Illinois Department of Transportation

To:	Anthony J. Quigley	Attn:	John Baczek
From:	Jack A. Elston	By:	Michael Brand MOB
Subject:	Pavement Design Approval		
Date:	July 15, 2019		

Route:	183rd Street	Job No.:	P-91-475-09
Section:		Contract No.:	12512
County:	Cook	Target Letting:	June 2020
Limits:	at Central Avenue		

We have reviewed the pavement design for the above referenced project which was submitted on June 7, 2019. The scope of the project involves reconstructing the intersection of 183rd Street at Central Avenue to raise the profile, provide additional left turn storage on 183rd Street, and add left turn lanes on Central Avenue.

The pavement design resulted in an HMA option and a PCC option for each roadway. The life cycle cost analysis of those options resulted in the HMA option being more than 10% less expensive in each case.

In summary, the approved pavement designs are as follows:

<u>183rd Street</u>
9.75" Full-Depth HMA Pavement w/ HMA Shoulders
12" Aggregate Subgrade Improvement

<u>Central Avenue</u>
8.25" Full-Depth HMA Pavement w/ HMA Shoulders
12" Aggregate Subgrade Improvement

If you have any questions, please contact Mike Brand at (217) 782-7651.

Illinois Department of Transportation

Memorandum

To: Jack Elston | Attn: Michael Brand

From: Jose A. Dominguez | By: Kari Smith/Ojas Patel

Subject: Pavement Analysis* | Date: June 7, 2019

*Route: 183rd Street
Limits: at Central Avenue
Section: Unknown
Current target: 06CY20

County: Cook
Contract No.: 12512
Job No.: P-91-475-09

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 to raise the profile of the intersection of 183rd Street at Central Avenue and to provide additional storage for the left turn lanes on 183rd Street and new left turn lanes on Central Avenue.

A 20-year pavement analysis was performed for the above segments. We recommend a mechanistic flexible pavement design based on the life cycle cost analysis which favors HMA pavement by 28% for 183rd Street and 19% for Central Avenue.

<u>183rd Street</u>
Reconstruction[4]
HMA Shoulder
9 ¾" Full Depth HMA[1]
    2" HMA Surface Course, Mix "D", N70
    7 ¾" HMA Base Course, IL-19.0, N70
12" Aggregate Subgrade Improvement[3]

<u>Central Avenue[5]</u>
Reconstruction[4]
HMA Shoulder
8 ¼" Full Depth HMA[2]
    2" HMA Surface Course, Mix "D", N70
    6 ¼" HMA Base Course, IL-19.0, N70
12" Aggregate Subgrade Improvement[3]

[1]Designer Note 1: Use pay item **40701876, HOT-MIX ASPHALT PAVEMENT (FULL-DEPTH), 9 ¾"**, paid for in square yards.

[2]Designer Note 2: Use pay item **40701846, HOT-MIX ASPHALT PAVEMENT (FULL-DEPTH), 8 ¼"**, paid for in square yards.

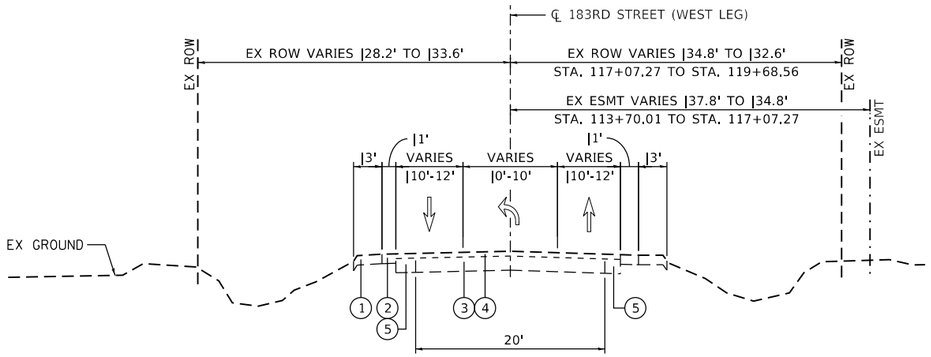
[3]Designer Note 3: Use pay item **30300112, AGGREGATE SUBGRADE IMPROVEMENT, 12"**, paid in square yards.

[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: Central Avenue is subject to local jurisdictional approval and concurrence.

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

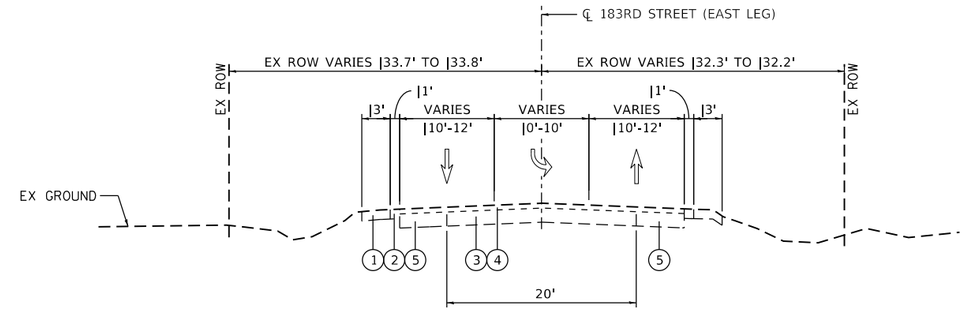
By: José A. Dominguez
Jose A. Dominguez, P.E.
Project Support Engineer



EXISTING 183RD STREET

STA. 113+70.01 TO STA. 120+00.00

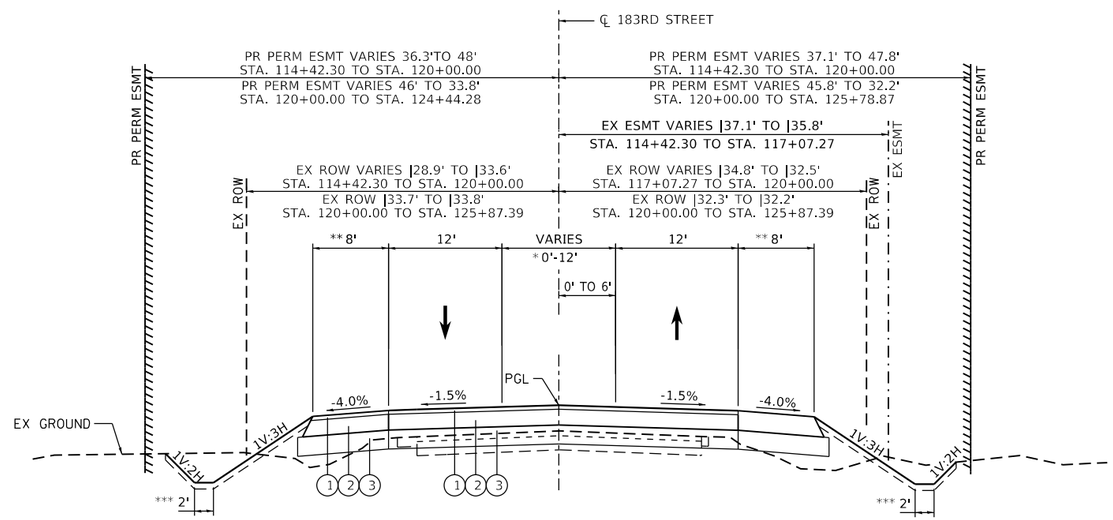
1. AGGREGATE SHOULDER
2. HMA SHOULDER
3. PCC PAVEMENT
4. HMA RESURFACE
5. HMA WIDENING



EXISTING 183RD STREET

STA. 120+00.00 TO STA. 126+42.01

1. AGGREGATE SHOULDER
2. HMA SHOULDER
3. PCC PAVEMENT
4. HMA RESURFACE
5. HMA WIDENING



PROPOSED 183RD STREET

(RECONSTRUCTION)
STA. 114+42.30 TO STA. 125+87.39

1. 2" HMA SURFACE COURSE MIX "D", N70
2. 5 1/4" HMA BINDER COURSE, IL-19.0, N70
3. 12" AGGREGATE SUBGRADE IMPROVEMENT

* FLUSH MEDIAN (WEST LEG)
0' TO 12' FROM STA. 113+70.01 TO STA. 116+70.01

FLUSH MEDIAN/TRANSITION LEFT TURN LANE (WEST LEG)
12' TO 0' FROM STA. 116+70.01 TO STA. 118+50.01

LEFT TURN LANE
(WEST LEG)
12' FROM STA. 118+50.01 TO STA. 119+65.01

(EAST LEG)
12' FROM STA. 120+47.01 TO STA. 121+62.01

TRANSITION LEFT TURN LANE/FLUSH MEDIAN (EAST LEG)
0' TO 12' FROM STA. 121+62.01 TO STA. 123+42.01

FLUSH MEDIAN (EAST LEG)
12' TO 0' FROM STA. 123+42.01 TO STA. 126+42.01

** 10' SHOULDER WIDENING TAPER:

FROM STA. 114+42.30 TO 114+52.30
LEFT: 3' TO 8'
RIGHT: 3.3' TO 8'

FROM STA. 125+77.39 TO 125+87.39
LEFT: 8' TO 3.2'
RIGHT: 8' TO 3.4'

*** DITCH IMPROVEMENTS TO BEGIN
@ STA. 112+00.00 & END @ STA. 127+00.00

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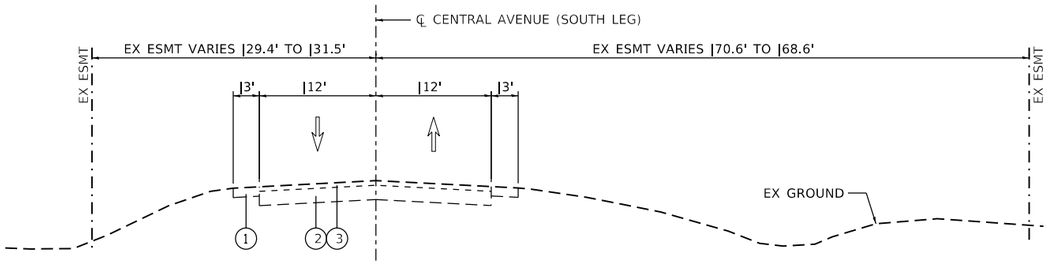
EXISTING AND PROPOSED TYPICAL SECTIONS
183RD STREET AT CENTRAL AVENUE

SCALE: NONE | SHEET OF SHEETS | STA. TO STA.

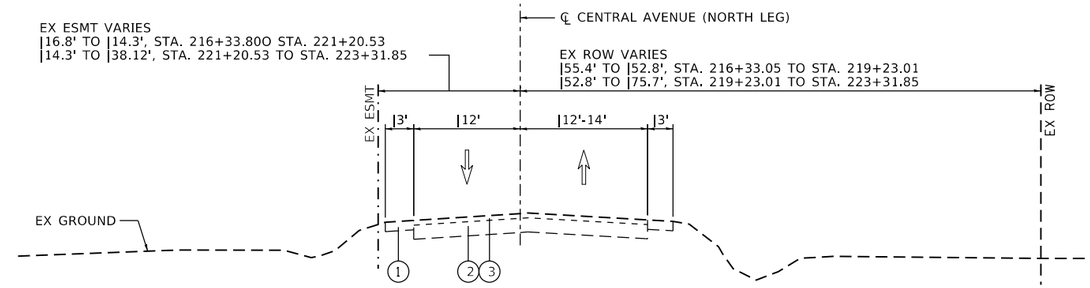
F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
1622		COOK		
		CONTRACT NO. 12512		
		ILLINOIS FED. AID PROJECT		



EXISTING CENTRAL AVENUE

STA. 208+68.02 TO STA. 216+00.00

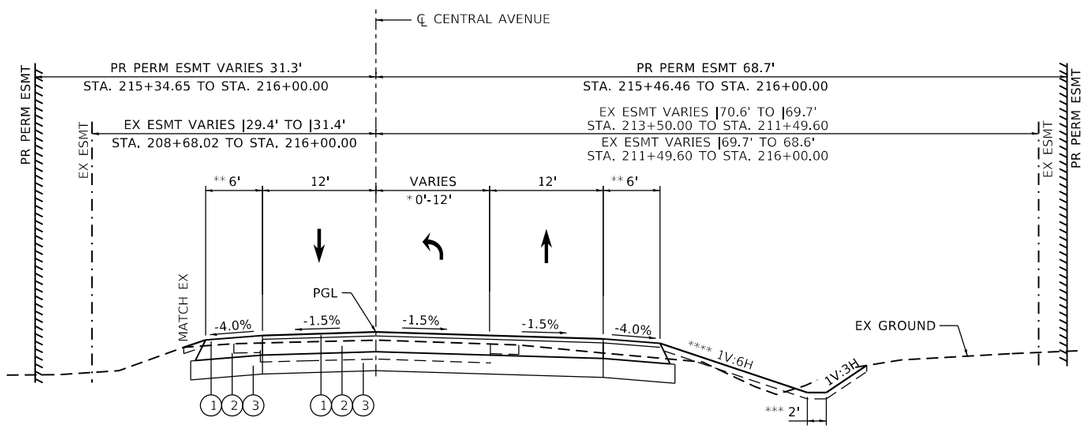
1. HMA SHOULDER
2. EXISTING PAVEMENT
3. HMA RESURFACE



EXISTING CENTRAL AVENUE

STA. 216+00.00 TO STA. 233+31.85

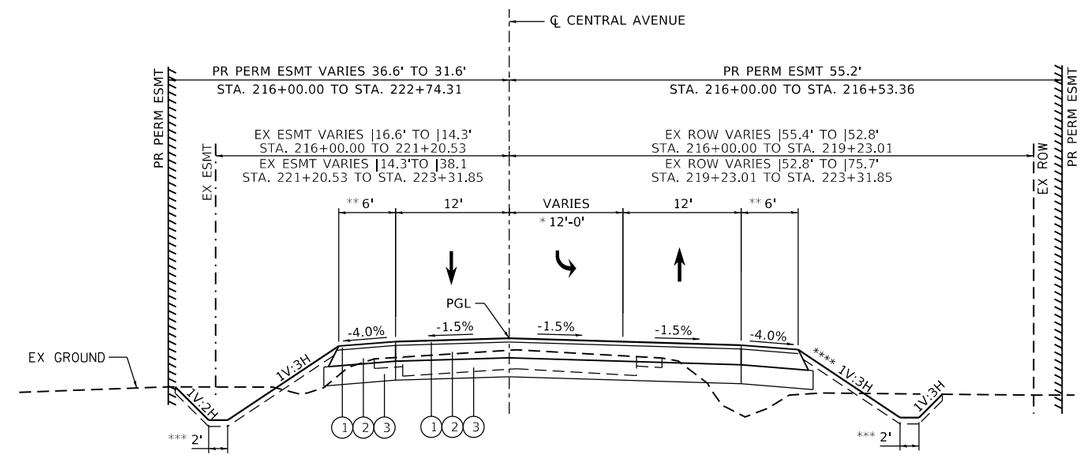
1. HMA SHOULDER
2. EXISTING PAVEMENT
3. HMA RESURFACE



PROPOSED CENTRAL AVENUE

(RECONSTRUCTION)
STA. 208+68.02 TO STA. 216+00.00

1. 2" HMA SURFACE COURSE MIX "D", N70
2. 5 1/4" HMA BINDER COURSE, IL-19.0, N70
3. 12" AGGREGATE SUBGRADE IMPROVEMENT



PROPOSED CENTRAL AVENUE

(RECONSTRUCTION)
STA. 216+00.00 TO STA. 223+31.85

1. 2" HMA SURFACE COURSE MIX "D", N70
2. 5 1/4" HMA BINDER COURSE, IL-19.0, N70
3. 12" AGGREGATE SUBGRADE IMPROVEMENT

* FLUSH MEDIAN (SOUTH LEG)
0' TO 12' FROM STA. 208+68.02 TO STA. 212+88.02

FLUSH MEDIAN/TRANSITION LEFT TURN LANE (SOUTH LEG)
12' TO 0' FROM STA. 212+88.02 TO STA. 214+44.02

LEFT TURN LANE
(SOUTH LEG)
12' FROM STA. 214+44.02 TO STA. 215+59.02

(NORTH LEG)
12' FROM STA. 216+40.85 TO STA. 217+55.85

TRANSITION LEFT TURN LANE/FLUSH MEDIAN (NORTH LEG)
0' TO 12' FROM STA. 217+55.85 TO STA. 219+11.85

FLUSH MEDIAN (NORTH LEG)
12' TO 0' FROM STA. 219+11.85 TO STA. 223+31.85

** 10' SHOULDER WIDENING TAPER:

FROM STA. 208+68.02 TO 208+78.02
LEFT: 2.8' TO 6'
RIGHT: 2.8' TO 6'

FROM STA. 223+21.85 TO 223+31.85
LEFT: 6' TO 2.6'
RIGHT: 6' TO 3.2'

*** DITCH IMPROVEMENTS TO BEGIN @ STA. 208+00.00 &
END @ STA. 222+50.00

**** RIGHT DITCH SLOPES VARY:

1V:6H FRONT SLOPE FROM STA. 208+00.00 TO STA. 216+00.00
1V:3H FRONT SLOPE FROM STA. 216+00.00 TO STA. 223+00.00

FROM DITCH BOTTOM BACK SLOPE MATCHES EXISTING GRADE
FROM STA. 208+00.00 TO STA. 211+00.00

FRONT SLOPE, DITCH BOTTOM & BACK SLOPE TRANSITION
TO MATCH EXISTING FROM STA. 222+00.00 TO STA. 223+00.00

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EXISTING AND PROPOSED TYPICAL SECTIONS
183RD STREET AT CENTRAL AVENUE

SCALE: NONE | SHEET OF SHEETS | STA. TO STA.

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
1622		COOK		
		CONTRACT NO. 12512		
		ILLINOIS	FED. AID PROJECT	

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

IDOT MECHANISTIC PAVEMENT DESIGN

Printed: 07/16/2019

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route:	183rd Street	Comments:	183rd St at Central Avenue			
Section:	N/A		Reconstruction			
County:	Cook	Design Date:	05/30/2019	ONP	<-- BY	
Location:	at Central Avenue	Modify Date:			<-- BY	

	ADT	Year
Current:	9,350	2018
Future:	13,000	2040

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:	2020
Design Period (DP) =	20 years

	Minimum ADT	Structural Design Traffic: Actual ADT	Actual %of Total ADT	% of ADT in Design Lane	
PV =	No Min	10,462	92.3%	P =	50%
SU =	No Min	312	2.8%	S =	50%
MU =	No Min	567	5.0%	M =	50%
		Struct. Design ADT =	11,341	(2030)	

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT

Cpv =	0.15	
Csu =	112.06	
Cmu =	385.44	
TF flexible (Actual) =	2.55	(Actual ADT)
TF flexible (Min) =	No Min	(Min ADT Fig. 54-2.C)

RIGID PAVEMENT

Cpv =	0.15	
Csu =	135.78	
Cmu =	567.21	
TF rigid (Actual) =	3.66	(Actual ADT)
TF rigid (Min) =	No Min	(Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement

Use TF flexible =	2.55	
PG Grade Lower Binder Lifts =	PG 64-22	(Fig. 53-4.R)
HMA Mixture Temp. =	75.5	deg. F (Fig. 54-5.C)
Design HMA Mixture Modulus (E_{HMA}) =	680	ksi (Fig. 54-5.D)
Design HMA Strain (ε_{HMA}) =	92	(Fig. 54-5.E)
Full Depth HMA Design Thickness =	9.75	in. (Fig. 54-5.F)
Limiting Strain Criterion Thickness =	14.75	in. (Fig. 54-5.I)
Use Full-Depth HMA Thickness =	**9.75**	**inches**

Goto Map

Goto Map

JPC Pavement

Use TF rigid =	3.66	
Edge Support =	Tied	Shoulder or C.&G.
Rigid Pavt Thick. =	**8.75**	**in. (Fig. 54-4.E)**

CRC Pavement

Use TF rigid =	3.66	
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 =	2.55	
HMA Overlay Design Thickness =	7.00	in. (Fig. 54-5.U)
Limiting Strain Criterion Thickness =		in. (Fig. 54-5.V)
Use HMA Overlay Thickness =	**999.00**	**inches**

Goto Map

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: 07/18/2019

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT

Standard Design

ROUTE		183rd Street			
SECTION		N/A			
COUNTY		Cook			
LOCATION		at Central Avenue			
FACILITY TYPE		NON-INTERSTATE			
PROJECT LENGTH		1150	FT	==>	0.22 Miles
# OF CENTERLINES		2	CL		
# OF LANES		3	LANES		
# OF EDGES		2	EP		
LANE WIDTH - AVERAGE		12	FT		
SHOULDER WIDTH	HMA Left	0	FT		
	HMA Right	8	FT		
	Total Width of Paved Shoulders	8	FT		
PAVEMENT THICKNESS (FLEXIBLE)		9.75	IN		14.75 IN MAX
SHOULDER THICKNESS		8.00	IN		HMA SD Standard Design
POLICY OVERLAY THICKNESS		2.25	IN		

FLEX PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	No Min	2.55	2.55

Read Me!

HMA COST PER TON	UNIT PRICE	
HMA SURFACE	$96.60	/ TON
HMA TOP BINDER	$81.96	/ TON
HMA LOWER BINDER	$81.96	/ 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)	(9.75")	4600	4,600	SQ YD	*	$39.85	/ SQ YD	$183,310	~
HMA SURFACE COURSE	(2.00")	1.0046	518	TONS		$96.60	/ TON	$0	
HMA TOP BINDER COURSE	(2.25")	1.0145	588	TONS		$81.96	/ TON	$0	
HMA LOWER BINDER COURSE	(5.50")	1.0324	1,463	TONS		$81.96	/ TON	$0	
HMA SHOULDER	(8.00")	1022	458	TONS		$72.00	/ TON	$32,973	~
CURB & GUTTER			0	LIN FT		$30.00	/ LIN FT	$0	
SUBBASE GRAN MATL TY C (TONS)			17	TONS		$25.00	/ TON	$425	
IMPROVED SUBGRADE:	Aggregate	Width = 46.6'	5,958	SQ YD		$7.00	/ SQ YD	$41,706	
Reserved For User Supplied Item			0	UNITS		$0.00	/ UNITS	$0	
Reserved For User Supplied Item			0	UNITS		$0.00	/ UNITS	$0	
PAVEMENT REMOVAL			4,600	SQ YD		$15.00	/ SQ YD	$69,000	
SHOULDER REMOVAL			1,022	SQ YD		$10.00	/ SQ YD	$10,220	

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST	$337,634
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE	$63,224

MAINTENANCE COSTS:

ITEM	THICKNESS		MATERIAL	T	UNIT COST	
ROUTINE MAINTENANCE ACTIVITY					$0.00	LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	(2.00")	1.0046	Surface Mix	2.00	$10.87	/ SQ YD
HMA OVERLAY PVMT	(2.25")	1.0052		2.25	$11.74	/ SQ YD
HMA SURFACE MIX	(1.50")	1.0035	Surface Mix	1.50	$8.14	/ SQ YD
HMA BINDER MIX	(0.75")	1.0097	ling Binder Mix	0.75	$3.60	/ SQ YD
HMA OVERLAY SHLD (Year 30)	(2.25")		Shoulder Mix	2.25	$9.07	/ SQ YD
HMA OVERLAY SHLD	(2.00")		Shoulder Mix	2.00	$8.06	/ SQ YD
MILLING (2.00 IN)				2.00	$3.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH	(Mill & Fill Surf)		Surface Mix	2.00	$80.82	/ SQ YD
PARTIAL DEPTH SHLD PATCH	(Mill & Fill Surf)		Shoulder Mix	2.00	$78.06	/ SQ YD
PARTIAL DEPTH PVMT PATCH	(Mill & Fill +2.00 ")		Leveling Binder Mix	2.00	$79.52	/ SQ YD
PARTIAL DEPTH SHLD PATCH	(Mill & Fill +2.00 ")		Shoulder Mix	2.00	$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	$470,995
FLEXIBLE TOTAL ANNUAL COST PER MILE	$88,197

HMA_SD

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

07/16/19

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%	2,300	LIN FT	$2.00		$4,600	
	CNTR LINE JOINT R&S	100.00%	2,300	LIN FT	$2.00		$4,600	
	RNDM / THRM CRACK R&S	50.00%	1,898	LIN FT	$2.00		$3,796	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	$80.82		$404	
	PWFn =	0.8626		PW =	0.8626	X	$13,400	$11,559
YEAR 10								
	LONG SHLD JT R&S	100.00%	2,300	LIN FT	$2.00		$4,600	
	CNTR LINE JOINT R&S	100.00%	2,300	LIN FT	$2.00		$4,600	
	RNDM / THRM CRACK R&S	50.00%	1,898	LIN FT	$2.00		$3,796	
	PD PVMT PATCH M&F SURF	0.50%	23	SQ YD	$80.82		$1,859	
	PWFn =	0.7441		PW =	0.7441	X	$14,855	$11,054
YEAR 15								
	MILL PVMT & SHLD 2.00"	100.00%	5,622	SQ YD	$3.00		$16,866	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	46	SQ YD	$79.52		$3,658	
	HMA OVERLAY PVMT 2.00"	100.00%	4,600	SQ YD	$10.87		$49,999	
	HMA OVERLAY SHLD 2.00 "	100.00%	1,022	SQ YD	$8.06		$8,243	
	PWFn =	0.6419		PW =	0.6419	X	$78,766	$50,557
YEAR 20								
	LONG SHLD JT R&S	100.00%	2,300	LIN FT	$2.00		$4,600	
	CNTR LINE JOINT R&S	100.00%	2,300	LIN FT	$2.00		$4,600	
	RNDM / THRM CRACK R&S	50.00%	1,898	LIN FT	$2.00		$3,796	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	$80.82		$404	
	PWFn =	0.5537		PW =	0.5537	X	$13,400	$7,419
YEAR 25								
	LONG SHLD JT R&S	100.00%	2,300	LIN FT	$2.00		$4,600	
	CNTR LINE JOINT R&S	100.00%	2,300	LIN FT	$2.00		$4,600	
	RNDM / THRM CRACK R&S	50.00%	1,898	LIN FT	$2.00		$3,796	
	PD PVMT PATCH M&F SURF	0.50%	23	SQ YD	$80.82		$1,859	
	PWFn =	0.4776		PW =	0.4776	X	$14,855	$7,095
	HMA_SD							
YEAR 30	NON-INTERSTATE							
	MILL PVMT & SHLD 2.00"	100.00%	5,622	SQ YD	$3.00		$16,866	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	92	SQ YD	$79.52		$7,316	
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	10	SQ YD	$78.06		$781	
	HMA OVERLAY PVMT 2.25 "	100.00%	4,600	SQ YD	$11.74		$54,020	
	HMA OVERLAY SHLD 2.25 "	100.00%	1,022	SQ YD	$9.07		$9,274	
	PWFn =	0.4120		PW =	0.4120	X	$88,257	$36,361
YEAR 35								
	LONG SHLD JT R&S	100.00%	2,300	LIN FT	$2.00		$4,600	
	CNTR LINE JOINT R&S	100.00%	2,300	LIN FT	$2.00		$4,600	
	RNDM / THRM CRACK R&S	50.00%	1,898	LIN FT	$2.00		$3,796	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	$80.82		$404	
	PWFn =	0.3554		PW =	0.3554	X	$13,400	$4,762
YEAR 40								
	LONG SHLD JT R&S	100.00%	2,300	LIN FT	$2.00		$4,600	
	CNTR LINE JOINT R&S	100.00%	2,300	LIN FT	$2.00		$4,600	
	RNDM / THRM CRACK R&S	50.00%	1,898	LIN FT	$2.00		$3,796	
	PD PVMT PATCH M&F SURF	0.50%	23	SQ YD	$80.82		$1,859	
	PWFn =	0.3066		PW =	0.3066	X	$14,855	$4,554
								$133,361
	ROUTINE MAINTENANCE ACTIVITY		0.65	Lane Miles	0.00		$0	$0
					MAINTENANCE LIFE-CYCLE COST			$133,361
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE ANNUAL COST PER MILE			$24,973

PCC PAVEMENT

JPCP

ROUTE		183rd Street
SECTION		N/A
COUNTY		Cook
LOCATION		at Central Avenue
FACILITY TYPE		NON-INTERSTATE
PROJECT LENGTH		1150 FT = = > 0.22 Miles
# OF CENTERLINES		2 CL
# OF LANES		3 LANES
# OF EDGES		2 EP
LANE WIDTH - AVERAGE		12 FT
SHOULDER WIDTH	PCC Left	0 FT
	PCC Right	8 FT
	Total Width of Paved Shoulders	8 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	3.66	3.66
Worksheet Construction Type is	Reconstruction		The Pavement Type is	JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE		COST
JPC PAVEMENT	(8.75")	4,600	SQ YD	$58.48	/ SQ YD	$269,008
PAVEMENT REINFORCEMENT		0	SQ YD	$22.00	/ SQ YD	$0
STABILIZED SUBBASE	(4.00")	4,983	SQ YD	$19.00	/ SQ YD	$94,677
PCC SHOULDERS		1,022	SQ YD	$40.00	/ SQ YD	$40,880
CURB & GUTTER		0	LIN FT	$30.00	/ LIN FT	$0
SUBBASE GRAN MATL TY C	(- 1.56")	125	TONS	$25.00	/ TON	$3,125
IMPROVED SUBGRADE:	Aggregate Width = 45.0'	5,750	SQ YD	$7.00	/ SQ YD	$40,250
Reserved For User Supplied Item		0	UNITS	$0.00	/ UNITS	$0
Reserved For User Supplied Item		0	UNITS	$0.00	/ UNITS	$0
PAVEMENT REMOVAL		4,600	SQ YD	$15.00	/ SQ YD	$69,000
SHOULDER REMOVAL		1,022	SQ YD	$10.00	/ SQ YD	$10,220

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	$527,160
RIGID CONSTRUCTION ANNUAL COST PER MILE	$98,714

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")	1.0058		2.50	$12.95	/ SQ YD
HMA SURFACE MIX	(1.50")	1.0035	Surface Mix	1.50	$8.14	/ SQ YD
HMA BINDER MIX	(1.00")	1.0093	ding Binder Mix	1.00	$4.80	/ 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	$78.11	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 2.50")			Surface Mix	2.50	$83.52	/ 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	$605,324
RIGID TOTAL ANNUAL COST PER MILE	$113,351

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

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST		COST	PRESENT WORTH
YEAR 10								
	PAVEMENT PATCH CLASS B	0.10%	5	SQ YD	$150.00		$750	
	PWFn =	0.7441		PW =	0.7441	X	$750	$558
YEAR 15								
	PAVEMENT PATCH CLASS B	0.20%	9	SQ YD	$150.00		$1,350	
	PWFn =	0.6419		PW =	0.6419	X	$1,350	$867
YEAR 20								
	PAVEMENT PATCH CLASS B	2.00%	92	SQ YD	$150.00		$13,800	
	SHOULDER PATCH CLASS C	0.50%	5	SQ YD	$145.00		$725	
	LONGITUDINAL SHLD JT R&S	100.00%	2,300	LIN FT	$2.00		$4,600	
	CENTERLINE JT R&S	100.00%	2,300	LIN FT	$2.00		$4,600	
	PWFn =	0.5537		PW =	0.5537	X	$23,725	$13,136
YEAR 25								
	PAVEMENT PATCH CLASS B	3.00%	138	SQ YD	$150.00		$20,700	
	SHOULDER PATCH CLASS C	1.00%	10	SQ YD	$145.00		$1,450	
	PWFn =	0.4776		PW =	0.4776	X	$22,150	$10,579
YEAR 30	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	4.00%	184	SQ YD	$150.00		$27,600	
	SHOULDER PATCH CLASS C	1.50%	15	SQ YD	$145.00		$2,175	
	HMA POLICY OVERLAY 2.5" (PVMT)	100.00%	4,600	SQ YD	$12.95		$59,555	
	HMA POLICY OVERLAY 2.5" (SHLD)	100.00%	1,022	SQ YD	$10.08		$10,304	
	PWFn =	0.4120		PW =	0.4120	X	$99,634	$41,048
YEAR 35	NON-INTERSTATE							
	LONGITUDINAL SHLD JT R&S	100.00%	2,300	LIN FT	$2.00		$4,600	
	CENTERLINE JT R&S	100.00%	2,300	LIN FT	$2.00		$4,600	
	RANDOM CRACK R&S	50.00%	1,725	LIN FT	$2.00		$3,450	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	1,109	LIN FT	$2.00		$2,218	
	PD PVMT PATCH M&F HMA 2.50"	0.10%	5	SQ YD	$83.52		$418	
	PWFn =	0.3554		PW =	0.3554	X	$15,286	$5,432
YEAR 40	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	0.50%	23	SQ YD	$150.00		$3,450	
	LONGITUDINAL SHLD JT R&S	100.00%	2,300	LIN FT	$2.00		$4,600	
	CENTERLINE JT R&S	100.00%	2,300	LIN FT	$2.00		$4,600	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	1,663	LIN FT	$2.00		$3,326	
	RANDOM CRACK R&S	50.00%	1,725	LIN FT	$2.00		$3,450	
	PD PVMT PATCH M&F HMA 2.50"	0.50%	23	SQ YD	$83.52		$1,921	
	PWFn =	0.3066		PW =	0.3066	X	$21,347	$6,544
								$78,164
	ROUTINE MAINTENANCE ACTIVITY		0.65	Lane Miles	$0.00		$0	$0
					MAINTENANCE LIFE-CYCLE COST			$78,164
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE ANNUAL COST PER MILE			$14,637

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 6/6/19 9:26 AM

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	$527,160	$337,634
		ANNUAL COST PER MILE	$98,714	$63,224
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	$78,164	$133,361
		ANNUAL COST PER MILE	$14,637	$24,973
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	$605,324	$470,995
		ANNUAL COST PER MILE	$113,351	$88,197

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	==========>	HMA	$88,197	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	JPCP	$113,351	28.5%

S:\GEN\WPDOCS\Pavement Designs\D-1\183rd Street at Central Ave - 12512\[183rd-IDOT Mech Pvmt Dgn LCCA 09-05-13.xlsm]LifeCycleCost

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

IDOT MECHANISTIC PAVEMENT DESIGN

Printed: 07/16/2019

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route:	Central Avenue	Comments:	183rd St at Central Avenue
Section:	N/A		Reconstruction
County:	Cook	Design Date:	05/30/2019 ONP
Location:	at 183rd	Modify Date:	

	ADT	Year
<-- BY		
<-- BY		
Current:	1,950	2018
Future:	6,000	2040

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:	2020
Design Period (DP) =	20 years

	Minimum ADT	Structural Design Traffic: Actual ADT	Actual %of Total ADT	% of ADT in Design Lane	
PV =	No Min	3,826	92.0%	P =	50%
SU =	No Min	125	3.0%	S =	50%
MU =	No Min	208	5.0%	M =	50%
Struct. Design ADT =		4,159	(2030)		

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT

Cpv =	0.15	
Csu =	112.06	
Cmu =	385.44	
TF flexible (Actual) =	0.95	(Actual ADT)
TF flexible (Min) =	No Min	(Min ADT Fig. 54-2.C)

RIGID PAVEMENT

Cpv =	0.15	
Csu =	135.78	
Cmu =	567.21	
TF rigid (Actual) =	1.35	(Actual ADT)
TF rigid (Min) =	No Min	(Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement

Use TF flexible =	0.95	
PG Grade Lower Binder Lifts =	PG 64-22	(Fig. 53-4.R)
HMA Mixture Temp. =	75.5	deg. F (Fig. 54-5.C)
Design HMA Mixture Modulus (E_{HMA}) =	680	ksi (Fig. 54-5.D)
Design HMA Strain (ε_{HMA}) =	122	(Fig. 54-5.E)
Full Depth HMA Design Thickness =	8.25	in. (Fig. 54-5.F)
Limiting Strain Criterion Thickness =	14.75	in. (Fig. 54-5.I)
Use Full-Depth HMA Thickness =	**8.25**	**inches**

Goto Map

Goto Map

JPC Pavement

Use TF rigid =	1.35	
Edge Support =	Tied	Shoulder or C.&G.
Rigid Pavt Thick. =	**8.00**	**in. (Fig. 54-4.E)**

CRC Pavement

Use TF rigid =	1.35	
IBR value =	3	
CRCP Thickness =	**6.25**	**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 =	0.95	
HMA Overlay Design Thickness =	5.50	in. (Fig. 54-5.U)
Limiting Strain Criterion Thickness =		in. (Fig. 54-5.V)
Use HMA Overlay Thickness =	**999.00**	**inches**

Goto Map

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	Rigid Cmu	Flexible (Fig. 54-5.B) Csu	Flexible 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	Rural S	Rural M	Urban P	Urban S	Urban 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 07/16/2019

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT

Standard Design

ROUTE	Central Avenue
SECTION	N/A
COUNTY	Cook
LOCATION	at 183rd
FACILITY TYPE	NON-INTERSTATE

PROJECT LENGTH			1450 FT	==>	0.27 Miles
# OF CENTERLINES			2 CL		
# OF LANES			3 LANES		
# OF EDGES			2 EP		
LANE WIDTH - AVERAGE			12 FT		
SHOULDER WIDTH	HMA	Left	0 FT		
	HMA	Right	6 FT		
	Total Width of Paved Shoulders		6 FT		

PAVEMENT THICKNESS (FLEXIBLE)	8.25 IN	14.75 IN MAX
SHOULDER THICKNESS	8.00 IN	HMA SD Standard Design
POLICY OVERLAY THICKNESS	2.25 IN	

FLEX PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	No Min	0.95	0.95

Read Me!

HMA COST PER TON	UNIT PRICE	
HMA SURFACE	$87.40	/ TON
HMA TOP BINDER	$82.40	/ TON
HMA LOWER BINDER	$82.40	/ 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)	(8.25")	5800	5,800	SQ YD *	$33.18	/ SQ YD	$192,444
HMA SURFACE COURSE	(2.00")	1.0049	653	TONS	$87.40	/ TON	$0
HMA TOP BINDER COURSE	(2.25")	1.0145	741	TONS	$82.40	/ TON	$0
HMA LOWER BINDER COURSE	(4.00")	1.0288	1,337	TONS	$82.40	/ TON	$0
HMA SHOULDER	(8.00")	967	433	TONS	$72.00	/ TON	$31,181
CURB & GUTTER			0	LIN FT	$30.00	/ LIN FT	$0
SUBBASE GRAN MATL TY C (TONS)			0	TONS	$25.00	/ TON	$0
IMPROVED SUBGRADE:	Aggregate	W:30' L:4450'	7,149	SQ YD	$7.00	/ SQ YD	$50,043
Reserved For User Supplied Item			0	UNITS	$0.00	/ UNITS	$0
Reserved For User Supplied Item			0	UNITS	$0.00	/ UNITS	$0
PAVEMENT REMOVAL			5,800	SQ YD	$15.00	/ SQ YD	$87,000
SHOULDER REMOVAL			967	SQ YD	$10.00	/ SQ YD	$9,670

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST	$370,338
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE	$55,000

MAINTENANCE COSTS:

ITEM		THICKNESS		MATERIAL		UNIT COST	
ROUTINE MAINTENANCE ACTIVITY						$0.00	LANE-MILE / YEAR
HMA OVERLAY PVMT SURF		(2.00")	1.0045	Surface Mix	2.00	$9.83	/ SQ YD
HMA OVERLAY PVMT		(2.25")	1.0052		2.25	$10.97	/ SQ YD
HMA SURFACE MIX		(1.50")	1.0035	Surface Mix	1.50	$7.37	/ SQ YD
HMA BINDER MIX		(0.75")	1.0067	eling Binder Mix	0.75	$3.60	/ SQ YD
HMA OVERLAY SHLD	(Year 30)	(2.25")		Shoulder Mix	2.25	$9.07	/ SQ YD
HMA OVERLAY SHLD		(2.00")		Shoulder Mix	2.00	$8.06	/ SQ YD
MILLING (2.00 IN)					2.00	$3.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH		(Mill & Fill Surf)		Surface Mix	2.00	$79.79	/ SQ YD
PARTIAL DEPTH SHLD PATCH		(Mill & Fill Surf)		Shoulder Mix	2.00	$78.06	/ SQ YD
PARTIAL DEPTH PVMT PATCH		(Mill & Fill +2.00 ")		Leveling Binder Mix	2.00	$79.52	/ SQ YD
PARTIAL DEPTH SHLD PATCH		(Mill & Fill +2.00 ")		Shoulder Mix	2.00	$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	$528,709
FLEXIBLE TOTAL ANNUAL COST PER MILE	$78,521

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%	2,900	LIN FT	$2.00		$5,800	
	CNTR LINE JOINT R&S	100.00%	2,900	LIN FT	$2.00		$5,800	
	RNDM / THRM CRACK R&S	50.00%	2,393	LIN FT	$2.00		$4,786	
	PD PVMT PATCH M&F SURF	0.10%	6	SQ YD	$79.79		$479	
	PWFn =	0.8626		PW =	0.8626	X	$16,865	$14,548
YEAR 10								
	LONG SHLD JT R&S	100.00%	2,900	LIN FT	$2.00		$5,800	
	CNTR LINE JOINT R&S	100.00%	2,900	LIN FT	$2.00		$5,800	
	RNDM / THRM CRACK R&S	50.00%	2,393	LIN FT	$2.00		$4,786	
	PD PVMT PATCH M&F SURF	0.50%	29	SQ YD	$79.79		$2,314	
	PWFn =	0.7441		PW =	0.7441	X	$18,700	$13,915
YEAR 15								
	MILL PVMT & SHLD 2.00"	100.00%	6,767	SQ YD	$3.00		$20,301	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	58	SQ YD	$79.52		$4,612	
	HMA OVERLAY PVMT 2.00"	100.00%	5,800	SQ YD	$9.83		$57,038	
	HMA OVERLAY SHLD 2.00 "	100.00%	967	SQ YD	$8.06		$7,795	
	PWFn =	0.6419		PW =	0.6419	X	$89,746	$57,605
YEAR 20								
	LONG SHLD JT R&S	100.00%	2,900	LIN FT	$2.00		$5,800	
	CNTR LINE JOINT R&S	100.00%	2,900	LIN FT	$2.00		$5,800	
	RNDM / THRM CRACK R&S	50.00%	2,393	LIN FT	$2.00		$4,786	
	PD PVMT PATCH M&F SURF	0.10%	6	SQ YD	$79.79		$479	
	PWFn =	0.5537		PW =	0.5537	X	$16,865	$9,338
YEAR 25								
	LONG SHLD JT R&S	100.00%	2,900	LIN FT	$2.00		$5,800	
	CNTR LINE JOINT R&S	100.00%	2,900	LIN FT	$2.00		$5,800	
	RNDM / THRM CRACK R&S	50.00%	2,393	LIN FT	$2.00		$4,786	
	PD PVMT PATCH M&F SURF	0.50%	29	SQ YD	$79.79		$2,314	
	PWFn =	0.4776		PW =	0.4776	X	$18,700	$8,931
	HMA SD							
YEAR 30	NON-INTERSTATE							
	MILL PVMT & SHLD 2.00"	100.00%	6,767	SQ YD	$3.00		$20,301	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	116	SQ YD	$79.52		$9,224	
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	10	SQ YD	$78.06		$781	
	HMA OVERLAY PVMT 2.25 "	100.00%	5,800	SQ YD	$10.97		$63,615	
	HMA OVERLAY SHLD 2.25 "	100.00%	967	SQ YD	$9.07		$8,770	
	PWFn =	0.4120		PW =	0.4120	X	$102,691	$42,307
YEAR 35								
	LONG SHLD JT R&S	100.00%	2,900	LIN FT	$2.00		$5,800	
	CNTR LINE JOINT R&S	100.00%	2,900	LIN FT	$2.00		$5,800	
	RNDM / THRM CRACK R&S	50.00%	2,393	LIN FT	$2.00		$4,786	
	PD PVMT PATCH M&F SURF	0.10%	6	SQ YD	$79.79		$479	
	PWFn =	0.3554		PW =	0.3554	X	$16,865	$5,994
YEAR 40								
	LONG SHLD JT R&S	100.00%	2,900	LIN FT	$2.00		$5,800	
	CNTR LINE JOINT R&S	100.00%	2,900	LIN FT	$2.00		$5,800	
	RNDM / THRM CRACK R&S	50.00%	2,393	LIN FT	$2.00		$4,786	
	PD PVMT PATCH M&F SURF	0.50%	29	SQ YD	$79.79		$2,314	
	PWFn =	0.3066		PW =	0.3066	X	$18,700	$5,733
								$158,371
	ROUTINE MAINTENANCE ACTIVITY		0.82	Lane Miles	0.00		$0	$0
					MAINTENANCE LIFE-CYCLE COST			$158,371
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE ANNUAL COST PER MILE			$23,520

PCC PAVEMENT

JPCP

ROUTE		Central Avenue
SECTION		N/A
COUNTY		Cook
LOCATION		at 183rd
FACILITY TYPE		NON-INTERSTATE
PROJECT LENGTH		1450 FT => 0.27 Miles
# OF CENTERLINES		2 CL
# OF LANES		3 LANES
# OF EDGES		2 EP
LANE WIDTH - AVERAGE		12 FT
SHOULDER WIDTH	PCC Left	0 FT
	PCC Right	6 FT
	Total Width of Paved Shoulders	6 FT
PAVEMENT THICKNESS (RIGID)	JPCP	8.00 IN — TIED SHLD
SHOULDER THICKNESS		8.00 IN
POLICY OVERLAY THICKNESS		2.50 IN

RIGID PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	No Min	1.35	1.35

Worksheet Construction Type is Reconstruction — The Pavement Type is JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE		COST
JPC PAVEMENT	(8.00")	5,800	SQ YD	$55.88	/ SQ YD	$324,104
PAVEMENT REINFORCEMENT		0	SQ YD	$22.00	/ SQ YD	$0
STABILIZED SUBBASE	(4.00")	6,283	SQ YD	$19.00	/ SQ YD	$119,377
PCC SHOULDERS		967	SQ YD	$40.00	/ SQ YD	$38,680
CURB & GUTTER		0	LIN FT	$30.00	/ LIN FT	$0
SUBBASE GRAN MATL TY C	(1.55")	128	TONS	$25.00	/ TON	$3,200
IMPROVED SUBGRADE:	Aggregate Width = 43.0'	6,928	SQ YD	$7.00	/ SQ YD	$48,496
Reserved For User Supplied Item		0	UNITS	$0.00	/ UNITS	$0
Reserved For User Supplied Item		0	UNITS	$0.00	/ UNITS	$0
PAVEMENT REMOVAL		5,800	SQ YD	$0.00	/ SQ YD	$0
SHOULDER REMOVAL		967	SQ YD	$0.00	/ SQ YD	$0

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	$533,857
RIGID CONSTRUCTION ANNUAL COST PER MILE	$79,285

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")	1.0058		2.50	$12.17	/ SQ YD
HMA SURFACE MIX	(1.50")	1.0035	Surface Mix	1.50	$7.37	/ SQ YD
HMA BINDER MIX	(1.00")	1.0093	eling Binder Mix	1.00	$4.80	/ 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	$77.34	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 2.50")			Surface Mix	2.50	$82.24	/ 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	$628,705
RIGID TOTAL ANNUAL COST PER MILE	$93,372

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%	6	SQ YD	$150.00		$900	
	PWFn =	0.7441		PW =	0.7441	X	$900	$670
YEAR 15								
	PAVEMENT PATCH CLASS B	0.20%	12	SQ YD	$150.00		$1,800	
	PWFn =	0.6419		PW =	0.6419	X	$1,800	$1,155
YEAR 20								
	PAVEMENT PATCH CLASS B	2.00%	116	SQ YD	$150.00		$17,400	
	SHOULDER PATCH CLASS C	0.50%	5	SQ YD	$145.00		$725	
	LONGITUDINAL SHLD JT R&S	100.00%	2,900	LIN FT	$2.00		$5,800	
	CENTERLINE JT R&S	100.00%	2,900	LIN FT	$2.00		$5,800	
	PWFn =	0.5537		PW =	0.5537	X	$29,725	$16,458
YEAR 25								
	PAVEMENT PATCH CLASS B	3.00%	174	SQ YD	$150.00		$26,100	
	SHOULDER PATCH CLASS C	1.00%	10	SQ YD	$145.00		$1,450	
	PWFn =	0.4776		PW =	0.4776	X	$27,550	$13,158
YEAR 30	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	4.00%	232	SQ YD	$150.00		$34,800	
	SHOULDER PATCH CLASS C	1.50%	15	SQ YD	$145.00		$2,175	
	HMA POLICY OVERLAY 2.5" (PVMT)	100.00%	5,800	SQ YD	$12.17		$70,593	
	HMA POLICY OVERLAY 2.5" (SHLD)	100.00%	967	SQ YD	$10.08		$9,744	
	PWFn =	0.4120		PW =	0.4120	X	$117,312	$48,331
YEAR 35	NON-INTERSTATE							
	LONGITUDINAL SHLD JT R&S	100.00%	2,900	LIN FT	$2.00		$5,800	
	CENTERLINE JT R&S	100.00%	2,900	LIN FT	$2.00		$5,800	
	RANDOM CRACK R&S	50.00%	2,175	LIN FT	$2.00		$4,350	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	1,397	LIN FT	$2.00		$2,794	
	PD PVMT PATCH M&F HMA 2.50"	0.10%	6	SQ YD	$82.24		$493	
	PWFn =	0.3554		PW =	0.3554	X	$19,237	$6,837
YEAR 40	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	0.50%	29	SQ YD	$150.00		$4,350	
	LONGITUDINAL SHLD JT R&S	100.00%	2,900	LIN FT	$2.00		$5,800	
	CENTERLINE JT R&S	100.00%	2,900	LIN FT	$2.00		$5,800	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	2,095	LIN FT	$2.00		$4,190	
	RANDOM CRACK R&S	50.00%	2,175	LIN FT	$2.00		$4,350	
	PD PVMT PATCH M&F HMA 2.50"	0.50%	29	SQ YD	$82.24		$2,385	
	PWFn =	0.3066		PW =	0.3066	X	$26,875	$8,239
								$94,848
	ROUTINE MAINTENANCE ACTIVITY		0.82	Lane Miles	$0.00		$0	$0
					MAINTENANCE LIFE-CYCLE COST			$94,848
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE ANNUAL COST PER MILE			$14,086

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 6/6/19 10:42 AM

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	$533,857	$370,338
		ANNUAL COST PER MILE	$79,285	$55,000
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	$94,848	$158,371
		ANNUAL COST PER MILE	$14,086	$23,520
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	$628,705	$528,709
		ANNUAL COST PER MILE	$93,372	$78,521

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	==========>	HMA	$78,521	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	JPCP	$93,372	18.9%

S:\GEN\WPDOCS\Pavement Designs\D-1\183rd Street at Central Ave - 12512\[Central-IDOT Mech Pvmt Dgn LCCA 09-05-13.xlsm]LifeCycleCost