

Highway Standards





Standards by Subject/Title

April 1, 2016

SUBJECT/TITLE	STD. NO.
A	
Abbreviations, Symbols and Patterns	
-	
Barricade, Type 1A for Non-NHS Routes	
Barrier, Concrete, 32 in. (815 mm) Height	
Barrier, Concrete, 42 in. (1065 mm) Height	
Barrier, Concrete, Temporary	704001
Base Course, PCC with HMA Binder and Surface	
Benchmarks, Method of Resetting	668001
Cable, Road Guard, Single Strand	
Catch Basin, Type A	
Catch Basin, Type B	
Catch Basin, Type C	602011
Catch Basin, Type D	
Circuit, Supervised Railroad Interconnect	
Curb Type B and Combination Curb and Gutter, C	
Curb Ramps for Sidewalks, Corner Parallel	
Curb Ramps for Sidewalks, Diagonal	
Curb Ramps for Sidewalks, Mid-block Curb Ramps for Sidewalks, Perpendicular	
Curb Namps for Sidewarks, Ferpendicular	424001
С	
Decimal Equivalents of an Inch and Foot	
Delineators	
Depressed Corner for Sidewalks	
Detection Loops, Typical Layout	
Detector Loop Installations Ditch, Paved	
Ditch Check, Earth Median	
Drainage Structures, Type 1, 2 and 3	
Drainage Structures, Type 4, 5 and 6	
3.	
Elbarra Carranta Bina OA in (200 mars) 20 in (775	
Elbow, Concrete Pipe, 24 in. (600 mm), 30 in. (750	
Electrical Service Installation Details End Section, Flared, Precast Reinforced Concrete	
End Section, Flared, Precast Reinforced Concrete End Section, Flared, Precast Reinforced Concrete	
End Section, Metal, for Pipe Arch	
End Section, Metal, for Pipe Culvert	

End Sections, Reinforced Concrete:	
Pipe Culverts, 15 in. (375 mm) thru 84 in. (2100 mm) Diameter	
Pipe Culverts, Elliptical, 15 in. (375 mm) thru 72 in. (1800 mm) Equivalent Diameter.	
Skewed, for 15 in. (375 mm) thru 36 in. (900 mm) Diameter	542201
Skewed, for 42 in. (1050 mm) thru 60 in. (1500 mm) Diameter	542206
Erosion Control Systems, Temporary	280001
F	
Fence, Chain Link	664001
Fence, Woven Wire	
Flashing Beacon Installation	
Flat Slab Top, Precast Reinforced Concrete	
Foundations, Details, Concrete	
Frames, Grates and Lids:	07 000 1
Type 1 Frame and Lids	604001
Type 3 Frame and Grate	
Type 3V Frame and Grate	
Type 4 Frame and Grate	
Type 5 Base, Frame and Lids	
Type 6 Frame and Grate	
Type 7 Grate	
Type 8 Grate	
Type 9 Frame and Grate	
Type 10 Frame and Grate	
Type 11 Frame and Grate	
Type 11V Frame and Grate	
Type 12 Frame and Grate	
Type 15 Frame and Lid	
Type 20 Frame and Grate	
Type 21 Frame and Grate	
Type 22 Frames and Grates	
Type 23 Frame and Grate	
Type 24 Frame and Grate	
G	
Glare Screen, Concrete	638101
Grate, Traversable Pipe	
Guardrail:	
Long Span Over Culverts	630106
Mounted on Existing Culverts	
Steel Plate Beam,	
Steel Plate Beam, 29 in. (731 mm) Height	BLR 26
Steel Plate Beam, PCC/HMA Stabilization	
H Handholes, Concrete and Polymer Concrete, Double	814006
Handholes, Polymer Concrete, Single	
Headwall for Pipe Underdrains, Concrete	

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Impact Attenuators, Sand Module	643001
Inlet:	
For 24 in. (600 mm) Reinforced Concrete Pipe in Median	
For 36 in. (900 mm) Reinforced Concrete Pipe in Median	
For Shoulder With Curb	
For Type B Gutter	
Outlet & Entrance for Type A Gutter	
Туре A Туре В	
Inlet Box:	002300
Flush for Median	542546
Type 24 (600) A	542501
Type 24 (600) B	542506
Type 24 (600) C	542511
Type 24 (600) D	542516
Type 24 (600) E	
Type 24 (600) F	542526
Type 24 (600) G	
Type 24 (900) A	
Type 48 (1200) A	
Islands, Concrete	606301
J/K	400004
Joints, Pavement	420001
I I	
Lane Closure(see Traffic Control and	Protection)
Lane Closure(see Traffic Control and	Protection)
Lane Closure	825001
Lane Closure(see Traffic Control and	825001 825006
Lane Closure	825001 825006 825011
Lane Closure	825001 825006 825011 825016 825021
Lane Closure	825001 825006 825011 825016 825021 825026
Lane Closure	825001 825006 825011 825016 825021 825026 826001
Lane Closure	825001 825006 825011 825016 825021 825026 826001
Lane Closure	825001 825006 825011 825016 825021 825026 826001 826006 821006
Lane Closure	825001 825006 825011 825016 825021 825026 826001 826006 821006
Lane Closure	825001825006825011825021825026826001826006821006821001830001
Lane Closure	825001825006825011825021825026826001826006821006821001830001830006
Lane Closure	825001825006825011825021825026826001826006821006830001830006838001
Lane Closure	825001825006825011825021825026826001826006821006821001830001830001830011
Lane Closure	825001825006825011825021825026826001826006821006821001830001830001830011830016
Lane Closure	825001825006825011825016825021825026826001826006821001830001830001830011830016830016
Lane Closure	825001825006825011825016825021825026826001826006821001830001830001830011830016830021835001
Lane Closure	825001825006825011825016825021825026826006821006830001830001830011830011830011830011830011830011830011
Lane Closure	825001825006825011825016825026826001826006821006830001830001830011830011830011830016836001836001
Lane Closure	825001825006825016825021825026826001826006821001830001830001830011830016830011836001836001836001
Lane Closure	825001825006825016825021825026826006826006821001830001830001830011830011830011836001836001836001836001

IVI	
Mailbox Turnout, Local System	. BLR-24
Mailbox Turnout, State System	406201
Manhole, Type A	602401
Manhole, Type A, 6 ft. (1.8 m) Diameter	602406
Manhole, Type A, 7 ft. (2.1 m) Diameter	602411
Manhole, Type A, 8 ft. (2.4 m) Diameter	602416
Manhole, Type A, 9 ft. (2.7 m) Diameter	
Manhole Steps	602701
Markers:	
Drainage	667001
Permanent Survey	667101
Right-of-Way	666001
Mast Arm Assembly and Pole 16' Through 55', Steel Combination	877011
Mast Arm Assembly and Pole 56' Through 75', Steel Combination	877012
Mast Arm Assembly and Pole, Steel, Dual Mast Arms	877006
Mast Arm Assembly and Pole 16' Through 55', Steel	
Mast Arm Assembly and Pole 56' Through 75', Steel	
Mast Arm Mounted Street Name Signs	
Median, Concrete	
Median, Concrete, Corrugated	
5 5 7 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	
N	
Name Plates for Bridges	515001
0	
Object and Terminal Markers	725001
Outlet:	
Inlet and entrance for Type A Gutter	606101
Type 1, for Type A Gutter	
Type 1, for Type B Gutter	
Type 2, for Type A Gutter	
Type 2, for Type B Gutter	606211
Type B-6.24 (B-15.60) for Concrete Curb and Gutter	
For Type B Gutter, Standard	
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P/Q	
Patching, Class A	442001
Patching, Class B	
Patching, Class C and D.	
Pavement:	
24' (7.2 m) Continuously Reinforced PCC With Lug System	421201
24' (7.2 m) Continuously Reinforced PCC With Wide Flange Beam Term. Joint	
24' (7.2 m) Jointed PCC	
24' (7.2 m) PCC	
36' (10.8 m) Continuously Reinf. PCC With Wide Flange Beam Term. Joint	
36' (10.8 m) Continuously Reinforced PCC With Lug System	
	421206
36' (10.8 m) Jointed PCC	
36' (10.8 m) Jointed PCC	420106

Standards by Subject

Connector (HMA) for Bridge Approach Slab Connector (PCC) for Bridge Approach Slab Nonreinforced PCC Reinforcement for Continuously Reinforced PCC Pavement Roundouts, PCC Special, PCC	420401 BLR 14 421001
Nonreinforced PCC Reinforcement for Continuously Reinforced PCC Pavement Roundouts, PCC Special, PCC	BLR 14 421001
Reinforcement for Continuously Reinforced PCC Pavement	421001
Roundouts, PCC	
Roundouts, PCC	
	420111
Wolded Wire Deinforcement	BLR 10
Welded Wire Reinforcement	420701
Pavement Markers, Raised Reflective, Applications	781001
Pavement Markings	780001
Pedestrian Crossings, Entrance / Alley	424026
Pedestrian Crossings, Median	424031
Phase Sequences	857001
Pipe Underdrains	601001
Posts, Metal, Applications for Type A and B	729001
Posts, Metal, for Signs, Markers and Delineators	
Push Button Post	
R	
Raceway Embedded in Structure	812001
Ramp Closure, Freeway/Expressway	
Ramp Closure, Partial Exit, Freeway/Expressway	
Ramp Terminal:	
Entrance, Flexible Adjacent to Flexible Mainline Pavement	406001
Entrance, Jointed PCC Adjacent to CRC Mainline Pavement	
Entrance, Jointed PCC Adjacent to Jointed PCC Mainline Pavement	
Exit, Flexible Adjacent to Flexible Mainline Pavement	
Exit, Jointed PCC Adjacent to CRC Mainline Pavement	
Exit, Jointed PCC Adjacent to Jointed PCC Mainline Pavement	
Reflector Mounting Details, Guardrail and Barrier	
Reflectors, Prismatic Curb	
Reinforcement Bars, Areas, Weights and Spacing	
Revetment Mat, Fabric Formed Concrete	
Rumble Strips, Shoulder, 16 inch	
Rumble Strips, Shoulder, 8 inch	
Numble ourps, oriodider, o incr	042000
S	
Shoulder:	
Adjacent to Flexible Pavement, HMA	492001
Adjacent to Rigid Pavement, HMA	
PCC	
HMA Shoulder Strips With Resurfacing or Widening and Resurfacing Projects	
Sidewalks, Corner Parallel Curb Ramps for	
SIDEWARS COIDE PARAMERUM RADOS IO	
·	
Sidewalks, Diagonal Curb Ramps for	404040
Sidewalks, Diagonal Curb Ramps forSidewalks, Mid-block Curb Ramps for	
Sidewalks, Diagonal Curb Ramps for	424001
Sidewalks, Diagonal Curb Ramps for	424001 640001
Sidewalks, Diagonal Curb Ramps for	424001 640001 639001
Sidewalks, Diagonal Curb Ramps for	424001 640001 639001 641001

Sign Panel, Erection Details	
Sign Panel, Extruded Aluminum Type	720021
Sign Panel, Mounting Details	
Sign Support, Telescoping Steel	728001
Sign Support, Telescoping Steel, Base for	731001
Symbols, Abbreviations, and Patterns	00001
Т	
Tee, Concrete Pipe	542606
Traffic Barrier Terminal:	
Type 1	
Type 1B	
Type 1 Special, Shoulder Widening for	
Type 2	
Type 5A	
Type 5R	
Type 6	
Type 6A	
Type 6B	
Type 10	
Type 11	631051
Traffic Control:	
Devices	701901
Devices:	
Type 1A Barricade for Non-NHS Routes	
Day Labor Construction	
Day Labor Maintenance	
Typical Application of, for Construction on Rural Local Highways	BLR 21
Typical Application of, for Construction on Rural Local Highways (Two-Lane	
Two Way Rural Traffic) (Road Closed to Thru Traffic)	BLR 22
Lane Closure, 2L, 2W:	
Bridge Repair, for Speeds ≥ 45 MPH	
Bridge Repair with Barrier	
Day Only, for Speeds ≥ 45 MPH	
Moving Operations - Day Only	
Night Only, for Speeds ≥ 45 MPH	
Pavement Widening, for Speeds ≥ 45 MPH	701326
Short Time Operations	
Slow Moving Operations Day Only, for Speeds ≥ 45 MPH	701306
With Run-Around, for Speeds ≥ 45 MPH	
Work Areas in Series, for Speeds ≥ 45 MPH	701336
Lane Closure, Freeway/Expressway	701401
Lane Closure, Freeway/Expressway:	
Approach to	701400
Day Operations Only	701406
Sidewalk, Corner or Crosswalk Closure	
Two Lane Closure	
with Barrier	
with Crossover and Barrier	
Lane Closure, Multilane:	

at Entrance or Exit Ramp, for Speeds ≥ 45 MPH	701411
Day Operations Only, for Speeds ≥ 45 MPH to 55 MPH	701421
for Speeds ≥ 45 MPH to 55 MPH	
Intermittent or Moving Operation, for Speeds ≥ 45 MPH	
Intermittent or Moving Operation, for Speeds ≤ 40 MPH	
Undivided With Crossover, for Speeds ≥ 45 MPH to 55 MPH	
with Barrier, for Speeds ≥ 45 MPH to 55 MPH	
Lane Closure, Urban:	
2L, 2W, Undivided	701501
2L, 2W, with Bidirectional Left Turn Lane	
Multilane, 1W or 2W with Nontraversable Median	
Multilane, 2W with Bidirectional Left Turn Lane	
Multilane, Single Lane Closure, 2W with Mountable Median	701606
Multilane, Half Road, Closure, 2W with Mountable Median	701611
Multilane Intersection	701701
Off-Road Operations:	
2L 2W, 15 ft. (4.5 m) to 24 in (600 mm) From Pavement Edge	701006
2L 2W, More Than 15 ft. (4.5 m) Away	
Moving, 2L 2W, Day Only	
Multilane, 15 ft. (4.5 m) to 24 in. (600 mm) From Pavement Edge	
Multilane, More Than 15 ft. (4.5 m) Away	
Setup and Removal, Freeway/Expressway	
Traffic Signal Grounding & Bonding	
Traffic Signal Mounting Details, Post and Bracket Mounted	
Traffic Signal Mounting Details, Span Wire Mounted and Flashing Beacon	880001
U-Z	
Uninterruptable Power Supply (UPS)	862001
Valve Vault Type A	602501



Standards by Division

DIVISION 000 MISCELLANEOUS TABLES

STD. NO. TITLE

000001-06 Standard Symbols, Abbreviations and Patterns

001001-02 Areas of Reinforcement Bars 001006 Decimal of an Inch and of a Foot

ABV	ABOVE	CU YD	CUBIC YARD	HD	HEAD	PED	PEDESTAL	STD	STANDARD
A/C	ACCESS CONTROL	CULV	CULVERT	HDW	HEADWALL	PNT	POINT	SBI	STATE BOND ISSUE
AC	ACRE	C&G	CURB & GUTTER	HDUTY	HEAVY DUTY	PC	POINT OF CURVATURE	SR	STATE ROUTE
ADJ	ADJUST	D	DEGREE OF CURVE	ha	HECTARE	PI	POINT OF INTERSECTION OF HORIZONTAL	STA	STATION
AS	AERIAL SURVEYS	DC	DEPRESSED CURVE	HMA	HOT MIX ASPHALT		CURVE	SPBGR	STEEL PLATE BEAM GUARDRAIL
AGG	AGGREGATE	DET	DETECTOR	HWY	HIGHWAY	PRC	POINT OF REVERSE CURVE	SS	STORM SEWER
AH	AHEAD	DIA	DIAMETER	HORIZ	HORIZONTAL	PT	POINT OF TANGENCY	STY	STORY
APT	APARTMENT	DIST	DISTRICT	HSE	HOUSE	POT	POINT ON TANGENT	ST	STREET
ASPH	ASPHALT	DOM	DOMESTIC	IL	ILLINOIS	POLYETH	POLYETHYLENE	STR	STRUCTURE
AUX	AUXILIARY	DBL	DOUBLE	IMP	IMPROVEMENT	PCC	PORTLAND CEMENT CONCRETE	e	SUPERELEVATION RATE
AGS	AUXILIARY GAS VALVE (SERVICE)	DSEL	DOWNSTREAM ELEVATION	IN DIA	INCH DIAMETER	PP	POWER POLE OR PRINCIPAL POINT	S.E. RUN.	
AVE	AVENUE	DSFL	DOWNSTREAM FLOWLINE	INL	INLET	PRM	PRIME	SURF	SURFACE
AX	AXIS OF ROTATION	DR	DRAINAGE OR DRIVE	INST	INSTALLATION	PE	PRIVATE ENTRANCE	SMK	SURVEY MARKER
ВК	BACK	DI	DRAINAGE INLET OR DROP INLET	IDS	INTERSECTION DESIGN STUDY	PROF	PROFILE	T	TANGENT DISTANCE
В-В	BACK TO BACK	DRV	DRIVEWAY	INV	INVERT	PGL	PROFILE GRADELINE	T.R.	TANGENT RUNOUT DISTANCE
BKPL	BACKPLATE	DCT	DUCT	IP	IRON PIPE	PROJ	PROJECT	TEL	TELEPHONE
В	BARN	EA	EACH	IR	IRON ROD	P.C.	PROPERTY CORNER	TB	TELEPHONE BOX
BARR	BARRICADE	EB	EASTBOUND	JT	JOINT	PL	PROPERTY LINE	TP	TELEPHONE POLE
BGN	BEGIN	EOP	EDGE OF PAVEMENT	kg	KILOGRAM	PR	PROPOSED	TEMP	TEMPORARY
Вм	BENCHMARK	E-CL	EDGE TO CENTERLINE	km	KILOMETER	R	RADIUS	ТВМ	TEMPORARY BENCH MARK
BIND	BINDER	E-E	EDGE TO EDGE	LS	LANDSCAPING	RR	RAILROAD	TD	TILE DRAIN
BIT	BITUMINOUS	EL	ELEVATION	LN	LANE	RRS	RAILROAD SPIKE	TBE	TO BE EXTENDED
ВТМ	BOTTOM	ENTR	ENTRANCE	LT	LEFT	RPS	REFERENCE POINT STAKE	TBR	TO BE REMOVED
BLVD	BOULEVARD	EXC	EXCAVATION	LP	LIGHT POLE	REF	REFLECTIVE	TBS	TO BE SAVED
BRK	BRICK	EX	EXISTING	LGT	LIGHTING	RCCP	REINFORCED CONCRETE CULVERT PIPE	TWP	TOWNSHIP
BBOX	BUFFALO BOX	EXPWAY	EXPRESSWAY	LF	LINEAL FEET OR LINEAR FEET	REINF	REINFORCEMENT	TR	TOWNSHIP ROAD
BLDG	BUILDING	E	EXTERNAL DISTANCE OF HORIZONTAL CURVE	L	LITER OR CURVE LENGTH	REM	REMOVAL	TS	TRAFFIC SIGNAL
CIP	CAST IRON PIPE	E	OFFSET DISTANCE TO VERTICAL CURVE	LC	LONG CHORD	RC	REMOVE CROWN	TSCB	TRAFFIC SIGNAL CONTROL BOX
СВ	CATCH BASIN	F-F	FACE TO FACE	LNG	LONGITUDINAL	REP	REPLACEMENT	TSC	TRAFFIC SYSTEMS CENTER
C-C	CENTER TO CENTER	FA	FEDERAL AID	L SUM	LUMP SUM	REST	RESTAURANT	TRVS	TRANSVERSE
CL	CENTERLINE OR CLEARANCE	FAI	FEDERAL AID INTERSTATE	MACH	MACHINE	RESURF	RESURFACING	TRVL	TRAVEL
CL-E	CENTERLINE TO EDGE	FAP FAS	FEDERAL AID PRIMARY	MB MH	MAIL BOX	RET	RETAINING	TRN TY	TURN TYPF
CL-F	CENTERLINE TO FACE		FEDERAL AID SECONDARY		MANHOLE MATERIAL	RT ROW	RIGHT		
CTS CERT	CENTERS CERTIFIED	FAUS FP	FEDERAL AID URBAN SECONDARY FENCE POST	MATL MED	MEDIAN	ROW RD	RIGHT-OF-WAY ROAD	T-A TYP	TYPE A TYPICAL
CHSLD	CHISELED	FE	FIELD ENTRANCE	MED.	METER	RDWY	ROADWAY	UNDGND	UNDERGROUND
CS	CITY STREET	FH	FIRE HYDRANT	METH	METHOD	RTE	ROUTE	USGS	U.S. GEOLOGICAL SURVEY
CP	CLAY PIPE	FL	FLOW LINE	M	MID-ORDINATE	SAN	SANITARY	USEL	UPSTREAM ELEVATION
CLSD	CLOSED	FB	FOOT BRIDGE	mm	MILLIMETER	SANS	SANITARY SEWER	USFL	UPSTREAM FLOWLINE
CLID	CLOSED LID	FDN	FOUNDATION		MILLIMETER DIAMETER	SEC	SECTION	UTIL	UTILITY
CT	COAT OR COURT	FR	FRAME	MIX	MIXTURE	SEED	SEEDING	VBOX	VALVE BOX
СОМВ	COMBINATION	F&G	FRAME & GRATE	MBH	MOBILE HOME	SHAP	SHAPING	VV	VALVE VAULT
C	COMMERCIAL BUILDING	FRWAY	FREEWAY	MOD	MODIFIED	S	SHED	VLT	VAULT
ČE	COMMERCIAL ENTRANCE	GAL	GALLON	MET	MOTOR FUEL TAX	SH	SHEET	VEH	VEHICLE
CONC	CONCRETE	GALV	GALVANIZED	N & BC	NAIL & BOTTLE CAP	SHLD	SHOULDER	VP	VENT PIPE
CONST	CONSTRUCT	G	GARAGE		NAIL & CAP	SW	SIDEWALK OR SOUTHWEST	VERT	VERTICAL
CONTD	CONTINUED	GM	GAS METER		NAIL & WASHER	SIG	SIGNAL	VC	VERTICAL CURVE
CONT	CONTINUOUS	GV	GAS VALVE	NOAA	NATIONAL OCEANIC ATMOSPHERIC	SOD	SODDING	VPC	VERTICAL POINT OF CURVATURE
COR	CORNER	GRAN	GRANUL AR		ADMINISTRATION	SM	SOLID MEDIAN	VPI	VERTICAL POINT OF INTERSECTION
CORR	CORRUGATED	GR	GRATE	NC	NORMAL CROWN	SB	SOUTHBOUND	VPT	VERTICAL POINT OF TANGENCY
CMP	CORRUGATED METAL PIPE	GRVL	GRAVEL	NB	NORTHBOUND	SE	SOUTHEAST	WM	WATER METER
CNTY	COUNTY	GND	GROUND	NE	NORTHEAST	SPL	SPECIAL	₩V	WATER VALVE
CH	COUNTY HIGHWAY	GUT	GUTTER	NW	NORTHWEST	SD	SPECIAL DITCH	WMAIN	WATER MAIN
CSE	COURSE	GP	GUY POLE	OLID	OPEN LID	SO FT	SQUARE FEET	WB	WESTBOUND
XSECT	CROSS SECTION	GW	GUY WIRE	PAT	PATTERN	m ²	SQUARE METER	WILDFL	WILDFLOWERS
m3_	CUBIC METER	HH	HANDHOLE	PVD	PAVED	mm 2	SQUARE MILLIMETER	W	WITH
mm 3	CUBIC MILLIMETER	HATCH	HATCHING	PVMT	PAVEMENT	SQ YD	SQUARE YARD	WO	WITHOUT
1				РМ	PAVEMENT MARKING	STB	STABILIZED		

[P] Illinois Department of Transportation

ISSUED 1-1-97

PASSED JONUGRY I. 2011

Middak France

ENGINEER OF POLICY AND PROCEDURES

APPROVED JONUGRY I. 2011

FIGHER OF DESIGN AND ENVIRONMENT

STANDARD SYMBOLS,

ABBREVIATIONS

AND PATTERNS

STANDARD 000001-06

(Sheet 1 of 8)

REVISIONS

1-1-11 Updated abbreviations

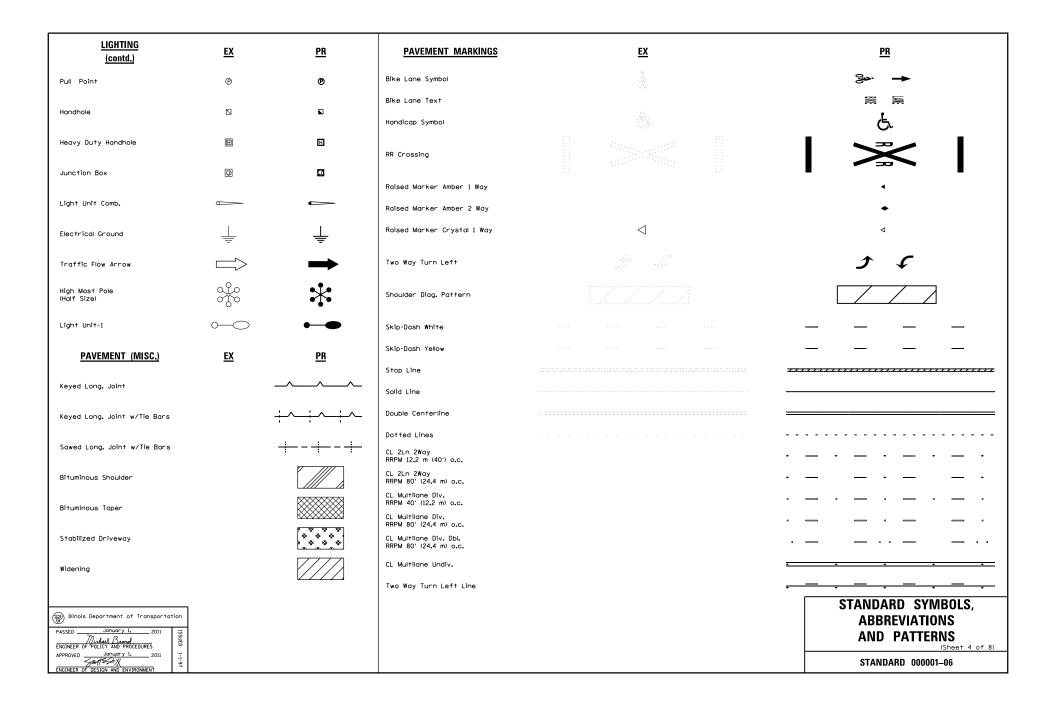
and symbols.

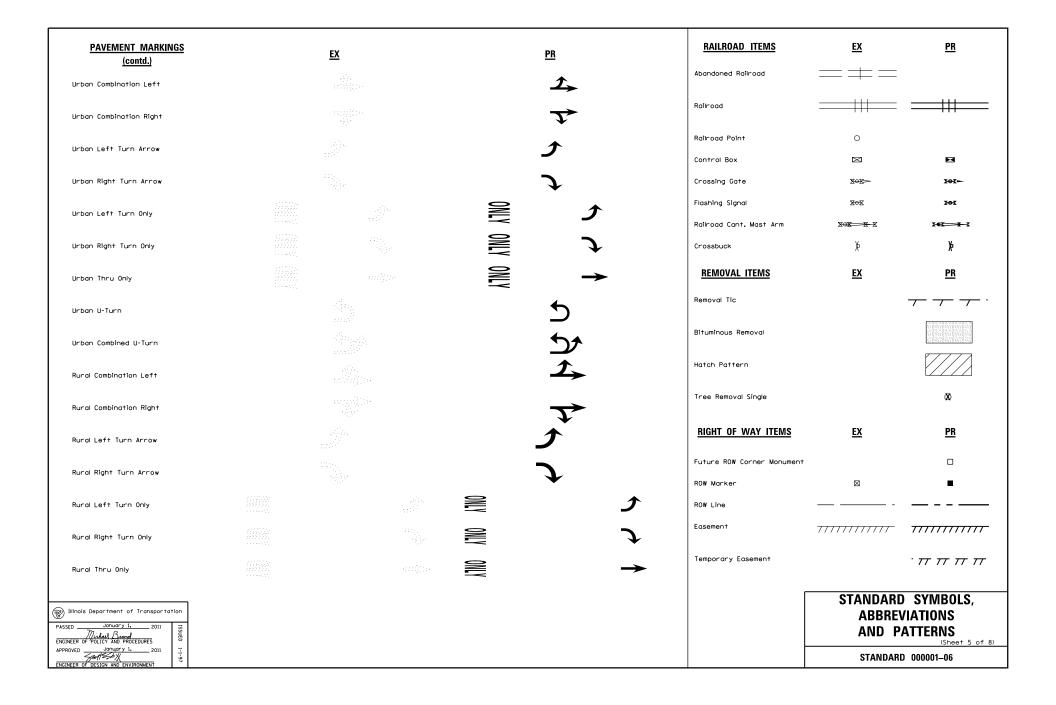
1-1-08 Updated abbreviations

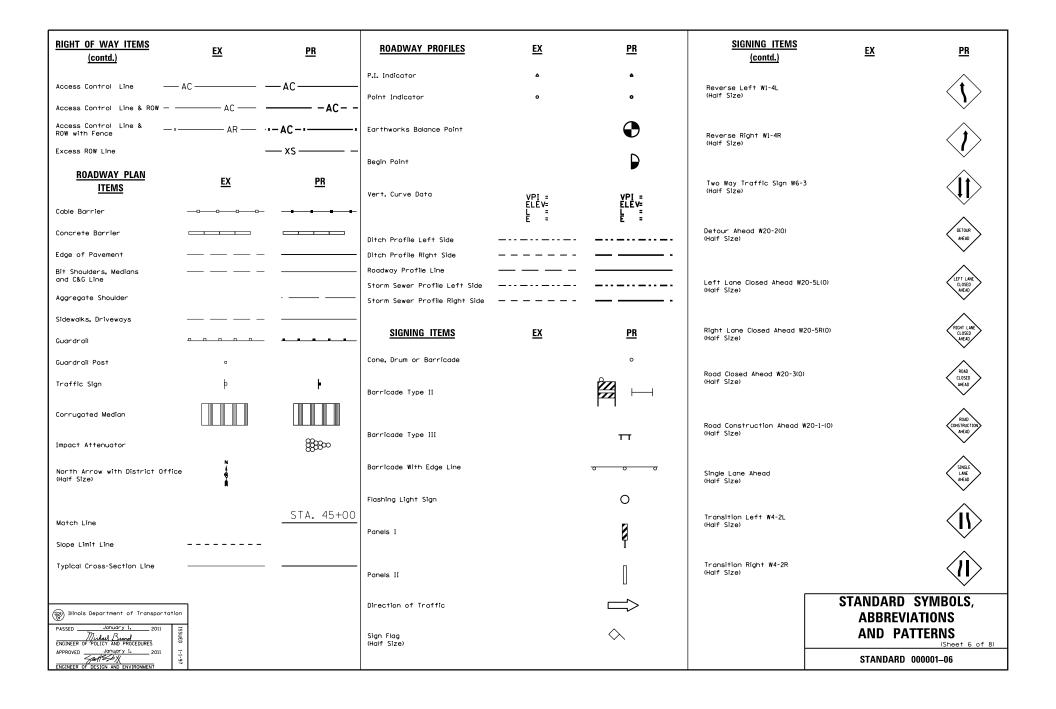
and symbols.

ADJUSTMENT ITEMS EX	<u>PR</u>	ALIGNMENT ITEMS	<u>EX</u>	<u>PR</u>	CONTOUR ITEMS	<u>EX</u>	<u>PR</u>
Structure To Be Adjusted	ADJ	Baseline			Approx. Index Line		
Structure To Be Cleaned	С	Centerline			Approx. Intermediate Line		
	_	Centerline Break Circle	٥	⊙ <u>-</u>	Index Contour		
Main Structure To Be Filled	FM	Baseline Symbol	₽.	₽.	Intermediate Contour		
Structure To Be Filled	F	Centerline Symbol	C	¢_	DRAINAGE ITEMS	<u>EX</u>	<u>PR</u>
		PI Indicator	Δ	۵	Channel or Stream Line		
Structure To Be Filled Special	FSP	Point Indicator	۰	•	Culvert Line	HI	
Structure To Be Removed	R	Horizontal Curve Data (Half Size)	CURVE P.I. STA= ∆= D=	CURVE P.I. STA= △=	Grading & Shaping Ditches		
Structure To Be	REC		EURVE P.I. STA= A= D= R= T= L= E= e=	Δ= D= R= T= L= E=	Drainage Boundary Line		111 111 -
Reconstructed	IKEC		TR-	L= e= T.R.= S.E. RUN= P.C. STA= P.T. STA=	Paved Ditch	Marije Marije Marije	wadio wadio wadio
Structure To Be Reconstructed Special	RSP		S.E. RUN= P.C. STA= P.T. STA=	P.C. STA= P.T. STA=	Aggregate Ditch	Servego Servego Servego	Servelle Servelle Servelle
Frame and Grate To Be Adjusted	А	BOUNDARIES ITEMS	<u>EX</u>	<u>PR</u>	Pipe Underdrain		
	_	Dashed Property Line			Storm Sewer		
Frame and Lid To Be Adjusted	A	Solid Property/Lot Line			Flowline	Ē.	ŧ.
Domestic Service Box To Be Adjusted	(A)	Section/Grant Line			Ditch Check	- \(- \)	*
Value Vault To Do Addicated	A	Quarter Section Line			Headwall Inlet	_	_
Valve Vault To Be Adjusted	A	Quarter/Quarter Section Line			Manhole	©	<u>-</u> ⊙
Special Adjustment	(SP)	County/Township Line			Summit	← +→	-
Item To Be Abandoned	AB	State Line			Roadway Ditch Flow	- √ >	< → -^>
	_	Iron Pipe Found	0		Swale	_ 03	
Item To Be Moved	М	Iron Pipe Set	•		Catch Basin	0	,
Item To Be Relocated	REL	Survey Marker	•		Culvert End Section		
Pavement Removal and Replacement		Property Line Symbol Same Ownership Symbol	₽ -		Water Surface Indicator	√ <u></u>	•
and Repidealierii		(Half Size)			Riprop		
		Northwest Quarter Corner (Half Size)					<u> </u>
Illinois Department of Transportation		Section Corner				STANDARD ABBREVIA	
PASSED January 1. 2011 55 Michael Brand ENGINEER OF POLICY AND PROCEDURES		(Half Size)	NIP			AND PAT	
APPROVED JOHNSTON I. 2011 FIGHT STATE OF THE STATE OF TH		Southeast Quarter Corner (Half Size)				STANDARD (

EROSION & SEDIMENT CONTROL ITEMS EX	<u>PR</u>	NON-HIGHWAY IMPROVEMENT ITEMS	<u>EX</u>	<u>PR</u>	EXISTING LANDSCAPING ITEMS	<u>EX</u>	<u>PR</u>
Cleaning & Grading Limits		Noise Attn./Levee			(contd.) Seeding Class 5		
Dike Eroslon Control Fence		Field Line	—— €——		Seeding Class 7		
Perimeter Erosion Barrier		Fence	- x x x x				[N
Temporary Fence	— XIX —— XIX —— XIX —— XIX -	Base of Levee			Seedlings Type 1		
Ditch Check Temporary	- \$-	Mailbox	P		Seedlings Type 2		
Ditch Check Permanent	-∳-	Multiple Mailboxes			Sodding		
Inlet & Pipe Protection	\bigoplus	Pay Telephone			Mowstake w/Sign		•
Sediment Basin	(o	Advertising Sign	þ		Tree Trunk Protection		
Erosion Control Blanket		LANDSCAPING ITEMS	<u>EX</u>	<u>PR</u>	Evergreen Tree	=(E)	Ø
Fabric Formed Concrete Revetment Mat		Contour Mounding Line			,		Ψ
Turf Reinforcement Mat		Fence Post			Shade Tree	E	+
Mulch Temporary	はなななな。	Shrubs Mowline			<u>LIGHTING</u>	<u>EX</u>	<u>PR</u>
Mulch Method 1	+ X	Perennial Plants			Duc†		
Mulch Method 2 Stabilized	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Seeding Class 2			Conduit Electrical Aerial Cable	A	A
Mulch Method 3 Hydraulic	444	Seeding Class 2A			Electrical Buried Cable	L	L
		Seeding Class 4		3333333	Controller	\boxtimes	⊠
					Underpass Luminaire		
		Seeding Class 4 & 5 Combined			Power Pole	 STANDARD	CVMDOLC
Illinois Department of Transportation						ABBREV AND PA	ATIONS
APPROVED JONUARY I. 2011 SMITSON ENGINEER OF DESIGN AND ENVIRONMENT						STANDARD	000001–06







SIGNING ITEMS (contd.)	<u>EX</u>	<u>PR</u>	STRUCTURES ITEMS	<u>EX</u>	<u>PR</u>	TRAFFIC SHEET ITEMS	<u>EX</u>	<u>PR</u>
One Way Arrow Lrg. W1-6-(0) (Haif Size)			Box Culvert Barrel			Cable Number	~	Ø
Two Way Arrow Large W1-7-(0) (Half Size)		\longrightarrow	Box Culvert Headwall Bridge Pier			Left Turn Green	<u>[</u> -G]	- -G
Detour M4-10L-(0) (Half Size)		< D€TOUR	Bridge	<u> </u>		Left Turn Yellow	<u>-</u> -7	- -Y
Detour M4-10R-(0) (Half Size)		DETOUR	Retaining Wall			Signal Backplate		
One Way Left R6-1L (Half Size)		ONE WAY	Temporary Sheet Piling		~~~~~			
One Way Right R6-1R (Half Size)		ONE WAY				Signal Section 8" (200 mm)	Ē	Ц
Left Turn Lane R3-I100L (Half Size)		LEFT TURN LANE				Signal Section 12" (300 mm)	_ 1	
Keep Left R4-7AL (Half Size)		KEEP				Walk/Don't Walk Letters		DW W
Keep Left R4-7BL (Half Size)		KEEP LEFT				Walk/Don't Walk Symbols	<u> </u>	*
Keep Right R4-7AR (Half Size)		RIGHT				TRAFFIC SIGNAL ITEMS	<u>EX</u>	<u>PR</u>
Keep Right R4-7BR (Half Size)		KEEP RIGHT				Galv. Steel Conduit		
Stop Here On Red R10-6-AL		STOP HERE WON RED				Underground Cable		
(Half Size) Stop Here On Red R10-6-AR						Detector Loop Line		
(Half Size)		STOP HERE ON A RED				Detector Loop Large	31114 31114	
No Left Turn R3-2 (Half Size)		\bigcirc				Detector Loop Small	13	
No Right Turn R3-1 (Half Size)						Detector Loop Quadrapole	*······*	
Road Closed R11-2 (Half Size)		ROAD CLOSED						
Road Closed Thru Traffic R11-2 (Half Size)		ROAD CLOSED TO THRU TRAFFIC					STANDARD	SAMBUI &
PASSED January 1. 2011 25 ENGINEER OF POLICY AND PROCEDURES							ABBREVIA AND PAT	ATIONS TERNS
ENGINEER OF POLICY AND PROCEDURES APPROVED JORNAOTY I. 2011 FACTORY ENGINEER OF DESIGN AND ENVIRONMENT							STANDARD 0	(Sheet 7 of 8)

TRAFFIC SIGNAL ITEMS (contd.)	<u>EX</u>	<u>PR</u>	UNDERGROUND UTILITY ITEMS	<u>EX</u>	<u>PR</u>	<u>ABANDONED</u>	UTILITY ITEMS (contd.)	<u>EX</u>	<u>PR</u>
Detector Raceway	"E" <u> </u>		Cable TV	- стv	стv	CTV	Traffic Signal	Ф	•
be rector indeemdy	• —		Electric Cable ——	—E	—-ε—	- -/E	Traffic Signal Control Box	DE S	
Aluminum Mast Arm	0		Fiber Optic —	— F0 ———	—— F0 ——	–	Water Meter	Y	
Steel Most Arm	0	•	Gas Pipe ——	— G ———	—— · G ·——	- -/	Water Meter Valve Box	0	•
			Oil Pipe ——	— 0 —	——о—	-	Profile Line	·	
Veh. Detector Magnetic	<u> </u>	-	Sanitary Sewer ->	->>>	->>->->	- /->/->/->/	Aerial Power Line	— А — А	A A
Conduit Splice	•	•	Telephone Cable ——	— т ——	—т	-	VEGETATION ITEMS	EX	<u>PR</u>
Controller	\boxtimes	⊠	Water Pipe ——	W		-	VEGETATION TIEMS	<u>LX</u>	<u></u>
Gulfbox Junction	0	0					Deciduous Tree	•	
Wood Pole	8	•	UTILITIES ITEMS		<u>EX</u>	<u>PR</u>	Bush or Shrub	0	
Temp. Signal Head		- \$te-	Controller		\bowtie	⊠	Evergreen Tree	Ø	
Handhole			Double Handhole			N.	Stump	a a.	
Double Handhole		KN.	Fire Hydrant		Д	*	Orchard/Nursery Line		
Heavy Duty Handhole	H	H	GuyWire or Deadman Anch	nor	\rightarrow		Vegetation Line	~~~~	
Junction Box	0	o	Handhole			N N	Woods & Bush Line		
Ped. Pushbutton Detector	•	•	Heavy Duty Handhole		H	н	<u>Water Feature</u> Items	<u>EX</u>	<u>PR</u>
Ped. Signal Head	-0	-1	Junction Box		O	0	Stream or Drainage Ditch		
Power Pole Service	-0-	-	Light Pole		¤	×	Waters Edge		
Priority Veh. Detector		•	Manhole		0	0	Water Surface Indicator	<u></u>	
Signal Head	>	-	Pipeline Warning Sign		þ		Water Point	<u> </u>	
Signal Head w/Backplate	+⊳	+-	Power Pole		-0-	-	Disappearing Ditch	<	
Signal Post	0	•	Power Pole with Light		ф—		Marsh	يتتلفق	
Closed Circuit TV	(C)	©	Sanitary Sewer Cleanout		0		Marsh/Swamp Boundary		
Video Detector System	(V)	© •	Splice Box Above Ground			-			
Illinois Department of Transportation PASSED January I, 2011 St.			Telephone Splice Box Above Ground Telephone Pole		⊞>-	•		STANDARD SY ABBREVIATI AND PATTE	ONS RNS (Sheet 8 of 8)
APPROVED JONUST 1. 2011 GANTESAN AND ENVIRONMENT ENGINEER OF DESIGN AND ENVIRONMENT								STANDARD 0000	01–06

	REINFORCEMENT BARS - ENGLISH (METRIC)																	
Bar Size	Dia.	Cross- Sectional	Weight		SPACING, in. (mm)													
	in.	Area	lbs./ft.	4 (100)	41/2 (115)	5 (125)	51/2 (140)	6 (150)	61/2 (165)	7 (175)	71/2 (190)	8 (200)	81/2 (215)	9 (225)	10 (250)	11 (275)	12 (300)	
English (metric)	mm	(sq. mm)	kg/m					ARE	A OF STEEL	PER FOOT	(METER), s	q. in. (sq.	mm)					
3	0.375	0.110	0.376	0.330	0.293	0.264	0.240	0.220	0.203	0.189	0.176	0.165	0.155	0.147	0.132	0.120	0.110	
(10)	(9.5)	(71)	(0.560)	(710)	(617)	(568)	(507)	(473)	(430)	(406)	(374)	(355)	(330)	(316)	(284)	(258)	(237)	
4	0.500	0.196	0.668	0.588	0.523	0.470	0.428	0.392	0.362	0.336	0.314	0.294	0.277	0.261	0.235	0.214	0.196	
(13)	(12.7)	(129)	(0.944)	(1290)	(1122)	(1032)	(921)	(860)	(782)	(737)	(679)	(645)	(600)	(573)	(516)	(469)	(430)	
5	0.625	0.307	1.043	0.921	0.819	0.737	0.670	0.614	0.567	0.526	0.491	0.461	0.433	0.409	0.368	0.335	0.307	
(16)	(15.9)	(199)	(1.552)	(1990)	(1730)	(1592)	(1421)	(1327)	(1206)	(1137)	(1047)	(995)	(926)	(884)	(796)	(724)	(663)	
6	0.750	0.442	1.502	1.326	1.179	1.061	0.964	0.884	0.816	0.758	0.707	0.663	0.624	0.589	0.530	0.482	0.442	
(19)	(19.1)	(284)	(2.235)	(2840)	(2470)	(2272)	(2029)	(1893)	(1721)	(1623)	(1495)	(1420)	(1321)	(1262)	(1136)	(1033)	(947)	
7	0.875	0.601	2.044	1.803	1.603	1.442	1.311	1.202	1.110	1.030	0.962	0.902	0.848	0.801	0.721	0.656	0.601	
(22)	(22.2)	(387)	(3.042)	(3870)	(3365)	(3096)	(2764)	(2580)	(2345)	(2211)	(2037)	(1935)	(1800)	(1720)	(1548)	(1407)	(1290)	
8	1.000	0.785	2.670	2.355	2.093	1.884	1.713	1.570	1.449	1.346	1.256	1.178	1.108	1.047	0.942	0.856	0.785	
(25)	(25.4)	(510)	(3.973)	(5100)	(4435)	(4080)	(3543)	(3400)	(3091)	(2914)	(2684)	(2550)	(2372)	(2267)	(2040)	(1855)	(1700)	
9	1.128	1.000	3.400	3.000	2.667	2.400	2.182	2.000	1.846	1.714	1.600	1.500	1.412	1.333	1.200	1.091	1.000	
(29)	(28.7)	(645)	(5.060)	(6450)	(5609)	(5160)	(4607)	(4300)	(3909)	(3686)	(3395)	(3225)	(3000)	(2867)	(2580)	(2345)	(2150)	
10	1.270	1.267	4.303	3.801	3.379	3,041	2.764	2.534	2.339	2.172	2.027	1.901	1.789	1.689	1.520	1.382	1.267	
(32)	(32.3)	(819)	(6.404)	(8190)	(7122)	(6552)	(5850)	(5460)	(4964)	(4680)	(4311)	(4095)	(3809)	(3640)	(3276)	(2978)	(2730)	
11	1.410	1.561	5.313	4.683	4.163	3.746	3.406	3.122	2.882	2.676	2.498	2.342	2.204	2.081	1.873	1.703	1.561	
(36)	(35.8)	(1006)	(7.907)	(10060)	(8748)	(8048)	(7186)	(6707)	(6097)	(5749)	(5295)	(5030)	(4679)	(4471)	(4024)	(3658)	(3353)	

② Illinois Department of Transportat	ion
PASSED January I. 2009 Hand Start S	ISSUED 1-1-97

DATE	REVISIONS	AREAS OF
1-1-09	Switched units to	AIILAO OI
	English (metric).	REINFORCEMENT BARS
		HEIRI OHOEMENT BAHO
1-1-07	Deleted metric table.	
	Soft converted English	STANDARD 001001-02
	table.	OTANDAND COTOCT OF

	DECIMAL OF AN INCH AND OF A FOOT																			
	Α	В			Α	В			Α	В			Α	В		Α	В		Α	В
1/64	0.0052 0.0104 0.015625 0.0208	1/16 1/8 3/16 1/4		64 16	0.171875 0.1771 0.1823 0.1875	2½ 2½ 2½ 2½ 2½		1/32	0.3385 0.34375 0.3490 0.3542	4½6 4½8 4¾6 4¼		33/64	0.5052 0.5104 0.515625 0.5208	61/16 61/8 63/16 61/4	4¾4 11/16	0.671875 0.6771 0.6823 0.6875	8½8 8¾8 8¾6 8½4	21/32	0.8385 0.84375 0.8490 0.8542	10½6 10½8 10¾6 10¼
1/32	0.0260 0.03125 0.0365 0.0417	5/16 3/8 1/16 1/2	ıs,	/6a	0.1927 0.1979 0.203125 0.2083	25/16 23/8 21/16 21/2		²‱ 3⁄8	0.359375 0.3646 0.3698 0.3750	45/16 43/8 41/16 41/2	1	17/32	0.5260 0.53125 0.5365 0.5417	65/6 63/8 63/6 61/2	1 %1	0.6927 0.6979 0.703125 0.7083	85/6 83/8 87/6 81/2	5% %	0.859375 0.8646 0.8698 0.8750	10 10 10 10 10 10 10 10 10 10 10 10 10 1
3/64 1/16	0.046875 0.0521 0.0573 0.0625	9/16 5/8 11/16 3/4	7	/32	0.2135 0.21875 0.2240 0.2292	2% 2% 2% 2% 2%		2% ₄	0.3802 0.3854 0.390625 0.3958	4%6 45% 41%6 43/4		3%4 %6	0.546875 0.5521 0.5573 0.5625	6% 6% 6% 6% 6¾	23 ₅₂	0.7135 0.71875 0.7240 0.7292	8%6 85%8 81%6 83/4	51/64	0.8802 0.8854 0.890625 0.8958	10% 10% 10% 10% 10%
5/64	0.0677 0.0729 0.078125 0.0833	13/ ₁₆ 7/ ₈ 15/ ₁₆ 1	15, 1/	/64 /4	0.234375 0.2396 0.2448 0.2500	2 ¹³ / ₆ 2 ¹ / ₈ 2 ¹⁵ / ₆ 3		13/32	0.4010 0.40625 0.4115 0.4167	4 ¹ / ₈ 4 ¹ / ₈ 4 ¹ / ₆ 5		31/64	0.5677 0.5729 0.578125 0.5833	613/6 67/8 615/6 7	1‰ 3√4	0.734375 0.7396 0.7448 0.7500	8 ¹³ / ₁₆ 8 ⁷ / ₈ 8 ¹⁵ / ₁₆ 9	29/32	0.9010 0.90625 0.9115 0.9167	10 ¹³ / ₁₆ 10 ⁷ / ₈ 10 ¹⁵ / ₁₆ 11
3/ ₃₂	0.0885 0.09375 0.0990 0.1042	1½6 1½8 1¾6 1¼4	17,	/61	0.2552 0.2604 0.265625 0.2708	31/16 31/8 33/16 31/4		27/64 7/16	0.421875 0.4271 0.4323 0.4375	5½8 5½8 5¾6 5½	1	19/32	0.5885 0.59375 0.5990 0.6042	7½6 7½8 7¾6 7¼	⁴ %4	0.7552 0.7604 0.765625 0.7708	9½6 9½8 9¾6 9½4	5% 15%	0.921875 0.9271 0.9323 0.9375	11½8 11½8 11¾6 11¼
%4 1∕8	0.1146 0.1198	15/6 13/8 13/6 11/2	9/	/ ₂₂	0.2760 0.28125 0.2865 0.2917	35/6 33/8 31/6 31/2		29 <u>%</u> ,	0.4427 0.4479 0.453125 0.4583	5 1/6 5 1/6 5 1/2		3%4 5%	0.609375 0.6146 0.6198 0.6250	75/16 73/8 73/16 71/2	25/ ₃₂	0.7760 0.78125 0.7865 0.7917	95/6 93/8 93/6 91/2	61/64	0.9427 0.9479 0.953125 0.9583	115/6 113/8 113/6 111/2
%4	0.1302 0.1354 0.140625 0.1458	1%6 15/8 11/6 13/4		/64 /16	0.296875 0.3021 0.3073 0.3125	3% 35% 31/16 33/4		15/32	0.4635 0.46875 0.4740 0.4792	5% 5% 5% 5% 5¾		4/64	0.6302 0.6354 0.640625 0.6458	7%6 75% 7"/16 73/4	51/64 13/16	0.796875 0.8021 0.8073 0.8125	9%6 95/8 9"/6 93/4	%2	0.9635 0.96875 0.9740 0.9792	11%6 11%8 11%6 11¾4
5/ ₃₂	0.1510 0.15625 0.1615 0.1667	1 ¹³ / ₆ 1 ⁷ / ₈ 1 ¹⁵ / ₆ 2	2 _j	/64	0.3177 0.3229 0.328125 0.3333	31% 37/8 31% 4		‰ 1∕2	0.484375 0.4896 0.4948 0.5000	51% 5% 51% 6	ŝ	2/32	0.6510 0.65625 0.6615 0.6667	7 ¹ 3/6 7 ¹ /8 7 ¹ 5/6 8	5¥4	0.8177 0.8229 0.828125 0.8333	9 ¹³ / ₆ 9 ¹ / ₈ 9 ¹⁵ / ₆ 10	63%4 1	0.984375 0.9896 0.9948 1.0000	11 ¹³ / ₁₆ 11 ⁷ / ₈ 11 ¹⁵ / ₁₆ 12



A = Fractions of Inch or Foot

B = Inch Equivalents to Foot Fractions

DECIMAL OF AN INCH	REVISIONS	DATE
DECIMAL OF AN INCH	New Standard.	1-1-97
AND OF A FOOT		
AND OF A 1001		
STANDARD 001006		



Standards by Division

DIVISION 200 EARTHWORK, LANDSCAPING, and EROSION CONTROL

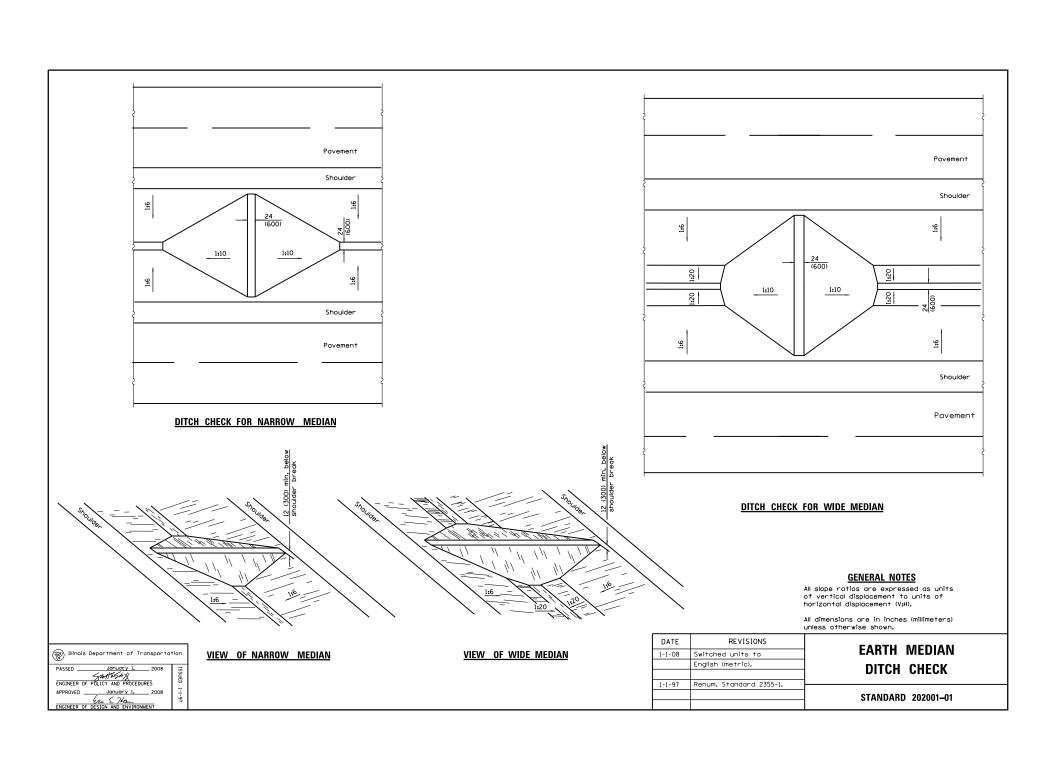
STD. NO. TITLE

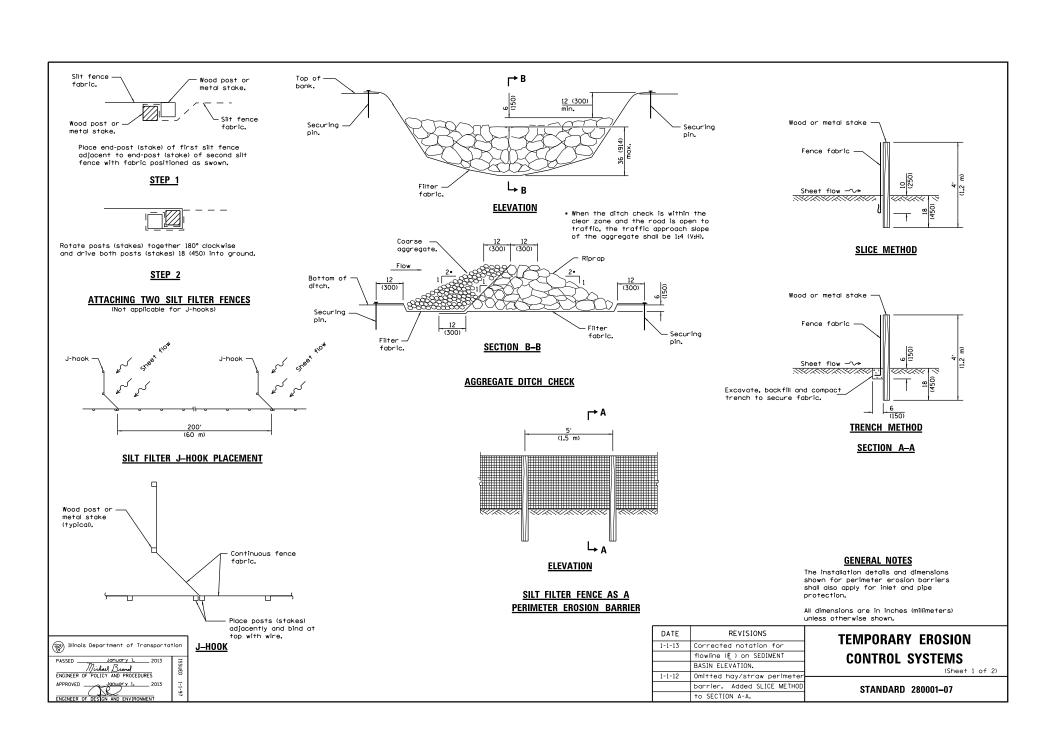
EARTHWORK

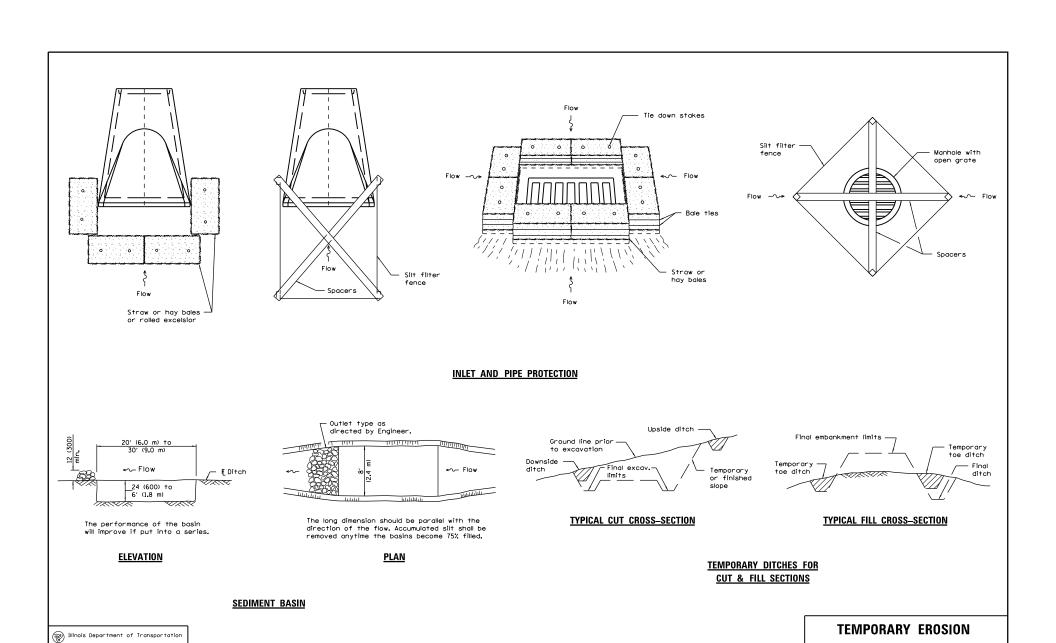
202001-01 Earth Median Ditch Check

EROSION CONTROL

280001-07 Temporary Erosion Control Systems
285001-02 Fabric Formed Concrete Revetment Mats







January 1.

Michael Brand
ENGINEER OF POLICY AND PROCEDURES

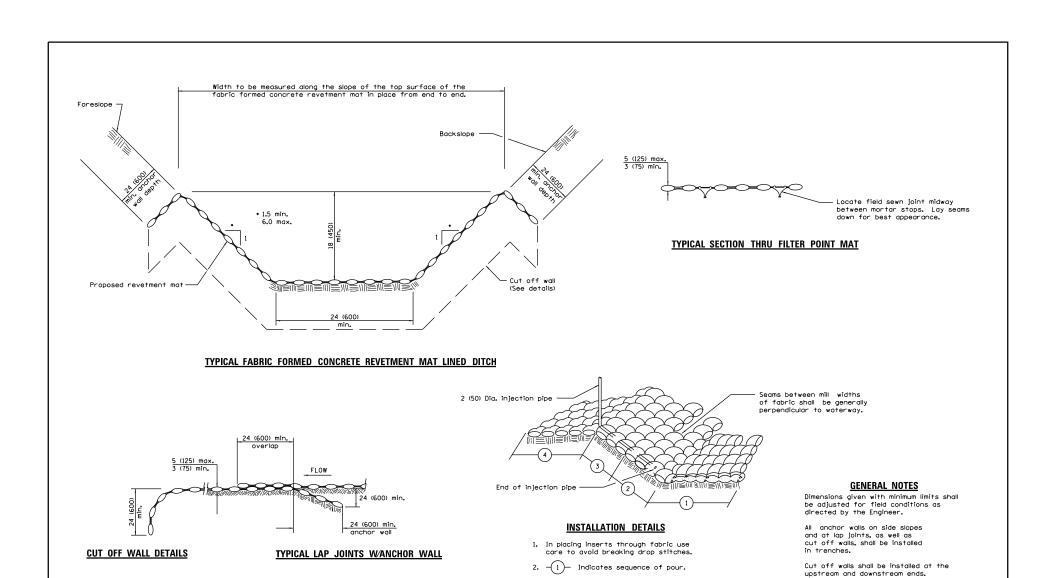
APPROVED January 1, 2
ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

CONTROL SYSTEMS

STANDARD 280001-07

(Sheet 2 of 2)



Illinois Department of Transpor	tation
PASSED January 1. 2008 South State ENGINEER OF POLICY AND PROCEDURES	ISSUED
APPROVED January 1. 2008 Law Than ENGINEER OF DESIGN AND ENVIRONMENT	1-1-97

DATE REVISIONS

1-1-08 Switched units to
English (metric).

1-1-02 Revised second note.

FABRIC FORMED CONCRETE REVETMENT MATS

All dimensions are in inches (millimeters)

unless otherwise shown.

STANDARD 285001-02



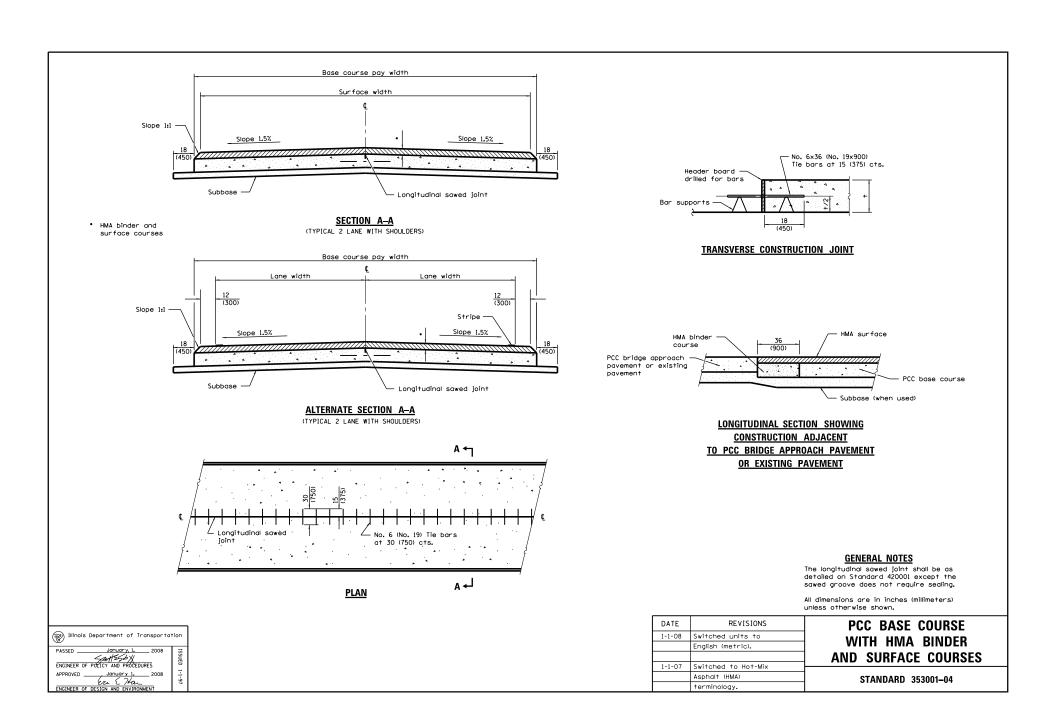
Standards by Division

DIVISION 300 SUBGRADES, SUBBASES, and BASE COURSES

STD. NO. TITLE

BASE COURSE

353001-04 PCC Base Course with HMA Binder and Surface Courses





482001-02

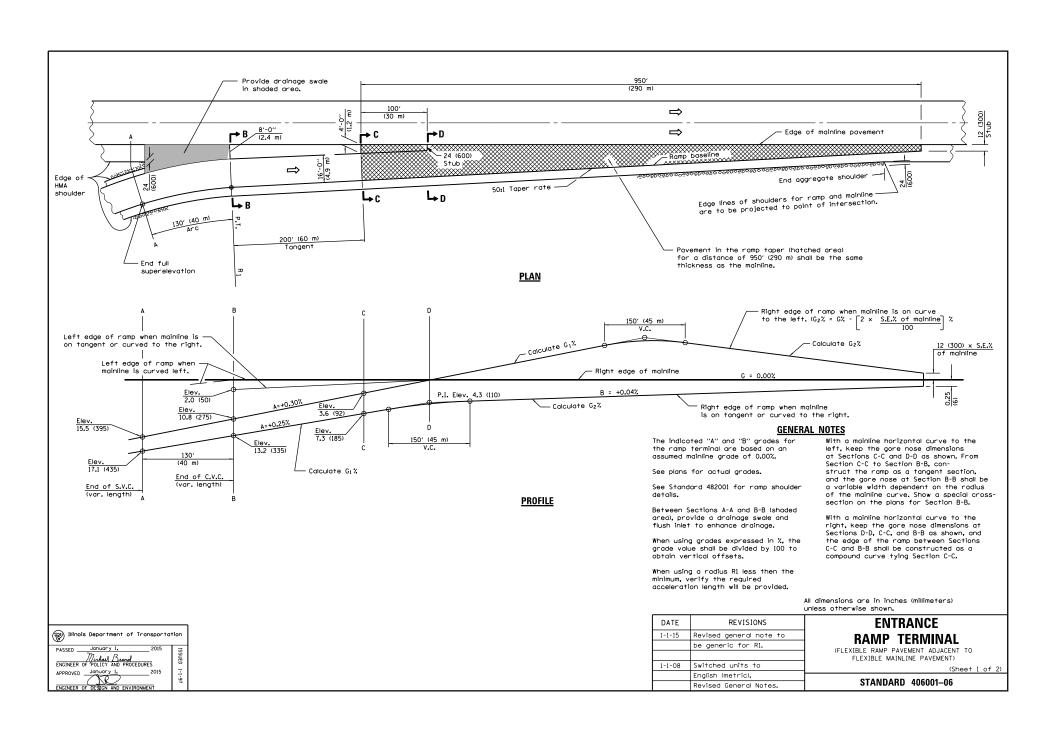
Standards by Division

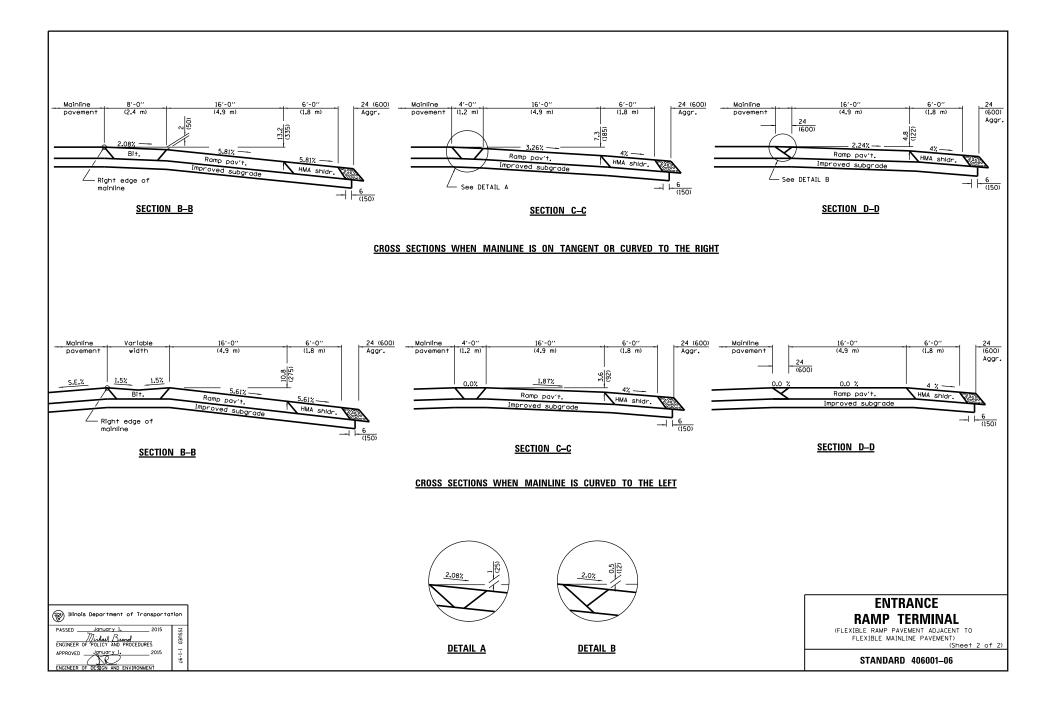
DIVISION 400 SURFACE COURSES, PAVEMENTS, REHABILITATION, AND SHOULDERS

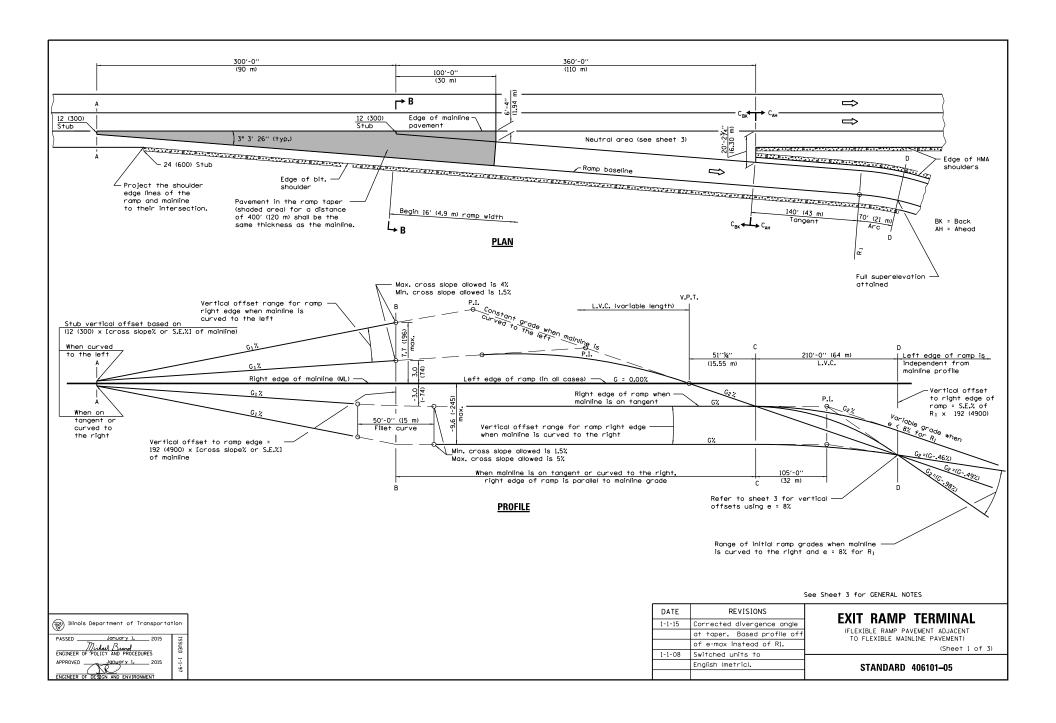
	· · · · · · · · · · · · · · · · · · ·
STD. NO.	TITLE
BITUMINOUS	SURFACES AND HOT-MIX ASPHALT PAVEMENTS
406001-06	Entrance Ramp Terminal (Flexible Ramp Pavement Adjacent to Flexible Mainline Pavement)
406101-05	Exit Ramp Terminal (Flexible Ramp Pavement Adjacent to Flexible Mainline Pavement)
406201-01	Mailbox Turnout
	EMENT CONCRETE DAVEMENTS AND SIDEWALKS
420001-08	EMENT CONCRETE PAVEMENTS AND SIDEWALKS Pavement Joints
420101-05	24' (7.2 m) Jointed PCC Pavement
420101-05	36' (10.8 m) Jointed PCC Pavement
420100-03	PCC Pavement Roundouts
420201-09	Entrance Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to Jointed PCC Mainline Pavt.)
420201-03	Entrance Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to CRC Mainline Pavement)
420301-06	Exit Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to Jointed PCC Mainline Pavt.)
420306-08	Exit Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to CRC Mainline Pavement)
420401-12	Pavement Connector (PCC) for Bridge Approach Slab
420406	Pavement Connector (HMA) for Bridge Approach Slab
420501-06	PCC Pavement and PCC Base Course Adjacent to Railroad Grade Crossing
420601-06	24' (7.2 m) PCC Pavement
420701-03	Pavement Welded Wire Reinforcement
421001-03	Bar Reinforcement for CRC Pavement
421101-09	24' (7.2 m) CRC Pavement (With Wide Flange Beam Terminal Joint)
421106-09	36' (10.8 m) CRC Pavement (With Wide Flange Beam Terminal Joint)
421201-06	24' (7.2 m) CRC Pavement (With Lug System)
421206-06	36' (10.8 m) CRC Pavement (With Lug System)
424001-08	Perpendicular Curb Ramps for Sidewalks
424006-02	Diagonal Curb Ramps for Sidewalks
424011-02	Corner Parallel Curb Ramps for Sidewalks
424016-02	Mid-block Curb Ramps for Sidewalks
424021-03	Depressed Corner for Sidewalks
424026-01	Entrance / Alley Pedestrian Crossings
424031-01	Median Pedestrian Crossings
PAVEMENT R	EHABILITATION
442001-04	Class A Patches
442101-07	Class B Patches
442201-03	Class C and D Patches
SHOULDERS	
OI IOOLDLING	

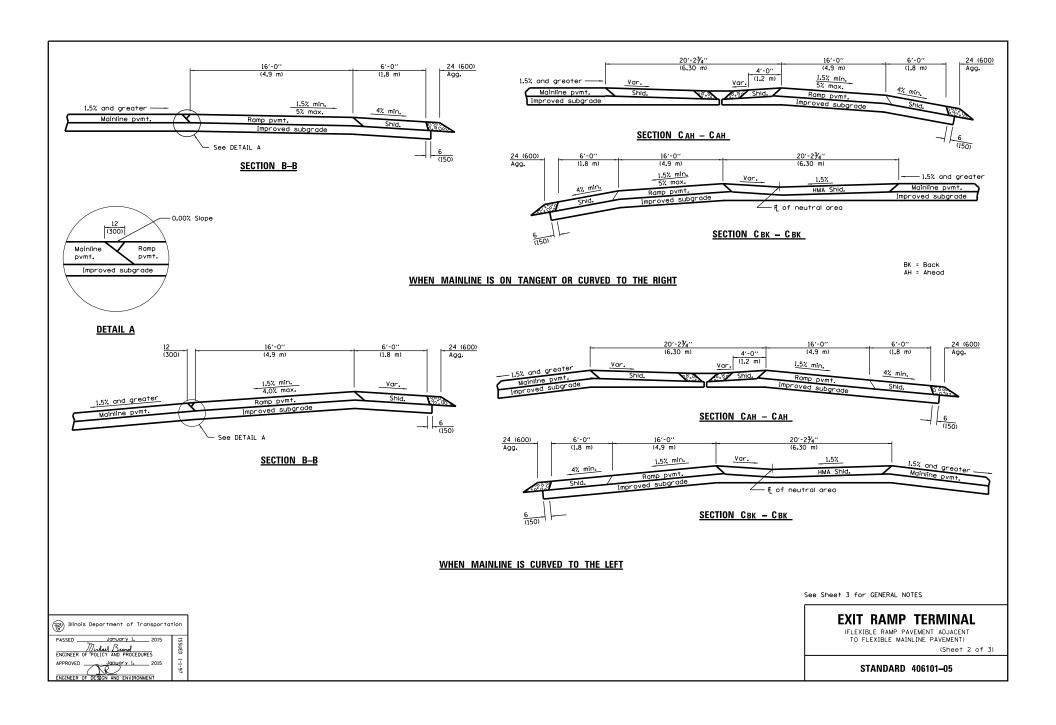
HMA Shoulder Adjacent to Flexible Pavement

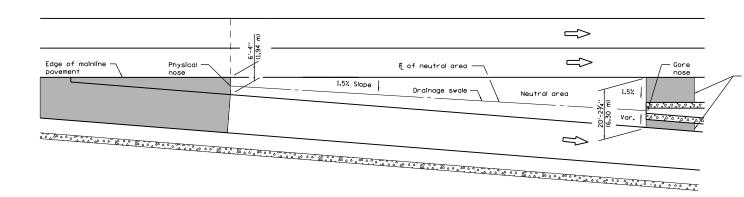
482006-03 HMA Shoulder Adjacent to Rigid Pavement
 482011-03 HMA Shoulder Strips/Shoulders With Resurfacing or Widening and Resurfacing Projects
 483001-04 PCC Shoulder











Shaded area indicates shoulder transition zone from neutral area to design shoulder slope. In this area, the relative profile grade difference along the outside povement edge and that along the outside shoulder edge shall not exceed 0.50%.

DETAILS FOR DRAINAGE IN NEUTRAL AREA

Vertical offsets in inches for right (1) edge of ramp, when e = 8%									
Sections	Mainline on Tangent	Mainline Curved Left							
A	- 0.18	S.E. % ML × 12	S.E. % ML × 12 ②						
В	- 3.0	S.E. % ML × 192	S.E. % ML × 192 ②						
С	- 3.0	S.E. % ML × 192	- 3.0						
D	- 15.4	- 15.4	- 15.4						

Vertical offsets in mm for right edge of ramp, when e = 8%.										
Sections	Mainline on Tangent	Mainline Curved Right	Mainline Curved Left							
А	- 5	S.E.% ML × 300	S.E.% ML × 300 ②							
В	- 74	S.E.% ML × 4900	S.E.% ML × 4900 ②							
С	- 74	- 74 S.E. % ML × 4900								
D	- 392	- 392	- 392							

- (1) Vertical offset values are calculated and based on the right edge of mainline pavement at 0.0 % grade.
- (2) The vertical offsets of these points are above the mainline pavement and lie on an upgrade in relationship to the mainline grade.
- (3) S.E.=Superelevation Rate

GENERAL NOTES

The initial ramp grade (62) is based on the line generated through the PI that is 105 ft. (32 m) past Section C-C and the point created by the vertical offset at Section D-D.

See plans for actual grades.

See Standard 482001 for ramp shoulder details.

In the neutral area, provide a swale and flush inlet to enhance drainage.

When using grades expressed in ${\it X}_{\bullet}$ the grade values shall be divided by 100 to obtain vertical offsets.

Where an exit ramp terminal is proposed adjacent to a mainline horizontal curve, construct the edge of the terminal by using offset widths, and for the terminal segment downstream from Section C-C to Ri, construct the ramp as a 140 ft. (43 m) tangent section.

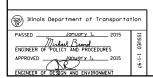
All dimensions are in inches (millimeters) unless otherwise shown.

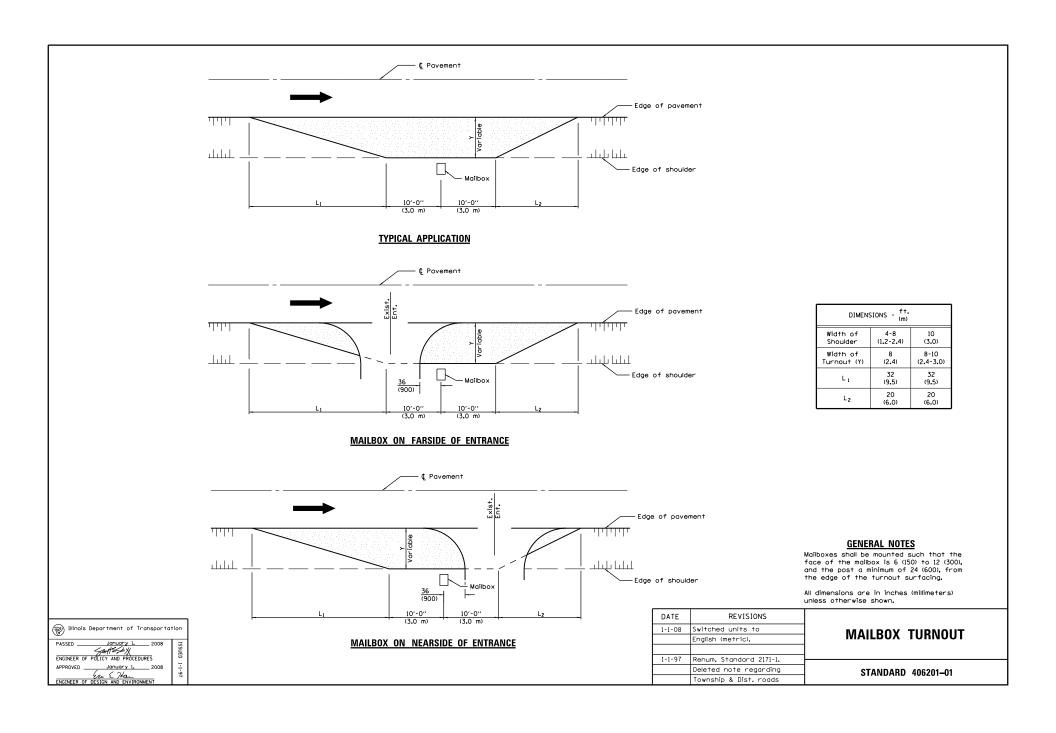
EXIT RAMP TERMINAL

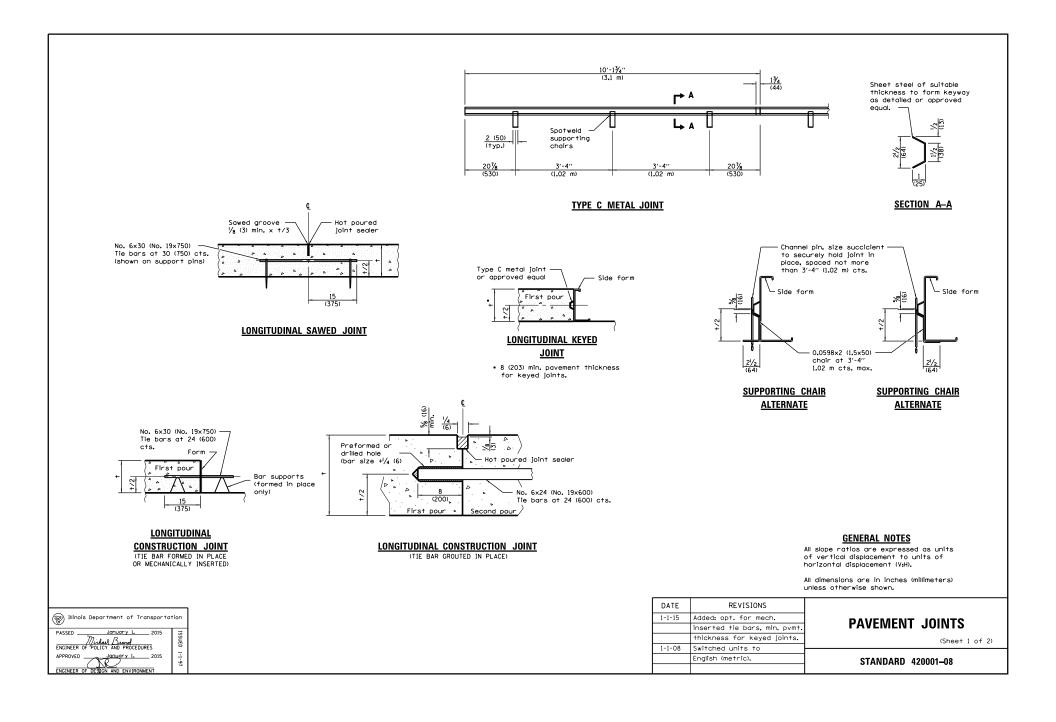
(FLEXIBLE RAMP PAVEMENT ADJACENT TO FLEXIBLE MAINLINE PAVEMENT)

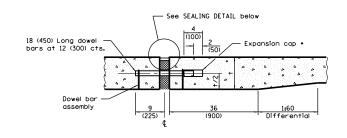
(Sheet 3 of 3)

STANDARD 406101-05





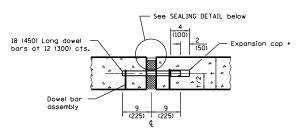




TRANSVERSE EXPANSION JOINT

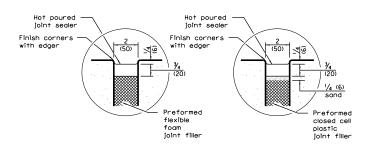
(FOR PAVEMENTS WITH UNEQUAL THICKNESS)

 Expansion caps shall be installed on the exposed end of each dowel bar once the header has been removed and the joint filler material has been installed.

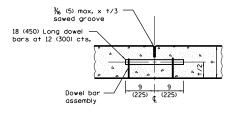


TRANSVERSE EXPANSION JOINT

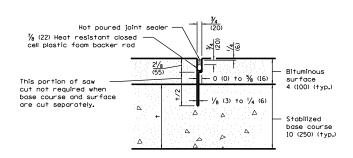
(FOR PAVEMENTS WITH EQUAL THICKNESS)



SEALING DETAIL



TRANSVERSE CONTRACTION JOINT



TRANSVERSE CONTRACTION JOINT

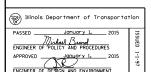
(FOR CAM, CFA AND LFA BASE COURSE MIXTURES)

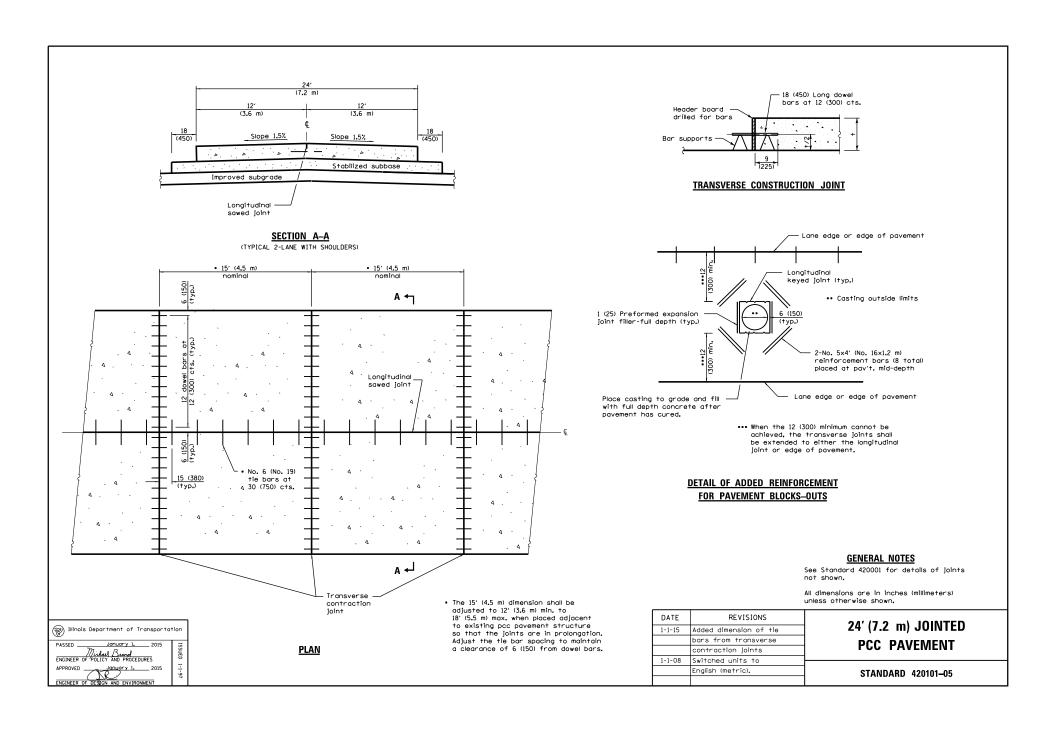
DOWEL BAR TABLE						
PAVEMENT THICKNESS	DOWEL BAR DIAMETER					
8 (200) or greater	11/2 (38)					
7 (175) thru 7.99 (199)	11/4 (32)					
Less than 7 (175)	1 (25)					

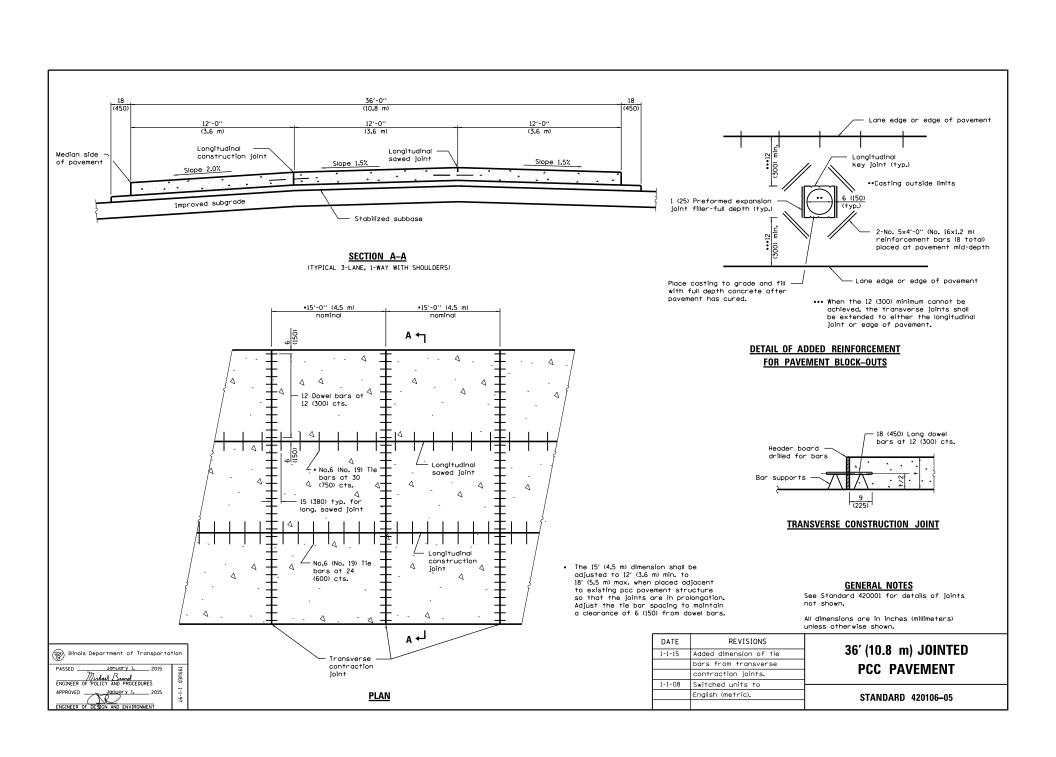
PAVEMENT JOINTS

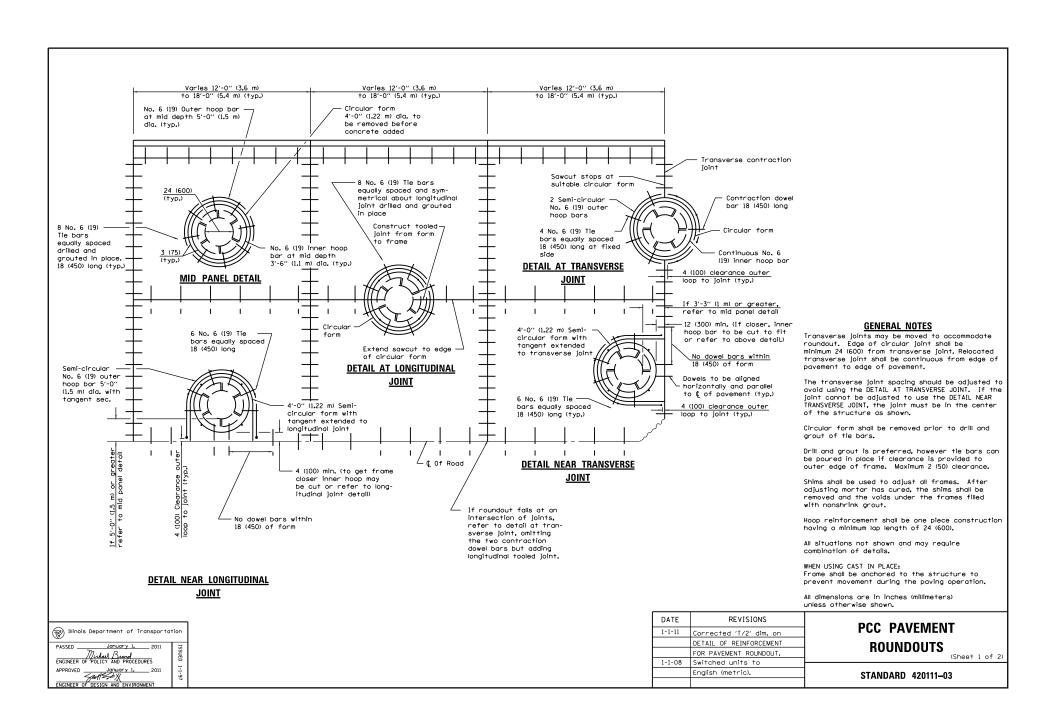
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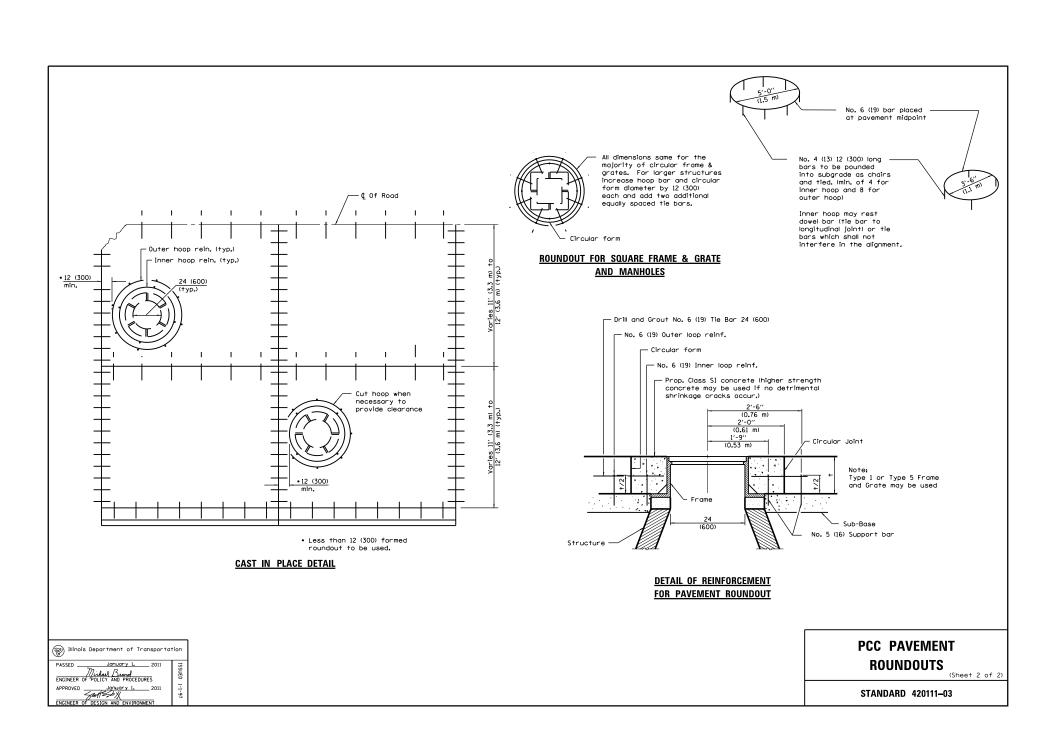
STANDARD 420001-08

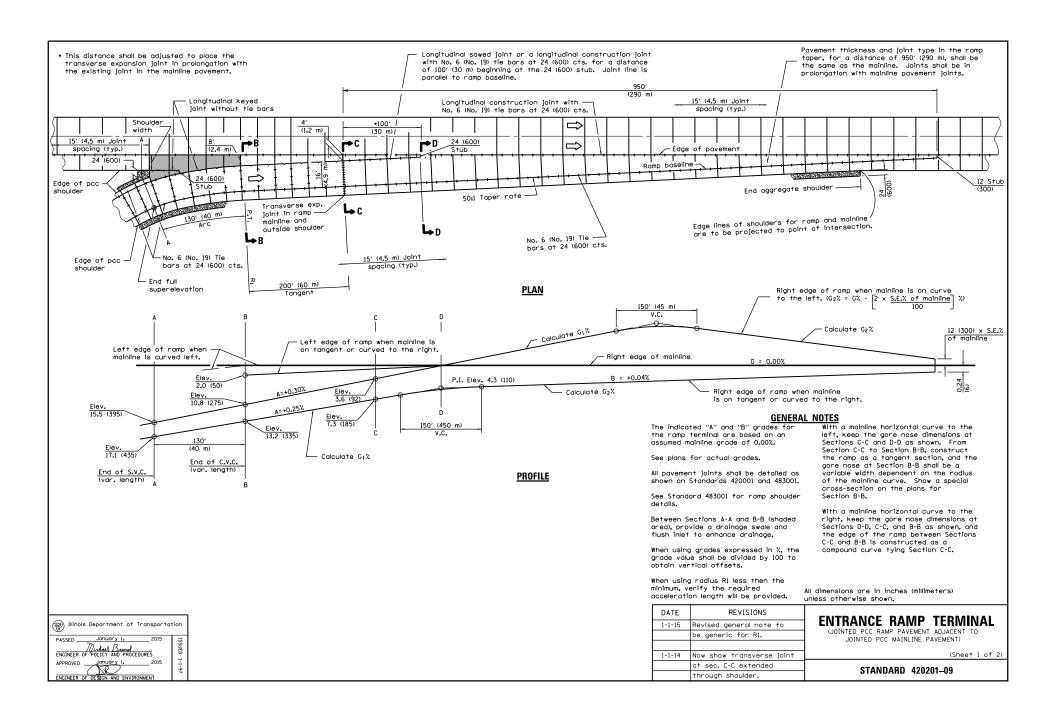


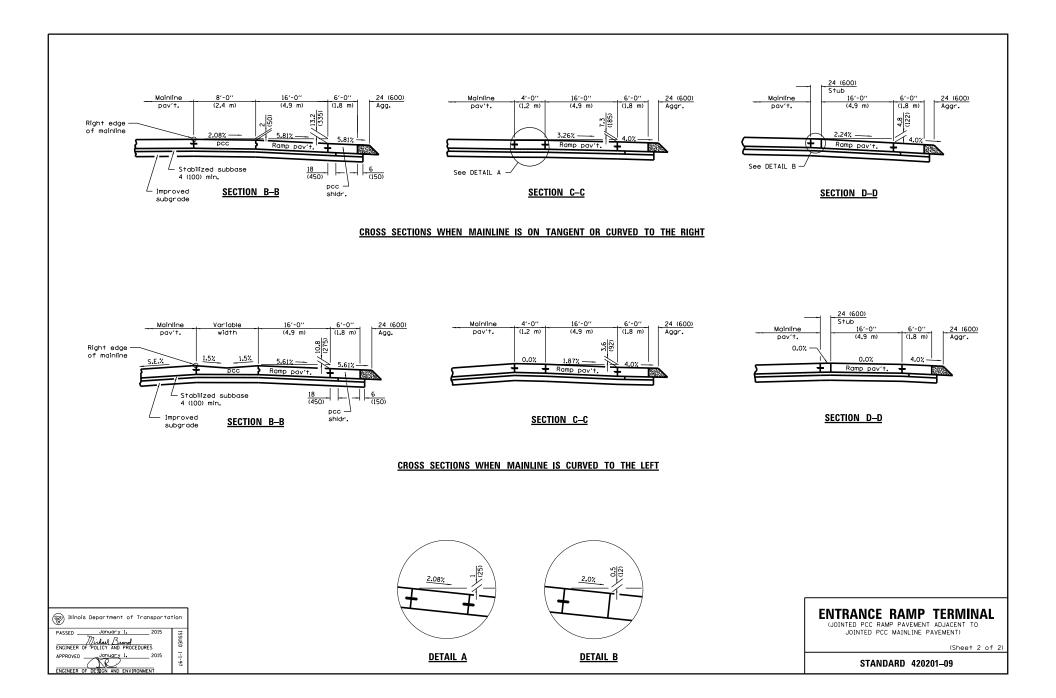


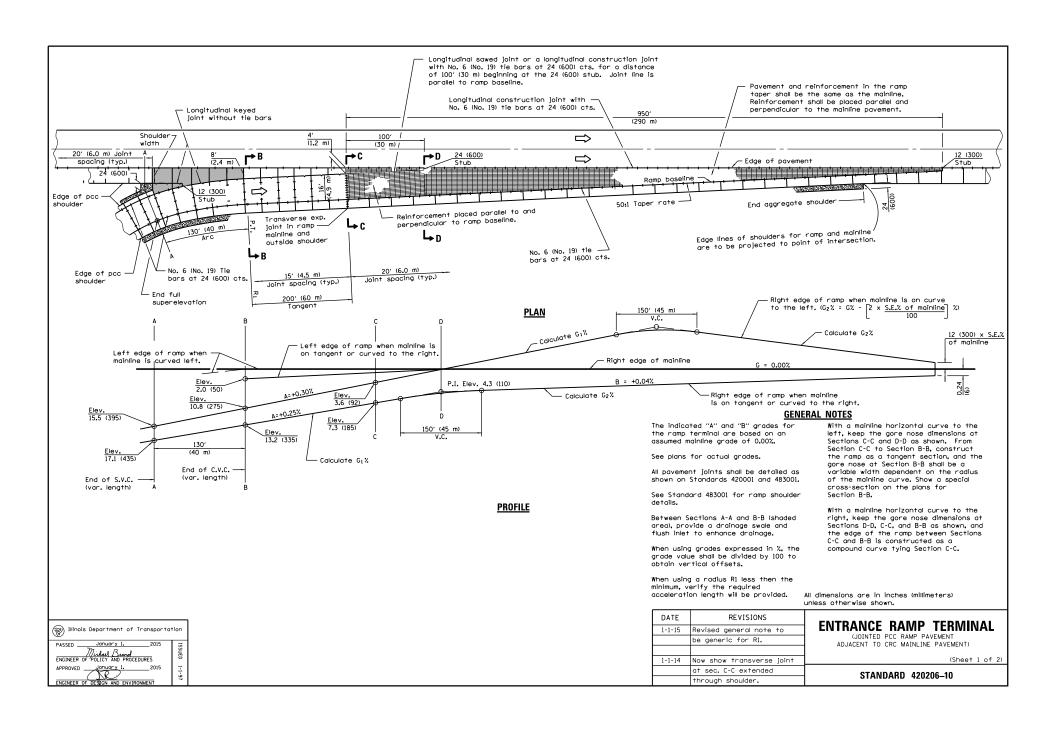


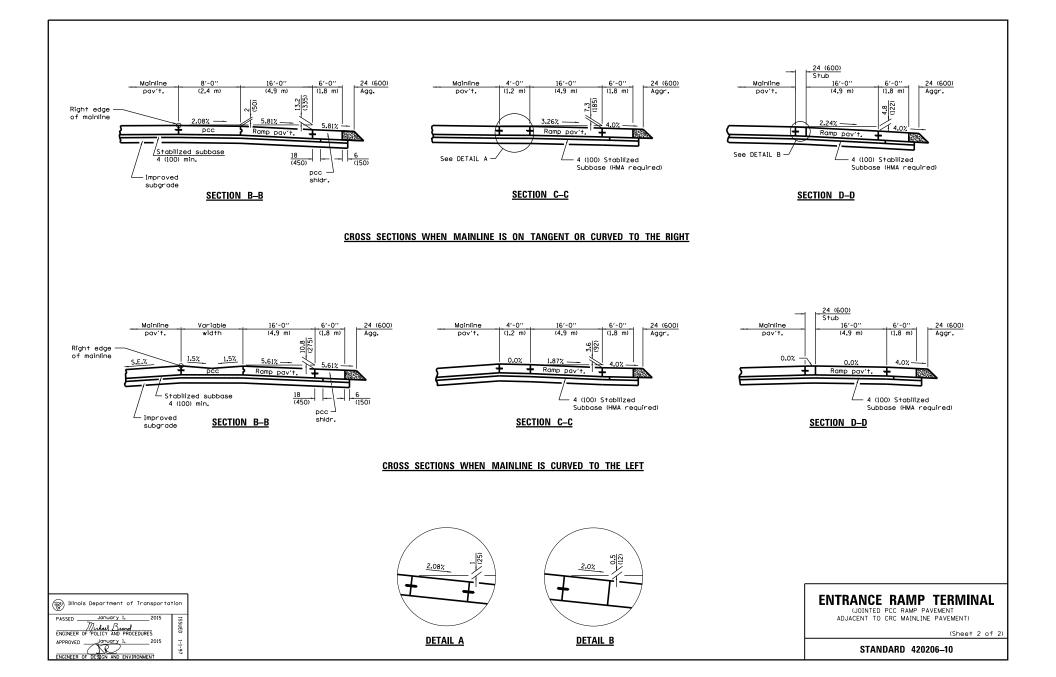


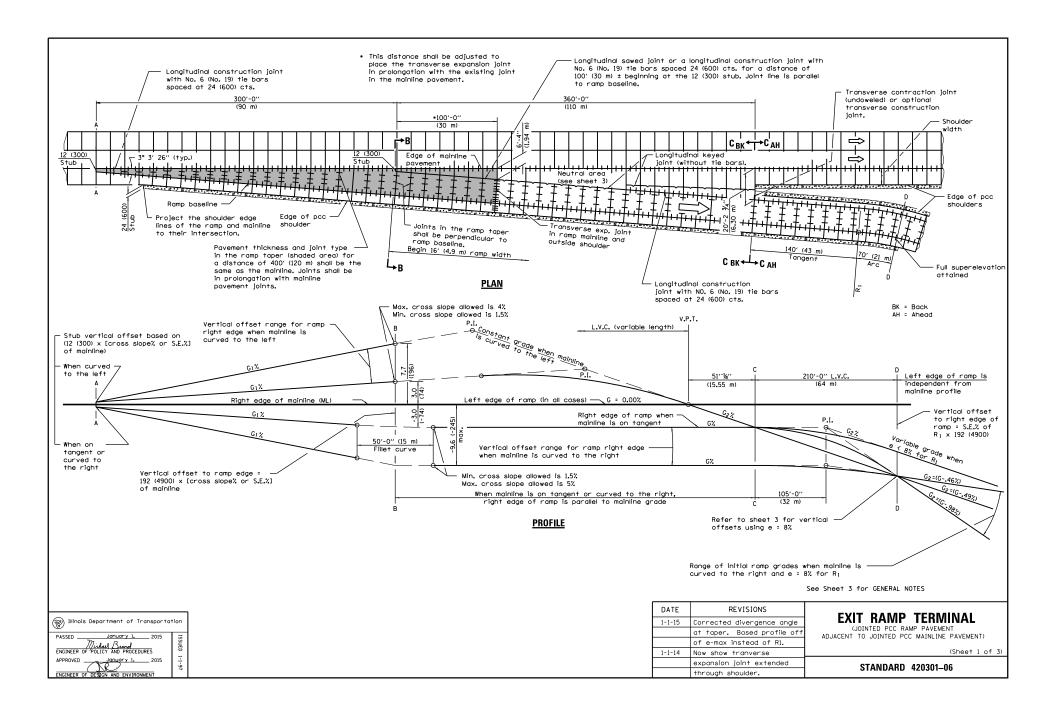


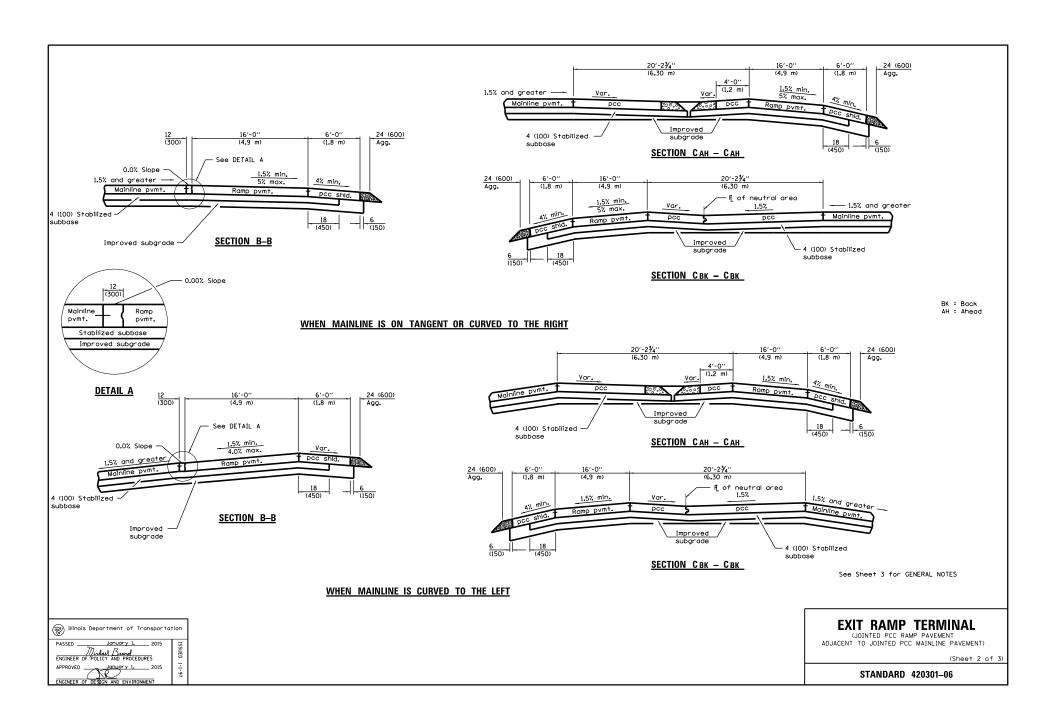


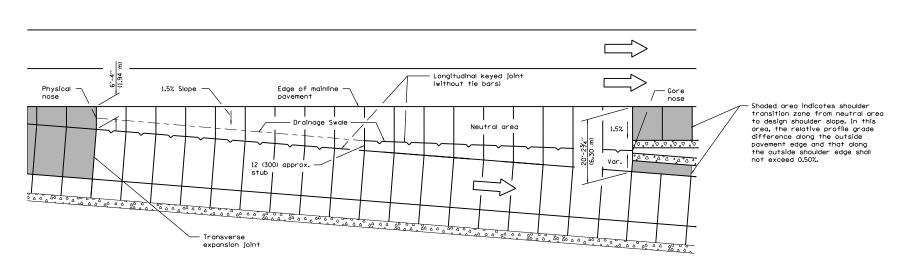












DETAILS FOR DRAINAGE IN NEUTRAL AREA

	Vertical offsets in inches for right (1) edge of ramp, when e = 8%					① Vertical offsets in mm for righted edge of ramp, when e = 8%			
Sections	Mainline on Tangent	Mainline Curved Right	Mainline Curved Left	Curved		Mainline on Tangent	Mainline Curved Right	Mainline Curved Left	
A	- 0.18	S.E. % ML × 12	S.E. % ML × 12 ②		Α	- 5	S.E.% ML × 300	S.E.% ML × 300 ②	
В	- 3.0	S.E. % ML × 192	S.E. % ML × 192 ②		В	- 74	S.E.% ML × 4900	S.E.% ML × 4900 ②	
С	- 3.0	S.E. % ML × 192	- 3.0		С	- 74	S.E. % ML × 4900	- 74	
D	- 15.4	- 15.4	- 15.4		D	- 392	- 392	- 392	

- (1) Vertical offset values are calculated and based on the right edge of mainline povement at 0.0 % grade.
- The vertical offsets of these points are above the mainline pavement and lie on an upgrade in relationship to the mainline grade.
- 3 S.E.=Superelevation Rate

GENERAL NOTES

The initial ramp grade (G_2) is based on the line generated through the PI that is 105' $(32\ m)$ past Section C-C and the point created by the vertical offset at Section D-D.

See plans for actual grades.

All pavement joints shall be detailed as shown on Standards 420001 and 483001.

See Standard 483001 for ramp shoulder details.

In the neutral area, provide a swale and flush inlet to enhance drainage, $% \left(1\right) =\left(1\right) \left(1\right) +\left(1\right) \left(1\right) \left(1\right) +\left(1\right) \left(1\right$

When using grades expressed in %, the grade values shall be divided by 100 to obtain vertical offsets.

Where an exit ramp terminal is proposed adjacent to a miniline horizontal curve, construct the edge of the terminal by using offset widths, and for the terminal segment downstream from Section C-C to R1, construct the ramp as a 141' (43 m) tangent section.

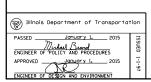
All dimensions are in inches (millimeters) unless otherwise shown.

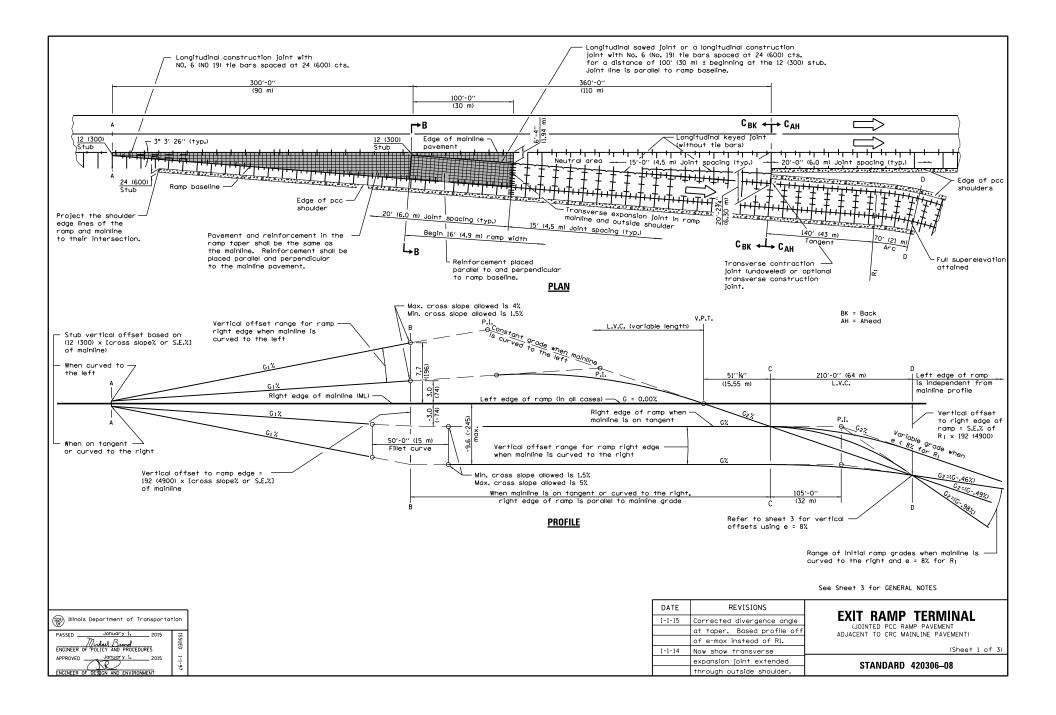
EXIT RAMP TERMINAL

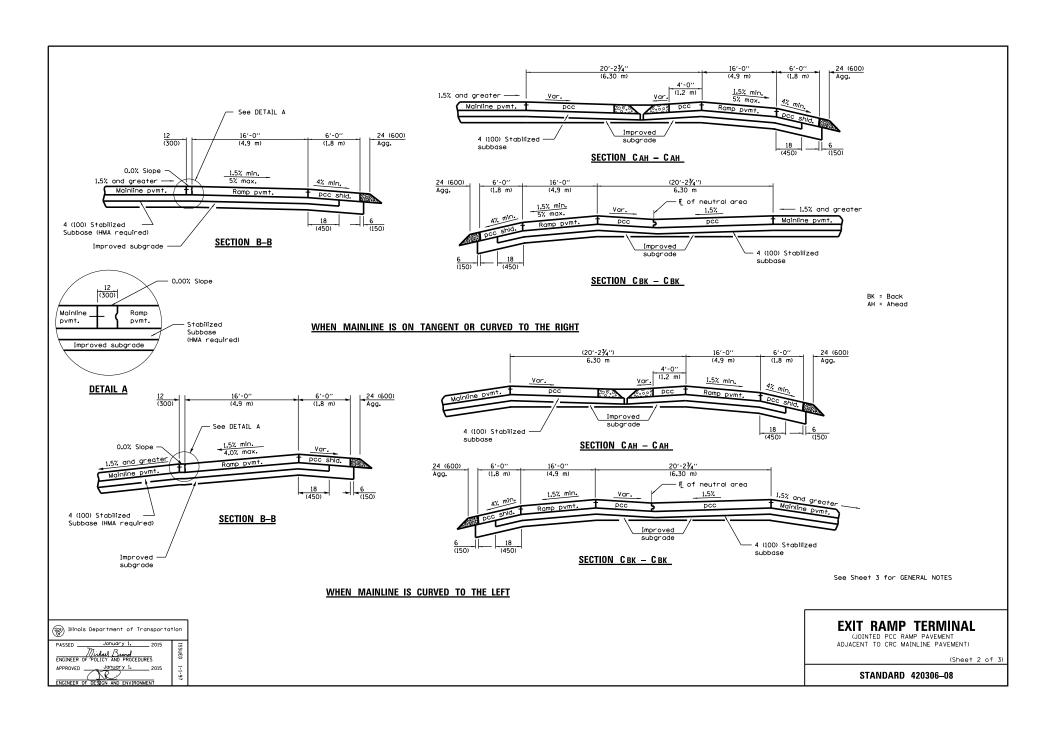
(JOINTED PCC RAMP PAVEMENT ADJACENT TO JOINTED PCC MAINLINE PAVEMENT)

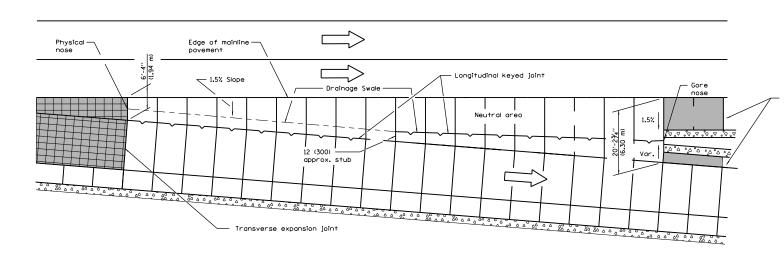
(Sheet 3 of 3)

STANDARD 420301-06









Shaded area indicates shoulder transition zone from neutral area to design shoulder slope. In this area, the relative profile grade difference along the outside pavement edge and that along the outside shoulder edge shall not exceed 0.50%.

DETAILS FOR DRAINAGE IN NEUTRAL AREA

Vertical offsets in inches for right (1) edge of ramp, when e = 8%				
Sections On Tangent		Mainline Curved Right	Mainline Curved Left	
А	- 0.18	S.E. % ML × 12	S.E. % ML × 12 ②	
В	- 3.0	S.E. % ML × 192	S.E. % ML × 192 ②	
С	- 3.0	S.E. % ML × 192	- 3.0	
D	- 15.4	- 15.4	- 15.4	
U	- 15.4	- 15.4	- 15.4	

① Vertical offsets in mm for right edge of ramp, when e = 8%			
Sections	Mainline on Tangent	Mainline Curved Right	Mainline Curved Left
Α	- 5	S.E.% ML × 300	S.E.% ML × 300 ②
В	- 74	S.E.% ML × 4900	S.E.% ML × 4900 ②
С	- 74	S.E. % ML × 4900	- 74
D	- 392	- 392	- 392

- (1) Vertical offset values are calculated and based on the right edge of mainline pavement at 0.0 % grade.
- The vertical offsets of these points are above the mainline pavement and lie on an upgrade in relationship to the mainline grade.
- 3 S.E.=Superelevation Rate

GENERAL NOTES

The initial ramp grade (G2) is based on the line generated through the PI that is 105' (32 m) post Section C-C and the point created by the vertical offset at Section 0-D.

See plans for actual grades.

All pavement joints shall be detailed as shown on Standards 420001 and 483001.

See Standard 483001 for ramp shoulder details.

In the neutral area, provide a swale and flush inlet to enhance drainage.

When using grades expressed in %, the grade values shall be divided by 100 to obtain vertical offsets.

Where an exit ramp terminal is proposed adjacent to a mainline horizontal curve, construct the edge of the terminal by using offset widths, and for the terminal segment downstream from Section C-C to Ri, construct the ramp as a 141′ (43 m) tangent section.

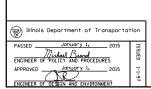
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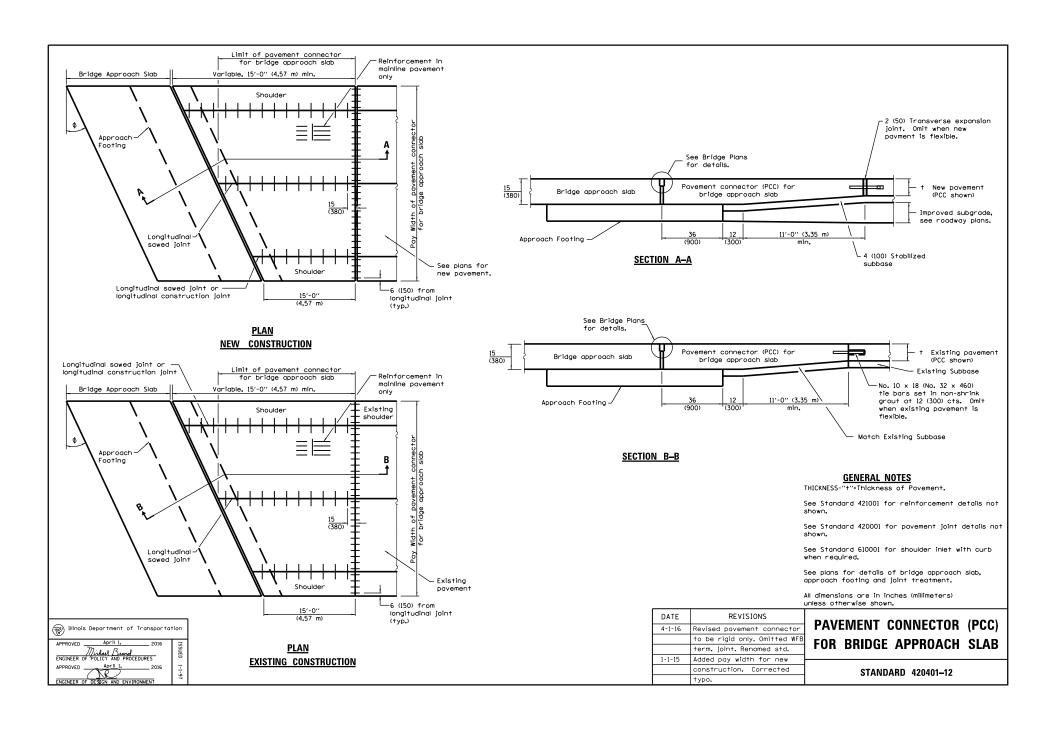
EXIT RAMP TERMINAL

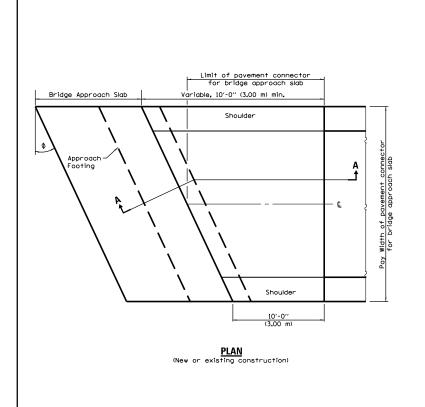
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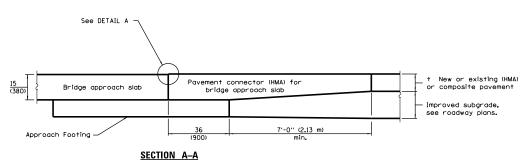
(Sheet 3 of 3)

STANDARD 420306-08











GENERAL NOTES

THICKNESS-"t"=Thickness of Povement.

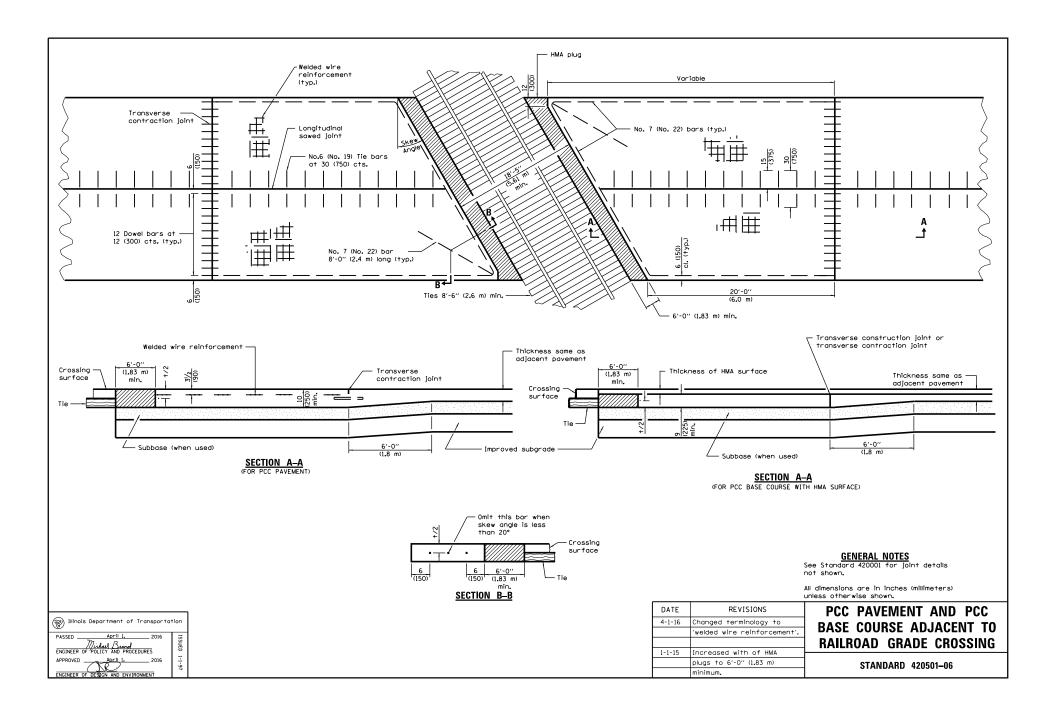
See Standard 610001 for shoulder inlet with curb when required.

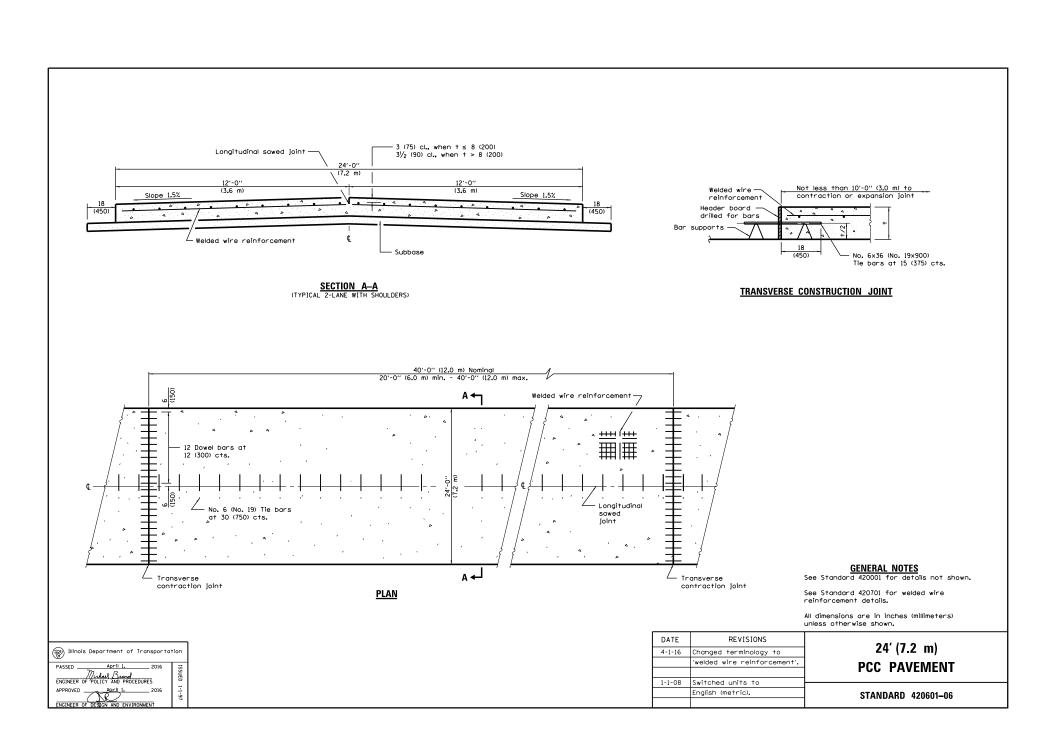
See plans for details of bridge approach slab and approach footing.

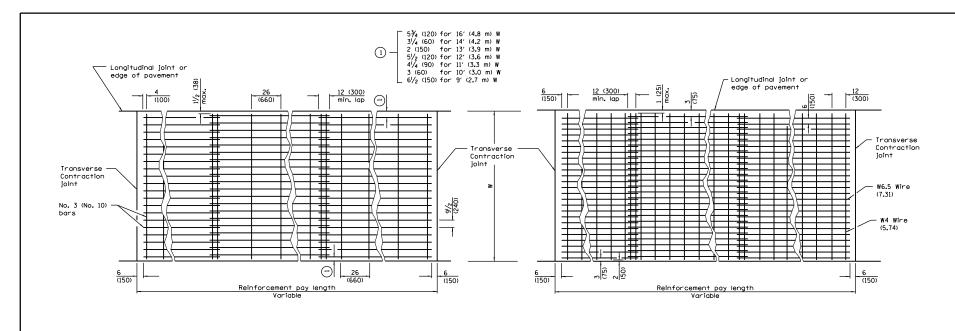
All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transporta	tion
APPROVED APPIL 2016 Michael Brand ENGINEER OF POLICY AND PROCEDURES	ISSUED
APPROVED APPROVED 2016	1-1-97

CTOD /IINAA\	DAVENIENT CONNECTOR	REVISIONS	DATE	
CIUK (HIVIA)	PAVEMENT CONNECTOR	New standard.	4-1-16	
OACH SLAB	FOR BRIDGE APPROACH			
071011 OE71B	1011 5111502 711 1 11071011			
0106	STANDARD 420406			
.0400	31ANDARD 420400			







Approximately 63 lbs./100 sq. ft. (3.07 kg/m^2)

When clipped bar mats are used, each bar intersection shall be clipped with W1.7 (3.74) wire.

• When the 12 (300) minimum cannot be achieved, the transverse joints shall be extended to either the longitudinal joint or edge of pavement.

ISSUED

Illinois Department of Transportation

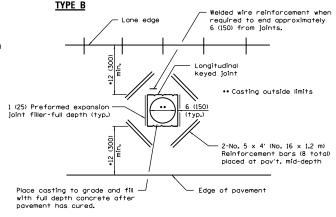
April 1,

Michael Brand
ENGINEER OF POLICY AND PROCEDURES

APPROVED April 1. 2
ENGINEER OF DESIGN AND ENVIRONMENT

PASSED

APPROVED



DETAIL OF ADDED REINFORCEMENT FOR PAVEMENT BLOCKS-OUTS

Approximately 63 lbs./100 sq. ft. (3.07 kg/m^2)

TYPE A

GENERAL NOTES

Pavement block-outs shall be at least 24 (600) from contraction joints.

Welded wire reinforcement which is lapped longitudinallyshall have a minimum lap of 6 (150).

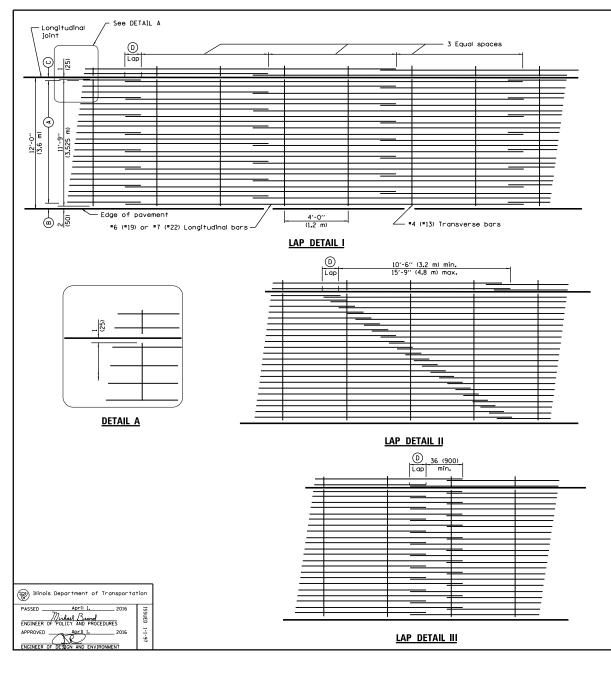
Welded wire reinforcement may be positioned with the transverse wires on top or bottom of the longitudinal wires.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
4-1-16	Changed terminology to
	'welded wire reinforcement'.
	Renamed standard.
1-1-08	Switched units to
	English (metric).

PAVEMENT WELDED WIRE REINFORCEMENT

STANDARD 420701-03



	ENGLISH (inches)				
Bar Size	Pavement Thickness	(Approx. Spacing)	B	0	0
# 6	7¾ thru 8½	18 spaces (19 bars) @ 75%	31/2	3	22
* 6	8¾ thru 9½	20 spaces (21 bars) e 6 1/8	31/2	3	22
*6	9¾ thru 10½	22 spaces (23 bars) @ 61/4	31/2	3	22
* 6	10¾ thru 11½	24 spaces (25 bars) @ 5¾	31/2	3	22
#6	11¾ thru 12½	27 spaces (28 bars) @ 51/8	31/2	3	22
* 7	9¾ thru 10½	16 spaces (17 bars) e 8%	31/2	3	26
# 7	10¾ thru 11½	18 spaces (19 bars) @ 75/8	31/2	3	26
*7	11¾ thru 12½	19 spaces (20 bars) @ 71/4	31/2	3	26
#7	12¾ thru 13½	21 spaces (22 bars) e 61/2	31/2	3	26
*7	13¾ thru 14½	23 spaces (24 bars) e 6	31/2	3	26
#7	14¾ thru 15½	24 spaces (25 bars) @ 5¾	31/2	3	26
#7	15¾ thru 16½	26 spaces (27 bars) @ 51/4	31/2	3	26

		METRIC (mm)			
Bar Size	Pavement Thickness	(Approx. Spacing)	B	©	0
= 19	200 thru 220	18 spaces (19 bars) @ 191	90	75	560
= 19	230 thru 250	21 spaces (22 bars) @ 163	95	80	560
= 19	260 thru 280	23 spaces (24 bars) @ 149	90	80	560
= 19	290 thru 310	26 spaces (27 bars) @ 132	90	75	560
- 19	320 thru 340	29 spaces (30 bars) @ 118	95	80	560
*22	230 thru 250	15 spaces (16 bars) © 229	90	75	660
*22	260 thru 280	17 spaces (18 bars) @ 202	90	75	660
*22	290 thru 310	19 spaces (20 bars) @ 181	90	70	660
*22	320 thru 340	21 spaces (22 bars) @ 163	95	80	660
*22	350 thru 370	23 spaces (24 bars) @ 149	90	80	660
*22	380 thru 400	25 spaces (26 bars) @ 137	95	80	660
* 22	410 thru 430	27 spaces (28 bars) @ 127	90	80	660

GENERAL NOTES

Except as noted or shown, the dimensions and notes specified for LAP DETAIL I are typical for LAP DETAIL II and III.

The (B) dimension and the distance from the end of the transverse bar to the edge of povement may be increased by 1 (25) for slip form poving.

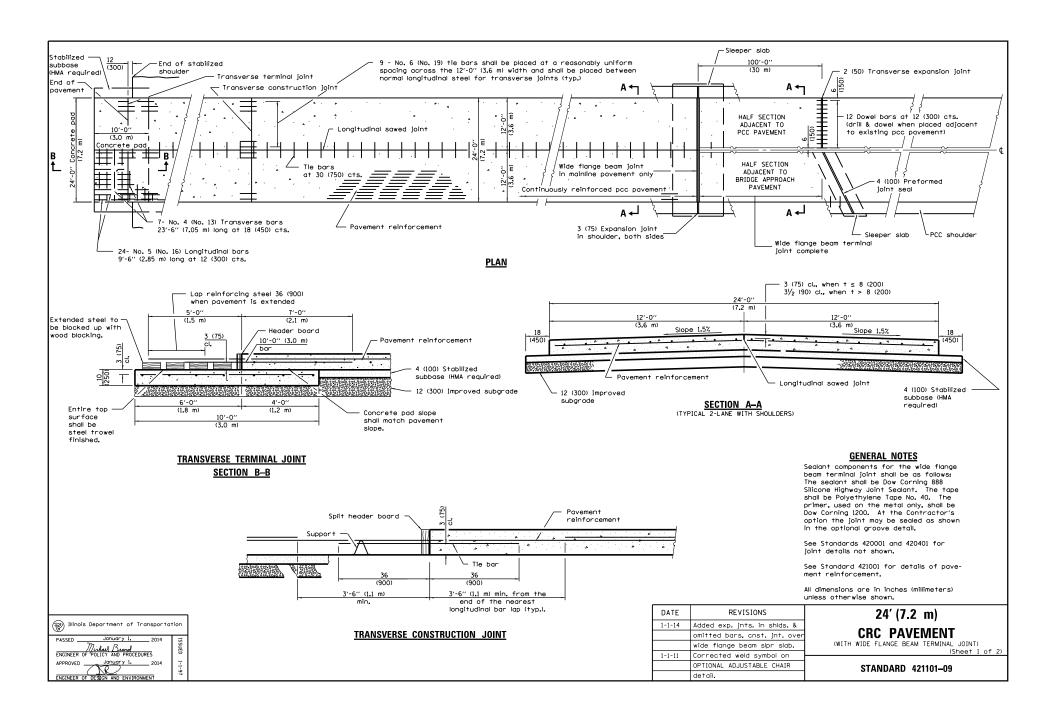
The minimum length of longitudinal bars shall be 30' (9 m) except as required to establish the lap arrangement selected.

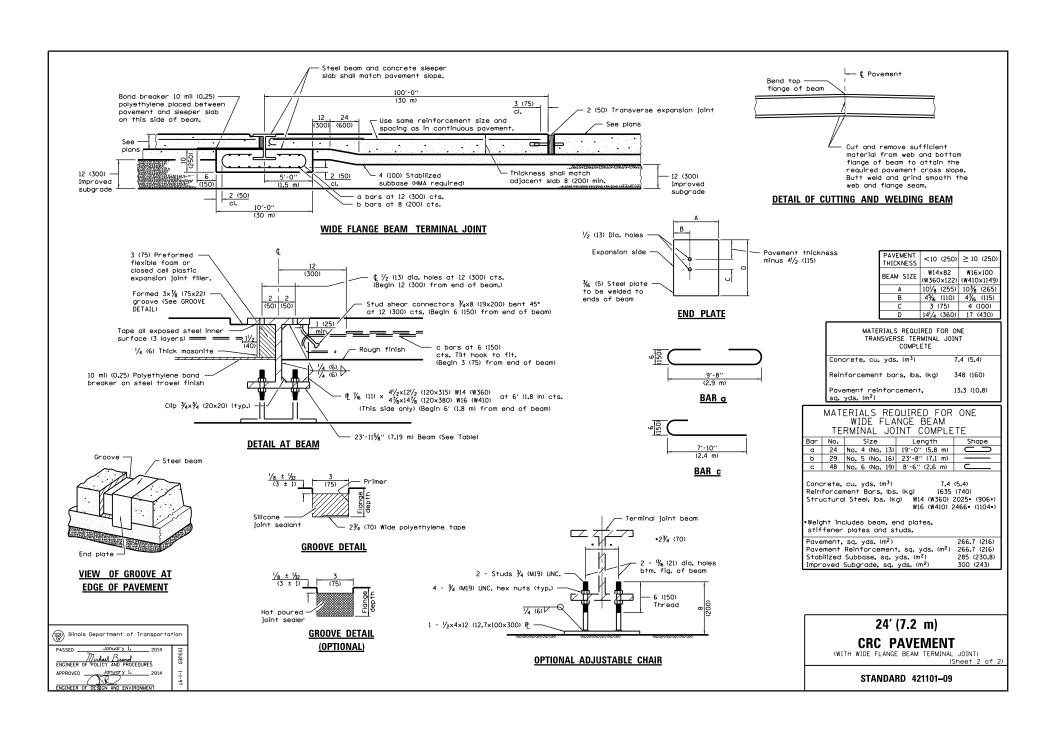
All dimensions are in inches (millimeters)

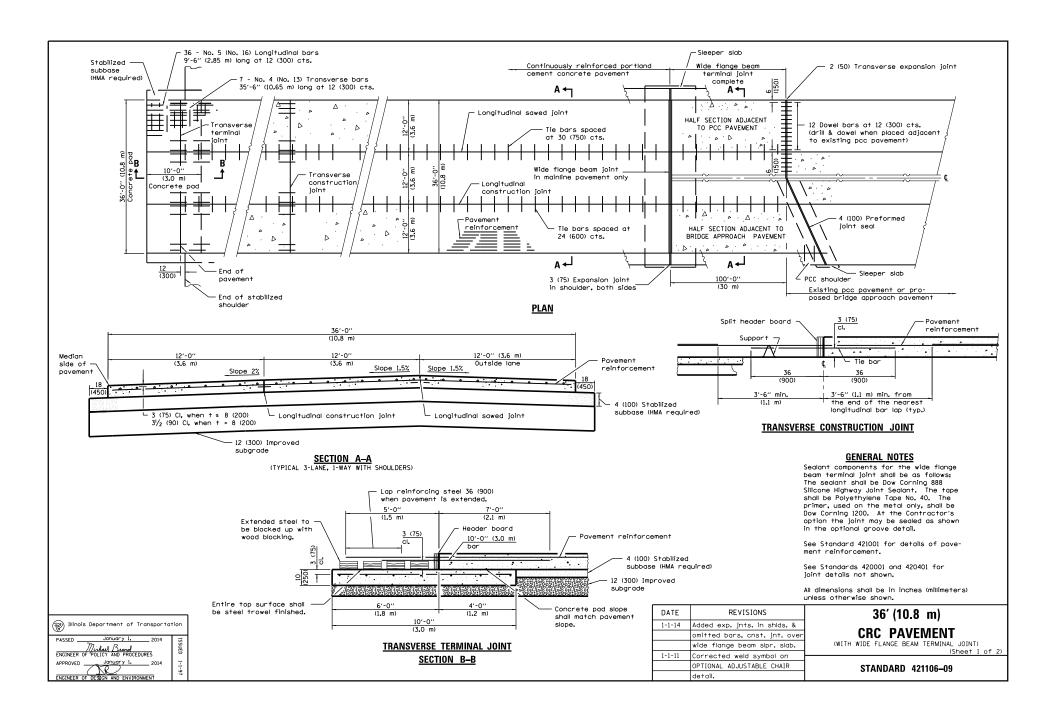
DATE	REVISIONS
4-1-16	Revised general notes
	with respect to 30'
	bar length.
1-1-08	Switched units to
	English (metric).

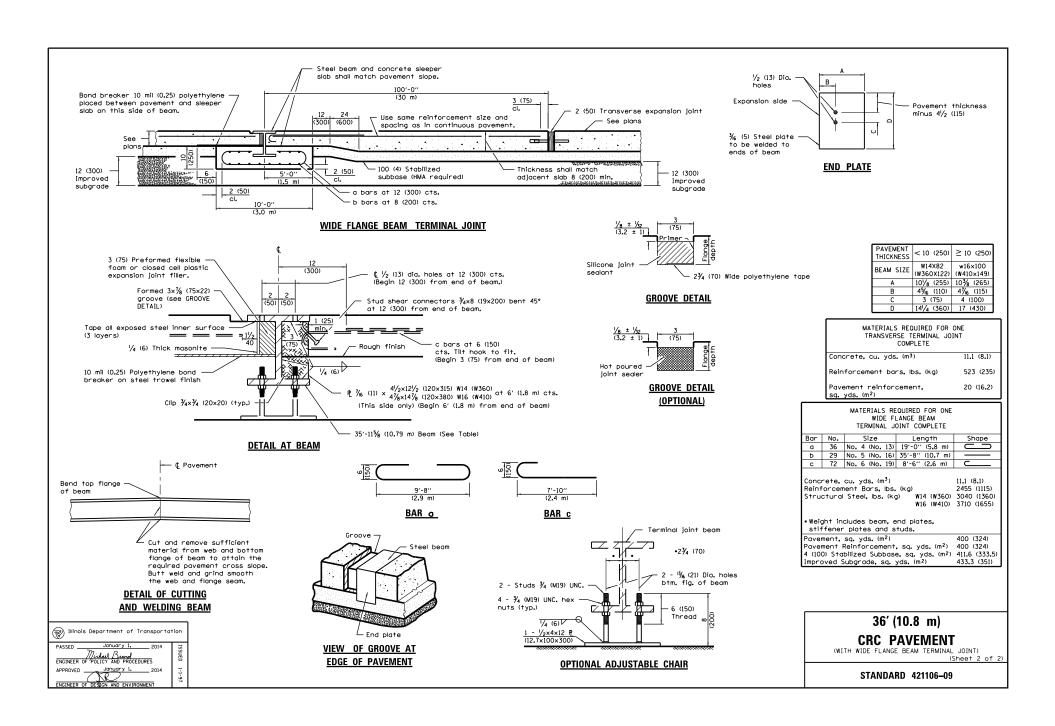
BAR REINFORCEMENT FOR CRC PAVEMENT

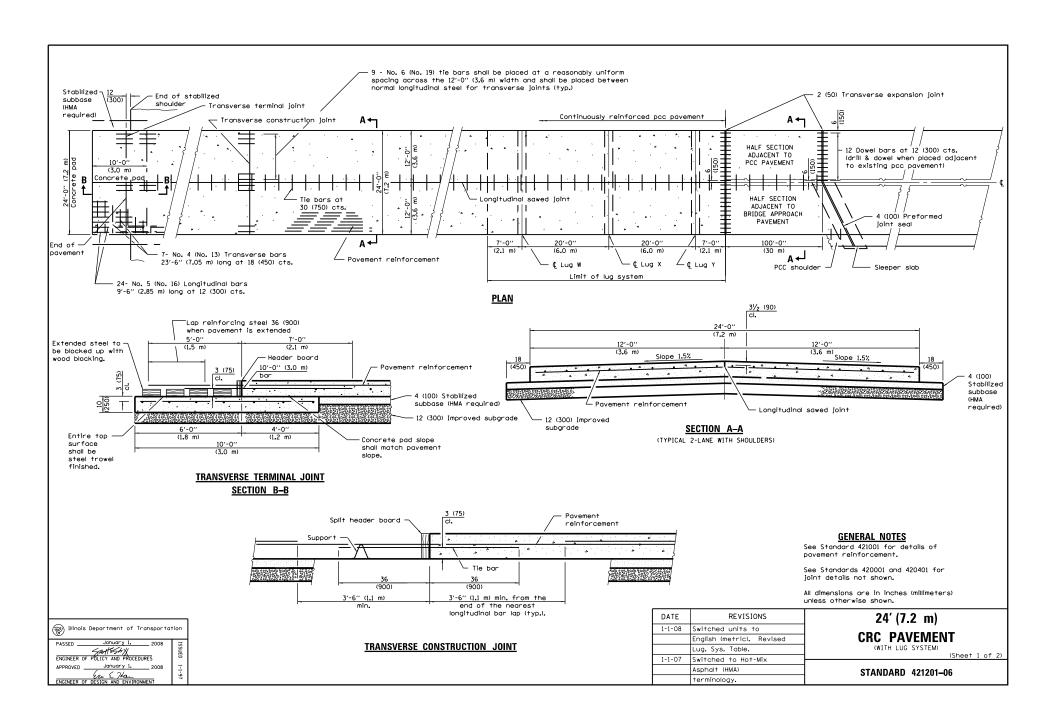
STANDARD 421001-03

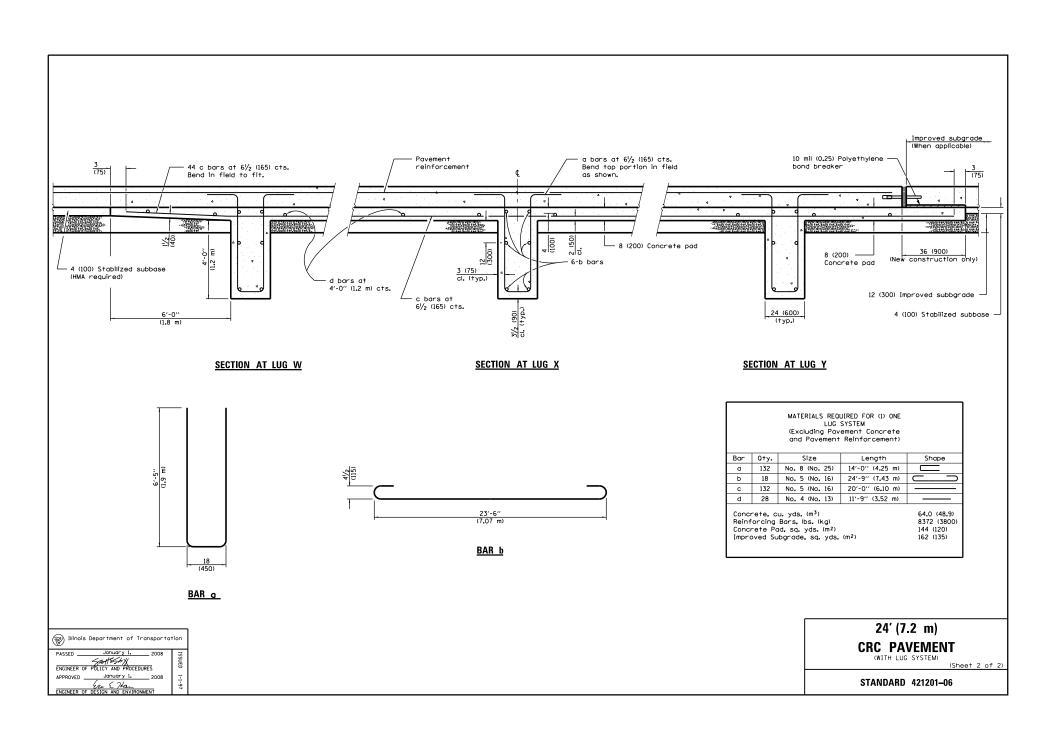


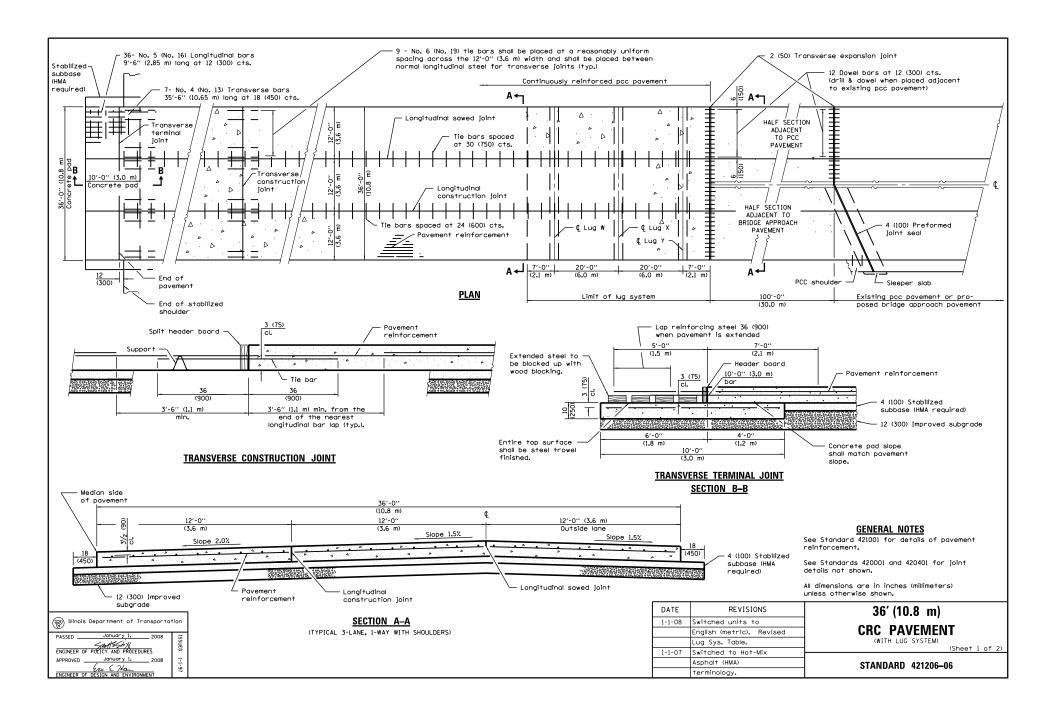


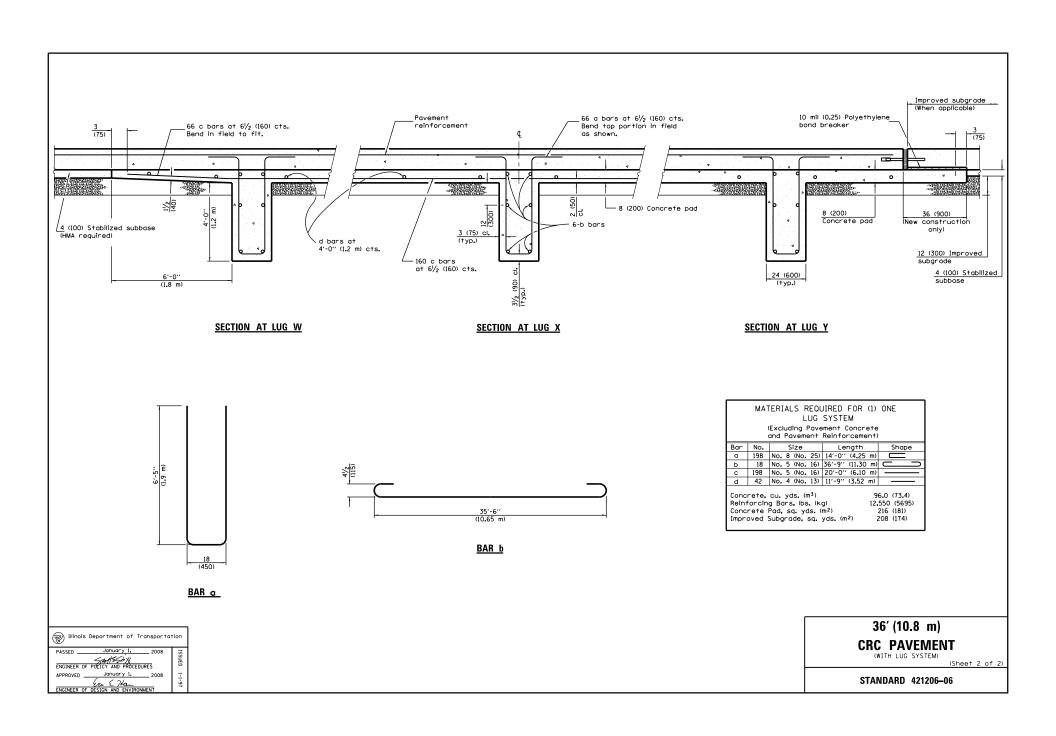


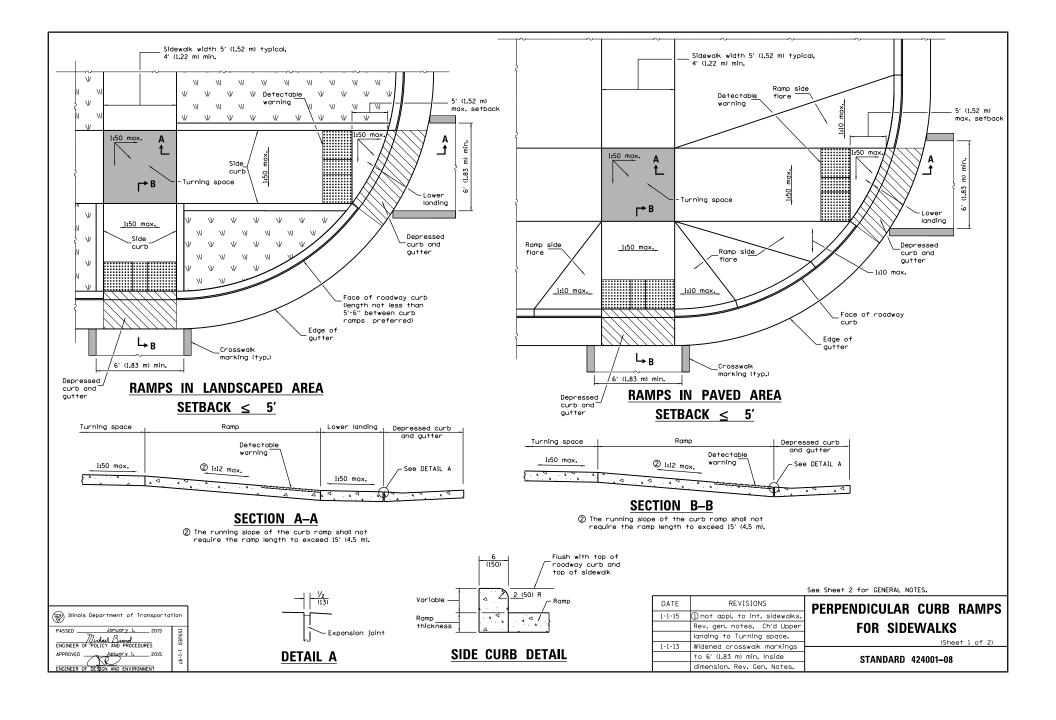


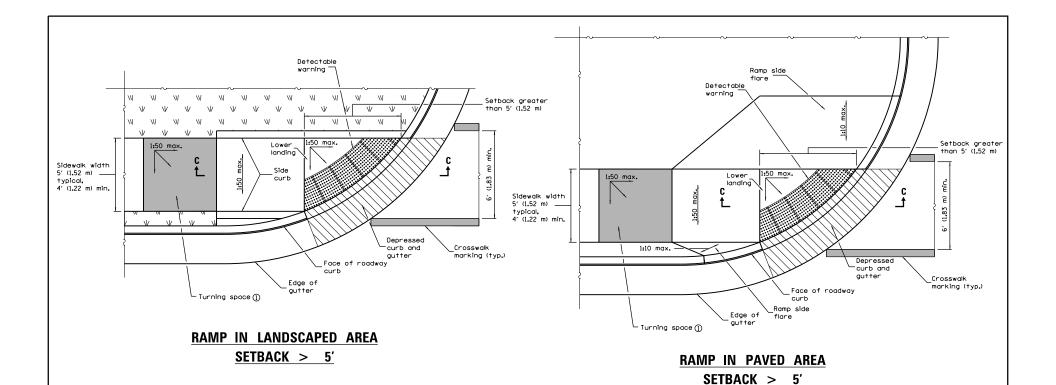














SECTION C-C

- ① Turning space not required for ramp slopes flatter than 1:20.
- ② The running slope of the curb ramp shall not require the ramp length to exceed 15' (4.5 m).

GENERAL NOTES

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H),

Where the turning space is constrained on a side opposite a ramp, the minimum length of the turning space in the direction of the ramp-run shall be 5' (1.52 m).

Where 1:50 maximum slope is shown, 1:64 is preferred.

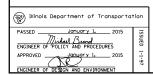
See Standard 606001 for details of depressed curb adjacent to curb ramp. $\begin{tabular}{ll} \hline \end{tabular}$

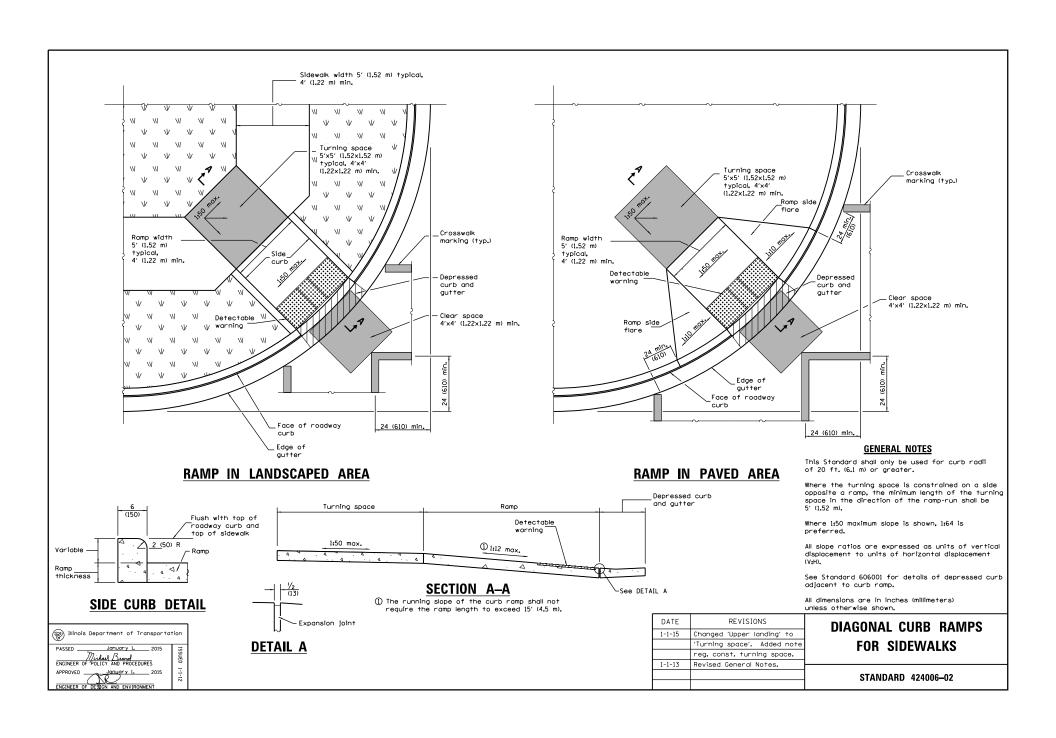
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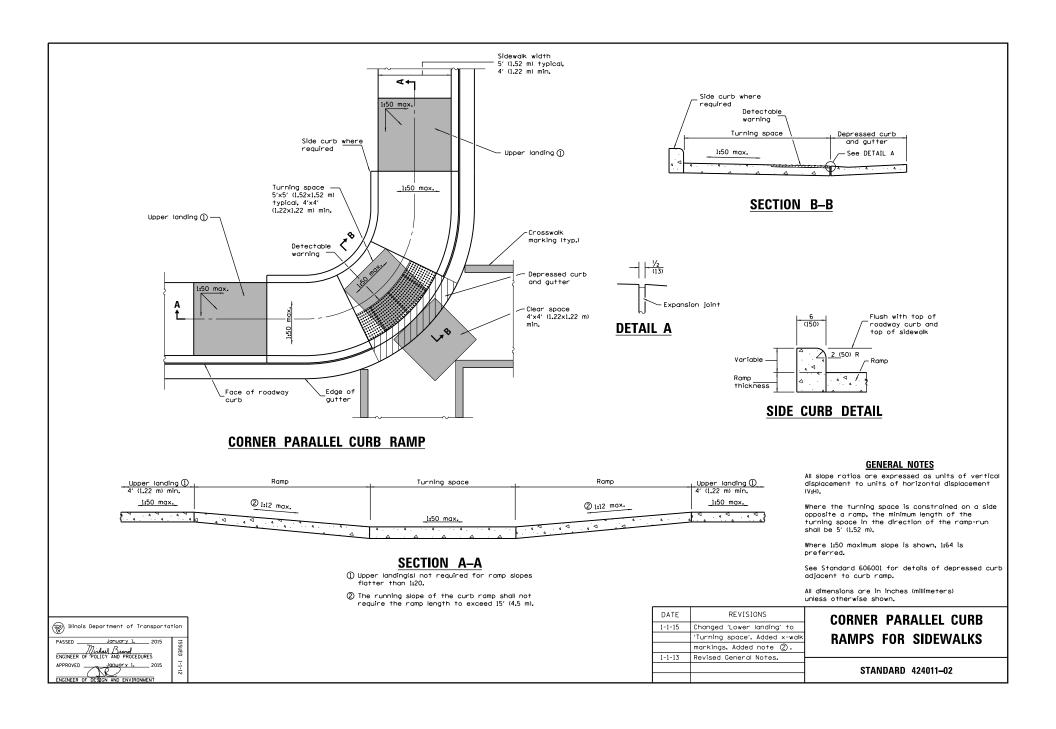
PERPENDICULAR CURB RAMPS FOR SIDEWALKS

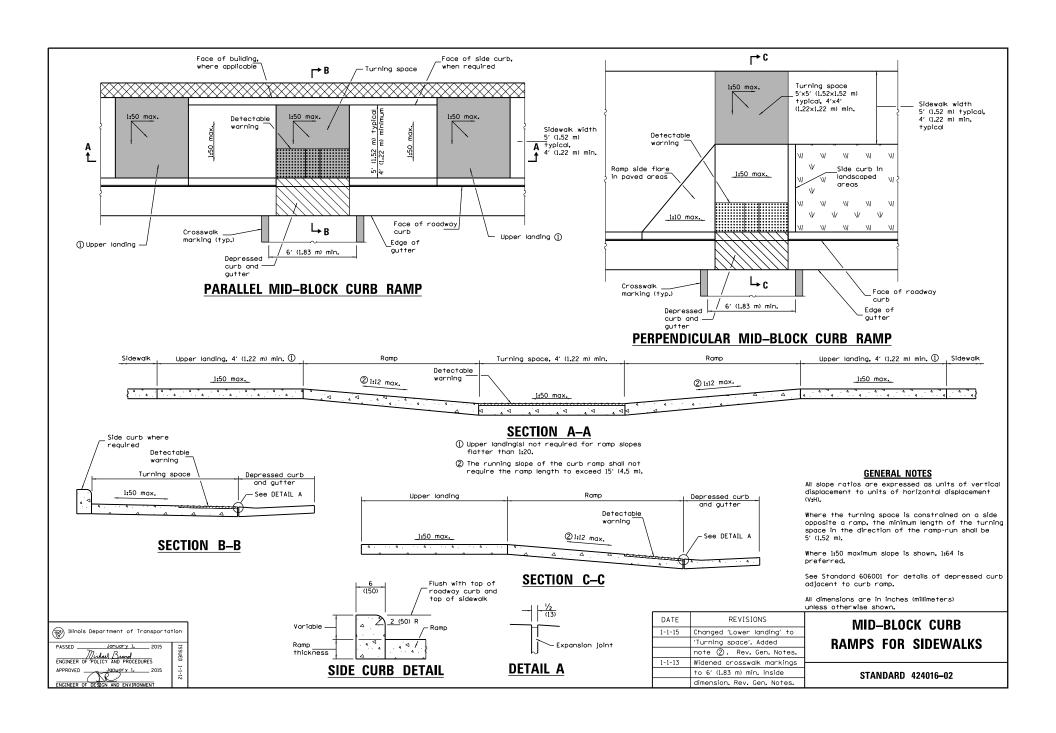
(Sheet 2 of 2)

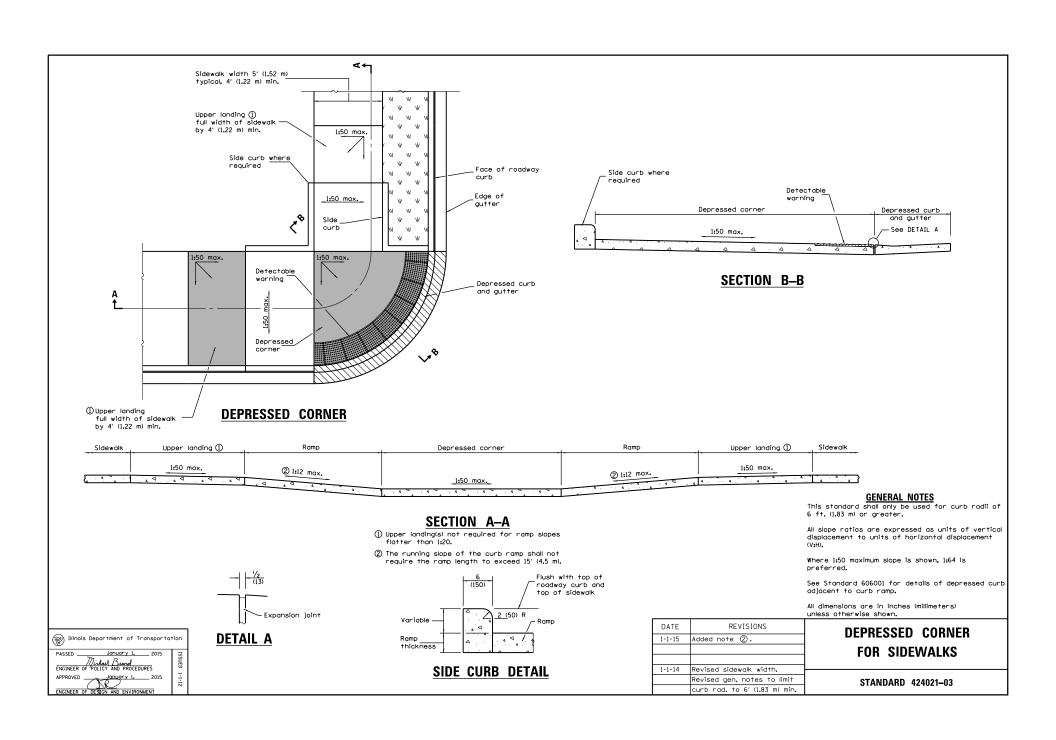
STANDARD 424001-08

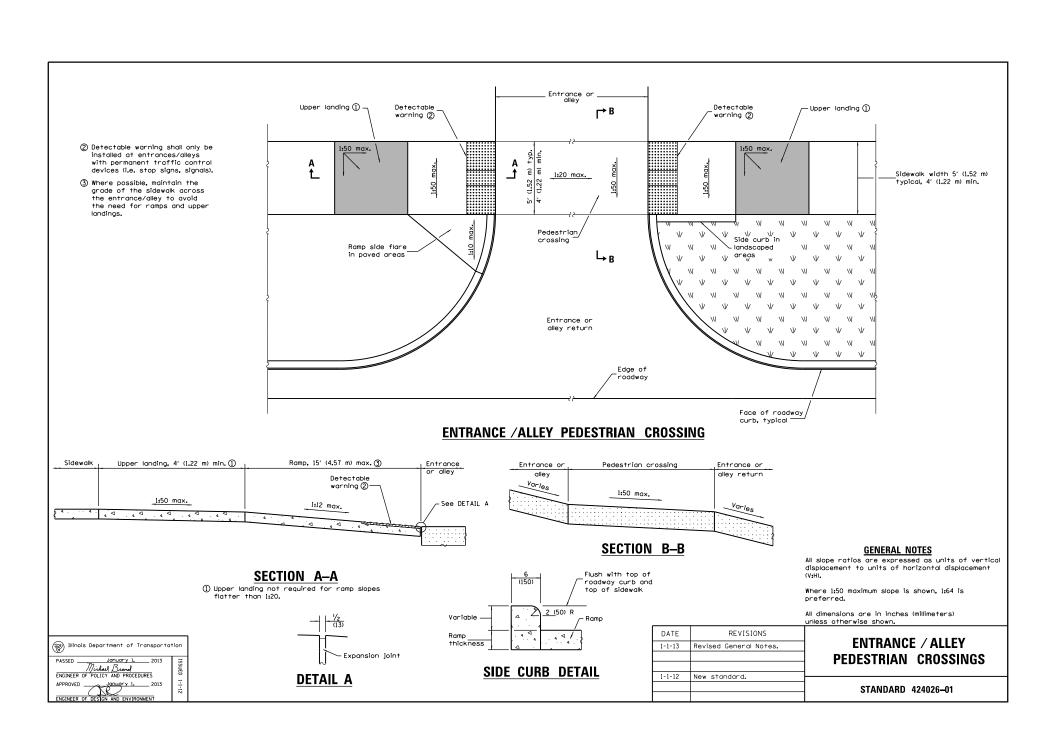


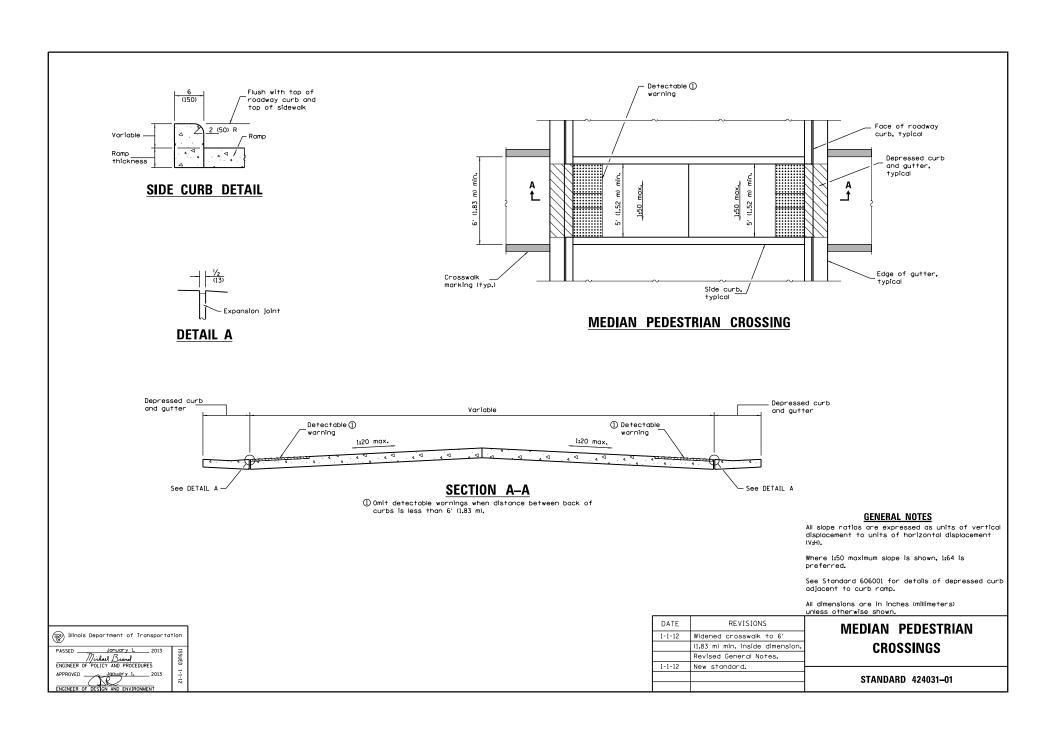


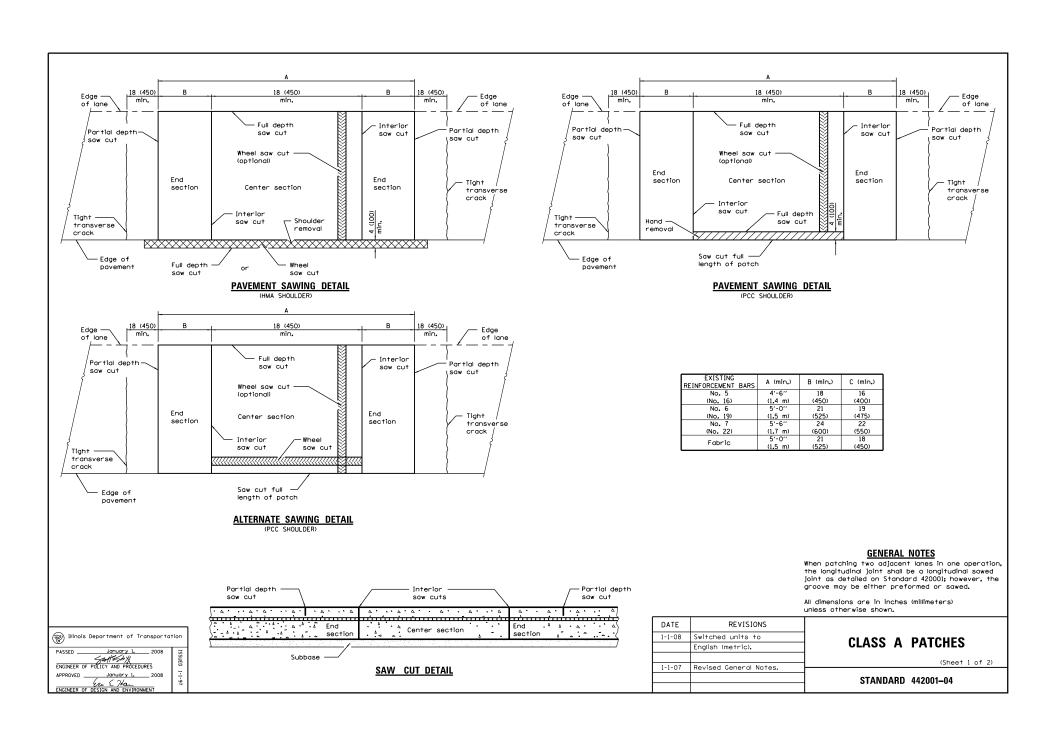


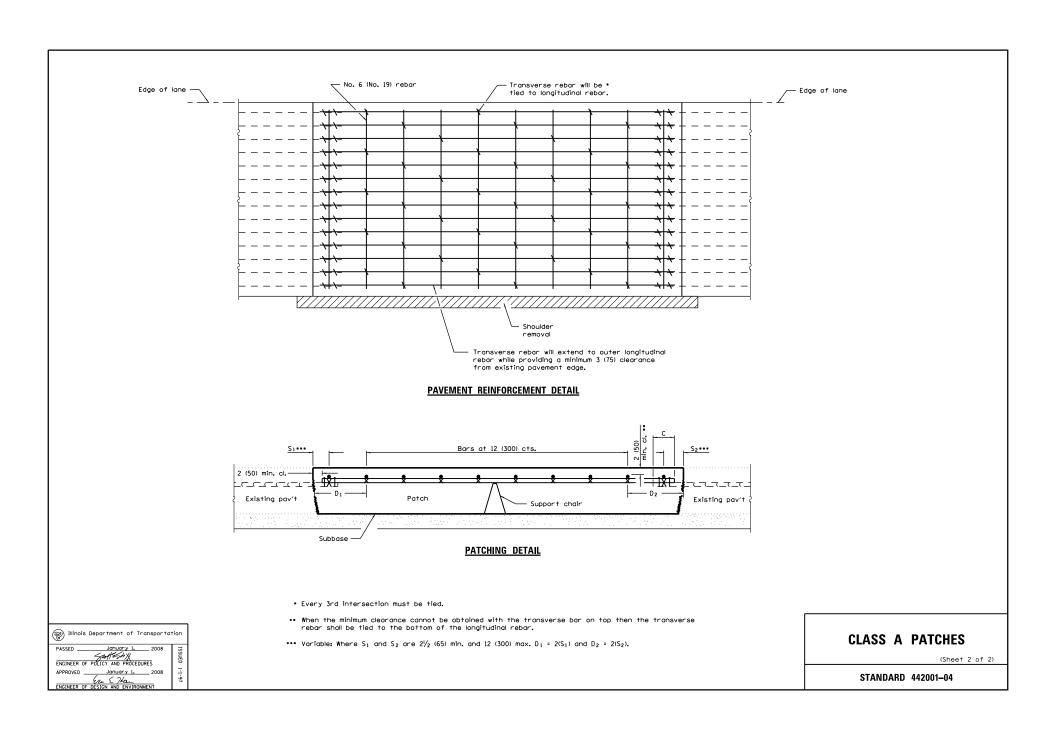


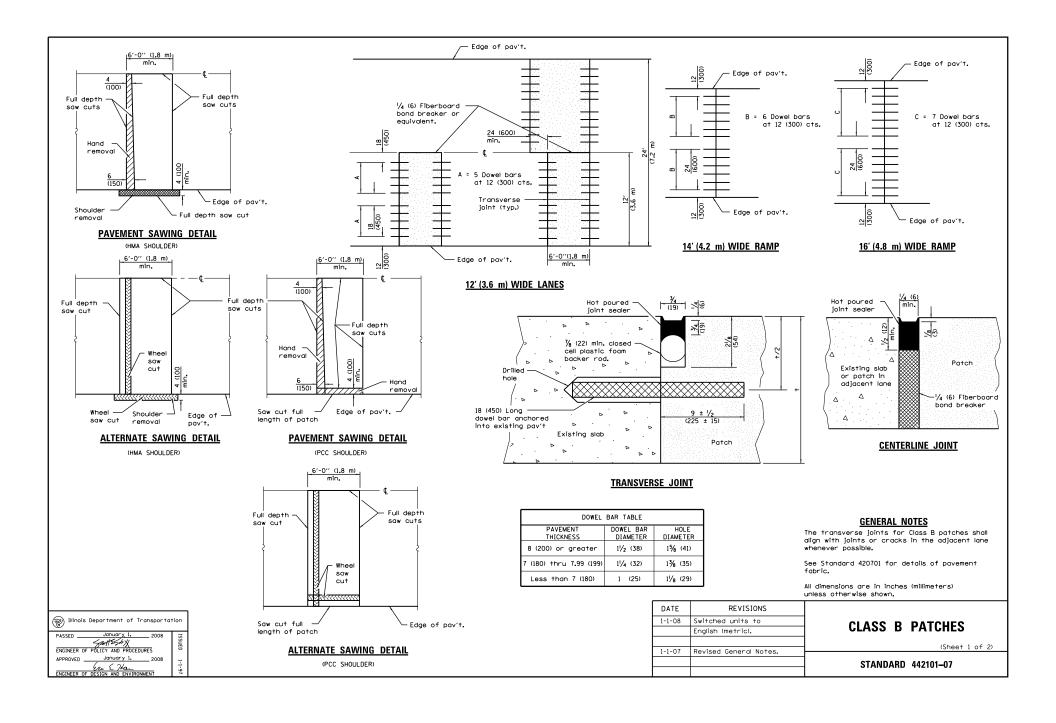


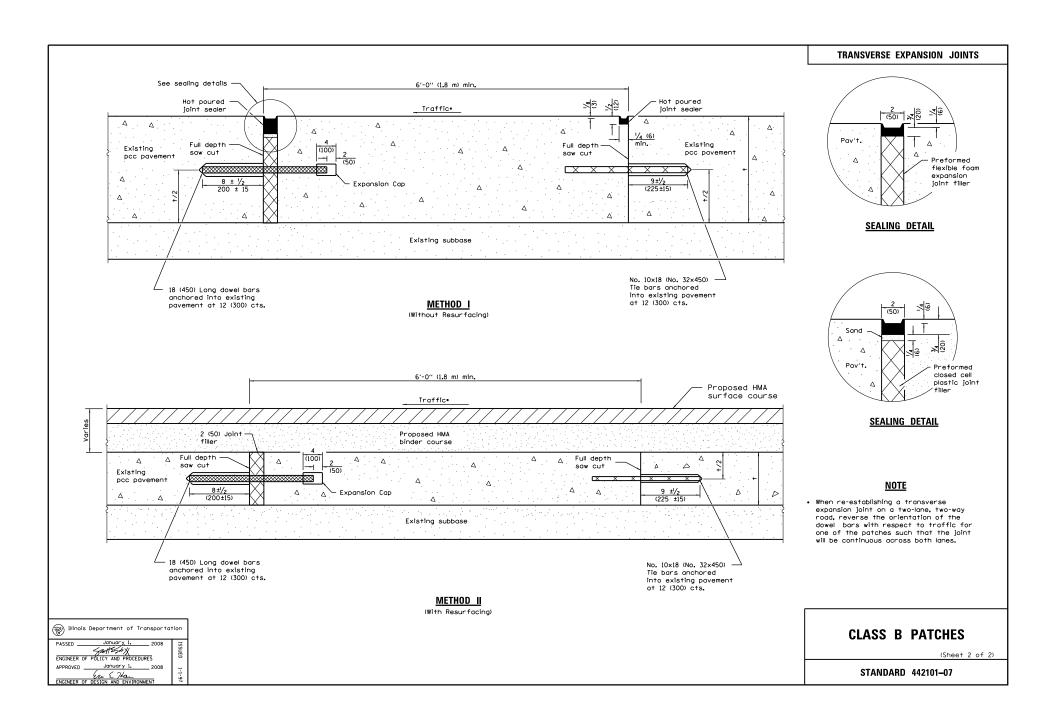


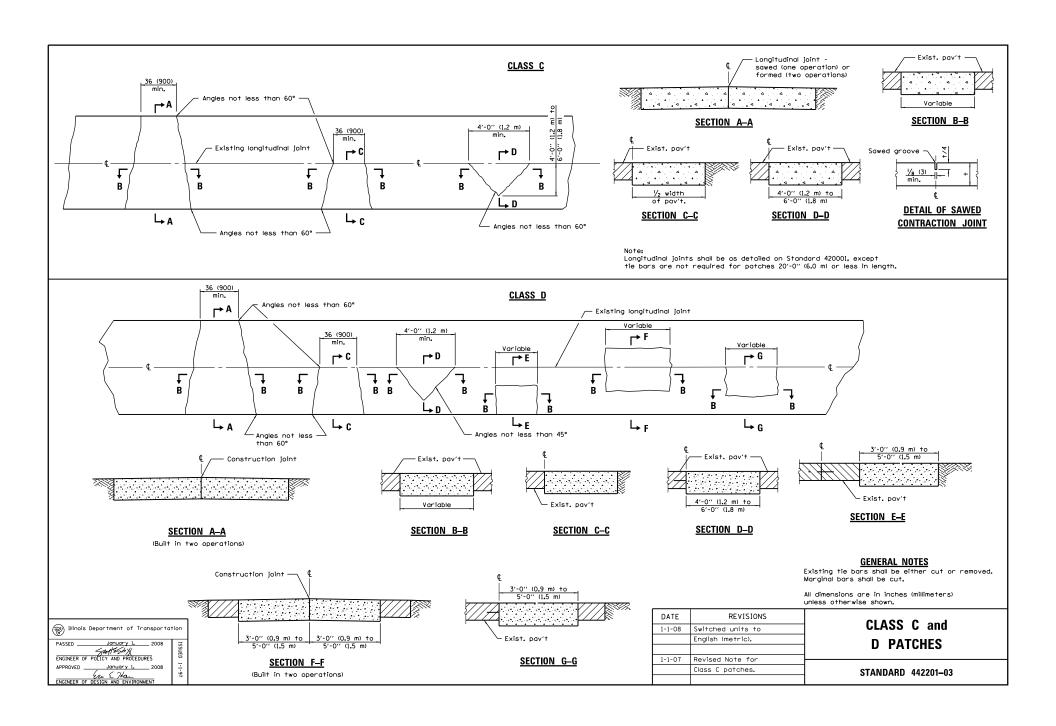


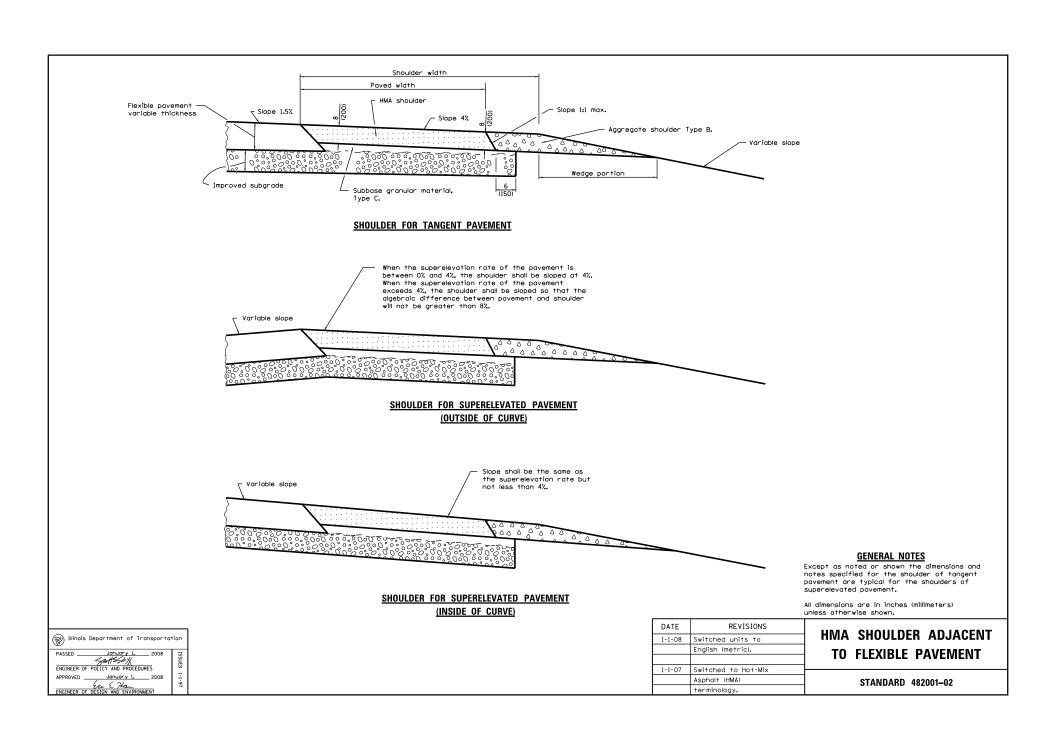


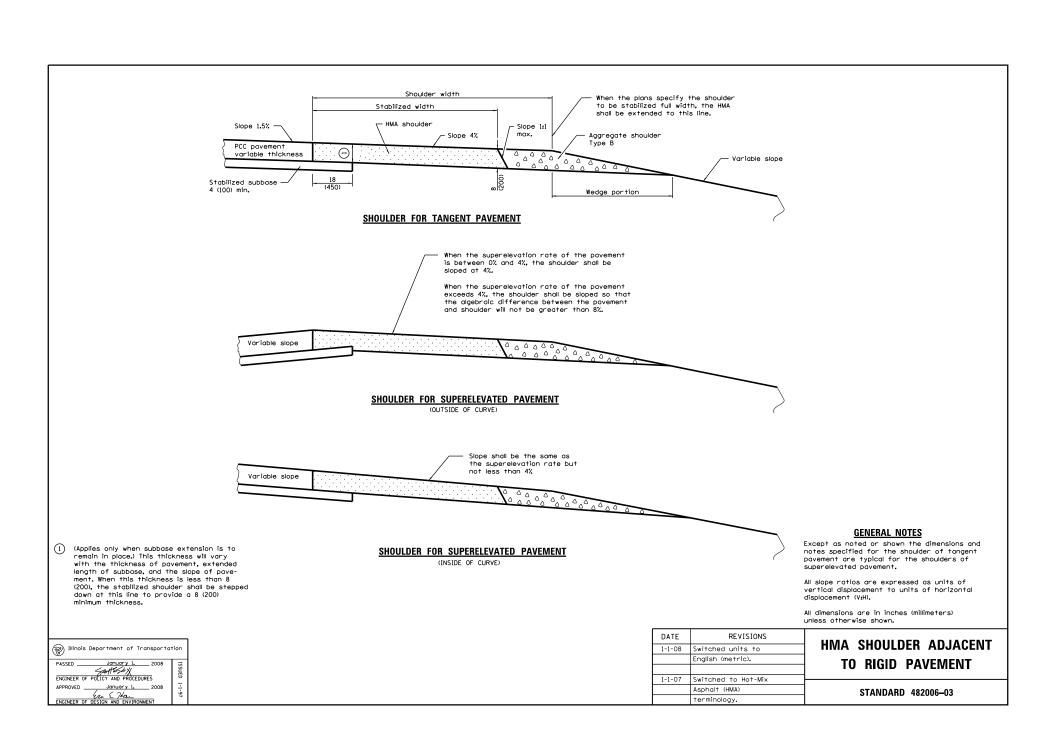


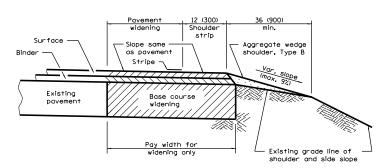






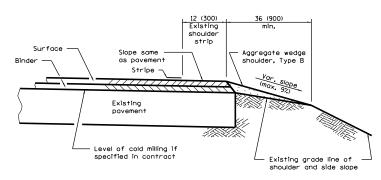






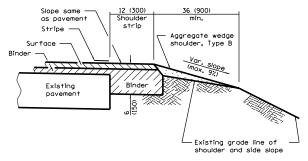
HMA SHOULDER STRIP AND AGGREGATE WEDGE WITH WIDENING

(Cross-section A)



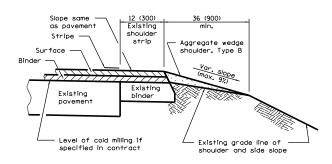
COLD MILLING AND/OR RESURFACING OF EXISTING PAVEMENT WITH SHOULDER STRIPS

(Cross-section C)



HMA SHOULDER STRIP AND AGGREGATE WEDGE WITH RESURFACING

(Cross-section B)



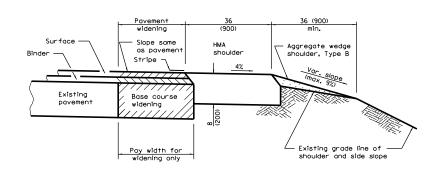
COLD MILLING AND/OR RESURFACING OF EXISTING PAVEMENT WITH SHOULDER STRIPS

(Cross-section D)

All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transporta	tion
PASSED January 1. 2008 Saft Saft X ENGINEER OF POLICY AND PROCEDURES	ISSUED
APPROVED January 1. 2008 Let 7/a_ ENGINEER OF DESIGN AND ENVIRONMENT	1-1-97

DATE	REVISIONS	HMA SHLD. STRIPS/SHLDS. WITH
1-1-08	Switched units to	RESURFACING OR WIDENING
	English (metric).	
		AND RESURFACING PROJECTS
1-1-07	Switched to Hot-Mix	(Sheet 1 of 2)
	Asphalt (HMA)	STANDARD 482011-03
	terminology.	3 TANUANU 402UTI-U3



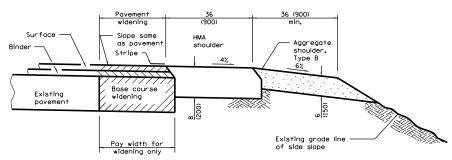
Stripe Surface Binder Binder Existing pavement Surface Existing pavement Surface Existing pavement Surface Existing pavement Surface Existing pavement Existing grade line of shoulder and side slope

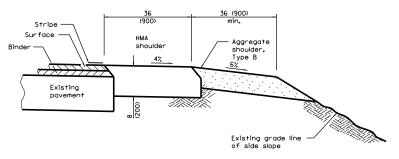
HMA SHOULDER AND AGGREGATE

HMA SHOULDER AND AGGREGATE WEDGE WITH WIDENING

(Cross-section E)







HMA AND AGGREGATE SHOULDERS WITH WIDENING

(Cross-section F)

HMA AND AGGREGATE SHOULDERS WITH RESURFACING

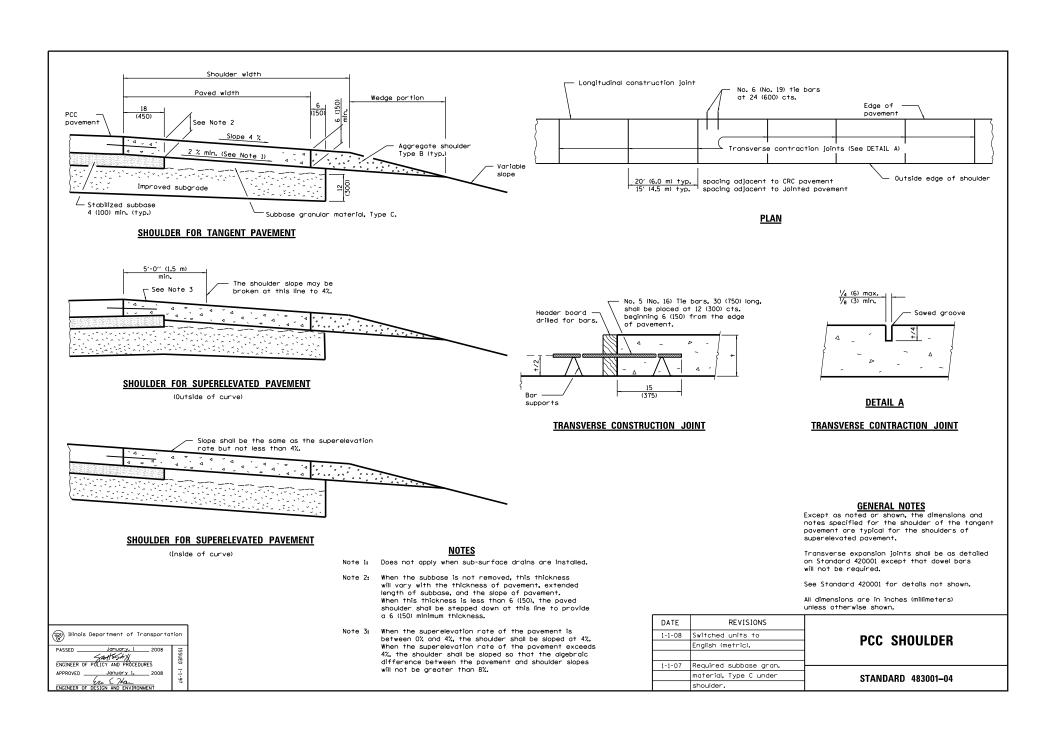
(Cross-section H)

Illinois Department of Transporta	ion
PASSED January, 1. 2008	SI
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ENGINEER OF POLICY AND PROCEDURES	0
APPROVEDJanuary l,2008	Ξ
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ENGINEER OF DESIGN AND ENVIRONMENT	

HMA SHLD. STRIPS/SHLDS. WITH RESURFACING OR WIDENING AND RESURFACING PROJECTS

(Sheet 2 of 2)

STANDARD 482011-03

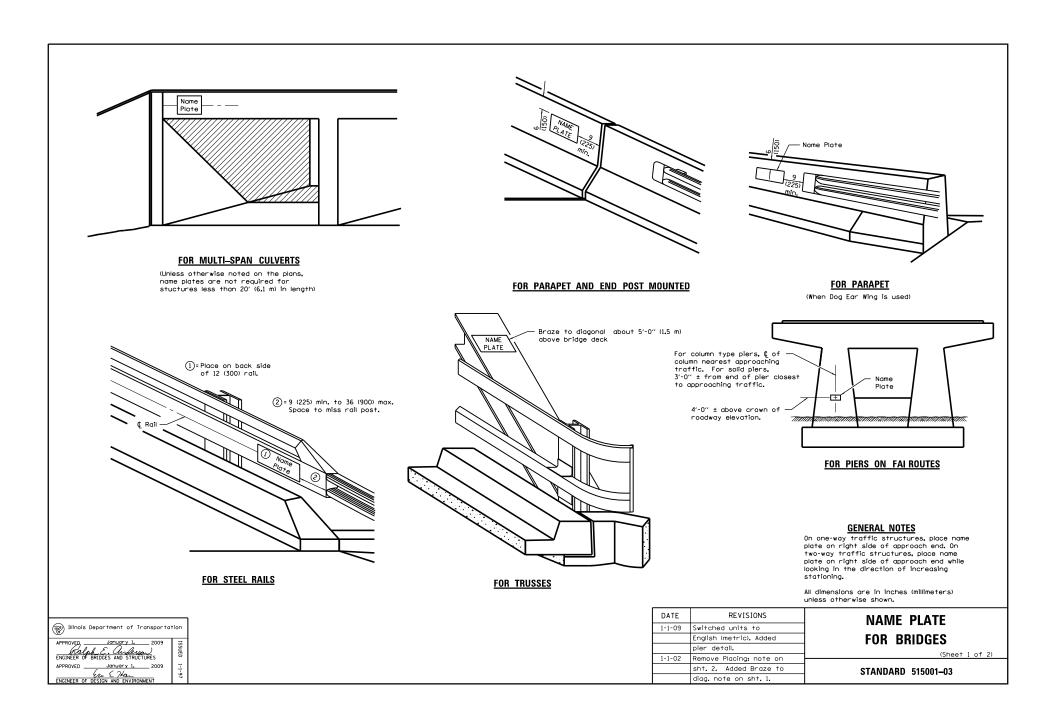


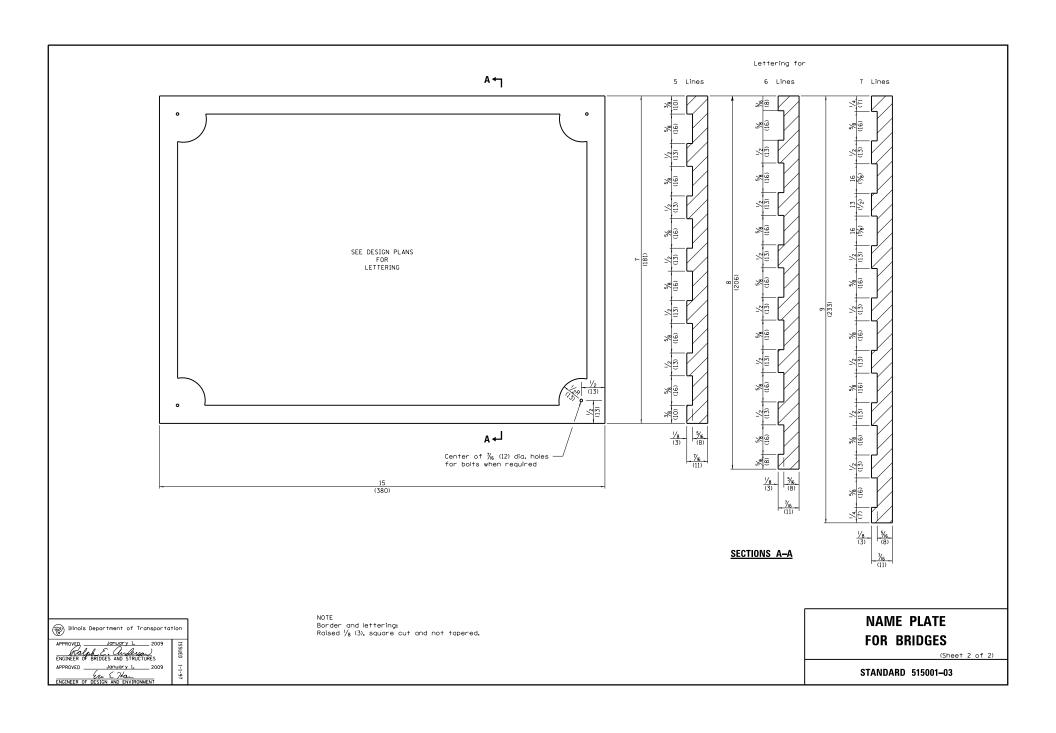


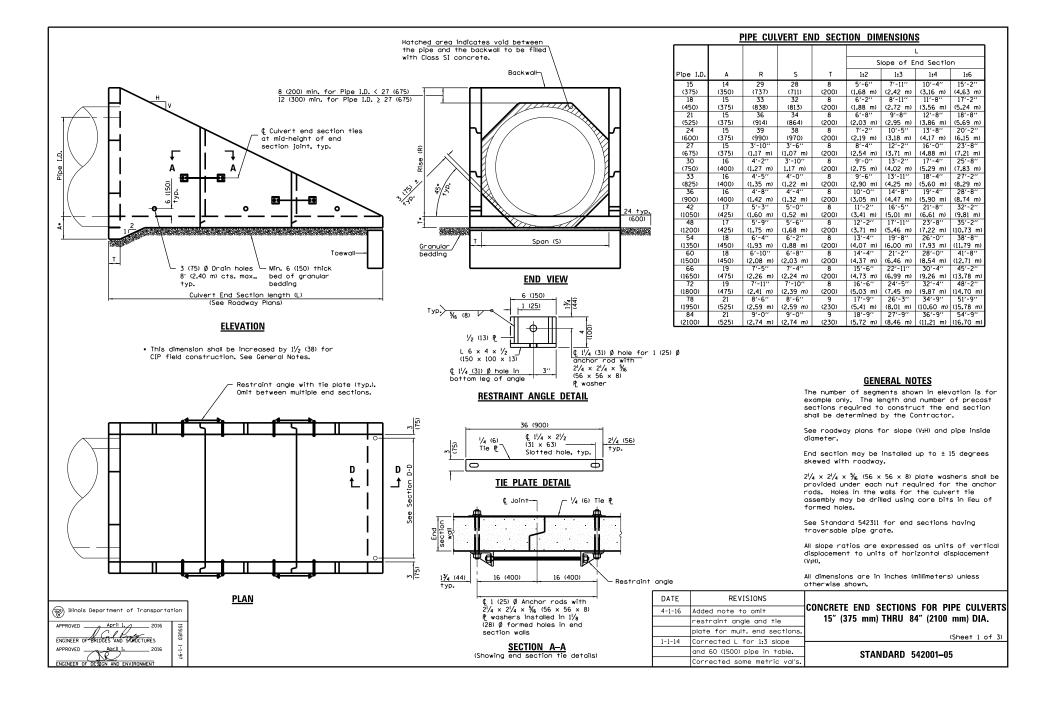
Standards by Division

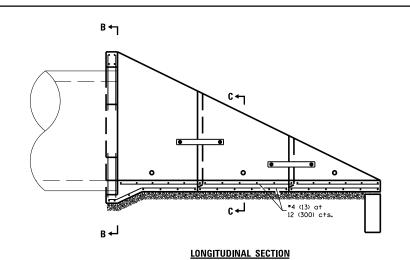
DIVISION 500 BRIDGES and CULVERTS

STD. NO.	TITLE
BRIDGES	
515001-03	Name Plate for Bridges
CULVERTS	
542001-05	Concrete End Sections for Pipe Culverts 15" (375 mm) thru 84" (2100 mm) Diameter
542011-01	Concrete End Sections for Elliptical Pipe Culverts 15" (375 mm) thru 72" (1800 mm) Equivalent Diameter
542201-02	Reinforced Concrete End Sections for Pipe Culverts, 15" (375 mm) thru 36" (900 mm) Diameter Skewed With Roadway
542206-04	Reinforced Concrete End Sections for Pipe Culverts, 42" (1050 mm) thru 60" (1500 mm) Diameter Skewed With Roadway
542301-03	Precast Reinforced Concrete Flared End Section
542306-03	Precast Reinforced Concrete Elliptical Flared End Section
542311-06	Traversable Pipe Grate
542401-02	Metal End Section for Pipe Culverts
542406-02	Metal End Section for Pipe Arches
542501-02	Inlet Box Type 24 (600) A
542506-03	Inlet Box Type 24 (600) B
542511-02	Inlet Box Type 24 (600) C
542516-03	Inlet Box Type 24 (600) D
542521-02	Inlet Box Type 24 (600) E
542526-03	Inlet Box Type 24 (600) F
542531-04	Inlet Box Type 24 (600) G
542536-03	Inlet Box Type 36 (900) A
542541-02	Inlet Box Type 48 (1200) A
542546-01	Flush Inlet Box for Median
542601-03	Reinforced Concrete Pipe Elbow 24", 30" or 36" (600 mm, 750 mm or 900 mm)
542606-02	Reinforced Concrete Pipe Tee

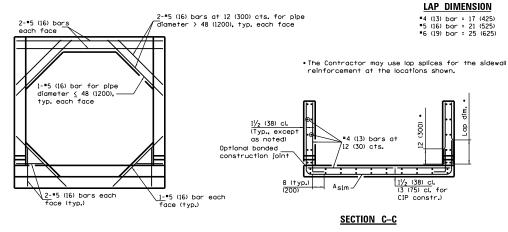






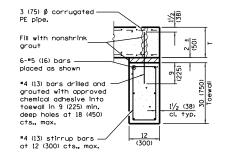


(Showing bottom slab and backwall reinforcement.)



SECTION B-B

(Showing backwall reinforcement only.)
(Pipe omitted for clarity.)



SECTION D-D

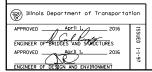
REINFORCEMENT SCHEDULE

		A _{slm}						
Pipe I.D.	Bar Size	Bar Spacing						
15	4	12						
(375)	(13)	(300)						
18	4	12						
(450)	(13)	(300)						
21	4	12						
(525)	(13)	(300)						
24	4	12						
(600)	(13)	(300)						
27	4	12						
(675)	(13)	(300)						
30	4	12						
(750)	(13)	(300)						
33	(13)	(300)						
(825)	4	12						
(900)	(13)	(300)						
42	4	8						
(1050)	(13)	(200)						
48	4	8						
(1200)	(13)	(200)						
54	5	8						
(1350)	(16)	(200)						
60	5	8						
(1500)	(16)	(200)						
66	5	8						
(1650)	(16)	(200)						
72	6	8						
(1800)	(19)	(200)						
78	6	8						
(1950)	(19)	(200)						
84	6	8 (200)						
(2100)	(19)	(200)						

CONCRETE END SECTIONS FOR PIPE CULVERTS 15" (375 mm) THRU 84" (2100 mm) DIA.

(Sheet 2 of 3)

STANDARD 542001-05



QUANTITIES

			yd³(m³) ①		Rein-	forcement Wit	thout Lap lbs.	(kg)	Reinforcement With Lap lbs (kg)							
		Slope of E	nd Section			Slope of E	nd Section			Slope of E	nd Section					
ipe I.D.	1:2	1:3	1:4	1:6	1:2	1:3	1:4	1:6	1:2	1:3	1:4	1:6				
15	1.3	1.7	2.1	2.8	190	230	280	360	210	260	310	410				
(375)	(1.0)	(1.3)	(1.6)	(2.1)	(85.2)	(104.1)	(123.3)	(159.2)	(94.9)	(117.6)	(140.3)	(182.9)				
18	1.6	2.1	2.6	3.5	230	290	350	460	260	330	400	520				
(450)	(1.2)	(1.6)	(2.0)	(2.7)	(104.3)	(131.1)	(158.0)	(207.3)	(114.8)	(146.0)	(177.3)	(234.0)				
21	1.8	2.3	2.9	3.9	260	320	380	510	280	360	430	580				
(525)	(1.4)	(1.8)	(2.2)	(3.0)	(114.5)	(143.3)	(172.2)	(229.9)	(126.5)	(159.7)	(193.0)	(259.5)				
24	2.1	2.7	3.3	4.5	270	350	420	560	300	390	470	630				
(600)	(1.6)	(2.1)	(2.5)	(3.4)	(121.9)	(155.8)	(189.3)	(251.5)	(133.9)	(172.8)	(211.6)	(282.6)				
27	2.6	3.4	4.2	5.8	350	440	540	740	380	480	600	830				
(675)	(2.0)	(2.6)	(3.2)	(4.4)	(155.5)	(198.5)	(244.4)	(336.3)	(169.6)	(217.8)	(269.6)	(373.2)				
30	2.9	3.9	4.9	6.8	380	490	600	830	410	530	660	920				
(750)	(2.2)	(3.0)	(3.7)	(5.2)	(169.6)	(219.2)	(271.9)	(374.0)	(184.5)	(240.0)	(299.2)	(413.9)				
33	3.2	4.3	5.3	7.4	400 (179 . 7)	520	640	880 (397 . 6)	430	570	710	970				
(825)		(2.4) (3.3)		(4.1) (5.7)			(234.9) (290.3)		(195.2)	(257.2)	(319.0)	(438.9)				
36	3.5	4.7	5.9	8.3	440	580	720	990	480	630	780	1090				
(900)	(2.7)	(3.6)	(4.5)	(6.3)	(197.8)	(262.4)	(323.8)	(449.4)	(214.2)	(286.1)	(354.0)	(493.7)				
42	4.3	5.8	7.3	10.3	570	770	950	1330	620	840	1040	1470				
(1050)	(3.3)	(4.4)	(5.6)	(7.9)	(256.4)	(346.4)	(429.0)	(601.3)	(279.4)	(380.0)	(471.6)	(663.7)				
48	5.0	6.8	8.6	12.2	670	910	1140	1610	720	990	1240	1760				
(1200)	(3.8)	(5.2)	(6.6)	(9.3)	(301.1)	(409.9)	(514.8)	(728.2)	(325.6)	(445.8)	(561.2)	(796.8)				
54	6.0	8.2	10.3	14.7	890	1200	1530	2170	990	1340	1710	2440				
(1350)	(4.6)	(6.3)	(7.9)	(11.2)	(403.6)	(544.5)	(692.0)	(985.0)	(448.6)	(608.1)	(775.8)	(1108.2)				
60	6.8	9.3	11.8	16.8	1020	1400	1780	2530	1120	1550	1980	2820				
(1500)	(5.2)	(7.1)	(9.0)	(12.8)	(461.5)	(635.3)	(806.8)	(1149.8)	(508.8)	(704.5)	(896.8)	(1281.5)				
66	7.9	10.9	13.8	19.7	1150	1570	2010	2880	1260	1730	2220	3190				
(1650)	(6.0)	(8.3)	(10.6)	(15.1)	(519.0)	(712.4)	(911.1)	(1305.8)	(570.2)	(786.1)	(1007.9)	(1449.3)				
72	8.8	12.2	15.5	22.2	1520	2120	2690	3880	1710	2400	3050	4410				
(1800)	(6.7)	(9.3)	(11.9)	(17.0)	(689.9)	(962.1)	(1222.5)	(1761.3)	(777.0)	(1088.2)	(1384.8)	(2001.0)				
78	11.4	15.8	20.1	28.9	1750	2400	3100	4490	1950	2700	3490	5060				
(1950)	(8.7)	(12.1)	(15.4)	(22.1)	(791.1)	(1090.7)	(1409.0)	(2039.7)	(885.5)	(1223.1)	(1583.9)	(2298.9)				
84	12.6	17.4	22.3	32.1	1900	2680	3430	4960	2120	3000	3840	5560				
(2100)	(9.6)	(13.3)	(17.0)	(24.5)	(862.7)	(1217.4)	(1558.6)	(2254.4)	(959.6)	(1359.6)	(1743.2)	(2526.8)				

 $\textcircled{\scriptsize 1}$ For cast-in-place construction, increase concrete volumes by approximately 12%.

Illinois Department of Transportation

APPROVED

APPRIL 2016

ENGINEER OF BRIDGES AND STRUCTURES

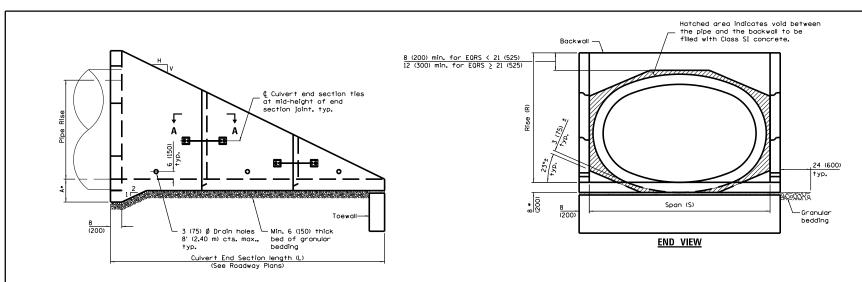
APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

CONCRETE END SECTIONS FOR PIPE CULVERTS 15" (375 mm) THRU 84" (2100 mm) DIA.

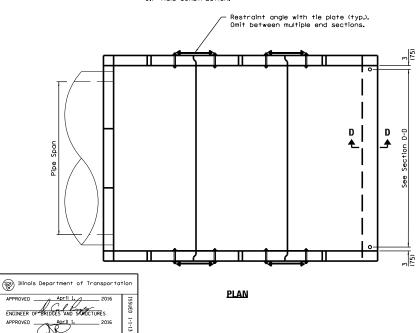
(Sheet 3 of 3)

STANDARD 542001-05



ELEVATION

• This dimension shall be increased by $1\frac{1}{2}$ (38) for CIP field construction.



ENGINEER OF BRIDGES AND STRUCTURES

APPROVED April 1. 2
ENGINEER OF DESIGN AND ENVIRONMENT

PIPE CULVERT END SECTION DIMENSIONS

						DIMETRO			
								L	
Equivalent						S	lope of E	nd Sectio	'n
Round Size	Pipe	Pîpe		_					
Pîpe I.D.	Span	Rise	A	R	S	1:2	1:3	1:4	1:6
15	23	14	15	28	36	5'-4''	7'-8''	10'-0''	14'-8''
(375)	(575)	(350)	(375)	(711)	(914)	(1.62 m)	(2.34 m)	(3.05 m)	(4.47 m)
18	23	14	15	28	36	5'-4''	7'-8''	10'-0''	14'-8''
(450)	(575)	(350)	(375)	(711)	(914)	(1.62 m)	(2.34 m)	(3.05 m)	(4.47 m)
21	30	19	15	38	3'-8''	7'-0"	10'-2"	13'-4"	19'-8''
(525)	(750)	(475)	(375)	(365)	(1.12 m)	(2.14 m)	(3.10 m)	(4.07 m)	(6.00 m)
24	30	19	15	38	3'-8''	7'-0"	10'-2"	13'-4"	19'-8''
(600)	(750)	(475)	(375)	(965)	(1.12 m)	(2.14 m)	(3.10 m)	(4.07 m)	(6.00 m)
27	34	22	15	3′-5′′	4'-0''	7'-6''	10'-11"	14'-4''	21'-2"
(675)	(850)	(550)	(375)	(1.04 m)	(1.22 m)	(2.29 m)	(3.33 m)	(4.38 m)	(6.46 m)
30	38	24	15	3'-7"	4'-4''	7'-10"	11'-5"	15'-0''	22'-2"
(750)	(950)	(600)	(375)	(1.09 m)	(1.32 m)	(2.39 m)	(3,48 m)	(4.57 m)	(6.75 m)
36	45	29	16	4'-1"	5'-0''	8'-10"	12'-11"	17'-0''	25'-2"
(900)	(1125)	(725)	(400)	(1.24 m)	(1.52 m)	(2.69 m)	(3,94 m)	(5,18 m)	(7.67 m)
42	53	34	16	4'-6"	5'-10"	9'-8''	14'-2"	18'-8''	27'-8"
(1050)	(1325)	(850)	(400)	(1.37 m)	(1.78 m)	(2.95 m)	(4.32 m)	(5.69 m)	(8.44 m)
48	60	38	17	4'-11''	6'-6"	10'-6"	15'-5"	20'-4"	30'-2"
(1200)	(1500)	(950)	(425)	(1.50 m)	(1.98 m)	(3.20 m)	(4.71 m)	(6.21 m)	(9.21 m)
54	68	43	17	5'-4''	7'-2''	11'-4"	16'-8"	22'-0"	32'-8"
(1350)	(1700)	(1075)	(425)	(1.63 m)	(2.18 m)	(3.45 m)	(5.08 m)	(6.71 m)	(9.96 m)
60	76	48	18	5'-10''	8'-0"	12'-4"	18'-2"	24'-0"	35'-8''
(1500)	(1900)	(1200)	(450)	(1.78 m)	(2.44 m)	(3.76 m)	(5,54 m)	(7.32 m)	(10.87 m)
66	83	53	18	6'-3''	8'-8''	13'-2"	19'-5"	25'-8"	38'-2"
(1650)	(2075)	(1325)	(450)	(1.91 m)	(2.64 m)	(4.02 m)	(5.92 m)	(7.83 m)	(11.64 m)
72	91	58	19	6'-9"	9'-4''	14'-2"	20'-11"	27'-8"	41'-2"
(1800)	(2275)	(1450)	(475)	(2.06 m)	(2.84 m)	(4.32 m)	(6.38 m)	(8,44 m)	(12.56 m)

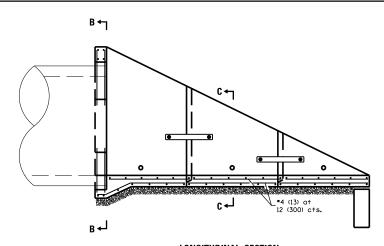
See Sheet 3 for GENERAL NOTES.

CONCRETE	REVISIONS	DATE
PIPE	Added note to omit	4-1-16
THRU 72" (restraint angle and tie	
111110 72 (plate for mult. end sections.	
	New standard.	1-1-13

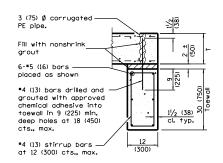
END SECTIONS FOR ELLIPTICAL E CULVERTS 15" (375 mm) (1800 mm) EQUIVALENT DIAMETER

(Sheet 1 of 3)

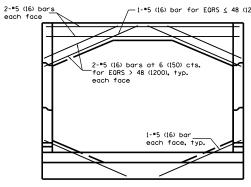
STANDARD 542011-01



LONGITUDINAL SECTION (Showing bottom slab and backwall reinforcement.)



SECTION D-D



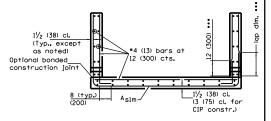
SECTION B-B (Showing backwall reinforcement only.) (Pipe omitted for clarity.)

-1-#5 (16) bar for EQRS ≤ 48 (1200), typ. each face

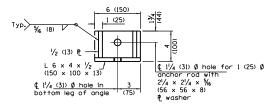
••• The Contractor may use lap splices for the sidewall reinforcement at the locations shown.

LAP DIMENSION

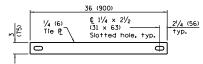
*4 (13) bar = 17 (425) *5 (16) bar = 21 (525) *6 (19) bar = 25 (625)



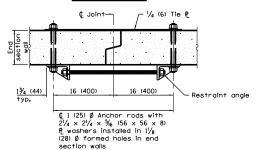
SECTION C-C



RESTRAINT ANGLE DETAIL



TIE PLATE DETAIL



SECTION A-A (Showing end section tie details)

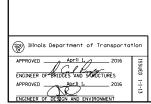
REINFORCEMENT SCHEDULE

Equivalent Round Size		A _{s1m}
Pipe I.D.	Bar Size	Bar Spacing
15	4	12
(375)	(13)	(300)
18	4	12
(450)	(13)	(300)
21	4	12
(525)	(13)	(300)
24	4	12
(600)	(13)	(300)
27	4	12
(700)	(13)	(300)
30	4	12
(750)	(13)	(300)
36	4	12
(900)	(13)	(300)
42	4	12
(1050)	(13)	(300)
48	4	8
(1200)	(13)	(200)
54	4	8
(1350)	(13)	(200)
60	4	8
(1500)	(13)	(200)
66	5	8
(1650)	(16)	(200)
72	5	8
(1800)	(16)	(200)

CONCRETE END SECTIONS FOR ELLIPTICAL PIPE CULVERTS 15" (375 mm) THRU 72" (1800 mm) EQUIVALENT DIAMETER

(Sheet 2 of 3)

STANDARD 542011-01



QUANTITIES

						<u>uonii IIII</u>	<u></u>								
Equivalent		Concrete	yd³ (m³) ①		Reint	orcement Wit	hout Lap lbs.	(kg)	Re	inforcement 1	With Lap Ibs (F	(g)			
Round Size		Slope of E	nd Section			Slope of E	nd Section		Slope of End Section						
Pipe I.D.	1:2	1:3	1:4	1:6	1:2	1:3	1:4	1:6	1:2	1:3	1:4	1:6			
15	1.5	1.9	2.3	3.0	3.0 220 270 320 420		420	240	300	350	470				
(375)	(1.1)	(1.6)	(1.8)	(2.3)	(120.8)	(148.3)	(172.9)	(228.5)	(132.3)	(164.3)	(192.8)	(257.4)			
18	1.5	1.9	2.3	3.0	220	270	320	420	240	300	350	470			
(450)	(1.3)	(1.6)	(1.8)	(2.3)	(120.8)	(148.3)	(172.9)	(228.5)	(132.3)	(164.3)	(192.8)	(257.4)			
21	2.2	2.8	3.5	4.8	310	390	470	630	330	420	520	700			
(525)	(1.7)	(2.1)	(2.7)	(3.7)	(167.2)	(172.9)	(211.5)	(285.2)	(181.8)	(189.3)	(232.9)	(316.3)			
24	2.2	2.8	3.5	4.8	310	390	470	630	330	420	520	700			
(600)	(1.7)	(2.1)	(2.7)	(3.7)	(167.2)	(172.9)	(211.5)	(285.2)	(181.8)	(189.3)	(232.9)	(316.3)			
27	2.5	3.2	3.9	5.4	330	420	510	690	360	460	560	760			
(700)	(1.9)	(2.4)	(3.0)	(4.1)	(181.7)	(190.1)	(231.4)	(310.5)	(197.0)	(208.0)	(254.3)	(343.1)			
30	2.7		3.5 4.3		.9 350		450 540		730 380		600	810			
(750)	(2.1)	(2.7)	(3.3)	(4.5)	(193.1)	(201.9)	(244.9)	(331.3)	(209.5)	(220.4)	(268.7)	(365.3)			
36	3.3	4.4	5.4	7.5	430	560	690	940	470	610	740	1020			
(900)	(2.5)	(3.4)	(4.1)	(5.7)	(237.6)	(252.2)	(309.3)	(423.4)	(255.8)	(273.0)	(335.9)	(461.8)			
42	4.0	5.3	6.6	9.2	510	660	820	1120	550	700	880	1220			
(1050)	(3.1)	(4.1)	(5.0)	(7.0)	(279.8)	(295.6)	(369.1)	(508.5)	(299.8)	(317.9)	(398.7)	(551.3)			
48	4.7	6.2	7.8	10.9	660	870	1070	1490	710	940	1160	1610			
(1200)	(3.6)	(4.7)	(6.0)	(8.3)	(362.5)	(391.5)	(485.4)	(672.8)	(389.5)	(422.8)	(525.7)	(731.4)			
54	5.3	7.2	9.0	12.6	730	960	1190	1670	780	1030	1290	1810			
(1350)	(4.1)	(5.5)	(6.9)	(9.6)	(400.1)	(434.4)	(540.2)	(756.6)	(428.9)	(467.9)	(583.7)	(820.5)			
60	6.3	8.5	10.7	15.1	830	1110	1390	1950	890	1180	1490	2100			
(1500)	(4.8)	(6.5)	(8.2)	(11.5)	(458.1)	(500.0)	(629.0)	(882.2)	(488.7)	(535.9)	(676.2)	(951.4)			
66	7.1	9.6	12.2	17.2	1080	1470	1840	2610	1180	1610	2030	2880			
(1650)	(5.4)	(7.3)	(9.3)	(13.2)	(596.0)	(665.5)	(836.2)	(1185.3)	(650.1)	(729.0)	(918.3)	(1306.3)			
72	8.2	11.1	14.0	19.8	1190	1620	2050	2930	1290	1770	2250	3220			
(1800)	(6.3)	(8.5)	(10.7)	(14.9)	(653.9)	(734.2)	(931.6)	(1328.9)	(710.7)	(801.7)	(1019.9)	(1460.0)			

① For cast-in-place construction, increase concrete volumes by approximately 13%.

GENERAL NOTES

The number of segments shown in elevation is for example only. The length and number of precast sections required to construct the end section shall be determined by the Contractor.

See roadway plans for slope (V:H) and pipe inside diameter.

End section may be installed up to \pm 15 degrees skewed with roadway.

 $2^\prime \! /_4 \times 2^\prime \! /_4 \times 5^\prime \! /_6$ (56 x 56 x 8) plate washers shall be provided under each nut required for the anchor rods. Holes in the walls for the culvert tie assembly may be drilled using core bits in lieu of formed holes.

See Standard 542311 for end sections having traversable pipe grate.

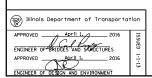
All slope ratios are expressed as units of verical dispacement to units of horizontal displacement (V:H).

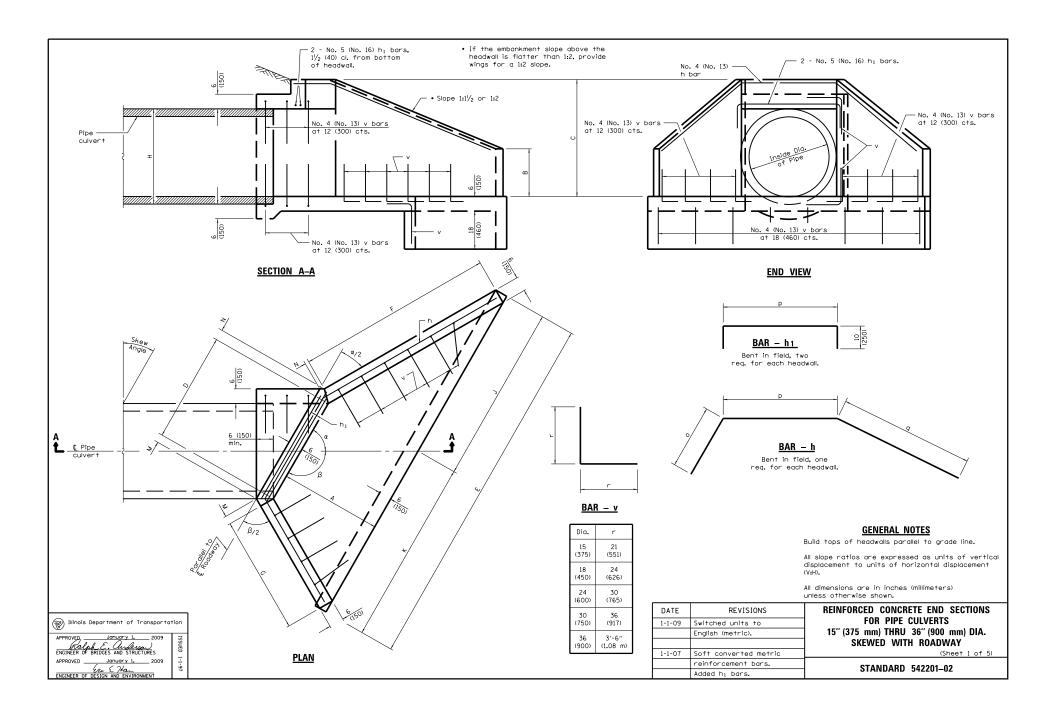
All dimensions are in inches (millimeters) unless otherwise shown.

CONCRETE END SECTIONS FOR ELLIPTICAL PIPE CULVERTS 15" (375 mm)
THRU 72" (1800 mm) EQUIVALENT DIAMETER

(Sheet 3 of 3)

STANDARD 542011-01





WINGS FOR 1:1 $\frac{1}{2}$ SLOPE

		Nominal					DIME	ENSIONS FOR	CONCRETE						Concrete		Re	inf. Bar	s - 2 En	d Sectio	ıns		Bars for
Skew	Design No.	Pipe													2 End Sections		h -	bars		hı -	bars	v-bars	2 End Sections
Arigie	No.	Dia.	Α	В	С	D	E	F	G	Н	J	K	М	N a	yd ³ (m ³)	0	Р	q	Lgth.	Р	Lgth.	No.	lbs. (kg)
	DS 15-1/ ₂	15	28	10	29	19	6′-11¾′′	3'-51/2"	38	19	3'-53/4"	3′-6′′	23/4	21/4 85°	1.4	3′-6′′	21	3′-9″	9'-0"	21	3′-5′′	28	90
	DS 18-1/ ₂)	(375)	(720) 28	(260)	(740) 32	(485) 22	(2.15 m) 7'-2¾''	(1.07 m) 3'-51/2"	(980)	(483)	(1.07 m) 3'-7 ¹ / ₄ "	(1.08 m) 3'-7 ¹ / ₂ "	(70) 2 ³ ⁄ ₄	21/4 050	(1.1)	(1.01 m) 3'-6"	(551)	(1.09 m) 3'-9"	(2.65 m) 9'-3''	(551)	(1.04 m) 3'-8"		(41) 100
	(DS 450-11/2)	(450)	(720)	(330)	(810)	(561)	(2.22 m)	(1.07 m)	(980)	(559)	(1.11 m)	(1.11 m)	(70)	(60) 85°	(1.2)	(1.03 m)	(626)	(1.12 m)	(2.78 m)	(626)	(1.12 m)	28	(45)
5°	DS 24-11/2	24 (600)	34 (870)	16 (410)	39 (990)	30 (765)	8'-10¾''	4'-21/4"	3′-10″	30 (762)	4'-5 ¹ / ₄ " (1.36 m)	4'-5 ¹ / ₂ '' (1.37 m)	23/4	21/4 85°	2.2	4'-3" (1.23 m)	32 (832)	4'-7" (1.33 m)	11'-6" (3.39 m)	32 (832)	4'-4'' (1.32 m)	32	140 (63)
	DS 600-1 ¹ / ₂) DS 30-1 ¹ / ₂	30	39	19	3'-9"	36	(2.73 m) 10'-3"	(1.29 m) 4'-9¾''	(1.18 m) 4'-5"	36	5'-1 ¹ / ₄ "	5'-1¾''	23/4	21/4 050	(1.7)	4'-10"	39	5'-2"	13'-3"	39	4'-11"	7.0	180
	(DS 750-11/2)	(750)	(990)	(480)	(1140)	(917)	(3.12 m)	(1.47 m)	(1.35 m)	(914)	(1.56 m)	(1.56 m)	(70)	(60) 85	(2.1)	(1.39 m)	(983)	(1.51 m)	(3.88 m)	(983)	(1.50 m)	36	(81)
	DS 36-1/ ₂ (DS 900-1/ ₂)	36 (900)	3'-9'' (1140)	(560)	4'-4'' (1320)	3′-8 ¹ /4″ (1123)	11'-11'' (3.63 m)	5'-6 ¹ / ₂ " (1.69 m)	5'-1'' (1.55 m)	3'-8'' (1.119 m)	5′-11 ¹ / ₄ ′′ (1.81 m)	5′-11¾′′ (1.82 m)	2¾ (70)	2 ¹ / ₄ 85°	3.3 (2.5)	5'-7" (1.6 m)	3'-11" (1.19 m)	6'-0" (1.73 m)	15'-6" (4,52 m)	3'-11" (1,19 m)	5'-7" (1.70 m)	42	240 (108)
	DS 15-1/ ₂	15	28	10	29	191/4	7'-01/2''	3'-71/2"	361/2	19	3′-6′′	3'-61/2''	23/4	21/4 800	1.5	3'-4"	22	3'-10''	9'-0"	22	3'-6''	28	90
	DS 18-1/ ₂)	(375)	(720)	(260)	(740) 32	(490) 22 ¹ / ₄	(2.17 m) 7'-3¾''	(1.12 m) 3'-7 ¹ / ₂ "	(940) 36½	(483)	(1.08 m) 3'-7 ¹ / ₂ "	(1.09 m) 3'-8 ¹ / ₄ "	(70) 2¾	21/4	(1.2)	(972)	(557) 25	(1.14 m) 3'-10"	(2.67 m) 9'-3''	(557)	(1.07 m) 3'-9"		(41) 100
	(DS 450-11/2)	(450)	(720)	(330)	(810)	(568)	(2.24 m)	(1.12 m)	(940)	(559)	(1.11 m)	(1.13 m)	(70)	(60)	(1.2)	(990)	(633)	(1.17 m)	(2.8 m)	(633)	(1.14 m)	28	(45)
10°	DS 24-1½ (DS 600-1½)	(600)	34 (870)	16 (410)	39 (990)	30½ (774)	9'-0'' (2.76 m)	4'-5" (1.36 m)	3'-8 ¹ / ₂ '' (1.14 m)	30 (762)	4'-5¾'' (1.37 m)	4'-6 ¹ / ₄ '' (1.39 m)	2¾ (70)	2 ¹ / ₄ 80°	2.2	4'-1'' (1.18 m)	33 (841)	4'-8" (1.4 m)	11'-6" (3.42 m)	(841)	4'-5" (1.35 m)	34	150 (68)
	DS 30-1/2	30	39	19	3'-9"	361/2	10'-41/2"	5'-03/4"	4'-3''	36	5'-13/4"	5'-21/2"	23/4	2 ¹ / ₄ 80°	2.8	4'-9"	39	5'-6"	13'-6"	39	4'-11"	36	180
	(DS 750-11/2)	(750)	(990)	(480)	(1140)	(928)	(3.15 m)	(1.54 m)	(1.3 m)	(914)	(1.57 m)	(1.58 m)	(70)	(60)	(2.1)	(1.34 m)	(993)	(1.58 m)	(3.92 m)	(993)	(1.50 m)	36	(81)
	DS 36-1½ (DS 900-1½)	36 (900)	3'-9'' (1140)	(560)	4'-4'' (1320)	3′-8¾′′ (1136)	12'-0 ¹ / ₂ '' (3.67 m)	5'-10'' (1.78 m)	4'-10¾'' (1.49 m)	3'-8" (1.119 m)	6'-0'' (1.83 m)	6'-0 ¹ / ₂ '' (1.84 m)	2¾ (70)	2 ¹ / ₄ 80°	3.5 (2.7)	5'-6" (1.54 m)	3'-11" (1.2 m)	6'-4" (1.82 m)	15'-9" (4.56 m)	3'-11" (1.2 m)	5'-7" (1.70 m)	42	240 (108)
	DS 15-1/ ₂	15	28	10	29	19¾	7'-2''	3'-10''	351/4	19	3'-61/2"	3'-71/2"	3	2 750	1.5	3'-4''	22	4'-1''	9'-3"	22	3'-6''	28	90
	DS 18-1/ ₂)	(375)	(720) 28	(260)	(740) 32	(500) 22¾	(2.2 m) 7'-5 ¹ / ₄ ''	(1.19 m) 3'-10''	(910) 35 ¹ / ₄	(483)	(1.09 m) 3'-8 "	(1.11 m) 3'-9 ¹ / ₄ "	(80)	(50)	(1.2)	(942)	(567) 25	(1.2 m) 4'-1"	(2.71 m) 9'-6''	(567)	(1.07 m) 3'-9"		(41) 100
	(DS 450-11/2)	(450)	(720)	(330)	(810)	(579)	(2.28 m)	(1.19 m)	(910)	(559)	(1.13 m)	(1.15 m)	(80)	(50)	(1.3)	(965)	(644)	(1.23 m)	(2.84 m)	(644)	(1.14 m)	28	(45)
15°	DS 24-1½ (DS 600-1½)	(600)	(870)	16 (410)	39 (990)	31 (789)	9'-2'' (2.8 m)	4'-7¾'' (1.43 m)	3'-6¾'' (1.1 m)	30 (762)	4'-6 ¹ / ₂ '' (1.39 m)	4'-7 ¹ / ₂ '' (1.41 m)	(80)	2 (50) 75°	2.3 (1.8)	4'-0" (1.15 m)	34 (857)	4'-11" (1.47 m)	11'-9" (3.47 m)	(857)	4'-6'' 1.37 m)	34	150 (68)
	DS 30-1/2	30	39	19	3'-9"	371/4	10'-61/2"	5'-4"	4'-1'/4''	36	5'-23/4"	5'-33/4"	3	2 750	2.9	4'-8"	3'-4"	5'-9"	13'-9"	3'-4"	5'-0"	40	200
	(DS 750-11/2)	(750)	(990)	(480)	(1140)	(946)	(3.21 m)	(1.63 m)	(1.25 m)	(914)	(1.59 m)	(1.62 m)	(80)	(50)	(2.2)	(1.3 m)	(1.01 m)	(1.67 m)	(3.98 m)	(1.01 m)	(1.52 m)	40	(90)
	DS 36-1/ ₂ (DS 900-1/ ₂)	36 (900)	3'-9'' (1140)	22 (560)	4'-4'' (1320)	3'-91/2'' (1158)	12'-3 ¹ / ₄ '' (3.73 m)	6'-2'' (1.87 m)	4'-8¾'' (1.44 m)	3'-8'' (1.119 m)	6'-1'' (1.85 m)	6'-2 ¹ / ₄ '' (1.88 m)	(80)	2 (50) 75°	3.8 (2.9)	5'-3" (1.49 m)	4'-0'' (1.22 m)	6'-6" (1.92 m)	15'-9" (4,63 m)	4'-0" (1.22 m)	5'-8" (1.73 m)	46	260 (117)
	DS 15-1/ ₂	15	28	10	29	201/4	7'-4''	4'-03/4''	341/4	19	3'-71/4"	3'-83/4''	3	2 700	1.6	39	23	4'-4''	9'-6"	23	3'-7''	28	90
	DS 18-1 ¹ / ₂)	(375)	(720)	(260)	(740)	(514) 23 ¹ / ₂	(2.26 m) 7'-7 ¹ / ₂ ''	(1.26 m) 4'-0¾''	(880) 34 ¹ / ₄	(483)	(1.11 m) 3'-9"	(1.15 m) 3'-10 ¹ / ₂ "	(80)	(50)	(1.2)	(916) 39	(581) 26	(1.27 m) 4'-4"	(2.77 m) 9'-9"	(581)	(1.09 m) 3'-10"		(41) 100
	(DS 450-11/2)	(450)	(720)	(330)	(810)	(595)	(2.34 m)	(1.26 m)	(880)	(559)	(1.15 m)	(1.19 m)	(80)	(50)	(1.3)	(938)	(661)	(1.31 m)	(2.9 m)	(661)	(1.17 m)	28	(45)
20°	DS 24-1½ (DS 600-1½)	24 (600)	34 (870)	16 (410)	39 (990)	32 (811)	9'-4 ¹ / ₂ '' (2 . 87 m)	4'-11 ¹ / ₄ '' (1.52 m)	3′-5½′′ (1.07 m)	30 (762)	4'-7 ¹ / ₂ '' (1.42 m)	4'-9'' (1.45 m)	(80)	2 (50) 70°	2.4 (1.8)	3'-11'' (1.11 m)	35 (879)	5'-2" (1.56 m)	12'-0" (3.55 m)	35 (879)	4'-7" (1.40 m)	38	160 (72)
	DS 30-1/2	30	39	19	3'-9"	281/4	10'-93/4"	5'-8"	3'-11/2"	36	5'-41/4"	5'-51/2"	3	2 700	3.1	4'-5"	3'-5"	5'-11"	13'-9"	3'-5"	5'-1"	42	210
	(DS 750-11/2)	(750) 36	(990) 3'-9''	(480)	(1140) 4'-4''	(973) 3′-10¾′′	(3,29 m) 12'-7"	(1.73 m)	(1.21 m) 4'-7''	(914) 3'-8''	(1.63 m)	(1.66 m) 6'-4 ¹ / ₄ ''	(80)	(50)	(2.4) 4.0	(1.26 m) 5'-3"	(1.04 m) 4'-1''	(1.77 m)	(4.07 m) 16'-3"	(1.04 m)	(1.55 m) 5'-9"	42	(95) 280
	DS 36-1½ (DS 900-1½)	(900)	(1140)	(560)	(1320)	(1191)	(3.86 m)	6'-6 ¹ / ₂ '' (1.99 m)	(1.41 m)	(1.119 m)	6'-2¾'' (1.9 m)	(1.93 m)	(80)	2 (50) 70°	(3.1)	(1.45 m)	(1.26 m)	6'-11" (2.03 m)	(4.73 m)	4'-1" (1.26 m)	(1.75 m)	50	(126)
	DS 15-1/ ₂	15	28	10	29	21	7'-7''	4'-4''	331/4	19	3'-81/2"	3'-101/2''	31/4	1 ³ / ₄ 65°	1.6	39	23	4'-7"	9'-9''	23	3'-7''	28	90
	(DS 375-1½) DS 18-1½	(375)	(720) 28	(260)	(740) 32	(533) 24 ¹ / ₄	(2.33 m) 7'-10 ¹ / ₄ "	(1.34 m) 4'-4"	(860) 33 ¹ / ₄	(483)	(1.14 m) 3'-10 ¹ / ₄ "	(1.19 m) 4'-0''	(90)	(50)	(1.2)	(893)	(600) 27	(1.36 m) 4'-7"	(2.85 m) 10'-0''	(600)	(1.09 m) 3'-11"		(41) 120
	(DS 450-11/2)	(450)	(720)	(330)	(810)	(617)	(2.42 m)	(1.34 m)	(860)	(559)	(1.19 m)	(1.23 m)	(90)	(50) 65	(1.4)	(914)	(683)	(1.39 m)	(2.99 m)	(683)	(1.19 m)	32	(54)
25°	DS 24-1/ ₂ (DS 600-1/ ₂)	24 (600)	34 (870)	16 (410)	39 (990)	33 (841)	9'-8 ¹ / ₂ '' (2.97 m)	5'-3 / ₄ '' (1.62 m)	3'-4 ¹ / ₄ '' (1.04 m)	30 (762)	4'-9 / ₄ '' (1.46 m)	4'-11 ¹ / ₄ '' (1.51 m)	3 ¹ / ₄ (90)	1¾ (50) 65°	2.5 (1.9)	3'-10" (1.09 m)	35 (909)	5'-6'' (1.66 m)	12'-3" (3.65 m)	35 (909)	4'-7'' (1.40 m)	38	160 (72)
	DS 30-1/ ₂	30	39	19	3'-9''	3'-33/4"	11'-2''	6'-01/2"	3'-101/4"	36	5′-6′′	5′-8′′	31/4	13/4 650	3.3	4'-5"	3'-6''	6'-4''	14'-3"	3'-6''	5'-2"	44	220
	(DS 750-1½) DS 36-1½	(750) 36	(990) 3'-9''	(480)	(1140) 4'-4''	(1008) 4'-01/2''	(3.4 m) 13'-0 ¹ / ₄ "	(1.83 m) 6'-11¾''	(1.18 m) 4'-5 ¹ / ₄ ''	(914) 3'-8''	(1.68 m) 6'-5 ¹ / ₄ "	(1.72 m) 6'-7''	(90)	(50)	(2.5)	(1.23 m) 5'-0"	(1.08 m) 4'-3''	(1.88 m) 7'-3"	(4.18 m) 16'-6''	(1.08 m) 4'-3"	(1.58 m) 5'-11"		(99) 280
	(DS 900-11/2)	(900)	(1140)	(560)	(1320)	(1235)	(3.96 m)	(2.12 m)	(1.36 m)	(1.119 m)	(1.96 m)	(2 m)	(90)	(50) 65°	(3.3)	(1.41 m)	(1.3 m)	(2.16 m)	(4.87 m)	(1.3 m)	(1.80 m)	50	(126)
	DS 15-1/ ₂	15	28	10	29	22	7'-103/4"	4′-8″	321/4	19	3'-10 /4''	4'-01/2"	31/4	1½ 60°	1.7	37	24	4'-11"	10'-0"	24	3′-8″	36	110
	DS 18-1 ¹ / ₂)	(375)	(720) 28	(260)	(740) 32	(558) 25½	(2.43 m) 8'-2 ¹ / ₄ "	(1.44 m) 4'-8''	(830) 32 ¹ / ₄	(483)	(1.19 m) 4'-0''	(1.24 m) 4'-2 ¹ / ₄ "	(90)	11/2 608	(1.3)	(873)	(626)	(1.46 m) 5'-0''	(2.95 m) 10'-6"	(626)	(1.12 m) 4'-0"	7.0	(50) 130
	(DS 450-11/2)	(450)	(720)	(330)	(810)	(645)	(2.52 m)	(1.44 m)	(830)	(559)	(1.23 m)	(1.29 m)	(90)	(40)	(1.5)	(893)	(712)	(1.49 m)	(3.1 m)	(712)	(1.22 m)	36	(59)
30°	DS 24-1½ (DS 600-1½)	24 (600)	34 (870)	16 (410)	39 (990)	34¾ (880)	10'-1 ¹ / ₄ '' (3.1 m)	5'-8" (1.74 m)	3'-3 ¹ / ₄ '' (1.01 m)	30 (762)	4'-11 ¹ / ₂ '' (1 . 52 m)	5'-1¾'' (1.58 m)	3 ¹ / ₄ (90)	1 ¹ / ₂ 60°	2.7 (2.1)	3'-9" (1.06 m)	37 (949)	5'-11" (1.78 m)	12'-9" (3.79 m)	(949)	4'-9" (1.45 m)	40	170 (77)
	DS 30-1/ ₂	30	39	19	3'-9"	3'-51/2"	11'-73/4''	6'-6''	3'-9''	36	5′-8¾′′	5′-11′′	31/4	11/2 600	3.5	4'-4''	3'-8''	6'-9"	14'-9"	3'-8"	5'-4''	46	230
	DS 36-1/ ₂)	(750)	(990) 3'-9"	(480)	(1140) 4'-4''	(1055) 4'-2¾''	(3.55 m) 13'-7"	(1.98 m) 7'-6"	(1.15 m) 4'-4''	(914) 3'-8''	(1.75 m) 6'-8 ¹ / ₂ ''	(1.8 m) 6'-101/2''	(90)	11/2 600	(2.7) 4.6	(1.2 m) 5'-0"	(1.12 m) 4'-5"	(2.02 m) 7'-10"	(4.34 m) 17'-3"	(1.12 m) 4'-5"	(1.63 m) 6'-1''		(104)
	(DS 900-11/2)	(900)	(1140)	(560)	(1320)	(1292)	(4.13 m)	(2.28 m)	(1.32 m)	(1.119 m)	(2.04 m)	(2.09 m)	(90)	(40) 60°	(3.5)				(5.05 m)			54	(135)



REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS 15" (375 mm) THRU 36" (900 mm) DIA. SKEWED WITH ROADWAY

(Sheet 2 of 5)

WINGS FOR 1:1 $\frac{1}{2}$ SLOPE

																	Bars for							
Skew	Design	Nominal					DIME	NSIONS FOR	CONCRETE	1					_	2 End				irs - 2 Er				2 End
Angle	No.	Pipe Dia.	A	В	С	D	E	F	G	н	J	K	м	N	α	Sections			bars	1	hı -	bars	v-bars	Sections
	DC 15 11/	15	20	10	29	231/4	8'-3¾''	E1 03/11	71/	19	4'-01/2"	4'-3''	23/	117	+	yd ³ (m ³)	37	P 26	9 5′-3″	Lgth.	P 26	Lgth. 3'-10"	No.	lbs. (kg)
	DS 15-1½ (DS 375-1½)	(375)	28 (720)	(260)	(740)	(590)	0 -374 (2.55 m)	5'-0¾'' (1.56 m)	31½ (820)	(483)	(1.24 m)	(1.31 m)	(90)	1 ¹ / ₂ (40)	55°	1.8	(855)	(658)	(1.57 n		(658)	(1.17 m)	36	110 (50)
	DS 18-1/ ₂	18	28	13	32	27	8'-71/4"	5'-03/4''	31/2	22	4'-21/4"	4'-5''	33/4	11/2	55°	2.0	37	29	5′-3′′	10'-9"	29	4'-1''	36	130
	(DS 450-1½)	(450) 24	(720)	(330)	(810)	(682)	(2.65 m)	(1.56 m)	(820)	(559)	(1.29 m)	(1.36 m)	(90)	(40)	33	(1.5)	(876)	(750)	(1.61 m		(750)	(1.25 m) 4'-11"		(59) 170
35°	DS 24-1½ (DS 600-1½)	(600)	(870)	16 (410)	(990)	36½ (930)	10'-7¾'' (3.26 m)	6'-1¾'' (1.88 m)	38 ¹ / ₄ (980)	30 (762)	5'-2 ¹ / ₂ '' (1.6 m)	5'-5 /4'' (1.66 m)	(90)	1½ (40)	55°	2.9	(1.04 m)	39 (1.0 m)	6'-4" (1.92 m	13'-3" (3.96 m)	(1-0 m)	(1.50 m)	40	(77)
	DS 30-1/ ₂	30	39	19	3'-9''	3'-8''	12'-31/4"	7'-01/2"	3′-8′′	36	6'-01/4"	6'-3''	33/4	11/2	550	3.7	4'-2"	3'-11''	7'-2"	15'-3"	3'-11''	5'-7''	50	240
	(DS 750-1½) DS 36-1½	(750) 36	(990)	(480)	(1140) 4'-4''	(1.116 m) 4'-5¾''	(3.74 m) 14'-3¾''	(2.15 m) 8'-1/ ₂ "	(1.12 m) 4'-2¾''	(914)	(1.84 m) 7'-01/2"	(1.9 m) 7'-3 ¹ / ₄ "	(90)	(40)	+	(2.8) 4.9	(1.17 m) 4'-11''	(1.18 m) 4'-8''	(2.18 n 8'-5"	(4.54 m) 18'-0"	(1.18 m) 4'-8''	(1.70 m) 6'-4''		(108)
	(DS 900-11/2)	(900)	(1140)	(560)	(1320)	(1,366 m)	(4.35 m)	(2.47 m)	(1.3 m)	(1.119 m)	(2.14 m)	(2.21 m)	(90)	1½ (40)	55°	(3.8)	(1.34 m)	(1.43 m)	(2.51 n			(1.93 m)	56	(140)
	DS 15-1/ ₂	15	28	10	29	243/4	8'-10"	5'-61/4"	31	19	4'-31/2"	4'-61/2"	33/4	11/4	500	1.9	37	27	5′-8′′	11'-0''	27	3'-11"	38	120
	DS 18-1 ¹ / ₂)	(375)	(720) 28	(260)	(740)	(631) 28¾	(2.71 m) 9'-1¾''	(1.71 m) 5'-6 ¹ / ₄ "	(780)	(483)	(1.32 m) 4'-5 ¹ / ₂ ''	(1.39 m) 4'-8 ¹ / ₄ ''	(100)	(40) 1 ¹ / ₄	+	(1.5)	(840)	(700)	(1.71 m 5'-8") (3.25 m) 11'-3"	(700)	(1.19 m) 4'-3''		(54) 130
	(DS 450-1½)	(450)	(720)	(330)	(810)	(730)	(2.81 m)	(1.71 m)	(780)	(559)	(1.37 m)	(1.44 m)	(100)	(40)	50°	(1.7)	(860)	(798)	(1.76 n		(798)	(1.30 m)	38	(59)
40°	DS 24-1/ ₂	24	34	16	39	3'-31/4"	11'-4''	6'-81/2"	371/2	30	5′-61/2′′	5'-91/2"	3 3/4	11/4		3.1	3′-8′′	3′-6′′	6'-10'		3′-6′′	5'-2"	48	200
	(DS 600-1 ¹ / ₂) DS 30-1 ¹ / ₂	(600)	(870) 39	(410) 19	(990) 3'-9''	(995) 3'-11"	(3.47 m) 13'-0¾''	(2.08 m) 7'-8 ¹ / ₄ "	(960) 3'-7''	(762) 36	(1.7 m) 6'-5''	(1.77 m) 6'-7¾''	(100)	(40) 1 ¹ / ₄	_	(2.4) 4.0	(1.02 m) 4'-2"	(1.07 m) 4'-2''	(2.1 m 7'-11"	(4.18 m) 16'-3"	(1.07 m) 4'-2"	(1.58 m) 5'-10"		(90) 260
	(DS 750-11/2)	(750)	(990)	(480)	(1140)	(1.193 m)	(3.98 m)	(2.35 m)	(1.1 m)	(914)	(1.95 m)	(2.03 m)	(100)	(40)	50°	(3.1)	(1.15 m)	(1.26 m)	(2.38 n			(1.78 m)	54	(117)
	DS 36-1½	36	3'-9''	22	4'-4''	4'-91/2"	15′-3′′	8'-101/2"	4'-17/4''	3′-8′′	7′-6′′	7'-9"	37/4	11/4	50°	5.3	4'-10''	5′-0′′	9'-2"	19'-0"	5′-0″	6′-8′′	62	340
	(DS 900-1 ¹ / ₂) DS 15-1 ¹ / ₂	(900) 15	(1140)	(560) 10	(1320) 29	(1.461 m) 27	(4.64 m) 9'-6"	(2.7 m) 6'-1 ¹ / ₄ "	(1.26 m) 30 ¹ / ₄	(1.119 m) 19	(2.28 m) 4'-7 ¹ / ₂ "	(2.35 m) 4'-10 ¹ / ₂ "	(100)	(40) 1 ¹ / ₄	-	2.1	(1.32 m) 36	(1.53 m) 29	(2.74 n 6'-1"	(5.59 m) 11'-6''	(1.53 m) 29	(2.03 m) 4'-1"		(153) 130
	(DS 375-1/ ₂)	(375)	(720)	(260)	(740)	(683)	(2.92 m)	(1.88 m)	(780)	(483)	(1.42 m)	(1.5 m)	(100)	(30)		(1.6)	(829)	(753)	(1.89 n	i) (3.47 m)	(753)	(1.25 m)	40	(59)
	DS 18-1½ (DS 450-1½)	18 (450)	28 (720)	13 (330)	32 (810)	31 (791)	9'-10 ¹ / ₄ " (3.03 m)	6'-1'/4"	30 ¹ / ₄ (780)	22 (559)	4'-91/2'' (1.47 m)	5'-0¾'' (1.56 m)	(100)	1 ¹ / ₄ (30)	45°	2.4	(847)	34 (859)	6'-2"	12'-0" (3.64 m)	(859)	4'-6'' (1.37 m)	44	150 (68)
	DS 24-1/ ₂	24	34	16	39	3'-61/2"	12'-3 ¹ / ₂ "	(1.88 m) 7'-4¾''	36¾	30	5'-11\/2''	6'-3"	4	11/4		(1.8)	3'-8"	3'-9"	7'-7"	15'-0"	3'-9"	5'-5"		210
45°	(DS 600-11/2)	(600)	(870)	(410)	(990)	(1.078 m)	(3.74 m)	(2.28 m)	(950)	(762)	(1.83 m)	(1.91 m)	(100)	(30)	45°	(2.6)	(1.0 m)	(1.15 m)	(2.31 m	(4.47 m)		(1.65 m)	50	(95)
	DS 30-1½ (DS 750-1½)	30 (750)	39 (990)	19 (480)	3'-9'' (1140)	4'-3" (1.293 m)	14'-1'' (4.29 m)	8'-6" (2.59 m)	3'-6 ¹ / ₄ '' (1.08 m)	36 (914)	6'-11'' (2.1 m)	7'-2'' (2.19 m)	(100)	(30)	45°	4.4 (3.4)	4'-2" (1.13 m)	4′-5′′	8′-8″	17'-3" (5.12 m)	4'-5" (1.36 m)	6'-1'' (1.86 m)	62	300 (135)
	DS 36-1/ ₂	36	3'-9"	22	4'-4''	5'-21/4"	16'-5'/4"	9'-91/2"	4'-03/4''	3'-8''	8'-1"	8'-4'/4"	4	11/4	45°	5.7	4'-10''	5'-5"	10'-0'		5'-5"	7'-1"	66	370
	(DS 900-11/2)	(900)	(1140)	(560)	(1320)	(1.583 m)	(5.01 m)	(2.98 m)	(1.24 m)	(1.119 m)	(2.46 m)	(2.55 m) 5'-4"	(100)	(30)	43	(4.4)	(1.3 m)	(1.65 m)	(3.02 n			(2.16 m) 4'-4''	- 66	(167)
	DS 15-1½ (DS 375-1½)	15 (375)	28 (720)	10 (260)	29 (740)	29½ (751)	10'-4 ¹ / ₂ '' (3.18 m)	6'-10'' (2.11 m)	29¾ (770)	19 (483)	5'-01/2'' (1.55 m)	(1.64 m)	(110)	(30)	40°	2.3	35 (817)	32 (822)	6'-11'' (2.11 m	12'-6") (3.75 m)	(822)	(1.32 m)	46	140 (63)
	DS 18-1/ ₂	18	28	13	32	241/4	10'-9''	6′-10′′	29¾	22	5'-23/4"	5′-61/4′′	41/4	1	40°	2.6	36	37	6′-11′′	13'-0"	37	4'-9''	46	160
	DS 450-1 ¹ / ₂) DS 24-1 ¹ / ₂	(450) 24	(720)	(330)	(810)	(870) 3'-10¾''	(3.31 m) 13'-4 ¹ / ₄ "	(2.11 m) 8'-3 ¹ / ₂ "	(770) 36 ¹ / ₄	(559)	(1.61 m) 6'-6'/4''	(1.7 m) 6'-10''	(110)	(30)		(2.0)	(836)	(939) 4'-1''	(2.16 n 8'-4"	(3.94 m) 16'-0"	(939) 4'-1"	(1.45 m) 5'-9"	-	(72) 230
50°	(DS 600-11/2)	(600)	(870)	(410)	(990)	(1.185 m)	(4.08 m)	(2.55 m)	(930)	(762)	(2 m)	(2.09 m)	(110)	(30)	40°	(2.8)	(990)	(1.26 m)		(4.83 m)		(1.75 m)	56	(104)
	DS 30-1/ ₂	30	39	19	3′-9″	4'-8''	15′-5′′	9′-6′′	3'-51/2''	36	7'-63/4''	7'-101/4"	41/4	1	40°	4.8	4'-1''	4'-10''	9'-7"	18'-6"	4′-10′′	6'-6"	66	320
	DS 36-1 ¹ / ₂)	(750) 36	(990)	(480)	(1140) 4'-4''	(1.422 m) 5'-8 ¹ / ₂ "	(4.7 m) 18'-0 ¹ / ₄ "	(2.9 m) 10'-11 ¹ / ₂ "	(1.06 m) 4'-0''	(914)	(2.3 m) 8'-10 ¹ / ₄ "	(2.39 m) 9'-2''	(110)	(30)		(3.7)	(1.12 m) 4'-9"	(1.49 m) 5'-11"	(2.94 n	(5.54 m) 21'-9"	(1.49 m) 5'-11"	(1.98 m) 7'-7''		(144) 410
	(DS 900-11/2)	(900)	(1140)	(560)	(1320)	(1.741 m)	(5.48 m)	(3.34 m)	(1.22 m)	(1.119 m)	(2.7 m)	(2.78 m)	(110)	(30)	40°	(4.8)	(1.28 m)	(1.81 m)	(3.38 n	n) (6.47 m)	(1.81 m)	(2.31 m)	74	(185)
	DS 15-1½ (DS 375-1½)	15 (375)	28 (720)	10 (260)	29 (740)	33 (842)	11'-6 ¹ / ₄ '' (3.54 m)	7'-9" (2.4 m)	29 ¹ / ₄ (760)	19 (483)	5'-7 ¹ / ₄ " (1.72 m)	5'-11" (1.82 m)	4½ (110)	(30)	35°	2.6 (2.0)	35 (809)	36 (914)	7'-10'	13'-9" (4.12 m)	36 (914)	4'-8'' (1.42 m)	50	150 (68)
	DS 18-1/ ₂	18	28	13	32	381/4	11'-111/2"	7'-9"	291/4	22	5'-93/4"	6'-13/4''	41/2	1	35°	2.9	36	3'-5"	7'-10'	14'-3"	3'-5"	5'-1"	50	170
	(DS 450-11/2)	(450)	(720)	(330)	(810)	(975)	(3.68 m)	(2.4 m)	(760)	(559)	(1.79 m)	(1,89 m)	(110)	(30)	35.	(2.2)		(1.05 m)		n) (4.33 m)		(1.55 m)	50	(77)
55°	DS 24-1½ (DS 600-1½)	24 (600)	34 (870)	16 (410)	39 (990)	4'-4 ¹ / ₄ " (1.329 m)	14'-10 ¹ / ₂ '' (4.55 m)	9'-5" (2.9 m)	35¾ (910)	30 (762)	7'-3 ¹ / ₄ '' (2.23 m)	7'-7 ¹ / ₄ '' (2.32 m)	(110)	(30)	35°	4.2 (3.2)	3′-6′′ (978)	4'-7" (1.4 m)	9'-5" (2.94 m	17'-6" (5.32 m)	4'-7" (1.4 m)	6'-3'' (1.91 m)	62	260 (117)
	DS 30-1/ ₂	30	39	19	3'-9''	5'-23/4"	17'-21/4"	10′-9¾′′	3′-5′′	36	8'-51/4"	8'-9''	41/2	1	35°	5.4	4'-1''	5'-6''	10'-11'	20'-6"	5′-6′′	7'-2"	74	350
	DS 36-1½	(750) 36	(990) 3'-9''	(480)	(1140) 4'-4''	(1.594 m) 6'-4¾''	(5.24 m) 20'-1 ¹ / ₄ "	(3.3 m) 12′-5¾′′	(1.04 m) 3'-11 ¹ / ₄ "	(914) 3'-8''	(2.57 m) 9'-10¾''	(2.67 m) 10'-2 ¹ / ₂ "	(110)	(30)	_	(4.1) 7.1	(1.1 m) 4'-9"	(1.66 m) 6'-7''	(3.33 n 12'-8"		(1.66 m) 6'-7''	(2.19 m) 8'-3"		(158)
	(DS 900-11/2)	(900)	(1140)	(560)	(1320)	(1.951 m)	(6.12 m)	(3.79 m)	(1.2 m)	(1.119 m)	(3.01 m)	(3.11 m)	(110)	(30)	35°	(5.4)			(3.84 n			(2.52 m)	86	212 (470)
	DS 15-1/ ₂	15	28	10	29	38	13'-1'/4''	9'-01/4''	29	19	6'-41/2''	6'-83/4''	41/2	03/4		2.9	34	3′-5′′	9'-0"	15'-3''	3'-5"	5′-1′′	54	170
1	DS 18-1 ¹ / ₂)	(375)	(720) 28	(260)	(740)	(966)	(4.03 m) 13'-7 ¹ / ₄ "	(2.78 m) 9'-0 ¹ / ₄ ''	(750) 29	(483)	(1.96 m) 6'-7 ¹ / ₂ "	(2.07 m) 6'-11 ³ / ₄ ''	(120)	(20)		(2.2)	(802)	(1.04 m) 3'-11"	(2.78 n	15'-0"	(1.04 m) 3'-11"	(1.55 m) 5'-7"		(77) 200
1	(DS 450-11/2)	(450)	(720)	(330)	(810)	(1.118 m)	(4.18 m)	(2.78 m)	(750)	(559)	(2.04 m)	(2.14 m)	(120)	(20)	30-	(2.5)	(820)	(1.19 m)	(2.85 n	(4.86 m)	(1.19 m)	(1.70 m)	58	(90)
60°	DS 24-1½ (DS 600-1½)	24 (600)	34 (870)	16 (410)	39 (990)	5′-0″	16'-11 ¹ / ₄ '' (5.19 m)	10'-11'/4''	35 ¹ / ₄ (900)	30 (762)	8'-3 ¹ / ₂ " (2.04 m)	8'-73/4'' (2.65 m)	4½ (120)	03/4		4.7 (3.6)	3'-6'' (969)	5′-3″	11'-0'	19'-9"	5'-3" (1.6 m)	6'-11''	72	300 (135)
1	DS 30-1/ ₂)	30	39	19	3'-9"	(1.524 m) 6'-0"	19'-7 ¹ / ₄ "	(3.36 m) 12'-6¾''	3'-41/2"	36	9'-7 ¹ / ₂ "	9'-11 /4"	41/2	03/4		6.1	4'-1"	(1.6 m) 6'-3''	12'-8"	(5.98 m) 23'-0"	6'-3"	(2.11 m) 7'-11"	00	390
1	(DS 750-11/2)	(750)	(990)	(480)	(1140)	(1.828 m)	(5.97 m)	(3.83 m)	(1.03 m)	(914)	(2.93 m)	(3.04 m)	(120)	(20)	30-	(4.7)	(1.09 m)	(1.9 m)	(3.87 n	n) (6.86 m)	(1.9 m)	(2.41 m)	82	(176)
1	DS 36-1½ (DS 900-1½)	36 (900)	3'-9'' (1140)	22 (560)	4'-4'' (1320)	7'-4" (2,238 m)	22'-11 ¹ / ₄ '' (6.98 m)	14'-5 ³ / ₄ '' (4,41 m)	3'-10½'' (1.18 m)	3'-8'' (1.119 m)	11'-3 ¹ / ₂ '' (3.44 m)	11'-7 ³ / ₄ '' (3.54 m)	4½ (119)	03/4		8.1 (6.2)	4'-7" (1.25 m)	7'-7'' (2.31 m)	14'-7"	26'-9" (8.02 m)	7'-7" (2.31 m)	9'-3'' (2.82 m)	98	530 (239)
	1.00 300 1/2/	13007	-11 107	13007	113207	1 .2.250 1117	.5.50 1117	. 14 14 1117	.1110 1117	1.4414.0 (11)	.54 11 111/	.5.51 111/	, 1115/	1207		10.27	1 117	.2.01 1117			1.6101 1117			16337

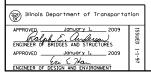


REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS 15" (375 mm) THRU 36" (900 mm) DIA. SKEWED WITH ROADWAY

(Sheet 3 of 5)

WINGS FOR 1:2 SLOPE

		Nominal					DIME	ENSIONS FOR	CONCRETE						Concrete		Re	inf. Bar	s - 2 En	d Sectio	ns		Bars for
Skew		Pipe													2 End Sections		h -	bars		hı -	bars	v-bars	2 End Sections
Arigie	, 100.	Dia.	A	В	С	D	E	F	G	Н	J	К	M	N a	vd3 (m3)	0	Р	q	Lath.	р	Lath.	No.	lbs. (kg)
	DS 15-2	15	38	10	29	19	8'-73/4''	4'-81/4"	4'-31/2"	19	4'-33/4"	4'-4''	23/4	21/4 050	1.9	4'-7"	21	4'-11"	11'-3''	551	3′-5′′	34	110
	(DS 375-2)	(375)	(960)	(260)	(740)	(485)	(2.63 m)	(1.42 m)	(1.31 m)	(483)	(1.31 m)	(1.32 m)	(70)	(60) 65	(1.5)	(1.33 m)	(551)	(1.45 m)	(3.33 m)	(551)	(1.04 m)	34	(50)
	DS 18-2 (DS 450-2)	18 (450)	(960)	13 (330)	32 (810)	(561)	8'-10¾'' (2.7 m)	4'-8 ¹ / ₄ '' (1.42 m)	4'-3 ¹ / ₂ '' (1.31 m)	22 (559)	4'-5 / ₄ '' (1.35 m)	4'-5 / ₂ '' (1.35 m)	2¾ (70)	2 ¹ / ₄ 85°	2.0 (1.5)	(1.36 m)	24 (626)	4'-11" (1.48 m)	11'-6" (4.47 m)	(626)	3′-8′′ (1.12 m)	34	120 (54)
5°	DS 24-2	24	3'-10"	16	39	30	10'-11"	5'-8"	5'-21/2"	30	5'-5'/4"	5'-53/4"	2 1/4	21/4 050	2.9	5'-5"	32	5'-11"	14'-0"	32	4'-4"	42	180
1 2.	(DS 600-2)	(600)	(1.16 m)	(410)	(990)	(765)	(3.31 m)	(1.72 m)	(1.58 m)	(762)	(1.65 m)	(1.66 m)	(70)	(60) 85	(2.2)	(1.62 m)	(832)	(1.77 m)	(4.22 m)	(832)	(1.32 m)	42	(81)
	DS 30-2 (DS 750-2)	30 (750)	4'-4'' (1.32 m)	19 (480)	3'-9'' (1.14 m)	36 (917)	12'-5'' (3.78 m)	6'-5'' (1.96 m)	5'-10½'' (1.79 m)	36 (914)	6'-2 ¹ / ₄ '' (1.89 m)	6'-2¾'' (1.89 m)	2¾ (70)	2 ¹ / ₄ 85°	3.7 (2.8)	6'-3'' (1.84 m)	39 (983)	6'-9" (2.0 m)	16'-3" (4.83 m)	39 (983)	4'-11" (1.50 m)	48	230 (104)
	DS 36-2	36	5'-0"	22	4'-4"	3'-8'/4"	14'-5"	7'-43/4"	6'-91/4"	3'-8"	7'-21/4"	7'-274"	23/4	21/4 050	4.5	7'-2"	3'-11"	7'-8"	18'-9"	3'-11"	5'-7"	54	300
L_	(DS 900-2)	(900)	(1.52 m)	(560)	(1.32 m)	(1.123 m)	(4.39 m)	(2.25 m)	(2.07 m)	(1.119 m)	(2.19 m)	(2.2 m)	(70)	(60) 85	(3.4)	(2.12 m)	(1.19 m)	(2.3 m)	(5.6 m)	(1.19 m)	(1.70 m)	54	(135)
	DS 15-2 (DS 375-2)	15 (375)	(960)	10 (260)	29 (740)	19 ¹ / ₄ (490)	8'-9'' (2 . 65 m)	4'-11'' 1.5 m)	4'-1 ¹ / ₂ '' (1.26 m)	19 (483)	4'-4'' (1.32 m)	4'-5'' (1.33 m)	2 3 / ₄ (70)	2 ¹ / ₄ 80°	2.0 (1.5)	(1.28 m)	22 (557)	5'-1" (1.52 m)	(3.36 m)	(557)	3'-6'' (1.07 m)	34	110 (50)
	DS 18-2	18	38	13	32	221/4	9'-0''	4'-11"	4'-11/2"	22	4'-53/4"	4'-6'/4''	23/4	21/4 000	2.1	4'-4"	25	5'-1"	11'-6"	25	3'-9"		120
	(DS 450-2)	(450)	(960)	(330)	(810)	(568)	(2.73 m)	(1.5 m)	(1.26 m)	(559)	(1.36 m)	(1.37 m)	(70)	(60)	(1.6)	(1.32 m)	(633)	(1.55 m)	(3.5 m)	(633)	(1.14 m)	34	(54)
10°	DS 24-2 (DS 600-2)	24 (600)	3'-10" (1.16 m)	16 (410)	39 (990)	30½ (774)	11'-0 ¹ / ₄ '' (3.34 m)	5'-11½'' (1.81 m)	5'-0'' (1.52 m)	30 (762)	5'-5¾'' (1.66 m)	5'-6 ¹ / ₂ '' (1.68 m)	2¾ (70)	2 ¹ / ₄ 80°	3.0 (2.3)	5'-4'' (1.57 m)	33 (841)	6'-2" (1.85 m)	14'-3" (4.26 m)	(841)	4'-5" (1.35 m)	42	180 (81)
	DS 30-2	30	4'-4"	19	3'-9"	361/2	12'-63/4"	6'-9"	5'-8"	36	6'-3''	6'-33/4"	23/4	217.	3.8	6'-0"	39	7'-0"	16'-3"	39	4'-11"	48	230
	(DS 750-2)	(750)	(1.32 m)	(480)	(1.14 m)	(928)	(3.82 m)	(2.06 m)	(1.73 m)	(914)	(1.9 m)	(1.92 m)	(70)	(60) 80°	(2.9)	(1.78 m)	(993)	(2.1 m)	(4.87 m)	(993)	(1.50 m)	48	(104)
	DS 36-2 (DS 900-2)	36 (900)	5'-0" (1.52 m)	22 (560)	4'-4'' (1.32 m)	3'-8¾'' (1.136 m)	14'-7'' (4.44 m)	7'-9 ¹ / ₄ '' (2.37 m)	6'-6 ¹ / ₄ " (1.99 m)	3'-8" (1.119 m)	7'-3'' (2,21 m)	7'-4'' (2,23 m)	2¾ (70)	2 ¹ / ₄ 80°	4.7 (3.6)	7'-0" (2.04 m)	3'-11" (1.2 m)	8'-1" (2.42 m)	19'-0" (5.66 m)	3'-11" (1.2 m)	5'-7" (1.70 m)	54	300 (135)
	DS 15-2	15	38	10	29	193/4	8'-103/4"	5'-21/2"	4'-0''	19	4'-43/4"	4'-6"	3	2 750	2.0	4'-3"	22	5'-5"	11'-6"	22	3'-6"		110
	(DS 375-2)	(375)	(960)	(260)	(740)	(500)	(2.7 m)	(1.58 m)	(1.21 m)	(483)	(1.34 m)	(1.36 m)	(80)	(50)	(1.5)	(1.24 m)	(567)	(1.6 m)	(3.41 m)	(567)	(1.07 m)	34	(50)
	DS 18-2	18 (450)	38 (960)	13 (330)	32 (810)	22 ³ / ₄ (579)	9'-2'' (2.78 m)	5'-2 ¹ / ₂ " (1.58 m)	4'-0''	22 (559)	4'-61/2"	4'-7 ¹ / ₂ '' (1.4 m)	(80)	2 (50) 75°	2.2	4'-3'' (1.27 m)	25 (644)	5'-5" (1.64 m)	11'-9"	25 (644)	3'-9'' (1.14 m)	34	120 (54)
	(DS 450-2) DS 24-2	24	3'-10"	16	39	31	11'-2¾''	6'-3 ¹ / ₂ "	(1,21 m) 4'-10"	30	(1.38 m) 5'-6¾''	11.4 m) 5'-8"	3	2 750	3.1	5'-2"	34	6'-6''	(3.55 m) 14'-6"	34	4'-6"		180
15°	(DS 600-2)	(600)	(1.16 m)	(410)	(990)	(789)	(3.4 m)	(1.91 m)	(1.47 m)	(762)	(1.69 m)	(1.72 m)	(80)	(50) 75°	(2.4)	(1.52 m)	(857)	(1.95 m)	(4.32 m)	(857)	(1.37 m)	42	(81)
	DS 30-2	30	4'-4''	19	3′-9′′	371/4	12'-9 ¹ / ₄ ''	7'-11/2"	5'-51/2''	36	6'-4''	6'-51/4"	3	2 75°	3.9	5′-10″	3'-4''	7'-4"	16'-6''	3'-4"	5′-0″	52	250
	(DS 750-2) DS 36-2	(750) 36	(1.32 m) 5'-0"	(480)	(1.14 m) 4'-4''	(946) 3'-9 ¹ / ₂	(3.89 m) 14'-10 ¹ / ₄ ''	(2.17 m) 8'-2 ¹ / ₂ "	(1.67 m) 6'-3 ¹ / ₂ ''	(914) 3'-8''	(1.93 m) 7'-4 ¹ / ₂ "	(1.96 m) 7'-5¾''	(80)	(50)	(3.0)	(1.72 m) 6'-9''	(1.01 m) 4'-0''	(2,21 m) 8'-6"	(4.94 m) 19'-3"	(1.01 m) 4'-0"	(1.52 m) 5'-8"		(113) 310
	(DS 900-2)	(900)	(1.52 m)	(560)	(1.32 m)	(1.158)	(4.52 m)	(2.5 m)	(1.92 m)	(1.119 m)	(2.25 m)	(2.27 m)	(80)	(50)	(3.8)	(1.97 m)	(1.22 m)	(2.55 m)	(5.74 m)	(1.22 m)	(1.73 m)	56	(140)
	DS 15-2	15	38	10	29	201/4	9'-11/2''	5'-6'/4''	3'-101/2"	19	4′-6′′	4'-71/2"	3	2 70°	2.1	4'-2"	23	5′-8″	11'-9"	23	3′-7′′	36	110
	(DS 375-2) DS 18-2	(375)	(960)	(260)	(740)	(514) 23 ¹ / ₂	(2.77 m) 9'-4 ¹ / ₂ ''	(1.68 m) 5'-6 ¹ / ₄ ''	(1.18 m) 3'-10 ¹ /2"	(483)	(1.37 m) 4'-7 ¹ / ₂ "	(1.4 m) 4'-9''	(80)	(50)	(1.6)	(1.21 m) 4'-2"	(581)	(1.69 m) 5'-8"	(3.48 m) 12'-0"	(581)	(1.09 m) 3'-10"		(50) 130
	(DS 450-2)	(450)	(960)	(330)	(810)	(595)	(2.85 m)	(1.68 m)	(1.18 m)	(559)	(1.41 m)	(1.44 m)	(80)	(50) 70°	(1.8)	(1.24 m)	(661)	(1.73 m)	(3.63 m)	(661)	(1.17 m)	36	(59)
20°	DS 24-2	24	3′-10′′	16	39	32	11'-6'/4''	6'-8'/4"	4'-81/4''	30	5'-81/2"	5'-9¾''	3	2 70°	3.2	5′-0"	35	6′-10′′	14'-9"	35	4'-7''	48	200
	(DS 600-2) DS 30-2	(600)	(1.16 m) 4'-4''	(410) 19	(990)	(811) 38 ¹ / ₄	(3.49 m) 13'-1 ¹ / ₄ "	(2.03 m) 7'-6¾''	(1.42 m) 5'-3 ¹ / ₂ ''	(762) 36	(1.73 m) 6'-6''	(1.76 m) 6'-7 ¹ / ₄ ''	(80)	(50)	(2.4) 4.1	(1.47 m) 5'-9"	(879) 3'-5''	(2.07 m) 7'-10''	(4.42 m) 17'-0"	(879)	(1.40 m) 5'-1"		(90) 250
	(DS 750-2)	(750)	(1.32 m)	(480)	(1.14 m)	(973)	(3.99 m)	(2.3 m)	(1.61 m)	(914)	(1.98 m)	(2.01 m)	(80)	(50) (10*	(3.1)	(1.67 m)	(1.04 m)	(2.35 m)	(5.05 m)	(1.04 m)	(1.55 m)	52	(113)
	DS 36-2	36	5′-0′′	22	4'-4''	3′-10¾′′	15'-3''	8'-81/2''	6'-1'/4"	3′-8′′	7'-63/4''	7'-81/4"	3	2 70°	5.3	6'-6''	4'-1''	8'-11"	19'-6"	4'-1''	5'-9"	58	320
-	(DS 900-2) DS 15-2	(900) 15	(1.52 m) 38	(560)	(1.32 m) 29	(1.191 m) 21	(4.64 m) 9'-5''	(2.65 m) 5'-10¾''	(1.86 m) 3'-9"	(1.119 m) 19	(2.3 m) 4'-7 ¹ / ₂ "	(2.34 m) 4'-9 ¹ / ₂ "	(80)	13/4 650	(4.1)	(1.91 m) 4'-1"	(1.26 m) 23	(2.7 m) 6'-0"	(5.87 m) 12'-0"	(1.26 m) 23	(1.75 m) 3'-7"		(144) 120
	(DS 375-2)	(375)	(960)	(260)	(740)	(533)	(2.86 m)	(1.79 m)	(1.14 m)	(483)	(1.41 m)	(1.45 m)	(90)	(50) 65°	(1.7)	(1.12 m)	(600)	(1.8 m)	(3.58 m)	(600)	(1.09 m)	38	(54)
	DS 18-2	18	38	13	32	241/4	9′-81/2′′	5′-10¾′′	3′-9′′	22	4'-91/4"	4'-11'/4''	31/4	1 ³ / ₄ 65°	2.4	4'-0''	27	6′-0′′	12'-3''	27	3′-11′′	42	140
	(DS 450-2) DS 24-2	(450)	(960) 3'-10''	(330)	(810)	(617)	(2.95 m) 11'-11"	(1.79 m) 7'-1 ¹ / ₂ ''	(1.14 m) 4'-6 ¹ / ₂ ''	(559)	(1.45 m) 5'-10 ¹ / ₂ ''	(1.5 m) 6'-0 ¹ / ₂ "	(90)	13/4 650	(1.8)	(1.2 m) 4'-11"	(683)	(1.85 m) 7'-4"	(3.73 m) 15'-3"	(683)	(1.19 m) 4'-7"		(63)
25°	(DS 600-2)	(600)	(1.16 m)	(410)	(990)	(841)	(3.61 m)	(2.16 m)	(1.38 m)	(762)	(1.78 m)	(1.83 m)	(90)	(50) 65°	(2.6)	(1.43 m)	(909)	(2.2 m)	(4.55 m)	(909)	(1.40 m)	48	(90)
	DS 30-2	30	4'-4''	19	3'-9''	3'-31/4"	13'-6 14''	8'-03/4''	5′-1¾′′	36	6'-81/2''	6'-10'/4''	31/4	1¾ 65°	4.3	5′-6"	3'-6''	8'-3"	17'-3"	3'-6''	5'-2''	52	250
	(DS 750-2) DS 36-2	(750) 36	(1.32 m) 5'-0"	(480)	(1.14 m) 4'-4''	(1.008 m) 4'-01/2''	(4.13 m) 15'-9 ¹ / ₄ ''	(2.46 m) 9'-3¾''	(1.57 m) 5'-11'/a''	(914) 3'-8''	(2.04 m) 7'-9¾''	(2.09 m) 7'-11 ¹ / ₂ "	(90)	(50)	(3.3)	(1.62 m) 6'-5"	(1.08 m) 4'-3''	(2.5 m) 9'-7"	(5.2 m) 20'-3"	(1.08 m) 4'-3"	(1.58 m) 5'-11"		(113)
	(DS 900-2)	(900)	(1.52 m)	(560)	(1.32 m)	(1.235 m)	(4.8 m)	(2.83 m)	(1.81 m)	(1.119 m)	(2.38 m)	(2.42 m)	(90)	(50) 65°	(4.3)	(1.86 m)	(1.3 m)	(2.88 m)	(6.04 m)	(1.3 m)	(1.80 m)	60	(149)
	DS 15-2	15	38	10	29	22	9'-93/4''	6'-4''	3′-8″	19	4'-93/4''	5′-0″	31/2	1½ 60°	2.3	4'-0"	24	6′-6′′	12'-6"	24	3′-8′′	42	130
1	(DS 375-2) DS 18-2	(375)	(960)	(260)	(740)	(558) 25½	(2.98 m) 10'-1 ¹ / ₂ "	(1.92 m) 6'-4''	(1.11 m) 3'-8"	(483)	(1.46 m) 4'-11 ¹ / ₂ ''	(1.52 m) 5'-2''	(90)	11/2	(1.8)	(1.15 m) 4'-0''	(626)	(1.93 m) 6'-5"	(3.71 m) 3.87 m	(626)	(1.12 m) 4'-0"		(59) 150
1	(DS 450-2)	(450)	(960)	(330)	(810)	(645)	(3.07 m)	(1.92 m)	(1.11 m)	(559)	(1.51 m)	(1.56 m)	(90)	(40) 60°	(1.9)	(1.18 m)	(712)	(1.98 m)	(12'-9'')	(712)	(1.22 m)	42	(68)
30°	DS 24-2	24	3′-10′′	16	39	34¾	12'-5''	7'-8''	4'-5''	30	6'-11/2"	6'-31/2"	31/2	1½ 60°	3.6	4'-10''	37	7′-10′′	4.71 m	37	4'-9''	52	210
1 ~~	(DS 600-2) DS 30-2	(600)	(1.16 m) 4'-4''	(410) 19	(990) 3'-9''	(880) 3'-5 ¹ / ₂ "	(3.77 m) 14'-1¾''	(2.32 m) 8'-8"	(1.34 m) 5'-0''	(762) 36	(1.86 m) 6'-11 ³ / ₄ ''	(1.91 m) 7'-2"	(90)	(40)	(2.8)	(1.4 m) 5'-6''	(949) 3'-8''	(2.37 m) 8'-10"	(15'-9'') 5.39 m	(949) 3'-8"	(1.45 m) 5'-4"		(95) 270
1	(DS 750-2)	(750)	(1.32 m)	(480)	(1.14 m)	(1.055 m)	(4.31 m)	(2.64 m)	(1.53 m)	(914)	(2.13 m)	(2,18 m)	(90)	1 ¹ / ₂ 60°	(3.4)	(1.58 m)	(1.12 m)	(2.69 m)	(18'-0'')	(1.12 m)	(1.63 m)	56	(122)
1	DS 36-2	36	5'-0''	22	4'-4''	4'-23/4"	16'-51/2''	10'-0''	5'-9'/4''	3′-8′′	8′1¾′′	8'-33/4''	31/2	11/2 600	5.9	6'-4''	4'-5''	10'-3''	6.26 m	4'-5"	6'-1''	66	360
$\overline{}$	(DS 900-2)	(900)	(1.52 m)	(560)	(1.32 m)	(1.292 m)	(5.01 m)	(3.04 m)	(1.76 m)	(1.119 m)	(2.48 m)	(2.53 m)	(90)	(40)	(4.5)	(1.82 m)	(1.36 m)	(3.09 m)	(21'-0'')	(1.36 m)	(1.86 m)	00	(162)



REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS 15" (375 mm) THRU 36" (900 mm) DIA. SKEWED WITH ROADWAY

(Sheet 4 of 5)

STANDARD 542201-02

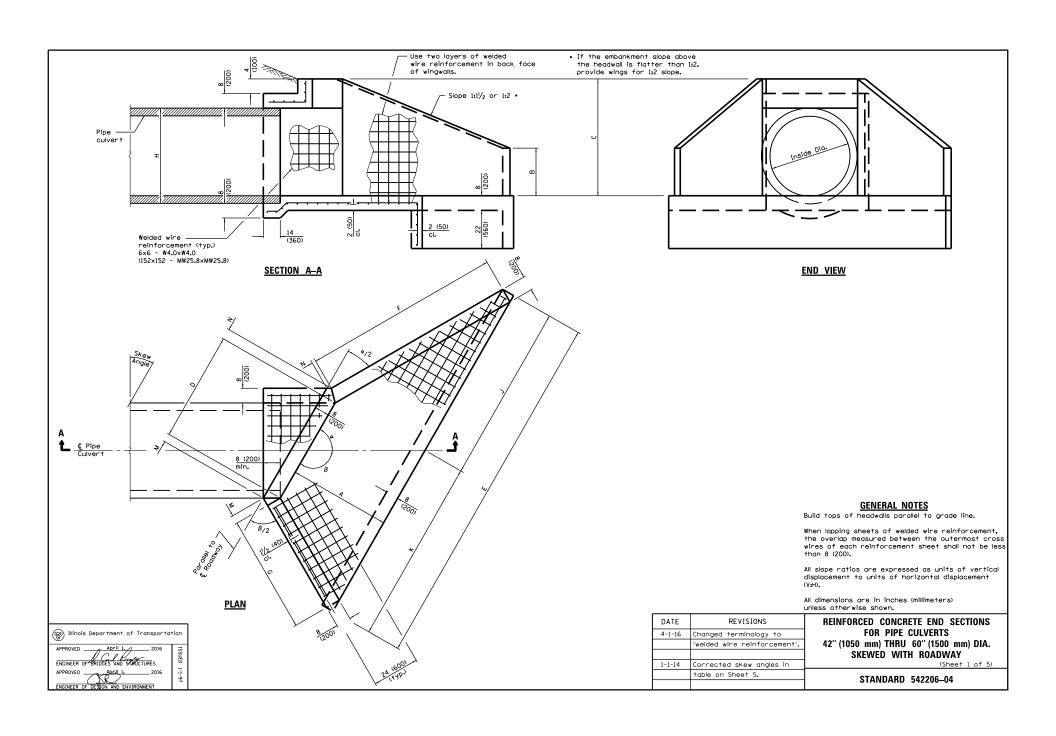
WINGS FOR 1:2 SLOPE

		Nominal					DIME	ENSIONS FOR	CONCRETE							Concrete		Re	inf. Ba	rs - 2 Er	d Sectio	ns		Bars for
Skew Angle	Design No.	Pipe													0	2 End Sections		h -	bars		hı -	bars	v-bars	2 End Sections
Arigie		Dia.	A	В	С	D	E	F	G	н	J	K	М	N	α	yd ³ (m ³)	0	P	q	Lgth.	P	Lgth.	No.	lbs. (kg)
	DS 15-2	15	38	10	29	231/4	10'-4"	6'-101/4''	3'-63/4''	19	5′-0¾′′	5'-31/4"	33/4	11/2	55°	2.4	3'-11"	26	6'-11"	13′-0″	26	3'-10"	44	140
	(DS 375-2) DS 18-2	(375) 18	(960)	(260)	(740)	(590) 27	(3.14 m) 10'-7 ³ / ₄ ''	(2.08 m) 6'-10 ¹ / ₄ ''	(1.08 m) 3'-6¾''	(485)	(1.54 m) 5'-2 ¹ / ₂ "	(1.6 m) 5'-5 ¹ / ₄ "	(90)	(40) 1½		2.6	(1.13 m) 3'-11"	(658)	(2.09 m 6'-11''	(3.87 m) 13'-3"	(658)	(1.17 m) 4'-1''		(63) 150
	(DS 450-2)	(450)	(960)	(330)	(810)	(683)	(3.23 m)	(2.08 m)	(1.09 m)	(559)	(1.58 m)	(1.65 m)	(90)	(40)	55°	(2.0)	(1.15 m)	(750)	(2.14 m	(4.04 m)	(750)	(1.25 m)	44	(68)
35°	DS 24-2 (DS 600-2)	24 (600)	3'-10'' (1.16 m)	16 (410)	39 (990)	36½ (930)	13'-1'' (3.97 m)	8'-3 ¹ / ₂ '' (2.52 m)	4'-3¾'' (1.31 m)	30 (762)	6'-5 ¹ / ₄ '' (1.95 m)	6'-7¾'' (2.02 m)	3¾ (90)	1½ (40)	55°	3.8 (2.9)	4'-8'' (1.37 m)	39 (1.0 m)	8'-4'' (2.56 m	16'-3") (4.93 m)	(1.0 m)	4'-11'' (1.50 m)	52	220 (99)
	DS 30-2	30	4'-4''	19	3'-9''	3′-8′′	14'-11''	9'-41/2"	4'-101/2"	36	7'-41/4"	7'-63/4''	33/4	11/2	55°	4.8	5'-4''	3'-11''	9'-6''	18'-9"	3'-11''	5′-7′′	60	290
	(DS 750-2) DS 36-2	(750) 36	(1.32 m) 5'-0''	(480)	(1.14 m) 4'-4''	(1.116 m) 4'-5¾''	(4.54 m) 17'-4 ¹ / ₄ "	(2.86 m) 10'-10"	(1.49 m) 5'-7¾''	(914) 3'-8''	(2.24 m) 8'-6¾''	(2.3 m) 8'-9 ¹ / ₂ "	(90)	(40)	+	(3.7)	(1.55 m) 6'-1"	(1.18 m) 4'-8''	(2.9 m) 11'-0''	(5.64 m) 21'-9"	(1.18 m) 4'-8"	(1.70 m) 6'-4"		(131) 380
	(DS 900-2)	(900)	(1.52 m)	(560)	(1.32 m)	(1.366 m)	(5.28 m)	(3.29 m)	(1.72 m)	(1.119 m)	(2.61 m)	(2.67 m)	(90)	(40)	55°	(4.8)	(1.78 m)	(1.43 m)	(3.34 m		(1.43 m)	(1.93 m)	70	(171)
	DS 15-2 (DS 375-2)	15 (375)	38 (960)	10 (260)	29 (740)	34¾ (631)	11'-0'' (3.34 m)	7'-6'' (2,27 m)	3'-6" (1.06 m)	19 (485)	5'-4 ¹ / ₂ '' (1.63 m)	5'-7 ¹ / ₂ '' (1.71 m)	33/4	11/4	50°	2.6	3′-10′′	28 (700)	7'-7" (2,28 m	13'-9") (4.08 m)	28 (700)	3'-11" (1.19 m)	48	150 (68)
	DS 18-2	18	38	13	32	283/4	11'-4"	7'-6"	3'-6"	22	5'-61/2"	5'-91/2"	33/4	11/4		(2.0)	(1.1 m) 3'-10''	31	7'-7"	14'-0"	31	4'-3"	48	160
	(DS 450-2)	(450)	(960)	(330)	(810)	(730)	(3.44 m)	(2.27 m)	(1.08 m)	(559)	(1.68 m)	(1.76 m)	(100)	(40)	50°	(2.1)	(1.13 m)	(798)	(2.34 m		(798)	(1.30 m)	48	(72)
40°	DS 24-2 (DS 600-2)	24 (600)	3'-10'' (1.16 m)	16 (410)	39 (990)	3'-3 ¹ / ₄ '' (995)	13'-11/4'' (4.23 m)	9'-0¾'' (2.75 m)	4'-2¾'' (1.28 m)	30 (762)	6'-10 ¹ / ₄ '' (2.08 m)	7'-1'' (2.15 m)	3¾ (100)	11/4	50°	4.1 (3.1)	4'-7" (1.34 m)	3'-6'' (1.07 m)	9'-2" (2.79 m	17'-3") (5.2 m)	3'-6" (1.07 m)	5'-2" (1.58 m)	58	240 (108)
	DS 30-2	30	4'-4''	19	3'-9''	3'-11''	15′-10¾′′	10'-3''	4'-91/2"	36	7'-10''	8'-03/4"	33/4	11/4	50°	5.2	5'-3''	4'-2"	10'-4"	19'-9"	4'-2"	5'-10''	64	310
	(DS 750-2) DS 36-2	(750) 36	(1.32 m) 5'-0''	(480)	(1.14 m) 4'-4''	(1.193 m) 4'-9 ¹ / ₂ ''	(4.84 m) 18'-6''	(3.12 m) 11'-10''	(1.46 m) 5'-6 ¹ / ₄ "	(914)	(2.38 m) 9'-1 ¹ / ₂ "	(2.46 m) 9'-4 ¹ / ₂ "	(100)	(40)		6.8	(1.52 m) 6'-0"	(1.26 m) 5'-0''	(3.17 m 12'-0") (5.95 m) 23'-0"	(1.26 m) 5'-0"	(1.78 m) 6'-3''		(140) 420
	(DS 900-2)	(900)	(1.52 m)	(560)	(1.32 m)	(1.461 m)	(5.63 m)	(3.6 m)	(1.68 m)	(1.119 m)	(2.78 m)	(2.85 m)	(100)	(40)	50°	(5.2)	(1.74 m)	(1.53 m)	(3.65 m) (6.92 m)		(2.03 m)	78	(189)
	DS 15-2 (DS 375-2)	15 (375)	(960)	10 (260)	29 (740)	27 (683)	11'-10 ¹ / ₄ '' (3.6 m)	8'-3 / ₄ '' (2.51 m)	3'-5 ¹ / ₄ '' (1.04 m)	19 (485)	5'-9 ¹ / ₂ '' (1.76 m)	6'-0¾'' (1.84 m)	(100)	(30)	45°	2.8 (2.1)	3'-9" (1.09 m)	29 (753)	8'-4'' (2.51 m	14'-6" (4.35 m)	29 (753)	4'-1'' (1.25 m)	48	150 (68)
	DS 18-2	18	38	13	32	31	12'-21/2"	8'-31/4"	3'-51/4"	22	5'-111/2"	6'-3''	4	11/4	45°	3.1	3'-10"	34	8'-4"	15'-0"	34	4'-6"		180
	(DS 450-2)	(450)	(960)	(330)	(810)	(791)	(3.7 m)	(2.51 m)	(1.04 m)	(559)	(1.81 m)	(1.89 m)	(100)	(30)	45*	(2.4)	(1.11 m)	(859)	(2.58 m		(859)	(1.37 m)	52	(81)
45°	DS 24-2 (DS 600-2)	24 (600)	3'-10'' (1.16 m)	16 (410)	39 (990)	3'-6 ¹ / ₂ " (1.078 m)	15'-0'/4'' (4.56 m)	10'-0'/4'' (3.03 m)	4'-1¾'' (1.26 m)	30 (762)	7'-4 ¹ / ₂ '' (2 . 24 m)	7'-7¾'' (2.32 m)	(100)	(30)	45°	4.4 (3.4)	4'-6'' (1.32 m)	3'-9'' (1.15 m)	10'-0" (3.08 m	18'-3" (5.55 m)	3'-9" (1.15 m)	5'-5" (1.65 m)	60	250 (113)
	DS 30-2	30	4'-4''	19	3'-9''	4'-3''	17′-1¾′′	11'-4''	4'-81/4''	36	8'-51/4"	8'-81/2"	4	11/4	45°	5.6	5'-2"	4'-5''	11'-5"	21'-0"	4'-5"	6'-1''	72	340
	(DS 750-2) DS 36-2	(750) 36	(1.32 m) 5'-0''	(480)	(1.14 m) 4'-4''	(1.293 m) 5'-2 ¹ / ₄ "	(5.23 m) 19'-11¾''	(3.45 m) 13'-0¾''	(1.43 m) 5'-5''	(914) 3'-8''	(2.57 m) 9'-10 ¹ / ₄ ''	(2.66 m) 10'-1 ¹ / ₂ ''	(100)	(30)	-	7.4	(1.49 m) 5'-11"	(1.36 m) 5'-5''	(3.5 m) 13'-2"	(6.35 m) 24'-6"	(1.36 m) 5'-5"	(1.86 m) 7'-1"		(153) 450
	(DS 900-2)	(900)	(1.52 m)	(560)	(1.32 m)	(1.583 m)	(6.08 m)	(3.97 m)	(1.65 m)	(1.119 m)	(3.0 m)	(3.08 m)	(100)	(30)	45°	(5.7)	(1.71 m)	(1.65 m)	(4.02 m	(7.39 m)	(1.65 m)	(2.16 m)	82	(203)
	DS 15-2 (DS 375-2)	15 (375)	38 (960)	10 (260)	29 (740)	29½ (751)	12'-11/ ₂ '' (3.93 m)	9'-3'' (2.81 m)	3'-4 ¹ / ₂ '' (1.03 m)	19 (485)	6'-4'' (1.92 m)	6'-7 ¹ / ₂ '' (2.01 m)	4 ¹ / ₄ (110)	(30)	40°	3.1 (2.4)	3'-9" (1.07 m)	32 (822)	9'-4'' (2.81 m	15'-9") (4.7 m)	32 (822)	4'-4" (1.32 m)	54	170 (77)
	DS 18-2	18	38	13	32	341/4	13'-4'/4"	9'-3"	3'-41/2"	22	6'-6'/4''	6'-10''	41/4	1	40°	3.4	3'-8"	37	9'-3"	16'-0"	37	4'-9"	54	190
	(DS 450-2)	(450)	(960)	(330)	(810)	(870)	(4.05 m)	(2.81 m)	(1.03 m)	(559)	(1.98 m)	(2.07 m)	(110)	(30)	40	(2.6)	(1.1 m)	(939)	(2.88 m		(939)	(1.45 m)	-	(86)
50°	DS 24-2 (DS 600-2)	24 (600)	3'-10'' (1.16 m)	16 (410)	39 (990)	3′-10¾′′ (1.185 m)	16'-5 ¹ / ₂ '' (4.99 m)	11'-2 ¹ / ₂ '' (3.39 m)	4'-1'' (1.24 m)	30 (762)	8'-1" (2.45 m)	8'-4 ¹ / ₂ '' (2 . 54 m)	4 ¹ / ₄ (110)	(30)	40°	4.8 (3.7)	4'-6'' (1.3 m)	4'-1'' (1.26 m)	11'-2" (3.44 m	19'-9") (6.0 m)	4'-1" (1.26 m)	5'-9" (1.75 m)	68	280 (126)
	DS 30-2	30	4'-4''	19	3'-9''	4'-8''	18'-91/2"	12'-8''	4'-71/4''	36	9'-3''	9'-61/2''	41/4	1	40°	6.2	5′-1′′	4'-10''	12'-9"	22'-9"	4'-10''	6′-6′′	78	370
	(DS 750-2) DS 36-2	(750) 36	(1.32 m) 5'-0''	(480)	(1.14 m) 4'-4''	(1.422 m) 5'-8 ¹ / ₂ "	(5.72 m) 21'-10¾''	(3.86 m) 14'-7 ¹ / ₂ ''	(1.41 m) 5'-3¾''	(914)	(2.82 m) 10'-9 ¹ / ₂ ''	(2.92 m) 11'-1 ¹ / ₄ ''	(110)	(30)	1	(4.7) 8.1	(1.47 m) 5'-10''	(1.49 m) 5'-11"	(3.91 m 14'-9") (6.87 m) 26'-6''	(1.49 m) 5'-11"	(1.98 m) 7'-7"		(167) 490
	(DS 900-2)	(900)	(1.52 m)	(560)	(1.32 m)	(1.741 m)	(6.67 m)	(4.45 m)	(1.62 m)	(1.119 m)	(3.29 m)	(3.38 m)	(110)	(30)	40°	(6.2)	(1.69 m)	(1.81 m)	(4.5 m)	(8.0 m)	(1.81 m)	(2.31 m)	90	(221)
	DS 15-2 (DS 375-2)	15 (375)	38 (960)	10 (260)	29 (740)	33 (842)	14'-5'' (4.38 m)	10'-6 ¹ / ₄ '' (3.2 m)	3'-4'' (1.01 m)	19 (485)	7'-0½'' (2.14 m)	7'-4 ¹ / ₂ '' (2.24 m)	4½ (110)	(30)	35°	3.4 (2.6)	3'-8" (1.06 m)	36 (914)	10'-7" (3.18 m	17'-3") (5.17 m)	36 (914)	4'-8" (1.42 m)	60	180 (81)
	DS 18-2	18	38	13	32	381/4	14'-101/4''	10'-6'/4''	3′-4′′	22	7'-31/4"	7'-7''	41/2	1	35°	3.7	3'-9''	3′-5"	10'-7''	17'-9"	3'-5"	5'-1''	60	210
	(DS 450-2) DS 24-2	(450) 24	(960) 3'-10''	(330)	(810)	(975) 4'-4 ¹ / ₄ ''	(14'-10 ¹ / ₄ '') 14'-10 ¹ / ₄ ''	(3.2 m) 12'-9"	(1.01 m) 4'-0 ¹ / ₄ ''	(559)	(2.21 m) 9'-0 ¹ / ₄ ''	(2.3 m) 9'-4''	(110) 4½	(30)	-	(2.8)	(1.08 m) 4'-5"	(1.05 m) 4'-7''	(3.27 m 12'-9") (5.4 m) 21'-9"	(1.05 m) 4'-7"	(1.55 m) 6'-3''		(95) 300
55°	(DS 600-2)	(600)	(1.16 m)	(410)	(990)	(1.329 m)	(5.56 m)	(3.86 m)	(1.22 m)	(762)	(2.73 m)	(2.83 m)	(110)	(30)	35°	(4.1)	(1.29 m)	(1.4 m)	(3.91 m		(1.4 m)	(1.91 m)	74	(135)
	DS 30-2	30	4'-4''	19 (480)	3′-9″	5'-23/4"	20′-11½″	14'-5''	4'-61/2"	36	10′-3¾′′	10'-73/4''	41/2	(30)	35°	6.9	5′-1″	5'-6'' (1.66 m)	14'-6"	25′-0″	5′-6″	7'-2"	88	420
	(DS 750-2) DS 36-2	(750) 36	(1.32 m) 5'-0''	22	(1.14 m) 4'-4''	(1.594 m) 6'-4¾''	(6.39 m) 24'-5 ¹ / ₄ "	(4.39 m) 16'-7 ¹ / ₂ "	(1.39 m) 5'-3''	(914) 3'-8''	(3.15 m) 12'-0¾''	(3.24 m) 12'-4¾''	41/2	1	750	(5.3)	5'-10"	6'-7''	16'-7") (7.56 m) 29'-0"	(1.66 m) 6'-7''	(2.19 m) 8'-3"	400	(189) 550
	(DS 900-2)	(900)	(1.52 m)	(560)	(1.32 m)	(1.951 m)	(7.44 m)	(5.06 m)	(1.61 m)	(1.119 m)	(3.67 m)	(3.77 m)	(110)	(30)	35°	(7.0)	(1.67 m)		(5.11 m		(2.02 m)	(2.52 m)	102	(248)
	DS 15-2 (DS 375-2)	15 (375)	(960)	10 (260)	29 (740)	(966)	16'-5 / ₄ '' (4.99 m)	12'-2¾'' (3.71 m)	3'-3 ¹ / ₄ '' (1.0 m)	19 (485)	8'-0 ¹ / ₂ '' (2.44 m)	8'-4¾'' (2.55 m)	(120)	(20)		3.9 (3.0)	3′-8″ (1.05 m)	3′-5′′ (1.04 m)	(3.7 m)	19'-3" (5.79 m)	3'-5" (1.04 m)	5'-1'' (1.55 m)	64	200 (90)
1	DS 18-2	18	38	13	32	3'-8''	16′-111/4′′	12'-23/4''	3'-31/4"	22	8'-31/2"	8'-73/4"	41/2	03/4	300	4.2	3'-8''	3'-11''	12'-2"	19'-9"	3'-11''	5'-7''	70	240
1	(DS 450-2) DS 24-2	(450) 24	(960)	(330)	(810)	(1.118 m) 5'-0"	(5.15 m) 20'-11 ¹ / ₄ ''	(3.71 m) 14'-9¾''	(1.0 m) 3'-11¾''	(559)	(2.52 m) 10'-3 ¹ / ₂ ''	(2.63 m) 10'-7¾''	(120) 4 ¹ / ₂	(20)	130	(3.2)	(1.07 m) 4'-5"	(1.19 m) 5'-3"	(3.8 m) 14'-10'	(6.06 m)	(1.19 m) 5'-3"	(1.70 m) 6'-11''		(108)
60°	(DS 600-2)	(600)	(1.16 m)	(410)	(990)	(1.524 m)	(6.35 m)	(4.48 m)	(1.2 m)	(762)	(3.12 m)	(3.23 m)	(120)	(20)	30°	(4.7)	(1.27 m)	(1.6 m)	(4.54 m	(7.41 m)	(1.6 m)	(2.11 m)	86	(158)
1	DS 30-2	30	4'-4''	19 (480)	3′-9′′	6'-0''	23′-11¼″	16'-9"	4'-53/4''	36	11'-91/2''	12'-1¾'' (3.7 m)	41/2	03/4		7.9	5′-0″	6'-3''	16'-9"	28'-0"	6'-3"	7'-11"	100	470
1	(DS 750-2) DS 36-2	(750) 36	(1.32 m) 5'-0''	22	(1.14 m) 4'-4''	(1.828 m) 7'-4"	(7.29 m) 27'-11 ¹ / ₄ "	(5.1 m) 19'-3¾''	(1.37 m) 5'-2"	(914)	(3.59 m) 13'-9 ¹ / ₂ ''	(3.7 m) 14'-1¾''	(120)	(20)		(6.0)	(1.44 m) 5'-10''	(1.9 m) 7'-7"	(5.16 m 19'-4") (8.5 m) 32'-9"	(1.9 m) 7'-7"	(2,41 m) 9'-3''		(212) 620
Щ	(DS 900-2)	(900)	(1.52 m)	(560)	(1.32 m)	(2.238 m)	(8.51 m)	(5.88 m)	(1.57 m)	(1.119 m)		(4.31 m)	(120)			(8.0)				(9.89 m)			114	(279)



REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS 15" (375 mm) THRU 36" (900 mm) DIA. SKEWED WITH ROADWAY

(Sheet 5 of 5)



WINGS FOR 1:1 1/2 SLOPE

Skew	Nominal Pipe					Di	mensions f	or Concre	te						Concrete 2 End Secs. cu. yd.	Welded Wire Reinforcement 2 End Secs.
Arigie	Dia.	А	В	С	D	E	F	G	н	J	к	М	N	a	(m ³)	sq. yd. (m²)
	42	4'-1''	26	4'-101/2"	4'-31/4"	13′-5′′	6'-01/2"	5'-61/2"	4'-3''	6'-81/4"	6′-8¾′′	31/2	3	85°	6.0	46
	(1050)	(1.25 m)		(1.49 m)	(1.299 m)	(4.09 m)	(1.85 m)	(1.69 m)	(1.295 m)	(2.04 m)	(2.05 m)	(90)	(80)	03	(4.6)	(38)
	48	4'-6''	29	5′-5′′	4'-101/4"	14'-10''	6′-8′′	6'-1'/4''	4'-10''	7'-43/4"	7'-51/4"	31/2	3	85°	7.2	53
5°	(1200)	(1.35 m)		(1.64 m)	(1.478 m)	(4.48 m)	(2.0 m)	(1.83 m)	(1.473 m)	(2.23 m)	(2.25 m)	(90)	(80)	"	(5.5)	(44)
-	54	4'-11"	32	5′-11½″	5'-51/4"	16′-3′′	7'-31/4"	6'-8"	5′-5″	8'-1'/4''	8'-13/4"	31/2	3	85°	8.4	65
-	(1350)	(1.56 m) 5'-4"	(810)	(1.85 m) 6'-6"	(1.657 m) 6'-0 ¹ / ₄ "	(5.08 m) 17'-8"	(2.31 m) 7'-10¾''	(2.12 m) 7'-2¾''	(1.651 m) 6'-0''	(2.53 m) 8'-9¾''	(2.55 m)	(90)	(80)	-	(6.4) 9.8	(55) 71
							(2,4 m)				8'-101/4''	3½ (90)	(80)	85°		(59)
	(1500)	(1.62 m) 4'-1"	26	(1.97 m) 4'-10 ¹ / ₂ ''	(1.835 m) 4'-3¾''	(5.37 m) 13'-6 ¹ / ₂ "	6'-4'/4"	(2.2 m) 5'-4"	(1.829 m) 4'-3''	(2.68 m) 6'-8¾"	(2.69 m) 6'-9¾''	33/4	3	-	(7.5) 6.3	47
	(1050)	(1.25 m)		4 -10/2 (1.49 m)	(1.314 m)	(4.13 m)	(1.94 m)	(1.63 m)	(1.295 m)	(2,05 m)	(2.08 m)	(100)	(80)	80°	(4.8)	(39)
-	48	4'-6"	29	5'-5"	4'-11"	15'-0"	7'-0"	5'-101/2"	4'-10"	7'-51/2"	7'-61/2"	33/4	3	_	7.5	54
	(1200)	(1.35 m)		(1.64 m)	(1.495 m)	(4.52 m)	(2.1 m)	(1.77 m)	(1.473 m)	(2.25 m)	(2.27 m)	(100)	(80)	80°	(5.7)	(45)
10°	54	4'-11"	32	5'-111/2"	5'-6"	16'-5"	7'-73/4"	6′-5′′	5'-5"	8'-2"	8'-3"	3 1/4	3	_	8.8	66
	(1350)	(1.56 m)		(1.85 m)	(1.676 m)	(5.13 m)	(2.43 m)	(2.04 m)	(1.651 m)	(2.55 m)	(2.58 m)	(100)	(80)	80°	(6.7)	(56)
	60	5'-4"	35	6'-6"	6'-1"	17'-101/2"	8'-31/2"	6'-111/2"	6'-0"	8'-10 1/4"	8'-113/4"	33/4	3		10.3	73
	(1500)	(1.62 m)	(890)	(1.97 m)	(1.857 m)	(5.43 m)	(2.52 m)	(2.12 m)	(1.829 m)	(2.7 m)	(2.73 m)	(100)	(80)	80°	(7,9)	(61)
	42	4'-1"	26	4'-101/2"	4'-43/4"	13'-91/2"	6'-81/2"	5'-13/4"	4'-3"	6'-10''	6'-11'/2"	4	21/4	75°	6.6	48
	(1050)	(1.25 m)		(1.49 m)	(1.34 m)	(4.2 m)	(2.05 m)	(1.57 m)	(1,295 m)	(2.08 m)	(2.12 m)	(100)	(70)	150	(5.0)	(40)
1	48	4'-6"	29	5′-5″	5'-0''	15'-3"	7'-43/4"	5'-8"	4'-10"	7'-63/4"	7'-81/4"	4	23/4	75°	7.9	55
15°	(1200)	(1.35 m)		(1.64 m)	(1.524 m)	(4,6 m)	(2.22 m)	(1.71 m)	(1.473 m)	(2.28 m)	(2.32 m)	(100)	(70)	150	(6.0)	(46)
15"	54	4'-11"	32	5'-11/2"	5'-71/4"	16'-874''	8'-1"	6'-21/4"	5'-5"	8'-33/4"	8'-5"	4	23/4	75°	9.3	68
	(1350)	(1.56 m)	(810)	(1.85 m)	(1.709 m)	(5.22 m)	(2.57 m)	(1.97 m)	(1.651 m)	(2.59 m)	(2.63 m)	(100)	(70)	1	(7.1)	(57)
	60	5'-4"	35	6′-6′′	6'-21/2"	18'-21/4"	8'-91/4"	6′-8¾′′	6′-0"	9'-01/2"	9'-13/4"	4	23/4	75°	10.8	75
	(1500)	(1.62 m)		(1.97 m)	(1.893 m)	(5.53 m)	(2.66 m)	(2.05 m)	(1.829 m)	(2.75 m)	(2.78 m)	(100)	(70)	13	(8.3)	(62)
	42	4'-1"	26	4'-101/2''	4'-61/4''	14'-13/4"	7'-11/2"	4'-11 3/4"	4'-3''	7'-0''	7'-13/4''	41/4	21/2	70°	7.0	49
	(1050)	(1.25 m)		(1.49 m)	(1.378 m)	(4.31 m)	(2.17 m)	(1.52 m)	(1.295 m)	(2.13 m)	(2.18 m)	(105)	(70)	1.0	(5.4)	(41)
	48	4'-6''	29	5′-5′′	5'-13/4"	15′-7¾′′	7'-10'/4''	5′-6′′	4'-10''	7′-9′′	7′-10¾′′	41/4	21/2	70°	8.4	57
20°	(1200)	(1.35 m)		(1.64 m)	(1.567 m)	(4.72 m)	(2.36 m)	(1.65 m)	(1.473 m)	(2.34 m)	(2.38 m)		(70)	1	(6.4)	(48)
	54	4'-11"	32	5'-11/2"	5'-91/4"	17'-2"	8'-63/4''	6'-0''	5′-5″	8′-6″	8'-8"	41/4	21/2	70°	9.9	70
	(1350)	(1.56 m)		(1.85 m)	(1.756 m)	(5.36 m)	(2.72 m)	(1.91 m)	(1.651 m)	(2.65 m)	(2.7 m)	(105)	(70)	<u> </u>	(7.6)	(59)
	60	5'-4" (1.62 m)	35	6'-6'' (1.97 m)	6'-41/2"	18-8" (5.68 m)	9'-3 ¹ / ₂ '' (2.83 m)	6'-6 ¹ / ₄ '' (1.98 m)	6'-0'' (1.829 m)	9'-3"	9'-5"	41/4	21/2	70°	11.5	77 (64)
	(1500)	4'-1"	26	4'-101/2"	(1.946 m) 4'-8 ¹ / ₄ "	14'-71/2"	7'-71/4"	4'-10"	4'-3"	(2.82 m) 7'-2 ¹ / ₂ "	(2.86 m) 7'-5"	(105) 4½	(70) 2 ¹ / ₄	-	(8.8) 7.4	51
	(1050)	(1.25 m)		(1.49 m)	(1.428 m)	(4.46 m)	(2.32 m)	(1,48 m)	(1.295 m)	(2,22 m)	(2,26 m)	(110)	(60)	65°	(5.7)	(43)
-	48	4'-6"	29	5′-5″	5'-4"	16'-21/4"	8'-41/2"	5'-4"	4'-10"	8'-0"	8'-21/4"	41/2	21/4	_	8.9	59
	(1200)	(1.35 m)		(1.64 m)	(1.625 m)	(4.88 m)	(2.52 m)	(1.6 m)	(1.473 m)	(2.41 m)	(2.47 m)	(110)	(60)	65°	(6.8)	(49)
25°	54	4'-11"	32	5'-11/2"	5'-113/4"	17'-9"	9'-13/4"	5'-10''	5'-5"	8'-91/4"	8'-113/4"	41/2	21/4	İ	10.5	73
	(1350)	(1.56 m)		(1.85 m)	(1.821 m)	(5.54 m)	(2.91 m)	(1.85 m)	(1.651 m)	(2.74 m)	(2.8 m)	nió	(60)	65°	(8,0)	(61)
	60	5'-4"	35	6'-6"	6'-71/2"	19'-374"	9'-11"	6'-4"	6'-0''	9'-61/4"	9'-9"	41/2	21/4		12.2	80
	(1500)	(1.62 m)		(1.97 m)	(2.018 m)	(5.87 m)	(3.02 m)	(1.92 m)	(1.829 m)	(2.90 m)	(2.97 m)	(110)	(60)	65°	(9.3)	(67)
	42	4'-1"	26	4'-101/2"	4'-11"	15'-3"	8'-2"	4'-81/2"	4'-3"	7'-6"	7'-9"	41/2	21/4	60°	7.9	53
	(1050)	(1.25 m)	(660)	(1.49 m)	(1.495 m)	(4.65 m)	(2.49 m)	(1.44 m)	(1.295 m)	(2.29 m)	(2.36 m)	(120)	(60)	100	(6.0)	(45)
ĺ	48	4'-6''	29	5′-5′′	5'-7''	16'-101/2"	9'-0''	5'-21/4"	4'-10''	8'-31/4''	8'-63/4''	41/2	21/4	60°	9.5	62
30°	(1200)	(1.35 m)		(1.64 m)	(1.7 m)	(5.1 m)	(2.7 m)	(1.56 m)	(1.473 m)	(2.51 m)	(2.59 m)	(120)	(60)	100	(7.3)	(52)
30	54	4'-11"	32	5′-11/2″	6′-3″	18′-6'/4′′	9'-10''	5′-8′′	5′-5″	9′-1¾′′	9'-41/2"	41/2	2 ¹ / ₄ (60)	60°	11.2	77
	(1350)	(1.56 m)		(1.85 m)	(1.906 m)	(5.79 m)	(3.12 m)	(1.8 m)	(1.651 m)	(2.85 m)	(2.92 m)	(120)	(60)	100	(8.6)	(64)
	60	5'-4"	35	6'-6"	6'-11'/4"	20'-2"	10'-8''	6'-2''	6'-0''	9'-111/2''	10'-21/2"	41/2	21/4	60°	13.1	84
	(1500)	(1.62 m)	(890)	(1.97 m)	(2.111 m)	(6.13 m)	(3.24 m)	(1.87 m)	(1.829 m)	(3.03 m)	(3.1 m)	(120)	(60)	100	(10.0)	(70)

Illinois Department of Transportation
APPROVED APRIL 1 2016
ENGINEER OF BRIDGES AND SMCCTURES
APPROVED APPROVED

REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS 42" (1050 mm) THRU 60" (1500 mm) DIA. SKEWED WITH ROADWAY

(Sheet 2 of 5)

STANDARD 542206-04

WINGS FOR 1:1 1/2 SLOPE

																Welded Wire
Skew	Nominal Pipe					Di	mensions f	or Concre	te						Concrete 2 End Secs.	Reinforcement 2 End Secs.
Angle	Dia.	A	В	С	р	E	F	G	н	J	к	м	N	a	cu. yd. (m³)	sq. yd.
_	42	4'-1"	26	4'-101/2"	5'-21/4"	16'-0¾''	8'-10''	4'-71/4"	4'-3''	7′-10¾″	8'-2"	43/4	2	<u> </u>	8.5	(m²) 56
	(1050)	(1.25 m)	(660)	(1.49 m)	(1.58 m)	(4.59 m)	(2.71 m)	(1.41 m)	(1.295 m)	(2.4 m)	(2,49 m)	(120)	(50)	55°	(6.5)	(47)
	48	4'-6"	29	5'-5"	5'-103/4"	17'-91/2"	9'-9"	5'-1"	4'-10"	8'-9"	9'-01/2"	43/4	2	.	10.2	66
750	(1200)	(1.35 m)		(1.64 m)	(1.798 m)	(5.36 m)	(2.93 m)	(1.53 m)	(1.473 m)	(2.64 m)	(2.73 m)	(120)	(50)	55°	(7.8)	(55)
35°	54	4'-11"	32	5'-111/2"	6'-71/4"	19'-61/4"	10'-73/4"	5'-61/2"	5′-5″	9'-71/2"	9'-10 1/4"	43/4	2	55°	12.0	81
	(1350)	(1.56 m)	(810)	(1.85 m)	(2.015 m)	(6.1 m)	(3.38 m)	(1.76 m)	(1.651 m)	(3.01 m)	(3.09 m)	(120)	(50)	22-	(9.2)	(68)
	60	5'-4''	35	6′-6′′	7'-4''	21'-3''	11'-61/2"	6'-01/4"	6′-0′′	10′-5¾′′	10'-9'/4''	43/4	2	55°	14.1	89
	(1500)	(1.62 m)		(1.97 m)	(2.232 m)	(6.46 m)	(3.51 m)	(1.83 m)	(1.829 m)	(3.19 m)	(3.27 m)	(120)	(50)	33	(10.8)	(74)
	42	4'-1''	26	4'-101/2''	5'-61/2"	17'-1'/4''	9'-8"	4'-6''	4'-3''	8'-43/4"	8'-81/2"	5	13/4	50°	9.1	60
- 1	(1050)	(1.25 m)		(1.49 m)	(1.69 m)	(5.21 m)	(2.95 m)	(1.38 m)	(1.295 m)	(2.56 m)	(2.65 m)	(130)	(50)	-	(7.0)	(50)
	48	4'-6" (1.35 m)	29	5′-5″	6'-3¾'' (1.922 m)	18'-11'/4'' (5.72 m)	10'-7¾'' (3,2 m)	4'-11½" (1.49 m)	4'-10'' (1.473 m)	9'-3¾'' (2,81 m)	9'-7 ¹ / ₂ '' (2.91 m)	5	13/4	50°	11.0 (8.4)	70 (58)
40°	(1200)	4'-11"	32	(1.64 m) 5'-11 ¹ / ₂ "	7'-0¾"	20'-9 ¹ / ₂ "	11'-7 ¹ /2"	5'-5"	5'-5"	10'-2 /4"	10'-6¾''	(130)	13/4	-	13.0	86
	(1350)	(1.56 m)		(1.85 m)	(2.155 m)	(6.5 m)	(3.69 m)	(1.72 m)	(1.651 m)	(3.2 m)	(3.3 m)	(130)	(50)	50°	(9.9)	(72)
	60	5'-4"	35	6'-6"	7'-10"	22'-7-74"	12'-71/2"	6'-0"	6'-0"	11'-2"	11'-5¾"	5	13/4	_	15.2	95
	(1500)	(1.62 m)	(890)	(1.97 m)	(2.387 m)	(6.89 m)	(3.84 m)	(1,79 m)	(1.829 m)	(3.4 m)	(3,49 m)	(130)	(50)	50°	(11.6)	(79)
	42	4'-1"	26	4'-101/2"	6'-0''	18'-5'/4"	10'-8"	4'-5"	4'-3"	9'-01/2''	9'-43/4"	51/4	11/2	T	10.0	65
	(1050)	(1.25 m)		(1.49 m)	(1.831 m)	(5.62 m)	(3,26 m)	(1.35 m)	(1.295 m)	(2.76 m)	(2.86 m)	(140)	(40)	45°	(7.6)	(54)
	48	4'-6''	29	5′-5″	6'-10"	20'-51/4"	11'-9"	4'-101/2"	4'-10"	10'-01/2"	10'-43/4"	51/4	11/2	45°	12.0	75
45°	(1200)	(1.35 m)	(740)	(1.64 m)	(2.083 m)	(6.17 m)	(3.53 m)	(1.46 m)	(1.473 m)	(3.03 m)	(3.14 m)	(140)	(40)	45	(9.2)	(63)
45-	54	4'-11"	32	5'-111/2"	7'-8''	22'-51/4"	12'-10'/4''	5'-33/4"	5'-5''	11'-01/2"	11'-41/4"	51/4	11/2	45°	14.2	93
	(1350)	(1.56 m)	(810)	(1.85 m)	(2.334 m)	(7.01 m)	(4.08 m)	(1.69 m)	(1.651 m)	(3.45 m)	(3.56 m)	(140)	(40)	45	(10.9)	(78)
- 1	60	5'-4"	35	6′-6′′	8′-5¾′′	24'-51/4"	13′-11¼"	5'-91/4"	6′-0′′	12'-01/2"	12'-41/4"	51/4	11/2	45°	16.7	103
	(1500)	(1.62 m)		(1.97 m)	(2.586 m)	(7.43 m)	(4.24 m)	(1.76 m)	(1.829 m)	(3.66 m)	(3.77 m)		(40)	٠,٠	(12.8)	(86)
	42	4'-1''	26	4'-101/2''	6'-71/4"	20'-2"	11'-11'/4''	4'-41/4"	4'-3''	9'-101/2"	10'-3/2"	51/2	11/2	40°	11.0	71
- 1	(1050)	(1.25 m)		(1.49 m)	(2.014 m)	(6.15 m)	(3.64 m)	(1.33 m)	(1.295 m)	(3.01 m)	(3.14 m)	(140)	(40)	-	(8.4)	(59)
	48	4'-6"	29	5′-5″	7'-6'/4''	22'-41/2"	13'-2"	4'-91/2"	4'-10"	10′-11¾′′	11'-43/4"	5½ (140)	11/2	40°	13.3	82
50°	(1200)	(1.35 m) 4'-11"	32	(1.64 m)	(2.291 m) 8'-5"	(6.75 m) 24'-7"	(3.95 m) 14'-4 ¹ / ₂ ''	(1.44 m) 5'-2¾''	(1.473 m) 5'-5"	(3.31 m) 12'-1"	(3,44 m) 12'-6"	51/2	(40) 1½	-	(10.2) 15.8	(69) 102
	(1350)	(1.56 m)		5'-11 ¹ / ₂ " (1.85 m)	(2.568 m)	(7,68 m)	(4.56 m)	(1.66 m)	(1.651 m)	(3.78 m)	(3.9 m)	(140)	(40)	40°	(12.1)	(85)
- 1	60	5'-4"	35	6'-6"	9'-4"	26'-9'/4"	15'-7'/4"	5'-8"	6'-0"	13'-2'/4"	13'-7"	51/2	11/2		18.5	112
	(1500)	(1.62 m)		(1.97 m)	(2.845 m)	(8.15 m)	(4.72 m)	(1.73 m)	(1.829 m)	(4.02 m)	(4.13 m)	(140)	(40)	40°	(14.1)	(94)
	42	4'-1"	26	4'-101/2"	7'-5"	22'-5¾"	13'-7"	4'-31/2"	4'-3''	11'-0'/4"	11'-51/2"	53/4	11/4		12.3	79
	(1050)	(1.25 m)		(1.49 m)	(2,257 m)	(6.85 m)	(4,14 m)	(1.31 m)	(1,295 m)	(3.36 m)	(3.49 m)	(150)	(30)	35°	(9.4)	(66)
- 1	48	4'-6''	29	5′-5′′	8'-5''	24'-111/2"	14'-111/2"	4'-81/2"	4'-10''	12'-3"	12'-81/2"	53/4	11/4	35°	14.9	92
55°	(1200)	(1.35 m)	(740)	(1.64 m)	(2.568 m)	(7.53 m)	(4.49 m)	(1.42 m)	(1.473 m)	(3.7 m)	(3.83 m)	(150)	(30)	35	(11.4)	(77)
22	54	4'-11"	32	5′-11½″	9'-51/4"	27′-5"	16'-4'/4''	5′-1¾′′	5′-5′′	13'-6''	13'-11"	53/4	11/4	35°	17.7	113
	(1350)	(1.56 m)	(810)	(1.85 m)	(2.878 m)	(8.57 m)	(5.19 m)	(1.64 m)	(1.651 m)	(4.22 m)	(4.35 m)	(150)	(30)	33	(13.5)	(95)
	60	5'-4"	35	6'-6"	10′-51/2″	29′-10¾′′	17′-8¾′′	5'-7"	6′-0′′	14′-8¾′′	15'-2"	5¾	11/4	35°	20.8	125
	(1500)	(1.62 m)		(1.97 m)	(3.188 m)	(9.09 m)	(5.39 m)	(1.7 m)	(1.829 m)	(4.48 m)	(4.61 m)	(150)	(30)	-	(15.9)	(104)
- 1	42	4'-1"	26	4'-101/2"	8′-6″	25′-7¾′′	15'-9'/4''	4'-23/4"	4'-3"	12'-7"	13′-0¾′′	61/4	1	30°	14.1	89
-	(1050)	(1.25 m) 4'-6''		(1.49 m) 5'-5"	(2.59 m) 9'-8''	(7.82 m) 28'-5¾"	(4.81 m) 17'-4¾''	(1.29 m)	(1.295 m)	(3.84 m) 14'-0''	(3.98 m) 14'-5¾''	(160)	(30)	-	(10.8) 17.0	(75)
	48 (1200)	(1.35 m)	29	5'-5'' (1.64 m)	(2.946 m)	(8.59 m)	(5.22 m)	4'-8'' (1.4 m)	4'-10'' (1.473 m)	(4.22 m)	(4.37 m)	(160)	(30)	30°	(13.0)	104 (87)
60°	54	4'-11"	32	5'-111/2"	10'-10"	31'-33/4"	19'-0"	5'-1"	5'-5"	15'-5"	15'-103/4"	61/4	1	\vdash	20.3	129
	(1350)	(1.56 m)		(1.85 m)	(3,302 m)	(9.79 m)	(6.03 m)	(1,62 m)	(1.651 m)	(4.82 m)	(4.97 m)		(30)	30°	(15.5)	(108)
- 1	60	5'-4"	35	6'-6"	12'-0"	34'-13/4"	20'-71/4"	5'-6'/4"	6'-0"	16'-10"	17'-374"	61/4	1	t	23.8	142
	(1500)	(1.62 m)			(3.658 m)	(10.39 m)	(6.26 m)	(1.68 m)		(5.12 m)	(5.27 m)	(160)		30°	(18.2)	(119)

REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS 42" (1050 mm) THRU 60" (1500 mm) DIA. SKEWED WITH ROADWAY

(Sheet 3 of 5)

WINGS FOR 1:2 SLOPE

Skew Angle	Nominal Pipe					Di	mensions f	or Concre	te						Concrete 2 End Secs. cu. yd.	Welded Wire Reinforcement 2 End Secs.
Aligio	Dia.	Α	В	С	D	E	F	G	н	J	к	М	N	α	(m ³)	sq. yd. (m²)
	42	5′-5″	26	4'-101/2"	4'-31/4"	16'-1"	8'-0'/4"	7'-41/4"	4'-3"	8'-0'/4''	8'-01/4"	31/2	3	85°	8.0	61
	(1050)	(1.66 m)		(1.49 m)	(1.299 m)	(4.29 m)	(2.46 m)	(2.26 m)	(1.295 m)	(2.45 m)	(2.47 m)	(90)	(80)	-	(6.1)	(51)
	48 (1200)	6'-0" (1.8 m)	29 (740)	5'-5'' (1.64 m)	4'-10 ¹ / ₄ " (1.478 m)	17'-10'' (5.38 m)	8'-10 ¹ / ₂ '' (2.67 m)	8'-1¾'' (2,44 m)	1.473 m (4'-10'')	8'-10¾'' (2.68 m)	8'-11 ¹ / ₄ '' (2,7 m)	3½ (90)	(80)	85°	9.6 (7.3)	71 (59)
5°	54	6'-7"	32	5'-111/2"	5'-51/4"	19'-7"	9'-9"	8'-11'/4"	1.651 m	9'-91/4"	9'-93/4"	31/2	3	-	11.3	88
	(1350)	(2.08 m)		(1.85 m)	(1.657 m)	(6.12 m)	(3.08 m)	(2.82 m)	(5'-5")	(3.05 m)	(3.07 m)	(90)	(80)	85°	(8.6)	(74)
	60	7'-2"	35	6'-6"	6'-01/4"	21'-4'/4"	10'-7'/4"	9'-81/4"	1.829 m	10'-8"	10'-8'/4"	31/2	3	İ	13.2	96
	(1500)	(2.16 m)		(1.97 m)	(1.835 m)	(6.46 m)	(3.2 m)	(2.93 m)	(6'-0'')	(3,22 m)	(3.24 m)	(90)	(80)	85°	(10.1)	(80)
	42	5'-5"	26	4'-101/2"	4'-3/4"	16'-3''	8'-5"	7'-01/4"	1.295 m	8'-1"	8'-2"	33/4	3	000	8.3	62
	(1050)	(1.66 m)		(1.49 m)	(1.314 m)	(4.97 m)	(2.59 m)	(2.17 m)	(4'-3'')	(2.47 m)	(2.5 m)	(100)	(80)	80°	(6.3)	(52
	48	6'-0''	29	5′-5′′	4'-11''	18'-01/2"	9'-4''	7′-10′′	1.473 m	8′-11¾′′	9′-0¾′′	33/4	3	80°	9.9	72
10°	(1200)	(1.8 m)	(740)	(1.64 m)	(1.495 m)	(5.43 m)	(2.8 m)	(2.35 m)	(4'-10'')	(2.71 m)	(2.73 m)	(100)	(80)	00	(7.6)	(60)
l .	54	6'-7''	32	5′-111/2″	5′-6″	19′-9¾′′	10'-3''	8'-71/4"	1.651 m	9'-101/2"	9'-11'/4"	33/4	3	80°	11.7	90
	(1350)	(2.08 m)		(1.85 m)	(1.676 m)	(6.19 m)	(3.24 m)	(2.72 m)	(5'-5")	(3.08 m)	(3.11 m)	(100)	(80)	-	(8.9)	(75)
	60	7'-2"	35	6'-6"	6'-1"	21'-7"	11'-174''	9'-41/4"	1.829 m	10′-9″	10'-10"	(100)	(80)	80°	13.7 (10.5)	98 (82)
	(1500)	(2.16 m) 5'-5"	(890)	(1.97 m) 4'-10 ¹ / ₂ ''	(1.857 m) 4'-4¾''	(6.53 m) 16'-6 ¹ / ₂ "	(3.36 m) 8'-10¾''	(2.82 m) 6'-10"	(6'-0'') 1,295 m	(3.25 m) 8'-2 ¹ / ₂ "	(3.28 m) 8'-4"	4	23/4	-	8.6	64
	(1050)	(1.66 m)		(1.49 m)	(1.34 m)	(5,06 m)	(2,73 m)	(2.1 m)	(4'-3'')	(2.51 m)	(2.55 m)	(100)	(70)	75°	(6.6)	(53)
	48	6'-0"	29	5'-5"	5'-0"	18'-41/2"	9'-10'/4"	7'-63/4"	1.473 m	9'-11/2"	9'-3"	4	23/4	_	10.4	74
	(1200)			(1.64 m)	(1.524 m)	(5.54 m)	(2.96 m)	(2,27 m)	(4'-10'')	(2.75 m)	(2.79 m)	(100)	(70)	75°	(8.0)	(62)
15°	54	6'-7''	32	5'-111/2"	5'-71/4"	20'-2"	10'-974"	8'-31/2"	1.651 m	10'-0'/4"	10'-13/4''	4	21/4	750	12.3	92
	(1350)	(2.08 m)	(810)	(1.85 m)	(1.709 m)	(6.3 m)	(3.42 m)	(2.63 m)	(5'-5'')	(3.13 m)	(3.17 m)	(100)	(70)	75°	(9.4)	(77)
l í	60	7'-2''	35	6′-6′′	6'-21/2"	21'-11 3/4"	11'-9'/4''	9'-01/2"	1.829 m	10'-11'/4"	11'-01/2"	4	23/4	75°	14.3	100
	(1500)	(2.16 m)		(1.97 m)	(1.893 m)	(6.65 m)	(3.55 m)	(2.73 m)	(6'-0'')	(3.31 m)	(3.34 m)	(100)	(70)	13	(10.9)	(84)
	42	5′-5″	26	4'-101/2''	4'-61/4''	16′-11¾′′	9'-51/4"	6'-71/4"	1.295 m	8'-5"	8'-6¾''	41/4	21/2	70°	9.0	66
	(1050)	(1.66 m)		(1.49 m)	(1.378 m)	(5.19 m)	(2.9 m)	(2.03 m)	(4'-3'')	(2.57 m)	(2.62 m)	(110)	(70)	1.0	(6.9)	(55)
	48	6'-0"	29	5′-5″	5′-1¾′′	18'-10"	10'-51/2"	7'-4"	1.473 m	9′-4″	9'-6"	41/4	21/2	70°	10.9	76
20°	(1200)	(1.8 m) 6'-7"	(740)	(1.64 m) 5'-11 ¹ / ₂ "	(1.567 m) 5'-9 ¹ / ₄ "	(5.68 m) 20'-8 ¹ / ₂ "	(3.14 m) 11'-5¾''	(2.2 m) 8'-01/2"	(4'-10'') 1.651 m	(2.81 m) 10'-3 ¹ / ₄ "	(2.86 m) 10'-5'/4''	(110)	(70) 2½	-	(8.3) 12.9	(64) 94
	(1350)	(2.08 m)		(1.85 m)	(1.756 m)	(6.47 m)	(3.63 m)	(2.54 m)	(5'-5'')	(3.21 m)	(3.26 m)	(110)	(70)	70°	(9.9)	(79)
1	60	7'-2"	35	6'-6"	6'-41/2"	22'-674"	12'-6"	8'-9"	1.829 m	11'-2'/2"	11'-4'/4"	41/4	21/2	_	15.1	103
	(1500)	(2.16 m)		(1.97 m)	(1.946 m)	(6.83 m)	(3.77 m)	(2.64 m)	(6'-0'')	(3.39 m)	(3.44 m)	(110)	(70)	70°	(11.5)	(86)
	42	5'-5"	26	4'-101/2"	4'-81/4"	17'-674"	10'-1"	6'-5"	1.295 m	8'-81/4"	8'-101/2"	41/2	21/4	65°	9.5	65
	(1050)	(1.66 m)	(660)	(1.49 m)	(1.428 m)	(5.37 m)	(3.09 m)	(1.64 m)	(4'-3'')	(2.65 m)	(2.72 m)	(110)	(60)	65	(7.3)	(55)
l í	48	6'-0''	29	5′-5′′	5′-4′′	19'-6''	11'-2'	7'-1'/4"	1.473 m	9'-7/4''	9'-10'/4''	41/2	21/4	65°	11.5	79
25°	(1200)	(1.8 m)		(1.64 m)	(1.625 m)	(5.88 m)	(3.35 m)	(2.14 m)	(4'-10'')	(2.91 m)	(2.97 m)	(110)	(60)	1	(8.8)	(66)
23	54	6'-7''	32	5'-11/2"	5'-113/4"	21′-5′′	12'-3"	7'-93/4"	1.651 m	10'-71/4"	10'-9¾''	41/2	21/4	65°	13.6	98
	(1350)	(2.08 m)		(1.85 m)	(1.821 m)	(6.69 m)	(3.87 m)	(2.47 m)	(5'-5")	(3.31 m)	(3.37 m)	(110)	(60)		(10.4)	(82)
	60 (1500)	7'-2"	35	6'-6'' (1.97 m)	6'-71/2"	23'-4 ¹ / ₄ " (7.06 m)	13'-4'' (4.02 m)	8'-6'' (2.56 m)	1.829 m (6'-0'')	11'-7'' (3.5 m)	11'-9 ¹ / ₄ " (3,56 m)	41/2	21/4	65°	15.9	107 (90)
	42	(2.16 m) 5'-5"	(890)	4'-101/2"	(2.018 m) 4'-11''	18'-4"	10'-10"	6'-3"	1.295 m	9'-01/2"	9'-31/2"	(110)	(60)	-	(12.2)	71
	(1050)	(1.66 m)		(1.49 m)	(1.495 m)	(5,61 m)	(3.32 m)	(1.92 m)	(4'-3'')	(2.77 m)	(2.84 m)	(120)	(60)	60°	(7.7)	(59)
1	48	6'-0"	29	5'-5"	5'-7"	20'-4'/4"	12'-0"	6'-11'/4"	1.473 m	10'-01/4"	10'-31/2"	41/2	21/4	l	12.2	82
	(1200)	(1.8 m)		(1.64 m)	(1.7 m)	(6.13 m)	(3.6 m)	(2.08 m)	(4'-10'')	(3.03 m)	(3.1 m)	(120)	(60)	60°	(9.3)	(69)
30°	54	6'-7"	32	5'-11/2"	6'-3"	22'-41/2"	13'-2"	7'-7'/4"	1.651 m	11'-074''	11'-374"	41/2	21/4	60°	14.4	102
	(1350)	(2.08 m)	(810)	(1.85 m)	(1.906 m)	(6.99 m)	(4.16 m)	(2.41 m)	(5'-5")	(3.46 m)	(3.53 m)	(120)	(60)	160°	(11.0)	(86)
l i	60	7'-2"	35	6'-6"	6'-11'/4''	24'-43/4"	14'-4"	8'-31/4"	1.829 m	12'-1''	12'-3¾"	41/2	21/4	60°	16.9	112
	(1500)	(2.16 m)	(890)	(1.97 m)	(2.111 m)	(7.38 m)	(4.32 m)	(2.45 m)	(6'-0'')	(3.65 m)	(3.73 m)	(120)	(60)	100	(12.9)	(93)

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REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS 42" (1050 mm) THRU 60" (1500 mm) DIA. SKEWED WITH ROADWAY

(Sheet 4 of 5)

WINGS FOR 1:1 1/2 SLOPE

_																
Skew Angle	Nominal Pipe					Di	imensions f	or Concre	te						Concrete 2 End Secs. cu. yd.	Welded Wire Reinforcement 2 End Secs.
Al Igio	Dia.	A	В	С	D	Ε	F	G	н	J	к	м	N	a	(m ³)	sq. yd. (m²)
	42	5′-5′′	26	4'-101/2"	5'-21/4"	19′-3¾"	11'-8¾''	6'-1'/4''	4'-3''	9'-61/4"	9'-91/2"	43/4	2	55°	10.8	75
	(1050)	(1.66 m)		(1.49 m)	(1.58 m)	(5.91 m)	(3.6 m)	(1.87 m)	(1.295 m)	(2.91 m)	(3.0 m)	(120)	(50)	33	(8.3)	(63)
	48	6'-0''	29	5′-5′′	5′-10¾′′	21'-51/2"	13'-0''	6'-91/4''	4'-10''	10'-7''	10'-101/2"	43/4	2	55°	13.0	87
35°	(1200)	(1.80 m)		(1.64 m)	(1.798 m)	(6.47 m)	(3.9 m)	(2.03 m)	(1.473 m)	(3.91 m)	(3.28 m)	(120)	(50)	100	(9.9)	(73)
	54	6'-7''	32	5′-11½″	6'-71/4"	23'-7"	14'-3"	7′-5″	5′-5″	11'-7-74''	11'-11'/4''	43/4	2	55°	15.4	108
-	(1350)	(2.08 m) 7'-2"		(1.85 m) 6'-6"	(2.015 m) 7'-4"	(7.37 m)	(4.51 m)	(2.35 m)	(1.651 m) 6'-0''	(3.64 m)	(3.73 m) 13'-0"	(120)	(50)	-	(11.8)	(90)
	60		35		(2.232 m)	25′-8¾′′ (7,78 m)	15'-6'/4"	8'-1'' (2,44 m)		12'-83/4"		4¾ (120)	2 (50)	55°	18.1	118 (99)
	(1500) 42	(2.16 m) 5'-5"	26	(1.97 m) 4'-10 ¹ /2''	5'-61/2"	20'-7"	(4.68 m) 12'-9¾''	5'-111/4"	(1.829 m) 4'-3''	(3.85 m) 10'-1 ¹ / ₂ "	(3.93 m) 10'-51/2"	5	13/4	-	(13.8)	80
	(1050)	(1.66 m)		4 -10/2 (1.49 m)	(1.69 m)	(6.29 m)	(3.93 m)	(1.84 m)	(1.295 m)	(3.1 m)	(3.19 m)	(130)	(50)	50°	(8.9)	(67)
- 1	48	6'-0"	29	5′-5″	6'-374"	22'-101/4"	14'-2'/4''	6'-71/2"	4'-10"	11'-3'/4"	11'-7"	5	13/4	_	14.0	93
	(1200)	(1.80 m)		(1.64 m)	(1.922 m)	(6.89 m)	(4.26 m)	(1.99 m)	(1.473 m)	(3,4 m)	(3,49 m)	(130)	(50)	50°	(10.7)	(77)
40°	54	6'-7"	32	5'-111/2"	7'-074"	25'-13/4"	15'-7"	7'-3'/4"	5'-5"	12'-5"	12'-8/4"	5	13/4	_	16.7	115
	(1350)	(2.08 m)		(1.85 m)	(2.155 m)	(7.86 m)	(4.93 m)	(2.3 m)	(1.651 m)	(3.88 m)	(3.98 m)	(130)	(50)	50°	(12.8)	(96)
l	60	7'-2"	35	6'-6"	7'-10"	27'-51/4"	16'-111/2"	7'-11"	6'-0"	13'-674''	13'-101/2"	5	13/4	İ	19.5	126
	(1500)	(2.16 m)		(1.97 m)	(2.387 m)	(8.3 m)	(5.11 m)	(2.39 m)	(1.829 m)	(4.1 m)	(4,2 m)		(50)	50°	(14.9)	(105)
	42	5'-5"	26	4'-101/2"	6'-0''	22'-21/2"	14'-13/4"	5'-10'/4''	4'-3"	10'-11"	11'-31/2"	51/4	11/2	45°	12.6	86
	(1050)	(1.66 m)		(1.49 m)	(1.831 m)	(6.79 m)	(4.34 m)	(1.8 m)	(1,295 m)	(3.34 m)	(3,45 m)		(40)	45	(9.6)	(72)
l	48	6'-0"	29	5′-5″	6'-10"	24'-81/4"	15'-8'/4"	6'-6"	4'-10"	12'-2"	12'-6'/4"	51/4	11/2	45°	15.2	100
45°	(1200)	(1.80 m)	(740)	(1.64 m)	(2.083 m)	(7.44 m)	(4.7 m)	(1.95 m)	(1.473 m)	(3.67 m)	(3.77 m)	(140)	(40)	45	(12.0)	(83)
45-	54	6'-7''	32	5'-111/2"	7'-8''	27'-13/4"	17'-21/2"	7'-11/2"	5'-5"	13'-474''	13'-9"	51/4	11/2	45°	18.2	124
	(1350)	(2.08 m)	(810)	(1.85 m)	(2.334 m)	(8.48 m)	(5.44 m)	(2.25 m)	(1.651 m)	(4.19 m)	(4.29 m)	(140)	(40)	45	(13.9)	(104)
	60	7'-2"	35	6′-6′′	8'-5¾''	29'-71/2"	18′-8¾′′	7′-9′′	6′-0′′	14'-71/2"	15'-0"	51/4	11/2	45°	21.3	136
	(1500)	(2.16 m)		(1.97 m)	(2.586 m)	(8.96 m)	(5.65 m)	(2.34 m)	(1.829 m)	(4.43 m)	(4.53 m)		(40)	45	(16.3)	(114)
	42	5′-5′′	26	4'-101/2''	6'-71/4"	24'-3¾''	15'-10''	5'-91/4"	4'-3''	11'-11'/2''	12'-4'/4"	51/2	11/2	40°	13.9	94
	(1050)	(1.66 m)		(1.49 m)	(2.014 m)	(7.44 m)	(4.86 m)	(1.77 m)	(1.295 m)	(3.66 m)	(3.78 m)	(150)	(40)	70	(10.6)	(78)
	48	6'-0"	29	5′-5′′	7'-61/4"	27'-01/2"	17'-61/2"	6'-41/2"	4'-10''	13′-3¾′′	13′-8¾′′	51/2	11/2	40°	16.8	109
50°	(1200)	(1.80 m)		(1.64 m)	(2.291 m)	(8.15 m)	(5.27 m)	(1.92 m)	(1.473 m)	(4.02 m)	(4.13 m)		(40)		(12.8)	(91)
	54	6'-7''	32	5'-11/2"	8′-5″	29'-91/4"	19'-3"	7′-0′′	5′-5″	14'-8'/4"	15′-1″	51/2	11/2	40°	20.0	135
-	(1350)	(2.08 m)		(1.85 m)	(2.568 m)	(9.3 m)	(6.09 m)	(2.21 m)	(1.651 m)	(4.59 m)	(4.71 m)	(150)	(40)	<u> </u>	(15.3)	(113)
	60 (1500)	7'-2" (2.16 m)	35 (890)	6'-6'' (1.97 m)	9'-4'' (2.845 m)	32′-5¾′′ (9.82 m)	20'-11 ¹ / ₂ " (6.32 m)	7'-7 ¹ / ₂ " (2.3 m)	6'-0" (1.829 m)	16'-0 ¹ / ₂ '' (4.86 m)	16'-5 ¹ / ₄ " (4.97 m)	5½ (150)	11/2	40°	23.5 (18.0)	148 (124)
	42	5'-5"	26	4'-101/2"	7'-5"	27'-11/2"	18'-0 ¹ / ₄ "	5'-8 ¹ / ₄ "	4'-3"	13'-4 ¹ / ₄ "	13'-9 ¹ / ₄ "	5 1/4	11/4	-	15.5	104
	(1050)	(1.66 m)		(1.49 m)	(2,257 m)	(8.3 m)	(5,52 m)	(1.74 m)	(1.295 m)	(4,08 m)	(4,22 m)	(150)	(30)	35°	(11.9)	(87)
ŀ	48	6'-0"	29	5′-5″	8'-5"	30'-2'/4"	19'-111/2"	6'-31/2"	4'-10"	14'-101/2"	15'-3/4"	53/4	11/4	_	18.8	121
	(1200)	(1.80 m)		(1.64 m)	(2.568 m)	(9.1 m)	(5.99 m)	(1.89 m)	(1.473 m)	(4.48 m)	(4.62 m)	(150)	(30)	35°	(14.4)	(101)
55°	54	6'-7"	32	5'-11/2"	9'-51/4"	33'-23/4"	21'-103/4"	6'-10 14"	5'-5"	16'-41/4''	16'-10''	53/4	11/4	İ	22.4	150
	(1350)	(2.08 m)		(1.85 m)	(2.878 m)	(10.39 m)	(6.92 m)	(2.18 m)	(1.651 m)	(5.13 m)	(5,26 m)		(30)	35°	(17.1)	(125)
l	60	7'-2"	35	6'-6"	10'-51/2"	36'-31/2"	23'-10"	7'-6'/4"	6'-0''	17'-11'/4"	18'-4'/4"	5/4	11/4	l	26.4	165
	(1500)	(2.16 m)		(1.97 m)	(3.188 m)	(10.97 m)	(7.18 m)	(2.27 m)	(1.829 m)	(5.42 m)	(5.55 m)	(150)	(30)	35°	(20.2)	(138)
	42	5'-5"	26	4'-101/2"	8'-6"	30'-117/4"	20'-11'/4"	5'-71/4"	4'-3"	15'-3"	15'-83/4"	61/4	1	700	17.7	118
	(1050)	(1.66 m)	(660)	(1.49 m)	(2.59 m)	(9.48 m)	(6.42 m)	(1.72 m)	(1.295 m)	(4.67 m)	(4.81 m)	(160)	(30)	30°	(13.5)	(98)
- 1	48	6'-0''	29	5′-5′′	9'-8''	34′-5¾′′	23'-21/4"	6'-21/2"	4'-10''	17'-0''	17'-53/4"	61/4	1	30°	21.5	137
60°	(1200)	(1.80 m)		(1.64 m)	(2.946 m)	(10.39 m)	(6.96 m)	(1.87 m)	(1.473 m)	(5.12 m)	(5.27 m)		(30)	130.	(16.4)	(115)
60	54	6'-7''	32	5′-11½″	10'-10''	37′-11¾′′	25'-51/4''	6′-9¾′′	5′-5″	18'-9''	19'-23/4"	61/4	1	30°	25.7	170
	(1350)	(2.08 m)		(1.85 m)	(3.302 m)	(11.87 m)	(8.04 m)	(2.16 m)	(1.651 m)	(5.86 m)	(6.01 m)		(30)	130.	(19.6)	(142)
[60	7'-2"	35	6'-6"	12'-0"	41′-5¾′′	27'-81/4''	7′-5′′	6′-0′′	20'-6''	20′-11¾′′	61/4	1	30°	30.2	187
	(1500)	(2.16 m)	(890)	(1.97 m)	(3.658 m)	(12.55 m)	(8.35 m)	(2.24 m)	(1.829 m)	(6.2 m)	(6.35 m)	(160)	(30)	1	(23.1)	(157)

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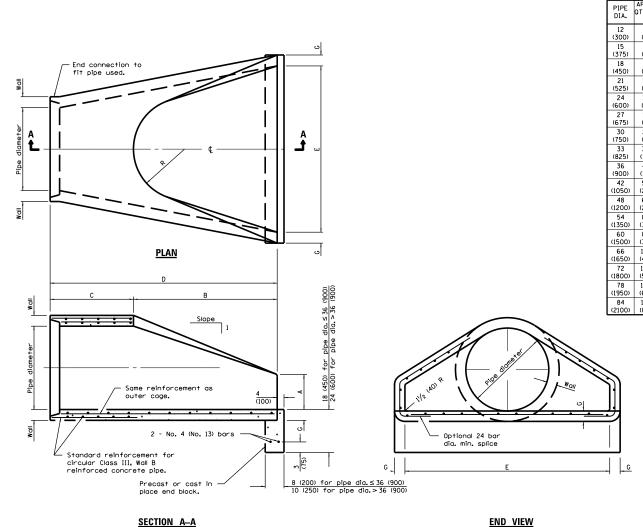
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REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS 42" (1050 mm) THRU 60" (1500 mm) DIA. SKEWED WITH ROADWAY

(Sheet 5 of 5)



PIPE DIA.	APPROX. OTY. Ibs. (kg)	WALL	А	В	С	D	E	G	R	APPROX. SLOPE
12	530	2	4	24	4'-0½''	6'-01/8''	24	2	9	1:2.4
(300)	(240)	(51)	(102)	(610)	(1.241 m)	(1.851 m)	(610)	(51)	(229)	
15	740	2 ¹ / ₄	6	27	3'-10"	6'-1''	30	2 ¹ / ₄	11	1:2.4
(375)	(335)	(57)	(152)	(686)	(1.168 m)	(1.854 m)	(762)	(57)	(280)	
18	990	2½	9	27	3'-10"	6'-1''	36	2 ¹ / ₂	12	1:2.4
(450)	(450)	(64)	(229)	(686)	(1.168 m)	(1.854 m)	(914)	(64)	(305)	
21 (525)	1280 (580)	2¾ (70)	9 (229)	35 (889)	38 (965)	6'-1'' (1.854 m)	3'-6'' (1.067 m)	2¾ (70)	13 (330)	1:2.4
24	1520	3	9½	3'-7 ¹ / ₂ ''	30	6'-1 ¹ / ₂ ''	4'-0"	3	14	1:2.5
(600)	(690)	(76)	(241)	(1.105 m)	(762)	(1.867 m)	(1.219 m)	(76)	(356)	
27	1930	3 ¹ / ₄	10½	4'-0''	25½	6'-1 ¹ / ₂ ''	4'-6''	3 ¹ / ₄	14½	1:2.4
(675)	(875)	(83)	(267)	(1.219 m)	(648)	(1.867 m)	(1.372 m)	(83)	(368)	
30	2190	3½	12	4'-6"	19¾	6'-1¾''	5'-0''	3½	15	1:2.5
(750)	(995)	(89)	(305)	(1.375 m)	(502)	(1.874 m)	(1.524 m)	(89)	(381)	
33 (825)	3200 (1450)	3¾ (95)	13½ (343)	4'-10 ¹ / ₂ " (1.486 m)		8'-1¾'' (2.483 m)	5'-6'' (1.676 m)	3¾ (95)	17½ (445)	1:2.5
36	4100	4	15	5'-3"	34¾	8'-1¾''	6'-0''	4	20	1:2.5
(900)	(1860)	(102)	(381)	(1.6 m)	(883)	(2.483 m)	(1.829 m)	(102)	(508)	
42	5380	4½	21	5'-3"	35	8'-2''	6'-6''	4½	22	1:2.5
(1050)	(2440)	(114)	(533)	(1.6 m)	(889)	(2.489 m)	(1.981 m)	(114)	(559)	
48	6550	5	24	6'-0"	26	8'-2"	7'-0''	5	22	1:2.5
(1200)	(2970)	(127)	(610)	(1.829 m)	(660)	(2.489 m)	(2.134 m)	(127)	(559)	
54	8240	5½	27	5′-5″	35	8'-4''	7′-6′′	5½	24	1:2.0
(1350)	(3740)	(140)	(686)	(1.651 m)	(889)	(2.54 m)	(2 . 286 m)	(140)	(610)	
60 (1500)	8730 (3960)	6 (152)	35 (889)	5'-0'' (1.524 m)	39 (991)	8'-3'' (2 . 515 m)	8'-0'' (2.438 m)	5 (127)	•	1:1.9
66 (1650)	10710 (4860)	6½ (165)	30 (762)	6'-0" (1.829 m)	27 (686)	8'-3'' (2 . 515 m)	8'-6'' (2 . 591 m)	5½ (140)	•	1:1.7
72 (1800)	12520 (5680)	7 (178)	36 (914)	6'-6" (1.981 m)	21 (533)	8'-3'' (2.514 m)	9'-0'' (2.743 m)		•	1:1.8
78 (1950)	14770 (6700)	7½ (191)	36 (914)	7'-6'' (2.286 m)	21 (533)	9'-3'' (2.819 m)	9′-6′′ (2.896 m)	6½ (165)	•	1:1.8
84 (2100)	18160 (8240)	8 (203)	36 (914)	7'-6½" (2.299 m)	21 (533)	9'-3½'' (2.832 m)	10'-0'' (3 . 048 m)	6½ (165)	•	1:1.6

• Radius as furnished by manufacturer

GENERAL NOTES

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement

All dimensions are in inches (millimeters) unless otherwise shown.

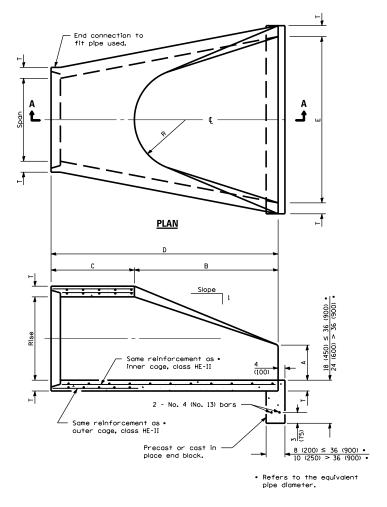
	DATE	REVISIONS	PRECAST REINFORCED
	1-1-11	Clarified ref. to pipe dia.	
Γ		on Section A-A. Changed	CONCRETE FLARED
Г		'inner' to 'outer' cage ref.	END SECTION
Γ	1-1-09	Switched units to	LIND SECTION
Γ		English (metric).	STANDARD 542301-03
Γ			31ANDAND 342301-03

[W] Illinois Department of Transportation ISSUED 1-1-97

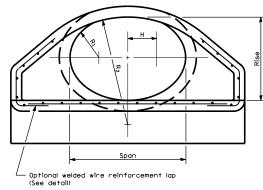
APPROVED January 1, 21

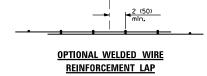
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ENGINEER OF DESIGN AND ENVIRONMENT



SPAN	RISE	EQUIV. DIA.	WALL	A	В	С	D	E	Н	R	R ₁	R ₂	APPROX. SLOPE
23	14	18	2¾	8	27	3'-9"	6'-0''	36	5¾	6	6	20	1:3.1
(584)	(356)	(450)	(70)	(203)	(686)	(1.143 m)	(1.829 m)	(914)	(137)	(152)	(152)	(508)	
30 (762)	19 (483)	24 (600)	3 ¹ / ₄ (83)	8½ (216)	39 (991)	33 (838)	6'-0'' (1.829 m)	4'-0'' (1.219 m)	6	7 (178)	81/4 (210)	26 ¹ / ₄ (667)	1:2.8
34	22	27	3 ¹ / ₂	9	4'-0''	24	6'-0"	4'-6''	7¾	8	91/4	29 ¹ / ₄	1:2.9
(864)	(559)	(675)	(89)	(229)	(1.219 m)	(610)	(1.829 m)	(1.372 m)	(197)	(203)	(235)	(743)	
38	24	30	31/ ₂	9½	4'-6''	18	6'-0''	5'-0''	8%	9	10 ¹ / ₄	32¾	1:2.9
(965)	(610)	(750)	(95)	(241)	(1.372 m)	(475)	(1.829 m)	(1.524 m)	(219)	(229)	(260)	(832)	
45	29	36	4½	11 ¹ / ₄	5'-0"	36	8'-0''	6'-0''	10½	12	12 ¹ / ₄	39 ¹ / ₄	1:2.7
(1143)	(737)	(900)	(114)	(286)	(1.524 m)	(914)	(2 . 438 m)	(1.829 m)	(267)	(305)	(311)	(997)	
53	34	42	5	15¾	5'-0"	36	8'-0''	6'-6''	121/8	13	14½	3'-10"	1:2.6
(1346)	(864)	(1050)	(127)	(400)	(1.524 m)	(914)	(2.438 m)	(1.981 m)	(308)	(330)	(368)	(1.168 m)	
60	38	48	5½	21	5'-0''	36	8'-0''	7'-0''	13½	14	16½	4'-3 ¹ / ₂ ''	1:2.7
(1524)	(965)	(1200)	(140)	(533)	(1 . 524 m)	(914)	(2 . 438 m)	(2.134 m)	(343)	(356)	(419)	(1.308 m)	
68	43	54	6	26	5'-0''	36	8'-0''	7'-6''	15 ¹ / ₄	16	18¾	4'-10 ¹ / ₂ ''	1:2.6
(1727)	(1092)	(1350)	(152)	(660)	(1 . 524 m)	(914)	(2 . 438 m)	(2 . 286 m)	(387)	(406)	(476)	(1.486 m)	
76	48	60	6½	31	5'-0"	36	8'-0''	8'-0''	17	18	20¾	5'-5"	1:2.6
(1930)	(1219)	(1500)	(165)	(787)	(1.524 m)	(914)	(2.438 m)	(2.439 m)	(432)	(457)	(527)	(1.651 m)	





END VIEW

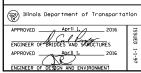
SECTION A-A

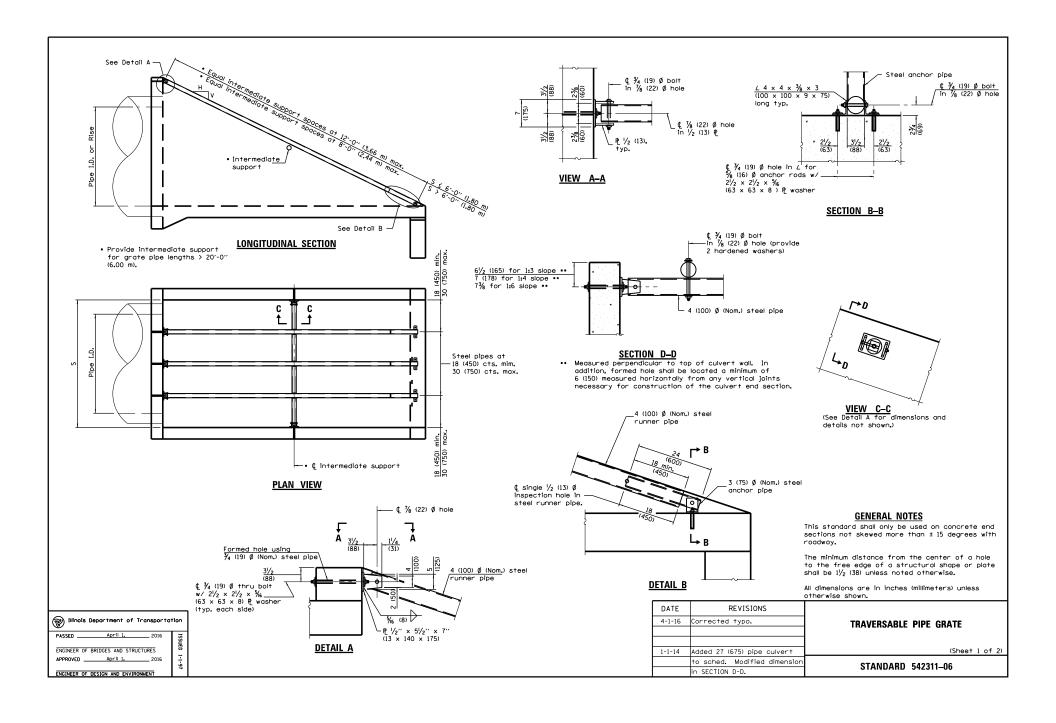
GENERAL NOTES

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS	PRECAST REINFORCED
4-1-16	Changed terminology to	
	'welded wire reinforcement'.	CONCRETE ELLIPTICAL
	Corrected min. lap dimension.	FLARED END SECTION
1-1-09	Switched units to	TEATILD LIND SECTION
	English (metric).	STANDARD 542306-03
		STANDAND 342300-03





PIPE-GRATE SCHEDULE FOR PIPE CULVERT END SECTIONS

	1								
				Slop	e of End Sec	tion			
Pîpe		1:3		l	1:4		l	1:6	
I.D.	Main Pipe	Int. Support	Total Length	Main Pipe	Int. support	Total Length	Main Pipe	Int. Support	Total Length
	No. / Length				No. / Length			No. / Length	
27	1 @ 9'-8"		9'-8"	1 @ 12'-11"		12'-11"	1 @ 19'-7"		19'-7"
(675)	1 @ (2.95 m)	N/A	(2.95 m)	1 @ (3.94 m)	N/A	(3.94 m)	1 @ (5.97 m)	N/A	(5,97 m)
30	1 @ 11'-4"		11'-4"	1 @ 14'-10"		14'-10"	1 @ 21'-10"	1 @ 3'-6	25'-4"
(750)	1 @ (3.43 m)	N/A	(3.43 m)	1 @ (4.52 m)	N/A	(4.52 m)	1 @ (6.65 m)	1 @ 1.07 m)	(7.72 m)
33	1 @ 12'-1"		12'-1"	1 @ 15'-10"		15'-10"	1 @ 23'-5"	1 @ 3'-7"	27'-0"
(825)	1 @ (3.68 m)	N/A	(3.68 m)	1 @ (4.83 m)	N/A	(4.83 m)	1 @ (7.14 m)	1 @ (1.09 m)	(8.23 m)
36	1 @ 12'-10"		12'-10"	1 @ 16'-10"		16'-10"	1 @ 24'-11"	2 @ 3'-11"	32'-9''
(900)	1 @ (3.91 m)	N/A	(3.91 m)	1 @ (5.13 m)	N/A	(5.13 m)	1 @ (7.59 m)	2 @ (1.19 m)	(9.97 m)
42	2 @ 14'-9"		29'-6"	2 @ 19'-3"		38'-6"	2 @ 28'-6"	2 @ 4'-7"	66'-2''
(1050)	2 @ (4.50 m)	N/A	(9.00 m)	2 @ (5.87 m)	N/A	(11.74 m)	2 @ (8.69 m)	2 @ (1.40 m)	(20.18 m)
48	2 @ 16'-4"		32'-8"	2 @ 21'-4"	1 @ 5'-1"	47'-9''	2 @ 31'-6"	2 @ 5'-1"	73′-2′′
(1200)	2 @ (4.98 m)	N/A	(9.96 m)	2 @ (6.50 m)	1 @ (1.55 m)	(14.55 m)	2 @ (9.60 m)	2 @ (1.55 m)	(22.30 m)
54	2 @ 18'-2"		36'-4''	2 @ 23'-9"	2 @ 5'-9"	59'-0''	2 @ 35'-1	4 @ 5'-9"	93'-2''
(1350)	2 @ (5.54 m)	N/A	(11.08 m)	2 @ (7.24 m)	2 @ (1.75 m)	(16.23 m)	2 @ (10.69 m)	4 @ (1.75 m)	(28.38 m)
60	2 @ 19'-9"		39'-6"	2 @ 25'-10"	3 @ 6'-3"	70'-5''	2 @ 38'-1"	4 @ 6'-3"	101'-2"
(1500)	2 @ (6.02 m)	N/A	(12.04 m)	2 @ (7.87 m)	3 @ (1.91 m)	(21.47 m)	2 @ (11.61 m)	4 @ (1.91 m)	(30.86 m)
66	2 @ 21'-7"	2 @ 6'-11"	57'-0''	2 @ 28'-2"	3 @ 6'-11"	77'-1"	2 @ 41'-11"	5 @ 6'-11''	127'-5"
(1650)	2 @ (6.58 m)	2 @ (2.11 m)	(17.38 m)	2 @ (8.59 m)	3 @ (2.11 m)	(23.51 m)	2 @ (12.78 m)	5 @ (2.11 m)	(36.11 m)
72	3 @ 23'-2"	2 @ 7'-5"	84'-4''	3 @ 30'-3"	3 @ 7'-5"	113'-0"	3 @ 44'-8"	5 @ 7'-5"	171′-1′′
(1800)	3 @ (7.06 m)	2 @ (2.26 m)	(25.70 m)	3 @ (9.22 m)	3 @ (2.26 m)	(34.44 m)	3 @ (13.61 m)	5 @ (2.26 m)	(52.13 m)
78	3 @ 25'-0"	3 @ 8'-1"	99'-3''	3 @ 32'-8"	4 @ 8'-1"	130'-4''	3 @ 48'-3"	6 @ 8'-1"	193'-3"
(1950)	3 @ (7.62 m)	3 @ (2.46 m)	(30.24 m)	3 @ (9.96 m)	4 @ (2.46 m)	(39.72 m)	3 @ (14.71 m)	6 @ (2.46 m)	(58.89 m)
84	3 @ 26'-7"	3 @ 8'-7"	105'-6''	3 € 34′-9′′	4 @ 8'-7"	138′-7"	3 @ 51'-3"	6 @ 8'-7"	206′-3″
(2100)	3 @ (8.10 m)	3 @ (2.62 m)	(32.16 m)	3 @ (10.59 m)	4 @ (2.62 m)	(42.25 m)	3 @ (15.62 m)	6 @ (2.62 m)	(62.58 m)

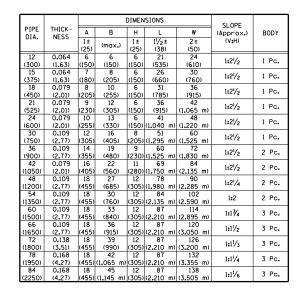
PIPE-GRATE SCHEDULE FOR ELLIPTICAL PIPE CULVERT END SECTIONS

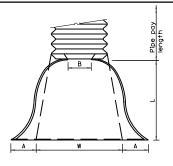
Pipe				Slop	e of End Sec	tion			
I.D.		1:3			1:4			1:6	
(Equiv.	Main Pipe	Int. Support	Total Length	Main Pipe	Int. Support	Total Length	Main Pipe	Int. Support	Total Length
Round)	No. / Length			No. / Length	No. / Length	of Pipe	No. / Length	No. / Length	of Pipe
21	1 @ 8'-2"		8'-2"	1 @ 11'-2"		11'-2"	1 @ 17'-5"		17'-5"
(525)	1 @ (2.49 m)	N/A	(2.49 m)	1 @ (3.40 m)	N/A	(3.40 m)	1 @ (5.31 m)	N/A	(5.31 m)
24	1 @ 8'-2"		8'-2"	1 @ 11'-2"		11'-2"	1 @ 17'-5"		17'-5''
(600)	1 @ (2.49 m)	N/A	(2.49 m)	1 @ (3.40 m)	N/A	(3.40 m)	1 @ (5.31 m)	N/A	(5.31 m)
27	1 @ 8'-11"		8'-11"	1 @ 12'-2"		12'-2"	1 @ 18'-11"		18'-11"
(675)	1 @ (2.72 m)	N/A	(2.72 m)	1 @ (3.71 m)	N/A	(3.71 m)	1 @ (5.77 m)	N/A	(5.77 m)
30	1 @ 9'-5"		9′-5′′	1 @ 12'-11"		12′-11′′	1 @ 19'-11"		19'-11"
(750)	1 @ (2.87 m)	N/A	(2.87 m)	1 @ (3.94 m)	N/A	(3.94 m)	1 @ (6.07 m)	N/A	(6.07 m)
36	2 @ 11'-0''		22'-0''	2 @ 14'-11"		29'-10"	2 @ 22'-11"	1 @ 4'-7"	50′-5″
(900)	2 @ (3.35 m)	N/A	(6.70 m)	2 @ (4.55 m)	N/A	(9.10 m)	2 @ (6.99 m)	1 @ (1.40 m)	(15.38 m)
42	2 @ 12'-4"		24'-8"	2 @ 16'-8"		33'-4''	2 @ 25'-6"	2 @ 5'-5"	61'-10''
(1050)	2 @ (3.76 m)	N/A	(7.52 m)	2 @ (5.08 m)	N/A	(10.16 m)	2 @ (7.77 m)	2 @ (1.65 m)	(18.84 m)
48	2 @ 13'-8"		27'-4"	2 @ 18'-5"		36'-10"	2 @ 28'-0"	3 € 6′-1″	64'-3''
(1200)	2 @ (4.17 m)	N/A	(8.34 m)	2 @ (5.61 m)	N/A	(11.22 m)	2 @ (8.53 m)	3 @ (1.85 m)	(22.61 m)
54	2 @ 15'-0"		30'-0''	2 @ 20'-1"	2 @ 6'-9"	53′-8′′	2 @ 30'-7"	3 @ 6′-9″	81'-5''
(1350)	2 @ (4.75 m)	N/A	(9.50 m)	2 @ (6.12 m)	2 @ (2.06 m)	(16.36 m)	2 @ (9.32 m)	3 @ (2.06 m)	(24.82 m)
60	3 @ 16'-7"		49'-9"	3 @ 22'-2"	2 @ 7'-7"	81'-8''	3 @ 33'-7"	4 @ 7'-7"	131'-1"
(1500)	3 @ (5.05 m)	N/A	(15.15 m)	3 @ (6.76 m)	2 @ (2.31 m)	(24.90 m)	3 @ (10.24 m)	4 @ (2.31 m)	(39.96 m)
66	3 @ 17'-11''		53′-9"	3 @ 23'-11"	2 @ 8'-3"	88'-3''	3 @ 36'-2"	4 @ 8'-3''	141'-6"
(1650)	3 @ (5.46 m)	N/A	(16.38 m)	3 @ (7.29 m)	2 @ (2.51 m)	(26.89 m)	3 @ (11.02 m)	4 @ (2.51 m)	(43.10 m)
72	3 @ 19'-6''		58′-6″	3 @ 25'-11"	3 @ 8'-11''	104'-6''	3 @ 39'-2"	4 @ 8'-11"	153'-2"
(1800)	3 @ (5.94 m)	N/A	(17.82 m)	3 @ (7.90 m)	3 @ (2.72 m)	(31.86 m)	3 @ (11.94 m)	4 @ (2.72 m)	(46.70 m)

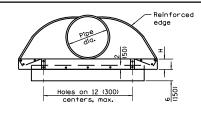
PASSED _____April 1, ____ 2016 ENGINEER OF DESIGN AND STRUCTURES APPROVED _____April 1, _____ 2016 ENGINEER OF DESIGN AND ENVIRONMENT

TRAVERSABLE PIPE GRATE

(Sheet 2 of 2)

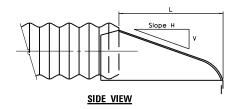






END VIEW



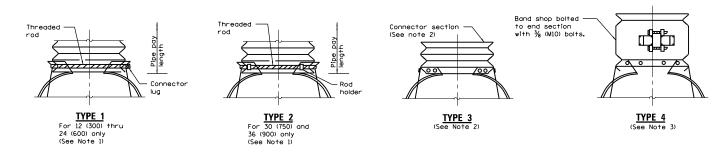


NOTES

For 60 (1500) thru 84 (2250) sizes, reinforced edges shall be supplemented with stiffener angles. The angles shall be 2x2x/4(51x51x6.4) for 60 (1500) thru 72 (1800) diameter and 2/yx2/yx/4 (64x64x6.4) for 78 (1950) thru 84 (2250) diameter. The angles shall be attached by % (MIO) rivets or botts.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement

END SECTION



1 (25) wide, 0.109 (2.77) thick strap with standard

 $\frac{1}{2} \times 6$ (M12×150) band bolt

and nut.

NOTES

- 1. Types 1 and 2 for pipes with annular ends only.
- 2. Type 3 connection may be used for all pipe sizes and includes 12 (300) of the pipe length. The connector section shall be attached to the end section by rivets or bolts and shall be the same metal thickness as the end section. Stub shall be either $2\frac{7}{3}$ (68) pitch x $\frac{1}{2}$ (13) depth or 3 (75) pitch x 1 (25) depth annular corrugated pipe.
- 3. Type 4 connection can be used for all pipe sizes, Coupler shall be $2^2/_3 \times I_2$ (68x13) dimple, hugger, or annular band of 3x1 (75x25). The dimple, hugger, or annular band may be used with corrugated metal pipes having annular ends. For corrugated metal pipes having helical ends, only the dimple band will be allowed.

All dimensions are in inches (millimeters) unless otherwise shown.

PASSED April 1. 2016 Midael Brand ENGINEER OF POLICY AND PROCEDURES APPROVED APPROVED TO THE PROCEDURES	Illinois De	partment of 1	[ransportat	tion
2010	mi	that Brand		ISSUED 1-1-97

ALTERNATE STRAP CONNECTOR

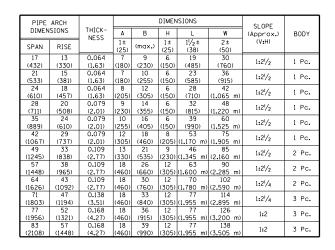
(For Type 1 only)

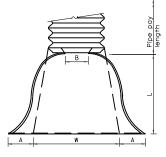
CONNECTIONS OF END SECTIONS

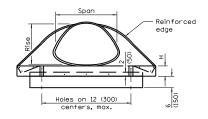
DATE	REVISIONS
4-1-16	Revised THICKNESS values
	in table.
1-1-09	Switched units to
	English (metric).

METAL END SECTION FOR PIPE CULVERTS

STANDARD 542401-02

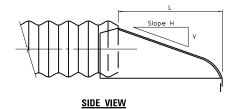






END VIEW





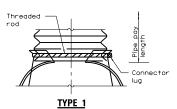
NOTES

For the 77×52 (1956×1321) and 83×57 (2108×1448) sizes, reinforced edges shall be supplemented with $2\times2\times\frac{1}{4}$ (51x51x6.4) stiffener angles. The angles shall be attached by $\frac{3}{8}$ (M10) rivets or bolts.

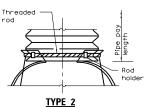
Angle reinforcement shall be placed under the center panel seams on the 77x52 (1956x1321) and 83x57 (2108x1448) sizes.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement

END SECTION



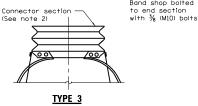
For 17x13 (432x330) thru 28x20 (711x508) only (See Note 1)



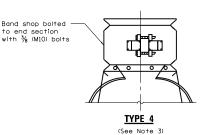
1 (25) wide, 0.109 (2.77) thick strap with standard

 $\frac{1}{2}$ x6 (M12x150) band bolt

For 17x13 (432x330) thru 57x38 (1448x965) only (See Note 1)



(See Note 2)



NOTES

- 1. Type 1 and 2 connection shall be used only with pipes with annular ends.
- 2. Type 3 connection can be used with all pipe arch sizes and includes 12 (300) of the pipe length. The annular connector section shall be attached to the end section by rivets or bolts and shall be the same metal thickness as the end section. When coupling the type 3end section to a pipe with helical ends, only the dimple type coupling band shall be used.
- 3. Type 4 connection can be used with all pipe arch sizes. The end section band shall be either a dimple, hugger, or annular band and can be used with pipes having annular ends. For pipes having helical ends, only the dimple end section band will be allowed.

All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transporta	tion	
PASSED April 1 2016	ISSUE	
ENGINEER OF POLICY AND PROCEDURES		

1-97

ALTERNATE STRAP CONNECTOR

and nut.

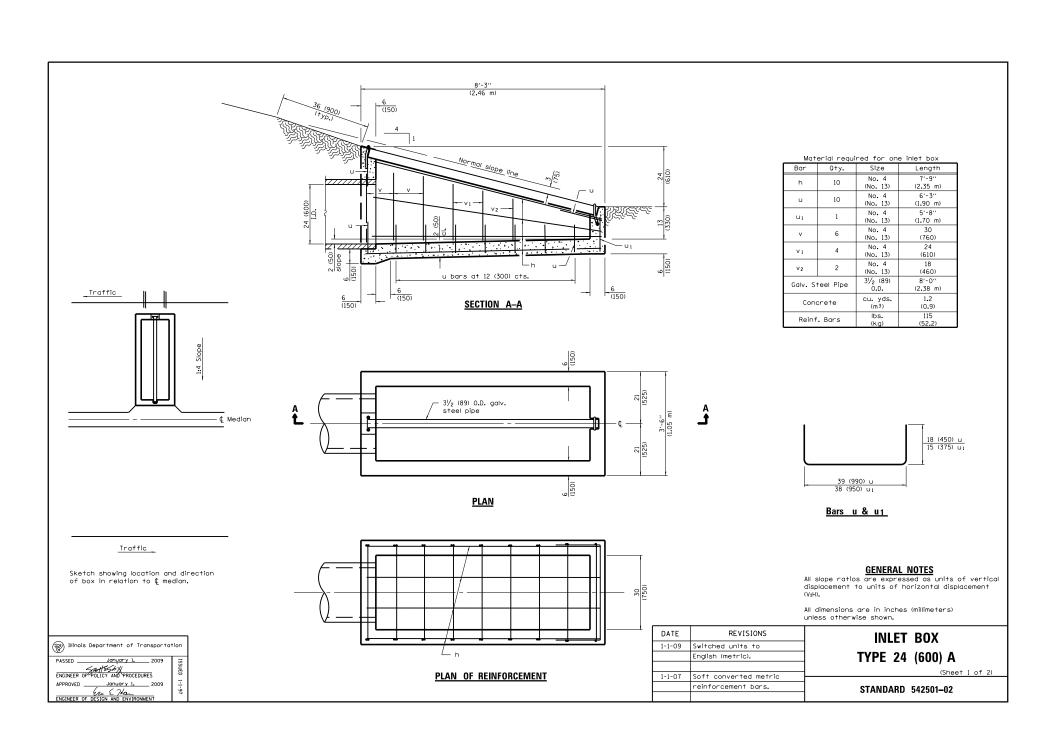
(For Type 1 only)

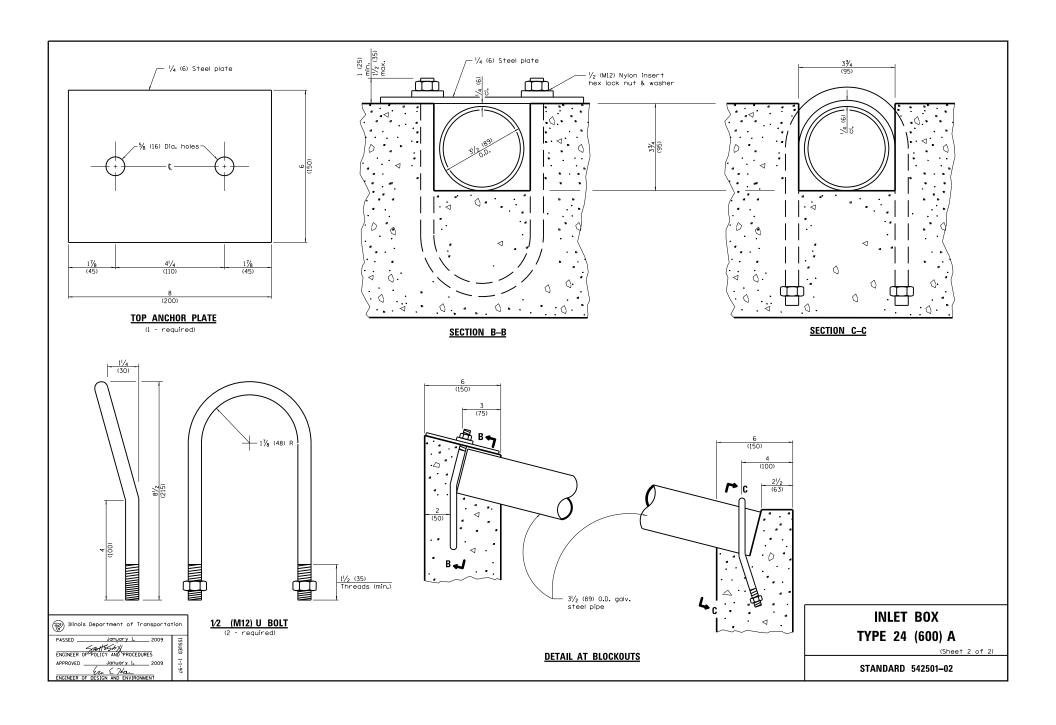
REVISIONS DATE 4-1-16 Revised THICKNESS values in table. Switched units to English (metric).

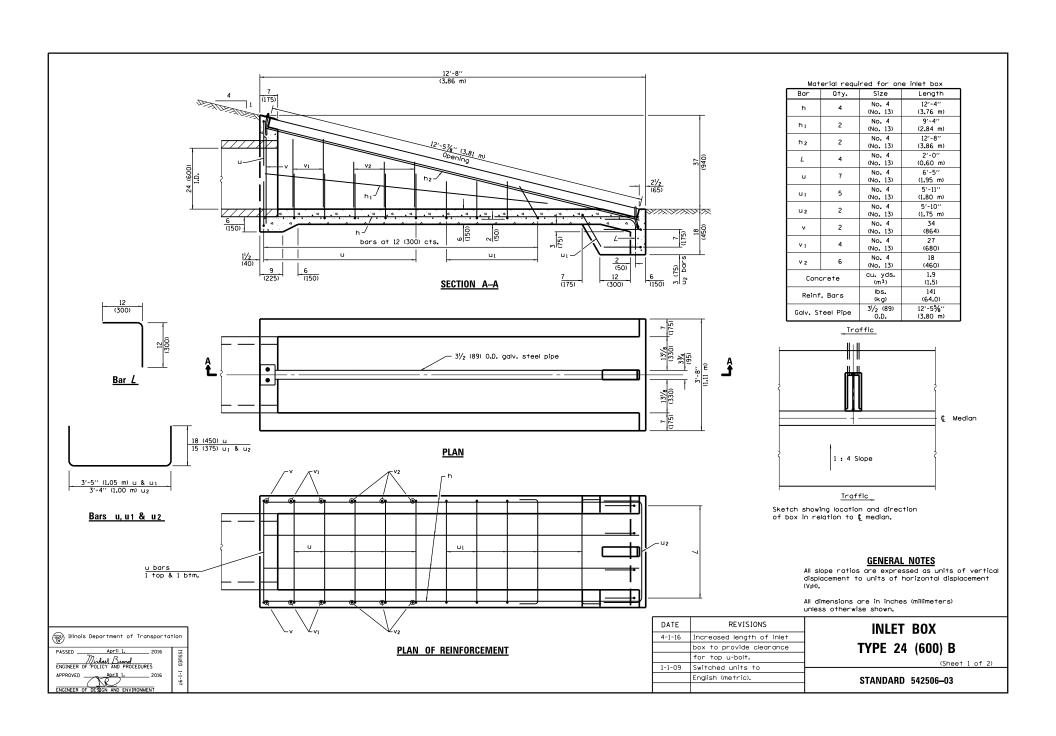
METAL END SECTIONS FOR PIPE ARCHES

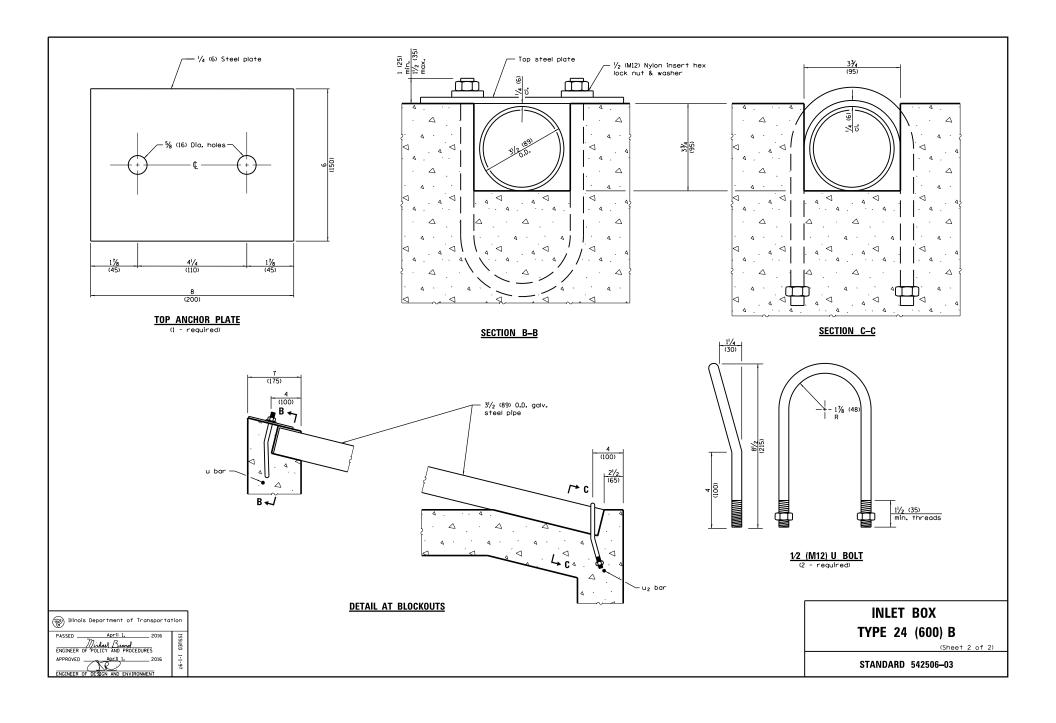
STANDARD 542406-02

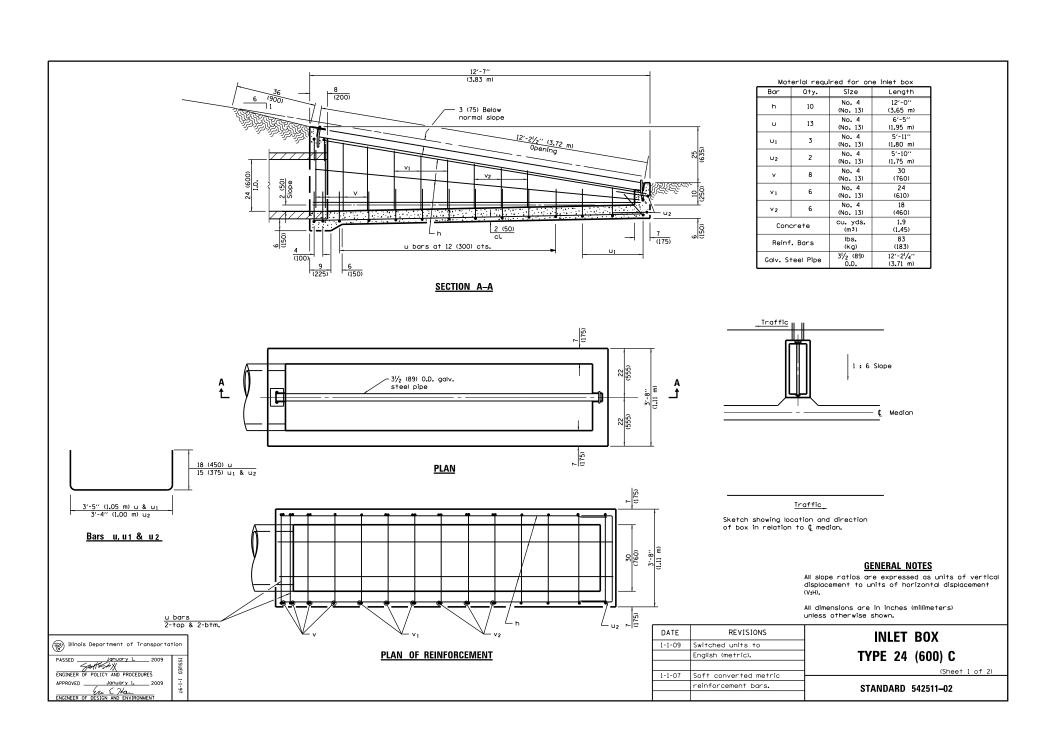
CONNECTIONS OF END SECTIONS

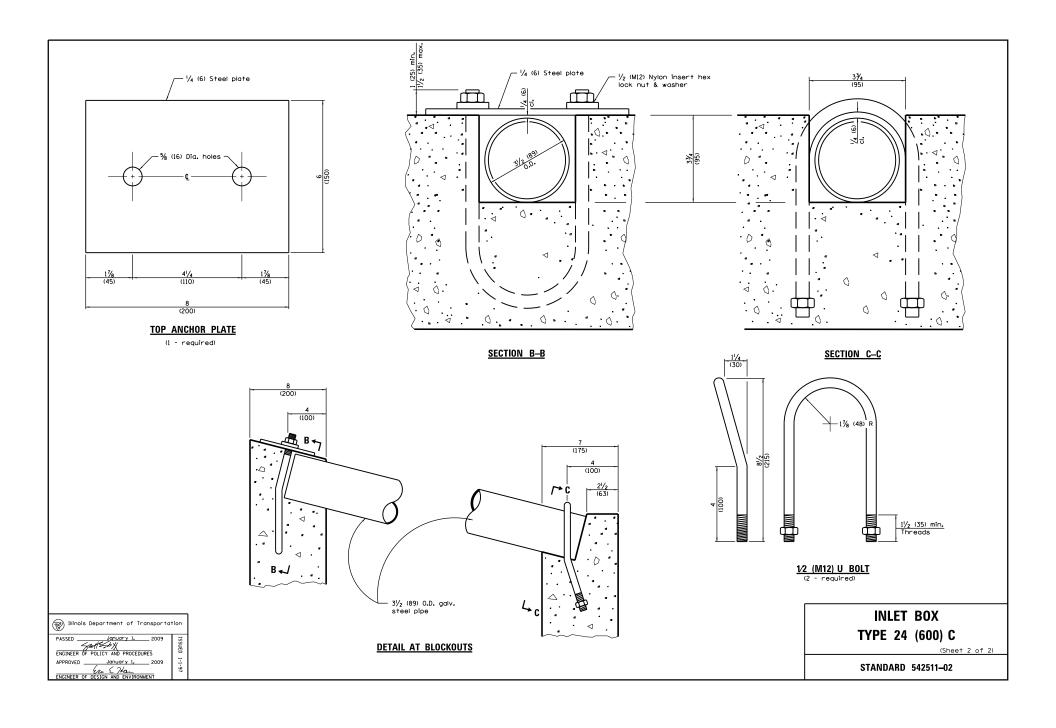


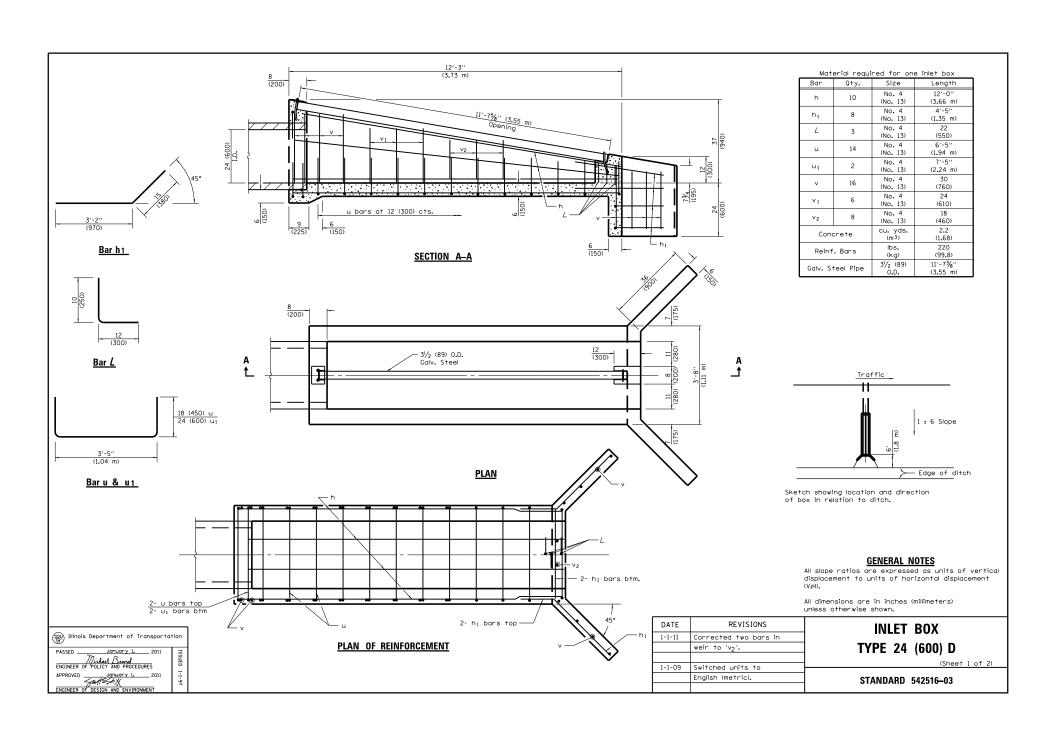


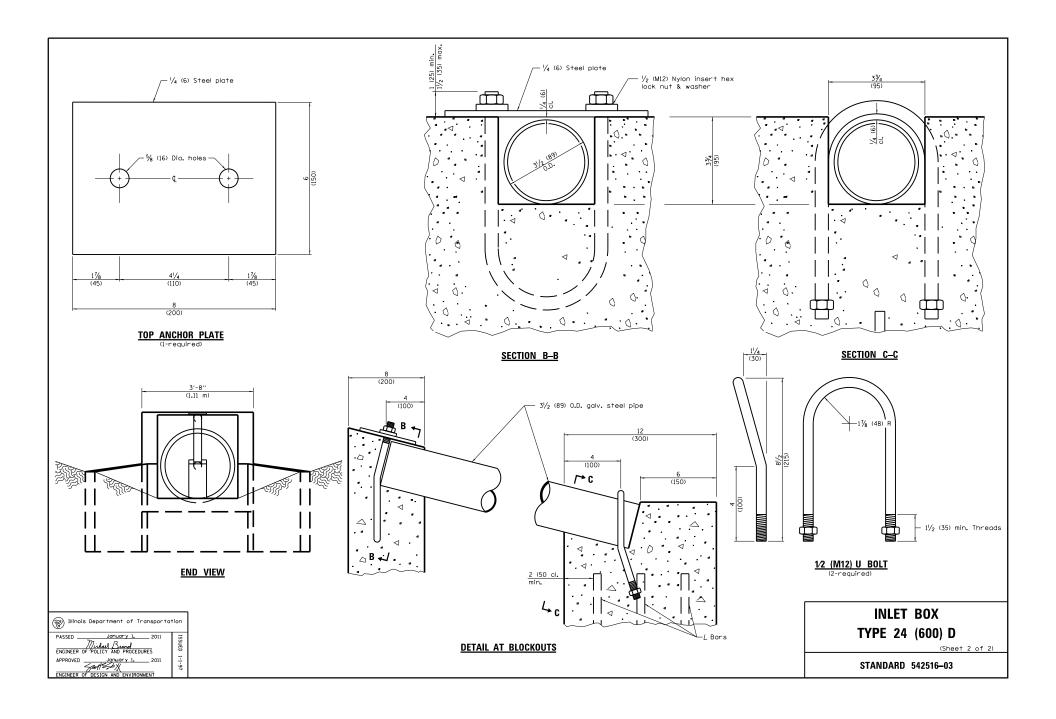


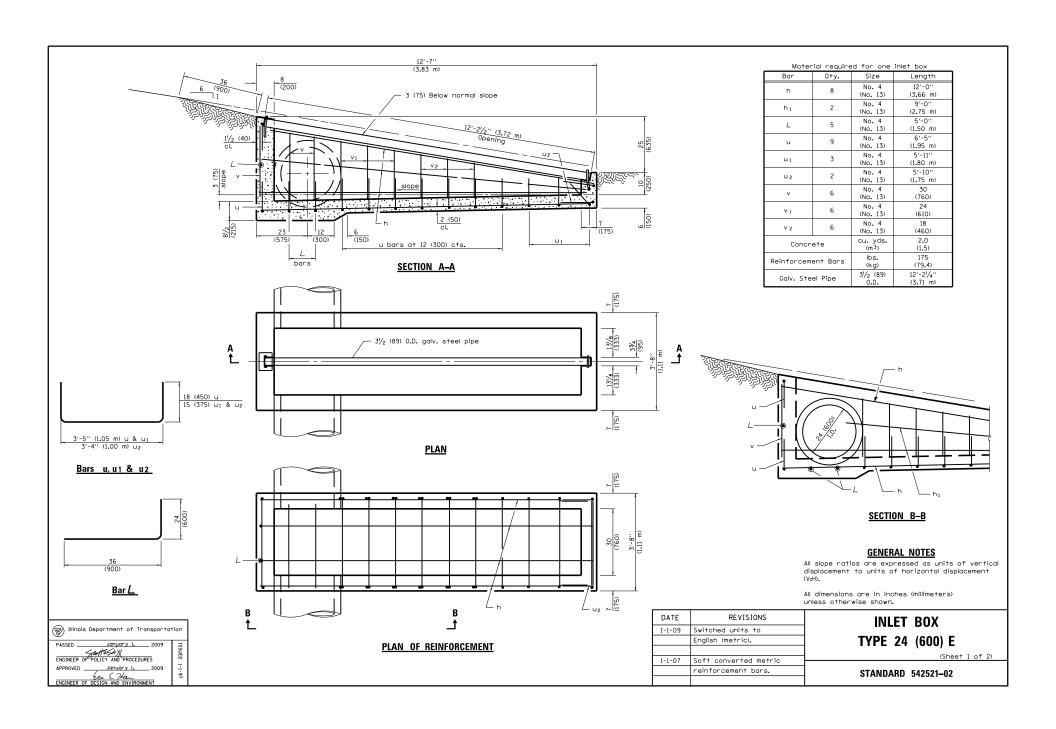


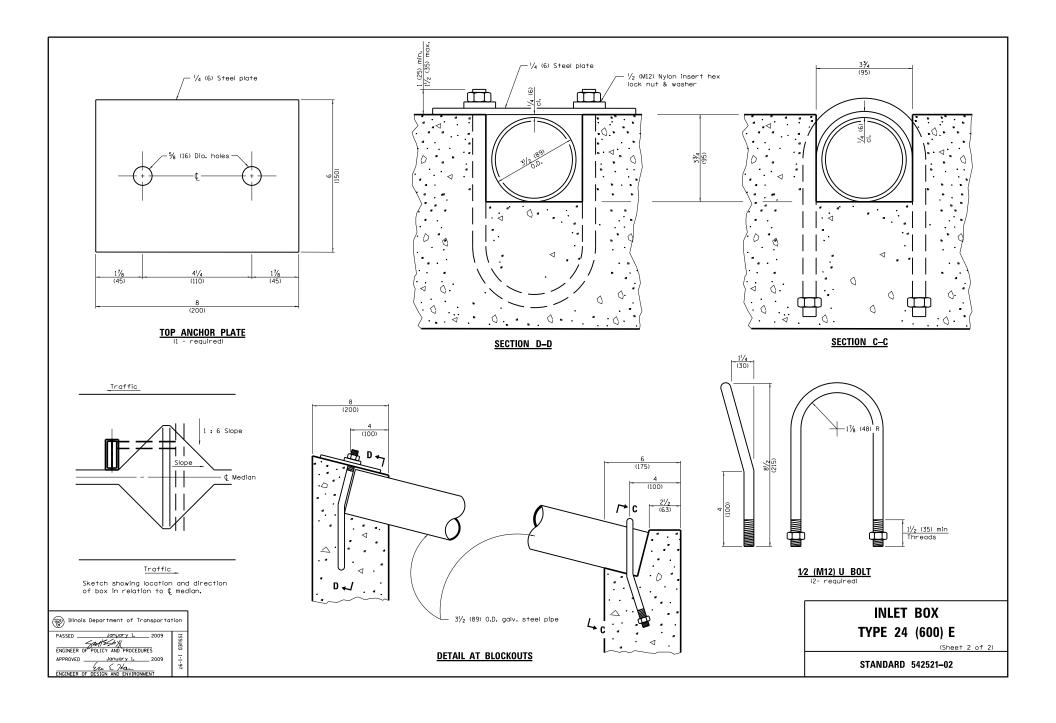


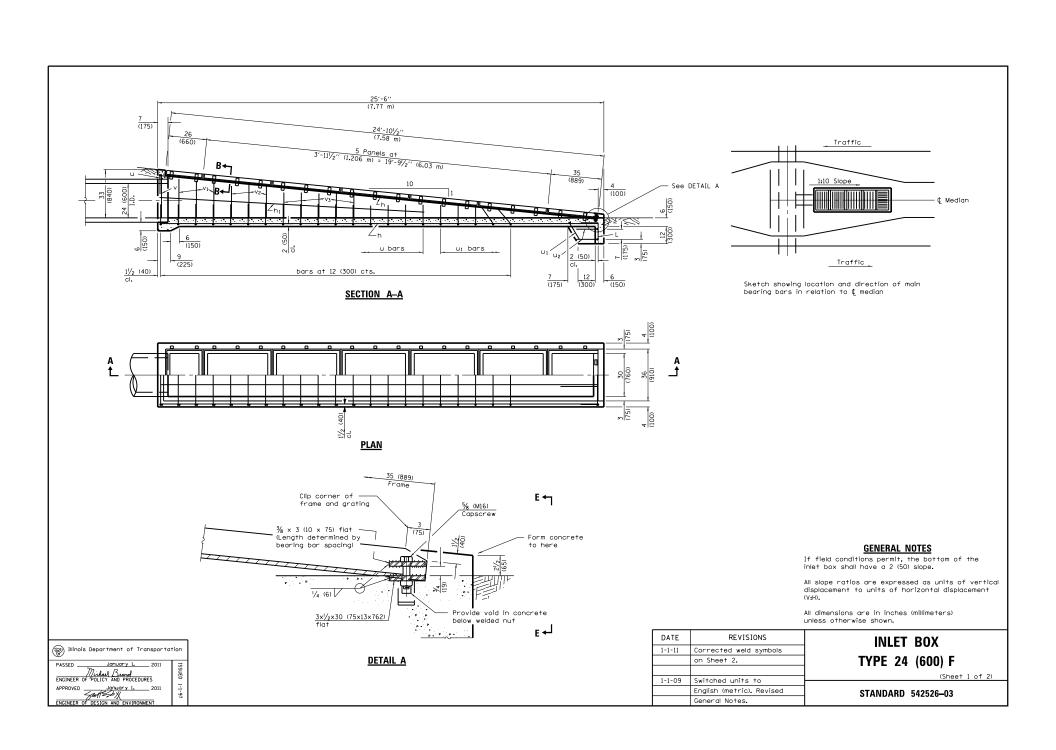


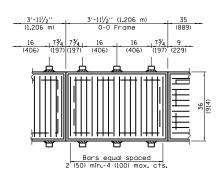




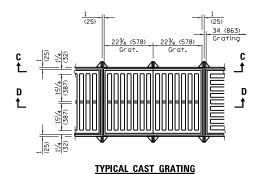








$\frac{1}{2} \times \frac{1}{2} \times 5$ (12.7 × 40 × 125) $\frac{1}{4}$ (6) cfw to $\frac{1}{2} \times 3$ (12.7 × 75) flat VIEW E-E



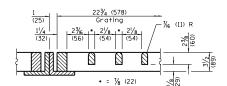
TYPICAL STEEL GRATING

Cut or grind flush Cut or C or G

TYPICAL CORNER OF STEEL GRATING FRAME

Material Required for One Inlet Box

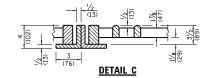
Bar	No.	Size	Length
h	6	No. 4 (No. 13)	25'-0'' (7 . 62 m)
h ₁	2	No. 4 (No. 13)	11'-0'' (3.35 m)
٦	4	No. 4 (No. 13)	24 (600)
5	17	No. 4 (No. 13)	6'-5'' (1.96 m)
u 1	6	No. 4 (No. 13)	5′-11′′ (1.80 m)
U 2	2	No. 4 (No. 13)	5′-10″ (1.78 m)
>	2	No. 4 (No. 13)	30 (760)
V 1	6	No. 4 (No. 13)	27 (690)
V 2	6	No. 4 (No. 13)	24 (610)
V 3	10	No. 4 (No. 13)	18 (460)
Concrete		cu. yds. (m³)	3.4 (2.6)
Reinf. Bars		lbs. (kg)	250 (113)
Gra	ting	(sq. ft.) (m²)	70.4 (6.54)



DETAIL B



SECTION C-C





(300)

Bar L 3'-5" (1.04 m) u & u₁ 3'-4" (1.02 m) u₂

BARS u, u1 & u2

102) Main bearing bars $4 \times 3 \times \frac{1}{2}$ (102 × 76 × 13) angle frame 11/2 (40)

(100)

SECTION B-B



 $3 \times \frac{3}{8} (76 \times 10)$ support bar, each end

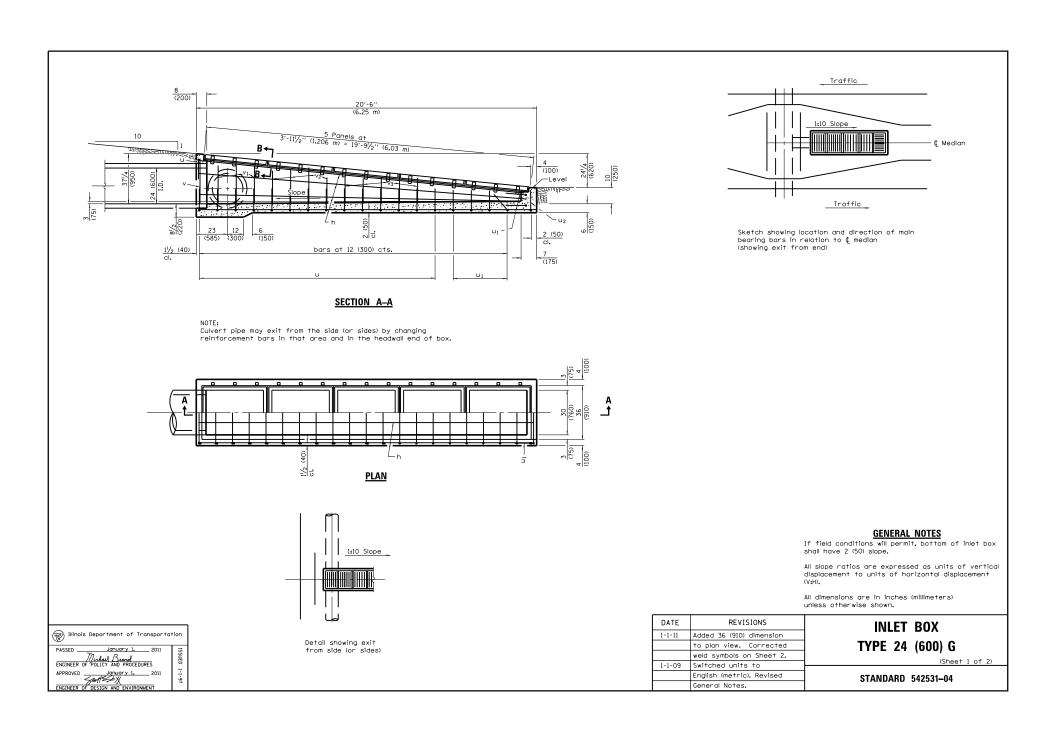
1/4 (6)

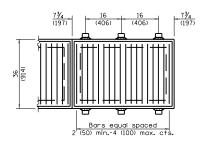
®	Illinois Department of Transporta	tion
	SED January 1. 2011 Mirkard Brand SINEER OF POLICY AND PROCEDURES	ISSUED
_	PROVED January I. 2011 SINEER OF DESIGN AND ENVIRONMENT	1-1-97

INLET BOX TYPE 24 (600) F

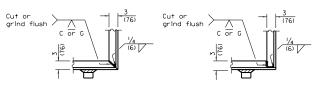
(Sheet 2 of 2)

STANDARD 542526-03

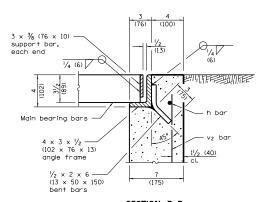




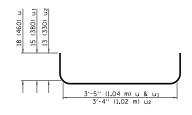
TYPICAL STEEL GRATING



TYPICAL CORNER OF STEEL GRATING FRAME



SECTION B-B



Material Required for One Inlet Box

Size

(No. 13)

(No. 13)

(No. 13)

(No. 13)

(No. 13)

(No. 13)

No. 4

(No. 13)

No. 4 (No. 13)

cu. yds. (m³)

(kg)

(sq. ft.) (m²) Length

(6.10 m)

6'-5"

(1.96 m) 5'-11"

(1.80 m)

(1.68 m)

(840)

(760)

24

(610)

(460)

(2.45)

(122)

56.0

(5.20)

Bar

u

U 2

٧1

V 3

Concrete

Reinf. Bars

Grating

No.

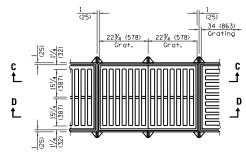
10

17

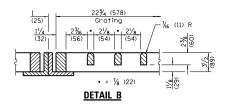
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10

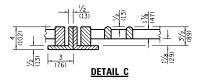
BARS u, u1 & u2



TYPICAL CAST GRATING







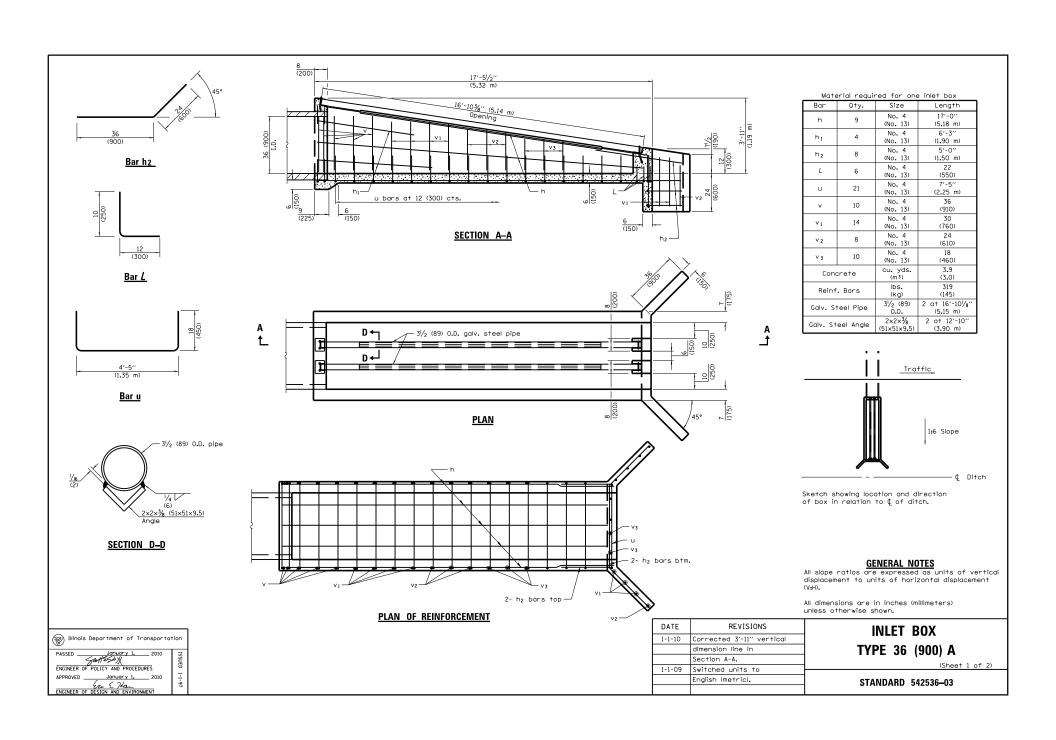


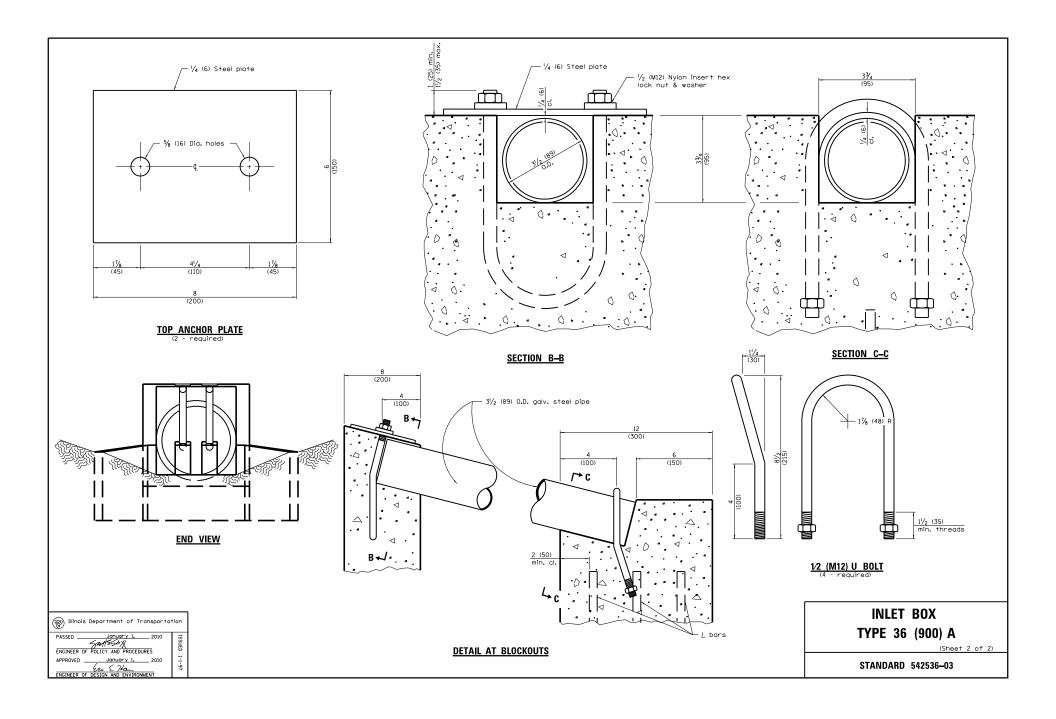
INLET BOX TYPE 24 (600) G

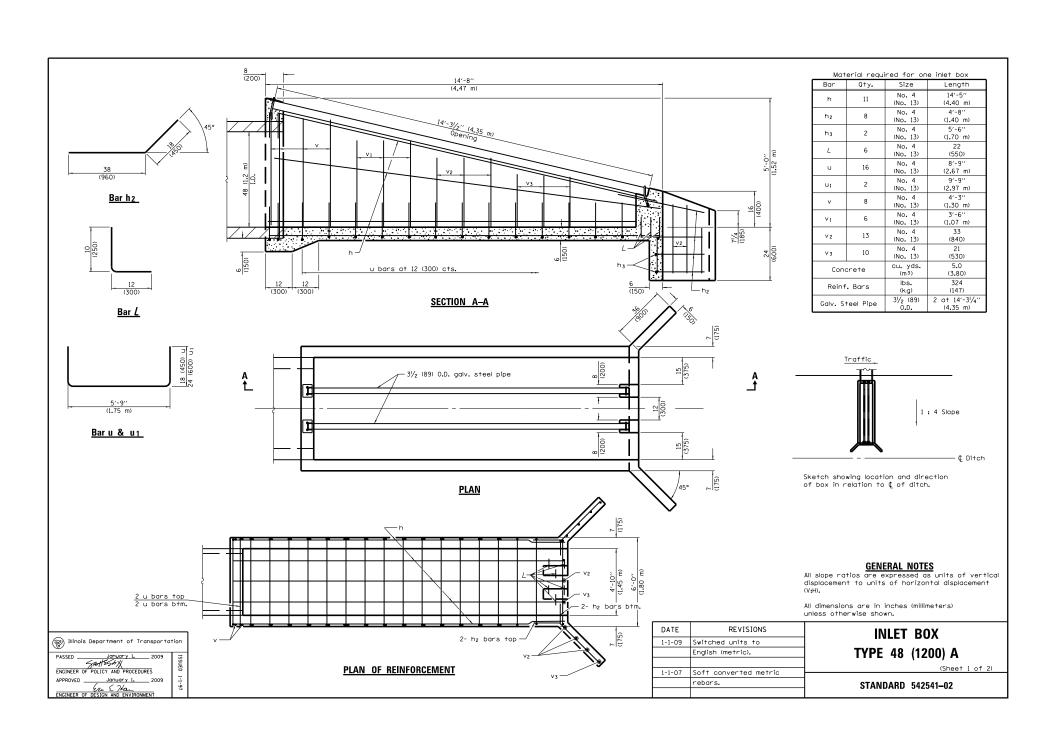
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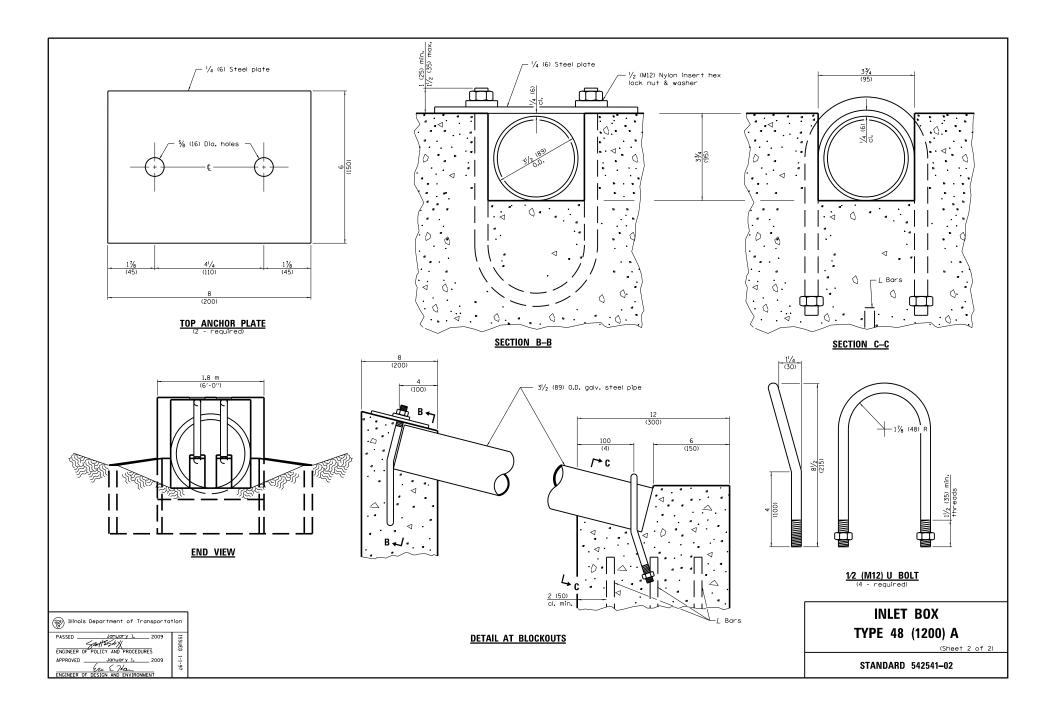
STANDARD 542531-04

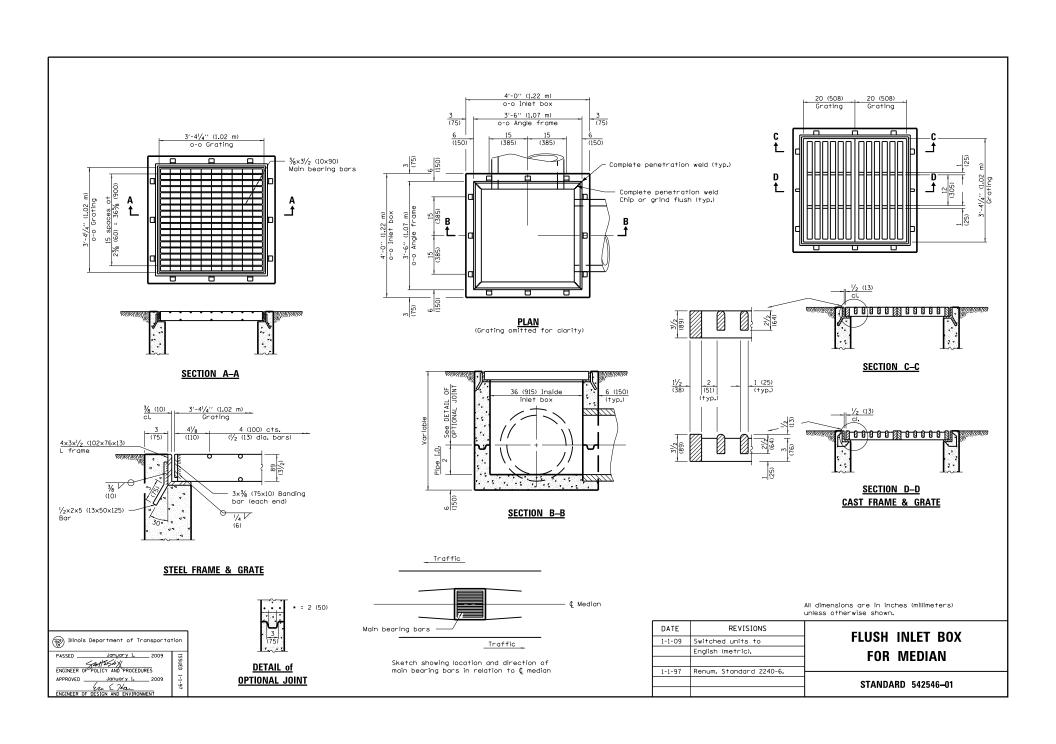


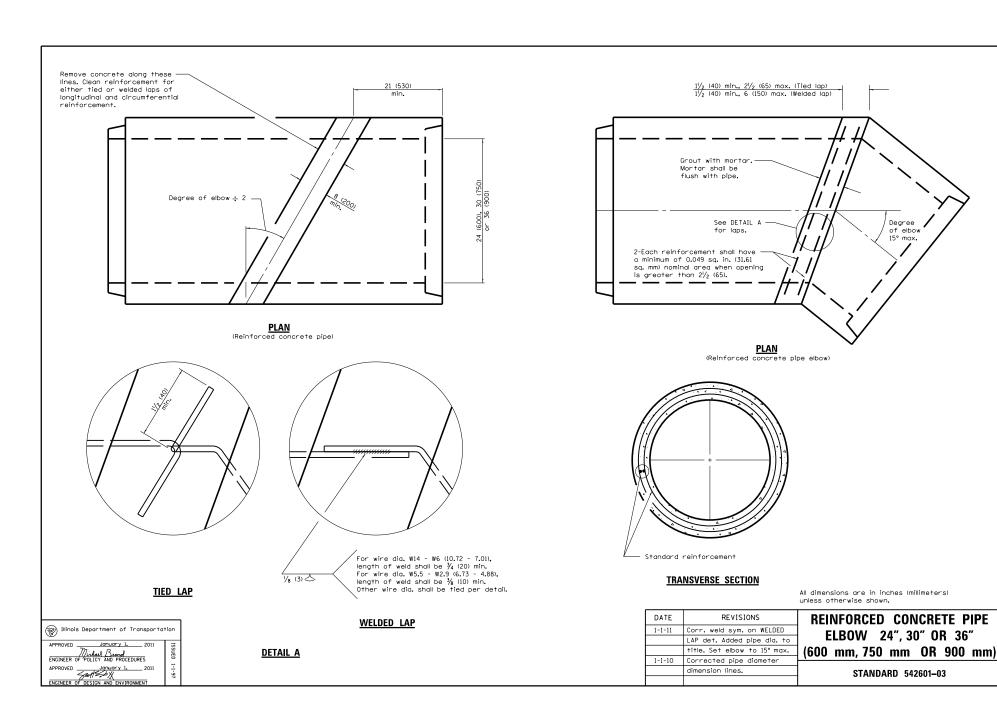


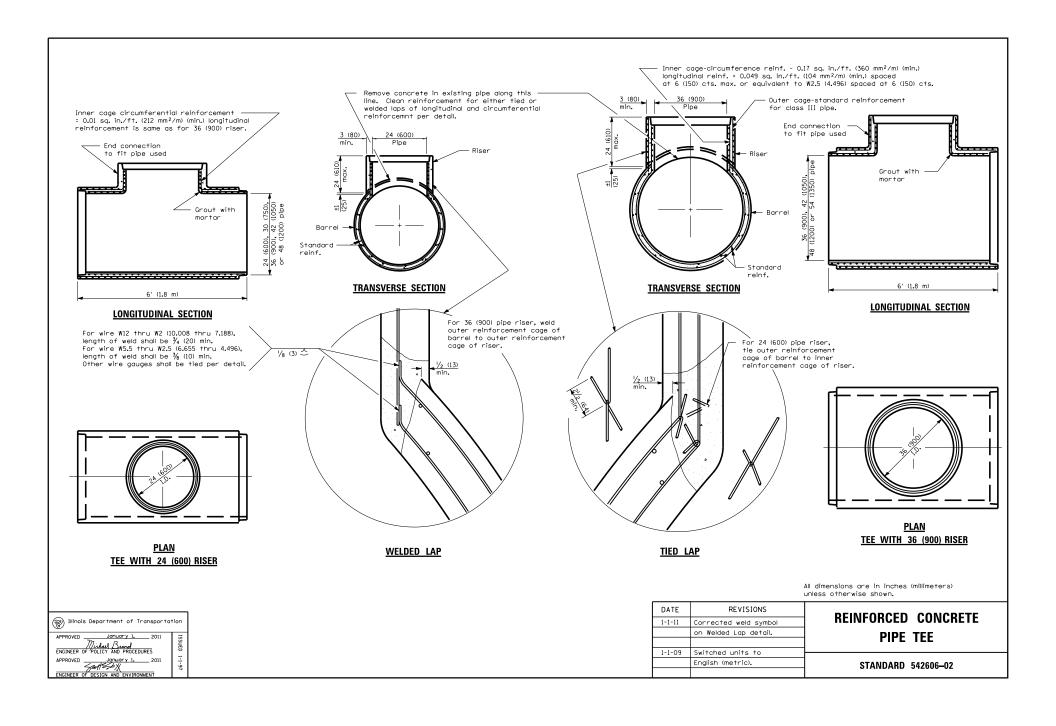












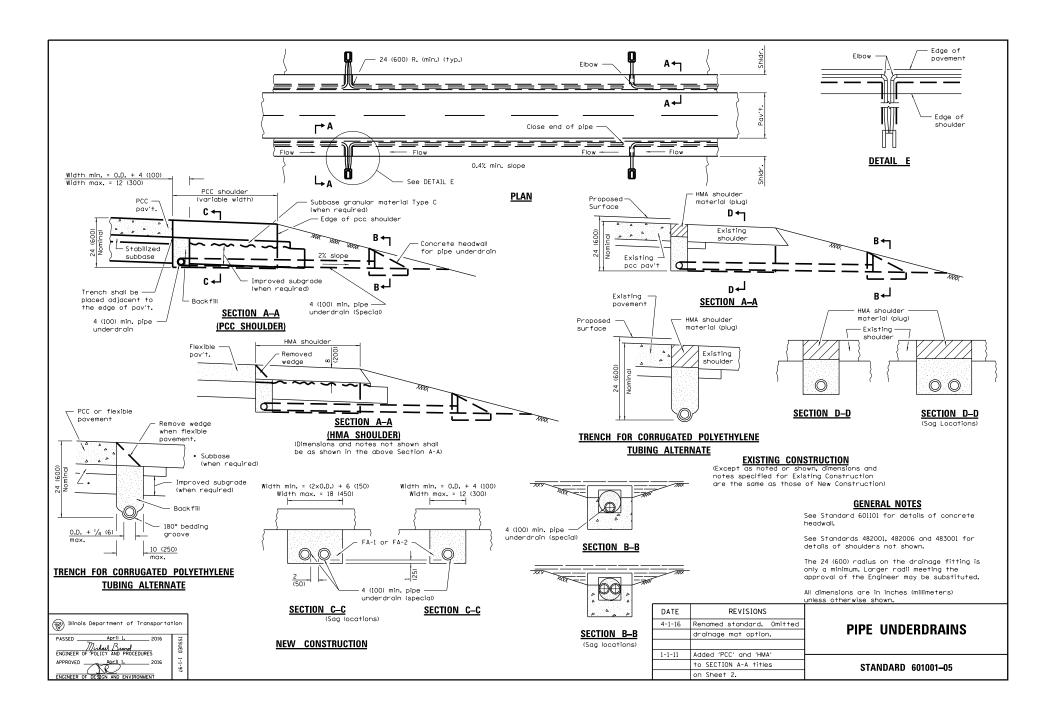


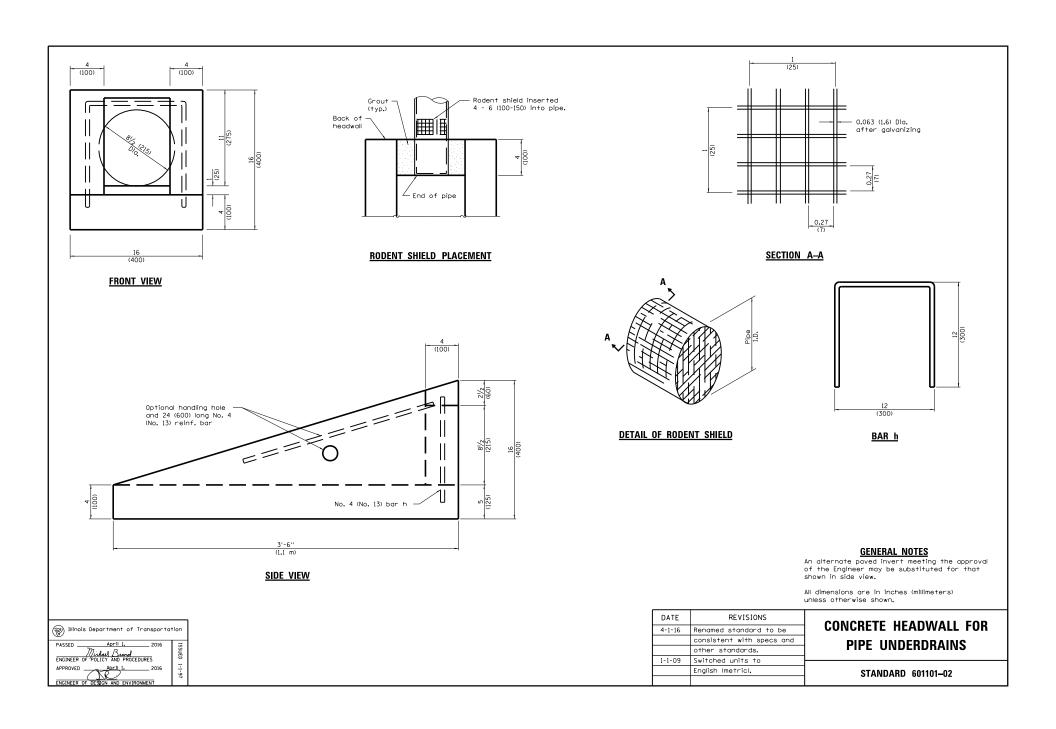
Standards by Division

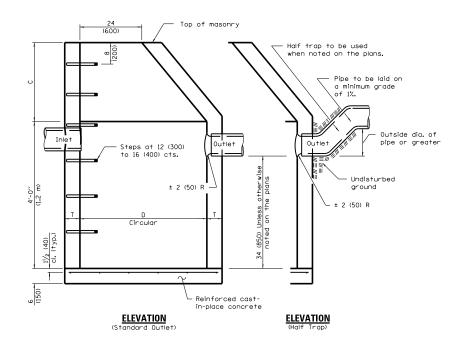
DIVISION 600 INCIDENTAL CONSTRUCTION

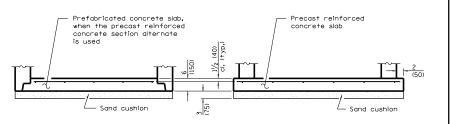
	STD. NO.	TITLE
	DRAINAGE RE	LATED ITEMS
l	601001-05	Pipe Underdrains
	601101-02	Concrete Headwall for Pipe Underdrain
•	602001-02	Catch Basin, Type A
	602006-04	Catch Basin, Type B
	602011-02	Catch Basin, Type C
	602016-02	Catch Basin, Type D
	602101-02	Drainage Structures, Types 1, 2 & 3
	602106-01	Drainage Structures, Types 4, 5 & 6
	602301-04	Inlet, Type A
	602306-03	Inlet, Type B
	602401-03	Manhole, Type A
	602406-07	Manhole, Type A, 6' (1.8 m) Diameter
	602411-05	Manhole, Type A, 7' (2.1 m) Diameter
	602416-05	Manhole, Type A, 8' (2.4 m) Diameter
	602421-05	Manhole, Type A, 9' (2.7 m) Diameter
	602501-02	Valve Vault, Type A
	602601-04	Precast Reinforced Concrete Flat Slab Top
	602701-02	Manhole Steps
	604001-04	Frame and Lids, Type 1
	604006-05	Frame and Grate, Type 3
	604011-05	Frame and Grate, Type 3V
	604016-04	Frame and Grate, Type 4
	604021-03	Base, Frame and Lids, Type 5
	604026-03	Frame and Grate, Type 6
	604031-03	Grate, Type 7
	604036-03	Grate, Type 8
	604041-03	Frame and Grate, Type 9
	604046-03	Frame and Grate, Type 10
	604051-04	Frame and Grate, Type 11
	604056-04	Frame and Grate, Type 11V
	604061-03	Frame and Grate, Type 12
	604066-02	Frame and Lid, Type 15
	604071-05	Frame and Grate, Type 20
	604076-04	Frame and Grate, Type 21
	604081-04	Frames and Grates, Type 22
	604086-03	Frame and Grate, Type 23
	604091-03	Frame and Grate, Type 24
	604101-01	Median Inlet for 24" (600 mm) Reinforced Concrete Pipe

606401-02 Paved Ditch 610001-06 Shoulder Inlet With Curb		604106-01 606001-06 606006-03 606101-05 606106-04 606111-03 606201-03 606206-03 606211-03 606301-04 606306-04	Median Inlet for 36" (900 mm) Reinforced Concrete Pipe Concrete Curb Type B and Combination Concrete Curb and Gutter Outlet for Concrete Curb and Gutter, Type B-6.24 (B-15.60) Type A Gutter (Inlet, Outlet, and Entrance) Outlet, Type I for Type A Gutter Outlets, Type 2 for Type A Gutter Type B Gutter (Inlet, Outlet, and Entrance) Outlet, Type 1 for Type B Gutter Outlets, Type 2 for Type B Gutter Outlets, Type 2 for Type B Gutter Outlets, Type 2 for Type B Gutter Concrete Islands And Medians Corrugated PC Concrete Medians
SAFETY RELATED ITEMS 630001-10 Steel Plate Beam Guardrail 630101-09 Guardrail Mounted on Existing Culverts 630106-01 Long-Span Guardrail Over Culvert 630201-06 PCC/HMA Stabilization at Steel Plate Beam Guardrail 630301-06 Shoulder Widening for Type 1 (Special) Guardrail Terminals 631006-08 Traffic Barrier Terminal, Type 1B 631011-09 Traffic Barrier Terminal, Type 2 631026-06 Traffic Barrier Terminal, Type 5 631031-14 Traffic Barrier Terminal, Type 6 631032-08 Traffic Barrier Terminal, Type 6A 631033-08 Traffic Barrier Terminal, Type 6B 631046-04 Traffic Barrier Terminal, Type 6B 631046-04 Traffic Barrier Terminal, Type 10 635001-02 Delineators 636001-02 Cable Road Guard Single Strand 637001-05 Concrete Barrier 32 in. (815 mm) Height 637006-03 Concrete Barrier 42 in. (1065 mm) Height 638101-02 Concrete Glare Screen 639001-02 Sight Screen Precast Prestressed Concrete Panel Wall 640001-01 Sight Screen Cedar Stockade Fence Type S 641006-01 Sight Screen Wood Plank Fence Type P 642001-02 Shoulder Rumble Strips, 16 in. 642006 Shoulder Rumble Strips, 8 in. 643001-02 Chain Link Fence			
63001-10 Steel Plate Beam Guardrail 630101-09 Guardrail Mounted on Existing Culverts 630106-01 Long-Span Guardrail Over Culvert 630201-06 PCC/HMA Stabilization at Steel Plate Beam Guardrail 630301-06 Shoulder Widening for Type 1 (Special) Guardrail Terminals 631006-08 Traffic Barrier Terminal, Type 18 631011-09 Traffic Barrier Terminal, Type 2 631026-06 Traffic Barrier Terminal, Type 5 631031-14 Traffic Barrier Terminal, Type 6 631032-08 Traffic Barrier Terminal, Type 6B 631033-06 Traffic Barrier Terminal, Type 6B 631046-04 Traffic Barrier Terminal, Type 10 631051-03 Traffic Barrier Terminal, Type 11 635001-02 Delineators 636001-02 Cable Road Guard Single Strand 637001-05 Concrete Barrier 32 in. (815 mm) Height 637006-03 Concrete Barrier 42 in. (1065 mm) Height 638101-02 Sight Screen Precast Prestressed Concrete Panel Wall 640001-01 Sight Screen Precast Prestressed Concrete Panel Wall 640001-01 Sight Screen Wood Plank Fence 641001-01 Sight Screen Wood Plank Fence Type P 642001-02 Shoulder Rumble Strips, 16 in. 642006 Shoulder Rumble Strips, 8 in. 643001-02 Chain Link Fence		610001-06	Shoulder Inlet With Curb
G30101-09 Guardrail Mounted on Existing Culverts G30106-01 Long-Span Guardrail Over Culvert G30201-06 PCC/HMA Stabilization at Steel Plate Beam Guardrail G30301-06 Shoulder Widening for Type 1 (Special) Guardrail Terminals G31006-08 Traffic Barrier Terminal, Type 1B G31011-09 Traffic Barrier Terminal, Type 2 G31026-06 Traffic Barrier Terminal, Type 5 G31031-14 Traffic Barrier Terminal, Type 6 G31032-08 Traffic Barrier Terminal, Type 6B G31033-06 Traffic Barrier Terminal, Type 6B G31046-04 Traffic Barrier Terminal, Type 10 G31051-03 Traffic Barrier Terminal, Type 11 G35001-02 Delineators G36001-02 Cable Road Guard Single Strand G37001-05 Concrete Barrier 32 in. (815 mm) Height G37006-03 Concrete Barrier 32 in. (1065 mm) Height G38101-02 Concrete Glare Screen G39001-02 Sight Screen Precast Prestressed Concrete Panel Wall G40001-01 Sight Screen Cedar Stockade Fence Type S G41006-01 Sight Screen Wood Plank Fence G41001-02 Shoulder Rumble Strips, 16 in. G42006 Shoulder Rumble Strips, 8 in. G43001-02 Chain Link Fence OTHER ITEMS G64001-02 Chain Link Fence		SAFETY RELAT	TED ITEMS
630106-01 Long-Span Guardrail Over Culvert 630201-06 PCC/HMA Stabilization at Steel Plate Beam Guardrail 630301-06 Shoulder Widening for Type 1 (Special) Guardrail Terminals 631006-08 Traffic Barrier Terminal, Type 1B 631011-09 Traffic Barrier Terminal, Type 2 631026-06 Traffic Barrier Terminal, Type 5 631031-14 Traffic Barrier Terminal, Type 6 631032-08 Traffic Barrier Terminal, Type 6A 631033-06 Traffic Barrier Terminal, Type 6B 631046-04 Traffic Barrier Terminal, Type 10 631051-03 Traffic Barrier Terminal, Type 11 635001-02 Delineators 636001-02 Cable Road Guard Single Strand 637001-05 Concrete Barrier 32 in. (815 mm) Height 637006-03 Concrete Barrier 42 in. (1065 mm) Height 638101-02 Concrete Glare Screen 639001-02 Sight Screen Precast Prestressed Concrete Panel Wall 640001-01 Sight Screen Cedar Stockade Fence Type S 641001-01 Sight Screen Wood Plank Fence Type P 642001-02 Shoulder Rumble Strips, 8 in. 643001-02 Chain Link Fence OTHER ITEMS 664001-02 Chain Link Fence		630001-10	Steel Plate Beam Guardrail
630201-06 PCC/HMA Stabilization at Steel Plate Beam Guardrail 630301-06 Shoulder Widening for Type 1 (Special) Guardrail Terminals 631006-08 Traffic Barrier Terminal, Type 1B 631011-09 Traffic Barrier Terminal, Type 2 631026-06 Traffic Barrier Terminal, Type 5 631031-14 Traffic Barrier Terminal, Type 6 631032-08 Traffic Barrier Terminal, Type 6A 631033-06 Traffic Barrier Terminal, Type 6B 631046-04 Traffic Barrier Terminal, Type 10 631051-03 Traffic Barrier Terminal, Type 11 635001-02 Delineators 636001-02 Cable Road Guard Single Strand 637001-05 Concrete Barrier 32 in. (815 mm) Height 637006-03 Concrete Barrier 42 in. (1065 mm) Height 638101-02 Concrete Glare Screen 639001-02 Sight Screen Precast Prestressed Concrete Panel Wall 640001-01 Sight Screen Cedar Stockade Fence Type S 641006-01 Sight Screen Wood Plank Fence 641001-02 Shoulder Rumble Strips, 16 in. 642001 Sand Module Impact Attenuators OTHER ITEMS 664001-02 Chain Link Fence		630101-09	Guardrail Mounted on Existing Culverts
630301-06 Shoulder Widening for Type 1 (Special) Guardrail Terminals 631006-08 Traffic Barrier Terminal, Type 1B 631011-09 Traffic Barrier Terminal, Type 2 631026-06 Traffic Barrier Terminal, Type 5 [631031-14 Traffic Barrier Terminal, Type 6 631032-08 Traffic Barrier Terminal, Type 6A 631033-06 Traffic Barrier Terminal, Type 6B 631046-04 Traffic Barrier Terminal, Type 10 631051-03 Traffic Barrier Terminal, Type 11 635001-02 Delineators 636001-02 Cable Road Guard Single Strand 637001-05 Concrete Barrier 32 in. (815 mm) Height 637006-03 Concrete Barrier 42 in. (1065 mm) Height 638101-02 Concrete Glare Screen 639001-02 Sight Screen Precast Prestressed Concrete Panel Wall 640001-01 Sight Screen Cedar Stockade Fence Type S 641006-01 Sight Screen Wood Plank Fence Type P 642001-02 Shoulder Rumble Strips, 16 in. 643001-02 Sand Module Impact Attenuators OTHER ITEMS 664001-02 Chain Link Fence		630106-01	Long-Span Guardrail Over Culvert
631006-08 Traffic Barrier Terminal, Type 1B 631011-09 Traffic Barrier Terminal, Type 2 631026-06 Traffic Barrier Terminal, Type 5 [631031-14 Traffic Barrier Terminal, Type 6 631032-08 Traffic Barrier Terminal, Type 6A 631033-06 Traffic Barrier Terminal, Type 6B 631046-04 Traffic Barrier Terminal, Type 10 631051-03 Traffic Barrier Terminal, Type 11 635001-02 Delineators 636001-02 Cable Road Guard Single Strand 637001-05 Concrete Barrier 32 in. (815 mm) Height 637006-03 Concrete Barrier 42 in. (1065 mm) Height 638101-02 Concrete Glare Screen 639001-02 Sight Screen Precast Prestressed Concrete Panel Wall 640001-01 Sight Screen Cedar Stockade Fence Type S 641006-01 Sight Screen Wood Plank Fence 641001-02 Shoulder Rumble Strips, 16 in. 642006 Shoulder Rumble Strips, 8 in. 643001-02 Chain Link Fence		630201-06	
631011-09 Traffic Barrier Terminal, Type 2 631026-06 Traffic Barrier Terminal, Type 5 631031-14 Traffic Barrier Terminal, Type 6 631032-08 Traffic Barrier Terminal, Type 6A 631033-06 Traffic Barrier Terminal, Type 6B 631046-04 Traffic Barrier Terminal, Type 10 631051-03 Traffic Barrier Terminal, Type 11 635001-02 Delineators 636001-02 Cable Road Guard Single Strand 637001-05 Concrete Barrier 32 in. (815 mm) Height 637006-03 Concrete Barrier 42 in. (1065 mm) Height 638101-02 Concrete Glare Screen 639001-02 Sight Screen Precast Prestressed Concrete Panel Wall 640001-01 Sight Screen Cedar Stockade Fence Type S 641006-01 Sight Screen Wood Plank Fence Type P 642001-02 Shoulder Rumble Strips, 16 in. 642006 Shoulder Rumble Strips, 8 in. 643001-02 Chain Link Fence OTHER ITEMS 664001-02 Chain Link Fence		630301-06	
631026-06 Traffic Barrier Terminal, Type 5 631031-14 Traffic Barrier Terminal, Type 6 631032-08 Traffic Barrier Terminal, Type 6A 631033-06 Traffic Barrier Terminal, Type 6B 631046-04 Traffic Barrier Terminal, Type 10 631051-03 Traffic Barrier Terminal, Type 11 635001-02 Delineators 636001-02 Cable Road Guard Single Strand 637001-05 Concrete Barrier 32 in. (815 mm) Height 637006-03 Concrete Barrier 42 in. (1065 mm) Height 638101-02 Concrete Glare Screen 639001-02 Sight Screen Precast Prestressed Concrete Panel Wall 640001-01 Sight Screen Cedar Stockade Fence Type S 641006-01 Sight Screen Wood Plank Fence Type P 642001-02 Shoulder Rumble Strips, 16 in. 642006 Shoulder Rumble Strips, 8 in. 643001-02 Chain Link Fence OTHER ITEMS 664001-02 Chain Link Fence			• ••
631031-14 Traffic Barrier Terminal, Type 6 631032-08 Traffic Barrier Terminal, Type 6A 631033-06 Traffic Barrier Terminal, Type 6B 631046-04 Traffic Barrier Terminal, Type 10 631051-03 Traffic Barrier Terminal, Type 11 635001-02 Delineators 636001-02 Cable Road Guard Single Strand 637001-05 Concrete Barrier 32 in. (815 mm) Height 637006-03 Concrete Barrier 42 in. (1065 mm) Height 638101-02 Concrete Glare Screen 639001-02 Sight Screen Precast Prestressed Concrete Panel Wall 640001-01 Sight Screen Chain Link Fence 641001-01 Sight Screen Wood Plank Fence Type S 641006-01 Sight Screen Wood Plank Fence Type P 642001-02 Shoulder Rumble Strips, 16 in. 642006 Shoulder Rumble Strips, 8 in. 643001-02 Chain Link Fence OTHER ITEMS 664001-02 Chain Link Fence			•••
631032-08 Traffic Barrier Terminal, Type 6A 631033-06 Traffic Barrier Terminal, Type 6B 631046-04 Traffic Barrier Terminal, Type 10 631051-03 Traffic Barrier Terminal, Type 11 635001-02 Delineators 636001-02 Cable Road Guard Single Strand 637001-05 Concrete Barrier 32 in. (815 mm) Height 637006-03 Concrete Barrier 42 in. (1065 mm) Height 638101-02 Concrete Glare Screen 639001-02 Sight Screen Precast Prestressed Concrete Panel Wall 640001-01 Sight Screen Chain Link Fence 641001-01 Sight Screen Wood Plank Fence Type S 641006-01 Sight Screen Wood Plank Fence Type P 642001-02 Shoulder Rumble Strips, 16 in. 642006 Shoulder Rumble Strips, 8 in. 643001-02 Chain Link Fence	ĺ		•••
631033-06 Traffic Barrier Terminal, Type 6B 631046-04 Traffic Barrier Terminal, Type 10 631051-03 Traffic Barrier Terminal, Type 11 635001-02 Delineators 636001-02 Cable Road Guard Single Strand 637001-05 Concrete Barrier 32 in. (815 mm) Height 637006-03 Concrete Barrier 42 in. (1065 mm) Height 638101-02 Concrete Glare Screen 639001-02 Sight Screen Precast Prestressed Concrete Panel Wall 640001-01 Sight Screen Chain Link Fence 641001-01 Sight Screen Cedar Stockade Fence Type S 641006-01 Sight Screen Wood Plank Fence Type P 642001-02 Shoulder Rumble Strips, 16 in. 642006 Shoulder Rumble Strips, 8 in. 643001-02 Chain Link Fence			• • • • • • • • • • • • • • • • • • • •
631046-04 Traffic Barrier Terminal, Type 10 631051-03 Traffic Barrier Terminal, Type 11 635001-02 Delineators 636001-02 Cable Road Guard Single Strand 637001-05 Concrete Barrier 32 in. (815 mm) Height 637006-03 Concrete Barrier 42 in. (1065 mm) Height 638101-02 Concrete Glare Screen 639001-02 Sight Screen Precast Prestressed Concrete Panel Wall 640001-01 Sight Screen Chain Link Fence 641001-01 Sight Screen Cedar Stockade Fence Type S 641006-01 Sight Screen Wood Plank Fence Type P 642001-02 Shoulder Rumble Strips, 16 in. 642006 Shoulder Rumble Strips, 8 in. 643001-02 Sand Module Impact Attenuators OTHER ITEMS 664001-02 Chain Link Fence			
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OTHER ITEMS 664001-02 Chain Link Fence			• •
664001-02 Chain Link Fence		0.10001.02	Cana Modale Impact, Mondatore
		OTHER ITEMS	
665001-02 Woven Wire Fence		664001-02	Chain Link Fence
110101111101 0100		665001-02	Woven Wire Fence
666001-01 Right-of-Way Markers		666001-01	Right-of-Way Markers
667001-01 Drainage Markers			-
667101-02 Permanent Survey Markers			Permanent Survey Markers
,		668001-01	U.S. Geological Survey and National Geodetic Survey Benchmarks, Resetting Method
,		668001-01	U.S. Geological Survey and National Geodetic Survey Benchmarks, Resetting Method









ALTERNATE BOTTOM SLAB

ALTERNATE MATERIALS FOR WALLS	D	C•	T (min.)
Concrete Masonry Unit	4'-0'' (1.2 m)	30 (750)	5 (125)
	5'-0'' (1.5 m)	3'-9" (1.15 m)	5 (125)
Brick Masonry	4'-0'' (1.2 m)	30 (750)	8 (200)
	5'-0'' (1.5 m)	3'-9" (1.15 m)	8 (200)
Precast Reinforced	4'-0'' (1.2 m)	30 (750)	4 (100)
Concrete Section	5'-0'' (1.5 m)	3'-9" (1.15 m)	5 (125)
Cast-in-place Concrete	4'-0'' (1.2 m)	30 (750)	6 (150)
	5'-0'' (1.5 m)	3'-9'' (1.15 m)	6 (150)

 For precast reinforced concrete sections, dimension "C" may vary from the dimension given to plus 6 (150).

GENERAL NOTES

Bottom slabs shall be reinforced with a minimum of 0.20 sq. in./ft (420 sq. mm/m) in both directions with a maximum spacing of 12 (300).

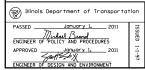
Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

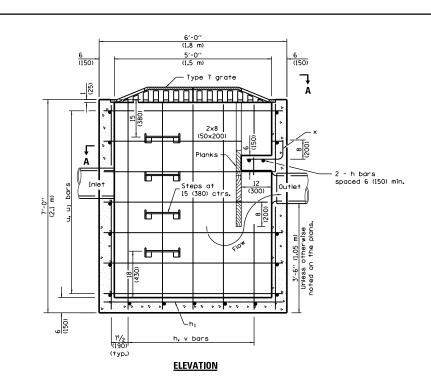
See Standard 602601 for optional precast reinforced concrete flat slab top.

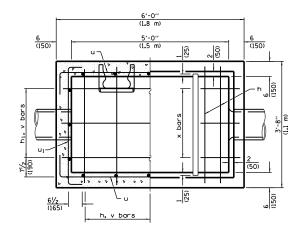
See Standard 602701 for details of steps.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS	CATCH DACIN
1-1-11	Added 'Outside' to half trap	CATCH BASIN
	note. Detail rein. in slabs.	TYPE A
	Revised general notes.	I ITE A
1-1-09	Switched units to	
	English (metric).	STANDARD 602001-02
		017/1127/112 002001 02







SECTION A-A (Grating removed to show plan of baffles.)

MATERIALS REQUIRED FOR ONE (1) TYPE B CATCH BASIN

Bar	0†y.	Size	Shape	Length
h	7	No. 4 (No. 13)		3'-5" (1.02 m)
hι	3	No. 4 (No. 13)		5'-9" (1.72 m)
u	14	No. 4 (No. 13)		7'-0'' (2.10 m)
uı	14	No. 4 (No. 13)	ш	4'-6" (1.35 m)
٧	16	No. 4 (No. 13)		6'-9" (2.02 m)
×	3	No. 4 (No. 13)		1'-11'' (580)
	Concrete			2.5 (1.90)
Rei	nforce	ment bars	lbs. (kg)	210 (95)

All bars shall be at 12 (300) centers unless otherwise shown. Reinforcement bar clearance shall be $1!/_2$ (40).

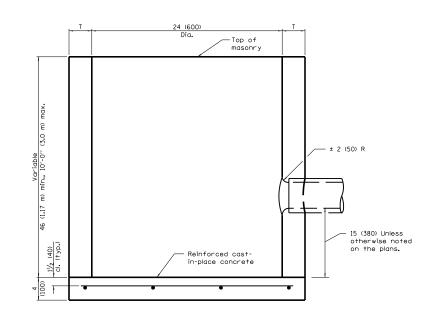
GENERAL NOTES

See Standard 602701 for details of steps.

All dimensions are in inches (millimeters) unless otherwise shown.

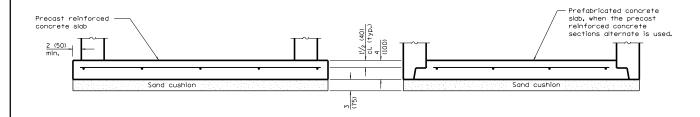
DATE	REVISIONS	CATCH DACIN	
1-1-13	Revised and relocated	CATCH BASIN	
	steps.	TYPE B	
		ITFE D	
1-1-11	Added additional bar		
	identification.	STANDARD 602006-04	
		517.1157.115 002000 04	





ALTERNATE MATERIALS FOR WALLS	T (min)
Precast Reinforced Concrete Section	3 (75)
Concrete Masonry Unit	5 (125)
Cast-in-Place Concrete	6 (150)
Brick Masonry	8 (200)

ELEVATION



ALTERNATE BOTTOM SLAB

GENERAL NOTES

Bottom slabs shall be reinforced with a minimum of 0.27 sq. in./ft. (570 sq. mm/m) in both directions with a maximum spacing of 9 (230).

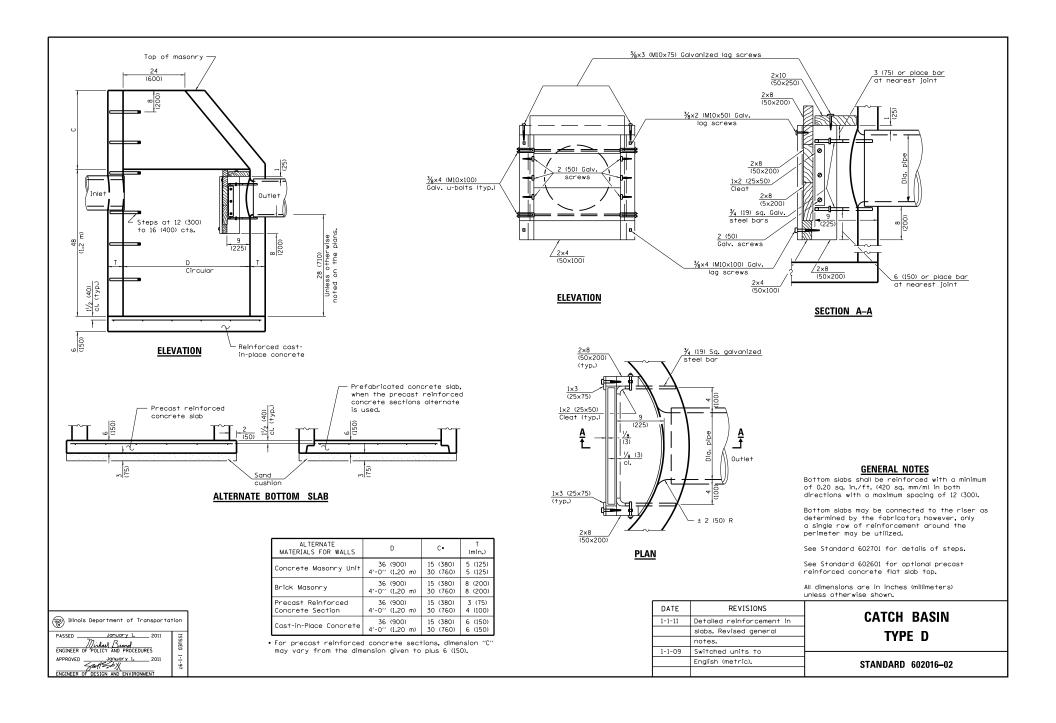
Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

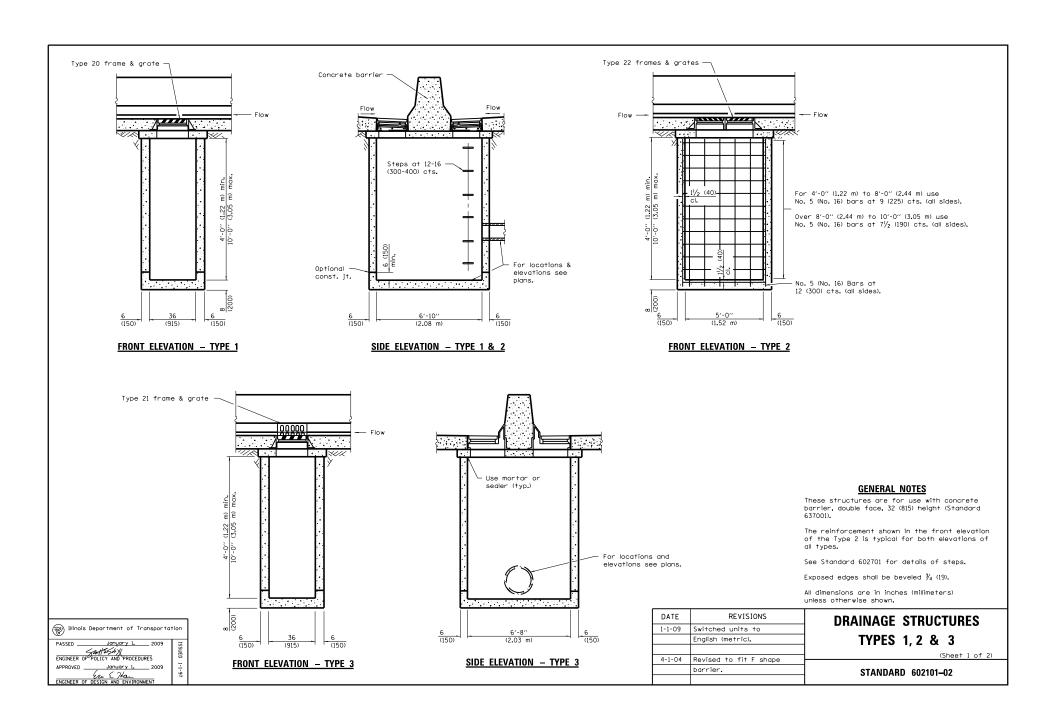
All dimensions are in inches (millimeters) unless otherwise shown.

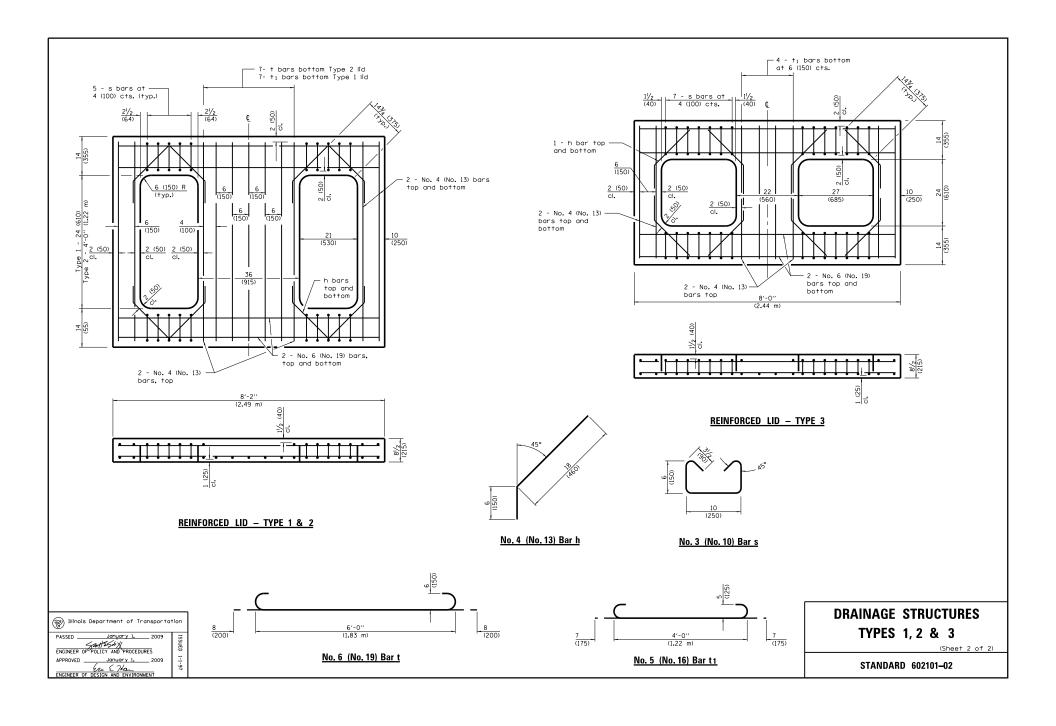
<u> </u>	DATE	REVISIONS
Illinois Department of Transportation	1-1-11	Detailed rein. in slabs.
PASSED January 1. 2011 70		Added max. limit to height.
		Added general notes.
Michael Brand ENGINEER OF POLICY AND PROCEDURES	1-1-09	Switched units to
APPROVED January 1, 2011		English (metric).
ENGINEER OF DESIGN AND ENVIRONMENT		

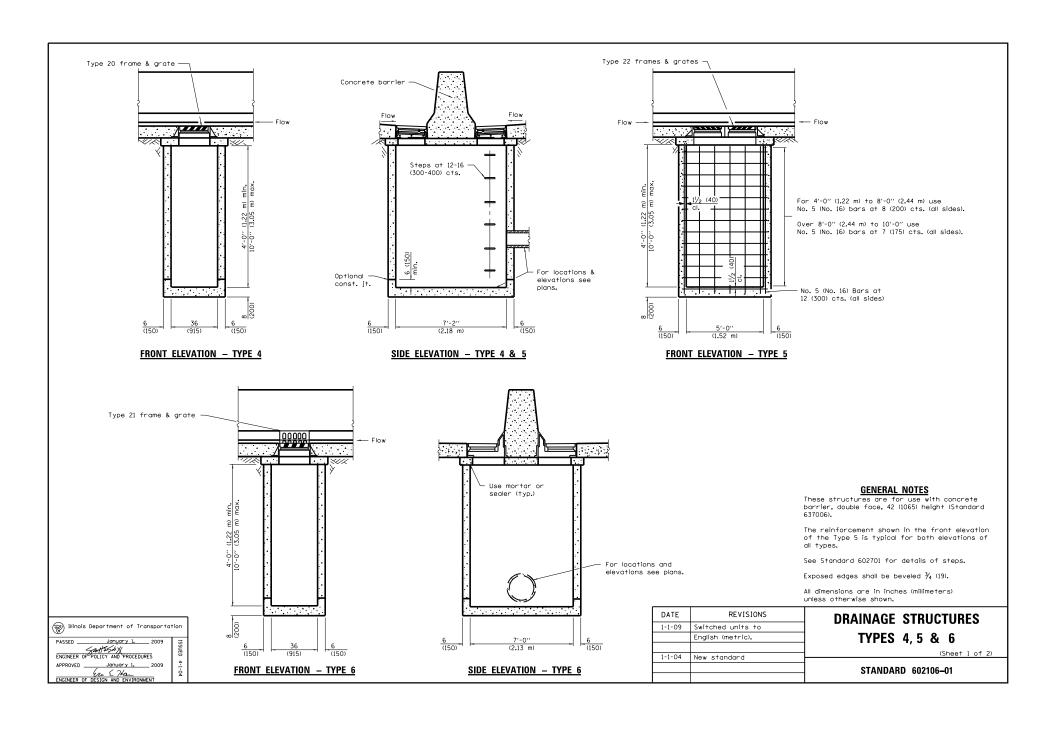
CATCH BASIN TYPE C

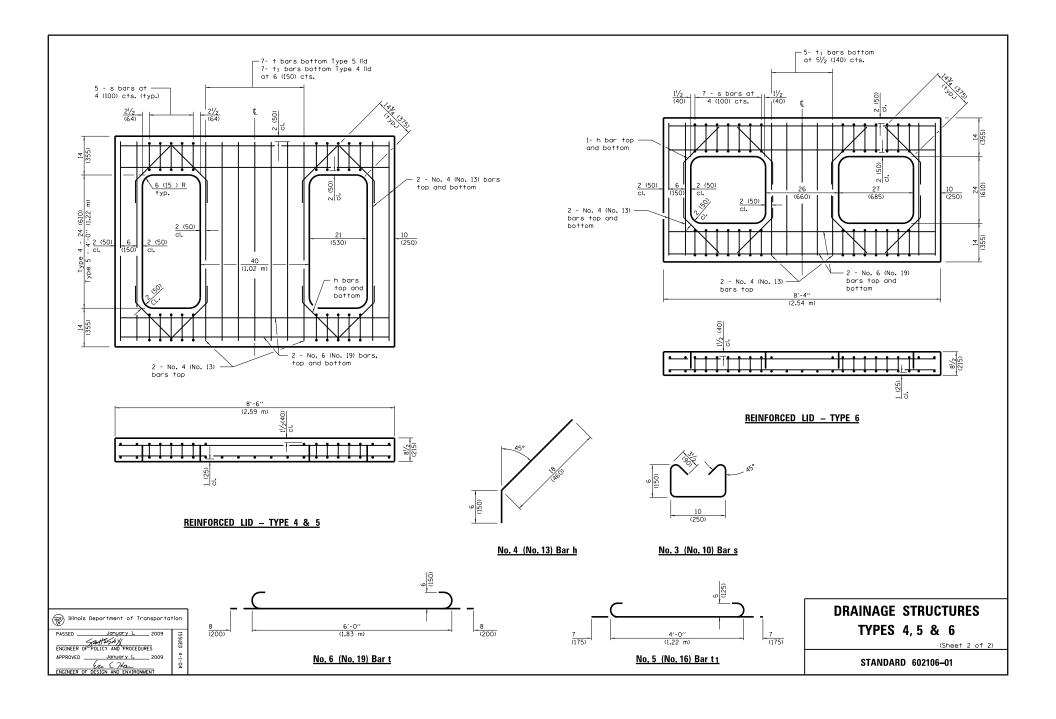
STANDARD 602011-02

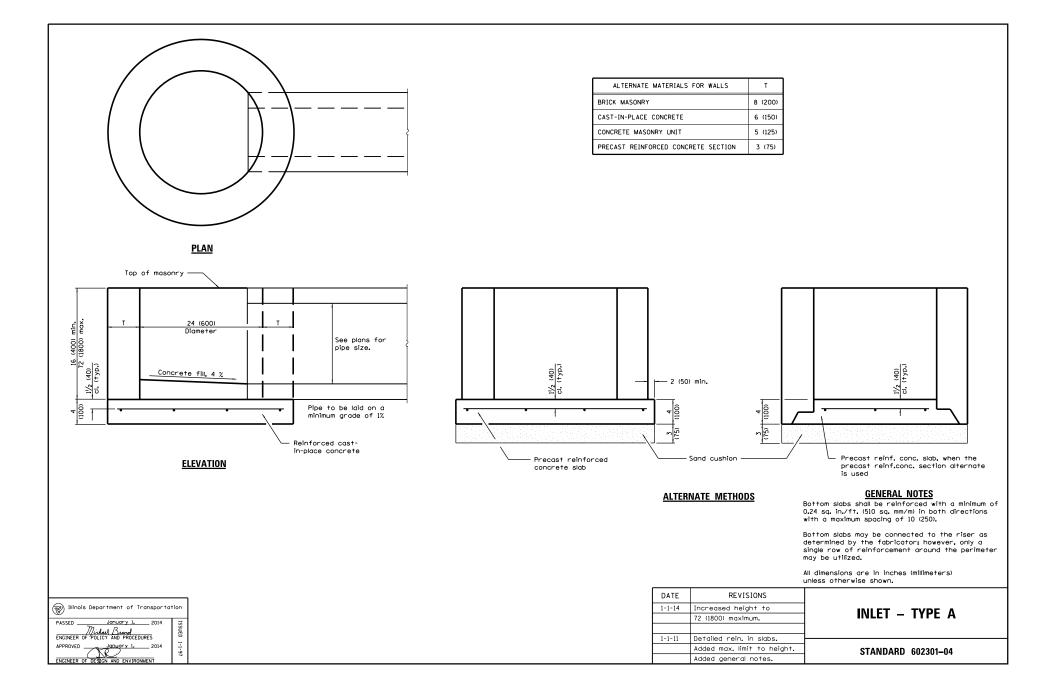


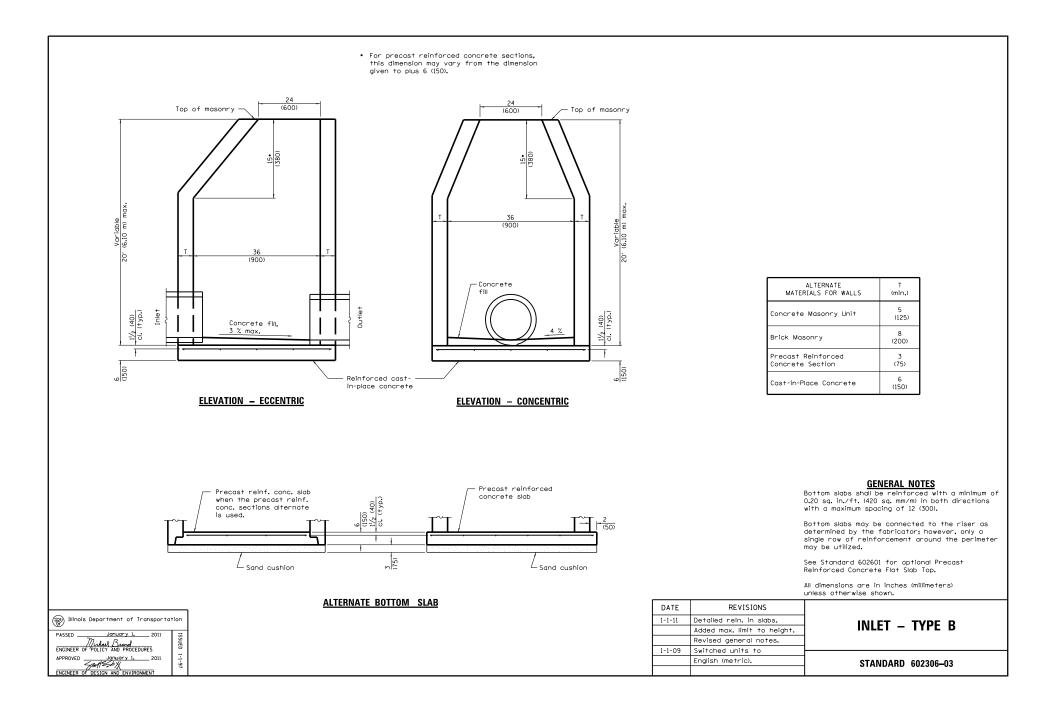


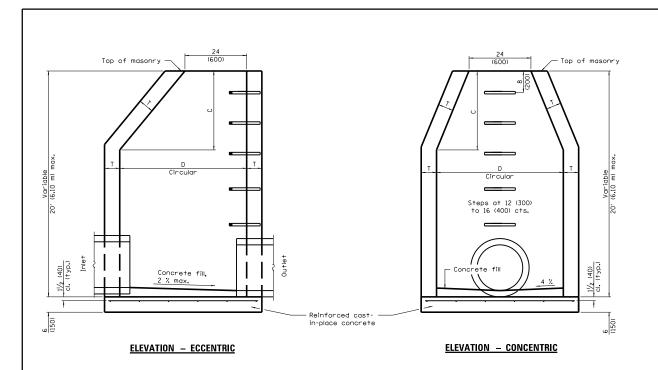












ALTERNATE MATERIALS FOR WALLS	D	C•	T (min.)
Concrete Masonry Unit	4'-0'' (1.2 m)	30 (750)	5 (125)
	5'-0'' (1.5 m)	3'-9'' (1.15 m)	5 (125)
Brick Masonry	4'-0'' (1.2 m)	30 (750)	8 (200)
	5'-0'' (1.5 m)	3'-9'' (1.15 m)	8 (200)
Precast Reinforced	4'-0'' (1.2 m)	30 (750)	4 (100)
Concrete Section	5'-0'' (1.5 m)	3'-9'' (1.15 m)	5 (125)
Cast-in-place Concrete	4'-0'' (1.2 m)	30 (750)	6 (150)
	5'-0'' (1.5 m)	3'-9'' (1.15 m)	6 (150)

• For precast reinforced concrete sections, dimension "C" may vary from the dimension given to plus 6 (150).

GENERAL NOTES

Bottom slabs shall be reinforced with a minimum of 0.31 sq. in./ft, (660 sq. mm/m) in both directions with a maximum spacing of 12 (300).

Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

See Standard 602701 for details of steps.

See Standard 602601 for optional Precast Reinforced Concrete Flat Slab Top.

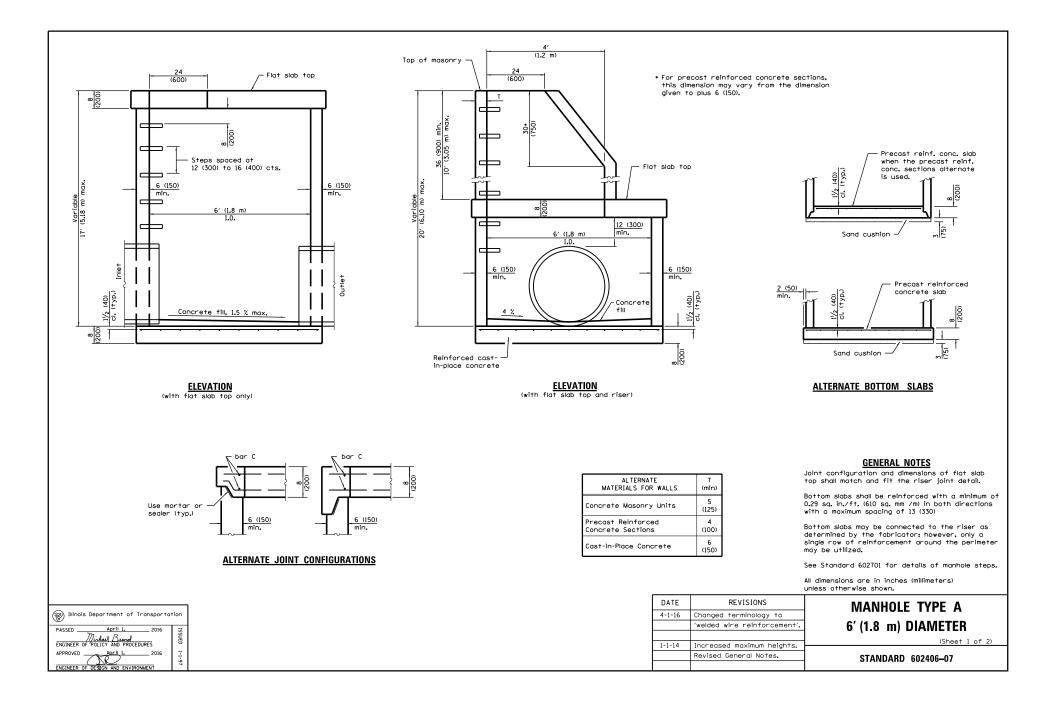
All dimensions are in inches (millimeters) unless otherwise shown.

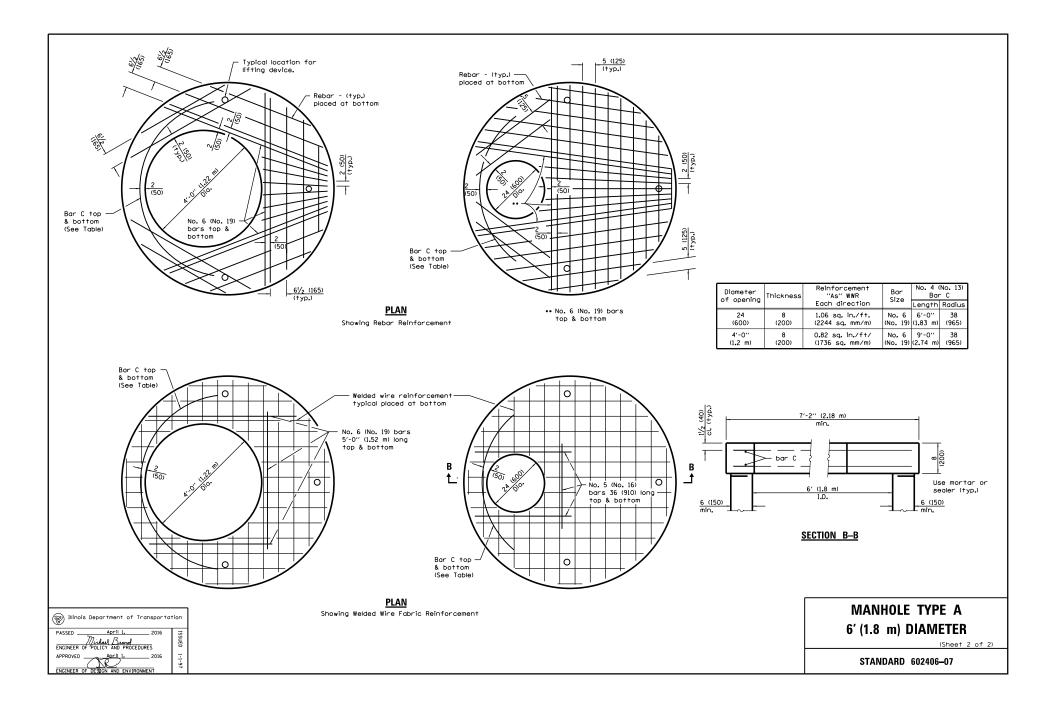
DATE	REVISIONS	
1-1-11	Detailed rein. in slabs.	MANUALE TYPE A
	Added max. limit to height.	MANHOLE TYPE A
	Revised general notes.	
1-1-09	Switched units to	
	English (metric).	STANDARD 602401-03
		5.75AIID 002401 00

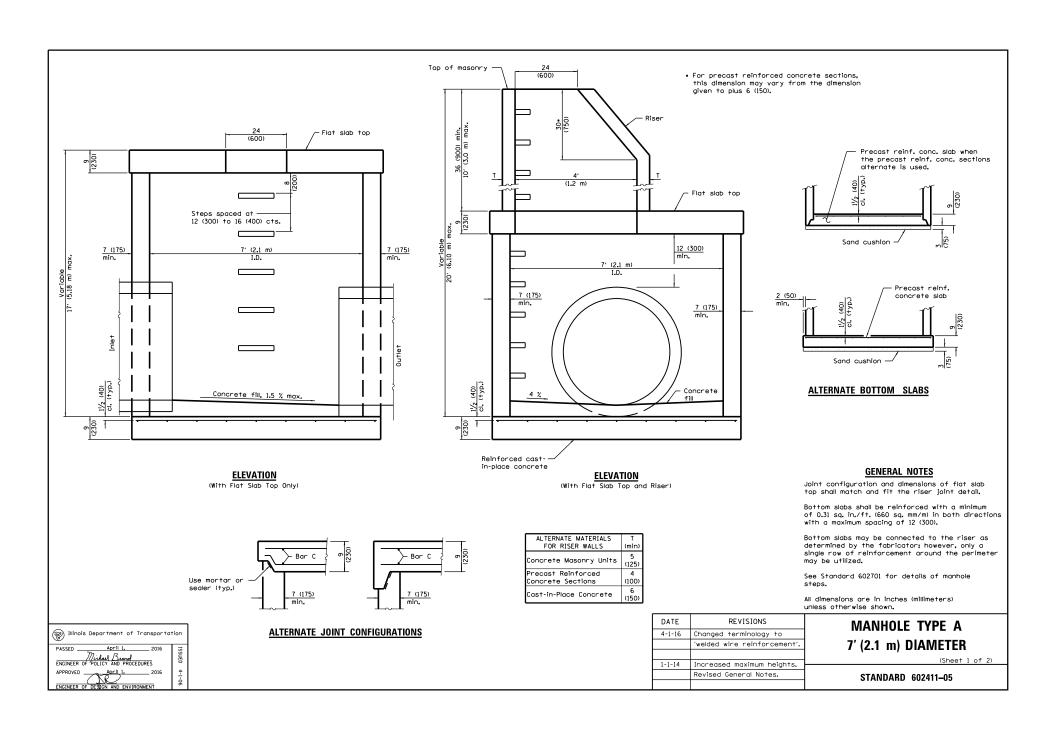
	Sand cushion Precast reinforced concrete slab	2 (50) min. (9)
	Sand cushion	3 (75) 6 (150)
Illinois Department of Transportation PASSED January I. 2011 ENGINEER OF FOLICY AND PROCEDURES APPROVED JANUARY I. 2011 JANUARY I. 2011 JANUARY I. 2011 JANUARY I. 2011	Precast reinf. conc. slab —/ when the precast reinf. conc. section alternate is used. ALTERNATE BOTTOM SLAB	

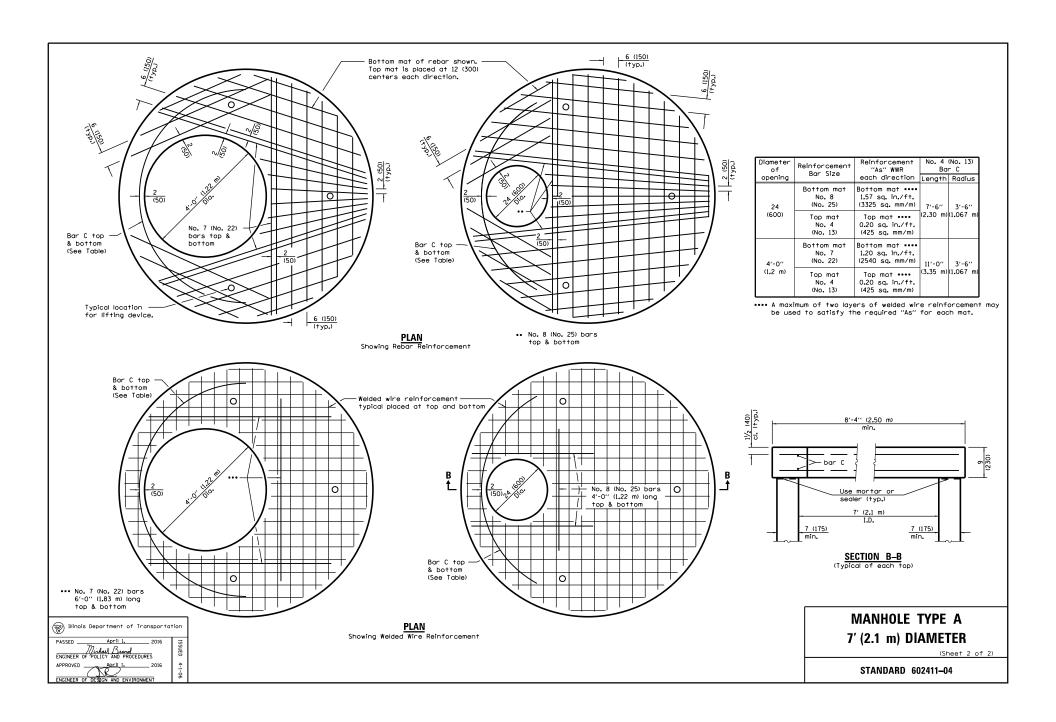
APPROVED January 1, 20

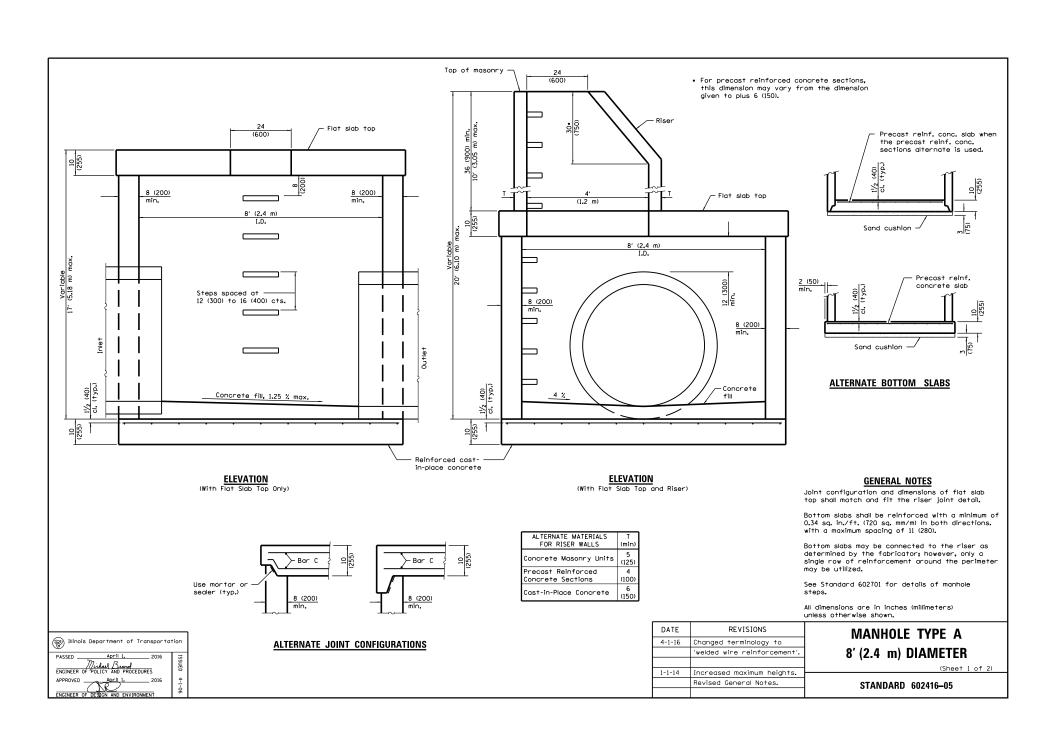
FINGINEER OF DESIGN AND ENVIRONMENT

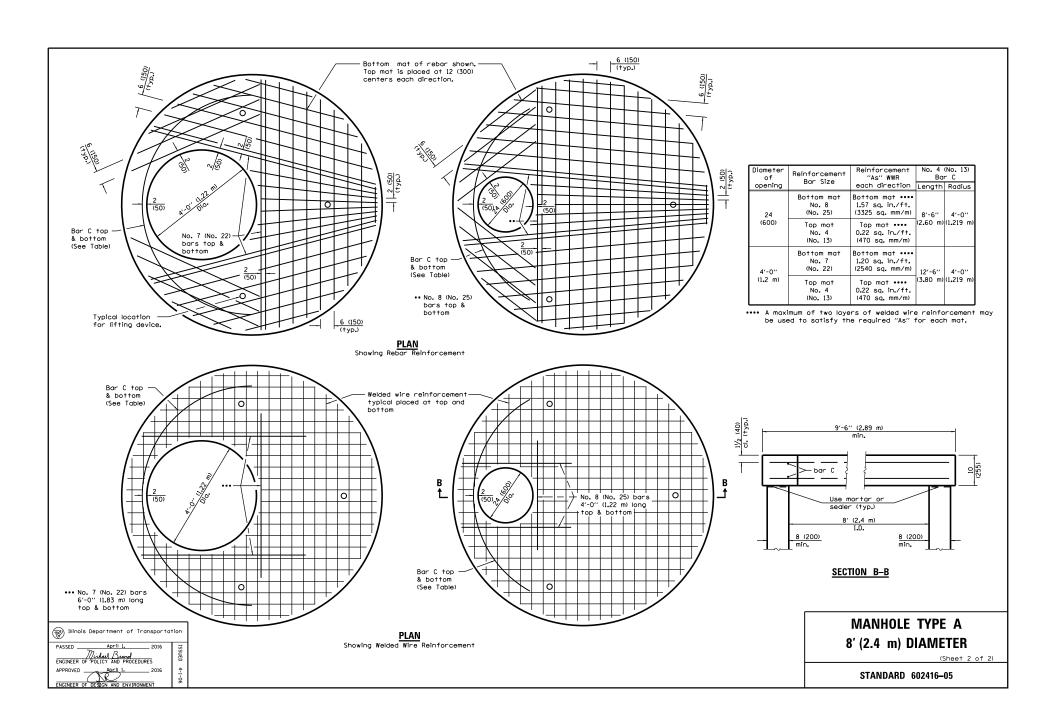


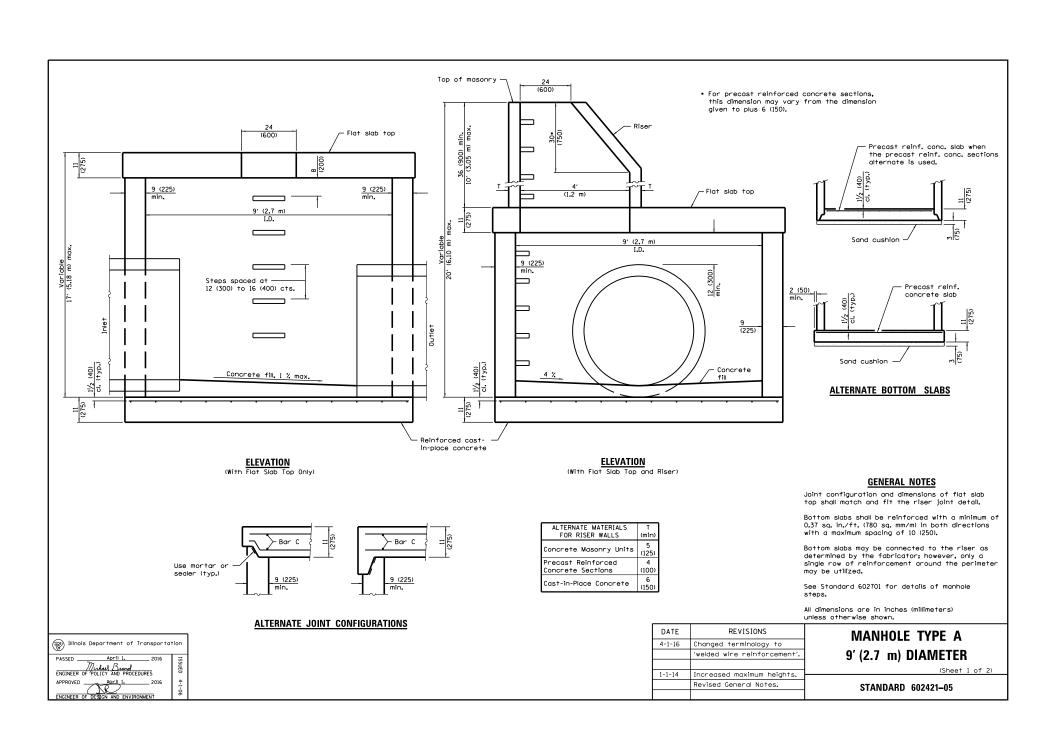


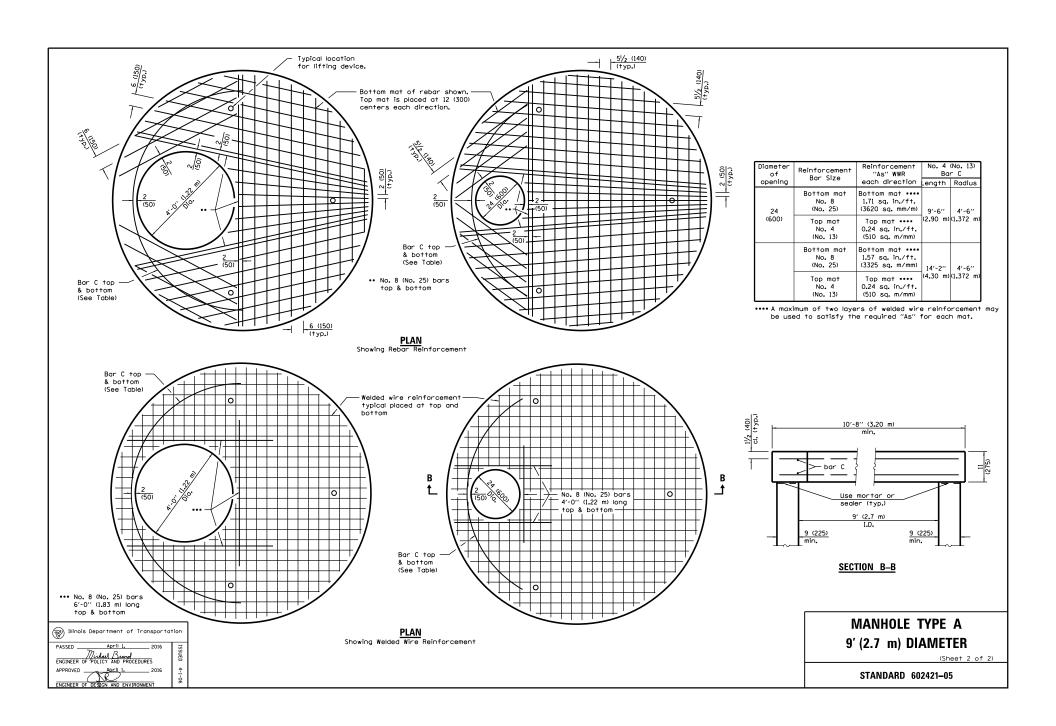


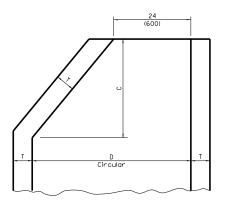




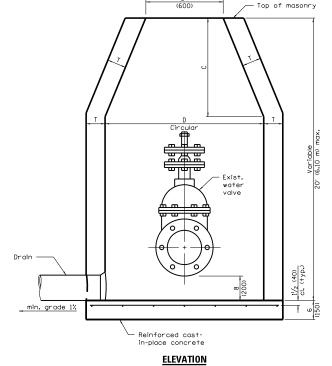








The cone of the valve vault shall be constructed as shown above only when there is interference with underground conditions and those conditions cannot be altered.



11/2 (40) cl. (†yp.)		Precast concrete slab when the precast reinf. concrete slab when concrete slab when the precast reinf. concrete section diternate is used.	1/2 (40) cl. (†yp.)
(150)			(75) (75) (150)
1-1/-	-	✓ Sand cushion ✓	.,,0

ALTERNATE MATERIALS FOR WALLS	D	с •	T (min.)	
Concrete Masonry Unit	4'-0'' (1.2 m)	30 (750)	5 (125)	
	5'-0'' (1.5 m)	3'-9'' (1.15 m)	5 (125)	
Brick Masonry	4'-0'' (1.2 m)	30 (750)	8 (200)	
	5'-0'' (1.5 m)	3'-9'' (1.15 m)	8 (200)	
Precast Reinforced	4'-0'' (1.2 m)	30 (750)	4 (100)	
Concrete Section	5'-0'' (1.5 m)	3'-9'' (1.15 m)	5 (125)	
Cast-in-Place Concrete	4'-0'' (1.2 m)	30 (750)	6 (150)	
	5'-0'' (1.5 m)	3'-9'' (1.15 m)	6 (150)	

• For precast reinforced concrete sections, dimension "C" may vary from the dimension given to plus 6 (150).

DIAMETER OF WATER MAIN	D		
8 (200) and under	4'-0'' (1.2 m)		
10 (250) and over	5'-0" (1.5 m)		

GENERAL NOTES

Bottom slabs shall be reinforced with a minimum of 0.31 sq. in./ft. (660 sq. mm/m) in both directions with a maximum spacing of 12 (300).

Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

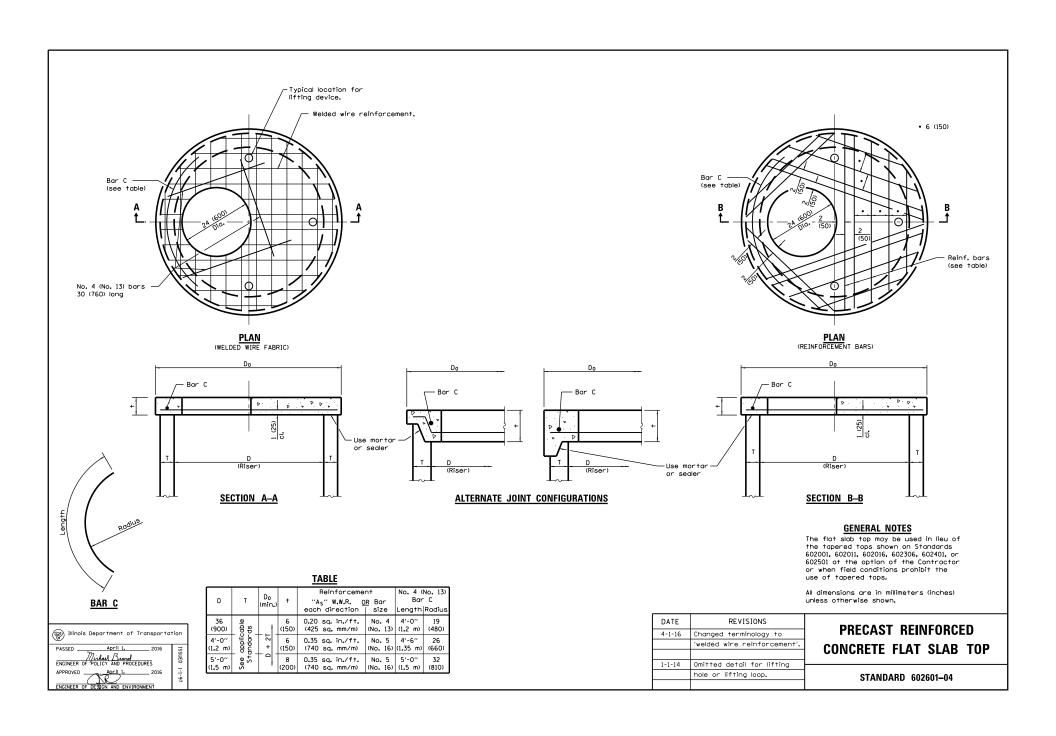
See Standard 602601 for optional Precast Reinforced Concrete Flat Top Slab.

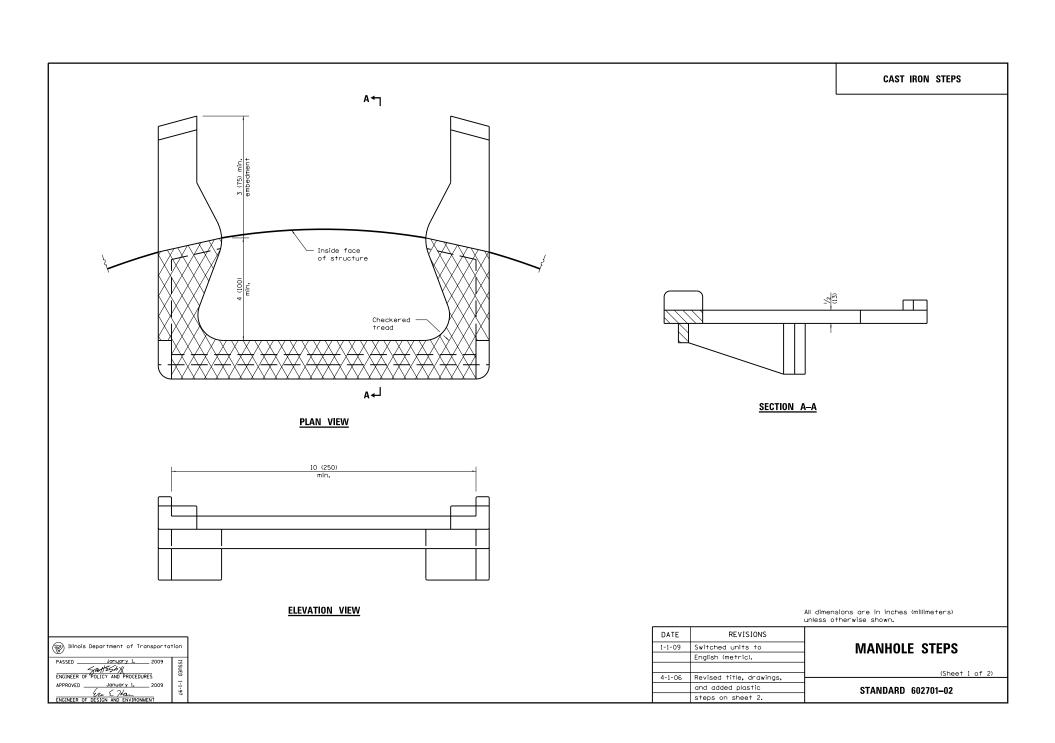
All dimensions are in inches (millimeters) unless otherwise shown.

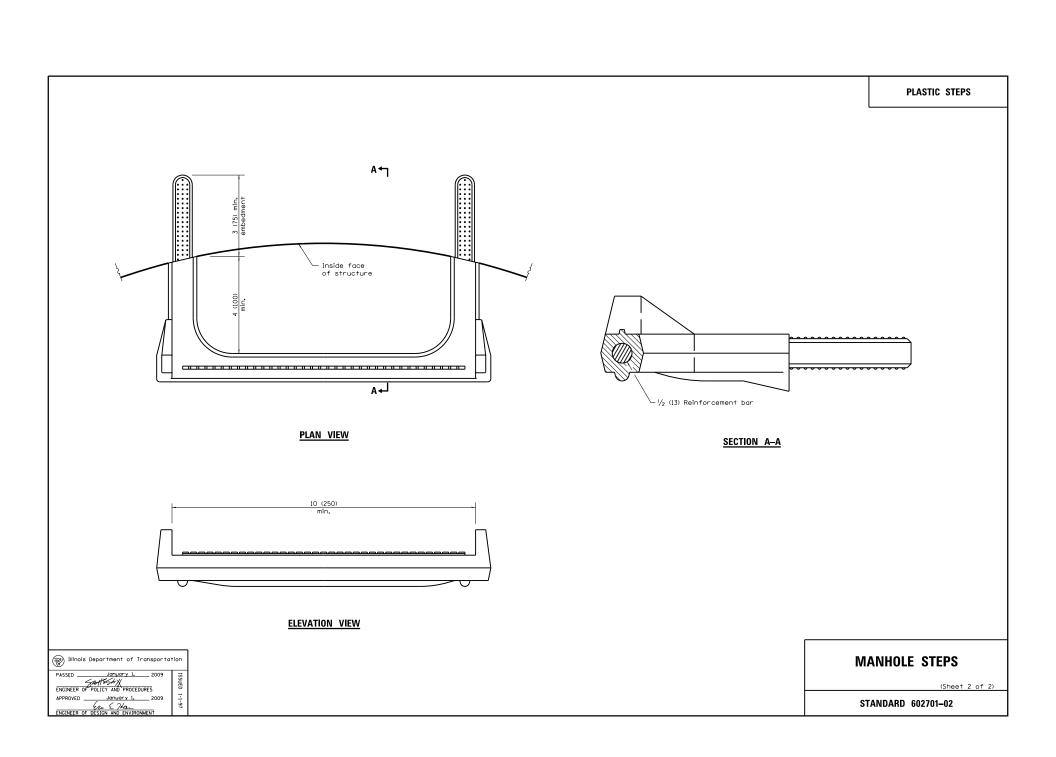
		ALTERNATE METHODS			
		ALIENNAIE WEIHUUS	DATE	REVISIONS	
	Illinois Department of Transportation		1-1-11	Detailed reinforcement in	
	PASSED January 1 2011 7			slabs. Revised general	
	Mirhael Beard E			notes.	
APPROVED _	ENGINEER OF POLICY AND PROCEDURES		1-1-09	Switched units to	
	APPROVED January 1. 2011			English (metric).	
	ENGINEER OF DESIGN AND ENVIRONMENT				

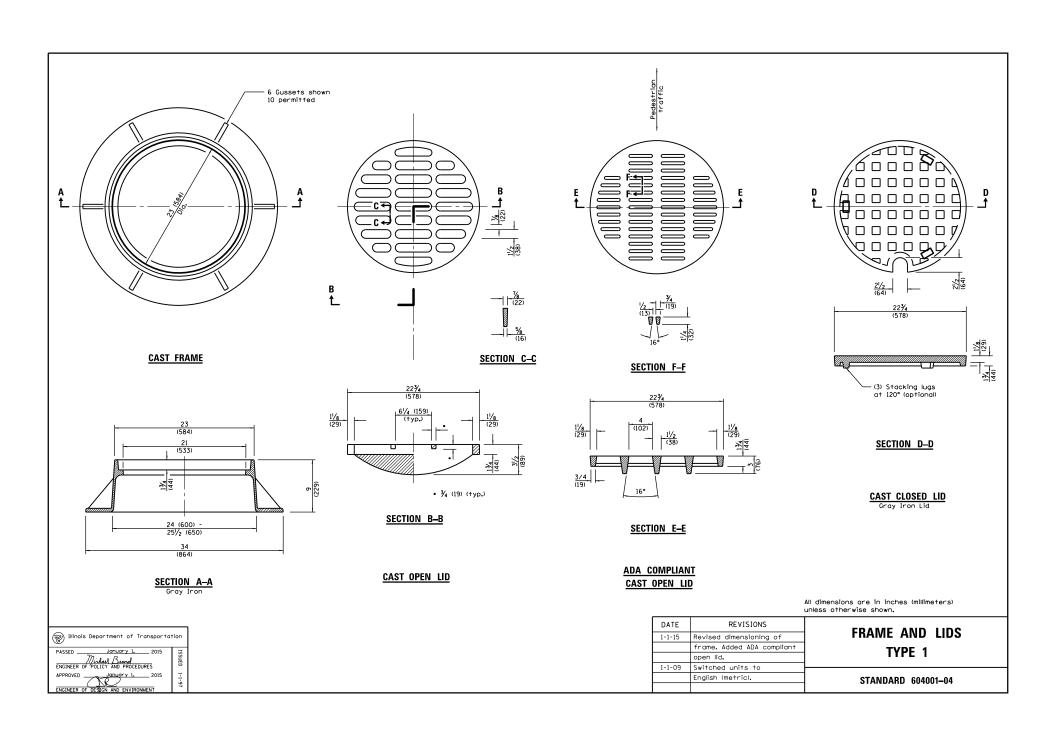
VALVE VAULT TYPE A

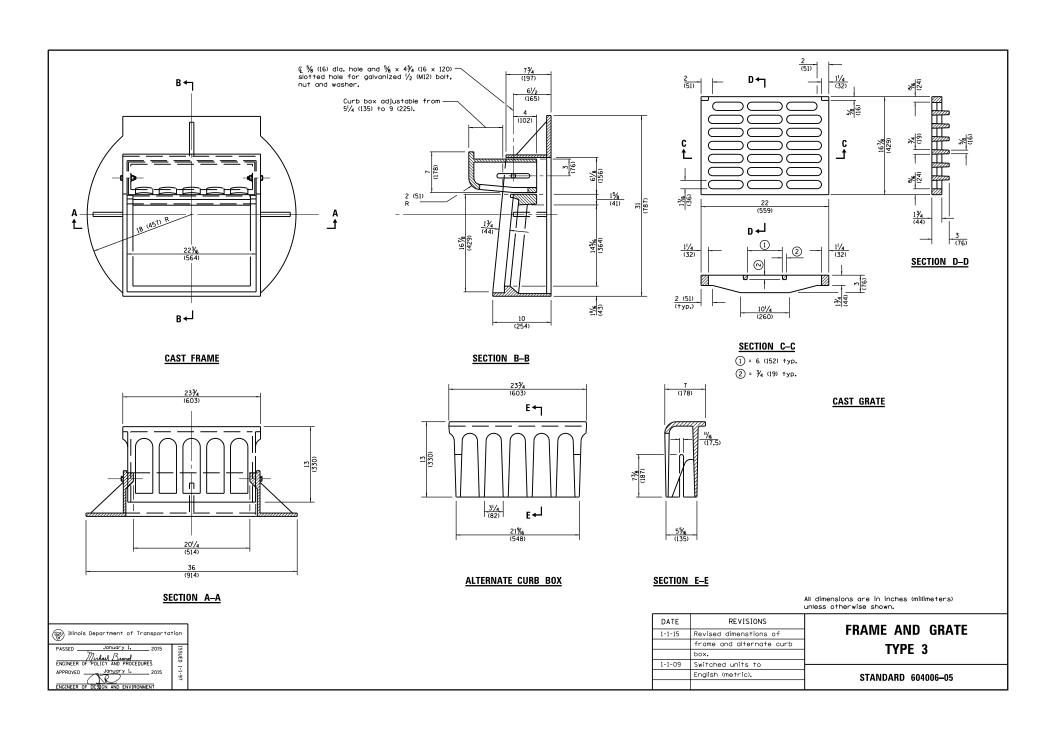
STANDARD 602501-02

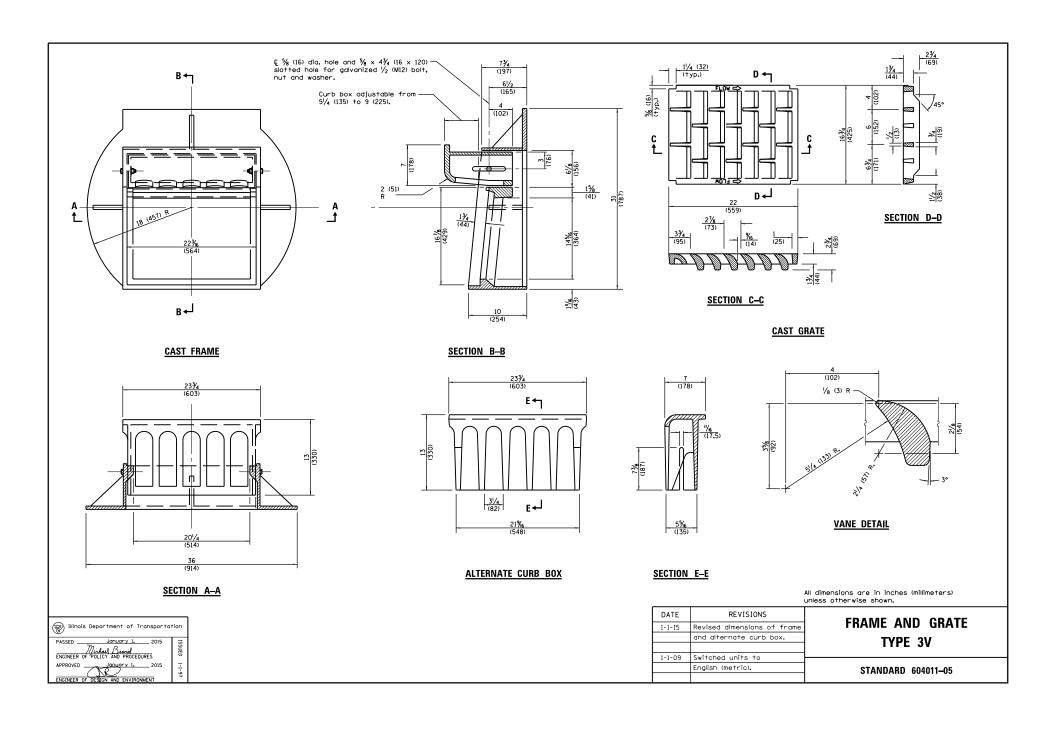


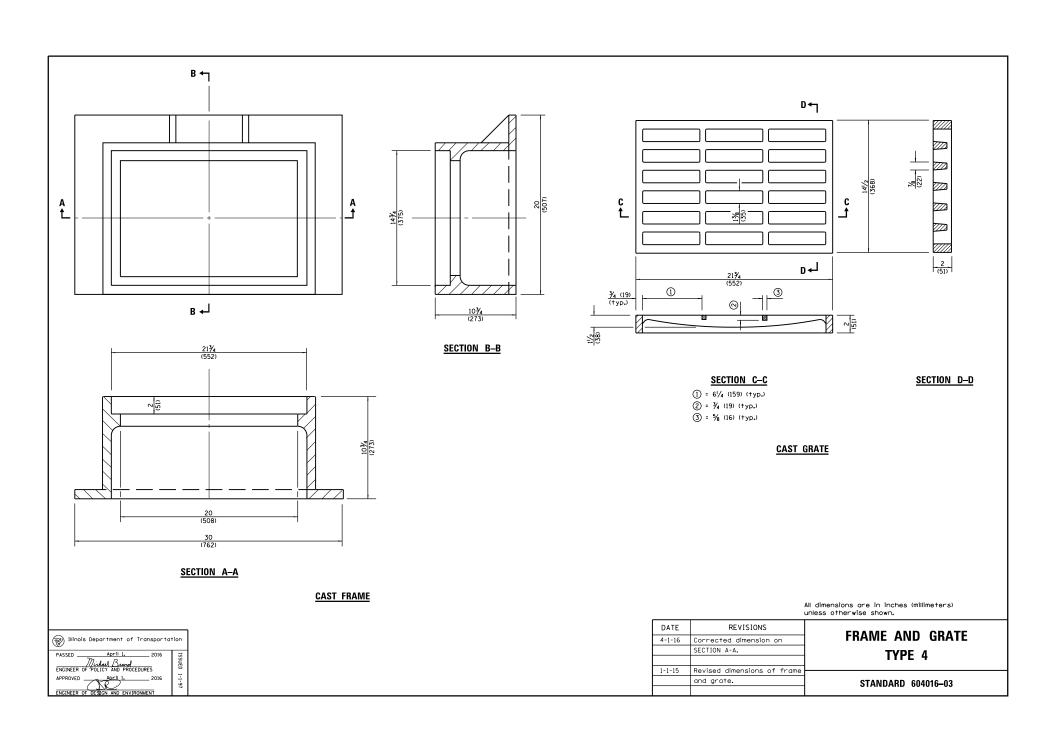


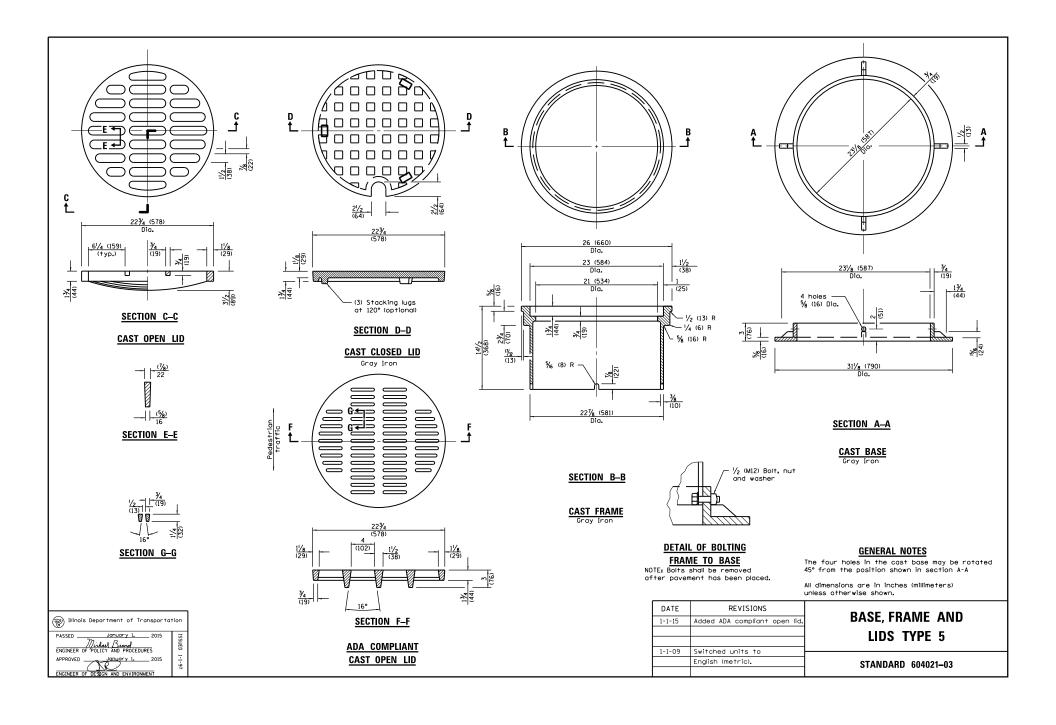


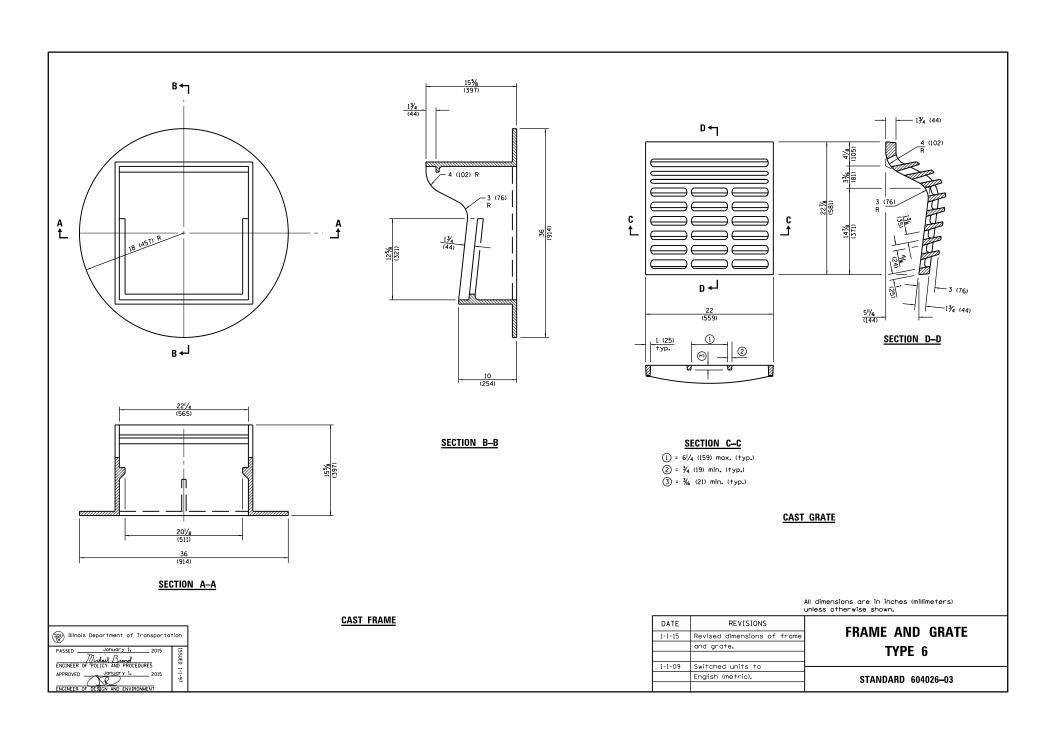


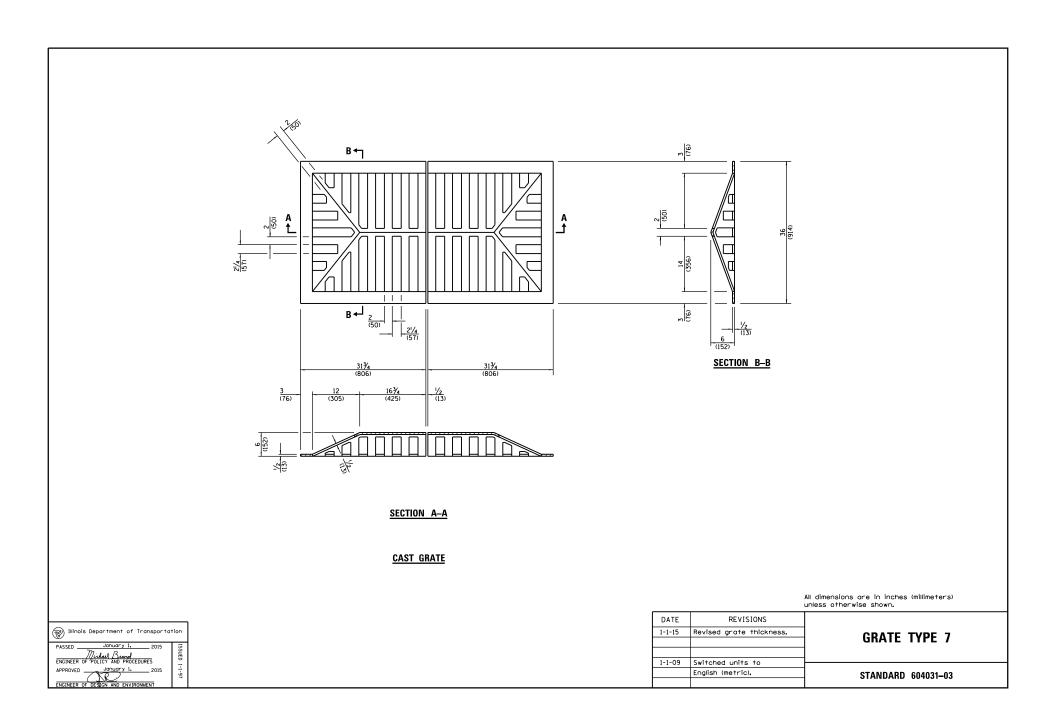


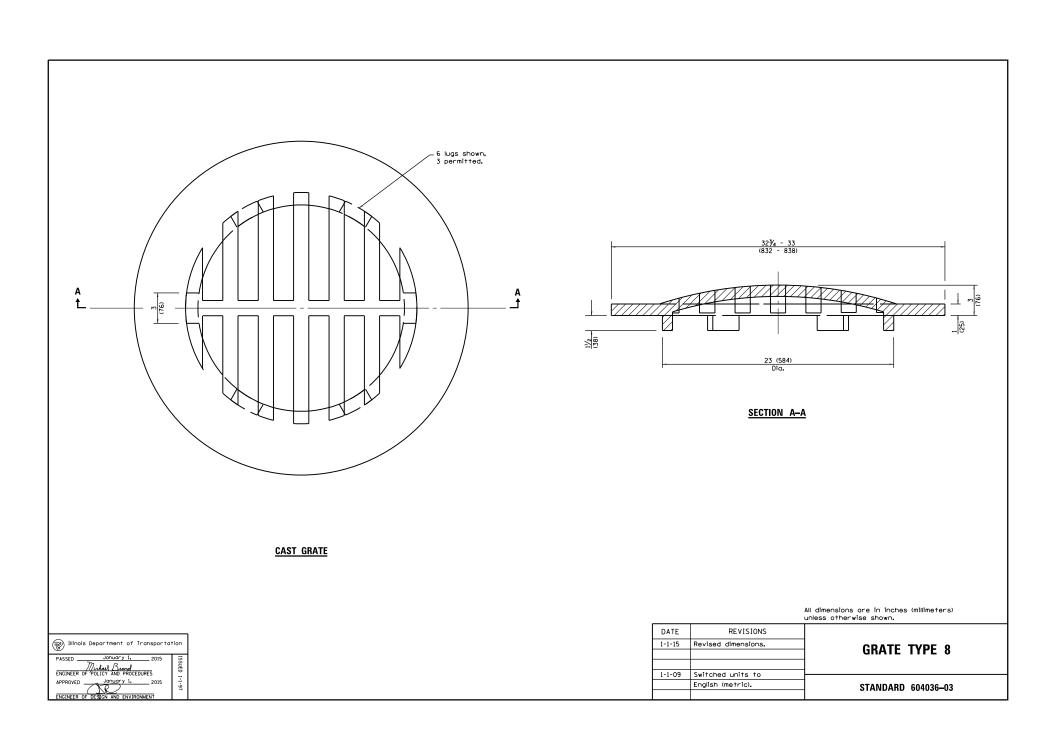


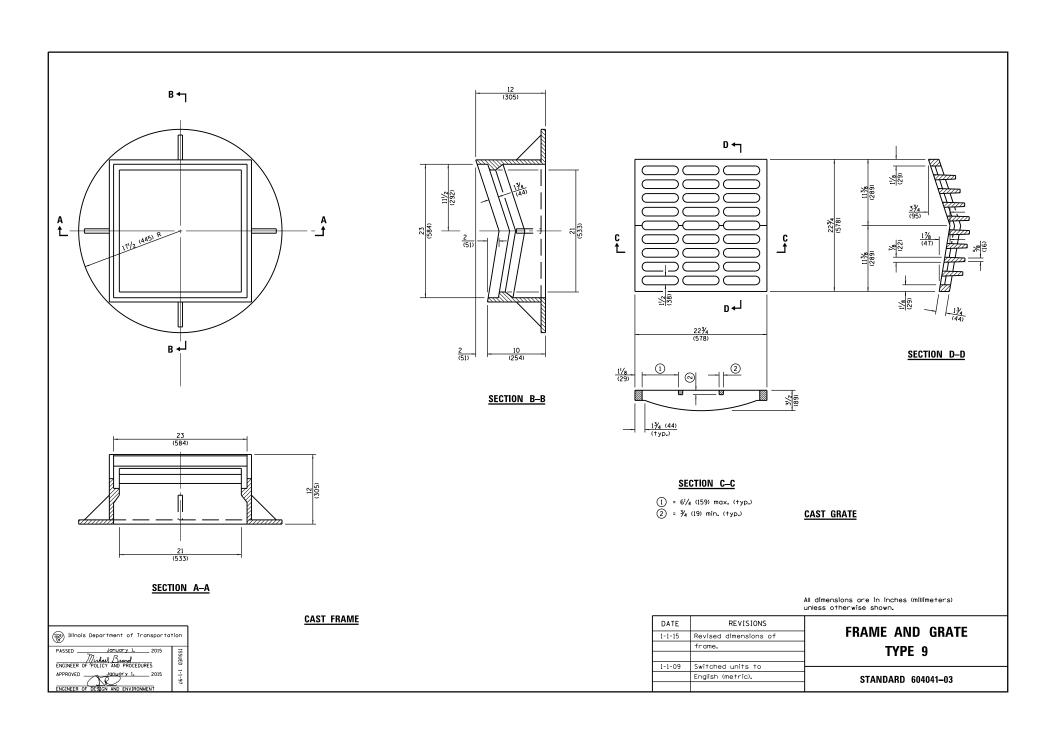


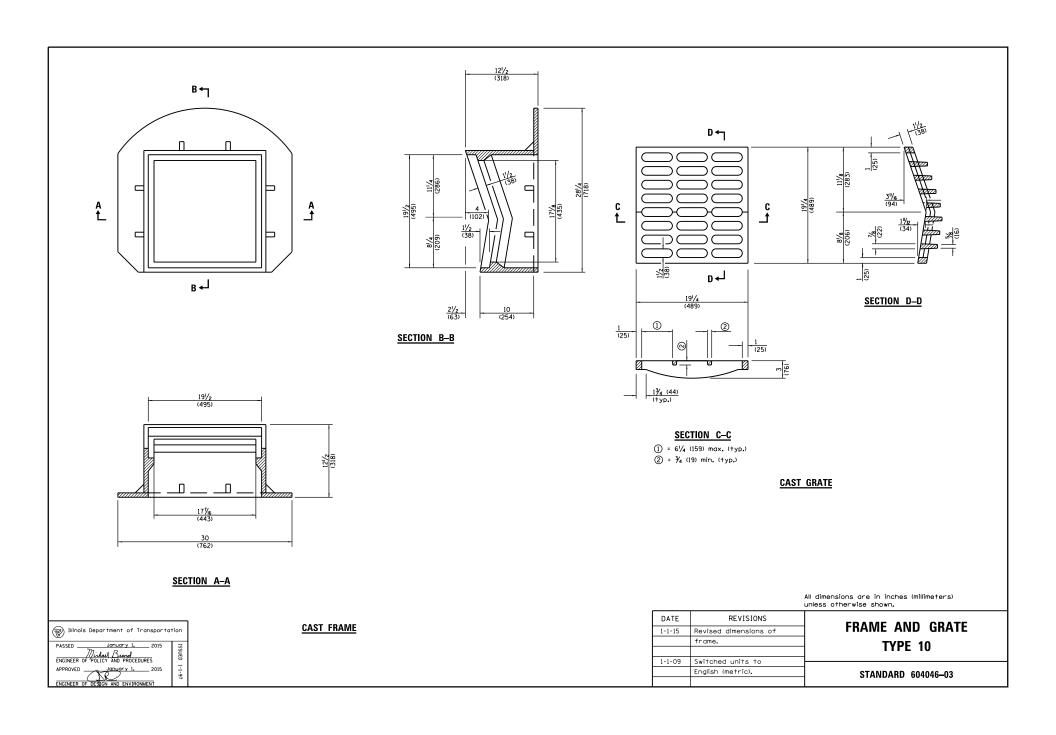


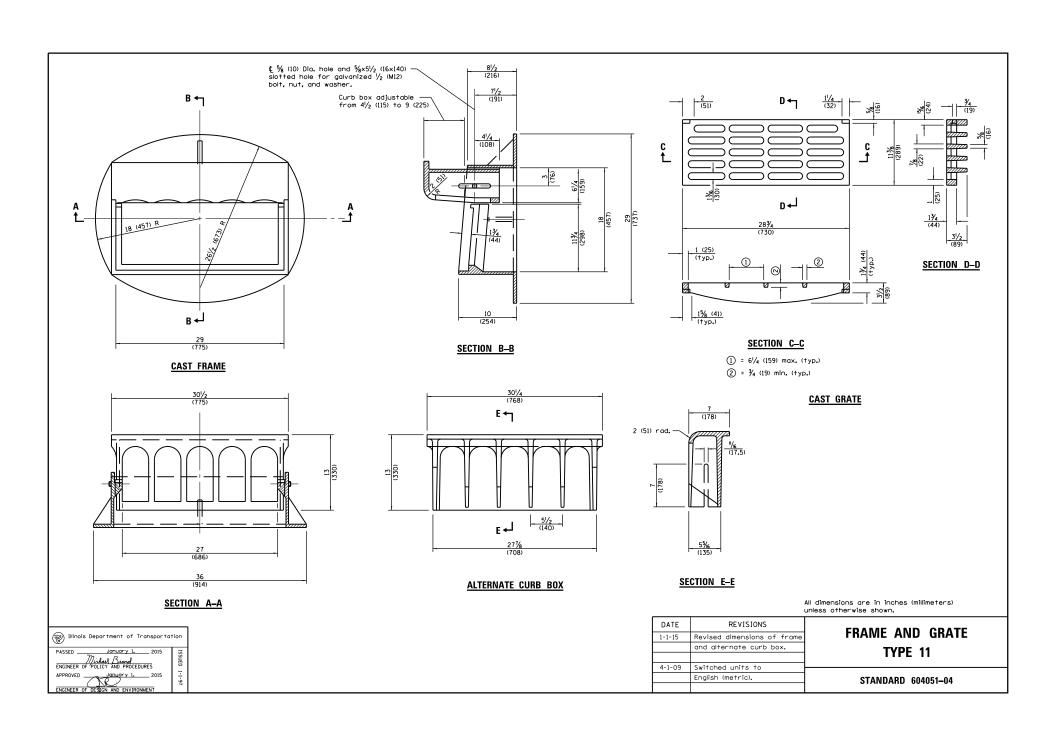


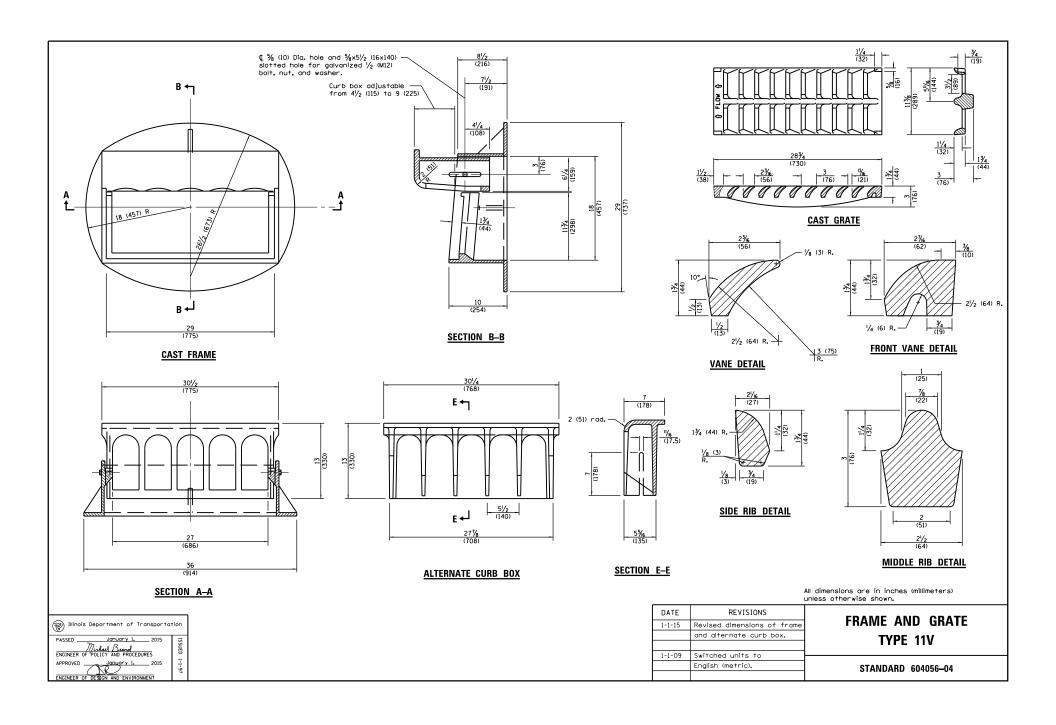


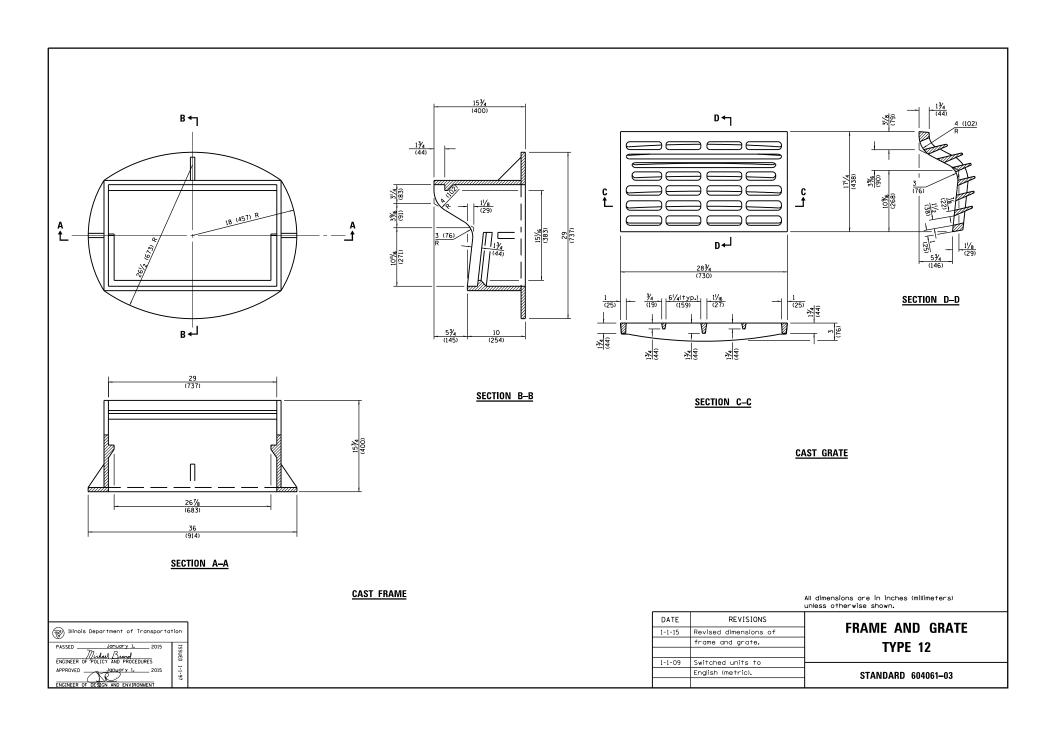


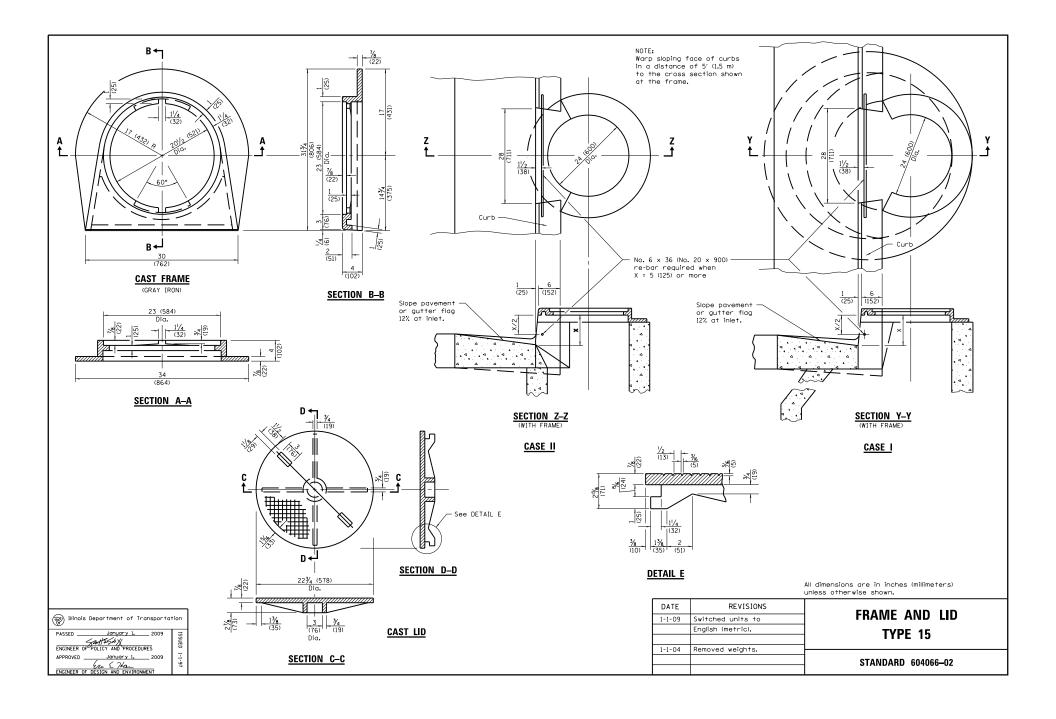


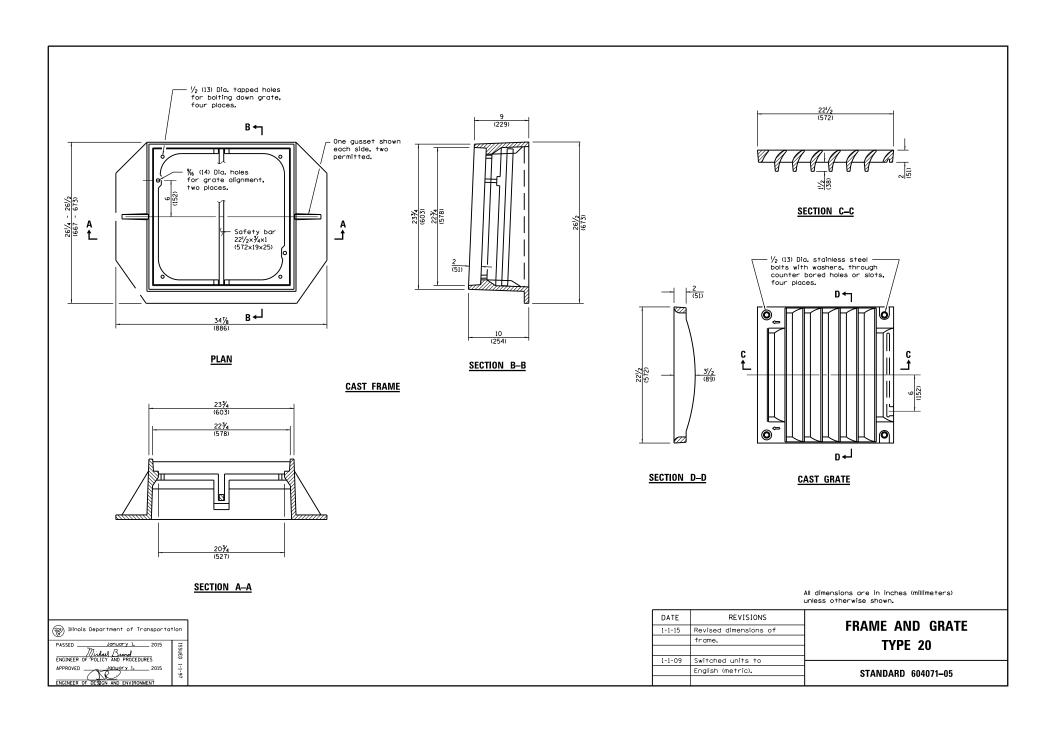


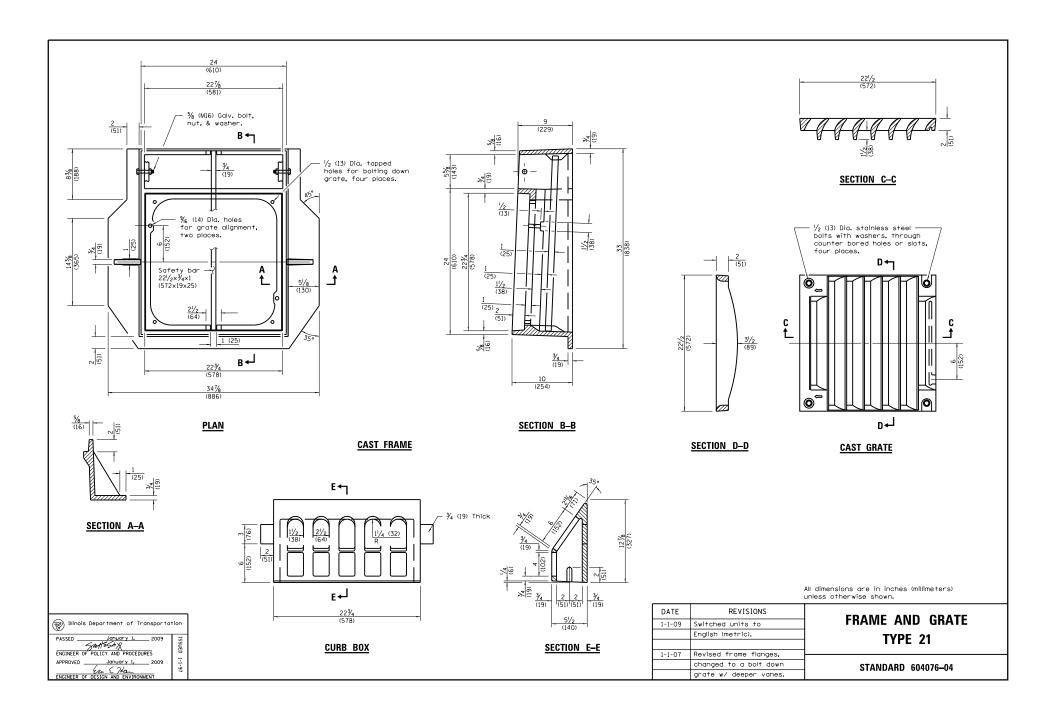


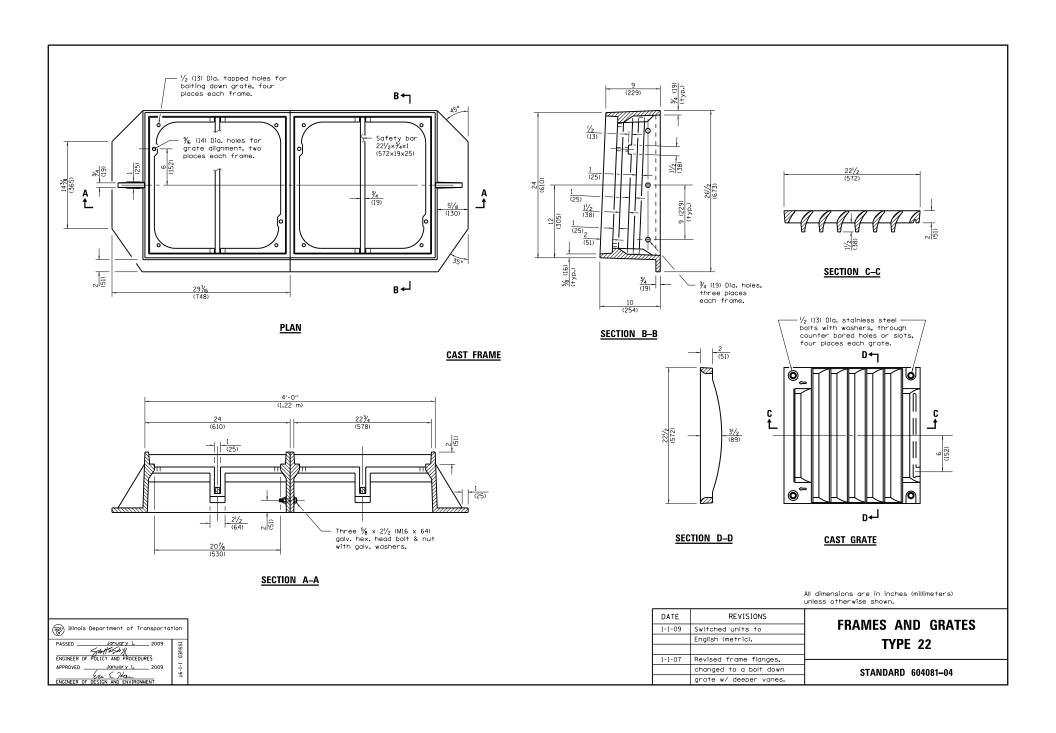


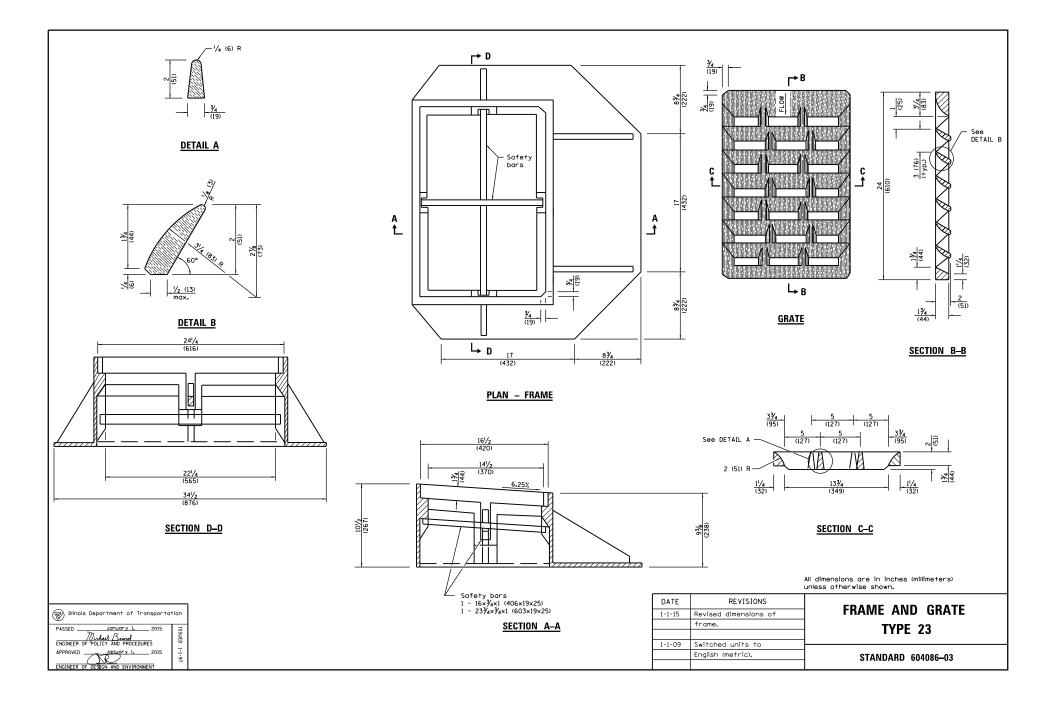


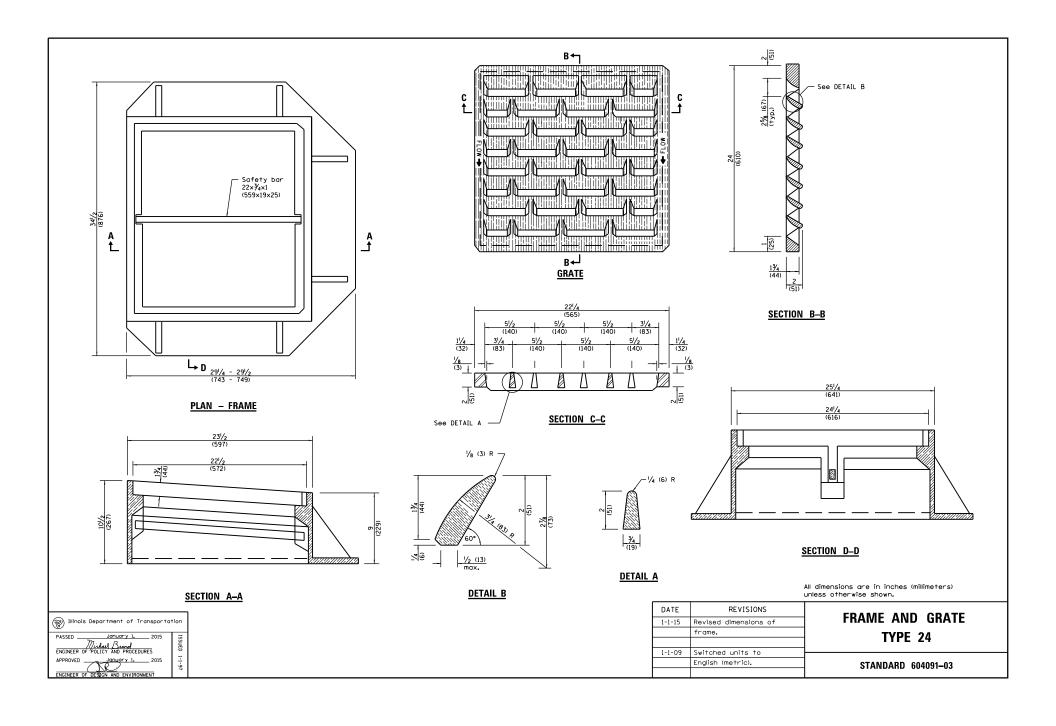


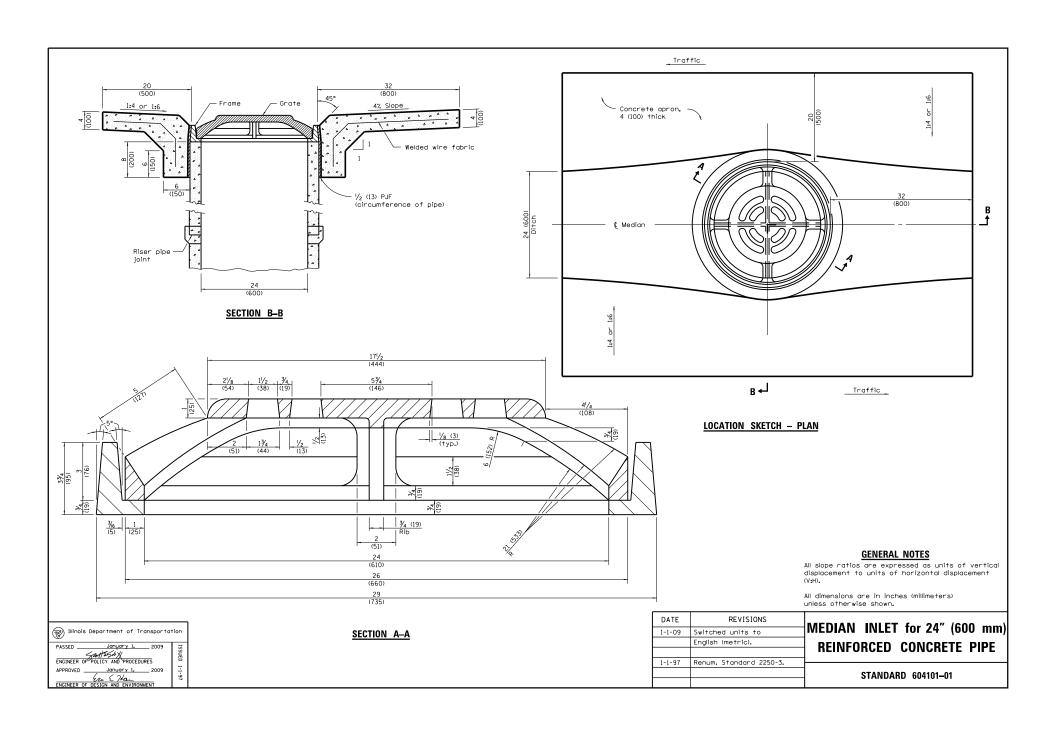


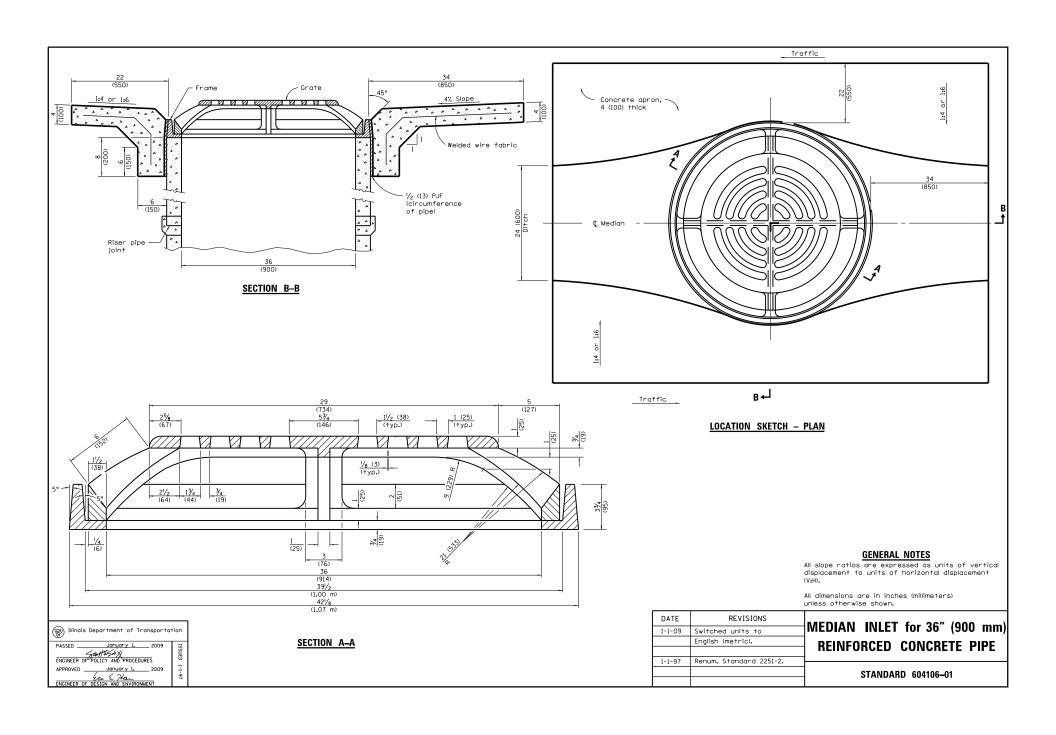


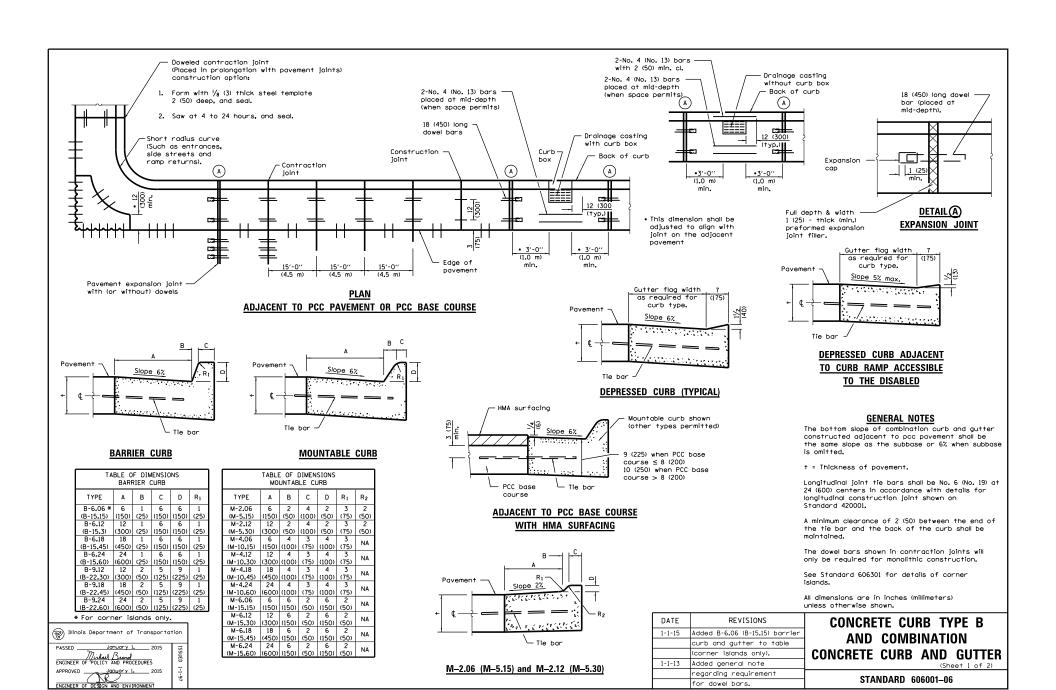


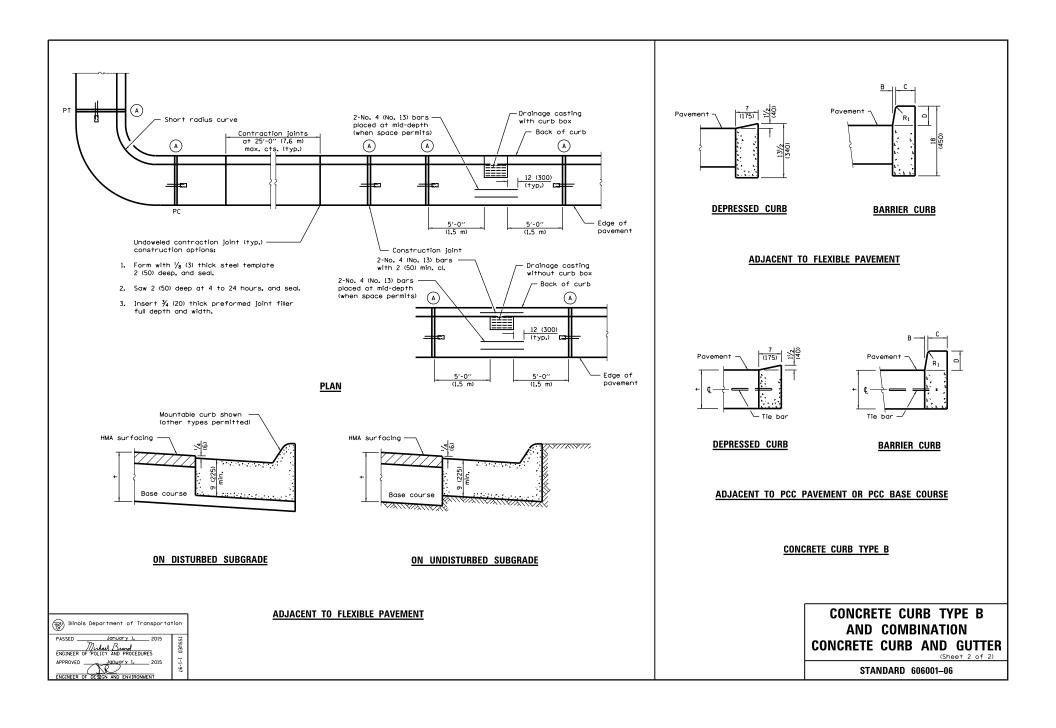


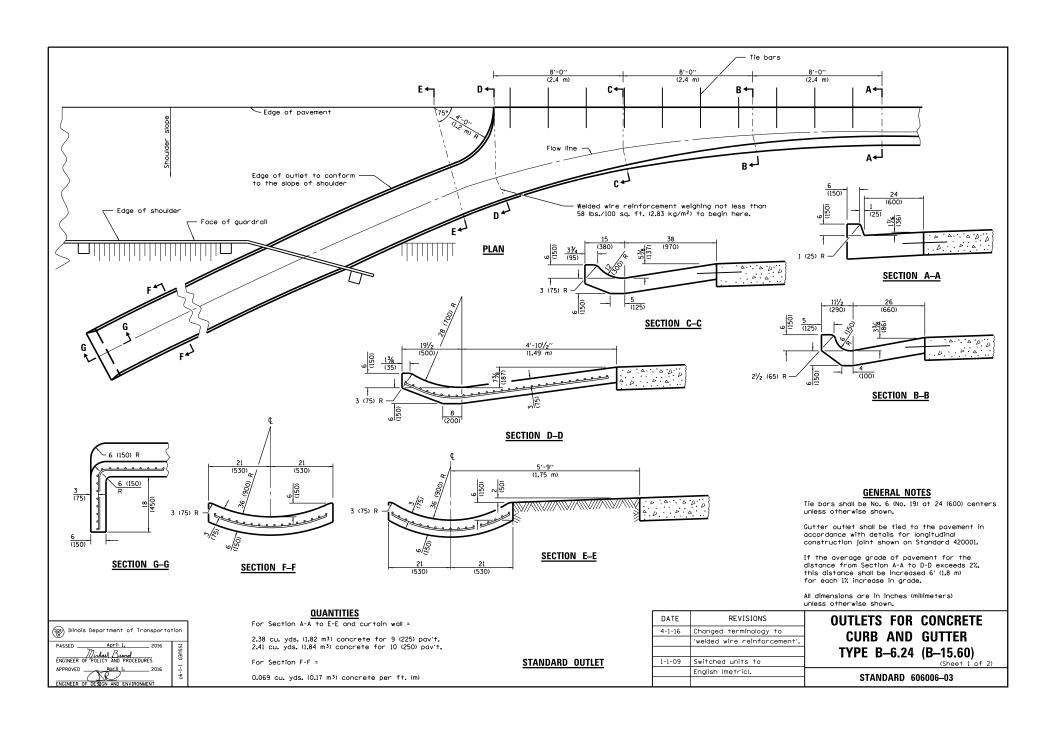


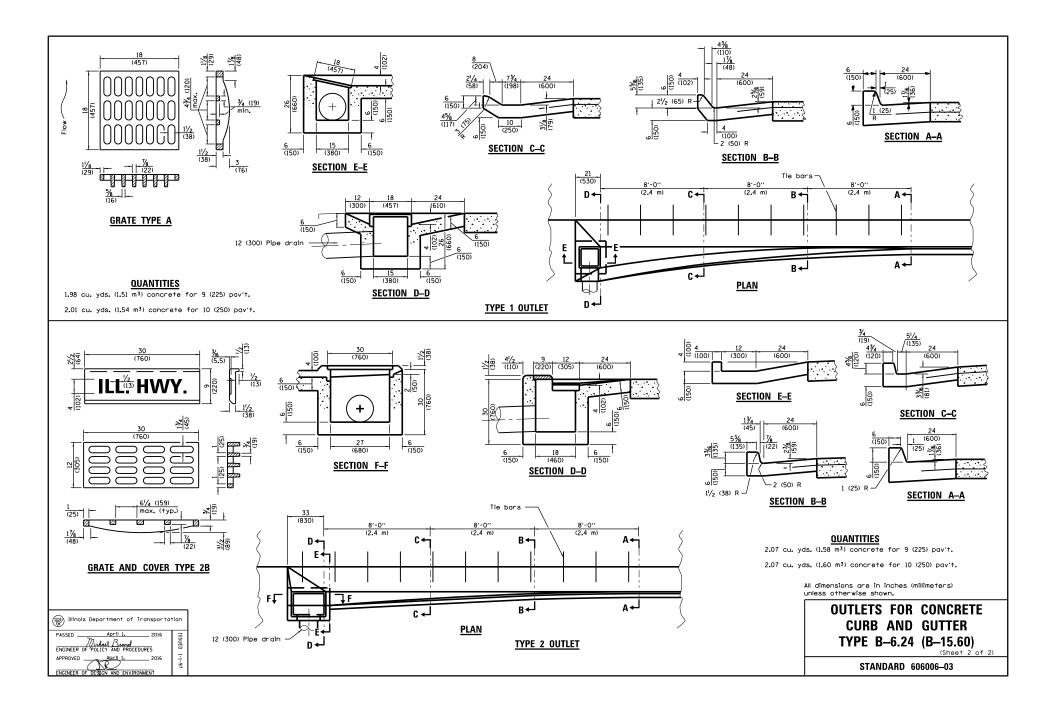


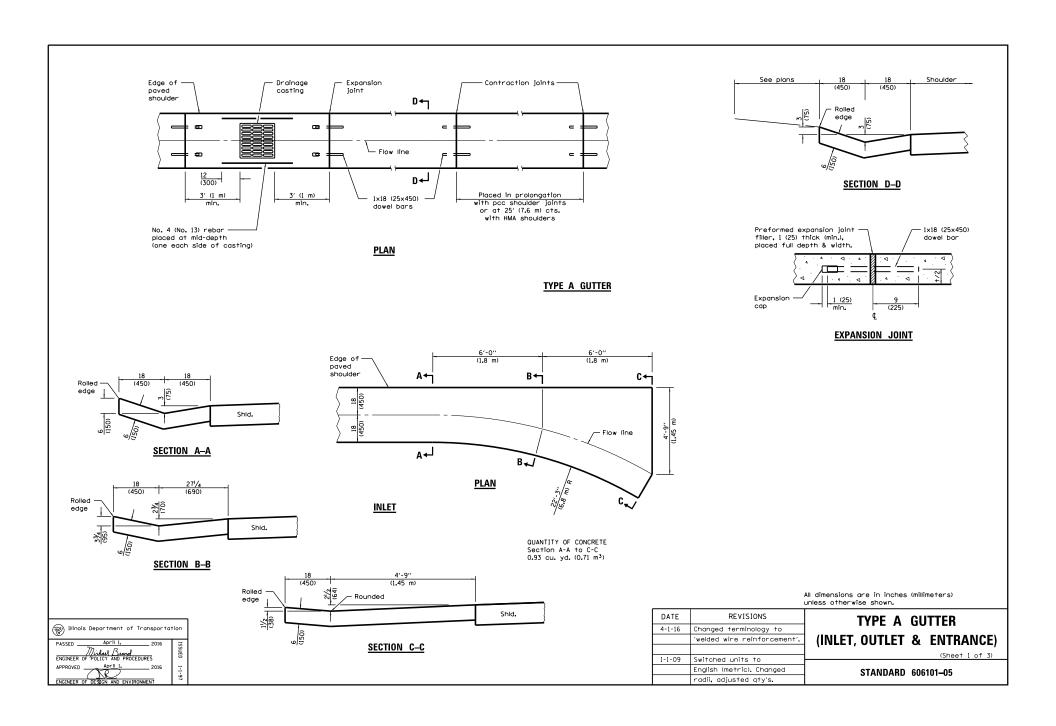


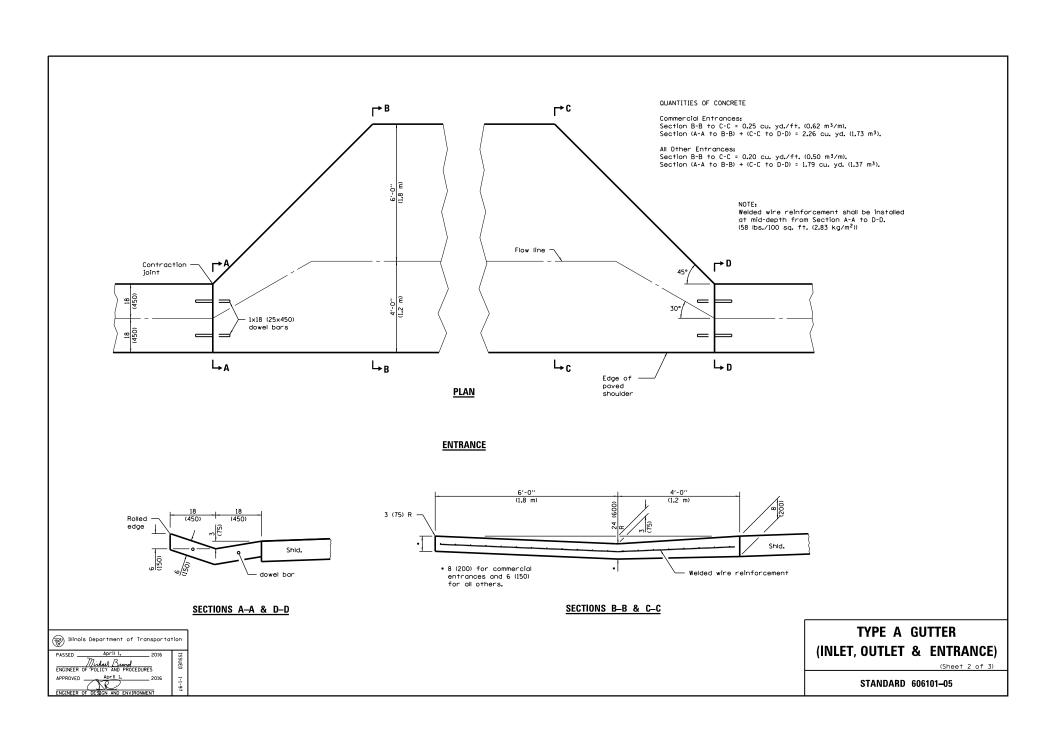


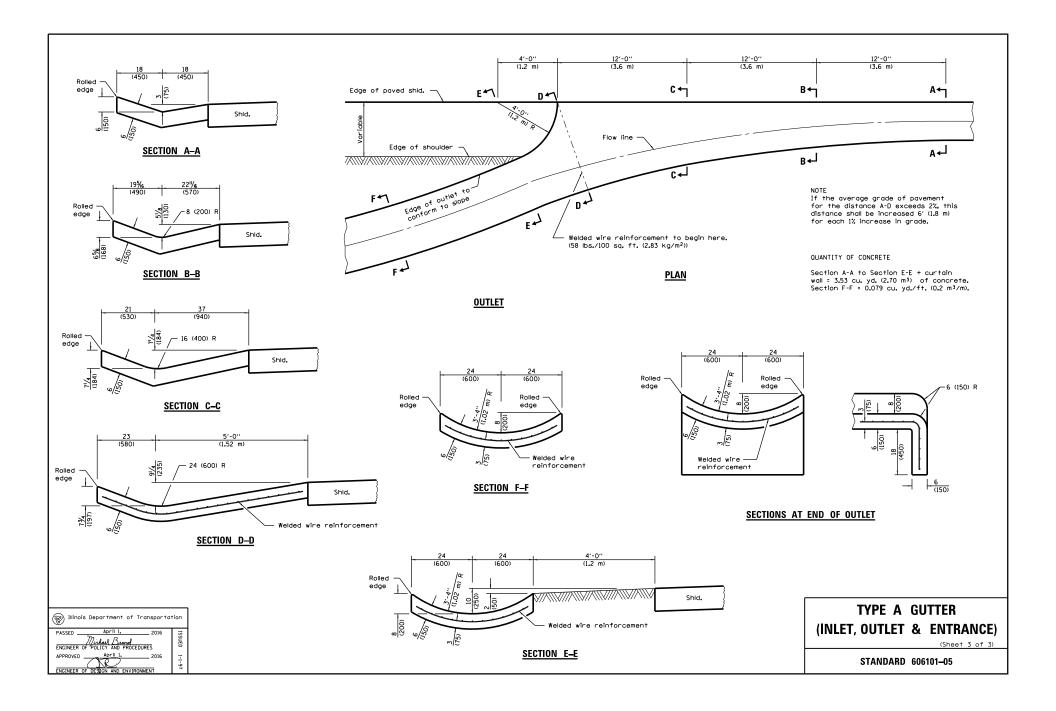


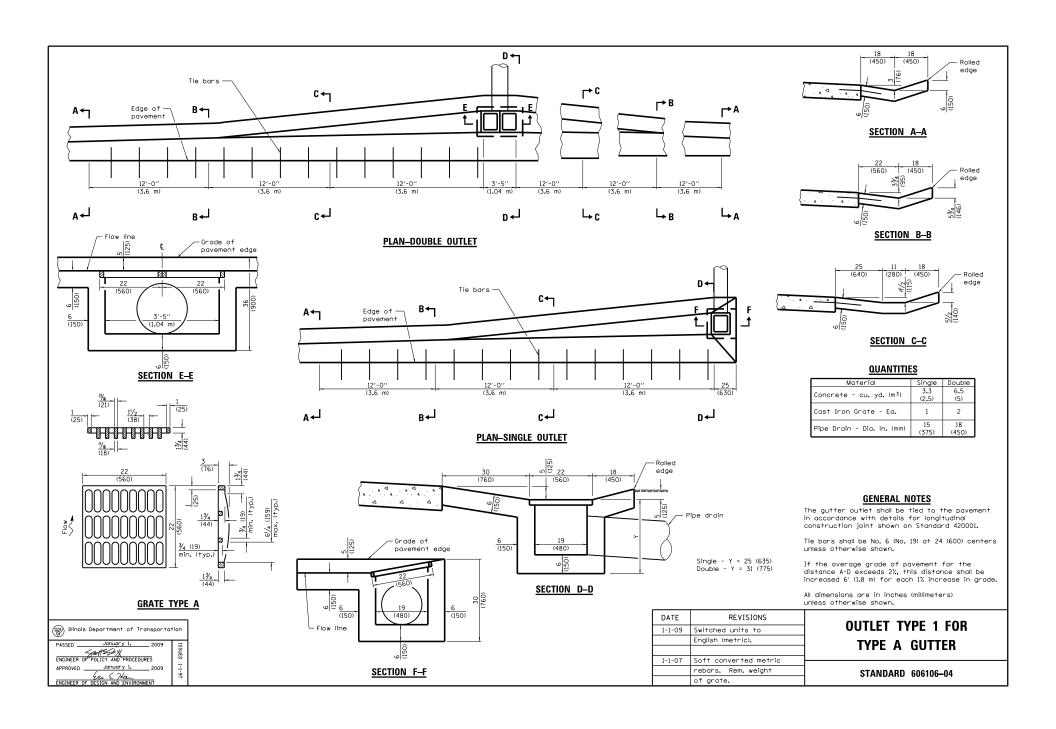


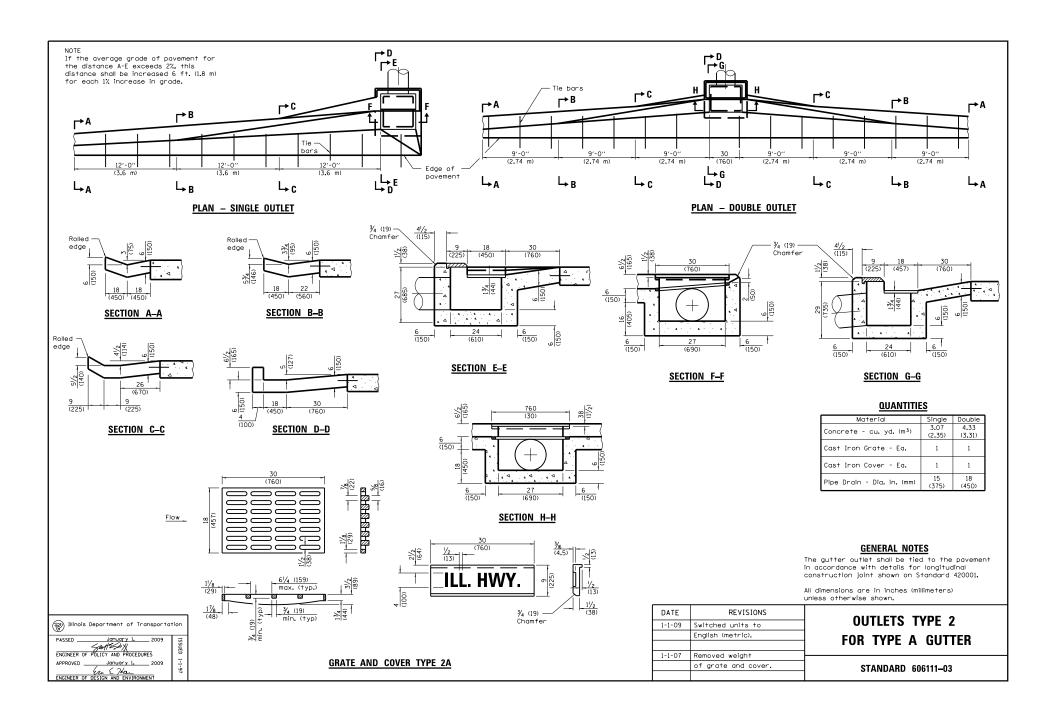


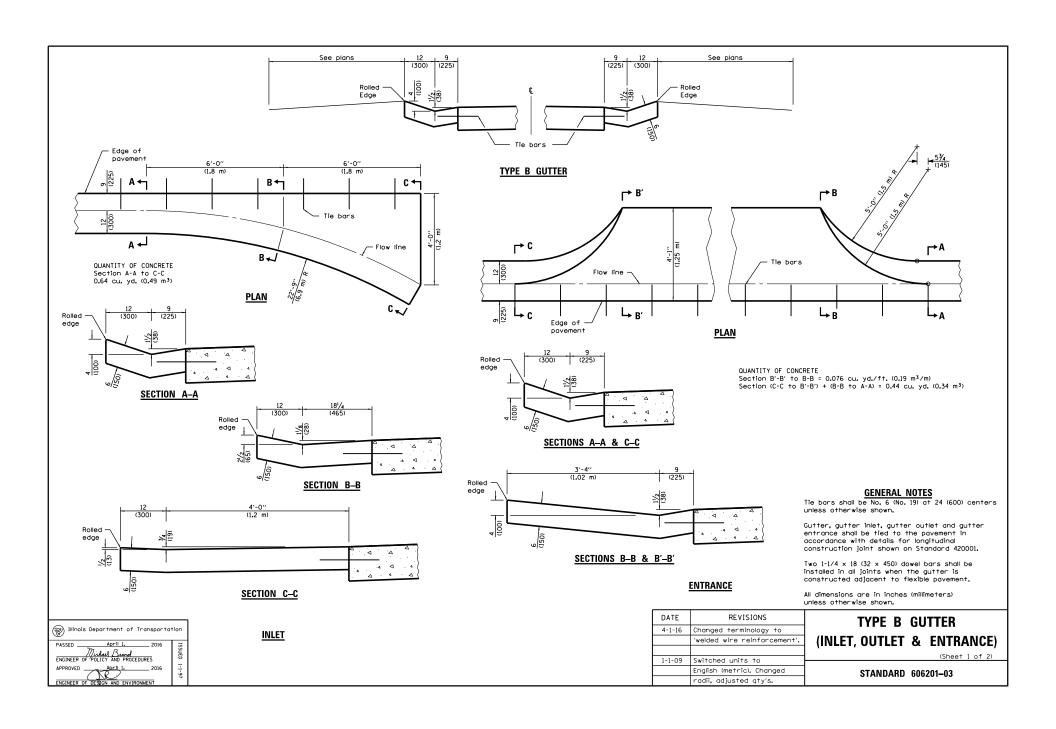


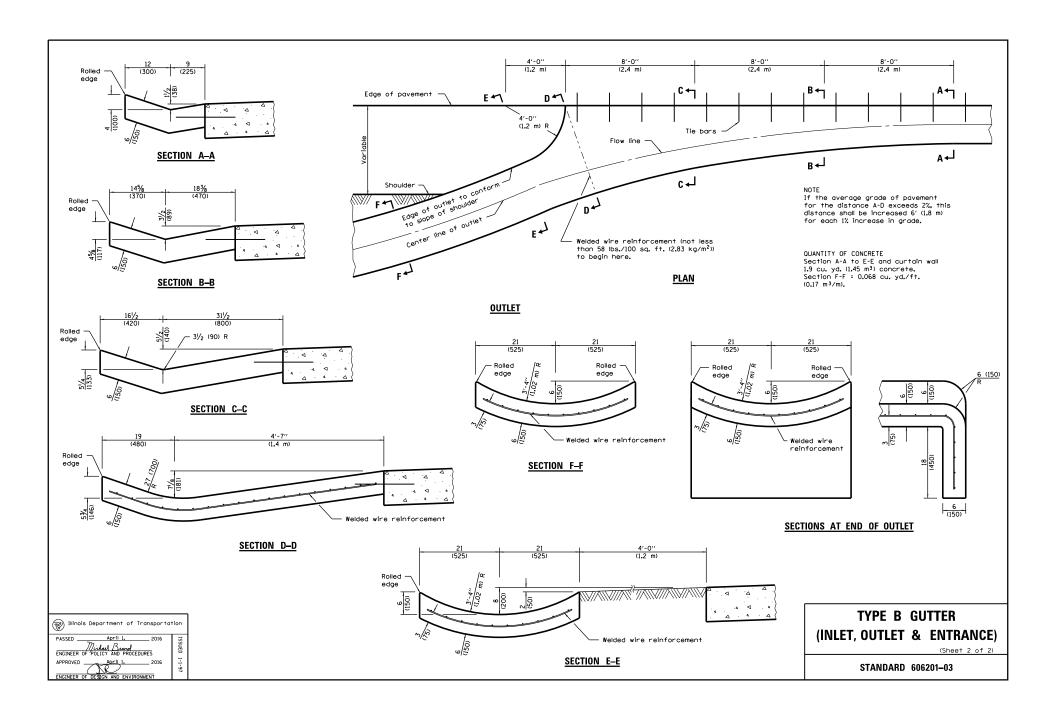


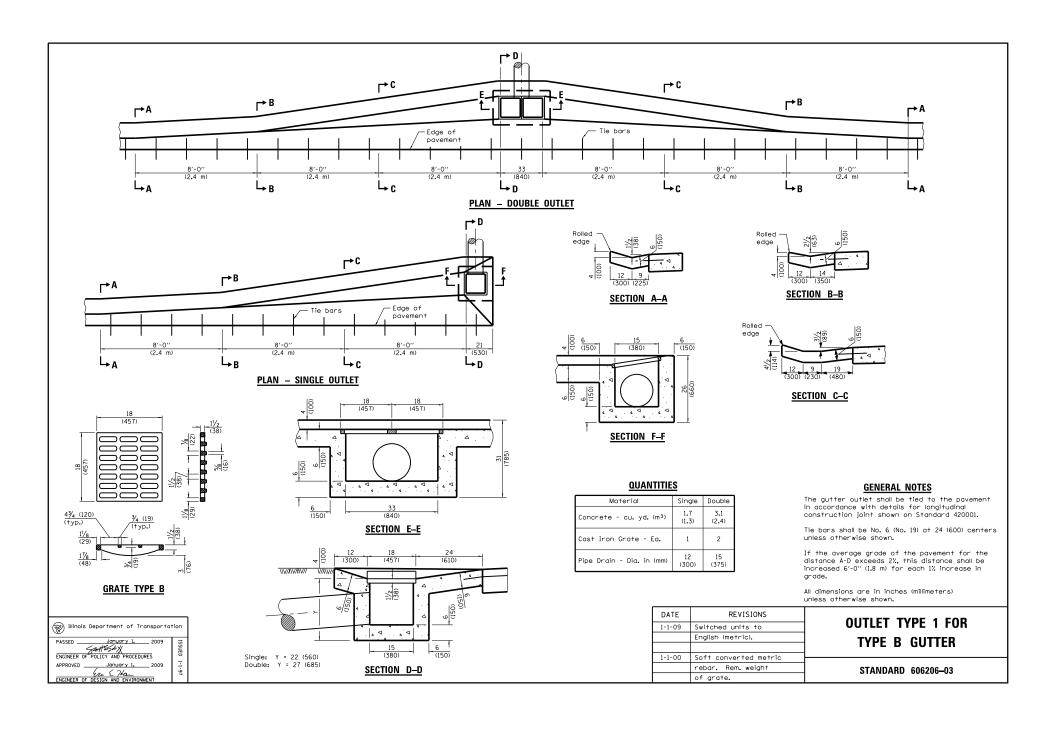


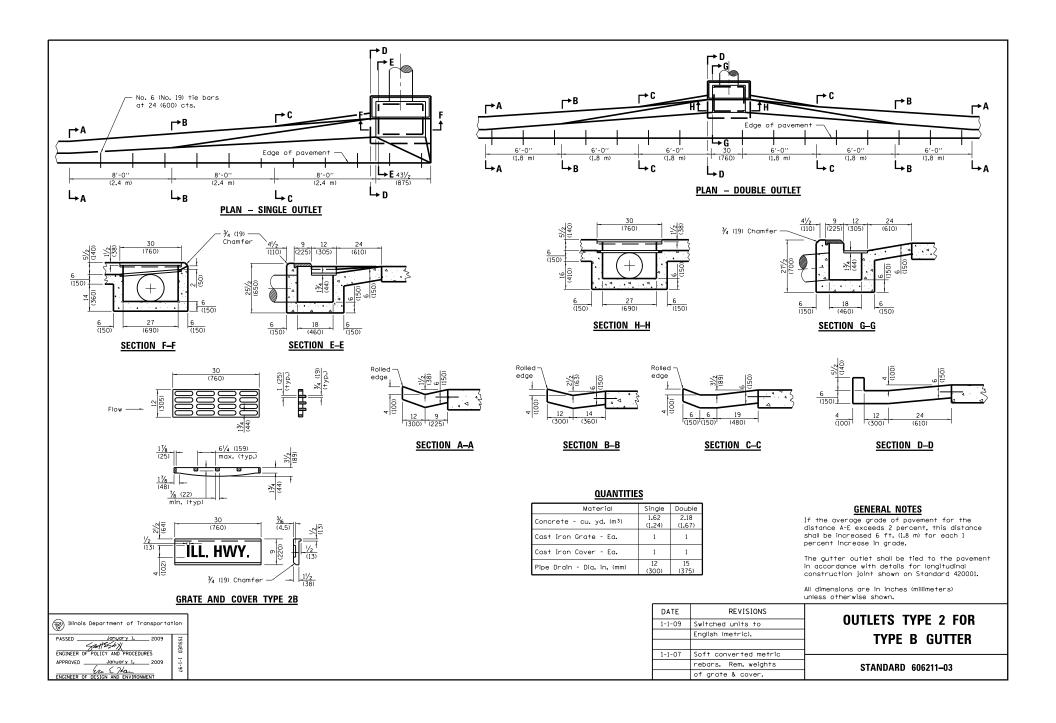


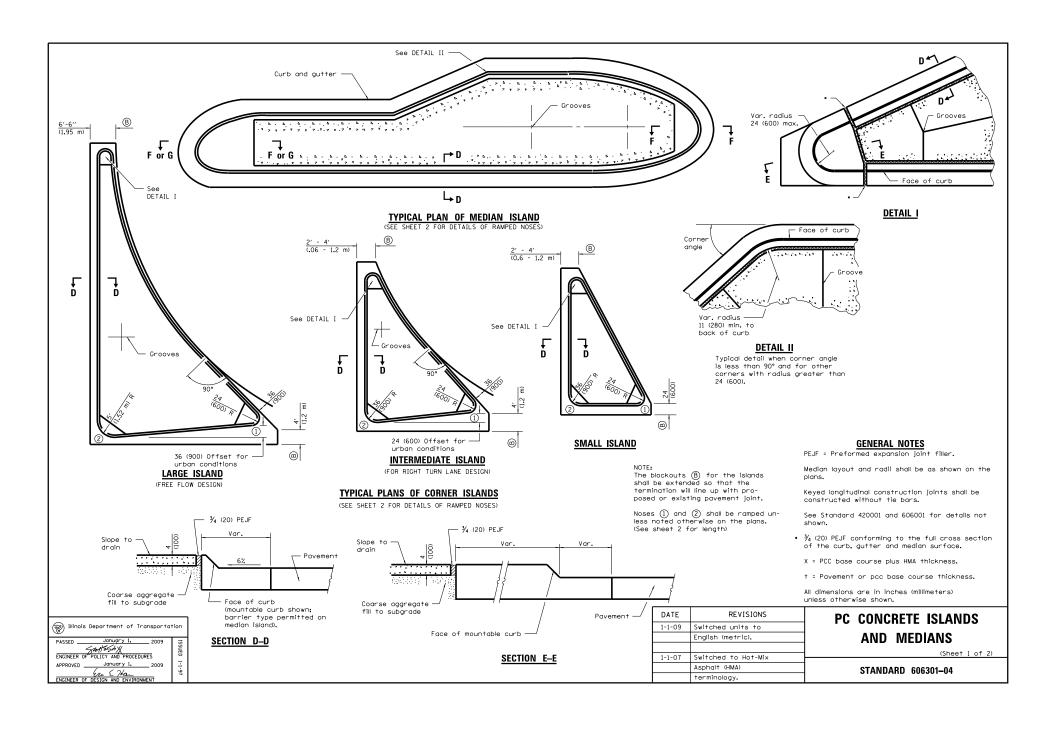


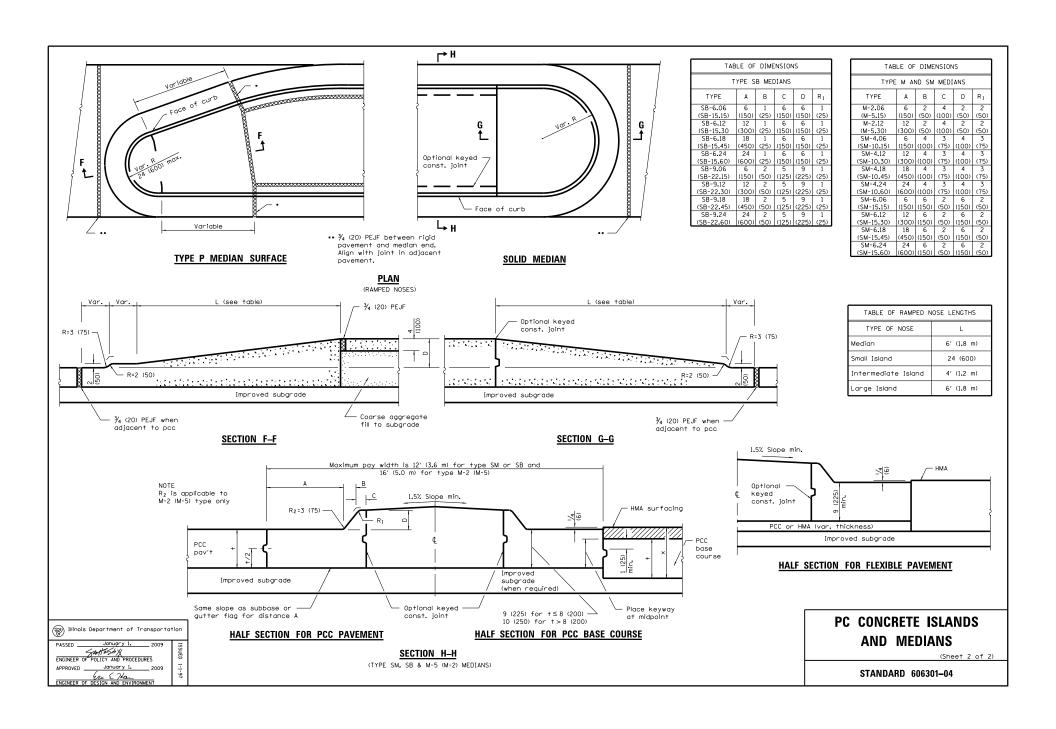


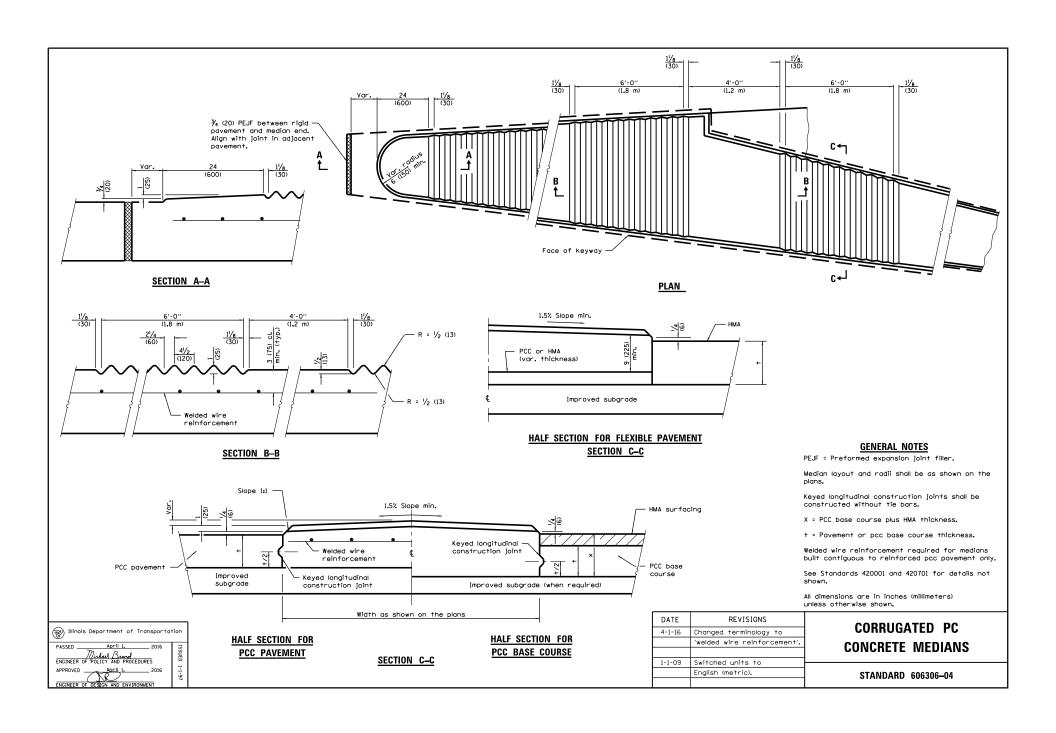


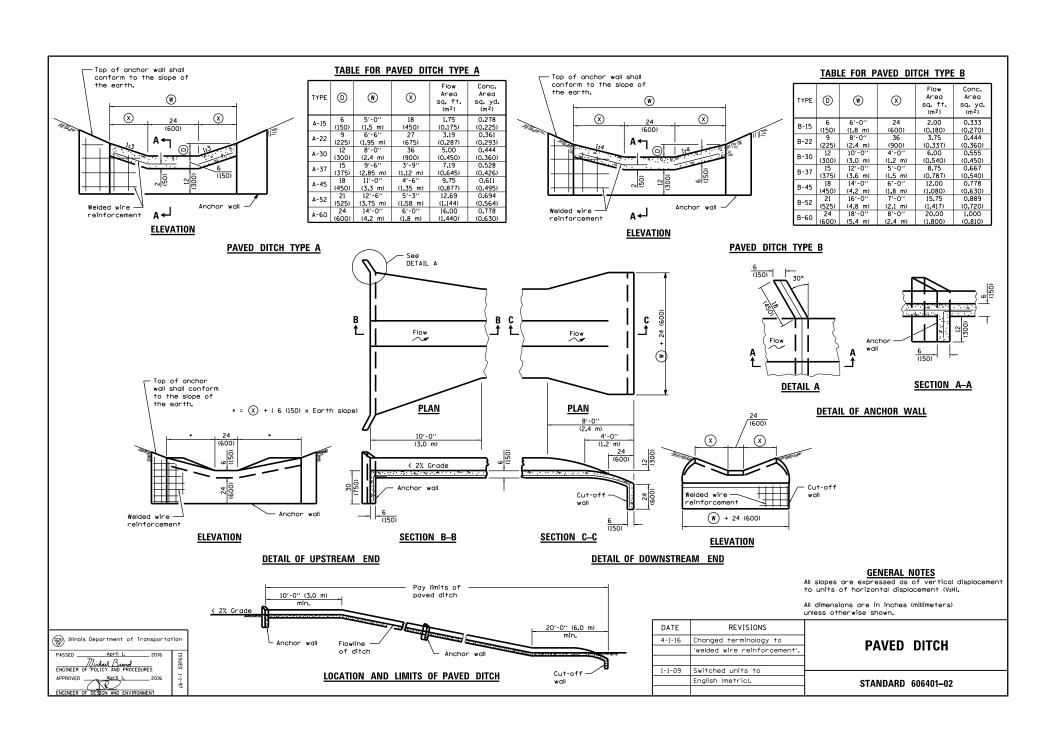


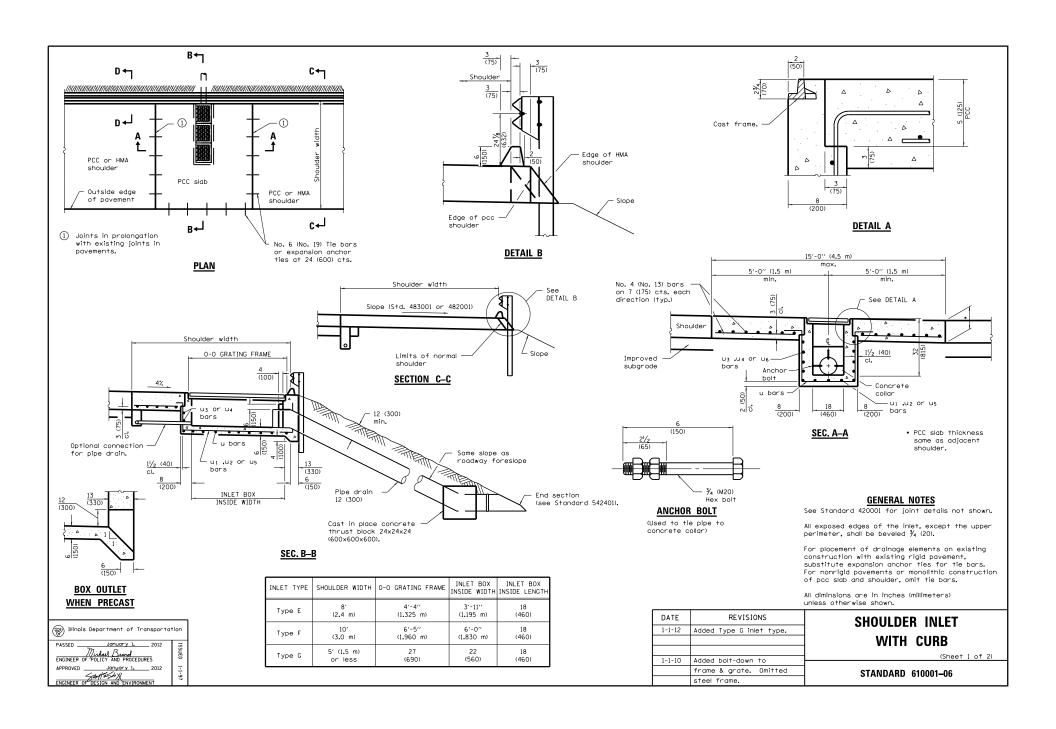


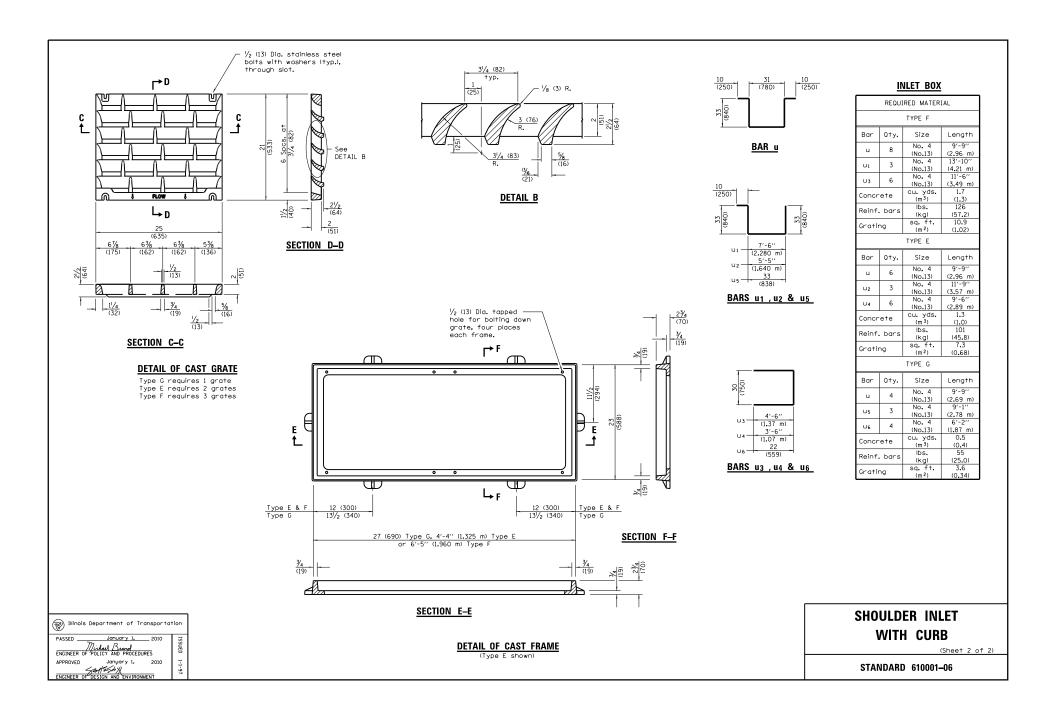


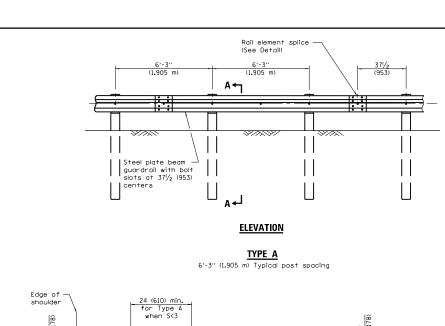


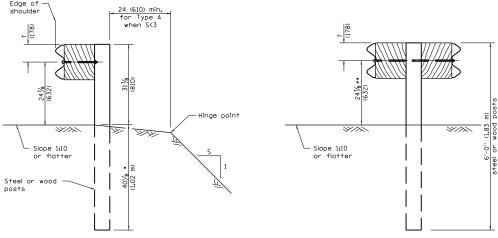










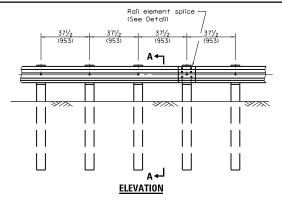


SECTION A-A

 When "S" is less than 3 and the distance from the back of post is less than 24 (610), the post shall be steel and the embedment shall be 76/g (1934).

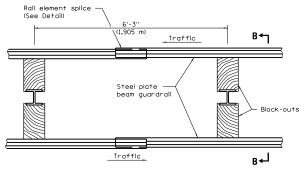
SECTION B-B

•• When connecting Type D guardrail to an impact attenuator, adjust this dimension to 21% (556) over a distance of 25'-0" (7.62 m) from point of connection.



TYPE B

371/2 (953) Closed post spacing



PLAN

TYPE D

Double steel plate beam guardrail 6'-3" (1.905 m) typical post spacing

GENERAL NOTES

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

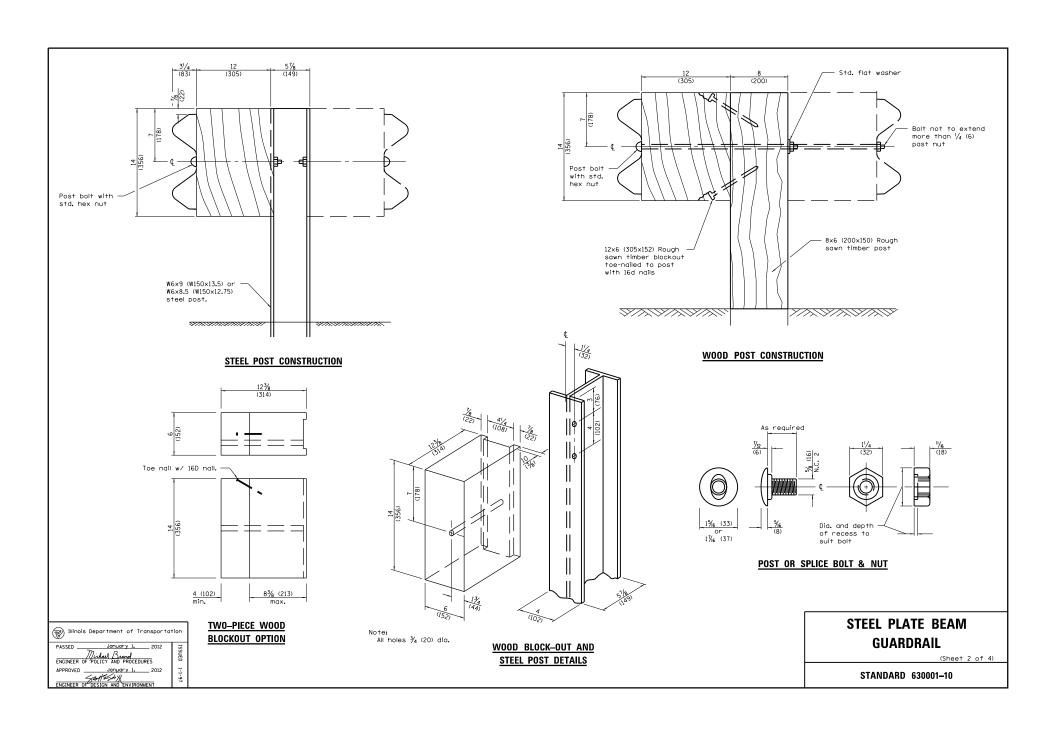
All dimensions are in inches (millimeters) unless otherwise shown.

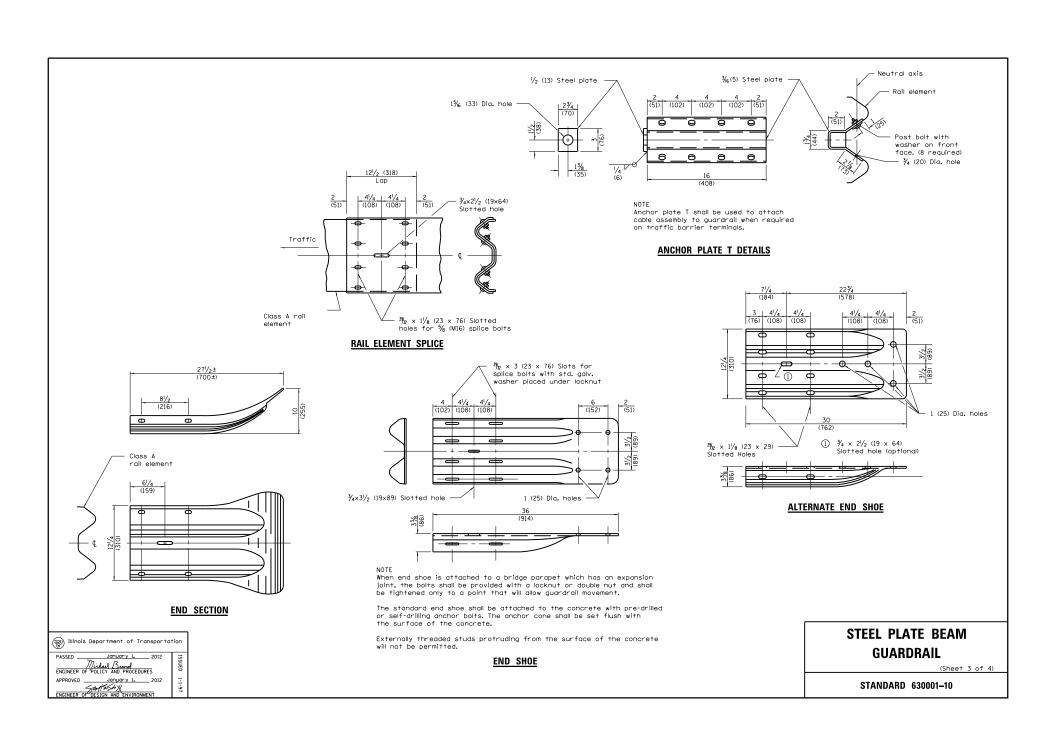
DATE	REVISIONS		
1-1-12	Added req. for 9 ft. posts		
	to be steel. Modified set		
	back of g'rail behind curb.		
1-1-11 Added note to Section B			
	for conn. to impact att.		
	Revised table on Sheet 4.		

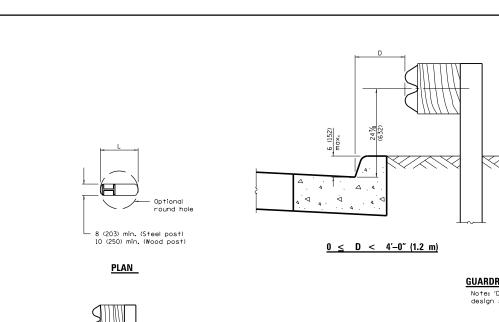
STEEL PLATE BEAM GUARDRAIL

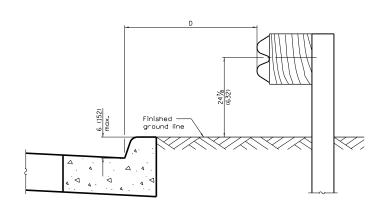
(Sheet 1 of 4)

STANDARD 630001-10





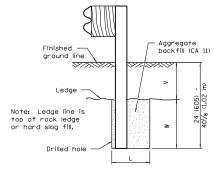




4'-0" (1.2 m) \leq D \leq 12'-0" (3.7 m)

GUARDRAIL PLACED BEHIND CURB

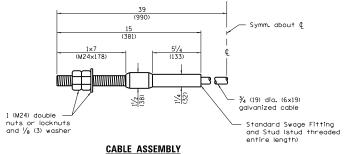
Note: 'D' shall not exceed 6 (152) for design speeds greater than 45 mph.



EI	EV.	۸TI	NN

FOOTING FOR POST WHEN IMPERVIOUS MATERIAL IS ENCOUNTERED

v	w	L		
ľ	w	Steel Post	Wood Post	
0 - 6	24	21	23	
(0 - 152)	(610)	(530)	(580)	
> 6 - 18	18	14½	16½	
(> 152 - 458)	(458)	(368)	(419)	
> 18 - 31	12	8	10	
(> 458 - 787)	(305)	(203)	(250)	
> 31 - 40½	12 - 0	8	10	
(> 787 - 1.02 m)	(305 - 0)	(203)	(250)	



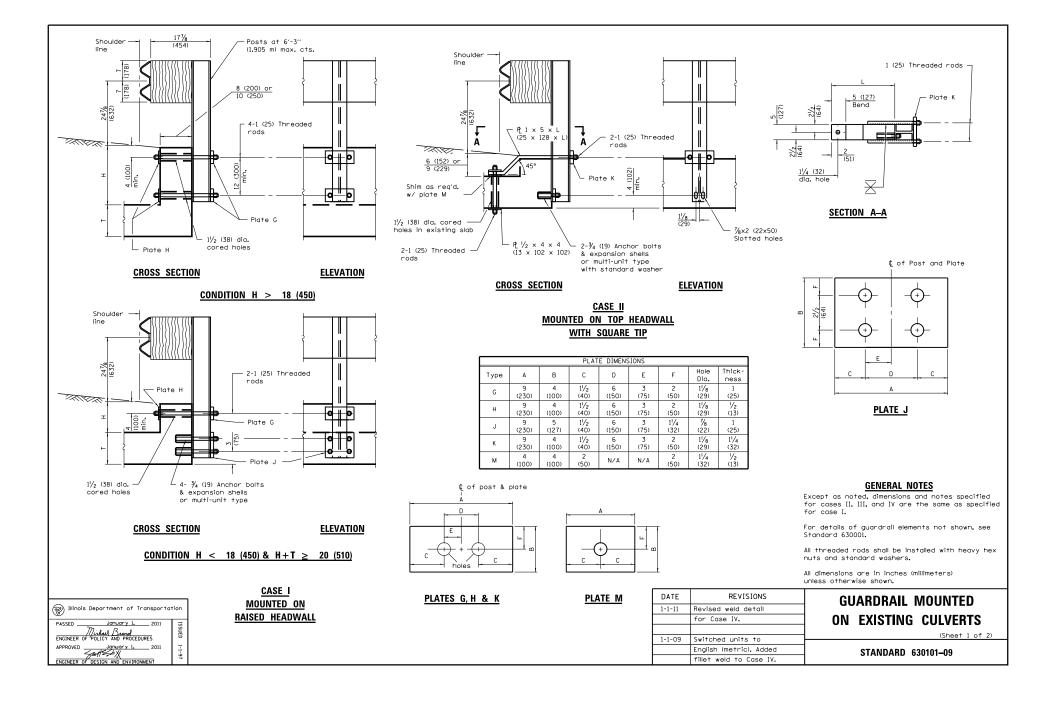
(40,000 lbs. (18,100 kg) min. breaking strength) Tighten to taut tension.

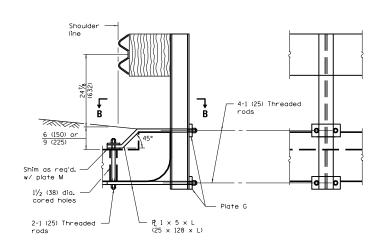
Illinois Department of Transportation January 1. Michael Brand ENGINEER OF POLICY AND PROCEDURES APPROVED January I. 2 Satt Shill ENGINEER OF DESIGN AND ENVIRONMENT

STEEL PLATE BEAM **GUARDRAIL**

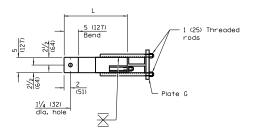
(Sheet 4 of 4)

STANDARD 630001-10





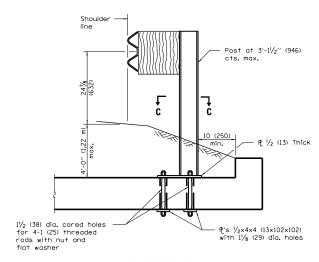
CROSS SECTION ELEVATION



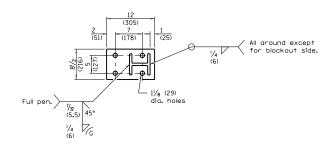
SECTION B-B

CASE III

MOUNTED ON HEADWALL
WITH CURVED OR DEMOLISHED TIP



CROSS SECTION



SECTION C-C

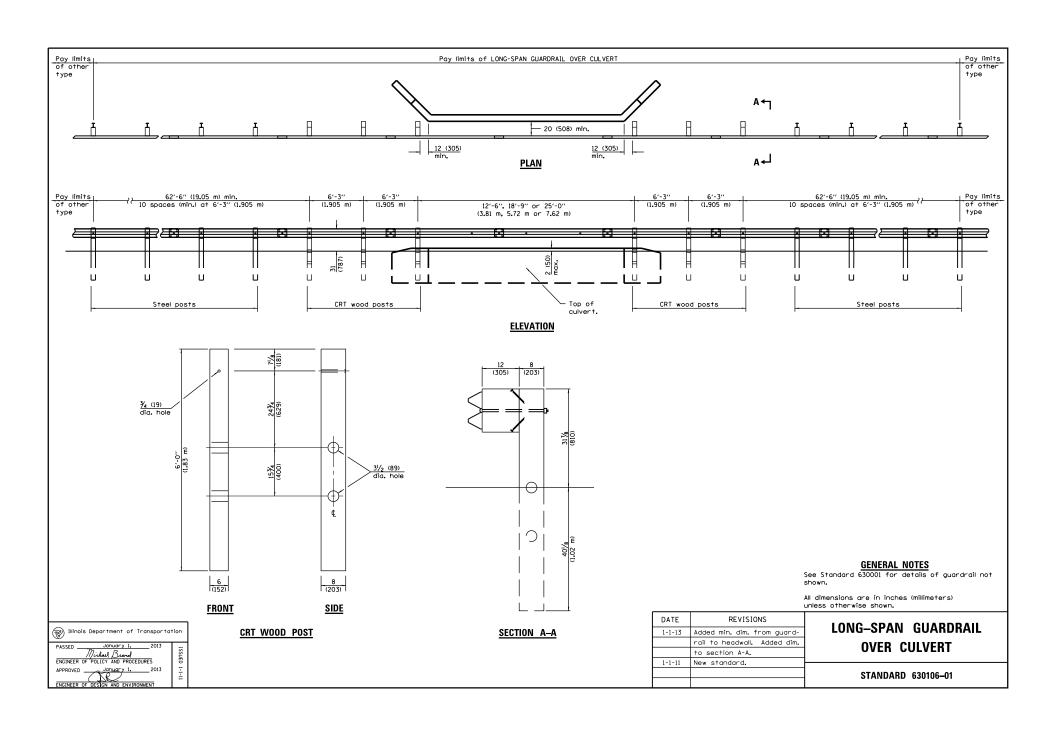
CASE IV MOUNTED ON SLAB

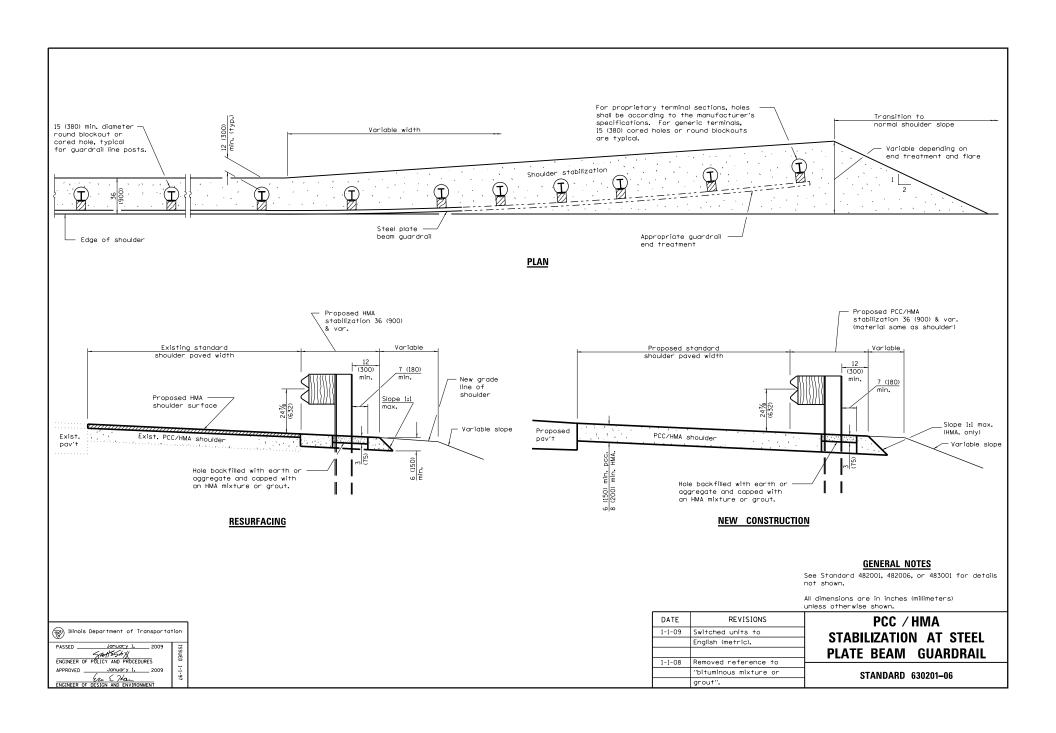
GUARDRAIL MOUNTED ON EXISTING CULVERTS

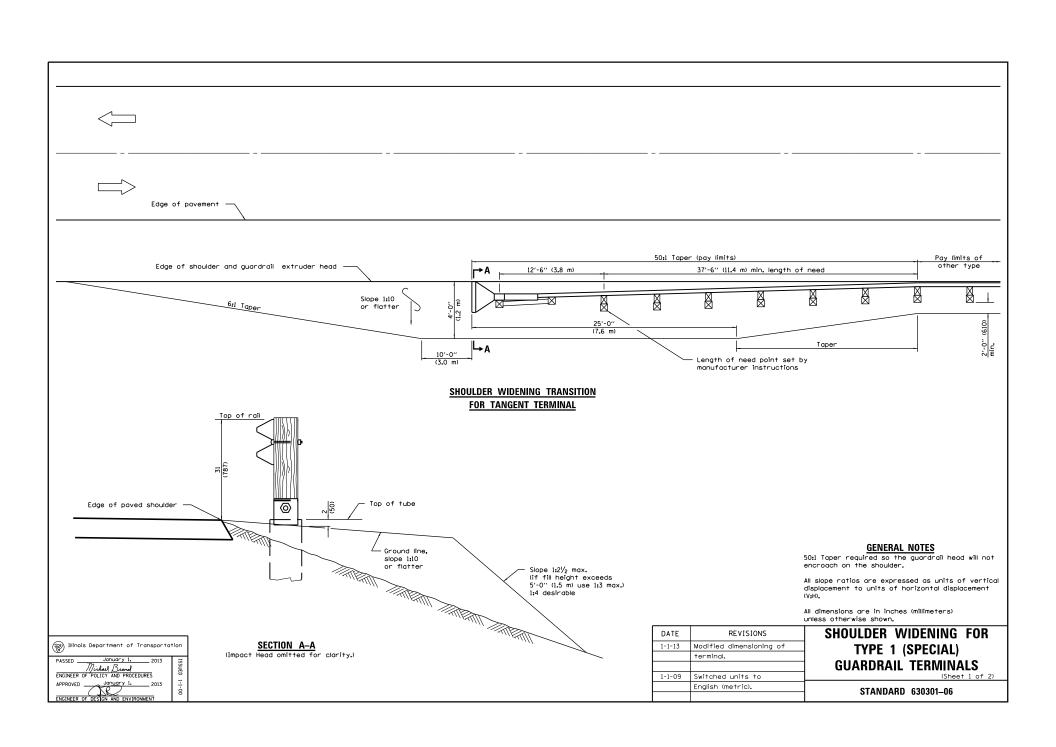
(Sheet 2 of 2

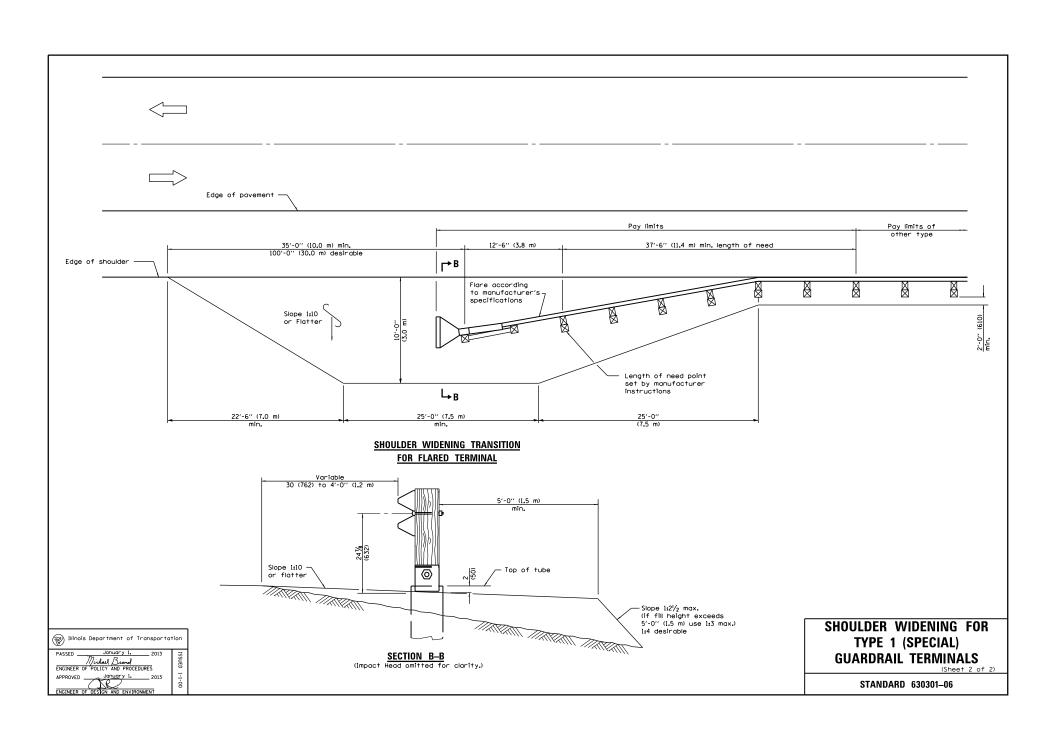
STANDARD 630101-09

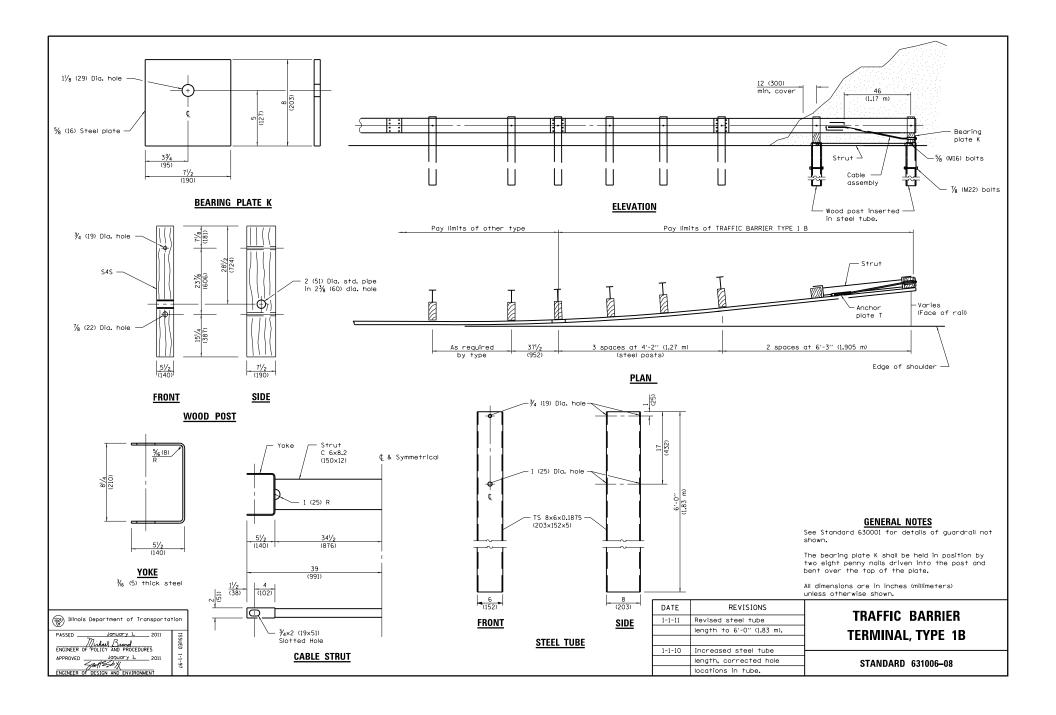


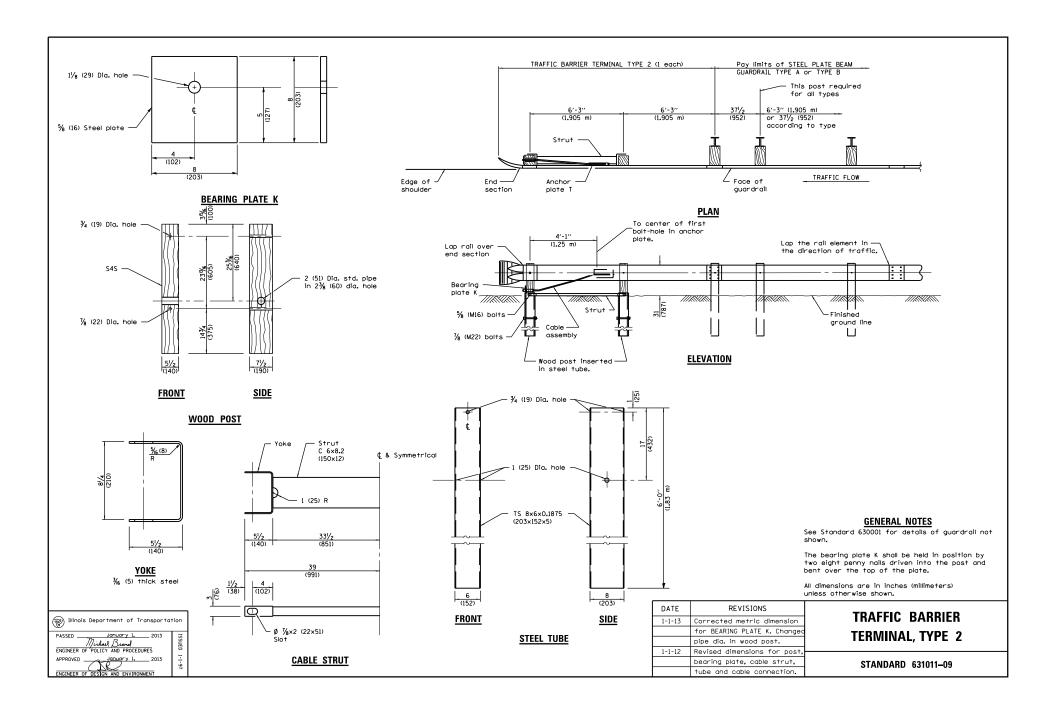


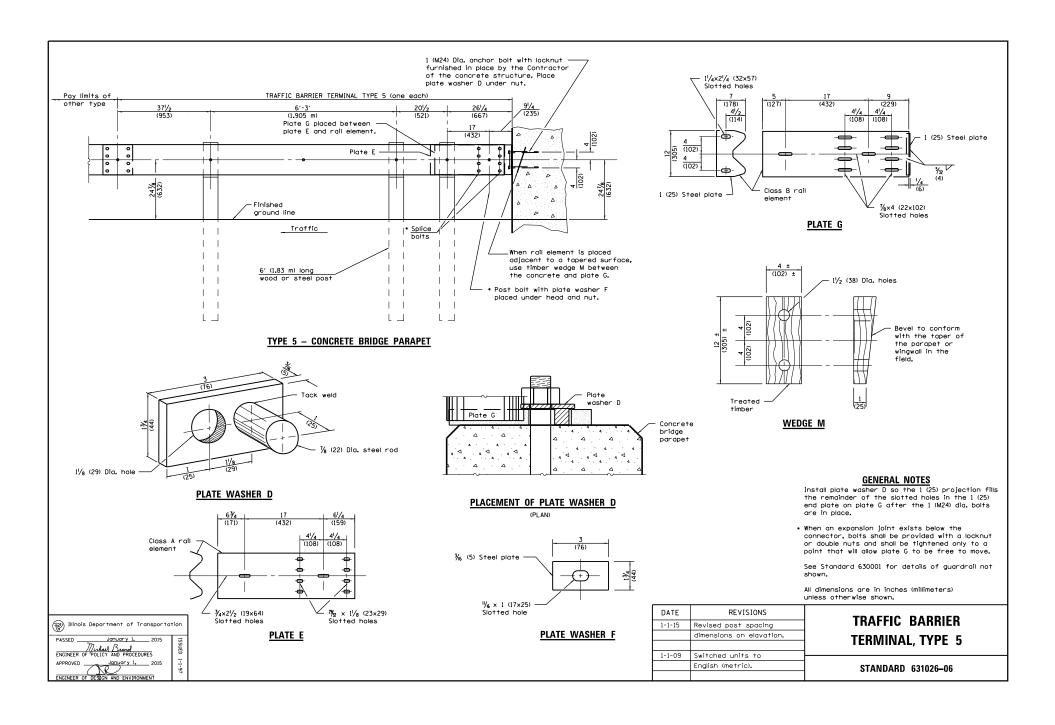


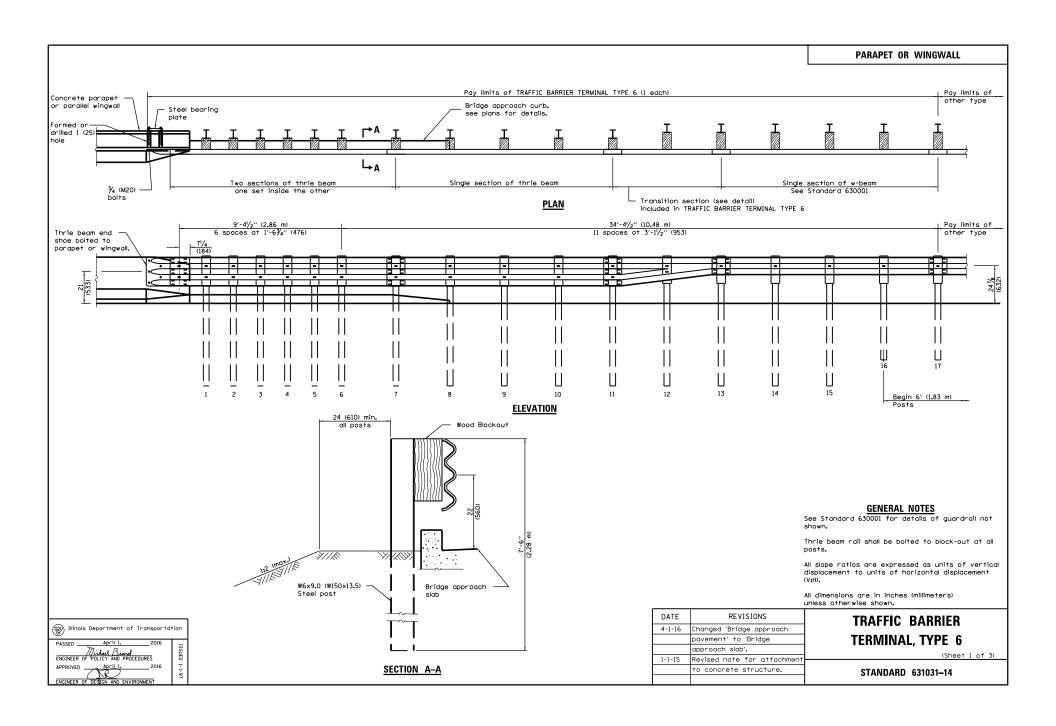


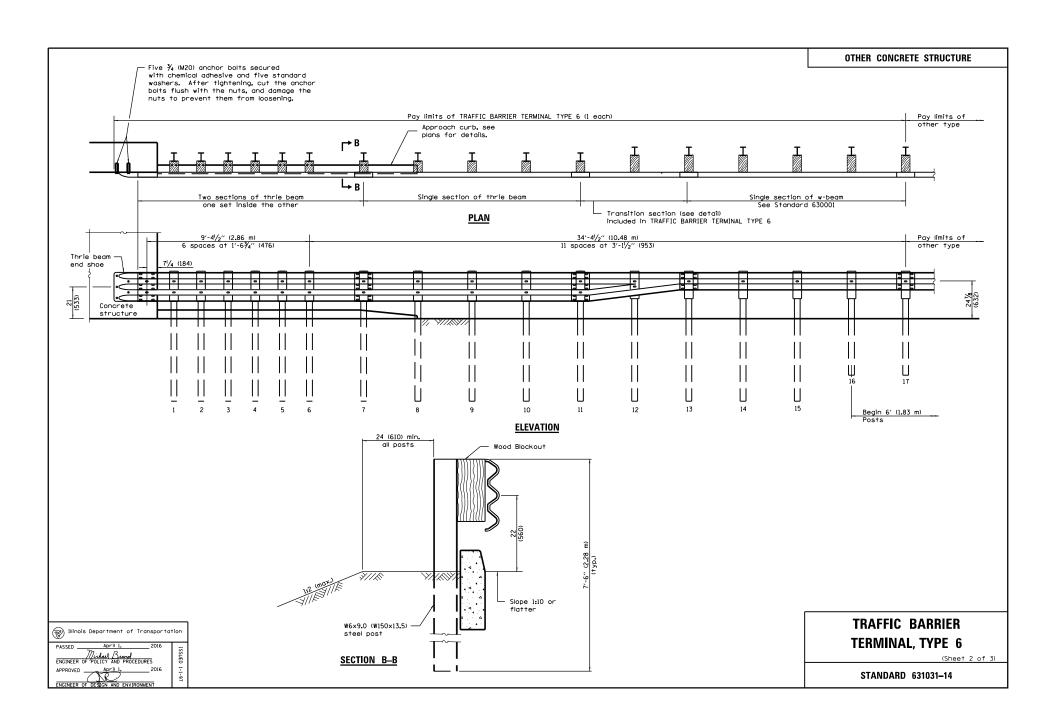


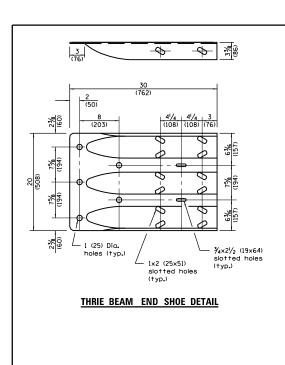


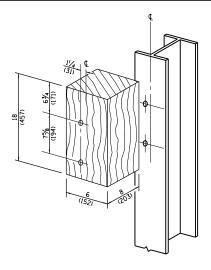






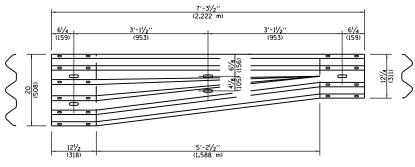




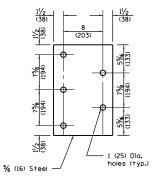


POSTS 1-11 WOOD BLOCKOUT DETAIL

(See Standard 630001 for post 13-17 blockouts.)







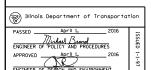
PARAPET STEEL BEARING PLATE DETAIL

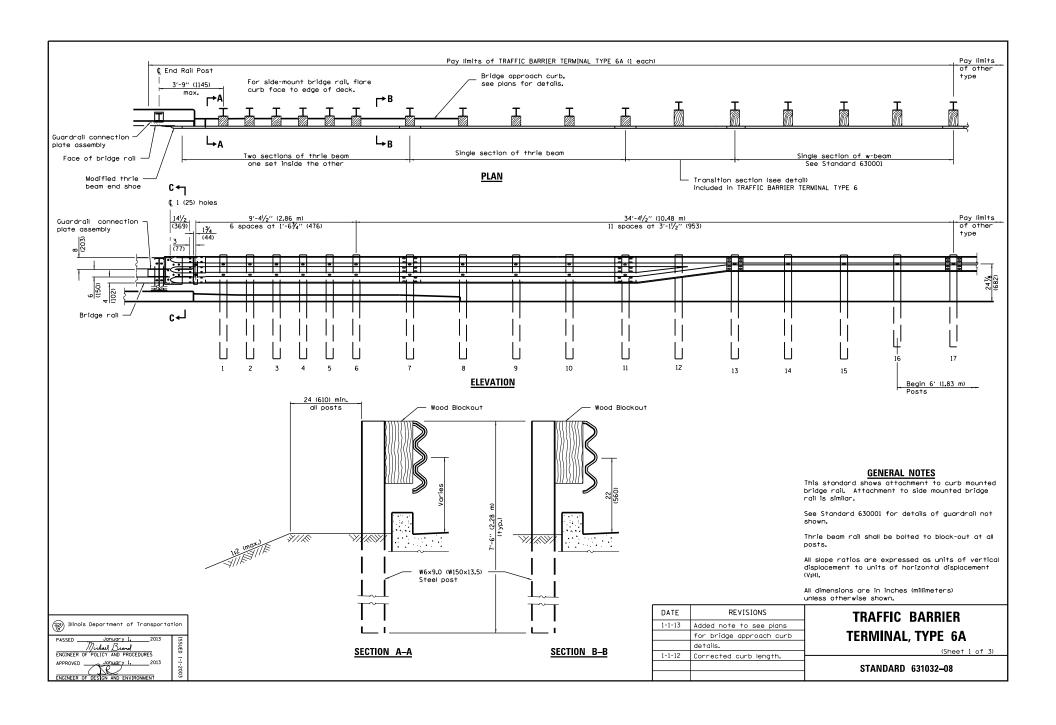
(5 each individual 5x5x5/g (125x125x16) steel plates with centered 1 (25) holes may be substituted for the plate shown.)

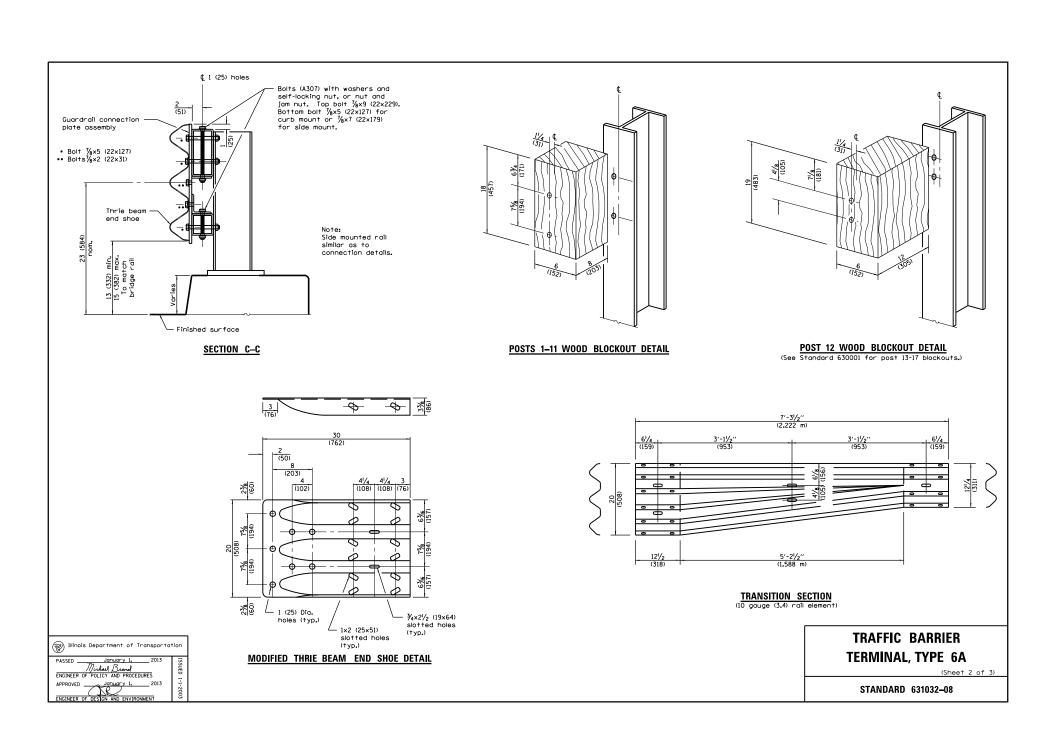
TRAFFIC BARRIER **TERMINAL, TYPE 6**

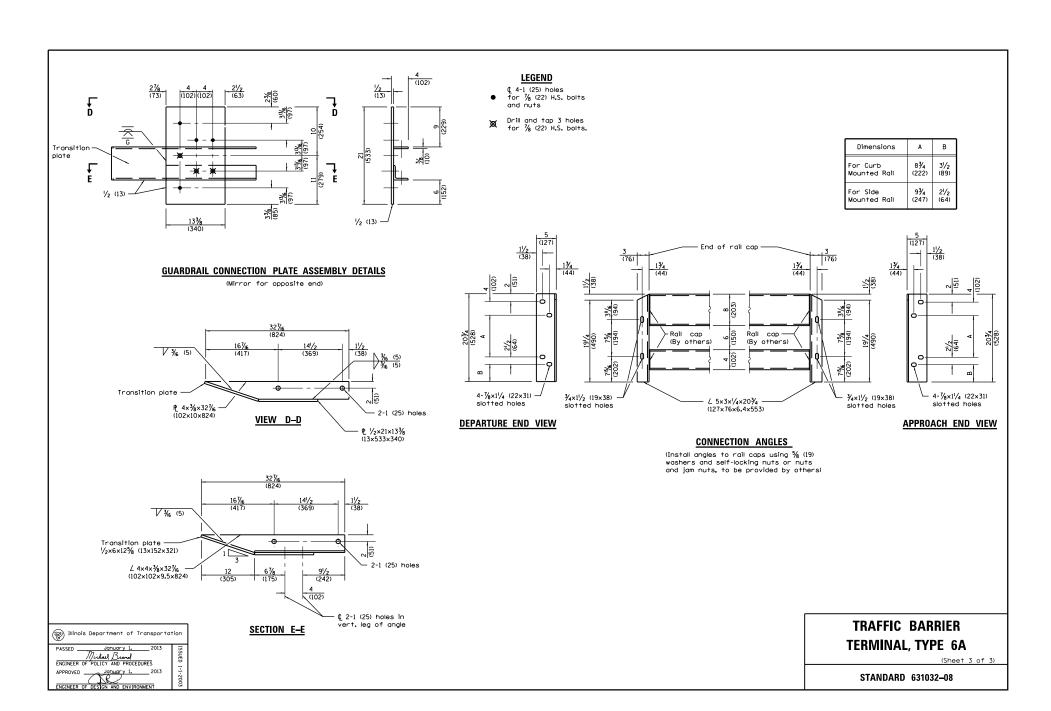
(Sheet 3 of 3)

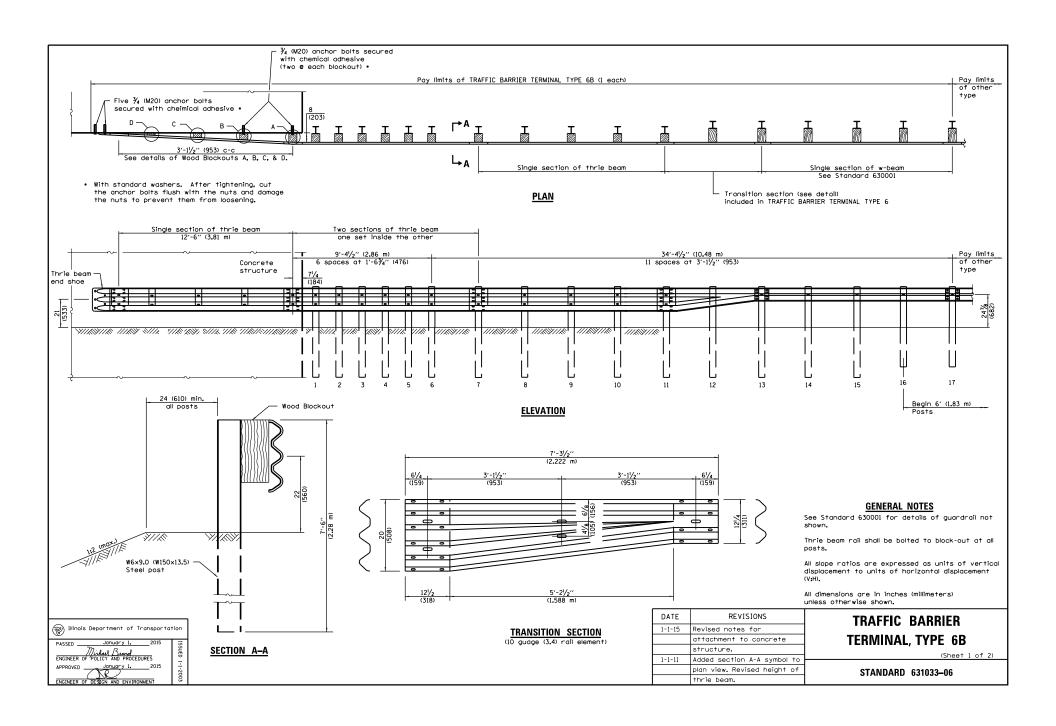
STANDARD 631031-14

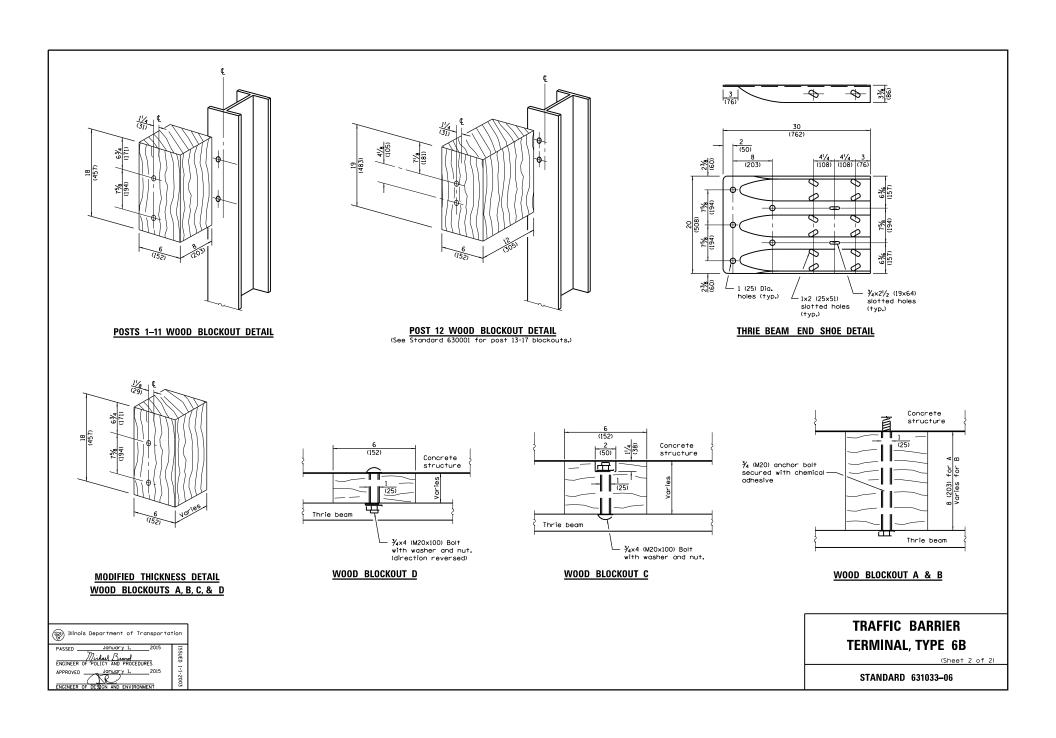


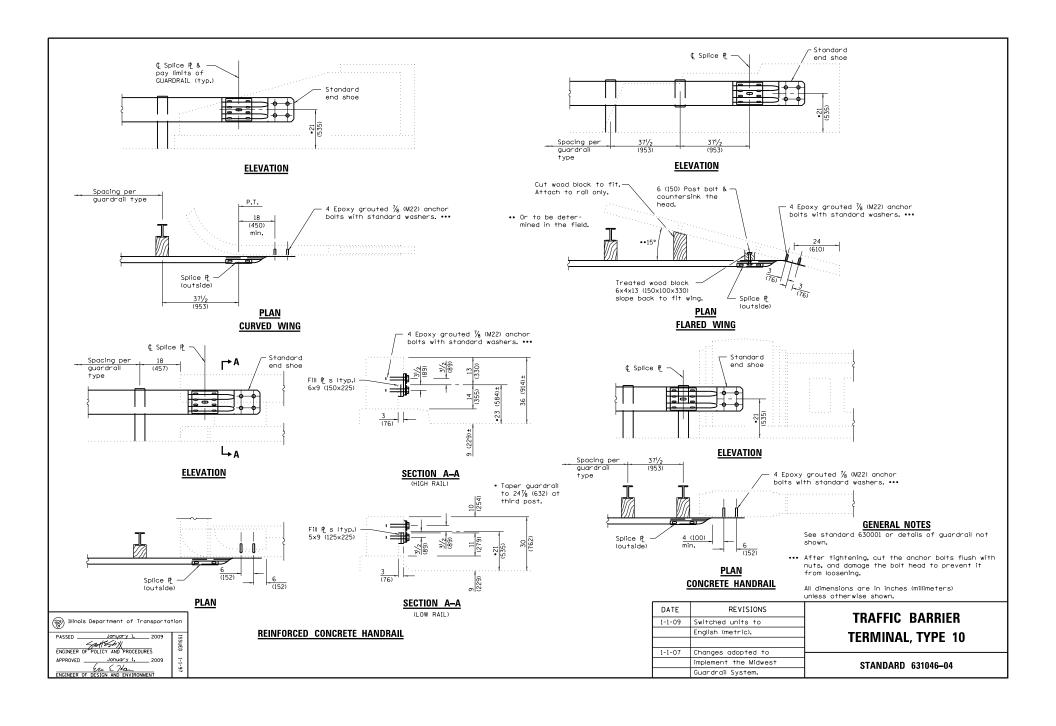


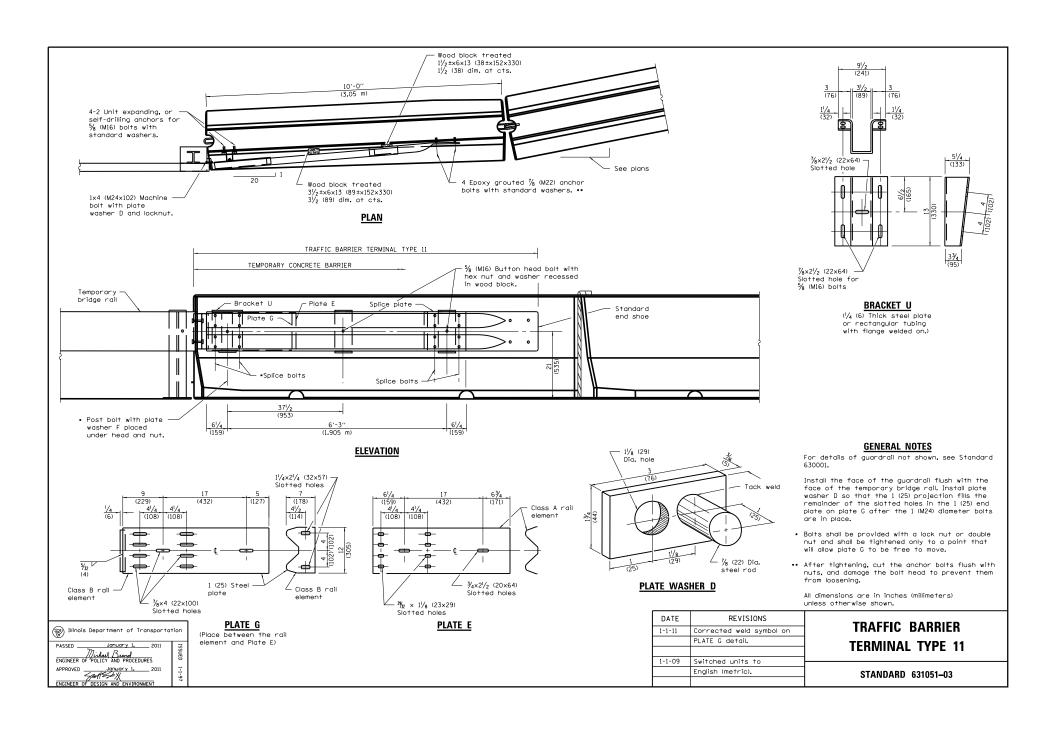


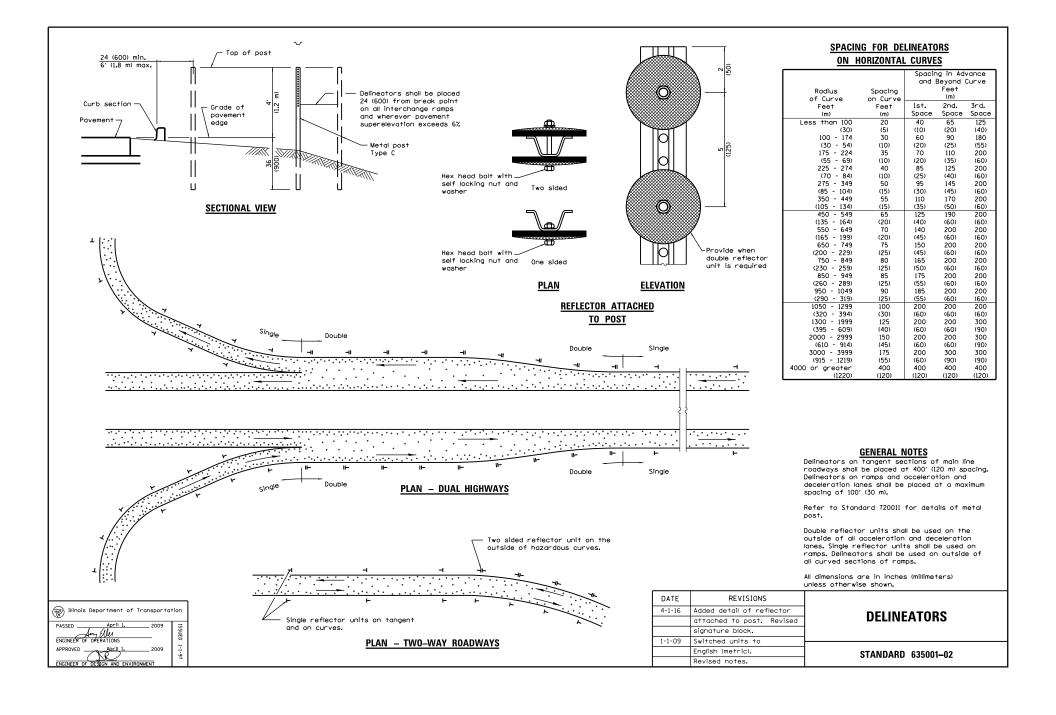


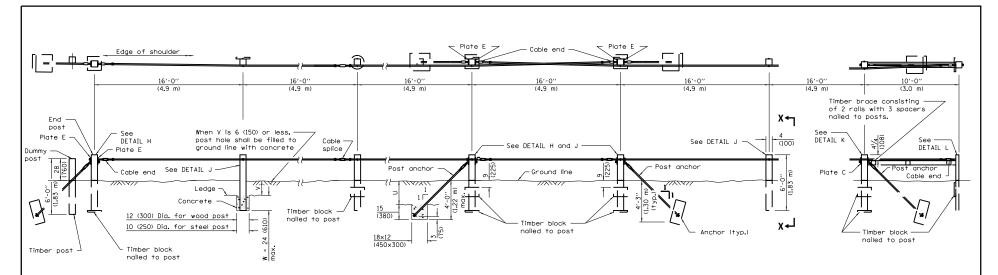












END ANCHOR ARRANGEMENT TYPICAL FOOTINGS FOR POST AND ANCHOR WHEN IMPERVIOUS MATERIAL IS ENCOUNTERED

INTERMEDIATE ANCHOR ARRANGEMENT

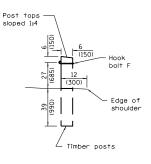
DEAD END ANCHOR ARRANGEMENT

NOTES

V + W shall not exceed 39 (990). When V is 0 to 15 (380), W = 24 (610), and posts shall be shortened as required. When V exceeds 15 (380), W shall be shortened correspondingly.

T = 15 (380) when U is 33 (840) or less. When U exceeds 33 (840) the impervious material shall be removed and the standard anchor shall be used.

Timber blocks shall be nailed to each wood post on the concave side of curve for curves having a radius of less than 600' (180 m).



VIEW X-X

Typical Wood Materials					
Item	Size				
Post	4×4×6′-0″ (100×150×1.83 m)				
Block	2×12×18 (50×300×450)				
Rail	2×6 (50×150)				
Spacer	2×6×6 (50×150×150)				

GENERAL NOTES

The Engineer will determine the stability of the impervious material for anchoring.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (VH).

All dimensions are in inches (millimeters) unless otherwise shown.

CABLE ROAD GUARD	REVISIONS	DATE
OADLE HOAD GOAHD	Switched units to Eng.	1-1-09
SINGLE STRAND	(met.). omitted precast	
***************************************	deadman and gen, note,	
(Sheet 1 of 3)	Corrected note on Post	1-1-05
STANDARD 636001-02	Anchor detail on sheet	
CIANDAND COCCOT OF	3 of 3.	

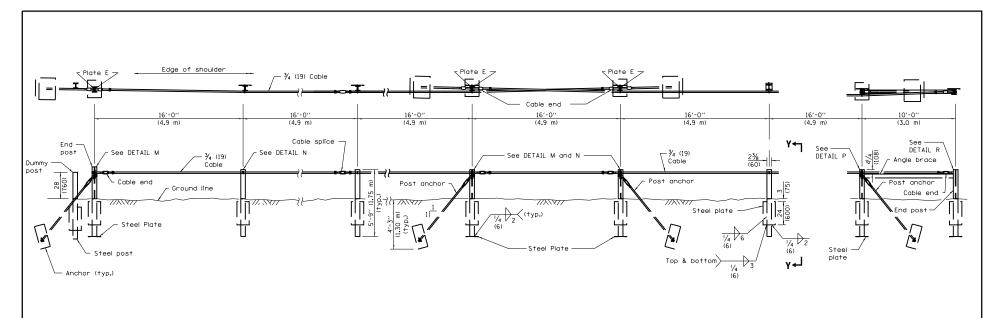
Dillinois Deportment of Transportation

PASSED Jonuary 1, 2009

SERVICE OF FOLICY AND PROCEDURES

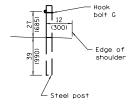
APPROVED JONUARY 1, 2009

SERVICE OF TRANSPORTED OF TRANSP



END ANCHORINTERMEDIATE ANCHORDEAD END ANCHORARRANGEMENTARRANGEMENT

TYPICAL STEEL MATERIALS			
Item	Size		
Post	S3×5.7×5′-9″ (S75×8.5×1.75 m)		
Bottom	1/4×8×8		
Plate	(6×200×200)		
Side	1/4×8×24		
Plate	(6×200×600)		
Brace	L 4×3×3/8 (L 102×76×9.5)		



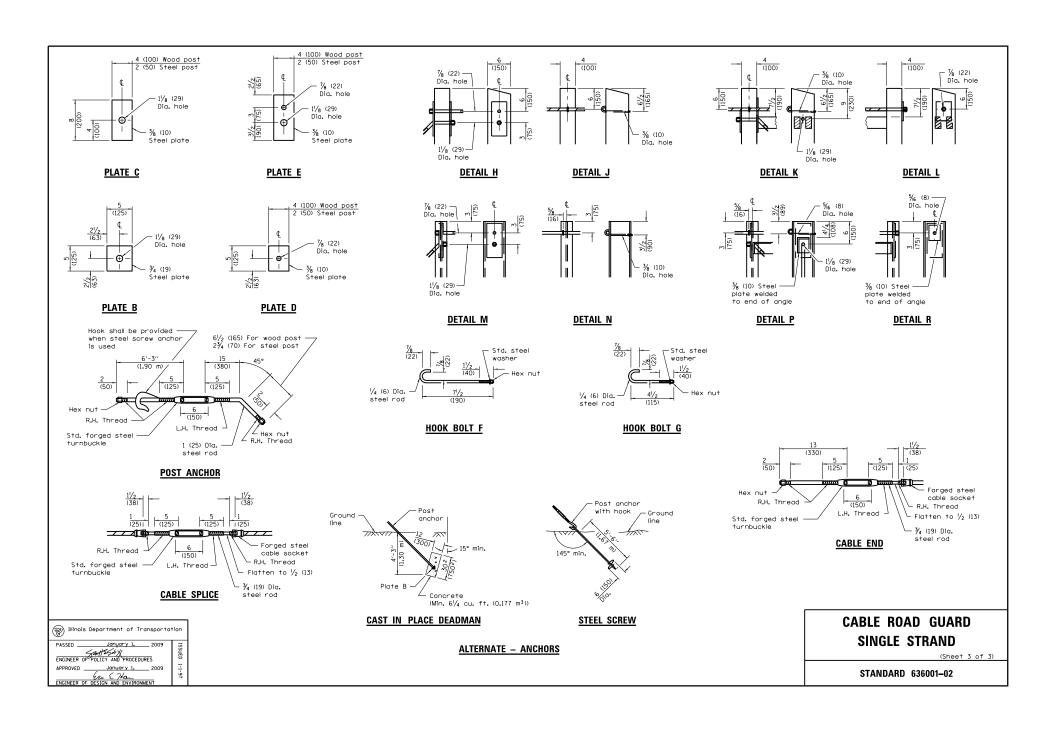
VIEW Y-Y

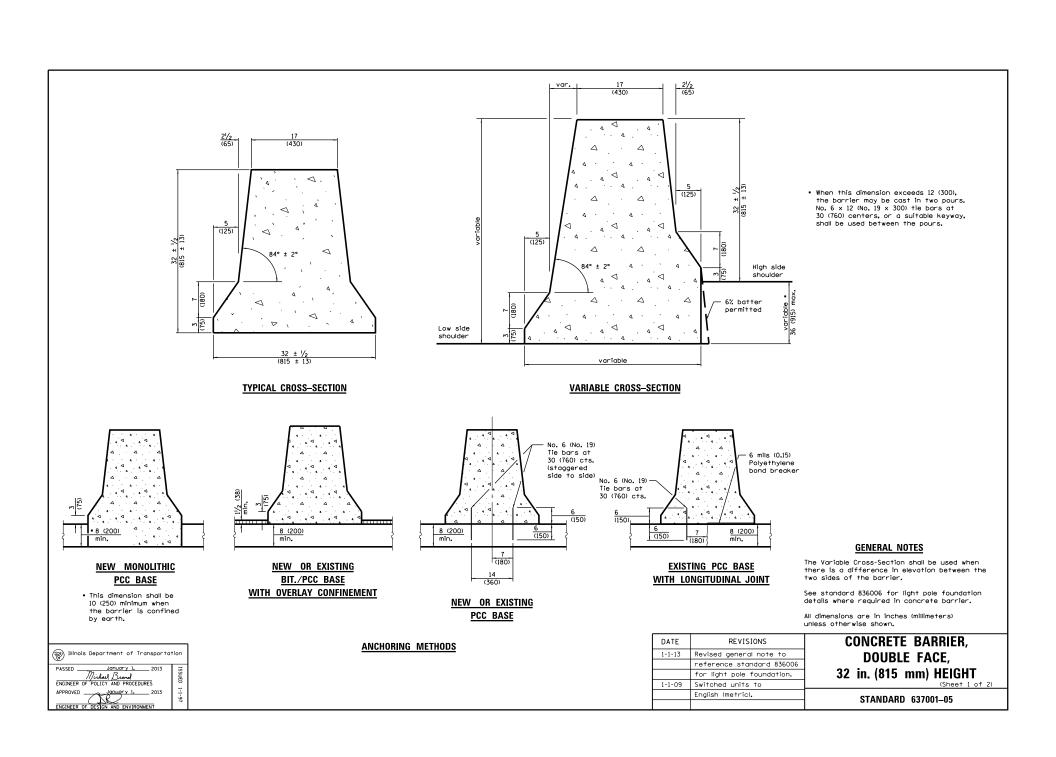
Illinois Department of Transporta	ion
PASSED Jonuary I. 2009 Handwary I. 2009 FROINER OF POLICY AND PROCEDURES APPROVED JONUARY I. 2009 Let 7 7-2 ENGINEER OF DESIGN AND ENVIRONMENT	ISSUED 1-1-97

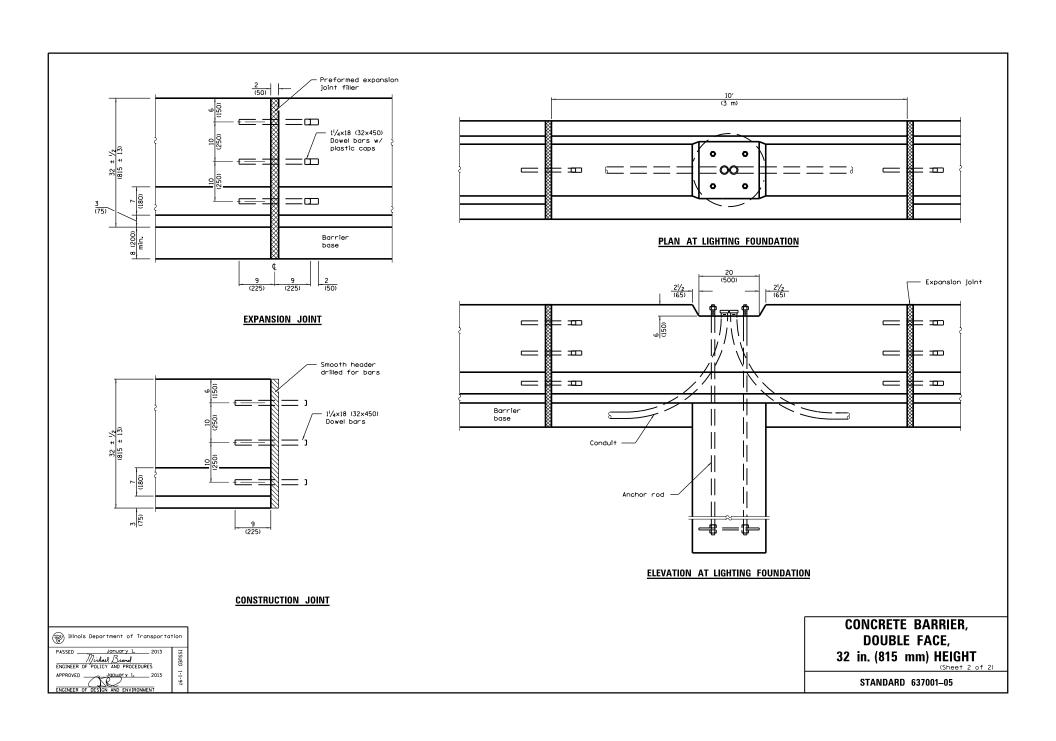
CABLE ROAD GUARD SINGLE STRAND

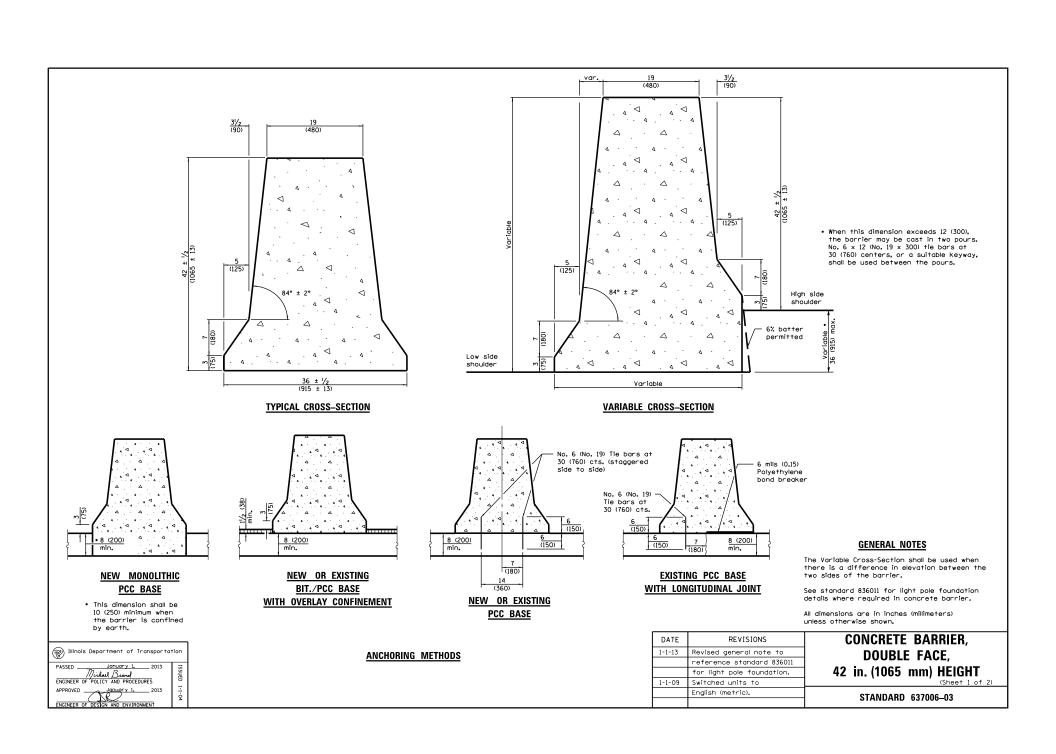
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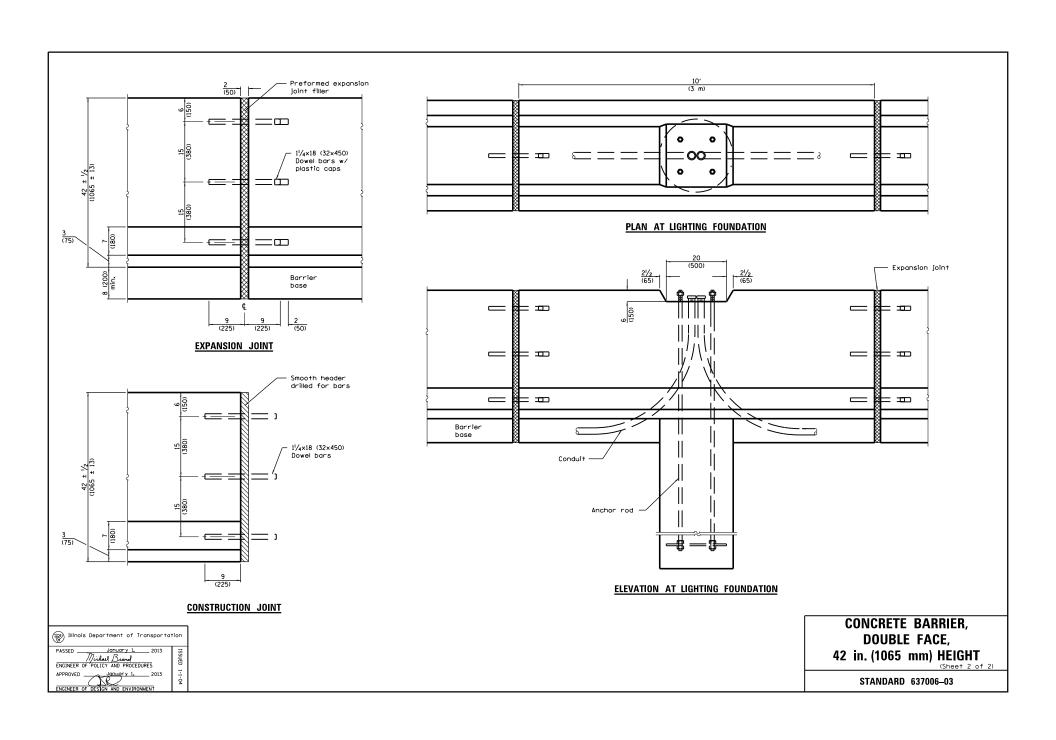
STANDARD 636001-02

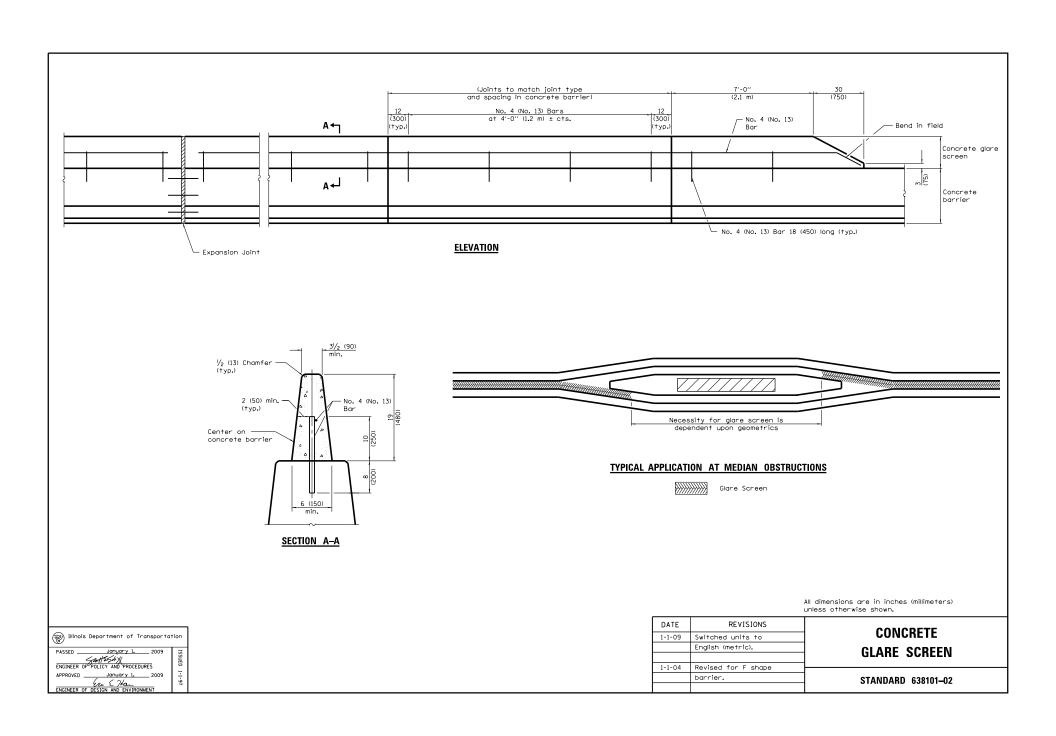


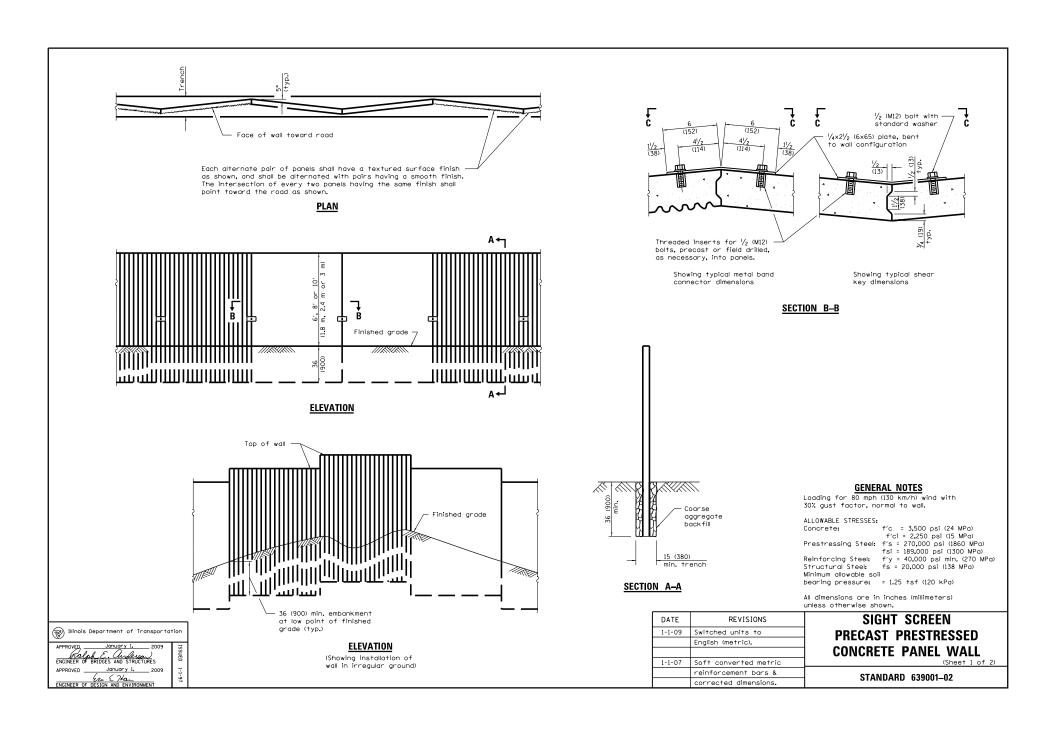


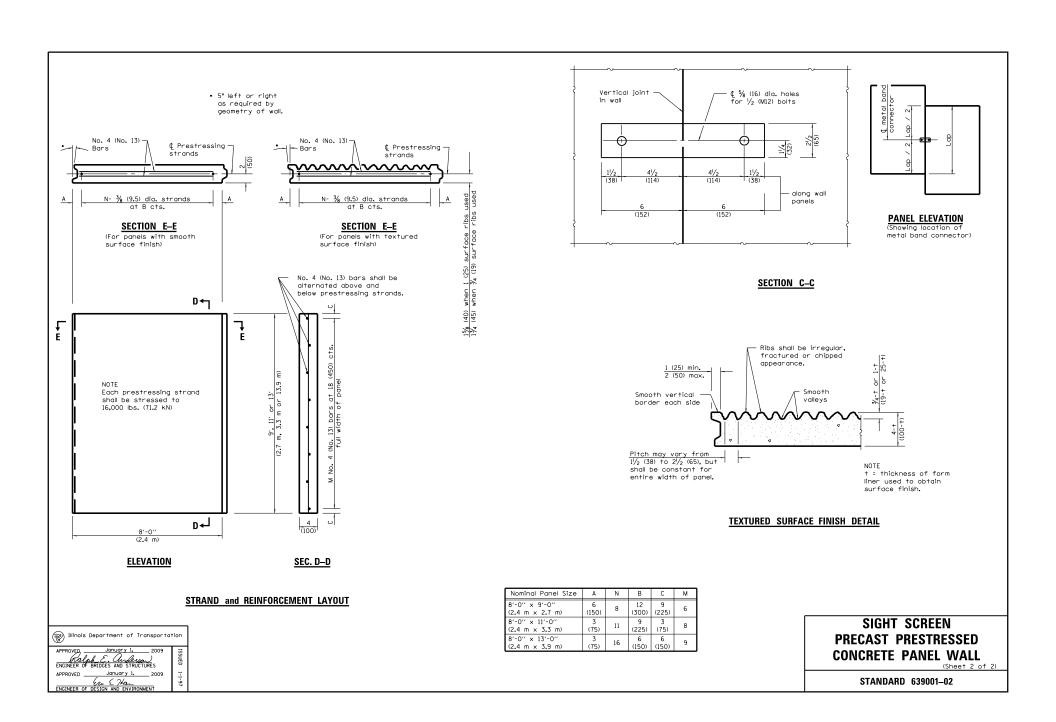


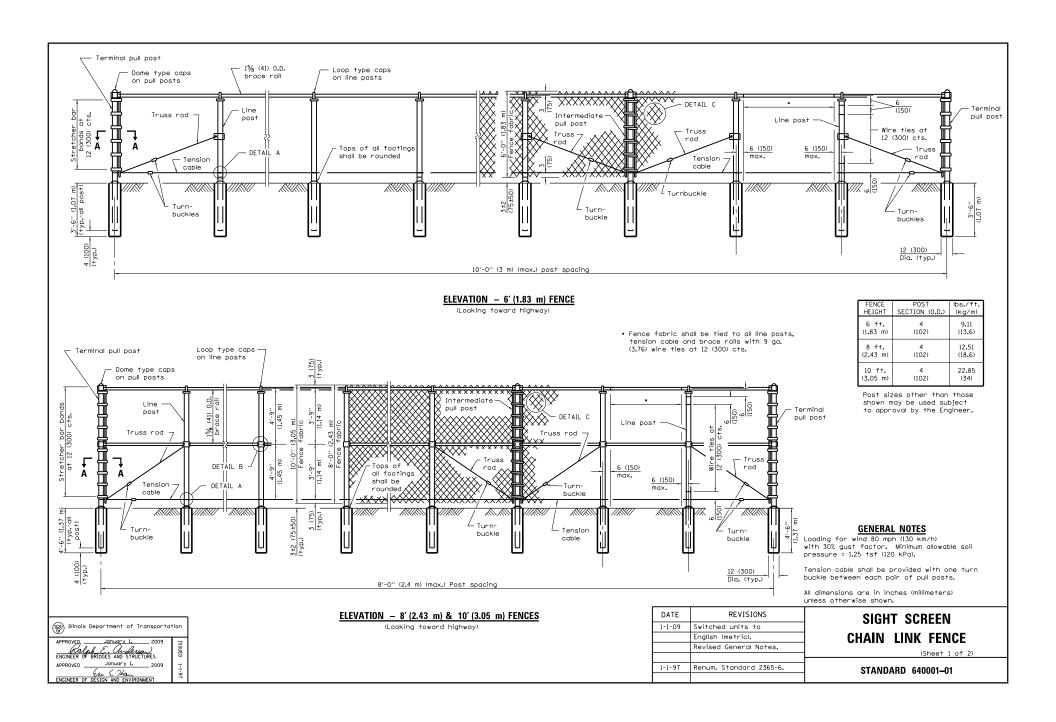


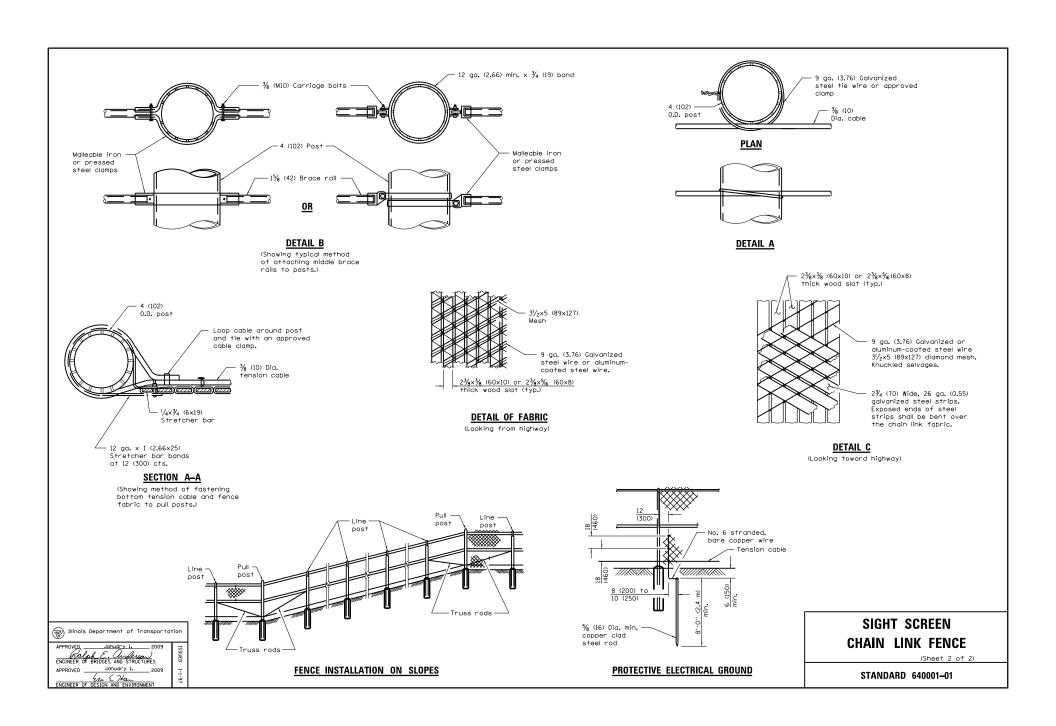


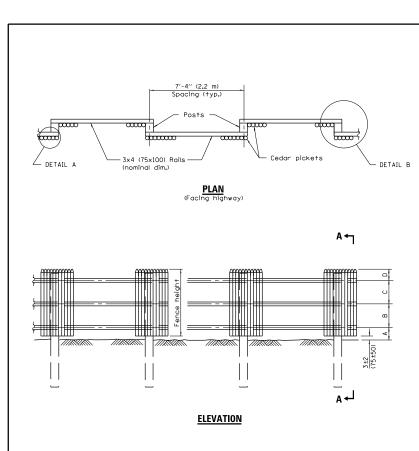








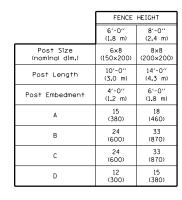


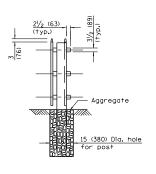


Galvanized common wire nails.

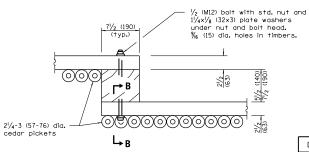
DETAIL A

(Showing typical picket to rail attachment)



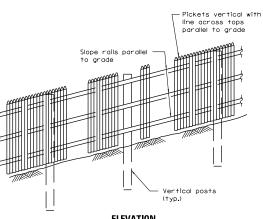


SEC. A-A



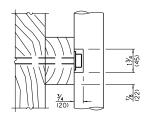
DETAIL B

(Showing typical panel to post connection at each rail.)



<u>ELEVATION</u>

(Showing treatment with sloping ground)



SECTION B-B

(Notch pickets when required to clear washer and bolt head.)

GENERAL NOTES

Loading is based on 80 mph (130 km/h) with 30% gust factor. Minimum allowable soil pressure = 1.25 tsf (120 kPa).

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-09	Switched units to
	English (metric). Changed
	Sec. B-B to Detail B.
1-1-97	Renum. Standard 2367-3.
	Deleted DN Symbol.

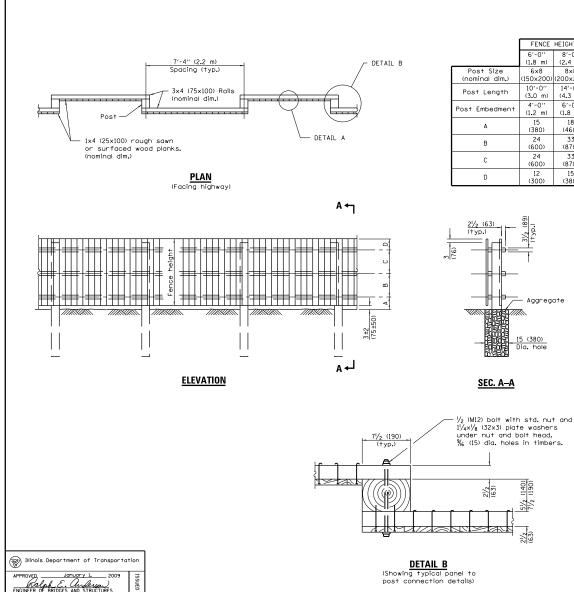
SIGHT SCREEN CEDAR STOCKADE FENCE TYPE S

STANDARD 641001-01

Illinois Department of Transportation

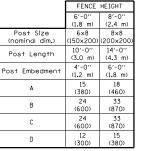
APPROVED January 1. 2009

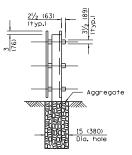
APPROVED JOHNSON IN 2009
ENGINEER OF BRIDGES AND STRUCTURES
APPROVED JOHNSON IN 2009
ENGINEER OF DESIGN AN HALL
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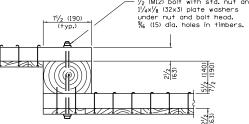


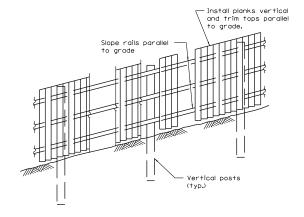
APPROVED

January I,



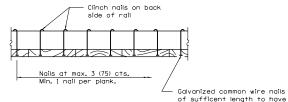






ELEVATION

(Showing treatment with sloping ground)



of sufficent length to have a minimum $\frac{1}{2}$ (13) projection to clinch nails in back.

DETAIL A

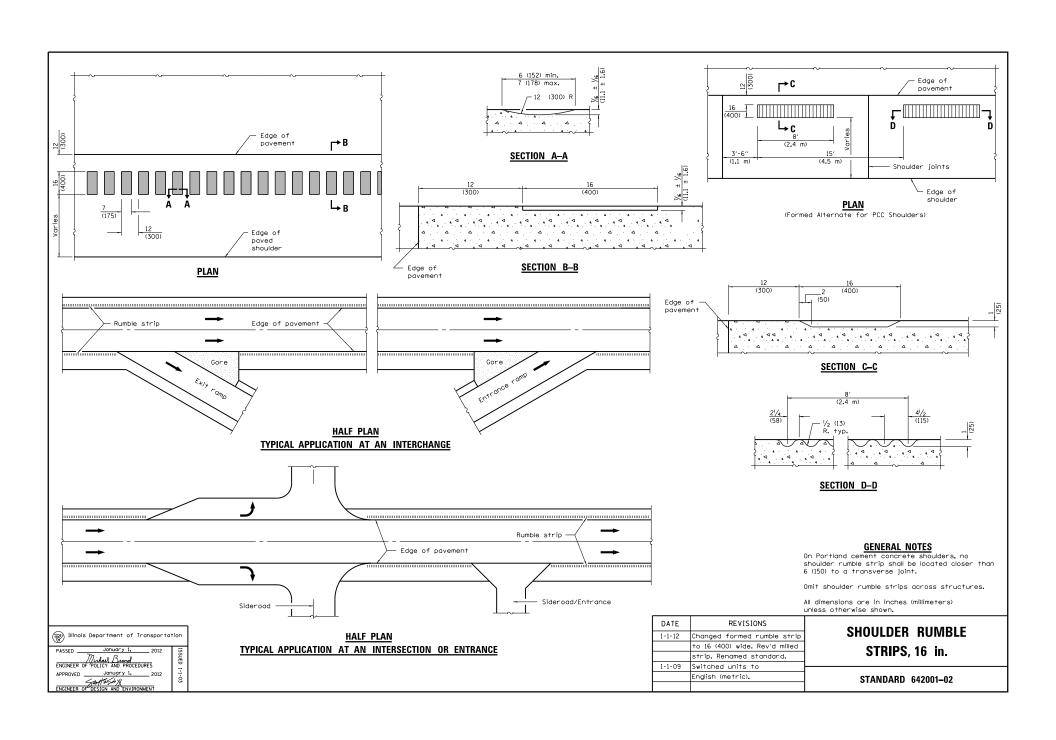
(Showing typical plank to rail attachment each rail.)

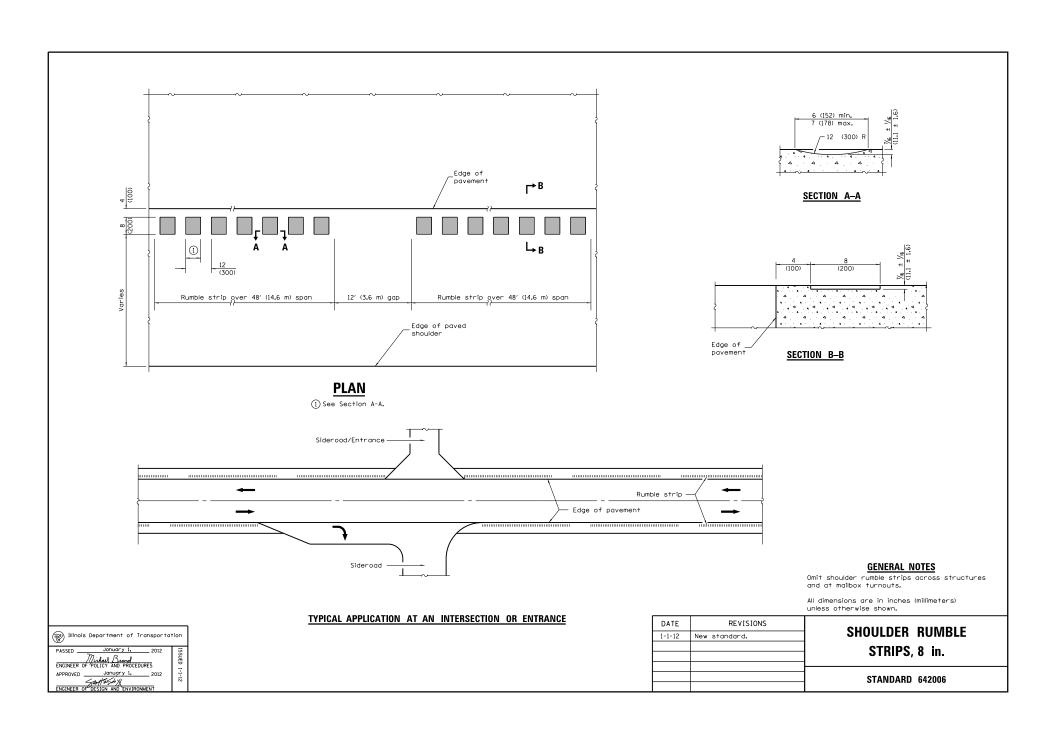
GENERAL NOTES

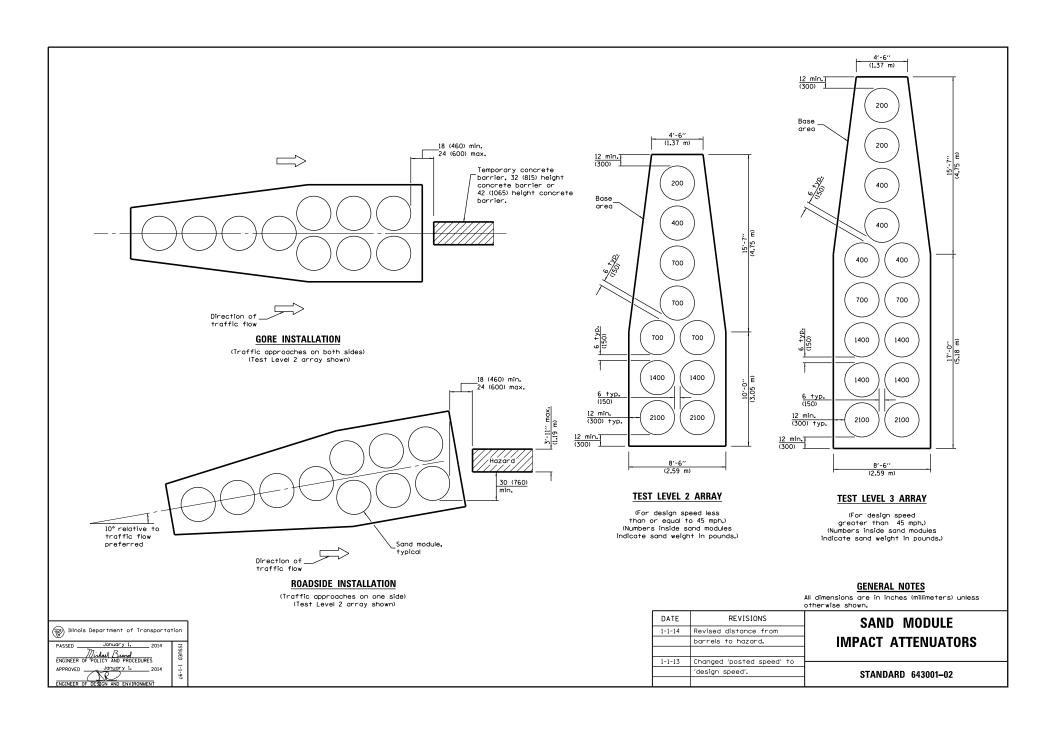
Loading was based on 80 mph (130 km/h) with 30% gust factor. Minimum allowable soil pressure = 1.25 tsf (120 kPa).

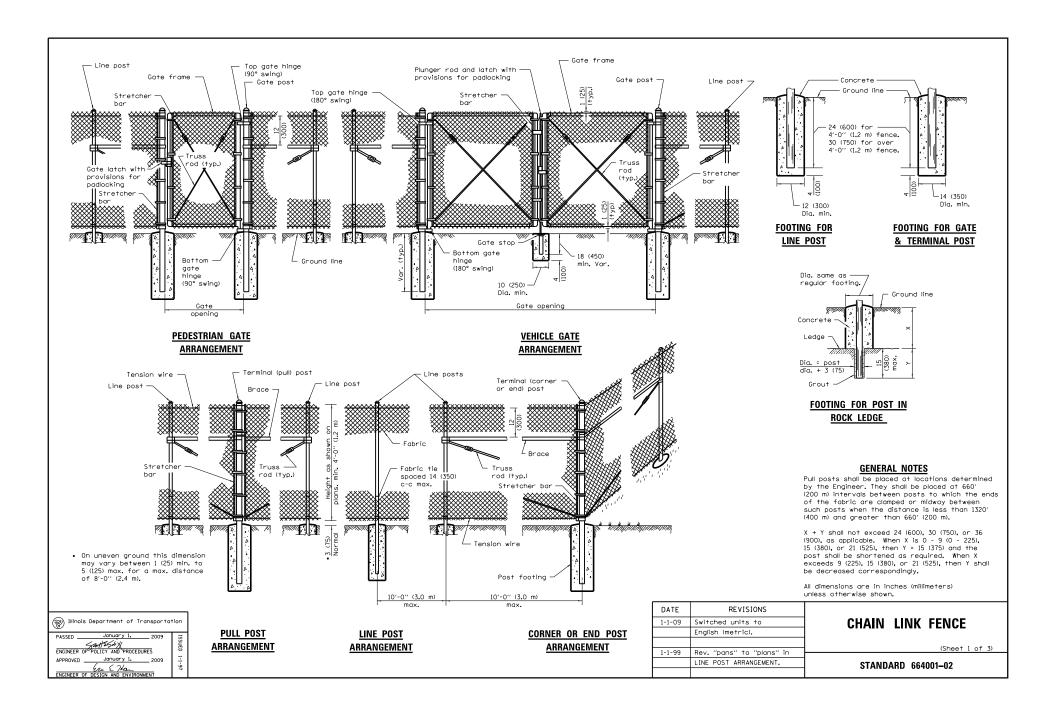
All dimensions are in inches (millimeters) unless otherwise shown.

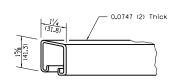
DATE	REVISIONS	SIGHT SCREEN
1-1-09	Switched units to	WOOD PLANK FENCE
	English (metric). Changed	VVUUD PLANK FENGE
	Section B-B to Detail B.	TYPE P
1-1-97	Renum. Standard 2367-3.	
	Deleted DN Symbol.	STANDARD 641006-01
		TANDAND OTIOGO OI

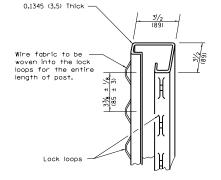


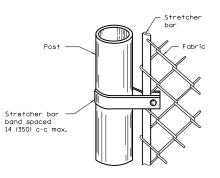


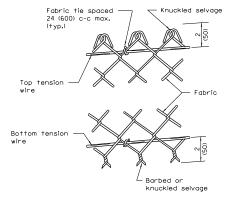












ROLL FORMED SECTION OF BRACE

ROLL FORME	D SECTION OF	F
TERMINAL 8	GATE POST	

METHOD OF FASTENING STRETCHER BAR TO POST

METHOD OF TYING **FABRIC TO TENSION WIRES**

LINE POST				
Section	lbs./ft. (ka/m)			
Dina Tuna A 1 00 (40 7) 0 D	2.72			
Pipe Type A 1.90 (48.3) O.D.	(4.05)			
	2,28			
Pipe Type B 1.90 (48.3) O.D.	(3,39)			
Pipe Type C 1.90 (48.3) O.D.	2.26			
Tipe Type C 1.30 (40.37 0.0.	(3.36)			
	2.72			
H 1.875×1.625 (47.6×41.3)	(4.05)			
С	1.60			
L	(2.38)			
т	2,30			
1	(3.42)			
	101127			

TERMINAL POST			
Section	lbs./ft. (kg/m)		
Pîpe Type A 2.375 (60.3) O.D.	3.65 (5.43)		
Pipe Type B 2.375 (60.3) 0.D.	3.11 (4.63)		
Pipe Type C 2.375 (60.3) 0.D.	3.09 (4.60)		
Roll Formed 3½×3½ (89.0×89.0)	See detail		
Sq. Tubing 2½×2½ (63.5×63.5)	4.32 (6.43)		

HORIZONTAL BRACES			
Section	lbs./ft. (kg/m)		
Pipe Type A 1.66 (42.2) O.D.	2.27 (3.38)		
Pipe Type B 1.66 (42.2) O.D.	1.83 (2.72)		
Pipe Type C 1.66 (42.2) 0.D.	1.82 (2.71)		
H 1.31×1.5 (33.3×38.1)	2.25 (3.35)		
Roll Formed 15%×11/4 (41.3×31.8)	See detail		

GATE FRAMES				
Section	lbs./ft. (kg/m)			
Pipe Type A 1.66 (42.2) O.D.	2.27 (3.38)			
Pipe Type B 1.66 (42.2) O.D.	1.83 (2.72)			
Pipe Type C 1.66 (42.2) O.D.	1.82 (2.71)			

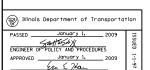
GATE POSTS •							
Gate Opening • ft. (m)		Pipe Type A		Sq. Tubing		Pipe Type B	
		Size (O.D.)	lbs./ft.	Size	lbs./ft.	Size (O.D.)	kg/m
Single	Double	312e (0.D.)	(kg/m)	3120	(kg/m)	3120 (0.0.7	(lbs./ft.)
Up to 4 (1.2)	Up to 8 (2.5)	2.375 (60.3)	3.65 (5.43)	2 ¹ / ₂ (63.5)	4.32 (6.43)	2.375 (60.3)	3.11 (4.63)
Over 4 (1.2) to 8 (2.5)	Over 8 (2.5) to 16 (5.0)	2.875 (73.0)	5.79 (8.62)	3 (76 . 2)	5.78 (8.60)	2.875 (73.0)	4.64 (6.91)
Over 8 (2.5) to 12 (3.6)	Over 16 (5.0) to 24 (7.4)	3.5 (89.0)	7.58 (11.28)	3 (76 . 2)	8.80 (13.10)	3.5 (89)	5.707 (8.49)

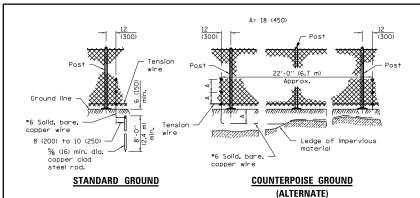
+ The $3^1\!/_2$ x $3^1\!/_2$ (89.0 x 89.0) roll formed section as detailed may be used as gate posts for single gate up to 6' (1.8 m) and double gate up to 12' (3.6 m).

CHAIN LINK FENCE

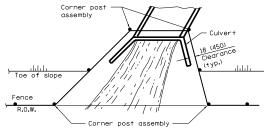
(Sheet 2 of 3)

STANDARD 664001-02





Toe of slope See DETAIL A Fence

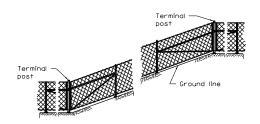


<u>PLAN</u> AT STREAM CROSSING

PLAN AT HEADWALL

Corner post assembly

PROTECTIVE ELECTRICAL GROUNDS



INSTALLATION ON SLOPES

R.O.W. Δ

— Fence

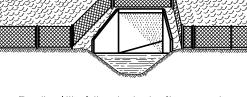
<u>PLAN</u>

When fence line has a change in direction of 15° or more,

Terminal post

a terminal post shall be placed as shown above.

End post assembly Extra length posts where necessary



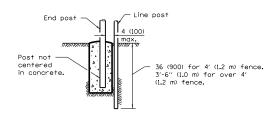
The chain link fabric shall be replaced by barbed wire strands at 12 (300) maximum centers between the double posts shown on DETAIL A when shown on the plans. $\,$

ELEVATION

When the width of the culvert makes it necessary to anchor a post to the top of the culvert, a cast iron shoe or other device approved by the Engineer shall be used.

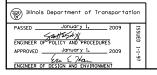
ELEVATION INSTALLATION AROUND HEADWALL

INSTALLATION OVER STREAM



terminal post, they shall be placed as directed by the Engineer. **INSTALLATION AT CORNERS**

Where angle is less than 15° and existing conditions require a

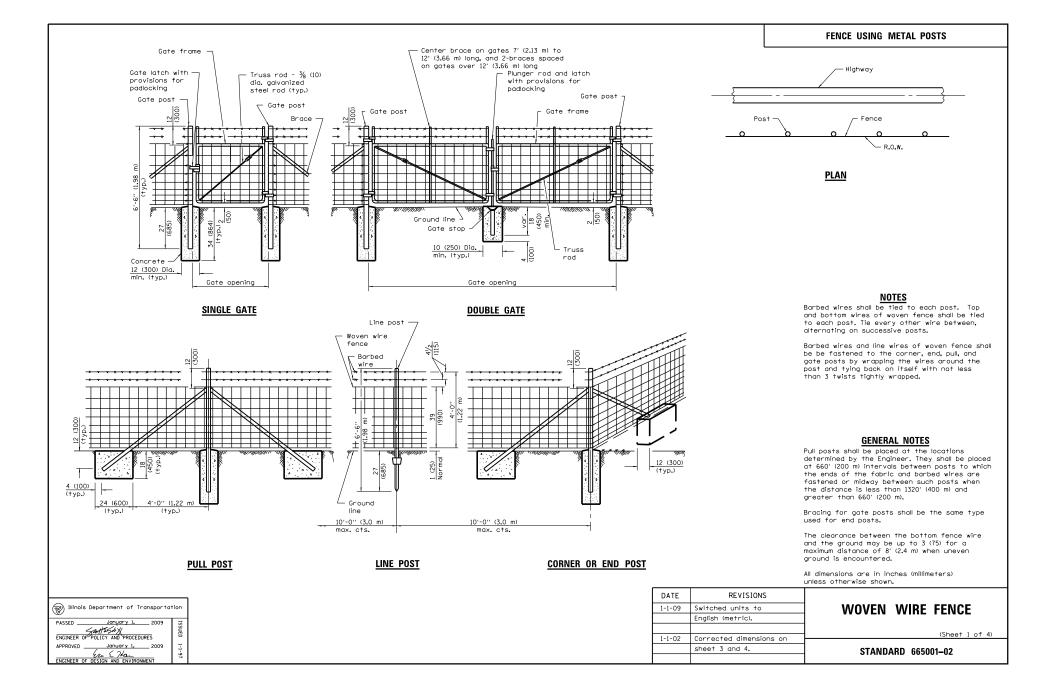


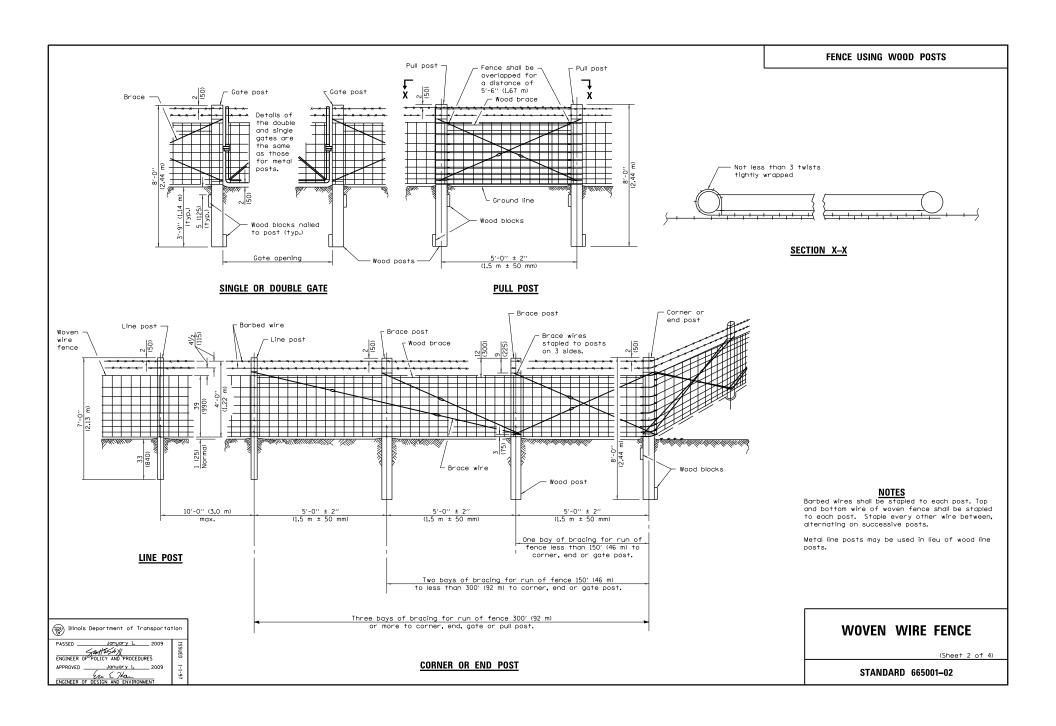
DETAIL A

CHAIN LINK FENCE

(Sheet 3 of 3)

STANDARD 664001-02





METAL ITEMS

GATE FRAMES	CORNER, END or PULL POSTS LINE POSTS				BRACES		
Section	lbs./ft. (kg/m)	Section	lbs./ft.kg/m	Section	lbs./ft.(kg/m)	Section	lbs./ft. (kg/m)
Type A: Pipe 1.66 (42.2) O.D. Type B: Pipe 1.66 (42.2) O.D. Type C: Pipe 1.66 (42.2) O.D.	2.27 (3.38) 1.83 (2.72) 1.82 (2.71)	Type A: Pipe 2.375 (60.3) O.D. Type B: Pipe 2.375 (60.3) O.D. Type C: Pipe 2.375 (60.3) O.D. Tubing 2.5 (63.5) Sq. Angle 2½x2½x¼ (64x64x6.4) H, I, U, structural shapes	3.65 (5.43) 3.11 (4.63) 3.09 (4.60) 4.32 (6.43) 4.1 (6.10)	Type A: Pipe 1.315 (33.4) 0.0. Type B: Pipe 1.315 (33.4) 0.0. Type C: Pipe 1.315 (33.4) 0.0. Tubing 1 (25.4) Sq. L, C, T, U, Y or other approved structural shapes	1.68 (2.50) 1.34 (1.99) 1.33 (1.98) 1.41 (2.10)	Type A: Pipe 1.66 (42.2) 0.D. Type B: Pipe 1.66 (42.2) 0.D. Type C: Pipe 1.66 (42.2) 0.D. Angle 2½x2½/x¼ (64x64x6.4) or other approved structural shapes	2.27 (3.38) 1.83 (2.72) 1.82 (2.71) 3.19 (4.75) 3.1 (4.61) min.

METAL ITEMS

		GATE POSTS			
Single gate up to 4 ft. (1.22 m) Double gate up to 8 ft. (2.44 m)		over 4 ft. to 8 ft. (1.22 m to 2.44 m) over 8 ft. to 12 ft. (2.44 m to over 8 ft. to 16 ft. (2.44 m to 4.88 m) over 16 ft. to 24 ft. (4.88 m to			
Section	lbs./ft. (kg/m)	Section	lbs./ft. (kg/m)	Section	lbs./ft. (kg/m)
Type A: Pipe 2.375 (60.3) 0.D. Type B: Pipe 2.375 (60.3) 0.D. Type C: Pipe 2.375 (60.3) 0.D. Tubing 2.5 (63.5) Sq. Angle $2V_2 \times 2V_2 \times V_4$ (64x64x6.4) H, I, U,	3.65 (5.43) 3.11 (4.63) 3.09 (4.60) 4.32 (6.43) 4.1 (6.10)	2.875 (73.0) 0.0. 2.875 (73.0) 0.0. 2.875 (73.0) 0.0. 3 (76.2) Sq. 3x3x ³ / ₆ (76x76x7.9)	5.79 (8.62) 4.64 (6.91) 3.78 (5.63) 5.78 (8.60) 6.1 (9.08)	3.500 (88.9) 0.D. 3 (76.2) Sq. 31/2×31/2×¾ (76×76×9.5)	7.58 (11.28) 8.80 (31.10) 8.5 (10.70)
structural shapes	4.1 (6.10) min.		6.1 (9.08) min.		8.5 (10.70) min.

WOOD ITEMS
(S4S or Rough Sawn)

GATE, CORNER, END or PULL POSTS	BRACES and LINE POSTS	BLOCKS
6 to 7 (150 to 175) Top dia. 6x6 (150x150)	4 to 5 (100 to 125) Top dia. 4×4 (100×100)	2×8×18 (50×200×450)

Illinois Department of Transportation PASSED JONUARY I. 2009

FAMILY AND PROCEDURES

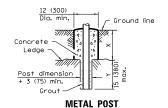
APPROVED JONUARY I. 2009

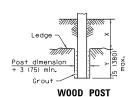
LA C / A CALL

ENGINEER OF DESIGN AND ENVIRONMENT ISSUED 1-1-97 **WOVEN WIRE FENCE**

(Sheet 3 of 4)

STANDARD 665001-02

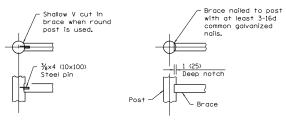




NOTE

 $\rm X+Y$ shall not exceed 27 (685), 33 (840), or 3'-9" (1.14 m) as applicable. When X is 0 to 12 (300), 18 (450), or 30 (760), Y = 15 (380), and the post shall be shortened as required. When X exceeds 12 (300), 18 (450), or 30 (760), Y shall be decreased correspondingly.

FOOTING FOR POSTS WHEN ROCK LEDGE IS ENCOUNTERED



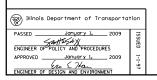
ALTERNATE DETAILS FOR FASTENING WOOD BRACE TO WOOD POST

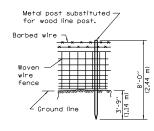


NOTE

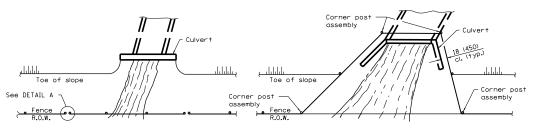
Where fence line has a change in direction of 15° of more, a corner post with bracing as required shall be placed as shown above. Where angle is less than 15° and existing conditions require a corner post, they shall be placed as directed by the Engineer.

INSTALLATION AT CORNERS





PROTECTIVE ELECTRICAL GROUNDING FOR WOOD POST FENCE INSTALLATION



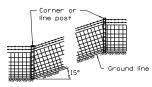
PLAN AT STREAM CROSSING

Extra length posts where necessary ELEVATION

NOTE

The woven wire fabric shall be replaced by barbed wire strands at 12 (300) maximum centers between the double posts shown on DETAIL A when shown on the plans.

INSTALLATION OVER STREAM



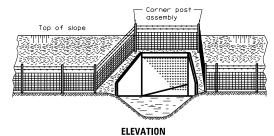
NOTE

Where grade line has a change in slope of 15° or more, a corner post with bracing as required shall be placed as shown above. Where angle is less than 15° line posts may be used.

When the tension of the fence tends to pull the posts from the ground, the line posts shall be anchored with the applicable concrete or wood anchorage specified for corner posts.

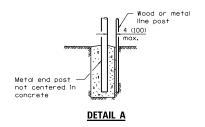
INSTALLATION ON SLOPES





NOTE When the width of the culvert makes it necessary to anchor a post to the top of the culvert, a cast iron shoe or other device approved by the Engineer shall be used.

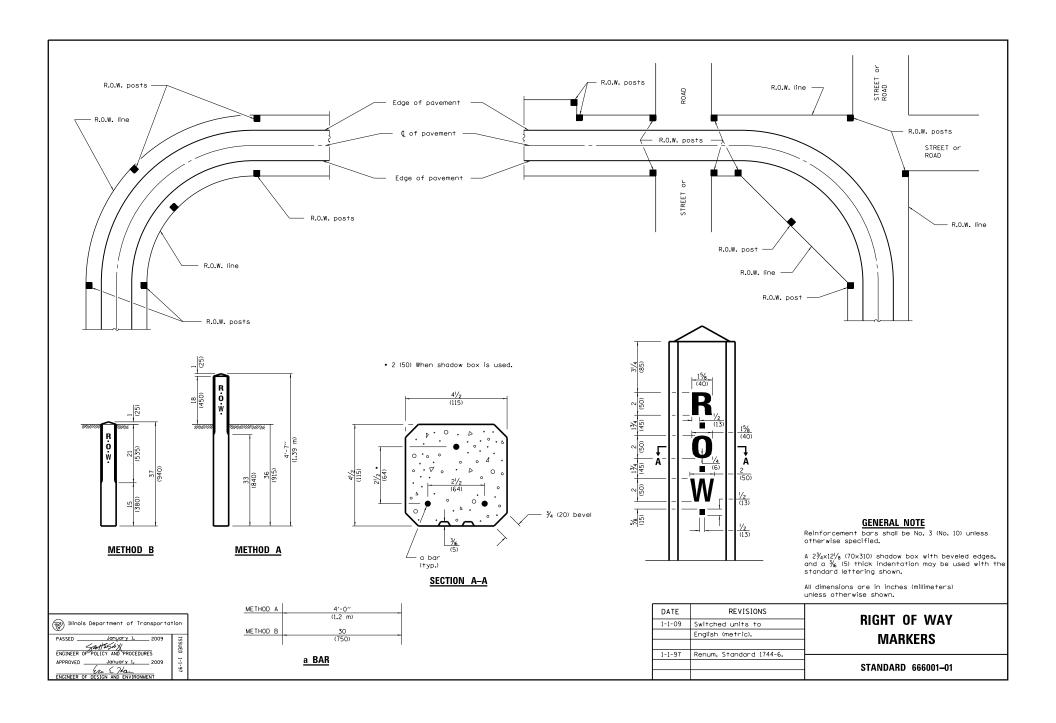
INSTALLATION AROUND HEADWALL

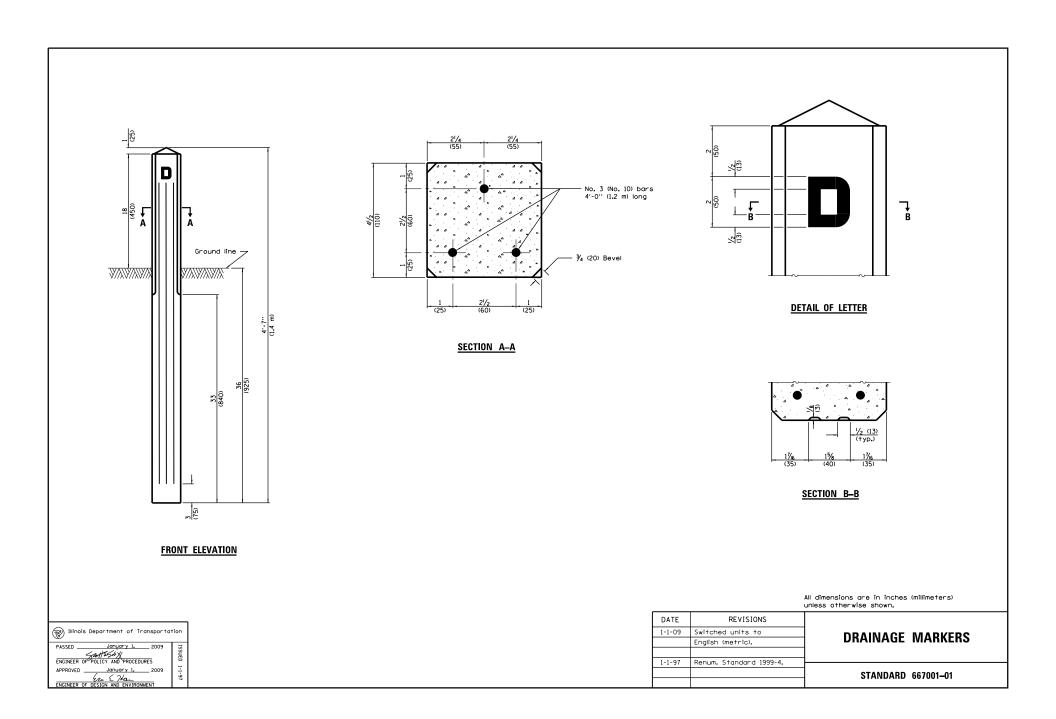


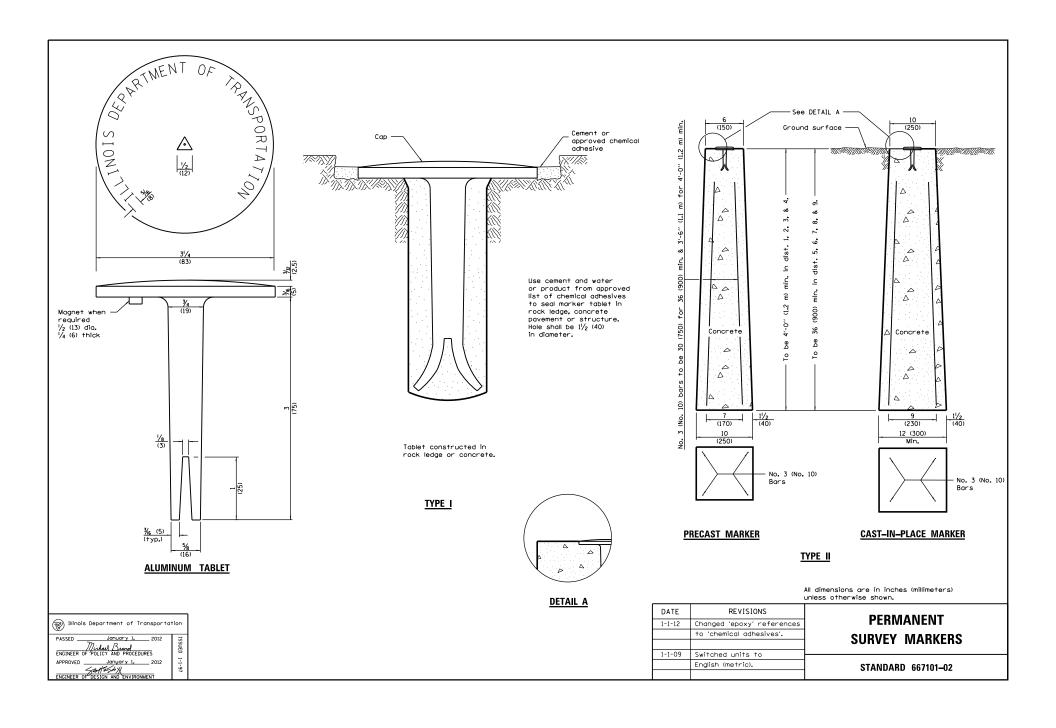
WOVEN WIRE FENCE

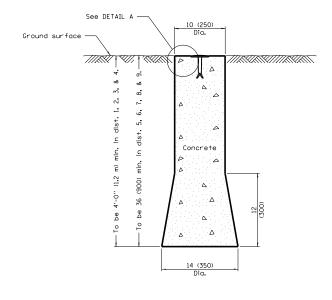
(Sheet 4 of 4)

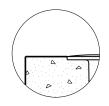
STANDARD 665001-02











DETAIL A

ELEVATION

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS			
1-1-09	1-1-09 Switched units to			
	English (metric).	1		
		BE		
1-1-97	Renum. Standard 2448.			
	Revised depth.			
		l		

U.S. GEOLOGICAL SURVEY AND NATIONAL GEODETIC SURVEY ENCHMARKS RESETTING METHOD

STANDARD 668001-01

Illinois Department of Transporta	tion
PASSED Jonuary 1, 2009 FAMILIES AND PROCEDURES APPROVED JONUARY 1, 2009 LEE TAGESTON TO SECTION AND PROCEDURES APPROVED JONUARY 1, 2009 ENGINEER OF DESIGN AND ENVIRONMENT	ISSUED 1-1-97

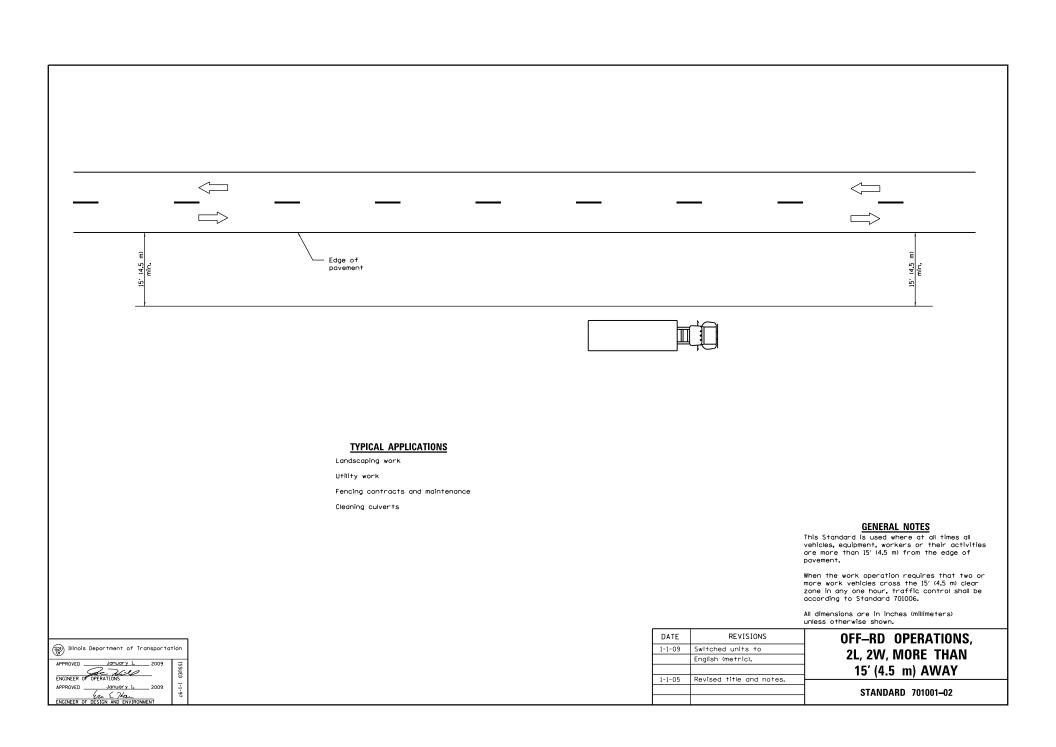


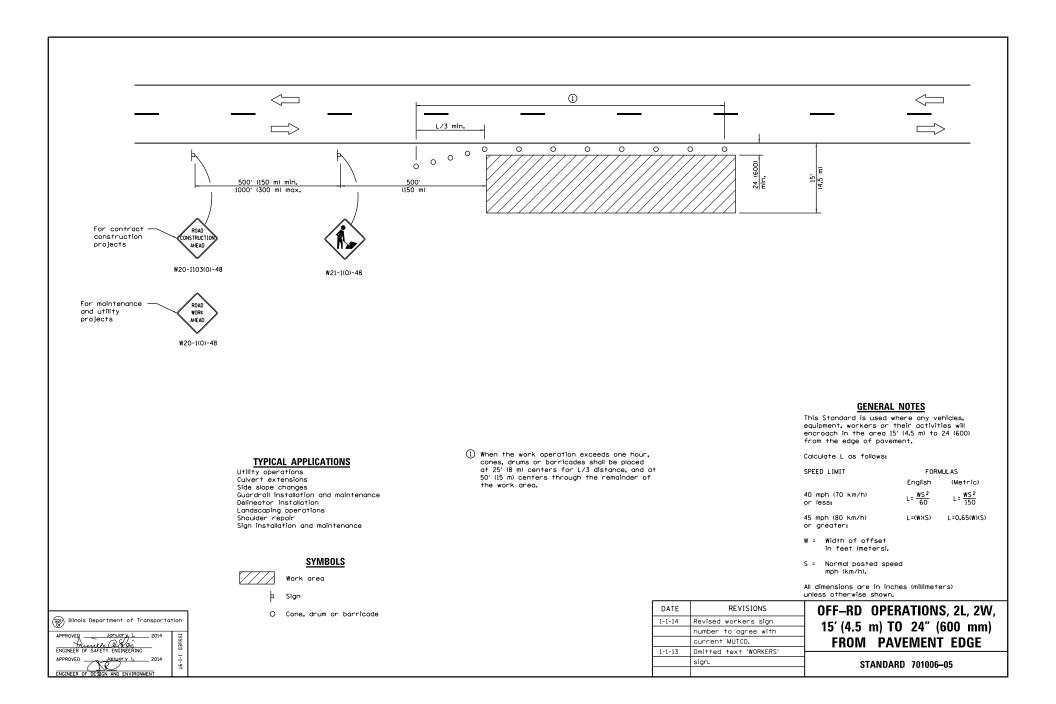
Standards by Division

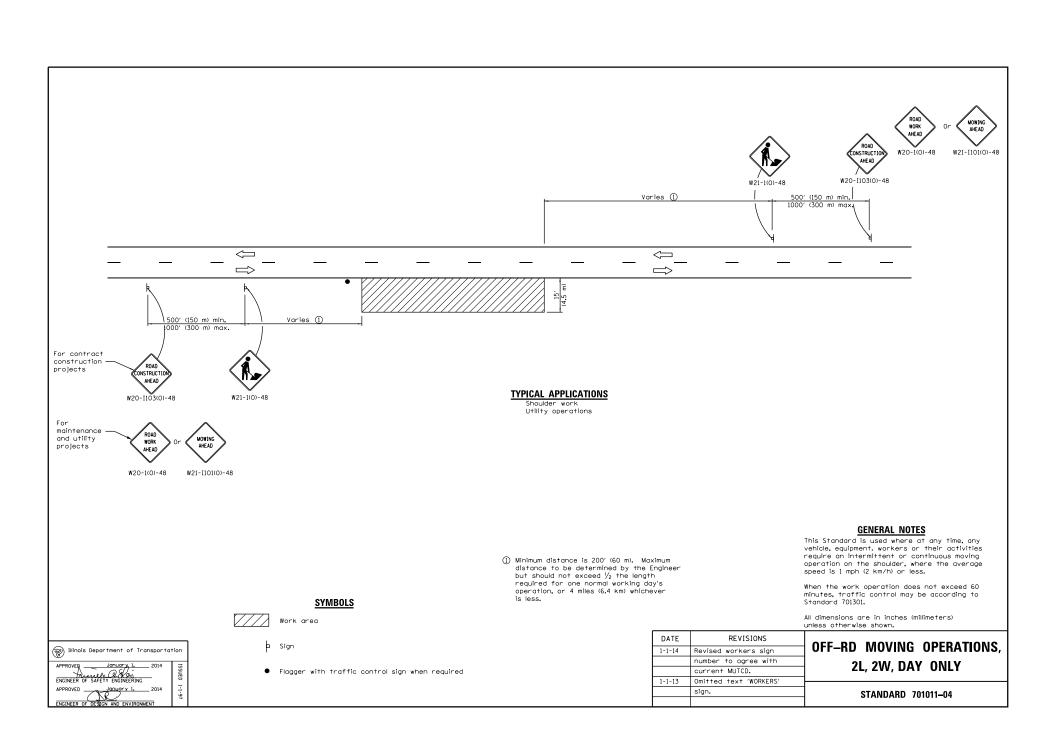
DIVISION 700 WORK ZONE TRAFFIC CONTROL AND PROTECTION, SIGNING, AND PAVEMENT MARKING

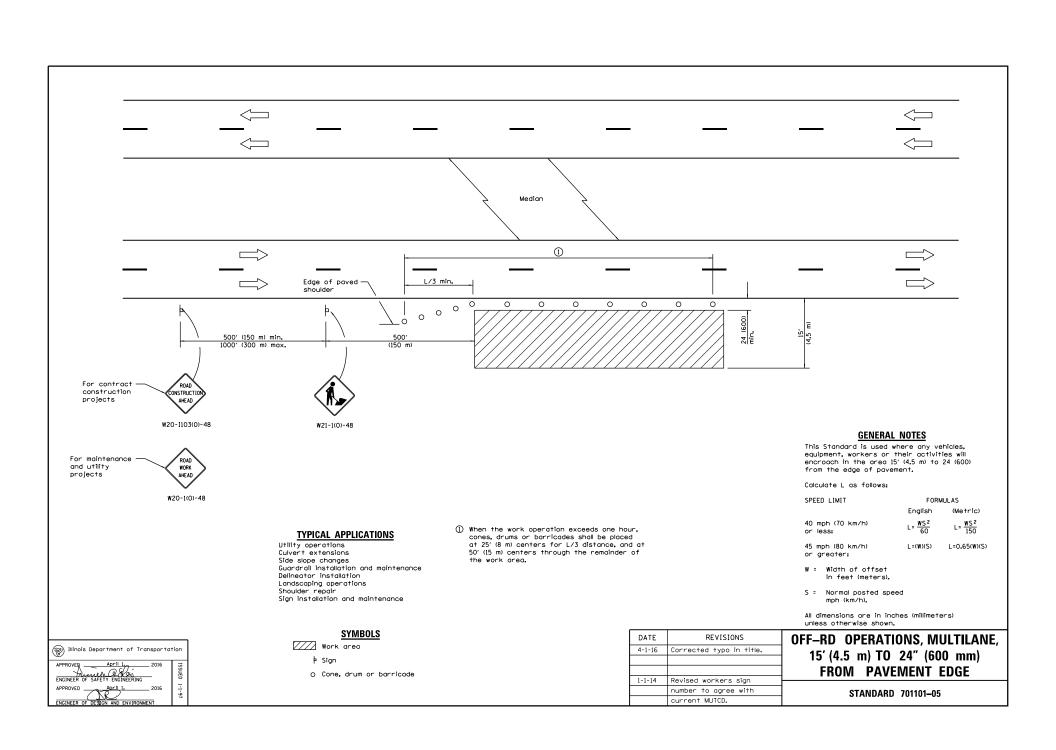
	STD. NO.	TITLE			
	WORK ZONE TRAFFIC CONTROL AND PROTECTION				
	701001-02	Off-Road Operations, 2L, 2W, More Than 15' (4.5 m) Away			
	701006-05	Off-Road Operations, 2L, 2W, 15' (4.5 m) to 24" (600 mm) From Pavement Edge			
	701011-04	Off-Road Moving Operations, 2L, 2W, Day Only			
	701101-05	Off-Road Operations, Multilane, 15' (4.5 m) to 24" (600 mm) From Pavement Edge			
	701106-02	Off-Road Operations, Multilane, More Than 15' (4.5 m) Away			
	701201-04	Lane Closure, 2L, 2W, Day Only, for Speeds > 45 MPH			
	701206-03	Lane Closure, 2L, 2W, Night Only, for Speeds > 45 MPH			
	701301-04	Lane Closure, 2L, 2W, Short Time Operations			
	701306-03	Lane Closure, 2L, 2W, Slow Moving Operations Day Only, for Speeds ≥ 45 MPH			
	701311-03	Lane Closure, 2L, 2W, Moving Operations - Day Only			
	701316-10	Lane Closure, 2L, 2W, Bridge Repair, for Speeds ≥ 45 MPH			
	701321-15	Lane Closure, 2L, 2W, Bridge Repair with Barrier			
	701326-04	Lane Closure, 2L, 2W, Pavement Widening, for Speeds ≥ 45 MPH			
	701331-04	Lane Closure, 2L, 2W, With Run-Around, for Speeds ≥ 45 MPH			
	701336-06	Lane Closure, 2L, 2W, Work Areas in Series, for Speeds ≥ 45 MPH			
	701400-08	Approach to Lane Closure, Freeway/Expressway			
	701401-09	Lane Closure, Freeway/Expressway			
	701402-11	Lane Closure, Freeway/Expressway, with Barrier			
	701406-10	Lane Closure, Freeway/Expressway, Day Operations Only			
	701411-09	Lane Closure, Multilane, at Entrance or Exit Ramp, for Speeds ≥ 45 MPH			
	701416-09	Lane Closure, Freeway/Expressway, with Crossover and Barrier			
	701421-07	Lane Closure, Multilane, Day Operations Only, for Speeds ≥ 45 MPH to 55 MPH			
	701422-08	Lane Closure, Multilane, for Speeds ≥ 45 MPH to 55 MPH			
	701423-09	Lane Closure, Multilane, with Barrier, for Speeds > 45 MPH to 55 MPH			
	701426-08	Lane Closure, Multilane, Intermittent or Moving Operation, for Speeds ≥ 45 MPH			
	701427-04	Lane Closure, Multilane, Intermittent or Moving Operation, for Speeds ≤ 40 MPH			
	701428-01	Traffic Control, Setup and Removal, Freeway/Expressway			
	701431-11	Lane Closure, Multilane, Undivided with Crossover, for Speeds ≥ 45 MPH to 55 MPH			
	701446-07	Two Lane Closure, Freeway/Expressway			
	701451-03	Ramp Closure Freeway/Expressway			
	701456-03	Partial Exit Ramp Closure Freeway/Expressway			
	701501-06	Urban Lane Closure, 2L, 2W, Undivided			
	701502-06	Urban Lane Closure, 2L, 2W, with Bidirectional Left Turn Lane			
	701601-09	Urban Lane Closure, Multilane, 1W or 2W with Nontraversable Median			
	701602-07	Urban Lane Closure, Multilane, 2W with Bidirectional Left Turn Lane			
1	701606-10	Urban Single Lane Closure, Multilane, 2W with Mountable Median			
	701611-01	Urban Half Road Closure, Multilane, 2W with Mountable Median			

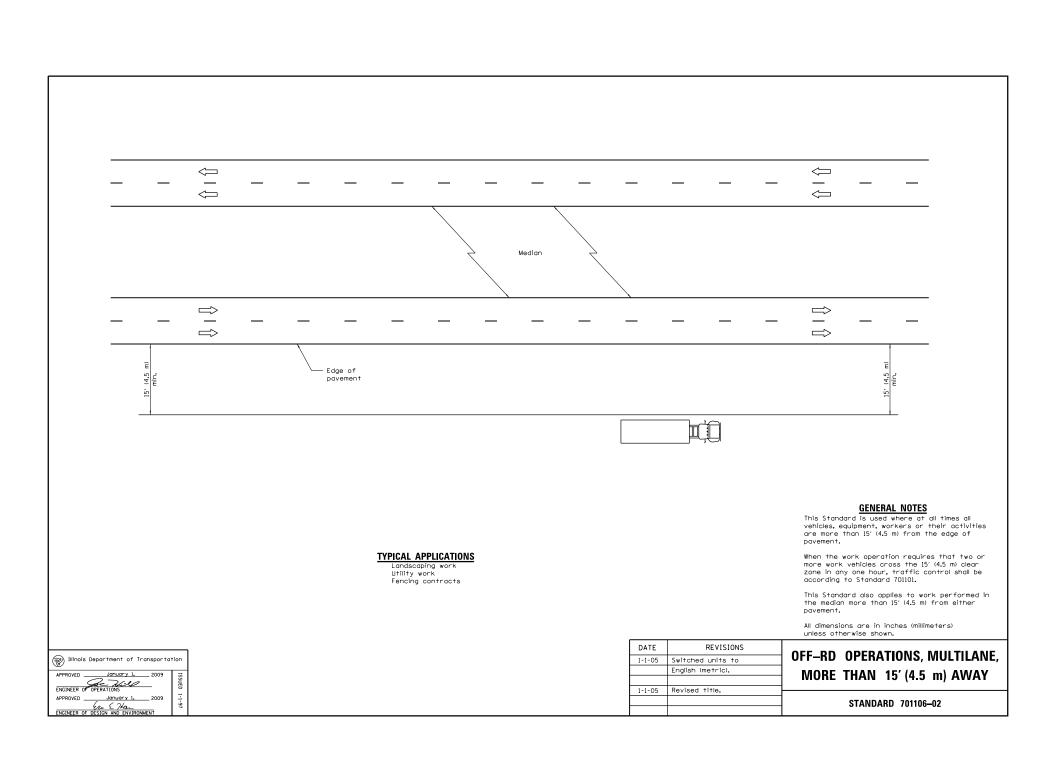
701701-10 701801-06 701901-05 704001-08	Urban Lane Closure, Multilane Intersection Sidewalk, Corner or Crosswalk Closure Traffic Control Devices Temporary Concrete Barrier
SIGNING 720001-01 720006-04 720011-01 720016-03 720021-02 725001 728001-01 729001-01 731001-01	Sign Panel Mounting Details Sign Panel Erection Details Metal Posts for Signs, Markers and Delineators Mast Arm Mounted Street Name Signs Sign Panels, Extruded Aluminum Type Object and Terminal Markers Telescoping Steel Sign Support Applications of Types A and B Metal Posts (For Signs & Markers) Base for Telescoping Steel Sign Support
PAVEMENT MA 780001-05 781001-04 782001-01 782006	ARKING Typical Pavement Markings Typical Applications Raised Reflective Pavement Markers Curb Reflectors Guardrail and Barrier Wall Reflector Mounting Details

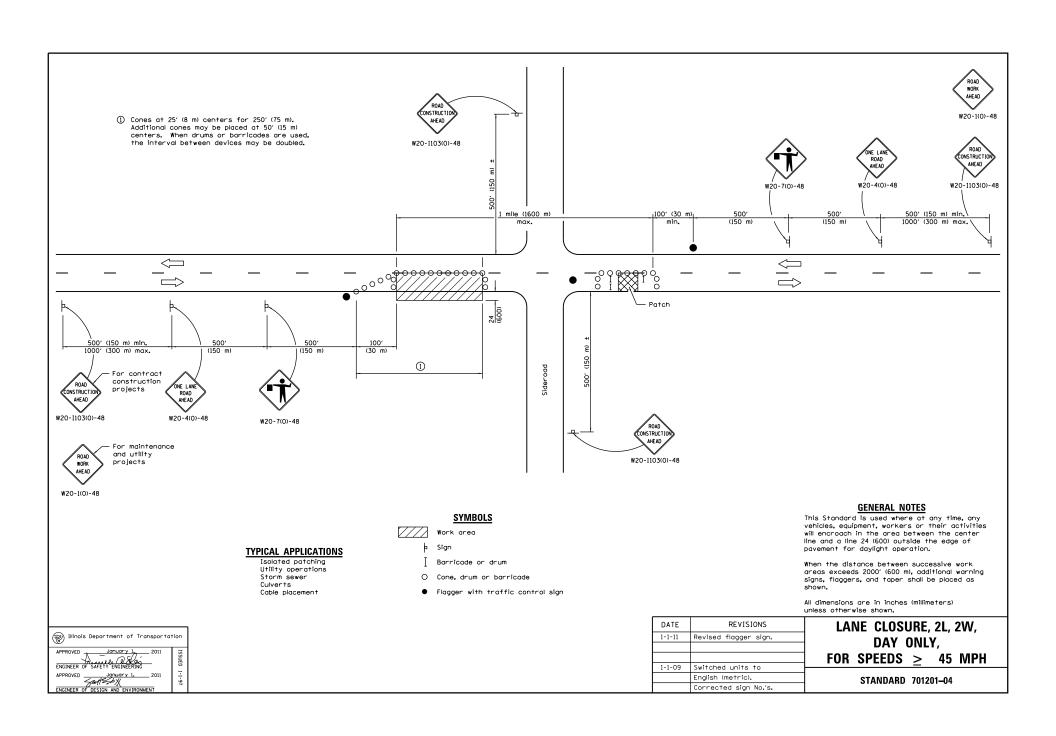


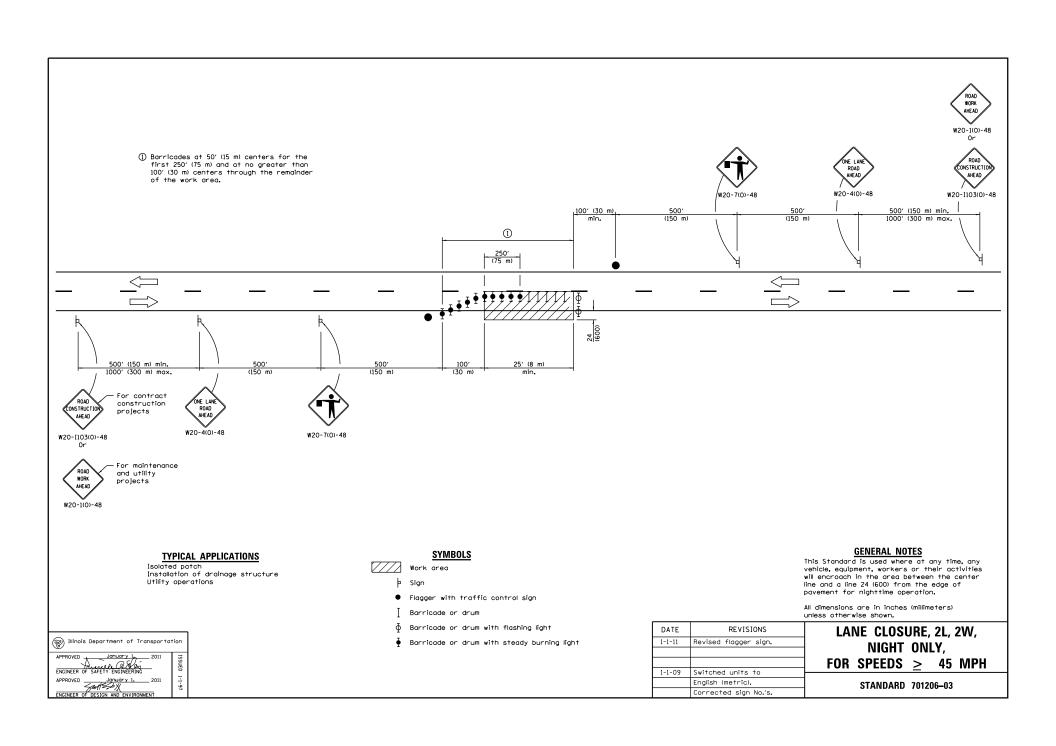


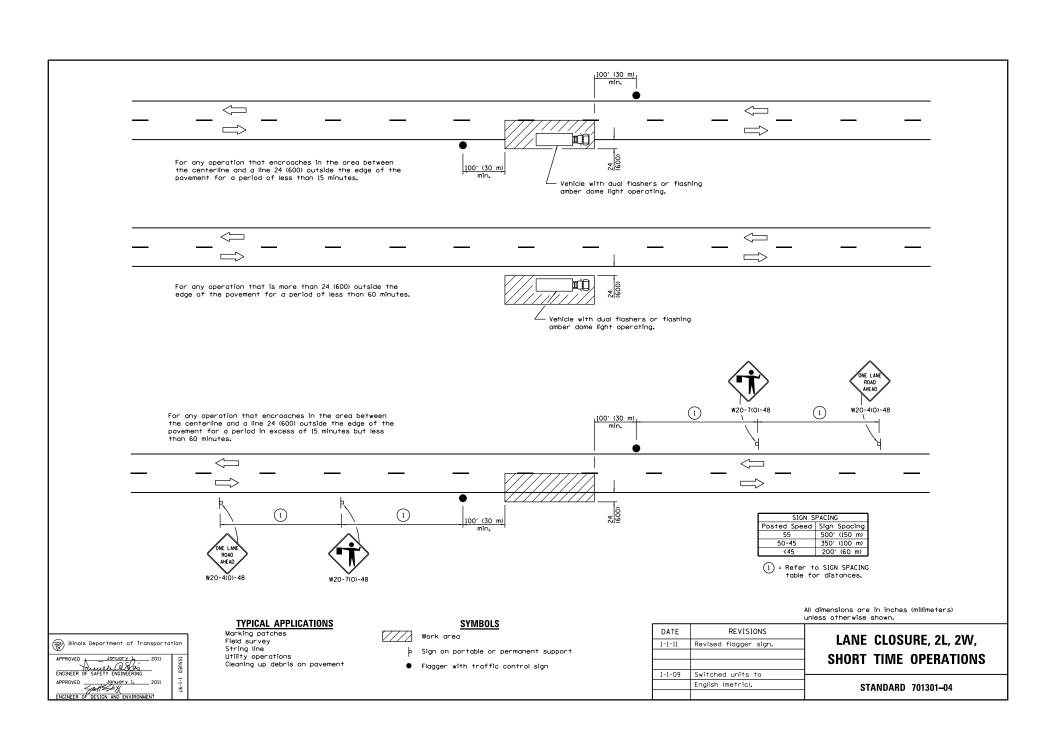


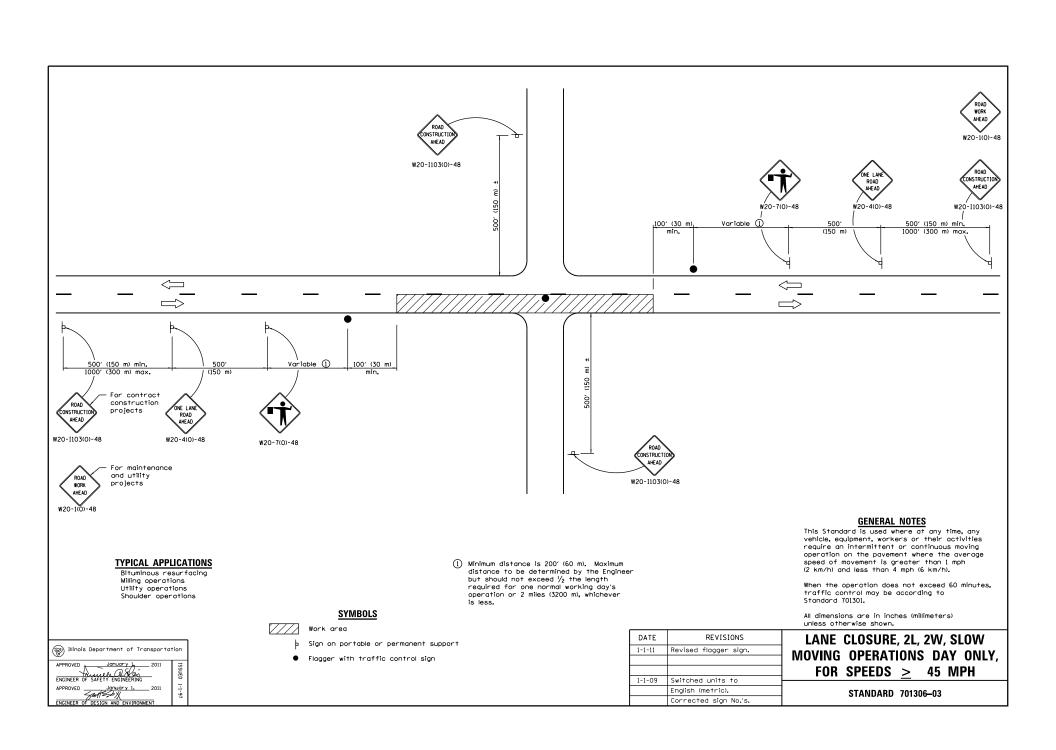


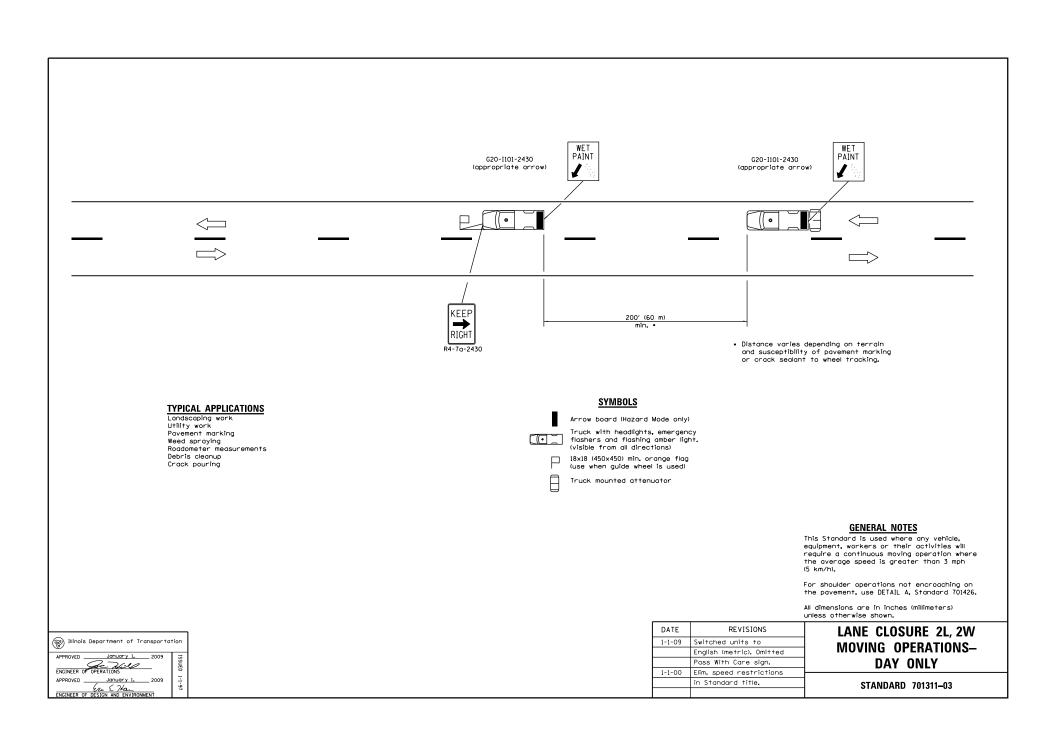


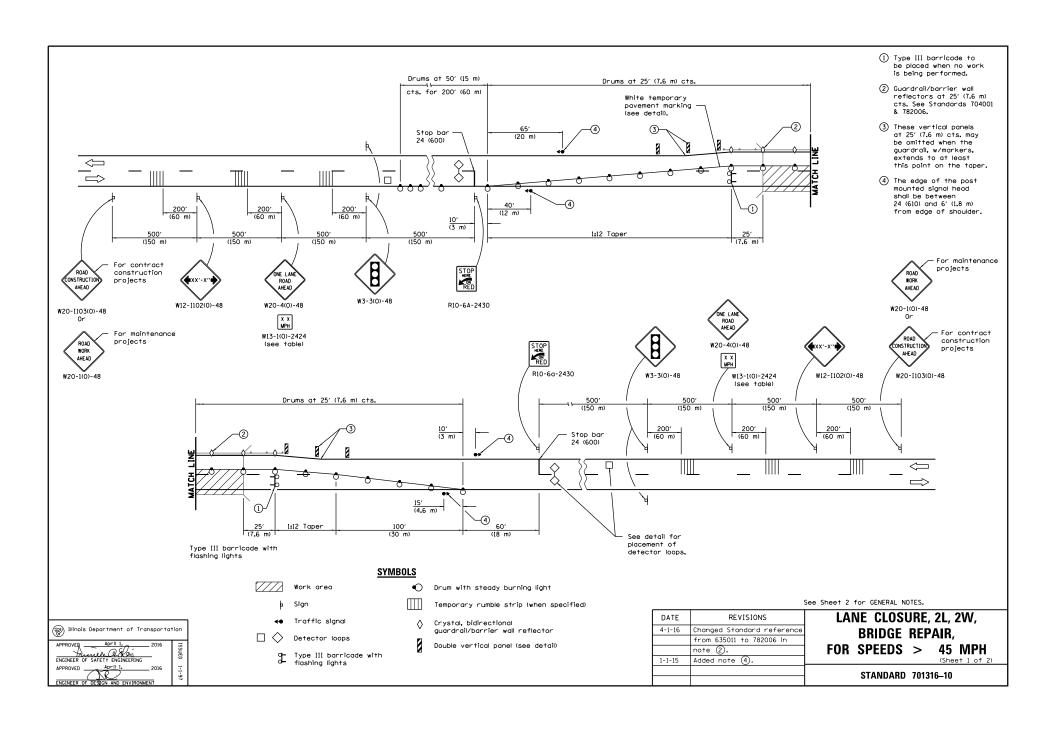


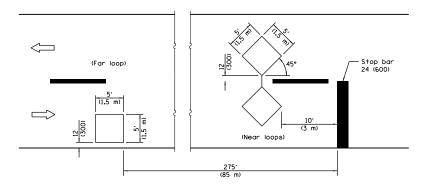








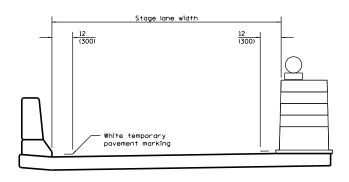


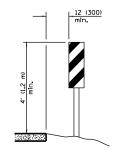


TRAFFIC SIGNAL SEQUENCE						
PHASE A			В			
INTERVAL	1	2	3	4	5	6
NORTHBOUND OR EASTBOUND	G	Υ	R	R	R	R
SOUTHBOUND OR WESTBOUND	R	R	R	G	Y	R

ADVISORY SPEED LIMIT				
NORMAL POSTED SPEED	ADVISORY SPEED			
55 - 45 mph	40 mph			
40 mph	35 mph			
35 - 30 mph	30 mph			

DETECTOR LOOPS





VERTICAL PANELS (Post mounted, one each side)

GENERAL NOTES

This Standard is used where, at any time any vehicle, equipment, workers or their activities will encroach on one lane of a bridge and traffic

When traffic signals are not in operation, flaggers shall be used and traffic control devices shall conform to Standard 701201 or 701206.

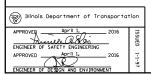
All dimensions are in inches (millimeters)

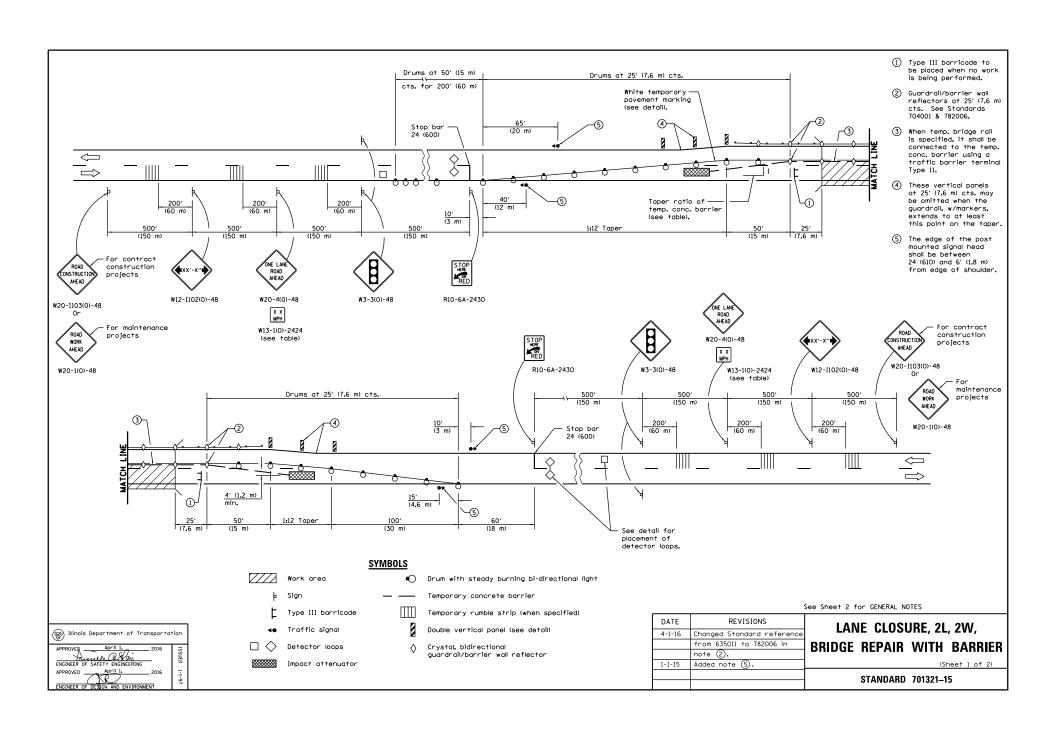
LANE CLOSURE, 2L, 2W, BRIDGE REPAIR, FOR SPEEDS > 45 MPH

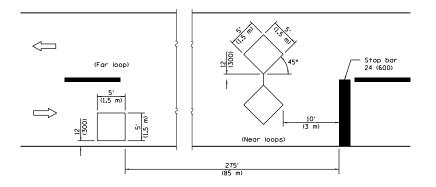
(Sheet 2 of 2)

STANDARD 701316-10

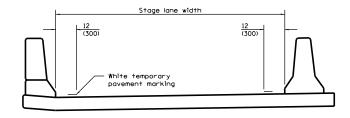
TEMPORARY PAVEMENT MARKING







DETECTOR LOOPS



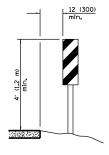
TEMPORARY PAVEMENT MARKING

Illinois Department of Transportat	ion
APPROVED APPI I. 2016 ENGINEER OF SAFETY ENGINEERING APPROVED APPI I. 2016 ENGINEER OF DESIGN AND ENVIRONMENT	ISSUED 1-1-97

TRAFFIC SIGNAL SEQUENCE						
PHASE		A			В	
INTERVAL	1	2	3	4	5	6
NORTHBOUND OR EASTBOUND	G	Υ	R	R	R	F
SOUTHBOUND OR WESTBOUND	R	R	R	G	Y	F

TEMPORARY CONCRETE	BARRIER
NORMAL POSTED SPEED	TAPER RATIO
40 mph AND ABOVE	12:1
BELOW 40 mph	8:1

ADVISORY SPEED LIMIT			
NORMAL POSTED SPEED	ADVISORY SPEED		
55 - 45 mph	40 mph		
40 mph	35 mph		
35 - 30 mph	30 mph		



VERTICAL PANELS (Post mounted, one each side)

GENERAL NOTES

This Standard is used where, at any time, any vehicle, equipment, workers, or their activities will encroach on one lane of a bridge. Traffic signals and a positive barrier are required.

Traffic signals shall be operational only when all traffic controls are in place. When traffic signals are not in operation, flaggers shall be used and traffic control shall conform to Standard 701201 or 701206.

Temporary concrete barrier shall be according to Standard 704001.

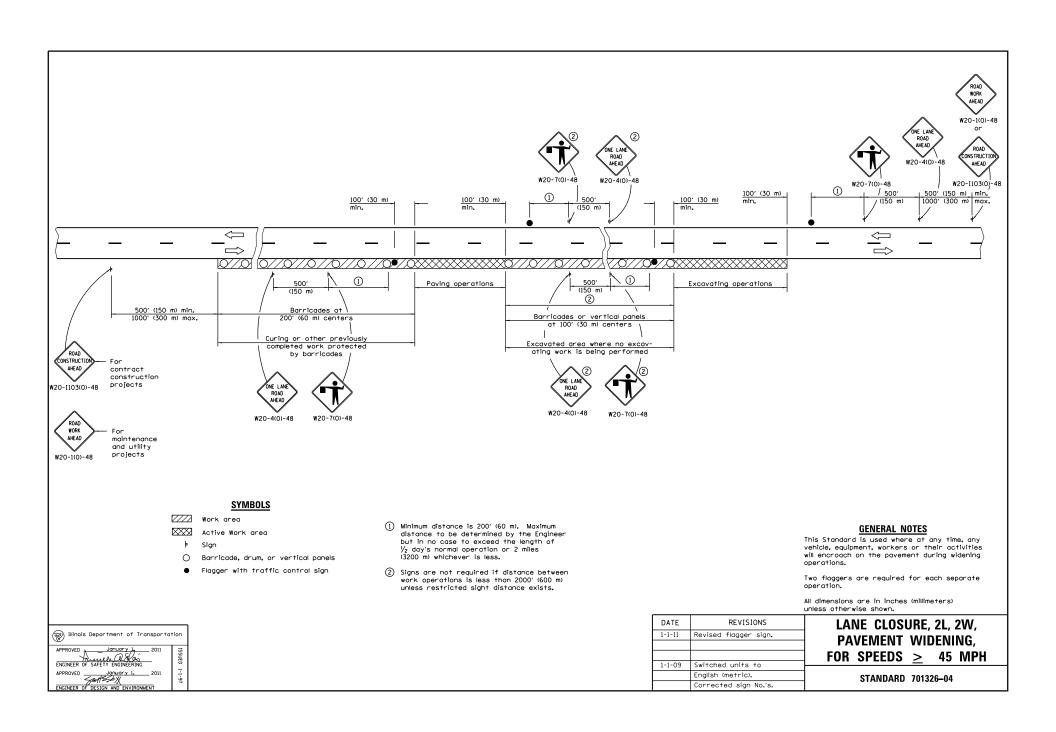
Existing or temporary pavement markings shall be on both sides of open lane from stop bar to stop bar.

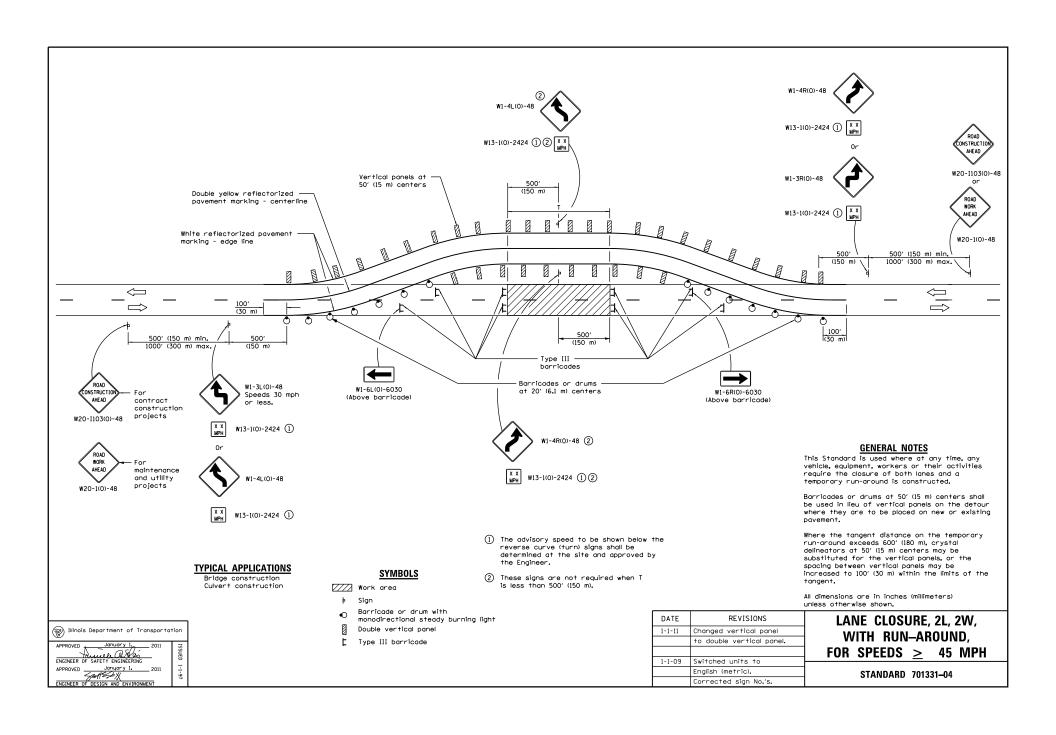
All dimensions are in inches (millimeters) unless otherwise shown.

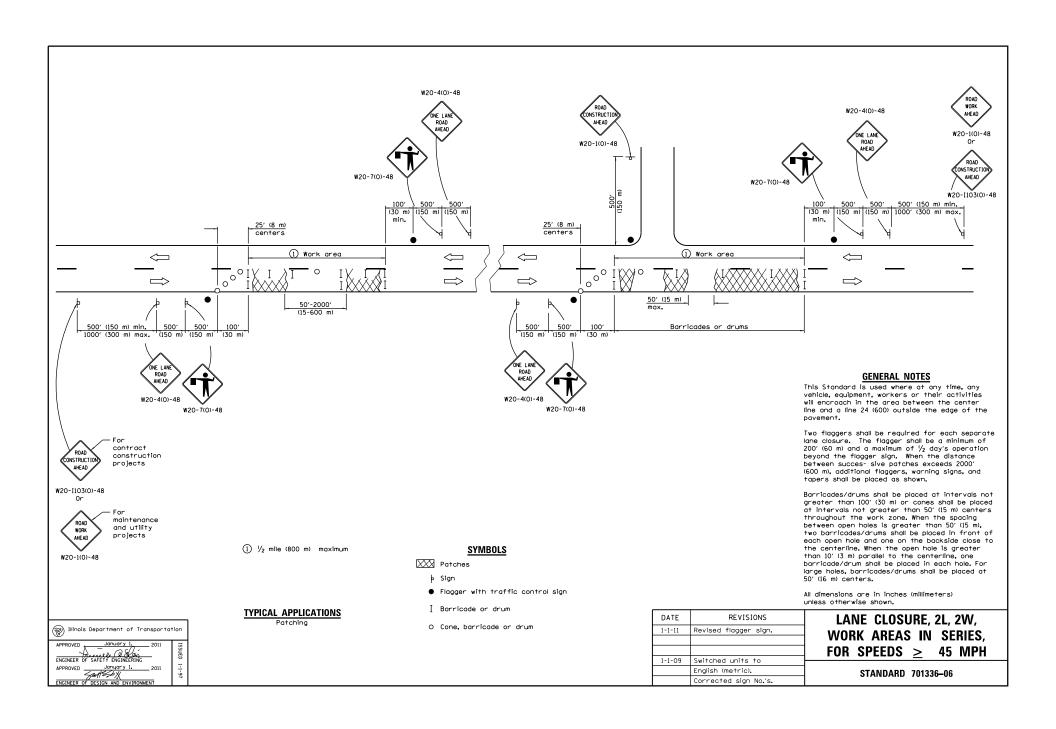
LANE CLOSURE, 2L, 2W, BRIDGE REPAIR WITH BARRIER

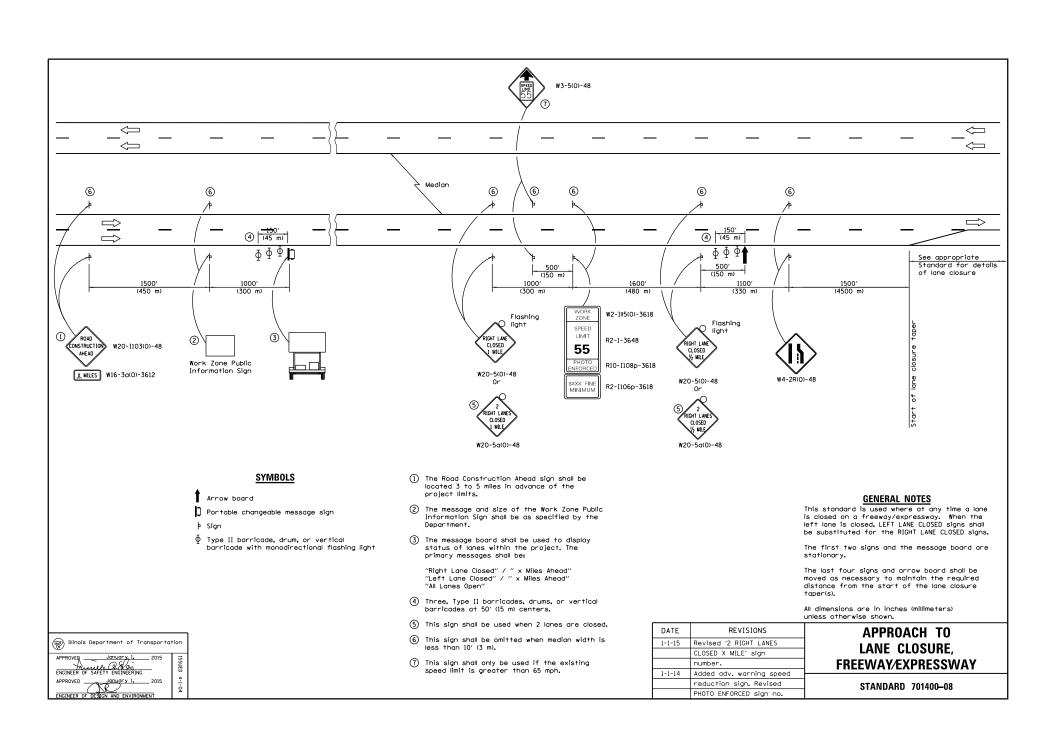
(Sheet 2 of 2)

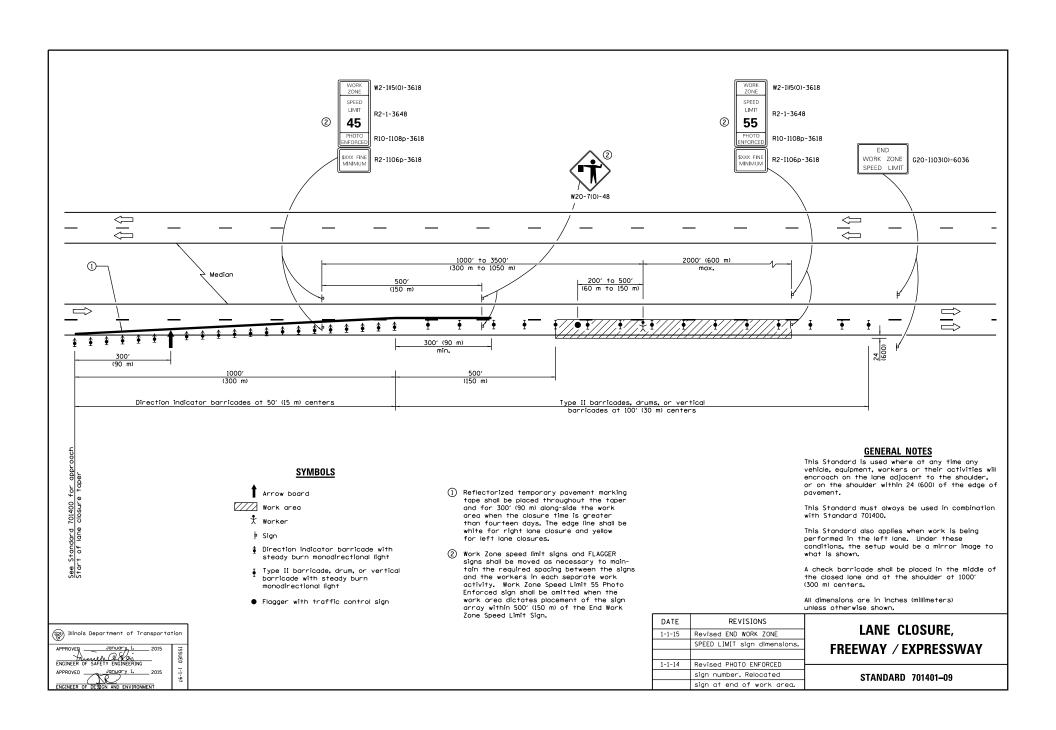
STANDARD 701321-15

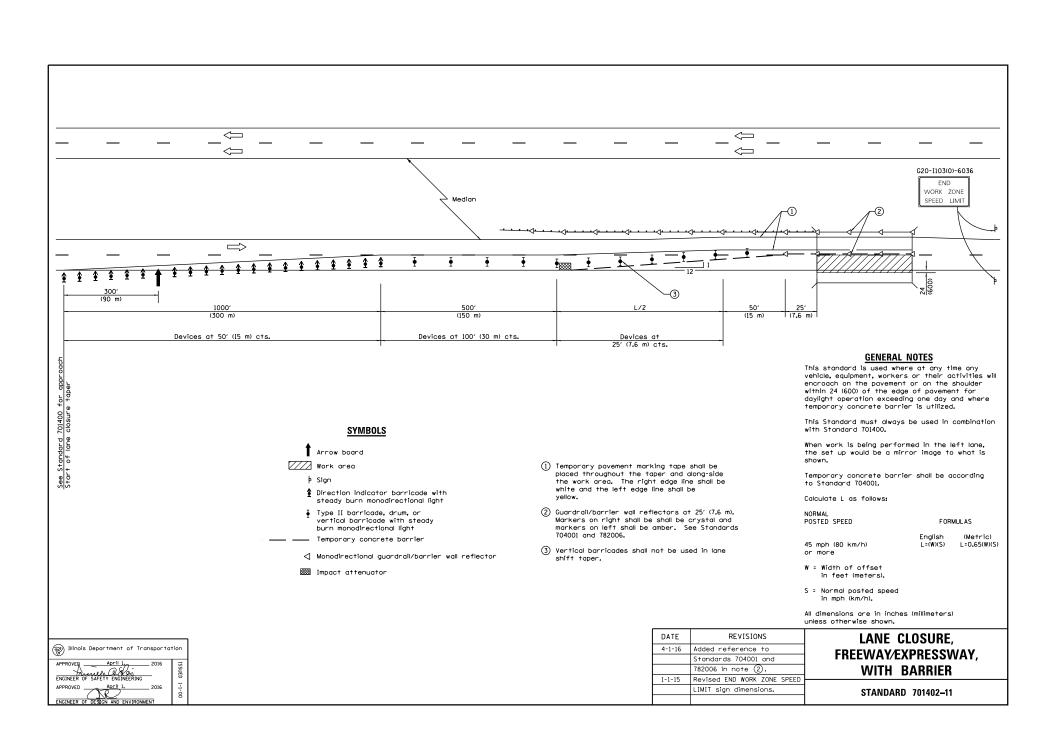


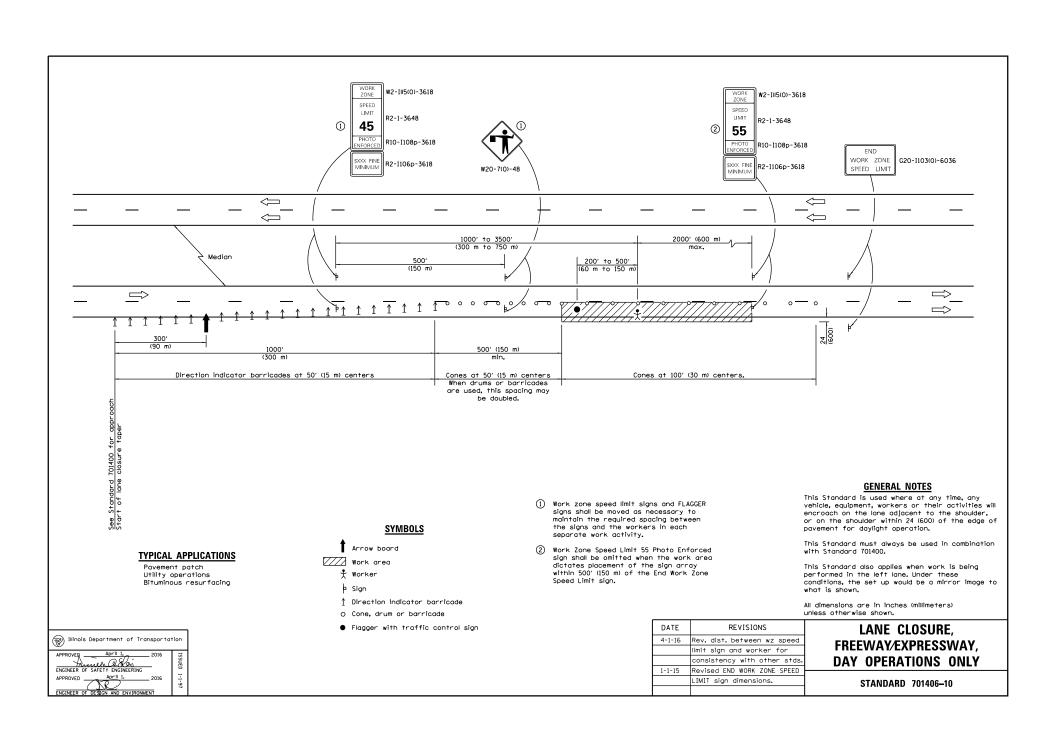


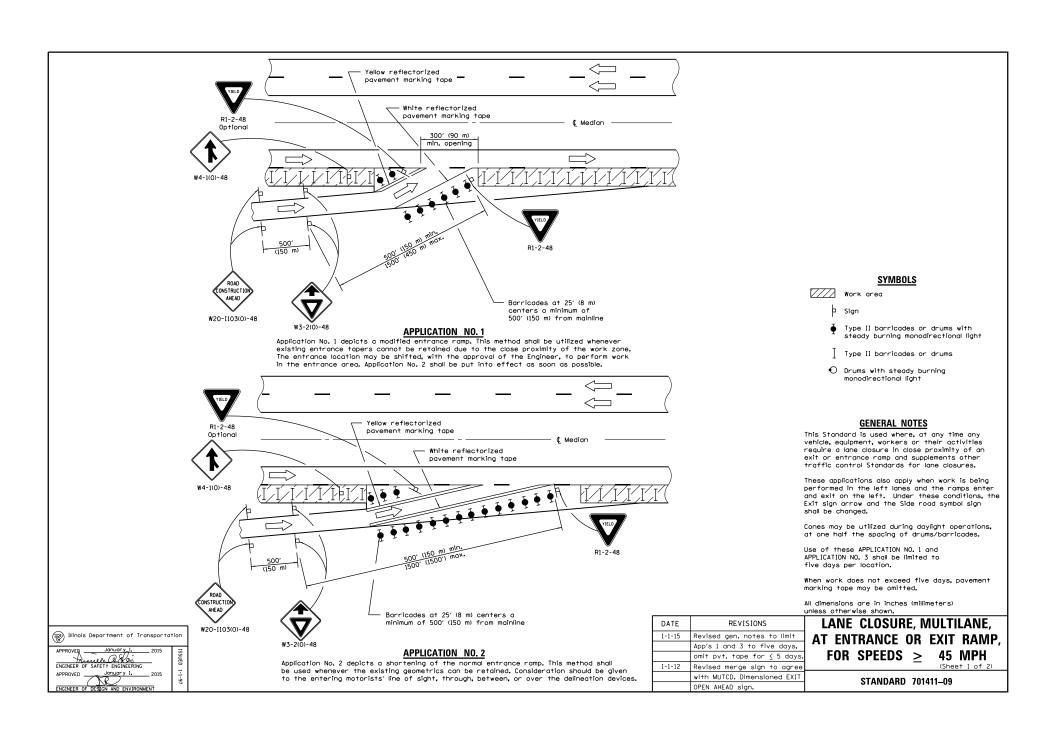


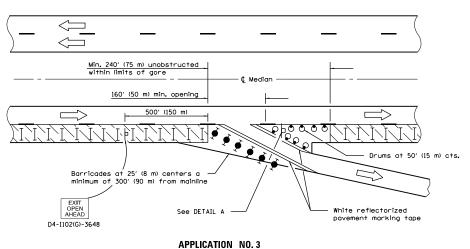




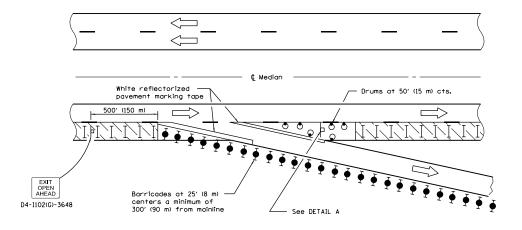








Application No. 3 depicts a modified exit ramp. The channelizing devices shall provide a clearly defined path for the exiting motorists. The minimum dimensions shown shall be increased as soon as the progress of the work will permit. The open portion of the ramp may be shifted, with the approval of the Engineer, to perform work in stages on the area adjacent to the ramp exit. Application No. 4 shall be put into effect as soon as possible.



Illinois Department of Transportation

ENGINEER OF SAFETY ENGINEERING APPROVED ______January 1.

ENGINEER OF DESIGN AND ENVIRONMENT

APPLICATION NO. 4

Application No. 4 depicts an extension of the normal exit ramp. This method shall be used whenever existing geometrics can be retained. Consideration should be given to the exiting motorist's line of sight through, between or over the delineation devices.

42 (1070) (280) (280) (510) (150) 6 (150) 36 Background - Green Border and legend - White

"D" size letters

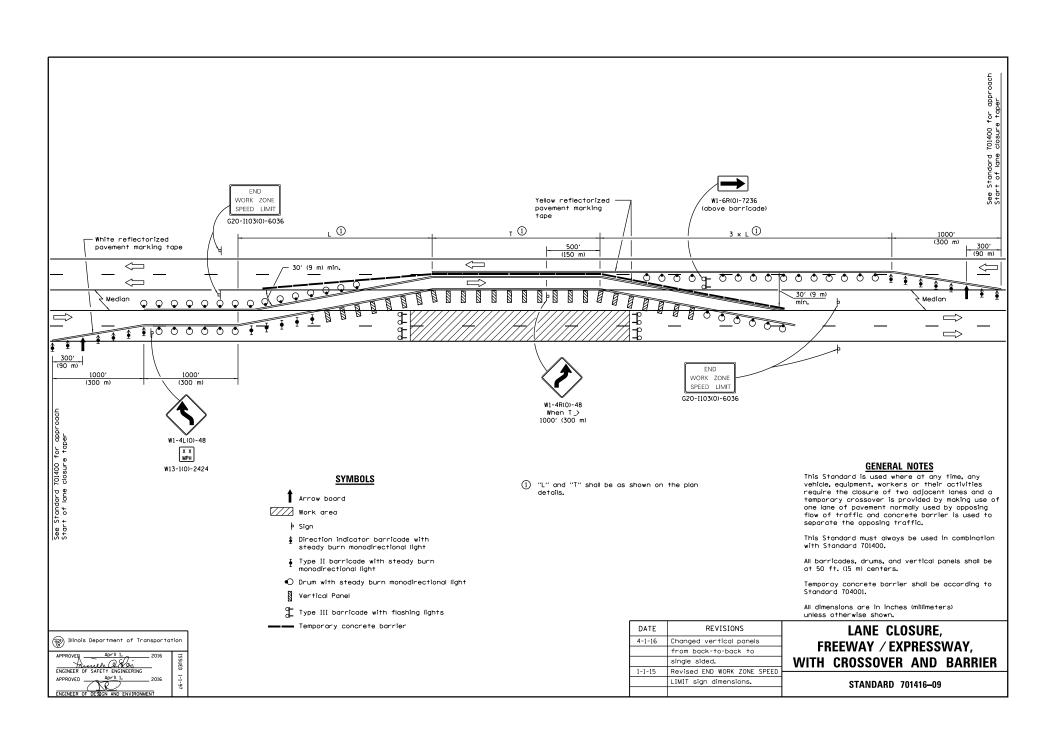
EXIT SIGN - SPECIAL

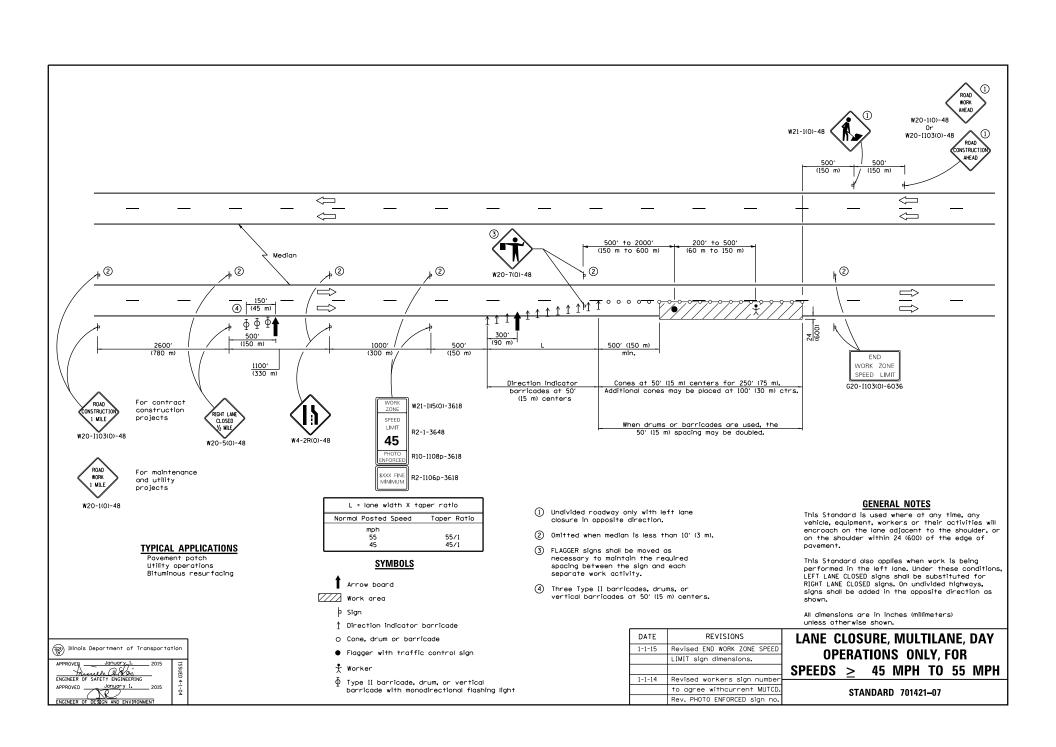
DETAIL A

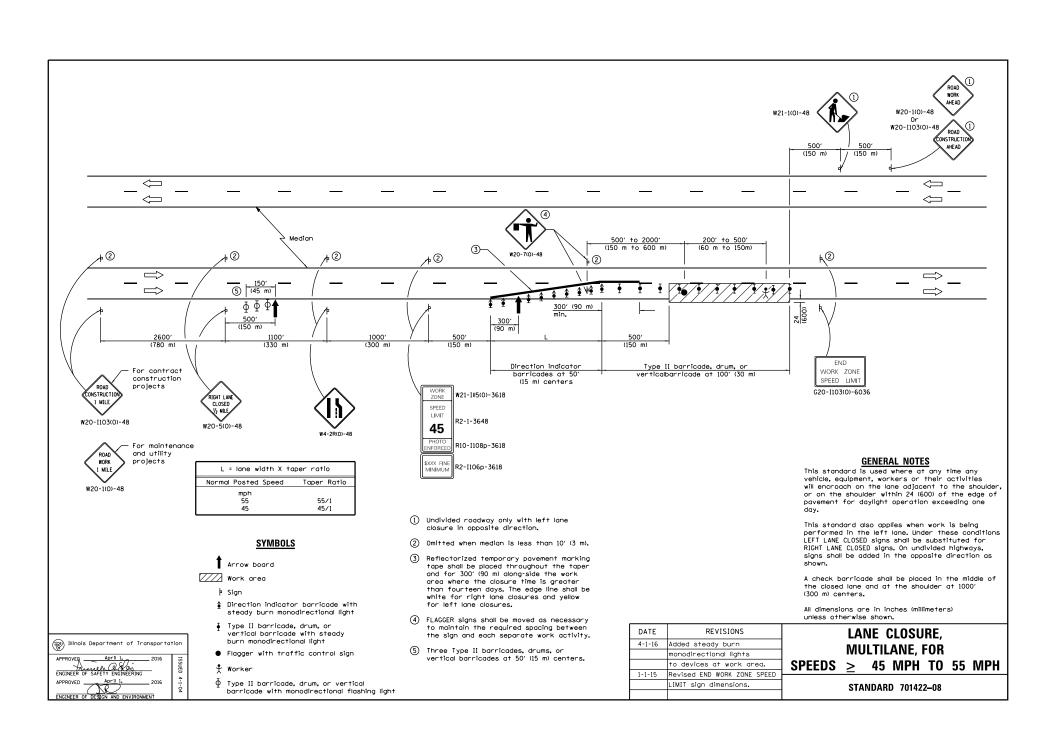
(To be utilized where distance between the two rows of channelizing devices is 6' (1.8 m) in width.)

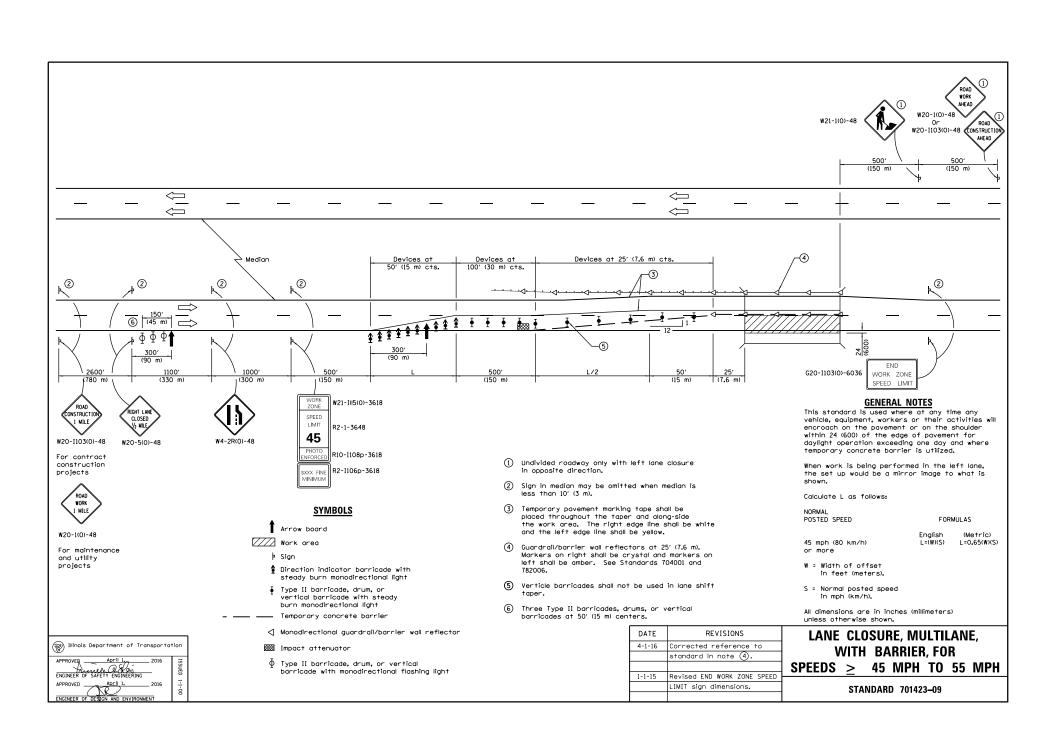
LANE CLOSURE, MULTILANE, AT ENTRANCE OR EXIT RAMP, FOR SPEEDS ≥ 45 MPH

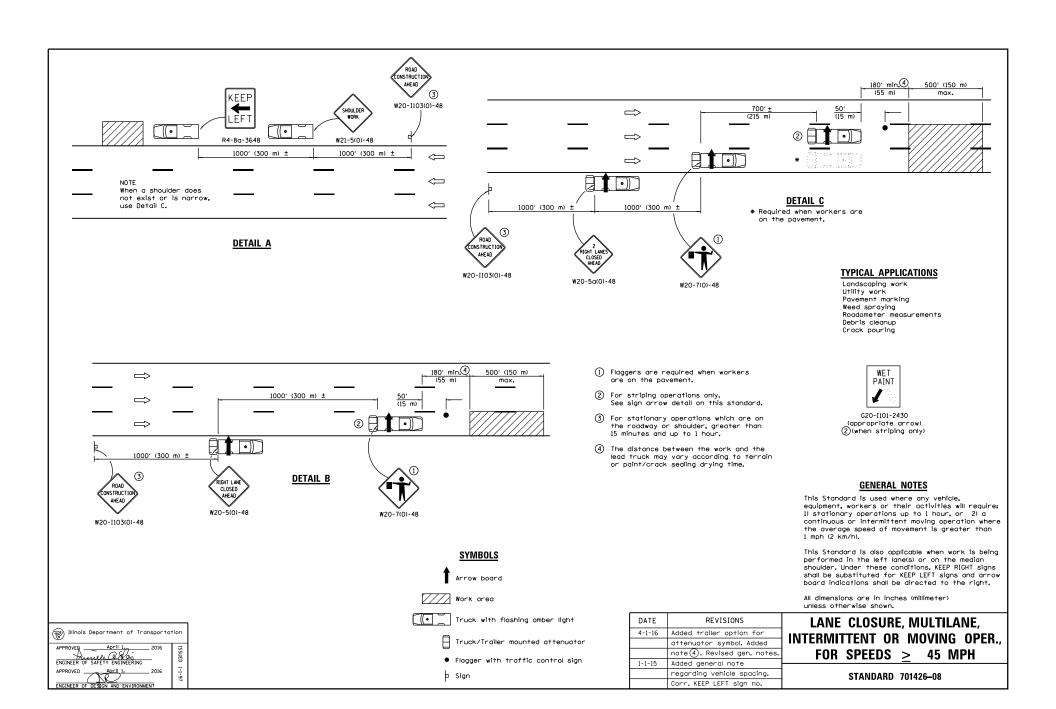
STANDARD 701411-09

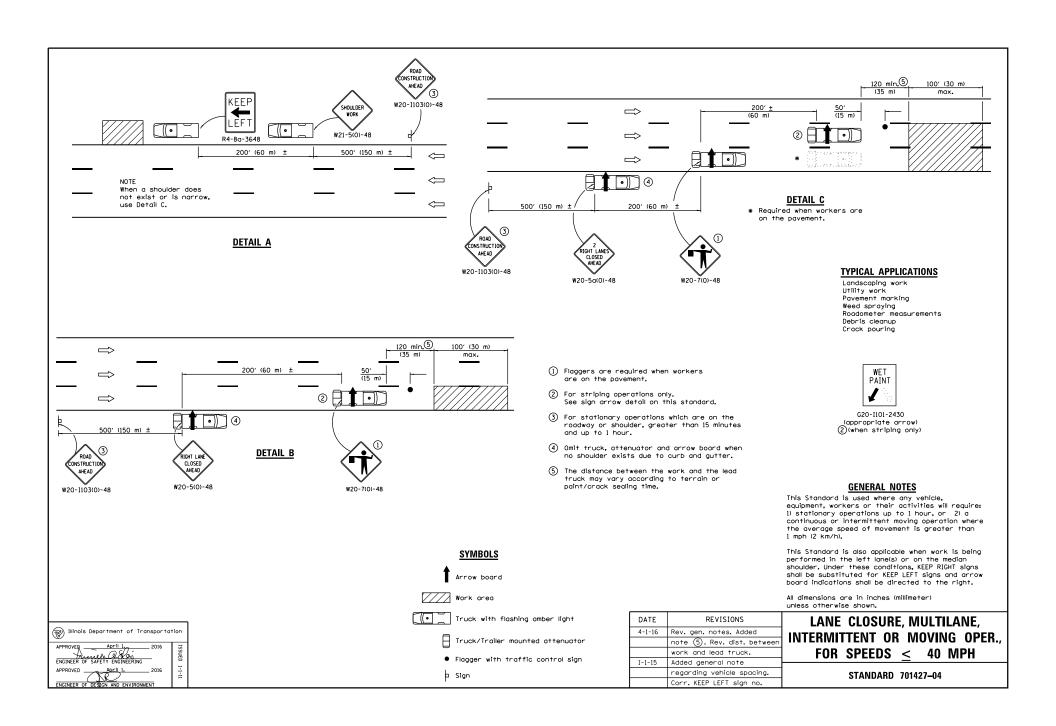


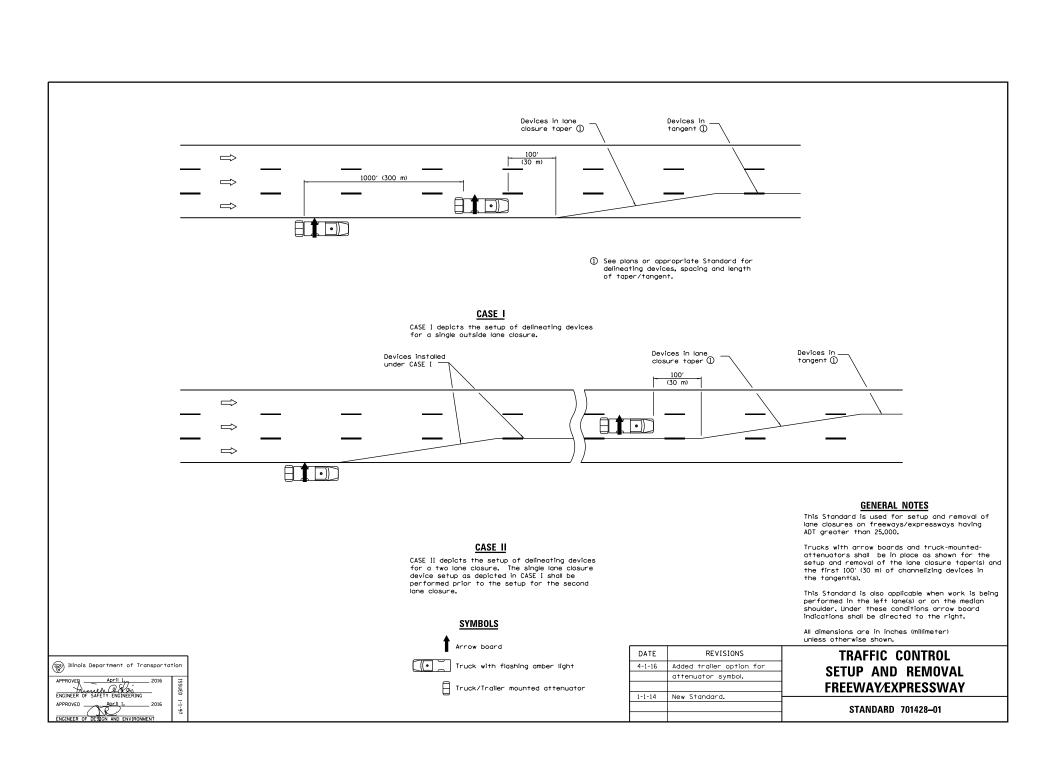


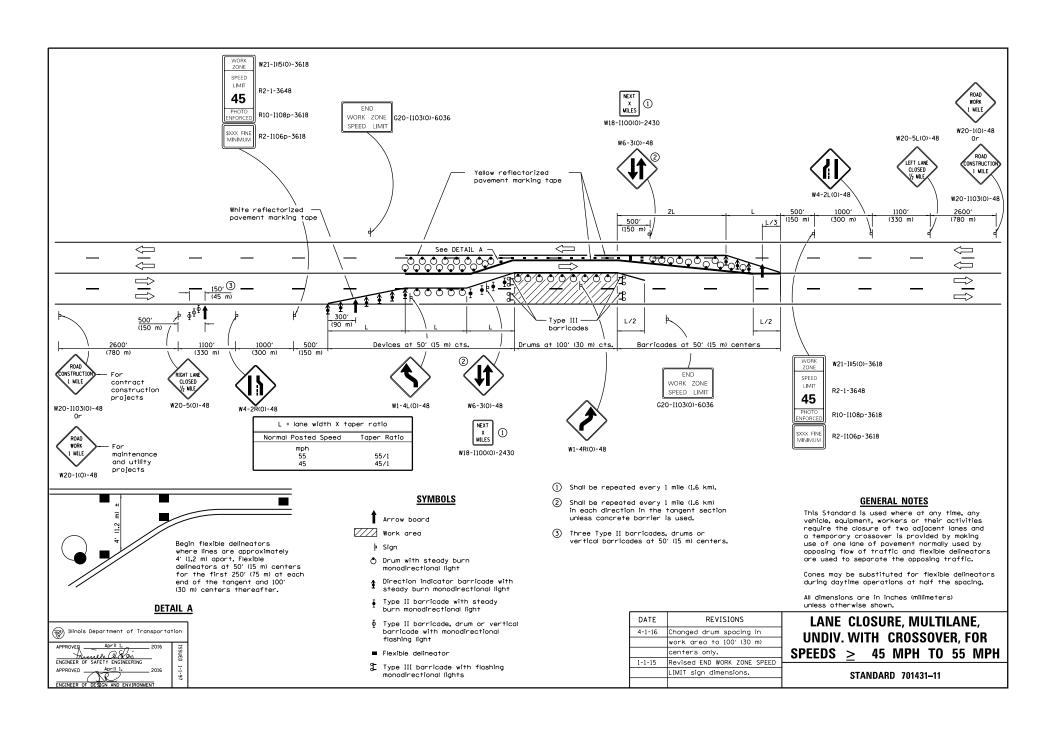


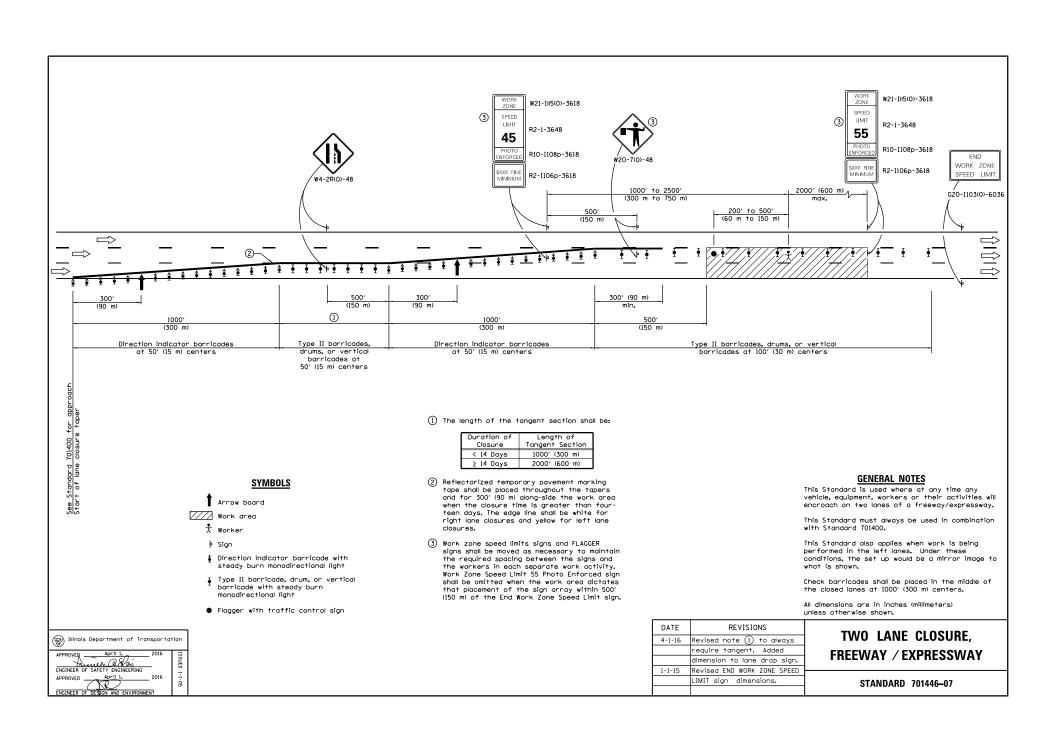


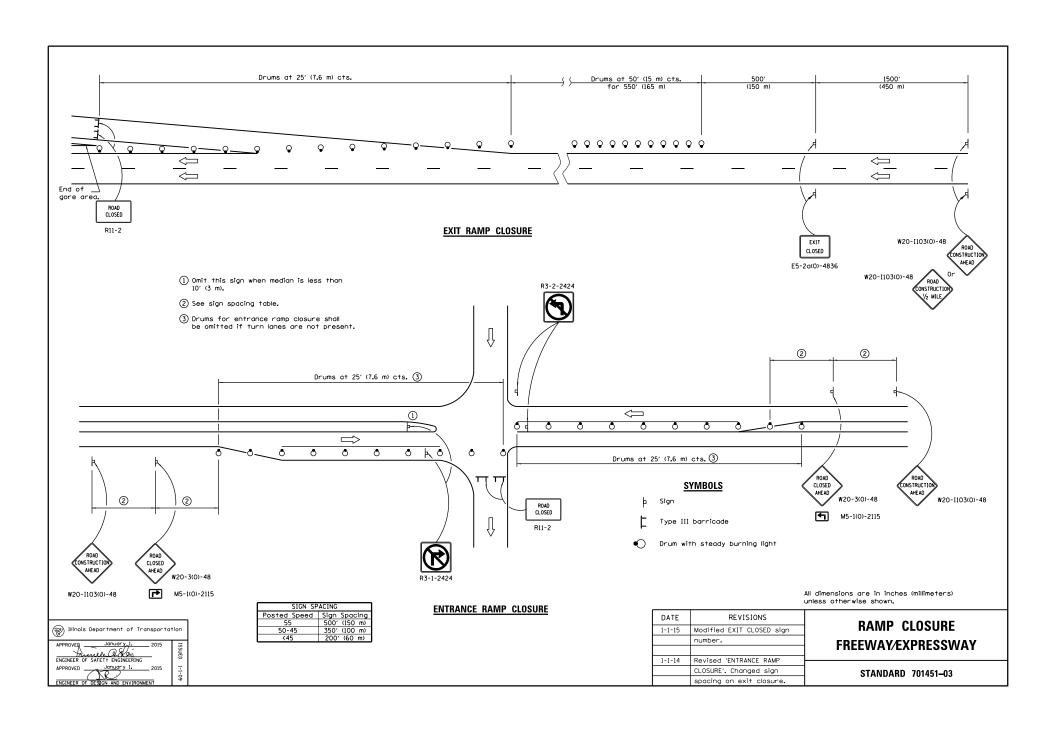


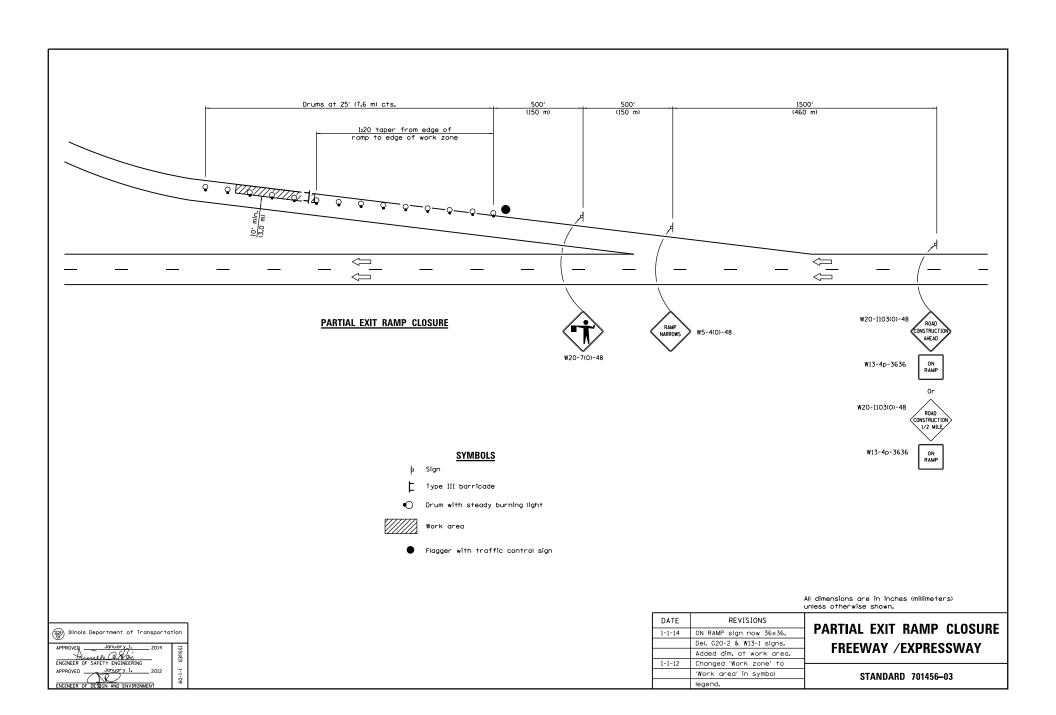


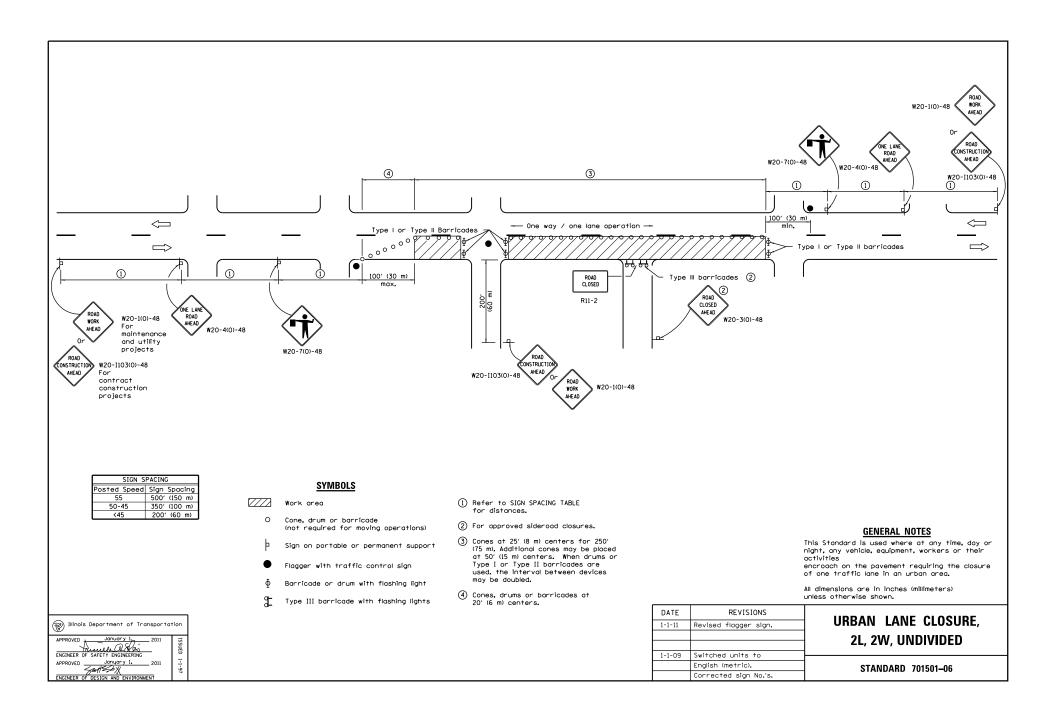


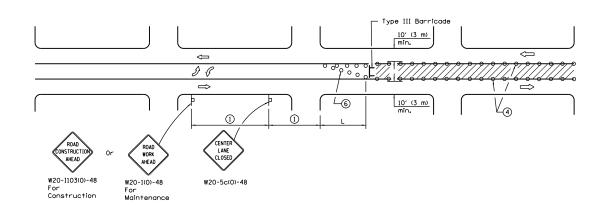












CASE | (Signs required for both directions)

SIGN SPACING				
Posted Speed	Sign Spacing			
55	500' (150 m)			
50-45	350' (100 m)			
<45	200' (60 m)			

SYMBOLS

Work area

- → Barricade or drum with flashing light
- Flagger with traffic control sign
- O Cone, drum or barricade (Cones for daytime use only)
- Sign on portable or permanent support

- Refer to SIGN SPACING TABLE for distances.
- Required for speeds > 40 mph (70 km/h).
- 3 Required if work exceeds 500' (164 m) or 1 block.
- Cones at 25' (8 m) centers for 250' (75 m). Additional cones may be placed at 15 m (50') centers. When drums or type I or II barricades are used, the interval between devices may be doubled.
- 5 For approved sideroad closures.
- 6 Cones, drums or barricades at 20' (6 m) centers in taper.
- 7) Use flagger sign only when flagger is

GENERAL NOTES

This Standard is used to close one lane of an urban, two lane, two way roadway with a bidirectional turn lane.

Case I applies when no workers are present. When workers are present, two lanes shall be closed and traffic control shall be according to Standard 701501.

Calculate L as follows:

 SPEED LIMIT
 FORMULAS English
 (Metric)

 40 mph (70 km/h) or less:
 L= WS² 60
 L= WS² 150

 45 mph (80 km/h) or greater:
 L=(WIS) L=0.65(WIS)
 L=0.65(WIS)

- W = Width of offset in feet (meters).
- S = Normal posted speed mph (km/h).

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS	URBAN LANE CLOSURE,
1-1-14	Omitted original note 4.	2L, 2W, WITH BIDIRECTIONAL
	Rev. workers sign no. to	
	agree with current MUTCD.	LEFT TURN LANE
1-1-13	Omitted text 'WORKERS'	(Sheet 1 of 2)
	sign.	STANDARD 701502-06
		31ANDAND /01302-00

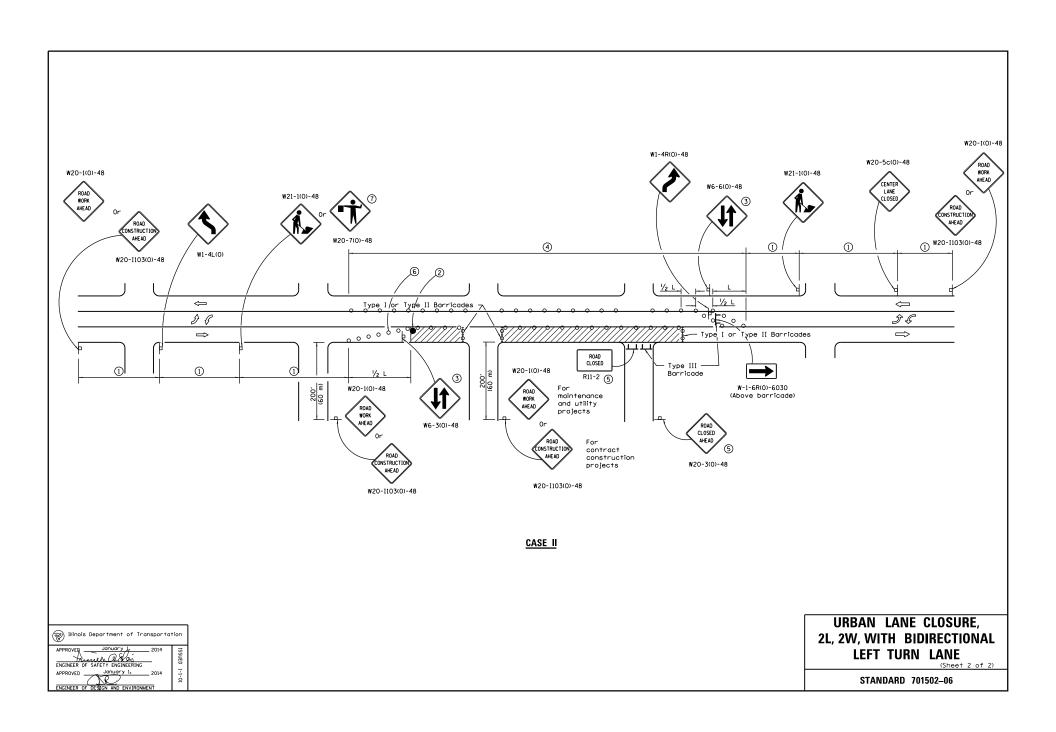
Illinois Department of Transportation

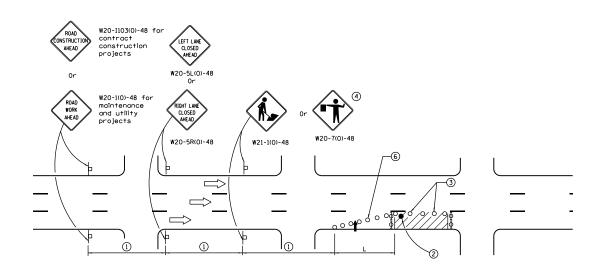
APPROVER January 1. 2014

ENGINEER OF SAFETY ENGINEERING

APPROVED JOURNAL 1. 2014

ENGINEER OF DESIGN AND ENVIRONMENT





SIGN SPACING				
Posted Speed	Sign Spacing			
55	500' (150 m)			
50-45	350' (100 m)			
(45	200' (60 m)			

SYMBOLS

1 4

Arrow board

Cone, drum or barricade

Sign on portable or permanent support

Work area

→ Barricade or drum with flashing light

Type III barricade with flashing lights

Flagger with traffic control sign.

- (1) Refer to SIGN SPACING TABLE for distances.
- 2 Required for speeds > 40 MPH
- 3 Cones at 25' (8 m) centers for 250' (75 m). Additional cones may be placed at 50' (15 m) centers. When drums or Type I or Type II barricades are used, the interval between devices may be doubled.
- 4) Use flagger sign only when flagger is
- (5) For approved sideroad closures.
- 6 Cones, drums or barricades at 20' (6 m)

GENERAL NOTES

This Standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the powement during shoulder operations or where construction requires lane closures in urban areas.

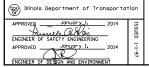
Calculate L as follows:

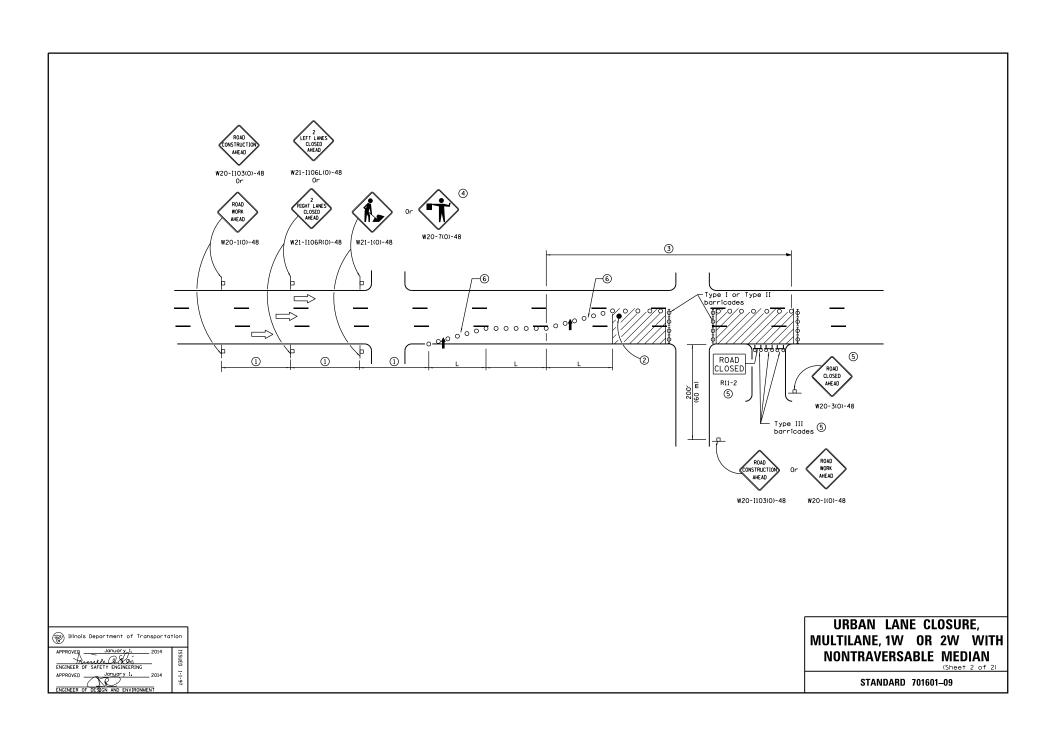
SPEED LIMIT	FORMULAS		
	English	(Metric)	
40 mph (70 km/h) or less:	$L = \frac{WS^2}{60}$	L= WS2 150	
45 mph (80 km/h) or greater:	L=(W)(S)	L=0.65(W)(S)	

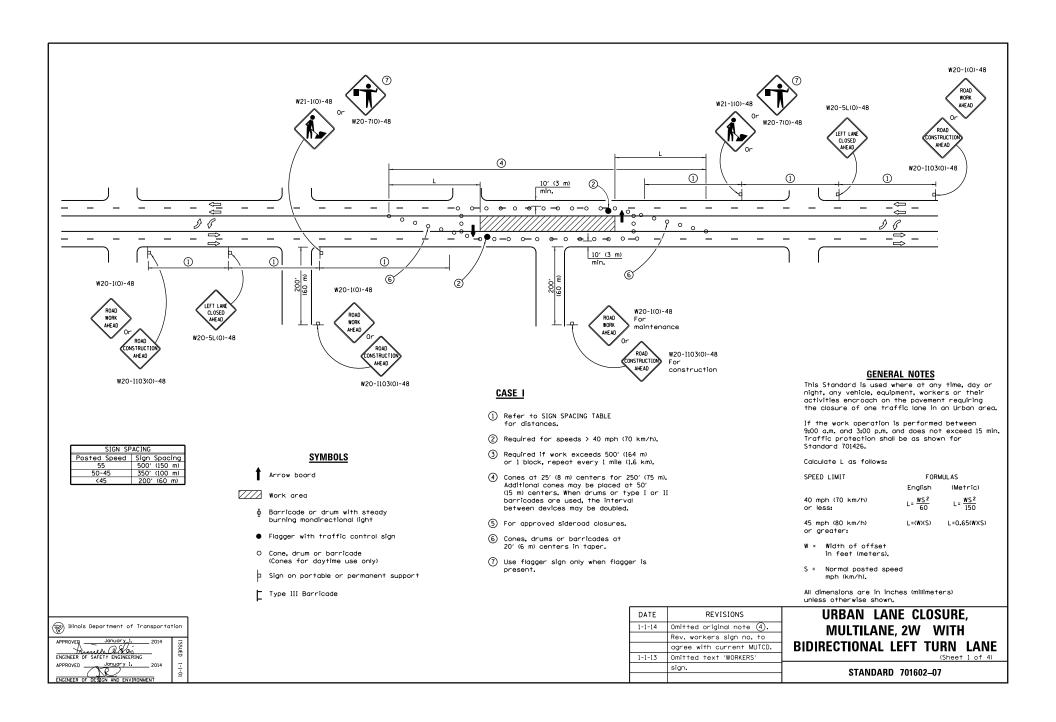
- W = Width of offset in feet (meters).
- S = Normal posted speed mph (km/h).

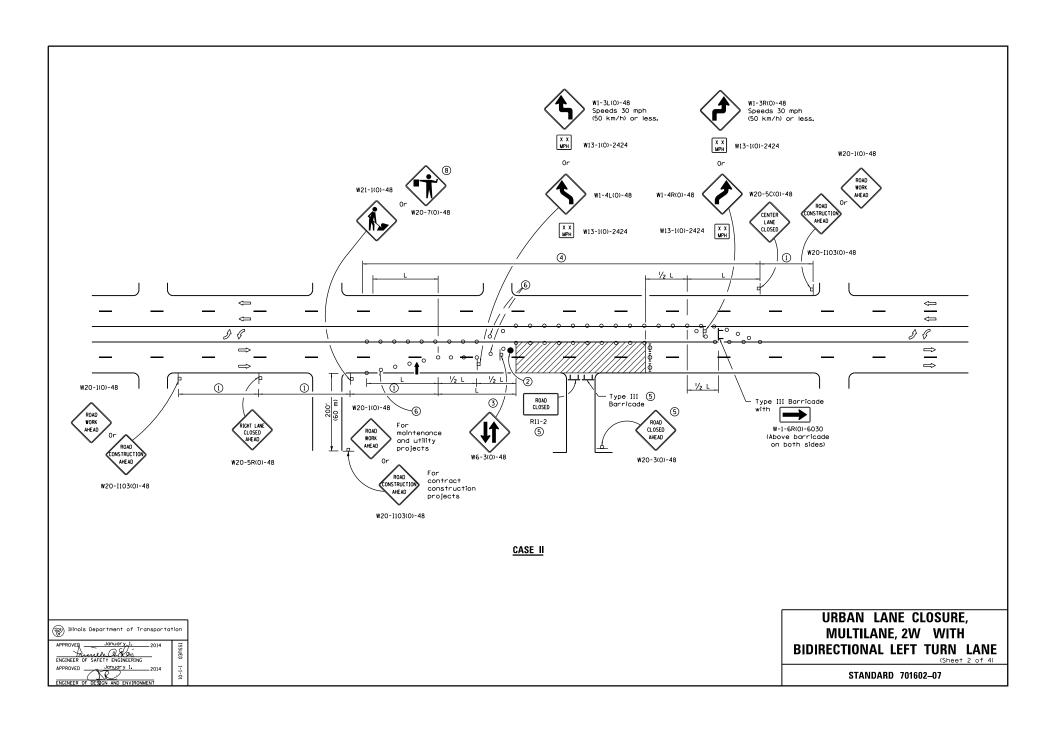
All dimensions are in inches (millimeters) unless otherwise shown.

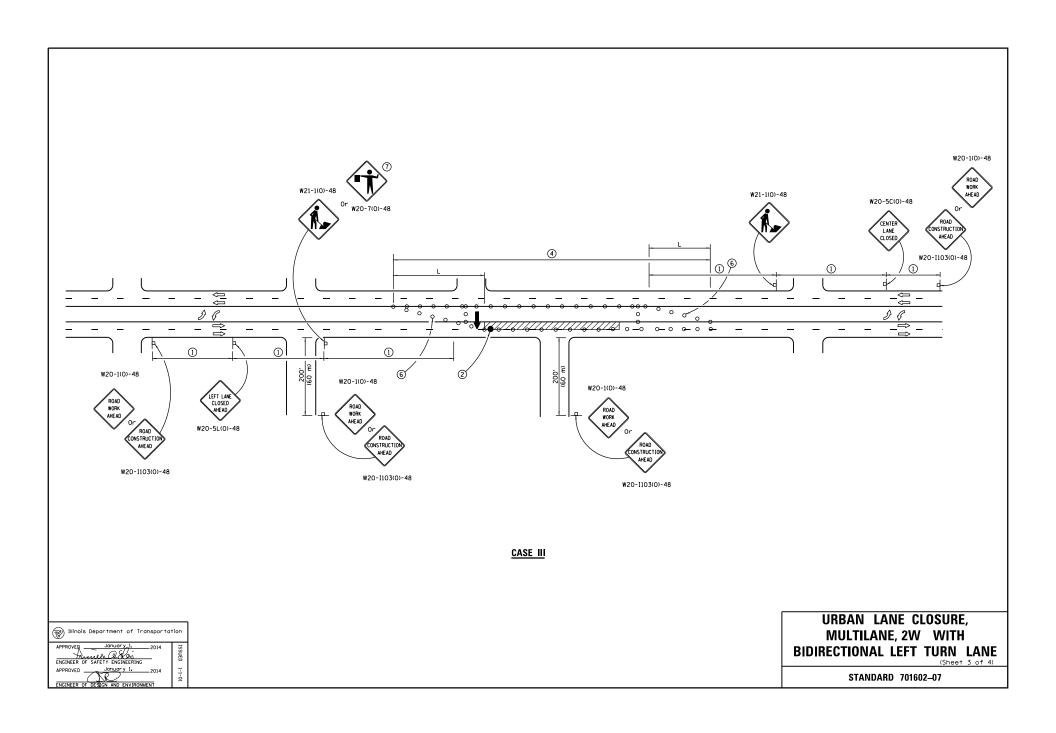
DATE	REVISIONS	URBAN LANE CLOSURE,
1-1-14	Revised workers sign	MULTILANE, 1W OR 2W WITH
	number to agree with	1
	current MUTCD.	NONTRAVERSABLE MEDIAN
1-1-13	Omitted text 'WORKERS'	(Sheet 1 of 2)
	sign.	STANDARD 701601-09
		31ANDAND /01001=09

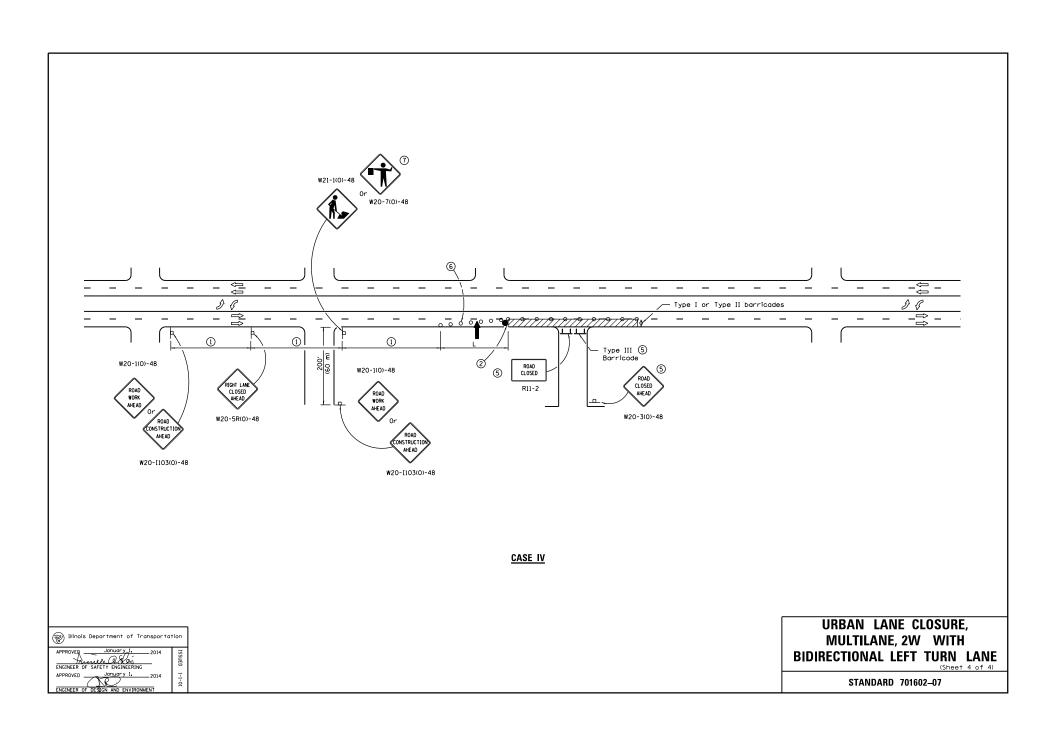


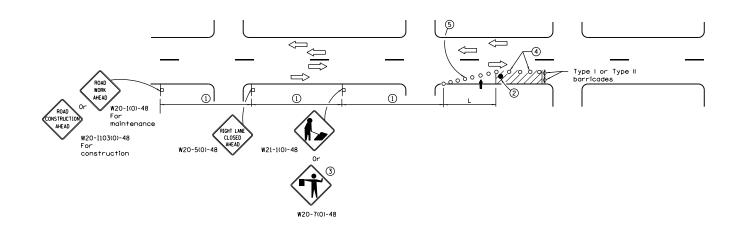












SIGN SPACING			
Posted Speed	Sign Spacing		
55	500' (150 m)		
50-45	350' (100 m)		
<45	200' (60 m)		

SYMBOLS

Arrow board

Cone, drum or barricade

Sign on portable or permanent support

Barricade or drum with flashing light

Flagger with traffic control sign.

- 1 Refer to SIGN SPACING TABLE for distances.
- 2 Required for speeds > 40 mph.
- 3 Use flagger sign only when flagger is present.
- 4 Cones at 25' (8 m) centers for 250' (75 m). Additional cones may be placed at 50' (15 m) centers. When drums or Type I or Type II barricades are used, the interval between devices may be doubled.
- (5) Cones, drums or barricades at 20' (6 m) centers in taper.

GENERAL NOTES

This Standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement requiring the closure of one traffic lane in an Urban area.

Calculate L as follows:

SPEED LIMIT FORMULAS English (Metric) 40 mph (70 km/h) $L = \frac{WS^2}{150}$ $L = \frac{WS^2}{60}$ or less: 45 mph (80 km/h) L=(W)(S) L=0.65(W)(S)

or greater:

Width of offset in feet (meters).

S = Normal posted speed mph (km/h).

All dimensions are in inches (millimeters)

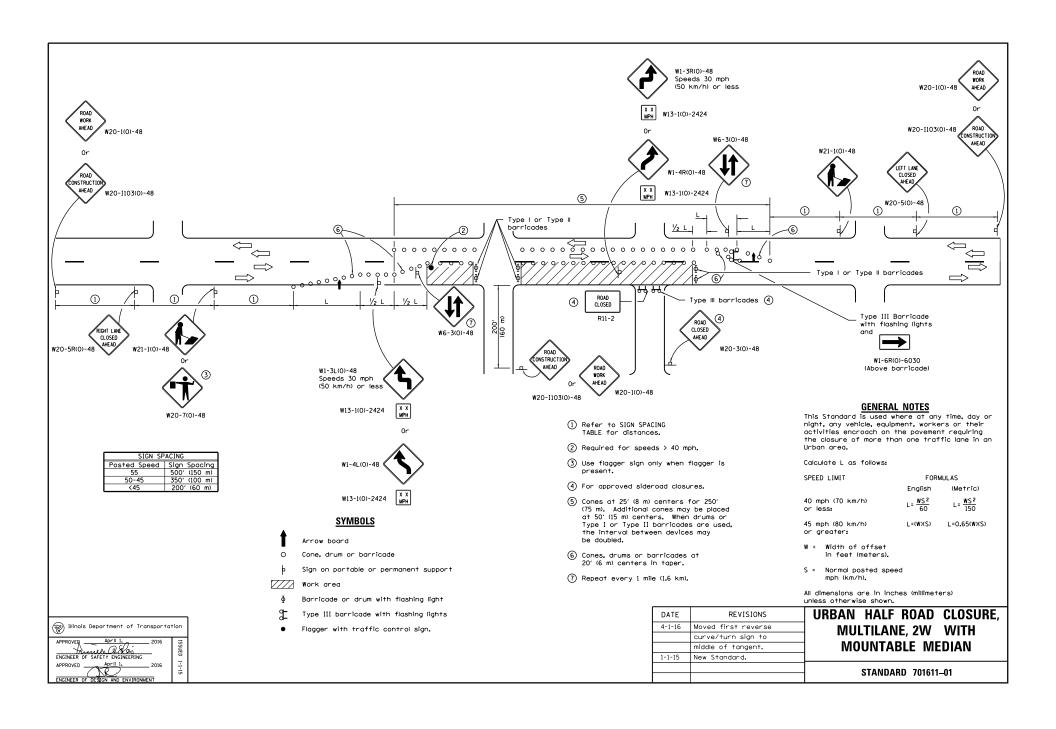
DATE	REVISIONS	HR
1-1-15	Renamed standard. Moved	٠
	case on Sheet 2 to new]
	Highway Standard.	
1-1-14	Revised workers sign	
	number to agree with	
	current MUTCD.	1

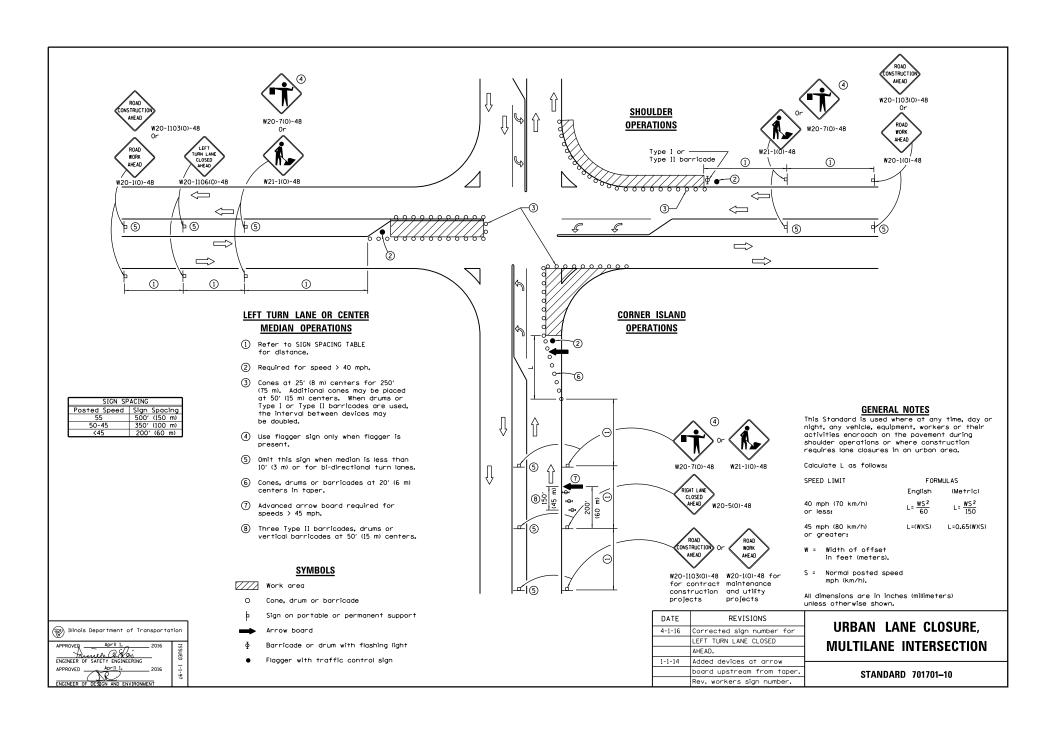
RBAN SINGLE LANE CLOSURE, **MULTILANE, 2W WITH MOUNTABLE MEDIAN**

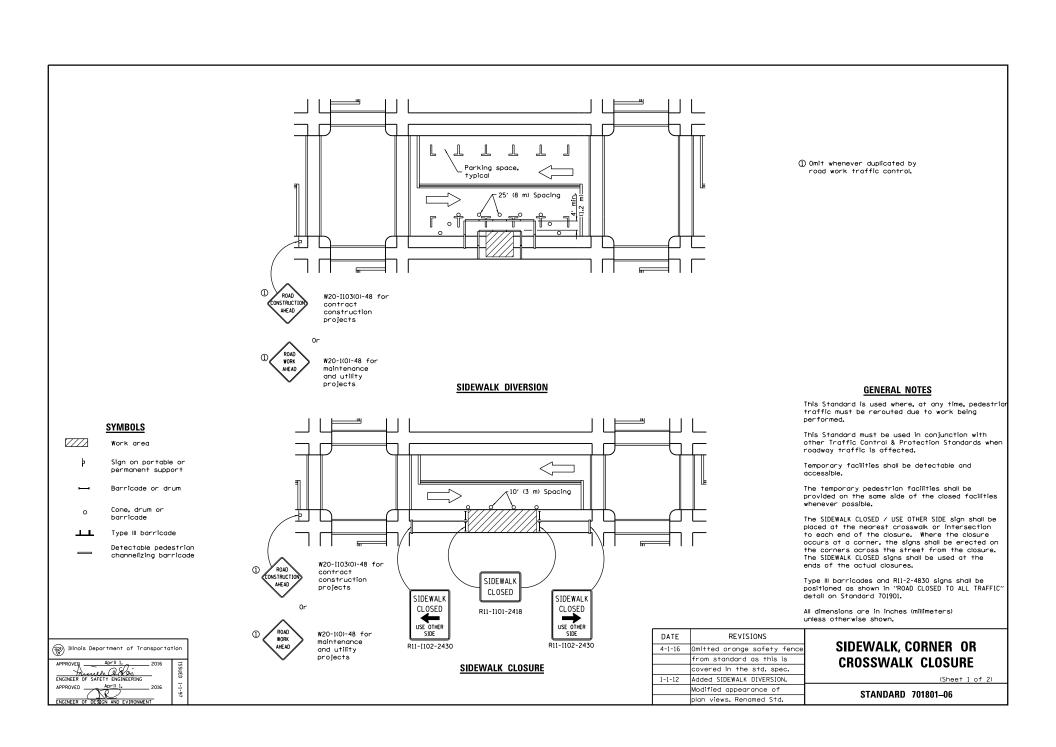
STANDARD 701606-10

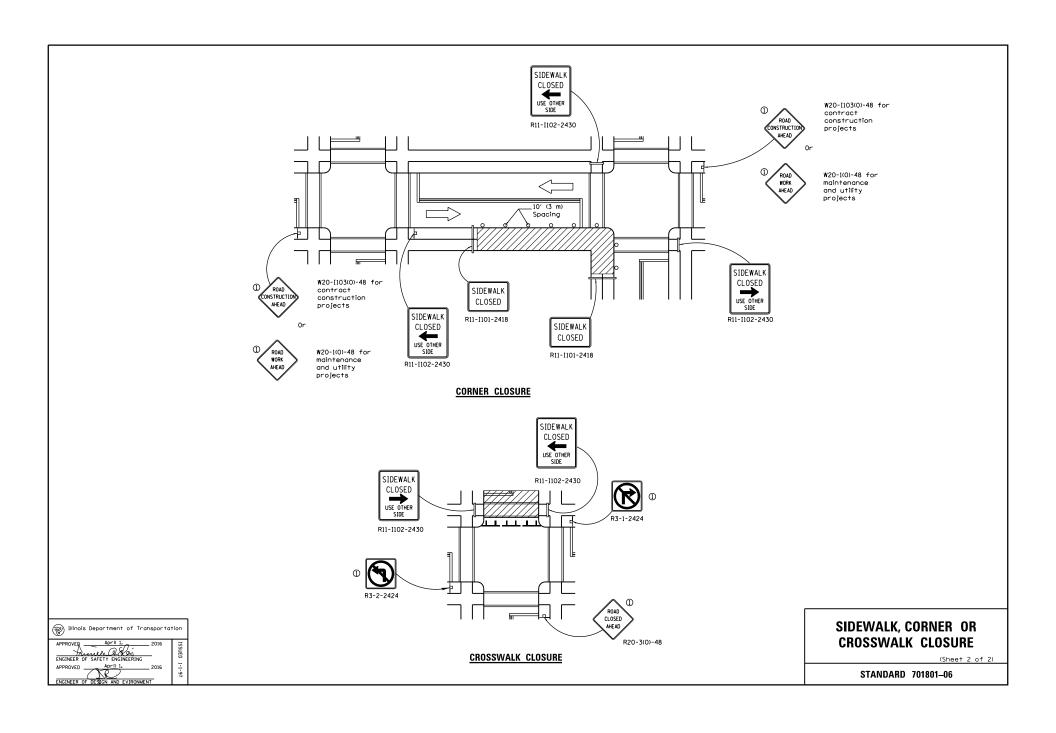
Illinois Department of Transporta	tion
APPROVED JONUARY, 1. 2015 ENGINEER OF SAFETY ENGINEERING APPROVED JONUARY 1. 2015	ISSUED 1-1-97

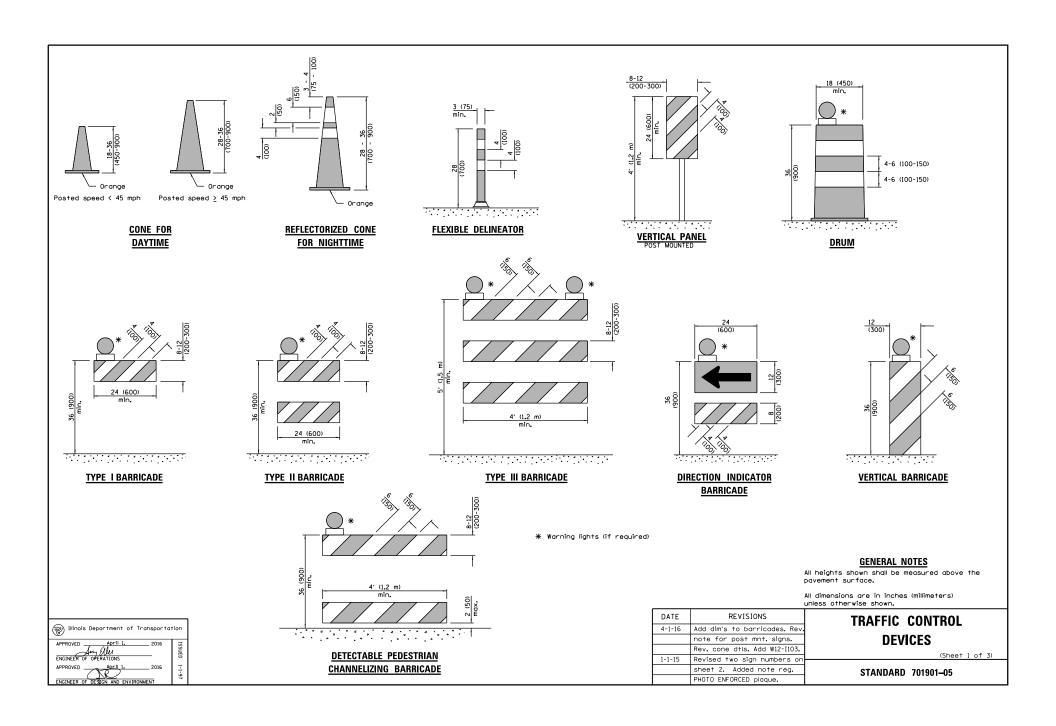
ENGINEER OF SAFETY ENGINEERING APPROVED January 1. 2
ENGINEER OF DESIGN AND ENVIRONMENT

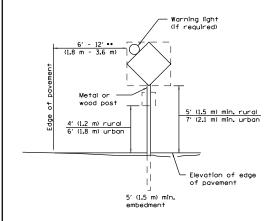












POST MOUNTED SIGNS

•• When curb or paved shoulder are present this dimension shall be 24 (600) to the face of curb or 6' (1.8 m) to the outside edge of the paved shoulder.

MAX WIDTH

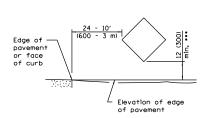
MILES

AHEAD

W12-I103-4848

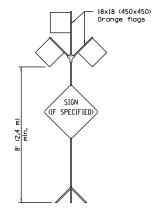
WIDTH RESTRICTION SIGN

XX'-XX" width and X miles are variable.



SIGNS ON TEMPORARY SUPPORTS

••• When work operations exceed four days, this dimension shall be 5' (1,5 m) min. If located behind other devices, the height shall be sufficient to be seen completely above the devices.



HIGH LEVEL WARNING DEVICE

ROAD CONSTRUCTION NEXT X MILES

END CONSTRUCTION

G20-I104(0)-6036

G20-I105(0)-6024

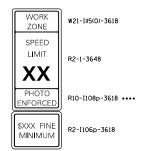
This signing is required for all projects 2 miles (3200 m) or more in length.

ROAD CONSTRUCTION NEXT X MILES sign shall be placed 500' (150 m) in advance of project limits.

END CONSTRUCTION sign shall be erected at the end of the job unless another job is within 2 miles (3200 m).

Dual sign displays shall be utilized on multilane highways.

WORK LIMIT SIGNING



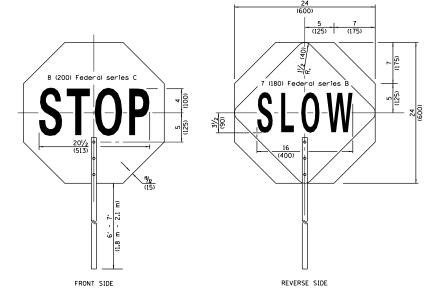
Sign assembly as shown on Standards or as allowed by District Operations.



This sign shall be used when the above sign assembly is used.

HIGHWAY CONSTRUCTION SPEED ZONE SIGNS

•••• R10-I108p shall only be used along roadways under the juristiction of the State.



(R) Illinois Department of Transportation

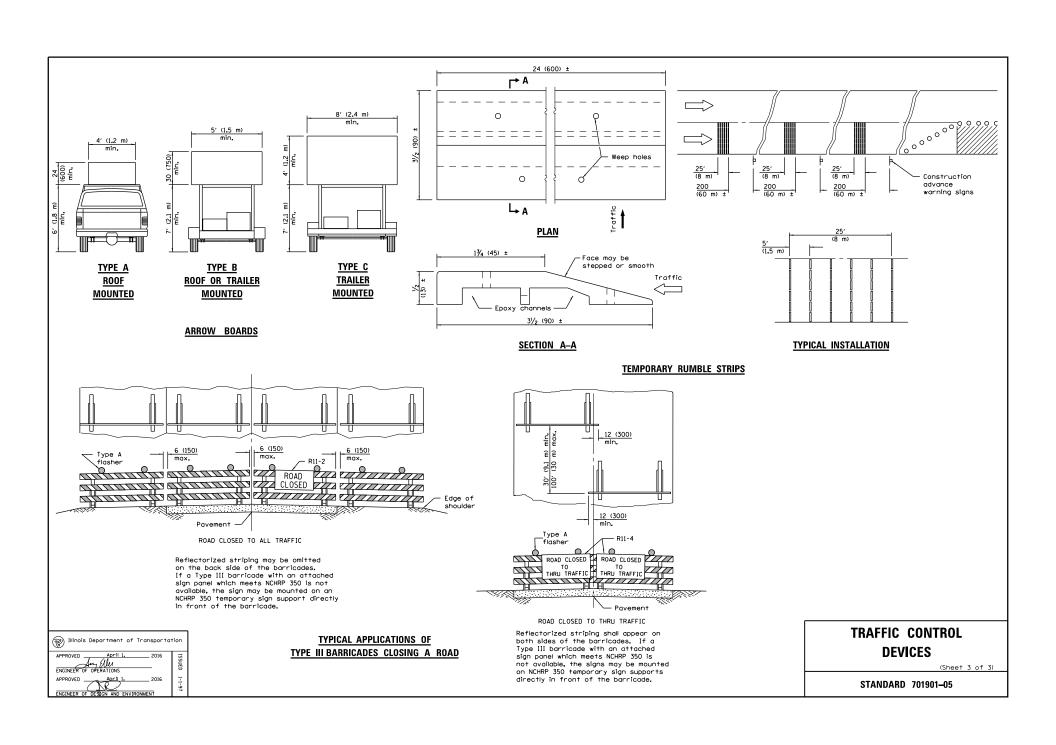
APPROVED April 1, 2016
ENGINEER OF OPERATIONS
APPROVED April 1, 2016
ENGINEER OF DESIGN AND ENVIRONMENT

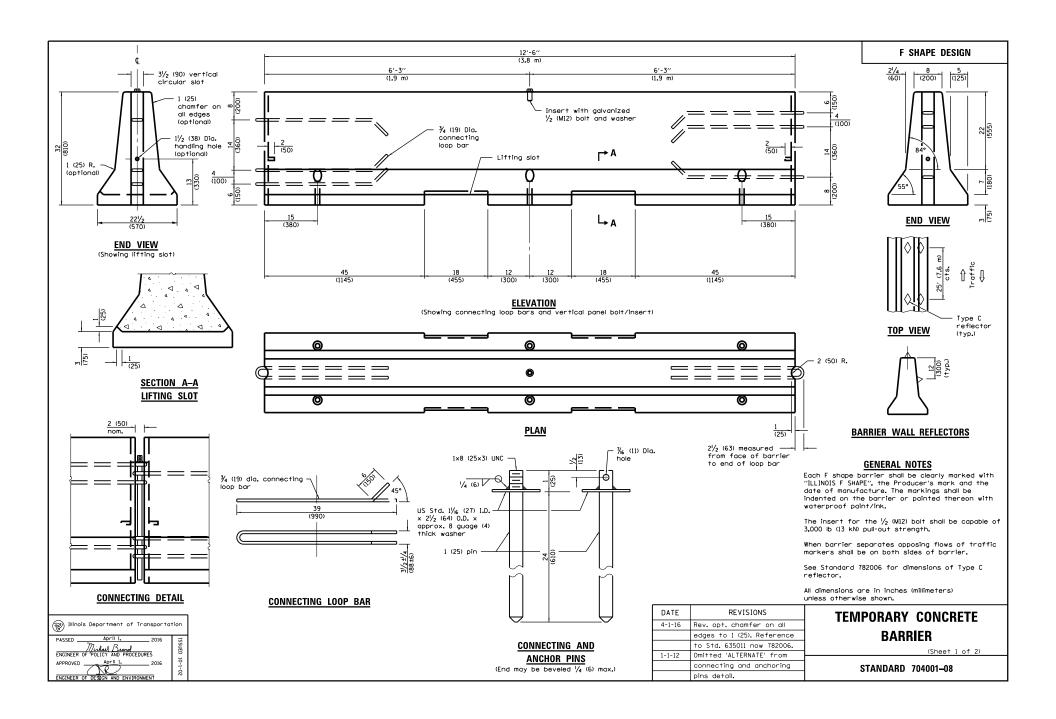
FLAGGER TRAFFIC CONTROL SIGN

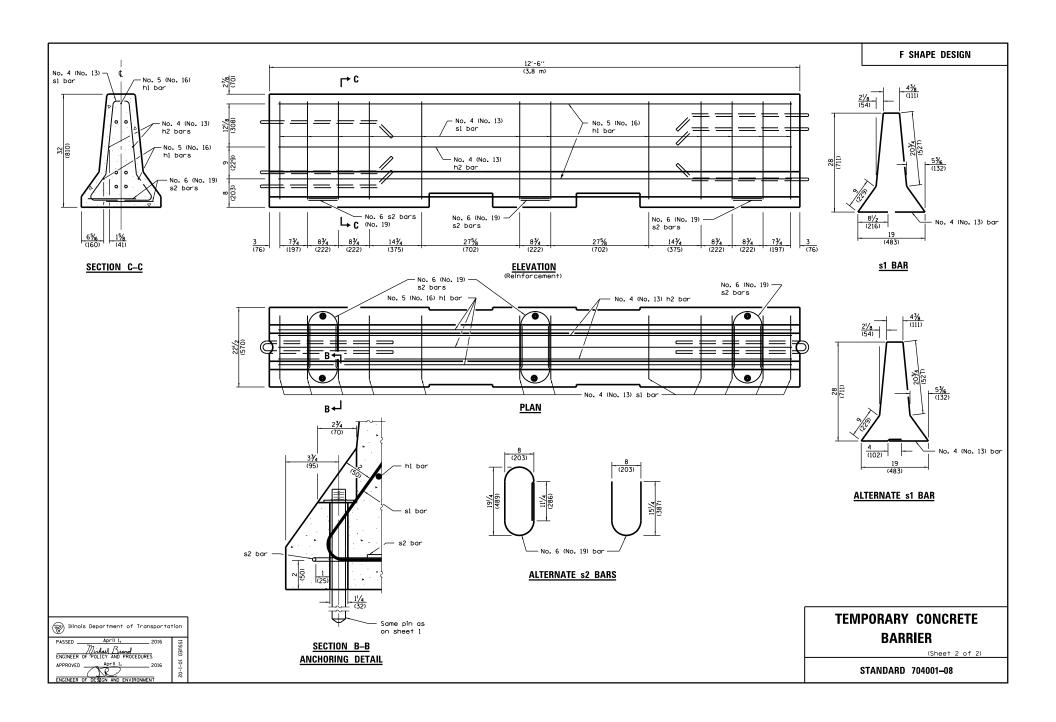
TRAFFIC CONTROL DEVICES

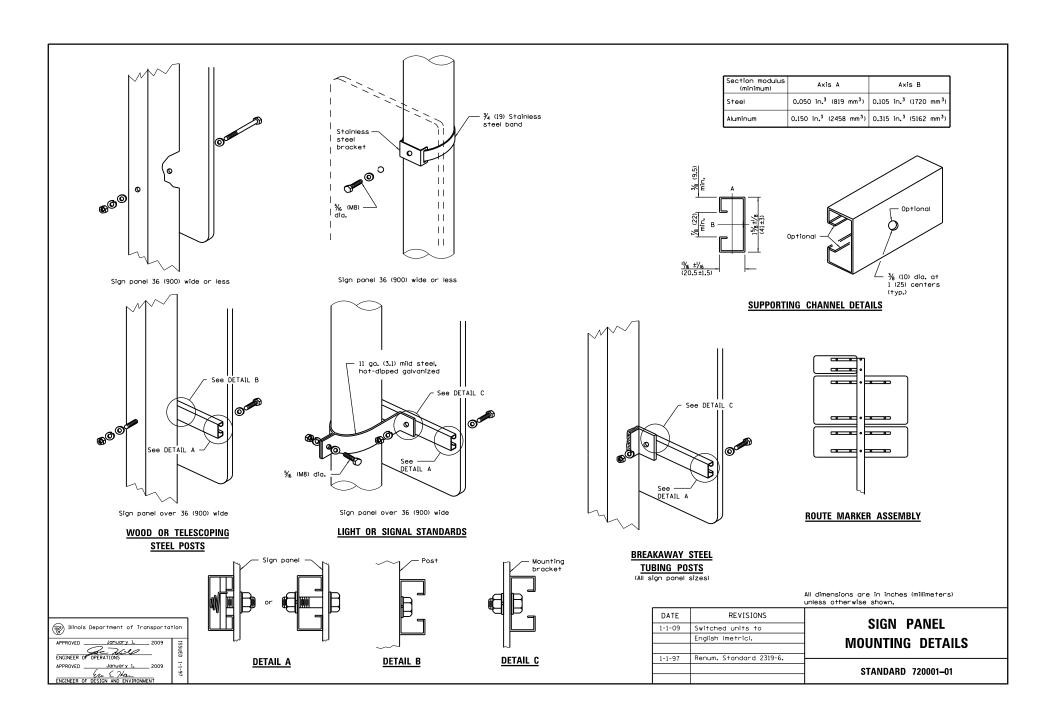
(Sheet 2 of 3)

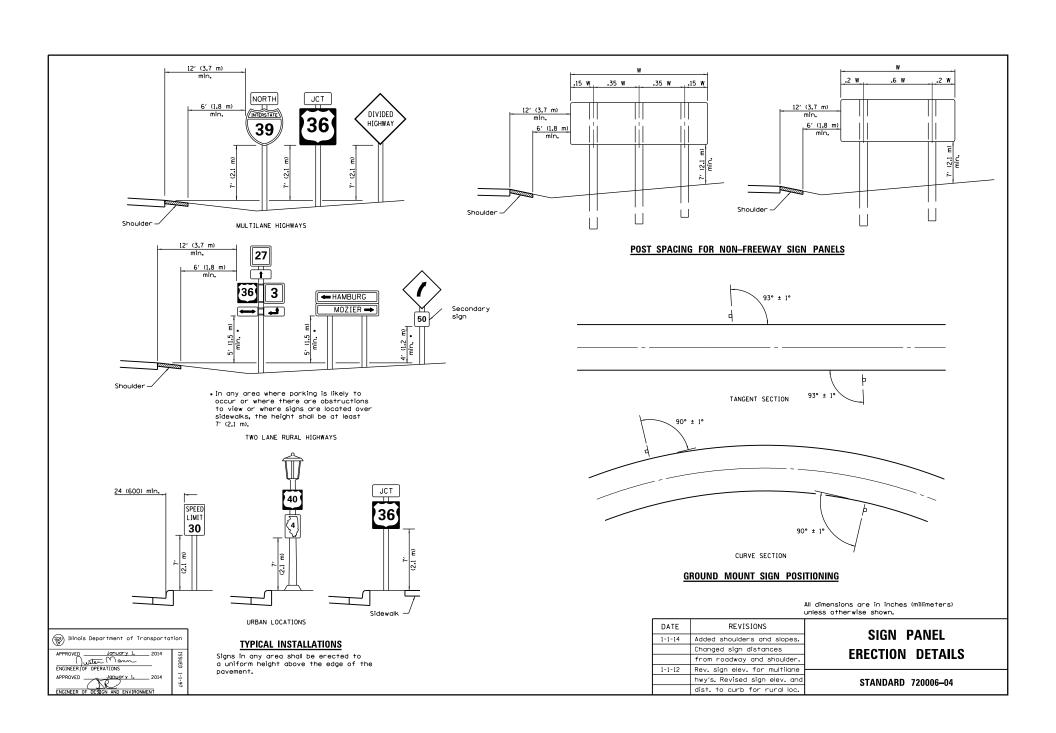
STANDARD 701901-05

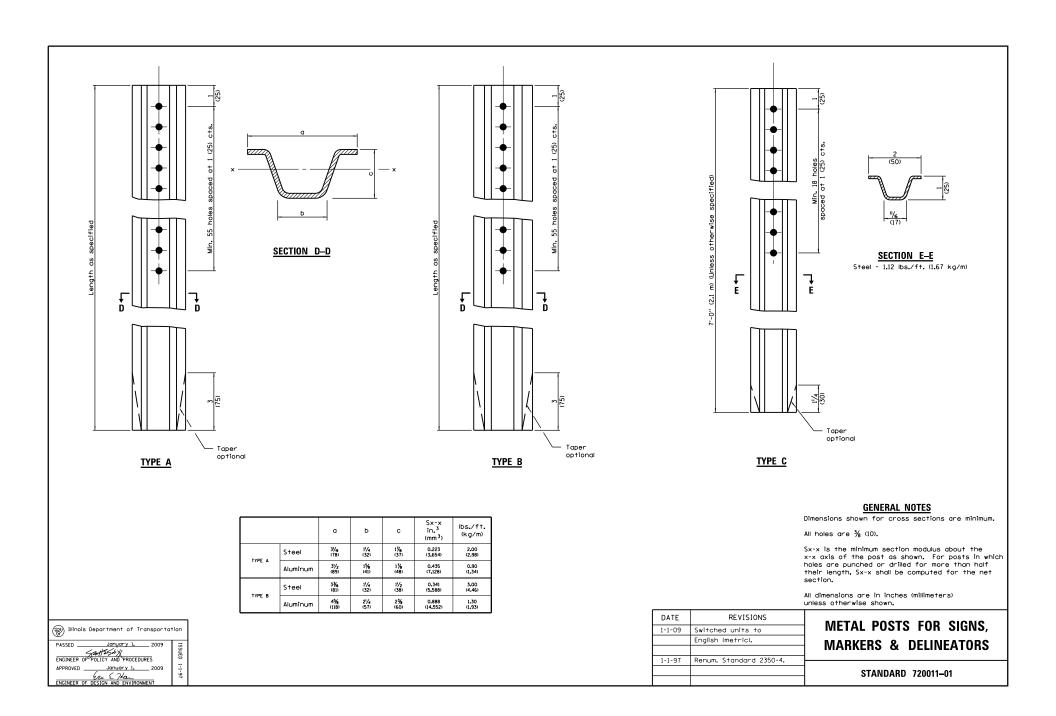


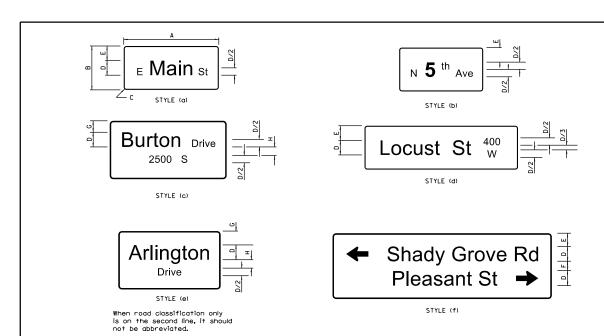












TYPICAL SIGN STYLES

SIGN STYLE	DIMENSIONS						nc r	BORDER				
	Α	В	С	D	E	F	G	н	1	2	•	
	Var.	12	11/2	6	3	-	-	-	6/41/2	-	-	3/8
a,b,d	var.	(300)	(40)	(150)	(75)	-	-	-	(150/115)	-	-	(10)
	Var.	18	11/2	8	5	-	-	-	8/6	-	-	5/8
	var.	(450)	(40)	(200)	(125)	-	-	-	(200/150)	-	-	(15)
	Var.	24	11/2	10	7	-	-	-	10/71/2	-	-	5/8
	vur.	(600)	(40)	(250)	(175)	-	-	-	(250/190)	-	-	(15)
	Var.	30	1 1/8	12	9	-	-	-	12/9	-	-	3/4
	var.	(750)	(45)	(300)	(225)	-	-	-	(400/300)	-	-	(20)
c.e	c.e Var.	24	11/2	6	-	-	51/2	4	6/41/2	-	3	5/8
C. C	vur.	(600)	(40)	(150)	-	-	(140)	(100)	(150/115)	-	(75)	(15)
	Var.	30	1 1/8	8	-	-	7	41/2	8/6	-	4	3/4
	vui.	(750)	(45)	(200)	-	-	(175)		(200/150)	-	(100)	(20)
	Var.	36	21/4	10	-	-	71/2	6	10/71/2	-	5	3/4
	V G1 2	(900)	(60)	(250)	-	-	(190)	(150)	(250/190)	-	(125)	(20)
	Var.	42	3	12	-	-	81/2	7	12/9	-	6	1
	Vui .	(1050)	(75)	(300)	-	-	(215)	(175)	(400/300)		(150)	(25)
f	Var.	24	1/2	6	4	4	-	-	6/41/2	6/41/2	-	5/8
	V G1 -	(600)	(40)	(150)	(100)	(100)	-	-	(150/115)	(150/115)	-	(15)
	Var.	30	1 1/8	8	41/2	5	-	-	8/6	8/6	-	3/4
	, J.	(750)	(45)	(200)	(115)	(125)	-	-	(200/150)		-	(20)
	Var.	42	3	10	71/2	7	-	-	10/71/2	10/71/2	-	1
	Vui .	(1050)	(75)	(250)	(190)	(175)	-	-	(250/190)		-	(25)
	Var.	48	3	12	71/2	8	-	-	12/9	12/9	-	1
	vur.	(1200)	(75)	(300)	(190)	(200)	-		(400/300)	(400/300)	-	(25)



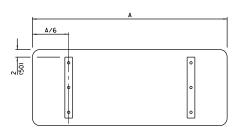
ISSUED 1-1-97

Illinois Department of Transportation

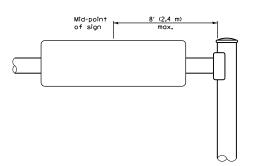
APPROVED January 1.

Outton Mann
ENGINEER/OF OPERATIONS

• Supplemental Messages



SUPPORTING CHANNELS



MOUNTING LOCATION

GENERAL NOTES

All signs shall have a white reflectorized legend and border on a green reflectorized background.

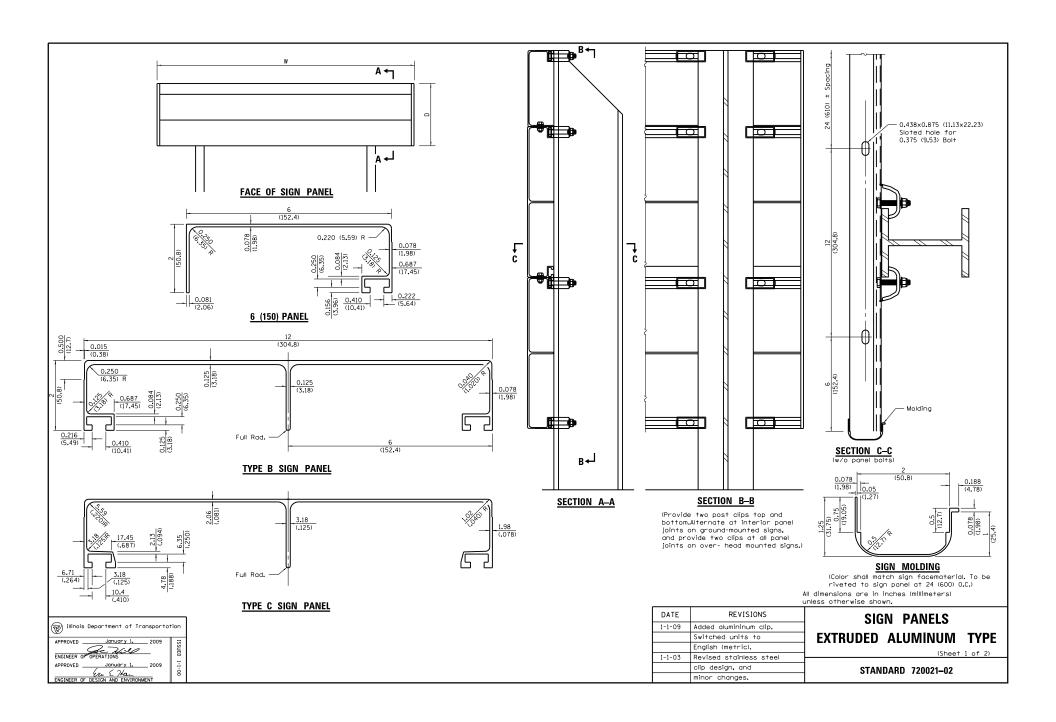
The sign panels shall be mounted as shown on Standard 720001 or as specified in the plans.

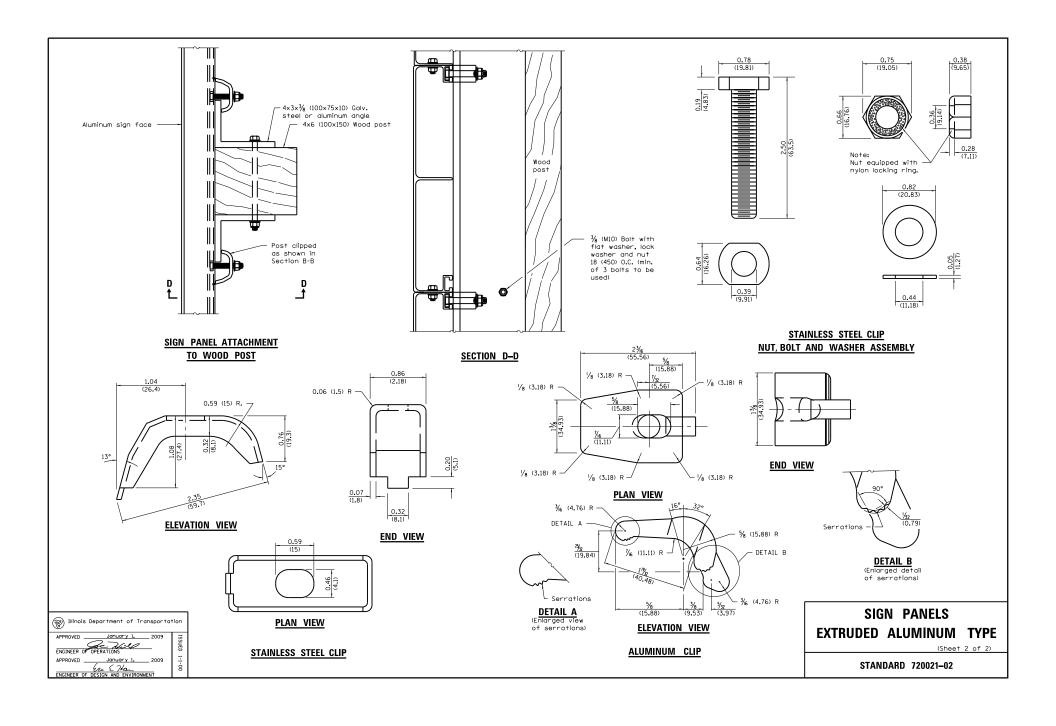
All dimensions are in inches (millimeters) unless otherwise shown.

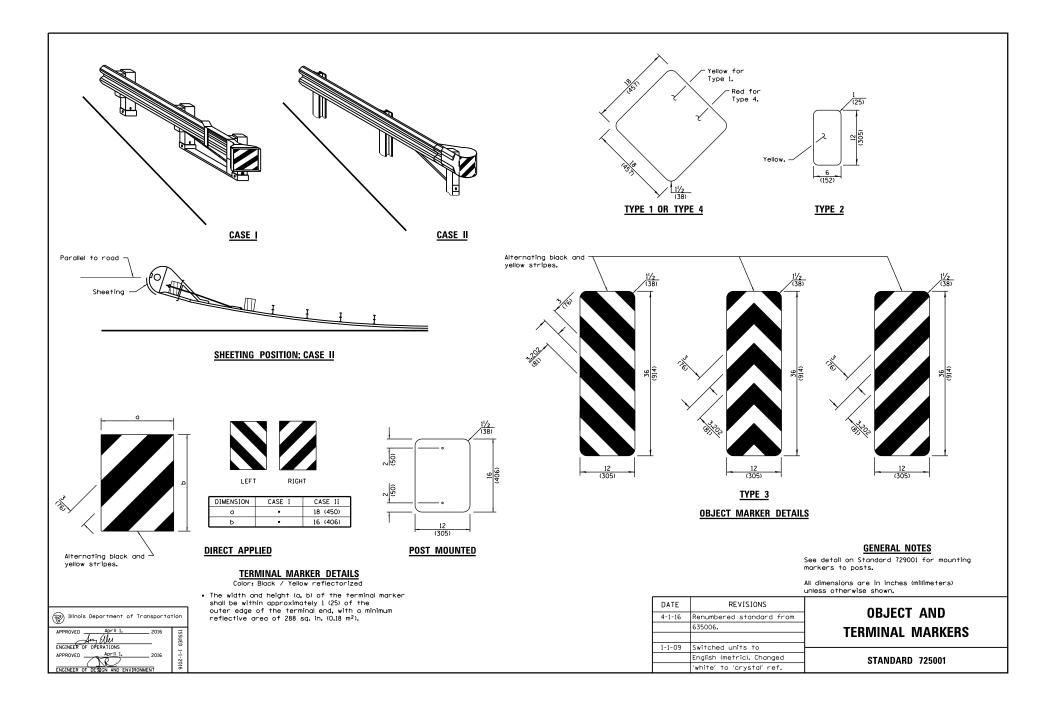
DATE	REVISIONS
1-1-12	Revised table and
	lettering to upper/lower
	case per current MUTCD.
1-1-09	Switched units to
	English (metric).

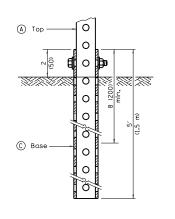
MAST ARM MOUNTED STREET NAME SIGNS

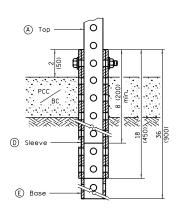
STANDARD 720016-03

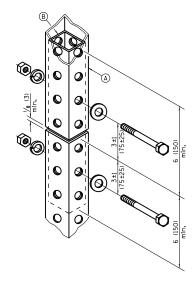












GROUND MOUNT DETAIL

PAVEMENT MOUNT DETAIL

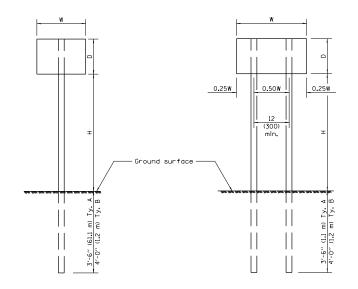
SPLICE DETAIL

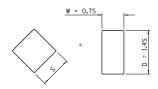
(A)	2 x 2 x var. (51 x 51 var.)
B	$1\frac{3}{4} \times 1\frac{3}{4} \times 12 (44 \times 44 \times 300)$ $2\frac{1}{4} \times 2\frac{1}{4} \times 60 (57 \times 57 \times 1500)$
0	21/4 × 21/4 × 60 (57 × 57 × 1500)
0	2 ¹ / ₂ × 2 ¹ / ₂ × 18 (64 × 64 × 450) 2 ¹ / ₄ × 2 ¹ / ₄ × 36) (57 × 57 × 900)
E	2 ¹ / ₄ × 2 ¹ / ₄ × 36) (57 × 57 × 900)

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS	TELESCOPING STEEL		
1-1-09	Switched units to	TELESCOPING STEEL		
	English (metric).	SIGN SUPPORT		
		SIGN SUFFUNI		
1-1-07	New Standard. Used to			
	be part of Standard	STANDARD 728001-01		
	720006.	OTANDAND 720001 01		



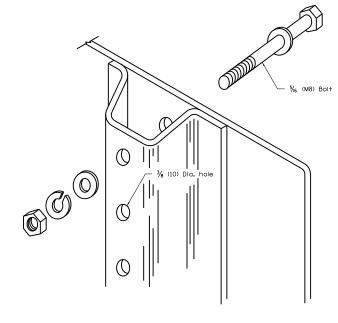




TWO POST INSTALLATION

For diamond shaped sign with side S as shown, use required post size for a sign with W = 0.7S and D = 1.4S.

SIGN DEPTH	н	NO. AND TYPE OF POST FOR SIGN WIDTH (W)					
(D)		12 (300)	18 (450)	24 (600)	30 (750)	36 (900)	
	5'-0" (1.5 m)	Α	Α	Α	Α	Α	
	5'-6" (1.7 m)	Α	Α	Α	Α	Α	
	6'-0'' (1.8 m)	Α	Α	Α	Α	В	
	6'-6'' (2.0 m)	Α	Α	Α	Α	В	
18 (450)	7'-0" (2.1 m)	Α	Α	Α	Α	В	
(430)	7'-6" (2.3 m)	Α	Α	Α	Α	В	
	8'-0" (2.4 m)	Α	Α	Α	Α	В	
	8'-6" (2.6 m)	Α	Α	Α	В	В	
	9'-0" (2.7 m)	Α	Α	Α	В	В	
	5'-0" (1.5 m)	Α	Α	Α	Α	В	
	5'-6" (1.7 m)	Α	Α	Α	Α	В	
	6'-0" (1.8 m)	Α	Α	Α	В	В	
	6'-6" (2.0 m)	Α	Α	Α	В	В	
(600)	7'-0" (2.1 m)	Α	Α	Α	В	В	
(600)	7'-6" (2.3 m)	Α	Α	Α	В	В	
	8'-0" (2.4 m)	Α	Α	Α	В	2A	
	8'-6" (2.6 m)	Α	Α	В	В	2A	
	9'-0" (2.7 m)	Α	Α	В	В	2A	
	5'-0" (1.5 m)	Α	Α	Α	В	В	
	5'-6" (1.7 m)	Α	Α	Α	В	2A	
	6'-0'' (1.8 m)	Α	Α	Α	В	2A	
30	6'-6" (2.0 m)	Α	Α	Α	В	2A	
(750)	7'-0" (2.1 m)	Α	Α	В	В	2A	
(130)	7'-6" (2.3 m)	Α	Α	В	В	2A	
	8'-0" (2.4 m)	Α	Α	В	В	2A	
	8'-6" (2.6 m)	Α	Α	В	2A	2A	
	9'-0" (2.7 m)	Α	Α	В	2A	2A	
	5'-0" (1.5 m)	A	Α	В	В	2A	
	5'-6" (1.7 m)	A	Ā	В	В	2A	
	6'-0" (1.8 m)	A	A	В	В	2A	
	6'-6" (2.0 m)	A	Â	В	2A	2A	
36	7'-0" (2.1 m)	A	A	В	2A	2A	
(900)	7'-6" (2.3 m)	A	A	В	2A	2A	
	8'-0" (2.4 m)	A	В	В	2A	2A	
	8'-6" (2.6 m)	A	В	В	2A	2B	
	9'-0" (2.7 m)	Α	В	2A	2A	2B	
	5'-0" (1.5 m)	Α	Α	В	2A	2A	
	5'-6" (1.7 m)	Α	В	В	2A	2A	
	6'-0" (1.8 m)	Α	В	В	2A	2A	
4'-0''	6'-6" (2.0 m)	Α	В	2A	2A	2B	
	7'-0" (2.1 m)	Α	В	2A	2A	2B	
(1.2 m)	7'-6" (2.3 m)	Α	В	2A	2B	2B	
		Α	-	2A	2B	2B	
	8'-0" (2.4 m)	Α	В	2 A	20	_ 20	
	8'-0" (2.4 m) 8'-6" (2.6 m)	В	В	2B	2B	2B	



DETAIL OF MOUNTING SIGN TO POST

NOTE: Minimum of 2 bolts per post required.

GENERAL NOTES

DESIGN: Current AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

LOADING: for 60 mph (95 km/h) wind velocity with 30% gust factor, normal to sign.

SOIL PRESSURE: Minimum allowable soil pressure 1.25 tsf (120 kPa).

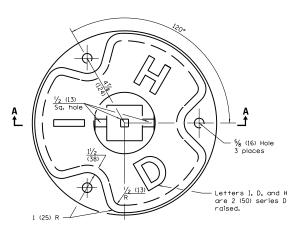
See Standard 720011 for details of Types A and B posts.

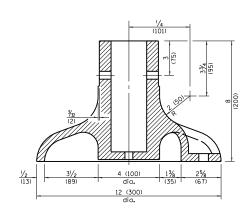
All dimensions are in inches (millimeters) unless otherwise shown.

APPLICATIONS OF TYPES	REVISIONS	DATE
A & B METAL POSTS	Switched units to	1-1-09
A & B WEIAL PUSIS	English (metric).	
(FOR SIGNS & MARKERS)		
(1 OII OIGITO & IIII/IIII/EIIO)	Renum. Standard 2363-2.	1-1-97
STANDARD 729001-01		
51ANDAND 723001-01		

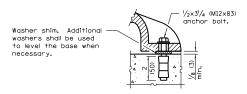
Illinois Department of Transportati	ion
PASSED January 1. 2009	S
Saut Est X	ISSUEC
ENGINEER OF POLICY AND PROCEDURES	٦
APPROVED January 1, 2009	1
Ere E Han	-97
ENGINEER OF DESIGN AND ENVIRONMENT	

ONE POST INSTALLATION

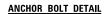


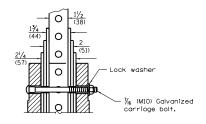


SECTION A-A



<u>PLAN</u>



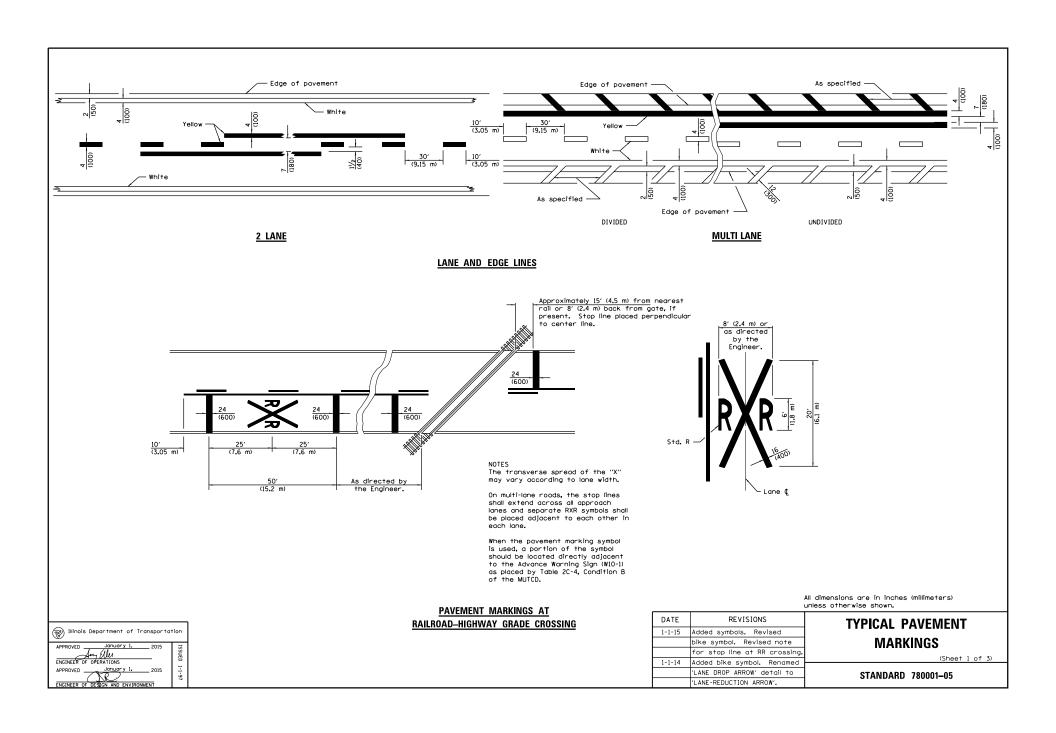


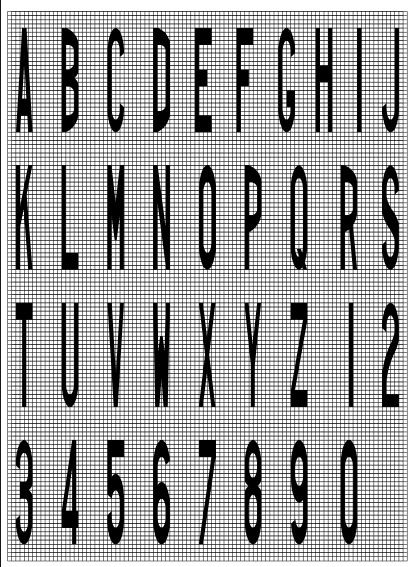
POST ASSEMBLY DETAIL

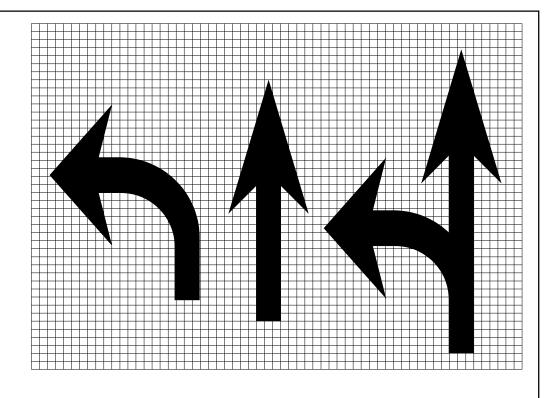
All dimensions are in inches (millimeters) unless otherwise shown.

	DATE	REVISIONS
W lilinois Department of Transportation	1-1-09	Switched units to
APROVED January I. 2009 75		English (metric).
ENGINEER OF OPERATIONS TO	1-1-07	New Standard. Used to
APPROVED		be part of Standard
ENGINEER OF DESIGN AND ENVIRONMENT		720006.

REVISIONS	DACE FOR TELECORING		
units to	BASE FOR TELESCOPING		
etric).	STEEL SIGN SUPPORT		
	SIEEL SIGN SUFFUNI		
dard. Used to			
of Standard	STANDARD 731001-01		
	1 OTANDAND 701001 01		









Legend Height	Arrow Size	a
6' (1.8 m)	Small	2.9 (74)
8' (2.4 m)	Large	3.8 (96)

The space between adjacent letters or numerals should be approximately 3 (75) for 6' (1.8 m) legend and 4 (100) for 8' (2.4 m) legend.

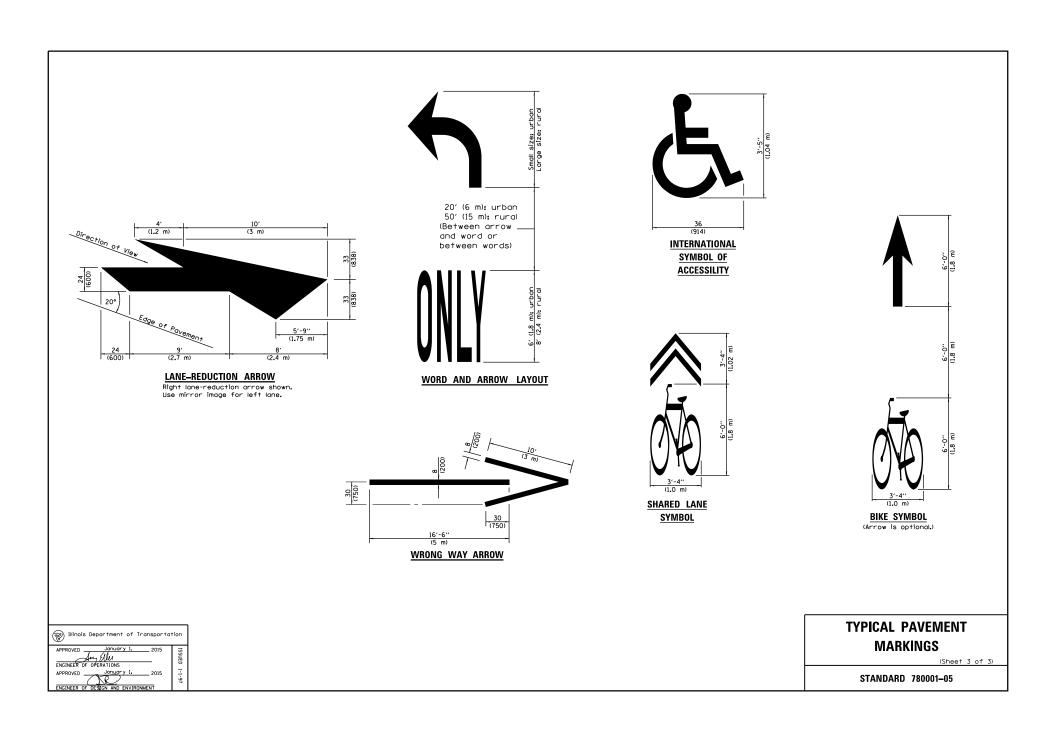
LETTER AND ARROW GRID SCALE

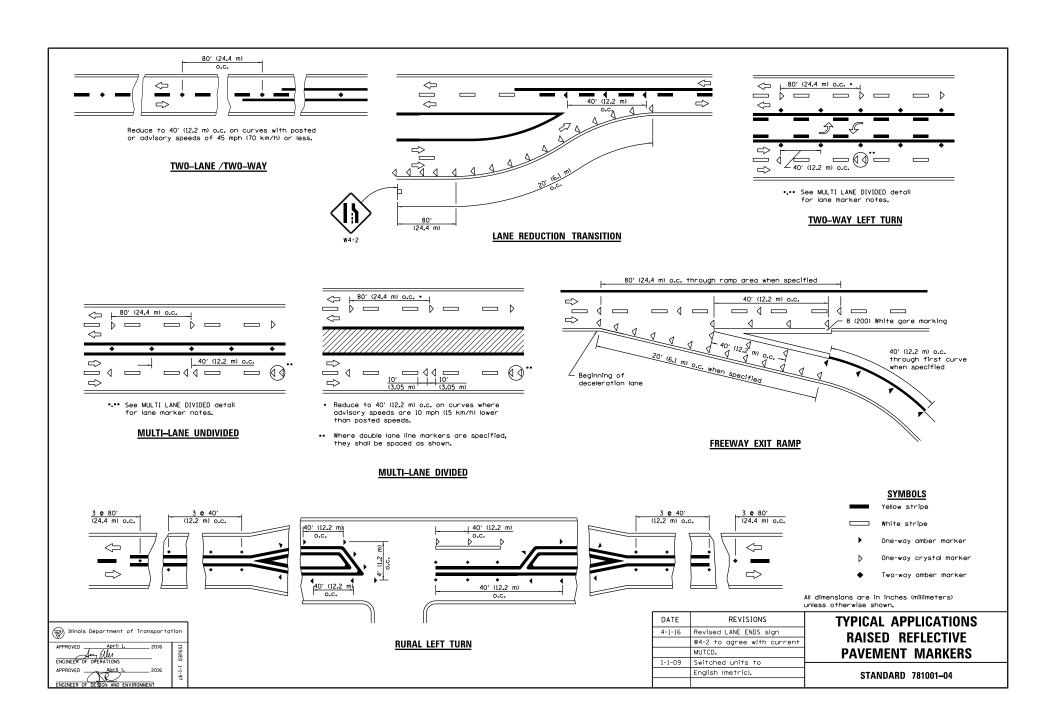
TYPICAL PAVEMENT MARKINGS

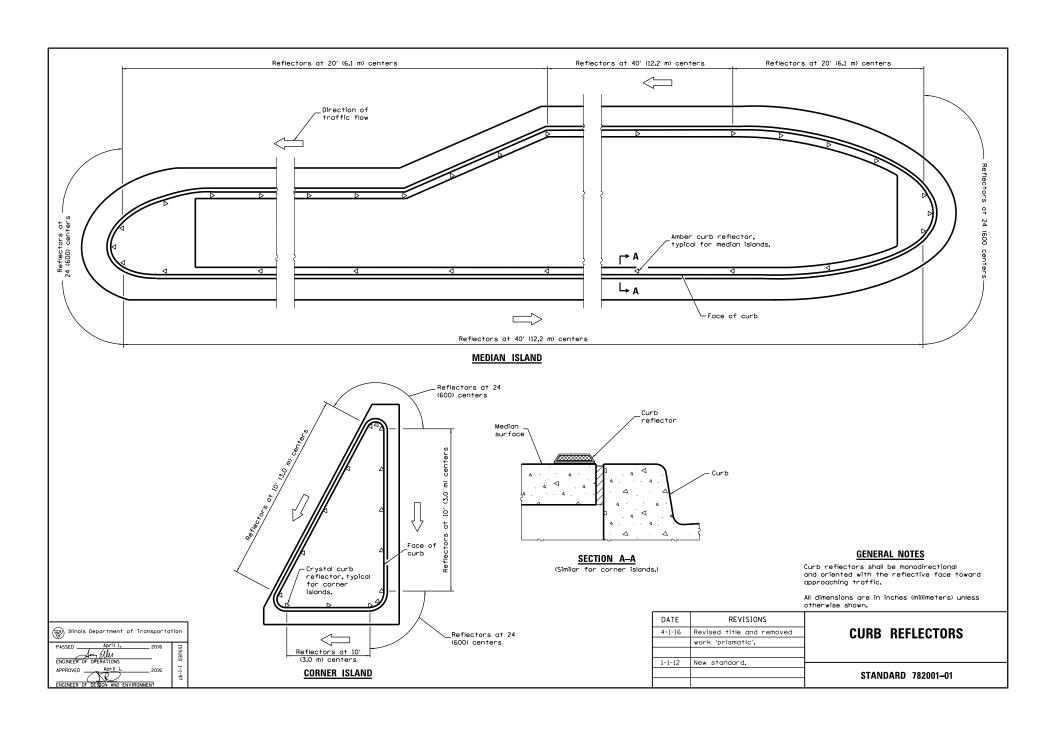
(Sheet 2 of 3)

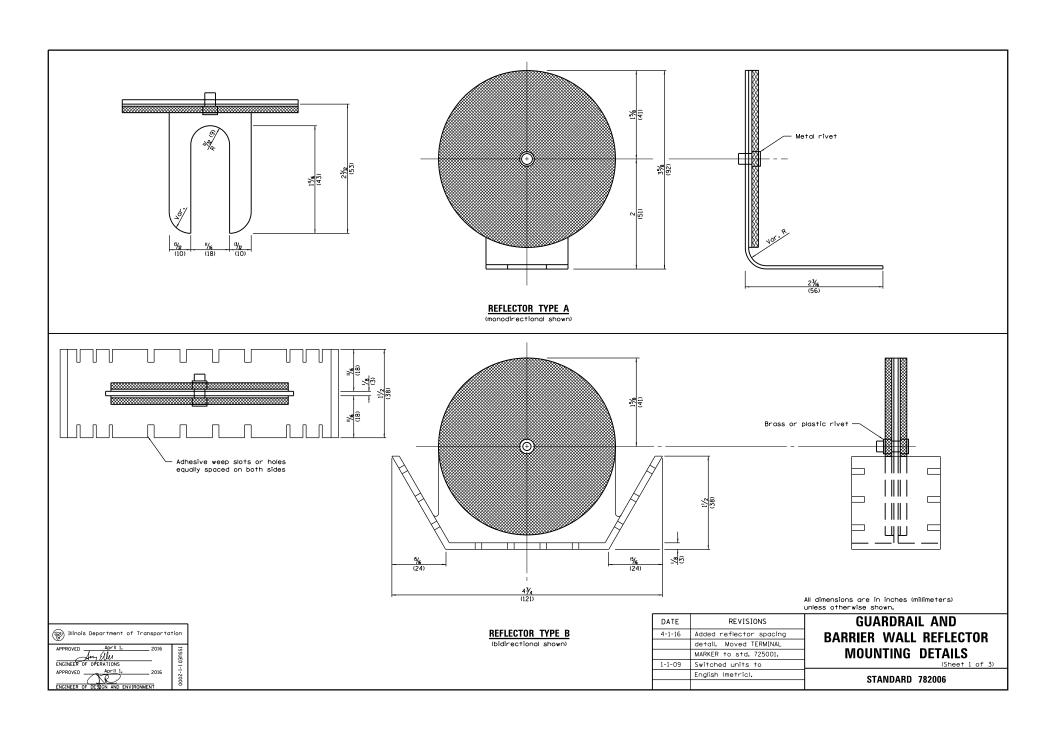
STANDARD 780001-05

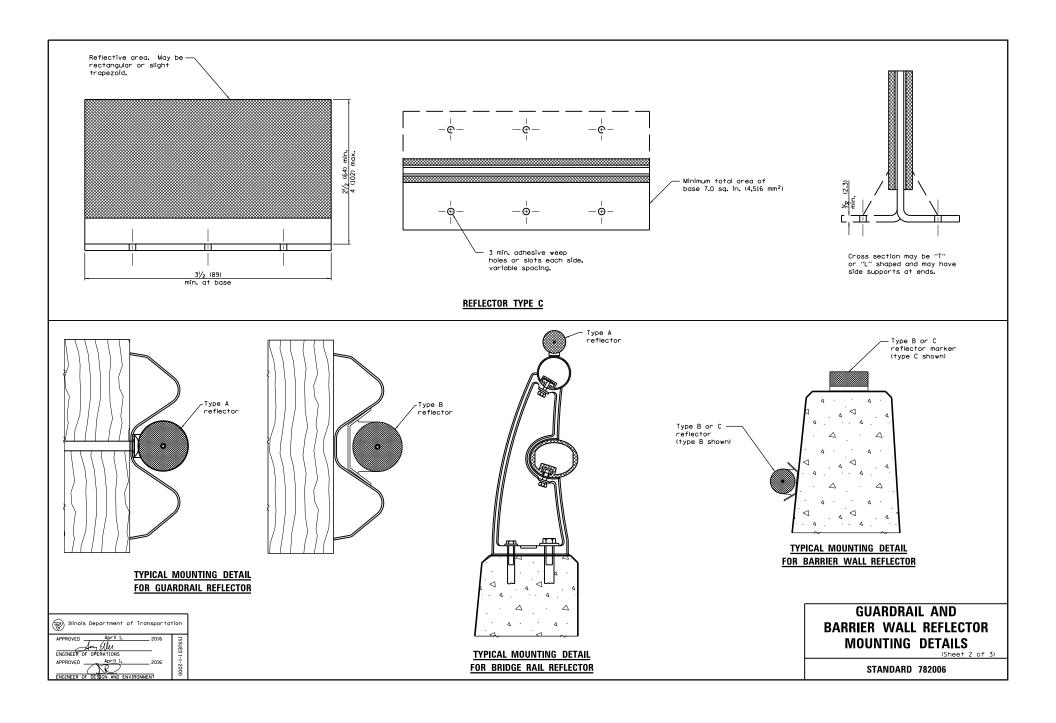
Illinois Department of Transporta	tion
APPROVED January 1, 2015	SI
Any Eller	ISSUEC
ENGINEER OF OPERATIONS	-
APPROVED January 1. 2015	ΙΞ.
	1-1-97
ENGINEER OF DESIGN AND ENVIRONMENT	

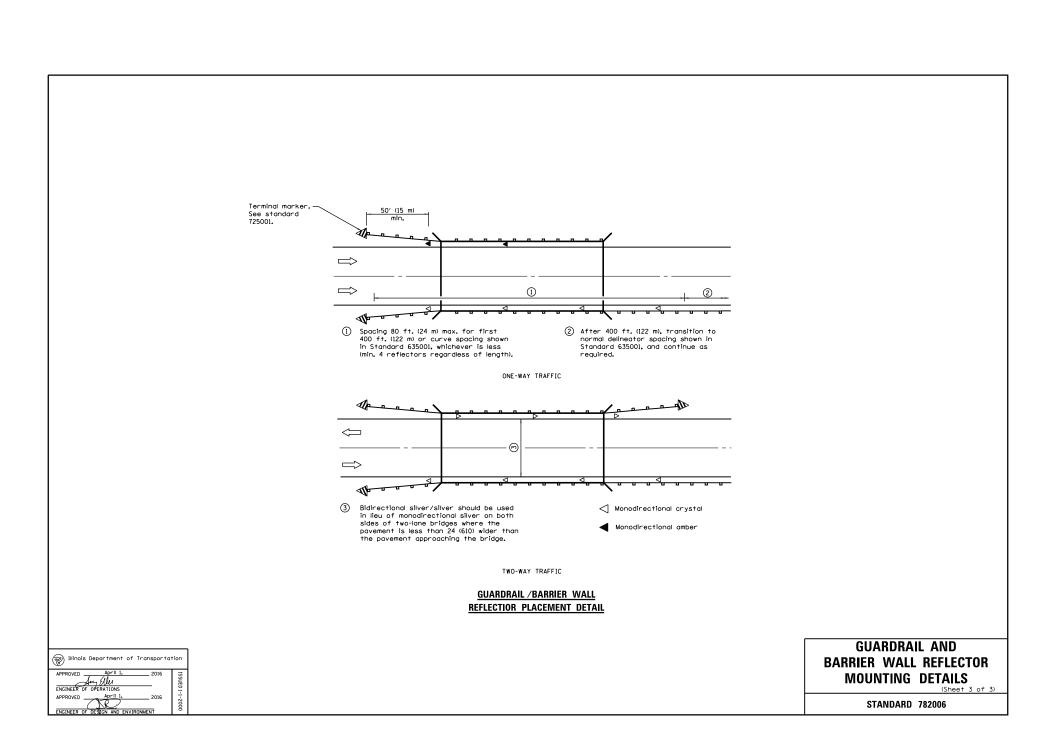














Standards by Division

DIVISION 800 ELECTRICAL

STD. NO. TITLE

GENERAL ELECTRICAL REQUIREMENTS

805001-01 Electrical Service Installation Details

WIREWAY AND CONDUIT SYSTEMS

812001 Raceway Embedded in Structure

814001-03 Handholes

814006-02 Double Handholes

LIGHTING - LUMINAIRES

821001	Underpass Lighting Wall Mount
821006	Underpass Lighting Suspended
821101-01	Luminaire Wiring Diagram

LIGHTING - CONTROLLERS

825001-03	Lighting Controller, Pole Mounted, 240V
825006-02	Lighting Controller, Pole Mounted, 480V
825011-03	Lighting Controller, Pedestal Mounted, 240V
825016-03	Lighting Controller, Pedestal Mounted, 480V
825021-03	Lighting Controller, Base Mounted, 240V
825026-03	Lighting Controller, Base Mounted, 480V
826001-01	Navigation Obstruction Lighting Controller, 240V

Navigation Obstruction Lighting Controller, 480V

LIGHTING - POLES

826006-01

830001-03	Light Pole Aluminum Mast Arm
830006-03	Light Pole Aluminum Davit Arm
830011-02	Light Pole Steel Mast Arm
830016-02	Light Pole Steel Davit Arm
830021-02	Light Pole Steel Tenon Top
830026	Temporary Roadway Lighting

LIGHTING - TOWERS

835001-01 Light Tower

LIGHTING - FOUNDATIONS

836001-02	Light Pole Foundation
-----------	-----------------------

Light Pole Foundation with 32 in. (815 mm) Concrete Median Barrier
Light Pole Foundation with 42 in. (1065 mm) Concrete Median Barrier

837001-04 Light Tower Foundation

LIGHTING - BREAKAWAY DEVICES

838001 Breakaway Devices

TRAFFIC SIGNALS - CONTROLLERS AND EQUIPMENT

857001-01 Standard Phase Design	nation Diagrams and Phase Sequences
---------------------------------	-------------------------------------

857006-01 Supervised Railroad Interconnect Circuit 862001-01 Uninterruptable Power Supply (UPS)

TRAFFIC SIGNALS - WIRE AND CABLE

873001-02 Traffic Signal Grounding & Bonding

TRAFFIC SIGNALS - POSTS AND FOUNDATIONS

876001-04	Pedestrian Push Button Post
877001-06	Steel Mast Arm Assembly and Pole 16' Through 55'
877002-03	Steel Mast Arm Assembly and Pole 56' Through 75'
877006-05	Steel Mast Arm Assembly and Pole with Dual Mast Arms
877011-06	Steel Combination Mast Arm Assembly and Pole 16' Through 55'
877012-03	Steel Combination Mast Arm Assembly and Pole 56' Through 75'
878001-10	Concrete Foundation Details

TRAFFIC SIGNALS - SIGNAL HEADS

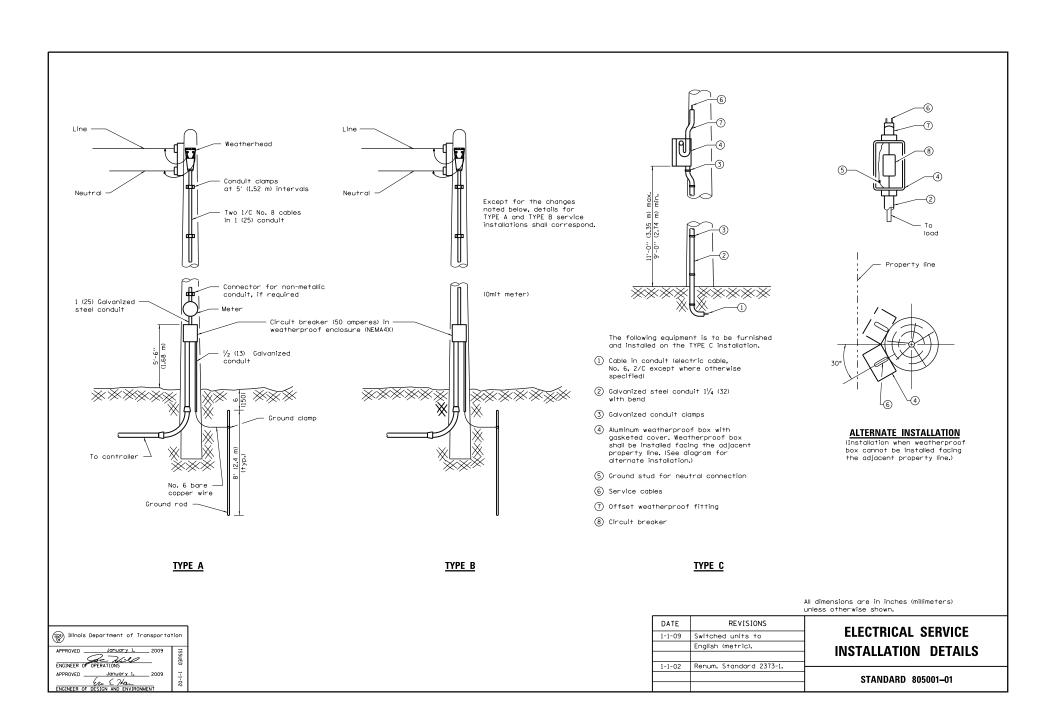
880001-01 Span Wire Mounted Signals and Flashing Beacon Installation

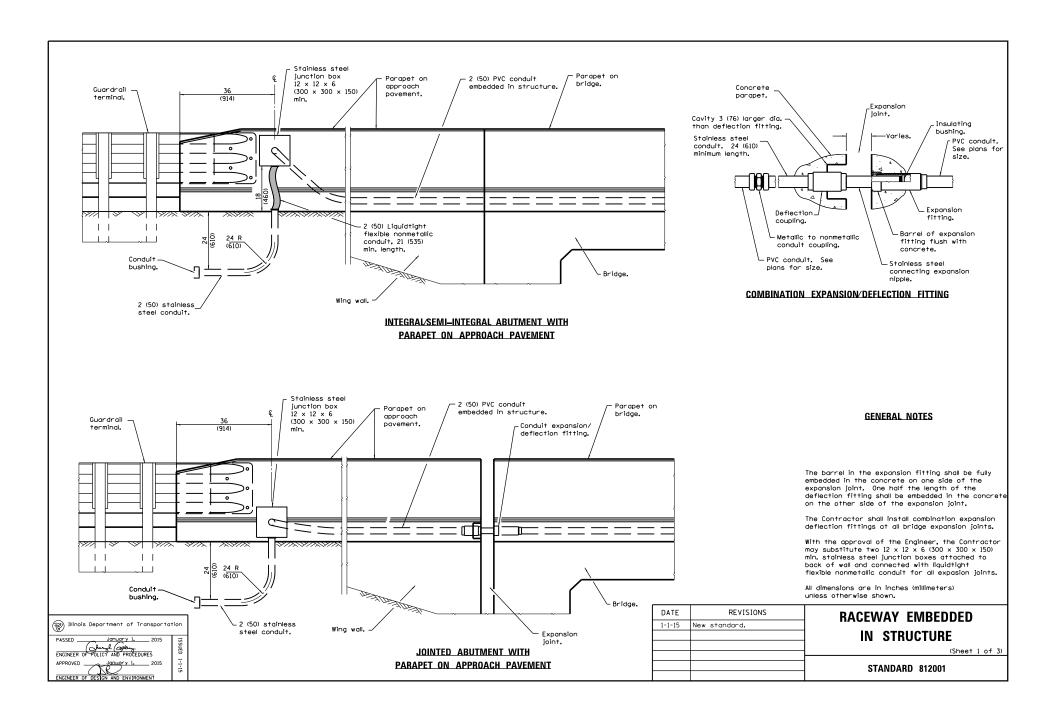
880006-1 Traffic Signal Mounting Details

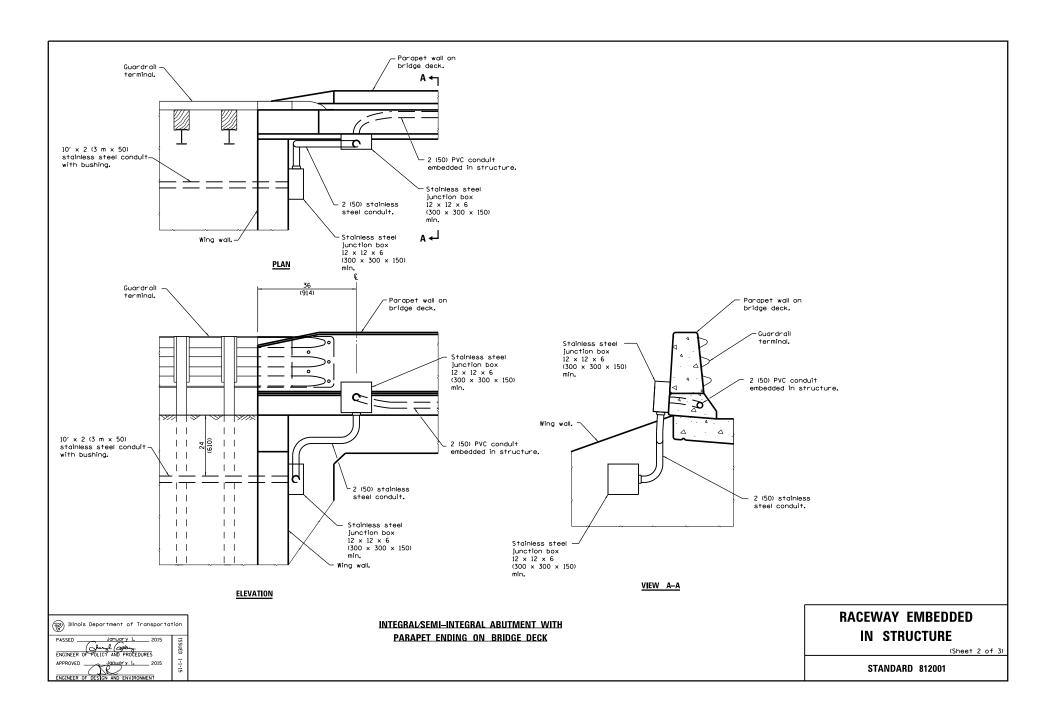
TRAFFIC SIGNALS - DETECTION

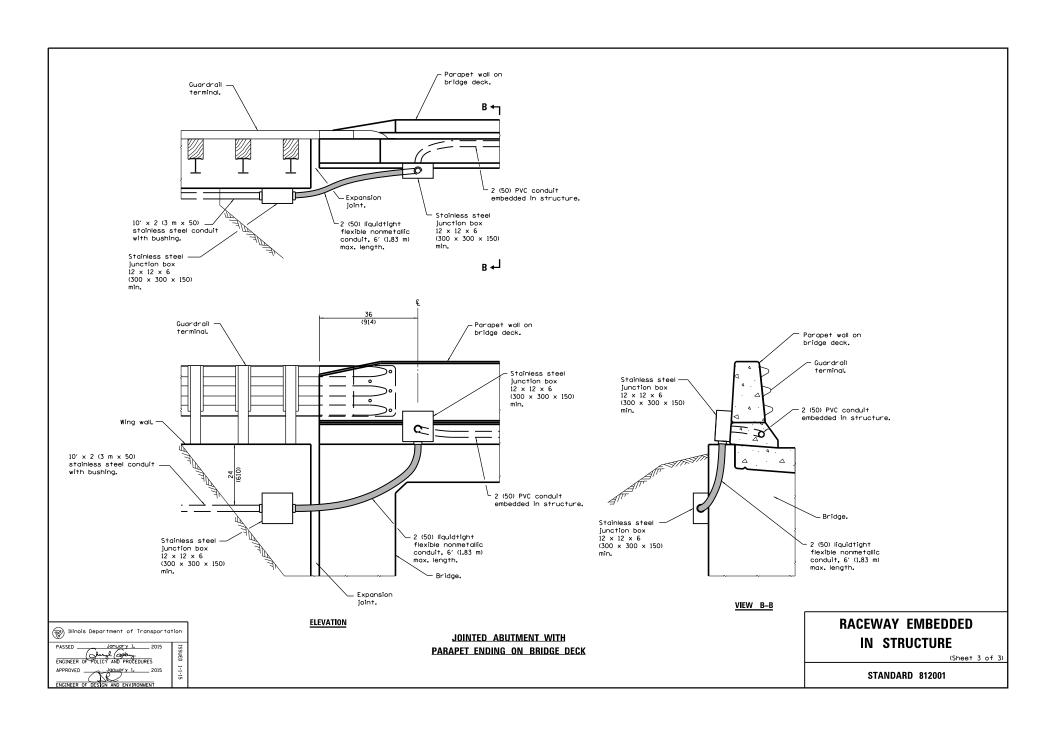
886001-01 Detector Loop Installations

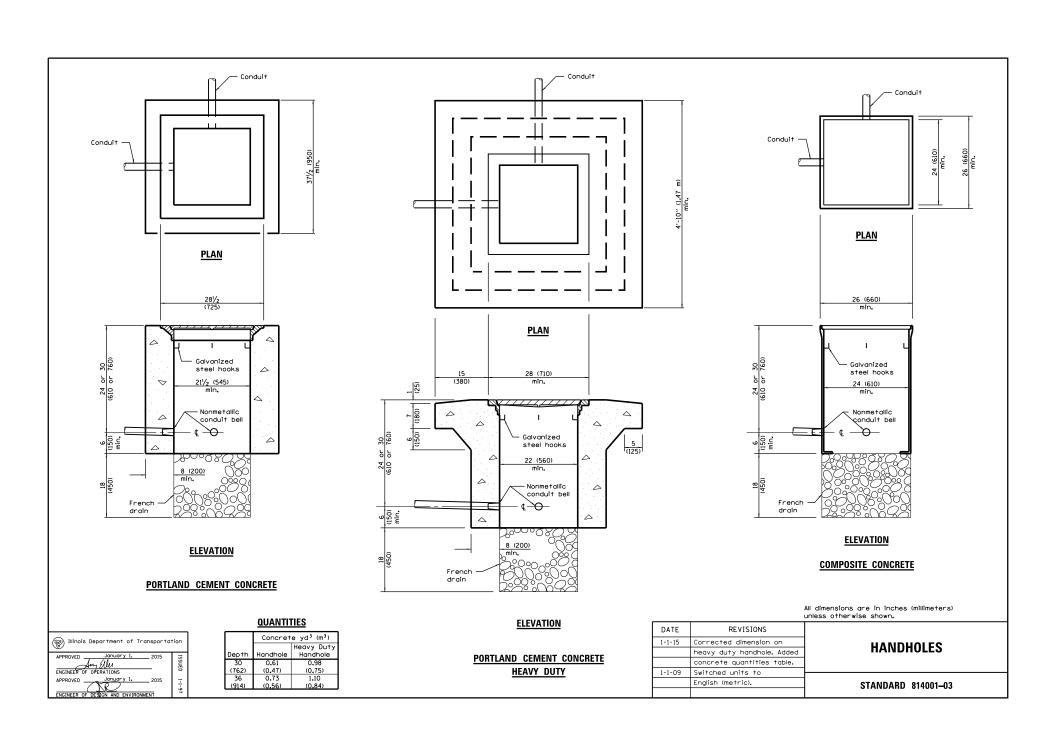
886006-01 Typical Layout for Detection Loops

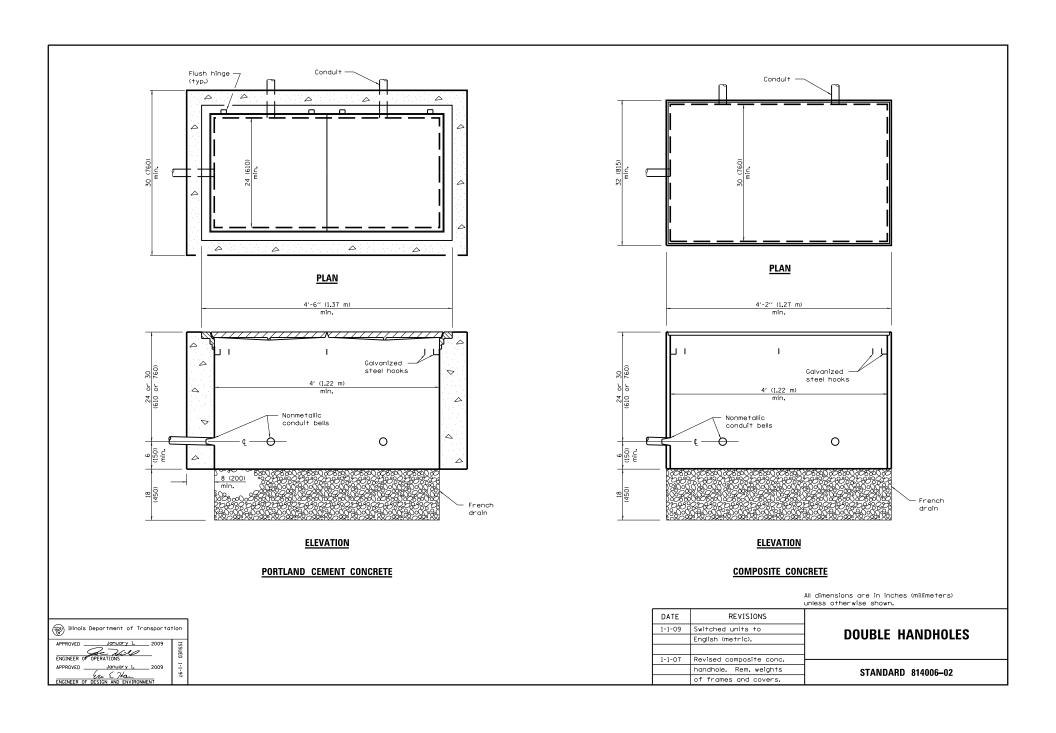


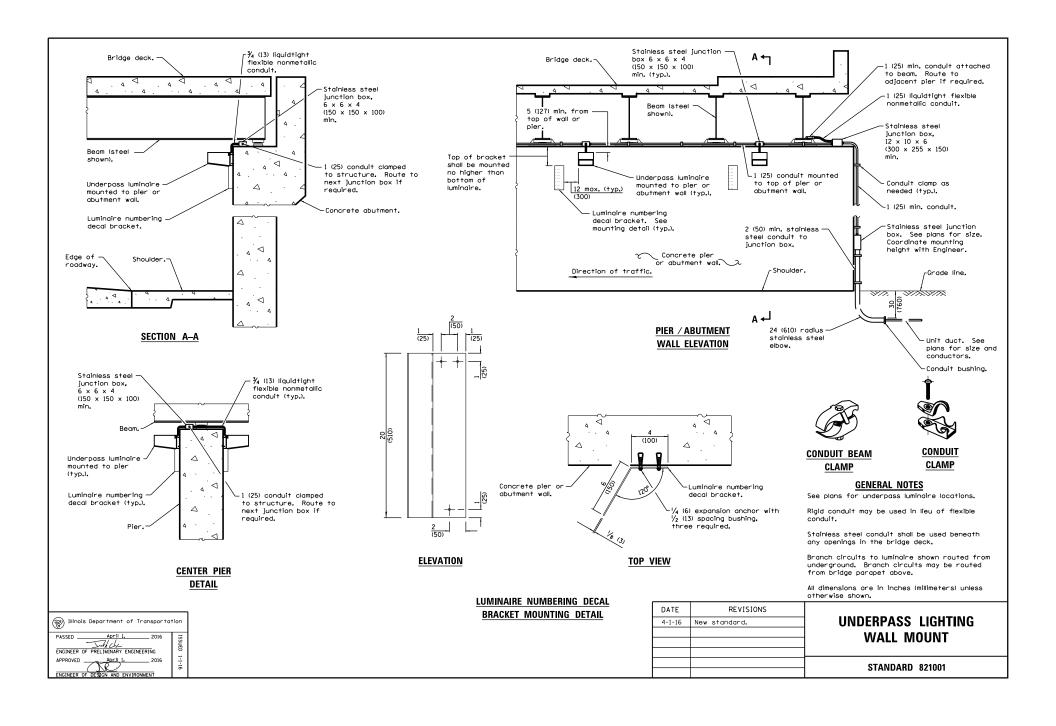


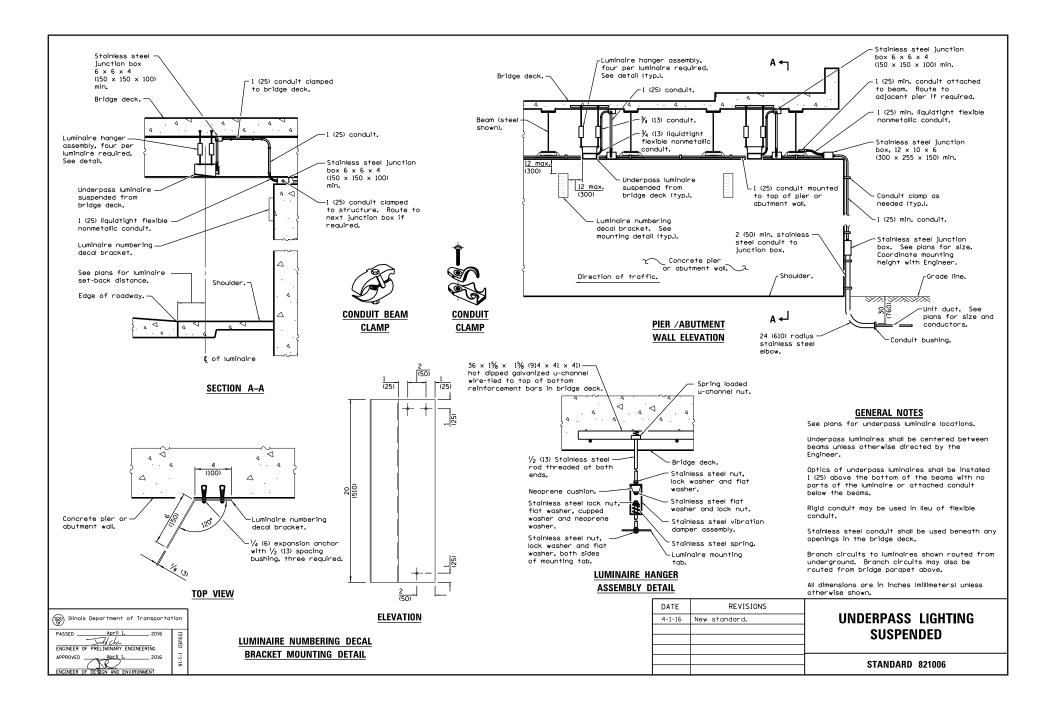


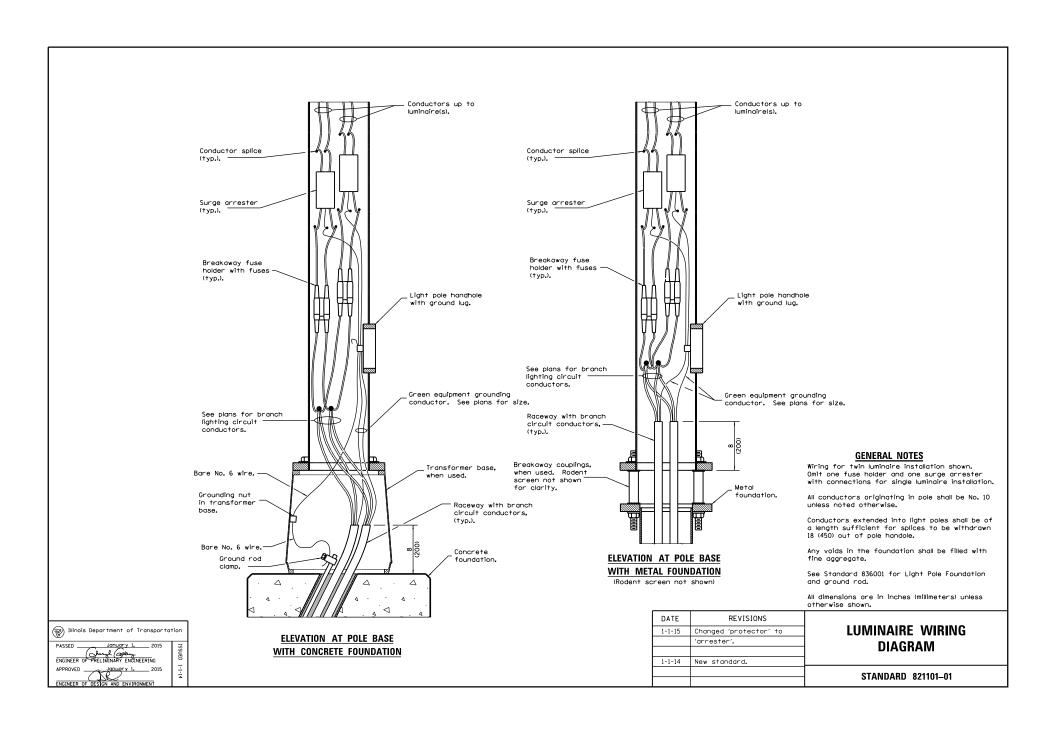


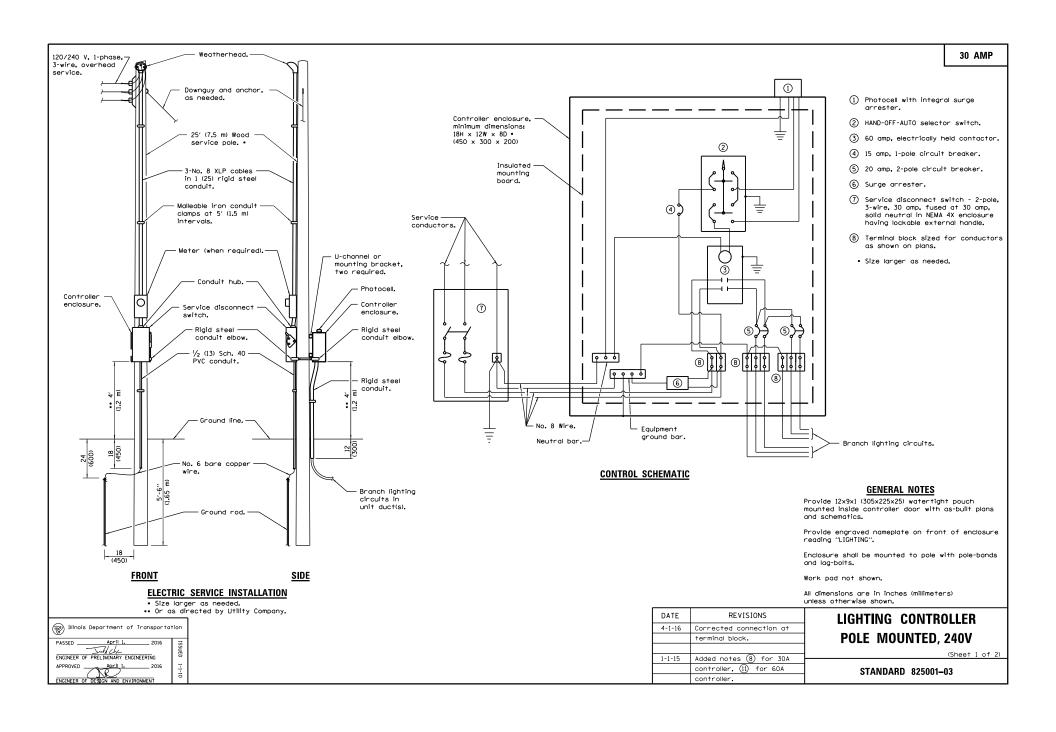


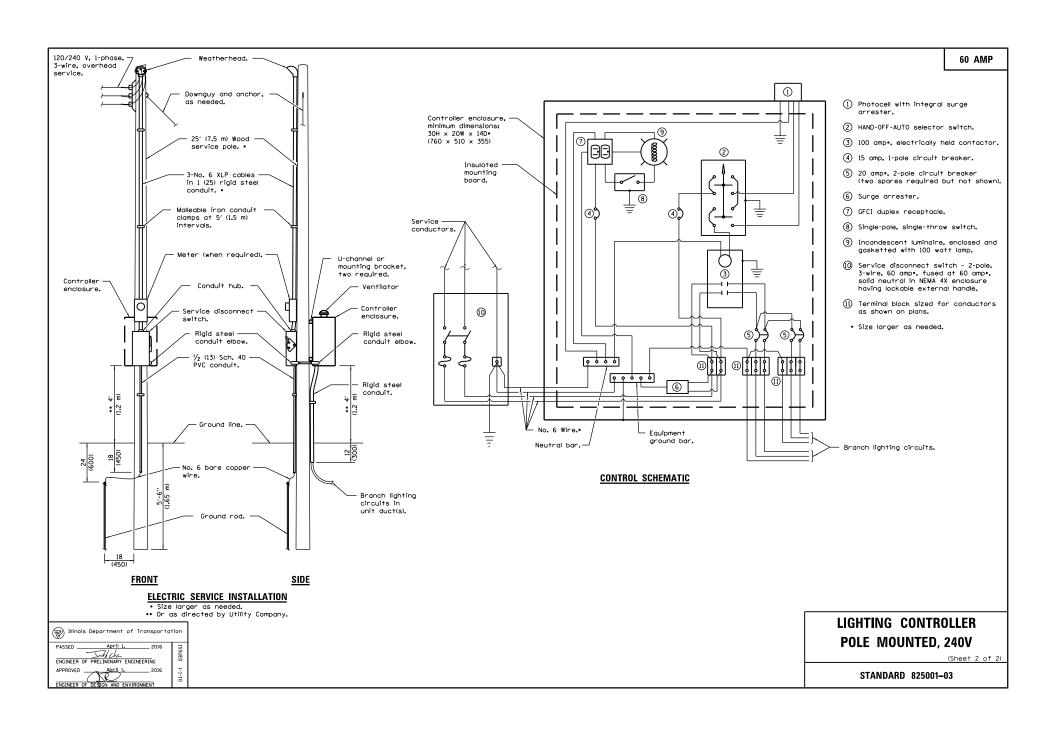


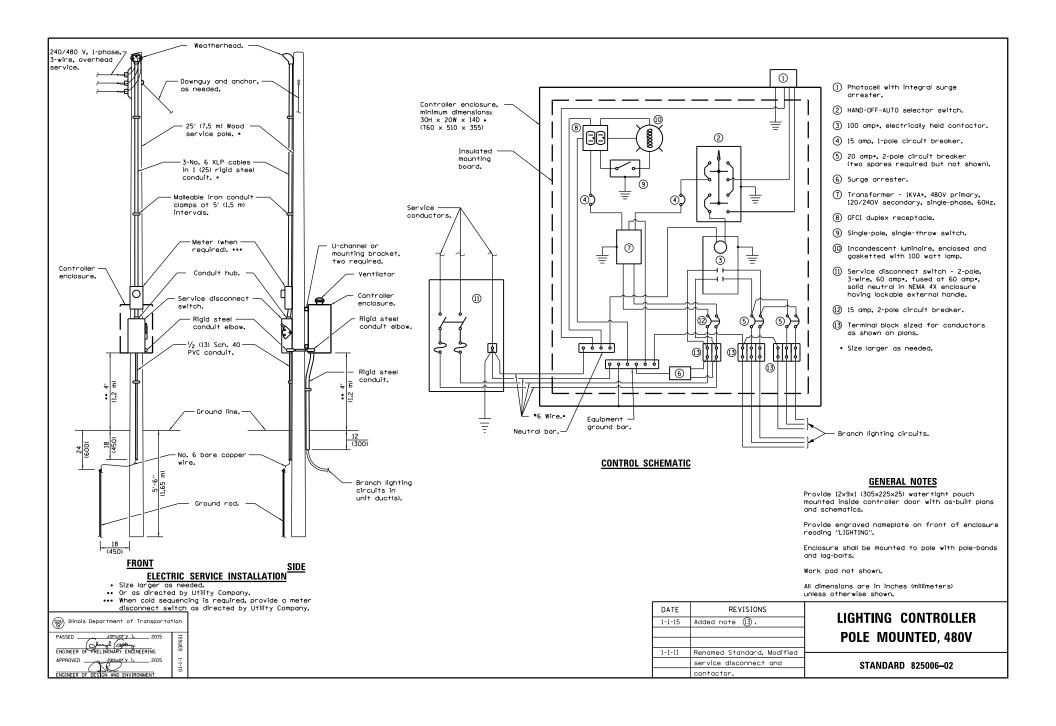


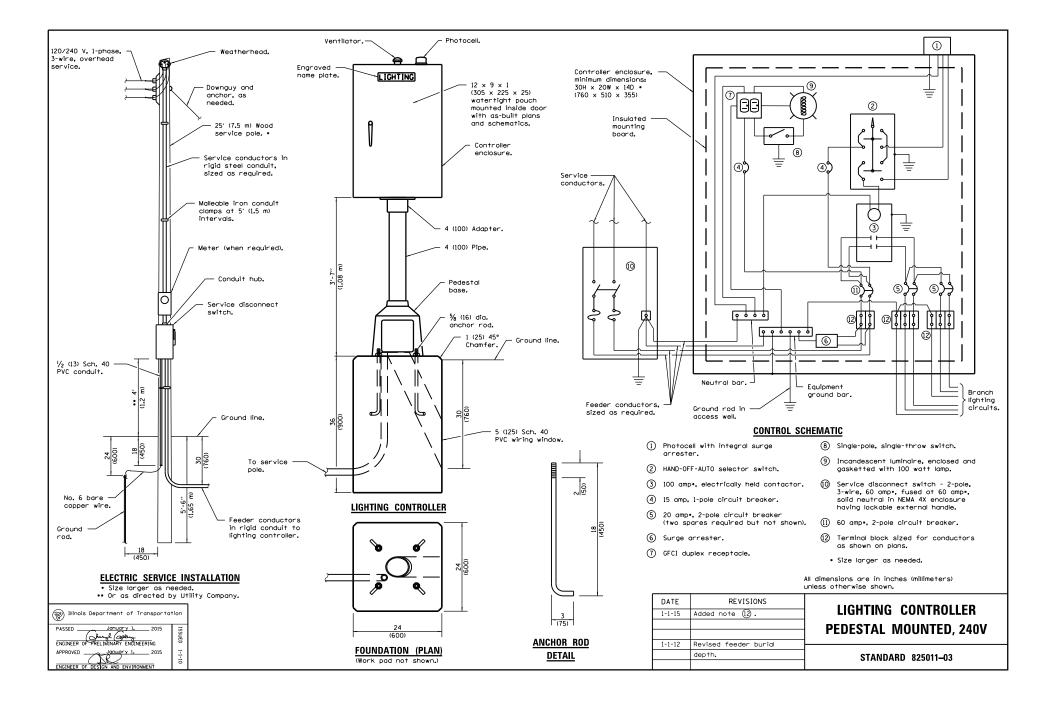


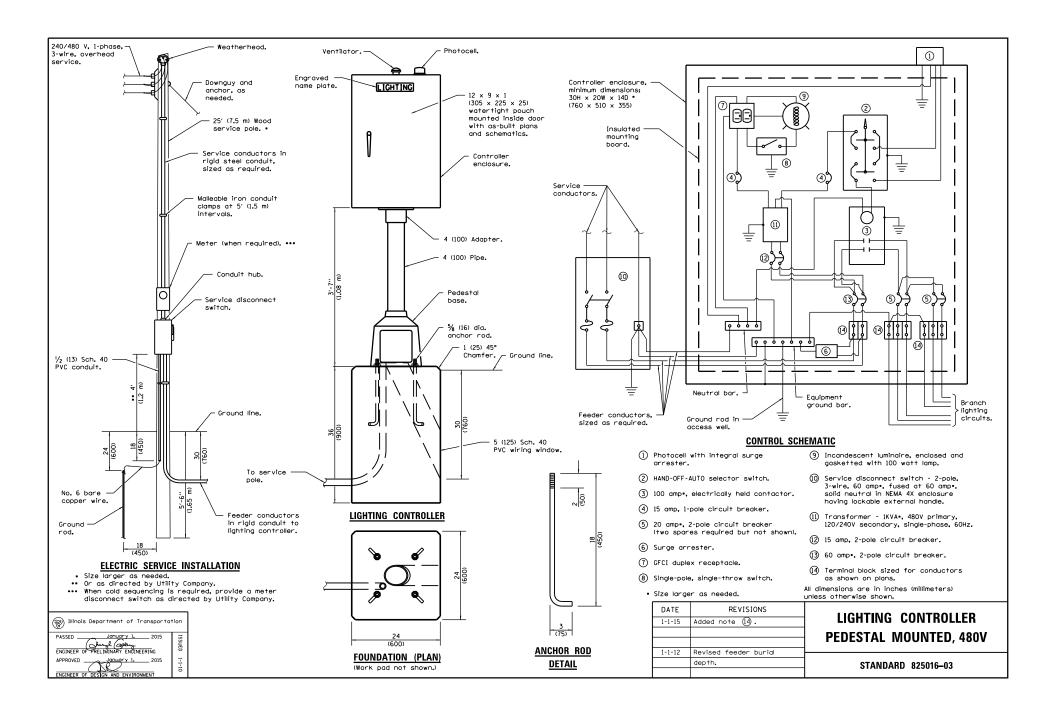


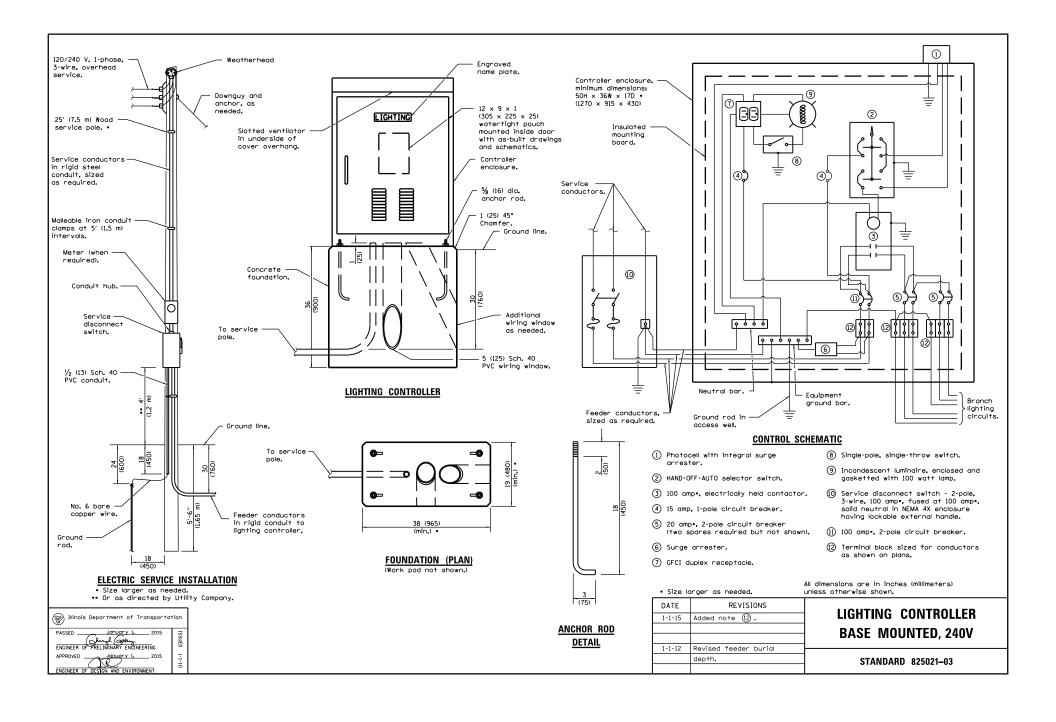


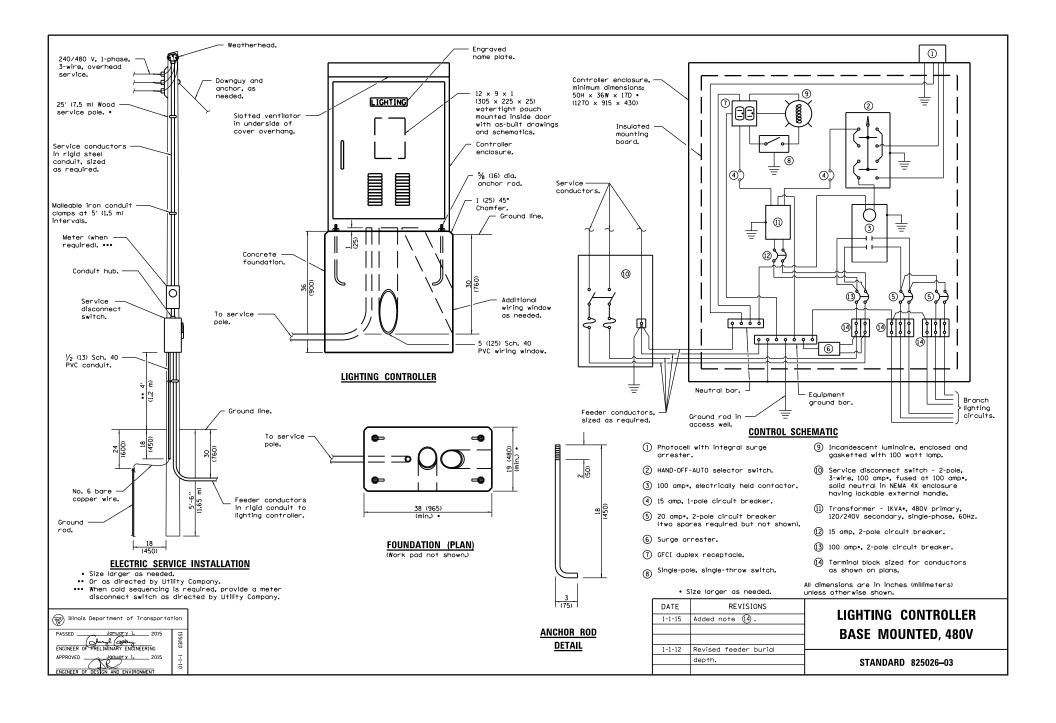


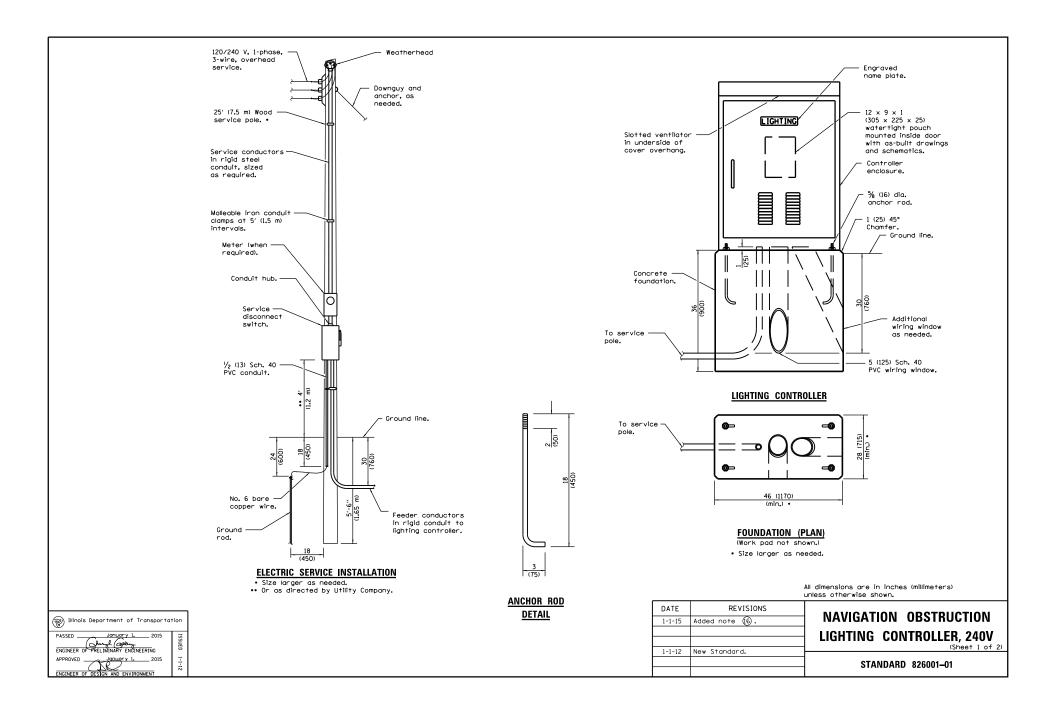


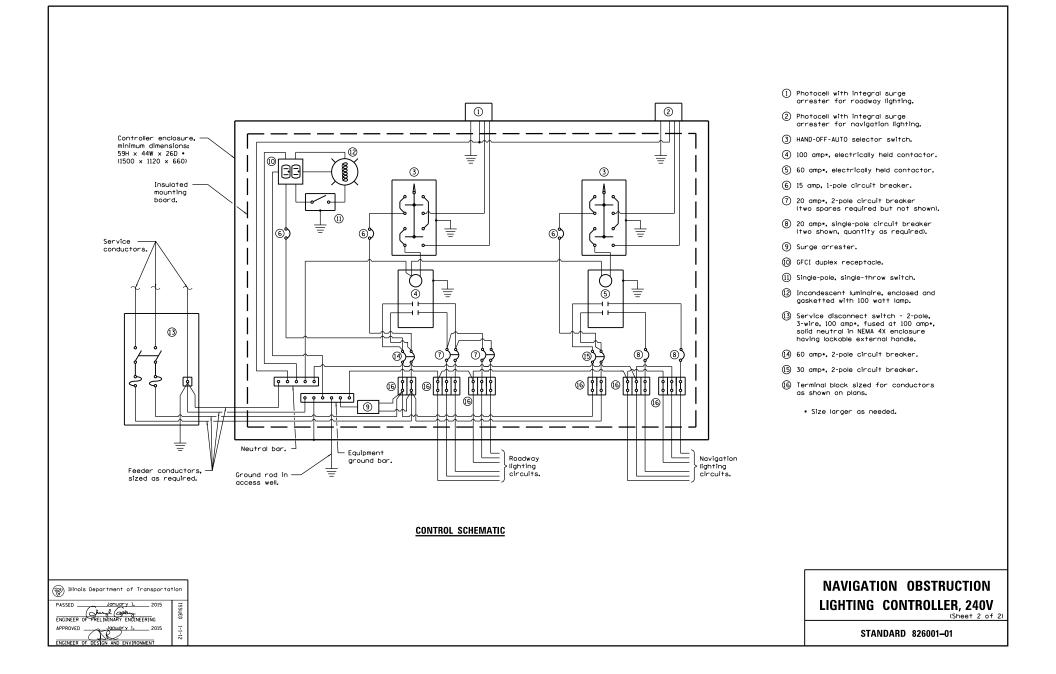


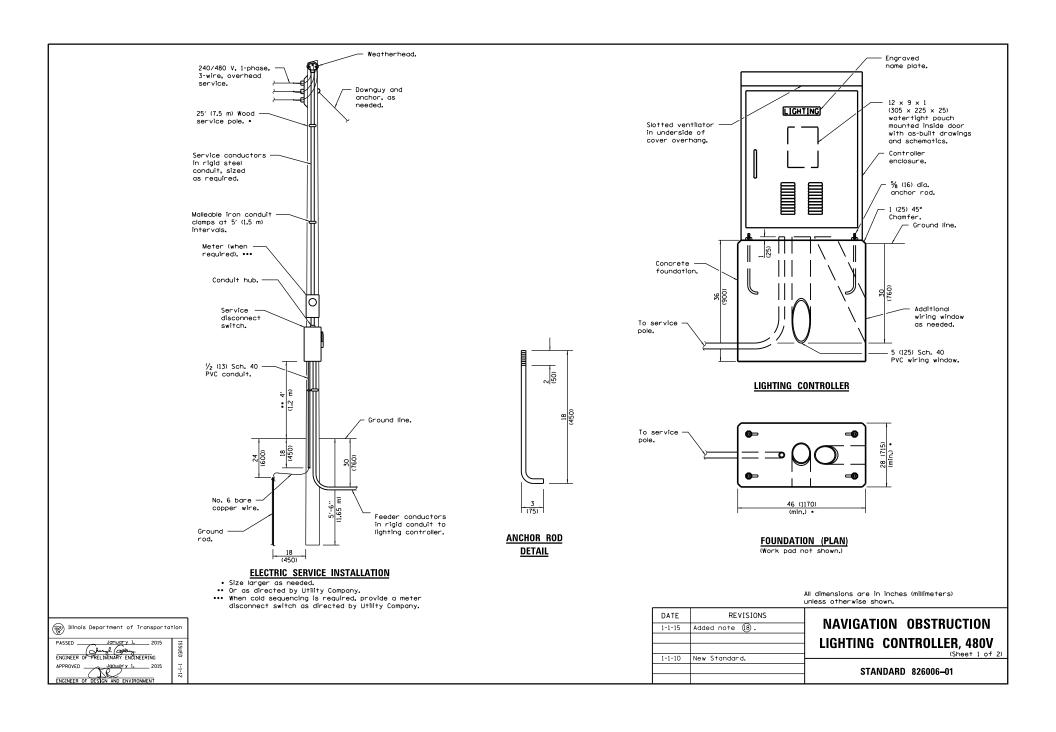


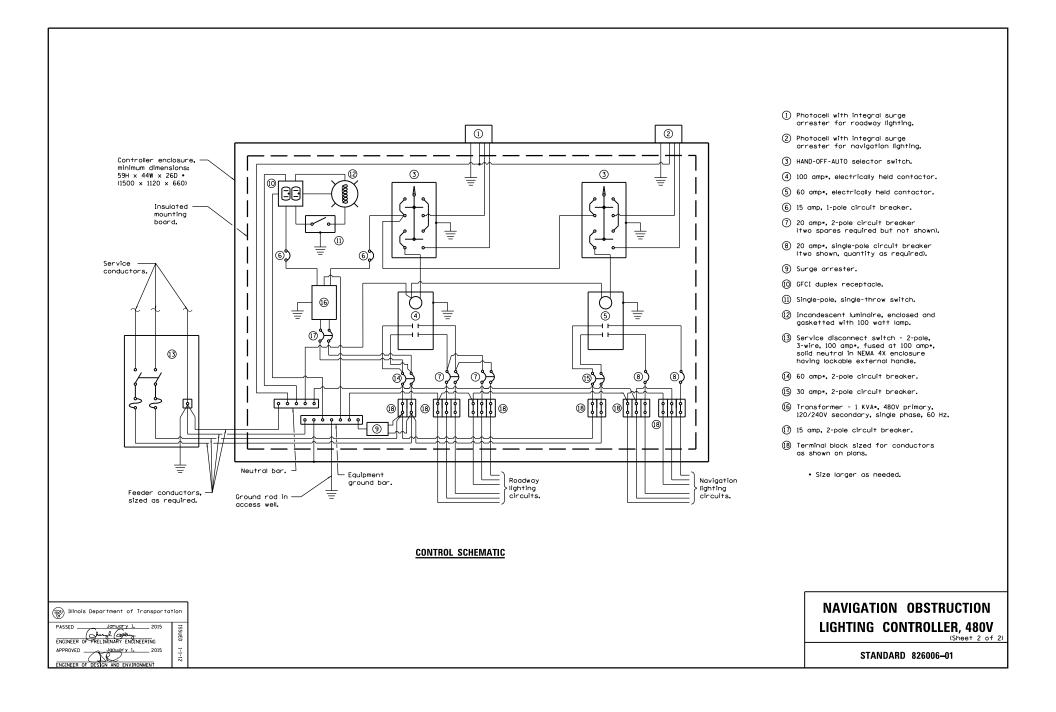


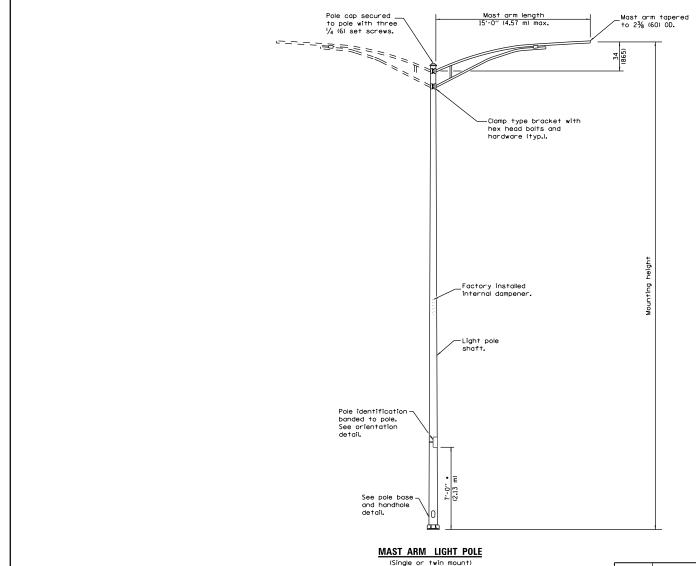












	POLE	
MOUNTING HEIGHT	MINIMUM SHAFT DIAMETER	MINIMUM WALL THICKNESS
35' (10.7 m) or less	8 tapered to 4½ (200 to 114)	0.25 (6)
Greater than 35' (10.7 m) to 45' (13.7 m)	10 tapered to 6 (250 to 150)	0.25 (6)
Greater than 45' (13.7 m) to 50' (15.2 m)	10 tapered to 6 (250 to 150)	0.312 (8)

POLE	BASE
MOUNTING HEIGHT	BOLT CIRCLE DIAMETER
35′ (10.7 m) or less	11½ (290)
Greater than 35' (10.7 m) to 50' (15.2 m)	15 (380)

See Standard 836001 for Light Pole Foundation and grounding electrode. $\,$

See Standard 720001 for pole identification banding to pole.

Voids in light pole base shall be sealed to prevent rodent entry. $\ensuremath{\,^{\circ}}$

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE REVISIONS 1-1-15 Revised note on HANDHOLE DETAIL. 1-1-14 Added pole mounted on

bridge parapet. Modified

attachment of screen.

LIGHT POLE ALUMINUM MAST ARM

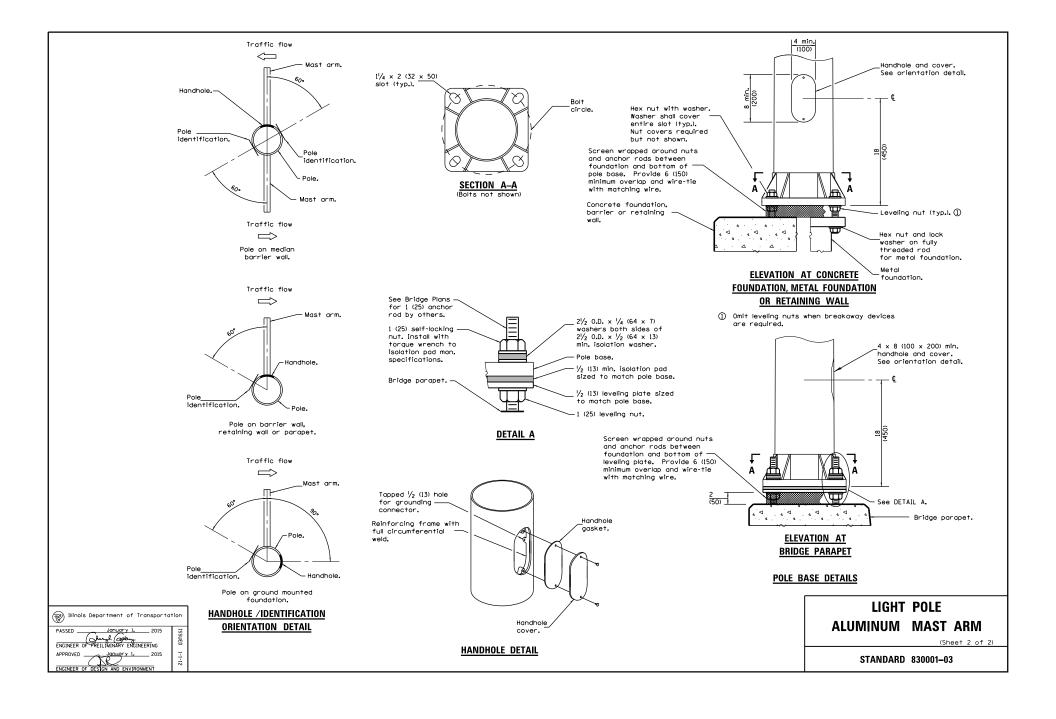
(Sheet 1 of 2)

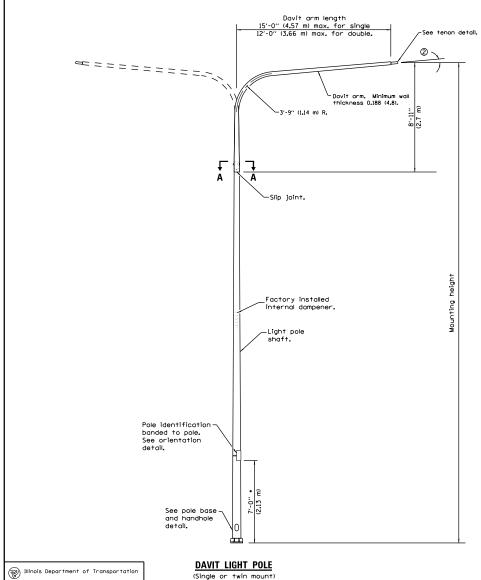
STANDARD 830001-03

illinois Department of Transportation	tion
PASSED January 1. 2015	ISSI

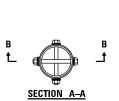
PASSED JOHUNGY I. 2015
ENGINEER OF PRELIMINARY ENGINEERING
APPROVED JOHN AND ENVIRONMENT

• Unless directed otherwise by the Engineer.



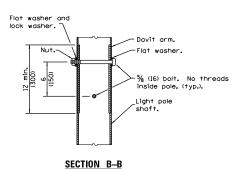


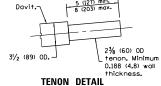
POLE BASE		
MOUNTING HEIGHT	BOLT CIRCLE DIAMETER	
35' (10.7 m) or less	11½ (290)	
Greater than 35' (10.7 m) to 50' (15.2 m)	15 (380)	



	POLE LOWER SHAFT		
MOUNTING HEIGHT	LOWER SHAFT LENGTH	MINIMUM SHAFT DIAMETER	MINIMUM WALL THICKNESS
30' (9.1 m)	21'-1'' (6.4 m)	8 tapered to 6 (200 to 114)	0.25 (6)
35′ (10.7 m)	26'-1'' (7.9 m)	8 tapered to 6 (200 to 114)	0.25 (6)
40′ (12 . 2 m)	31'-1'' (9.5 m)	10 tapered to 6 (250 to 150)	0.25 (6)
45′ (13.7 m)	36'-1" (11.0 m)	10 tapered to 6 (250 to 150)	0.25 (6)
50′ (15.2 m)	41'-1'' (12.5 m)	10 tapered to 6 (250 to 150)	0.312 (8)

- ① Lower shaft length shall be from the bottom of the pole base to the bottom of the slip joint.
- 2 5° max. for unloaded pole, 1.5° max. for loaded pole.





See Standard 836001 for Light Pole Foundation and grounding electrode.

See Standard 720001 for pole identification banding to pole.

Voids in light pole base shall be sealed to prevent rodent entry.

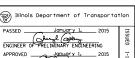
Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

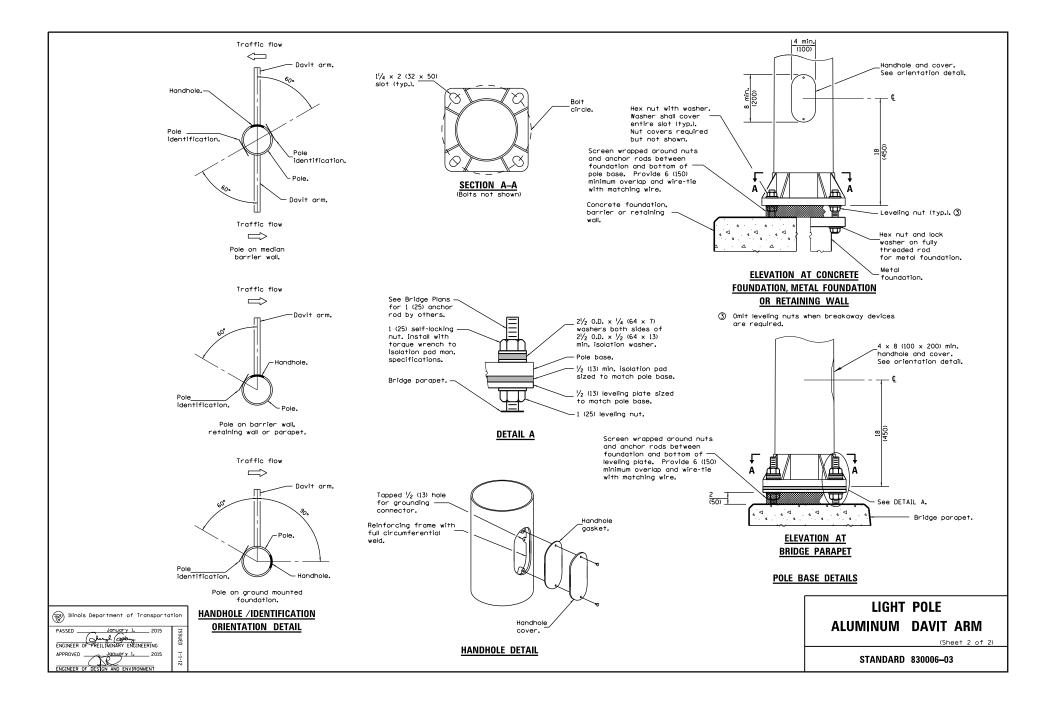
(Sheet 1 of 2)

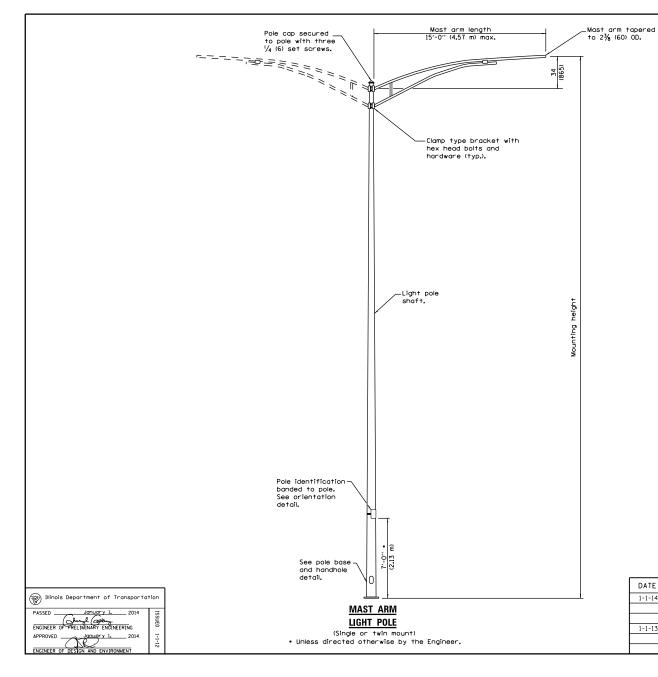
All dimensions are in inches (millimeters) unless otherwise shown.

	DATE	REVISIONS	LIGHT	POLE
-	1-1-15	Revised note on		
-		HANDHOLE DETAIL.	ALUMINUM	DAVIT ARM
-				
1	1-1-14	Added pole mounted on		(Sheet 1 of
1		bridge parapet. Modified	STANDARD	830006-03
		attachment of screen.	OTANDAND	000000 00



(Single or twin mount)
• Unless directed otherwise by the Engineer.





	POLE	
MOUNTING HEIGHT	MINIMUM SHAFT DIAMETER	MINIMUM WALL THICKNESS
35' (10.7 m) or less	8 tapered to 4 (200 to 100)	10 guage
Greater than 35' (10.7 m) to 50' (15.2 m)	10 tapered to 4 (250 to 100)	7 guage
Greater than 50' (15.2 m) to 60' (18.3 m)	10 tapered to 4 (250 to 100)	5 guage

BASE PLATE		
MOUNTING HEIGHT	BOLT CIRCLE DIAMETER	BASE PLATE THICKNESS
35' (10.7 m) or less	11½ (290)	1 (25)
Greater than 35' (10.7 m) to 50' (15.2 m)	15 (380)	1 ¹ / ₄ (32)
Greater than 50' (15.1 m) to 60' (18.3 m)	15 (380)	1½ (40)

See Standard 836001 for Light Pole Foundation and grounding electrode. $\ensuremath{\,^{\circ}}$

See Standard 720001 for pole identification banding to pole.

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

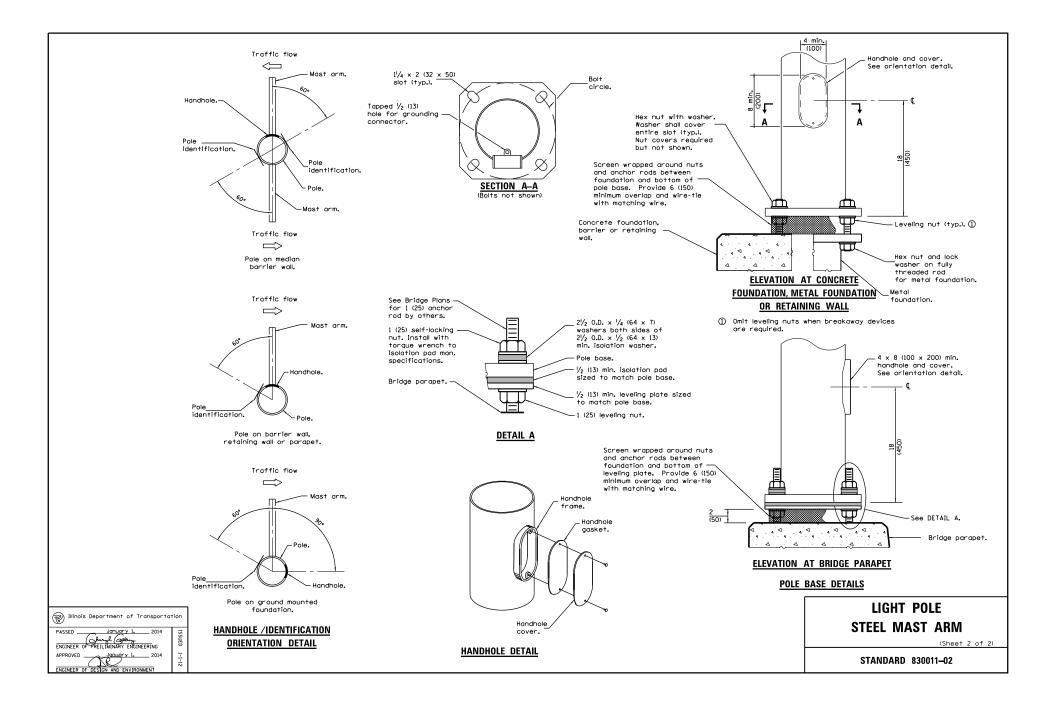
All dimensions are in inches (millimeters) unless otherwise shown.

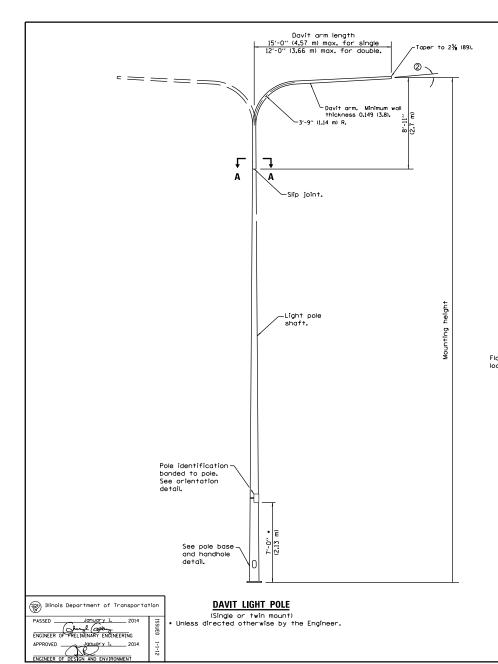
DATE	REVISIONS
1-1-14	Added pole mounted on
	bridge parapet. Modified
	attachment of screen.
1-1-13	Added 'barrier or retaining
	wall' to POLE BASE DETAIL.

LIGHT POLE STEEL MAST ARM

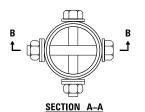
(Sheet 1 of 2)

STANDARD 830011-02



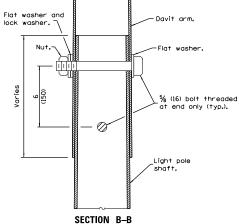


	BASE PLATE	
MOUNTING HEIGHT	BOLT CIRCLE DIAMETER	BASE PLATE THICKNESS
35' (10.7 m) or less	11½ (290)	1 (25)
Greater than 35' (10.7 m) to 50' (15.2 m)	15 (380)	1 ¹ / ₄ (32)
Greater than 50' (15.1 m) to 60' (18.3 m)	15 (380)	1½ (40)



	POLE LOWER SHAFT			
MOUNTING HEIGHT	LOWER SHAFT LENGTH	MINIMUM SHAFT DIAMETER	MINIMUM WALL THICKNESS	
30' (9.1 m)	21'-1'' (6.4 m)	8 tapered to 6 (200 to 114)	10 gauge	
35' (10.7 m)	26'-1'' (7.9 m)	8 tapered to 6 (200 to 114)	10 gauge	
40′ (12 . 2 m)	31'-1" (9 . 5 m)	10 tapered to 6 (250 to 150)	7 gauge	
45′ (13.7 m)	36'-1" (11.0 m)	10 tapered to 6 (250 to 150)	7 gauge	
50′ (15 . 2 m)	41'-1'' (12.5 m)	10 tapered to 6 (250 to 150)	7 gauge	

- ① Lower shaft length shall be from the bottom of the pole base to the bottom of the slip joint.
- 2 3° max. for unloaded pole, 1.5° max. for loaded pole.



See Standard 836001 for Light Pole Foundation and grounding electrode. $\,$

See Standard 720001 for pole identification banding to pole.

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

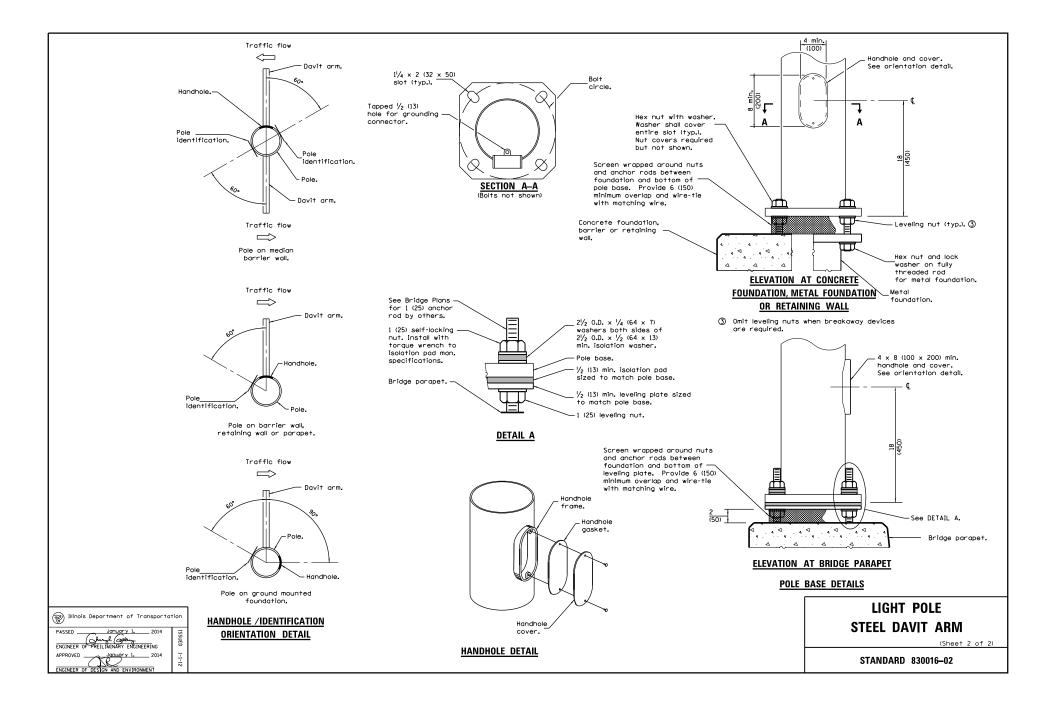
All dimensions are in inches (millimeters) unless otherwise shown.

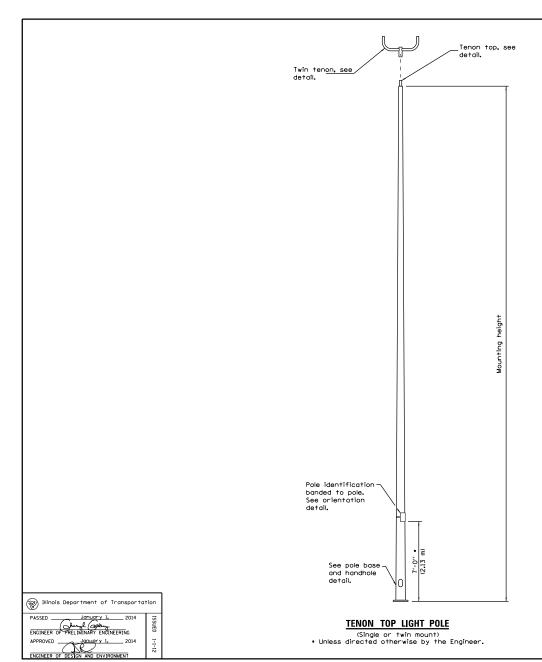
DATE	REVISIONS	Γ
1-1-14	Added pole mounted on	
	bridge parapet. Modified	
	attachment of screen.	
1-1-13	Added 'barrier or retaining	┝
	wall' to POLE BASE DETAIL.	
		ı

LIGHT POLE STEEL DAVIT ARM

(Sheet 1 of 2)

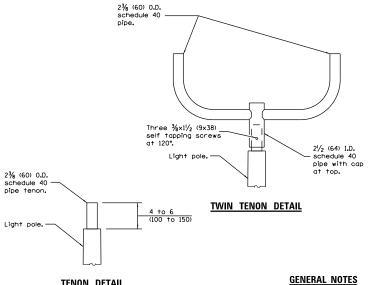
STANDARD 830016-02





BASE PLATE						
MOUNTING HEIGHT	BOLT CIRCLE DIAMETER	BASE PLATE THICKNESS				
35' (10.7 m) or less	11½ (290)	1 (25)				
Greater than 35' (10.7 m) to 50' (15.2 m)	15 (380)	1 ¹ / ₄ (32)				
Greater than 50' (15.1 m) to 60' (18.3 m)	15 (380)	1 ¹ / ₂ (40)				

LIGHT POLE					
MOUNTING HEIGHT	MINIMUM SHAFT DIAMETER	MINIMUM WALL THICKNESS			
35' (10.7 m) or less	8 tapered to 4 (200 to 100)	10 guage			
Greater than 35' (10.7 m) to 50' (15.2 m)	10 tapered to 4 (250 to 100)	7 guage			
Greater than 50' (15.2 m) to 60' (18.3 m)	10 tapered to 4 (250 to 100)	5 guage			



TENON DETAIL

See Standard 836001 for Light Pole Foundation and grounding electrode.

See Standard 720001 for pole identification banding to pole.

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

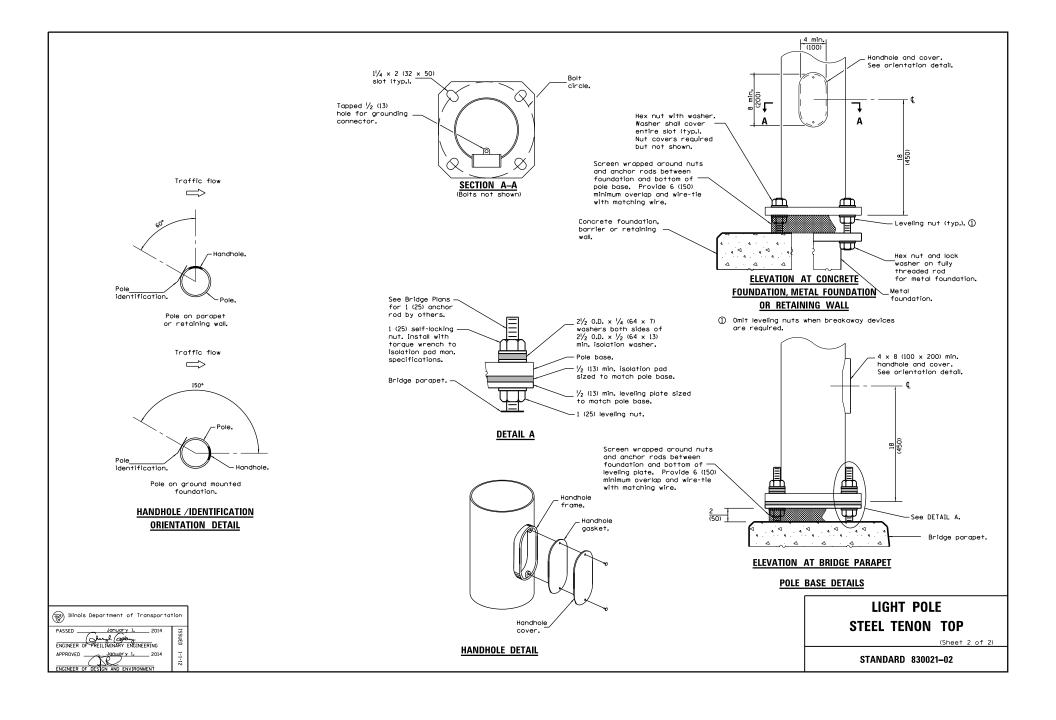
All dimensions are in inches (millimeters) unless otherwise shown.

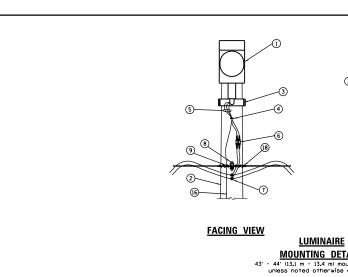
DATE	REVISIONS			
1-1-14	Added pole mounted on			
	bridge parapet. Modified			
	attachment of screen.			
1-1-13	Added 'barrier or retaining			
	wall' to POLE BASE DETAIL.			

LIGHT POLE STEEL TENON TOP

(Sheet 1 of 2)

STANDARD 830021-02



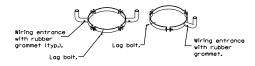


3

SIDE VIEW

MOUNTING DETAILS

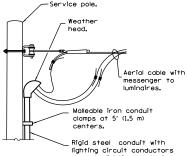
43' - 44' (13.1 m - 13.4 m) mounting height unless noted otherwise on plans.



TWIN

SINGLE

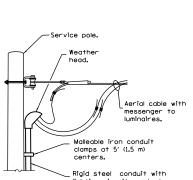
MOUNTING BRACKET DETAILS



LIGHTING CIRCUIT

AT SERVICE/CONTROLLER

See standard 825001 for service installation.



down to lighting controller.

Grade.

(3)

LIGHT POLE WITH CIRCUIT ROUTED

UNDERGROUND

- 1 Luminaire.
- ② Wood light pole, 50' (15.2 m), class 3 (typ.). •
- 3 Luminaire mounting bracket.
- (4) Cable clamps on 24 (600) centers.
- 5) Three #10 XLP-USE cable.
- (6) Waterproof, two-pole fuse holder with fuses.
- Waterproof insulation piercing tap connector.
- (8) Heavy duty insulated pulley clevis with mounting bolt and hardware.
- Ground clamp.
- (1) 1 (25) rigid steel conduit. •
- (1) Malleable iron conduit clamps, 5' (1.5 m)
- 12 Threaded conduit reducer.
- (3) "C" condulet, threaded.
- $1\frac{1}{2}$ (40) rigid steel conduit. •
- (5) Conduit bushing.
- (6) *6 Bare copper ground wire to 10 ft. ground rod, every third light pole.
- (17) Unit duct.
- (18) Wire tie.
- (19) Malleable iron conduit clamp below "C" condulet.
- Size larger as needed.

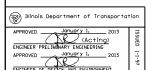
GENERAL NOTES

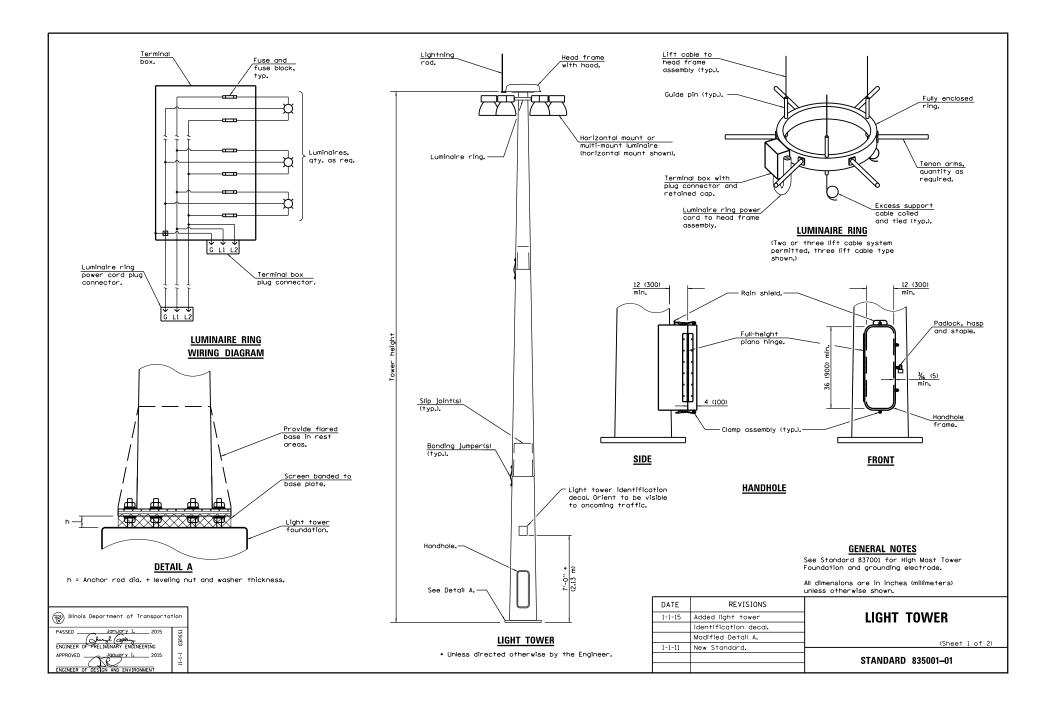
See plans for wire and unit duct sizes and pole locations not shown.

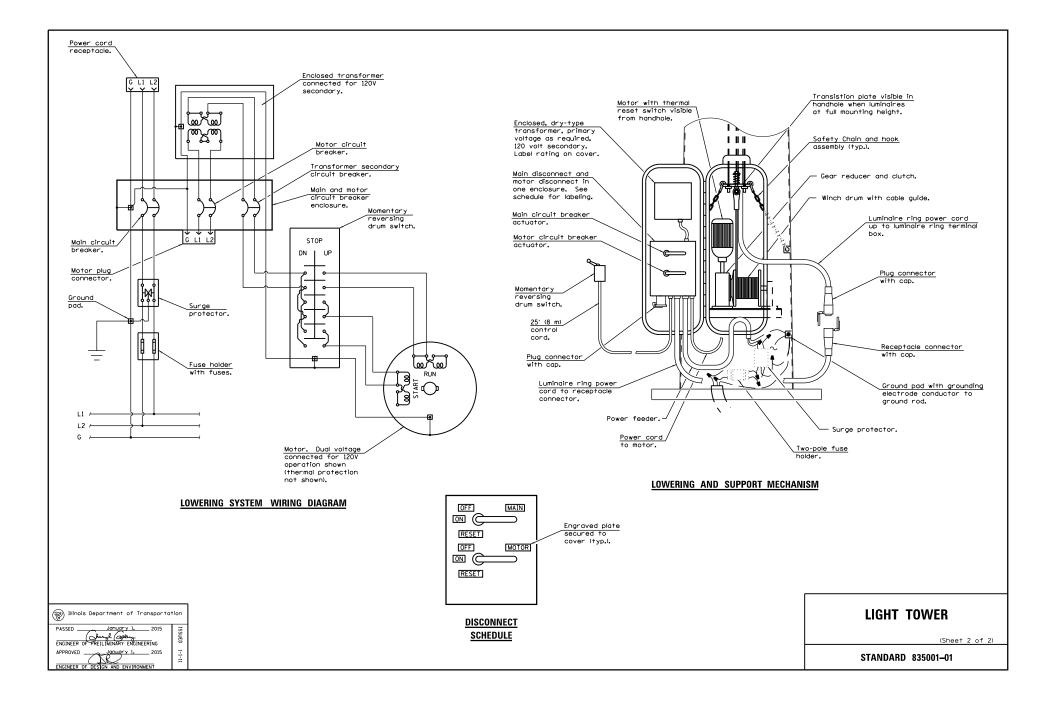
Provide guy wires with strain insulators and anchors, as

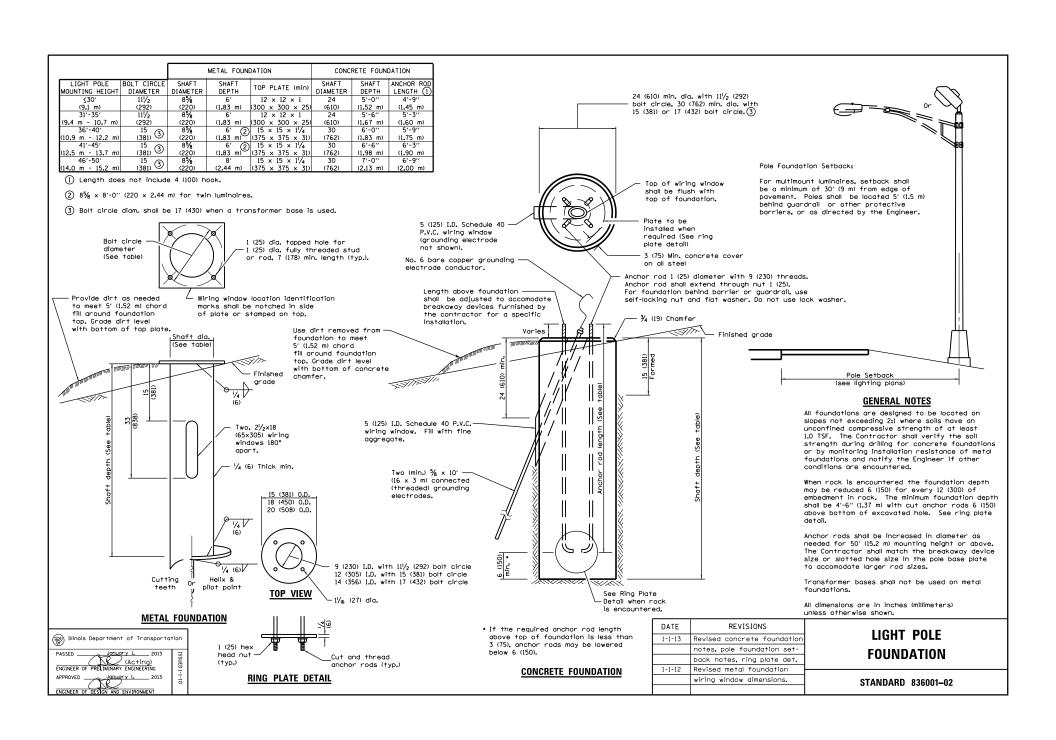
All dimensions are in inches (millimeters) unless otherwise shown.

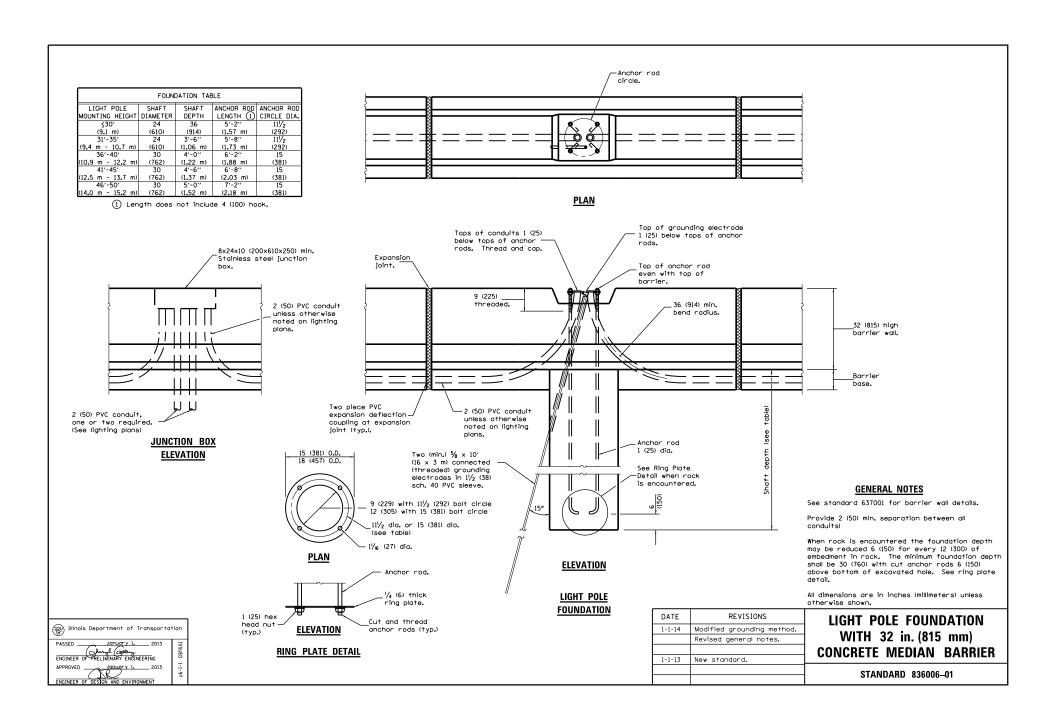
DATE	REVISIONS	TEMPODARY ROADWAY			
1-1-13	New standard.	TEMPORARY ROADWAY			
		LIGHTING			
		STANDARD 830026			

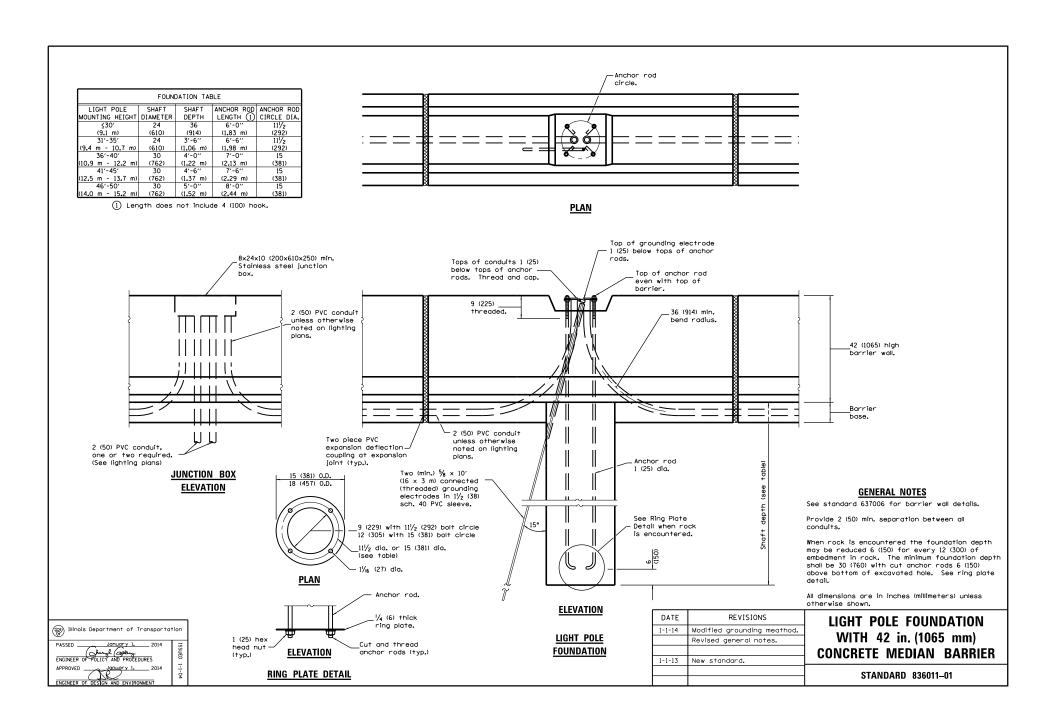


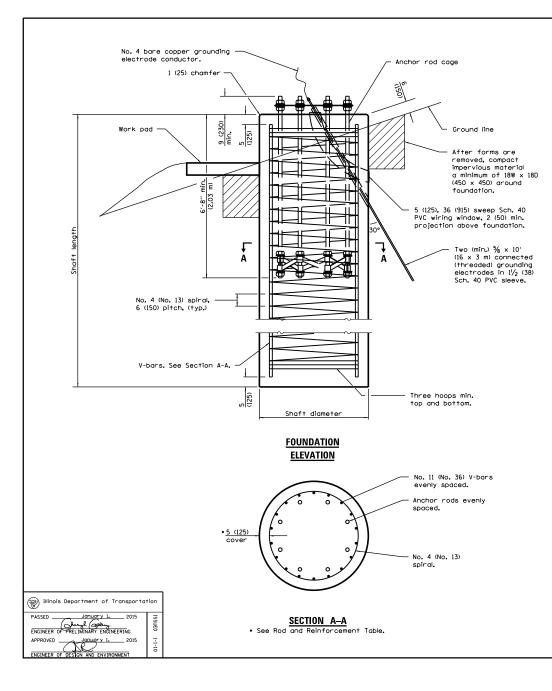








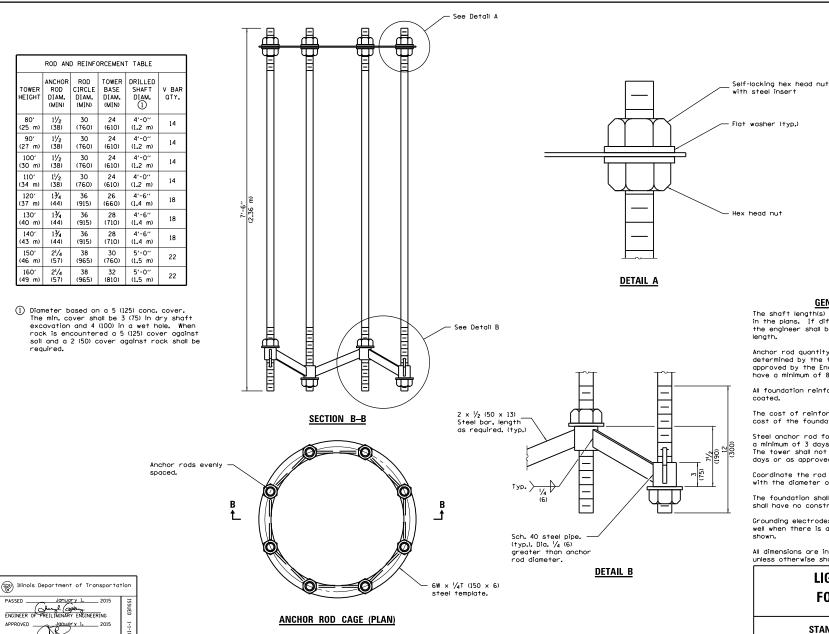




SHAFT LENGTH TABLE											
AV		AVERAGE STRENGTH	LIGHT TOWER HEIGHT								
SOII	CONSISTENCY	Qu în tsf (Qu în kPa)	80' (24 m)	90' (27 m)	100' (30 m)	110' (34 m)	120′ (37 m)	130' (40 m)	140′ (43 m)	150' (46 m)	160' (49 m
	SOFT	< 0.5 (< 50)		21'-6" (6.5 m)							
é	MEDIUM	0.5 to 1 (50 to 100)		17'-6" (5.3 m)							
Cohestve	STIFF	1 to 2 (100 to 200)		15'-0'' (4 . 5 m)							
S	VERY STIFF	2 to 4 (200 to 400)		13'-0'' (3.9 m)							
	HARD	> 4 (> 400)		12'-0'' (3.5 m)							
		N in BLOWS/FT. (N in BLOWS/0.3m)									
	VERY LOOSE	< 5 (< 5)		17'-6" (5.2 m)							
F	LOOSE	5 to 10 (5 to 10)		16'-0'' (4.8 m)							
Granular	MEDIUM	10 to 25 (10 to 25)		15'-0'' (4 . 5 m)							
Ö	DENSE	25 to 50 (25 to 50)		14'-6" (4.3 m)							
	VERY DENSE	> 50 (> 50)		13'-6" (4.1 m)							

See Sheet 2 for GENERAL NOTES.

DATE	REVISIONS	LIGHT TOWER			
1-1-15	Added 6'-8" min. anchor	light towen			
	rod embedment in	FOUNDATION			
	foundation.	(5			
1-1-14	Revised diameter of grd.	(Sheet 1 of 2)			
	electrode sleeve.	STANDARD 837001-04			
]			



The shaft length(s) are based on soil borings in the plans. If different soils are encountered, the engineer shall be notified to provide a revised length.

Anchor rod quantity, diameter, and length shall be determined by the tower manufacturer and approved by the Engineer. Each foundation shall have a minimum of 8 anchor rods.

All foundation reinforcement steel shall be epoxy

The cost of reinforcement shall be included in the cost of the foundation.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

Coordinate the rod circle diameter of the tower with the diameter of the anchor rod cage.

The foundation shall be poured monolithically and shall have no construction joints.

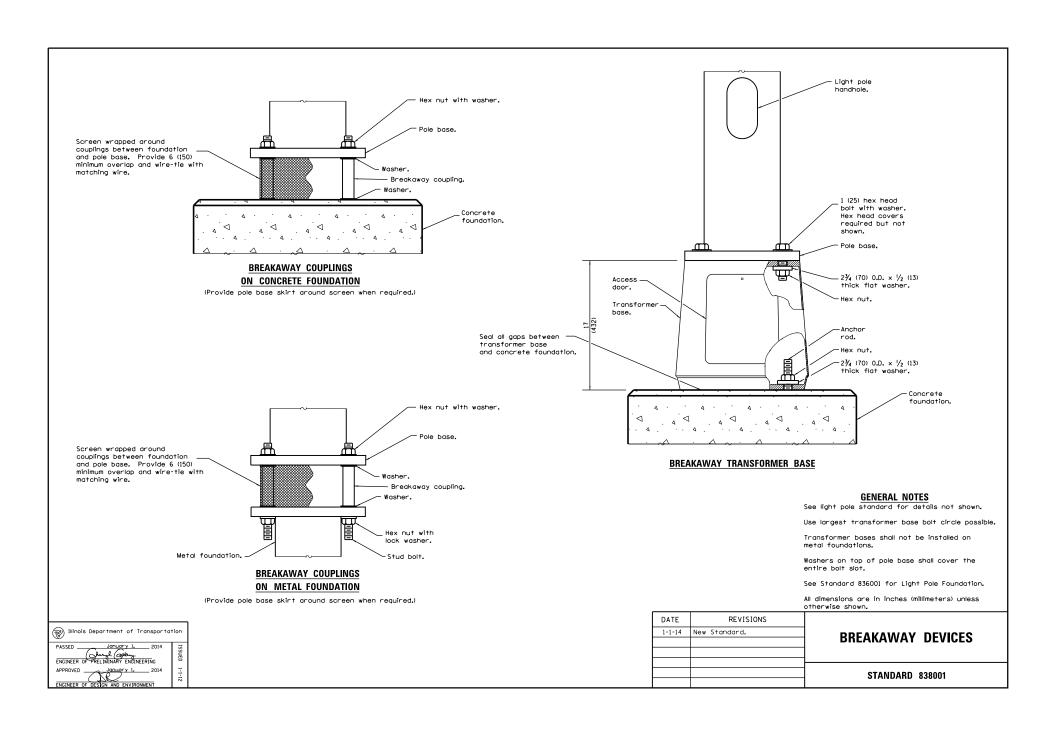
Grounding electrodes shall be installed in an access well when there is a conflict in using the method

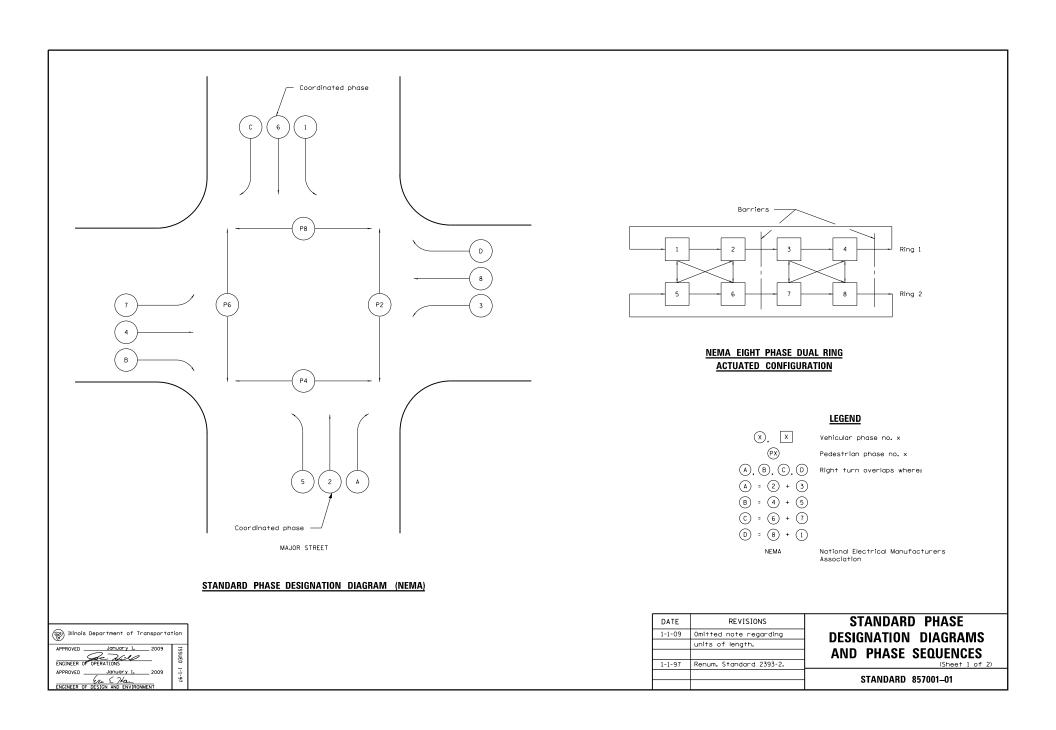
All dimensions are in inches (millimeters)

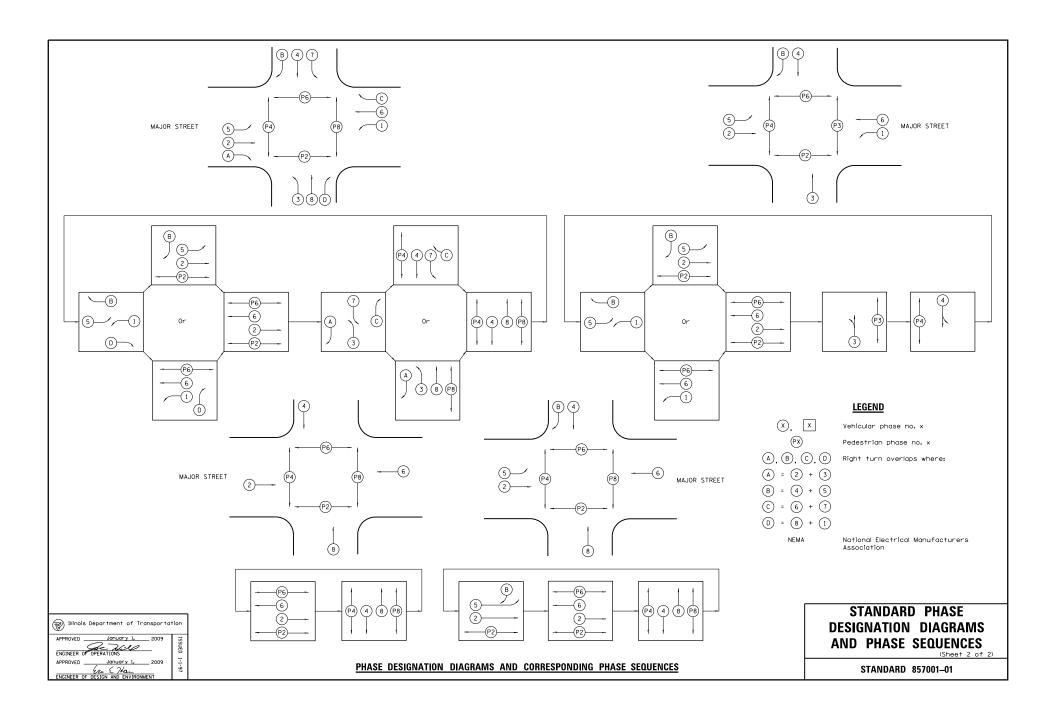
LIGHT TOWER FOUNDATION

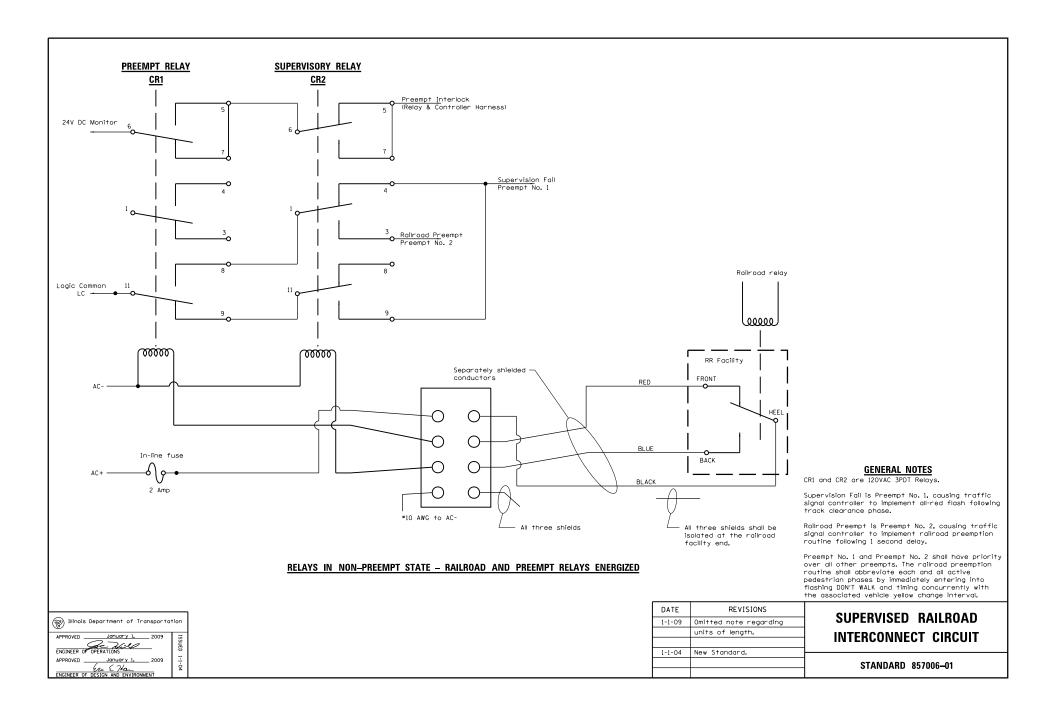
(Sheet 2 of 2)

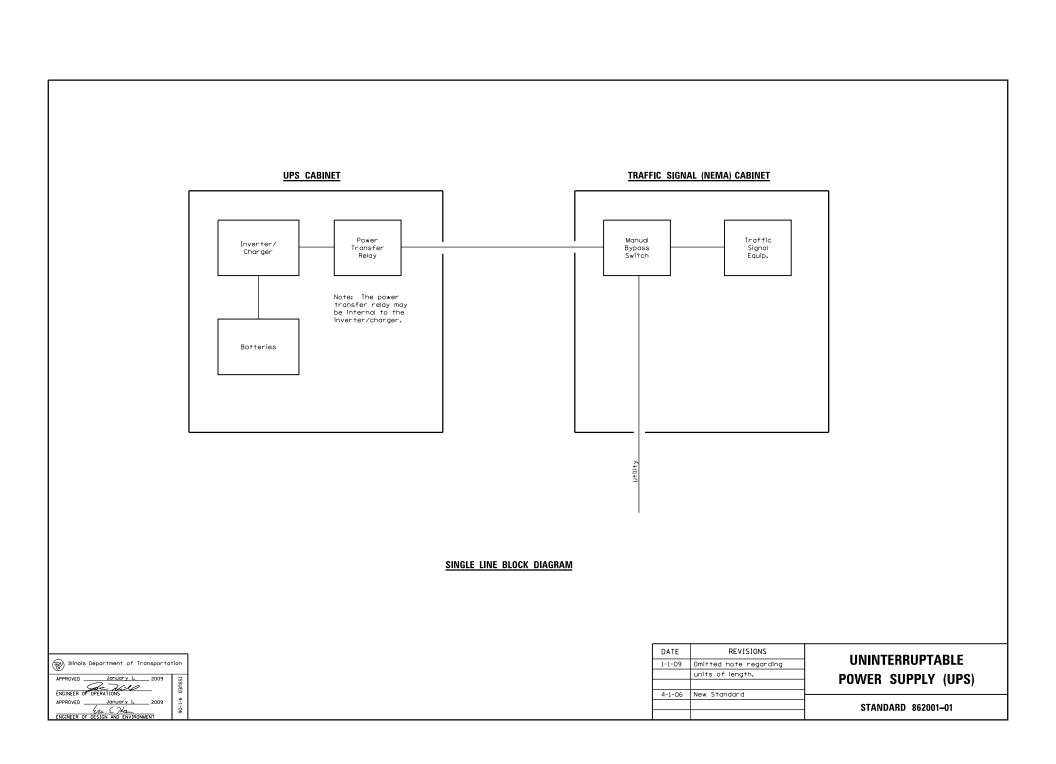
STANDARD 837001-04

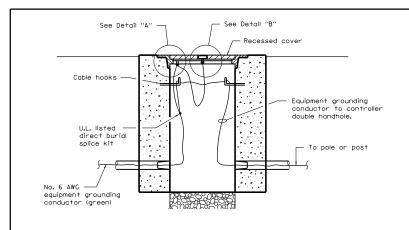


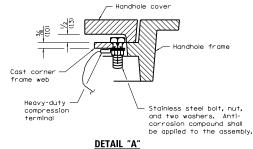


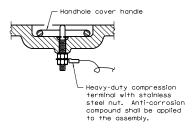






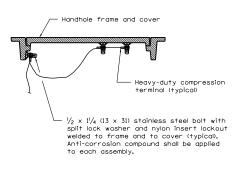






DETAIL "B"

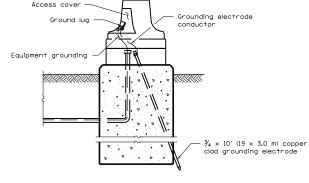
BONDING A HANDHOLE COVER & FRAME



BONDING AN EXISTING HANDHOLE COVER & FRAME



HEAVY-DUTY



GROUNDING A MAST ARM POLE/POST



HEAVY-DUTY GROUND ROD CLAMP All dimensions are in inches (millimeters) unless otherwise shown.

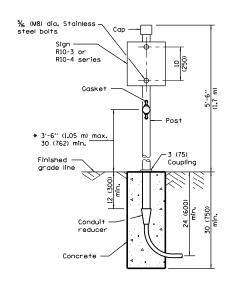
DATE	REVISIONS	
1-1-09	Switched units to	
	English (metric).	
1-1-07	Revised terminology.	

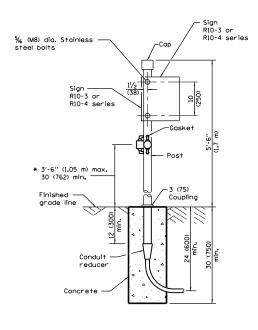
TRAFFIC SIGNAL **GROUNDING & BONDING**

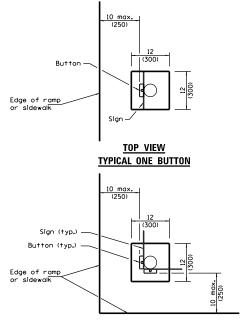
STANDARD 873001-02

Illinois Department of Transportation APPROVED January 1. ENGINEER OF OPERATIONS APPROVED January l.

COMPRESSION TERMINAL







PEDESTRIAN ONE PUSH BUTTON POST

PEDESTRIAN TWO PUSH BUTTON POST

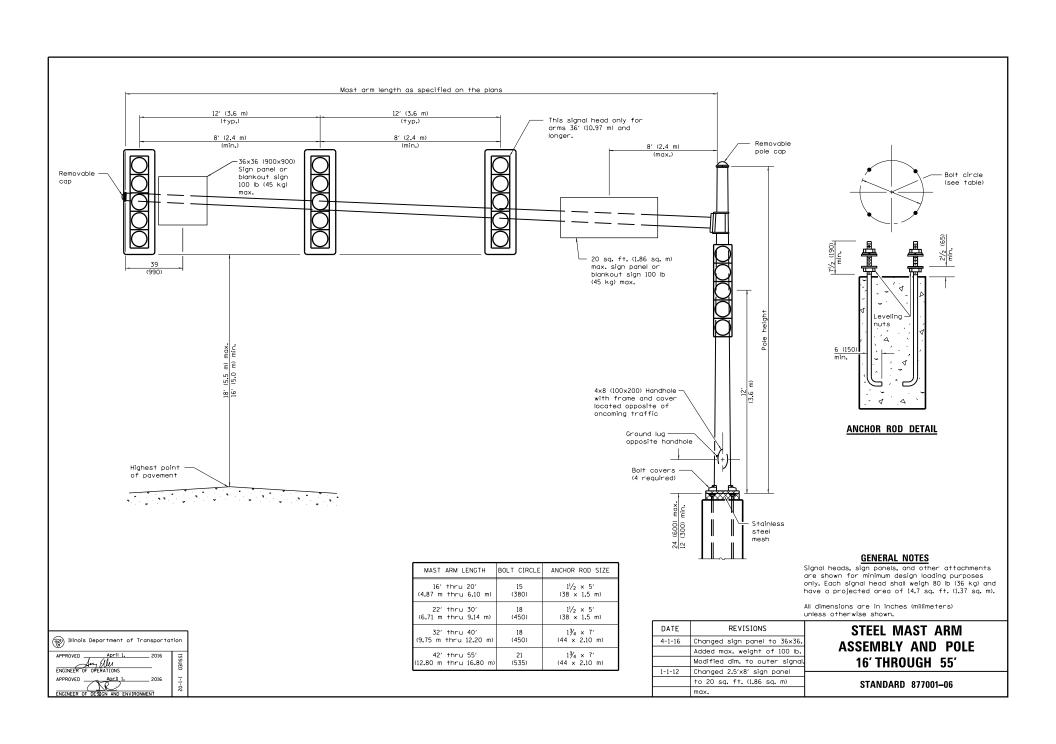
* 36 (914) prefered

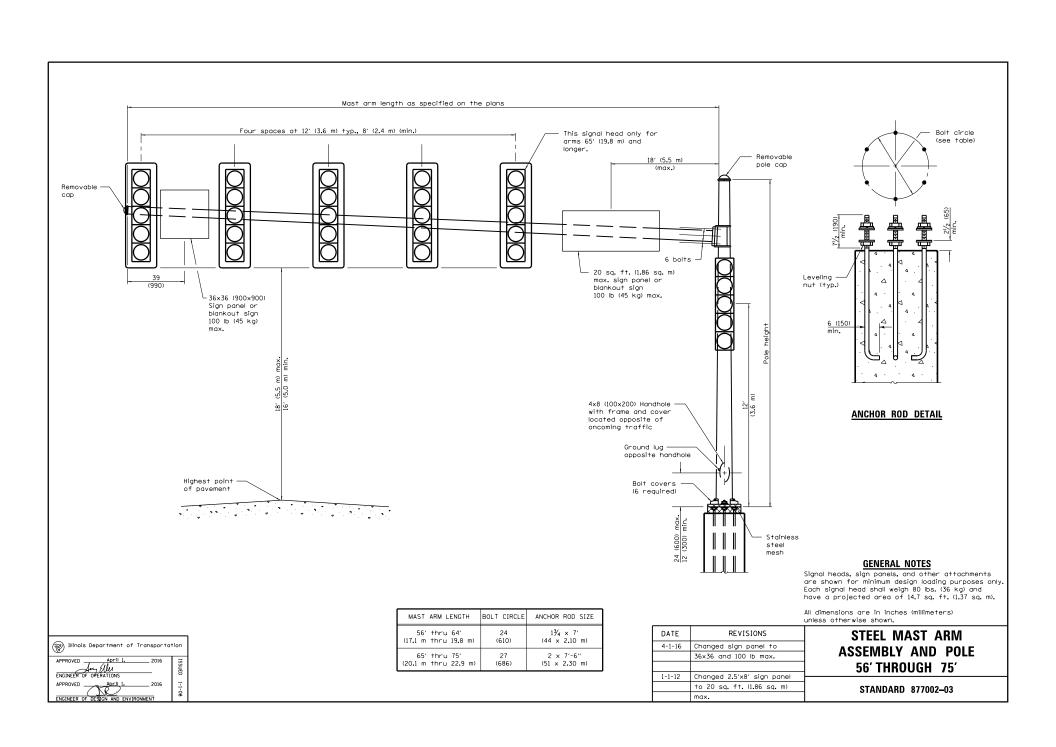
All dimensions are in inches (millimeters) unless otherwise shown.

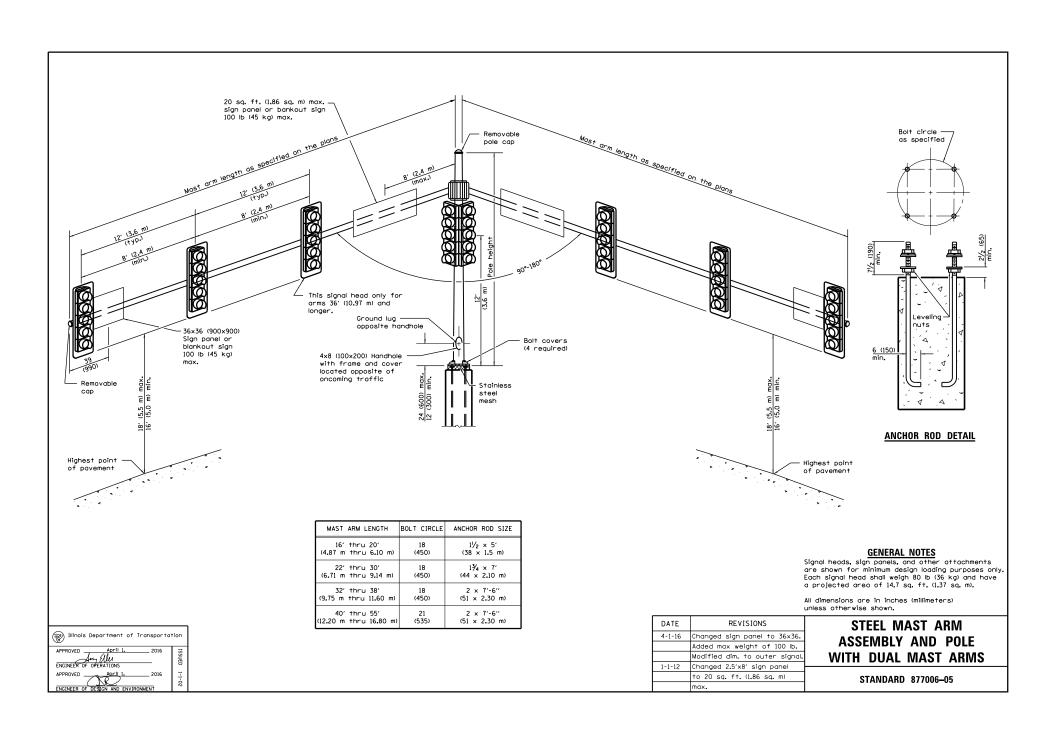
TOP VIEW
TYPICAL TWO BUTTONS

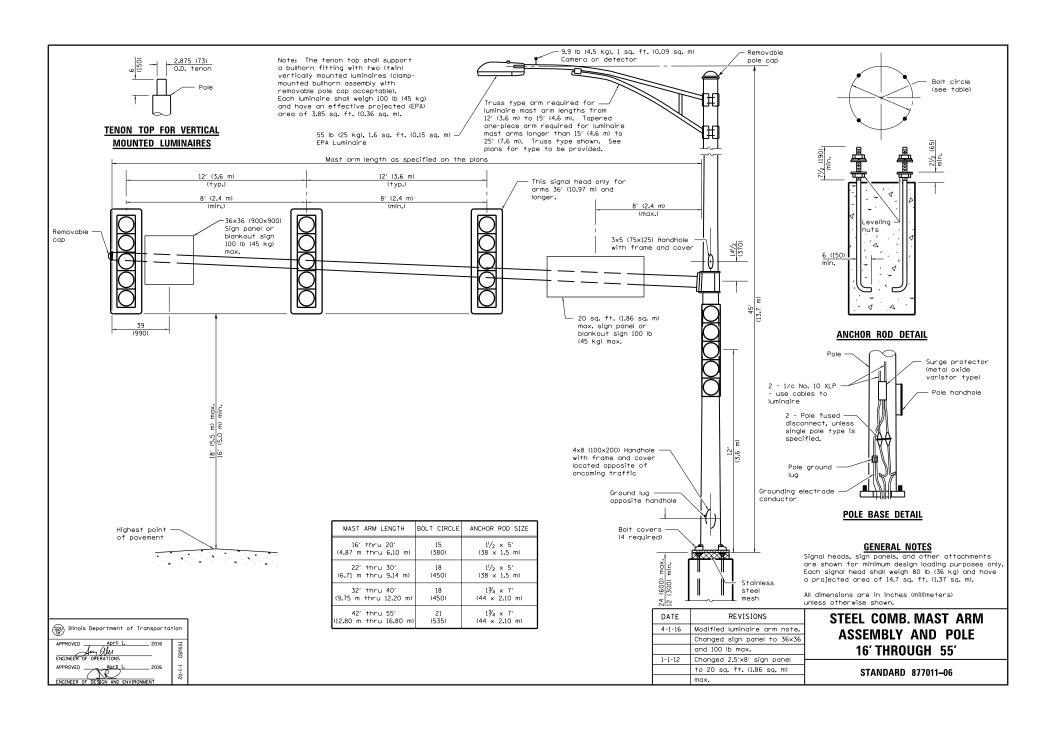
DATE	REVISIONS	DEDECTRIAN DUCH	
4-1-16	Revised sign numbers	PEDESTRIAN PUSH	
	for concistency with	BUTTON POST	
	current MUTCD.	DUTTUN FUST	
1-1-14	Revised and added		
	dimensions for PROWAG	STANDARD 876001-04	
	reach range requirements.	07/112/112 070001 01	

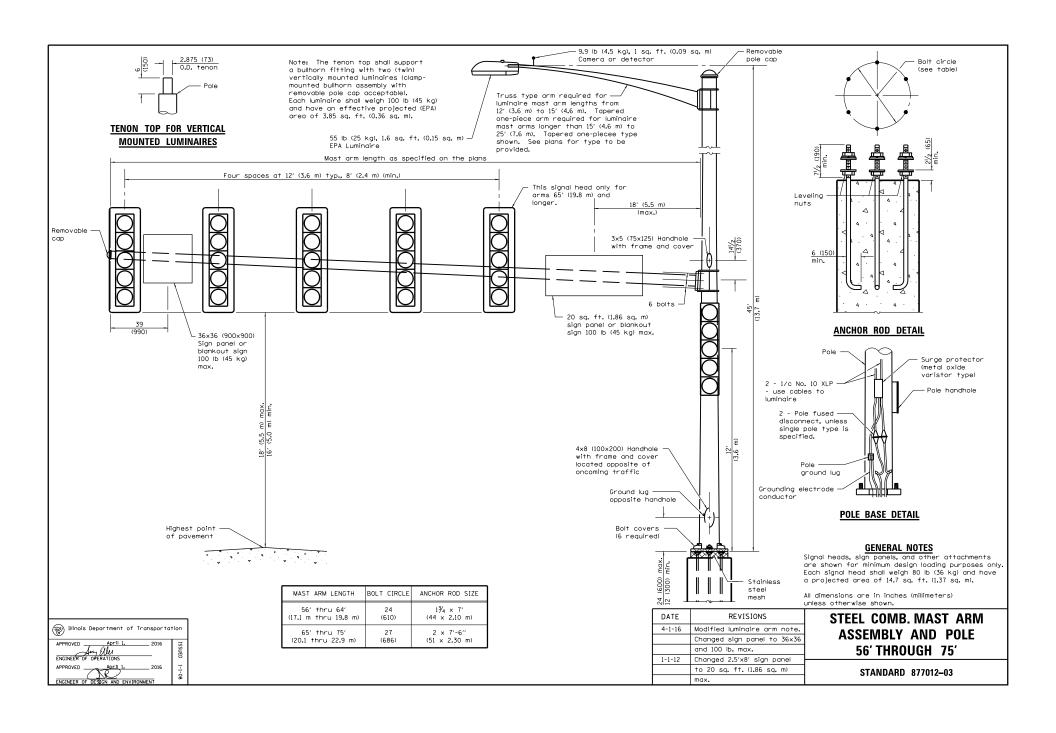
illinois Department of Transporta				
APPROVEDApril 12016	П			
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ENGINEER OF OPERATIONS	1			
APPROVED April 1. 2016	1			
(KR)	3			
ENGINEER OF DESIGN AND ENVIRONMENT	1			

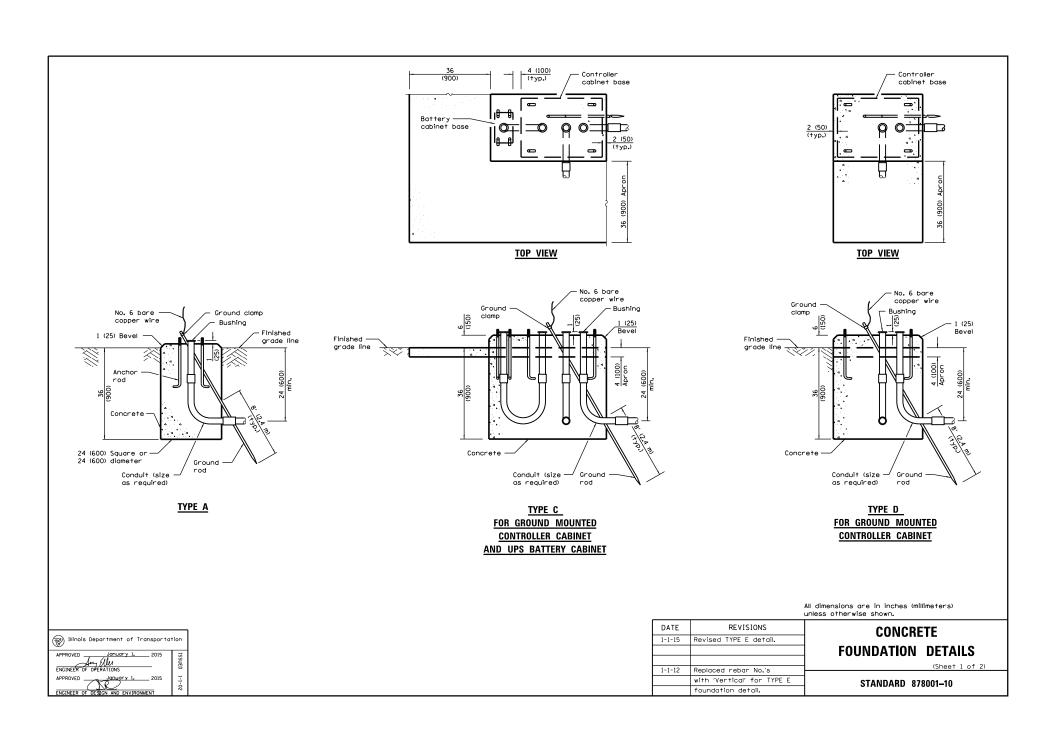


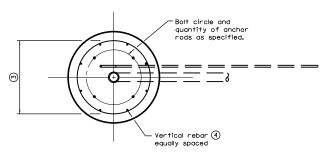




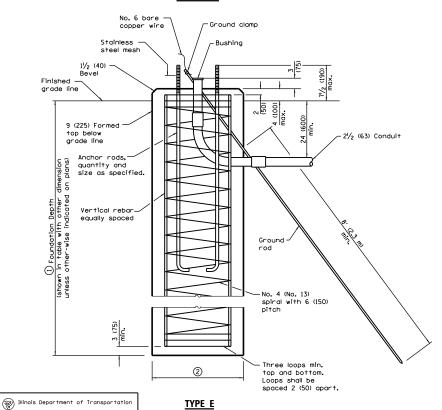








TOP VIEW



ISSUED

ENGINEER OF OPERATIONS

Mast Arm Length	① Foundation Depth •	② Foundation Diameter	3 Spiral Diameter	4 Quantity of Rebars	Size of Rebars
Less than 30' (9.1 m)	10'-0" (3.0 m)	30 (750)	24 (600)	8	6 (19)
Greater than or equal to 30' (9.1 m) and less than 40' (12.2 m)	13'-6" (4.1 m)	30 (750)	24 (600)	8	6 (19)
	11'-0" (3.4 m)	36 (900)	30 (750)	12	7 (22)
Greater than or equal to 40' (12.2 m) and less than 50' (15.2 m)	13'-0" (4.0 m)	36 (900)	30 (750)	12	7 (22)
Greater than or equal to 50' (15.2 m) and up to 55' (16.8 m)	15'-0'' (4.6 m)	36 (900)	30 (750)	12	7 (22)
Greater than or equal to 56' (16.8 m) and less than 65' (19.8 m)	21'-0'' (6.4 m)	42 (1060)	36 (900)	16	8 (25)
Greater than or equal to 65' (19.8 m) and up to 75' (22.9 m)	25'-0'' (7.6 m)	42 (1060)	36 (900)	16	8 (25)

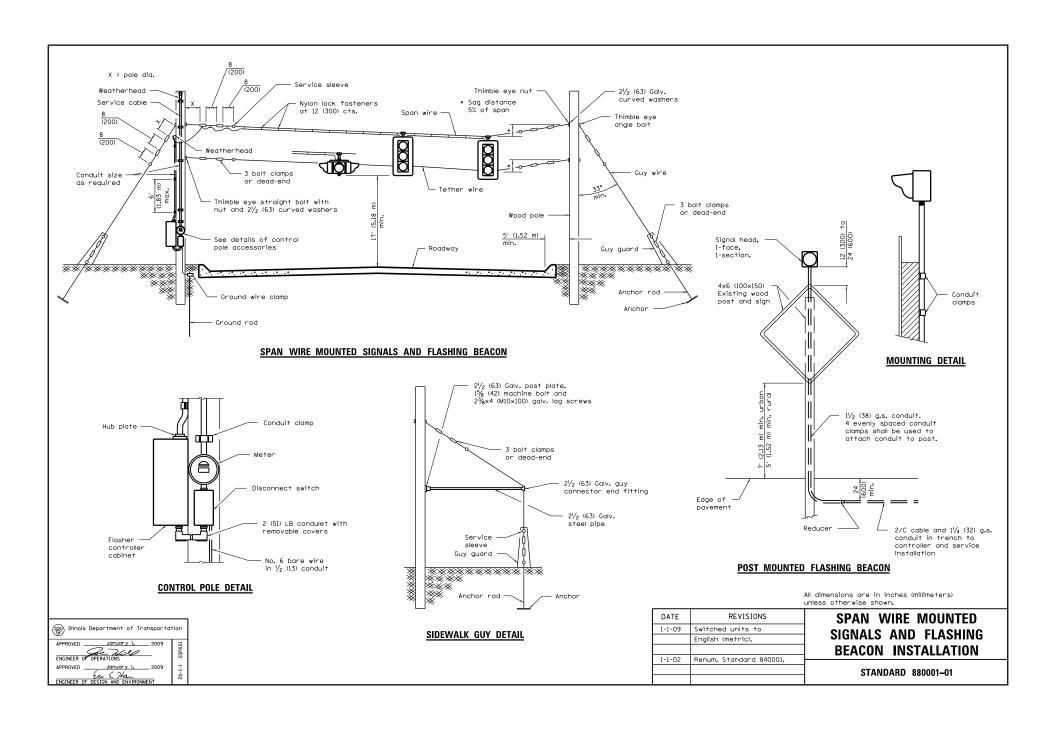
• For standard and combination mast arm assembiles. Foundation depths for standard dual mast arms with the longest arm length upto and including 55' (16.8 m) shall be increased by 1' $(0.3\ \mathrm{m})$ of that shown in the table, based on the longer of the two arms.

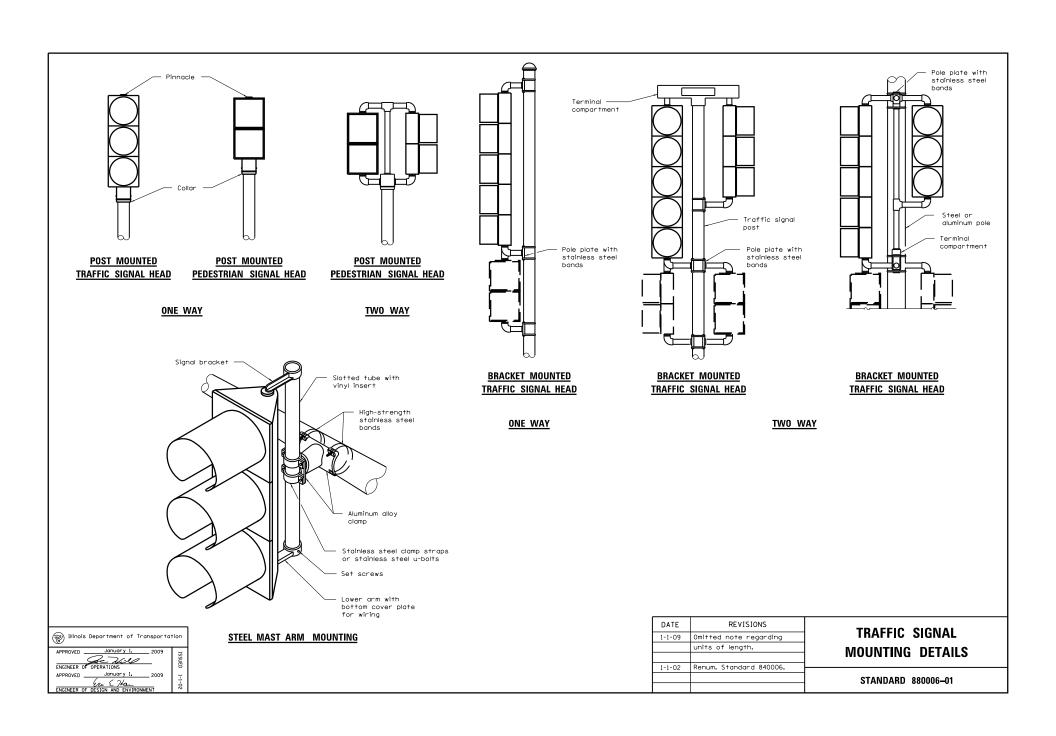
These foundation depths are for sites which have cohesive soils (clayey silt, sandy clay, etc.) along the length of the shaft, with an average Unconfined Compressive Strength (0u) > 1.0 tsf (100 kpa). This strength shall be verified by boring data prior to construction or with testing by the Engineer during foundation drilling. The Bureau of Bridges & Structures should be contacted for a revised design if other conditions are encountered.

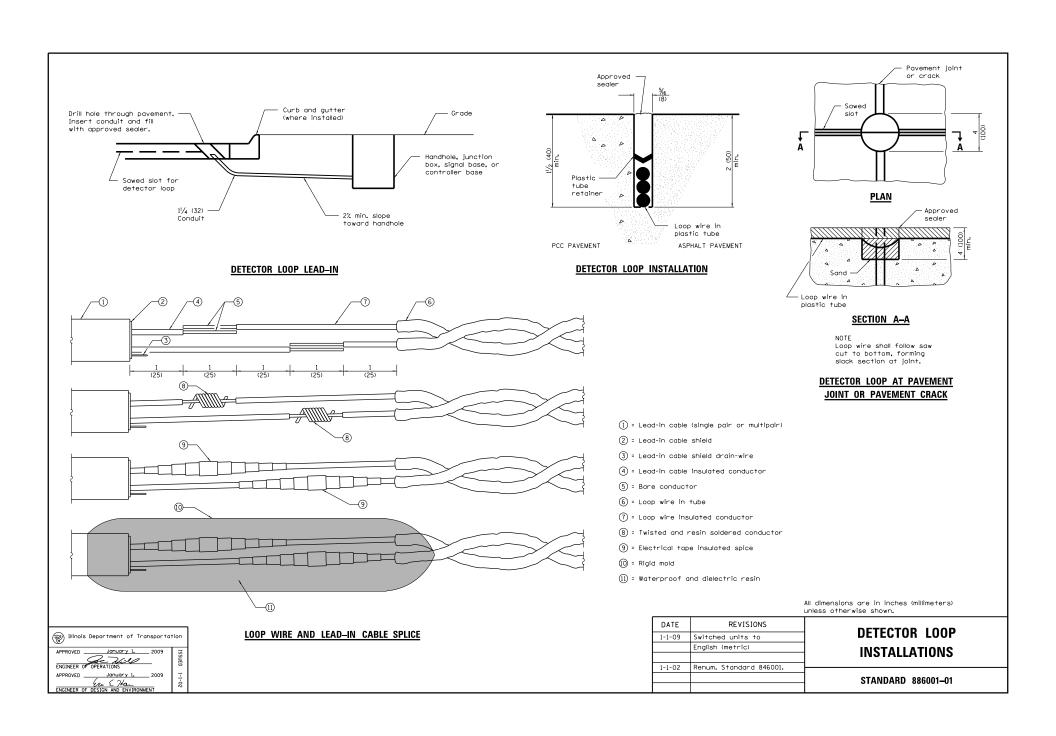
CONCRETE FOUNDATION DETAILS

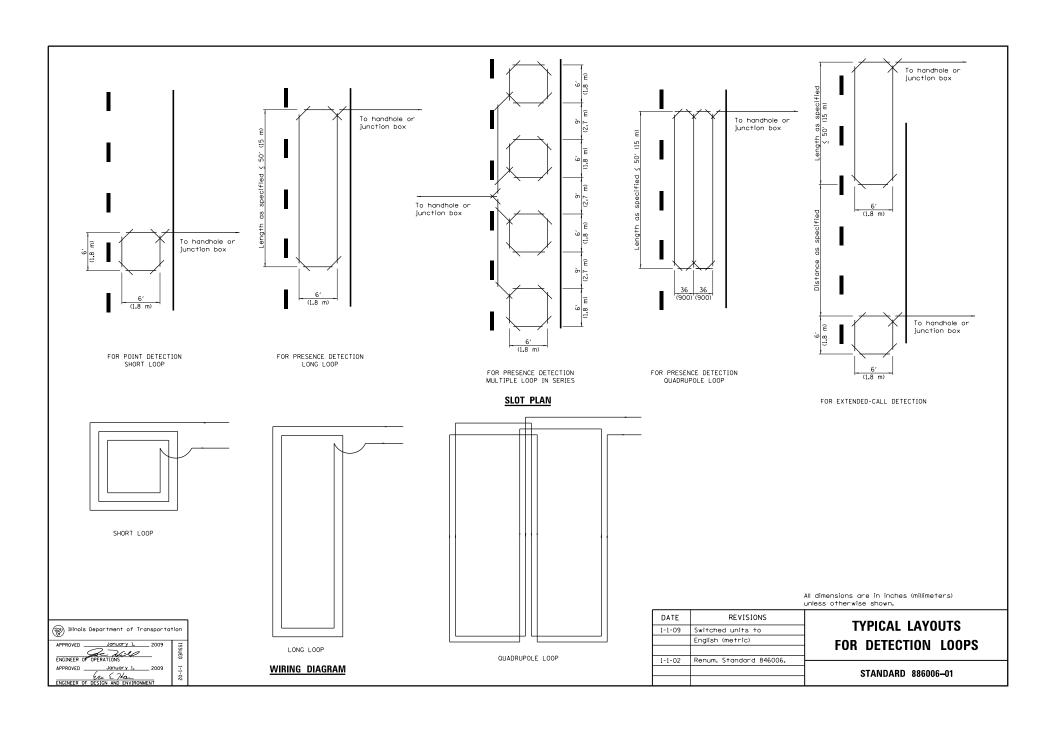
(Sheet 2 of 2)

STANDARD 878001-10







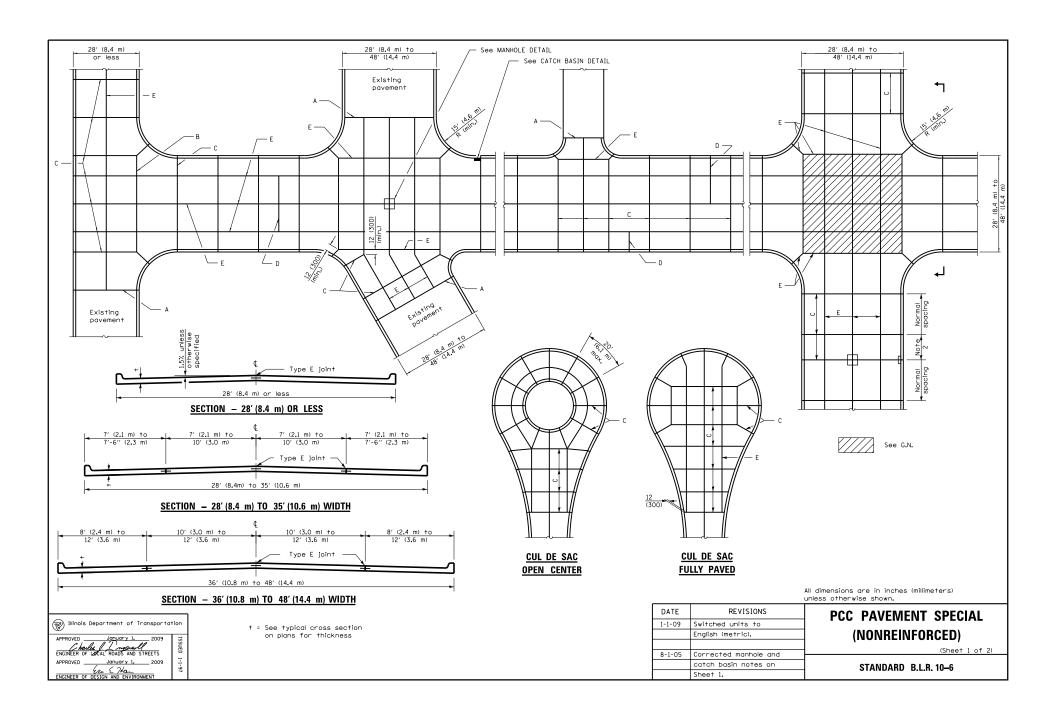


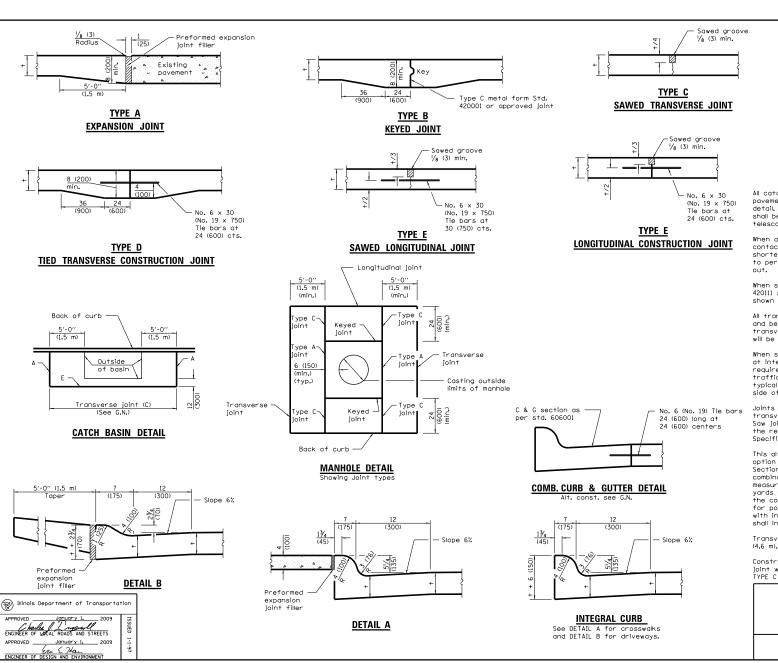


Standards by Division

DIVISION BLR LOCAL ROADS

STD. NO.	TITLE
BLR 10-6	PCC Pavement Special
BLR 14-11	Portland Cement Concrete Pavement (Nonreinforced)
BLR 17-4	Traffic Control Devices - Day Labor Construction
BLR 18-6	Traffic Control Devices - Day Labor Maintenance
BLR 20-7	Traffic Barrier Terminal - Type 5R
BLR 21-9	Typical Application of Traffic Control Devices for Construction on Rural Local Highways
BLR 22-7	Typ. Appl. of T.C.D. for Rural Loc. Hwys. (2-Lane 2 Way Rural Traff.) (Rd. Closed to Thru Traff.)
BLR 23-4	Traffic Barrier Terminal Type 1
BLR 24-2	Mailbox Turnout for Local Roads
BLR 25-1	Type 1A Barricade for Non-NHS Routes
BLR 26-3	Steel Plate Beam Guardrail 29 in. (731 mm) Height
BLR 27-1	Traffic Barrier Terminal Type 5A





GENERAL NOTES

All catch basins shall be separated from the pavement and curb by boxing out as shown in the detail. Manhole castings within the pavement ilmits shall be boxed in a like manner except when telescoping type castings are used.

When a joint falls within 5 ft. (1.5 m) of or contacts basins, manholes, or other structures, shorten one or more panels either side of opening to permit joint to fall at the corners of the box out.

When specified, roundouts as shown on Standard 420111 shall be used in lieu of the manhole detail shown herein.

All transverse joints must extend through curbs and be continuous across pavement, except fied transverse construction joints. Expansion joints will be required as shown on the plans.

When specified, the pavement structure thickness at intersections shall be increased. This requirement generally will occur when the design traffic through the intersection exceeds the typical design of the pavement structure either side of the intersection.

Joints shall be sawed to a depth of 1/4 for transverse joints and 1/3 for longitudinal joints. Saw joints shall be sealed with material meeting the requirements of Section 1050 of the Standard Section 1050 of the Standard

This alternate construction is at the Contractor's option and shall be constructed in accordance with Section 606 of the Standard Specifications. The combination concrete curb and gutter shall be measured in place and the area computed in sq. yards (sq. meters). This work will be paid for at the contract unit price per sq. yards (sq. meters) for portland cement concrete pavement special with integral curb of the thickness specified and shall include all materials and labor.

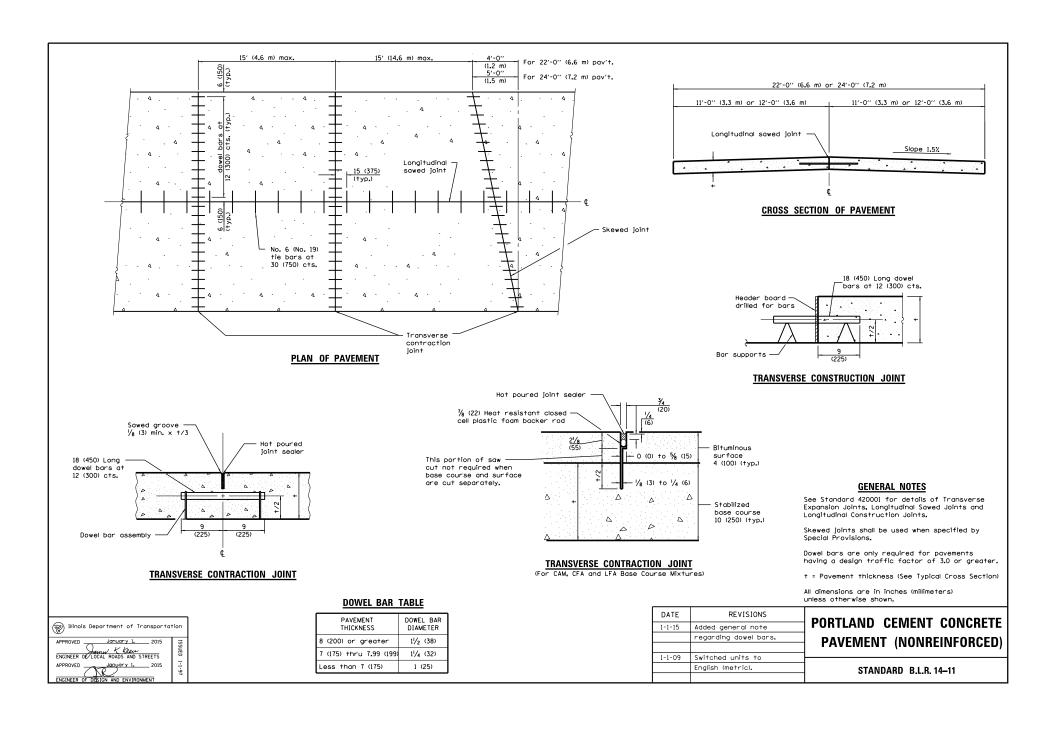
Transverse joint spacing shall not exceed 15 ft. (4.6 m).

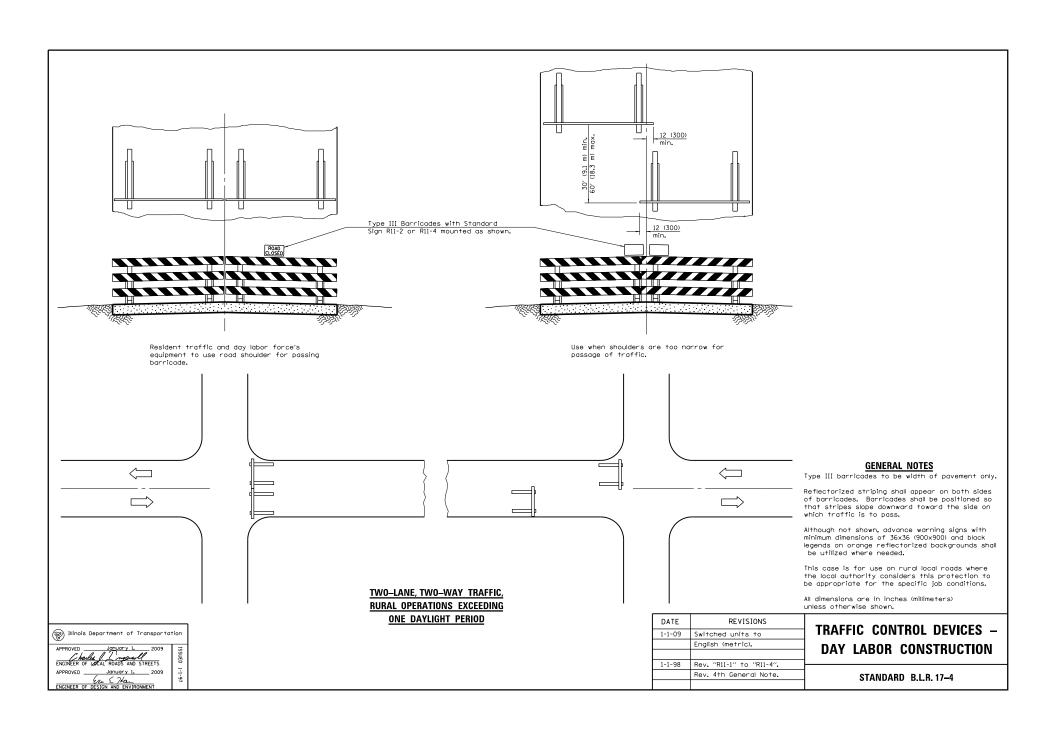
Construct TYPE D tied transverse construction joint when construction joint does not fall at a TYPE C sawed transverse joint.

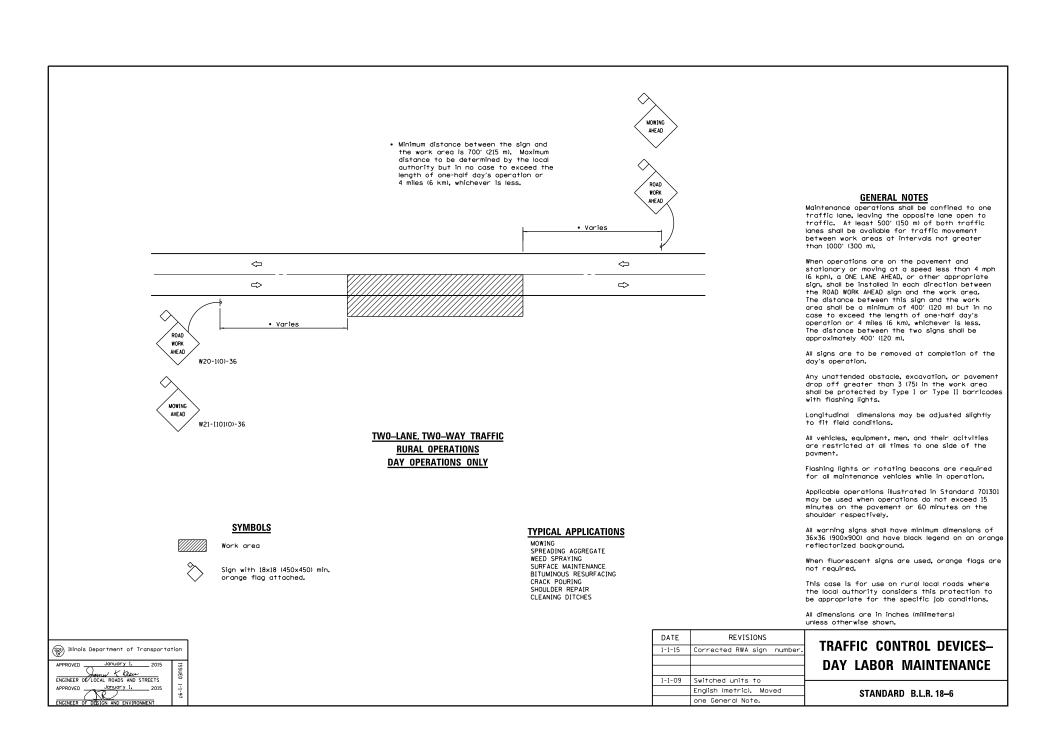
PCC PAVEMENT SPECIAL (NONREINFORCED)

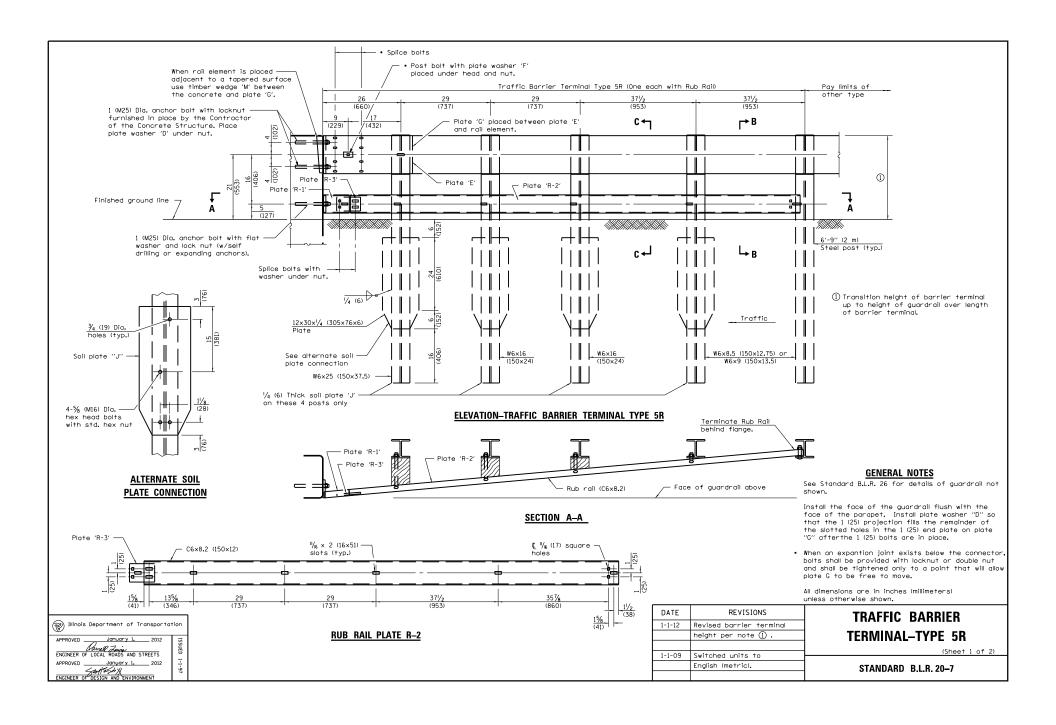
(Sheet 2 of 2)

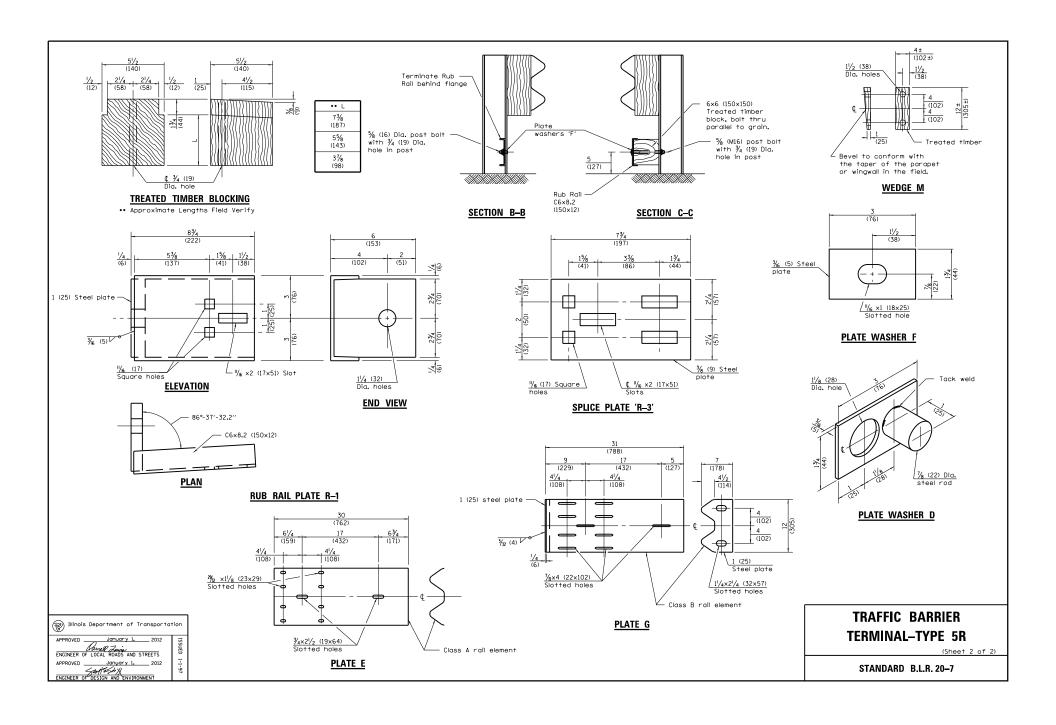
STANDARD B.L.R. 10-6

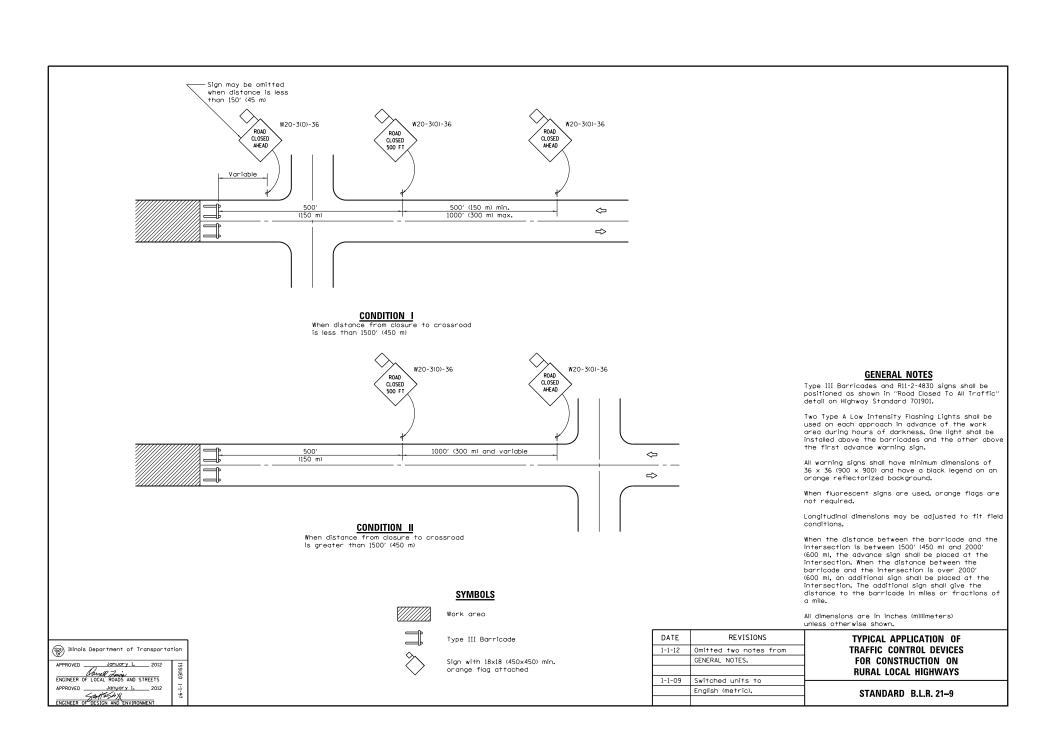


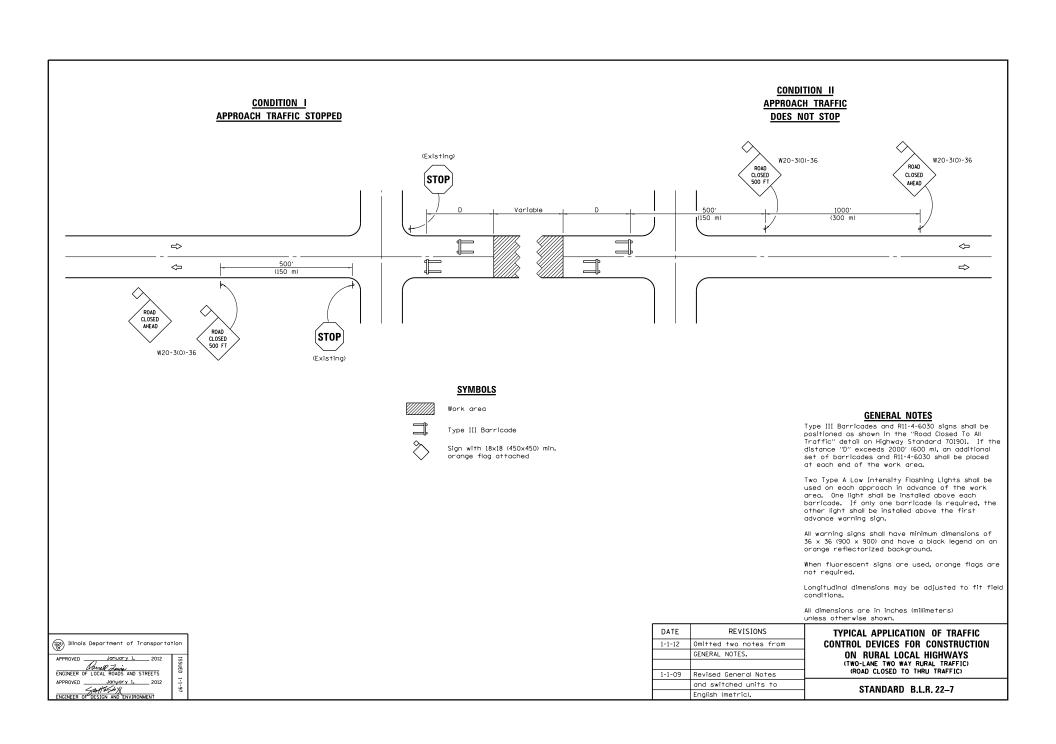


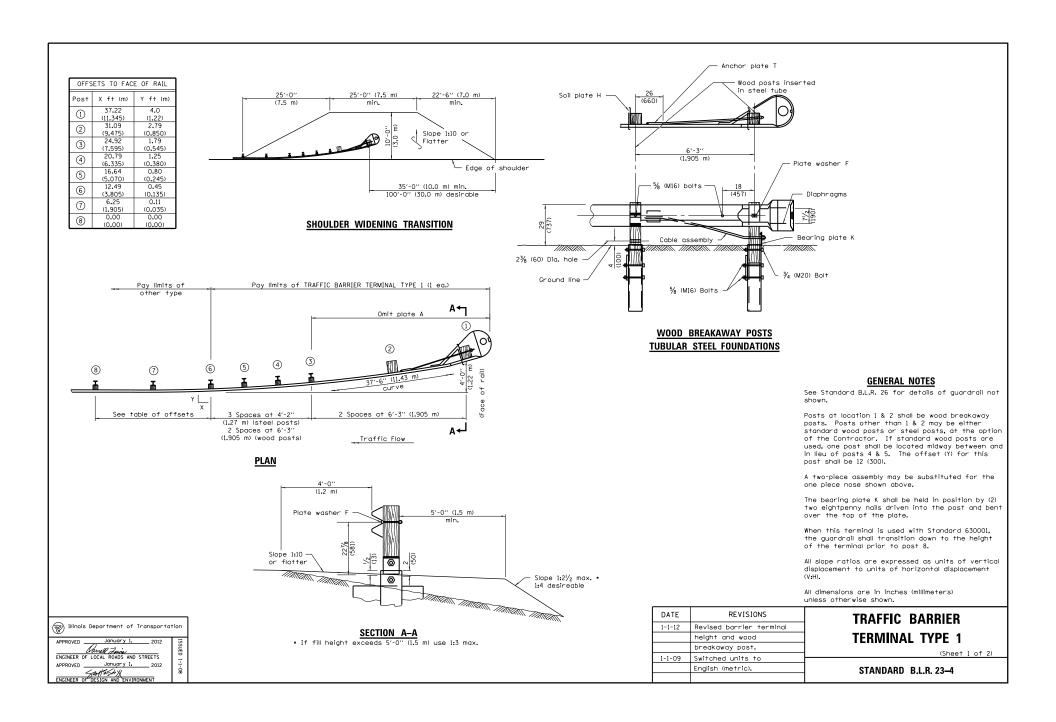


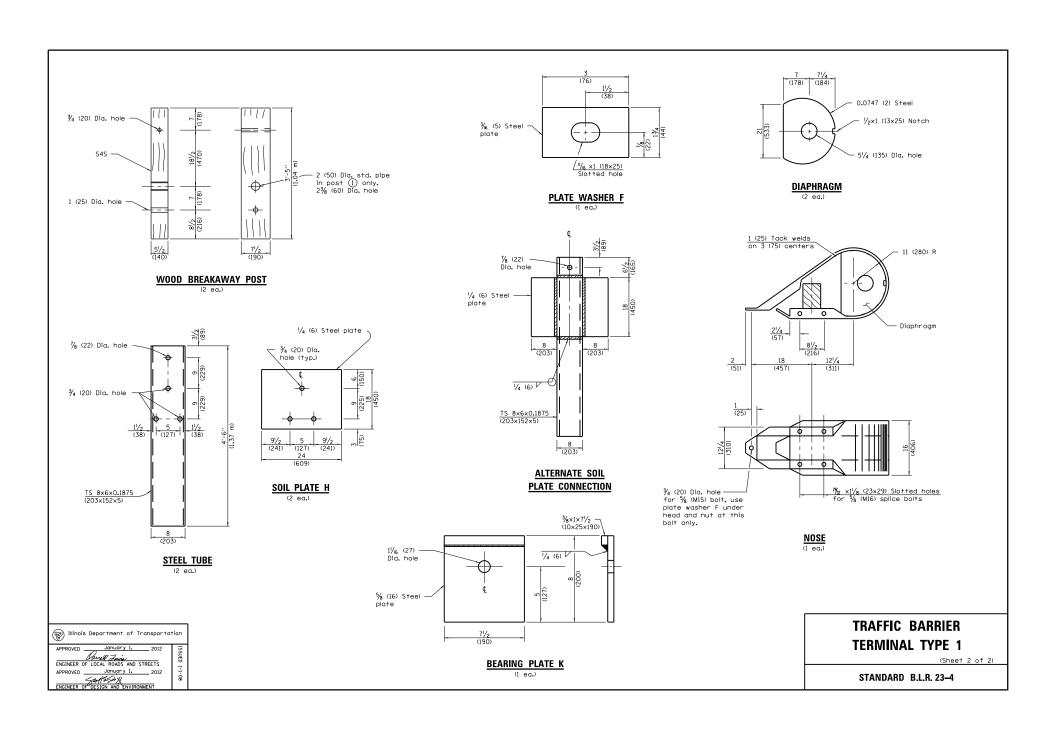


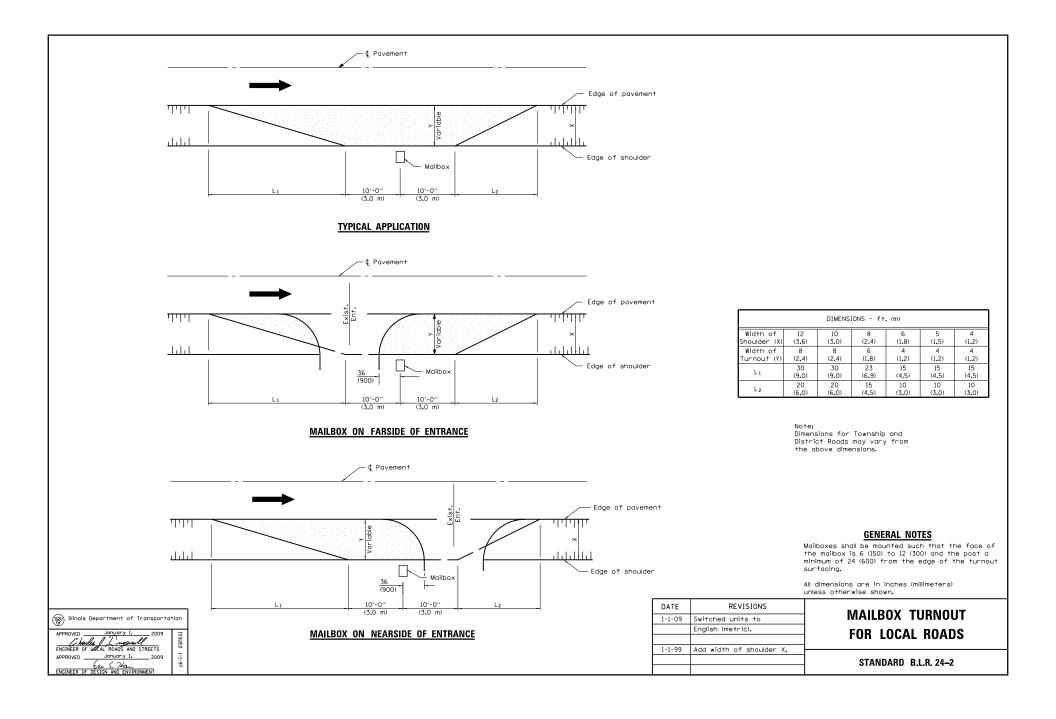


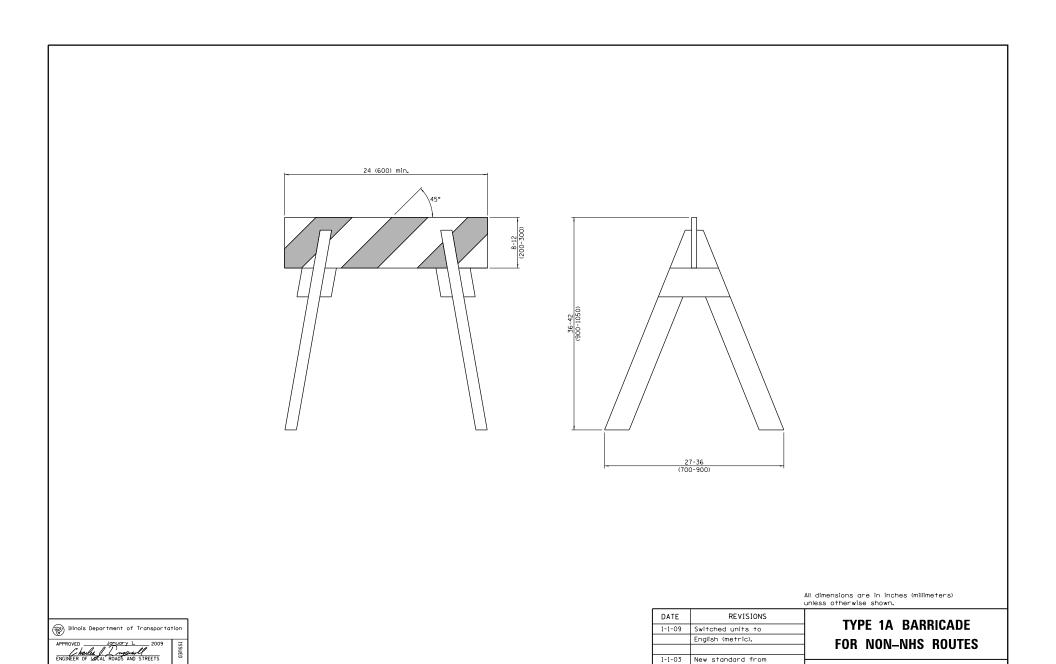






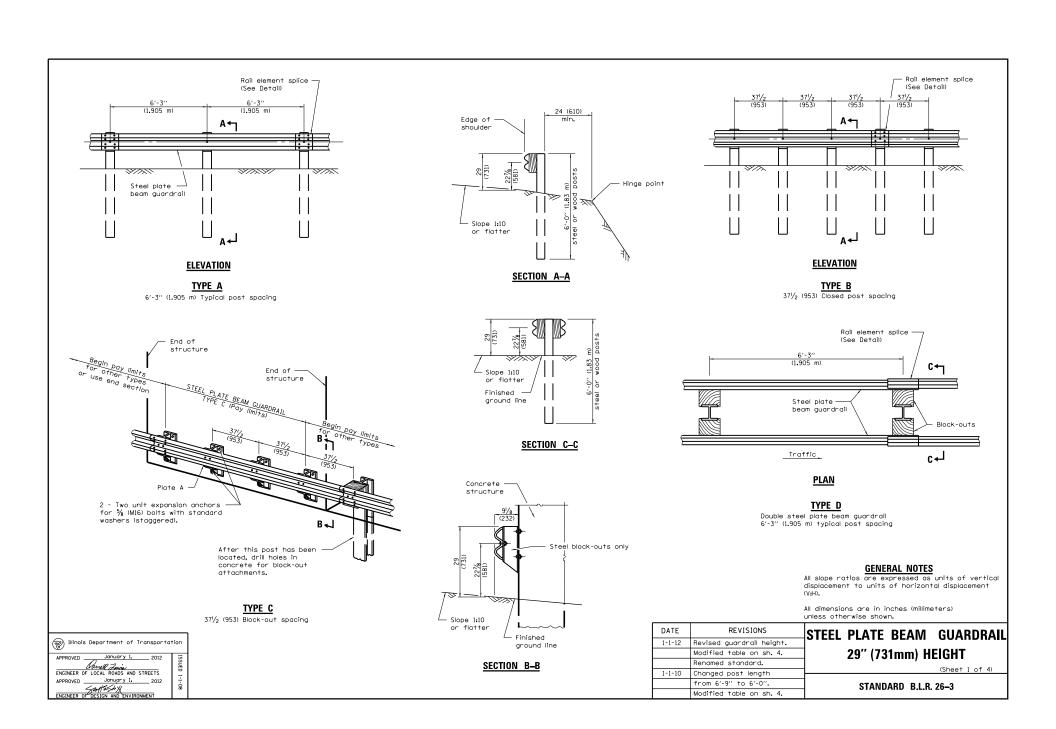


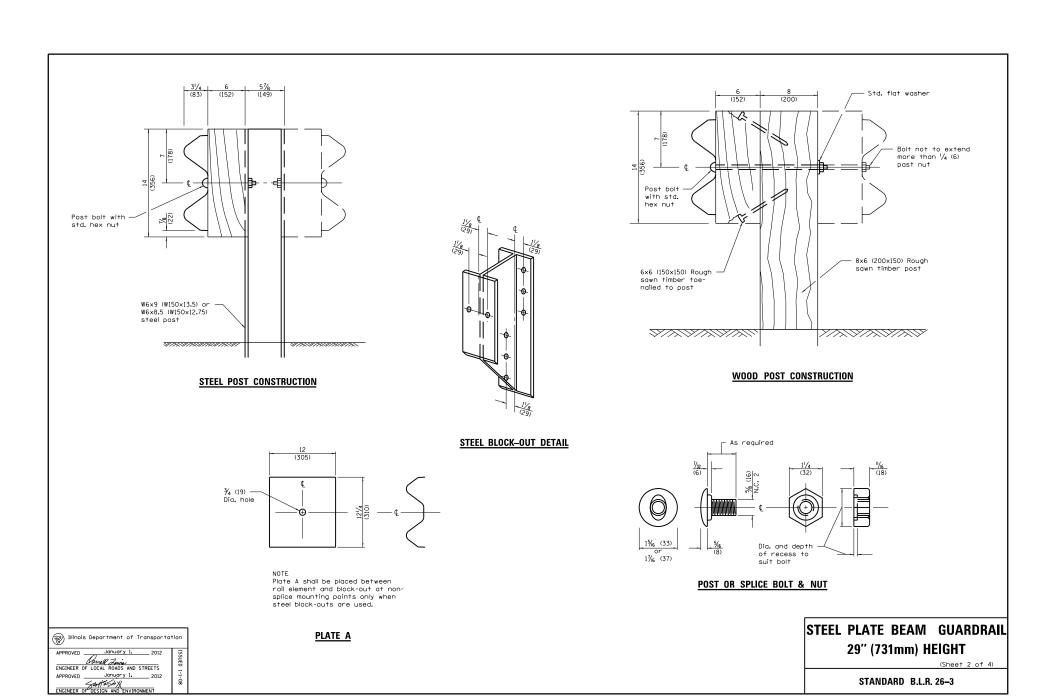


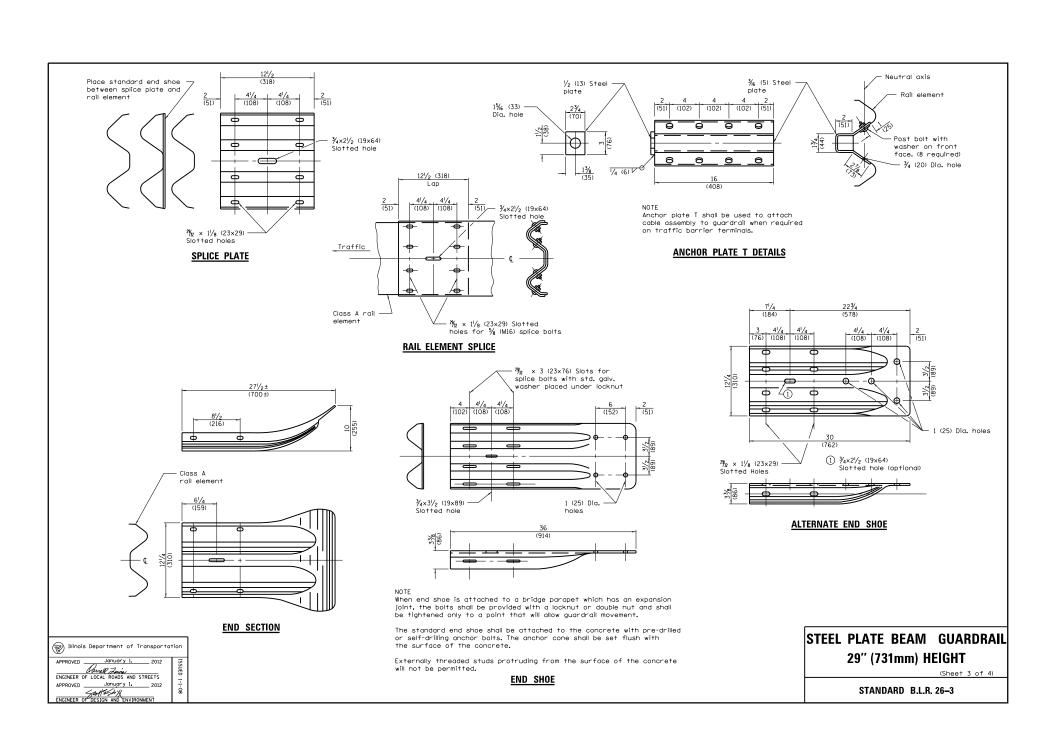


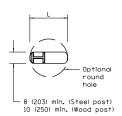
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STANDARD B.L.R. 25-1

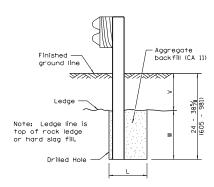






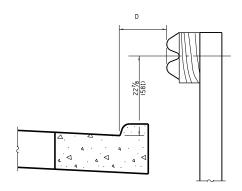


<u>PLAN</u>



ELEVATION

FOOTING FOR POST WHEN IMPERVIOUS MATERIAL IS ENCOUNTERED

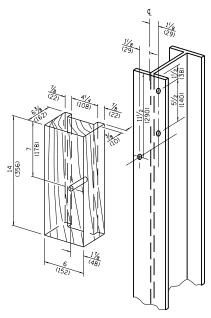


Note: If it is necessary for D to be more than 12 (300) and less than $10^{\circ}-0^{\circ\prime}$ (3.0 m). Type M-2 (M-5) curb and gutter (Std. 6060D) shall be used in front of and in advance of the guardrali.

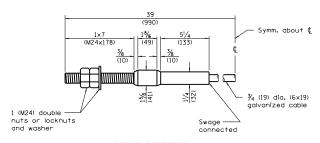
GUARDRAIL PLACED BEHIND CURB

(D = 0 desirable to 12 (300) maximum)

V	w	L	
		Steel Post	Wood Post
0 - 16½	24	21	23
(0 - 410)	(610)	(530)	(580)
>16½ - 28½	12	8	10
(>410 - 714)	(305)	(203)	(250)
>28½ - 38½	12 - 0	8	10
(>714 - 981)	(305 - 0)	(203)	(250)



WOOD BLOCK-OUT AND STEEL POST DETAILS



CABLE ASSEMBLY

(40,000 lbs. (18,100 kg) min. breaking strength) Tighten to taut tension.

STEEL PLATE BEAM GUARDRAIL 29" (731mm) HEIGHT

(Sheet 4 of 4)

STANDARD B.L.R. 26-3

