Illinois Department of Transportation

To:	John Fortmann	Attn: District One
From:	John D. Baranzelli	
Subject:	Pavement Design	
Date:	December 11, 2013	

FAU Route 1284 (West Lake Avenue)
Cook County
At Greenwood Road

The project, submitted to BDE by email memo dated October 21, 2013, will improve the interchange by widening and reconstructing this intersection. The LCCA favored a rigid design by less than 10%. The Pavement Selection Committee was convened on December 5, 2013 to discuss this project. Due to the nature of the project, a flexible pavement is more suitable to widen the roadway, as it difficult to tie new concrete pavement to existing concrete pavement. The Pavement Selection Committee agreed that the flexible pavement design was more prudent for this pavement design.

The approved pavement design is as follows:

<u>West Lake Avenue (Pavement Reconstruction)</u>

9.75 inches of Full Depth HMA with PCC Curb & Gutter
- 2 inches of Polymerized HMA Surface Course, Mix "F", N90
- 2.25 inches of Polymerized HMA Binder Course, IL-19.0, N90
- 5.5 inches of HMA Binder Course, IL-19.0, N90

12 inches of Aggregate Subgrade Improvement

<u>West Lake Avenue (Pavement Widening/Reconstruction)</u>

9.75 inches of Full Depth HMA with PCC Curb & Gutter/HMA Shoulders
- 2 inches of Polymerized HMA Surface Course, Mix "F", N90
- 7.75 inches of HMA Binder Course, IL-19.0, N90

12 inches of Aggregate Subgrade Improvement

Greenwood Road (Pavement Widening/Reconstruction)

9.5 inches of Full Depth HMA with HMA Shoulder
2 inches of Polymerized HMA Surface Course, Mix "F", N90
7.5 inches of HMA Binder Course, IL-19.0, N90
12 inches of Aggregate Subgrade Improvement

Pavement Resurfacing

Cold Milling of Existing HMA Pavement
2 inches Minimum
2 inches of Polymerized HMA Surface Course, Mix "F", N90

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 9, 2013

*Route: FAU 1284 (West Lake Avenue) — County: Cook
Limits: at Greenwood Road — Contract No.: Pending
Section: 07-00164-02-RS — Job No.: C-91-028-13
Current target: 01CY14

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:

a) Reconstruction of West Lake Road for approximately 1,129 feet.

b) Widening & Resurfacing of West Lake Road at the east and west ends of the project limits for a total of approximately 554 feet.

c) Widening & Resurfacing of Greenwood Road for approximately 689 feet.

Both East Lake Avenue and Greenwood Road are a "High Stress" roadway since the design lane MU ADT exceeds 200 vehicles. A segmental pavement analysis was performed on East Lake Avenue and Greenwood Road and it is recommended to use a mechanistic flexible pavement design based on the existing pavement types and conditions of the reconstruction and widening improvements.

Please note that we have used traffic data obtained from 2007 manual counts and 2030 projections obtained by CMAP. ADT information as shown on IRoads is not correct for Greenwood Road at the project area. A significant amount of vehicles use East Lake Road to continue north. As a result, the ADT of Greenwood Road near West Lake Road is not as high as indicated on IRoads.

a) West Lake Road
Reconstruction
PCC Curb and Gutter
9 ¾" Full Depth HMA[7]
2" Polymerized HMA Surface Course, Mix "F", N90[1]
2 ¼" Polymerized HMA Binder Course, IL-19.0, N90[2]
5 ½" HMA Binder Course, IL-19.0, N90[3]
12" Aggregate Subgrade Improvement [6]

Widening and Resurfacing
Portions PCC Curb and Gutter and HMA Shoulder/Aggregate Shoulder
9 ¾" Full Depth HMA[7]
2" Polymerized HMA Surface Course, Mix "F", N90[1]
7 ¾" HMA Binder Course, IL-19.0, N90[4]
12" Aggregate Subgrade Improvement [6]

b) Greenwood Road
Widening and Resurfacing
HMA Shoulder/Aggregate Shoulder
9 ½" Full Depth HMA[7]
2" Polymerized HMA Surface Course, Mix "F", N90[1]
7 ½" HMA Binder Course, IL-19.0, N90[5]
12" Aggregate Subgrade Improvement [6]

Pavement Resurfacing
Cold Milling of Existing HMA Pavement
2" Minimum (more if necessary)
2" Polymerized HMA Surface Course, Mix "F", N90[1]

[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 **#35501306, "HOT-MIX ASPHALT BASE COURSE, 5 ½"**, paid for in square yards.

[4]Designer Note 4: For widening of six feet or less use pay item **#35600707, "Hot-Mix Asphalt Base Course Widening, 7 ¾" "**, paid for in square yards. For widening of greater than six feet use pay item **#35501315, "Hot-Mix Asphalt Base Course, 7 ¾" "**, paid for in square yards.

[5]Designer Note 5: For widening of six feet or less use pay item **#35600706, "Hot-Mix Asphalt Base Course Widening, 7 ½" "**, paid for in square yards. For widening of greater than six feet use pay item **#35501314, "Hot-Mix Asphalt Base Course, 7 ½" "**, paid for in square yards.

[6]Designer Note 6: Use pay item **#30300112, "AGGREGATE SUBGRADE IMPROVEMENT, 12"**, paid in square yards.

[7]Designer Note 7: 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.

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

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

FOR INDEX OF SHEETS, SEE SHEET NO. 2

FOR INDEX OF HIGHWAY STANDARDS, SEE SHEET NO. 2

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PLANS FOR PROPOSED FEDERAL AID HIGHWAY

FAU 1284 (WEST LAKE AVENUE) AT FAU 2743 (GREENWOOD ROAD)

INTERSECTION IMPROVEMENTS
SECTION 07-00164-02-RS
PROJECT: M-4003(085)
JOB NO. C-91-028-13
VILLAGE OF GLENVIEW
COOK COUNTY

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
1284/2743	07-00164-02-RS	COOK	87	1
FED. ROAD DIST. NO.	C-91-028-13	FED. AID PROJECT M-4003(085)		

CONTRACT NO. XXXXX

TRAFFIC DATA

WEST LAKE AVENUE
POSTED SPEED = 35 MPH
DESIGN SPEED = 40 MPH
EXISTING ADT = 10,000 (2007)
PROPOSED ADT = 12,000 (2030)
URBAN COLLECTOR

GREENWOOD ROAD
POSTED SPEED = 35 MPH
DESIGN SPEED = 40 MPH
EXISTING ADT = 8,500 (2007)
PROPOSED ADT = 10,000 (2030)
URBAN COLLECTOR

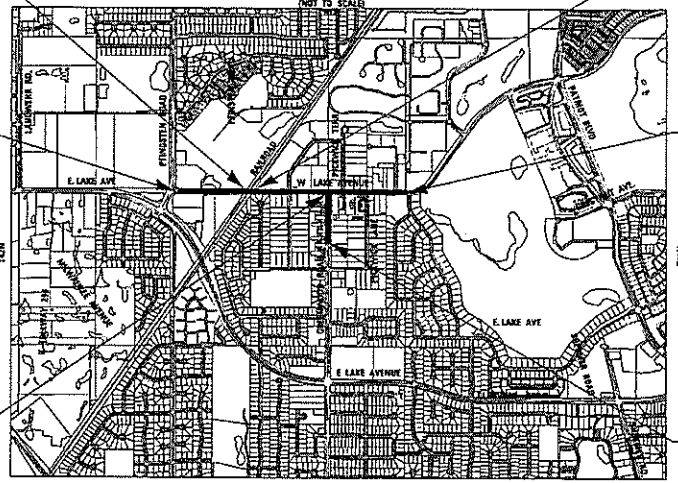
FULL SIZE PLANS HAVE BEEN PREPARED USING STANDARD ENGINEERING SCALES. REDUCED SIZED PLANS WILL NOT CONFORM TO STANDARD SCALES. IN MAKING MEASUREMENTS ON REDUCED PLANS, THE ABOVE SCALES MAY BE USED.

WEST LAKE AVENUE BEGIN OMISSION STA 257+78

WEST LAKE AVENUE IMPROVEMENT BEGINS STA. 245+08

GREENWOOD ROAD IMPROVEMENT ENDS STA. 25+32

LOCATION MAP
NOT TO SCALE



SECTION 28, T42N, R12E, OF THE THIRD PRINCIPAL MERIDIAN

NORTHFIELD TOWNSHIP
GROSS LENGTH OF IMPROVEMENT = 4,522 LF OR 0.856 MILES
NET LENGTH OF IMPROVEMENT = 4,478 LF OR 0.848 MILES

WEST LAKE AVENUE END OMISSION STA 258+22

WEST LAKE AVENUE IMPROVEMENT ENDS STA 282+20

GREENWOOD ROAD IMPROVEMENT BEGINS STA. 17+21

J.U.L.I.E. DESIGN STAGE REQUEST
DIG. No. XX

Call Before You Dig
JULIE
CONTACT JULIE AT 811 OR 800-892-0123
WITH THE FOLLOWING:
COUNTY = COOK
CITY-TWNSHP. = GLENVIEW-NORTHFIELD
SEC. & 1/4 SEC. NO. = SEC 28
48 HOURS (2 working days) BEFORE YOU DIG

BAXTER & WOODMAN Consulting Engineers

TODD L. HOFFMAN
062-058724
LICENSED PROFESSIONAL ENGINEER
OF
STATE OF ILLINOIS

PROJECT MANAGER
LICENSE EXPIRES 11-30-2013

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

APPROVED _____
VILLAGE OF GLENVIEW

PASSED _____
DISTRICT 1 ENGINEER OF LOCAL ROADS AND STREETS

RELEASING FOR BID BASED ON LIMITED REVIEW _____
DEPUTY DIRECTOR OF HIGHWAYS, REGION 1 ENGINEER

PRINTED BY THE AUTHORITY OF THE STATE OF ILLINOIS

CONTRACT NO. XXXXX

B&W PROJECT NO.: 120011-34 DATE: 09-20-13

PROGRAM AND OFFICE ENGINEER: CHARLES F. RIDGLE, P.E. (847)705-4400 SCHAUMBURG, IL

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

IDOT MECHANISTIC PAVEMENT DESIGN

Printed: 08/12/2014

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: FAU 1284 West Lake Road
Section: 07-00164-02-RS
County: Cook
Location: at Greenwood Road
Comments: Local Roads Pavement Design
Design Date: 09/23/2013 ONP
Modify Date:

	ADT	Year
<-- BY		
<-- BY		
Current:	10,000	2007
Future:	12,000	2030

Facility Type: Unmarked State Route
# of Lanes = 2 or 3
Part of future 4 lanes or more ? No
One Way Street ? No
Road Class: II

Subgrade Support Rating (SSR): Poor
Construction Year: 2014
Design Period (DP) = 20 years

	Structural Design Traffic			
	Minimum ADT	Actual ADT	Actual %of Total ADT	% of ADT in Design Lane
PV =	No Min	9,986	87.0%	P = 50%
SU =	No Min	803	7.0%	S = 50%
MU =	No Min	689	6.0%	M = 50%
Struct. Design ADT =		11,478	(2024)	

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT			RIGID PAVEMENT		
Cpv =	0.15		Cpv =	0.15	
Csu =	112.06		Csu =	135.78	
Cmu =	385.44		Cmu =	567.21	
TF flexible (Actual) =	3.57	(Actual ADT)	TF rigid (Actual) =	5.01	(Actual ADT)
TF flexible (Min) =	No Min	(Min ADT Fig. 54-2.C)	TF rigid (Min) =	No Min	(Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement

Use TF flexible = 3.57
Goto Map — PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)
HMA Mixture Temp. = 73.5 deg. F (Fig. 54-5.C)
Design HMA Mixture Modulus (E_{HMA}) = 740 ksi (Fig. 54-5.D)
Design HMA Strain (ε_{HMA}) = 84 (Fig. 54-5.E)
Goto Map — Full Depth HMA Design Thickness = 9.75 in. (Fig. 54-5.F)
Limiting Strain Criterion Thickness = 14.25 in. (Fig. 54-5.I)

Use Full-Depth HMA Thickness = 9.75 inches

JPC Pavement

Use TF rigid = 5.01
Edge Support = Tied Shoulder or C.&G.

Rigid Pavt Thick. = 9.00 in. (Fig. 54-4.E)

CRC Pavement

Use TF rigid = 5.01
IBR value = 3

CRCP Thickness = 7.75 in. (Fig. 54-4.N)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC

Use TF flexible = 3.57
Goto Map — HMA Overlay Design Thickness = 7.25 in. (Fig. 54-5.U)
Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)

Use HMA Overlay Thickness = 7.25 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	No Min	No Min	No Min

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: 08/12/2014

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT

Standard Design

ROUTE	FAU 1284 West Lake Road
SECTION	07-00164-02-RS
COUNTY	Cook
LOCATION	at Greenwood Road
FACILITY TYPE	NON-INTERSTATE

PROJECT LENGTH			1129	FT = = >	0.21 Miles
# OF CENTERLINES			1	CL	
# OF LANES			2	LANES	
# OF EDGES			2	EP	
LANE WIDTH - AVERAGE			12	FT	
SHOULDER WIDTH	HMA	Left	0	FT	
	HMA	Right	0	FT	
	Total Width of Paved Shoulders		0	FT	

PAVEMENT THICKNESS (FLEXIBLE)	9.75	IN	14.25 IN MAX
SHOULDER THICKNESS	8.00	IN	Standard Design
POLICY OVERLAY THICKNESS	2.25	IN	

FLEX PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	No Min	3.57	3.57

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	$1.00 / TON
HMA TOP BINDER	$1.00 / TON
HMA LOWER BINDER	$1.00 / TON
HMA BINDER (LEVELING)	$1.00 / TON
HMA SHOULDER	$1.00 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT		UNIT PRICE	COST	
HMA PAVEMENT (FULL-DEPTH)	(9.75")	3,011	SQ YD		$0.56 / SQ YD	$0	
HMA SURFACE COURSE	(2.00")	3,011	SQ YD	*	$8.32 / SQ YD	$25,049	~
HMA TOP BINDER COURSE	(2.25")	3,011	SQ YD	*	$8.37 / SQ YD	$25,199	~
HMA LOWER BINDER COURSE	(5.50")	3,011	SQ YD	*	$20.45 / SQ YD	$61,568	~
HMA SHOULDER	(8.00")	0	TONS		$1.00 / TON	$0	~
CURB & GUTTER		0	LIN FT		$30.00 / LIN FT	$0	
SUBBASE GRAN MATL TY C (TONS)		10	TONS		$25.00 / TON	$250	
IMPROVED SUBGRADE:	Modified Soil	3,340	SQ YD		$7.00 / SQ YD	$23,380	
Reserved For User Supplied Item		0	UNITS		$0.00 / UNITS	$0	
Reserved For User Supplied Item		0	UNITS		$0.00 / UNITS	$0	
PAVEMENT REMOVAL		3,011	SQ YD		$15.00 / SQ YD	$45,165	
SHOULDER REMOVAL		0	SQ YD		$10.00 / SQ YD	$0	

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST	$180,611
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE	$34,450

MAINTENANCE COSTS:

ITEM		THICKNESS	MATERIAL		UNIT COST	
ROUTINE MAINTENANCE ACTIVITY					$0.00	LANE-MILE / YEAR
HMA OVERLAY PVMT SURF		(2.00")	Surface Mix	2.00	$8.32	/ SQ YD
HMA OVERLAY PVMT		(2.25")		2.25	$9.36	/ SQ YD
HMA SURFACE MIX		(1.50")	Surface Mix	1.50	$6.24	/ SQ YD
HMA BINDER MIX		(0.75")	eling Binder Mix	0.75	$2.79	/ SQ YD
HMA OVERLAY SHLD	(Year 30)	(2.25")	Shoulder Mix	2.25	$0.13	/ SQ YD
HMA OVERLAY SHLD		(2.00")	Shoulder Mix	2.00	$0.11	/ SQ YD
MILLING (2.00 IN)				2.00	$3.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH		(Mill & Fill Surf)	Surface Mix	2.00	$70.11	/ SQ YD
PARTIAL DEPTH SHLD PATCH		(Mill & Fill Surf)	Shoulder Mix	2.00	$70.11	/ SQ YD
PARTIAL DEPTH PVMT PATCH		(Mill & Fill +2.00 ")	Leveling Binder Mix	2.00	$70.11	/ SQ YD
PARTIAL DEPTH SHLD PATCH		(Mill & Fill +2.00 ")	Shoulder Mix	2.00	$70.11	/ 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	$253,432
FLEXIBLE TOTAL ANNUAL COST PER MILE	$48,340

HMA_SD

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

08/12/14

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%	2,258	LIN FT	$2.00	$4,516	
	CNTR LINE JOINT R&S	100.00%	1,129	LIN FT	$2.00	$2,258	
	RNDM / THRM CRACK R&S	50.00%	1,242	LIN FT	$2.00	$2,484	
	PD PVMT PATCH M&F SURF	0.10%	3	SQ YD	$70.11	$210	
	PWFn =	0.8626		PW =	0.8626 X	$9,468	$8,167
YEAR 10							
	LONG SHLD JT R&S	100.00%	2,258	LIN FT	$2.00	$4,516	
	CNTR LINE JOINT R&S	100.00%	1,129	LIN FT	$2.00	$2,258	
	RNDM / THRM CRACK R&S	50.00%	1,242	LIN FT	$2.00	$2,484	
	PD PVMT PATCH M&F SURF	0.50%	15	SQ YD	$70.11	$1,052	
	PWFn =	0.7441		PW =	0.7441 X	$10,310	$7,672
YEAR 15							
	MILL PVMT & SHLD 2.00"	100.00%	3,011	SQ YD	$3.00	$9,033	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	30	SQ YD	$70.11	$2,103	
	HMA OVERLAY PVMT 2.00"	100.00%	3,011	SQ YD	$8.32	$25,049	
	HMA OVERLAY SHLD 2.00 "	100.00%	0	SQ YD	$0.11	$0	
	PWFn =	0.6419		PW =	0.6419 X	$36,185	$23,226
YEAR 20							
	LONG SHLD JT R&S	100.00%	2,258	LIN FT	$2.00	$4,516	
	CNTR LINE JOINT R&S	100.00%	1,129	LIN FT	$2.00	$2,258	
	RNDM / THRM CRACK R&S	50.00%	1,242	LIN FT	$2.00	$2,484	
	PD PVMT PATCH M&F SURF	0.10%	3	SQ YD	$70.11	$210	
	PWFn =	0.5537		PW =	0.5537 X	$9,468	$5,242
YEAR 25							
	LONG SHLD JT R&S	100.00%	2,258	LIN FT	$2.00	$4,516	
	CNTR LINE JOINT R&S	100.00%	1,129	LIN FT	$2.00	$2,258	
	RNDM / THRM CRACK R&S	50.00%	1,242	LIN FT	$2.00	$2,484	
	PD PVMT PATCH M&F SURF	0.50%	15	SQ YD	$70.11	$1,052	
	PWFn =	0.4776		PW =	0.4776 X	$10,310	$4,924
	HMA_SD						
YEAR 30	NON-INTERSTATE						
	MILL PVMT & SHLD 2.00"	100.00%	3,011	SQ YD	$3.00	$9,033	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	60	SQ YD	$70.11	$4,207	
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	0	SQ YD	$70.11	$0	
	HMA OVERLAY PVMT 2.25 "	100.00%	3,011	SQ YD	$9.36	$28,180	
	HMA OVERLAY SHLD 2.25 "	100.00%	0	SQ YD	$0.13	$0	
	PWFn =	0.4120		PW =	0.4120 X	$41,420	$17,064
YEAR 35							
	LONG SHLD JT R&S	100.00%	2,258	LIN FT	$2.00	$4,516	
	CNTR LINE JOINT R&S	100.00%	1,129	LIN FT	$2.00	$2,258	
	RNDM / THRM CRACK R&S	50.00%	1,242	LIN FT	$2.00	$2,484	
	PD PVMT PATCH M&F SURF	0.10%	3	SQ YD	$70.11	$210	
	PWFn =	0.3554		PW =	0.3554 X	$9,468	$3,365
YEAR 40							
	LONG SHLD JT R&S	100.00%	2,258	LIN FT	$2.00	$4,516	
	CNTR LINE JOINT R&S	100.00%	1,129	LIN FT	$2.00	$2,258	
	RNDM / THRM CRACK R&S	50.00%	1,242	LIN FT	$2.00	$2,484	
	PD PVMT PATCH M&F SURF	0.50%	15	SQ YD	$70.11	$1,052	
	PWFn =	0.3066		PW =	0.3066 X	$10,310	$3,161
							$72,821
	ROUTINE MAINTENANCE ACTIVITY		0.43	Lane Miles	0.00	$0	$0
					MAINTENANCE LIFE-CYCLE COST		$72,821
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE ANNUAL COST PER MILE		$13,890

PCC PAVEMENT

JPCP

ROUTE			**FAU 1284 West Lake Road**	
SECTION			**07-00164-02-RS**	
COUNTY			**Cook**	
LOCATION			**at Greenwood Road**	
FACILITY TYPE			**NON-INTERSTATE**	
PROJECT LENGTH			**1129** FT = = >	0.21 Miles
# OF CENTERLINES			**1** CL	
# OF LANES			**2** LANES	
# OF EDGES			**2** EP	
LANE WIDTH - AVERAGE			**12** FT	
SHOULDER WIDTH	PCC	Left	**0** FT	
	PCC	Right	**0** FT	
	Total Width of Paved Shoulders		**0** 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
	No Min	**5.01**	**5.01**
Worksheet Construction Type is Reconstruction		**The Pavement Type is**	**JPCP**

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE		COST
JPC PAVEMENT	(9.00")	3,011	SQ YD	**$40.89**	/ SQ YD	$123,120
PAVEMENT REINFORCEMENT		0	SQ YD	**$0.00**	/ SQ YD	$0
STABILIZED SUBBASE	(4.00")	3,387	SQ YD	**$0.00**	/ SQ YD	$0
PCC SHOULDERS	(9.00" to 9.00")	0	SQ YD	**$40.00**	/ SQ YD	$0
CURB & GUTTER		0	LIN FT	**$30.00**	/ LIN FT	$0
SUBBASE GRAN MATL TY C	(~ 0.00")	0	TONS	**$25.00**	/ TON	$0
IMPROVED SUBGRADE:	Modified Soil (Mean = 25.0	3,136	SQ YD	**$7.00**	/ SQ YD	$21,952
Reserved For User Supplied Item		0	**UNITS**	**$0.00**	/ UNITS	$0
Reserved For User Supplied Item		0	**UNITS**	**$0.00**	/ UNITS	$0
PAVEMENT REMOVAL		3,011	SQ YD	**$15.00**	/ SQ YD	$45,165
SHOULDER REMOVAL		0	SQ YD	**$10.00**	/ SQ YD	$0

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	$190,237
RIGID CONSTRUCTION ANNUAL COST PER MILE	$36,286

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	T	UNIT COST	
ROUTINE MAINTENANCE ACTIVITY				**$0.00**	/ LANE-MILE / YEAR
HMA POLICY OVERLAY	(2.50")		2.50		
HMA POLICY OVERLAY PVMT	(2.50")	1.0257	2.50	**$10.40**	/ SQ YD
HMA SURFACE MIX	(1.50")	1.0262	Surface Mix 1.50	**$6.24**	/ SQ YD
HMA BINDER MIX	(1.00")	1.0139	eling Binder Mix 1.00	**$3.72**	/ SQ YD
HMA POLICY OVERLAY SHLD	(2.50")		Shoulder Mix 2.50	**$0.14**	/ 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 1.50	**$70.08**	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 2.50")			Surface Mix 2.50	**$70.14**	/ 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	$234,886
RIGID TOTAL ANNUAL COST PER MILE	$44,802

JPCP

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 08/12/14

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%	3	SQ YD	$150.00		$450	
	PWFn =	0.7441		PW =	0.7441	X	$450	$335
YEAR 15								
	PAVEMENT PATCH CLASS B	0.20%	6	SQ YD	$150.00		$900	
	PWFn =	0.6419		PW =	0.6419	X	$900	$578
YEAR 20								
	PAVEMENT PATCH CLASS B	2.00%	60	SQ YD	$150.00		$9,000	
	SHOULDER PATCH CLASS C	0.50%	0	SQ YD	$145.00		$0	
	LONGITUDINAL SHLD JT R&S	100.00%	2,258	LIN FT	$2.00		$4,516	
	CENTERLINE JT R&S	100.00%	1,129	LIN FT	$2.00		$2,258	
	PWFn =	0.5537		PW =	0.5537	X	$15,774	$8,734
YEAR 25								
	PAVEMENT PATCH CLASS B	3.00%	90	SQ YD	$150.00		$13,500	
	SHOULDER PATCH CLASS C	1.00%	0	SQ YD	$145.00		$0	
	PWFn =	0.4776		PW =	0.4776	X	$13,500	$6,448
YEAR 30	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	4.00%	120	SQ YD	$150.00		$18,000	
	SHOULDER PATCH CLASS C	1.50%	0	SQ YD	$145.00		$0	
	HMA POLICY OVERLAY 2.5" (PVMT)	100.00%	3,011	SQ YD	$10.40		$31,311	
	HMA POLICY OVERLAY 2.5" (SHLD)	100.00%	0	SQ YD	$0.14		$0	
	PWFn =	0.4120		PW =	0.4120	X	$49,311	$20,315
YEAR 35	NON-INTERSTATE							
	LONGITUDINAL SHLD JT R&S	100.00%	2,258	LIN FT	$2.00		$4,516	
	CENTERLINE JT R&S	100.00%	1,129	LIN FT	$2.00		$2,258	
	RANDOM CRACK R&S	50.00%	1,129	LIN FT	$2.00		$2,258	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	720	LIN FT	$2.00		$1,440	
	PD PVMT PATCH M&F HMA 2.50"	0.10%	3	SQ YD	$70.14		$210	
	PWFn =	0.3554		PW =	0.3554	X	$10,682	$3,796
YEAR 40	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	0.50%	15	SQ YD	$150.00		$2,250	
	LONGITUDINAL SHLD JT R&S	100.00%	2,258	LIN FT	$2.00		$4,516	
	CENTERLINE JT R&S	100.00%	1,129	LIN FT	$2.00		$2,258	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	1,080	LIN FT	$2.00		$2,160	
	RANDOM CRACK R&S	50.00%	1,129	LIN FT	$2.00		$2,258	
	PD PVMT PATCH M&F HMA 2.50"	0.50%	15	SQ YD	$70.14		$1,052	
	PWFn =	0.3066		PW =	0.3066	X	$14,494	$4,443
								$44,649
	ROUTINE MAINTENANCE ACTIVITY		0.43	Lane Miles	$0.00		$0	$0
					MAINTENANCE LIFE-CYCLE COST			$44,649
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE ANNUAL COST PER MILE			$8,516

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : **9/30/13 9:00 AM**

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	$190,237	$180,611
		ANNUAL COST PER MILE	$36,286	$34,450
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	$44,649	$72,821
		ANNUAL COST PER MILE	$8,516	$13,890
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	$234,886	$253,432
		ANNUAL COST PER MILE	$44,802	$48,340

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	==========>	**JPCP**	**$44,802**	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	**HMA**	**$48,340**	7.9%

P:\Pavement Design Stuff\D-1\West Lake Avenue at Greenwood Road\Revised Sheets 12-09-13\[IDOT Mechanistic West Lake Road.xlsm]LifeCycleCost

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

IDOT MECHANISTIC PAVEMENT DESIGN

Printed: 08/12/2014

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: FAU 2743 Greenwood Road
Section: 07-00164-02-RS
County: Cook
Location: at West Lake Street
Comments: Local Roads Pavement Design
Design Date: 09/23/2013 ONP <-- BY
Modify Date: 12/04/2013 ONP <-- BY

	ADT	Year
Current:	8,500	2007
Future:	10,000	2030

Facility Type: Unmarked State Route
# of Lanes = 2 or 3
Part of future 4 lanes or more ? No
One Way Street ? No
Road Class: II

Subgrade Support Rating (SSR): Poor
Construction Year: 2014
Design Period (DP) = 20 years

	Structural Design Traffic			
	Minimum ADT	Actual ADT	Actual %of Total ADT	% of ADT in Design Lane
PV =	No Min	8,360	87.0%	P = 50%
SU =	No Min	673	7.0%	S = 50%
MU =	No Min	577	6.0%	M = 50%
Struct. Design ADT =		9,609	(2024)	

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT			RIGID PAVEMENT		
Cpv =	0.15		Cpv =	0.15	
Csu =	112.06		Csu =	135.78	
Cmu =	385.44		Cmu =	567.21	
TF flexible (Actual) =	2.99	(Actual ADT)	TF rigid (Actual) =	4.20	(Actual ADT)
TF flexible (Min) =	No Min	(Min ADT Fig. 54-2.C)	TF rigid (Min) =	No Min	(Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement

Use TF flexible = 2.99
Goto Map
PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)
HMA Mixture Temp. = 73.5 deg. F (Fig. 54-5.C)
Design HMA Mixture Modulus (E_{HMA}) = 740 ksi (Fig. 54-5.D)
Design HMA Strain (ε_{HMA}) = 88 (Fig. 54-5.E)
Goto Map
Full Depth HMA Design Thickness = 9.50 in. (Fig. 54-5.F)
Limiting Strain Criterion Thickness = 14.25 in. (Fig. 54-5.I)

Use Full-Depth HMA Thickness = 9.50 inches

JPC Pavement

Use TF rigid = 4.20
Edge Support = Tied Shoulder or C.&G.

Rigid Pavt Thick. = 8.75 in. (Fig. 54-4.E)

CRC Pavement

Use TF rigid = 4.20
IBR value = 3

CRCP Thickness = 7.50 in. (Fig. 54-4.N)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC

Use TF flexible = 2.99
Goto Map
HMA Overlay Design Thickness = 7.00 in. (Fig. 54-5.U)
Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)

Use HMA Overlay Thickness = 7.00 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	No Min	No Min	No Min

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: 08/12/2014

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT

Standard Design

ROUTE	FAU 2743 Greenwood Road
SECTION	07-00164-02-RS
COUNTY	Cook
LOCATION	at West Lake Street

FACILITY TYPE: NON-INTERSTATE

PROJECT LENGTH			1000 FT	= = > 0.19 Miles
# OF CENTERLINES			2 CL	
# OF LANES			2 LANES	
# OF EDGES			4 EP	
LANE WIDTH - AVERAGE			12 FT	
SHOULDER WIDTH	HMA	Inside	6 FT	
	HMA	Outside	10 FT	
	Total Width of Paved Shoulders		32 FT	

PAVEMENT THICKNESS (FLEXIBLE)	9.50 IN	14.25 IN MAX	
SHOULDER THICKNESS	8.00 IN		Standard Design
POLICY OVERLAY THICKNESS	2.25 IN		

FLEX PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	No Min	2.97	2.97

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	$95.00 / TON
HMA TOP BINDER	$95.00 / TON
HMA LOWER BINDER	$80.00 / TON
HMA BINDER (LEVELING)	$85.00 / TON
HMA SHOULDER	$72.00 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
HMA PAVEMENT (FULL-DEPTH)	(9.50")	2,667	SQ YD	$49.04 / SQ YD	$130,782 ~
HMA SURFACE COURSE	(2.00")	303	TONS	$95.00 / TON	$0
HMA TOP BINDER COURSE	(2.25")	351	TONS	$95.00 / TON	$0
HMA LOWER BINDER COURSE	(5.25")	859	TONS	$80.00 / TON	$0
HMA SHOULDER	(8.00")	1,593	TONS	$72.00 / TON	$114,688 ~
CURB & GUTTER		0	LIN FT	$30.00 / LIN FT	$0
SUBBASE GRAN MATL TY C (TONS)		21	TONS	$25.00 / TON	$525
IMPROVED SUBGRADE:	Modified Soil	6,796	SQ YD	$7.00 / SQ YD	$47,572
Reserved For User Supplied Item		0	UNITS	$0.00 / UNITS	$0
Reserved For User Supplied Item		0	UNITS	$0.00 / UNITS	$0
PAVEMENT REMOVAL		2,667	SQ YD	$0.00 / SQ YD	$0
SHOULDER REMOVAL		3,556	SQ YD	$0.00 / SQ YD	$0

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST	$293,567
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE	$63,218

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			$0.00 LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	(2.00")	Surface Mix	$10.79 / SQ YD
HMA OVERLAY PVMT	(2.25")		$11.73 / SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	$8.06 / SQ YD
HMA BINDER MIX	(0.75")	eling Binder Mix	$3.66 / 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	$79.52 / 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	$429,439
FLEXIBLE TOTAL ANNUAL COST PER MILE	$92,478

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 08/12/14

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%	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%	1,100	LIN FT	$2.00		$2,200	
	PD PVMT PATCH M&F SURF	0.10%	3	SQ YD	$80.64		$242	
	PWFn =	0.8626		PW =	0.8626	X	$14,442	$12,458
YEAR 10								
	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%	1,100	LIN FT	$2.00		$2,200	
	PD PVMT PATCH M&F SURF	0.50%	13	SQ YD	$80.64		$1,048	
	PWFn =	0.7441		PW =	0.7441	X	$15,248	$11,346
YEAR 15								
	MILL PVMT & SHLD 2.00"	100.00%	6,222	SQ YD	$3.00		$18,666	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	27	SQ YD	$79.52		$2,147	
	HMA OVERLAY PVMT 2.00"	100.00%	2,667	SQ YD	$10.79		$28,767	
	HMA OVERLAY SHLD 2.00 "	100.00%	3,556	SQ YD	$8.06		$28,672	
	PWFn =	0.6419		PW =	0.6419	X	$78,252	$50,227
YEAR 20								
	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%	1,100	LIN FT	$2.00		$2,200	
	PD PVMT PATCH M&F SURF	0.10%	3	SQ YD	$80.64		$242	
	PWFn =	0.5537		PW =	0.5537	X	$14,442	$7,996
YEAR 25								
	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%	1,100	LIN FT	$2.00		$2,200	
	PD PVMT PATCH M&F SURF	0.50%	13	SQ YD	$80.64		$1,048	
	PWFn =	0.4776		PW =	0.4776	X	$15,248	$7,283

HMA_SD

YEAR 30	NON-INTERSTATE							
	MILL PVMT & SHLD 2.00"	100.00%	6,222	SQ YD	$3.00		$18,666	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	53	SQ YD	$79.52		$4,215	
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	36	SQ YD	$78.06		$2,810	
	HMA OVERLAY PVMT 2.25 "	100.00%	2,667	SQ YD	$11.73		$31,270	
	HMA OVERLAY SHLD 2.25 "	100.00%	3,556	SQ YD	$9.07		$32,256	
	PWFn =	0.4120		PW =	0.4120	X	$89,217	$36,756
YEAR 35								
	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%	1,100	LIN FT	$2.00		$2,200	
	PD PVMT PATCH M&F SURF	0.10%	3	SQ YD	$80.64		$242	
	PWFn =	0.3554		PW =	0.3554	X	$14,442	$5,132
YEAR 40								
	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%	1,100	LIN FT	$2.00		$2,200	
	PD PVMT PATCH M&F SURF	0.50%	13	SQ YD	$80.64		$1,048	
	PWFn =	0.3066		PW =	0.3066	X	$15,248	$4,674
								$135,872
	ROUTINE MAINTENANCE ACTIVITY		0.38	Lane Miles	0.00		$0	$0
					MAINTENANCE LIFE-CYCLE COST			$135,872
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE ANNUAL COST PER MILE			$29,259

PCC PAVEMENT

JPCP

ROUTE			FAU 2743 Greenwood Road		
SECTION			07-00164-02-RS		
COUNTY			Cook		
LOCATION			at West Lake Street		
FACILITY TYPE			NON-INTERSTATE		
PROJECT LENGTH			1000 FT	= = >	0.19 Miles
# OF CENTERLINES			2 CL		
# OF LANES			2 LANES		
# OF EDGES			4 EP		
LANE WIDTH - AVERAGE			12 FT		
SHOULDER WIDTH	PCC	Inside	6 FT		
	PCC	Outside	10 FT		
	Total Width of Paved Shoulders		32 FT		
PAVEMENT THICKNESS (RIGID)		JPCP	8.75 IN	TIED SHLD	
SHOULDER THICKNESS			8.75 IN		
POLICY OVERLAY THICKNESS			2.50 IN		

RIGID PAVEMENT TRAFFIC FACTORS		MINIMUM	ACTUAL	USE
		No Min	4.17	4.17
Worksheet Construction Type is	Reconstruction		The Pavement Type is	JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE		COST
JPC PAVEMENT	(8.75")	2,667	SQ YD	$50.00	/ SQ YD	$133,350
PAVEMENT REINFORCEMENT		0	SQ YD	$22.00	/ SQ YD	$0
STABILIZED SUBBASE	(4.00")	3,333	SQ YD	$19.00	/ SQ YD	$63,327
PCC SHOULDERS	(8.75" to 8.75")	3,556	SQ YD	$40.00	/ SQ YD	$142,240
CURB & GUTTER		0	LIN FT	$30.00	/ LIN FT	$0
SUBBASE GRAN MATL TY C	(~ 3.46")	418	TONS	$25.00	/ TON	$10,450
IMPROVED SUBGRADE:	Modified Soil (Weight = 98.0	6,444	SQ YD	$7.00	/ SQ YD	$45,108
Reserved For User Supplied Item		0	UNITS	$0.00	/ UNITS	$0
Reserved For User Supplied Item		0	UNITS	$0.00	/ UNITS	$0
PAVEMENT REMOVAL		2,667	SQ YD	$0.00	/ SQ YD	$0
SHOULDER REMOVAL		3,556	SQ YD	$0.00	/ SQ YD	$0

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	$394,475
RIGID CONSTRUCTION ANNUAL COST PER MILE	$84,949

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	T	UNIT COST	
ROUTINE MAINTENANCE ACTIVITY				$0.00	/ LANE-MILE / YEAR
HMA POLICY OVERLAY	(2.50")		2.50		
HMA POLICY OVERLAY PVMT	(2.50")	1.0174	2.50	$12.96	/ SQ YD
HMA SURFACE MIX	(1.50")	1.0104	Surface Mix 1.50	$8.06	/ SQ YD
HMA BINDER MIX	(1.00")	1.0272	ding Binder Mix 1.00	$4.89	/ SQ YD
HMA POLICY OVERLAY SHLD	(2.50")		Shoulder Mix 2.50	$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	1.50	$77.98	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 2.50")		Surface Mix	2.50	$83.30	/ 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	$466,117
RIGID TOTAL ANNUAL COST PER MILE	$100,376

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 08/12/14

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%	3	SQ YD	$150.00	$450	
	PWFn = 0.7441			PW =	0.7441 X	$450	$335
YEAR 15							
	PAVEMENT PATCH CLASS B	0.20%	5	SQ YD	$150.00	$750	
	PWFn = 0.6419			PW =	0.6419 X	$750	$481
YEAR 20							
	PAVEMENT PATCH CLASS B	2.00%	53	SQ YD	$150.00	$7,950	
	SHOULDER PATCH CLASS C	0.50%	18	SQ YD	$145.00	$2,610	
	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	
	PWFn = 0.5537			PW =	0.5537 X	$22,560	$12,491
YEAR 25							
	PAVEMENT PATCH CLASS B	3.00%	80	SQ YD	$150.00	$12,000	
	SHOULDER PATCH CLASS C	1.00%	36	SQ YD	$145.00	$5,220	
	PWFn = 0.4776			PW =	0.4776 X	$17,220	$8,224
YEAR 30	NON-INTERSTATE						
	PAVEMENT PATCH CLASS B	4.00%	107	SQ YD	$150.00	$16,050	
	SHOULDER PATCH CLASS C	1.50%	53	SQ YD	$145.00	$7,685	
	HMA POLICY OVERLAY 2.5" (PVMT)	100.00%	2,667	SQ YD	$12.96	$34,548	
	HMA POLICY OVERLAY 2.5" (SHLD)	100.00%	3,556	SQ YD	$10.08	$35,840	
	PWFn = 0.4120			PW =	0.4120 X	$94,123	$38,777
YEAR 35	NON-INTERSTATE						
	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%	1,000	LIN FT	$2.00	$2,000	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	643	LIN FT	$2.00	$1,286	
	PD PVMT PATCH M&F HMA 2.50"	0.10%	3	SQ YD	$83.30	$250	
	PWFn = 0.3554			PW =	0.3554 X	$15,536	$5,521
YEAR 40	NON-INTERSTATE						
	PAVEMENT PATCH CLASS B	0.50%	13	SQ YD	$150.00	$1,950	
	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%	965	LIN FT	$2.00	$1,930	
	RANDOM CRACK R&S	50.00%	1,000	LIN FT	$2.00	$2,000	
	PD PVMT PATCH M&F HMA 2.50"	0.50%	13	SQ YD	$83.30	$1,083	
	PWFn = 0.3066			PW =	0.3066 X	$18,963	$5,813
							$71,642
	ROUTINE MAINTENANCE ACTIVITY		0.38	Lane Miles	$0.00	$0	$0
					MAINTENANCE LIFE-CYCLE COST		$71,642
45	YEAR LIFE CYCLE CRFn = 0.0407852				MAINTENANCE ANNUAL COST PER MILE		$15,428

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 9/30/13 9:02 AM

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	$394,475	$293,567
		ANNUAL COST PER MILE	$84,949	$63,218
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	$71,642	$135,872
		ANNUAL COST PER MILE	$15,428	$29,259
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	$466,117	$429,439
		ANNUAL COST PER MILE	$100,376	$92,478

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	==========>	**HMA**	**$92,478**	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	**JPCP**	**$100,376**	8.5%

P:\Pavement Design Stuff\D-1\West Lake Avenue at Greenwood Road\Revised Sheets 12-09-13\[IDOT Mechanistic Greenwood Road.xlsm]LifeCycleCost

First Cost Analysis of Widening Project

Date:	10/3/2013		Route	West Lake Road
Quantities by:	ONP	Checked by:	Section	
Unit prices by:	MM	Checked by:	County	Cook
		Net Length	Project	C-91-028-13
			Contract	XX

Mechanistic Flexible

Area (Sq. Yd.)	Height (inches)	Weight (Tons)	Material		Unit Cost	Total	ITEM #
		0	HMA **Surface** Course, MIX "D" N50	@		$0.00	40603335
		0	HMA **Surface** Course, MIX "D" N70	@		$0.00	40603340
1143	2	128	Poly HMA **Surface** Course, MIX "F" N90	@	$80	$10,241.28	40603595
		0	Poly HMA **Surface** Course, SMA N80	@		$0.00	40603153
		0	HMA **Binder** course, IL-19, N50	@		$0.00	40603080
		0	HMA **Binder** course, IL-19, N70	@		$0.00	40603085
1143	7.75	496	HMA **Binder** course, IL-19, N90	@	$78	$38,692.84	40603090
		0	Poly HMA **Binder** course, IL-19, N90	@		$0.00	40603240
		0	HMA **Binder** course, SMA, N80	@		$0.00	40603148
	NA	NA	12" Aggregate Subgrade	@		$0.00	30300112
			Total			**$48,934.12**	

Modified AASHTO

Area (Sq. Yd.)	Height (inches)	Weight (Tons)	Material		Unit Cost	Total	ITEM #
		0	HMA **Surface** Course, MIX "D" N50	@		$0.00	40603335
		0	HMA **Surface** Course, MIX "D" N70	@		$0.00	40603340
1143	2	128	Poly HMA **Surface** Course, MIX "F" N90	@	$80	$10,241.28	40603595
		0	Poly HMA **Surface** Course, SMA N80	@		$0.00	40603153
		0	HMA **Binder** course, IL-19, N50	@		$0.00	40603080
		0	HMA **Binder** course, IL-19, N70	@		$0.00	40603085
1143	9.5	608	HMA **Binder** course, IL-19, N90	@	$78	$47,429.93	40603090
		0	Poly HMA **Binder** course, IL-19, N90	@		$0.00	40603240
		0	HMA **Binder** course, SMA, N80	@		$0.00	40603148
	NA	NA	12" Aggregate Subgrade	@		$0.00	30300112
			Total			**$57,671.21**	

Composite

Area (Sq. Yd.)	Height (inches)	Weight (Tons)	Material		Unit Cost	Total	ITEM #
		0	HMA **Surface** Course, MIX "D" N50	@		$0.00	40603335
		0	HMA **Surface** Course, MIX "D" N70	@		$0.00	40603340
1143	2	128	Poly HMA **Surface** Course, MIX "F" N90	@	$80	$10,241.28	40603595
		0	Poly HMA **Surface** Course, SMA N80	@		$0.00	40603153
1143	10	NA	PCC Base Course	@	$60	$68,580.00	35300410
	NA	NA	12" Aggregate Subgrade	@		$0.00	30300112
			Total			**$78,821.28**	

First Cost Analysis of Widening Project

Date: 10/3/2013
Quantities by: ONP
Unit prices by: MM

Checked by:
Checked by:
Net Length

Route Greenwood Road
Section
County Cook
Project C-91-028-13
Contract XX

Mechanistic Flexible

Area (Sq. Yd.)	Height (inches)	Weight (Tons)	Material		Unit Cost	Total	ITEM #
		0	HMA **Surface** Course, MIX "D" N50	@		$0.00	40603335
		0	HMA **Surface** Course, MIX "D" N70	@		$0.00	40603340
535	2	60	Poly HMA **Surface** Course, MIX "F" N90	@	$80	$4,793.60	40603595
		0	Poly HMA **Surface** Course, SMA N80	@		$0.00	40603153
		0	HMA **Binder** course, IL-19, N50	@		$0.00	40603080
		0	HMA **Binder** course, IL-19, N70	@		$0.00	40603085
535	7.5	225	HMA **Binder** course, IL-19, N90	@	$78	$17,526.60	40603090
		0	Poly HMA **Binder** course, IL-19, N90	@		$0.00	40603240
		0	HMA **Binder** course, SMA, N80	@		$0.00	40603148
	NA	NA	12" Aggregate Subgrade	@		$0.00	30300112
			Total			**$22,320.20**	

Modified AASHTO

Area (Sq. Yd.)	Height (inches)	Weight (Tons)	Material		Unit Cost	Total	ITEM #
		0	HMA **Surface** Course, MIX "D" N50	@		$0.00	40603335
		0	HMA **Surface** Course, MIX "D" N70	@		$0.00	40603340
535	2	60	Poly HMA **Surface** Course, MIX "F" N90	@	$80	$4,793.60	40603595
		0	Poly HMA **Surface** Course, SMA N80	@		$0.00	40603153
		0	HMA **Binder** course, IL-19, N50	@		$0.00	40603080
		0	HMA **Binder** course, IL-19, N70	@		$0.00	40603085
535	10	300	HMA **Binder** course, IL-19, N90	@	$78	$23,368.80	40603090
		0	Poly HMA **Binder** course, IL-19, N90	@		$0.00	40603240
		0	HMA **Binder** course, SMA, N80	@		$0.00	40603148
	NA	NA	12" Aggregate Subgrade	@		$0.00	30300112
			Total			**$28,162.40**	

Composite

Area (Sq. Yd.)	Height (inches)	Weight (Tons)	Material		Unit Cost	Total	ITEM #
		0	HMA **Surface** Course, MIX "D" N50	@		$0.00	40603335
		0	HMA **Surface** Course, MIX "D" N70	@		$0.00	40603340
535	2	60	Poly HMA **Surface** Course, MIX "F" N90	@	$80	$4,793.60	40603595
		0	Poly HMA **Surface** Course, SMA N80	@		$0.00	40603153
535	8.5	NA	PCC Base Course	@	$60	$32,100.00	35300410
	NA	NA	12" Aggregate Subgrade	@		$0.00	30300112
			Total			**$36,893.60**	