Illinois Department of Transportation

To:	John Fortmann	Attn: District One
From:	John D. Baranzelli	
Subject:	Pavement Design	
Date:	February 9, 2015	

FAU Route 3887 (IL 31)
Kane County
At Longmeadow Parkway

The project, submitted to BDE by memo dated December 1, 2014, will reconstruct IL 31 as a result of the construction of Longmeadow Parkway. The project is not subject to alternate bidding, and the LCCA favored a flexible design by 5.3%. The Pavement Selection Committee was convened, and the district requested the use of HMA Pavement due to constructability and the interim project status, as this new roadway will likely be upgraded in the future. The PSC Committee concurred with the district's request.

The approved pavement design is as follows:

IL 31 (Pavement Reconstruction)

10 inches of Full Depth HMA Pavement with PCC C&G and HMA Shoulder
- 2 inches of Polymerized HMA Surface Course, Mix "F", N90
- 2.25 inches of Polymerized HMA Binder Course, IL-19.0, N90
- 5.75 inches of HMA Base Course, IL-19.0, N90

12 inches of Aggregate Subgrade Improvement

IL 31 (Temporary Pavement)

Option 1
10 inches of Full Depth Temporary HMA Pavement
- 2 inches of HMA Surface Course, Mix "D", N50
- 8 inches of HMA Binder Course, IL-19.0, N50

4 inches of Subgrade Granular Material Type B (CA-6)

Option 2
8 inches of Temporary PCC Pavement
4 inches of Subgrade Granular Material Type B (CA-6)

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

Illinois Department of Transportation

Memorandum

To: John D. Baranzelli — Attn: Paul Niedernhofer

From: Jose A. Dominguez — By: Melchor Mangoba / Ojas Patel

Subject: Pavement Analysis*

Date: December 1, 2014

*Route: IL 31
Limits: at Longmeadow Parkway
Section: 13-00215-10-PV
Current target: 01CY15

County: Kane
Contract No.: NA
Job No.: C-91-513-08

We have completed the pavement analysis for the above captioned location. Review by the Central Office is required since the total pavement area for reconstruction exceeds 4,750 Square Yards. The following is the scope of the project:

Reconstruction of approximately 3,600 feet of IL 31 to provide two lanes in each direction as a result of the new construction of Longmeadow Parkway (new route under local jurisdiction). Since the intersection of IL 31 and Longmeadow Parkway will be grade separated, connectivity to/from Longmeadow Parkway will be via a new intersection with Connector Road to the south.

IL 31 at Connector Road is a "High Stress" intersection since the design lane MU ADT exceeds 200 vehicles. District 1 recommends Mix "F" 90 at "High Stress" intersections to be built at a minimum 150 feet back from the location of the stop bar.

The life-cycle cost analysis does not favor HMA or PCC pavement by more than 10% in any of the locations on the project. A review by pavement selection committee will be required according to the flowchart in Figure 54-1.A of Chapter 54 of the BDE manual. Our recommendation is to provide full depth HMA as the life-cycle cost analysis favors HMA pavement by 5.3%.

IL 31
Reconstruction
PCC Curb and Gutter
HMA Shoulder[6] (Sta. 401+59 to 409+00 and Sta. 420+00 to 437+40)

10" Full Depth HMA[5]
- 2" Polymerized HMA Surface Course, Mix "F", N90[1]
- 2 ¼" Polymerized HMA Binder Course, IL-19.0, N90[2]
- 5 ¾" HMA Base Course, IL-19.0, N90[3]

12" Aggregate Subgrade Improvement[4]

IL 31 (Temporary Pavement)

Option 1[7]
- Temporary Pavement
  - 10" Full Depth Temporary HMA Pavement[8]
    - 2" HMA Surface Course, Mix "D", N50
    - 8" HMA Binder Course, IL-19.0, N50
  - 4" Subbase Granular Material Type B (CA-6)[9]

Option 2[7]
- Temporary Pavement
  - 8" Temporary PCC Pavement[8]
  - 4" Subbase Granular Material Type B (CA-6)[9]

[1]Designer Note 1: Use pay item **40603595, POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, MIX "F", N90** paid for in tons.

[2]Designer Note 2: Use pay item **40603240, POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, IL-19.0, N90** paid for in tons.

[3]Designer Note 3: Use pay item **35501307, HOT-MIX ASPHALT BASE COURSE, 5 ¾"**, paid for in square yards.

[4]Designer Note 4: Use pay item **30300112, AGGREGATE SUBGRADE IMPROVEMENT, 12"**, paid in square yards.

[5]Designer Note 5: Refer to the District One, Bureau of Materials' "Hot-Mix Asphalt – Mix Selection" tables to determine the corresponding HMA mix table requirements for the plans.

[6] Designer Note 6: The designer shall utilize IDOT Highway Standards in conjunction with guidelines in BDE Manual 34-2.02 if necessary for shoulder thicknesses.

[7] Designer Note 7: The contractor shall have the option of constructing either material type if both Portland cement concrete and HMA are shown in the plans. For quantity estimation purposes, excavation quantities should be estimated assuming the thicker design if both options are shown in the plans.

[8] Designer Note 8: Use pay item **Z0062456, TEMPORARY PAVEMENT**, paid in square yards.

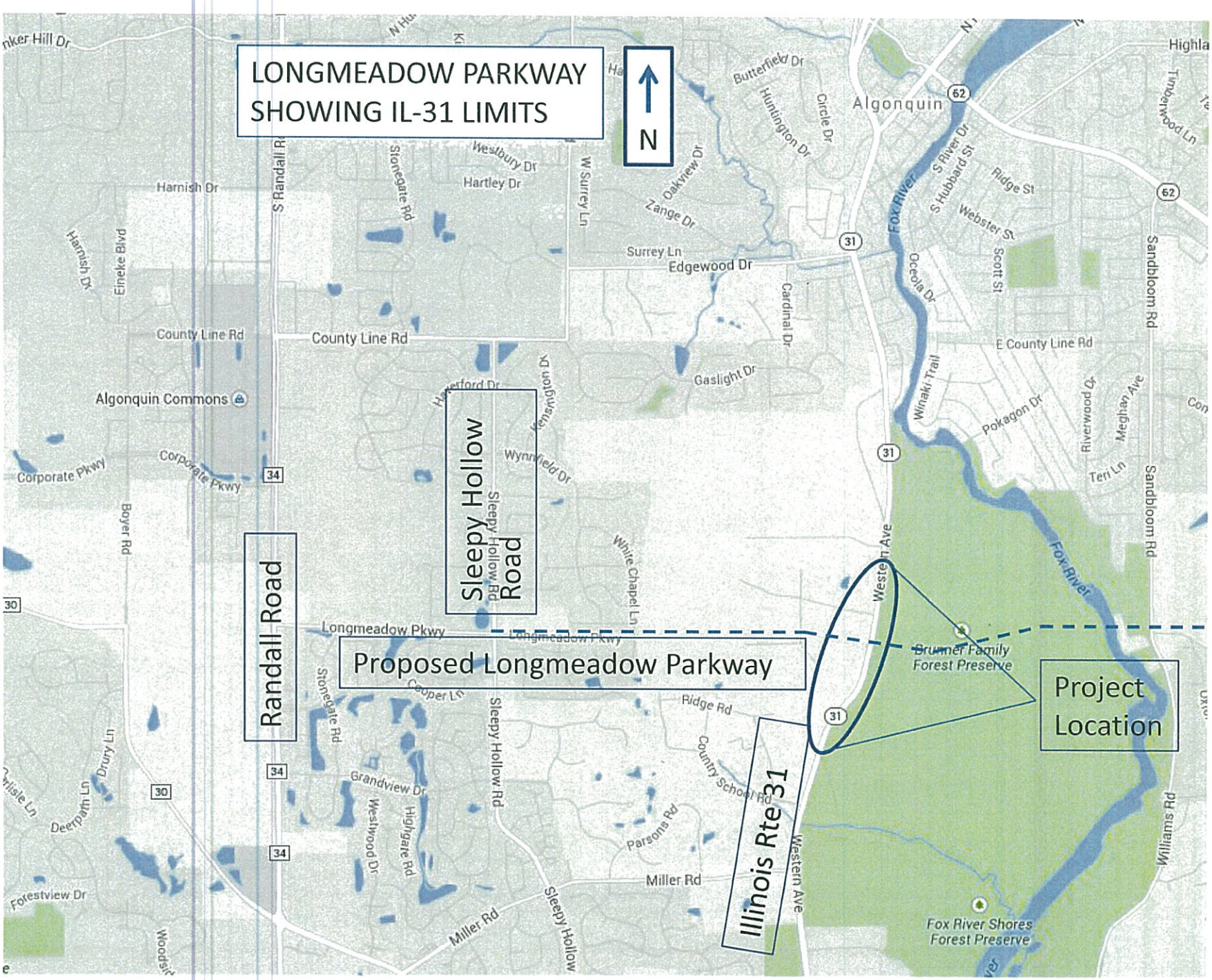
The HMA temporary pavement shall consist of two items, HMA binder course and HMA surface course. Include both items in the HMA mix table requirements.

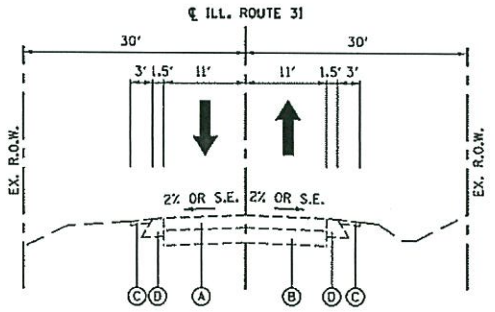
When PC Temp Pavement is used as an option, the following note shall appear on the plans adjacent to the HMA mix table: "PC Concrete temporary pavement shall consist of Class PV Concrete meeting the requirements of Art.1020 of the Standard Specifications. Temporary PCC pavement does not require dowel bars.

[9] Designer Note 9: Use pay item **31101200, SUBBASE GRANULAR MATERIAL, TYPE B 4"**, paid in square yards

If you have any questions or need additional information, please contact Ojas Patel, Pavement Design Engineer, at (847)705-4550.

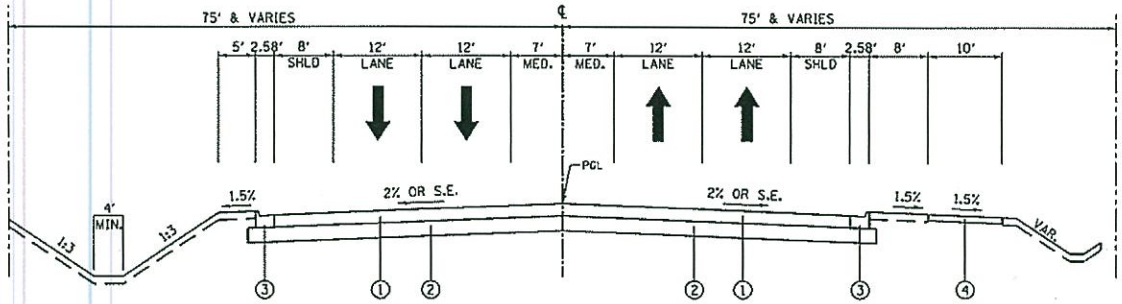
By: Jose A. Dominguez
Jose A. Dominguez, P.E.
Project Support Engineer


LONGMEADOW PARKWAY
SHOWING IL-31 LIMITS
N
Randall Road
Sleepy Hollow Road
Proposed Longmeadow Parkway
Illinois Rte 31
Project Location
Algonquin
Algonquin Commons
County Line Rd
Corporate Pkwy
Longmeadow Pkwy
Sleepy Hollow Rd
Western Ave
Fox River
Brunner Family Forest Preserve
Fox River Shores Forest Preserve
Edgewood Dr
Surrey Ln
Harnish Dr
Miller Rd
Ridge Rd
Grandview Dr
Country School Rd
Parsons Rd
Gaslight Dr
Cardinal Dr
Sandbloom Rd
Williams Rd
Boyer Rd
Drury Ln
Deerpath Ln
Forestview Dr
Stonegate Rd
Westwood Dr
Highgate Rd
Cooper Ln
White Chapel Ln
Wynnfield Dr
Kensington Dr
Hartley Dr
Westbury Dr
Zange Dr
Oakview Dr
Huntington Dr
Circle Dr
Butterfield Dr
Oceola Dr
Winaki Trail
Pokagon Dr
Riverwood Dr
Meghan Ave
Teri Ln
Scott St
Webster St
Ridge St
S Hubbard St
S River Dr
Timberwood Ln
Eineke Blvd
S Randall Rd
W Surrey Ln
Cardinal Dr
E County Line Rd
62
31
34
30



ILLINOIS ROUTE 31
EXISTING TYPICAL SECTION

Ⓐ HMA PAVEMENT
Ⓑ PCC PAVEMENT
Ⓒ AGGREGATE SHOULDER
Ⓓ HMA SHOULDER



ILLINOIS ROUTE 31
PROPOSED TYPICAL SECTION

① PAVEMENT
② 12" AGGREGATE SUBGRADE
③ M-4.24 C&G
④ HMA MULTI-USE PATH (3" HMA, 5" AGG)
⑤ PAVEMENT MARKING

TranSystems

PROJ NO: P401130109	
SCALE: AS SHOWN	
DATE: 11/05/2014	
DESIGNED BY: BSH	
DRAWN BY: BSH	
CHECKED BY: MFD	

SHEET TITLE

ILLINOIS ROUTE 31
TYPICAL SECTIONS

PROJECT

LONGMEADOW PARKWAY

DWG NUMBER

TYP-31

BDE 5401 Template (Rev. 09/05/2013) **IDOT MECHANISTIC PAVEMENT DESIGN** Printed: 02/09/2015

PROJECT AND TRAFFIC INPUTS (Enter Data in Gray Shaded Cells)

Route: IL 31
Section: 13-00215-10-PV
County: Kane
Location: at Longmeadow Parkway
Comments: Local Roads - Longmeadow Parkway (New Construction)
Design Date: 11/20/2014 ONP <-- BY
Modify Date: <-- BY

	ADT	Year
Current:	13,900	2013
Future:	22,000	2040

Facility Type: Other Marked State Route
# of Lanes = 4
Road Class: I
Subgrade Support Rating (SSR): Poor
Construction Year: 2016
Design Period (DP) = 20 years

	Minimum ADT	Structural Design Traffic: Actual ADT	Actual %of Total ADT	% of ADT in Design Lane
PV =	0	16,536	92.9%	P = 32%
SU =	250	712	4.0%	S = 45%
MU =	750	552	3.1%	M = 45%

Struct. Design ADT = 17,800 (2026)

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT

Cpv = 0.15
Csu = 132.5
Cmu = 482.53
TF flexible (Actual) = 3.26 (Actual ADT)
TF flexible (Min) = 3.56 (Min ADT Fig. 54-2.C)

RIGID PAVEMENT

Cpv = 0.15
Csu = 143.81
Cmu = 696.42
TF rigid (Actual) = 4.40 (Actual ADT)
TF rigid (Min) = 5.02 (Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement

Use TF flexible = 3.56
Goto Map — PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)
Goto Map — HMA Mixture Temp. = 74.0 deg. F (Fig. 54-5.C)
Design HMA Mixture Modulus (E_{HMA}) = 720 ksi (Fig. 54-5.D)
Design HMA Strain (ε_{HMA}) = 84 (Fig. 54-5.E)
Goto Map — Full Depth HMA Design Thickness = 10.00 in. (Fig. 54-5.F)
Goto Map — Limiting Strain Criterion Thickness = 14.50 in. (Fig. 54-5.I)
Use Full-Depth HMA Thickness = 10.00 inches

JPC Pavement

Use TF rigid = 5.02
Edge Support = Tied Shoulder or C.&G.
Rigid Pavt Thick. = 9.00 in. (Fig. 54-4.E)

CRC Pavement

Use TF rigid = 5.02
IBR value = 3
CRCP Thickness = 8.00 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 = 3.56
Goto Map — HMA Overlay Design Thickness = 7.50 in. (Fig. 54-5.U)
Goto Map — Limiting Strain Criterion Thickness = in. (Fig. 54-5.V)
Use HMA Overlay Thickness = 999.00 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)

Facility Type	Min. Str. Design Traffic (Fig 54-2.C) PV	SU	MU
Interstate or 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) Csu	Cmu	Flexible (Fig. 54-5.B) 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 P	S	M	Urban 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: 02/09/2015

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT

Standard Design

ROUTE	IL 31
SECTION	13-00215-10-PV
COUNTY	Kane
LOCATION	at Longmeadow Parkway
FACILITY TYPE	NON-INTERSTATE

PROJECT LENGTH			3581	FT ==>	0.68 Miles
# OF CENTERLINES			4	CL	
# OF LANES			4	LANES	
# OF EDGES			2	EP	
LANE WIDTH - AVERAGE			12	FT	
SHOULDER WIDTH	HMA	Left	8	FT	
	HMA	Right	8	FT	
	Total Width of Paved Shoulders		16	FT	

PAVEMENT THICKNESS (FLEXIBLE)	10.00 IN	14.50 IN MAX	
SHOULDER THICKNESS	8.00 IN		Standard Design
POLICY OVERLAY THICKNESS	2.25 IN		

FLEX PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	3.56	3.26	3.56

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	$85.90 / TON
HMA TOP BINDER	$85.88 / TON
HMA LOWER BINDER	$72.26 / TON
HMA BINDER (LEVELING)	$85.88 / TON
HMA SHOULDER	$72.00 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT		UNIT PRICE		COST	
HMA PAVEMENT (FULL-DEPTH)	(10.00")	19,099	SQ YD	*	$44.15	/ SQ YD	$843,206	~
HMA SURFACE COURSE	(2.00")	2,146	TONS		$85.90	/ TON	$0	
HMA TOP BINDER COURSE	(2.25")	2,433	TONS		$85.88	/ TON	$0	
HMA LOWER BINDER COURSE	(5.75")	6,302	TONS		$72.26	/ TON	$0	
HMA SHOULDER	(8.00")	2,852	TONS		$72.00	/ TON	$205,349	~
CURB & GUTTER		2,200	LIN FT	*	$30.00	/ LIN FT	$66,000	
SUBBASE GRAN MATL TY C (TONS)		170	TONS		$25.00	/ TON	$4,250	
IMPROVED SUBGRADE:	Aggregate	26,526	SQ YD		$7.00	/ SQ YD	$185,682	
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0	
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0	
PAVEMENT REMOVAL		19,099	SQ YD		$15.00	/ SQ YD	$286,485	
SHOULDER REMOVAL		6,366	SQ YD		$10.00	/ SQ YD	$63,660	

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST	$1,654,632
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE	$99,502

MAINTENANCE COSTS:

ITEM		THICKNESS	MATERIAL	UNIT COST	
ROUTINE MAINTENANCE ACTIVITY				$0.00	LANE-MILE / YEAR
HMA OVERLAY PVMT SURF		(2.00")	Surface Mix	$9.65	/ SQ YD
HMA OVERLAY PVMT		(2.25")		$10.86	/ SQ YD
HMA SURFACE MIX		(1.50")	Surface Mix	$7.23	/ SQ YD
HMA BINDER MIX		(0.75")	eling Binder Mix	$3.63	/ 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	$79.62	/ 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	$79.62	/ 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	$2,228,109
FLEXIBLE TOTAL ANNUAL COST PER MILE	$133,989

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 02/09/15

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%	7,162	LIN FT	$2.00		$14,324	
	CNTR LINE JOINT R&S	100.00%	14,324	LIN FT	$2.00		$28,648	
	RNDM / THRM CRACK R&S	50.00%	7,878	LIN FT	$2.00		$15,756	
	PD PVMT PATCH M&F SURF	0.10%	19	SQ YD	$79.62		$1,513	
	PWFn =	0.8626		PW =	0.8626	X	$60,241	$51,964
YEAR 10								
	LONG SHLD JT R&S	100.00%	7,162	LIN FT	$2.00		$14,324	
	CNTR LINE JOINT R&S	100.00%	14,324	LIN FT	$2.00		$28,648	
	RNDM / THRM CRACK R&S	50.00%	7,878	LIN FT	$2.00		$15,756	
	PD PVMT PATCH M&F SURF	0.50%	95	SQ YD	$79.62		$7,564	
	PWFn =	0.7441		PW =	0.7441	X	$66,292	$49,327
YEAR 15								
	MILL PVMT & SHLD 2.00"	100.00%	25,465	SQ YD	$3.00		$76,395	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	191	SQ YD	$79.62		$15,207	
	HMA OVERLAY PVMT 2.00"	100.00%	19,099	SQ YD	$9.65		$184,382	
	HMA OVERLAY SHLD 2.00 "	100.00%	6,366	SQ YD	$8.06		$51,337	
	PWFn =	0.6419		PW =	0.6419	X	$327,321	$210,095
YEAR 20								
	LONG SHLD JT R&S	100.00%	7,162	LIN FT	$2.00		$14,324	
	CNTR LINE JOINT R&S	100.00%	14,324	LIN FT	$2.00		$28,648	
	RNDM / THRM CRACK R&S	50.00%	7,878	LIN FT	$2.00		$15,756	
	PD PVMT PATCH M&F SURF	0.10%	19	SQ YD	$79.62		$1,513	
	PWFn =	0.5537		PW =	0.5537	X	$60,241	$33,354
YEAR 25								
	LONG SHLD JT R&S	100.00%	7,162	LIN FT	$2.00		$14,324	
	CNTR LINE JOINT R&S	100.00%	14,324	LIN FT	$2.00		$28,648	
	RNDM / THRM CRACK R&S	50.00%	7,878	LIN FT	$2.00		$15,756	
	PD PVMT PATCH M&F SURF	0.50%	95	SQ YD	$79.62		$7,564	
	PWFn =	0.4776		PW =	0.4776	X	$66,292	$31,661
	HMA_SD							
YEAR 30	NON-INTERSTATE							
	MILL PVMT & SHLD 2.00"	100.00%	25,465	SQ YD	$3.00		$76,395	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	382	SQ YD	$79.62		$30,414	
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	64	SQ YD	$78.06		$4,996	
	HMA OVERLAY PVMT 2.25 "	100.00%	19,099	SQ YD	$10.86		$207,504	
	HMA OVERLAY SHLD 2.25 "	100.00%	6,366	SQ YD	$9.07		$57,754	
	PWFn =	0.4120		PW =	0.4120	X	$377,063	$155,345
YEAR 35								
	LONG SHLD JT R&S	100.00%	7,162	LIN FT	$2.00		$14,324	
	CNTR LINE JOINT R&S	100.00%	14,324	LIN FT	$2.00		$28,648	
	RNDM / THRM CRACK R&S	50.00%	7,878	LIN FT	$2.00		$15,756	
	PD PVMT PATCH M&F SURF	0.10%	19	SQ YD	$79.62		$1,513	
	PWFn =	0.3554		PW =	0.3554	X	$60,241	$21,409
YEAR 40								
	LONG SHLD JT R&S	100.00%	7,162	LIN FT	$2.00		$14,324	
	CNTR LINE JOINT R&S	100.00%	14,324	LIN FT	$2.00		$28,648	
	RNDM / THRM CRACK R&S	50.00%	7,878	LIN FT	$2.00		$15,756	
	PD PVMT PATCH M&F SURF	0.50%	95	SQ YD	$79.62		$7,564	
	PWFn =	0.3066		PW =	0.3066	X	$66,292	$20,322
								$573,477
	ROUTINE MAINTENANCE ACTIVITY		2.71	Lane Miles	0.00		$0	$0
					MAINTENANCE LIFE-CYCLE COST			$573,477
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE ANNUAL COST PER MILE			$34,486

PCC PAVEMENT

JPCP

ROUTE			IL 31		
SECTION			13-00215-10-PV		
COUNTY			Kane		
LOCATION			at Longmeadow Parkway		
FACILITY TYPE			NON-INTERSTATE		
PROJECT LENGTH			3581 FT	= = >	0.68 Miles
# OF CENTERLINES			4 CL		
# OF LANES			4 LANES		
# OF EDGES			2 EP		
LANE WIDTH - AVERAGE			12 FT		
SHOULDER WIDTH	PCC	Left	8 FT		
	PCC	Right	8 FT		
	Total Width of Paved Shoulders		16 FT		
PAVEMENT THICKNESS (RIGID)		JPCP	9.00 IN	TIED SHLD	
SHOULDER THICKNESS			9.00 IN		
POLICY OVERLAY THICKNESS			2.50 IN		

RIGID PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	5.02	4.40	5.02
Worksheet Construction Type is Reconstruction		The Pavement Type is	JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT		UNIT PRICE		COST
JPC PAVEMENT	(9.00")	19,099	SQ YD		$46.24	/ SQ YD	$883,138
PAVEMENT REINFORCEMENT		0	SQ YD		$22.00	/ SQ YD	$0
STABILIZED SUBBASE	(4.00")	13,500	SQ YD	*	$19.00	/ SQ YD	$256,500
PCC SHOULDERS	(9.00" to 9.00")	6,366	SQ YD		$40.00	/ SQ YD	$254,640
CURB & GUTTER		2,200	LIN FT	*	$30.00	/ LIN FT	$66,000
SUBBASE GRAN MATL TY C	(~ 1.80")	777	TONS		$25.00	/ TON	$19,425
IMPROVED SUBGRADE:	Aggregate	25,863	SQ YD		$7.00	/ SQ YD	$181,041
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0
PAVEMENT REMOVAL		19,099	SQ YD		$15.00	/ SQ YD	$286,485
SHOULDER REMOVAL		6,366	SQ YD		$10.00	/ SQ YD	$63,660

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	$2,010,889
RIGID CONSTRUCTION ANNUAL COST PER MILE	$120,926

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST	
ROUTINE MAINTENANCE ACTIVITY			$0.00	/ LANE-MILE / YEAR
HMA POLICY OVERLAY	(2.50")			
HMA POLICY OVERLAY PVMT	(2.50")		$12.08	/ SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	$7.23	/ SQ YD
HMA BINDER MIX	(1.00")	Binding Binder Mix	$4.84	/ SQ YD
HMA POLICY OVERLAY SHLD	(2.50")	Shoulder Mix	$10.08	/ SQ YD
CLASS A PAVEMENT PATCHING			$195.00	/ SQ YD
CLASS B PAVEMENT PATCHING			$150.00	/ SQ YD
CLASS C SHOULDER PATCHING			$145.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		Surface Mix	$77.22	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 2.50")		Surface Mix	$82.03	/ SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			$2.00	/ LIN FT
CENTERLINE JOINT ROUT & SEAL			$2.00	/ LIN FT
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL			$2.00	/ LIN FT
RANDOM CRACK ROUT & SEAL	(100% Rehab = 100.00' / Station / Lane)		$2.00	/ LIN FT

RIGID TOTAL LIFE-CYCLE COST	$2,347,311
RIGID TOTAL ANNUAL COST PER MILE	$141,157

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 02/09/15

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%	19	SQ YD	$150.00		$2,850	
	PWFn =	0.7441		PW =	0.7441	X	$2,850	$2,121
YEAR 15								
	PAVEMENT PATCH CLASS B	0.20%	38	SQ YD	$150.00		$5,700	
	PWFn =	0.6419		PW =	0.6419	X	$5,700	$3,659
YEAR 20								
	PAVEMENT PATCH CLASS B	2.00%	382	SQ YD	$150.00		$57,300	
	SHOULDER PATCH CLASS C	0.50%	32	SQ YD	$145.00		$4,640	
	LONGITUDINAL SHLD JT R&S	100.00%	7,162	LIN FT	$2.00		$14,324	
	CENTERLINE JT R&S	100.00%	14,324	LIN FT	$2.00		$28,648	
	PWFn =	0.5537		PW =	0.5537	X	$104,912	$58,087
YEAR 25								
	PAVEMENT PATCH CLASS B	3.00%	573	SQ YD	$150.00		$85,950	
	SHOULDER PATCH CLASS C	1.00%	64	SQ YD	$145.00		$9,280	
	PWFn =	0.4776		PW =	0.4776	X	$95,230	$45,482
YEAR 30	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	4.00%	764	SQ YD	$150.00		$114,600	
	SHOULDER PATCH CLASS C	1.50%	95	SQ YD	$145.00		$13,775	
	HMA POLICY OVERLAY 2.5" (PVMT)	100.00%	19,099	SQ YD	$12.08		$230,656	
	HMA POLICY OVERLAY 2.5" (SHLD)	100.00%	6,366	SQ YD	$10.08		$64,171	
	PWFn =	0.4120		PW =	0.4120	X	$423,202	$174,354
YEAR 35	NON-INTERSTATE							
	LONGITUDINAL SHLD JT R&S	100.00%	7,162	LIN FT	$2.00		$14,324	
	CENTERLINE JT R&S	100.00%	14,324	LIN FT	$2.00		$28,648	
	RANDOM CRACK R&S	50.00%	7,162	LIN FT	$2.00		$14,324	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	4,589	LIN FT	$2.00		$9,178	
	PD PVMT PATCH M&F HMA 2.50"	0.10%	19	SQ YD	$82.03		$1,558	
	PWFn =	0.3554		PW =	0.3554	X	$68,032	$24,177
YEAR 40	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	0.50%	95	SQ YD	$150.00		$14,250	
	LONGITUDINAL SHLD JT R&S	100.00%	7,162	LIN FT	$2.00		$14,324	
	CENTERLINE JT R&S	100.00%	14,324	LIN FT	$2.00		$28,648	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	6,883	LIN FT	$2.00		$13,766	
	RANDOM CRACK R&S	50.00%	7,162	LIN FT	$2.00		$14,324	
	PD PVMT PATCH M&F HMA 2.50"	0.50%	95	SQ YD	$82.03		$7,792	
	PWFn =	0.3066		PW =	0.3066	X	$93,104	$28,542
								$336,422
	ROUTINE MAINTENANCE ACTIVITY		2.71	Lane Miles	$0.00		$0	$0
					MAINTENANCE LIFE-CYCLE COST			$336,422
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE ANNUAL COST PER MILE			$20,231

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : **12/1/14 11:10 AM**

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	$2,010,889	$1,654,632
		ANNUAL COST PER MILE	$120,926	$99,502
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	$336,422	$573,477
		ANNUAL COST PER MILE	$20,231	$34,486
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	$2,347,311	$2,228,109
		ANNUAL COST PER MILE	$141,157	$133,989

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	==========>	**HMA**	**$133,989**	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	**JPCP**	**$141,157**	5.3%

P:\Pavement Design Stuff\D-1\IL 31 at Longmeadow Parkway\[IL 31 at Longmeadow Parkway Mechanistic Design LCCA 09-05-13.xlsm]LifeCycleCost