



# Illinois Department of Transportation

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To: Joseph E. Crowe                      Attn: District Four  
From: John D. Baranzelli  
Subject: Pavement Design  
Date: May 14, 2013

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A handwritten signature in black ink, appearing to be 'JDB'.

FAU Route 6584/6585 (Allen Road)  
Section 105; (72-7HB)BY  
Peoria County  
From Suds Parkway to First Street in Peoria

We have reviewed the pavement selection for the above captioned section, which was submitted by email dated March 22, 2013. This project does not require alternate bidding. Life Cycle Cost Analysis favored a rigid pavement design. The approved pavement design is as follows:

Allen Road from Suds Parkway to First Street (Pavement Construction)

8 inches of PCC Pavement (Jointed) With Tied PCC Curb & Gutter  
12 inches of Aggregate Subgrade, Type A

If you have any questions, please contact Paul Niedernhofer at (217) 524-1651.

## RECOMMENDATION

The proposed improvements consist of the construction of approximately 13,200 square yards of new pavement on Allen Rd from Suds Parkway to just south of First Street in Peoria County. According to Chapter 54 of the BDE Manual a mechanistic design of jointed PCC pavement shall be compared with mechanistic full-depth HMA pavement. This segment of roadway is within an urban area so use of lime modified soils are not advised. Also, the staging of pavement construction will require short segments to be placed at intersections and driveways which are not feasible for a HMA paving train. The typical sections indicate the edge of pavement will be supported by B-6.24 CCC&G which will require the installation of a storm sewer system. A composite aggregate or granular over modified soil improved subgrade will be allowed without the use of a HMA or PCC stabilized subbase because of the urban typical section with storm sewer and it is an unmarked route with a traffic factor < 2.0. The result of the rigid pavement design was an 8" jointed PCC pavement placed on 12" aggregate improved subgrade. The full-depth HMA design yielded an 8.5" HMA pavement on 12" aggregate improved subgrade.

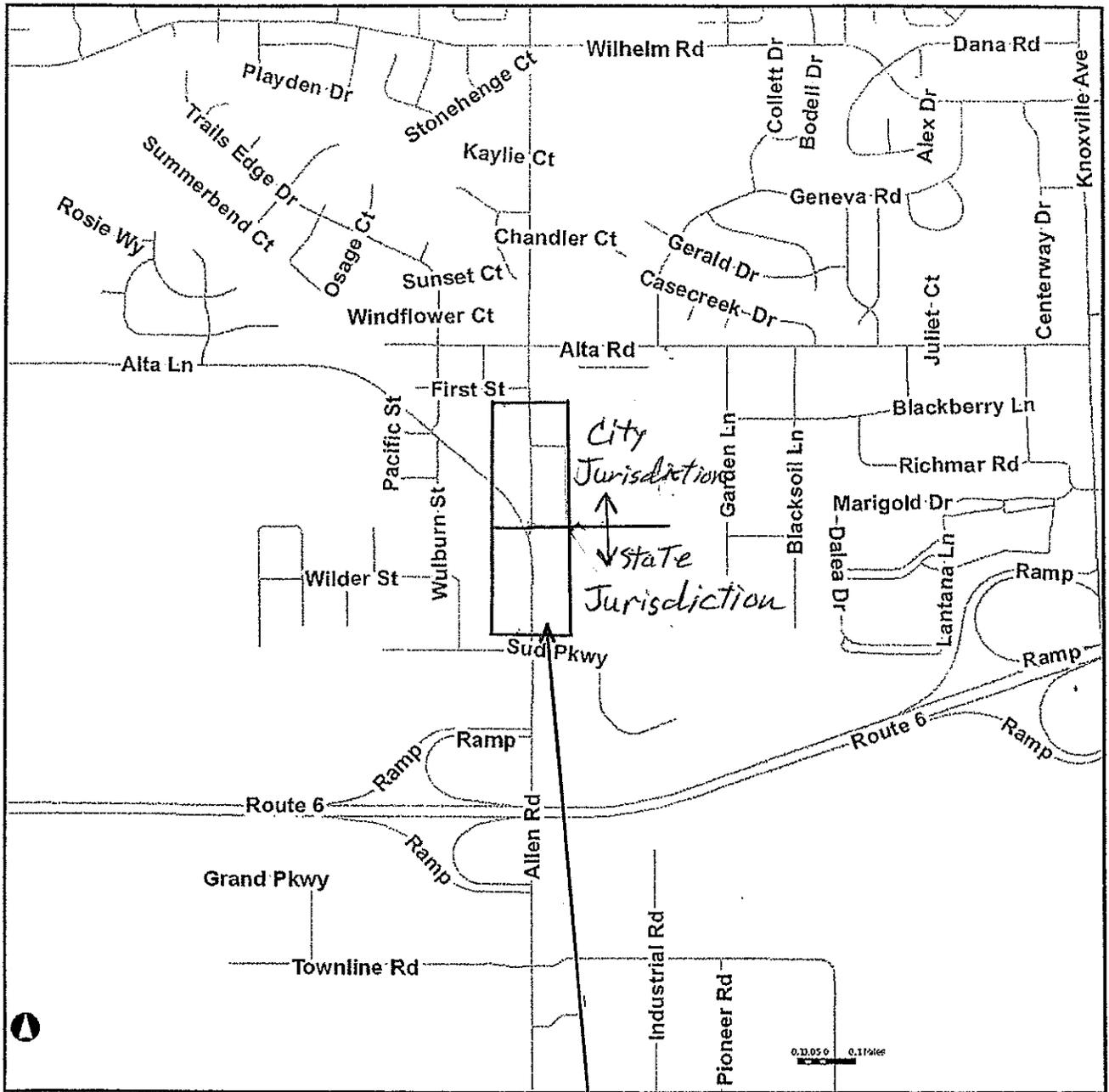
Jurisdiction of a portion of the proposed pavement from Alta Lane to First Street is currently under the City of Peoria and will remain so after completion of the project. The remaining portion of this section from Suds parkway to Alta Lane is under State of Illinois' jurisdiction. However, since this is an unmarked route and carries local traffic to a largely residential area, discussions with the City have been ongoing regarding the jurisdictional transfer of this entire segment to the City. It is

the City's request that the portion of roadway under their jurisdiction be a minimum of 8" jointed PCC pavement on 12" aggregate improved subgrade as well as any pavement that may be part of a future jurisdictional transfer.

According to the life cycle cost analysis, the present cost per mile per year for the 8" rigid PCC pavement is \$80,447, and the present cost per mile per year for the 8.5" flexible HMA pavement is \$90,370. This is a difference of about 12.3%.

According to section 54-1.04 this project is not required to be an alternate bid for the following reasons: First, the quantity of pavement is less than 2 lane miles in length. Second, the staging of this pavement will require short segments to be paved at various times to accommodate the shifting of traffic. Third, the cost difference is greater than 10%. Based on the cost advantage of 8" PCC, the City's request to construct their pavement with 8" PCC, the potential to transfer jurisdiction of the State's pavement to the City and the constructability advantage of PCC pavement in urban locations the District is requesting approval to continue with PORTLAND CEMENT CONCRETE PAVEMENT 8" (JOINTED) over 12" of aggregate improved subgrade as the preferred pavement design.

# Location Map



Centerline

Web Hosting Services Provided by Peoria County  
Web Hosting Services Provided by Peoria County

*New Pavement Limits*

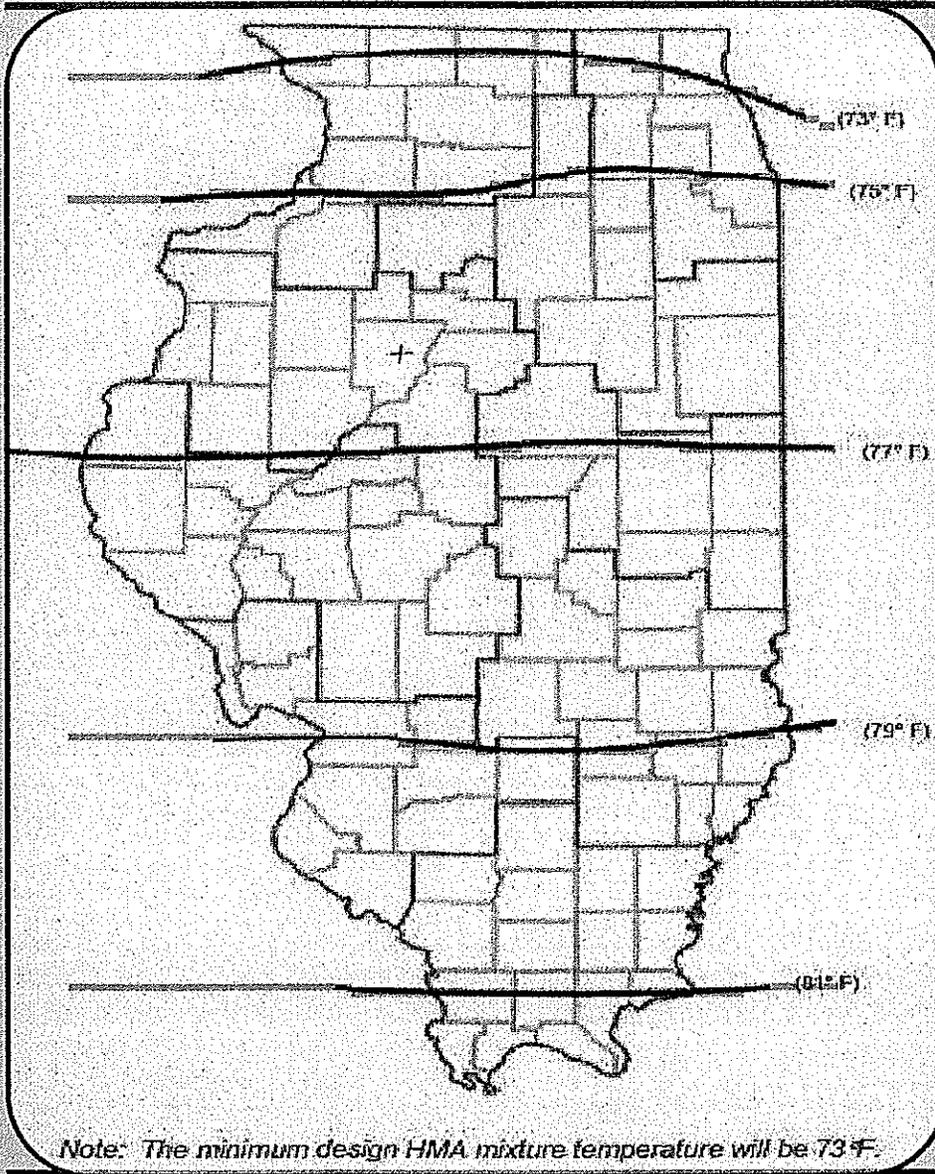
5

Click On Map to Set Your Project Location

Help

Then Press **Set HMA Mix Temp** to Set Temp

76.26° F



PROJECT AND TRAFFIC INPUTS				(Enter Data in Gray Shaded Cells)			
Route: FAU 6584 & 6585	Comments: This segment is the new construction that will be part of future JT.						
Section: 105; (72-7HB)BY	Design Date: 03/15/2013		R. Dotson		<-- BY		
County: PEORIA	Modify Date:				<-- BY		
Location: Allen Road from Suds Parkway to First S					ADT	Year	
Facility Type: Unmarked State Route					Current:	13,200 2008	
# of Lanes = 4					Future:	14,876 2024	
Road Class: I					Structural Design Traffic		
Subgrade Support Rating (SSR): Poor					Minimum ADT	Actual ADT	
Construction Year: 2014					Actual % of Total ADT	% of ADT in Design Lane	
Design Period (DP) = 20 years					PV = No Min	14,452 97.2% P = 32%	
					SU = No Min	226 1.5% S = 45%	
					MU = No Min	198 1.3% M = 45%	
					Struct. Design ADT =	14,876 (2024)	

**TRAFFIC FACTOR CALCULATION**

**FLEXIBLE PAVEMENT**

Cpv = 0.15  
 Csu = 132.5  
 Cmu = 482.53  
 TF flexible (Actual) = 1.14 (Actual ADT)  
 TF flexible (Min) = No Min (Min ADT Fig. 54-2.C)

**RIGID PAVEMENT**

Cpv = 0.15  
 Csu = 143.81  
 Cmu = 696.42  
 TF rigid (Actual) = 1.55 (Actual ADT)  
 TF rigid (Min) = No Min (Min ADT Fig. 54-2.C)

**NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS**

Full-Depth HMA Pavement		JPC Pavement	
Use TF flexible = 1.14	PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)	Use TF rigid = 1.55	Edge Support = Tied Shoulder or C.&G.
HMA Mixture Temp. = 76.5 deg. F (Fig. 54-5.C)	Design HMA Mixture Modulus (E <sub>HMA</sub> ) = 650 ksi (Fig. 54-5.D)	<b>Rigid Pavt Thick. = 8.00 in. (Fig. 54-4.E)</b>	
Design HMA Strain (ε <sub>HMA</sub> ) = 116 (Fig. 54-5.E)	Full Depth HMA Design Thickness = 8.50 in. (Fig. 54-5.F)	CRC Pavement	
Limiting Strain Criterion Thickness = 15.25 in. (Fig. 54-5.I)	Use Full-Depth HMA Thickness = 8.50 inches	Use TF rigid = 1.55	IBR value = 3
		<b>CRCP Thickness = 6.75 in. (Fig. 54-4.M)</b>	

**TF MUST BE > 60 FOR CRCP**

**RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS**

HMA Overlay of Rubblized PCC		Unbonded Concrete Overlay	
Use TF flexible = 1.14	District = 3,4,5,6	Review 54-4.03 for limitations and special considerations.	
<b>HMA Overlay Design Thickness = 6.25 in. (Fig. 54-5.U)</b>		<b>JPCP Thickness = NA inches</b>	

**CONTACT BMPP FOR ASSISTANCE**

**DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN**

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more Part of a future 4 lanes or more One-way Streets with ADT > 3500	2 lanes with ADT > 2000 One way Street with ADT <= 3500	2 Lanes (ADT 750 -2000)	2 Lanes (ADT < 750)

Facility Type	Min. Str. Design Traffic (Fig 54-2.C)		
	PV	SU	MU
Interstate or Supplemental Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	No Min	No Min	No Min

Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

Class	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
	Csu	Cmu	Csu	Cmu
I	143.81	696.42	132.50	482.53
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV	129.58	562.47	109.14	384.35

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
ADT	Class
0 - 749	IV
750 - 2000	III
>2000	II

Number of Lanes	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)					
	Rural			Urban		
	P	S	M	P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

JPCP

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

11/05/13

FULL-DEPTH HMA PAVEMENT

Standard Design

ROUTE SECTION COUNTY LOCATION FACILITY TYPE PROJECT LENGTH # OF CENTERLINES # OF LANES # OF EDGES LANE WIDTH - AVERAGE SHOULDER WIDTH PAVEMENT THICKNESS (FLEXIBLE) SHOULDER THICKNESS POLICY OVERLAY THICKNESS FLEX PAVEMENT TRAFFIC FACTORS

HMA COST PER TON HMA SURFACE HMA TOP BINDER HMA LOWER BINDER HMA BINDER (LEVELING) HMA SHOULDER

INITIAL COSTS ITEM THICKNESS 100% QUANTITY UNIT UNIT PRICE COST USER SUPPLIED QUANTITY USER SUPPLIED UNIT PRICE

MAINTENANCE COSTS ITEM THICKNESS MATERIAL UNIT COST SCHEDULE QUANTITY UNIT COST

FULL-DEPTH HMA PAVEMENT HMA OVERLAY OF RIBBED PCC PAVEMENT

Figure 54-7-C STANDARD DESIGN

MAINTENANCE COSTS ITEM % QUANTITY UNIT UNIT COST COST PRESENT WORTH

PCC PAVEMENT

JPCP

JPCP

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

11/05/13

ROUTE SECTION COUNTY LOCATION FACILITY TYPE PROJECT LENGTH # OF CENTERLINES # OF LANES # OF EDGES LANE WIDTH - AVERAGE SHOULDER WIDTH PAVEMENT THICKNESS (RIGID) SHOULDER THICKNESS POLICY OVERLAY THICKNESS RIGID PAVEMENT TRAFFIC FACTORS

INITIAL COSTS ITEM THICKNESS 100% QUANTITY UNIT UNIT PRICE COST USER SUPPLIED QUANTITY USER SUPPLIED UNIT PRICE

MAINTENANCE COSTS ITEM THICKNESS MATERIAL UNIT COST SCHEDULE QUANTITY UNIT COST

JOINTED PLAIN CONCRETE PAVEMENT UNBONDED JOINTED PLAIN CONCRETE OVERLAY

Figure 54-7-A

MAINTENANCE COSTS ITEM % QUANTITY UNIT UNIT COST COST PRESENT WORTH

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised 3/18/13 10:53 AM

CONSTRUCTION INITIAL COST PRESENT WORTH ANNUAL COST PER MILE MAINTENANCE LIFE-CYCLE COST PRESENT WORTH ANNUAL COST PER MILE TOTAL LIFE-CYCLE COST PRESENT WORTH ANNUAL COST PER MILE

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION OTHER OPTIONS (LOWEST TO HIGHEST) TYPE / PERCENTAGE

# LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

## FULL-DEPTH HMA PAVEMENT

Standard Design

ROUTE FAU 6584 & 6585  
 SECTION 105; (72-7HB)BY  
 COUNTY PEORIA  
 LOCATION Allen Road from Suds Parkway to First St.

FACILITY TYPE NON-INTERSTATE

PROJECT LENGTH 2000 FT ==> 0.38 Miles  
 # OF CENTERLINES 1 CL  
 # OF LANES 4 LANES  
 # OF EDGES 2 EP  
 LANE WIDTH - AVERAGE 12 FT  
 SHOULDER WIDTH HMA Inside 0 FT  
 HMA Outside 0 FT

PAVEMENT THICKNESS (FLEXIBLE) 8.50 IN 15.25 IN MAX  
 SHOULDER THICKNESS 8.00 IN HMA 30 Standard Design  
 POLICY OVERLAY THICKNESS 2.25 IN

FLEX PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		No Min	1.14	No Min

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	\$95.00 / TON
HMA TOP BINDER	\$95.00 / TON
HMA LOWER BINDER	\$76.01 / TON
HMA BINDER (LEVELING)	\$106.11 / TON
HMA SHOULDER	\$72.00 / TON

### INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
HMA PAVEMENT ( FULL-DEPTH )	( 8.50" )	13,200	SQ YD	\$41.27 / SQ YD	\$0
HMA SURFACE COURSE	( 2.00" )	13,200	SQ YD	\$10.68 / SQ YD	\$140,936 ~
HMA TOP BINDER COURSE	( 2.25" )	13,200	SQ YD	\$12.10 / SQ YD	\$159,718 ~
HMA LOWER BINDER COURSE	( 4.25" )	13,200	SQ YD	\$18.49 / SQ YD	\$244,079 ~
HMA SHOULDER	( 8.00" )	0	TONS	\$72.00 / TON	\$0 ~
CURB & GUTTER		0	LIN FT	\$22.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS)		0	TONS	\$25.00 / TON	\$0
IMPROVED SUBGRADE: Aggregate		0	SQ YD	\$9.89 / SQ YD	\$0
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		0	SQ YD	\$0.00 / SQ YD	\$0
SHOULDER REMOVAL		0	SQ YD	\$0.00 / SQ YD	\$0

Note: \* Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST \$544,733  
 FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE \$58,653

### MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY \$0.00 LANE-MILE / YEAR			
HMA OVERLAY PVMT SURF	( 2.00" )	Surface Mix	\$10.68 / SQ YD
HMA OVERLAY PVMT	( 2.25" )	Surface Mix	\$12.49 / SQ YD
HMA SURFACE MIX	( 1.50" )	Surface Mix	\$8.00 / SQ YD
HMA BINDER MIX	( 0.75" )	Leveling Binder Mix	\$4.49 / SQ YD
HMA OVERLAY SHLD (Year 30)	( 2.25" )	Shoulder Mix	\$9.07 / SQ YD
HMA OVERLAY SHLD	( 2.00" )	Shoulder Mix	\$8.06 / SQ YD
MILLING (2.00 IN)			\$3.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill Surf)		Surface Mix	\$80.64 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill Surf)		Shoulder Mix	\$78.06 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill +2.00")		Leveling Binder Mix	\$81.88 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill +2.00")		Shoulder Mix	\$78.06 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
RANDOM / THERMAL CRACK ROUT & SEAL (100% Rehab = 110.00' / Station / Lane)			\$2.00 / LIN FT

FLEXIBLE TOTAL LIFE-CYCLE COST \$839,303  
 FLEXIBLE TOTAL ANNUAL COST PER MILE \$90,370

FULL-DEPTH HMA PAVEMENT  
HMA OVERLAY OF RUBBLIZED PCC PAVEMENT  
Figure 54-7.C  
STANDARD DESIGN

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
<b>YEAR 5</b>							
	LONG SHLD JT R&S	100.00%	4,000	LIN FT	\$2.00	\$8,000	
	CNTR LINE JOINT R&S	100.00%	2,000	LIN FT	\$2.00	\$4,000	
	RNDM / THRM CRACK R&S	50.00%	4,400	LIN FT	\$2.00	\$8,800	
	PD PVMT PATCH M&F SURF	0.10%	13	SQ YD	\$80.64	\$1,048	
	PWFn =	0.8626		PW =	0.8626 X	\$21,848	\$18,846
<b>YEAR 10</b>							
	LONG SHLD JT R&S	100.00%	4,000	LIN FT	\$2.00	\$8,000	
	CNTR LINE JOINT R&S	100.00%	2,000	LIN FT	\$2.00	\$4,000	
	RNDM / THRM CRACK R&S	50.00%	4,400	LIN FT	\$2.00	\$8,800	
	PD PVMT PATCH M&F SURF	0.50%	66	SQ YD	\$80.64	\$5,322	
	PWFn =	0.7441		PW =	0.7441 X	\$26,122	\$19,437
<b>YEAR 15</b>							
	MILL PVMT & SHLD 2.00"	100.00%	13,200	SQ YD	\$3.00	\$39,600	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	132	SQ YD	\$81.88	\$10,809	
	HMA OVERLAY PVMT 2.00"	100.00%	13,200	SQ YD	\$10.68	\$140,936	
	HMA OVERLAY SHLD 2.00"	100.00%	0	SQ YD	\$8.06	\$0	
	PWFn =	0.6419		PW =	0.6419 X	\$191,345	\$122,817
<b>YEAR 20</b>							
	LONG SHLD JT R&S	100.00%	4,000	LIN FT	\$2.00	\$8,000	
	CNTR LINE JOINT R&S	100.00%	2,000	LIN FT	\$2.00	\$4,000	
	RNDM / THRM CRACK R&S	50.00%	4,400	LIN FT	\$2.00	\$8,800	
	PD PVMT PATCH M&F SURF	0.10%	13	SQ YD	\$80.64	\$1,048	
	PWFn =	0.5537		PW =	0.5537 X	\$21,848	\$12,097
<b>YEAR 25</b>							
	LONG SHLD JT R&S	100.00%	4,000	LIN FT	\$2.00	\$8,000	
	CNTR LINE JOINT R&S	100.00%	2,000	LIN FT	\$2.00	\$4,000	
	RNDM / THRM CRACK R&S	50.00%	4,400	LIN FT	\$2.00	\$8,800	
	PD PVMT PATCH M&F SURF	0.50%	66	SQ YD	\$80.64	\$5,322	
	PWFn =	0.4776		PW =	0.4776 X	\$26,122	\$12,476
<b>YEAR 30</b>							
	HMA_SD NON-INTERSTATE						
	MILL PVMT & SHLD 2.00"	100.00%	13,200	SQ YD	\$3.00	\$39,600	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	264	SQ YD	\$81.88	\$21,617	
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	0	SQ YD	\$78.06	\$0	
	HMA OVERLAY PVMT 2.25"	100.00%	13,200	SQ YD	\$12.49	\$164,821	
	HMA OVERLAY SHLD 2.25"	100.00%	0	SQ YD	\$9.07	\$0	
	PWFn =	0.4120		PW =	0.4120 X	\$226,038	\$93,125
<b>YEAR 35</b>							
	LONG SHLD JT R&S	100.00%	4,000	LIN FT	\$2.00	\$8,000	
	CNTR LINE JOINT R&S	100.00%	2,000	LIN FT	\$2.00	\$4,000	
	RNDM / THRM CRACK R&S	50.00%	4,400	LIN FT	\$2.00	\$8,800	
	PD PVMT PATCH M&F SURF	0.10%	13	SQ YD	\$80.64	\$1,048	
	PWFn =	0.3554		PW =	0.3554 X	\$21,848	\$7,764
<b>YEAR 40</b>							
	LONG SHLD JT R&S	100.00%	4,000	LIN FT	\$2.00	\$8,000	
	CNTR LINE JOINT R&S	100.00%	2,000	LIN FT	\$2.00	\$4,000	
	RNDM / THRM CRACK R&S	50.00%	4,400	LIN FT	\$2.00	\$8,800	
	PD PVMT PATCH M&F SURF	0.50%	66	SQ YD	\$80.64	\$5,322	
	PWFn =	0.3066		PW =	0.3066 X	\$26,122	\$8,008
							\$294,570
ROUTINE MAINTENANCE ACTIVITY				1.52 Lane Miles	0.00	\$0	\$0
						MAINTENANCE LIFE-CYCLE COST	\$294,570
45	YEAR LIFE CYCLE	CRFn = 0.0407852	MAINTENANCE ANNUAL COST PER MILE				\$31,717

**PCC PAVEMENT**

**JPCP**

ROUTE **FAU 6584 & 6585**  
 SECTION **105; (72-7HB)BY**  
 COUNTY **PEORIA**  
 LOCATION **Allen Road from Suds Parkway to First St.**

FACILITY TYPE **NON-INTERSTATE**

PROJECT LENGTH **2000 FT ==> 0.38 Miles**  
 # OF CENTERLINES **1 CL**  
 # OF LANES **4 LANES**  
 # OF EDGES **2 EP**  
 LANE WIDTH - AVERAGE **12 FT**  
 SHOULDER WIDTH **PCC Inside 0 FT**  
                           **PCC Outside 0 FT**

PAVEMENT THICKNESS (RIGID) **JPCP 8.00 IN TIED SHLD**  
 SHOULDER THICKNESS **8.00 IN**

POLICY OVERLAY THICKNESS **2.50 IN**

**RIGID PAVEMENT TRAFFIC FACTORS**

	MINIMUM	ACTUAL	USE
Worksheet Construction Type is	<b>No Min</b>	<b>1.55</b>	<b>No Min</b>
New Construction		<b>The Pavement Type is</b>	<b>JPCP</b>

**INITIAL COSTS**

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
JPC PAVEMENT	( 8.00" )	13,200	SQ YD *	<b>\$42.05 /SQ YD</b>	\$555,060
PAVEMENT REINFORCEMENT		0	SQ YD	<b>\$22.00 /SQ YD</b>	\$0
STABILIZED SUBBASE	( 4.00" )	0	SQ YD *	<b>\$19.00 /SQ YD</b>	\$0
PCC SHOULDERS	( 8.00" to 8.00" )	0	SQ YD	<b>\$40.00 /SQ YD</b>	\$0
CURB & GUTTER		0	LIN FT *	<b>\$22.00 /LIN FT</b>	\$0
SUBBASE GRAN MATL TY C	( ~ 0.00" )	0	TONS *	<b>\$25.00 /TON</b>	\$0
IMPROVED SUBGRADE:	Aggregate <b>Wash = 0.0</b>	0	SQ YD *	<b>\$9.89 /SQ YD</b>	\$0
Reserved For User Supplied Item		0	UNITS	<b>\$0.00 /UNITS</b>	\$0
Reserved For User Supplied Item		0	UNITS	<b>\$0.00 /UNITS</b>	\$0
PAVEMENT REMOVAL		10,667	SQ YD	<b>\$0.00 /SQ YD</b>	\$0
SHOULDER REMOVAL		0	SQ YD	<b>\$0.00 /SQ YD</b>	\$0

Note: \* Denotes User Supplied Quantity

<b>RIGID CONSTRUCTION INITIAL COST</b>	<b>\$555,060</b>
<b>RIGID CONSTRUCTION ANNUAL COST PER MILE</b>	<b>\$59,765</b>

**MAINTENANCE COSTS:**

ITEM	THICKNESS	MATERIAL	UNIT COST
<b>ROUTINE MAINTENANCE ACTIVITY</b>			<b>\$0.00 /LANE-MILE /YEAR</b>
HMA POLICY OVERLAY	( 2.50" )		<b>2.50</b>
HMA POLICY OVERLAY PVMT	( 2.50" )	1.0043	<b>2.50 \$13.98 /SQ YD</b>
HMA SURFACE MIX	( 1.50" )	1.0029	Surface Mix <b>1.50 \$8.00 /SQ YD</b>
HMA BINDER MIX	( 1.00" )	1.0089	aling Binder Mix <b>1.00 \$5.98 /SQ YD</b>
HMA POLICY OVERLAY SHLD	( 2.50" )		Shoulder Mix <b>2.50 \$10.08 /SQ YD</b>
CLASS A PAVEMENT PATCHING			<b>\$195.00 /SQ YD</b>
CLASS B PAVEMENT PATCHING			<b>\$150.00 /SQ YD</b>
CLASS C SHOULDER PATCHING			<b>\$145.00 /SQ YD</b>
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		Surface Mix 1.83	<b>\$77.98 /SQ YD</b>
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 2.50")		Surface Mix 2.83	<b>\$83.30 /SQ YD</b>
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			<b>\$2.00 /LIN FT</b>
CENTERLINE JOINT ROUT & SEAL			<b>\$2.00 /LIN FT</b>
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL			<b>\$2.00 /LIN FT</b>
RANDOM CRACK ROUT & SEAL	(100% Rehab = 100.00' / Station / Lane)		<b>\$2.00 /LIN FT</b>

<b>RIGID TOTAL LIFE-CYCLE COST</b>	<b>\$747,141</b>
<b>RIGID TOTAL ANNUAL COST PER MILE</b>	<b>\$80,447</b>

JOINTED PLAIN CONCRETE PAVEMENT  
UNBONDED JOINTED PLAIN CONCRETE OVERLAY  
Figure 54-7.A

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
<b>YEAR 10</b>							
	PAVEMENT PATCH CLASS B	0.10%	13 SQ YD		\$150.00	\$1,950	
		PWF <sub>n</sub> = 0.7441			PW = 0.7441 X	\$1,950	\$1,451
<b>YEAR 15</b>							
	PAVEMENT PATCH CLASS B	0.20%	26 SQ YD		\$150.00	\$3,900	
		PWF <sub>n</sub> = 0.6419			PW = 0.6419 X	\$3,900	\$2,503
<b>YEAR 20</b>							
	PAVEMENT PATCH CLASS B	2.00%	264 SQ YD		\$150.00	\$39,600	
	SHOULDER PATCH CLASS C	0.50%	0 SQ YD		\$145.00	\$0	
	LONGITUDINAL SHLD JT R&S	100.00%	4,000 LIN FT		\$2.00	\$8,000	
	CENTERLINE JT R&S	100.00%	2,000 LIN FT		\$2.00	\$4,000	
		PWF <sub>n</sub> = 0.5537			PW = 0.5537 X	\$51,600	\$28,570
<b>YEAR 25</b>							
	PAVEMENT PATCH CLASS B	3.00%	396 SQ YD		\$150.00	\$59,400	
	SHOULDER PATCH CLASS C	1.00%	0 SQ YD		\$145.00	\$0	
		PWF <sub>n</sub> = 0.4776			PW = 0.4776 X	\$59,400	\$28,370
<b>YEAR 30 NON-INTERSTATE</b>							
	PAVEMENT PATCH CLASS B	4.00%	528 SQ YD		\$150.00	\$79,200	
	SHOULDER PATCH CLASS C	1.50%	0 SQ YD		\$145.00	\$0	
	HMA POLICY OVERLAY 2.5" (PVMT)	100.00%	13,200 SQ YD		\$13.98	\$184,592	
	HMA POLICY OVERLAY 2.5" (SHLD)	100.00%	0 SQ YD		\$10.08	\$0	
		PWF <sub>n</sub> = 0.4120			PW = 0.4120 X	\$263,792	\$108,679
<b>YEAR 35 NON-INTERSTATE</b>							
	LONGITUDINAL SHLD JT R&S	100.00%	4,000 LIN FT		\$2.00	\$8,000	
	CENTERLINE JT R&S	100.00%	2,000 LIN FT		\$2.00	\$4,000	
	RANDOM CRACK R&S	50.00%	4,000 LIN FT		\$2.00	\$8,000	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	2,554 LIN FT		\$2.00	\$5,108	
	PD PVMT PATCH M&F HMA 2.50"	0.10%	13 SQ YD		\$83.30	\$1,083	
		PWF <sub>n</sub> = 0.3554			PW = 0.3554 X	\$26,191	\$9,308
<b>YEAR 40 NON-INTERSTATE</b>							
	PAVEMENT PATCH CLASS B	0.50%	66 SQ YD		\$150.00	\$9,900	
	LONGITUDINAL SHLD JT R&S	100.00%	4,000 LIN FT		\$2.00	\$8,000	
	CENTERLINE JT R&S	100.00%	2,000 LIN FT		\$2.00	\$4,000	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	3,830 LIN FT		\$2.00	\$7,660	
	RANDOM CRACK R&S	50.00%	4,000 LIN FT		\$2.00	\$8,000	
	PD PVMT PATCH M&F HMA 2.50"	0.50%	66 SQ YD		\$83.30	\$5,498	
		PWF <sub>n</sub> = 0.3066			PW = 0.3066 X	\$43,058	\$13,200
							\$192,081
	ROUTINE MAINTENANCE ACTIVITY		1.52 Lane Miles		\$0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST \$192,081
45	YEAR LIFE CYCLE	CRF <sub>n</sub> = 0.0407852					MAINTENANCE ANNUAL COST PER MILE \$20,682

## LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 3/16/13 10:53 AM

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	\$555,060	\$544,733
		ANNUAL COST PER MILE	\$59,765	\$58,653
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	\$192,081	\$294,570
		ANNUAL COST PER MILE	\$20,682	\$31,717
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	\$747,141	\$839,303
		ANNUAL COST PER MILE	\$80,447	\$90,370

## LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=====>	JPCP	\$80,447	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	HMA	\$90,370	12.3%