Illinois Department of Transportation

To:	Paul Loete, P.E	Attn: District Two
From:	John Baranzelli	
Subject:	Pavement Design	
Date:	September 21, 2015	

FAI Route 39 (I- 39)
(141-1)M-4
Ogle County
NW Ramp I-39 [SB]/I-88 [WB] interchange

The project, submitted to BDE by email memo dated August 20, 2015, will reconstruct the NW Ramp of the I-39/I-88 interchange. The project length does not qualify for alternate bid, as it is less than 2 lane-miles. The LCCA favors a flexible design by more than 10%.

The approved pavement design is as follows:

I-39 NW Ramp (Pavement Reconstruction)

12.5 inches of Full Depth HMA Pavement with HMA Shoulders
- 2 inches of Polymerized HMA Surface Course, Mix "D", N70
- 2.5 inches of Polymerized HMA Binder Course, IL-19.0, N70
- 8 inches of HMA Binder Course, IL-19.0, N70
- 12 inches of Aggregate Subgrade Improvement

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

FILE COPY

Illinois Department of Transportation

Memorandum

To:	Scott E. Stitt	Attn: Paul Niedernhofer
From:	Paul A. Loete	By: Masood Ahmad
Subject:	Pavement Design	
Date:	August 17, 2015	

FAI Route 39 (I-39)
Section (141-1)M-4
Ogle County
Job No. P-92-026-14
Contract No. 64L03
Geometric improvements to the northwest ramp of the I-39 (SB) / I-88 (WB) interchange

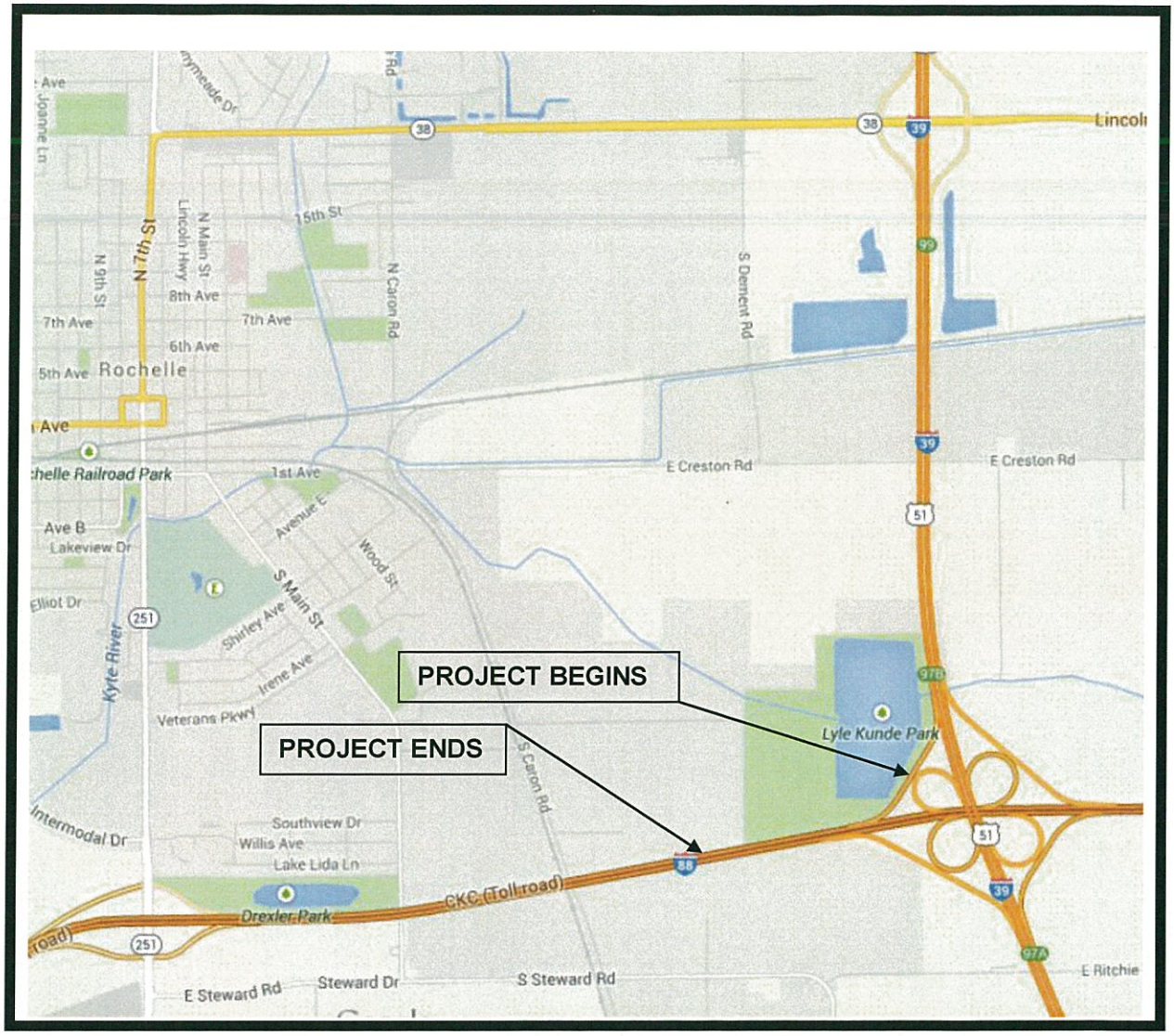
Attached is the pavement selection analysis for the above-captioned section. This section consists of 4,905 square yards of new pavement.

Mechanistic Pavement Design indicates that flexible pavement design presents the lower first and life cycle costs, providing a 14.7% annual cost savings versus a rigid pavement design. The recommended design consists of a 12.5" full-depth hot-mix asphalt pavement.

If you have any questions, please contact Corey Conderman at 815/284-5936.

Attachments

T.40N.



R.2E.

FAI 39 (I-39)
SECTION (141-1)M-4
OGLE COUNTY
JOB NO. P/D-92-026-14
CONTRACT NO. 64L03
PROJECT LENGTH = 3,329.1 FT = 0.63 MILES
(DIXON QUAD – ROCHELLE SE SID MAP)
DEMENT TOWNSHIP – SECTIONS 29 & 32
HSIP SAFETY FUNDING
APRIL 22, 2016 LETTING
SQUAD ENGINEER – COREY CONDERMAN (815) 284-5936

GEOMETRIC IMPROVEMENTS TO THE NORTHWEST RAMP OF THE
I-39 (SB) / I-88 (WB) INTERCHANGE

Figure A

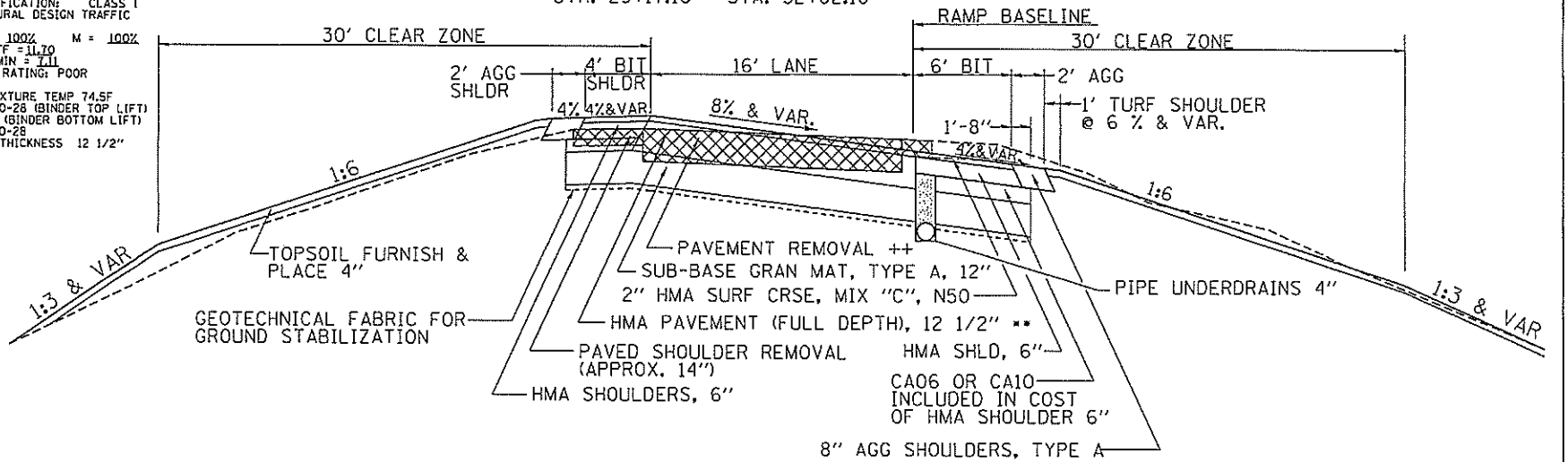
TYPICAL SECTIONS

STRUCTURAL DESIGN INFORMATION
(FLEXIBLE PAVEMENT)

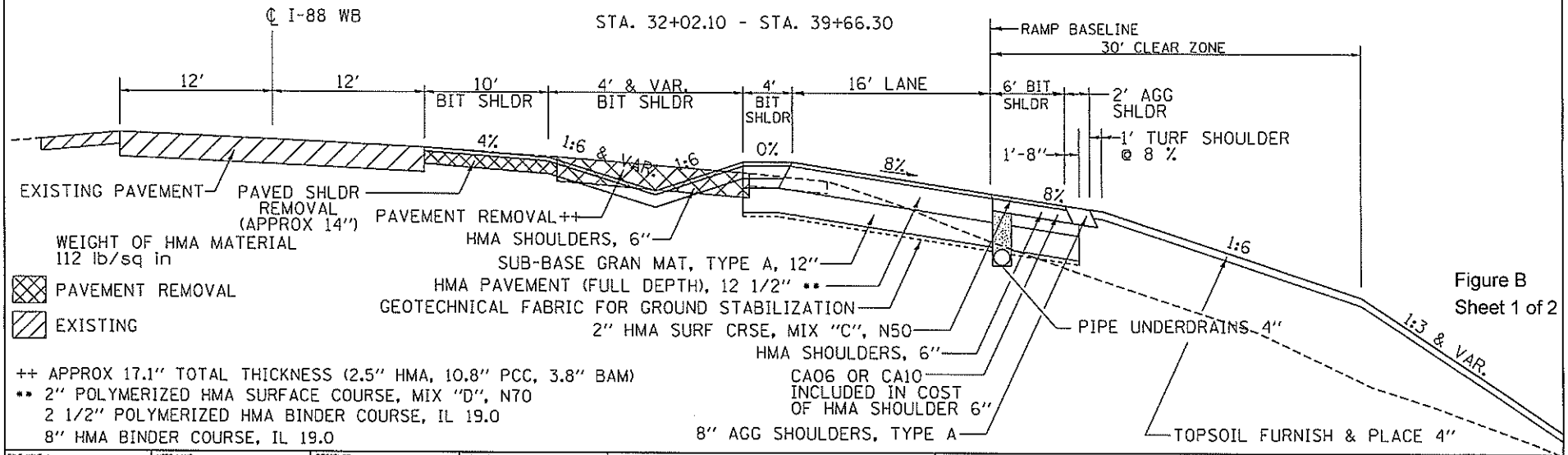
STRUCTURAL DESIGN TRAFFIC: YEAR 2026
PV= 2,200 SU= 180 MU= 1,170
ROAD/STREET CLASSIFICATION: CLASS I
PERCENT OF STRUCTURAL DESIGN TRAFFIC IN DESIGN LANE:
P = 100% S = 100% M = 100%
TRAFFIC FACTOR: TF = 11.70
TRAFFIC FACTOR: MIN = 7.11
SUB-GRADE SUPPORT RATING: POOR

AC 20 AC MIXTURE TEMP 74.5F
AC GRADE: SBS PG 70-28 (BINDER TOP LIFT)
PG 64-22 (BINDER BOTTOM LIFT)
SURFACE: SBS PG 70-28
FLEXIBLE PAVEMENT THICKNESS 12 1/2"

STA. 29+17.10 - STA. 32+02.10



STA. 32+02.10 - STA. 39+66.30



WEIGHT OF HMA MATERIAL
112 lb/sq in

PAVEMENT REMOVAL

EXISTING

++ APPROX 17.1" TOTAL THICKNESS (2.5" HMA, 10.8" PCC, 3.8" BAM)
** 2" POLYMERIZED HMA SURFACE COURSE, MIX "D", N70
2 1/2" POLYMERIZED HMA BINDER COURSE, IL 19.0
8" HMA BINDER COURSE, IL 19.0

Figure B
Sheet 1 of 2

FILE NAME	USER NAME	DESIGNED	REVISED
	PLOT SCALE	CHECKED	REVISED
	PLOT DATE	DATE	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

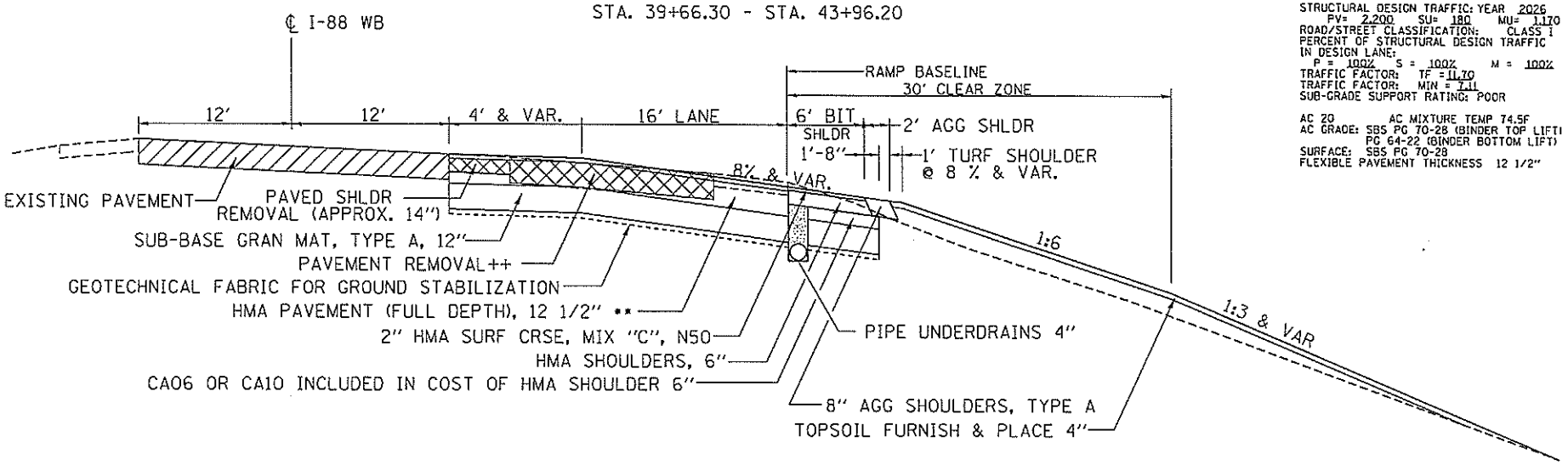
TYPICAL SECTIONS
I-394-88 NORTHWEST RAMP

SCALE: 1" = 50' | SHEET NO. 7 OF 82 SHEETS | STA. | TO STA.

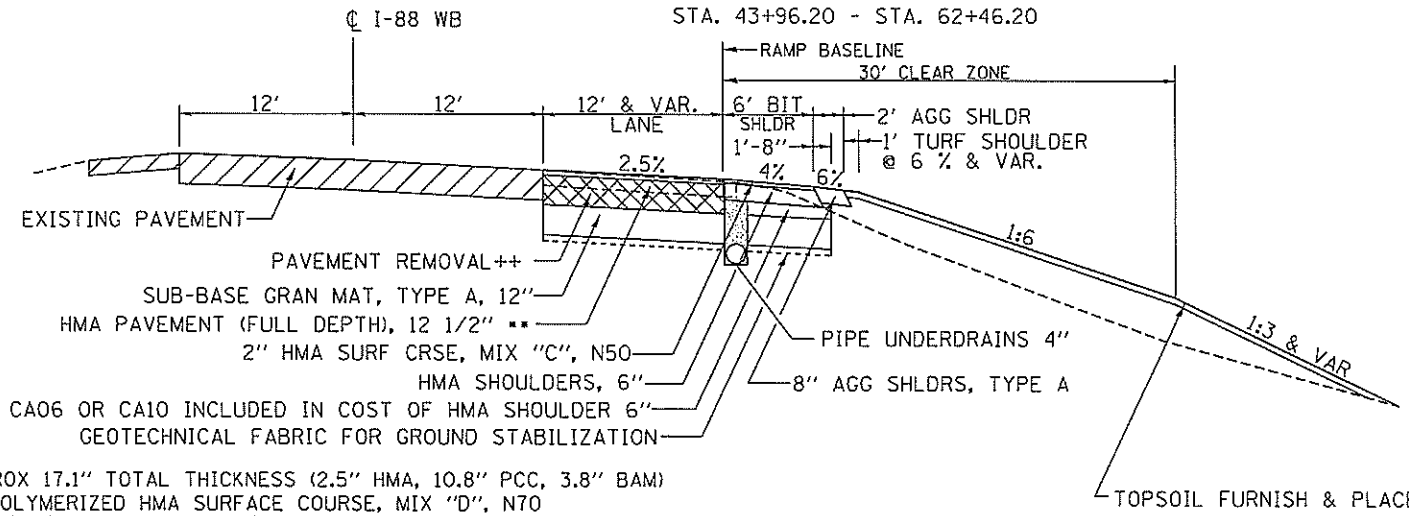
P.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
39		DOLE		
		CONTRACT NO.		
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		

TYPICAL SECTIONS

STA. 39+66.30 - STA. 43+96.20



STA. 43+96.20 - STA. 62+46.20



STRUCTURAL DESIGN INFORMATION
(FLEXIBLE PAVEMENT)

STRUCTURAL DESIGN TRAFFIC: YEAR 2026
PV= 2,200 SU= 180 MU= 1,170
ROAD/STREET CLASSIFICATION: CLASS I
PERCENT OF STRUCTURAL DESIGN TRAFFIC IN DESIGN LANE:
P = 100% S = 100% M = 100%
TRAFFIC FACTOR: TF = 11.70
TRAFFIC FACTOR: MIN = 7.11
SUB-GRADE SUPPORT RATING: POOR

AC 20 AC MIXTURE TEMP 74.5F
AC GRADE: SBS PG 70-28 (BINDER TOP LIFT)
PG 64-22 (BINDER BOTTOM LIFT)
SURFACE: SBS PG 70-28
FLEXIBLE PAVEMENT THICKNESS 12 1/2"

Figure B
Sheet 2 of 2

WEIGHT OF HMA MATERIAL
112 lb/sq in
PAVEMENT REMOVAL
EXISTING

++ APPROX 17.1" TOTAL THICKNESS (2.5" HMA, 10.8" PCC, 3.8" BAM)
** 2" POLYMERIZED HMA SURFACE COURSE, MIX "D", N70
2 1/2" POLYMERIZED HMA BINDER COURSE, IL 19.0
8" HMA BINDER COURSE, IL 19.0

FILE NAME =	USER NAME =	DESIGNED -	REVISED -
	PLOT SCALE =	CHECKED -	REVISED -
	PLOT DATE =	DATE -	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
I-391-88 NORTHWEST RAMP

SCALE: 1" = 50' | SHEET NO. 82 OF SHEETS | STA. | TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
39		DOLE		
		CONTRACT NO.		
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		

BDE 5401 Template (Rev. 09/05/2013)

IDOT MECHANISTIC PAVEMENT DESIGN

Printed: 08/24/2015

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: FAI 39 (I-39)
Section: (141-1)M-4
County: Ogle
Location: I-39 (SB) / I-88 (WB) interchange
Comments: Geometric improvement (Realignment / Repair)
Design Date: 05/01/2015
Modify Date:

	ADT	Year
<-- BY		
<-- BY	ADT	Year
Current:	3,150	2016
Future:	3,950	2036

Facility Type: Interstate or Freeway
** Ramp Design Fig. 54-1.B **
# of Lanes = 1 Lane Ramp
Crossroad? Interstate or Freeway
# of Lanes = 4
Road Class: I
Subgrade Support Rating (SSR): Poor
Construction Year: 2016
Design Period (DP) = 20 years

	Minimum ADT	Actual ADT	Actual %of Total ADT	% of ADT in Design Lane
				Structural Design Traffic
PV =	0	2,200	62.0%	P = 100%
SU =	500	180	5.1%	S = 100%
MU =	1500	1,170	33.0%	M = 100%
Struct. Design ADT =		3,550	(2026)	

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT		RAMP DESIGN MIN	
Cpv =	0.15	0.15	32%
Csu =	132.5	132.5	45%
Cmu =	482.53	482.53	45%
TF flexible (Actual) =	11.78	(Actual ADT)	7.11
TF flexible (Min) =	7.11	(Min ADT Fig. 54-2.C)	

RIGID PAVEMENT		RAMP DESIGN MIN	
Cpv =	0.15	0.15	32%
Csu =	143.81	143.81	45%
Cmu =	696.42	696.42	45%
TF rigid (Actual) =	16.82	(Actual ADT)	10.05
TF rigid (Min) =	10.05	(Min ADT Fig. 54-2.C)	

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement

Use TF flexible = 11.78
PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)
Goto Map
HMA Mixture Temp. = 74.5 deg. F (Fig. 54-5.C)
Design HMA Mixture Modulus (E_{HMA}) = 710 ksi (Fig. 54-5.D)
Design HMA Strain (ε_{HMA}) = 59 (Fig. 54-5.E)
Goto Map
Full Depth HMA Design Thickness = 12.50 in. (Fig. 54-5.F)
Limiting Strain Criterion Thickness = 14.50 in. (Fig. 54-5.I)

Use Full-Depth HMA Thickness = 12.50 inches

JPC Pavement

Use TF rigid = 16.82
Edge Support = Tied Shoulder or C.&G.

Rigid Pavt Thick. = 10.25 in. (Fig. 54-4.E)

CRC Pavement

Use TF rigid = 16.82
IBR value = 3

CRCP Thickness = 9.50 in. (Fig. 54-4.M)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC

Use TF flexible = 11.78
HMA Overlay Design Thickness = 10.00 in. (Fig. 54-5.U)
Goto Map
Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)

Use HMA Overlay Thickness = 10.00 inches

Unbonded Concrete Overlay

Review 54-4.03 for limitations and special considerations.

JPCP Thickness = NA inches

CONTACT BMPR 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)

	Min. Str. Design Traffic (Fig 54-2.C)		
Facility Type	PV	SU*	MU*
Interstate or Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	0	250	750

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

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

	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
Class	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

	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)					
	Rural			Urban		
Number of Lanes	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%

BDE 5401 Template (Rev. 09/05/2013) Printed: 08/24/2015

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT

Standard Design

ROUTE			FAI 39 (I-39)
SECTION			(141-1)M-4
COUNTY			Ogle
LOCATION			I-39 (SB) / I-88 (WB) interchange
FACILITY TYPE			INTERSTATE
PROJECT LENGTH		3353	FT = = > 0.64 Miles
# OF CENTERLINES		1	CL
# OF LANES		1	LANES
# OF EDGES		2	EP
LANE WIDTH - AVERAGE		16	FT
SHOULDER WIDTH	HMA Left	4	FT
	HMA Right	6	FT
	Total Width of Paved Shoulders	10	FT

PAVEMENT THICKNESS (FLEXIBLE)	12.50	IN	14.50 IN MAX
SHOULDER THICKNESS	8.00	IN	Standard Design
POLICY OVERLAY THICKNESS	3.75	IN	

FLEX PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	7.11	11.78	11.78

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	$105.00 / TON
HMA TOP BINDER	$90.00 / TON
HMA LOWER BINDER	$64.00 / TON
HMA BINDER (LEVELING)	$0.00 / TON
HMA SHOULDER	$80.00 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT		UNIT PRICE	COST
HMA PAVEMENT (FULL-DEPTH)	(12.50")	4,905	SQ YD	*	$53.06 / SQ YD	$260,259 ~
HMA SURFACE COURSE	(2.00")	550	TONS	*	$105.00 / TON	$0
HMA TOP BINDER COURSE	(2.25")	687	TONS	*	$90.00 / TON	$0
HMA LOWER BINDER COURSE	(8.25")	2,198	TONS	*	$64.00 / TON	$0
HMA SHOULDER	(8.00")	1,450	TONS	*	$80.00 / TON	$116,000 ~
CURB & GUTTER		0	LIN FT		$0.00 / LIN FT	$0
SUBBASE GRAN MATL TY C (TONS)		0	TONS	*	$0.00 / TON	$0
IMPROVED SUBGRADE:	Modified Soil	8,901	SQ YD	*	$14.00 / SQ YD	$124,614
Reserved For User Supplied Item		0	UNITS		$0.00 / UNITS	$0
Reserved For User Supplied Item		0	UNITS		$0.00 / UNITS	$0
PAVEMENT REMOVAL		5,961	SQ YD		$10.00 / SQ YD	$59,610
SHOULDER REMOVAL		3,726	SQ YD		$10.00 / SQ YD	$37,260

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST	$597,743
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE	$38,390

MAINTENANCE COSTS:

ITEM		THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY				$0.00 LANE-MILE / YEAR
HMA OVERLAY PVMT SURF		(2.00")	Surface Mix	$11.77 / SQ YD
HMA OVERLAY PVMT		(3.75")		$22.93 / SQ YD
HMA SURFACE MIX		(1.50")	Surface Mix	$11.34 / SQ YD
HMA BINDER MIX		(2.25")	Top Binder Mix	$11.59 / SQ YD
HMA OVERLAY SHLD	(Year 30)	(1.75")	Shoulder Mix	$8.62 / SQ YD
HMA OVERLAY SHLD		(2.00")	Shoulder Mix	$9.53 / SQ YD
MILLING (2.00 IN)				$3.25 / SQ YD
PARTIAL DEPTH PVMT PATCH		(Mill & Fill Surf)	Surface Mix	$105.00 / SQ YD
PARTIAL DEPTH SHLD PATCH		(Mill & Fill Surf)	Shoulder Mix	$105.00 / SQ YD
PARTIAL DEPTH PVMT PATCH		(Mill & Fill +2.00 ")	Leveling Binder Mix	$60.00 / SQ YD
PARTIAL DEPTH SHLD PATCH		(Mill & Fill +2.00 ")	Shoulder Mix	$60.00 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL				$1.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL				$1.00 / LIN FT
RANDOM / THERMAL CRACK ROUT & SEAL		(100% Rehab = 110.00' / Station / Lane)		$1.00 / LIN FT

FLEXIBLE TOTAL LIFE-CYCLE COST	$785,303
FLEXIBLE TOTAL ANNUAL COST PER MILE	$50,436

HMA_SD

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 08/24/15

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
YEAR 5								
	LONG SHLD JT R&S	100.00%	6,706	LIN FT	$1.00		$6,706	
	CNTR LINE JOINT R&S	100.00%	3,353	LIN FT	$1.00		$3,353	
	RNDM / THRM CRACK R&S	50.00%	1,844	LIN FT	$1.00		$1,844	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	$105.00		$525	
	PWFn =	0.8626		PW =	0.8626	X	$12,428	$10,721
YEAR 10								
	LONG SHLD JT R&S	100.00%	6,706	LIN FT	$1.00		$6,706	
	CNTR LINE JOINT R&S	100.00%	3,353	LIN FT	$1.00		$3,353	
	RNDM / THRM CRACK R&S	50.00%	1,844	LIN FT	$1.00		$1,844	
	PD PVMT PATCH M&F SURF	0.50%	25	SQ YD	$105.00		$2,625	
	PWFn =	0.7441		PW =	0.7441	X	$14,528	$10,810
YEAR 15								
	MILL PVMT & SHLD 2.00"	100.00%	8,142	SQ YD	$3.25		$26,462	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	49	SQ YD	$60.00		$2,940	
	HMA OVERLAY PVMT 2.00"	100.00%	4,905	SQ YD	$11.77		$57,732	
	HMA OVERLAY SHLD 2.00 "	100.00%	3,237	SQ YD	$9.53		$30,845	
	PWFn =	0.6419		PW =	0.6419	X	$117,979	$75,726
YEAR 20								
	LONG SHLD JT R&S	100.00%	6,706	LIN FT	$1.00		$6,706	
	CNTR LINE JOINT R&S	100.00%	3,353	LIN FT	$1.00		$3,353	
	RNDM / THRM CRACK R&S	50.00%	1,844	LIN FT	$1.00		$1,844	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	$105.00		$525	
	PWFn =	0.5537		PW =	0.5537	X	$12,428	$6,881
YEAR 25								
	LONG SHLD JT R&S	100.00%	6,706	LIN FT	$1.00		$6,706	
	CNTR LINE JOINT R&S	100.00%	3,353	LIN FT	$1.00		$3,353	
	RNDM / THRM CRACK R&S	50.00%	1,844	LIN FT	$1.00		$1,844	
	PD PVMT PATCH M&F SURF	0.50%	25	SQ YD	$105.00		$2,625	
	PWFn =	0.4776		PW =	0.4776	X	$14,528	$6,939
YEAR 30	INTERSTATE							
	MILL PVMT ONLY 2.00"	100.00%	4,905	SQ YD	$3.25		$15,941	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	98	SQ YD	$60.00		$5,880	
	PD SHLD PATCH M&F SURF 2.00"	1.00%	32	SQ YD	$60.00		$1,920	
	HMA OVERLAY PVMT 3.75 "	100.00%	4,905	SQ YD	$22.93		$112,472	
	HMA OVERLAY SHLD 1.75 "	100.00%	3,237	SQ YD	$8.62		$27,900	
	PWFn =	0.4120		PW =	0.4120	X	$164,113	$67,612
YEAR 35								
	LONG SHLD JT R&S	100.00%	6,706	LIN FT	$1.00		$6,706	
	CNTR LINE JOINT R&S	100.00%	3,353	LIN FT	$1.00		$3,353	
	RNDM / THRM CRACK R&S	50.00%	1,844	LIN FT	$1.00		$1,844	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	$105.00		$525	
	PWFn =	0.3554		PW =	0.3554	X	$12,428	$4,417
YEAR 40								
	LONG SHLD JT R&S	100.00%	6,706	LIN FT	$1.00		$6,706	
	CNTR LINE JOINT R&S	100.00%	3,353	LIN FT	$1.00		$3,353	
	RNDM / THRM CRACK R&S	50.00%	1,844	LIN FT	$1.00		$1,844	
	PD PVMT PATCH M&F SURF	0.50%	25	SQ YD	$105.00		$2,625	
	PWFn =	0.3066		PW =	0.3066	X	$14,528	$4,454
								$187,560
	ROUTINE MAINTENANCE ACTIVITY		0.64	Lane Miles	0.00		$0	$0
					MAINTENANCE LIFE-CYCLE COST			$187,560
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE ANNUAL COST PER MILE			$12,046

PCC PAVEMENT

JPCP

ROUTE		FAI 39 (I-39)	
SECTION		(141-1)M-4	
COUNTY		Ogle	
LOCATION		I-39 (SB) / I-88 (WB) interchange	
FACILITY TYPE		INTERSTATE	
PROJECT LENGTH		3353 FT = = >	0.64 Miles
# OF CENTERLINES		1 CL	
# OF LANES		1 LANES	
# OF EDGES		2 EP	
LANE WIDTH - AVERAGE		16 FT	
SHOULDER WIDTH	PCC Left	4 FT	
	PCC Right	6 FT	
	Total Width of Paved Shoulders	10 FT	
PAVEMENT THICKNESS (RIGID)	JPCP	10.25 IN	TIED SHLD
SHOULDER THICKNESS		10.25 IN	
POLICY OVERLAY THICKNESS		3.75 IN	

RIGID PAVEMENT TRAFFIC FACTORS		MINIMUM	ACTUAL	USE
		10.05	16.82	16.82
Worksheet Construction Type is	New Construction		The Pavement Type is	JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT		UNIT PRICE		COST
JPC PAVEMENT	(10.25")	4,905	SQ YD	*	$50.00	/ SQ YD	$245,250
PAVEMENT REINFORCEMENT		0	SQ YD		$0.00	/ SQ YD	$0
STABILIZED SUBBASE	(4.00")	5,840	SQ YD	*	$24.00	/ SQ YD	$140,160
PCC SHOULDERS	(10.25" to 10.25")	3,235	SQ YD	*	$48.00	/ SQ YD	$155,275
CURB & GUTTER		0	LIN FT		$0.00	/ LIN FT	$0
SUBBASE GRAN MATL TY C	(~ 1.80")	0	TONS	*	$0.00	/ TON	$0
IMPROVED SUBGRADE:	Modified Soil Width = 23.6'	8,901	SQ YD	*	$14.00	/ SQ YD	$124,614
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0
PAVEMENT REMOVAL		5,961	SQ YD		$10.00	/ SQ YD	$59,610
SHOULDER REMOVAL		3,726	SQ YD		$10.00	/ SQ YD	$37,260

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	$762,169
RIGID CONSTRUCTION ANNUAL COST PER MILE	$48,950

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL		UNIT COST	
ROUTINE MAINTENANCE ACTIVITY				$0.00	/ LANE-MILE / YEAR
HMA POLICY OVERLAY	(3.75")		3.75		
HMA POLICY OVERLAY PVMT	(3.75")		3.75	$22.93	/ SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	1.50	$11.34	/ SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	2.25	$11.59	/ SQ YD
HMA POLICY OVERLAY SHLD	(3.75")	Shoulder Mix	3.75	$18.91	/ SQ YD
CLASS A PAVEMENT PATCHING				$0.00	/ SQ YD
CLASS B PAVEMENT PATCHING				$200.00	/ SQ YD
CLASS C SHOULDER PATCHING				$165.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		Surface Mix	1.50	$99.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50")		Surface Mix	1.50	$99.00	/ SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL				$1.00	/ LIN FT
CENTERLINE JOINT ROUT & SEAL				$1.00	/ LIN FT
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL				$1.00	/ LIN FT
RANDOM CRACK ROUT & SEAL	(100% Rehab = 100.00' / Station / Lane)			$1.00	/ LIN FT

RIGID TOTAL LIFE-CYCLE COST	$901,080
RIGID TOTAL ANNUAL COST PER MILE	$57,872

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 08/24/15

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

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST		COST	PRESENT WORTH
YEAR 10								
	PAVEMENT PATCH CLASS B	0.10%	5	SQ YD	$200.00		$1,000	
	PWFn =	0.7441		PW =	0.7441	X	$1,000	$744
YEAR 15								
	PAVEMENT PATCH CLASS B	0.20%	10	SQ YD	$200.00		$2,000	
	PWFn =	0.6419		PW =	0.6419	X	$2,000	$1,284
YEAR 20								
	PAVEMENT PATCH CLASS B	2.00%	98	SQ YD	$200.00		$19,600	
	SHOULDER PATCH CLASS C	0.50%	16	SQ YD	$165.00		$2,640	
	LONGITUDINAL SHLD JT R&S	100.00%	6,706	LIN FT	$1.00		$6,706	
	CENTERLINE JT R&S	100.00%	3,353	LIN FT	$1.00		$3,353	
	PWFn =	0.5537		PW =	0.5537	X	$32,299	$17,883
YEAR 25								
	PAVEMENT PATCH CLASS B	3.00%	147	SQ YD	$200.00		$29,400	
	SHOULDER PATCH CLASS C	1.00%	32	SQ YD	$165.00		$5,280	
	PWFn =	0.4776		PW =	0.4776	X	$34,680	$16,563
YEAR 30	INTERSTATE							
	PAVEMENT PATCH CLASS B	4.00%	196	SQ YD	$200.00		$39,200	
	SHOULDER PATCH CLASS C	1.50%	49	SQ YD	$165.00		$8,085	
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%	4,905	SQ YD	$22.93		$112,472	
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00%	3,237	SQ YD	$18.91		$61,204	
	PWFn =	0.4120		PW =	0.4120	X	$220,961	$91,033
YEAR 35	INTERSTATE							
	LONGITUDINAL SHLD JT R&S	100.00%	6,706	LIN FT	$1.00		$6,706	
	CENTERLINE JT R&S	100.00%	3,353	LIN FT	$1.00		$3,353	
	RANDOM CRACK R&S	50.00%	1,677	LIN FT	$1.00		$1,677	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	1,434	LIN FT	$1.00		$1,434	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	5	SQ YD	$99.00		$495	
	PWFn =	0.3554		PW =	0.3554	X	$13,665	$4,856
YEAR 40	INTERSTATE							
	PAVEMENT PATCH CLASS B	0.50%	25	SQ YD	$200.00		$5,000	
	LONGITUDINAL SHLD JT R&S	100.00%	6,706	LIN FT	$1.00		$6,706	
	CENTERLINE JT R&S	100.00%	3,353	LIN FT	$1.00		$3,353	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	2,150	LIN FT	$1.00		$2,150	
	RANDOM CRACK R&S	50.00%	1,677	LIN FT	$1.00		$1,677	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%	25	SQ YD	$99.00		$2,475	
	PWFn =	0.3066		PW =	0.3066	X	$21,361	$6,548
								$138,911
	ROUTINE MAINTENANCE ACTIVITY		0.64	Lane Miles	$0.00		$0	$0
					MAINTENANCE LIFE-CYCLE COST			$138,911
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE ANNUAL COST PER MILE			$8,922

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 5/26/15 8:33 AM

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	$762,169	$597,743
		ANNUAL COST PER MILE	$48,950	$38,390
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	$138,911	$187,560
		ANNUAL COST PER MILE	$8,922	$12,046
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	$901,080	$785,303
		ANNUAL COST PER MILE	$57,872	$50,436

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	==========>	**HMA**	**$50,436**	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	**JPCP**	**$57,872**	**14.7%**

P:\Pavement Design Stuff\D-2\I-39 NW ramp at I-88 interchange 08-20-15\[I-39 NW rampat I-88 interchange IDOT Mechanistic Pavement Design with LCCA 090513