

E. Airfield Pavement Management Study

E.1. INTRODUCTION

E.1.1. Project Description and Scope of Work

McFarland-Johnson, Inc. (Engineer/Consultant) was retained by the County of Broome, New York, Owner/Sponsor of the Greater Binghamton Airport (BGM or the Airport) to provide planning and engineering services, to complete the pavement inspection and Airfield Pavement Management Study (APMS).

The APMS will aid the Sponsor in project planning and securing grants and funding for the overall Maintenance and Rehabilitation (M&R) of their airfield pavements.

All work performed as part of this APMS has been performed in accordance with:

- Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5380-7B *Airport Pavement Management Program*
- FAA AC 150/5380-6C *Guidelines and Procedures for Maintenance of Airport Pavements*
- American Society for Testing and Materials (ASTM) D5340-12 *Standard Test Method for Airport Pavement Condition Index Surveys*
- ASTM D6690-15 *Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements*

To complete the APMS, the following services were performed by the Engineer/Consultant:

- Reviewed existing record plans to develop pavement histories
- Defined the pavement network and calculated sample units based on project history and record documents
- Conducted an airfield pavement condition survey to visually assess the condition of all airfield pavement and document pavement distress types, severities and quantities
- Evaluated the results of the visual assessment and documented distresses to assign a Pavement Condition Index (PCI) value for each section and branch of pavement using PAVER software
- Performed analyses of distress data and deterioration rates to develop a maintenance plan, 5-year near-term Capital Improvement Program (CIP), and a 20-year long-term CIP including estimated project costs
- Identified basic short and long-term M&R techniques

E.1.2. Deliverables

The following deliverables are included in the project scope:

- Color-coded PCI map of all inspected airfield pavements
- Basic network plan of airfield pavement showing branch, section, and sample unit boundaries including inspected sample units



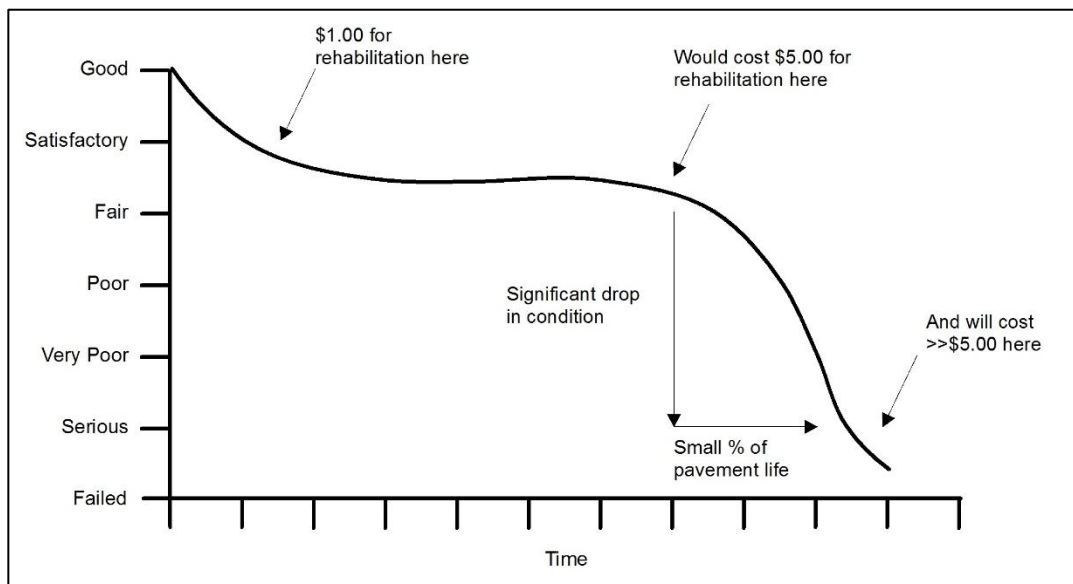
- Electronic base mapping for BGM showing pavement locations and boundaries used in the APMS, which includes the PCI calculations and analysis, types of distresses noted for each pavement branch, deterioration rate and its effect on the PCI, and basic M&R techniques
- 5-year near-term CIP
- 20-year long-term CIP
- Technical report which summarizes the above data and includes PCI maps along with inspection photographs, descriptions of pavement distresses and definitions of repair methods and strategies
- PAVER Version 7.0.5 Software

E.1.3. Purpose

The FAA requires federally obligated airports funding projects through the Airport Improvement Program (AIP) or with revenue from the Passenger Facility Charges (PFC) Program to implement an APMS. A detailed inspection of airfield pavements at least once a year is also required. The exception to the annual detailed inspection is when a PCI survey is performed and in this case, the frequency of detailed inspections may be extended to three years.

By implementing an APMS, an airport owner is able to evaluate the condition of its pavements, prioritize preventative M&R, quickly identify the most economical time to perform M&R, and implement the best M&R practice for a given section of pavement. The importance of this is identified in **Figure E-1**. Preserving pavements by performing M&R within the first 75 percent of the pavement life can eliminate or delay rehabilitation or reconstruction expenses that may be six to ten times the cost of preventative maintenance measures.

Figure E-1: Typical Pavement Condition Life Cycle



Source: FAA AC 150/5380-7B Airport Pavement Management Program

E.1.4. Software

PAVER Version 7.0.5 and PAVER FieldInspector, developed by Colorado State University were used to develop the APMS.

PAVER Version 7.0.5 software was developed for the sole purpose of managing pavements, and allows the user to inventory pavements, calculate PCI values from field inspections, predict pavement deterioration and prepare pavement M&R programs.

PAVER FieldInspector is a tablet-based software application that allows pavement inspectors to record pavement distress data in the field and calculate the PCI in real time. Additionally, the Global Positioning System (GPS) capability in both the tablet and the software allow inspectors to rapidly identify their position on a pavement network map.

E.2. PAVEMENT INVENTORY

E.2.1. Overview

This section of the APMS describes the steps taken to define the pavement network and establish the various pavement branch and section boundaries at the Airport. An accurate pavement network allows for a comprehensive PCI survey to be conducted.

E.2.2. Definitions

To provide an accurate assessment of the PCI, each APMS is divided into a pavement network with branches, sections and sample units within those sections. These terms, common to all APMSs, are used as a baseline for the organization of pavements to be inspected. Found in FAA AC 150/5380-7B, and ASTM D5340-12, they are defined as follows:

- Pavement Network: The highest level of an APMS. For example, a network can include all the airfield pavements at a single airport or all the airfield pavements in a state airport system. For this project, the BGM airfield pavements are defined as the pavement network.
- Pavement Branch: A readily identifiable part of the pavement network with a distinct function. For example, pavement branches in an airport setting consist of each individual runway, taxiway, or apron and together make up the pavement network.
- Pavement Section: Individual components of a pavement branch. Each branch consists of at least one section but may consist of more if pavement characteristics vary throughout the branch. Factors that affect the division of branches into sections include, but are not limited to: pavement structure, type, age and condition; traffic composition and frequency (current and future); construction history; pavement function; and drainage facilities and shoulders.
- Pavement Sample Unit: The final level of an APMS. Sample units are 20 contiguous slabs (± 8 slabs if the total number of slabs in the section is not evenly divided by 20, or to accommodate specific field condition) for Portland Cement Concrete (PCC) airfield pavement and 5,000 contiguous square feet (SF) ($\pm 2,000$ SF if the pavement is not evenly divided by 5,000, or to accommodate specific field conditions) for Asphalt Concrete (asphalt) airfield pavement and porous friction surfaces. A statistically significant number of sample units are inspected within a pavement section to determine the PCI.



In addition to the above, other terms related to M&R efforts are commonly used throughout APMSs. Some of these include:

- Preventative Maintenance: Cost-effective efforts applied to an existing pavement network that slows future deterioration, preserves the network, and maintains or improves the condition of the system. Preventative maintenance does not significantly increase the structural capacity of the pavement section. Examples include slurry seals, crack sealing/filling, or patching for asphalt pavements and joint or slab repair for PCC pavements.
- Pavement Rehabilitation: Structural improvements to an existing pavement section that increase its load carrying capacity and extends its service life. Examples of pavement rehabilitation includes mill and overlay of existing asphalt pavements, as well as reclamation through pulverization and asphalt or PCC overlay for PCC pavements.
- Pavement Reconstruction: Replacement of the entire pavement section with an equivalent or increased section dependent upon the aircraft fleet mix.

E.2.3. Records Review and Pavement History

The Engineer/Consultant performed a thorough review of past project records at BGM to determine construction history and the pavement structures for the existing airfield pavements. Record plans from projects designed by McFarland-Johnson, Inc. were reviewed. Pavement section data and construction history at BGM is included in **Attachment E-1**. Recent grant information is included in **Attachment E-9**.

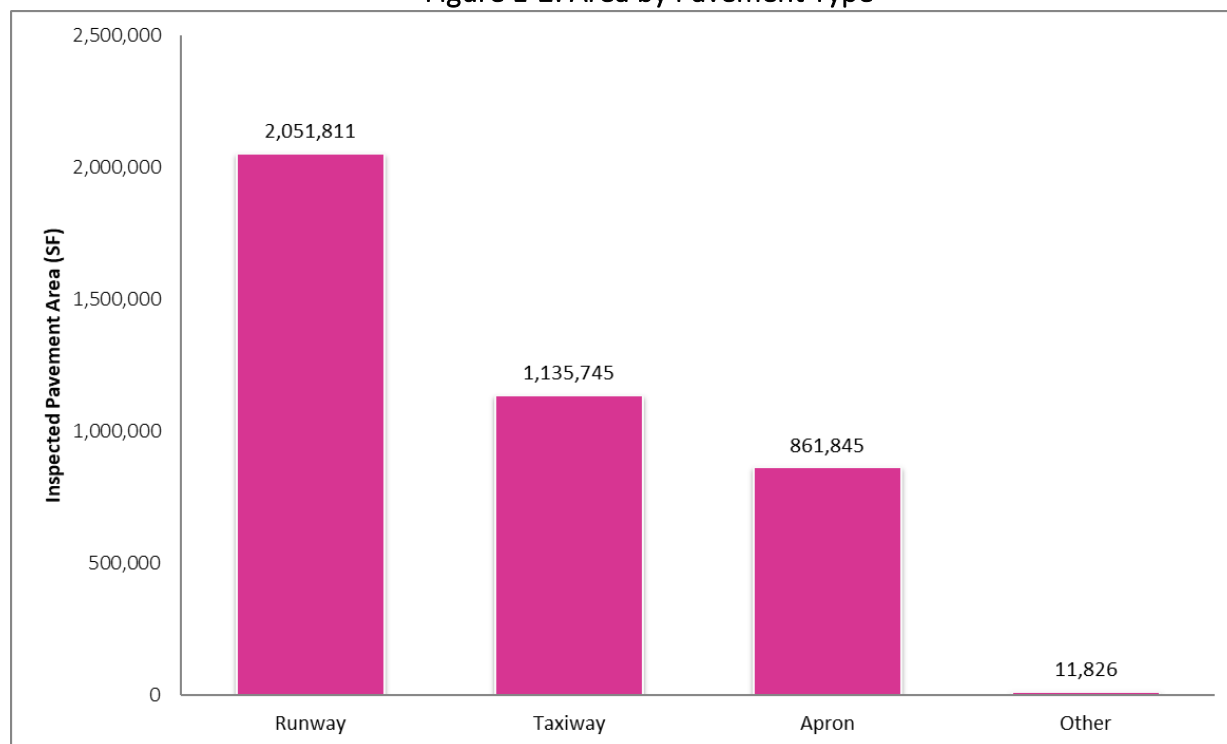
E.2.4. Pavement Ownership

The Airport owns and is responsible for the maintenance of all the airfield pavement. All pavement sections are identified and described in the attachments of this appendix. Additionally, Attachment E-3 identifies and describes all of the pavement distresses that were identified as part of this study.

E.2.5. Pavement Inventory Results

The total existing airfield pavement area at BGM is 4,061,277 SF. A total of 907,447 SF of the airfield pavement area of BGM was inspected. A detailed breakdown of the total pavement areas categorized by type (branch use) is shown in **Figure E-2**. The final pavement inventory is displayed in **Attachment E-2** showing the established branches, sections and sample units.

Figure E-2: Area by Pavement Type



Source: PAVER, McFarland-Johnson Analysis




E.3. PAVEMENT CONDITION EVALUATION

E.3.1. Field Inspection and Procedure

Pavement conditions for BGM were evaluated using the PCI procedure, as documented in the FAA AC 150/5380-6C, and ASTM D5340-12. The PCI procedure is the aviation industry standard for visually assessing pavement condition. It involves inspecting sample units within a particular section, identifying the type and severity of pavement distresses within that sample unit and measuring the quantity of distress.

The PCI represents the overall condition of the pavement ranging from 0 to 100. A pavement section in excellent condition receives a PCI score of 100, with a failed pavement section receiving a PCI score of 0. **Figure E-3** shows visual representations of several PCI values at BGM.

Figure E-3: Visual Representation of PCI Values at BGM

Pavement Surface	PCI
	84
	66
	38

Source: McFarland Johnson, 2018

The PCI field inspections took place over the course of three different inspections. The first inspection was conducted on March 21, 2017 as part of the 10-28 Runway Rehabilitation project. The second PCI field inspection of BGM pavements took place over the course of four days, occurring July 10-13, 2018. The last inspection was of newly rehabilitated pavements (i.e. Runway 16-34, Taxiway C, etc.), which took place on March 28th, 2019. The inspections were performed by a two-person crew, and measurements and photographs were taken of the various distresses found in the pavement sample units identified in **Attachment E-2** with the resulting distress data for each sample unit shown in **Attachment E-3**.

E.3.2. Distress Types

To better understand the cause of pavement deterioration, it is necessary to look at the distress types associated with each PCI score. Each distress type has been classified into three groups based on cause including load, climate/durability, or other. Load-related distresses such as alligator cracking in asphalt pavements, or corner breaks in PCC pavements, indicate that the

structural integrity of the pavement has been compromised. Climate-related distresses indicate that the pavement has aged due to seasonal environmental effects. Distresses that cannot be attributed solely to either load or climate, are classified as other. **Table E-1** presents the asphalt and PCC distress types in the PCI procedure, including their cause classification, and also identifies the most common distresses found at BGM during the pavement inspection. A full inventory of distress types at BGM for each sample unit are shown in **Attachment E-3**.

Table E-1: PCI Distress Types

Asphalt Distresses	Cause Classification	PCC Distresses	Cause Classification
Alligator Cracking	Load	Blowup	Climate
Bleeding	Other	Corner Break	Load
Block Cracking	Climate	Linear Cracking	Load
Corrugation	Other	Durability Cracking	Climate
Depression	Other	Joint Seal Damage	Climate
Jet Blast	Other	Small Patch	Other
Joint Reflection Cracking	Climate	Large Patch	Other
Long. & Transv. Cracking	Climate	Popouts	Other
Oil Spillage	Other	Pumping	Other
Patching	Other	Scaling/crazing	Other
Polished Aggregate	Other	Faulting	Other
Raveling	Climate	Shattered Slab	Load
Rutting	Load	Shrinkage Cracking	Other
Shoving	Other	Joint Spalling	Other
Slippage Cracking	Other	Corner Spalling	Other
Swelling	Other	Alkali Silica Reaction	Climate
Weathering	Climate		

Indicates most common distresses found at BGM

Source: ASTM D5340-1: Standard Test Method for Airport Pavement Condition Index Surveys

For the asphalt pavements at BGM, the most common distress types found were the following:

- Alligator cracking – a series of interconnecting cracks caused by fatigue failure of the asphalt surface under repeated traffic loading. The cracking initiates at the bottom of the asphalt surface where tensile stress and strain is highest under a wheel load. Alligator cracking is considered a major structural distress.
- Longitudinal and transverse cracking – resulting from shrinkage or contraction of the asphalt pavement. Shrinkage of the surface material is caused by oxidation and age hardening of the asphalt material. Contractions are caused by thermal fluctuations induced by temperature changes and freeze-thaw cycles. This type of cracking is not load associated.
- Weathering – the wearing away of the asphalt binder and fine aggregate matrix from the pavement surface. The asphalt surface begins to show signs of aging which may be accelerated by climatic conditions.



For the PCC pavements at BGM, the most common distress types found were the following:

- Joint Seal Damage – any condition that enables incompressible foreign material such as soil or rocks to accumulate in the joints or that allows infiltration of water. Accumulation of foreign materials prevents the slabs from expanding and may result in buckling, shattering, or spalling. Joint seal damage is caused by improper joint width, use of the wrong type of sealant, incorrect application, not properly cleaning the joint before sealing and/or climate (aging).
- Linear Cracks – a combination of repeated loads and shrinkage stresses usually causes this type of distress. It is characterized by cracks that divide the slab into two or three pieces that may indicate poor construction techniques, underlying pavement layers that are structurally inadequate for the applied load, or pavement overloads.

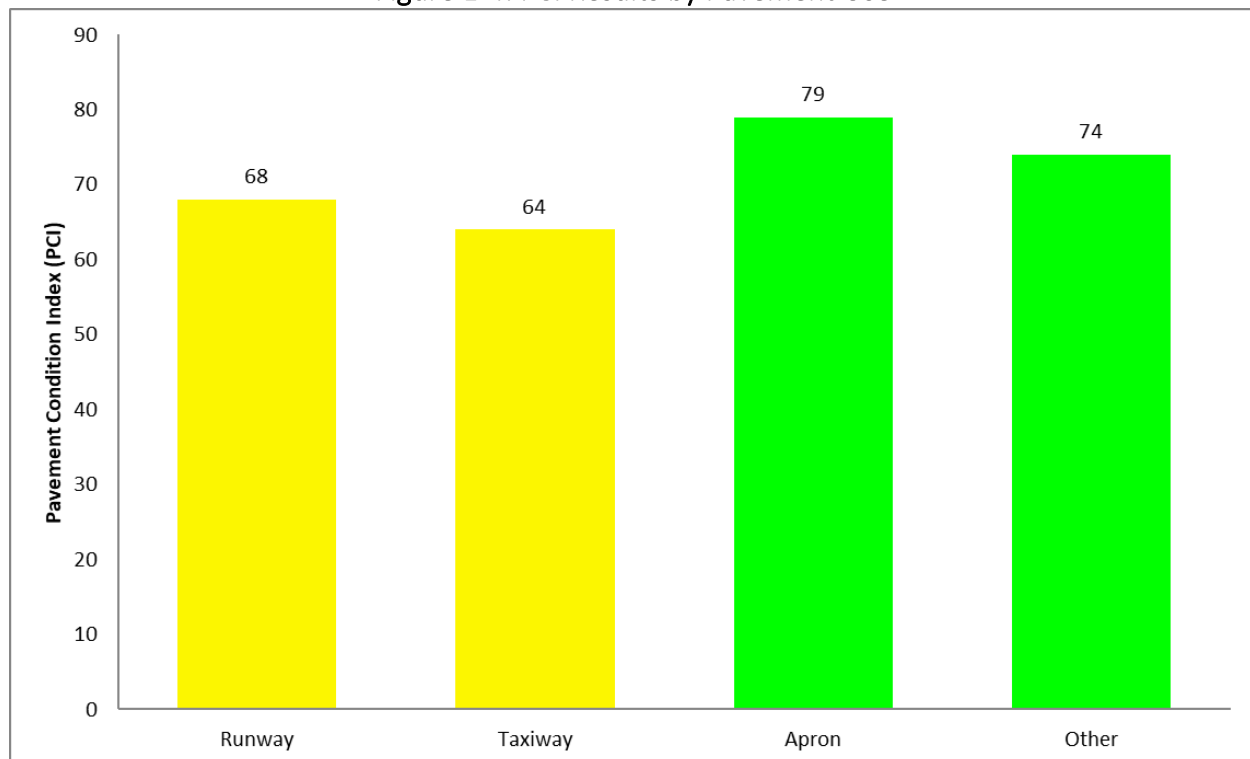
BGM inspection photographs of these distresses can be found in **Attachment E-4**.

E.3.3. Pavement Condition Index (PCI) Results Summary

Approximately 22% of all airfield pavements were inspected. The total area of airfield pavement included in this study is 4,212,077 SF. Of this total, the inspectors surveyed 907,447 SF.

Figure E-4 below depicts the results of the PCI survey graphically for each branch type.

Figure E-4: PCI Results by Pavement Use



Source: PAVER, McFarland Johnson, 2019

Table E-2 provides a general description of the PCI rating categories and the corresponding pavement areas at BGM which fall under these categories.

Using the distress measurements taken by the inspectors, a PCI was determined for each pavement sample unit within a given pavement section. PCI calculations were completed using the PAVER software to determine a PCI value for each section, with a weighted PCI then calculated for each branch. These results may be found in **Table E-3**, and a visual representation of these results may be found on the PCI Map in **Attachment E-5**.

Table E-2: Distribution of PCI Ratings for BGM

Simplified PCI Rating	PCI Range	Definition	Pavement Area (SF)	Pavement Area (%)
Good	86-100	GOOD: Pavement has minor or no distresses and requires only routine maintenance	1,331,401	33%
	71-85	SATISFACTORY: Pavement has scattered low-severity distresses that need only routine maintenance	825,782	20%
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	1,066,424	26%
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	816,649	20%
	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	20,970	1%
	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	-	-

Source: PAVER, McFarland-Johnson Analysis



Table E-3: PCI Results for BGM

Branch Description	Branch ID	Branch PCI	Surface	Section	PCI
Runway 16 (End)	RW 16	42	Asphalt	RW 16	42
Runway 34 (End)	RW 34	76	Asphalt	RW 34-1	74
			Asphalt	RW 34-2	78
Runway 16-34	RW 16-34	86	Asphalt	RW 16-34	86
Runway 10-28	RW 10-28	53	Asphalt	RW 10-28-1	50
			Asphalt	RW 10-28-2	86
			Asphalt	RW 10-28-3	78
			Asphalt	RW 10-28-4	51
T-Hangar Apron	TH APRN	73	Asphalt	TH APRN-1	84
			Asphalt	TH APRN-2	53
North Apron	N APRN	85	Asphalt	N APRN	85
Deicing Area	DEICE	52	Asphalt	DEICE	52
Terminal Apron	T APRN	78	Asphalt	T APRN-1	70
			PCC	T APRN-2	85
			Asphalt	T APRN-3	42
West Apron	W APRN	79	Asphalt	W APRN-1	80
			PCC	W APRN-2	76
Helipad	HELI	75	Asphalt	HELI-1	74
			PCC	HELI-2	76
Taxiway A	TWY A	62	Asphalt	TWY A-1	77
			Asphalt	TWY A-2	70
			Asphalt	TWY A-3	58
			Asphalt	TWY A-4	83
Taxiway B	TWY B	59	Asphalt	TWY B-1	43
			Asphalt	TWY B-2	77
Taxiway C	TWY C	85	Asphalt	TWY C	85
Taxiway D	TWY D	62	Asphalt	TWY D-1	65
			Asphalt	TWY D-2	47
			Asphalt	TWY D-3	92
Taxiway E	TWY E	69	Asphalt	TWY E	69
Taxiway F	TWY F	65	Asphalt	TWY F-1	68
			Asphalt	TWY F-2	35
			Asphalt	TWY F-3	89
Taxiway G	TWY G	61	Asphalt	TWY G-1	62
			Asphalt	TWY G-2	59
Taxiway H	TWY H	64	Asphalt	TWY H-1	63
			Asphalt	TWY H-2	59

Branch Description	Branch ID	Branch PCI	Surface	Section	PCI
			Asphalt	TWY H-3	89
			Asphalt	TWY H-4	95
			Asphalt	TWY H-5	41
Taxiway J	TWY J	93	Asphalt	TWY J	93
Taxiway K	TWY K	58	Asphalt	TWY K-1	58
			Asphalt	TWY K-2	67
			Asphalt	TWY K-3	54
Taxiway L	TWY L	56	Asphalt	TWY L	56
Taxiway M	TWY M	53	Asphalt	TWY M	53
Taxiway P	TWY P	49	Asphalt	TWY P	49

Source: PAVER, McFarland-Johnson Analysis

E.3.4. Projected PCI

Included in the APMS is an analysis of the projected airfield pavement deterioration rates at BGM. **Table E-4** shows the results of PAVER's Condition Performance Analysis. The analysis shows projected deterioration of the various pavement branches at the Airport over a 5-year period. Colors shown equate to the previously described PCI rating scale. It should be noted that this deterioration rate table does not account for any preventative maintenance implemented at the Airport, nor any rehabilitation or reconstruction projects that may take place over this 5-year period.

E.4. MAINTENANCE AND REHABILITATION (M&R) PROGRAM

E.4.1. Introduction

The results of the PCI survey can be correlated with an appropriate M&R work type. This is illustrated in **Table E-5**. Pavements with a PCI of 71 and above will benefit from preventative maintenance such as crack sealing and surface treatments. Pavements with a PCI between 41 and 70 likely will require major or minor rehabilitation. Pavement with a PCI of 40 or below typically has deteriorated beyond repair and only full reconstruction will correct the problems exhibited. The M&R program for this APMS was developed using the criteria shown in **Table E-5**.

Table E-4: Projected Pavement Deterioration at BGM

Branch ID	2019	2020	2021	2022	2023	2024
(All)	73	70	67	64	60	56
RW 16	42	39	36	33	30	28
RW 34	76	75	74	72	71	70
RW 16-34	86	82	79	76	73	70
RW 10-28	53	49	46	40	37	34
TH APRN	77	74	71	68	65	63



Branch ID	2019	2020	2021	2022	2023	2024
N APRN	85	80	76	72	68	63
DEICE	52	49	47	44	41	39
T APRN	78	76	73	70	67	64
W APRN	79	74	68	62	57	51
HELI	74	71	68	65	62	59
TWY A	65	62	58	55	52	48
TWY B	63	58	55	52	49	46
TWY C	85	81	78	75	72	69
TWY D	65	61	57	53	49	45
TWY E	69	65	62	59	56	52
TWY F	64	61	58	54	51	48
TWY G	61	56	51	46	41	37
TWY H	67	64	61	57	54	51
TWY J	93	90	87	83	79	76
TWY K	62	59	56	53	49	46
TWY L	56	51	47	43	39	35
TWY M	53	48	44	39	35	30
TWY P	49	42	35	28	21	15

Source: PAVER Condition Performance Analysis (Area Weighted Average), McFarland-Johnson Analysis

Table E-5: PCI Compared to Repair Type

PCI		Rating	Repair
86-100		Good	Preventative Maintenance
71-85		Satisfactory	
56-70		Fair	Minor Rehabilitation
41-55		Poor	Major Rehabilitation
26-40		Very Poor	Reconstruction
11-25		Serious	
0-10		Failed	

Source: McFarland Johnson, 2018

E.4.2. Inspection Schedule

Airport Sponsors are required by the FAA to meet certain requirements for their APMS. One of these requirements is the frequency of inspections. Airports must perform a detailed inspection

of airfield pavements at least once a year. The only exception is if a PCI survey, such as that included in this project, is performed, whereupon the frequency of the detailed inspections may be extended to three years. Airports should also incorporate less detailed daily, weekly and monthly inspections of their pavements.

E.4.3. Best Practices for Rehabilitation and Repair

Different types and severity levels of distresses require varying degrees and frequency of maintenance in order to be effective. **Table E-6** and **Table E-7** contain recommended localized pavement maintenance based on distress type and severity level for asphalt and PCC pavement types. **Attachment E-6** provides further detail of M&R Work Descriptions.

E.4.1. Pavement Repair Materials

Pavement repair materials are frequently improved and new products are being introduced to the market on a regular basis. The following materials listed in this section are the recommended materials available to Airport maintenance staff.

Joint and Crack Sealer

Hot-poured, pressure-injected, polymeric rubberized asphalt sealant meeting the requirements of ASTM D6690 is the FAA required standard for joint and crack sealant material. The advantage to this material is its low cost, durability, and the fact that it is suitable for both flexible (asphalt) and rigid (PCC) pavements.

Flexible Pavement Patch

Long-term patches should be made with high-quality plant mixed hot-mix asphalt having a ¾-inch maximum aggregate size and meeting FAA P-401 specifications. P-401 is a specialty asphalt mix and as such is not always available from local suppliers, especially in the small quantities required for asphalt patching. Should this be the case, high quality state highway asphalt mixes may be used in lieu of P-401. For short-term repairs, high performance plant mixed cold patching products may be used. Low-quality asphalt patch materials available at local hardware stores should be avoided.

Rigid Pavement Patch

Permanent patches in rigid pavement should be made with air-entrained concrete that has a 1-inch maximum coarse aggregate size. Consideration should be given to whether the area being repaired needs to be opened to traffic immediately after repair. If so, consideration should be given to adding an accelerator admixture to the concrete, or using type III cement. The concrete patch material should either have low slump or zero slump. As with flexible pavement patches, low-quality packaged materials should be avoided.

E.4.2. Pavement Repair Equipment

As with pavement repair materials, the equipment used in pavement repairs is regularly being upgraded and refined. Specialty equipment is available to speed up the process of, and produce



long lasting, pavement repairs. The following are the most commonly used and effective pieces of equipment in pavement repair operations:

Air Compressor

Air compressors are used to remove non-compressible sand, debris, and other detritus from cracks and joints. A sustained capacity of 120 cubic feet per minute with a nozzle velocity of 100 pounds per square inch is the most effective unit. An air compressor meeting these requirements is typically a towed unit or trailer-mounted.

Concrete Saw

Concrete saws must have the ability to make a minimum 3-inch deep cut in both asphalt and concrete pavements. To perform this type of work, gasoline-powered, 5- to 20-horsepower walk-behind saws are typically used.

Router

Routing pavement cracks before sealant is installed will extend pavement life significantly. Adequate depth is provided after routing to allow the sealant to handle the seasonal expansion and contraction. Typical crack routers have a 25-horsepower motor and are available from a variety of manufacturers.

Heating Kettle

The heating kettle is a critical item in a successful and productive crack sealing program. A heating kettle with minimum material capacity of 100 gallons and a melt rate of at least 1,000 pounds per hour is recommended for large sealing operations. These variables dictate the rate at which a crew progresses. Heating kettles should also contain a double boiler tank with continuous recirculation. Sealant material has the potential to be overheated by the heating kettle and temperatures should be monitored as sealing operations are ongoing. "Burning" the sealant will age harden the material and reduce its effectiveness.

Vibratory Roller or Plate Compactor

Both pieces of equipment are required to compact plant mixed hot-mix asphalt material. Vibratory rollers are typically used for larger patches and plate compactors are used for smaller patches.

Milling Machine or Cold Planer

These machines use a large rotating drum to remove and grind the pavement surface. They should be used to ensure an adequate area and depth of pavement is removed prior to patching and/or repairing joints.

Table E-6: Recommended Maintenance Method – Asphalt Concrete

Distress Type	Probable Cause of Distress	Recommended Maintenance Method
Alligator Cracking	Fatigue failure of the asphalt surface under repeated traffic loading.	If localized, partial- or full-depth asphalt patch. If extensive, major rehabilitation needed.
Block Cracking	Shrinkage of the asphalt and daily temperature cycling; it is not load associated.	At low severity levels, crack seal and/or surface treatment. At higher severities, consider overlay.
Bleeding	Excessive amounts of asphalt cement or tars in the mix and/or low air void content.	Spread heated sand, roll, and sweep. Another option is to plane excess asphalt, or, remove and replace.
Corrugation	Traffic action combines with and unstable pavement layer.	If localized, mill. If extensive, remove and replace.
Depression	Settlement of the foundation soil.	Patch.
Jet Blast	Bituminous binder has been burned or carbonized.	Patch.
Joint Reflection Cracking	Movement of the concrete slab beneath the asphalt the asphalt surface due to thermal and moisture changes.	At low- and medium-severities, crack seal. At higher severities, especially if extensive, consider overlay.
Longitudinal and Transverse Cracking	Cracks may be caused by 1) poorly constructed paving joint, 2) shrinkage of the asphalt surface due to low temperatures or hardening, or 3) reflective crack caused by cracks in an underlying asphalt layer.	At low- and medium-severity levels, crack seal. At higher severities, especially if extensive, consider overlay options.
Oil Spillage	Deterioration or softening of the pavement surface caused by the spilling of oil, fuel, or other solvents.	Replace patch if deteriorated.
Patching	N/A	
Polished Aggregate	Repeated traffic applications.	Aggregate seal coat is one option. Could also groove or mill. Overlay is another option.
Rutting	Usually caused by consolidation or lateral movement of the materials due to traffic loads.	Patch medium- and high-severity levels if localized. If extensive, consider major rehabilitation.
Shoving	Where PCC pavements adjoin flexible pavements, PCC “growth” may shove the asphalt pavement.	Mill and patch as needed.
Slippage Cracking	Low strength surface mix or poor bond between the surface and next layer of pavement structure.	Partial- or full-depth patch.
Swelling	Usually caused by frost action or by swelling soil.	Patch if localized. Major rehabilitation if extensive.
Raveling	Asphalt binder may have hardened significantly, causing coarse aggregate pieces to dislodge.	Patch if isolated. At higher severity levels, consider major rehabilitation if extensive.
Weathering	Asphalt binder and/or fine aggregate may wear away as the pavement ages and hardens.	Patch if isolated. Consider a surface treatment if extensive.

Table E-7: Recommended Maintenance Method – PCC

Distress Type	Probable Cause of Distress	Recommended Maintenance Method
Alkali Silica Reaction (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.	At medium- and high-severity levels, slab replacement is recommended.
Blow-Up	Incompressible material in joints.	Partial- or full-depth patch. Slab replacement.
Corner Break	Load repetition combined with loss of support and curling stresses.	Seal cracks at low-severity. Full-depth patch.
Cracks	Combination of load repetition, curling stresses, and shrinkage stresses.	Seal cracks. At high-severity, may need full-depth patch or slab replacement.
Durability Cracking	Concrete’s inability to withstand environmental factors such as freeze-thaw cycles.	Full-depth patch if present on small amount of slab. At higher severity levels, once it has appeared on most of slab, slab replacement.
Joint Seal Damage Cracking	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 joint.	Replace joint seal.
Patching (Small and Large)	N/A	Replace patches if deteriorated.
Popouts	Freeze-thaw action in combination with expansive aggregates.	Monitor.
Pumping	Poor drainage, poor joint sealant.	Seal cracks and joints. Under seal is an option if voids have developed. Establish good drainage.
Scaling	Overfinishing of concrete, deicing salts, improper construction, freeze-thaw cycles, and poor aggregate.	At low-severity levels, do nothing. At medium- and high-severity levels, partial-depth patches or slab replacement.
Settlement	Upheaval or consolidation.	At higher severity levels, leveling patch or grind to restore smooth ride.
Shattered Slab	Load repetition.	Replace slab.
Shrinkage	Setting and curing of the concrete.	Monitor.
Spalling (Joint and Corner)	Excessive stresses at the joint caused by infiltration of incompressible materials or traffic loads; weak concrete at joint combined with traffic.	Partial-depth patch.



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Other Equipment

General use equipment such as dump trucks, water trucks, power sweeping units, and front-end loaders are commonly used in pavement repair operations and can be helpful in a maintenance program.

E.4.3. Recommended Maintenance Actions

The airfield pavements at BGM that need the most repair are the taxiways (as shown in **Figure E-2**). Overall, the taxiways have the lowest overall PCI of 64, which is categorized as requiring minor rehabilitation. Taxiways M and P, the Deicing Area in the North Apron, Runway 10-28, and the end of Runway 16 fall within the PCI range of 41 and 55, which calls for major rehabilitation. A portion of Taxiway F, with a PCI of 36, has the lowest PCI and falls in the reconstruction category.

Using the results of the PCI survey, the most common distress types encountered, and the projected deterioration shown in **Table E-4**, it is recommended that the Airport implement a comprehensive crack sealing program on asphalt surfaces and joint seal replacement on PCC surfaces. All of the pavements at the Airport would benefit and see increased longevity from these maintenance actions. Localized asphalt pavement patching is recommended in areas where longitudinal and transverse cracking widths have increased to the point where sealant is no longer effective. It should be noted that PCI surveys are conservative estimates as to the current condition of the pavements. Detailed engineering analysis conducted during the design phase of a project may result in a different conclusion as to the extent of repair required. Technically, AIP funding can be used for routine maintenance which includes, cleaning, filling and/or sealing of longitudinal and transverse cracks, grading pavement edges, and pavement patching, however, due to funding constraints the FAA has been reluctant to fund these types of projects, therefore, PFC and/or funding sources outside of AIP would be needed to implement preventive maintenance activities at the airport.

E.5. CAPITAL IMPROVEMENT PROGRAM (CIP)

E.5.1. Objective

One of the primary objectives of the BGM APMS is to identify and determine the airfield pavement M&R needs of the Airport by comparing the PCI values to a standardized benchmark called the Minimum Service Level (MSL). The MSL is defined as the minimum pavement condition acceptable for airside operations at the Airport. MSL values are shown in **Table E-8** below. Once the MSLs are established, the MSLs are the basis of the Capital Improvement Program (CIP).

Table E-8: Minimum Service Levels

Branch Use	MSL Value
Runway	65
Taxiway	60
Apron	60



E.5.2. Analysis Approach

By establishing benchmark MSLs, a CIP can be developed using project data inputs into PAVER software to develop projects and costs. It should be noted that the CIP is based on 1) visual evaluation of pavements to establish a condition baseline, 2) applying recommended deterioration rates for pavements to predict when a particular pavement section attains the MSL, and 3) utilizing historic unit cost data based on type of pavement and PCI to estimate project costs of maintaining, rehabilitating or replacing pavements. Since more rigorous engineering analysis would be necessary to establish overall project costs, the CIP should only be used as a guide in developing the costs associated with only pavement work in any project funding requests. It is advisable to employ a more detailed analysis to identify and estimate overall project scopes and costs that are intended to be used in any grant funding requests.

This section of the report identifies and defines future CIP projects, along with their respective estimated costs based on acceptable PCI service levels, project type, and year of proposed construction. The M&R plan and CIP development utilized analysis of existing record plan information, the visual inspection of the pavement surfaces, and in accordance with the methods described in FAA AC 150/5380-7B and ASTM D5340-12. Based on ongoing projects, plans, and conversations with BGM; the following funding scenario was utilized in development of the CIP's:

- Stopgap/Preventive Maintenance – Set Budget of \$10,000: A specific budget amount of approximately \$10,000/year was used.
- Major Rehabilitation – Unlimited Budget.

Before presenting the analysis results, it is important to explain how the PAVER software develops such a program. Within the PAVER software, pavement repair is categorized as follows:

- **Major Rehabilitation** such as an overlay, mill and pave, or reconstruction.
- **Localized Stopgap/Preventive Maintenance** is a maintenance action that is applied only to a distressed area, such as crack sealing or patching. It is called Stopgap Maintenance when the PCI is less than the MSL and Preventive Maintenance when the PCI is greater than the MSL.

For each year of the analysis, the PAVER software applies the performance models and estimates the future condition of the pavement sections. If a section falls below the MSL's shown in **Table E-8**, major rehabilitation is recommended during that year. Stopgap maintenance is used if a major rehabilitation project cannot be completed in the year the PCI falls below the MSL. If the section is above the critical PCI, localized preventive maintenance may be recommended for that year. After the treatment is selected for the pavement section based on its predicted PCI value and the criteria listed above, its cost is calculated using the unit cost figures store in PAVER.

E.5.3. 5-Year Near-Term CIP

A 5-Year Near-Term CIP was developed to provide BGM with a list of short-term pavement capital projects for the 2019 through 2024 timeframe, the full 5-year plan is shown in **Attachment E-7**.

Table E-9: 5-Year Capital Improvement Plan Costs

Year	Stopgap/Preventive	Major Rehabilitation
2019	\$10,000	\$7,109,974.08
2020	\$10,000	\$0.00
2021	\$10,000	\$6,000,000.00
2022	\$10,000	\$5,890,314.19
2023	\$10,000	\$0.00

The full 5-Year Capital Improvement Plan showing treatment and PCI for each Branch/Section of airport pavement is shown in **Attachment E-7**.

E.5.4. 20-Year Long-Term CIP

A 20-Year Long-Term CIP was developed to provide BGM with a list of long-term pavement capital projects for 2020 through 2039. The 20-Year Long-Term CIP is an extension of the 5-Year Plan and was developed in the same manner.

Table E-10: 20-Year Capital Improvement Plan Costs

Year	Stopgap/Preventive	Major Rehabilitation
2019	\$10,000	\$7,109,974.08
2020	\$10,000	\$0.00
2021	\$10,000	\$6,000,000.00
2022	\$10,000	\$5,890,314.19
2023	\$10,000	\$0.00
2024	\$10,000	\$14,409.48
2025	\$10,000	\$30,417.46
2026	\$10,000	\$310,669.58
2027	\$10,000	\$766,096.88
2028	\$10,000	\$4,789,978.90
2029	\$10,000	\$409,619.48
2030	\$10,000	\$214,370.64
2031	\$10,000	\$716,357.61
2032	\$10,000	\$0.00
2033	\$10,000	\$2,398,810.69
2034	\$10,000	\$720,847.03
2035	\$10,000	\$689,199.52
2036	\$10,000	\$6,469,667.77
2037	\$10,000	\$165,794.12
2038	\$10,000	\$93,346.30

Source: PAVER, McFarland-Johnson Analysis

The full 20-Year Long-Term Capital Improvement Plan showing treatment and PCI for each Branch/Section of airport pavement is shown in **Attachment E-8**.



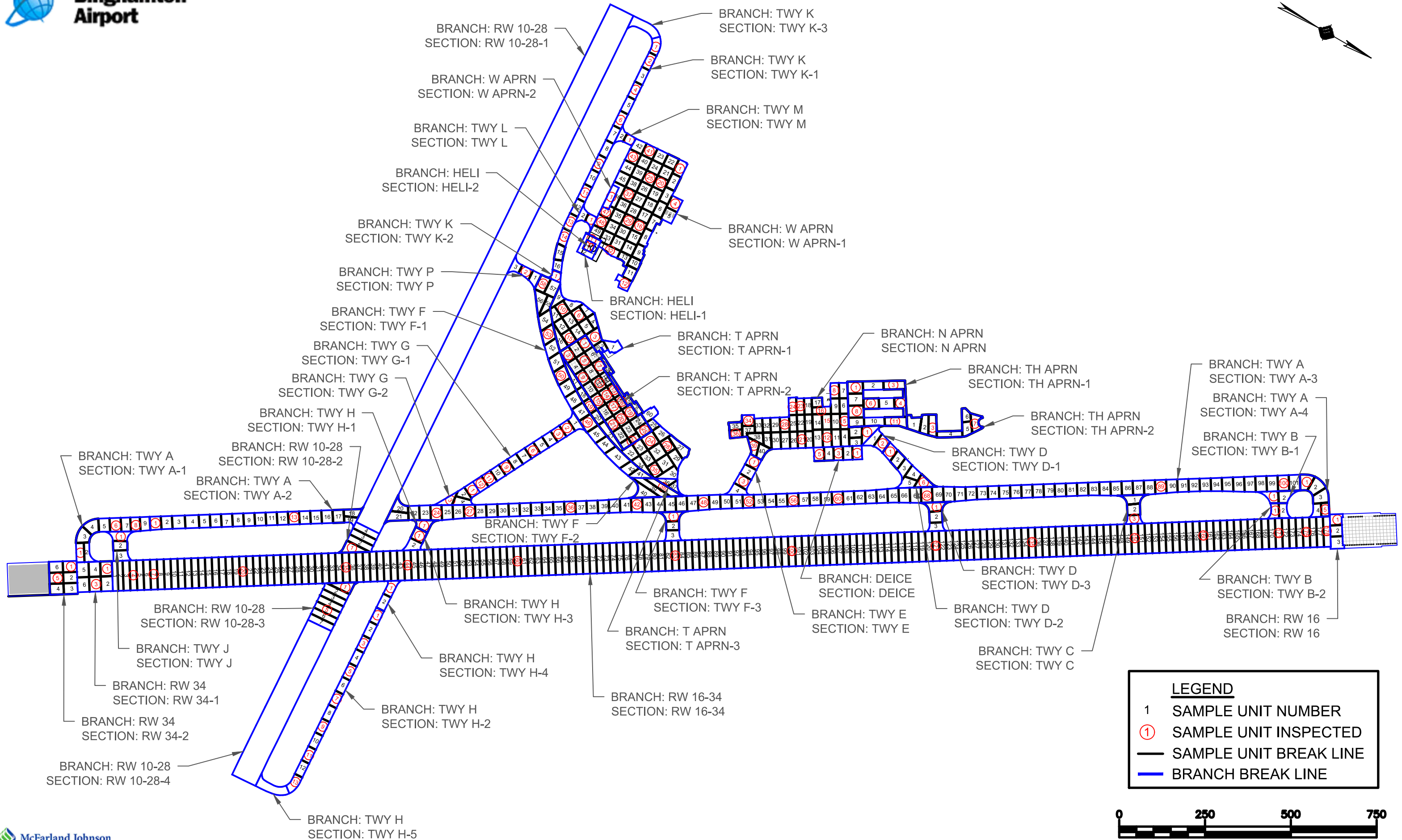
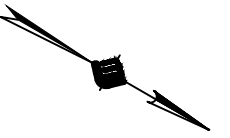
It should also be noted that in using the developed CIP to plan future funding requirements, BGM may find it necessary to adjust the timing of CIP projects due to fiscal and operational constraints. For example, a taxiway pavement may be divided into multiple sections that reach the MSL during different years. However, in an operational sense, it may be deemed not to be feasible to stage the rehabilitation of the taxiway over the course of multiple years. Instead, the rehabilitation may actually be programmed to minimize the taxiway closure time, while simultaneously maximizing the remaining service life. Conversely, it also may become necessary to break a large CIP project into multiple phases due to constraints based on available grant funding.

ATTACHMENT E-1: BGM PAVEMENT CONSTRUCTION HISTORY

Network	Name	Branch	Section	Section Area (ft²)	Last Construction Date	Surface Type¹	Surface Course¹	Base Course	Subbase Course¹	Notes
Greater Binghamton Airport	Runway 16	RW 16	RW 16	14,319	9/1/2001	AC	-	-	-	
	Runway 34	RW 34	RW 34-1	35,670	-	AC	-	-	-	
		RW 34	RW 34-2	31,104	-	AC	-	-	-	
	Runway 16-34	RW 16-34	RW 16-34	1,242,797	7/1/2017	AC	4" AC	VARIES AC	VARIES CABC	
	Runway 10-28	RW 10-28	RW 10-28-1	509,585	9/1/1999	AC	4" AC	-	-	
	Runway 10-28	RW 10-28	RW 10-28-2	24,281	7/1/2017	AC	4" AC	4" AC	VARIES CABC	
	Runway 10-28	RW 10-28	RW 10-28-3	42,043	7/1/2017	AC	4" AC	VARIES AC	VARIES CABC	
	Runway 10-28	RW 10-28	RW 10-28-4	152,012	9/1/1999	AC	4" AC	-	-	
	Taxiway A	TWY A	TWY A-1	45,189	9/1/2009	AC	2.25" AC	3" AC	18.5" CABC	
		TWY A	TWY A-2	92,024	9/1/2009	AC	2.25" AC	3" AC	18.5" CABC	
		TWY A	TWY A-3	426,227	9/1/2009	AC	2.25" AC	3" AC	18.5" CABC	
		TWY A	TWY A-4	26,159	7/1/2017	AC	4" AC	4" AC	24" CABC	
	Taxiway B	TWY B	TWY B-1	10,244	9/1/2009	AC	2.25" AC	3" AC	18.5" CABC	
		TWY B	TWY B-2	8,762	7/1/2017	AC	4" AC	-	-	
	Taxiway C	TWY C	TWY C	14,289	7/1/2017	AC	4" AC	-	-	
	Taxiway D	TWY D	TWY D-1	10,269	9/1/2016	AC	2.25" AC	3.75" AC	17" CABC	
		TWY D	TWY D-2	29,661	9/1/2009	AC	2.25" AC	3" AC	18.5" CABC	
		TWY D	TWY D-3	14,263	7/1/2017	AC	4" AC	-	-	
	Taxiway E	TWY E	TWY E	20,001	9/1/2009	AC	2.25" AC	3" AC	18.5" CABC	
	Taxiway F	TWY F	TWY F-1	110,935	9/1/2011	AC	3" AAC	+/- 10" AC	-	
		TWY F	TWY F-2	20,971	9/1/2009	AC	2.25" AC	3" AC	18.5" CABC	
		TWY F	TWY F-3	14,397	7/1/2017	AC	4" AC	4" AC	-	
	Taxiway G	TWY G	TWY G-1	54,201	9/1/2016	AC	3" AAC	+/- 10" AC	-	
		TWY G	TWY G-2	16,404	9/1/2009	AC	2.25" AC	3" AC	18.5" CABC	
	Taxiway H	TWY H	TWY H-1	5,209	9/1/2009	AC	2.25" AC	3" AC	18.5" CABC	
		TWY H	TWY H-2	59,124	9/1/2008	AC	2" AC	-	-	
		TWY H	TWY H-3	10,343	7/1/2017	AC	4" AC	-	-	
		TWY H	TWY H-4	9,502	7/1/2017	AC	4" AC	-	-	
	Taxiway J	TWY H	TWY H-5	9,783	9/1/2008	AC	2" AC	-	-	
		TWY J	TWY J	15,818	7/1/2017	AC	4" AC	-	-	
	Taxiway K	TWY K	TWY K-1	74,536	9/1/2008	AC	2" AC	-	-	
		TWY K	TWY K-2	3,147	9/1/2011	AC	2.25" AC	3" AC	18.5" CABC	
		TWY K	TWY K-3	9,619	9/1/2008	AC	2" AC	-	-	
	Taxiway L	TWY L	TWY L	6,854	9/1/2008	AC	2" AC	-	-	
	Taxiway M	TWY M	TWY M	6,285	9/1/2008	AC	2" AC	-	-	
	Taxiway P	TWY P	TWY P	11,829	-	AC	-	-	-	
	T-Hangar Apron	TH APRN	TH APRN-1	65,639	9/1/2013	AC	-	-	12" CABC	
		TH APRN	TH APRN-2	35,928	-	AC	-	-	-	
	North Apron	N APRN	N APRN	180,235	9/1/2016	AC	2.25" AC	3.75" AC	17" CABC	
	Deicing	DEICE	DEICE	22,100	-	AC	-	-	-	
	Terminal Apron	T APRN	T APRN-1	187,495	9/1/2011	AC	3" AAC	+/- 10" AC	-	
		T APRN	T APRN-2	120,254	9/1/2011	PCC	13" PCC	4" AC, 6" CABC	10" P-154-6.1	
		T APRN	T APRN-3	5,916	9/1/2009	AC	2.25" AC	3" AC	18.5" CABC	
	West Apron	W APRN	W APRN-1	238,975	9/1/2015	AC	2.5" AC	3.5" AC	24" CABC	
		W APRN	W APRN-2	5,636	9/1/2015	PCC	12" PCC	4" AC	14" CABC	
	Helipad	HELI	HELI-1	8,690	9/1/2016	AC	2.5" AC	3.5" AC	24" CABC	
		HELI	HELI-2	3,139	9/1/2016	PCC	12" PCC	4" AC	14" CABC	

¹ AC = Asphalt Concrete, AAC = Asphalt Overlay on AC, CABC = Crushed Aggregate Base Course, PCC=Portland Cement Concrete

Attachment E-2: Network Map



ATTACHMENT E-3 - PAVEMENT DISTRESSES BY BRANCH, SECTION AND SAMPLE UNIT ID

BranchID	SectionID	Surface Type - Current	Sample Unit Id	Distress Description	Severity
RW 16	RW 16	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 16	RW 16	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 16	RW 16	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 16	RW 16	AC	01	SHOVING	MEDIUM
RW 16	RW 16	AC	01	PATCHING	LOW
RW 16	RW 16	AC	01	WEATHERING	MEDIUM
RW 16	RW 16	AC	01	BLOCK CRACKING	LOW
RW 34	RW 34-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 34	RW 34-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 34	RW 34-1	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 34	RW 34-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 34	RW 34-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 34	RW 34-2	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 34	RW 34-2	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 16-34	RW 16-34	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 16-34	RW 16-34	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 16-34	RW 16-34	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 16-34	RW 16-34	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 16-34	RW 16-34	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 16-34	RW 16-34	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 16-34	RW 16-34	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 16-34	RW 16-34	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 16-34	RW 16-34	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 16-34	RW 16-34	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 16-34	RW 16-34	AC	07	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 16-34	RW 16-34	AC	08	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 16-34	RW 16-34	AC	09	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 16-34	RW 16-34	AC	09	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 16-34	RW 16-34	AC	10	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 16-34	RW 16-34	AC	11	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 16-34	RW 16-34	AC	12	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 16-34	RW 16-34	AC	13	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 16-34	RW 16-34	AC	14	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 16-34	RW 16-34	AC	15	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 10-28	RW 10-28-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 10-28	RW 10-28-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-1	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-1	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-1	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-1	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-1	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-1	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-1	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM

ATTACHMENT E-3 - PAVEMENT DISTRESSES BY BRANCH, SECTION AND SAMPLE UNIT ID

BranchID	SectionID	Surface Type - Current	Sample Unit Id	Distress Description	Severity
RW 10-28	RW 10-28-1	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-1	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 10-28	RW 10-28-1	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-1	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-1	AC	07	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 10-28	RW 10-28-1	AC	07	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-1	AC	07	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-1	AC	08	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 10-28	RW 10-28-1	AC	08	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-1	AC	08	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-1	AC	09	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 10-28	RW 10-28-1	AC	09	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-1	AC	09	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-1	AC	10	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-1	AC	10	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-1	AC	11	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 10-28	RW 10-28-1	AC	11	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-1	AC	11	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-1	AC	12	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 10-28	RW 10-28-1	AC	12	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-1	AC	12	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-1	AC	13	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 10-28	RW 10-28-1	AC	13	ALLIGATOR CRACKING	MEDIUM
RW 10-28	RW 10-28-1	AC	13	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 10-28	RW 10-28-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-3	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 10-28	RW 10-28-3	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-3	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 10-28	RW 10-28-3	AC	02	ALLIGATOR CRACKING	LOW
RW 10-28	RW 10-28-4	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-4	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-4	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-4	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-4	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 10-28	RW 10-28-4	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-4	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-4	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-4	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-4	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	LOW
RW 10-28	RW 10-28-4	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-4	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
RW 10-28	RW 10-28-4	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
RW 10-28	RW 10-28-4	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	HIGH

ATTACHMENT E-3 - PAVEMENT DISTRESSES BY BRANCH, SECTION AND SAMPLE UNIT ID

BranchID	SectionID	Surface Type - Current	Sample Unit Id	Distress Description	Severity
TXW A	TWY A-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TXW A	TWY A-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TXW A	TWY A-1	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TXW A	TWY A-1	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TXW A	TWY A-1	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TXW A	TWY A-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TXW A	TWY A-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TXW A	TWY A-2	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TXW A	TWY A-2	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TXW A	TWY A-2	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TXW A	TWY A-2	AC	02	BLOCK CRACKING	LOW
TXW A	TWY A-3	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TXW A	TWY A-3	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TXW A	TWY A-3	AC	01	ALLIGATOR CRACKING	LOW
TXW A	TWY A-3	AC	01	BLOCK CRACKING	LOW
TXW A	TWY A-3	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TXW A	TWY A-3	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TXW A	TWY A-3	AC	02	ALLIGATOR CRACKING	LOW
TXW A	TWY A-3	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TXW A	TWY A-3	AC	03	ALLIGATOR CRACKING	LOW
TXW A	TWY A-3	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TXW A	TWY A-3	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TXW A	TWY A-3	AC	04	ALLIGATOR CRACKING	LOW
TXW A	TWY A-3	AC	04	BLOCK CRACKING	LOW
TXW A	TWY A-3	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TXW A	TWY A-3	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TXW A	TWY A-3	AC	05	BLOCK CRACKING	LOW
TXW A	TWY A-3	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TXW A	TWY A-3	AC	06	BLOCK CRACKING	LOW
TXW A	TWY A-3	AC	07	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TXW A	TWY A-3	AC	07	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TXW A	TWY A-3	AC	07	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TXW A	TWY A-3	AC	08	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TXW A	TWY A-3	AC	08	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TXW A	TWY A-3	AC	08	ALLIGATOR CRACKING	LOW
TXW A	TWY A-3	AC	09	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TXW A	TWY A-3	AC	09	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TXW A	TWY A-3	AC	09	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TXW A	TWY A-3	AC	09	ALLIGATOR CRACKING	LOW
TXW A	TWY A-3	AC	10	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TXW A	TWY A-3	AC	10	ALLIGATOR CRACKING	LOW
TXW A	TWY A-3	AC	11	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TXW A	TWY A-3	AC	11	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TXW A	TWY A-3	AC	11	ALLIGATOR CRACKING	LOW

ATTACHMENT E-3 - PAVEMENT DISTRESSES BY BRANCH, SECTION AND SAMPLE UNIT ID

BranchID	SectionID	Surface Type - Current	Sample Unit Id	Distress Description	Severity
TXW A	TWY A-4	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TXW A	TWY A-4	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TXW A	TWY A-4	AC	01	PATCHING	LOW
TXW A	TWY A-4	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY B	TWY B-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY B	TWY B-1	AC	01	WEATHERING	LOW
TWY B	TWY B-1	AC	01	ALLIGATOR CRACKING	LOW
TWY B	TWY B-1	AC	01	BLOCK CRACKING	LOW
TWY B	TWY B-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY B	TWY B-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY C	TWY C	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY C	TWY C	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY D	TWY D-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY D	TWY D-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY D	TWY D-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TWY D	TWY D-1	AC	01	ALLIGATOR CRACKING	LOW
TWY D	TWY D-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY D	TWY D-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY D	TWY D-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TWY D	TWY D-2	AC	01	ALLIGATOR CRACKING	LOW
TWY D	TWY D-2	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY D	TWY D-2	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TWY D	TWY D-2	AC	02	ALLIGATOR CRACKING	LOW
TWY D	TWY D-3	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY E	TWY E	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY E	TWY E	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY E	TWY E	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY E	TWY E	AC	02	ALLIGATOR CRACKING	LOW
TWY F	TWY F-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY F	TWY F-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY F	TWY F-1	AC	01	ALLIGATOR CRACKING	LOW
TWY F	TWY F-1	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY F	TWY F-1	AC	02	ALLIGATOR CRACKING	LOW
TWY F	TWY F-1	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY F	TWY F-1	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY F	TWY F-1	AC	03	ALLIGATOR CRACKING	LOW
TWY F	TWY F-1	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY F	TWY F-1	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY F	TWY F-1	AC	04	DEPRESSION	LOW
TWY F	TWY F-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY F	TWY F-2	AC	01	ALLIGATOR CRACKING	LOW
TWY F	TWY F-2	AC	01	ALLIGATOR CRACKING	MEDIUM
TWY F	TWY F-3	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY F	TWY F-3	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM

ATTACHMENT E-3 - PAVEMENT DISTRESSES BY BRANCH, SECTION AND SAMPLE UNIT ID

BranchID	SectionID	Surface Type - Current	Sample Unit Id	Distress Description	Severity
TWY G	TWY G-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY G	TWY G-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY G	TWY G-1	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY G	TWY G-1	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY G	TWY G-1	AC	02	ALLIGATOR CRACKING	LOW
TWY G	TWY G-1	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY G	TWY G-1	AC	03	ALLIGATOR CRACKING	LOW
TWY G	TWY G-1	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY G	TWY G-1	AC	04	ALLIGATOR CRACKING	LOW
TWY G	TWY G-1	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY G	TWY G-1	AC	05	ALLIGATOR CRACKING	LOW
TWY G	TWY G-1	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY G	TWY G-1	AC	06	ALLIGATOR CRACKING	LOW
TWY G	TWY G-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY G	TWY G-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY G	TWY G-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TWY G	TWY G-2	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY G	TWY G-2	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TWY G	TWY G-2	AC	02	ALLIGATOR CRACKING	LOW
TWY H	TWY H-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY H	TWY H-1	AC	01	ALLIGATOR CRACKING	LOW
TWY H	TWY H-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY H	TWY H-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY H	TWY H-2	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY H	TWY H-2	AC	02	ALLIGATOR CRACKING	LOW
TWY H	TWY H-2	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY H	TWY H-2	AC	03	ALLIGATOR CRACKING	LOW
TWY H	TWY H-2	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY H	TWY H-2	AC	04	ALLIGATOR CRACKING	LOW
TWY H	TWY H-2	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY H	TWY H-2	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY H	TWY H-2	AC	05	ALLIGATOR CRACKING	LOW
TWY H	TWY H-2	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY H	TWY H-2	AC	06	ALLIGATOR CRACKING	LOW
TWY H	TWY H-2	AC	07	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY H	TWY H-2	AC	07	ALLIGATOR CRACKING	LOW
TWY H	TWY H-2	AC	07	BLOCK CRACKING	LOW
TWY H	TWY H-3	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY H	TWY H-4	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY H	TWY H-5	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY H	TWY H-5	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TWY H	TWY H-5	AC	01	WEATHERING	MEDIUM
TWY J	TWY J	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY K	TWY K-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM

ATTACHMENT E-3 - PAVEMENT DISTRESSES BY BRANCH, SECTION AND SAMPLE UNIT ID

BranchID	SectionID	Surface Type - Current	Sample Unit Id	Distress Description	Severity
TWY K	TWY K-1	AC	01	ALLIGATOR CRACKING	LOW
TWY K	TWY K-1	AC	01	BLOCK CRACKING	LOW
TWY K	TWY K-1	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY K	TWY K-1	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY K	TWY K-1	AC	02	ALLIGATOR CRACKING	LOW
TWY K	TWY K-1	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY K	TWY K-1	AC	03	ALLIGATOR CRACKING	LOW
TWY K	TWY K-1	AC	03	BLOCK CRACKING	LOW
TWY K	TWY K-1	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY K	TWY K-1	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY K	TWY K-1	AC	04	ALLIGATOR CRACKING	LOW
TWY K	TWY K-1	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY K	TWY K-1	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY K	TWY K-1	AC	05	ALLIGATOR CRACKING	LOW
TWY K	TWY K-1	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY K	TWY K-1	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY K	TWY K-1	AC	06	ALLIGATOR CRACKING	LOW
TWY K	TWY K-1	AC	06	BLOCK CRACKING	LOW
TWY K	TWY K-1	AC	07	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY K	TWY K-1	AC	07	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY K	TWY K-1	AC	07	ALLIGATOR CRACKING	LOW
TWY K	TWY K-1	AC	08	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY K	TWY K-1	AC	08	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY K	TWY K-1	AC	08	ALLIGATOR CRACKING	LOW
TWY K	TWY K-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY K	TWY K-2	AC	01	ALLIGATOR CRACKING	LOW
TWY K	TWY K-3	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY K	TWY K-3	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TWY K	TWY K-3	AC	01	POLISHED AGGREGATE	MEDIUM
TWY L	TWY L	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY L	TWY L	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TWY L	TWY L	AC	01	ALLIGATOR CRACKING	LOW
TWY M	TWY M	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TWY M	TWY M	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY M	TWY M	AC	01	ALLIGATOR CRACKING	LOW
TWY M	TWY M	AC	01	BLOCK CRACKING	LOW
TWY P	TWY P	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TWY P	TWY P	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
TWY P	TWY P	AC	01	ALLIGATOR CRACKING	LOW
TH APRN	TH APRN-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TH APRN	TH APRN-1	AC	01	DEPRESSION	LOW
TH APRN	TH APRN-1	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TH APRN	TH APRN-1	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TH APRN	TH APRN-1	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM

ATTACHMENT E-3 - PAVEMENT DISTRESSES BY BRANCH, SECTION AND SAMPLE UNIT ID

BranchID	SectionID	Surface Type - Current	Sample Unit Id	Distress Description	Severity
TH APRN	TH APRN-1	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TH APRN	TH APRN-1	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TH APRN	TH APRN-1	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TH APRN	TH APRN-1	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	LOW
TH APRN	TH APRN-1	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TH APRN	TH APRN-2	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TH APRN	TH APRN-2	AC	01	PATCHING	HIGH
TH APRN	TH APRN-2	AC	01	ALLIGATOR CRACKING	HIGH
TH APRN	TH APRN-2	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
TH APRN	TH APRN-2	AC	02	WEATHERING	LOW
N APRN	N APRN	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
N APRN	N APRN	AC	01	DEPRESSION	LOW
N APRN	N APRN	AC	01	PATCHING	LOW
N APRN	N APRN	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	LOW
N APRN	N APRN	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
N APRN	N APRN	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	LOW
N APRN	N APRN	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
N APRN	N APRN	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	LOW
N APRN	N APRN	AC	04	DEPRESSION	LOW
N APRN	N APRN	AC	04	PATCHING	LOW
N APRN	N APRN	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	LOW
N APRN	N APRN	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	LOW
N APRN	N APRN	AC	07	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
N APRN	N APRN	AC	07	DEPRESSION	MEDIUM
N APRN	N APRN	AC	08	DEPRESSION	LOW
N APRN	N APRN	AC	09	LONGITUDINAL & TRANSVERSE CRACKING	LOW
N APRN	N APRN	AC	09	WEATHERING	LOW
N APRN	N APRN	AC	10	LONGITUDINAL & TRANSVERSE CRACKING	LOW
N APRN	N APRN	AC	11	LONGITUDINAL & TRANSVERSE CRACKING	LOW
N APRN	N APRN	AC	12	LONGITUDINAL & TRANSVERSE CRACKING	LOW
DEICE	DEICE	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
DEICE	DEICE	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
DEICE	DEICE	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
DEICE	DEICE	AC	01	PATCHING	LOW
DEICE	DEICE	AC	01	PATCHING	HIGH
DEICE	DEICE	AC	01	WEATHERING	MEDIUM
DEICE	DEICE	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	LOW
DEICE	DEICE	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
DEICE	DEICE	AC	02	BLOCK CRACKING	LOW
DEICE	DEICE	AC	02	PATCHING	LOW
DEICE	DEICE	AC	02	WEATHERING	MEDIUM
DEICE	DEICE	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	LOW
DEICE	DEICE	AC	03	PATCHING	LOW
DEICE	DEICE	AC	03	WEATHERING	MEDIUM

ATTACHMENT E-3 - PAVEMENT DISTRESSES BY BRANCH, SECTION AND SAMPLE UNIT ID

BranchID	SectionID	Surface Type - Current	Sample Unit Id	Distress Description	Severity
DEICE	DEICE	AC	03	DEPRESSION	LOW
DEICE	DEICE	AC	03	BLOCK CRACKING	LOW
T APRN	T APRN-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
T APRN	T APRN-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
T APRN	T APRN-1	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
T APRN	T APRN-1	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
T APRN	T APRN-1	AC	03	ALLIGATOR CRACKING	LOW
T APRN	T APRN-1	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	LOW
T APRN	T APRN-1	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
T APRN	T APRN-1	AC	04	ALLIGATOR CRACKING	LOW
T APRN	T APRN-1	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	LOW
T APRN	T APRN-1	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
T APRN	T APRN-1	AC	05	ALLIGATOR CRACKING	LOW
T APRN	T APRN-1	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	LOW
T APRN	T APRN-1	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
T APRN	T APRN-1	AC	07	LONGITUDINAL & TRANSVERSE CRACKING	LOW
T APRN	T APRN-1	AC	07	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
T APRN	T APRN-1	AC	08	LONGITUDINAL & TRANSVERSE CRACKING	LOW
T APRN	T APRN-1	AC	08	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
T APRN	T APRN-2	PCC	01	LINEAR CRACKING	LOW
T APRN	T APRN-2	PCC	01	JOINT SEAL DAMAGE	LOW
T APRN	T APRN-2	PCC	02	LINEAR CRACKING	LOW
T APRN	T APRN-2	PCC	02	JOINT SEAL DAMAGE	LOW
T APRN	T APRN-2	PCC	03	JOINT SEAL DAMAGE	LOW
T APRN	T APRN-2	PCC	04	LINEAR CRACKING	LOW
T APRN	T APRN-2	PCC	04	JOINT SEAL DAMAGE	LOW
T APRN	T APRN-2	PCC	05	LINEAR CRACKING	LOW
T APRN	T APRN-2	PCC	05	JOINT SEAL DAMAGE	LOW
T APRN	T APRN-2	PCC	06	LINEAR CRACKING	LOW
T APRN	T APRN-2	PCC	06	CORNER CRACKING	LOW
T APRN	T APRN-2	PCC	06	JOINT SEAL DAMAGE	LOW
T APRN	T APRN-2	PCC	07	LINEAR CRACKING	LOW
T APRN	T APRN-2	PCC	07	JOINT SEAL DAMAGE	LOW
T APRN	T APRN-2	PCC	08	LINEAR CRACKING	LOW
T APRN	T APRN-2	PCC	09	LINEAR CRACKING	LOW
T APRN	T APRN-2	PCC	09	JOINT SEAL DAMAGE	LOW
T APRN	T APRN-2	PCC	10	LINEAR CRACKING	LOW
T APRN	T APRN-2	PCC	10	JOINT SEAL DAMAGE	LOW
T APRN	T APRN-2	PCC	11	LINEAR CRACKING	LOW
T APRN	T APRN-2	PCC	11	JOINT SEAL DAMAGE	LOW
T APRN	T APRN-2	PCC	12	LINEAR CRACKING	LOW
T APRN	T APRN-2	PCC	12	JOINT SEAL DAMAGE	LOW
T APRN	T APRN-2	PCC	13	JOINT SEAL DAMAGE	LOW
T APRN	T APRN-2	PCC	14	LINEAR CRACKING	LOW

ATTACHMENT E-3 - PAVEMENT DISTRESSES BY BRANCH, SECTION AND SAMPLE UNIT ID

BranchID	SectionID	Surface Type - Current	Sample Unit Id	Distress Description	Severity
T APRN	T APRN-2	PCC	14	JOINT SEAL DAMAGE	LOW
T APRN	T APRN-2	PCC	15	LINEAR CRACKING	LOW
T APRN	T APRN-2	PCC	15	JOINT SEAL DAMAGE	LOW
T APRN	T APRN-2	PCC	16	LINEAR CRACKING	LOW
T APRN	T APRN-2	PCC	16	JOINT SEAL DAMAGE	LOW
T APRN	T APRN-3	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
T APRN	T APRN-3	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	HIGH
T APRN	T APRN-3	AC	01	ALLIGATOR CRACKING	LOW
W APRN	W APRN-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW
W APRN	W APRN-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
W APRN	W APRN-1	AC	01	DEPRESSION	LOW
W APRN	W APRN-1	AC	02	LONGITUDINAL & TRANSVERSE CRACKING	LOW
W APRN	W APRN-1	AC	02	DEPRESSION	LOW
W APRN	W APRN-1	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	LOW
W APRN	W APRN-1	AC	03	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
W APRN	W APRN-1	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	LOW
W APRN	W APRN-1	AC	04	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
W APRN	W APRN-1	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	LOW
W APRN	W APRN-1	AC	05	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
W APRN	W APRN-1	AC	05	PATCHING	LOW
W APRN	W APRN-1	AC	06	LONGITUDINAL & TRANSVERSE CRACKING	LOW
W APRN	W APRN-1	AC	06	DEPRESSION	LOW
W APRN	W APRN-1	AC	07	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
W APRN	W APRN-1	AC	08	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
W APRN	W APRN-1	AC	09	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
W APRN	W APRN-1	AC	10	LONGITUDINAL & TRANSVERSE CRACKING	LOW
W APRN	W APRN-1	AC	10	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
W APRN	W APRN-1	AC	11	LONGITUDINAL & TRANSVERSE CRACKING	LOW
W APRN	W APRN-1	AC	11	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
W APRN	W APRN-1	AC	12	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
W APRN	W APRN-1	AC	13	LONGITUDINAL & TRANSVERSE CRACKING	LOW
W APRN	W APRN-2	PCC	01	JOINT SEAL DAMAGE	LOW
W APRN	W APRN-2	PCC	01	LINEAR CRACKING	LOW
HELI	HELI-1	AC	01	LONGITUDINAL & TRANSVERSE CRACKING	MEDIUM
HELI	HELI-2	PCC	01	LINEAR CRACKING	LOW
HELI	HELI-2	PCC	01	LONGITUDINAL & TRANSVERSE CRACKING	LOW

Attachment E-4 – Inspection Photographs

Taxiway A-1: Medium Longitudinal/Transverse Cracking



Taxiway A-1: Medium Longitudinal/Transverse Cracking



Taxiway A-2: Medium Longitudinal/Transverse Cracking



Taxiway A-2: Low Alligator Cracking



Taxiway A-3: High Longitudinal/Transverse Cracking



Taxiway A-3: Low Alligator Cracking



Taxiway A-3: Medium Longitudinal/Transverse Cracking



Taxiway A-4: Low Patching



Taxiway A-4: Medium Longitudinal/Transverse Cracking



Taxiway B-1: Low Block Cracking



Taxiway B-1: Low Weathering



Taxiway B-2: Medium Longitudinal/Transverse Cracking



Taxiway C: Medium Longitudinal/Transverse Cracking



Taxiway C: Low Longitudinal/Transverse Cracking



Taxiway D-1: High Longitudinal/Transverse Cracking



Taxiway D-1: Low Weathering



Taxiway D-2: Low Alligator Cracking



Taxiway D-2: Medium Longitudinal/Transverse Cracking



Taxiway D-3: Low Longitudinal/Transverse Cracking



Taxiway E: Medium Longitudinal/Transverse Cracking



Taxiway E: Low Alligator Cracking



Taxiway F-1: Medium Longitudinal/Transverse Cracking



Taxiway F-1: Low Alligator Cracking



Taxiway F-2: High Longitudinal/Transverse Cracking



Taxiway F-2: Low Alligator Cracking



Taxiway F-3: Low Longitudinal/Transverse Cracking



Taxiway G-1: Medium Longitudinal/Transverse Cracking



Taxiway G-1: Low Alligator Cracking



Taxiway G-1: Medium Longitudinal/Transverse Cracking



Taxiway G-2: Medium Longitudinal/Transverse Cracking



Taxiway G-2: High Longitudinal/Transverse Cracking



Taxiway G-2: Low Alligator Cracking



Taxiway H-1: Low Alligator Cracking



Taxiway H-1: Medium Longitudinal/Transverse Cracking



Taxiway H-2: Low Alligator Cracking



Taxiway H-2: Medium Longitudinal/Transverse Cracking



Taxiway H-2: Medium Longitudinal/Transverse Cracking



Taxiway H-3: Low Longitudinal/Transverse Cracking



Taxiway H-4: Low Longitudinal/Transverse Cracking



Taxiway J: Low Longitudinal/Transverse Cracking



Taxiway K-1: Medium Longitudinal/Transverse Cracking



Taxiway K-1: Low Alligator Cracking



Taxiway K-2: Medium Longitudinal/Transverse Cracking



Taxiway K-2: Low Alligator Cracking



Taxiway L: Medium Longitudinal/Transverse Cracking



Taxiway L: Low Alligator Cracking



Taxiway M: Medium Longitudinal/Transverse Cracking



Taxiway M: Low Alligator Cracking



Taxiway P: Medium Longitudinal/Transverse Cracking



Taxiway P: Low Alligator Cracking



T-Hangar Apron-1: Low Longitudinal/Transverse Cracking



T-Hangar Apron-1: Oil Spots



T-Hangar Apron-1: Low Depression



T-Hangar Apron-2: Medium Longitudinal/Transverse Cracking



T-Hangar Apron-2: High Alligator Cracking



T-Hangar Apron-2: High Patching Damage



North Apron: Medium Longitudinal/Transverse Cracking



North Apron: Low Depression



Deicing Area: High Longitudinal/Transverse Cracking



Deicing Area: Medium Weathering



Deicing Area: High Patching Damage



Terminal Apron-1: Medium Longitudinal/Transverse Cracking



Terminal Apron-1: Low Alligator Cracking



Terminal Apron-2: Medium Linear Cracking



Terminal Apron-2: Low Joint Seal Damage



Terminal Apron-2: Low Corner Cracking



West Apron-1: Medium Longitudinal/Transverse Cracking



West Apron-1: Low Patching Damage



West Apron-1: Medium Longitudinal/Transverse Cracking



Helipad: Medium Longitudinal/Transverse Cracking



Runway 16-34: Medium Longitudinal/Transverse Cracking



Runway 16-34: Low Longitudinal/Transverse Cracking



Runway 16-34: Medium Longitudinal/Transverse Cracking



Runway 16: Medium Longitudinal/Transverse Cracking



Runway 16: Low Patching Damage



Runway 16: Low Block Cracking



Runway 34-1: Low Longitudinal/Transverse Cracking



Runway 34-1: Medium Longitudinal/Transverse Cracking



Runway 34-2: Medium Longitudinal/Transverse Cracking



Runway 34-2: Medium Longitudinal/Transverse Cracking



Runway 10-28-2: Medium Longitudinal/Transverse Cracking



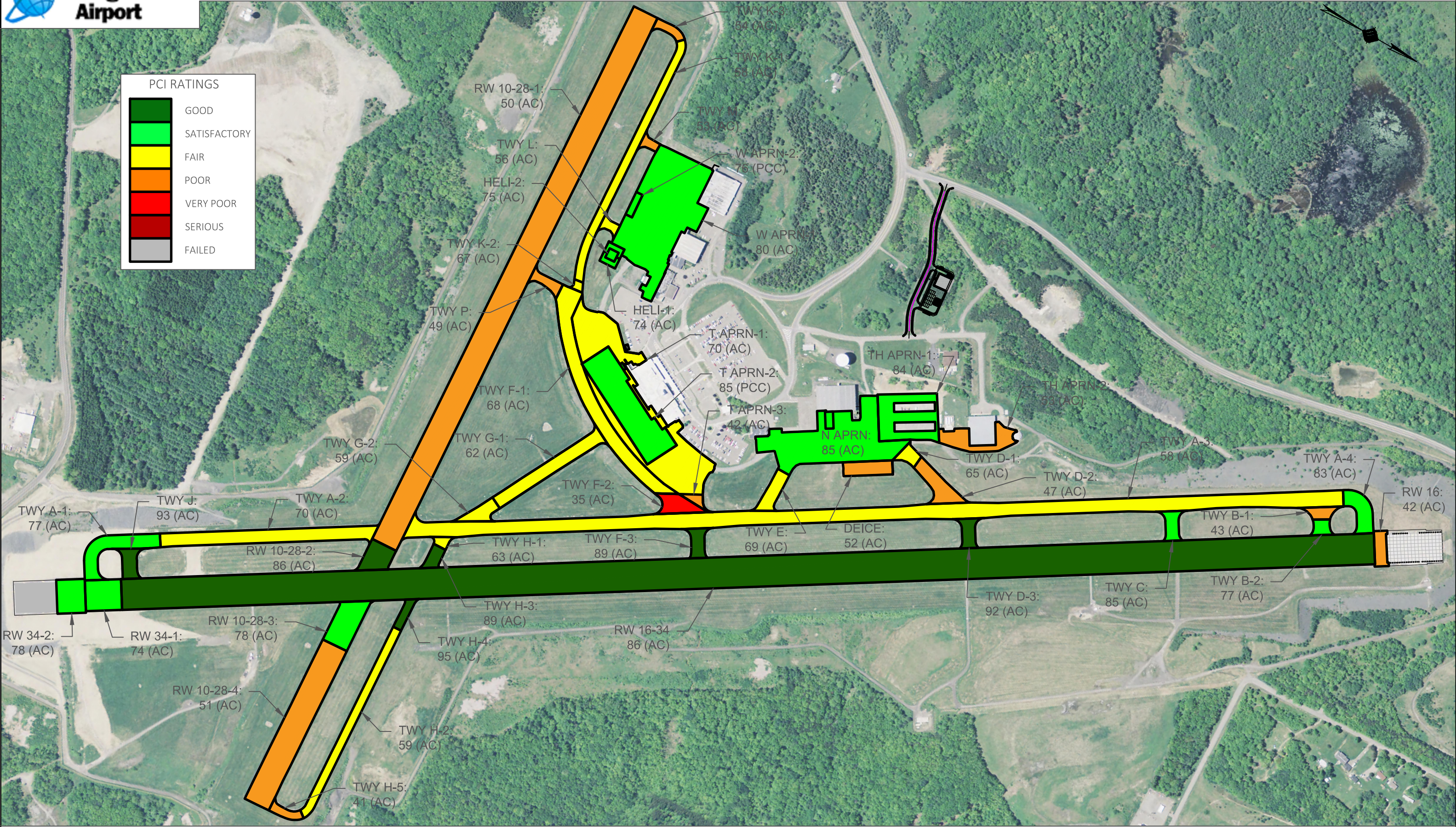
Runway 10-28-3: Low Alligator Cracking



Runway 10-28-3: Low Longitudinal/Transverse Cracking



Attachment E-5: Pavement Condition Index



E-6. M&R Work Descriptions

E-6.1. FLEXIBLE PAVEMENT (AC) WORK DESCRIPTIONS

E-6.1.1. Reconstruction

Reconstruction is recommended when pavements have deteriorated to the point where preventative maintenance techniques and pavement rehabilitation are no longer viable. The unit price assumes excavation of the existing pavement section down to subgrade, installation of a geotextile fabric membrane, 18-inches of P-209 base course material, and 11-inches of P-401 AC material.



E-6.1.2. Resurfacing

A form of pavement rehabilitation that eliminates minor distresses in asphalt pavement and extends pavement life. The unit price in this PMP assumes a nominal 2-inch mill, pavement repairs, and 2-inch inlay.



E-6.1.3. Overlay

Overlays are used to address load related distresses and increase pavement load bearing/structural capacity. The overlay unit prices in this PMP include a nominal 2-inch mill of existing pavement, pavement repairs, and overlays at various depths depending on the needs of the pavement section.



E-6.1.4. Patching

Patches may be either partial depth or full depth. They are used to eliminate distresses that have FOD potential. Temporary cold patching material may be used for short term repairs but should be replaced with FAA P-401 hot mix asphalt or an equivalent DOT product.



E-6.1.5. Crack Repair/Sealing

The most common type of preventative maintenance, crack repair/sealing, is highly effective at extending pavement life by preventing moisture from seeping into the pavement section. Cracks of a more severe nature should be routed before sealing operations take place.



E-6.1.6. Surface Treatment/Rejuvenation

Application of a high quality, penetrating sealer to the surface of asphalt pavement. Patching and/or crack sealing may take place before the placement of sealer.

E-6.2 RIGID PAVEMENT (PCC) WORK DESCRIPTIONS

E-6.2.1. Reconstruction

Reconstruction is recommended when pavements have deteriorated to the point where preventative maintenance techniques and pavement rehabilitation are no longer viable. The unit price assumes excavation of the existing pavement section down to subgrade, installation of a geotextile fabric membrane, 18-inches of P-209 base course material, and 17-inches of P-501 PCC material.



E-6.2.2. Surface Reconstruction

Surface reconstruction consists of the demolition of the top layer of concrete through rubbilization or a crack and seat process. Through this process, reflective crack is minimized and the pavement section retains its compacted state. A new surface layer of PCC is placed.



E-6.2.3. Slab Replacement/Full Depth Patching

Shattered slabs, scaling, and high-severity blowups usually necessitate this repair method. The unit price in this PMP includes sawcutting of the existing concrete, removal of the slab and subbase to subgrade, installation of 18-inches of new P-209 base material, and placement of new concrete at a depth of 17-inches.



E-6.2.4. Partial Depth Patching

Partial depth patching of existing PCC is an effective method to treat a variety of distresses most notably joint spalling and corner spalling. Unit price assumes removal and replacement of concrete to a depth of 2-inches.



E-6.2.5. Joint Seal Repair/Replacement

The most common type of preventative maintenance, crack repair/sealing, is highly effective at extending pavement life by preventing moisture from seeping into the pavement section. Cracks of a more severe nature should be routed before sealing operations take place.



ATTACHMENT E-7: 5 YEAR CIP

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

Legend

Construction Type \$###.## Before: PCI #After: PCI#	Construction Type: StopGap, Preventative, or Major Below Critical \$###.##: Projected cost of project (via PAVER). All Before: PCI# PCI number before (if any) rehabilitation After: PCI# PCI number after (if any) rehabilitation Color of square: Refer to PCI Ratings Legend (based off After: PCI#)
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Branch/Section	2019	2020	2021	2022	2023
BGM DEICE DEICE	Do Nothing Before:50.01 After:50.01	Do Nothing Before:48.41 After:48.41	Do Nothing Before:44.82 After:44.82	Major Below Critical \$114180.72 Before:42.23 After:100	Do Nothing Before:97 After:97
BGM HELI HELI1	Do Nothing Before:71.71 After:71.71	Do Nothing Before:68.7 After:68.7	Do Nothing Before:65.7 After:65.7	Preventive \$410.23 Before:62.7 After:64.03	Preventive \$463.33 Before:61.03 After:62.37
BGM HELI HELI2	Do Nothing Before:69.56 After:69.56	Do Nothing Before:62.45 After:62.45	StopGap \$125.89 Before:55.36 After:55.36	Major Below Critical \$13733.23 Before:48.27 After:100	Do Nothing Before:97 After:97
BGM N-APR N-APR	Do Nothing Before:82.69 After:82.69	Do Nothing Before:79.68 After:79.68	Do Nothing Before:76.68 After:76.68	Do Nothing Before:73.68 After:73.68	Do Nothing Before:70.68 After:70.68
BGM RWY 10-28 RW10-28-1	Major Below Critical \$5297339.14 Before:49.9 After:100	Do Nothing Before:96.99 After:96.99	Do Nothing Before:94 After:94	Do Nothing Before:91 After:91	Preventive \$1145.52 Before:88 After:88.85
BGM RWY 10-28 RW10-28-2	Do Nothing Before:85.83 After:85.83	Do Nothing Before:82.82 After:82.82	Do Nothing Before:79.82 After:79.82	Preventive \$603.15 Before:76.82 After:77.91	Preventive \$830.36 Before:74.91 After:75.99
BGM RWY 10-28 RW10-28-3	Do Nothing Before:75.83 After:75.83	Do Nothing Before:72.82 After:72.82	Do Nothing Before:69.82 After:69.82	Preventive \$3024.7 Before:66.82 After:68.15	Preventive \$3509.81 Before:65.15 After:66.49
BGM RWY 10-28 RW10-28-4	Major Below Critical \$1576570.46 Before:50.9 After:100	Do Nothing Before:96.99 After:96.99	Do Nothing Before:94 After:94	Do Nothing Before:91 After:91	Preventive \$340.93 Before:88 After:88.85
BGM RWY 16-34 RWY 16-34	Do Nothing Before:85.83 After:85.83	Do Nothing Before:82.82 After:82.82	Do Nothing Before:79.82 After:79.82	Do Nothing Before:76.82 After:76.82	Do Nothing Before:73.82 After:73.82
BGM RWY16 RWY16- 1	StopGap \$291.3 Before:39.85 After:39.85	StopGap \$383.8 Before:37.02 After:37.02	StopGap \$481.44 Before:34.19 After:34.19	Major Below Critical \$98701.69 Before:31.37 After:100	Do Nothing Before:97 After:97
BGM RWY34 RWY34- 1	Do Nothing Before:73.03 After:73.03	Do Nothing Before:71.76 After:71.76	Do Nothing Before:70.49 After:70.49	Preventive \$2102.75 Before:69.22 After:69.41	Preventive \$2380.47 Before:68.15 After:68.33
BGM RWY34 RWY34- 2	Do Nothing Before:77.18 After:77.18	Do Nothing Before:76.11 After:76.11	Do Nothing Before:75.04 After:75.04	Preventive \$1159.79 Before:73.97 After:74.11	Preventive \$1324.68 Before:73.04 After:73.17
BGM TERM-APR TERM-APR1	Do Nothing Before:66.94 After:66.94	Do Nothing Before:62.94 After:62.94	StopGap \$2003.26 Before:58.96 After:58.96	Major Below Critical \$681774.51 Before:54.97 After:100	Do Nothing Before:97 After:97
BGM TERM-APR TERM-APR2	Do Nothing Before:83.47 After:83.47	Do Nothing Before:81.47 After:81.47	Do Nothing Before:79.48 After:79.48	Do Nothing Before:77.49 After:77.49	Do Nothing Before:75.5 After:75.5
BGM TERM-APR TERM-APR3	StopGap \$108.05 Before:41.77 After:41.77	StopGap \$186.36 Before:34.73 After:34.73	Do Nothing Before:27.71 After:27.71	Major Below Critical \$42083.64 Before:20.69 After:100	Do Nothing Before:97 After:97
BGM TH-APR TH- APR1	Do Nothing Before:83.91 After:83.91	Do Nothing Before:81.35 After:81.35	Do Nothing Before:78.79 After:78.79	Do Nothing Before:76.23 After:76.23	Do Nothing Before:73.67 After:73.67
BGM TH-APR TH- APR2	Do Nothing Before:51.06 After:51.06	Do Nothing Before:48.52 After:48.52	Do Nothing Before:45.98 After:45.98	Major Below Critical \$180404.88 Before:43.45 After:100	Do Nothing Before:97 After:97
BGM TWYA TWYA1	Do Nothing Before:75.16 After:75.16	Do Nothing Before:72.74 After:72.74	Do Nothing Before:70.33 After:70.33	Do Nothing Before:67.92 After:67.92	Do Nothing Before:65.51 After:65.51
BGM TWYA TWYA2	Do Nothing Before:67.59 After:67.59	Do Nothing Before:64.43 After:64.43	Do Nothing Before:61.28 After:61.28	Major Below Critical \$300266.45 Before:58.14 After:100	Do Nothing Before:97 After:97
BGM TWYA TWYA3	StopGap \$4260.7 Before:54.63 After:54.63	StopGap \$4388.52 Before:50.21 After:50.21	Do Nothing Before:45.8 After:45.8	Major Below Critical \$2250495.91 Before:41.4 After:100	Do Nothing Before:97 After:97

BGM TWYA TWYA4	Do Nothing Before:82.83 After:82.83	Do Nothing Before:79.82 After:79.82	Do Nothing Before:76.82 After:76.82	Do Nothing Before:73.82 After:73.82	Do Nothing Before:70.82 After:70.82
BGM TWYB TWYB1	StopGap \$196.36 Before:40.89 After:40.89	Do Nothing Before:38.11 After:38.11	Do Nothing Before:35.34 After:35.34	Major Below Critical \$68669.07 Before:32.56 After:100	Do Nothing Before:97 After:97
BGM TWYB TWYB2	Do Nothing Before:76.83 After:76.83	Do Nothing Before:73.82 After:73.82	Do Nothing Before:70.82 After:70.82	Do Nothing Before:67.82 After:67.82	Do Nothing Before:64.82 After:64.82
BGM TWYC TWYC1	Do Nothing Before:84.83 After:84.83	Do Nothing Before:81.82 After:81.82	Do Nothing Before:78.82 After:78.82	Do Nothing Before:75.82 After:75.82	Do Nothing Before:72.82 After:72.82
BGM TWYD TWYD1	Do Nothing Before:62.72 After:62.72	StopGap \$105.43 Before:59.71 After:59.71	StopGap \$108.6 Before:56.71 After:56.71	Major Below Critical \$38368.93 Before:53.71 After:100	Do Nothing Before:97 After:97
BGM TWYD TWYD2	Do Nothing Before:42.77 After:42.77	Do Nothing Before:37.2 After:37.2	Do Nothing Before:31.64 After:31.64	Major Below Critical \$210808.84 Before:26.08 After:100	Do Nothing Before:97 After:97
BGM TWYD TWYD3	Do Nothing Before:91.83 After:91.83	Do Nothing Before:88.82 After:88.82	Do Nothing Before:85.82 After:85.82	Do Nothing Before:82.82 After:82.82	Do Nothing Before:79.82 After:79.82
BGM TWYE TWYE1	Do Nothing Before:66.51 After:66.51	Do Nothing Before:63.25 After:63.25	StopGap \$212.1 Before:60 After:60	Major Below Critical \$68317.32 Before:56.74 After:100	Do Nothing Before:97 After:97
BGM TWYF TWYF1	Do Nothing Before:64.74 After:64.74	Do Nothing Before:60.48 After:60.48	StopGap \$1175.9 Before:56.23 After:56.23	Major Below Critical \$436423.91 Before:51.98 After:100	Do Nothing Before:97 After:97
BGM TWYF TWYF2	StopGap \$923.07 Before:29.77 After:29.77	Do Nothing Before:22.93 After:22.93	Do Nothing Before:16.11 After:16.11	Major Below Critical \$150087.65 Before:9.29 After:100	Do Nothing Before:97 After:97
BGM TWYF TWYF3	Preventive \$16.86 Before:88.83 After:89.68	Do Nothing Before:86.68 After:86.68	Do Nothing Before:83.68 After:83.68	Do Nothing Before:80.68 After:80.68	Do Nothing Before:77.68 After:77.68
BGM TWYG TWYG1	Do Nothing Before:57.04 After:57.04	Do Nothing Before:51.85 After:51.85	Do Nothing Before:46.67 After:46.67	Major Below Critical \$285671.34 Before:41.49 After:100	Do Nothing Before:97 After:97
BGM TWYG TWYG2	StopGap \$163.94 Before:55.71 After:55.71	StopGap \$168.86 Before:51.4 After:51.4	StopGap \$224.36 Before:47.1 After:47.1	Major Below Critical \$83582.29 Before:42.8 After:100	Do Nothing Before:97 After:97
BGM TWYH TWYH1	Do Nothing Before:60.32 After:60.32	StopGap \$53.54 Before:56.79 After:56.79	Major Below Critical \$91749.14 Before:53.28 After:100	Do Nothing Before:97 After:97	Do Nothing Before:94 After:94
BGM TWYH TWYH2	StopGap \$591.29 Before:56.02 After:56.02	StopGap \$609.02 Before:52.12 After:52.12	Major Below Critical \$3078675.91 Before:48.23 After:100	Do Nothing Before:97 After:97	Do Nothing Before:94 After:94
BGM TWYH TWYH3	Preventive \$12.17 Before:88.83 After:89.68	Preventive \$35.51 Before:86.68 After:87.53	Do Nothing Before:84.53 After:84.53	Preventive \$96.14 Before:81.53 After:82.53	Do Nothing Before:79.53 After:79.53
BGM TWYH TWYH4	Do Nothing Before:94.83 After:94.83	Do Nothing Before:91.82 After:91.82	Do Nothing Before:88.82 After:88.82	Do Nothing Before:85.82 After:85.82	Do Nothing Before:82.82 After:82.82
BGM TWYH TWYH5	Major Below Critical \$66554.72 Before:40.9 After:100	Do Nothing Before:97 After:97	Do Nothing Before:94 After:94	Do Nothing Before:91 After:91	Do Nothing Before:88 After:88
BGM TWYJ TWYJ1	Do Nothing Before:92.83 After:92.83	Do Nothing Before:89.82 After:89.82	Do Nothing Before:86.82 After:86.82	Do Nothing Before:83.82 After:83.82	Do Nothing Before:80.82 After:80.82
BGM TWYK TWYK1	StopGap \$745.23 Before:54.94 After:54.94	StopGap \$767.59 Before:50.94 After:50.94	Major Below Critical \$2778281.45 Before:46.95 After:100	Do Nothing Before:97 After:97	Do Nothing Before:94 After:94
BGM TWYK TWYK2	Do Nothing Before:64.6 After:64.6	Do Nothing Before:61.46 After:61.46	Major Below Critical \$51293.5 Before:58.32 After:100	Do Nothing Before:97 After:97	Do Nothing Before:94 After:94
BGM TWYK TWYK3	Major Below Critical \$46523.75 Before:52.9 After:100	Do Nothing Before:97 After:97	Do Nothing Before:94 After:94	Do Nothing Before:91 After:91	Do Nothing Before:88 After:88
BGM TWYL TWYL1	StopGap \$68.48 Before:52.8 After:52.8	StopGap \$80.36 Before:48.61 After:48.61	Do Nothing Before:44.43 After:44.43	Major Below Critical \$37201.39 Before:40.25 After:100	Do Nothing Before:97 After:97
BGM TWYM TWYM1	StopGap \$65.3 Before:49.58 After:49.58	Do Nothing Before:45.1 After:45.1	Do Nothing Before:40.64 After:40.64	Major Below Critical \$38193.11 Before:36.17 After:100	Do Nothing Before:97 After:97
BGM TWYP TWYP1	Major Below Critical \$122986.01 Before:43.8 After:100	Do Nothing Before:96.99 After:96.99	Do Nothing Before:94 After:94	Do Nothing Before:91 After:91	Do Nothing Before:88 After:88

BGM W-APR W-APR1	Do Nothing Before:75.63 After:75.63	Do Nothing Before:69.94 After:69.94	Do Nothing Before:64.26 After:64.26	Major Below Critical \$768139.52 Before:58.59 After:100	Do Nothing Before:97 After:97
BGM W-APR W-APR2	Do Nothing Before:70.78 After:70.78	Do Nothing Before:63.95 After:63.95	Do Nothing Before:57.14 After:57.14	Major Below Critical \$23209.79 Before:50.34 After:100	Do Nothing Before:97 After:97
Major Rehabilitation Cost:	\$7,109,974.08	\$0.00	\$6,000,000.00	\$5,890,314.19	\$0.00
Major Rehabilitation Projects:	RW 10-28-1, RW 10-28-4, TWY P, TWY K-3, and TWY H-5	-	TWY H-1, TWY H-2, TWY K-1, and TWY K-2 (Includes expansion of TWY K)	RW 16 (End), W APR-1, W APR-2, HELI-2, TH APR-2, DEICE, TERM APR-1, TERM APR-3, TWY A-2, TWY A-3, TWY B-1, TWY D-1, TWY D-2, TWY E, TWY F-1, TWY F-2, TWY G-1, TWY G-2, TWY L, TWY M	-

ATTACHMENT E-7: 5 YEAR CIP

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

Legend		Construction Type: StopGap, Preventative, or Major Below Critical																			S####-##: Projected cost of project (via PAVER). All		Before: PCI# PCI number before (if any) rehabilitation		After: PCI# PCI number after (if any) rehabilitation		Color of square: Refer to PCI Ratings Legend (based off After: PCI#)	
Branch/Section	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038								
BGM DEICE DEICE	Do Nothing Before:50.01 After:50.01	Do Nothing Before:48.41 After:48.41	Do Nothing Before:44.82 After:44.82	Major Below Critical \$114180.72 Before:42.23 After:100	Do Nothing Before:69.97 After:69.97	Do Nothing Before:69.94 After:69.94	Do Nothing Before:69.91 After:69.91	Do Nothing Before:69.88 After:69.88	Do Nothing Before:69.85 After:69.85	Do Nothing Before:69.82 After:69.82	Do Nothing Before:69.79 After:69.79	Do Nothing Before:69.76 After:69.76	Do Nothing Before:69.73 After:69.73	Do Nothing Before:69.70 After:69.70	Do Nothing Before:69.67 After:69.67	Do Nothing Before:69.64 After:69.64	Do Nothing Before:69.61 After:69.61	Major Below Critical \$109557.42 Before:67.98 After:100	Do Nothing Before:67.97 After:67.97	Do Nothing Before:67.94 After:67.94								
BGM HELI HELI1	Do Nothing Before:71.71 After:71.71	Do Nothing Before:68.7 After:68.7	Do Nothing Before:65.7 After:65.7	Preventive \$410.23 Before:62.7 After:64.03	Preventive \$463.33 Before:61.03 After:62.37	Major Below Critical \$14409.48 Before:59.36 After:100	Do Nothing Before:69.97 After:69.97	Do Nothing Before:69.94 After:69.94	Do Nothing Before:69.91 After:69.91	Preventive \$111.31 Before:69.89 After:89.33	Do Nothing Before:69.86 After:69.86	Do Nothing Before:69.83 After:69.83	Do Nothing Before:69.80 After:69.80	Do Nothing Before:69.77 After:69.77	Do Nothing Before:69.74 After:69.74	Do Nothing Before:69.71 After:69.71	Do Nothing Before:69.68 After:69.68	Do Nothing Before:69.65 After:69.65	Major Below Critical \$109557.42 Before:67.98 After:100	Do Nothing Before:67.97 After:67.97	Do Nothing Before:67.94 After:67.94							
BGM HELI HELI2	Do Nothing Before:69.56 After:69.56	Do Nothing Before:62.45 After:62.45	StopGap \$125.89 Before:55.36 After:55.36	StopGap \$1373.23 Before:48.27 After:100	Do Nothing Before:69.97 After:69.97	Do Nothing Before:69.94 After:69.94	Do Nothing Before:69.91 After:69.91	Do Nothing Before:69.88 After:69.88	Do Nothing Before:69.85 After:69.85	Do Nothing Before:69.82 After:69.82	Do Nothing Before:69.79 After:69.79	Do Nothing Before:69.76 After:69.76	Do Nothing Before:69.73 After:69.73	Preventive \$170.06 Before:72.99 After:71.7	Preventive \$214.78 Before:70.84 After:70.7	Do Nothing Before:68.7 After:68.7	Do Nothing Before:65.7 After:65.7	Preventive \$435.31 Before:62.7 After:68.32	Do Nothing Before:62.69 After:62.69	Major Below Critical \$21033.07 Before:67.31 After:100								
BGM N-APR N-APR	Do Nothing Before:82.69 After:82.69	Do Nothing Before:79.68 After:79.68	Do Nothing Before:76.68 After:76.68	Do Nothing Before:73.68 After:73.68	Do Nothing Before:70.68 After:70.68	Do Nothing Before:67.67 After:67.67	Do Nothing Before:64.67 After:64.67	Do Nothing Before:61.67 After:61.67	Major Below Critical \$69483.49 Before:58.67 After:100	Do Nothing Before:61.64 After:61.64	Do Nothing Before:61.61 After:61.61	Do Nothing Before:61.58 After:61.58	Do Nothing Before:61.55 After:61.55	Do Nothing Before:61.52 After:61.52	Do Nothing Before:61.49 After:61.49	Do Nothing Before:61.46 After:61.46	Do Nothing Before:61.43 After:61.43	Do Nothing Before:61.40 After:61.40	Do Nothing Before:61.37 After:61.37	Do Nothing Before:61.34 After:61.34								
BGM RWY 10-28 RW10-28-1	Major Below Critical \$202339.14 Before:43.9 After:100	Do Nothing Before:79.68 After:79.68	Do Nothing Before:76.68 After:76.68	Do Nothing Before:73.68 After:73.68	Preventive \$1145.52 Before:68.88 After:88.85	Do Nothing Before:69.97 After:69.97	Do Nothing Before:69.94 After:69.94	Do Nothing Before:69.91 After:69.91	Do Nothing Before:69.88 After:69.88	Do Nothing Before:69.85 After:69.85	Do Nothing Before:69.82 After:69.82	Do Nothing Before:69.79 After:69.79	Do Nothing Before:69.76 After:69.76	Do Nothing Before:69.73 After:69.73	Do Nothing Before:69.70 After:69.70	Do Nothing Before:69.67 After:69.67	Do Nothing Before:69.64 After:69.64	Major Below Critical \$2247473.62 Before:58.84 After:100	Do Nothing Before:69.97 After:69.97	Do Nothing Before:69.94 After:69.94								
BGM RWY 10-28 RW10-28-2	Do Nothing Before:85.83 After:85.83	Do Nothing Before:82.82 After:82.82	Do Nothing Before:79.82 After:79.82	Preventive \$803.15 Before:76.82 After:76.82	Preventive \$830.36 Before:74.91 After:75.99	Preventive \$1071.45 Before:72.99 After:73.96	Do Nothing Before:70.98 After:70.98	Preventive \$1796.11 Before:68.98 After:68.98	Preventive \$2158 Before:66.98 After:66.98	Preventive \$2553.82 Before:63.89 After:64.81	Preventive \$2970.24 Before:61.81 After:62.73	Major Below Critical \$20507.8 Before:59.100	Do Nothing Before:61.97 After:61.97	Do Nothing Before:61.94 After:61.94	Do Nothing Before:61.91 After:61.91	Do Nothing Before:61.88 After:61.88	Preventive \$179.04 Before:60.98 After:60.98	Preventive \$247.39 Before:60.84 After:60.84	Preventive \$340.9 Before:60.76 After:60.76	Preventive \$480.58 Before:60.68 After:60.68								
BGM RWY 10-28 RW10-28-3	Do Nothing Before:75.83 After:75.83	Do Nothing Before:72.82 After:72.82	Do Nothing Before:69.82 After:69.82	Preventive \$3024.7 Before:68.62 After:68.62	Preventive \$3509.81 Before:65.15 After:66.49	Preventive \$4021.76 Before:63.48 After:64.68	Preventive \$4593.88 Before:61.68 After:62.88	Major Below Critical \$14292.96 Before:59.88 After:100	Do Nothing Before:61.81 After:61.81	Do Nothing Before:61.78 After:61.78	Do Nothing Before:61.75 After:61.75	Preventive \$116.13 Before:60.89 After:89.2	Preventive \$227.54 Before:60.82 After:89.2	Preventive \$346.1 Before:60.84 After:89.2	Preventive \$469.8 Before:60.82 After:89.2	Preventive \$601.83 Before:60.82 After:89.2	Preventive \$943.6 Before:60.82 After:89.2	Do Nothing Before:60.81 After:60.81	Do Nothing Before:60.78 After:60.78	Do Nothing Before:60.75 After:60.75								
BGM RWY 10-28 RW10-28-4	Major Below Critical \$115760.46 Before:50.9 After:100	Do Nothing Before:79.68 After:79.68	Do Nothing Before:76.68 After:76.68	Do Nothing Before:73.68 After:73.68	Preventive \$340.93 Before:68.88 After:88.85	Preventive \$728.44 Before:65.85 After:86.86	Do Nothing Before:68.87 After:68.87	Preventive \$1731.01 Before:60.71 After:61.5	Do Nothing Before:60.71 After:60.71	Do Nothing Before:60.68 After:60.68	Do Nothing Before:60.65 After:60.65	Do Nothing Before:60.62 After:60.62	Do Nothing Before:60.59 After:60.59	Do Nothing Before:60.56 After:60.56	Do Nothing Before:60.53 After:60.53	Do Nothing Before:60.50 After:60.50	Do Nothing Before:60.47 After:60.47	Major Below Critical \$20847.03 Before:57.49 After:100	Do Nothing Before:60.97 After:60.97	Do Nothing Before:60.94 After:60.94								
BGM RWY 16-34 RWY 16-34	Do Nothing Before:85.83 After:85.83	Do Nothing Before:82.82 After:82.82	Do Nothing Before:79.82 After:79.82	Do Nothing Before:76.82 After:76.82	Do Nothing Before:73.82 After:73.82	Do Nothing Before:70.81 After:70.81	Do Nothing Before:67.81 After:67.81	Do Nothing Before:64.81 After:64.81	Do Nothing Before:61.81 After:61.81	Major Below Critical \$473351.22 Before:57.84 After:100	Do Nothing Before:62.81 After:62.81	Do Nothing Before:62.78 After:62.78	Do Nothing Before:62.75 After:62.75	Do Nothing Before:62.72 After:62.72	Do Nothing Before:62.69 After:62.69	Do Nothing Before:62.66 After:62.66	Do Nothing Before:62.63 After:62.63	Do Nothing Before:62.60 After:62.60	Do Nothing Before:62.57 After:62.57	Do Nothing Before:62.54 After:62.54								
BGM RWY16 RWY16-1	StopGap \$291.3 Before:39.85 After:39.85	StopGap \$383.8 Before:37.02 After:37.02	StopGap \$481.44 Before:34.19 After:34.19	Major Below Critical \$98701.09 Before:31.37 After:100	Do Nothing Before:69.97 After:69.97	Do Nothing Before:69.94 After:69.94	Do Nothing Before:69.91 After:69.91	Preventive \$35.25 Before:68.88 After:88.85	Preventive \$179.04 Before:68.71 After:68.71	Preventive \$356.07 Before:68.53 After:68.53	Preventive \$612.7 Before:68.27 After:68.27	Preventive \$1062.68 Before:67.99 After:68.21	Preventive \$244.7 Before:67.92 After:68.21	Preventive \$428.05 Before:67.92 After:68.21	Preventive \$621.99 Before:67.92 After:68.21	Preventive \$826.57 Before:67.92 After:68.21	Preventive \$1399.98 Before:67.92 After:68.21	Do Nothing Before:65.58 After:65.58	Do Nothing Before:65.55 After:65.55	Major Below Critical \$171512.63 Before:58.56 After:100								
BGM RWY34 RWY34-1	Do Nothing Before:73.03 After:73.03	Do Nothing Before:71.76 After:71.76	Do Nothing Before:70.49 After:70.49	Preventive \$2102.75 Before:69.22 After:69.22	Preventive \$2380.47 Before:68.15 After:68.15	Preventive \$2677.97 Before:67.06 After:67.25	Preventive \$2986.02 Before:65.98 After:66.17	Preventive \$3312.59 Before:64.91 After:65.09	Preventive \$3656.07 Before:63.83 After:64.02	Preventive \$4017.61 Before:62.75 After:62.93	Preventive \$4399.79 Before:61.66 After:61.84	Preventive \$4800.81 Before:60.57 After:60.76	Major Below Critical \$145114.9 Before:59.49 After:100	Do Nothing Before:60.96 After:60.96	Do Nothing Before:60.93 After:60.93	Do Nothing Before:60.90 After:60.90	Preventive \$114.43 Before:60.88 After:88.85	Preventive \$270.26 Before:60.84 After:88.85	Do Nothing Before:60.81 After:60.81	Preventive \$563.58 Before:60.73 After:60.73								
BGM RWY34 RWY34-2	Do Nothing Before:77.18 After:77.18	Do Nothing Before:76.11 After:76.11	Do Nothing Before:75.04 After:75.04	Preventive \$1159.79 Before:73.97 After:74.11	Preventive \$1324.68 Before:73.04 After:73.17	Preventive \$1500.09 Before:72.1 After:72.2	Preventive \$1683.11 Before:71.17 After:71.3	Preventive \$1877.53 Before:70.23 After:70.37	Preventive \$2109.03 Before:69.29 After:69.43	Preventive \$2364.01 Before:68.48 After:68.68	Do Nothing Before:67.41 After:67.41	Preventive \$2940.77 Before:66.34 After:66.47	Preventive \$3549.31 Before:65.4 After:65.53	Preventive \$3876.52 Before:64.46 After:64.59	Preventive \$4220.62 Before:63.52 After:63.65	Preventive \$4582.33 Before:62.64 After:62.77	Preventive \$4961 Before:61.64 After:61.77	Do Nothing Before:60.97 After:60.97	Do Nothing Before:60.94 After:60.94	Major Below Critical \$146827.39 Before:59.76 After:100								
BGM TERM-APR TERM-APR1	Do Nothing Before:66.94 After:66.94	Do Nothing Before:62.94 After:62.94	StopGap \$2003.26 Before:58.96 After:58.96	Major Below Critical \$681774.51 Before:54.97 After:100	Do Nothing Before:69.97 After:69.97	Do Nothing Before:69.94 After:69.94	Do Nothing Before:69.91 After:69.91	Do Nothing Before:69.88 After:69.88	Do Nothing Before:69.85 After:69.85	Do Nothing Before:69.82 After:69.82	Do Nothing Before:69.79 After:69.79	Do Nothing Before:69.76 After:69.76	Do Nothing Before:69.73 After:69.73	Do Nothing Before:69.70 After:69.70	Do Nothing Before:69.67 After:69.67	Do Nothing Before:69.64 After:69.64	Do Nothing Before:69.61 After:69.61	Major Below Critical \$817285.68 Before:57.88 After:100	Do Nothing Before:69.97 After:69.97	Do Nothing Before:69.94 After:69.94								
BGM TERM-APR TERM-APR2	Do Nothing Before:83.47 After:83.47	Do Nothing Before:81.47 After:81.47	Do Nothing Before:79.48 After:79.48	Do Nothing Before:77.49 After:77.49	Do Nothing Before:75.49 After:75.49	Do Nothing Before:73.49 After:73.49	Do Nothing Before:71.49 After:71																					

ATTACHMENT E-9: Recent Grant History

Fiscal Year	Service Level (or State Project)	State	Location Identifier	Airport Name	Grant Sequence Number	AIP Federal Funds	Work Description	Pavement Included	Hub Type
2007	P	NY	BGM	Greater Binghamton/Edwin A Link Field	47	\$272,080	Rehabilitate Taxiway	Design Only	N
2008	P	NY	BGM	Greater Binghamton/Edwin A Link Field	54	\$585,993	Rehabilitate Taxiway		N
2008	P	NY	BGM	Greater Binghamton/Edwin A Link Field	52	\$7,901,674	Rehabilitate Taxiway	Taxiway A (Reconstruct and Shift from TW B to TW F, Construct new From TW F to TW H, and Reconstruct and Shift from TW H to TW RW 34 end)	N
2009	P	NY	BGM	Greater Binghamton/Edwin A Link Field	56	\$310,790	Improve Runway Safety Area - 16/34	Environmental Only	N
2009	P	NY	BGM	Greater Binghamton/Edwin A Link Field	58	\$635,585	Improve Runway Safety Area - 16/34		N
2010	P	NY	BGM	Greater Binghamton/Edwin A Link Field	60	\$760,000	Improve Runway Safety Area - 16/34	Design Only	N
2010	P	NY	BGM	Greater Binghamton/Edwin A Link Field	59	\$3,816,350	Rehabilitate Apron	Terminal Apron Construction	N
2011	P	NY	BGM	Greater Binghamton/Edwin A Link Field	61	\$12,312,938	Improve Runway Safety Area - 16/34	RW 34 RSA Improvements (and extension)	N
2012	P	NY	BGM	Greater Binghamton/Edwin A Link Field	62	\$855,310	Rehabilitate Apron	North Apron Ph 1	N
2013	P	NY	BGM	Greater Binghamton/Edwin A Link Field	64	\$2,606,573	Rehabilitate Apron	West Apron Construction	N
2014	P	NY	BGM	Greater Binghamton/Edwin A Link Field	67	\$213,750	Rehabilitate Apron	Design Only	N
2015	P	NY	BGM	Greater Binghamton/Edwin A Link Field	68	\$1,354,208	Rehabilitate Apron	North Apron Ph 2	N
2016	P	NY	BGM	Greater Binghamton/Edwin A Link Field	69	\$10,705,035	Rehabilitate Runway [RW 16 Touchdown Zone] - 16/34, Rehabilitate Runway - 16/34, Rehabilitate Runway Lighting - 16/34	Runway 16/34 and Taxiway Tie-In's	N
2017	P	NY	BGM	Greater Binghamton/Edwin A Link Field	71	\$375,305	Rehabilitate Runway - 10/28	Design Only	N

Notes about the Data

The grant data are generated at the end of each fiscal year and will not reflect subsequent grant amendments. This data will not reflect any funding or project amendments. Airport locations that received funds as part of a State Block Grant Program (SBGP) may have also received grants directly from the FAA prior to inclusion into the SBGP---specifically during periods when the airport was designated as a primary airport and/or opted out of the SBGP. Because of this the data available from this tool may not necessarily be complete for States participating in the SBGP.