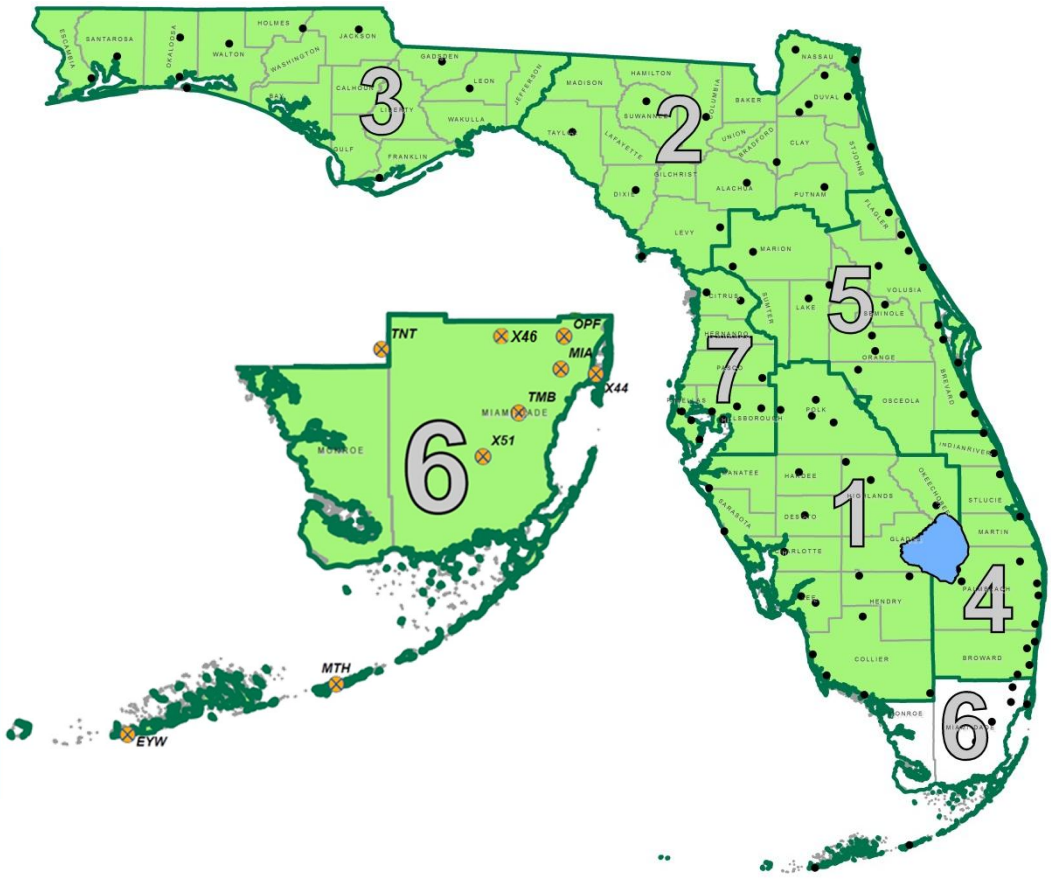
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

AVIATION OFFICE

Statewide Airfield Pavement Management Program

District 6 Report



June 2012

TABLE OF CONTENTS

PAGE NO.

Executive Summary iii
1. Introduction 1
2. System Inventory and Airport Network Definition Development 4
3. Pavement Evaluation 7
4. MicroPAVER Analysis 12
5. Conclusion 21

LIST OF FIGURES

Figure I-A: Runway Condition v
Figure I-B: Runway Pavement Condition Comparison to FDOT Minimum PCI vi
Figure II: PCI by Pavement Use by Airport viii
Figure III: Pictorial Representation of PCIs and Ratings ix
Figure 1-1: Pavement Life Cycle 2
Figure 2-1: District Pavement Area by Use 5
Figure 2-2: Pavement Area by Use by Airport 6
Figure 3-1: PCI Rating Scale 8
Figure 3-2: PCI by Pavement Use by Airport 9
Figure 3-3: PCI by Pavement Use 10
Figure 3-4: PCI by Pavement Rank 11
Figure 3-5: PCI by Surface Type 11
Figure 4-1: Example Performance Model: FDOT-GA-RW-AC 12
Figure 4-2: Summary of 10-Year Major Rehabilitation and Maintenance Costs by Plan Year 18

LIST OF TABLES

Table I: Condition Summary by Airport iv
Table II: Runway Condition Summary by Airport iv
Table III: Summary of Area by Use by Airport vii
Table IV: Summary of Immediate Major Rehabilitation Needs x
Table V: Summary of 10-Year Major Rehabilitation Costs by Airport x
Table VI: M&R Activities by Condition xi
Table 2-1: Summary of Area by Use by Airport 5

TABLE OF CONTENTS

PAGE NO.

Table 3-1: Sampling Rate for FDOT Condition Surveys 7
Table 3-2: Condition Summary by Airport 8
Table 4-1: Routine Maintenance Activities for Airfield Pavements 14
Table 4-2: M&R Activities by Condition 15
Table 4-3: FDOT Minimum Service Levels 15
Table 4-4: Summary of Immediate Major Rehabilitation Needs 16
Table 4-5: Summary of 10-Year Major Rehabilitation Costs by Airport 17
Table 4-6: 10-Year Major Rehabilitation Costs by Airport by Year 19
Table 4-7: 10-Year Maintenance Costs by Airport by Year 20

APPENDICES

Appendix A Glossary of Terms
Appendix B M&R Cost Schedules and Critical PCIs
Appendix C Airport Condition Maps and Major Rehabilitation Project Tables

EXECUTIVE SUMMARY

Airfield pavement facilities represent a large capital investment in the Florida Airport System. Timely airport maintenance and strategic rehabilitation are essential as repair costs increase significantly in proportion to deterioration. Airport distresses can also contribute to the development of loose debris and decrease rideability quality, which can be a significant safety concern for aircraft.

In 2010, the FDOT Aviation Office selected a Consultant team consisting of Kimley-Horn and Associates, Inc. and their Subconsultants, AMEC, Penuel Consulting, LLC and All About Pavements, Inc., to provide services in support of FDOT in the continuing evaluation and updating of the existing SAPMP to be completed over fiscal years 2011 and 2012. Pavement condition surveys were performed for airside pavements for the following airports located in District 6:

- EYW – Key West International Airport
- MTH – Florida Keys Marathon Airport
- OPF – Opa-locka Executive Airport
- TMB – Kendall-Tamiami Executive Airport
- TNT – Dade-Collier Training and Transition Airport
- X51 – Homestead General Aviation Airport

Opa-locka West Airport (X46), located in northwestern Dade County, and Miami International Airport (MIA), which is managed by the Dade County Aviation Department, declined to participate in the FDOT SAPMP and therefore were not inspected as part of this update.

District 6's overall PCI is at a 73, which corresponds to a 'Satisfactory' condition. **Table I: Condition Summary by Airport** below represents the results of the PCI inspection at each airport within the District. Average PCI values for the airports in District 6 ranged from 67 (Fair) to 86 (Good). Specific individual airport results are identified in individual airport reports provided to the airports. **Table II: Runway Condition Summary by Airport** indicates the PCI values for every runway within the District, grouped by airport. **Figure I-A: Runway Condition** graphically depicts the percentage of the District's runways below the FDOT Minimum PCI, and **Figure I-B: Runway Pavement Condition Comparison to FDOT Minimum PCI** shows the PCIs of the District's runways in comparison to the FDOT Minimum PCI.

Table I: Condition Summary by Airport

FAA Identifier	Airport Name	Type	Runway PCI	Taxiway PCI	Apron PCI	Overall PCI	Overall Condition Rating
EYW	Key West International Airport	PR	80	77	54	67	Fair
MTH	Florida Keys Marathon Airport	PR	63	76	64	67	Fair
OPF	Opa-locka Executive Airport	RL	72	73	53	67	Fair
TMB	Kendall-Tamiami Executive Airport	RL	90	86	83	86	Good
TNT	Dade-Collier Training and Transition Airport	GA	70	78	64	74	Satisfactory
X51	Homestead General Aviation Airport	GA	80	68	71	74	Satisfactory
	District 6 Overall =		**76**	**76**	**65**	**73**	**Satisfactory**

Table II: Runway Condition Summary by Airport

FAA Identifier	Airport Name	Airport Type	Runway Facility	Length	Width	Weighted Average PCI	Below Critical	Below FDOT
EYW	Key West International Airport	PR	9-27	4,801	100	80		
MTH	Florida Keys Marathon Airport	PR	7-25	5,008	100	63	X	X
OPF	Opa-locka Executive Airport	RL	12-30	6,800	150	70		X
OPF	Opa-locka Executive Airport	RL	9L-27R	8,002	150	72		X
OPF	Opa-locka Executive Airport	RL	9R-27L	4,309	100	78		
TMB	Kendall-Tamiami Executive Airport	RL	13-31	4,001	150	90		
TMB	Kendall-Tamiami Executive Airport	RL	9L-27R	5,003	150	91		
TMB	Kendall-Tamiami Executive Airport	RL	9R-27L	5,999	150	90		
TNT	Dade-Collier Training and Transition Airport	GA	9-27	10,499	150	70		X
X51	Homestead General Aviation Airport	GA	10-28	3,000	75	79		
X51	Homestead General Aviation Airport	GA	18-36	3,999	100	81		
					Weighted Average =	77		36%

Figure I-A: Runway Condition

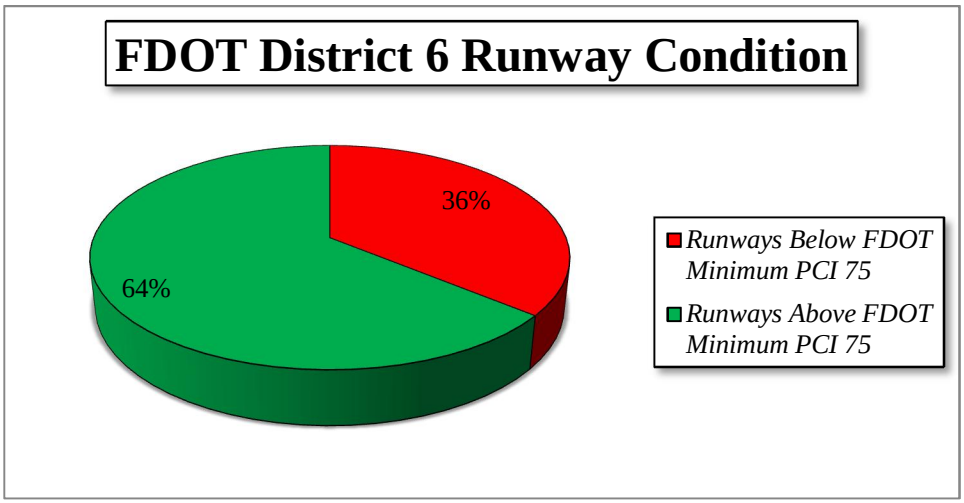
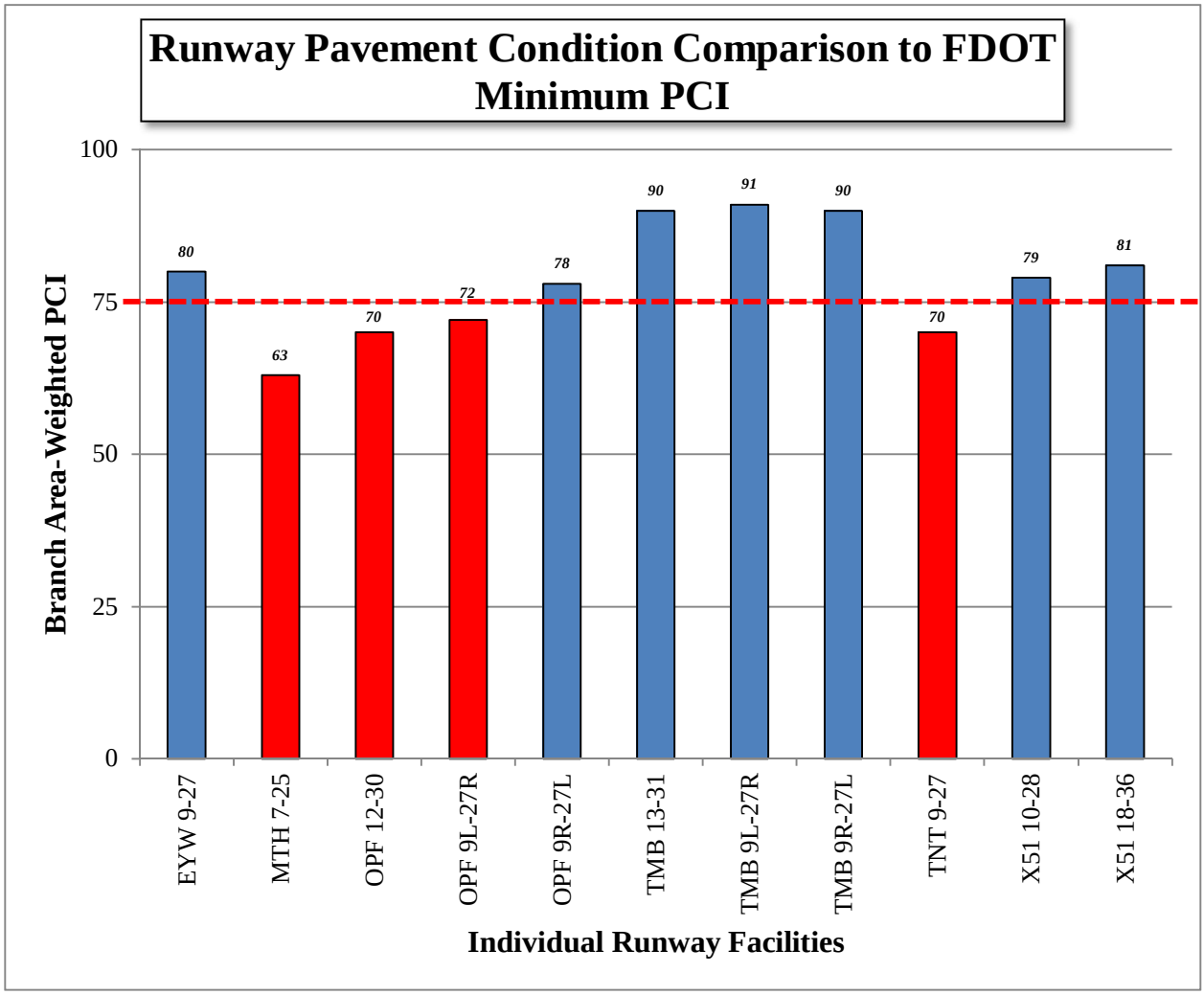


Figure I-B: Runway Pavement Condition Comparison to FDOT Minimum PCI



Pavement use has an influence on the pavement condition of each facility. For example, the amount and type of distresses observed on a primary runway can vary from a maintenance apron based on frequency and variety of traffic loads experienced. **Table III: Summary of Area by Use by Airport** provides a breakdown of the airport areas by pavement use. **Figure II: PCI by Pavement Use by Airport** graphically shows the PCI for each pavement use at each airport.

Table III: Summary of Area by Use by Airport

FAA Identifier	Airport Name	Type	Runway Area (SqFt)	Taxiway Area (SqFt)	Apron Area (SqFt)	Total Area (SqFt)
EYW	Key West International Airport	PR	480,000	419,295	845,040	1,744,335
MTH	Florida Keys Marathon Airport	PR	500,800	395,295	753,654	1,649,749
OPF	Opa-locka Executive Airport	RL	2,651,200	4,941,163	2,845,474	10,437,837
TMB	Kendall-Tamiami Executive Airport	RL	2,250,750	2,299,565	2,667,124	7,217,439
TNT	Dade-Collier Training and Transition Airport	GA	1,575,000	1,774,087	49,500	3,398,587
X51	Homestead General Aviation Airport	GA	624,825	505,736	368,046	1,498,607
	District 6 Overall =		**8,082,575**	**10,335,141**	**7,528,838**	**25,946,554**

Figure II: PCI by Pavement Use by Airport

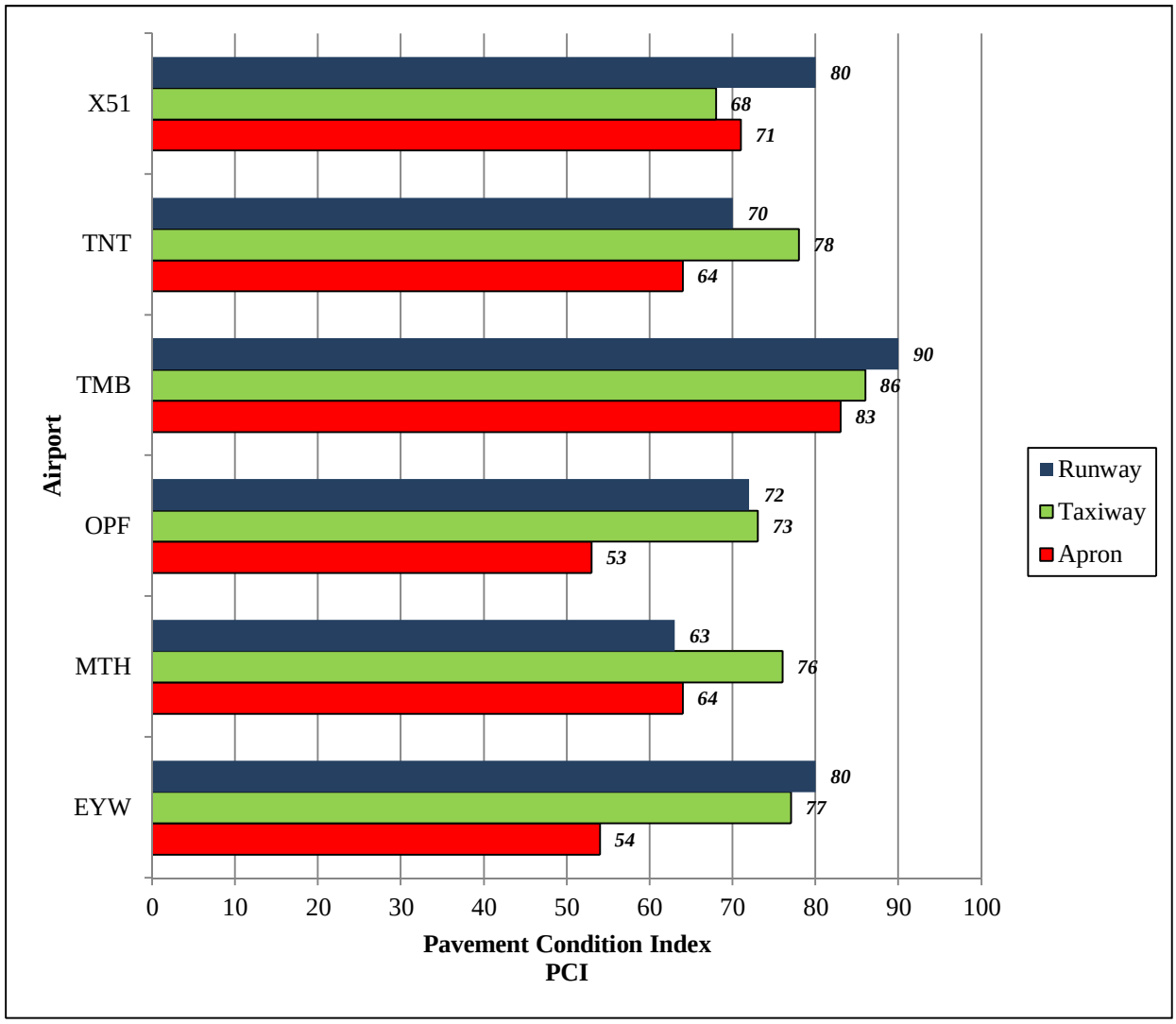
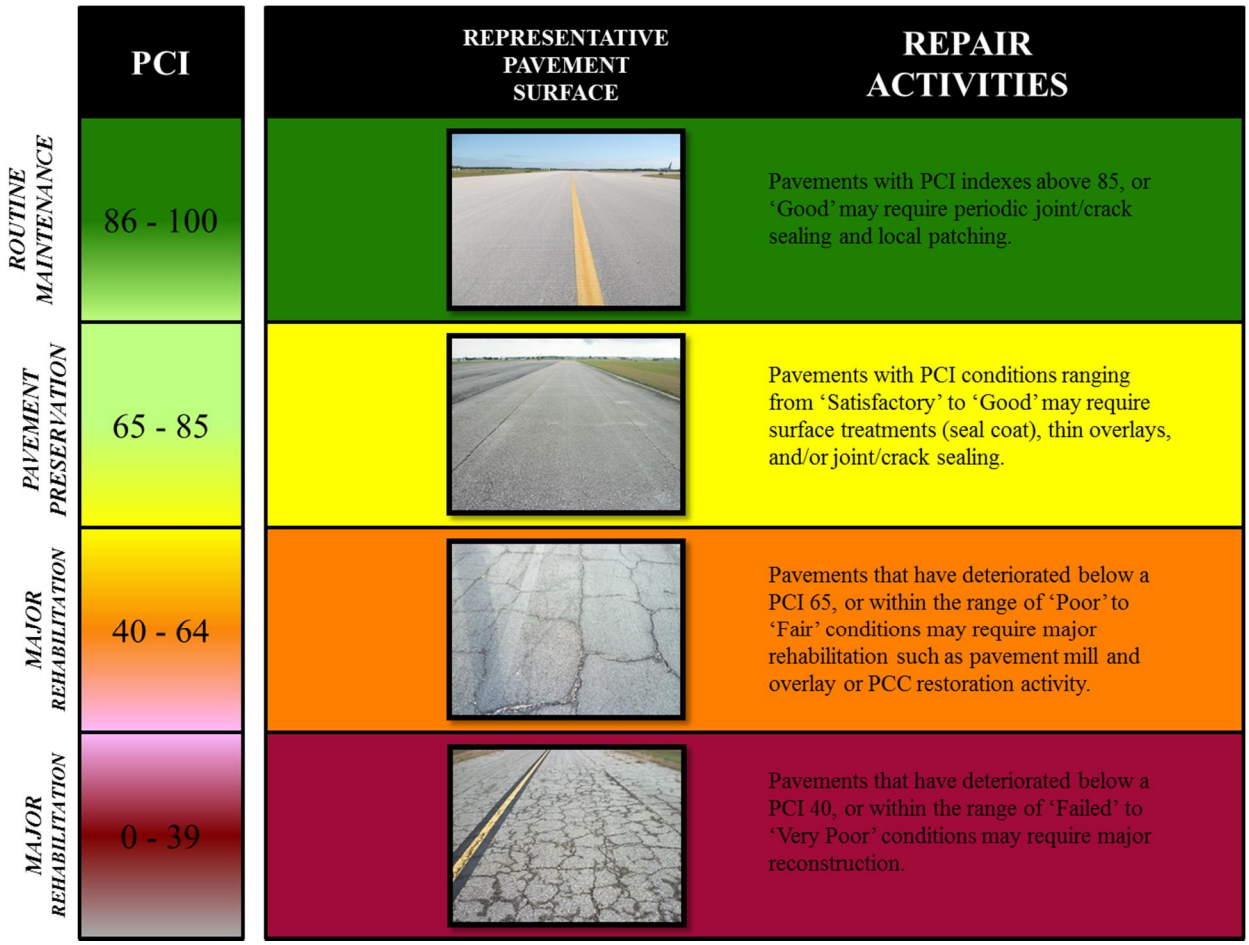


Figure III: Pictorial Representation of PCIs and Ratings below illustrates characteristic pavement surfaces associated with various ranges of PCIs and Ratings, along with typical repair activities for the PCI ranges.

Figure III: Pictorial Representation of PCIs and Ratings



The immediate major rehabilitation needs, or needs that have been programmed to be completed in the first year of the 10-year M&R plan based on an unlimited budget in District 6 are summarized in **Table IV: Summary of Immediate Major Rehabilitation Needs**.

Table IV: Summary of Immediate Major Rehabilitation Needs

FAA Identifier	Airport Name	Type	Current Average PCI	Current Condition Rating	Immediate Major Rehabilitation Need Costs
EYW	Key West International Airport	PR	67	Fair	$6,630,210.46
MTH	Florida Keys Marathon Airport	PR	67	Fair	$2,700,378.04
OPF	Opa-locka Executive Airport	RL	67	Fair	$22,796,445.66
TMB	Kendall-Tamiami Executive Airport	RL	86	Good	$2,862,892.13
TNT	Dade-Collier Training and Transition Airport	GA	74	Satisfactory	$640,597.54
X51	Homestead General Aviation Airport	GA	74	Satisfactory	$426,699.37
	District 6 Overall =		**73**	**Satisfactory**	**$36,057,223.20**

The identified major rehabilitation projects summarized above and further explained in each individual airport report have been determined based on the Critical Pavement Condition Index Criteria. The criteria establishes recommended minimum PCI values that pavement facilities should not deteriorate past based on facility use and airport type.

A forecast of major rehabilitation needs for a 10-year period was developed using an unlimited budget. The analysis identified ongoing maintenance needs and major rehabilitation during that interval. The resulting major rehabilitation needs, excluding maintenance needs, by airport are provided in **Table V: Summary of 10-Year Major Rehabilitation Costs by Airport** below.

Table V: Summary of 10-Year Major Rehabilitation Costs by Airport

FAA Identifier	Airport Name	Type	Current Average PCI	Current Condition Rating	10-Year Major Rehabilitation Need Cost
EYW	Key West International Airport	PR	67	Fair	$9,642,941.05
MTH	Florida Keys Marathon Airport	PR	67	Fair	$3,885,947.29
OPF	Opa-locka Executive Airport	RL	67	Fair	$37,430,425.04
TMB	Kendall-Tamiami Executive Airport	RL	86	Good	$3,538,614.77
TNT	Dade-Collier Training and Transition Airport	GA	74	Satisfactory	$8,073,463.26
X51	Homestead General Aviation Airport	GA	74	Satisfactory	$2,824,282.37
	District 6 Overall =		**73**	**Satisfactory**	**$65,395,673.78**

The development of the aforementioned costs is based on planning level assumptions with regards to the type of rehabilitation being performed. **Table VI: M&R Activities by Condition** summarizes the M&R activities based on PCI values, as established by the FDOT.

Table VI: M&R Activities by Condition

	Activity	PCI Trigger
Maintenance	Crack Sealing and Full-Depth Patching	90
		80
Rehabilitation	Mill and Overlay (AC) or Concrete Pavement Restoration (PCC)	70
		60
		50
		40
	Reconstruction	30
		20

It is important to state that design level efforts are necessary in determining the final rehabilitative construction activity.

1. INTRODUCTION

1.1 Project Background

The State of Florida has more than 100 public airports that are vital to the Florida economy as well as the economy of the United States. There are millions of square yards of pavement for the runways, taxiways, aprons and other areas of these airports that support aircraft operations. The timely and proper maintenance and rehabilitation of these pavements allows the airports to operate efficiently, economically and without excessive down time.

In order to support the planning, scheduling, and design of the M&R activities based on pavement evaluation and pavement management performance trends, the Florida Department of Transportation (FDOT) Aviation Office implemented the Statewide Airfield Pavement Management Program (SAPMP) in 1992.

In 2010, the FDOT Aviation Office selected a Consultant team consisting of Kimley-Horn and Associates, Inc. and their Subconsultants, AMEC, Penuel Consulting, LLC and All About Pavements, Inc., to provide services in support of FDOT in the continuing evaluation and updating of the existing SAPMP to be completed over fiscal years 2011 and 2012. Pavement condition surveys were performed for airside pavements for the following airports located in District 6:

- EYW – Key West International Airport
- MTH – Florida Keys Marathon Airport
- OPF – Opa-locka Executive Airport
- TMB – Kendall-Tamiami Executive Airport
- TNT – Dade-Collier Training and Transition Airport
- X51 – Homestead General Aviation Airport

Opa-locka West Airport (X46), located in northwestern Dade County, and Miami International Airport (MIA), which is managed by the Dade County Aviation Department, declined to participate in the FDOT SAPMP and therefore were not inspected as part of this update.

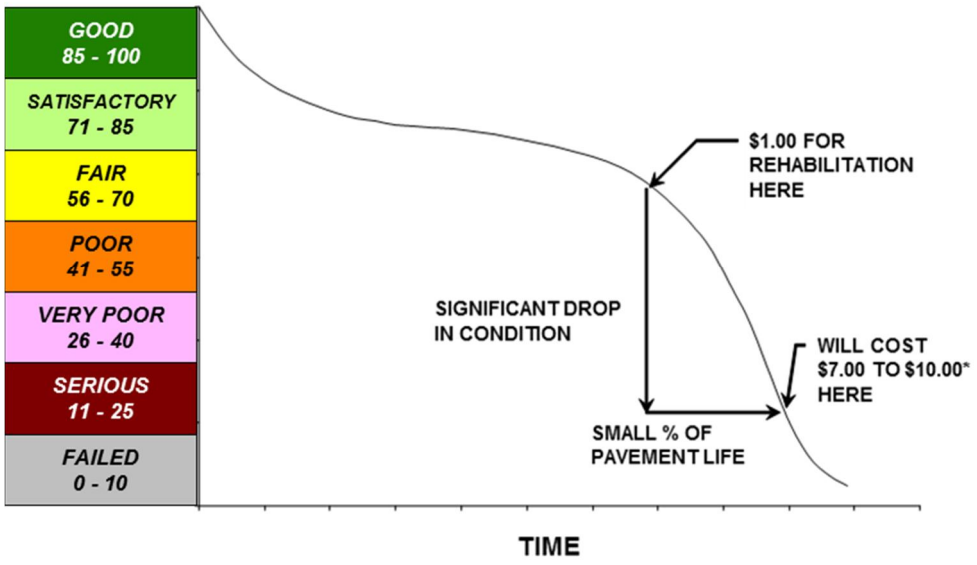
1.2 Purpose

The primary goal of the SAPMP update is to provide individual airports with pavement condition ratings as well as recommendations for immediate and long-term major rehabilitation on the basis of pavement condition. This approach is intended to focus pavement M&R in areas where the most urgent need is with the overall goal of minimizing costs by improving pavements before they deteriorate to a point where the cost to rehabilitate is increasing at a higher rate than would have been experienced if repaired earlier.

Figure 1-1: Pavement Life Cycle below, taken from FAA/AC 5380-7A "Airport Pavement Management Program", illustrates how a pavement generally deteriorates and the relative cost of rehabilitation at various times throughout its life. Note that during the first portion of a pavement's life, it performs relatively well. After that, however, it begins to deteriorate rapidly.

The number of years a pavement stays in "good" condition depends on how well it is maintained. As the illustration demonstrates, the cost of maintaining the pavement above a critical condition before rapid deterioration occurs is much less compared to maintaining pavements after substantial deterioration has occurred.

Figure 1-1: Pavement Life Cycle



Source: FAA/AC 150/5380-7A "Airport Pavement Management Program"
**Modified to reflect current construction costs.*

The inspections and analysis that were done were performed in accordance with the methods identified in ASTM D 5340-04 and in the FAA Advisory Circular 150/5380-6B to comply with the FAA Airport Improvement Program (AIP) requirements. The tasks required to achieve this objectives at each airport include:

- Obtain recent construction history from the Airport to update the Pavement Inventory CADD drawings and database from the previous SAPMP update;
- Perform a visual Pavement Condition Index (PCI) survey of the airfield pavements at the Airport;
- Update the MicroPAVER database to analyze the PCI field data and determine the current condition of the airfield pavements;
- Predict the future deterioration of the pavements using performance models based on condition data collected from current and previous inspections;
- Develop a 10-year M&R plan to address the pavement maintenance/rehabilitation needs;
- Estimate the anticipated costs associated with the suggested immediate and future M&R activities based on statewide average construction costs.

This document is intended to serve as a district summary of airport facility pavement condition and both immediate and long-term major rehabilitation based on needs for each airport. Furthermore, this document is intended to:

- Describe, briefly, the Florida Department of Transportation Aviation Office Statewide Airfield Pavement Management Program and the roles and responsibilities of the program's participants;
- Provide information on the pavement management principles, objectives, and methods used to update the existing program;
- Provide average results of the PCI survey at each airport based on pavement facility use, ranking, and type (i.e. Runway, Taxiway, Apron, Primary, Secondary, Tertiary, AC, AAC, APC, PCC, etc.);
- Provide the results of the M&R Analysis that identified both the immediate and 10-Year major rehabilitation project needs on an airport and district wide basis.

2. SYSTEM INVENTORY AND AIRPORT NETWORK DEFINITION DEVELOPMENT

2.1 System Inventory Update

A significant element to the development and update of the SAPMP has been to identify recent and anticipated construction activity that affects the pavement composition and performance. With cooperation from the airport facility personnel, the project team was able to gather airport specific information that included changes in pavement geometry, new or reconstructed pavements since the last inspection and anticipated pavement rehabilitation that would negate the findings of a visual inspection done in the short term. At the beginning of each phase for this update, FDOT SAPMP participants responded to the Aviation Office with project specific information on the recent and anticipated work. In addition to the construction activity, updates to pavement facility designators (i.e. re-designation, magnetic declination, and/or decommissioning) were reported.

This information was considered during the updating of pavement section areas on the individual airport Network Definition Map. The construction activity information provided by the airport is depicted on the System Inventory Update Map for each facility. This information was also included in the updates to the SAPMP specific MicroPAVER software database.

2.2 Network Definition Update

Based on the information identified in the System Inventory Map, the geometry of the Network Definition specific to the pavement area sections has been updated to reflect the changes. The purpose of developing pavement area sections is to track future pavement performance as well as to plan for future projects. The Network Definition Map categorically identifies pavement geometry, pavement composition, and sample identification. The updated areas by use for each airport are summarized in **Table 2-1: Summary of Area by Use by Airport**. **Figure 2-1: District Pavement Area by Use** below depicts the district pavement area by use, and **Figure 2-2: Pavement Area by Use by Airport** provides a breakdown of pavement area by usage at each airport.

Table 2-1: Summary of Area by Use by Airport

FAA Identifier	Airport Name	Type	Runway Area (SqFt)	Taxiway Area (SqFt)	Apron Area (SqFt)	Total Area (SqFt)
EYW	Key West International Airport	PR	480,000	419,295	845,040	1,744,335
MTH	Florida Keys Marathon Airport	PR	500,800	395,295	753,654	1,649,749
OPF	Opa-locka Executive Airport	RL	2,651,200	4,941,163	2,845,474	10,437,837
TMB	Kendall-Tamiami Executive Airport	RL	2,250,750	2,299,565	2,667,124	7,217,439
TNT	Dade-Collier Training and Transition Airport	GA	1,575,000	1,774,087	49,500	3,398,587
X51	Homestead General Aviation Airport	GA	624,825	505,736	368,046	1,498,607
	District 6 Overall =		**8,082,575**	**10,335,141**	**7,528,838**	**25,946,554**

Figure 2-1: District Pavement Area by Use

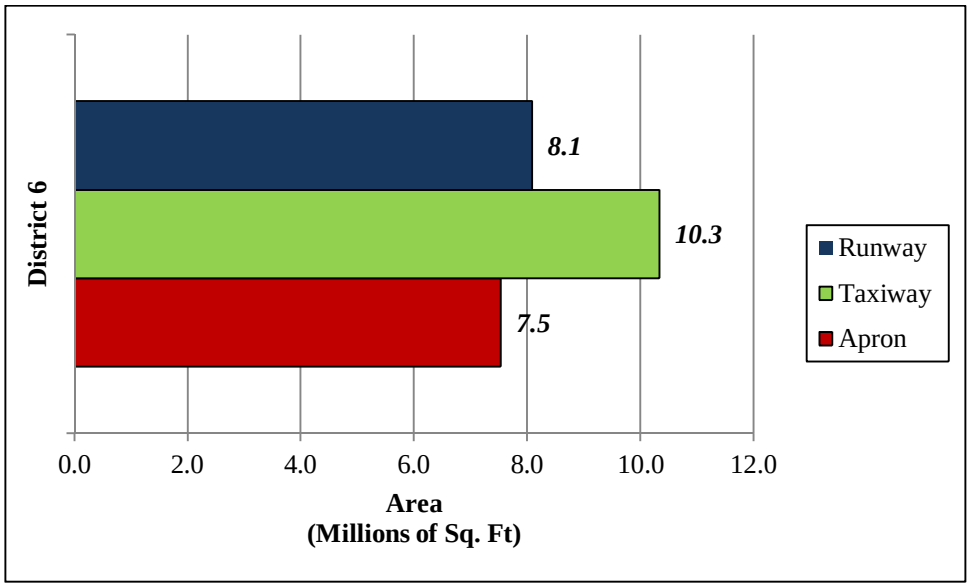
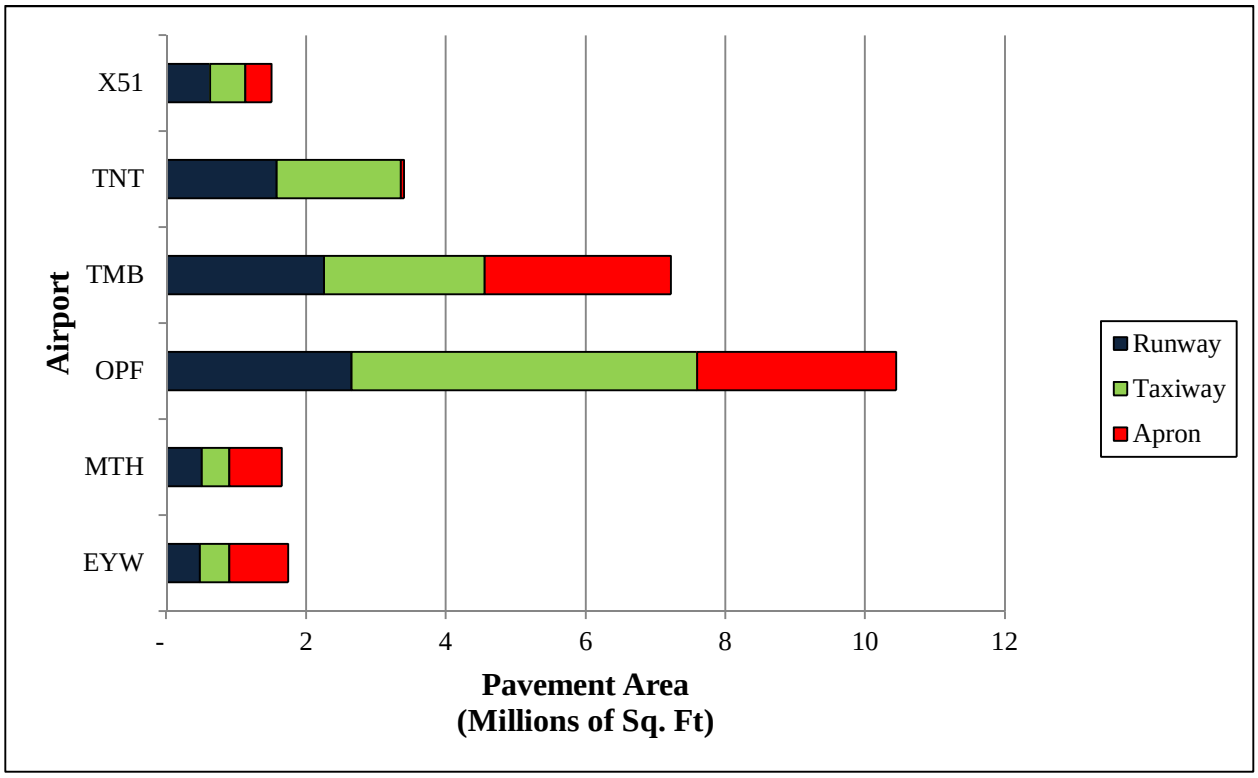


Figure 2-2: Pavement Area by Use by Airport



As part of this process, the individual airport network maps have been referenced in the State Plane Coordinate System. This update included the referencing of aerial imagery supplied by FDOT to the Network Definition Maps resulting in a GIS based navigation map for use on mobile GPS data collection units.

3. PAVEMENT EVALUATION

3.1 Pavement Condition Survey

The pavement condition survey was performed using the methods described in ASTM D 5340-04 and FAA Advisory Circular 150/5380-6B. These inspections were performed by a minimum of two inspection personnel that have undergone appropriate FDOT training, demonstrated adequate experience, and have been approved by AO-PM. The visual surveys were performed with significant coordination with airport personnel to ensure minimal impacts on airport operations while maintaining safety. When appropriate, pavement inspectors were escorted by authorized airport personnel.

The inspection of pavement facilities is limited to the identified sample units. The number of sample units inspected in each pavement section was determined to achieve a confidence level of representative distresses throughout the facility. The sampling rate used for the FDOT SAPMP is identified in **Table 3-1: Sampling Rate for FDOT Condition Surveys**.

Table 3-1: Sampling Rate for FDOT Condition Surveys

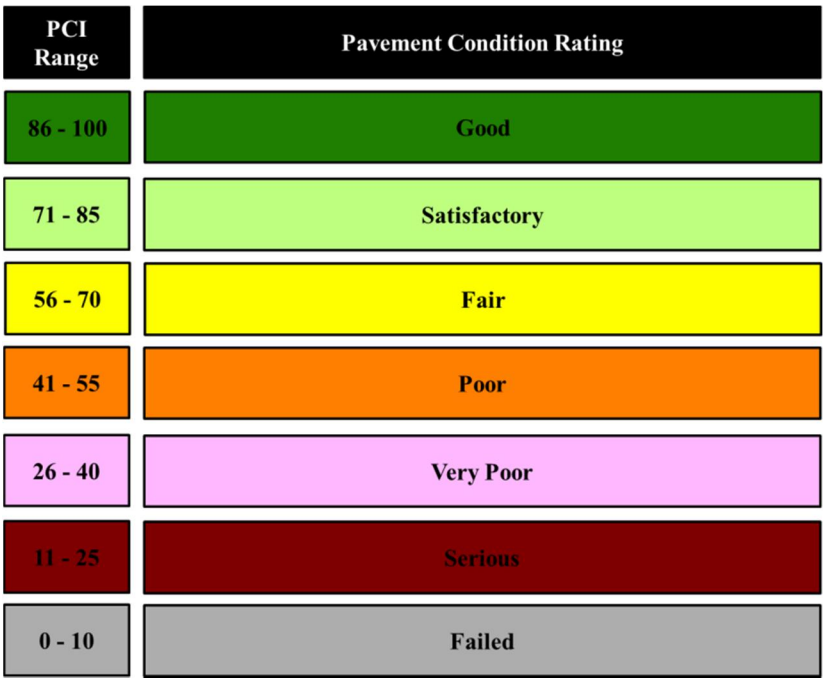
AC Pavements			PCC Pavements		
N	n		N	n	
	Runway	Others		Runway	Others
1-4	1	1	1-3	1	1
5-10	2	1	4-6	2	1
11-15	3	2	7-10	3	2
16-30	5	3	11-15	4	2
31-40	7	4	16-20	5	3
41-50	8	5	21-30	7	3
≥51	20% but ≤20	10% but ≤10	31-40	8	4
			41-50	10	5
			≥51	20% but ≤20	10% but ≤10

Where *N = total number of sample units in Section*
n = number of sample units to inspect

3.2 Pavement Condition Summary

The pavement condition results from each airport have been developed by analyzing the specific pavement distresses using U.S. Army Corp of Engineers CERL MicroPAVER 5.2.4 software. In adherence to the ASTM D 5340-04, the pavement condition index ranges from 100 to 0 with corresponding condition ratings of “Good” to “Failed”, respectively**. Figure 3-1: PCI Rating Scale** depicts the standard index with the corresponding condition ratings and color identification used for this program update.

Figure 3-1: PCI Rating Scale



District 6's overall PCI is at a 73, which corresponds to a 'Satisfactory' condition. **Table 3-2: Condition Summary by Airport** below represents the results of the PCI inspection at each airport within the District. Specific individual airport results are identified in each individual airport report.

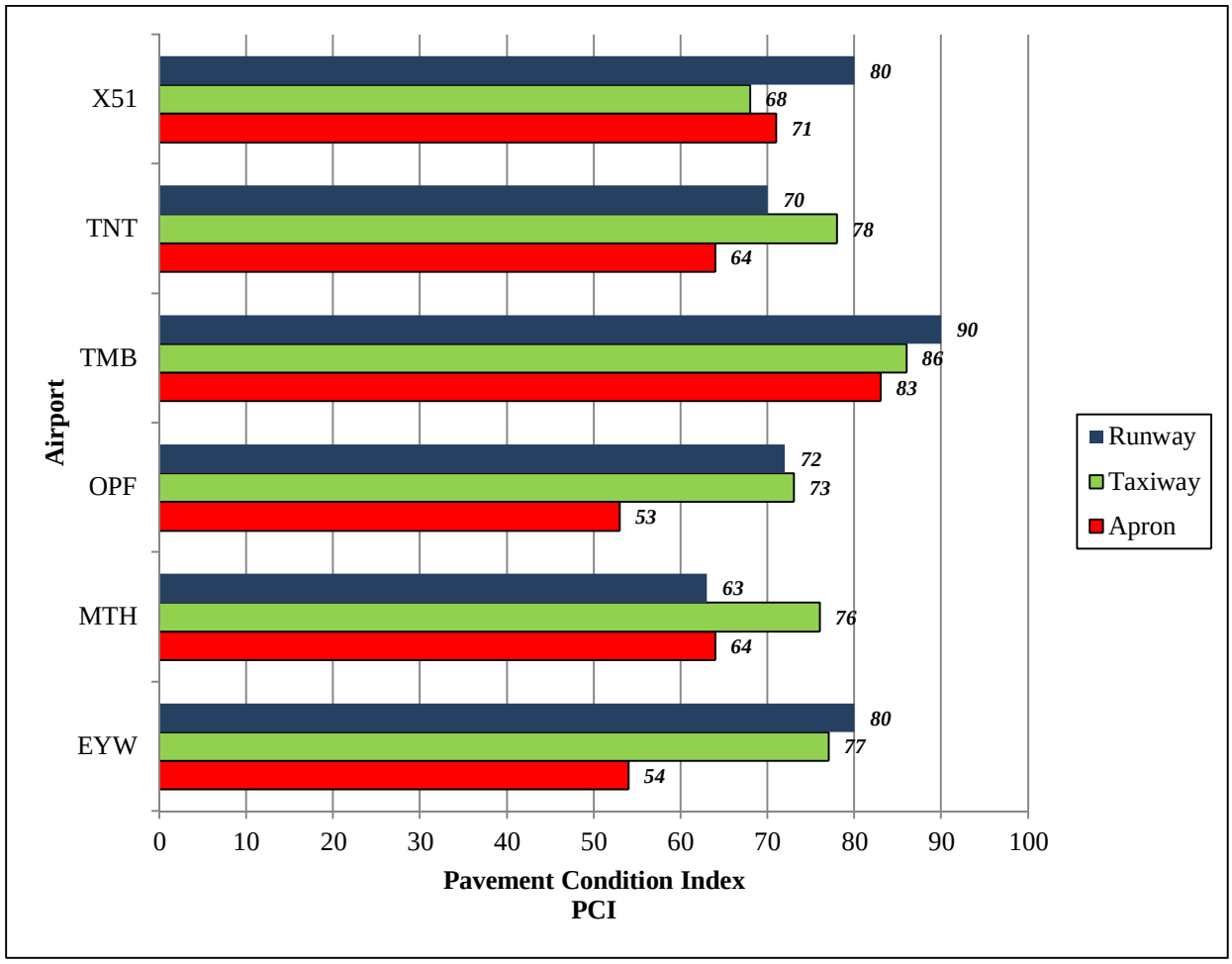
Table 3-2: Condition Summary by Airport

FAA Identifier	Airport Name	Type	Runway PCI	Taxiway PCI	Apron PCI	Overall PCI	Overall Condition Rating
EYW	Key West International Airport	PR	80	77	54	67	Fair
MTH	Florida Keys Marathon Airport	PR	63	76	64	67	Fair
OPF	Opa-locka Executive Airport	RL	72	73	53	67	Fair
TMB	Kendall-Tamiami Executive Airport	RL	90	86	83	86	Good
TNT	Dade-Collier Training and Transition Airport	GA	70	78	64	74	Satisfactory
X51	Homestead General Aviation Airport	GA	80	68	71	74	Satisfactory
	District 6 Overall =		**76**	**76**	**65**	**73**	**Satisfactory**

Pavement use has an influence on the pavement condition of each facility. For example, the amount and type of distresses observed on a primary runway can vary from a maintenance apron

based on frequency and variety of traffic loads experienced. **Figure 3-2: PCI by Pavement Use by Airport** graphically shows the PCI for each pavement use at each airport within the District.

Figure 3-2: PCI by Pavement Use by Airport



A summary of the area-weighted PCI for each pavement use for all pavements throughout the District are shown below in **Figure 3-3: PCI by Pavement Use**.

Figure 3-3: PCI by Pavement Use

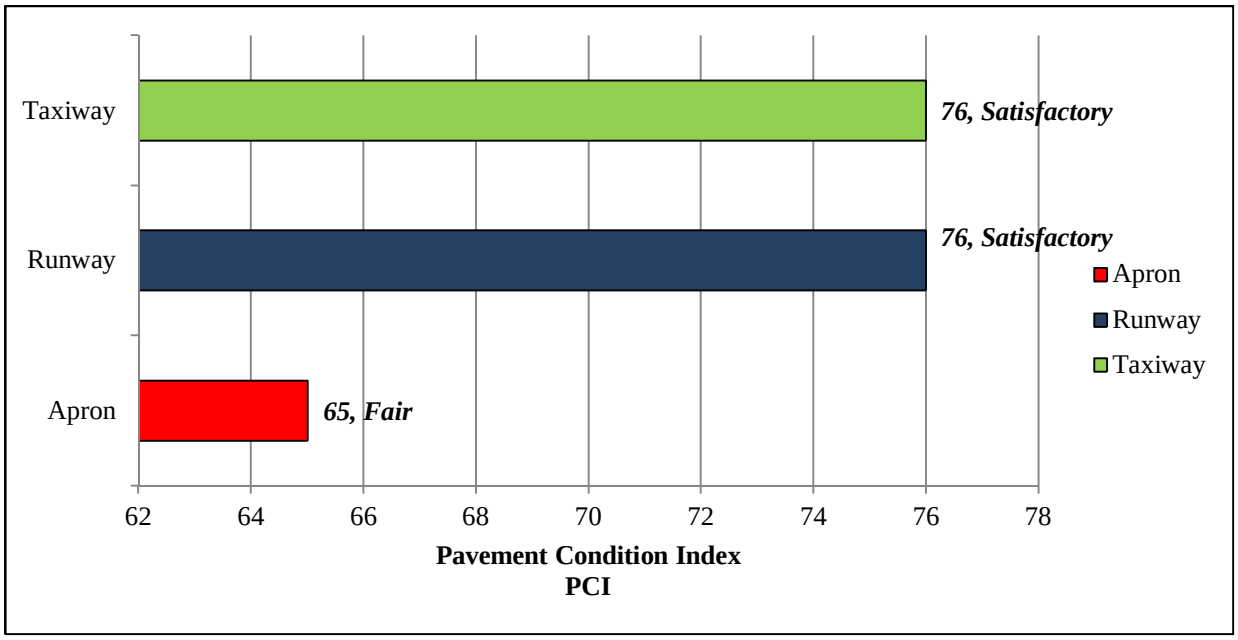
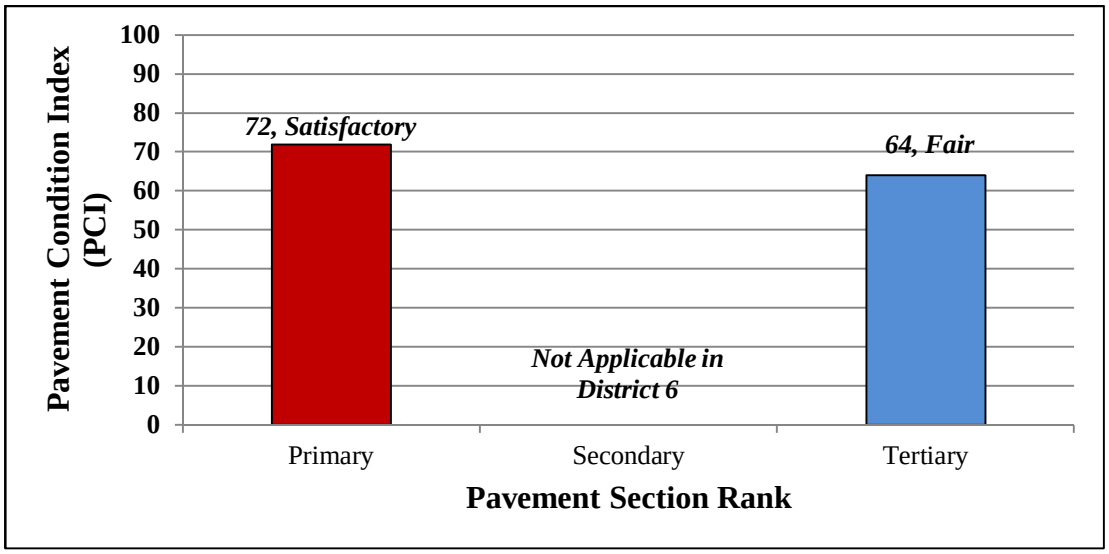


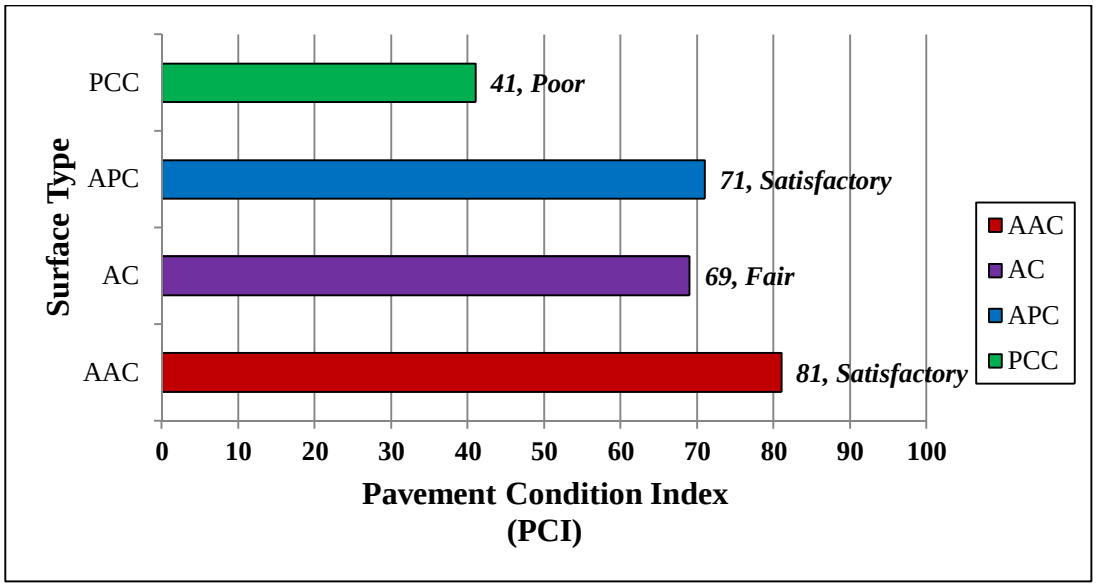
Figure 3-4: PCI by Pavement Rank below illustrates the area-weighted PCI within the District for Primary, Secondary and Tertiary pavements. The pavement facility ranking was established during the 1998/1999 survey and has been updated based on airport feedback. Primary pavements are considered to be of highest importance, examples include a primary runway and its parallel taxiway. Secondary pavements examples include a secondary crosswind runway and its parallel taxiway. Tertiary pavements examples can be active aprons such as a maintenance area or a non-active aircraft equipment storage apron.

Figure 3-4: PCI by Pavement Rank



Pavement facility surface types include four common types of pavement: Portland cement concrete (PCC), asphalt concrete overlaid on Portland cement concrete (APC), asphalt concrete (AC), and asphalt concrete overlay on asphalt concrete (AAC). **Figure 3-5: PCI by Surface Type** summarizes the PCI based on the various pavement types within the District. Whitetopping, a pavement type that consists of a thin concrete overlay on an asphalt concrete pavement does exist at several airports in the Florida Airport System. However, it does not exist at any airports in District 6.

Figure 3-5: PCI by Surface Type



4. MICROPAVER ANALYSIS

4.1 Performance Modeling

A significant benefit of consolidating Florida's Airport System's pavement infrastructure within the FDOT SAPMP is the large amount of pavement condition data recorded using consistent methods of measurement. The historic pavement condition, or performance trend, has been compiled throughout the entire State system since the inception of the SAPMP and is used in the development of Performance Models. These models have been categorically arranged and developed to predict the future conditions of pavements based on Florida's specific characteristics of climate, construction materials, and operations. Each model has been developed based on the following criteria:

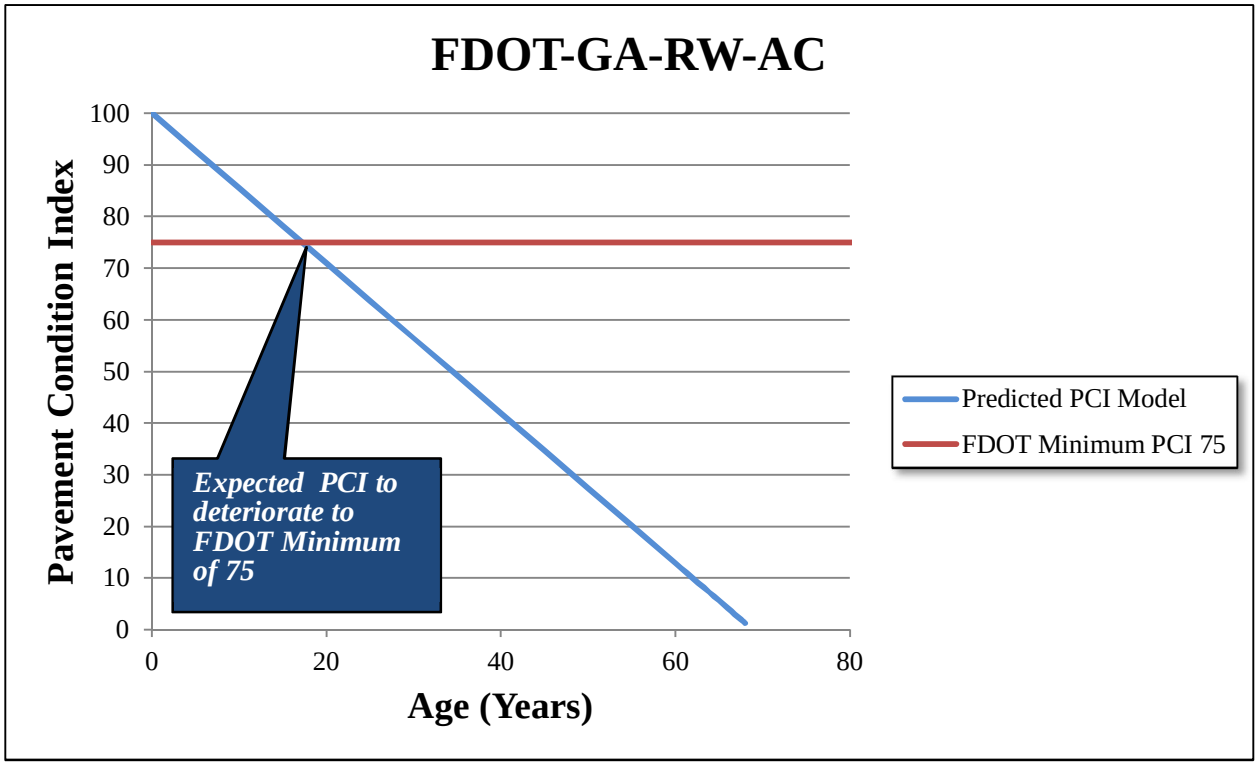
AIRPORT TYPE (Primary, Regional Reliever, or General Aviation)

> FACILITY USE (Runway, Taxiway, or Apron)

>>FACILITY SURFACE TYPE (AC, AAC, APC, or PCC)

The following figure, **Figure 4-1: Example Performance Model**, represents the condition data collected for all participating General Aviation airport runways constructed of AC pavement. The approximate deterioration observed for these pavement types, excluding outliers, is about 1.5 PCI points per year. Appropriate curves have been developed for the identified airport types, facility use, and pavement material.

Figure 4-1: Example Performance Model: FDOT-GA-RW-AC



The historic trends of pavement performance at Florida airport facilities for all performance models are consolidated within the program database. This information is utilized in the prediction of pavement performance based on the current PCI determined from the inspections that took place between 2011 and 2012. Major rehabilitation is planned based on the predicted PCI. The intent of this for both the individual airport and the District to be aware of anticipated rehabilitation work based on condition.

4.2 Maintenance Policies

FDOT utilizes the distress data collected to estimate maintenance work efforts for pavement area sections that would benefit from this work, specifically sections with a PCI ranging from 65 to 100. Examples of maintenance work include crack sealing, area patching, seal coat applications, and other routine maintenance efforts that typically can be performed in a short time frame by airport maintenance personnel. This maintenance, or repair-type activity, is intended to preserve and extend pavement condition above the critical condition.

Table 4-1: Routine Maintenance Activities for Airfields provides the list of the maintenance activities used in MicroPAVER to treat specific distress types based on the FDOT Distress Repair and Maintenance Manual. MicroPAVER applies repairs to these distresses and adjusts the PCI based on specific rules. These repairs are used only in the first year of an analysis.

Table 4-1: Routine Maintenance Activities for Airfield Pavements

Surface	Distress	Severity*	Work Type	MicroPAVER Code	Work Unit
Asphalt Concrete Pavement	Alligator Crack	M, H	Patching - AC Deep	PA-AD	SqFt
	Bleeding	N/A	No Localized M&R	NONE	N/A
	Block Crack	M, H	Crack Sealing – AC	CS-AC	SqFt
	Corrugation	L, M, H	Patching - AC Deep	PA-AD	SqFt
	Depression	M, H	Patching - AC Deep	PA-AD	SqFt
	Jet Blast	N/A	Patching - AC Deep	PA-AD	SqFt
	Joint Ref. Crack	M, H	Crack Sealing – AC	CS-AC	Ft
	L & T Crack	M, H	Crack Sealing – AC	CS-AC	Ft
	Oil Spillage	N/A	Patching - AC Shallow	PA-AS	SqFt
	Patching	M, H	Patching - AC Deep	PA-AD	SqFt
	Polished Agg.	N/A	No Localized M&R	NONE	N/A
	Raveling / Weathering	L	Surface Sealing - Rejuvenating	SS-RE	SqFt
		M	Surface Seal - Coal Tar	SS-CT	SqFt
		H	Microsurfacing	MI-AC	SqFt
	Rutting	M, H	Patching - AC Deep	PA-AD	SqFt
	Shoving	M, H	Grinding (Localized)	GR-LL	SqFt
	Slippage Crack	N/A	Patching - AC Shallow	PA-AS	SqFt
	Swelling	M, H	Patching - AC Deep	PA-AD	SqFt
Portland Cement Concrete Pavement	Blow-Up	L, M, H	Patching - PCC Full Depth	PA-PF	SqFt
	Corner Break	M, H	Patching - PCC Full Depth	PA-PF	SqFt
	Linear Crack	M, H	Crack Sealing – PCC	CS-PC	Ft
	Durability Crack	H	Slab Replacement – PCC	SL-PC	SqFt
		M	Patching - PCC Full Depth	PA-PF	SqFt
	Jt. Seal Damage	M, H	Joint Seal (Localized)	JS-LC	Ft
	Small Patch	M, H	Patching - PCC Partial Depth	PA-PP	SqFt
	Large Patch	M, H	Patching - PCC Full Depth	PA-PF	SqFt
	Popouts	N/A	No Localized M&R	NONE	N/A
	Pumping	N/A	No Localized M&R	NONE	N/A
	Scaling	H	Slab Replacement – PCC	SL-PC	SqFt
	Faulting	M, H	Grinding (Localized)	GR-PP	Ft
	Shattered Slab	M, H	Slab Replacement – PCC	SL-PC	SqFt
	Shrinkage Crack	N/A	No Localized M&R	NONE	N/A
	Joint Spall	M, H	Patching - PCC Partial Depth	PA-PP	SqFt
	Corner Spall	M, H	Patching - PCC Partial Depth	PA-PP	SqFt

*L = Low, M = Medium, H = High

4.3 Major Rehabilitation Planning

Major rehabilitation is warranted when the pavement condition decreases below a critical point such that the deterioration is extensive or the rate of deterioration is so great that routine maintenance is no longer cost-efficient. This critical point is called "Critical PCI." The critical PCI levels for different pavement and branch types established in the previous SAPMP update were used in this update for the development of the Major M&R plan for the airports. Sections

above critical PCI levels receive routine maintenances while pavements predicted to deteriorate below their respective critical PCI level during the analysis period will be identified for Major M&R. Appendix B identifies the Cost by Condition and Critical PCI used in the development of major rehabilitation. **Table 4-2: M&R Activities by Condition** summarizes the M&R activities based on PCI values, as established by the FDOT.

Table 4-2: M&R Activities by Condition

	Activity	PCI Trigger
Maintenance	Crack Sealing and Full-Depth Patching	90
		80
Rehabilitation	Mill and Overlay (AC) or Concrete Pavement Restoration (PCC)	70
		60
		50
		40
	Reconstruction	30
		20

Special consideration is given to pavements that exhibit a significant amount of structural distresses while maintaining a PCI above the critical condition. The presence of structural distresses may be attributed to the greater fatigue load being applied to the pavement than the original design capacity. Therefore in certain situations, pavement area sections may be triggered for work due to structural distresses found rather than solely based on PCI values determined.

4.4 Budget Analysis Approach

The scope of this update was to identify the overall work required for major rehabilitation using comparative costs based on the condition survey and predicted pavement performance. As mentioned previously, the criteria for major rehabilitation is based on the MicroPAVER set critical PCI of 65. From the previous SAPMP updates, FDOT has developed desired minimum PCI values based on the airport type and facility use, which are shown in **Table 4-3: FDOT Minimum Service Levels.** The rehabilitation activity identified is based on the critical PCI of 65.

Table 4-3: FDOT Minimum Service Levels

Use	FDOT Minimum PCI		
	GA	RL	PR
Runway	75	75	75
Taxiway	65	65	70
Apron	60	65	65

The development of major rehabilitation work expressed in the individual airport reports was based on an 'unlimited budget' or unconstrained budget scenario. This scenario was selected in particular as a means to identify project activity based on the condition need. This information is intended to be used as a planning tool to determine project selection based on airport priority, facility use, and traffic demand, among other factors.

The major rehabilitation costs of the projects identified are determined using a cost scale range based on the PCI of the pavement area sections. The cost study performed for pavement work such as mill and overlay and reconstruction identified varying costs based on airport type. The schedule of costs used for the major rehabilitation is referenced in Appendix B.

4.5 Immediate Major Rehabilitation Need

Based on the condition surveys performed in 2011 and 2012, major rehabilitation has been identified for pavement area sections that resulted in a current condition below 65. The following table, **Table 4-4: Summary of Immediate Major Rehabilitation Needs**, identifies the immediate major rehabilitation need for each airport under the unlimited funding scenario. The breakdown of these costs on an individual airport basis can be found in Appendix C.

Table 4-4: Summary of Immediate Major Rehabilitation Needs

FAA Identifier	Airport Name	Type	Current Average PCI	Current Condition Rating	Immediate Major Rehabilitation Need Costs
EYW	Key West International Airport	PR	67	Fair	$6,630,210.46
MTH	Florida Keys Marathon Airport	PR	67	Fair	$2,700,378.04
OPF	Opa-locka Executive Airport	RL	67	Fair	$22,796,445.66
TMB	Kendall-Tamiami Executive Airport	RL	86	Good	$2,862,892.13
TNT	Dade-Collier Training and Transition Airport	GA	74	Satisfactory	$640,597.54
X51	Homestead General Aviation Airport	GA	74	Satisfactory	$426,699.37
	District 6 Overall =		**73**	**Satisfactory**	**$36,057,223.20**

4.6 10-Year Major Rehabilitation Program

Based on the condition surveys performed in 2011 and 2012 and the predicted pavement condition using the performance models, major rehabilitation has been identified for additional pavement area sections that are expected to reach a condition below 65 in the next 10 years. **Table 4-5: Summary of 10-Year Major Rehabilitation Costs by Airport** below identifies the major rehabilitation need for each airport over a program period of 10 years assuming an unlimited budget. It includes the immediate needs identified in **Table 4-4: Summary of Immediate Major Rehabilitation Needs**.

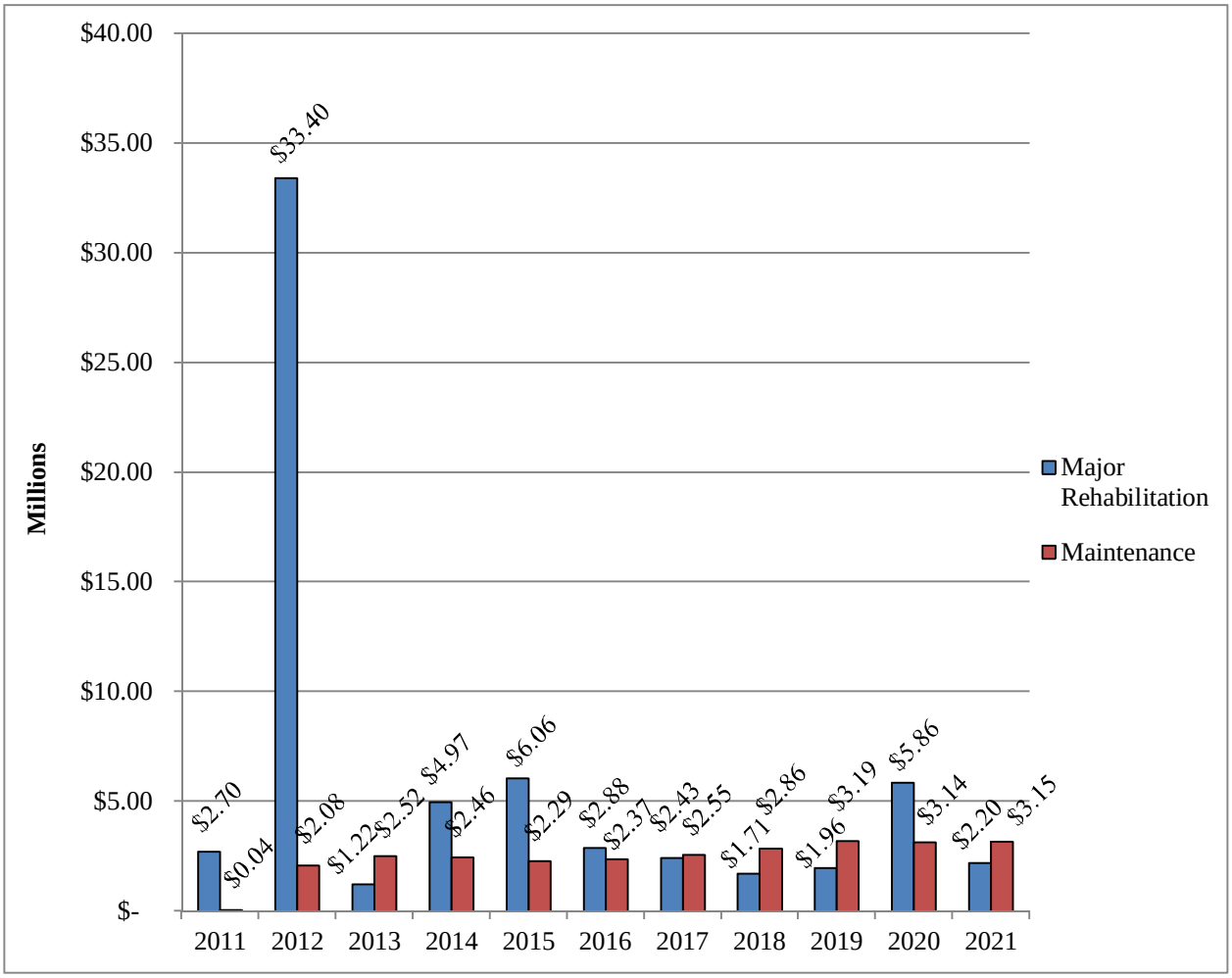
The breakdown of these costs on an individual airport basis can be found in Appendix C.

Table 4-5: Summary of 10-Year Major Rehabilitation Costs by Airport

FAA Identifier	Airport Name	Type	Current Average PCI	Current Condition Rating	10-Year Major Rehabilitation Need Cost
EYW	Key West International Airport	PR	67	Fair	$9,642,941.05
MTH	Florida Keys Marathon Airport	PR	67	Fair	$3,885,947.29
OPF	Opa-locka Executive Airport	RL	67	Fair	$37,430,425.04
TMB	Kendall-Tamiami Executive Airport	RL	86	Good	$3,538,614.77
TNT	Dade-Collier Training and Transition Airport	GA	74	Satisfactory	$8,073,463.26
X51	Homestead General Aviation Airport	GA	74	Satisfactory	$2,824,282.37
	District 6 Overall =		**73**	**Satisfactory**	**$65,395,673.78**

Figure 4-2: Summary of 10-Year Major Rehabilitation and Maintenance Costs by Plan Year depicts the 10-year major rehabilitation and maintenance needs under an unlimited funding scenario for all airports in District 6 by plan year.

Figure 4-2: Summary of 10-Year Major Rehabilitation and Maintenance Costs by Plan Year



Tables 4-6 and **4-7** below list the major rehabilitation costs and maintenance needs costs, respectively, by airport for each plan year.

Table 4-6: 10-Year Major Rehabilitation Costs by Airport by Year

FAA Identifier	Type	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
EYW	PR	n/a	$6,630,210.46	$0.00	$0.00	$0.00	$76,734.75	$0.00	$206,073.19	$894,933.77	$1,556,186.14	$278,802.74	$9,642,941.05
MTH	PR	$2,700,378.04	$47,980.81	$0.00	$686,870.35	$0.00	$75,053.40	$0.00	$363,900.40	$0.00	$11,764.29	n/a	$3,885,947.29
OPF	RL	n/a	$22,796,445.65	$1,028,133.32	$3,796,021.33	$1,164,427.18	$2,696,341.72	$1,012,185.30	$553,458.12	$981,064.93	$2,125,950.49	$1,276,397.00	$37,430,425.04
TMB	RL	n/a	$2,862,892.13	$119,608.70	$189,216.97	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$366,896.97	$3,538,614.77
TNT	GA	n/a	$640,597.54	$0.00	$293,675.75	$2,984,293.91	$33,346.98	$1,416,865.66	$269,552.81	$21,294.15	$2,162,749.43	$251,087.03	$8,073,463.26
X51	GA	n/a	$426,699.36	$75,518.68	$0.00	$1,911,085.24	$0.00	$0.00	$320,420.03	$64,690.22	$2,806.54	$23,062.30	$2,824,282.37
Annual Total =		***$2,700,378.04***	***$33,404,825.95***	***$1,223,260.70***	***$4,965,784.40***	***$6,059,806.33***	***$2,881,476.85***	***$2,429,050.96***	***$1,713,404.55***	***$1,961,983.07***	***$5,859,456.89***	***$2,196,246.04***	***$65,395,673.78***

Table 4-7: 10-Year Maintenance Costs by Airport by Year

FAA Identifier	Type	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
EYW	PR	n/a	$28,938.36	$126,432.03	$151,377.10	$177,281.55	$198,474.16	$238,104.12	$267,835.09	$243,381.45	$168,273.57	$178,394.33	$1,778,491.76
MTH	PR	$39,207.05	$141,416.66	$158,944.78	$107,181.30	$133,508.16	$155,238.33	$189,897.55	$180,579.25	$215,631.59	$251,190.09	n/a	$1,572,794.76
OPF	RL	n/a	$761,285.17	$1,119,752.65	$897,878.49	$909,548.73	$761,375.15	$781,345.04	$909,316.91	$1,003,431.27	$995,945.04	$1,068,846.32	$9,208,724.77
TMB	RL	n/a	$227,635.95	$317,033.06	$442,042.84	$580,827.62	$723,255.67	$883,425.04	$1,036,746.05	$1,206,371.41	$1,384,189.92	$1,518,954.53	$8,320,482.09
TNT	GA	n/a	$665,866.87	$564,025.87	$611,402.34	$395,453.64	$427,881.02	$335,666.32	$357,467.48	$405,876.77	$206,992.89	$236,858.50	$4,207,491.70
X51	GA	n/a	$253,422.07	$228,914.20	$251,694.64	$91,588.93	$104,444.93	$123,407.78	$105,068.66	$118,143.41	$134,059.65	$151,130.62	$1,561,874.89
Annual Total =		***$39,207.05***	***$2,078,565.08***	***$2,515,102.59***	***$2,461,576.71***	***$2,288,208.63***	***$2,370,669.26***	***$2,551,845.85***	***$2,857,013.44***	***$3,192,835.90***	***$3,140,651.16***	***$3,154,184.30***	***$26,649,859.97***

5. CONCLUSION

The FDOT Aviation Office has updated the Statewide Airfield Pavement Management Program through the pavement condition surveys performed at each participating airport and preparation of M&R planning information in compliance with the FAA Advisory Circular 150/5380-6B. MicroPAVER software was utilized to determine pavement conditions in accordance with ASTM D 5340-04 and develop maintenance and rehabilitation policies consistent with the FDOT Aviation Office policies. These policies were used to identify pavement rehabilitation projects based on the condition of the pavement over a 10-year period that are detailed in the individual airport reports and in Appendix C.

This study was focused on identifying current pavement condition and using a condition based tool to assist in the evaluation of pavement performance and identify and prioritize maintenance and rehabilitation needs and costs to maximize useful pavement life. The methods used to determine pavement condition for this program update, as with previous updates, have been performed in accordance with ASTM D 5340-04. The process is intended to provide airport sponsors with guidance in planning pavement maintenance and rehabilitation projects and funding agencies with planning tools for allocation of funds.

A detailed breakdown of pavement condition for each airport is included in Appendix C. As can be seen in this report and by comparing pavement conditions on an airport by airport basis, there is a wide variation in pavement conditions between airports. Recommended major rehabilitation recommendations for each airport are also included in Appendix C. High priority runway projects, based on pavement conditions below the FDOT recommended minimum service level PCI of 75, which the District should consider as immediate needs are listed below. These are not all the needs at each airport in the District and may not be the individual airport's priority, but should be considered in development of funding programs.

MTH – Florida Keys Marathon Airport

- **Runway 7-25, pavement mill and overlay $1.20M**

OPF – Opa-locka Executive Airport

- **Runway 12-30, pavement mill and overlay $1.85M**
- **Runway 9L-27R, pavement mill and overlay $1.98M**

APPENDIX A

GLOSSARY OF TERMS

Glossary

Aviation Office - The Aviation Office is charged with responsibility for promoting the safe development of aviation to serve the people of the State of Florida. The Aviation Office Program Manager (AO-PM) has review and approval authority for each program task of the SAPMP.

Branch - A Branch designates pavements that have common usage and functionality, such as an entire runway, taxiway, or apron.

Category - The Category classifies the airport according to the type and volume of aircraft traffic, as follows:

- GA – for general aviation or community airports;
- RL – for regional relievers or small hubs;
- PR – for primary (certified under Part 139 requirements).

Critical PCI - The PCI value considered to be the threshold for M&R decisions. PCI above the Critical generate economical activities expected to preserve and prolong acceptable condition. M&R for PCI values less than Critical make sense only for reasons of safety or to maintain a pavement in operable condition. A pavement section is expected to deteriorate very quickly once it reaches the Critical PCI and the unit cost of repair increases significantly.

Distress Type - A distress type is a defined visible defect in pavement evidenced by cracking, vertical displacement or deterioration of material. In PCI technology, 16 distinct distress types for asphalt surfaced and 15 for Portland Cement Concrete surfaced pavements have been described and rated according to the impact their presence has on pavement condition.

Florida DOT (FDOT) - Florida Department of Transportation was represented in this project by the Office of Aviation.

Localized M&R (Maintenance and Repair) - Localized M&R is a temporizing activity performed on existing pavement to extend its serviceability and/or to improve rideability. Localized M&R can be applied either as a safety (stop-gap) measure or preventive measure. Common localized maintenance methods include crack sealing, joint sealing, and patching.

Major M&R (e.g. Rehabilitation) - Activities performed over the entire area of a pavement Section that are intended to restore and/or maintain serviceability. This includes asphalt overlays, milling and replacing asphalt pavement, reconstruction with asphalt, reconstruction with Portland Cement Concrete (PCC) pavements, and PCC overlays.

MicroPAVER - A commercially available software subsidized by FAA and agencies in the US Department of Defense developed to support engineered management of pavement assets using a condition based approach. This software has the functionality such that, if properly implemented, maintained, and operated, it meets the pavement management program requirements described by the FAA in Advisory Circular 150/5380-7A.

Minimum Condition Level - A threshold PCI value established by FDOT to represent the targeted minimum pavement condition that is desirable in the Florida Airport System. These values were established with consideration of pavement function and airport type. For instance, runways have higher minimum condition levels than aprons, and Primary airports have higher minimum condition levels than General Aviation airports.

Glossary (Continued)

Network Definition - A Network Definition is a Computer-Aided Drafting & Design (CADD) drawing which shows the airport pavement outline with Branch and Section boundaries. This drawing also includes the PCI sample units and is used to identify those sample units to be surveyed, i.e. the sampling plan. The Network Definition for the airport is in Appendix A along with a table of inventory data.

Pavement Condition Index (PCI) - The Pavement Condition Index is a number which represents the condition of a pavement segment at a specific point in time. It is based on visual identification and measurement of specific distress types commonly found in pavement which has been in service for a period of time. The definitions and procedures for determining the PCI are found in ASTM D 5340, published by ASTM International.

Pavement Evaluation - A systematic approach undertaken by trained and experienced personnel intended for determination of the condition, serviceability, and best corrective action for pavement. Techniques to standardize pavement evaluation include the Pavement Condition Index procedures.

Pavement Management System (PMS) - A Pavement Management System is a broad function that uses pavement evaluation and pavement performance trends as a basis for planning, programming, financing, and maintaining a pavement system.

Pavement Surface Type - The surface of pavement is identified as one of four types:

- AC – for asphalt surface pavements;
- PCC – for Portland Cement Concrete pavements;
- AAC – for asphalt surface pavements that have had an asphalt overlay at some point in their construction history;
- APC – for composite pavements, which consist of asphalt over Portland Cement Concrete pavement.
- PAC – for composite pavements, which consist of Portland Cement Concrete over asphalt pavement.

Rank - Pavement rank in MicroPAVER determines the priority to be assigned to a pavement Section when developing an M&R plan. Pavement Sections are ranked as follows according to their use:

- P – for Primary pavements, such as primary runways, primary taxiways, and primary aprons;
- S – or Secondary pavements, such as secondary runways, secondary taxiways, and secondary aprons;
- T – for Tertiary pavements such as “T” hangars and slightly used aprons.

Reconstruction - Reconstruction includes removal of existing pavement, preparation of subgrade, and construction of new pavement with new or recycled materials. Reconstruction is indicated when distress types evident at the surface indicate failure in the pavement structure or subgrade of a type, and to an extent, not correctable by less extensive construction.

Glossary (Continued)

Rehabilitation - Rehabilitation represents construction using existing pavement for a foundation. Rehabilitation most commonly consists of an overlay of existing pavement with a new asphalt or concrete surface. Recently, technology has expanded the options to include recycling of existing pavement and incorporating engineering fabrics or thin layers of elasticized materials to retard reflection of distress types through the new surface.

Sample Unit - Uniformly sized portions of a Section as defined in ASTM D 5340. Sample units are a means to reduce the total amount of pavement actually surveyed using statistics to select and survey enough area to provide a representative measure of Section PCI. Sample Unit sizes are 5,000 ± 2,000 square feet for AC-surfaced pavements and 20 ± 8 slabs for PCC-surfaced pavements.

Section - Sections subdivide Branches into portions of similar pavement. Sections are prescribed by pavement structure, age, condition, and use. Sections are identified on the airport Network Definition. They are the smallest unit used for determining M&R requirements based on condition.

Statewide Airfield Pavement Management Program (SAPMP) – The Statewide Airfield Pavement Management Program is a program implemented in 1992 by the Florida Department of Transportation to plan, schedule, and design the maintenance and rehabilitation activities necessary for the airfield pavement on Florida's public airports to allow the airports to operate efficiently, economically, and without excessive down time.

System Inventory - A System Inventory is a Computer-Aided Drafting & Design (CADD) drawing which shows the airport pavement outline and identifies airfield construction activities since the last inspection. The System Inventory for the airport is included in Appendix A.

Use - In MicroPAVER, Use is the term for the function of the pavement area. This is either Runway, Taxiway, or Apron for purposes of the FDOT Statewide Aviation Pavement Management System.

APPENDIX B

M&R COST SCHEDULES AND CRITICAL PCIs

General Aviation Airports

M&R Activities and Unit Costs by Condition

	Activity	PCI Trigger	Cost/SqFt
Maintenance	Crack Sealing and Full-Depth Patching	90	$0.06
		80	$0.24
Rehabilitation	Mill and Overlay (AC) or Concrete Pavement Restoration (PCC)	70	$3.00
		60	$3.42
		50	$6.29
		40	$6.29
	Reconstruction	30	$13.62
		20	$13.62

Critical PCIs

Use	Critical PCI
Runway	65
Taxiway	65
Apron	65

FDOT Minimum Service Level PCIs

Minimum PCI		
Runway	**Taxiway**	**Apron**
75	65	60

Regional Reliever Airports

M&R Activities and Unit Costs by Condition

	Activity	PCI Trigger	Cost/SqFt
Maintenance	Crack Sealing and Full-Depth Patching	90	$0.10
		80	$0.40
Rehabilitation	Mill and Overlay (AC) or Concrete Pavement Restoration (PCC)	70	$0.90
		60	$3.68
		50	$7.61
		40	$18.57
	Reconstruction	30	$18.57
		20	$18.57

Critical PCIs

Use	Critical PCI
Runway	65
Taxiway	65
Apron	65

FDOT Minimum Service Level PCIs

Minimum PCI		
Runway	**Taxiway**	**Apron**
75	65	65

Primary Airports

M&R Activities and Unit Costs by Condition

	Activity	PCI Trigger	Cost/SqFt
Maintenance	Crack Sealing and Full-Depth Patching	90	$0.20
		80	$0.80
Rehabilitation	Mill and Overlay (AC) or Concrete Pavement Restoration (PCC)	70	$1.40
		60	$4.23
		50	$8.55
		40	$8.55
	Reconstruction	30	$20.88
		20	$20.88

Critical PCIs

Use	Critical PCI
Runway	65
Taxiway	65
Apron	65

FDOT Minimum Service Level PCIs

Minimum PCI		
Runway	**Taxiway**	**Apron**
75	70	65

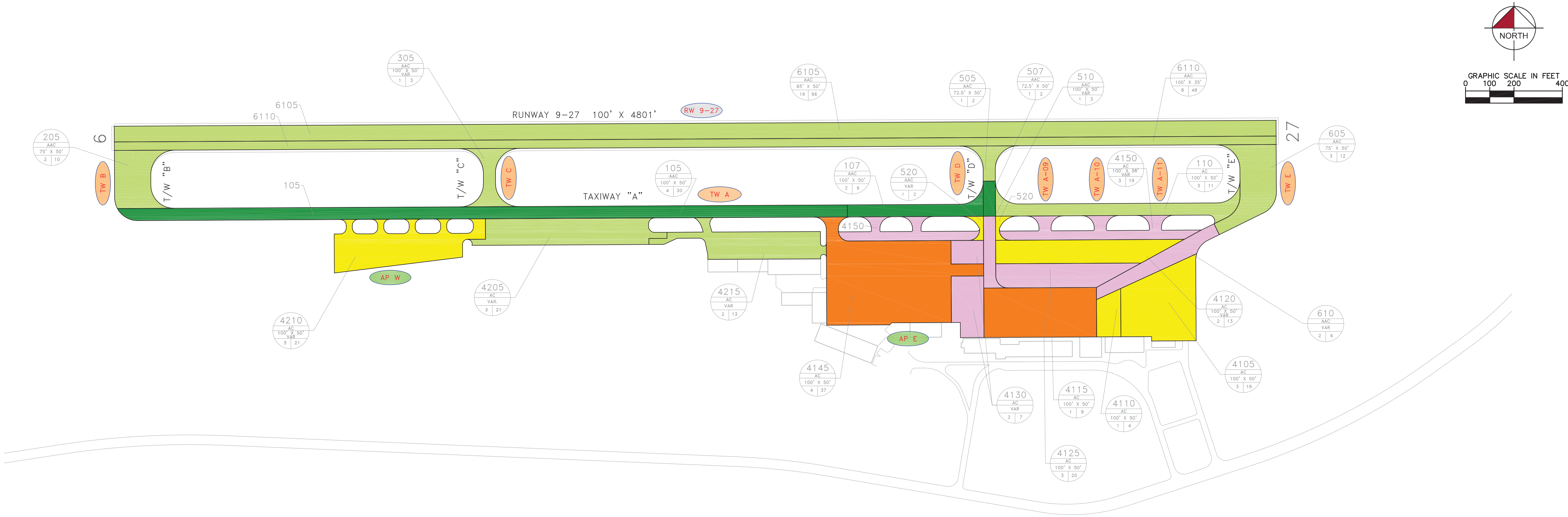
Maintenance Unit Costs

Maintenance Unit Costs for FDOT

Code	Name	Cost	Unit
GR-LL	Grinding (Localized for AC)	$2.10	SqFt
PA-AL	Patching – AC Leveling	$2.30	SqFt
PA-AS	Patching – AC Shallow	$2.90	SqFt
PA-PF	Patching – PCC Full Depth	$38.11	SqFt
PA-PP	Patching – PCC Partial Depth	$19.06	SqFt
SL-PC	Slab Replacement – PCC	$39.11	SqFt
CS-PC	Crack Sealing – PCC	$4.24	Ft
UN-PC	Undersealing – PCC	$3.40	Ft
CS-AC	Crack Sealing – AC	$2.25	Ft
GR-PP	Grinding (Localized for PCC)	$22.51	Ft
JS-LC	Joint Seal (Localized)	$2.00	Ft
SH-LE	Shoulder Leveling	$2.81	Ft
JS-SI	Joint Seal – Silicon	$2.81	Ft
PA-AD	Patching – AC Deep	$4.90	SqFt
OL-AT	Overlay – AC Thin	$2.80	SqFt
SS-CT	Surface Seal – Coal Tar	$0.40	SqFt
SS-FS	Surface Seal – Fog Seal	$0.40	SqFt
SS-RE	Surface Seal – Rejuvenating	$0.40	SqFt
ST-SB	Surface Treatment – Single Bitum.	$0.30	SqFt
ST-SS	Surface Treatment – Slurry Seal	$0.55	SqFt
ST-ST	Surface Treatment – Sand Tar	$0.28	SqFt
MI-AC	Microsurfacing - AC	$0.65	SqFt

APPENDIX C

AIRPORT CONDITION MAPS AND MAJOR REHABILITATION PROJECT TABLES



LEGEND

RW 13-31	TYPICAL RUNWAY BRANCH ID
TW A	TYPICAL TAXIWAY BRANCH ID
AP S	TYPICAL APRON BRANCH ID
	PCI 86-100 GOOD
	PCI 71-85 SATISFACTORY
	PCI 56-70 FAIR
	PCI 41-55 POOR
	PCI 26-40 VERY POOR
	PCI 11-25 SERIOUS
	PCI 0-10 FAILED

RUNWAY LENGTHS DEPICTED IN THIS DRAWING ARE FOR PAVEMENT MANAGEMENT PURPOSES ONLY AND MAY NOT MATCH PUBLISHED RUNWAY LENGTHS.

NUMBER	DATE	REVISIONS

DESIGNED: BAL | DRAWN: BAL | CHECKED: DRB | DATE: MAY 2011

2012 CONDITION MAP

KEY WEST INTERNATIONAL AIRPORT
MONROE COUNTY, FLORIDA

FLORIDA DEPARTMENT OF TRANSPORTATION - AVIATION OFFICE

IDENTIFIER: EYW

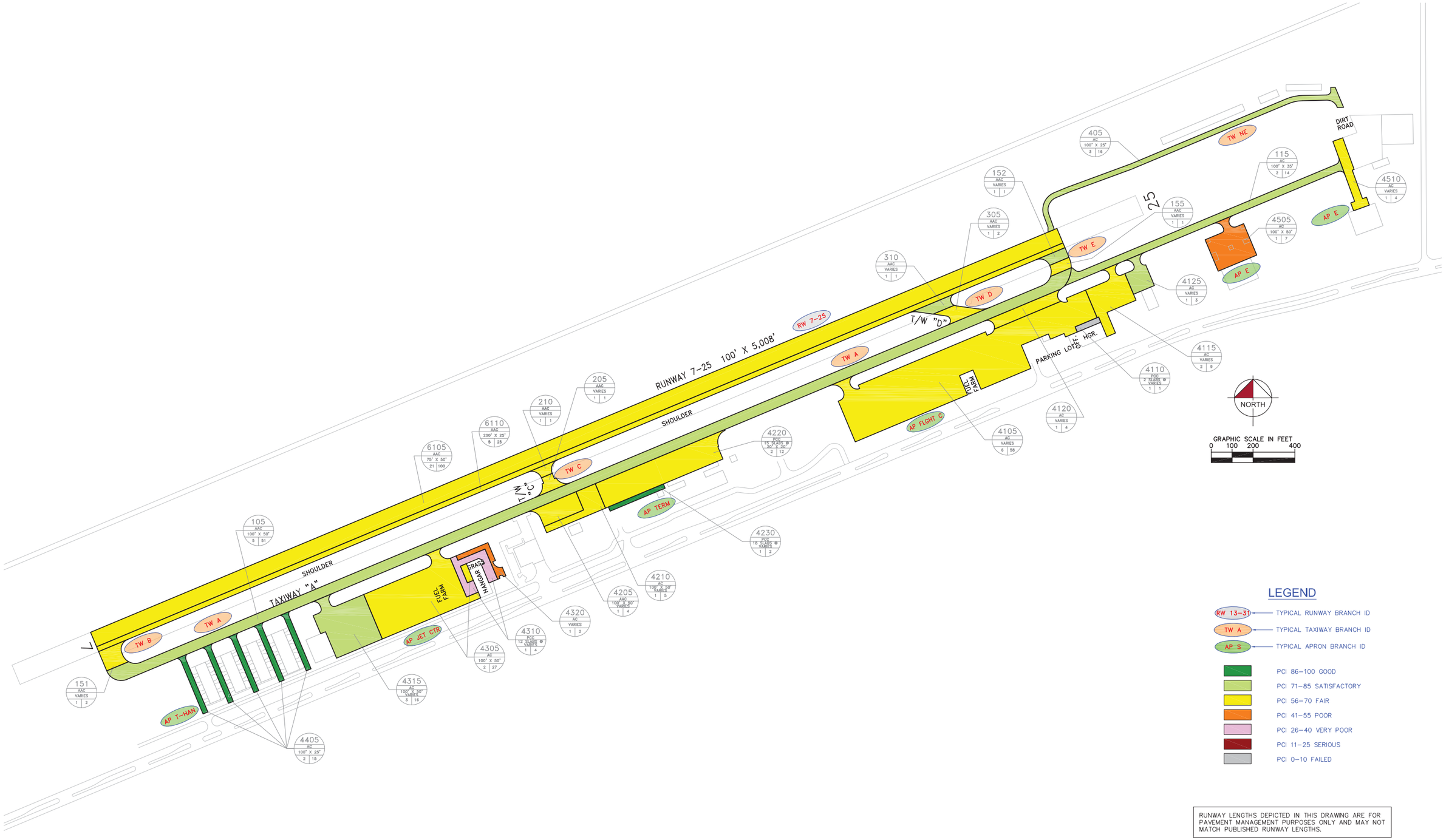
FDOT DISTRICT: 6

Key West International Airport (EYW)

Major Rehabilitation Plan by Year under Unlimited Funding Scenario

Year	Branch Name	Section ID	Surface Type	Section Area (ft^2)	Major M&R Costs*	PCI Before M&R	M&R Activity	PCI After M&R
2012	West Apron	4210	AC	82,435	$302,041.61	62	Mill and Overlay	100
2012	East Apron	4150	AC	70,300	$947,784.26	36	Reconstruction	100
2012	East Apron	4145	AC	189,745	$1,622,319.20	48	Mill and Overlay	100
2012	East Apron	4130	AC	44,900	$716,065.00	34	Reconstruction	100
2012	East Apron	4125	AC	94,960	$811,907.72	44	Mill and Overlay	100
2012	East Apron	4120	AC	66,920	$340,890.24	58	Mill and Overlay	100
2012	East Apron	4115	AC	50,255	$615,573.28	37	Reconstruction	100
2012	East Apron	4110	AC	17,665	$64,724.51	62	Mill and Overlay	100
2012	East Apron	4105	AC	87,200	$594,878.15	54	Mill and Overlay	100
2012	Taxiway Echo	610	AAC	33,365	$367,548.71	38	Reconstruction	100
2012	Taxiway Delta	520	AAC	6,165	$39,394.33	55	Mill and Overlay	100
2012	Taxiway Delta	510	AAC	15,360	$207,083.45	36	Reconstruction	100
2016	Taxiway Charlie	305	AAC	20,165	$76,734.75	63	Mill and Overlay	100
2018	Taxiway Delta	505	AAC	11,125	$44,912.61	63	Mill and Overlay	100
2018	Taxiway Bravo	205	AAC	39,920	$161,160.58	63	Mill and Overlay	100
2019	Runway 9-27	6110	AAC	168,000	$698,577.81	63	Mill and Overlay	100
2019	Taxiway Echo	605	AAC	51,535	$196,355.96	64	Mill and Overlay	100
2020	Runway 9-27	6105	AAC	312,000	$1,224,429.05	64	Mill and Overlay	100
2020	West Apron	4205	AC	77,460	$331,757.10	63	Mill and Overlay	100
2021	West Apron	4215	AC	63,200	$278,802.74	63	Mill and Overlay	100
				Total	**$9,642,941.06**	**54**		**100**

* Costs are adjusted for inflation.



LEGEND

- RW 13-31 — TYPICAL RUNWAY BRANCH ID
- TW A — TYPICAL TAXIWAY BRANCH ID
- AP S — TYPICAL APRON BRANCH ID

- PCI 86-100 GOOD
- PCI 71-85 SATISFACTORY
- PCI 56-70 FAIR
- PCI 41-55 POOR
- PCI 26-40 VERY POOR
- PCI 11-25 SERIOUS
- PCI 0-10 FAILED

RUNWAY LENGTHS DEPICTED IN THIS DRAWING ARE FOR PAVEMENT MANAGEMENT PURPOSES ONLY AND MAY NOT MATCH PUBLISHED RUNWAY LENGTHS.

NUMBER	DATE	REVISIONS

DESIGNED: ELT | DRAWN: ALB | CHECKED: DRB | DATE:

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2011 CONDITION MAP

THE FLORIDA KEYS MARATHON AIRPORT
MONROE COUNTY, FLORIDA

FLORIDA DEPARTMENT OF TRANSPORTATION - AVIATION OFFICE

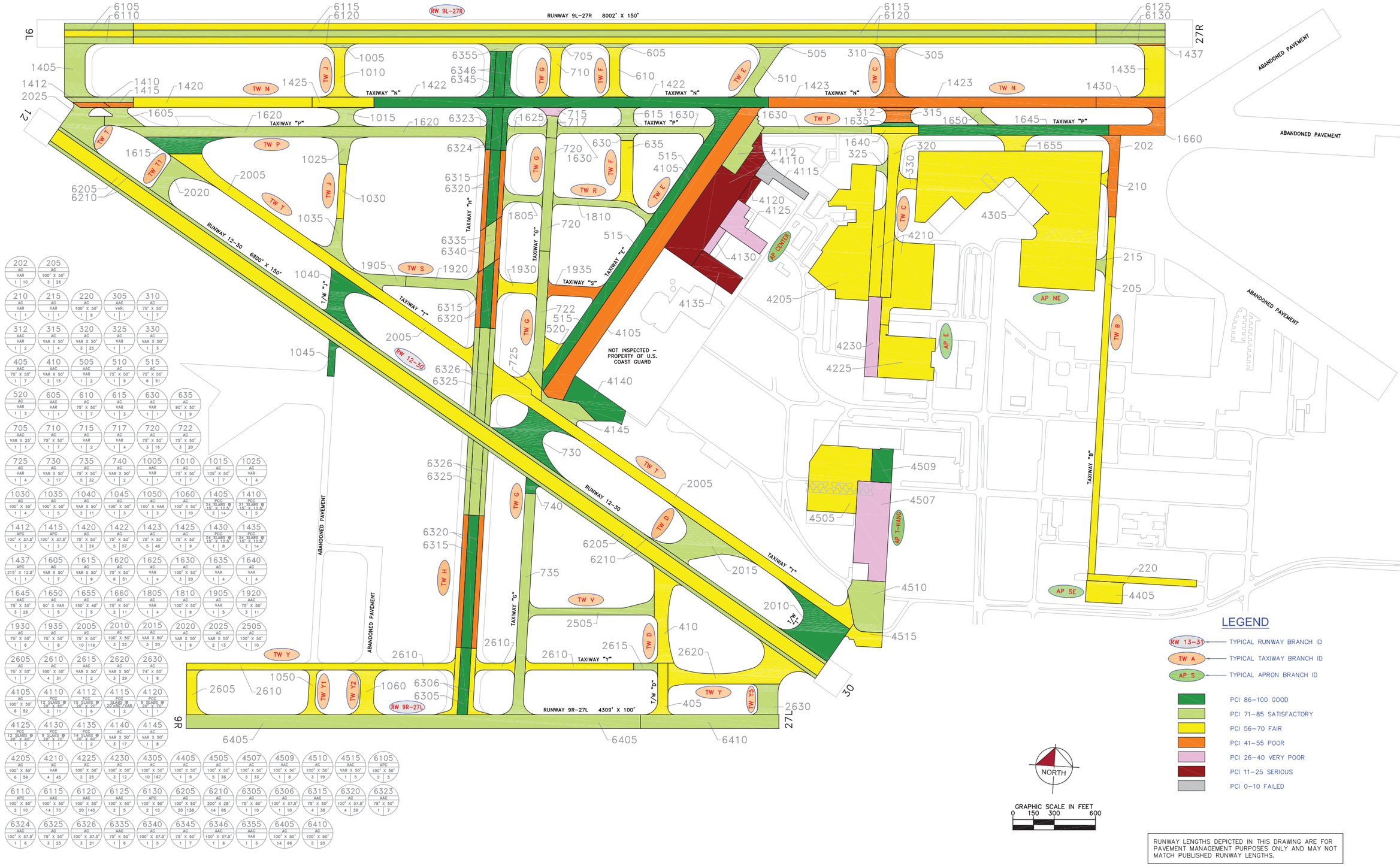
IDENTIFIER: MTH
FDOT DISTRICT 6

Florida Keys Marathon Airport (MTH)

Major Rehabilitation Plan by Year under Unlimited Funding Scenario

Year	Branch Name	Section ID	Surface Type	Section Area (ft^2)	Major M&R Costs*	PCI Before M&R	M&R Activity	PCI After M&R
2011	Apron East	4505	AC	35,120	$220,904.82	43	Mill and Overlay	100
2011	Apron East	4510	AC	17,050	$72,991.08	57	Reconstruction	100
2011	Apron at Flight Center	4110	AC	3,294	$44,864.29	0	Mill and Overlay	100
2011	Apron at Flight Center	4115	AC	35,580	$111,970.34	61	Mill and Overlay	100
2011	Jet Center Apron	4305	AC	112,150	$512,301.41	56	Mill and Overlay	100
2011	Jet Center Apron	4310	AAC	17,440	$237,532.88	26	Reconstruction	100
2011	Jet Center Apron	4320	AC	8,020	$50,445.80	45	Mill and Overlay	100
2011	Terminal Apron	4210	AAC	19,260	$50,095.29	63	Reconstruction	100
2011	Terminal Apron	4220	AAC	78,600	$182,980.92	64	Reconstruction	100
2011	Runway 7-25	6105	AC	375,600	$874,397.35	64	Mill and Overlay	100
2011	Runway 7-25	6110	AC	125,200	$325,645.40	63	Mill and Overlay	100
2011	Taxiway Charlie	205	AC	6,247	$16,248.46	63	Mill and Overlay	100
2012	Terminal Apron	4205	AC	20,010	$47,980.81	64	Mill and Overlay	100
2014	Apron at Flight Center	4105	AC	270,010	$686,870.35	64	Mill and Overlay	100
2016	Apron at Flight Center	4120	AC	18,520	$49,981.62	64	Mill and Overlay	100
2016	Taxiway Delta	305	AC	9,290	$25,071.78	64	Mill and Overlay	100
2018	Jet Center Apron	4315	AC	60,630	$173,592.67	64	Mill and Overlay	100
2018	Taxiway Alpha	115	AC	50,655	$145,032.77	64	Mill and Overlay	100
2018	Taxiway Bravo	151	AC	10,710	$30,664.32	64	Mill and Overlay	100
2018	Taxiway Echo	155	AC	5,103	$14,610.65	64	Mill and Overlay	100
2020	Taxiway Charlie	210	AC	3,873	$11,764.29	64	Mill and Overlay	100
				Total	**$3,885,947.30**	**56**		**100**

* Costs are adjusted for inflation.



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NUMBER	DATE	REVISIONS

DESIGNED: KHA | DRAWN: KHA | CHECKED: KHA | DATE:

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2012 CONDITION MAP

OPA-LOCKA EXECUTIVE AIRPORT
MIAMI-DADE COUNTY, FLORIDA

FLORIDA DEPARTMENT OF TRANSPORTATION - AVIATION OFFICE

IDENTIFIER: OPF | FDOT DISTRICT: 6

Opa-locka Executive Airport (OPF)

Major Rehabilitation Plan by Year under Unlimited Funding Scenario

Year	Branch Name	Section ID	Surface Type	Section Area (ft^2)	Major M&R Costs*	PCI Before M&R	M&R Activity	PCI After M&R
2012	Center Apron	4105	AC	324,740	$2,471,273.46	48	Mill and Overlay	100
2012	Center Apron	4110	PCC	209,044	$3,881,939.02	15	Reconstruction	100
2012	Center Apron	4115	PCC	31,142	$578,301.70	1	Reconstruction	100
2012	Center Apron	4120	PCC	12,508	$232,273.54	19	Reconstruction	100
2012	Center Apron	4125	PCC	53,217	$929,913.82	31	Reconstruction	100
2012	Center Apron	4130	PCC	12,508	$232,273.54	29	Reconstruction	100
2012	Center Apron	4135	PCC	51,051	$948,017.01	13	Reconstruction	100
2012	East Apron	4205	AC	273,536	$778,483.30	63	Mill and Overlay	100
2012	East Apron	4230	AC	55,350	$603,204.44	37	Reconstruction	100
2012	Northeast Apron	4305	AC	785,844	$3,818,417.46	57	Mill and Overlay	100
2012	Southeast Apron	4405	AC	41,364	$217,244.50	56	Mill and Overlay	100
2012	T-Hangar Apron	4505	AC	190,348	$775,288.72	59	Mill and Overlay	100
2012	T-Hangar Apron	4507	AC	161,305	$1,757,902.29	37	Reconstruction	100
2012	T-Hangar Apron	4515	AAC	26,770	$119,554.06	58	Mill and Overlay	100
2012	Taxiway Bravo	202	AC	43,883	$333,946.67	49	Mill and Overlay	100
2012	Taxiway Charlie	310	AC	33,038	$186,500.32	55	Mill and Overlay	100
2012	Taxiway Charlie	312	AAC	5,722	$43,547.64	49	Mill and Overlay	100
2012	Taxiway Charlie	315	AC	15,689	$119,394.26	42	Mill and Overlay	100
2012	Taxiway Echo	520	AC	17,228	$76,940.01	58	Mill and Overlay	100
2012	Taxiway Foxtrot	610	AC	32,630	$83,794.84	64	Mill and Overlay	100
2012	Taxiway Golf	710	AC	33,147	$174,086.44	56	Mill and Overlay	100
2012	Taxiway Golf	715	AC	8,758	$133,834.56	33	Reconstruction	100

Opa-locka Executive Airport (OPF)

Major Rehabilitation Plan by Year under Unlimited Funding Scenario (Continued)

Year	Branch Name	Section ID	Surface Type	Section Area (ft^2)	Major M&R Costs*	PCI Before M&R	M&R Activity	PCI After M&R
2012	Taxiway Golf	725	AC	16,579	$47,184.49	63	Mill and Overlay	100
2012	Taxiway Hotel	6320	AC	146,625	$1,115,816.80	48	Mill and Overlay	100
2012	Taxiway Hotel	6340	AC	22,875	$174,078.84	50	Mill and Overlay	100
2012	Taxiway Juliet	1010	AC	33,038	$112,395.73	61	Mill and Overlay	100
2012	Taxiway November	1412	APC	8,390	$63,850.37	47	Mill and Overlay	100
2012	Taxiway November	1415	APC	7,149	$43,166.11	54	Mill and Overlay	100
2012	Taxiway November	1420	AC	97,500	$331,695.04	61	Mill and Overlay	100
2012	Taxiway November	1423	AC	178,575	$1,148,416.36	53	Mill and Overlay	100
2012	Taxiway November	1430	PCC	37,642	$227,283.90	54	PCC Restoration	100
2012	Taxiway November	1435	PCC	59,701	$219,698.99	60	PCC Restoration	100
2012	Taxiway November	1437	APC	2,716	$19,603.11	51	Mill and Overlay	100
2012	Taxiway Papa	1660	AC	43,446	$330,621.26	48	Mill and Overlay	100
2012	Taxiway Sierra	1935	AC	30,114	$229,168.41	47	Mill and Overlay	100
2012	Taxiway Yankee	2605	AC	27,058	$69,483.71	64	Mill and Overlay	100
2012	Taxiway Y-2	1060	AC	41,211	$167,850.94	59	Mill and Overlay	100
2013	East Apron	4210	AC	209,760	$554,823.05	64	Mill and Overlay	100
2013	Taxiway Yankee	2610	AC	157,256	$415,947.16	64	Mill and Overlay	100
2013	Taxiway Y-1	1050	AC	21,687	$57,363.11	64	Mill and Overlay	100
2014	Runway 12-30	6205	AC	680,000	$1,852,585.87	64	Mill and Overlay	100
2014	Runway 9L-27R	6120	AAC	700,000	$1,907,073.69	64	Mill and Overlay	100
2014	Taxiway Charlie	330	AC	13,347	$36,361.77	64	Mill and Overlay	100
2015	Runway 9L-27R	6105	APC	25,000	$70,153.07	64	Mill and Overlay	100

Opa-locka Executive Airport (OPF)

Major Rehabilitation Plan by Year under Unlimited Funding Scenario (Continued)

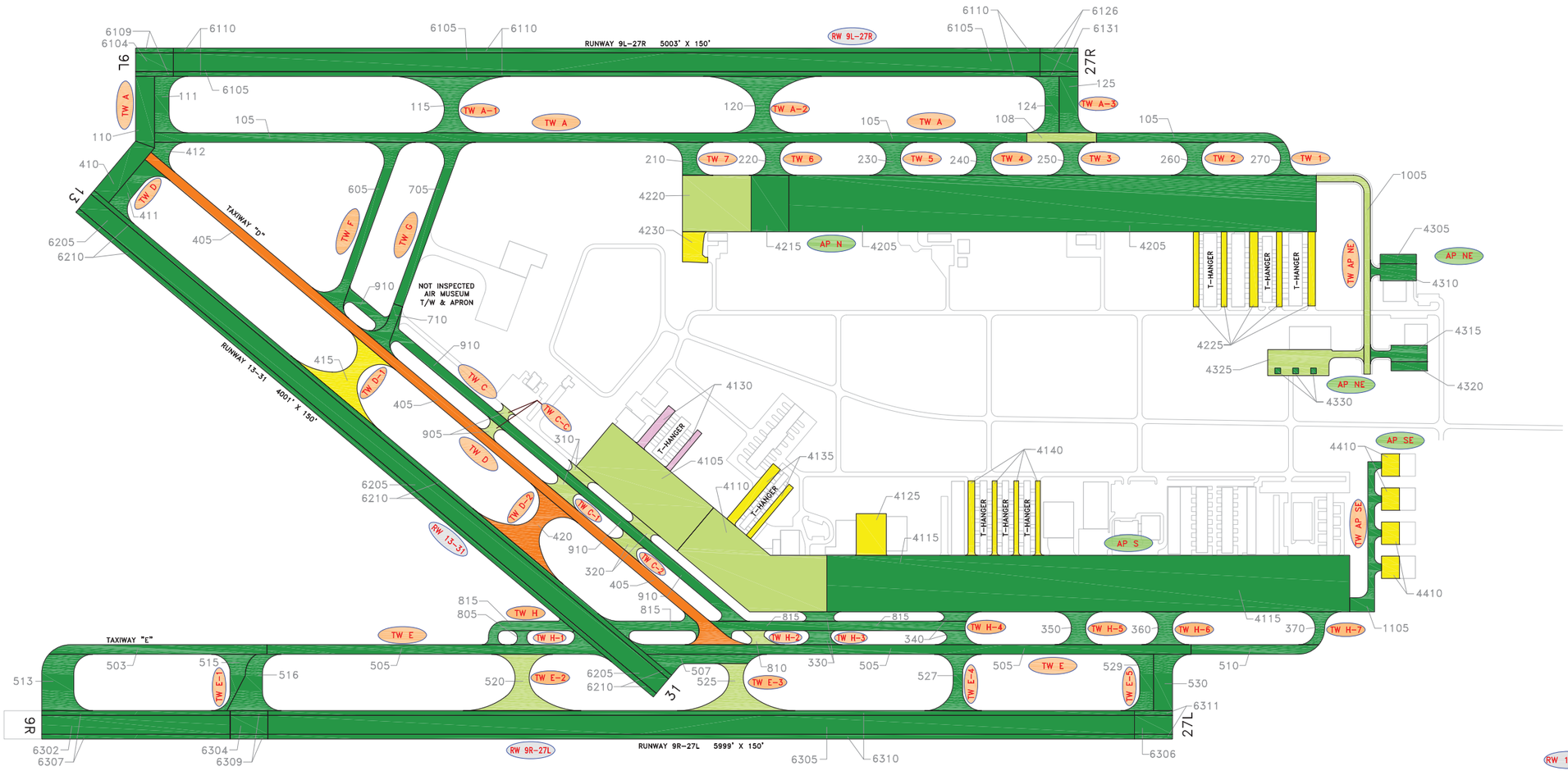
Year	Branch Name	Section ID	Surface Type	Section Area (ft^2)	Major M&R Costs*	PCI Before M&R	M&R Activity	PCI After M&R
2015	Taxiway Bravo	205	AC	130,079	$365,016.88	64	Mill and Overlay	100
2015	Taxiway Bravo	210	AC	4,748	$13,324.54	64	Mill and Overlay	100
2015	Taxiway Bravo	220	AC	39,650	$111,262.77	64	Mill and Overlay	100
2015	Taxiway Charlie	320	AC	100,755	$313,337.30	63	Mill and Overlay	100
2015	Taxiway Foxtrot	635	AC	42,867	$133,312.93	63	Mill and Overlay	100
2015	Taxiway November	1425	AC	33,750	$104,959.16	63	Mill and Overlay	100
2015	Taxiway Papa	1640	AC	17,062	$53,060.54	63	Mill and Overlay	100
2016	East Apron	4225	AC	126,677	$366,136.59	64	Mill and Overlay	100
2016	Runway 9R-27L	6410	AC	100,600	$290,764.82	64	Mill and Overlay	100
2016	Taxiway Hotel	6306	AC	41,939	$121,217.17	64	Mill and Overlay	100
2016	Taxiway Juliet	1030	AC	19,750	$57,083.55	64	Mill and Overlay	100
2016	Taxiway Papa	1655	AC	21,542	$62,263.10	64	Mill and Overlay	100
2016	Taxiway Sierra	1930	AC	26,928	$77,828.87	64	Mill and Overlay	100
2016	Taxiway Tango	2005	AC	477,685	$1,380,656.94	64	Mill and Overlay	100
2016	Taxiway Yankee	2620	AC	117,770	$340,390.69	64	Mill and Overlay	100
2017	Runway 12-30	6210	AC	340,000	$1,012,185.30	64	Mill and Overlay	100
2018	Runway 9L-27R	6130	APC	50,200	$153,929.57	64	Mill and Overlay	100
2018	Taxiway Delta	405	AAC	30,808	$94,465.90	64	Mill and Overlay	100
2018	Taxiway Golf	722	AC	74,916	$229,716.33	64	Mill and Overlay	100
2018	Taxiway Sierra	1905	AC	24,572	$75,346.32	64	Mill and Overlay	100
2019	Center Apron	4145	AC	37,843	$132,457.78	63	Mill and Overlay	100
2019	Runway 9L-27R	6110	APC	50,000	$157,915.79	64	Mill and Overlay	100

Opa-locka Executive Airport (OPF)

Major Rehabilitation Plan by Year under Unlimited Funding Scenario (Continued)

Year	Branch Name	Section ID	Surface Type	Section Area (ft^2)	Major M&R Costs*	PCI Before M&R	M&R Activity	PCI After M&R
2019	Taxiway Bravo	215	AC	7,653	$24,170.91	64	Mill and Overlay	100
2019	Taxiway Delta	410	AAC	71,495	$225,804.58	64	Mill and Overlay	100
2019	Taxiway Juliet	1025	AC	19,915	$62,898.05	64	Mill and Overlay	100
2019	Taxiway Papa	1630	AC	99,886	$315,472.52	64	Mill and Overlay	100
2019	Taxiway Romeo	1805	AC	19,740	$62,345.31	64	Mill and Overlay	100
2020	T-Hangar Apron	4510	AC	88,298	$287,240.10	64	Mill and Overlay	100
2020	Runway 9R-27L	6405	AC	330,300	$1,190,806.67	63	Mill and Overlay	100
2020	Taxiway Golf	717	AC	12,210	$39,721.29	64	Mill and Overlay	100
2020	Taxiway Golf	720	AC	61,875	$201,283.42	64	Mill and Overlay	100
2020	Taxiway Golf	735	AC	125,082	$406,899.01	64	Mill and Overlay	100
2021	Runway 9L-27R	6115	AAC	350,000	$1,172,730.05	64	Mill and Overlay	100
2021	Runway 9L-27R	6125	AAC	25,100	$84,101.50	64	Mill and Overlay	100
2021	Taxiway Charlie	325	AC	5,839	$19,565.46	64	Mill and Overlay	100
				Total	**$37,430,425.09**	**56**		**100**

* Costs are adjusted for inflation.



105 AAC 100' X 50' 10 56 | 108 AAC 100' X 50' 1 4 | 110 AC 100' X 50' 1 7 | 111 AC 77' X 50' 1 6 | 115 AC 50' X VAR 2 14 | 120 AC 50' X VAR 2 14 | 124 AC 75' X 50' 1 6 | 125 AC 100' X 50' 2 8 | 210 AAC 50' X VAR 1 4 | 220 AAC 50' X VAR 1 4 | 230 AAC 50' X VAR 1 4 | 240 AAC 50' X VAR 1 4 | 250 AAC 50' X VAR 1 4 | 260 AAC 50' X VAR 1 4 | 270 AAC 100' X 50' 1 2 | 310 AAC 25' X VAR 1 5 | 320 AAC 25' X VAR 1 5 | 330 AAC VAR 1 4 | 340 AAC VAR 1 4 | 350 AAC VAR X 50' 1 4

360 AAC VAR X 50' 1 4 | 370 AAC 100' X 50' 1 2 | 405 AC 100' X 50 5 43 | 410 AC 100' X 50 1 7 | 411 AC 76' X 50' 1 6 | 412 AC VAR 1 2 | 415 AC 50' X VAR 2 14 | 420 AC VAR X 50' 2 14 | 503 AAC 100' X 50' 1 11 | 505 AAC 100' X 50' 5 47 | 507 AAC 100' X 50' 1 7 | 510 AAC 100' X 50' 1 7 | 513 AC 100' X 50' 20' X 20' 2 12 | 515 AAC 100' X 50' 1 4 | 516 AC 71' X 50' 1 8 | 520 AAC 75' X 50' VAR 3 14 | 525 AAC 75' X 50' VAR 3 11 | 527 AC 100' X 50' VAR 1 7 | 529 AC 75' X 50' 1 6 | 530 AAC 100' X 50' 2 8

605 AAC 100' X 50 3 12 | 705 AAC 100' X 50' 2 10 | 710 AC 100' X 50' VAR 1 3 | 805 AC VAR 1 1 | 810 AC VAR 1 2 | 815 AAC 100' X 50' 3 25 | 905 AC VAR 1 2 | 910 AC 100' X 50' 3 27 | 1005 AC 100' X 35' 2 13 | 1105 AC 100' X 35' VAR 1 10 | 4105 AC 100' X 50' 5 42 | 4110 AAC 100' X 50' 5 48 | 4115 AAC 100' X 50' 10 168 | 4125 AC VAR. 1 7 | 4130 AC VAR. 1 6 | 4135 AC VAR. 1 8 | 4140 AC VAR. 3 16 | 4205 AAC 100' X 50' 16 168 | 4215 AAC 100' X 50' 2 12 | 4220 AAC 100' X 50' 3 24

4225 AC 100' X VAR. 3 20 | 4230 AC VAR 1 3 | 4305 PCC 20' SLABS @ 12' X 12' 1 3 | 4310 AC 90' X 50' 1 5 | 4315 AC 85' X 50' 1 5 | 4320 PCC 20' SLABS @ 12' X 12' 1 3 | 4325 AC 88' X 50' 2 12 | 4330 PCC VAR. 1 1 | 4410 AC 120' X 50' 2 8 | 6104 AC 100' X 50' 1 4 | 6105 AC 100' X 50' 19 92 | 6109 AC 200' X 25' 1 2 | 6110 AC 200' X 25' 8 46 | 6126 AC 200' X 25' 1 2 | 6131 AC 100' X 50' 1 4 | 6205 AAC 100' X 50' 16 80 | 6210 AAC 200' X 25' 7 40 | 6302 AC 100' X 50' 5 20 | 6304 AAC 100' X 50' 1 4 | 6305 AAC 100' X 50' 19 92

6306 AC 100' X 50' 1 4 | 6307 AC 200' X 25' 2 10 | 6309 AAC 200' X 25' 1 2 | 6310 AAC 200' X 25' 8 46 | 6311 AC 200' X 25' 1 2

LEGEND

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NUMBER	DATE	REVISIONS

DESIGNED: KHA | DRAWN: KHA | CHECKED: KHA | DATE:

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2012 CONDITION MAP

KENDALL-TAMIAMI EXECUTIVE AIRPORT
MIAMI-DADE COUNTY, FLORIDA

FLORIDA DEPARTMENT OF TRANSPORTATION - AVIATION OFFICE

IDENTIFIER: TMB

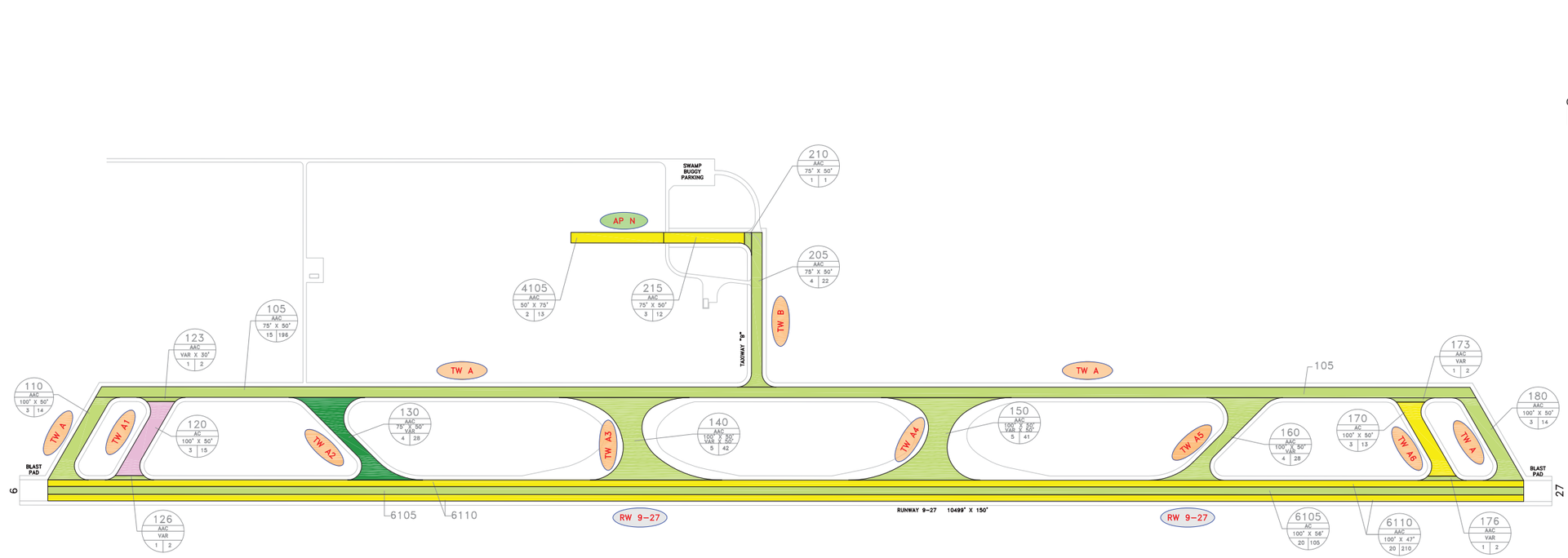
FDOT DISTRICT: 6

Kendall-Tamiami Executive Airport (TMB)

Major Rehabilitation Plan by Year under Unlimited Funding Scenario

Year	Branch Name	Section ID	Surface Type	Section Area (ft^2)	Major M&R Costs*	PCI Before M&R	M&R Activity	PCI After M&R
2012	North Apron	4225	AC	69,490	$178,450.31	64	Mill and Overlay	100
2012	South Apron	4125	AC	35,371	$110,498.16	62	Mill and Overlay	100
2012	South Apron	4130	AC	19,714	$258,061.25	35	Reconstruction	100
2012	South Apron	4135	AC	29,788	$121,327.74	59	Mill and Overlay	100
2012	Taxiway Delta	405	AC	210,898	$1,604,932.90	47	Mill and Overlay	100
2012	Taxiway D-1	415	AC	50,475	$265,094.71	56	Mill and Overlay	100
2012	Taxiway D-2	420	AC	50,463	$324,527.06	53	Mill and Overlay	100
2013	Southeast Apron	4410	AC	45,220	$119,608.70	64	Mill and Overlay	100
2014	North Apron	4230	AC	18,795	$56,747.42	63	Mill and Overlay	100
2014	South Apron	4140	AC	43,874	$132,469.55	63	Mill and Overlay	100
2021	North Apron	4220	AAC	109,500	$366,896.97	64	Mill and Overlay	100
				Total	**$3,538,614.77**	**57**		**100**

* Costs are adjusted for inflation.



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NUMBER	DATE	REVISIONS

DESIGNED:	KHA	DRAWN:	KHA	CHECKED:	KHA	DATE:

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2012 CONDITION MAP

DADE-COLLIER TRAINING & TRANSITION AIRPORT

MIAMI-DADE COUNTY, FLORIDA

FLORIDA DEPARTMENT OF TRANSPORTATION - AVIATION OFFICE

IDENTIFIER: TNT

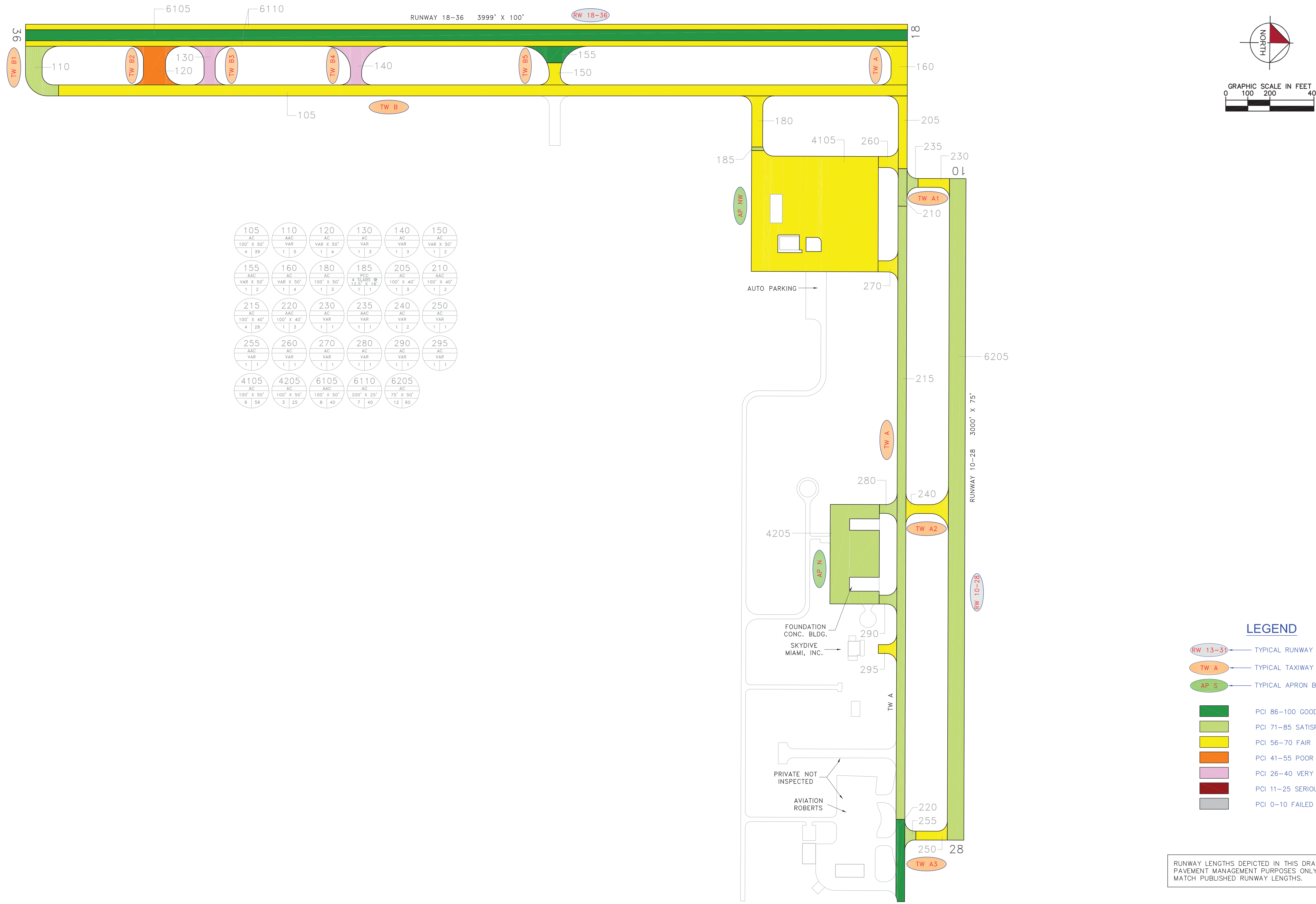
FDOT DISTRICT: 6

Dade-Collier Training and Transition Airport (TNT)

Major Rehabilitation Plan by Year under Unlimited Funding Scenario

Year	Branch Name	Section ID	Surface Type	Section Area (ft^2)	Major M&R Costs*	PCI Before M&R	M&R Activity	PCI After M&R
2012	North Apron	4105	AAC	49,500	$115,236.07	64	Mill and Overlay	100
2012	Taxiway A-1	120	AC	67,736	$525,361.47	38	Reconstruction	100
2014	Taxiway A-6	170	AC	67,736	$186,911.23	63	Mill and Overlay	100
2014	Taxiway Bravo	215	AAC	43,228	$106,764.52	64	Mill and Overlay	100
2015	Runway 9-27	6110	AAC	1,050,000	$2,984,293.91	63	Mill and Overlay	100
2016	Taxiway A-6	176	AAC	7,437	$19,487.16	64	Mill and Overlay	100
2016	Taxiway Bravo	210	AAC	5,290	$13,859.82	64	Mill and Overlay	100
2017	Runway 9-27	6105	AC	525,000	$1,416,865.66	64	Mill and Overlay	100
2018	Taxiway Bravo	205	AAC	86,792	$269,552.81	63	Mill and Overlay	100
2019	Taxiway A-1	123	AAC	7,437	$21,294.15	64	Mill and Overlay	100
2020	Taxiway Alpha	105	AAC	733,373	$2,162,749.43	64	Mill and Overlay	100
2021	Taxiway Alpha	180	AAC	75,225	$228,496.07	64	Mill and Overlay	100
2021	Taxiway A-6	173	AAC	7,437	$22,590.96	64	Mill and Overlay	100
				Total	**$8,073,463.26**	**62**		**100**

* Costs are adjusted for inflation.



LEGEND

RW 13-31	TYPICAL RUNWAY BRANCH ID
TW A	TYPICAL TAXIWAY BRANCH ID
AP S	TYPICAL APRON BRANCH ID
(dark green)	PCI 86–100 GOOD
(light green)	PCI 71–85 SATISFACTORY
(yellow)	PCI 56–70 FAIR
(orange)	PCI 41–55 POOR
(pink)	PCI 26–40 VERY POOR
(dark red)	PCI 11–25 SERIOUS
(grey)	PCI 0–10 FAILED

RUNWAY LENGTHS DEPICTED IN THIS DRAWING ARE FOR PAVEMENT MANAGEMENT PURPOSES ONLY AND MAY NOT MATCH PUBLISHED RUNWAY LENGTHS.

NUMBER	DATE	REVISIONS

DESIGNED: KHA DRAWN: KHA CHECKED: KHA DATE:

2012 CONDITION MAP

HOMESTEAD GENERAL AVIATION
HOMESTEAD, MIAMI-DADE CO., FLORIDA

FLORIDA DEPARTMENT OF TRANSPORTATION - AVIATION OFFICE

IDENTIFIER X51

FDOT DISTRICT 6

Homestead General Aviation Airport (X51)

Major Rehabilitation Plan by Year under Unlimited Funding Scenario

Year	Branch Name	Section ID	Surface Type	Section Area (ft^2)	Major M&R Costs*	PCI Before M&R	M&R Activity	PCI After M&R
2012	Taxiway Alpha	160	AC	14,699	$34,219.32	64	Mill and Overlay	100
2012	Taxiway Alpha	260	AC	5,369	$15,430.92	62	Mill and Overlay	100
2012	Taxiway Alpha	295	AC	4,189	$19,136.00	56	Mill and Overlay	100
2012	Taxiway A-3	250	AC	6,135	$19,305.51	61	Mill and Overlay	100
2012	Taxiway B-2	120	AC	21,223	$133,494.82	43	Mill and Overlay	100
2012	Taxiway B-3	130	AC	12,237	$85,942.43	39	Reconstruction	100
2012	Taxiway B-4	140	AC	15,569	$97,928.84	40	Mill and Overlay	100
2012	Taxiway B-5	150	AC	6,211	$21,241.53	60	Mill and Overlay	100
2013	Taxiway Alpha	205	AC	13,738	$32,941.62	64	Mill and Overlay	100
2013	Taxiway A-1	230	AC	6,237	$14,954.14	64	Mill and Overlay	100
2013	Taxiway A-2	240	AC	11,520	$27,622.92	64	Mill and Overlay	100
2015	Northwest Apron	4105	AC	282,998	$804,333.94	63	Mill and Overlay	100
2015	Runway 18-36	6110	AC	199,950	$508,646.82	64	Mill and Overlay	100
2015	Taxiway Alpha	270	AC	5,369	$15,260.09	63	Mill and Overlay	100
2015	Taxiway Bravo	105	AC	192,408	$546,859.07	63	Mill and Overlay	100
2015	Taxiway Bravo	180	AC	12,661	$35,985.33	63	Mill and Overlay	100
2018	Taxiway Alpha	215	AC	111,200	$309,108.81	64	Mill and Overlay	100
2018	Taxiway Alpha	290	AC	4,069	$11,311.21	64	Mill and Overlay	100
2019	Taxiway B-1	110	AAC	20,223	$64,690.22	63	Mill and Overlay	100
2020	Taxiway Bravo	185	PCC	852	$2,806.54	63	PCC Restoration	100
2021	Taxiway Alpha	280	AC	4,273	$12,979.33	64	Mill and Overlay	100

Homestead General Aviation Airport (X51)

Major Rehabilitation Plan by Year under Unlimited Funding Scenario (Continued)

Year	Branch Name	Section ID	Surface Type	Section Area (ft^2)	Major M&R Costs*	PCI Before M&R	M&R Activity	PCI After M&R
2021	Taxiway A-1	235	AAC	2,971	$10,082.97	63	Mill and Overlay	100
				Total	**$2,824,282.38**	**60**		**100**

* Costs are adjusted for inflation.