Figure 1-1. Most pavement references in this report are presented in this format.

Using statistical sampling methods, the PCI procedure provides a high confidence level in evaluating overall pavement condition while sampling only a portion of the pavement surface. Figure 1-2 shows the network-level inspection density used on this project. Where appropriate, "additional sample units" were identified and inspected to record pavement areas with distress patterns not representative of the overall pavement condition. The unique distress types documented in additional sample units are not extrapolated across the entire feature.

As the surveyors inspected the pavement, they were mindful to ensure that the pre-survey airfield map depicted the actual pavement, otherwise known as a "ground-truth" survey. Noticeable differences between what was present in the field and what was displayed on the maps were adjusted by a CADD technician.

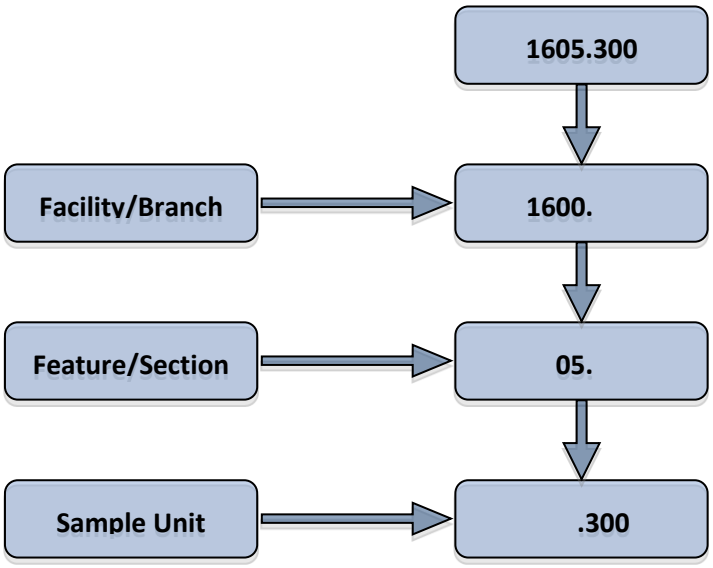


Figure 1-1. Pavement Numbering System

Table 1-2. Inspection Density

Sample Unit in Feature	Inspected Sample Units
1-2	ALL
3-4	2
5-7	3
8-10	4
11-14	5
15-19	6
20-25	7
26-30	8
31-37	9
38-45	10
46-55	11
56-80	12
> 80	15%

1.2.3 Conduct Airfield Condition Survey

The pavement condition surveys were performed in accordance with ASTM D5340-12. The procedure is based on the identification and measurement of visible distress at the pavement surface. Each PCI distress will deduct from the pavement's perfect condition of 100. Using pavement management software (or curves provided in ASTM D5340-12), a deduct value is determined for each combination of distress type, severity, and measured quantity. The PCI value is then determined from the unique combination of these variables.

A primary benefit of the PCI procedure is the ability to perform objective evaluations and compare pavement condition with an easy-to-understand numerical rating. Because the combined impact of multiple distresses is not cumulative, ASTM D5340-12 provides an additional family of curves to adjust for multiple distresses. The PCI is determined by applying the individual deduct value for each distress type along with any required correction factors to account for multiple distress types.

Figure 1-2 shows the relationship between PCI values, descriptive ratings, and typical repair actions. Generally, pavement maintenance is most cost-effective when the pavement is still in satisfactory condition. Rehabilitation, such as an asphalt mill and inlay, is typically performed for pavements with PCI values between 55 and 70. When the PCI value drops below 55, a mill an inlay may not provide the desired performance and complete reconstruction often becomes the most cost-effective means of repairing the pavement.

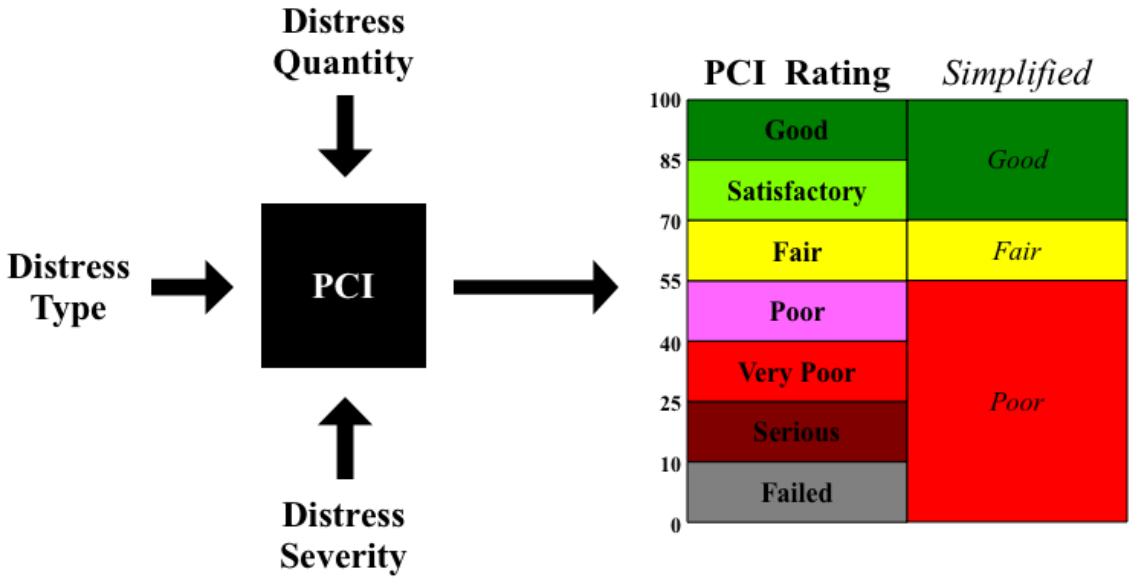


Figure 1-2. PCI Value and Descriptive Rating

1.2.4 Update AIRPAV Database & Software

The network definition, construction history, and data from the survey were entered into the AIRPAV pavement management system (APMS) software. After all data were entered, family curves were developed to model the change in pavement condition over time. These family curves are used to estimate future pavement condition. Typically, several curves are developed, with separate curves defined for different pavement surface types, such as AC, PCC, asphalt overlay on existing asphalt (ACC), and asphalt overlay on existing concrete (APC). The latest version of AIRPAV containing all survey data, deterioration curves, M&R policies, budgets, and construction history, was provided to INDOT on CD-ROM.

1.2.5 Develop 5-Year Airfield M&R Work Plans

A 5-year capital improvement program (CIP) was developed showing the year that each pavement feature was expected to fall below the MSL. The 5-year plan detailed in chapter 3 shows rehabilitation alternatives for each feature based on the PCI and the individual distress types observed during the pavement evaluation. The timing of each project is shown as the year that the PCI falls below the MSL and does not consider other important factors. Using reports like this for each airport in the State, INDOT engineers and planners develop a final 5-year statewide CIP plan that balances the sometimes conflicting priorities of pavement condition, operational constraints, construction staging considerations, and available funding.

1.2.6 Report Finding to INDOT

This report includes background information, PCI results and recommendations, and M&R budget scenarios. Photographs depicting typical pavement conditions observed during the survey are included in chapter 2. Appendix A contains general information about the AIRPAV pavement management software. Appendix B provides an analysis of each pavement section based on recorded distress. Appendix C contains a summary of general maintenance techniques and best practices. Appendix D provides a detailed summary of the airfield pavement condition. Appendix E describes common airfield distress types, and Appendix F contains exhibits to help the airport owner manage the airfield pavement system.

2. Pavement Condition Evaluation

2.1 Overview

Using statistical sampling methods, approximately 350,000 square feet of airside pavement was surveyed as part of this assessment. The average inspected PCI for all pavements was 90 (Good). The average inspected runways, taxiways, and ramps were as follows: 100 (Good), 81 (Satisfactory), and 89 (Good). Table 2-1 provides a general description of the PCI rating categories, including a simplified rating scale of Good, Fair, and Poor. This table also shows the associated distress levels and general M&R requirements for each rating category.

Table 2-1. Definition and Distribution of PCI Ratings

Simplified PCI Rating	PCI Range	Definition	Pavement Area (ft^2)	Pavement Area (%)
Good	86-100	GOOD: Pavement has minor or no distresses and requires only routine maintenance.	880,384	77
	71-85	SATISFACTORY: Pavement has scattered low-severity distresses that need only routine maintenance.	57,183	5
Fair	56-70	FAIR: Pavement has a combination of generally low- and medium-severity distresses. M&R needs are routine to major in the near future.	165,347	14
Poor	41-55	POOR: Pavement has low-, medium-, and high-severity distresses that probably cause some operational problems. Near-term maintenance and repair needs may range from routine up to a requirement for reconstruction.	38,332	3
	26-40	VERY POOR: Pavement has predominantly medium- and high-severity distresses that cause considerable maintenance and operational problems. Near-term maintenance and repair needs will be intensive in nature.	-	-
	11-25	SERIOUS: Pavement has mainly high-severity distresses that cause operational restrictions; immediate repairs are needed.	-	-
	0-10	FAILED: Pavement deterioration has progressed to the point that safe operations are no longer possible; complete reconstruction is required.	-	-

Six pavement sections had a simplified PCI rating of Fair, indicating maintenance needs may vary from routine to major. Four pavement sections had a simplified PCI rating of Poor, indicating significant maintenance needs up to a requirement for reconstruction.

The pavement within each of the PCI condition categories is shown in Figure 2-1. The inspected PCI is summarized by branch use in Figure 2-2, and the photographs in Figure 2-3 through Figure 2-7 provide examples of the condition categories.

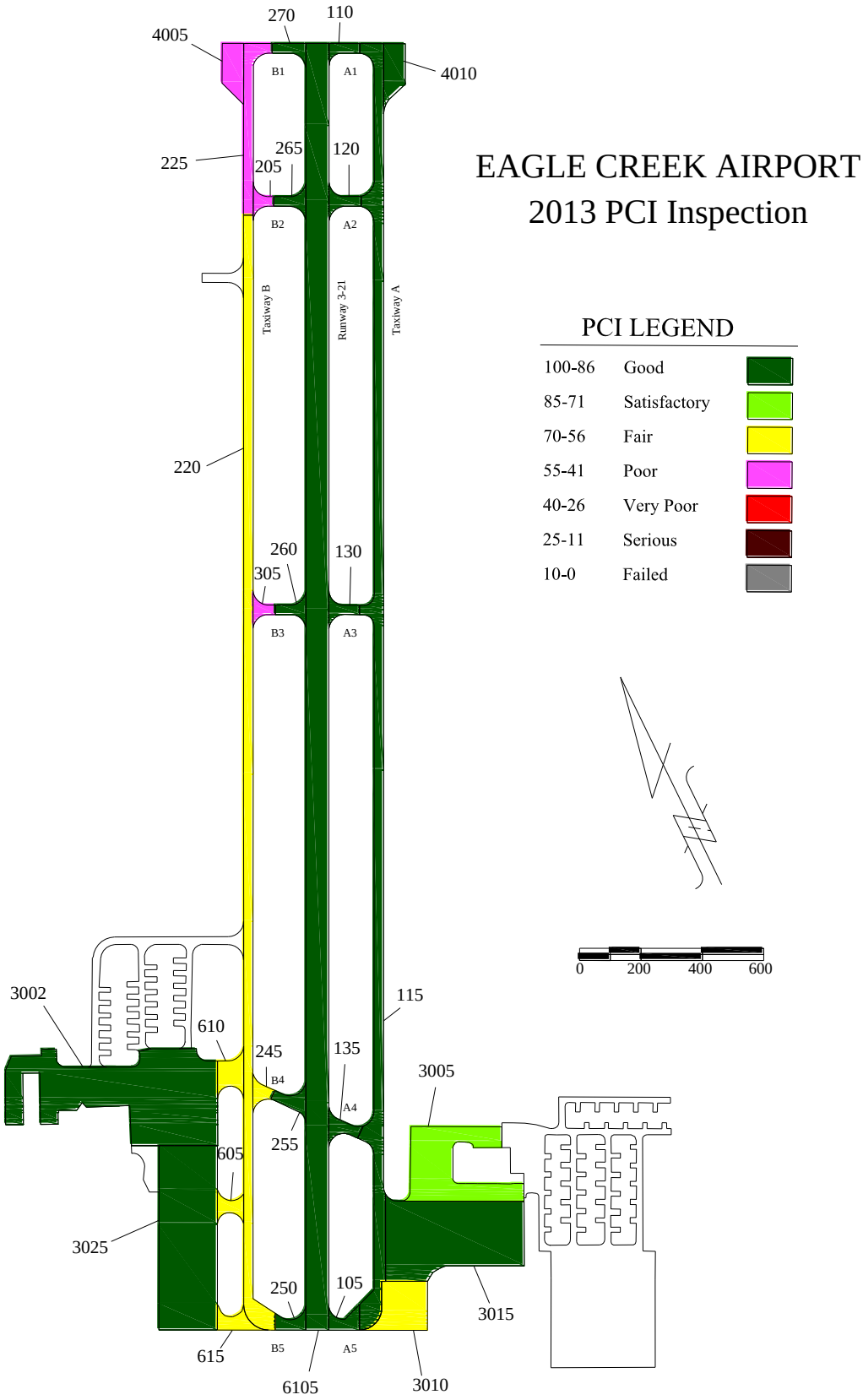


Figure 2-1. Inspected Pavement Condition

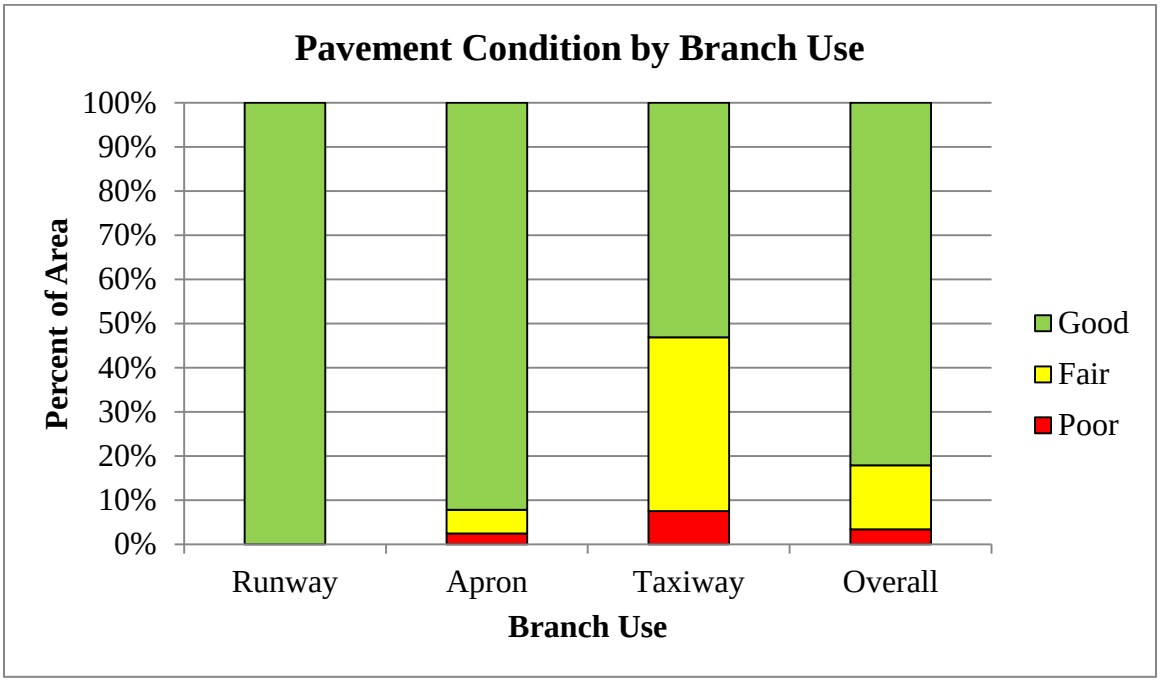


Figure 2-2. Pavement Condition by Branch Use

Figure 2-3. Typical Good AC Pavement (Feature 6105)

Figure 2-4. Typical Fair AC Pavement (Feature 220)

Figure 2-5. Typical Poor AC Pavement (Feature 305)

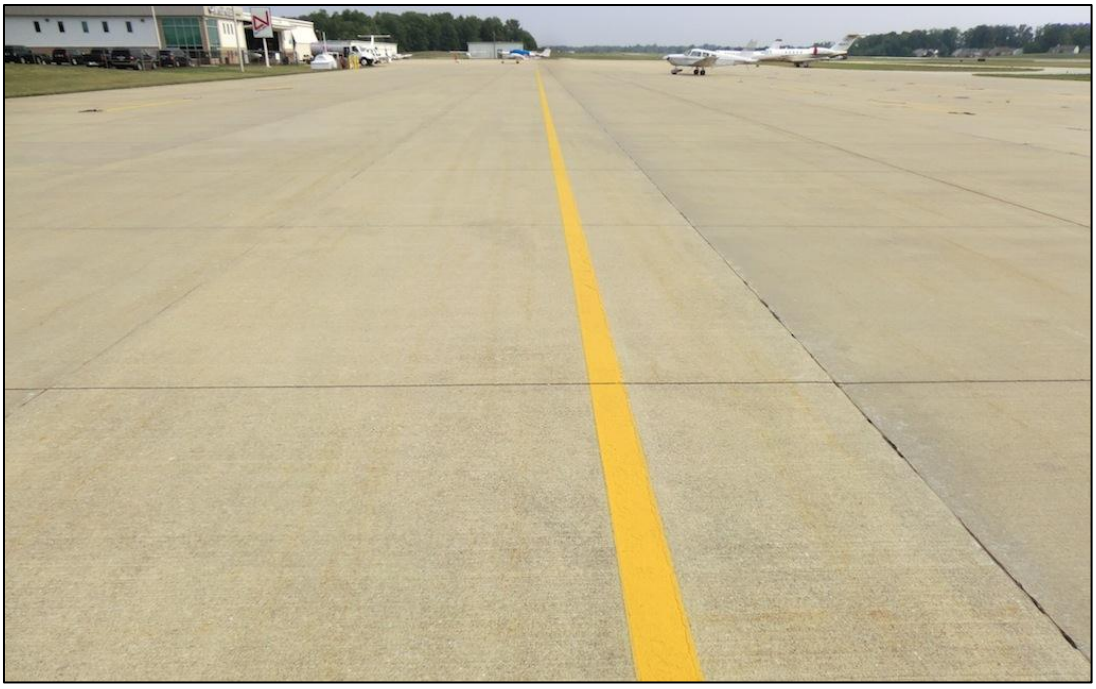


Figure 2-6. Typical Good PCC Pavement (Feature 3025)

Figure 2-7. Typical PCC Maintenance Needs (Feature 3025)

2.2 Distress Types and Frequency

The inspectors surveyed approximately 290,000 ft^2 of AC pavement. The frequency of each distress type is shown in Table 2-2. The most common distress types were longitudinal and transverse (L&T) cracking, ravelling, weathering, and alligator cracking. L&T cracking, ravelling, and weathering are climate-related distresses. Alligator cracking is a load related distress.

Table 2-2. Distress Frequency in AC Pavement

Distress	Sample Units	% Inspected Sample Units
L&T CRACKING	29	39
RAVELING	26	35
WEATHERING	10	13
ALLIGATOR CRACKING	3	4
PATCHING	2	3
RUTTING	2	3
SWELL	2	3

The inspectors surveyed approximately 58,000 ft^2 of PCC pavement. The frequency of each distress type is shown in Table 2-3. The most common distress types were joint seal damage, settlement and spalls.

Table 2-3. Distress Frequency in PCC Pavement

Distress	Sample Units	% Inspected Sample Units	Slabs	% Inspected Slabs
JOINT SEAL DAMAGE	6	33	120	33
SETTLEMENT OR FAULTING	4	22	10	3
CORNER SPALLING	6	33	8	2
ASR	2	11	3	1
LONG/TRANS/DIAG CRACKS	1	6	1	0
PATCHING SMALL	1	6	1	0
SCALING/CRAZING/MAP CRACK	1	6	1	0
SHATTERED SLAB	1	6	1	0
JOINT SPALLING	1	6	1	0

2.3 PCI Summary

The branch and section PCI values are shown below, along with the surface type, area, and last year construction occurred.

Table 2-4. PCI Results

Branch ID	Branch PCI	Section	Surface	Area (sf)	Built	2009 PCI	2013 PCI
100	100	105	AC/AC	5,174	2012	-	100
		110	AC/AC	3,500	2012	-	100
		115	AC/AC	144,806	2013	-	100
		120	AC/AC	4,483	2012	-	100
		130	AC/AC	4,100	2012	-	100
		135	AC/AC	5,001	2012	-	100
200	64	205	AC/AC	3,105	2003	70	52*
		220	AC/AC	116,494	2003	72	59*
		225	AC/AC	20,274	2003	68	53*
		245	AC/AC	3,743	2003	77	66*
		250	AC/AC	4,310	2012	-	100
		255	AC/AC	5,190	2012	-	100
		260	AC/AC	4,148	2012	-	100
		265	AC/AC	4,437	2012	-	100
		270	AC/AC	4,175	2012	-	100
300	51	305	AC/AC	3,355	2003	64	51*
600	61	605	AC/AC	5,300	2003	85	66*
		610	AC/AC	8,332	2003	67	60*
		615	AC/AC	6,356	2003	84	59*
3000	90	3002	PCC	146,023	1984	94	93
		3005	AC	57,183	1999	82	75
		3010	AC	25,122	1995	64	59
		3015	AC/AC	103,678	2012	-	100
		3025	PCC	114,892	1994	97	92
4000	74	4005	AC/AC	11,598	2003	68	48*
		4010	AC/AC	11,754	2013	-	100
6100	100	6105	AC/AC	314,713	2012	-	100

*All of these features are performing much worse than is typical for pavement of this age due to extensive raveling. However, other than the raveling, the pavements generally are performing well with typical levels of L&T cracking. These sets of conditions are ideally suited for a surface treatment to provide a cost effective and long lasting rehabilitation solution.

2.4 Analysis Commentary

The following pages provide a brief overview of the 2013 inspected pavement conditions for each facility. Comments are based primarily on the AIRPAV analysis but also include field notes and remarks from the pavement condition inspectors. Where appropriate, individual pavement sections are referenced within the larger facility.

2.4.1 Runways

Runway 2-21 consisted of 1 section AAC pavement. The runway had a total area of 314,713 ft² and was newly reconstructed with a PCI of 100 (Good). The distribution of pavement area and sections by PCI range are shown in Table 2-5.

Table 2-5. Runway Condition Distribution

PCI Range	Rating	Number of Sections	Pavement Area (ft²)	Pavement Area (%)
100-71	Good	1	314,713	100
70-56	Fair	-	-	-
55-0	Poor	-	-	-

2.4.2 Taxiways

The taxiways consisted of 4 branches containing 19 sections of AAC pavement. The total area of the taxiways was 356,283 ft². The area-weighted average PCI was 81 (Good). The distribution of pavement area and sections by PCI range are shown in Table 2-6.

Table 2-6. Taxiway Condition Distribution

PCI Range	Rating	Number of Sections	Pavement Area (ft²)	Pavement Area (%)
100-71	Good	11	189,324	53
70-56	Fair	5	140,225	39
55-0	Poor	3	26,734	8

2.4.2.1 100 Series

The 100 series taxiways consisted of 6 sections of AAC pavement. The branch had a total area of 167,064 ft² the branch was newly reconstructed with a PCI of 100 (Good).

2.4.2.2 200 Series

The 200 series taxiways consisted of 9 sections of AAC pavement. The branch had a total area of 165,876 ft² with an area-weighted average PCI of 64 (Fair). The portions of the connector taxiways adjacent to the runway were newly reconstructed and had PCI of 100. Features 205 and 225 were below MSL at the time of the inspection. Features 220 and 245 had simplified PCI ratings of Fair due primarily to raveling.

2.4.2.3 600 Series

The 600 series of taxiway connectors consist of 3 sections of AAC pavement, with a total area of 19,988 ft² and an area-weighted average PCI of 61 (Fair). The recorded distresses included L&T cracking, ravelling, weathering, rutting, and swell.

2.4.3 Aprons

The aprons consisted of 2 sections of AC, 3 sections of AAC, and 2 sections of PCC pavement. The total area of apron pavements was 470,250 ft², and the area-weighted average PCI was 89 (Good). The distribution of pavement area and sections by PCI range are shown in Table 2-7.

Table 2-7. Apron Condition Distribution

PCI Range	Rating	Number of Sections	Pavement Area (ft²)	Pavement Area (%)
100-71	Good	5	433,530	92
70-56	Fair	1	25,122	5
55-0	Poor	1	11,598	3

2.4.3.1 3000 Series

The 3000 series ramps consisted of 2 sections of AC, 1 section of AAC, and 2 sections of PCC pavement. The branch had a total area of 446,898 ft² with a PCI of 90 (Good). The recorded distresses in the PCC pavement included LTD cracking, joint seal damage, faulting, divided slab, alkali silica reactivity, and spalls. The recorded distresses in the AC pavement included L&T cracking, alligator cracking, patching, ravelling, and weathering.

2.4.3.2 4000 Series

The 4000 series ramps consisted of 2 sections of AAC pavement with a total area of 23,352 ft² and an average PCI of 74 (Good). The recorded distresses included L&T cracking, ravelling, rutting, and swell.

3. Capital Improvement Program

3.1 Analysis

The individual feature analyses shown in appendix B document viable rehabilitation projects that address the causes of each pavement section failure while restoring the pavement to a condition above the desired MSL. The recommended timing of each improvement action is defined as the year that the pavement condition is projected to reach the MSL. By establishing benchmark MSL targets, it is possible to plan objectively for future needs against a standard set of performance criteria. This section categorizes the identified viable options into CIP strategies based on cost and expected service life.

The airport may find it desirable to adjust the timing of projects detailed in the CIP to meet fiscal and operational constraints. For example, if different sections of a runway were projected to reach the MSL in various years ranging from 2013 to 2015, it is not operationally feasible to stage rehabilitation over a 3-year period. Instead, runway rehabilitation would be programmed in a manner that balanced the need to minimize the length of the runway closure while maximizing the remaining service life.

3.2 Cost Estimates

Project costs were estimated based on the pavement area and the unit costs shown in Table 3-1 for specific M&R activities. Project costs are presented so planners and managers can compare the relative magnitude of funding required for various alternatives. The two-page AIRPAV feature analysis (see appendix B) provides cost estimates for each identified project. These cost estimates are for planning purposes only and do not constitute an engineering estimate.

Furthermore, these costs estimates represent the improvement of existing pavement structures and associated incidental work only. Other potential project line items, such as lighting, navigational aids, and drainage modifications are not included, and estimates for those items must be developed separately and incorporated into an overall project cost.

Typical examples of work that might be included in alternatives evaluated by AIRPAV are outlined on the following pages. These example projects would meet the requirements for each selected option; however, the descriptions are not intended to imply required, or even preferred, design configurations. Rehabilitation decisions, such as overlay thickness design, should be made in conjunction with engineering design analysis.

Table 3-1. Unit Costs

Rigid Pavement (PCC)	
Reconstruction	$12.90 /sf
Slab Replacement & Full Depth Patching	$12.48 /sf
Patching (Partial Depth)	$16.70 /sf
Slab Repair & Overlay	$4.69 /sf + $0.41 /sf/in > 4”
Joint Seal Replacement	$2.24 /lf
Joint Seal Repair	$0.87 /lf
Undersealing	$4.16 /sf
Flexible Pavement (AC)	
Reconstruction	$5.36 /sf
Resurfacing	$1.44 /sf
Structural Overlay	$2.25 /sf + $0.41 /sf/in > 4”
Surface Treatment	$0.39 /sf
Patching	$9.78 /lf
Crack Repair (Restorative)	$1.24 /lf
Crack Repair (Sustaining)	$0.85 /lf

3.2.1 Rigid Pavement Work Descriptions

The following descriptions provide additional information about the typical work items covered by the unit costs shown in Table 3-1.

3.2.1.1 Reconstruction

Reconstruction is recommended when the pavement defects would not be corrected by less extensive measures. Unit prices assume removal of the existing pavement to the subgrade and reconstruction with 8 inches of high strength PCC pavement on 6 inches of aggregate subbase.

3.2.1.2 Repair and Overlay

This procedure usually consists of a crack and seat process, where the existing pavement is broken into segments of approximately 2 ft on a side by dropping a heavy breaker bar onto the pavement. Properly done, aggregate interlock between pavement segments is retained and reflective cracking is reduced. A flexible surface is then placed over the recycled PCC base.

3.2.1.3 Slab Replacement

Slab replacements are typically required for high-severity blow ups, scaling, and shattered slabs. Unit prices assume removal of the selected slab to the subgrade. Prepare subgrade to bearing strength equivalent to surrounding subgrade. Provide subbase support equivalent to existing and install load transfer steel as required. Place PCC pavement level with existing surface.

3.2.1.4 Patching (Partial Depth)

While partial depth patching is most commonly used to repair joint and corner spalls, it is effective for a wide variety of distress types. Saw cut and remove area of pavement to sound concrete above reinforcing steel. Treat existing concrete to ensure firm bond. Place PCC level with existing surface.

3.2.1.5 Joint Seal Replacement

Rout joints and cracks to a depth of at least 1-1/4 inches, clean joint wall surfaces to expose fresh vital concrete, install backing rope, and apply rubberized sealant meeting ASTM D3405 specification, or equivalent.

3.2.1.6 Joint Seal Repair

Press existing sealant into joint for use as backer material; apply joint sealant meeting ASTM D3405 specification, or equivalent.

3.2.1.7 Undersealing

Undersealing is used to repair faulting between slabs or when corner breaks have settled relative to the slab. High-pressure injection is used to force material into the underlying voids and continues until the settled pavement is restored to its original elevation. Several materials have been used for undersealing, including cement grout, asphalt slurries, and proprietary formulations of expansive Styrofoam.

3.2.2 Flexible Pavement Work Descriptions

3.2.2.1 Reconstruction

Reconstruction is recommended when the pavement defects would not be corrected by less extensive measures. Unit prices assume removal of existing pavement to subgrade. Scarify and compact subgrade to 6-inch depth. Construct 4 inches of P401 AC surface course on 8 inches of aggregate base course.

3.2.2.2 Resurfacing

Resurfacing assumes a nominal 2-inch asphalt mill and inlay on existing prepared pavement.

3.2.2.3 Structural Overlay

Structural overlays are used to address load related distress or to increase pavement load bearing capacity. Apply a 4-inch AC overlay on existing prepared pavement. Add additional thickness as needed to achieve required strength.

3.2.2.4 Surface Treatment

Apply a high-quality, penetrating rejuvenating sealer

3.2.2.5 Patching

High-performance cold patching products can be used for short term repairs. Long-term patches should be made with plant mixed hot asphalt meeting FAA P401 specs.

3.2.2.6 Crack Repair (Restorative)

Rout existing crack to a minimum depth of 1-1/4 inches, install backing rope and apply rubberized crack filler meeting ASTM D3405 specification.

3.2.2.7 Crack Repair (Sustaining)

This is typically spot repairs of existing crack sealant.

3.3 Capital Improvement Strategies

Figure 3-1 shows a projection of the overall airport pavement condition for the next 10 years based on implementing one of three capital improvement strategies:

- No Action: No capital improvement action is undertaken
- Longest Life: The most comprehensive repair and longest life rehabilitation option
- Lowest Cost: The rehabilitation option with the projected lowest annual cost

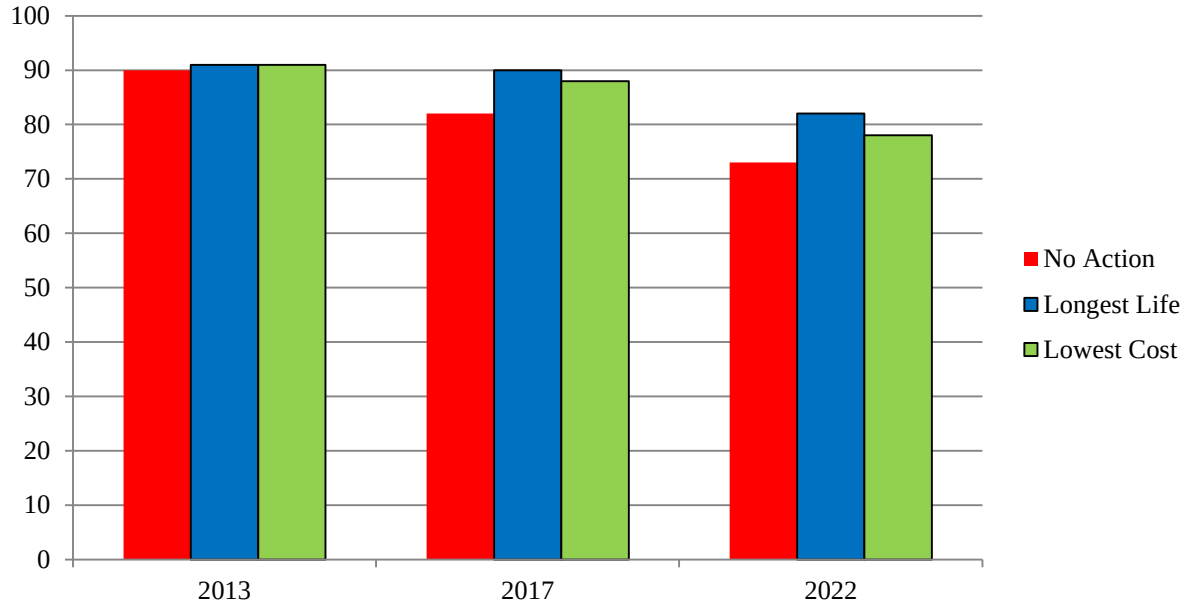


Figure 3-1. Programmed CIP

The longest life CIP scenario is projected to cost approximately **$290,000** over the next 10 years. The lowest annual cost scenario is projected to cost approximately **$98,000** over the next 10 years. Examples of each capital improvement strategy and a complete listing of all viable capital projects are presented in Table 3-2 through Table 3-4.

Table 3-2. Most Comprehensive Repair

Feature	Built	Description	Action Yr	Work Item	Cost, $
205	2003	TAXIWAY B2	2013	Resurfacing	4,471
220	2003	TAXIWAY B	2015	Resurfacing	167,751
225	2003	TAXIWAY B	2013	Resurfacing	29,194
245	2003	TAXIWAY B4	2018	Resurfacing	5,389
305	2003	TAXIWAY B3	2013	Resurfacing	4,831
605	2003	TAXIWAY TO RAMP	2018	Resurfacing	7,632
610	2003	TAXIWAY TO RAMP	2015	Resurfacing	11,998
615	2003	TAXIWAY TO RAMP	2015	Resurfacing	9,152
3010	1995	EAST RAMP	2016	Resurfacing	36,175
4005	2003	RUNWAY 21 RUNUP	2013	Resurfacing	16,701
				Total	**293,294**

Table 3-3. Lowest Annual Cost Repair

Feature	Built	Description	Action Yr	Work Item	Cost, $
205	2003	TAXIWAY B2	2013	Surface Treatment	1,218
220	2003	TAXIWAY B	2015	Surface Treatment	46,732
225	2003	TAXIWAY B	2013	Surface Treatment	8,059
245	2003	TAXIWAY B4	2018	Surface Treatment	1,582
305	2003	TAXIWAY B3	2013	Resurfacing	4,831
605	2003	TAXIWAY TO RAMP	2018	Surface Treatment	2,066
610	2003	TAXIWAY TO RAMP	2015	Surface Treatment	3,300
615	2003	TAXIWAY TO RAMP	2015	Surface Treatment	2,503
3010	1995	EAST RAMP	2016	Surface Treatment	10,649
4005	2003	RUNWAY 21 RUNUP	2013	Resurfacing	16,701
				Total	**97,641**

Table 3-4. All Viable Options

Feature	Built	Description	Action Yr	Work Item	Cost, $
105	2012	TAXIWAY A5	2013	No Action	-
110	2012	TAXIWAY A1	2013	No Action	-
115	2013	TAXIWAY A	2013	No Action	-
120	2012	TAXIWAY A2	2013	No Action	-
130	2012	TAXIWAY A3	2013	No Action	-
135	2012	TAXIWAY A4	2013	No Action	-
205	2003	TAXIWAY B2	2013	Surface Treatment	1,218
205	2003	TAXIWAY B2	2013	Resurfacing	4,471
220	2003	TAXIWAY B	2015	Surface Treatment	46,732
220	2003	TAXIWAY B	2015	Resurfacing	167,751
225	2003	TAXIWAY B	2013	Surface Treatment	8,059
225	2003	TAXIWAY B	2013	Resurfacing	29,194
245	2003	TAXIWAY B4	2018	Surface Treatment	1,582
245	2003	TAXIWAY B4	2018	Resurfacing	5,389
250	2012	TAXIWAY B5	2013	No Action	-
255	2012	TAXIWAY B4	2013	No Action	-
260	2012	TAXIWAY B3	2013	No Action	-
265	2012	TAXIWAY B2	2013	No Action	-
270	2012	TAXIWAY B1	2013	No Action	-
305	2003	TAXIWAY B3	2013	Surface Treatment	1,377
305	2003	TAXIWAY B3	2013	Resurfacing	4,831
605	2003	TAXIWAY TO RAMP	2018	Surface Treatment	2,066
605	2003	TAXIWAY TO RAMP	2018	Resurfacing	7,632
610	2003	TAXIWAY TO RAMP	2015	Surface Treatment	3,300
610	2003	TAXIWAY TO RAMP	2015	Crack Repair	1,001
610	2003	TAXIWAY TO RAMP	2015	Resurfacing	11,998
615	2003	TAXIWAY TO RAMP	2015	Surface Treatment	2,503
615	2003	TAXIWAY TO RAMP	2015	Resurfacing	9,152
3002	1984	WEST RAMP	2013	No Action	-

Feature	Built	Description	Action Yr	Work Item	Cost, $
3005	1999	EAST RAMP	2013	No Action	-
3010	1995	EAST RAMP	2016	Surface Treatment	10,649
3010	1995	EAST RAMP	2016	Crack Repair	2,768
3010	1995	EAST RAMP	2016	Resurfacing	36,175
3015	2012	EAST RAMP	2013	No Action	-
3025	1994	WEST RAMP	2013	No Action	-
4005	2003	RUNWAY 21 RUNUP	2013	Surface Treatment	4,565
4005	2003	RUNWAY 21 RUNUP	2013	Resurfacing	16,701
4010	2013	RUNWAY 21 RUNUP	2013	No Action	-
6105	2012	RUNWAY 3-21	2013	No Action	-

4. Maintenance Management Program

4.1 General Comments

Most pavement distress is classified by severity (low, medium, or high). As a general rule, high-severity distresses should be patched, and medium-severity distress should be sealed. A detailed matrix of recommended maintenance policies to address various distress types is provided near the end of this section.

4.1.1 Inspected Crack Severity

Of the inspected pavement, 85 percent of the cracks were rated at low severity and require no maintenance beyond ongoing inspection and spot repair. About 15 percent of the cracks were rated at medium severity and would benefit from sealing and repair. No cracks were rated at high severity.

4.1.2 Other Distress

In asphalt pavement, area measured distresses such as rutting, depressions, fatigue cracks, and ravelling were recorded at low severity levels 80 percent of the time, medium severity 18 percent of the time, and high severity 2 percent of the time.

Joint seal damage was recorded on 33 percent of the inspected PCC slabs. When identified, joint seal damage severity levels were recorded at low severity 100 percent of the time.

4.2 Recommended Maintenance Actions

The following illustrations and tables show pavement areas that have maintenance and repair needs. Ongoing development of capital improvement projects may address some of these maintenance needs. To help budgeting and prevent duplication of effort, all pavement features recommended for maintenance should be compared to planned improvements prior to finalizing a maintenance program strategy.

Table 4-1. Recommend Maintenance Actions

Work Item	Quantity	Unit	Cost
AC PATCH	34	SF	$299
AC RESTORATIVE CRACK REPAIR	3,671	LF	$4,522
AC SUSTAINING CRACK REPAIR	2,450	LF	$2,120
PCC SLAB REPAIR/REPLACEMENT	807	LF	$10,079
PCC PATCHING	96	SF	$1,606
Total:			**$18,626**

In the following tables, pavement features shown in grey text cannot be raised above MSL via maintenance alone, and need only be included in a maintenance plan to provide continued safety or serviceability until their programmed major rehabilitation is implemented.

4.2.1 Patching

Table 4-2. Recommend AC Patching

Feature	Work Item	Amount	Insp. PCI	Change	Est. PCI
610	AC PATCH	15	60	9	69
3005	AC PATCH	19	75	6	81
	TOTAL:	34	S.F.		
EQUIPMENT: SAW, AIR COMPRESSOR, HEATING KETTLE, HAND TOOLS					
EST. MATERIALS: < 1 TON ASPHALT PATCH					
EST. MATERIAL COST: $43					
EST. CREW HOURS: 1.0					
EST. CREW COST: $256					
EST. PROJECT COST: $299					

Table 4-3. Recommend PCC Patching

Feature	Work Item	Amount	Insp. PCI	Change	Est. PCI
3002	PCC PATCHING	31	93	-	93
3025	PCC PATCHING	64	92	3	95
	TOTAL:	96	S.F.		
EQUIPMENT: SAW, AIR COMPRESSOR, JACK HAMMER, MIXER, HAND TOOLS					
EST. MATERIALS: 2 CUBIC YARDS CONCRETE MIX					
EST. MATERIAL COST: $253					
EST. CREW HOURS: 9.7					
EST. CREW COST: $1,352					
EST. PROJECT COST: $1,606					

Table 4-4. Recommend PCC Slab Replacement

Feature	Work Item	Amount	Insp. PCI	Change	Est. PCI
3002	SLAB REPAIR/REPLACEMENT	807	93	1	94
	TOTAL:	807	S.F.		
EQUIPMENT: SAW, AIR COMPRESSOR, JACK HAMMER, MIXER, LOADER HAND TOOLS					
EST. MATERIALS: 33 CUBIC YARDS CONCRETE MIX					
EST. MATERIAL COST: $3,190					
EST. CREW HOURS: 53.8					
EST. CREW COST: $6,889					
EST. PROJECT COST: $10,079					

4.2.2 Crack Seal

Table 4-5. Recommend AC Restorative Crack Repair

Feature	Work Item	Amount	Insp. PCI	Change	Est. PCI
245	AC RESTORATIVE CRACK REPAIR	382	66	-	66
3005	AC RESTORATIVE CRACK REPAIR	1,056	75	5	80
3010	AC RESTORATIVE CRACK REPAIR	2,233	59	4	63
	TOTAL:	3,671	L.F.		
EQUIPMENT: AIR COMPRESSOR, HEATING KETTLE, HAND TOOLS					
EST. MATERIALS: 734 POUNDS ASTM D3405 SEALANT OR EQUIVALENT					
EST. MATERIAL COST: $734					
EST. CREW HOURS: 18.4					
EST. CREW COST: $3,817					
EST. PROJECT COST: $4,552					

Table 4-6. Recommend AC Sustaining Crack Repair

Feature	Work Item	Amount	Insp. PCI	Change	Est. PCI
220	AC SUSTAINING CRACK REPAIR	2,244	59	N/A	59
305	AC SUSTAINING CRACK REPAIR	85	51	N/A	51
610	AC SUSTAINING CRACK REPAIR	121	60	N/A	60
	TOTAL:	2,450	L.F.		
EQUIPMENT: AIR COMPRESSOR, HEATING KETTLE, HAND TOOLS					
EST. MATERIALS: 490 POUNDS ASTM D3405 SEALANT OR EQUIVALENT					
EST. MATERIAL COST: $490					
EST. CREW HOURS: 10.7					
EST. CREW COST: $1,630					
EST. PROJECT COST: $2,120					

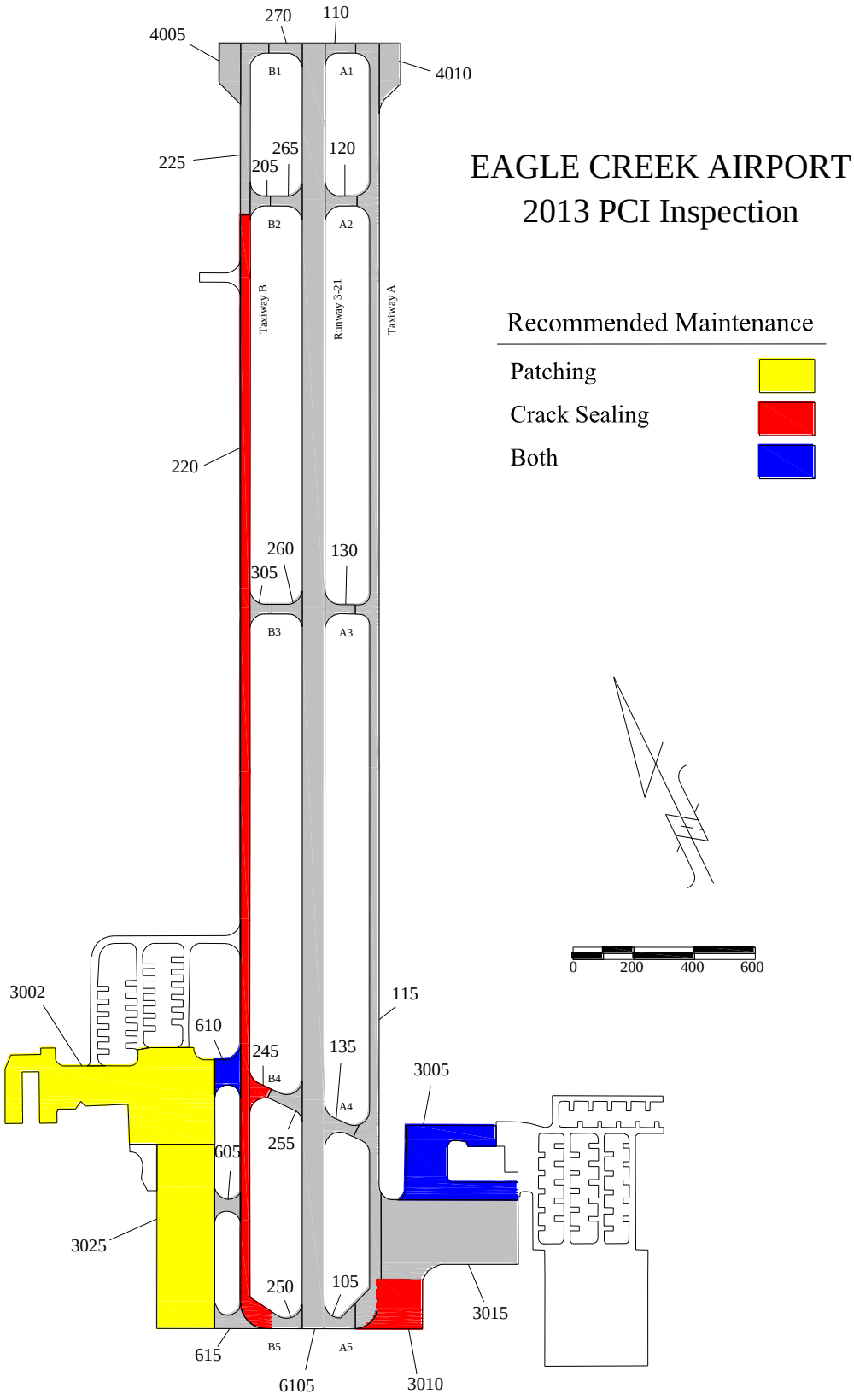


Figure 4-1. Recommended Maintenance

4.3 Pavement Deterioration

Before attempting maintenance and repairs, it helps to understand pavement performance and pavement deterioration. The factors that contribute most to deterioration are environmental, materials, and/or load related. Brief discussions of each are presented in the following sections.

4.3.1 Environmental/Age-Related Deterioration

Seasonal and daily temperature changes cause expansion and contraction of the pavement materials. The shear stresses created by expansion and contraction can cause transverse cracking in flexible pavement and mid-slab cracking in rigid pavement. Further, expansion and contraction will cause cracks, and rigid pavement joints, to open and close with changes in temperature.

Flexible pavement oxidizes as it ages, losing its lighter, volatile, components and becoming brittle with time. Surface treatments and seal coats are designed, in part, to provide a protective barrier and prevent this type of oxidation.

Subsurface water can have the greatest impact on pavement deterioration. A wet subgrade greatly reduces the ability of a pavement to support wheel loads, and the results often show up as rutting and cracking of flexible pavement. The fine materials in a wet base can be pumped up through the cracks and eventually result in a loss of support. This loss of support can be evidenced as corner breaks and faulting in rigid pavement. Moisture inside a pavement system expands when it freezes, creating stresses that cause the pavement surface to heave. Subsequent freeze-thaw cycles leave voids in the pavement structure that enable further rutting and breaking. Repeated freeze-thaw cycles eventually cause the pavement to disintegrate. Freeze-thaw deterioration requires frost-susceptible material, sub-zero temperatures, and water. If we remove one of these factors, freeze-thaw damage will not occur. One of the best ways to ensure pavement longevity is to provide drainage and keep it dry.

4.3.2 Materials-Related Deterioration

The pavement thickness and type of subgrade play a large role in the formation and spacing of transverse cracks. If the subgrade and base materials are smooth or rounded and allow for relatively free movement of the pavement surface, transverse cracks will often be spaced far apart (>60 feet). If the subgrade and base material are rough or angular and provide greater resistance to movement of the pavement surface, transverse cracks will be spaced more closely (<40 feet). The distance between transverse cracks also depends on the pavement thickness, as a thicker pavement can resist cracking for longer lengths. At general aviation airport pavements, around 50 feet is typical transverse crack spacing.

Aggregate is the biggest component of any pavement structure, and it is the contact between the aggregate particles that actually transfers the load and provides the strength. Aggregate durability and shape are major factors affecting pavement performance. Durability is the ability of the aggregate to perform satisfactorily over time and resist deterioration. Sharp, well-angled aggregates that interlock, compact densely, and resist movement are the most desirable.

In flexible pavement, the selection of asphalt cement can have a significant impact on pavement performance. Asphalt is visco-elastic, which means it is stiff at low temperatures and flows at high temperatures. With this in mind, we expect asphalt pavement to remain stiff on hot summer days to resist plastic deformation (rutting and shoving). In addition, we expect asphalt pavement to have

sufficient cold temperature flexible on cold winter days to resist transverse cracking. The proper selection of asphalt cement grade and maintaining adequate mix volumetrics (air voids, voids in the mineral aggregate, etc.) are key factors in the performance of flexible pavement.

As water freezes, it expands and occupies a greater volume than in a liquid state. In PCC pavement, interconnected, well-distributed air voids are required to allow for expansion of moisture with the PCC. PCC mixes with insufficient air entrainment are susceptible to freeze-thaw damage, as the expansive forces have been shown to cause concrete deterioration. Small, closely spaced, interconnected air voids provide the greatest degree of protection.

Asphalt paving mixes also require air voids, but for reasons different than for PCC pavement. When a well-constructed asphalt pavement is subjected to vehicle loading, it will nevertheless experience some minor secondary consolidation. Air voids allow for the safe movement of the asphalt binder within the mix. With insufficient air voids, the asphalt binder will migrate to the surface of the pavement—it will in essence, get squeezed out of the mix. This phenomenon is called flushing. In addition, these mixes become unstable and are prone to rutting in the wheel paths.

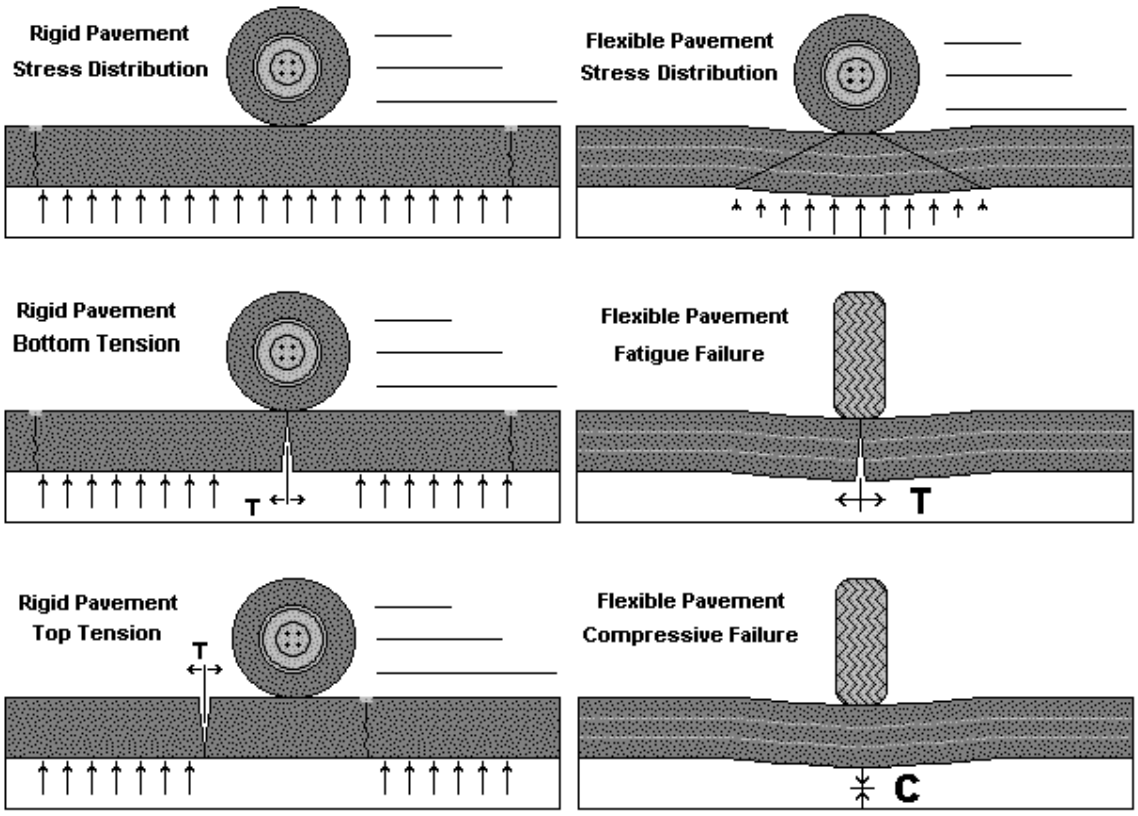
However, if the air voids become too high, air and water can penetrate the pavement, reducing both durability and flexibility. Air infiltration will accelerate oxidization of the binder, while water penetration will increase the moisture susceptibility of the mix (i.e., stripping of the asphalt cement from the aggregate). Air voids in flexible pavement should be kept low enough to prevent water and air from penetrating the asphalt layers, but high enough to minimize the potential of plastic deformation.

Regardless of whether the pavement binder is AC or PCC, binder materials are mixed with aggregate to coat all aggregate particles with a thin binder film. Durability of flexible asphalt pavement is increased with a thicker binder film, and the pavement becomes more resistant to age hardening; however, if the film is too thick, the asphalt acts like a lubricant, promoting ruts, shoving, and bleeding. Each asphalt mix should be customized for materials available locally.

With a concrete pavement, aggregate interlock supports the wheel loads, and the hydrated cement binder further interlocks the aggregate particles to inhibit all movement. “Hydration” is the term for the chemical reaction of portland cement with water. In the hydration process, dry cement particles react with water to form gels, and then crystals, that grow and bond with the aggregate and form a rigid interlocking structure. Hydration can continue for years, but much of the ultimate strength will be reached within 28 days. Hydration is a sensitive chemical process. Typically, any admixtures used to accelerate the hydration process will reduce durability, and admixture use should be considered carefully or avoided.

4.3.3 Load-Related Deterioration

As illustrated below, rigid and flexible pavements differ in the way loads are distributed. A concrete slab resists bending and transfers loads evenly, while an asphalt pavement is designed to bend, gradually spreading loads over wider areas.



Load-related cracks can start at the top or bottom of a pavement section. In asphalt sections, load-related (fatigue) cracks start at the bottom. If a load-related crack reaches the surface, it usually indicates structural deficiency. In rigid pavement, corner breaks are caused by tensile forces at the top of the slab, and the crack propagates downward. Mid-slab LTD cracks are distress examples resulting from tensile forces at the bottom of the slab.

Both wheel loads and environmental factors can cause spalls anytime there is movement between adjacent slabs. If non-compressible material (such as a small rock) is allowed into a joint, stresses will build up between adjacent slabs can cause a spall. Keeping joint and crack sealant intact can help to reduce the infiltration of non-compressible material and minimize spalling.

4.4 Best Practices

4.4.1 Flexible Pavement

L&T cracks at medium severity should be filled with a good quality crack sealant material. High-severity cracks normally must be patched.

Cracks rated at low severity may be narrow unsealed cracks or sealed cracks up to 3 inches wide. The PCI procedure does not distinguish between narrow unfilled cracks and wider filled cracks. Some L&T cracks at low severity are included in the estimated sealing quantities and costs in this maintenance plan. In general, when medium- or high-severity cracking constitutes less than 25 percent of the total crack quantity, sustaining maintenance usually is more cost-effective. When 25 percent or more of the total crack quantity is at medium or high severity, a restorative program typically becomes more cost-effective.

Existing patches rated as medium and high severity should be replaced with new patches. Small areas (usually less than 100 square feet per patch) of alligator cracking and rutting at medium and high severity also may be repaired cost-effectively by patching. Larger patches should be considered if equipment can be made available to accomplish the work. Patching to repair up to 10 percent of the surface of a pavement feature that is otherwise serviceable can result in significant cost savings as compared to rehabilitation of the entire feature.

An example maintenance policy treatment matrix for flexible pavement is shown in Table 4-7. Examples of various maintenance techniques are provided in appendix C.

4.4.2 Rigid Pavement

Joint seal damage rated at medium and high severity should be repaired. If medium- and high-severity damage is limited to less than about 25 percent of the total joint length, sustaining maintenance is recommended. If medium- and high-severity damage exceeds 25 percent of the total joint length, the joint sealant should be removed and replaced under a restorative repair project.

LTD cracks at low and medium severity should be considered for sealing as part of the joint sealing project. High-severity LTD cracks require sealing, patching, or slab replacement, depending on the extent of deterioration.

Small patches are typically used to repair medium- and high-severity spalls or to replace deteriorated older patches. Restorative small patches are typically partial-depth repairs, usually to a maximum depth of 1/3 of the slab thickness. Large patches and corner breaks at medium and high severity should be repaired by full-depth large patches.

High-severity LTD cracks and shattered slabs are candidates for patching and slab replacement. Low-severity shattered slabs can be left in place pending further deterioration.

An example maintenance policy treatment matrix for rigid pavement is shown in Table 4-7. Examples of various maintenance techniques are provided in appendix C.

Table 4-7. General Maintenance Policy (AC)

Distress Type	Distress Severity	Maintenance Action
Alligator Cracking	Low	Crack Sealing - AC
	Medium	Patching - AC Deep
	High	Patching - AC Deep
Bleeding	N/A	Monitor
Depression	Low	Monitor
	Medium	Patching - AC Shallow
	High	Patching - AC Deep
Jet Blast	N/A	Patching - AC Shallow
Longitudinal, Transverse, Joint Reflective, & Block Cracking	Low	Monitor
	Medium	Crack Sealing - AC
	High	Patching - AC Deep
Oil Spill	N/A	Patching - AC Shallow
Patching	Low	Monitor
	Medium	Crack Sealing - AC
	High	Patching - AC Deep
Polished Aggregate	N/A	Monitor
Weathering / Raveling	Low	Monitor
	Medium	Surface Treatment
	High	Patching - AC Shallow
Rutting, Corrugation and Swell	Low	Monitor
	Medium	Patching - AC Deep
	High	Patching - AC Deep
Shoving	Low	Monitor
	Medium	Patching - AC Shallow
	High	Patching - AC Deep
Slippage Cracking	N/A	Patching - AC Shallow

Table 4-8. General Maintenance Policy (PCC)

Distress Type	Distress Severity	Maintenance Action
Blow Up	Low	Patching - PCC Partial Depth
	Medium	Slab Replacement - PCC
	High	Slab Replacement - PCC
Longitudinal, Transverse & Diagonal Cracking	Low	Monitor
	Medium	Crack Sealing - PCC
	High	Patching - PCC Full Depth
Durability Cracking	Low	Monitor
	Medium	Patching - PCC Full Depth
	High	Slab Replacement - PCC
Large Patch & Corner Break	Low	Monitor
	Medium	Patching - PCC Full Depth
	High	Patching - PCC Full Depth
Popout / Shrinkage Cracks	N/A	Monitor
Scaling	Low	Monitor
	Medium	Patching - PCC Partial Depth
	High	Slab Replacement - PCC
Faulting	Low	Monitor
	Medium	Grinding (Localized)
	High	Grinding (Localized)
Shattered Slab	Low	Monitor
	Medium	Crack Sealing - PCC
	High	Slab Replacement - PCC
Joint Spall, Corner Spall & Small Patch	Low	Monitor
	Medium	Patching - PCC Partial Depth
	High	Patching - PCC Partial Depth
Alkali Silica Reactivity	Low	Monitor
	Medium	Slab Replacement - PCC
	High	Slab Replacement - PCC

4.5 Pavement Repair Materials

New pavement repair materials are introduced and improved regularly. This section provides information on products compatible with airport needs.

4.5.1 Joint and Crack Sealer

Hot-poured, pressure-injected, polymeric rubberized asphalt sealant meeting ASTM D3405 specifications is suitable for most sealing requirements. This product is relatively inexpensive, durable, and suitable for both rigid and flexible pavements. Other, more expensive, hot-applied sealants that promise longer life are being developed for specialty applications. Twin component cold applied sealants also have been used with success. Contact your local distributor.

4.5.2 Flexible Pavement Patch

High-performance plant mixed cold patching products that can be stockpiled on-site can be used for short term repairs to maintain safety. Long-term patches should be made with high-quality plant mixed hot asphalt having a ¾-inch maximum aggregate size and meeting Federal Aviation Administration (FAA) P401, or highest quality highway specifications. Low-quality packaged materials available from local hardware type stores should be avoided.

4.5.3 Rigid Pavement Patch

Permanent patches in rigid pavement should be made with air-entrained concrete with 1-inch maximum size aggregate. If the area must be quickly opened to traffic, high early concrete should be considered. Concrete should have zero slump and a coarse texture. As with asphalt patches, low-quality packaged materials should be used only as temporary patches to maintain safety and service until a more permanent repair can be made.

4.6 Pavement Repair Equipment

Many pavement repair and sealing products are available. Specialized tools and equipment help ensure high-quality repairs. This section discusses equipment compatible with airport needs.

4.6.1 Air Compressor

Used to remove non-compressible sand and debris from prepared cracks and joints, the compressor should have a sustained capacity of 120 cubic feet per minute with a nozzle velocity of 100 psi. Trailer-mounted compressors typically have capacities in this range.

4.6.2 Concrete Saw

A saw capable of making a minimum 3-inch-deep cut is required. The saw should be capable of making cuts in both asphalt and concrete. Gasoline-powered 5- to 25-hp wheel-mounted saws typically are preferred for this type of work, but electric and pneumatic tools also are available.

4.6.3 Heating Kettle

Applying sealant is the most time-consuming operation, and a sealing machine with heating and pressure application capabilities is a critical item in a successful sealing program. The capacity of the sealing equipment dictates the rate at which a crew progresses. For large sealing projects, a minimum 100-gallons/hour sustained capacity is recommended. The unit should be a double boiler type, with mechanical agitators or continuous recirculation. Kettle temperature must be monitored to ensure that the sealant is not "burned." Overheating the sealant will prematurely age harden the material.

4.6.4 Router

A concrete saw can be used to prepare joints, but for random cracking, a mechanical router with a vertical impact mechanism is preferred. When cracks are being routed, this activity will dictate the speed of the crew. Crack routers in the 25-hp range are commonly used and are available from a variety of manufacturers.

4.6.5 Sand Cleaner

A sand blaster helps to clean loose particles and dust from prepared cracks. The unit must have sufficient force to expose fresh, vital pavement to bond with sealant and patching materials.

4.6.6 Vibratory Roller or Plate Compactor

Required to compact plant mixed and packaged patching materials properly. Small rollers are best for pothole type applications; plate compactors are best for large areas.

4.6.7 Other Equipment

Other general use equipment that can be helpful in a maintenance program includes bucket loaders, dump trucks, water tanks, and a power sweeper unit.

Appendix A. AIRPAV Software

The Software

Data analysis was performed using the AIRPAV pavement evaluation and management software. In addition to calculating and documenting PCI values, AIRPAV evaluates the collected inspection data and recommends rehabilitation actions that address the cause of pavement distress. AIRPAV can incorporate traffic and structural capacity evaluations into the pavement evaluation matrix, and AIRPAV also performs preliminary life cycle cost analysis of the various rehabilitation alternatives, providing guidance on the lowest annual cost repair strategy.

A complete database, along with an updated version of AIRPAV, is provided on INDOT computers for ongoing management of the INDOT pavement systems.

Capital Improvements

AIRPAV creates interactive CIPs, providing the user with the ability to control unit costs, develop new projects, move projects between years, and even increase or decrease the scope and cost of individual projects.

Maintenance

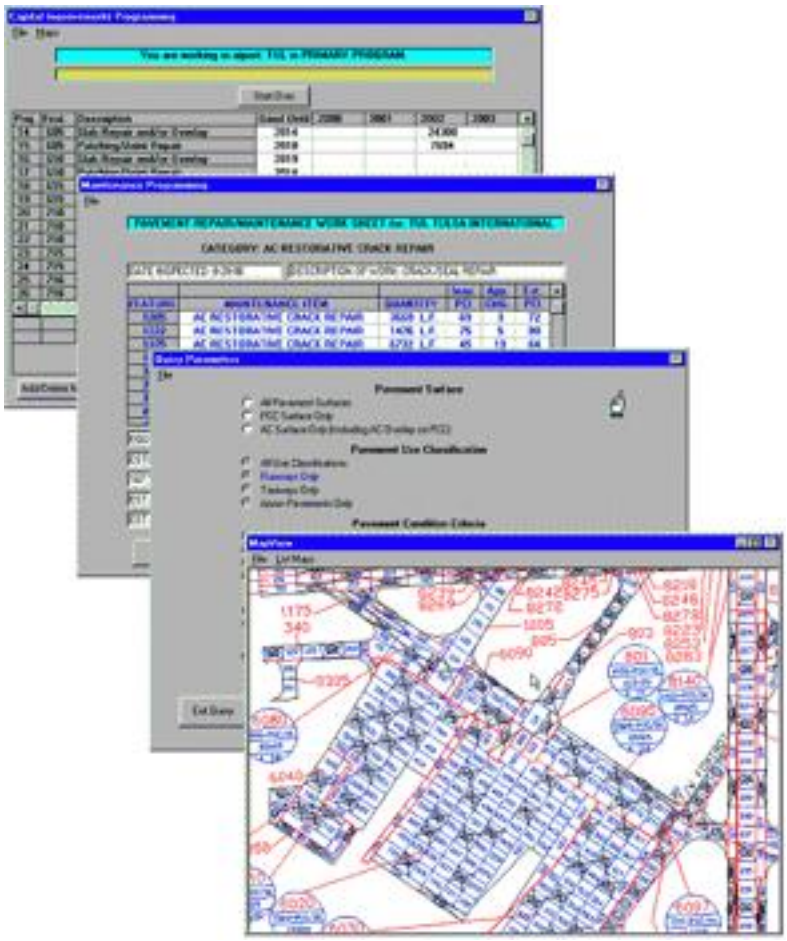
AIRPAV calculates and develops maintenance work orders organized by type of work. Maintenance work orders can be printed and issued directly to maintenance crews.

Traffic

AIRPAV provides the ability to model aircraft ground movements. Traffic can be sorted by airline, aircraft type, destination gate or ramp, and runway used. The program graphically displays each taxi path, accumulates total operations, automatically determines design aircraft, and calculates structural overlay requirements for each pavement feature. The software can provide Pavement Classification Numbers (PCN) for each pavement feature or report results directly as inches of overlay required.

Maps

AIRPAV permits viewing and printing of PCI maps. Inspection layout, pavement condition, and other views are available from within the software.



Query

The AIRPAV query function is a powerful search tool that allows users to extract useful reports meeting various criteria. As examples, lists can be created for taxiway pavement, asphalt pavement, or areas below MSL at the time of inspection.

Global Information System (GIS) Integration

AIRPAV is fully GIS-enabled. A single click in AIRPAV exports all data to an MS Access database that can be linked to shape files used in an ESRI product. In this way, virtually all data in the pavement management database can be accessed in GIS format.

Appendix B. Feature Analysis

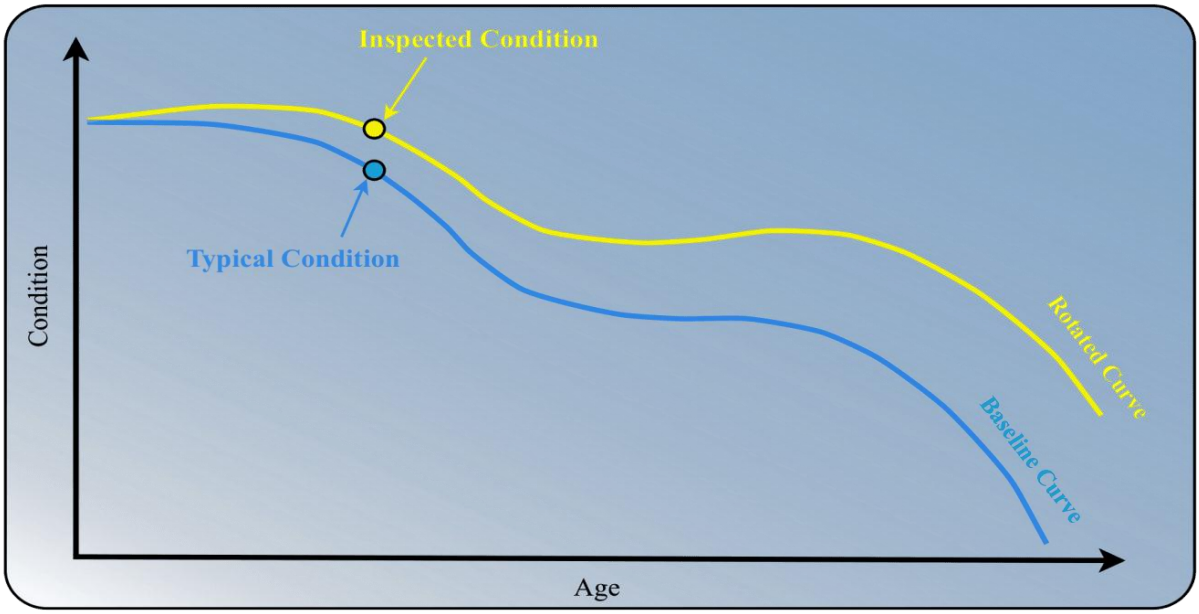
Pavement Performance Models

Projected performance is determined by relating current pavement condition to expected pavement condition. Projected performance varies based on pavement type. There are four pavement types in Indiana: AC, PCC, ACC, and APC. Each pavement type has a unique deterioration curve, created by plotting all data for that group as PCI vs. age and then finding a performance curve to best fit the data. These curves represent the historic performance of pavement in the group and become the baseline for future projections. The baseline curves are modeled with a third order polynomial equation as shown below.

$$PCI = X(Age)3 + Y(Age)2 + Z(Age)1 + C$$

Current Condition (rotating the curves)

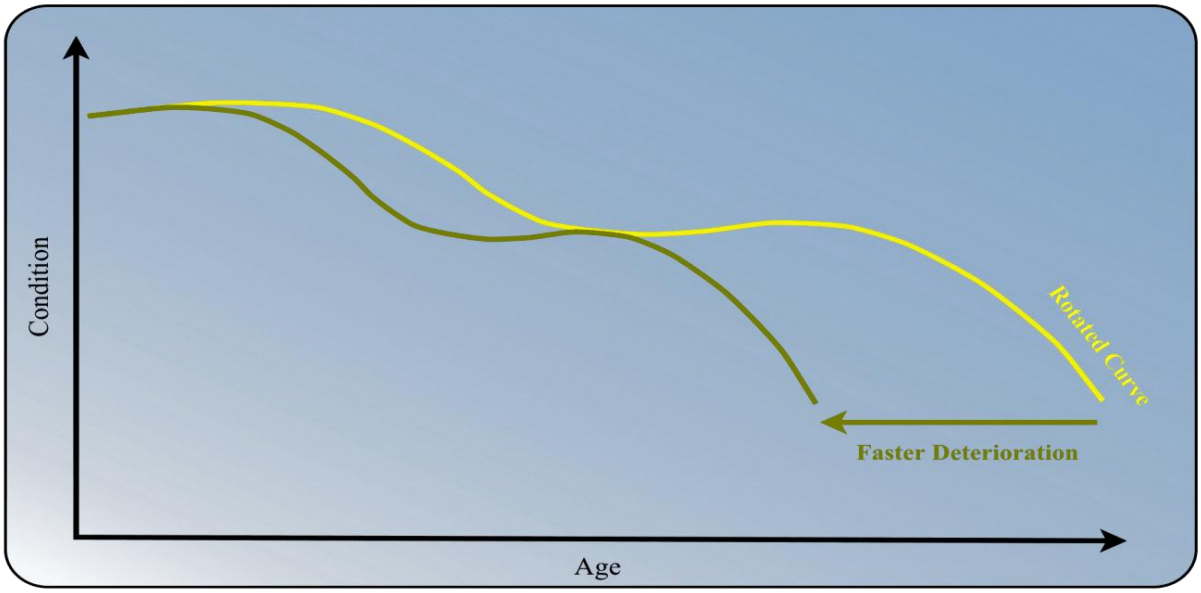
Starting with the baseline curve for comparison, current pavement condition is plotted, and the baseline curve is rotated to meet the current condition. The rotated curve provides the starting point for projecting the future pavement condition.



Advanced Analysis (accounting for distress)

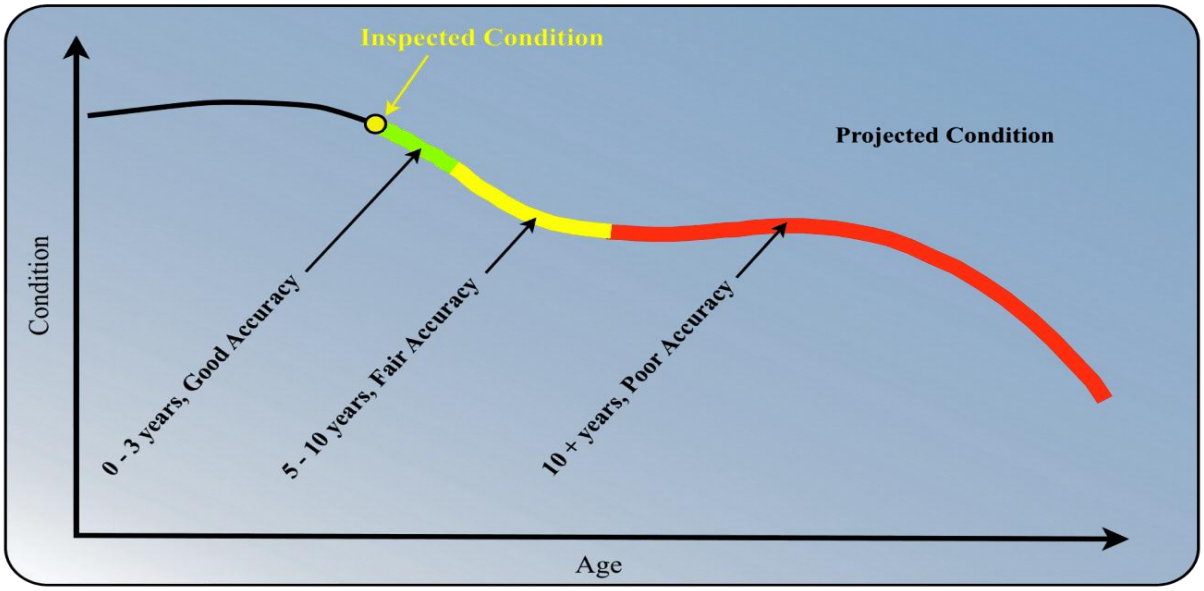
Some types of pavement distress have a greater impact on pavement deterioration than others. Rutting and alligator (fatigue) cracking are major structural failures and can lead to rapid pavement deterioration. Other distress types, like L&T cracking, develop slowly over time and typically do not cause a significant deviation from the baseline curve.

After current condition is accounted for with the curve rotation, pavement distress is addressed in the advanced analysis by compressing or expanding the baseline curve to account for the expected rate of pavement deterioration.



Projected PCI (near term vs. longer term)

Projecting pavement condition with advanced analysis is a combination of rotating, expanding, and contracting the baseline curves. This projection method provides good short-term results for all pavement sections and fair long-term projections on pavement sections with conditions near the baseline model. The long-term accuracy of outlier data is discussed on the following page.

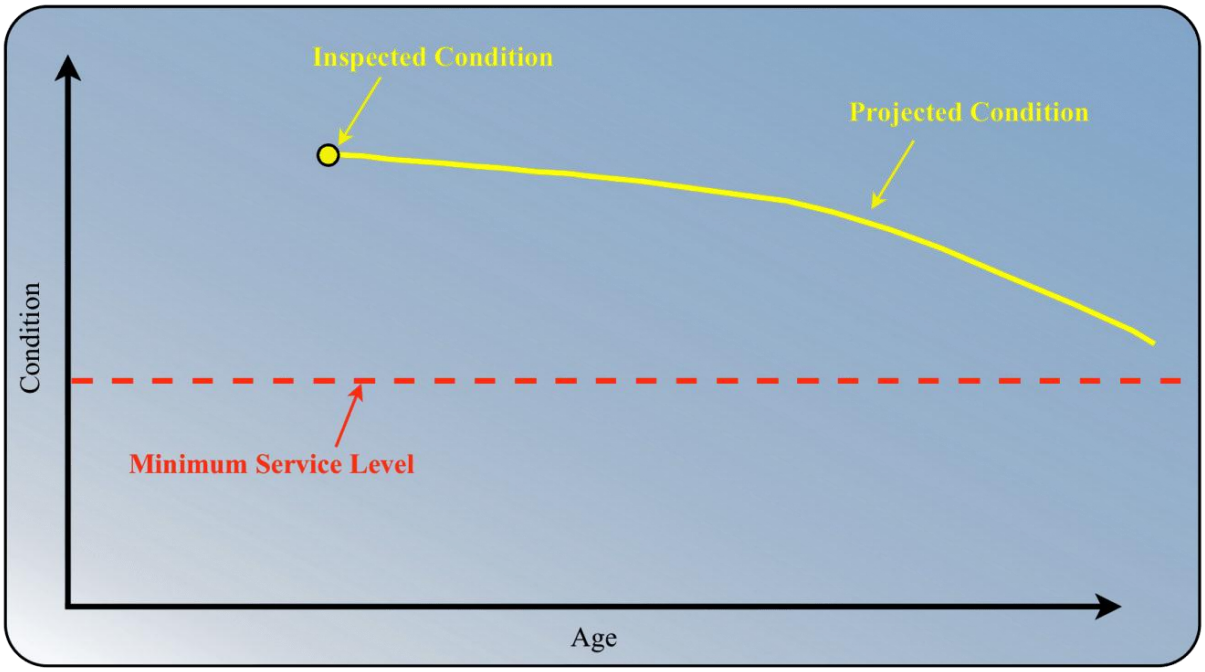


Projected PCI (why some features have unexpected projections)

Long-term PCI projections can be very useful for planning purposes. However, projections in excess of 10 years are well beyond the intended scope of the PCI procedure. FAA Advisory Circular 150/5380-6B establishes a maximum 3-year interval between detailed PCI surveys.

Curve rotation, expansion, and contraction are performed to produce the best possible accuracy of future pavement condition over the next 3 to 5 years. This methodology can overemphasize certain performance trends in the long term. This is especially true for outlier data, such as pavement features that are performing much better or worse than is typical.

The curve below shows an example of a performance trend being overemphasized in the long-term projection. Because the pavement feature is performing much better than the baseline curve, the long-term projection shows the pavement lasting an additional 30+ years before reaching the MSL. Rotation of the curve to provide the most accurate projection over 3 to 5 years has resulted in a long-term projection that is likely unrealistic.



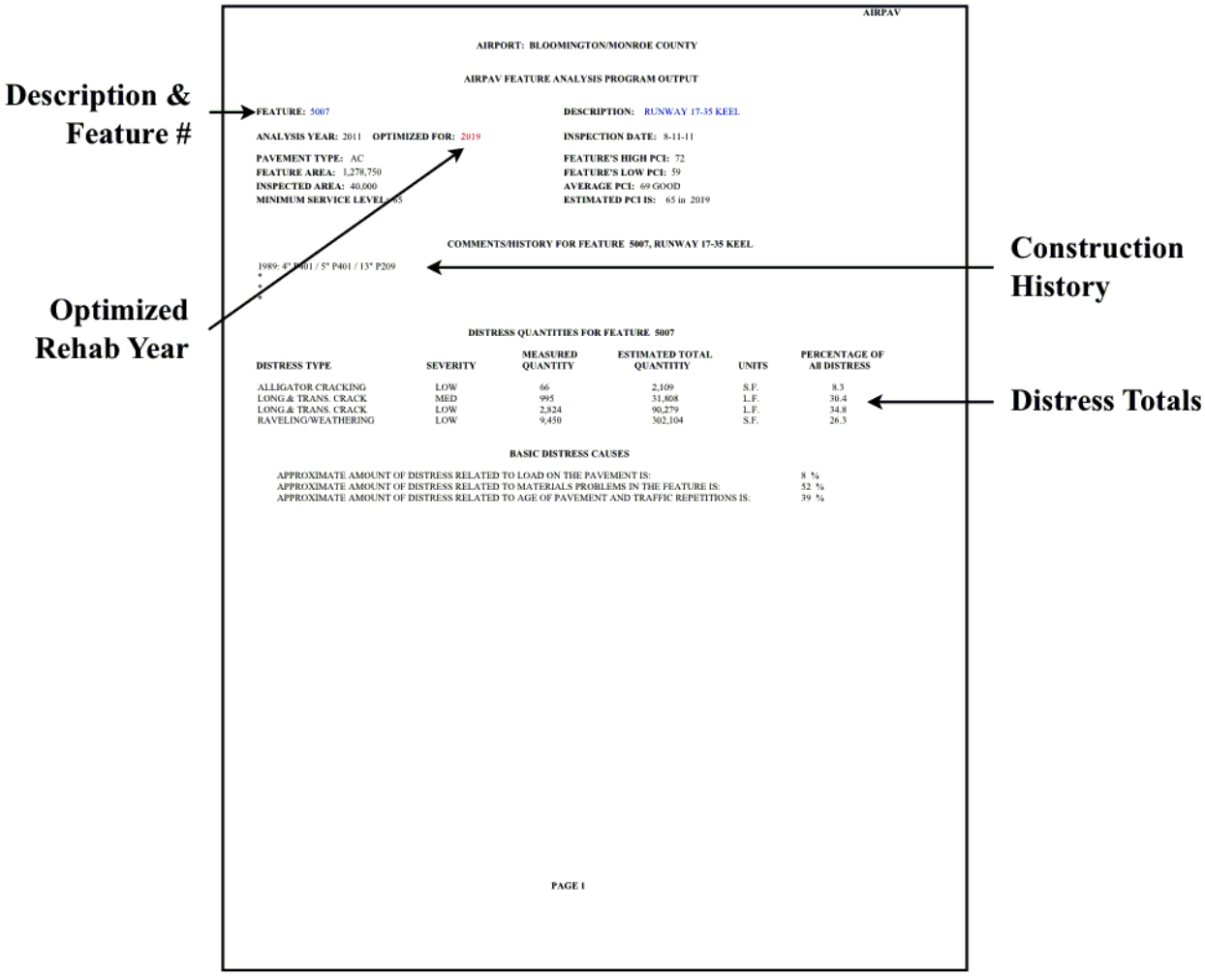
When long-term projections such as this are encountered, airport managers should not rely on projections in excess of 10 years. Managers can be confident that the pavement is performing much better than average and will not require rehabilitation within the current 5-year CIP planning window. As new distress develops over time, future PCI surveys will determine the ideal timing for rehabilitation.

Feature Analysis

As part of the PCI evaluation, a detailed analysis is presented for each airside pavement feature using the two-page format depicted below.

Page 1

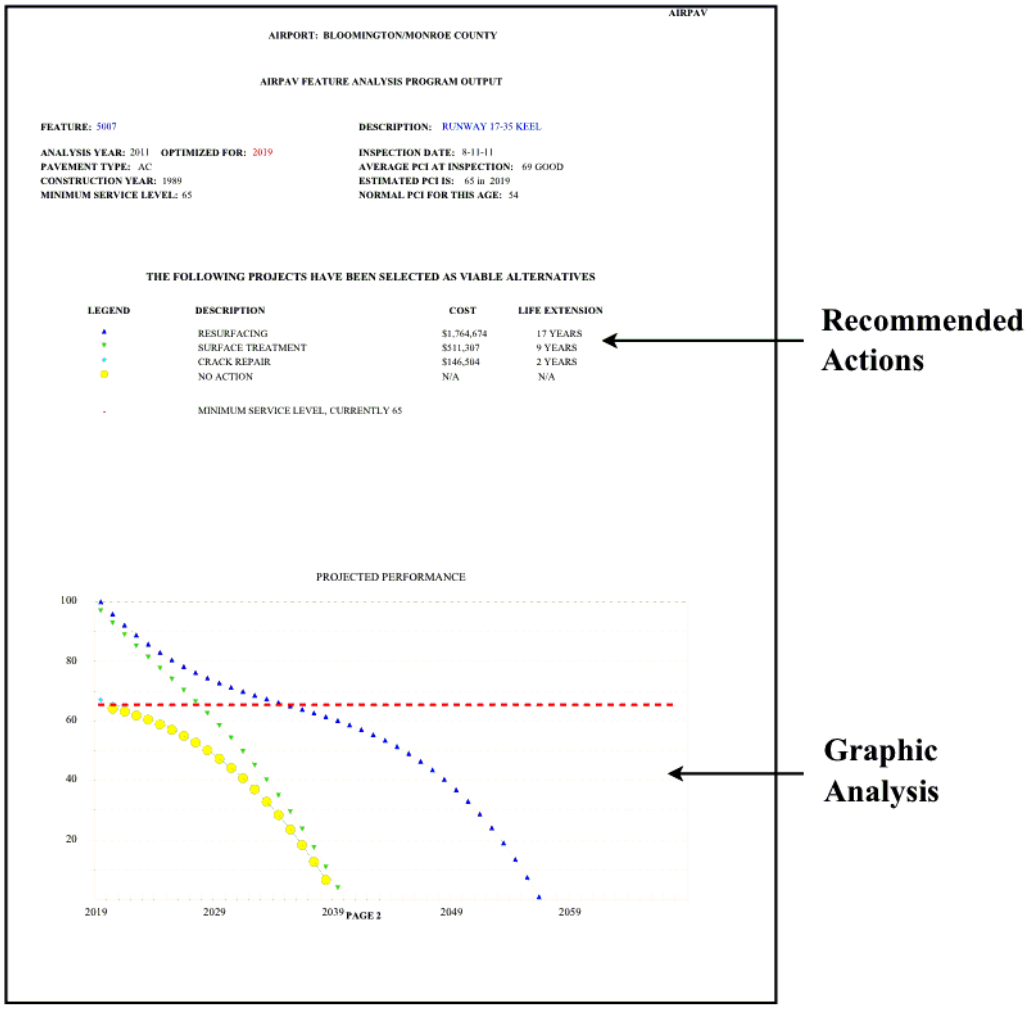
The first page of the analysis is a feature summary. Located near the top left-hand corner is the feature number and pavement description. Construction history and inspector comments are listed below, along with a photo of the pavement section if available. Distress totals recorded during the PCI survey are listed next, and an approximation of the cause of the pavement deterioration is shown at the bottom. If the pavement is projected to fall below the desired MSL during the next 12 years, the analysis year will be shown along with the optimum year for pavement rehabilitation.



Page 2

The second page is a graphic analysis of pavement deterioration. Pavement deterioration is forecast based on historic deterioration of similar Indiana pavement types. Remaining life is projected by stretching and rotating the baseline curves to fit the current condition determined from the PCI survey.

When pavement condition drops below the desired MSL, the software selects rehabilitation actions that address the cause of the pavement failure while restoring the pavement to a condition above the MSL. A NO ACTION recommendation indicates that the feature is expected to remain serviceable during the 12-year forecasting period without major repairs. NO ACTION recommendations do not diminish the need for regular maintenance.



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 105 **DESCRIPTION:** TAXIWAY A5

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 100
FEATURE AREA: 5,174 **FEATURE'S LOW PCI:** 100
INSPECTED AREA: 4,450 **AVERAGE PCI:** 100 GOOD
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 97 in 2013

COMMENTS/HISTORY FOR FEATURE 105, TAXIWAY A5

2012 AC
1995 - AC OVERLAY ON UNKNOWN SECTION
*
*

DISTRESS QUANTITIES FOR FEATURE 105

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	0 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

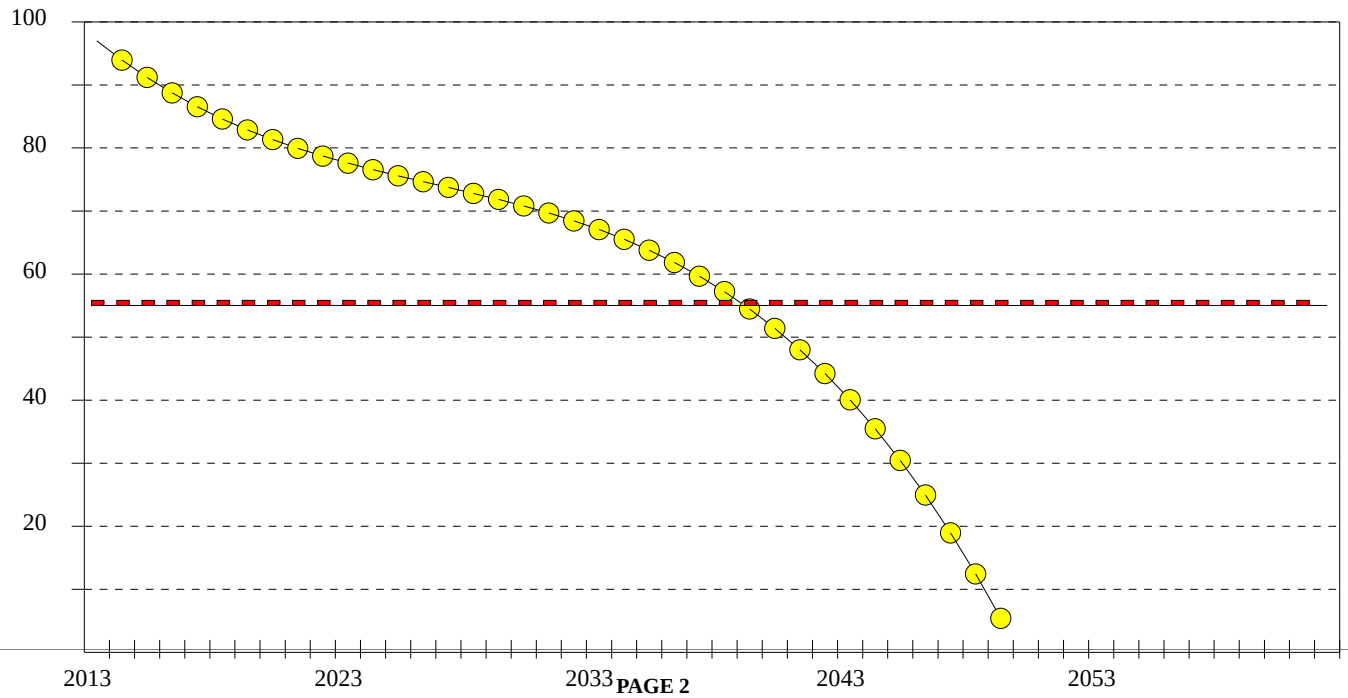
FEATURE: 105 **DESCRIPTION:** TAXIWAY A5

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 100 GOOD
CONSTRUCTION YEAR: 2012 **ESTIMATED PCI IS:** 97 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 96

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 110 **DESCRIPTION:** TAXIWAY A1

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 100
FEATURE AREA: 3,500 **FEATURE'S LOW PCI:** 100
INSPECTED AREA: 3,330 **AVERAGE PCI:** 100 GOOD
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 97 in 2013

COMMENTS/HISTORY FOR FEATURE 110, TAXIWAY A1

2012 AC
1995 - AC OVERLAY ON UNKNOWN SECTION
*
*

DISTRESS QUANTITIES FOR FEATURE 110

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	0 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

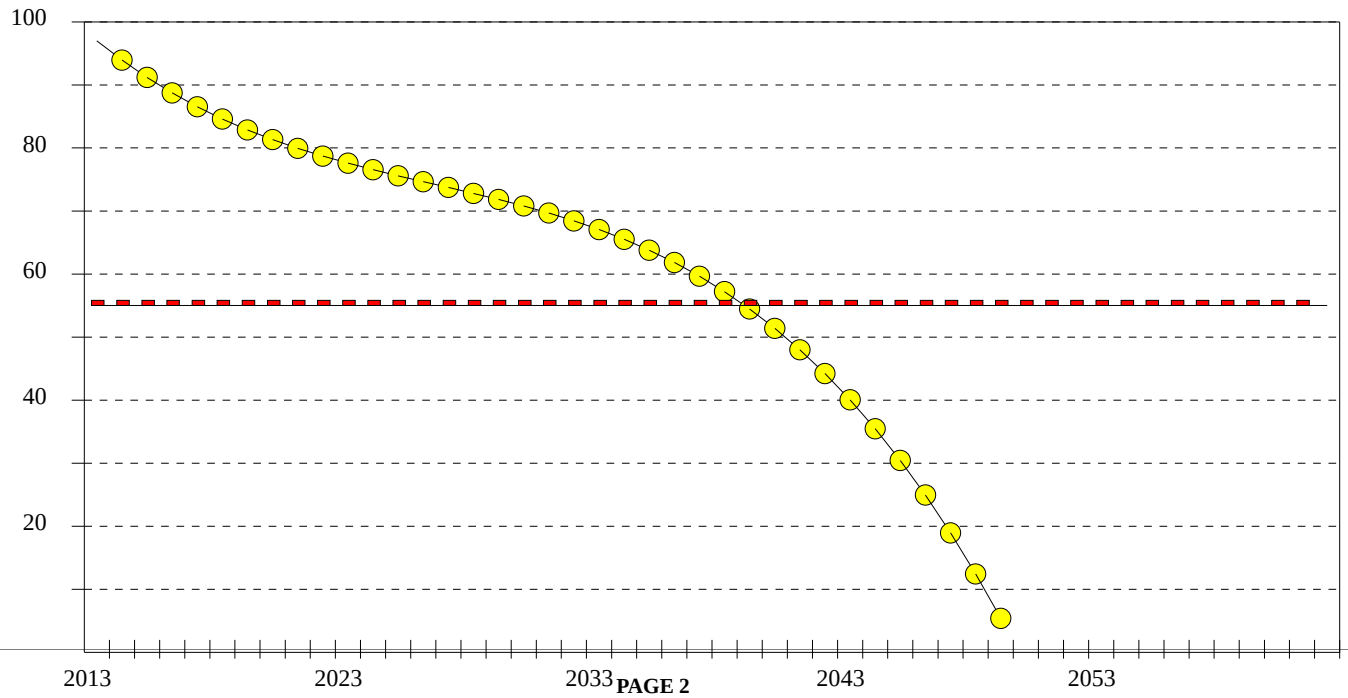
FEATURE: 110 **DESCRIPTION:** TAXIWAY A1

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 100 GOOD
CONSTRUCTION YEAR: 2012 **ESTIMATED PCI IS:** 97 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 96

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 115 **DESCRIPTION:** TAXIWAY A

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 100
FEATURE AREA: 144,806 **FEATURE'S LOW PCI:** 100
INSPECTED AREA: 33,000 **AVERAGE PCI:** 100 GOOD
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 100 in 2013

COMMENTS/HISTORY FOR FEATURE 115, TAXIWAY A

2013 AC
1984 - 4" P401 OVERALY
1967 - 2" P401 SURFACE ON 4" P208 BASE ON 4" P154 SUBBASE
*

DISTRESS QUANTITIES FOR FEATURE 115

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	0 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

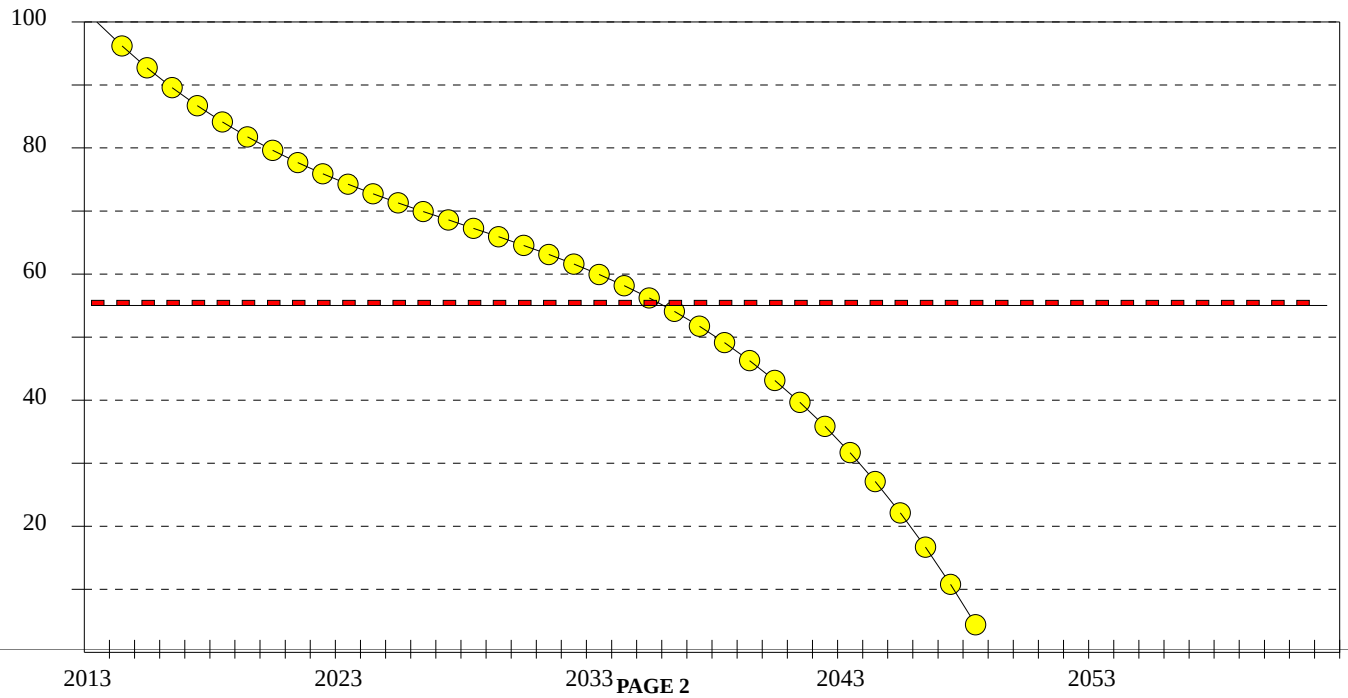
FEATURE: 115 **DESCRIPTION:** TAXIWAY A

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 100 GOOD
CONSTRUCTION YEAR: 2013 **ESTIMATED PCI IS:** 100 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 100

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
○	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 120 **DESCRIPTION:** TAXIWAY A2

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 100
FEATURE AREA: 4,483 **FEATURE'S LOW PCI:** 100
INSPECTED AREA: 3,850 **AVERAGE PCI:** 100 GOOD
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 97 in 2013

COMMENTS/HISTORY FOR FEATURE 120, TAXIWAY A2

2012 AC
1995 AC SURFACE ON UNKNOWN SECTION
*
*

DISTRESS QUANTITIES FOR FEATURE 120

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	0 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

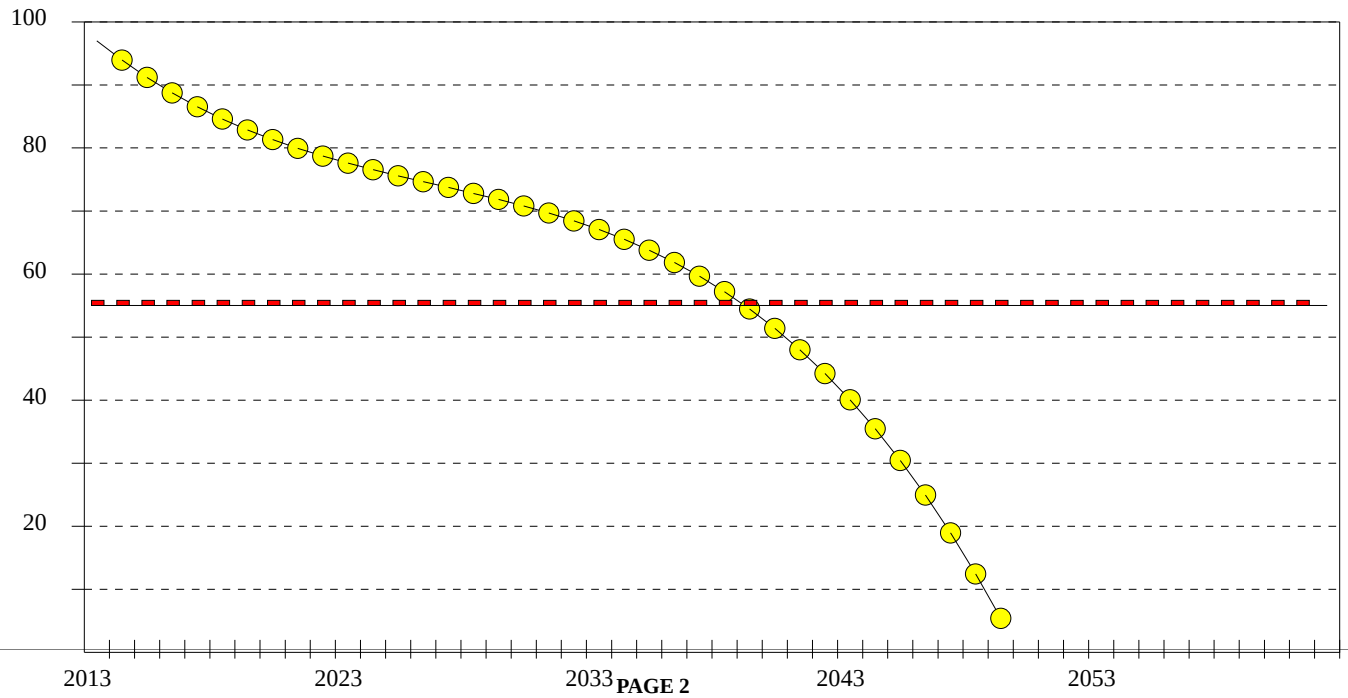
FEATURE: 120 **DESCRIPTION:** TAXIWAY A2

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 100 GOOD
CONSTRUCTION YEAR: 2012 **ESTIMATED PCI IS:** 97 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 96

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 130 **DESCRIPTION:** TAXIWAY A3

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 100
FEATURE AREA: 4,100 **FEATURE'S LOW PCI:** 100
INSPECTED AREA: 3,670 **AVERAGE PCI:** 100 GOOD
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 97 in 2013

COMMENTS/HISTORY FOR FEATURE 130, TAXIWAY A3

2012 AC
1995 - P401 SURFACE ON UNKNOWN SECTION
*
*

DISTRESS QUANTITIES FOR FEATURE 130

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	0 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

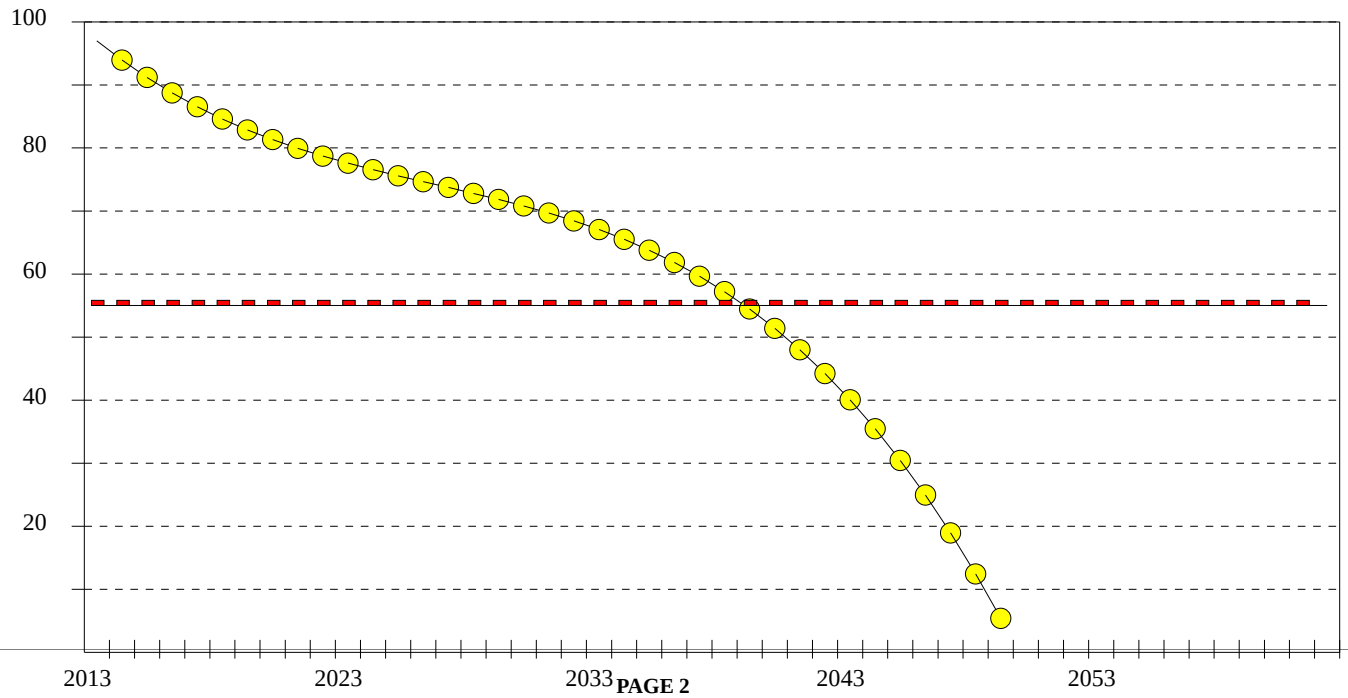
FEATURE: 130 **DESCRIPTION:** TAXIWAY A3

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 100 GOOD
CONSTRUCTION YEAR: 2012 **ESTIMATED PCI IS:** 97 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 96

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 135 **DESCRIPTION:** TAXIWAY A4

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 100
FEATURE AREA: 5,001 **FEATURE'S LOW PCI:** 100
INSPECTED AREA: 4,210 **AVERAGE PCI:** 100 GOOD
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 97 in 2013

COMMENTS/HISTORY FOR FEATURE 135, TAXIWAY A4

2012 AC
1995 - P401 SURFACE ON UNKNOWN SECTION
*
*

DISTRESS QUANTITIES FOR FEATURE 135

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	0 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

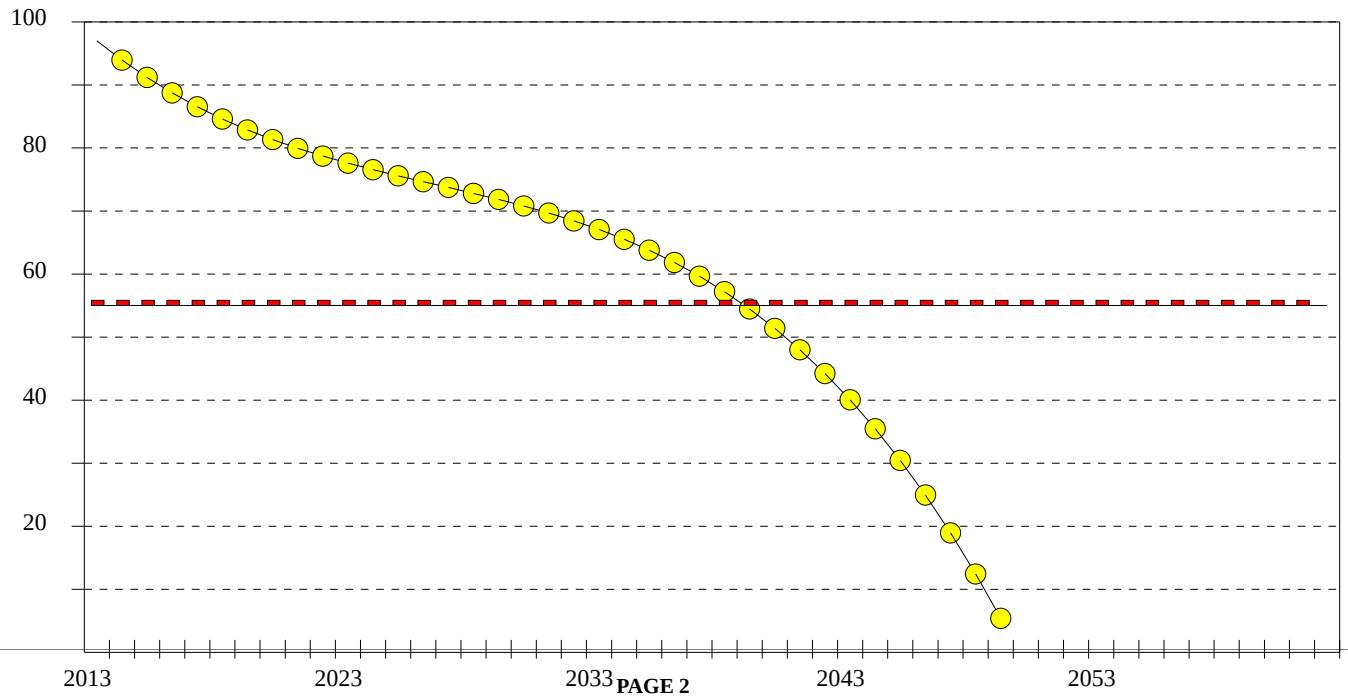
FEATURE: 135 **DESCRIPTION:** TAXIWAY A4

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 100 GOOD
CONSTRUCTION YEAR: 2012 **ESTIMATED PCI IS:** 97 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 96

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 205 **DESCRIPTION:** TAXIWAY B2

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 52
FEATURE AREA: 3,105 **FEATURE'S LOW PCI:** 52
INSPECTED AREA: 2,680 **AVERAGE PCI:** 52 POOR
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 52 in 2013

COMMENTS/HISTORY FOR FEATURE 205, TAXIWAY B2

2003 AC SURFACE est
1983 AC SURFACE ON UNKNOWN SECTION est
*
*

DISTRESS QUANTITIES FOR FEATURE 205

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	MED	6	6	L.F.	6.2
LONG.& TRANS. CRACK	LOW	229	265	L.F.	24.6
RAVELING	HIGH	30	34	S.F.	22.1
RAVELING	MED	500	579	S.F.	32.6
RAVELING	LOW	400	463	S.F.	14.3

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	44 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	56 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

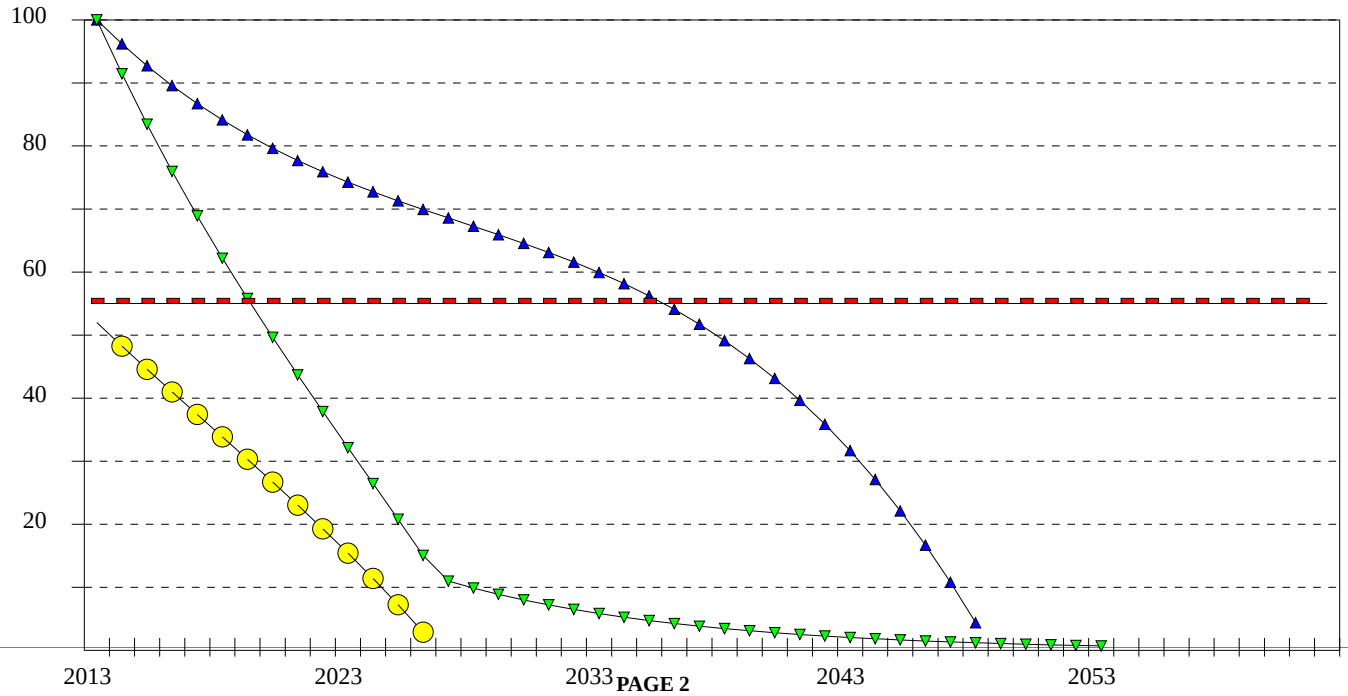
FEATURE: 205 **DESCRIPTION:** TAXIWAY B2

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 52 POOR
CONSTRUCTION YEAR: 2003 **ESTIMATED PCI IS:** 52 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 74

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	$4,471	23 YEARS
▼	SURFACE TREATMENT	$1,218	7 YEARS
○	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 220 **DESCRIPTION:** TAXIWAY B

ANALYSIS YEAR: 2013 **OPTIMIZED FOR:** 2015 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 61
FEATURE AREA: 116,494 **FEATURE'S LOW PCI:** 53
INSPECTED AREA: 28,000 **AVERAGE PCI:** 59 FAIR
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 53 in 2015

COMMENTS/HISTORY FOR FEATURE 220, TAXIWAY B

2003 2" INDOT P-401 Overlay
1991 - UNKNOWN THICKNESS OF P401 OVERLAY
1974 - UNKNOWN AC PAVEMENT SECTION
*

DISTRESS QUANTITIES FOR FEATURE 220

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	MED	252	1,048	L.F.	16.6
LONG.& TRANS. CRACK	LOW	3,344	13,912	L.F.	43.1
RAVELING	HIGH	10	41	S.F.	1.8
RAVELING	MED	1,060	4,410	S.F.	19.5
RAVELING	LOW	2,450	10,193	S.F.	14.1
WEATHERING	MED	700	2,912	S.F.	1.6
WEATHERING	LOW	6,100	25,379	S.F.	3.2

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS: 0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS: 53 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS: 47 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 220 **DESCRIPTION:** TAXIWAY B

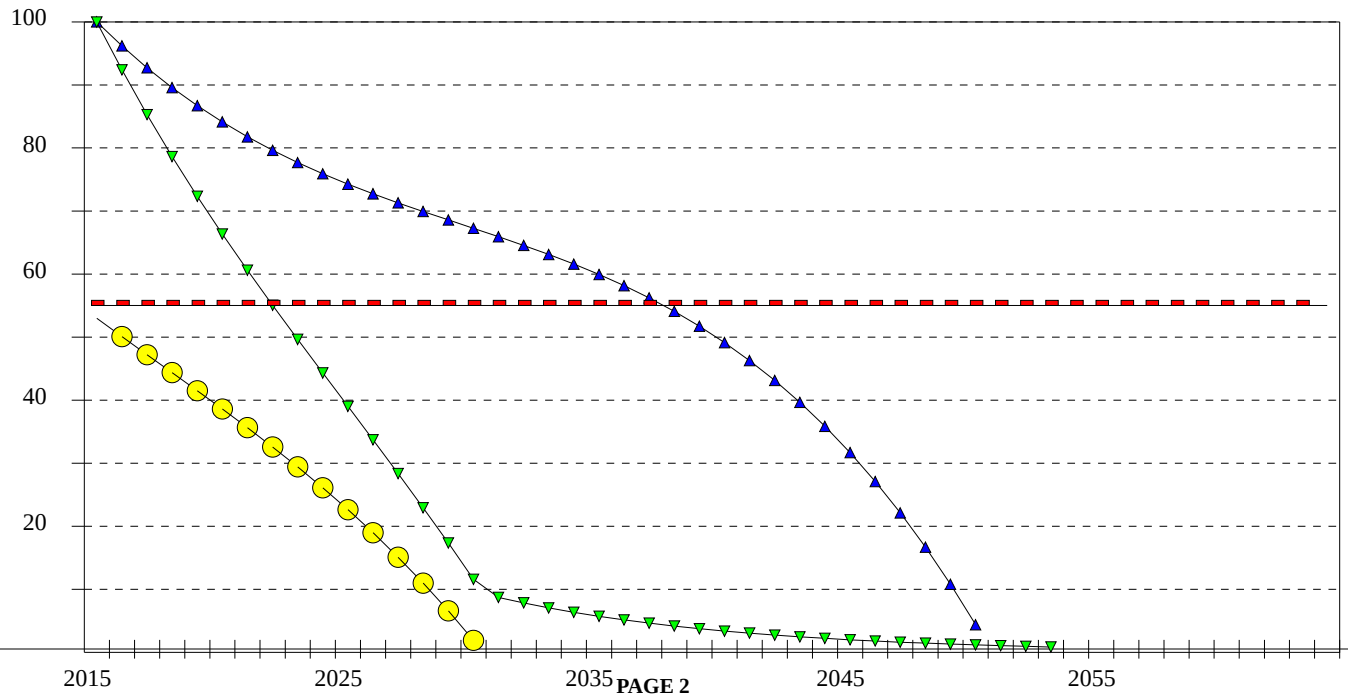
ANALYSIS YEAR: 2013 **OPTIMIZED FOR:** 2015
PAVEMENT TYPE: AC OVERLAY
CONSTRUCTION YEAR: 2003
MINIMUM SERVICE LEVEL: 55

INSPECTION DATE: 9-9-13
AVERAGE PCI AT INSPECTION: 59 FAIR
ESTIMATED PCI IS: 53 in 2015
NORMAL PCI FOR THIS AGE: 71

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	$167,751	23 YEARS
▼	SURFACE TREATMENT	$46,732	8 YEARS
○	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 225 **DESCRIPTION:** TAXIWAY B

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 57
FEATURE AREA: 20,274 **FEATURE'S LOW PCI:** 50
INSPECTED AREA: 9,000 **AVERAGE PCI:** 53 POOR
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 53 in 2013

COMMENTS/HISTORY FOR FEATURE 225, TAXIWAY B

2003 2" INDOT P-401 Overlay
1983 - 2" P401 SURFACE ON 7" P201 AC BASE
*
*

DISTRESS QUANTITIES FOR FEATURE 225

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	MED	55	123	L.F.	8.4
LONG.& TRANS. CRACK	LOW	1,457	3,282	L.F.	39.3
RAVELING	HIGH	43	96	S.F.	12.5
RAVELING	MED	552	1,243	S.F.	21.9
RAVELING	LOW	1,440	3,243	S.F.	16.4
WEATHERING	LOW	900	2,027	S.F.	1.2

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	49 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	51 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

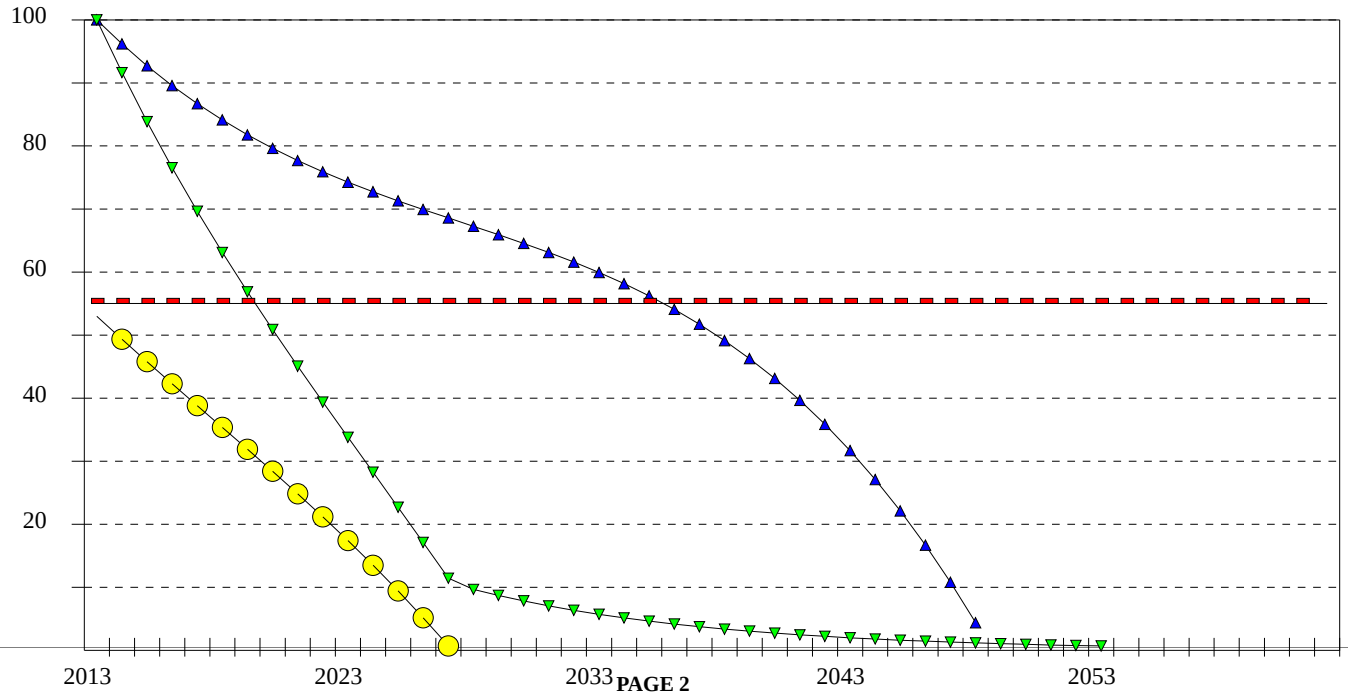
FEATURE: 225 **DESCRIPTION:** TAXIWAY B

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 53 POOR
CONSTRUCTION YEAR: 2003 **ESTIMATED PCI IS:** 53 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 74

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	$29,194	23 YEARS
▼	SURFACE TREATMENT	$8,059	7 YEARS
○	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 245 **DESCRIPTION:** TAXIWAY B4

ANALYSIS YEAR: 2013 **OPTIMIZED FOR:** 2018 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 66
FEATURE AREA: 3,743 **FEATURE'S LOW PCI:** 66
INSPECTED AREA: 3,210 **AVERAGE PCI:** 66 FAIR
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 55 in 2018

COMMENTS/HISTORY FOR FEATURE 245, TAXIWAY B4

2003 2" INDOT P-401 Overlay
1991 - UNKNOWN THICKNESS AC OVERLAY
1974 - 3" P401 SURFACE ON 4" P209 BASE ON 4" P154 SUBBASE
*

DISTRESS QUANTITIES FOR FEATURE 245

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	MED	85	99	L.F.	34.9
LONG.& TRANS. CRACK	LOW	243	283	L.F.	40.6
RAVELING	MED	10	11	S.F.	13.5
RAVELING	LOW	90	104	S.F.	10.8

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	59 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	41 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 245 **DESCRIPTION:** TAXIWAY B4

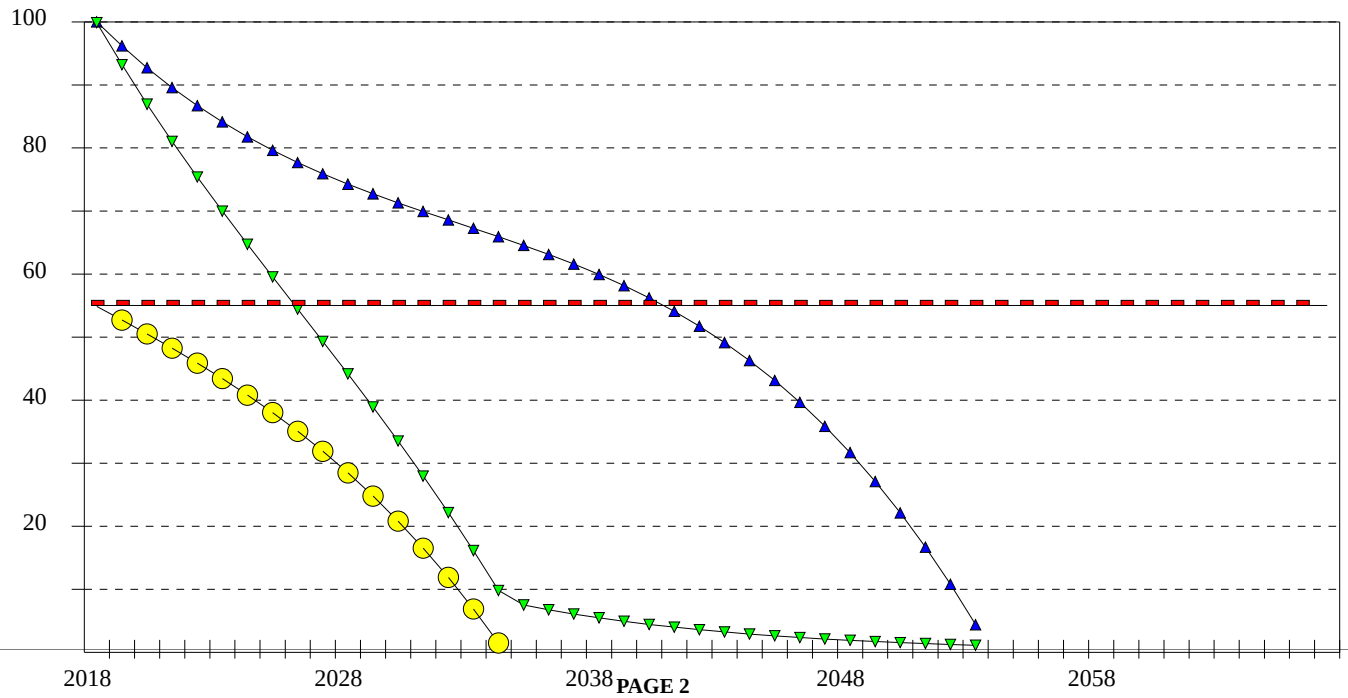
ANALYSIS YEAR: 2013 **OPTIMIZED FOR:** 2018
PAVEMENT TYPE: AC OVERLAY
CONSTRUCTION YEAR: 2003
MINIMUM SERVICE LEVEL: 55

INSPECTION DATE: 9-9-13
AVERAGE PCI AT INSPECTION: 66 FAIR
ESTIMATED PCI IS: 55 in 2018
NORMAL PCI FOR THIS AGE: 67

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	$5,389	23 YEARS
▼	SURFACE TREATMENT	$1,582	8 YEARS
○	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 250 **DESCRIPTION:** TAXIWAY B5

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 100
FEATURE AREA: 4,310 **FEATURE'S LOW PCI:** 100
INSPECTED AREA: 3,080 **AVERAGE PCI:** 100 GOOD
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 97 in 2013

COMMENTS/HISTORY FOR FEATURE 250, TAXIWAY B5

2012 AC
1995 - AC PAVEMENT OF UNKNOWN SECTION
*
*

DISTRESS QUANTITIES FOR FEATURE 250

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	0 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

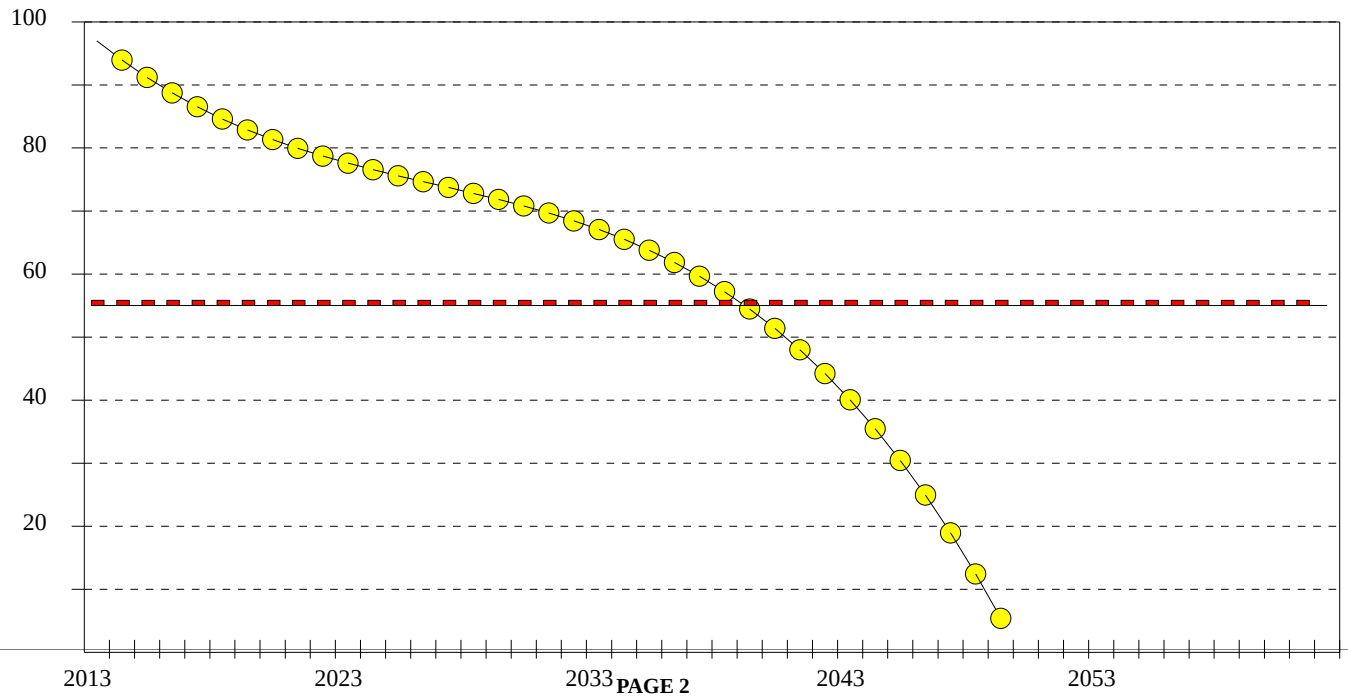
FEATURE: 250 **DESCRIPTION:** TAXIWAY B5

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 100 GOOD
CONSTRUCTION YEAR: 2012 **ESTIMATED PCI IS:** 97 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 96

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 255 **DESCRIPTION:** TAXIWAY B4

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 100
FEATURE AREA: 5,190 **FEATURE'S LOW PCI:** 100
INSPECTED AREA: 4,640 **AVERAGE PCI:** 100 GOOD
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 97 in 2013

COMMENTS/HISTORY FOR FEATURE 255, TAXIWAY B4

2012 AC
1991 - UNKNOWN THICKNESS AC OVERLAY
1974 - 3" P401 SURFACE ON 4" P209 BASE ON 4" P154 SUBBASE
*

DISTRESS QUANTITIES FOR FEATURE 255

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	0 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

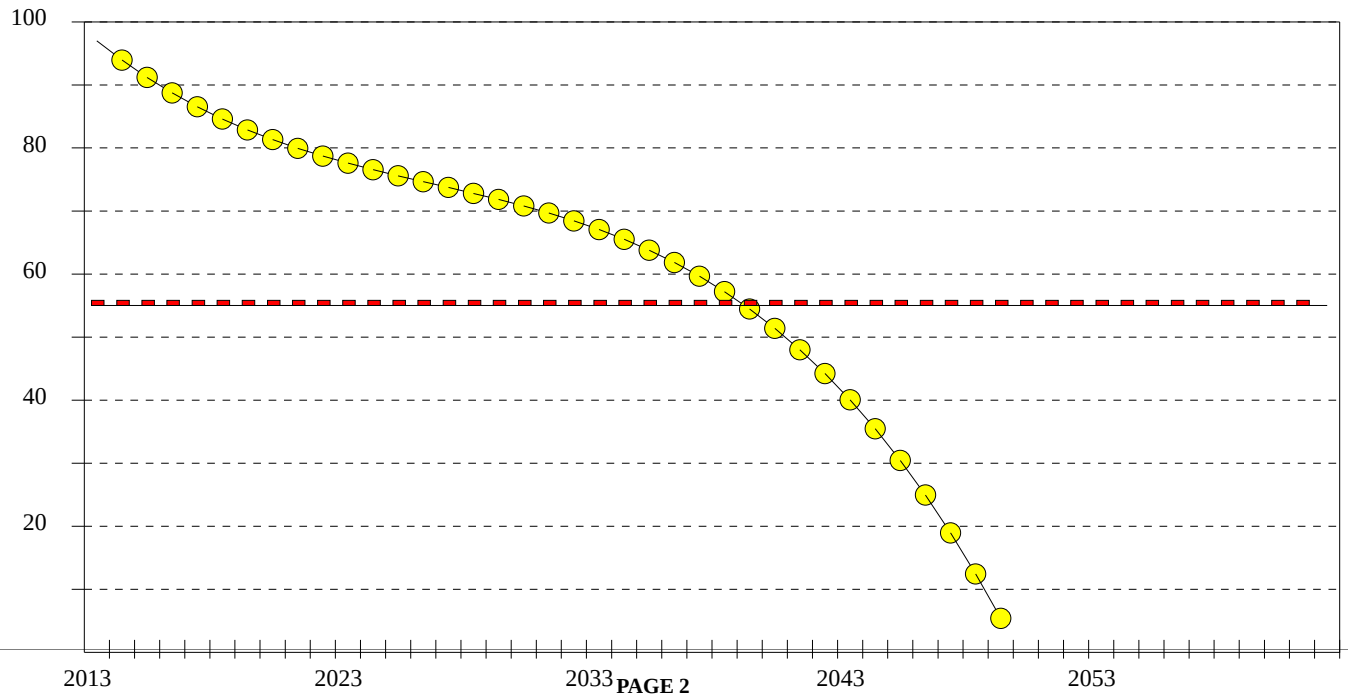
FEATURE: 255 **DESCRIPTION:** TAXIWAY B4

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 100 GOOD
CONSTRUCTION YEAR: 2012 **ESTIMATED PCI IS:** 97 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 96

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 260 **DESCRIPTION:** TAXIWAY B3

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 100
FEATURE AREA: 4,148 **FEATURE'S LOW PCI:** 100
INSPECTED AREA: 3,670 **AVERAGE PCI:** 100 GOOD
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 97 in 2013

COMMENTS/HISTORY FOR FEATURE 260, TAXIWAY B3

2012 AC
1995 - P401 SURFACE ON UNKNOWN SECTION
*
*

DISTRESS QUANTITIES FOR FEATURE 260

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	0 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

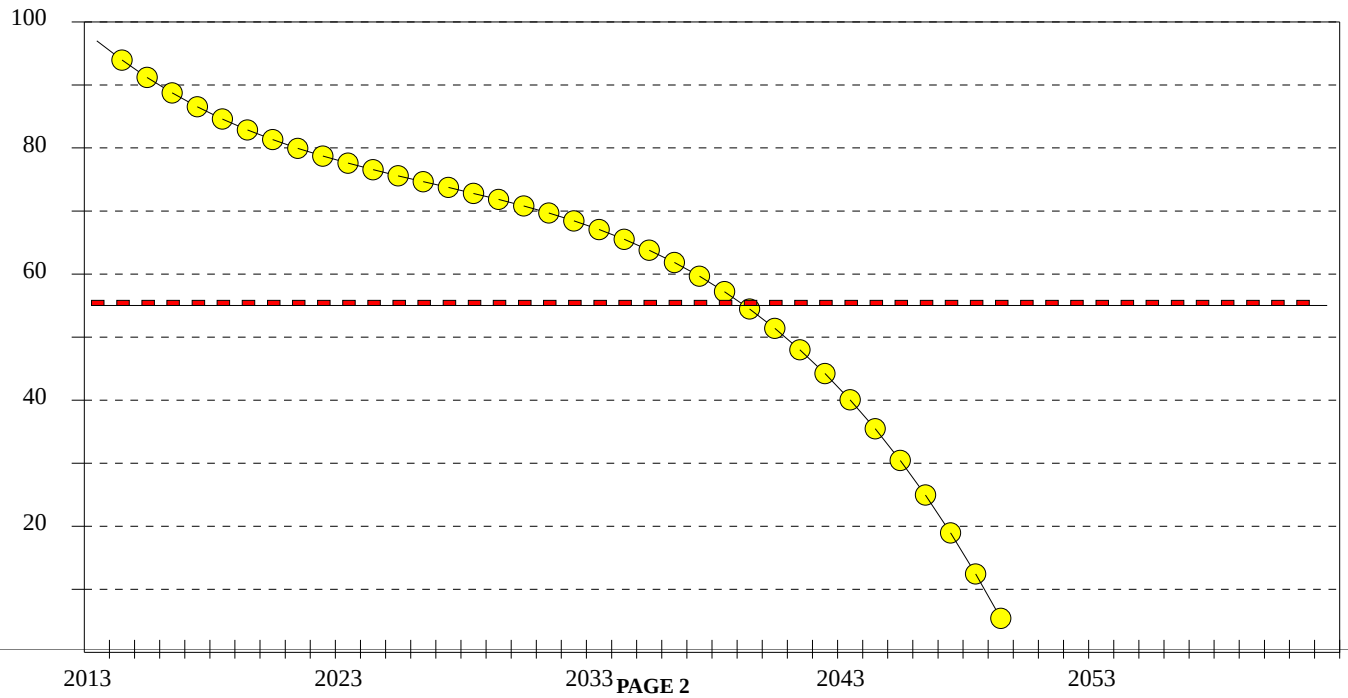
FEATURE: 260 **DESCRIPTION:** TAXIWAY B3

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 100 GOOD
CONSTRUCTION YEAR: 2012 **ESTIMATED PCI IS:** 97 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 96

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 265 **DESCRIPTION:** TAXIWAY B2

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 100
FEATURE AREA: 4,437 **FEATURE'S LOW PCI:** 100
INSPECTED AREA: 4,000 **AVERAGE PCI:** 100 GOOD
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 97 in 2013

COMMENTS/HISTORY FOR FEATURE 265, TAXIWAY B2

2012 AC
1995 - P401 SURFACE ON UNKNOWN SECTION
*
*

DISTRESS QUANTITIES FOR FEATURE 265

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	0 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

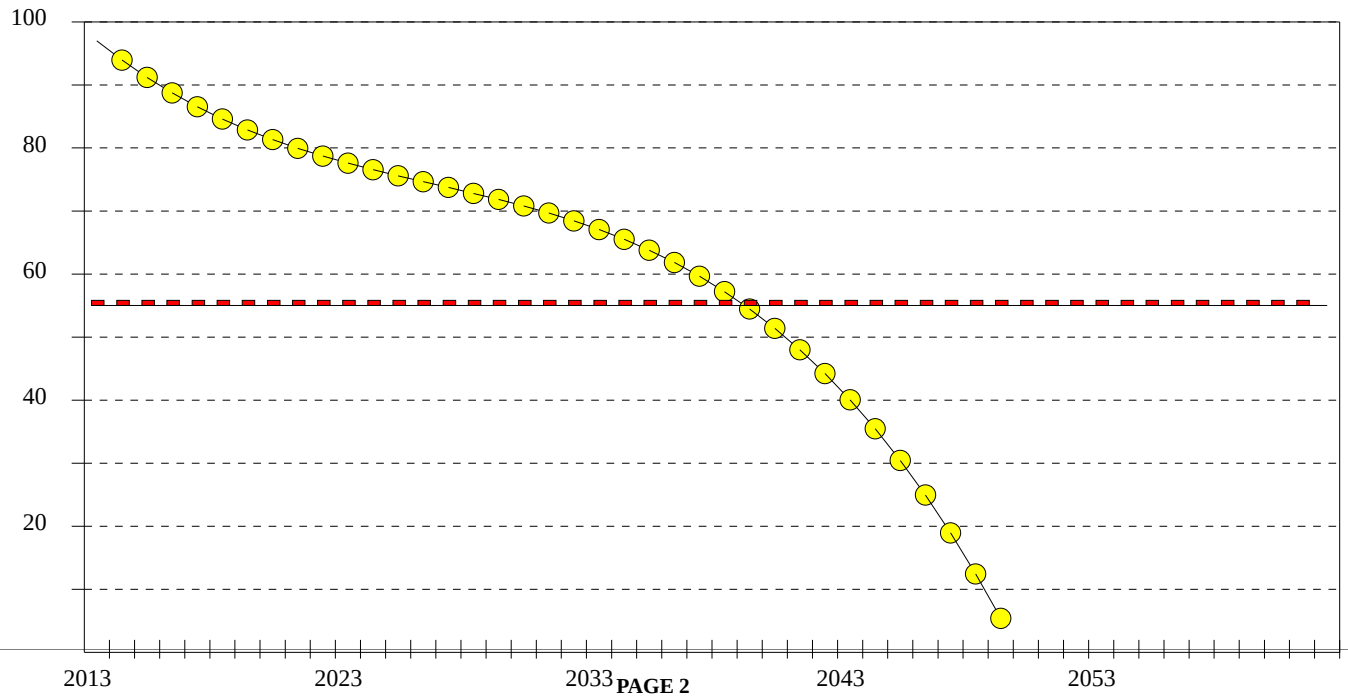
FEATURE: 265 **DESCRIPTION:** TAXIWAY B2

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 100 GOOD
CONSTRUCTION YEAR: 2012 **ESTIMATED PCI IS:** 97 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 96

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 270 **DESCRIPTION:** TAXIWAY B1

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 100
FEATURE AREA: 4,175 **FEATURE'S LOW PCI:** 100
INSPECTED AREA: 4,175 **AVERAGE PCI:** 100 GOOD
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 97 in 2013

COMMENTS/HISTORY FOR FEATURE 270, TAXIWAY B1

2012 AC
1995 - P401 SURFACE ON UNKNOWN SECTION
*
*

DISTRESS QUANTITIES FOR FEATURE 270

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	0 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

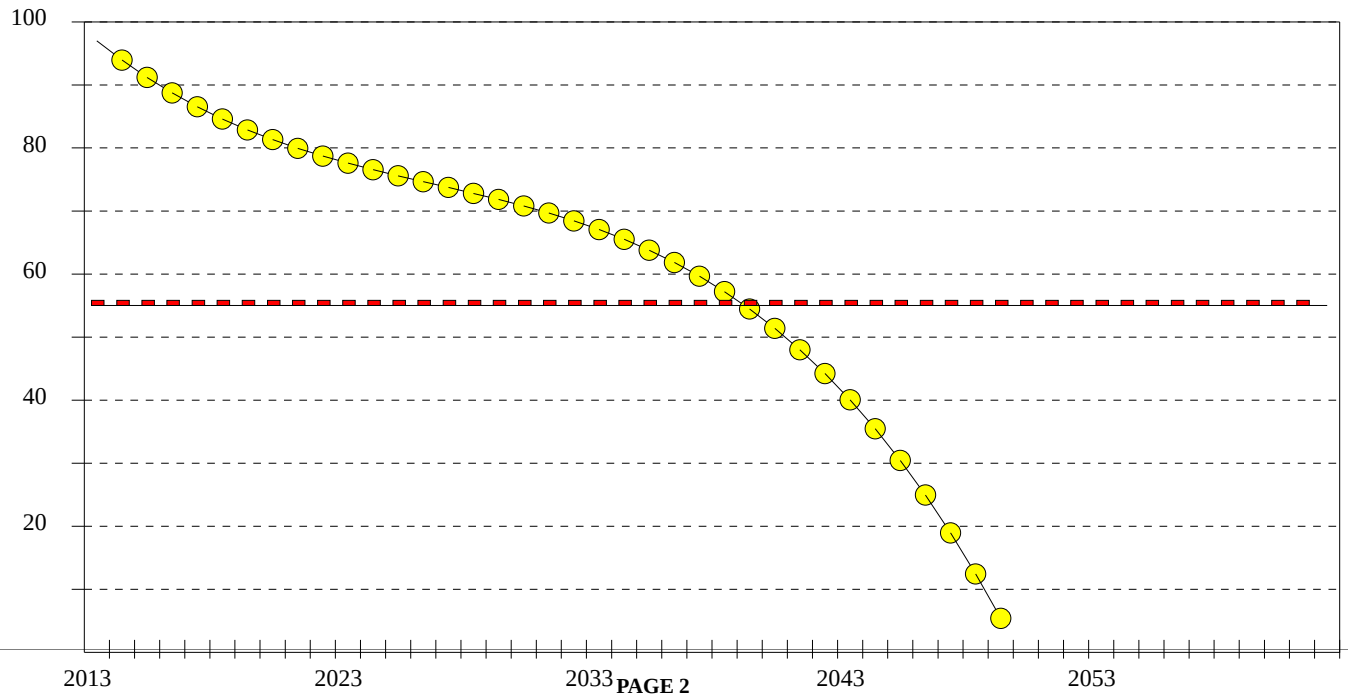
FEATURE: 270 **DESCRIPTION:** TAXIWAY B1

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 100 GOOD
CONSTRUCTION YEAR: 2012 **ESTIMATED PCI IS:** 97 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 96

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 305 **DESCRIPTION:** TAXIWAY B3

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 51
FEATURE AREA: 3,355 **FEATURE'S LOW PCI:** 51
INSPECTED AREA: 2,770 **AVERAGE PCI:** 51 POOR
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 51 in 2013

COMMENTS/HISTORY FOR FEATURE 305, TAXIWAY B3

2003 P-401 Overlay
*
*
*

DISTRESS QUANTITIES FOR FEATURE 305

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	MED	47	56	L.F.	13.7
LONG.& TRANS. CRACK	LOW	424	513	L.F.	31.2
RAVELING	HIGH	20	24	S.F.	15.3
RAVELING	MED	220	266	S.F.	20.1
RAVELING	LOW	1,000	1,211	S.F.	19.4

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	48 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	52 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

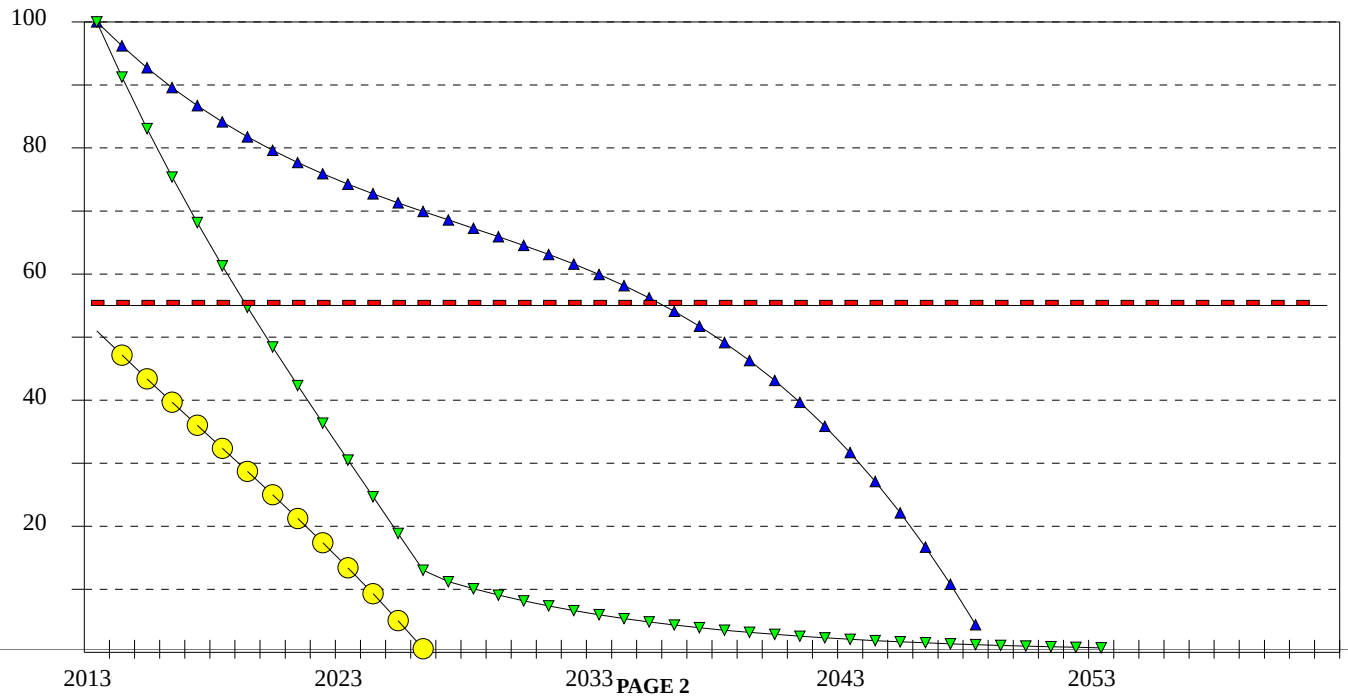
FEATURE: 305 **DESCRIPTION:** TAXIWAY B3

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 51 POOR
CONSTRUCTION YEAR: 2003 **ESTIMATED PCI IS:** 51 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 74

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	$4,831	23 YEARS
▼	SURFACE TREATMENT	$1,377	6 YEARS
○	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 605 **DESCRIPTION:** TAXIWAY TO RAMP

ANALYSIS YEAR: 2013 **OPTIMIZED FOR:** 2018 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 66
FEATURE AREA: 5,300 **FEATURE'S LOW PCI:** 66
INSPECTED AREA: 5,300 **AVERAGE PCI:** 66 FAIR
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 55 in 2018

COMMENTS/HISTORY FOR FEATURE 605, TAXIWAY TO RAMP

2003 2" INDOT P-401 Overlay
1994 10.5" P401 ON 12" P154
*
*

DISTRESS QUANTITIES FOR FEATURE 605

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	LOW	435	435	L.F.	50.4
RAVELING	HIGH	3	3	S.F.	17.4
RAVELING	MED	63	63	S.F.	21.7
RAVELING	LOW	100	100	S.F.	10.3

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	50 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	50 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 605 **DESCRIPTION:** TAXIWAY TO RAMP

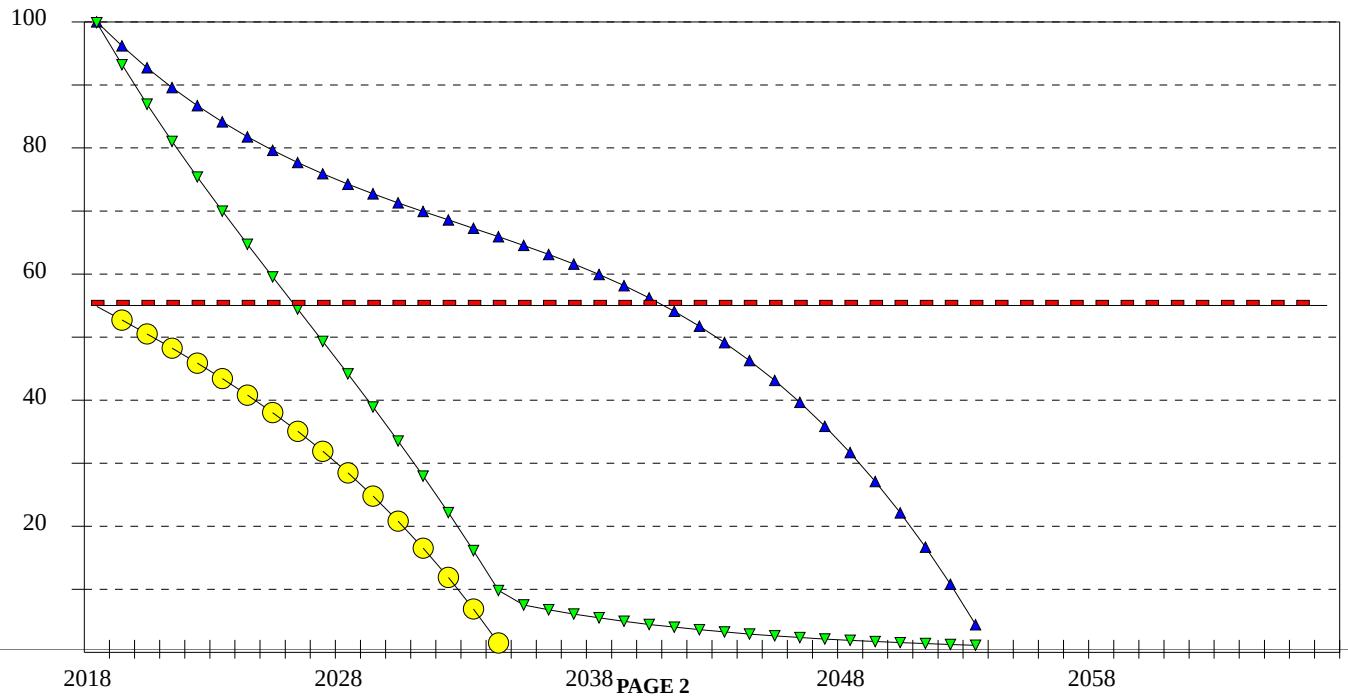
ANALYSIS YEAR: 2013 **OPTIMIZED FOR:** 2018
PAVEMENT TYPE: AC OVERLAY
CONSTRUCTION YEAR: 2003
MINIMUM SERVICE LEVEL: 55

INSPECTION DATE: 9-9-13
AVERAGE PCI AT INSPECTION: 66 FAIR
ESTIMATED PCI IS: 55 in 2018
NORMAL PCI FOR THIS AGE: 67

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	$7,632	23 YEARS
▼	SURFACE TREATMENT	$2,066	8 YEARS
○	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 610 **DESCRIPTION:** TAXIWAY TO RAMP

ANALYSIS YEAR: 2013 **OPTIMIZED FOR:** 2015 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 66
FEATURE AREA: 8,332 **FEATURE'S LOW PCI:** 53
INSPECTED AREA: 7,980 **AVERAGE PCI:** 60 FAIR
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 54 in 2015

COMMENTS/HISTORY FOR FEATURE 610, TAXIWAY TO RAMP

2003 2" INDOT P-401 Overlay
1983 - 4" P401 OVERLAY
1967 - 2" P401 SURFACE ON 4" P209 BASE ON 4" P154 SUBBASE
*

DISTRESS QUANTITIES FOR FEATURE 610

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	MED	40	41	L.F.	11.1
LONG.& TRANS. CRACK	LOW	735	767	L.F.	33.7
RAVELING	MED	285	297	S.F.	20.8
RUTTING	MED	10	10	S.F.	12.8
RUTTING	LOW	12	12	S.F.	9.1
SWELL	LOW	20	20	S.F.	1.3
WEATHERING	MED	800	835	S.F.	8.6
WEATHERING	LOW	900	939	S.F.	2.3

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS: 15 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS: 49 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS: 36 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 610 **DESCRIPTION:** TAXIWAY TO RAMP

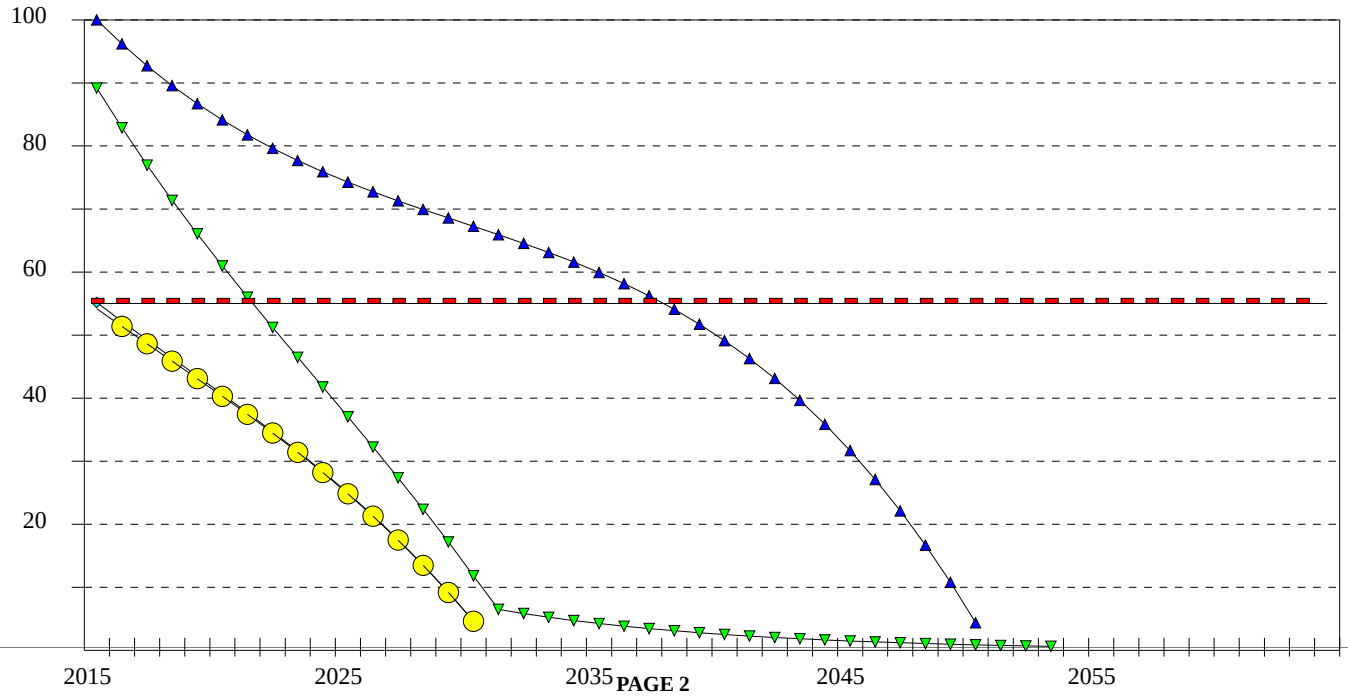
ANALYSIS YEAR: 2013 **OPTIMIZED FOR:** 2015
PAVEMENT TYPE: AC OVERLAY
CONSTRUCTION YEAR: 2003
MINIMUM SERVICE LEVEL: 55

INSPECTION DATE: 9-9-13
AVERAGE PCI AT INSPECTION: 60 FAIR
ESTIMATED PCI IS: 54 in 2015
NORMAL PCI FOR THIS AGE: 71

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	$11,998	23 YEARS
▼	SURFACE TREATMENT	$3,300	7 YEARS
◆	CRACK REPAIR	$1,001	1 YEAR
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 615 **DESCRIPTION:** TAXIWAY TO RAMP

ANALYSIS YEAR: 2013 **OPTIMIZED FOR:** 2015 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 59
FEATURE AREA: 6,356 **FEATURE'S LOW PCI:** 59
INSPECTED AREA: 6,356 **AVERAGE PCI:** 59 FAIR
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 53 in 2015

COMMENTS/HISTORY FOR FEATURE 615, TAXIWAY TO RAMP

2003 2" INDOT P-401 Overlay
1994 10.5" P401 ON 12" P154
*
*

DISTRESS QUANTITIES FOR FEATURE 615

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	MED	20	20	L.F.	10.3
LONG.& TRANS. CRACK	LOW	552	552	L.F.	35.7
RAVELING	HIGH	38	38	S.F.	22
RAVELING	MED	180	180	S.F.	20.2
RAVELING	LOW	300	300	S.F.	11.5

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	49 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	51 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 615 **DESCRIPTION:** TAXIWAY TO RAMP

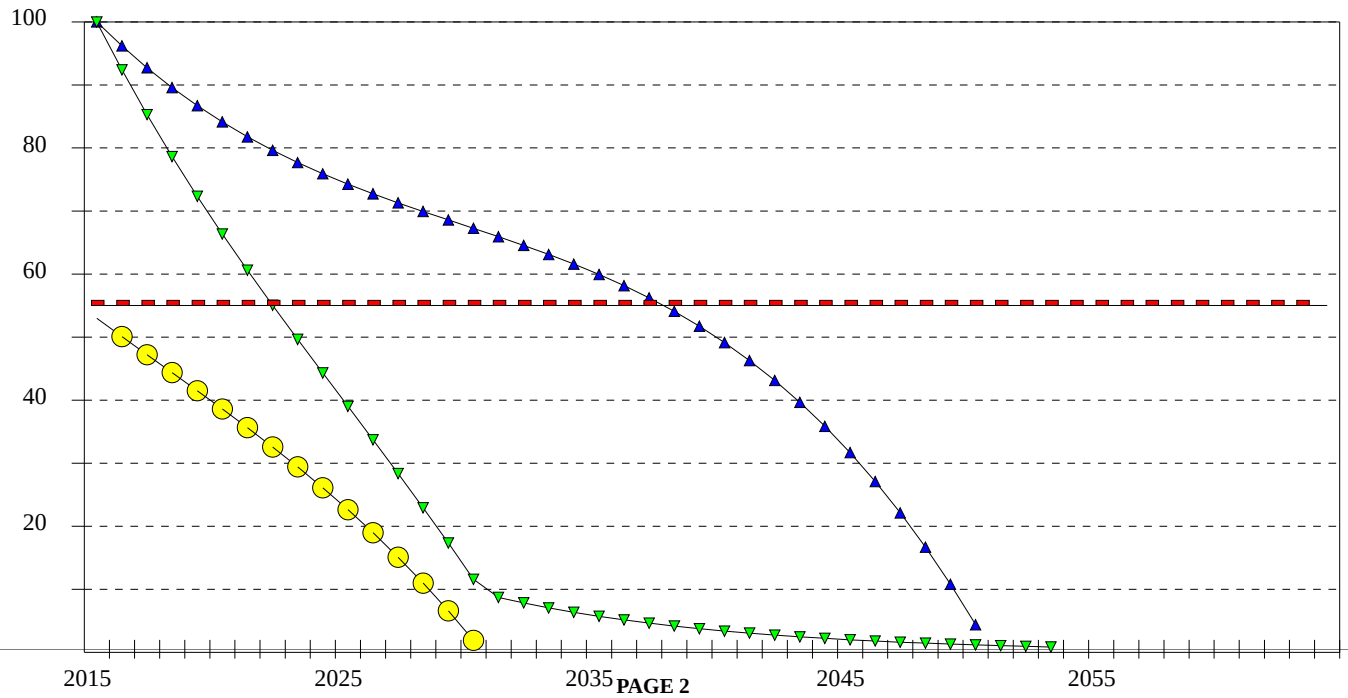
ANALYSIS YEAR: 2013 **OPTIMIZED FOR:** 2015
PAVEMENT TYPE: AC OVERLAY
CONSTRUCTION YEAR: 2003
MINIMUM SERVICE LEVEL: 55

INSPECTION DATE: 9-9-13
AVERAGE PCI AT INSPECTION: 59 FAIR
ESTIMATED PCI IS: 53 in 2015
NORMAL PCI FOR THIS AGE: 71

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	$9,152	23 YEARS
▼	SURFACE TREATMENT	$2,503	8 YEARS
○	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3002 **DESCRIPTION:** WEST RAMP

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: PCC **FEATURE'S HIGH PCI:** 100
FEATURE AREA: 146,023 **FEATURE'S LOW PCI:** 74
INSPECTED AREA: 32,195 **AVERAGE PCI:** 93 GOOD
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 93 in 2013

COMMENTS/HISTORY FOR FEATURE 3002, WEST RAMP

1984 - 8" P501 PCC PAVEMENT
*
*
*

DISTRESS QUANTITIES FOR FEATURE 3002

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS
LONG/TRAN/DIAG CRK.	LOW	1	4	SLABS	6
JOINT SEAL DAMAGE	LOW	20	90	SLABS	2.8
SETTLEMENT/FAULT	LOW	10	45	SLABS	54.8
DIVIDED SLAB	MED	1	4	SLABS	28
SPALLING-JOINTS	MED	1	4	SLABS	5.2
SPALLING-CORNERS	LOW	1	4	SLABS	3.1

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS: 62 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS: 30 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS: 9 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

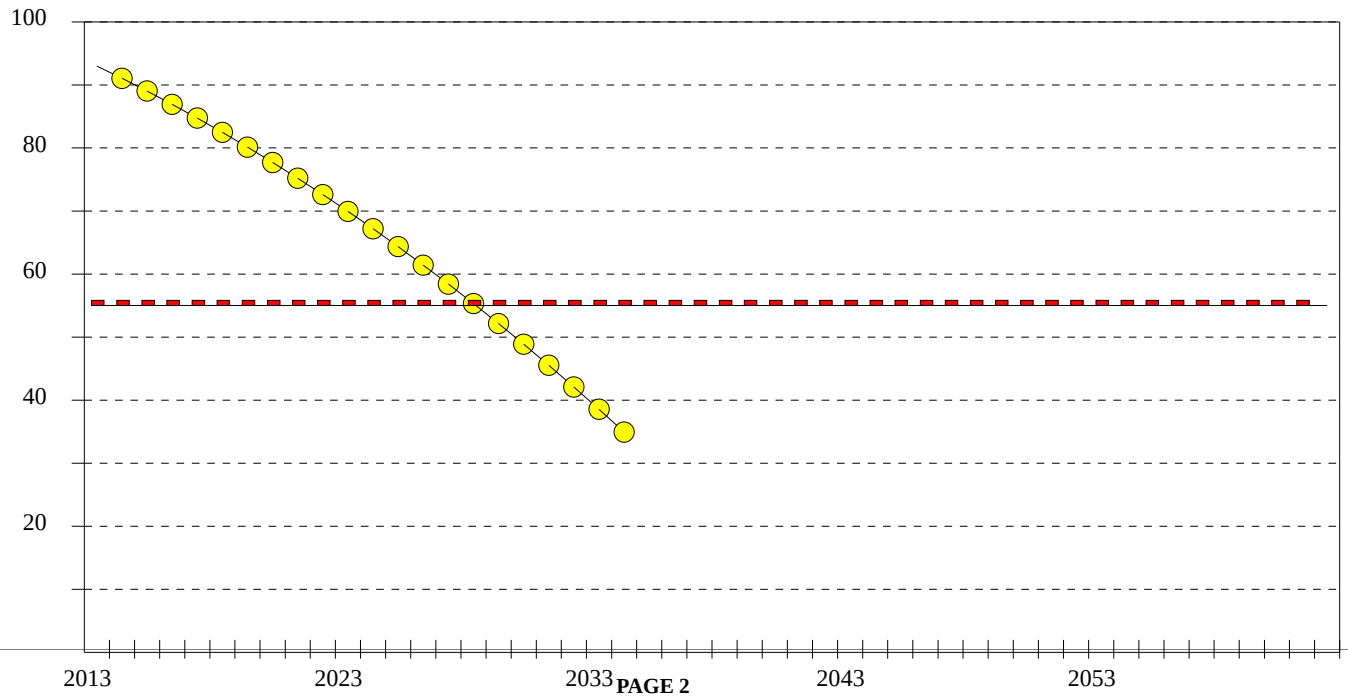
FEATURE: 3002 **DESCRIPTION:** WEST RAMP

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: PCC **AVERAGE PCI AT INSPECTION:** 93 GOOD
CONSTRUCTION YEAR: 1984 **ESTIMATED PCI IS:** 93 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 57

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3005 **DESCRIPTION:** EAST RAMP

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC **FEATURE'S HIGH PCI:** 77
FEATURE AREA: 57,183 **FEATURE'S LOW PCI:** 71
INSPECTED AREA: 27,500 **AVERAGE PCI:** 75 SATISFACTORY
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 75 in 2013

COMMENTS/HISTORY FOR FEATURE 3005, EAST RAMP

1999: 2.5" P401 / 4" P401 / 6" P209 / 16" P155
Emulsion Seal
*
*

DISTRESS QUANTITIES FOR FEATURE 3005

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	LOW	19	19	S.F.	.9
LONG.& TRANS. CRACK	LOW	1,178	2,538	L.F.	37.8
LONG.& TRANS. CRACK	MED	407	909	L.F.	37
LONG.& TRANS. CRACK	HIGH	11	13	L.F.	5.5
PATCH & UTILITY CUT	LOW	46	106	S.F.	3.3
RAVELING	LOW	200	463	S.F.	4
RAVELING	HIGH	2	4	S.F.	5

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	3 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	62 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	35 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

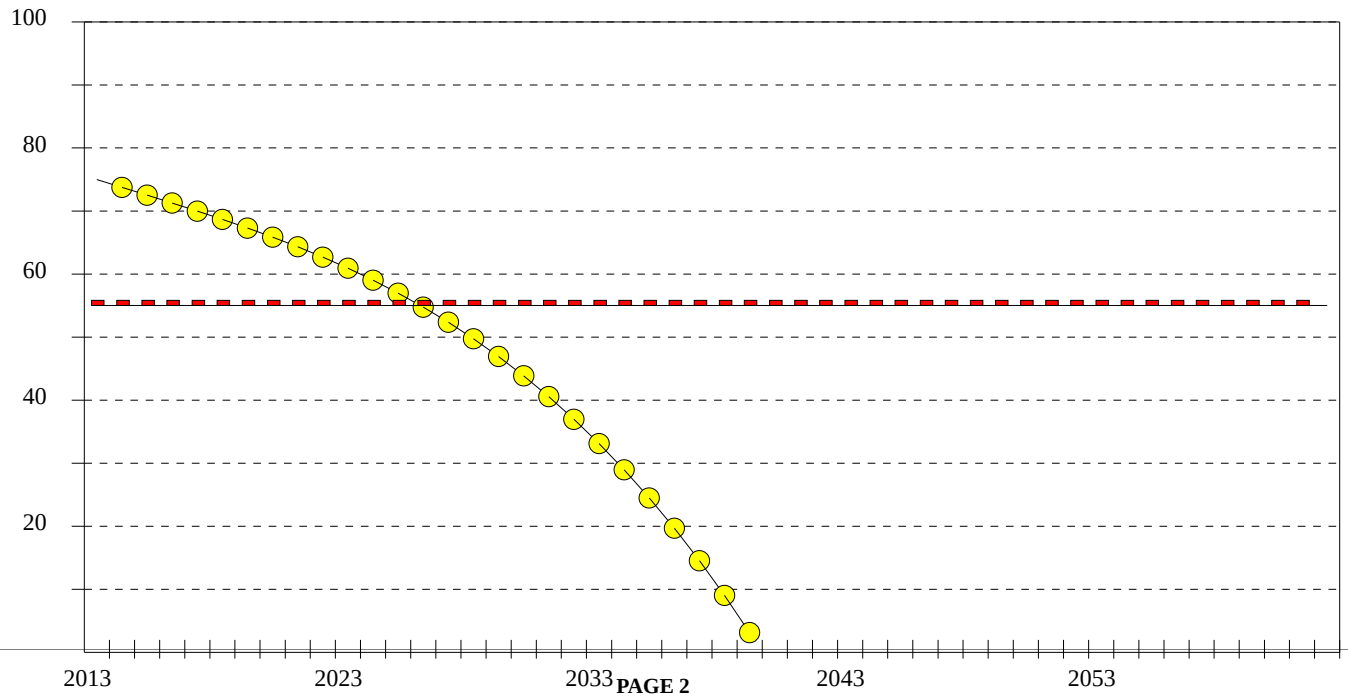
FEATURE: 3005 **DESCRIPTION:** EAST RAMP

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC **AVERAGE PCI AT INSPECTION:** 75 SATISFACTORY
CONSTRUCTION YEAR: 1999 **ESTIMATED PCI IS:** 75 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 70

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
○	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3010 **DESCRIPTION:** EAST RAMP

ANALYSIS YEAR: 2013 **OPTIMIZED FOR:** 2016 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC **FEATURE'S HIGH PCI:** 59
FEATURE AREA: 25,122 **FEATURE'S LOW PCI:** 58
INSPECTED AREA: 12,750 **AVERAGE PCI:** 59 FAIR
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 53 in 2016

COMMENTS/HISTORY FOR FEATURE 3010, EAST RAMP

1995 AC est
*
*
*

DISTRESS QUANTITIES FOR FEATURE 3010

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	LOW	11	21	S.F.	7.5
LONG.& TRANS. CRACK	MED	349	687	L.F.	24
LONG.& TRANS. CRACK	LOW	785	1,546	L.F.	23.1
RAVELING	MED	340	669	S.F.	11.9
RAVELING	LOW	7,500	14,777	S.F.	30.8
WEATHERING	LOW	2,500	4,925	S.F.	2.4

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	8 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	47 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	46 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3010 **DESCRIPTION:** EAST RAMP

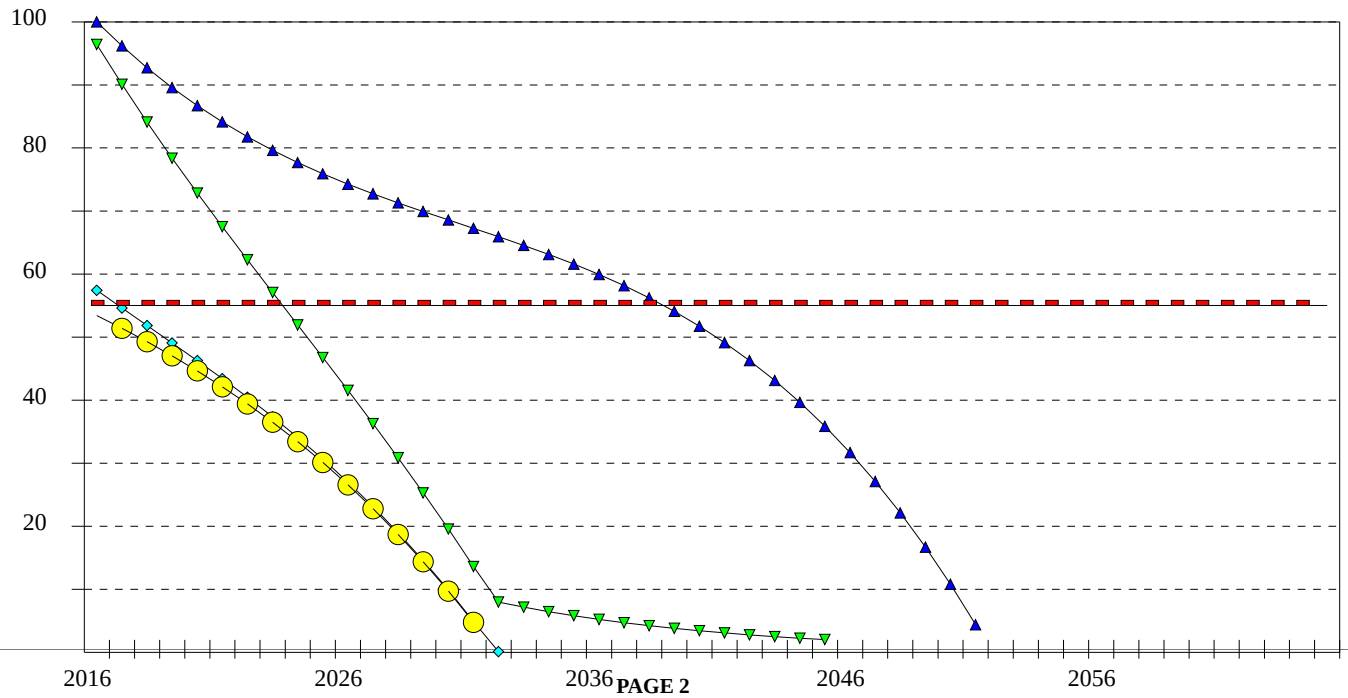
ANALYSIS YEAR: 2013 **OPTIMIZED FOR:** 2016
PAVEMENT TYPE: AC
CONSTRUCTION YEAR: 1995
MINIMUM SERVICE LEVEL: 55

INSPECTION DATE: 9-9-13
AVERAGE PCI AT INSPECTION: 59 FAIR
ESTIMATED PCI IS: 53 in 2016
NORMAL PCI FOR THIS AGE: 60

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	$36,175	23 YEARS
▼	SURFACE TREATMENT	$10,649	8 YEARS
◆	CRACK REPAIR	$2,768	1 YEAR
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3015 **DESCRIPTION:** EAST RAMP

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 100
FEATURE AREA: 103,678 **FEATURE'S LOW PCI:** 100
INSPECTED AREA: 35,000 **AVERAGE PCI:** 100 GOOD
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 97 in 2013

COMMENTS/HISTORY FOR FEATURE 3015, EAST RAMP

2012 AC
Emulsion Seal
1983 - 4" P401 OVERLAY
1967 - 2" P401 SURFACE ON 4" P209 BASE ON 4" P154 SUBBASE

DISTRESS QUANTITIES FOR FEATURE 3015

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	0 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

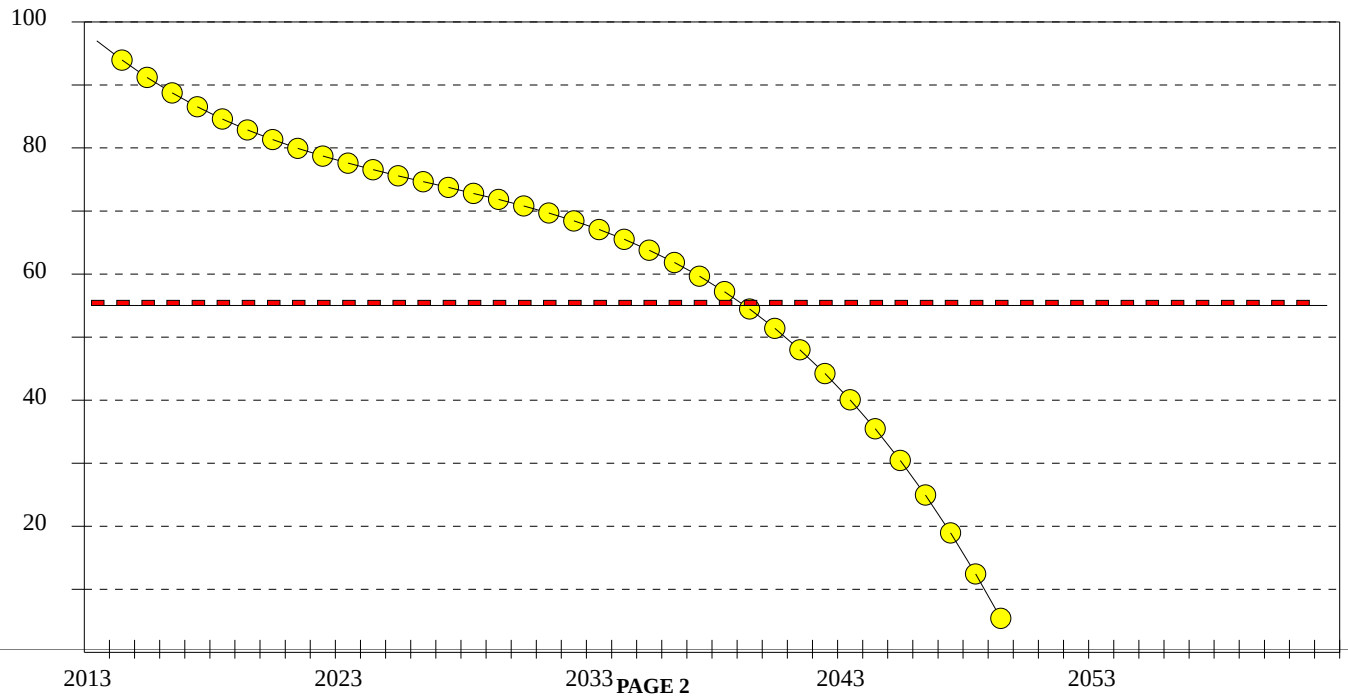
FEATURE: 3015 **DESCRIPTION:** EAST RAMP

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 100 GOOD
CONSTRUCTION YEAR: 2012 **ESTIMATED PCI IS:** 97 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 96

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3025 **DESCRIPTION:** WEST RAMP

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: PCC **FEATURE'S HIGH PCI:** 100
FEATURE AREA: 114,892 **FEATURE'S LOW PCI:** 71
INSPECTED AREA: 28,350 **AVERAGE PCI:** 92 GOOD
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 92 in 2013

COMMENTS/HISTORY FOR FEATURE 3025, WEST RAMP

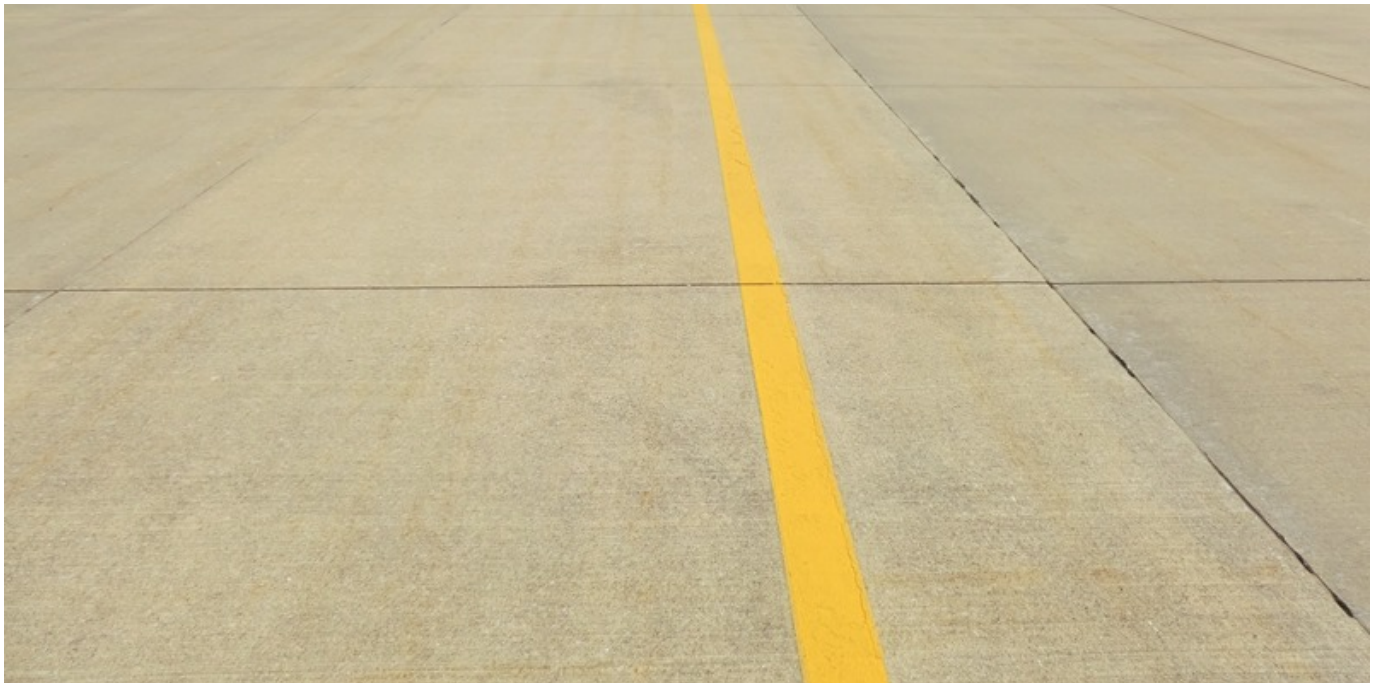
1994: 8" P-501 / 6" P-209 / 12" P-154
*
*
*

DISTRESS QUANTITIES FOR FEATURE 3025

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS
JOINT SEAL DAMAGE	LOW	100	405	SLABS	13.7
PATCH<5 SF	LOW	1	4	SLABS	.8
SCALING/CRAZING	MED	1	4	SLABS	7
SPALLING-CORNERS	MED	5	20	SLABS	24
SPALLING-CORNERS	LOW	3	12	SLABS	9.1
ALKALI SILICA	MED	2	8	SLABS	30.9
ALKALI SILICA	LOW	2	8	SLABS	14.1

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS: 11 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS: 51 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS: 38 %



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

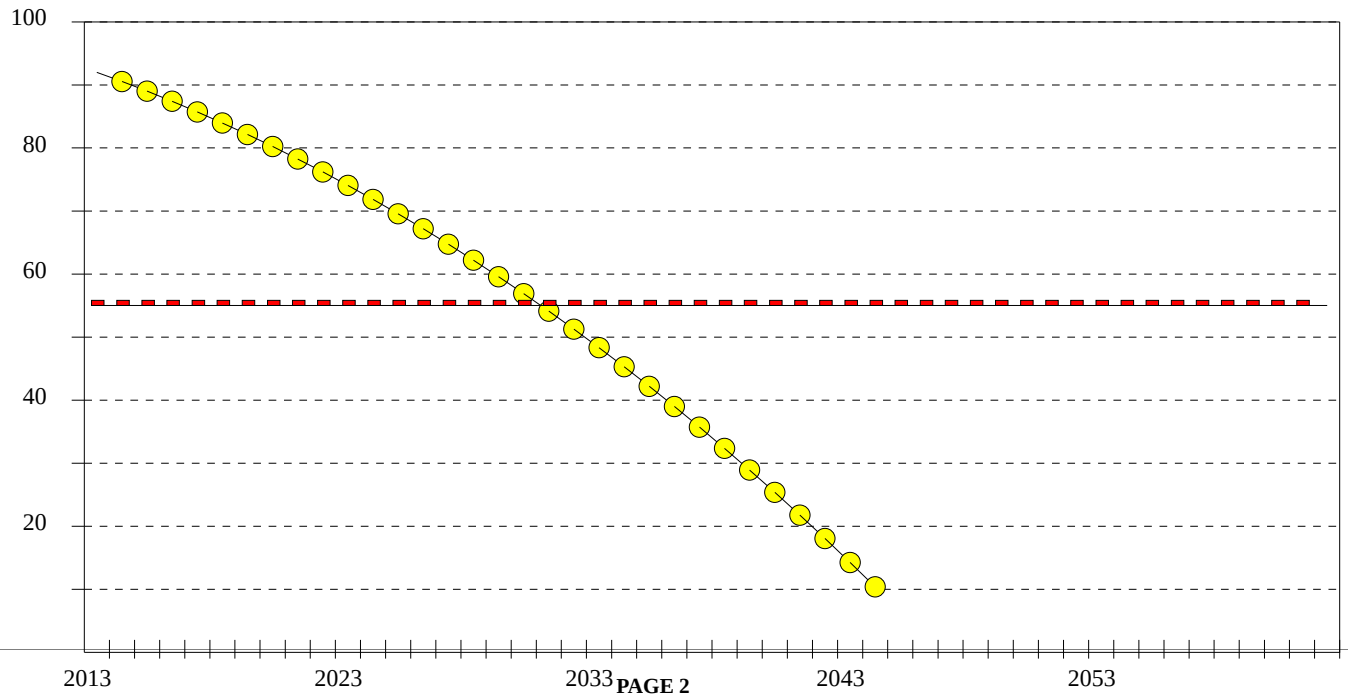
FEATURE: 3025 **DESCRIPTION:** WEST RAMP

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: PCC **AVERAGE PCI AT INSPECTION:** 92 GOOD
CONSTRUCTION YEAR: 1994 **ESTIMATED PCI IS:** 92 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 79

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
○	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 4005 **DESCRIPTION:** RUNWAY 21 RUNUP

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 55
FEATURE AREA: 11,598 **FEATURE'S LOW PCI:** 41
INSPECTED AREA: 6,800 **AVERAGE PCI:** 48 POOR
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 48 in 2013

COMMENTS/HISTORY FOR FEATURE 4005, RUNWAY 21 RUNUP

2003 - P-401 Overlay
1983 - 2" P401 SURFACE ON 7" P201 AC BASE
*
*

DISTRESS QUANTITIES FOR FEATURE 4005

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	MED	20	34	L.F.	6.6
LONG.& TRANS. CRACK	LOW	975	1,662	L.F.	31.4
RAVELING	HIGH	105	179	S.F.	19.2
RAVELING	MED	411	701	S.F.	17.9
RAVELING	LOW	2,350	4,008	S.F.	19.5
RUTTING	LOW	2	3	S.F.	4.5
SWELL	LOW	5	8	S.F.	.7

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	3 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	47 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	50 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

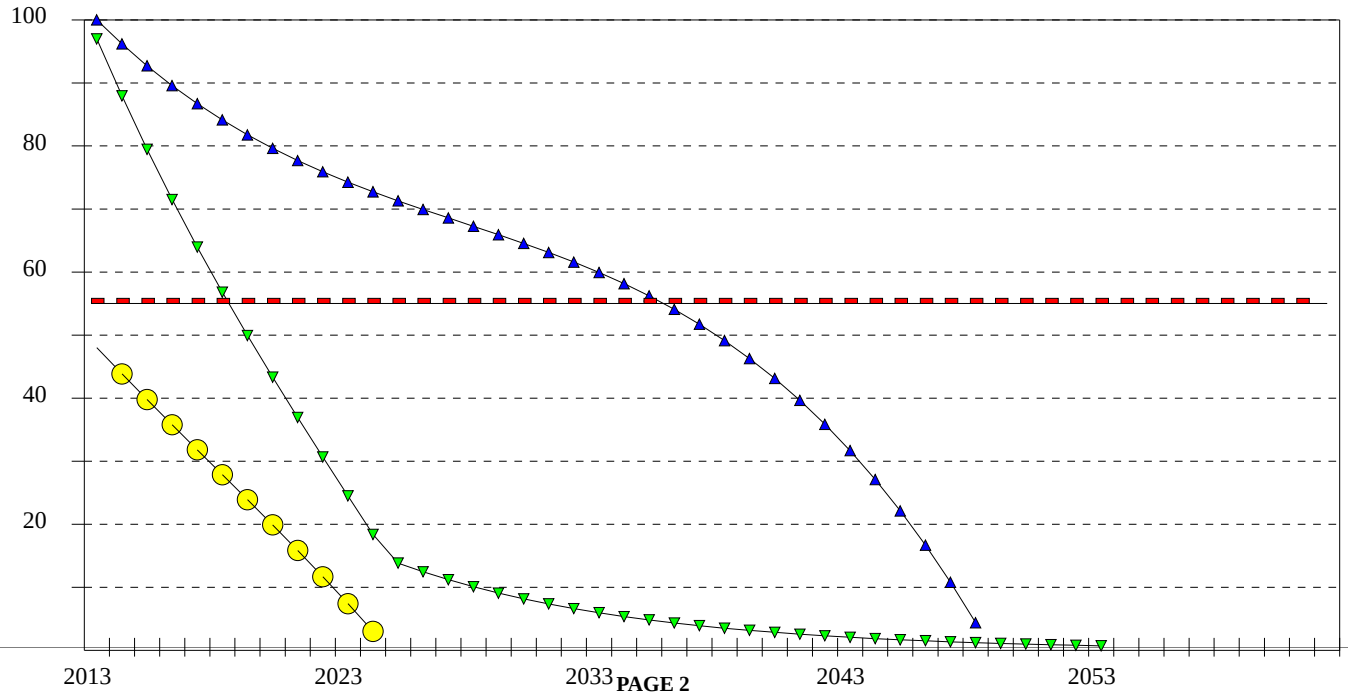
FEATURE: 4005 **DESCRIPTION:** RUNWAY 21 RUNUP

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 48 POOR
CONSTRUCTION YEAR: 2003 **ESTIMATED PCI IS:** 48 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 74

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	$16,701	23 YEARS
▼	SURFACE TREATMENT	$4,565	6 YEARS
○	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 4010 **DESCRIPTION:** RUNWAY 21 RUNUP

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 12-4-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 100
FEATURE AREA: 11,754 **FEATURE'S LOW PCI:** 100
INSPECTED AREA: 10,000 **AVERAGE PCI:** 100 GOOD
MINIMUM SERVICE LEVEL: 55 **ESTIMATED PCI IS:** 100 in 2013

COMMENTS/HISTORY FOR FEATURE 4010, RUNWAY 21 RUNUP

2013 AC mill and overlay
1983 - 2" P401 on 7" P201 Base
*
*

DISTRESS QUANTITIES FOR FEATURE 4010

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	0 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

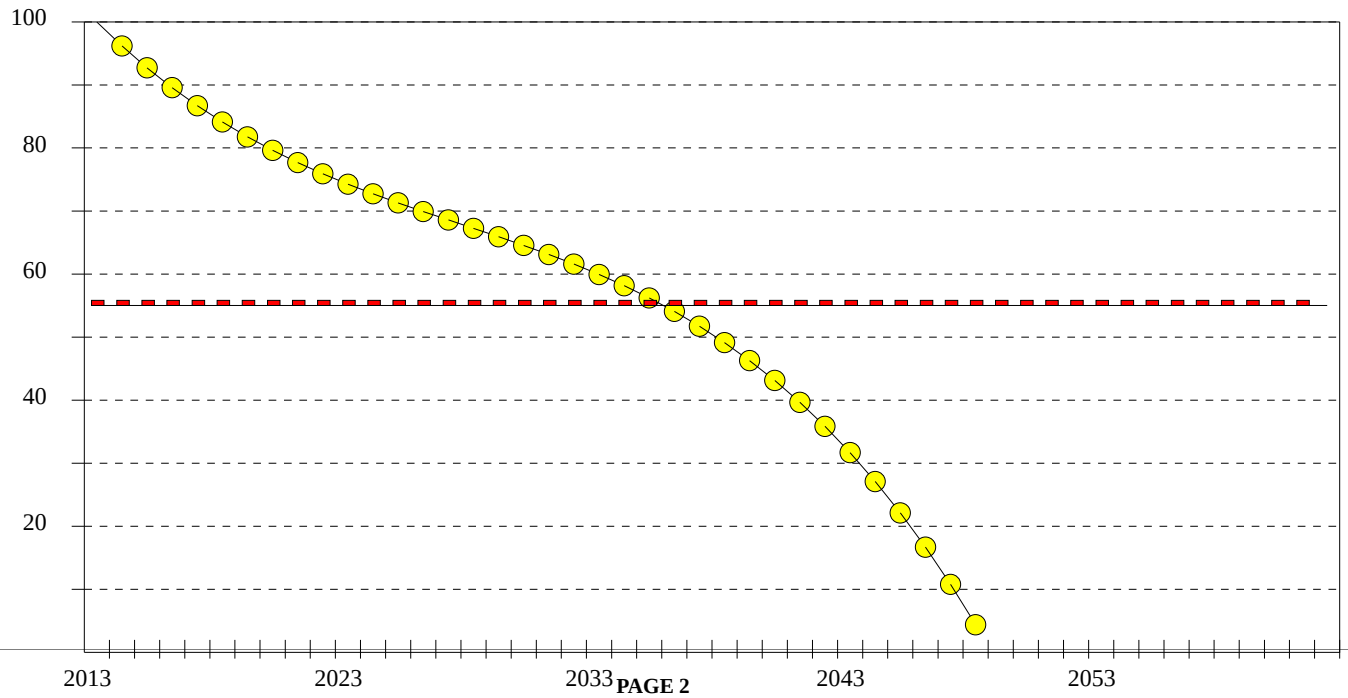
FEATURE: 4010 **DESCRIPTION:** RUNWAY 21 RUNUP

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 12-4-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 100 GOOD
CONSTRUCTION YEAR: 2013 **ESTIMATED PCI IS:** 100 in 2013
MINIMUM SERVICE LEVEL: 55 **NORMAL PCI FOR THIS AGE:** 100

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
○	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

PROJECTED PERFORMANCE



AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 6105 **DESCRIPTION:** RUNWAY 3-21

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13

PAVEMENT TYPE: AC OVERLAY **FEATURE'S HIGH PCI:** 100
FEATURE AREA: 314,713 **FEATURE'S LOW PCI:** 100
INSPECTED AREA: 56,250 **AVERAGE PCI:** 100 GOOD
MINIMUM SERVICE LEVEL: 60 **ESTIMATED PCI IS:** 97 in 2013

COMMENTS/HISTORY FOR FEATURE 6105, RUNWAY 3-21

2012 AC
1995 - P401 OVERLAY ON 1984 4" P401 OVERLAY
1967 - 2" P401 SURFACE ON 4" P209 BASE ON 4" P154 SUBBASE
*

DISTRESS QUANTITIES FOR FEATURE 6105

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITIY	UNITS	PERCENTAGE OF All DISTRESS

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	0 %

AIRPORT: INDIANAPOLIS EAGLE CREEK

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

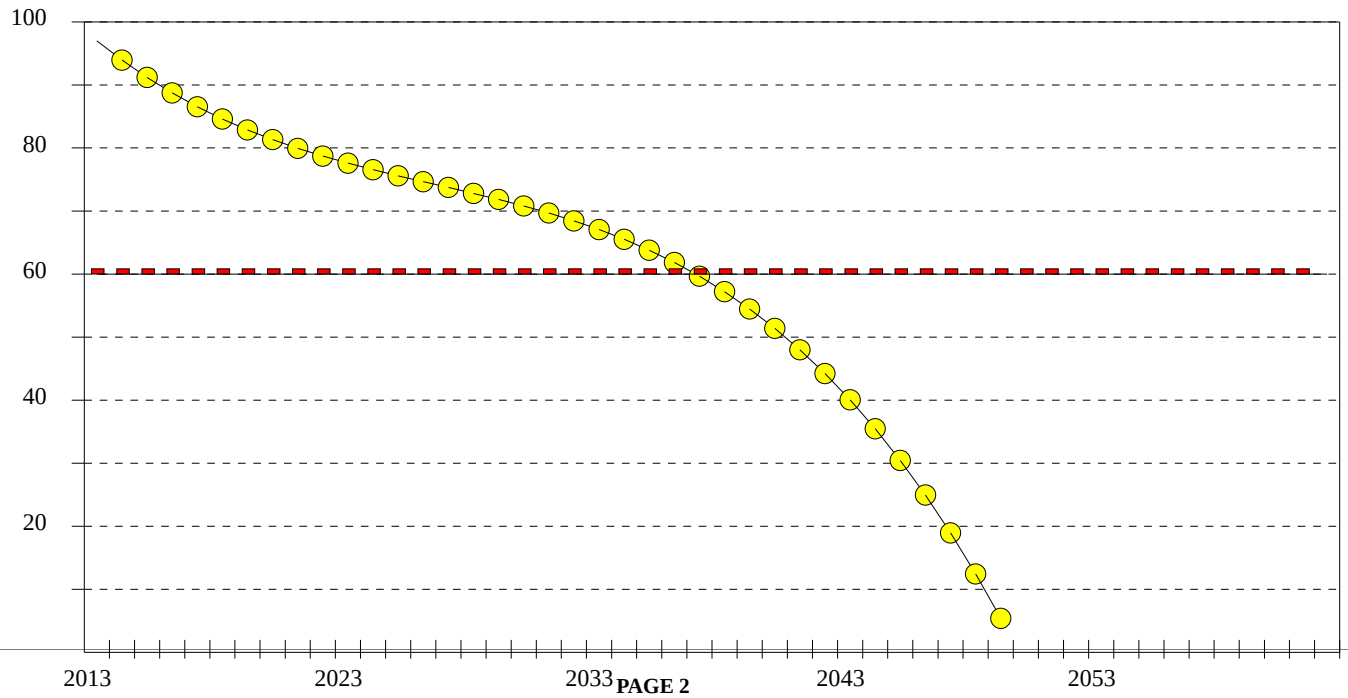
FEATURE: 6105 **DESCRIPTION:** RUNWAY 3-21

ANALYSIS YEAR: 2013 **INSPECTION DATE:** 9-9-13
PAVEMENT TYPE: AC OVERLAY **AVERAGE PCI AT INSPECTION:** 100 GOOD
CONSTRUCTION YEAR: 2012 **ESTIMATED PCI IS:** 97 in 2013
MINIMUM SERVICE LEVEL: 60 **NORMAL PCI FOR THIS AGE:** 96

THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 60		

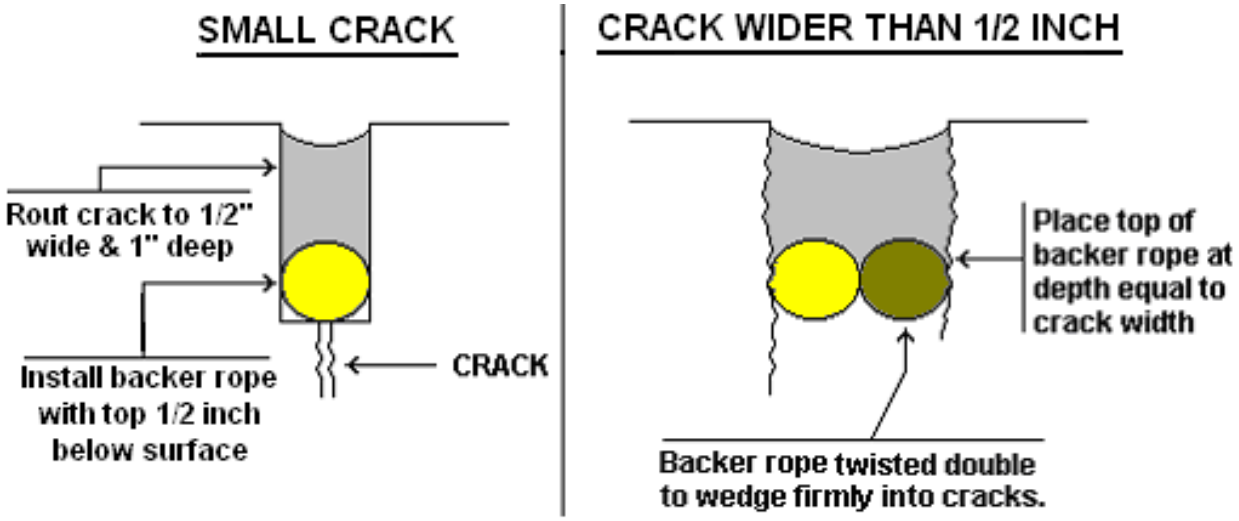
PROJECTED PERFORMANCE



Appendix C. General Maintenance Techniques

Crack Sealing

- Cracks over ¼ inches wide should be sealed.
- Cracks wider than 3 inches should be patched.
- Sealant depth above the backer rope should be equal to the width of the reservoir, or as recommended by the manufacturer.
- Routed cracks should be sand blasted, to prepare for bonding with the sealant.
- Clean cracks with compressed air prior to sealing.
- Backing material should always be placed into the cracks. Commercial products are available. Several sizes of rope should be available to accommodate various crack sizes.
- Apply sealant after placing the backer rope. Follow the manufacturer's instructions. Sealant should be applied to within ¼ inch of the pavement surface.
- The final activity is to clean the surrounding pavement areas. A vacuum sweeper works well for this. Allow the sealant time to set before using a broom.
- Consider hot-applied, pourable patch material for cracks > ½ inch and any subsidence or depressions.



Overband Technique

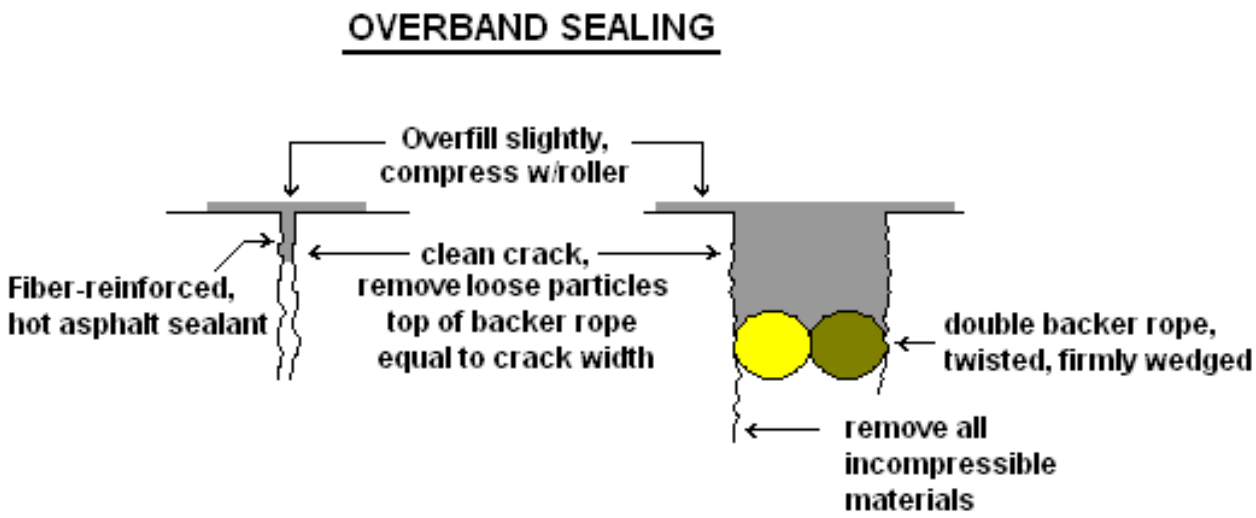
An alternate crack sealing technique using the procedures outlined below.

Material

- Blend grade 20 or equivalent asphalt cement and latex rubber at 5 percent by weight asphalt.
- Again, at 5 percent by weight of asphalt, add polyester fibers into agitator tank.
- Maintain blended asphalt temperature at least 20 degrees below flash point.
- Continuously recycle hot blended asphalt through pumps and hoses when heating kettle is in standby mode.

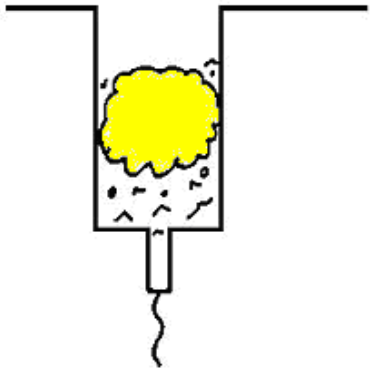
Application

- Sealant should be applied to dry pavement, with ambient temperatures above 40 degrees.
- Cracks should be sand cleaned and blown free of debris immediately before sealing.
- Application of sealant immediately follows cleaning of the crack.
- Sealant should be pressure applied from a wand-type applicator with “overband” nozzle.
- Seat the sealant with a steel-wheeled roller immediately after placement.
- In wider cracks, a backer rope is recommended to limit material quantities required.

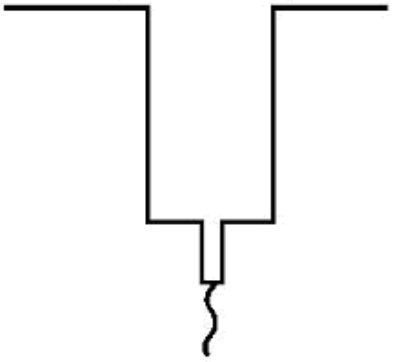


Joint Repair (portland cement)

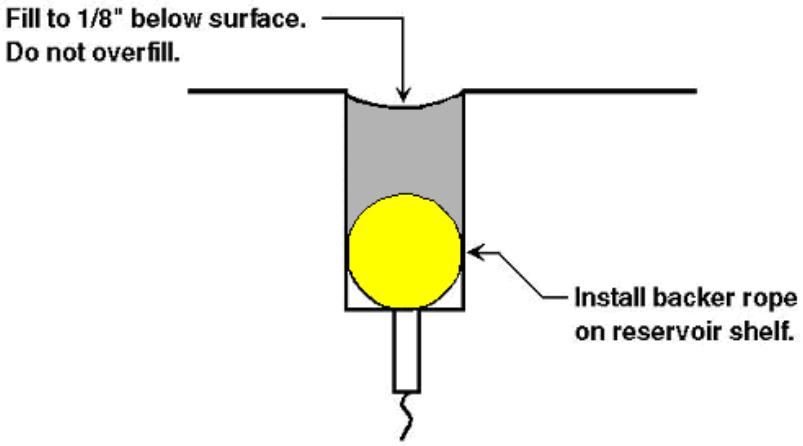
- Rout a reservoir for the sealant ½ inch wide and 1 inch deep.
- Cracks wider than ½ inch should have reservoirs ¼ inch wider than the crack. Reservoir height above backer rope should be less than reservoir width, or as recommended by manufacturer.
- Routed cracks should be cleaned to expose fresh, vital pavement on the vertical crack edge.
- Cracks should be cleaned to remove all sand, debris, and other materials from the crack.
- Backing material should be placed into the crack.
- Apply sealant to within ¼ inch of pavement surface, following manufacturer's instructions.
- Clean the surrounding pavement area.



Typical failed joint sealant, w/ debris and incompressibles.

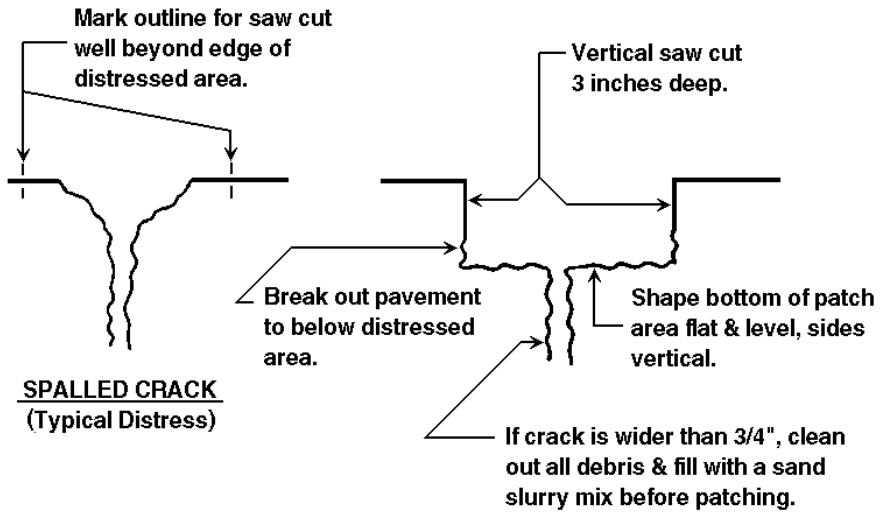


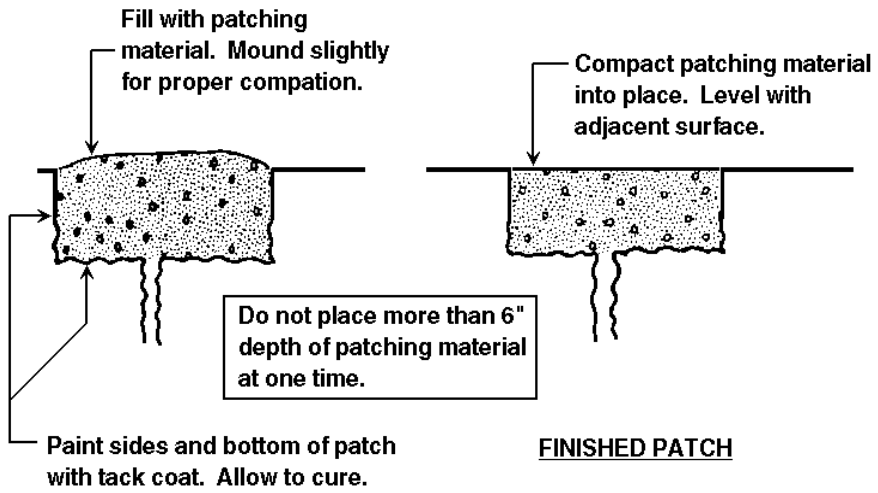
Clean joints exposing fresh, clean concrete and stone. Retain existing resevoir shape.



Patching (bituminous material)

- Examine distressed area and mark patch outline.
- Cut patch area with saw, no less than 3 inches deep.
- Remove enclosed pavement, leaving the vertical sawed edges undamaged.
- Clean sides and bottom and blow out with compressed air
- Paint sides and bottom with rapid curing asphalt tack coat. Prevent pooling on bottom.
- Allow tack coat to cure until it reaches a gummy consistency.
- Place hot mixed asphalt concrete and mound slightly, allowing for compaction.
- Compact with vibratory roller or plate compactor, in layers no greater than 6 inches.

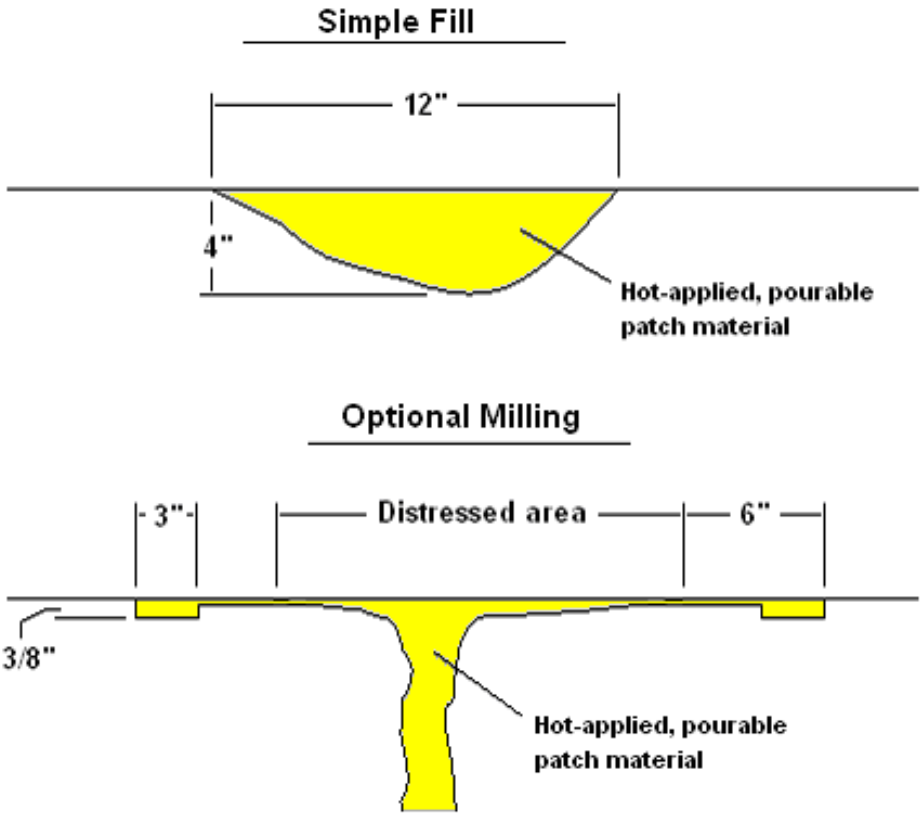




Patching (pourable materials)

Hot-applied, pourable materials generally are used to repair deficiencies larger than can be repaired by sealants, but smaller than those where traditional techniques would be required. Suggested uses for this type of repair include cracks over 2 inches wide, potholes less than 4 inches deep, as a leveling for small depressions, as a cap for settled utility cuts, and as a skin patch for areas of alligator cracking.

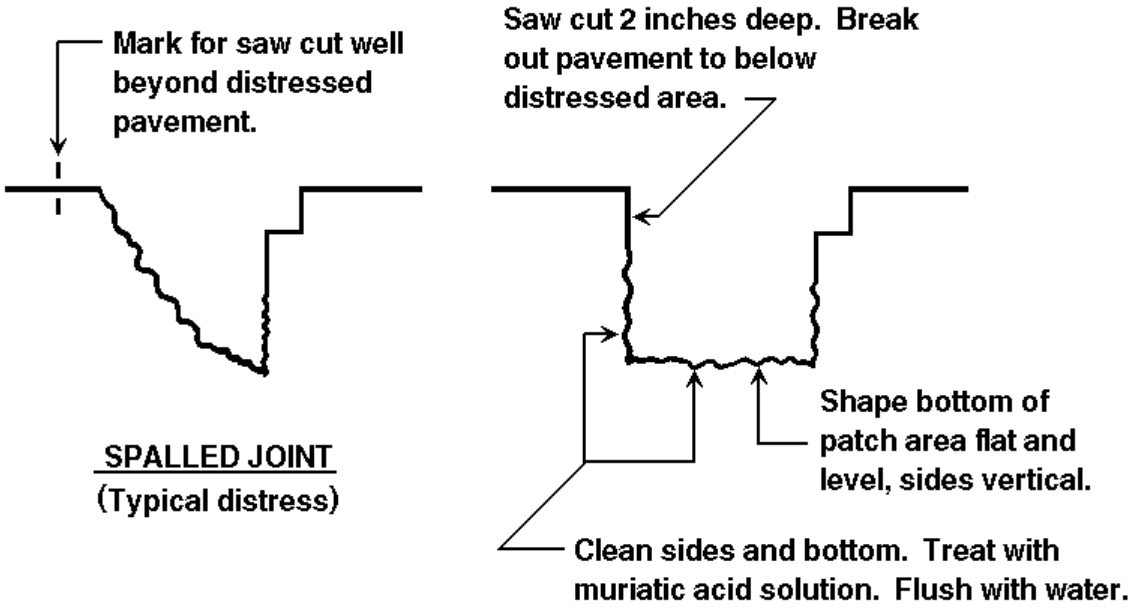
- Examine and mark the patch outline. Boundaries should extend to sound pavement.
- Apply patch material to clean, dry surfaces.
- A heating lance to preheat or dry existing pavement is recommended in cold or wet conditions.
- Patch material should be poured into the area to be repaired and leveled as appropriate.
- Patch edges should be sealed after application to assure good adhesion, preventing surface moisture from migrating under patch edges.

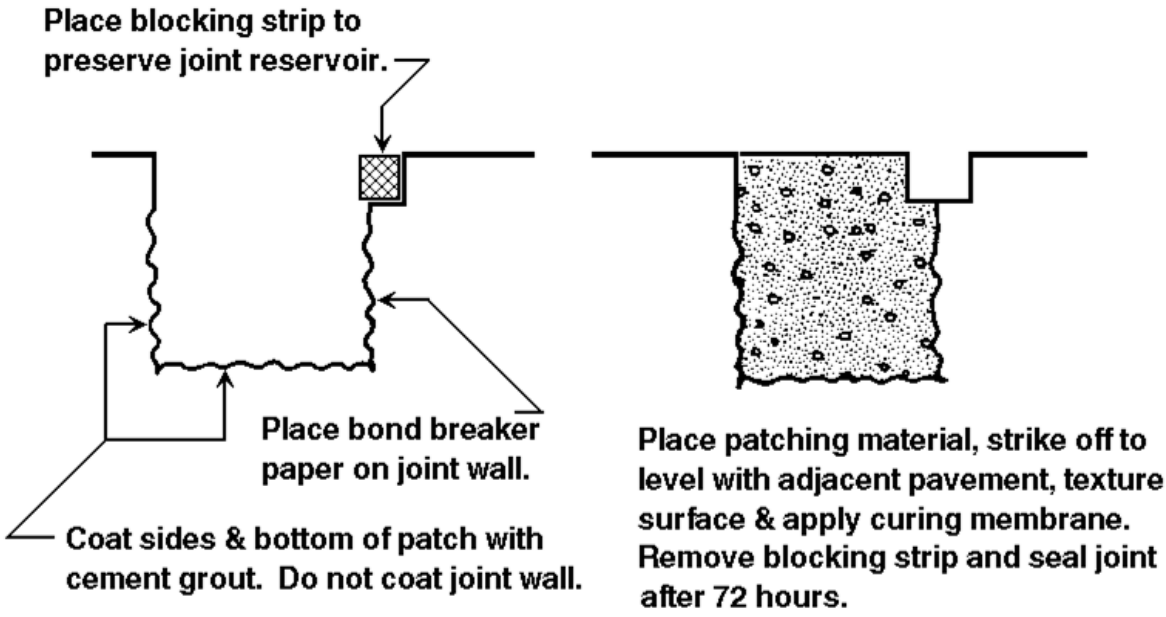


Patching (PCC)

The technique outlined here simulates a thin bonded PCC overlay. This procedure has been proven effective in service throughout the country.

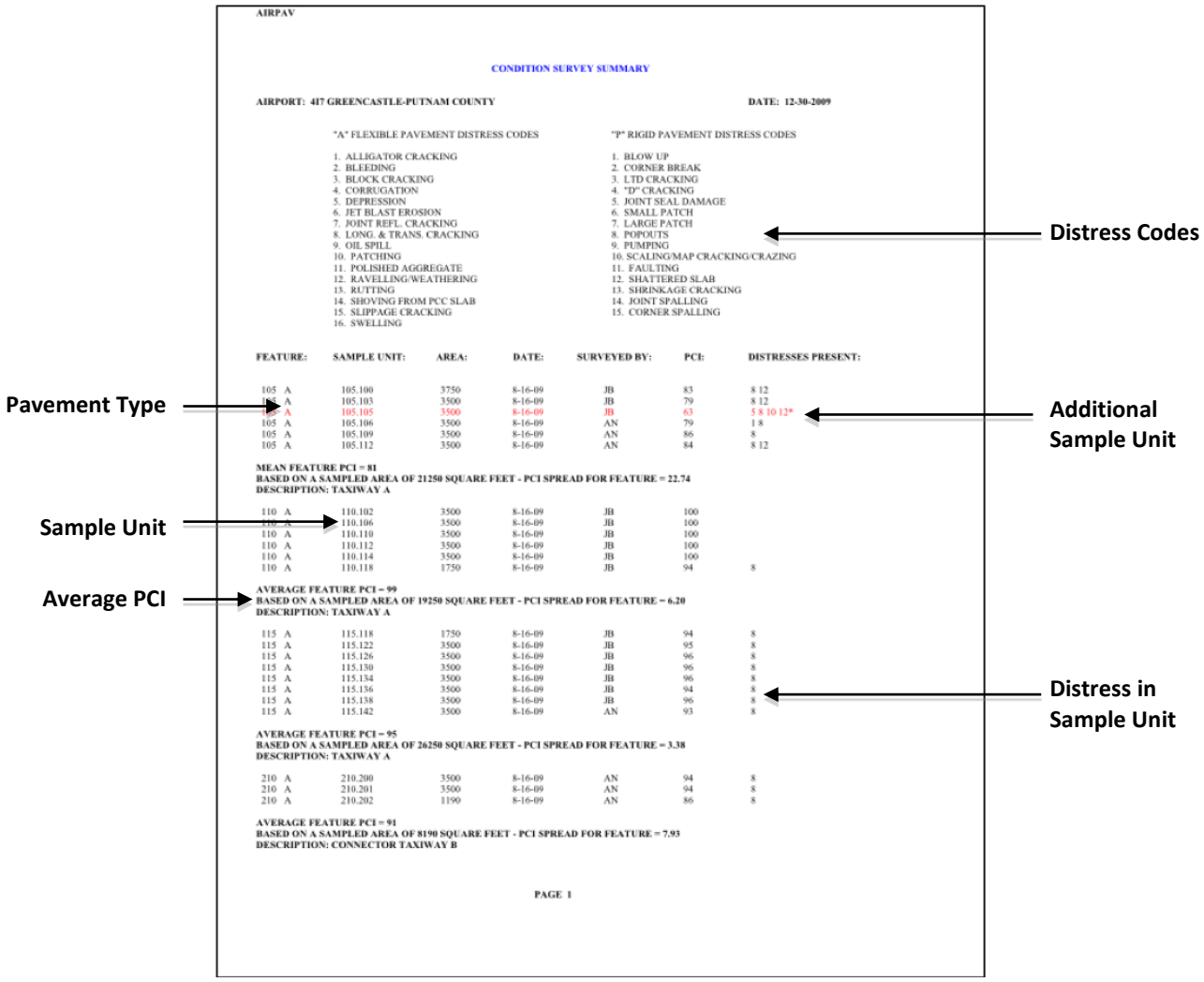
- Examine and mark patch outline.
- Saw cut area to a depth of 2 inches. The enclosed area is then chipped or jack hammered to solid pavement, but not less than a 2-inch nominal depth.
- The sides and bottom are sand cleaned and air-blasted to expose vital, clean concrete.
- A 25 percent solution of muriatic acid is applied to all exposed surfaces within the patch.
- The muriatic acid solution is thoroughly flushed from the patch area with water.
- Compressed air is used to remove excess water from the area, but exposed concrete must be maintained in a moist condition.
- The sides and bottom of the area are then coated with approximately a 1/16-inch layer of cement grout applied at the consistency of paste. The grout acts as an adhesive to bond the fresh concrete to existing concrete.
- If the patch is adjacent to joints, the continuity of the joint must be maintained by placing inserts approximately the shape of the desired joint against the wall of the patch.
- Before concrete grout begins to dry, concrete is placed in the patch area and is compacted into position with hand tampers or a vibrating plate tamper.
- When the patch has been struck to the proper slope and elevation, a surface texture is applied to approximate the texture of adjacent pavement.
- Joint edges may be edged slightly to remove sharp edges. The patch should be covered with polyethylene or sprayed with a curing compound.
- Clean the surrounding pavement before concrete spillover has a chance to set up.
- The patch may be open to traffic in 72 hours.


Mark for saw cut well beyond distressed pavement.
Saw cut 2 inches deep. Break out pavement to below distressed area.
SPALLED JOINT
(Typical distress)
Shape bottom of patch area flat and level, sides vertical.
Clean sides and bottom. Treat with muriatic acid solution. Flush with water.


Place blocking strip to preserve joint reservoir.
Place bond breaker paper on joint wall.
Coat sides & bottom of patch with cement grout. Do not coat joint wall.
Place patching material, strike off to level with adjacent pavement, texture surface & apply curing membrane. Remove blocking strip and seal joint after 72 hours.

Appendix D. PCI Summary

The PCI summary provides an index of pavement conditions at the airport. The letter in the first column indicates the type of pavement, asphalt or portland cement. The last column lists the distress types found in each sample unit. The distress types are listed by a numbering code for each type of pavement, shown at the beginning of the summary.


AIRPAV

CONDITION SURVEY SUMMARY

AIRPORT: 417 GREENCASTLE-PUTNAM COUNTY DATE: 12-30-2009

"A" FLEXIBLE PAVEMENT DISTRESS CODES

1. ALLIGATOR CRACKING
2. BLEEDING
3. BLOCK CRACKING
4. CORRUGATION
5. DEPRESSION
6. JET BLAST EROSION
7. JOINT REFL. CRACKING
8. LONG. & TRANS. CRACKING
9. OIL SPILL
10. PATCHING
11. POLISHED AGGREGATE
12. RAVELLING/WEATHERING
13. RUTTING
14. SHOVING FROM PCC SLAB
15. SLIPPAGE CRACKING
16. SWELLING

"P" RIGID PAVEMENT DISTRESS CODES

1. BLOW UP
2. CORNER BREAK
3. LTD CRACKING
4. "D" CRACKING
5. JOINT SEAL DAMAGE
6. SMALL PATCH
7. LARGE PATCH
8. POPOUTS
9. PUMPING
10. SCALING/MAP CRACKING/CRAZING
11. FAULTING
12. SHATTERED SLAB
13. SHRINKAGE CRACKING
14. JOINT SPALLING
15. CORNER SPALLING

FEATURE:	SAMPLE UNIT:	AREA:	DATE:	SURVEYED BY:	PCI:	DISTRESSES PRESENT:
105 A	105.100	3750	8-16-09	JB	83	8 12
105 A	105.103	3500	8-16-09	JB	79	8 12
105 A	105.105	3500	8-16-09	JB	63	5 8 10 12*
105 A	105.106	3500	8-16-09	AN	79	1 8
105 A	105.109	3500	8-16-09	AN	86	8
105 A	105.112	3500	8-16-09	AN	84	8 12

MEAN FEATURE PCI = 81
BASED ON A SAMPLED AREA OF 21250 SQUARE FEET - PCI SPREAD FOR FEATURE = 22.74
DESCRIPTION: TAXIWAY A

110 A	110.102	3500	8-16-09	JB	100	
110 A	110.106	3500	8-16-09	JB	100	
110 A	110.110	3500	8-16-09	JB	100	
110 A	110.112	3500	8-16-09	JB	100	
110 A	110.114	3500	8-16-09	JB	100	
110 A	110.118	1750	8-16-09	JB	94	8

AVERAGE FEATURE PCI = 99
BASED ON A SAMPLED AREA OF 19250 SQUARE FEET - PCI SPREAD FOR FEATURE = 6.20
DESCRIPTION: TAXIWAY A

115 A	115.118	1750	8-16-09	JB	94	8
115 A	115.122	3500	8-16-09	JB	95	8
115 A	115.126	3500	8-16-09	JB	96	8
115 A	115.130	3500	8-16-09	JB	96	8
115 A	115.134	3500	8-16-09	JB	96	8
115 A	115.136	3500	8-16-09	JB	94	8
115 A	115.138	3500	8-16-09	JB	96	8
115 A	115.142	3500	8-16-09	AN	93	8

AVERAGE FEATURE PCI = 95
BASED ON A SAMPLED AREA OF 26250 SQUARE FEET - PCI SPREAD FOR FEATURE = 3.38
DESCRIPTION: TAXIWAY A

210 A	210.200	3500	8-16-09	AN	94	8
210 A	210.201	3500	8-16-09	AN	94	8
210 A	210.202	1190	8-16-09	AN	86	8

AVERAGE FEATURE PCI = 91
BASED ON A SAMPLED AREA OF 8190 SQUARE FEET - PCI SPREAD FOR FEATURE = 7.93
DESCRIPTION: CONNECTOR TAXIWAY B

PAGE 1

Sample units marked with an asterisk (*) are additional sample units. Additional sample units do not represent the typical condition of surrounding sample units in the pavement features.

The PCI summary provides a quick overview of the pavement condition and consistency. Are the distress types similar? Do the individual sample units have consistent PCI ratings? Answering these questions is a start to understanding your dynamic pavement system.

CONDITION SURVEY SUMMARY

AIRPORT: EYE INDIANAPOLIS EAGLE CREEK **DATE: 12-17-2013**

"A" FLEXIBLE PAVEMENT DISTRESS CODES

1. ALLIGATOR CRACKING
2. BLEEDING
3. BLOCK CRACKING
4. CORRUGATION
5. DEPRESSION
6. JET BLAST EROSION
7. JOINT REFL. CRACKING
8. LONG. & TRANS. CRACKING
9. OIL SPILL
10. PATCHING
11. POLISHED AGGREGATE
12. RAVELLING
13. RUTTING
14. SHOVING FROM PCC SLAB
15. SLIPPAGE CRACKING
16. SWELLING
17. WEATHERING

"P" RIGID PAVEMENT DISTRESS CODES

1. BLOW UP
2. CORNER BREAK
3. LTD CRACKING
4. "D" CRACKING
5. JOINT SEAL DAMAGE
6. SMALL PATCH
7. LARGE PATCH
8. POPOUTS
9. PUMPING
10. SCALING/MAP CRACKING/CRAZING
11. FAULTING
12. SHATTERED SLAB
13. SHRINKAGE CRACKING
14. JOINT SPALLING
15. CORNER SPALLING
16. ALKALI SILICA REACTION

FEATURE:	SAMPLE UNIT:	AREA:	DATE:	SURVEYED BY:	PCI:	DISTRESSES PRESENT:
105 A	105.100	4450	9-9-13	DMY	100	

AVERAGE FEATURE PCI = 100
BASED ON A SAMPLED AREA OF 4450 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: TAXIWAY A5

110 A	110.100	3330	9-9-13	DMY	100

AVERAGE FEATURE PCI = 100
BASED ON A SAMPLED AREA OF 3330 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: TAXIWAY A1

115 A	115.102	3000	11-13-13	DMY	100
115 A	115.107	3000	11-13-13	DMY	100
115 A	115.112	3000	11-13-13	DMY	100
115 A	115.116	3000	11-13-13	DMY	100
115 A	115.120	3000	11-13-13	DMY	100
115 A	115.124	3000	11-13-13	DMY	100
115 A	115.128	3000	11-13-13	DMY	100
115 A	115.132	3000	11-13-13	DMY	100
115 A	115.136	3000	11-13-13	DMY	100
115 A	115.139	3000	11-13-13	DMY	100
115 A	115.142	3000	11-13-13	DMY	100

AVERAGE FEATURE PCI = 100
BASED ON A SAMPLED AREA OF 33000 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: TAXIWAY A

120 A	120.100	3850	9-9-13	DMY	100

AVERAGE FEATURE PCI = 100
BASED ON A SAMPLED AREA OF 3850 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: TAXIWAY A2

130 A	130.100	3670	9-9-13	DMY	100

AVERAGE FEATURE PCI = 100
BASED ON A SAMPLED AREA OF 3670 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: TAXIWAY A3

FEATURE:	SAMPLE UNIT:	AREA:	DATE:	SURVEYED BY:	PCI:	DISTRESSES PRESENT:
135 A	135.800	4210	9-9-13	DMY	100	

AVERAGE FEATURE PCI = 100
BASED ON A SAMPLED AREA OF 4210 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: TAXIWAY A4

205 A	205.101	2680	9-9-13	AN	52	8 12

AVERAGE FEATURE PCI = 52
BASED ON A SAMPLED AREA OF 2680 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: TAXIWAY B2

220 A	220.102	3000	9-9-13	AN	59	8 12
220 A	220.106	3000	9-9-13	AN	58	8 12
220 A	220.111	3000	9-9-13	AN	60	8 12 17
220 A	220.116	4000	9-9-13	AN	61	8 12 17
220 A	220.120	3000	9-9-13	AN	58	8 12 17
220 A	220.124	3000	9-9-13	AN	60	8 12
220 A	220.128	3000	9-9-13	AN	61	8 12 17
220 A	220.133	3000	9-9-13	AN	61	8 12 17
220 A	220.136	3000	9-9-13	AN	53	8 12 17

AVERAGE FEATURE PCI = 59
BASED ON A SAMPLED AREA OF 28000 SQUARE FEET - PCI SPREAD FOR FEATURE = 8.37
DESCRIPTION: TAXIWAY B

225 A	225.139	3000	9-9-13	AN	57	8 12 17
225 A	225.140	3000	9-9-13	AN	51	8 12
225 A	225.142	3000	9-9-13	AN	50	8 12

AVERAGE FEATURE PCI = 53
BASED ON A SAMPLED AREA OF 9000 SQUARE FEET - PCI SPREAD FOR FEATURE = 7.18
DESCRIPTION: TAXIWAY B

245 A	245.101	3210	9-9-13	ARA	66	8 12

AVERAGE FEATURE PCI = 66
BASED ON A SAMPLED AREA OF 3210 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: TAXIWAY B4

250 A	250.100	3080	9-9-13	ARA	100	

AVERAGE FEATURE PCI = 100
BASED ON A SAMPLED AREA OF 3080 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: TAXIWAY B5

255 A	255.100	4640	9-9-13	DMY	100	

AVERAGE FEATURE PCI = 100
BASED ON A SAMPLED AREA OF 4640 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: TAXIWAY B4

260 A	260.100	3670	9-9-13	DMY	100	

AVERAGE FEATURE PCI = 100
BASED ON A SAMPLED AREA OF 3670 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: TAXIWAY B3

265 A	265.100	4000	9-9-13	DMY	100	

AVERAGE FEATURE PCI = 100
BASED ON A SAMPLED AREA OF 4000 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: TAXIWAY B2

270 A	270.100	4175	9-9-13	DMY	100	

AVERAGE FEATURE PCI = 100
BASED ON A SAMPLED AREA OF 4175 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: TAXIWAY B1

FEATURE:	SAMPLE UNIT:	AREA:	DATE:	SURVEYED BY:	PCI:	DISTRESSES PRESENT:
305 A	305.101	2770	9-9-13	AN	51	8 12

AVERAGE FEATURE PCI = 51
BASED ON A SAMPLED AREA OF 2770 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: TAXIWAY B3

605 A	605.100	5300	9-9-13	AN	66	8 12

AVERAGE FEATURE PCI = 66
BASED ON A SAMPLED AREA OF 5300 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: TAXIWAY TO RAMP

610 A	610.100	4850	9-9-13	AN	53	8 12 13 16 17
610 A	610.101	3130	9-9-13	AN	66	8 12 17

AVERAGE FEATURE PCI = 60
BASED ON A SAMPLED AREA OF 7980 SQUARE FEET - PCI SPREAD FOR FEATURE = 12.80
DESCRIPTION: TAXIWAY TO RAMP

615 A	615.100	6356	9-9-13	AN	59	8 12

AVERAGE FEATURE PCI = 59
BASED ON A SAMPLED AREA OF 6356 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: TAXIWAY TO RAMP

3002 P	3002.101	3150	9-9-13	JB	92	11
3002 P	3002.103	3150	9-9-13	JB	92	11
3002 A	3002.200	2710	9-9-13	AN	100	
3002 P	3002.202	3150	9-9-13	AN	98	15
3002 P	3002.204	3910	9-9-13	AN	96	14
3002 P	3002.303	3250	9-9-13	JB	92	11
3002 P	3002.400	3250	9-9-13	JB	100	
3002 P	3002.402	3250	9-9-13	JB	74	3 5 12
3002 P	3002.501	3250	9-9-13	AN	85	11
3002 P	3002.951	3125	9-9-13	JB	100	

AVERAGE FEATURE PCI = 93
BASED ON A SAMPLED AREA OF 32195 SQUARE FEET - PCI SPREAD FOR FEATURE = 26.30
DESCRIPTION: WEST RAMP

3005 A	3005.101	6000	9-9-13	JB	74	8 12
3005 A	3005.102	6000	9-9-13	JB	74	8 12
3005 A	3005.200	5500	9-9-13	JB	77	8 10
3005 A	3005.300	5000	9-9-13	JB	75	8 10
3005 A	3005.501	5000	9-9-13	JB	71	1 8*

MEAN FEATURE PCI = 75
BASED ON A SAMPLED AREA OF 27500 SQUARE FEET - PCI SPREAD FOR FEATURE = 5.97
DESCRIPTION: EAST RAMP

3010 A	3010.100	5000	9-9-13	JB	59	1 8 12
3010 A	3010.201	2750	9-9-13	JB	59	8 12 17
3010 A	3010.300	5000	9-9-13	JB	58	1 8 12

AVERAGE FEATURE PCI = 59
BASED ON A SAMPLED AREA OF 12750 SQUARE FEET - PCI SPREAD FOR FEATURE = 1.93
DESCRIPTION: EAST RAMP

3015 A	3015.200	5000	9-9-13	DMY	100
3015 A	3015.202	5000	9-9-13	DMY	100
3015 A	3015.301	5000	9-9-13	DMY	100
3015 A	3015.303	5000	9-9-13	DMY	100
3015 A	3015.400	5000	9-9-13	DMY	100
3015 A	3015.402	5000	9-9-13	DMY	100
3015 A	3015.501	5000	9-9-13	DMY	100

AVERAGE FEATURE PCI = 100
BASED ON A SAMPLED AREA OF 35000 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: EAST RAMP

FEATURE:	SAMPLE UNIT:	AREA:	DATE:	SURVEYED BY:	PCI:	DISTRESSES PRESENT:
3025 P	3025.109	3150	9-9-13	ARA	97	5 6
3025 P	3025.114	3150	9-9-13	ARA	89	5 10 15
3025 P	3025.206	3150	9-9-13	ARA	100	
3025 P	3025.210	3150	9-9-13	ARA	91	5 15 16
3025 P	3025.212	3150	9-9-13	ARA	91	15
3025 P	3025.308	3150	9-9-13	ARA	93	15
3025 P	3025.311	3150	9-9-13	ARA	100	
3025 P	3025.312	3150	9-9-13	ARA	71	5 16
3025 P	3025.315	3150	9-9-13	ARA	96	5 15

AVERAGE FEATURE PCI = 92
BASED ON A SAMPLED AREA OF 28350 SQUARE FEET - PCI SPREAD FOR FEATURE = 29.44
DESCRIPTION: WEST RAMP

4005 A	4005.100	3500	9-9-13	JB	41	8 12 13
4005 A	4005.102	3300	9-9-13	JB	55	8 12 16

AVERAGE FEATURE PCI = 48
BASED ON A SAMPLED AREA OF 6800 SQUARE FEET - PCI SPREAD FOR FEATURE = 14.05
DESCRIPTION: RUNWAY 21 RUNUP

4010 A	4010.196	5000	12-4-13	DMY	100
4010 A	4010.197	5000	12-4-13	DMY	100

AVERAGE FEATURE PCI = 100
BASED ON A SAMPLED AREA OF 10000 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: RUNWAY 21 RUNUP

6105 A	6105.102	3750	9-9-13	ARA	100
6105 A	6105.108	3750	9-9-13	ARA	100
6105 A	6105.114	3750	9-9-13	ARA	100
6105 A	6105.120	3750	9-9-13	ARA	100
6105 A	6105.126	3750	9-9-13	ARA	100
6105 A	6105.132	3750	9-9-13	ARA	100
6105 A	6105.138	3750	9-9-13	ARA	100
6105 A	6105.144	3750	9-9-13	ARA	100
6105 A	6105.150	3750	9-9-13	ARA	100
6105 A	6105.156	3750	9-9-13	ARA	100
6105 A	6105.162	3750	9-9-13	ARA	100
6105 A	6105.168	3750	9-9-13	ARA	100
6105 A	6105.172	3750	9-9-13	ARA	100
6105 A	6105.178	3750	9-9-13	ARA	100
6105 A	6105.182	3750	9-9-13	ARA	100

AVERAGE FEATURE PCI = 100
BASED ON A SAMPLED AREA OF 56250 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00
DESCRIPTION: RUNWAY 3-21

TOTAL NUMBER OF INSPECTED FEATURES = 27
TOTAL NUMBER OF INSPECTED SAMPLE UNITS = 93 **TOTAL AREA OF INSPECTED PAVEMENT = 346,216 S.F.**

* INDICATES "ADDITIONAL" SAMPLE UNITS.

Appendix E. Distress Identification

This chapter describes pavement distress types commonly identified during airport PCI inspections.

Rigid Pavement Distress

Longitudinal, Transverse & Diagonal Cracking

LTD cracking is often a result of load or temperature deformations. External loads cause flexure. Temperature changes can cause curling. When any of these stresses exceed the slab strength, cracking occurs.

LTD cracking is recorded at low, medium, or high severity, depending on the width of crack opening and degree of deterioration.

At low severity, a crack is less than 1/8 inch wide with little spalling, and no corrective action is indicated. At medium severity, LTD cracks can be up to 1 inch wide with moderate spalling and should be repaired using procedures similar to joint sealing. At high severity, cracks exceed 1 inch in width and may be severely spalled. High-severity LTD cracking is evidence of serious load failure, and correction may require patching or slab replacement. If distress occurs in several adjacent slabs at medium or high severity, major rehabilitation of that area is indicated.

A slab divided into four or more pieces is said to be “divided” or “shattered.” Shattered slab is a separate distress category and indicates a significant structural failure. A shattered slab has lost its ability to distribute loads. Shattered slabs are rated in three severities, but the recommended action in any case is slab replacement.

Shrinkage Cracking

Shrinkage cracks are small, non-working cracks visible at the pavement surface but not penetrating the full depth of concrete. Shrinkage cracks most commonly occur shortly after construction due to concrete shrinkage during the curing process.

Shrinkage cracks are usually so small that they are not visible until staining or loss of material at crack edges begins to take place. Shrinkage cracks do not represent structural weakness, and no corrective action is prescribed.

Durability Cracking

Durability cracking (D-cracking) is caused by environmental factors, the most common being freeze/thaw. D-cracking usually appears as either a pattern of hairline cracks running parallel to a joint or crack, or in a corner, where water tends to collect. D-cracking eventually leads to disintegration of the pavement, creating foreign object damage (FOD) potential.

At low severity, D-cracking is evident, but no disintegration has occurred. Medium severity is evident over a significant area of the slab, and some disintegration and FOD potential exist. High-severity D-cracking is evidenced by extensive cracking with loose and missing pieces and significant FOD potential.

Joint Spall and Corner Spall

Spalls at slab joints and corners are caused by excessive internal stress in the pavement. Spalls occur when these stresses exceed the shear strength of the concrete.

Spalling usually results from thermal expansion during hot weather when slabs push and expand against one another. If the joints are filled with incompressible material, such as sand, stresses can become severe, causing spalls. Spalling can be reduced significantly by maintenance of joint sealant.

Spall repair requires patching. The extent and severity of spalling suggests the appropriate action. At low severity, spalled concrete remains securely in place in the slab. A low-severity spall should be monitored closely for further deterioration and should be patched when spalled particles become loose, or during the next scheduled patching activity. Medium- and high-severity spalls should be repaired immediately to prevent FOD. If the pavement can be restored to serviceable condition, spalls should be patched for long-term service. If the pavement is beyond repair, temporary patching should be considered to control FOD.

Patches, Large and Small

Large and small patches, by PCI inspection criteria, are distress conditions. Patches indicate deterioration and aging of pavement that contributes to shortened service life. However, patching also indicates that pavement is being maintained.

A patch that is performing well and shows no outward distress is recorded at low severity, and no corrective action is required. Medium-severity patches are serviceable but are beginning to deteriorate. Maintenance or replacement is indicated. At high severity, replacement is indicated.

By definition, small patches are smaller than 5 square feet in surface area, and they usually result from spall repair at slab joints and corners.

Large patches also may be the result of spall repair, but they often indicate more serious deficiencies, such as corner breaks or other full-depth failure smaller than panel size.

Joint Seal Damage

When joint sealant is in perfect condition (no damage), there is no distress.

At low severity, at least 10 percent of the sealant is debonded but still in contact with the joint edges. Medium-severity joint seal damage is recorded when at least 10 percent of the sealant has visible gaps smaller than 1/8 inch and is an indicator that replacement should be programmed as soon as is practical. In the meantime, aggressive inspection and sustaining maintenance is recommended to minimize subsurface damage from moisture penetration. At high severity, visible gaps exceed 1/8 inch, and the amount and degree of joint seal damage typically requires complete removal and replacement of the existing sealant.

On serviceable pavement, deteriorated joint sealant should be repaired or replaced to preserve pavement and subgrade integrity and prolong service life. The issue is not so clear-cut with unserviceable pavement. Pavement that can be restored to serviceable condition by maintenance activities such as patching and joint seal repair, or by slab replacement, should be so maintained as long as the process is cost-effective. However, when age and condition preclude economical return to serviceable condition by such means, joint seal repair would no longer be cost-effective and should be suspended except for an interim maintenance program to control FOD potential.

Flexible Pavement Distress

Longitudinal & Trans. Cracking

L&T cracks are caused by age, construction, and subsurface conditions. Age-related cracking occurs as oxidizing pavement loses components to the atmosphere and becomes more brittle. Consistent application of seal coats can help to prevent age-related cracks.

Construction-related cracking often develops along paving joints. Ensuring that joints are made when both sides are still hot, and near the same temperature, is one of the best ways to mitigate this potential problem.

Seasonal movement caused by changes in subsurface moisture or temperature differences also can cause pavement cracking. Asphalt pavement placed over a PCC pavement or cement stabilized base course may evidence reflective cracking from the underlying material. Wheel loads do not cause L&T cracks, although traffic may worsen their condition.

Low-severity L&T cracks are less than ¼ inch wide, or if sealed with suitable filler material in satisfactory condition can be any width less than 3 inches, if they are not spalled. Maintenance usually is not indicated for low-severity cracking. Moderately spalled cracks and cracks wider than ¼ inch which are not satisfactorily sealed are at medium severity. Medium-severity cracks should be sealed with a high-quality crack filling material. Severely spalled cracks and cracks wider than 3 inches are at high severity. High-severity L&T cracks normally require patching.

Alligator Cracking

Alligator cracks are a series of interconnected load-related cracks caused by fatigue of the asphalt surface. Alligator cracking is a significant structural distress and develops only in places subject to traffic loads. These cracks typically initiate at the bottom of the asphalt layer and propagate upward. Once a fatigue crack is visible at the surface, significant damage has already occurred.

At low severity, alligator cracks are evidenced by a series of parallel hairline cracks (usually in a wheel path). Medium-severity alligator cracking is a well-defined pattern of interconnected cracks, and some spalling may be present. High-severity alligator cracks have lost aggregate interlock between adjacent pieces, and the cracks may be severely spalled with FOD potential. Most likely, the pieces will move freely under traffic.

Alligator cracking is a serious structural failure that cannot be repaired with sealant. The proper repair is patching.

Raveling/Weathering

Raveling and weathering are the wearing away of the pavement surface. Failure can be caused by the dislodging of aggregate particles or the loss of asphalt binder. These distresses are usually evident over large areas and may indicate that the asphalt binder has hardened significantly.

Raveling is the loss of coarse aggregate, weathering is the loss of fine aggregate or binder.

Raveling: At low severity, 5 to 20 coarse aggregate particles are missing per square yard. Medium severity is defined by 20 to 40 missing coarse aggregate particles per square yard. At high severity, more than 40 coarse aggregate particles are missing per square yard, and the top layer of aggregate has eroded away.

Weathering: At low severity, edges of coarse aggregate are exposed less than 1 mm. At medium severity, loss of fine aggregate is noticeable and edges of coarse aggregate are exposed up to 6 mm (1/4 inch). High severity weathering has edges of coarse aggregate exposed > 6 mm, with considerable loss of fine aggregate matrix and potential for loss of coarse aggregate.

Rutting

Ruts are localized areas of pavement having elevations lower than the surrounding sections.

Rutting is due to base and subgrade consolidation caused by excessive wheel loads or poor compaction. Ruts indicate structural failure and can cause hydroplaning.

At low severity, ruts have an average depth of ¼ to ½ inches. At medium severity, ruts have an average depth of ½ to 1 inch. At high severity, ruts have an average depth greater than 1 inch. Patching is the appropriate repair for ruts.

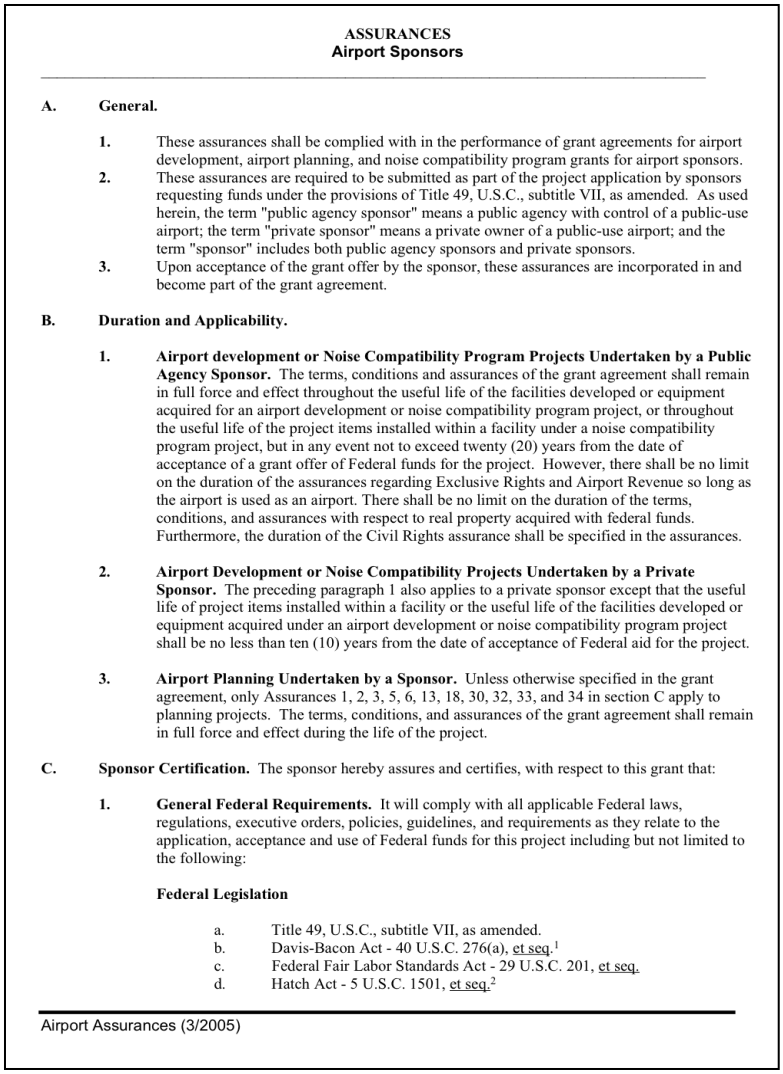
Appendix F. Airport Responsibilities

Grant Assurances

In 1995, Congress mandated that the FAA require, as a condition of grant funding, that airport sponsors prepare documentation of a maintenance management program on pavement that has been constructed, reconstructed, or repaired with Federal assistance.

This report fulfills many of the grant assurance requirements, including documenting:

- Locating all runways, taxiways, and aprons.
- Documenting pavement dimensions.
- Documenting types of pavement.
- Documenting year of construction or most recent major rehabilitation.



ASSURANCES
Airport Sponsors

A. General.

1. These assurances shall be complied with in the performance of grant agreements for airport development, airport planning, and noise compatibility program grants for airport sponsors.
2. These assurances are required to be submitted as part of the project application by sponsors requesting funds under the provisions of Title 49, U.S.C., subtitle VII, as amended. As used herein, the term "public agency sponsor" means a public agency with control of a public-use airport; the term "private sponsor" means a private owner of a public-use airport; and the term "sponsor" includes both public agency sponsors and private sponsors.
3. Upon acceptance of the grant offer by the sponsor, these assurances are incorporated in and become part of the grant agreement.

B. Duration and Applicability.

1. **Airport development or Noise Compatibility Program Projects Undertaken by a Public Agency Sponsor.** The terms, conditions and assurances of the grant agreement shall remain in full force and effect throughout the useful life of the facilities developed or equipment acquired for an airport development or noise compatibility program project, or throughout the useful life of the project items installed within a facility under a noise compatibility program project, but in any event not to exceed twenty (20) years from the date of acceptance of a grant offer of Federal funds for the project. However, there shall be no limit on the duration of the assurances regarding Exclusive Rights and Airport Revenue so long as the airport is used as an airport. There shall be no limit on the duration of the terms, conditions, and assurances with respect to real property acquired with federal funds. Furthermore, the duration of the Civil Rights assurance shall be specified in the assurances.

2. **Airport Development or Noise Compatibility Projects Undertaken by a Private Sponsor.** The preceding paragraph 1 also applies to a private sponsor except that the useful life of project items installed within a facility or the useful life of the facilities developed or equipment acquired under an airport development or noise compatibility program project shall be no less than ten (10) years from the date of acceptance of Federal aid for the project.

3. **Airport Planning Undertaken by a Sponsor.** Unless otherwise specified in the grant agreement, only Assurances 1, 2, 3, 5, 6, 13, 18, 30, 32, 33, and 34 in section C apply to planning projects. The terms, conditions, and assurances of the grant agreement shall remain in full force and effect during the life of the project.

C. Sponsor Certification. The sponsor hereby assures and certifies, with respect to this grant that:

1. **General Federal Requirements.** It will comply with all applicable Federal laws, regulations, executive orders, policies, guidelines, and requirements as they relate to the application, acceptance and use of Federal funds for this project including but not limited to the following:

Federal Legislation

a. Title 49, U.S.C., subtitle VII, as amended.
b. Davis-Bacon Act - 40 U.S.C. 276(a), et seq.[1]
c. Federal Fair Labor Standards Act - 29 U.S.C. 201, et seq.
d. Hatch Act - 5 U.S.C. 1501, et seq.[2]

Airport Assurances (3/2005)

The airport owners must be an active participant in maintaining compliance. Actions taken to ensure compliance include:

- Annotating areas constructed or repaired with Federal aid.
- Conducting monthly drive-by inspections to detect changes in pavement condition.
- Recording each drive-by inspection and any maintenance performed as a result.
- Keeping complete records of all maintenance activities.
- Keeping records for 5 years.
- Documenting detailed inspection information with a history of recorded pavement deterioration by PCI survey (e.g., this report).

The table on the following pages is available for maintaining a record of drive-by inspections and maintenance repairs.

Table F-1. Monthly Pavement Inspection Log

Date	Inspector	Conditions/Changes	Repairs/Work Order

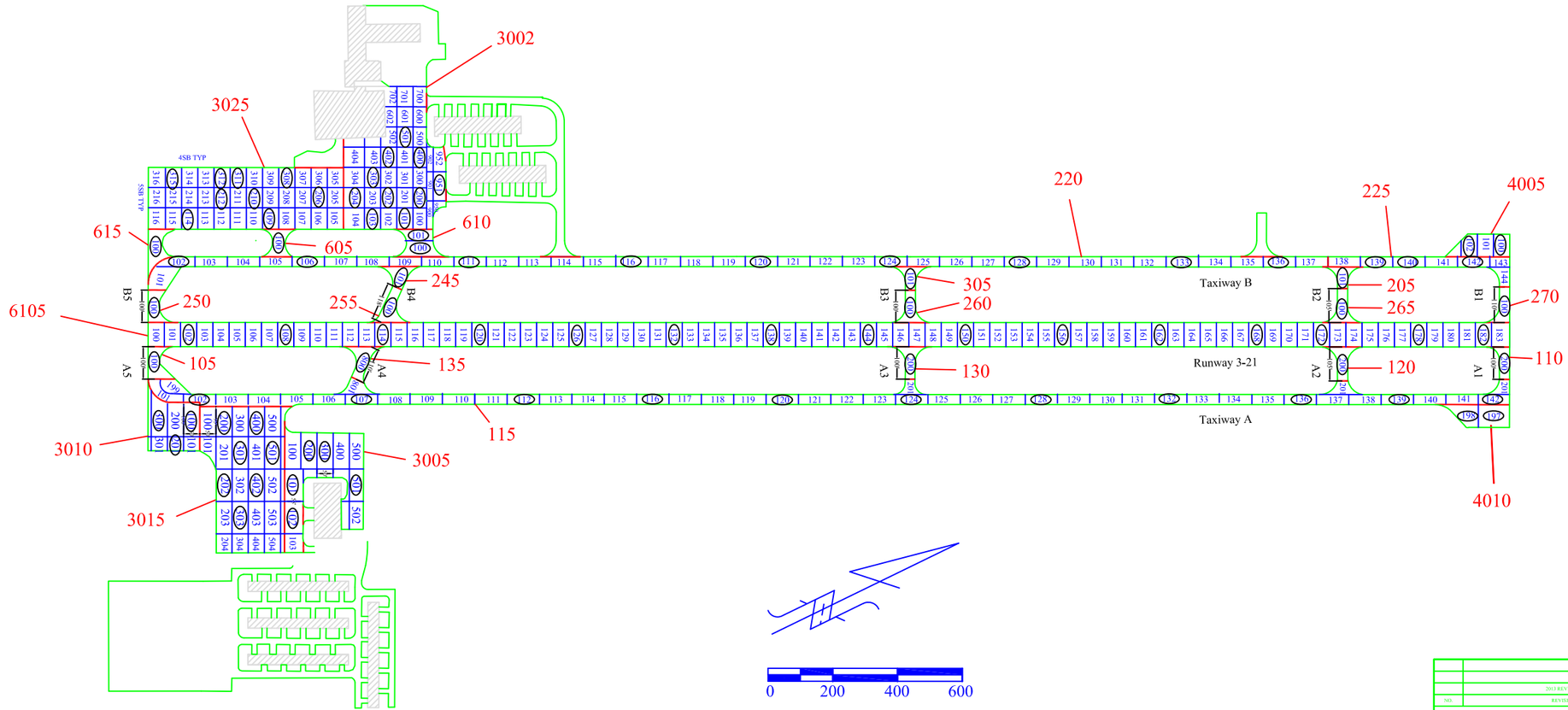
Date	Inspector	Conditions/Changes	Repairs/Work Order

Date	Inspector	Conditions/Changes	Repairs/Work Order

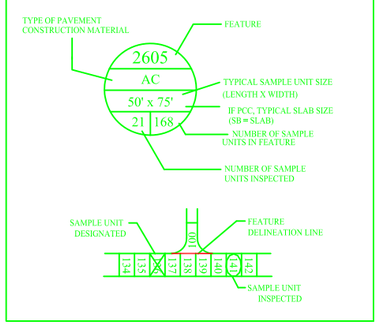
105	110	115	120	130	135	205	220	225	245
AC 2012	AC 1995	AC 2013*	AC 2012	AC 2012	AC 2012	AC 2003	AC 2003	AC 2003	AC 1995
4450 sf	1900 sf	100 x 30	3850 sf	100' x 30'	4210 sf	2680 sf	100x30	30 X 100	3210 sf
1 1	1 1	11 47	1 1	1 1	1 1	1 1	9 37	3 7	1 1

250	255	260	265	270	305	605	610	615
AC 2012	AC 2012	AC 2012	AC 2012	AC 1995	AC 2003	AC 2003	AC 2003	AC 2003
3080 sf	4640 sf	3670 sf	4000 sf	4175 sf	2770 sf	5300 sf	50xvar	6536sf
1 1	1 1	1 1	1 1	1 1	1 1	1 1	2 2	1 1

3002	3005	3010	3015	3025	4005	4010	6105
PCC 1984	AC 1999	AC 1995	AC 2012	PCC 1994	AC 2003	AC 2013*	AC 2012
20@ 12.5 X 12.5	50x100	50x100	50x100	20@ 11.67'x12.5'	50 x 70	VARIABLE	50 x 75
10 38	8 19	4 9	7 22	9 36	2 4	2 2	15 84



LEGEND



NO.	REVISIONS	BY	APP.	DATE
	2013 REVISIONS	JH	-	-

INDIANA DEPARTMENT OF TRANSPORTATION
AERONAUTICS SECTION

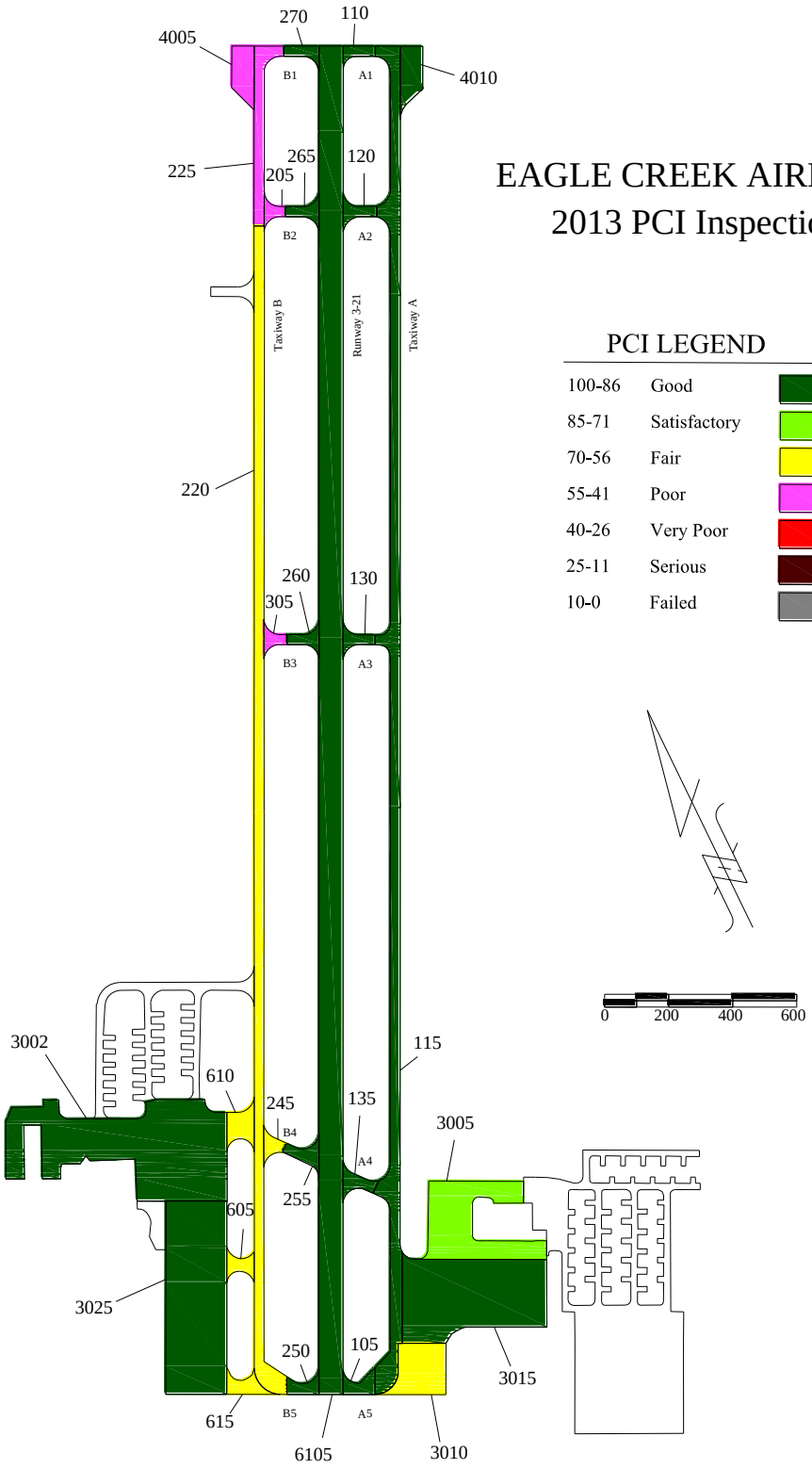
PCI EVALUATION

Eagle Creek EYE
Indianapolis, Indiana

INICOM 122.8

APPLIED RESEARCH ASSOCIATES, INC.

EAGLE CREEK AIRPORT
2013 PCI Inspection



PCI LEGEND

100-86	Good	
85-71	Satisfactory	
70-56	Fair	
55-41	Poor	
40-26	Very Poor	
25-11	Serious	
10-0	Failed	

0 200 400 600