

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	1	75

CASS COUNTY HIGHWAY DEPARTMENT

PLANS

FOR COUNTY PROJECT NO. CB1301 BRIDGE NO. 09-121-17.0

GOVERNING SPECIFICATIONS:

STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION ADOPTED BY THE NORTH DAKOTA DEPARTMENT OF TRANSPORTATION, OCTOBER 2008; STANDARD DRAWINGS CURRENTLY IN EFFECT; AND OTHER CONTRACT PROVISIONS SUBMITTED HEREIN.

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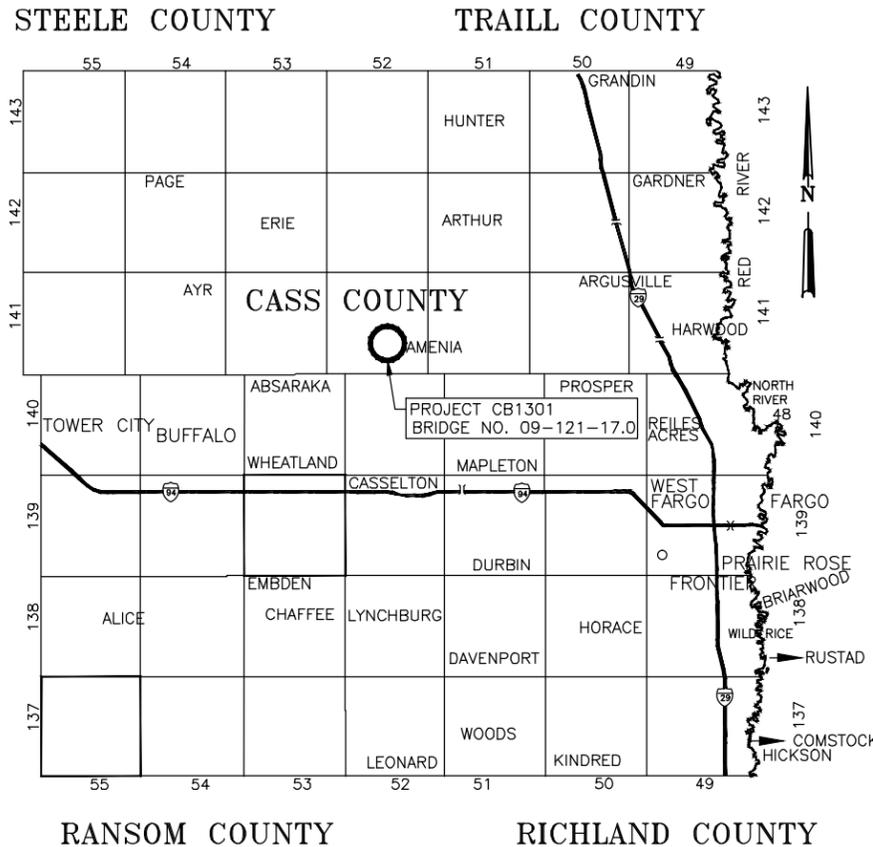
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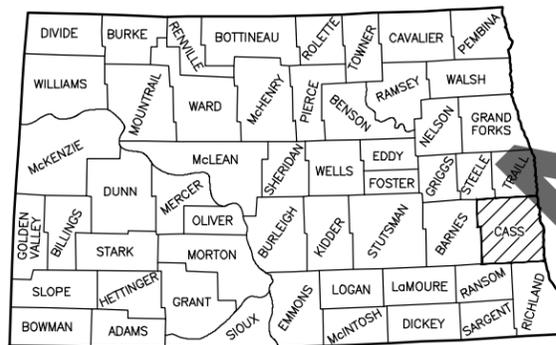
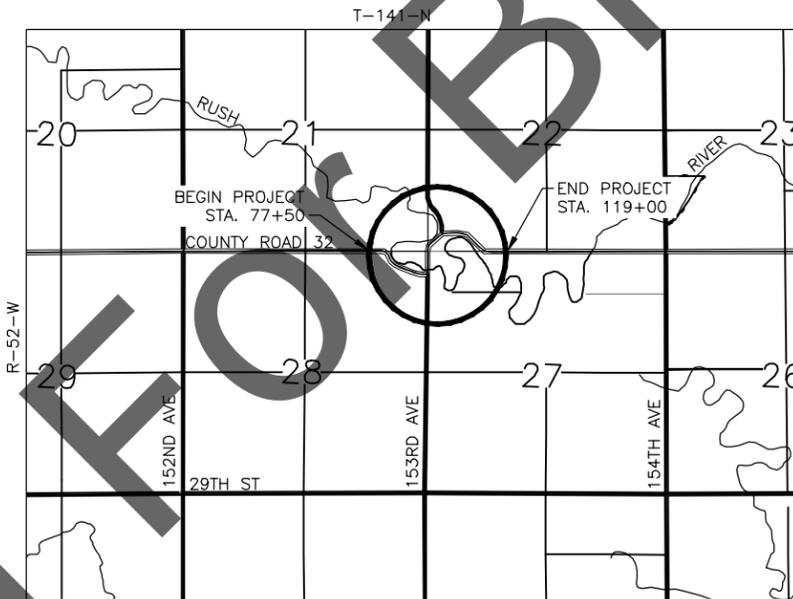
THE STANDARD DRAWINGS ARE INCLUDED IN THE BACK OF THE PLANS

LENGTH OF PROJECT = 0.786 MILES

SURVEY NOVEMBER, 2013
DESIGN FEBRUARY, 2014



PROJECT CONSISTS OF CONSTRUCTION OF A 129'-0" LONG PRESTRESSED BOX BEAM BRIDGE WITH A CAST-IN-PLACE DECK ON COUNTY ROAD 32, ROAD REALIGNMENT, GRADING, AND INCIDENTALS.



SKETCH MAP OF NORTH DAKOTA SHOWING COUNTIES

DESIGN DATA FOR BRIDGE 09-121-17.0					
Traffic	Average Daily				Max.Hr.
Current 2014	Pass: 66	Trucks:	Total: 66	N/A	
Forecast 2034	Pass: 73	Trucks:	Total: 73	N/A	
Clear Zone Distance: 10 FT		Design Speed: 40 MPH			
Minimum Sight Dist. for Stopping: 305 FT					
Minimum Sight Dist. for Safe Passing: N/A					
Sight Dist. for No Passing Zone: 600 FT					
Pavement Design Life 20 (years)					

APPROVED BY CASS COUNTY ENGINEER:

JASON BENSON /S/

JASON BENSON N.D. REG. NO. PE-7490

DATE: 02/28/14

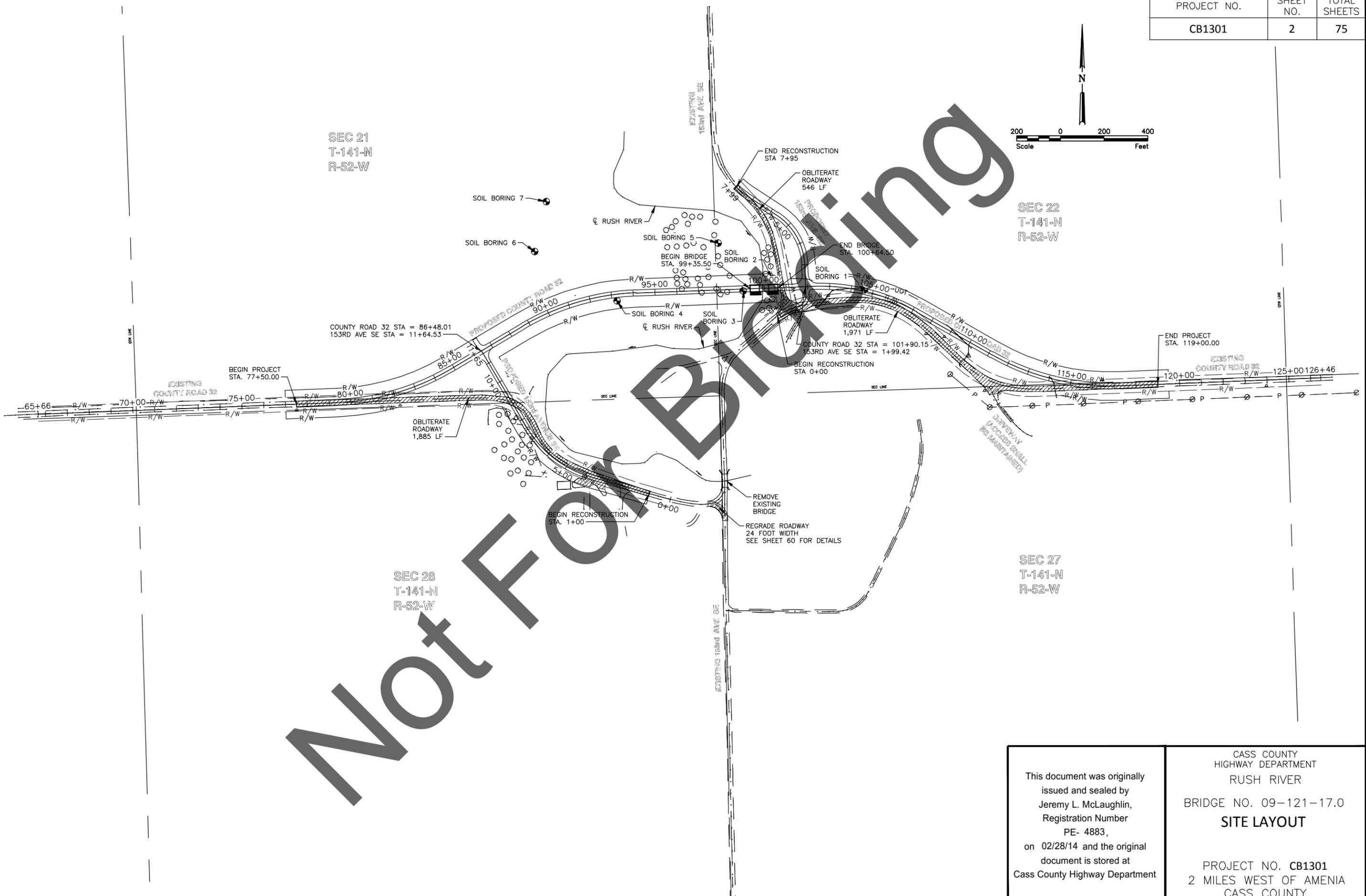
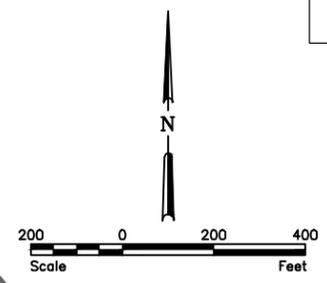


Fargo

P: 701.237.5065
F: 701.237.5101

This document was originally issued and sealed by Jeremy L. McLaughlin, Registration Number PE- 4883, on 02/28/14 and the original document is stored at Cass County Highway Department

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	2	75



Not For Bidding

This document was originally issued and sealed by
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CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
SITE LAYOUT
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	3	75

NOTES:

100 DESIGN DATA:
 HL-93 LOADING
 INCLUDES 15 P.S.F. FOR FUTURE WEARING SURFACE
 CLASS AE-3 CONCRETE - f'c = 3,000 P.S.I.
 CLASS AAE-3 CONCRETE - f'c = 4,000 P.S.I.
 REINFORCING STEEL (GRADE 60) - Fy = 60,000 P.S.I.

100-P01 INDIVIDUAL ITEMS: THE COST OF THOSE ITEMS SHOWN ON PLANS BUT NOT LISTED IN THE ESTIMATE OF QUANTITIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR VARIOUS PAY ITEMS.

100-P02 SURVEY & CONSTRUCTION TESTING: ALL SURVEYING AND CONSTRUCTION TESTING SHALL BE PROVIDED BY THE OWNER.

102-P01 GEOTECHNICAL REPORT: THE FULL GEOTECHNICAL REPORT IS AVAILABLE UPON REQUEST.

105-P01 UTILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ANY UTILITY RELOCATION NECESSARY DURING CONSTRUCTION. THE CONTRACTOR WILL BE RESPONSIBLE FOR VERIFYING UTILITY LOCATIONS, CONTACTING THE UTILITY COMPANIES, AND HAVING UTILITIES MARKED AND FLAGGED PRIOR TO CONSTRUCTION. FOR THE STATE OF NORTH DAKOTA, THE LOCATE NUMBER IS 1-800-795-0555.

105-P02 PLAN LOCATION: PLAN LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS SHALL BE VERIFIED BY THE CONTRACTOR.

107-P01 HAUL ROAD RESTRICTIONS: THE CONTRACTOR SHALL CONTACT THE APPROPRIATE COUNTY, TOWNSHIP, NDDOT AND CITY OFFICIALS TO DETERMINE IF THERE ARE ANY "NO HAUL ROUTES" PRIOR TO PREPARING A BID FOR THIS PROJECT.

202-P01 REMOVAL OF EXISTING STRUCTURE: THE CONTRACTOR IS TO REMOVE THE EXISTING 62' SINGLE SPAN STEEL GIRDER BRIDGE WITH CONCRETE DECK, LOCATED ON 153RD AVE S.E. THE EXISTING STRUCTURE SHALL REMAIN IN PLACE UNTIL COUNTY ROAD 32 IS OPEN TO TRAFFIC. THE CONTRACTOR WILL BE RESPONSIBLE FOR REMOVAL AND PROPER DISPOSAL OF ALL PORTIONS OF THE STRUCTURE. THE DISPOSAL SITE SHALL BE AT A LOCATION OFF SITE AND APPROVED BY THE ENGINEER. THE ABUTMENT PILING SHALL BE REMOVED TO TWO FEET BELOW THE FINAL GRADE LINE AND SHALL BE INCLUDED IN THE BID FOR "REMOVAL OF STRUCTURE."

203-P01 SHRINKAGE: 30 PERCENT ADDITIONAL VOLUME IS INCLUDED FOR SHRINKAGE IN EMBANKMENT QUANTITIES.

203-P02 EMBANKMENT: EMBANKMENT QUANTITIES ARE LISTED FOR INFORMATIONAL PURPOSES ONLY. COSTS TO HAUL, PLACE AND COMPACT EMBANKMENT SHALL BE INCLUDED IN THE PRICE BID FOR "BORROW-EXCAVATION".

203-P03 SCARIFYING AND RECOMPACTION OF EMBANKMENT AREAS: UNDER ALL EMBANKMENT AREAS, AN ADDITIONAL 12" (BEYOND ANY TOPSOIL STRIPPING IF REQUIRED) SHALL BE SCARIFIED AND RECOMPACTED. THIS WORK SHALL BE INCLUDED IN THE BID ITEM FOR "BORROW-EXCAVATION" ALL AREAS UNDER THE ROADWAY SHALL BE COMPACTED BEFORE PLACEMENT OF AGGREGATE SURFACING.

203-P04 ROADWAY OBLITERATION: THE "ROADWAY OBLITERATION" ITEM SHALL BE FULL COMPENSATION FOR THE ALL LABOR AND MATERIALS NECESSARY TO REMOVE THE EXISTING ROADWAY SURFACING AND EMBANKMENT TO RESTORE THE AREAS IDENTIFIED ON THE SITE PLAN TO NATURAL GROUND ELEVATIONS.

ALL REMOVED MATERIAL SHALL BECOME THE PROPERTY OF THE CONTRACTOR IF IT IS DETERMINED BY THE ENGINEER IN THE FIELD TO BE UNSUITABLE FOR EMBANKMENT CONSTRUCTION. ALL COSTS ASSOCIATED WITH THE REMOVAL OF THE EXISTING ROADWAY SHALL BE INCLUDED IN THE PRICE BID FOR "ROADWAY OBLITERATION".

203-P05 EMBANKMENT CONSTRUCTION: ALL CHANNEL AND ROADWAY EMBANKMENT SHALL BE COMPACTED TO THE REQUIREMENTS OF SECTIONS 203.02 A AND 203.02 G.

THE SUITABILITY OF THE MATERIAL FROM ON-SITE EXCAVATIONS FOR USE IN EMBANKMENTS WILL BE DETERMINED BY THE FIELD ENGINEER. EMBANKMENT CONSTRUCTED FROM MATERIAL EXCAVATED ON-SITE WILL NOT BE MEASURED FOR PAYMENT, BUT WILL BE CONSIDERED INCLUDED IN THE BID ITEM "BORROW EXCAVATION". EMBANKMENT WILL BE REQUIRED FOR THE CONSTRUCTION OF APPROACHES AND ROADWAY. IF MATERIAL IS NOT SUITABLE FOR THE ROADBED ITSELF, IT MAY BE USED ON SLOPE AREAS AS DETERMINED BY THE ENGINEER.

203-P06 COMPACTION AND DENSITY CONTROL: SUB-SURFACE MATERIAL SHALL BE COMPACTED WITH A SHEEPS FOOT ROLLER.

MOISTURE AND DENSITY CONTROLS SHALL BE IN ACCORDANCE WITH SECTION 203.02 G OF THE STANDARD SPECIFICATIONS AASHTO T-99 EXCEPT AS STATED BELOW.

FILL MATERIAL SHALL BE SPREAD AND COMPACTED IN LOOSE LIFTS OF 4-8 INCHES. COMPACTION SHALL MEET THE FOLLOWING REQUIREMENTS:

REFERENCE	RELATIVE COMPACTION, PERCENT (ASTM D 698 STANDARD PROCTOR)	MOISTURE CONTENT VARIANCE FROM OPTIMUM, PERCENTAGE POINTS
GRANULAR MATERIALS	> 95	SANDS (+/- 3)
CLAY MATERIALS	> 95	CLAYS (-1 TO +3)

ALL COSTS ASSOCIATED WITH SUBGRADE COMPACTION SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS.

203-P07 EXCAVATION AND FILL ELEVATIONS: ALL DITCH GRADES AND CONTOURS ARE GIVEN AT THE TOP OF THE TOPSOIL. A FINISHED GROUND SURFACE FOR GRADING IS AVAILABLE UPON REQUEST.

203-P08 BORROW: BORROW FOR THE ROADWAY AND EMBANKMENTS SHALL BE OBTAINED BY THE CONTRACTOR PER THE REQUIREMENTS OF SECTIONS 203.02 E.3. THE CONTRACTOR SHALL SUBMIT MATERIAL SOURCE APPROVALS TO THE ENGINEER FOR SITE APPROVAL PRIOR TO UTILIZING ANY BORROW MATERIAL. BORROW SHALL CONFORM TO THE REQUIREMENTS OF SECTION 203.02E. PAY QUANTITY SHALL BE DETERMINED FROM CROSS SECTIONING, PER SECTION 203.03A. ALL COSTS ASSOCIATED WITH OBTAINING THE SITE AND THE BORROW, INCLUDING BUT NOT LIMITED TO THE CULTURAL RESOURCE INVENTORY AND THE UTILITY ADJUSTMENT OR RELOCATIONS, SHALL BE INCLUDED IN THE PRICE BID FOR "BORROW-EXCAVATION".

203-P09 TOPSOIL: ALL DISTURBED EMBANKMENT AREAS SHALL REQUIRE REMOVAL AND REPLACEMENT OF THE TOPSOIL (QUANTITY ESTIMATED AT 4"). REMOVED TOPSOIL SHALL BE STOCKPILED WITHIN THE RIGHT-OF-WAY AT DESIGNATED OR ACCEPTABLE LOCATIONS OUTSIDE THE GRADING LIMITS. THIS WORK SHALL BE INCLUDED IN THE BID ITEM FOR TOPSOIL.

210-P01 SELECT BACKFILL: SELECT BACKFILL SHALL BE PLACED, MOISTENED OR DRIED AS REQUIRED, AND THOROUGHLY COMPACTED WITH MECHANICAL TAMPING EQUIPMENT IN MAXIMUM 6" LIFTS. MOISTURE CONTENT OF MATERIAL SHALL BE NEAR OPTIMUM MOISTURE AS DETERMINED BY THE ENGINEER. SELECT BACKFILL SHALL MEET THE REQUIREMENTS OF SECTION 816.03 - CLASS 5 MATERIAL.

MATERIAL SHALL BE PAID PER PLAN QUANTITY BASED ON LIMITS SHOWN.

210-P02 CHANNEL EXCAVATION: THE TYPICAL CHANNEL CROSS-SECTION IS TO EXTEND 50 FEET EITHER SIDE OF THE BRIDGE CENTERLINE AND TRANSITION TO MEET EXISTING GRADE AT 100 FEET FROM CENTERLINE. EXISTING ELEVATIONS WILL BE MAINTAINED AND EXTENDED AS NEEDED TO CONNECT TO GRADES AT WING WALLS. ITEM SHALL BE INCLUDED IN THE BID PRICE FOR "CHANNEL EXCAVATION." DISPOSAL OF EXCESS EXCAVATED OR WASTE MATERIALS SHALL BE IN AREAS ARRANGED BY THE COUNTY. THE DISPOSAL SITE SHALL BE ROUGH GRADED AS DIRECTED BY THE ENGINEER. 2,500 CY HAS BEEN APPROXIMATED FOR CHANNEL EXCAVATION. NO ADJUSTMENT WILL BE MADE FOR VARIATION IN QUANTITY.

210-P03 FOUNDATION PREPARATION: THE LUMP SUM PAY ITEM FOR "FOUNDATION PREPARATION" SHALL INCLUDE THOSE ITEMS LISTED IN SECTION 210.04 B. ROOTS OR OTHER VEGETATION MORE THAN 1" IN THICKNESS BELOW THE FINISHED SURFACE OF EXCAVATED SECTIONS SHALL BE REMOVED TO A DEPTH OF 6" BELOW THE FINISHED SURFACE. ALL COST TO DEWATER SHALL BE INCLUDED IN THE PRICE BID FOR "FOUNDATION PREPARATION".

210-P04 CLASS 1 EXCAVATION: EXCAVATION SHALL EXTEND FROM THE BOTTOM OF THE FOOTING TO THE UPPER LIMITS AS SHOWN ON THE BRIDGE LAYOUT SHEET AT THE ABUTMENTS. EXCAVATION IS ABOVE THE DATUM LINE OF 964.00.

210-P05 CLASS 2 EXCAVATION: EXCAVATION SHALL EXTEND FROM THE BOTTOM OF THE FOOTING TO THE UPPER LIMITS AS SHOWN ON THE BRIDGE LAYOUT SHEET AT THE PIERS. EXCAVATION IS BELOW THE DATUM LINE OF 964.00.

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CASS COUNTY
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 2 MILES WEST OF AMENIA
 CASS COUNTY

NOTES:

302-P01 SURFACE TOLERANCE: SURFACE TOLERANCE TYPE A (MAX. VARIANCE 0.08') SHALL BE USED ON AGGREGATE SURFACE MATERIAL.

602-P01 CONCRETE: ALL SUPERSTRUCTURE CONCRETE SHALL BE CLASS AAE-3 CONCRETE. CONCRETE FOR ABUTMENTS AND PIERS SHALL BE CLASS AE-3 CONCRETE.

SURFACE FINISH "D" (SECTION 602.03 I-5) WILL BE REQUIRED FOR ALL EXPOSED WING SURFACES OR OTHER SURFACES THAT ARE VISIBLE TO THE MOTORING PUBLIC. THE COST OF SURFACE FINISH "D" SHALL BE INCLUDED IN THE PRICE BID FOR CLASS AAE-3 CONCRETE.

BEAMS AND GIRDERS HAVE SLIGHT VARIATIONS IN THE ANTICIPATED CAMBER. TO BUILD THE DECK TO THE DESIGNATED THICKNESS WILL REQUIRE SLIGHT ADJUSTMENTS IN DECK ELEVATION AND/OR RISER DIMENSIONS. THESE ADJUSTMENTS RESULT IN MINOR CONCRETE QUANTITY DISCREPANCIES. THE CONTRACTOR SHALL CONSIDER THE QUANTITY DISCREPANCY WHEN HE/SHE BIDS THE UNIT PRICE FOR SUPERSTRUCTURE CONCRETE.

IF THE DEPTH OF THE CONCRETE RISERS BETWEEN THE TOPS OF THE GIRDERS AND THE BOTTOM OF THE DECK SLAB EXCEEDS THE THEORETICAL DIMENSIONS, THE ADDITIONAL CONCRETE SHALL BE CONSIDERED INCIDENTAL.

DEFLECTION OF THE DECK SHORING SHALL BE COMPUTED USING THE TOTAL DEAD LOAD PLUS THE WEIGHT OF THE FINISHING MACHINE. THE FORMING SHALL BE ADJUSTED PROPERLY TO ACCOMMODATE THE DEFLECTION AND THEREBY MAINTAIN THE TOTAL SLAB THICKNESS SPECIFIED IN THE PLANS.

THE COST OF FURNISHING AND PLACING CONCRETE INSERTS, TIE WIRE, BAR SPACERS, BAR SUPPORTS, AND OTHER MISCELLANEOUS ITEMS SHALL BE INCLUDED IN THE PRICE BID FOR CLASS AE-3 CONCRETE OR CLASS AAE-3 CONCRETE.

602-P02 END BEAMS AND PIER DIAPHRAGMS: END BEAM AND PIER DIAPHRAGM CONCRETE SHALL BE PLACED AT THE SAME TIME AS THE DECK.

602-P03 DECK CURING: NO WORK SHALL BE DONE ON THE DECK WHILE THE WET CURE IS IN PROGRESS, INCLUDING RAIL WORK.

602-P04 PENETRATING WATER REPELLENT TREATMENT: PENETRATING WATER REPELLENT SHALL BE APPLIED TO THE DRIVING SURFACE OF THE CONCRETE DECK.

612-P01 STRUCTURAL STEEL: STRUCTURAL STEEL SHALL BE AASHTO M 270, GRADE 36, EXCEPT THE REQUIREMENTS FOR CHARPY V-NOTCH TEST IS WAIVED FOR THE ICE NOSE AND ARMOR ANGLE. THE ICE NOSE AND ARMOR ANGLE SHALL BE GALVANIZED ACCORDING TO AASHTO M 111.

612-P02 REINFORCING STEEL: ALL REINFORCING STEEL SHALL BE GRADE 60. BARS ENDING WITH THE SUFFIX "E" SHALL BE EPOXY COATED. BARS ENDING WITH THE SUFFIX "S" INDICATE A SERIES.

DIMENSIONS FOR REINFORCING STEEL BARS ARE GIVEN AS OUT TO OUT UNLESS OTHERWISE NOTED.

THE FIRST DIGIT OR THE FIRST TWO DIGITS OF EACH BAR INDICATES THE BAR SIZE.

616-P01 SHOP DRAWINGS: SHOP DRAWINGS, INCLUDING THOSE FOR THE PRESTRESSED BOX BEAMS, METAL PROTECTION ANGLE AND METAL ICE NOSE SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

622-P01 PILING: THE CONTRACTOR WILL CHECK TO SEE IF EXISTING PILING OR SPREAD FOOTINGS WILL INTERFERE WITH PILING TO BE DRIVEN. IF AN INTERFERENCE WILL RESULT, THEN IT MAY REQUIRE THE RESPACING OF PILING AS DETERMINED BY THE ENGINEER IN THE FIELD AND ENGINEERING FIRM.

PILING SHALL BE DRIVEN WITH A STEAM, AIR, OR DIESEL HAMMER WITH A RATED ENERGY AND RAM WEIGHT NOT LESS THAN 31,523 FOOT-POUND-TONS, AS COMPUTED BY THE FORMULA $W(E - 11,319) + 0.557E$, WHERE W IS THE WEIGHT OF THE RAM IN TONS, AND E IS THE RATED HAMMER ENERGY. IN NO CASE SHALL THE RAM WEIGHT BE LESS THAN 3,000 POUNDS.

NO PILING SHALL BE DRIVEN ON THE PROJECT SITE WITHIN 72 HOURS OF CONCRETE PLACEMENT OR UNTIL 70% OF THE DESIGN STRENGTH OF THE CONCRETE IS REACHED.

PILE TIPS SHALL BE REQUIRED FOR ALL PILE.

704-P01 TEMPORARY TRAFFIC CONTROL: THE CONTRACTOR SHALL DEVELOP AND SUBMIT A TRAFFIC CONTROL PHASING PLAN TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL MAINTAIN ACCESS FOR LOCAL TRAFFIC AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL DEVELOP A PLAN TO REDUCE IMPACTS TO TRAFFIC ALONG EXISTING COUNTY ROAD 32 AS WELL AS 153RD AVE SE.

708-P01 LOOSE ROCK RIPRAP: RIPRAP SHALL BE PLACED ON PREPARED SLOPES. EXACT PLACEMENT LIMITS SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD.

RIPRAP SHALL CONFORM TO SECTION 708.04 OF THE STANDARD SPECIFICATIONS.

708-P02 SEEDING: CONTRACTOR WILL SEED AND MULCH AREAS DISTURBED BY CONSTRUCTION ACTIVITY. CONTRACTOR SHALL PROVIDE EROSION CHECKS UNTIL TURF IS ESTABLISHED AS DIRECTED BY THE ENGINEER IN THE FIELD.

MATERIALS FOR MULCHING SHALL CONSIST OF HAY OR THE STRAW FROM OATS OR BARLEY AS NOTED IN SECTION 708.02.B.3.b.

PLAN QUANTITY FOR SEEDING SHALL BE PAY QUANTITY.

SEEDING - TYPE B CLASS V SHALL BE USED AS SHOWN IN THE TURF ESTABLISHMENT AND EROSION CONTROL PLANS. THE CONTRACTOR MAY CHOOSE TO APPLY SEEDING AS STATED IN THE STANDARD SPECIFICATIONS OR AS STATED IN THIS PLAN NOTE. THE SEED MIXTURE SHALL BE AS FOLLOWS:

CLASS V	PERCENT OF LIVE SEEDS PER ACRE
MEADOW BROMEGRASS	25%
INTERMEDIATE WHEATGRASS	25%
CRESTED WHEATGRASS	25%
TETRAPLOID INT. RYEGRASS	10%
CREeping ALFALFA	15%

80 LBS OF SEED AND 20 LBS OF RYE PER ACRE.

A GRASS DRILL USED TO SEED LAWNS SHALL BE USED TO APPLY THE SEED INTO THE SEEDBED. FERTILIZER SHALL BE A MIXTURE OF 5-10-5 APPLIED AT THE RATE OF 100 LBS PER ACRE. SEED APPLICATION RATE SHALL BE AS SHOWN IN STANDARD SPECIFICATIONS 708.02 B.3.a. ALL COST FOR LABOR, EQUIPMENT, AND MATERIALS NECESSARY TO COMPLETE THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR "SEEDING-TYPE B-CLASS V".

708-P03 TEMPORARY EROSION CONTROL: THE CONTRACTOR SHALL SUBMIT A TEMPORARY EROSION CONTROL PLAN IN ACCORDANCE WITH SECTION 110 OF THE STANDARD SPECIFICATIONS AND STANDARD DRAWING D-708-2. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO BEGINNING CONSTRUCTION.

710-P01 DETOUR: COUNTY ROAD 32 SHALL BE TEMPORARILY CLOSED DURING CONSTRUCTION OF THE ROADWAY TIE POINTS DURING CONSTRUCTION PHASE 2. NO OFFICIAL DETOUR SHALL BE MARKED. TEMPORARY LOCAL ACCESS SHALL BE MAINTAINED AT ALL TIMES.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE ROADWAY AND DRIVEWAYS SO THAT THEY REMAIN ACCESSIBLE TO LOCAL RESIDENTS AND EMERGENCY VEHICLES AT ALL TIMES DURING CONSTRUCTION.

714-P01 CULVERTS: ALL ITEMS ASSOCIATED WITH PLACEMENT OF NEW CULVERTS, EXCLUDING REPLACEMENT OF SURFACING MATERIALS, SHALL BE INCLUDED IN THE BID PRICE FOR PIPE CORR STEEL .064IN 24IN.

CULVERT LENGTHS GIVEN ON THE PLAN AND PROFILE SHEETS ARE ACTUAL CULVERT LENGTH. FLARED END SECTIONS ARE NOT INCLUDED IN TOTAL LENGTH.

754-P01 SIGNS AND DELINEATORS: ANY EXISTING SIGNS AND DELINEATOR POSTS SHALL BE REMOVED AND RESET BY THE CONTRACTOR. THIS ITEM OF WORK IS NOT A SEPARATE PAY ITEM BUT IS INCIDENTAL TO OTHER ITEMS.

764-P01 GUARDRAIL: THE GUARDRAIL CONNECTION TO THE CONCRETE BARRIER AT THE BRIDGE ENDS SHALL BE INCLUDED IN THE BID FOR W-BEAM GUARDRAIL.

FLARED END TERMINALS WILL NOT BE ACCEPTABLE. REFER TO THE STANDARD DETAILS LISTED ON THE COVER SHEET FOR ALLOWABLE GUARDRAIL TERMINALS.

<p>This document was originally issued and sealed by Jeremy L. McLaughlin, Registration Number PE- 4883, on 02/28/14 and the original document is stored at Cass County Highway Department</p>	<p>CASS COUNTY HIGHWAY DEPARTMENT RUSH RIVER BRIDGE NO. 09-121-17.0 NOTES PROJECT NO. CB1301 2 MILES WEST OF AMENIA CASS COUNTY</p>
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153rd AVENUE SE S

Superelevation Curve	Start Station	Left Lane	Right Lane
Curve.5			
End Normal Crown	2+12.74'	-4.00%	-4.00%
Level Crown	2+95.41'	0.00%	-4.00%
Reverse Crown	3+78.07'	4.00%	-4.00%
Begin Full Super	4+19.41'	6.00%	-6.00%
End Full Super	7+17.48'	6.00%	-6.00%
Reverse Crown	7+58.81'	4.00%	-4.00%
Level Crown	8+41.48'	0.00%	-4.00%
Begin Normal Crown	9+24.14'	-4.00%	-4.00%

153rd AVENUE SE N

Superelevation Curve	Start Station	Left Lane	Right Lane
Curve.8			
End Normal Crown	1+88.03'	-4.00%	-4.00%
Level Crown	2+52.79'	-4.00%	0.00%
Reverse Crown	3+17.55'	-4.00%	4.00%
Begin Full Super	3+20.79'	-4.20%	4.20%
End Full Super	5+48.71'	-4.20%	4.20%
Reverse Crown	5+51.95'	-4.00%	4.00%
Level Crown	6+16.71'	-4.00%	0.00%
Curve.9			
Level Crown	6+86.43'	0.00%	-4.00%
Begin Full Super	7+51.43'	4.00%	-4.00%
Reverse Crown	7+51.43'	4.00%	-4.00%
End Full Super	7+77.54'	4.00%	-4.00%
Reverse Crown	7+77.54'	4.00%	-4.00%
Level Crown	8+42.54'	0.00%	-4.00%
Begin Normal Crown	9+07.54'	-4.00%	-4.00%

COUNTY ROAD 32

Superelevation Curve	Start Station	Left Lane	Right Lane
Curve.1			
End Normal Crown	77+92.42'	-4.00%	-4.00%
Level Crown	78+75.03'	-4.00%	0.00%
Reverse Crown	79+57.64'	-4.00%	4.00%
Begin Full Super	79+70.03'	-4.60%	4.60%
End Full Super	84+51.46'	-4.60%	4.60%
Reverse Crown	84+63.85'	-4.00%	4.00%
Level Crown	85+46.46'	-4.00%	0.00%
Begin Normal Crown	86+29.07'	-4.00%	-4.00%
Curve.2			
End Normal Crown	87+21.25'	-4.00%	-4.00%
Level Crown	88+03.85'	0.00%	-4.00%
Reverse Crown	88+86.46'	4.00%	-4.00%
Begin Full Super	88+98.85'	4.60%	-4.60%
End Full Super	93+81.48'	4.60%	-4.60%
Reverse Crown	93+93.87'	4.00%	-4.00%
Level Crown	94+76.48'	0.00%	-4.00%
Begin Normal Crown	95+59.08'	-4.00%	-4.00%
Curve.3			
End Normal Crown	100+65.35'	-4.00%	-4.00%
Level Crown	101+48.43'	0.00%	-4.00%
Reverse Crown	102+31.51'	4.00%	-4.00%
Begin Full Super	102+56.43'	5.20%	-5.20%
End Full Super	106+83.21'	5.20%	-5.20%
Reverse Crown	107+08.13'	4.00%	-4.00%
Level Crown	107+91.21'	0.00%	-4.00%
Begin Normal Crown	108+74.28'	-4.00%	-4.00%
Curve.4			
End Normal Crown	109+67.88'	-4.00%	-4.00%
Level Crown	110+50.49'	-4.00%	0.00%
Reverse Crown	111+33.10'	-4.00%	4.00%
Begin Full Super	111+45.49'	-4.60%	4.60%
End Full Super	116+94.62'	-4.60%	4.60%
Reverse Crown	117+07.02'	-4.00%	4.00%
Level Crown	117+89.62'	-4.00%	0.00%
Begin Normal Crown	118+72.23'	-4.00%	-4.00%

SUMMARY OF QUANTITIES				
SPEC	CODE	DESCRIPTION	QUANTITY	UNIT
103	0100	CONTRACT BOND	1	L SUM
201	0330	CLEARING & GRUBBING	1	L SUM
202	0104	REMOVAL OF STRUCTURE	1	EA
203	0101	COMMON EXCAVATION-TYPE A	12,682	CY
203	0109	TOPSOIL	3,888	CY
203	0121	TOPSOIL-WETLAND	56	CY
203	0140	BORROW-EXCAVATION	5,434	CY
203	0180	ROADWAY OBLITERATION	4,402	LF
210	0101	CLASS 1 EXCAVATION (130 C.Y.)	1	L SUM
210	0111	CLASS 2 EXCAVATION (95 C.Y.)	1	L SUM
210	0127	CHANNEL EXCAVATION (2,500 C.Y.)	1	L SUM
210	0198	SELECT BACKFILL	310	TON
210	0411	FOUNDATION PREPARATION	1	L SUM
216	0100	WATER	320	M GAL
302	0320	AGGREGATE SURFACE COURSE CL 5	6,041	TON
602	0130	CLASS AAE-3 CONCRETE	116.3	CY
602	1130	CLASS AE-3 CONCRETE	133.0	CY
602	1208	CONCRETE BRIDGE BARRIER	258.0	LF
602	1250	PENETRATING WATER REPELLENT TREATMENT	421.8	SY
604	9600	PRESTRESSED BOX BEAM-21IN	498.0	LF
612	0115	REINFORCING STEEL-GRADE 60	11,508	LBS
612	0116	REINFORCING STEEL-GRADE 60-EPOXY COATED	23,563	LBS
616	5890	STRUCTURAL STEEL	1	L SUM
622	0012	STEEL H-PILE TIPS 10 X 42	20	EA
622	0020	STEEL PILING HP 10 X 42	1,800	LF
702	0100	MOBILIZATION	1	L SUM
704	1000	TRAFFIC CONTROL SIGNS	936	UNITS
704	1052	TYPE III BARRICADE	24	EA
708	1020	RIPRAP-LOOSE ROCK	317	CY
708	1375	FLOTATION SILT CURTAIN	280	LF
708	1376	REMOVAL FLOTATION SILT CURTAIN	280	LF
708	1430	FIBER ROLLS 12IN	13,038	LF
708	1431	REMOVAL FIBER ROLLS 12IN	6,519	LF
708	2260	SEEDING-TYPE B-CL IV (P)	13.47	ACRE
708	2280	SEEDING-TYPE B-CL V (P)	13.47	ACRE
708	5500	MULCHING (P)	26.94	ACRE
714	3150	HEADWALL - PRECAST CONCRETE 4IN	2	EA
714	5035	PIPE CORR STEEL .064IN 24IN	176	LF
714	5820	END SECT CORR STEEL .064IN 24IN	6	EA
714	9720	UNDERDRAIN PIPE PVC PERFORATED 4IN	65	LF
714	9770	UNDERDRAIN PIPE PVC NON-PERFORATED 4IN	94	LF
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	161.1	SF
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	366.8	SF
764	0131	W-BEAM GUARDRAIL	314	LF
764	0145	W-BEAM GUARDRAIL END TERMINAL	4	EA

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	5	75

BASIS OF ESTIMATE

MATERIAL

SELECT BACKFILL	1.875 TON/CY
AGGREGATE CL 5	1.875 TON/CY
SEEDING	ALL DISTURBED AREAS OUTSIDE OF ROADBED
TOPSOIL QUANTITY BASED ON 4" DEPTH	
<u>WATER FOR COMPACTION</u>	
EMBANKMENT	10 GAL/CY
AGGREGATE BASE CLASS 5	20 GAL/TON
ADDITIONAL INCLUDED AS DUST PALLIATIVE	10 M GAL/MILE
<u>EARTHWORK</u>	
TOTAL EMBANKMENT*	= 14,416 CY
LOOSE VOLUME REQUIRED*	= 18,741 CY (BASED ON 130% COMPACTION)
COMMON EXCAVATION VOLUME	= 12,682 CY
CHANNEL EXCAVATION VOLUME	= 2,500 CY
USABLE CHANNEL EXCAVATION	= 625 CY (BASED ON 25% USABLE)
BORROW EXCAVATION REQUIRED (BORROW EXCAVATION)	= 5,434 CY

*NOT A PAY ITEM (INCIDENTAL TO OTHER ITEMS)

BASIS OF ESTIMATE

ENVIRONMENTAL COMMITMENTS

COMMITMENT NO. 1: A CONCRETE STRUCTURE OR BRIDGE WILL BE DEMOLISHED AS A PART OF THIS PROJECT. SFN 17987 ASBESTOS NOTIFICATION OF DEMOLITION AND RENOVATION IS REQUIRED.

ACTION TAKEN/REQUIRED: THE CONTRACTOR WILL COMPLETE AND SUBMIT SFN 17987 TO THE NORTH DAKOTA DEPARTMENT OF HEALTH 10 DAYS PRIOR TO BEGINNING THE ACTIVITY.

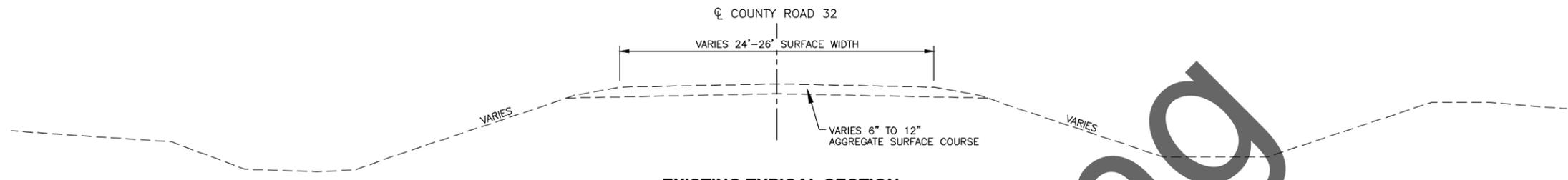
COMMITMENT NO. 2: ACTIVE MIGRATORY BIRD NESTS WITH EGGS OR CHICKS ARE PROTECTED BY THE FEDERAL MIGRATORY BIRD TREATY ACT. DEMOLITION ON BRIDGES OR BOX CULVERTS WITH ACTIVE NESTING CAN NOT START UNTIL NESTING SEASON IS OVER UNLESS MEASURES ARE TAKEN TO PREVENT NESTING.

ACTION TAKEN/REQUIRED: THE CONTRACTOR SHALL NOT REMOVE ANY EXISTING BRIDGE OR BOX CULVERT IF ACTIVE NESTS ARE PRESENT. THE CONTRACTOR CAN LEGALLY REMOVE INACTIVE NESTS PRIOR TO THE NESTING SEASON. AFTER INACTIVE NESTS ARE REMOVED THE CONTRACTOR CAN USE NETS OR TARPS SECURED TO THE STRUCTURE TO DISCOURAGE NESTING. PLEASE ALSO REFER TO THE BRIDGE NOTE SECTION OF THE PLANS.

- NOTES:
- WHERE A SPEC AND CODE ITEM DESCRIPTION IS FOLLOWED BY A (P), THE PLAN QUANTITY SHALL BE THE FINAL PAY QUANTITY.

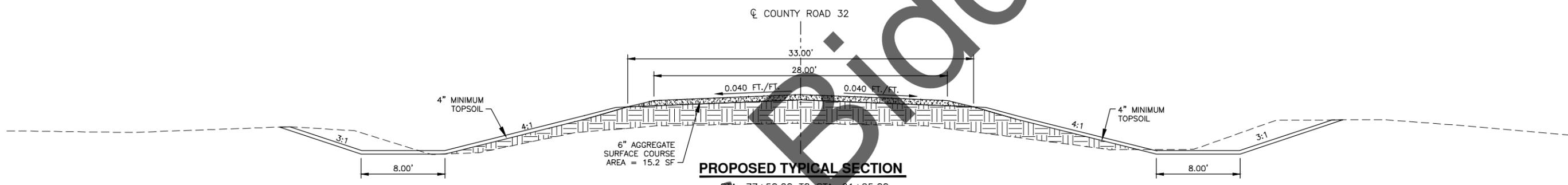
<p>This document was originally issued and sealed by Jeremy L. McLaughlin, Registration Number PE- 4883, on 02/28/14 and the original document is stored at Cass County Highway Department</p>	<p>CASS COUNTY HIGHWAY DEPARTMENT RUSH RIVER BRIDGE NO. 09-121-17.0 BASIS OF ESTIMATE PROJECT NO. CB1301 2 MILES WEST OF AMENIA CASS COUNTY</p>
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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	6	75



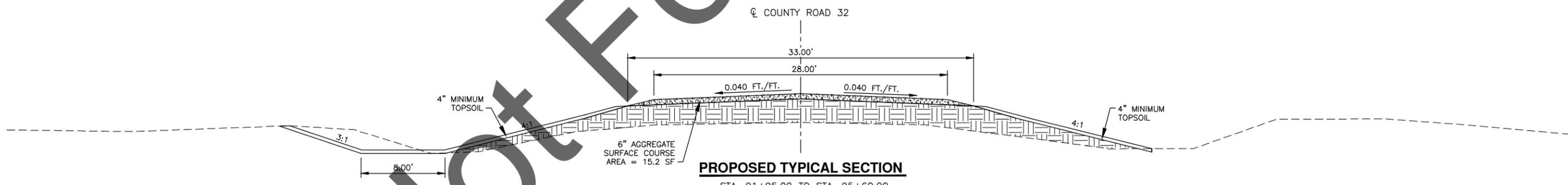
EXISTING TYPICAL SECTION

STA. 77+50.00 TO STA. 119+00.00
 PROPOSED ALIGNMENT IS OFF EXISTING ROADWAY
 FROM STA. 81+00.00 TO 115+00.00



PROPOSED TYPICAL SECTION

STA. 77+50.00 TO STA. 91+95.00
 STA. 100+64.50 TO STA. 119+00.00



PROPOSED TYPICAL SECTION

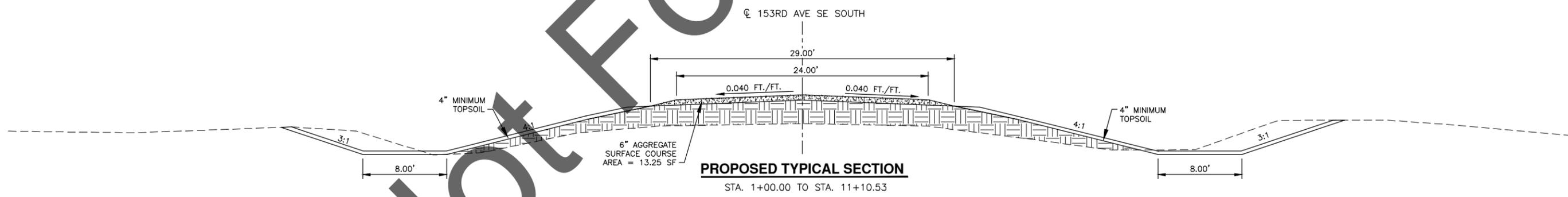
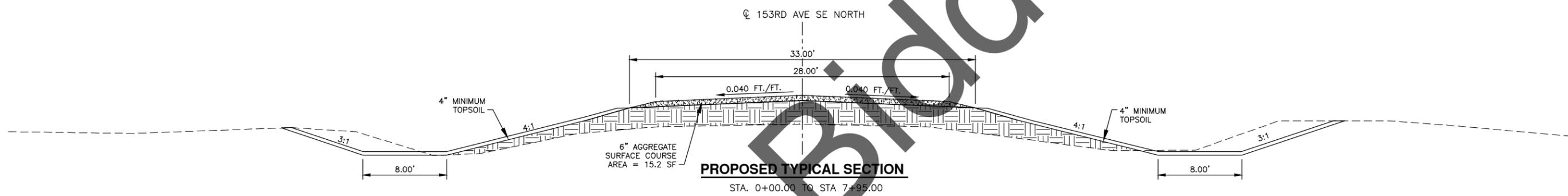
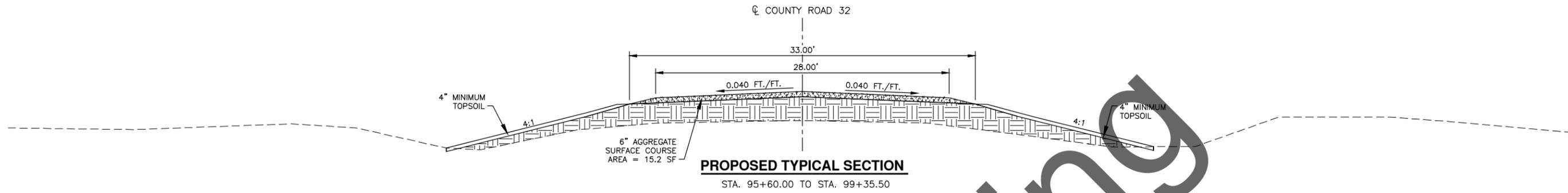
STA. 91+95.00 TO STA. 95+60.00

Not For Bidding

This document was originally issued and sealed by Jeffrey T. Lansink, Registration Number PE- 5244, on 02/28/14 and the original document is stored at Cass County Highway Department	CASS COUNTY HIGHWAY DEPARTMENT RUSH RIVER BRIDGE NO. 09-121-17.0 TYPICAL SECTIONS
	PROJECT NO. CB1301 2 MILES WEST OF AMENIA CASS COUNTY

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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	7	75



Not For Bidding

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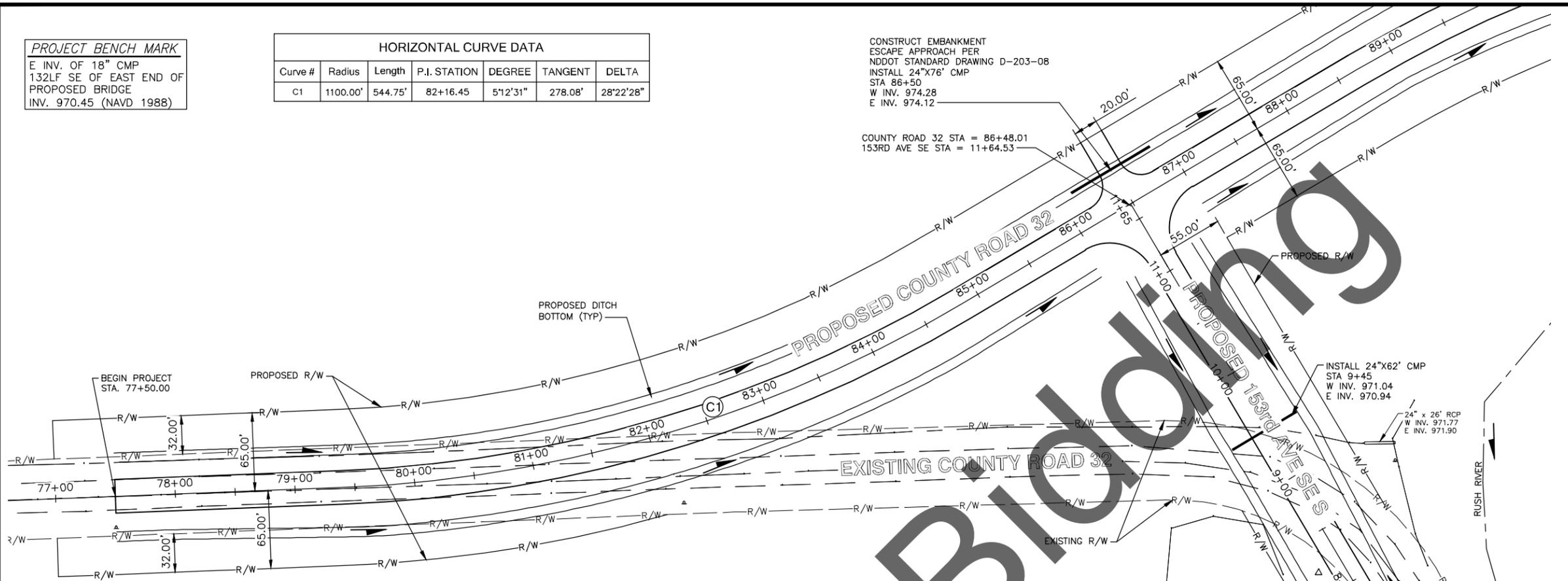
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PROJECT BENCH MARK
 E INV. OF 18" CMP
 132LF SE OF EAST END OF
 PROPOSED BRIDGE
 INV. 970.45 (NAVD 1988)

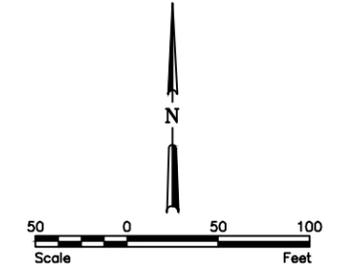
HORIZONTAL CURVE DATA						
Curve #	Radius	Length	P.I. STATION	DEGREE	TANGENT	DELTA
C1	1100.00'	544.75'	82+16.45	5°12'31"	278.08'	28°22'28"

CONSTRUCT EMBANKMENT
 ESCAPE APPROACH PER
 NDDOT STANDARD DRAWING D-203-08
 INSTALL 24"x76" CMP
 STA 86+50
 W INV. 974.28
 E INV. 974.12

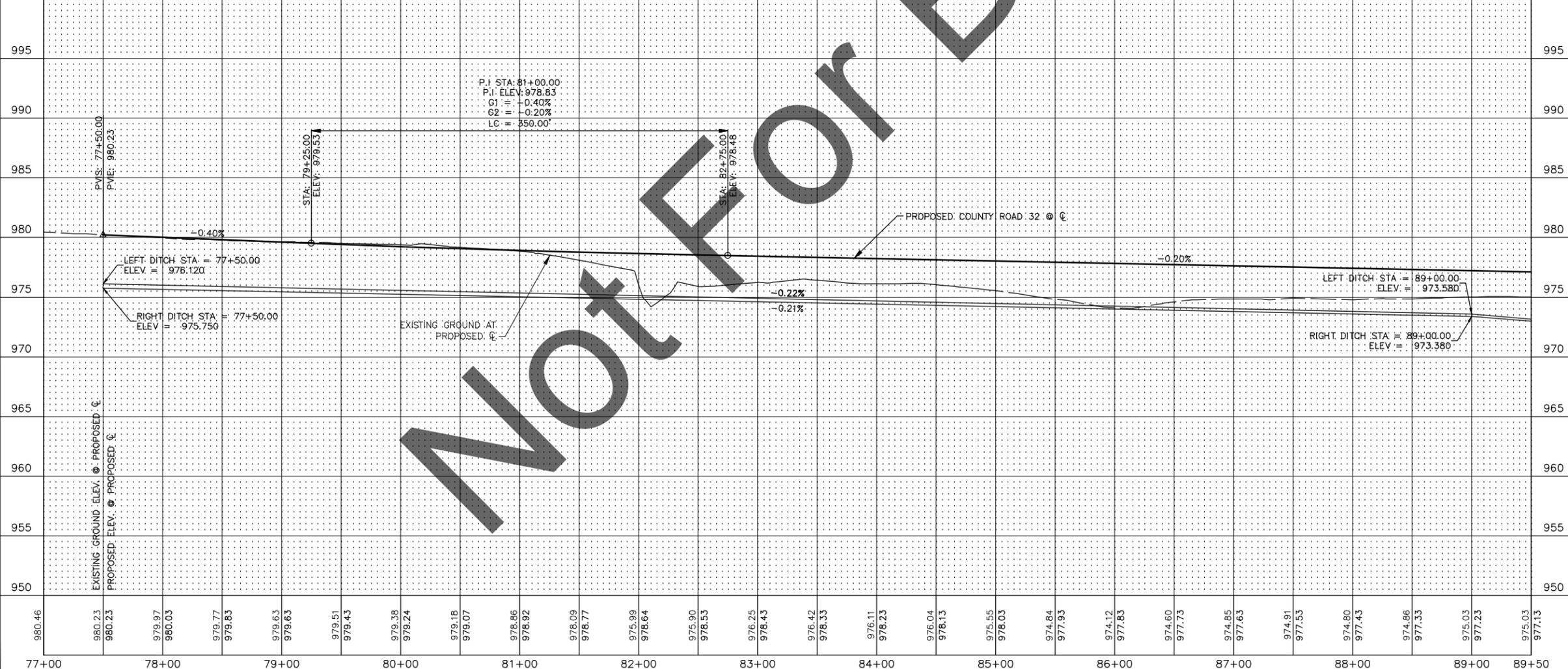
COUNTY ROAD 32 STA = 86+48.01
 153RD AVE SE STA = 11+64.53



PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	8	75



Item	Description	Quantity	Unit
704-5035	PIPE CORR STEEL .064IN 24IN	138	LF
704-5820	END SECT CORR STEEL .064IN 24IN	4	LF



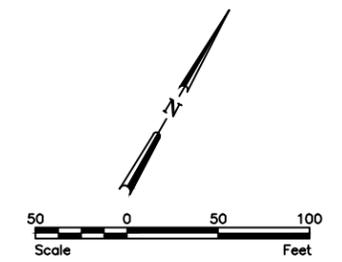
NOTE:
 EXISTING DRAIN TILE RUN EAST/WEST
 WITHIN AGRICULTURAL LAND ADJACENT
 TO THE PROJECT SOUTHWEST,
 NORTHWEST AND NORTHEAST OF
 EXISTING COUNTY ROAD 32. THE
 ENGINEER IN THE FIELD SHALL
 DETERMINE THE LOCATION PRIOR TO
 EXCAVATION.

THE CONTRACTOR SHALL AVOID
 IMPACTS TO EXISTING DRAIN TILES. IF
 EXISTING DRAIN TILE IS DAMAGED
 DURING CONSTRUCTION, IT SHALL BE
 REPAIRED AT THE CONTRACTORS
 EXPENSE.

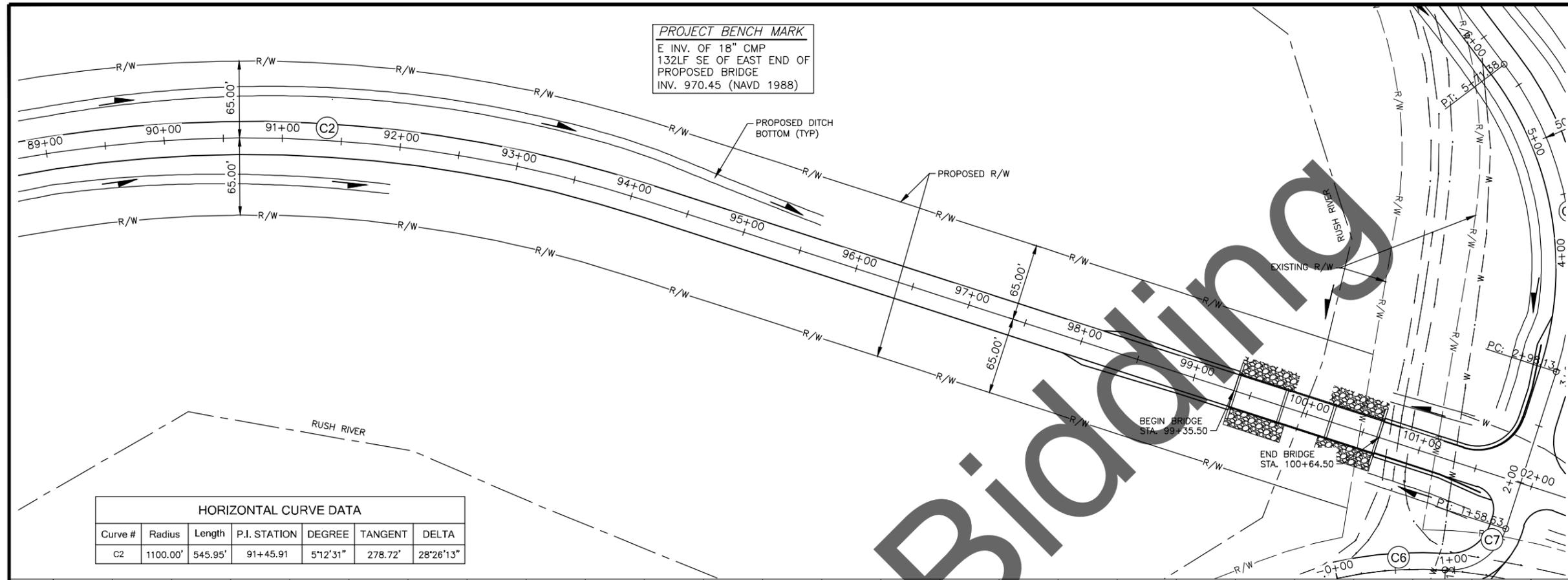
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CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
COUNTY ROAD 32
PLAN & PROFILE
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

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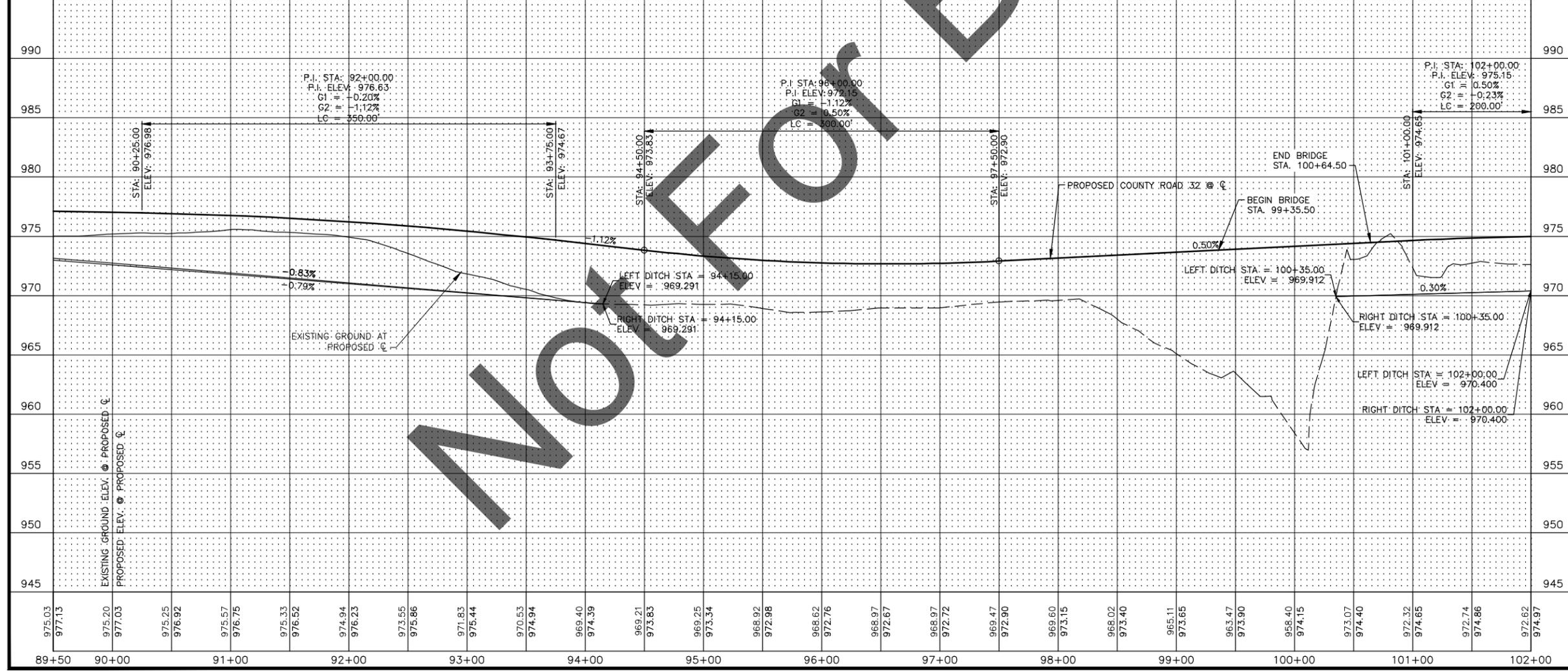


PROJECT BENCH MARK
 E INV. OF 18" CMP
 132LF SE OF EAST END OF
 PROPOSED BRIDGE
 INV. 970.45 (NAVD 1988)



HORIZONTAL CURVE DATA

Curve #	Radius	Length	P.I. STATION	DEGREE	TANGENT	DELTA
C2	1100.00'	545.95'	91+45.91	5'12'31"	278.72'	28'26'13"



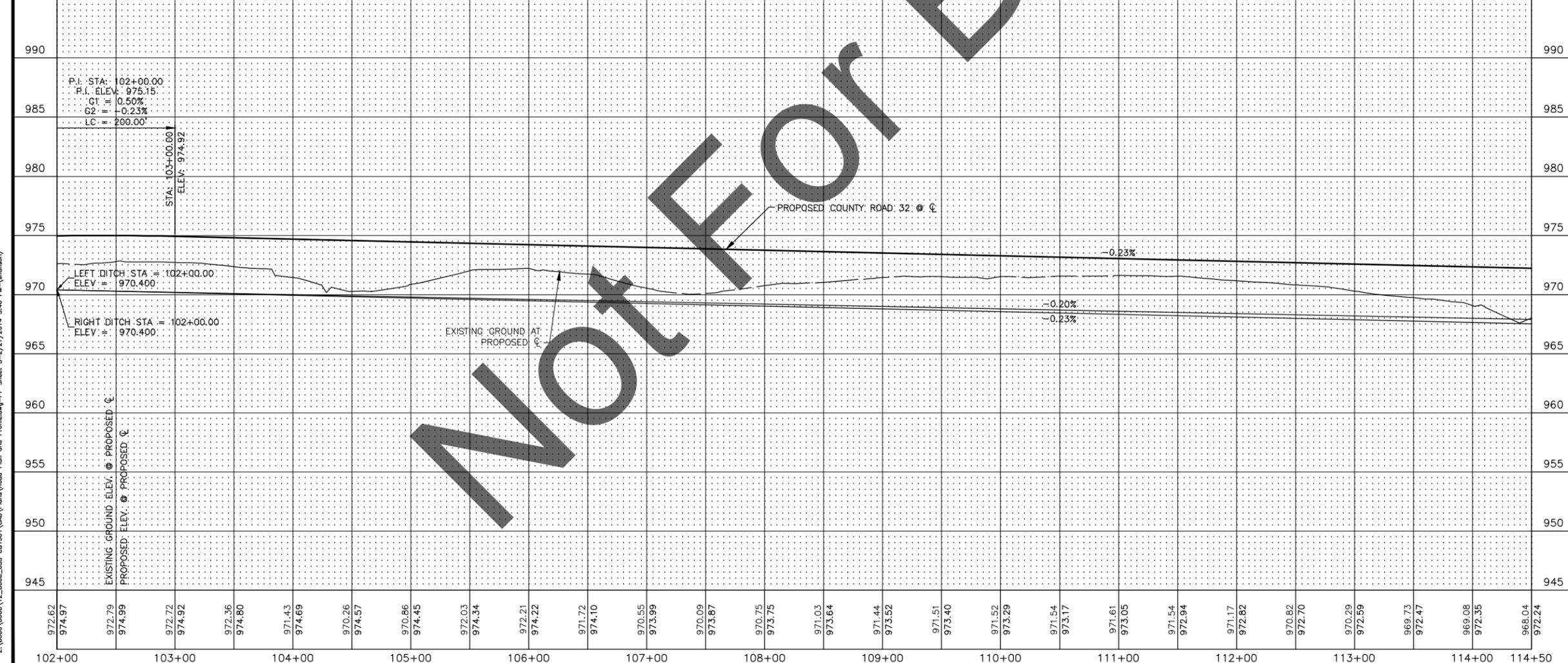
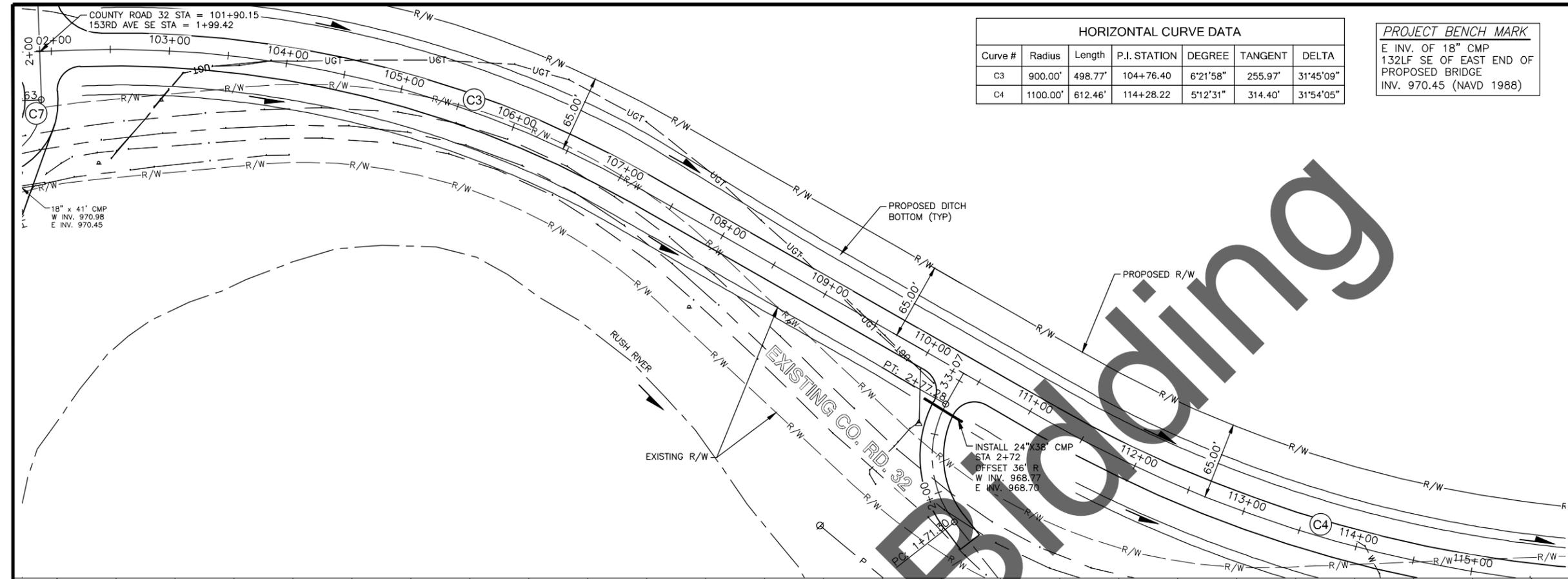
NOTE:
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CASS COUNTY
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COUNTY ROAD 32
PLAN & PROFILE
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

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PROJECT NO. CB1301 SHEET NO. 10 TOTAL SHEETS 75

Scale 0 50 100 Feet

North Arrow

Item	Description	Quantity	Unit
704-5035	PIPE CORR STEEL .064IN 24IN	38	LF
704-5820	END SECT CORR STEEL .064IN 24IN	2	LF

NOTE:
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CASS COUNTY
HIGHWAY DEPARTMENT
RUSH RIVER

BRIDGE NO. 09-121-17.0

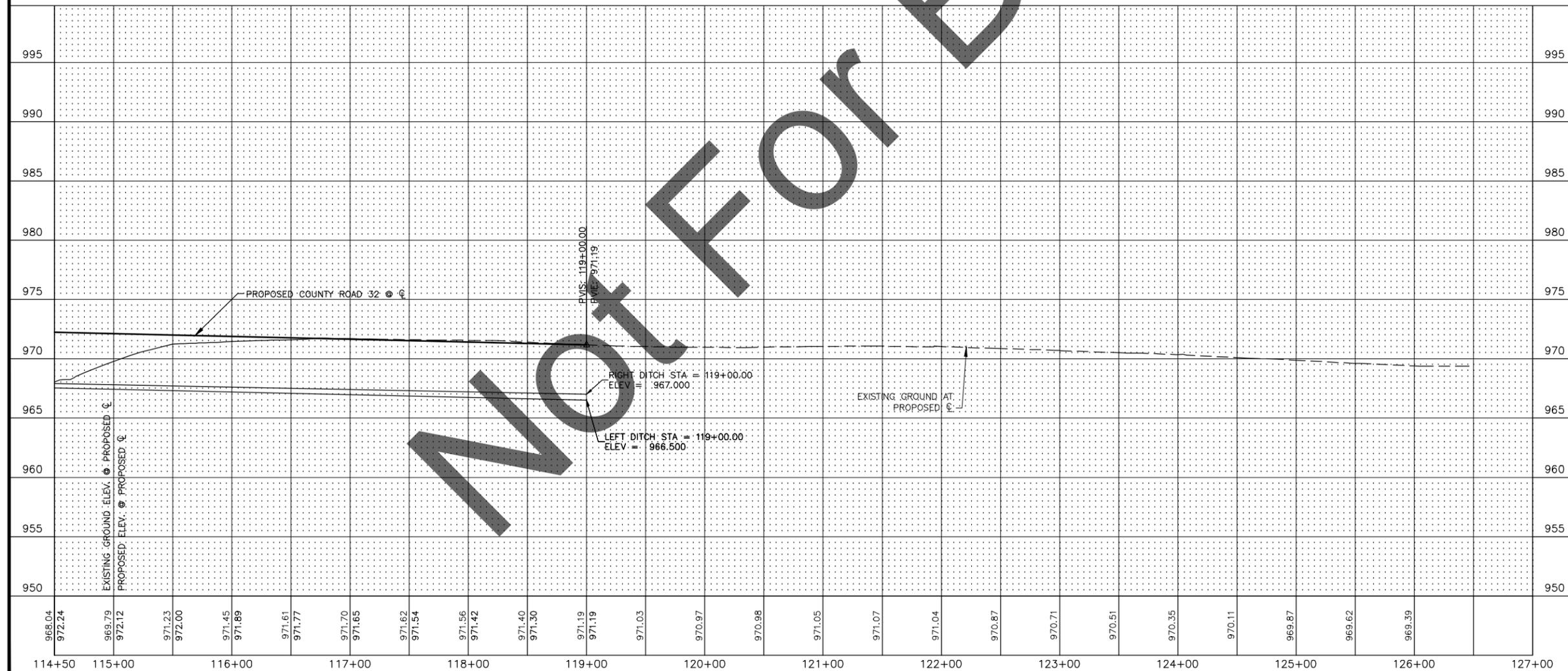
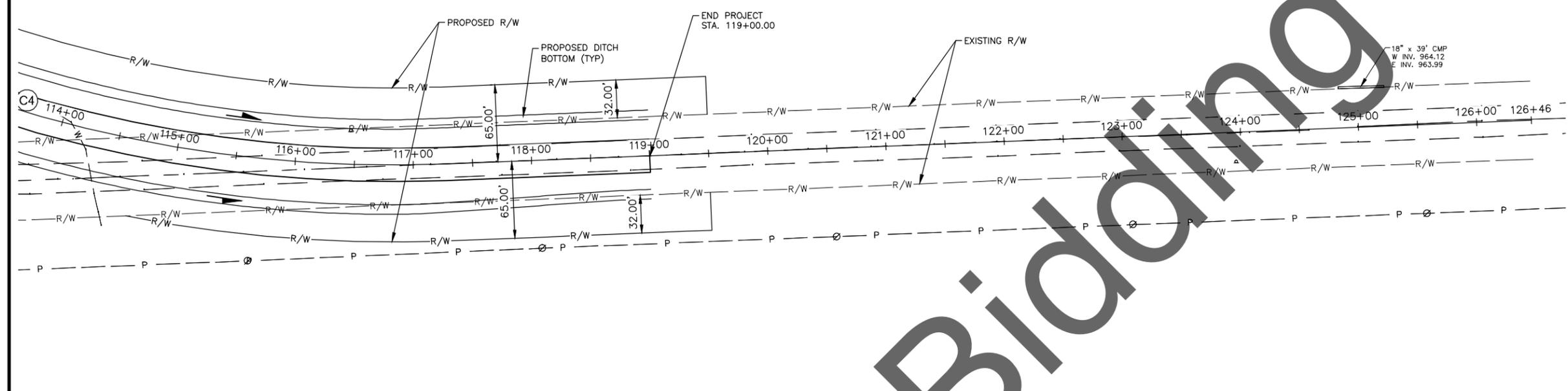
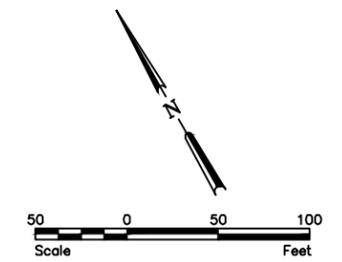
**COUNTY ROAD 32
PLAN & PROFILE**

PROJECT NO. CB1301
2 MILES WEST OF AMENIA
CASS COUNTY

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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	11	75

PROJECT BENCH MARK
 E INV. OF 18" CMP
 132LF SE OF EAST END OF
 PROPOSED BRIDGE
 INV. 970.45 (NAVD 1988)



NOTE:
 EXISTING DRAIN TILE RUN EAST/WEST WITHIN AGRICULTURAL LAND ADJACENT TO THE PROJECT SOUTHWEST, NORTHWEST AND NORTHEAST OF EXISTING COUNTY ROAD 32. THE ENGINEER IN THE FIELD SHALL DETERMINE THE LOCATION PRIOR TO EXCAVATION.

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CASS COUNTY
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 RUSH RIVER

BRIDGE NO. 09-121-17.0
COUNTY ROAD 32
PLAN & PROFILE

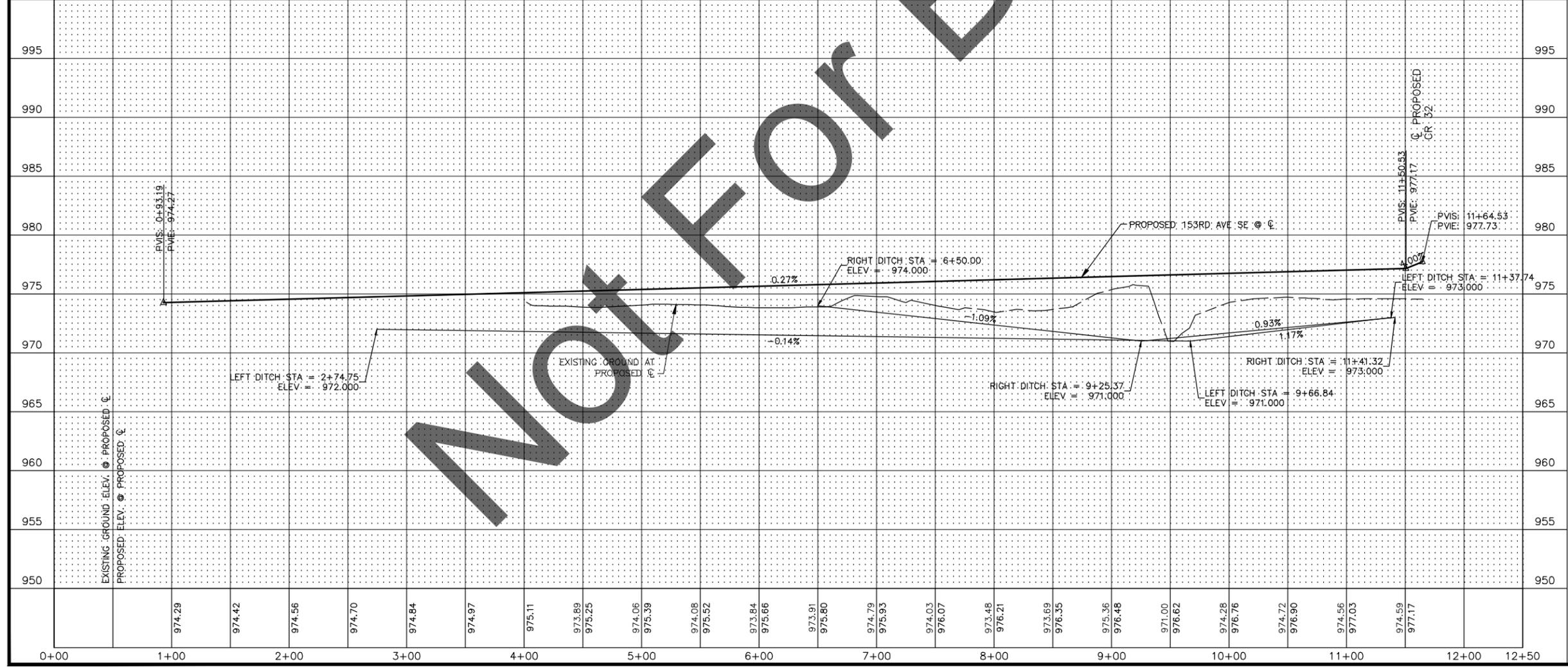
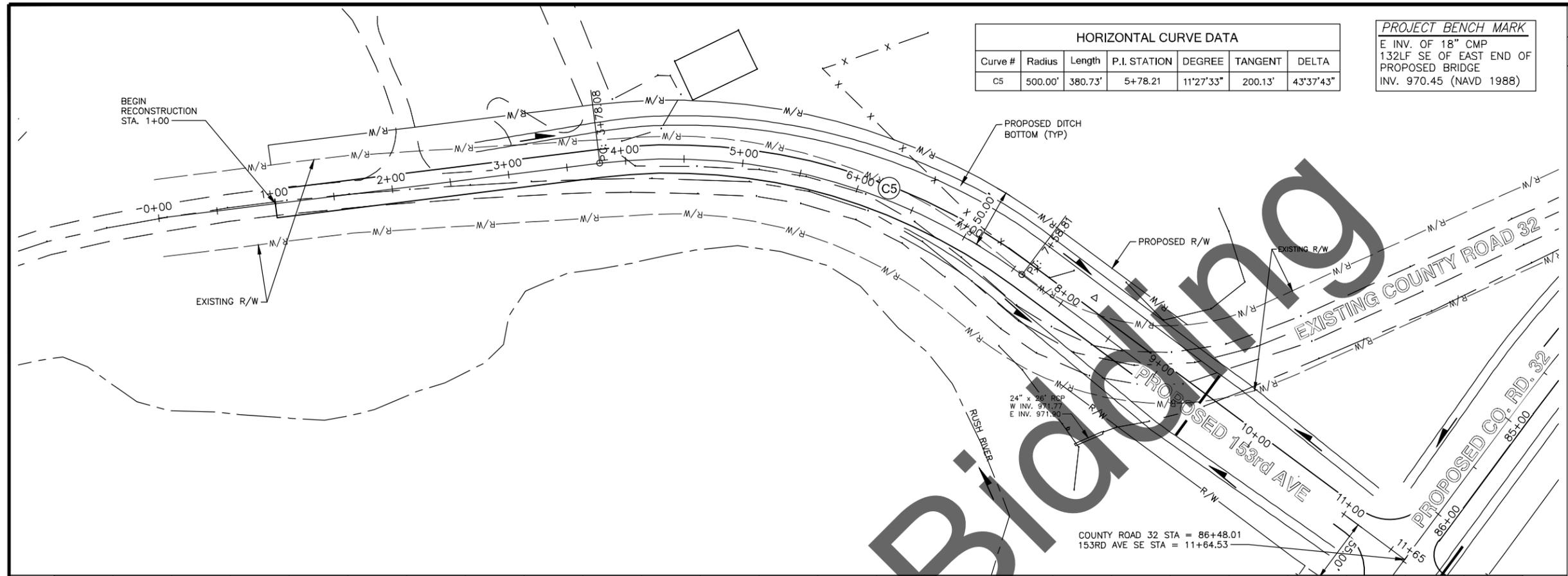
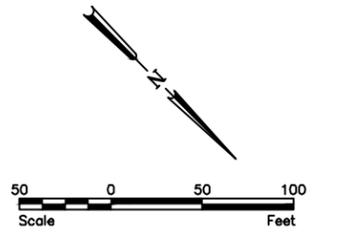
PROJECT NO. **CB1301**
 2 MILES WEST OF AMENIA
 CASS COUNTY

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HORIZONTAL CURVE DATA						
Curve #	Radius	Length	P.I. STATION	DEGREE	TANGENT	DELTA
C5	500.0'	380.73'	5+78.21	11°27'33"	200.13'	43°37'43"

PROJECT BENCH MARK
 E INV. OF 18" CMP
 132LF SE OF EAST END OF
 PROPOSED BRIDGE
 INV. 970.45 (NAVD 1988)

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	12	75



NOTE:
 EXISTING DRAIN TILE RUN EAST/WEST WITHIN AGRICULTURAL LAND ADJACENT TO THE PROJECT SOUTHWEST, NORTHWEST AND NORTHEAST OF EXISTING COUNTY ROAD 32. THE ENGINEER IN THE FIELD SHALL DETERMINE THE LOCATION PRIOR TO EXCAVATION.

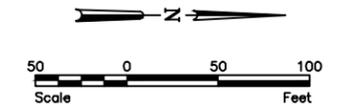
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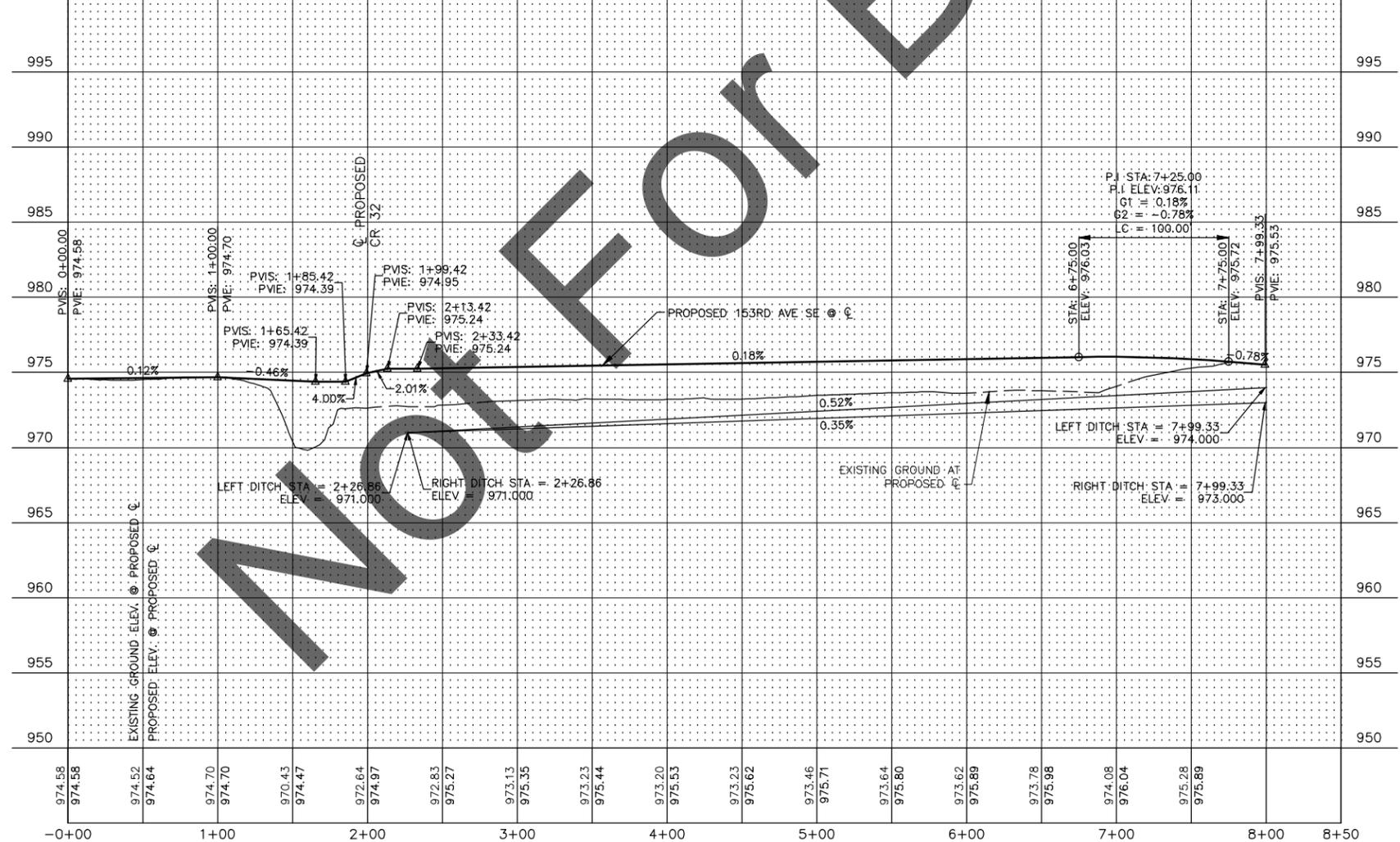
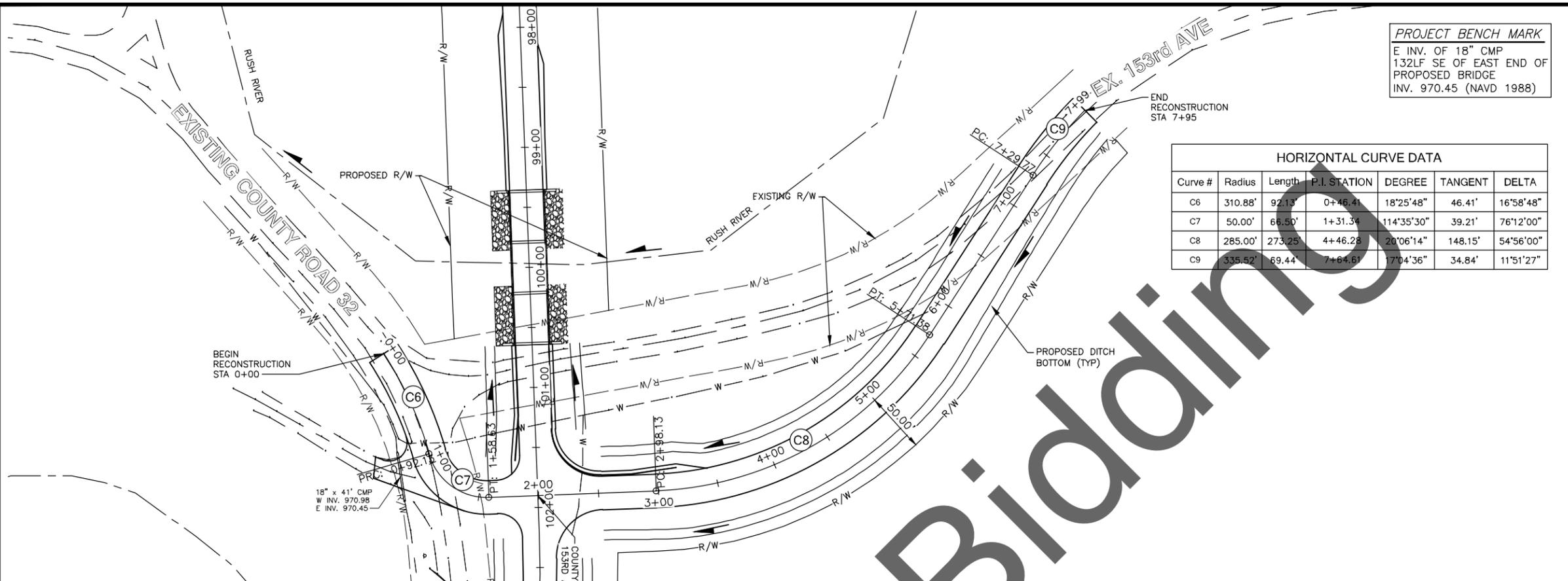
CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
**153RD AVENUE SE S
 PLAN & PROFILE**
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

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PROJECT BENCH MARK
 E INV. OF 18" CMP
 132LF SE OF EAST END OF
 PROPOSED BRIDGE
 INV. 970.45 (NAVD 1988)



HORIZONTAL CURVE DATA						
Curve #	Radius	Length	P.I. STATION	DEGREE	TANGENT	DELTA
C6	310.88'	92.13'	0+46.41	18°25'48"	46.41'	16°58'48"
C7	50.00'	66.50'	1+31.34	114°35'30"	39.21'	76°12'00"
C8	285.00'	273.25'	4+46.28	20°06'14"	148.15'	54°56'00"
C9	335.52'	69.44'	7+64.61	17°04'36"	34.84'	11°51'27"



NOTE:
 EXISTING DRAIN TILE RUN EAST/WEST WITHIN AGRICULTURAL LAND ADJACENT TO THE PROJECT SOUTHWEST, NORTHWEST AND NORTHEAST OF EXISTING COUNTY ROAD 32. THE ENGINEER IN THE FIELD SHALL DETERMINE THE LOCATION PRIOR TO EXCAVATION.
 THE CONTRACTOR SHALL AVOID IMPACTS TO EXISTING DRAIN TILES. IF EXISTING DRAIN TILE IS DAMAGED DURING CONSTRUCTION, IT SHALL BE REPAIRED AT THE CONTRACTORS EXPENSE.

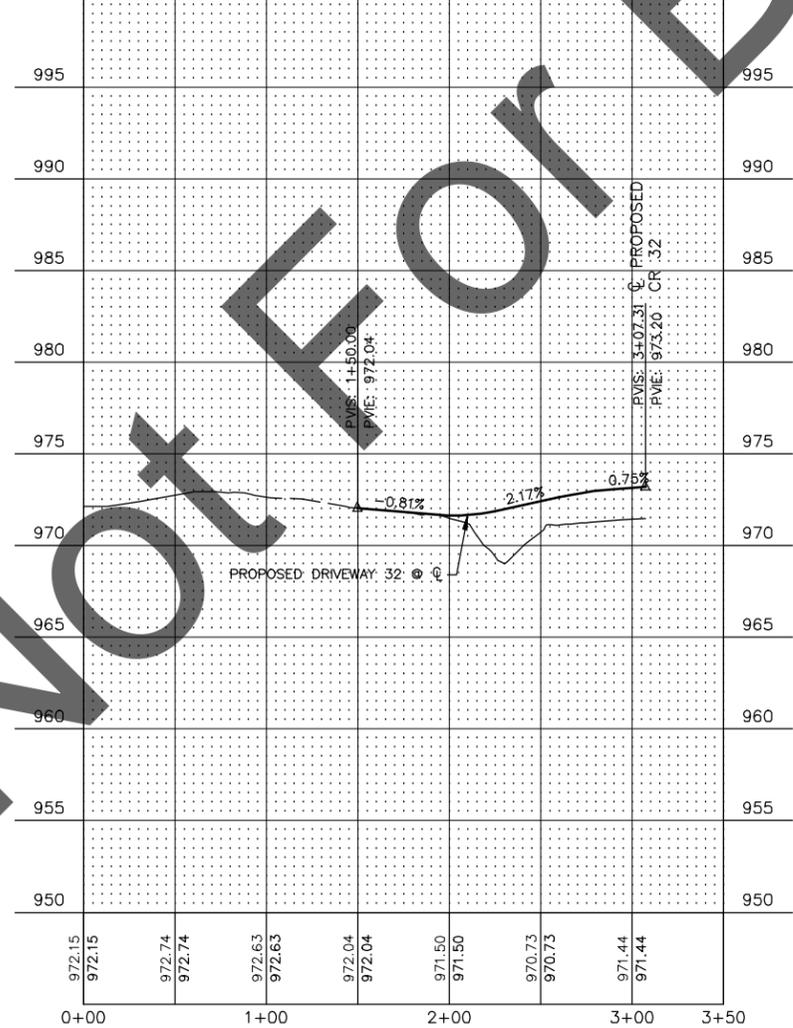
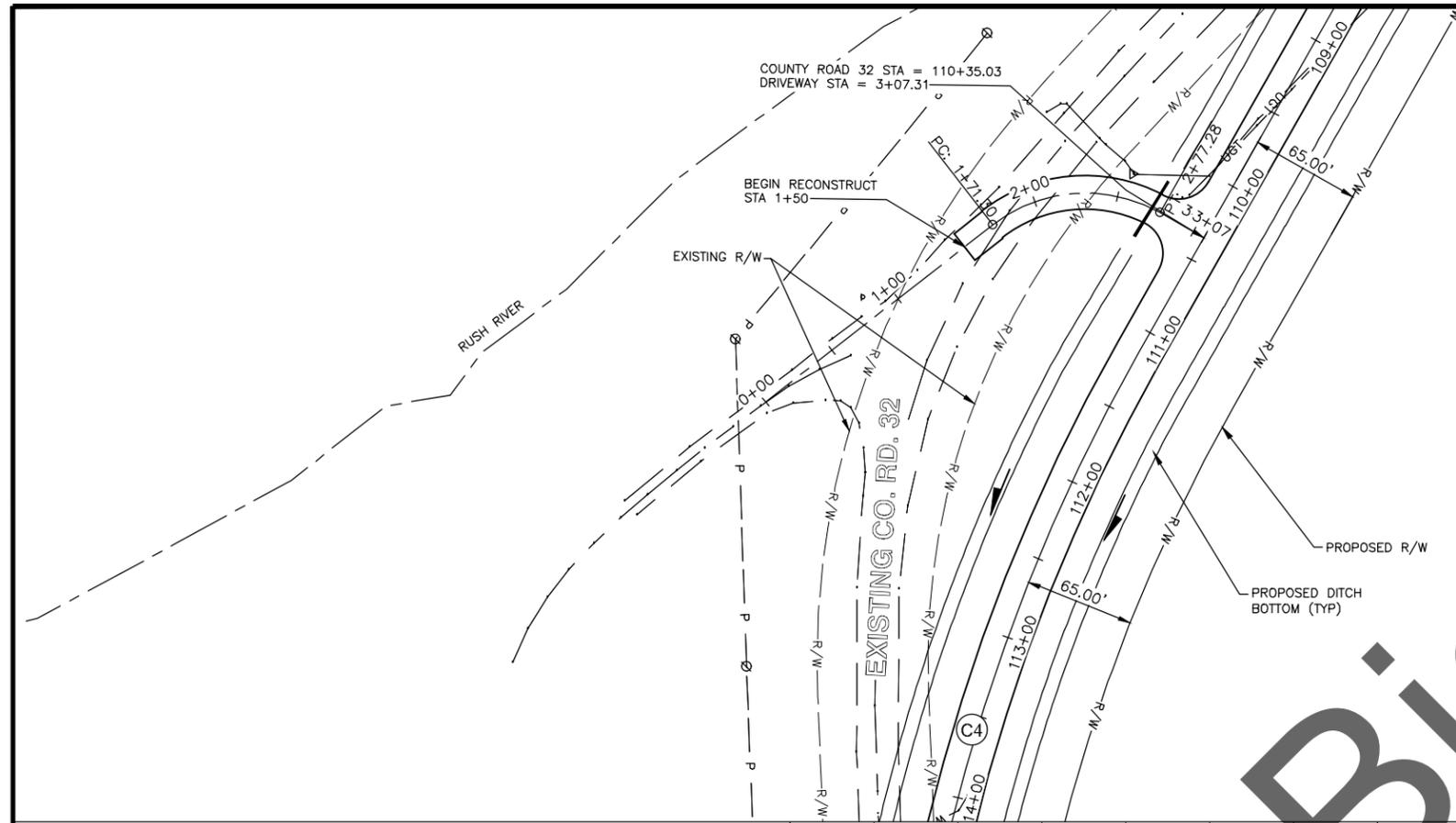
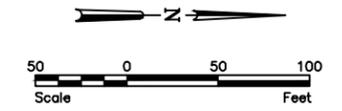
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CASS COUNTY
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 RUSH RIVER
 BRIDGE NO. 09-121-17.0
**153RD AVENUE SE N
 PLAN & PROFILE**
 PROJECT NO. **CB1301**
 2 MILES WEST OF AMENIA
 CASS COUNTY

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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	14	75

PROJECT BENCH MARK
 E INV. OF 18" CMP
 132LF SE OF EAST END OF
 PROPOSED BRIDGE
 INV. 970.45 (NAVD 1988)



NOTE:
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THE CONTRACTOR SHALL AVOID IMPACTS TO EXISTING DRAIN TILES. IF EXISTING DRAIN TILE IS DAMAGED DURING CONSTRUCTION, IT SHALL BE REPAIRED AT THE CONTRACTORS EXPENSE.

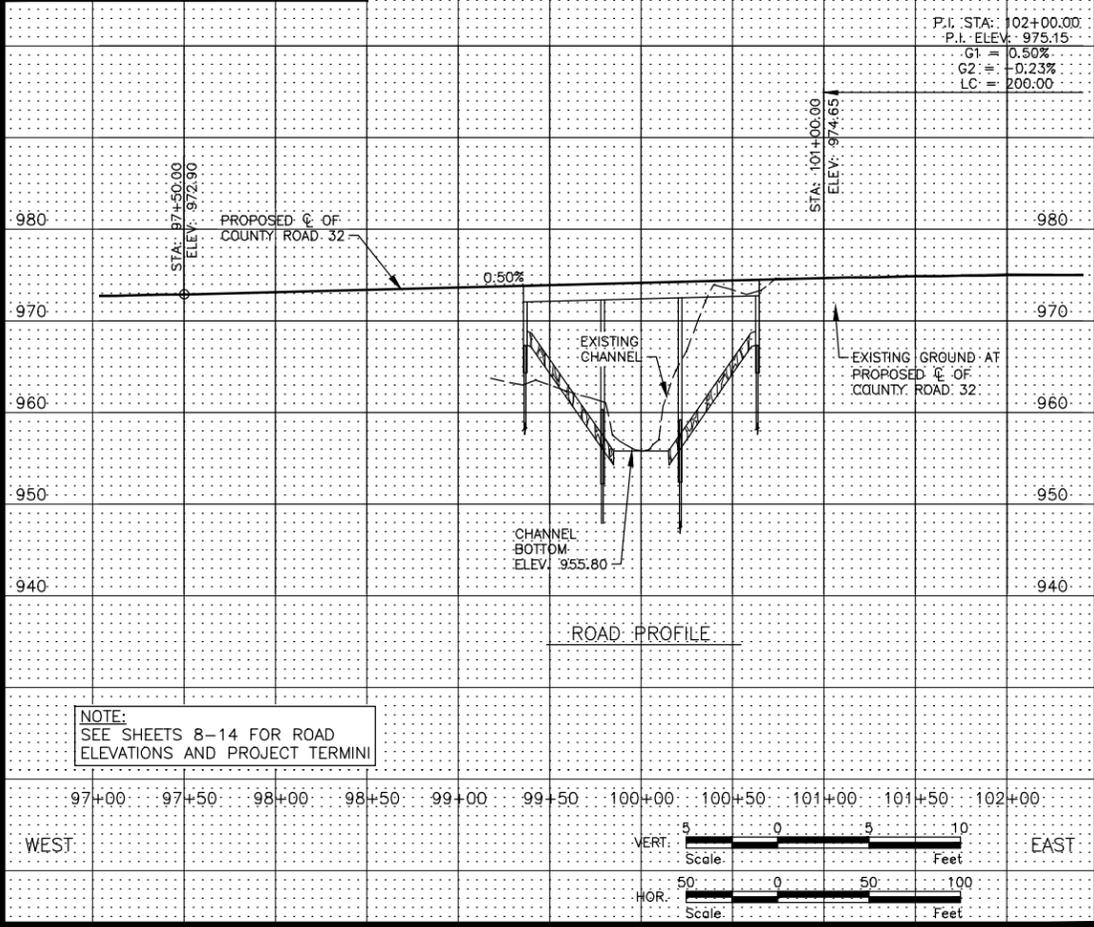
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CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
**PRIVATE DRIVE
 PLAN & PROFILE**
 PROJECT NO. **CB1301**
 2 MILES WEST OF AMENIA
 CASS COUNTY

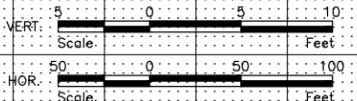
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CONTRACTED PROFILE

SCALES AS SHOWN

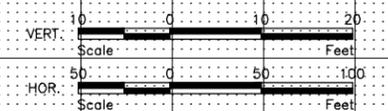
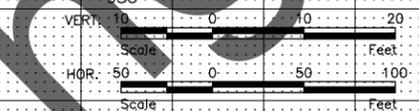
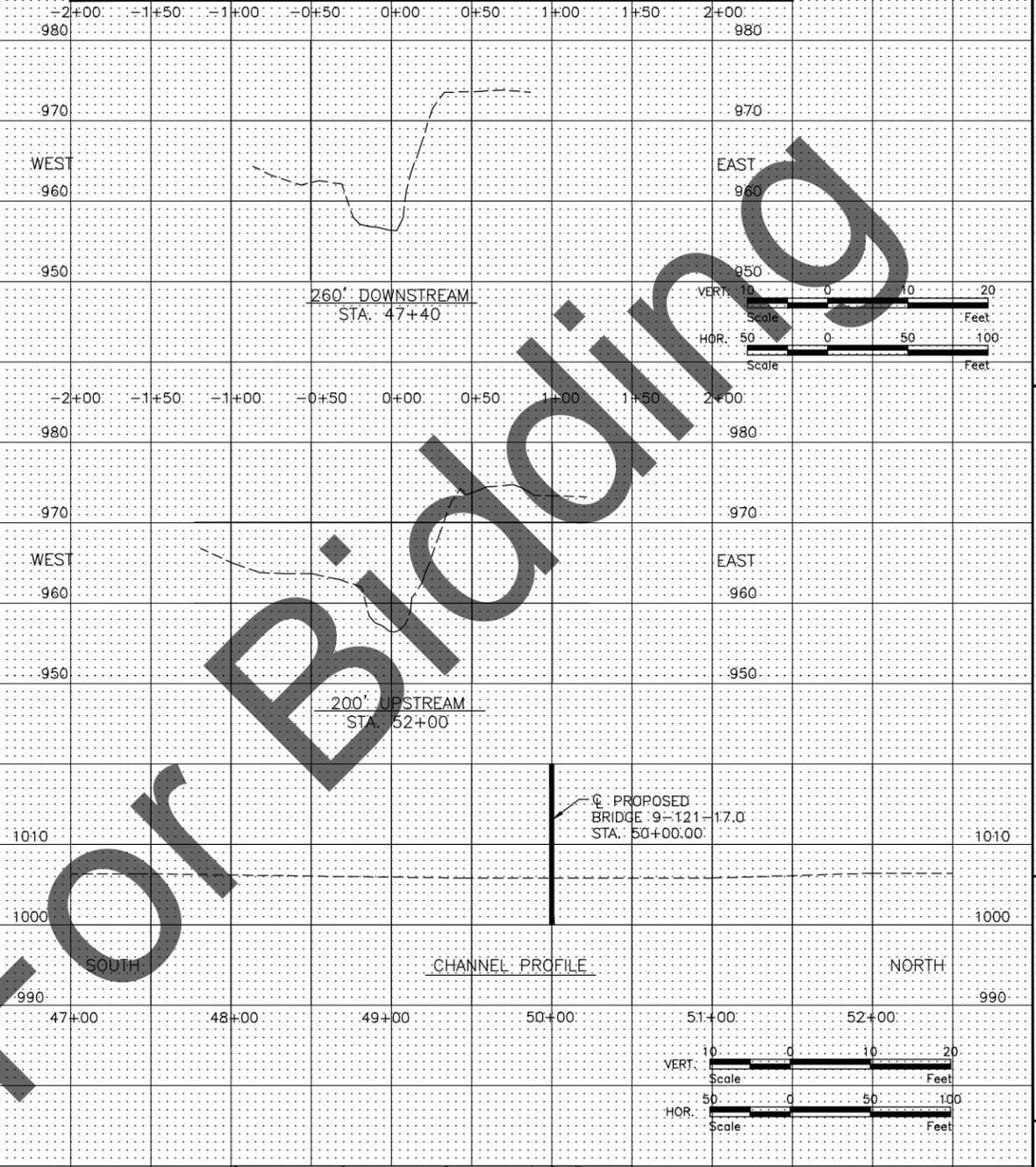


NOTE:
SEE SHEETS 8-14 FOR ROAD
ELEVATIONS AND PROJECT TERMINI



TYPICAL SECTIONS & PERTINENT DATA

SCALES AS SHOWN



LOCATION ENGINEER'S OBSERVATIONS AT BRIDGE SITE

- Special Features: Waterfalls, dams, floods, ice, debris, sliding banks, recreational boating. NONE
- Other bridges or culverts over the same stream (particularly structures which carry highwater without overflow of roadway): Given locations, type, length, height above highwater, cross-sectional area, etc.
APPROX. 1 MILE UPSTREAM, 25'W x 35'L SINGLE SPAN TIMBER DECK
TOTAL WATERWAY AREA = 450 SQ. FT.
APPROX. 1/2 MILE DOWNSTREAM, 25'W x 60'L
TOTAL WATERWAY AREA = 890 SQ. FT.
- Apparent highwater elevation N/A Obtained from _____
- Other data: Approx. velocity of water at time of survey N/A

HYDRAULIC ENGINEER'S RECOMMENDATION

DATE FEB 11, 2014

STREAM OR DITCH DESIGNATION RUSH
 DRAINAGE AREA 97.5 SQ. MILES
 MAX FLOOD OF RECORD UNKNOWN DESIGN FLOOD 970.8
 MAX OBSERVED HIGHWATER ELEVATION N/A DESIGN HIGH WATER N/A
 DESIGN MEAN VELOCITY THROUGH STRUCTURE 3.5 F.P.S.
 LOW SUPERSTRUCTURE AT OR ABOVE ELEVATION 971.66
 FLOWLINE ELEVATION 955.8 SKEW ANGLE NONE
 WATERWAY AREA REQUIRED BELOW ELEVATION 971.66 = 1250.0 SQ. FT. AT
 RIGHT ANGLES TO CHANNEL _____
 IN THE INTEREST OF FLOOD PLAIN ZONING THE REGIONAL FLOOD (100 YR.) IS
4,040 C.F.S. AT STAGE 970.8 AND MEAN VELOCITY OF 3.5 F.P.S. WITH
N/A FT. SWELLHEAD. THE ABOVE RECOMMENDATION WILL PROVIDE A
 STRUCTURE OF ADEQUATE WATERWAY TO PASS THE REGIONAL FLOOD WITHIN
 CRITERIA ESTABLISHED BY THE DEPARTMENT OF NATURAL RESOURCES.

FOUNDATION ENGINEER'S RECOMMENDATION

DATE JAN 31, 2014

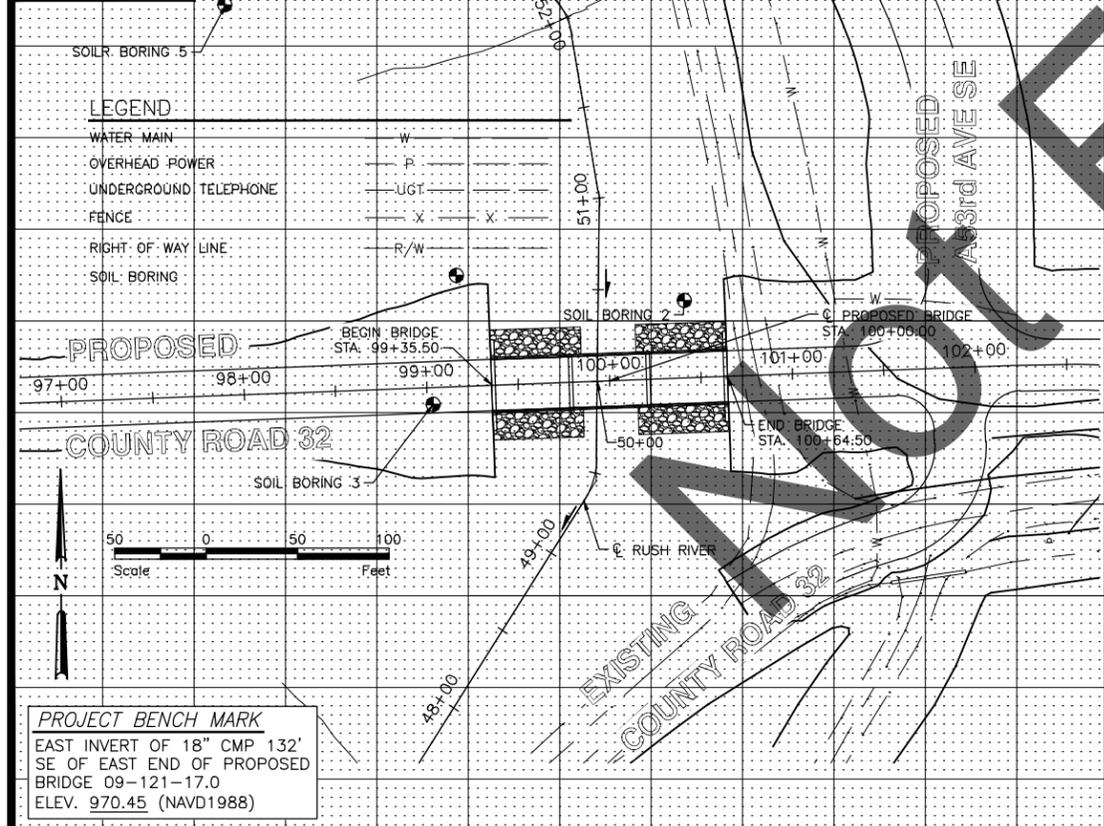
FROM MIDWEST TESTING LAB REPORT NO. M1135065 RECOMMEND THE
 PROPOSED BRIDGE BE SUPPORTED BY A DEEP PILE FOUNDATION SYSTEM,
 SUGGEST USING H-PILE DRIVEN TO REFUSAL IN THE HARD, SANDY, LEAN
 CLAYS OR VERY DENSE SILTY SAND DEPOSITS FIRST ENCOUNTERED AT DEPTHS
 OF APPROXIMATELY 90 TO 110 FEET BELOW EXISTING GRADE. RECOMMEND
 APPLYING A NEGATIVE LOAD FOR DOWNDRAG AT THE WEST END OF THE
 BRIDGE. RECOMMEND USING ROCK TIPS ON ALL PILE. RECOMMEND THE SLOPES
 OF THE CHANNEL BELOW THE BRIDGE BE A MINIMUM OF 3H:1V.

Bridge survey sheets made from: HOUSTON ENGINEERING INC.

Bench mark elevation 970.45 (NAVD 1988 DATUM)
 Location: EAST INVERT OF 18" CMP 132' SE OF EAST END OF
 PROPOSED BRIDGE 09-121-17.0

PLAT

SCALES AS SHOWN



PROJECT BENCH MARK
 EAST INVERT OF 18" CMP 132'
 SE OF EAST END OF PROPOSED
 BRIDGE 09-121-17.0
 ELEV. 970.45 (NAVD1988)

Z:\6000\6000\12_0006_03 CB1301\GAD\Plan\BRIDGE SURVEY SHEET.dwg Bridge Survey-2/28/2014 8:05 AM (crogner)

This document was originally issued and sealed by
 Jeremy L. McLaughlin,
 Registration Number
 PE- 4883,
 on 02/28/14 and the original document is stored at
 Cass County Highway Department

NORTH DAKOTA
 DEPARTMENT OF TRANSPORTATION

BRIDGE SURVEY

OVER RUSH RIVER
 (T.H., C.S.A.H., C.R. etc.)

PROPOSED BRIDGE LOCATED
2 MILES WEST OF AMENIA

SEC. 21/22 TWP. 141N R. 52 W

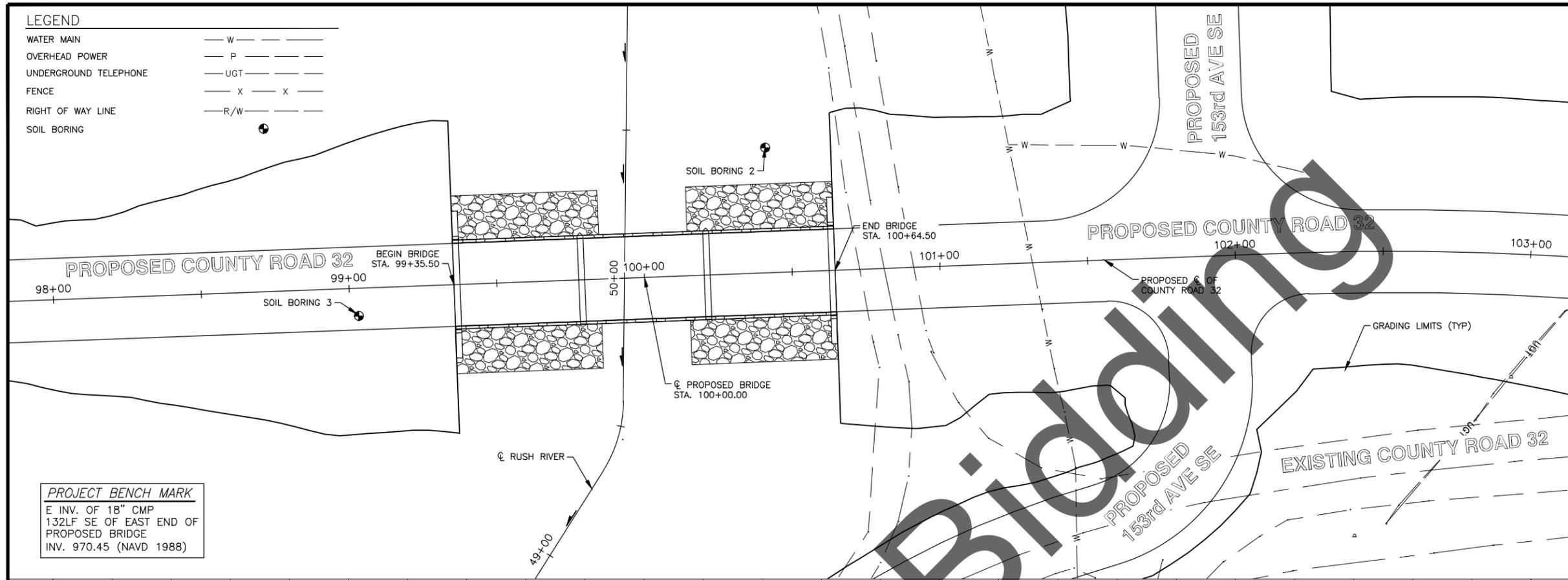
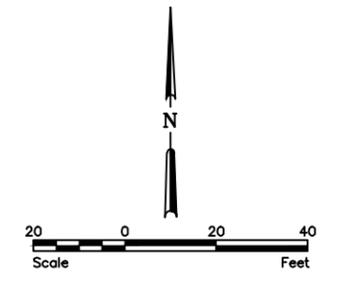
TOWNSHIP AMENIA COUNTY CASS

BRIDGE NO. 09-121-17.0

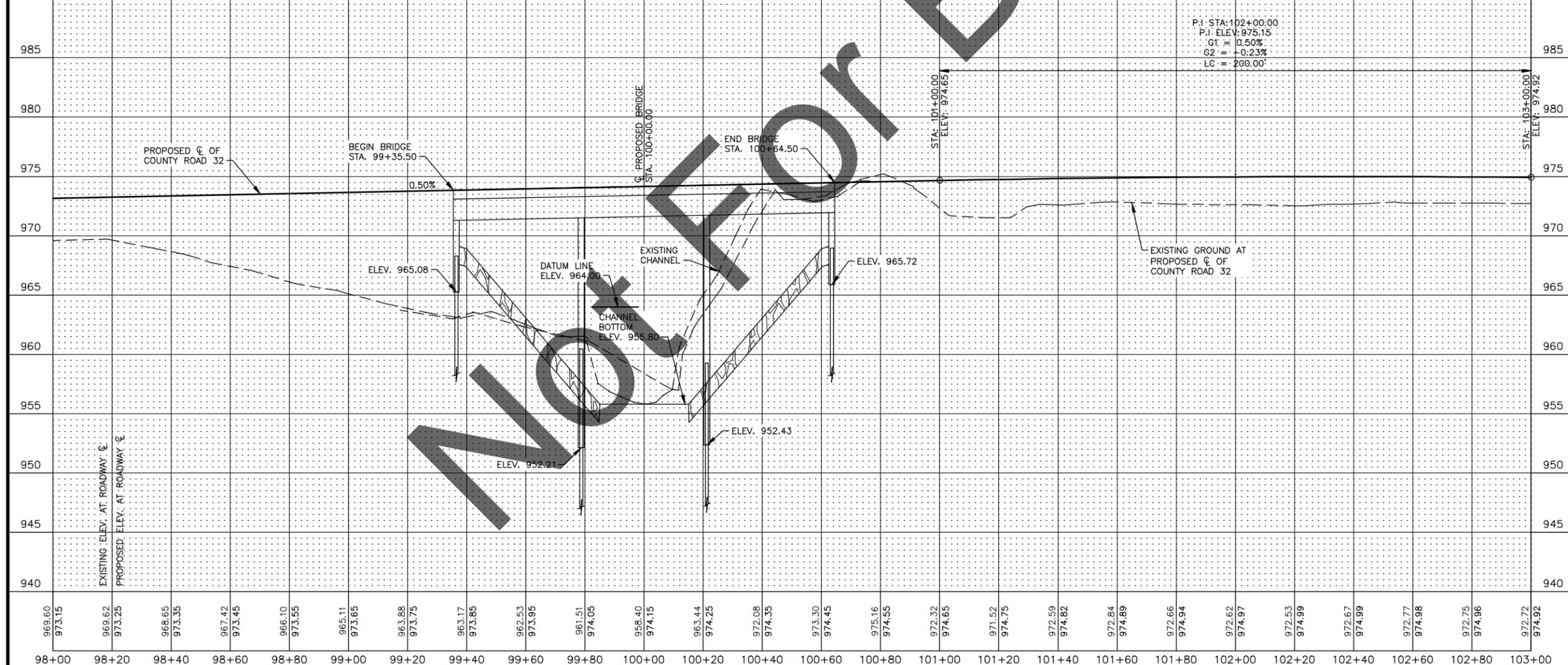
LEGEND

WATER MAIN	— W —
OVERHEAD POWER	— P —
UNDERGROUND TELEPHONE	— UGT —
FENCE	— X — X —
RIGHT OF WAY LINE	— R/W —
SOIL BORING	⊙

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	16	75



PROJECT BENCH MARK
 E INV. OF 18" CMP
 132LF SE OF EAST END OF
 PROPOSED BRIDGE
 INV. 970.45 (NAVD 1988)

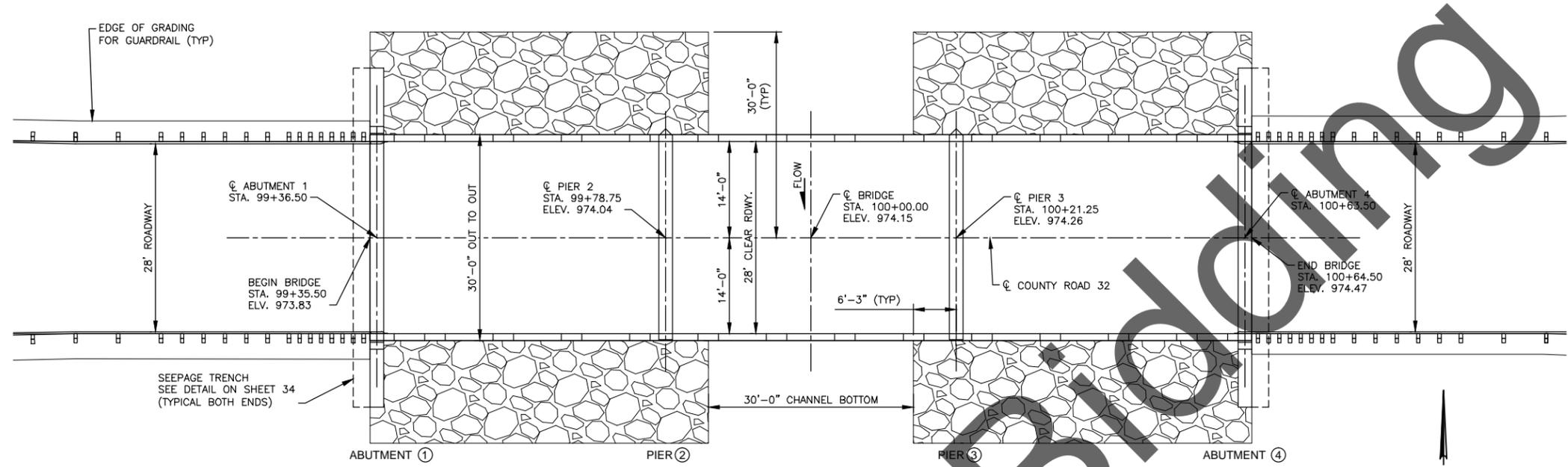


P.I. STA: 102+00.00
 P.I. ELEV: 975.15
 G1 = 0.50%
 G2 = -0.23%
 LC = 200.00'

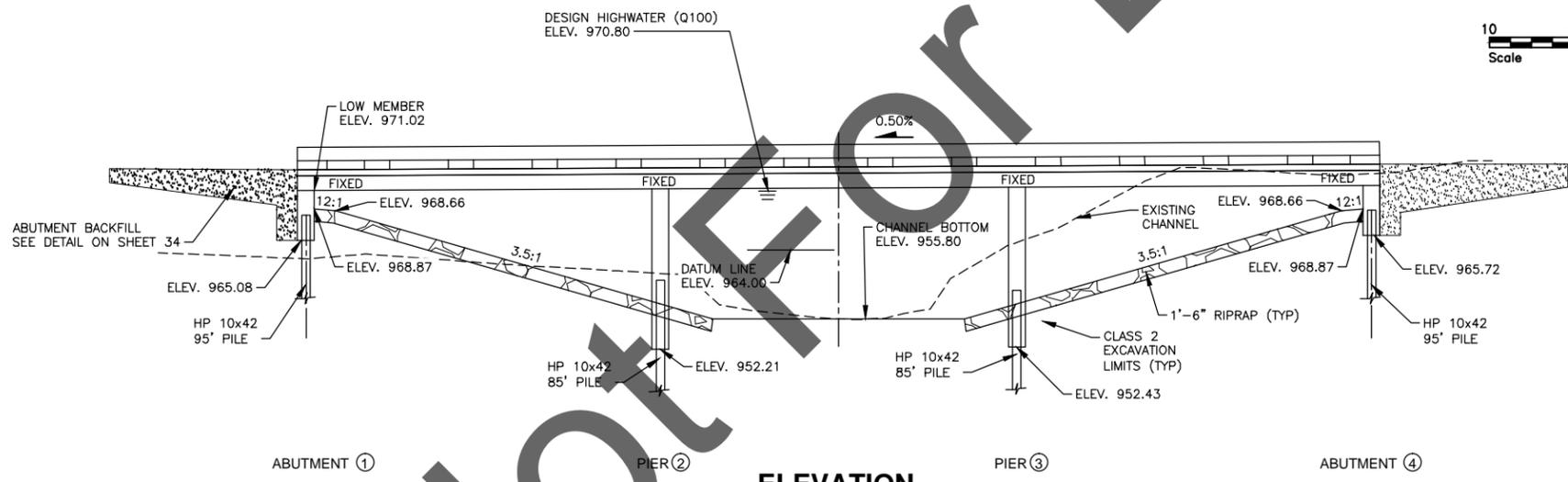
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 Registration Number
 PE- 4883,
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 Cass County Highway Department

CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
BRIDGE PLAN AND PROFILE
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

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PLAN VIEW



ELEVATION

- NOTES:
- SEE SHEET 24 FOR PILING LOCATIONS.
 - SEE SHEET 40 FOR GUARDRAIL TRANSITION DETAILS.

HYDRAULIC DESIGN DATA		GIRDER DATA												
DRAINAGE AREA	97.5 SQ. MI.	LENGTH "L"	SPACE BETWEEN BEAMS	THICKNESS OF SLAB BETW. BMS	THICKNESS OF SLAB ON TOP BMS	BOX BEAM DEPTH	LIVE LOAD	FINAL STRESSING FORCE AT MIDSPAN						
50 YR DESIGN DISCHARGE	3221 CFS							A	KIPS	A	KIPS	A	KIPS	WEIGHT TONS
STREAM GRADIENT	0.08%	41'-6"	8'-3"	8"	9"	21"	HL-93	2.00	384.7	2.25	392.3	2.50	400.3	10.6
50 YR DESIGN STAGE	969.8	DETENSING STRENGTH 4,000 PSI					ACCEPTANCE STRENGTH 5,000 PSI							
50 YR STREAM VELOCITY AT BRIDGE	3.1 FPS	BENCH MARKS												
100 YR DESIGN DISCHARGE	4040 CFS	NO.	DESCRIPTION	LOC.	ELEV.									
100 YR FLOOD STAGE	970.8	1	E INV OF 18" CMP	132LF SE OF PROPOSED BRIDGE	970.45									
100 YR VELOCITY AT BRIDGE	3.5 FPS													

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 Cass County Highway Department

CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
BRIDGE LAYOUT
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	18	75

BORING LOG NO. B-1												Page 1 of 2		
PROJECT: Proposed Bridge and Road Realignment						CLIENT: Cass County Highway Department West Fargo, North Dakota								
SITE: CB 1301 Cass County, North Dakota														
DEPTH (ft.)	ELEVATION (ft.)	GRAPHIC LOG	LOCATION	DEPTH (ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (pcf)	UNCONSOLIDATED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0.5	974.5		See Exhibit A-2 Latitude: 47.00785° Longitude: -97.25805°											
0.5 - 4.0	974.5 - 970.5		TOPSOIL, very dark brownish gray											
4.0 - 5.0	970.5 - 969.5		SANDY LEAN CLAY (CL), trace gravel, grayish brown, stiff											
5.0 - 12.0	969.5 - 962.5		SILT (ML), light brown, medium dense											
5.0 - 15.0	969.5 - 967.5		LEAN CLAY WITH SAND (CL), dark grayish brown, stiff, may include cobbles and boulders											
15.0 - 22.0	967.5 - 962.5		LEAN CLAY WITH SAND (CL), dark grayish brown, stiff, may include cobbles and boulders											
12.0 - 15.0	962.5 - 961.5		SANDY LEAN CLAY (CL), trace gravel, dark grayish brown, very stiff, may include cobbles and boulders											
15.0 - 22.0	961.5 - 951.5		SANDY LEAN CLAY (CL), trace gravel, dark grayish brown, very stiff, may include cobbles and boulders											
22.0 - 23.0	951.5 - 951.5		LEAN CLAY WITH SAND (CL), dark gray, very stiff, may include cobbles and boulders											
23.0 - 32.0	951.5 - 942.5		LEAN CLAY WITH SAND (CL), dark gray, very stiff, may include cobbles and boulders											
32.0 - 35.0	942.5 - 942.5		SANDY LEAN CLAY (CL), trace gravel, dark gray, hard to very stiff, may include cobbles and boulders											
35.0 - 35.0	942.5 - 942.5		SANDY LEAN CLAY (CL), trace gravel, dark gray, hard to very stiff, may include cobbles and boulders											

BORING LOG NO. B-1												Page 2 of 2		
PROJECT: Proposed Bridge and Road Realignment						CLIENT: Cass County Highway Department West Fargo, North Dakota								
SITE: CB 1301 Cass County, North Dakota														
DEPTH (ft.)	ELEVATION (ft.)	GRAPHIC LOG	LOCATION	DEPTH (ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (pcf)	UNCONSOLIDATED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
40.0 - 45.0	923.5 - 923.5		See Exhibit A-2 Latitude: 47.00785° Longitude: -97.25805°											
40.0 - 45.0	923.5 - 923.5		SANDY LEAN CLAY (CL), trace gravel, dark gray, hard to very stiff, may include cobbles and boulders (continued)											
45.0 - 51.0	923.5 - 923.5		SANDY LEAN CLAY (CL), trace gravel, dark gray, hard to very stiff, may include cobbles and boulders (continued)											
45.0 - 51.0	923.5 - 923.5		LEAN CLAY WITH SAND (CL), dark grayish brown, stiff, may include cobbles and boulders											
51.0 - 51.0	923.5 - 923.5		Boring Terminated at 51 Feet											

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT: GEO SMART LOG-NO WELL: M1135065.GPJ TERRACON2012.GDT 1/31/14

Advancement Method: Hollow Stem Auger 0-49.5'

Abandonment Method: Borings backfilled with soil cuttings upon completion.

Notes: See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.

Water Level Observations: Not measurable before HSA removal. Dry cave-in at 17' (0 hrs).

Midwest Testing LABORATORY INC. 4102 7th Ave, North Fargo, North Dakota

Boring Started: 11/12/2013 Boring Completed: 11/12/2013
Drill Rig: Mobile B-53 Driller: DW
Project No.: M1135065 Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT: GEO SMART LOG-NO WELL: M1135065.GPJ TERRACON2012.GDT 1/31/14

Advancement Method: Hollow Stem Auger 0-49.5'

Abandonment Method: Borings backfilled with soil cuttings upon completion.

Notes: See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.

Water Level Observations: Not measurable before HSA removal. Dry cave-in at 17' (0 hrs).

Midwest Testing LABORATORY INC. 4102 7th Ave, North Fargo, North Dakota

Boring Started: 11/12/2013 Boring Completed: 11/12/2013
Drill Rig: Mobile B-53 Driller: DW
Project No.: M1135065 Exhibit: A-5

NOTE:
SEE SHEET 2 FOR BORING LOCATIONS

CASS COUNTY
HIGHWAY DEPARTMENT
RUSH RIVER
BRIDGE NO. 09-121-17.0
SOIL BORING 1
PROJECT NO. CB1301
2 MILES WEST OF AMENIA
CASS COUNTY

BORING LOG NO. B-2												Page 1 of 3	
PROJECT: Proposed Bridge and Road Realignment						CLIENT: Cass County Highway Department West Fargo, North Dakota							
SITE: CB 1301 Cass County, North Dakota													
DEPTH	LOCATION	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (pcf)	UNCONFINED COMPRESSIVE STRENGTH (pcf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES		
DEPTH	LOCATION	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (pcf)	UNCONFINED COMPRESSIVE STRENGTH (pcf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES		
2.0	FILL - CLAY FILL WITH TOPSOIL, black			9	2-2-3 N=5								
4.0	LEAN CLAY (CL), light grayish brown, stiff			8	4-3-6 N=9								
5.0	SILT (ML), reddish brown to light reddish brown, medium dense to loose			18	4-5-5 N=10								
12.5	SILTY CLAY WITH SAND (CL-ML), reddish brown, stiff, may include cobbles and boulders			18	3-3-3 N=6			34					
21.0	SANDY LEAN CLAY (CL), trace gravel, dark gray, very stiff to stiff, may include cobbles and boulders			16	7-6-7 N=13	5000 (HP)	2250	30	93	29-22-7	74		
35.0				14	3-4-5 N=9	500 (HP)	970	28			59		

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Mobile Downhole

Advancement Method: Hollow Stem Auger 0-114.5'	See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any).	Notes: 17.5' Shelby tube crushed, no recoverable sample. 19.5' Shelby tube crushed, no recoverable sample.
Abandonment Method: Borings backfilled with soil cuttings. Reversed auger upon completion.	See Appendix C for explanation of symbols and abbreviations.	
WATER LEVEL OBSERVATIONS 14.1' initially observed before HSA removal.	 4102 7th Ave. North Fargo, North Dakota	Boring Started: 11/20/2013 Boring Completed: 11/20/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135065 Exhibit: A-6

BORING LOG NO. B-2												Page 2 of 3	
PROJECT: Proposed Bridge and Road Realignment						CLIENT: Cass County Highway Department West Fargo, North Dakota							
SITE: CB 1301 Cass County, North Dakota													
DEPTH	LOCATION	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (pcf)	UNCONFINED COMPRESSIVE STRENGTH (pcf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES		
DEPTH	LOCATION	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (pcf)	UNCONFINED COMPRESSIVE STRENGTH (pcf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES		
40.0	SANDY LEAN CLAY (CL), trace gravel, dark gray, very stiff to stiff, may include cobbles and boulders (continued)			16	3-4-5 N=9	1500 (HP)		30					
45.0				18	4-4-7 N=11								
50.0				18	4-5-6 N=11			26					
55.0				18	4-6-7 N=13								
60.0				16	5-6-9 N=15								
65.0				18	5-7-8 N=15								
68.0	ELASTIC SILT (MH), dark gray, medium dense												
71.0	SANDY LEAN CLAY (CL), trace gravel, dark gray, very stiff, may include cobbles and boulders			18	5-6-7 N=13	2000 (HP)	990	38	79	56-31-25			
75.0				18	10-10-15 N=25								

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Mobile Downhole

Advancement Method: Hollow Stem Auger 0-114.5'	See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any).	Notes: Borings backfilled with soil cuttings. Reversed auger upon completion.
Abandonment Method: Borings backfilled with soil cuttings. Reversed auger upon completion.	See Appendix C for explanation of symbols and abbreviations.	
WATER LEVEL OBSERVATIONS 14.1' initially observed before HSA removal.	 4102 7th Ave. North Fargo, North Dakota	Boring Started: 11/20/2013 Boring Completed: 11/20/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135065 Exhibit: A-7

BORING LOG NO. B-2												Page 3 of 3	
PROJECT: Proposed Bridge and Road Realignment						CLIENT: Cass County Highway Department West Fargo, North Dakota							
SITE: CB 1301 Cass County, North Dakota													
DEPTH	LOCATION	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (pcf)	UNCONFINED COMPRESSIVE STRENGTH (pcf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES		
DEPTH	LOCATION	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (pcf)	UNCONFINED COMPRESSIVE STRENGTH (pcf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES		
80.0	SILT (ML), dark gray, dense			18	11-15-15 N=30			26					
85.0	SANDY LEAN CLAY (CL), trace gravel, dark gray, very stiff to hard, may include cobbles and boulders			18	4-6-6 N=12			34					
90.0				18	6-12-15 N=27			13					
95.0				16	14-25-40 N=65								
100.0				16	24-40-55 N=95	12,000 (HP)		17					
105.0				12	100/12"								
110.0				12	100/12"	12,000 (HP)		19					
115.0				12	100/12"								

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Mobile Downhole

Boring Terminated at 116 Feet

Advancement Method: Hollow Stem Auger 0-114.5'	See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any).	Notes: Borings backfilled with soil cuttings. Reversed auger upon completion.
Abandonment Method: Borings backfilled with soil cuttings. Reversed auger upon completion.	See Appendix C for explanation of symbols and abbreviations.	
WATER LEVEL OBSERVATIONS 14.1' initially observed before HSA removal.	 4102 7th Ave. North Fargo, North Dakota	Boring Started: 11/20/2013 Boring Completed: 11/20/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135065 Exhibit: A-8

NOTE:
SEE SHEET 2 FOR BORING LOCATIONS

CASS COUNTY
HIGHWAY DEPARTMENT
RUSH RIVER
BRIDGE NO. 09-121-17.0
SOIL BORING 2

PROJECT NO. CB1301
2 MILES WEST OF AMENIA
CASS COUNTY

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NOT FOR BIDDING

BORING LOG NO. B-3												Page 1 of 3	
PROJECT: Proposed Bridge and Road Realignment						CLIENT: Cass County Highway Department West Fargo, North Dakota							
SITE: CB 1301 Cass County, North Dakota													
DEPTH (FT.)	WATER LEVEL OBSERVATIONS	SAMPLE RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	LL-PL-PI	PERCENT FINES	ATTENBERG LIMITS			
0.0		15	2-3-3 N=6										
1.0		15	3-2-4 N=6			16							
5.0		15	4-4-4 N=8			13							
6.0		15	10-4-3 N=7			13							
10.0		15	2-3-5 N=8	2000 (HP)	2390	20	108						
15.0		15	4-4-8 N=12										
20.0		18	2-3-4 N=7	1500 (HP)		21							
25.0		18	3-3-4 N=7	500 (HP)		23							
30.0		22											
35.0		18	4-5-7 N=12										

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Mobile Downhole

Advancement Method: Hollow Stem Auger 0-99.5'	See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any).	Notes:
Abandonment Method: Borings backfilled with soil cuttings. Reversed auger upon completion.	See Appendix C for explanation of symbols and abbreviations.	
WATER LEVEL OBSERVATIONS 14.6' initially observed before HSA removal.		Boring Started: 11/13/2013 Boring Completed: 11/13/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135065 Exhibit: A-9

BORING LOG NO. B-3												Page 2 of 3	
PROJECT: Proposed Bridge and Road Realignment						CLIENT: Cass County Highway Department West Fargo, North Dakota							
SITE: CB 1301 Cass County, North Dakota													
DEPTH (FT.)	WATER LEVEL OBSERVATIONS	SAMPLE RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	LL-PL-PI	PERCENT FINES	ATTENBERG LIMITS			
40.0		18	4-6-7 N=13										
42.0		18	3-4-5 N=9	2500 (HP)		26							
45.0		18	8-9-8 N=17										
50.0		15	6-10-11 N=21	2000 (HP)		34		47-29-18					
53.0		16	5-7-10 N=17	4000 (HP)	2990	30	93						
55.0		15	6-10-11 N=21										
60.0		18	13-18-22 N=40										
65.0		18	13-14-15 N=29										
67.0		18											

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Mobile Downhole

Advancement Method: Hollow Stem Auger 0-99.5'	See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any).	Notes:
Abandonment Method: Borings backfilled with soil cuttings. Reversed auger upon completion.	See Appendix C for explanation of symbols and abbreviations.	
WATER LEVEL OBSERVATIONS 14.6' initially observed before HSA removal.		Boring Started: 11/13/2013 Boring Completed: 11/13/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135065 Exhibit: A-10

BORING LOG NO. B-3												Page 3 of 3	
PROJECT: Proposed Bridge and Road Realignment						CLIENT: Cass County Highway Department West Fargo, North Dakota							
SITE: CB 1301 Cass County, North Dakota													
DEPTH (FT.)	WATER LEVEL OBSERVATIONS	SAMPLE RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	LL-PL-PI	PERCENT FINES	ATTENBERG LIMITS			
78.0		18	4-5-5 N=10	2000 (HP)		29							
80.0		18	100/11.5"										
83.0		10	100/11.5"										
85.0		12	100/10"			23							
88.0		10	100/12"										
90.0		12	100/12"										
96.0		12	100/12"										
101.0													

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Mobile Downhole

Advancement Method: Hollow Stem Auger 0-99.5'	See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any).	Notes:
Abandonment Method: Borings backfilled with soil cuttings. Reversed auger upon completion.	See Appendix C for explanation of symbols and abbreviations.	
WATER LEVEL OBSERVATIONS 14.6' initially observed before HSA removal.		Boring Started: 11/13/2013 Boring Completed: 11/13/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135065 Exhibit: A-11

NOTE:
SEE SHEET 2 FOR BORING LOCATIONS

CASS COUNTY
HIGHWAY DEPARTMENT
RUSH RIVER
BRIDGE NO. 09-121-17.0
SOIL BORING 3

PROJECT NO. CB1301
2 MILES WEST OF AMENIA
CASS COUNTY

Z:\6000\6006\12_6006_063_CB1301\CAD\Plans\SOIL BORINGS.dwg -11x17 (3)-2/28/2014 8:06 AM (cwgner)

Not For Bidding

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	21	75

BORING LOG NO. B-4												Page 1 of 1	
PROJECT: Proposed Bridge and Road Realignment						CLIENT: Cass County Highway Department West Fargo, North Dakota							
SITE: CB 1301 Cass County, North Dakota													
DEPTH (ft.)	ELEVATION (ft.)	GRAPHIC LOG	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE (pcf)	UNCONSOLIDATED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	SHRINKAGE LIMIT (%)	LL-PL-PI	PERCENT FINES	
3.0	975.0	SANDY TOPSOIL, dark reddish gray			10	2-3-4 N=7							
4.0	975.0	SILTY SAND (SM), fine grained, reddish gray, loose			10	2-2-3 N=5			22				
5.0	975.0				12								
7.0	968.5	SILT (ML), trace sand, dark brownish gray, loose			12	2-3-2 N=5			26				
9.0	966.5	SANDY LEAN CLAY (CL), trace gravel, dark brown with gray mottled, medium stiff to very stiff, may include cobbles and boulders			15	2-3-3 N=6	2000 (HP)		23				
15.0	960.5	SANDY LEAN CLAY (CL), trace gravel, dark gray, may include cobbles and boulders			15	6-9-9 N=18							
16.5	959.0	Boring Terminated at 16.5 Feet			24		5000 (HP)		18				

BORING LOG NO. B-5												Page 1 of 1	
PROJECT: Proposed Bridge and Road Realignment						CLIENT: Cass County Highway Department West Fargo, North Dakota							
SITE: CB 1301 Cass County, North Dakota													
DEPTH (ft.)	ELEVATION (ft.)	GRAPHIC LOG	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE (pcf)	UNCONSOLIDATED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	SHRINKAGE LIMIT (%)	LL-PL-PI	PERCENT FINES	
3.0	970.6	SANDY TOPSOIL, very dark gray			12	2-2-2 N=4							
4.0	970.6	SILTY SAND (SM), fine grained, grayish brown, loose to very loose			15	3-2-3 N=5			21				
5.0	970.6				15	1-2-1 N=3			18				
9.0	962.0	SANDY SILT (ML), dark grayish brown, loose, moist			24								
11.0	960.0	SANDY LEAN CLAY (CL), trace gravel, dark brown with gray mottled, stiff, may include cobbles and boulders			15	2-3-3 N=6			23				
14.0	957.0	SANDY LEAN CLAY (CL), trace gravel, dark brown with gray mottled, stiff, may include cobbles and boulders			15	3-4-6 N=10	3000 (HP)		22				
16.0	955.0	Boring Terminated at 16 Feet			15	4-5-6 N=11							

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL M1135085.GPJ TERRACON2012.GDT 1/31/14

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL M1135085.GPJ TERRACON2012.GDT 1/31/14

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Mobile Downhole

Advancement Method: Hollow Stem Auger 0-14.5'

Abandonment Method: Borings backfilled with soil cuttings upon completion.

Notes: See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS: Not measurable before HSA removal. Dry cave-in at 11.3' (0 hrs).

Midwest Testing LABORATORY INC. 4102 7th Ave, North Fargo, North Dakota

Boring Started: 11/12/2013 Boring Completed: 11/12/2013
Drill Rig: Mobile B-53 Driller: DW
Project No.: M1135085 Exhibit: A-12

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Mobile Downhole

Advancement Method: Hollow Stem Auger 0-14.5'

Abandonment Method: Borings backfilled with soil cuttings. Reversed auger upon completion.

Notes: See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS: Not measurable before HSA removal.

Midwest Testing LABORATORY INC. 4102 7th Ave, North Fargo, North Dakota

Boring Started: 11/13/2013 Boring Completed: 11/13/2013
Drill Rig: Mobile B-53 Driller: DW
Project No.: M1135085 Exhibit: A-13

NOTE:
SEE SHEET 2 FOR BORING LOCATIONS

CASS COUNTY
HIGHWAY DEPARTMENT
RUSH RIVER
BRIDGE NO. 09-121-17.0
SOIL BORING 4 & 5

PROJECT NO. CB1301
2 MILES WEST OF AMENIA
CASS COUNTY

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	22	75

BORING LOG NO. B-6												Page 1 of 1	
PROJECT: Proposed Bridge and Road Realignment						CLIENT: Cass County Highway Department West Fargo, North Dakota							
SITE: CB 1301 Cass County, North Dakota													
DEPTH (ft.)	ELEVATION (ft.)	SOIL DESCRIPTION	WATER LEVEL OBSERVATIONS	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORQUE/UNIT WEIGHT (pcf)	UNCONSOLIDATED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS (LL-PL-PI)	PERCENT FINES		
0.5	969.6+/-	SANDY TOPSOIL, black		15	2-3-3 N=6								
1.0		SILTY SAND (SM), dark reddish brown, loose		15	2-3-3 N=6			15					
5.0	985+/-	LEAN CLAY (CL), dark brownish gray, soft		8		4000 (HP)		20					
9.0	961+/-	SILTY SAND (SM), medium grained, very dark brown, loose, wet		18	1-1-1 N=2			29					
11.0	959+/-	SILTY SAND WITH GRAVEL (SM), medium grained, very dark brown, loose, wet		15	2-3-4 N=7			11					
13.0	957+/-	SANDY LEAN CLAY (CL), trace gravel, dark gray, stiff, may include cobbles and boulders		15	2-3-4 N=7								
16.0	954+/-	Boring Terminated at 16 Feet		15	11-6-7 N=13	4500 (HP)		21					

BORING LOG NO. B-7												Page 1 of 1	
PROJECT: Proposed Bridge and Road Realignment						CLIENT: Cass County Highway Department West Fargo, North Dakota							
SITE: CB 1301 Cass County, North Dakota													
DEPTH (ft.)	ELEVATION (ft.)	SOIL DESCRIPTION	WATER LEVEL OBSERVATIONS	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORQUE/UNIT WEIGHT (pcf)	UNCONSOLIDATED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS (LL-PL-PI)	PERCENT FINES		
1.0	972+/-	SANDY TOPSOIL, very dark reddish gray		12	2-3-2 N=5								
1.8		SILTY SAND (SM), fine grained, reddish gray, loose to medium dense, moist		18	2-3-2 N=5			17					
5.0				18	2-3-4 N=7			14					
9.0	964+/-	SILTY SAND (SM), fine to medium grained, dark reddish brown, medium dense, moist		18	8-10-8 N=18								
12.0	961+/-	SILTY SAND (SM), fine grained, reddish brown, loose, wet		9	8-6-5 N=11								
14.0	959+/-	SILTY SAND (SM), fine grained, reddish brown, loose, wet		16	3-4-3 N=7			36					
16.0	957+/-	SILTY SAND (SM), fine grained, dark brownish gray, loose, organic material in sample, wet		16	2-3-3 N=6								

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL M1135065.GPJ TERRACON2012.GDT 1/31/14

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL M1135065.GPJ TERRACON2012.GDT 1/31/14

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Mobile Downhole

Advancement Method: Hollow Stem Auger 0-14.5'

Abandonment Method: Boring backfilled with soil cuttings. Reversed auger upon completion.

Notes: See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS: Not measurable before HSA removal.

Midwest Testing LABORATORY INC. 4102 7th Ave, North Fargo, North Dakota

Boring Started: 11/12/2013 Boring Completed: 11/12/2013
Drill Rig: Mobile B-53 Driller: DW
Project No.: M1135065 Exhibit: A-14

Stratification lines are approximate. In-situ, the transition may be gradual. Hammer Type: Mobile Downhole

Advancement Method: Hollow Stem Auger

Abandonment Method: Boring backfilled with soil cuttings. Reversed auger upon completion.

Notes: See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS: Not measurable before HSA removal.

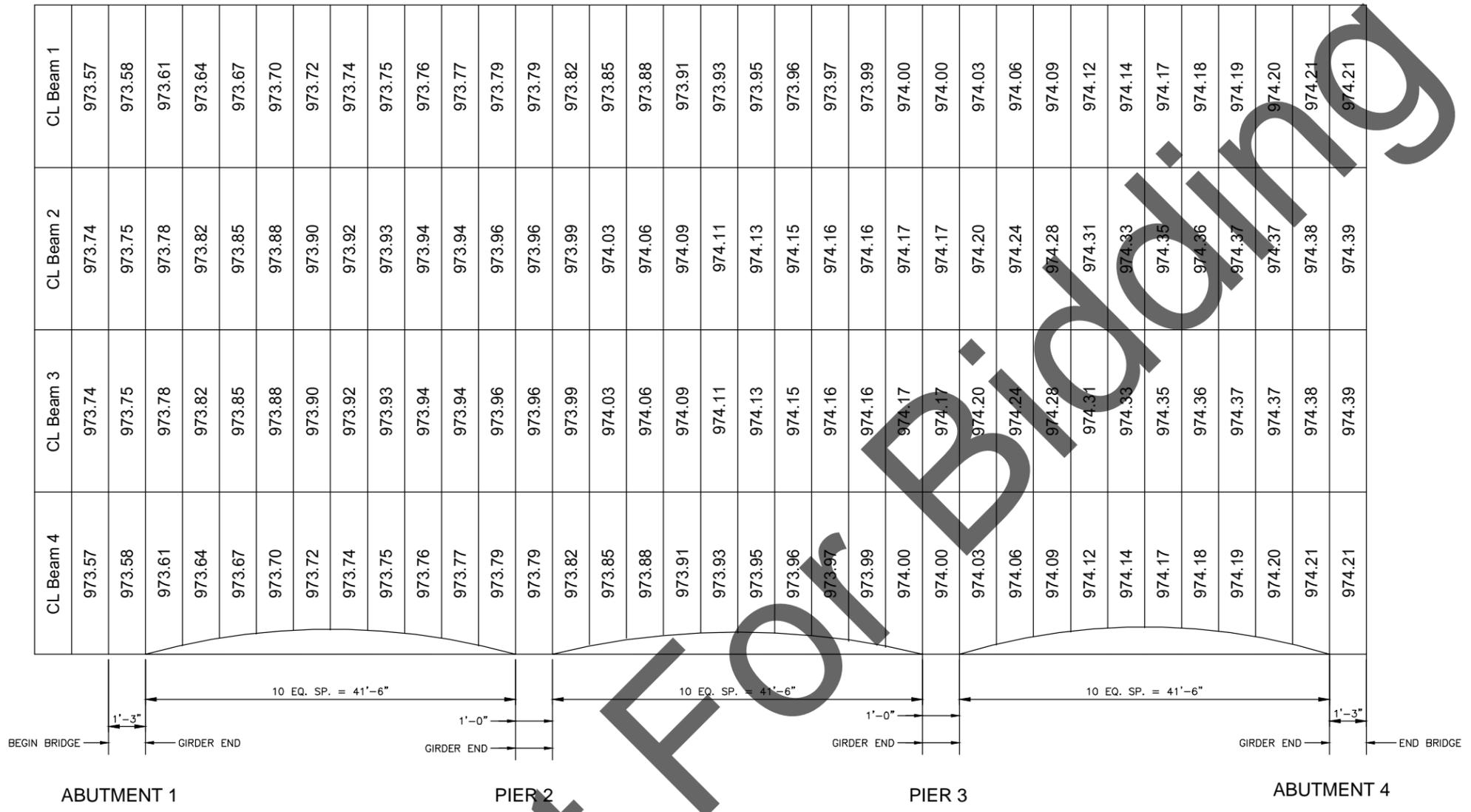
Midwest Testing LABORATORY INC. 4102 7th Ave, North Fargo, North Dakota

Boring Started: 11/20/2013 Boring Completed: 11/20/2013
Drill Rig: Mobile B-53 Driller: DW
Project No.: M1135065 Exhibit: A-15

NOTE:
SEE SHEET 2 FOR BORING LOCATIONS

CASS COUNTY
HIGHWAY DEPARTMENT
RUSH RIVER
BRIDGE NO. 09-121-17.0
SOIL BORING 6 & 7

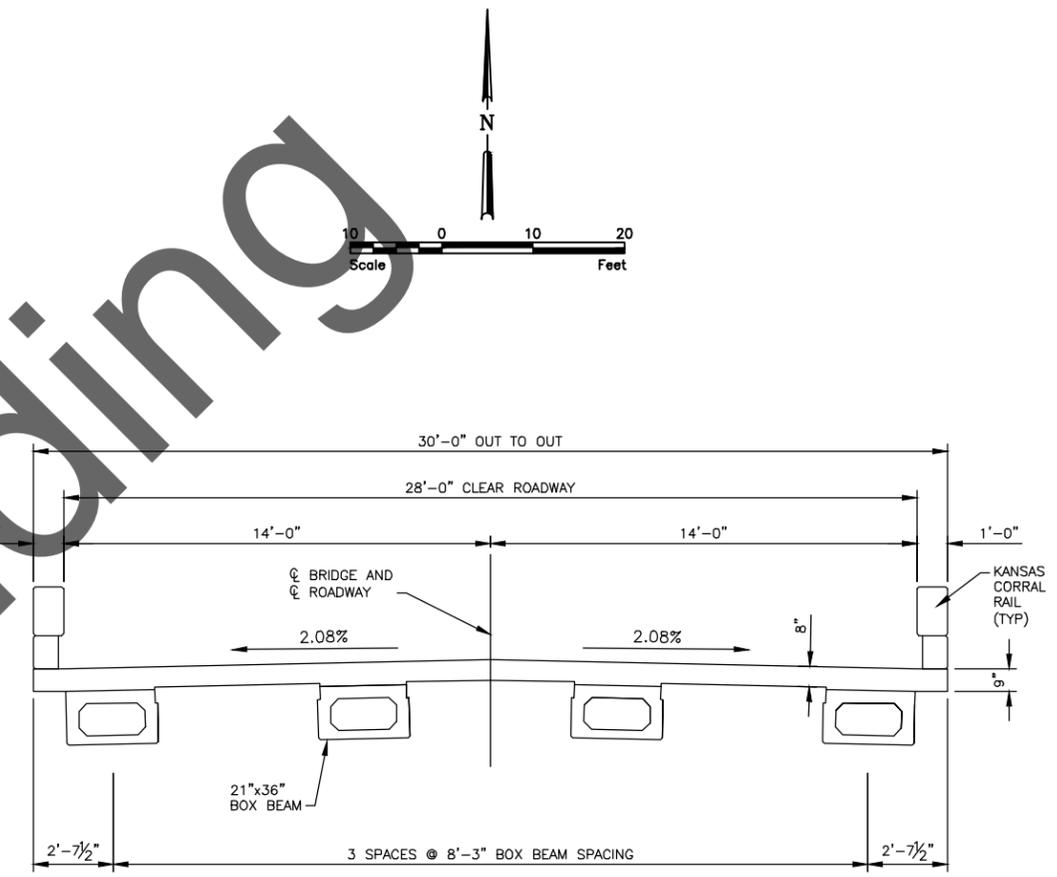
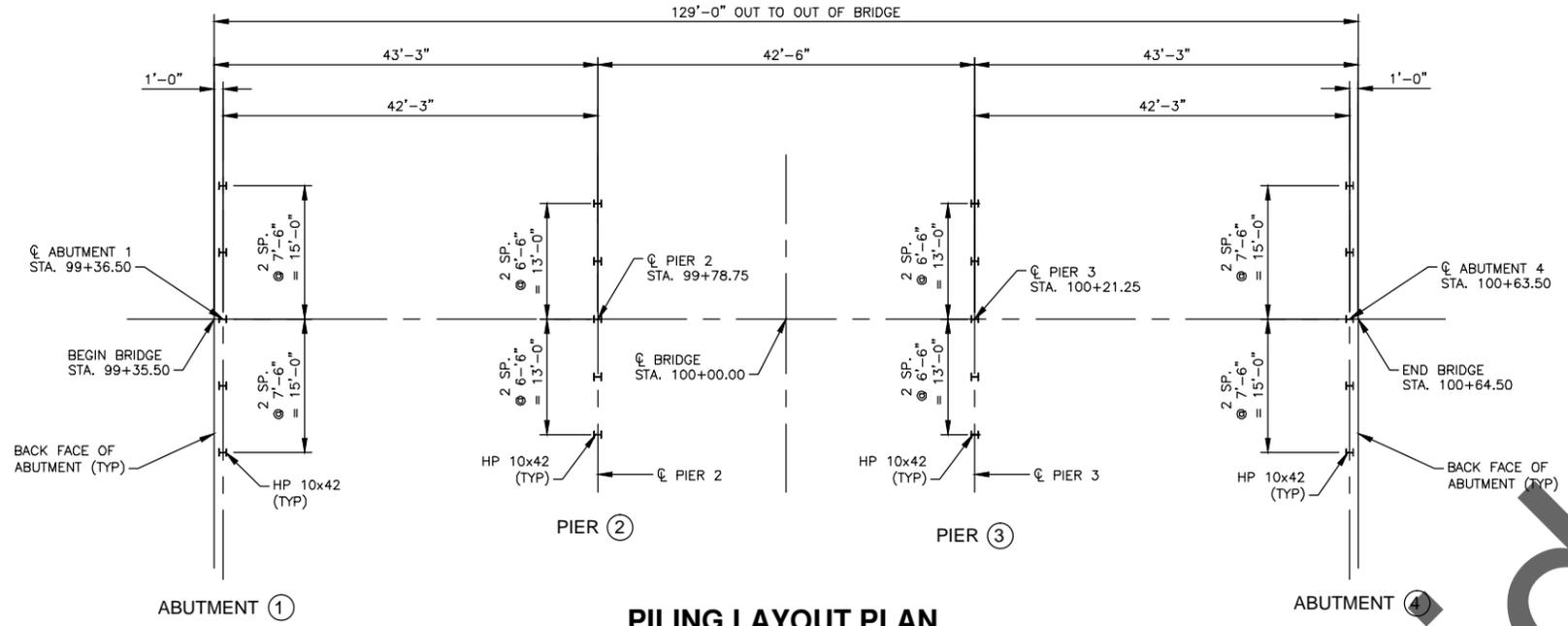
PROJECT NO. CB1301
2 MILES WEST OF AMENIA
CASS COUNTY



SCREED ELEVATIONS
NOT TO SCALE

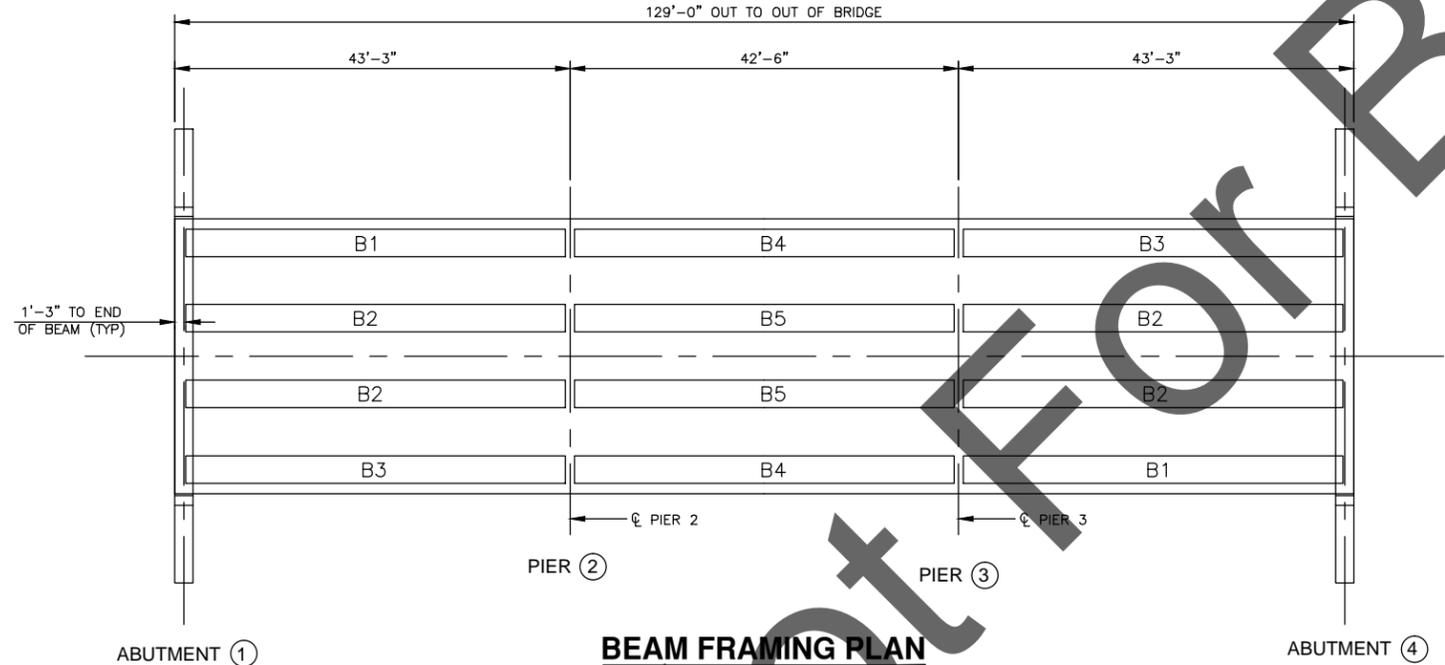
- NOTES:
- ELEVATIONS ARE TO TOP OF FINISHED ROADWAY.
 - WEIGHT OF SCREED NOT INCLUDED IN CALCULATION OF DEFLECTIONS.
 - BEAM 1 IS NORTH EXTERIOR BEAM.

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- NOTES:
- FOR DOUBLE OR SINGLE ACTING DIESEL HAMMERS, THE SAFE BEARING SHALL BE DETERMINED BY THE FOLLOWING FORMULA:

$$P = \frac{4.5E}{S + 0.2} \times \frac{W + 0.2M}{W + M}$$
 - SEE STANDARD DRAWING D-622-1 FOR PILE SPLICE DETAILS.
 - PILES SHALL BE DRIVEN TO THE FOLLOWING LOADING TO ACCOUNT FOR ADDITIONAL LOADING DUE TO DOWNDRAG
 HP10x42 ~ 105 TONS



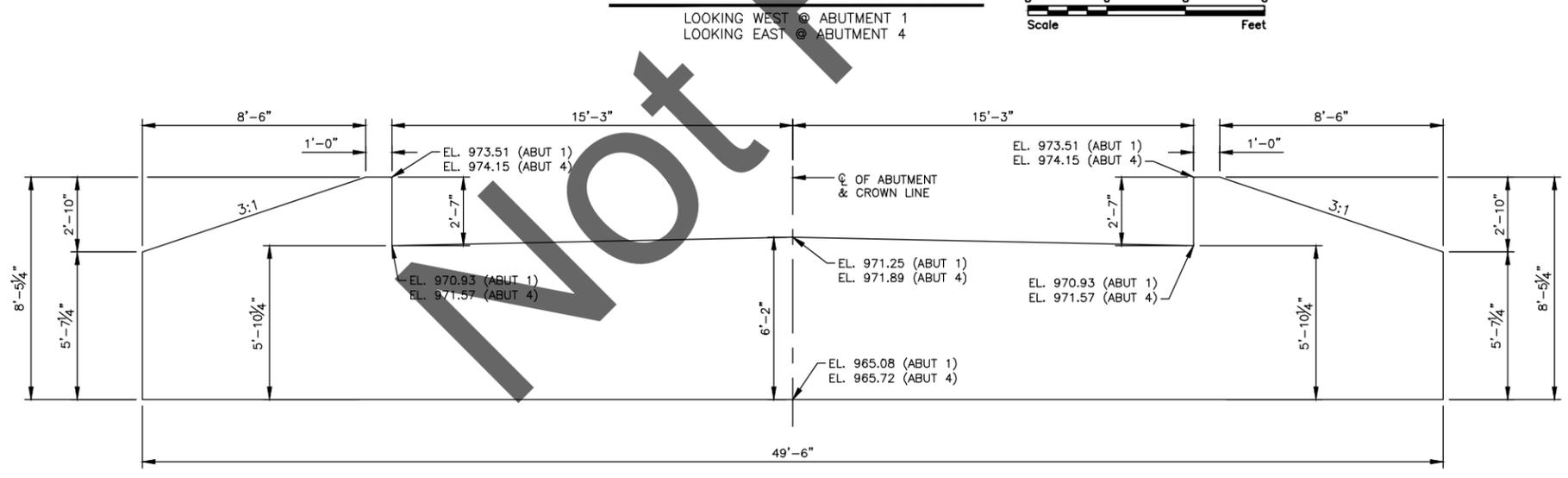
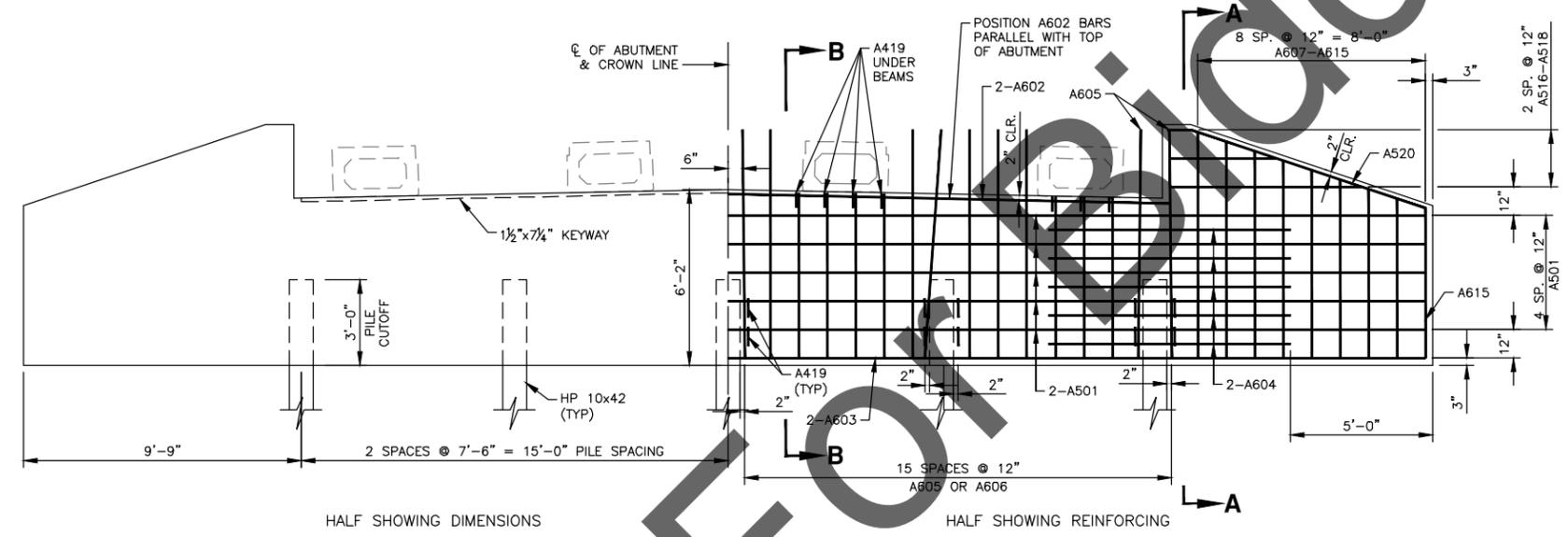
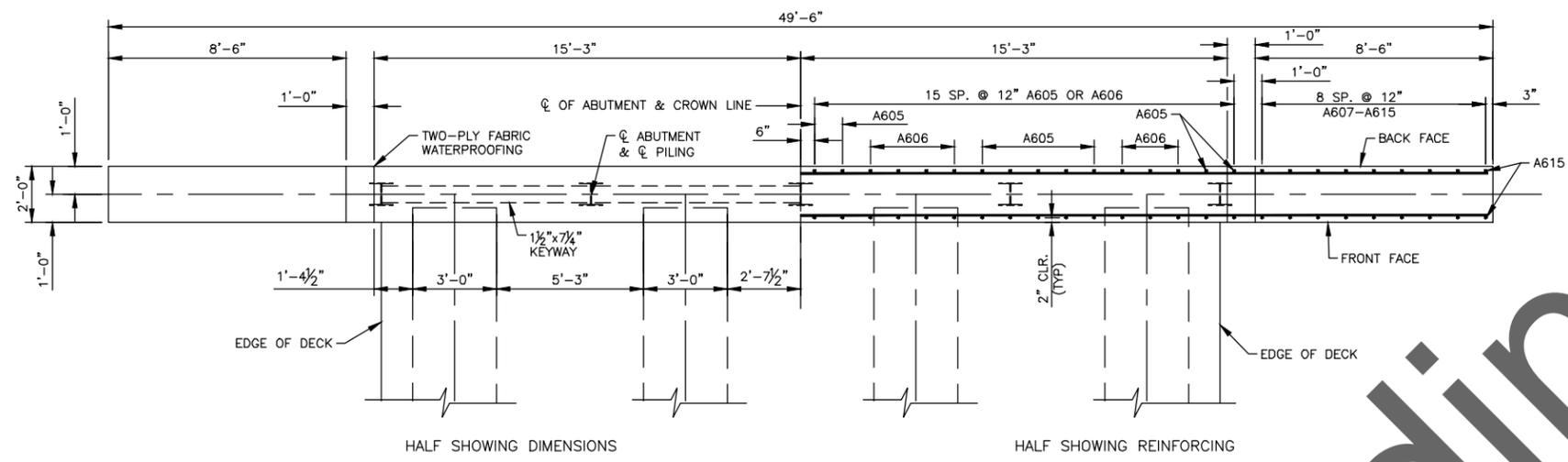
BEARING SEAT ELEVATIONS				
GIRDER HT. = 21"	POSI-RISER = 1 5/8"	DECK = 8"		
	FILLER = 3/8"	TOTAL = 2.58'		
BEAM LOCATION	NORTH FACIA	NORTH INTERIOR	SOUTH INTERIOR	SOUTH FACIA
ABUTMENT 1	970.99	971.17	971.17	970.99
PIER 2	971.21	971.38	971.38	971.21
PIER 3	971.42	971.59	971.59	971.42
ABUTMENT 4	971.63	971.80	971.80	971.63

PILE LOADING (TONS)			
LOCATION	DEAD LOAD	LIVE LOAD	DESIGN LOAD
ABUTMENT 1	31.1	22.7	53.8
PIER 2	44.4	34.5	78.9
PIER 3	44.4	34.5	78.9
ABUTMENT 4	31.1	22.7	53.8

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CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
**BEAM FRAMING AND
 PILING LAYOUT**
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

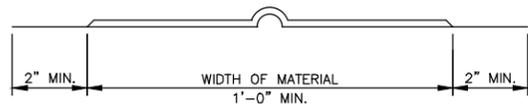
Z:\6000\6006\12_6006_063_CB1301\CAD\Plans\PILING LAYOUT.dwg -PILING AND BEAM FRAMING -2/28/2014 8:06 AM (cwagner)



QUANTITIES & PROPERTIES ABUTMENT 1 & 4 (PER ABUTMENT)	
CLASS AE-3 CONCRETE	23.7 C.Y.
CONCRETE STRENGTH	3,000 PSI
REINFORCING STEEL	2,353 LBS
REINFORCEMENT STRENGTH	60,000 PSI
PILING (SEE LAYOUT - SHEET 24)	

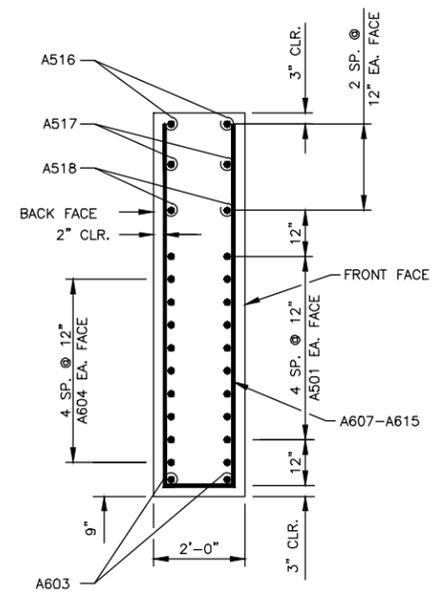
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CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
**ABUTMENT 1 & 4 DETAILS
 AND REINFORCEMENT**
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

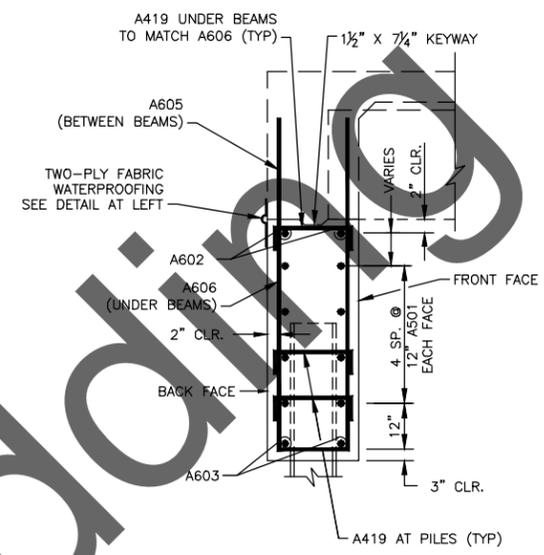


NOTE: ALL MATERIAL AND WORK SHALL BE INCLUDED IN THE BID ITEM OF CLASS AE-3 CONCRETE.

TWO-PLY FABRIC WATERPROOFING DETAIL
NOT TO SCALE



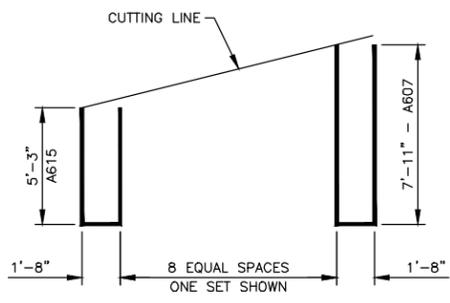
SECTION A-A
NOT TO SCALE



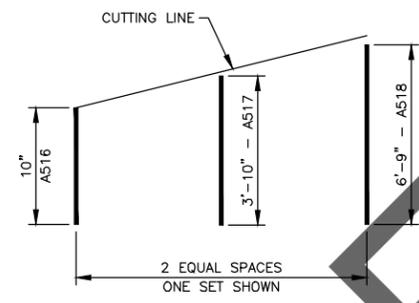
SECTION B-B
NOT TO SCALE

BILL OF REINFORCEMENT (PER ABUTMENT)				
MARK	NO.	SIZE	LENGTH	SHAPE
A501	10	5	49' - 2"	STRT.
A602	2	6	31' - 1"	STRT.
A603	2	6	49' - 2"	STRT.
A604	20	6	8' - 6"	STRT.
A605	18	6	17' - 8"	BENT
A606	14	6	15' - 1"	BENT
A607-A615	2 SETS	6	133' - 6"	BENT
A516-A518	4 SETS	5	11' - 5"	STRT.
A419	34	4	2' - 8"	BENT
A520	4	5	8' - 8"	STRT.

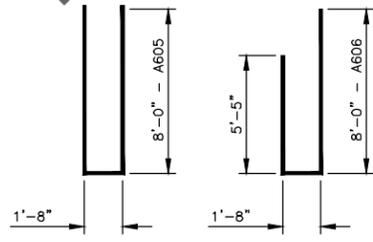
NOTE: SEE PLAN & ELEVATION VIEW ON SHEET 25 FOR BAR LOCATION & SPACING



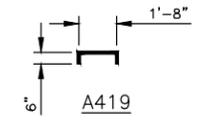
A607-A615



A516-A518



A605 & A606



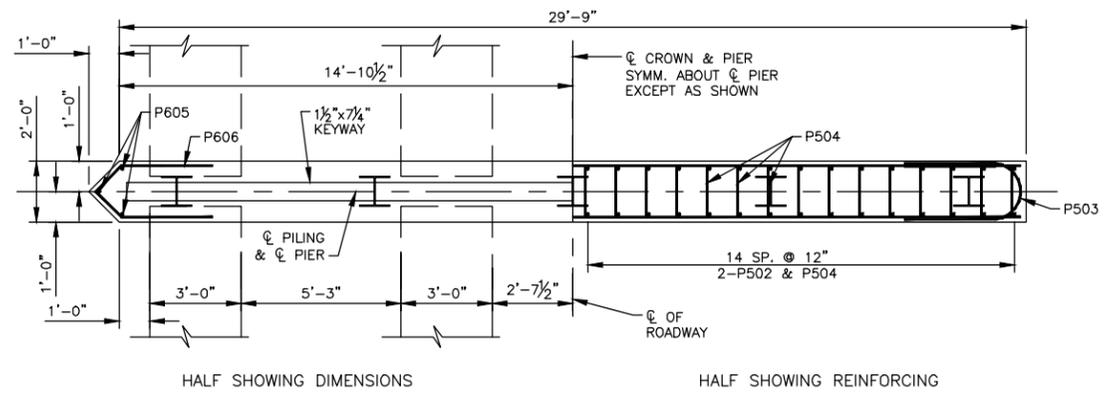
A419

BAR CUTTING DETAIL
NOT TO SCALE

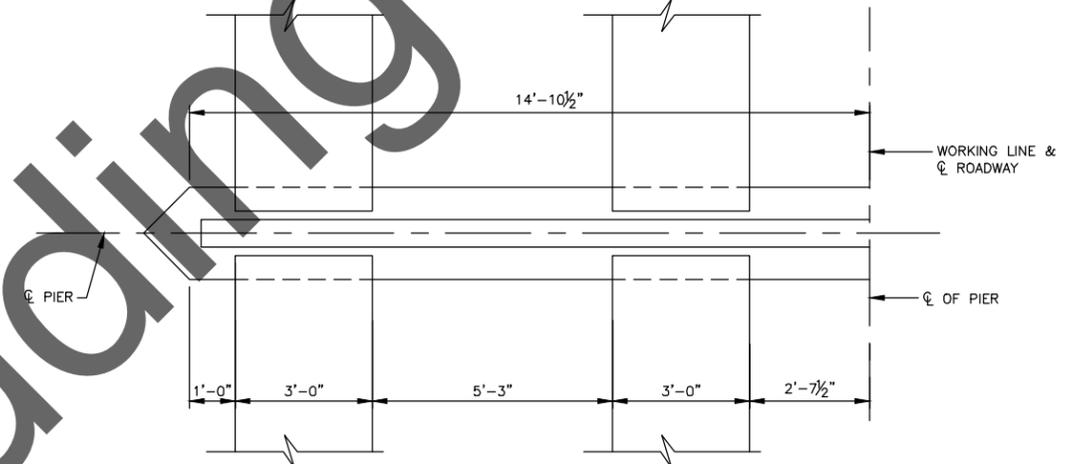
BENT BAR DETAILS
NOT TO SCALE - DIMENSIONS ARE OUT TO OUT

Not For Bidding

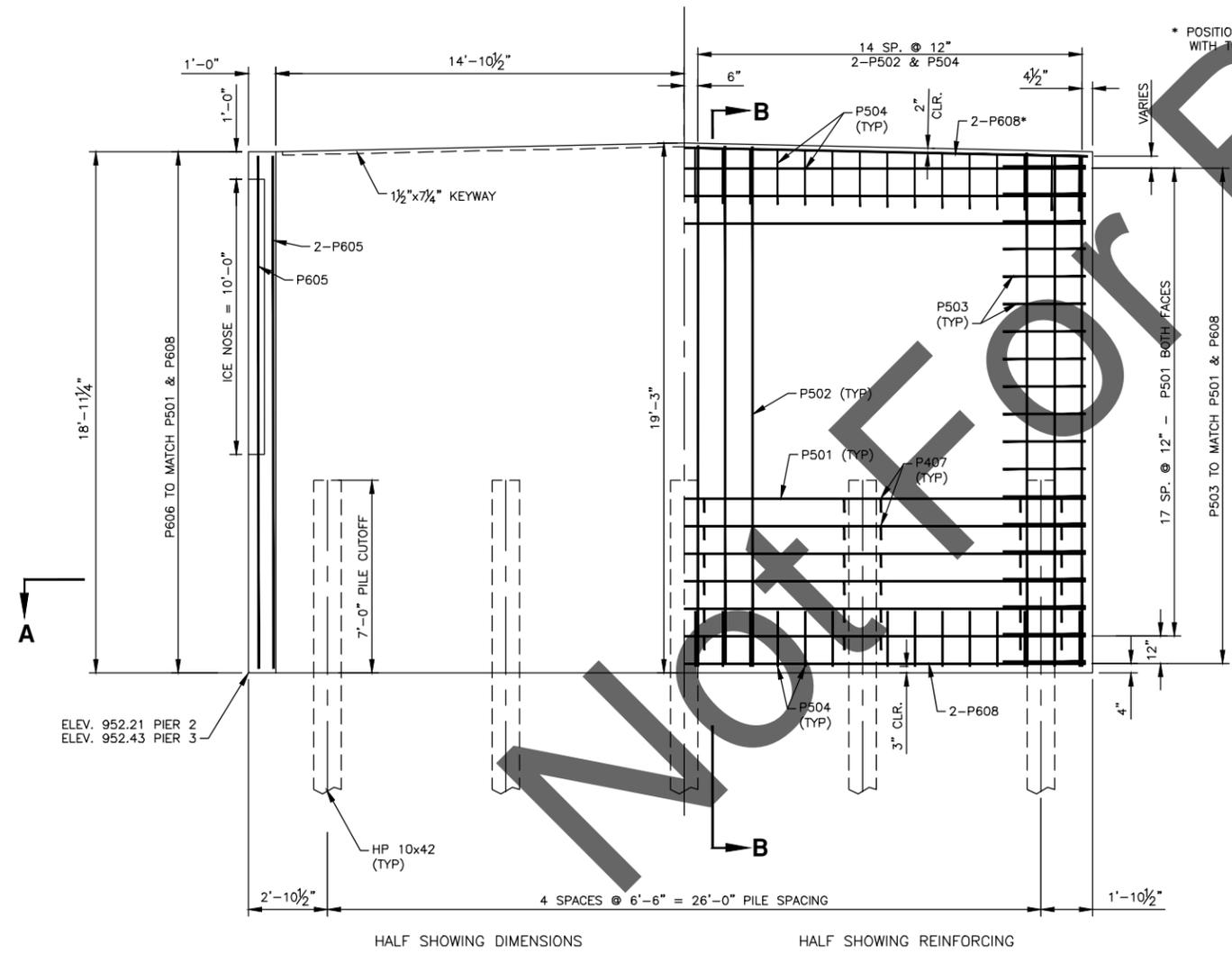
<p>This document was originally issued and sealed by Jeremy L. McLaughlin, Registration Number PE- 4883, on 02/28/14 and the original document is stored at Cass County Highway Department</p>	<p>CASS COUNTY HIGHWAY DEPARTMENT RUSH RIVER BRIDGE NO. 09-121-17.0 ABUTMENT DETAILS PROJECT NO. CB1301 2 MILES WEST OF AMENIA CASS COUNTY</p>
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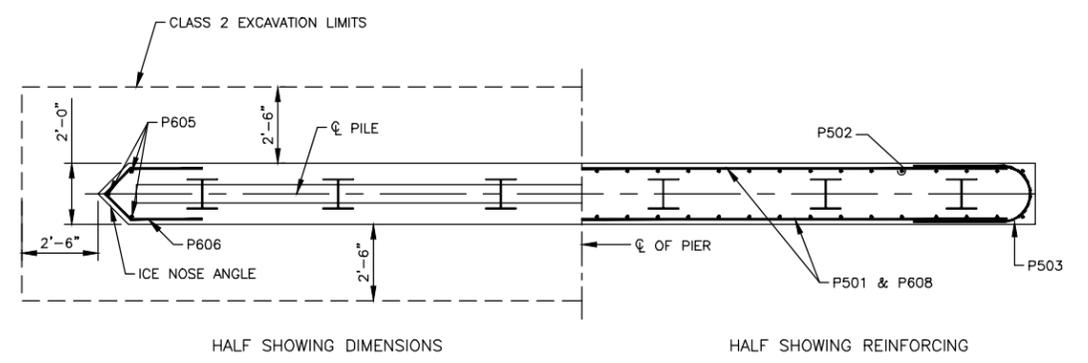
PIER PLAN VIEW



BOX BEAM DIMENSIONING DETAIL
NOT TO SCALE



PIER ELEVATION VIEW
LOOKING EAST



SECTION A-A

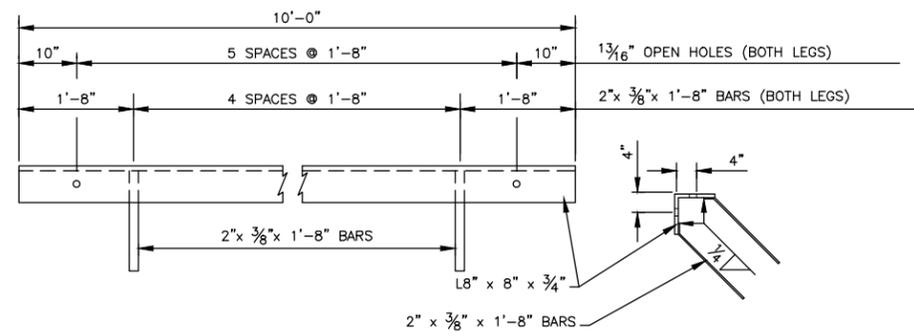


QUANTITIES & PROPERTIES (PER PIER)	
CLASS AE-3 CONCRETE	42.8 C.Y.
CONCRETE STRENGTH	3,000 PSI
REINFORCING STEEL	3,401 LBS
REINFORCEMENT STRENGTH	60,000 PSI
PILING (SEE LAYOUT - SHEET 24)	

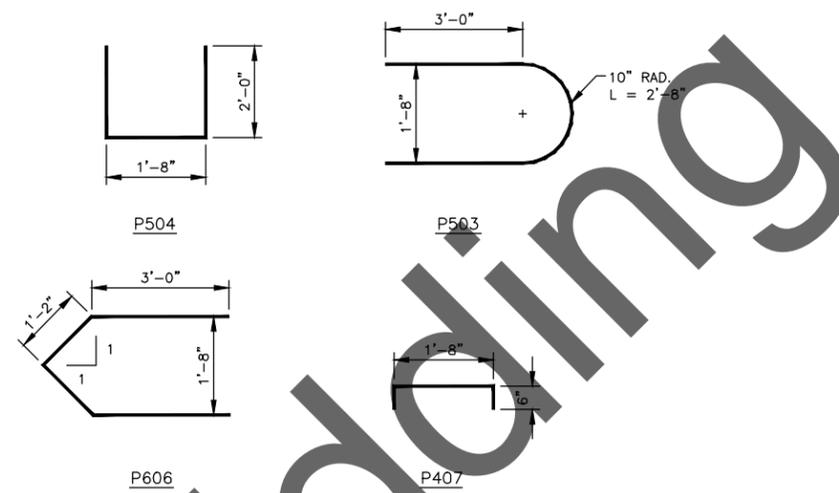
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CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
PIER 2 & 3 DETAILS AND REINFORCEMENT
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

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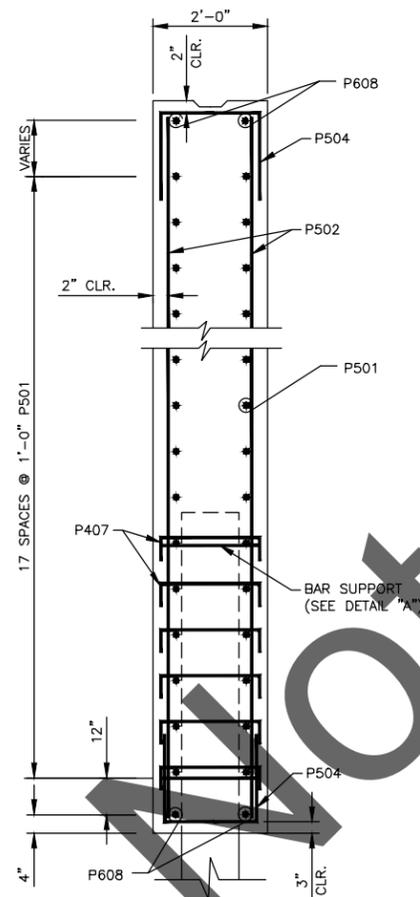


ICE NOSE DETAIL
NOT TO SCALE

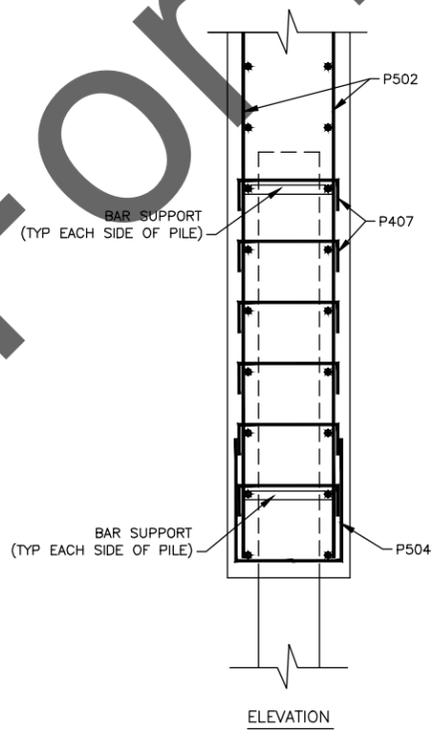


BENT BAR DETAILS
DIMENSIONS SHOWN ARE OUT TO OUT
NOT TO SCALE

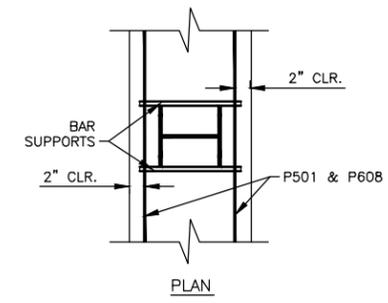
BILL OF REINFORCEMENT (PER PIER)				
MARK	NO.	SIZE	LENGTH	SHAPE
P501	36	5	29' - 7"	STRT.
P502	60	5	18' - 6"	STRT.
P503	19	5	8' - 8"	BENT
P504	60	5	5' - 8"	BENT
P605	3	6	18' - 6"	STRT.
P606	19	6	8' - 4"	BENT
P407	60	4	2' - 8"	BENT
P608	4	6	29' - 7"	STRT.



SECTION B-B
NOT TO SCALE

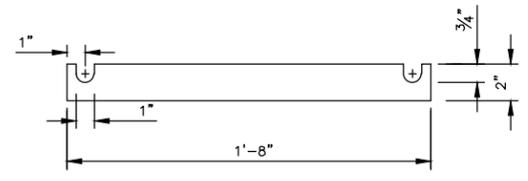


ELEVATION



PLAN

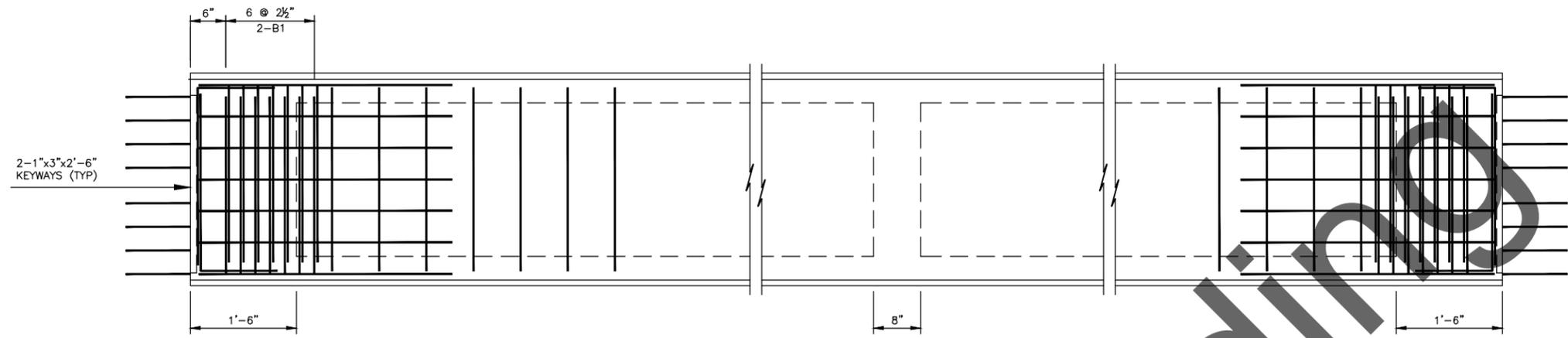
DETAIL "A"
NOT TO SCALE



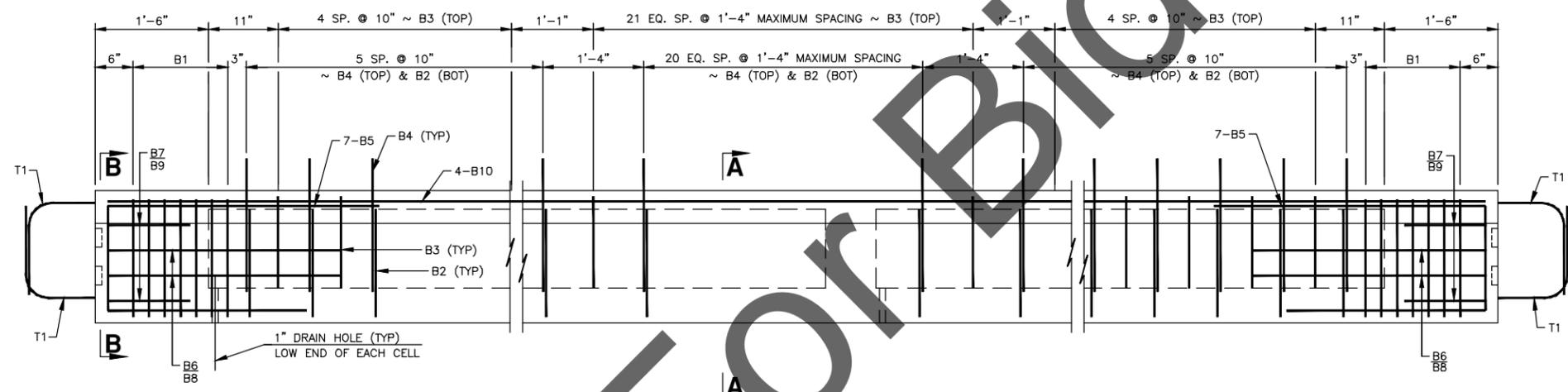
NOTE:
2" x 3/8" FLAT BAR TO BE INCIDENTAL TO REINFORCING STEEL.

BAR SUPPORT DETAIL
NOT TO SCALE

<p>This document was originally issued and sealed by Jeremy L. McLaughlin, Registration Number PE- 4883, on 02/28/14 and the original document is stored at Cass County Highway Department</p>	<p>CASS COUNTY HIGHWAY DEPARTMENT RUSH RIVER BRIDGE NO. 09-121-17.0 PIER DETAILS</p>
	<p>PROJECT NO. CB1301 2 MILES WEST OF AMENIA CASS COUNTY</p>



PLAN



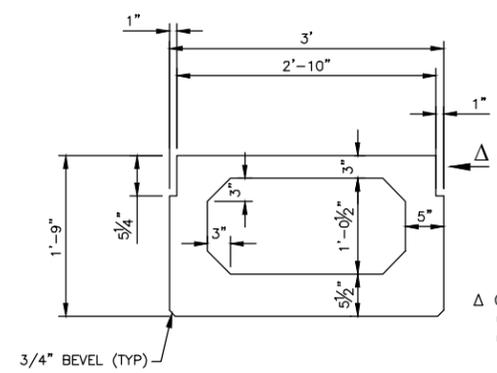
ELEVATION

BEAM SECTION DATA	
WT =	471 LBS/FT + 1580 LBS
CROSS SECTIONAL AREA =	438.0 IN ²
C.G. (FROM BOTTOM) =	9.4 IN
I =	22,358 IN ⁴
SB =	2,366 IN ³

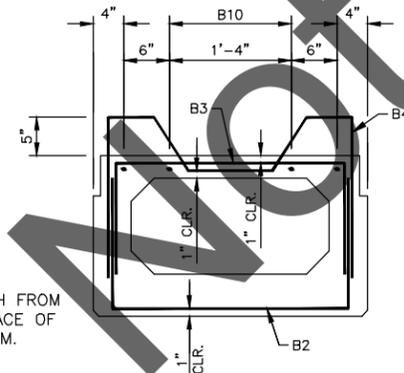
BILL OF REINFORCEMENT (PER BEAM)				
MARK	NO.	SIZE	LENGTH	SHAPE
B1	28	4	5' - 10.5"	BENT
B2*	33	4	5' - 5"	BENT
B3*	32	4	5' - 0"	BENT
B4	33	4	6' - 9"	BENT
B5	14	5	7' - 7"	BENT
B6	4	4	5' - 7"	BENT
B7	4	4	3' - 7"	BENT
B8	4	4	5' - 7"	BENT
B9	4	4	3' - 7"	BENT
B10	4	4	41' - 2"	STRT.
T1**	32	4	3' - 9"	STRT.

* WELDED WIRE REINFORCING WITH MINIMUM CIRCUMFERENTIAL STEEL AREA OF 0.15 SQ IN PER FT MAY BE SUBSTITUTED FOR B2 AND B3 BARS.

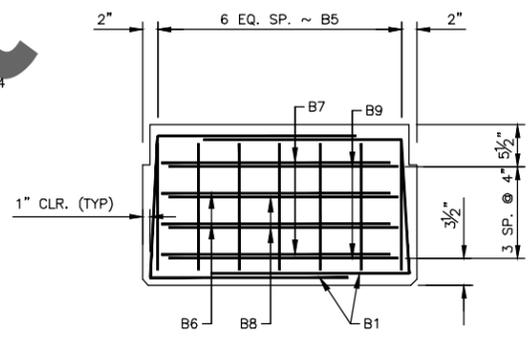
** FIELD BEND AS SHOWN (GRADE 40).



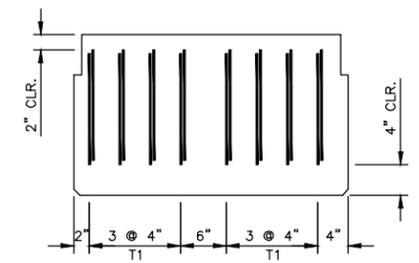
(SHOWING DIMENSIONS)
A - A



(SHOWING REINFORCING)
A - A



B - B



END VIEW

Δ OMIT NOTCH FROM OUTSIDE FACE OF OUTER BEAM.

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Jeremy L. McLaughlin,
Registration Number
PE- 4883,
on 02/28/14 and the original document is stored at
Cass County Highway Department

CASS COUNTY
HIGHWAY DEPARTMENT
RUSH RIVER
BRIDGE NO. 09-121-17.0
21IN BOX BEAM DETAIL
PROJECT NO. CB1301
2 MILES WEST OF AMENIA
CASS COUNTY

NOTES:

AT LEAST 14 DAYS PRIOR TO THE FORMING AND POURING OF ANY BEAMS, THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE ENGINEER FOR REVIEW. THE SHOP DRAWINGS SHALL INCLUDE THE TOTAL INITIAL PRESTRESS FORCE AND THE LOSSES IN THE PRESTRESS DUE TO ELASTIC SHORTENING, SHRINKING OR CREEPING OF CONCRETE AND THE RELAXATION OF STEEL STRESS AS DETERMINED BY THE CONTRACTOR FOR HIS METHOD OF STRESSING.

SHOP DRAWINGS SHALL SHOW STRAND LAYOUT, PULL DOWN LOCATIONS, TENSIONING FORCES, ELONGATION AND ANY PROPOSED CHANGES IN REINFORCING STEEL.

THE FINAL PRESTRESS FORCE (REMAINING AFTER ALL LOSSES HAVE BEEN ACCOUNTED FOR) AND ITS CORRESPONDING CENTER OF GRAVITY, SHALL BE SELECTED FROM THOSE ON A CURVE DETERMINED BY THE THREE VALUES SHOWN.

THE BEAMS SHALL BE POURED IN ALL STEEL FORMS.

ALL REINFORCING STEEL SHALL HAVE A CLEARANCE OF 1" UNLESS OTHERWISE NOTED.

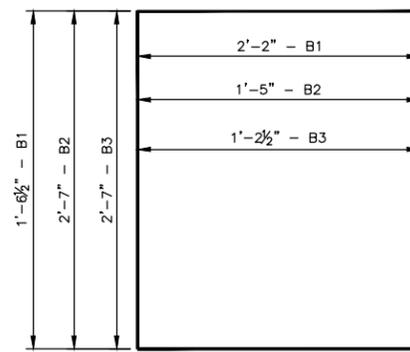
MINOR CHANGES TO THE SHAPE OF THE BEAM AND TO REINFORCING STEEL MAY BE MADE TO ACCOMMODATE THE FORMS OF VARIOUS CONTRACTORS AND THEIR CONSTRUCTION METHODS WITH THE APPROVAL OF THE ENGINEER.

THE TOPS OF THE BEAMS SHALL BE ROUGH FLOATED AND BROOMED TRANSVERSELY FOR BOND.

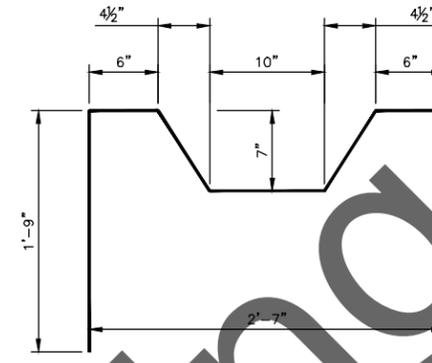
PROVIDE HANDLING HOOKS OR DEVICES AS REQUIRED BY THE CONTRACTOR. HOOKS OR DEVICES PROVIDED WILL BE SUBJECT TO APPROVAL BY THE ENGINEER AND SHALL BE INSTALLED WITHIN 4'-0" OF THE END OF BEAM.

HOLES AND INSERTS TO ACCOMMODATE THE DIAPHRAGM BARS SHALL BE PROVIDED IN THE BEAMS AT LOCATIONS AS SHOWN AT NO ADDITIONAL COST TO OWNER.

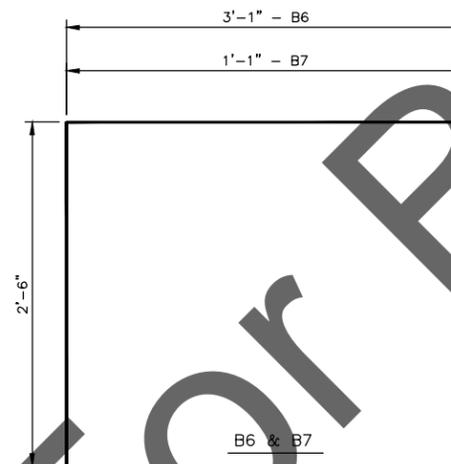
BEAMS SHALL BE CAST NO MORE THAN 6 MONTHS BEFORE BEAM PLACEMENT ON THE PROJECT.



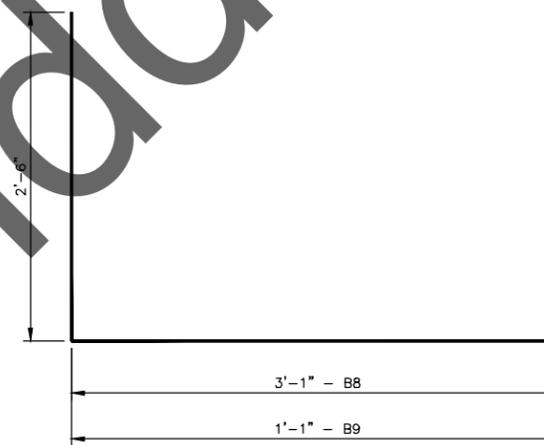
B1, B2, & B3



B4



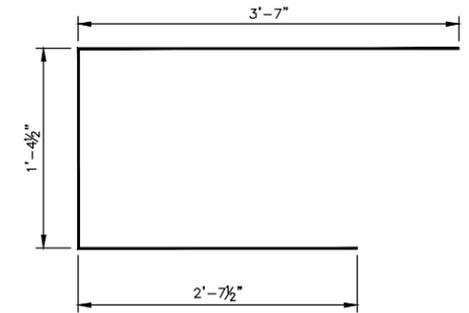
B6 & B7



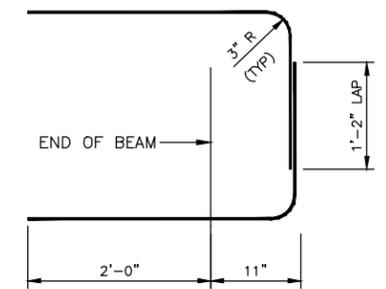
B8 & B9

(DIMENSIONS SHOWN ARE OUT TO OUT)

BENT BAR DETAILS

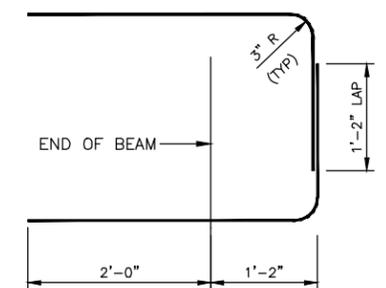


B5



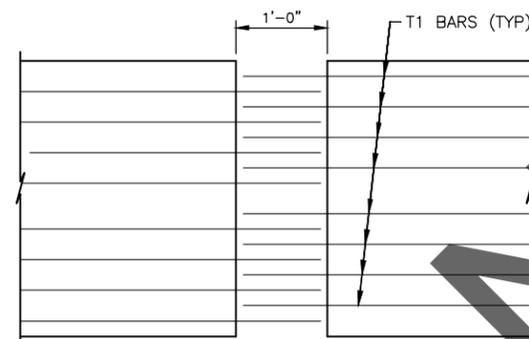
(AT PIERS)

T1



(AT ABUTMENTS)

T1



BEAM END PLAN AT PIER

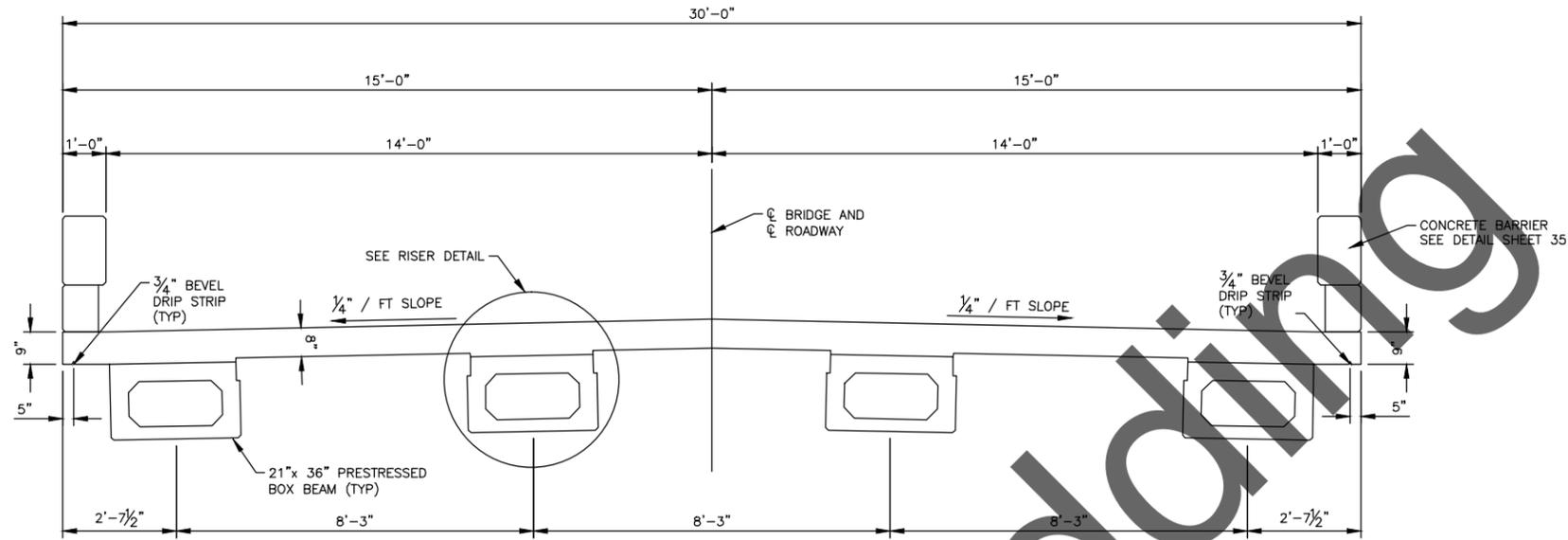
PRESTRESSING DATA					
C.G.	FINAL FORCE	DETENSION STRENGTH	ACCEPTANCE STRENGTH	WEIGHT (TONS)	BEAM LENGTH
2.00	384.7 k	4000 psi (Min)	5000 psi (Min)	10.6	41'-6"
2.25	392.3 k				
2.50	400.3 k				

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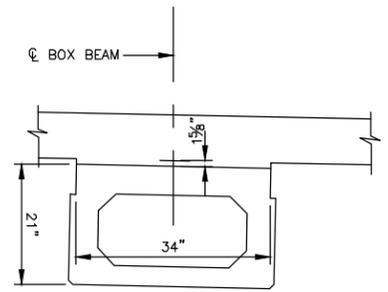
CASS COUNTY HIGHWAY DEPARTMENT
RUSH RIVER
BRIDGE NO. 09-121-17.0
BOX BEAM REBAR DETAILS

PROJECT NO. CB1301
2 MILES WEST OF AMENIA
CASS COUNTY

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	31	75

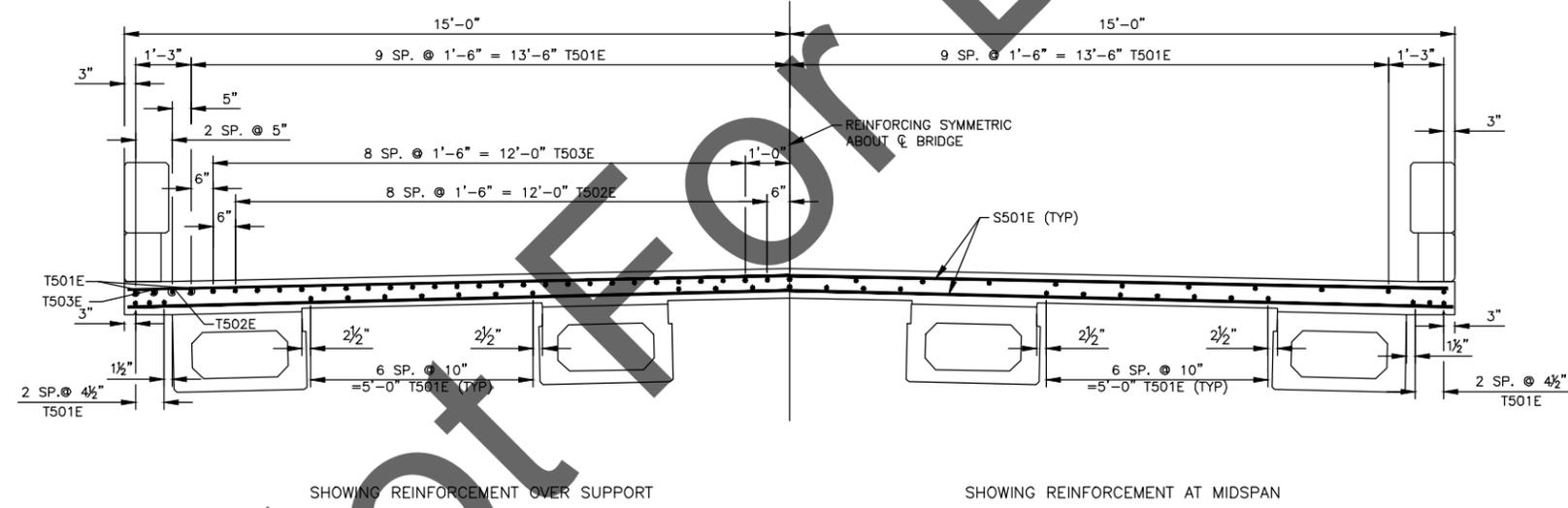


SLAB ELEVATION VIEW
(SHOWING DIMENSIONS)

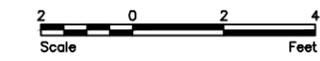


THE 15 1/8" DIMENSION SHOWN IS LOCATED AT THE SUPPORTS. THE ANTICIPATED MIDSPAN RISER IS 1". THE RISER SHALL BE ADJUSTED TO MAINTAIN THE 8" SLAB THICKNESS.

RISER DETAIL
NOT TO SCALE



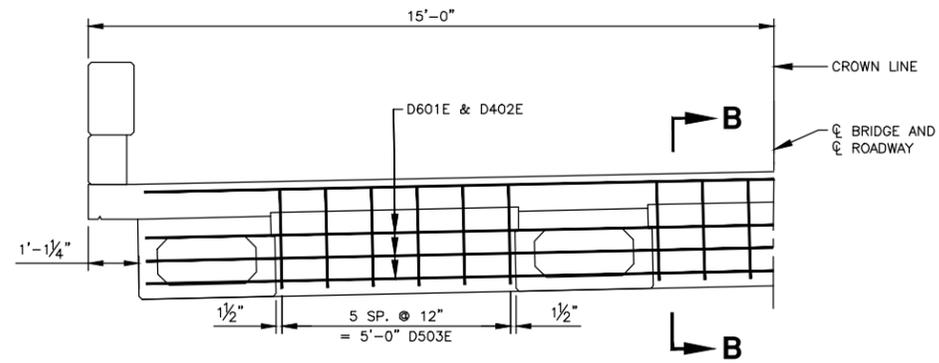
SLAB ELEVATION VIEW
(SHOWING REINFORCEMENT)



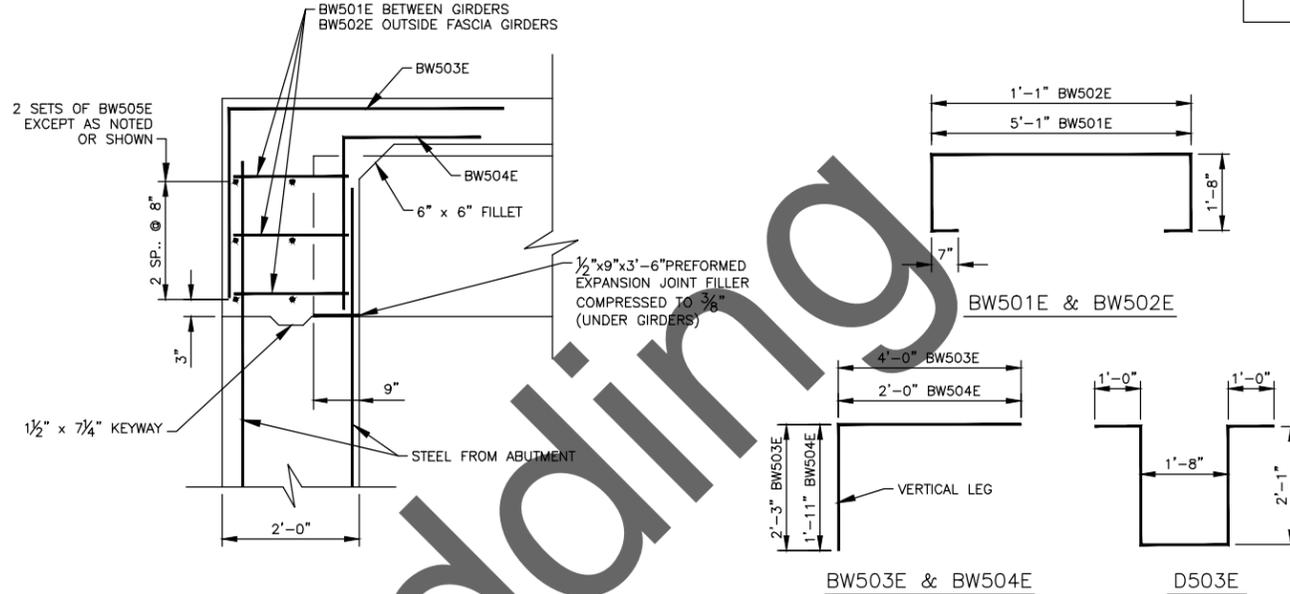
- NOTES:
1. RAIL REINFORCING IN DECK OMITTED FOR CLARITY.
 2. SEE SHEETS 35 & 36 FOR RAIL REINFORCING DETAILS.

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	<p>PROJECT NO. CB1301 2 MILES WEST OF AMENIA CASS COUNTY</p>

Z:\6000\6006\12_6006_063_CB1301\CAD\Plans\SUPERSTRUCTURE LAYOUT.dwg -11x17-2/28/2014 8:07 AM (cwagner)



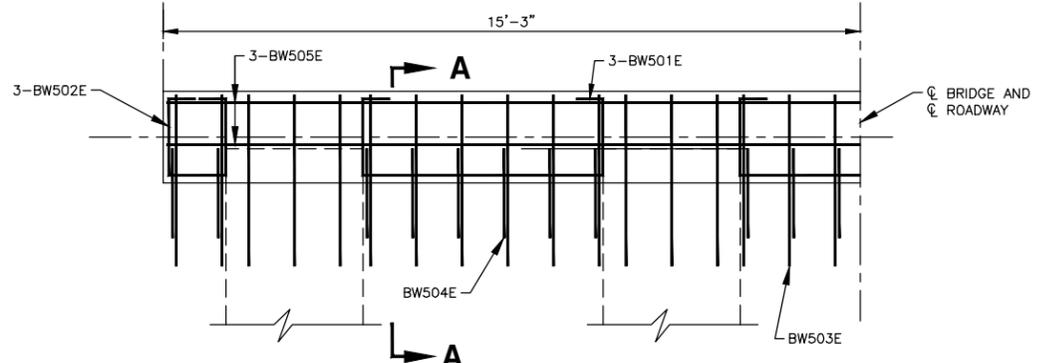
HALF SLAB SECTION AT PIER



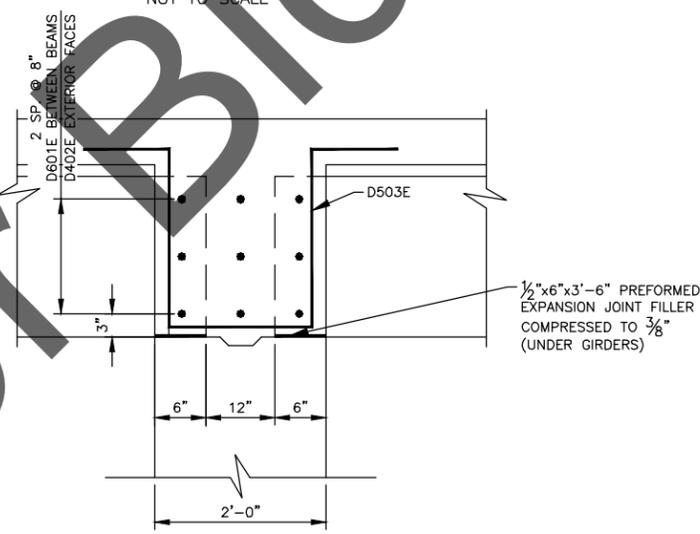
SECTION A-A

BENT BAR DETAILS

- NOTES:
- FABRICATION AND TOLERANCES SHALL BE IN ACCORDANCE WITH THE C.R.S.I. MANUAL OF STANDARD PRACTICE.
 - ALL DIMENSIONS ARE OUT TO OUT OF BARS.
 - NOMINAL LENGTH OF EACH BENT BAR OR CUT BAR IS THE SUM TOTAL OF DETAILING DIMENSIONS FOR THAT BAR, UNLESS OTHERWISE NOTED.
 - AN "E" FOLLOWING A BAR DESIGNATION INDICATES AN EPOXY COATED BAR.



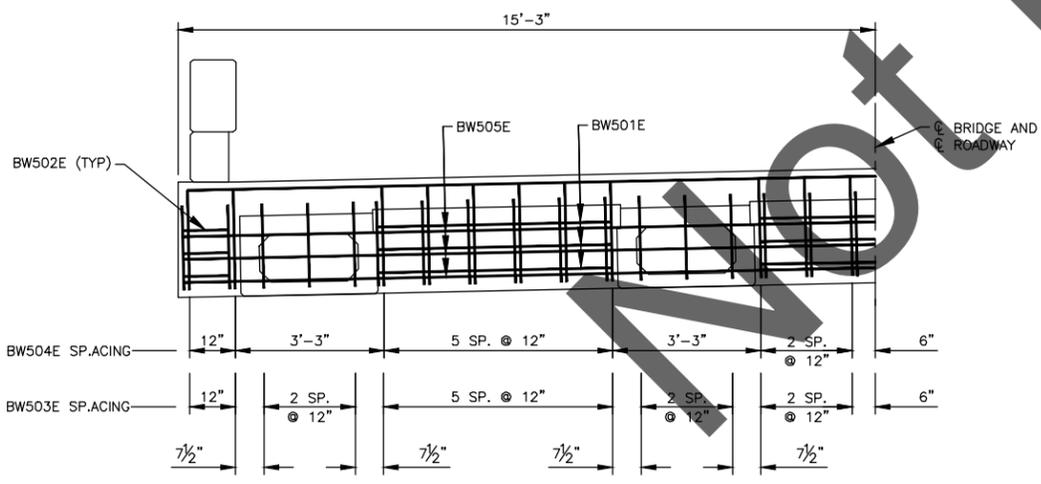
HALF END BEAM - PLAN VIEW



SECTION B-B

SUPERSTRUCTURE				
BILL OF REINFORCEMENT				
MARK	NO.	SIZE	LENGTH	SHAPE
BW501E	18	5	9' - 7"	BENT
BW502E	12	5	5' - 7"	BENT
BW503E	68	5	6' - 3"	BENT
BW504E	44	5	3' - 11"	BENT
BW505E	12	5	30' - 2"	STRT.
D601E	6	6	27' - 5"	STRT.
D402E	36	4	4' - 11"	STRT.
D503E	36	5	7' - 10"	BENT
S501E	442	5	29' - 8"	STRT.
T501E	48	5	132' - 8"	STRT.
T502E	40	5	10' - 0"	STRT.
T503E	40	5	22' - 0"	STRT.

- ① 2'-0" SP.LICE LENGTH
 ② SEE SHEET 33 FOR DETAIL



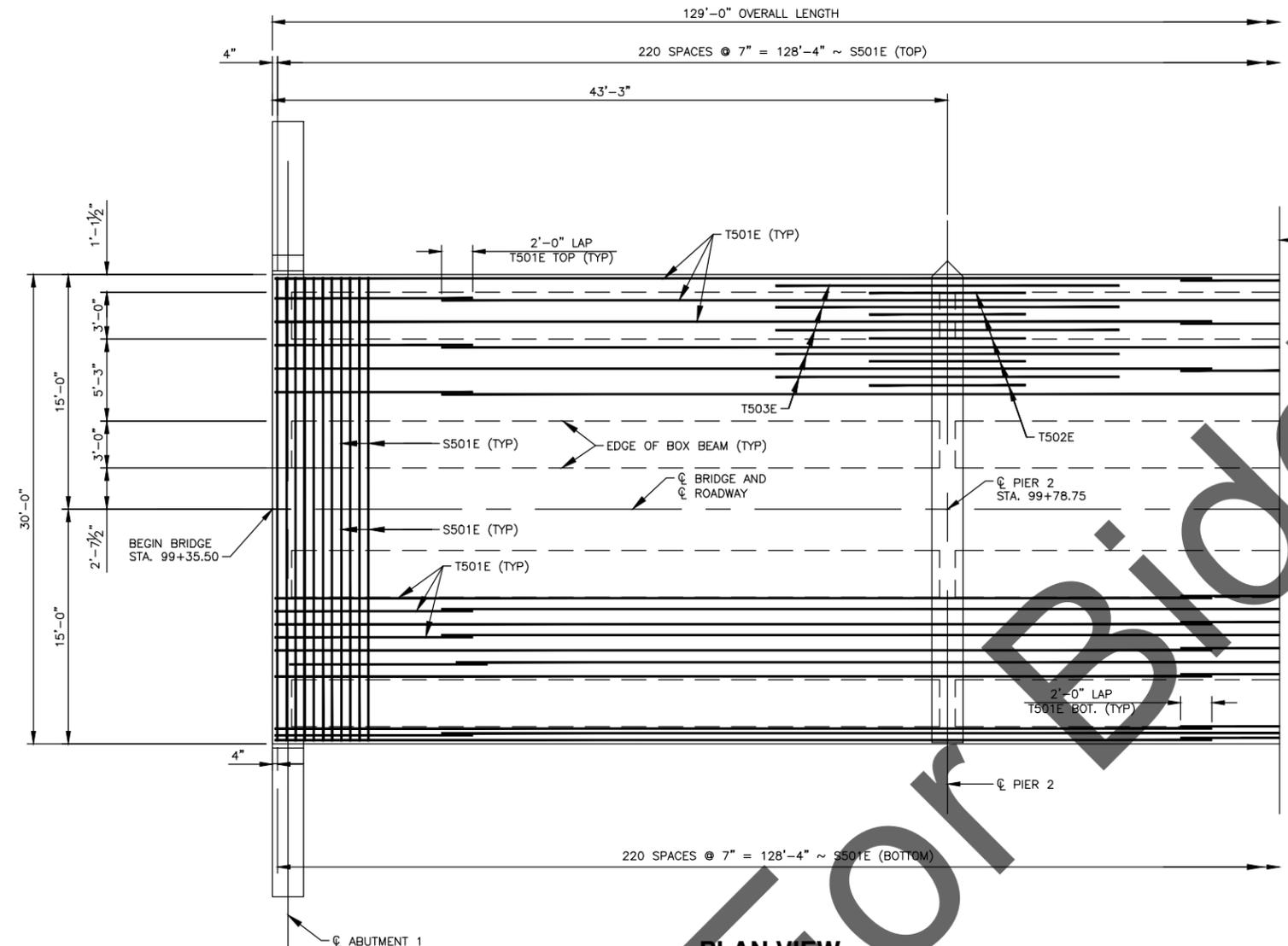
HALF END BEAM - ELEVATION VIEW

QUANTITIES & PROPERTIES	
CLASS AAE-3 CONCRETE	116.3 C.Y.
CONCRETE STRENGTH	4,000 PSI
REINFORCING STEEL - EPOXY	23,563 LBS
REINFORCEMENT STRENGTH	60,000 PSI

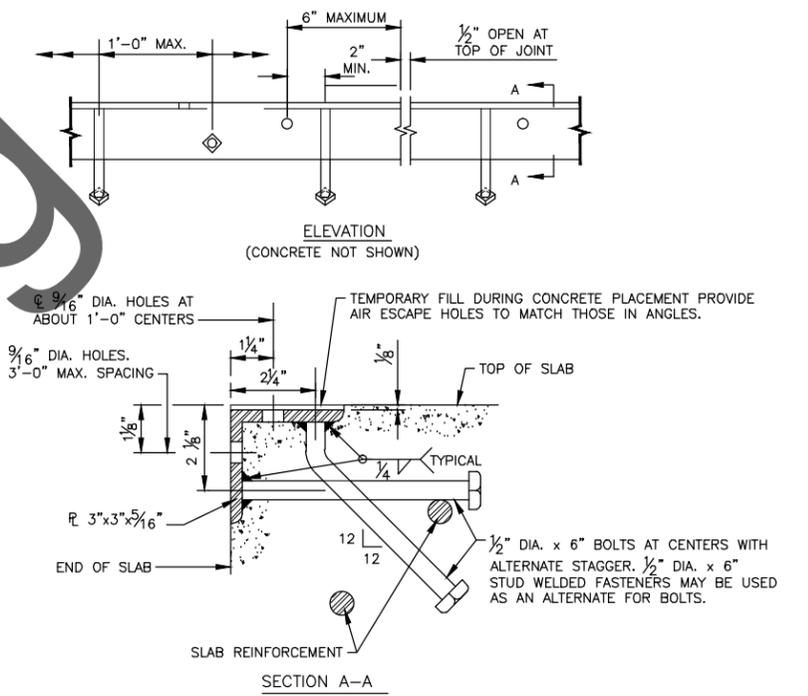
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CASS COUNTY HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
SUPERSTRUCTURE DETAILS
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	33	75

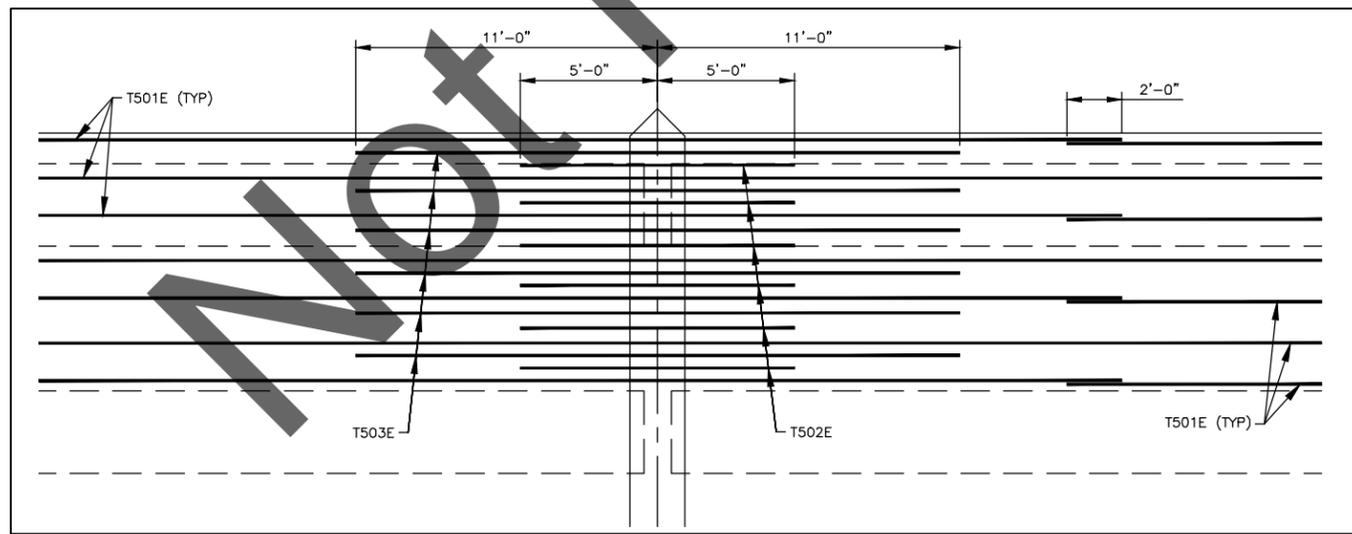


PLAN VIEW

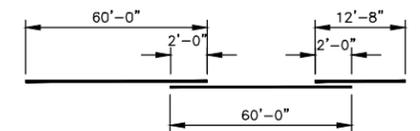


PROTECTION PLAN DETAIL
NOT TO SCALE

- NOTES:
1. ANGLES SHALL EXTEND FULL WIDTH OF ROADWAY WITH A 1/2" OPEN JOINT AT EACH BREAK IN CROWN PROFILE.
 2. ANGLES SHALL BE STRAIGHTENED TO A TOLERANCE OF 1/16" IN 10 FEET AFTER GALVANIZING.
 3. MATERIAL: STRUCTURAL STEEL PER NDDOT 834, GALVANIZED AFTER FABRICATION PER AASHTO M111 (ASTM A123).
 4. SET ANGLE TO PROPER GRADE AND CROWN.
 5. ALL MATERIAL WILL BE PAID FOR AS STRUCTURAL STEEL.



PIER 2 DETAIL
(SYMMETRIC BY 180° ROTATION @ PIER 3)



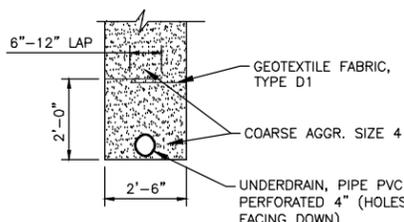
T501E DETAIL
NOT TO SCALE

- NOTE:
1. TURN END FOR END SO THAT SPLICE LOCATIONS ARE STAGGERED.

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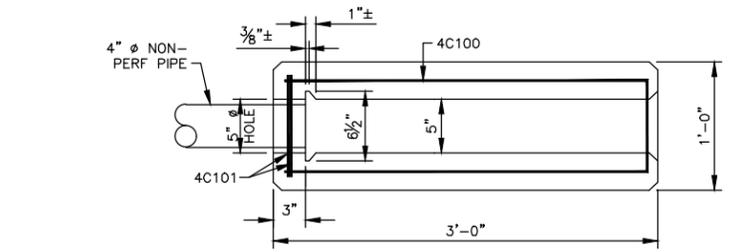
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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	34	75

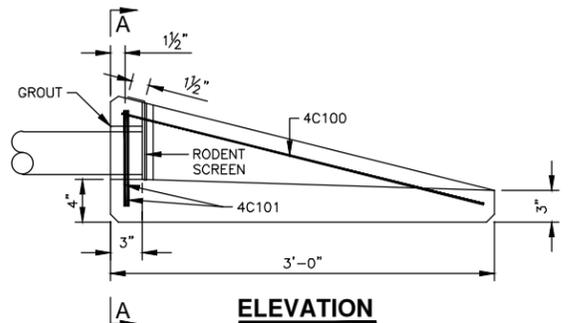


NOTE:
 GEOTEXTILE FABRIC - TYPE D1,
 COARSE AGGR SIZE 4 AND
 INSULATION BOARD SHALL BE
 INCIDENTAL TO THE PRICE BID
 SELECT BACKFILL.

TRENCH DETAIL
 NOT TO SCALE

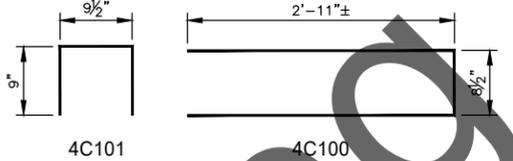


PLAN

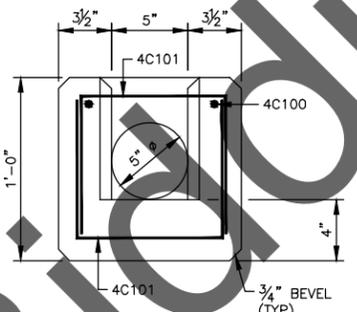


ELEVATION

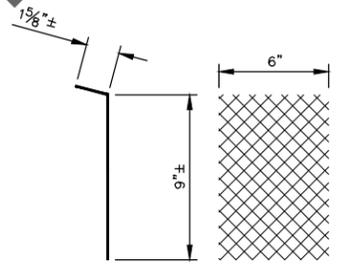
PRECAST CONCRETE HEADWALL DETAILS



BENT BAR DETAILS



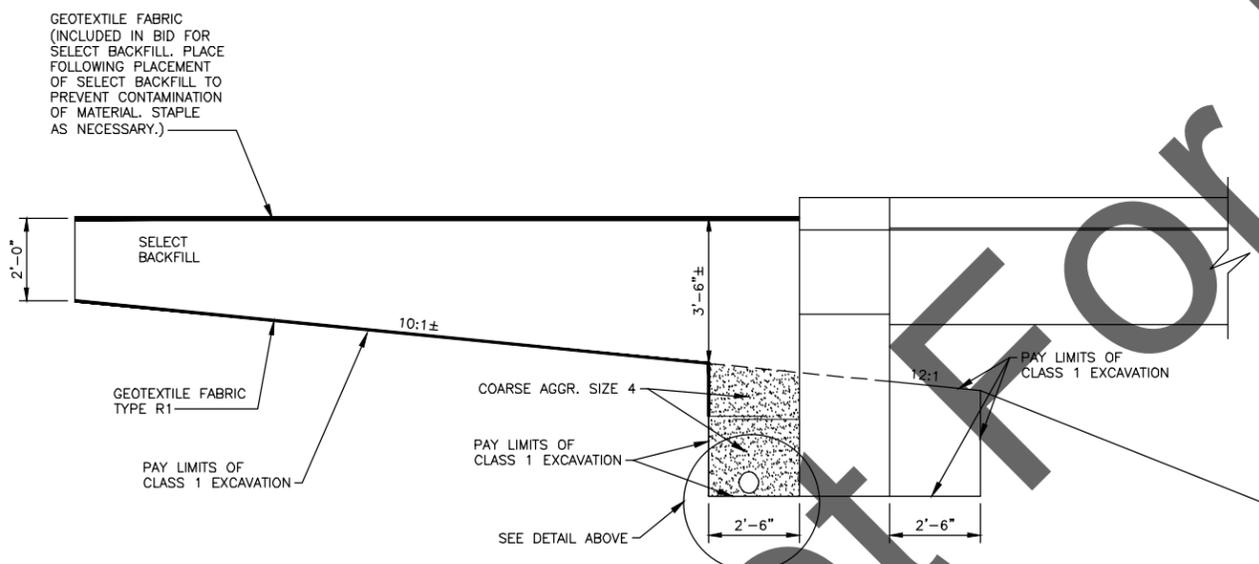
SECTION A-A



SIDE VIEW FRONT VIEW

RODENT SCREEN DETAILS

NOTES:
 THE DIMENSIONS FOR THE RODENT SCREEN ARE APPROXIMATE TO ALLOW FOR BENDING AND A SNUG FIT INTO THE SLOT IN THE HEADWALL.
 THE RODENT SCREEN SHALL BE FABRICATED FROM FLATTENED, EXPANDED METAL WITH SCREEN OPENINGS OF APPROXIMATELY 0.25 SQUARE INCHES. THE SCREEN SHALL BE 16 GAGE METAL AND BE HOT DIP GALVANIZED AFTER FABRICATION.

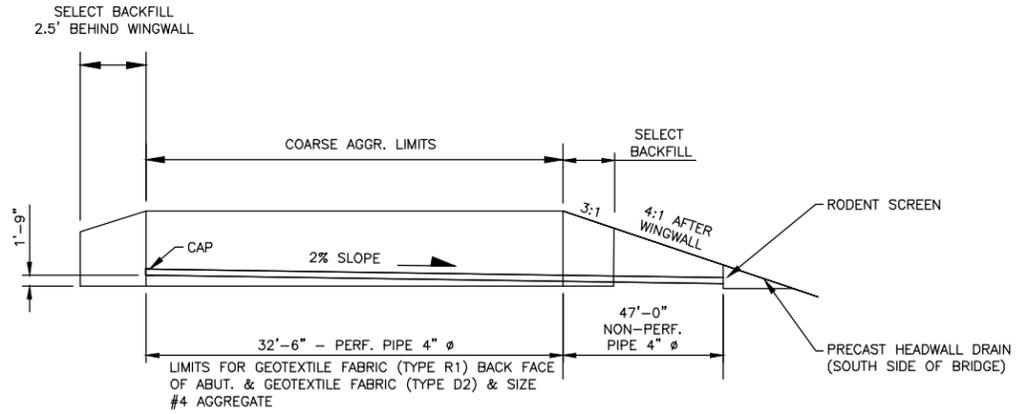


DETAIL AT ABUTMENT

SEEPAGE TRENCH DETAILS

NOT TO SCALE

NOTES:
 CLASS 1 EXCAVATION REQUIRED @ EAST ABUTMENT ONLY.
 ALL MATERIAL, EQUIPMENT, AND LABOR REQUIRED TO PLACE THE SELECT BACKFILL, COARSE AGGREGATE, AND GEOTEXTILE FABRIC SYSTEM SHALL BE INCLUDED IN THE BID FOR SELECT BACKFILL.
 PAY QUANTITY = PLAN QUANTITY



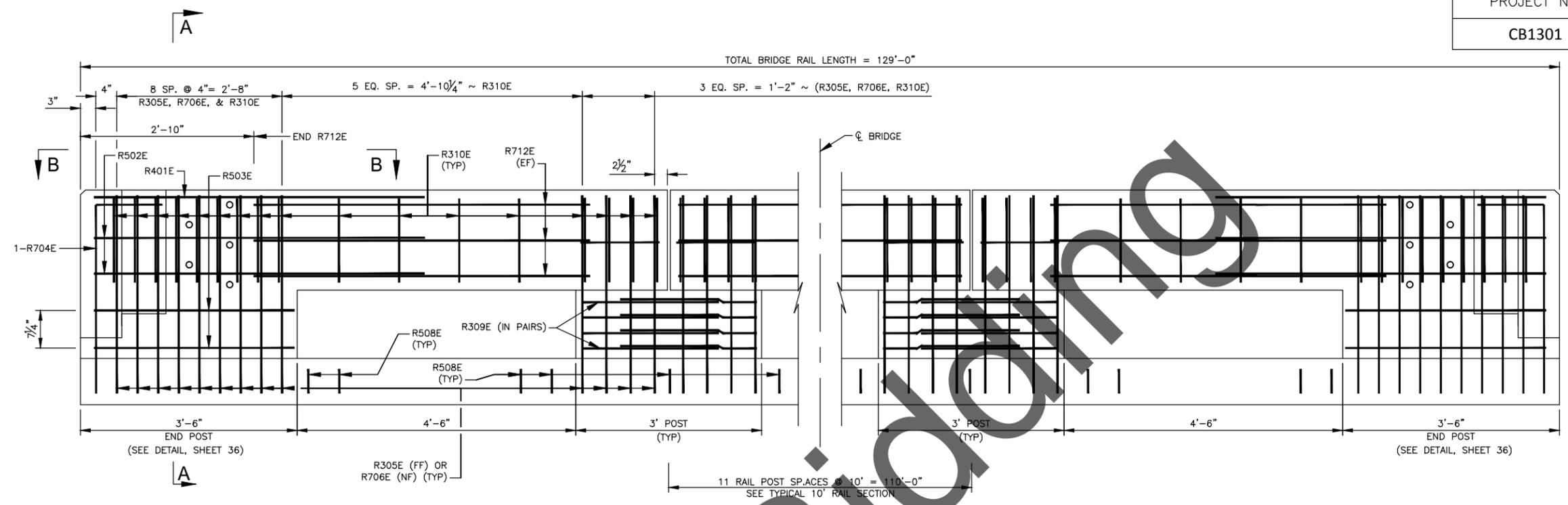
BACK FACE OF ABUTMENT

NOT TO SCALE

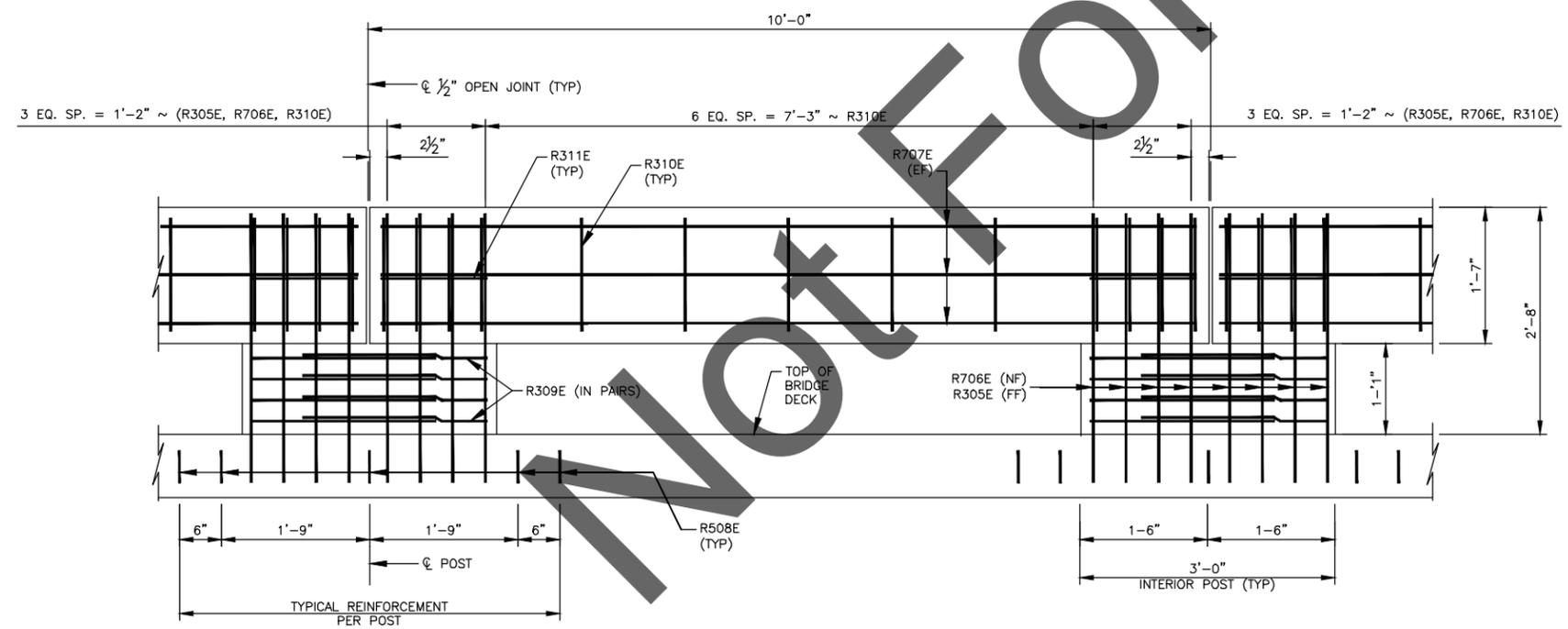
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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	35	75



BRIDGE RAIL ELEVATION VIEW
NOT TO SCALE



TYPICAL 10' RAIL SECTION
NOT TO SCALE

LEGEND	
NF	= NEAR FACE
FF	= FAR FACE
EF	= EACH FACE

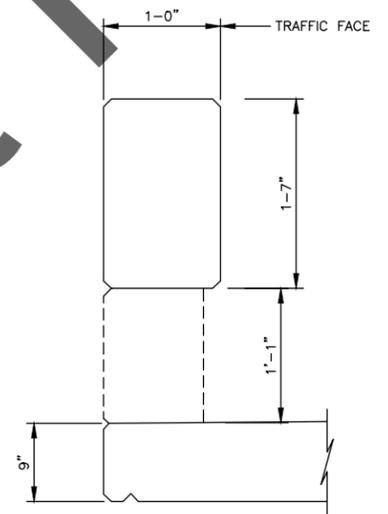
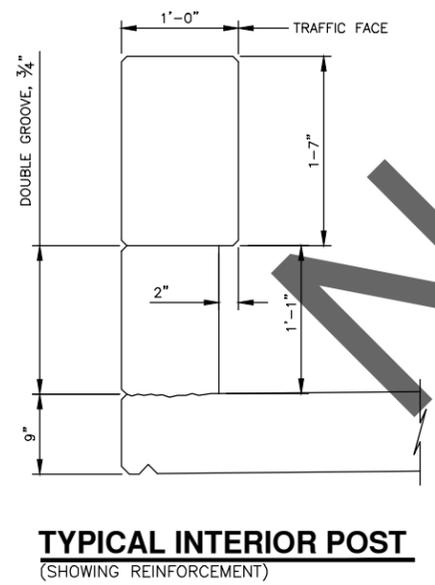
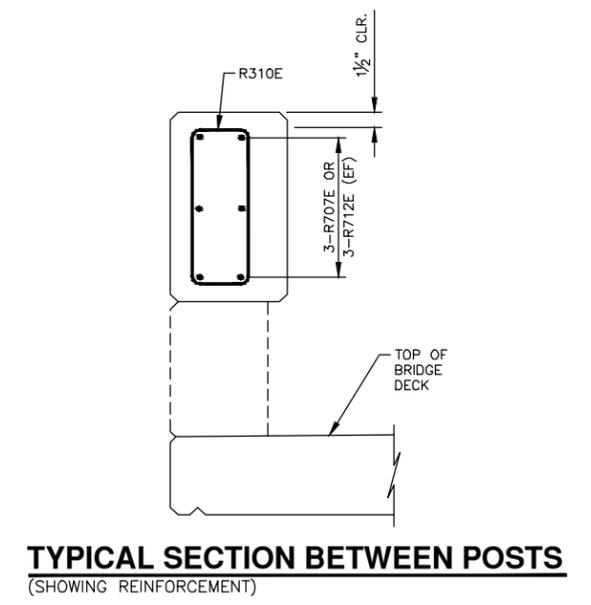
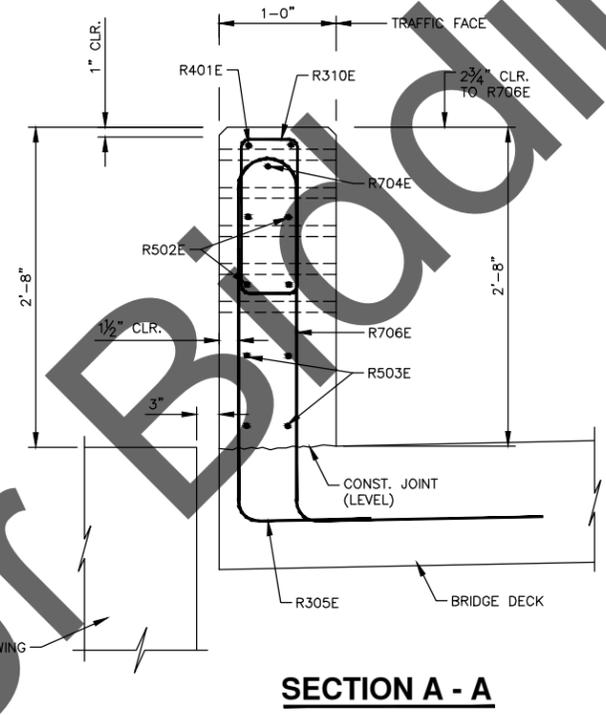
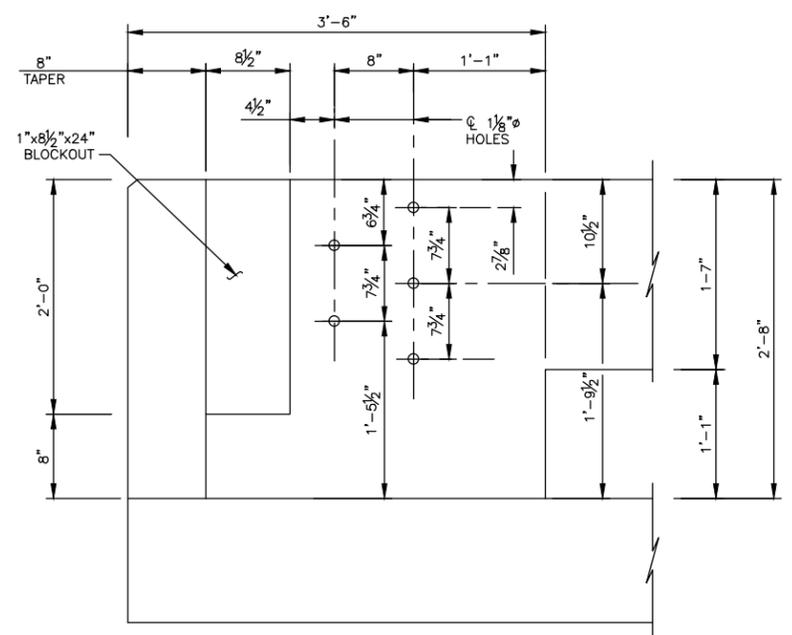
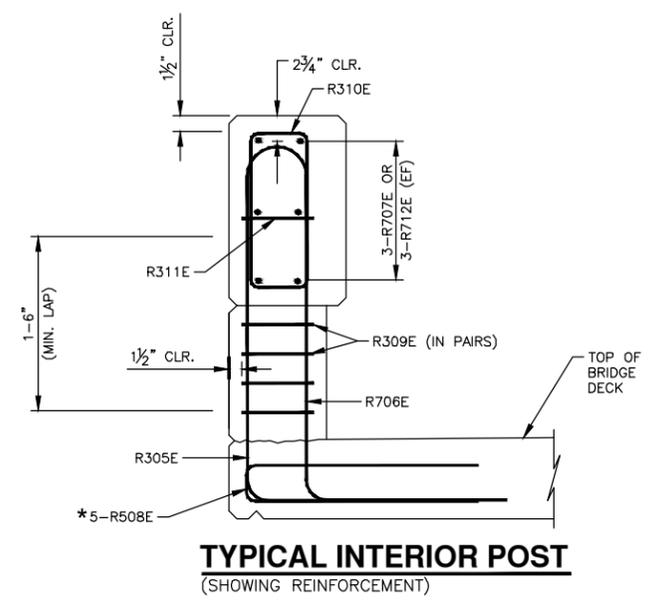
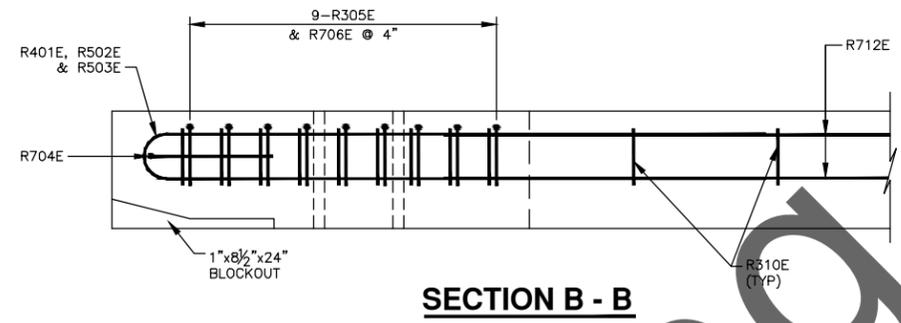
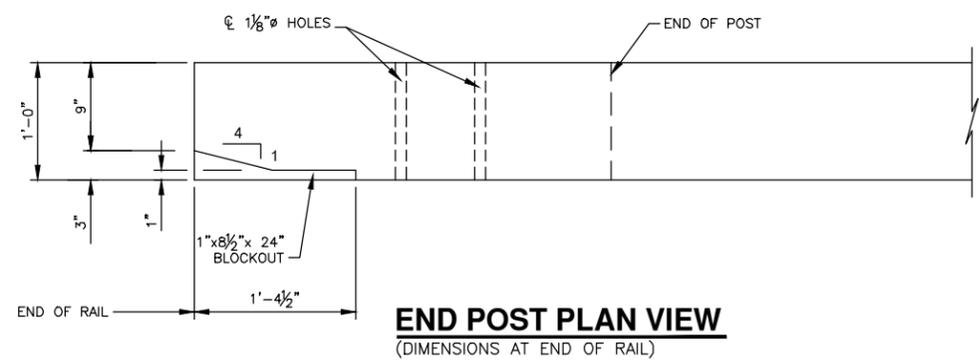
- NOTES:
1. REINFORCING STEEL AND CONCRETE FOR KANSAS CORRAL RAIL ARE QUANTIFIED ON SHEET 37.
 2. VIEWS A-A, AND B-B ARE SHOWN ON SHEET 36.
 3. REINFORCING SYMMETRIC ABOUT BRIDGE ϕ UNLESS OTHERWISE NOTED.

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 Registration Number
 PE- 4883,
 on 02/28/14 and the original document is stored at
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CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
**CONCRETE BARRIER
 DETAILS**
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

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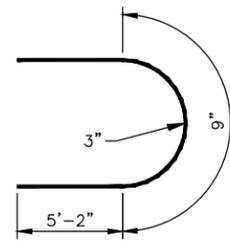
PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	36	75



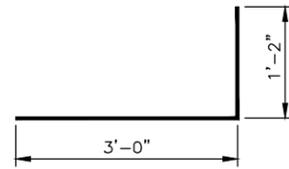
- NOTES:
1. REINFORCING STEEL AND CONCRETE FOR KANSAS CORRAL RAIL ARE QUANTIFIED ON SHEET 37.
 2. * THE HOOK MAY BE CANTED TO PROVIDE CLR.EARANCE AND/OR FIT BETWEEN REINFORCING.

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	<p>PROJECT NO. CB1301 2 MILES WEST OF AMENIA CASS COUNTY</p>

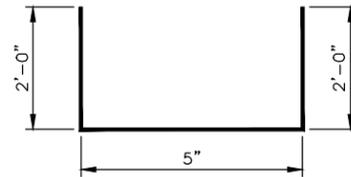
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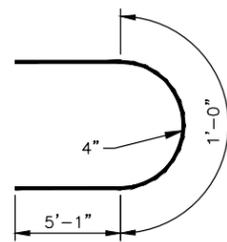
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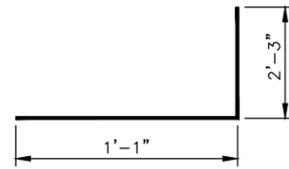
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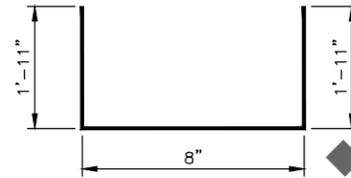
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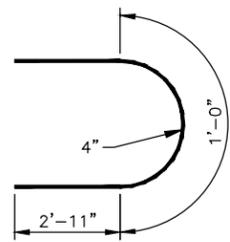
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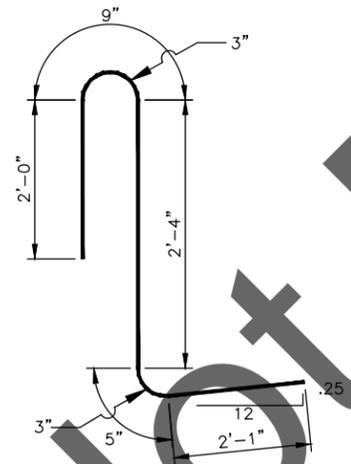
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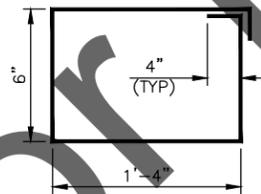
R309E



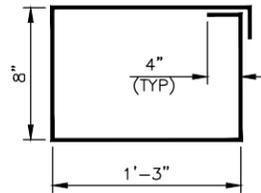
R503E



R706E



R310E



R311E

NOTES:

1. THE ESTIMATED MATERIAL QUANTITIES SHOWN ARE FOR INFORMATION PURPOSES ONLY. ALL MATERIALS, INCLUDING CONCRETE & REINFORCING BARS, AND ALL LABOR REQUIRED TO BUILD THE KANSAS CORRAL RAIL OVER THE DECK SHALL BE INCLUDED IN THE PAY ITEM, "CONCRETE BRIDGE BARRIER". ESTIMATED REINFORCING AND CONCRETE QUANTITIES LISTED ARE FOR BOTH RAILS AND INFORMATIONAL PURPOSES ONLY.
2. FABRICATION AND TOLERANCES SHALL BE IN ACCORDANCE WITH THE CRSI MANUAL OF STANDARD PRACTICE.
3. ALL DIMENSIONS ARE OUT TO OUT OF BARS.
4. NOMINAL LENGTH OF EACH BENT BAR OR CUT BAR IS THE SUM TOTAL OF THE DETAILING DIMENSIONS FOR THAT BAR, UNLESS OTHERWISE NOTED.
5. THE GIVEN DIMENSION FOR ALL BENDS ARE THE BEND RADII.
6. AN "E" FOLLOWING A BAR DESIGNATION INDICATES AN EPOXY COATED BAR.
7. THE CONCRETE FOR BRIDGE BARRIER SHALL BE CLASS AAE-3 AND THE REINFORCING STEEL SHALL BE GRADE 60.

BILL OF REINFORCEMENT (ONE RAIL)				
MARK	NO.	SIZE	LENGTH	SHAPE
R401E	2	4	11' - 1"	BENT
R502E	4	5	11' - 2"	BENT
R503E	4	5	6' - 10"	BENT
R704E	2	7	4' - 2"	BENT
R305E	114	3	3' - 4"	BENT
R706E	114	7	7' - 7"	BENT
R707E	66	7	9' - 8"	STRT.
R508E	64	5	4' - 5"	BENT
R309E	96	3	4' - 6"	BENT
R310E	177	3	4' - 4"	BENT
R311E	24	3	4' - 6"	BENT
R712E	12	7	5' - 5"	STRT.

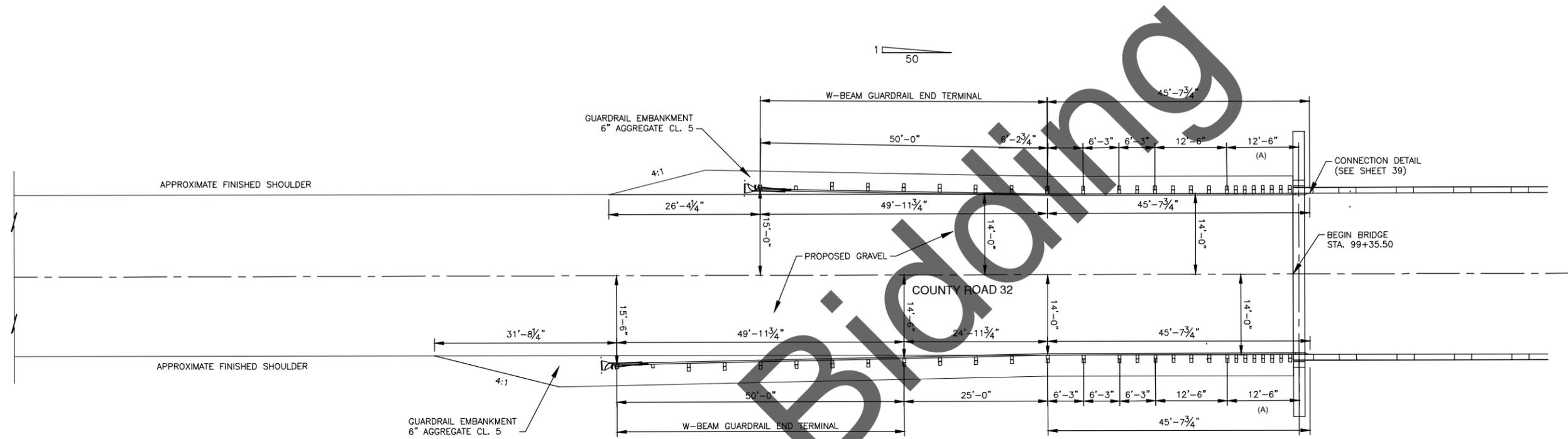
BENT BAR DETAILS

QUANTITIES & PROPERTIES (PER RAIL) (FOR INFORMATION PURPOSES ONLY)	
CLASS AAE-3 CONCRETE	9.1 CY
CONCRETE STRENGTH	4,000 PSI
REINFORCING STEEL	4,240 LBS
REINFORCEMENT STRENGTH	60,000 PSI

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CASS COUNTY HIGHWAY DEPARTMENT
RUSH RIVER
BRIDGE NO. 09-121-17.0
CONCRETE BARRIER REBAR DETAILS
PROJECT NO. CB1301
2 MILES WEST OF AMENIA
CASS COUNTY

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	38	75

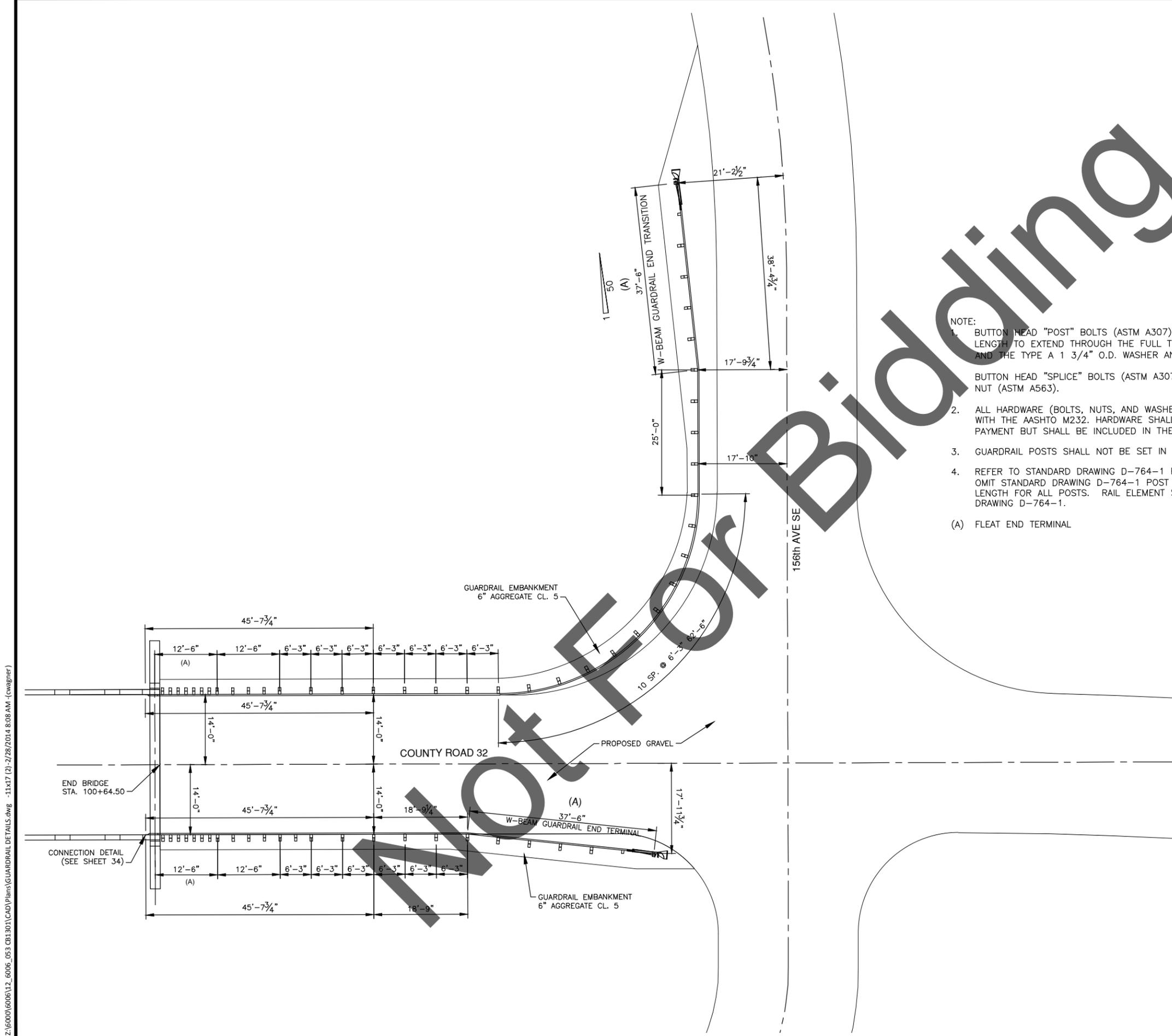


- NOTE:
- BUTTON HEAD "POST" BOLTS (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND THE TYPE A 1 3/4" O.D. WASHER AND NOT MORE THAN 1" BEYOND IT.
BUTTON HEAD "SPlice" BOLTS (ASTM A307) ARE 5/8"Ø WITH A 5/8"Ø RECESSED NUT (ASTM A563).
 - ALL HARDWARE (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH THE AASHTO M232. HARDWARE SHALL NOT BE MEASURED FOR SEPARATE PAYMENT BUT SHALL BE INCLUDED IN THE UNIT PRICE BID FOR "W-BEAM GUARDRAIL".
 - GUARDRAIL POSTS SHALL NOT BE SET IN CONCRETE.
 - REFER TO STANDARD DRAWING D-764-1 FOR ADDITIONAL DETAILS EXCEPT AS FOLLOWS. OMIT STANDARD DRAWING D-764-1 POST LENGTH OF 6'-0" AND USE 6'-6" POST LENGTH FOR ALL POSTS. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF STANDARD DRAWING D-764-1.

Not For Bidding

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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	39	75



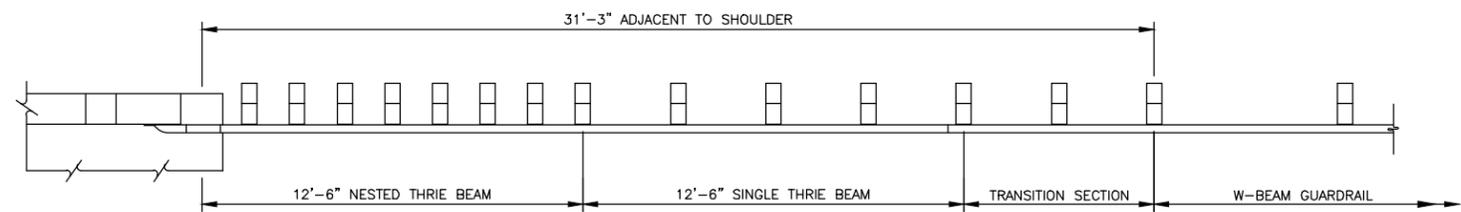
- NOTE:
- BUTTON HEAD "POST" BOLTS (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND THE TYPE A 1 3/4" O.D. WASHER AND NOT MORE THAN 1" BEYOND IT.
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- (A) FLEAT END TERMINAL

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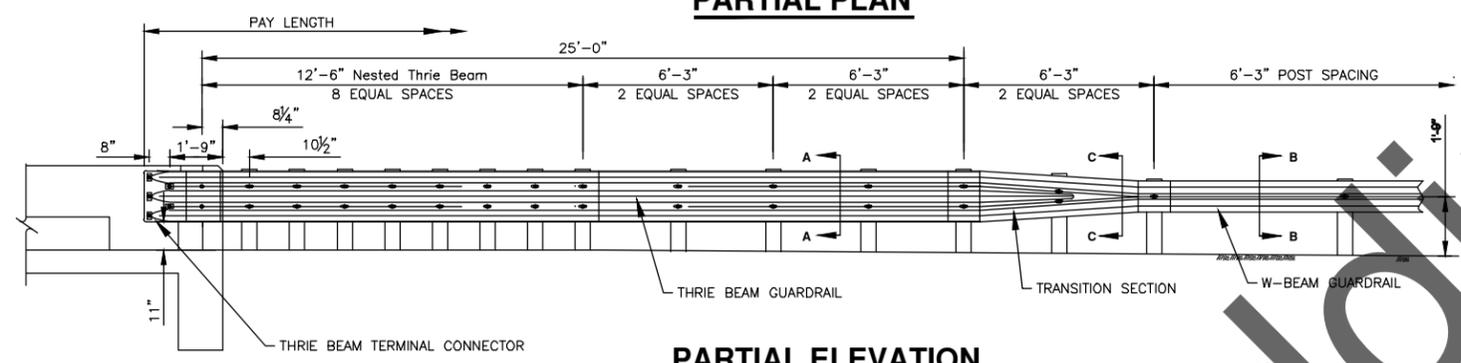
CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
GUARDRAIL DETAILS
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

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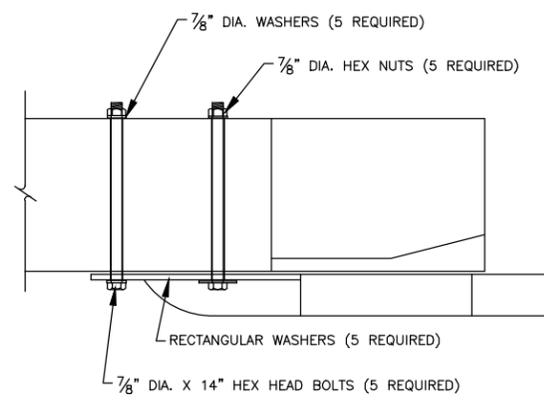
PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	40	75



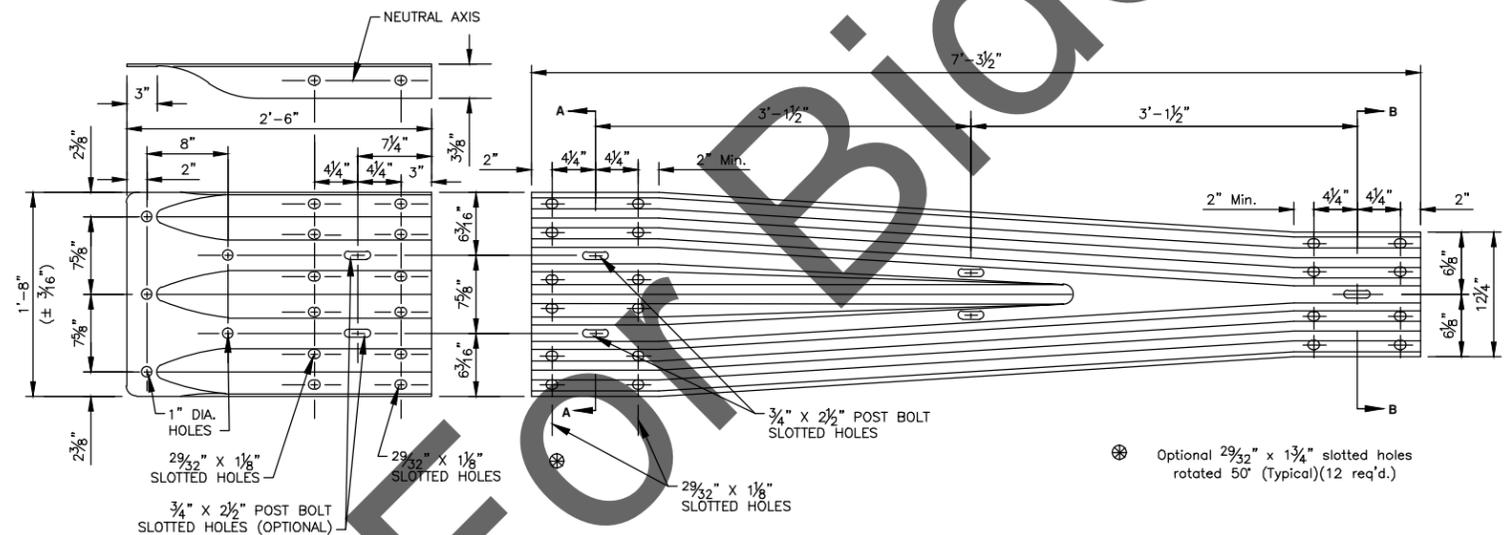
PARTIAL PLAN



PARTIAL ELEVATION

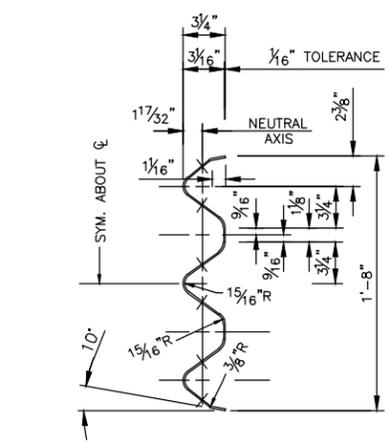


DETAIL BRIDGE ATTACHMENT

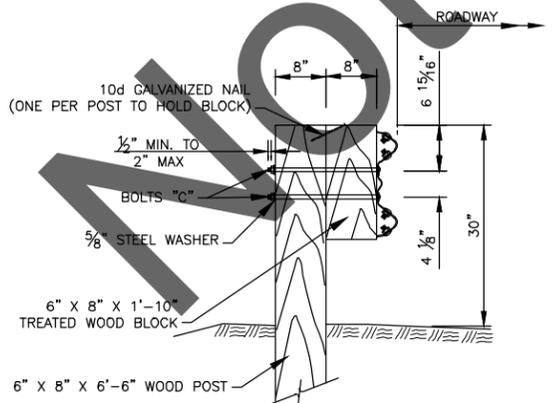


ELEVATION - TRANSITION SECTION
(FROM THRIE BEAM TO W-BEAM RAIL)

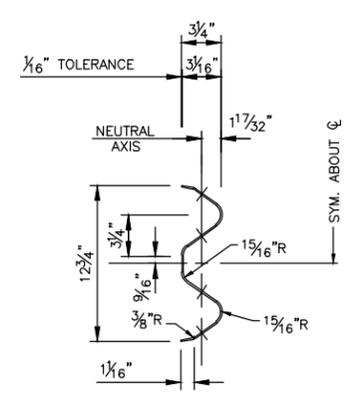
TERMINAL CONNECTOR



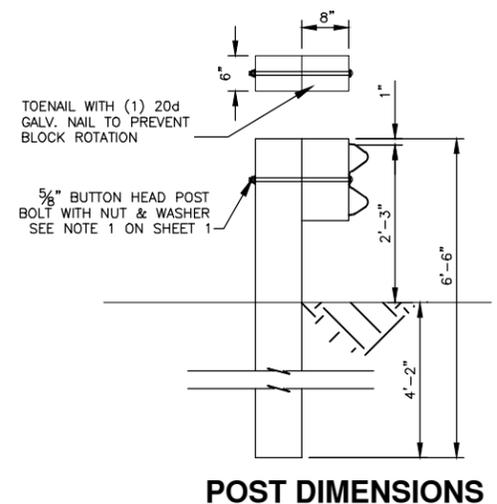
SECTION A-A THRU RAIL ELEMENT
TYPICAL THRIE BEAM



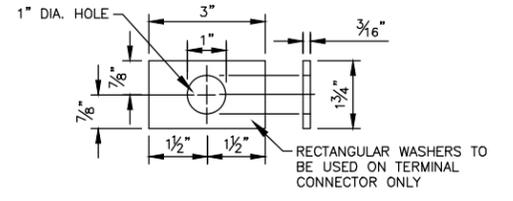
SECTION C-C (WOOD POST)



SECTION B-B THRU RAIL ELEMENT
TYPICAL W-BEAM



POST DIMENSIONS



RECTANGULAR WASHER

(Other Approved Washer May Be Used)

GENERAL NOTES:

RAIL ELEMENT SHALL BE #10 OR #12 U.S. STANDARD GAUGE EXCEPT WHERE SPECIFIC GAUGE IS REQUIRED, SUCH AS AT END TERMINAL OR BULLNOSE SECTIONS.

GALVANIZED STEEL RAIL ELEMENTS SHALL BE USED. ALL POST RAIL FITTINGS AND ANCHOR BOLTS SHALL BE GALVANIZED IN ACCORDANCE WITH STANDARD SPECIFICATIONS.

GUARDRAIL PARTS FURNISHED UNDER THIS SPECIFICATION SHALL BE INTERCHANGEABLE WITH SIMILAR PARTS REGARDLESS OF THE SOURCE OR MANUFACTURER.

WHEN RADIUS IS LESS THAN 150', RAILS ARE TO BE SHOP CURVED.

TERMINAL CONNECTOR SHALL BE 10 GAUGE STEEL. THE CONNECTOR HAS THE SAME SECTION AS THRIE BEAM GUARDRAIL. TERMINAL CONNECTOR SHALL BE SUBSIDIARY TO THE BID ITEM "W-BEAM GUARDRAIL".

ALL GUARDRAIL SPLICES, INCLUDING SPECIAL END SHOES, SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC. WHERE TRAFFIC IS TEMPORARILY CARRIED IN THE DIRECTION OPPOSITE OF THE FINAL CONFIGURATION, THE RAIL SPLICES SHALL BE LAPPED IN THE DIRECTION OF THE PERMANENT TRAFFIC.

BRIDGE RAIL TRANSITION SHALL CONSIST OF ONE 25'-0" THRIE BEAM SECTION, ONE 12'-6" THRIE BEAM SECTION NESTED IN BACK OF 25'-0" SECTION, AND ONE THRIE BEAM TO W-BEAM TRANSITION SECTION, POSTS LOCATED AS SHOWN, AND ALL ASSOCIATED HARDWARE. THE REMAINDER OF THE GUARDRAIL SHALL BE W-BEAM WITH 6'-3" POST SPACING AND MAY BE FURNISHED IN EITHER 12'-6" OR 25'-0" SECTIONS.

ALL MATERIAL AND WORK REQUIRED FOR THIS CONSTRUCTION SHALL BE INCLUDED IN THE PAY ITEM "W-BEAM GUARDRAIL."

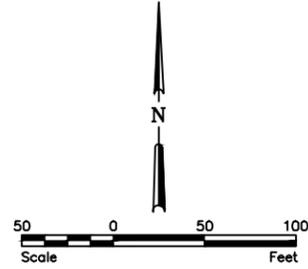
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CASS COUNTY
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 RUSH RIVER
 BRIDGE NO. 09-121-17.0
GUARDRAIL TRANSITION
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

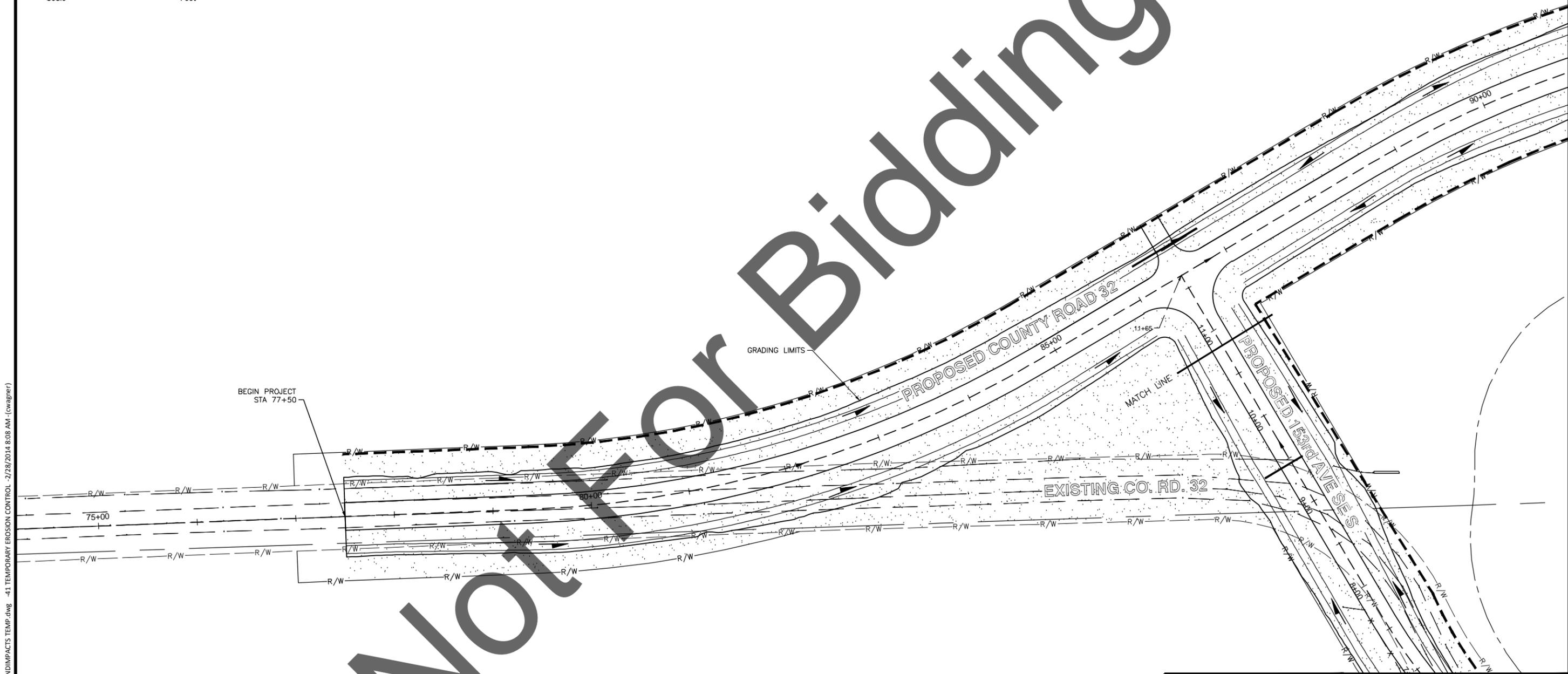
Z:\6000\6006\12_6006_063_CB1301\CAD\Plans\GUARDRAIL TRANSITION.dwg -11x17-2/28/2014 8:08 AM - (cwagner)

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	41	75

ITEM	DESCRIPTION	QUANTITY	UNIT
708-1430	FIBER ROLLS 12IN	1,522	LF
708-1431	REMOVAL FIBER ROLLS 12IN	1,522	LF
708-2260	SEEDING - TYPE B CL IV	3.23	ACRE
708-5500	MULCHING	3.23	ACRE



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LEGEND

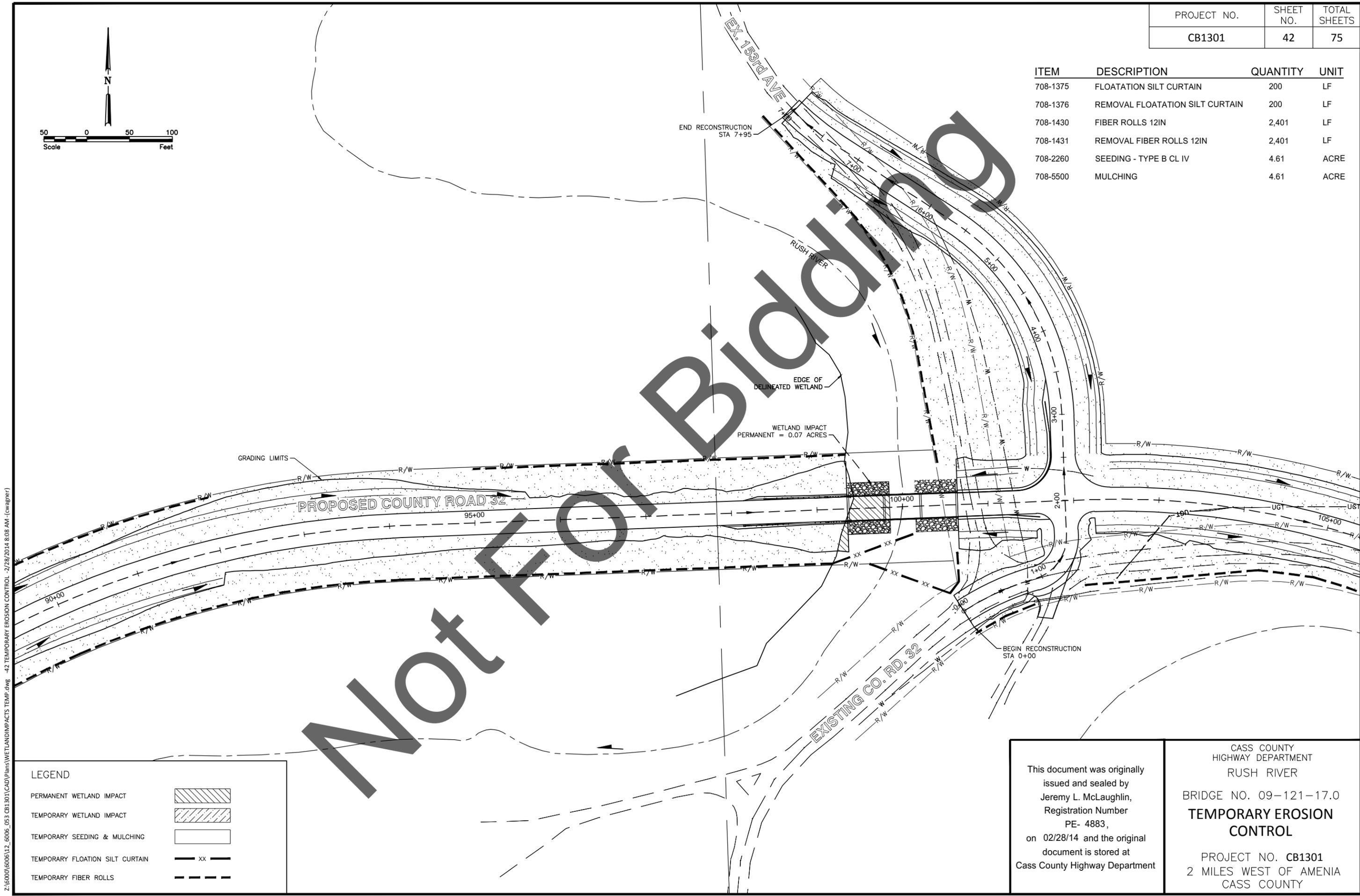
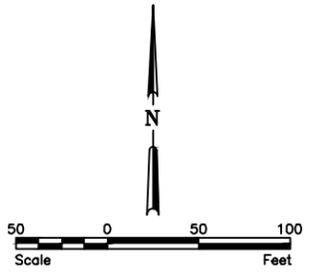
PERMANENT WETLAND IMPACT	
TEMPORARY WETLAND IMPACT	
TEMPORARY SEEDING & MULCHING	
TEMPORARY FLOATION SILT CURTAIN	
TEMPORARY FIBER ROLLS	

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CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
TEMPORARY EROSION CONTROL
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	42	75

ITEM	DESCRIPTION	QUANTITY	UNIT
708-1375	FLOATATION SILT CURTAIN	200	LF
708-1376	REMOVAL FLOATATION SILT CURTAIN	200	LF
708-1430	FIBER ROLLS 12IN	2,401	LF
708-1431	REMOVAL FIBER ROLLS 12IN	2,401	LF
708-2260	SEEDING - TYPE B CL IV	4.61	ACRE
708-5500	MULCHING	4.61	ACRE



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LEGEND

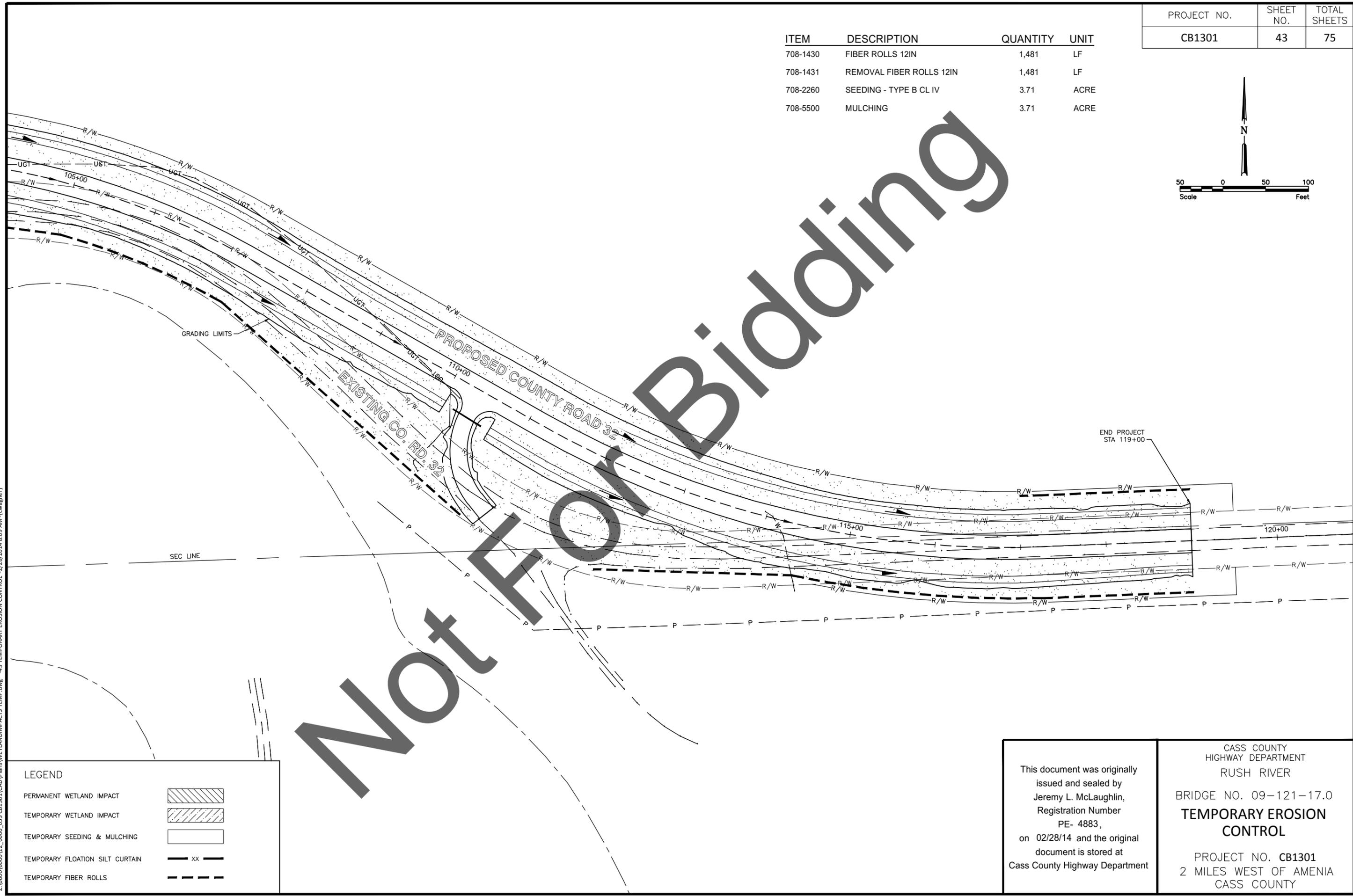
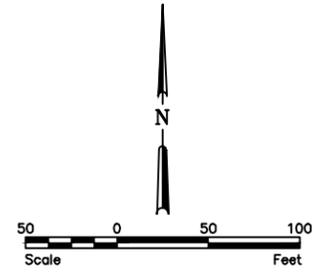
PERMANENT WETLAND IMPACT	
TEMPORARY WETLAND IMPACT	
TEMPORARY SEEDING & MULCHING	
TEMPORARY FLOATATION SILT CURTAIN	
TEMPORARY FIBER ROLLS	

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CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
TEMPORARY EROSION CONTROL
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	43	75

ITEM	DESCRIPTION	QUANTITY	UNIT
708-1430	FIBER ROLLS 12IN	1,481	LF
708-1431	REMOVAL FIBER ROLLS 12IN	1,481	LF
708-2260	SEEDING - TYPE B CL IV	3.71	ACRE
708-5500	MULCHING	3.71	ACRE

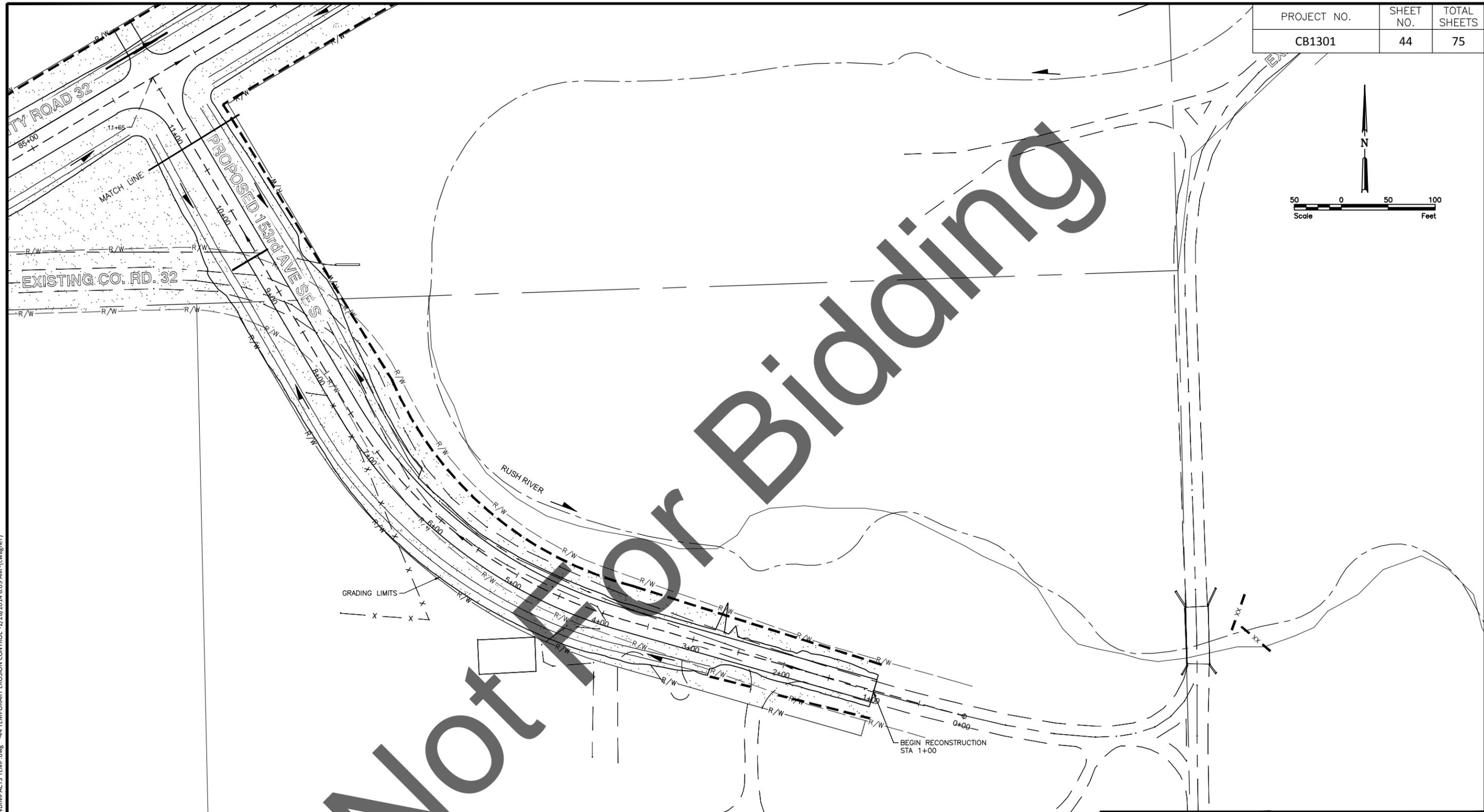
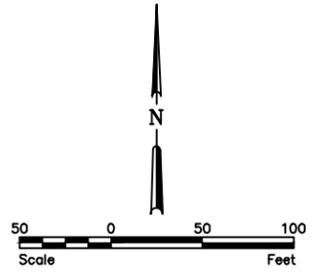


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LEGEND	
PERMANENT WETLAND IMPACT	
TEMPORARY WETLAND IMPACT	
TEMPORARY SEEDING & MULCHING	
TEMPORARY FLOATION SILT CURTAIN	
TEMPORARY FIBER ROLLS	

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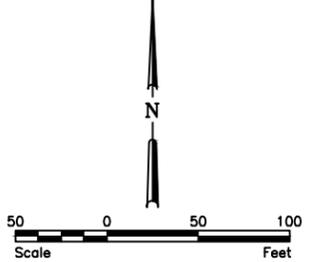
LEGEND	
PERMANENT WETLAND IMPACT	
TEMPORARY WETLAND IMPACT	
TEMPORARY SEEDING & MULCHING	
TEMPORARY FLOATION SILT CURTAIN	
TEMPORARY FIBER ROLLS	

ITEM	DESCRIPTION	QUANTITY	UNIT
708-1375	FLOATION SILT CURTAIN	80	LF
708-1376	REMOVAL FLOATION SILT CURTAIN	80	LF
708-1430	FIBER ROLLS 12IN	1,115	LF
708-1431	REMOVAL FIBER ROLLS 12IN	1,115	LF
708-2260	SEEDING - TYPE B CL IV	1.92	ACRE
708-5500	MULCHING	1.92	ACRE

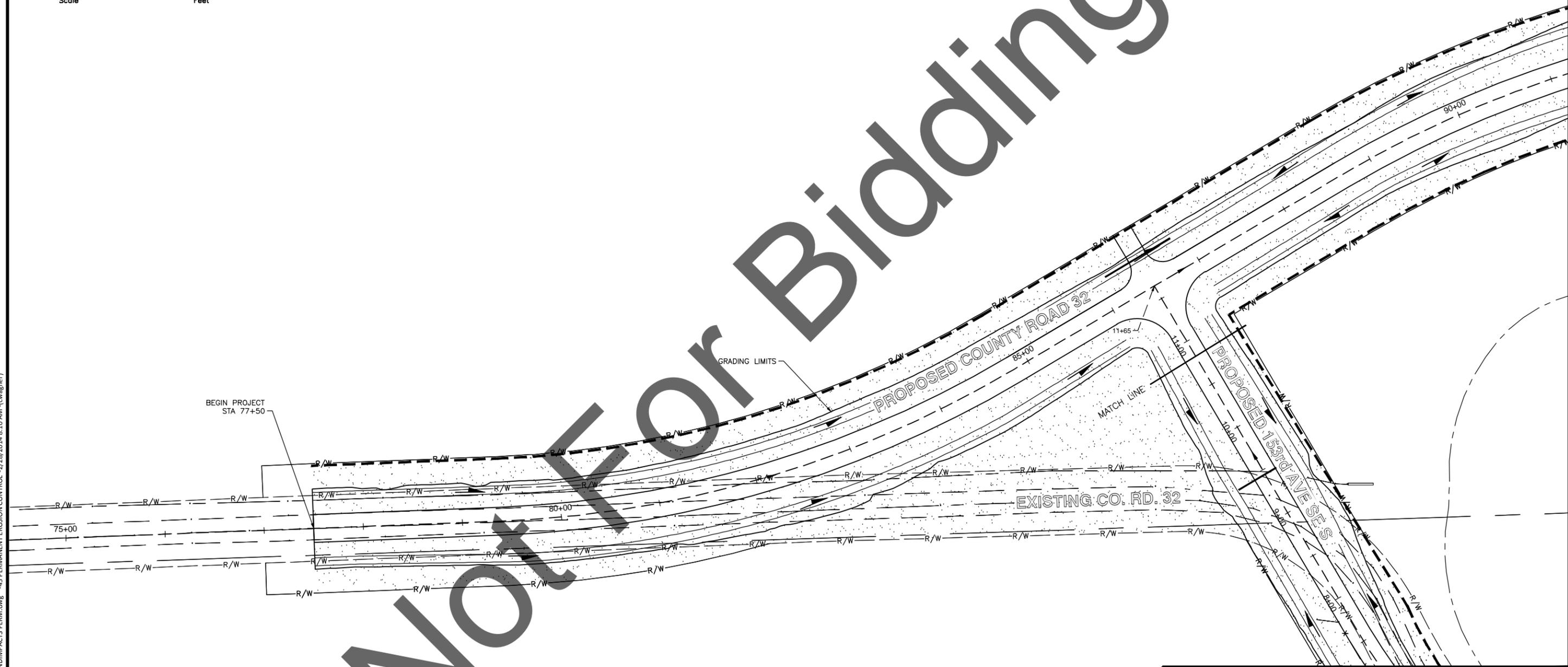
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 RUSH RIVER
 BRIDGE NO. 09-121-17.0
TEMPORARY EROSION CONTROL
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	45	75



ITEM	DESCRIPTION	QUANTITY	UNIT
708-1430	FIBER ROLLS 12IN	1,522	LF
708-2280	SEEDING - TYPE B CL V	3.23	ACRE
708-5500	MULCHING	3.23	ACRE



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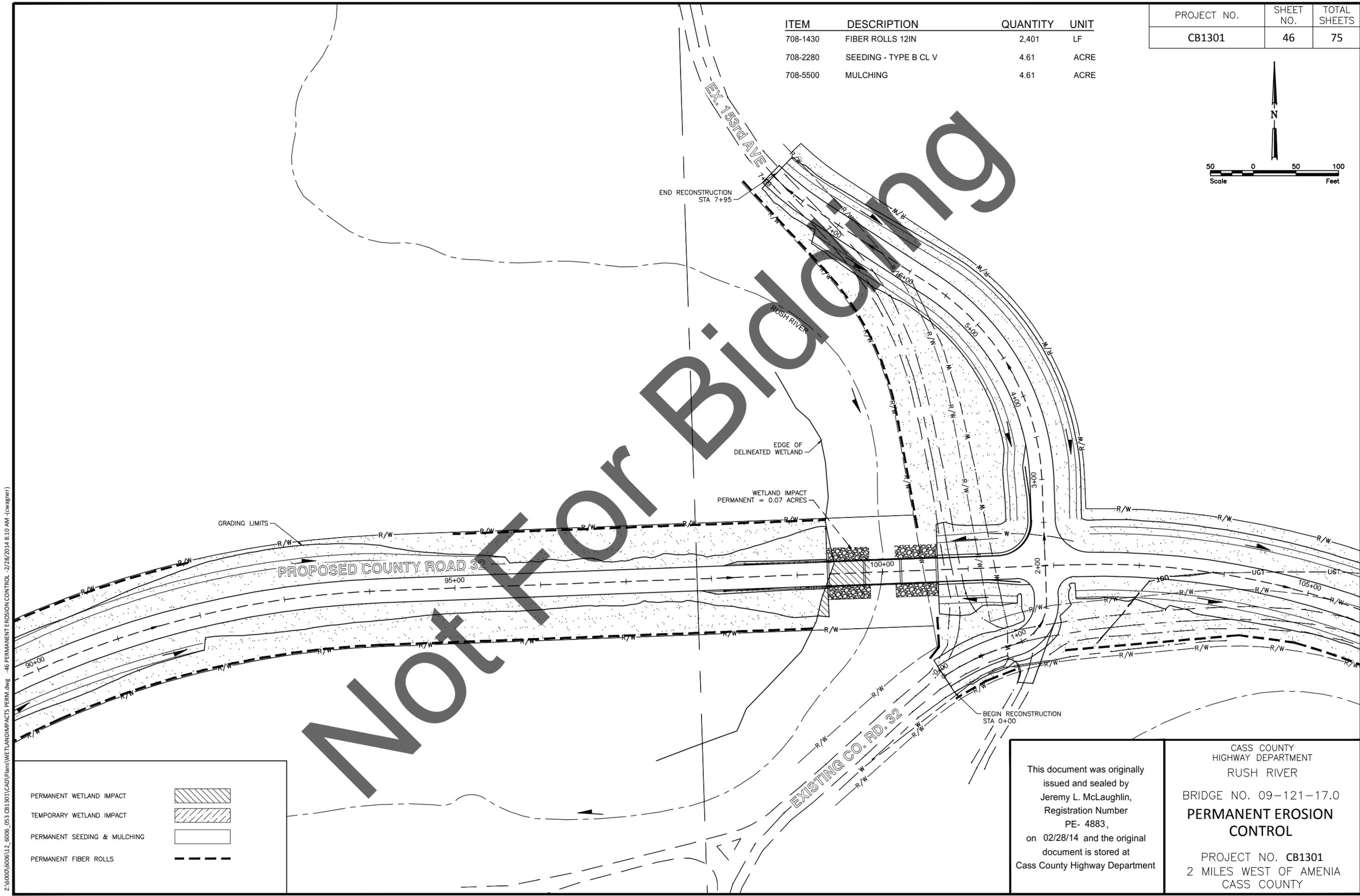
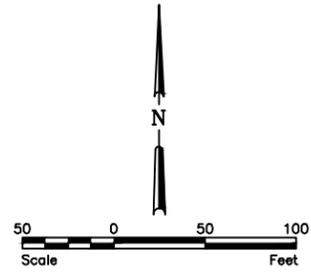
PERMANENT WETLAND IMPACT	
TEMPORARY WETLAND IMPACT	
PERMANENT SEEDING & MULCHING	
PERMANENT FIBER ROLLS	

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 RUSH RIVER
 BRIDGE NO. 09-121-17.0
PERMANENT EROSION CONTROL
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

ITEM	DESCRIPTION	QUANTITY	UNIT
708-1430	FIBER ROLLS 12IN	2,401	LF
708-2280	SEEDING - TYPE B CL V	4.61	ACRE
708-5500	MULCHING	4.61	ACRE

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	46	75



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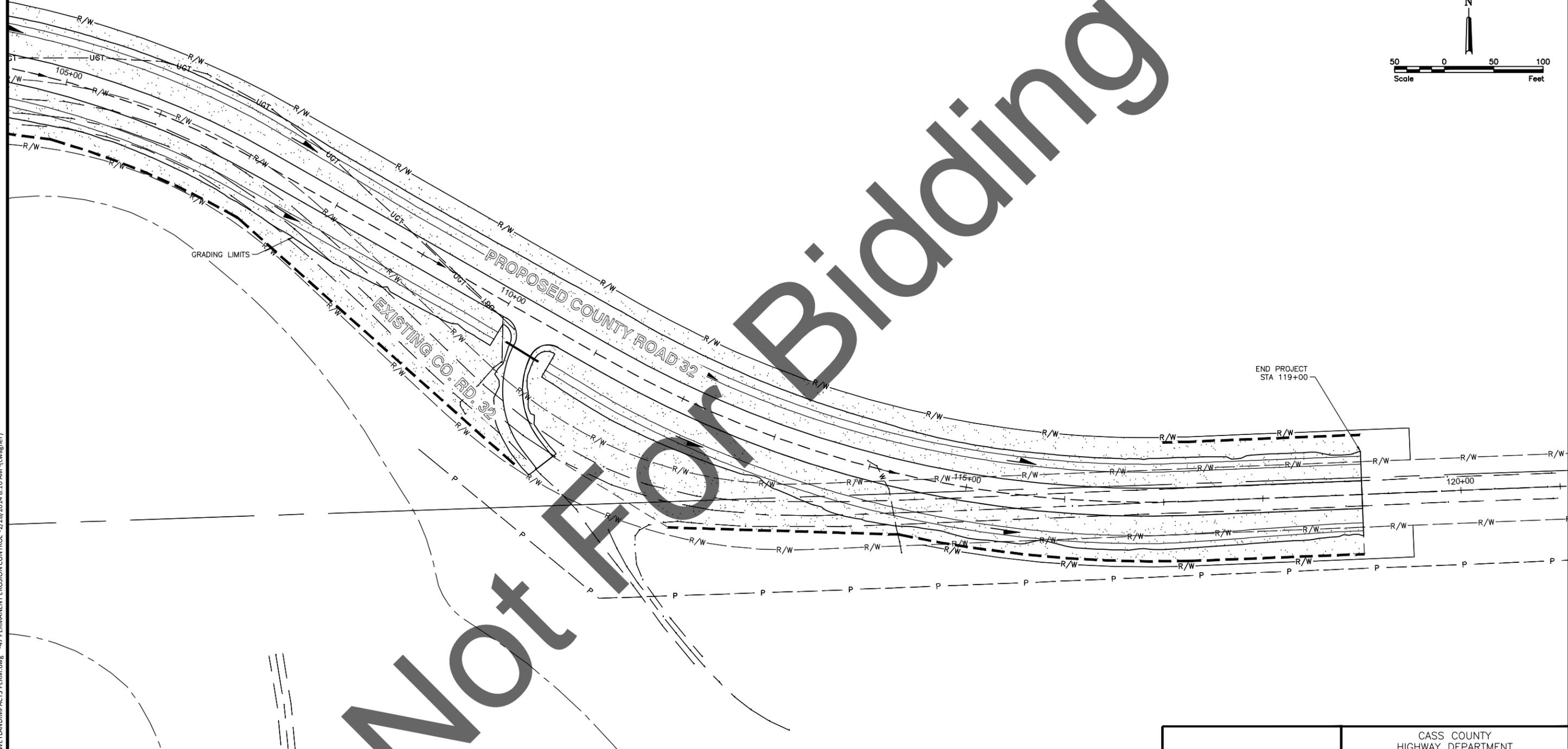
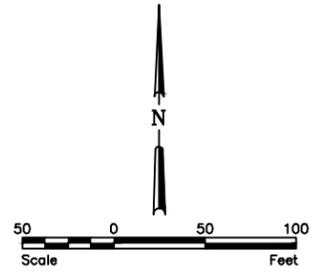
PERMANENT WETLAND IMPACT	
TEMPORARY WETLAND IMPACT	
PERMANENT SEEDING & MULCHING	
PERMANENT FIBER ROLLS	

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CASS COUNTY
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 RUSH RIVER
 BRIDGE NO. 09-121-17.0
PERMANENT EROSION CONTROL
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	47	75

ITEM	DESCRIPTION	QUANTITY	UNIT
708-1430	FIBER ROLLS 12IN	1,481	LF
708-2280	SEEDING - TYPE B CL V	3.71	ACRE
708-5500	MULCHING	3.71	ACRE



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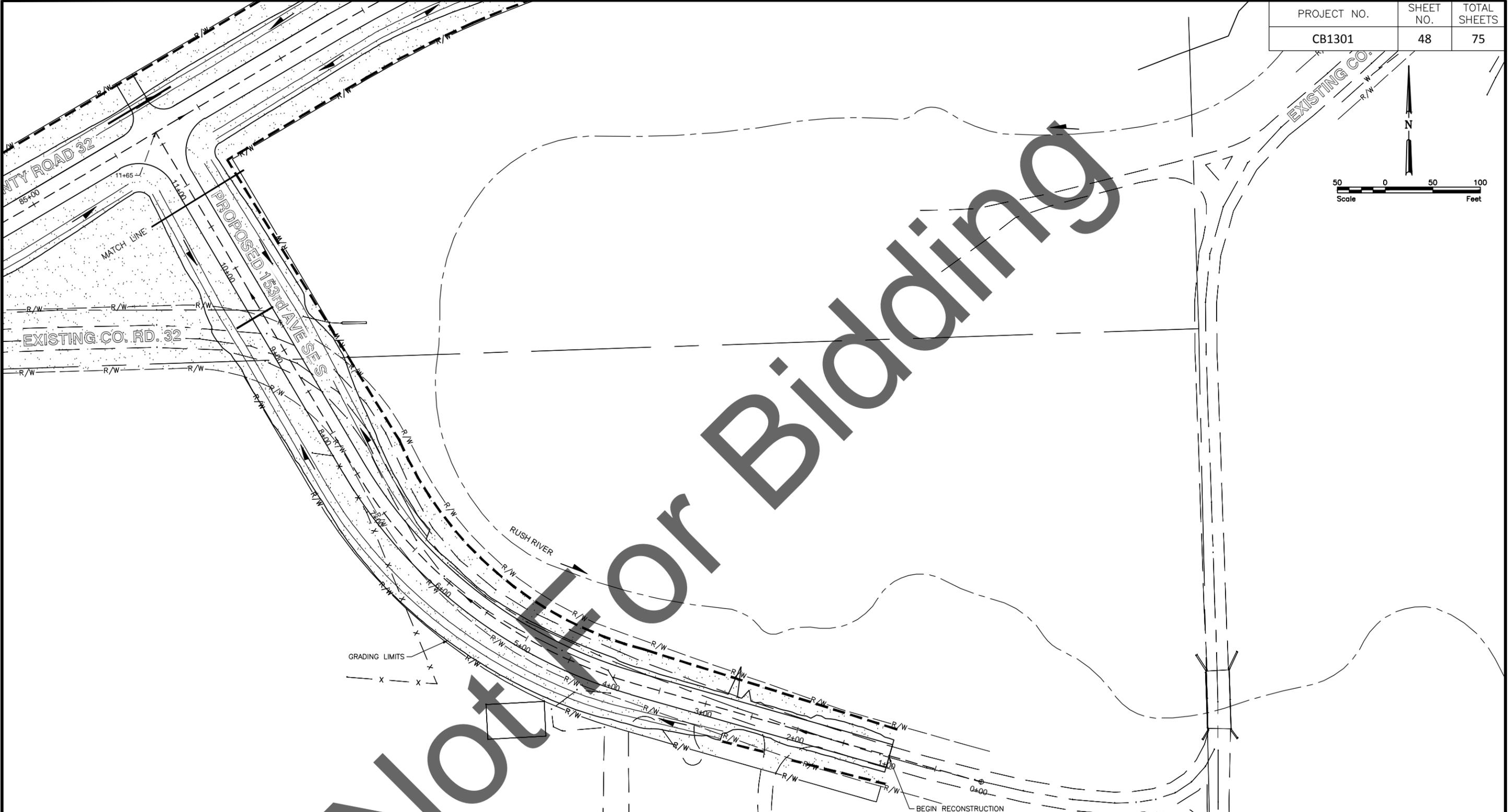
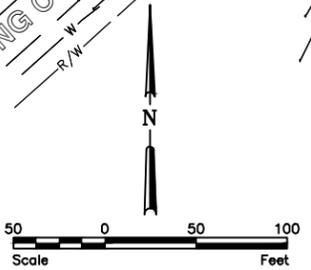
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PERMANENT WETLAND IMPACT	
TEMPORARY WETLAND IMPACT	
PERMANENT SEEDING & MULCHING	
PERMANENT FIBER ROLLS	

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CASS COUNTY
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 RUSH RIVER
 BRIDGE NO. 09-121-17.0
PERMANENT EROSION CONTROL
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	48	75



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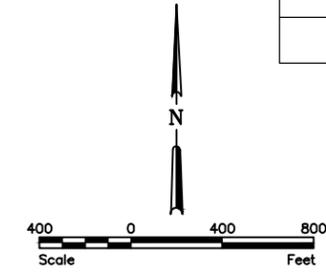
- PERMANENT WETLAND IMPACT
- TEMPORARY WETLAND IMPACT
- PERMANENT SEEDING & MULCHING
- PERMANENT FIBER ROLLS

ITEM	DESCRIPTION	QUANTITY	UNIT
708-1430	FIBER ROLLS 12IN	1,115	LF
708-2280	SEEDING - TYPE B CL V	1.92	ACRE
708-5500	MULCHING	1.92	ACRE

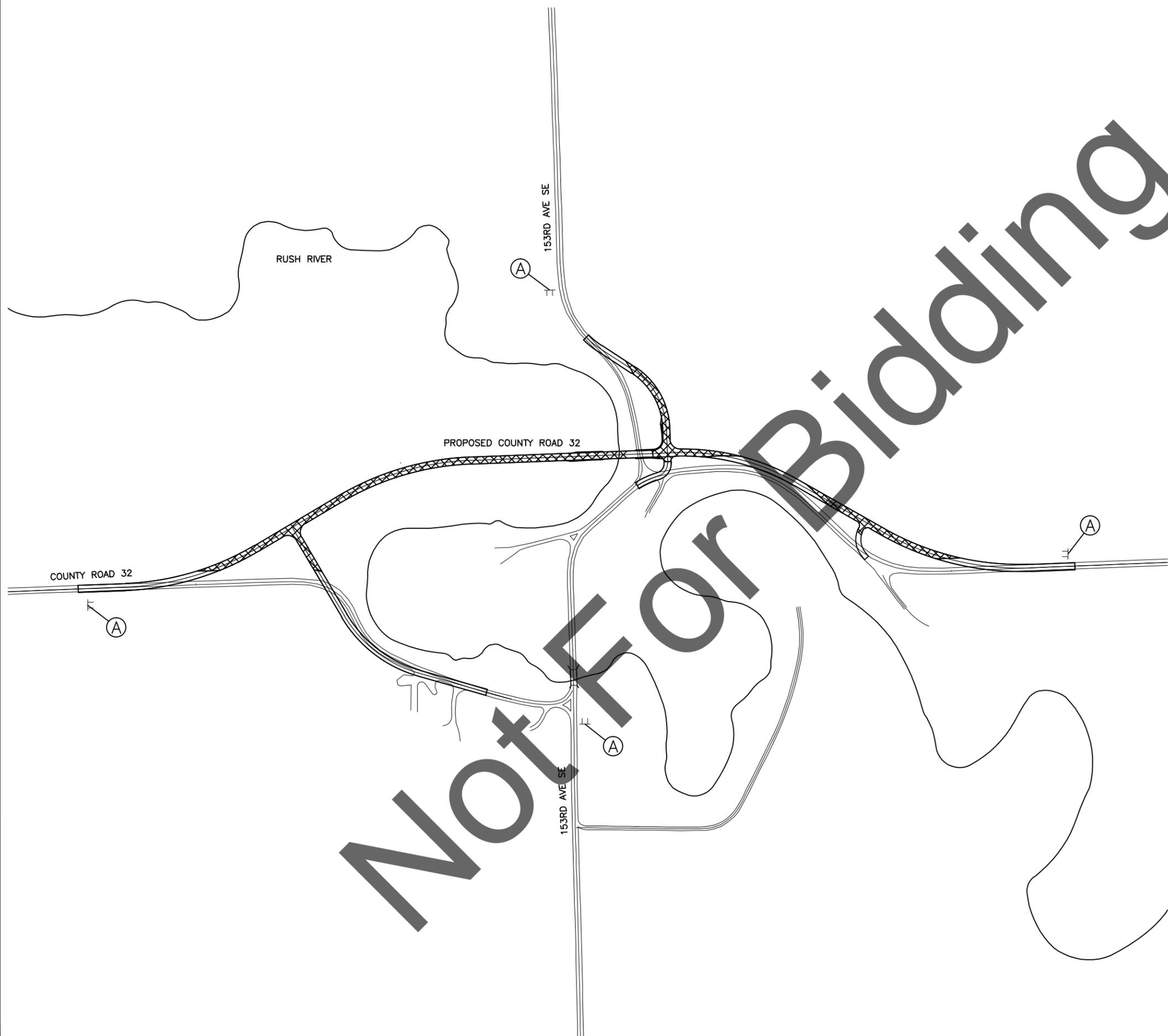
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PERMANENT EROSION CONTROL
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	49	75



NOTE: THE CONTRACTOR SHALL MAINTAIN TRAFFIC ON COUNTY ROAD 32 AND 153RD AVE SE FOR THE DURATION OF PHASE 1. IF THE CONTRACTORS OPERATIONS REQUIRE TEMPORARY CONNECTIONS NO ADDITIONAL PAYMENT WILL BE MADE.



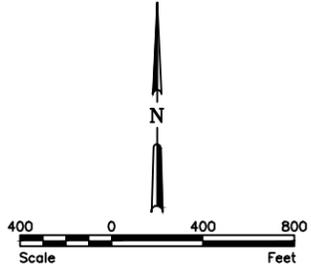
Not For Bidding

Z:\6000\6006\12_6006_063_CB1301\CAD\Plans\TrafficControl.dwg -49 TRAFFIC CONTROL PHASE 1 -2/28/2014 8:11 AM - (cwagner)

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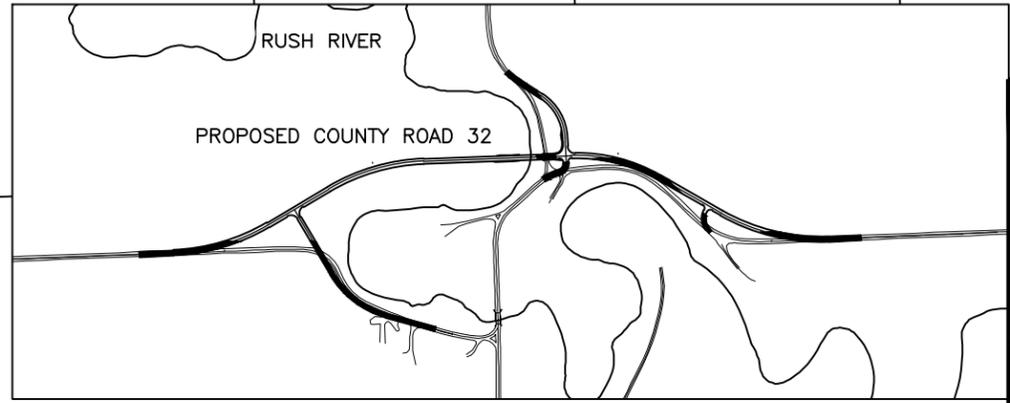
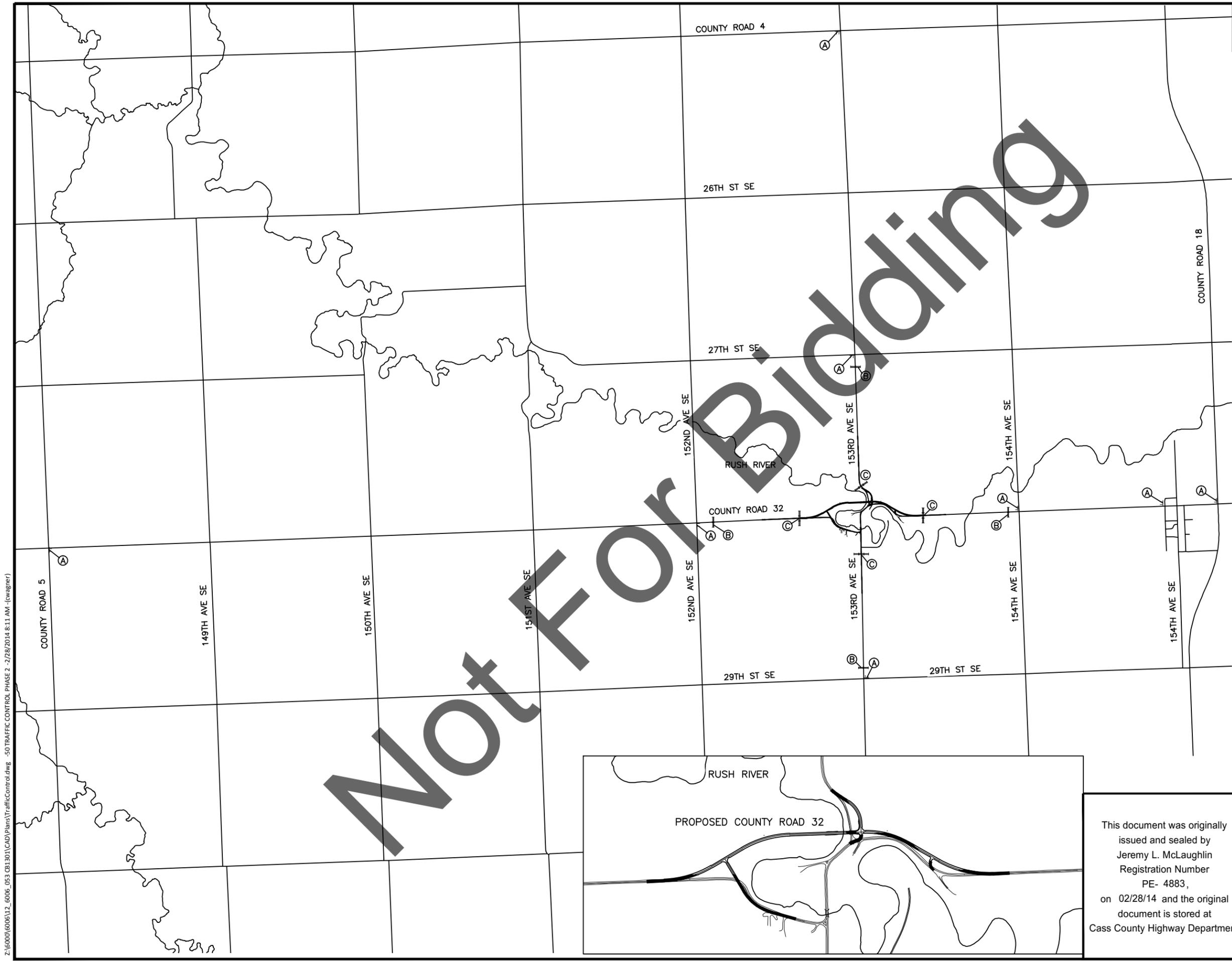
CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
TRAFFIC CONTROL PHASE 1
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	50	75



- (A) - 8
W20-3-48
W16-2-24
POST MOUNTED
- (B) - 4
R11-4-48
BARRICADE MOUNTED
- (C) - 4
R11-2-48
BARRICADE MOUNTED

PHASE 2 WORK AREA

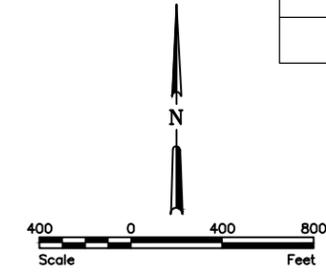


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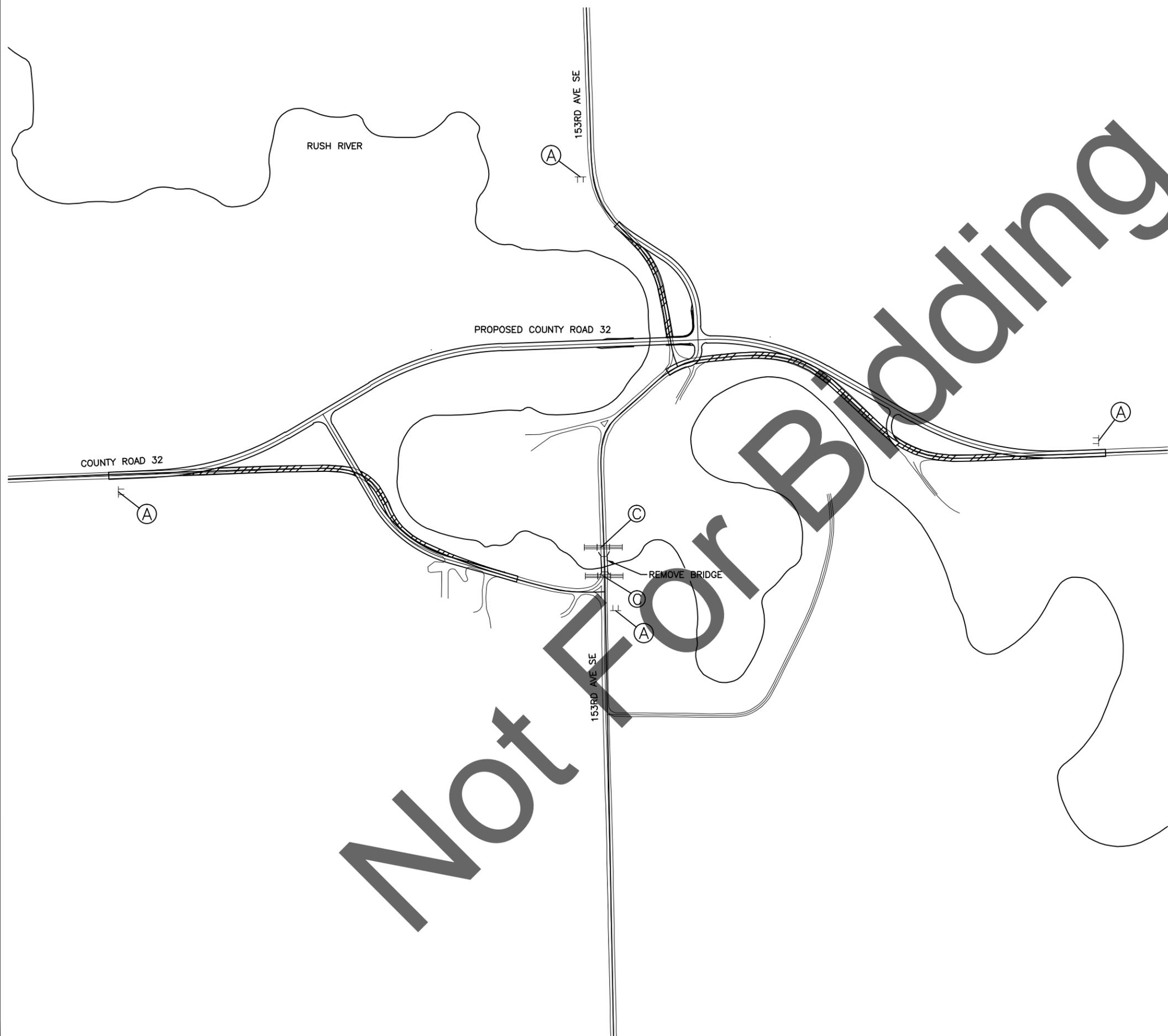
CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
TRAFFIC CONTROL PHASE 2
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

Z:\6000\6006\12_6006_063_CB1301\CAD\Plans\TrafficControl.dwg -50 TRAFFIC CONTROL PHASE 2 -2/28/2014 8:11 AM - (cwagner)

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	51	75



NOTE: THE CONTRACTOR SHALL MAINTAIN TRAFFIC ON COUNTY ROAD 32 AND 153RD AVE SE FOR THE DURATION OF PHASE 3. IF THE CONTRACTORS OPERATIONS REQUIRE TEMPORARY CONNECTIONS NO ADDITIONAL PAYMENT WILL BE MADE.



Not For Bidding

Z:\6000\6006\12_6006_063_CB1301\CAD\Plans\TrafficControl.dwg -51 TRAFFIC CONTROL PHASE 3 -2/28/2014 8:11 AM - (cwagner)

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CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
TRAFFIC CONTROL PHASE 3

 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)		6	
G20-1a-60	60"x24"	ROAD WORK NEXT ___ MILES		34	
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)		26	
G20-2a-48	48"x24"	END ROAD WORK		19	
G20-4-36	36"x18"	PILOT CAR FOLLOW ME		18	
G20-10-108	108"x48"	CONTRACTOR SIGN		64	
G20-50a-72	72"x36"	ROAD WORK NEXT ___ MILES RT & LT ARROWS		37	
G20-52a-72	72"x24"	ROAD WORK NEXT ___ MILES RT or LT ARROW		30	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT		59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR ARROW RIGHT or LEFT		23	
M5-1-21	21"x15"	ARROW AHD AND RT or LT (Mounted on route marker post)		7	
M5-2-21	21"x15"	ARROW AHD UP & RT or LT (Mounted on route marker post)		7	
M6-1-21	21"x15"	ARROW RT or LT (Mounted on route marker post)		7	
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)		7	
M6-3-21	21"x15"	ARROW AHD (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-1a-18	18"x18"	STOP and SLOW PADDLE Back to Back		5	
R1-2-60	60"x60"	YIELD		29	
R2-1-48	48"x60"	SPEED LIMIT ___		39	
R2-1a-24	24"x18"	MINIMUM FEE \$80 (Mounted on Speed Limit post)		10	
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT		35	
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT SYMBOL		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-36	36"x12"	ONE WAY RIGHT or LEFT		13	
R7-1-12	12"x18"	NO PARKING		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED	4	28	112
R11-2a-48	48"x30"	STREET CLOSED		28	
R11-3b-60	60"x30"	BRIDGE OUT ___ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-3c-60	60"x30"	STREET CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-4-60	60"x30"	ROAD CLOSED TO THRU TRAFFIC	4	31	124
W1-3-48	48"x48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW		35	
W1-4-48	48"x48"	RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-6-48	48"x24"	LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD SYMBOL		35	
W3-1a-48	48"x48"	STOP AHEAD SYMBOL		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5a-48	48"x48"	SPEED REDUCTION AHEAD		35	
W4-2-48	48"x48"	RIGHT or LEFT LANE TRANSITION SYMBOL		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC SYMBOL		35	
W8-1-48	48"x48"	BUMP		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-9a-48	48"x48"	SHOULDER DROP-OFF		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER STRIPE		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or ___ FT.		35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or ___ FT.		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL		35	
W13-1-24	24"x24"	___ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)		11	
W13-4-48	48"x60"	RAMP ARROW		39	
W14-3-48	48"x36"	NO PASSING ZONE		23	
W16-2-24	24"x18"	SUPPLEMENTAL MILE	8	35	280
W20-1-48	48"x48"	ROAD WORK AHEAD or ___ FT or ___ MILE	4	35	140
W20-2-48	48"x48"	DETOUR AHEAD or ___ FT		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or ___ FT.	8	35	280
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or ___ FT.		35	
W20-5-48	48"x48"	RIGHT or LEFT LANE CLOSED AHEAD or ___ FT.		35	
W20-7a-48	48"x48"	FLAGGING SYMBOL		35	
W20-7k-24	24"x18"	___ FEET (Mounted on warning sign post)		10	
W20-8-48	48"x48"	STREET CLOSED		35	
W20-51-48	48"x48"	EQUIPMENT WORKING		35	
W20-52-54	54"x12"	NEXT ___ MILES (Mounted on warning sign post)		12	
W21-1a-48	48"x48"	WORKERS SYMBOL		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or ___ FT		35	
W21-5-48	48"x48"	SHOULDER WORK		35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or ___ FT.		35	
W21-6a-48	48"x48"	SURVEY CREW AHEAD		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or ___ FT.		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
	24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)		11	

SPECIAL SIGNS	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL

SPEC & CODE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
704-1000	TRAFFIC CONTROL SIGNS			936

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	FLAGGING	MHR	
704-1041	ATTENUATION DEVICE-TYPE B-55	EACH	
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH	
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1051	TYPE II BARRICADES	EACH	
704-1052	TYPE III BARRICADES	EACH	20
704-1060	DELINEATOR DRUMS	EACH	
704-1065	TRAFFIC CONES	EACH	
704-1067	TUBULAR MARKERS	EACH	
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH	
704-1095	TYPE B FLASHERS	EACH	
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	
762-1500	OBLITERATION OF PVMIT MK	SF	
772-2110	FLASHING BEACON - POST MOUNTED	EACH	

NOT FOR BIDDING

<p>This document was originally issued and sealed by Jeremy L. McLaughlin Registration Number PE- 4883, on 02/28/14 and the original document is stored at Cass County Highway Department</p>	<p>CASS COUNTY HIGHWAY DEPARTMENT RUSH RIVER BRIDGE NO. 09-121-17.0 TRAFFIC CONTROL DEVICE LIST PROJECT NO. CB1301 2 MILES WEST OF AMENIA CASS COUNTY</p>
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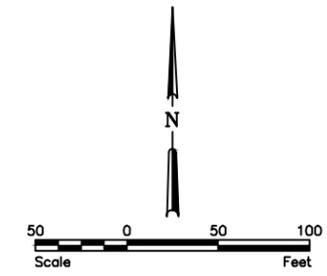
Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Support Size	Max Post Len LF	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF			1st LF	2nd LF	3rd LF	4th LF								
County Road 32																						
76+00 Rt		9		5.0		11.5			2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga					
78+00 Rt		19		6.3		12.2			2.5 x 2.5 12 ga	14.5					1	4	3 x 3 7 ga					
85+00 Lt		9		5.0		11.5			2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga					
86+55 Lt		34		8.0		10.7			2.5 x 2.5 10 ga	13.6					1	4	3 x 3 7 ga				1	
88+00 Rt		9		5.0		11.5			2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga					
95+50 Lt		19		6.3		12.2			2.5 x 2.5 12 ga	14.5					1	4	3 x 3 7 ga					
101+00 Lt		9		5.0		11.5			2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga					
101+00 Rt		19		6.3		12.2			2.5 x 2.5 12 ga	14.5					1	4	3 x 3 7 ga					
103+00 Rt		9		5.0		11.5			2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga					
118+75 Lt		19		6.3		12.2			2.5 x 2.5 12 ga	14.5					1	4	3 x 3 7 ga					
120+75 Lt		9		5.0		11.5			2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga					
123+95 Rt		20		9.0		12.6			2.25 x 2.25 12 ga	14.1	3.8				1	4	3 x 3 7 ga				1	
Sub Total			0.0	72.2			Total	140.8							Total	48		0	0		2	
28TH STREET																						
1+00 Lt		53		8.5		13.2			2.5 x 2.5 10 ga	14.7					1	4	3 x 3 7 ga				1	
2+25 Rt		53		8.5		13.2			2.5 x 2.5 10 ga	14.7					1	4	3 x 3 7 ga				1	
9+00 Lt		53		8.5		13.2			2.5 x 2.5 10 ga	14.7					1	4	3 x 3 7 ga				1	
11+35 Rt		1		5.2		10.5			2.25 x 2.25 12 ga	13.7					1	4	2.5 x 2.5 12 ga					
Sub Total			0.0	30.7			Total	50.1							Total	16		0	0		3	
153RD AVE																						
1+70 Lt		19		6.3		11.7			2.5 x 2.5 12 ga	14.5					1	4	3 x 3 7 ga					
1+70 Rt		1		5.2		10.5			2.25 x 2.25 12 ga	13.7					1	4	2.5 x 2.5 12 ga					
2+28 Lt		1		5.2		11.2			2.25 x 2.25 12 ga	13.7					1	4	2.5 x 2.5 12 ga					
3+00 Rt		53		8.5		13.3			2.5 x 2.5 10 ga	14.7					1	4	3 x 3 7 ga				1	
Loc 1 Lt		34		8.0		10.8			2.5 x 2.5 10 ga	13.6					1	4	3 x 3 7 ga				1	
Loc 2 Rt		34		8.0																	Mount on Barricade	
Loc 3 Rt		53		8.5		13.2			2.5 x 2.5 10 ga	14.7					1	4	3 x 3 7 ga				1	
Loc 4 Lt		53		8.5		13.3			2.5 x 2.5 10 ga	14.7					1	4	3 x 3 7 ga				1	
Sub Total			0.0	58.2			Total	83.9							Total	28		0	0		4	
Grand Total			0.0	161.1			Total	274.8							Total	92		0	0		9	

Basis of Estimate
Sign Support Lengths
The sign support lengths have been calculated
using the following vertical clearances:
Rural Roadway - 60"

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CASS COUNTY
HIGHWAY DEPARTMENT
RUSH RIVER
BRIDGE NO. 09-121-17.0
SIGN SUMMARY
PROJECT NO. CB1301
2 MILES WEST OF AMENIA
CASS COUNTY

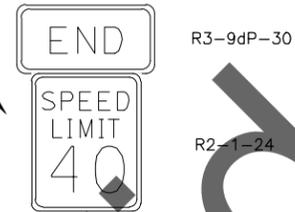
PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	54	75



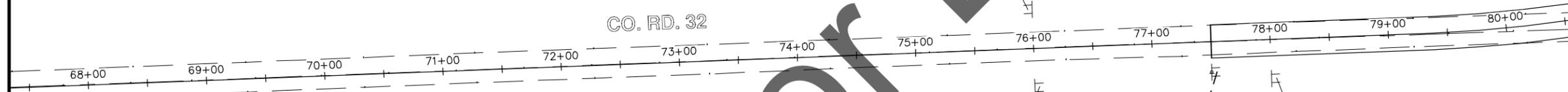
PROJECT BENCH MARK
 E INV. OF 18" CMP
 132LF SE OF EAST END OF
 PROPOSED BRIDGE
 INV. 970.45 (NAVD 1988)

SIGN TO BE INSTALLED BY OTHERS

STA 76+00 - 26' LT
 NEW SIGN AND SUPPORT
 SPECIAL ASSEMBLY A



CO. RD. 32



Not For Bidding



STA 76+00 - 26' RT
 NEW SIGN AND SUPPORT
 ASSEMBLY NO. 9



REMOVE EXISTING
 SIGN AND SUPPORT



STA 78+00 - 26' RT
 NEW SIGN AND SUPPORT
 ASSEMBLY NO. 19

W1-4-30

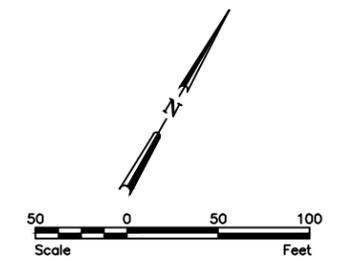
NOTE:
 OFFSETS ARE TAKEN FROM THE CENTERLINE OF
 THE ROADWAY TO THE EDGE OF THE SIGN.

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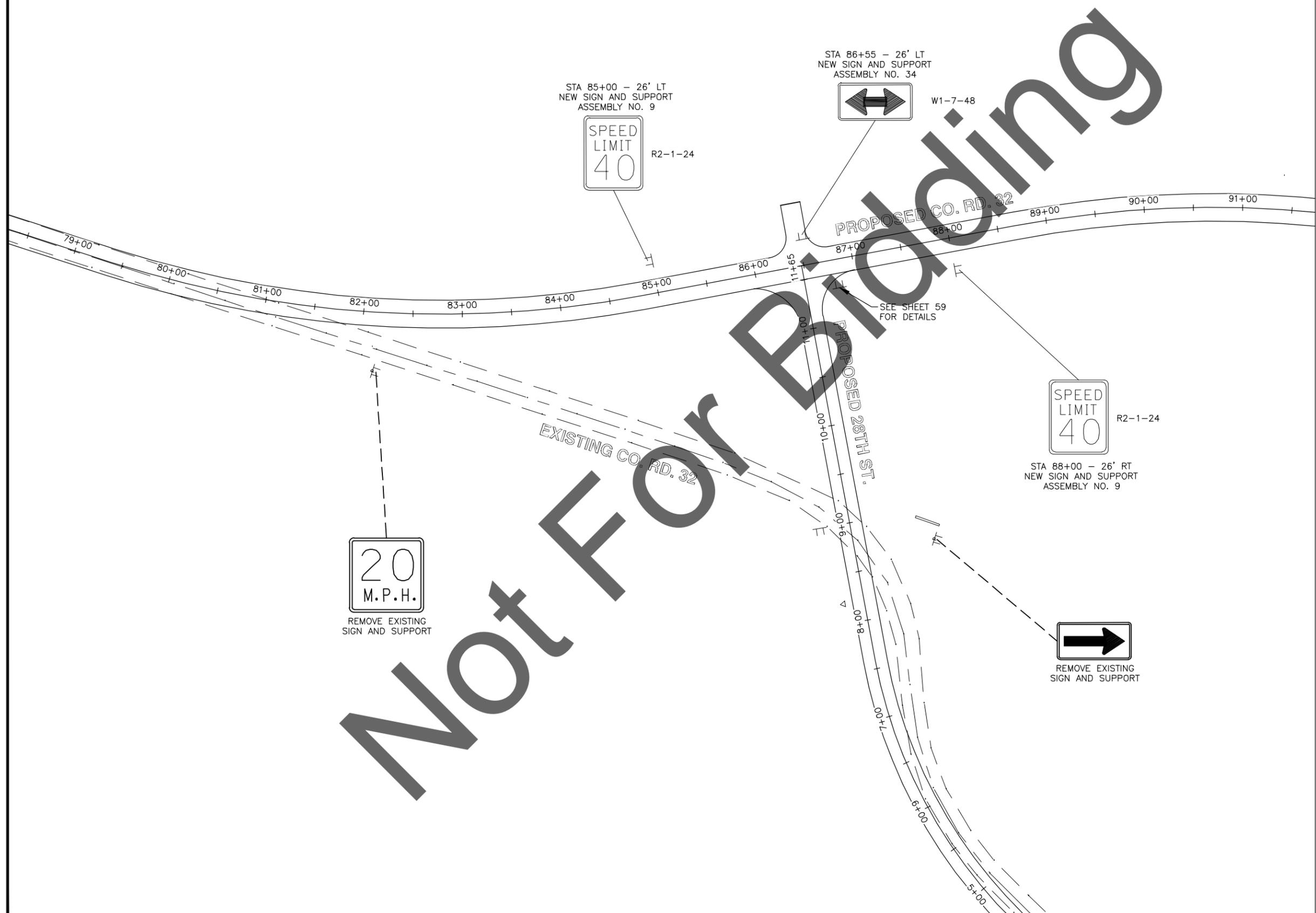
CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
**COUNTRY ROAD 32
 SIGNING**
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	55	75



PROJECT BENCH MARK
 E INV. OF 18" CMP
 132LF SE OF EAST END OF
 PROPOSED BRIDGE
 INV. 970.45 (NAVD 1988)



SEE SHEET 59 FOR DETAILS

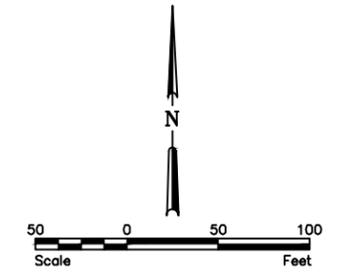
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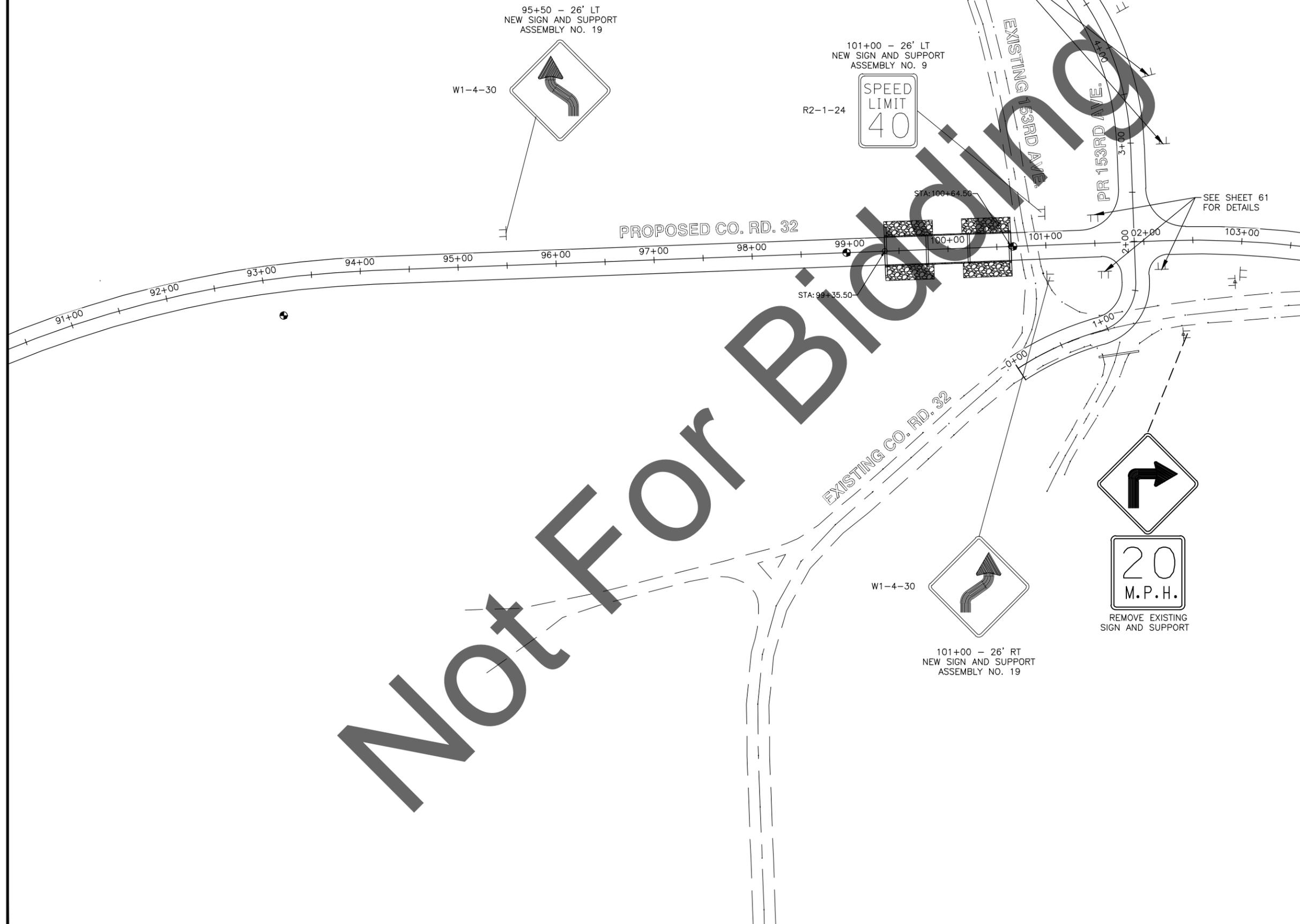
CASS COUNTY
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**COUNTRY ROAD 32
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 2 MILES WEST OF AMENIA
 CASS COUNTY

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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	56	75



PROJECT BENCH MARK
 E INV. OF 18" CMP
 132LF SE OF EAST END OF
 PROPOSED BRIDGE
 INV. 970.45 (NAVD 1988)



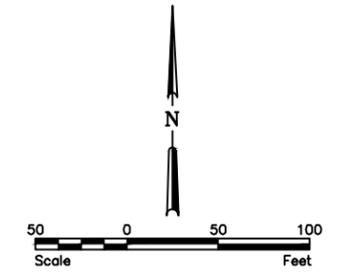
NOTE:
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 BRIDGE NO. 09-121-17.0
**COUNTRY ROAD 32
 SIGNING**
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	57	75



PROJECT BENCH MARK
 E INV. OF 18" CMP
 132LF SE OF EAST END OF
 PROPOSED BRIDGE
 INV. 970.45 (NAVD 1988)

103+00 - 26' RT
 NEW SIGN AND SUPPORT
 ASSEMBLY NO. 9



REMOVE EXISTING
 SIGN AND SUPPORT

REMOVE EXISTING
 SIGN AND SUPPORT



REMOVE EXISTING
 SIGN AND SUPPORT



REMOVE EXISTING
 SIGN AND SUPPORT

NOT FOR Bidding

NOTE:
 OFFSETS ARE TAKEN FROM THE CENTERLINE OF
 THE ROADWAY TO THE EDGE OF THE SIGN.

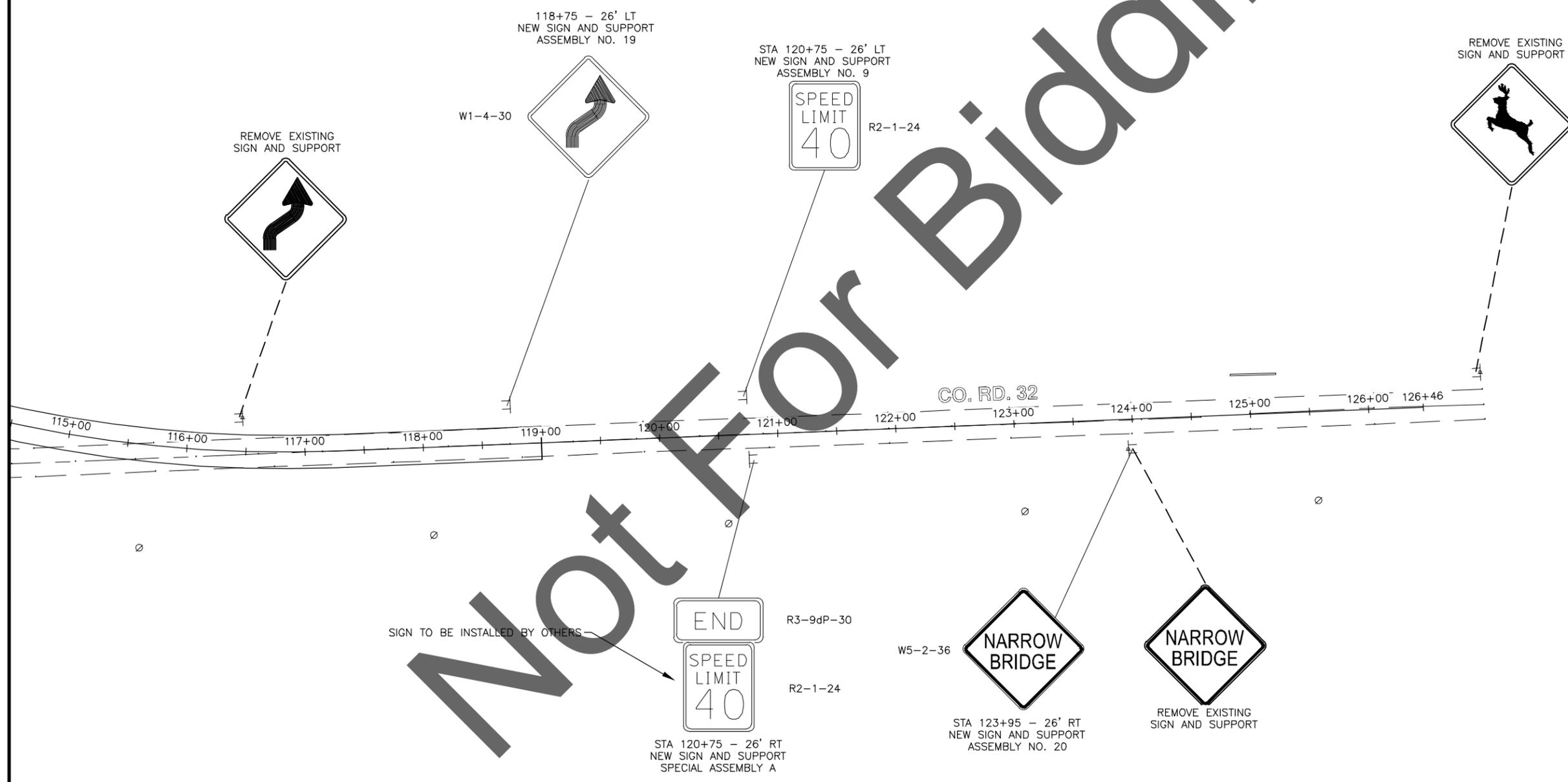
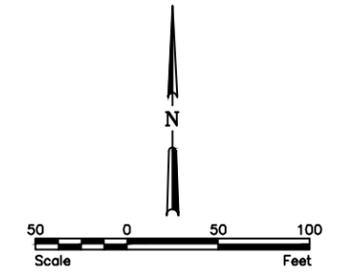
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 RUSH RIVER
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**COUNTRY ROAD 32
 SIGNING**
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

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PROJECT BENCH MARK
 E INV. OF 18" CMP
 132LF SE OF EAST END OF
 PROPOSED BRIDGE
 INV. 970.45 (NAVD 1988)

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	58	75



Not For Bidding

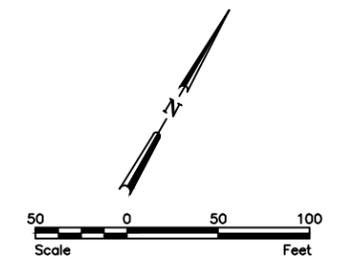
NOTE:
 OFFSETS ARE TAKEN FROM THE CENTERLINE OF
 THE ROADWAY TO THE EDGE OF THE SIGN.

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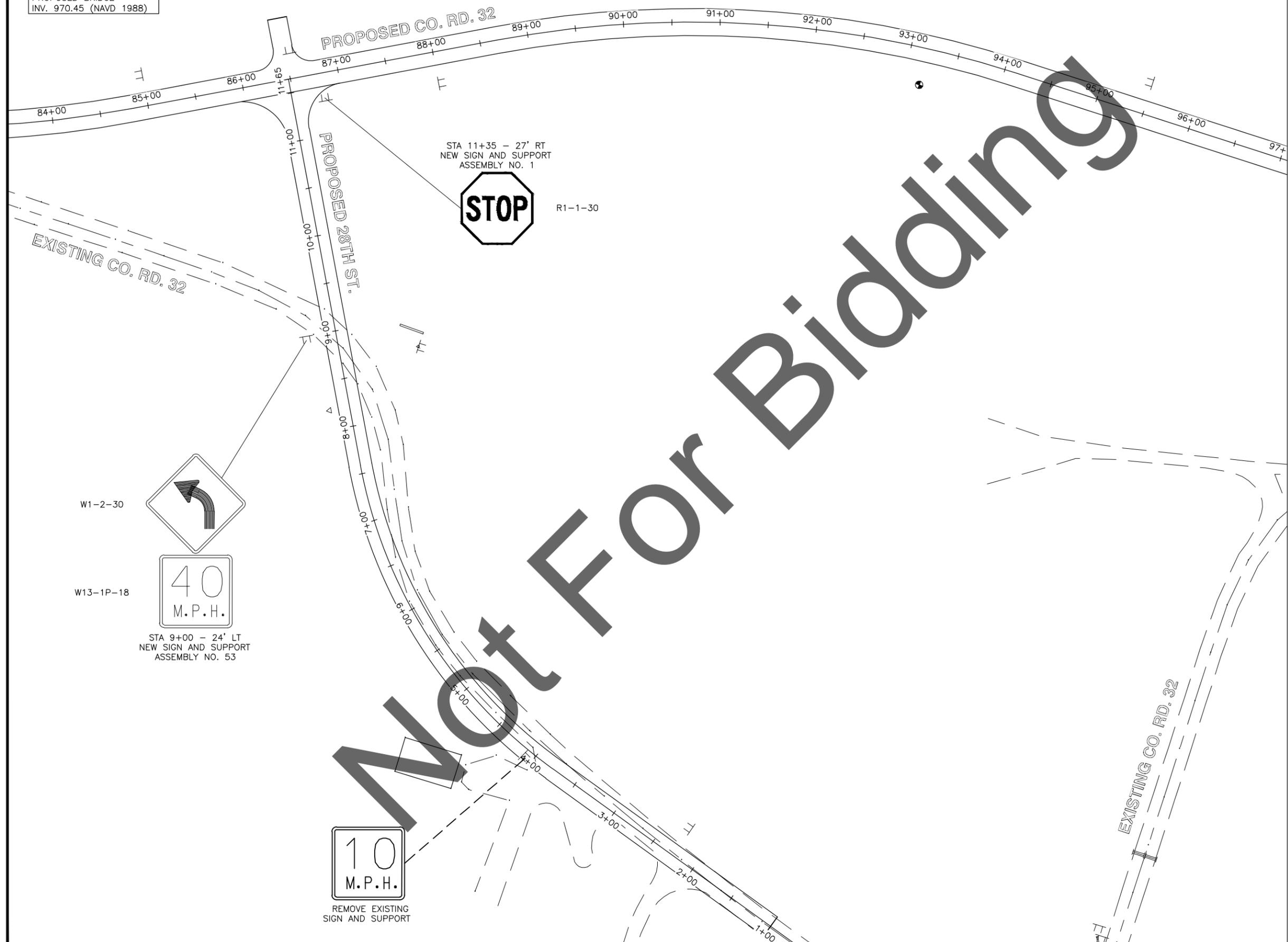
CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
**COUNTRY ROAD 32
 SIGNING**
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	59	75



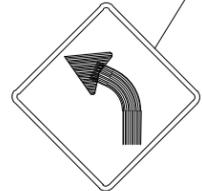
PROJECT BENCH MARK
 E INV. OF 18" CMP
 132LF SE OF EAST END OF
 PROPOSED BRIDGE
 INV. 970.45 (NAVD 1988)



STA 11+35 - 27' RT
 NEW SIGN AND SUPPORT
 ASSEMBLY NO. 1



R1-1-30



W1-2-30



W13-1P-18

STA 9+00 - 24' LT
 NEW SIGN AND SUPPORT
 ASSEMBLY NO. 53



REMOVE EXISTING
 SIGN AND SUPPORT

NOTE:
 OFFSETS ARE TAKEN FROM THE CENTERLINE OF
 THE ROADWAY TO THE EDGE OF THE SIGN.

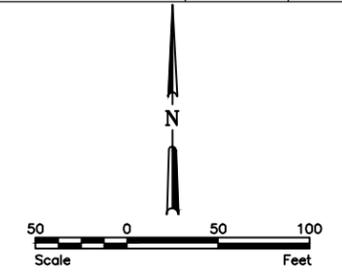
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CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
28TH ST SIGNING

PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	60	75



PROJECT BENCH MARK
 E INV. OF 18" CMP
 132LF SE OF EAST END OF
 PROPOSED BRIDGE
 INV. 970.45 (NAVD 1988)

STA 2+25 - 24' RT
 NEW SIGN AND SUPPORT
 ASSEMBLY NO. 53



W1-2-30



W13-1P-18

REMOVE EXISTING
 SIGN AND SUPPORT



REMOVE EXISTING
 SIGN AND SUPPORT



INSTALL NEW TYPE III BARRICADES (2).
 REFER TO STD DRAWING D-754-18 FOR
 BARRICADE SPECIFICATIONS AND INSTALLATION DETAILS.
 ALL COSTS ASSOCIATED WITH FURNISHING AND INSTALLING
 BARRICADES SHALL BE INCLUDED IN THE PRICE BID FOR
 "TYPE III BARRICADE".

REMOVE EXISTING
 SIGN AND SUPPORT



INSTALL NEW TYPE III BARRICADES (2).
 REFER TO STD DRAWING D-754-18 FOR
 BARRICADE SPECIFICATIONS AND INSTALLATION DETAILS.
 ALL COSTS ASSOCIATED WITH FURNISHING AND INSTALLING
 BARRICADES SHALL BE INCLUDED IN THE PRICE BID FOR
 "TYPE III BARRICADE".

REMOVE EXISTING
 SIGN AND SUPPORT

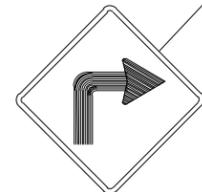


RESHAPE ROADWAY
 ALL COSTS ASSOCIATED
 RESHAPING ROADWAY
 TO BE INCLUDED IN PRICE
 BID FOR OTHER ITEMS

EXISTING ROADWAY
 TO BE REMOVED

24.00'

275'

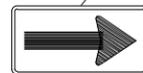


W1-1-30



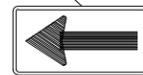
W13-P-18

STA 1+00 - 24' LT
 NEW SIGN AND SUPPORT
 ASSEMBLY NO. 53



W1-6-48

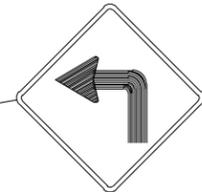
LOCATION 1
 12' OFFSET FROM EDGE OF SHOULDER
 NEW SIGN AND SUPPORT
 ASSEMBLY NO. 34



W1-6-48

LOCATION 2
 12' OFFSET FROM EDGE OF SHOULDER
 NEW SIGN AND BARRICADE
 SPECIAL ASSEMBLY B

LOCATION 3
 12' OFFSET FROM EDGE OF SHOULDER
 NEW SIGN AND SUPPORT
 ASSEMBLY NO. 53



W1-1-30



W13-P-18

NOTE:
 OFFSETS ARE TAKEN FROM THE CENTERLINE OF
 THE ROADWAY TO THE EDGE OF THE SIGN.

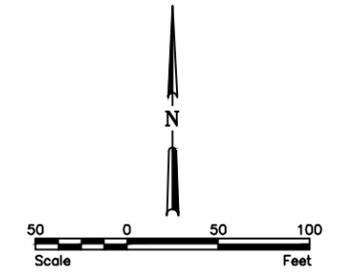
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CASS COUNTY
 HIGHWAY DEPARTMENT
 RUSH RIVER
 BRIDGE NO. 09-121-17.0
**28TH ST & 153RD AVE
 SIGNING**
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

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Not For Bidding

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	61	75

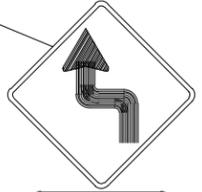


PROJECT BENCH MARK
 E INV. OF 18" CMP
 132LF SE OF EAST END OF
 PROPOSED BRIDGE
 INV. 970.45 (NAVD 1988)

SIGN NOT SHOWN IN PROPER LOCATION,
 INSTALL SIGN 225 LF NORTH OF THE CURVE

DELINEATORS TO BE INSTALLED BY OTHERS

W1-1-30



W13-1P-18



LOCATION 4
 12' OFFSET FROM EDGE OF SHOULDER
 NEW SIGN AND SUPPORT
 ASSEMBLY NO. 53

EXISTING
 153RD AVE.

PROPOSED 153RD AVE.

DELINEATORS TO BE INSTALLED BY OTHERS

STA 3+00 - 26' RT
 NEW SIGN AND SUPPORT
 ASSEMBLY NO. 53



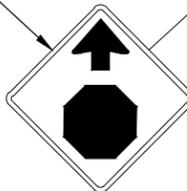
W1-1-30



W13-1P-18

SIGN TO BE INSTALLED BY OTHERS

W3-1-30



STA 6+50 - 26' LT
 NEW SIGN AND SUPPORT
 ASSEMBLY NO. 19

STA 2+28 - 33' LT
 NEW SIGN AND SUPPORT
 ASSEMBLY NO. 1



R1-1-30

PROPOSED CO. RD. 32

STA: 100+64.50

STA: 99+35.50

W14-1-30



STA 1+70 - 24' LT
 NEW SIGN AND SUPPORT
 ASSEMBLY NO. 19

EXISTING
 CO. RD. 32



R1-1-30

STA 1+70 - 20' RT
 NEW SIGN AND SUPPORT
 ASSEMBLY NO. 1

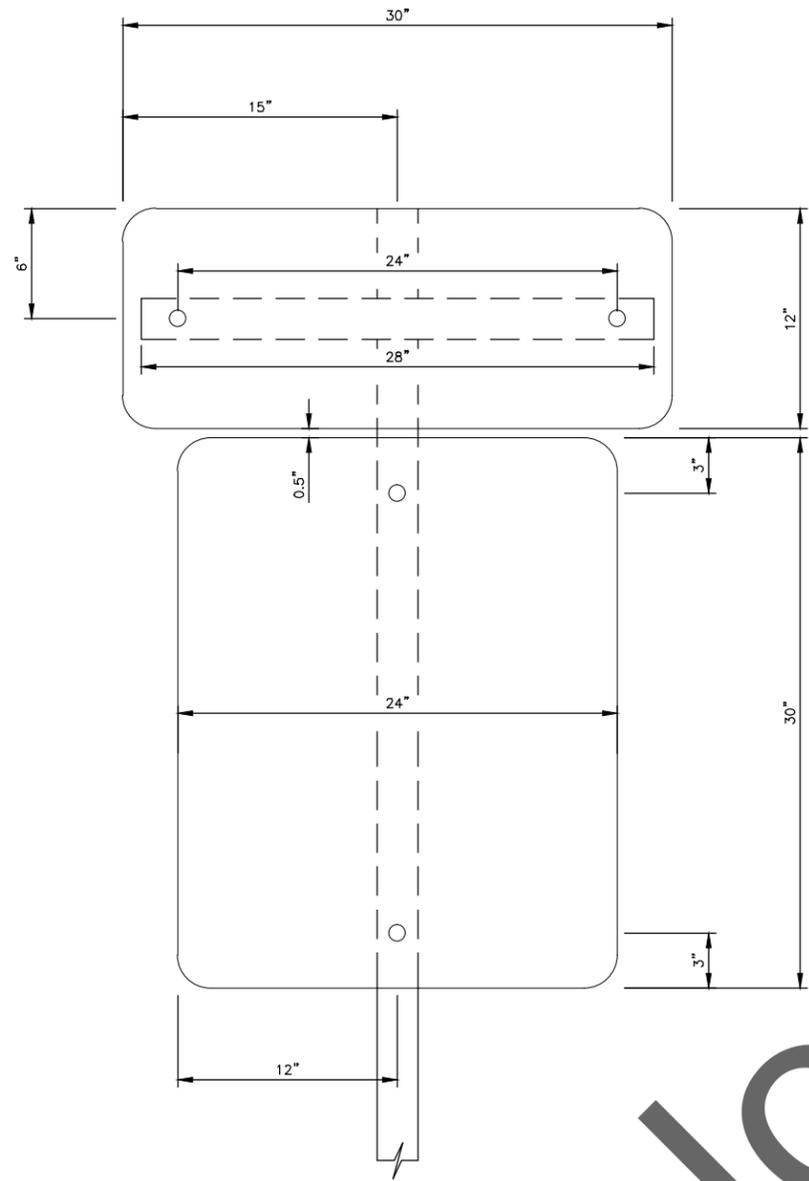
NOTE:
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CASS COUNTY
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 RUSH RIVER
 BRIDGE NO. 09-121-17.0
153RD AVE SIGNING
 PROJECT NO. CB1301
 2 MILES WEST OF AMENIA
 CASS COUNTY

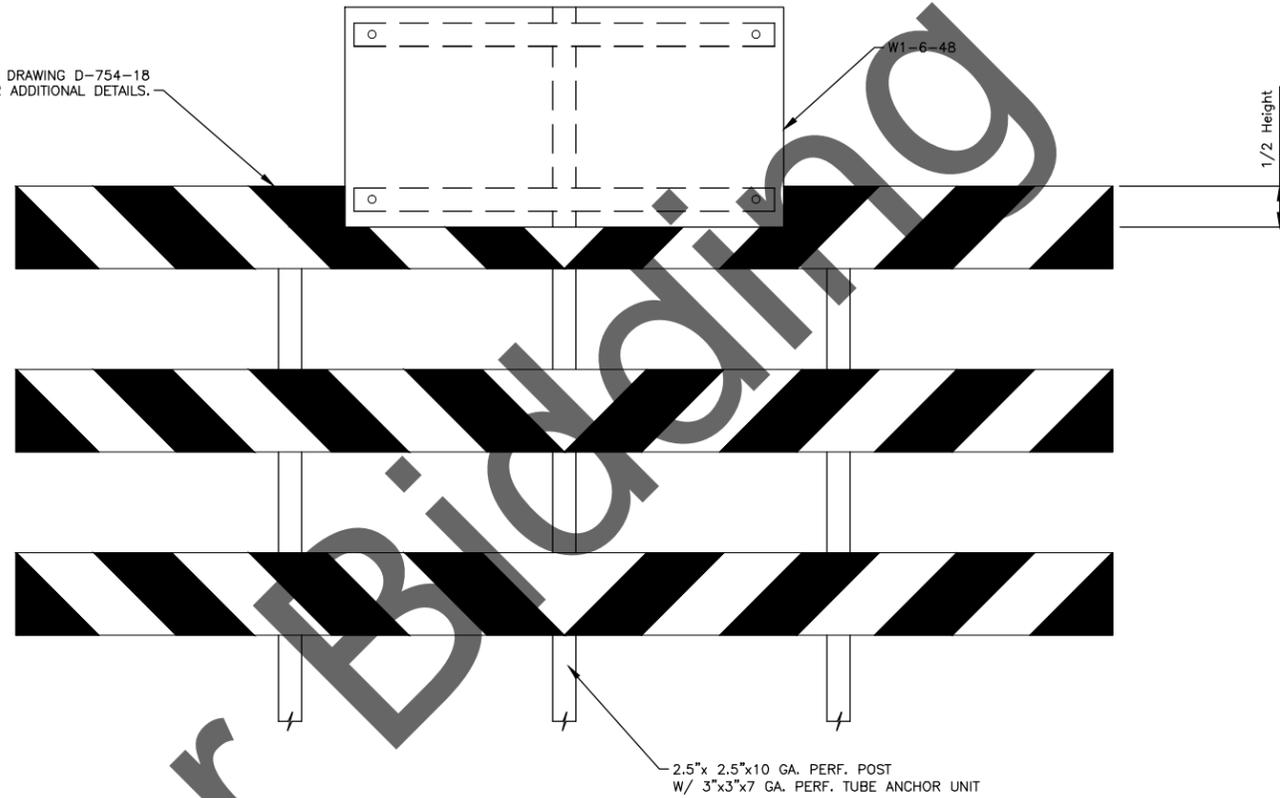
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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1301	62	75

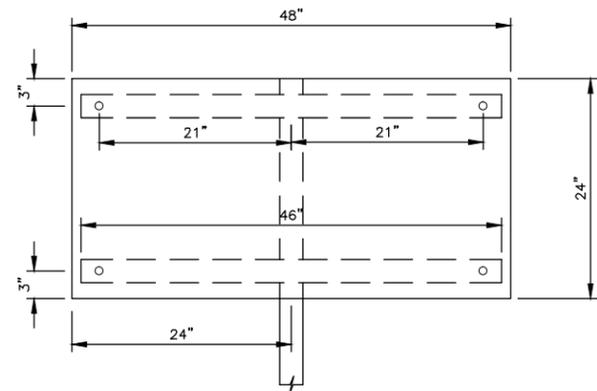


SPECIAL ASSEMBLY A
NOT TO SCALE

REFER TO STD DRAWING D-754-18 FOR ADDITIONAL DETAILS.



2.5"x 2.5"x10 GA. PERF. POST
W/ 3"x3"x7 GA. PERF. TUBE ANCHOR UNIT

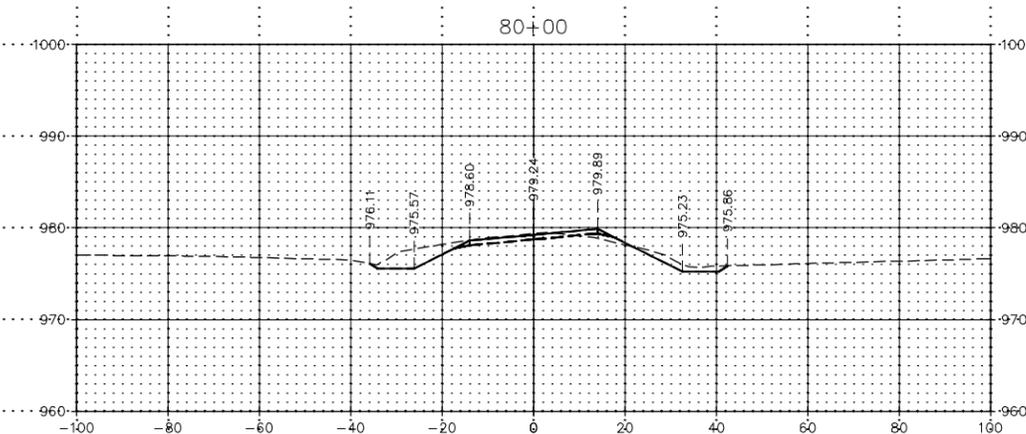
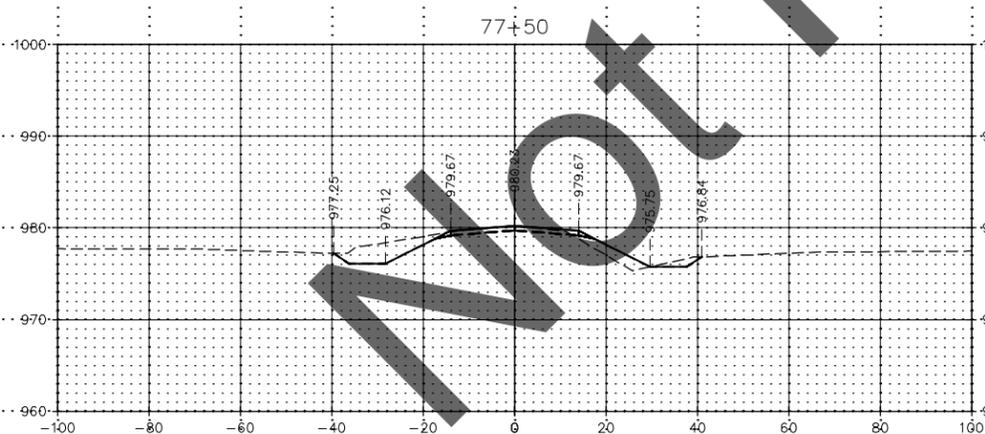
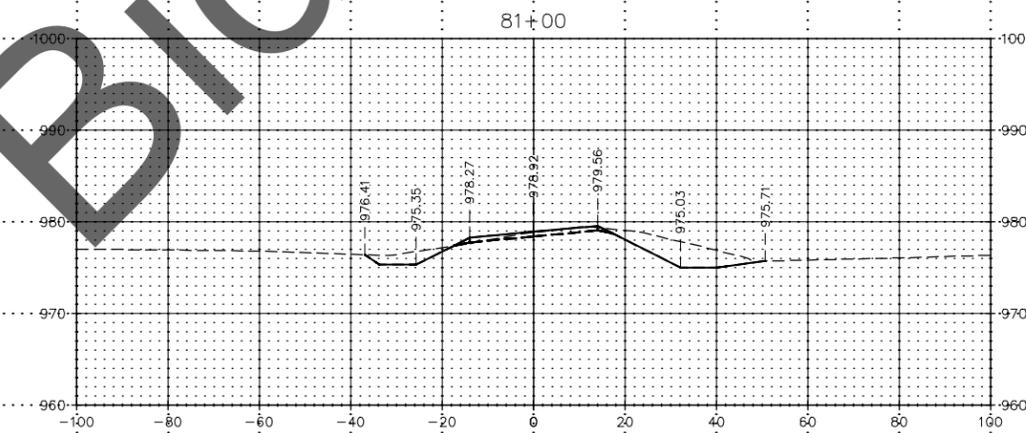
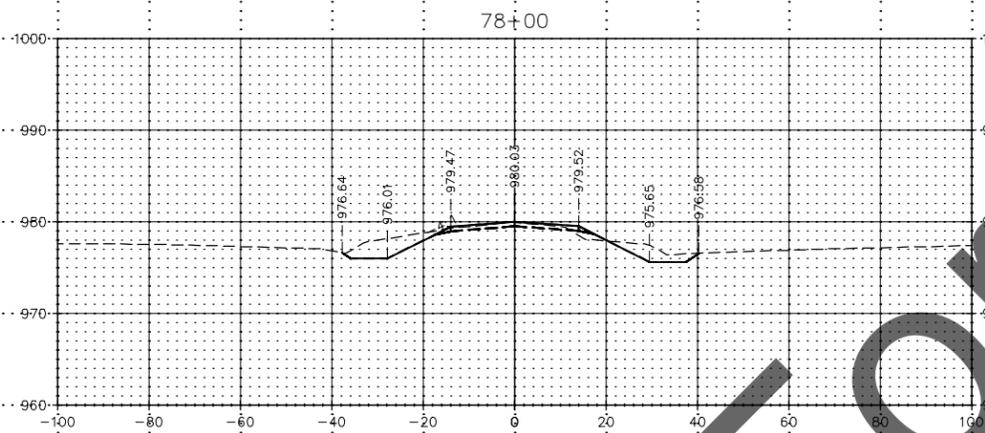
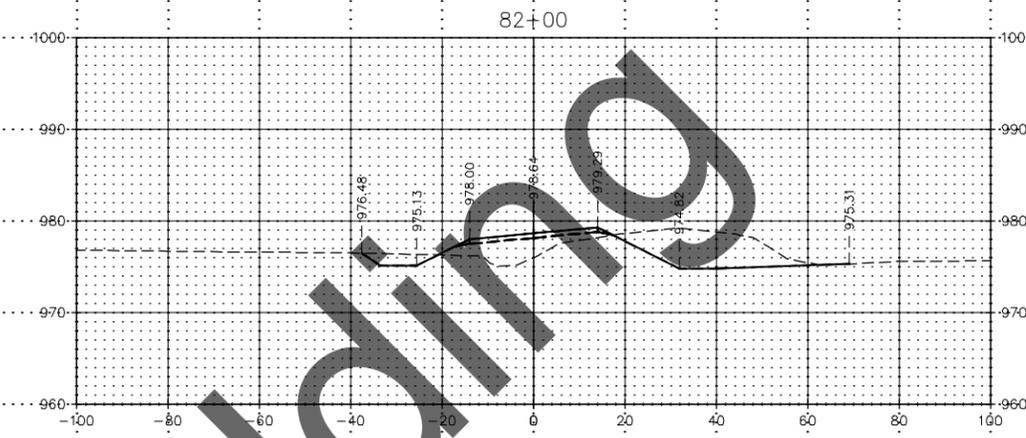
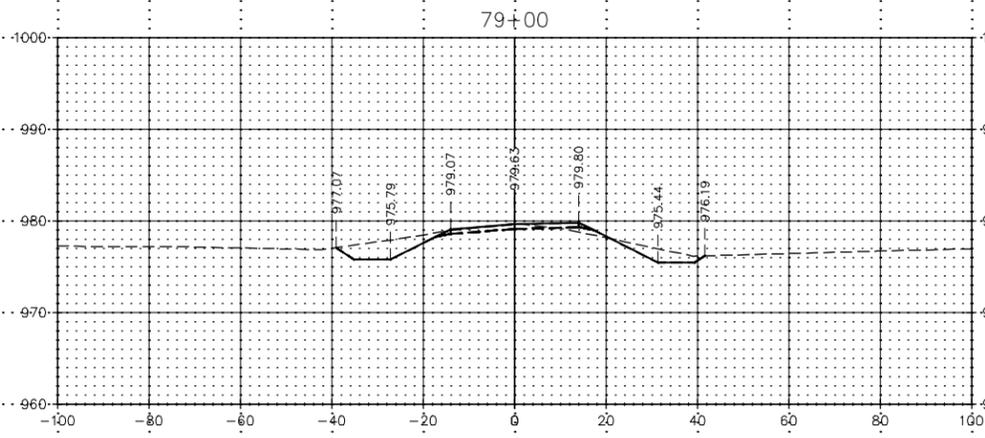


SPECIAL ASSEMBLY B
NOT TO SCALE

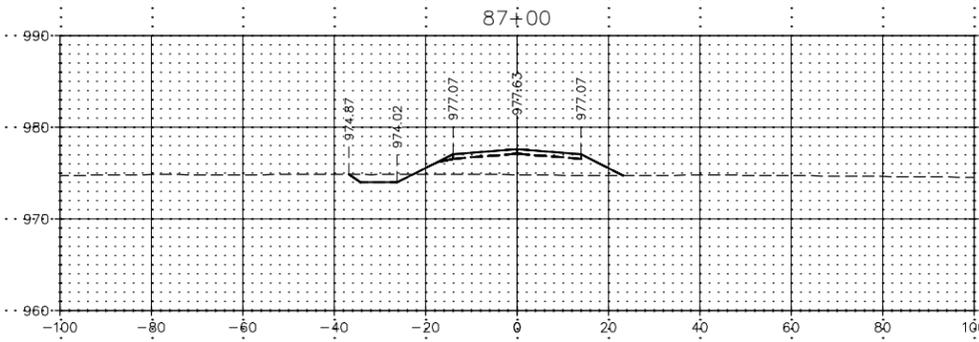
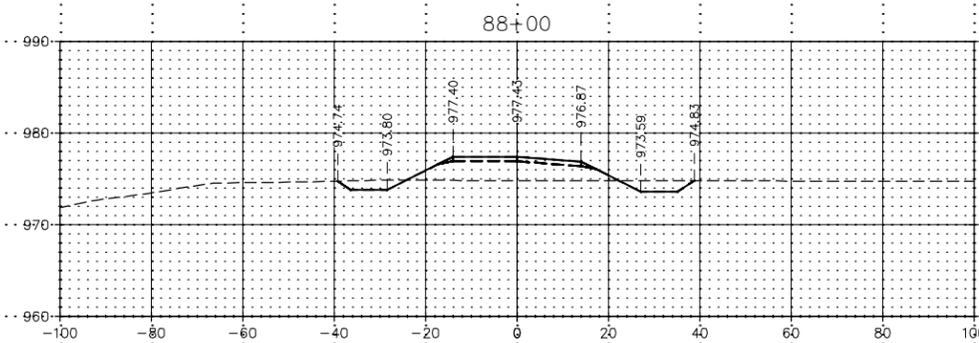
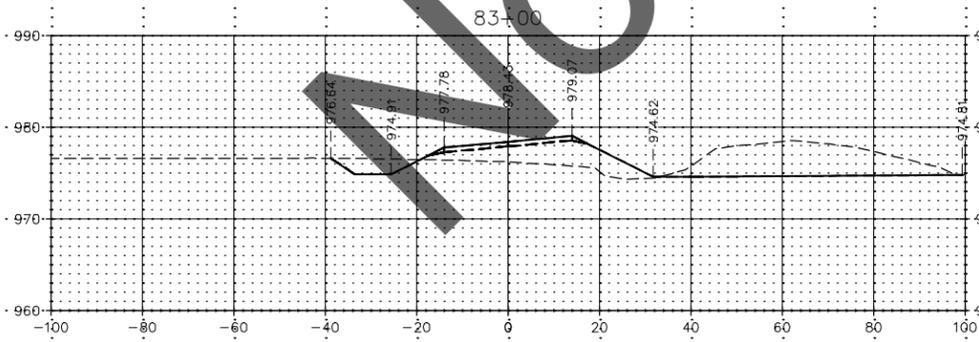
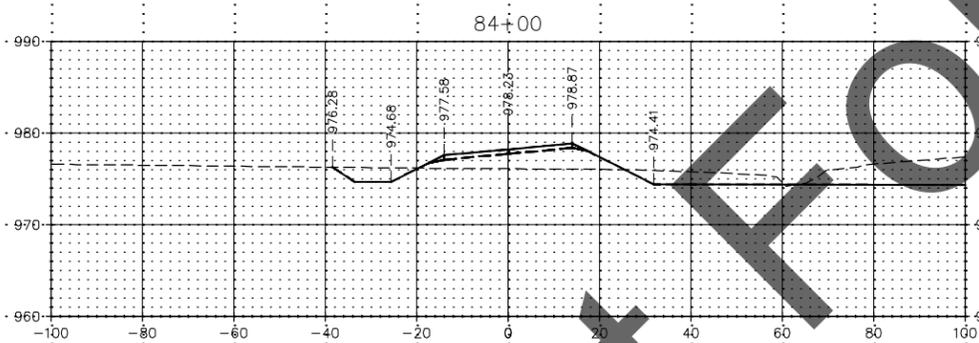
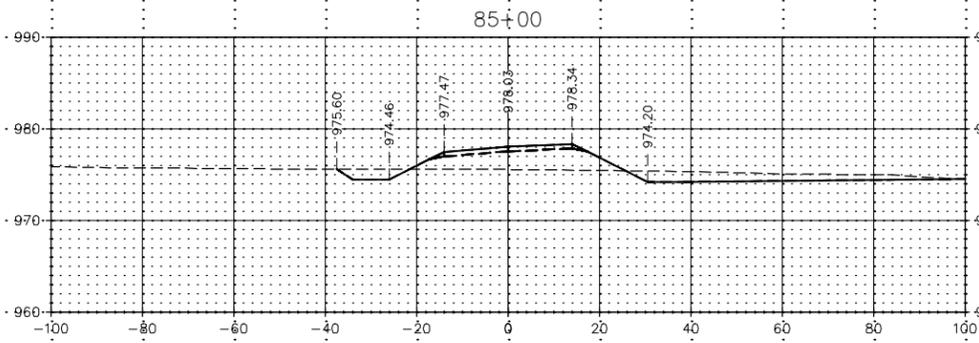
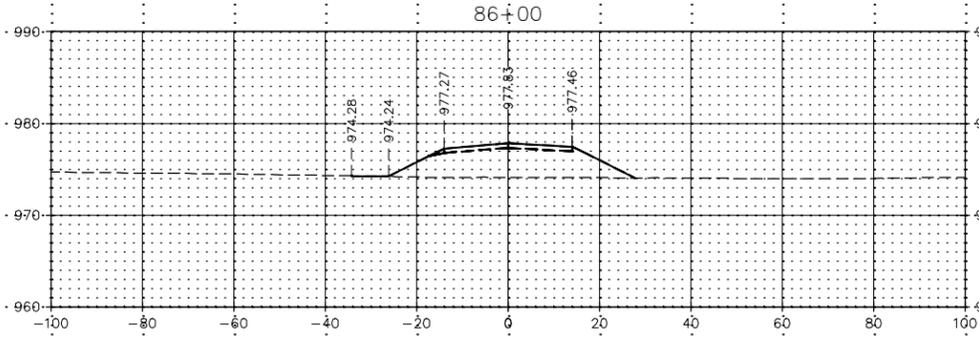
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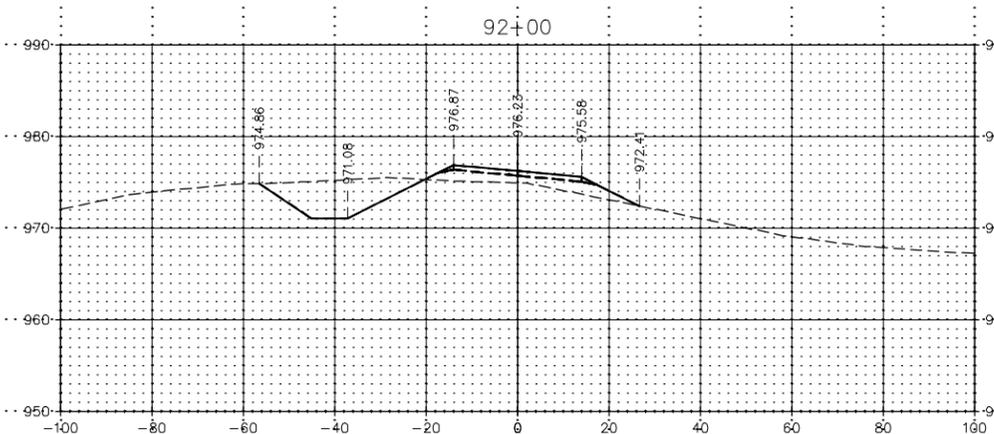
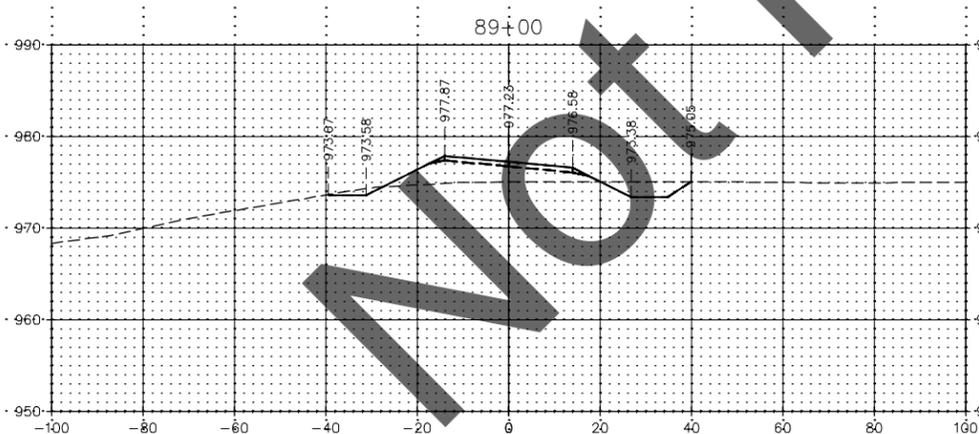
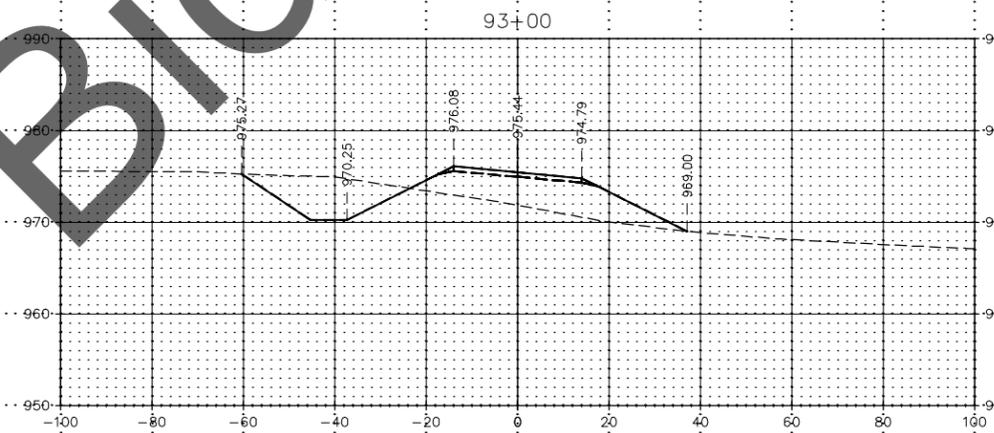
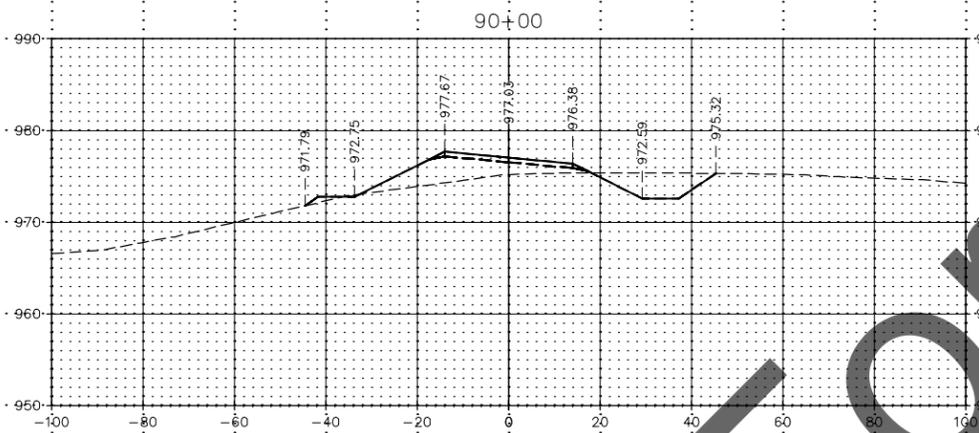
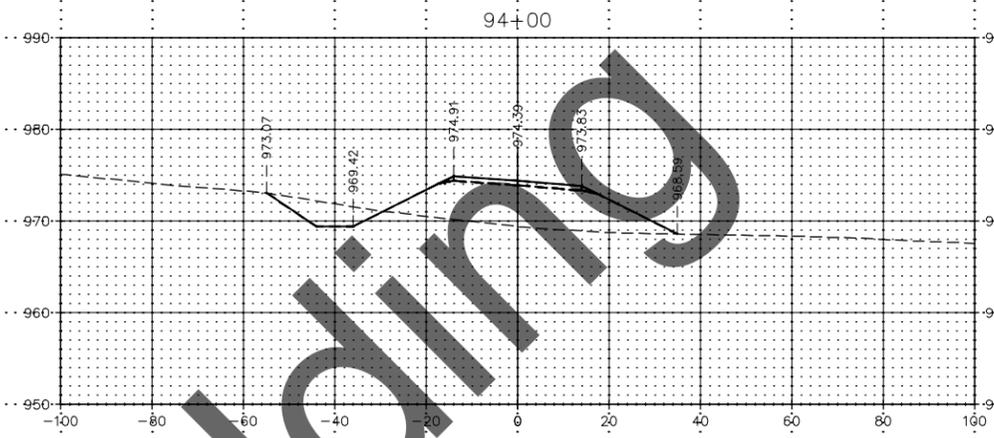
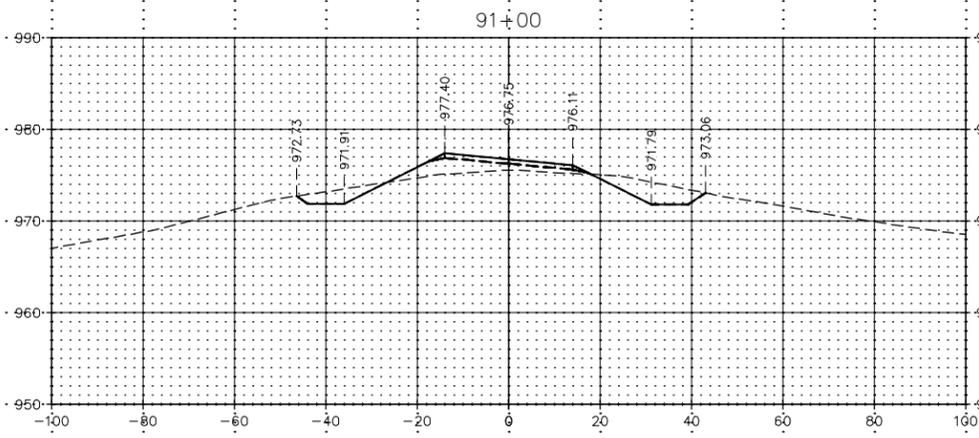
CASS COUNTY
HIGHWAY DEPARTMENT
RUSH RIVER
BRIDGE NO. 09-121-17.0
SPECIAL ASSEMBLIES
PROJECT NO. **CB1301**
2 MILES WEST OF AMENIA
CASS COUNTY



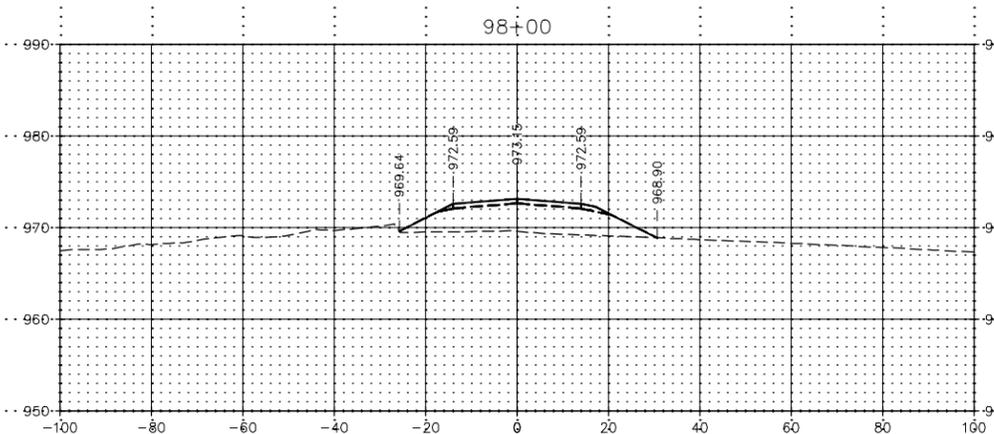
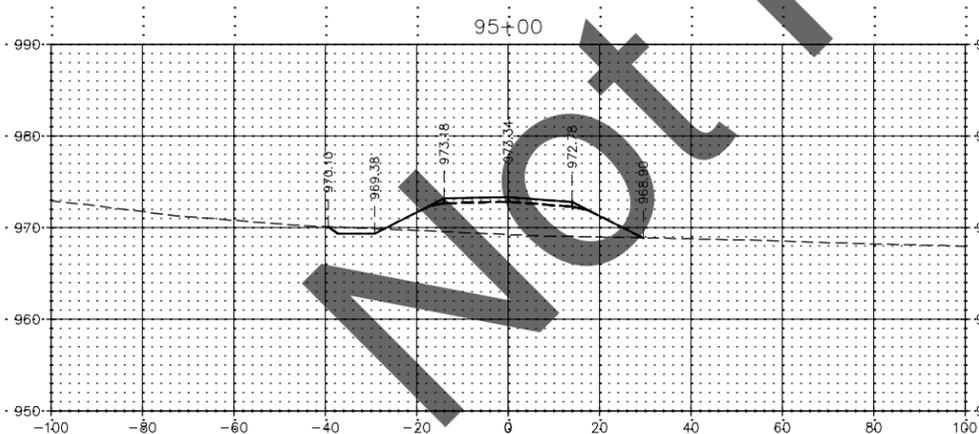
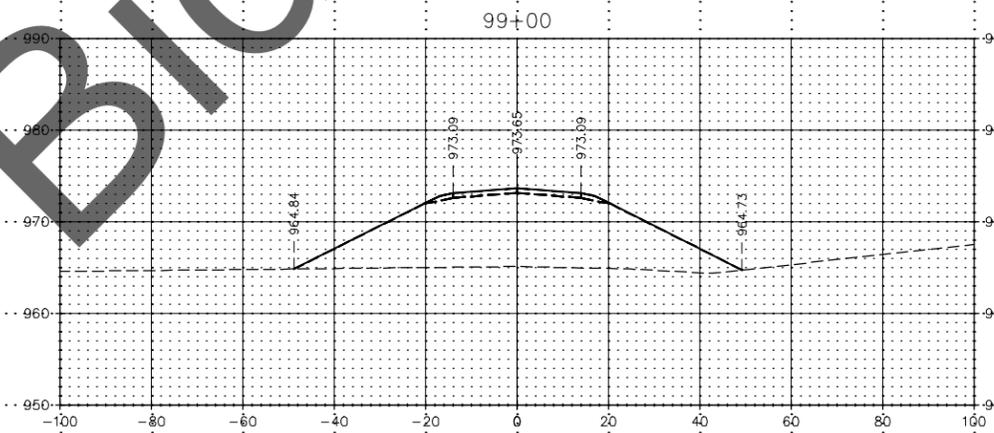
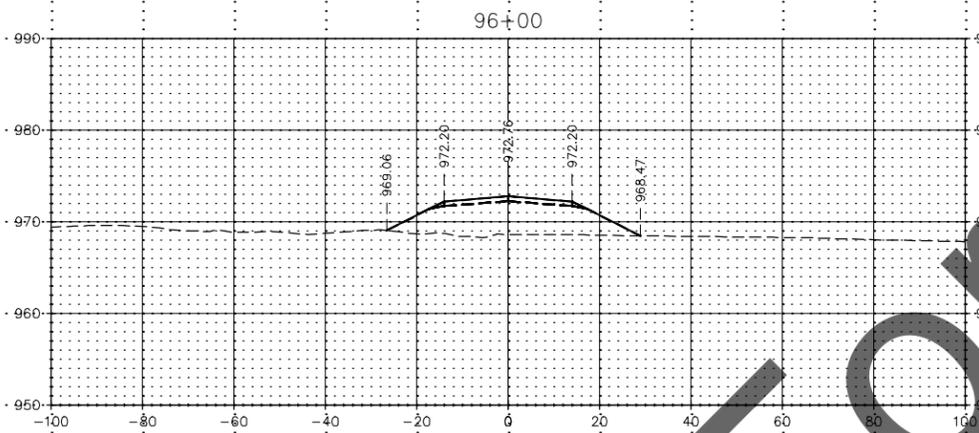
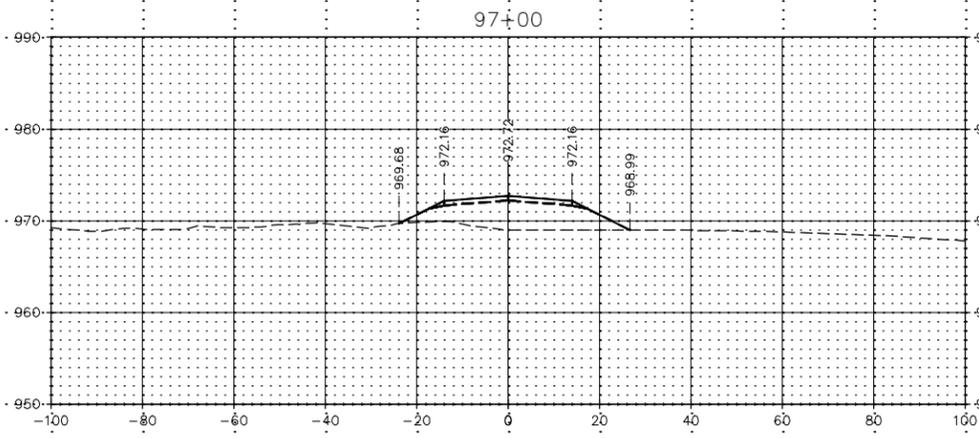
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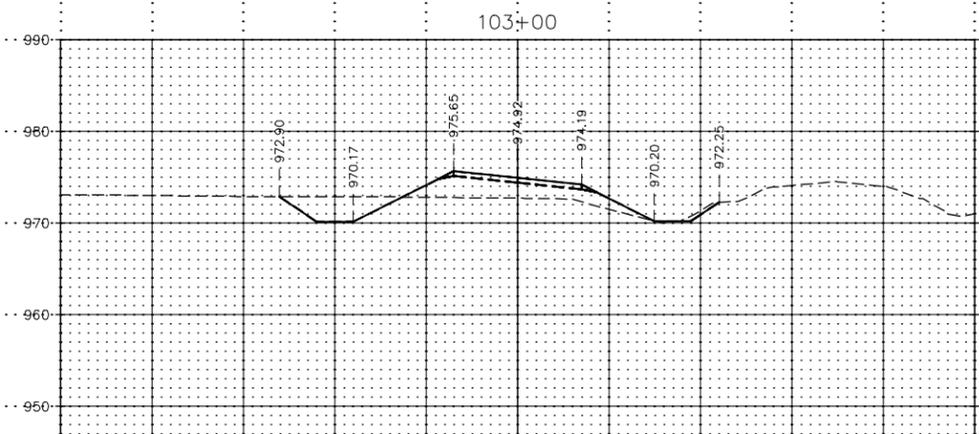
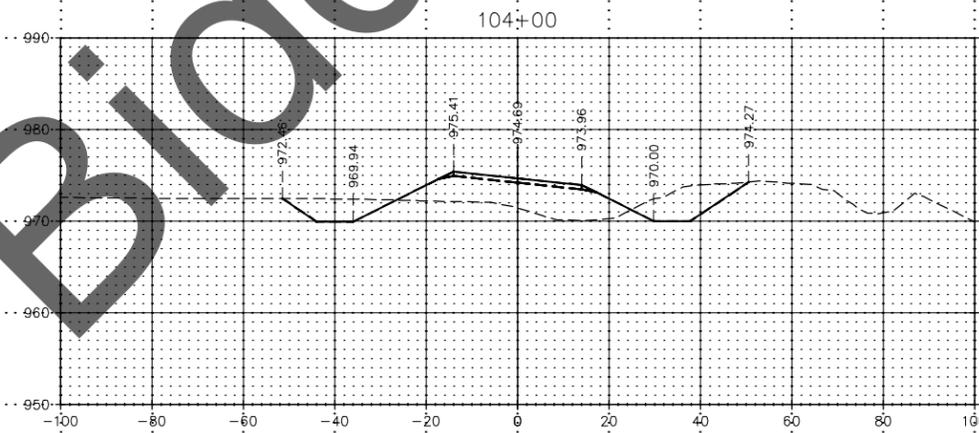
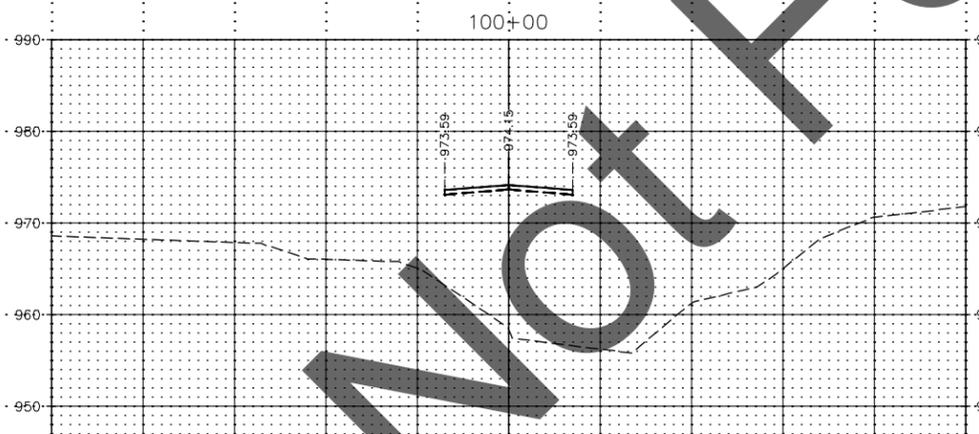
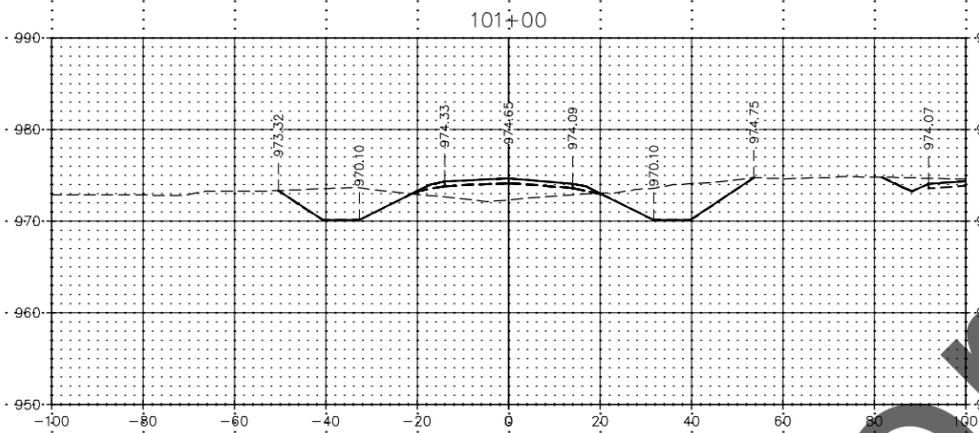
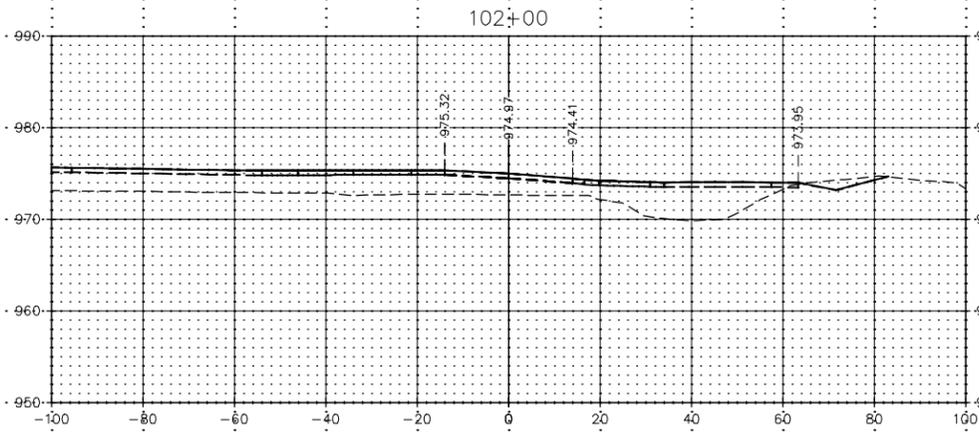
Not For Bidding



Not For Bidding

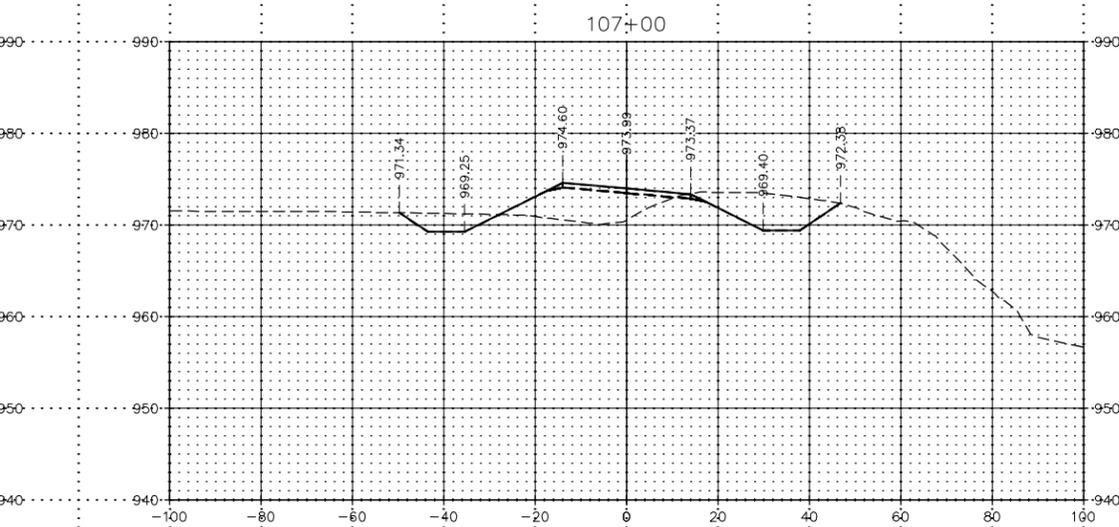
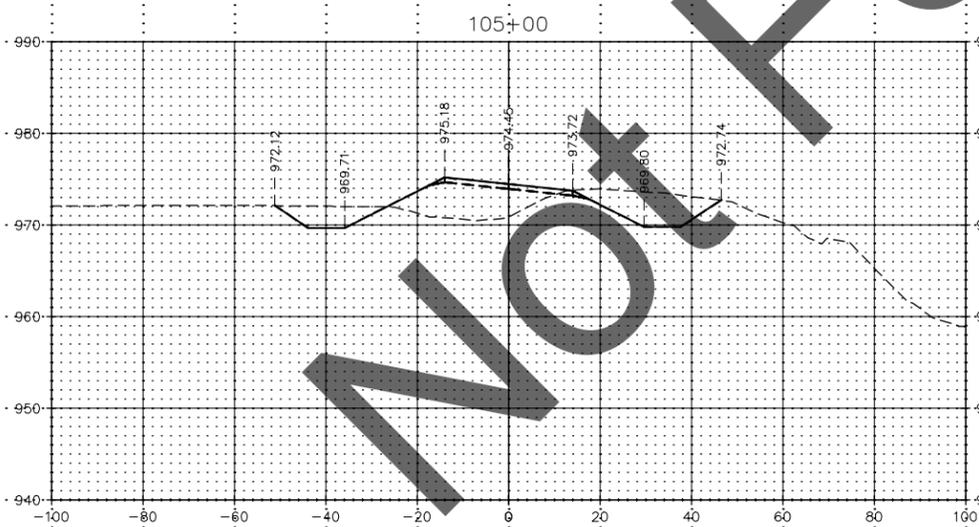
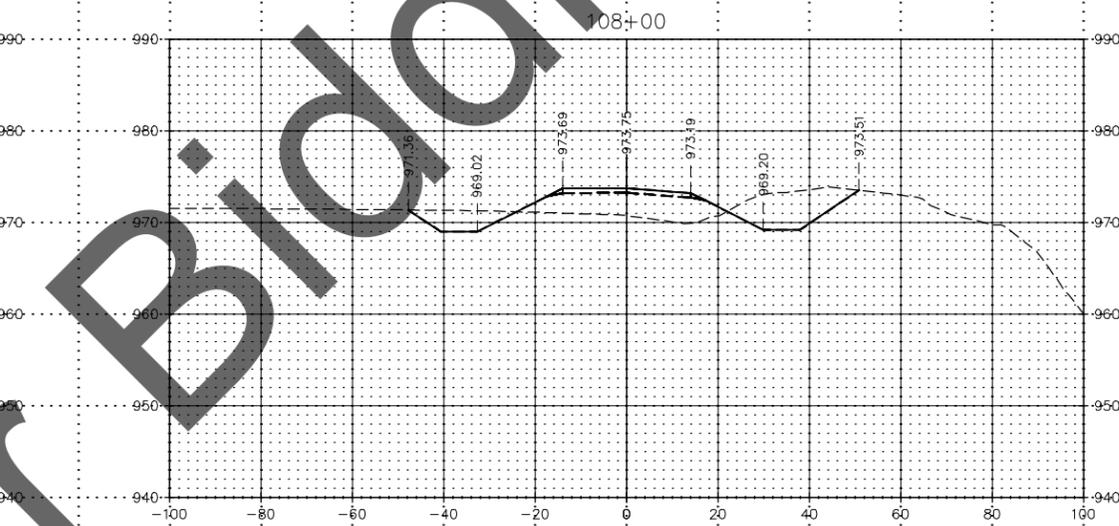
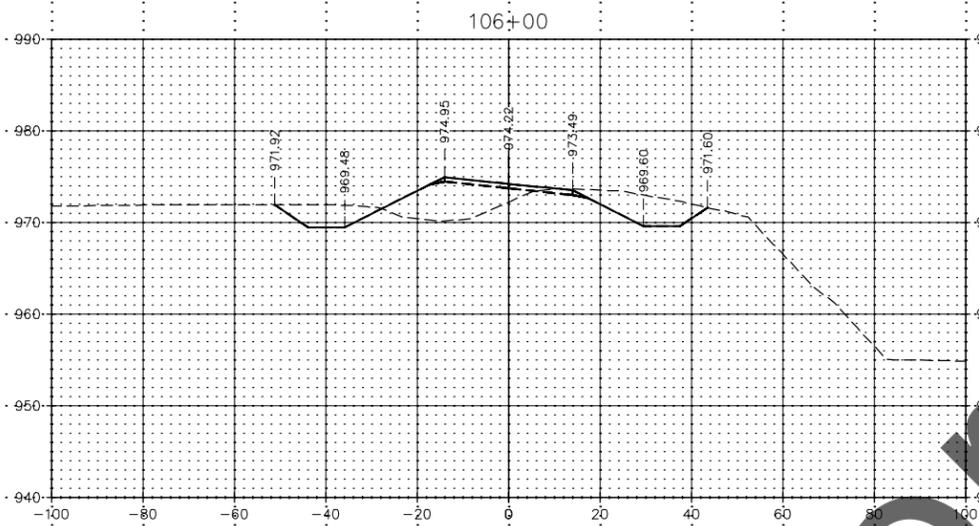


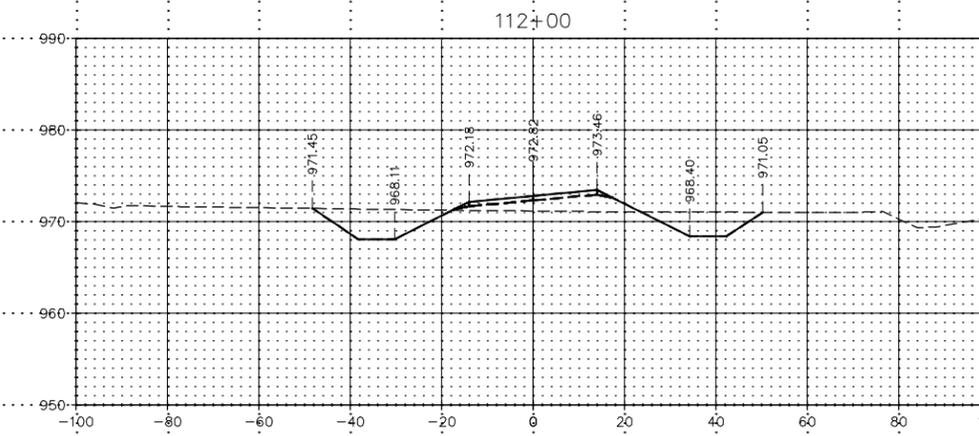
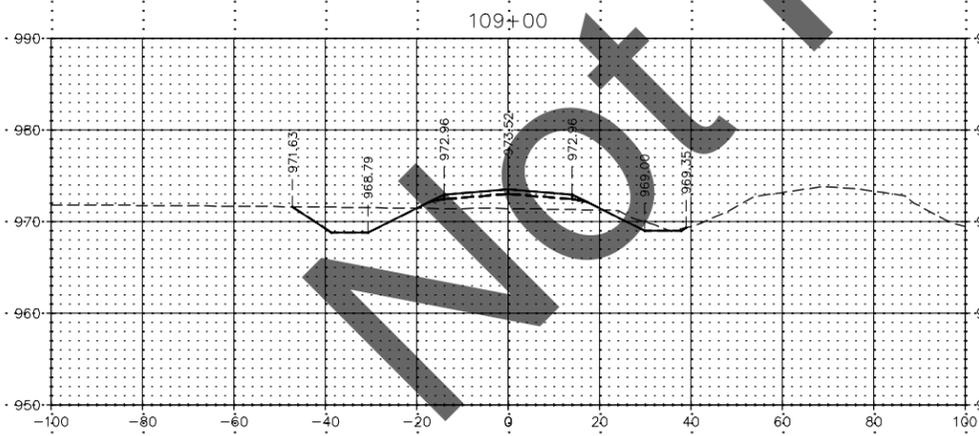
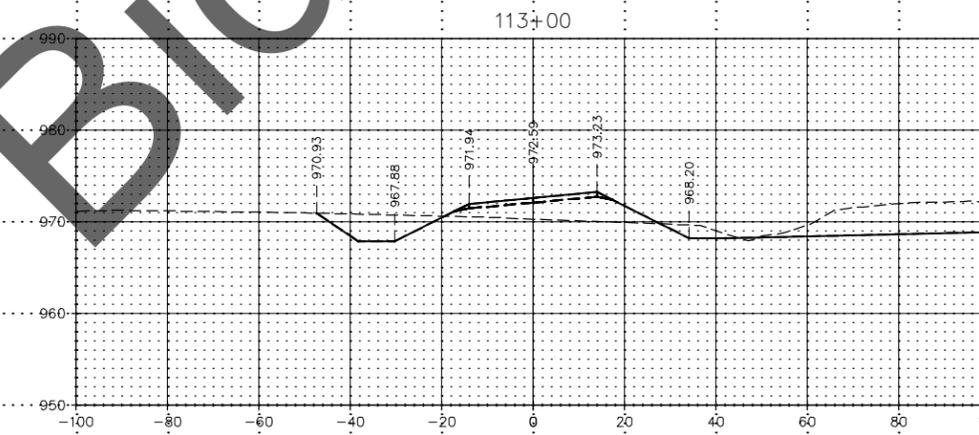
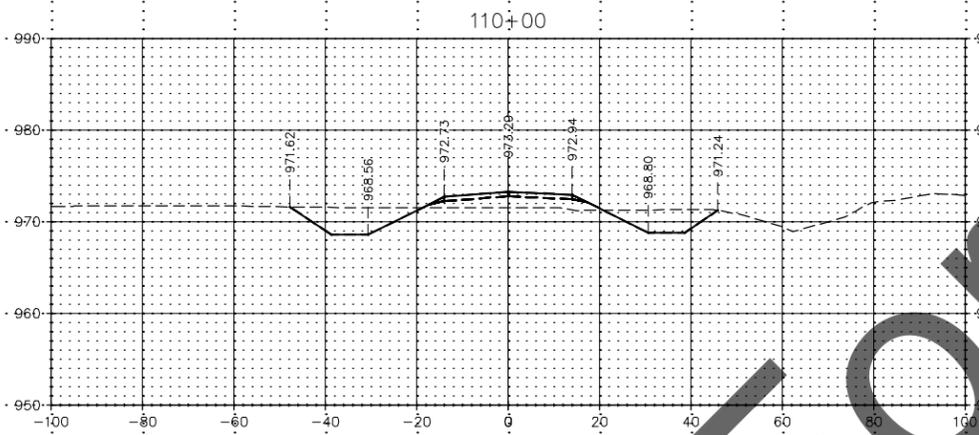
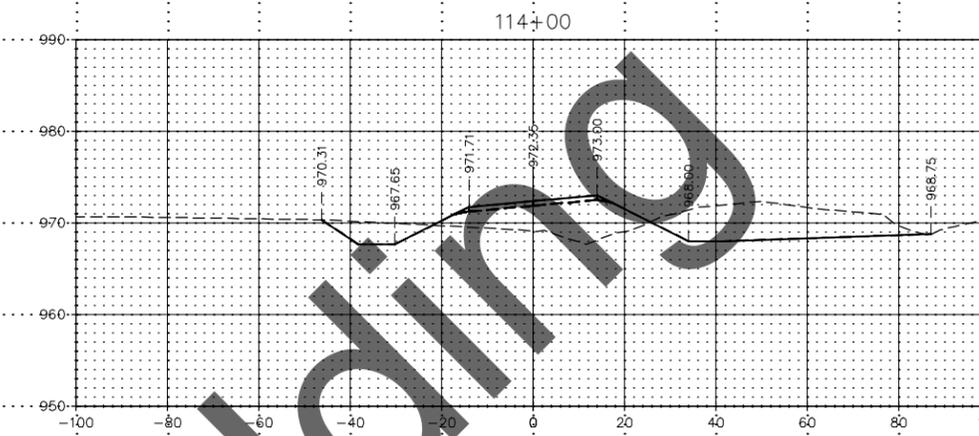
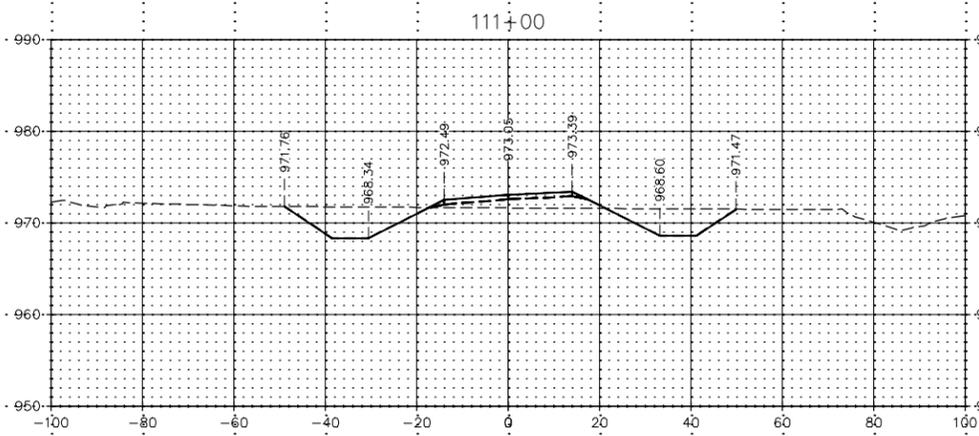
NOT FOR BIDDING



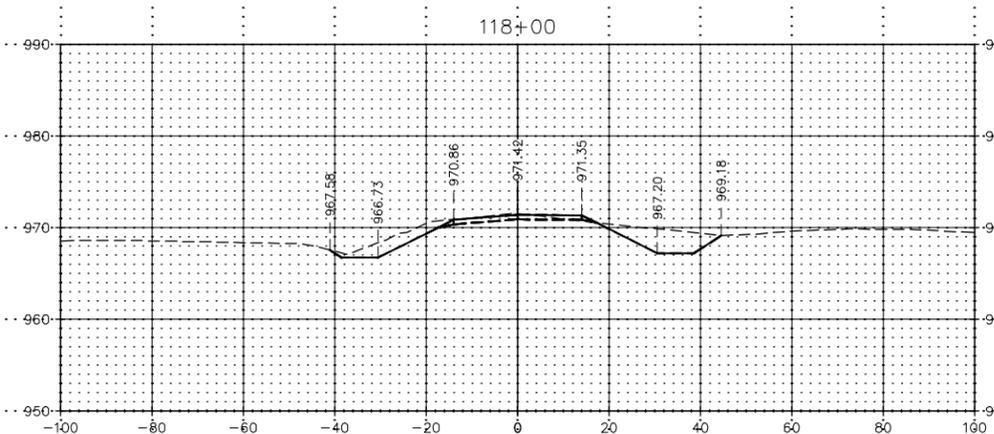
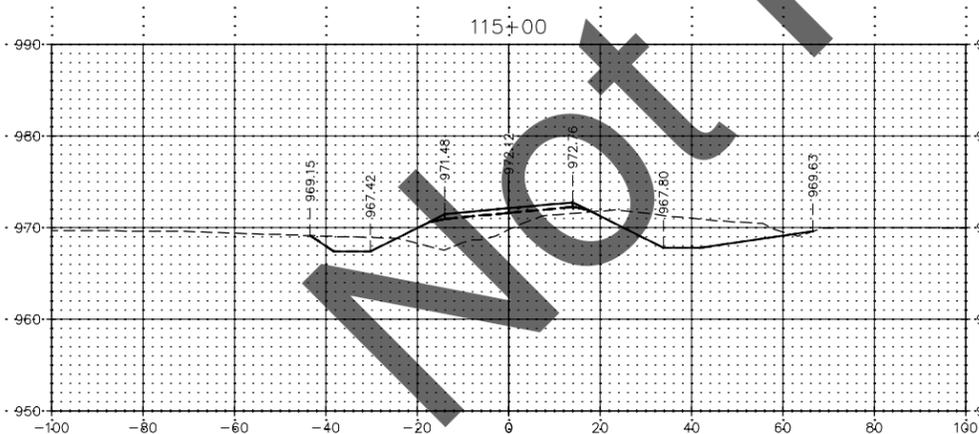
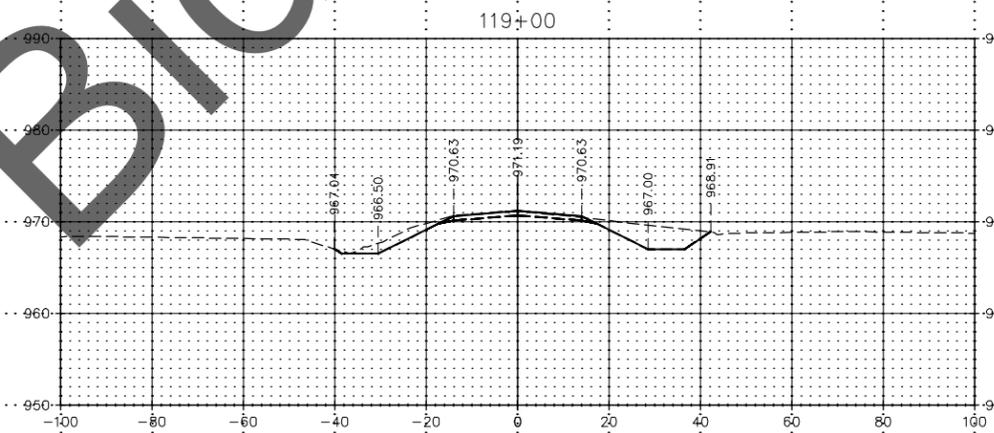
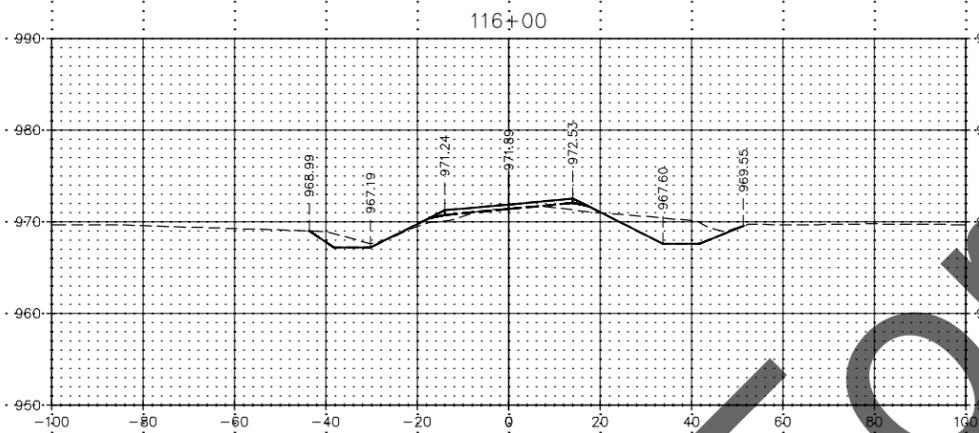
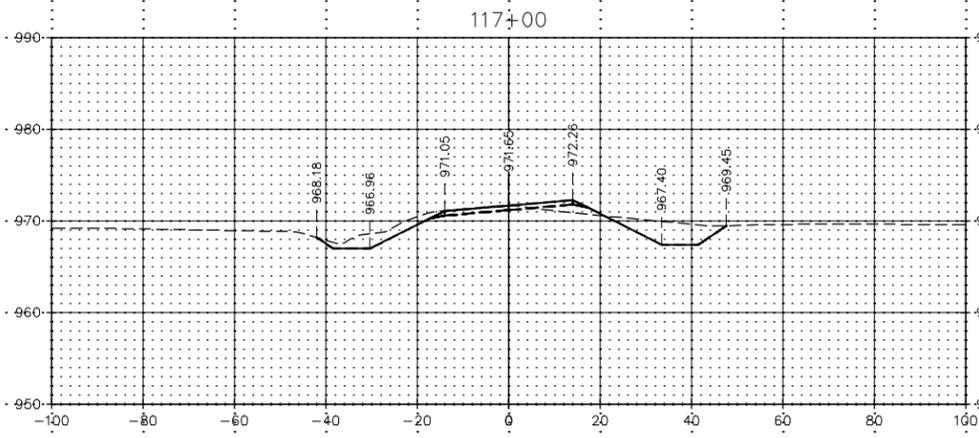
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Not For Bidding



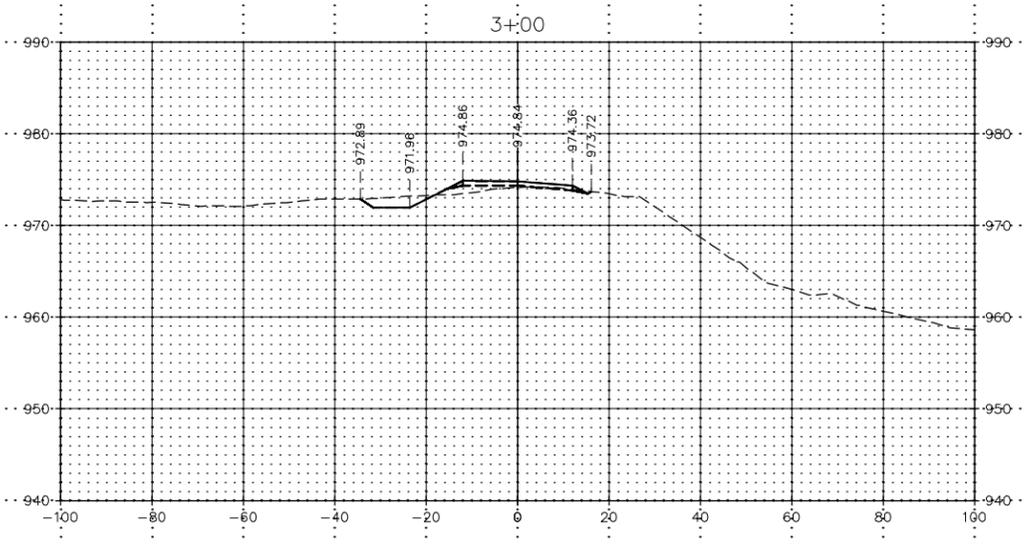
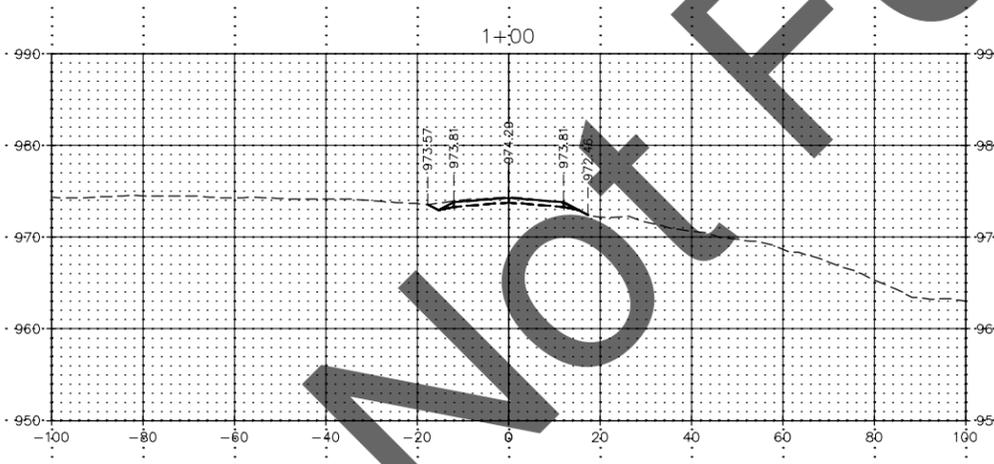
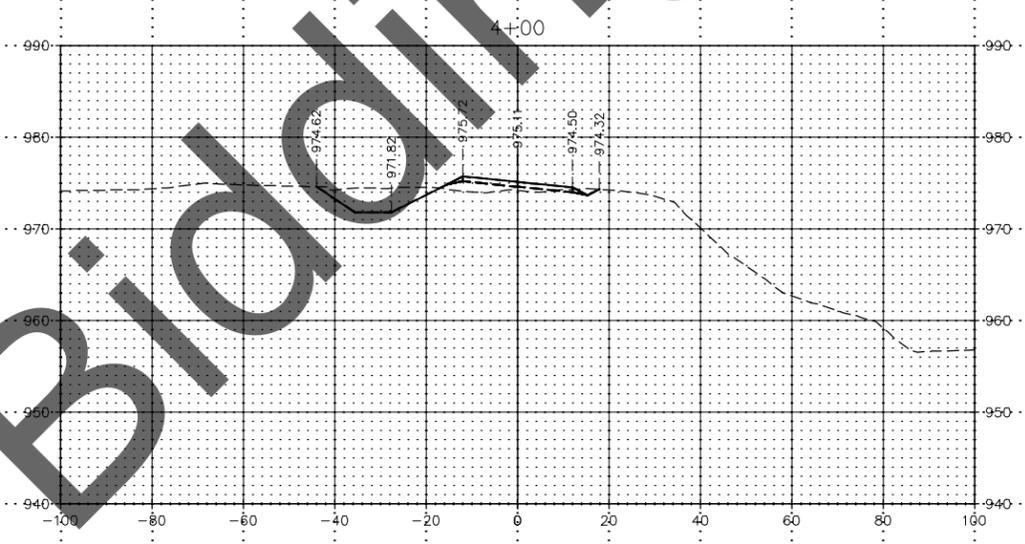
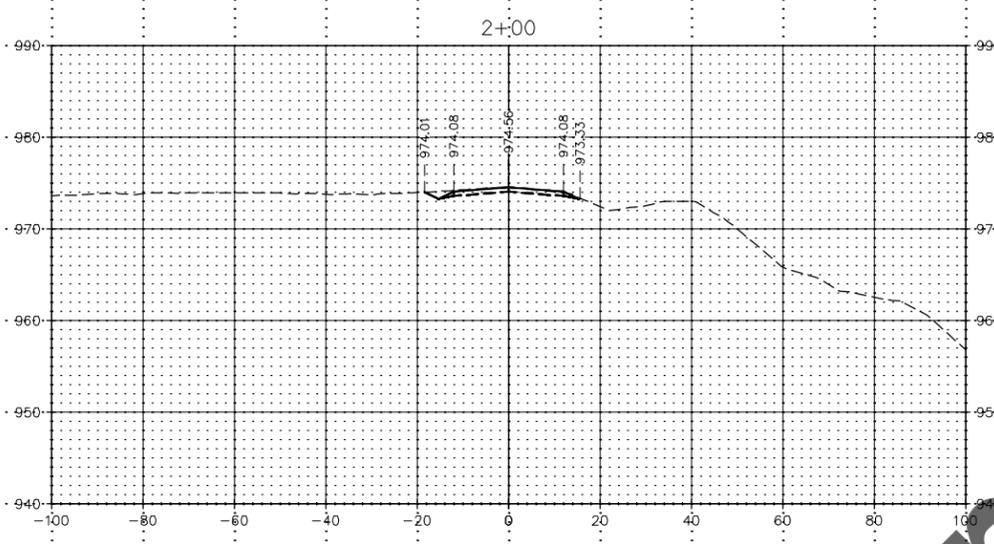


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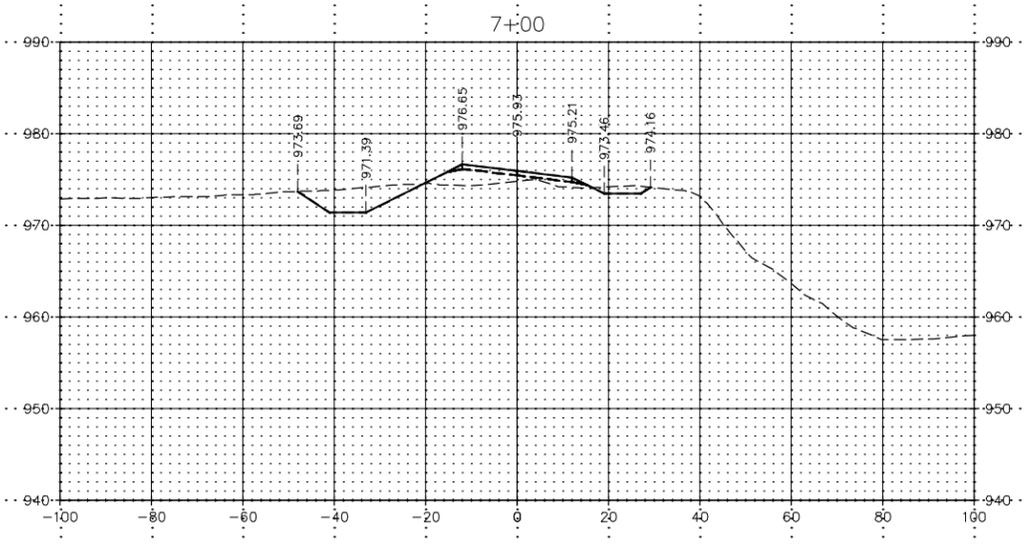
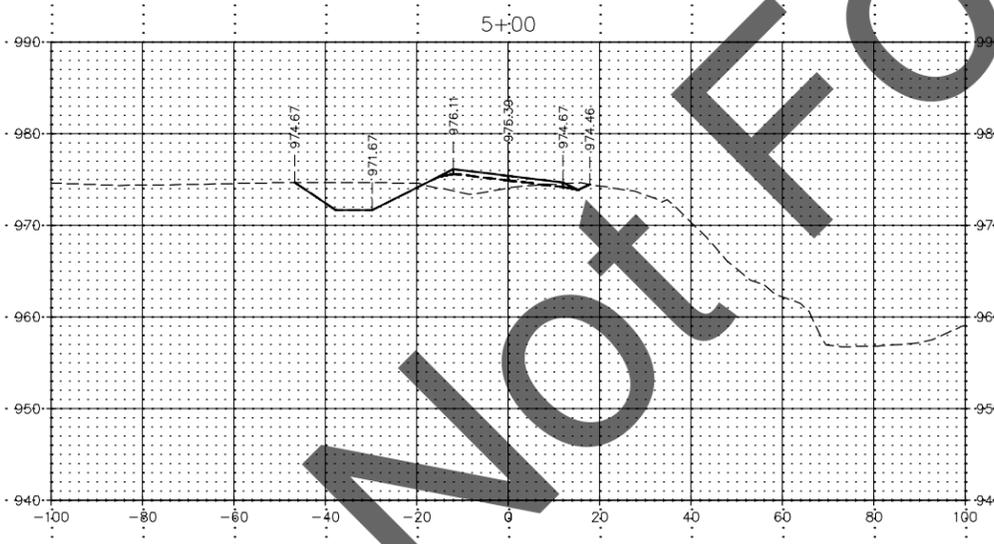
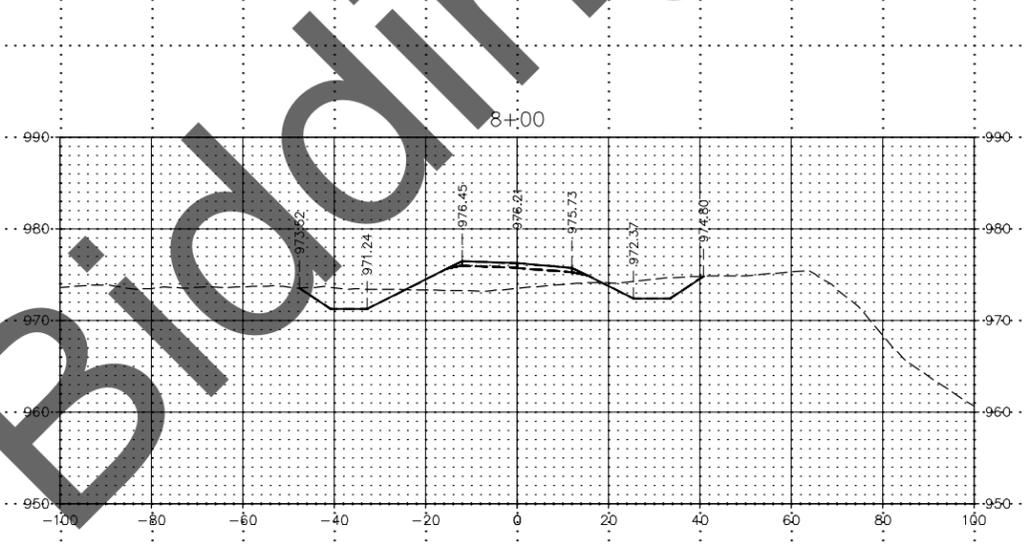
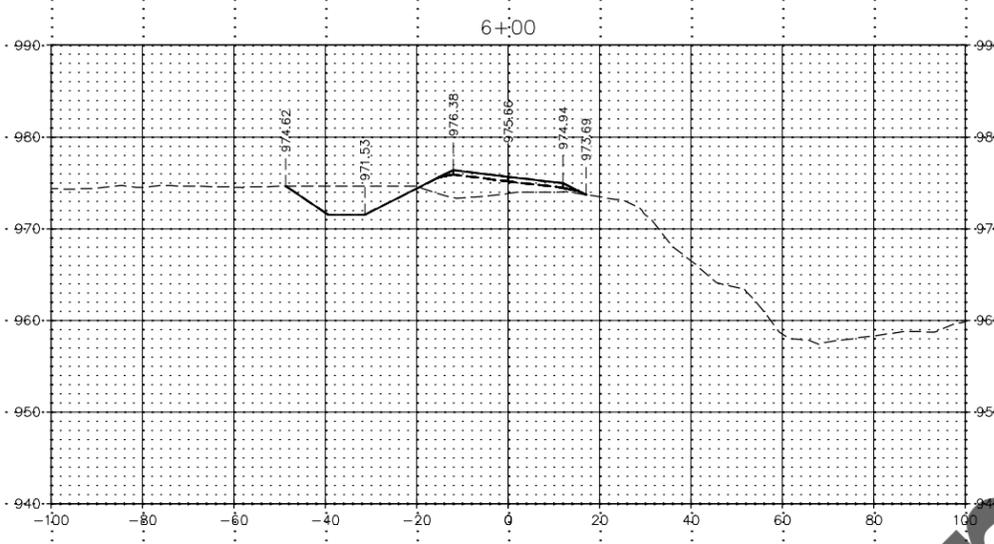


Not For Bidding

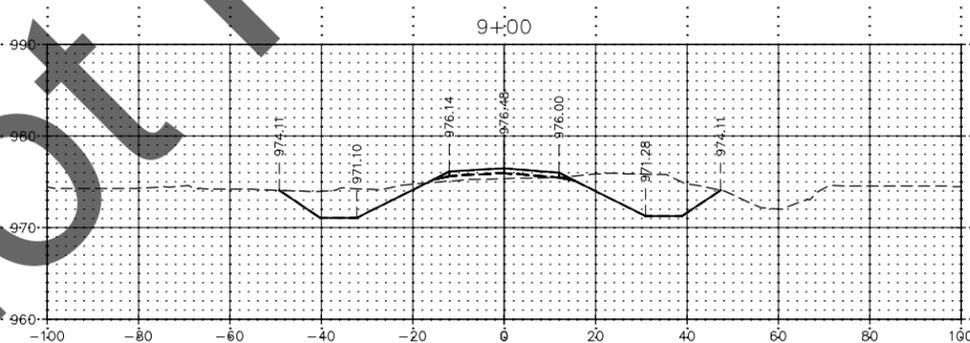
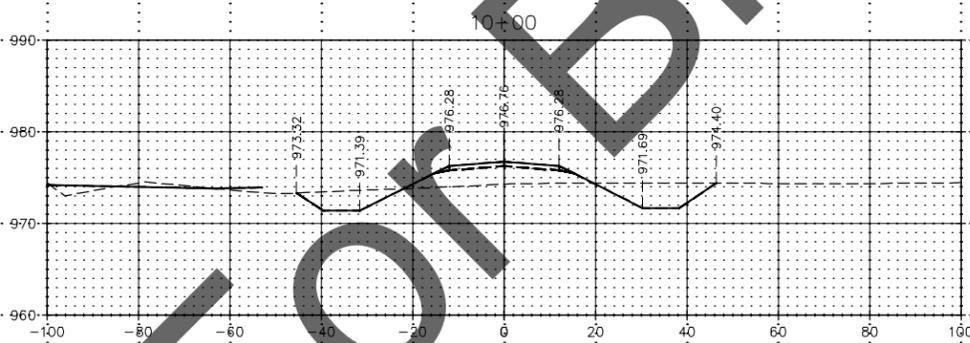
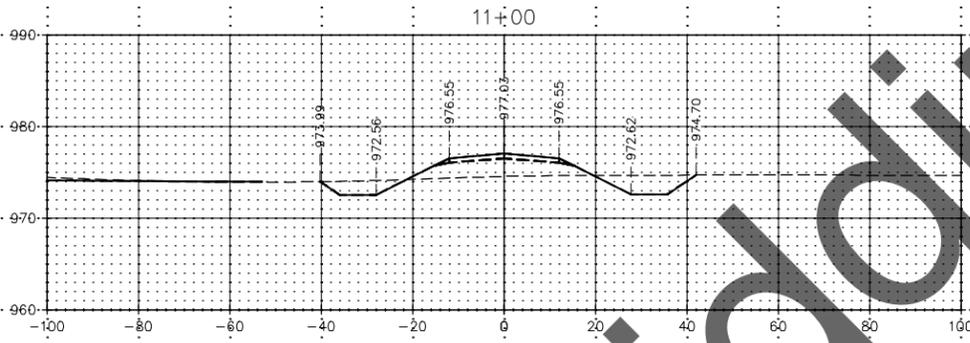
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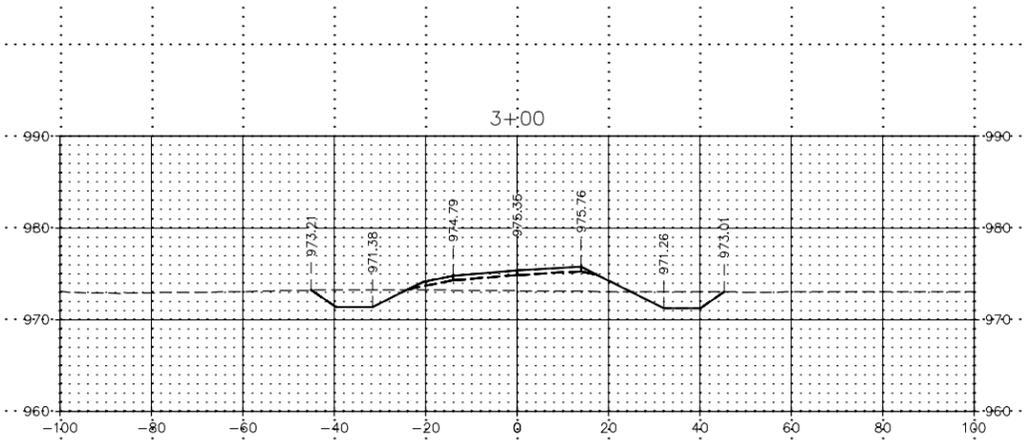
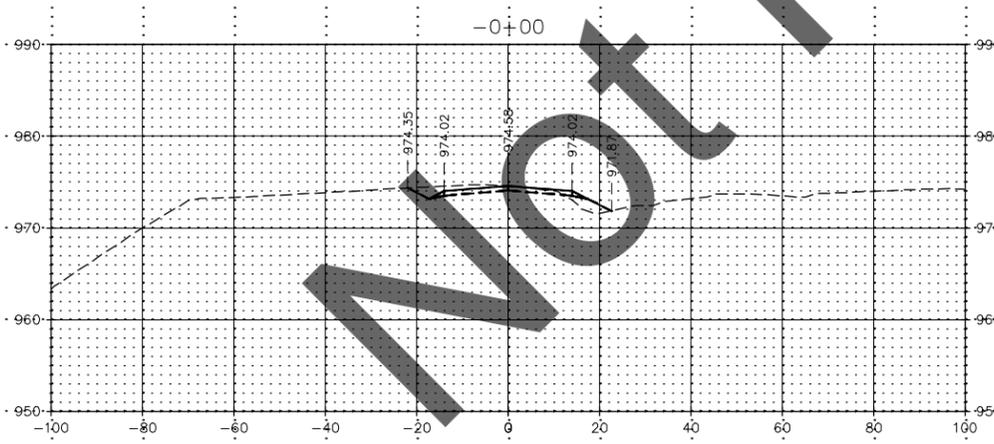
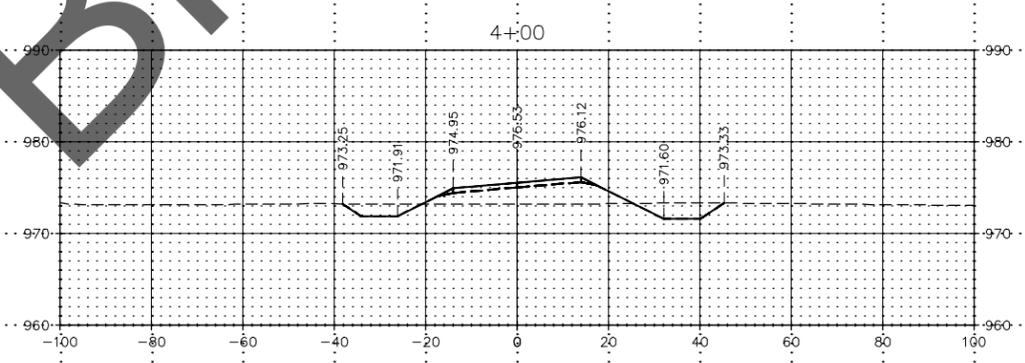
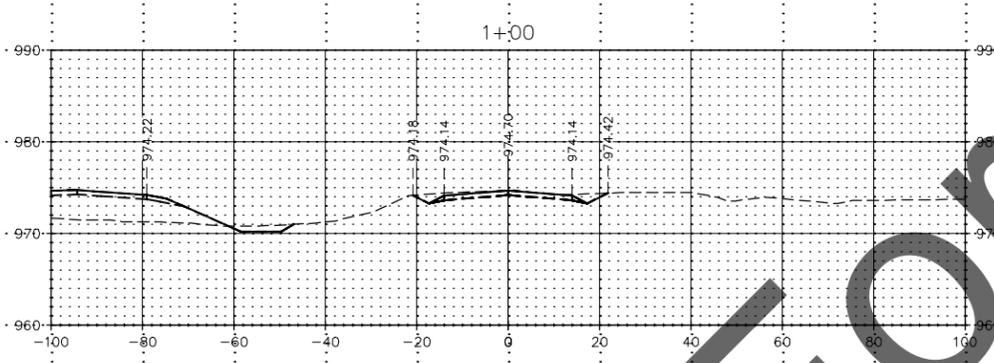
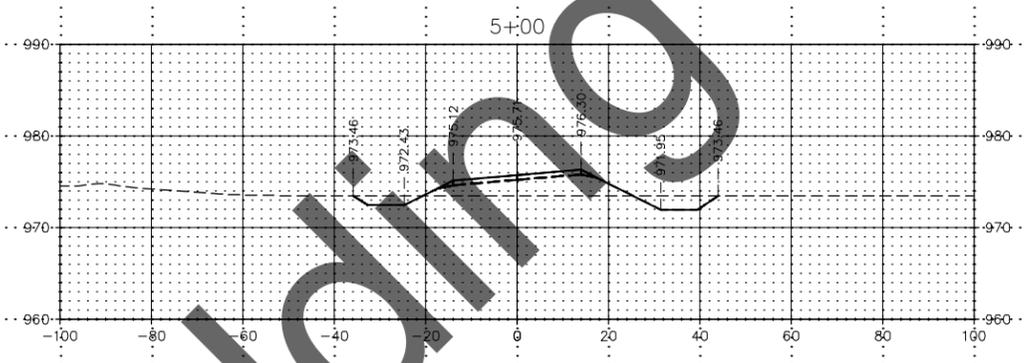
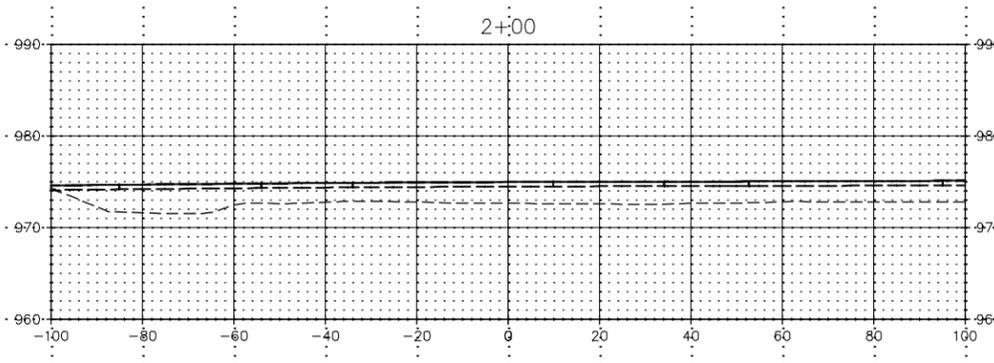


Not For Bidding



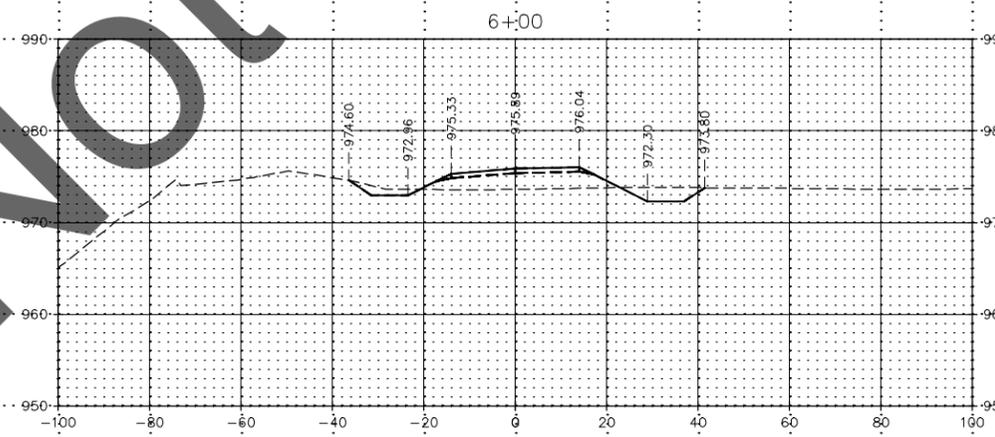
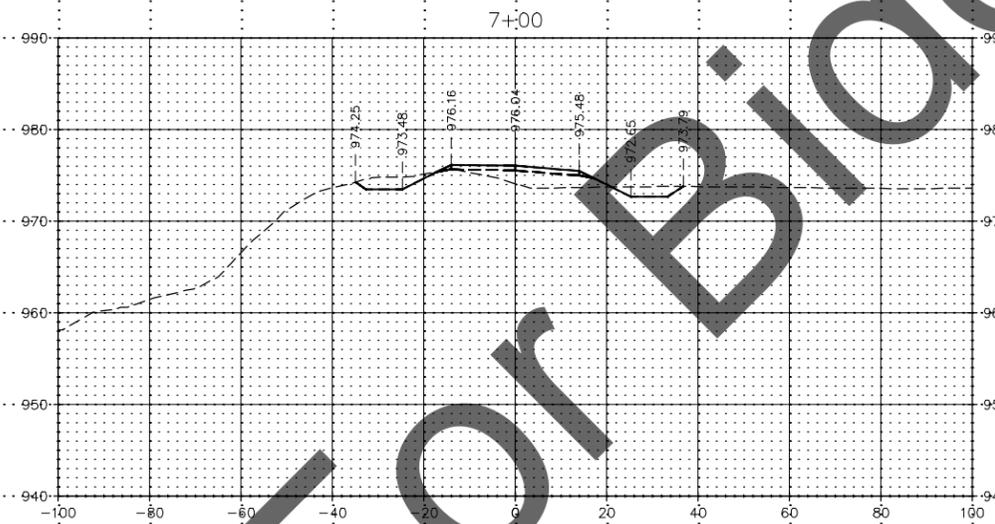
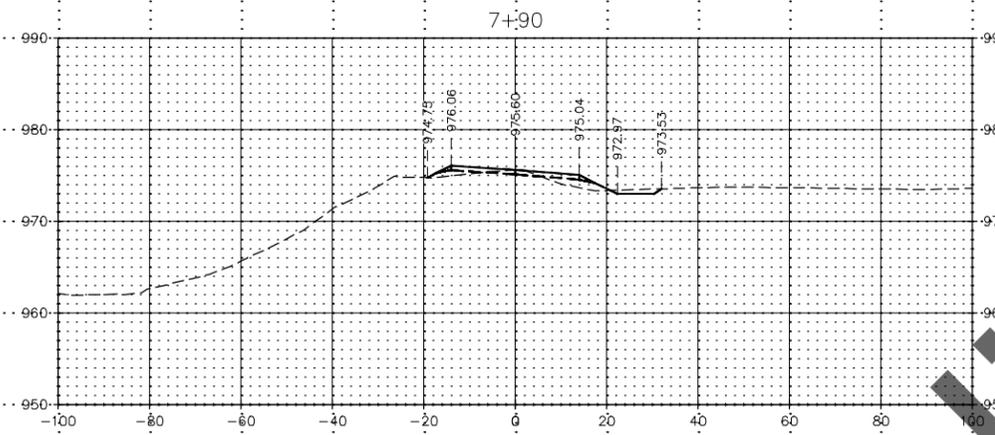
Not For Bidding





Not For Bidding

Not For Bidding

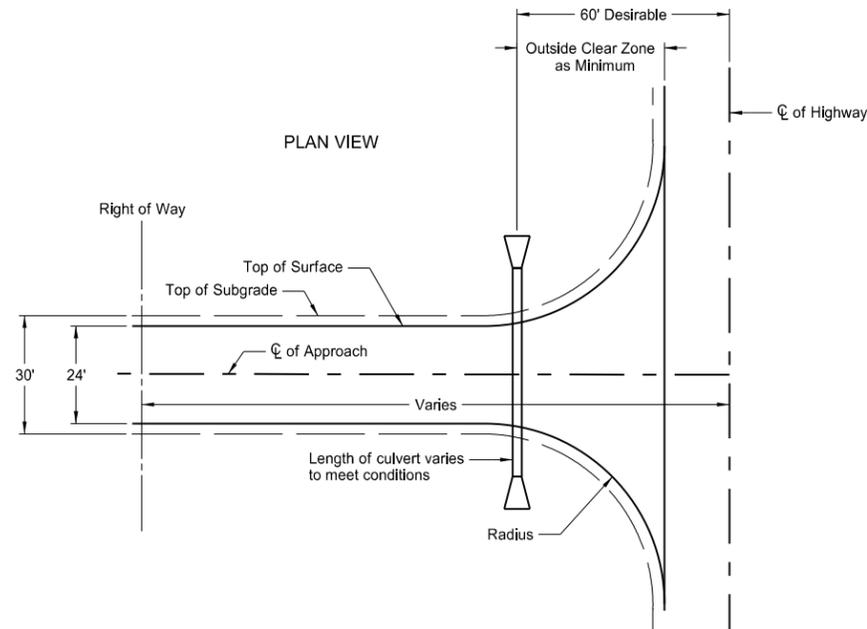


STANDARD RURAL APPROACHES

D-203-8

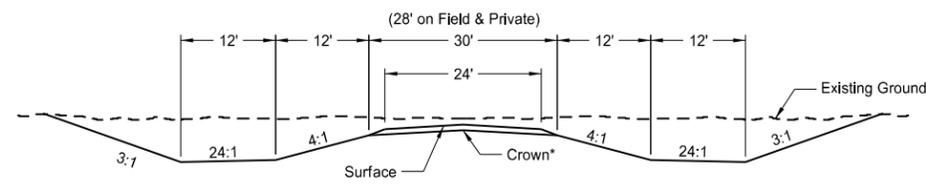
NOTES:

1. Max breakover between approach storage platform and highway shall not exceed 5%.
2. The approach slope shall be measured outside the area of mainline inslope influence.



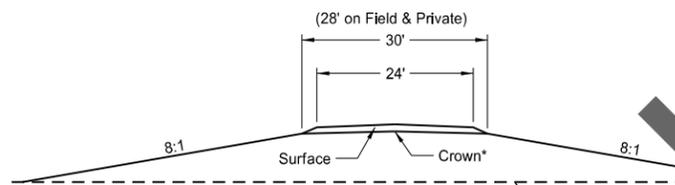
CRITERIA FOR RURAL APPROACH TYPES

	Field Drives	Private Drives	Low Volume Public Roads
Radius	R=24 ft	R=30 ft	R=40 ft
Maximum Grade	10%	7%	7%
Storage Platform	20 ft	24 ft	30 ft
Vertical Curve Length	10 ft	10 ft	Varies (Min. 20 mph)

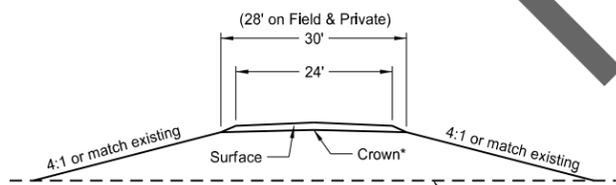


SECTION A-A

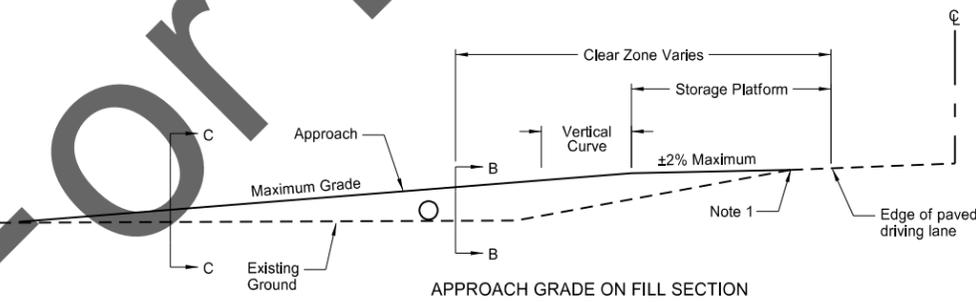
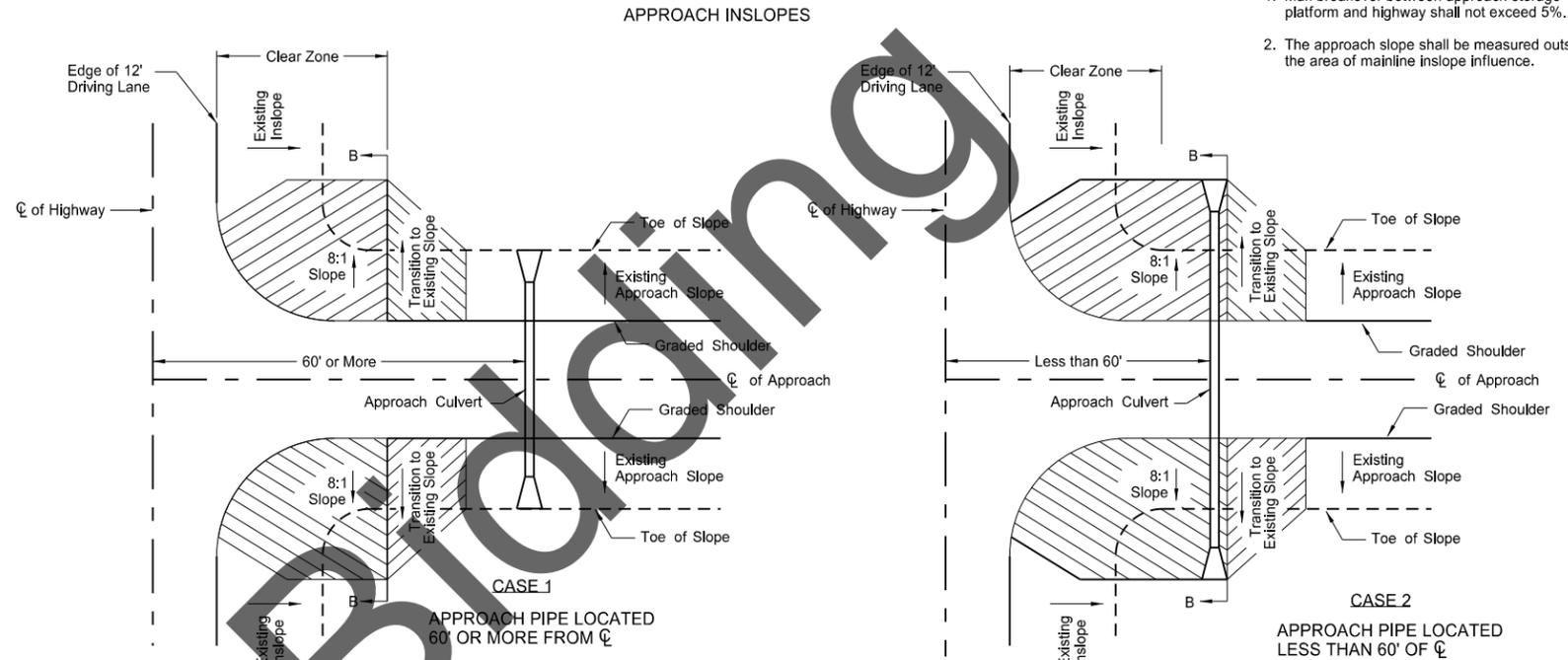
*2.1% crown for paved surface
*3.0% crown for gravel surface



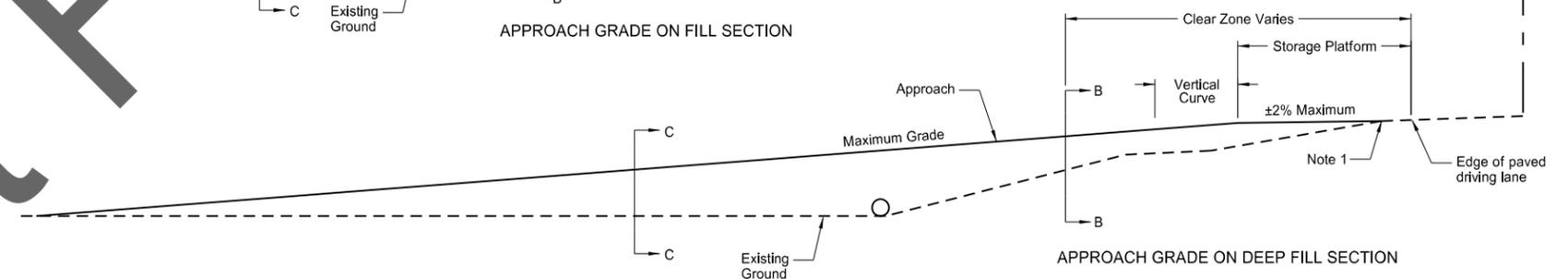
SECTION B-B



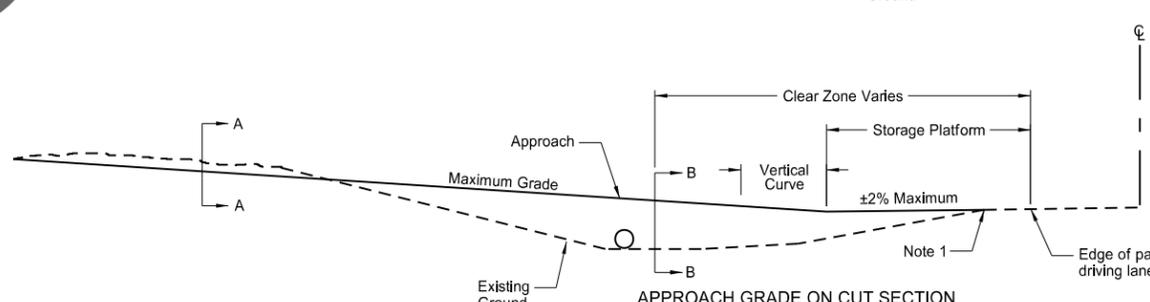
SECTION C-C



APPROACH GRADE ON FILL SECTION



APPROACH GRADE ON DEEP FILL SECTION

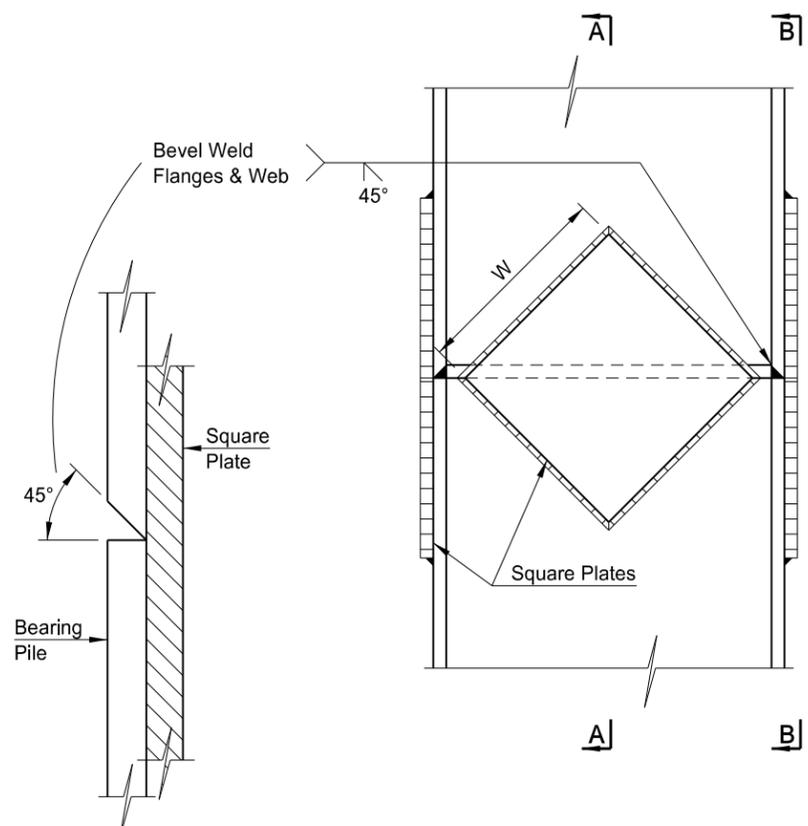


APPROACH GRADE ON CUT SECTION

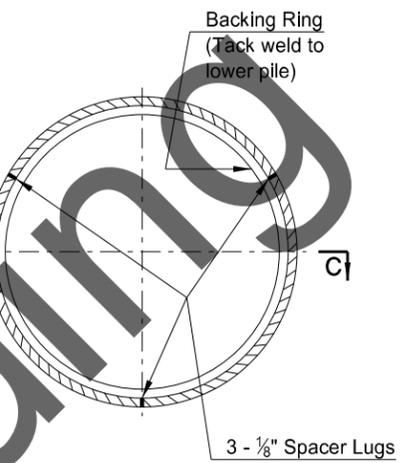
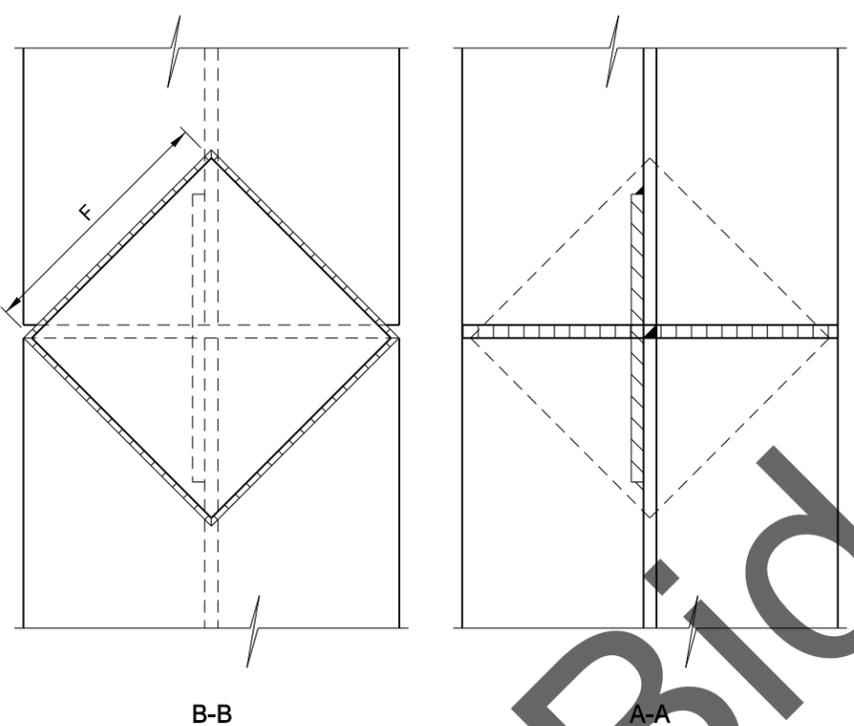
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION 2-25-14	
REVISIONS	
DATE	CHANGE

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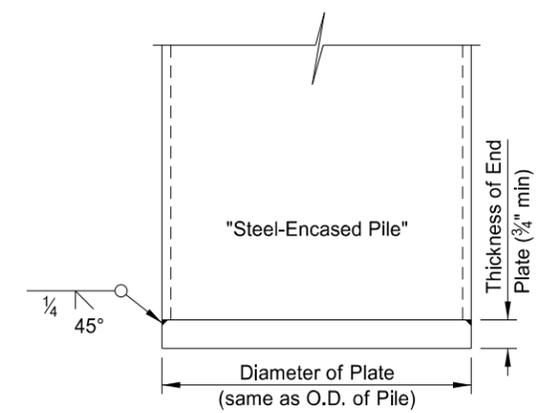
PILE SPLICE DETAILS



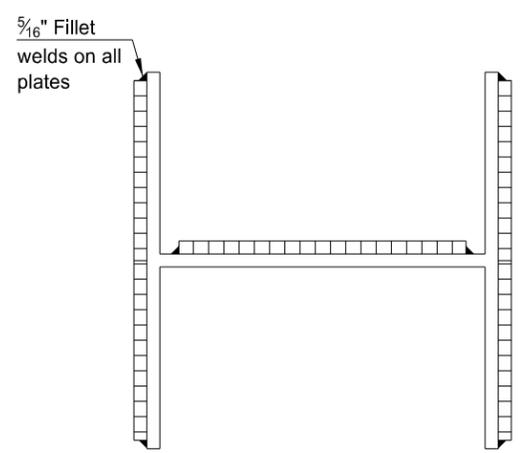
ENLARGED VIEW



Backing Ring may be made from pile cut-offs or other material of a like quality.



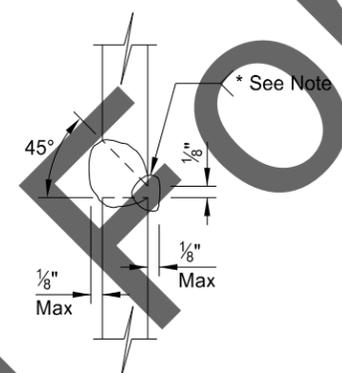
END PLATE DETAIL



PILE	8"	10"	12"	14"
"F" FLANGE	5"	6 1/2"	8"	10"
"W" WEB	4"	5 1/2"	6 1/2"	8"

H-PILE SPLICE DETAIL

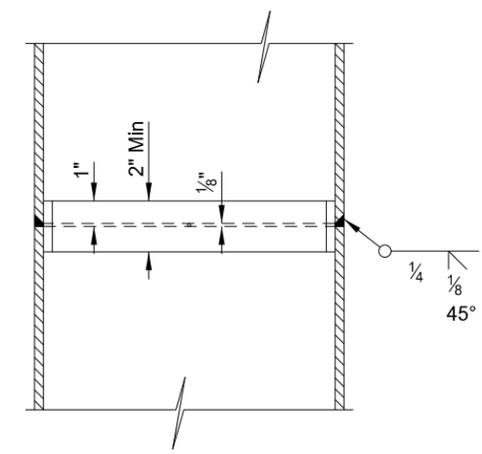
Flame scarf inside of both flanges and one side of web of upper section.



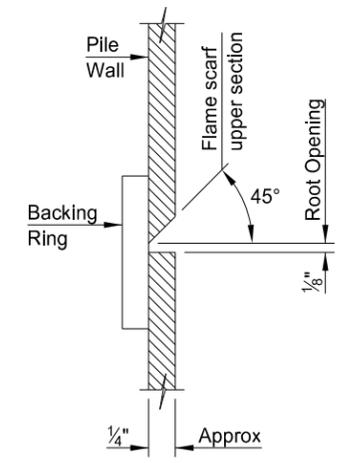
ALTERNATE H-PILE SPLICE DETAIL

NOTES:

- Steel H-Pile may be spliced with complete penetration groove welds in both flanges and web in lieu of using the reinforcing plates.
- AWS classification E70XX Low Hydrogen Electrodes shall be used.
- * Welds made without the use of backing material shall have the root gouged to sound metal and welded from the second side.
- All welding shall conform to the current AASHTO/AWS D1.5 Bridge Welding Code.
- The thickness of the steel square plates shall at a minimum be as thick as the flanges and web of the pile being spliced.



STEEL-ENCASED CONCRETE PILE SPLICE DETAIL



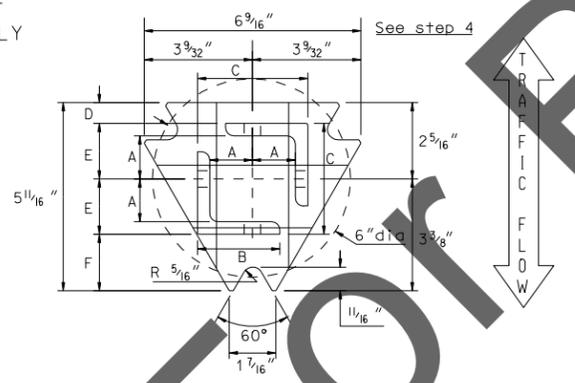
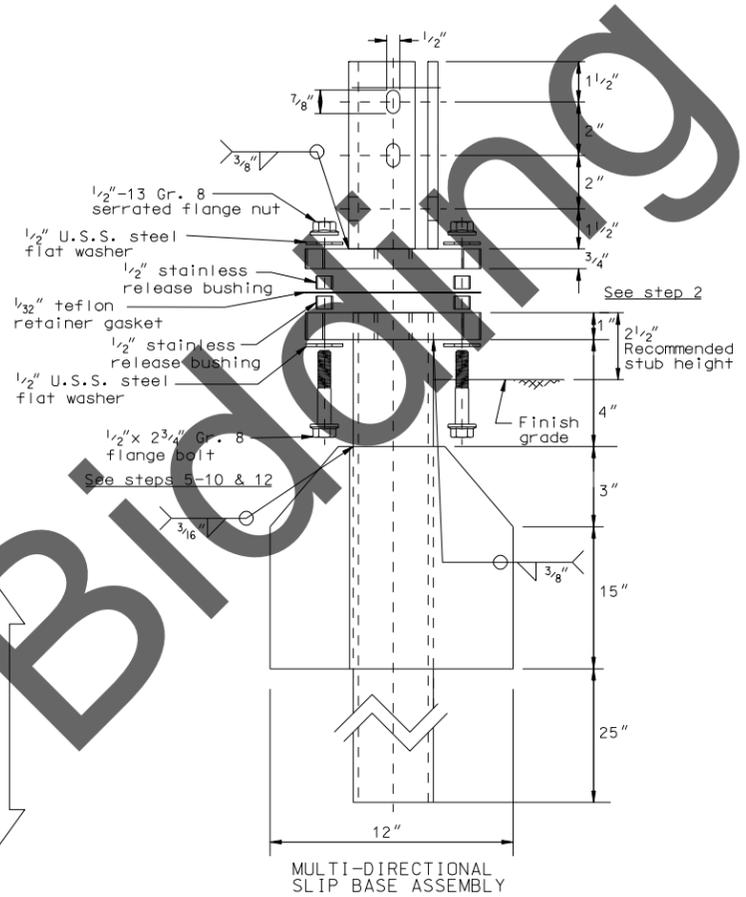
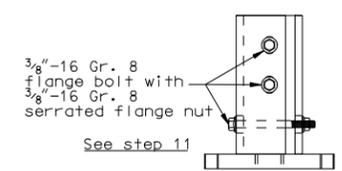
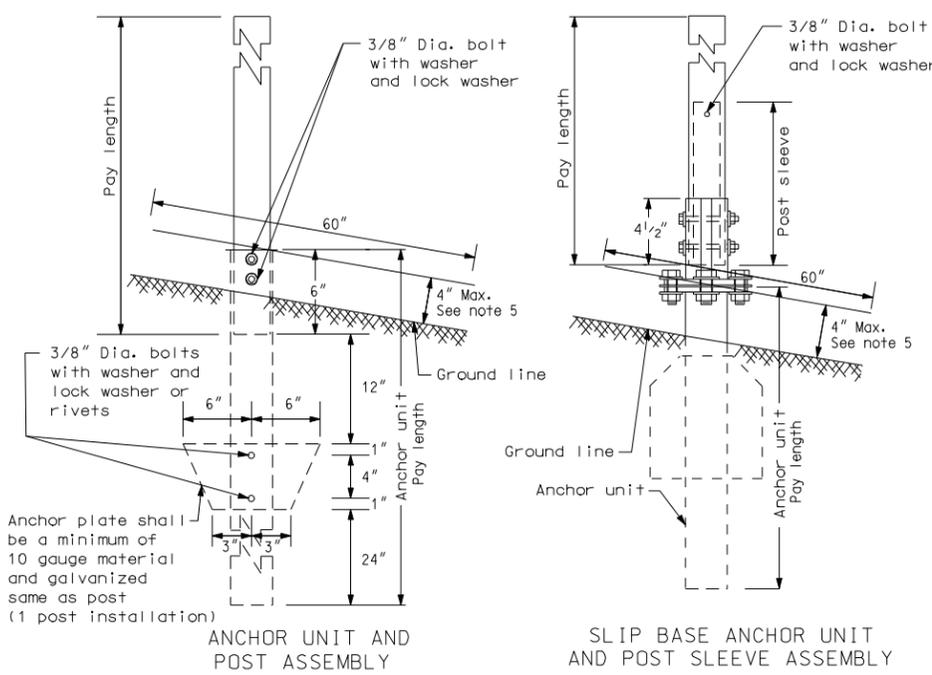
ENLARGED VIEW

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
09/14/11	
REVISIONS	
DATE	CHANGE

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BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

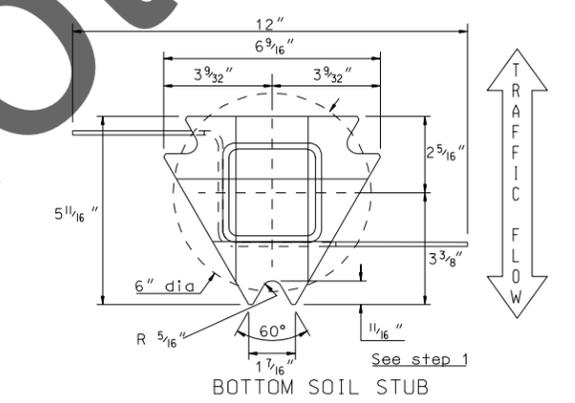
PERFORATED TUBE



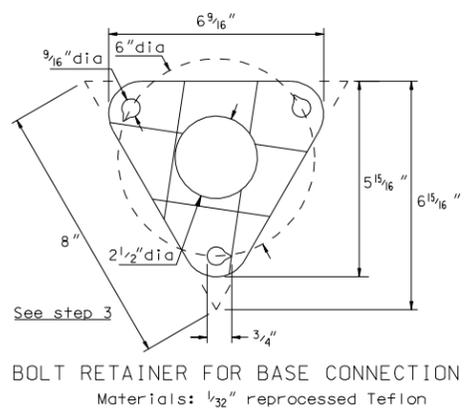
Materials: Plate - ASTM A572 grade 50
 Angle receiver - 2 1/2" x 2 1/2" x 3/8" ASTM A36 structural angle

Square Post Sizes	A	B	C	D	E	F
2 3/16" x 10 Ga. Square Post	1 3/64"	2 1/2"	3 1/32"	2 5/32"	1 33/64"	1 7/8"
2 1/2" x 10 Ga. Square Post	1 3/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

2 3/16" x 10 gauge may be inserted into 2 1/2" x 10 gauge for additional wind load.

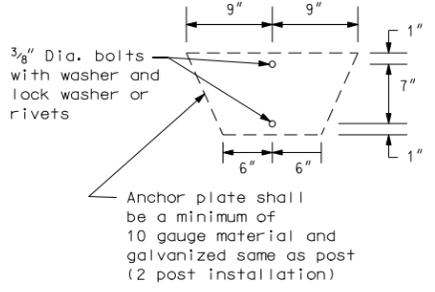


Materials: Tube - 3" x 3" x 7 gauge ASTM A500 Gr B tube
 Stabilizing Wing - 7 gauge H.R.P.O. ASTM A 569
 Plate - ASTM A572 grade 50



Materials: 1/32" reprocessed Teflon

- Notes
1. Slip base bolts shall be torqued as specified by the manufacturer.
 2. The 2 3/16" size 10 gauge is shown as 2.19" size on the plans. The 2 1/2" size 10 gauge is shown as 2.51" size on the plans.
 3. Anchor for 2", 2 1/4", and 2 1/2" posts.
 4. Anchor material shall be 7 gauge H.R.P.O. Commercial quality ASTM A569 and 3" x 3" x 7 gauge ASTM A500 Grade B. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI. Anchor shall be hot dipped galvanized per ASTM A123/A153. All tolerances on anchor unit and slip base bottom assembly are ± 0.005 unless otherwise noted.
 5. 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.
 6. When used in concrete sidewalk, anchor shall be the same except without the wings.
 7. Four post signs shall have over 8' between the first and fourth posts.



MULTI-DIRECTIONAL SLIP BASE ASSEMBLY	
STEP	INSTALLATION PROCEDURE
1.	Install bottom soil anchor stub plumb and squared up with road, with point of plate facing oncoming traffic.
2.	Depth of imbedment to leave 2 1/2" from grade to top of anchor plate.
3.	Place teflon bolt retainer gasket on top of bottom plate (make sure that notches in holes are pointing counter clockwise).
4.	Place top post receiver on to retainer gasket, properly indexed so that angle receivers are squared up with road.
5.	Slide 1 each 1/2" flat washer on to 1 each inverted 1/2"-13 gr. 8 flange bolt, followed by 1 each stainless steel release bushing.
6.	Insert above bolt with washer and bushing up through notched points of top and bottom plates, passing through hole in gasket.
7.	Slide second bushing down on to above bolt until it rests on top of gasket followed by second washer.
8.	Complete by threading 1/2"-13 gr. 8 serrated flange nut snugly down against top of washer.
9.	Repeat steps 5,6,7 & 8 at the two remaining notched triangle points.
10.	Insert sign post into angle receivers on top half until post(s) bottom out. *NOTE: Where higher wind load is desired, insert the next size smaller square post inside bottom of main upright post (Minimum of 48", not to exceed beyond bottom edge of sign).
11.	Secure posts into receivers using 3 each 3/8"-16 gr. 8 flange bolts and 3 each 3/8"-16 serrated flange nuts in receiver slots (top 2 bolts should be parallel to highway) do not tighten nuts until all bolts are in place.
12.	After all sub-assembly hardware is tightened, then torque the three 1/2"-13 nuts to 42 ft-lbs, in a circular pattern until all bolt assemblies reach the required torque. *NOTE: On multi-leg installations, be sure that all anchors are squared and lined up with each other.

Number of Posts	Telescoping Perforated Tube					
	Post Size In.	Wall Thickness Gauge	Sleeve Size In.	Wall Thickness Gauge	Slip Base	Anchor Size Without Slip Base In.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			B	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No	2 1/4
2	2 1/4	12			No	2 1/2
2	2 1/2	12			Yes	
2	2 1/2	10			Yes	
2	2 1/4	12	2	12	Yes	
2	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/2	12			Yes	
3 & 4	2 1/2	10			Yes	
3 & 4	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/4	12	2	12	Yes	
3 & 4	2 1/2	10	2 3/16	10	Yes	

B - The 2 1/2", 12 gauge posts do not need breakaway bases when placed in standard soils, but require a shim as specified by the manufacturer. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.

Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In. 4	Cross Sect. Area In. 2	Section Modulus In. 3
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.785
4 x 4	0.250	1/4	6.600	3.040	1.940	1.050

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-21-02	
REVISIONS	
DATE	CHANGE
12-01-04	PE stamp added

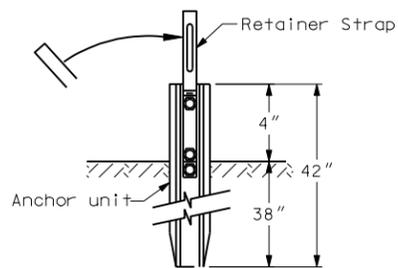
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BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

FLANGED CHANNEL

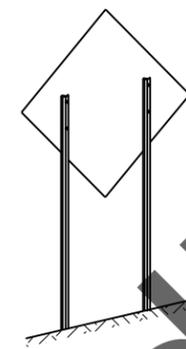
3 LB/FT U POSTS



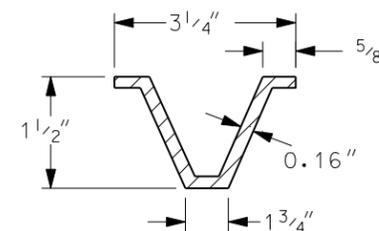
Anchor Unit & Strap Assembly Detail

STEPS OF INSTALLATION

1. A) Drive anchor unit to within 12" of ground level.
B) Proper assembly established by lining up the top 3/4" slot of retainer spacer strap with top hole of anchor unit.
C) Assemble strap to back of anchor unit using 3/8"-16 UNC x 2.0" long bolt, lock washer and nut.
D) Rotate strap 90° to left.
2. A) Drive anchor unit to 4" dimension.
B) Rotate strap to vertical position.
3. A) Place 3/8"-16 UNC x 2" bolt, lock washer & nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit (this coincides with the bottom 3/4" slot in the strap).
B) Alternately tighten two connector bolts.
4. A) Complete assembly by tightening 3/8"-16 UNC x 2" long retainer bolt (this fastens sign post to retainer spacer strap).
5. The base post, strap & sign post shall be properly nested. Proper nesting occurs when all flat surfaces of the base post, strap and sign post at the bolts have full contact across the entire width.



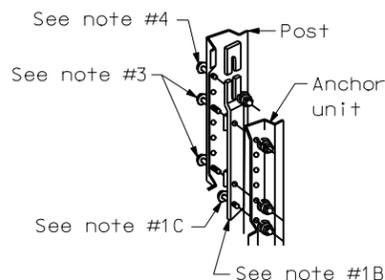
Typical Installation



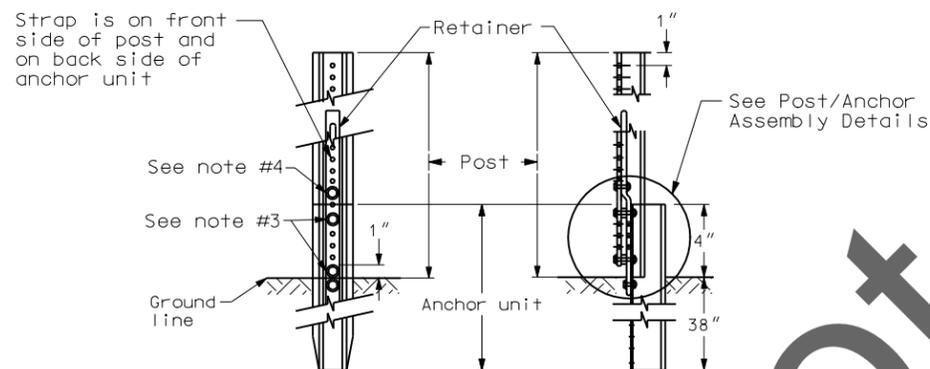
U-Post Detail (3 lb/ft)

Notes

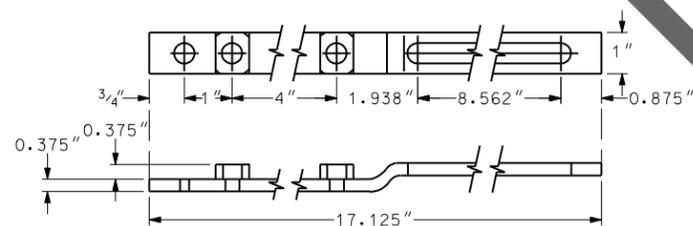
1. Use 3 lb/ft riser anchor units and risers
2. Driven riser posts shall be at least 7' long and embedded at least 3.5'.
3. A splice shall overlap a minimum of 18".
4. Use 4 bolts 5/16" diameter with washers and nuts. Two at top and two at bottom of splice.
5. Anchor unit for guy wires shall be no more than 4" above ground and embedded at least 3.5'.



Post/Anchor Assembly Details

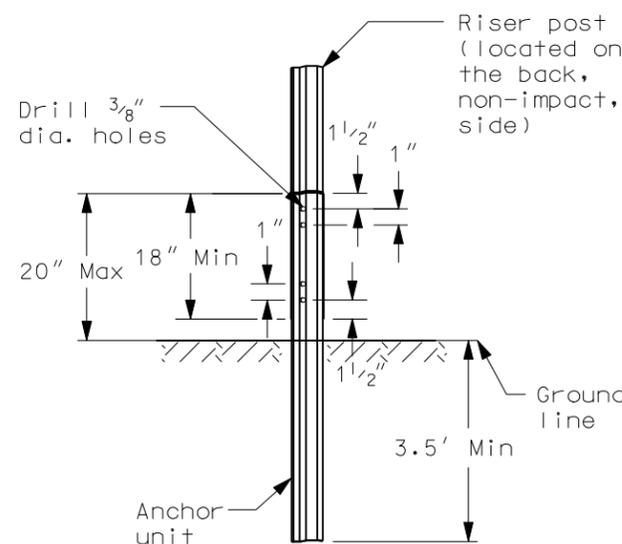


Front View Side View Sign Post Assembly Detail

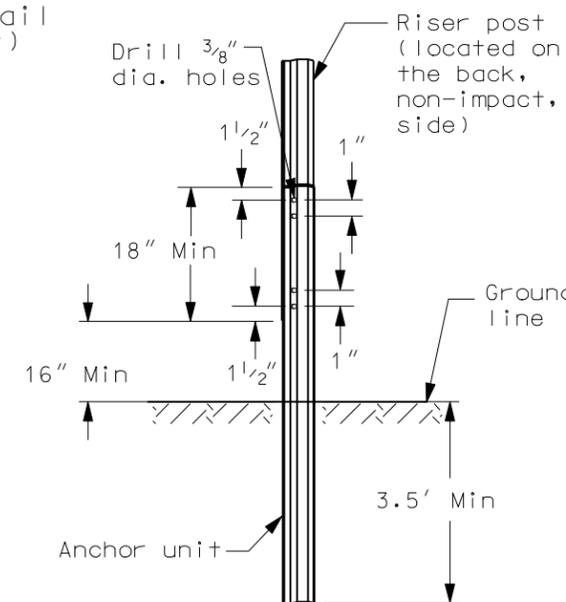


Retainer/Spacer Strap Detail

CHANNEL SIZE IN.	WALL THICKNESS IN.	WEIGHT PER FOOT LBS.	MOMENT OF INERTIA IN. 4	CROSS SECT. AREA IN. SQ.	SECTION MODULUS IN. 3
1.516 x 3.125"	.116	2.00	.179	.590	.225
1.532 x 3.125"	.124	2.25	.201	.648	.254
1.562 x 3.125"	.132	2.50	.233	.748	.289
1.578 x 3.125"	.140	2.75	.271	.819	.329
1.750 x 3.500"	.150	3.00	.372	.918	.403
1.750 x 3.500"	.175	4.00	.500	1.190	.560



U-Channel Splice Option 1



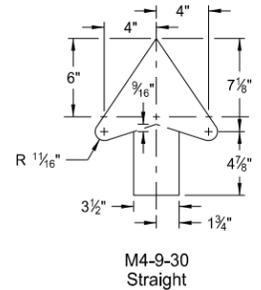
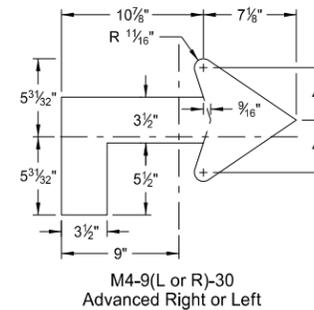
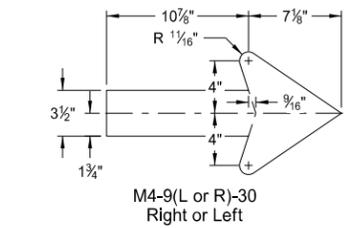
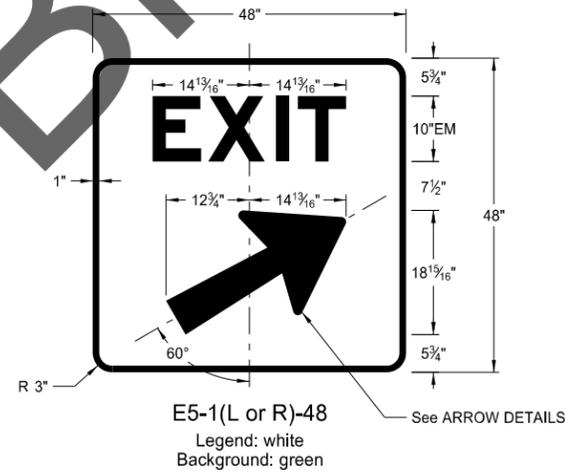
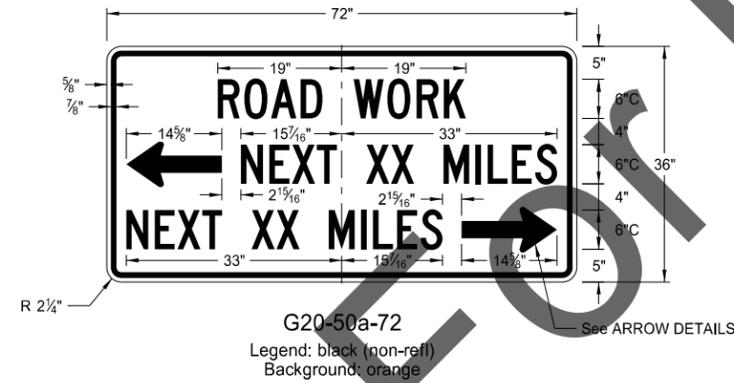
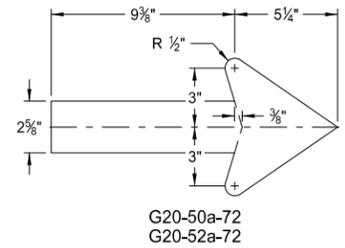
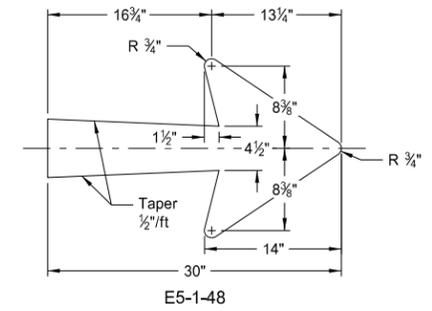
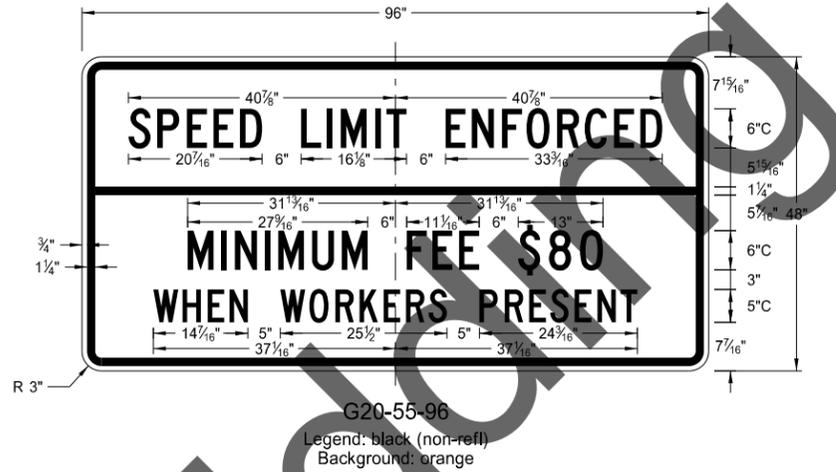
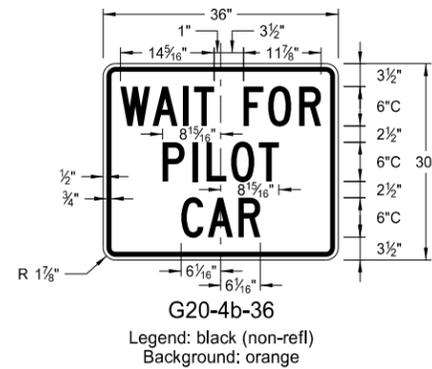
U-Channel Splice Option 2

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-28-93	
REVISIONS	
DATE	CHANGE
03-07-01	Revised U-post details
11-21-02	Deleted perforated tube
05-08-03	Revised U-Channel splice
12-01-04	PE stamp added
06-29-05	Revised flanged channel note

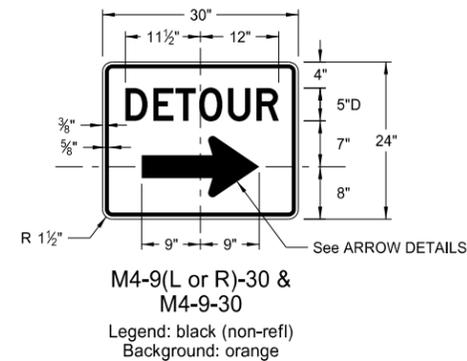
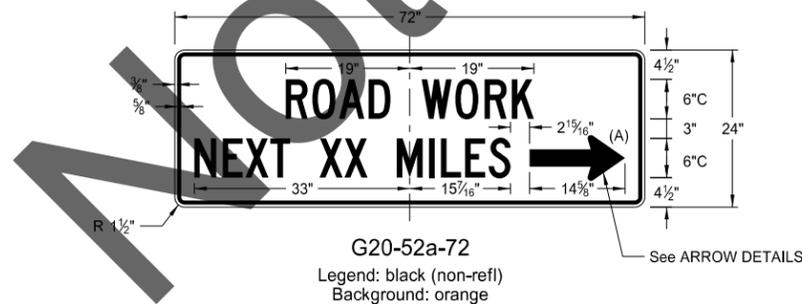
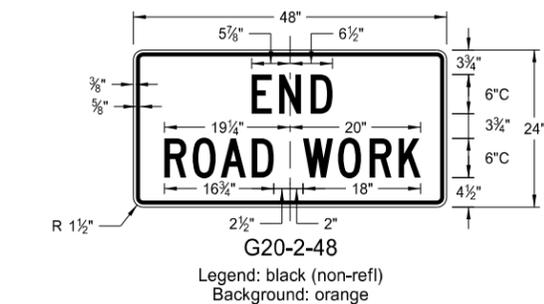
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CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

D-704-9



ARROW DETAILS



NOTES:

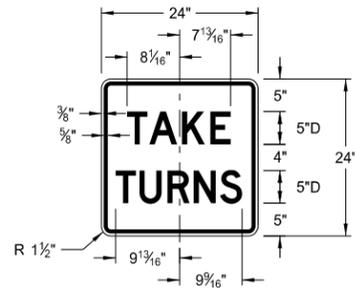
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

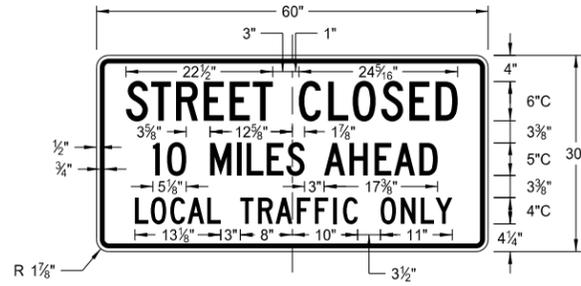
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CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

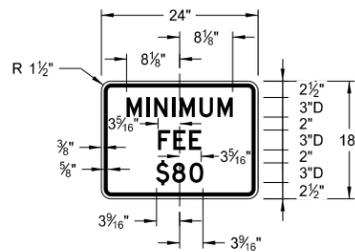
D-704-10



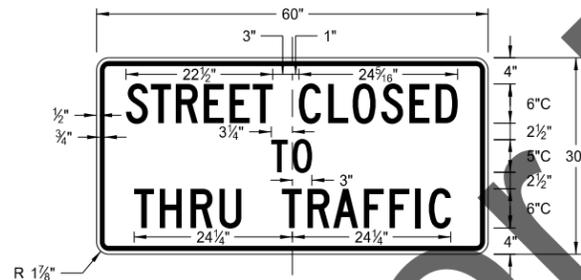
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R11-3c-60
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R2-1a-24
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R11-4a-60
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R11-2a-48
Legend: black (non-refl)
Background: white

Not For Bidding

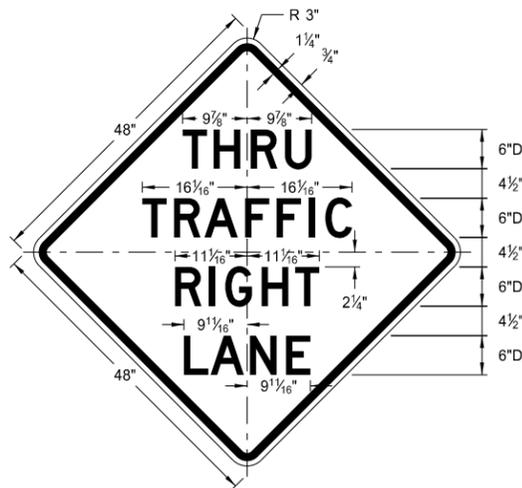
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

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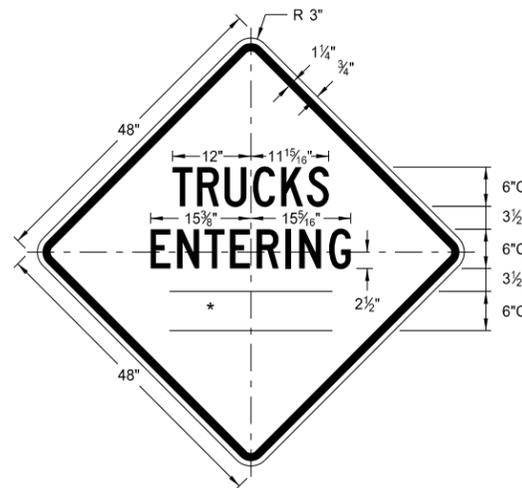
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

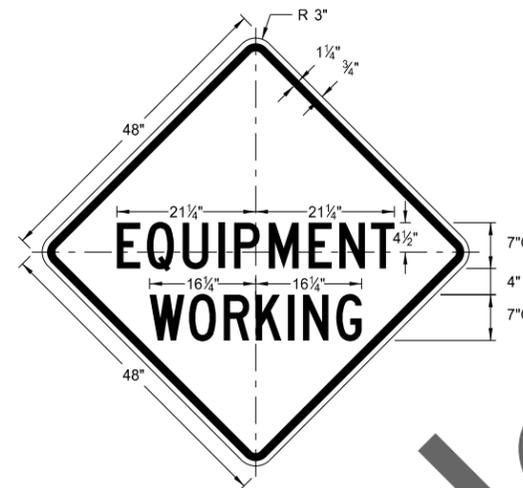
* DISTANCE MESSAGES



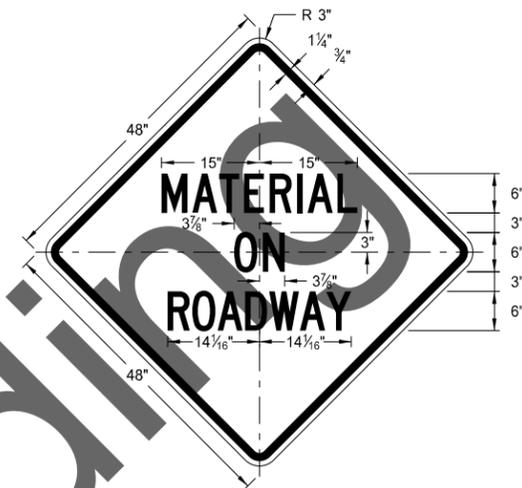
W5-8-48
Legend: black (non-refl)
Background: orange



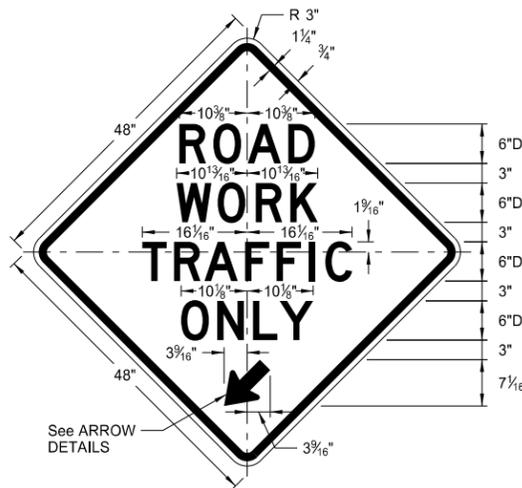
W8-54-48
Legend: black (non-refl)
Background: orange



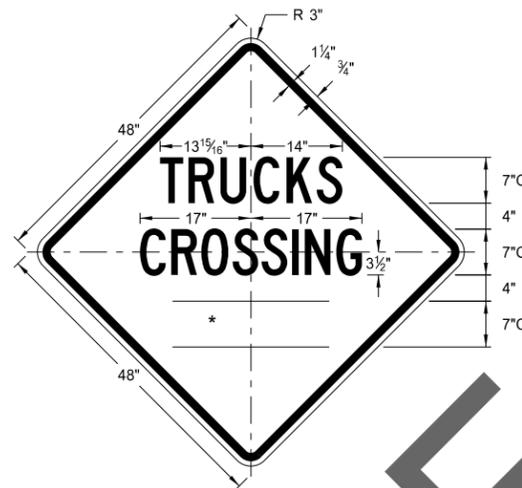
W20-51-48
Legend: black (non-refl)
Background: orange



W21-51-48
Legend: black (non-refl)
Background: orange



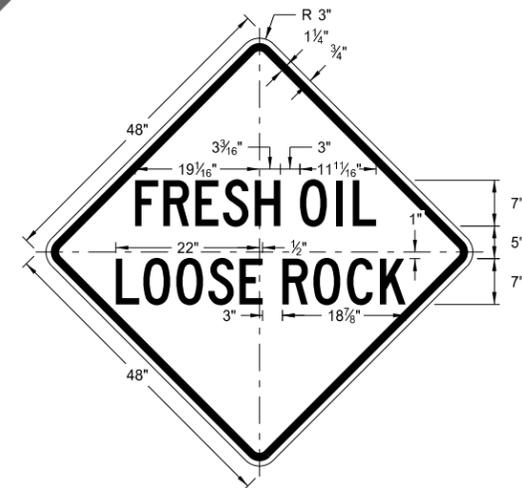
W5-9-48
Legend: black (non-refl)
Background: orange



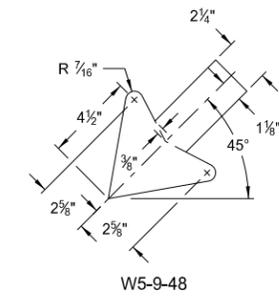
W8-55-48
Legend: black (non-refl)
Background: orange



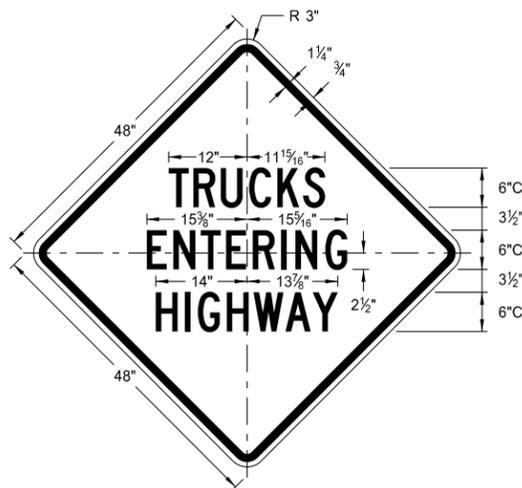
W20-52-54
Legend: black (non-refl)
Background: orange



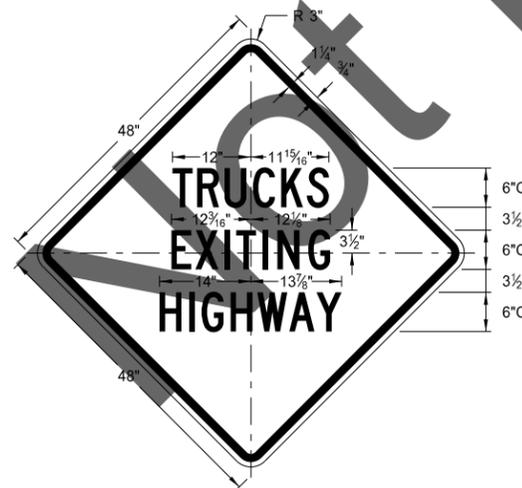
W22-8-48
Legend: black (non-refl)
Background: orange



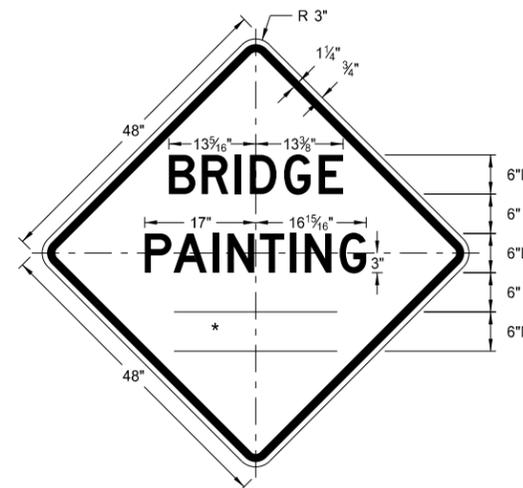
W5-9-48
ARROW DETAILS



W8-53-48
Legend: black (non-refl)
Background: orange



W8-56-48
Legend: black (non-refl)
Background: orange

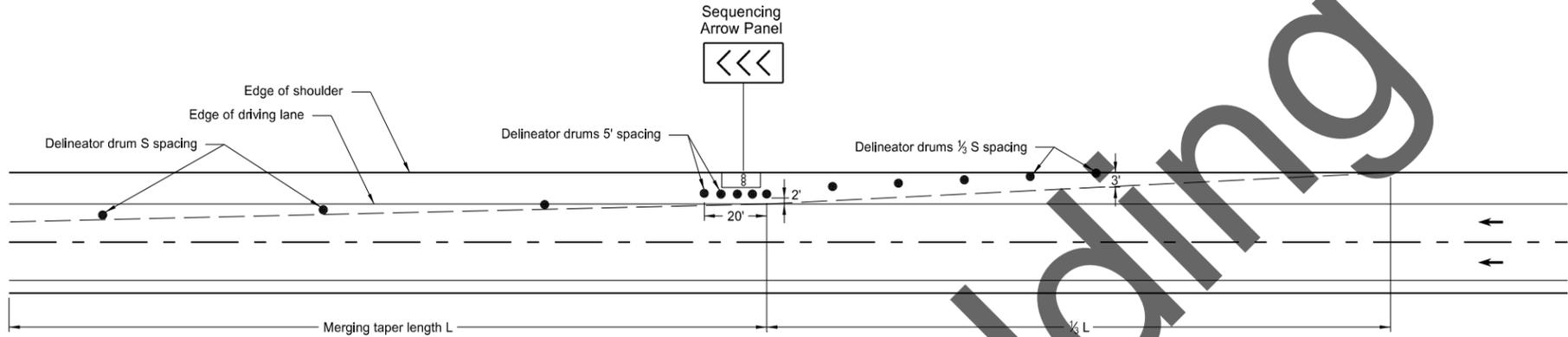


W21-50-48
Legend: black (non-refl)
Background: orange

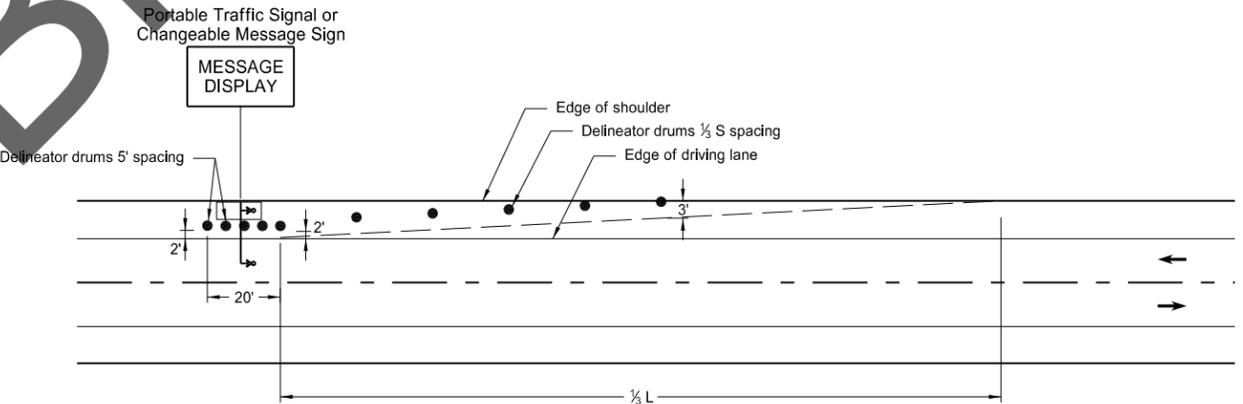
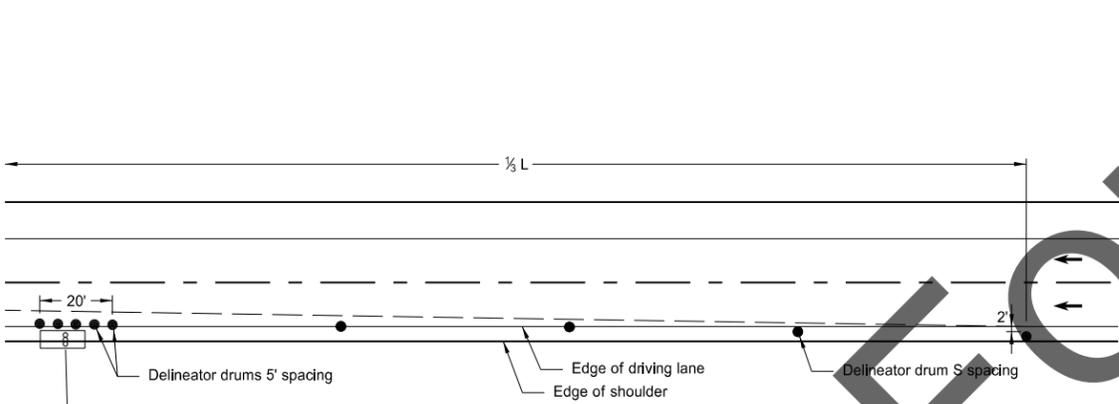
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
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SHOULDER CLOSURE TAPERS



SHOULDER CLOSURE WITH LANE CLOSURE
(when shoulder is 8' or wider)



SHOULDER CLOSURE USED WITH LANE CLOSURE
(when shoulder is less than 8' wide)

PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

KEY

● Delineator Drum	∞ Sequencing Arrow Panel
• Message Display	↳ Portable Traffic Signal

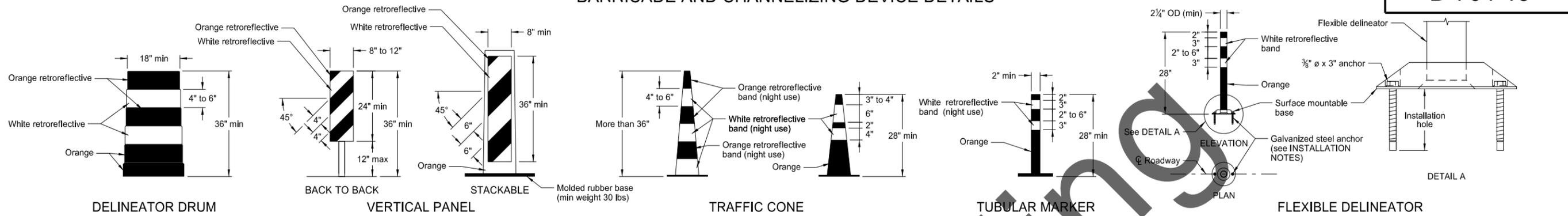
Notes:

- S = Posted Speed Limit in mph
W = Width of offset in feet
L = Taper length in feet
L = WS²/60 (40mph or less)
L = WS (45mph or more)
- If a shoulder taper is used, it should have a length of approximately 1/3L. If a shoulder is used as a travel lane, a normal merging or shifting taper should be used.
- When paved shoulders of 8 foot width or more are closed, channelizing devices shall be used to close the shoulder in advance to delineate the beginning of the work space and direct vehicular traffic to remain within the traveled way.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
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DATE	CHANGE

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BARRICADE AND CHANNELIZING DEVICE DETAILS



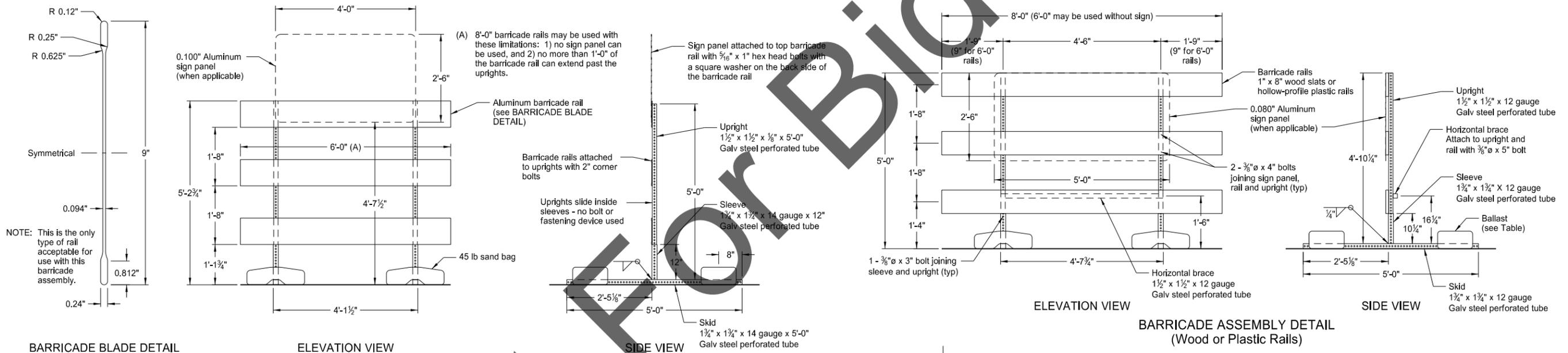
- INSTALLATION NOTES:**
1. Drill installation holes to diameter and depth as required by manufacturer's specifications.
 2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
 3. In lieu of bolted down base, the contractor may use an 8" x 8" butyl pad or hot melt butyl. Butyl shall be removed as close as possible to pavement surface.

The markings on drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide. Each drum shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectORIZED spaces between the horizontal orange and white stripes shall not exceed 3" wide. Stripes shall not be placed on ribs or indentations in the drum. Drums shall have closed tops that will not allow collection of construction debris or other debris. Ballast shall not be placed on the top of a drum.

Markings for vertical panels shall be alternating orange and white retroreflective stripes, sloping downward in the direction vehicular traffic is to pass. Retroreflective sheeting shall be placed on both sides of panel and shall have a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective material on the vertical panel is 36 inches or more, a stripe width of 6 inches shall be used.

RetroreflectORIZATION of cones more than 36" in height shall be provided by alternating orange and white retroreflective stripes. Each cone shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectORIZED space between the orange and white stripes shall not exceed 3" wide.

RetroreflectORIZATION of tubular markers more than 42" in height shall be provided by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.

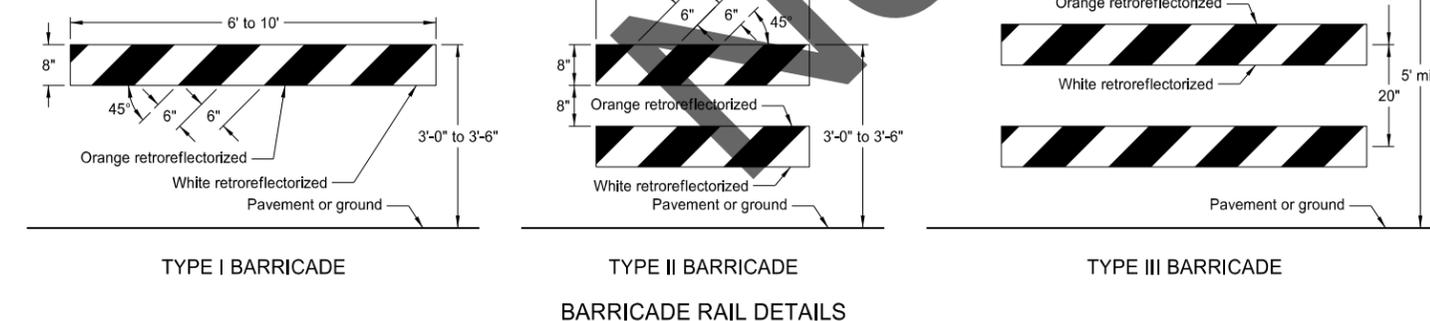


BARRICADE BLADE DETAIL

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the barricade length is less than 36", the rail stripe width shall be 4".

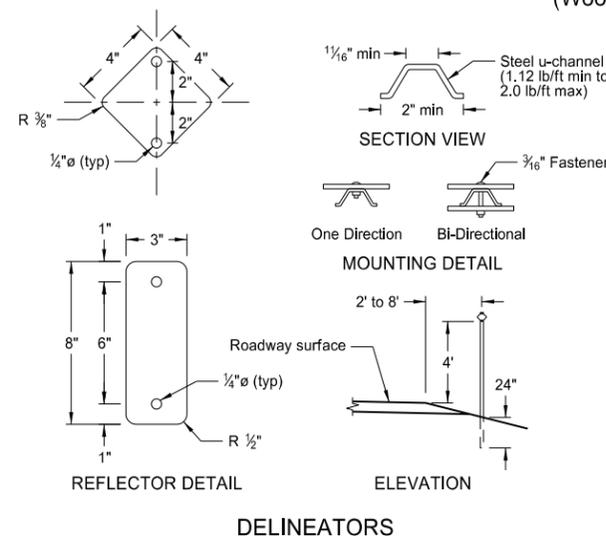


TYPE I BARRICADE

TYPE II BARRICADE

TYPE III BARRICADE

BARRICADE RAIL DETAILS



REFLECTOR DETAIL

ELEVATION

DELINEATORS

MINIMUM BALLAST (For each side of barricade support)

Without Sign	4 - 25 lb sandbags
With Sign	6 - 25 lb sandbags

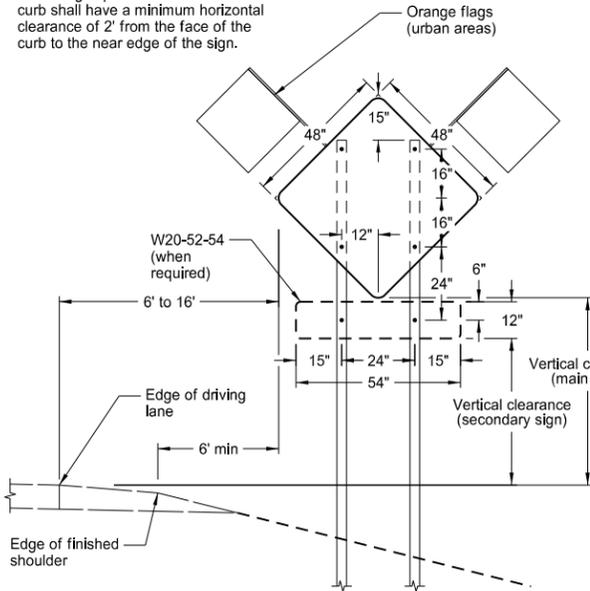
Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
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DATE	CHANGE

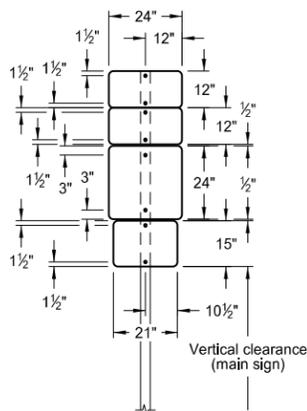
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CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

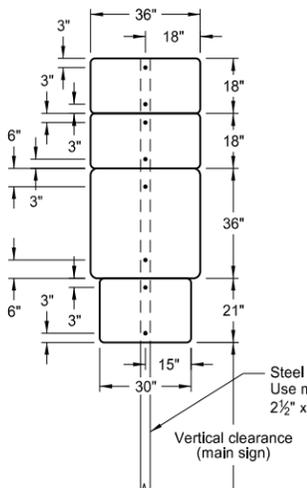
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



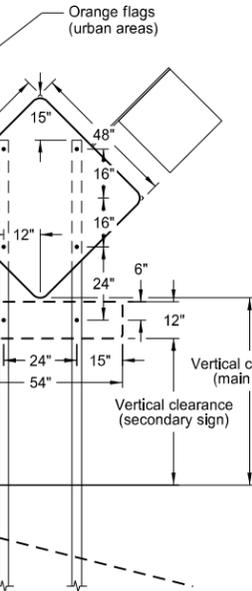
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



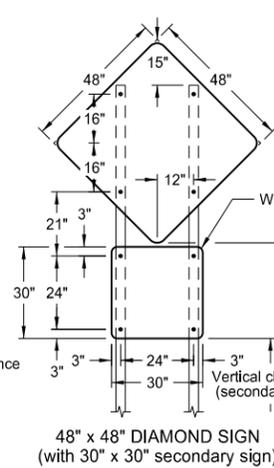
24" x 24" ROUTE MARKER ASSEMBLY



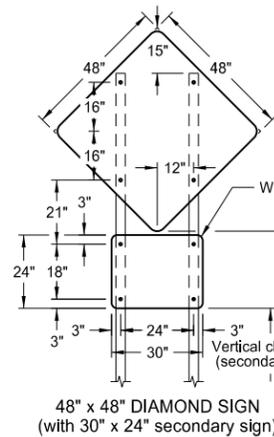
36" x 36" ROUTE MARKER ASSEMBLY



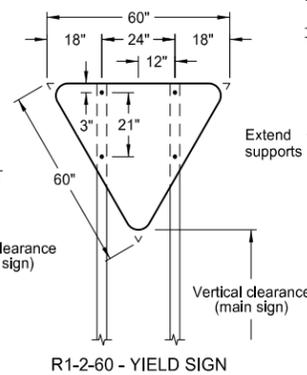
18" x 18" DIAMOND SIGN



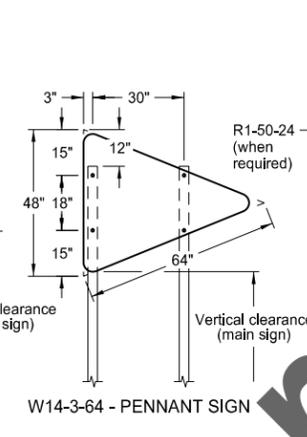
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



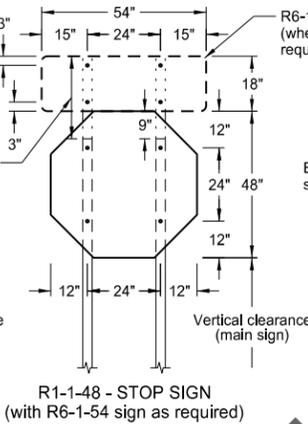
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



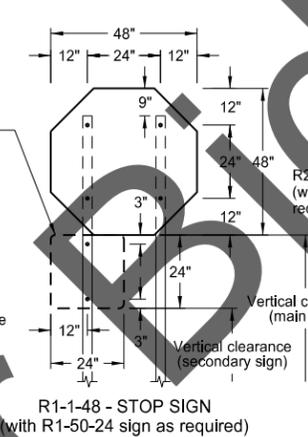
R1-2-60 - YIELD SIGN



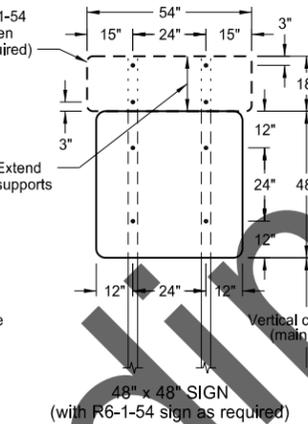
W14-3-64 - PENNANT SIGN



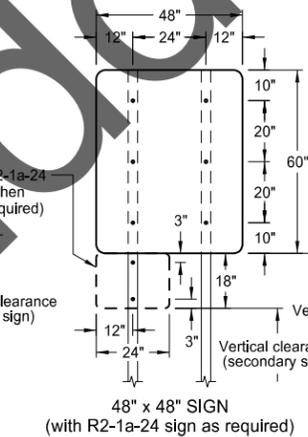
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



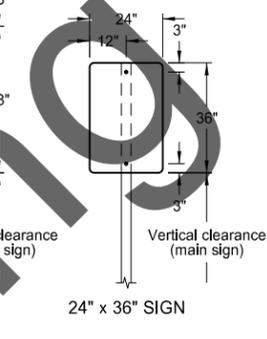
R1-1-48 - STOP SIGN
(with R1-50-24 sign as required)



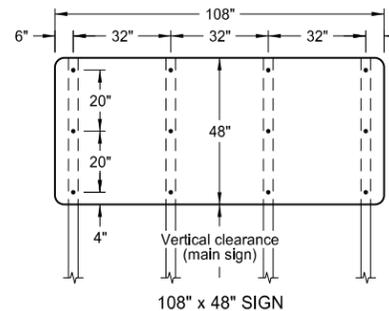
48" x 48" SIGN
(with R6-1-54 sign as required)



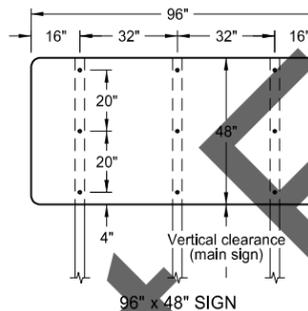
48" x 48" SIGN
(with R2-1a-24 sign as required)



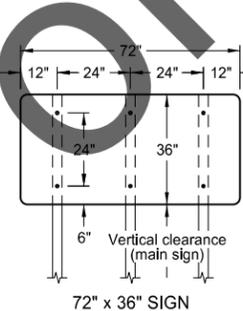
24" x 36" SIGN



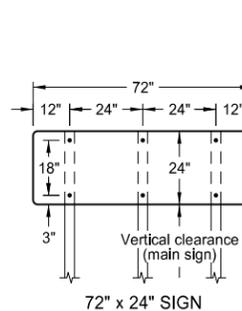
108" x 48" SIGN



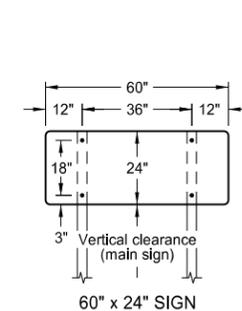
96" x 48" SIGN



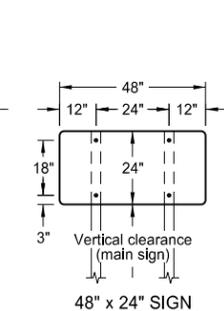
72" x 36" SIGN



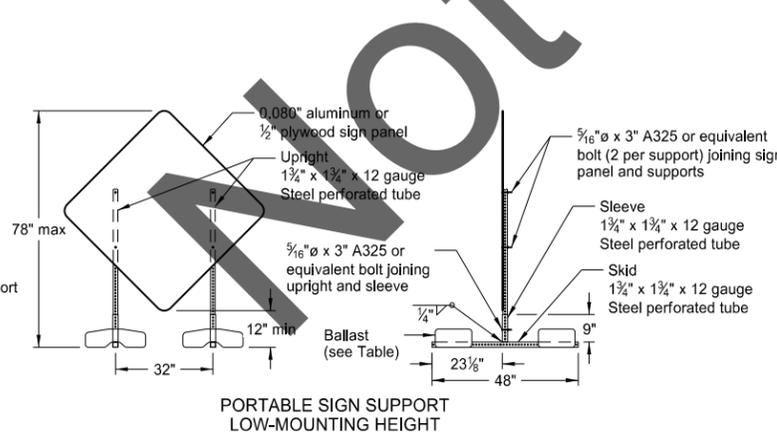
72" x 24" SIGN



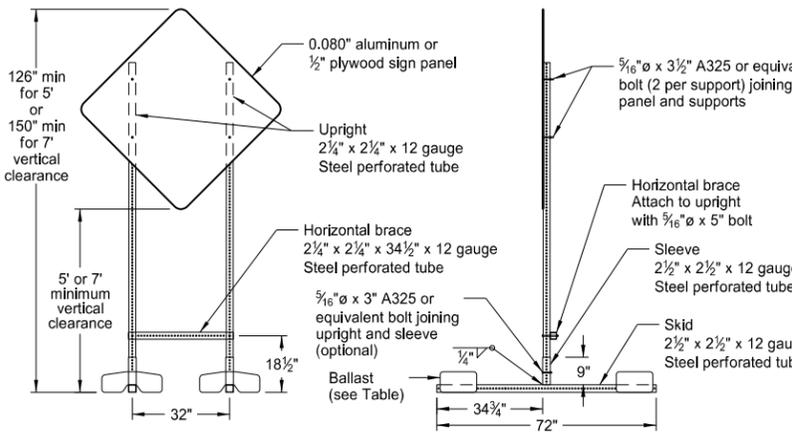
60" x 24" SIGN



48" x 24" SIGN



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

1. Sign Supports: Supports shall be galvanized or painted. Minimum post sizes are 2.5 lb/ft u-channel or 2" x 2" x 12 gauge steel perforated tube, except where noted. When installing signs on u-channel, the minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes are based on a wind speed of 55 MPH.

Signs over 50 square feet should be installed on 2 1/2" x 2 1/2" perforated tube supports as a minimum.

Guy wires shall not be attached to sign supports. Wind beams may be attached to u-posts behind the sign panels.

2. Sign Panels: Provide sign panels made of 0.100" aluminum, 1/2" plywood, or other approved material, except where noted. All holes to be punched round for 3/8" bolts.

3. Alternate Messages: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate (without a border) and installed and removed as required. (i.e. "Left" and "Right" message on a lane closure sign)

4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

Interstate - white legend on blue background
Interstate Business Loop - white legend on green background
US and State - black legend on white background
County - yellow legend on blue background

5. Vertical Clearance: Install signs with a vertical clearance of 5'-0" (see TYPICAL SECTION.) In areas where parking or pedestrian movements are likely or the view of the sign may be obstructed, install signs with a vertical clearance of 7'-0" from the top of the curb or from the near edge of the driving lane in absence of a curb.

The vertical clearance to secondary signs is 1'-0" less than the vertical clearance as stated above.

Large signs having an area exceeding 50 square feet shall have a minimum clearance of 7'-0" from the ground at the post.

6. Portable Signs: Provide portable signs that meet the vertical clearance as stated above. Use portable signs when it is necessary to place signs within the pavement surface.

When portable signs are used for 5 days or less, low-mounting height (minimum 12" vertical clearance) sign supports may be used as long as the view of the sign is not obstructed. Time delays caused by unforeseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. The R9-8 through R9-11a series, W1-5 through W1-8 series, M4-10, and E5-1 may be used for longer than 5 days.

Signs mounted to the portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT Details shall have a maximum surface area of 16 square feet.

MINIMUM BALLAST
(For each side of sign support base)

Sign Panel Mounting Height (ft)	Number of 25 lb sandbags for 4' x 4' sign panel
1'	6
5'	8
7'	10

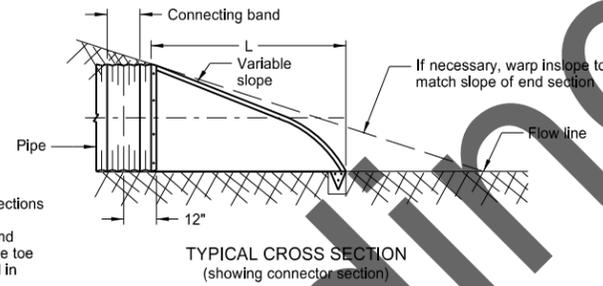
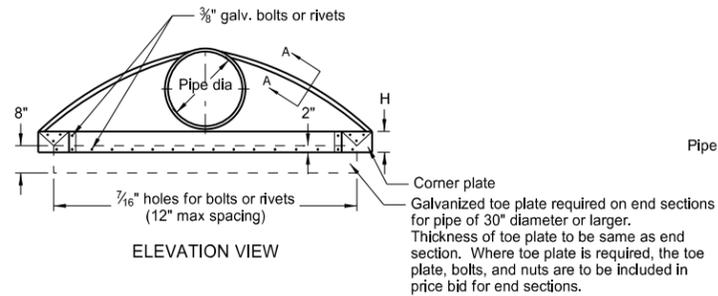
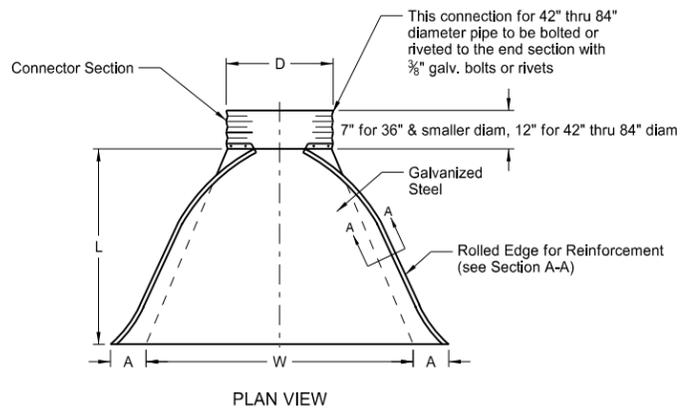
Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6.

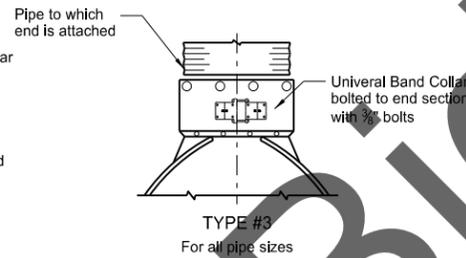
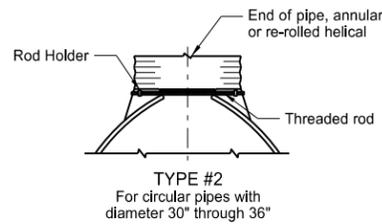
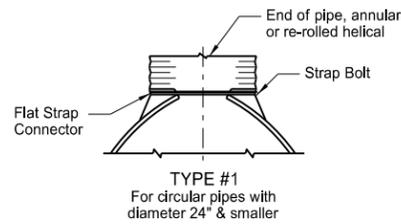
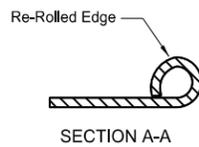
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ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS

D-714-4



PIPE DIA. IN	GALV. THICK.	END SECTION DIMENSIONS					APPROX. SLOPE	BODY PIECE
		A IN	B IN	H IN	L IN	W IN		
15	0.064	7	8	6	26	30	2 1/2:1	1
18	0.064	8	10	6	31	36	2 1/2:1	1
24	0.064	10	13	6	41	48	2 1/2:1	1
30	0.079	12	16	8	51	60	2 1/2:1	1 or 2
36	0.079	14	19	9	60	72	2 1/2:1	2
42	0.109	16	22	11	69	84	2 1/2:1	2
48	0.109	18	27	12	78	90	2 1/2:1	2
54	0.109	18	30	12	84	102	2:1	2
* 60	0.109	18	33	12	87	114	1 1/2:1	3
* 66	0.109	18	36	12	87	120	1 1/2:1	3
* 72	0.109	18	39	12	87	126	1 1/3 :1	3
* 78	0.109	18	42	12	87	132	1 1/2:1	3
* 84	0.109	18	45	12	87	138	1 1/6 :1	3



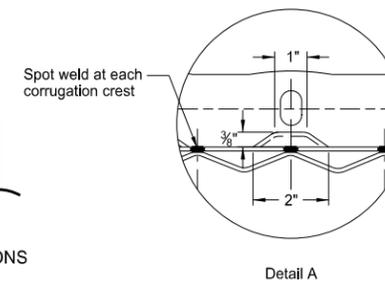
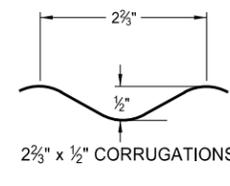
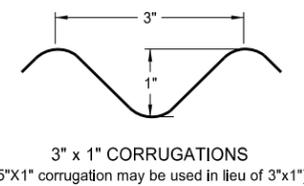
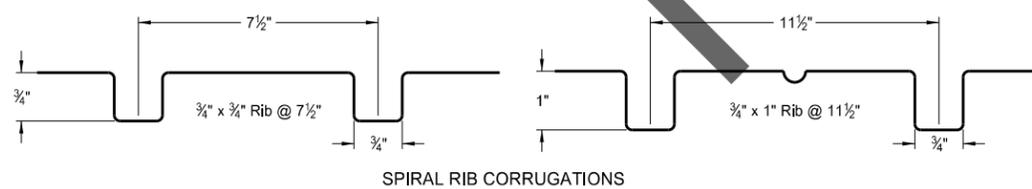
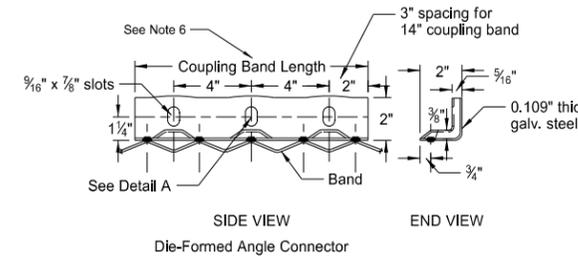
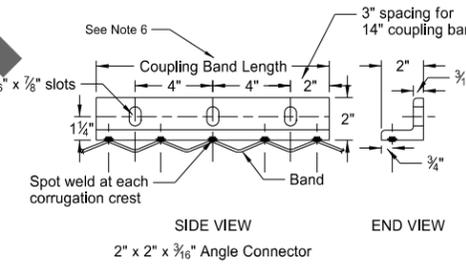
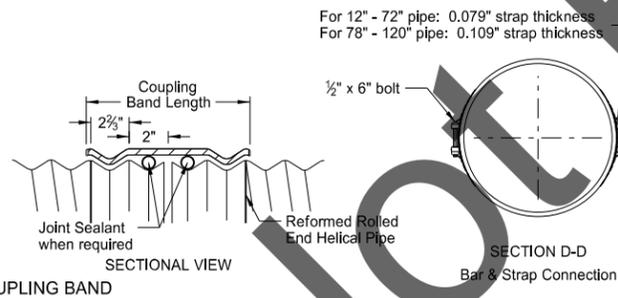
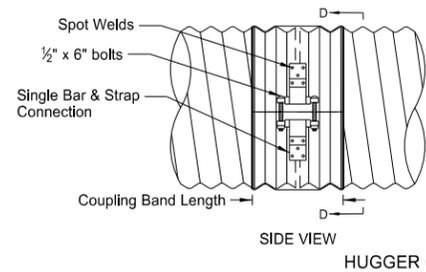
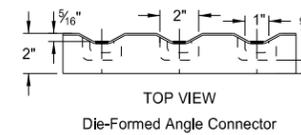
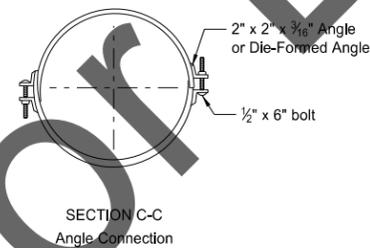
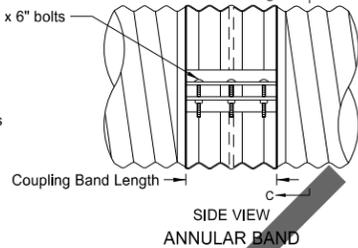
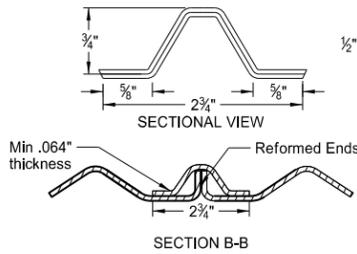
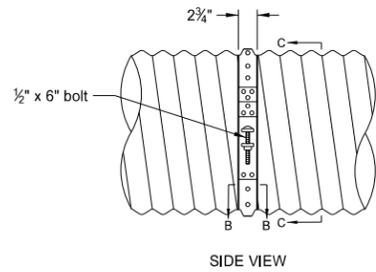
COUPLING BAND DIMENSIONS				
COUPLING TYPE	CORRUGATION PITCH x DEPTH	PIPE SIZE	COUPLING BAND LENGTH	MIN. BAND THICKNESS
Hat Band	2 3/8" x 1/2"	12" - 48"	2 3/4"	.064"
		12" - 72"	12"	.052"
Annular Band	2 3/8" x 1/2"	78" - 84"	12"	.079"
		48" - 120"	14"	.052"
Hugger Band	2 5/8" x 1/2" Rerolled End	12" - 72"	10 1/2"	.052"
		78" - 84"	10 1/2"	.079"
	3" x 1" Rerolled End	48" - 120"	10 1/2"	.052"
		5" x 1" Rerolled End	48" - 120"	12"

- These sizes have 0.109" sides and 0.138" center panels.
 - Pipe diameter is equal to dimension "D" of end section.
- Manufacturers tolerances of above dimensions will be allowed.
- Splices to be the lap riveted type.

Multiple panel bodies shall have lap seams which are to be tightly joined with 3/8" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.

NOTES:

1. Pipes and connecting bands shall conform to applicable sections of NDDOT Standard Specifications and to AASHTO M-36.
2. Top edge of all end sections to have rolled edges for reinforcement (see Section A-A). The reinforced edges are to be supplemented with 2" x 2" x 1/4" galv. angle for 60" through 72" dia. and 2 1/2" x 2 1/2" x 1/4" galv. angle for 78" and 84" dia.. Angles to be attached by galv. 3/8" dia. bolts and nuts. Angles are to extend from pipe to the corner wing bend.
3. Elongated pipes shall be factory preformed so that the vertical diameter shall be 5% greater and the horizontal diameter 5% less than a circular pipe.
4. Coupling bands shall be two-piece for pipes larger than 36" as shown in Section C-C & D-D details. For pipes 36" and smaller, a one-piece band is acceptable.
5. 1/2" x 8" bolts may be used as a substitute for the 1/2" x 6" bolts shown in the details.
6. Coupling bands wider than 14" may be used if a minimum of four 1/2" bolts with maximum spacing of 5 1/2" are used for the connection.
7. Length of spot welds shall be minimum 1/2".

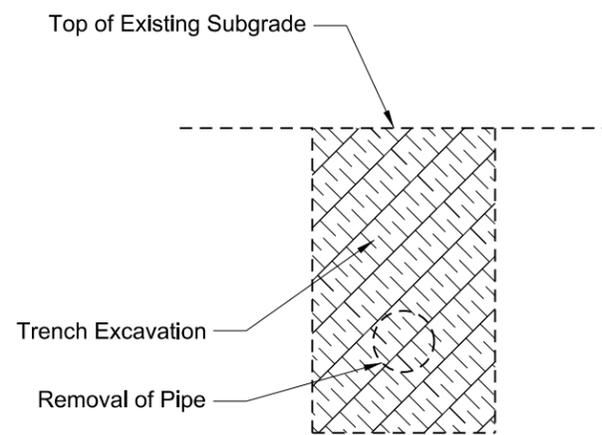


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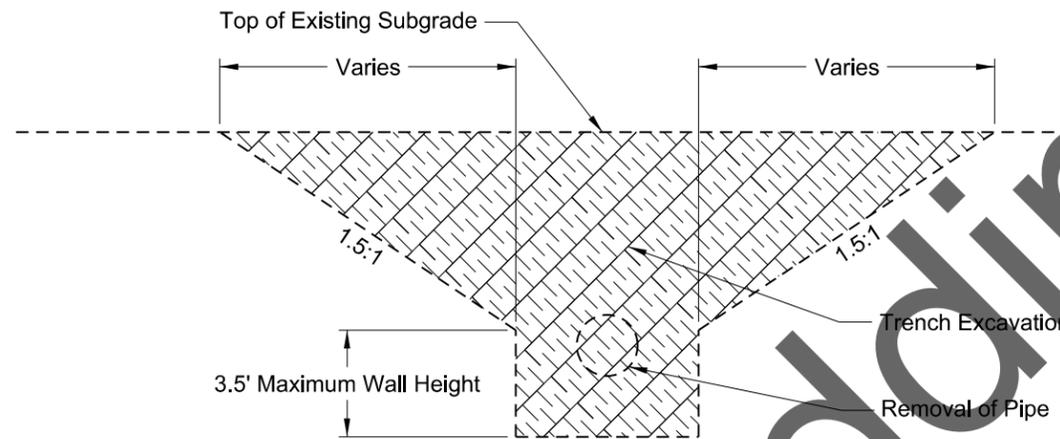
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PIPE EXCAVATION AND INSTALLATION DETAIL FOR LONGITUDINAL MAINLINE PIPE
OR PIPE NOT UNDER THE ROADWAY

D-714-27



EXCAVATION DETAIL A



EXCAVATION DETAIL B

Pay Items

- 1) Pipe*
- 2) Removal of Pipe (if required)

*Included in Pipe Pay Item

- 1) Pipe
- 2) Trench excavation
- 3) Aggregate base course CI 3 or CI 5
- 4) Common Excavation - Type A
- 5) Common Excavation - Type B

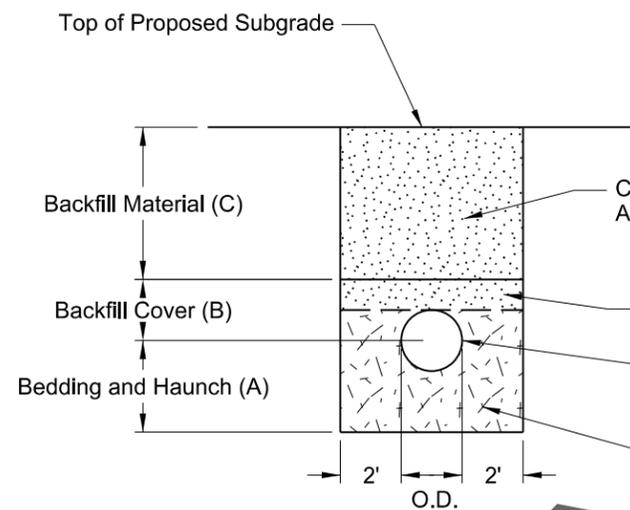
NOTES:

- 1) This drawing does not apply to pipes in approaches.
- 2) It is the contractor's option to select Detail A or B.

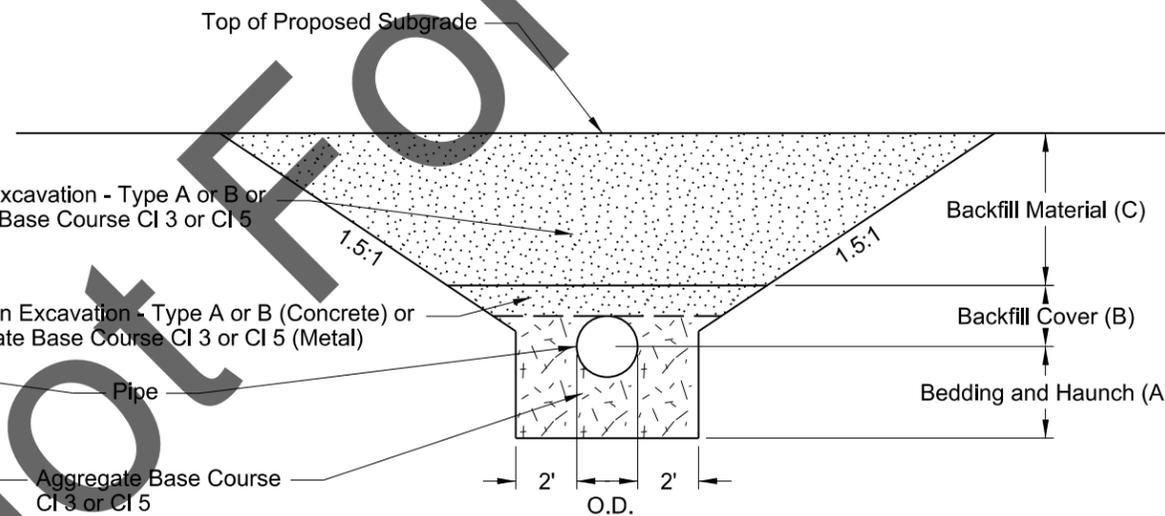
Bedding and Haunch (A)
Pipes Not Under Roadway = 0.5 O.D. + 4 Inches
Pipes Under the Roadway = 0.5 O.D. + 2 Feet

Backfill Cover (B)
Concrete Pipe = 0.5 O.D.
Metal Pipe = 0.5 O.D. + 1 Foot
PVC/HDPE = 0.5 O.D. + 1 Foot

Backfill Material (C)
Top of Pipe 4 Feet or Less Below the Top of Proposed Subgrade = Aggregate Base Course CI 3 or CI 5
Top of Pipe Greater than 4 Feet Below the Top of Proposed Subgrade = Common Excavation - Type A
Pipe Not Under Roadway = Common Excavation - Type B



BACKFILL DETAIL A



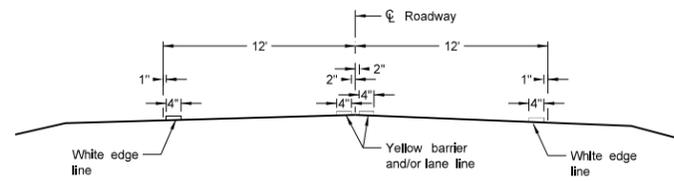
BACKFILL DETAIL B

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-26-13	
REVISIONS	
DATE	CHANGE
10-15-13	Label Formatting

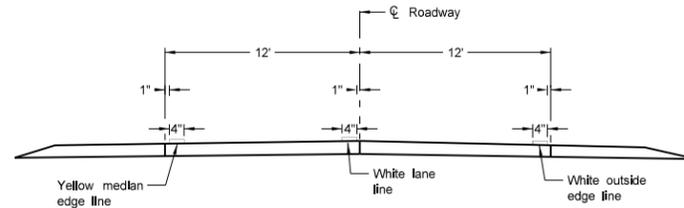
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Ron Horner,
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PE-2087,
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PAVEMENT MARKING

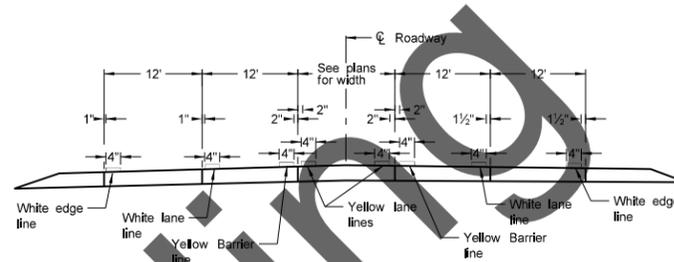
D-762-4



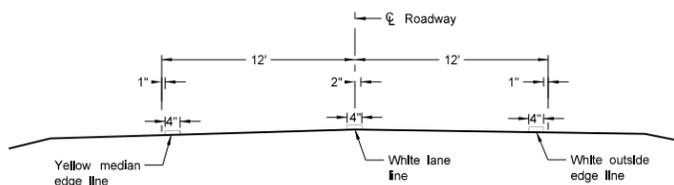
Two Lane Two Way
RURAL ROADWAY



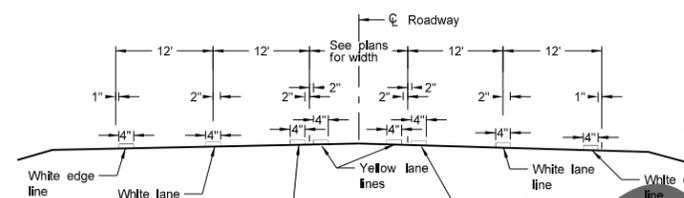
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



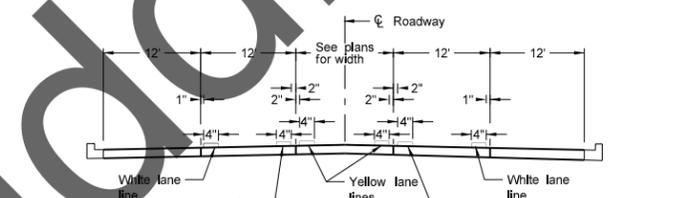
RURAL FIVE LANE ROADWAY
Concrete Section



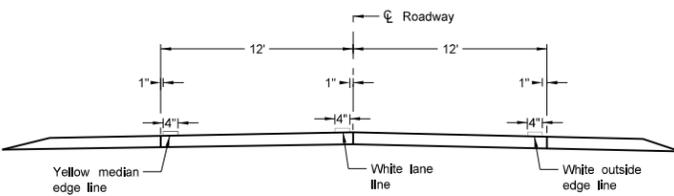
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



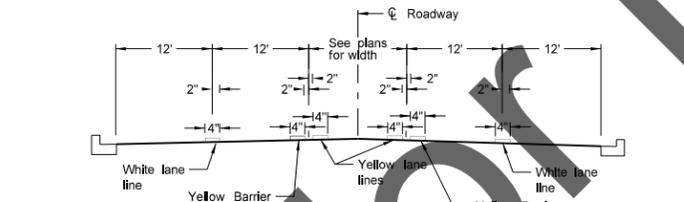
RURAL FIVE LANE ROADWAY
Asphalt Section



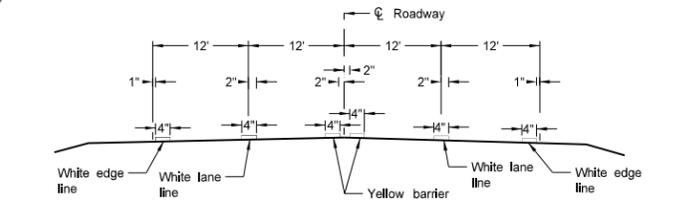
URBAN FIVE LANE SECTION
Concrete Section



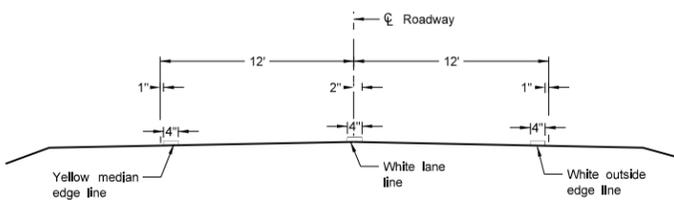
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



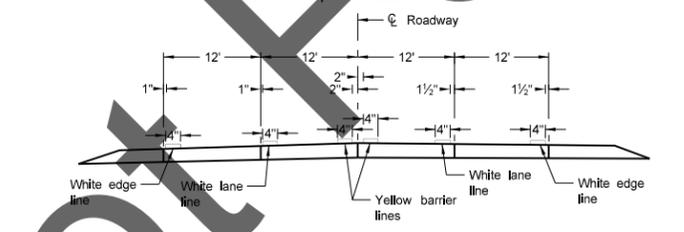
URBAN FIVE LANE SECTION
Asphalt Section



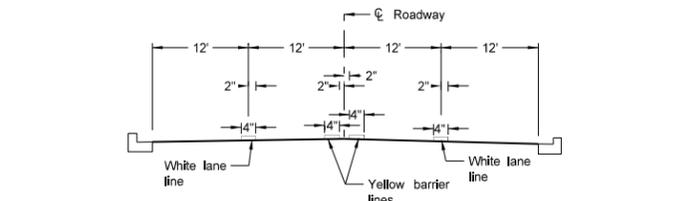
RURAL FOUR LANE ROADWAY
Asphalt Section



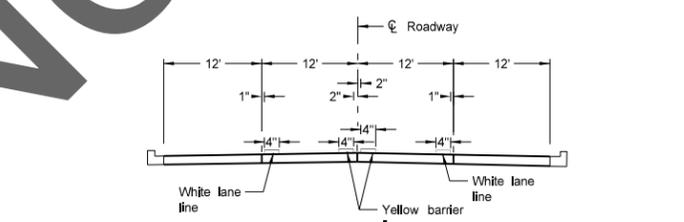
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



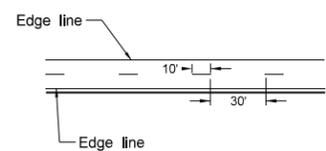
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:
1. Edge lines shall be continued through private drives and field drives and broken for intersections.

NOT FOR BIDDING

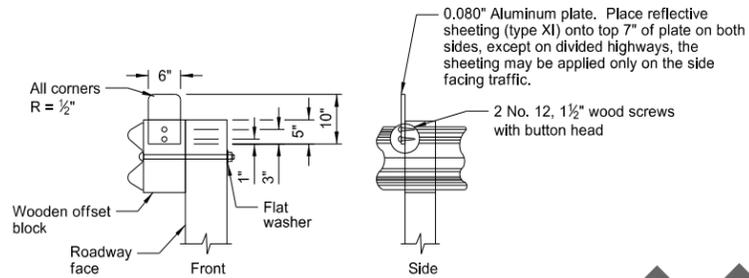
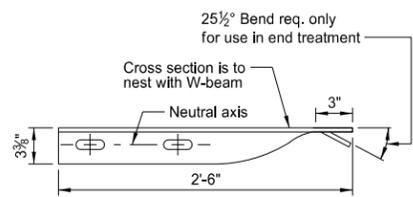
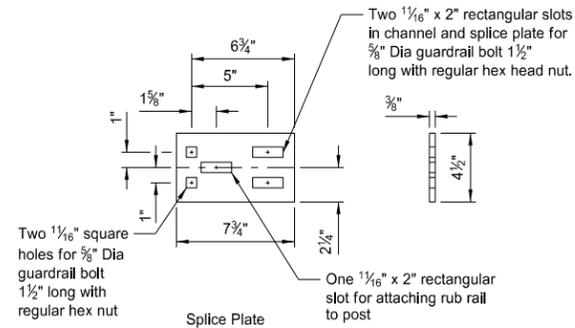
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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W-BEAM GUARDRAIL GENERAL DETAILS

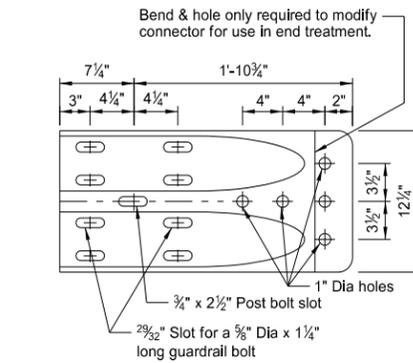
NOTES:

1. ReflectORIZED plates: Reflector plates shall begin at the first post and be spaced at 25' centers on guardrail less than 250' in length and at 50' centers for guardrail over 250' in length. The reflector shall be the same color as the pavement marking adjacent to that reflector unless noted otherwise on the plans.
2. Manner of replacing bituminous material at guardrail post: All excess earth from excavations for guard posts shall be disposed of as directed by the engineer. Replace bituminous material wherever guardrail is installed after mat has been laid. Cost of excavation and replacing of bituminous material to be included in the price bid for other items.
3. The Object Marker shall fit within the vertical edges of the Impact Plate. The retroreflective sheeting shall be type XI sheeting meeting the requirements of Section 894.02.B of the standard specifications. The sheeting shall be applied to 0.100 Aluminum sheeting meeting the requirements Section 894.01.A. The Object Marker shall attach to the Impact Head Plate with rivets or some other attachment device. The rivets or attachment device shall be non-rust. The stripes shall slope downward toward the roadway side.
4. Guardrail installation height tolerance = $- \frac{1}{4}''$, $+ 1''$.

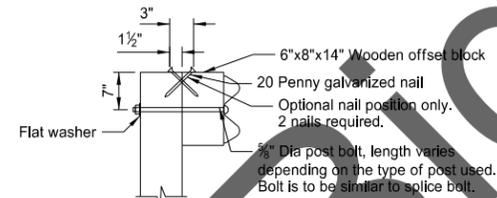


REFLECTORIZED PLATE DETAIL

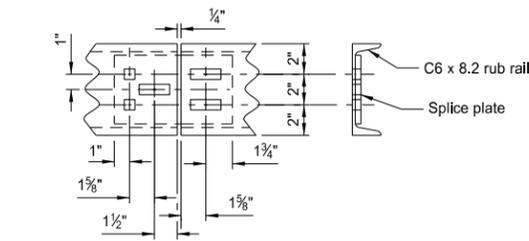
Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



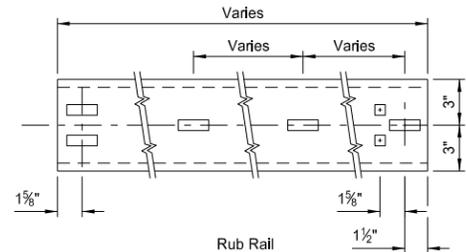
W BEAM TERMINAL CONNECTOR



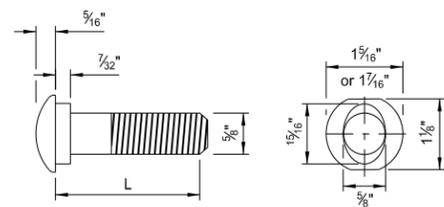
TYPICAL POST ATTACHMENT DETAIL



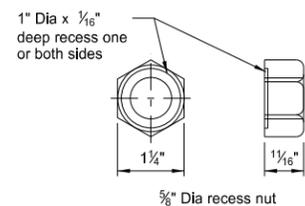
Splice Detail



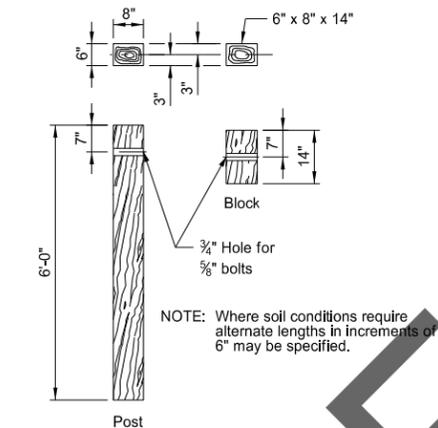
C6x8 RUB RAIL AND SPLICE PLATE



$\frac{5}{8}''$ Diameter Guardrail Bolt	
L	Thread Length
1 $\frac{1}{4}''$	Full length thread
2"	1 $\frac{3}{4}''$ Min thread length
9 $\frac{1}{2}''$	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length

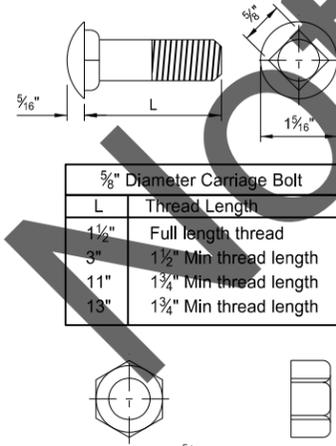


$\frac{5}{8}''$ GUARDRAIL BOLT & RECESS NUT



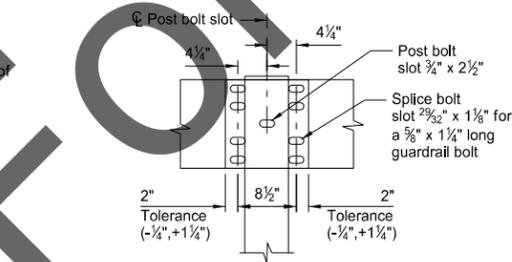
6"x8" TIMBER POST & BLOCK

NOTE: Where soil conditions require alternate lengths in increments of 6" may be specified.

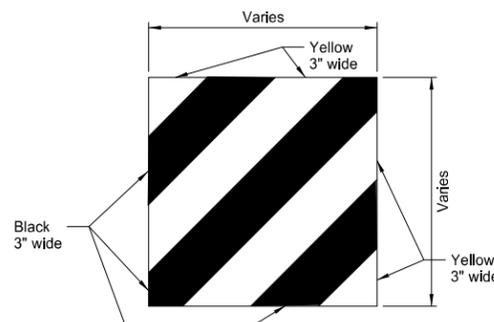


$\frac{5}{8}''$ Diameter Carriage Bolt	
L	Thread Length
1 $\frac{1}{2}''$	Full length thread
3"	1 $\frac{1}{2}''$ Min thread length
11"	1 $\frac{3}{4}''$ Min thread length
13"	1 $\frac{3}{4}''$ Min thread length

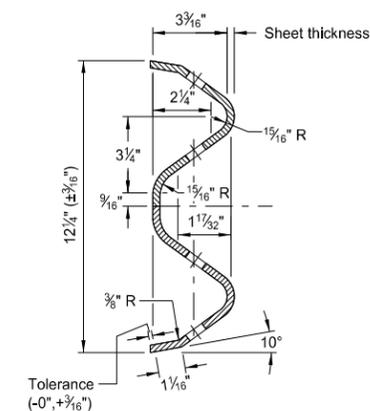
$\frac{5}{8}''$ CARRIAGE BOLT & NUT



SPLICE DETAIL



IMPACT HEAD OBJECT MARKER



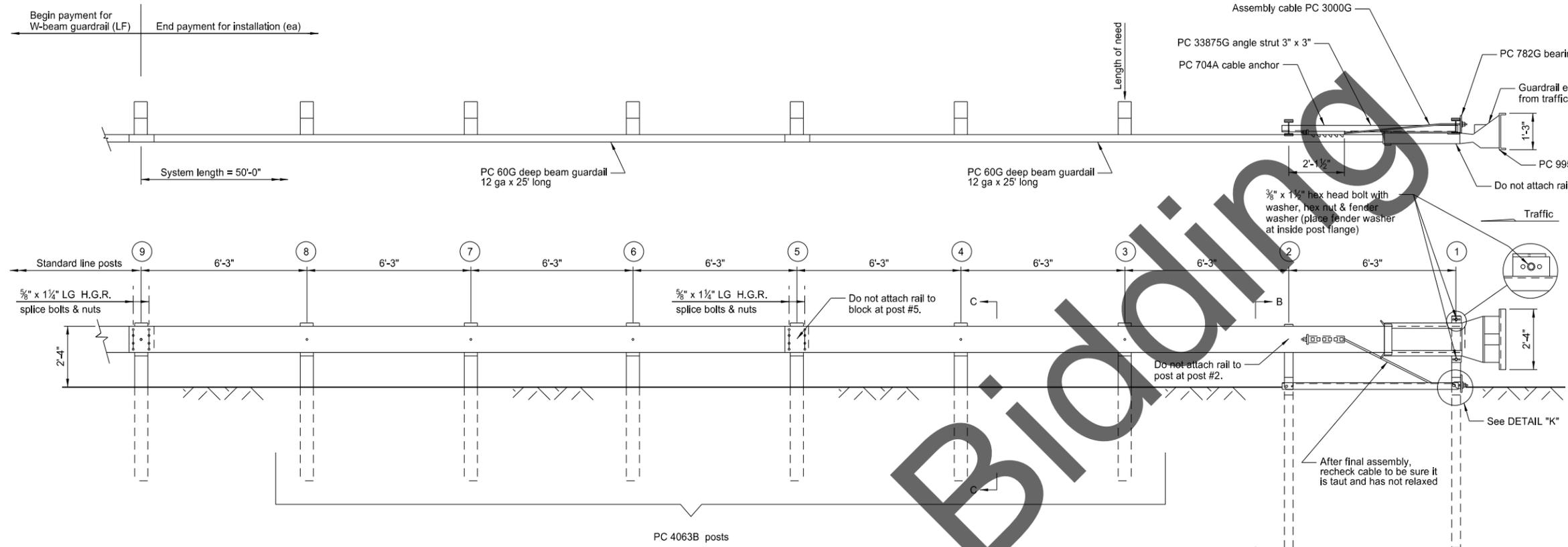
W-BEAM CROSS SECTION

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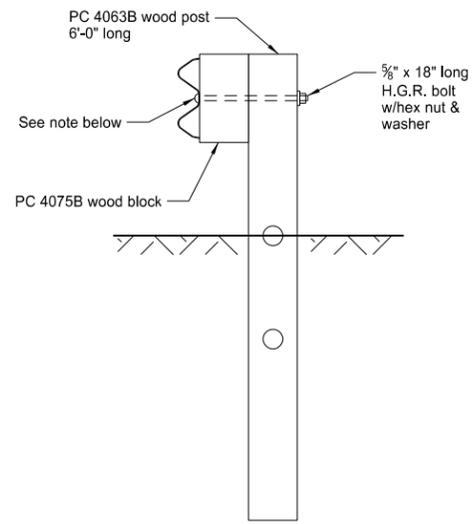
ET-PLUS

D-764-4

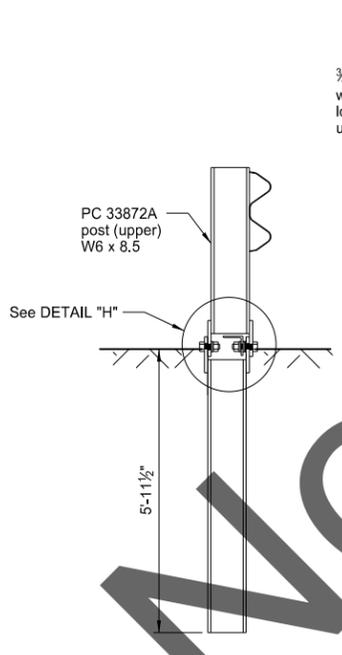


BILL OF MATERIAL		
PC	QTY	DESCRIPTION
60G	1	12/25/6'3"/S (guardrail)
62G	1	12/25/6'3"/S ANC (guardrail)
704A	1	Cable anchor bracket
782G	1	5/8" x 8" x 8" bearing plate
995A	1	ET-plus extruder
3000G	1	Cable 3/4 x 6'-6"
3300G	6	5/8" washer
3340G	22	5/8" hex nut
3360G	16	5/8" x 1 1/4" splice bolt
3580G	6	5/8" x 18" post bolt
3701G	7	3/4" washer
3704G	4	3/4" hex nut
3717G	3	3/4" x 2 1/2" hex head bolt
3718G	1	3/4" x 3" hex head bolt
3900G	2	1" washer
3910G	2	1" hex nut
4063B	6	WD 6'-0" post 6" x 8"
4075B	6	WD block 1'-2" x 6" x 8" DR
4254G	6	3/8" washer
4255G	2	3/8" fender washer (1 1/2 OD)
4258G	4	3/8" lockwasher
4261G	2	3/8" x 1 1/2" hex head bolt
4699G	4	3/4" lockwasher
6321G	4	3/8" x 2" hex head bolt
6405G	6	3/8" hex nut
33871A	1	HBA post #1 top
33872A	1	HBA post #2 top
33873A	2	HBA post #1-#2 bottom
33875G	1	6'-6" angle strut ET HBA

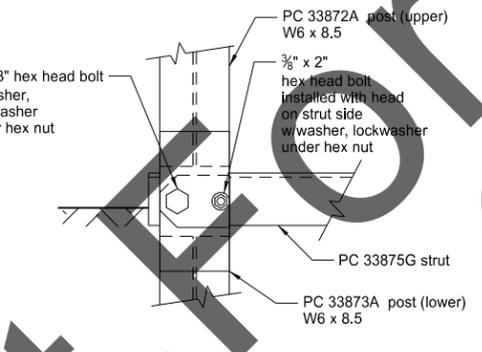
- NOTES:
- Wood posts are required from post #3 to post #9.
 - All bolts, nuts, cable assembly, cable anchors, and bearing plates shall be galvanized.
 - This end terminal shall only be installed at locations where the flare rate is 25:1 or flatter, relative to the traveled way. The end terminal can be flared at a rate of 50:1 for the first 50' of the system to prevent the impact head from encroaching on the shoulder. The 25:1 flare rate is recommended with curb installations. See plans for when taper is used or not.
 - Do not attach guardrail to post #1 or post #2.
 - Do not attach guardrail to post block at post #5.
 - The 5/8" flat washer is used under the nut, behind the post only, no washer is used at the rail.
 - An impact head object marker shall be placed.
 - The wood blockouts shall be "toe nailed" to the rectangular wood posts to prevent them from turning when wood shrinks. The nails shall be 20 penny and galvanized.



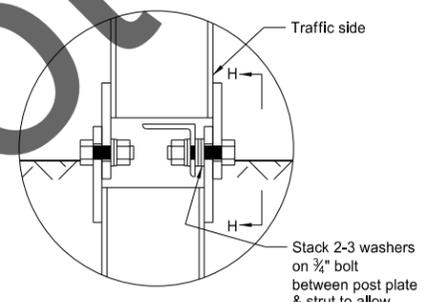
SECTION "C-C"
(TYP @ POSTS #3, 4, 6, 7 & 8)



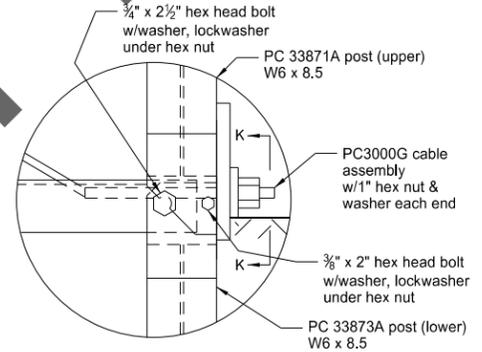
SECTION "B-B"
(POST #2)



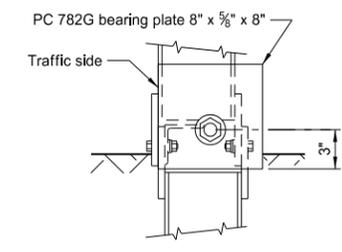
VIEW "H-H"



DETAIL "H"
(POST #2)



DETAIL "K"
(POST #1)



VIEW "K-K"

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-11-13	
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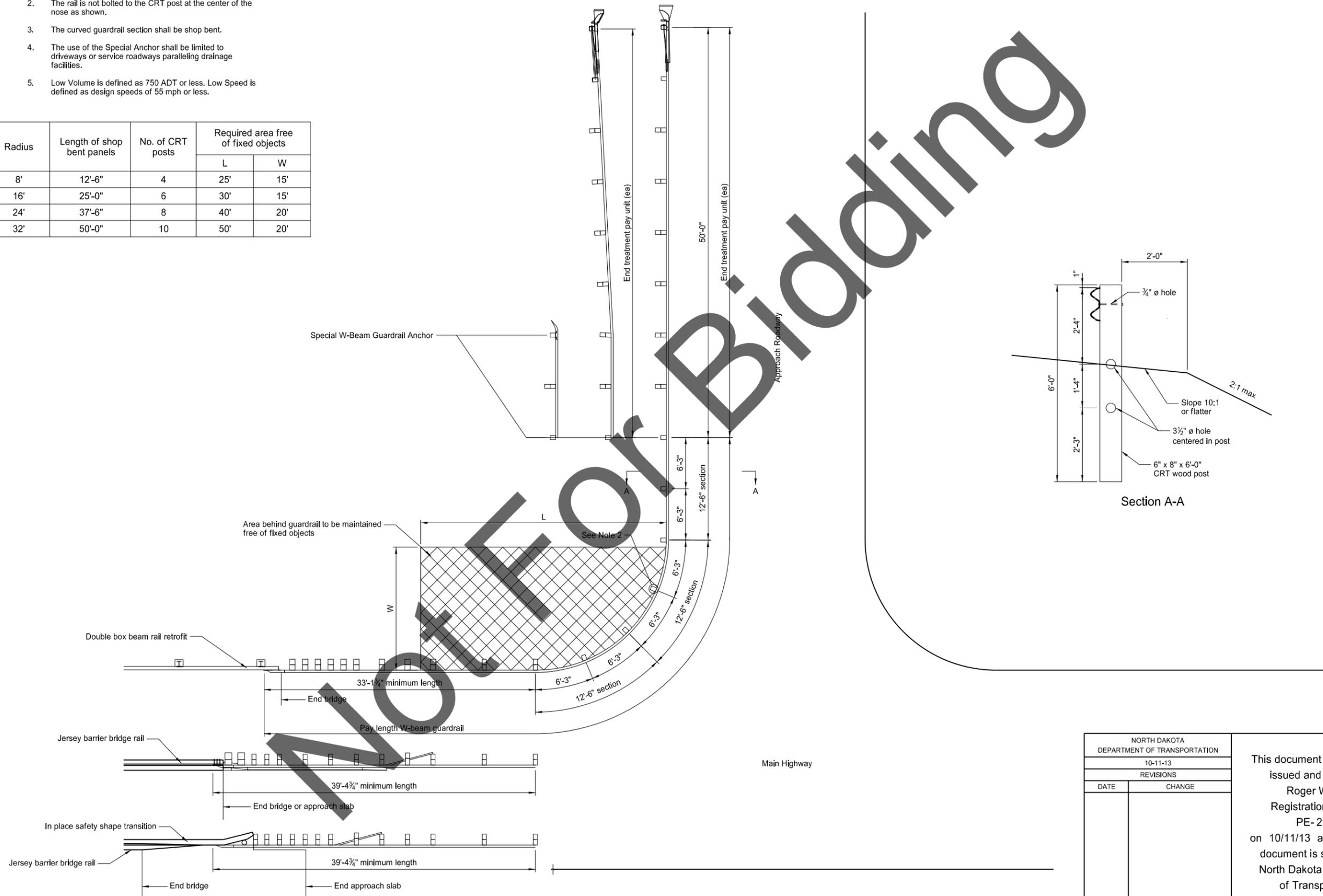
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W-BEAM GUARDRAIL WITH APPROACHES NEAR BRIDGE
FOR LOW VOLUME LOW SPEED ROADWAYS

NOTES:

1. No washers are used on the 5/8" guardrail bolts connecting the rail to the Controlled Release Terminal (CRT) posts.
2. The rail is not bolted to the CRT post at the center of the nose as shown.
3. The curved guardrail section shall be shop bent.
4. The use of the Special Anchor shall be limited to driveways or service roadways paralleling drainage facilities.
5. Low Volume is defined as 750 ADT or less. Low Speed is defined as design speeds of 55 mph or less.

Radius	Length of shop bent panels	No. of CRT posts	Required area free of fixed objects	
			L	W
8'	12'-6"	4	25'	15'
16'	25'-0"	6	30'	15'
24'	37'-6"	8	40'	20'
32'	50'-0"	10	50'	20'

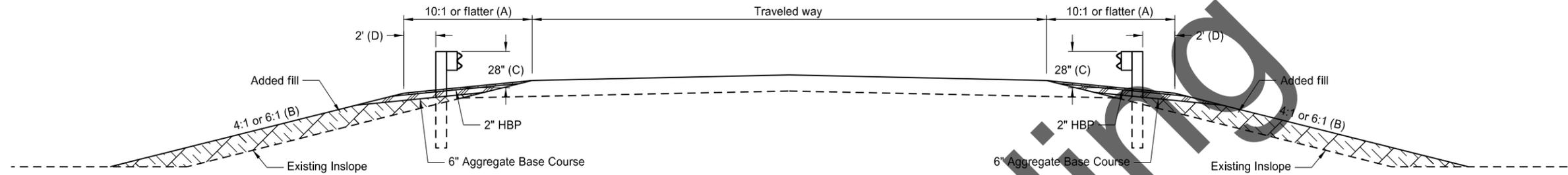


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10-11-13	
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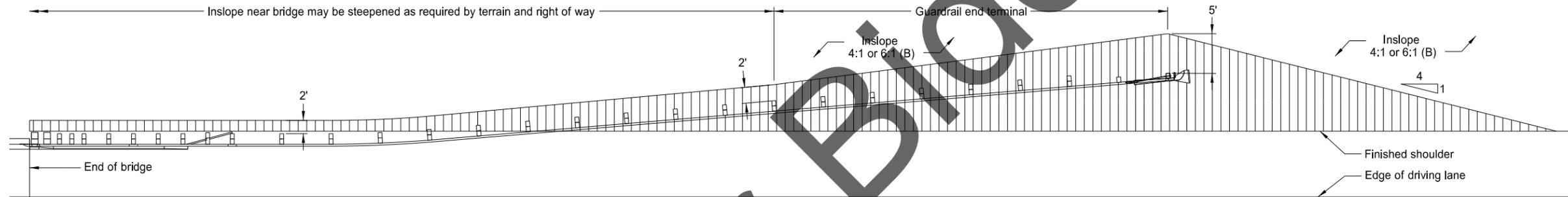
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TYPICAL GRADING AT BRIDGE ENDS
WITH W-BEAM GUARDRAIL

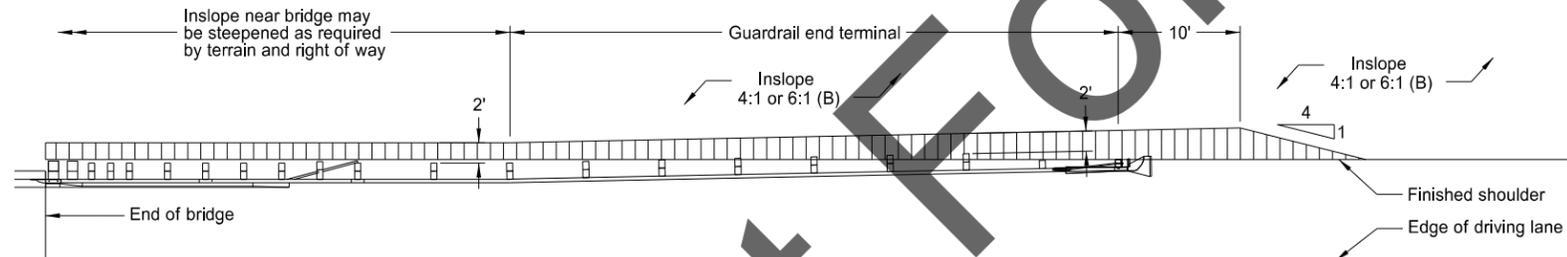
D-764-22



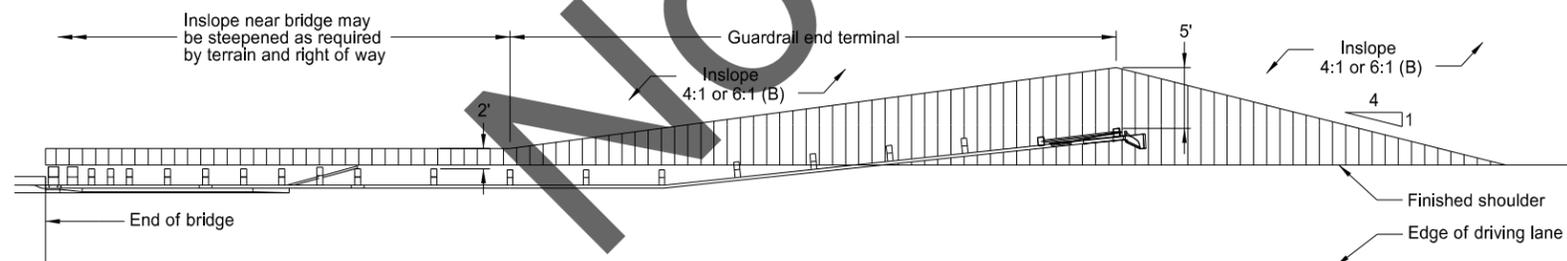
TYPICAL SECTION



PLAN LAYOUT
FLARED GUARDRAIL WITH END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH TANGENT END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH FLARED END TERMINAL

NOTES:

- (A) Slope flatter than 10:1 may be required to provide proper guardrail height.
- (B) Where normal inslope is 4:1 the added fill shall be 4:1. Where normal inslope is 6:1 the added fill shall be 6:1.
- (C) Measured from top of guardrail to top of surfacing at front face of guardrail.
- (D) Dimension at end terminals may vary per Plan Layouts shown on this sheet.

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