



Illinois Department of Transportation

To: Anthony J. Quigley Attn: Ken Eng
From: Maureen M. Addis *MA mms*
Subject: Pavement Design Approval
Date: April 21, 2017

Route: I-90/94 Job No.: C-91-190-14
Section: 2014-005R&B Contract No.: 60X76
County: Cook Target Letting: 08CY17
Limits: at I-290 (Circle Interchange)

On April 5, 2017, the Pavement Selection Committee met to review the pavement design for the above referenced project which was submitted on February 2, 2017. The scope of the project involves reconstruction of I-290 EB from East of Loomis Street to the Circle Interchange at I-90/94; as well as portions of the ramps to I-90/94/Taylor Street.

The Pavement Selection Committee concurred with the District that the life cycle cost analysis did not favor any option by more than ten percent and that alternate bidding was not a viable option.

In summary, the pavement design selected by the Committee is as follows:

<u>I-290 (Eastbound Mainline)</u>	<u>I-290 (Ramps to I-90/94/Taylor Street)</u>
11.25" Jointed PCC Pavement	11" Jointed PCC Pavement
Tied PCC Shoulders	Tied PCC Shoulders
4" HMA Stabilized Subbase	4" HMA Stabilized Subbase
12" Agg Subgrade Improvement	12" Agg Subgrade Improvement

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



Illinois Department of Transportation

Memorandum

To: Maureen Addis

Attn: Michael Brand

From: Jose A. Dominguez

By: Ojas Patel

Subject: Pavement Analysis*

Date: February 2, 2017

*Route: Interstate Route 90/94

County: Cook

Limits: at I-290 (Circle Interchange)

Contract No.: 60X76

Section: 2014-005R&B

Job No.: C-91-190-14

Current target: 08CY17

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 I-290 EB Mainline lanes (Loomis Street to I-90/94).
Reconstruction to provide new I-290 EB to I-90/94 NB & SB (EN &
ES/Taylor Street exit Ramps).***

A 20-year pavement analysis was performed on the mainline segment. The life cycle cost analysis does not favor either pavement by more than 10%. However, this contract is only one part of an overall reconstruction of the I-90/94 at I-290 interchange. All previous contracts provided PCC pavement. Therefore, a mechanistic-rigid pavement design is recommended since PCC pavement will provide for continuity of pavement type for the overall interchange. For Ramps EN and ES/Taylor Street, it is recommended to match the mainline pavement based on Section 54-1.06 of the BDE Manual. The recommended pavement design is:

I-290 (Eastbound Mainline Lanes)

Reconstruction

PCC Shoulder (Tied)

11 ¼" PCC Pavement (Jointed)¹

4" HMA Stabilized Subbase³

12" Aggregate Subgrade Improvement⁴

I-290 Eastbound to I-90/94 NB/SB/Taylor Street Ramp (EN & ES Ramps)

Reconstruction

PCC Shoulder (Tied)

11" PCC Pavement (Jointed)²

4" HMA Stabilized Subbase³

12" Aggregate Subgrade Improvement⁴

Temporary Pavement for EN/ES/Taylor Street Ramps

Temporary Pavement

Option 1⁵

13" Full Depth Temporary HMA Pavement⁶

2" HMA Surface Course, Mix "D", N70

11" HMA Binder Course, IL-19.0, N70

4" Subbase Granular Material Type B (CA-6)⁷

Option 2⁵

11" Temporary PCC Pavement⁶

4" Subbase Granular Material Type B (CA-6)⁷

¹**Designer Note 1:** Use pay item **42000526, PORTLAND CEMENT CONCRETE PAVEMENT 11 ¼" (JOINTED)**, paid for in square yards.

²**Designer Note 2:** Use pay item **42000521, PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)**, paid for in square yards. When variable width lanes (12'-18') exceed 14 feet in width, a centerline joint should be added to avoid longitudinal cracking; see Bureau of Design Standard 53.

³**Designer Note 3:** Use pay item **31200500, STABILIZED SUBBASE – HOT MIX ASPHALT, 4"**, paid for in square yards.

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

⁵**Designer Note 5:** 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.

⁶Designer 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.

⁷Designer 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: 
Jose A. Dominguez, P.E.
Project Support Engineer

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: I-290	Comments: Phase II submittal		
Section: 2014-002R&B	Design Date: 01/11/2017 st	<-- BY	
County: Cook	Modify Date: 01/19/2017 onp	<-- BY	
Location: Loomis Street to I-90 / I-94		ADT	Year
		Current:	187,300 2012
Facility Type: Interstate or Freeway		Future:	197,000 2040
# of Lanes = 6 or more		Structural Design Traffic	
Road Class: I		Minimum ADT	Actual ADT
Rural or Urban ? Urban			Actual %of Total ADT
Subgrade Support Rating (SSR): Poor		PV = 0	178,765 92.7%
Construction Year: 2018		SU = 500	3,857 2.0%
Design Period (DP) = 20 years		MU = 1500	10,221 5.3%
		Struct. Design ADT =	192,843 (2028)
			% of ADT in Design Lane
			P = 8%
			S = 37%
			M = 37%

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT

Cpv = 0.15
 Csu = **132.5**
 Cmu = **482.53**
 TF flexible (Actual) = 40.32 (Actual ADT)
 TF flexible (Min) = 5.85 (Min ADT Fig. 54-2.C)

RIGID PAVEMENT

Cpv = 0.15
 Csu = **143.81**
 Cmu = **696.42**
 TF rigid (Actual) = 56.82 (Actual ADT)
 TF rigid (Min) = 8.26 (Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement	JPC Pavement
Use TF flexible = 40.32	Use TF rigid = 56.82
PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)	Edge Support = Tied Shoulder or C.&G.
HMA Mixture Temp. = 75.0 deg. F (Fig. 54-5.C)	Rigid Pavt Thick. = 11.25 in. (Fig. 54-4.E)
Design HMA Mixture Modulus (E _{HMA}) = 690 ksi (Fig. 54-5.D)	
Design HMA Strain (ε _{HMA}) = 42 (Fig. 54-5.E)	CRCP Pavement
Full Depth HMA Design Thickness = 15.75 in. (Fig. 54-5.F)	Use TF rigid = 56.82
Limiting Strain Criterion Thickness = 14.50 in. (Fig. 54-5.I)	IBR value = 3
Use Full-Depth HMA Thickness = 14.50 inches	CRCP Thickness = 11.50 in. (Fig. 54-4.M)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC	Unbonded Concrete Overlay
Use TF flexible = 40.32	Review 54-4.03 for limitations and special considerations.
HMA Overlay Design Thickness = 13.25 in. (Fig. 54-5.U)	
Limiting Strain Criterion Thickness = in. (Fig. 54-5.V)	
Use HMA Overlay Thickness = 999.00 inches	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	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
	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 One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

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)						
Number of Lanes	Rural			Urban		
	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%

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT

LSC Design

ROUTE I-290
 SECTION 2014-002R&B
 COUNTY Cook
 LOCATION Loomis Street to I-90 / I-94

FACILITY TYPE INTERSTATE

PROJECT LENGTH 3800 FT == > 0.72 Miles
 # OF CENTERLINES 4 CL
 # OF LANES 5 LANES
 # OF EDGES 2 EP
 LANE WIDTH - AVERAGE 11 FT
 SHOULDER WIDTH HMA Left 5 FT
 HMA Right 4 FT
 Total Width of Paved Shoulders 9 FT

PAVEMENT THICKNESS (FLEXIBLE) 14.50 IN 14.50 IN MAX
 SHOULDER THICKNESS 8.00 IN HMA_LSCD LSC Design
 POLICY OVERLAY THICKNESS 2.00 IN

FLEX PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		5.85	40.32	40.32

[Read Me!](#)

HMA	COST PER TON	UNIT PRICE
HMA SURFACE		\$108.91 / TON
HMA TOP BINDER		\$108.91 / TON
HMA LOWER BINDER		\$93.20 / TON
HMA BINDER (LEVELING)		\$101.05 / TON
HMA SHOULDER		\$72.00 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
HMA PAVEMENT (FULL-DEPTH)	(14.50")	23222	23,222 SQ YD *	\$79.99 / SQ YD	\$1,857,546 ~
HMA SURFACE COURSE	(2.00")	1.0030	2,609 TONS	\$108.91 / TON	\$0
HMA TOP BINDER COURSE	(2.25")	1.0095	2,954 TONS	\$108.91 / TON	\$0
HMA LOWER BINDER COURSE	(10.25")	1.0284	13,708 TONS	\$93.20 / TON	\$0

HMA SHOULDER	(8.00")	3800	1,702 TONS	\$72.00 / TON	\$122,573 ~
CURB & GUTTER			0 LIN FT	\$30.00 / LIN FT	\$0

SUBBASE GRAN MATL TY C (TONS)			1,286 TONS	\$25.00 / TON	\$32,150
IMPROVED SUBGRADE:	Aggregate	Width = 67.4'	28,465 SQ YD	\$7.00 / SQ YD	\$199,255

Reserved For User Supplied Item			0 UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item			0 UNITS	\$0.00 / UNITS	\$0

PAVEMENT REMOVAL			23,222 SQ YD	\$15.00 / SQ YD	\$348,330
SHOULDER REMOVAL			3,800 SQ YD	\$10.00 / SQ YD	\$38,000

Note: * Denotes User Supplied Quantity
 FLEXIBLE CONSTRUCTION INITIAL COST \$2,597,854
 FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE \$147,220

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	T	UNIT COST
ROUTINE MAINTENANCE ACTIVITY				\$0.00 LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	(2.00")	1.0030	Surface Mix 2.00	\$12.23 / SQ YD
HMA OVERLAY PVMT	(2.00")	1.0030	2.00	\$12.23 / SQ YD
HMA SURFACE MIX	(2.00")	1.0030	Surface Mix 2.00	\$12.23 / SQ YD
HMA BINDER MIX	(0.00")	1.0061	aling Binder Mix 0.00	\$0.00 / SQ YD
HMA OVERLAY SHLD (Year 30)	(2.00")		Shoulder Mix 2.00	\$8.06 / 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	\$82.20 / 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	\$81.32 / 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	\$3,281,242
FLEXIBLE TOTAL ANNUAL COST PER MILE	\$185,948

PCC PAVEMENT

JPCP

ROUTE I-290
 SECTION 2014-002R&B
 COUNTY Cook
 LOCATION Loomis Street to I-90 / I-94

FACILITY TYPE INTERSTATE

PROJECT LENGTH 3800 FT == > 0.72 Miles
 # OF CENTERLINES 4 CL
 # OF LANES 5 LANES
 # OF EDGES 2 EP
 LANE WIDTH - AVERAGE 11 FT
 SHOULDER WIDTH PCC Left 5 FT
 PCC Right 4 FT
 Total Width of Paved Shoulders 9 FT

PAVEMENT THICKNESS (RIGID) JPCP 11.25 IN TIED SHLD
 SHOULDER THICKNESS 11.25 IN

POLICY OVERLAY THICKNESS 3.75 IN

RIGID PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	8.26	56.82	56.82
Worksheet Construction Type is Reconstruction		The Pavement Type is	JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
JPC PAVEMENT	(11.25")	23,222	SQ YD	\$75.93 / SQ YD	\$1,763,246
PAVEMENT REINFORCEMENT		0	SQ YD	\$22.00 / SQ YD	\$0
STABILIZED SUBBASE	(4.00")	24,489	SQ YD	\$16.50 / SQ YD	\$404,069
PCC SHOULDERS		3,800	SQ YD	\$40.00 / SQ YD	\$152,000
CURB & GUTTER		0	LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C	(~ 1.78")	513	TONS	\$25.00 / TON	\$12,825
IMPROVED SUBGRADE:	Aggregate Width = 65.0'	27,444	SQ YD	\$7.00 / SQ YD	\$192,108
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		23,222	SQ YD	\$15.00 / SQ YD	\$348,330
SHOULDER REMOVAL		3,800	SQ YD	\$10.00 / SQ YD	\$38,000

Note: * Denotes User Supplied Quantity
 RIGID CONSTRUCTION INITIAL COST \$2,910,578
 RIGID CONSTRUCTION ANNUAL COST PER MILE \$164,942

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	T	UNIT COST
ROUTINE MAINTENANCE ACTIVITY				\$0.00 / LANE-MILE / YEAR
HMA POLICY OVERLAY	(3.75")		3.75	
HMA POLICY OVERLAY PVMT	(3.75")	1.0057	3.75	\$23.00 / SQ YD
HMA SURFACE MIX	(1.50")	1.0023	1.50	\$9.17 / SQ YD
HMA BINDER MIX	(2.25")	1.0080	2.25	\$13.83 / SQ YD
HMA POLICY OVERLAY SHLD	(3.75")	Shoulder Mix	3.75	\$15.12 / 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	\$79.15 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50")		Surface Mix	1.50	\$79.15 / 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 \$3,400,623
 RIGID TOTAL ANNUAL COST PER MILE \$192,713

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : **2/2/17 1:20 PM**

				JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH		\$2,910,578	\$2,597,854
		ANNUAL COST PER MILE		\$164,942	\$147,220
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH		\$490,045	\$683,388
		ANNUAL COST PER MILE		\$27,771	\$38,728
TOTAL	LIFE-CYCLE COST	PRESENT WORTH		\$3,400,623	\$3,281,242
		ANNUAL COST PER MILE		\$192,713	\$185,948

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=====>	HMA	\$185,948	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	JPCP	\$192,713	3.6%

FULL-DEPTH HMA PAVEMENT
 HMA OVERLAY OF RUBBLIZED PCC PAVEMENT
 Figure 54-7.C
 LIMITING STRAIN CRITERION DESIGN

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 5							
	LONG SHLD JT R&S	100.00%	7,600	LIN FT	\$2.00	\$15,200	
	CNTR LINE JOINT R&S	100.00%	15,200	LIN FT	\$2.00	\$30,400	
	RNDM / THRM CRACK R&S	50.00%	10,450	LIN FT	\$2.00	\$20,900	
	PD PVMT PATCH M&F SURF	0.10%	23	SQ YD	\$82.20	\$1,891	
	PWFn =	0.8626		PW =	0.8626 X	\$68,391	\$58,995
YEAR 10							
	LONG SHLD JT R&S	100.00%	7,600	LIN FT	\$2.00	\$15,200	
	CNTR LINE JOINT R&S	100.00%	15,200	LIN FT	\$2.00	\$30,400	
	RNDM / THRM CRACK R&S	50.00%	10,450	LIN FT	\$2.00	\$20,900	
	PD PVMT PATCH M&F SURF	0.50%	116	SQ YD	\$82.20	\$9,535	
	PWFn =	0.7441		PW =	0.7441 X	\$76,035	\$56,577
YEAR 15							
	MILL PVMT & SHLD 2.00"	100.00%	27,022	SQ YD	\$3.00	\$81,066	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	232	SQ YD	\$81.32	\$18,866	
	HMA OVERLAY PVMT 2.00"	100.00%	23,222	SQ YD	\$12.23	\$284,121	
	HMA OVERLAY SHLD 2.00 "	100.00%	3,800	SQ YD	\$8.06	\$30,643	
	PWFn =	0.6419		PW =	0.6419 X	\$414,696	\$266,178
YEAR 20							
	LONG SHLD JT R&S	100.00%	7,600	LIN FT	\$2.00	\$15,200	
	CNTR LINE JOINT R&S	100.00%	15,200	LIN FT	\$2.00	\$30,400	
	RNDM / THRM CRACK R&S	50.00%	10,450	LIN FT	\$2.00	\$20,900	
	PD PVMT PATCH M&F SURF	0.10%	23	SQ YD	\$82.20	\$1,891	
	PWFn =	0.5537		PW =	0.5537 X	\$68,391	\$37,866
YEAR 25							
	LONG SHLD JT R&S	100.00%	7,600	LIN FT	\$2.00	\$15,200	
	CNTR LINE JOINT R&S	100.00%	15,200	LIN FT	\$2.00	\$30,400	
	RNDM / THRM CRACK R&S	50.00%	10,450	LIN FT	\$2.00	\$20,900	
	PD PVMT PATCH M&F SURF	0.50%	116	SQ YD	\$82.20	\$9,535	
	PWFn =	0.4776		PW =	0.4776 X	\$76,035	\$36,315
YEAR 30							
	HMA_LSCD INTERSTATE						
	MILL PVMT & SHLD 2.00"	100.00%	27,022	SQ YD	\$3.00	\$81,066	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	464	SQ YD	\$81.32	\$37,731	
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	38	SQ YD	\$78.06	\$2,966	
	HMA OVERLAY PVMT 2.00"	100.00%	23,222	SQ YD	\$12.23	\$284,121	
	HMA OVERLAY SHLD 2.00 "	100.00%	3,800	SQ YD	\$8.06	\$30,643	
	PWFn =	0.4120		PW =	0.4120 X	\$436,527	\$179,843
YEAR 35							
	LONG SHLD JT R&S	100.00%	7,600	LIN FT	\$2.00	\$15,200	
	CNTR LINE JOINT R&S	100.00%	15,200	LIN FT	\$2.00	\$30,400	
	RNDM / THRM CRACK R&S	50.00%	10,450	LIN FT	\$2.00	\$20,900	
	PD PVMT PATCH M&F SURF	0.10%	23	SQ YD	\$82.20	\$1,891	
	PWFn =	0.3554		PW =	0.3554 X	\$68,391	\$24,305
YEAR 40							
	LONG SHLD JT R&S	100.00%	7,600	LIN FT	\$2.00	\$15,200	
	CNTR LINE JOINT R&S	100.00%	15,200	LIN FT	\$2.00	\$30,400	
	RNDM / THRM CRACK R&S	50.00%	10,450	LIN FT	\$2.00	\$20,900	
	PD PVMT PATCH M&F SURF	0.50%	116	SQ YD	\$82.20	\$9,535	
	PWFn =	0.3066		PW =	0.3066 X	\$76,035	\$23,309
							\$683,388
	ROUTINE MAINTENANCE ACTIVITY		3.60	Lane Miles	0.00	0	\$0
							MAINTENANCE LIFE-CYCLE COST \$683,388
45	YEAR LIFE CYCLE	CRFn = 0.0407852					MAINTENANCE ANNUAL COST PER MILE \$38,728

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%	23	SQ YD	\$150.00	\$3,450		
		PWFn = 0.7441			PW = 0.7441 X	\$3,450	\$2,567	
YEAR 15								
	PAVEMENT PATCH CLASS B	0.20%	46	SQ YD	\$150.00	\$6,900		
		PWFn = 0.6419			PW = 0.6419 X	\$6,900	\$4,429	
YEAR 20								
	PAVEMENT PATCH CLASS B	2.00%	464	SQ YD	\$150.00	\$69,600		
	SHOULDER PATCH CLASS C	0.50%	19	SQ YD	\$145.00	\$2,755		
	LONGITUDINAL SHLD JT R&S	100.00%	7,600	LIN FT	\$2.00	\$15,200		
	CENTERLINE JT R&S	100.00%	15,200	LIN FT	\$2.00	\$30,400		
		PWFn = 0.5537			PW = 0.5537 X	\$117,955	\$65,309	
YEAR 25								
	PAVEMENT PATCH CLASS B	3.00%	697	SQ YD	\$150.00	\$104,550		
	SHOULDER PATCH CLASS C	1.00%	38	SQ YD	\$145.00	\$5,510		
		PWFn = 0.4776			PW = 0.4776 X	\$110,060	\$52,565	
YEAR 30								
	INTERSTATE							
	PAVEMENT PATCH CLASS B	4.00%	929	SQ YD	\$150.00	\$139,350		
	SHOULDER PATCH CLASS C	1.50%	57	SQ YD	\$145.00	\$8,265		
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%	23,222	SQ YD	\$23.00	\$534,135		
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00%	3,800	SQ YD	\$15.12	\$57,456		
		PWFn = 0.4120			PW = 0.4120 X	\$739,206	\$304,543	
YEAR 35								
	INTERSTATE							
	LONGITUDINAL SHLD JT R&S	100.00%	7,600	LIN FT	\$2.00	\$15,200		
	CENTERLINE JT R&S	100.00%	15,200	LIN FT	\$2.00	\$30,400		
	RANDOM CRACK R&S	50.00%	9,500	LIN FT	\$2.00	\$19,000		
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	5,566	LIN FT	\$2.00	\$11,132		
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	23	SQ YD	\$79.15	\$1,820		
		PWFn = 0.3554			PW = 0.3554 X	\$77,552	\$27,561	
YEAR 40								
	INTERSTATE							
	PAVEMENT PATCH CLASS B	0.50%	116	SQ YD	\$150.00	\$17,400		
	LONGITUDINAL SHLD JT R&S	100.00%	7,600	LIN FT	\$2.00	\$15,200		
	CENTERLINE JT R&S	100.00%	15,200	LIN FT	\$2.00	\$30,400		
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	8,349	LIN FT	\$2.00	\$16,698		
	RANDOM CRACK R&S	50.00%	9,500	LIN FT	\$2.00	\$19,000		
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%	116	SQ YD	\$79.15	\$9,181		
		PWFn = 0.3066			PW = 0.3066 X	\$107,879	\$33,071	
							\$490,045	
	ROUTINE MAINTENANCE ACTIVITY				3.60 Lane Miles	\$0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST	\$490,045
45	YEAR LIFE CYCLE		CRFn = 0.0407852			MAINTENANCE ANNUAL COST PER MILE	\$27,771	

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: Ramp EN	Comments: Phase II submittal				
Section: 2014-002R&B	Comments: Ramp ES controls the design				
County: Cook	Design Date: 01/11/2017 st	<-- BY	ADT	Year	
Location: at I-90 / I-94	Modify Date: 02/02/2017 ONP	<-- BY	Current: 43,900	2012	
Facility Type: Interstate or Freeway	** Ramp Design Fig. 54-1.B **		Future: 43,900	2040	
# of Lanes = 1 Lane Ramp	Crossroad? Interstate or Freeway				
Road Class: I	# of Lanes = 6 or more				
Subgrade Support Rating (SSR): Poor	Rural or Urban? Urban				
Construction Year: 2018					
Design Period (DP) = 20 years					
		Structural Design Traffic			
		Minimum ADT	Actual ADT	Actual % of Total ADT	% of ADT in Design Lane
		PV = 0	39,510	90.0%	P = 100%
		SU = 500	1,537	3.5%	S = 100%
		MU = 1500	2,854	6.5%	M = 100%
		Struct. Design ADT = 43,900		(2028)	

TRAFFIC FACTOR CALCULATION					
FLEXIBLE PAVEMENT			RAMP DESIGN MIN		
Cpv = 0.15	0.15	8%	Cpv = 0.15	0.15	8%
Csu = 132.5	132.5	37%	Csu = 143.81	143.81	37%
Cmu = 482.53	482.53	37%	Cmu = 696.42	696.42	37%
TF flexible (Actual) = 31.73	(Actual ADT)	5.85	TF rigid (Actual) = 44.28	(Actual ADT)	8.26
TF flexible (Min) = 5.85	(Min ADT Fig. 54-2.C)		TF rigid (Min) = 8.26	(Min ADT Fig. 54-2.C)	

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement			JPC Pavement		
Use TF flexible = 31.73	PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)		Use TF rigid = 44.28	Edge Support = Tied Shoulder or C.&G.	
Goto Map	HMA Mixture Temp. = 75.0 deg. F (Fig. 54-5.C)		Rigid Pavt Thick. = 11.00 in. (Fig. 54-4.E)		
Design HMA Mixture Modulus (E _{HMA}) = 690 ksi (Fig. 54-5.D)	Design HMA Strain (ε _{HMA}) = 45 (Fig. 54-5.E)		CRCP Pavement		
Goto Map	Full Depth HMA Design Thickness = 15.00 in. (Fig. 54-5.F)		Use TF rigid = 44.28	IBR value = 3	
Limiting Strain Criterion Thickness = 14.50 in. (Fig. 54-5.I)			CRCP Thickness = 11.00 in. (Fig. 54-4.M)		
Use Full-Depth HMA Thickness = 14.50 inches			CRCP Thickness = 11.00 in. (Fig. 54-4.M)		

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC			Unbonded Concrete Overlay		
Use TF flexible = 31.73	HMA Overlay Design Thickness = 12.50 in. (Fig. 54-5.U)		Review 54-4.03 for limitations and special considerations.		
Goto Map	Limiting Strain Criterion Thickness = in. (Fig. 54-5.V)				
Use HMA Overlay Thickness = 999.00 inches			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	0	250	750

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

Class	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
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 One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

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)						
Number of Lanes	Rural			Urban		
	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%

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	\$711,101
FLEXIBLE TOTAL ANNUAL COST PER MILE	\$153,133

PCC PAVEMENT

JPCP

ROUTE
SECTION
COUNTY
LOCATION

Job Route
Job Section
Job County
Job Location

FACILITY TYPE

INTERSTATE

PROJECT LENGTH 1000 FT == > 0.19 Miles
 # OF CENTERLINES 2 CL
 # OF LANES 4 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 10.00 IN TIED SHLD
 SHOULDER THICKNESS 10.00 IN

POLICY OVERLAY THICKNESS 3.75 IN

RIGID PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
Worksheet Construction Type is	New Construction	10.05	1.00	10.05
				The Pavement Type is JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
JPC PAVEMENT	(10.00")	5,333	SQ YD	\$50.00 / SQ YD	\$266,650
PAVEMENT REINFORCEMENT		0	SQ YD	\$22.00 / SQ YD	\$0
STABILIZED SUBBASE	(4.00")	6,000	SQ YD	\$19.00 / SQ YD	\$114,000
PCC SHOULDERS		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	(~ 3.48")	418	TONS	\$25.00 / TON	\$10,450
IMPROVED SUBGRADE:	Modified Soil Width = 82.0'	9,111	SQ YD	\$7.00 / SQ YD	\$63,777
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		5,333	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 \$597,117
 RIGID CONSTRUCTION ANNUAL COST PER MILE \$128,587

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	T	UNIT COST
ROUTINE MAINTENANCE ACTIVITY				\$0.00 / LANE-MILE / YEAR
HMA POLICY OVERLAY	(3.75")		3.75	
HMA POLICY OVERLAY PVMT	(3.75")	1.0130	3.75	\$20.21 / SQ YD
HMA SURFACE MIX	(1.50")	1.0052	1.50	\$8.02 / SQ YD
HMA BINDER MIX	(2.25")	1.0182	2.25	\$12.19 / SQ YD
HMA POLICY OVERLAY SHLD	(3.75")		3.75	\$15.12 / 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 1.50")		Surface Mix	1.50	\$77.98 / 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 \$727,263
 RIGID TOTAL ANNUAL COST PER MILE \$156,613

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : **9/5/13 9:40 AM**

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	\$597,117	\$512,043
		ANNUAL COST PER MILE	\$128,587	\$110,266
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	\$130,146	\$199,058
		ANNUAL COST PER MILE	\$28,026	\$42,866
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	\$727,263	\$711,101
		ANNUAL COST PER MILE	\$156,613	\$153,133

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=====>	HMA	\$153,133	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	JPCP	\$156,613	2.3%

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%	2,200	LIN FT	\$2.00	\$4,400	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	\$80.64	\$403	
	PWFn =	0.8626		PW =	0.8626 X	\$16,803	\$14,494
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%	2,200	LIN FT	\$2.00	\$4,400	
	PD PVMT PATCH M&F SURF	0.50%	27	SQ YD	\$80.64	\$2,177	
	PWFn =	0.7441		PW =	0.7441 X	\$18,577	\$13,823
YEAR 15							
	MILL PVMT & SHLD 2.00"	100.00%	8,889	SQ YD	\$3.00	\$26,667	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	53	SQ YD	\$79.52	\$4,215	
	HMA OVERLAY PVMT 2.00"	100.00%	5,333	SQ YD	\$10.71	\$57,141	
	HMA OVERLAY SHLD 2.00 "	100.00%	3,556	SQ YD	\$8.06	\$28,672	
	PWFn =	0.6419		PW =	0.6419 X	\$116,695	\$74,902
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%	2,200	LIN FT	\$2.00	\$4,400	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	\$80.64	\$403	
	PWFn =	0.5537		PW =	0.5537 X	\$16,803	\$9,303
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%	2,200	LIN FT	\$2.00	\$4,400	
	PD PVMT PATCH M&F SURF	0.50%	27	SQ YD	\$80.64	\$2,177	
	PWFn =	0.4776		PW =	0.4776 X	\$18,577	\$8,872
HMA SD							
YEAR 30 INTERSTATE							
	MILL PVMT ONLY 2.00"	100.00%	5,333	SQ YD	\$3.00	\$15,999	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	107	SQ YD	\$79.52	\$8,509	
	PD SHLD PATCH M&F SURF 2.00"	1.00%	36	SQ YD	\$78.06	\$2,810	
	HMA OVERLAY PVMT 3.75 "	100.00%	5,333	SQ YD	\$20.21	\$107,785	
	HMA OVERLAY SHLD 1.75 "	100.00%	3,556	SQ YD	\$7.06	\$25,088	
	PWFn =	0.4120		PW =	0.4120 X	\$160,191	\$65,997
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%	2,200	LIN FT	\$2.00	\$4,400	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	\$80.64	\$403	
	PWFn =	0.3554		PW =	0.3554 X	\$16,803	\$5,972
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%	2,200	LIN FT	\$2.00	\$4,400	
	PD PVMT PATCH M&F SURF	0.50%	27	SQ YD	\$80.64	\$2,177	
	PWFn =	0.3066		PW =	0.3066 X	\$18,577	\$5,695
							\$199,058
ROUTINE MAINTENANCE ACTIVITY				0.76 Lane Miles	0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST \$199,058
45	YEAR LIFE CYCLE	CRFn = 0.0407852	MAINTENANCE ANNUAL COST PER MILE				\$42,866

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%	11	SQ YD	\$150.00	\$1,650		
		PWFn = 0.6419			PW = 0.6419 X	\$1,650	\$1,059	
YEAR 20								
	PAVEMENT PATCH CLASS B	2.00%	107	SQ YD	\$150.00	\$16,050		
	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	\$30,660	\$16,976	
YEAR 25								
	PAVEMENT PATCH CLASS B	3.00%	160	SQ YD	\$150.00	\$24,000		
	SHOULDER PATCH CLASS C	1.00%	36	SQ YD	\$145.00	\$5,220		
		PWFn = 0.4776			PW = 0.4776 X	\$29,220	\$13,956	
YEAR 30								
	INTERSTATE							
	PAVEMENT PATCH CLASS B	4.00%	213	SQ YD	\$150.00	\$31,950		
	SHOULDER PATCH CLASS C	1.50%	53	SQ YD	\$145.00	\$7,685		
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%	5,333	SQ YD	\$20.21	\$107,785		
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00%	3,556	SQ YD	\$15.12	\$53,760		
		PWFn = 0.4120			PW = 0.4120 X	\$201,180	\$82,883	
YEAR 35								
	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%	2,000	LIN FT	\$2.00	\$4,000		
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	1,286	LIN FT	\$2.00	\$2,572		
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	5	SQ YD	\$77.98	\$390		
		PWFn = 0.3554			PW = 0.3554 X	\$18,962	\$6,739	
YEAR 40								
	INTERSTATE							
	PAVEMENT PATCH CLASS B	0.50%	27	SQ YD	\$150.00	\$4,050		
	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%	1,930	LIN FT	\$2.00	\$3,860		
	RANDOM CRACK R&S	50.00%	2,000	LIN FT	\$2.00	\$4,000		
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%	27	SQ YD	\$77.98	\$2,105		
		PWFn = 0.3066			PW = 0.3066 X	\$26,015	\$7,975	
							\$130,146	
	ROUTINE MAINTENANCE ACTIVITY				0.76 Lane Miles	\$0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST	\$130,146
45	YEAR LIFE CYCLE		CRFn = 0.0407852		MAINTENANCE ANNUAL COST PER MILE		\$28,026	

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: Ramp ES/Taylor Street	Comments: Phase II submittal
Section: 2014-002R&B	
County: Cook	Design Date: 01/11/2017 st <-- BY
Location: at I-90 / I-94	Modify Date: 02/02/2017 ONP <-- BY
Facility Type: Interstate or Freeway	** Ramp Design Fig. 54-1.B **
# of Lanes = 1 Lane Ramp	Crossroad? Interstate or Freeway
Road Class: I	# of Lanes = 6 or more
Subgrade Support Rating (SSR): Poor	Rural or Urban? Urban
Construction Year: 2018	
Design Period (DP) = 20 years	

Structural Design Traffic			
Minimum ADT	Actual ADT	Actual % of Total ADT	% of ADT in Design Lane
PV = 0	39,510	90.0%	P = 100%
SU = 500	1,537	3.5%	S = 100%
MU = 1500	2,854	6.5%	M = 100%
Struct. Design ADT = 43,900		(2028)	

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT		RAMP DESIGN MIN		RIGID PAVEMENT		RAMP DESIGN MIN	
Cpv = 0.15	0.15	8%	Cpv = 0.15	0.15	8%		
Csu = 132.5	132.5	37%	Csu = 143.81	143.81	37%		
Cmu = 482.53	482.53	37%	Cmu = 696.42	696.42	37%		
TF flexible (Actual) = 31.73	(Actual ADT)	5.85	TF rigid (Actual) = 44.28	(Actual ADT)	8.26		
TF flexible (Min) = 5.85	(Min ADT Fig. 54-2.C)		TF rigid (Min) = 8.26	(Min ADT Fig. 54-2.C)			

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement	JPC Pavement
Use TF flexible = 31.73	Use TF rigid = 44.28
PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)	Edge Support = Tied Shoulder or C.&G.
HMA Mixture Temp. = 75.0 deg. F (Fig. 54-5.C)	Rigid Pavt Thick. = 11.00 in. (Fig. 54-4.E)
Design HMA Mixture Modulus (E _{HMA}) = 690 ksi (Fig. 54-5.D)	
Design HMA Strain (ε _{HMA}) = 45 (Fig. 54-5.E)	
Full Depth HMA Design Thickness = 15.00 in. (Fig. 54-5.F)	
Limiting Strain Criterion Thickness = 14.50 in. (Fig. 54-5.I)	
Use Full-Depth HMA Thickness = 14.50 inches	
	CRCP Pavement
	Use TF rigid = 44.28
	IBR value = 3
	CRCP Thickness = 11.00 in. (Fig. 54-4.M)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC	Unbonded Concrete Overlay
Use TF flexible = 31.73	Review 54-4.03 for limitations and special considerations.
HMA Overlay Design Thickness = 12.50 in. (Fig. 54-5.U)	
Limiting Strain Criterion Thickness = in. (Fig. 54-5.V)	
Use HMA Overlay Thickness = 999.00 inches	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	0	250	750

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

Class	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
I	Csu 143.81	Cmu 696.42	Csu 132.50	Cmu 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 One-Way Streets	ADT	Class
	0 - 3500	
>3501		I

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	ADT	Class
	0 - 749	
750 - 2000		III
>2000		II

Number of Lanes	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)					
	Rural			Urban		
	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%

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	\$711,101
FLEXIBLE TOTAL ANNUAL COST PER MILE	\$153,133

PCC PAVEMENT

JPCP

ROUTE
SECTION
COUNTY
LOCATION

Job Route
Job Section
Job County
Job Location

FACILITY TYPE

INTERSTATE

PROJECT LENGTH 1000 FT == > 0.19 Miles
 # OF CENTERLINES 2 CL
 # OF LANES 4 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 10.00 IN TIED SHLD
 SHOULDER THICKNESS 10.00 IN

POLICY OVERLAY THICKNESS 3.75 IN

RIGID PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	10.05	1.00	10.05
Worksheet Construction Type is New Construction	The Pavement Type is		JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
JPC PAVEMENT	(10.00")	5,333	SQ YD	\$50.00 / SQ YD	\$266,650
PAVEMENT REINFORCEMENT		0	SQ YD	\$22.00 / SQ YD	\$0
STABILIZED SUBBASE	(4.00")	6,000	SQ YD	\$19.00 / SQ YD	\$114,000
PCC SHOULDERS		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	(~ 3.48")	418	TONS	\$25.00 / TON	\$10,450
IMPROVED SUBGRADE:	Modified Soil Width = 82.0'	9,111	SQ YD	\$7.00 / SQ YD	\$63,777
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		5,333	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 \$597,117
 RIGID CONSTRUCTION ANNUAL COST PER MILE \$128,587

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	T	UNIT COST
ROUTINE MAINTENANCE ACTIVITY				\$0.00 / LANE-MILE / YEAR
HMA POLICY OVERLAY	(3.75")		3.75	
HMA POLICY OVERLAY PVMT	(3.75")	1.0130	3.75	\$20.21 / SQ YD
HMA SURFACE MIX	(1.50")	1.0052	1.50	\$8.02 / SQ YD
HMA BINDER MIX	(2.25")	1.0182	2.25	\$12.19 / SQ YD
HMA POLICY OVERLAY SHLD	(3.75")		3.75	\$15.12 / 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 1.50")		Surface Mix	1.50	\$77.98 / 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 \$727,263
 RIGID TOTAL ANNUAL COST PER MILE \$156,613

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 9/5/13 9:40 AM

				JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH		\$597,117	\$512,043
		ANNUAL COST PER MILE		\$128,587	\$110,266
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH		\$130,146	\$199,058
		ANNUAL COST PER MILE		\$28,026	\$42,866
TOTAL	LIFE-CYCLE COST	PRESENT WORTH		\$727,263	\$711,101
		ANNUAL COST PER MILE		\$156,613	\$153,133

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

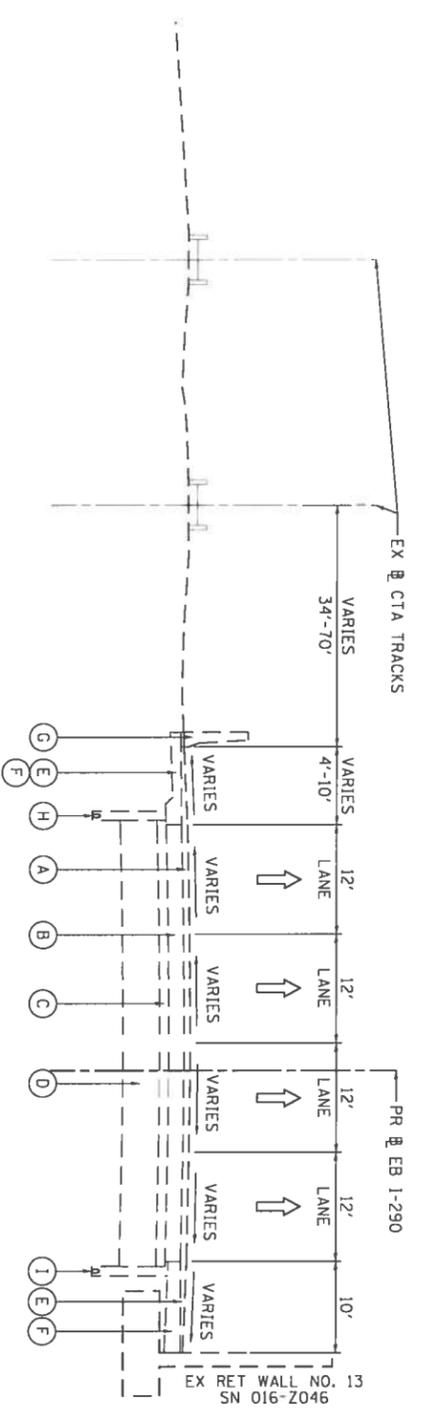
LOWEST COST OPTION	=====>	HMA	\$153,133	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	JPCP	\$156,613	2.3%

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%	2,200	LIN FT	\$2.00	\$4,400	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	\$80.64	\$403	
	PWFn =	0.8626		PW =	0.8626 X	\$16,803	\$14,494
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%	2,200	LIN FT	\$2.00	\$4,400	
	PD PVMT PATCH M&F SURF	0.50%	27	SQ YD	\$80.64	\$2,177	
	PWFn =	0.7441		PW =	0.7441 X	\$18,577	\$13,823
YEAR 15							
	MILL PVMT & SHLD 2.00"	100.00%	8,889	SQ YD	\$3.00	\$26,667	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	53	SQ YD	\$79.52	\$4,215	
	HMA OVERLAY PVMT 2.00"	100.00%	5,333	SQ YD	\$10.71	\$57,141	
	HMA OVERLAY SHLD 2.00 "	100.00%	3,556	SQ YD	\$8.06	\$28,672	
	PWFn =	0.6419		PW =	0.6419 X	\$116,695	\$74,902
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%	2,200	LIN FT	\$2.00	\$4,400	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	\$80.64	\$403	
	PWFn =	0.5537		PW =	0.5537 X	\$16,803	\$9,303
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%	2,200	LIN FT	\$2.00	\$4,400	
	PD PVMT PATCH M&F SURF	0.50%	27	SQ YD	\$80.64	\$2,177	
	PWFn =	0.4776		PW =	0.4776 X	\$18,577	\$8,872
HMA SD							
YEAR 30 INTERSTATE							
	MILL PVMT ONLY 2.00"	100.00%	5,333	SQ YD	\$3.00	\$15,999	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	107	SQ YD	\$79.52	\$8,509	
	PD SHLD PATCH M&F SURF 2.00"	1.00%	36	SQ YD	\$78.06	\$2,810	
	HMA OVERLAY PVMT 3.75 "	100.00%	5,333	SQ YD	\$20.21	\$107,785	
	HMA OVERLAY SHLD 1.75 "	100.00%	3,556	SQ YD	\$7.06	\$25,088	
	PWFn =	0.4120		PW =	0.4120 X	\$160,191	\$65,997
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%	2,200	LIN FT	\$2.00	\$4,400	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	\$80.64	\$403	
	PWFn =	0.3554		PW =	0.3554 X	\$16,803	\$5,972
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%	2,200	LIN FT	\$2.00	\$4,400	
	PD PVMT PATCH M&F SURF	0.50%	27	SQ YD	\$80.64	\$2,177	
	PWFn =	0.3066		PW =	0.3066 X	\$18,577	\$5,695
							\$199,058
ROUTINE MAINTENANCE ACTIVITY				0.76 Lane Miles	0.00	\$0	\$0
							\$199,058
45	YEAR LIFE CYCLE	CRFn = 0.0407852	MAINTENANCE LIFE-CYCLE COST				\$199,058
							\$42,866
							\$42,866

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%	11	SQ YD	\$150.00	\$1,650		
		PWFn = 0.6419			PW = 0.6419 X	\$1,650	\$1,059	
YEAR 20								
	PAVEMENT PATCH CLASS B	2.00%	107	SQ YD	\$150.00	\$16,050		
	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	\$30,660	\$16,976	
YEAR 25								
	PAVEMENT PATCH CLASS B	3.00%	160	SQ YD	\$150.00	\$24,000		
	SHOULDER PATCH CLASS C	1.00%	36	SQ YD	\$145.00	\$5,220		
		PWFn = 0.4776			PW = 0.4776 X	\$29,220	\$13,956	
YEAR 30								
	INTERSTATE							
	PAVEMENT PATCH CLASS B	4.00%	213	SQ YD	\$150.00	\$31,950		
	SHOULDER PATCH CLASS C	1.50%	53	SQ YD	\$145.00	\$7,685		
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%	5,333	SQ YD	\$20.21	\$107,785		
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00%	3,556	SQ YD	\$15.12	\$53,760		
		PWFn = 0.4120			PW = 0.4120 X	\$201,180	\$82,883	
YEAR 35								
	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%	2,000	LIN FT	\$2.00	\$4,000		
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	1,286	LIN FT	\$2.00	\$2,572		
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	5	SQ YD	\$77.98	\$390		
		PWFn = 0.3554			PW = 0.3554 X	\$18,962	\$6,739	
YEAR 40								
	INTERSTATE							
	PAVEMENT PATCH CLASS B	0.50%	27	SQ YD	\$150.00	\$4,050		
	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%	1,930	LIN FT	\$2.00	\$3,860		
	RANDOM CRACK R&S	50.00%	2,000	LIN FT	\$2.00	\$4,000		
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%	27	SQ YD	\$77.98	\$2,105		
		PWFn = 0.3066			PW = 0.3066 X	\$26,015	\$7,975	
							\$130,146	
	ROUTINE MAINTENANCE ACTIVITY				0.76 Lane Miles	\$0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST	\$130,146
45	YEAR LIFE CYCLE		CRFn = 0.0407852		MAINTENANCE ANNUAL COST PER MILE		\$28,026	

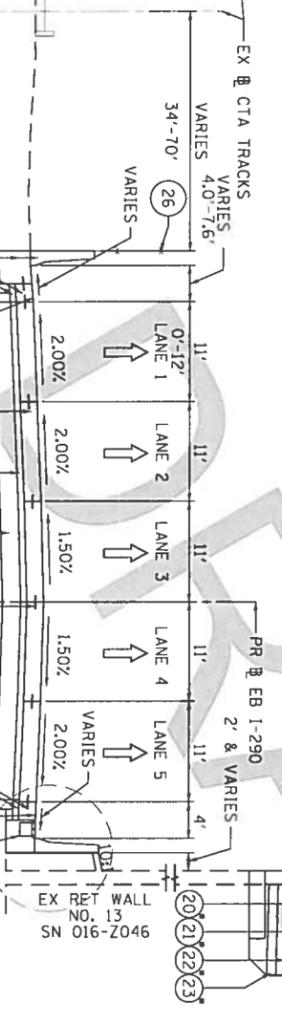


**EXISTING TYPICAL SECTION
(LOOKING EAST)**

PR # EB 1-290
STA 5128+09.23 TO STA 5132+60.20

DETAIL A

BARRIER WALL FROM
STA 5128+09.23 TO STA 5128+57.07
STA 5129+37.79 TO STA 5132+18.51

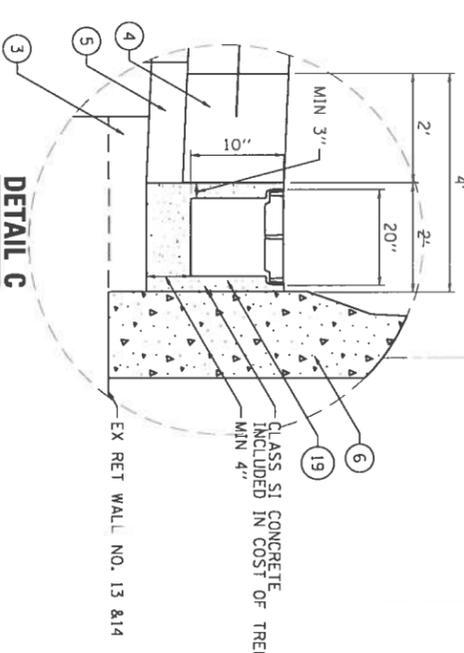


**PROPOSED TYPICAL SECTION
(LOOKING EAST)**

PR # EB 1-290
STA 5128+09.23 TO STA 5132+60.20

DETAIL B

BARRIER WALL FROM
STA 5128+57.07 TO STA 5129+37.79
STA 5132+18.57 TO STA 5132+60.20



DETAIL C

TRENCH DRAIN (SPECIAL) FROM
STA 5127+55.23 TO STA 5130+65.80
SEE SHEET 173 FOR DETAILS

- EXISTING**
- A HOT-MIX ASPHALT PAVEMENT, 4" TO 7"
 - B PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
 - C GRANULAR SUBBASE, 6"
 - D PREPARED SUBGRADE, 12"
 - E HOT MIX ASPHALT SHOULDER, 10"
 - F PORTLAND CEMENT CONCRETE SHOULDER, 9"
 - G CONCRETE BARRIER
 - H PIPE UNDERDRAIN
 - I COMBINATION CURB AND GUTTER, TYPE M-6.24 OR B-6.24
 - J BITUMINOUS SHOULDER
 - K TEMPORARY PAVEMENT
 - L SUBBASE GRANULAR MATERIAL, 4"
 - M POROUS GRANULAR EMBANKMENT, SPECIAL, 0"-36"
 - N FENCE
 - O METAL RAILING

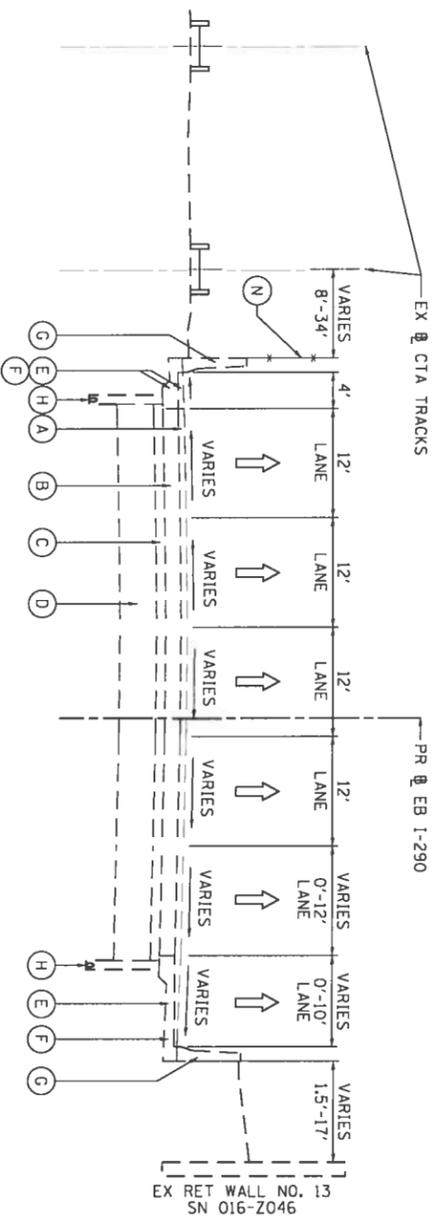
PROPOSED

- 1 PORTLAND CEMENT CONCRETE PAVEMENT, 11" (JOINTED)
- 2 STABILIZED SUBBASE HOT MIX ASPHALT, 4"
- 3 AGGREGATE SUBGRADE IMPROVEMENT, 12"
- 4 PORTLAND CEMENT CONCRETE SHOULDERS, 11"
- 5 SUBBASE GRANULAR MATERIAL, TYPE C, 4"
- 6 CONCRETE BARRIER WALL, SINGLE FACE, 42 INCH HEIGHT
- 7 CONCRETE BARRIER BASE
- 8 PIPE UNDERDRAIN
- 9 COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- 10 #5 THE BARS, 30" LONG AT 30" C-C (LONGITUDINAL CONSTRUCTION JOINT) (INCLUDED IN PRICE FOR BID FOR PCC BASE COURSE)
- 11 CONCRETE GUTTER TYPE A
- 12 TOPSOIL FURNISH AND PLACE, 4" AND SEEDING, CLASS 2A (SEE EROSION CONTROL PLANS)
- 13 PORTLAND CEMENT CONCRETE PAVEMENT, 10 1/2" (JOINTED)
- 14 PORTLAND CEMENT CONCRETE SHOULDERS, 10 1/2"
- 15 TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET #STYP-09 FOR DETAILS)
- 16 SUBBASE GRANULAR MATERIAL, TYPE B, 4"
- 17 TEMPORARY CONCRETE BARRIER (TO REMAIN PERMANENTLY)
- 18 CONCRETE MEDIUM SURFACE, 4 INCH
- 19 TRENCH DRAIN (SPECIAL)
- 20 HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70, 1 1/2"
- 21 HOT-MIX ASPHALT BINDER COURSE, IL-19.0, N70, 2 1/4"
- 22 PORTLAND CEMENT CONCRETE BASE COURSE, 9"
- 23 SUBBASE GRANULAR MATERIAL, TYPE B, 6"
- 24 HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70, 2"
- 25 HOT-MIX ASPHALT BASE COURSE, 8"
- 26 CTA FENCE
- 27 CONCRETE BARRIER WALL (SPECIAL)
- 28 CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT (SPECIAL)
- 29 CONCRETE BARRIER, VARIABLE CROSS SECTION 42 INCH HEIGHT
- 30 CONCRETE BARRIER BASE (SPECIAL)
- 31 SHOULDER RUMBLE STRIPS, 16 INCH PINNING TEMPORARY CONCRETE BARRIER

NOTES:

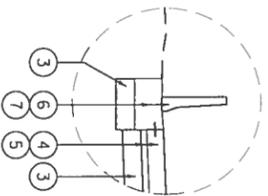
1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
3. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND PCC PAVEMENT DETAIL PLAN.

		DESIGNED: JLV DRAWN: SED CHECKED: JMG DATE: 11/18/16		REVISIONS:	
USER: vj.pamphile USER NAME: vj.pamphile USER ID: 2014002888	PROJECT: EB 1-290 PROJECT NAME: EB 1-290 PROJECT NO: 60X76	DESIGNED: JLV DRAWN: SED CHECKED: JMG DATE: 11/18/16	REVISIONS:	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	SCALE: NONE SHEET: 3 OF 10 SHEETS STA. TO STA.
FILE PATH: g:\617479-PWR\Leccom\img\local\RECOM_0582_NAV\documents\01_Americas\Transportation\60269938_Circle\Phase 1\X08D CAD\006_Roadway\Sheets\60X76_Contract\0160X76-shs\Typical_C1.dgn		PROJECT: EB 1-290 PROJECT NAME: EB 1-290 PROJECT NO: 60X76		SCALE: NONE SHEET: 3 OF 10 SHEETS STA. TO STA.	

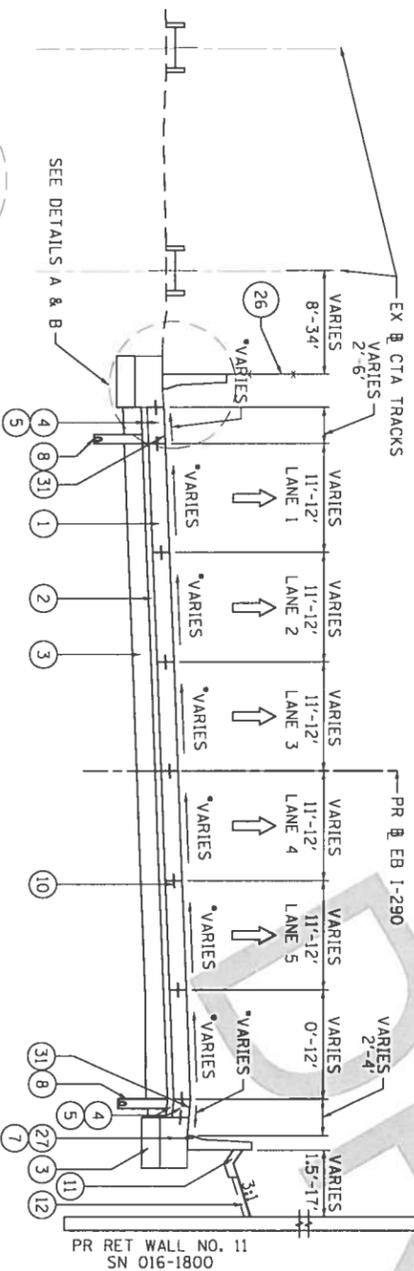


**EXISTING TYPICAL SECTION
(LOOKING EAST)**

PR & EB 1-290
STA 5132+60.20 TO STA 5139+07.34

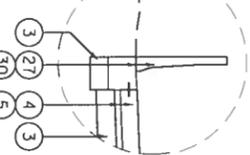


DETAIL A
BARRIER WALL FROM
STA 5132+60.20 TO STA 5134+35.00



**PROPOSED TYPICAL SECTION
(LOOKING EAST)**

PR & EB 1-290
STA 5132+60.20 TO STA 5136+69.17



DETAIL B
BARRIER WALL FROM
STA 5134+35.00 TO STA 5136+69.17

NOTES:

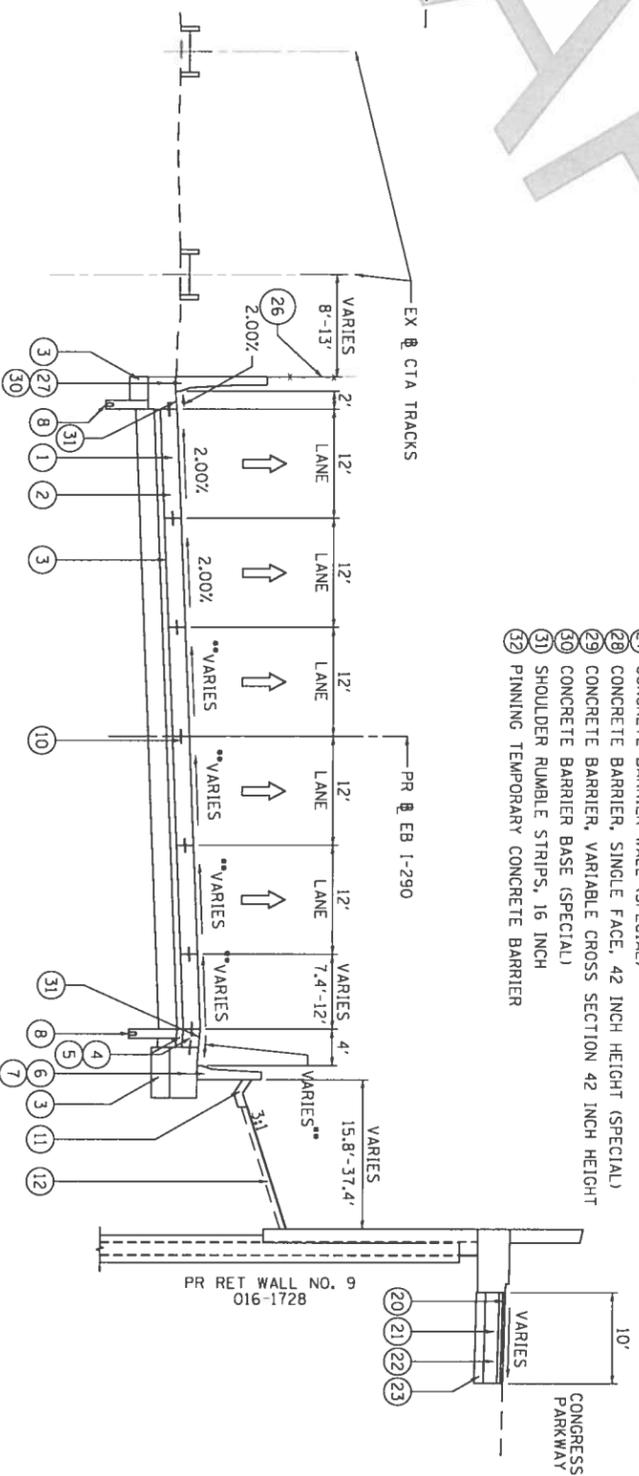
1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
2. THE MAXIMUM ROLL-OVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
3. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND PCC PAVEMENT DETAIL PLAN.

EXISTING

- A HOT-MIX ASPHALT PAVEMENT, 4" TO 7"
- B PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
- C GRANULAR SUBBASE, 6"
- D PREPARED SUBGRADE, 12"
- E HOT MIX ASPHALT SHOULDER, 10"
- F PORTLAND CEMENT CONCRETE SHOULDER, 9"
- G CONCRETE BARRIER
- H PIPE UNDERDRAIN
- I COMBINATION CURB AND GUTTER, TYPE M-6.24 OR B-6.24
- J BITUMINOUS SHOULDER
- K TEMPORARY PAVEMENT
- L SUBBASE GRANULAR MATERIAL, 4"
- M POROUS GRANULAR EMBANKMENT, SPECIAL, 0'-36"
- N FENCE
- O METALL RAILING

PROPOSED

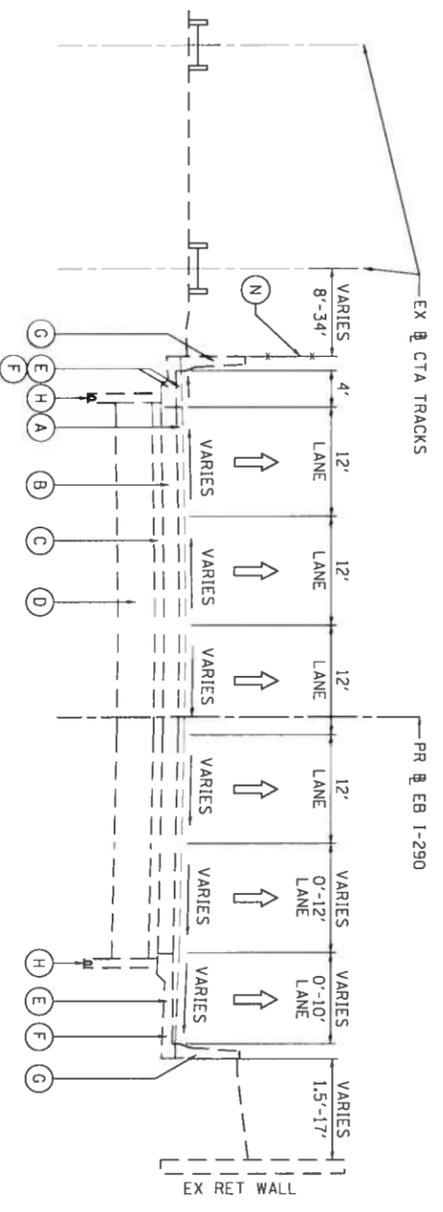
- 1 PORTLAND CEMENT CONCRETE PAVEMENT, 11" (JOINTED)
- 2 STABILIZED SUBBASE HOT MIX ASPHALT, 4"
- 3 AGGREGATE SUBGRADE IMPROVEMENT, 12"
- 4 PORTLAND CEMENT CONCRETE SHOULDERS, 11"
- 5 SUBBASE GRANULAR MATERIAL, TYPE C, 4"
- 6 CONCRETE BARRIER WALL, SINGLE FACE, 42 INCH HEIGHT
- 7 CONCRETE BARRIER BASE
- 8 PIPE UNDERDRAIN
- 9 COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- 10 #5 TIE BARS, 30" LONG AT 30" C-C (LONGITUDINAL CONSTRUCTION JOINT) INCLUDED IN PRICE FOR BID FOR PCC BASE COURSE
- 11 CONCRETE GUTTER TYPE A
- 12 TOPSOIL FURNISH AND PLACE, 4" AND SEEDING, CLASS 2A (SEE EROSION CONTROL PLANS)
- 13 PORTLAND CEMENT CONCRETE PAVEMENT, 10 1/2" (JOINTED)
- 14 PORTLAND CEMENT CONCRETE SHOULDERS, 10 1/2"
- 15 TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET #STR-09 FOR DETAILS)
- 16 SUBBASE GRANULAR MATERIAL, TYPE B 4"
- 17 TEMPORARY CONCRETE BARRIER (TO REMAIN PERMANENTLY)
- 18 CONCRETE MEDIAN SURFACE, 4 INCH
- 19 TRENCH DRAIN (SPECIAL)
- 20 HOT MIX ASPHALT SURFACE COURSE, MIX "D", NTO, 1 1/2"
- 21 HOT-MIX ASPHALT BINDER COURSE, IL-19.0, NTO, 2 1/4"
- 22 PORTLAND CEMENT CONCRETE BASE COURSE, 9"
- 23 SUBBASE GRANULAR MATERIAL, TYPE B, 6"
- 24 HOT-MIX ASPHALT SURFACE COURSE, MIX "D", NTO, 2"
- 25 HOT-MIX ASPHALT BASE COURSE, 8"
- 26 CTA FENCE
- 27 CONCRETE BARRIER WALL (SPECIAL)
- 28 CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT (SPECIAL)
- 29 CONCRETE BARRIER, VARIABLE CROSS SECTION 42 INCH HEIGHT
- 30 CONCRETE BARRIER BASE (SPECIAL)
- 31 SHOULDER RUMBLE STRIPS, 16 INCH
- 32 PINNING TEMPORARY CONCRETE BARRIER



**PROPOSED TYPICAL SECTION
WALL 9 (LOOKING EAST)**

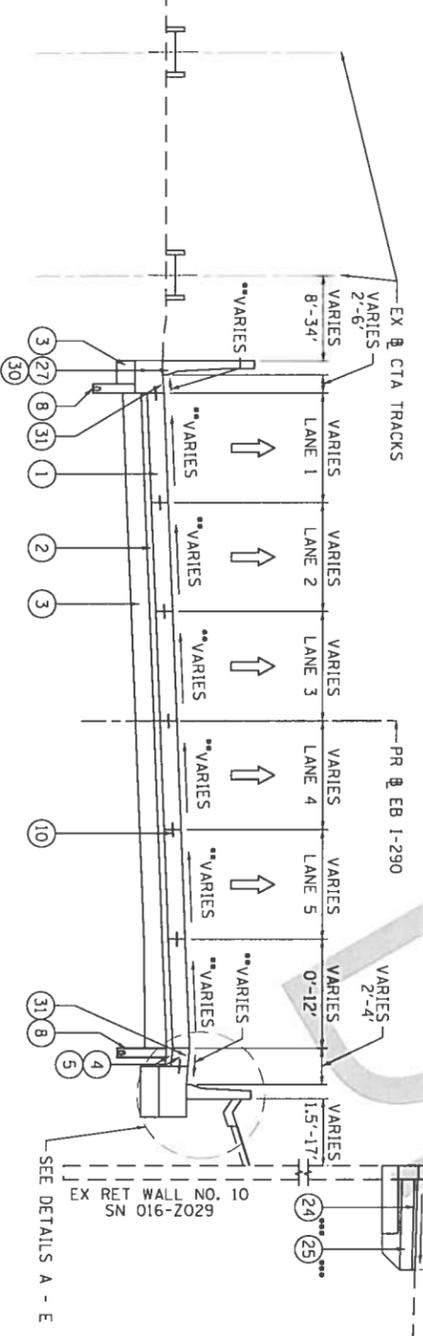
PR & EB 1-290
STA 5136+69.17 TO STA 5139+07.34

*SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES
**PROPOSED PAVEMENT SECTION ADJACENT TO PROPOSED PARAFET WALL FROM STA 5132+58.15 TO STA 5133+00.00



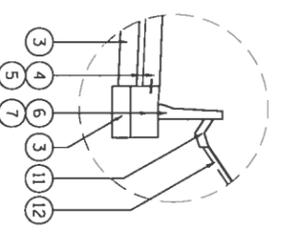
**EXISTING TYPICAL SECTION
(LOOKING EAST)**

PR @ EB I-290
STA 5139+07.34 TO STA 5145+85.09

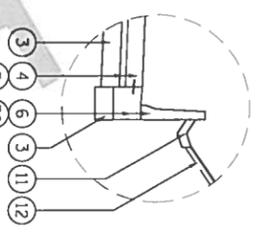


**PROPOSED TYPICAL SECTION
(LOOKING EAST)**

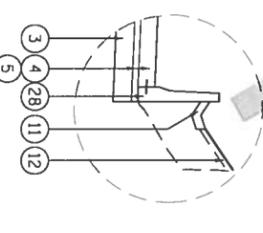
PR @ EB I-290
STA 5139+07.34 TO STA 5145+85.09



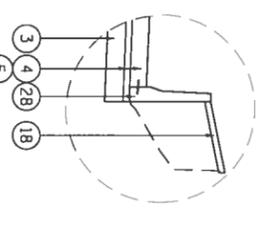
DETAIL A
BARRIER WALL FROM
STA 5139+07.34 TO STA 5140+46.61



DETAIL B
BARRIER WALL FROM
STA 5140+46.61 TO STA 5145+38.54



DETAIL C
BARRIER WALL FROM
STA 5140+89.74 TO STA 5141+33.84



DETAIL D
BARRIER WALL FROM
STA 5141+33.84 TO STA 5143+85.28

*LANE VARIES 11' TO 12'
**SEE SUPERELEVATION TRANSITION DETAILS
***FOR CROSS SLOPES
****PROPOSED PAVEMENT SECTION ADJACENT
TO PROPOSED PARAPET WALL
FROM STA 5139+95.29 TO STA 5145+06.18

EXISTING

- ① HOT-MIX ASPHALT PAVEMENT, 4" TO 7"
- ② PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
- ③ GRANULAR SUBBASE, 6"
- ④ PREPARED SUBGRADE, 12"
- ⑤ HOT MIX ASPHALT SHOULDER, 10"
- ⑥ PORTLAND CEMENT CONCRETE SHOULDER, 9"
- ⑦ CONCRETE BARRIER
- ⑧ PIPE UNDERDRAIN
- ⑨ COMBINATION CURB AND GUTTER, TYPE M-6.24 OR B-6.24
- ⑩ BITUMINOUS SHOULDER
- ⑪ TEMPORARY PAVEMENT
- ⑫ SUBBASE GRANULAR MATERIAL, 4"
- ⑬ POROUS GRANULAR EMBANKMENT, SPECIAL, 0'-36"
- ⑭ FENCE
- ⑮ METAL RAILING

PROPOSED

- ① PORTLAND CEMENT CONCRETE PAVEMENT, 11" (JOINTED)
- ② STABILIZED SUBBASE HOT MIX ASPHALT, 4"
- ③ AGGREGATE SUBGRADE IMPROVEMENT, 12"
- ④ PORTLAND CEMENT CONCRETE SHOULDERS, 11"
- ⑤ SUBBASE GRANULAR MATERIAL, TYPE C, 4"
- ⑥ CONCRETE BARRIER WALL, SINGLE FACE, 42 INCH HEIGHT
- ⑦ CONCRETE BARRIER BASE
- ⑧ PIPE UNDERDRAIN
- ⑨ COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- ⑩ *5 TIE BARS, 30" LONG AT 30" C-C (LONGITUDINAL CONSTRUCTION JOINT) INCLUDED IN PRICE FOR BID FOR PCC BASE COURSE
- ⑪ CONCRETE GUTTER TYPE A
- ⑫ TOPSOIL FURNISH AND PLACE, 4" AND SEEDING, CLASS 2A (SEE EROSION CONTROL PLANS)
- ⑬ PORTLAND CEMENT CONCRETE PAVEMENT, 10 1/2" (JOINTED)
- ⑭ PORTLAND CEMENT CONCRETE SHOULDERS, 10 1/2"
- ⑮ TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET \$TYP-09 FOR DETAILS)
- ⑯ SUBBASE GRANULAR MATERIAL, TYPE B, 4"
- ⑰ TEMPORARY CONCRETE BARRIER (TO REMAIN PERMANENTLY)
- ⑱ CONCRETE MEDIUM SURFACE, 4 INCH
- ⑲ TRENCH DRAIN (SPECIAL)
- ⑳ HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70, 1 1/2"
- ㉑ HOT-MIX ASPHALT BINDER COURSE, IL-19.0, N70, 2 1/4"
- ㉒ PORTLAND CEMENT CONCRETE BASE COURSE, 9"
- ㉓ SUBBASE GRANULAR MATERIAL, TYPE B, 6"
- ㉔ HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70, 2"
- ㉕ HOT-MIX ASPHALT BASE COURSE, 8"
- ㉖ CTA FENCE
- ㉗ CONCRETE BARRIER WALL (SPECIAL)
- ㉘ CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT (SPECIAL)
- ㉙ CONCRETE BARRIER, VARIABLE CROSS SECTION 42 INCH HEIGHT
- ㉚ CONCRETE BARRIER BASE (SPECIAL)
- ㉛ SHOULDER RUMBLE STRIPS, 16 INCH
- ㉜ PINNING TEMPORARY CONCRETE BARRIER

NOTES:

1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
3. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND PCC PAVEMENT DETAIL PLAN.



Drawn by: Typical.dwg
User Name: vjwachter
Plot Scale: 240000 / in.
Plot Date: 11/16/2016

DESIGNED: JLV
DRAWN: SED
CHECKED: JMG
DATE: 11/18/16

REVISDED: -
REVISDED: -
REVISDED: -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

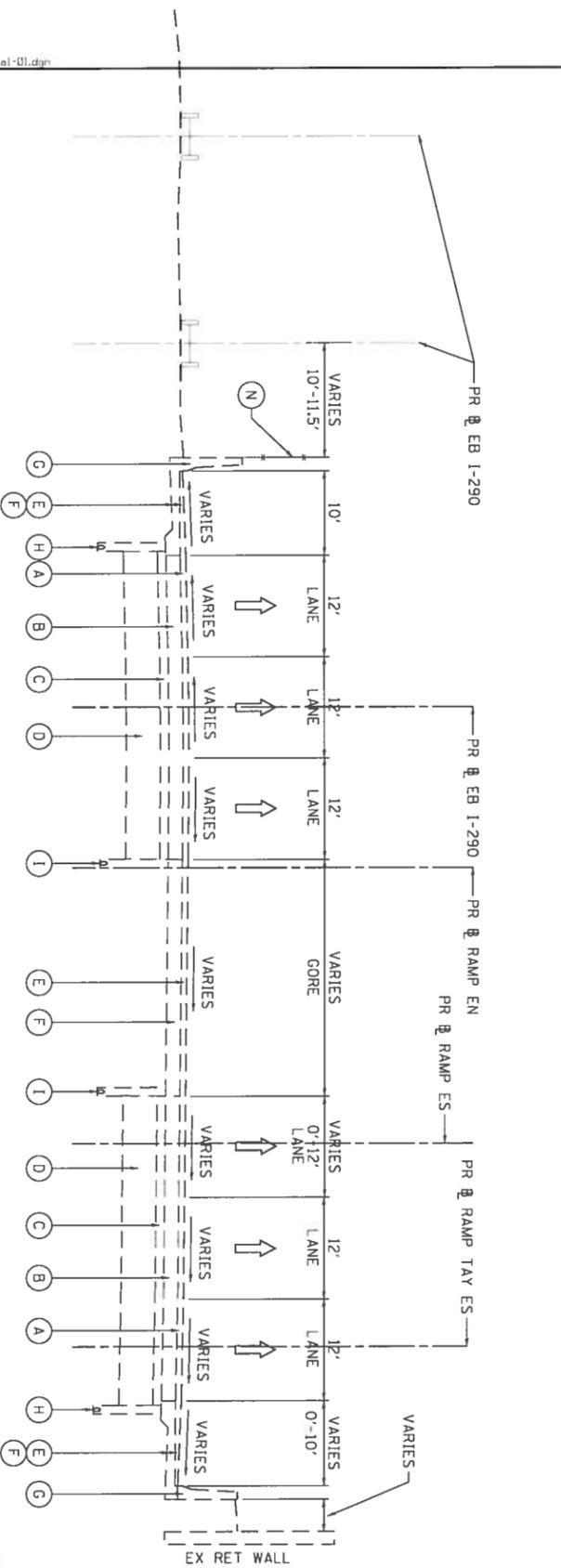
SCALE: NONE

SHEET 4A OF 10 SHEETS

TYPICAL SECTIONS
EB I-290

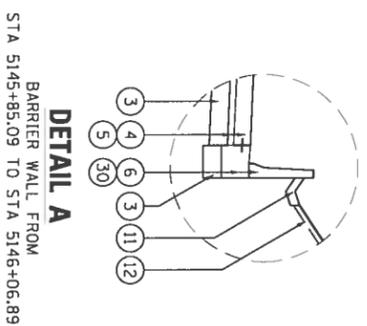
TO STA.

FAI. RTE.	SECTION	COUNTY	TOTAL SHEET NO.
90/94/290	2014-002948	COOK	527
			264
			CONTRACT NO. 60X76

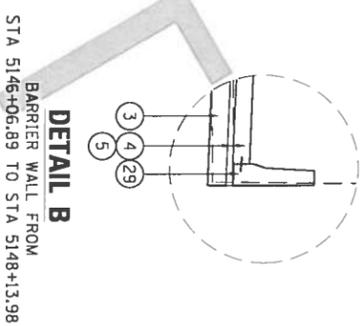


**EXISTING TYPICAL SECTION
(LOOKING EAST)**

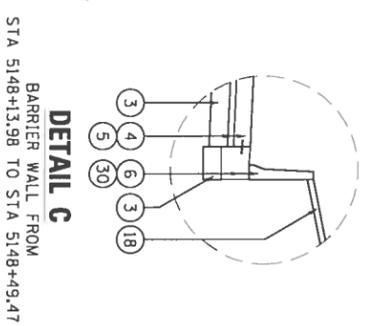
PR EB I-290
STA 5145+85.09 TO STA 5151+33.88



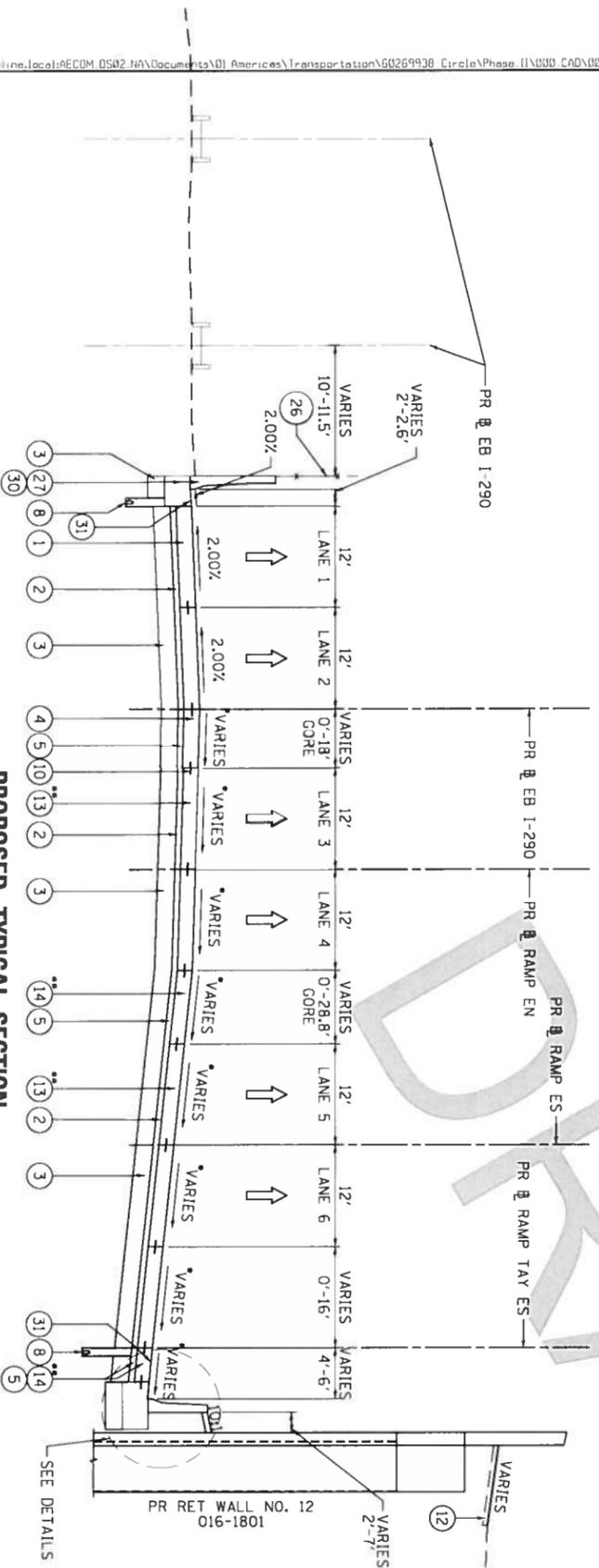
DETAIL A
BARRIER WALL FROM
STA 5145+85.09 TO STA 5148+06.89



DETAIL B
BARRIER WALL FROM
STA 5146+06.89 TO STA 5148+13.98

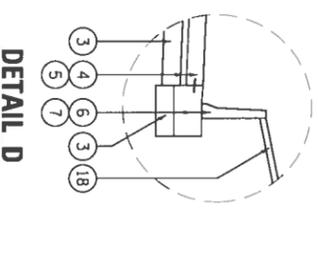


DETAIL C
BARRIER WALL FROM
STA 5148+13.98 TO STA 5148+49.47



**PROPOSED TYPICAL SECTION
(LOOKING EAST)**

PR EB I-290
STA 5148+49.47 TO STA 5148+93.88



DETAIL D
BARRIER WALL FROM
STA 5148+49.47 TO STA 5148+93.88

- EXISTING**
- (A) HOT-MIX ASPHALT PAVEMENT, 4" TO 7"
 - (B) PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
 - (C) GRANULAR SUBBASE, 6"
 - (D) PREPARED SUBGRADE, 12"
 - (E) HOT MIX ASPHALT SHOULDER, 10"
 - (F) PORTLAND CEMENT CONCRETE SHOULDER, 9"
 - (G) CONCRETE BARRIER
 - (H) PIPE UNDERDRAIN
 - (I) COMBINATION CURB AND GUTTER, TYPE M-6.24 OR B-6.24
 - (J) BITUMINOUS SHOULDER
 - (K) TEMPORARY PAVEMENT
 - (L) SUBBASE GRANULAR MATERIAL, 4"
 - (M) POROUS GRANULAR EMBANKMENT, SPECIAL, 0"-36"
 - (N) FENCE
 - (O) METAL RAILING

- PROPOSED**
- (1) PORTLAND CEMENT CONCRETE PAVEMENT, 11" (JOINTED)
 - (2) STABILIZED SUBBASE HOT MIX ASPHALT, 4"
 - (3) AGGREGATE SUBGRADE IMPROVEMENT, 12"
 - (4) PORTLAND CEMENT CONCRETE SHOULDERS, 11"
 - (5) SUBBASE GRANULAR MATERIAL, TYPE C, 4"
 - (6) CONCRETE BARRIER WALL, SINGLE FACE, 42 INCH HEIGHT
 - (7) CONCRETE BARRIER BASE
 - (8) PIPE UNDERDRAIN
 - (9) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
 - (10) #5 TIE BARS, 30" LONG AT 30" C-C (LONGITUDINAL CONSTRUCTION JOINT) INCLUDED IN PRICE FOR BID FOR PCC BASE COURSE)
 - (11) CONCRETE GUTTER TYPE A
 - (12) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING, CLASS 2A (SEE EROSION CONTROL PLANS)
 - (13) PORTLAND CEMENT CONCRETE PAVEMENT, 10 1/2" (JOINTED)
 - (14) PORTLAND CEMENT CONCRETE SHOULDERS, 10 1/2"
 - (15) TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET #STP-09 FOR DETAILS)
 - (16) SUBBASE GRANULAR MATERIAL, TYPE B, 4"
 - (17) TEMPORARY CONCRETE BARRIER (TO REMAIN PERMANENTLY)
 - (18) CONCRETE MEDIAN SURFACE, 4 INCH
 - (19) TRENCH DRAIN (SPECIAL)
 - (20) HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70, 1 1/2"
 - (21) HOT-MIX ASPHALT BINDER COURSE, IL-19.0, N70, 2 1/4"
 - (22) PORTLAND CEMENT CONCRETE BASE COURSE, 9"
 - (23) SUBBASE GRANULAR MATERIAL, TYPE B, 6"
 - (24) HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70, 2"
 - (25) HOT-MIX ASPHALT BASE COURSE, 8"
 - (26) CTA FENCE
 - (27) CONCRETE BARRIER WALL (SPECIAL)
 - (28) CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT (SPECIAL)
 - (29) CONCRETE BARRIER, VARIABLE CROSS SECTION 42 INCH HEIGHT
 - (30) CONCRETE BARRIER BASE (SPECIAL)
 - (31) SHOULDER RUMBLE STRIPS, 16 INCH
 - (32) PINNING TEMPORARY CONCRETE BARRIER

NOTES:

1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
3. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND PCC PAVEMENT DETAIL PLAN.

SEE SUPERELEVATION TRANSITION DETAILS
FOR CROSS SLOPES
**MAINLINE PAVEMENT ENDS AT STA 5147+56.70
(STA 1502+96.17 PR RAMP ES)



DIR: 6/16/2016
USER: J. J. J.
PLOT SCALE: 1/8" = 1'-0"
DATE: 11/18/2016

DESIGNED: JLV
DRAWN: JMC
CHECKED: JMC
DATE: 11/18/16

REVISIONS
REVISED
REVISED
REVISED

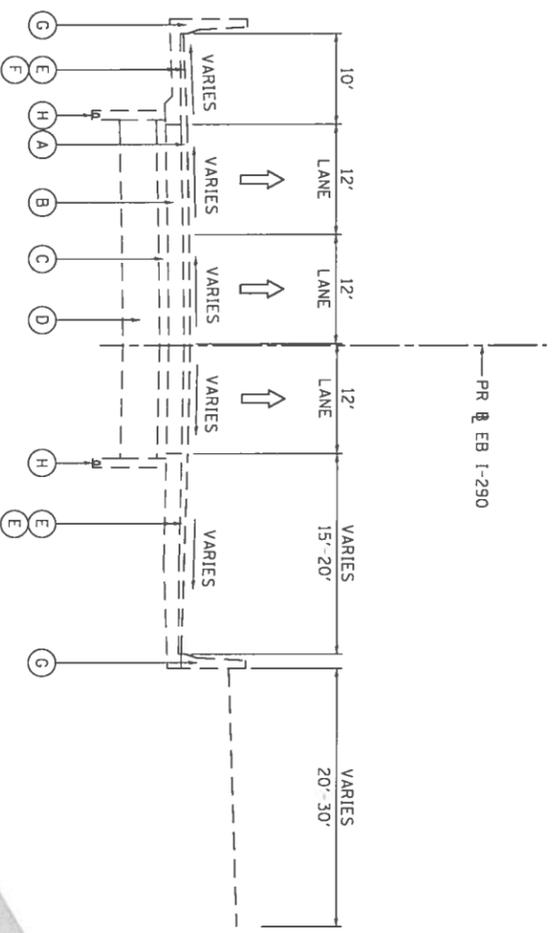
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SCALE: NONE

TYPICAL SECTIONS
EB I-290

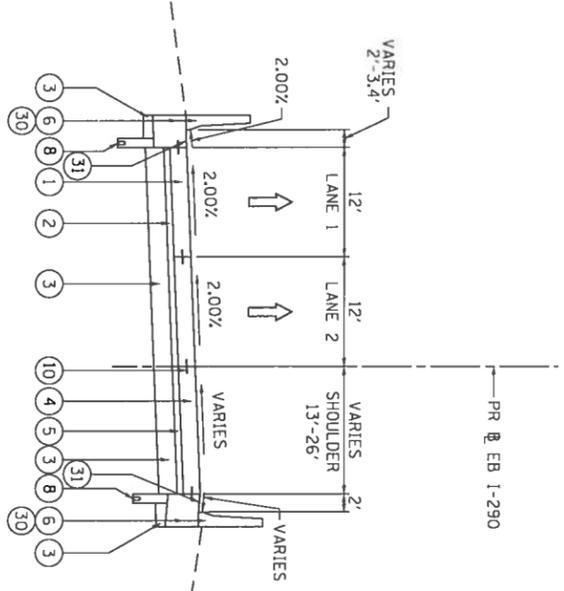
SHEET 5 OF 10 SHEETS

FA.I. DATE: 9/0/2016
SECTION: 2014-002848
COUNTY: COOK
SHEET NO.: 527
TOTAL SHEETS: 27
CONTRACT NO.: 60X76
ILLINOIS FED. AID PROJECT



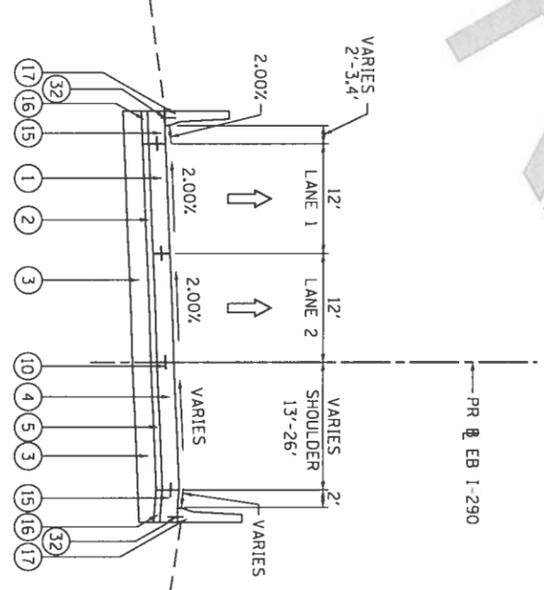
**EXISTING TYPICAL SECTION
(LOOKING EAST)**

PR # EB 1-290
STA 5151+33.88 TO 5155+26.53



**PROPOSED TYPICAL SECTION
(LOOKING EAST)**

PR # EB 1-290
STA 5151+33.88 TO 5151+85.69



**PROPOSED TYPICAL SECTION
(LOOKING EAST)**

PR # EB 1-290
STA 5151+85.69 TO 5155+26.53

- EXISTING**
- (A) HOT-MIX ASPHALT PAVEMENT, 4" TO 7"
 - (B) PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
 - (C) GRANULAR SUBBASE, 6"
 - (D) PREPARED SUBGRADE, 12"
 - (E) HOT MIX ASPHALT SHOULDER, 10"
 - (F) PORTLAND CEMENT CONCRETE SHOULDER, 9"
 - (G) CONCRETE BARRIER
 - (H) PIPE UNDERDRAIN
 - (I) COMBINATION CURB AND GUTTER, TYPE M-6.24 OR B-6.24
 - (J) BITUMINOUS SHOULDER
 - (K) TEMPORARY PAVEMENT
 - (L) SUBBASE GRANULAR MATERIAL, 4"
 - (M) POROUS GRANULAR EMBANKMENT, SPECIAL, 0"-36"
 - (N) FENCE
 - (O) METAL RAILING

- PROPOSED**
- (1) PORTLAND CEMENT CONCRETE PAVEMENT, 11" (JOINTED)
 - (2) STABILIZED SUBBASE HOT MIX ASPHALT, 4"
 - (3) AGGREGATE SUBGRADE IMPROVEMENT, 12"
 - (4) PORTLAND CEMENT CONCRETE SHOULDERS, 11"
 - (5) SUBBASE GRANULAR MATERIAL, TYPE C, 4"
 - (6) CONCRETE BARRIER WALL, SINGLE FACE, 42 INCH HEIGHT
 - (7) CONCRETE BARRIER BASE
 - (8) PIPE UNDERDRAIN
 - (9) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
 - (10) #5 TIE BARS, 30" LONG AT 30" C-C (LONGITUDINAL CONSTRUCTION JOINT) (INCLUDED IN PRICE FOR BID FOR PCC BASE COURSE)
 - (11) CONCRETE GUTTER TYPE A
 - (12) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING, CLASS 2A (SEE EROSION CONTROL PLANS)
 - (13) PORTLAND CEMENT CONCRETE PAVEMENT, 10 1/2" (JOINTED)
 - (14) PORTLAND CEMENT CONCRETE SHOULDERS, 10 1/2"
 - (15) TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET #TYP-09 FOR DETAILS)
 - (16) SUBBASE GRANULAR MATERIAL, TYPE B, 4"
 - (17) TEMPORARY CONCRETE BARRIER (TO REMAIN PERMANENTLY)
 - (18) CONCRETE MEDIUM SURFACE, 4 INCH
 - (19) TRENCH DRAIN (SPECIAL)
 - (20) HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70, 1 1/2"
 - (21) HOT-MIX ASPHALT BINDER COURSE, 1L-19.0, N70, 2 1/4"
 - (22) PORTLAND CEMENT CONCRETE BASE COURSE, 9"
 - (23) SUBBASE GRANULAR MATERIAL, TYPE B, 6"
 - (24) HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70, 2"
 - (25) HOT-MIX ASPHALT BASE COURSE, 8"
 - (26) CTA FENCE
 - (27) CONCRETE BARRIER WALL (SPECIAL)
 - (28) CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT (SPECIAL)
 - (29) CONCRETE BARRIER, VARIABLE CROSS SECTION 42 INCH HEIGHT
 - (30) CONCRETE BARRIER BASE (SPECIAL)
 - (31) SHOULDER RUMBLE STRIPS, 16 INCH
 - (32) PINNING TEMPORARY CONCRETE BARRIER

- NOTES:**
1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
 2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
 3. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND PCC PAVEMENT DETAIL PLAN.

FILE PATH: p:\1617479\PRINT\encomline\local\AECOM_0582_HAN\Documents\01_Americas\Transportation\6026993B_Circle\Phase 11\000_10\006_Roadway\Sheets\60X76_Contract\0160X76-sh1_Typical E1.dgn

TranSystems

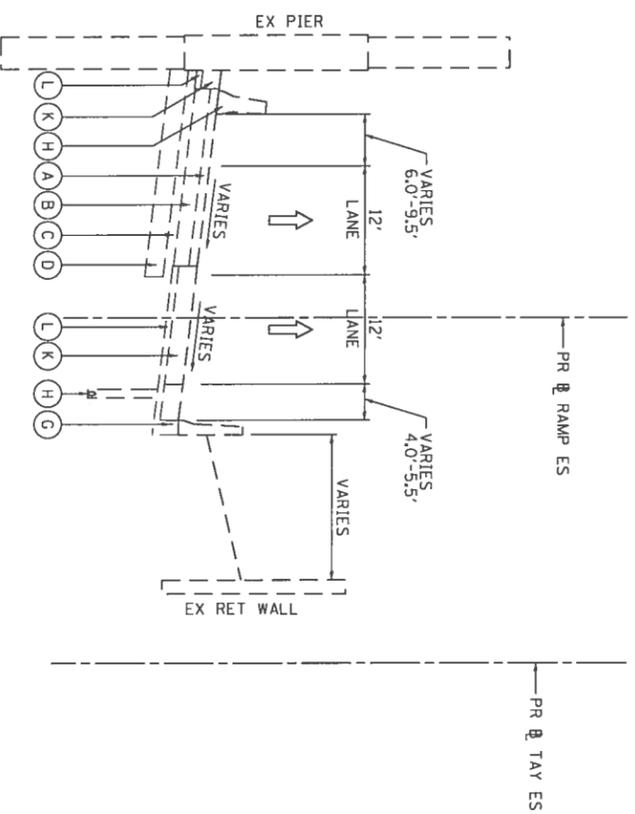
USER NAME: vjames@encomline.com	DESIGNED: JLV	REVISIONS:
PLOT SCALE: 28.0000 / in.	DRAWN: JMG	REVISIONS:
PLOT DATE: 11/18/2016	CHECKED: JMG	REVISIONS:
DATE: 11/18/16	DATE: 11/18/16	REVISIONS:

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
EB 1-290

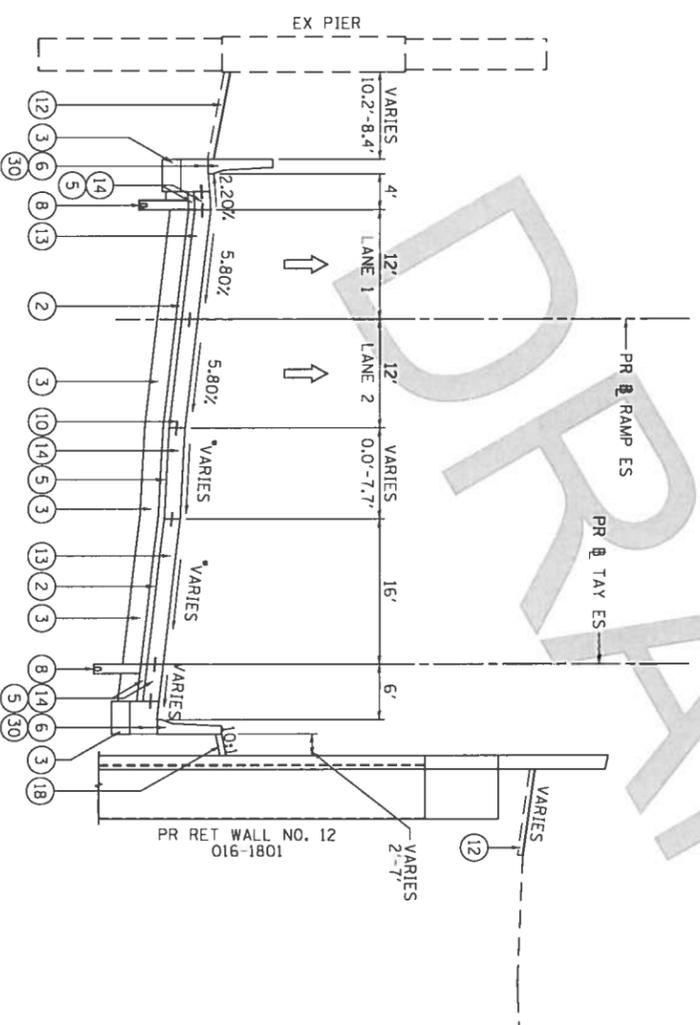
SCALE: NONE SHEET 6 OF 10 SHEETS STA. TO STA.

F.A.I. RTE. 90/94/290	SECTION 2014-002828B	COUNTY COOK	TOTAL SHEETS 527
		CONTRACT NO. 60X76	NO. 28



**EXISTING TYPICAL SECTION
(LOOKING EAST)**

PR @ TAY ES
STA 7305+24.36 TO STA 7306+34.77



**PROPOSED TYPICAL SECTION
(LOOKING EAST)**

PR @ TAY ES
STA 7305+24.36 TO STA 7306+34.77

*SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES

- EXISTING**
- (A) HOT-MIX ASPHALT PAVEMENT, 4" TO 7"
 - (B) PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
 - (C) GRANULAR SUBBASE, 6"
 - (D) PREPARED SUBGRADE, 12"
 - (E) HOT MIX ASPHALT SHOULDER, 10"
 - (F) PORTLAND CEMENT CONCRETE SHOULDER, 9"
 - (G) CONCRETE BARRIER
 - (H) PIPE UNDERDRAIN
 - (I) COMBINATION CURB AND GUTTER, TYPE M-6.24 OR B-6.24
 - (J) BITUMINOUS SHOULDER
 - (K) TEMPORARY PAVEMENT
 - (L) SUBBASE GRANULAR MATERIAL, 4"
 - (M) POROUS GRANULAR EMBANKMENT, SPECIAL, 0'-36"
 - (N) FENCE
 - (O) METAL RAILING

- PROPOSED**
- (1) PORTLAND CEMENT CONCRETE PAVEMENT, 11" (JOINTED)
 - (2) STABILIZED SUBBASE HOT MIX ASPHALT, 4"
 - (3) AGGREGATE SUBGRADE IMPROVEMENT, 12"
 - (4) PORTLAND CEMENT CONCRETE SHOULDERS, 11"
 - (5) SUBBASE GRANULAR MATERIAL, TYPE C, 4"
 - (6) CONCRETE BARRIER WALL, SINGLE FACE, 42 INCH HEIGHT
 - (7) CONCRETE BARRIER BASE
 - (8) PIPE UNDERDRAIN
 - (9) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
 - (10) #5 TIE BARS, 30" LONG AT 30" C-C (LONGITUDINAL CONSTRUCTION JOINT) INCLUDED IN PRICE FOR BID FOR PCC BASE COURSE)
 - (11) CONCRETE GUTTER TYPE A
 - (12) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING, CLASS 2A (SEE EROSION CONTROL PLANS)
 - (13) PORTLAND CEMENT CONCRETE PAVEMENT, 10 1/2" (JOINTED)
 - (14) PORTLAND CEMENT CONCRETE SHOULDERS, 10 1/2"
 - (15) TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET \$TYP-09 FOR DETAILS)
 - (16) SUBBASE GRANULAR MATERIAL, TYPE B, 4"
 - (17) TEMPORARY CONCRETE BARRIER (TO REMAIN PERMANENTLY)
 - (18) CONCRETE MEDIAN SURFACE, 4 INCH
 - (19) TRENCH DRAIN (SPECIAL)
 - (20) HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70, 1 1/2"
 - (21) HOT-MIX ASPHALT BINDER COURSE, IL-19.0, N70, 2 1/4"
 - (22) PORTLAND CEMENT CONCRETE BASE COURSE, 9"
 - (23) SUBBASE GRANULAR MATERIAL, TYPE B, 6"
 - (24) HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70, 2"
 - (25) HOT-MIX ASPHALT BASE COURSE, 8"
 - (26) CTA FENCE
 - (27) CONCRETE BARRIER WALL (SPECIAL)
 - (28) CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT (SPECIAL)
 - (29) CONCRETE BARRIER, VARIABLE CROSS SECTION 42 INCH HEIGHT
 - (30) CONCRETE BARRIER BASE (SPECIAL)
 - (31) SHOULDER RUMBLE STRIPS, 16 INCH
 - (32) PINNING TEMPORARY CONCRETE BARRIER

NOTES:

1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
2. THE MAXIMUM ROLL-OVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
3. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND PCC PAVEMENT DETAIL PLAN.



FILE PATH: p:\617479-PW\11\ecomm\line\local\ECOM 05M2_HA\Documents\01_Americas\Transportation\60264938_Circle\Phase 1\1\000_CAD\006_Roadway\Sheets\60X76_Contract\0160X76-sht_Typical_C1.dgn

USER NAME: vj\james@tran.com
 DRAWN: JMG
 CHECKED: JMG
 DATE: 11/18/16

DESIGNED: JLV
 DRAWN: JMG
 CHECKED: JMG
 DATE: 11/18/16

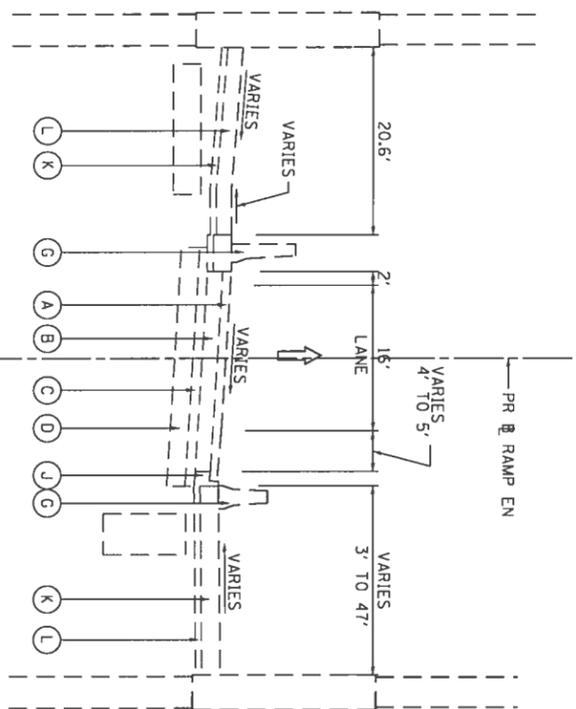
REVISIONS:
 REVISED: []
 REVISED: []
 REVISED: []

STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION

SCALE: NONE

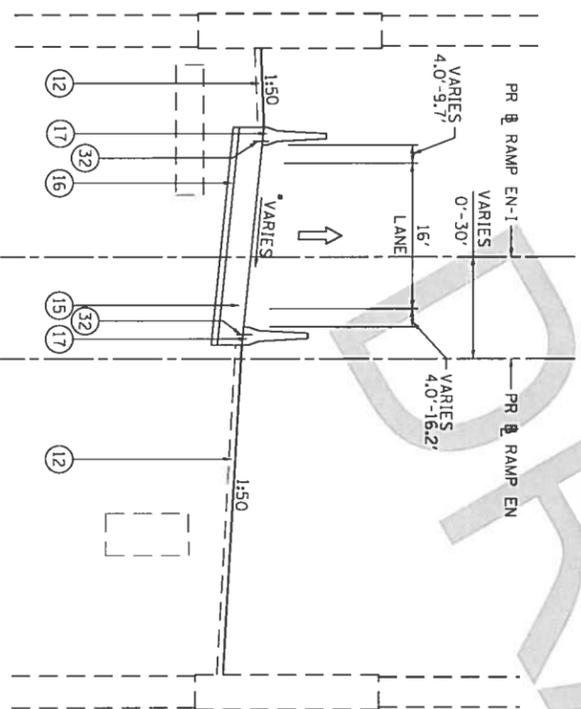
TYPICAL SECTIONS
 RAMP ES & TAYLOR EXIT RAMP
 SHEET 7 OF 10 SHEETS STA. TO STA.

F.A.I. SECTION COUNTY TOTAL SHEET
 RTE. 90/94/290 SECTION 204-002848 COOK 527
 NO. 29
 ILLINOIS FED. AID PROJECT CONTRACT NO. 60X76



**EXISTING TYPICAL SECTION
(LOOKING EAST)**

PR B RAMP ENI-2
STA 2602+82.00 TO STA 2605+65.00



**PROPOSED TYPICAL SECTION
(LOOKING EAST)**

PR B RAMP ENI-2
STA 2602+82.00 TO STA 2605+65.00

- EXISTING**
- (A) HOT-MIX ASPHALT PAVEMENT, 4" TO 7"
 - (B) PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
 - (C) GRANULAR SUBBASE, 6"
 - (D) PREPARED SUBGRADE, 12"
 - (E) HOT MIX ASPHALT SHOULDER, 10"
 - (F) PORTLAND CEMENT CONCRETE SHOULDER, 9"
 - (G) CONCRETE BARRIER
 - (H) PIPE UNDERDRAIN
 - (I) COMBINATION CURB AND GUTTER, TYPE M-6.24 OR B-6.24
 - (J) BITUMINOUS SHOULDER
 - (K) TEMPORARY PAVEMENT
 - (L) SUBBASE GRANULAR MATERIAL, 4"
 - (M) POROUS GRANULAR EMBANKMENT, SPECIAL, 0'-36"
 - (N) FENCE
 - (O) METAIL RAILING

- PROPOSED**
- (1) PORTLAND CEMENT CONCRETE PAVEMENT, 11" (JOINTED)
 - (2) STABILIZED SUBBASE HOT MIX ASPHALT, 4"
 - (3) AGGREGATE SUBGRADE IMPROVEMENT, 12"
 - (4) PORTLAND CEMENT CONCRETE SHOULDERS, 11"
 - (5) SUBBASE GRANULAR MATERIAL, TYPE C, 4"
 - (6) CONCRETE BARRIER WALL, SINGLE FACE, 42 INCH HEIGHT
 - (7) CONCRETE BARRIER BASE
 - (8) PIPE UNDERDRAIN
 - (9) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
 - (10) #5 TIE BARS, 30" LONG AT 30" C-C (LONGITUDINAL CONSTRUCTION JOINT) INCLUDED IN PRICE FOR BID FOR PCC BASE COURSE
 - (11) CONCRETE GUTTER TYPE A
 - (12) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING, CLASS 2A (SEE EROSION CONTROL PLANS)
 - (13) PORTLAND CEMENT CONCRETE PAVEMENT, 10 1/2" (JOINTED)
 - (14) PORTLAND CEMENT CONCRETE SHOULDERS, 10 1/2"
 - (15) TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET #STYP-09 FOR DETAILS)
 - (16) SUBBASE GRANULAR MATERIAL, TYPE B 4"
 - (17) TEMPORARY CONCRETE BARRIER (TO REMAIN PERMANENTLY)
 - (18) CONCRETE MEDIAN SURFACE, 4 INCH
 - (19) TRENCH DRAIN (SPECIAL)
 - (20) HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70, 1 1/2"
 - (21) HOT-MIX ASPHALT BINDER COURSE, IL-19.0, N70, 2 1/4"
 - (22) PORTLAND CEMENT CONCRETE BASE COURSE, 9"
 - (23) SUBBASE GRANULAR MATERIAL, TYPE B, 6"
 - (24) HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70, 2"
 - (25) HOT-MIX ASPHALT BASE COURSE, 8"
 - (26) CTA FENCE
 - (27) CONCRETE BARRIER WALL (SPECIAL)
 - (28) CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT (SPECIAL)
 - (29) CONCRETE BARRIER, VARIABLE CROSS SECTION 42 INCH HEIGHT
 - (30) CONCRETE BARRIER BASE (SPECIAL)
 - (31) SHOULDER RUMBLE STRIPS, 16 INCH
 - (32) PINNING TEMPORARY CONCRETE BARRIER

NOTES:

1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
3. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND PCC PAVEMENT DETAIL PLAN.

*SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES



DESIGNED - JLV
DRAWN - SED
CHECKED - JMG
DATE - 11/18/16

REVISIONS

NO.	DATE	DESCRIPTION
1	11/18/16	ISSUED FOR PERMITS

DESIGNED - JLV
DRAWN - SED
CHECKED - JMG
DATE - 11/18/16

REVISIONS

NO.	DATE	DESCRIPTION
1	11/18/16	ISSUED FOR PERMITS

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SCALE: NONE

SHEET 9 OF 10

TYPICAL SECTIONS
RAMP EN

TO STA.

FAH. RTE.	SECTION	COUNTY	TOTAL SHEET NO.
90/94/290	2014-002R48B	COOK	527
			31
		CONTRACT NO.	60X76

ILLINOIS FED. AID PROJECT