Alabama Statewide Airport Pavement Management Program Update

Enterprise Municipal Airport (EDN)

Final Report

February 2022

Submitted to

Alabama Aeronautics Bureau

Submitted by

JVIATION

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Pavement Management – Evaluation – Testing - Design

ALABAMA STATEWIDE AIRPORT PAVEMENT MANAGEMENT PROGRAM UPDATE

Enterprise Municipal Airport, Enterprise (EDN)

FINAL REPORT

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February 2022

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Executive Summary

The Jviation Inc. team, which included All About Pavements, Inc., (API) was awarded a contract by the !fl·ōl·Y l· 5ŜLJl·₦ŭŸŜyű 2₮ ¢₦l·yãLJ2₦ŭl·ûʌ2yℚă !Ŝ₦2yl·dzŭλÖă .dz₦Ŝl·dz ó! [5h¢ú in 2018 to update the existing Alabama Statewide Airport Pavement Management Program (APMP). The scope of this project includes the airside pavement network at Enterprise Municipal Airport (EDN).

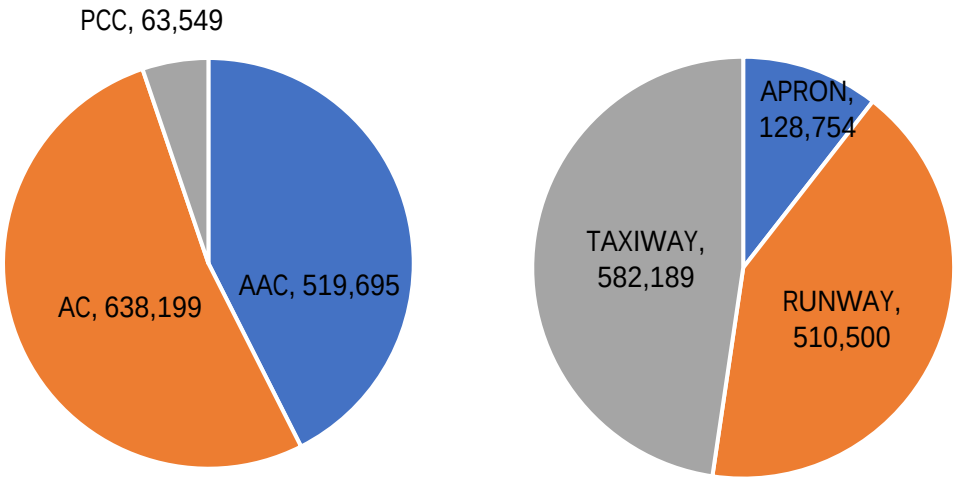
The following APMP tasks were completed to achieve the project objectives at EDN:

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

ES.1 Pavement Inventory

There are 11 branches and 15 sections within EDNℚă LJl·ØŜYŜyű ySűø2₦ℚ ølűK l· ű2ûl·f ădz₦₮l·ÖŜ l·₦Ŝl· 2₮ approximately 1.22 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 November 2019 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 ăÖl·fŜ ₮₦2Y л ű2 млл ŭKl·ú LJ₦2ØλŘŜă l· YŜl·ădz₦Ŝ 2₮ ŭKŜ LJl·ØŜYŜyűℚă ₮unctional surface condition. The overall

area-weighted network PCI (AW PCI) for the EDN pavement network is 82ΣℕŜLJℕŜăŜyΰλyƎ I· άSatisfactoryέ condition. The network area-weighted pavement age (AW Age) is greater than 20 years.

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

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

Branch ID	Name	Section ID	Surface	Area, sf	PCI	PCI Category
A01	Apron 01	01	AAC	65,205	100	Good
A01	Apron 01	02	PCC	63,549	100	Good
R0523	Runway 05-23	01	AC	165,000	89	Good
R0523	Runway 05-23	02	AAC	285,000	82	Satisfactory
R0523	Runway 05-23	03	AC	60,500	89	Good
TA	Taxiway A	01	AAC	164,755	98	Good
TA1	Taxiway A1	01	AC	4,164	91	Good
TA1	Taxiway A1	02	AAC	4,735	99	Good
TA2	Taxiway A2	01	AC	15,365	70	Fair
TA3	Taxiway A3	01	AC	20,037	97	Good
TA4	Taxiway A4	01	AC	15,724	90	Good
TC01	Taxiway Connector 01	01	AC	9,945	82	Satisfactory
TC02	Taxiway Connector 02	01	AC	7,847	100	Good
THANG01	Taxiway Hangar 01	01	AC	255,301	62	Fair
TL01	Taxilane 01	01	AC	84,316	87	Good

ES.3 Pavement Maintenance and Repair Funding Levels

The PAVER database was updated with 2019 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 EDN network PCI values for each funding level.

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 $2.1 million. These recommendations are based on a network-level evaluation. Project-level evaluations should be conducted prior to developing design and bid package documents.

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 $28,225 as summarized in Table ES-3.

Figure ES-2: M&R Funding Levels.

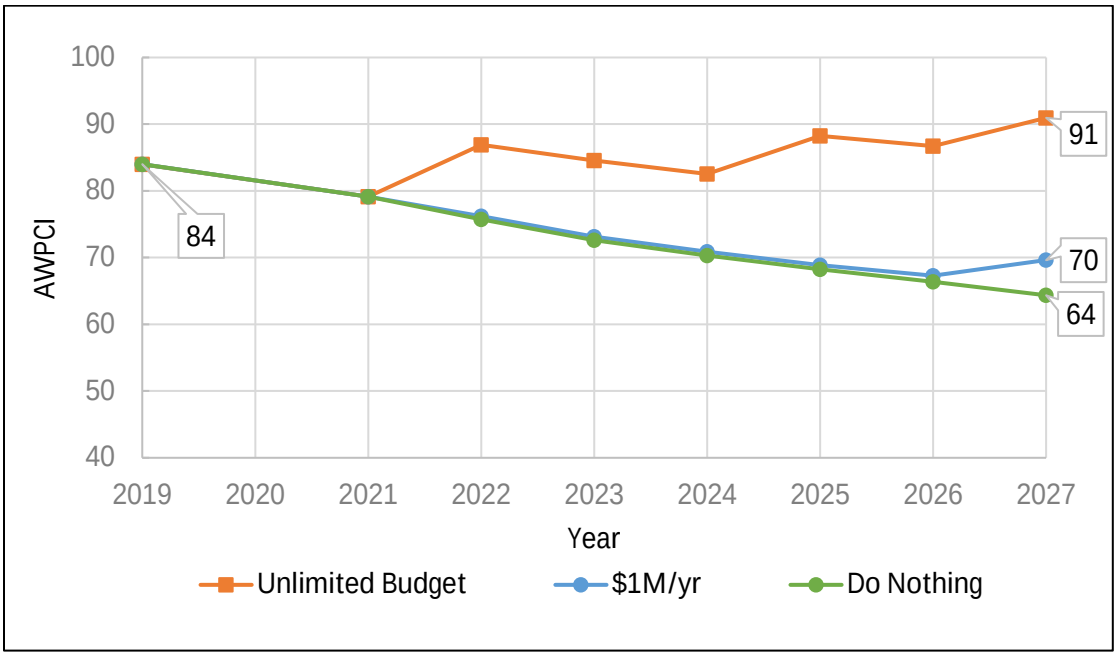


Table ES-2: Summary of Pavement Capital Improvement Program.

Project Year	CIP Project	Total Project Cost	Total Project Area, sf	AWPCI Before	AWPCI After
2021	EDN_21-01_Runway 05-23 Preservation	$345,794	565,790	80	87
	EDN_21-02_Taxilane Preservation	$82,627	94,261	83	90
2022	EDN_22-01_Apron 01 Surface Treatment	$43,824	73,052	98	98
2023	EDN_23-01_Taxiway A Preservation	$157,620	169,490	91	97
	EDN_23-02_Taxiway Hangar Rehabilitation	$1,497,082	255,301	46	100
	Total	$2,126,947			

Table ES-3: Summary of Localized Maintenance Plan.

Policy	Work Description	Work Quantity	Work Unit	Work Cost
Preventive	Crack Sealing - AC	2,914	Ft	$11,511
	Patching - AC Full-Depth	613	SqFt	$15,364
Safety	Crack Sealing - AC	342	Ft	$1,350
			Total	$28,225

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1 Introduction

1.1. Overview

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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 Enterprise Municipal Airport (EDN), 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:

- ü Conduct a visual pavement inspection of the asphalt surfaced pavements for 59 of the 74 general aviation airports in Alabama.
- ü Based on the visual inspection analysis results, develop a 7-year PCIP for each airport.

The scope of work is as shown below:

- ü Conduct a Records Review
- ü Update Pavement Network Definition
- ü Conduct Pavement Condition Surveys
- ü Update and customize existing APMP PAVER database
- ü Develop PCIP and associated project cost estimates
- ü Prepare Draft and Final Reports
- ü 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 №I·ŭλyƎ 2Ŧ áD22ŘéΣ áCI·λ№éΣ 2№ át22№é ØI·ă I·ăăλƎyŜŘ ōI·ăŜŘ 2y˙ŭKŜ 2ØŜ№I·ftf LJI·ØŜY˙Ŝyű Õ2yŘλŭλ2y⁄

The deliverable products include a PAVER 7.0 database, individual airport evaluation reports, a statewide summary report, and the web viewer. The EDN report will be one of the 59 individual airport reports that will be I·ØI·λfI·ōfŜ 2y˙ ![5h¢⁄ă ØŜōăλúŜ⁄

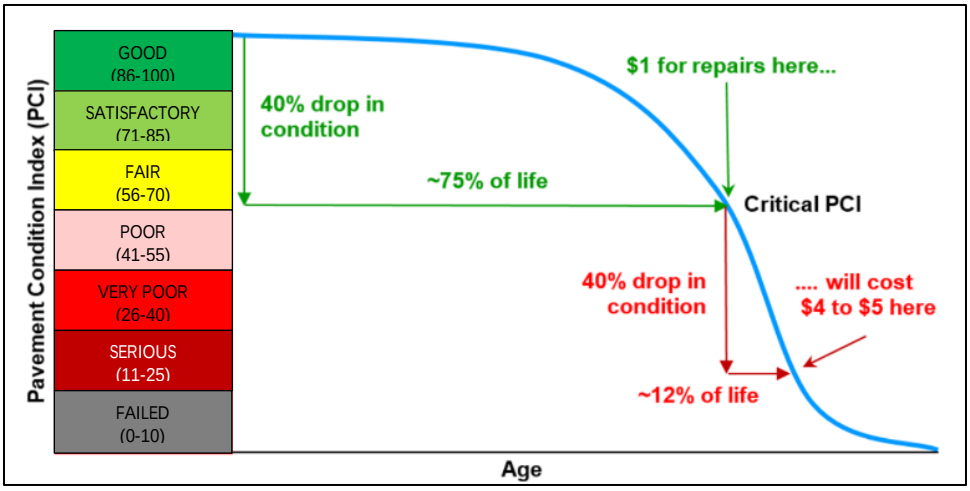
1.3. Pavement Management Concept

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-ëŜI·ℕ LJI·ØŜY˝ŜyűΣ I· άD22Řέ ű2 άCI·λℕέ Ŏ2yŘλűλ2y˝ℕI·ûλyΞ Y˝I·è fI·ăú 2yťè p ű2 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 ûKŜ LJI·ØŜY˝Ŝyű ădzℕŦI·ŎŜ ŘŜŎfλyŜă ű2 I· άŦI·λℕέ Ŏ2yŘλűλ2y℗ ¢KŜ LJ2λyű I·û ØKλŎK ℕŜKI·ōλfλúI·ûλ2y˝ŎI·y˝ōŜ Ř2yŜ ōŜŦ2ℕŜ ûKŜ ăúŜŜLJ ŘŜŎfλyŜ 2ŎŎdzℕă ăă ŎI·ffŜŘ ûKŜ άŎℕλûλŎI·f t /LέΣ I·yŘ ăă ΞŜyŜℕI·ffè Ŏ2yãλŘŜℕŜŘ ű2 2ŎŎdzℕ ØKŜy˝ûKŜ 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

EDN is a General Aviation (GA) airport located approximately 3 miles west of Enterprise. The airport was activated in July 1955 and is owned and operated by the Town of Enterprise. Figure 2.1 shows an aerial image of the airport.

Figure 2.1: Enterprise Municipal Airport.

(Source: Google Earth)

2.2. Pavement Inventory

EDN consists of one runway, a parallel taxiway, two connector taxiways, and an apron. The total pavement area is approximately 1.23 million square feet. Pavement surfaces at EDN include Asphalt Concrete (AC), Asphalt Overlay on AC (AAC), and Portland Cement Concrete (PCC). A complete listing of the pavement sections is included in Appendix A. Runway 05-23 is 5,080 ft. long and 100 ft. wide.

A records search was undertaken to identify any preservation or rehabilitation work that has occurred at EDN 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:

- ü Runway 05-23 Rehabilitation, 2011
- ü Taxiway Rehabilitation, 2018
- ü Apron Reconstruction, 2019

2.3. Climatic Conditions

Table 3.1 provides a summary of the climatic data for the geographic region that includes EDN. As the table shows, the pavements at EDN are not exposed to any freeze-thaw cycles. The mean air temperature for January ranges from an average low of 39 degrees °F to an average high of 58 degrees °F. The average annual rainfall at EDN is near 57 inches.

Table 2.1: Average Annual Temperatures and Rainfall for EDN.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High Temp (°F)	58	63	70	76	83	88	90	89	86	78	69	61
Low Temp (°F)	39	42	48	54	62	69	71	71	67	56	48	41
Precip. (in)	6.1	5.1	6.3	4.0	4.7	4.8	6.2	3.8	3.9	2.8	4.4	4.7

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 ŘλØλŘλyƎ I·yΥI·ƎŜyŎèΩă LJI·ØŜΥŜyΰă λyΰ2 I· KλŜℕI·ℕŎKλŎI·f 2ℕŘŜℕ ΰKI·ΰ ŦI·ŎλfλΰI·ΰŜă λyãLJŜŎΰλ2ΥI·yŘ a ɔw LJfI·yŸλyƎ¢ The EDN 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 EDN.

Once branches have been defined, pavement evaluation and analysis techniques require the airfield LJI·ØŜΥŜyΰ ăëăΰŜΥ ΰ2 ōŜ ōℕ2ʅŜΥ ʤLJ λyΰ2 ŘλăŎℕŜΰŜ ăŜŎΰλ2yã¢ ! LJI·ØŜΥŜyΰ ΰăŜŎΰλ2y€ λă ΰKŜ ăΥI·ftŜăΰ 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 ƨℕ Ijʤl·yűʎúè ƨŦ l· ŘʎăúŃŜăă ăŜŜƴŜťăŜøKŜŃŜΣ øŜŃŜ ŘŜăʎƎƴl·űŜŘ l·ă ɑl·ŘŘʎúʎƨƴl·ťɛ ăl·Y˙LJťŜ ʤzƴűúă l·ă ŘŜăŎŃʎōŜŘ ʎƴ 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 EDN.

Table 2.2: PCI Sampling Rate for AC Surfaces.

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

2.5. Inventory Summary

There are 11 branches (facilities) at EDN that include 15 pavement sections and a total area of approximately 1.22 million square feet of paved surfaces, as shown in Table 2.3.

Table 2.3: EDN Pavement Branches.

Branch ID	Branch Name	Branch Use	Area, sf	Number of Sections
A01	Apron 01	APRON	128,754	2
R0523	Runway 05-23	RUNWAY	510,500	3
TA	Taxiway A	TAXIWAY	164,755	1
TA1	Taxiway A1	TAXIWAY	8,899	2
TA2	Taxiway A2	TAXIWAY	15,365	1
TA3	Taxiway A3	TAXIWAY	20,037	1
TA4	Taxiway A4	TAXIWAY	15,724	1
TC01	Taxiway Connector 01	TAXIWAY	9,945	1
TC02	Taxiway Connector 02	TAXIWAY	7,847	1
THANG01	Taxiway Hangar 01	TAXIWAY	255,301	1
TL01	Taxilane 01	TAXIWAY	84,316	1
		Total	1,221,443	15

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 EDN.

Table 2.4: EDN Pavement Age.

Age (Years)	Number of Sections	Percent of Area	Area, sf
0 ς 5	5	25	306,091
6 ς 10	6	45	545,753
11 ς 15	0	0	0
16 ς 20	0	0	0
> 20	4	30	369,599

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: EDN Pavement Area by Surface Type.

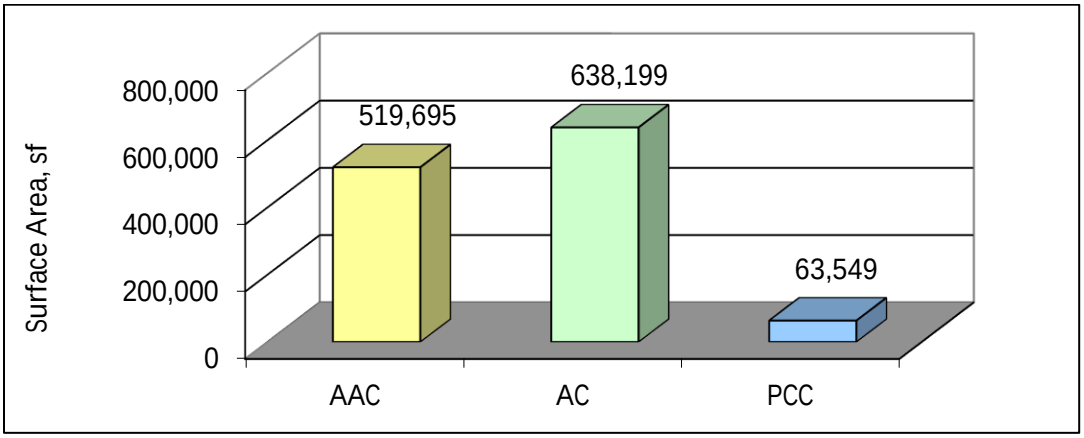
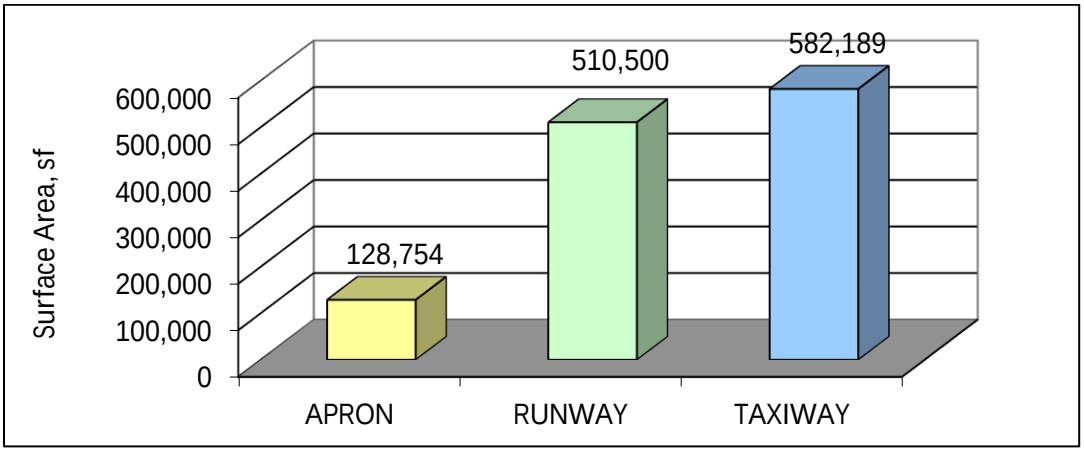


Figure 2.3: EDN Pavement Area by Branch Use.



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 EDN 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 November 2019 by a 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;

- ü 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.
- ü 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

¢ĸŜ t/ʟ ƛă ı· ϒŜı·ăʤℕŜ 2₮ űĸŜ ʟJı·ØŜϒŜyűΩă ₮ʤzyŎúλ2yl·ſ ăʤzℕ₮ı·ŎŜ Ŏ2yŘλúλ2y℗ Lű ʟJℕ2ØλŘŜă ƛyãλ∃Kű ƛyű2 űĸŜ Ŏı·ʤžŜă 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	GOOD: Pavement has minor or no distresses and should require only routine maintenance.
			71-85	SATISFACTORY: Pavement has scattered low-severity distresses that should require only routine maintenance.
FAIR			56-70	FAIR: 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	POOR: 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	VERY POOR: Pavement has predominantly medium- and high-severity distresses that cause considerable maintenance & operational problems. Near-term M&R needs will be major.
			11-25	SERIOUS: Pavement has mainly high-severity distresses that cause operational restrictions; immediate repairs are needed.
			0-10	FAILED: Pavement deterioration has progressed to the point that safe 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:

- ü 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.
- ü 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-dzLJăΣ á5é ŎNI·Ŏ]ʎyΞΣ f2yΞʎűdzŘʎy1·f ŎNI·Ŏ]ʎyΞΣ LJ2LJ-outs, pumping, scaling, shrinkage cracks, and joint and corner spalling.
- ü Moisture & Drainage related: AC distresses include alligator cracking, depressions, potholes and swelling; PCC distresses include corner breaks, divided slabs and pumping.
- ü 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.

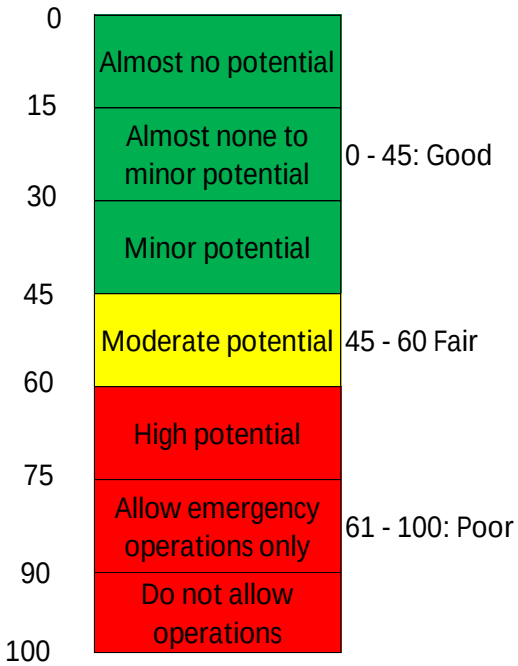
Distress descriptions provided in Appendix C were taken ŦŃ2Y ŭKŜ άt /ʟ CΛŜfŘ a l·yŧzI·ŧ£é ŘŜØŜf2LJŜŘ ōè ŭKŜ U.S. Army Construction Engineering Research Lab (CERL), latest edition. Appendix C provides a detailed explanation of each type of AC and PCC surface distress.

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 airside pavements at EDN include 15 sections with 230 sample units. The sample number of sample units that were surveyed in the field is 65, which is 28 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 3.2: Pavement Condition by Branch Use.

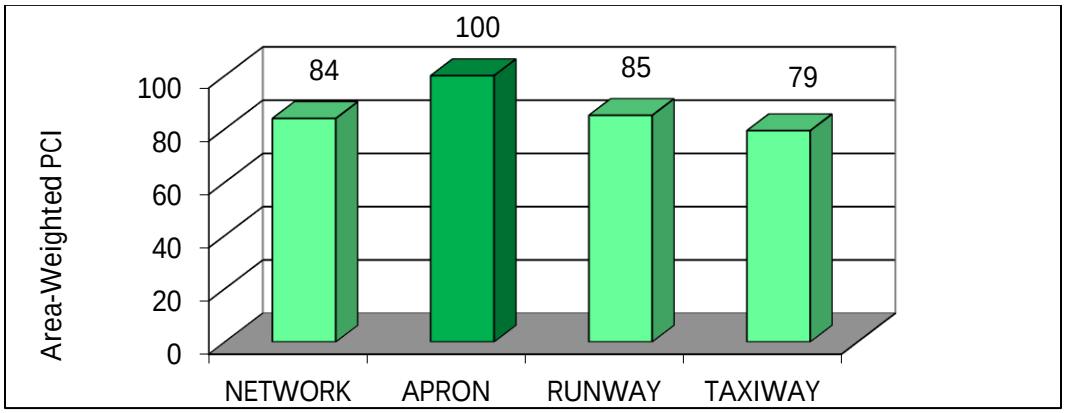


Figure 3.3 shows the distribution of the EDN pavement network by condition. None of the pavement yŜűø2ℕ℩ ƛă ƛy˝ά t2ƨℕ€ ƨℕ ø2ℕăŜ Ŏƨ2yŘΛűƛ2y℗

Figure 3.3: Pavement Condition by Percent of Area.

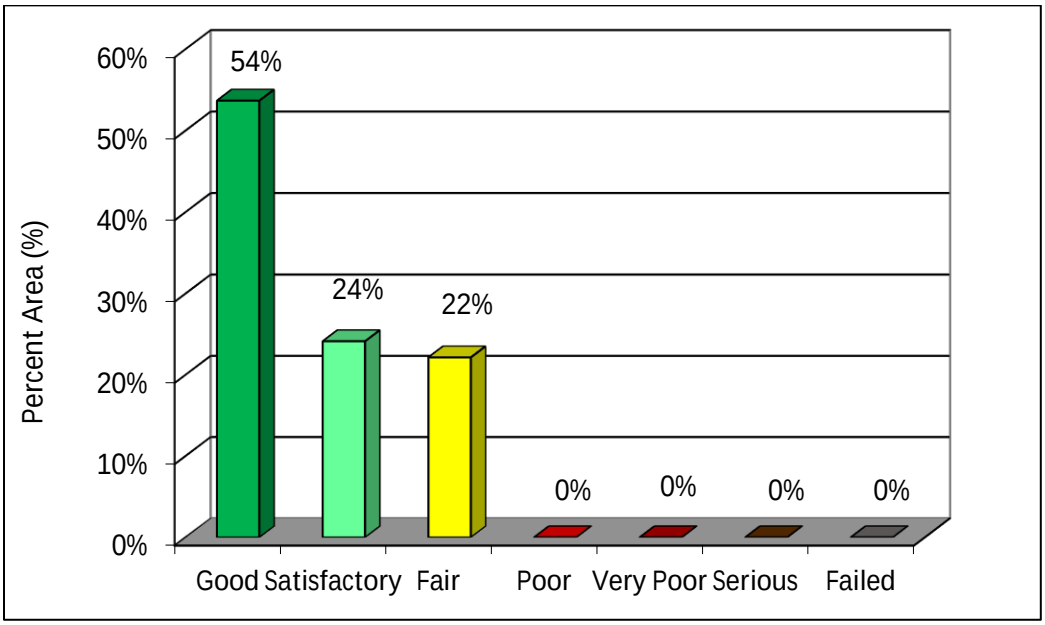


Table 3.2 is a listing of the section PCI.

Table 3.2: Section PCI.

Branch ID	Name	Section ID	Surface	Area, sf	PCI	PCI Category	FOD
A01	Apron 01	01	AC	65,205	100	Good	0
A01	Apron 01	02	PCC	63,549	100	Good	0
R0523	Runway 05-23	01	AC	165,000	89	Good	21
R0523	Runway 05-23	02	AAC	285,000	82	Satisfactory	29
R0523	Runway 05-23	03	AC	60,500	89	Good	21
TA	Taxiway A	01	AAC	164,755	98	Good	11
TA1	Taxiway A1	01	AC	4,164	91	Good	19
TA1	Taxiway A1	02	AAC	4,735	99	Good	10
TA2	Taxiway A2	02	AC	4,347	60	Fair	54
TA3	Taxiway A3	01	AC	20,037	97	Good	12
TA4	Taxiway A4	01	AC	15,724	90	Good	20
TC01	Taxiway Connector 01	01	AC	9,945	82	Satisfactory	29
TC02	Taxiway Connector 02	01	AC	7,847	100	Good	0
THANG01	Taxiway Hangar 01	01	AC	255,301	62	Fair	48
TL01	Taxilane 01	01	AC	84,316	87	Good	22

Figure B2A and B2B in Appendix B are maps of the section PCI in 7- and 3-scale categories, respectively. Figures 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 t2ŇűfIٜyŘ /ŜYˆŜyű /2yŎŇŜűŜ ót / /ú Iٜ LJŇ2yãΦ C2Ň űKŜăŜ LJIٜØŜYˆŜyűăΣ Iٜ ŇIٜűΛyƎ 2Ŧ άD22ŘέΣ άCIٜΛŇέΣ 2Ň át22Ňέ ø Iٜă assigned based on the overall pavement condition. There are no PCC aprons at EDN.

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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 ŘI·ű I·φ t ! ±9wΩă t№ŜŘλŎűλ2ƴ a 2ŘŜfλyΞ Y2ŘdzfŜ ø I·ă used to develop pavement performance models that I·№Ŝ Ŏ2YY2yfè №Ŝ₮Ŝ№№ŜŘ ű2 I·ă ΨCI·Yλfè /dz№ØŜăΩφ

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.

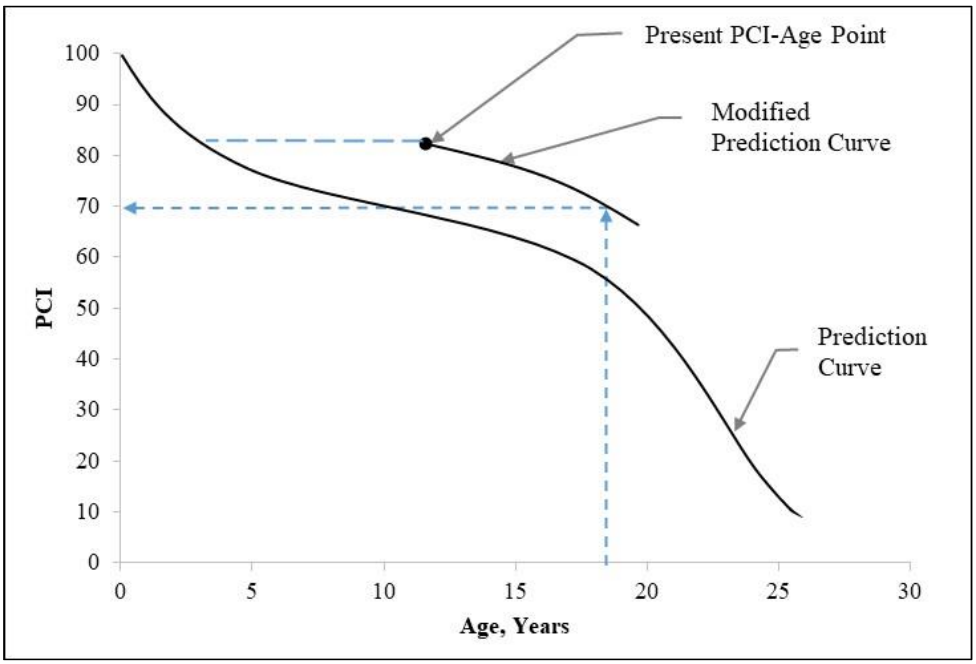
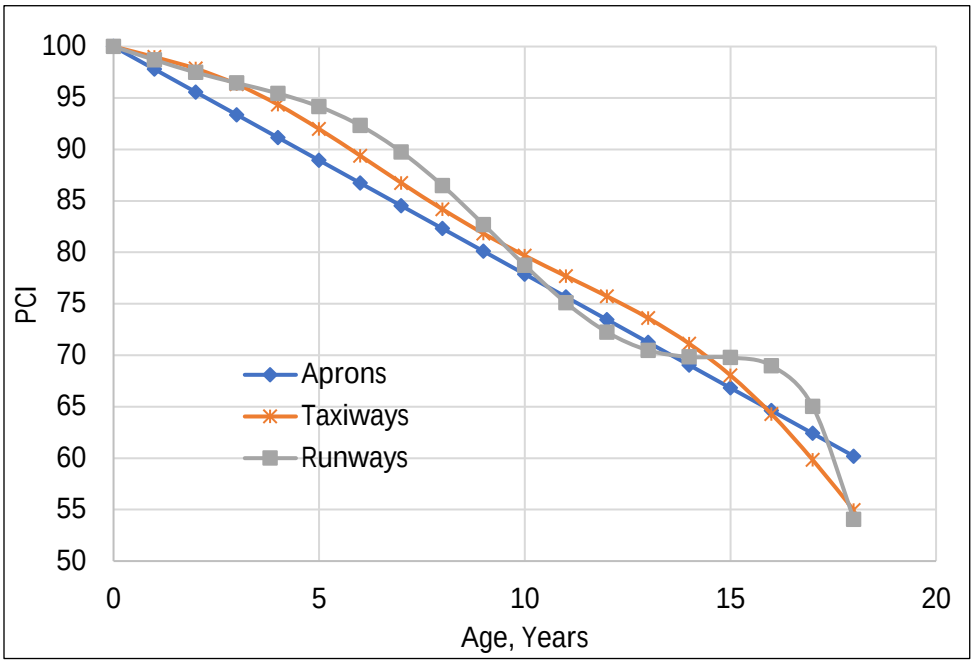


Figure 4.2: Family Curves.



4.3. Critical PCI Values

¢KŜ /ℕλúλŎl·f t /L ØI·fdzŜ λă ŘŜ₸λyŜŘ I·ă á*the PCI value at which the rate of PCI loss increases with time, or the cost of applying localized preventive maintenance increases significantly*¢é ¢Kλă ŘŜ₸λyλúλ2y˝λă λyŎ2ℕLJ2ℕI·úŜŘ 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.

Ly˝I·ŎŎ2ℕŘI·yŎŜ øλúK ![5h¢Ωă 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 ç 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" & 2" AC OLP (With Pre-Overlay Repairs)	$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 EDN 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:

- ü Unlimited Funding: Unlimited funding is available for all pavement needs. The PCI increases to 91 by 2027.
- ü Maintain PCI: PAVER cannot iterate to this scenario.
- ü Constrained Funding: This scenario constrains the funding to $1 million each year (total of $7 million). The PCI decreases to 70 in 2027.
- ü Do Nothing: Performing no M&R would reduce the network PCI from 84 to 64 by 2027.

Figure 4.3: Budget Analysis Process.

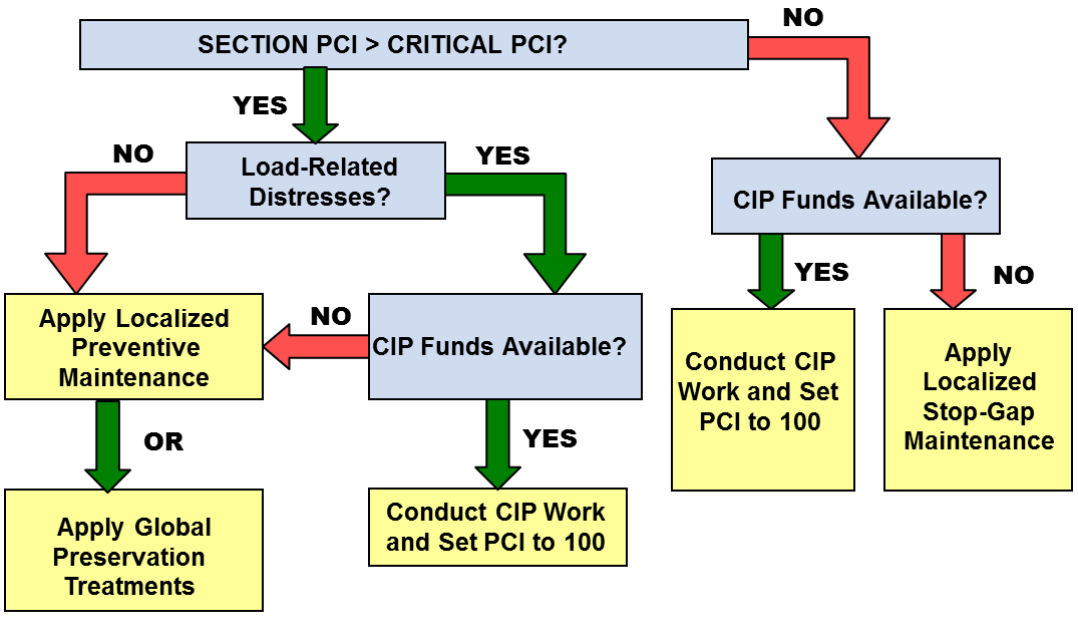


Figure 4.4: M&R Funding Levels.

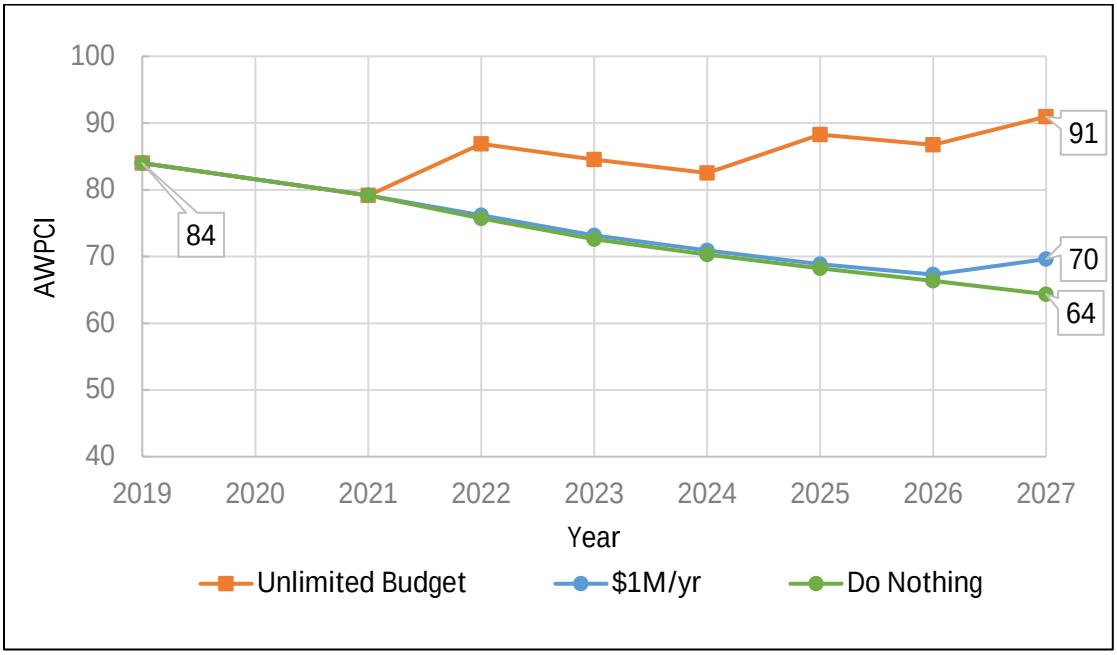


Table 4.2 summarizes the annual funding required for the above analyses. For the unlimited analysis, all pavement needs are funded in the year they are required. Therefore, the unfunded costs are zero. The total funded amount over the 7-year period is approximately $4.1 million. For the annual funding 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

ŦƵ ŭĶŜăŜ ŀŏŭλØλŭλŜă ŀ·ℕŜ ℕŜLJℕŜăŜyŭŜŘ ŀ·ă ádzyŦdzyŘŜŘɛ¢ The ádzyŦdzyŘŜŘɛ ℕŜLJŀ·λℕă λy˅2027 for this funding level are approximately $4.8 million.

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

Year	Unlimited	Constrained $1M/year	Do Nothing
2021	$19,000	$19,000	$0
2022	$1,451,000	$91,000	$0
2023	$19,097	$28,000	$0
2024	$22,000	$31,000	$0
2025	$1,385,000	$29,000	$0
2026	$67,117	$87,566	$0
2027	$1,162,373	$893,424	$0
Total	$4,125,000	$1,178,000	$0
2027 Backlog	-	$4,770,000	$5,877,000

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 λyŎŧdzŘŜŘ ŭƨ LJℕƨØλŘŜ ŀ· fƨƎλŎŀ·f LJfŀ·y˅ øKλŎK øƨdzfŘ ŀ·Ø2λŘ ŎℕŜŀ·ŭλyƎ áλăfŀ·yŘăɛ ƨŦ yŜøŜℕ 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 $2.1 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 EDN.

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	EDN_21-01_Runway 05-23 Preservation	$345,794	565,790	80	87
	EDN_21-02_Taxilane Preservation	$82,627	94,261	83	90
2022	EDN_22-01_Apron 01 Surface Treatment	$43,824	73,052	98	98
2023	EDN_23-01_Taxiway A Preservation	$157,620	169,490	91	97
	EDN_23-02_Taxiway Hangar Rehabilitation	$1,497,082	255,301	46	100
	Total	$2,126,947			

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

Branch	Section	Area, sf	PCI Before Rehab	Activity	Activity Type	Cost
EDN_21-01_Runway 05-23 Preservation						$345,794
R0523	01	165,000	85	Runway Surface Treatment	Preservation	$96,100
R0523	02	285,000	77	Runway Surface Treatment	Preservation	$165,991
R0523	03	60,500	85	Runway Surface Treatment	Preservation	$35,237
TA1	01	4,164	88	Taxiway & Apron Surface Treatment	Preservation	$3,650
TA2	01	15,365	66	Taxiway & Apron Surface Treatment	Preservation	$13,469
TA3	01	20,037	95	Taxiway & Apron Surface Treatment	Preservation	$17,564
TA4	01	15,724	87	Taxiway & Apron Surface Treatment	Preservation	$13,783
EDN_21-02_Taxilane Preservation						$82,627
TC01	01	9,945	80	Taxiway & Apron Surface Treatment	Preservation	$8,718
TL01	01	84,316	84	Taxiway & Apron Surface Treatment	Preservation	$73,910
EDN_22-01_Apron 01 Surface Rehabilitation						$43,824
A01	01	65,205	95	Taxiway & Apron Surface Treatment	Preservation	$39,116
TA2	02	4,347	98	Taxiway & Apron Surface Treatment	Preservation	$4,707
EDN_23-01_Taxiway A Preservation						$157,620
TA	01	164,755	92	Taxiway & Apron Surface Treatment	Preservation	$153,216
TA1	02	4,735	94	Taxiway & Apron Surface Treatment	Preservation	$4,403
EDN_23-02_Taxiway Hangar Rehabilitation						$1,497,082
THANG01	01	255,301	47	Mill 2" & 2" AC OLP	Rehabilitation	$1,497,082
					Total	$2,126,947

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 $2.1 million for EDN:

- FAA (90%): $1.9 million
- ALDOT (5%): $0.1 million

- ü Airport Sponsor (5%): $0.1 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 $28,225. 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 EDN pavements.

Table 4.5: Summary of Year-1 Maintenance Plan.

Policy	Work Description	Work Quantity	Work Unit	Work Cost
Preventive	Crack Sealing - AC	2,914	Ft	$11,511
	Patching - AC Full-Depth	613	SqFt	$15,364
Safety	Crack Sealing - AC	342	Ft	$1,350
			Total	$28,225

APPENDIX A

INVENTORY

Appendix A

Pavement Inventory Report

Enterprise Municipal Airport (EDN)

Branch ID	Name	Branch Use	Section ID	Rank[1]	Length (ft)	Width (ft)	Area (sf)	LCD[2]	Surface[3]
A01	Apron 01 Enterprise	APRON	01	S	315	207	65,205	12/1/2019	AAC
A01	Apron 01 Enterprise	APRON	02	S	307	207	63,549	1/2/2020	PCC
R0523	Runway 05-23 Enterprise	RUNWAY	01	P	1,650	100	165,000	6/2/2011	AC
R0523	Runway 05-23 Enterprise	RUNWAY	02	P	2,850	100	285,000	6/2/2011	AAC
R0523	Runway 05-23 Enterprise	RUNWAY	03	P	605	100	60,500	6/2/2011	AC
TA	Taxiway A Enterprise	TAXIWAY	01	P	4,844	35	164,755	6/1/2018	AAC
TA1	Taxiway A1 Enterprise	TAXIWAY	01	S	83	45	4,164	6/1/2011	AC
TA1	Taxiway A1 Enterprise	TAXIWAY	02	S	146	35	4,735	6/1/2018	AAC
TA2	Taxiway A2 Enterprise	TAXIWAY	01	S	235	35	15,365	6/2/2011	AC
TA3	Taxiway A3 Enterprise	TAXIWAY	01	S	233	25	20,037	1/1/1955	AC
TA4	Taxiway A4 Enterprise	TAXIWAY	01	S	366	35	15,724	6/1/2011	AC
TC01	Taxiway Connector 01 Enterprise	TAXIWAY	01	S	317	29	9,945	1/1/1955	AC
TC02	Taxiway Connector 02 Enterprise	TAXIWAY	01	S	85	57	7,847	6/1/2019	AC
THANG01	Taxiway Hangar 01 Enterprise	TAXIWAY	01	T	849	547	255,301	1/1/1955	AC
TL01	Taxilane 01 Enterprise	TAXIWAY	01	T	1,242	50	84,316	1/1/1955	AC

[1] P = Primary pavement, S = Secondary pavement, T = Tertiary pavement

[2] LCD = Last construction date. The date of the last major pavement rehabilitation (e.g. AC overlay)

[3] AC = Asphalt Cement Concrete, AAC = Aphalt Overlay AC, PCC = Portland cement Concrete, APC = Asphalt Overlay PCC

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

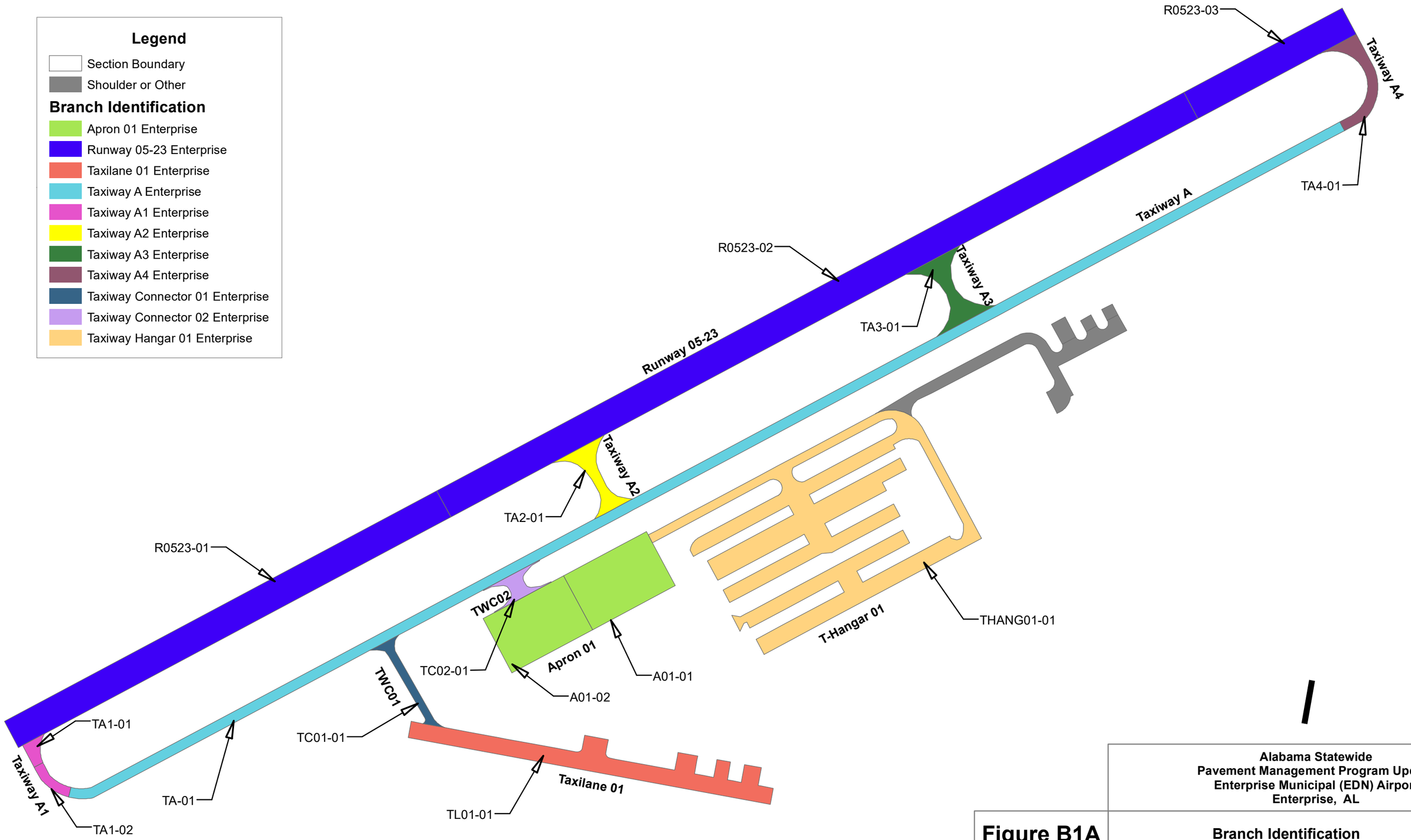
B3: Pavement Capital Improvement Plan (PCIP) Maps
- B3A: 2027 Forecasted PCI without PCIP
- B3B: M&R Needs
- B3C: PCIP Recommendations

Legend

- Section Boundary
- Shoulder or Other

Branch Identification

- Apron 01 Enterprise
- Runway 05-23 Enterprise
- Taxilane 01 Enterprise
- Taxiway A Enterprise
- Taxiway A1 Enterprise
- Taxiway A2 Enterprise
- Taxiway A3 Enterprise
- Taxiway A4 Enterprise
- Taxiway Connector 01 Enterprise
- Taxiway Connector 02 Enterprise
- Taxiway Hangar 01 Enterprise



Alabama Statewide
Pavement Management Program Update
Enterprise Municipal (EDN) Airport
Enterprise, AL

Figure B1A

Branch Identification

All About Pavements, Inc. (API)
www.allaboutpavements.com
Telephone: 217-586-2765 FAX: 217 586-1967

ENGINEER	DATE	MAP NUMBER
KP/MR	July 2021	Page 1
REVISED	SCALE	
JMA	1 in = 300 ft	**FINAL**

Legend

- Section Boundary
- Shoulder or Other

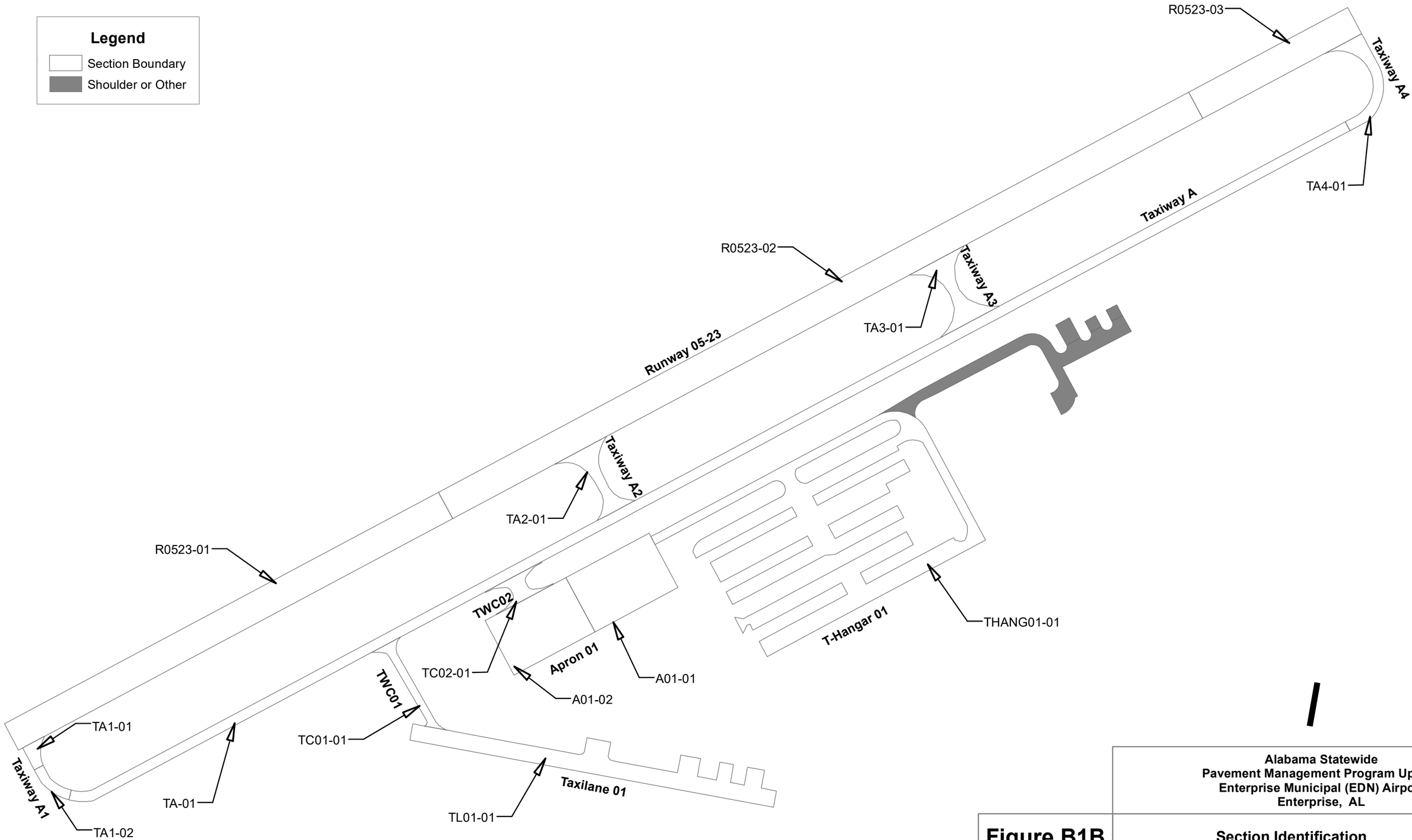


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Figure B1B

Section Identification

All About
Pavements, Inc. (API)
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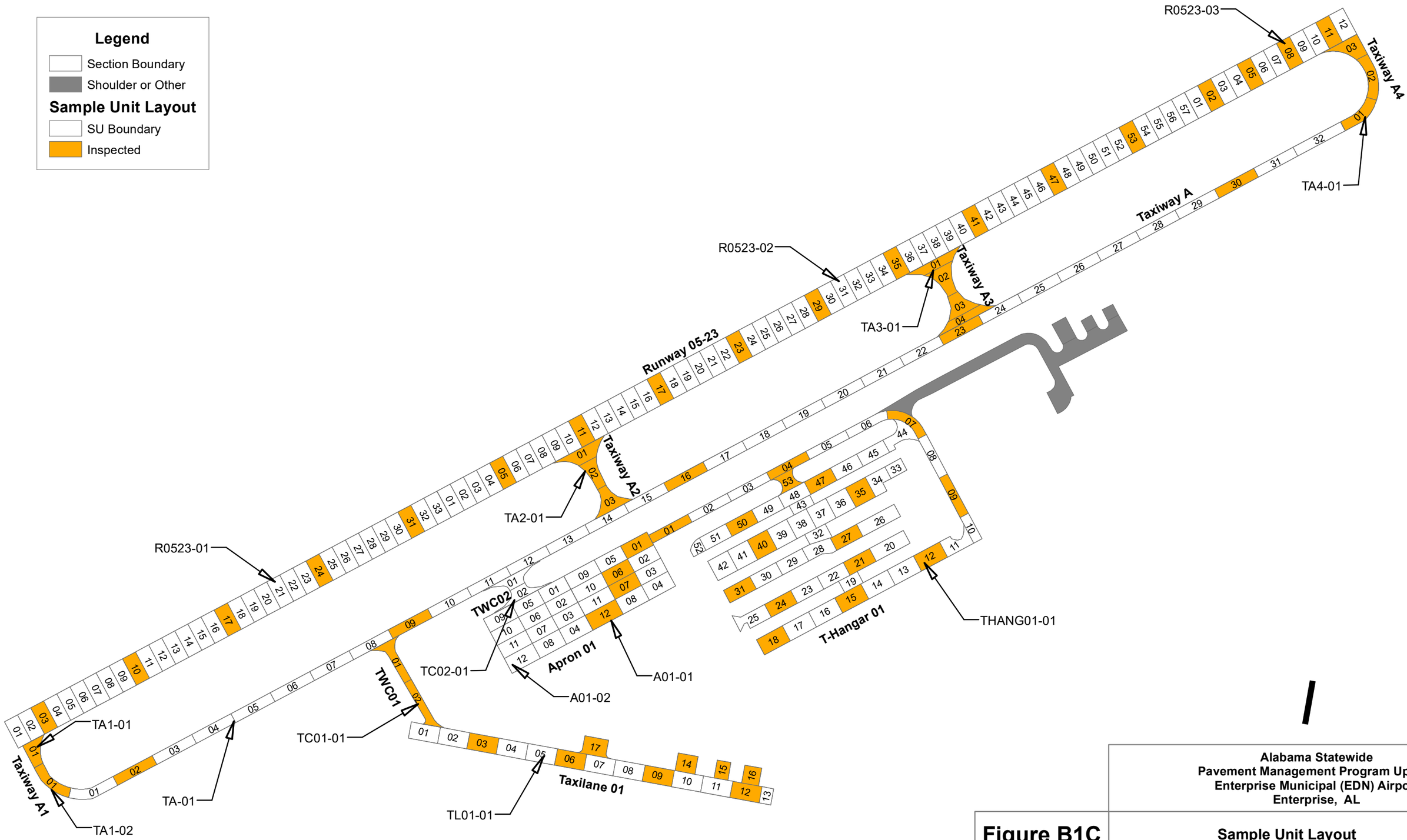
Telephone: 217-586-2765 FAX: 217 586-1967

ENGINEER	DATE	MAP NUMBER
KP/MR	July 2021	Page 2
REVISED	SCALE	
JMA	1 in = 300 ft	**FINAL**



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Enterprise Municipal (EDN) Airport
Enterprise, AL

Figure B1C

Sample Unit Layout

All About Pavements, Inc. (API)
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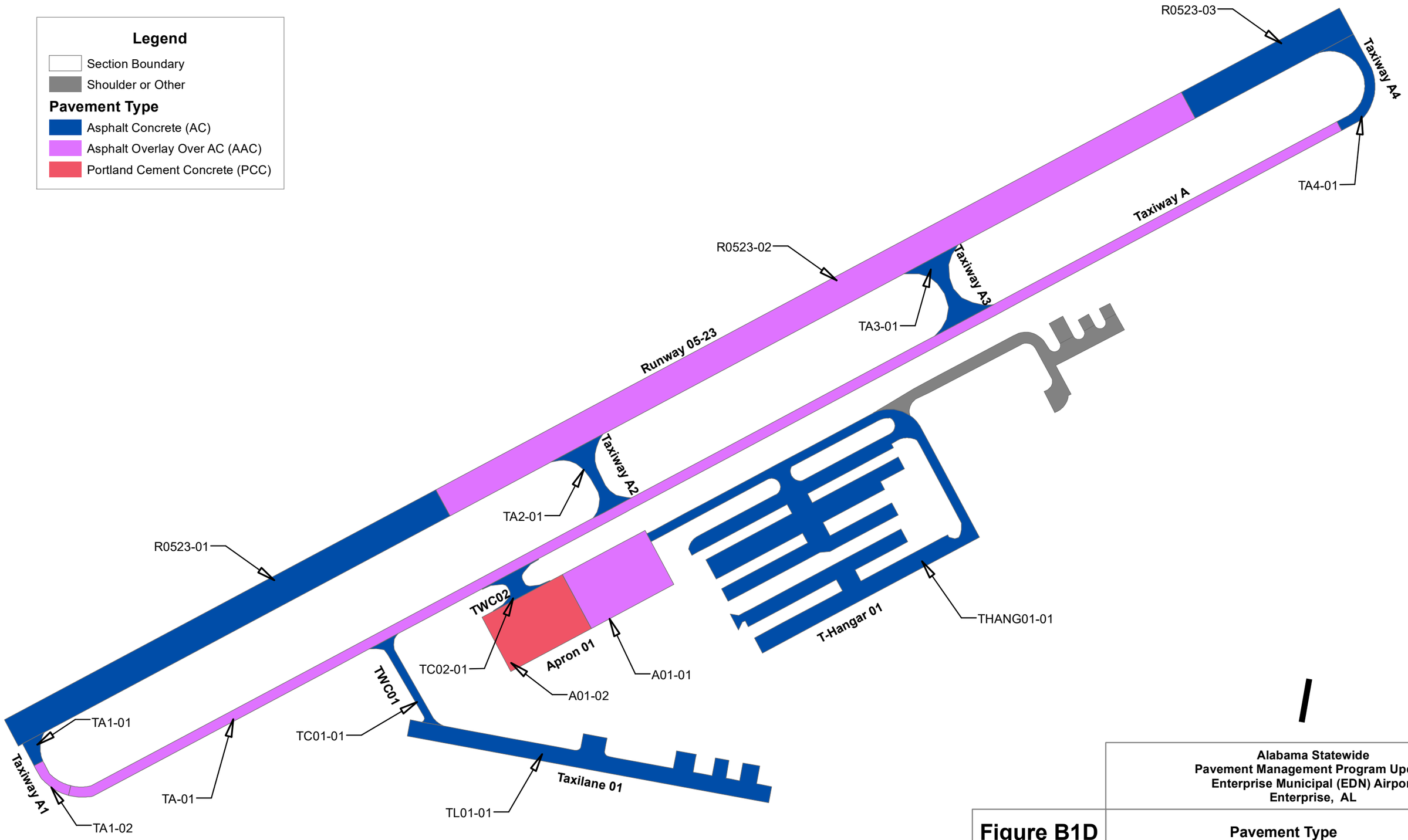
ENGINEER	DATE	MAP NUMBER
KP/MR	July 2021	Page 3
REVISED	SCALE	
JMA	1 in = 300 ft	FINAL

Legend

- Section Boundary
- Shoulder or Other

Pavement Type

- Asphalt Concrete (AC)
- Asphalt Overlay Over AC (AAC)
- Portland Cement Concrete (PCC)



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Enterprise Municipal (EDN) Airport
Enterprise, AL

Figure B1D

Pavement Type

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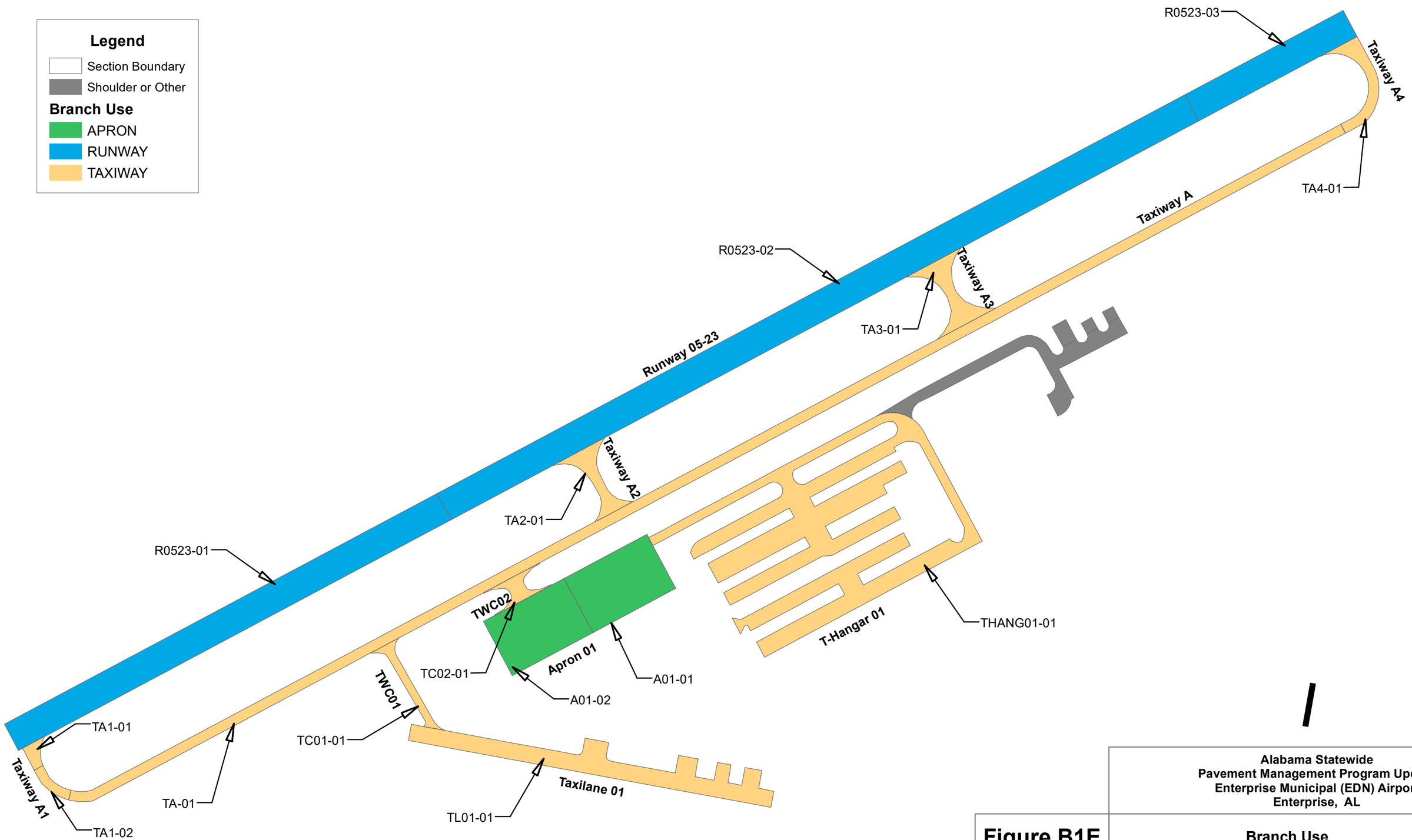
ENGINEER	DATE	MAP NUMBER
KP/MR	July 2021	Page 4
REVISED	SCALE	
JMA	1 in = 300 ft	**FINAL**

Legend

- Section Boundary
- Shoulder or Other

Branch Use

- APRON
- RUNWAY
- TAXIWAY



Alabama Statewide
Pavement Management Program Update
Enterprise Municipal (EDN) Airport
Enterprise, AL

Figure B1E

Branch Use

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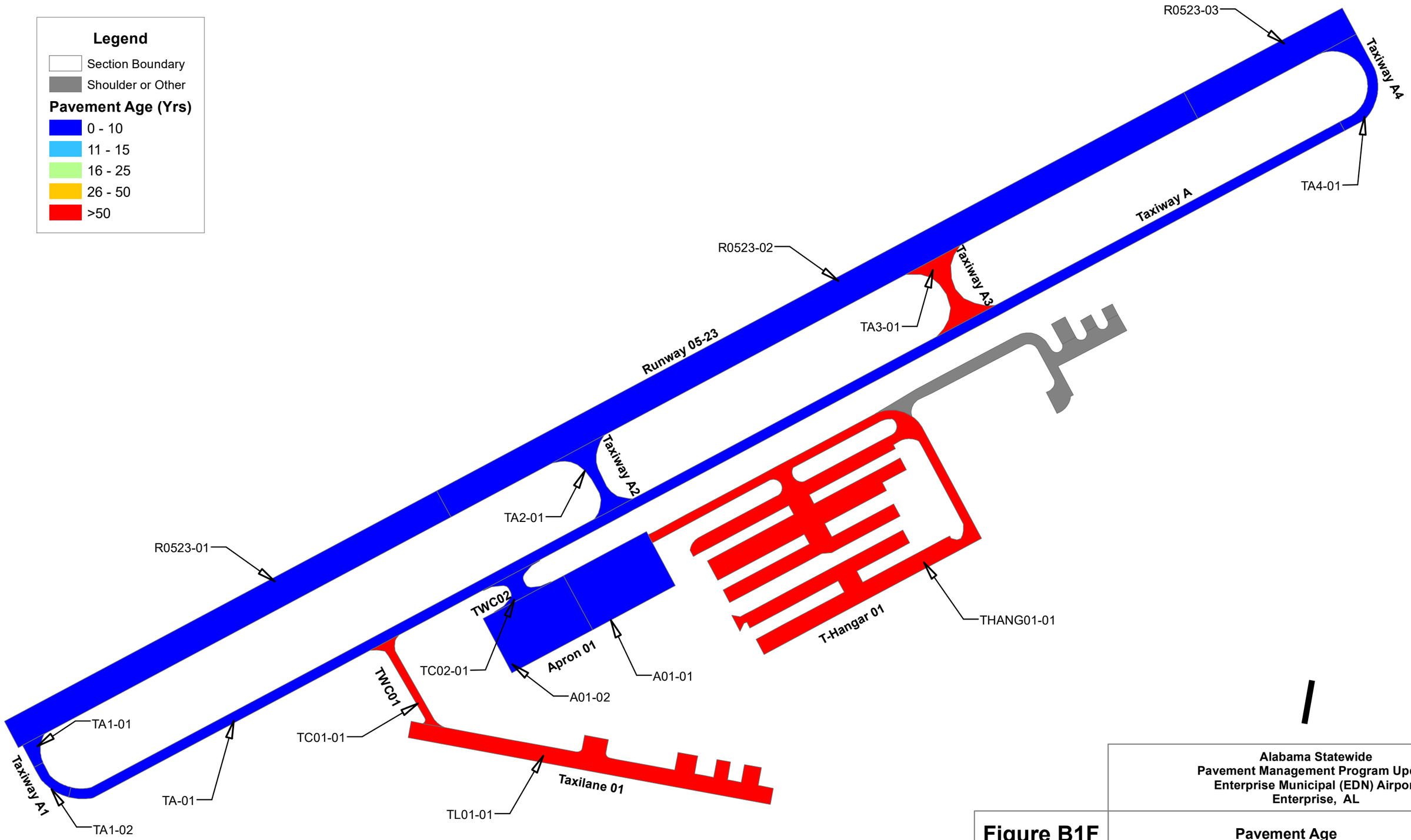
ENGINEER	DATE	MAP NUMBER
KP/MR	July 2021	Page 5
REVISED	SCALE	
JMA	1 in = 300 ft	**FINAL**

Legend

- Section Boundary
- Shoulder or Other

Pavement Age (Yrs)

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



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Enterprise Municipal (EDN) Airport
Enterprise, AL

Figure B1F

Pavement Age

All About Pavements, Inc. (API)
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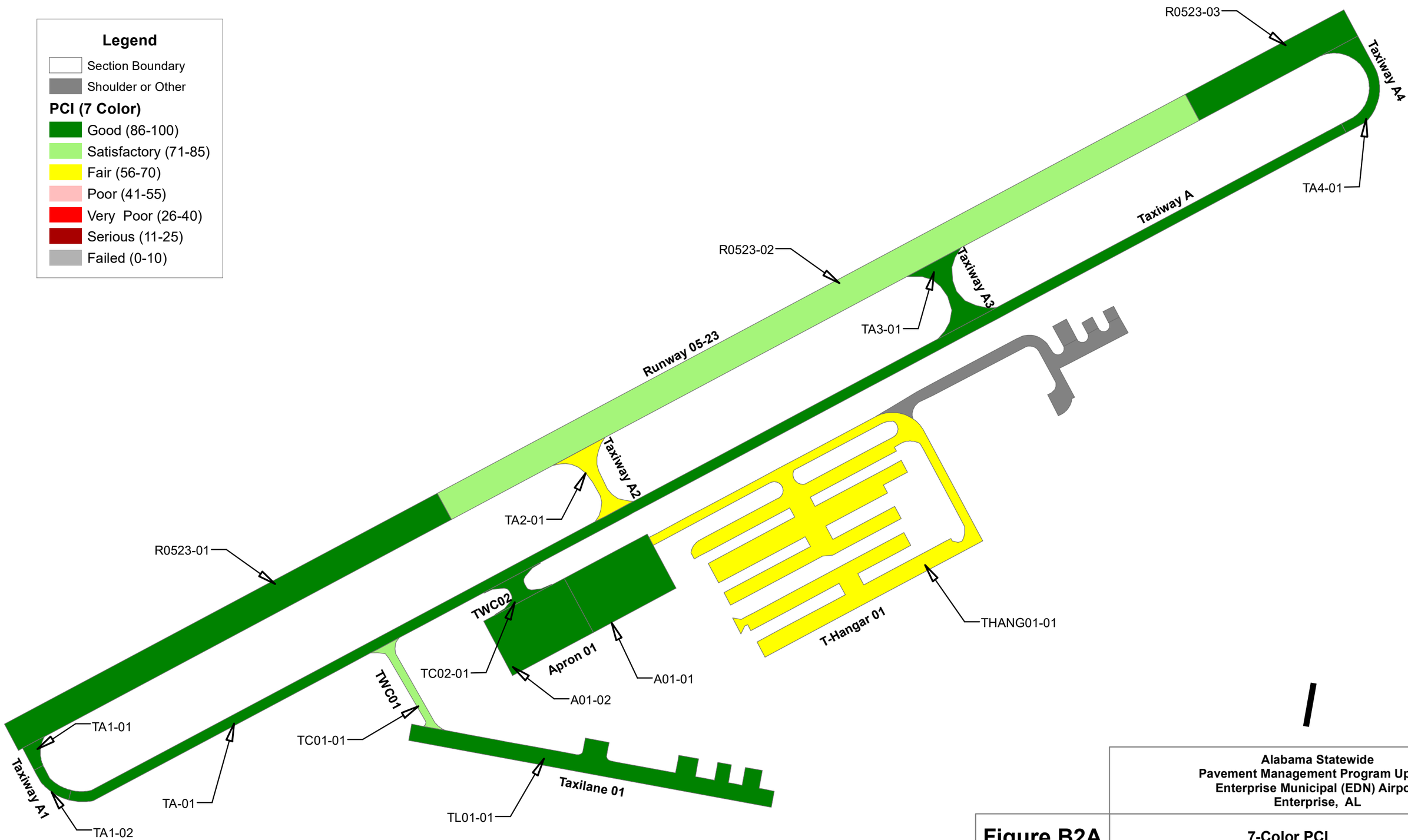
ENGINEER	DATE	MAP NUMBER
KP/MR	July 2021	Page 6
REVISED	SCALE	
JMA	1 in = 300 ft	**FINAL**

Legend

- Section Boundary
- 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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Enterprise Municipal (EDN) Airport
Enterprise, AL

Figure B2A

7-Color PCI

All About Pavements, Inc. (API)
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Telephone: 217-586-2765 FAX: 217 586-1967

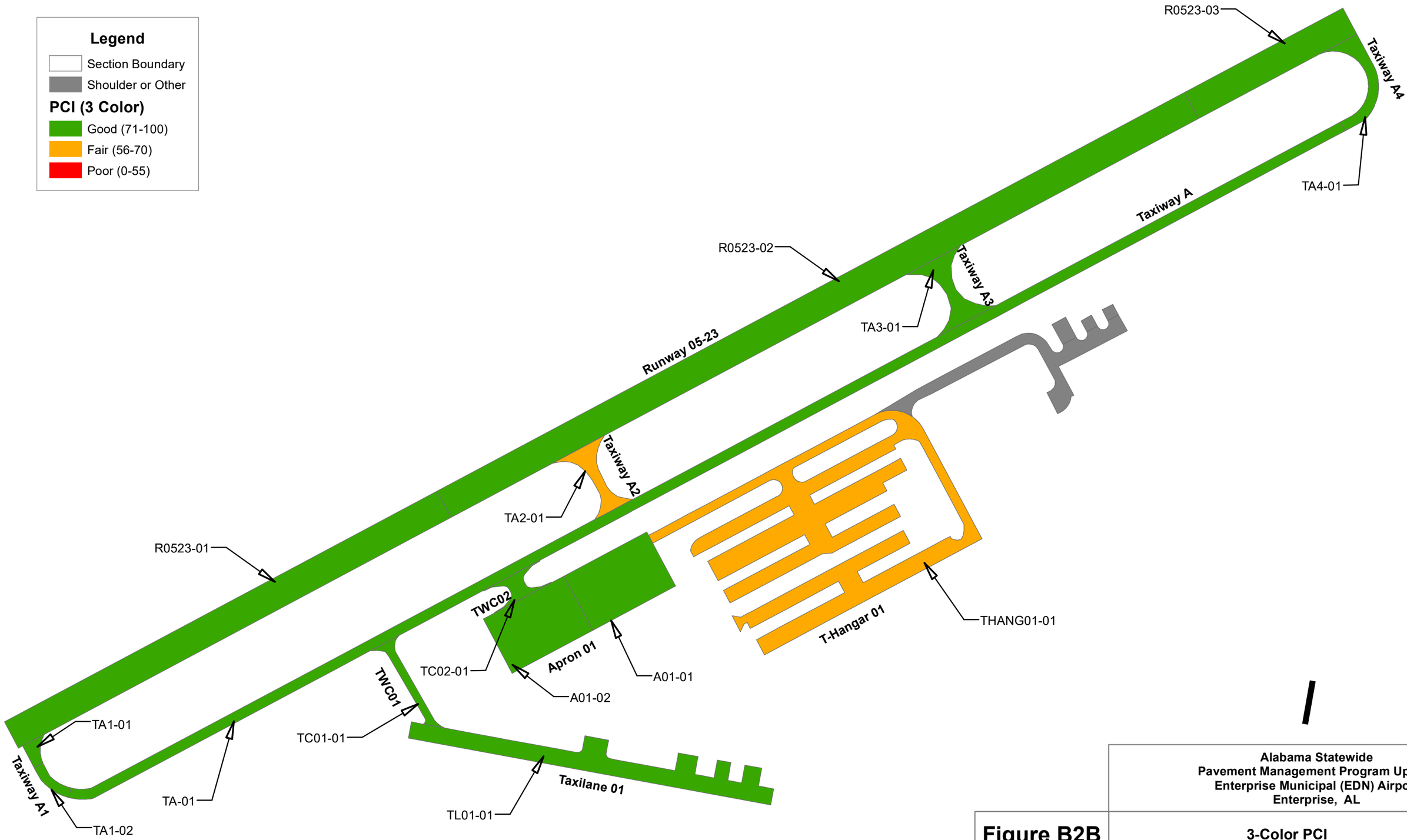
ENGINEER	DATE	MAP NUMBER
KP/MR	July 2021	Page 7
REVISED	SCALE	
JMA	1 in = 300 ft	**FINAL**

Legend

- Section Boundary
- Shoulder or Other

PCI (3 Color)

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



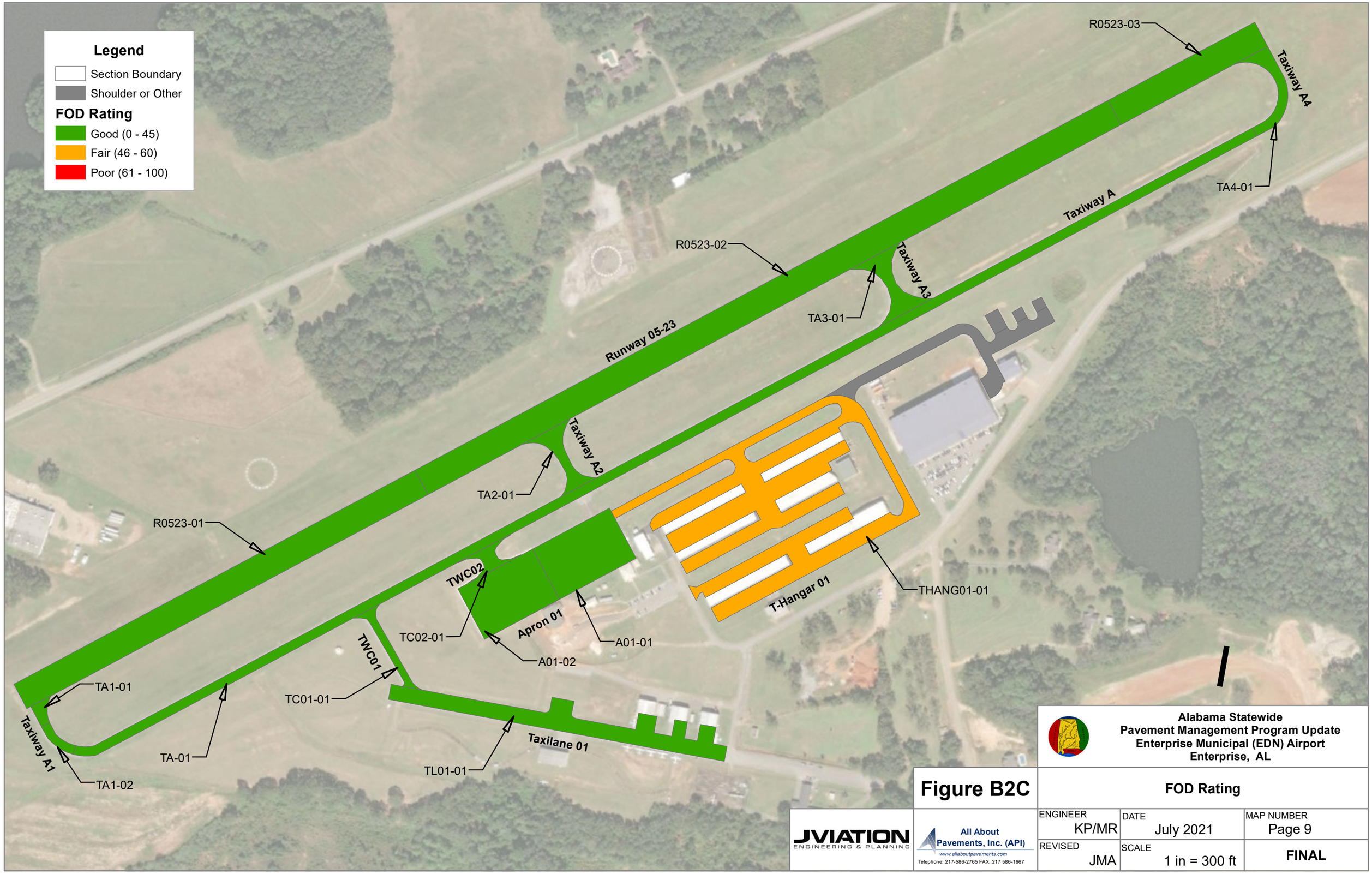
Alabama Statewide
Pavement Management Program Update
Enterprise Municipal (EDN) Airport
Enterprise, AL

Figure B2B

3-Color PCI

All About Pavements, Inc. (API)
www.allaboutpavements.com
Telephone: 217-586-2765 FAX: 217 586-1967

ENGINEER	DATE	MAP NUMBER
KP/MR	July 2021	Page 8
REVISED	SCALE	
JMA	1 in = 300 ft	**FINAL**



Alabama Statewide
Pavement Management Program Update
Enterprise Municipal (EDN) Airport
Enterprise, AL

Figure B2C

FOD Rating

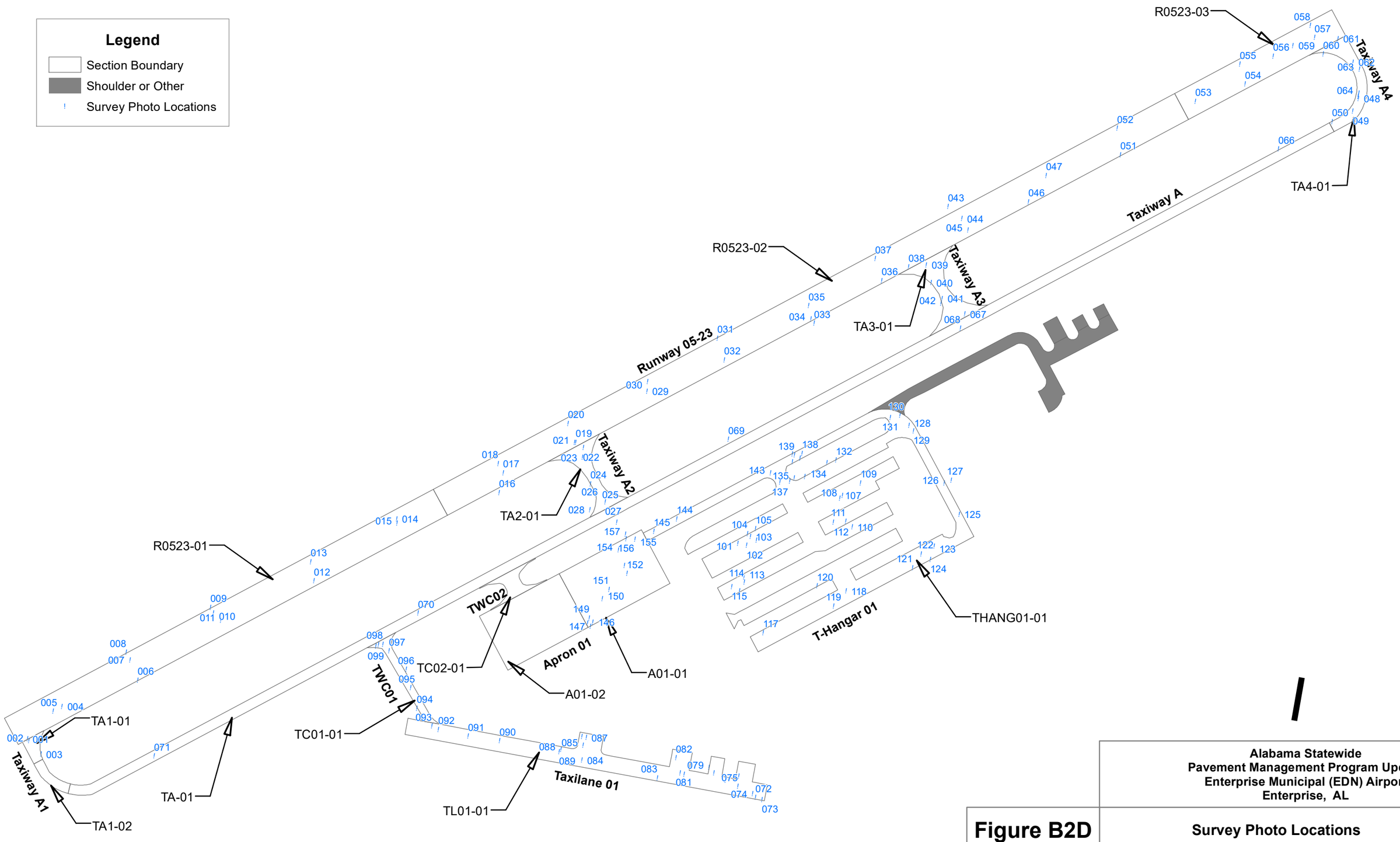
JVIATION ENGINEERING & PLANNING

All About Pavements, Inc. (API)
www.allaboutpavements.com
Telephone: 217-586-2765 FAX: 217 586-1967

ENGINEER	DATE	MAP NUMBER
KP/MR	July 2021	Page 9
REVISED	SCALE	
JMA	1 in = 300 ft	**FINAL**

Legend

- Section Boundary
- Shoulder or Other
- Survey Photo Locations



Alabama Statewide
Pavement Management Program Update
Enterprise Municipal (EDN) Airport
Enterprise, AL

Figure B2D

Survey Photo Locations

All About Pavements, Inc. (API)
www.allaboutpavements.com
Telephone: 217-586-2765 FAX: 217 586-1967

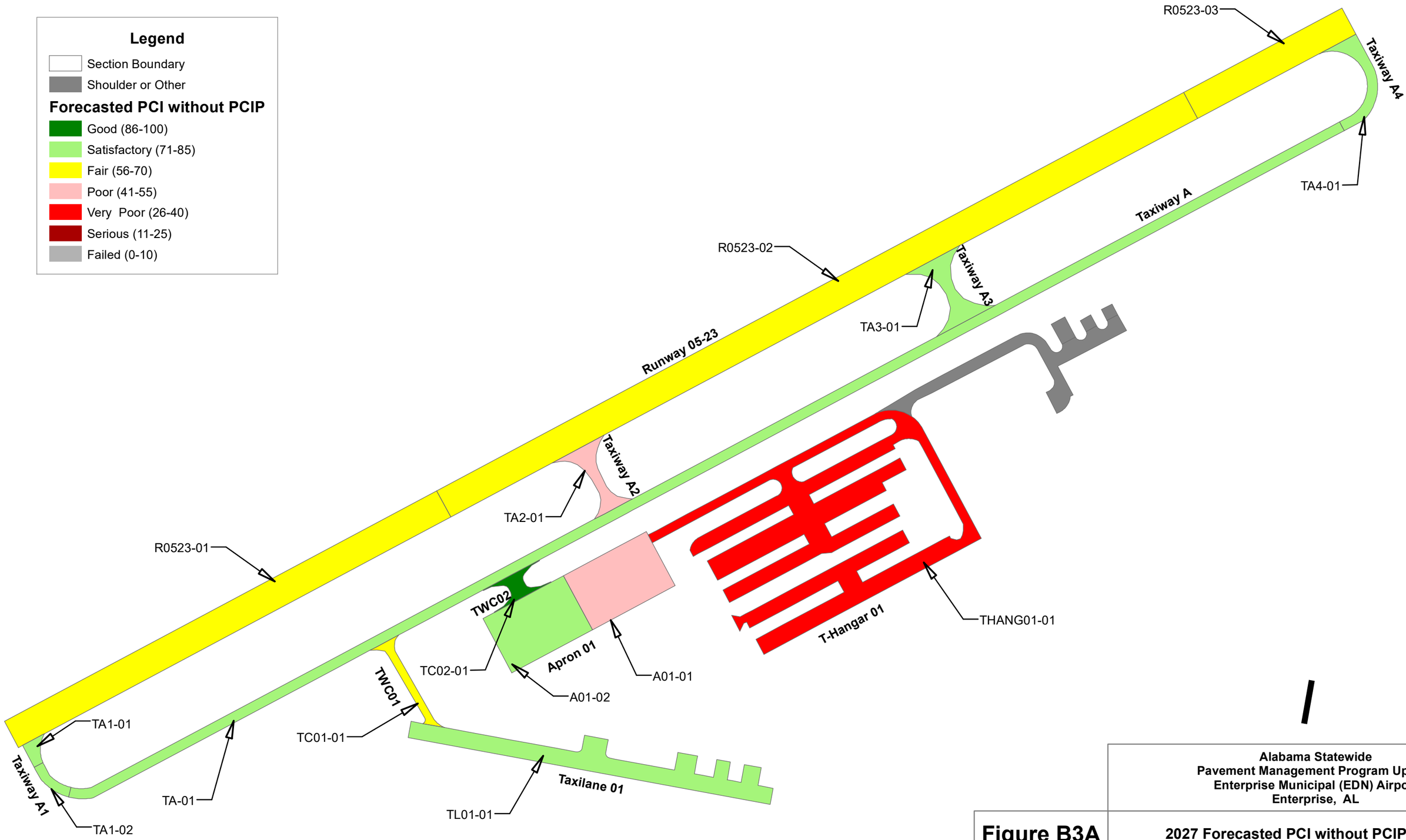
ENGINEER	DATE	MAP NUMBER
KP/MR	July 2021	Page 10
REVISED	SCALE	
JMA	1 in = 300 ft	**FINAL**

Legend

- Section Boundary
- 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)



Alabama Statewide
Pavement Management Program Update
Enterprise Municipal (EDN) Airport
Enterprise, AL

Figure B3A

2027 Forecasted PCI without PCIP

All About Pavements, Inc. (API)
www.allaboutpavements.com
Telephone: 217-586-2765 FAX: 217 586-1967

ENGINEER	DATE	MAP NUMBER
KP/MR	July 2021	Page 11
REVISED	SCALE	
JMA	1 in = 300 ft	**FINAL**

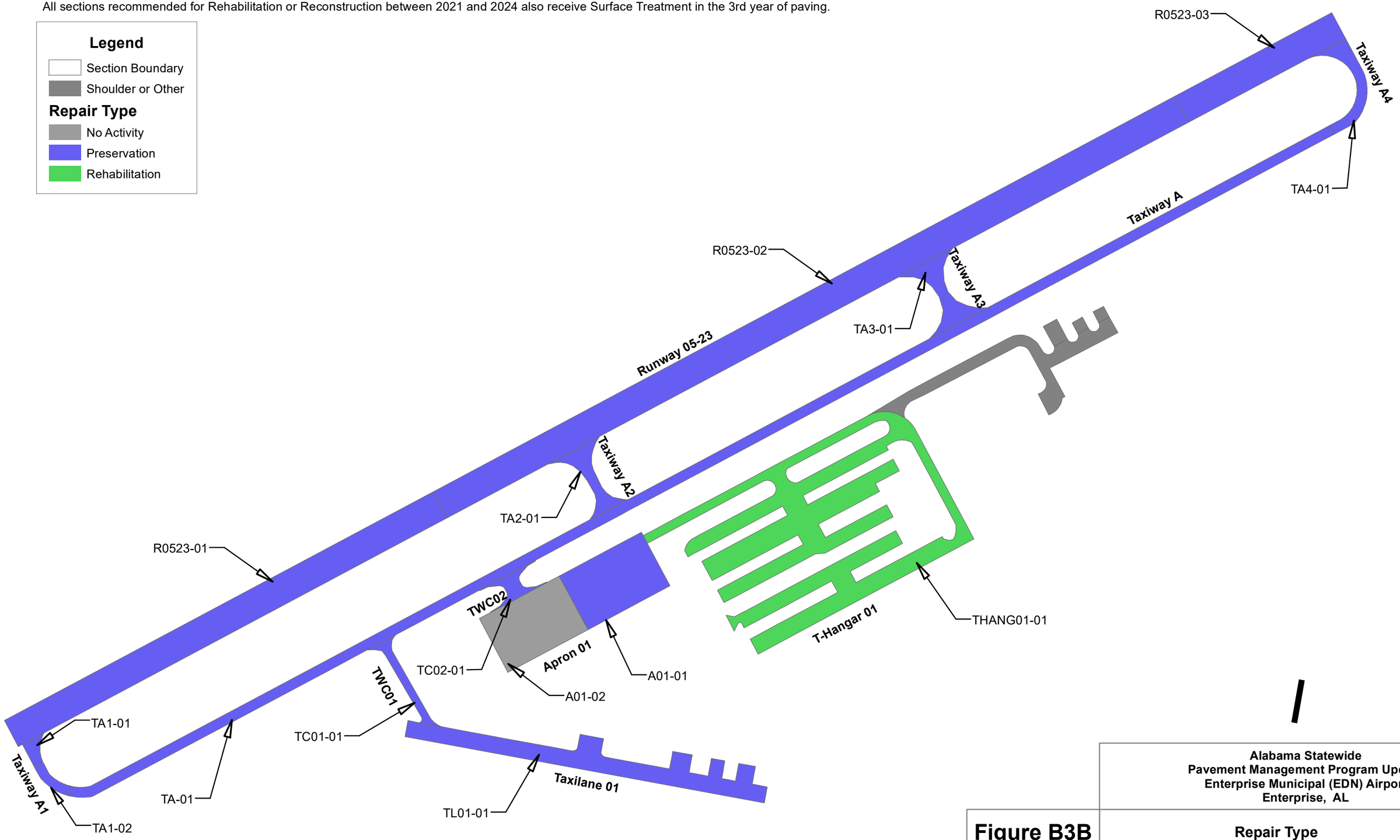
All sections recommended for Rehabilitation or Reconstruction between 2021 and 2024 also receive Surface Treatment in the 3rd year of paving.

Legend

- Section Boundary
- Shoulder or Other

Repair Type

- No Activity
- Preservation
- Rehabilitation



Alabama Statewide
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Enterprise Municipal (EDN) Airport
Enterprise, AL

Figure B3B

Repair Type

All About Pavements, Inc. (API)
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Telephone: 217-586-2765 FAX: 217 586-1967

ENGINEER	DATE	MAP NUMBER
KP/MR	July 2021	Page 12
REVISED	SCALE	
JMA	1 in = 300 ft	**FINAL**

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

- EDN_21-01_Runway 05-23 Preservation
- EDN_21-02_Taxilane Preservation
- EDN_22-01_Apron 01 Surface Treatment
- EDN_23-01_Taxiway A Preservation
- EDN_23-02_Taxiway Hangar Rehabilitation
- No Project

M&R Activity

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

R0523-03
Taxiway A4
TA4-01
Taxiway A
R0523-02
Taxiway A3
TA3-01
Runway 05-23
Taxiway A2
TA2-01
R0523-01
TWC02
Apron 01
TC02-01
A01-01
A01-02
T-Hangar 01
THANG01-01
TWC01
TC01-01
TA1-01
Taxiway A1
TA1-02
TA-01
Taxilane 01
TL01-01

Alabama Statewide
Pavement Management Program Update
Enterprise Municipal (EDN) Airport
Enterprise, AL

Figure B3C

PCIP Recommendations

All About Pavements, Inc. (API)
www.allaboutpavements.com
Telephone: 217-586-2765 FAX: 217 586-1967

ENGINEER	DATE	MAP NUMBER
KP/MR	February 2022	Page 13
REVISED	SCALE	
JMA	1 in = 300 ft	**FINAL**

APPENDIX C

OVERVIEW OF PAVEMENT DISTRESSES

1. Alligator Cracking (AC)

2. Bleeding (AC)

3. Block Cracking (AC)

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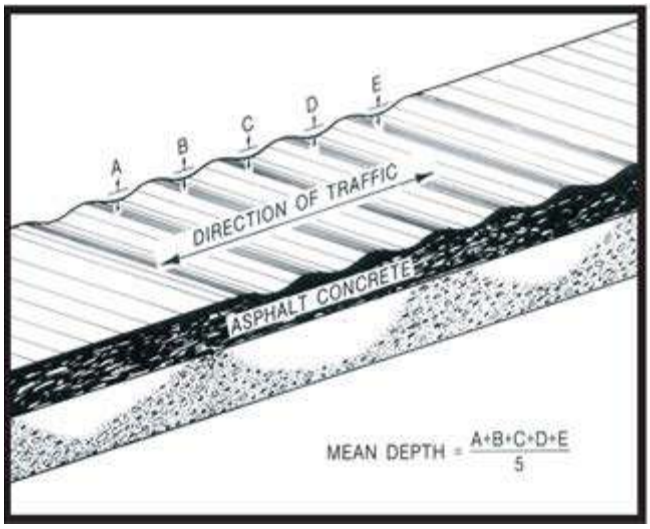
-

4. Corrugation (AC)

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



_____

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CAP

7. Joint Reflection Cracking (AC)

_____

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_____

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48 M

9. Oil Spillage (AC)

_____

_____

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-

10. Patching

_____

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-
-

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-
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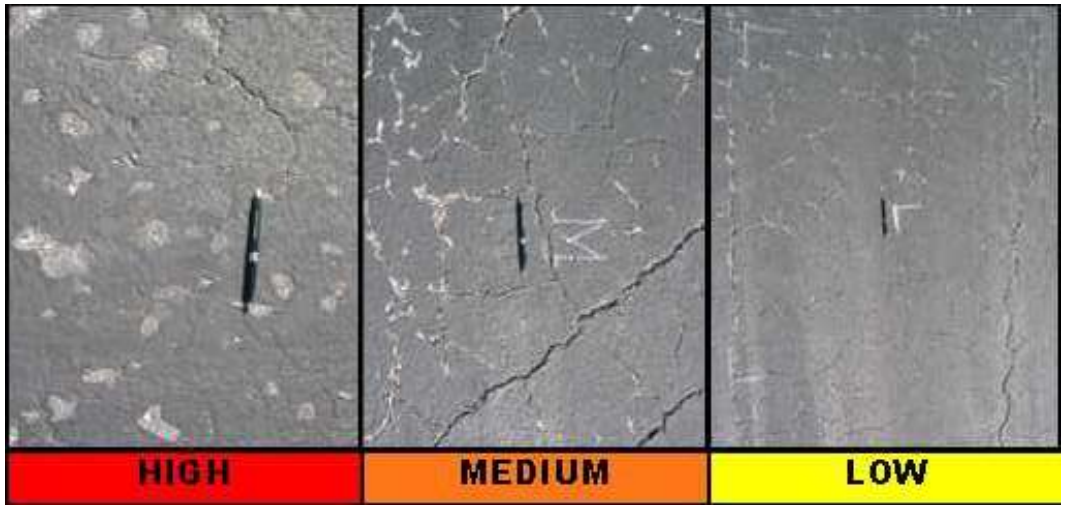
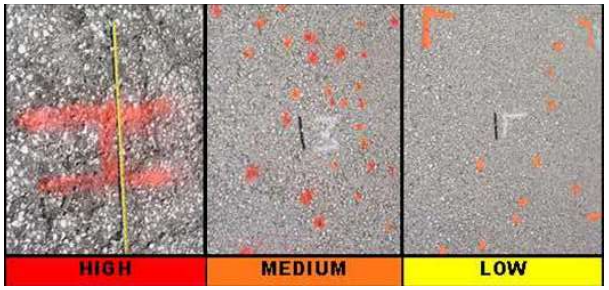
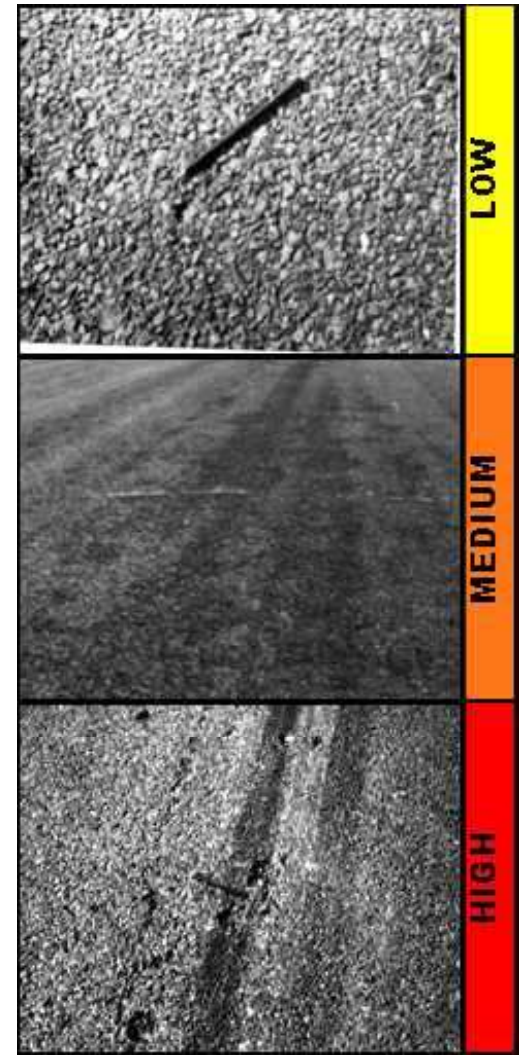
11. Polished Aggregate (AC)

12. Raveling (AC)


HIGH
MEDIUM
LOW


HIGH
MEDIUM
LOW


LOW
MEDIUM
HIGH

13. Rutting (AC)

from the direction of traffic. They are produced when braking or turning wheels cause the

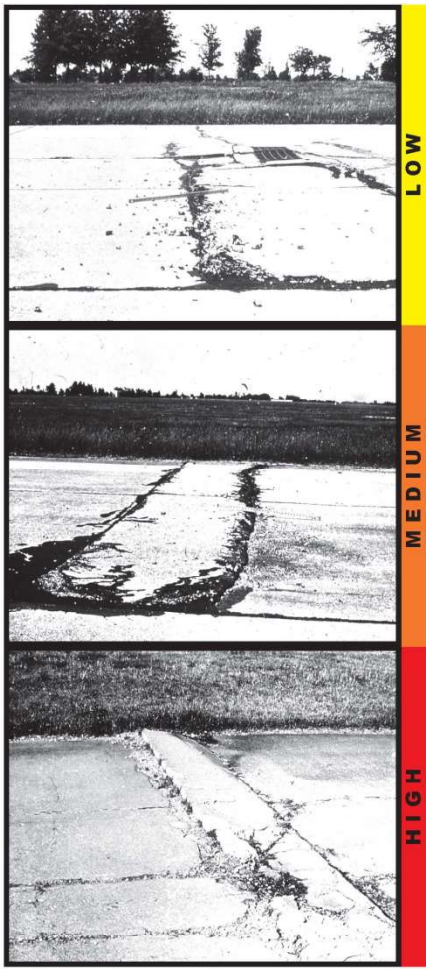
_____ No degrees of severity are defined. It is sufficient to indicate that a slippage

_____

- ♦
- ♦

15. Swelling (AC)

16. Weathering (AC)

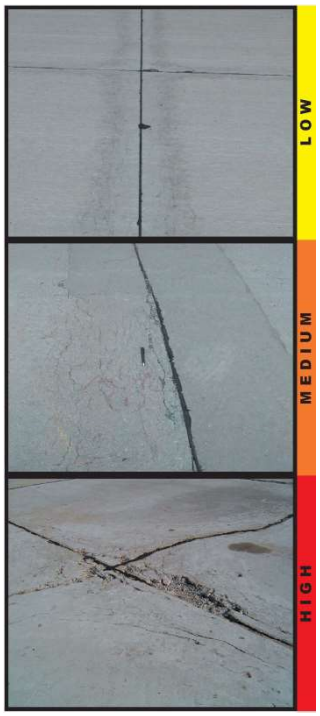

LOW
MEDIUM
HIGH

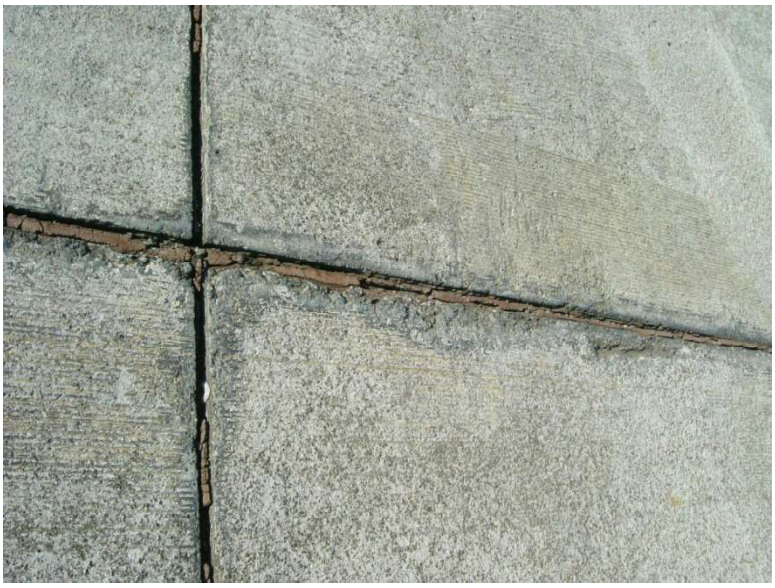
- filled, it has a mean width less than approximately 1 inch (3 millimeters); a filled crack can be of any width, but the filler material

- One of the following conditions exists: (1) filled or non filled c 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

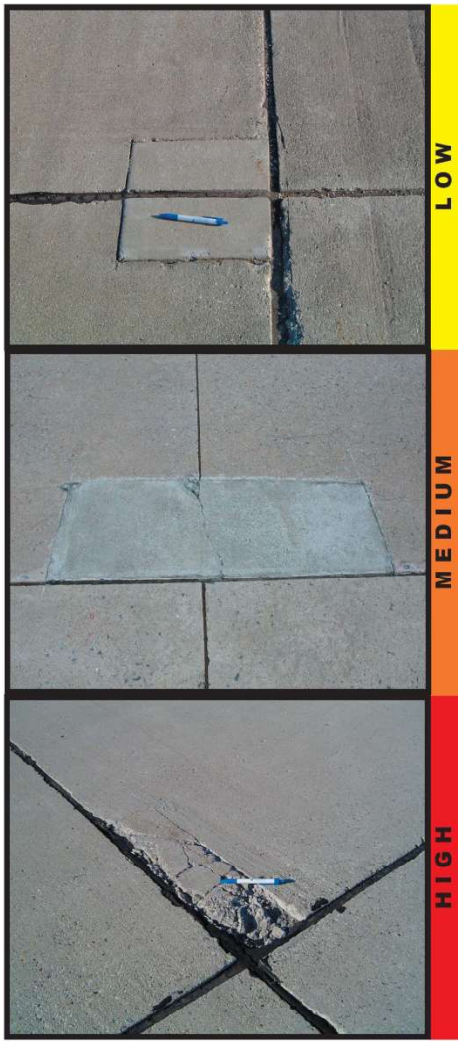
- One of the following conditions exists: (1) filled or non filled crack is severely spalled, causing definite FOD potential; (2) a non filled crack ha

parallel to a joint or linear crack. A dark coloring can usually be seen around the fine





has been removed and replaced by a filler



Patching is the same as defined

No degrees of severity are defined for popouts.

of approximately 1⁄4 to 1⁄2 in

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

-
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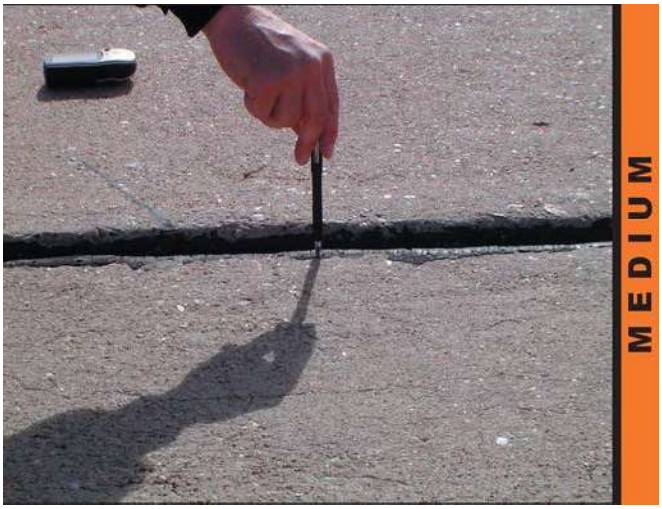
-



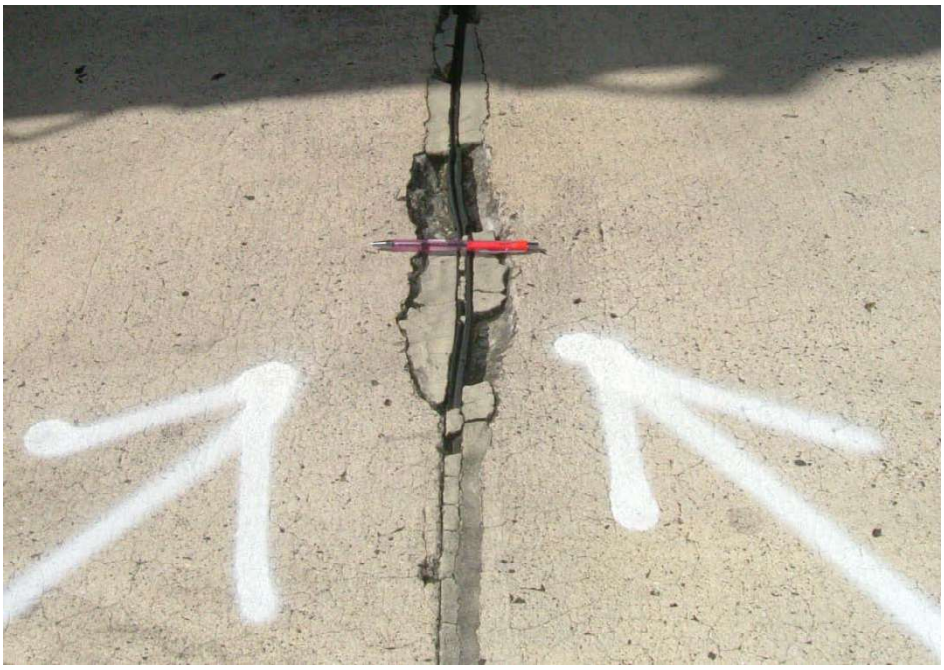
severity level of this distress type, as defined below,

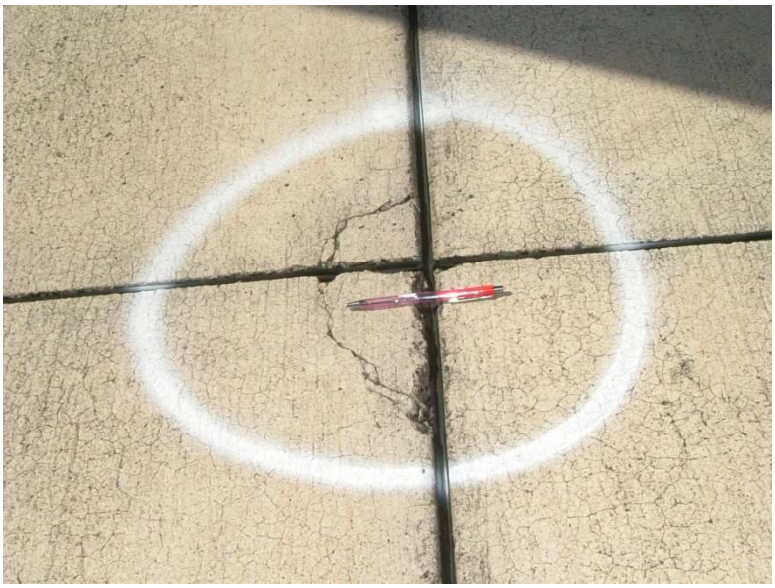
- Slab is broken into four or five pieces with the vast majority of the cracks
- (1) Slab is broken into four or five pieces with over 15 percent of the
- four or five pieces with some or all of the cracks of high severity; (2) slab is

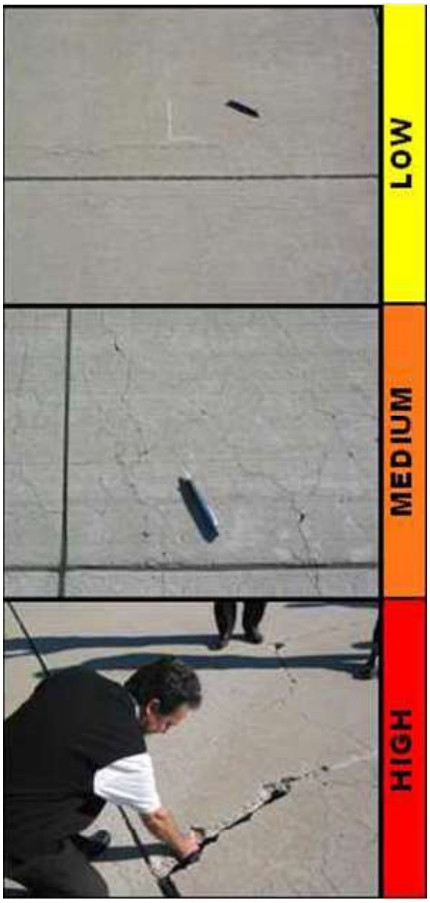
---

-
-
-

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






LOW
MEDIUM
HIGH

APPENDIX D

DETAILED PAVEMENT CONDITION DATA

APPENDIX E

DISTRESS SUMMARY REPORT

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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

Enterprise Municipal Airport (EDN)

Branch ID	Section ID	Forecasted PCI						
		2021	2022	2023	2024	2025	2026	2027
A01	01	98	95	93	91	89	87	84
A01	02	98	96	93	91	89	87	85
R0523	01	85	81	77	74	71	70	70
R0523	02	77	74	72	70	70	70	68
R0523	03	85	81	77	74	71	70	70
TA	01	96	94	92	89	87	84	82
TA1	01	88	85	83	81	79	77	75
TA1	02	98	96	94	92	89	86	84
TA2	01	66	62	57	52	48	45	43
TA3	01	95	93	90	87	85	82	80
TA4	01	87	84	82	80	78	76	74
TC01	01	80	78	76	73	71	68	64
TC02	01	99	98	96	94	92	89	86
THANG01	01	56	52	47	45	42	39	35
TL01	01	84	82	80	78	76	73	71

Pavement Database: ALDOT_220316

Pavement Database: ALDOT_220316

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 RSMeans, 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.

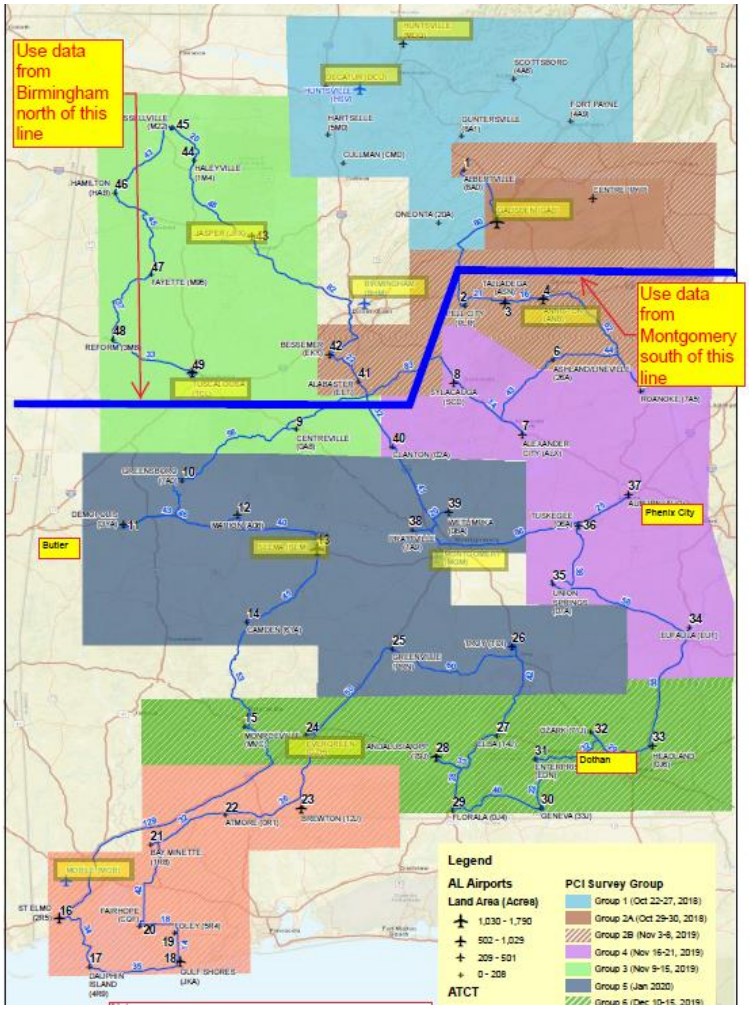

Figure 1: RSMeans Unit Costs Locations.

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

[1]For 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 RSMeans 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
	Gadsen	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

Enterprise Municipal Airport (EDN)

Branch & Section	2021	2022	2023	2024	2025	2026	2027
A01-01	Preventive $159.92 Before:97.6 After:97.6	Preventive $316.34 Before:95.39 After:95.39	Preventive $482 Before:93.18 After:93.18	Preventive $657.31 Before:90.97 After:90.97	Preventive $842.71 Before:88.76 After:88.76	Preventive $1039.34 Before:86.55	Preventive $1246.29 Before:84.34
R0523-01	Preventive + Required Project Global MR $98480.68 Before:83.51 After:90.36	Preventive $2219.92 Before:87.22 After:87.22	Preventive $2948.4 Before:83.52 After:83.52	Preventive $3758.79 Before:79.56 After:79.56	Preventive $4516.82 Before:75.82 After:75.82	Preventive $5196.1 Before:72.76 After:72.76	Preventive $5719.88 Before:70.75 After:70.75
R0523-02	Preventive + Required Project Global MR $172162.93 Before:76.08 After:83.8	Preventive $6037.95 Before:79.86 After:79.86	Preventive $7280.89 Before:76.08 After:76.08	Preventive $8404.9 Before:72.95 After:72.95	Preventive $9279.88 Before:70.86 After:70.86	StopGap $3404.02 Before:69.92 After:69.92	StopGap $3550.4 Before:69.79 After:69.79
R0523-03	Preventive + Required Project Global MR $36109.58 Before:83.51 After:90.36	Preventive $813.97 Before:87.22 After:87.22	Preventive $1081.08 Before:83.52 After:83.52	Preventive $1378.22 Before:79.56 After:79.56	Preventive $1656.17 Before:75.82 After:75.82	Preventive $1905.24 Before:72.76 After:72.76	Preventive $2097.29 Before:70.75 After:70.75

Appendix I1

PCIP Summary

Enterprise Municipal Airport (EDN)

Branch & Section	2021	2022	2023	2024	2025	2026	2027
TA-01	Preventive $750.01 Before:95.55 After:95.55	Preventive $1146.15 Before:93.39 After:93.39	Preventive + Required Project Global MR $154845.99 Before:90.91 After:97.26	Preventive $821.22 Before:95.54 After:95.54	Preventive $1254.15 Before:93.38 After:93.38	Preventive $1776.19 Before:90.9 After:90.9	Preventive $2359.49 Before:88.26 After:88.26
TA1-01	Preventive + Required Project Global MR $3719.95 Before:86.93 After:94.51	Preventive $34.31 Before:92.17 After:92.17	Preventive $46.99 Before:89.59 After:89.59	Preventive $60.79 Before:86.93 After:86.93	Preventive $74.89 Before:84.36 After:84.36	Preventive $88.84 Before:81.99 After:81.99	Preventive $102.41 Before:79.83 After:79.83
TA1-02	Preventive $13.94 Before:97.12 After:97.12	Preventive $23.11 Before:95.36 After:95.36	Preventive + Required Project Global MR $4438.6 Before:93.17 After:98.43	Preventive $15.24 Before:97.12 After:97.12	Preventive $25.25 Before:95.36 After:95.36	Preventive $38.3 Before:93.17 After:93.17	Preventive $53.89 Before:90.67 After:90.67
TA2-01	StopGap + Required Project Global MR $13763.44 Before:64.57 After:73.77	Preventive $451.23 Before:71.31 After:71.31	StopGap $195.05 Before:68.29 After:68.29	StopGap $264.7 Before:64.57 After:64.57	StopGap $350.4 Before:60.17 After:60.17	StopGap $442 Before:55.29 After:55.29	StopGap $537.76 Before:50.45 After:50.45

Appendix I1

PCIP Summary

Enterprise Municipal Airport (EDN)

Branch & Section	2021	2022	2023	2024	2025	2026	2027
TA3-01	Preventive + Required Project Global MR $17754.67 Before:94.04 After:98.84	Preventive $48.89 Before:97.68 After:97.68	Preventive $84.72 Before:96.1 After:96.1	Preventive $133.23 Before:94.05 After:94.05	Preventive $192.33 Before:91.65 After:91.65	Preventive $260.25 Before:89.04 After:89.04	Preventive $332.52 Before:86.4 After:86.4
TA4-01	Preventive + Required Project Global MR $14063.25 Before:85.93 After:93.65	Preventive $145.65 Before:91.2 After:91.2	Preventive $194.81 Before:88.57 After:88.57	Preventive $247.1 Before:85.93 After:85.93	Preventive $299.73 Before:83.43 Afterf8A 3	3	