

Alabama Statewide Airport Pavement Management Program Update



Talladega Municipal Airport (ASN)

Final Report

February 2022



Submitted to

Alabama Aeronautics Bureau

Submitted by



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Pavement Management – Evaluation – Testing – Design

**ALABAMA STATEWIDE AIRPORT PAVEMENT MANAGEMENT
PROGRAM UPDATE**

Talladega Municipal Airport (ASN)

FINAL REPORT

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Executive Summary

The Aviation Inc. team, which included All About Pavements, Inc., (API) was awarded a contract by the Alabama Department of Transportation’s Aeronautics Bureau (ALDOT) in 2018 to update the existing Alabama Statewide Airport Pavement Management Program (APMP). The scope of this project includes the airside pavement network at Talladega Municipal Airport (ASN).

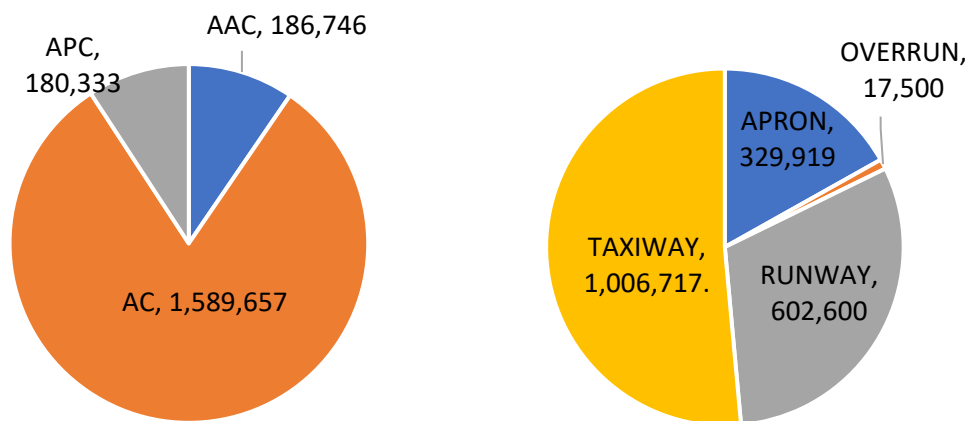
The following APMP tasks were completed to achieve the project objectives at ASN:

- Update the PAVER work history with records review information provided by ALDOT
- Conduct a visual pavement condition survey of the airfield pavements
- Update the PAVER database with inventory and condition data
- Update Maintenance and Rehabilitation (M&R) policies and unit costs
- Develop a 7-Year Pavement Capital Improvement Program (PCIP) with associated cost estimates

ES.1 Pavement Inventory

There are 14 branches and 27 sections within ASN’s pavement network with a total surface area of approximately 1.96 million square feet (sf). Figure ES-1 shows the distribution of the pavement network by surface type and branch use.

Figure ES-1: Pavement Area (sf) by Surface Type and Branch Use.



ES.2 Pavement Condition

Visual pavement inspections were conducted in October 2018 using the Pavement Condition Index (PCI) method as specified in ASTM D5340-12 and FAA AC 150/5380-6C. The PCI is a numerical rating scale from 0 to 100 that provides a measure of the pavement’s functional surface condition. The overall area-weighted network PCI (AW PCI) for the ASN pavement network is 78, representing a “Satisfactory” condition. The network area-weighted pavement age (AW Age) is greater than 20 years. ALDOT wanted



the condition of the overrun to not be included in the overall PCI computations, and it was also not considered for the PCIP.

Table ES-1 is a listing of the section PCI values and ratings.

Table ES-1: ASN Section PCI Values and Ratings.

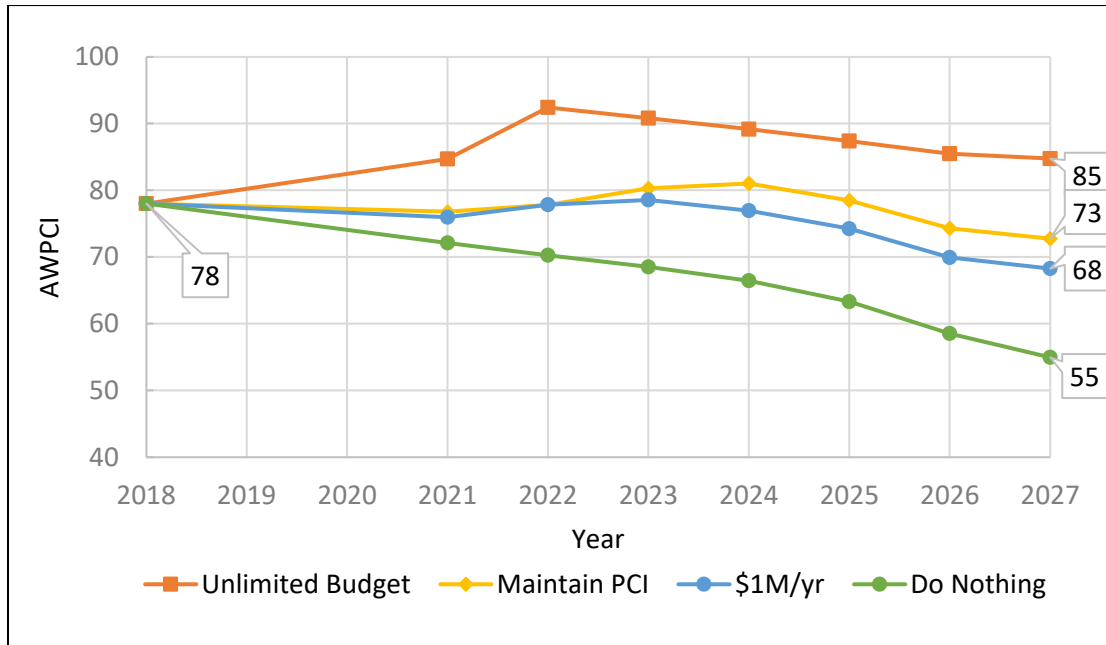
Name	Section ID	Surface	Area (sf)	PCI	PCI Category
Apron 01	02	AC	150,000	81	Satisfactory
Apron 01	01	AAC	112,419	84	Satisfactory
Apron 02	01	AC	67,500	57	Fair
Runway 04-22	02	AC	20,000	100	Good
Runway 04-22	01	AC	582,600	76	Satisfactory
Taxiway A	01	AC	358,835	83	Satisfactory
Taxiway A1	02	AC	10,806	76	Satisfactory
Taxiway A1	01	AC	18,562	63	Fair
Taxiway A2	01	AC	17,908	66	Fair
Taxiway A2	02	AC	10,857	70	Fair
Taxiway A3	02	AC	6,677	79	Satisfactory
Taxiway A3	03	AAC	29,634	100	Good
Taxiway A3	01	AC	19,104	69	Fair
Taxiway A4	01	AC	12,786	75	Satisfactory
Taxiway A4	02	AAC	44,693	100	Good
Taxiway A4	03	APC	82,200	87	Good
Taxiway Connector 01	01	AC	10,600	51	Poor
Taxiway Connector 02	01	AC	6,314	80	Satisfactory
Taxiway Connector 03	01	AC	5,776	100	Good
Taxiway Hangar 01	05	APC	42,133	100	Good
Taxiway Hangar 01	06	APC	56,000	100	Good
Taxiway Hangar 01	01	AC	29,017	72	Satisfactory
Taxiway Hangar 01	03	AC	131,439	58	Fair
Taxiway Hangar 01	02	AC	65,691	50	Poor
Taxiway Hangar 01	04	AC	28,085	54	Poor
Taxiway Hangar 02	01	AC	19,600	82	Satisfactory

ES.3 Pavement Maintenance and Repair Funding Levels

The PAVER database was updated with 2018 condition data, maintenance and repair (M&R) policies, and unit costs; which were then used to evaluate the effect of multiple funding levels on the overall

future pavement condition. Figure ES-2 presents the forecasted ASN network PCI values for each funding level.

Figure ES-2: M&R Funding Levels.



ES.4 Pavement Capital Improvement Program (PCIP)

The analysis output from the unlimited funding budget scenario was used as a starting point in developing the PCIP. For this scenario, sections were grouped into projects to allow for a logical construction sequence. Table ES-2 summarizes the 7-year PCIP, which has an estimated total cost of approximately \$7.4 million. These recommendations are based on a network-level evaluation. Project-level evaluations should be conducted prior to developing design and bid package documents.

Table ES-2: Summary of Pavement Capital Improvement Program.

Project Year	CIP Project	Total Project Cost	Total Project Area (sf)	AWPCI Before	AWPCI After
2021	ASN_21-01_Taxiway A Preservation	\$325,145	370,925	79	85
	ASN_21-02_Apron 01 Preservation	\$230,031	262,419	77	84
	ASN_21-03_Taxiway A4 Preservation	\$89,236	101,800	81	88
	ASN_21-04_Runway 04-22 Rehabilitation	\$3,095,578	699,300	70	100
2022	ASN_22-01_Hangar Taxiways Reconstruction	\$2,490,642	254,232	45	100
2023	ASN_23-01_Apron 02 Rehabilitation	\$510,191	78,100	46	100
2024	ASN_24-01_Runway 04-22 Surface Treatment	\$445,057	699,300	96	99
2025	ASN_25-01_Taxiway A3 Preservation	\$29,237	29,634	89	96
	ASN_25-02_Taxiway A4 Preservation	\$44,094	44,693	89	96



Project Year	CIP Project	Total Project Cost	Total Project Area (sf)	AWPCI Before	AWPCI After
	ASN_25-03 Hangar Taxiway Preservation	\$96,818	98,133	89	96
2026	ASN_26-01_Apron 02 Surface Treatment	\$52,732	78,100	94	98
Total		\$7,408,761			

In addition to the major rehabilitation needs that are identified in the PCIP, PAVER was used to develop maintenance activities to repair specific PCI distresses in Year 1. The estimated costs for these maintenance activities are \$173,736 as summarized in Table ES-3.

Table ES-3: Summary of Localized Maintenance Plan.

Policy	Work Description	Work Quantity	Work Unit	Work Cost
Maintenance	Crack Sealing - AC	19,145	Ft	\$75,623
	Patching - AC Full-Depth	1,155	SqFt	\$28,939
	Patching - AC Partial-Depth	7	SqFt	\$112
Safety	Crack Sealing - AC	826	Ft	\$3,264
	Patching - AC Full-Depth	2,627	SqFt	\$65,798
Total				\$173,736



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1 Introduction

1.1. Overview

The Alabama Department of Transportation's Aeronautics Bureau (ALDOT) is responsible for preserving and enhancing Alabama's air transportation system, which consists of 72 airports throughout the State. ALDOT implemented an Airport Pavement Management Program (APMP) in 2008 using the PAVER system. ALDOT awarded a project in 2018 to Jviation Inc. (Jviation) to update the System Plan and conduct an Economic Analysis for the Alabama airports. The scope of work also included an update of the APMP for 59 airports, which was conducted by All About Pavements, Inc., (API), a Jviation team member.

With this update of the APMP, the Alabama airports continue to be eligible for FAA funding for major pavement rehabilitation work under the Airport Improvement Program (AIP) since an APMP meets the pavement maintenance management requirements described in Appendix A of AC 150/5380-6C.

This report discusses the evaluation of the airside pavements at Talladega Municipal Airport (ASN), the current and forecasted pavement condition, and the development of the Pavement Capital Improvement Program (PCIP).

1.2. Work Scope

The goals of the Alabama Statewide Airport Pavement Management Update program are as follows:

- Conduct a visual pavement inspection of the asphalt surfaced pavements for 59 of the 72 public use airports in Alabama.
- Based on the visual inspection analysis results, develop a 7-year PCIP for each airport.

The scope of work is as shown below:

- Conduct a Records Review
- Update Pavement Network Definition
- Conduct Pavement Condition Surveys
- Update and customize existing APMP PAVER database
- Develop PCIP and associated project cost estimates
- Prepare Draft and Final Reports
- Develop a web-based viewer for reporting APMP data

As required in the Scope of Work, a detailed pavement condition survey was not conducted for any Portland Cement Concrete (PCC) aprons and PCC taxiways longer than 2,000 ft. Instead, a condition rating of "Good", "Fair", or "Poor" was assigned based on the overall pavement condition.

The deliverable products include a PAVER 7.0 database, individual airport evaluation reports, a statewide summary report, and the web viewer. The ASN report will be one of the 59 individual airport reports that will be available on ALDOT's website.



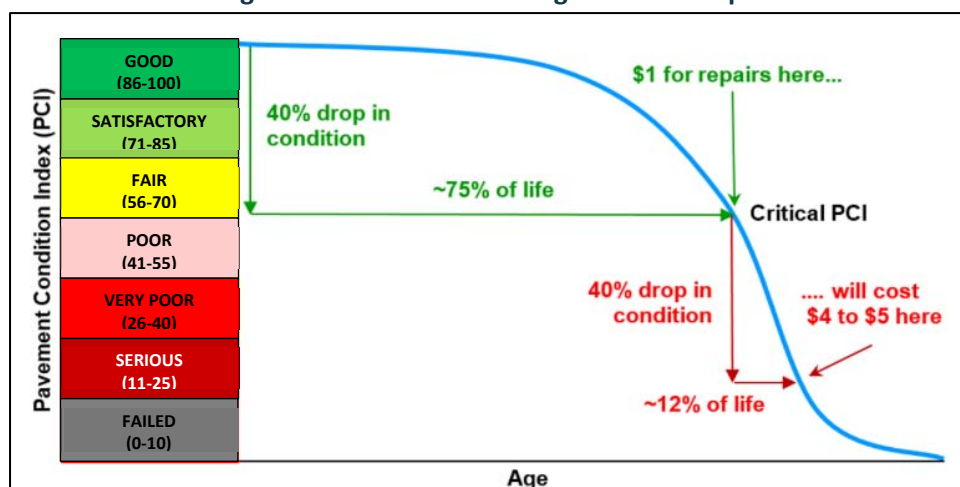
1.3. Pavement Management Concept

An APMP provides an integrated framework for comprehensive evaluation and decision making for managing airfield pavements. The essential components of an effective APMP provide for an objective evaluation of the condition of existing pavements, identification of short-term and long-range major rehabilitation work, necessary improvements in the pavement structural capacity, and the recurring maintenance work that should be completed each year. The APMP will also provide a budget for each of these types of pavement construction.

Historically, most organizations have made maintenance decisions based on past experience, without the benefit of documented data or analysis. This practice does not encourage life cycle cost analysis, nor the evaluation of cost effectiveness of alternate scenarios, and can lead to the inefficient use of funds. With limited allocated funding for Maintenance and Repair (M&R) Program projects, a defined procedure for setting priorities and schedules that will maximize the funds available is more important than ever.

In examining the lifespan of a 20-year pavement, a “Good” to “Fair” condition rating may last only 5 to 15 years. After that point, the rate of deterioration of pavements accelerates sharply as the age of the pavement increases, and within five years, the pavement may deteriorate to the point of failure. In order to extend pavement life, maintenance and repairs need to be scheduled and performed before the pavement surface declines to a “fair” condition. The point at which rehabilitation can be done before the steep decline occurs is called the “critical PCI”, and is generally considered to occur when the Pavement Condition Index (PCI) is between 60 and 70 for general aviation airports. If the work is done before deterioration accelerates, the cost of rehabilitation can be reduced as shown in Figure 1.1.

Figure 1.1: Pavement Management Concept.



2 Airfield Pavement Inventory

2.1. Introduction

ASN is a General Aviation (GA) airport located approximately 8 miles north east of Talladega. The airport was activated in October 1943 and is owned and operated by the City of Talladega. Figure 2.1 shows an aerial image of the airport.

Figure 2.1: Talladega Municipal Airport.



(Source: Google Earth)

2.2. Pavement Inventory

ASN consists of one runway, a parallel taxiway, three connector taxiways, and multiple aprons. The total pavement area is approximately 1.96 million square feet. Pavement surfaces at ASN include Asphalt Concrete (AC) and Asphalt Overlay on AC (AAC). A complete listing of the pavement sections is included in Appendix A. Runway 04-22 is 6,026 ft. long and 100 ft. wide.

A records search was undertaken to identify any preservation or rehabilitation work that has occurred at ASN since the last APMP update in 2009. The following records that were provided by ALDOT were reviewed, and the PAVER database was updated with work history information:

- Rehabilitation of Terminal Apron & Taxiway Connectors, 2010
- Sealcoat Taxiways, 2011



- Overlay Access Taxiway, 2014
- Construct Stub Taxiway, 2015
- Rehabilitation of Taxilanes, 2016
- Rehabilitate Taxiways A3 and Fuel Farm Taxiway, 2017

2.3. Climatic Conditions

Table 3.1 provides a summary of the climatic data for the geographic region that includes ASN. As the table shows, the pavements at ASN are exposed to freeze-thaw cycles from December to February. The mean air temperature for January ranges from an average low of 28 degrees °F to an average high of 54 degrees °F. The average annual rainfall at ASN is near 56 inches.

Table 2.1: Average Annual Temperatures and Rainfall for ASN.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High Temp (°F)	54	59	67	75	81	88	91	90	85	76	66	57
Low Temp (°F)	28	31	38	45	53	61	66	64	58	45	37	30
Precip. (in)	6.1	5.1	6.8	4.8	4.7	4.6	4.7	3.5	3.8	3.4	4.6	4.2

Source: www.intellicast.com

2.4. Pavement Network Definition

A key element in developing an APMP system is defining the pavement network, which is the process of dividing an agency’s pavements into a hierarchical order that facilitates inspection and M&R planning. The ASN network (e.g. all airside pavements) is then divided into branches, which are a readily identifiable part of the pavement system and have distinct functions. For airports, branches typically consist of individual runways, taxiways and aprons. Figure B1A in Appendix B shows the branches at ASN.

Once branches have been defined, pavement evaluation and analysis techniques require the airfield pavement system to be broken up into discrete sections. A pavement “section” is the smallest management unit that is used when considering the application and selection of maintenance and rehabilitation (M&R) treatments, and is defined in Section 2.1.8 of ASTM D 5340-12 as *“a contiguous pavement area having uniform construction, maintenance, usage history, and condition. A section should also have the same traffic volume and load intensity.”* A complete list of the pavement inventory and the corresponding section designations are included in Appendix A. Figure B1B presents the section layout.

To facilitate the visual survey of the airside pavement, each section is further subdivided into conveniently defined sub-section areas, or sample units. Similar sizing is critical as studies have found that maintaining the size of the sample units to within 40 percent of the established norm may reduce the standard error of the average PCI values. To meet that criteria, ASTM recommends that sample units for asphalt pavements be 5,000 square feet (± 2,000).



Table 2.2 was used as a guideline in developing sampling rates that reflect typical rates that are used for other large pavement networks. In general, this sampling rate will not provide a 95% confidence level with a standard error of 5 PCI points. A higher level of sampling is recommended before a project-level rehabilitation design is developed for a pavement section or facility.

Sample units that include a one-time occurrence of a distress (i.e. a large patch) or an unusual severity or quantity of a distress seen elsewhere, were designated as “additional” sample units as described in the ASTM D5340 PCI procedure. This allows the PCI to be calculated without extrapolating the aberrant distress throughout the section as a whole. In Appendix B, Figure B1C shows the sample unit layout for ASN.

Table 2.2: PCI Sampling Rate for AC Surfaces.

Total Samples	Samples to Inspect
1	1
2	2
3 – 6	3
7 – 13	4
14 – 39	5
> 39	15 percent, but less than 12

2.5. Inventory Summary

There are 14 branches (facilities) at ASN that include 27 pavement sections and a total area of approximately 1.96 million square feet of paved surfaces, as shown in Table 2.3.

Table 2.3: ASN Pavement Branches.

Branch ID	Branch Name	Branch Use	Area, sf	Number of Sections
A01	Apron 01	APRON	262,419	2
A02	Apron 02	APRON	67,500	1
ORR22	Overrun Runway 22	OVERRUN	17,500	1
R0422	Runway 04-22	RUNWAY	602,600	2
TA	Taxiway A	TAXIWAY	358,835	1
TA1	Taxiway A1	TAXIWAY	29,368	2
TA2	Taxiway A2	TAXIWAY	28,765	2
TA3	Taxiway A3	TAXIWAY	55,415	3
TA4	Taxiway A4	TAXIWAY	139,679	3
TC01	Taxiway Connector 01	TAXIWAY	10,600	1
TC02	Taxiway Connector 02	TAXIWAY	6,314	1
TC03	Taxiway Connector 03	TAXIWAY	5,776	1
THANG01	Taxiway Hangar 01	TAXIWAY	352,365	6
THANG02	Taxiway Hangar 02	TAXIWAY	19,600	1
Total			1,956,736	27



Table 2.4 shows the distribution of airfield pavement by age with the area-weighted age being greater than 20 years for all airside pavements at ASN.

Table 2.4: ASN Pavement Age.

Age (Years)	Number of Sections	Percent of Area	Area, sf
0 – 5	6	9	184,550
6 – 10	1	4	82,200
11 – 15	2	19	378,435
16 – 20	0	0	0
> 20	18	67	1,311,551

Figure 2.2 shows the distribution by surface type. Figure 2.3 presents the distribution by pavement use (e.g. runway, taxiway, and apron).

Figure 2.2: ASN Pavement Area by Surface Type.

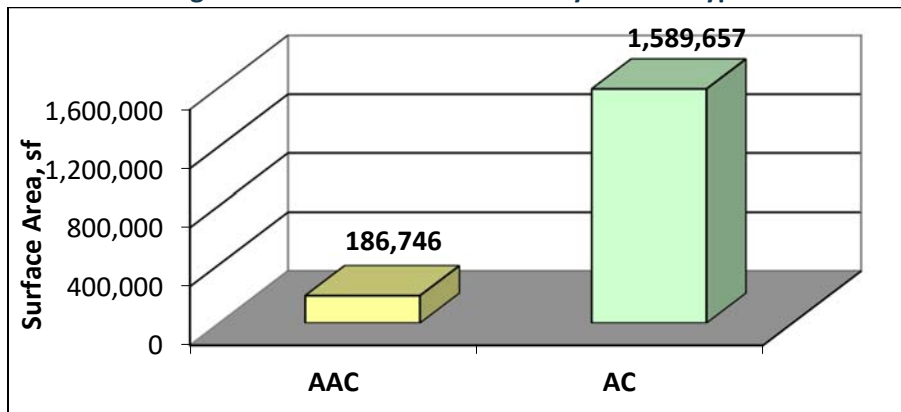
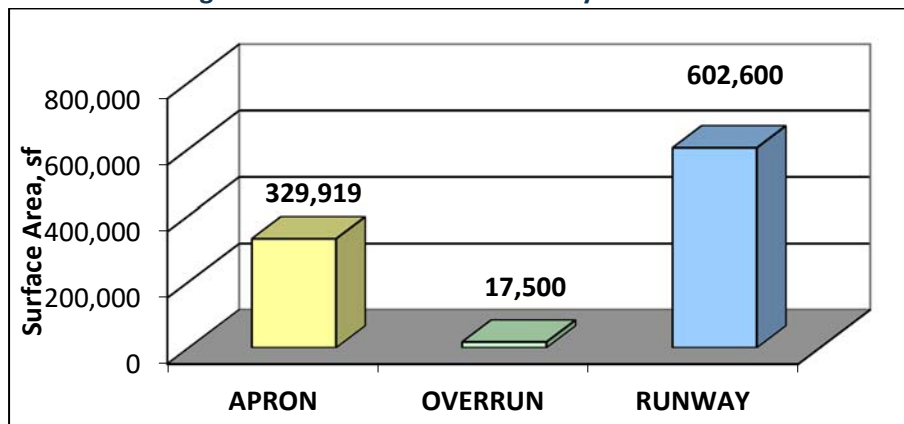


Figure 2.3: ASN Pavement Area by Branch Use.



Maps B1D, B1E, and B1F show the pavement type, branch use, and pavement age, respectively.



3 Pavement Condition

3.1. Introduction

A visual PCI survey of the airside pavements at ASN was conducted in order to assist in the development of a realistic PCIP. The PCI survey measures and records pavement distresses that exist within each of the inspected sample units. This survey was conducted in October 2018 by a two 2-person team. The survey was performed in accordance with the methods described in ASTM D 5340-12 and FAA AC 150/5380-7B, using the sampling rates from Chapter 2 of this API report.

During the pavement survey, Quality Control (QC) and data verification were performed on both the individual distresses and the calculated section PCI values. QC included the following activities;

- Review of distress quantities to identify data entry errors (100% review at the sample unit level). General guidance was used from ASTM D5340-12, section 13, which addresses the precision of distress quantities that are recorded during PCI surveys.
- Duplicate surveys were performed to ensure consistency between each of the inspectors in a 2-person PCI survey team.

3.2. Pavement Condition Rating Methodology

The PCI is a measure of the pavement's functional surface condition. It provides insight into the causes of each distress, and whether the distress is primarily caused by load, climatic conditions, and other material related deficiencies. The PCI is a numerical rating (on a scale of 0 to 100) that is based on the type, severity and quantity of each distress that is found in an inspected sample unit.

The PCI survey results are displayed using seven categories and ratings in accordance with the ASTM, but can also be presented using a simplified 3-category rating system for use in comparing with other distress related indices, as shown in Table 3.1.



Table 3.1: Pavement Condition Index Rating Scale.

	Simplified PCI Color Legend	ASTM PCI Color Legend	PCI Range	PCI Ratings and Definition
GOOD			86-100	<u>GOOD</u> : Pavement has minor or no distresses and should require only routine maintenance.
			71-85	<u>SATISFACTORY</u> : Pavement has scattered low-severity distresses that should require only routine maintenance.
FAIR			56-70	<u>FAIR</u> : Pavement has a combination of generally low- and medium-severity distresses. Near-term maintenance and repair needs may range from routine to major.
POOR			41-55	<u>POOR</u> : Pavement has low-, medium-, and high-severity distresses that probably cause some operational problems. Near-term M&R needs range from routine to major. requirement for
			26-40	<u>VERY POOR</u> : Pavement has predominantly medium- and high-severity distresses that cause considerable maintenance & operational problems. Near-term M&R needs will be major.
			11-25	<u>SERIOUS</u> : Pavement has mainly high-severity distresses that cause operational restrictions; immediate repairs are needed.
			0-10	<u>FAILED</u> : Pavement deterioration has progressed to the point that safe aircraft operations are no longer possible; complete reconstruction is required.

3.3. Distress Types

The ASTM D5340 standard considers 17 distresses, which tend to fall into one of the following four cause categories:

- Load related: AC distresses include alligator cracking, corrugation, depression, polished aggregate, rutting and slippage cracking; PCC distresses include corner breaks, longitudinal cracking, divided slabs, polished aggregate, pumping and joint spalling.
- Climate and durability related: AC distresses include bleeding, block cracking, joint reflection cracking, longitudinal and transverse (L&T) cracking, swelling, raveling, and weathering; PCC distresses include blow-ups, “D” cracking, longitudinal cracking, pop-outs, pumping, scaling, shrinkage cracks, and joint and corner spalling.
- Moisture & Drainage related: AC distresses include alligator cracking, depressions, potholes and swelling; PCC distresses include corner breaks, divided slabs and pumping.
- Other factors: Oil spillage, jet blast erosion, bleeding, patching and concrete slab joint faulting.

As described above, distress may have more than one cause. For example, depressions may be caused by incorrect compaction during construction, or by subgrade softening due to environmental factors. In addition, a distress may be initiated by one cause but may progress to a distress of higher severity by another cause. Therefore, engineering judgment is critical in analyzing the actual causes of the distress.

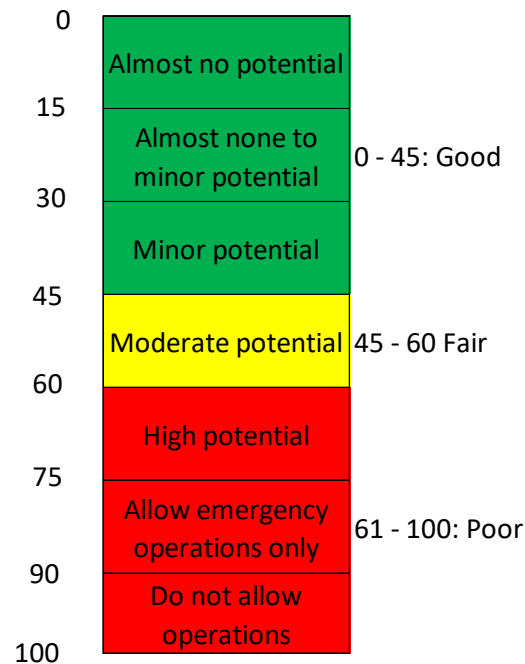
Distress descriptions provided in Appendix C were taken from the “PCI Field Manual,” developed by the U.S. Army Construction Engineering Research Lab (CERL), latest edition. Appendix C provides a detailed explanation of each type of AC and PCC surface distress.

3.4. Additional PCI-based Indices

The distress data used to compute PCI can also be used to calculate additional indices that are helpful in understanding the condition of the pavement and developing PCIP recommendations. One additional index that was computed is the Foreign Object Damage (FOD) potential index.

The FOD index was developed by the US Air Force and is described in detail in the US Army Corp of Engineers Engineering Technical Letter (ETL) 04-09, Pavement Engineering Assessment (EA) Standards. Loose objects on an airfield pavement surface resulting from pavement distresses can be detrimental to aircraft engines, specifically engines that are low to the ground. The objects are ingested into the engines causing costly damage and presenting a safety hazard. Not all pavement distresses create a FOD potential. Therefore, an additional index was identified that uses the results of the PCI distress survey. As shown in Figure 3.1, the scale ranges from 0 to 100 with 0 being no FOD potential. Note that the FOD index uses a simplified three color scale.

Figure 3.1: FOD Potential Rating Scale.





3.5. PCI Survey Results

The condition of the overrun was not included in the overall PCI computations and it was not considered for the PCIP. The airside pavements at ASN include 26 sections with 386 sample units. The sample number of sample units that were surveyed in the field is 113, which is 29 percent of the total samples. Data from the inspected sample units were input into the PAVER database and a resultant PCI for each section was computed.

Figure 3.2 presents the area-weighted PCI by use and the overall airside network.

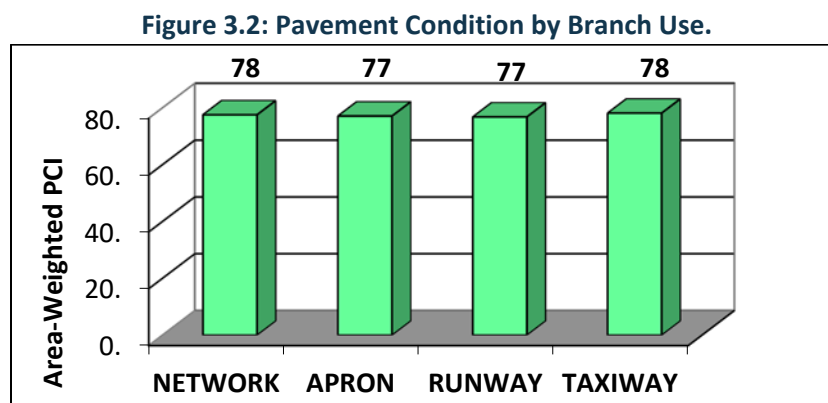


Figure 3.3 shows the distribution of the ASN pavement network by condition. Approximately 5 percent of the network is in “Poor” or worse condition.

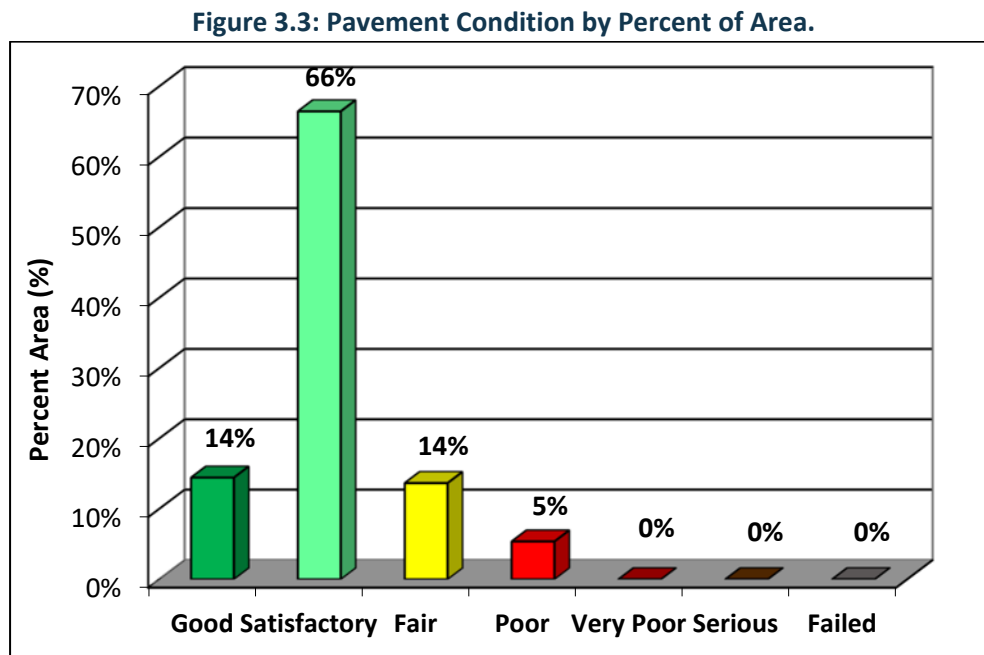


Table 3.2 is a listing of the section PCI.

Table 3.2: Section PCI.

Name	Section ID	Surface	Area (sf)	PCI	PCI Category	FOD
Apron 01	02	AC	150,000	81	Satisfactory	31
Apron 01	01	AAC	112,419	84	Satisfactory	26
Apron 02	01	AC	67,500	57	Fair	58
Runway 04-22	02	AC	20,000	100	Good	0
Runway 04-22	01	AC	582,600	76	Satisfactory	36
Taxiway A	01	AC	358,835	83	Satisfactory	28
Taxiway A1	02	AC	10,806	76	Satisfactory	36
Taxiway A1	01	AC	18,562	63	Fair	51
Taxiway A2	01	AC	17,908	66	Fair	46
Taxiway A2	02	AC	10,857	70	Fair	42
Taxiway A3	02	AC	6,677	79	Satisfactory	33
Taxiway A3	03	AAC	29,634	100	Good	0
Taxiway A3	01	AC	19,104	69	Fair	44
Taxiway A4	01	AC	12,786	75	Satisfactory	35
Taxiway A4	02	AAC	44,693	100	Good	0
Taxiway A4	03	APC	82,200	87	Good	23
Taxiway Connector 01	01	AC	10,600	51	Poor	64
Taxiway Connector 02	01	AC	6,314	80	Satisfactory	32
Taxiway Connector 03	01	AC	5,776	100	Good	0
Taxiway Hangar 01	05	APC	42,133	100	Good	0
Taxiway Hangar 01	06	APC	56,000	100	Good	0
Taxiway Hangar 01	01	AC	29,017	72	Satisfactory	41
Taxiway Hangar 01	03	AC	131,439	58	Fair	57
Taxiway Hangar 01	02	AC	65,691	50	Poor	54
Taxiway Hangar 01	04	AC	28,085	54	Poor	61
Taxiway Hangar 02	01	AC	19,600	82	Satisfactory	29

Figure B2A and B2B in Appendix B are maps of the section PCI in 7- and 3-scale categories, respectively. Figure B2C is a map of the FOD rating. Appendix D contains a detailed report of the PCI values and distress type, quantity, and severity data for each sample unit that was surveyed in a section. Appendix E is a summary report of the extrapolated distress data at the section level.

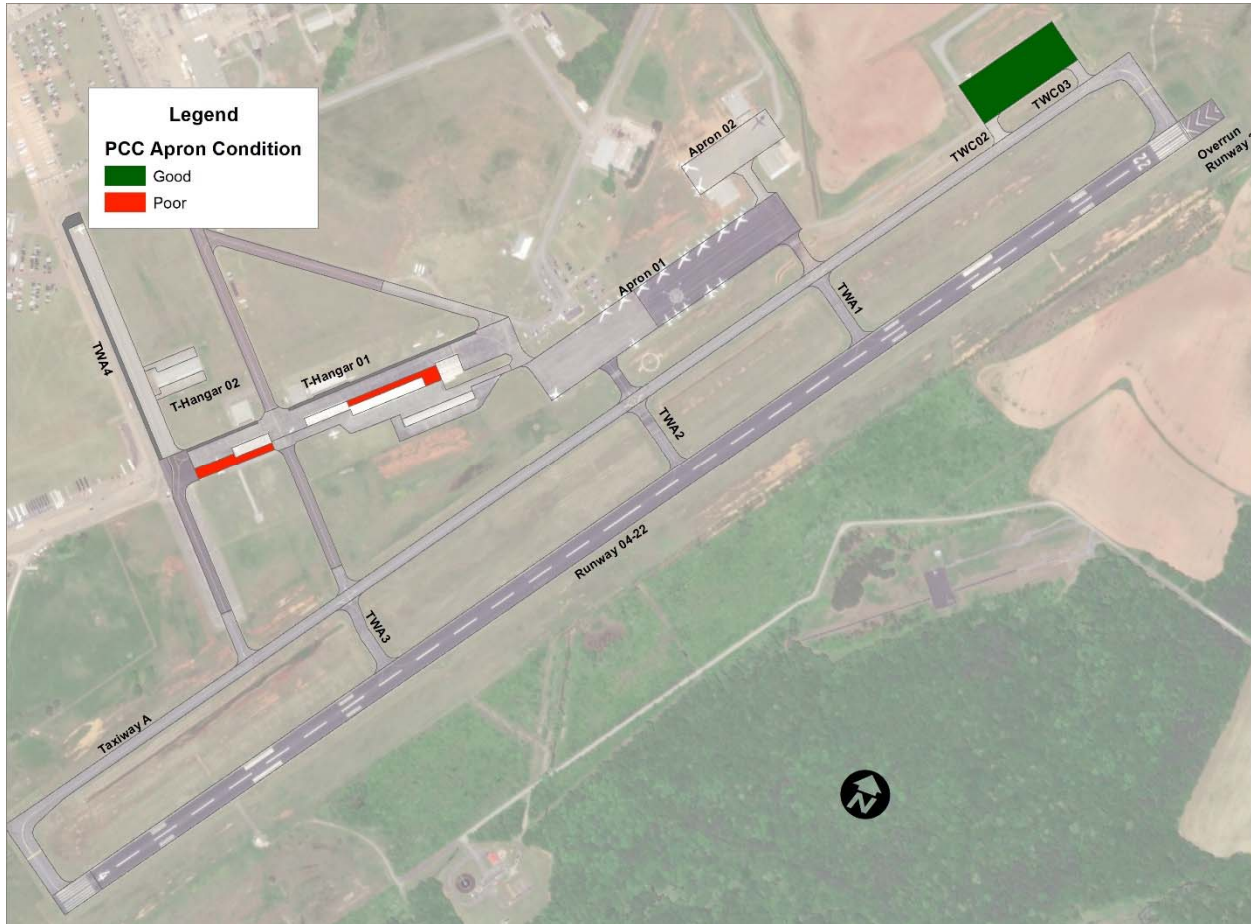
Appendix F contains current section and branch PCI data and forecasted section PCI values. FOD values by section and branch are also presented. Figure B2D in Appendix B shows the locations of the photos that were taken during the survey. Photos are included in Appendix J.



3.6. PCC Pavements

As stated earlier, the project scope did not include a detailed pavement condition survey for any Portland Cement Concrete (PCC) aprons. For these pavements, a rating of “Good”, “Fair”, or “Poor” was assigned based on the overall pavement condition. Figure 3.4 shows the condition of the PCC aprons at ASN.

Figure 3.4: PCC Apron Condition Rating.



4 Pavement Capital Improvement Program

4.1. Introduction

PCI data were collected and entered into the PAVER database. In addition, the database customization included the following components, which are described in detail in this chapter.

1. Performance Modeling
2. Maintenance & Repair (M&R) Triggers (Critical PCI)
3. M&R Policies
4. Unit Costs

Once the database was customized, it was used to run budget analysis scenarios and develop a 7-year PCIP.

4.2. Performance Modeling

To determine long-term M&R needs, a APMP must be able to predict future pavement condition. Future pavement condition is predicted using equation models that are generated from current and historical PCI data. Equation models are developed by grouping pavements based on similar performance characteristics such as region, construction history, surface type, traffic, priority and use. Mathematical techniques such as straight-line extrapolation and regression that include boundary and outlier filters are used to develop models that provide the best fit equation for the pavement condition data. PAVER's Prediction Modeling module was used to develop pavement performance models that are commonly referred to as 'Family Curves'.

Prediction models are used at the section level to compute future conditions based on the typical performance of the pavement sections that are included in each model. Future condition is computed by defining its position relative to the prediction model. The section prediction curve, or equation, is drawn through the current PCI-age point for each specific section. Since the shifted curve will run parallel to the computed prediction model, the predicted condition can be computed for any future age. Figure 4.1 is an illustration of this process.

Prediction models provide an effective way to compute future pavement performance based on past and current conditions, and pavement maintenance and rehabilitation practices. As new PCI inspection surveys are conducted, these models should be updated accordingly. In the case of the Alabama statewide airport pavement network, the best fit family curves were developed for each region by grouping pavements according to branch use (e.g. runway, taxiway) and surface type (e.g. AC, AAC, and APC). The family curves for ALDOT were developed based on branch use and are presented in Figure 4.2.



Figure 4.1: PCI Forecasting.

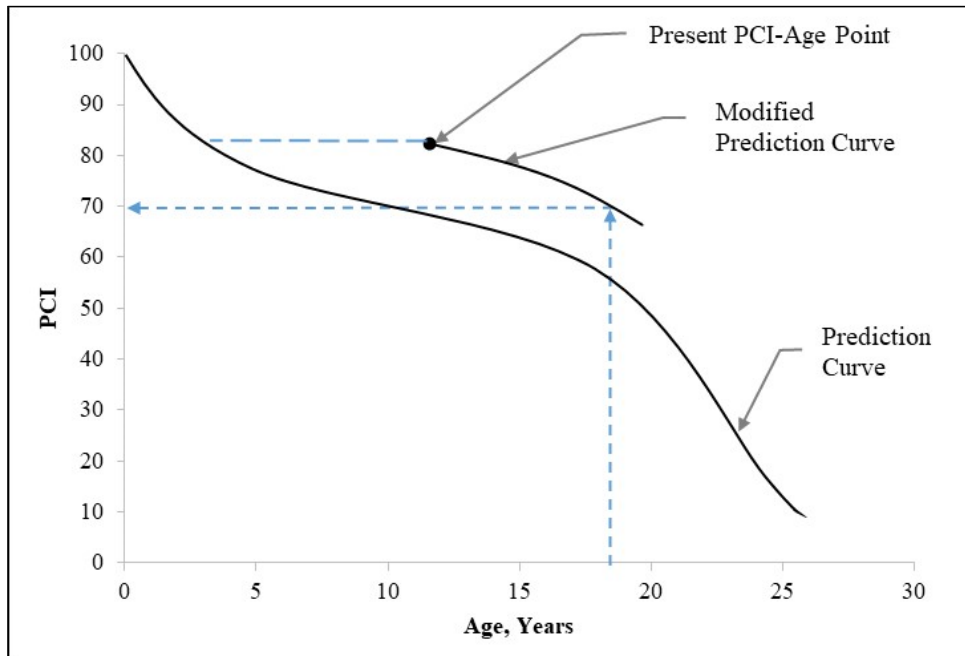
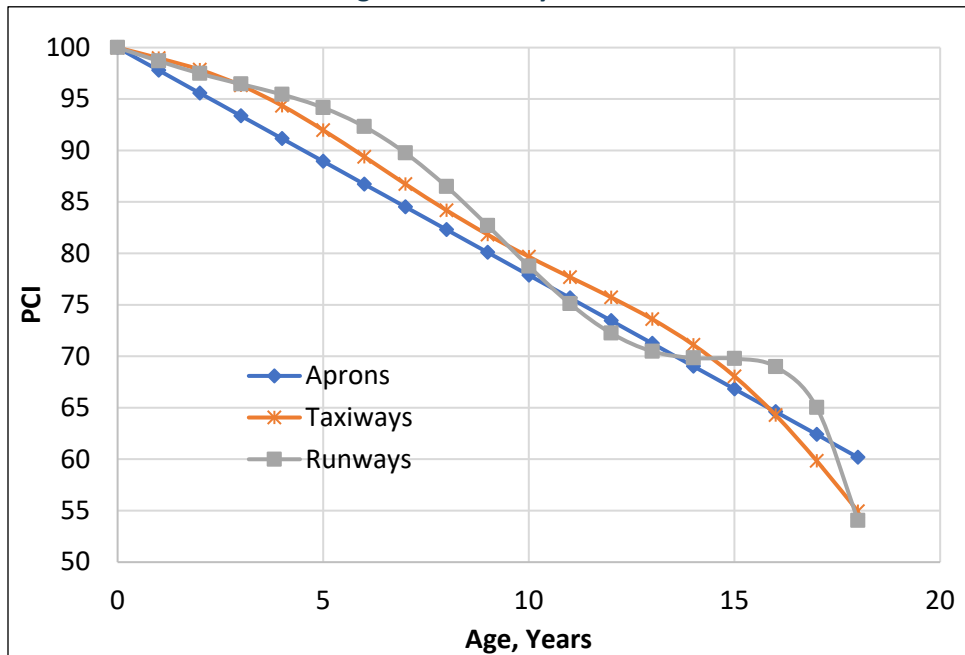


Figure 4.2: Family Curves.



4.3. Critical PCI Values

The Critical PCI value is defined as “the PCI value at which the rate of PCI loss increases with time, or the cost of applying localized preventive maintenance increases significantly.” This definition is incorporated into PAVER in defining and measuring the critical PCI values. These values, or M&R triggers, are assigned for each prediction model. As such, the critical PCI values are directly related to the branch use.

These critical PCI levels are selected based on several factors including a review of performance models; experience; other airport triggers; and acknowledge that time is required for funding approval and design. Note that preventive maintenance is recommended, and it should generally be performed above the critical PCI (trigger) values and Major M&R is generally performed below them. The critical PCI (CP) values were set at 70 for runways and taxiways, and 65 for other pavements.

4.4. M&R Policies and Unit Costs

M&R policies refer to the activities that are applied at different condition levels to maintain and repair a pavement section.

Maintenance activities are localized activities which are typically assigned in the first year of the M&R plan based on the observed distresses. Safety (stopgap) maintenance addresses distresses that would affect operational safety if left unrepaired and is applied to pavements below the critical PCI. Preventive maintenance activities are aimed at slowing the rate of deterioration through consistent maintenance of existing pavements and are generally applied to pavements above the critical PCI. Appendix G presents the policies for preventive and safety maintenance.

Repair activities are conducted for larger areas, typically at the section level and are assigned based on the critical PCI. Repair activities broadly consist of three categories: preservation, rehabilitation, and reconstruction. Pavement preservation involves activities like surface treatments that are used to extend pavement service life and to delay more expensive rehabilitation work. These are applied when the pavement is in relatively good condition and does not exhibit any structural distress. Rehabilitation activities are used to repair pavements below or around the critical PCI and typically include mill and overlay. Reconstruction is recommended when the pavement has deteriorated to a level where rehabilitation is no longer cost effective.

Table 4.1 lists the pavement activity types, the individual activities within each type, and their associated 2020 unit costs. A more detailed description of the M&R activities and the development of the M&R unit costs is presented in Appendix H.

In accordance with ALDOT’s focus on preservation, surface treatment is applied to all resurfaced and reconstructed runways, taxiways, and aprons three years after construction work is complete. Taxilanes and T-Hangar pavements are excluded from this requirement. This policy is applicable for projects in the PCIP between 2021 and 2024. For cost estimating, this surface treatment is assumed to have the same cost as the runway surface treatment.



Table 4.1: M&R Activities and Unit Costs.

Activity Type	PCI	Activity	Cost/sf
Maintenance	Note 1	Seal Cracks – AC (\$/lf)	\$3.95
		AC Full-Depth Patching	\$25.05
		AC Partial-Depth Patching	\$16.28
Preservation	75-90	Runway Surface Treatment	\$0.57
		Taxiway and Apron Surface Treatment	\$0.85
Rehabilitation	> CP	2" AC OL ²	\$3.91
	55 - CP	Mill 2" & 2" AC OL	\$4.27
	45 - 55	Mill 2" & 3" AC OL	\$5.37
Reconstruction	0 - 45	AC Reconstruction	\$9.87

¹ Preventive > CP; Safety (Stopgap) < CP

² For sections with structural distress and PCI > CP

4.5. Pavement CIP Development

The PAVER database, updated with condition data and customized with condition performance priorities, policies, and costs; was used to evaluate the effect of multiple funding levels on the overall future pavement condition. This output was further used to develop the PCIP. Figure 4.3 illustrates the process that PAVER uses in the funding analysis.

The following M&R funding levels were used for the ASN pavement network to help establish the 7-Year PCIP. Figure 4.4 presents the network area-weighted average PCI for each of the following funding scenarios at the end of the analysis period:

- Unlimited Funding: Unlimited funding is available for all pavement needs. The PCI increases to 85 by 2027.
- Maintain PCI: Maintain existing PCI of 78.
- Constrained Funding: This scenario constrains the funding to \$1 million each year (total of \$7 million). The PCI decreases to 68 in 2027.
- Do Nothing: Performing no M&R would reduce the network PCI from 78 to 55 by 2027.

Figure 4.3: Budget Analysis Process.

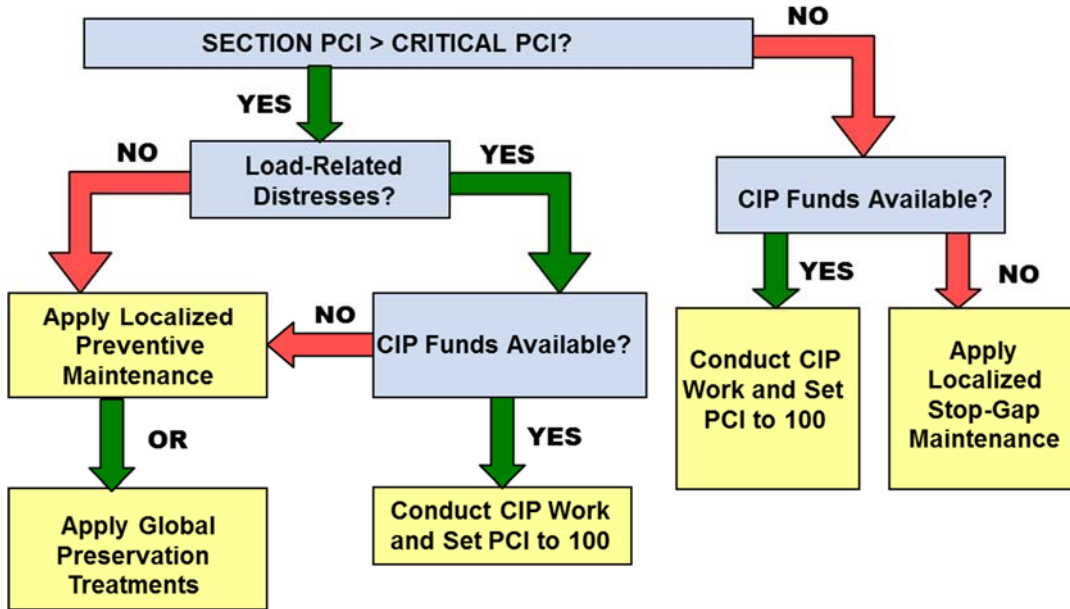


Figure 4.4: M&R Funding Levels.

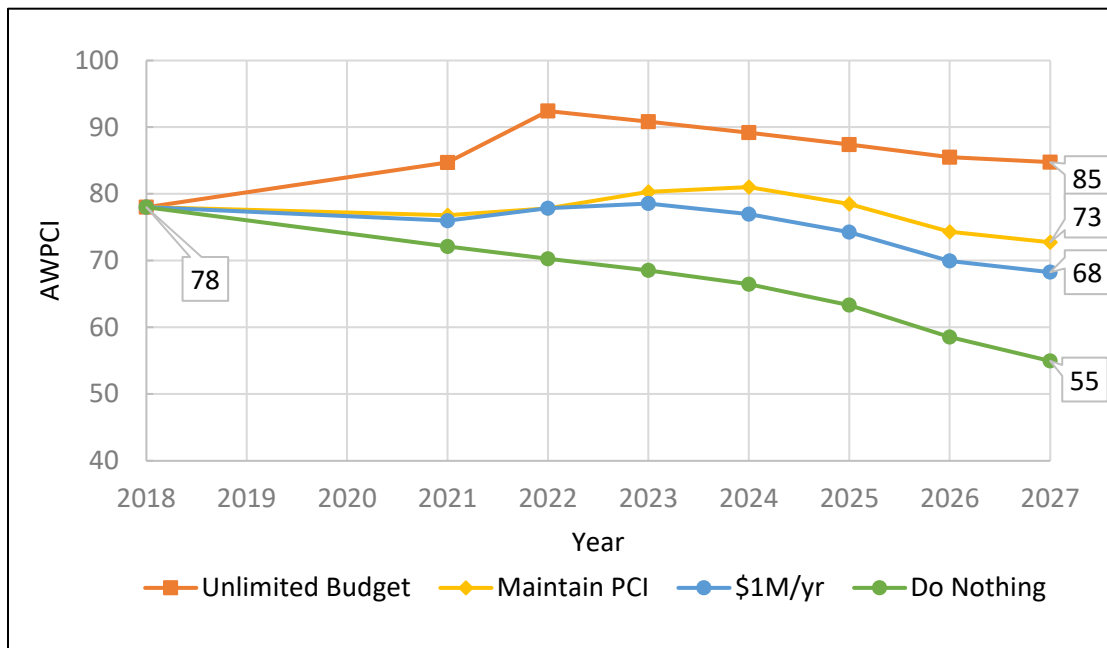


Table 4.2 summarizes the annual funding required for the above analyses. For the unlimited analysis, all pavement needs are funded in the year they are required. Therefore, the unfunded costs are zero. The total funded amount over the 7-year period is approximately \$6.3 million. For the annual funding level of \$1 million per year, funding is prioritized based on the prioritization matrix. When the needs exceed the funding for any year, the remaining sections are transferred to the succeeding year and the amount



for these activities are represented as “unfunded”. The “unfunded” repairs in 2027 for this funding level is approximately \$5.1 million.

Table 4.2: Summary of M&R Funding Level Analyses.

Year	Unlimited	Maintain PCI	Constrained \$1M/year	Do Nothing
2021	\$3,078,000	\$1,156,000	\$950,000	\$0
2022	\$2,625,000	\$696,000	\$927,000	\$0
2023	\$50,000	\$1,281,000	\$748,000	\$0
2024	\$53,000	\$766,000	\$66,000	\$0
2025	\$28,000	\$34,000	\$51,000	\$0
2026	\$33,000	\$44,000	\$71,000	\$0
2027	\$455,000	\$469,000	\$502,000	\$0
Total	\$6,321,000	\$4,447,000	\$3,314,000	\$0
2027 Backlog	-	\$3,585,000	\$5,134,000	\$11,783,000

Map B3A in Appendix B presents the 2027 forecasted PCI by section when the M&R activities recommended in the CIP are not conducted.

4.6. Pavement Capital Improvement Program

The unlimited funding analysis contains rehabilitation activities for sections from the same branch spread out over the seven-year period, which is not always operationally feasible to construct. The analysis output was treated as a starting point in developing the CIP. Sections were often integrated together to account for construction feasibility and other factors, resulting in larger projects which were more realistic. In addition, each project could contain sections whose condition did not trigger rehabilitation but were included to provide a logical plan which would avoid creating “islands” of newer pavement within a particular feature. For example, if the PAVER analysis showed rehabilitation was required for eight out of 10 sections on a runway, the entire runway would be recommended for rehabilitation to provide a continuous new pavement surface.

Table 4.3 shows the projects and the associated costs for the recommended 7-year PCIP. Table 4.4 is a more detailed view of the PCIP. This table lists the individual pavement section, section level M&R work, section repair cost, surface area and the PCI before the M&R is applied. The costs that are presented represent an annual escalation rate of 3% for the unit costs. The total 7-year PCIP cost is approximately \$7.4 million. Map B3B shows the recommended repair types, while Map B3C presents the recommended projects and activities in the PCIP. Appendix I1 presents a summary of the recommended activities and cost by year for each section at ASN.



Table 4.3: Summary of 7-Year PCIP by Project.

Project Year	CIP Project	Total Project Cost	Total Project Area (sf)	AWPCI Before	AWPCI After
2021	ASN_21-01_Taxiway A Preservation	\$325,145	370,925	79	85
	ASN_21-02_Apron 01 Preservation	\$230,031	262,419	77	84
	ASN_21-03_Taxiway A4 Preservation	\$89,236	101,800	81	88
	ASN_21-04_Runway 04-22 Rehabilitation	\$3,095,578	699,300	70	100
2022	ASN_22-01_Hangar Taxiways Reconstruction	\$2,490,642	254,232	45	100
2023	ASN_23-01_Apron 02 Rehabilitation	\$510,191	78,100	46	100
2024	ASN_24-01_Runway 04-22 Surface Treatment	\$445,057	699,300	96	99
2025	ASN_25-01_Taxiway A3 Preservation	\$29,237	29,634	89	96
	ASN_25-02_Taxiway A4 Preservation	\$44,094	44,693	89	96
	ASN_25-03_Hangar Taxiway Preservation	\$96,818	98,133	89	96
2026	ASN_26-01_Apron 02 Surface Treatment	\$52,732	78,100	94	98
Total		\$7,408,761			

Table 4.4: Summary of 7-Year PCIP by Project and Section.

Branch	Section	Area, SF	PCI Before Rehab	Activity	Activity Type	Cost
ASN_21-01_Taxiway A Preservation						\$555,177
TA	01	358,835	78	Taxiway & Apron Surface Treatment	Preservation	\$314,548
TC02	01	6,314	76	Taxiway & Apron Surface Treatment	Preservation	\$5,535
TC03	01	5,776	98	Taxiway & Apron Surface Treatment	Preservation	\$5,063
A01	01	112,419	79	Taxiway & Apron Surface Treatment	Preservation	\$98,544
A01	02	150,000	79	Taxiway & Apron Surface Treatment	Preservation	\$131,487
ASN_21-03_Taxiway A4 Preservation						\$89,236
TA4	03	82,200	82	Taxiway & Apron Surface Treatment	Preservation	\$72,055
THANG02	01	19,600	77	Taxiway & Apron Surface Treatment	Preservation	\$17,181
ASN_21-04_Runway 04-22 Rehabilitation						\$3,095,578
R0422	01	582,600	72	Mill 2" & 2" AC OL	Rehabilitation	\$2,561,499
R0422	02	20,000	97	Mill 2" & 2" AC OL	Rehabilitation	\$87,933
TA1	01	18,562	52	Mill 2" & 3" AC OL	Rehabilitation	\$102,599
TA1	02	10,806	71	Mill 2" & 2" AC OL	Rehabilitation	\$47,510
TA2	01	17,908	56	Mill 2" & 2" AC OL	Rehabilitation	\$78,736



Branch	Section	Area, SF	PCI Before Rehab	Activity	Activity Type	Cost
TA2	02	10,857	62	Mill 2" & 2" AC OL	Rehabilitation	\$47,735
TA3	01	19,104	60	Mill 2" & 2" AC OL	Rehabilitation	\$83,994
TA3	02	6,677	75	Mill 2" & 2" AC OL	Rehabilitation	\$29,357
TA4	01	12,786	70	Mill 2" & 2" AC OL	Rehabilitation	\$56,216
ASN_22-01_Hangar Taxiways Reconstruction						\$2,490,642
THANG01	01	29,017	60	Mill 2" & 2" AC OL	Rehabilitation	\$131,405
THANG01	02	65,691	40	AC Reconstruction	Reconstruction	\$688,145
THANG01	03	131,439	45	AC Reconstruction	Reconstruction	\$1,376,887
THANG01	04	28,085	43	AC Reconstruction	Reconstruction	\$294,204
ASN_23-01_Apron 02 Rehabilitation						\$510,191
A02	01	67,500	48	Mill 2" & 3" AC OL	Rehabilitation	\$395,819
TC01	01	10,600	37	AC Reconstruction	Reconstruction	\$114,371
ASN_24-01_Runway 04-22 Surface Treatment						\$445,057
R0422	01	582,600	-	Surface Treatment	Preservation	\$370,785
R0422	02	20,000	-	Surface Treatment	Preservation	\$12,729
TA1	01	18,562	-	Surface Treatment	Preservation	\$11,813
TA1	02	10,806	-	Surface Treatment	Preservation	\$6,877
TA2	01	17,908	-	Surface Treatment	Preservation	\$11,397
TA2	02	10,857	-	Surface Treatment	Preservation	\$6,910
TA3	01	19,104	-	Surface Treatment	Preservation	\$12,158
TA3	02	6,677	-	Surface Treatment	Preservation	\$4,249
TA4	01	12,786	-	Surface Treatment	Preservation	\$8,137
ASN_25-01_Taxiway A3 Preservation						\$29,237
TA3	03	29,634	-	Taxiway & Apron Surface Treatment	Preservation	\$29,237
ASN_25-02_Taxiway A4 Preservation						\$44,094
TA4	02	44,693	-	Taxiway & Apron Surface Treatment	Preservation	\$44,094
ASN_25-03_Hangar Taxiway Preservation						\$96,818
THANG01	05	42,133	-	Taxiway & Apron Surface Treatment	Preservation	\$41,568
THANG01	06	56,000	-	Taxiway & Apron Surface Treatment	Preservation	\$55,250
ASN_26-01_Apron 02 Surface Treatment						\$52,732
A02	01	67,500	-	Surface Treatment	Preservation	\$45,575
TC01	01	10,600	-	Surface Treatment	Preservation	\$7,157
Total						\$7,408,761

Chapter 4, Pavement Capital Improvement Program

The FAA, under the Airport Improvement Program (AIP) provides approximately 90 percent of eligible costs for planning and development of public-use airports included in the NPIAS as grants. The remaining 10 percent of costs are shared between ALDOT and the airport sponsor. The following is the distribution of the 7-yr PCIP cost of \$7.4 million for ASN:

- FAA (90%): \$6.6 million
- ALDOT (5%): \$0.4 million
- Airport Sponsor (5%): \$0.4 million

The recommendations within the PCIP are based on a network-level study and should be used for planning purposes only. A detailed project-level assessment should be conducted for each project to determine the appropriate repair activities and develop more accurate cost estimates.

Table 4.5 summarizes the maintenance activities that are recommended for Year 1 (2021). The estimated cost is approximately \$173,736. A complete listing of the maintenance activities by section is presented in Appendix I2. This may be used as a basis for establishing an annual maintenance budget for the ASN pavements.

Table 4.5: Summary of Year-1 Maintenance Plan.

Policy	Work Description	Work Quantity	Work Unit	Work Cost
Maintenance	Crack Sealing - AC	19,145	Ft	\$75,623
	Patching - AC Full-Depth	1,155	SqFt	\$28,939
	Patching - AC Partial-Depth	7	SqFt	\$112
Safety	Crack Sealing - AC	826	Ft	\$3,264
	Patching - AC Full-Depth	2,627	SqFt	\$65,798
Total				\$173,736

APPENDIX A
INVENTORY



APPENDIX B

PMP Maps

B1: Inventory Maps

B1A: Branch Identification

B1B: Section Identification

B1C: Sample Unit Layout

B1D: Pavement Type

B1E: Branch Use

B1F: Pavement Age

B2: Surface Condition Maps

B2A: 7-Color PCI

B2B: 3-Color PCI

B2C: FOD Rating

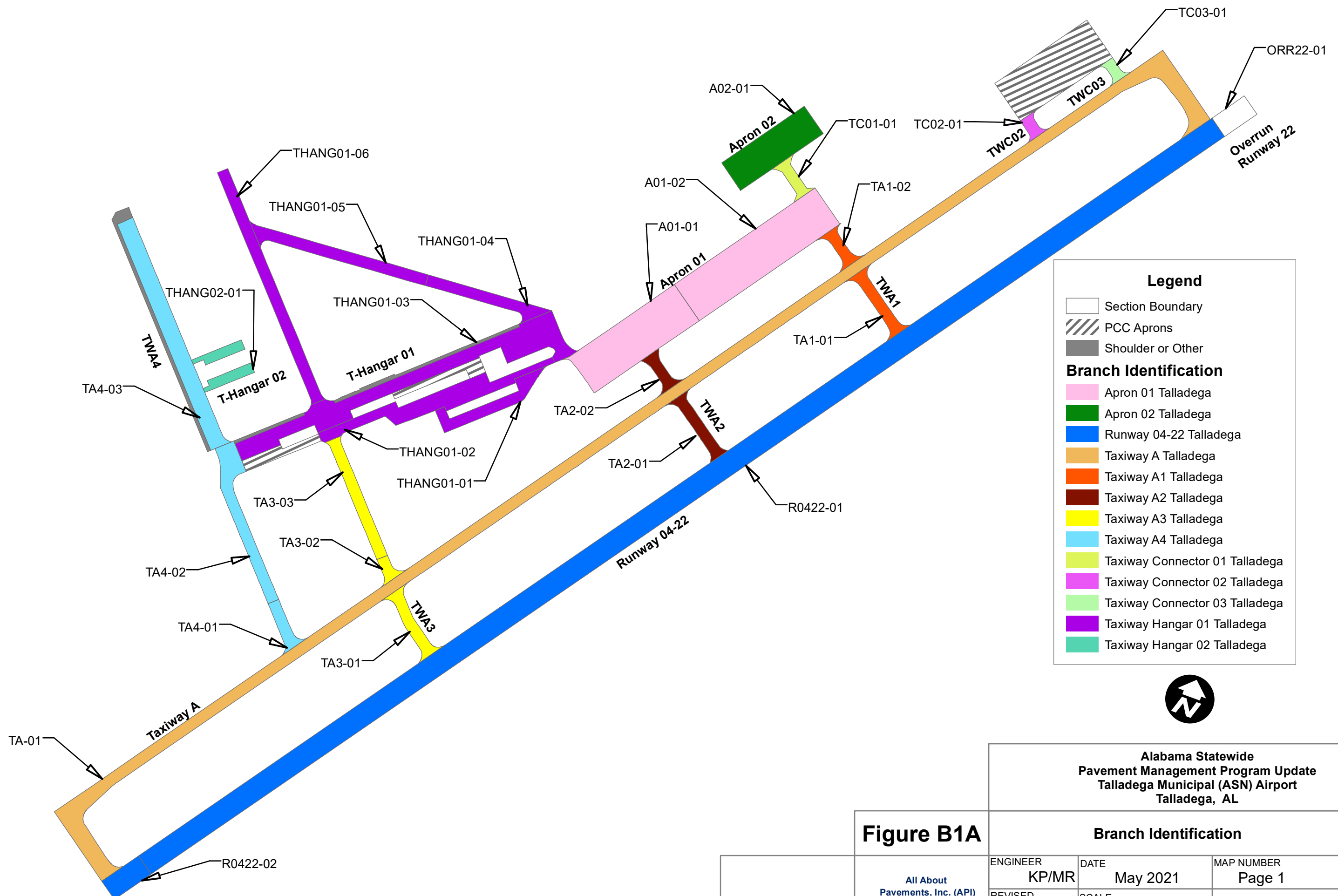
B2D: Survey Photo Locations

B3: Pavement Capital Improvement Plan (PCIP) Maps

B3A: 2027 Forecasted PCI without PCIP

B3B: M&R Needs

B3C: PCIP Recommendations



Legend

- Section Boundary
- PCC Aprons
- Shoulder or Other

Branch Identification

- Apron 01 Talladega
- Apron 02 Talladega
- Runway 04-22 Talladega
- Taxiway A Talladega
- Taxiway A1 Talladega
- Taxiway A2 Talladega
- Taxiway A3 Talladega
- Taxiway A4 Talladega
- Taxiway Connector 01 Talladega
- Taxiway Connector 02 Talladega
- Taxiway Connector 03 Talladega
- Taxiway Hangar 01 Talladega
- Taxiway Hangar 02 Talladega

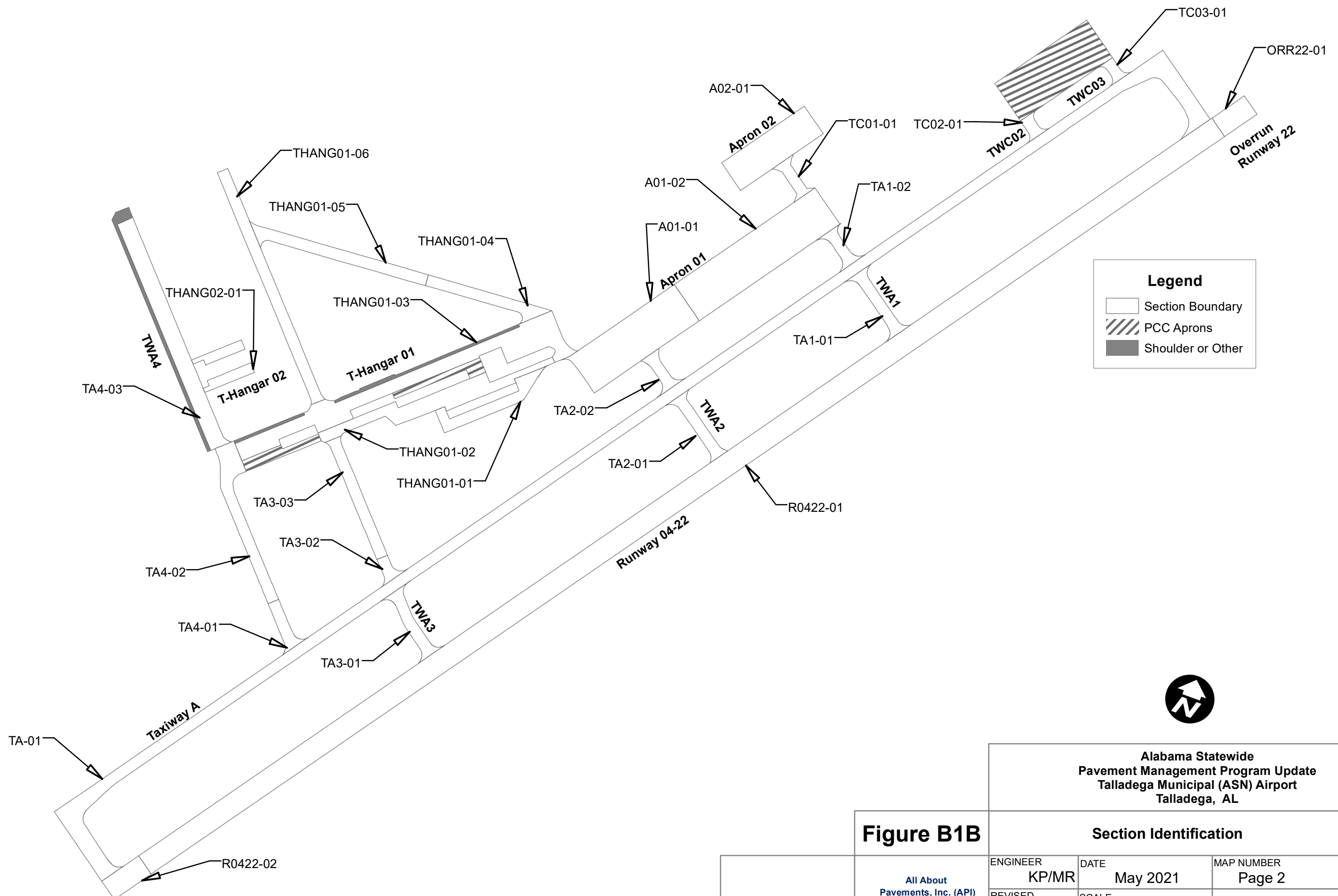


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Talladega, AL**




Figure B1A

Branch Identification		
ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 1
REVISED JMA	SCALE 1 in = 400 ft	FINAL

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Legend

-  Section Boundary
-  PCC Aprons
-  Shoulder or Other

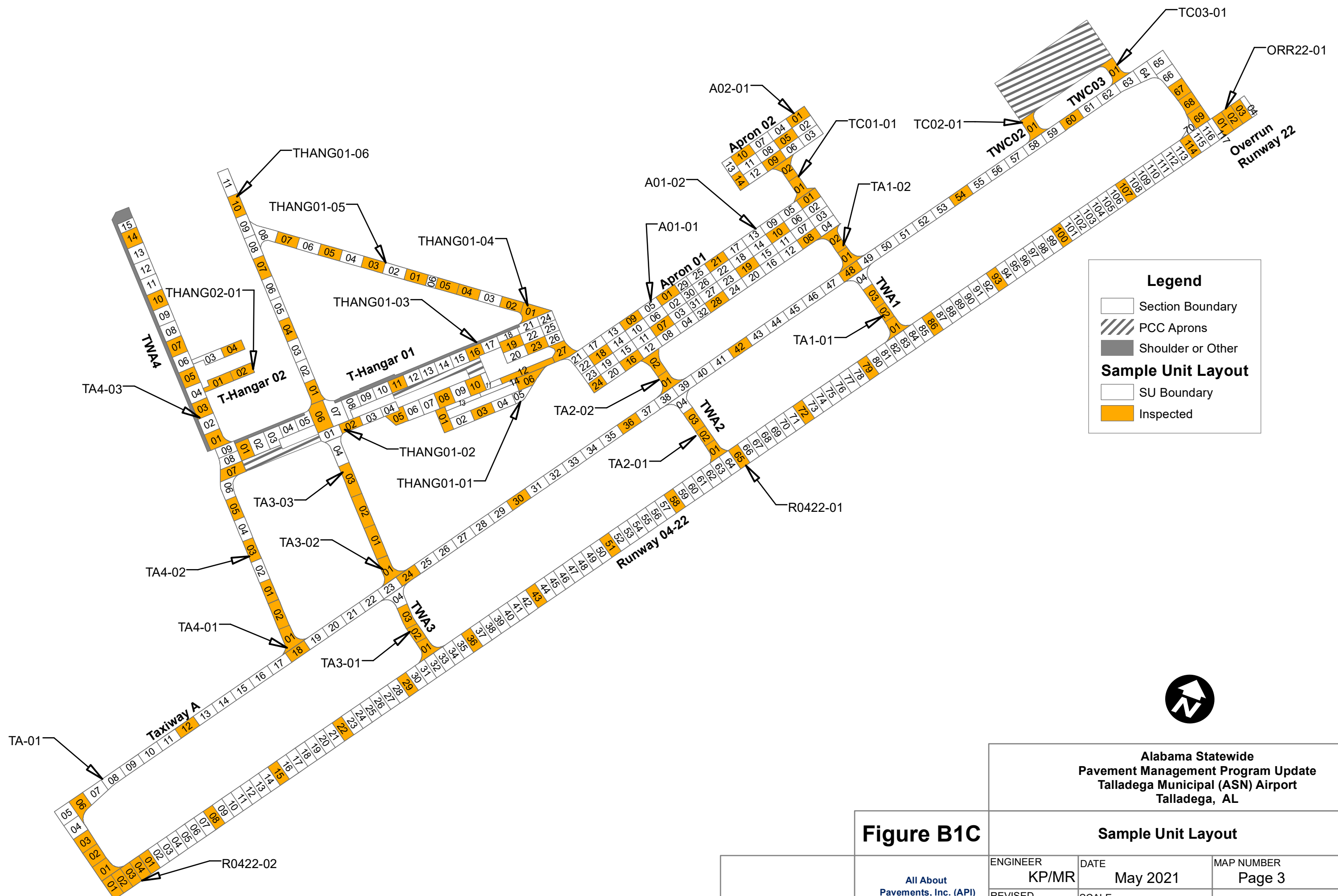


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Figure B1B

Section Identification		
ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 2
REVISED JMA	SCALE 1 in = 400 ft	FINAL

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Legend

- Section Boundary
- PCC Aprons
- Shoulder or Other

Sample Unit Layout

- SU Boundary
- Inspected

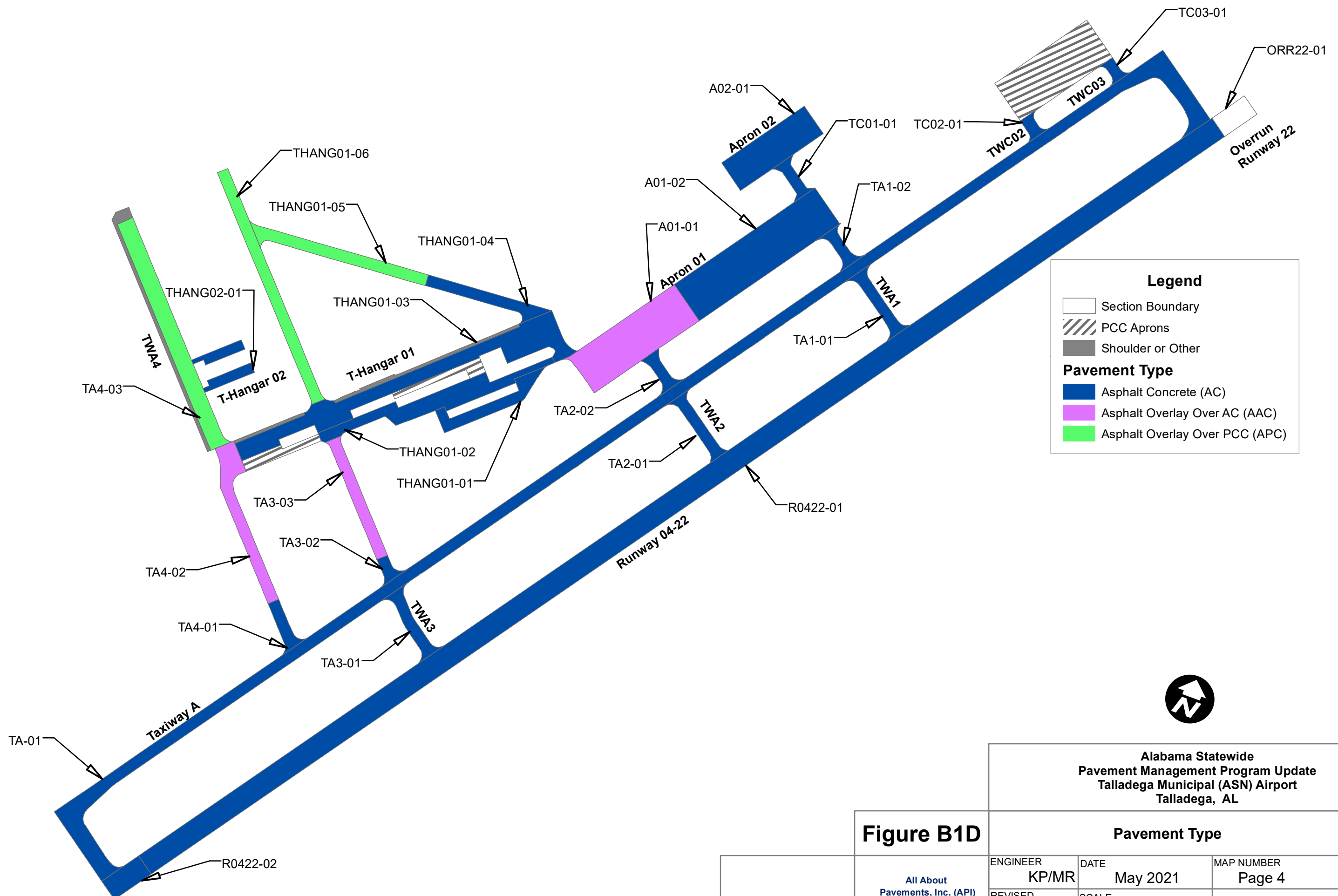


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Figure B1C

Sample Unit Layout

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	REVISED JMA	SCALE 1 in = 400 ft	FINAL



Legend

- Section Boundary
- PCC Aprons
- Shoulder or Other

Pavement Type

- Asphalt Concrete (AC)
- Asphalt Overlay Over AC (AAC)
- Asphalt Overlay Over PCC (APC)

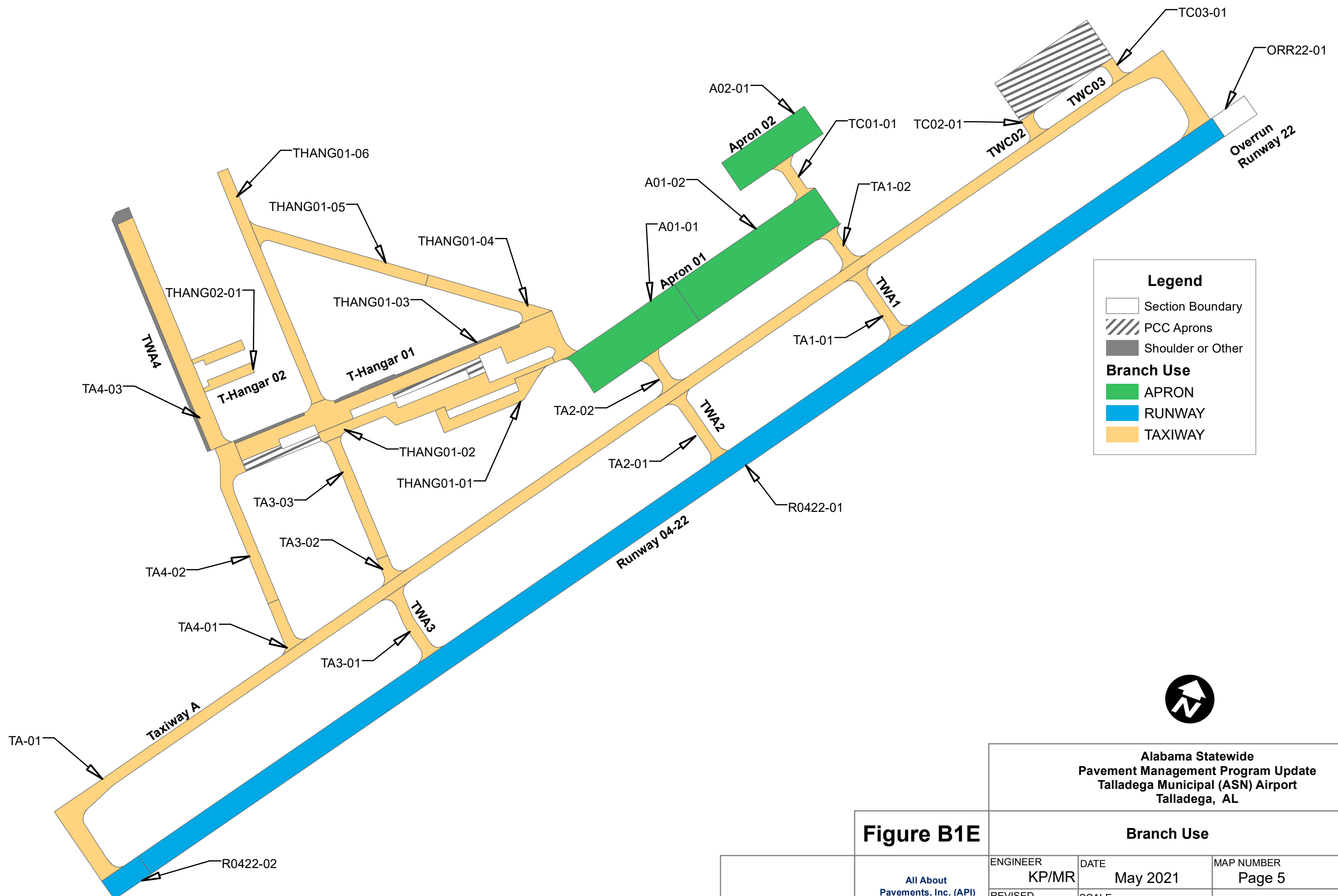


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Figure B1D

Pavement Type		
ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 4
REVISED JMA	SCALE 1 in = 400 ft	FINAL

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Legend

- Section Boundary
- PCC Aprons
- Shoulder or Other

Branch Use

- APRON
- RUNWAY
- TAXIWAY

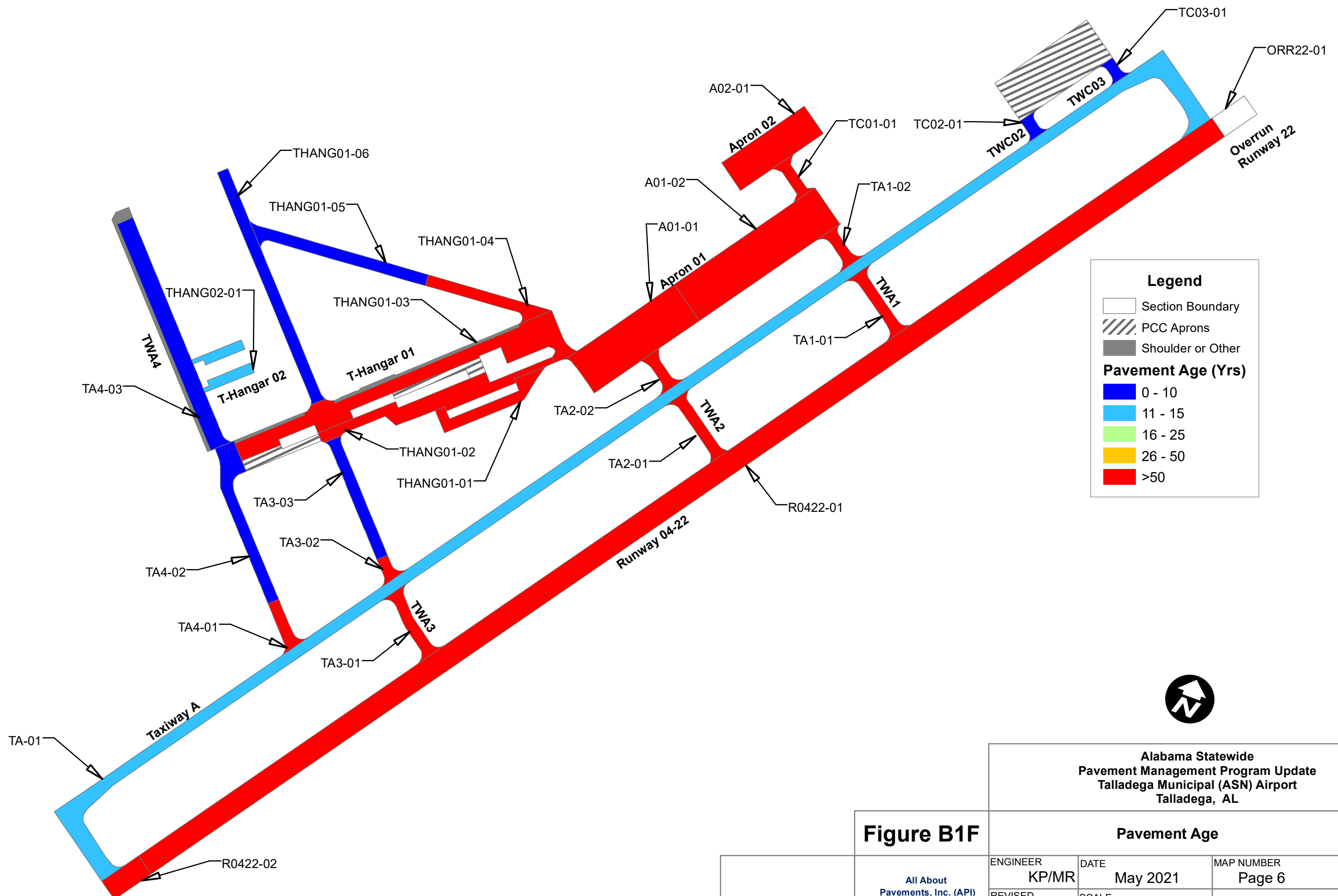


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Figure B1E

Branch Use		
ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 5
REVISED JMA	SCALE 1 in = 400 ft	FINAL

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Legend

- Section Boundary
- PCC Aprons
- Shoulder or Other

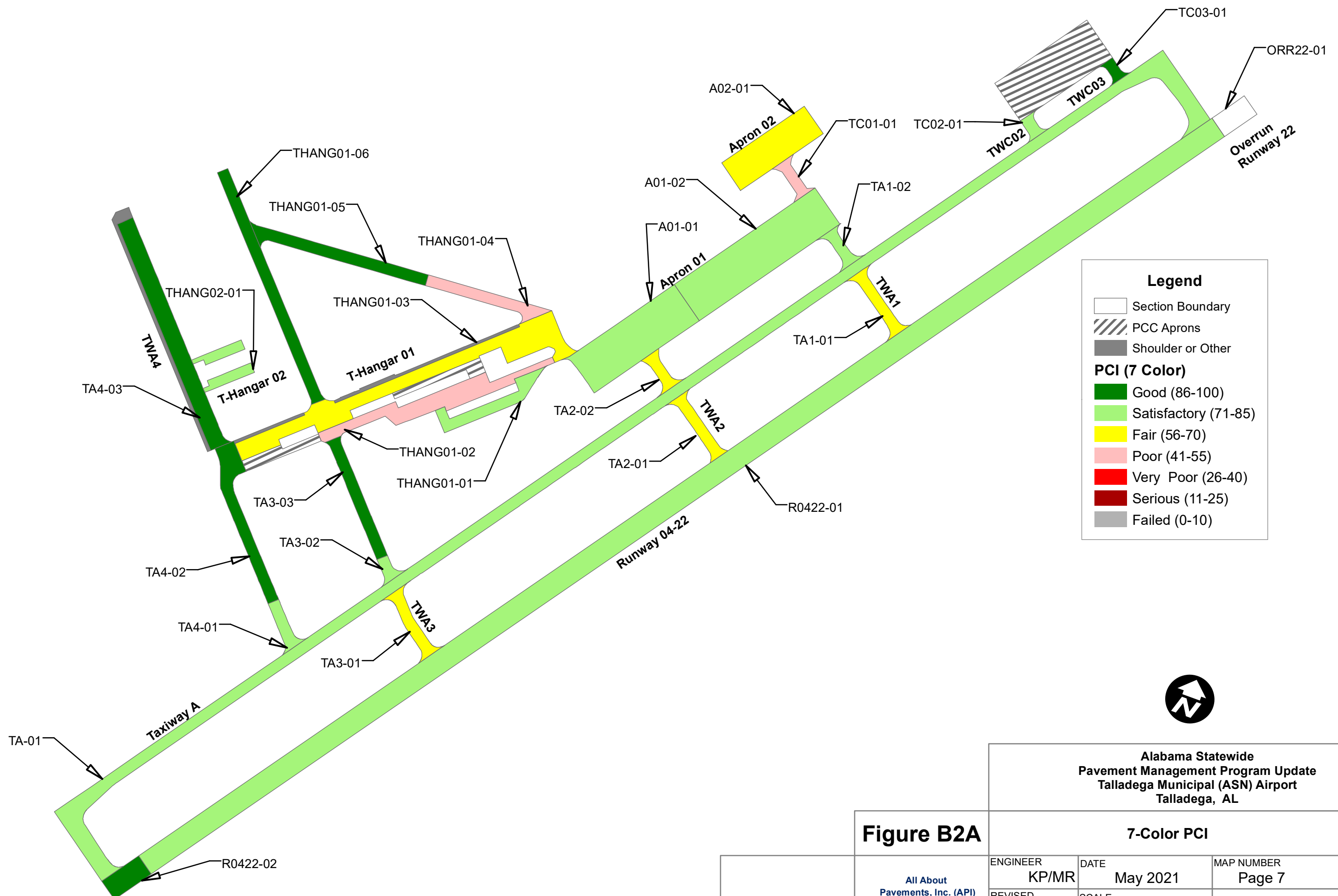
Pavement Age (Yrs)

- 0 - 10
- 11 - 15
- 16 - 25
- 26 - 50
- >50

Figure B1F

Alabama Statewide Pavement Management Program Update Talladega Municipal (ASN) Airport Talladega, AL		
Pavement Age		
ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 6
REVISED JMA	SCALE 1 in = 400 ft	FINAL

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Legend

- Section Boundary
- PCC Aprons
- Shoulder or Other

PCI (7 Color)

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

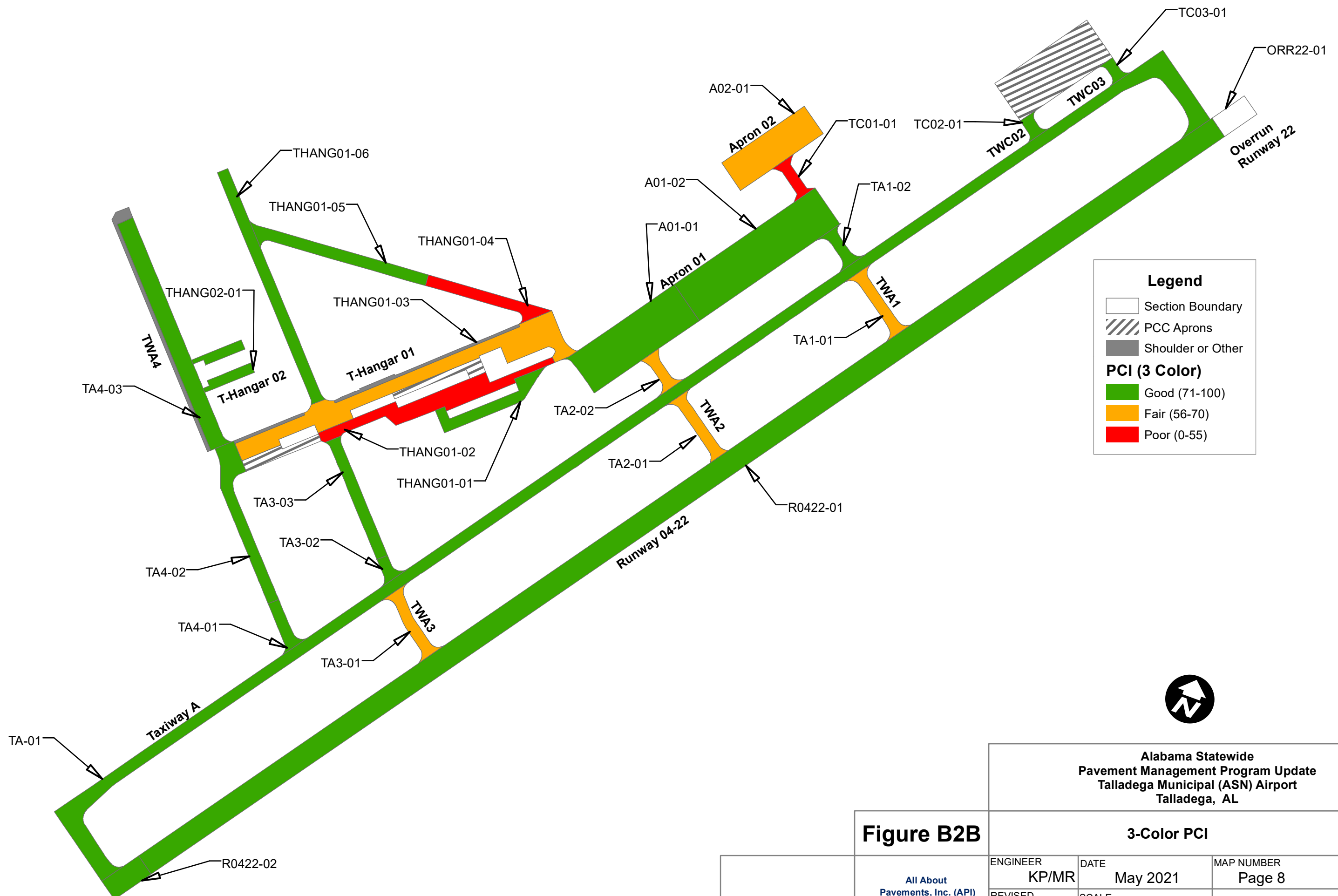


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Figure B2A

7-Color PCI		
ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 7
REVISED JMA	SCALE 1 in = 400 ft	FINAL

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Legend

- Section Boundary
- PCC Aprons
- Shoulder or Other

PCI (3 Color)

- Good (71-100)
- Fair (56-70)
- Poor (0-55)

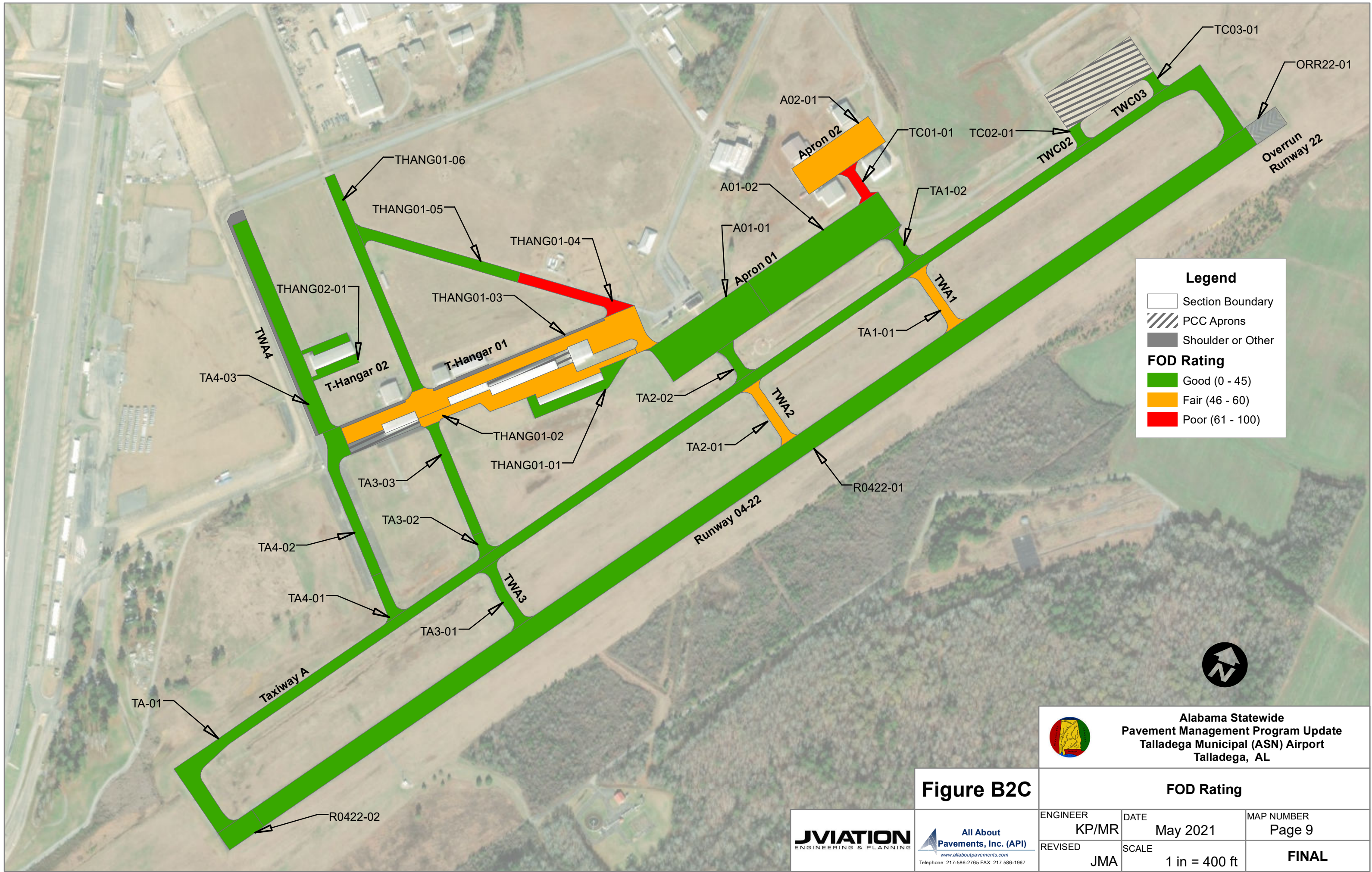


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Figure B2B

3-Color PCI

<p>All About Pavements, Inc. (API) <small>www.allaboutpavements.com Telephone: 217-586-2765 FAX: 217-586-1967</small></p>	ENGINEER	DATE	MAP NUMBER
	KP/MR	May 2021	Page 8
	REVISED	SCALE	
	JMA	1 in = 400 ft	FINAL



Legend

- Section Boundary
- PCC Aprons
- Shoulder or Other

FOD Rating

- Good (0 - 45)
- Fair (46 - 60)
- Poor (61 - 100)

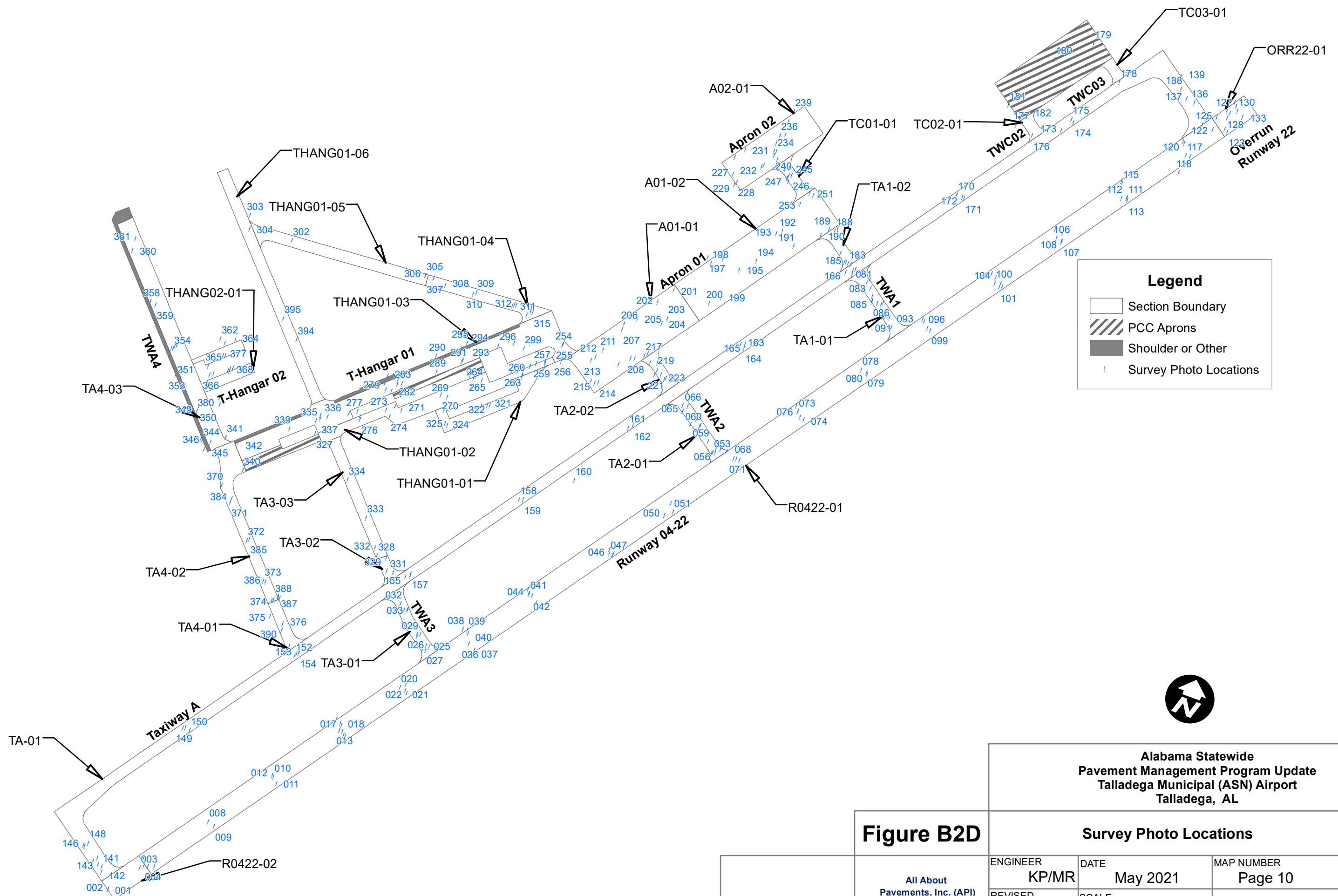
**Alabama Statewide
Pavement Management Program Update
Talladega Municipal (ASN) Airport
Talladega, AL**

Figure B2C





FOD Rating		
ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 9
REVISED JMA	SCALE 1 in = 400 ft	FINAL

JVIATION
ENGINEERING & PLANNING

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Telephone: 217-586-2765 FAX: 217-586-1967



Legend

-  Section Boundary
-  PCC Aprons
-  Shoulder or Other
-  Survey Photo Locations

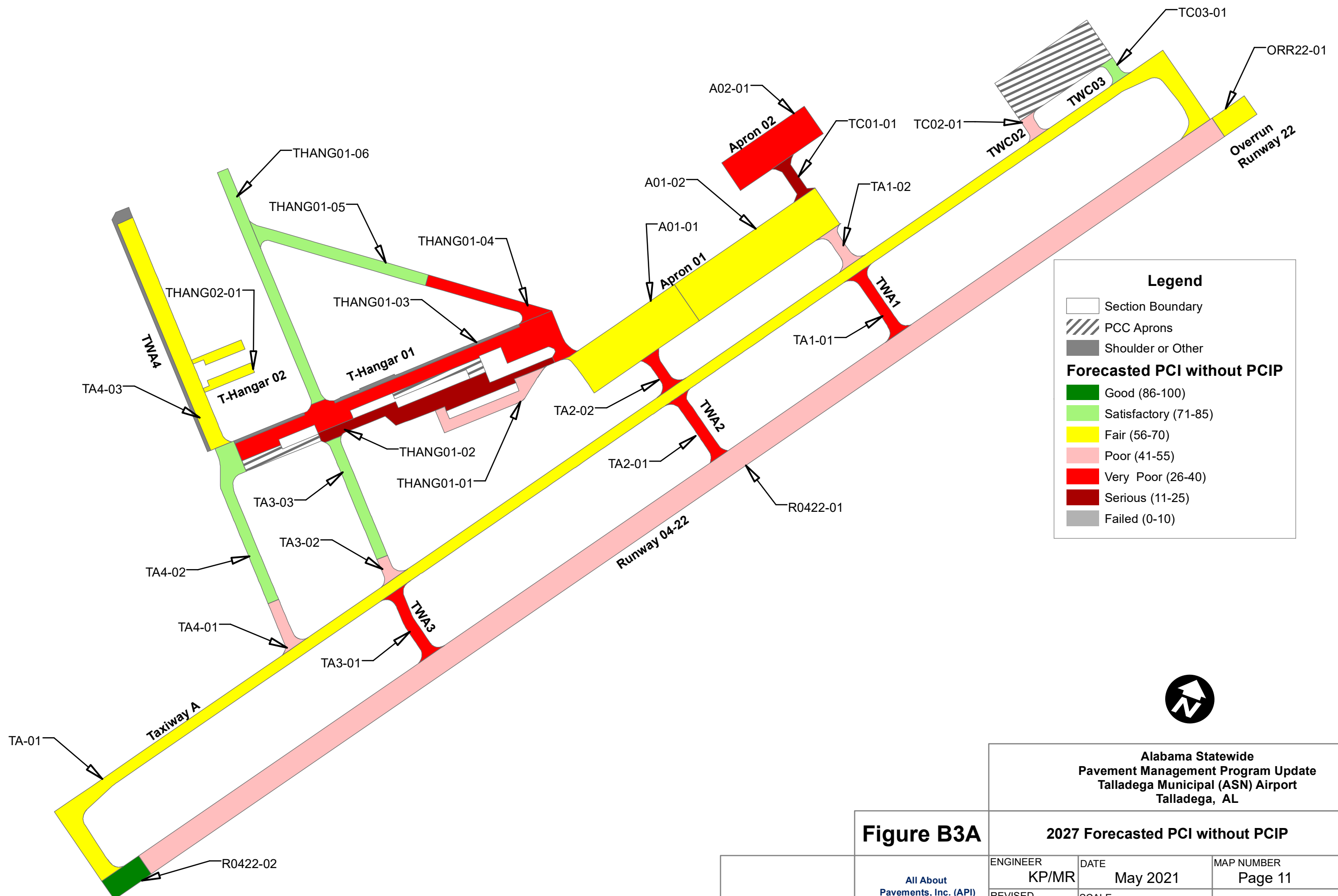


**Alabama Statewide
Pavement Management Program Update
Talladega Municipal (ASN) Airport
Talladega, AL**

Figure B2D **Survey Photo Locations**

ENGINEER	DATE	MAP NUMBER
KP/MR	May 2021	Page 10
REVISOR	SCALE	FINAL
JMA	1 in = 400 ft	

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Legend

- Section Boundary
- PCC Aprons
- Shoulder or Other

Forecasted PCI without PCIP

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



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Talladega, AL**

Figure B3A

2027 Forecasted PCI without PCIP

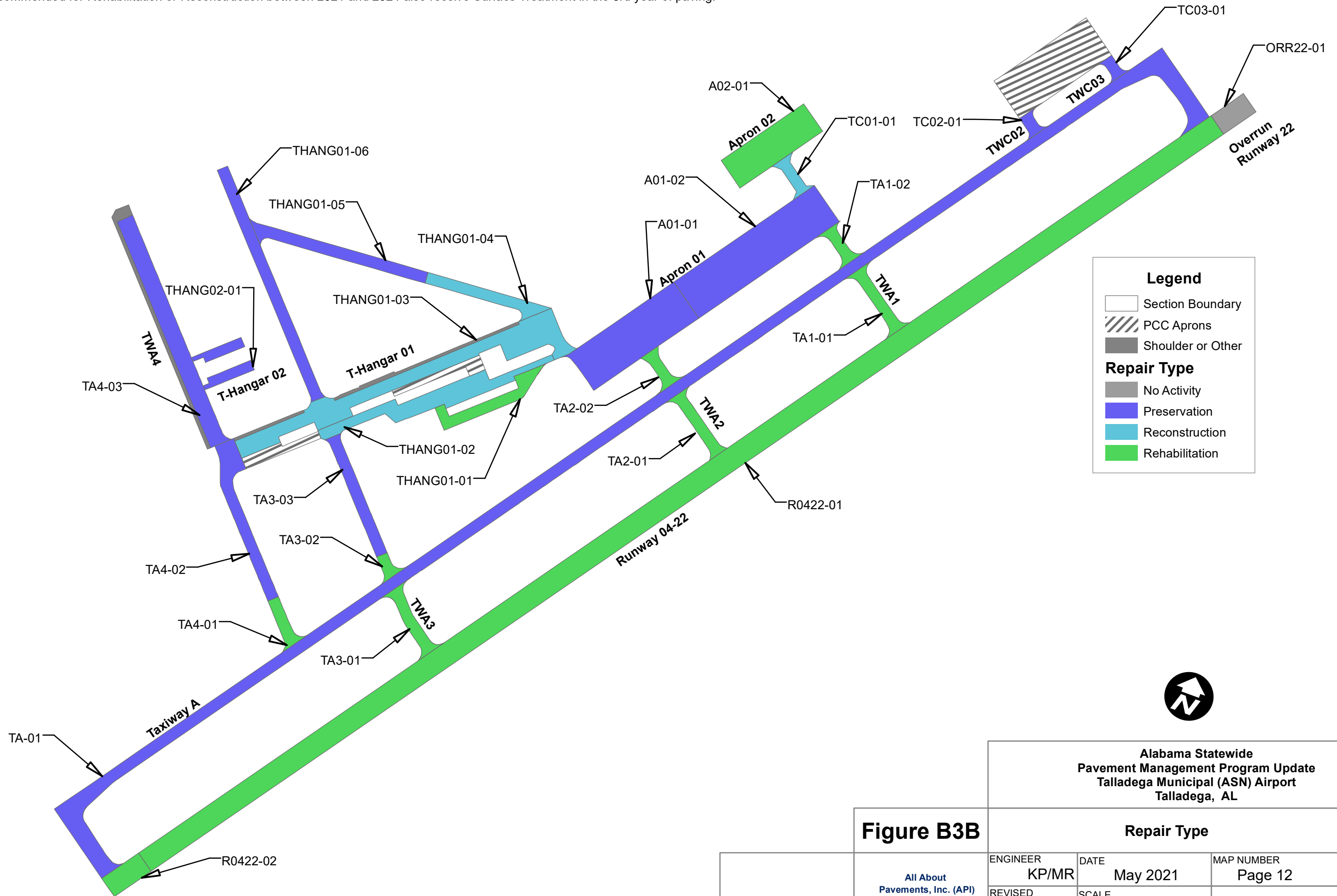
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ENGINEER
KP/MR
REVISOR
JMA

DATE
May 2021
SCALE
1 in = 400 ft

MAP NUMBER
Page 11
FINAL

All sections recommended for Rehabilitation or Reconstruction between 2021 and 2024 also receive Surface Treatment in the 3rd year of paving.



Legend

- Section Boundary
- PCC Aprons
- Shoulder or Other

Repair Type

- No Activity
- Preservation
- Reconstruction
- Rehabilitation



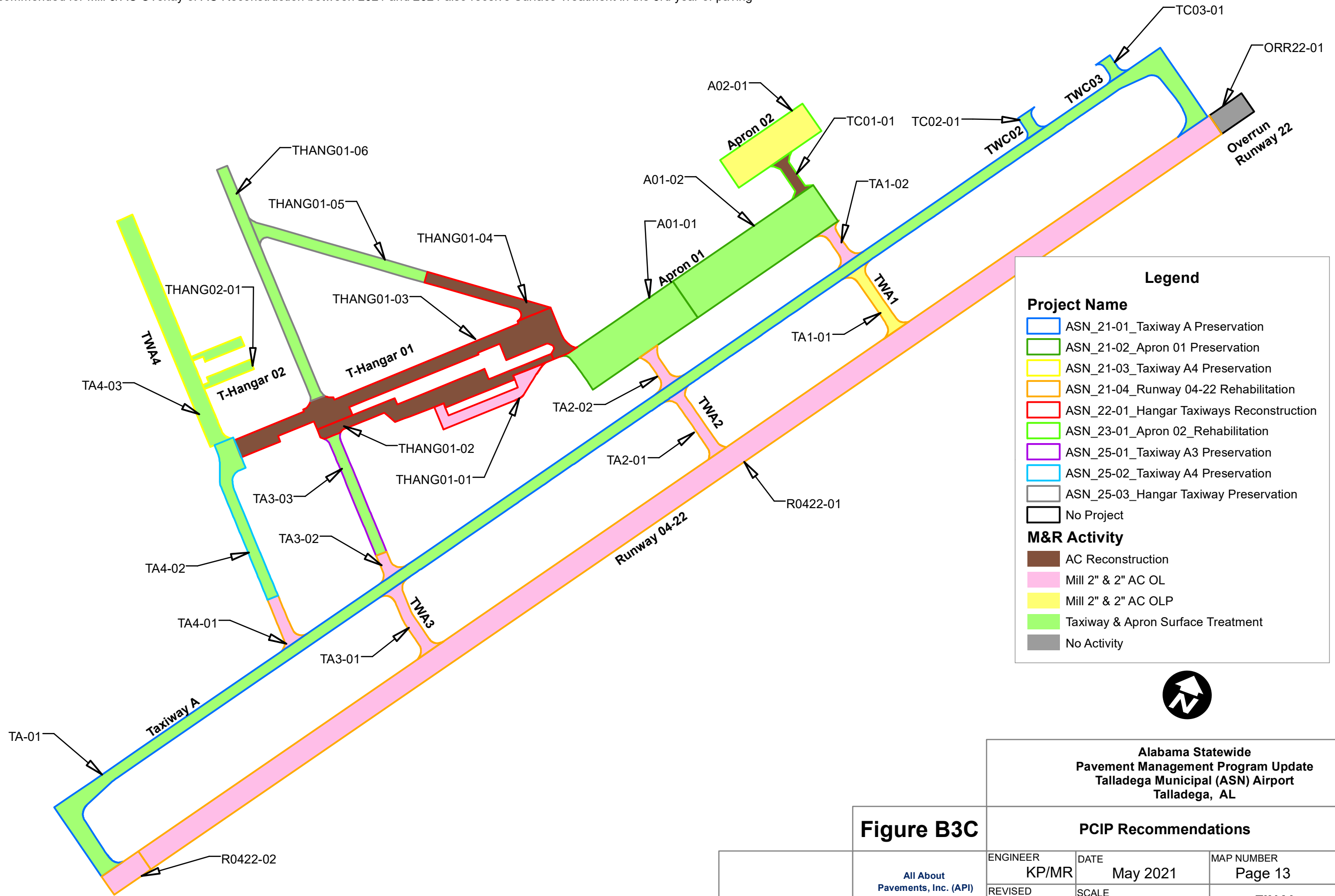
**Alabama Statewide
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Figure B3B

Repair Type		
ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 12
REVISED JMA	SCALE 1 in = 400 ft	FINAL

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All sections recommended for Mill & AC Overlay or AC Reconstruction between 2021 and 2024 also receive Surface Treatment in the 3rd year of paving



Legend

Project Name

- ASN_21-01_Taxiway A Preservation
- ASN_21-02_Apron 01 Preservation
- ASN_21-03_Taxiway A4 Preservation
- ASN_21-04_Runway 04-22 Rehabilitation
- ASN_22-01_Hangar Taxiways Reconstruction
- ASN_23-01_Apron 02_Rehabilitation
- ASN_25-01_Taxiway A3 Preservation
- ASN_25-02_Taxiway A4 Preservation
- ASN_25-03_Hangar Taxiway Preservation
- No Project

M&R Activity

- AC Reconstruction
- Mill 2" & 2" AC OL
- Mill 2" & 2" AC OLP
- Taxiway & Apron Surface Treatment
- No Activity



**Alabama Statewide
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Talladega Municipal (ASN) Airport
Talladega, AL**

Figure B3C

PCIP Recommendations		
ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 13
REVISED JMA	SCALE 1 in = 400 ft	FINAL

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APPENDIX C

OVERVIEW OF PAVEMENT DISTRESSES



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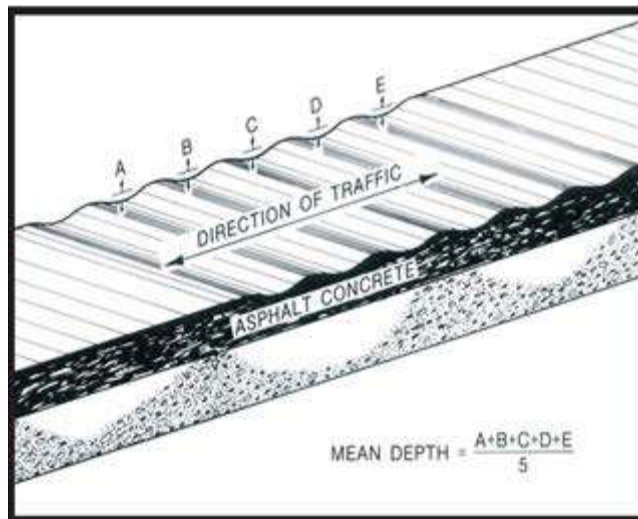
Corrugation

Description

Corrugation is a series of closely spaced ridges and valleys (ripples) occurring at fairly regular intervals, usually less than 5 feet (1.5 meters) along the pavement. The ridges are perpendicular to the traffic direction. Traffic action combined with an unstable pavement surface or base usually causes this type of distress.

Severity Levels

- @** Corrugation is a series of closely spaced ridges and valleys (ripples) occurring at fairly regular intervals, usually less than 5 feet (1.5 meters) along the pavement. The ridges are perpendicular to the traffic direction. Traffic action combined with an unstable pavement surface or base usually causes this type of distress.
- A** Corrugation is a series of closely spaced ridges and valleys (ripples) occurring at fairly regular intervals, usually less than 5 feet (1.5 meters) along the pavement. The ridges are perpendicular to the traffic direction. Traffic action combined with an unstable pavement surface or base usually causes this type of distress.
- <** Corrugation is a series of closely spaced ridges and valleys (ripples) occurring at fairly regular intervals, usually less than 5 feet (1.5 meters) along the pavement. The ridges are perpendicular to the traffic direction. Traffic action combined with an unstable pavement surface or base usually causes this type of distress.



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- ◆ DffU'cfZ' Xh' dUW'



%8' DUWb'`

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dMzfa gcfk UgWbgi WXX

Gj YINg

- ◆ @ck!]b[ccXWbY]cbUx]gdMzfa]h`]h]gZUMf]m
- ◆ A Y]i a !]gga Yk\ U]NY]cfU]XU]XU]ZUM]g]Y]h` ei U]m]c'ga Y]Y]N]h
- ◆ <][\!]gU]X]m]N]h]cfU]XU]XU]ZUM]g]Y]h` ei U]m]g]]h]ZUM]h]ncf\U]g]][\`
: CS'dh]U'

FYUfcd]cbg

- ◆ @ck! BcU]cb/
- ◆ A Y]i a ! g]U]V]W]g]FYU]f]h]Y]X]g]Y]g]g]]bh]YdUW]cf]m]U]W]h]YdUW
- ◆ <][\!]m]U]W]h]YdUW'



:]]ifY74. "5g]U]H]U]W]b]"

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8YAd]db

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GjY]h]e]y]Yg

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%&FUYH 157L

8YbHdb

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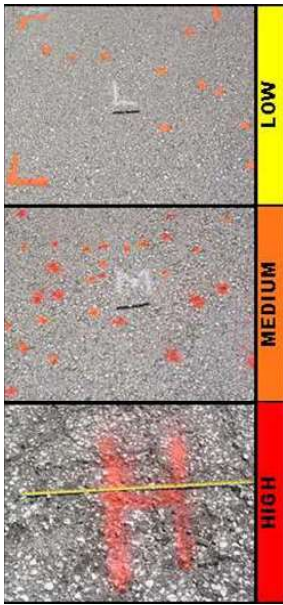
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U|fYUYdUfMwZca hX'

@ck'gj YlmiWUg|ZlncbYcZHYgWbN|dgY lgh fE:bUgi fYnFXgi fY
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@ VlkYb) UfX'S'fEA|ggh| U|[fYUYWgUg'g'YghU'&MWH'cZHY
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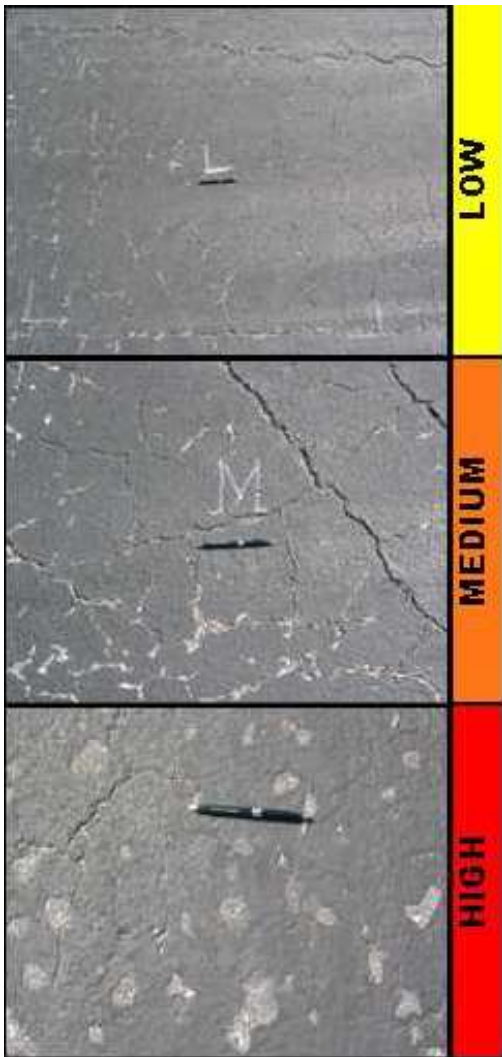
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A lgvkYb:&fX(S' fEA|ggh| U|[fYUYWgUg'g'VlkYb:&fX'S'dMWH'cZ
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gaY: CS'ddHlU'

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< fgi fYa YfLNUgHlUj YUfZHYbi a Vf'cZMUGYU|fYUYdUfMwZca|ggh|'
lgj Y(S' fEA|ggh| U|[fYUYWgUg'g'g'cfYhU'&MWH'cZHYUa|bX
gi fYnFXgi fYa YfLNU'-b' ||\ 'gj YlmiY YlH'zhYY'g'|b'fWH CS'
ddHlU'

BdY h|lgUbkXgYgg'bwH YSS+ 'g'fj Ym



Gi ffr#7cUHfCjY8YgYAl GYfJh@Yg



@

f2H YgUyXfUlg YghU% dVfHfE-bhYWgCZAUrk\YYdUMB
VWWh \UgXjYcdXzhYgfZWWUgUfY YghU%#]Wfl'aaIk]X'

A

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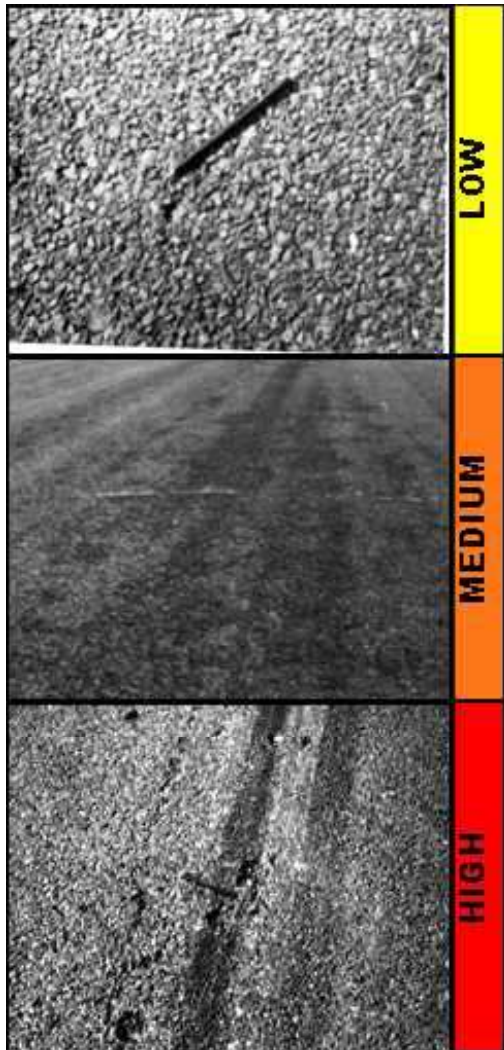
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%" Fi Hh 157L

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gi VifUZ]i fycZhYdj Ya Yh

Gj YfHgUgXcbfi hXchL

- ◆ @ck! YghUb`]bW]bXch/
- ◆ A Y]a! WkYb` Ux%]bW]bXch/
- ◆ <]]\! YWNg%]bW]bXch"

FYUfcdhcg

- ◆ @ck! BcU]cb/
- ◆ A Y]a! dWUbx]fcj YUth
- ◆ <]]\! dWUbx]fcj YUth



:]ifY7!."57FiHh"

%"G|dd|Y7fUW|b| B57L

G|dd|Y7fUW|b|Y7fUW|b|Uz|ac|b|g|U|X|W|g|U|j|h|l|k|c|Y|g|d|b|X|k|U|n
from the direction of traffic. They are produced when braking or turning wheels cause the
d|j|Y|a|Y|g|f|W|c|g|X|U|X|Z|f|a|'H|g|g|U|n|c|W|f|g|k|Y|b|Y|g|U|c|k|g|U|h|'
g|f|W|a|l|'c|d|c|f|V|b|X|W|k|Y|b|Y|g|f|W|U|X|b|l|h|U|f|c|Z|d|j|Y|a|Y|g|f|W|f|Y'

G|j|Y|f|U|g| No degrees of severity are defined. It is sufficient to indicate that a slippage
W|W|Y|l|g|'

F|Y|U|f|D|'M|g|

- ◆ **S|c|b|h|l|/|'**
- ◆ **D|f|U|'c|Z|'X|h|'d|U|W|'**



:||ifY7%\$ G|dd|Y7fUW|b|"

%"GkY]h] f57L

8Yg]d]b

5'gkY'lgWfUW]h]XVn]bi dkUfXV' [Y]bhYdj Ya YH]g]fZW'5'gkY'aUn
cWf]g]f]dn]ej YUgaU' fU]cf]g]U]d]h] YZ]f]U]X]U]k]j]Y'9]h]Y]h]n]c]z]g]k]Y' WbWY
UW]a]d]h]Y]X]V]n]g]f]Z]W]W]U]h]'5'gkY'lg]g]U]m]W]g]X]V]n]c]g]U]W]b]h]Y
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GjY]h]n]@]j]Y]g

GkY'lgWfYnj]lgVYU]X]U]g]U]a]h]c]f]Z]W]c]b]h]Y]d]j]Ya]Y]H]g]f]X]e]i]U]h]m]g]
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U]Q]W]Z]g]h]X]Z]f]h]Y]d]j]c]k]h]c]W]f]Z]h]Y]g]k]Y'lg]d]f]g]h]!

GkY'WbVcV]g]j]Y]k]h]c]i]h]Z]V]W]h]U]b]X]U]g]U]g]l]h]Z]W]h]Z]W]c]b]h]Y]
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g]W]b]i]b]X]W]g]X]U]h]b]'

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%"KXhY[h] 157L

8Yg[d]db

H YkY[h] UkUhcZhYUgUHMbXfUXZBYU[f]UYaUqI Zca hYdjYaYh
gfAW

GjY[h]e@jYg

5gUhg fAWW[h]bb[le'g'ck'g[hgcZU[h] k\jWaUuYUWYUUXVn
V\UWbY[h]dg' @cg[hYZBYU[f]UYaUqI [gchMVYUXXaUuY
@ UWadhYXVnZ[h] cZhYUgUHWc" 9N YgcZhYUgYU[f]UYgUY
V[h]bb[leWYdcgXfngU\$) [bWgcf%aaE' DjYaYhaUuY
fYUjYnbk f[h]bk Ug* 'adhg'X!

A @cg'cZBYU[f]UYaUqI [gchMVYUXX YgcZUgYU[f]UY\jYVb'
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cZBYU[f]UYaUqI "

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8YgAd]b

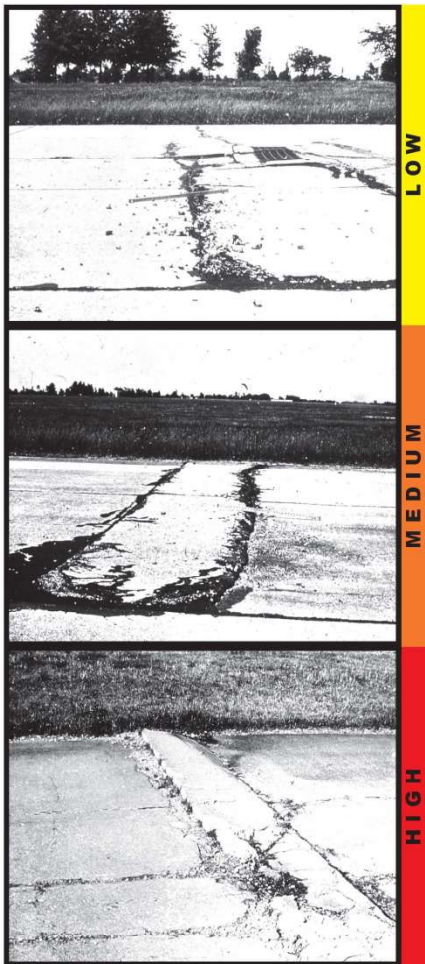
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f]Z]f]W]k\Y]b]W]g]X]g]U]h]g]U]Y]V]h]]Y]U]U]X]Z]f]f]X]d]h]h]"

GjY]h]e]j]Yg

@ 6i W]h] 'c]f]g]U]M]h] \U]g]b]d]f]b]W]X]h]Y]d]j]Y]a]Y]h]b]c]d]M]U]j]Y]Z]U]X]d]b]n]U]g]l\h
l]a]c]i]h]c]Z]i [\b]g]Y]g]g'

A 6i W]h] 'c]f]g]U]M]h] \U]g]b]d]f]b]W]X]h]Y]d]j]Y]a]Y]h]b]c]d]M]U]j]Y]Z]U]h]U]g]l]b]Z]W]h
l]a]c]i]h]c]Z]i [\b]g]Y]g]g'

< 6i W]h] 'c]f]g]U]M]h] \U]g]b]d]f]b]W]X]h]Y]d]j]Y]a]Y]h]b]c]d]M]U]j]Y'



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gUkjh Xa YgdcgZ& Vri& ZfhUhgUWWhUfhgNgh hY'cbh) Zfhca`
hYWbf'cbYgYUX% ZYidbhYchYfgW'gchdHgXfXUWbfVU/Thg
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chY'lgWgXfXUWbfVU" 5 WbfVU XZfgZca UWbf'gU'bhUHY
WVYhNgj VU'nfci [\ hYhYgUVh]Wbggk\]YUWbf'gU'fhgNgh
hY'chUhbU' Y'@UXfVh]cbWa VbXkjh`cggZgdbfUWf'h' gggg
igUmUgWbfVU_g'

GjYfNg

- ◆ @ck! 7UW\lgYhY'bc'gU'h' 'cfa'bcfgU'h' fbcZfY[b'cVWNaU'Y
fIC8f'dfHUE'Z'cb'filled, it has a mean width less than approximately 1 #'
inch (3 millimeters); a filled crack can be of any width, but the filler material
aigWY'bgHgUWf'WbX]cb'HYUfUWkYb'hYWbfVU' UxhY'
^'cb'lg'gd'WVW
- ◆ A'Wia! One of the following conditions exists: (1) filled or non!filled c'fUW'g'
acXfUYngU'Xf'ga Y: C8'dfHUE/f'U'cb'filled crack has a mean
width between 1/8 inch (3 millimeters) and 1 inch (25 millimeters); (3) a filled
crack is not spalled or only lightly spalled, but the filler is in unsatisfactory
WbX]cb'f'f'HYUfUWkYb'hYWbfVU' UxhY'cb'lg'g'[\h'WVW
kjh`ccgY'cfa'gg'd'cf'Wg'
- ◆ <ll\! One of the following conditions exists: (1) filled or non!filled crack is
severely spalled, causing definite FOD potential; (2) a non!filled crack ha'gU
a'Wbk]h [f'UY'h'U'hd'ja'UYm'f'WVf) 'a]'ja'WgZ'WU]h' U'fY
XaU'Y'd'f'U'/'c'f'f'HYUfUWkYb'hYWbfVU' UxhY'cb'lg'g'
g'j'Y'm'WVW'

FYU'fcd'cbg

- ◆ @ck! BcU'f'bc'fgU'WVWg'
- ◆ A'Wia! gU'WVWg'
- ◆ <ll\! gU'WVWg'U'hd'U'~
cf'f'U'W'h'Y'gU'



X'h'd'W

: llifY7%&'D77 7cbf6fU''

%! 7fUWg"@cb|liXpUZHFUbg YgYUbxS|U|cbU'fD77L

H YgVWUgXj |XhYgU|bc lkc'cfhfYd|WgZUXIfYi gUmW gXVhU
Wá VhU|bcZcdXFNH|cbZAF|h' gYgZUXgfb_UYgYgYg"@ck'gY|lhn
VWgUfYbdhWgXfXaUcf gfi VifUXgYgYg'AYfi a'cf||\ gY|lhnVWgUfY
igUnkcf |h| VWgUxIfVWgXfXaUcf gfi VifUXgYgYg'

GjYfing

- ◆ @ck! %i hZ`YXVWg%# |bWlc%&|bWk|Xk|h bcZi |h| 'cf gU|h| /&E
VWgYghU%&|bWk|Xk|h `ck'gY|lhnigU|h| /cf' EZ`YXVWgcz
Unk|Xk|h ZfM'cZfa |h| |bUg|gUfina UbfUx|bcZi |h| 'cf
gU|h| /
- ◆ AYfi a ! %i hZ`YXVWgVhYb%&lc%|bWk|Xk|h bcZi |h| 'cf
gU|h| 'cf&Z`YXVWgczUnk|Xk|h Zi |h| `YghU%# |bWcfaYfi a'
gY|lhnigU|h| /
- ◆ <||\! %i hZ`YXVWgk|h Uk|h |fNfHb%|bW'&i hZ`YXVWgcz
Unk|Xk|h Zi |h| |fNfHb%&|bWcfaYfi a' gY|lhnZi |h| /cf' E
Z`YXVWgczUnk|Xk|h Zi |h| |fNfHb%&|bWcf||\ gY|lhnZi |h|"

FYUfcd|cbg

- ◆ @ck! BcU|b'cf gU VWg/
- ◆ AYfi a ! gU VWg/
- ◆ <||\! gU VWgZUdnUZ`Xh'dUWcf fYUWhYgU'



: ||ifY7%&'D77HUbg YgY7fUWg'

§' Si fUj]m7fUWgID77L

8YgAdjb

Si fUj]m7fUWg]gWgXVnhYbUj]m7cZhYWBWYk]hgUXXj]fdaYbU' ZWfggWgZYYhukVWg'-hi gUnldNfggUdUMB'cZMwgi bhd' parallel to a joint or linear crack. A dark coloring can usually be seen around the fine XfUj]m7fUWg'H]ghdYcZMwgd' aUnjYbU'mXkXghN]fulbcZhY WBWYk]h]b%c'SZYfSSle*SSa]`jaYgicZhY^chidVW'

GjY]m7Yg

@ ÍSÍ VWVh] \gWgXVnhYbUj]m7cZhYWBWYk]hgUXXj]fdaYbU' gWgZYYhukVWg'-hi gUnldNfggUdUMB'cZMwgi bhd' cWfYX'bc: CS'dhHjU'

A fEÍSÍ VWVh] \gWgXVnhYbUj]m7cZhYWBWYk]hgUXXj]fdaYbU' bcXghN]fulbcf: CS'dhHjU'/cfEÍSÍ VWVh] \gWfYX]bU]ja]fX fUcZhYgUzgWg]bcbYcfkVWg'fUd]`cbY^chid]WgUfY a]gh] UXXghN]fulb\gWfYX'GaY: CS'dhHjU'

< ÍSÍ VWVh] \gWgXVnhYbUj]m7cZhYWBWYk]hgUXXj]fdaYbU' XghN]fulbcZ: CS'dhHjU'



8% >chhGU'SUa U YID77L

>chhGU'SUa U YgUmWbNjdbzk\|WYbUVyg|'cfcVgkUWai 'UYbhY^chh
cfUck'g|b|ZUH|b|f|U|bcZkUf''5Wai 'U|bcZ|WadYgVYaUfUg|b'
hY'chh|fY YghYgUVZca YdbNj| UxUthng| hbVW|d|zgUf|d|zcf
gU|d|''D|UVY'chh| YVbXX|chYX YgZ|YgUgd|fWg^chhZca hY
UWai 'U|bcZaUfUgUxUg'cfY YhgkUfZca gX|d| XkbUxgZ|b|d| hY
Zi bX|dbj dbf|d| hYgV' Hd|W|hdngZ'chhGU'SUa U YUfY'%g|dd|d| hY
'chhGU'SUa U YgUmWbNjdbzk\|WYbUVyg|'cfcVgkUWai 'UYbhY^chh
'cg|ZcbX|chYgUVX YgUx*EUWcfUg|bWczgUf|b|bhY'chh

Gj Yfng

- ◆ @ck ! |b| YbU n|ccXWbNjdbhfc| [\|ci hYgUmWbNjdbzk\|WYbUVyg|'cfcVgkUWai 'UYbhY^chh
- ◆ A X|a ! |b| YbU n|fVbNjdbhfc| [\|ci hYgUmWbNjdbzk\|WYbUVyg|'cfcVgkUWai 'UYbhY^chh
- ◆ <||\ ! |b| YbU n|bcfVbNjdbhfc| [\|ci hYgUmWbNjdbzk\|WYbUVyg|'cfcVgkUWai 'UYbhY^chh

FYUfcd|ch

- ◆ @ck ! BcU|cb/
- ◆ A X|a ! gU^chh
- ◆ <||\ ! gU^chh



: ||ifY7% 'D77 >chhGU'SUa U Y'

88! GaU DUWID77L

5' dUWlgUBfUk\ YfhYcfll jBU'dj Ya Yh
has been removed and replaced by a filler

aUfJU': cfWbXllcbY U UjcbzdUWll lg'
Xj jXXllc lkc lndg' gaU fngghU) 'gei lfy
ZNLUXUf Yfj Y) 'gei lfyZNL'@uf YdUWg'
lFYXgllVXllbhYbl hgXllcb'

Gj Yllng

- ◆ @k! DUWlgZblcbll kY'zkjh'
'llhYcfbcXllfclllcb/
- ◆ A Yjia ! DUW\lgXllfclUWZUWf
acXllUygdU' ll WbVYgXbUfcbXhY
Y'Y'gDUWaUfJUWbVYXgclY'Z
kjh WbgXllUY'Zllfllh llcf: C8'
dnlhU/
- ◆ < ll\ ! DUW\lgXllfclUWZUWfYVn
gdU' ll UfcbXhYdUWcfWllll'
kjhllbhYdUWZc UgdUk\ jWkUfUllg
fYUWa Yh

FYUfcdllcbg

- ◆ @k ÈScBchll/
- ◆ A Yjia ! FYUWdUWcfFYUWWhY
gU'
- ◆ < ll\ ÈFYUWdUWcfFYUWWhYgU'



: llifY7% 'D77 GaU DUW'

&" @Uf YDUWID77L

Patching is the same as defined **ZfUgaU`dUW`
**ckYVzhYufUcZhYdUWlgacfyhUb) 'gi UfY
ZNF5 i f]hMhlgUdUWhUgfydUWkhY
cf]]bU'dj Ya YHMMgycZdUWa YhcZ
i bXf fci bXi f]]ng'HYgj Yf]m'j YgcZLi f]]m
WfYhYga YghegYZffYi 'Uf dUW]d."****

Gj Yf]ng

- ◆ **@ck ? DUWlgZb]]cb] kY'zk]h `]hYcf
bcXNFcfU]cb/**
- ◆ **A Y]i a ! DUW\UgXNFcfUWZbXf
acXfUYgdU]d VbVYgYbUfci bXhY
Y] Yg'DUWa Uf]U VbVYg'cX Y'zk]h`
WbgXfUYWZf]f]]cf: CS'dh]]U/**
- ◆ **<] \ ! DUW\UgXNFcfUWZ]hYfVn
gdU]d Ufci bXhYdUWcfVW]d k]h]b'
hYdUWZc Ug]]k\]WkUffU]g
fyUWa Yh**

FYUfcd]cbg

- ◆ **@ck E8cBch]d /**
- ◆ **A Y]i a ! FYUWdUWcfFYUWWhYgU'**
- ◆ **<] \ E'FYUWdUWcfFYUWWhYgU'**



:]]ifY7% `D77 @Uf YDUW'

&" Dddi lgiD77L

5' dddi hlgUga U' dJWcZdj Ya YHhUMFU_g' cogYZca hYg fZWX Ylc ZYH
hUk UWcbJbWa VbUcbkjh Y dcbj YU [fY UHg' Dddi lgi g UnfUj YZca '
Uddid ja UYnfbWlc(JbWYgbXLa YfUbxZca %&JbWlc' &JbWgXsd"

Gj YHNg

No degrees of severity are defined for popouts. < ckY Yzddi lgaig hYV Hgij Y
VZfYh YnfYw hXUg UxgJYg' YZj YU Yddi hXghiaig hVWX
Uddid ja UYnfbYddi lgidf gi UYnfbXg YhYHfYgUVfU



: ||ifY7%. 'Dddi lgi'

Ⓕ"Di adq id77L

8YqAdhb

Di adq lghYYMbcZaUhfUvkUfhci [\ `c h g c f V W W g W i g X V n N Z N M b :
cZhYgWi bXfdigh `cXg'5ghYkUf'lg'Y N M X Z H M f Y g d f W g c Z f j Y z g b X
W n c f g H B X Y j l g b U d c f Y g j Y c g g c Z d j Y a Y h j d b f H G f a W g U b h U b X
V g y c f g V f U X a U h U ' d b h Y d j Y a Y h V g Y c ^ c h g c f V W W g U f Y j X N M c Z
d a d q ' D a d q b M f ^ c h g b X M g d c f ^ c h g U Y U b X c g g c Z g d b f k \ J W k] ^ ^
' Y X l e V W W h i b X f Y N U X c X g '

GjYfm@jYg

BcX fYgcZgjYfm fYXWbX-HggZMhlc' bXUyhUid adq Ylgg'



&" GUVh ID77L

**AUVWVh 'cfVUth fYZfgUbkcf 'cZgUdczZbZcf\UFjBYWVghU
YfXcbnhfi [\ hYiddf g fZWCZhYWBWYHYWVgN6Xc]bMgWU
Uj 'YgZ/8\$X|fyg'AUVWVh 'cfVUth |lgjUmWgXVnj YZhg |hY
WBWYUxAltXk:cGUh 'cZhYgfZWK\|W|ghYVU_XkbcZhYgU
g fZWC Uxh of approximately 1/4 to 1/2 in W'GUh 'aUthg VVWgXVn
|adcfWghj VcbUXdcfU|f|UY'5bchYfW|bhXgi fWcZgdYgghY
fU|bVWkYbhYU_UlgfUc'UX? &E|bga YW YlgUXWUba |bUglb'
ga YU|f|Uhg'UcXVZfa YVnhYVU|bVWkYbhYU_UlgUxU|f|UY
fg |bYd|gcbghUWgYUUVU_Xkb|bhYWBWY'**

GjYfng

- ◆ @k! 7Uth 'cfaUVWVh Ylggj Yg|bZVWghUVfUHYg fZW|gb
|ccXWV|cbk|hbc'GUh 'HYWVdUmbaig|WkY X|bXUX
Yg|nfW|bhX
- ◆ AYia ! GUVggVXkj YUdd |aUfM)1 'cf'YgZZhYgfZWK|h'gaY
: CS'dh|U/
- ◆ <||\! GUVggj YfngVXWgh U||\ : CS'dh|U'U'gUmācfYhU
)1 'cZhYgfZW|gUWEX



&' : U 'Hb' 1D77L

GhVa Yhcf Zi 'Hh 'lg UxZZfYbWcZYj U'cbUfU'c'hhcf VUWUg gXVnd YjU' cfVhg' 'Hh'cb'

Gj YfHg

Severity levels are defined by the difference in elevation across the fault and the

	Fi bkUng#U jkUng	5dfcbg
@	0% 'bW	% 'E%'bW
A	% 'E%'bW	%'bW
<	2%'bW	2%'bW

FYUfCd'cbg

- ◆ **@k! BcU'cb'**
- ◆ **A Yj a 'E; f'bh Udh hY'cbh**
- ◆ **<|| 'E; f'bh 'cf'cbh'cXUhgZfYg'fU'cb'**



&" G UMFYXGUVFD77L

=hfgNMh VUWgUYVUWghUMFU]hcZifcfacydWgVWU gczj YcUjh' UxwfhDSgi UYgd bffHY\| \!severity level of this distress type, as defined below, lghZfYXlc UgUg UMFYXgU'ZU`dWgcfVUWgUYWUj bXkjh bUWbf VUZhYXgUgUgUWU] cfhXUgUgUj YWUbfVU"

Gj YfHg

- ◆ **@k! Slab is broken into four or five pieces with the vast majority of the cracks fjh Y,) dWUhcZck!gj Yfhn**
- ◆ **AWja !(1) Slab is broken into four or five pieces with over 15 percent of the VUWgZaWja gj Yfhn\| \!gj YfhnVUWg/cffgU]gVc_Y]hc'gl' cfacydWgkjh'gj Y,) dWUhcZhYUWgZck!/'**
- ◆ **<|\! 5hlg^Y Y'Zgj YfhnYgU]gWYXg UMFYXgU]gVc_Y]hc' four or five pieces with some or all of the cracks of high severity; (2) slab is Vc_Y]hc'gl' cfacydWgkjh'gj Y%) dWUhcZhYUWgZaWja! cf \|\!gj Yfhn**

FYUfcdhbg

- ◆ **@k EGU'7UWg/**
- ◆ **AWja !: i`Xdh dUWcffYUWYgU'**
- ◆ **<|\!: i`Xdh dUWcffYUWYgU'**



&" Gfb_ qY7fQWfD77L

Gfb_ qY7fQWfD77L
Yf]bYf]WghUf]YigUnibnUZkZf]hd| UbXXcbdi
Yf]bYf]WghUf]YigUnibnUZkZf]hd| UbXXcbdi
Yf]bYf]WghUf]YigUnibnUZkZf]hd| UbXXcbdi
Yf]bYf]WghUf]YigUnibnUZkZf]hd| UbXXcbdi

GjYf]Dg

No degrees of severity are defined. It is sufficient to indicate that shrinkage cracks exist.

FYUfcdhbg

- ◆ **8cBch|d**



''

' \$' >chGdUgfD77L

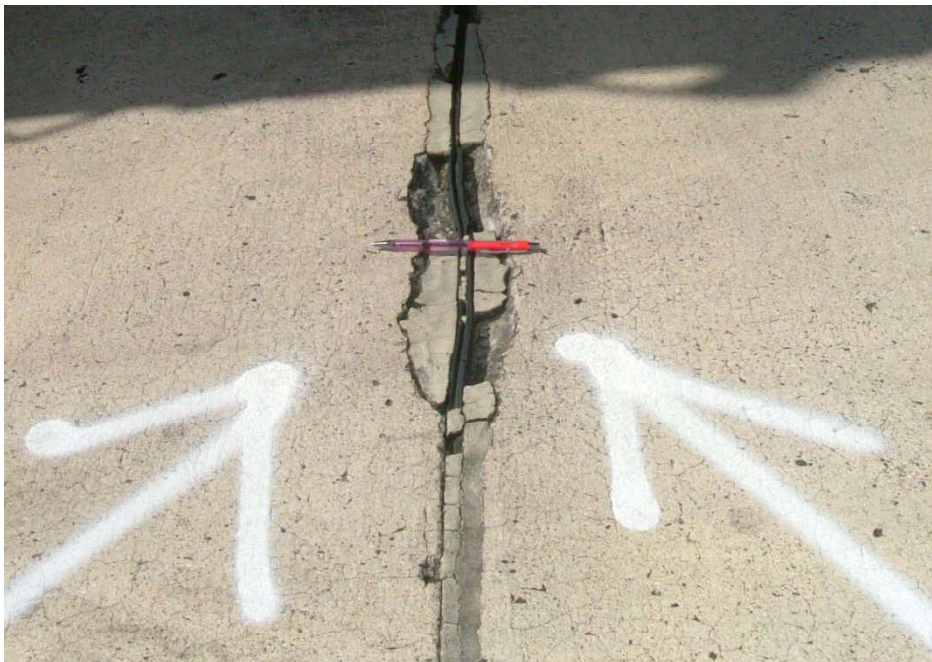
>chigU'h lghYXghN fU'bcZhYgUVX Ygkjh b&ZYh'ZhYgXyZHY'chH'
5'chigU i gUmXygdhN Nbxj YhU nhtci [\ hYgUzV hHhGhY'chHh
UbU' Y'GU'h' ng' l'Zca YWgjj YgYggUthY'chH'WwU gXVn' b' f'U'cb'
cZb'AdYgVYaUhfU'gcf'U'W'U'g' K'U' W'U'Y'U'hY'chH'U' gXVn
cj Ykcf' h' l'EWa VbXk'h' l'U'W'U'g'U'g'U'chY'W'U' g'Z'g'U' h' "

Gj Yhng

- ◆ @k! gj Y&ZYh'ch' UxlgVc_Y]hc'bc'acfyhUbhfYd]WgXVbXVn
'ck'cfa Y]a' gj Y]h'W'W'g'k'h' \]h'Y'cf'bc': CS'dhH]U'zcf'lg&Y'ghU'
&ZYh'ch' UxlgVc_Y]hc'bc'acfyhUbhfYd]W'g'k'h' \]h': CS'cf]Y
XaU'Y'dhH]U'/
- ◆ A Y]a' ! gj Y&ZYh'ch' UxlgVc_Y]hc'bc'acfyhUb' 'd]W'g'X'V'b'X'V'n'[\h'
cfa Y]a' W'W'g'cf'ga'Y: CS'dhH]U'Y' l]h'zcf'lg&Y'ghU'&ZYh'ch' '
UxlgVc_Y]hc'd]W'g'cf'Z]U'a' Y]X'k'h' ga' YcZhYd]W'g'cg'Y'cf'U'gh'z'
W'gh' W'gh'X'U'V'Y: CS'cf]Y'X'a'U'Y'dhH]U'/
- ◆ <[\! gj Y&ZYh'ch' UxlgVc_Y]hc'bc'acfyhUbhfYd]W'g'X'V'b'X'V'n'cb'Y'
cf'ac'Y'[\! gj Y]h'W'W'g'k'h' \]h': CS'dhH]U'

FYUfCd]bg

- ◆ @k! BcU]cb/
- ◆ A Y]a' ! d]Z'fa' U'd]H]U'X'h'd]W'
- ◆ <[\! d]Z'fa' U'd]H]U'X'h'd]W'



'% 7cbfGdUgd77L

7cbfGdUd ghYfjYh'cfVfUXkbcZhYgUkjhJbUdIdJaUYn&ZncZ
hYwbf"5 wbfGdU XZGZca UWbfVfU JbUdYgUUh'YgXdkkUX
lcJbGfVhY'chk\]YhYfU YfXgjYfU nhci[\ hYgU'

GjYfng

- ◆ @ck! YhY%hYgU'lgMc_Yb]bc'dYcfkcd]WgXfXVnck'gjYfhn
VWgkjh`JhYcfbc: CS'ddHfU/cf&hYgU'lgXfXVnchYaYfja'
gjYfhnVWgkjh`JhYcfbc: CS'ddHfU/
- ◆ AYfja È%hYgU'lgMc_Yb]bc'kcd'afYd]WgXfXVnchYaYfja'
gjYfhnVWgkjh`ZUaYfjaUfYgU'lgXfXVnchYaYfja'
XfXVnchYaYfja'YfjaUfYgU'lgXfXVnchYaYfja'
Uf]bVWgcf' hYgU'UgXfXVnchYaYfja'YfjaUfYgU'lg
Wfgh: CS'ddHfU/
- ◆ <||È%hYgU'UgMc_Yb]bc'kcd'afYd]WgXfXVnchYaYfja'
ZUaYfjaUfYgU'lgXfXVnchYaYfja'YfjaUfYgU'lgXfXVnchYaYfja'
VfXgU'lgXfXVnchYaYfja'YfjaUfYgU'lgXfXVnchYaYfja'
XfXVnchYaYfja'YfjaUfYgU'lgXfXVnchYaYfja'YfjaUfYgU'lg
Wfgh\||: CS'ddHfU'

FYUfCdHbg

- ◆ @ck! BcUfcb/
- ◆ AYfja! dffUXh'dUW
- ◆ <||! dffUXh'dUW



' &'5GF 'ID77L

5GF 'lgWU gXVhWwWw JW'fUWfcbVWkYbU_UlgUkXWUfcbfUWUj Yg'JWa JbMUG
k\JWZfa U|Y' HY|YUgcfVgkUfZUg gh' Y dHgdbk\JWa UnNa UYhY
WbWfYUkXUWfHgi WfYg' 5`_UlgUfYacgicZb'JfcXVWVnhYcbfUk
Ww YHkjh|bhYdj Ya YH' 5GF 'WUWj' a UnYUWYUfXVhWwWw JW'dj Ya YH
XjWg'

JlgU'JbWUfghU'5GF'a UnYdYgHh|bWXY'

% 7UWj' cZhYWbWfYdj Ya YHfZb'JbUa UfdUMB

& K\JZVfckb'fufcfchYWcfX|Y'cfgh|Jh' a UnYdYgHhUfYUW
g'fWY

" 5|[fYUyddi|g

(" bWUg|bWbWfYj'c'ia YfU dHgdb'Ufa UnfYg' HbXg'fH'bc'ZUXWf'cf
JH'fU'g'f WfYg'cf d'ng'WUYa Yb'9'Ua d'Yg'Z'f dHgdb'JWXYg'cj |J' cZ
Ugd Uhdj Ya Yb'g'|\hWb|Jh'Zg'U'Zi' |H'Z'c'ha |gU|| ba YH'U'X'U'f'g'bc'Z
'c'Jh'g'U'g'cf Y dHgdb'c'Jh'g'Yg'

6WU g'5GF 'ga Uf|U'XVhWwWw5GF 'gl' YbMU'ndYgHh'fci [\c'fH'Ydj Ya YH
g'Wfcb' 7cfh' U'XWbWfY'nf'cf'fU'JW'Ung'g'gh'Ycb'n'W'Jh'J' Ya YhcXc'
Wb'Zfa hYdYg'Wc'Z5GF' HYZ`ck|J' g'c'XY_Yh'ba |bXk\Yb|Xb|H|J' .
hYdYg'Wc'Z5GF'fci [\j'lgU'Jg'Wfcb

%; YbMU'n5GF' Xg'Yg'g'fYbdc'Vg'j YX|bhYZ'f'Zk' n'f'g'U'f'W'g'f'W'cb' b'
Wb'U'g'Z'U'g'f'f'U'Y'W'W'J' W'c'W'f'h'Y'X'c'Z'W'g'f' W'cb'U'X'g'U'd'f'Y'h
k|h|bhYZ'f'g'f'f'

& 5GF 'lgXVhWwWwZca 8!7UWj' VnhYdYg'Wc'ZUWj' d'f'W'X'W'f'c'
hY'c'Jh'W 8!7UWj' d'f'Xca |b'f'h'W'Y'Y'od'g'U'g'f'Y'g'Z'd'f'U'Y'W'W'g'c'
'c'Jh'W'g'U'X'J'f'f'W'W'J' k|h|bhYg'W'

" 5GF 'lgXVhWwWwZca 'A'U'f'7UWj' #G'U'J' VnhYdYg'Wc'Zj'lg'U'g'f'bg'Z
Y dHgdb'

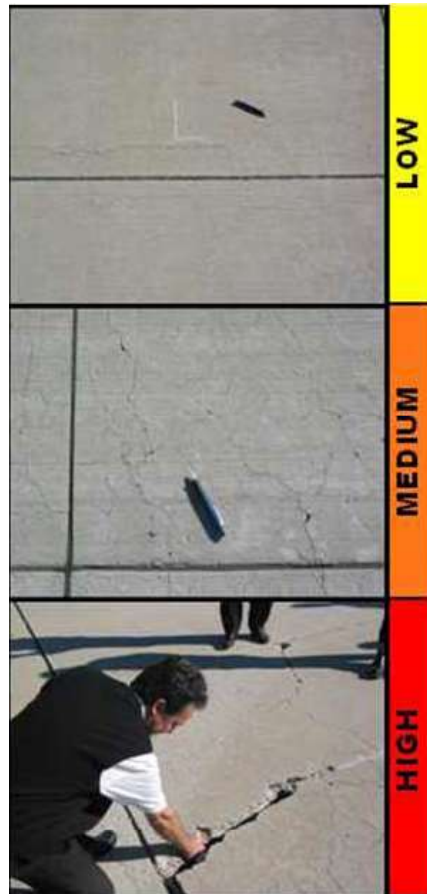
GjYfhi@jYg

@ A|jaUlebc: cf||bCVVNSUaUyECSE'ddnh|UZca VWGf'clhgcf5GF' fYUXdddi lg/VWGUhYg fZWFYH| \HfYXa|b|hn?aa'cf~Yg|@|hY lebcY|NSWcZag Ya YH|bdj Ya YHcf g ffdi b|h|' g| VifgcfYYa Ylg'

Gca Y: CS'ddnh|U/|b|N|gXgkY|h|'cfchY: CSfYagU'a YhcXgaUnWY f|i|fYX AUnWY|NSWcZgU'Va'g Ya YH|b|Xcf ga YXa U|Yc UXW|h| g| VifgcfYYa Ylg'

A A Y|i a'5GF Xg|Ng|gXZf|h|UXZca ~ck Vm|U|h|'dbYcfadYcZhY ZE~ck|h|. |b|N|gX: CS'ddnh|U|b|N|gX|W|h|'cZhYgU'zga YZU|a Ylg' Ud| VWGcfU|W|h|fYg|N|d|g|fYg|h|g fZWFddi lgZ|W|N|Y|a Un cW|Z|U|b|c|Zk|X|VWg|fYXa|b|hn?aa'cfk|X|h|U|a UnY gVaj|X|X|h| |h|VWg'

< ObYcfVh'cZhYZE~ck|h| Y|g| %|@|cgYcfalg|h| W|N|Y|ZU|a Ylgk|W dca\||\ : CS'ddnh|U|Z &EGU'g fZWF|H|f|h|U|X|Z|b|f|b|g|h|Z|W|h|n X|f|U|X|U|X|d|j Ya YH|f|i|fYg|aa Y|U|f|U|f'|a UnU'g'f|i|fY|U|g|g|c' UXW|h|g| VifgcfYYa Ylg'



APPENDIX D

DETAILED PAVEMENT CONDITION DATA



5@SCH7caVbYSS%89%

; YMUPXSUY

%89%#SSS

DjY%Z&

BYkcf. 5GB

BuY

HUS(UAihjWU'5]dch

6FUBW 58%

BuY

5dcb\$%HUS(U

IgY

5FCB

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&&% G: h

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@Gj7cbg! %89%('

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NcbY

7UWcfm

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%SSS G: h

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%* : h

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GVK]h.

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: h

Gcd Xf.

GfYHhdY

; fUX \$

@Ug \$

GMjcb7caaYhg

Kcf_SUY %89%('

Kcf_HdY Bk7cbg! Ucb! :h]U

7cX BI!B

=gAUcfA/ F. HfY

@Gj7cbg!SUY %89%#SSS%

HRUAdYg ' &

GfjYhX *

7cb]cbg D7= ,%

-hgNjcb7caaYhg

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QAdY7caaYhg

(, @/ H7F

@

(\$SSS : h

BYkcf.	5GB			BUAY	HUON(UAihWU5)rbh		
GfUW	58%			BUAY	5dbb%HUONU	Ig	5DFCB 5fU &&%Geh
GMch	\$%	cZ &	: fca.	HUkUu Ulf\$%		H. GMcb\$&	@gh7cbgH' %%%('
GfUW	557	: Ua]m	5@SCH5dldg	NbY		7UH[cfm	FUb. G
5fU	%&%Geh	@Y[h.	)+\$:h	K]Ph.		%* :h	
GUg		GU@Y[h.	:h	GUVK]Ph.		:h	>ch@Y[h. :h
Gci Xf.		GfYHhY		; fUX \$		@byg \$	
GMcb7caaYlg							
Kcf_8UY %%%('		Kcf_HhY Bk7cbgUcb' h]U				7cX BI !-B	=AUcfA/ F. HfY
Kcf_8UY %%%\$%		Kcf_HhY 7cXA]H				7cX A!7C	=AUcfA/ F. :UgY
Kcf_8UY %%%\$%		Kcf_HhY GYUa57H]bE cUL				7cX ; @5H	=AUcfA/ F. :UgY
@gh7cbg'8UY %%%\$%		HRUcladyg &				GfjYhX *	
7cb]cbg D7= ,(
hgN]cb7caaYlg							
QadYBiaVf. \$%		HhY	F	5fU		(*) \$\$\$Geh	D7= ,)
QadY7caaYlg							
(, @/ H7F		@		%\$\$\$:h			
(, @/ H7F		A		%'\$\$:h			
QadYBiaVf. \$		HhY	F	5fU		) \$\$\$Geh	D7= ,*
QadY7caaYlg							
(, @/ H7F		@		%) '\$\$:h			
)+ K95H9F-B;		@		* \$\$\$ Geh			
QadYBiaVf. \$		HhY	F	5fU		(*) \$\$\$Geh	D7= ,)
QadY7caaYlg							
(, @/ H7F		@		&)'\$\$:h			
QadYBiaVf. %		HhY	F	5fU		) \$\$\$Geh	D7= ,'
QadY7caaYlg							
(, @/ H7F		@		' \$\$\$:h			
QadYBiaVf. %		HhY	F	5fU		) \$\$\$Geh	D7= ,*
QadY7caaYlg							
(, @/ H7F		@		& \$\$\$:h			
QadYBiaVf. &		HhY	F	5fU		') \$\$\$Geh	D7= +
QadY7caaYlg							
(, @/ H7F		@		% \$\$\$:h			
)* GK9@@B;		@		% \$\$\$ Geh			

BYkcf.	5GB		BLAY	HUON(UAihWU5)ldh			
GfUW	58&		BLAY	5dcbSSHUON(U	Ig	5DFCB	5fU
							*+7SSGe h
GMch	%	cZ %	: fca.	HUON(UAihWU5)ldh		H.	9(YcZDjYaYh
GfUW	57	: Ua]m	5@SCH5dldg	NbY		7UH(cfm	@(j7cbg)! %%%('
5fU		*+7SSGe h	@Y[h.	()\$: h	K]Ph.	%\$: h	Fb. G
GUg		GU@Y[h.	: h	GUVK]Ph.	: h	>ch@Y[h.	: h
Gci XE.		GfYWHdY		; fUX \$		@bYg \$	
GMcb7caaYlg							
Kcf_8UY %%%('		Kcf_HdY	Bk7cbg	Wcb! h]U		7cX BI!-B	=AUcfA/ F. HiY
Kcf_8UY %%%48%		Kcf_HdY	GfUWGU!	7dUHF		7cX GG7H	=AUcfA/ F. :Ug
@(j7cbg!8UY %%%48%			HUON(UAihWU5)ldh	%		GfjYhX)	
7cbg D7=)+							
-bgWcb7caaYlg							
QldYBi aVF. %		HdY	F	5fU	)SSSS Ge h	D7= (-	
QldY7caaYlg							
(' 6@C7: 7F		@			&SSSS Ge h		
(' 6@C7: 7F		A			&SSSS Ge h		
)+ K95H:9F-B;		@			)SSSS Ge h		
QldYBi aVF. \$		HdY	F	5fU	)SSSS Ge h	D7=)(
QldY7caaYlg							
(, @/ H7F		A			*)SSS : h		
)+ K95H:9F-B;		@			)SSSS Ge h		
QldYBi aVF. \$		HdY	F	5fU	)SSSS Ge h	D7= *\$	
QldY7caaYlg							
(, @/ H7F		A			(*SSS : h		
)+ K95H:9F-B;		@			)SSSS Ge h		
QldYBi aVF. %		HdY	F	5fU	)SSSS Ge h	D7= %*	
QldY7caaYlg							
(, @/ H7F		A			(&'SS : h		
)+ K95H:9F-B;		@			)SSSS Ge h		
QldYBi aVF. %		HdY	F	5fU	'*%)'SS Ge h	D7= *\$	
QldY7caaYlg							
(, @/ H7F		@			)SSS : h		
(, @/ H7F		A			&SSS : h		
)+ K95H:9F-B;		@			'*%)'SS Ge h		

BVkc_f.	5GB		BlaY	HUON(UAihWU5)fbh				
GfUW	FS &&		BlaY	FibkUn(!.88HUON(U	IgY	FIEK5M	5fU	*8888Geh
GMch	&&		cZ &	: fca.	FibkUn(9bX	H.	GMcb\$%	@gh7cbgH' %%%('
GfZW	57		: Ua]m	5@SCHFKg	NbY	7UH(cfm		Fub. D
5fU			88888Geh	@Y[h.	888:h	K]h.	%S:h	
GUg			GU@Y[h.		:h	GUVK]h.	:h	>ch@Y[h.
Gci XE.			GfYHhY		; fUX	\$		@bg \$
GMcb7caa Ylg								
Kcf_8UY	%%%('		Kcf_HdY	Bk7cbgVcb! :hU		7cX	BI!B	=AUcfA/ F. HfY
Kcf_8UY	%4888(		Kcf_HdY	GfZWGU! FYj YUH		7cX	GGF9	=AUcfA/ F. :UgY
@gh7cbgH'8UY	%8888%		HUON(UAihWU5)	fbh		GfjYhX	%	
7cbgH'8UY	D7= %S							
-bgH'8UY	7caa Ylg							
QadYBaVf.	%		HdY	F	5fU	)88888Geh	D7= %S	
QadY7caa Ylg								
OBc8jYg2								

BYkcf.	5GB	BlaY	HUON(UAihVU5)ldh
GFUW	FS&&	BlaY	FihkUin(!&HUONU I g FIEK5M 5fU *S&SSGe h
GMfch	%	cZ & : fca.	GMfcb&& H. FihkUin&SX @Uj7cbg! %%%('
GfZAW	57	: Ua]m 5@SCHFKg	NbY 7UH(cfm FUb. D
5fU	) , &SSGe h	@V[h.)z& : h	K]Ph. %S: h
GUg		GV@V[h. : h	GVK]Ph. : h >ch@V[h. : h
Gci Xf.		GfYVHdV ; fUX \$	@Ujg \$
GMfcb7caaYlg			
Kcf_8UY %%%('		Kcf_HdV Bk7cbgVcb! h]U	7cX BI!-B =AUcfA/ F. HiY
Kcf_8UY %%%(		Kcf_HdV GfZAWGU! FYj YUH	7cX GGF9 =AUcfA/ F. : Ug
@Uj7cbg!8UY %%%%		HUCladYg %%	GfjYhX %
7cb]cbg D7= +*			
-bg]cb7caaYlg			
QladYBi aVf. %%		HdV F 5fU	)SSSSGe h D7= +*
QladY7caaYlg			
(, @/ H7F		@	&'SS : h
(, @/ H7F		A	&'SS : h
)& F5J9@B		<	%SS Ge h
QladYBi aVf. \$		HdV F 5fU	)SSSSGe h D7= +'
QladY7caaYlg			
(, @/ H7F		@	%SS : h
(, @/ H7F		A	%SS : h
QladYBi aVf. %S		HdV F 5fU	)SSSSGe h D7= , \$
QladY7caaYlg			
(, @/ H7F		@	&'SS : h
(, @/ H7F		A	+'SS : h
QladYBi aVf. %-		HdV F 5fU	)SSSSGe h D7= +,
QladY7caaYlg			
(, @/ H7F		@	'SSSS : h
(, @/ H7F		A	)SS : h
QladYBi aVf. %6		HdV F 5fU	)SSSSGe h D7= ++
QladY7caaYlg			
(, @/ H7F		@	'&'SS : h
(, @/ H7F		A	)SS : h
QladYBi aVf. %		HdV F 5fU	)SSSSGe h D7= +&
QladY7caaYlg			
(, @/ H7F		@	%SS : h
(, @/ H7F		A	SSSS : h
QladYBi aVf. &&		HdV F 5fU	)SSSSGe h D7= +*
QladY7caaYlg			
(, @/ H7F		@	&'SS : h
(, @/ H7F		A	%SS : h
QladYBi aVf. &		HdV F 5fU	)SSSSGe h D7= ++
QladY7caaYlg			
(, @/ H7F		@	'&'SS : h
(, @/ H7F		A	SSSS : h
QladYBi aVf. ' *		HdV F 5fU	)SSSSGe h D7= +&
QladY7caaYlg			
(, @/ H7F		@	&'SS : h
(, @/ H7F		A	&'SS : h

QādYBīaVf. (HdY F 5fU) \$\$\$Gē h D7= +,

QādY7caaYlg

(@/ H7F @ ' \$\$\$: h
(@/ H7F A % \$\$\$: h

QādYBīaVf.)% HdY F 5fU) \$\$\$Gē h D7= +*

QādY7caaYlg

(@/ H7F @ ') \$\$\$: h
(@/ H7F A % \$\$\$: h

QādYBīaVf.), HdY F 5fU) \$\$\$Gē h D7= +*

QādY7caaYlg

(@/ H7F @ ') \$\$\$: h
(@/ H7F A) \$\$\$: h

QādYBīaVf. *) HdY F 5fU) \$\$\$Gē h D7= ++

QādY7caaYlg

(@/ H7F @ \$\$\$: h
(@/ H7F A % \$\$\$: h
) * GK9@@B; @ &' \$\$\$ Gē h

QādYBīaVf. +& HdY F 5fU) \$\$\$Gē h D7= +

QādY7caaYlg

(@/ H7F @ &' \$\$\$: h
(@/ H7F A) \$\$\$: h
) * GK9@@B; @ % \$\$\$ Gē h

QādYBīaVf. + HdY F 5fU) \$\$\$Gē h D7= +

QādY7caaYlg

(@/ H7F @ \$\$\$: h
(@/ H7F A % \$\$\$: h

QādYBīaVf. , * HdY F 5fU) \$\$\$Gē h D7= , \$

QādY7caaYlg

(@/ H7F @ &' \$\$\$: h
(@/ H7F A - \$\$\$: h

QādYBīaVf. - ' HdY F 5fU) \$\$\$Gē h D7= +'

QādY7caaYlg

(@/ H7F @ % \$\$\$: h
(@/ H7F A %) '\$\$: h

BYkcf.	5GB			BuY	HUUS(UAihWU5)idh		
6fUW	H5			BuY	HI|kUisHUUS(U	Ig	H5L-K5M 5fU ') ,ž') Gē h
GMch	%			z %	: fca. FilkUis(9BX	H. FilkUis(9BX	@gh7chj' %4SS
GfUW	57			: Ua]m 5@SCH57HI|kUig	NbY	7UH(cfm	Fub. D
5fU				'),ž') Gē h	@Y[h. *ž) \$: h	K]Ph.) \$: h	
GUg				GU@Y[h.	: h	GVK]Ph. : h	>ch@Y[h. : h
Gci Xf.				GfYWHuY	; fUX \$		@Ug \$
GMcb7caaYlg							
Kcf_8UY %4SS				Kcf_HuY Bk7chj' Vcb' h]U		7cX BI!-B	=AUcfA/ F. HiY
@gh7chj'8UY %4SS%				HRUcladyg)-		GfjYhX %	
7chj'chj' D7= ,'							
hgNMcb7caaYlg							
QadYBi aVf. %				HuY F	5fU	* & \$SS Gē h	D7= ,(
QadY7caaYlg							
(, @/ H7F				@	\$SS : h		
(, @/ H7F				A	\$SS : h		
QadYBi aVf. &				HuY F	5fU	) +) \$SS Gē h	D7= ,(
QadY7caaYlg							
(, @/ H7F				@	' %'SS : h		
QadYBi aVf. \$				HuY F	5fU	), , \$SS Gē h	D7= , \$
QadY7caaYlg							
(, @/ H7F				@	' \$SS : h		
(, @/ H7F				A	\$'SS : h		
QadYBi aVf. %&				HuY F	5fU	*% \$SS Gē h	D7= , %
QadY7caaYlg							
(, @/ H7F				@	\$SSSS : h		
(, @/ H7F				A	%SSSS : h		
QadYBi aVf. %				HuY F	5fU	) \$SSSS Gē h	D7= , &
QadY7caaYlg							
(, @/ H7F				@	\$SSSS : h		
(, @/ H7F				A	+ \$SS : h		
QadYBi aVf. &				HuY F	5fU	) \$SSSS Gē h	D7= , *
QadY7caaYlg							
(, @/ H7F				@	& \$SS : h		
QadYBi aVf. '\$				HuY F	5fU	) \$SSSS Gē h	D7= ,)
QadY7caaYlg							
(, @/ H7F				@	& \$SS : h		
QadYBi aVf. '*				HuY F	5fU	) \$SSSS Gē h	D7= ,)
QadY7caaYlg							
(, @/ H7F				@	% \$SS : h		
(, @/ H7F				A	% \$SS : h		
QadYBi aVf. (&				HuY F	5fU	) \$SSSS Gē h	D7= , '
QadY7caaYlg							
(, @/ H7F				@	' \$SS : h		
QadYBi aVf. (,				HuY F	5fU	) \$SSSS Gē h	D7= +*
QadY7caaYlg							
(, @/ H7F				@	% \$SS : h		
(, @/ H7F				A	% \$SS : h		
QadYBi aVf. )(				HuY F	5fU	) \$SSSS Gē h	D7= , '
QadY7caaYlg							

(, @/ H7F	@	' \$\$\$:h			
QádYBí aVÉ. *\$	HndY F	5fYU	) \$\$\$Gé h	D7= ,'	
QádY7caaYhg					
(, @/ H7F	@	% \$\$\$:h			
(, @/ H7F	A	\$\$\$:h			
QádYBí aVÉ. *+	HndY F	5fYU	* \$\$\$Gé h	D7= ,'	
QádY7caaYhg					
(, @/ H7F	@	% \$\$\$:h			
(, @/ H7F	A	*)' \$\$:h			
QádYBí aVÉ. *,	HndY F	5fYU	()' \$\$\$Gé h	D7= -'	
QádY7caaYhg					
(, @/ H7F	@	+) '\$\$:h			
QádYBí aVÉ. *-	HndY F	5fYU	+& \$\$\$Gé h	D7= +	
QádY7caaYhg					
(, @/ H7F	@	+) '\$\$:h			
(, @/ H7F	A	%) '\$\$:h			

BYkcf.	5GB		BLaY	HUON(UAihWU5)idh			
6fUW	H5%		BLaY	HI]kUis%4UON[U	IgY	H5L-K5M	5fU
GM]ch	S&		cZ &	: fca. HI]kUis		H. 5drb\$%	@Gj7ch]l' %%%('
GfZUW	57		: Ua]m 5@SCH57HI]kUig	NbY		7UH]cfm	FU. G
5fU		%&\$ Gc h	@Y[h.	%+: h	K]Ph.	)\$: h	
GUg			GU@Y[h.	: h	GUVK]Ph.	: h	>ch@Y[h. : h
Gci XE.			GfYWHdY		; fUX \$		@Ug \$
GM]cb7caaYlg							
Kcf_8UY %%%('			Kcf_HdY Bk7ch]l' Vcb' :h]U		7cX BI!B		=AUcfA/ F. HfY
@Gj7ch]l'8UY %%%('			HRUladYg &		GfjYhX &		
7ch]l'ch]g D7= +*							
-hg]l'cb7caaYlg							
QladYBi aVE. \$%			HdY F	5fU	((SS\$Gc h	D7= ,%	
QladY7caaYlg							
(, @/ H7F			@	'%\$\$: h			
QladYBi aVE. S&			HdY F	5fU	)*! ('\$\$Gc h	D7= +'	
QladY7caaYlg							
(, @/ H7F			@	%) '\$\$: h			
(, @/ H7F			A	%\$\$: h			
)\$ D5H<-B			@	, \$\$Gc h			

BYkcf.	5GB	BlaY		HUON(UAihWU5)idh			
GfUW	H5%	BlaY	HI|kUis%4UON|U	IgY	H5L-K5M	5fU	&Z*, Ge h
GM|ch	\$%	cZ &	: fca.	FibkUis(!&	H.	HI|kUis5	@|g|7ch|' %%%('
GfUW	57	: Ua]m	5@SCH57HI|kUig	NbY	7UH|cfm		FUb. G
5fU	%Z*&Ge h	@Y|h.	'& : h	K|Ph.	() : h		
GUg		GU@Y|h.	: h	GUVK|Ph.	: h	>ch@Y|h.	: h
Gci Xf.		GfYWHdY		; fUX \$		@b|g \$	
GM|cb7caaYig							
Kcf_SUY %%%('		Kcf_HndY Bk7ch|g|V|cb|:h|U		7cXV BI!B		=AUcfA/ F. HiY	
@|g|hg|'SUY %%%(	%%%(	HRU|LadYg	'	GfjYnX	'		
7ch|g|D7= *							
-hg|V|cb7caaYig							
Q|adYBi aVf. \$%		HndY	F	5fU	)\$ \$\$\$Ge h	D7= * ,	
Q|adY7caaYig							
(, @/ H7F		@		'\$) '\$\$: h			
(, @/ H7F		A		&\$ \$\$: h			
Q|adYBi aVf. \$&		HndY	F	5fU	'+'\$) '\$\$Ge h	D7= (,	
Q|adY7caaYig							
(, @/ H7F		@		%\$\$\$: h			
(, @/ H7F		A		'\$) '\$\$: h			
)& F5J9@B;		A		'\$) '\$\$ Ge h			
)& F5J9@B;		<		%\$\$\$ Ge h			
Q|adYBi aVf. \$		HndY	F	5fU	() \$\$\$Ge h	D7= *-	
Q|adY7caaYig							
(, @/ H7F		@		\$\$\$: h			
(, @/ H7F		A		-)'\$: h			
)& F5J9@B;		A		\$\$\$ Ge h			
)& F5J9@B;		<		)'\$ Ge h			

BYkcf.	5GB	BLAY	HUON(UAihWU5)idh				
GfUW	H5&	BLAY	HI]kUis&HUON[U	Ig	H5L-K5M	5fU	&ž*) Gē h
GM]ch	%	cZ &	: fca. FibkUis(!&		H. HI]kUis		@g]7ch]i' %ž%('
GfUW	57	: Ua]m 5@SCH57HI]kUig	NbY		7U]cfm		FUb. G
5fU	%ž\$ Gē h	@Y]h.	' & : h	K]Ph.	() : h		
GUg		GU@Y]h.	: h	GUVK]Ph.	: h	>ch@Y]h.	: h
Gci XE.		GfY]HdY		; fUX \$		@Ug \$	
GM]cb7caa Ylg							
Kcf_SUY %ž%('		Kcf_HdY Bk7ch]i' Vcb: h]U		7cX BI!B		=AUcfA/ F. HiY	
@g]h]i'SUY %ž%ž%		HRUladYg (		GfjYnX '			
7ch]i' D7= **							
-hg]i'cb7caa Ylg							
QadYBi aVF. \$%		HdY F	5fU	)\$ \$\$\$Gē h		D7= +%	
QadY7caa Ylg							
(, @/ H7F		@	', \$\$\$: h				
(, @/ H7F		A	\$\$\$: h				
QadYBi aVF. \$&		HdY F	5fU	''+) '\$\$Gē h		D7= *(
QadY7caa Ylg							
(, @/ H7F		@	\$\$\$: h				
(, @/ H7F		A	&\$: h				
QadYBi aVF. \$		HdY F	5fU	() \$\$\$Gē h		D7= **%	
QadY7caa Ylg							
(, @/ H7F		@	%\$\$\$: h				
(, @/ H7F		A	&)'\$\$: h				
)* GK9@@B,		@	%\$\$\$ Gē h				

BVkf.	5GB		BláY	HUON(UAihWU5)fbh			
GfUW	H5&		BláY	HI|kúis&HUON|U	IgY	H5L-K5M	5fU
GW|ch	S&	cZ &	: fca.	HI|kúis		H. 5dRb\$%	@|g|7cb|' %%%('
GfUW	57	: Ua)m	5@SCH57HI|kúg	NbY		7UH|cfm	FUb. G
5fU		%%) + Gc h	@|h.	%+ : h	K|Ph.	() : h	
GUg		GU@|h.	: h	GUVK|Ph.	: h	>|h@|h.	: h
Gci Xf.		GfY|HdY		; fUX \$		@|g \$	
GW|cb7caaYlg							
Kcf_SUY %%%('		Kcf_HdY Bk7cb|V|b|:|h|U			7cX BI!-B		=AUcfA/ F. H|Y
@|g|7cb|'SUY %%%('		HRU|adYg &			GfjYnX &		
7cb|V|b| D7= +\$							
-|g|W|cb7caaYlg							
G|adYB|aVf. \$%		HdY	F	5fU	)\$ \$\$\$Gc h	D7= +*	
G|adY7caaYlg							
(, @/ H7F		@		%%\$\$: h			
(, @/ H7F		A		%\$\$: h			
G|adYB|aVf. S&		HdY	F	5fU	)(%'\$\$Gc h	D7= *(
G|adY7caaYlg							
(, @/ H7F		@		))'\$ : h			
(, @/ H7F		A		%\$\$: h			
)\$ D5H<-B;		@		%\$ \$\$\$ Gc h			
)& F5J9@B;		A		(\$\$\$ Gc h			
)* GK9@B;		@		)\$ \$\$ Gc h			

BYkcf.	5GB		BLáY	HUOS(UAihWU5)fbh				
GfUW	H5'		BLáY	HI|kúis' HUOS(U	IgX	H5L-K5M	5fU	))ž% Gá h
GM|ch	\$&		z ' : fca.	HI|kúis		H. GM|cb\$	@|h7cb|' %%%('	
GfUW	57		: Uá]m 5@SCH57HI|kúg	NbY		7UH|cfm	Fb. G	
5fU			*ž++ Gá h @|h.	%& h	K|Ph.	' \$: h		
GUg			GU@|h.	: h	GUVK|Ph.	: h	>|h@|h.	: h
Gd XE.			GfYHhY		; fUX \$		@b|g \$	
GM|cb7caa Ylg								
Kcf_8UY %%%('			Kcf_HhY Bk7cb|V|b' |h|U			7cX BI!B	gAUcfA/ F. HhY	
@|h|g|'8UY %%%%			HRU|ádyg %			GfjYhX %		
7cb|h|g D7= +								
hg|b7caa Ylg								
QádYBia VÉ. \$%			HhY F	5fU	)%-'\$\$Gá h	D7= +		
QádY7caa Ylg								
(, @/ H7F			@	&\$\$\$: h				
(, @/ H7F			A	%'\$ \$: h				

BYkcf.	5GB	BlaY	HUON(UAihWU5)idh
GfUW	H'	BlaY	HI]kúis' HUON(U
GMch	\$	cz'	: fca. GUKb8&
GfUW	557	: Ua]m	5@SCH57HI]kúg Nby
5fU	&Z'(Gc h	@Y[h.	),, :h K]h.
GUg		GU@Y[h.	:h GUVK]h.
Gci XE.		GfYWHdY	; fUX \$
GMcb7caaYlg			
Kcf_8UY	%#%('	Kcf_HdY	Bk7d]i V]b! D77
Kcf_8UY	%#%#%)	Kcf_HdY	GfUW-FUaYH]Gh YG]ha"
Kcf_8UY	*#%#%	Kcf_HdY	GjYUa'57H]b
@G]hgl'SUY	%#%#%#%	HRUladYg	(GfjYhX '
7cb]h]hg	D7= %\$		
-hg]h]b7caaYlg			
GladYBi aVf.	\$%	HdY	F 5fU () \$\$\$Gc h D7= %\$
GladY7caaYlg			
OBc8]g]Yg?			
GladYBi aVf.	\$&	HdY	F 5fU () \$\$\$Gc h D7= %\$
GladY7caaYlg			
OBc8]g]Yg?			
GladYBi aVf.	\$	HdY	F 5fU () \$\$\$Gc h D7= %\$
GladY7caaYlg			
OBc8]g]Yg?			

BYkcf.	5GB	BLAY	HUON(UAihWU5)idh					
GfUW	H'	BLAY	HI|kúis'	HUON(U	Ig'	H5L-K5M	5fU	))ž% Gē h
GM|ch	%	z'	: fca.	Fibkúis(!&		H. HI|kúis		@g|7ch|' %%%('
GfUW	57	: Ua]m	5@SCH57HI|kúg	NbY		7UH|cfm		FUb. G
5fU	%2% Gē h	@Y|h.	' & : h	K|Ph.		() : h		
GUg		GU@Y|h.	: h	GUVK|Ph.	: h	>ch@Y|h.		: h
Gci Xf.		GfYHhY		; fUX \$		@b|g \$		
GM|cb7caa Ylg								
Kcf_SUY %%%('		Kcf_HhY Bk7ch|V|b' : h|U			7cXV BI !-B			=gAUcfA/ F. H|Y
@g|7ch|'SUY %%%SS%		HRU|ádYg (			GfjYhX '			
7ch|V|ch|g D7= *-								
-hg|V|cb7caa Ylg								
QádYBi aVf. %	%	HhY	F	5fU	**%'SS Gē h		D7= +*	
QádY7caa Ylg								
(, @/ H7F		@		(,)'SS : h				
(, @/ H7F		A		%SS : h				
QádYBi aVf. &	%	HhY	F	5fU	'+)SS Gē h		D7= +(
QádY7caa Ylg								
(, @/ H7F		@		&)'SS : h				
(, @/ H7F		A		%SS : h				
QádYBi aVf. \$	\$	HhY	F	5fU	)SSSS Gē h		D7=)*	
QádY7caa Ylg								
(, @/ H7F		@		%SS : h				
(, @/ H7F		A		'SS : h				
)\$ D5H<-B		@		%SS Gē h				
)& F5J9@B		A		&'SS Gē h				

BVkf.	5GB		BhY	HUS(UAihWU5)idh			
GfUW	H5(		BhY	HI]kúis(HUS(U	Ig	H5L-K5M	5fU
GMch	%	z'	: fca.	HI]kúis		H. GMc'S&	@g]7dgh' %%%('
GfUW	57	: Ua]m	5@SCH57HI]kúg	NbY		7UH]cfm	Fb. G
5fU	%&, * G& h	@Y[h.	&& : h	K]h.		() : h	
GUg		GU@Y[h.	: h	GUVK]h.		: h	>ch@Y[h. : h
Gd XE		GfYHhY		; fUX \$			@b]g \$
GMcb7caaYlg							
Kcf_8UY %%%('		Kcf_HhY	Bk7dghVcb' :hU		7cX BI!B		=AUcfA/ F. HhY
@g]hgl'SUY %%%%		HRUladYg	&		GfjYhX	&	
7d]h]hg D7= +)							
hg]h]cb7caaYlg							
QadYBiaVf. %		HhY	F	5fU	*(%SSG& h	D7= +,	
QadY7caaYlg							
(, @/ H7F		@	-)'SS : h				
(, @/ H7F		A	%)'SS : h				
QadYBiaVf. &&		HhY	F	5fU	))- \$SSG& h	D7= +&	
QadY7caaYlg							
(, @/ H7F		@	' \$SS : h				
(, @/ H7F		A	%)'SS : h				
)* GK9@B;		A	- \$SS G& h				

BYkcf.	5GB		BláY	HUOS(UAihVWU5)rbh			
6fUW	H5(		BláY	HI]kúis(HUOS(U	IgX	H5L-K5M	5fU
GM]ch	\$&	cZ '	: fca.	GM]cb\$%		H. GM]cb\$	@G]7cbgH' *#488%
GfZUW	557	: Uá]m	5@SCH57HI]kúg	NcbY		7UH]cfm	FUb. G
5fU		((Z-' Gc h	@V]h.	+' & h	K]Ph.	() :h	
GUg		GUV@V]h.	: h	GUVK]Ph.	: h	>cb]h@V]h.	: h
Gci Xf.		GfYV]HndY		; fUX \$		@Ubg \$	
GM]cb7caaYlg							
Kcf_8UY	%488%('		Kcf_HndY	Bk7cbg]V]cb': h]U		7cX BI !-B	=AUcfA/ F. HiY
Kcf_8UY	*#488%		Kcf_HndY	GjYUá57H]b		7cX C@5H	=AUcfA/ F. HiY
@G]i:hg]'8UY	%8888%		HUCládYg	,		GfjYX (
7cb]hcbg	D7= %88						
-hg]M]cb7caaYlg							
CládYBi aVf.	\$%	HndY	F	5fU	()8888Gc h	D7= %88	
CládY7caaYlg							
OBc8]g]Yg?							
CládYBi aVf.	\$	HndY	F	5fU	()8888Gc h	D7= %88	
CládY7caaYlg							
OBc8]g]Yg?							
CládYBi aVf.	9	HndY	F	5fU	()8888Gc h	D7= %88	
CládY7caaYlg							
OBc8]g]Yg?							
CládYBi aVf.	\$-	HndY	F	5fU	)-)888Gc h	D7= %88	
CládY7caaYlg							
OBc8]g]Yg?							

BYkcf.	5GB	BuY	HUON(UAihWU5)idh
GfUW	H5(	BuY	HI]kuis(HUON(U
GWch	\$	z'	: fca. GWcb&&
GfUW	5D7	: Ua]m 5@SCH57HI]kUg	NbY
5fU	, &&&Gc h	@Y[h.	%\$* : h K]Ph.
GUg		GU@Y[h.	: h GUVK]Ph.
Gci Xf.		GfYWHuY	; fUX \$
GWcb7caaYlg			
Kcf_8UY	%&&&&	Kcf_HuY Bk7cbj6Vcb! :h]U	7cX BI!B
Kcf_8UY	%&&&&	Kcf_HuY GfUW-FUaYH]Gh]Y6]ha"	7cX GHG
Kcf_8UY	%&&&&	Kcf_HuY GYUa57H]b	7cX C@5H
@Gihg]8UY	%&&&&	HUCladyg %	GfjYnX *
7cb]hcg	D7= ,+		
hg]Wcb7caaYlg			
QadYBiaVf.	\$%	HuY F	5fU)+) '\$\$Gc h D7= ,&
QadY7caaYlg			
(+ >HF9 "7F		@	\$\$\$: h
(+ >HF9 "7F		A	- \$\$\$: h
QadYBiaVf.	\$	HuY F	5fU)'+' '\$\$Gc h D7= ,+
QadY7caaYlg			
(+ >HF9 "7F		@	'+\$: h
QadYBiaVf.	\$	HuY F	5fU)', '\$\$Gc h D7= ,-
QadY7caaYlg			
(+ >HF9 "7F		@	&)' \$: h
QadYBiaVf.	\$	HuY F	5fU)' - '\$\$Gc h D7= -%
QadY7caaYlg			
(+ >HF9 "7F		@	&\$: h
QadYBiaVf.	\$\$	HuY F	5fU)(\$\$\$Gc h D7= ,,
QadY7caaYlg			
(+ >HF9 "7F		@	'% '\$: h
QadYBiaVf.	%	HuY F	5fU)(\$\$\$Gc h D7= ,*
QadY7caaYlg			
(+ >HF9 "7F		@	(') '\$: h

BYkcf.	5GB		BláY	HUON(UAihWU5)rbh			
GfUW	H7S%		BláY	HI]kú7dbNMF\$%HUON[U I g	H5L-K5M	5fU	%\$SSGé h
GM]ch	\$%	cZ %	: fca.	5dcb\$%	H. 5dcb\$&		@g]7cbg]l' %%%('
GfUW	57	: Uá]m	5@SCH57HI]kúg	NbY	7UH]cfm		Fb. G
5fU	%\$SSGé h	@Y]h.	%\$: h	K]Ph.	)\$: h		
GUg		GU@Y]h.	: h	GUVK]Ph.	: h	>cb]h@Y]h.	: h
Gci XE.		GfY]HndY		; fUX \$		@b]g \$	
GM]cb7caaYlg							
Kcf_8UY %%%('		Kcf_HndY	Bk7cb]g]Vcb' b]U		7cX BI!-B		=AUcfA/ F. H]Y
@g]h]g]l'8UY %\$SSGé h		HRUcláYg	&		Gf]YnX	&	
7cb]h]g] D7=)%							
=g]N]cb7caaYlg							
CládYBiaVÉ. \$%		HndY	F	5fU	)%\$SSGé h	D7=)'	
CládY7caaYlg							
(, @/ H7F		@		%)'SS : h			
(, @/ H7F		A		'), \$SS : h			
)\$ D5H<-B		@		')\$SS Gé h			
)+ K95H 9F-B		@		(+, \$SS Gé h			
CládYBiaVÉ. \$&		HndY	F	5fU	)(+\$SSGé h	D7= (-	
CládY7caaYlg							
(% 5@@; 5HCF 7F		A		%'SS Gé h			
(, @/ H7F		@		*\$SS : h			
(, @/ H7F		A		(, \$SS : h			
)\$ D5H<-B		@		\$SS Gé h			
)+ K95H 9F-B		@		)&\$SS Gé h			

BV	kcf.	5GB	BlaY	HUON(UAihVU5)idh			
GfUW	H7S&	BlaY	HI|kUr7dbNMfSSHUON[U I g	H5L-K5M	5fU	*Z% Gc h	
GM	ch	%	cZ %	: fca.	HI|kUr5	H. 7dMAY5drb	@g|7dgh' %SSS%
GfUW	57	: Ua]m	5@SCH57HI|kUg	NbY	7U|cfm	FUb. G	
5fU	*Z% Gc h	@V|h.	%S: h	K]Ph.	) : h		
GUg	GU@V|h.	: h	GUVK]Ph.	: h	>ch@V|h.	: h	
Gd	Xf.	GfYVHdY	; fUX	\$	@Ug	\$	
GM	cb7caa Ylg						
Kcf	8UY	%SSS%	Kcf_HdY	6g7dgh'5|[fUY	7cXV 65!5;	=AUcfA/ F. :Ug	
Kcf	8UY	%SSS%	Kcf_HdY	Bk7dgh'Vcb!h]U	7cXV BI!B	=AUcfA/ F. HiY	
@g|7dgh'	8UY	%SSS%	HUONadYg	%	GfjYX	%	
7dMAY5drb	D7=	, \$					
-hg	Mcb7caa Ylg						
QadY	Bi aVf.	%	HdY	F	5fU	*' %SSGc h	D7= , \$
QadY	7caa Ylg						
(	@/ H7F		@	%'SS : h			
(	@/ H7F		A	)SSS : h			
)+	K95H 9F-B;		@	*' %SS Gc h			

BVkf.	5GB	BlaY	HUON(UAihVU5)rbh
GfUW	H7S	BlaY	HI]kür7dbNMfS HUON[U I g H5L-K5M 5fU)ž+* Gē h
GMch	%	z %	: fca. HI]kür5 H. 7dMY5drb @g7dgh %888%
GfUW	57	: Ua]m 5@SCH57HI]küg	NbY 7UH[cfm FUb. G
5fU	)ž+* Gē h	@V[h.	%S: h K]h.)) : h
GUg		GU@V[h.	: h GUVK]h. : h >ch@V[h. : h
Gd XE		GfYHhV	; fUX \$ @Ug \$
GMcb7caa Ylg			
Kcf_8UY %888%		Kcf_HdY Gg7dgh!5[[f]UY	7cX 65!5; =gAUcfA/ F. : UY
Kcf_8UY %888%		Kcf_HdY Bk7dgh Vcb! h]U	7cX BI !-B =gAUcfA/ F. HiY
@g7dgh!8UY %888%		HUONadYg %	GfjYX %
7dgh!cbg D7= %S			
-hgNMcb7caa Ylg			
GädYBaVF. %		HdY F	5fU)++*!SSGē h D7= %S
GädY7caa Ylg			
OBc8]gYg			

BVkc_f.	5GB	BlaY	HUON(UAihjWU5)rbh			
GfUW	H 5B %	BlaY	HI]kUa UH]fS%4UON[U	I g	H5L-K5M	5fU
GM]ch	9	z *	: fca.	GM]cb\$	H.	GM]cb\$
GfUW	5D	: Ua]m	5@SCH57HI]U]g	NbY	7UH]cfm	FUb. H
5fU	(% G h	@Y]h.	, \$S: h	K]Ph.	)S: h	
GUg		GUV@Y]h.	: h	GUVK]Ph.	: h	>ch@Y]h.
Gci Xf.		GfYWHdY		; fUX \$		@U]g \$
GM]cb7caa Ylg						
Kcf_8UY %%%\$		Kcf_HdY Bk7cb]U]cb!D7			7cX B7D	=AUcfA/ F. HiY
Kcf_8UY %%%\$		Kcf_HdY GYfUa57H]b			7cX C@5H	=AUcfA/ F. HiY
@]i:hg]8UY %%%\$		HUCladYg %		GfjYX (
7cb]U]cbg D7= %\$						
-hg]U]cb7caa Ylg						
QadYBi aVf. %		HdY F	5fU	)%\$G h	D7= %\$	
QadY7caa Ylg						
OBc8]g]g						
QadYBi aVf. \$		HdY F	5fU	, &' \$G h	D7= %\$	
QadY7caa Ylg						
OBc8]g]g						
QadYBi aVf. 9		HdY F	5fU	, ' \$G h	D7= %\$	
QadY7caa Ylg						
OBc8]g]g						
QadYBi aVf. \$-		HdY F	5fU	, ')' \$G h	D7= %\$	
QadY7caa Ylg						
OBc8]g]g						

BVkf.	5GB	BlaY	HUON(UAihjWU5)rbh			
6fUW	H 5B %	BlaY	HI]kUia UH]f\$%HUON[U	I g	H5L-K5M	5fU
GM]ch	\$	z *	: fca.	GM]cb\$	H.	GM]cb\$
GfZUW	5D7	: Ua]m	5@SCH57HI]UBg	NbY	7UH]cfm	FUb. H
5fU	) *\$\$\$Gc h	@Y[h.	%\$S: h	K]Ph.	) \$: h	
GUg	GU@Y[h.	: h	GUVK]Ph.	: h	>ch@Y[h.	: h
Gci XE.	GfYWHdY		; fUX \$		@Ug \$	
GM]cb7caa Ylg						
Kcf_8UY %%%\$	Kcf_HdY Bk7cb]U]cb!D77			7cX	B7D7	=AUcfA/ F. HiY
Kcf_8UY %%%\$	Kcf_HdY GYFu]57H]b			7cX	C@5H	=AUcfA/ F. HiY
@]i:hg!8UY %%%\$	HUCladYg %			GfjYX (
7cb]U]cbg D7= %\$						
-hg]U]cb7caa Ylg						
QadYBi aVE. \$%	HdY	F	5fU	' +\$'\$\$\$Gc h	D7= %\$	
QadY7caa Ylg						
OBc8]g]Yg						
QadYBi aVE. \$	HdY	F	5fU	', ')\$Gc h	D7= %\$	
QadY7caa Ylg						
OBc8]g]Yg						
QadYBi aVE. \$-	HdY	F	5fU	',) \$\$\$\$Gc h	D7= %\$	
QadY7caa Ylg						
OBc8]g]Yg						
QadYBi aVE. %\$	HdY	F	5fU	', \$\$\$\$Gc h	D7= %\$	
QadY7caa Ylg						
OBc8]g]Yg						

BVkd.	5GB	BláY	HUON(UAihVU5)lbdh
GfUW	H 5B %	BláY	HI]kUá U]f\$%HUON[U I g H5L-K5M 5fU ')&*) G h
GMch	%	z *	: fca. 9NYcZDjYh H. GMcb&& @g]7cbg] %%%('
GfUW	57	: Ua]m 5@SCH57HI]Ubg	NbY 7U]cfm FUb. H
5fU	&8% G h	@Y[h.	)*\$:h K]h.)\$:h
GUg		GV@Y[h.	:h GVK]h. :h >ch@Y[h. :h
Gci Xf.		GfYHhY	; fUX \$ @bg \$
GMcb7caaYlg			
Kcf_SUY %%%('		Kcf_HdY Bk7cbg]Vcb: h]U	7cX BI!B =AUcfA/ F. HfY
@g]hgl'SUY %%%%		HRUladYg *	GfjYhX '
7cb]hbg D7= +&			
hg]Vcb7caaYlg			
GladYBiaVf. %		HdY F	5fU)\$)'SSG h D7= +
GladY7caaYlg			
(, @/ H7F		@	%SS\$:h
(, @/ H7F		A	%SS\$:h
GladYBiaVf. \$		HdY F	5fU (-%'SSG h D7= *)
GladY7caaYlg			
(, @/ H7F		A	'SS\$:h
)+ K95H9FB		@	(-%'SS G h
GladYBiaVf. \$		HdY F	5fU)-()'SSG h D7= +&
GladY7caaYlg			
(, @/ H7F		@	%SS\$:h
(, @/ H7F		A	\$SS\$:h

BYkcf.	5GB	BlaY	HUON(UAihWU5)rbh
6fUW	H 5B %	BlaY	HI]kUia UH]fS%4UON[U I g/ H5L-K5M 5fU ')&*) Gc h
GM]ch \$	cZ *	: fca.	GM]cbS(H. GM]cbS& @G]7cbg]i %%%('
GfZW 57	: Ua]m 5@SCH57HI]UBg	NbY	7UH]cfm FUb. H
5fU	%%' - Gc h	@Y]h.	%& : h K]Ph. +S: h
GUg	GUV@Y]h.	: h	GUVK]Ph. : h >cb]h@Y]h. : h
Gci XE.	GfYWHdY		; fUX \$ @U]g \$
GM]cb7caaYlg			
Kcf_8UY %%%('	Kcf_HdY Bk7cbg]i Vcb]i h]U		7cXV BI!-B =gAUcfA/ F. HfY
@G]7cbg]i 8UY %%%(	HRUcladYg &		GfjYhX +
7cb]hcbg D7=),			
hg]h]cb7caaYlg			
QladYBiaVE. %	HdY F	5fU	+&)'SSGc h D7=)(
QladY7caaYlg			
(+ >HF9 "7F	A	(, \$\$\$: h	
(+ >HF9 "7F	<	\$\$\$: h	
(, @/ H7F	A	\$\$\$: h	
QladYBiaVE. \$	HdY F	5fU	, - \$\$\$Gc h D7=))
QladY7caaYlg			
(+ >HF9 "7F	A	, (\$\$\$: h	
(+ >HF9 "7F	<	\$\$\$: h	
(, @/ H7F	A	\$\$\$: h	
QladYBiaVE. %	HdY F	5fU	)&)'SSGc h D7=))
QladY7caaYlg			
(+ >HF9 "7F	@	\$\$'SS : h	
(+ >HF9 "7F	A	' \$\$\$: h	
(+ >HF9 "7F	<	\$'SS : h	
(, @/ H7F	A	% \$\$\$: h	
QladYBiaVE. %	HdY F	5fU	(-, \$\$\$Gc h D7=))
QladY7caaYlg			
(+ >HF9 "7F	A	* \$\$\$: h	
(, @/ H7F	A	\$\$\$: h	
QladYBiaVE. %	HdY F	5fU	) \$\$\$Gc h D7=)*
QladY7caaYlg			
(+ >HF9 "7F	@	% \$\$\$: h	
(+ >HF9 "7F	A	') \$\$\$: h	
(, @/ H7F	A	' \$\$\$: h	
QladYBiaVE. &	HdY F	5fU	) \$\$\$Gc h D7=)%
QladY7caaYlg			
(+ >HF9 "7F	@	& \$\$\$: h	
(+ >HF9 "7F	A	() \$\$\$: h	
(, @/ H7F	A	') \$\$\$: h	
QladYBiaVE. &	HdY F	5fU	) \$\$\$Gc h D7= ,*
QladY7caaYlg			
(, @/ H7F	@	& \$\$\$: h	

BYkcf.	5GB	BláY	HUON(UAihWU5)rbh
GfUW	H 5B; %	BláY	HI]kUá UH]f\$%HUON[U I g/ H5L-K5M 5fU ')&*) Gc h
GM]ch	\$&	z *	: fca. GM]cb\$% H. GM]cb\$ @G]7cbg] %%%('
GfUW	57	: Uá]m 5@SCH57HI]U]g	NbY 7UH]cfm FUb. H
5fU	*)ž-%Gc h	@Y[h.	%\$ \$: h K]Ph. +\$: h
GUg		GU@Y[h.	: h GUVK]Ph. : h >ch@Y[h. : h
Gci XE.		GfYWHdY	; fUX \$ @U]g \$
GM]cb7caaYlg			
Kcf_8UY %%%('		Kcf_HdY Bk7cbg]U]b]h]U	7cXV BI!-B =AUcfA/ F. HfY
@G]h]g]8UY %%%%		HRUcláYg %	GfjYnX)
7cb]h]g D7=)\$			
hg]U]cb7caaYlg			
GládYBi aVf. \$&		HdY F	5fU (' &'\$\$Gc h D7=)-
GládY7caaYlg			
(+ >HF9 "7F		@	%\$\$\$: h
(+ >HF9 "7F		A	(\$\$\$: h
GládYBi aVf. \$		HdY F	5fU)&'\$\$Gc h D7= %
GládY7caaYlg			
(% 5@@; 5HCF 7F		<	- \$\$\$ Gc h
(, @/ H7F		A	&\$\$\$: h
GládYBi aVf. \$		HdY F	5fU)' \$\$\$Gc h D7= *-
GládY7caaYlg			
(, @/ H7F		A	'+) '\$\$: h
GládYBi aVf. %\$		HdY F	5fU))%'\$\$Gc h D7= (%
GládY7caaYlg			
(% 5@@; 5HCF 7F		A	' \$\$\$ Gc h
(% 5@@; 5HCF 7F		<	\$\$\$ Gc h
(, @/ H7F		A	() '\$\$: h
(, @/ H7F		<	) '\$\$ : h
GládYBi aVf. %&		HdY F	5fU **+) '\$\$Gc h D7= *)
GládY7caaYlg			
(, @/ H7F		@	)) '\$\$ : h
(, @/ H7F		A	(,)' '\$\$: h
) + K95H 9F-B;		A	) '\$\$ Gc h

BYkcf.	5GB		BláY	HUON(UAihWU5)rbh			
6fUW	H 5B %		BláY	HI]kUá U]f\$%HUON[U	I g	H5L-K5M	5fU
GM]ch	\$(		z *	: fca.	GM]cb\$	H.	GM]cb\$
GfZUW	57		: Uá]m	5@SCH57HI]U]g	NbY	7U]cfm	Fb. H
5fU	&Z) Gc h		@Y[h.	)\$ : h	K]Ph.	)\$ : h	
GUg			GU@Y[h.	: h	GUVK]Ph.	: h	>ch@Y[h.
Gci XE.			GfYWHdY		; fUX \$		@b]g \$
GM]cb7caaYlg							
Kcf_8UY %%%('			Kcf_HdY Bk7cb]Vcb' :h]U			7cX BI!-B	=AUcfA/ F. H]Y
@g]h]g]8UY %%%%			HRU]dYg %			GfjYnX (
7cb]h]g D7=)							
hg]V]cb7caaYlg							
QádYBiaVf. %			HdY	F	5fU	)\$)\$Gc h	D7=)'
QádY7caaYlg							
(+ >HF9 "7F			A		)\$)\$ : h		
(+ >HF9 "7F			<		\$'5\$: h		
(, @/ H7F			A		\$)\$)\$: h		
QádYBiaVf. \$&			HdY	F	5fU	)\$)\$Gc h	D7=)\$
QádY7caaYlg							
(+ >HF9 "7F			A		*\$)\$: h		
(, @/ H7F			A		(\$)\$: h		
QádYBiaVf. \$(			HdY	F	5fU	)\$)\$Gc h	D7=)
QádY7caaYlg							
(+ >HF9 "7F			A		*)\$) : h		
(, @/ H7F			A		%\$)\$: h		
QádYBiaVf. \$			HdY	F	5fU)\$)\$Gc h	D7= *\$
QádY7caaYlg							
(+ >HF9 "7F			A		*\$)\$: h		

BYkcf.	5GB		BláY	HUON(UAihWU5)lbdh			
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GM]ch	\$%	cZ %	: fca.	HI]kúá(H. H<U]Ug	@]h7ch] %\$SS-
GfUW	57	: Uá]m	5@SCH57HI]U]g	NbY		7U]cfm	Fb. H
5fU	%Z \$S Gc h	@]h.	(, \$: h	K]h.		() : h	
GUg	GU@]h.		: h	GUVK]h.		: h	>ch@]h. : h
Gci XE.	GfY]HdY			; fUX \$			@]g \$
GM]cb7caa Ylg							
Kcf_SUY %\$SS-		Kcf_HdY Bk7ch]U]b:]]U			7cX BI!-B		=AUcfA/ F. H]Y
@]h]h]SUY %\$SS%		HRU]dYg (		GfjYhX '			
7ch]h]g D7= ,&							
-g]h]cb7caa Ylg							
Q]dYBi aVF. \$%		HdY	F	5fU	))(\$SS Gc h		D7= ,-
Q]dY7caa Ylg							
(, @/ H7F		@		, \$SS : h			
)+ K95H 9F-B;		@		))(\$SS Gc h			
Q]dYBi aVF. S&		HdY	F	5fU	() \$SS Gc h		D7= ,+
Q]dY7caa Ylg							
(, @/ H7F		A		%SS : h			
)+ K95H 9F-B;		@		() \$SS Gc h			
Q]dYBi aVF. \$		HdY	F	5fU	() \$SS Gc h		D7= ++
Q]dY7caa Ylg							
(, @/ H7F		@) \$SS : h			
(, @/ H7F		A		\$SS : h			
)& F5J9@B;		@		&\$SS Gc h			
)+ K95H 9F-B;		@		(&\$SS Gc h			

APPENDIX E
DISTRESS SUMMARY REPORT



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u° V8		°#			K0uk 70#u@V#k° #M08	#)	=		7	
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u° V8		°#			K0uk 70#u@V#k° #M08	#)	U		7	
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u° V8		°#			O V8ey) @° Ouk° Vof- lo° #k° #M08	#)	U		7	
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APPENDIX F

PAVEMENT CONDITION REPORTS

F1: Section Forecasted Pavement Condition Rating

F2: Branch PCI Rating

F3: Branch FOD Rating



Appendix F1
Forecasted Section PCI
Talladega Municipal Airport (ASN)

Branch ID	Section ID	Forecasted PCI						
		2021	2022	2023	2024	2025	2026	2027
A01	01	79	77	75	73	70	68	66
A01	02	76	74	72	70	67	65	63
A02	01	52	50	48	46	43	41	39
R0422	01	71	70	70	69	65	56	52
R0422	02	97	96	95	94	92	89	86
TA	01	78	76	74	72	69	66	61
TA1	01	52	48	45	43	39	36	32
TA1	02	71	68	64	60	55	50	46
TA2	01	56	51	47	45	42	38	35
TA2	02	62	57	52	48	45	42	39
TA3	01	60	55	51	47	45	41	38
TA3	02	75	72	70	66	62	57	52
TA3	03	98	96	94	92	89	86	84
TA4	01	70	66	62	57	52	48	45
TA4	02	98	96	94	92	89	86	84
TA4	03	82	79	78	76	73	71	68
TC01	01	45	41	37	34	30	27	23
TC02	01	76	74	71	68	64	60	55
TC03	01	98	96	94	92	89	86	84
THANG01	01	65	60	56	51	47	45	41
THANG01	02	44	40	37	33	30	26	22
THANG01	03	48	45	42	39	35	32	28
THANG01	04	45	43	40	36	33	29	25
THANG01	05	98	96	94	92	89	86	84
THANG01	06	98	96	94	92	89	86	84
THANG02	01	77	75	73	71	68	64	59

~~D:\A\H\SUB\05\BCH7\ca\B\SS\8%~~

Branch ID	Number of Sections	Sum Section Length (Ft)	Avg Section Width (Ft)	True Area (SqFt)	Use	Average PCI	Standard Deviation PCI	Weighted Average PCI
A01	2	1,333.00	196.00	262,419.00	APRON	82.50	1.50	82.29
A02	1	450.00	150.00	67,500.00	APRON	57.00	0.00	57.00
R0422	2	6,026.00	100.00	602,600.00	RUNWAY	88.00	12.00	76.80
TA	1	6,650.00	50.00	358,835.00	TAXIWAY	83.00	0.00	83.00
TA1	2	502.00	47.50	29,368.00	TAXIWAY	69.50	6.50	67.78
TA2	2	502.00	45.00	28,765.00	TAXIWAY	68.00	2.00	67.51
TA3	3	1,025.00	35.00	55,415.00	TAXIWAY	82.67	12.92	86.78
TA4	3	2,051.00	55.00	139,679.00	TAXIWAY	87.33	10.21	90.06
TC01	1	180.00	50.00	10,600.00	TAXIWAY	51.00	0.00	51.00
TC02	1	100.00	55.00	6,314.00	TAXIWAY	80.00	0.00	80.00
TC03	1	100.00	55.00	5,776.00	TAXIWAY	100.00	0.00	100.00
THANG01	6	5,735.00	56.67	352,365.00	TAXIWAY	72.33	20.70	69.04
THANG02	1	480.00	45.00	19,600.00	TAXIWAY	82.00	0.00	82.00

~~DJVA YHSUWJY 5@BCH7ca VbYSS%8%~~

Use Category	Number of Sections	Total Area (SqFt)	Arithmetic Average PCI	Average STD PCI	Weighted Average PCI
APRON	3	329,919.00	74.00	12.08	77.11
RUNWAY	2	602,600.00	88.00	12.00	76.80
TAXIWAY	21	1,006,717.00	76.90	16.29	78.14
ALL	26	1,939,236.00	77.42	15.89	77.55

8/27/2021

Branch Condition Report

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Pavement Database: ALDOT_210811

Branch ID	Number of Sections	Sum Section Length (Ft)	Avg Section Width (Ft)	True Area (SqFt)	Use	Average FOD Potential	Standard Deviation FOD Pote	Weighted Average FOD Poten
A01	2	1,333.00	196.00	262,419.00	APRON	28.50	2.50	28.86
A02	1	450.00	150.00	67,500.00	APRON	58.00	0.00	58.00
R0422	2	6,026.00	100.00	602,600.00	RUNWAY	18.00	18.00	34.81
TA	1	6,650.00	50.00	358,835.00	TAXIWAY	28.00	0.00	28.00
TA1	2	502.00	47.50	29,368.00	TAXIWAY	43.50	7.50	45.48
TA2	2	502.00	45.00	28,765.00	TAXIWAY	44.00	2.00	44.49
TA3	3	1,025.00	35.00	55,415.00	TAXIWAY	25.67	18.70	19.14
TA4	3	2,051.00	55.00	139,679.00	TAXIWAY	19.33	14.52	16.74
TC01	1	180.00	50.00	10,600.00	TAXIWAY	64.00	0.00	64.00
TC02	1	100.00	55.00	6,314.00	TAXIWAY	32.00	0.00	32.00
TC03	1	100.00	55.00	5,776.00	TAXIWAY	0.00	0.00	0.00
THANG01	6	5,735.00	56.67	352,365.00	TAXIWAY	35.50	25.84	39.57
THANG02	1	480.00	45.00	19,600.00	TAXIWAY	29.00	0.00	29.00

8/27/2021

Branch Condition Report

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Pavement Database: ALDOT_210811

Use Category	Number of Sections	Total Area (SqFt)	Arithmetic Average FOD	Average STD FOD Potential	Weighted Average FOD P
APRON	3	329,919.00	38.33	14.06	34.82
RUNWAY	2	602,600.00	18.00	18.00	34.81
TAXIWAY	21	1,006,717.00	32.19	20.82	31.24
ALL	26	1,939,236.00	31.81	20.44	32.96

APPENDIX G

SAFETY AND PREVENTIVE MAINTENANCE POLICIES



Appendix G1
Localized Safety (Stopgap) Repair Policy

Distress	Distress Severity	Description	Code	Work Type	Work Unit
41	High	ALLIGATOR CR	PA-FD	Patching - AC Full-Depth	SqFt
43	High	BLOCK CR	CS-AC	Crack Sealing - AC	Ft
45	High	DEPRESSION	PA-FD	Patching - AC Full-Depth	SqFt
47	High	JT REF. CR	CS-AC	Crack Sealing - AC	Ft
48	High	L & T CR	CS-AC	Crack Sealing - AC	Ft
50	High	PATCHING	PA-FD	Patching - AC Full-Depth	SqFt
53	High	RUTTING	PA-FD	Patching - AC Full-Depth	SqFt
54	High	SHOVING	PA-PD	Patching - AC Partial-Depth	SqFt
55	NA	SLIPPAGE CR	PA-PD	Patching - AC Partial-Depth	SqFt
56	High	SWELLING	PA-FD	Patching - AC Full-Depth	SqFt
61	High	BLOW-UP	SL-PC	Slab Replacement - PCC	SqFt
61	Medium	BLOW-UP	PA-PF	Patching - PCC Full Depth	SqFt
62	High	CORNER BREAK	PA-PF	Patching - PCC Full Depth	SqFt
63	High	LINEAR CR	PA-PF	Patching - PCC Full Depth	SqFt
63	Medium	LINEAR CR	CS-PC	Crack Sealing - PCC	Ft
64	High	DURABIL. CR	SL-PC	Slab Replacement - PCC	SqFt
64	Medium	DURABIL. CR	PA-PF	Patching - PCC Full Depth	SqFt
66	High	SMALL PATCH	PA-PP	Patching - PCC Partial Depth	SqFt
67	High	LARGE PATCH	PA-PF	Patching - PCC Full Depth	SqFt
70	High	SCALING	SL-PC	Slab Replacement - PCC	SqFt
71	High	FAULTING	GR-PP	Grinding (Localized)	Ft
72	High	SHAT. SLAB	SL-PC	Slab Replacement - PCC	SqFt
74	High	JOINT SPALL	PA-PP	Patching - PCC Partial Depth	SqFt
75	High	CORNER SPALL	PA-PP	Patching - PCC Partial Depth	SqFt
76	High	ASR	SL-PC	Slab Replacement - PCC	SqFt

Appendix G2
Localized Preventive Repair Policy

Distress	Distress Severity	Description	Code	Work Type	Work Unit
41	Medium	ALLIGATOR CR	PA-AD	Patching - AC Full-Depth	SqFt
41	High	ALLIGATOR CR	PA-AD	Patching - AC Full-Depth	SqFt
42	N/A	BLEEDING	PA-AS	Patching - AC Partial-Depth	SqFt
43	High	BLOCK CR	PA-AD	Patching - AC Full-Depth	SqFt
43	Medium	BLOCK CR	CS-AC	Crack Sealing - AC	Ft
44	Low	CORRUGATION	PA-AS	Patching - AC Partial-Depth	SqFt
44	High	CORRUGATION	PA-AS	Patching - AC Partial-Depth	SqFt
44	Medium	CORRUGATION	PA-AS	Patching - AC Partial-Depth	SqFt
45	Medium	DEPRESSION	PA-AD	Patching - AC Full-Depth	SqFt
45	Low	DEPRESSION	PA-AD	Patching - AC Full-Depth	SqFt
45	High	DEPRESSION	PA-AD	Patching - AC Full-Depth	SqFt
47	High	JT REF. CR	CS-AC	Crack Sealing - AC	Ft
47	Medium	JT REF. CR	CS-AC	Crack Sealing - AC	Ft
48	High	L & T CR	CS-AC	Crack Sealing - AC	Ft
48	Medium	L & T CR	CS-AC	Crack Sealing - AC	Ft
49	N/A	OIL SPILLAGE	PA-AD	Patching - AC Full-Depth	SqFt
50	High	PATCHING	PA-AD	Patching - AC Full-Depth	SqFt
50	Medium	PATCHING	PA-AD	Patching - AC Full-Depth	SqFt
52	High	RAVELING	PA-AS	Patching - AC Partial-Depth	SqFt
53	High	RUTTING	PA-AD	Patching - AC Full-Depth	SqFt
53	Low	RUTTING	PA-AD	Patching - AC Full-Depth	SqFt
53	Medium	RUTTING	PA-AD	Patching - AC Full-Depth	SqFt
55	N/A	SLIPPAGE CR	PA-AD	Patching - AC Full-Depth	SqFt
56	Low	SWELLING	PA-AD	Patching - AC Full-Depth	SqFt
56	Medium	SWELLING	PA-AD	Patching - AC Full-Depth	SqFt
61	Low	BLOW-UP	PA-PF	Patching - PCC Full Depth	SqFt
61	Medium	BLOW-UP	PA-PF	Patching - PCC Full Depth	SqFt
61	High	BLOW-UP	PA-PF	Patching - PCC Full Depth	SqFt
62	Medium	CORNER BREAK	PA-PF	Patching - PCC Full Depth	SqFt
62	High	CORNER BREAK	PA-PF	Patching - PCC Full Depth	SqFt
62	Low	CORNER BREAK	CS-PC	Crack Sealing - PCC	Ft
63	Medium	LINEAR CR	CS-PC	Crack Sealing - PCC	Ft
63	High	LINEAR CR	PA-PP	Patching - PCC Partial Depth	SqFt
64	Medium	DURABIL. CR	PA-PF	Patching - PCC Full Depth	SqFt
64	High	DURABIL. CR	SL-PC	Slab Replacement - PCC	SqFt
65	High	JT SEAL DMG	JS-LC	Joint Seal (Localized)	Ft
65	Medium	JT SEAL DMG	JS-LC	Joint Seal (Localized)	Ft
66	High	SMALL PATCH	PA-PP	Patching - PCC Partial Depth	SqFt
66	Medium	SMALL PATCH	PA-PP	Patching - PCC Partial Depth	SqFt
67	Medium	LARGE PATCH	PA-PF	Patching - PCC Full Depth	SqFt

Appendix G2
Localized Preventive Repair Policy

Distress	Distress Severity	Description	Code	Work Type	Work Unit
67	High	LARGE PATCH	PA-PF	Patching - PCC Full Depth	SqFt
69	N/A	PUMPING	JS-LC	Joint Seal (Localized)	Ft
70	Medium	SCALING	PA-PP	Patching - PCC Partial Depth	SqFt
70	High	SCALING	SL-PC	Slab Replacement - PCC	SqFt
71	High	FAULTING	GR-PP	Grinding (Localized)	Ft
71	Medium	FAULTING	GR-PP	Grinding (Localized)	Ft
72	Medium	SHAT. SLAB	SL-PC	Slab Replacement - PCC	SqFt
72	High	SHAT. SLAB	SL-PC	Slab Replacement - PCC	SqFt
74	High	JOINT SPALL	PA-PP	Patching - PCC Partial Depth	SqFt
74	Medium	JOINT SPALL	PA-PP	Patching - PCC Partial Depth	SqFt
75	Medium	CORNER SPALL	PA-PP	Patching - PCC Partial Depth	SqFt
75	High	CORNER SPALL	PA-PP	Patching - PCC Partial Depth	SqFt
76	Medium	ASR	SL-PC	Slab Replacement - PCC	SqFt
76	High	ASR	SL-PC	Slab Replacement - PCC	SqFt

APPENDIX H

M&R UNIT COSTS

H1: M&R Unit Costs

H2: Component Costs for Repair

H3: Airport Category

Maintenance and Repair (M&R) Unit Costs

The M&R costs developed for the ALDOT PMP include costs for maintenance, preservation, and repair activities and are described below.

Unit Costs Source Data

The source for the M&R costs data is RSMMeans, which has data for 14 locations throughout Alabama, as identified by the yellow highlighted boxes in Figure 1. The cost data is presented in terms of individual line items like asphalt wearing course, aggregate base etc., which were consolidated to develop the activity costs described below.

The cost data show a distinct difference in costs between locations north and south of Birmingham, especially for the higher value items like the asphalt layers. Therefore, the unit costs were developed accordingly for the airports north and south of Birmingham, as identified in Figure 1. Appendix H2 presents the component costs used in developing the M&R costs.

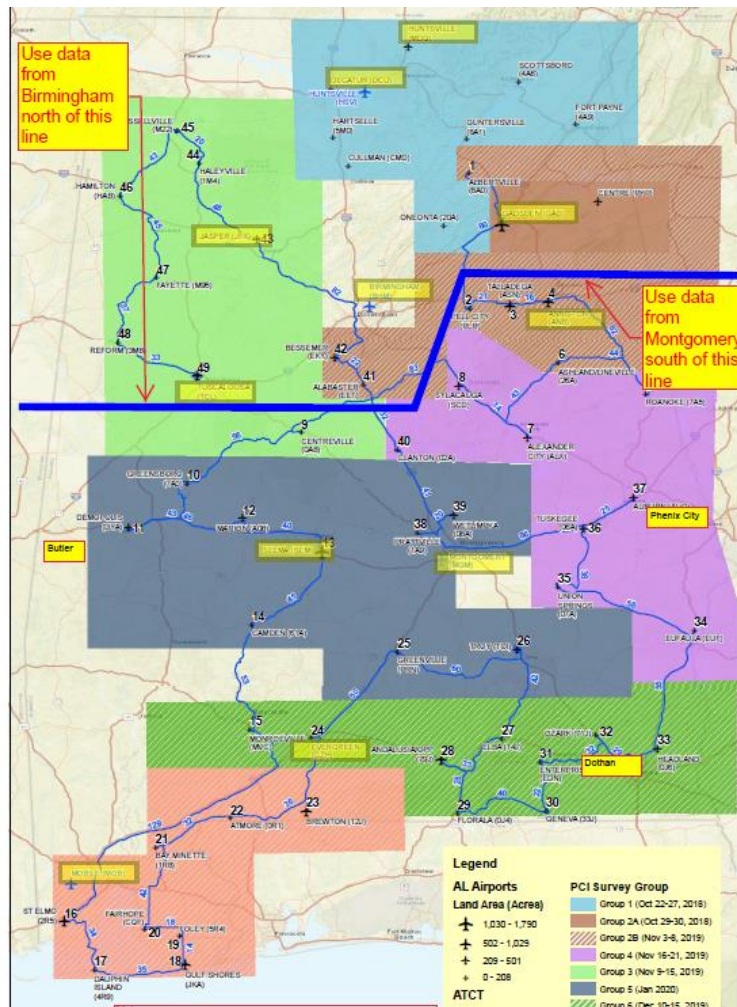


Figure 1: RSMMeans Unit Costs Locations.

Maintenance & Repair (M&R) Activities

Maintenance activities are localized activities which are typically assigned in the first year of the M&R plan based on the observed distresses.

Repair activities are further subdivided into preservation, rehabilitation, and reconstruction. Repair activities are conducted for larger areas, typically at the section level and are assigned based on the Critical Pavement Condition Index, denoted as CP in Table 1. The CP is based on the section’s rank or importance within the overall network and typically ranges from 55 to 70. The CP was set at 70 for the ALDOT runway pavements and 65 for the other pavements.

Table 1: Repair Activities.

Activity Type	PCI	Activity
Preservation	> CP	Runway Surface Treatment
		Taxiway and Apron Surface Treatment
Rehabilitation	> CP	2" AC OL ¹
	55 - CP	Mill 2" & 2" AC OL
	45 - 55	Mill 2" & 3" AC OL
Reconstruction	0 - 45	Reconstruct with AC

¹For Sections with Structural Distress and PCI greater than Critical PCI

The depths for the milling and overlay (AC OL) in Table 1 were established by creating a balance between removal of surficial distress and providing additional pavement structural capacity. All overlay options include full-depth patching to repair localized distresses.

From the FAA 5010 records, the Alabama airport network includes a wide range of allowable aircraft loads. The airports were divided into three categories of allowable aircraft loads based on requirements for minimum pavement thickness and the use of a P-401 surface layer. The categories are based on the aircraft maximum gross takeoff weight (MGTOW) and include: less than 12,500 lbs, 12,500 to 30,000 lbs, and 30,000 to 100,000 lbs. Appendix H3 presents the category for each airport.

For any sections requiring reconstruction, the pavement sections were established primarily in accordance with the requirements in Table 3 of the FAA’s Advisory Circular 150/5320-6F. The pavement sections used for developing the cost estimates are:

- ≤ 12,500 lbs 4" P-403 (State HMA Mix) + 6" P-209 Base
- 12,500 – 30,000 lbs 4" P-403 (State HMA Mix) + 8" P-209 Base
- 30,000 – 100,000 lbs 5" P-401 + 10" P-209 Base

It is important to note that while the FAA requires a stabilized base for those pavements that support aircraft operations with MGTOWs that are greater than 100,000 lbs, the number of such operations is minimal for those airports shown in Appendix H3. As a result, the cost of a stabilized base is excluded in the development of the unit costs for ALDOT’s PMP update. However, based on the Engineer’s future design and aircraft fleet mix development, project-level construction work could include the use of a stabilized base at that time.

M&R Unit Costs

Paving projects typically include additional project costs like mobilization, design, construction administration and inspections, and drainage improvements. A summary of non-direct pavement construction line items has been included in the unit costs in Tables 5 and 6 as described below. These non-direct items are expressed as a percentage of the total component costs for each activity.

These non-direct pavement construction items were developed from API’s extensive experience with APMP project cost estimation. These percentages may vary for Alabama airport construction projects; however, since the direct pavement scope of work is estimated in a network-level evaluation, these conservative estimates serve as a good starting point for the development of realistic total project costs and annual APMP budgets for ALDOT. For repair activities such as Mill & Overlay, which typically do not include significant drainage work, the corresponding multiplier was reduced by 50 percent. The non-direct cost factors are presented in Table 2.

Table 2: Cost Factors.

Factor	Function of	Estimate		
		Preservation	Rehabilitation	Reconstruction
Mobilization	All costs, less design	10%	10%	10%
Drainage Improvements	Paving costs	-	4%	8%
Contingency	All costs, less mobilization and design	10%	20%	20%
Design & CM	All costs, less mobilization and design	15%	20%	20%

The M&R unit costs for maintenance, preservation, and repair activities were developed from the RSMMeans cost data and are presented in the following section.

Maintenance

The maintenance activities include crack seal, and full and partial-depth patching. The unit costs are presented in Table 3.

Table 3: Unit Costs for Maintenance.

Activity	Unit Cost	Unit
Seal Cracks - AC	\$3.95	lf
AC Full-Depth Patching	\$25.05	sf
AC Partial-Dept Patching	\$16.28	sf
Seal Cracks – PCC	\$6.00	lf
PCC Full-Depth Patching	\$35.00	sf
PCC Partial-Depth Patching	\$175.00	sf
Jt. Seal	\$8.00	lf
Slab Replacement	\$20.00	sf

Preservation

The unit costs for the surface treatments are presented in Table 4. They include sealing of cracks and application of pavement markings.

Table 4: Unit Costs for Preservation Activities.

Activity	Unit Cost	Unit
Runway Surface Treatment	\$0.57	sf
Taxiway and Apron Surface Treatment	\$0.88	sf

Rehabilitation and Reconstruction

As discussed previously, repair activities are also divided into rehabilitation and reconstruction. The unit costs for airport repair for the Northern Region (Birmingham Area) and Southern Region (Montgomery Area) are shown in Tables 5 and 6, respectively.

Table 5: Unit Costs for Repair Activities, Northern Region.

Activity Type	Activity	MGTOW, thousand lbs		
		≤ 12.5	12.5-30	30-100
Rehabilitation	2" AC OL	\$3.78		\$4.19
	Mill 2" & 2" AC OL	\$4.15		\$4.56
	Mill 2" & 3" AC OL	\$5.18		\$5.79
Reconstruction	AC Reconstruction	\$8.40	\$9.10	\$10.91

Table 6: Unit Costs for Repair Activities, Southern Region.

Activity Type	Activity	MGTOW, thousand lbs		
		≤ 12.5	12.5-30	30-100
Rehabilitation	2" AC OL	\$3.54		\$3.91
	Mill 2" & 2" AC OL	\$3.90		\$4.27
	Mill 2" & 3" AC OL	\$4.82		\$5.37
Reconstruction	AC Reconstruction	\$7.63	\$8.25	\$9.87

Appendix H2
Component Costs for Repair

Activity Type	Unit	Birmingham (Northern)	Montgomery (Southern)	Comments
Milling 1" to 3"	SY	\$2.08	\$2.01	
Pavement Demolition	SY	\$6.34	\$6.12	
Haulage - For Demolition & AC	CY	\$6.08	\$5.87	
Haulage for 12" Thick Demolition	SY	\$2.03	\$1.96	
Haulage for 2" Thick AC Paving	SY	\$0.34	\$0.33	
Haulage for 3" Thick AC Paving	SY	\$0.51	\$0.49	
Haulage for 4" Thick AC Paving	SY	\$0.68	\$0.65	
AC Wearing Course	Ton	\$97.42	\$86.90	
AC Binder Course	Ton	\$87.80	\$78.17	
P401 - For airports with >60 kip aircraft	Ton	\$116.90	\$104.28	Assumed P401 cost to be 20% greater than AC Wearing Course
6" Aggregate Base (P208)	SY	\$10.17	\$9.12	
8" Aggregate Base (P208)	SY	\$13.29	\$11.89	
6" P209 Aggregate Base	SY	\$12.20	\$10.94	Assumed P209 cost to be 20% greater than P208
8" P209 Aggregate Base	SY	\$15.95	\$14.27	Assumed P209 cost to be 20% greater than P208
10" P209 Aggregate Base	SY	\$19.94	\$17.84	Direct multiplier for 10" from 8"
4" P154 Aggregate Base	SY	\$5.42	\$4.86	Assumed P154 cost to be 20% lower than P208
6" P154 Aggregate Base	SY	\$8.14	\$7.30	Assumed P154 cost to be 20% lower than P208
Pavement Markings	sf	\$1.48	\$1.39	

**Appendix H3
Airport Category**

Region	City	FAA ID	Max Gross Weight (Thousand lbs)			Max GW	Category
			S	D	2D		
Birmingham	Reform	3M8	12.5	-	-	12.5	<= 12,500
	Fayette	M95	15.0	-	-	15.0	12,500-30,000
	Hamilton	HAB	15.0	-	-	15.0	12,500-30,000
	Scottsboro	4A6	15.0	-	-	15.0	12,500-30,000
	Alabaster	EET	16.0	-	-	16.0	12,500-30,000
	Centre-Piedmont	PYP	16.0	-	-	16.0	12,500-30,000
	Fort Payne	4A9	16.0	-	-	16.0	12,500-30,000
	Haleyville	1M4	20.0	-	-	20.0	12,500-30,000
	Hartselle	5M0	20.0	-	-	20.0	12,500-30,000
	Guntersville	8A1	24.0	-	-	24.0	12,500-30,000
	Cullman	CMD	30.0	-	-	30.0	12,500-30,000
	Russellville	M22	30.0	-	-	30.0	12,500-30,000
	Jasper	JFX	50.0	-	-	50.0	> 30,000
	Oneonta	20A	20.0	35.0	55.0	55.0	> 30,000
	Bessemer	EKY	60.0	60.0	-	60.0	> 30,000
	Albertville	8A0	60.0	90.0	130.0	130.0	> 30,000
	Madison	MDQ	60.0	75.0	140.0	140.0	> 30,000
	Decatur	DCU	75.0	125.0	150.0	150.0	> 30,000
	Tuscaloosa	TCL	61.0	87.0	168.0	168.0	> 30,000
	Gadsden	GAD	90.0	115.0	195.0	195.0	> 30,000
Montgomery	Florala	0J4	-	-	-	-	<= 12,500
	Elba	14J	4.0	-	-	4.0	<= 12,500
	Headland	0J6	12.0	-	-	12.0	<= 12,500
	Roanoke	7A5	12.0	-	-	12.0	<= 12,500
	Greenville	PRN	15.0	-	-	15.0	12,500-30,000
	Union Springs	07A	15.0	-	-	15.0	12,500-30,000
	Wetumpka	08A	15.0	-	-	15.0	12,500-30,000
	Atmore	0R1	16.0	-	-	16.0	12,500-30,000
	Clanton	02A	16.0	-	-	16.0	12,500-30,000
	Eufaula	EUF	16.0	-	-	16.0	12,500-30,000
	Geneva	33J	16.0	-	-	16.0	12,500-30,000
	Greensboro	7A0	16.0	-	-	16.0	12,500-30,000
	Centreville	0A8	18.0	-	-	18.0	12,500-30,000
	Ashland-Lineville	26A	20.0	-	-	20.0	12,500-30,000
	Sylacauga	SCD	20.0	-	-	20.0	12,500-30,000
	St. Elmo	2R5	23.0	-	-	23.0	12,500-30,000
	Ozark	71J	-	25.0	-	25.0	12,500-30,000
	Camden	61A	27.0	-	-	27.0	12,500-30,000
	Bay Minette	1R8	28.0	-	-	28.0	12,500-30,000
	Foley	5R4	28.0	-	-	28.0	12,500-30,000
Tuskegee	06A	28.5	-	-	28.5	12,500-30,000	

**Appendix H3
Airport Category**

Region	City	FAA ID	Max Gross Weight (Thousand lbs)			Max GW	Category
			S	D	2D		
Montgomery	Alexander City	ALX	30.0	-	-	30.0	12,500-30,000
	Dauphin Island	4R9	30.0	-	-	30.0	12,500-30,000
	Pell City	PLR	30.0	-	-	30.0	12,500-30,000
	Prattville	1A9	30.0	-	-	30.0	12,500-30,000
	Enterprise	EDN	-	-	-	-	> 30,000
	Evergreen	GZH	30.0	50.0	-	50.0	> 30,000
	Marion	A08	30.0	50.0	-	50.0	> 30,000
	Selma	SEM	33.0	54.0	-	54.0	> 30,000
	Fairhope	CQF	36.0	58.0	-	58.0	> 30,000
	Brewton	12J	40.0	60.0	-	60.0	> 30,000
	Demopolis	DYA	30.0	38.0	60.0	60.0	> 30,000
	Monroeville	MVC	70.0	-	-	70.0	> 30,000
	Auburn-Opelika	AUO	45.0	75.0	-	75.0	> 30,000
	Talladega	ASN	30.0	65.0	95.0	95.0	> 30,000
	Gulf Shores	JKA	80.0	100.0	-	100.0	> 30,000
	Troy	TOI	24.0	80.0	140.0	140.0	> 30,000
	Anniston	ANB	28.0	43.5	260.0	260.0	> 30,000
Andalusia-OPP	79J	98.0	160.0	275.0	275.0	> 30,000	

APPENDIX I

PAVEMENT CAPITAL IMPROVEMENT PROGRAM

I1: PCIP Summary

I2: Year 1 Maintenance Plan



Appendix I1
PCIP Summary
Talladega Municipal Airport (ASN)

Branch & Section	2021	2022	2023	2024	2025	2026	2027
A01-01	Preventive + Required Project Global MR \$101316.23 Before:79.14 After:85.78	Preventive \$1943.86 Before:83.57 After:83.57	Preventive \$2271.42 Before:81.36 After:81.36	Preventive \$2607.76 Before:79.15 After:79.15	Preventive \$2945.78 Before:76.94 After:76.94	Preventive \$3301.73 Before:74.73 After:74.73	Preventive \$3676.38 Before:72.52 After:72.52
A01-02	Preventive + Required Project Global MR \$135603.71 Before:76.14 After:82.78	Preventive \$3067.35 Before:80.57 After:80.57	Preventive \$3494.97 Before:78.36 After:78.36	Preventive \$3936.35 Before:76.15 After:76.15	Preventive \$4401.06 Before:73.94 After:73.94	Preventive \$4890.12 Before:71.73 After:71.73	Preventive \$5755.66 Before:69.52 After:69.52
A02-01	StopGap \$1872.51 Before:52.14 After:52.14	StopGap \$2072.07 Before:49.93 After:49.93	Required Project Major Below Critical \$395550 Before:47.72 After:100	Preventive \$166.51 Before:97.79 After:97.79	Preventive \$343.73 Before:95.57 After:95.57	Preventive + Required Project Global MR \$46430.69 Before:93.36 After:97.79	Preventive \$363.91 Before:95.58 After:95.58
R0422-01	Required Project Major Above Critical \$2563440 Before:70.56 After:100	Preventive \$797.21 Before:98.7 After:98.7	Preventive \$1590.58 Before:97.48 After:97.48	Preventive + Required Project Global MR \$375170.62 Before:96.45 After:98.7	Preventive \$1687.44 Before:97.48 After:97.48	Preventive \$2447.1 Before:96.45 After:96.45	Preventive \$3231.42 Before:95.45 After:95.45

Appendix I1
PCIP Summary
Talladega Municipal Airport (ASN)

Branch & Section	2021	2022	2023	2024	2025	2026	2027
R0422-02	Required Project Major Above Critical \$88000 Before:97.26 After:100	Preventive \$27.37 Before:98.7 After:98.7	Preventive \$54.6 Before:97.48 After:97.48	Preventive + Required Project Global MR \$12879.18 Before:96.45 After:98.7	Preventive \$57.93 Before:97.48 After:97.48	Preventive \$84.01 Before:96.45 After:96.45	Preventive \$110.93 Before:95.45 After:95.45
TA-01	Preventive + Required Project Global MR \$323675.64 Before:78.3 After:84.97	Preventive \$6592.7 Before:82.55 After:82.55	Preventive \$7649.9 Before:80.34 After:80.34	Preventive \$8629.81 Before:78.31 After:78.31	Preventive \$9620.37 Before:76.36 After:76.36	Preventive \$10701.23 Before:74.31 After:74.31	Preventive \$11957.71 Before:71.96 After:71.96
TA1-01	Required Project Major Below Critical \$102647.86 Before:52.47 After:100	Preventive \$19.89 Before:98.98 After:98.98	Preventive \$43.36 Before:97.85 After:97.85	Preventive + Required Project Global MR \$11955.81 Before:96.33 After:98.98	Preventive \$46 Before:97.85 After:97.85	Preventive \$80.56 Before:96.34 After:96.34	Preventive \$127.66 Before:94.36 After:94.36
TA1-02	Required Project Major Above Critical \$47546.4 Before:70.95 After:100	Preventive \$11.58 Before:98.98 After:98.98	Preventive \$25.24 Before:97.85 After:97.85	Preventive + Required Project Global MR \$6960.16 Before:96.33 After:98.98	Preventive \$26.78 Before:97.85 After:97.85	Preventive \$46.9 Before:96.34 After:96.34	Preventive \$74.32 Before:94.36 After:94.36

Appendix I1
PCIP Summary
Talladega Municipal Airport (ASN)

Branch & Section	2021	2022	2023	2024	2025	2026	2027
TA2-01	Required Project Major Below Critical \$78795.2 Before:56.11 After:100	Preventive \$19.19 Before:98.98 After:98.98	Preventive \$41.83 Before:97.85 After:97.85	Preventive + Required Project Global MR \$11534.57 Before:96.33 After:98.98	Preventive \$44.38 Before:97.85 After:97.85	Preventive \$77.73 Before:96.34 After:96.34	Preventive \$123.17 Before:94.36 After:94.36
TA2-02	Required Project Major Below Critical \$47770.8 Before:61.76 After:100	Preventive \$11.64 Before:98.98 After:98.98	Preventive \$25.36 Before:97.85 After:97.85	Preventive + Required Project Global MR \$6993.01 Before:96.33 After:98.98	Preventive \$26.91 Before:97.85 After:97.85	Preventive \$47.12 Before:96.34 After:96.34	Preventive \$74.67 Before:94.36 After:94.36
TA3-01	Required Project Major Below Critical \$84057.6 Before:60.27 After:100	Preventive \$20.47 Before:98.98 After:98.98	Preventive \$44.62 Before:97.85 After:97.85	Preventive + Required Project Global MR \$12304.91 Before:96.33 After:98.98	Preventive \$47.34 Before:97.85 After:97.85	Preventive \$82.92 Before:96.34 After:96.34	Preventive \$131.39 Before:94.36 After:94.36
TA3-02	Required Project Major Above Critical \$29378.8 Before:74.64 After:100	Preventive \$7.16 Before:98.98 After:98.98	Preventive \$15.6 Before:97.85 After:97.85	Preventive + Required Project Global MR \$4300.66 Before:96.33 After:98.98	Preventive \$16.55 Before:97.85 After:97.85	Preventive \$28.98 Before:96.34 After:96.34	Preventive \$45.92 Before:94.36 After:94.36

Appendix I1
PCIP Summary
Talladega Municipal Airport (ASN)

Branch & Section	2021	2022	2023	2024	2025	2026	2027
TA3-03	Preventive \$72.96 Before:97.59 After:97.59	Preventive \$125.34 Before:95.98 After:95.98	Preventive \$195.4 Before:93.92 After:93.92	Preventive \$281.28 Before:91.5 After:91.5	Preventive + Required Project Global MR \$19937.71 Before:88.87 After:95.98	Preventive \$213.52 Before:93.92 After:93.92	Preventive \$307.37 Before:91.5 After:91.5
TA4-01	Required Project Major Below Critical \$56258.4 Before:69.5 After:100	Preventive \$13.7 Before:98.98 After:98.98	Preventive \$29.87 Before:97.85 After:97.85	Preventive + Required Project Global MR \$8235.48 Before:96.33 After:98.98	Preventive \$31.69 Before:97.85 After:97.85	Preventive \$55.5 Before:96.34 After:96.34	Preventive \$87.94 Before:94.36 After:94.36
TA4-02	Preventive \$110.03 Before:97.59 After:97.59	Preventive \$189.03 Before:95.98 After:95.98	Preventive \$294.69 Before:93.92 After:93.92	Preventive \$424.22 Before:91.5 After:91.5	Preventive + Required Project Global MR \$44818.07 Before:88.87 After:95.98	Preventive \$322.02 Before:93.92 After:93.92	Preventive \$463.56 Before:91.5 After:91.5
TA4-03	Preventive + Required Project Global MR \$73880.89 Before:81.61 After:89.13	Preventive \$1168.85 Before:86.49 After:86.49	Preventive \$1429.95 Before:83.95 After:83.95	Preventive \$1688.14 Before:81.61 After:81.61	Preventive \$1935.62 Before:79.48 After:79.48	Preventive \$2168.97 Before:77.5 After:77.5	Preventive \$2413.68 Before:75.53 After:75.53

Appendix I1
PCIP Summary
Talladega Municipal Airport (ASN)

Branch & Section	2021	2022	2023	2024	2025	2026	2027
TC01-01	StopGap \$374.61 Before:44.51 After:44.51	StopGap \$425.4 Before:40.96 After:40.96	Required Project Major Below Critical \$114374 Before:37.42 After:100	Preventive \$12.05 Before:98.98 After:98.98	Preventive \$26.27 Before:97.85 After:97.85	Preventive + Required Project Global MR \$7254.12 Before:96.33 After:98.98	Preventive \$27.87 Before:97.85 After:97.85
TC02-01	Preventive + Required Project Global MR \$5710.89 Before:75.65 After:81.74	Preventive \$135.34 Before:79.6 After:79.6	Preventive \$151.72 Before:77.62 After:77.62	Preventive \$168.83 Before:75.66 After:75.66	Preventive \$188.03 Before:73.52 After:73.52	Preventive \$210.74 Before:71.01 After:71.01	StopGap \$93.02 Before:67.93 After:67.93
TC03-01	Preventive + Required Project Global MR \$5097.1 Before:97.59 After:100	Preventive \$6.19 Before:98.98 After:98.98	Preventive \$13.49 Before:97.85 After:97.85	Preventive \$23.69 Before:96.33 After:96.33	Preventive \$37.57 Before:94.35 After:94.35	Preventive \$54.8 Before:91.99 After:91.99	Preventive \$74.77 Before:89.39 After:89.39
THANG01-01	StopGap \$449.65 Before:64.84 After:64.84	Required Project Major Below Critical \$131447.01 Before:60.48 After:100	Preventive \$32.03 Before:98.98 After:98.98	Preventive \$69.81 Before:97.85 After:97.85	Preventive \$122.58 Before:96.33 After:96.33	Preventive \$194.38 Before:94.35 After:94.35	Preventive \$283.58 Before:91.99 After:91.99
THANG01-02	StopGap \$2374.03 Before:43.73 After:43.73	Required Project Major Below Critical \$688441.68 Before:40.19 After:100	Preventive \$72.52 Before:98.98 After:98.98	Preventive \$158.05 Before:97.85 After:97.85	Preventive \$277.5 Before:96.33 After:96.33	Preventive \$440.06 Before:94.35 After:94.35	Preventive \$642 Before:91.99 After:91.99

Appendix I1
PCIP Summary
Talladega Municipal Airport (ASN)

Branch & Section	2021	2022	2023	2024	2025	2026	2027
THANG01-03	StopGap \$4210.38 Before:47.75 After:47.75	Required Project Major Below Critical \$1377480.72 Before:45.23 After:100	Preventive \$145.09 Before:98.98 After:98.98	Preventive \$316.24 Before:97.85 After:97.85	Preventive \$555.24 Before:96.33 After:96.33	Preventive \$880.5 Before:94.35 After:94.35	Preventive \$1284.56 Before:91.99 After:91.99
THANG01-04	StopGap \$964.35 Before:45.49 After:45.49	Required Project Major Below Critical \$294330.8 Before:43.16 After:100	Preventive \$31 Before:98.98 After:98.98	Preventive \$67.57 Before:97.85 After:97.85	Preventive \$118.64 Before:96.33 After:96.33	Preventive \$188.14 Before:94.35 After:94.35	Preventive \$274.48 Before:91.99 After:91.99
THANG01-05	Preventive \$103.73 Before:97.59 After:97.59	Preventive \$178.2 Before:95.98 After:95.98	Preventive \$277.81 Before:93.92 After:93.92	Preventive \$399.92 Before:91.5 After:91.5	Preventive + Required Project Global MR \$42250.91 Before:88.87 After:95.98	Preventive \$303.57 Before:93.92 After:93.92	Preventive \$437.01 Before:91.5 After:91.5
THANG01-06	Preventive \$137.87 Before:97.59 After:97.59	Preventive \$236.85 Before:95.98 After:95.98	Preventive \$369.25 Before:93.92 After:93.92	Preventive \$531.55 Before:91.5 After:91.5	Preventive + Required Project Global MR \$56156.72 Before:88.87 After:95.98	Preventive \$403.49 Before:93.92 After:93.92	Preventive \$580.84 Before:91.5 After:91.5

Appendix I1
PCIIP Summary
Talladega Municipal Airport (ASN)

Branch & Section	2021	2022	2023	2024	2025	2026	2027
THANG02-01	Preventive + Required Project Global MR \$17694.85 Before:77.46 After:83.9	Preventive \$380.36 Before:81.56 After:81.56	Preventive \$435.81 Before:79.44 After:79.44	Preventive \$488.08 Before:77.47 After:77.47	Preventive \$543.1 Before:75.5 After:75.5	Preventive \$604.99 Before:73.34 After:73.34	Preventive \$678.37 Before:70.8 After:70.8

Appendix I2
Localized Maintenance Plan
Talladega Municipal Airport (ASN)

Branch ID	Section ID	Policy	Distress Code	Description	Severity	Distress Qty	Distress Unit	Percent Distress	Work Description	Work Qty	Work Unit	Unit Cost	Work Cost
A01	01	Preventive	48	L & T CR	Low	5,378	Ft	4.78	No Localized M & R	0		\$0.00	\$0
A01	01	Preventive	48	L & T CR	Medium	61	Ft	0.05	Crack Sealing - AC	61	Ft	\$3.95	\$240
A01	01	Preventive	56	SWELLING	Low	607	SqFt	0.54	Patching - AC Full-Depth	709	SqFt	\$25.05	\$17,778
A01	01	Preventive	57	WEATHERING	Low	243	SqFt	0.22	No Localized M & R	0		\$0.00	\$0
A01	02	Preventive	48	L & T CR	Medium	410	Ft	0.27	Crack Sealing - AC	409	Ft	\$3.95	\$1,618
A01	02	Preventive	48	L & T CR	Low	9,276	Ft	6.18	No Localized M & R	0		\$0.00	\$0
A01	02	Preventive	52	RAVELING	Low	256	SqFt	0.17	No Localized M & R	0		\$0.00	\$0
A02	01	Safety	43	BLOCK CR	Low	7,146	SqFt	10.59	No Localized M & R	0		\$0.00	\$0
A02	01	Safety	43	BLOCK CR	Medium	7,146	SqFt	10.59	No Localized M & R	0		\$0.00	\$0
A02	01	Safety	48	L & T CR	Low	143	Ft	0.21	No Localized M & R	0		\$0.00	\$0
A02	01	Safety	48	L & T CR	Medium	5,217	Ft	7.73	No Localized M & R	0		\$0.00	\$0
A02	01	Safety	57	WEATHERING	Low	67,500	SqFt	100	No Localized M & R	0		\$0.00	\$0
R0422	01	Preventive	48	L & T CR	Medium	13,845	Ft	2.38	Crack Sealing - AC	13,845	Ft	\$3.95	\$54,689
R0422	01	Preventive	48	L & T CR	Low	29,815	Ft	5.12	No Localized M & R	0		\$0.00	\$0
R0422	01	Preventive	52	RAVELING	High	7	SqFt	0	Patching - AC Partial-Dep	6	SqFt	\$16.28	\$112
R0422	01	Preventive	56	SWELLING	Low	240	SqFt	0.04	Patching - AC Full-Depth	307	SqFt	\$25.05	\$7,671
TA	01	Preventive	48	L & T CR	Low	13,351	Ft	3.72	No Localized M & R	0		\$0.00	\$0
TA	01	Preventive	48	L & T CR	Medium	2,740	Ft	0.76	Crack Sealing - AC	2,740	Ft	\$3.95	\$10,824
TA1	01	Safety	48	L & T CR	Medium	1,024	Ft	5.52	No Localized M & R	0		\$0.00	\$0
TA1	01	Safety	48	L & T CR	Low	967	Ft	5.21	No Localized M & R	0		\$0.00	\$0
TA1	01	Safety	52	RAVELING	Medium	72	SqFt	0.39	No Localized M & R	0		\$0.00	\$0
TA1	01	Safety	52	RAVELING	High	22	SqFt	0.12	No Localized M & R	0		\$0.00	\$0
TA1	02	Preventive	48	L & T CR	Medium	13	Ft	0.12	Crack Sealing - AC	13	Ft	\$3.95	\$51
TA1	02	Preventive	48	L & T CR	Low	544	Ft	5.03	No Localized M & R	0		\$0.00	\$0
TA1	02	Preventive	50	PATCHING	Low	862	SqFt	7.97	No Localized M & R	0		\$0.00	\$0
TA2	01	Safety	48	L & T CR	Medium	1,016	Ft	5.67	No Localized M & R	0		\$0.00	\$0
TA2	01	Safety	48	L & T CR	Low	1,009	Ft	5.63	No Localized M & R	0		\$0.00	\$0
TA2	01	Safety	56	SWELLING	Low	138	SqFt	0.77	No Localized M & R	0		\$0.00	\$0
TA2	02	Safety	48	L & T CR	Medium	332	Ft	3.06	No Localized M & R	0		\$0.00	\$0

Appendix I2
Localized Maintenance Plan
Talladega Municipal Airport (ASN)

Branch ID	Section ID	Policy	Distress Code	Description	Severity	Distress Qty	Distress Unit	Percent Distress	Work Description	Work Qty	Work Unit	Unit Cost	Work Cost
TA2	02	Safety	48	L & T CR	Low	162	Ft	1.5	No Localized M & R	0		\$0.00	\$0
TA2	02	Safety	50	PATCHING	Low	1,086	SqFt	10	No Localized M & R	0		\$0.00	\$0
TA2	02	Safety	52	RAVELING	Medium	41	SqFt	0.38	No Localized M & R	0		\$0.00	\$0
TA2	02	Safety	56	SWELLING	Low	52	SqFt	0.48	No Localized M & R	0		\$0.00	\$0
TA3	01	Safety	48	L & T CR	Medium	696	Ft	3.64	No Localized M & R	0		\$0.00	\$0
TA3	01	Safety	48	L & T CR	Low	1,107	Ft	5.79	No Localized M & R	0		\$0.00	\$0
TA3	01	Safety	50	PATCHING	Low	187	SqFt	0.98	No Localized M & R	0		\$0.00	\$0
TA3	01	Safety	52	RAVELING	Medium	31	SqFt	0.16	No Localized M & R	0		\$0.00	\$0
TA3	02	Preventive	48	L & T CR	Medium	135	Ft	2.02	Crack Sealing - AC	135	Ft	\$3.95	\$533
TA3	02	Preventive	48	L & T CR	Low	295	Ft	4.42	No Localized M & R	0		\$0.00	\$0
TA4	01	Preventive	48	L & T CR	Low	133	Ft	1.04	No Localized M & R	0		\$0.00	\$0
TA4	01	Preventive	48	L & T CR	Medium	373	Ft	2.92	Crack Sealing - AC	373	Ft	\$3.95	\$1,473
TA4	01	Preventive	56	SWELLING	Medium	96	SqFt	0.75	Patching - AC Full-Depth	139	SqFt	\$25.05	\$3,490
TA4	03	Preventive	47	JT REF. CR	Low	2,748	Ft	5.55	No Localized M & R	0		\$0.00	\$0
TA4	03	Preventive	47	JT REF. CR	Medium	136	Ft	0.28	Crack Sealing - AC	136	Ft	\$3.95	\$538
TC01	01	Safety	41	ALLIGATOR CR	Medium	18	SqFt	0.17	No Localized M & R	0		\$0.00	\$0
TC01	01	Safety	48	L & T CR	Low	225	Ft	2.12	No Localized M & R	0		\$0.00	\$0
TC01	01	Safety	48	L & T CR	Medium	860	Ft	8.11	No Localized M & R	0		\$0.00	\$0
TC01	01	Safety	50	PATCHING	Low	560	SqFt	5.28	No Localized M & R	0		\$0.00	\$0
TC01	01	Safety	57	WEATHERING	Low	10,040	SqFt	94.72	No Localized M & R	0		\$0.00	\$0
TC02	01	Preventive	48	L & T CR	Medium	50	Ft	0.79	Crack Sealing - AC	50	Ft	\$3.95	\$198
TC02	01	Preventive	48	L & T CR	Low	105	Ft	1.66	No Localized M & R	0		\$0.00	\$0
TC02	01	Preventive	57	WEATHERING	Low	6,314	SqFt	100	No Localized M & R	0		\$0.00	\$0
THANG01	01	Preventive	48	L & T CR	Medium	1,221	Ft	4.21	Crack Sealing - AC	1,220	Ft	\$3.95	\$4,821
THANG01	01	Preventive	48	L & T CR	Low	364	Ft	1.26	No Localized M & R	0		\$0.00	\$0
THANG01	01	Preventive	57	WEATHERING	Low	8,959	SqFt	30.88	No Localized M & R	0		\$0.00	\$0
THANG01	02	Safety	41	ALLIGATOR CR	High	2,424	SqFt	3.69	Patching - AC Full-Depth	2,626	SqFt	\$25.05	\$65,798
THANG01	02	Safety	41	ALLIGATOR CR	Medium	73	SqFt	0.11	No Localized M & R	0		\$0.00	\$0
THANG01	02	Safety	47	JT REF. CR	Medium	970	Ft	1.48	No Localized M & R	0		\$0.00	\$0

Appendix I2
Localized Maintenance Plan
Talladega Municipal Airport (ASN)

Branch ID	Section ID	Policy	Distress Code	Description	Severity	Distress Qty	Distress Unit	Percent Distress	Work Description	Work Qty	Work Unit	Unit Cost	Work Cost
THANG01	02	Safety	47	JT REF. CR	Low	364	Ft	0.55	No Localized M & R	0		\$0.00	\$0
THANG01	02	Safety	48	L & T CR	Low	133	Ft	0.2	No Localized M & R	0		\$0.00	\$0
THANG01	02	Safety	48	L & T CR	High	12	Ft	0.02	Crack Sealing - AC	12	Ft	\$3.95	\$48
THANG01	02	Safety	48	L & T CR	Medium	3,734	Ft	5.68	No Localized M & R	0		\$0.00	\$0
THANG01	02	Safety	57	WEATHERING	Medium	121	SqFt	0.18	No Localized M & R	0		\$0.00	\$0
THANG01	03	Safety	47	JT REF. CR	High	779	Ft	0.59	Crack Sealing - AC	779	Ft	\$3.95	\$3,078
THANG01	03	Safety	47	JT REF. CR	Low	1,988	Ft	1.51	No Localized M & R	0		\$0.00	\$0
THANG01	03	Safety	47	JT REF. CR	Medium	9,604	Ft	7.31	No Localized M & R	0		\$0.00	\$0
THANG01	03	Safety	48	L & T CR	Medium	3,498	Ft	2.66	No Localized M & R	0		\$0.00	\$0
THANG01	03	Safety	48	L & T CR	Low	763	Ft	0.58	No Localized M & R	0		\$0.00	\$0
THANG01	04	Safety	47	JT REF. CR	High	35	Ft	0.13	Crack Sealing - AC	35	Ft	\$3.95	\$139
THANG01	04	Safety	47	JT REF. CR	Medium	3,300	Ft	11.75	No Localized M & R	0		\$0.00	\$0
THANG01	04	Safety	48	L & T CR	Medium	983	Ft	3.5	No Localized M & R	0		\$0.00	\$0
THANG02	01	Preventive	48	L & T CR	Low	175	Ft	0.89	No Localized M & R	0		\$0.00	\$0
THANG02	01	Preventive	48	L & T CR	Medium	162	Ft	0.83	Crack Sealing - AC	162	Ft	\$3.95	\$639
THANG02	01	Preventive	52	RAVELING	Low	364	SqFt	1.86	No Localized M & R	0		0	\$0
THANG02	01	Preventive	57	WEATHERING	Low	19,236	SqFt	98.14	No Localized M & R	0		0	\$0