Illinois Department of Transportation

To:	John Fortmann	Attn: District One
From:	John D. Baranzelli	
Subject:	Pavement Design	
Date:	January 23, 2015	

FAU Route 1419 (Madison Street)
Cook County
From Park Avenue to Des Plaines Avenue

The project, submitted to BDE by memo dated September 15, 2014, will reconstruct this short segment of Madison Street from Park Avenue to Des Plaines Avenue. The LCCA favored a rigid design for Madison Street by 7.2%. The project is not subject to alternate bidding, and was discussed by the Pavement Selection Committee. Due to the short length of new pavement, and that the adjacent sections of pavement exist as HMA, the Committee agreed with the district's request to build this pavement as a flexible pavement.

The approved pavement design is as follows:

Madison Street (Pavement Reconstruction)

9.25 inches of Full Depth HMA Pavement PCC C&G
2 inches of HMA Surface Course, Mix "D", N70
7.25 inches of HMA Base Course, IL-19.0, N70
12 inches of Aggregate Subgrade Improvement

Madison Street (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

Option 2
8 inches of Temporary PCC Pavement
4 inches of Subgrade Granular Material Type B

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: September 15, 2014

*Route: Madison Street
Limits: Park Avenue to Des Plaines Avenue
Section: 13-00111-00-LS
Current target: 01CY15

County: Cook
Contract No.: N/A
Job No.: C-91-269-13

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 Madison Street (Streetscape) from Park Avenue to Des Plaines Avenue

A 20-year pavement analysis was performed on the above segments. The life cycle cost analysis which favors PCC pavement by 7.2%, however, we recommend a flexible pavement design to maintain continuity of pavement type for this reconstruction portion (approximately 1,500 feet) as the existing pavement type at the east and west limits is HMA. Our recommendation is as follows:

Madison Ave

PCC Curb and Gutter
9 ¼" Full Depth HMA[4]
2" HMA Surface Course, Mix "D", N70[1]
7 ¼" HMA Base Course, IL-19.0, N70[2]
12" Aggregate Subgrade Improvement[3]

Temporary Pavement
Option 1[5]
Temporary Pavement
10" Full Depth Temporary HMA Pavement[6]
2" HMA Surface Course, Mix "D", N50
8" HMA Binder Course, IL-19.0, N50
4" Subbase Granular Material, Type B[7]

Option 2[5]
Temporary Pavement
8" Temporary PCC Pavement[6]
4" Subbase Granular Material, Type B[7]

[1]Designer Note 1: Use pay item **40603340, HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70** paid for in tons.

[2]Designer Note 2: Use pay item **35501313, HOT-MIX ASPHALT BASE COURSE, 7 ¼",** paid for in square yards.

[3]Designer Note 3: Use pay item **30300112, AGGREGATE SUBGRADE IMPROVEMENT, 12"**, paid in square yards.

[4]Designer Note 4: 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.

[5]Designer Note 5: 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.

[6]Designer Note 6: 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.

[7]Designer Note 7: 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: José A. Dominguez
Jose A. Dominguez, P.E.
Project Support Engineer

CONTRACT NO. 61A53

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
1419	13-00111-00-LS	COOK	62	1
FEDERAL ROAD DISTRICT NO. 1 (ILLINOIS)		FEDERAL AID PROJECT		

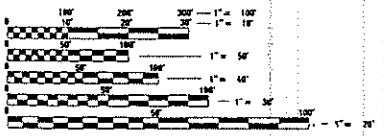
SHEET NO.	DESCRIPTION
1	COVER SHEET
2	GENERAL NOTES
3 - 4	SUMMARY OF QUANTITIES
5	TYPICAL SECTIONS
6	SCHEDULES
7	ALIGNMENT, TIES & BENCHMARKS
8 - 10	PROFILES
11 - 12	EXISTING CONDITIONS AND REMOVAL PLANS
13 - 18	GRADING AND LANDSCAPING PLAN
19 - 20	DRAINAGE AND GEOMETRIC PLANS
21 - 23	WATER MAIN PLAN, NOTES, AND DETAILS
24 - 36	SUGGESTED MAINTENANCE OF TRAFFIC
37 - 38	PAVEMENT MARKING AND SIGNING PLANS
39	LANDSCAPING DETAILS
40 - 41	CONSTRUCTION DETAILS
42	LIGHTING GENERAL NOTES
43 - 44	EXISTING LIGHTING CONDITIONS AND REMOVAL PLAN
45 - 46	PROPOSED LIGHTING PLAN
47 - 51	PROPOSED ELECTRICAL DETAILS
52 - 60	CROSS SECTIONS
61 - 62	DISTRICT 1 STANDARDS

LIST OF STATE STANDARDS

000001-06	STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS
280001-07	TEMPORARY EROSION CONTROL SYSTEMS
424001-07	PERPENDICULAR CURB RAMPS FOR SIDEWALK
424016-01	MID-BLOCK CURB RAMPS FOR SIDEWALKS
424021-02	DEPRESSED CORNER FOR SIDEWALK
424026-01	ENTRANCE / ALLEY PEDESTRIAN CROSSING
602001-02	CATCH BASIN, TYPE A
602011-02	CATCH BASIN, TYPE C
602401-03	MANHOLE, TYPE A
602601-03	PRECAST REINFORCED CONCRETE FLAT SLAB TOP
602701-02	MANHOLE STEPS
604001-03	FRAME AND LIDS, TYPE 1
606001-05	CONCRETE CURB TYPE B AND COMBINATION CONCRETE CURB AND GUTTER
701011-04	OFF-ROAD MOVING OPERATIONS, 2L, 2W, DAY ONLY
701301-04	LANE CLOSURE, 2L, 2W, SHORT TIME OPERATIONS
701502-06	URBAN LANE CLOSURE, 2L, 2W, WITH BIDIRECTIONAL LEFT TURN LANE
701601-09	URBAN LANE CLOSURE MULTILANE, 1W OR 2W WITH NONTRAVERSABLE MEDIAN
701602-07	URBAN LANE CLOSURE, MULTILANE, 2W WITH BIDIRECTIONAL LEFT TURN LANE
701606-09	URBAN LANE CLOSURE, MULTILANE, 2W WITH MOUNTABLE MEDIAN
701701-09	URBAN LANE CLOSURE, MULTILANE, INTERSECTION
701801-05	LANE CLOSURE, MULTILANE 1W OR 2W CROSSWALK OR SIDEWALK CLOSURE
701901-03	TRAFFIC CONTROL DEVICES
720001-01	TYPICAL PAVEMENT MARKINGS
720006-04	SIGN PANEL MOUNTING DETAILS
728001-01	SIGN PANEL ERECTION DETAILS
731001-01	TELESCOPING STEEL SIGN SUPPORT
780001-04	BASE FOR TELESCOPING STEEL SIGN SUPPORT
814001-02	HANDHOLES

PROJECT LOCATED IN THE VILLAGE OF FOREST PARK AND VILLAGE OF RIVER FOREST

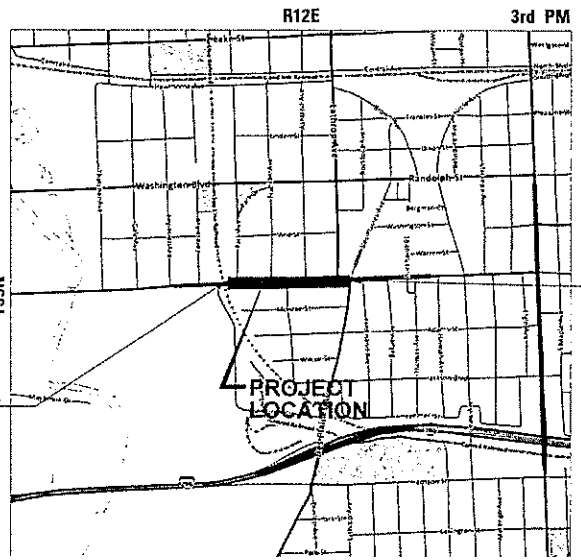
CALL JULIE 811
WITH THE FOLLOWING:
COUNTY COOK
CITY-TOWNSHIP FOREST PARK-PROVISO
SECTION & RANGE SEC. 12&13, T39N, R12E, 3RD PM
48 HOURS BEFORE YOU DIG.
EXCLUDING SAT., SUN., & HOLIDAYS



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.

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PLAN FOR PROPOSED
FEDERAL AID HIGHWAY

F.A.U. ROUTE 1419 (MADISON STREET)
PARK AVENUE TO DES PLAINES AVENUE
STREETSCAPE
SECTION 13-00111-00-LS
PROJECT NO. TE-00D1(917)
VILLAGE OF FOREST PARK
AND VILLAGE OF RIVER FOREST
COOK COUNTY
JOB NO: C-91-269-13



LOCATION MAP

GROSS LENGTH = 1,600 FT. = 0.303 MILE
NET LENGTH = 1,600 FT. = 0.303 MILE

DESIGN DESIGNATION
F.A.U. ROUTE 1419 (MADISON STREET)
ARTERIAL

TRAFFIC DATA
F.A.U. (MADISON STREET)
2010 ADT = 18,800

POSTED SPEED LIMIT
F.A.U. (MADISON STREET) = 25 MPH

DESIGN SPEED
F.A.U. (MADISON STREET) = 25 MPH

ENGINEER DATE
JAMES F AMELIO, P.E.
ILLINOIS REGISTRATION No. 062-060779
EXPIRATION DATE: 11/15

ENGINEER DATE
ANTHONY J. DERICCO, P.E.
ILLINOIS REGISTRATION No. 062-057484
EXPIRATION DATE: 11/15
APPLIES TO SHEETS 35 - 44

ENGINEER DATE

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

APPROVED _____ 20 _____
VILLAGE OF FOREST PARK — MAYOR

APPROVED _____ 20 _____
VILLAGE OF RIVER FOREST — PRESIDENT

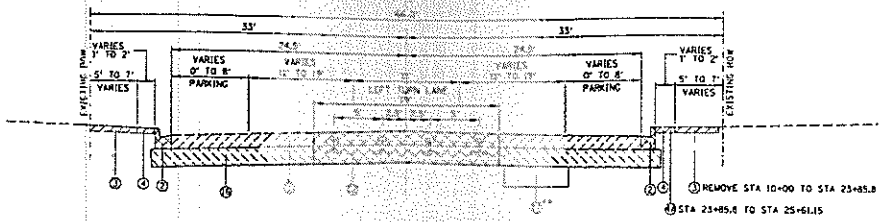
PASSED _____ 20 _____
DISTRICT 1 ENGINEER OF LOCAL ROADS AND STREETS

RELEASING FOR BID BASED ON LIMITED REVIEW _____ 20 _____
DEPUTY DIRECTOR OF HIGHWAYS, REGION 1 ENGINEER

CHRISTOPHER B. BURKE ENGINEERING, LTD
9575 W. Higgins Road, Suite 600
Rosemont, Illinois 60018
(847) 823-0500
PROFESSIONAL DESIGN FIRM NO. 184-001175
EXPIRATION DATE: 04/30/15

PRINTED BY THE AUTHORITY OF THE STATE OF ILLINOIS

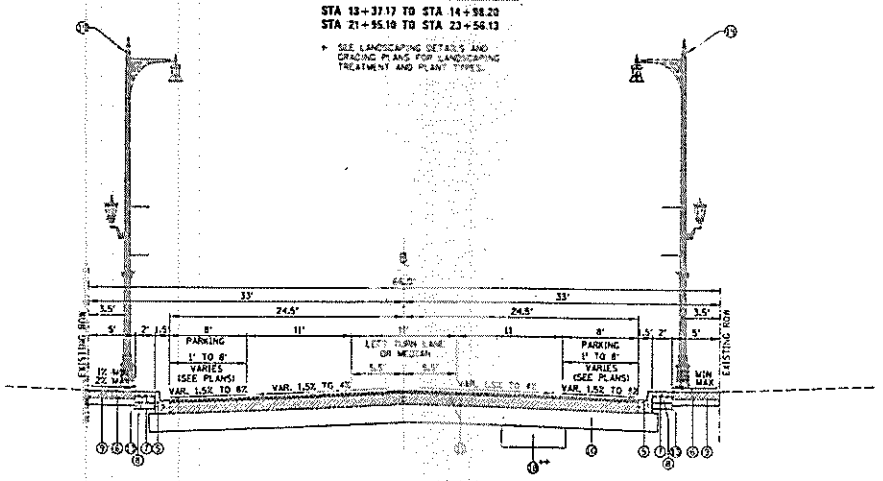
CHRISTOPHER B. BURKE ENGINEERING, LTD 9575 West Higgins Road Suite 600 Rosemont, Illinois 60018 Telephone No. (847) 823-0500



EXISTING TYPICAL SECTION
STATION 10+31.20 STATION 25+67.15 MADISON STREET

PROPOSED TYPICAL SECTION
LANDSCAPED MEDIAN MADISON STREET
STA 13+37.17 TO STA 14+58.20
STA 21+55.18 TO STA 23+56.13

* SEE LANDSCAPING DETAILS AND GRADING PLANS FOR LANDSCAPING TREATMENT AND PLANT TYPES.



PROPOSED TYPICAL SECTION
STATION 10+34.20 TO STATION 23+85.92 MADISON STREET

** UNDERCUT LOCATIONS TO BE DETERMINED BY THE ENGINEER BASED ON SOIL BORINGS ITO BE PROVIDED WITH FINAL PLAN SUBMITTAL AND FIELD CONDITIONS)

LEGEND

1. EXISTING PAVEMENT REMOVAL
2. EXISTING CURB AND GUTTER REMOVAL
3. EXISTING SIDEWALK REMOVAL
4. EXISTING PARKWAY
5. EXISTING BRICK PAVER TO REMAIN
6. COMBINATION CONCRETE CURB AND GUTTER, TY B-6.12
7. PORTLAND CEMENT CONCRETE SIDEWALK 5"
8. UNIT PAVER ON SAND BED, 2.7" NOMINAL
9. SAND CUSHION, 1" (INCLUDED IN THE COST OF UNIT PAVER ON SAND BED)
10. AGGREGATE BASE COURSE, TYPE B, 4" (CA-6)
11. AGGREGATE SUBGRADE IMPROVEMENT 12"
12. HOT-MIX ASPHALT PAVEMENT (FULL-DEPTH), 9"
    + HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70; 1-1/2"
    + HOT-MIX ASPHALT BINDER COURSE, IL-19.0, N70; 7-1/2"
13. PAVEMENT REMOVAL (SPECIAL)
14. CONCRETE LANDING SLAB; 6"
15. SHREDDED BARK MULCH 4"
16. TOPSOIL FURNISH AND PLACE, SPECIAL
17. EARTH EXCAVATION
18. REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL
19. POROUS GRANULAR EMBANKMENT
20. LIGHT POLE

HOT-MIX ASPHALT REQUIREMENTS	
MIXTURE TYPE	AIR VOIDS @ NOES
HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70; 1-1/2"	4% @ 70 Gyr.
HOT-MIX ASPHALT BINDER COURSE, IL-19.0, N70; 7-1/2	4% @ 70 Gyr.

NOTES:

1. THE UNIT WEIGHT USED TO CALCULATE ALL HOT-MIX ASPHALT SURFACE MIXTURE QUANTITIES IS 112 LBS/ SQ. YD. IN.

2. AGGREGATE SUBGRADE IMPROVEMENT HAVE BEEN PROVIDED TO REPLACE SOILS WHICH TEND TO BE UNSTABLE WHEN WET. THE ACTUAL NEED FOR REMOVAL AND REPLACEMENT WITH PGES WILL BE DETERMINED IN THE FIELD AT THE TIME OF CONSTRUCTION BY THE ENGINEER. IF UNSUITABLE SOILS ARE ENCOUNTERED THE SOILS SHALL BE REMOVED AND REPLACED WITH PGES. THE REMOVAL AND REPLACEMENT AREA SHALL EXTEND TO 12 INCHES BEYOND THE CURB AND GUTTER AND COME UP AT A 1:1 SLOPE TO THE EXISTING GROUND SURFACE. THESE LIMITS SHALL BE PAID FOR AS "REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL".

3. ALL CURB AND GUTTER JOINTS SHALL MATCH THE EXISTING PCC BASE COURSE JOINTS.

4. ALL CURB AND GUTTER AND PAVEMENT WIDENING SHALL BE PINNED TO EXISTING CONCRETE BASE WHEN PRESENT.

5. CLASS D PATCH SHALL MATCH THE GRADE OF THE MILLED SURFACE. IF THE SURFACE IN NOT MILLED AT THE TIME OF PATCHING, THE CONTRACTOR SHALL PROVIDE 2" OF HOT-MIX ASPHALT TEMPORARY SURFACE COURSE. THE COST OF THIS TEMPORARY SURFACE COURSE SHALL BE INCLUDED IN THE COST OF THE CLASS D PATCH.

CHRISTOPHER B. BURKE ENGINEERING, LTD
9575 W. Higgins Road, Suite 610
Rosemont, Illinois 60018
(847) 823-0500

USER NAME = cburke@cbburke.com
PLOT SCALE = 1.0
PLOT DATE = 7/27/2016

DESIGNED - JJA
DRAWN - PDP
CHECKED - CBB
DATE -

REVISED -
REVISED -
REVISED -
REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
MADISON STREET

SCALE: N/S | SHEET 1 OF 1 SHTS. | STA. TO STA.

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
1459	13-00111-00-LS	COOK	62	4
		CONTRACT NO. 61A73		

DISTRICT ONE TOLL HIGHWAY PROJECT

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

IDOT MECHANISTIC PAVEMENT DESIGN

Printed: 02/02/2015

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: Madison Avenue
Section: 13-00111-00-LS
County: Cook
Location: Park ave to Des Plaines Ave
Comments: Local Roads project (Madison Ave from Park Ave to Des Plaines Ave)
Design Date: 09/10/2014 ONP
Modify Date:

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: 2015
Design Period (DP) = 20 years

<-- BY	ADT	Year
Current:	18,800	2010
Future:	22,000	2040

	Structural Design Traffic			
	Minimum ADT	Actual ADT	Actual %of Total ADT	% of ADT in Design Lane
PV =	No Min	19,115	93.7%	P = 50%
SU =	No Min	979	4.8%	S = 50%
MU =	No Min	306	1.5%	M = 50%
		Struct. Design ADT =	20,400	(2025)

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) =	2.31	(Actual ADT)	TF rigid (Actual) =	3.09	(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

Goto Map

Use TF flexible =	2.31	
PG Grade Lower Binder Lifts =	PG 64-22	(Fig. 53-4.R)
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}) =	95	(Fig. 54-5.E)
Full Depth HMA Design Thickness =	9.25	in. (Fig. 54-5.F)
Limiting Strain Criterion Thickness =	14.75	in. (Fig. 54-5.I)
Use Full-Depth HMA Thickness =	**9.25**	**inches**

JPC Pavement

Use TF rigid =	3.09	
Edge Support =	Tied	Shoulder or C.&G.
Rigid Pavt Thick. =	**8.50**	**in. (Fig. 54-4.E)**

CRC Pavement

Use TF rigid =	3.09	
IBR value =	3	
CRCP Thickness =	**7.25**	**in. (Fig. 54-4.N)**

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC

Goto Map

Use TF flexible =	2.31	
HMA Overlay Design Thickness =	6.75	in. (Fig. 54-5.U)
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)

	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: 02/02/2015

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT

Standard Design

ROUTE	Madison Avenue
SECTION	13-00111-00-LS
COUNTY	Cook
LOCATION	Park ave to Des Plaines Ave
FACILITY TYPE	NON-INTERSTATE

PROJECT LENGTH			1527 FT	= = > 0.29 Miles
# OF CENTERLINES			1 CL	
# OF LANES			2 LANES	
# OF EDGES			2 EP	
LANE WIDTH - AVERAGE			11 FT	
SHOULDER WIDTH	HMA	Left	0 FT	
	HMA	Right	0 FT	
	Total Width of Paved Shoulders		0 FT	

PAVEMENT THICKNESS (FLEXIBLE)	9.25 IN	14.75 IN MAX
SHOULDER THICKNESS	8.00 IN	Standard Design
POLICY OVERLAY THICKNESS	2.25 IN	

FLEX PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	No Min	2.31	2.31

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	$87.51 / TON
HMA TOP BINDER	$59.52 / TON
HMA LOWER BINDER	$59.52 / TON
HMA BINDER (LEVELING)	$73.00 / TON
HMA SHOULDER	$0.00 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT		UNIT PRICE		COST	
HMA PAVEMENT (FULL-DEPTH)	(9.25")	3,733	SQ YD	*	$34.08	/ SQ YD	$127,209	~
HMA SURFACE COURSE	(2.00")	421	TONS		$87.51	/ TON	$0	
HMA TOP BINDER COURSE	(2.25")	481	TONS		$59.52	/ TON	$0	
HMA LOWER BINDER COURSE	(5.00")	1,099	TONS		$59.52	/ TON	$0	
HMA SHOULDER	(8.00")	0	TONS		$0.00	/ TON	$0	~
CURB & GUTTER		3,054	LIN FT	*	$30.00	/ LIN FT	$91,620	
SUBBASE GRAN MATL TY C (TONS)		9	TONS		$25.00	/ TON	$225	
IMPROVED SUBGRADE:	Modified Soil	4,164	SQ YD		$7.00	/ SQ YD	$29,148	
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0	
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0	
PAVEMENT REMOVAL		3,733	SQ YD		$15.00	/ SQ YD	$55,995	
SHOULDER REMOVAL		0	SQ YD		$0.00	/ SQ YD	$0	

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST	$304,197
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE	$42,899

MAINTENANCE COSTS:

ITEM		THICKNESS	MATERIAL	UNIT COST	
ROUTINE MAINTENANCE ACTIVITY				$0.00	LANE-MILE / YEAR
HMA OVERLAY PVMT SURF		(2.00")	Surface Mix	$9.88	/ SQ YD
HMA OVERLAY PVMT		(2.25")		$10.50	/ SQ YD
HMA SURFACE MIX		(1.50")	Surface Mix	$7.39	/ SQ YD
HMA BINDER MIX		(0.75")	eling Binder Mix	$3.11	/ SQ YD
HMA OVERLAY SHLD	(Year 30)	(2.25")	Shoulder Mix	$0.00	/ SQ YD
HMA OVERLAY SHLD		(2.00")	Shoulder Mix	$0.00	/ SQ YD
MILLING (2.00 IN)				$3.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH		(Mill & Fill Surf)	Surface Mix	$79.80	/ SQ YD
PARTIAL DEPTH SHLD PATCH		(Mill & Fill Surf)	Shoulder Mix	$70.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH		(Mill & Fill +2.00 ")	Leveling Binder Mix	$78.18	/ SQ YD
PARTIAL DEPTH SHLD PATCH		(Mill & Fill +2.00 ")	Shoulder Mix	$70.00	/ 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	$404,286
FLEXIBLE TOTAL ANNUAL COST PER MILE	$57,015

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 02/02/15

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%	3,054	LIN FT	$2.00		$6,108	
	CNTR LINE JOINT R&S	100.00%	1,527	LIN FT	$2.00		$3,054	
	RNDM / THRM CRACK R&S	50.00%	1,680	LIN FT	$2.00		$3,360	
	PD PVMT PATCH M&F SURF	0.10%	4	SQ YD	$79.80		$319	
	PWFn =	0.8626		PW =	0.8626	X	$12,841	$11,077
YEAR 10								
	LONG SHLD JT R&S	100.00%	3,054	LIN FT	$2.00		$6,108	
	CNTR LINE JOINT R&S	100.00%	1,527	LIN FT	$2.00		$3,054	
	RNDM / THRM CRACK R&S	50.00%	1,680	LIN FT	$2.00		$3,360	
	PD PVMT PATCH M&F SURF	0.50%	19	SQ YD	$79.80		$1,516	
	PWFn =	0.7441		PW =	0.7441	X	$14,038	$10,446
YEAR 15								
	MILL PVMT & SHLD 2.00"	100.00%	3,733	SQ YD	$3.00		$11,199	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	37	SQ YD	$78.18		$2,893	
	HMA OVERLAY PVMT 2.00"	100.00%	3,733	SQ YD	$9.88		$36,861	
	HMA OVERLAY SHLD 2.00 "	100.00%	0	SQ YD	$0.00		$0	
	PWFn =	0.6419		PW =	0.6419	X	$50,953	$32,705
YEAR 20								
	LONG SHLD JT R&S	100.00%	3,054	LIN FT	$2.00		$6,108	
	CNTR LINE JOINT R&S	100.00%	1,527	LIN FT	$2.00		$3,054	
	RNDM / THRM CRACK R&S	50.00%	1,680	LIN FT	$2.00		$3,360	
	PD PVMT PATCH M&F SURF	0.10%	4	SQ YD	$79.80		$319	
	PWFn =	0.5537		PW =	0.5537	X	$12,841	$7,110
YEAR 25								
	LONG SHLD JT R&S	100.00%	3,054	LIN FT	$2.00		$6,108	
	CNTR LINE JOINT R&S	100.00%	1,527	LIN FT	$2.00		$3,054	
	RNDM / THRM CRACK R&S	50.00%	1,680	LIN FT	$2.00		$3,360	
	PD PVMT PATCH M&F SURF	0.50%	19	SQ YD	$79.80		$1,516	
	PWFn =	0.4776		PW =	0.4776	X	$14,038	$6,705
	HMA_SD							
YEAR 30	NON-INTERSTATE							
	MILL PVMT & SHLD 2.00"	100.00%	3,733	SQ YD	$3.00		$11,199	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	75	SQ YD	$78.18		$5,863	
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	0	SQ YD	$70.00		$0	
	HMA OVERLAY PVMT 2.25 "	100.00%	3,733	SQ YD	$10.50		$39,201	
	HMA OVERLAY SHLD 2.25 "	100.00%	0	SQ YD	$0.00		$0	
	PWFn =	0.4120		PW =	0.4120	X	$56,263	$23,180
YEAR 35								
	LONG SHLD JT R&S	100.00%	3,054	LIN FT	$2.00		$6,108	
	CNTR LINE JOINT R&S	100.00%	1,527	LIN FT	$2.00		$3,054	
	RNDM / THRM CRACK R&S	50.00%	1,680	LIN FT	$2.00		$3,360	
	PD PVMT PATCH M&F SURF	0.10%	4	SQ YD	$79.80		$319	
	PWFn =	0.3554		PW =	0.3554	X	$12,841	$4,563
YEAR 40								
	LONG SHLD JT R&S	100.00%	3,054	LIN FT	$2.00		$6,108	
	CNTR LINE JOINT R&S	100.00%	1,527	LIN FT	$2.00		$3,054	
	RNDM / THRM CRACK R&S	50.00%	1,680	LIN FT	$2.00		$3,360	
	PD PVMT PATCH M&F SURF	0.50%	19	SQ YD	$79.80		$1,516	
	PWFn =	0.3066		PW =	0.3066	X	$14,038	$4,303
								$100,089
	ROUTINE MAINTENANCE ACTIVITY		0.58	Lane Miles	0.00		$0	$0
							MAINTENANCE LIFE-CYCLE COST	$100,089
45	YEAR LIFE CYCLE	CRFn = 0.0407852					MAINTENANCE ANNUAL COST PER MILE	$14,115

PCC PAVEMENT

JPCP

ROUTE			Madison Avenue	
SECTION			13-00111-00-LS	
COUNTY			Cook	
LOCATION			Park ave to Des Plaines Ave	
FACILITY TYPE			NON-INTERSTATE	
PROJECT LENGTH			1527 FT = = >	0.29 Miles
# OF CENTERLINES			1 CL	
# OF LANES			2 LANES	
# OF EDGES			2 EP	
LANE WIDTH - AVERAGE			11 FT	
SHOULDER WIDTH	PCC	Left	0 FT	
	PCC	Right	0 FT	
	Total Width of Paved Shoulders		0 FT	

PAVEMENT THICKNESS (RIGID)	JPCP	8.50 IN	TIED SHLD
SHOULDER THICKNESS		8.50 IN	
POLICY OVERLAY THICKNESS		2.50 IN	

RIGID PAVEMENT TRAFFIC FACTORS		MINIMUM	ACTUAL	USE
		No Min	3.09	3.09
Worksheet Construction Type is	Reconstruction		The Pavement Type is	JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT		UNIT PRICE		COST
JPC PAVEMENT	(8.50")	3,733	SQ YD		$38.54	/ SQ YD	$143,870
PAVEMENT REINFORCEMENT		0	SQ YD		$22.00	/ SQ YD	$0
STABILIZED SUBBASE	(4.00")	0	SQ YD	*	$19.00	/ SQ YD	$0
PCC SHOULDERS	(8.50" to 8.50")	0	SQ YD		$40.00	/ SQ YD	$0
CURB & GUTTER		3,054	LIN FT	*	$30.00	/ LIN FT	$91,620
SUBBASE GRAN MATL TY C	(~ 0.00")	0	TONS		$25.00	/ TON	$0
IMPROVED SUBGRADE:	Modified Soil	3,902	SQ YD		$7.00	/ SQ YD	$27,314
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0
PAVEMENT REMOVAL		3,733	SQ YD		$15.00	/ SQ YD	$55,995
SHOULDER REMOVAL		0	SQ YD		$0.00	/ SQ YD	$0

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	$318,799
RIGID CONSTRUCTION ANNUAL COST PER MILE	$44,959

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL		UNIT COST	
ROUTINE MAINTENANCE ACTIVITY				$0.00	/ LANE-MILE / YEAR
HMA POLICY OVERLAY	(2.50")		2.50		
HMA POLICY OVERLAY PVMT	(2.50")		2.50	$11.54	/ SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	1.50	$7.39	/ SQ YD
HMA BINDER MIX	(1.00")	eling Binder Mix	1.00	$4.15	/ SQ YD
HMA POLICY OVERLAY SHLD	(2.50")	Shoulder Mix	2.50	$0.00	/ 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	$77.35	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 2.50")		Surface Mix	2.50	$82.25	/ 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	$377,223
RIGID TOTAL ANNUAL COST PER MILE	$53,198

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 02/02/15

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%	4	SQ YD	$150.00		$600	
	PWFn = 0.7441			PW =	0.7441	X	$600	$446
YEAR 15								
	PAVEMENT PATCH CLASS B	0.20%	7	SQ YD	$150.00		$1,050	
	PWFn = 0.6419			PW =	0.6419	X	$1,050	$674
YEAR 20								
	PAVEMENT PATCH CLASS B	2.00%	75	SQ YD	$150.00		$11,250	
	SHOULDER PATCH CLASS C	0.50%	0	SQ YD	$145.00		$0	
	LONGITUDINAL SHLD JT R&S	100.00%	3,054	LIN FT	$2.00		$6,108	
	CENTERLINE JT R&S	100.00%	1,527	LIN FT	$2.00		$3,054	
	PWFn = 0.5537			PW =	0.5537	X	$20,412	$11,302
YEAR 25								
	PAVEMENT PATCH CLASS B	3.00%	112	SQ YD	$150.00		$16,800	
	SHOULDER PATCH CLASS C	1.00%	0	SQ YD	$145.00		$0	
	PWFn = 0.4776			PW =	0.4776	X	$16,800	$8,024
YEAR 30	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	4.00%	149	SQ YD	$150.00		$22,350	
	SHOULDER PATCH CLASS C	1.50%	0	SQ YD	$145.00		$0	
	HMA POLICY OVERLAY 2.5" (PVMT)	100.00%	3,733	SQ YD	$11.54		$43,085	
	HMA POLICY OVERLAY 2.5" (SHLD)	100.00%	0	SQ YD	$0.00		$0	
	PWFn = 0.4120			PW =	0.4120	X	$65,435	$26,958
YEAR 35	NON-INTERSTATE							
	LONGITUDINAL SHLD JT R&S	100.00%	3,054	LIN FT	$2.00		$6,108	
	CENTERLINE JT R&S	100.00%	1,527	LIN FT	$2.00		$3,054	
	RANDOM CRACK R&S	50.00%	1,527	LIN FT	$2.00		$3,054	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	898	LIN FT	$2.00		$1,796	
	PD PVMT PATCH M&F HMA 2.50"	0.10%	4	SQ YD	$82.25		$329	
	PWFn = 0.3554			PW =	0.3554	X	$14,341	$5,097
YEAR 40	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	0.50%	19	SQ YD	$150.00		$2,850	
	LONGITUDINAL SHLD JT R&S	100.00%	3,054	LIN FT	$2.00		$6,108	
	CENTERLINE JT R&S	100.00%	1,527	LIN FT	$2.00		$3,054	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	1,346	LIN FT	$2.00		$2,692	
	RANDOM CRACK R&S	50.00%	1,527	LIN FT	$2.00		$3,054	
	PD PVMT PATCH M&F HMA 2.50"	0.50%	19	SQ YD	$82.25		$1,563	
	PWFn = 0.3066			PW =	0.3066	X	$19,321	$5,923
								$58,424
	ROUTINE MAINTENANCE ACTIVITY		0.58	Lane Miles	$0.00		$0	$0
					MAINTENANCE LIFE-CYCLE COST			$58,424
45	YEAR LIFE CYCLE CRFn = 0.0407852				MAINTENANCE ANNUAL COST PER MILE			$8,239

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 9/11/14 9:26 AM

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	$318,799	$304,197
		ANNUAL COST PER MILE	$44,959	$42,899
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	$58,424	$100,089
		ANNUAL COST PER MILE	$8,239	$14,115
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	$377,223	$404,286
		ANNUAL COST PER MILE	$53,198	$57,015

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	==========>	**JPCP**	**$53,198**	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	**HMA**	**$57,015**	7.2%

P:\Pavement Design Stuff\D-1\Madison Street from Park Avenue to Des Plaines Avenue 09-15-14\[Madison Street from Park Avenue to Des Plaines Avenue Mechar