Illinois Department of Transportation

To:	Diane M. O'Keefe	Attn: District One
From:	Scott E. Stitt	
Subject:	Pavement Design	
Date:	December 13, 2010	

FAP Route 339 (IL 62)
Section 116 Y-1-R-1
Cook County
From Penny Road to Easting's Way

We have reviewed the pavement design for the above captioned section, which was submitted to BDE on October 21, 2010. Life cycle costs were recalculated due to erroneous prices included with the district submittal. Please ensure that accurate material prices are included with the pavement design transmittal to reduce review time.

The approved pavement design is as follows:

IL 62 Road from Penny Road to Easting's Way

9.5 inches of Jointed PCC with tied PCC Curb and Gutter
12 inches of Aggregate Subgrade

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

PLAIN JOINTED PCC PAVEMENT

FILENAME-	FAP 339	29-Aug-12	
ROUTE-	IL 62	02:22 PM	
SECTION-	116 Y-1-R-1		
COUNTY-	Cook		
LOCATION-	Easting's Way		
DATE-			
PROJECT LENGTH (FT)	6336 =	1.20	MILES
AVERAGE LANE WIDTH (FT)	12		
NUMBER OF LANES	4		
# OF EDGES	6		
INSIDE SHLDER WIDTH (FT)	0		
OUTSIDE SHLDER WIDTH (FT)	0		
# OF CENTERLINES	1		
RIGID THICKNESS-	9.5		
TRAFFIC FACTORS	MINIMUM	ACTUAL	
RIGID-	6.03	5.77	
TRAFFIC			
PV-	0	32932	
SU-	300	759	
MU-	900	759	

INITIAL COSTS

ITEM	QUANTITY	UNIT PRICE	COST
PAVEMENT (SQ YDS)	33,792	$45.00	1,520,640
SUB BASE (SQ YDS)	0	$0.00	0
SHOULDERS (SQ YDS)	0	$0.00	0
SUBBASE GRAN MATL TY C (TONS	0	$0.00	0
SHOULDER SEAL (LN FT)	38,018	$1.50	57,027
Additional concrete for c&g [lin. Ft.]	12672	$6.32	80,087
			0
CONSTRUCTION INITIAL COST			$1,657,754
CONSTRUCTION ANNUAL COST			$59,762
TOTAL LIFE CYCLE COST-			$2,144,645
ANNUAL COST PER MILE-			$79,334

MAINTENANCE COSTS:

ITEM	UNIT COST
SHOULDER JOINT ROUTE AND SEAL (FT)	$2.00
CENTERLINE JOINT ROUTE AND SEAL (FT)	$2.00
TRANVERSE JOINT ROUTE AND SEAL (FT)	$0.00
PAVEMENT PATCHING (SQ YDS)	$90.00
SHOULDER PATCHING (SQ YDS)	$60.00
HOLES DRILLED (EACH)	$16.90
GROUT SOLIDS (CU FT)	$15.00
PAVEMENT GRINDING (SQ YDS)	$3.00

MAINTENANCE COSTS

	ITEM	QUANTITY	UNIT PRICE	COST	PW
YEAR 7					
	PATCHING 0.5% (SQ YDS)	169	90.00	15,210	
				15,210	12,367
YEAR 10					
	PATCHING 1.0% (SQ YDS)	338	90.00	30,420	
	SHLDER JT 100.0% (LIN FT)	38,016	2.00	76,032	
	CENTERLINE JT 100.0% (LIN FT)	6,336	2.00	12,672	
				0	
	SHOULDER PATCH 1.0% (SQ YD)	0	60.00	0	
				119,124	88,640
YEAR 15					
	PATCHING 1.5% (SQ YDS)	507	90.00	45,630	
				45,630	29,290
YEAR 20					
	HOLES DRILLED 70.0% (EACH)	2,363	16.90	39,938	
	GROUT SOLIDS (CU FT)	4,136	15.00	62,034	
	PATCHING 4.0% (SQ YDS)	1,352	90.00	121,680	
	SHOULDER PATCH 4.0% (SQ YDS)	0	60.00	0	
	GRINDING (SQ YD)	33,792	3.00	101,376	
				0	
	SHLDER JT 100.0% (LIN FT)	38,016	2.00	76,032	
	CENTERLINE JT 100.0% (LIN FT)	6,336	2.00	12,672	
				413,732	229,083
YEAR 25					
	SHOULDER PATCH 1.0% (SQ YDS)	0	60.00	0	
	PATCHING 1.5% (SQ YDS)	507	90.00	45,630	
				45,630	21,793
YEAR 30					
	PATCHING 2.5% (SQ YDS)	845	90.00	76,050	
	SHLDER JT 100.0% (LIN FT)	38,016	2.00	76,032	
	CENTERLINE JT 100.0% (LIN FT)	6,336	2.00	12,672	
				0	
	SHOULDER PATCH 1.5% (SQ YDS)	0	60.00	0	
				164,754	67,879
YEAR 35	SHOULDER PATCH 2.0% (SQ YDS)	0	60.00	0	
	PATCHING 3.5% (SQ YDS)	1,183	90.00	106,470	
				106,470	37,839
	MAINTANENCE LIFE CYCLE COST				$486,891
	MAINTANENCE ANNUAL COST				$17,552

FULL-DEPTH FLEXIBLE
TRAFFIC FACTOR LESS THAN 15.0 (RURAL)
TRAFFIC FACTOR LESS THAN 10.0 (URBAN)

ROUTE-	FAI 70	29-Aug-12
SECTION-	116 Y-1-R-1	02:22 PM
COUNTY-	Cook	
LOCATION-	Penny Road to Easting's Way	
PROJECT LENGTH (FT)	6336	

FULL-DEPTH FLEXIBLE PAVEMENT
MAINTENANCE COSTS

ITEM	QUANTITY	UNIT PRICE	COST	PW

* FOR SINGLE LANE PAVING

AVERAGE LANE WIDTH (FT)	12	
NUMBER OF LANES	4	
# OF EDGES	6	
INSIDE SHLDER WIDTH (FT)	0	
OUTSIDE SHLDER WIDTH (FT)	0	
# OF CENTERLINES	1	
PROJECT TYPE	1	1=RURAL, 2=URBAN
PAVING WIDTH	2	1=SINGLE LANE, 2=DUAL LANE

FLEXIBLE THICKNESS-	12.25	
TRAFFIC FACTORS	MINIMUM	ACTUAL
FLEXIBLE	4.27	4.23

TRAFFIC		
PV-	0	32982
SU-	300	759
MU-	900	759

OVERLAY THICKNESS	2.25

INITIAL COSTS

ITEM	QUANTITY	UNIT PRICE	COST
SURFACE (SQ YDS)	33,792	$8.40	283,853
(TONS)	0	$80.00	0
BINDER (SQ YDS)	33,792	$43.05	1,454,746
(TONS)		$65.00	0
SHOULDERS	0	$65.00	0
SUBBASE GRAN MATL TY C (TONS	0	$0.00	0
			0
			0
			0
CONSTRUCTION INITIAL COST-			$1,738,599
CONSTRUCTION ANNUAL COST-			$62,676
TOTAL LIFE CYCLE COST-			$2,371,578
ANNUAL COST PER MILE -			$87,515

MAINTENANCE COSTS:

ITEM	UNIT COST
SHOULDER JOINT ROUTE AND SEAL (FT)	$2.00
CENTERLINE JOINT ROUTE AND SEAL (FT)	$2.00
THERMAL CRACKS ROUTE AND SEAL (FT)	$2.00
RANDOM CRACKS ROUTE AND SEAL (FT)	$2.00
PAVEMENT PATCHING (SQ YDS)	$80.00
SHOULDER PATCHING (SQ YDS)	$65.00
OVERLAY (TON)	$80.00
MILLING (SQ YDS)	$2.20

MATERIAL TYPE/PERCENTAGE	PCC	10.3%

** FOR FULL WIDTH PAVING
*** FOR BOTH SINGLE LANE & FULL WIDTH PAVING

YEAR 3					
	THERMAL CRACK 15.0% (LIN FT)	456	2.00	912	
	SHLDER JT 100.0% (LIN FT)	38,016	2.00	76,032	
*	CENTERLINE JT 100.0% (LIN FT)	0	2.00	0	
				76,944	70,411
YEAR 5					
	PATCHING 0.5% (SQ YD)	169	80.00	13,520	
				13,520	11,662
YEAR 6					
	THERMAL CRACK 50.0% (LIN FT)	1,521	2.00	3,042	
				3,042	2,548
YEAR 10					
	PATCHING 3.0% (SQ YD)	1,014	80.00	81,120	
	SHLDER PATCH 2.0% (SQ YD)	0	65.00	0	
				81,120	60,361
YEAR 12					
	SHLDER JT 100.0 %(LIN FT)	38,016	2.00	76,032	
*	CENTERLINE JT 100.0% (LIN FT)	0	2.00	0	
	THERMAL CRACK 100.0% (LIN FT)	3,041	2.00	6,082	
	RANDOM CRACK 50.0% (LIN FT)	6,336	2.00	12,672	
				94,786	66,483
YEAR 20					
	MILLING (SQ YD)	33,792	2.20	74,342	
	OVERLAY (TONS)	4,258	80.00	340,640	
	PATCHING 4.0% (SQ YD)	1,352	80.00	108,160	
	SHLDER PATCH 4.0% (SQ YD)	0	65.00	0	
				523,142	289,664
YEAR 21					
	SHLDER JT 100.0 %(LIN FT)	38,016	2.00	76,032	
*	CENTERLINE JT 100.0% (LIN FT)	0	2.00	0	
	THERMAL CRACK 100.0% (LIN FT)	3,041	2.00	6,082	
	RANDOM CRACK 50.0% (LIN FT)	6,336	2.00	12,672	
				94,786	50,947
YEAR 23					
**	CENTERLINE JT 100.0% (LIN FT)	6,336	2.00	12,672	6,421
YEAR 31					
	SHLDER JT 100.0 %(LIN FT)	38,016	2.00	76,032	
***	CENTERLINE JT 100.0% (LIN FT)	6,336	2.00	12,672	
	THERMAL CRACK 100.0% (LIN FT)	3,041	2.00	6,082	
	RANDOM CRACK 50.0% (LIN FT)	6,336	2.00	12,672	
				107,458	42,983
YEAR 32					
	PATCHING 3.0% (SQ YD)	1,014	80.00	81,120	
	SHLDER PATCH 3.0% (SQ YD)	0	65.00	0	
				81,120	31,499
	MAINTENANC LIFE CYCLE COSTS				$632,979
	MAINTENANC ANNUAL COST PER MILE				$22,819

Illinois Department of Transportation

Memorandum

To:	Scott Stitt	Attn:	Paul Niedernhofer
From:	Diane O'Keefe		
Subject:	Pavement Analysis*		
Date:	October 21, 2010		

*Location: Il-62(Penny Road to Easting's Way)
Route: FAP 339
Section: 116 Y-1-R-1
County: Cook
Contract No.: 60I35
Job No: C-91-022-10 Current target: 04CY11

We are submitting the pavement analysis for the above captioned location for your review and approval.

Reconstruct IL-62 pavement from a two-lane cross-section to a four-lane cross-section with a flush painted median to match existing conditions to the east (at Penny Road) and west (at Easting's Way) at project limits. Length of improvement is approximately 6340'.

A pavement analysis was performed on the above segment. We recommend the selection of mechanistic rigid pavement for the following reasons.

- Life-cycle cost favors rigid pavement by more than 10%
- Initial reconstruction cost also favors rigid pavement
- Existing Pavement at project limits at each end is rigid

IL-62 Road(from Penny Road to Easting's Way)

Tied PCC curb and gutter
Pavement reconstruction:

9.5" JPC Pavement
12" Aggregate Subgrade

If you have any questions or need additional information, please contact Mr. Mohamad Khudeira, at (847) 705-4209.

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

Prepared By: Tom Matousek, Ext. 4255
Bureau of Design

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Spreadsheet by Uehle - Rev. 11/02

MECHANISTIC PAVEMENT DESIGN

Date: 7/22/10

INPUT (Enter Data in Gray Shaded Cells)

Route: IL 62 (Algonquin Road)
Section: 116(YC1-R-1
County: Cook
Location: Eastings Way to Penny Road
Comments: IL 62 (Algonquin Road)
Designer:

	ADT	Year
Current:	25000	2007
Future:	34500	2020

Facility Type: Other Marked State Route
# of Lanes = 4
Road Class: I
Subgrade Support Rating (SSR): Poor
Construction Year: 2012
Design Period (DP) = 20 years

	Minimum ADT	Actual ADT	Actual %of Total ADT	% of ADT in Design Lane
		Structural Design Traffic		
PV =	0	32,982	95.6%	P = 32%
SU =	300	759	2.2%	S = 45%
MU =	900	759	2.2%	M = 45%
Struct. Design ADT =		34500	(2022)	

FLEXIBLE & RIGID PAVEMENT CALCULATIONS AND ADDITIONAL INPUT

Flexible Pavement

Cpv =	0.15	
Csu =	133	
Cmu =	483	
TF flexible (Actual)=	4.23	(Actual ADT)
TF flexible (Min)=	4.27	(Min ADT Fig 54-2C)
Use TF flexible =	4.27	
AC Type =	20	
AC Mixture Tempurature =	760	deg. F (Figure 54-5C)
Design AC Mixture Modulus (Eac)=	650	ksi (Figure 54-5D)
Design Asphalt Concrete Microstrain =	66.2	(Figure 54-5E)
Asphalt Concrete Thickness =	**12.25**	**in. (Figure 54-5F)**

Rigid Pavement

Cpv =	0.15	
Csu =	144	
Cmu =	696	
TF rigid (Actual)=	5.77	(Actual ADT)
TF rigid (Min)=	6.03	(Min ADT Fig 54-2C)
Use TF rigid =	6.03	
	Tied	Shoulder or C. &G.
Rigid Pavt Thick.=	**9.50**	**in. (Figure 54-4D)**

DESIGN TABLES FROM BD&E PAVEMENT DESIGN CH. 54 AND PAVEMENT DESIGN MANUAL

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 54-2C)		
Facility Type	PV	SU	MU
Interstate or Supplemental Freeway	0	500	1500
Other Marked State Route	0	300	900
Unmarked State Route	No Min	No Min	No Min

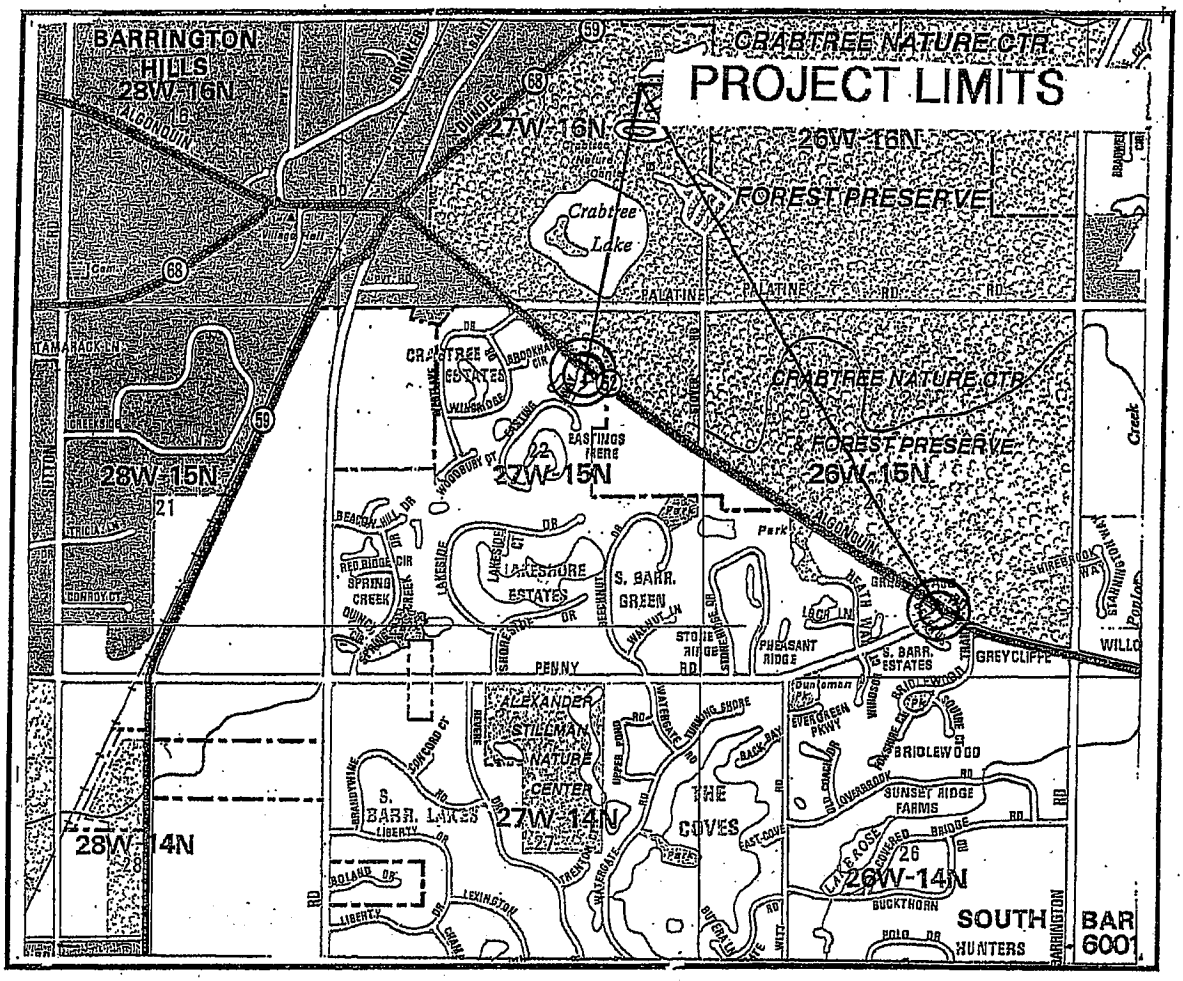
Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4C)		Flexible (Fig. 54-5B)	
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(ADT>400)	127.75	555.90	109.14	384.35
IV(ADT<=400)	127.75	555.90	9.86	78.84

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

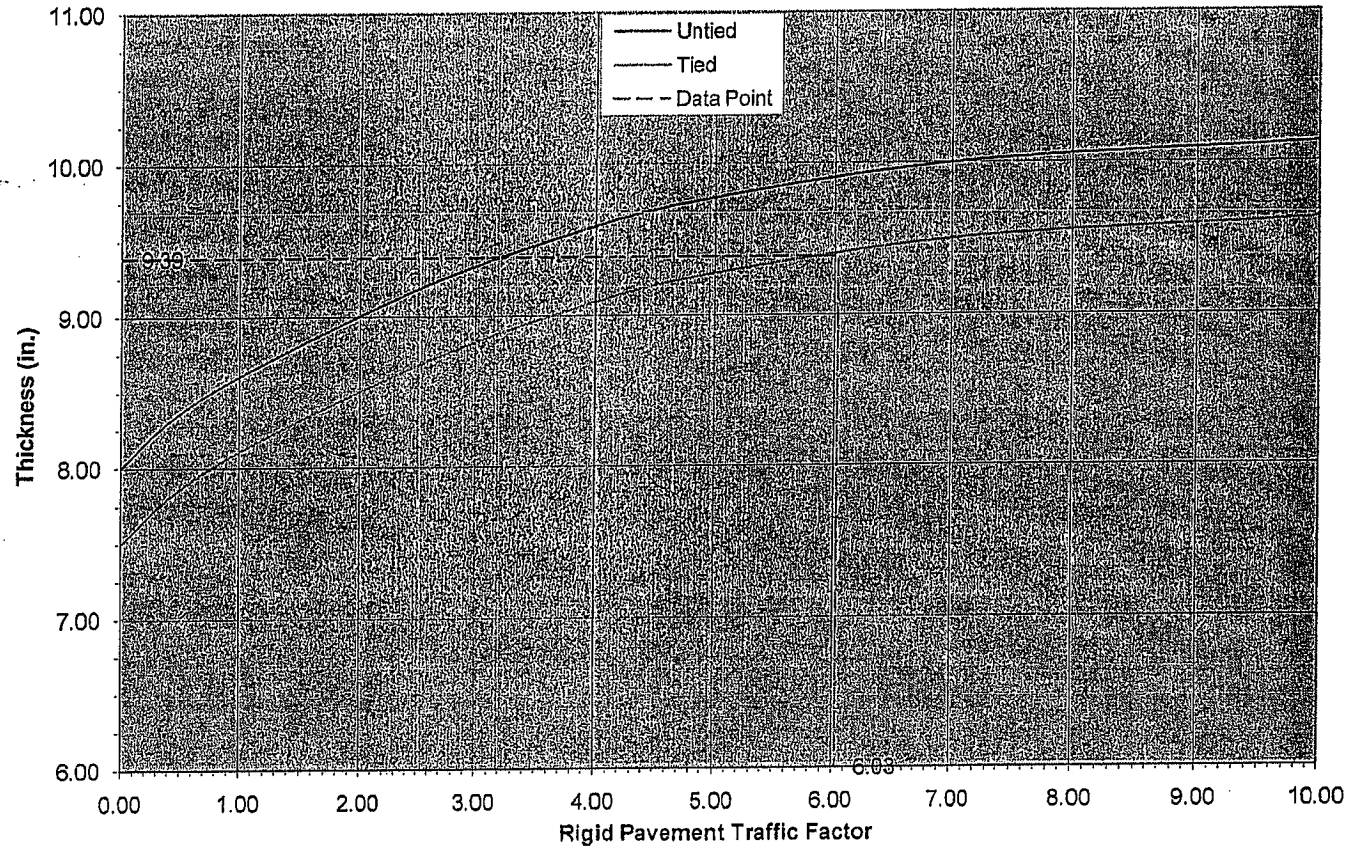
	Figure 54-2B Percentage of ADT in Design Lane					
	Rural			Urban		
Number of Lanes	P	S	M	P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

LOCATION MAP



Illinois Route 62
(Algonquin Road)
From Penny Road to Easting's Way
Cook County
Village of South Barrington
P-91-156-96

Rigid Pavement Design Chart (SSR = Poor) (Fig. 54-4D)



Rigid Pavement Design Chart (SSR = Poor) (Fig. 54-4D)