TWIN BRIDGES AIRPORT

Branch: 51A **APRON** **A-1**

Length: 0 LF **Width:** 0 LF **Area:** 90,000 SF **Last Const. :** 2000 **Family:** 9ACAM
From: ENTIRE APRON **To:** **Surface:** AC

Inspections

Samples Surveyed: 5 **Total Samples:** 18 **Last Inspection Date:** 10/1/2009 **PCI: 48**

Sample # 1 **Area:** 5250 SF

Distress Description	Severity	Quantity
LONGITUDINAL/TRANSVERSE CRACKING	L	681 LF
LONGITUDINAL/TRANSVERSE CRACKING	M	125 LF
WEATHERING/RAVELING	L	158 SF
WEATHERING/RAVELING	M	26 SF
BLEEDING	N	24 SF
SWELLING	L	15 SF
OIL SPILLAGE	N	12 SF
DEPRESSION	L	2 SF

Sample # 3 **Area:** 5250 SF

Distress Description	Severity	Quantity
LONGITUDINAL/TRANSVERSE CRACKING	L	810 LF
LONGITUDINAL/TRANSVERSE CRACKING	M	149 LF
WEATHERING/RAVELING	L	211 SF
WEATHERING/RAVELING	M	77 SF
ALLIGATOR CRACKING	L	53 SF
OIL SPILLAGE	N	21 SF
BLEEDING	N	16 SF
DEPRESSION	L	15 SF
DEPRESSION	H	5 SF

Sample # 5 **Area:** 5250 SF

Distress Description	Severity	Quantity
LONGITUDINAL/TRANSVERSE CRACKING	L	658 LF
LONGITUDINAL/TRANSVERSE CRACKING	M	181 LF
ALLIGATOR CRACKING	L	300 SF
WEATHERING/RAVELING	L	158 SF
WEATHERING/RAVELING	M	41 SF
DEPRESSION	L	14 SF
BLEEDING	N	9 SF
DEPRESSION	H	6 SF
SWELLING	L	6 SF

Sample # 12 **Area:** 5250 SF

Distress Description	Severity	Quantity
LONGITUDINAL/TRANSVERSE CRACKING	L	531 LF
LONGITUDINAL/TRANSVERSE CRACKING	M	60 LF
WEATHERING/RAVELING	L	184 SF
WEATHERING/RAVELING	M	52 SF
BLEEDING	N	17 SF
DEPRESSION	L	9 SF
SWELLING	L	6 SF
DEPRESSION	H	3 SF

Sample # 16 **Area:** 5250 SF

Distress Description	Severity	Quantity
LONGITUDINAL/TRANSVERSE CRACKING	L	398 LF
WEATHERING/RAVELING	L	165 SF
LONGITUDINAL/TRANSVERSE CRACKING	M	47 LF
BLEEDING	N	87 SF
WEATHERING/RAVELING	M	30 SF
OIL SPILLAGE	N	1 SF

Extrapolated Distress Quantities*

Distress Description	Severity	Quantity	Density	Deduct
LONGITUDINAL/TRANSVERSE CRACKING	L	10556 LF	11.73 %	25.45
ALLIGATOR CRACKING	L	1210 SF	1.34 %	23.26
LONGITUDINAL/TRANSVERSE CRACKING	M	1927 LF	2.14 %	16.28
DEPRESSION	H	48 SF	0.05 %	12.00
WEATHERING/RAVELING	M	775 SF	0.86 %	7.45
WEATHERING/RAVELING	L	3003 SF	3.34 %	5.41
BLEEDING	N	525 SF	0.58 %	3.48
OIL SPILLAGE	N	117 SF	0.13 %	2.06
SWELLING	L	93 SF	0.10 %	1.03

TWIN BRIDGES AIRPORT

Branch: 51A **APRON** **A-1**

Extrapolated Distress Quantities*

Distress Description	Severity	Quantity	Density	Deduct
DEPRESSION	L	137 SF	0.15 %	0.45

* Multiple deduct values are scaled down from their algebraic sum to keep the model consistent with experimental data.

Percent of Deduct Values Based on Distress Mechanism

24.0 **% Load** 56.0 **% Climate/Durability** 20.0 **% Other**

TWIN BRIDGES AIRPORT

Branch: 51R **RUNWAY** **R-1**

Length: 4,300 LF **Width:** 60 LF **Area:** 258,000 SF **Last Const. :** 2000 **Family:** 9ACRML

From: RWY 16-34 STA 0+00 **To:** RWY 16-34 STA 43+00 **Surface:** AC

Inspections

Samples Surveyed: 7 **Total Samples:** 54 **Last Inspection Date:** 10/1/2009 **PCI: 48**

Sample # 1 **Area:** 4800 SF

Distress Description	Severity	Quantity
WEATHERING/RAVELING	L	960 SF
LONGITUDINAL/TRANSVERSE CRACKING	L	268 LF
LONGITUDINAL/TRANSVERSE CRACKING	M	80 LF
WEATHERING/RAVELING	M	104 SF
ALLIGATOR CRACKING	L	8 SF
DEPRESSION	L	7 SF

Sample # 9 **Area:** 4800 SF

Distress Description	Severity	Quantity
LONGITUDINAL/TRANSVERSE CRACKING	L	360 LF
WEATHERING/RAVELING	L	960 SF
LONGITUDINAL/TRANSVERSE CRACKING	M	166 LF
ALLIGATOR CRACKING	L	130 SF
WEATHERING/RAVELING	M	104 SF
DEPRESSION	L	13 SF
SWELLING	L	4 SF

Sample # 17 **Area:** 4800 SF

Distress Description	Severity	Quantity
WEATHERING/RAVELING	L	960 SF
LONGITUDINAL/TRANSVERSE CRACKING	L	289 LF
LONGITUDINAL/TRANSVERSE CRACKING	M	179 LF
ALLIGATOR CRACKING	L	123 SF
WEATHERING/RAVELING	M	122 SF
LONGITUDINAL/TRANSVERSE CRACKING	H	10 LF
SWELLING	L	16 SF
DEPRESSION	L	9 SF

Sample # 25 **Area:** 4800 SF

Distress Description	Severity	Quantity
LONGITUDINAL/TRANSVERSE CRACKING	L	329 LF
WEATHERING/RAVELING	L	960 SF
LONGITUDINAL/TRANSVERSE CRACKING	M	105 LF
ALLIGATOR CRACKING	L	182 SF
WEATHERING/RAVELING	M	106 SF
SWELLING	L	10 SF
DEPRESSION	L	3 SF

Sample # 33 **Area:** 4800 SF

Distress Description	Severity	Quantity
LONGITUDINAL/TRANSVERSE CRACKING	L	381 LF
WEATHERING/RAVELING	L	960 SF
ALLIGATOR CRACKING	L	167 SF
LONGITUDINAL/TRANSVERSE CRACKING	M	37 LF
WEATHERING/RAVELING	M	106 SF
DEPRESSION	L	4 SF

Sample # 41 **Area:** 4800 SF

Distress Description	Severity	Quantity
LONGITUDINAL/TRANSVERSE CRACKING	L	307 LF
WEATHERING/RAVELING	L	960 SF
LONGITUDINAL/TRANSVERSE CRACKING	M	91 LF
WEATHERING/RAVELING	M	140 SF
ALLIGATOR CRACKING	L	87 SF
LONGITUDINAL/TRANSVERSE CRACKING	H	10 LF
SWELLING	L	18 SF
DEPRESSION	L	8 SF

Sample # 49 **Area:** 4800 SF

Distress Description	Severity	Quantity
WEATHERING/RAVELING	L	960 SF
LONGITUDINAL/TRANSVERSE CRACKING	L	275 LF
ALLIGATOR CRACKING	L	225 SF
LONGITUDINAL/TRANSVERSE CRACKING	M	40 LF
WEATHERING/RAVELING	M	111 SF

TWIN BRIDGES AIRPORT

Branch: 51R **RUNWAY** **R-1**

DEPRESSION	L	2	SF

Extrapolated Distress Quantities*

Distress Description	Severity	Quantity		Density	Deduct
ALLIGATOR CRACKING	L	7080	SF	2.74 **%**	30.20
LONGITUDINAL/TRANSVERSE CRACKING	L	16966	LF	6.58 **%**	17.89
LONGITUDINAL/TRANSVERSE CRACKING	M	5361	LF	2.08 **%**	16.03
WEATHERING/RAVELING	L	51600	SF	20.00 **%**	13.71
WEATHERING/RAVELING	M	6089	SF	2.36 **%**	11.07
LONGITUDINAL/TRANSVERSE CRACKING	H	154	LF	0.06 **%**	7.50
SWELLING	L	369	SF	0.14 **%**	1.33
DEPRESSION	L	353	SF	0.14 **%**	0.37

* Multiple deduct values are scaled down from their algebraic sum to keep the model consistent with experimental data.

Percent of Deduct Values Based on Distress Mechanism

31.0 **% Load** 67.0 **% Climate/Durability** 2.0 **% Other**

TWIN BRIDGES AIRPORT

Branch: 51T **TAXIWAY** **T-1**

Length: 2,700 LF **Width:** 25 LF **Area:** 67,500 SF **Last Const. :** 2000 **Family:** 9ACRML
From: RWY 16-34 STA 17+00 **To:** APRON **Surface:** AC

Inspections

Samples Surveyed: 5 **Total Samples:** 14 **Last Inspection Date:** 10/1/2009 **PCI: 52**

Sample # 3 **Area:** 5000 SF

Distress Description	Severity	Quantity
LONGITUDINAL/TRANSVERSE CRACKING	L	252 LF
WEATHERING/RAVELING	L	250 SF
LONGITUDINAL/TRANSVERSE CRACKING	M	40 LF
WEATHERING/RAVELING	M	75 SF

Sample # 6 **Area:** 5000 SF

Distress Description	Severity	Quantity
LONGITUDINAL/TRANSVERSE CRACKING	L	390 LF
WEATHERING/RAVELING	L	250 SF
LONGITUDINAL/TRANSVERSE CRACKING	M	40 LF
WEATHERING/RAVELING	M	50 SF
LONGITUDINAL/TRANSVERSE CRACKING	H	6 LF
ALLIGATOR CRACKING	L	15 SF
DEPRESSION	L	3 SF

Sample # 9 **Area:** 5000 SF

Distress Description	Severity	Quantity
LONGITUDINAL/TRANSVERSE CRACKING	L	524 LF
WEATHERING/RAVELING	L	350 SF
LONGITUDINAL/TRANSVERSE CRACKING	M	53 LF
WEATHERING/RAVELING	M	100 SF
ALLIGATOR CRACKING	L	16 SF

Sample # 12 **Area:** 5000 SF

Distress Description	Severity	Quantity
LONGITUDINAL/TRANSVERSE CRACKING	L	418 LF
ALLIGATOR CRACKING	L	500 SF
LONGITUDINAL/TRANSVERSE CRACKING	M	78 LF
WEATHERING/RAVELING	L	250 SF
WEATHERING/RAVELING	M	50 SF
SWELLING	L	6 SF

Sample # 14 **Area:** 5000 SF

Distress Description	Severity	Quantity
LONGITUDINAL/TRANSVERSE CRACKING	L	128 LF
LONGITUDINAL/TRANSVERSE CRACKING	M	72 LF
ALLIGATOR CRACKING	L	150 SF
WEATHERING/RAVELING	L	113 SF
WEATHERING/RAVELING	M	56 SF
OIL SPILLAGE	N	46 SF
DEPRESSION	L	6 SF

Extrapolated Distress Quantities*

Distress Description	Severity	Quantity	Density	Deduct
ALLIGATOR CRACKING	L	1839 SF	2.72 %	30.13
LONGITUDINAL/TRANSVERSE CRACKING	L	4624 LF	6.85 %	18.39
LONGITUDINAL/TRANSVERSE CRACKING	M	764 LF	1.13 %	11.89
WEATHERING/RAVELING	M	894 SF	1.32 %	8.77
LONGITUDINAL/TRANSVERSE CRACKING	H	16 LF	0.02 %	7.50
WEATHERING/RAVELING	L	3275 SF	4.85 %	6.69
OIL SPILLAGE	N	124 SF	0.18 %	2.41
SWELLING	L	16 SF	0.02 %	1.00
DEPRESSION	L	24 SF	0.04 %	0.30

* Multiple deduct values are scaled down from their algebraic sum to keep the model consistent with experimental data.

Percent of Deduct Values Based on Distress Mechanism

35.0 **% Load** 61.0 **% Climate/Durability** 4.0 **% Other**

TWIN BRIDGES AIRPORT

FIRST YEAR LOCAL:2010 LOCAL REPAIR COST: $3,210

Section	Distress Description	Severity	Quantity	Work Description	Quantity	Cost	Policy
A-1	DEPRESSION	H	48 SF	Patching - AC Deep	80 SF	$2,956	SAFET
R-1	L & T CR	H	154 LF	Crack Sealing - AC	154 LF	$230	SAFET
T-1	L & T CR	H	17 LF	Crack Sealing - AC	17 LF	$24	SAFET

FIFTEEN YEAR PROJECTIONS: ESTIMATED AVERAGE ANNUAL COST: $78,676

PLAN YEAR: 2010 ESTIMATED COST: $900,870

SectionI	Maintenance	Local	Global	Major<Crit	Major>Crit	Total	PCI before	PCI after
A-1	Reconstruct			$195,977		$195,977	47	100
R-1	Reconstruct			$567,859		$567,859	47	100
T-1	Reconstruct			$137,034		$137,034	51	100

PLAN YEAR: 2013 ESTIMATED COST: $1,436

SectionI	Maintenance	Local	Global	Major<Crit	Major>Crit	Total	PCI before	PCI after
A-1	Basic Prev.	$341				$341	88	88
R-1	Basic Prev.	$868				$868	88	88
T-1	Basic Prev.	$227				$227	88	88

PLAN YEAR: 2014 ESTIMATED COST: $3,840

SectionI	Maintenance	Local	Global	Major<Crit	Major>Crit	Total	PCI before	PCI after
A-1	Basic Prev.	$874				$874	84	84
R-1	Basic Prev.	$2,351				$2,351	84	84
T-1	Basic Prev.	$615				$615	84	84

PLAN YEAR: 2015 ESTIMATED COST: $89,140

SectionI	Maintenance	Local	Global	Major<Crit	Major>Crit	Total	PCI before	PCI after
A-1	Prev. & Fog Seal	$1,373	$18,000			$19,373	81	88
R-1	Prev. & Fog Seal	$3,698	$51,600			$55,299	81	88
T-1	Prev. & Fog Seal	$968	$13,500			$14,468	81	88

PLAN YEAR: 2016 ESTIMATED COST: $3,840

SectionI	Maintenance	Local	Global	Major<Crit	Major>Crit	Total	PCI before	PCI after
A-1	Basic Prev.	$874				$874	84	84
R-1	Basic Prev.	$2,351				$2,351	84	84
T-1	Basic Prev.	$615				$615	84	84

PLAN YEAR: 2017 ESTIMATED COST: $6,047

SectionI	Maintenance	Local	Global	Major<Crit	Major>Crit	Total	PCI before	PCI after
A-1	Basic Prev.	$1,375				$1,375	81	81
R-1	Basic Prev.	$3,703				$3,703	81	81
T-1	Basic Prev.	$969				$969	81	81

PLAN YEAR: 2018 ESTIMATED COST: $8,633

SectionI	Maintenance	Local	Global	Major<Crit	Major>Crit	Total	PCI before	PCI after
A-1	Basic Prev.	$2,032				$2,032	78	78
R-1	Basic Prev.	$5,232				$5,232	78	78
T-1	Basic Prev.	$1,369				$1,369	78	78

PLAN YEAR: 2019 ESTIMATED COST: $11,322

SectionI	Maintenance	Local	Global	Major<Crit	Major>Crit	Total	PCI before	PCI after
A-1	Basic Prev.	$2,710				$2,710	74	74
R-1	Basic Prev.	$6,826				$6,826	76	76
T-1	Basic Prev.	$1,786				$1,786	76	76

PLAN YEAR: 2020 ESTIMATED COST: $96,816

SectionI	Maintenance	Local	Global	Major<Crit	Major>Crit	Total	PCI before	PCI after
A-1	Prev. & Fog Seal	$3,361	$18,000			$21,361	72	78
R-1	Prev. & Fog Seal	$8,207	$51,600			$59,807	74	78
T-1	Prev. & Fog Seal	$2,147	$13,500			$15,647	74	78

PLAN YEAR: 2021 ESTIMATED COST: $11,322

SectionI	Maintenance	Local	Global	Major<Crit	Major>Crit	Total	PCI before	PCI after
A-1	Basic Prev.	$2,710				$2,710	74	74
R-1	Basic Prev.	$6,826				$6,826	76	76
T-1	Basic Prev.	$1,786				$1,786	76	76

PLAN YEAR: 2022 ESTIMATED COST: $13,727

SectionI	Maintenance	Local	Global	Major<Crit	Major>Crit	Total	PCI before	PCI after
A-1	Basic Prev.	$3,364				$3,364	72	72
R-1	Basic Prev.	$8,214				$8,214	74	74
T-1	Basic Prev.	$2,149				$2,149	74	74

TWIN BRIDGES AIRPORT

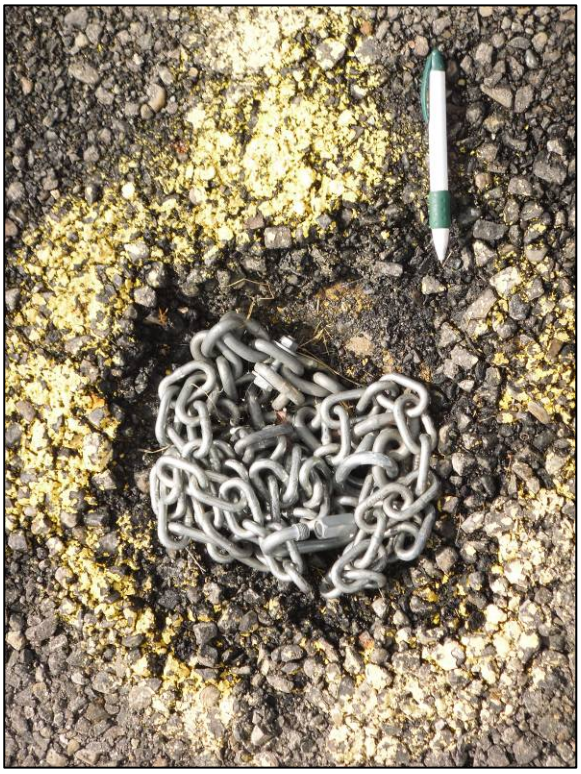
PLAN YEAR: 2023					ESTIMATED COST:	$15,747	PCI	
SectionI	**Maintenance**	**Local**	**Global**	**Major<Crit**	**Major>Crit**	**Total**	**before**	**after**
A-1	Basic Prev.	$3,863				$3,863	69	69
R-1	Basic Prev.	$9,420				$9,420	72	72
T-1	Basic Prev.	$2,464				$2,464	72	72

PLAN YEAR: 2024					ESTIMATED COST:	$17,397	PCI	
SectionI	**Maintenance**	**Local**	**Global**	**Major<Crit**	**Major>Crit**	**Total**	**before**	**after**
A-1	Basic Prev.	$4,194				$4,194	66	66
R-1	Basic Prev.	$10,465				$10,465	70	70
T-1	Basic Prev.	$2,738				$2,738	70	70

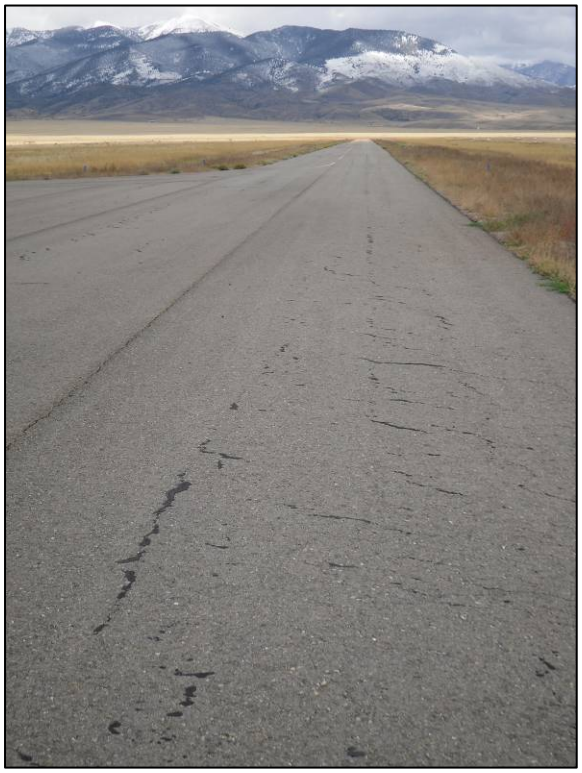
TWIN BRIDGES AIRPORT

10/1/2009

A-1, overview



A-1, surface detail with tiedown & raveling



T-1, overview with alligator cracking & bleeding

T-1, surface detail with bleeding

TWIN BRIDGES AIRPORT

10/1/2009

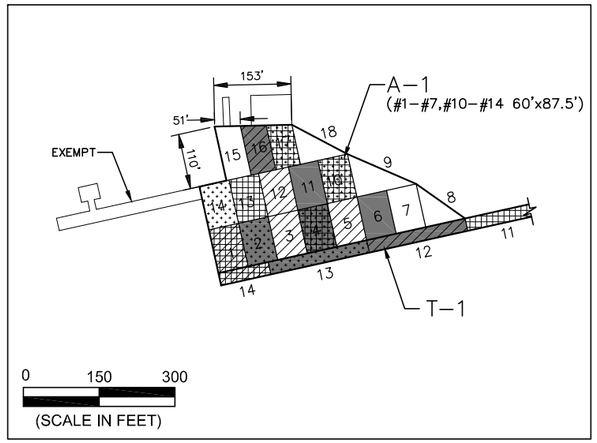
T-1, surface detail with bleeding & alligator cracking

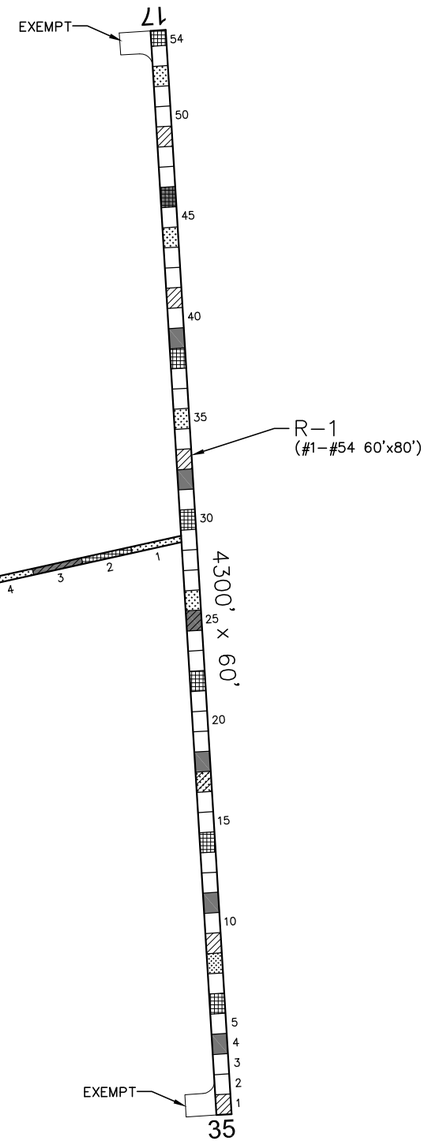
R-1, surface detail with bleeding

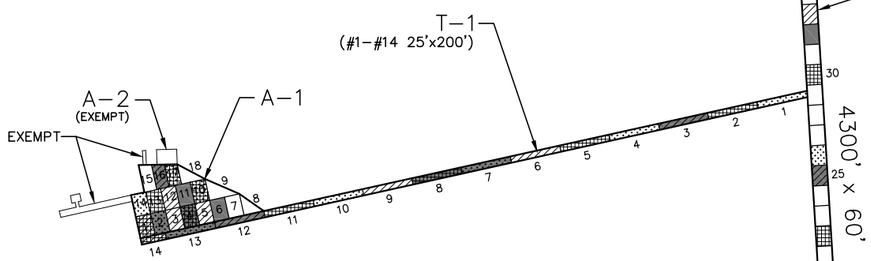
R-1, surface detail with alligator cracking

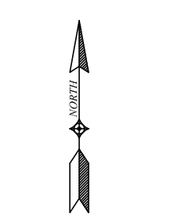
R-1, overview

TWIN BRIDGES









0 300 600
(SCALE IN FEET)

PAVEMENT STRENGTH SURVEY/PAVEMENT CONDITION SURVEY

PAVE. IDENT.	SOIL CLASS	SUB GRADE CLASS	SUBBASE COURSE	BASE COURSE	SURFACE COURSE	OVERLAY	PAVEMENT STRENGTH MAX. GROSS LOAD (LBS) SINGLE	DUAL	DUAL TAN.	REMARKS
RUNWAYS										
R–1	CBR=5			11" P–208	P609	1.8" P–401	12,500			1 2
TAXIWAYS										
T–1	CBR=5			11" P–208	P609	1.8" P–401	12,500			1 2
APRONS										
A–1	CBR=5			11" P–208	P609	1.8" P–401	12,500			1 2
A–2				UNKNOWN	PCC		UNKNOWN			

REMARKS:

1 AIP–03, 1988, ALL NEW PAVEMENTS.

2 AIP–04, 2000, OVERLAY EXISTING BITUMINOUS RUNWAY, TAXIWAY, APRON, AND TURNAROUNDS.

LEGEND

- 1997 SURVEY AREA
- 2000 SURVEY AREA (NOT SURVEYED)
- 2003 SURVEY AREA
- 2006 SURVEY AREA
- 2009 SURVEY AREA

DATE OF PAVEMENT STRENGTH SURVEY:	
EVALUATED BY:	
DATE OF MOST RECENT PAVEMENT CONDITION SURVEY:	OCT. 1, 2009
EVALUATED BY:	N. BELL

MONTANA AVIATION SYSTEM PLAN
2009 UPDATE - PAVEMENT CONDITION INDEXES

TWIN BRIDGES AIRPORT

PREPARED FOR: MONTANA AERONAUTICS DIVISION ORO Y PLATA

TWIN BRIDGES MONTANA

DATE: NOV. 2009

PREPARED BY: RPA

TWIN BRIDGES