Grinnell Regional Airport

PAVEMENT MANAGEMENT REPORT

PREPARED BY

Applied Pavement Technology, Inc.
115 West Main Street, Suite 400
Urbana, Illinois 61801
(217) 398-3977
www.appliedpavement.com

JULY 2022

applied pavement TECHNOLOGY

The preparation of this document was financed in part through an Airport Improvement Program grant from the Federal Aviation Administration (Project Number 3-19-0000-028-2021) as provided under Section 505 of the Airport and Airway Improvement Act of 1982, as amended. The contents do not necessarily reflect the DOT's official views or the policy of the FAA. Acceptance of this report by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate the proposed development is environmentally acceptable in accordance with appropriate public laws.

GRINNELL REGIONAL AIRPORT
PAVEMENT MANAGEMENT REPORT

Prepared For:

Iowa Department of Transportation
Modal Transportation Bureau – Aviation
800 Lincoln Way
Ames, Iowa 50010
515-239-1691
https://iowadot.gov/aviation/

Prepared By:

Applied Pavement Technology, Inc.
115 West Main Street, Suite 400
Urbana, Illinois 61801
217-398-3977
https://www.appliedpavement.com

In Association With:

Robinson Engineering Company
Consulting Engineers
819 Second Street NE
Independence, Iowa 50644
319-334-7211

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDIXES

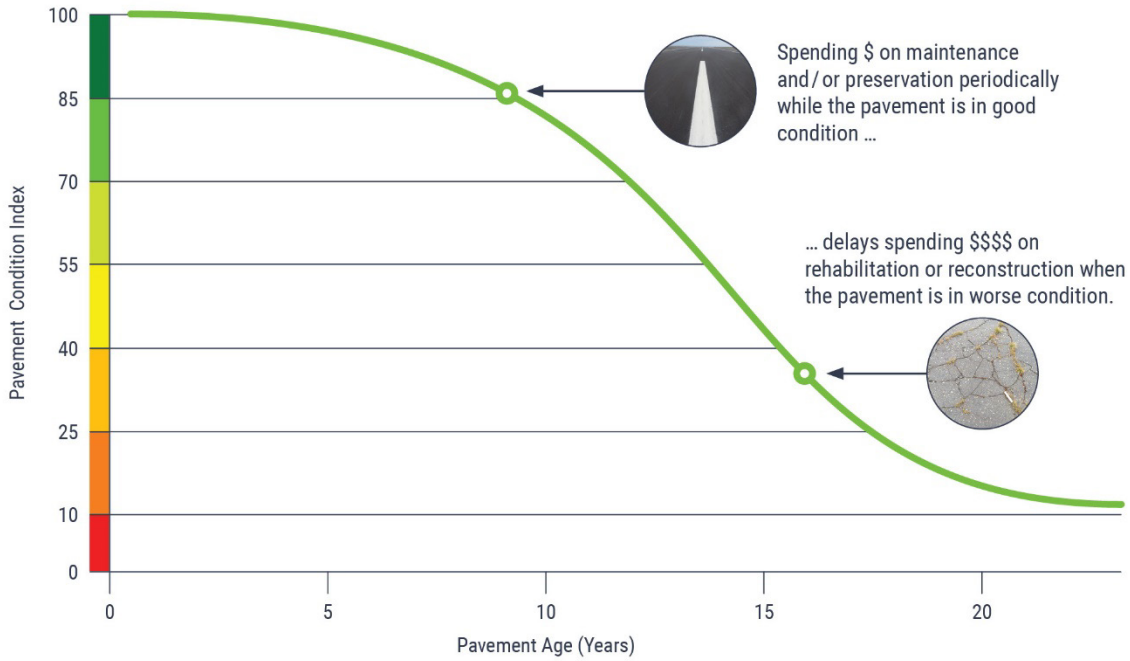
INTRODUCTION

Applied Pavement Technology, Inc. (APTech), with assistance from Robinson Engineering Company, updated the Airport Pavement Management System (APMS) for the Iowa Department of Transportation, Modal Transportation Bureau – Aviation (Iowa DOT). The APMS provides a means to monitor the condition of the pavements within the state of Iowa and to proactively plan for their preservation.

As part of this project, pavement conditions at Grinnell Regional Airport were assessed in November 2021 using the Pavement Condition Index (PCI) procedure. During a PCI inspection, the types, severities, and amounts of distress present in a pavement are quantified. This information is then used to develop a composite index that represents the overall condition of the pavement in numerical terms, ranging from 0 (failed) to 100 (excellent). The PCI provides an overall measure of condition and an indication of the level of work that will be required to maintain or repair a pavement. The distress information also provides insight into what is causing the pavement to deteriorate, which is the first step in selecting the appropriate repair action to correct the problem.

Programmed into an APMS, PCI information is used to determine when preventive maintenance actions (such as crack or joint sealing) are advisable and to identify the most cost-effective time to perform major rehabilitation (such as an overlay or whitetopping). Delaying maintenance and rehabilitation (M&R) until a pavement structure has seriously degraded can cost many times more than if M&R was applied earlier in a pavement's life cycle, as shown in Figure 1. From a safety perspective, pavement distresses, such as cracks and loose debris, may pose risks in terms of the potential for aircraft tire damage and the ability of a pilot to safely control aircraft.

Figure 1. Pavement condition versus cost of repair.



The pavement evaluation results for Grinnell Regional Airport are presented within this report and can be used by Grinnell Regional Airport, the Iowa DOT, and the Federal Aviation Administration (FAA) to identify, prioritize, and schedule pavement M&R actions at the airport. In addition to this report, the interactive pavement management data visualization tool IDEA, containing the pavement management information collected during this project, was updated and may be accessed from the Iowa DOT's website (https://iowadot.gov/aviation).

PAVEMENT INVENTORY

The project began with a review of the existing inventory information pertaining to the pavements at Grinnell Regional Airport. The date of original construction, along with the date of any subsequent rehabilitation; the location of completed work; and the type of work undertaken were gathered. The information was used to update the pavement management database and associated maps as necessary to account for pavement-related work that had been undertaken since the last time the airport was evaluated in 2018.

The pavement network at Grinnell Regional Airport was then divided into branches, sections, and sample units. A branch is a single entity that serves a distinct function. For example, a runway is considered a branch because it serves a single function (allowing aircraft to take off and land). Taxiways, aprons, and T-hangars are also separate branches.

Each branch was further divided into sections. Traditionally, sections are defined as parts of the branch that share common attributes, such as cross-section, date of last construction, traffic level, and performance. Using this approach, if a runway was built in 1968 and then extended in 1984, it would contain two separate sections.

To estimate the overall condition of a pavement section, each section was subdivided into sample units. Portions of these sample units were evaluated during the pavement inspection, and the collected information was extrapolated to predict the overall section condition and quantities of distress.

Approximately 654,500 square feet of pavement were evaluated at Grinnell Regional Airport, as illustrated in Figure 2. This figure also shows the area-weighted age, in years, of the pavements at the time of the inspection. Figure 3 provides a map that details how the pavement network was divided into management units and identifies the sample units that were evaluated during the pavement inspection at Grinnell Regional Airport.

Figure 2. Pavement area by branch use at Grinnell Regional Airport.

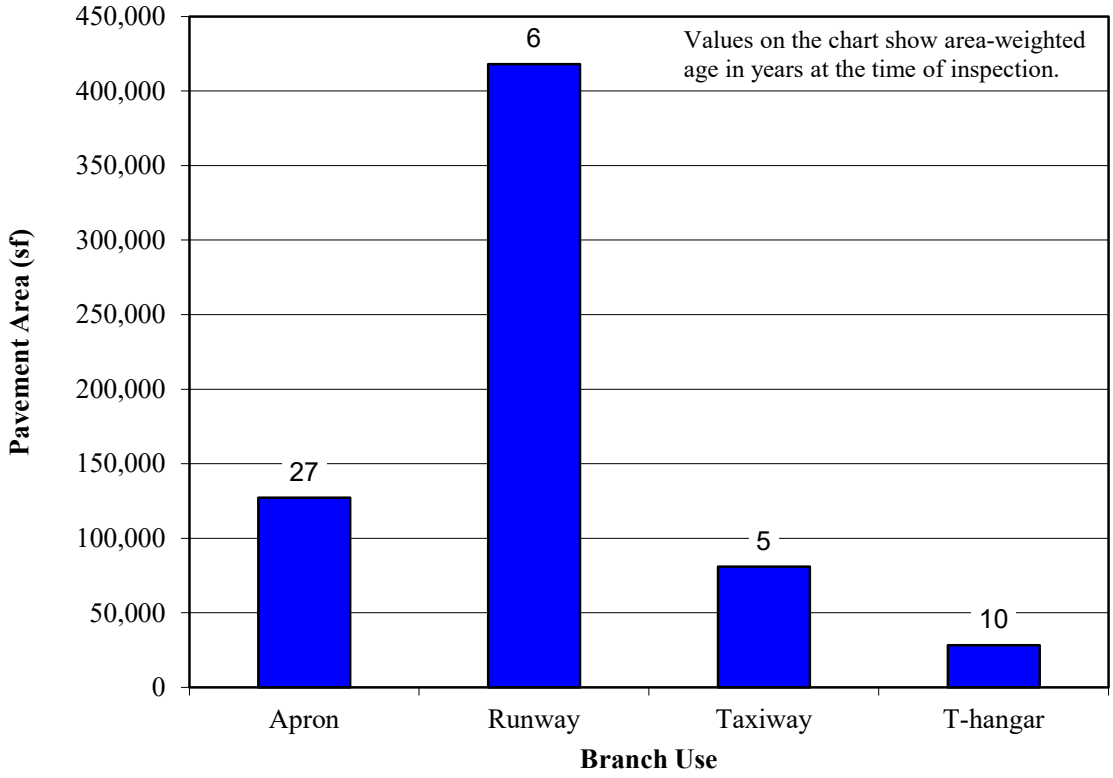
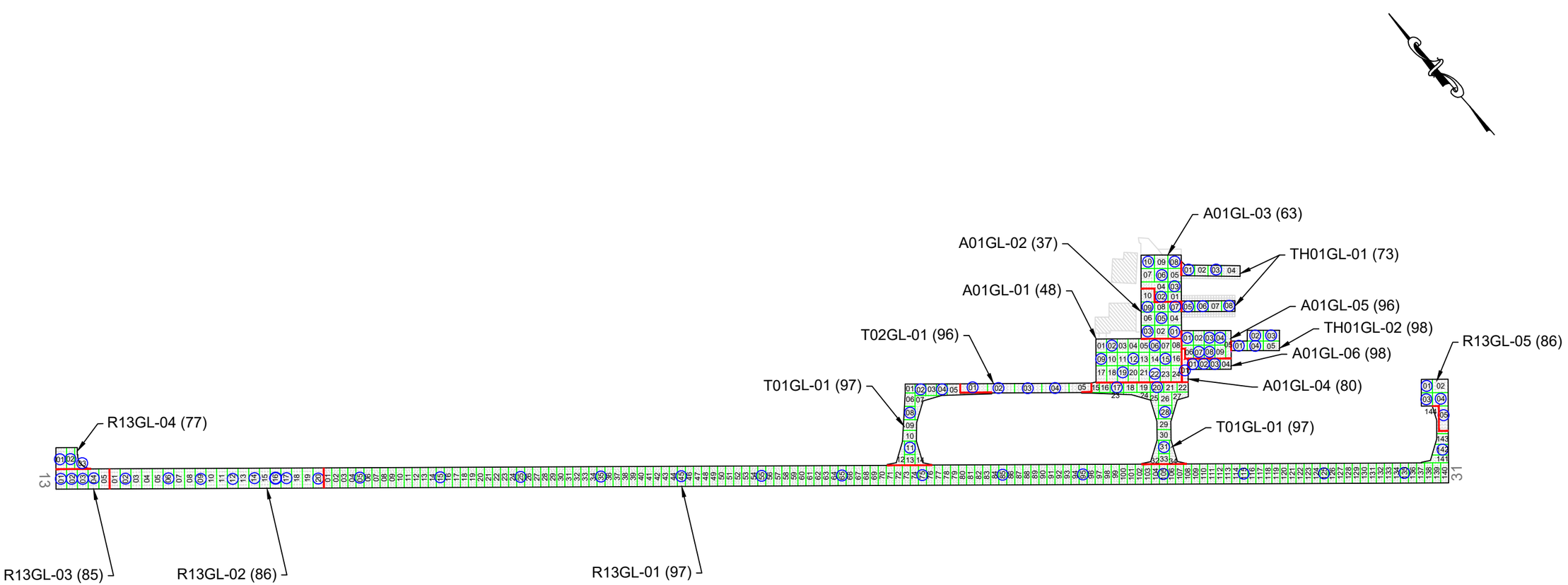


FIGURE 3. NETWORK DEFINITION MAP.



NETWORK DEFINITION LEGEND

R18AL-01 (71)
BRANCH IDENTIFIER
SECTION IDENTIFIER
PCI VALUE

SECTION BREAK LINE
SAMPLE UNIT BREAK LINE
SLAB JOINT
03 SAMPLE UNIT NUMBER
03 SAMPLE UNIT INSPECTED
03 ADDITIONAL SAMPLE UNIT

applied pavement TECHNOLOGY
115 W. Main Street, Suite 400
Urbana, IL 61801
Tel: (217) 398-3977
Fax: (217) 398-4027

AGENCY: Iowa Department of Transportation, Modal Transportation Bureau - Aviation			
LOCATION: Grinnell Regional Airport, Grinnell, Iowa			
PAGE TITLE: Network Definition Map			
PROJECT DATE: SEP. 2021	CREATION DATE: SEP. 2021	PROJECT MANAGER: LJR	JOB NUMBER: 17-020-AM05
DRAWING SCALE: 1"=400'	LAST MODIFIED DATE: JAN. 2022	REVISED BY: MDK	DRAWN BY: DSP
FILENAME: Grinnell.dwg		LAYOUT NAME/NUMBER: NET. DEF.	PAGE NUMBER: 5

PAVEMENT EVALUATION

Pavement Evaluation Procedure

APTech inspected the pavements at Grinnell Regional Airport using the PCI procedure described in:

- FAA Advisory Circular 150/5380-6C, *Guidelines and Procedures for Maintenance of Airport Pavements* (https://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5380-6C.pdf).
- FAA Advisory Circular 150/5380-7B, *Airport Pavement Management Program (PMP)* (https://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5380-7B.pdf).
- ASTM D5340-20, *Standard Test Method for Airport Pavement Condition Index Surveys*.

The PCI provides a numerical indication of overall pavement condition, as illustrated in Figure 4. The types and amounts of deterioration are used to calculate the PCI of the section. The PCI ranges from a value of 0, which represents a pavement in a failed condition, to a value of 100, which represents a pavement in excellent condition. It is important to note that factors other than overall PCI need to be considered when identifying the appropriate type of repair, including types of distress present and rate of deterioration. Also, since the PCI does not assess the structural integrity or capacity of the pavement structure, further testing may be needed to validate and refine the treatment strategy.

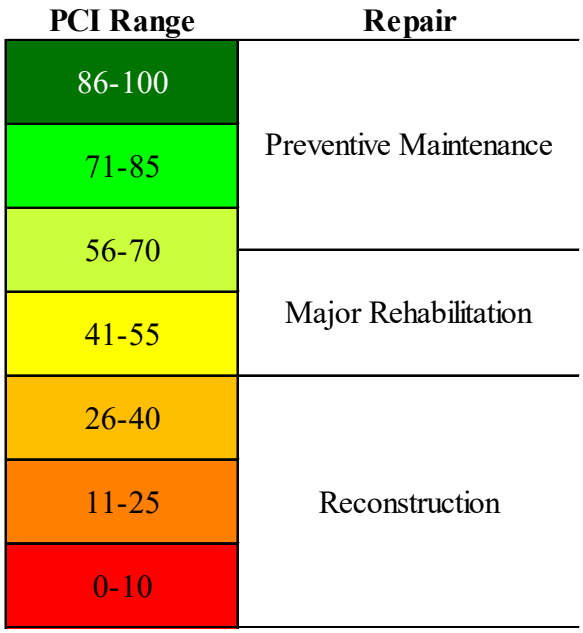
Figure 4. Visual representation of PCI scale on typical pavement surfaces[1].

PCI = 100 PCI = 60 PCI = 35

[1]Photographs shown are not specific to Grinnell Regional Airport.

Generally, pavements with relatively high PCIs that are not exhibiting significant load-related distress will benefit from preventive maintenance actions, such as crack sealing or joint resealing. As the PCI drops, the pavements may require major rehabilitation, such as an overlay or whitetopping. In some situations where the PCI has dropped low enough, reconstruction may be the only viable alternative due to the substantial damage to the pavement structure. Figure 5 illustrates how the appropriate repair type varies with the PCI of a pavement section and provides the corresponding colors used for the maps and charts in this report for each range of PCIs.

Figure 5. PCI versus repair type.



The types of distress identified during the PCI inspection provide insight into the cause of pavement deterioration, which in turn helps in selecting a rehabilitation alternative that corrects the cause, thus eliminating or delaying its recurrence. PCI distress types are characterized as load-related (such as alligator cracking on asphalt-surfaced pavements or shattered slabs on portland cement concrete [PCC] pavements), climate/durability-related (such as weathering [a climate-related distress type on asphalt-surfaced pavements] and durability cracking [a durability-related distress type on PCC pavements]), and other (distress types that cannot be attributed solely to load or climate/durability).

Appendix A identifies the distress types considered during a PCI inspection and describes the likely cause of each distress type. It should be noted that a PCI is based on visual signs of pavement deterioration and does not provide a measure of structural capacity.

Pavement Evaluation Results

The pavements at Grinnell Regional Airport were inspected in November 2021. The 2021 area-weighted condition of Grinnell Regional Airport is 87, with conditions ranging from 37 to 98 (on a scale of 0 [failed] to 100 [excellent]). During the previous pavement inspection in 2018, the area-weighted PCI of the airport was 90.

Figure 6 summarizes the overall condition of the pavements at Grinnell Regional Airport, and Figure 7 presents area-weighted condition (average PCI adjusted to account for the relative size of the pavement sections) by branch use. Figure 8 is a map that displays the condition of the evaluated pavements. Table 1 summarizes the results of the pavement evaluation. Appendix B presents photographs taken during the PCI inspection, and Appendix C contains detailed information on the distress types observed during the visual survey. Appendix D includes detailed work history information that was collected during the record review process.

Figure 6. Pavement area by PCI range at Grinnell Regional Airport.

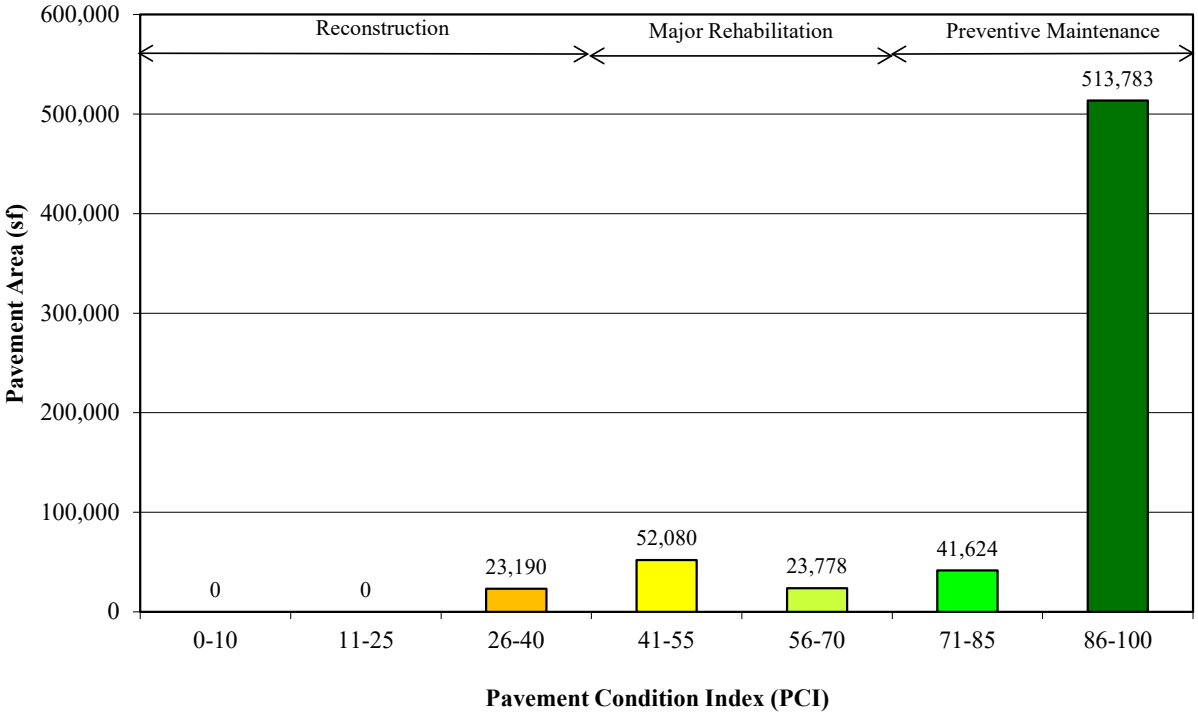


Figure 7. Area-weighted PCI by branch use at Grinnell Regional Airport.
(Values on chart are area-weighted)

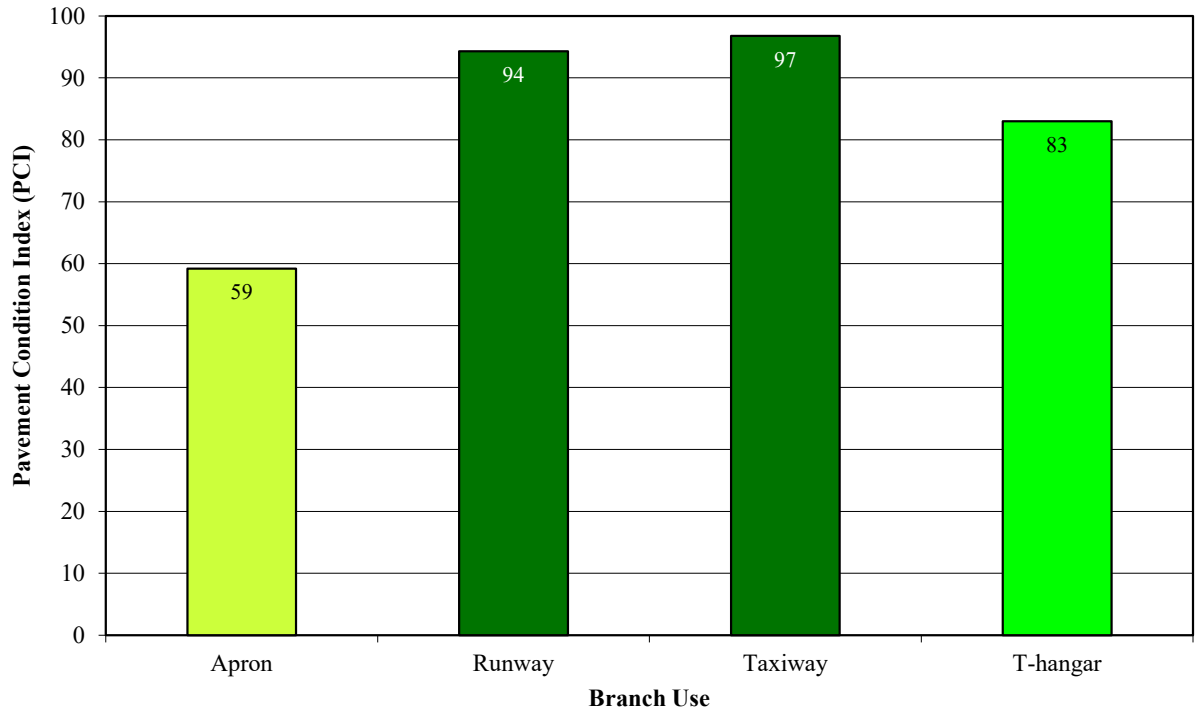
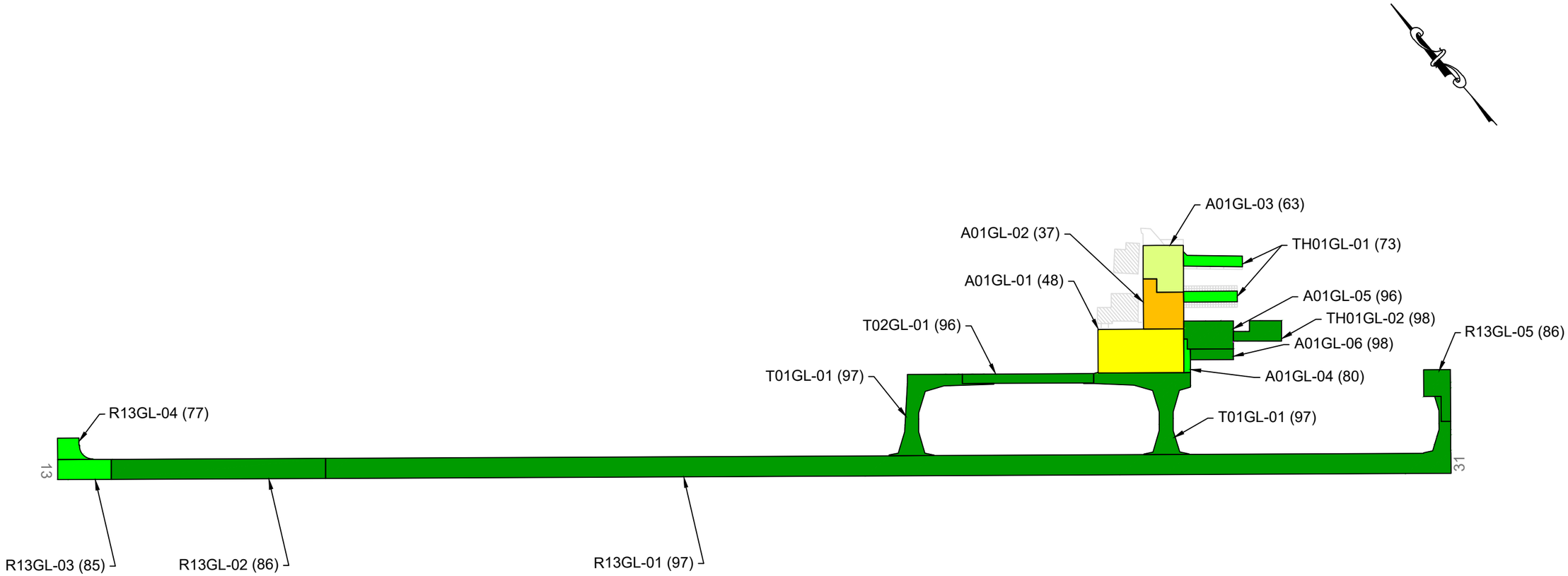


FIGURE 8. PCI MAP.



LEGEND

R18AL-01 (71)

- BRANCH IDENTIFIER
- SECTION IDENTIFIER
- PCI VALUE
- SECTION BREAK LINE

PAVEMENT CONDITION INDEX

PCI

86-100
71-85
56-70
41-55
26-40
11-25
0-10

applied pavement TECHNOLOGY
115 W. Main Street, Suite 400
Urbana, IL 61801
Tel: (217) 398-3977
Fax: (217) 398-4027

Robinson Engineering Company
Consulting Engineers
322 1st Street East
Independence, IA 50644
Tel: (319) 334-7211

AGENCY: Iowa Department of Transportation
Modal Transportation Bureau - Aviation

LOCATION: Grinnell Regional Airport
Grinnell, Iowa

PAGE TITLE: 2021 Pavement Condition Index Map

PROJECT DATE:	CREATION DATE:	PROJECT MANAGER:	JOB NUMBER:
SEP. 2021	SEP. 2021	LJR	17-020-AM05
DRAWING SCALE:	LAST MODIFIED DATE:	REVISED BY:	DRAWN BY:
1"=400'	APR. 2022	DSP	DSP
FILENAME:		LAYOUT NAME/NUMBER:	PAGE NUMBER:
Grinnell.dwg		PCI	9

Table 1. 2021 pavement evaluation results.

Branch	Section	Surface Type	Section Area (sf)	LCD	2021 PCI	% Distress Due to Load	% Distress Due to Climate/ Durability	% Distress Due to Other	Type of Distress
A01GL	01	PCC	52,080	6/30/1990	48	11	20	69	ASR, Corner Break, Corner Spalling, Faulting, Joint Spalling, Joint Seal Damage, Large Patch, Shattered Slab, Small Patch
A01GL	02	PCC	23,190	6/30/1987	37	9	8	83	ASR, Corner Break, Corner Spalling, Joint Spalling, Joint Seal Damage, Large Patch, LTD Cracking, Small Patch
A01GL	03	PCC	23,778	6/30/1987	63	31	30	39	ASR, Corner Break, Corner Spalling, Joint Spalling, Joint Seal Damage, Large Patch, LTD Cracking, Small Patch
A01GL	04	PCC	2,619	6/1/2003	80	61	10	29	Joint Spalling, Joint Seal Damage, Large Patch, LTD Cracking
A01GL	05	PCC	19,079	7/2/2011	96	0	100	0	Joint Seal Damage
A01GL	06	PCC	6,446	6/3/2018	98	0	100	0	Joint Seal Damage
R13GL	01	PCC	322,765	10/3/2019	97	24	46	30	Faulting, Joint Spalling, Joint Seal Damage, LTD Cracking
R13GL	02	PCC	60,000	6/1/2000	86	13	31	56	Corner Spalling, Faulting, Joint Spalling, Joint Seal Damage, LTD Cracking, Small Patch
R13GL	03	PCC	15,000	6/1/2000	85	30	41	29	Corner Spalling, Joint Spalling, Joint Seal Damage, Large Patch, LTD Cracking
R13GL	04	PCC	7,100	6/1/2000	77	37	47	16	Corner Spalling, Faulting, Joint Spalling, Joint Seal Damage, LTD Cracking

Table 1. 2021 pavement evaluation results (continued).

Branch	Section	Surface Type	Section Area (sf)	LCD	2021 PCI	% Distress Due to Load	% Distress Due to Climate/ Durability	% Distress Due to Other	Type of Distress
R13GL	05	PCC	13,265	6/3/2012	86	0	44	56	ASR, Faulting, Joint Spalling, Joint Seal Damage
T01GL	01	PCC	63,778	3/3/2020	97	0	100	0	Joint Seal Damage
T02GL	01	PCC	17,170	6/3/2003	96	0	91	9	Corner Spalling, Joint Spalling, Joint Seal Damage
TH01GL	01	PCC	16,905	5/2/2006	73	50	42	8	Corner Break, Corner Spalling, Durability Cracking, Joint Spalling, Joint Seal Damage, LTD Cracking, Scaling, Shattered Slab
TH01GL	02	PCC	11,280	6/3/2018	98	0	100	0	Joint Seal Damage

Table Notes:

1. See Figure 3 for the location of the branch and section.
2. Surface Type: AC = asphalt cement concrete; AAC = asphalt overlay on AC; PCC = portland cement concrete; APC = asphalt overlay on PCC.
3. LCD = last construction date.
4. Distress due to load includes distress types that are attributed to a structural deficiency in the pavement, such as alligator cracking or rutting on asphalt-surfaced pavements or shattered slabs on PCC pavements.
5. Distress due to climate or durability includes distress types that are attributed to either the aging of the pavement and the effects of the environment (such as weathering, raveling, or block cracking on asphalt-surfaced pavements) or to a materials-related problem (such as durability cracking or alkali-silica reaction [ASR] on PCC pavements). If materials-related distresses were recorded during the inspection, further laboratory testing is required to definitively determine the type present.
6. Distress due to other refers to distress types that are not attributed to one factor but rather may be caused by a combination of factors.
7. Distress types are defined by ASTM D5340-20. L&T Cracking = Longitudinal and Transverse Cracking; LTD Cracking = Longitudinal, Transverse, and Diagonal Cracking; ASR = Alkali-Silica Reaction.

Inspection Comments

Grinnell Regional Airport was inspected on November 15, 2021. There were fifteen pavement sections defined during the inspection. Suspected alkali-silica reaction (ASR) was recorded at this airport in accordance with ASTM D5340-20. It should be noted that laboratory testing in the form of petrographic analysis is the only definitive way to validate the presence of ASR; however, the formation of a precipitate is evidence of a reaction consistent with this type of materials-related distress.

Runway

Runway 13/31 was defined by five sections. Section 01 was in excellent condition with areas of low-severity faulting, joint seal damage, joint spalling, and longitudinal, transverse, and diagonal (LTD) cracking. Section 02 contained low- and medium-severity corner spalling, faulting, joint seal damage, and LTD cracking; low- and high-severity joint spalling; and high-severity small patching. Low- and medium-severity corner spalling and joint spalling, medium-severity joint seal damage and LTD cracking, and low-severity large patching were recorded in Section 03. Section 04 had areas of medium-severity corner spalling, joint spalling, and LTD cracking; low-severity faulting; and medium- and high-severity joint seal damage. Section 05 contained medium-severity joint seal damage and low-severity ASR, faulting, and joint spalling.

Taxiways

Taxiway 01 connected Runway 13/31 to the apron area and consisted of one section in excellent condition. Only low- and medium-severity joint seal damage were observed throughout Section 01.

Taxiway 02 contained one section. Section 01 was in excellent condition with areas of low- and medium-severity joint seal damage and low-severity corner spalling and joint spalling recorded during the inspection.

Apron

The apron was divided into six sections. Section 01 contained areas of all severities of ASR and joint seal damage; low- and medium-severity corner break and corner spalling; low-severity faulting, joint spalling, small patching, and large patching; and medium-severity shattered slab. Section 02 was in poor condition with medium-severity corner break and LTD cracking; low- and medium-severity joint seal damage, large patching, and corner spalling; all severities of ASR; low-severity joint spalling; and low- and high-severity small patching. Low- and medium-severity corner break, joint spalling, LTD cracking, and ASR; low-severity large patching, small patching, and corner spalling; and all severities of joint seal damage were identified in Section 03. Section 04 contained medium-severity LTD cracking and low-severity joint seal damage, joint spalling, and large patching. Section 05 was in excellent condition with only low- and medium-severity joint seal damage recorded throughout. Section 06 was also in excellent condition with only low-severity joint seal damage noted at the time of inspection.

T-Hangar

The T-hangar area was defined by two sections. Section 01 contained areas of low-severity corner break and durability cracking, low- and medium-severity corner spalling and LTD cracking, medium- and high-severity joint seal damage, medium-severity joint spalling and scaling, and low- and high-severity shattered slab. Section 02 was in excellent condition with only low-severity joint seal damage observed throughout.

PAVEMENT MAINTENANCE AND REHABILITATION PROGRAM

Using the information collected during the pavement inspection, the PAVER pavement management software was used to develop a 5-year M&R program for Grinnell Regional Airport. In addition, a 1-year plan for localized preventive maintenance (such as crack sealing and patching) was prepared.

Analysis Parameters

Critical PCIs

PAVER uses critical PCIs to determine whether localized preventive maintenance or major rehabilitation is the appropriate repair action. Above the critical PCI, localized preventive maintenance activities are recommended. Below the critical PCI, major rehabilitation actions, such as an overlay or reconstruction, are recommended. The Iowa DOT set the critical PCIs at 65 for runways, 60 for taxiways, and 55 for aprons and T-hangars.

Localized Preventive Maintenance Policies and Unit Costs

Localized preventive maintenance policies were developed for asphalt-surfaced and PCC pavements. These policies, shown in Appendix E, identify the localized preventive maintenance actions that the Iowa DOT considered appropriate to correct for the different distress types and severities. The Iowa DOT provided unit costs for each of the localized preventive maintenance actions included in these policies, and these costs are detailed in Appendix E. Please note that this information is of a general nature for the entire state. The localized preventive maintenance policies and unit costs may require adjustment to reflect specific conditions at Grinnell Regional Airport.

Major Rehabilitation Unit Costs

PAVER estimates the cost of major rehabilitation based on the predicted PCI of the pavement section. The Iowa DOT provided the costs for major rehabilitation, and they are presented in Appendix E. If major rehabilitation is recommended in the 5-year program, further engineering investigation will be needed to identify the most appropriate rehabilitation action and to estimate the cost of such work more accurately.

Budget and Inflation Rate

An unlimited budget with a start date of July 1, 2022 and an inflation rate of 4.0 percent was used during the analysis.

Analysis Approach

The 5-year M&R program was prepared with the goal of maintaining the pavements above established critical PCIs. During this analysis, major rehabilitation was recommended for pavements in the year they dropped below their critical PCI. For the first year (2022) of the analysis only, a localized preventive maintenance plan was developed for those pavement sections that were above their critical PCI. If major rehabilitation was triggered for a section in 2023 or 2024, then localized preventive maintenance was not recommended for 2022. While localized preventive maintenance should be an annual undertaking at Grinnell Regional Airport, it is not possible to accurately predict the propagation of cracking and other distress types. Therefore, the airport should budget for maintenance every year and can use the 2022 localized

preventive maintenance plan as a baseline for that work. As the pavements age, it can be assumed that the amount of localized preventive maintenance required will increase.

Analysis Results

A summary of the M&R program for Grinnell Regional Airport is presented in Table 2. Detailed information on the recommended localized preventive maintenance plan for 2022 is provided in Appendix F.

Table 2. 5-year M&R program under an unlimited funding analysis scenario.

Year	Branch	Section	Surface Type	Type of Repair	Estimated Cost
2022	A01GL	01	PCC	Major Rehabilitation	$549,849
2022	A01GL	02	PCC	Major Rehabilitation	$403,092
2022	A01GL	03	PCC	Preventive Maintenance	$26,753
2022	A01GL	04	PCC	Preventive Maintenance	$38
2022	A01GL	05	PCC	Preventive Maintenance	$4,173
2022	R13GL	02	PCC	Preventive Maintenance	$11,042
2022	R13GL	03	PCC	Preventive Maintenance	$8,444
2022	R13GL	04	PCC	Preventive Maintenance	$3,895
2022	R13GL	05	PCC	Preventive Maintenance	$6,033
2022	T01GL	01	PCC	Preventive Maintenance	$8,492
2022	T02GL	01	PCC	Preventive Maintenance	$1,578
2022	TH01GL	01	PCC	Preventive Maintenance	$15,304
				Total Estimated Cost:	**$1,039,000**

Table Notes:

1. See Figure 3 for the location of the branch and section.
2. Surface Type: AC = asphalt cement concrete; AAC = asphalt overlay on AC; PCC = portland cement concrete; APC = asphalt overlay on PCC.
3. Type of Repair: Major Rehabilitation such as pavement reconstruction or an overlay; Localized Preventive Maintenance such as crack sealing or patching.
4. The estimated costs provided are of a general nature for the entire state and may require adjustment to reflect specific conditions at Grinnell Regional Airport.

The recommendations made in this report are based on a broad network-level analysis and meant to provide Grinnell Regional Airport with an indication of the type of pavement-related work required during the next 5 years. Further engineering investigation may be necessary to identify which repair action is most appropriate. In addition, the cost estimates provided are based on overall unit costs for the entire state, and Grinnell Regional Airport should adjust the plan to reflect local costs.

Because an unlimited budget was used in the analysis, it is possible that the pavement repair program may need to be adjusted to consider economic or operational constraints. The identification of a project need does not necessarily mean that state or federal funding will be available in the year it is indicated. It is important to remember that regardless of the

recommendations presented within this report, Grinnell Regional Airport is responsible for repairing pavements where existing conditions pose a hazard to safe operations.

General Maintenance Recommendations

In addition to the specific maintenance actions presented in Appendix F, it is recommended that the following strategies be considered for prolonging pavement life:

1. Regularly inspect all safety areas of the airport and document all inspection activity. A sample form that can be used to perform these inspections is provided in Table 3 of this report.
2. Provide a method of tracking all maintenance activities that occur as a result of inspections. These need to be reported to the FAA and the Iowa DOT. This information is used to update the APMS records and is required to remain in compliance with Public Law 103-305 (see the next section of this report for further information on this law).
3. Conduct an aggressive campaign against weed growth through timely herbicide applications and mowing programs of the safety areas. Vegetation growth in pavement cracks is destructive and significantly increases the rate of pavement deterioration.
4. Implement a periodic crack and joint sealing program. Keeping water and debris out of the pavement system by sealing cracks and joints is a proven and cost-effective method of extending the life of the pavement system.
5. Ensure that dirt does not build up along the edges of the pavements. This can create a "bathtub" effect, reducing the ability of water to drain away from the pavement system.
6. Closely monitor the movement of heavy equipment (particularly farming, construction, and fueling equipment) to make sure it is only operating on pavements that are designed to accommodate heavy loads. Failure to restrict heavy equipment to appropriate areas may result in the premature failure of airport pavements.

FAA Requirements (Public Law 103-305)

Because Grinnell Regional Airport is in the National Plan of Integrated Airport Systems (NPIAS), the airport sponsor is required to keep the airport in a viable operating condition. This includes maintaining airport pavements in accordance with Public Law 103-305. Public Law 103-305 states that after January 1, 1995, NPIAS airport sponsors must provide assurances or certifications that an airport has implemented an effective airport pavement maintenance management system (PMMS) before the airport will be considered for federal funding of pavement replacement or reconstruction projects. To be in full compliance with the federal law, the PMMS must include the following components at minimum: pavement inventory, pavement inspections, record keeping, information retrieval, and program funding.

This report serves as a complete pavement inventory and detailed inspection. To remain in compliance with the law, Grinnell Regional Airport will also need to undertake monthly drive-by inspections of pavement conditions and track pavement-related maintenance activities.

FAA Advisory Circular 150/5380-7B provides detailed guidance pertaining to the requirements for an acceptable pavement management program (PMP). Appendix A of the FAA Advisory Circular 150/5380-7B outlines what needs to be included in a PMP to remain in compliance with this law and Grant Assurance #11. The following is a copy of this Appendix, along with

instructions for supplementing this report so that all requirements are met. Note that the italicized words are direct quotations from the FAA Advisory Circular.

FAA Advisory Circular 150/5830-7B, Appendix A. Pavement Management Program (PMP)

A-1.0. *An effective PMP specifies the procedures to follow to assure that proper preventative and remedial pavement maintenance is performed. The program should identify funding or anticipated funding and other resources available to provide remedial and preventive maintenance activities. An airport sponsor may use any format deemed appropriate, but the program needs to, as a minimum, include the following:*

A-1.1. Pavement Inventory. *The following must be depicted:*

a. Identification of all runways, taxiways, and aprons with pavement broken down into sections each having similar properties.

The network definition map provided in Figure 3 of this report shows the location of all runways, taxiways, aprons, and T-hangars at Grinnell Regional Airport. If any new pavements are constructed or any pavement areas are permanently closed, this map must be updated. Project plans should be submitted to the Iowa DOT after project completion.

b. Dimensions of pavement sections.

The dimensions of all runways, taxiways, aprons, and T-hangars are stored in the PAVER database. Appendix C provides information on length, width, and area. In addition, the network definition map (Figure 3) is drawn to scale. Any changes to pavement dimensions must be recorded.

c. Type of pavement surface.

The type of pavement for each section at Grinnell Regional Airport is listed in Table 1 of this report and is also stored in the PAVER database. Any changes to pavement type (through an overlay or reconstruction) must be recorded.

d. Year of construction and/or most recent major rehabilitation.

Dates for pavement construction, rehabilitation, or reconstruction must be recorded. The current pavement history for Grinnell Regional Airport is provided in Appendix D of this report.

e. Whether AIP [Airport Improvement Program] or PFC [Passenger Facility Charge] funds were used to construct, reconstruct, or repair the pavement.

Funding sources for all pavement projects should be recorded.

A-1.2. PMP Pavement Inspection Schedule. *Airports must perform a detailed inspection of airfield pavements at least once a year for the PMP. If a pavement condition index (PCI) survey is performed, as set forth in ASTM D5340, Standard Test Method for Airport Pavement Condition Index Surveys, the frequency of the detailed inspection by PCI surveys may be extended to three years. Less comprehensive routine daily, weekly, and monthly maintenance inspections required for operations should be addressed.*

This report consists of a detailed inspection that will extend the inspection period to 3 years. It is the airport sponsor's responsibility to perform monthly drive-by inspections. A sample pavement inspection report form is provided in Table 3 of this report.

A-1.3. Record Keeping. *The airport must record and keep on file complete information about all detailed inspections and maintenance performed until the pavement system is replaced. The types of distress, their locations, and remedial action, scheduled or performed, must be documented. The minimum information recorded includes:*

a. *Inspection date*

b. Location

c. Distress types

d. Maintenance scheduled or performed

Items a through c are satisfied by this inspection report. Item d is the responsibility of the airport, as is record keeping of the monthly drive-by inspections.

A-1.4. Information Retrieval. *An airport sponsor may use any form of record keeping it deems appropriate so long as the information and records from the pavement survey can generate required reports, as necessary.*

Keep this report, monthly drive-by inspection reports, construction updates, and all records of maintenance activities in a readily accessible location so that they can be easily retrieved as requested by the FAA.

Table 3. Pavement inspection report.

Inspected By: _____

Date Inspected: _____

Branch	Section	Distress Description/Dimensions/Severity/ Recommended Action	Description of Repair	Date Performed	Cost	Funding Source
A01GL	01					
A01GL	02					
A01GL	03					
A01GL	04					
A01GL	05					
A01GL	06					

Table 3. Pavement inspection report (continued).

Inspected By: _____

Date Inspected: _____

Branch	Section	Distress Description/Dimensions/Severity/ Recommended Action	Description of Repair	Date Performed	Cost	Funding Source
R13GL	01					
R13GL	02					
R13GL	03					
R13GL	04					
R13GL	05					
T01GL	01					

Table 3. Pavement inspection report (continued).

Inspected By: _____

Date Inspected: _____

Branch	Section	Distress Description/Dimensions/Severity/ Recommended Action	Description of Repair	Date Performed	Cost	Funding Source
T02GL	01					
TH01GL	01					
TH01GL	02					

Table Notes:

1. See Figure 3 for the location of the branch and section.

SUMMARY

This report documents the results of the pavement evaluation conducted at Grinnell Regional Airport. A visual inspection of the pavements in 2021 found that the overall condition of the pavement network is a PCI of 87. A 5-year pavement repair program, shown in Table 2, was generated for Grinnell Regional Airport, which revealed that approximately $1,039,000 needs to be expended on M&R. Grinnell Regional Airport should utilize these study results to assist in planning for future maintenance needs as part of the airport CIP planning process.

APPENDIX A

CAUSE OF DISTRESS TABLES

Table A-1. Cause of pavement distress, asphalt-surfaced pavements.

Distress Type	Probable Cause of Distress
Alligator Cracking	Fatigue failure of the asphalt surface under repeated traffic loading.
Bleeding	Excessive amounts of asphalt cement or tars in the mix or low air void content, or both.
Block Cracking	Shrinkage of the asphalt and daily temperature cycling; it is not load associated.
Corrugation	Traffic action combined with an unstable pavement layer.
Depression	Settlement of the foundation soil or can be "built up" during construction.
Jet-Blast Erosion	Bituminous binder has been burned or carbonized.
Joint Reflection Cracking	Movement of the concrete slab beneath the asphalt surface due to thermal and moisture changes.
L&T Cracking	Cracks may be caused by (1) a poorly constructed paving lane joint, (2) shrinkage of the asphalt surface due to low temperatures or hardening of the asphalt, or (3) reflective cracking caused by cracks in an underlying PCC slab.
Oil Spillage	Deterioration or softening of the pavement surface caused by the spilling of oil, fuel, or other solvents.
Patching	N/A
Polished Aggregate	Repeated traffic applications.
Raveling	Asphalt binder may have hardened significantly, causing coarse aggregate pieces to dislodge.
Rutting	Usually caused by consolidation or lateral movement of the materials due to traffic loads.
Shoving	Where PCC pavements adjoin flexible pavements, PCC "growth" may shove the asphalt pavement.
Slippage Cracking	Low strength surface mix or poor bond between the surface and the next layer of the pavement structure.
Swelling	Usually caused by frost action or by swelling soil.
Weathering	Asphalt binder and/or fine aggregate may wear away as the pavement ages and hardens.

Table A-2. Cause of pavement distress, PCC pavements.

Distress Type	Probable Cause of Distress
ASR	Chemical reaction of alkalis in the portland cement with certain reactive silica minerals. ASR may be accelerated by the use of chemical pavement deicers.
Blowup	Incompressible materials in the joints.
Corner Break	Load repetition combined with loss of support and curling stresses.
Durability Cracking	Concrete's inability to withstand environmental factors such as freeze-thaw cycles.
Faulting	Upheaval or consolidation.
Joint Seal Damage	Stripping of joint sealant, extrusion of joint sealant, weed growth, hardening of the filler (oxidation), loss of bond to the slab edges, or absence of sealant in the joint.
LTD Cracking	Combination of load repetition, curling stresses, and shrinkage stresses.
Patching (Small and Large)	N/A
Popouts	Freeze-thaw action in combination with expansive aggregates.
Pumping	Poor drainage, poor joint sealant.
Scaling	Over finishing of concrete, deicing salts, improper construction, freeze-thaw cycles, and poor aggregate.
Shattered Slab	Load repetition.
Shrinkage Cracking	Setting and curing of the concrete.
Spalling (Joint and Corner)	Excessive stresses at the joint caused by infiltration of incompressible materials or traffic loads; weak concrete at the joint combined with traffic loads.

APPENDIX B

INSPECTION PHOTOGRAPHS

A01GL-01. Overview.

A01GL-01. ASR (Sample Unit No. 09).

A01GL-02. Overview.

A01GL-02. ASR (Sample Unit No. 01).

A01GL-03. Overview.

A01GL-03. ASR (Sample Unit No. 10).

A01GL-03. LTD Cracking (Sample Unit No. 10).

A01GL-04. Overview.

A01GL-04. LTD Cracking (Sample Unit No. 01).

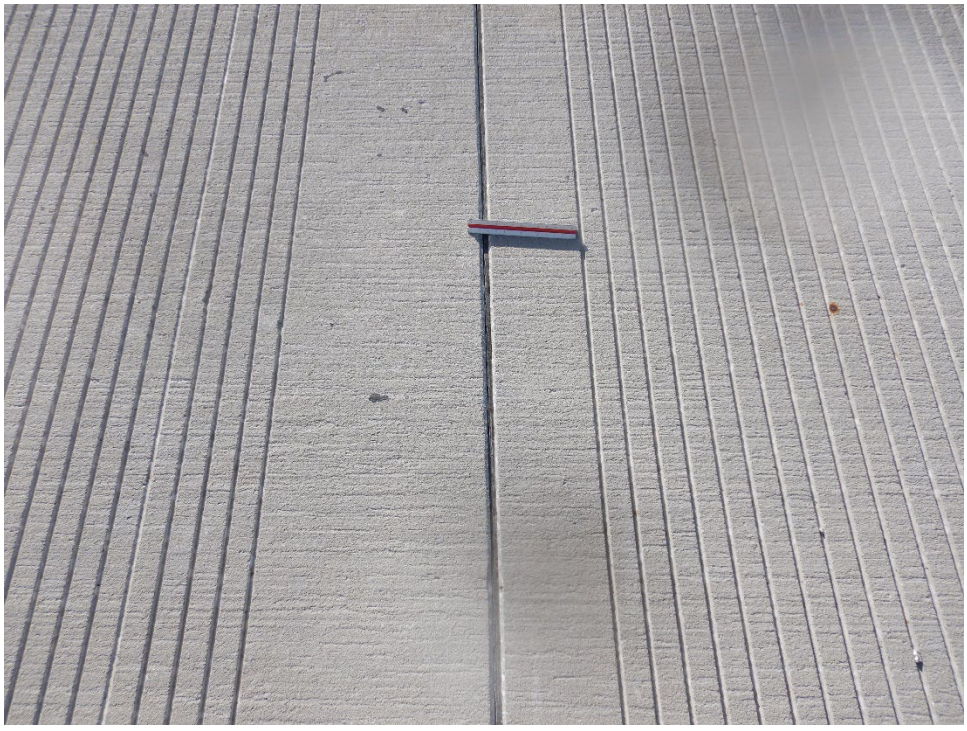
A01GL-05. Overview.

A01GL-05. Joint Seal Damage (Sample Unit No. 03).

A01GL-06. Overview.

A01GL-06. Joint Seal Damage (Sample Unit No. 01).

R13GL-01. Joint Seal Damage (Sample Unit No. 95).



R13GL-01. Joint Spalling (Sample Unit No. 45).

R13GL-02. Overview.

R13GL-02. Corner Spalling (Sample Unit No. 20).

R13GL-02. Joint Spalling (Sample Unit No. 02).

R13GL-02. LTD Cracking (Additional Sample Unit No. 16).

R13GL-03. Overview.

R13GL-03. Joint Seal Damage (Sample Unit No. 02).

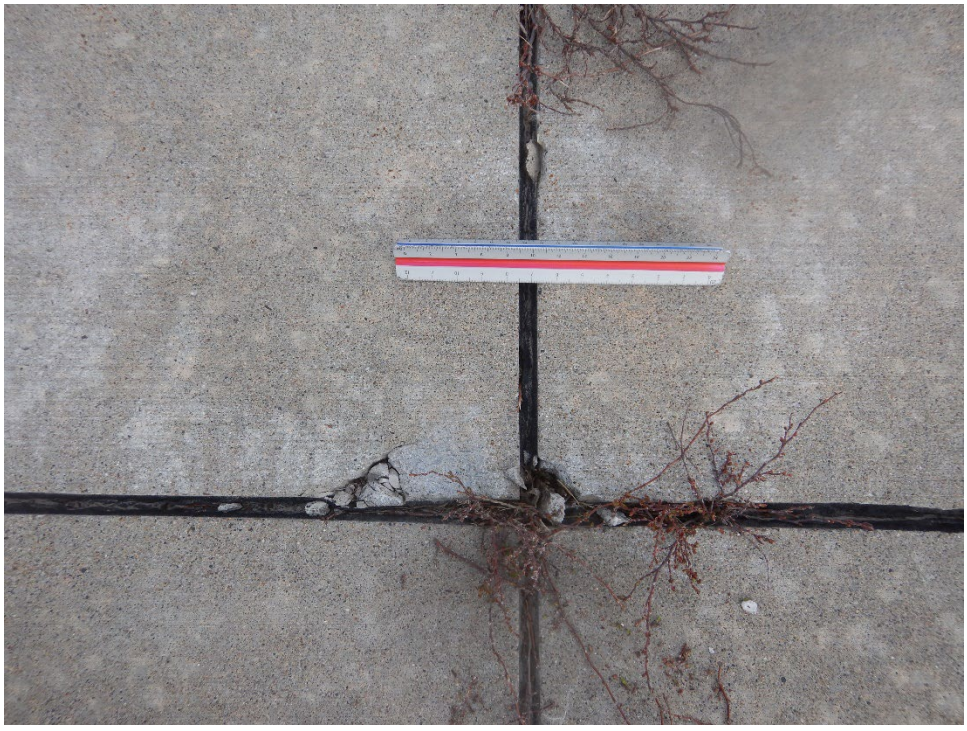
R13GL-03. Joint Spalling (Sample Unit No. 02).

R13GL-04. Overview.

R13GL-04. Corner Spalling (Sample Unit No. 01).

R13GL-04. Joint Seal Damage (Sample Unit No. 01).

R13GL-05. ASR (Sample Unit No. 01).



R13GL-05. Joint Seal Damage (Sample Unit No. 05).

R13GL-05. Joint Spalling (Sample Unit No. 03).

T01GL-01. Overview.

T01GL-01. Joint Seal Damage (Sample Unit No. 02).

T01GL-01. Joint Seal Damage (Sample Unit No. 20).

T02GL-01. Overview.

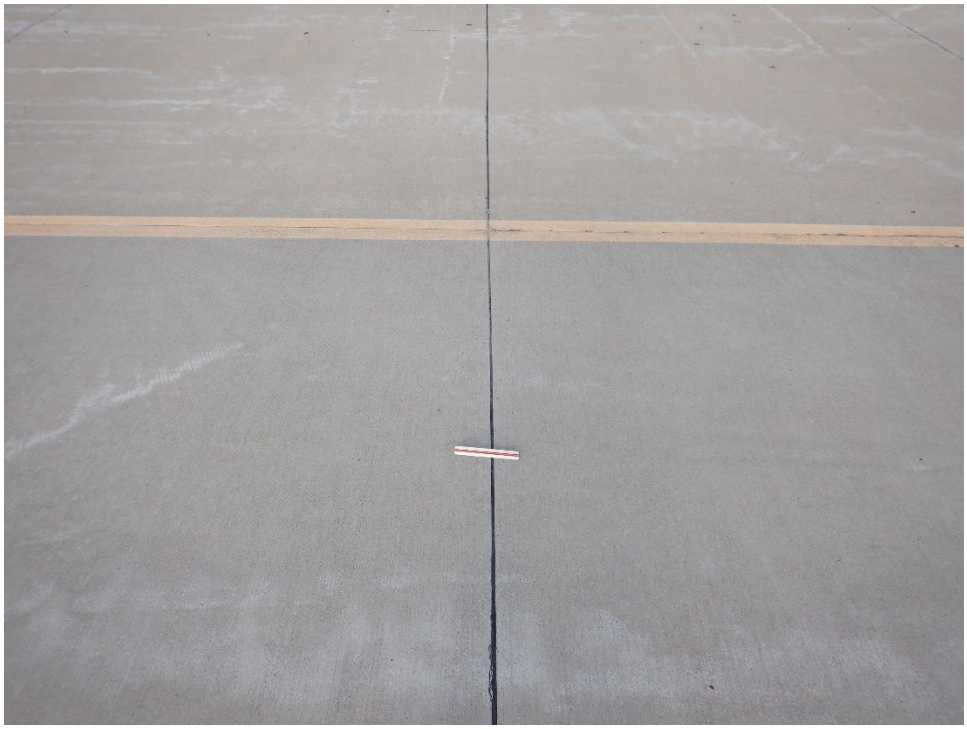
T02GL-01. Joint Seal Damage (Sample Unit No. 01).

TH01GL-01. Overview.

TH01GL-01. LTD Cracking (Sample Unit No. 05).

TH01GL-02. Overview.

TH01GL-02. Joint Seal Damage (Sample Unit No. 01).



APPENDIX C

INSPECTION REPORT

RE-INSPECTION REPORT
GRINNELL REGIONAL AIRPORT

Branch - Section ID: A01GL - 01

Branch Name: APRON Use: APRON

LCD: 6/30/1990
Surface Type: PCC
Rank: P
Section Area (sf): 52,080.00
Length (ft): 160.00
Width (ft): 320.00
From: SW END OF APRON
To: 200' TO THE NE

PCI Family: IowaPCCAPSE_GeneralBasic

Slabs: 417
Slab Length (ft): 12.50
Slab Width (ft): 10.00
Joint Length (ft): 8,886.15

Section Comments:

Last Insp Date: 11/15/2021
PCI: 48
Total Samples: 24
Surveyed: 7

Inspection Comments:

Sample Number: 02

Sample Type: R
Sample PCI: 20
Sample Area (Slabs): 16

Sample Comments:

62 CORNER BREAK	L	1 Slabs
66 SMALL PATCH	L	10 Slabs
67 LARGE PATCH	L	6 Slabs
71 FAULTING	L	3 Slabs
74 JOINT SPALL	L	3 Slabs
75 CORNER SPALL	M	1 Slabs
76 ASR	H	2 Slabs
76 ASR	L	3 Slabs
76 ASR	M	3 Slabs

Sample Number: 06

Sample Type: R
Sample PCI: 59
Sample Area (Slabs): 16

Sample Comments:

65 JT SEAL DMG	L	16 Slabs
66 SMALL PATCH	L	6 Slabs
67 LARGE PATCH	L	1 Slabs
71 FAULTING	L	3 Slabs
74 JOINT SPALL	L	1 Slabs
75 CORNER SPALL	M	1 Slabs
76 ASR	M	1 Slabs

RE-INSPECTION REPORT
GRINNELL REGIONAL AIRPORT

Sample Number: 09

Sample Type: R
Sample PCI: 13
Sample Area (Slabs): 16
Sample Comments:

62 CORNER BREAK	M	1 Slabs
65 JT SEAL DMG	H	16 Slabs
66 SMALL PATCH	L	14 Slabs
72 SHAT. SLAB	M	1 Slabs
72 SHAT. SLAB	M	1 Slabs
74 JOINT SPALL	L	1 Slabs
76 ASR	H	1 Slabs
76 ASR	L	3 Slabs
76 ASR	M	6 Slabs

Sample Number: 12

Sample Type: R
Sample PCI: 51
Sample Area (Slabs): 16
Sample Comments:

65 JT SEAL DMG	M	16 Slabs
66 SMALL PATCH	L	5 Slabs
67 LARGE PATCH	L	1 Slabs
74 JOINT SPALL	L	1 Slabs
75 CORNER SPALL	L	1 Slabs
76 ASR	L	2 Slabs
76 ASR	M	2 Slabs

Sample Number: 15

Sample Type: R
Sample PCI: 67
Sample Area (Slabs): 16
Sample Comments:

65 JT SEAL DMG	L	16 Slabs
66 SMALL PATCH	L	6 Slabs
76 ASR	M	2 Slabs

Sample Number: 19

Sample Type: R
Sample PCI: 76
Sample Area (Slabs): 20
Sample Comments:

65 JT SEAL DMG	L	20 Slabs
67 LARGE PATCH	L	4 Slabs
71 FAULTING	L	1 Slabs
74 JOINT SPALL	L	1 Slabs
75 CORNER SPALL	M	2 Slabs

Sample Number: 22

Sample Type: R
Sample PCI: 47
Sample Area (Slabs): 20
Sample Comments:

65 JT SEAL DMG	L	20 Slabs
66 SMALL PATCH	L	4 Slabs
67 LARGE PATCH	L	4 Slabs
71 FAULTING	L	1 Slabs
75 CORNER SPALL	M	1 Slabs
76 ASR	L	1 Slabs
76 ASR	M	4 Slabs

RE-INSPECTION REPORT
GRINNELL REGIONAL AIRPORT

Branch - Section ID: A01GL - 02

Branch Name: APRON Use: APRON

LCD: 6/30/1987
Surface Type: PCC
Rank: P
Section Area (sf): 23,190.00
Length (ft): 138.00
Width (ft): 150.00
From: 200' NE OF SW EDGE
To: 137.5' ON TO THE NE

PCI Family: IowaPCCAPSE_GeneralBasic

Slabs: 186
Slab Length (ft): 12.50
Slab Width (ft): 10.00
Joint Length (ft): 3,850.95

Section Comments:

Last Insp Date: 11/15/2021
PCI: 37
Total Samples: 10
Surveyed: 5

Inspection Comments:

Sample Number: 001

Sample Type: R
Sample PCI: 22
Sample Area (Slabs): 20

Sample Comments:

62 CORNER BREAK	M	1 Slabs
63 LINEAR CR	M	1 Slabs
63 LINEAR CR	M	1 Slabs
65 JT SEAL DMG	M	20 Slabs
66 SMALL PATCH	L	13 Slabs
67 LARGE PATCH	L	1 Slabs
74 JOINT SPALL	L	2 Slabs
74 JOINT SPALL	L	2 Slabs
75 CORNER SPALL	M	1 Slabs
76 ASR	H	2 Slabs
76 ASR	L	2 Slabs
76 ASR	M	3 Slabs

Sample Number: 003

Sample Type: R
Sample PCI: 20
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	M	24 Slabs
66 SMALL PATCH	H	1 Slabs
66 SMALL PATCH	L	9 Slabs
67 LARGE PATCH	M	1 Slabs
75 CORNER SPALL	L	3 Slabs
75 CORNER SPALL	M	2 Slabs
76 ASR	H	3 Slabs
76 ASR	L	4 Slabs
76 ASR	M	5 Slabs

RE-INSPECTION REPORT
GRINNELL REGIONAL AIRPORT

Sample Number: 005

Sample Type: R
Sample PCI: 33
Sample Area (Slabs): 20
Sample Comments:

65 JT SEAL DMG	M	20 Slabs
66 SMALL PATCH	L	13 Slabs
76 ASR	H	1 Slabs
76 ASR	L	3 Slabs
76 ASR	M	10 Slabs

Sample Number: 007

Sample Type: R
Sample PCI: 56
Sample Area (Slabs): 15
Sample Comments:

65 JT SEAL DMG	L	15 Slabs
66 SMALL PATCH	L	7 Slabs
76 ASR	L	2 Slabs
76 ASR	M	3 Slabs

Sample Number: 009

Sample Type: R
Sample PCI: 69
Sample Area (Slabs): 15
Sample Comments:

63 LINEAR CR	M	1 Slabs
65 JT SEAL DMG	L	15 Slabs
66 SMALL PATCH	L	6 Slabs
75 CORNER SPALL	L	2 Slabs
76 ASR	L	1 Slabs

Branch - Section ID: A01GL - 03

Branch Name: APRON Use: APRON

LCD: 6/30/1987
Surface Type: PCC
Rank: P
Section Area (sf): 23,778.00
Length (ft): 250.00
Width (ft): 150.00
From: 337.5' FROM THE SW EDGE
To: NE EDGE

PCI Family: IowaPCCAPSE_GeneralBasic

Slabs: 190
Slab Length (ft): 12.50
Slab Width (ft): 10.00
Joint Length (ft): 4,026.41

Section Comments:

Last Insp Date: 11/15/2021
PCI: 63
Total Samples: 10
Surveyed: 5

Inspection Comments:

Sample Number: 002

Sample Type: R
Sample PCI: 53
Sample Area (Slabs): 15

Sample Comments:

63 LINEAR CR	L	1 Slabs
65 JT SEAL DMG	M	15 Slabs
66 SMALL PATCH	L	5 Slabs
67 LARGE PATCH	L	2 Slabs
74 JOINT SPALL	L	1 Slabs
75 CORNER SPALL	L	1 Slabs
76 ASR	L	3 Slabs
76 ASR	M	1 Slabs

Sample Number: 003

Sample Type: R
Sample PCI: 92
Sample Area (Slabs): 15

Sample Comments:

65 JT SEAL DMG	L	15 Slabs
66 SMALL PATCH	L	4 Slabs
74 JOINT SPALL	L	1 Slabs

Sample Number: 006

Sample Type: R
Sample PCI: 56
Sample Area (Slabs): 20

Sample Comments:

62 CORNER BREAK	L	1 Slabs
63 LINEAR CR	M	1 Slabs
65 JT SEAL DMG	M	20 Slabs
66 SMALL PATCH	L	2 Slabs
76 ASR	L	1 Slabs
76 ASR	M	2 Slabs

Sample Number: 008

Sample Type: R
Sample PCI: 79
Sample Area (Slabs): 20

Sample Comments:

62 CORNER BREAK	M	1 Slabs
63 LINEAR CR	M	1 Slabs
65 JT SEAL DMG	M	20 Slabs

Sample Number: 010

Sample Type: R
Sample PCI: 41
Sample Area (Slabs): 20

Sample Comments:

62 CORNER BREAK	M	1 Slabs
63 LINEAR CR	M	5 Slabs
65 JT SEAL DMG	H	20 Slabs
66 SMALL PATCH	L	1 Slabs
67 LARGE PATCH	L	2 Slabs
74 JOINT SPALL	L	2 Slabs
74 JOINT SPALL	M	1 Slabs
76 ASR	L	5 Slabs

RE-INSPECTION REPORT
GRINNELL REGIONAL AIRPORT

Branch - Section ID: A01GL - 04

Branch Name: APRON Use: APRON

LCD: 6/1/2003
Surface Type: PCC
Rank: P
Section Area (sf): 2,619.00
Length (ft): 125.00
Width (ft): 23.00
From: A01GR-01
To: ..

PCI Family: IowaPCCAPSE_GeneralBasic

Slabs: 17
Slab Length (ft): 13.50
Slab Width (ft): 11.50
Joint Length (ft): 286.92

Section Comments:

Last Insp Date: 11/15/2021
PCI: 80
Total Samples: 1
Surveyed: 1

Inspection Comments:

Sample Number: 001

Sample Type: R
Sample PCI: 80
Sample Area (Slabs): 17

Sample Comments:

63 LINEAR CR	M	1 Slabs
65 JT SEAL DMG	L	17 Slabs
67 LARGE PATCH	L	1 Slabs
74 JOINT SPALL	L	1 Slabs

Branch - Section ID: A01GL - 05

Branch Name: APRON Use: APRON

LCD: 7/2/2011
Surface Type: PCC
Rank: P
Section Area (sf): 19,079.00
Length (ft): 185.00
Width (ft): 105.00
From: SEE MAP
To: SEE MAP

PCI Family: IowaPCCAPSE_GeneralBasic

Slabs: 191
Slab Length (ft): 10.00
Slab Width (ft): 10.00
Joint Length (ft): 3,530.97

Section Comments:

Last Insp Date: 11/15/2021
PCI: 96
Total Samples: 9
Surveyed: 5

Inspection Comments:

Sample Number: 001

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 20

Sample Comments:

65 JT SEAL DMG	L	20 Slabs

Sample Number: 003

Sample Type: R
Sample PCI: 93
Sample Area (Slabs): 20

Sample Comments:

65 JT SEAL DMG	M	20 Slabs

Sample Number: 004

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 20

Sample Comments:

65 JT SEAL DMG	L	20 Slabs

Sample Number: 007

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 16

Sample Comments:

65 JT SEAL DMG	L	16 Slabs

Sample Number: 008

Sample Type: R
Sample PCI: 93
Sample Area (Slabs): 16

Sample Comments:

65 JT SEAL DMG	M	16 Slabs

Branch - Section ID: A01GL - 06

Branch Name: APRON Use: APRON

LCD: 6/3/2018
Surface Type: PCC
Rank: P
Section Area (sf): 6,446.00
Length (ft): 160.00
Width (ft): 40.00
From: SEE MAP
To: SEE MAP

PCI Family: IowaPCCAPSE_GeneralBasic

Slabs: 81
Slab Length (ft): 10.00
Slab Width (ft): 8.00
Joint Length (ft): 1,248.91

Section Comments: avg

Last Insp Date: 11/15/2021
PCI: 98
Total Samples: 4
Surveyed: 3

Inspection Comments:

Sample Number: 001

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 20

Sample Comments:

65 JT SEAL DMG	L	20 Slabs

Sample Number: 002

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 20

Sample Comments:

65 JT SEAL DMG	L	20 Slabs

Sample Number: 003

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 20

Sample Comments:

65 JT SEAL DMG	L	20 Slabs

Branch - Section ID: R13GL - 01

Branch Name: RUNWAY 13/31 Use: RUNWAY

LCD: 10/3/2019
Surface Type: PCC
Rank: P
Section Area (sf): 322,765.00
Length (ft): 4,300.00
Width (ft): 75.00
From: NW END (13) OF RWY
To: SE END (31) OF RWY

PCI Family: IowaPCCRWSE_General

Slabs: 3,443
Slab Length (ft): 10.00
Slab Width (ft): 9.37
Joint Length (ft): 62,326.17

Section Comments:

Last Insp Date: 11/15/2021
PCI: 97
Total Samples: 144
Surveyed: 15

Inspection Comments:

Sample Number: 05

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	L	24 Slabs

Sample Number: 105

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	L	24 Slabs

Sample Number: 115

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	L	24 Slabs

Sample Number: 125

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	L	24 Slabs

Sample Number: 135

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	L	24 Slabs

Sample Number: 142

Sample Type: R
Sample PCI: 94
Sample Area (Slabs): 23

Sample Comments:

63 LINEAR CR	L	1 Slabs
65 JT SEAL DMG	L	23 Slabs

Sample Number: 15

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 24
Sample Comments:

65 JT SEAL DMG	L	24	Slabs

Sample Number: 25

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 24
Sample Comments:

65 JT SEAL DMG	L	24	Slabs

Sample Number: 35

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 24
Sample Comments:

65 JT SEAL DMG	L	24	Slabs

Sample Number: 45

Sample Type: R
Sample PCI: 97
Sample Area (Slabs): 24
Sample Comments:

65 JT SEAL DMG	L	24	Slabs
74 JOINT SPALL	L	1	Slabs

Sample Number: 55

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 24
Sample Comments:

65 JT SEAL DMG	L	24	Slabs

Sample Number: 65

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 24
Sample Comments:

65 JT SEAL DMG	L	24	Slabs

Sample Number: 75

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 24
Sample Comments:

65 JT SEAL DMG	L	24	Slabs

Sample Number: 85

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 24
Sample Comments:

65 JT SEAL DMG	L	24	Slabs

Sample Number: 95

Sample Type: R
Sample PCI: 94
Sample Area (Slabs): 24
Sample Comments:

65 JT SEAL DMG	L	24	Slabs
71 FAULTING	L	1	Slabs

Branch - Section ID: R13GL - 02

Branch Name: RUNWAY 13/31 Use: RUNWAY

LCD: 6/1/2000
Surface Type: PCC
Rank: P
Section Area (sf): 60,000.00
Length (ft): 800.00
Width (ft): 75.00
From: R13GL-01
To: R13GL-03

PCI Family: IowaPCCRWSE_General

Slabs: 480
Slab Length (ft): 10.00
Slab Width (ft): 12.50
Joint Length (ft): 9,925.00

Section Comments:

Last Insp Date: 11/15/2021
PCI: 86
Total Samples: 20
Surveyed: 8

Inspection Comments:

Sample Number: 02

Sample Type: R
Sample PCI: 74
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	M	24 Slabs
66 SMALL PATCH	H	1 Slabs
74 JOINT SPALL	H	1 Slabs
75 CORNER SPALL	M	2 Slabs

Sample Number: 06

Sample Type: R
Sample PCI: 93
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	L	24 Slabs
74 JOINT SPALL	L	1 Slabs
75 CORNER SPALL	M	1 Slabs

Sample Number: 09

Sample Type: R
Sample PCI: 93
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	L	24 Slabs
75 CORNER SPALL	L	1 Slabs
75 CORNER SPALL	M	1 Slabs

Sample Number: 12

Sample Type: R
Sample PCI: 86
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	L	24 Slabs
71 FAULTING	M	1 Slabs
75 CORNER SPALL	M	2 Slabs

Sample Number: 14

Sample Type: R
Sample PCI: 95
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	L	24	Slabs
75 CORNER SPALL	M	1	Slabs

Sample Number: 16

Sample Type: A
Sample PCI: 49
Sample Area (Slabs): 24

Sample Comments:

63 LINEAR CR	L	1	Slabs
63 LINEAR CR	M	3	Slabs
65 JT SEAL DMG	M	24	Slabs
74 JOINT SPALL	L	1	Slabs
75 CORNER SPALL	L	1	Slabs
75 CORNER SPALL	M	22	Slabs

Sample Number: 17

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	L	24	Slabs

Sample Number: 20

Sample Type: R
Sample PCI: 80
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	L	24	Slabs
71 FAULTING	L	4	Slabs
75 CORNER SPALL	L	1	Slabs
75 CORNER SPALL	M	1	Slabs

Branch - Section ID: R13GL - 03

Branch Name: RUNWAY 13/31 Use: RUNWAY

LCD: 6/1/2000
Surface Type: PCC
Rank: P
Section Area (sf): 15,000.00
Length (ft): 200.00
Width (ft): 75.00
From: R13GL-02
To: R13GL-04

PCI Family: IowaPCCRWSE_General

Slabs: 120
Slab Length (ft): 10.00
Slab Width (ft): 12.50
Joint Length (ft): 2,425.00

Section Comments:

Last Insp Date: 11/15/2021
PCI: 85
Total Samples: 5
Surveyed: 4

Inspection Comments:

Sample Number: 01

Sample Type: R
Sample PCI: 87
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	M	24 Slabs
67 LARGE PATCH	L	1 Slabs
74 JOINT SPALL	L	1 Slabs
75 CORNER SPALL	L	1 Slabs

Sample Number: 02

Sample Type: R
Sample PCI: 90
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	M	24 Slabs
74 JOINT SPALL	M	1 Slabs

Sample Number: 03

Sample Type: R
Sample PCI: 74
Sample Area (Slabs): 24

Sample Comments:

63 LINEAR CR	M	2 Slabs
65 JT SEAL DMG	M	24 Slabs
74 JOINT SPALL	M	2 Slabs

Sample Number: 04

Sample Type: R
Sample PCI: 90
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	M	24 Slabs
75 CORNER SPALL	M	1 Slabs

RE-INSPECTION REPORT
GRINNELL REGIONAL AIRPORT

Branch - Section ID: R13GL - 04

Branch Name: RUNWAY 13/31 Use: RUNWAY

LCD: 6/1/2000
Surface Type: PCC
Rank: P
Section Area (sf): 7,100.00
Length (ft): 100.00
Width (ft): 80.00
From: R13GL-03
To: ..

PCI Family: IowaPCCRWSE_General

Slabs: 55
Slab Length (ft): 13.00
Slab Width (ft): 10.00
Joint Length (ft): 1,096.40

Section Comments: avg slab

Last Insp Date: 11/15/2021
PCI: 77
Total Samples: 3
Surveyed: 3

Inspection Comments:

Sample Number: 01

Sample Type: R
Sample PCI: 65
Sample Area (Slabs): 24

Sample Comments:

63 LINEAR CR	M	3 Slabs
65 JT SEAL DMG	H	24 Slabs
74 JOINT SPALL	M	1 Slabs
75 CORNER SPALL	M	2 Slabs

Sample Number: 02

Sample Type: R
Sample PCI: 93
Sample Area (Slabs): 18

Sample Comments:

65 JT SEAL DMG	M	18 Slabs

Sample Number: 03

Sample Type: R
Sample PCI: 75
Sample Area (Slabs): 13

Sample Comments:

63 LINEAR CR	M	1 Slabs
65 JT SEAL DMG	M	13 Slabs
71 FAULTING	L	1 Slabs

Branch - Section ID: R13GL - 05

Branch Name: RUNWAY 13/31 Use: RUNWAY

LCD: 6/3/2012
Surface Type: PCC
Rank: P
Section Area (sf): 13,265.00
Length (ft): 180.00
Width (ft): 105.00
From: SEE MAP
To: SEE MAP

PCI Family: IowaPCCRWSE_General

Slabs: 91
Slab Length (ft): 12.50
Slab Width (ft): 11.67
Joint Length (ft): 1,997.85

Section Comments: SLAB SIZE VARIES

Last Insp Date: 11/15/2021
PCI: 86
Total Samples: 5
Surveyed: 4

Inspection Comments:

Sample Number: 01

Sample Type: R
Sample PCI: 86
Sample Area (Slabs): 16

Sample Comments:

65 JT SEAL DMG	M	16 Slabs
76 ASR	L	2 Slabs

Sample Number: 03

Sample Type: R
Sample PCI: 89
Sample Area (Slabs): 16

Sample Comments:

65 JT SEAL DMG	M	16 Slabs
74 JOINT SPALL	L	2 Slabs

Sample Number: 04

Sample Type: R
Sample PCI: 87
Sample Area (Slabs): 20

Sample Comments:

65 JT SEAL DMG	M	20 Slabs
71 FAULTING	L	1 Slabs
74 JOINT SPALL	L	1 Slabs

Sample Number: 05

Sample Type: R
Sample PCI: 85
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	M	24 Slabs
71 FAULTING	L	2 Slabs
71 FAULTING	L	1 Slabs

Branch - Section ID: T01GL - 01

Branch Name: TAXIWAY 01 Use: TAXIWAY

LCD: 3/3/2020
Surface Type: PCC
Rank: P
Section Area (sf): 63,778.00
Length (ft): 1,120.00
Width (ft): 58.00
From: APRON
To: RUNWAY

PCI Family: IowaPCCTWSE_General

Slabs: 638
Slab Length (ft): 10.00
Slab Width (ft): 10.00
Joint Length (ft): 11,599.03

Section Comments: slab width varies

Last Insp Date: 11/15/2021
PCI: 97
Total Samples: 34
Surveyed: 8

Inspection Comments:

Sample Number: 02

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 20

Sample Comments:

65 JT SEAL DMG	L	20 Slabs

Sample Number: 04

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 20

Sample Comments:

65 JT SEAL DMG	L	20 Slabs

Sample Number: 08

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 20

Sample Comments:

65 JT SEAL DMG	L	20 Slabs

Sample Number: 11

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 20

Sample Comments:

65 JT SEAL DMG	L	20 Slabs

Sample Number: 17

Sample Type: R
Sample PCI: 93
Sample Area (Slabs): 20

Sample Comments:

65 JT SEAL DMG	M	20 Slabs

Sample Number: 20

Sample Type: R
Sample PCI: 93
Sample Area (Slabs): 20

Sample Comments:

65 JT SEAL DMG	M	20 Slabs

Sample Number: 28

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 25

Sample Comments:

65 JT SEAL DMG	L	25 Slabs

Sample Number: 31

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 20

Sample Comments:

65 JT SEAL DMG	L	20 Slabs

Branch - Section ID: T02GL - 01

Branch Name: TAXIWAY 02 Use: TAXIWAY

LCD: 6/3/2003
Surface Type: PCC
Rank: P
Section Area (sf): 17,170.00
Length (ft): 490.00
Width (ft): 35.00
From: R13GL-01
To: A01GL-01

PCI Family: IowaPCCTWSE_General

Slabs: 98
Slab Length (ft): 15.00
Slab Width (ft): 11.67
Joint Length (ft): 2,090.35

Section Comments:

Last Insp Date: 11/15/2021
PCI: 96
Total Samples: 5
Surveyed: 4

Inspection Comments:

Sample Number: 01

Sample Type: R
Sample PCI: 91
Sample Area (Slabs): 21

Sample Comments:

65 JT SEAL DMG	M	21	Slabs
75 CORNER SPALL	L	1	Slabs

Sample Number: 02

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 21

Sample Comments:

65 JT SEAL DMG	L	21	Slabs

Sample Number: 03

Sample Type: R
Sample PCI: 96
Sample Area (Slabs): 21

Sample Comments:

65 JT SEAL DMG	L	21	Slabs
74 JOINT SPALL	L	1	Slabs

Sample Number: 04

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 21

Sample Comments:

65 JT SEAL DMG	L	21	Slabs

Branch - Section ID: TH01GL - 01

Branch Name: T-HANGAR 01 Use: T-HANGAR

LCD: 5/2/2006
Surface Type: PCC
Rank: P
Section Area (sf): 16,905.00
Length (ft): 425.00
Width (ft): 40.00
From: SEE MAP
To: SEE MAP

PCI Family: IowaPCCTH_SE

Slabs: 169
Slab Length (ft): 10.00
Slab Width (ft): 10.00
Joint Length (ft): 2,918.60

Section Comments:

Last Insp Date: 11/15/2021
PCI: 73
Total Samples: 8
Surveyed: 5

Inspection Comments:

Sample Number: 001

Sample Type: R
Sample PCI: 62
Sample Area (Slabs): 22

Sample Comments:

62 CORNER BREAK	L	1 Slabs
63 LINEAR CR	L	4 Slabs
65 JT SEAL DMG	H	22 Slabs
70 SCALING	M	1 Slabs
72 SHAT. SLAB	L	1 Slabs
74 JOINT SPALL	M	1 Slabs
75 CORNER SPALL	M	1 Slabs

Sample Number: 003

Sample Type: R
Sample PCI: 83
Sample Area (Slabs): 20

Sample Comments:

63 LINEAR CR	L	2 Slabs
65 JT SEAL DMG	H	20 Slabs

Sample Number: 005

Sample Type: R
Sample PCI: 75
Sample Area (Slabs): 20

Sample Comments:

63 LINEAR CR	L	1 Slabs
63 LINEAR CR	M	1 Slabs
65 JT SEAL DMG	M	20 Slabs
74 JOINT SPALL	M	1 Slabs

Sample Number: 006

Sample Type: R
Sample PCI: 93
Sample Area (Slabs): 20

Sample Comments:

65 JT SEAL DMG	M	20 Slabs

Sample Number: 008

Sample Type: R
Sample PCI: 55
Sample Area (Slabs): 20

Sample Comments:

63 LINEAR CR	L	1	Slabs
64 DURABIL. CR	L	1	Slabs
65 JT SEAL DMG	M	20	Slabs
72 SHAT. SLAB	H	1	Slabs
75 CORNER SPALL	L	1	Slabs

Branch - Section ID: TH01GL - 02

Branch Name: T-HANGAR 01 Use: T-HANGAR

LCD: 6/3/2018
Surface Type: PCC
Rank: P
Section Area (sf): 11,280.00
Length (ft): 180.00
Width (ft): 80.00
From: SEE MAP
To: SEE MAP

PCI Family: IowaPCCTH_SE

Slabs: 113
Slab Length (ft): 10.00
Slab Width (ft): 10.00
Joint Length (ft): 2,052.33

Section Comments:

Last Insp Date: 11/15/2021
PCI: 98
Total Samples: 5
Surveyed: 4

Inspection Comments:

Sample Number: 001

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	L	24 Slabs

Sample Number: 002

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	L	24 Slabs

Sample Number: 003

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	L	24 Slabs

Sample Number: 004

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 24

Sample Comments:

65 JT SEAL DMG	L	24 Slabs

APPENDIX D

WORK HISTORY REPORT

Work History

Pavement Database: IA 2021

Network: GRINNELL REGIONAL AIRPORT

Branch - Section ID: A01GL - 01

LCD: 6/30/1990
Use: APRON
Rank: P
Surface: PCC

Length (ft): 160.00
Width (ft): 320.00
True Area (sf): 52,080.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-01-2012	CS-PC	Crack Sealing - PCC	$0.00	0.00	False	-
06-01-2012	PA-PF	Patching - PCC Full Depth	$0.00	0.00	False	-
06-01-2012	JS-LC	Joint Seal (Localized)	$0.00	0.00	False	-
06-01-2009	PA-PP	Patching - PCC Partial Depth	$0.00	0.00	False	State Funding - $9,940
06-30-1990	NC-PC	New Construction - PCC	$0.00	0.00	True	-

Branch - Section ID: A01GL - 02

LCD: 6/30/1987
Use: APRON
Rank: P
Surface: PCC

Length (ft): 137.50
Width (ft): 150.00
True Area (sf): 23,190.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-01-2012	PA-PP	Patching - PCC Partial Depth	$0.00	0.00	False	-
06-01-2012	CS-PC	Crack Sealing - PCC	$0.00	0.00	False	-
06-01-2012	JS-LC	Joint Seal (Localized)	$0.00	0.00	False	-
06-30-1987	NC-PC	New Construction - PCC	$0.00	0.00	True	-

Branch - Section ID: A01GL - 03

LCD: 6/30/1987
Use: APRON
Rank: P
Surface: PCC

Length (ft): 250.00
Width (ft): 150.00
True Area (sf): 23,778.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-01-2012	PA-PP	Patching - PCC Partial Depth	$0.00	0.00	False	-
06-01-2012	CS-PC	Crack Sealing - PCC	$0.00	0.00	False	-
06-01-2012	JS-LC	Joint Seal (Localized)	$0.00	0.00	False	-
06-30-1987	NC-PC	New Construction - PCC	$0.00	0.00	True	-

Branch - Section ID: A01GL - 04

LCD: 6/1/2003
Use: APRON
Rank: P
Surface: PCC

Length (ft): 125.00
Width (ft): 23.00
True Area (sf): 2,619.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-01-2012	JS-LC	Joint Seal (Localized)	$0.00	0.00	False	-
06-01-2012	CS-PC	Crack Sealing - PCC	$0.00	0.00	False	-
06-01-2003	NU-IN	New Construction - Initial	$0.00	0.00	True	-

Work History

Pavement Database: IA 2021

Branch - Section ID: A01GL - 05

LCD: 7/2/2011
Use: APRON
Rank: P
Surface: PCC

Length (ft): 185.00
Width (ft): 105.00
True Area (sf): 19,079.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
07-02-2011	CR-PC	Complete Reconstruction - PCC	$0.00	5.00	True	5" P-505 PCC
07-01-2011	SB-AG	Subbase - Aggregate	$0.00	4.00	False	4" P-154 SUBBASE

Branch - Section ID: A01GL - 06

LCD: 6/3/2018
Use: APRON
Rank: P
Surface: PCC

Length (ft): 160.00
Width (ft): 40.00
True Area (sf): 6,446.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-01-2020	JS-LC	Joint Seal (Localized)	$0.00	0.00	False	est.
06-03-2018	CR-PC	Complete Reconstruction - PCC	$64,460.00	6.00	True	6" PCC SURFACE COURSE
06-02-2018	SB-AG	Subbase - Aggregate	$0.00	6.00	False	6" MODIFIED SUBBASE
06-01-2018	SG-ST	Subgrade - Stabilized	$0.00	18.00	False	18" SUBGRAGE PREPARATION TREATED W/ F

Branch - Section ID: R13GL - 01

LCD: 10/3/2019
Use: RUNWAY
Rank: P
Surface: PCC

Length (ft): 4,300.00
Width (ft): 75.00
True Area (sf): 322,765.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
10-03-2019	CR-PC	Complete Reconstruction - PCC	$0.00	6.00	True	6" P501
10-02-2019	BA-AG	Base Course - Aggregate	$0.00	6.00	False	6' P208 AGG BASE
10-01-2019	SG-ST	Subgrade - Stabilized	$0.00	12.00	False	12" CEMENT TREATED SUBGRADE
06-01-2016	PA-PF	Patching - PCC Full Depth	$0.00	0.00	False	FIELD EST
06-01-2012	JS-LC	Joint Seal (Localized)	$0.00	0.00	False	-
06-01-2012	CS-PC	Crack Sealing - PCC	$0.00	0.00	False	-
06-01-2012	PA-PF	Patching - PCC Full Depth	$0.00	0.00	False	-
06-30-1990	NC-PC	New Construction - PCC	$0.00	0.00	True	-

Branch - Section ID: R13GL - 02

LCD: 6/1/2000
Use: RUNWAY
Rank: P
Surface: PCC

Length (ft): 800.00
Width (ft): 75.00
True Area (sf): 60,000.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-01-2012	CS-PC	Crack Sealing - PCC	$0.00	0.00	False	-
06-01-2012	JS-LC	Joint Seal (Localized)	$0.00	0.00	False	-
06-01-2000	NU-IN	New Construction - Initial	$0.00	0.00	True	-

Work History

Pavement Database: IA 2021

Branch - Section ID: R13GL - 03

LCD: 6/1/2000
Use: RUNWAY
Rank: P
Surface: PCC

Length (ft): 200.00
Width (ft): 75.00
True Area (sf): 15,000.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-01-2012	JS-LC	Joint Seal (Localized)	$0.00	0.00	False	-
06-01-2012	PA-PF	Patching - PCC Full Depth	$0.00	0.00	False	FIELD EST
06-01-2012	CS-PC	Crack Sealing - PCC	$0.00	0.00	False	-
06-01-2000	NU-IN	New Construction - Initial	$0.00	0.00	True	-

Branch - Section ID: R13GL - 04

LCD: 6/1/2000
Use: RUNWAY
Rank: P
Surface: PCC

Length (ft): 100.00
Width (ft): 80.00
True Area (sf): 7,100.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-01-2012	CS-PC	Crack Sealing - PCC	$0.00	0.00	False	-
06-01-2012	JS-LC	Joint Seal (Localized)	$0.00	0.00	False	-
06-01-2000	NU-IN	New Construction - Initial	$0.00	0.00	True	-

Branch - Section ID: R13GL - 05

LCD: 6/3/2012
Use: RUNWAY
Rank: P
Surface: PCC

Length (ft): 180.00
Width (ft): 105.00
True Area (sf): 13,265.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-03-2012	NC-PC	New Construction - PCC	$0.00	6.00	True	6" PCC (ASSUMED MAT. CODE)
06-02-2012	SB-AG	Subbase - Aggregate	$0.00	4.00	False	4" MODIFIED SUBBASE
06-01-2012	SG-CO	Subgrade - Compacted	$0.00	8.00	False	8" SUBGRADE PREPARATION

Branch - Section ID: T01GL - 01

LCD: 3/3/2020
Use: TAXIWAY
Rank: P
Surface: PCC

Length (ft): 1,120.00
Width (ft): 58.00
True Area (sf): 63,778.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
03-03-2020	CR-PC	Complete Reconstruction - PCC	$0.00	6.00	True	6" P501
03-02-2020	BA-AG	Base Course - Aggregate	$0.00	6.00	False	6' P208 AGG BASE
03-01-2020	SG-ST	Subgrade - Stabilized	$0.00	12.00	False	12" CEMENT TREATED SUBGRADE
06-01-2012	PA-PP	Patching - PCC Partial Depth	$0.00	0.00	False	-
06-01-2012	JS-LC	Joint Seal (Localized)	$0.00	0.00	False	-
06-01-2012	CS-PC	Crack Sealing - PCC	$0.00	0.00	False	-
06-30-1990	NC-PC	New Construction - PCC	$0.00	0.00	True	-

Work History

Pavement Database: IA 2021

Branch - Section ID: T02GL - 01

LCD: 6/3/2003
Use: TAXIWAY
Rank: P
Surface: PCC

Length (ft): 490.00
Width (ft): 35.00
True Area (sf): 17,170.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-03-2003	NC-PC	New Construction - PCC	$0.00	6.00	True	6" P501 PCC
06-02-2003	SB-AG	Subbase - Aggregate	$0.00	4.00	False	4" P154 SUBBASE
06-01-2003	SG-CO	Subgrade - Compacted	$0.00	12.00	False	12" P152 COMPACTED SUBGRADE

Branch - Section ID: TH01GL - 01

LCD: 5/2/2006
Use: T-HANGAR
Rank: P
Surface: PCC

Length (ft): 425.00
Width (ft): 40.00
True Area (sf): 16,905.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
05-02-2006	NC-PC	New Construction - PCC	$0.00	5.00	True	5" P-505 PCC
05-01-2006	SB-AG	Subbase - Aggregate	$0.00	4.00	False	4" P-154 SUBBASE

Branch - Section ID: TH01GL - 02

LCD: 6/3/2018
Use: T-HANGAR
Rank: P
Surface: PCC

Length (ft): 180.00
Width (ft): 80.00
True Area (sf): 11,280.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-03-2018	NC-PC	New Construction - PCC	$0.00	6.00	True	6" PCC SURFACE COURSE
06-02-2018	SB-AG	Subbase - Aggregate	$0.00	6.00	False	6" MODIFIED SUBBASE
06-01-2018	SG-ST	Subgrade - Stabilized	$0.00	18.00	False	18" SUBGRAGE PREPARATION TREATED W/ F

APPENDIX E

LOCALIZED PREVENTIVE MAINTENANCE POLICIES AND UNIT COST TABLES

Table E-1. Localized preventive maintenance policy, asphalt-surfaced pavements.

Distress Type	Severity Level	Maintenance Action
Alligator Cracking	Low	Monitor
Alligator Cracking	Medium	Asphalt Patch
Alligator Cracking	High	Asphalt Patch
Bleeding	N/A	Monitor
Block Cracking	Low	Monitor
Block Cracking	Medium	Crack Seal—Asphalt
Block Cracking	High	Crack Seal—Asphalt
Corrugation	Low	Monitor
Corrugation	Medium	Asphalt Patch
Corrugation	High	Asphalt Patch
Depression	Low	Monitor
Depression	Medium	Monitor
Depression	High	Asphalt Patch
Jet-Blast Erosion	N/A	Asphalt Patch
Joint Reflection Cracking	Low	Monitor
Joint Reflection Cracking	Medium	Crack Seal—Asphalt
Joint Reflection Cracking	High	Crack Seal—Asphalt
L&T Cracking	Low	Monitor
L&T Cracking	Medium	Crack Seal—Asphalt
L&T Cracking	High	Crack Seal—Asphalt
Oil Spillage	N/A	Asphalt Patch
Patching	Low	Monitor
Patching	Medium	Asphalt Patch
Patching	High	Asphalt Patch
Polished Aggregate	N/A	Monitor
Raveling	Low	Monitor
Raveling	Medium	Asphalt Patch
Raveling	High	Asphalt Patch
Rutting	Low	Monitor
Rutting	Medium	Monitor
Rutting	High	Asphalt Patch
Shoving	Low	Monitor
Shoving	Medium	Asphalt Patch
Shoving	High	Asphalt Patch
Slippage Cracking	N/A	Asphalt Patch
Swelling	Low	Monitor
Swelling	Medium	Monitor
Swelling	High	Asphalt Patch
Weathering	Low	Monitor
Weathering	Medium	Monitor
Weathering	High	Asphalt Patch

Table E-2. Localized preventive maintenance policy, PCC pavements.

Distress Type	Severity Level	Maintenance Action
ASR	Low	Monitor
ASR	Medium	Slab Replacement
ASR	High	Slab Replacement
Blowup	Low	Slab Replacement
Blowup	Medium	Slab Replacement
Blowup	High	Slab Replacement
Corner Break	Low	Crack Seal—PCC
Corner Break	Medium	Full Depth PCC Patch
Corner Break	High	Full Depth PCC Patch
Durability Cracking	Low	Monitor
Durability Cracking	Medium	Full Depth Patch
Durability Cracking	High	Slab Replacement
Faulting	Low	Monitor
Faulting	Medium	Grinding
Faulting	High	Slab Replacement
Joint Seal Damage	Low	Monitor
Joint Seal Damage	Medium	Joint Seal
Joint Seal Damage	High	Joint Seal
LTD Cracking	Low	Monitor
LTD Cracking	Medium	Crack Seal—PCC
LTD Cracking	High	Slab Replacement
Patching (Small and Large)	Low	Monitor
Patching (Small and Large)	Medium	Full Depth PCC Patch
Patching (Small and Large)	High	Full Depth PCC Patch
Popouts	N/A	Monitor
Pumping	N/A	Monitor
Scaling	Low	Monitor
Scaling	Medium	Partial Depth PCC Patch
Scaling	High	Slab Replacement
Shattered Slab	Low	Crack Seal—PCC
Shattered Slab	Medium	Slab Replacement
Shattered Slab	High	Slab Replacement
Shrinkage Cracking	N/A	Monitor
Spalling (Joint and Corner)	Low	Monitor
Spalling (Joint and Corner)	Medium	Partial Depth PCC Patch
Spalling (Joint and Corner)	High	Partial Depth PCC Patch

Table E-3. 2022 unit costs for preventive maintenance actions.

Maintenance Action	Unit Cost
Asphalt Patch—Asphalt-Surfaced Pavement	$14.66/sf
Crack Sealing—Asphalt-Surfaced Pavement	$2.51/lf
Partial Depth PCC Patch—PCC Pavement	$37.54/sf
Full Depth PCC Patch—PCC Pavement	$16.76/sf
Crack Sealing—PCC Pavement	$3.02/lf
Joint Sealing—PCC Pavement	$3.02/lf
Grinding—PCC Pavement	$0.36/sf
Slab Replacement—PCC Pavement	$16.76/sf

Table E-4. 2022 unit costs (per square foot) based on pavement type and PCI ranges.

Pavement Type	PCI Range 0–40	PCI Range 40–50	PCI Range 50–60	PCI Range 60–70	PCI Range 70–80	PCI Range 80–90	PCI Range 90–100
AC	$10.41	$4.93	$4.93	$4.93	$0.00	$0.00	$0.00
PCC	$17.38	$8.22	$8.22	$8.22	$0.00	$0.00	$0.00

APPENDIX F

YEAR 2022 LOCALIZED PREVENTIVE MAINTENANCE DETAILS

Table F-1. Year 2022 localized preventive maintenance details.

Branch	Section	Distress Type	Severity	Distress Quantity	Distress Unit	Maintenance Action	Unit Cost	2022 Estimated Cost
A01GL	03	ASR	Medium	6	Slabs	Slab Replacement - PCC	$16.76	$13,268
A01GL	03	Corner Break	Low	2	Slabs	Crack Sealing - PCC	$3.02	$52
A01GL	03	Corner Break	Medium	4	Slabs	Patching - PCC Full Depth	$16.76	$2,285
A01GL	03	Joint Seal Damage	Medium	116	Slabs	Joint Seal (Localized)	$3.02	$7,431
A01GL	03	Joint Seal Damage	High	42	Slabs	Joint Seal (Localized)	$3.02	$2,702
A01GL	03	Joint Spalling	Medium	2	Slabs	Patching - PCC Partial Depth	$37.54	$512
A01GL	03	LTD Cracking	Medium	15	Slabs	Crack Sealing - PCC	$3.02	$502
A01GL	04	LTD Cracking	Medium	1	Slabs	Crack Sealing - PCC	$3.02	$38
A01GL	05	Joint Seal Damage	Medium	75	Slabs	Joint Seal (Localized)	$3.02	$4,173
R13GL	02	Corner Spalling	Medium	44	Slabs	Patching - PCC Partial Depth	$37.54	$4,416
R13GL	02	Faulting	Medium	3	Slabs	Grinding (Localized)	$0.36	$12
R13GL	02	Joint Seal Damage	Medium	89	Slabs	Joint Seal (Localized)	$3.02	$5,566
R13GL	02	Joint Spalling	High	3	Slabs	Patching - PCC Partial Depth	$37.54	$823
R13GL	02	LTD Cracking	Medium	3	Slabs	Crack Sealing - PCC	$3.02	$102
R13GL	02	Small Patch	High	3	Slabs	Patching - PCC Full Depth	$16.76	$122
R13GL	03	Corner Spalling	Medium	1	Slabs	Patching - PCC Partial Depth	$37.54	$126
R13GL	03	Joint Seal Damage	Medium	120	Slabs	Joint Seal (Localized)	$3.02	$7,323
R13GL	03	Joint Spalling	Medium	4	Slabs	Patching - PCC Partial Depth	$37.54	$909
R13GL	03	LTD Cracking	Medium	3	Slabs	Crack Sealing - PCC	$3.02	$85
R13GL	04	Corner Spalling	Medium	2	Slabs	Patching - PCC Partial Depth	$37.54	$202
R13GL	04	Joint Seal Damage	Medium	31	Slabs	Joint Seal (Localized)	$3.02	$1,866
R13GL	04	Joint Seal Damage	High	24	Slabs	Joint Seal (Localized)	$3.02	$1,445
R13GL	04	Joint Spalling	Medium	1	Slabs	Patching - PCC Partial Depth	$37.54	$242
R13GL	04	LTD Cracking	Medium	4	Slabs	Crack Sealing - PCC	$3.02	$139

Table F-1. Year 2022 localized preventive maintenance details (continued).

Branch	Section	Distress Type	Severity	Distress Quantity	Distress Unit	Maintenance Action	Unit Cost	2022 Estimated Cost
R13GL	05	Joint Seal Damage	Medium	91	Slabs	Joint Seal (Localized)	$3.02	$6,033
T01GL	01	Joint Seal Damage	Medium	155	Slabs	Joint Seal (Localized)	$3.02	$8,492
T02GL	01	Joint Seal Damage	Medium	25	Slabs	Joint Seal (Localized)	$3.02	$1,578
TH01GL	01	Corner Break	Low	2	Slabs	Crack Sealing - PCC	$3.02	$41
TH01GL	01	Corner Spalling	Medium	2	Slabs	Patching - PCC Partial Depth	$37.54	$167
TH01GL	01	Joint Seal Damage	Medium	99	Slabs	Joint Seal (Localized)	$3.02	$5,185
TH01GL	01	Joint Seal Damage	High	70	Slabs	Joint Seal (Localized)	$3.02	$3,629
TH01GL	01	Joint Spalling	Medium	3	Slabs	Patching - PCC Partial Depth	$37.54	$803
TH01GL	01	LTD Cracking	Medium	2	Slabs	Crack Sealing - PCC	$3.02	$50
TH01GL	01	Scaling	Medium	2	Slabs	Patching - PCC Partial Depth	$37.54	$2,551
TH01GL	01	Shattered Slab	Low	2	Slabs	Crack Sealing - PCC	$3.02	$100
TH01GL	01	Shattered Slab	High	2	Slabs	Slab Replacement - PCC	$16.76	$2,777

Table Notes:

1. See Figure 3 for the location of the branch and section.
2. Distress types are defined by ASTM D5340-20. L&T Cracking = Longitudinal and Transverse Cracking; LTD Cracking = Longitudinal, Transverse, and Diagonal Cracking; ASR = Alkali-Silica Reaction.
3. The costs provided are of a general nature for the entire state and may require adjustment to reflect specific conditions at Grinnell Regional Airport.

PREPARED FOR

Iowa Department of Transportation
Modal Transportation Bureau — Aviation
800 Lincoln Way
Ames, Iowa 50010
515-239-1691
iowadot.gov/aviation

JULY 2022