

# MADRAS MUNICIPAL AIRPORT

This report describes how your Pavement Maintenance Management Program (PMMP) was developed. Your Program was developed as part of the Oregon Continuous Aviation System Plan sponsored in part by the Oregon Department of Aviation and the Federal Aviation Administration (FAA). The information and data contained in this report ensures you comply with the requirements of FAA Grant Assurance Number 11 which states that any airport requesting federal funds for pavement improvement projects must have implemented a pavement maintenance management program.

## DATA COLLECTION

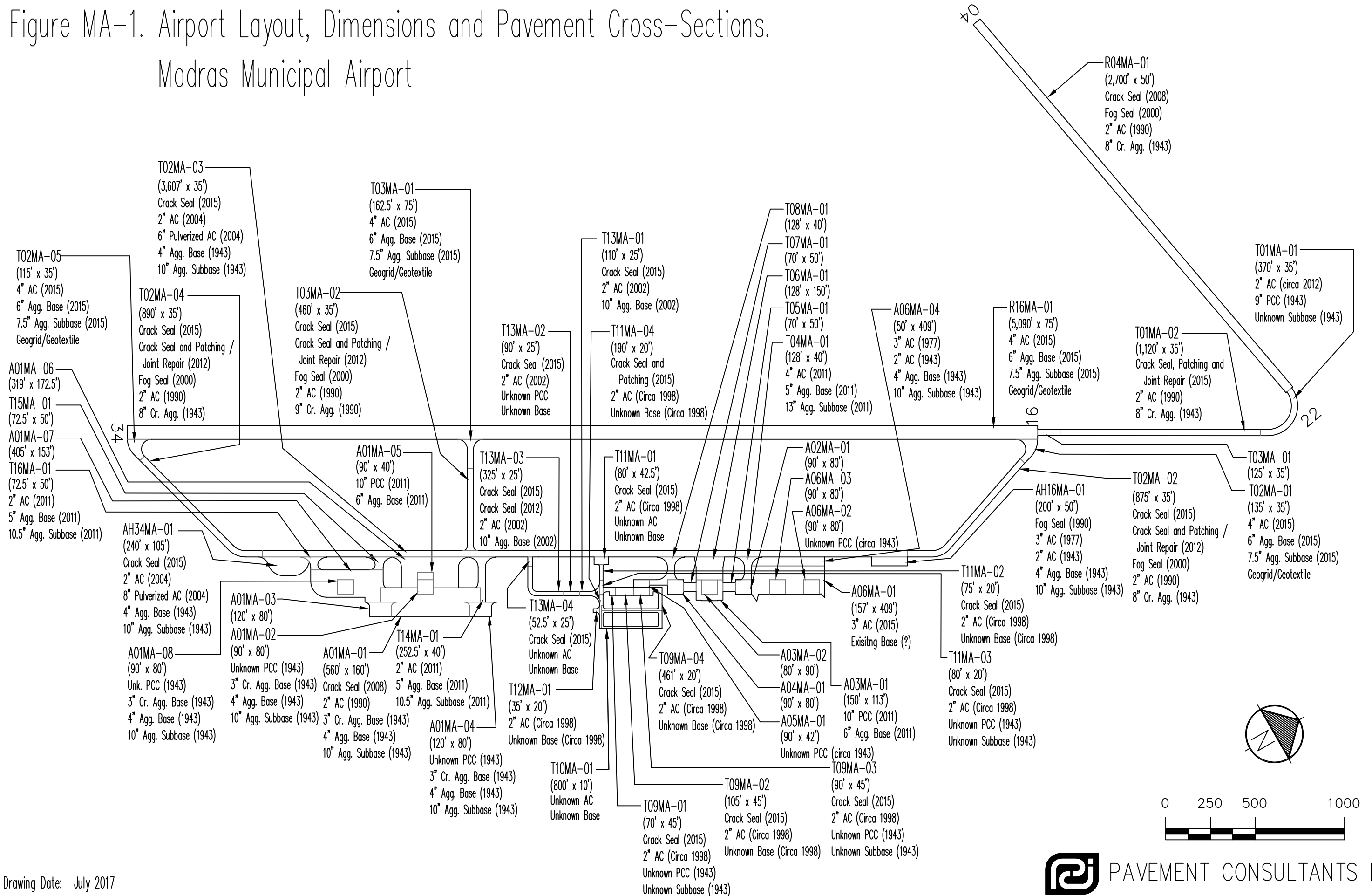
To determine how your pavements were constructed and their age, a records review was conducted. Figure MA-1 shows the records review results. This figure identifies pavement boundaries, dimensions, pavement layer types, thicknesses and dates of construction. The most recent construction date for each pavement can also be found in the Section Condition Report in Appendix 2. Figure MA-1 and the information contained in Appendices 1, 2 and 4 ensure that your airport complies with the “pavement inventory” requirement of FAA’s PMMP guidelines.

The pavements at your airport were divided into branches, sections and sample units in accordance with the methodology outlined in the current edition of ASTM D5430, *Standard Test Method for Airport Condition Index Surveys*. The branches, sections and sample units established at your airport are shown in Figure MA-2. A Branch Condition Report showing all branches, their associated areas, and their area-weighted average condition is provided in Appendix 1. Additionally, the Appendix 2 Section Condition Report provides information used to define each branch and section in the PAVER database.

Using the branch, section and sample unit divisions established, a visual condition survey was conducted at Madras Municipal Airport in June 2017. During the inspection, pavement defects were identified and measured in accordance with the methodology outlined in ASTM D5430. This inspection ensures your airport complies with the “detailed inspection” requirement of FAA’s PMMP guidelines. After collection, the data were entered into the PAVER software for analysis. These data are reproduced in the Re-Inspection Report attached as Appendix 4.

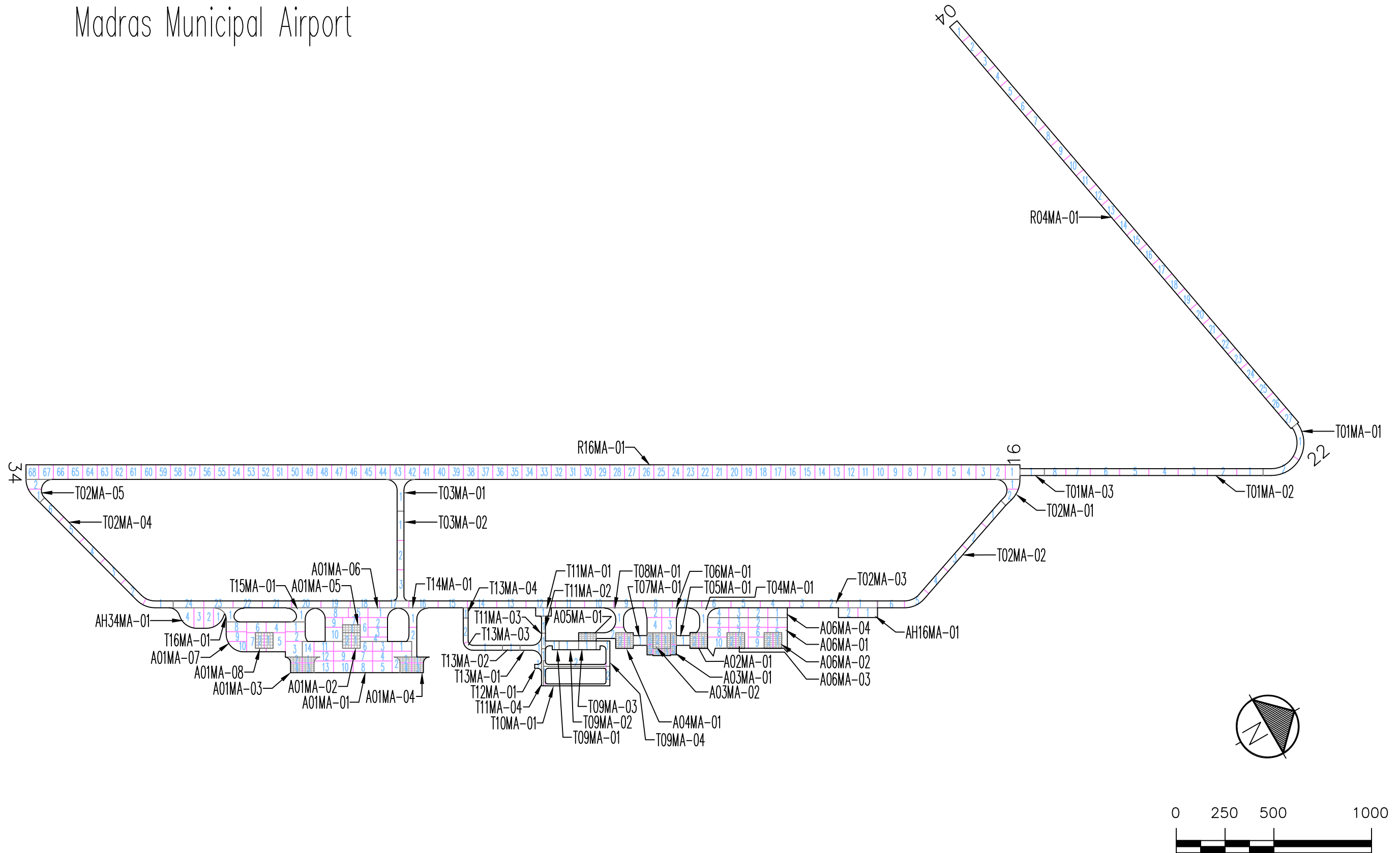
The PAVER database updated during this project ensures your airport complies with the “record keeping and information retrieval” requirements of FAA’s PMMP guidelines.

Figure MA-1. Airport Layout, Dimensions and Pavement Cross-Sections.  
 Madras Municipal Airport



Drawing Date: July 2017

Figure MA-2. Pavement Branch, Section and Sample Unit Layout.  
 Madras Municipal Airport



## RESULTS

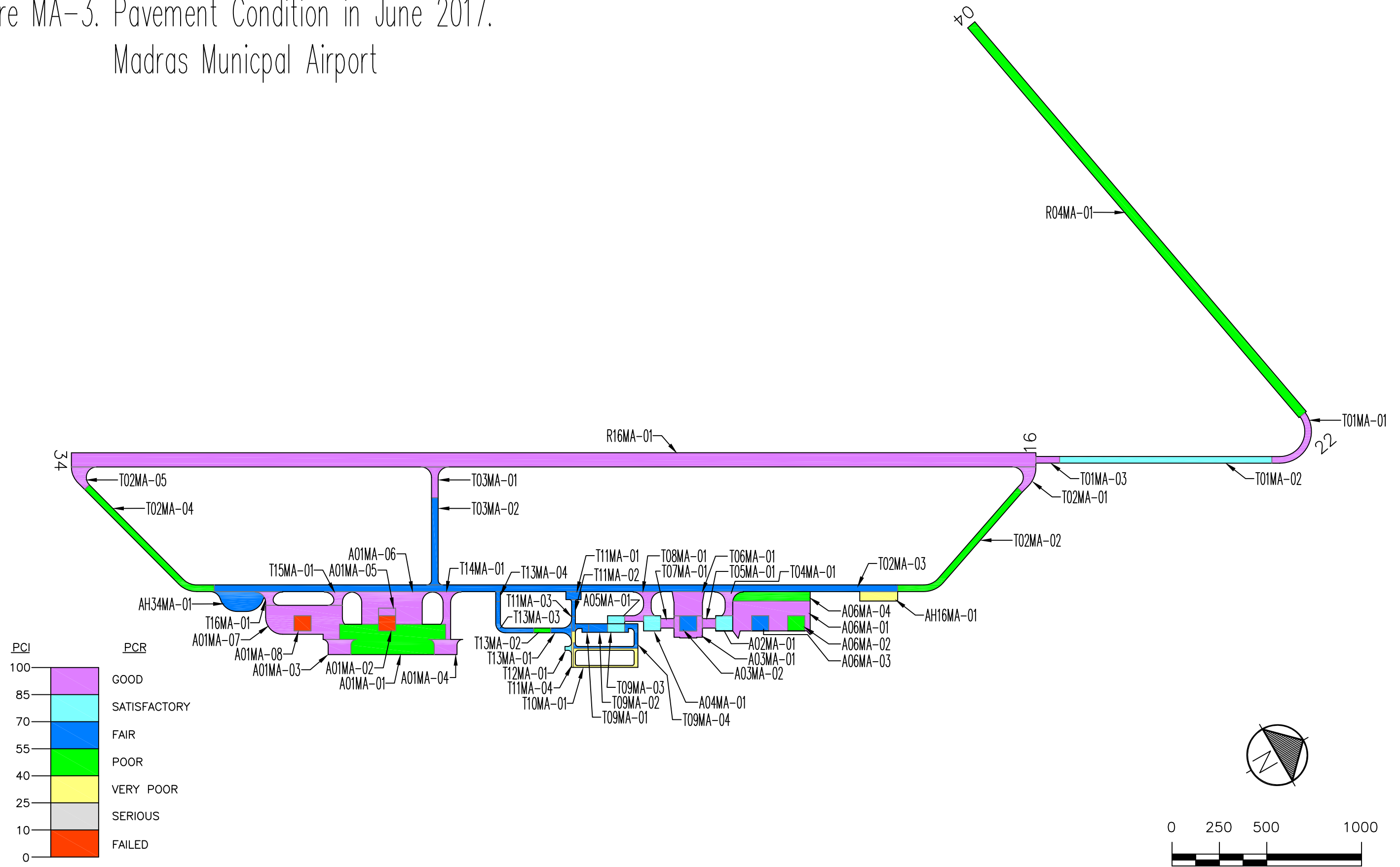
Using the data collected during the visual inspection, the PAVER software was used to calculate an area-weighted average Pavement Condition Index (PCI) for each pavement section inspected using the sample units evaluated. Using each section's PCI, a Pavement Condition Rating (PCR) was assigned. The PCIs measured during this inspection are shown in Table 1. The table also contains PCIs from past inspections as well as projected PCIs for 2022 and 2025. The projections were based on pavement deterioration models developed by PAVER using the inspection data from other pavements in the same airport category as your airport, located in the same climatic region, and with the same surface type and use.

The Branch Condition Report in Appendix 1 summarizes current pavement condition by branch while the Section Condition Report in Appendix 2 lists pavement condition by section. The current Pavement Condition Rating (PCR) is shown graphically in Figure MA-3.

**Table 1. Past, Present and Future Pavement Condition Indices.**

Branch	Section	Inspections			Forecast	
		2011	2014	2017	2022	2027
A01MA	01	37	50	50	49	49
A01MA	02	2	0	3	3	3
A01MA	03	66	83	95	78	67
A01MA	04	41	68	86	72	63
A01MA	05	---	97	100	82	69
A01MA	06	---	100	100	91	80
A01MA	07	---	100	96	83	75
A01MA	08	---	0	0	0	0
A02MA	01	---	55	74	64	57
A03MA	01	---	97	97	80	68
A03MA	02	---	52	64	57	53
A04MA	01	---	42	75	65	58
A05MA	01	---	41	76	65	58
A06MA	01	---	---	100	91	80
A06MA	02	---	---	50	50	49
A06MA	03	---	---	57	53	51
A06MA	04	---	---	43	36	30
AH16MA	01	21	37	37	31	27
AH34MA	01	78	83	69	63	56
R04MA	01	27	42	53	46	44
R16MA	01	---	---	100	87	82
T01MA	01	---	100	100	86	77
T01MA	02	33	72	76	70	67
T01MA	03	---	---	100	90	80

Figure MA-3. Pavement Condition in June 2017.  
 Madras Municipal Airport



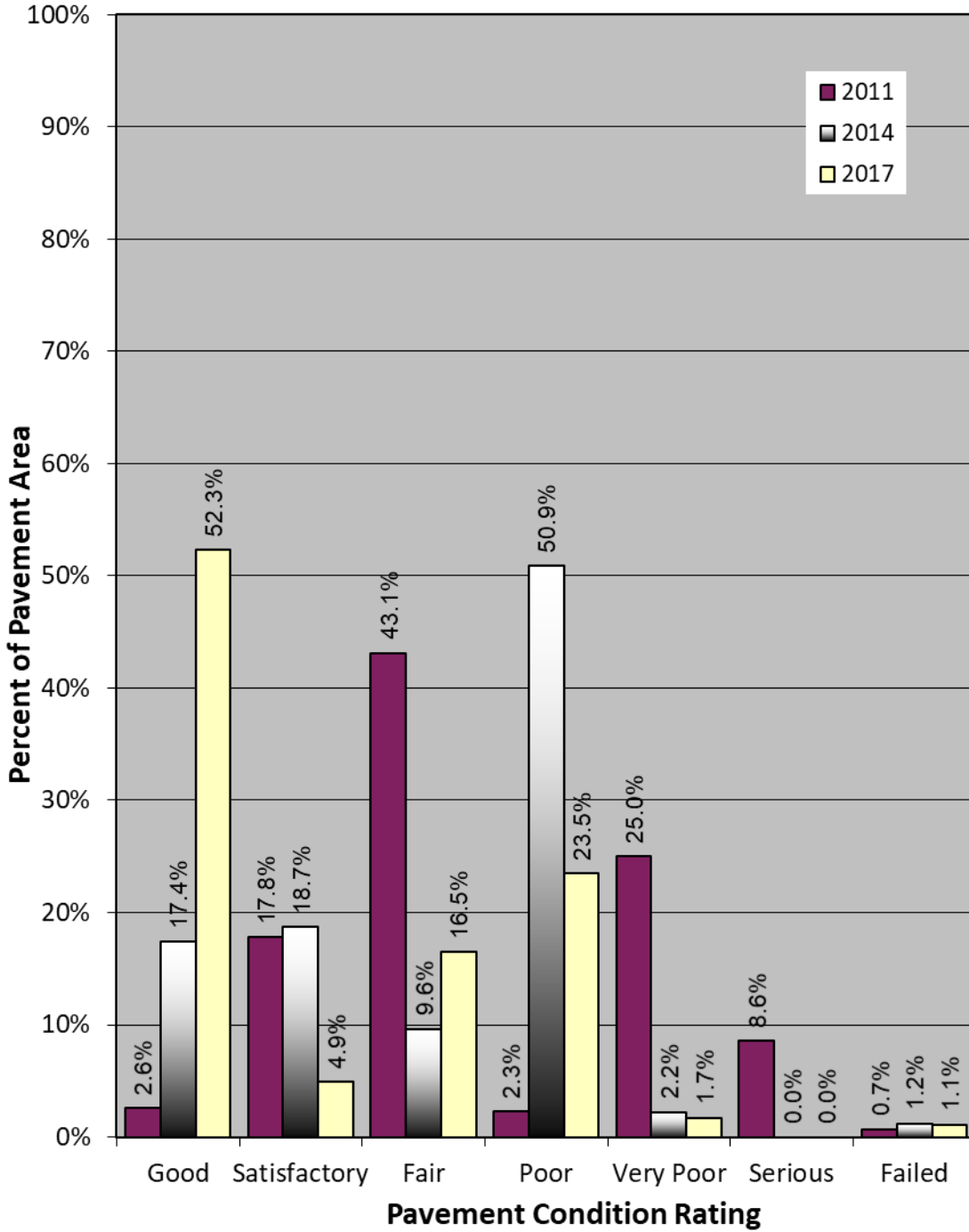
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**Table 1. Past, Present and Future Pavement Condition Indices.**

Branch	Section	Inspections			Forecast	
		2011	2014	2017	2022	2027
T02MA	01	---	---	100	90	80
T02MA	02	57	60	42	14	0
T02MA	03	82	85	59	53	36
T02MA	04	57	63	42	14	0
T02MA	05	---	---	100	90	80
T03MA	01	---	---	100	90	80
T03MA	02	73	69	67	66	66
T04MA	01	---	100	95	84	75
T05MA	01	100	100	98	88	78
T06MA	01	100	100	99	89	79
T07MA	01	100	100	98	88	78
T08MA	01	100	100	100	90	80
T09MA	01	75	80	70	69	67
T09MA	02	86	72	70	67	66
T09MA	03	59	75	75	71	69
T09MA	04	79	86	70	67	66
T10MA	01	40	26	29	0	0
T11MA	01	54	56	61	53	49
T11MA	02	81	81	65	64	63
T11MA	03	74	66	70	69	67
T11MA	04	90	65	36	6	0
T12MA	01	94	94	82	74	68
T13MA	01	79	76	63	62	60
T13MA	02	86	76	54	53	51
T13MA	03	93	89	68	66	66
T13MA	04	27	56	60	56	44
T14MA	01	100	100	100	90	80
T15MA	01	100	100	100	90	80
T16MA	01	100	100	100	90	80

Section PCIs at Madras Municipal Airport range from a low of 0 (a PCR of “Failed”) to a high of 100 (a PCR of “Good”). The area-weighted average PCI for all airport pavements is 78, corresponding to an overall PCR of “Satisfactory”. Figure MA-4 shows how much pavement area is associated with each Pavement Condition Rating category and also shows pavement condition distribution from the inspections conducted in 2011 and 2014.

**Figure MA-4. Distribution of Pavement Condition  
Madras Municipal Airport**



The primary distresses observed during the inspection of asphalt concrete pavements were: weathering, longitudinal and transverse cracking, patching, block cracking, alligator cracking, joint reflection cracking, and oil spills. The primary distresses observed during the inspection of portland cement concrete pavements were: joint spalls, joint seal damage, scaling, corner spalls, linear cracks, shattered slabs and small patches.

A graphical representation of the projected PCIs listed in Table 1 is shown in Figure MA-5.

## RECOMMENDATIONS

Data collected during the visual condition survey were used by the PAVER software to generate the Network Maintenance Report contained in Appendix 3. This report identifies, for each pavement section, the recommended localized maintenance activities (i.e.-crack sealing, patching) that should be completed to repair the defects observed during the visual inspection. The repair quantities identified in the report were extrapolated to cover the entire pavement section, based on the distresses measured in the inspected sample units. If the repair activities identified are completed, the pavement deterioration rate will be slowed.

The recommended localized maintenance activities to be applied are selected by the PAVER software based on a Distress Maintenance Policy established for the Oregon airport system. The report results indicate that, over your entire airport, the following quantities of localized maintenance are needed:

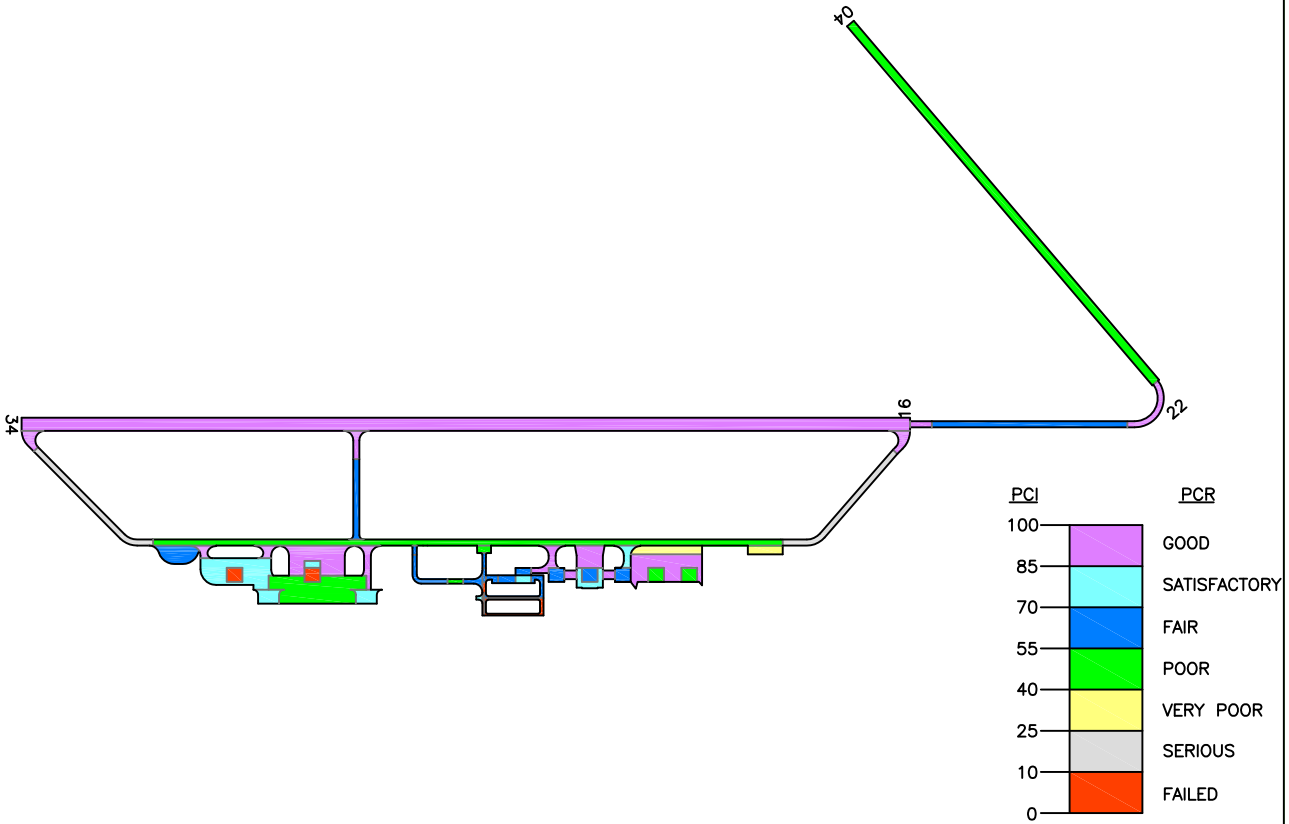
- 32,552 linear feet of asphalt concrete crack sealing
- 54 linear feet of asphalt concrete wide crack repair
- 603 square feet of deep (full-depth) asphalt concrete patching
- 450 linear feet of portland cement concrete crack sealing
- 5,288 square feet of portland cement concrete full depth patching
- 47 square feet of portland cement concrete partial depth patching

The PAVER software can also identify and schedule recommended global (applied over an entire section) maintenance activities such as fog seals, slurry seals and other surface treatments, as well as major rehabilitation activities such as asphalt concrete overlays and complete reconstruction. PAVER schedules global maintenance on a user-defined interval. To schedule major rehabilitation PAVER uses pavement deterioration models developed during this project. These models are used to estimate future pavement condition and to schedule rehabilitation based on a trigger PCI.

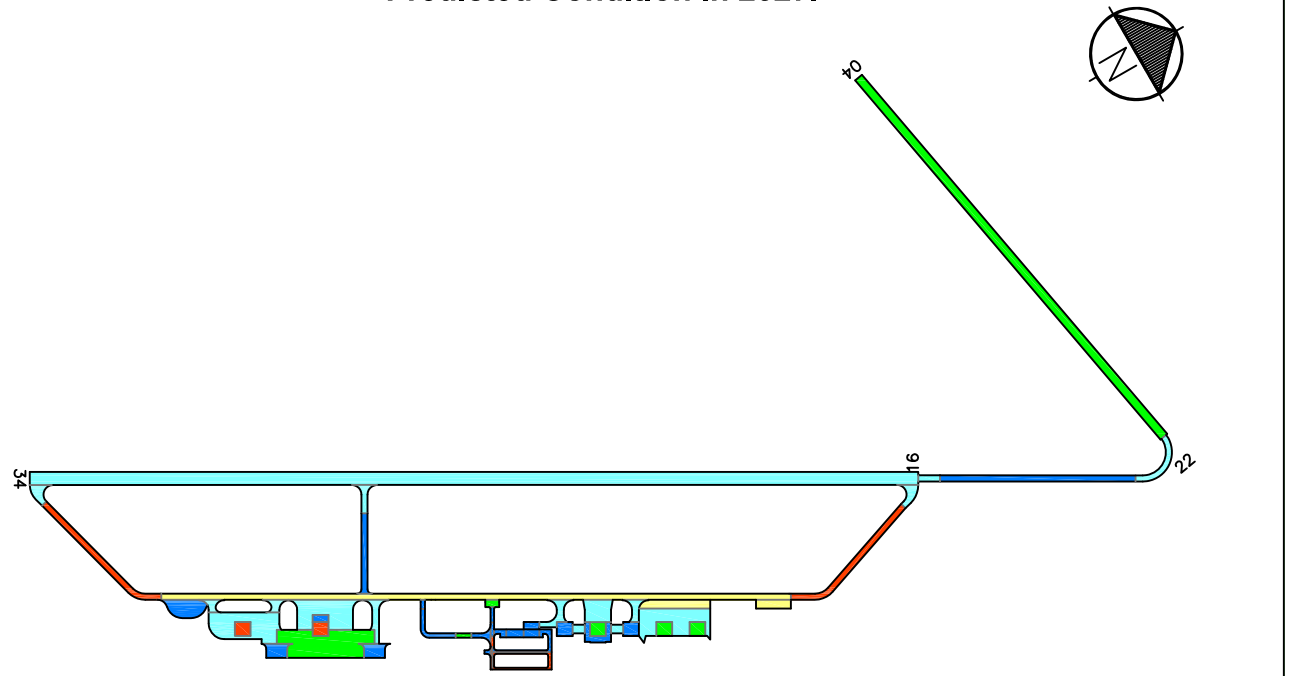
During this project a 5-year program outlining recommended global maintenance and rehabilitation was developed. The program begins in the year 2018 to allow time for project development. These recommendations are presented in Table 2, which identifies the



**Predicted Condition in 2022.**



**Predicted Condition in 2027.**



Drawing Date: July 2017



**Figure MA-5. Future Pavement Condition.**

pavement section requiring rehabilitation, the year the action should be completed, the type of action, and an associated cost. This information is also presented graphically in Figure MA-6.

**Table 2. Five-Year Global Maintenance and Rehabilitation Plan.**

Year	Branch	Section	Action	Area (sf)	Unit Cost (\$/sf)	Total Cost (\$)
2018	A01MA	01	2" AC Overlay	76,461	\$2.50	\$191,153
2018	A01MA	02	Reconstruct	7,200	\$18.35	\$132,120
2018	A01MA	08	10" PCC over 11" Aggregate Subbase	7,200	\$18.35	\$132,120
2018	A06MA	04	2" AC Overlay	19,823	\$2.50	\$49,558
2018	AH16MA	01	4" AC over 6" Aggregate Base over 7.5" Aggregate Subbase	10,000	\$9.52	\$95,200
2018	AH34MA	01	Slurry Seal	20,720	\$0.31	\$6,423
2018	R04MA	01	2" AC Overlay	134,997	\$2.50	\$337,493
2018	T01MA	02	Slurry Seal	39,200	\$0.31	\$12,152
2018	T02MA	02	4" AC over 6" Aggregate Base over 7.5" Aggregate Subbase	30,530	\$9.52	\$290,646
2018	T02MA	03	Slurry Seal	126,238	\$0.31	\$39,134
2018	T02MA	04	4" AC over 6" Aggregate Base over 7.5" Aggregate Subbase	31,086	\$9.52	\$295,939
2018	T03MA	02	Slurry Seal	16,370	\$0.31	\$5,075
2018	T09MA	01	Slurry Seal	2,535	\$0.31	\$786
2018	T09MA	02	Slurry Seal	4,725	\$0.31	\$1,465
2018	T09MA	03	Slurry Seal	4,050	\$0.31	\$1,255
2018	T09MA	04	Slurry Seal	7,805	\$0.31	\$2,420
2018	T10MA	01	4" AC over 6" Aggregate Base over 7.5" Aggregate Subbase	9,313	\$9.52	\$88,660
2018	T11MA	01	Slurry Seal	3,400	\$0.31	\$1,054
2018	T11MA	02	Slurry Seal	1,543	\$0.31	\$478
2018	T11MA	03	Slurry Seal	1,600	\$0.31	\$496
2018	T11MA	04	4" AC over 6" Aggregate Base over 7.5" Aggregate Subbase	2,500	\$9.52	\$23,800
2018	T12MA	01	Slurry Seal	872	\$0.31	\$270
2018	T13MA	01	Slurry Seal	3,823	\$0.31	\$1,185
2018	T13MA	02	Slurry Seal	2,250	\$0.31	\$697

**Table 2. Five-Year Global Maintenance and Rehabilitation Plan.**

Year	Branch	Section	Action	Area (sf)	Unit Cost (\$/sf)	Total Cost (\$)
2018	T13MA	03	Slurry Seal	8,122	\$0.31	\$2,518
2018	T13MA	04	Slurry Seal	1,313	\$0.31	\$407
2018 Total						\$1,712,502
2020	A01MA	07	Slurry Seal	54,712	\$0.31	\$16,961
2020	T04MA	01	Fog Seal	6,892	\$0.19	\$1,309
2020 Total						\$18,270
2021	R16MA	01	Fog Seal	381,750	\$0.19	\$72,531
2021	T01MA	01	Fog Seal	13,014	\$0.19	\$2,473
2021 Total						\$75,004
2022	T05MA	01	Fog Seal	3,500	\$0.19	\$665
2022	T06MA	01	Fog Seal	19,816	\$0.19	\$3,765
2022	T07MA	01	Fog Seal	3,500	\$0.19	\$665
2022 Total						\$5,095
<b>TOTAL</b>						<b>\$1,810,871</b>

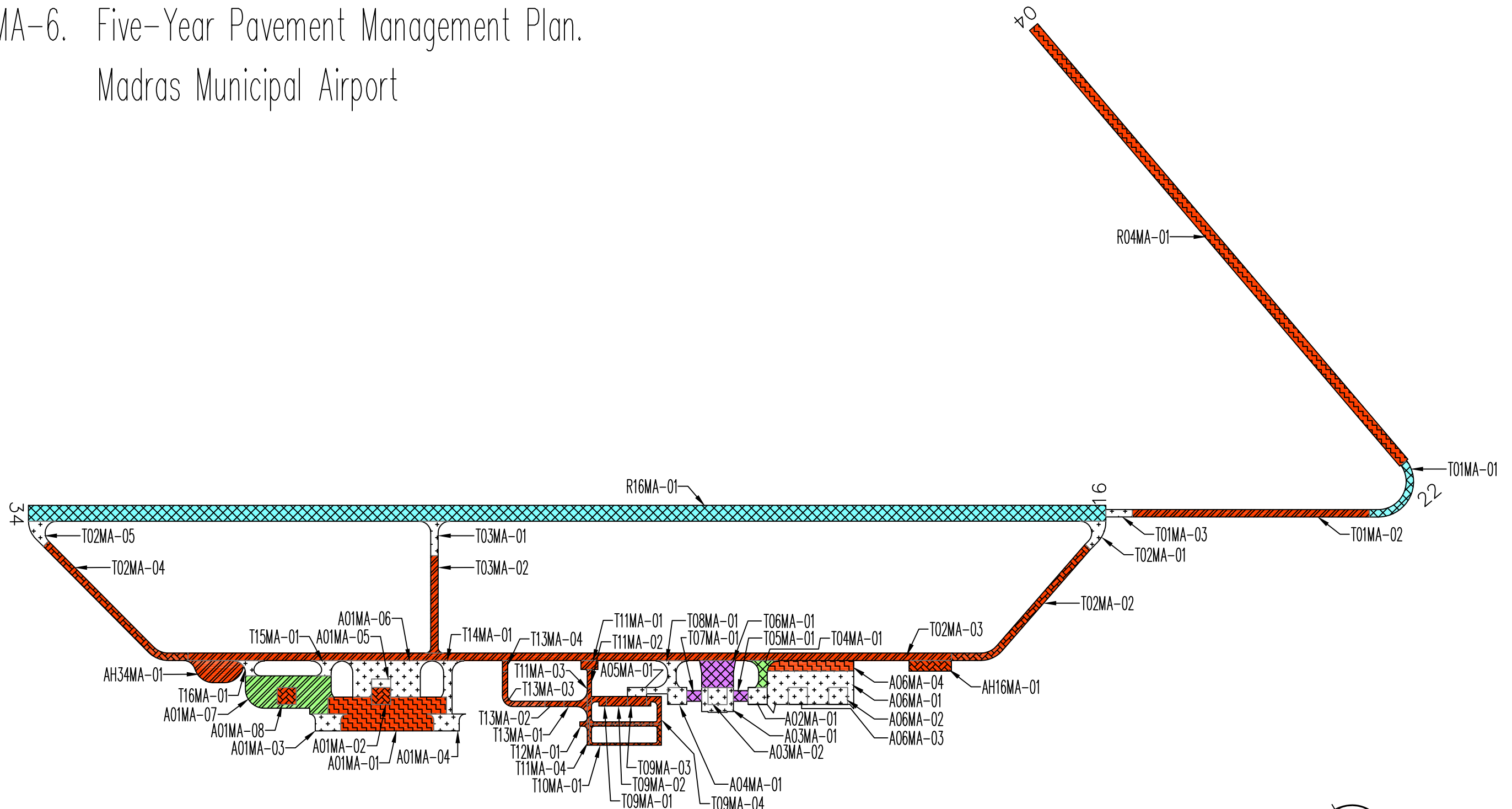
If the global maintenance and/or rehabilitation activities recommended in Table 2 are not completed, the localized maintenance activities identified in the Network Maintenance Report (Appendix 3) for that section should be done. Additionally, for those sections not listed in Table 2 as requiring global maintenance or rehabilitation, the localized maintenance activities outlined in the Network Maintenance Report should be completed. By completing the localized maintenance activities, pavement condition is improved, life is extended, deterioration is slowed and the length of time until major repair or rehabilitation is required is increased.

## **INSPECTION SCHEDULE**

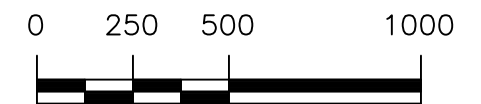
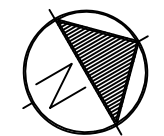
To comply with the inspection schedule requirement of FAA Grant Assurance Number 11, a detailed visual inspection should be conducted every 3 years using the methodology described in ASTM D5430. The next scheduled detailed visual inspection should take place in 2020.

In addition, the FAA requires that a drive-by inspection be conducted monthly to detect unforeseen changes in pavement condition. The results of each drive-by inspection should be recorded and kept in a file. At a minimum, the date of the inspection and an indication of any maintenance performed since the last drive-by inspection should be recorded.

Figure MA-6. Five-Year Pavement Management Plan.  
Madras Municipal Airport



ACTION TIMING		ACTION	
	2018		FOG SEAL
	2019		SLURRY SEAL
	2020		OVERLAY
	2021		RECONSTRUCT
	2022		ROUTINE MAINTENANCE



Drawing Date: July 2017