DESIGN DATA: IM-8-094(100)337				
Traffic	Average Daily			
Current 2020	Pass: 7,480	Trucks: 1,440	Total: 8,920	WB
Forecast 2040	Pass: 10,100	Trucks: 2,060	Total: 12,160	WB
Current 2020	Pass: 7,025	Trucks: 1,350	Total: 8,375	EB
Forecast 2040	Pass: 9,485	Trucks: 1,935	Total: 11,420	EB
Clear Zone Dist. 6:1 = 34 ft, 10:1 = 30 ft		Design Speed: 75		
Minimum Sight Dist. for Stopping: 820 ft		Bridges: HL-93 Design Loading		
Full Control of Access, No Point of Access Other Than at Interchange Ramps				
Pavement Design Life 30 (years)				
Design Accumulated One-way Heavy Trucks: 23,393,700				

DESIGN DATA: BRO-8-010(036)009				
Traffic	Average Daily			
Current 2020	Pass: 145	Trucks: 35	Total: 180	
Forecast 2040	Pass: 180	Trucks: 45	Total: 225	
Clear Zone Distance: 18 ft		Design Speed: 55		
Minimum Sight Dist. for Stopping: 495 ft		Bridges: HL-93 Design Loading		
Sight Dist. for No Passing Zone: 900 ft				
Pavement Design Life 20 (years)				
Design Accumulated One-way Flexible ESALs: 104,480				

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	IM-8-094(100)337	22319	1	1
		BRO-8-010(036)009	22544		

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

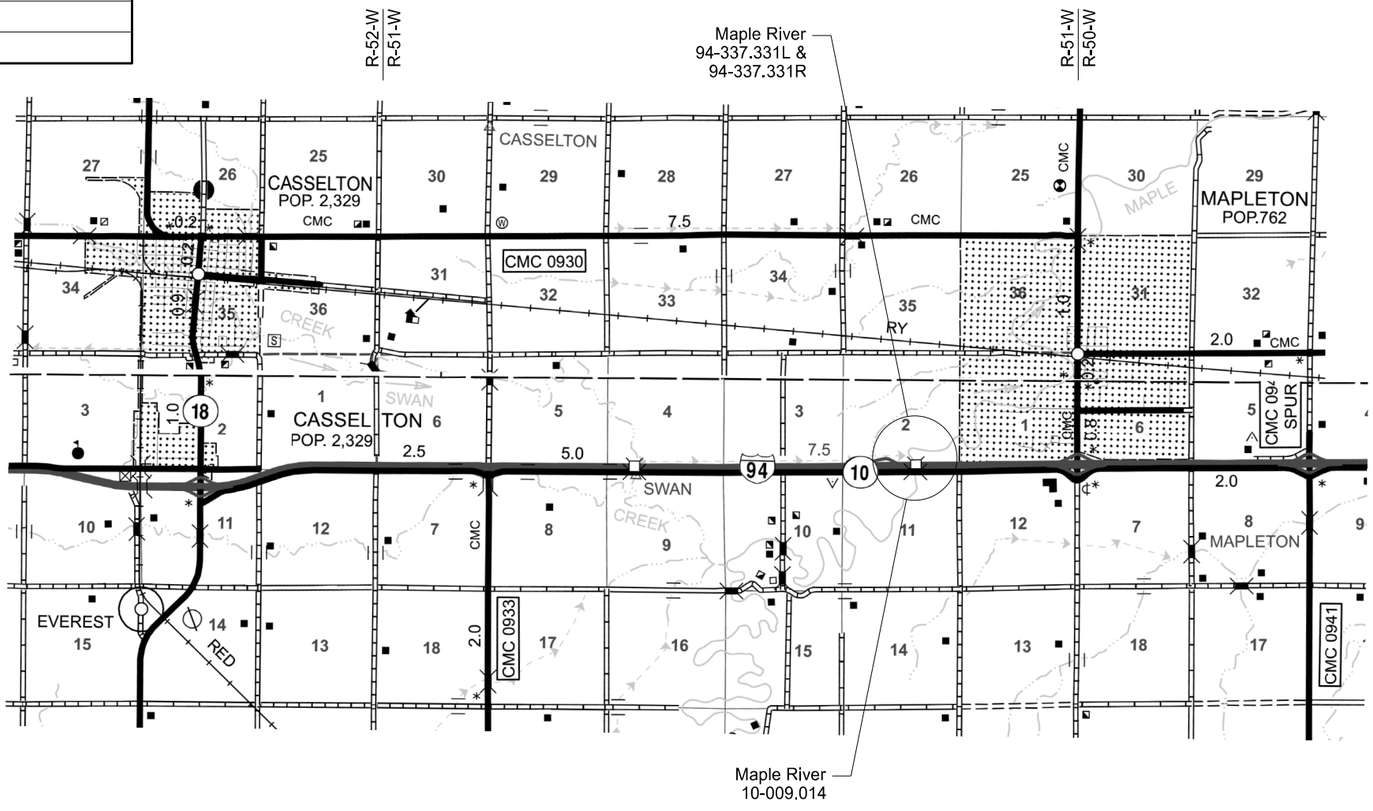
IM-8-094(100)337
BRO-8-010(036)009
Cass County

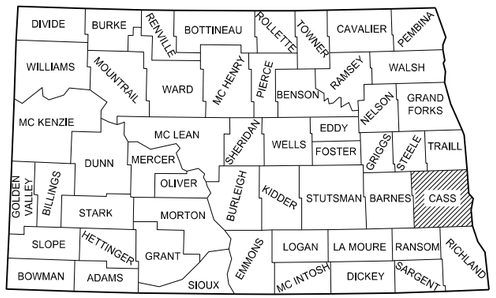
6 East of ND 18

Bridge Replacements

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	10/1/2020
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
IM-8-094(100)337	0.25	0.25
BRO-8-010(036)009	0.35	0.35





STATE COUNTY MAP

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

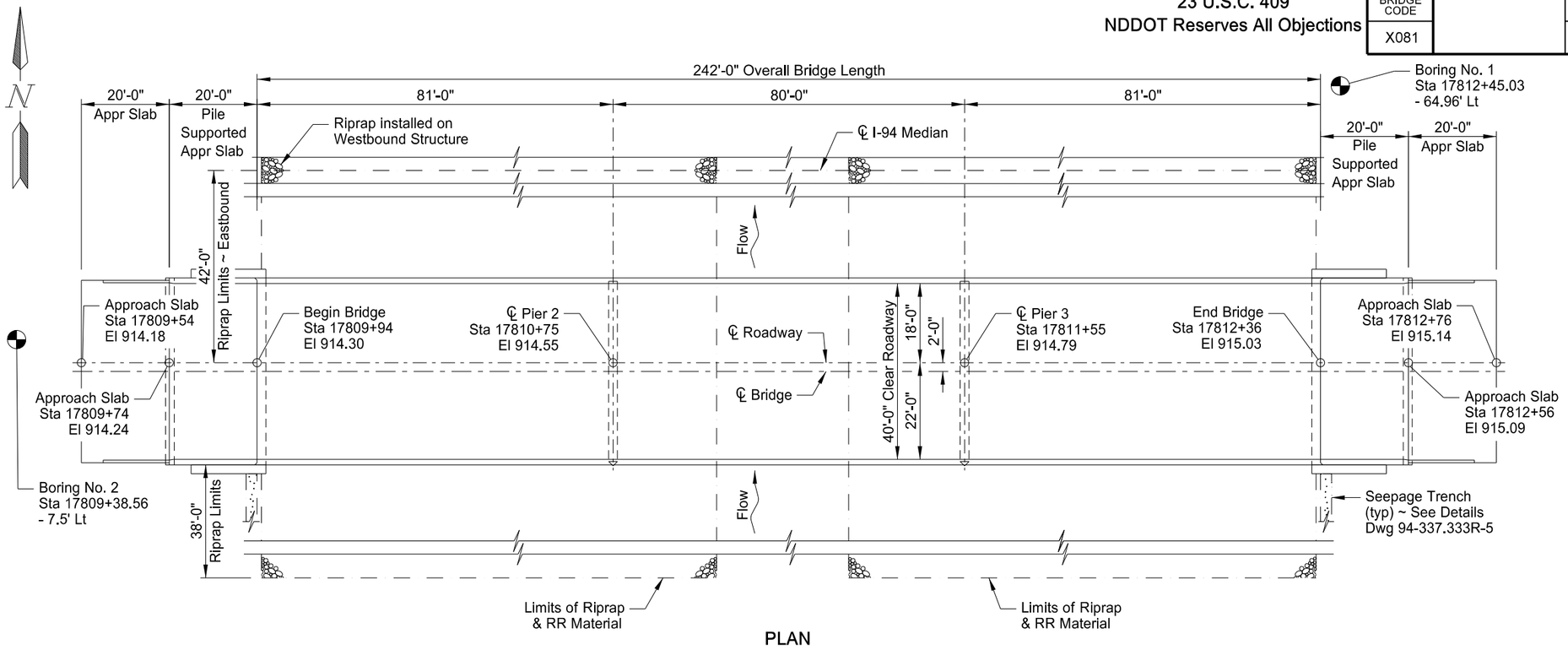
Bridge Division

This document is preliminary and not for construction or implementation purposes.

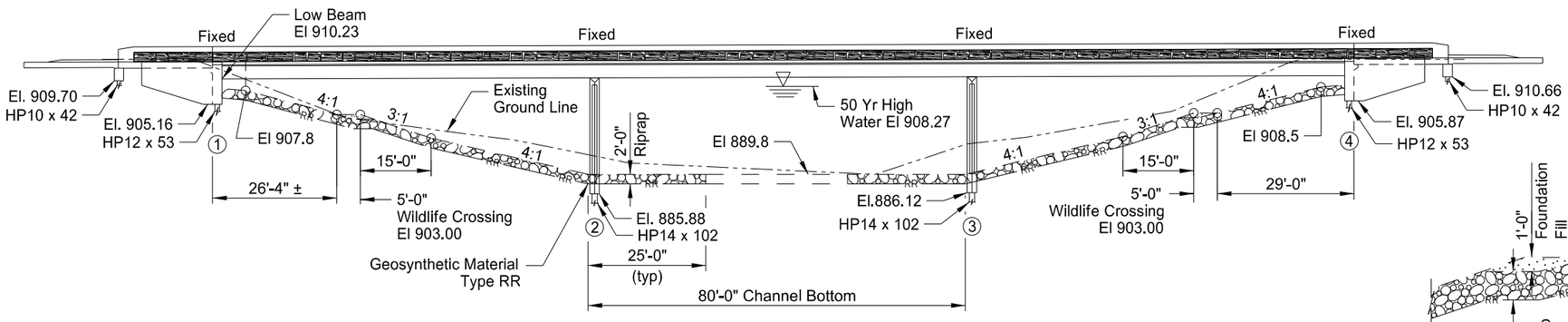
PRELIMINARY

23 U.S.C. 409
NDDOT Reserves All Objections

BRIDGE CODE		STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
X081		ND	IM-8-094(100)337	170	19



PLAN



ELEVATION

HYDRAULIC DATA:

Drainage Area	1,467.8	sq mi
Design Frequency	50	yr
Design Discharge	11,443	cfs
Design Stage (upstream)	908.27	ft
Stream Gradient	0.00068	ft/ft
Waterway Provided Below Design Stage	2,717	sq ft
Waterway Provided Below Clearance Elevation	3,291.5	sq ft
Average Velocity of Flow in Natural Channel	4.28	fps
Depth of Flow	18.36	ft
Velocity of Flow Under Bridge	4.21	fps
100-Year Frequency Discharge	13,269	cfs
100-Year Frequency Stage	909.03	ft
Overtopping Stage	914.24	ft
Overtopping Discharge	45,093.6	cfs

DESIGN STRENGTHS:

f'c = 3,000 psi ~ Class AE-3 Concrete
f'c = 4,000 psi ~ Class AAE-3 Concrete
f'c = 7,000 psi ~ Prestressed Beam Concrete
fy = 60,000 psi ~ Reinforcing Steel

Load & Resistance Factor Design

SURVEY CONTROL POINTS			
POINT	NORTHING	EASTING	ELEVATION
RTK 1018	460,119.90	2,823,629.48	913.03
RTK 1019	460,052.43	2,822,608.92	913.35

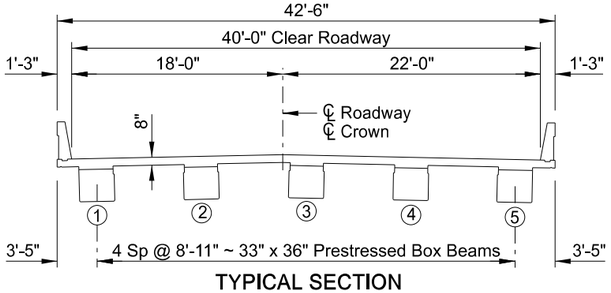
SPECIAL PROVISIONS	
SSP 2	MIGRATORY BIRD TREATY ACT
SP 294(20)	ARCHITECTURAL SURFACE
SP 355(20)	WINTER SUSPENSION

STANDARD DRAWINGS

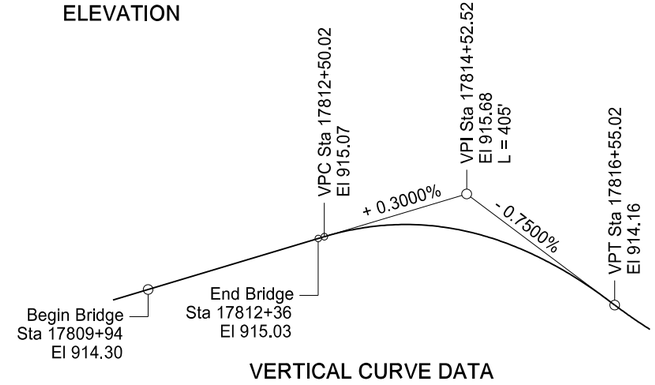
D-622-1, D-714-18, D-900-1

F.W.S. 15 PSF

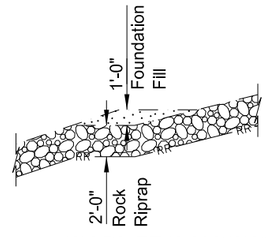
HL-93 DESIGN LOADING



TYPICAL SECTION



VERTICAL CURVE DATA



WILDLIFE WALKWAY

NOTE:

Place 1'-0" of foundation fill over riprap for wildlife walkway. Include all costs for walkway in price bid for riprap.

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

MAPLE RIVER

STA 17811+15

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-8-094(100)337	170	20

NOTES

100 SCOPE OF WORK: This project consists of building a new 3-span prestressed concrete box beam bridge with an overall bridge length of 242'-0" and a clear roadway width of 40'-0".

100 GENERAL: Include the cost of furnishing and placing preformed expansion joint filler, concrete inserts, rebar couplers, silicone sealant, waterproof membrane, and other miscellaneous items in the price bid for Class AE-3 and AAE-3 concrete.

107 HAZARDOUS MATERIAL: The existing structural steel is painted with lead-based paint. Remove and dispose of any loose and peeling paint found on the existing structural steel according to the North Dakota Department of Health's management of lead-based paint debris.

202 REMOVAL OF STRUCTURE – SITE 2: The existing structure is a 5-span steel girder bridge, 235'-0" long with a clear roadway width of 40'-0". The bridge was originally constructed to a length of 155 feet in 1959 but was lengthened to 235 feet in 1983. At that time, the clear roadway width was also increased from 30 feet to 40 feet.

The substructures are made of concrete and are supported on steel piling, except for the two interior piers which are supported on timber piling. Remove the concrete from both abutments in entirety and remove the piers to 1 foot below bottom of rip rap elevation.

If the abandoned abutments from 1959 are encountered during construction, remove them to 1 foot below bottom of rip rap elevation.

Include all work required to remove the bridge, including any removals of the original 1959 abutment that are required, in the contract unit price for "Removal of Structure – Site 2."

602 DIAPHRAGMS AND ENDWALLS: Place the pier diaphragm and endwall concrete at the same time as the deck concrete.

602 DECK PLACEMENT: Place the deck concrete at a minimum rate of 40 CY per hour.

602 BRIDGE DECK AND APPROACH SLAB CURING: Do not cover the wet cure burlap with a waterproof material such as polyethylene during the curing period.

602 BRIDGE DECK AND APPROACH SLAB CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck and approach slabs to determine the need for crack sealing. Repair all cracks designated by the Engineer at this time.

Perform a visual inspection of the bridge deck surface and mark all visible cracks appearing on the top surface 0.007" or greater in width at its widest segment or as directed by the Engineer.

Immediately before applying the sealer, clean the cracks by removing all dust and debris with compressed air. Seal the cracks with a two-part epoxy in accordance with the manufacturer's recommendations. Chase crack with the sealant application to limits of crack, including those portions that are narrower than 0.007" wide. The epoxy sealer may be Paulco TE-2501 (Viking Paints, Inc.), Dural 50 LM (Euclid Chemical Co.), TK-9000 or TK-2110 (TK Products), or an approved equal. Include all work and materials associated with the deck and approach slab crack sealing in the price bid for the Class AAE-3 Concrete and Approach Slab bid items.

602 FORM LINERS: Include the cost to provide and install the form liners in the price bid for the appropriate concrete items.

602 SURFACE FINISH "D": Apply Surface Finish "D" on the exposed abutment surfaces, the fascia surface of the exterior beams, the outside edges of the pier diaphragm, the outside edges of the deck, the exposed endwall areas outside of the exterior beams, and to all bridge and approach slab barrier surfaces except for the recessed form liner areas. Use gray surface finish, color number 36424 meeting Aerospace Material Specification (AMS) Standard 595, for the inside and top surfaces of the bridge and approach slab barriers. Match the color of the lightest brown used in the Architectural Surface Finish for all other surfaces. Submit to the Engineer a 1' x 1' sample of the tan surface finish.

602 WEATHER LIMITATIONS: All requests in accordance with 602.04 C.4 "Weather Limitations" require approval from the NDDOT Bridge Division.

604 PRESTRESSED BEAMS: Set prestressed beams on bearing seats without field bending substructure or beam reinforcing steel.

616 STRUCTURAL STEEL: Approximately 1,660 lbs of structural steel has been estimated for the ice noses. Include all costs to provide and install the ice noses in the price bid for "Structural Steel." Shop drawings for ice nose structural steel are not required.

622 PILING: Drive the approach slab piling with a diesel hammer with an operational energy of at least 34,668 foot-pound-tons (minimum ram weight of 2,500 pounds) computed by the formula:

$$W(E–12{,}936) + 0.536E$$

Drive the abutment piling with a diesel hammer with an operational energy of at least 47,848 foot-pound-tons (minimum ram weight of 3,500 pounds) computed by the formula:

$$W(E–16{,}016) + 0.598E$$

Drive the pier piling with diesel hammer with an operational energy of at least 125,048 foot-pound-tons (minimum ram weight of 5,500 pounds) computed by the formula:

$$W(E–30{,}800) + 0.812E$$

Where:
W = Weight of the ram (tons)
E = Operating hammer energy

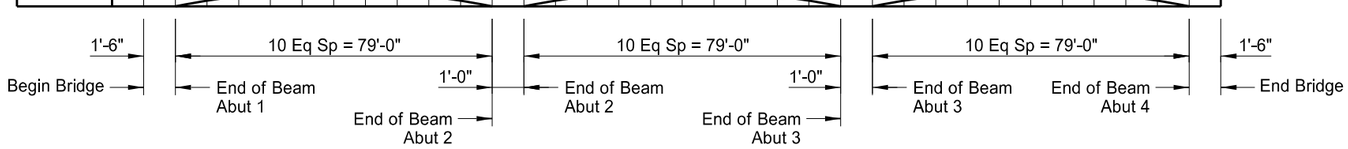
Run the hammers at an energy that produces a penetration at bearing between ½ inch and 3 inches in the last 10 blows.

Stop pile driving operations if bearing is not yet obtained at a depth approximately 10 feet beyond the estimated depth. Wait 24 hours to allow pile setup to occur. After 24 hours warm the hammer with a minimum of 20 blows by striking the ground or timber mats. Restrike the pile with 10 blows to determine if bearing has been achieved. If bearing was not achieved during restrike, continue to drive the pile until bearing is achieved.

23 U.S.C. 409
NDDOT Reserves All Objections

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	IM-8-094(100)337	170	21

℄ BEAM 1	℄ BEAM 2	℄ BEAM 3	℄ BEAM 4	℄ BEAM 5
913.98	914.16	914.27	914.08	913.89
913.98	914.17	914.27	914.08	913.90
914.06	914.25	914.35	914.16	913.98
914.13	914.32	914.42	914.24	914.05
914.19	914.38	914.48	914.30	914.11
914.24	914.43	914.53	914.35	914.16
914.27	914.46	914.56	914.38	914.19
914.29	914.48	914.58	914.39	914.21
914.29	914.48	914.58	914.39	914.21
914.28	914.46	914.56	914.38	914.19
914.25	914.44	914.54	914.35	914.17
914.22	914.40	914.51	914.32	914.14
914.22	914.41	914.51	914.32	914.14
914.30	914.49	914.59	914.40	914.22
914.37	914.56	914.66	914.48	914.29
914.43	914.62	914.72	914.54	914.35
914.48	914.67	914.77	914.59	914.40
914.51	914.70	914.80	914.62	914.43
914.53	914.72	914.82	914.63	914.45
914.53	914.72	914.82	914.63	914.45
914.52	914.70	914.80	914.62	914.43
914.49	914.68	914.78	914.59	914.41
914.46	914.64	914.75	914.56	914.38
914.46	914.65	914.75	914.56	914.38
914.54	914.73	914.83	914.64	914.46
914.61	914.80	914.90	914.72	914.53
914.67	914.86	914.96	914.78	914.59
914.72	914.91	915.01	914.83	914.64
914.75	914.94	915.04	914.86	914.67
914.77	914.96	915.06	914.87	914.69
914.77	914.96	915.06	914.87	914.69
914.76	914.94	915.04	914.86	914.67
914.73	914.92	915.02	914.83	914.65
914.70	914.88	914.99	914.80	914.62
914.70	914.89	914.99	914.81	914.62



Beam 1 is the north beam.

SCREED ELEVATION

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0109	REMOVAL OF STRUCTURE-SITE 2	L SUM	1
210	0103	CLASS 1 EXCAVATION-SITE 2	L SUM	1
210	0113	CLASS 2 EXCAVATION-SITE 2	L SUM	1
210	0203	FOUNDATION PREPARATION-SITE 2	EA	1
256	0200	RIPRAP GRADE II	CY	1,630
602	0130	CLASS AAE-3 CONCRETE	CY	361.4
602	1130	CLASS AE-3 CONCRETE	CY	221.2
602	1133	CONCRETE BRIDGE APPROACH SLAB	SY	183.8
602	1134	PILE SUPPORTED APPROACH SLAB	SY	188.8
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	1,690
604	9620	PRESTRESSED BOX BEAM-33 IN	LF	1,185
612	0115	REINFORCING STEEL-GRADE 60	LBS	19,435
612	0116	REINFORCING STEEL-GRADE 60-EPOXY COATED	LBS	79,615
616	0360	STRUCTURAL STEEL	LBS	1,660
622	0020	STEEL PILING HP 10 X 42	LF	700
622	0040	STEEL PILING HP 12 X 53	LF	780
622	0070	STEEL PILING HP 14 X 102	LF	600
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	2,445
930	3000	BRIDGE BENCH MARKS	SET	1
930	9537	ABUTMENT UNDERDRAIN SYSTEM	EA	2

This drawing is preliminary and not for construction or implementation purposes.

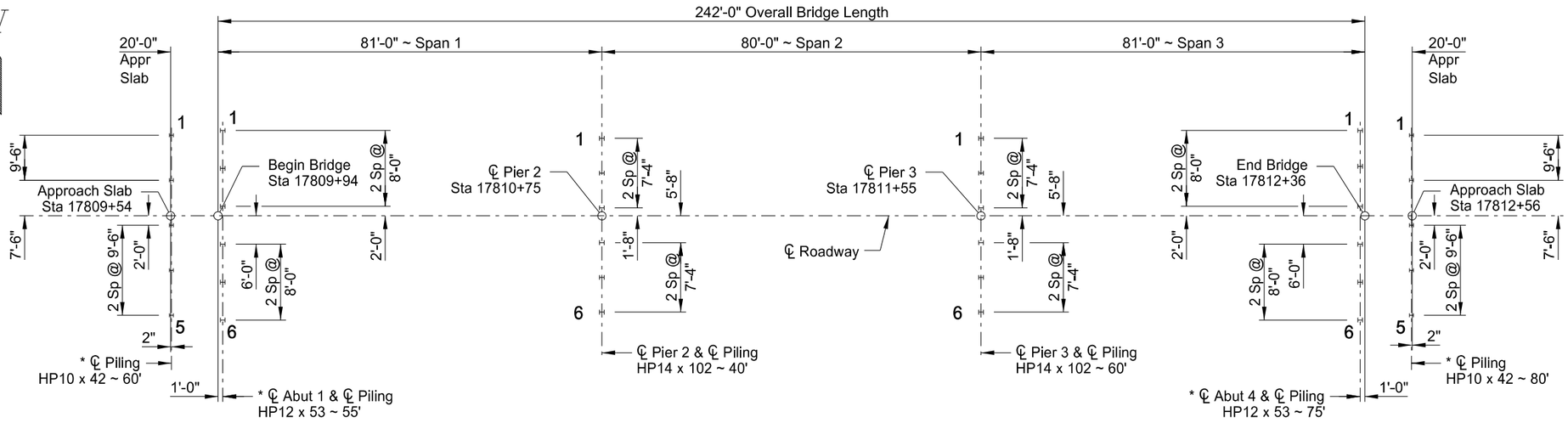
PRELIMINARY

MAPLE RIVER

SCREED ELEVATIONS &
BID ITEM QUANTITIES

23 U.S.C. 409
NDDOT Reserves All Objections

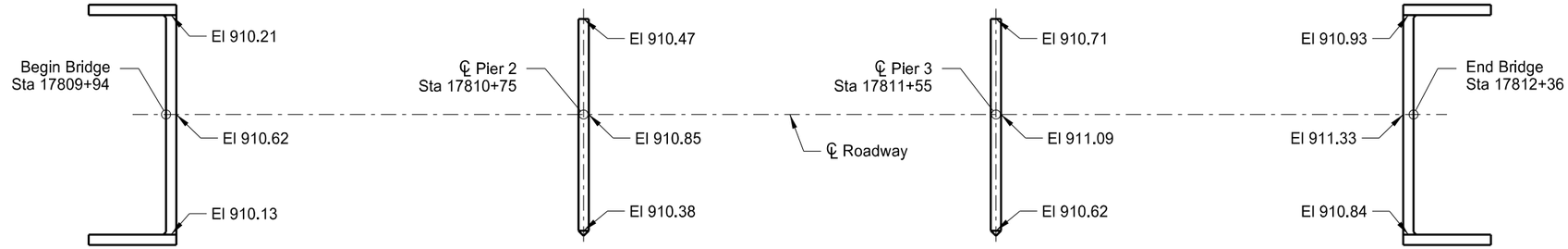
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	IM-8-094(100)337	170	22



* Do not drive approach slab or abutment piling until all constructed embankment is in place.

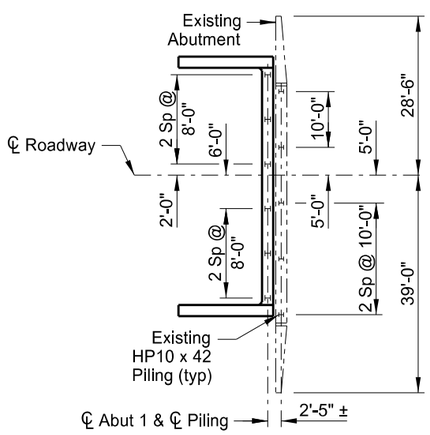
Drive the HP10 x 42 Pile to a bearing resistance of 105 tons.
Drive the HP12 x 53 Pile to a bearing resistance of 130 tons.
Drive the HP14 x 102 Pile to a bearing resistance of 250 tons.

PILING LAYOUT

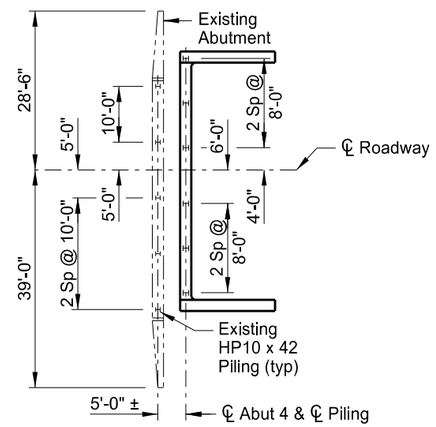


Elevations shown are to top of finished concrete.

BEARING ELEVATIONS



ABUT 1 PILING LAYOUT



ABUT 4 PILING LAYOUT

	PILE	NORTHING	EASTING
		PILE COORDINATES	
WEST APPR SLAB	1	459,997.14	2,823,120.37
	5	459,959.20	2,823,122.58
ABUT 1	1	459,999.35	2,823,141.11
	6	459,959.41	2,823,143.44
PIER 2	1	460,002.34	2,823,221.07
	6	459,965.73	2,823,223.21
PIER 3	1	460,006.99	2,823,300.94
	6	459,970.39	2,823,303.07
ABUT 4	1	460,013.31	2,823,380.71
	6	459,973.38	2,823,383.03
EAST APPR SLAB	1	460,013.52	2,823,401.56
	5	459,975.59	2,823,403.77

NOTE:

For double acting or single acting diesel hammers, calculate the bearing resistance of piles by the following formula:

$$\Phi Rn = \frac{4.5E}{S + 0.2} \times \frac{W + 0.2M}{W + M}$$

Where:

ΦRn = Nominal pile bearing resistance, in pounds. The Φ factor is included in equation.
W = Weight of striking parts (ram), in pounds.
M = Weight of parts being driven, in pounds. Includes pile weight, anvil (if any), driving cap, etc.
E = Energy per blow, in foot-pounds.
S = Average penetration of pile in inches per blow for last ten blows.

For single acting hammers, calculate E by multiplying observed stroke (ft) and W (lbs).

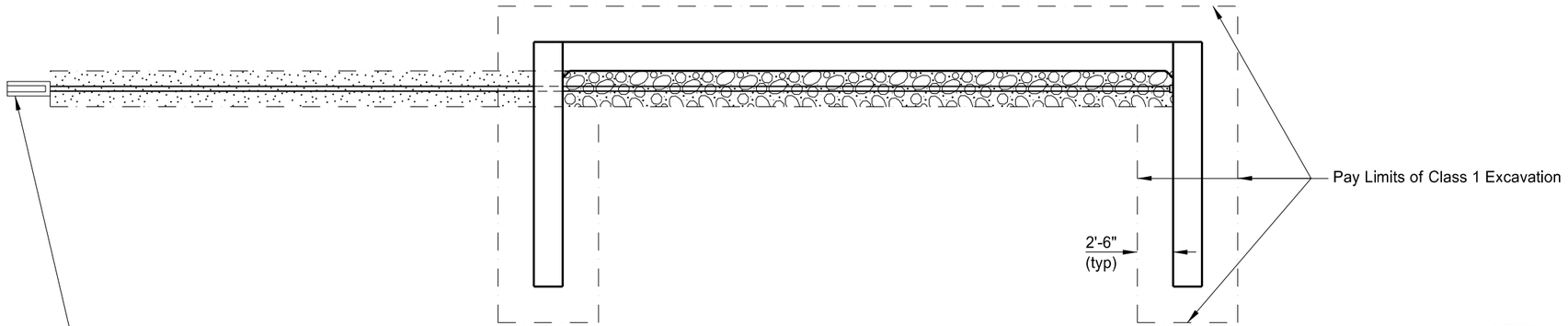
This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

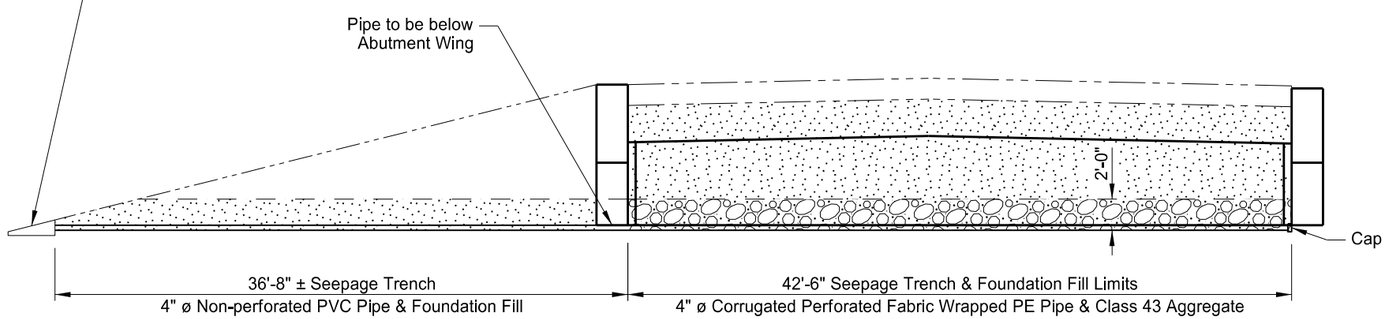
MAPLE RIVER

PILING LAYOUT & BEARING ELEVATIONS

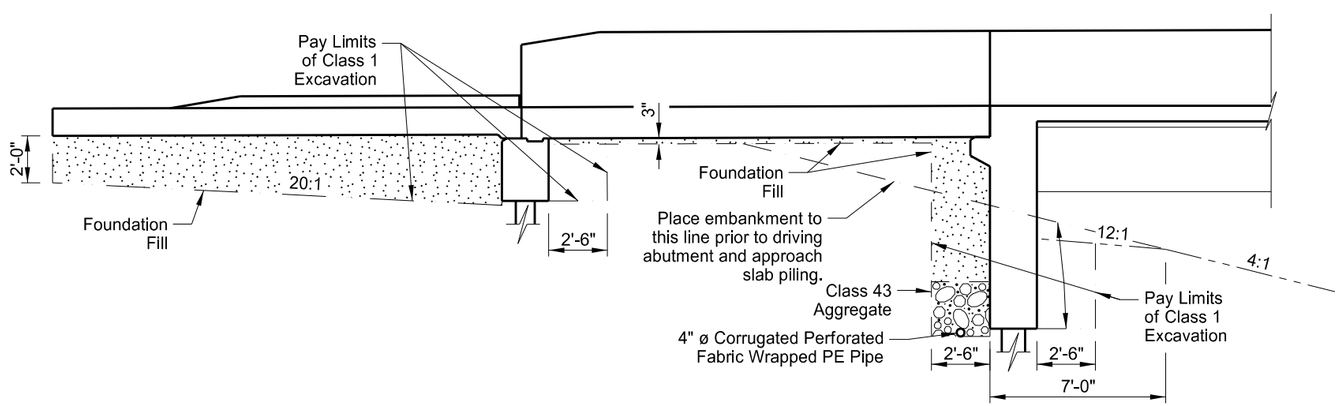
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	IM-8-094(100)337	170	23



ABUTMENT PLAN



BACK FACE OF ABUTMENT



DETAIL AT ABUTMENT

NOTES:

Use corrugated perforated fabric wrapped PE pipe that meets the requirements of Section 830.03 A.4. Provide fabric wrapping for the pipe that meets the requirements of Section 858.01 for D3 or D4 drainage fabric. Use non-perforated PVC pipe that meets the requirements of Section 830.03 A.3. Provide aggregate that meets the requirements of Section 816.03, Class 43. Provide foundation fill that meets the requirements of Section 210.

Include the cost to furnish and place the foundation fill, aggregate, corrugated perforated pipe, non-perforated pipe and headwalls in the pay item "Abutment Underdrain System."

This drawing is preliminary and not for construction or implementation purposes.

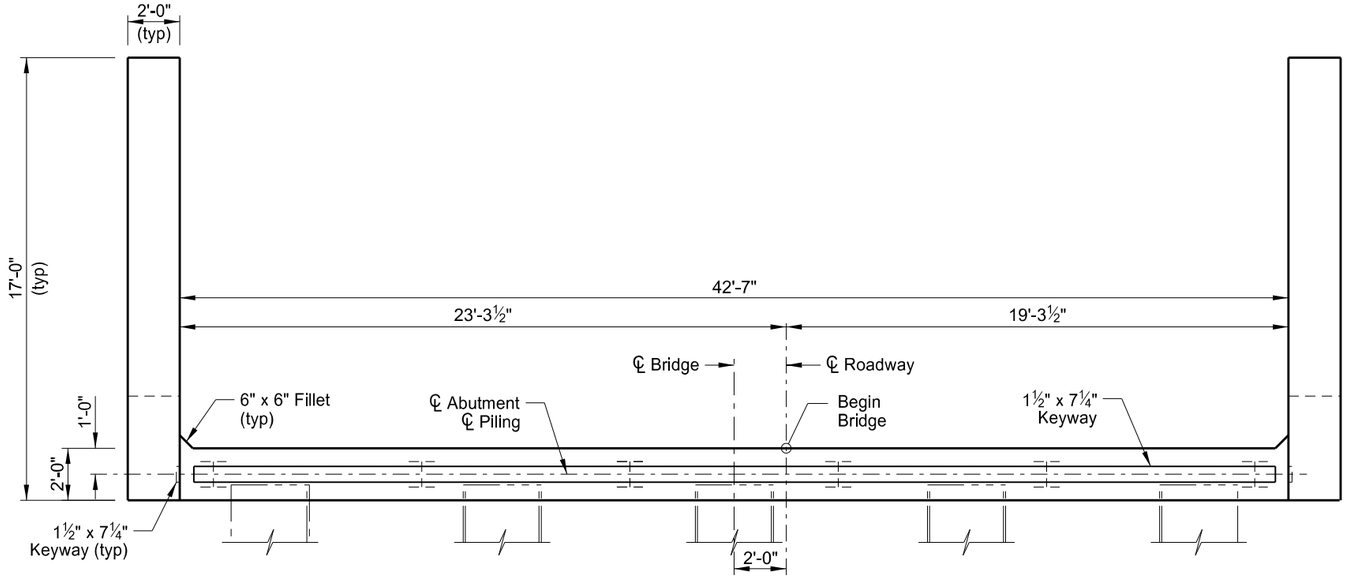
PRELIMINARY

MAPLE RIVER

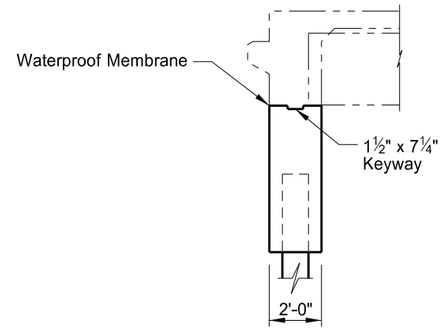
ABUTMENT UNDERDRAIN & EXCAVATION DETAILS

23 U.S.C. 409
NDDOT Reserves All Objections

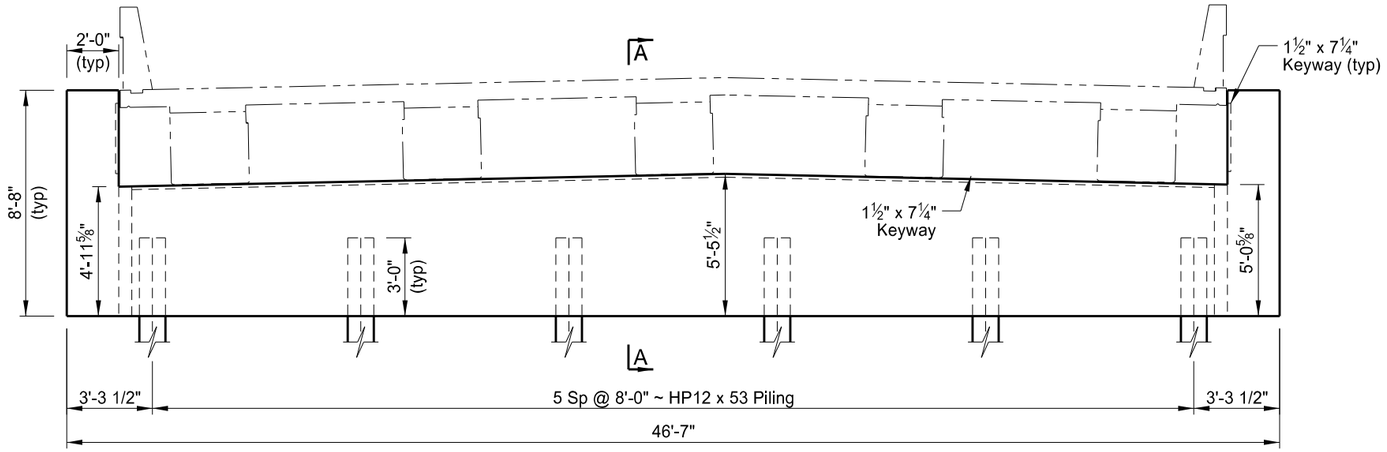
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	IM-8-094(100)337	170	24



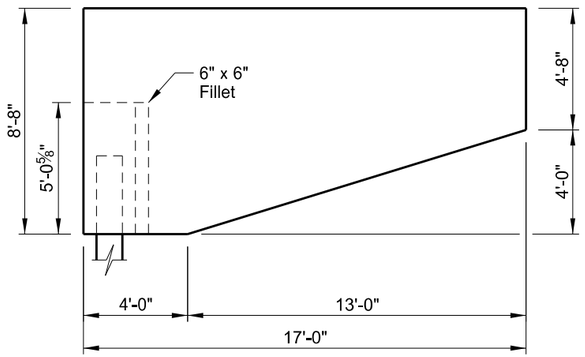
PLAN



A-A



ELEVATION



WING ELEVATION

NOTE:

Use waterproof membrane that meets the requirements of Section 602.03 B.
Center the waterproof membrane (1'-0" minimum width) on the joint.

NOTE:

Abutment 1 shown in elevation view, facing west.

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

QUANTITIES
SEE DWG 94-337.333R-7

MAPLE RIVER

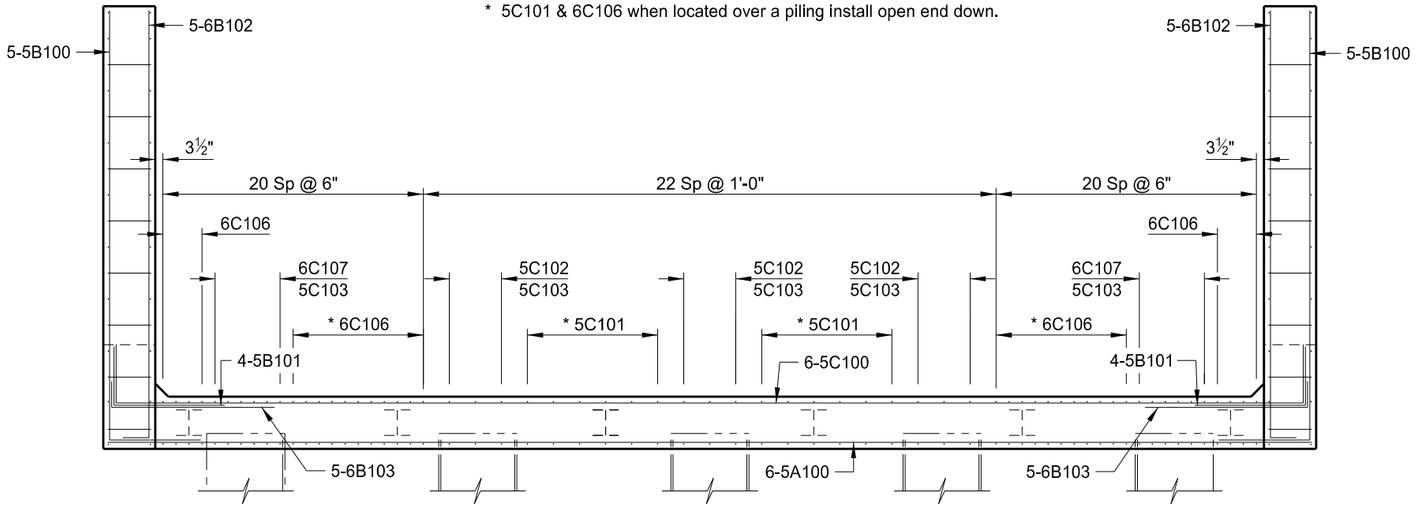
(SHOWING DIMENSIONS)

ABUTMENT DETAILS

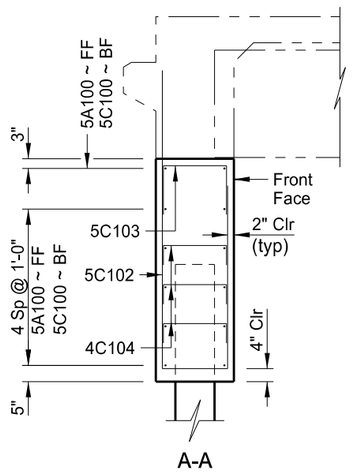
23 U.S.C. 409
NDDOT Reserves All Objections

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	IM-8-094(100)337	170	25

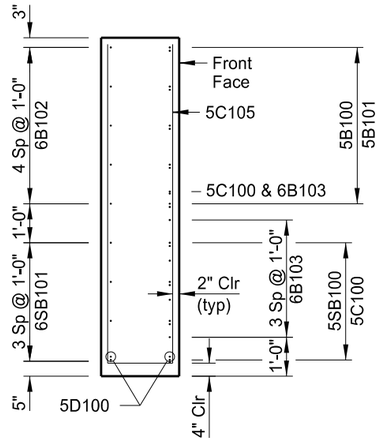
NOTE:
Position the long leg of 5B102 bar perpendicular to abutment wing.
* 5C101 & 6C106 when located over a piling install open end down.



PLAN



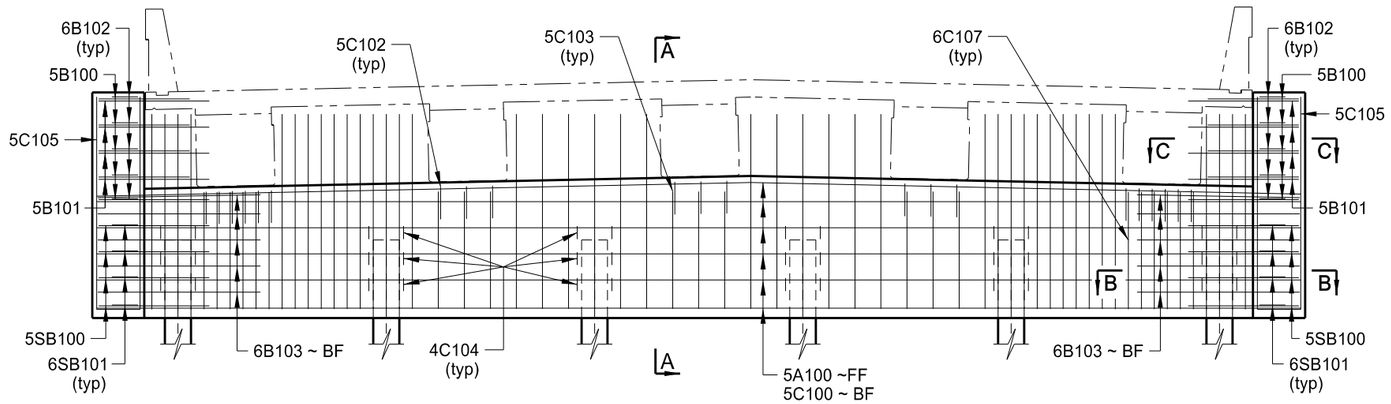
A-A



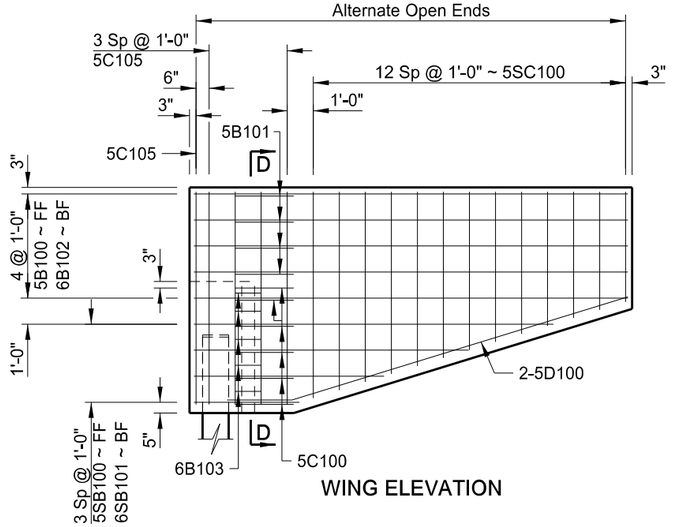
D-D

NOMENCLATURE:

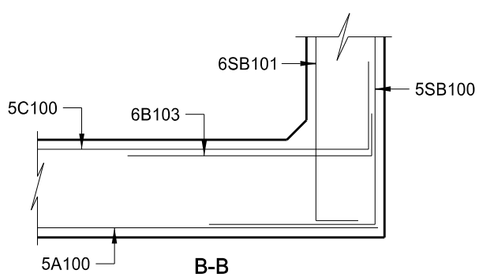
FF = Front Face
BF = Back Face



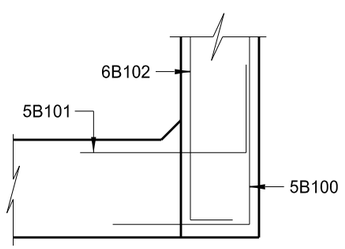
ELEVATION



WING ELEVATION



B-B



C-C

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

QUANTITIES	(ONE ABUTMENT)
CLASS AE-3 CONCRETE	34.5 CY
REINFORCING STEEL	3,625 LBS

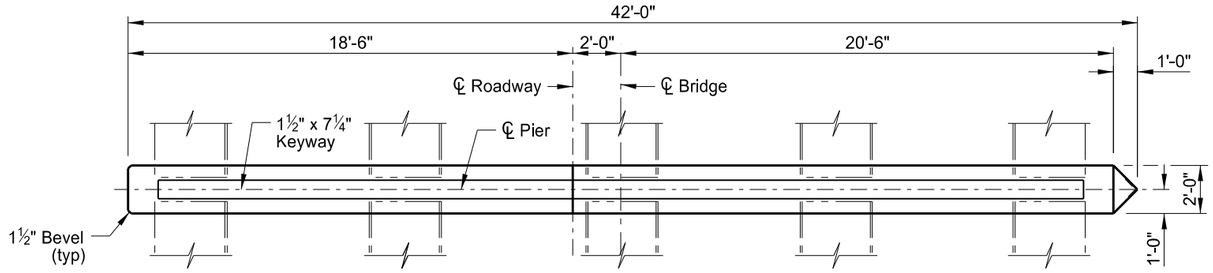
MAPLE RIVER

(SHOWING REINFORCING)

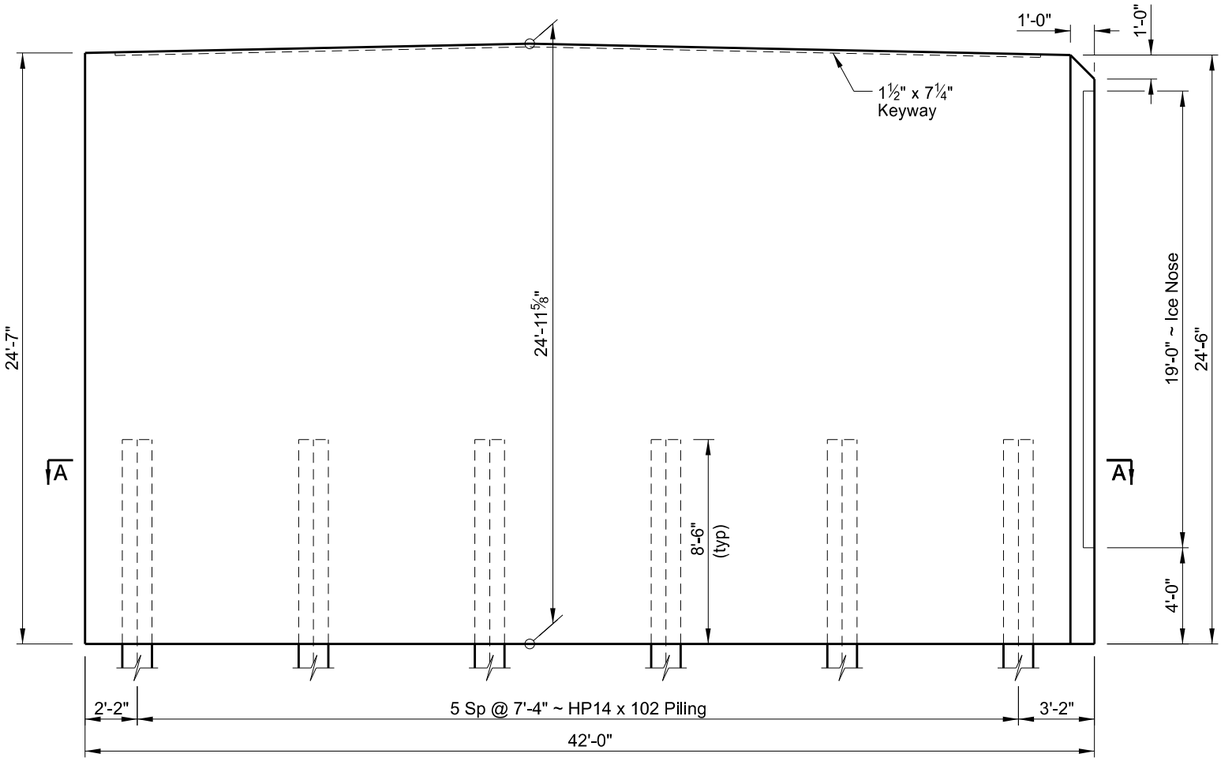
ABUTMENT DETAILS

23 U.S.C. 409
NDDOT Reserves All Objections

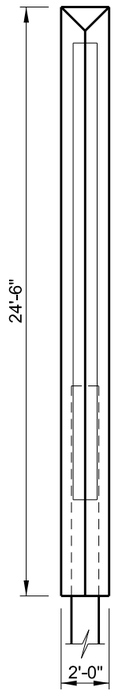
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	IM-8-094(100)337	170	26



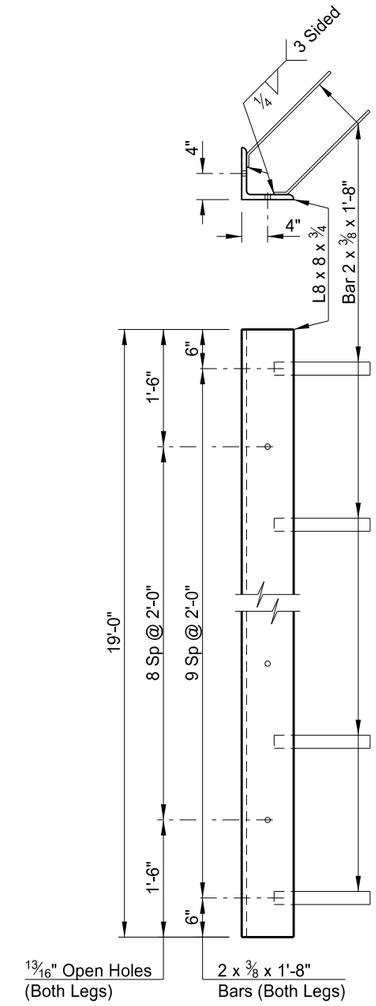
PLAN



ELEVATION

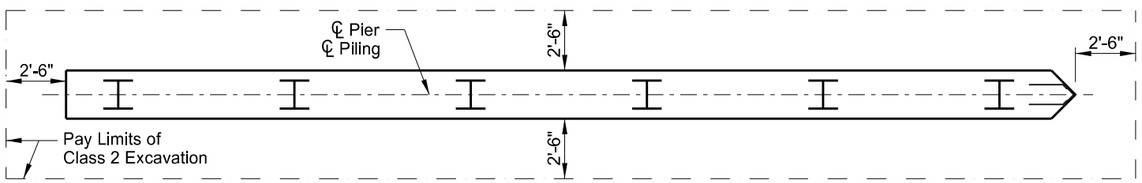


END VIEW



Galvanize in accordance with Section 854 after fabrication.

ICE NOSE DETAIL



A-A

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

QUANTITIES
SEE DWG 94-337.333R-9

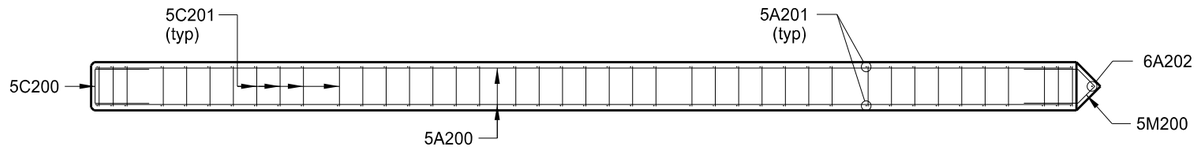
MAPLE RIVER

(SHOWING DIMENSIONS)

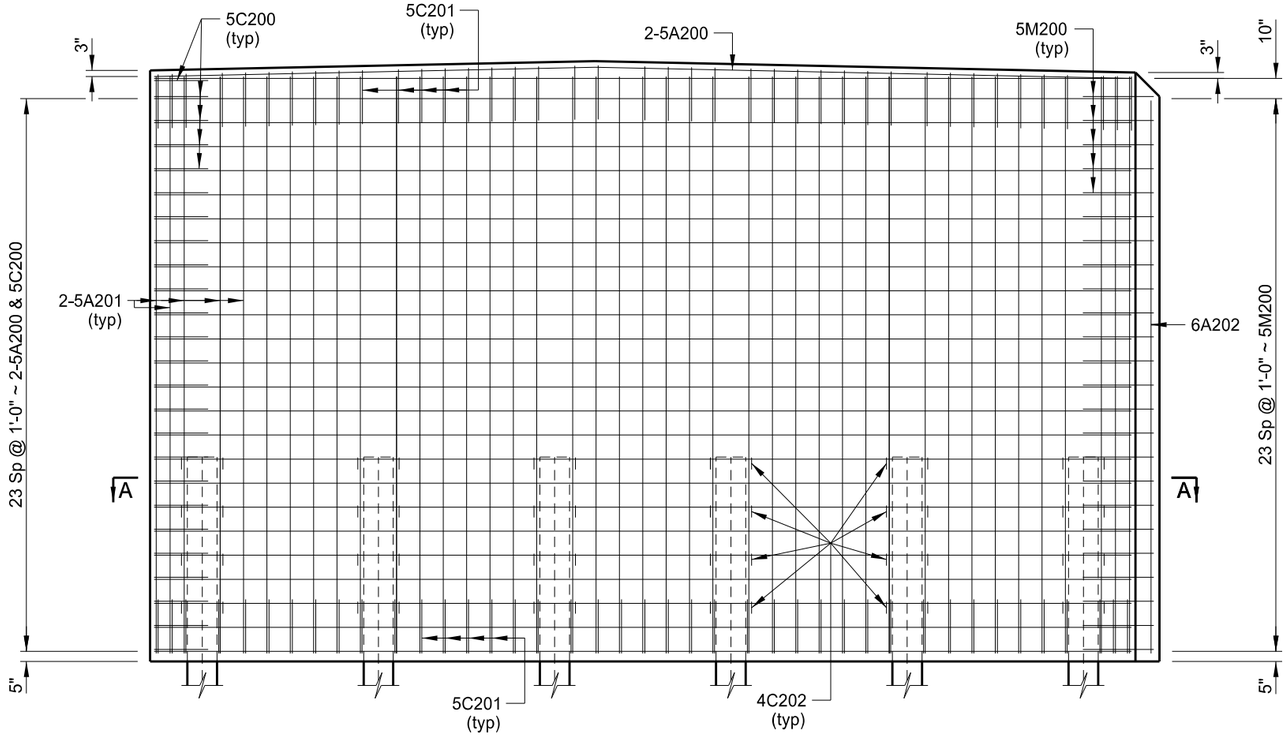
PIER DETAILS

23 U.S.C. 409
NDDOT Reserves All Objections

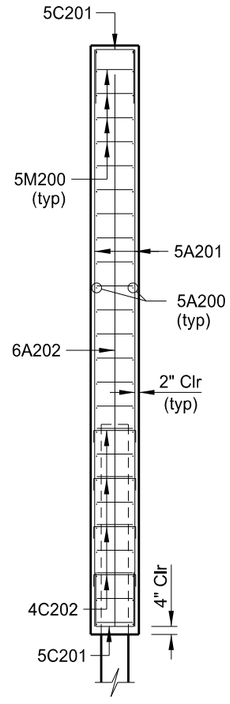
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	IM-8-094(100)337	170	27



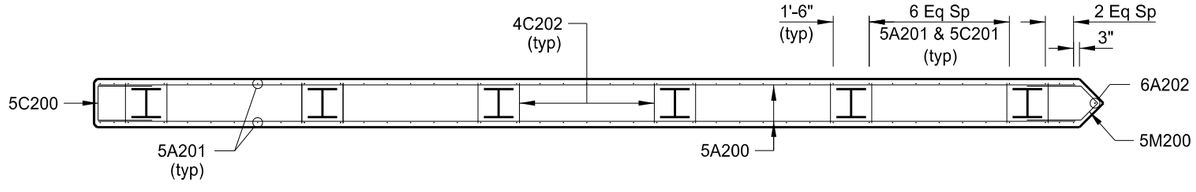
PLAN



ELEVATION



END VIEW



A-A

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

QUANTITIES	(ONE PIER)
CLASS AE-3 CONCRETE	76.1 CY
REINFORCING STEEL	5,229 LBS
STRUCTURAL STEEL	830 LBS

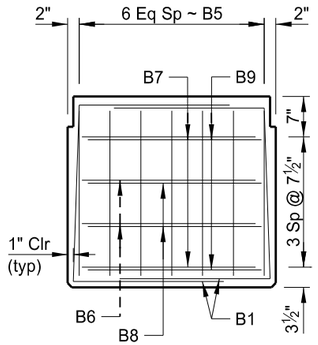
MAPLE RIVER

(SHOWING REINFORCING)

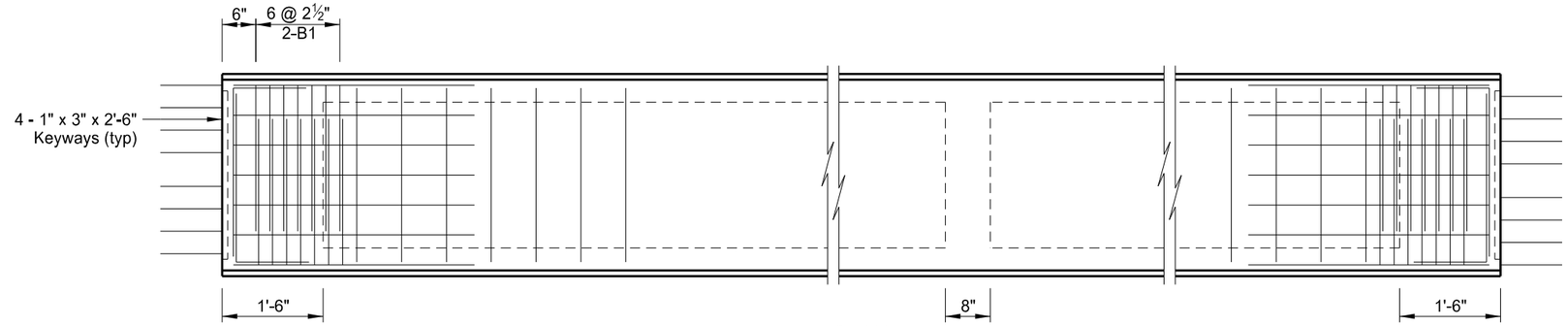
PIER DETAILS

23 U.S.C. 409
NDDOT Reserves All Objections

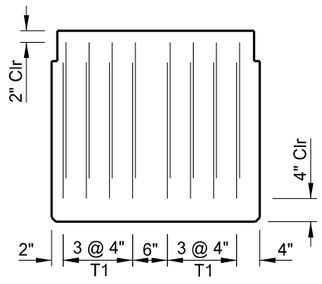
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	IM-8-094(100)337	170	28



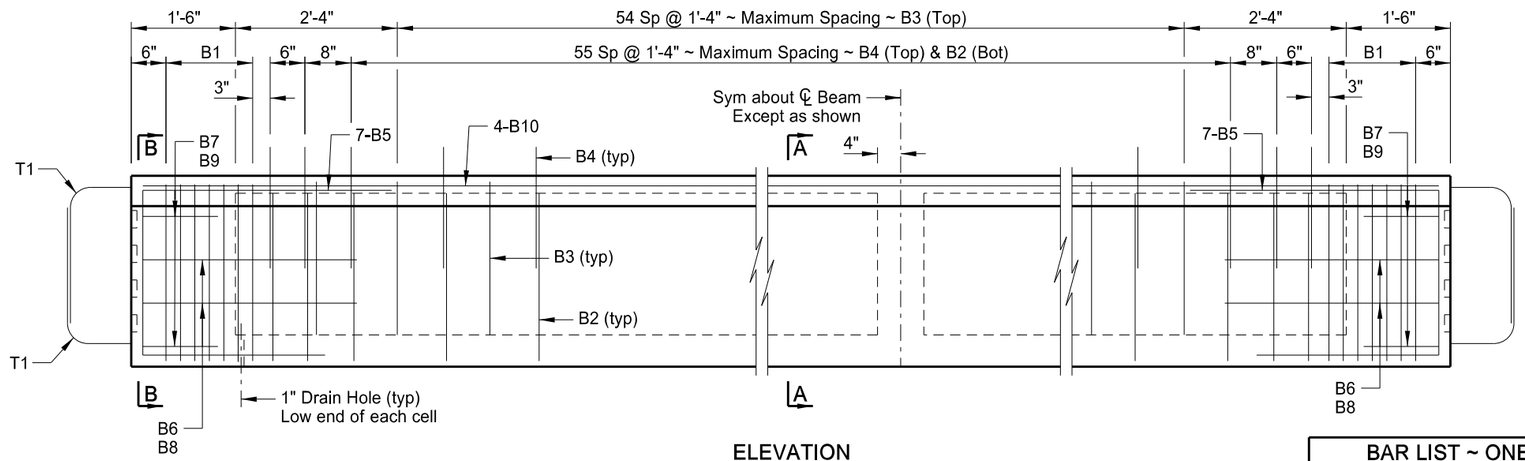
B-B



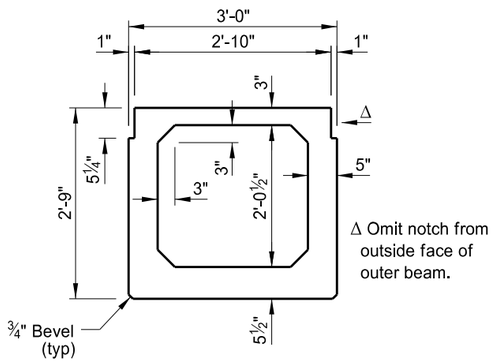
PLAN



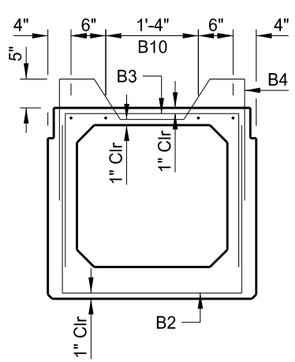
END VIEW



ELEVATION



(SHOWING DIMENSIONS)
A-A



(SHOWING REINFORCING)
A-A

BAR LIST ~ ONE BEAM					
	MARK	SIZE	NO.	LENGTH	SHAPE
	B1	4	28	6'-11"	BENT
*	B2	4	56	7'-5"	BENT
*	B3	4	55	7'-0"	BENT
	B4	4	56	6'-9"	BENT
	B5	5	14	8'-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	12	28'-3"	STR
**	T1	4	32	4'-9"	STR

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

QUANTITIES	(ONE BEAM)
BEAM LENGTH	79.0 LF

BEAM SECTION DATA
WT = 601.2 LBS/FT + 2443 LBS
CROSS SECTIONAL AREA = 558.5 IN^2
C.G. (FROM BOTTOM) = 14.85 IN
I = 73,708 IN^4
S_B = 4,964 IN^3

MAPLE RIVER

PRE-TENSIONED 33" x 36"
PRESTRESSED SPREAD BOX BEAM

** Field bend as shown (Grade 40).

* Welded Wire Reinforcing with minimum circumferential steel area of 0.15 sq in per ft may be substituted for B2 and B3 bars.

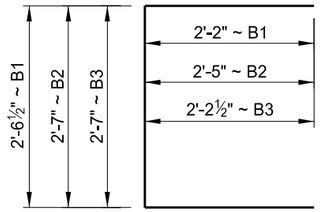
23 U.S.C. 409
NDDOT Reserves All Objections

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	IM-8-094(100)337	170	29

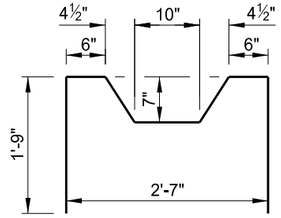
NOTES:

Select the final prestress force (remaining after all losses have been accounted for) and its corresponding center of gravity from those on a curve determined by the three values shown in the "Prestressing Data" table.

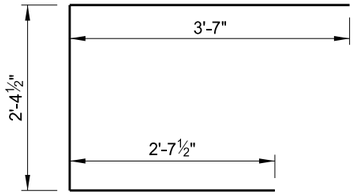
Minor changes to the shape of the beam and to reinforcing steel may be made to accommodate the forms of various contractors and their construction methods with the approval of the Engineer.



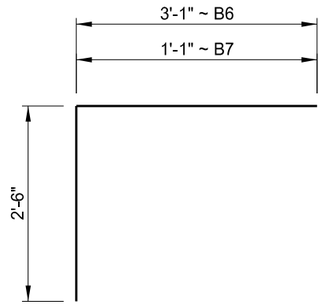
B1, B2 & B3



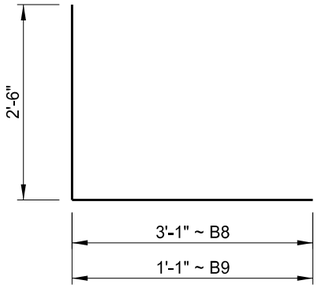
B4



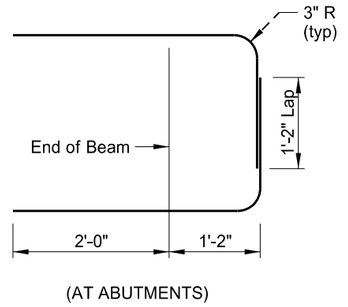
B5



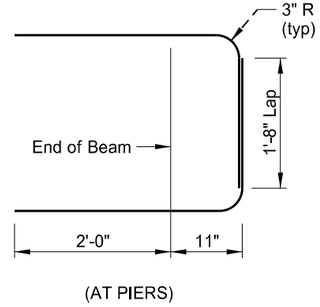
B6 & B7



B8 & B9



(AT ABUTMENTS)

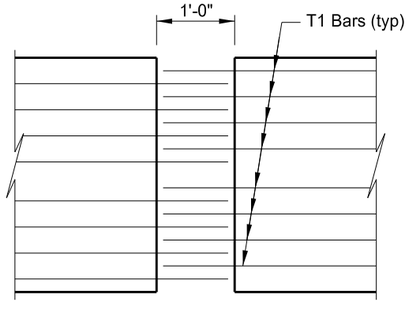


(AT PIERS)

T1

(DIMENSIONS SHOWN ARE OUT TO OUT)

BENT BAR DETAILS



BEAM END PLAN AT PIER

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

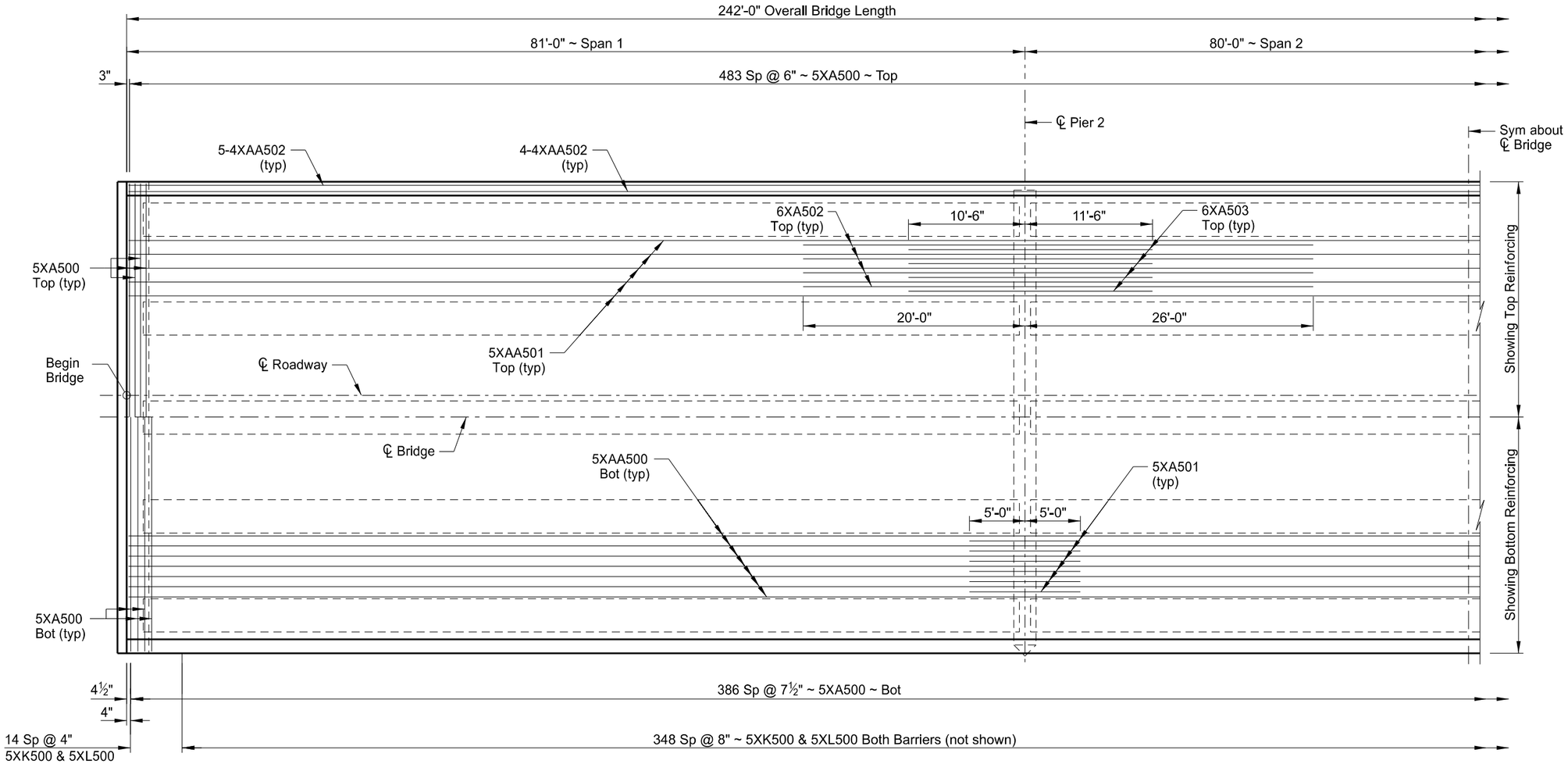
PRESTRESSING DATA					
C.G.	FINAL FORCE	DETENSION STRENGTH	ACCEPTANCE STRENGTH	WEIGHT (TONS)	BEAM LENGTH
2.75"	1,076.4 k	7,000 psi (Min)	7,000 psi (Min)	25.0	79'-0"
2.94"	1,086.2 k				
3.25"	1,102.7 k				

MAPLE RIVER

PRE-TENSIONED 33" x 36"
PRESTRESSED SPREAD BOX BEAM

23 U.S.C. 409
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	IM-8-094(100)337	170	30



PLAN

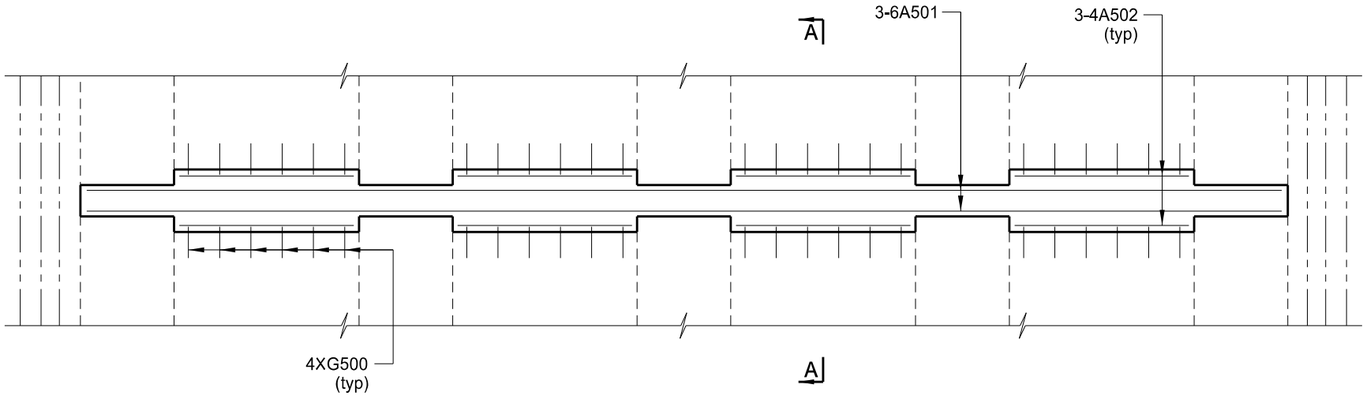
This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

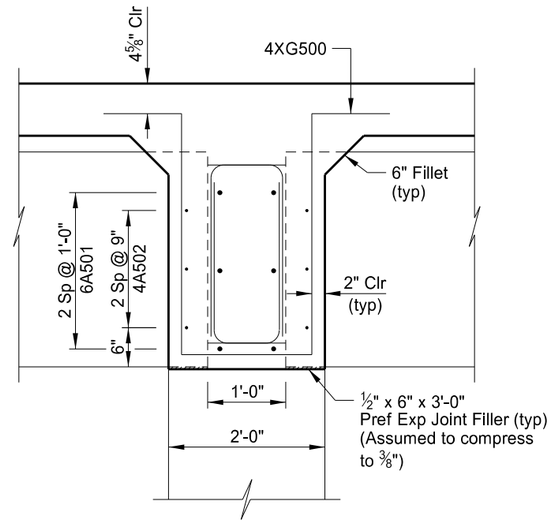
QUANTITIES
SEE DWG 94-337.333R-15
MAPLE RIVER
HALF SLAB LAYOUT

23 U.S.C. 409
NDDOT Reserves All Objections

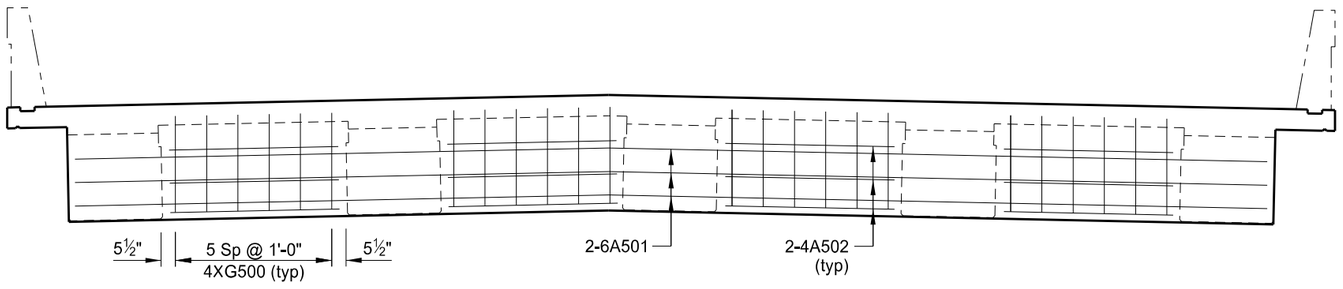
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	IM-8-094(100)337	170	31



PLAN



A-A



ELEVATION

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

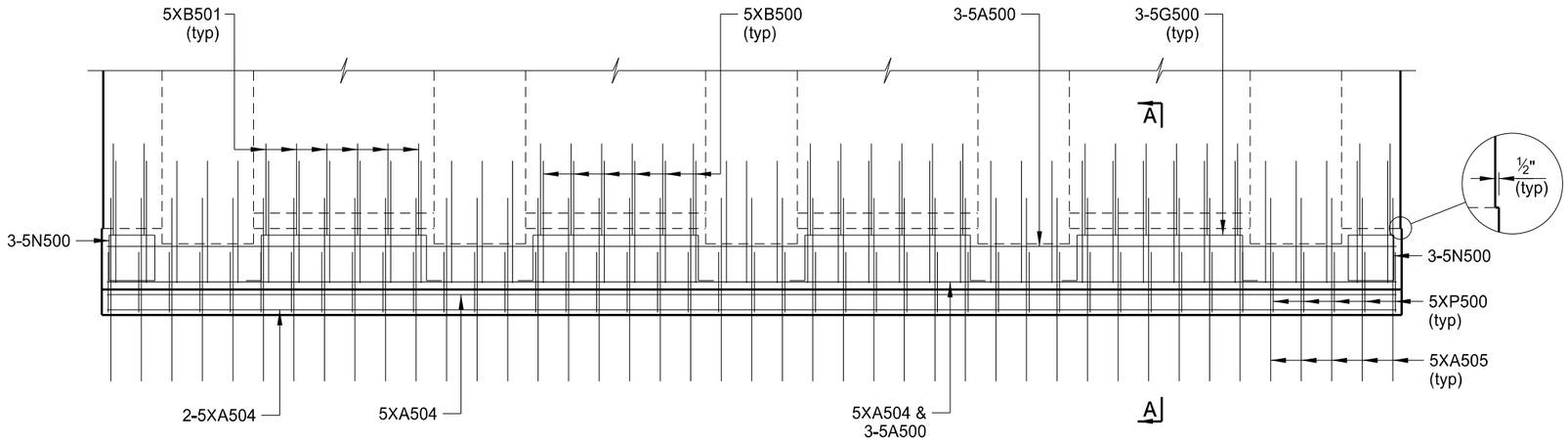
QUANTITIES
SEE DWG 94-337.333R-15

MAPLE RIVER

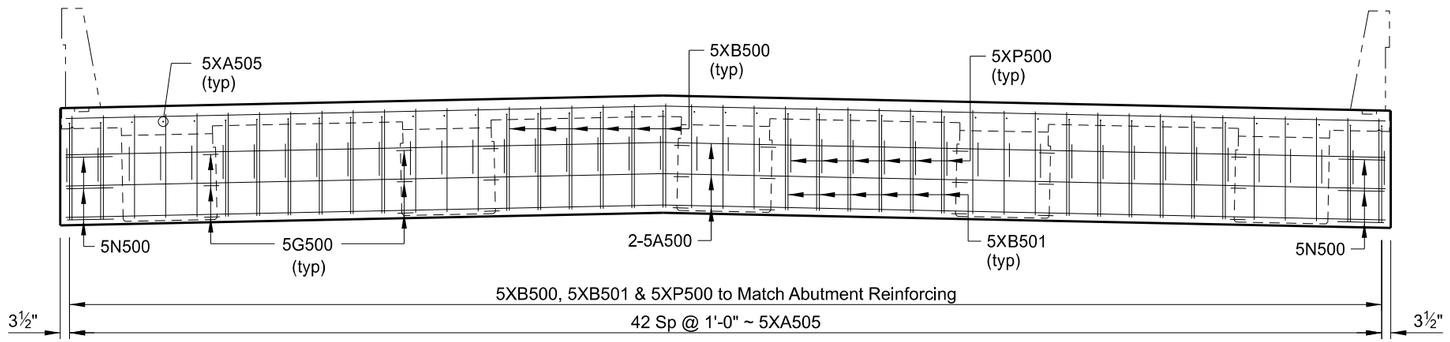
PIER DIAPHRAGM DETAILS

23 U.S.C. 409
NDDOT Reserves All Objections

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	IM-8-094(100)337	170	32



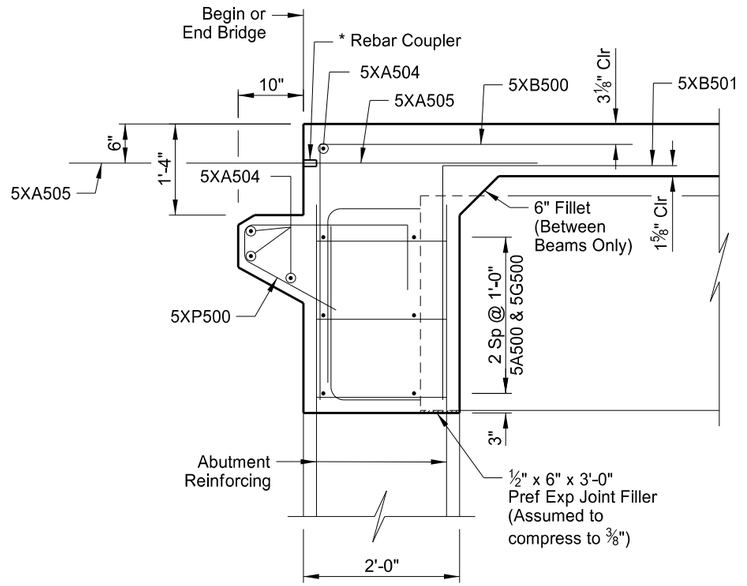
PLAN



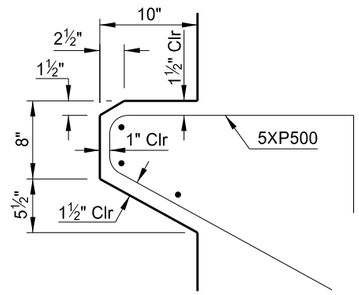
(APPROACH LIP NOT SHOWN)
ELEVATION

NOTE:
Do not install the 5XA506 bars into the approach slab until all of the foundation fill is in place.

* Use mechanical connectors for the couplers capable of developing 125% of the reinforcing steel specified yield strength. Provide epoxy coated couplers according to Section 836.02 A and repair any damaged epoxy coating according to Section 612.04 E.



A-A



APPROACH LIP DETAIL

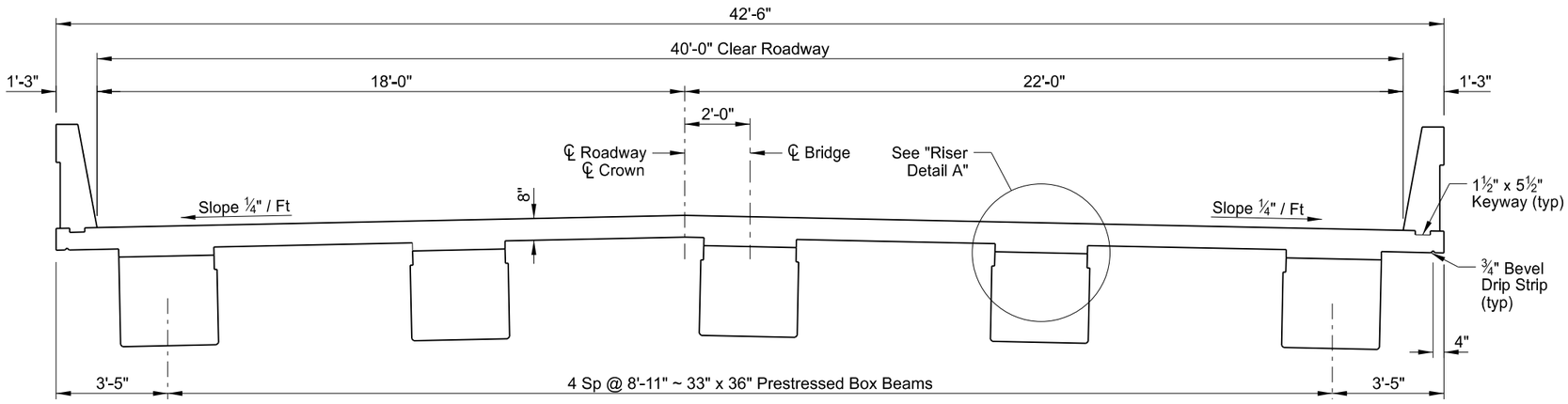
This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

QUANTITIES
SEE DWG 94-337.333R-15
MAPLE RIVER
ENDWALL DETAILS

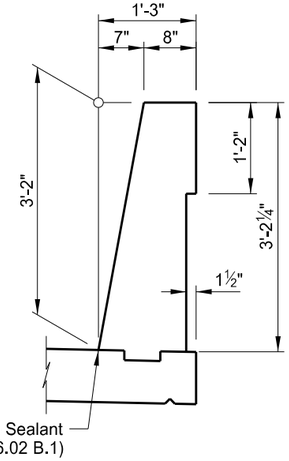
23 U.S.C. 409
NDDOT Reserves All Objections

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	IM-8-094(100)337	170	33

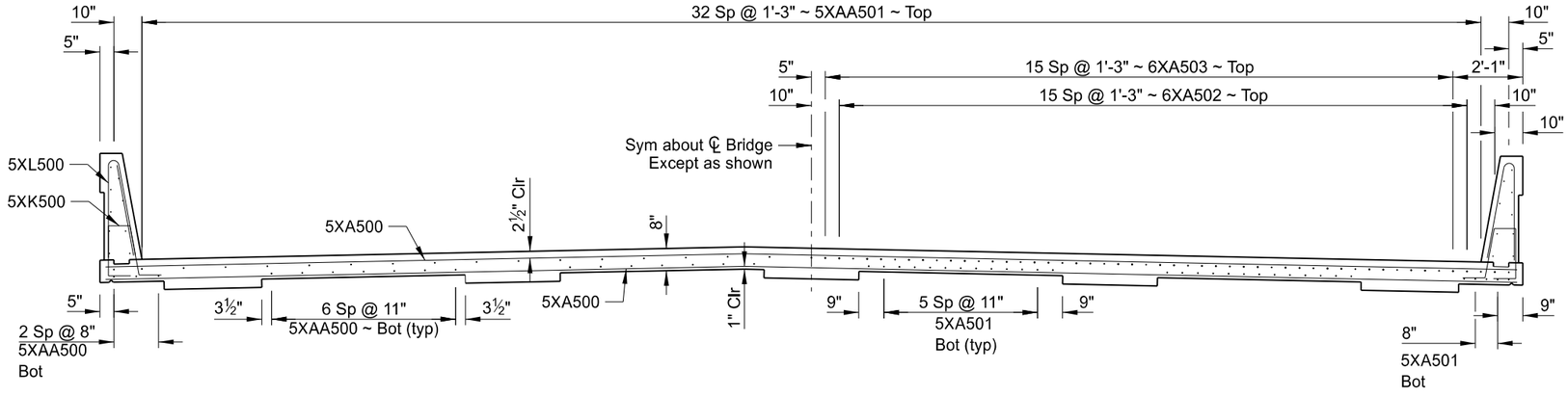


(SHOWING DIMENSIONS)

SLAB SECTION



SHOWING DIMENSIONS



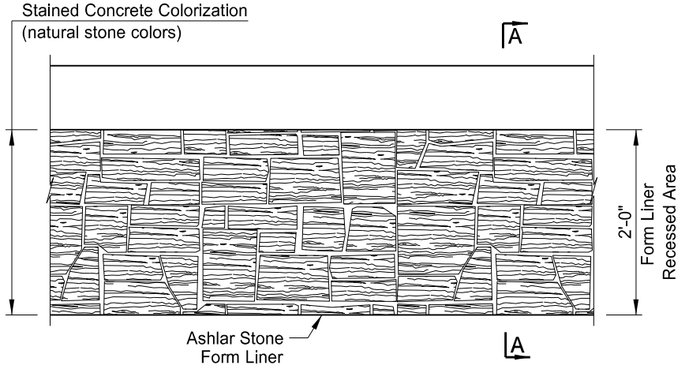
(SHOWING REINFORCING BETWEEN SUPPORTS) (SHOWING REINFORCING OVER PIERS)

SLAB SECTION

* Provide a 2" clearance from the front face to the barrier reinforcing.

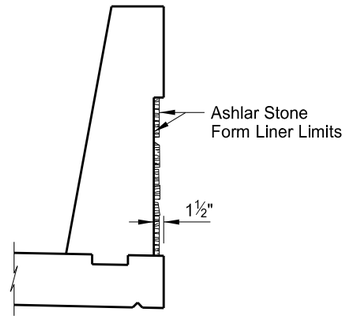
SHOWING REINFORCING

BARRIER DETAIL



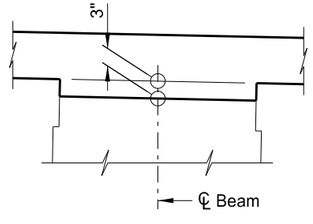
(SHOWING FORM LINER ~ BACK FACE)

BARRIER ELEVATION



A-A

The 3" dimensions shown are located at the supports.
The anticipated midspan riser is ¾". Adjust the riser to maintain the 8" slab thickness.



RISER DETAIL A

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

QUANTITIES	
CLASS AAE-3 CONCRETE	361.4 CY
REINFORCING STEEL	1,727 LBS
REINFORCING STEEL (EPOXY)	79,615 LBS

MAPLE RIVER

SLAB SECTION

BILL OF REINFORCING STEEL, GRADE 60

LETTER PREFIX OF BAR MARK DENOTES SHAPE ~ SEE BAR DETAILS

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	IM-8-094(100)337	170	34

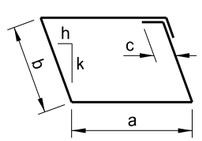
LOCATION	SIZE	MARK	NO. EACH /SET	NOMINAL LENGTH	DETAILING DIMENSIONS a	b	c	d	e	f	g	h	k
ABUTMENTS	5	A100	12	46'-3"		46'-3"							
	5	B100	20	20'-1"		3'-6"	16'-7"						
	5	B101	16	6'-6"		2'-3"	4'-3"						
	6	B102	20	17'-7"		1'-0"	16'-7"						
	6	B103	20	9'-0"		1'-0"	8'-0"						
	5	C100	12	50'-9"		2'-3"	46'-3"	2'-3"					
	5	C101	24	17'-2"		7'-9"	1'-8"	7'-9"					
	5	C102	18	14'-1"		4'-8"	1'-8"	7'-9"					
	5	C103	42	4'-2"		1'-3"	1'-8"	1'-3"					
	4	C104	72	2'-8"		6"	1'-8"	6"					
	5	C105	20	18'-0"		8'-2"	1'-8"	8'-2"					
	6	C106	60	16'-8"		7'-6"	1'-8"	7'-6"					
	6	C107	24	13'-8"		4'-6"	1'-8"	7'-6"					
	5	D100	8	16'-0"		2'-6"	13'-6"					12	3.7
	5	SB100	4	52'-6"	4'-3"	4'-0"	4'-3"	13'-9"	3				
	6	SB101	4	39'-6"	1'-0"	4'-0"	1'-0"	13'-9"	3				
	5	SC100	4	178'-9"	1'-8"	4'-2"	7'-11"	1'-8"	12				
PIERS	5	A200	104	40'-8"		40'-8"							
	5	A201	164	24'-0"		24'-0"							
	6	A202	2	23'-0"		23'-0"							
	5	C200	50	6'-0"		2'-3"	1'-6"	2'-3"					
	5	C201	164	6'-2"		2'-3"	1'-8"	2'-3"					
	4	C202	96	2'-8"		6"	1'-8"	6"					
	5	M200	48	6'-8"	2'-3"	1'-1"	1'-1"	2'-3"				12	12

LOCATION	SIZE	MARK	NO. EACH /SET	NOMINAL LENGTH	DETAILING DIMENSIONS a	b	c	d	e	f	g	h	k
SUPERSTRUCTURE REGULAR	5	A500	12	42'-3"		42'-3"							
	6	A501	12	38'-3"		38'-3"							
	4	A502	48	5'-7"		5'-7"							
	5	G500	24	9'-7"	1'-6"	5'-7"	1'-6"	6"				12	0
	5	N500	12	7'-2"	1'-7"	1'-6"	6"					0	12
SUPERSTRUCTURE EPOXY	5	XA500	871	42'-2"		42'-2"							
	5	XA501	68	10'-0"		10'-0"							
	6	XA502	80	46'-0"		46'-0"							
	6	XA503	80	22'-0"		22'-0"							
	5	XA504	8	42'-3"		42'-3"							
	5	XA505	172	3'-0"		3'-0"							
	5	XB500	86	7'-3"		3'-3"	4'-0"						
	5	XB501	56	6'-0"		3'-0"	3'-0"						
	4	XG500	48	9'-10"	3'-1"	1'-8"	3'-1"	1'-0"				12	0
	5	XK500	754	4'-11"	1'-6"	7"			10"		8"	2.2	12
	5	XL500	754	5'-11"	9"	2'-9"	5"			1.25"		2.2	12
	5	XP500	86	5'-6"	5"	2'-1"	2'-2"			1.25"	10"	12	6.5
	5	XAA500	34	253'-8"		60'-0"	3'-0"	13'-8"	4		241'-8"		
	5	XAA501	35	251'-8"		60'-0"	2'-6"	11'-8"	4		241'-8"		
	4	XAA502	18	251'-8"		60'-0"	2'-6"	11'-8"	4		241'-8"		

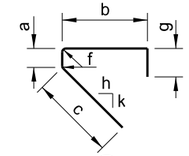
23 U.S.C. 409
NDDOT Reserves All Objections

NOTES:

1. All dimensions are out to out of bars.
2. Nominal length of each bent bar or cut bar is the sum total of the detailing dimensions for that bar, unless otherwise noted.
3. Turn adjacent "AA" bars end for end so that the splice locations are staggered.
4. The "f" dimension indicates the inside radius unless otherwise noted.
5. An "X" preceding a bar designation indicates an epoxy coated bar.



(N)



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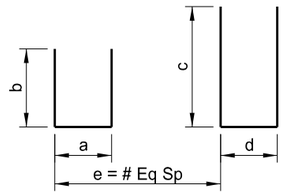
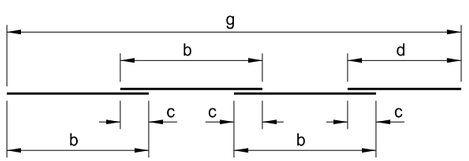
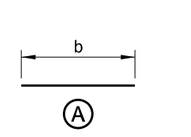


(SC)

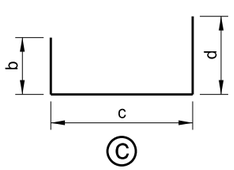


c = Lap Splice (typ)
e = # of "b" Length Pieces in a Set
Total Length per Set = e x b + d
(AA)

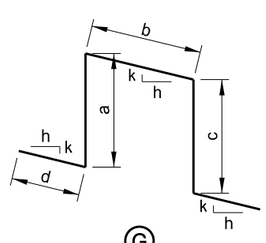


(A) (B)

* b = Vertical Leg for XB500 and XB501



(C) (D)



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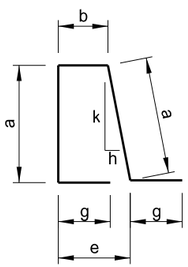
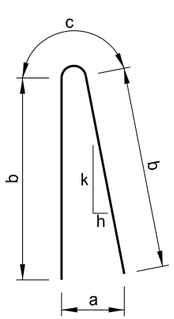
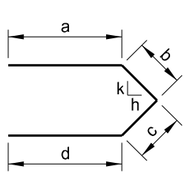


(K)



(L)



(M)

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

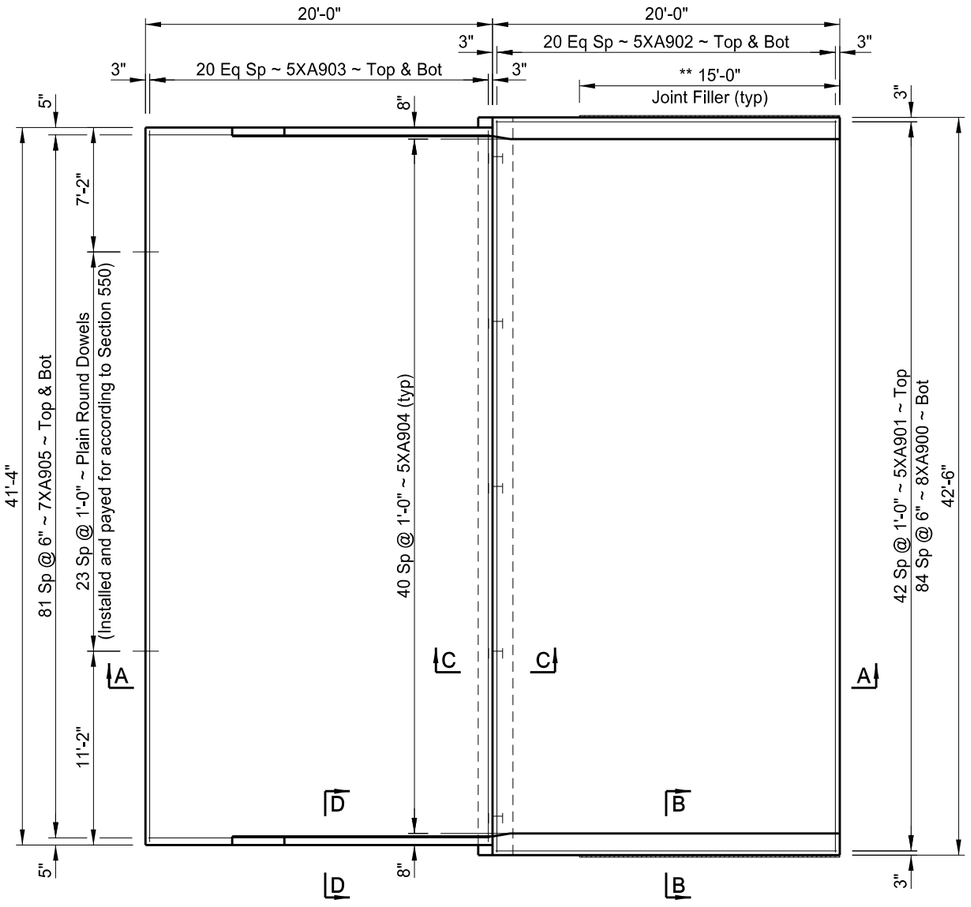
MAPLE RIVER

REINFORCING BAR LIST & DETAILS

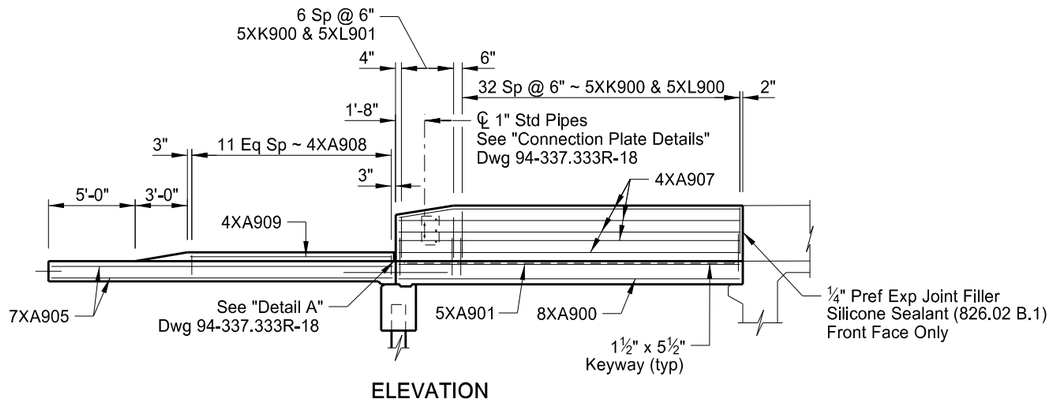
23 U.S.C. 409
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	IM-8-094(100)337	170	35

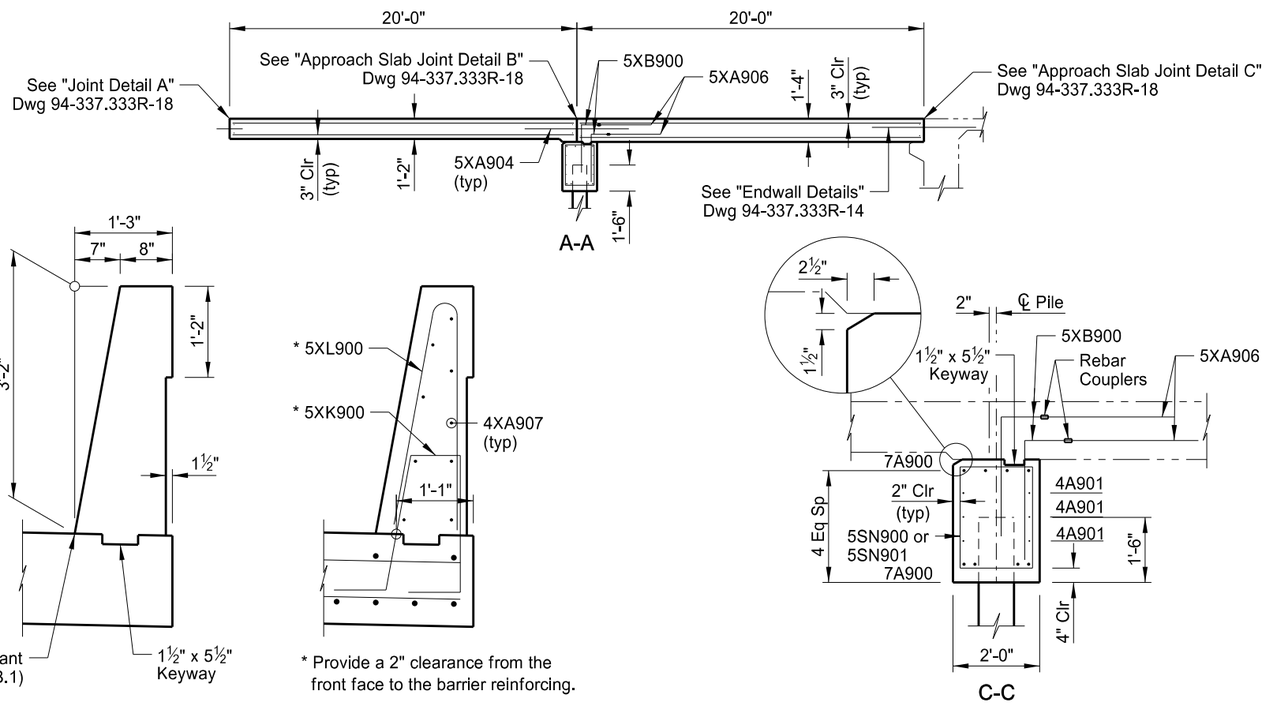
** ½" x 14" Pref Exp Joint Filler ~ Place between approach slab & abutment wing (typ).

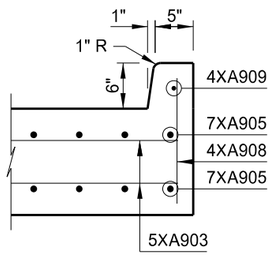


PLAN

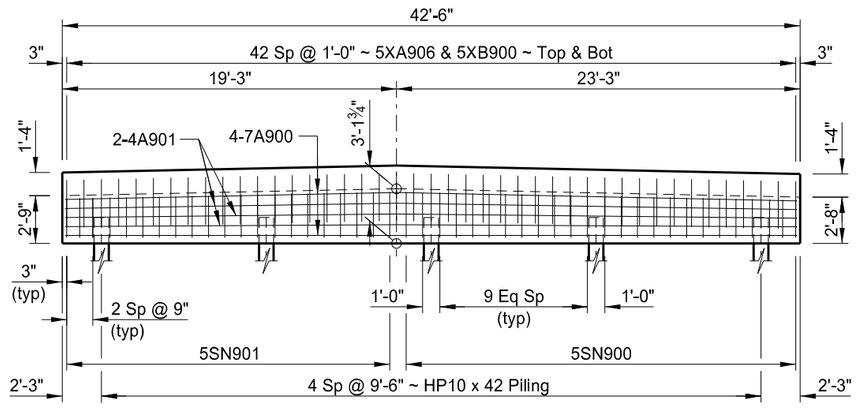


ELEVATION





D-D



FOOTING ELEVATION

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

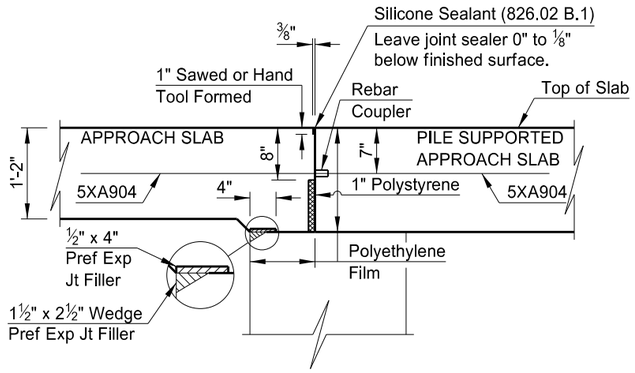
QUANTITIES
SEE DWG 94-337.333R-18

MAPLE RIVER

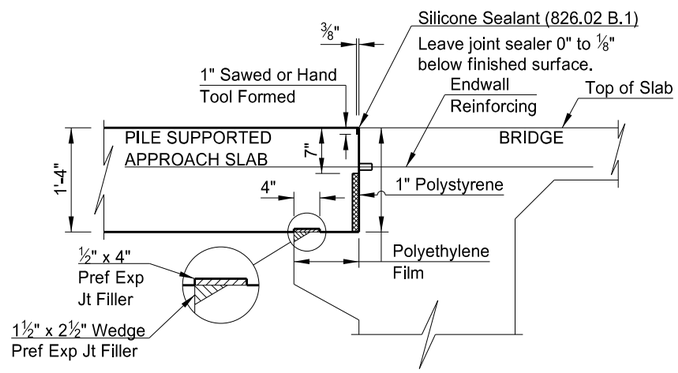
APPROACH SLAB DETAILS

23 U.S.C. 409
NDDOT Reserves All Objections

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	IM-8-094(100)337	170	36



APPROACH SLAB JOINT DETAIL B



APPROACH SLAB JOINT DETAIL C

NOTES:

The estimated material quantities shown are for information purposes only. Include the concrete, reinforcing bars, polyethylene film, preformed joint filler, polystyrene, silicone sealant, connection plates and pipes, and labor required to build the approach slabs and barriers in the pay item "Pile Supported Approach Slab." Use Class AE-3 concrete and Grade 60 reinforcing steel. Provide reinforcing steel that meets the requirements of Section 612. Use polyethylene film that meets the requirements of ASTM C171.

The bar marks beginning with an "X" indicate an epoxy coated bar. The dimensions shown in the "Bent Bar Details" are out to out.

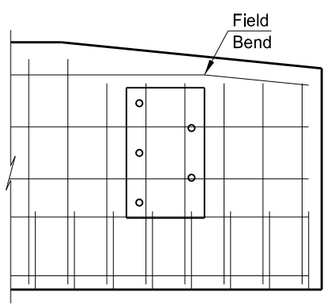
SKEW ANGLE = 0°

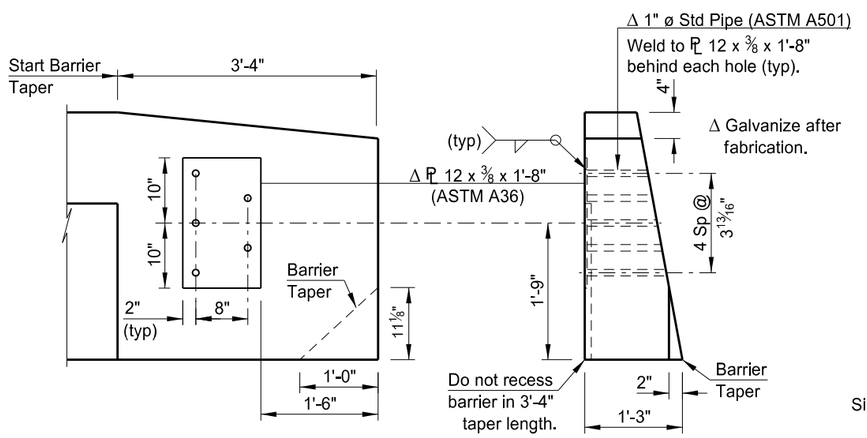
BAR LIST - ONE SLAB

SIZE	MARK	NO.	LENGTH
7	A900	8	42'-2"
4	A901	6	42'-2"
5	SN900	1	228'-5"
5	SN901	1	193'-7"
8	XA900	85	19'-8"
5	XA901	43	19'-8"
5	XA902	42	42'-2"
5	XA903	42	41'-0"
5	XA904	41	6'-0"
7	XA905	164	19'-8"
5	XA906	43	3'-0"
4	XA907	18	19'-8"
4	XA908	24	1'-2"
4	XA909	2	11'-7"
5	XB900	43	3'-6"
5	XK900	66	5'-7"
5	XL900	66	5'-11"
5	XL901	14	5'-3"

ESTIMATED MATERIAL QUANTITIES

REINFORCING STEEL (LBS)	CONCRETE (CY)
18,567	97.4



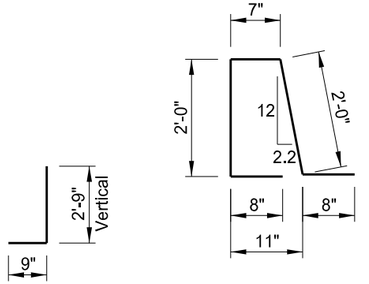


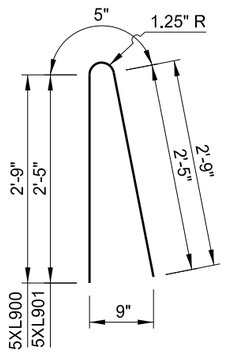
SHOWING REINFORCING

SHOWING DIMENSIONS

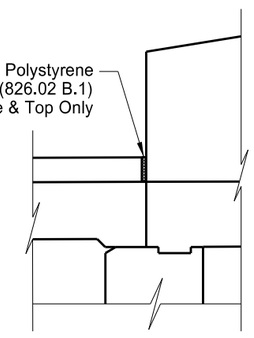
(SHOWING BACK FACE)

CONNECTION PLATE DETAILS

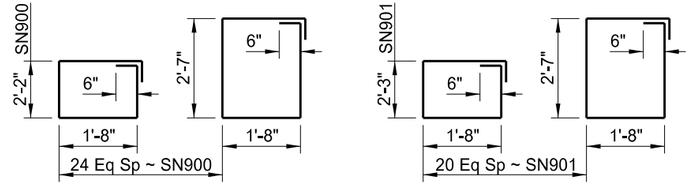




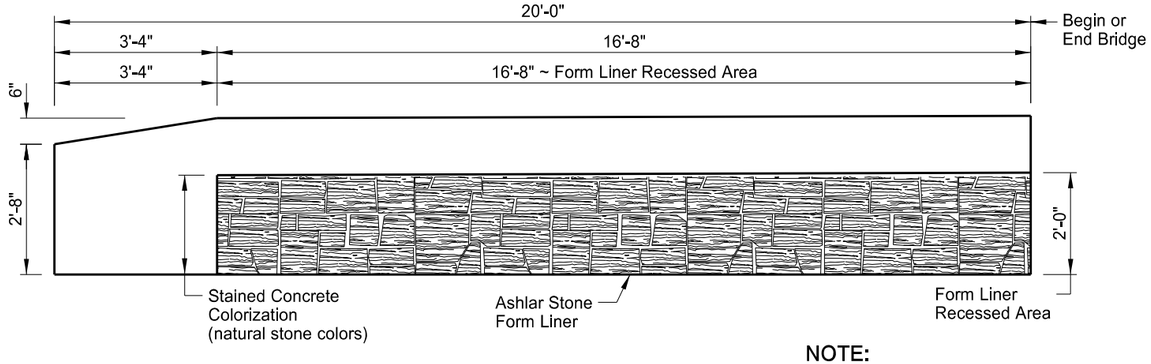
XL900 & XL901



DETAIL "A"



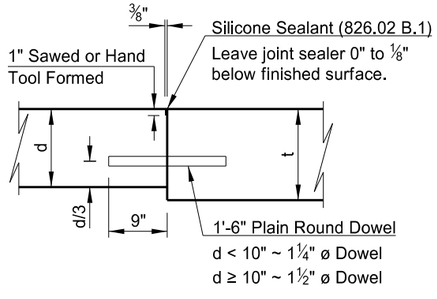
BENT BAR DETAILS



(SHOWING FORM LINER ~ BACK FACE)

BARRIER ELEVATION

NOTE:
See "A-A" Dwg 94-337.331R-15 for Form Liner Limits.



d = Pavement Thickness
t = Approach Slab Thickness

JOINT DETAIL A

QUANTITIES	(ONE END)
APPROACH SLAB	91.9 SY
PILE SUPPORTED APPROACH SLAB	94.4 SY

This drawing is preliminary and not for construction or implementation purposes.

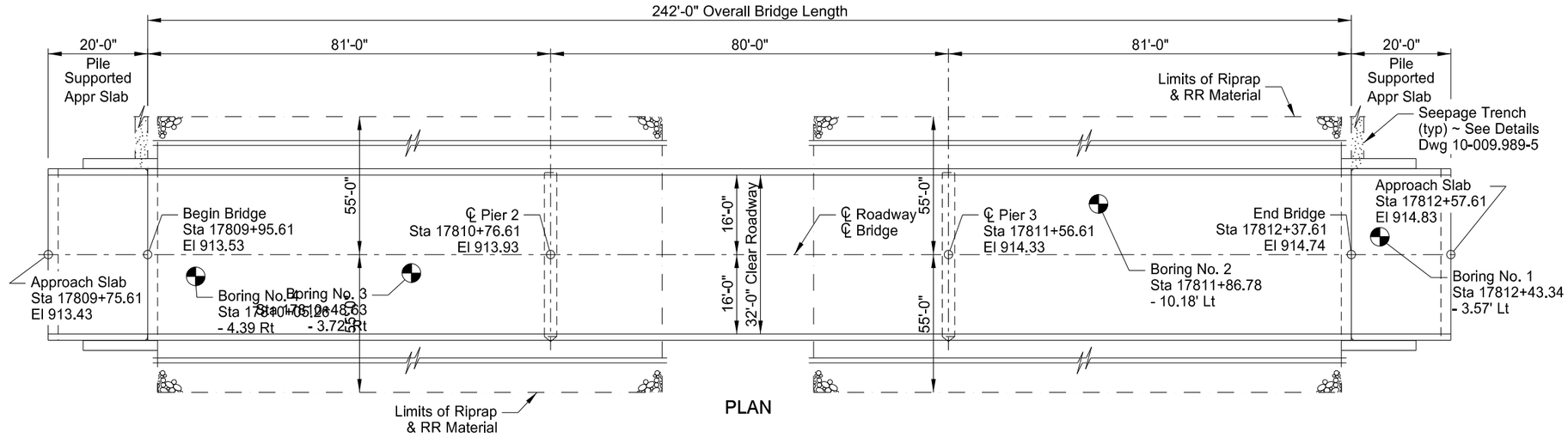
PRELIMINARY

MAPLE RIVER

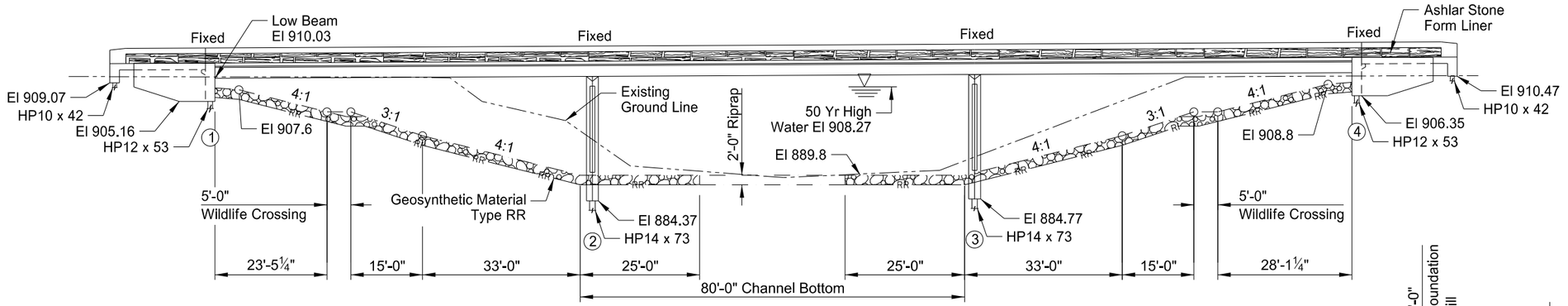
APPROACH SLAB DETAILS

23 U.S.C. 409
NDDOT Reserves All Objections

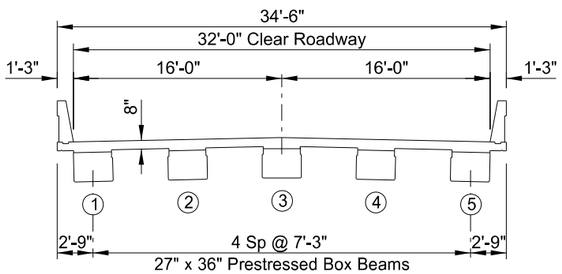
BRIDGE CODE		STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
X081		ND	BRO-8-010(036)009	170	37



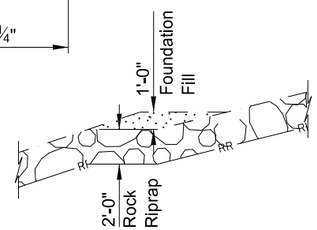
PLAN



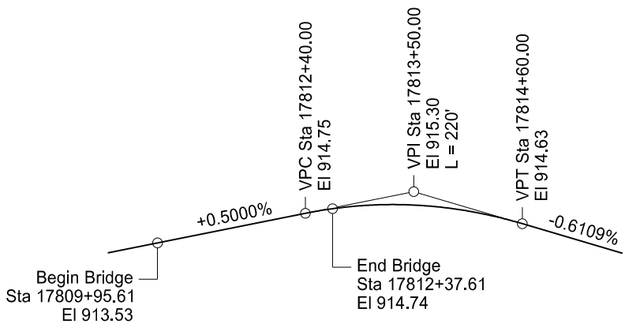
ELEVATION



TYPICAL SECTION



WILDLIFE WALKWAY



VERTICAL CURVE DATA

HYDRAULIC DATA:

Drainage Area	1,467.8	sq mi
Design Frequency	50	yr
Design Discharge	11,443	cfs
Design Stage (upstream)	908.27	ft
Stream Gradient	0.00068	ft/ft
Waterway Provided Below Design Stage	2,740.30	sq ft
Waterway Provided Below Clearance Elevation	3,286.9	sq ft
Average Velocity of Flow in Natural Channel	4.28	fps
Depth of Flow	18.47	ft
Velocity of Flow Under Bridge	4.17	fps
100-Year Frequency Discharge	13,269	cfs
100-Year Frequency Stage	909.20	ft
Overtopping Stage	910.88	ft
Overtopping Discharge	35,903.0	cfs

DESIGN STRENGTHS:

f'c = 3,000 psi ~ Class AE-3 Concrete
f'c = 4,000 psi ~ Class AAE-3 Concrete
f'c = 7,500 psi ~ Prestressed Beam Concrete
fy = 60,000 psi ~ Reinforcing Steel

Load & Resistance Factor Design

SURVEY CONTROL POINTS			
POINT	NORTHING	EASTING	ELEVATION
RTK 1018	460,119.90	2,823,629.48	913.03
RTK 1019	460,052.43	2,822,608.92	913.35

SPECIAL PROVISIONS	
SPP 2	MIGRATORY BIRD TREATY ACT
SP 294(20)	ARCHITECTURAL SURFACE
SP 355(20)	WINTER SUSPENSION

STANDARD DRAWINGS
D-622-1, D-714-18, D-900-1

F.W.S. 15 PSF

HL-93 DESIGN LOADING

MAPLE RIVER

STATION: 17811+16.61

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

23 U.S.C. 409
NDDOT Reserves All Objections

REVISED 11-8-2021

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-8-010(036)009	170	38

NOTES

100 SCOPE OF WORK: This project consists of building a new 3-span prestressed concrete box beam bridge with an overall bridge length of 242'-0" and a clear roadway width of 32'-0".

100 GENERAL: Include the cost of furnishing and placing preformed expansion joint filler, concrete inserts, rebar couplers, silicone sealant, waterproof membrane, and other miscellaneous items in the price bid for Class AE-3 and AAE-3 concrete.

107 HAZARDOUS MATERIAL: The existing structural steel is painted with lead-based paint. Remove and dispose of any loose and peeling paint found on the existing structural steel according to the North Dakota Department of Health's management of lead-based paint debris.

202 REMOVAL OF STRUCTURE: The existing structure is a 3-span steel girder bridge, 140'-0" long with a clear roadway width of 24'-0". The substructures are made of concrete. Remove existing substructures to 1 foot below final rip rap bottom. Include all work required to remove the bridge in the contract unit price for "Removal of Structure – Site 3."

The substructures are made of concrete and are supported on steel piling, except for the two interior piers which are supported on timber piling. Remove existing substructures to 1 foot below final rip rap bottom. Portions of the original abutment from 1959 may remain in place and should also be removed to 1 foot below the final rip rap elevation.

210 EXCAVATION: The estimated quantity of channel excavation is 4,000 CY. Include the excavation costs for shaping the channel bottom and end slopes in the lump sum bid item, "Foundation Preparation-Site 3." Include the excavation costs at the abutments and approach slab footings, as shown in the "Detail at Abutment", in the lump sum bid item, "Class 1 Excavation – Site 3." Include the excavation costs at the piers in the lump sum bid item, "Class 2 Excavation – Site 3."

602 DIAPHRAGMS AND ENDWALLS: Place the pier diaphragm and endwall concrete at the same time as the deck concrete.

602 WEATHER LIMITATIONS: All requests in accordance with 602.04 C.4 "Weather Limitations" require approval from the NDDOT Bridge Division.

602 DECK PLACEMENT: Place the deck concrete at a minimum rate of 40 CY per hour.

602 BRIDGE DECK AND APPROACH SLAB CURING: Do not cover the wet cure burlap with a waterproof material such as polyethylene during the curing period.

602 BRIDGE DECK AND APPROACH SLAB CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck and approach slabs to determine the need for crack sealing. Repair all cracks designated by the Engineer at this time.

Perform a visual inspection of the bridge deck surface and mark all visible cracks appearing on the top surface 0.007" or greater in width at its widest segment or as directed by the Engineer.

Immediately before applying the sealer, clean the cracks by removing all dust and debris with compressed air. Seal the cracks with a two-part epoxy in accordance with the manufacturer's recommendations. Chase crack with the sealant application to limits of crack, including those portions that are narrower than 0.007" wide. The epoxy sealer may be Paulco TE-2501 (Viking Paints, Inc.), Dural 50 LM (Euclid Chemical Co.), TK-9000 or TK-2110 (TK Products), or an approved equal. Include all work and materials associated with the deck and approach slab crack sealing in the price bid for the Class AAE-3 Concrete and Approach Slab bid items.

602 FORM LINERS: Include the cost to provide and install the form liners in the price bid for the appropriate concrete items.

602 SURFACE FINISH "D": Apply Surface Finish "D" on the exposed abutment surfaces, the fascia surface of the exterior beams, the outside edges of the pier diaphragm, the outside edges of the deck, the exposed endwall areas outside of the exterior beams, and to all bridge and approach slab barrier surfaces except for the recessed form liner areas. Use gray surface finish, color number 36424 meeting Aerospace Material Specification (AMS) Standard 595, for the inside and top surfaces of the bridge and approach slab barriers. Match the color of the lightest brown used in the Architectural Surface Finish for all other surfaces. Submit to the Engineer a 1' x 1' sample of the tan surface finish.

604 PRESTRESSED BEAMS: Set prestressed beams on bearing seats without field bending substructure or beam reinforcing steel.

616 STRUCTURAL STEEL: Approximately 1,500 lbs of structural steel has been estimated for the ice noses. Include all costs to provide and install the ice noses in the price bid for "Structural Steel." Shop drawings for ice nose structural steel are not required.

622 PILING: Drive approach slabs piling with a diesel hammer with with an operational hammer energy and ram weight (minimum of 3,000 pounds) of at least 35,000 foot-pound-tons computed by the formula:

$$W(E–12{,}936) + 0.515E$$

Drive pier piling with a diesel hammer with an operational hammer energy and ram weight (minimum of 6,000 pounds) of at least 60,000 foot-pound-tons computed by the formula:

$$W(E–22{,}176) + 0.492E$$

Drive abutment pile with a diesel hammer with an operational hammer energy and ram weight (minimum of 4,000 pounds) of at least 48,000 foot-pound-tons computed by the formula:

$$W(E–16{,}000) + 0.598E$$

W = Weight of the ram (tons)
E = Rated hammer energy

Run the hammers at an energy that produces a penetration at bearing between ½ inch and 3 inches in the last 10 blows.

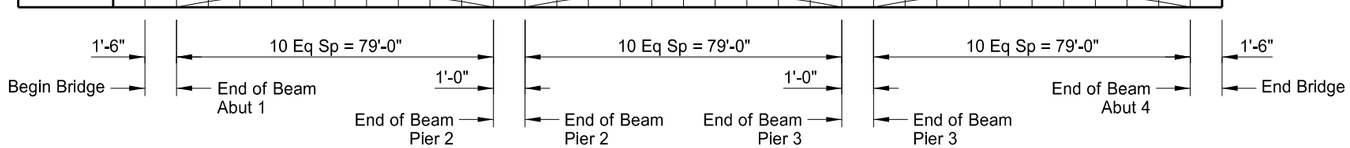
Stop pile driving operations if bearing is not yet obtained at a depth approximately 10 feet beyond the estimated depth. Wait 24 hours to allow pile setup to occur. After 24 hours warm the hammer with a minimum of 20 blows by striking the ground or timber mats. Restrike the pile with 10 blows to determine if bearing has been achieved. If bearing was not achieved during restrike, continue to drive the pile until bearing is achieved.

900 ELEVATION CHECK POINTS: Place eight bolts on the top of the barriers, in accordance with Std D-900-1, to serve as elevation check points. Include the cost for this item in the unit price bid for Class AAE-3 concrete.

23 U.S.C. 409
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	BRO-8-010(036)009	170	39

℄ BEAM 5	℄ BEAM 4	℄ BEAM 3	℄ BEAM 2	℄ BEAM 1
913.23	913.38	913.53	913.38	913.23
913.23	913.38	913.54	913.38	913.23
913.34	913.50	913.65	913.50	913.34
913.45	913.60	913.75	913.60	913.45
913.54	913.69	913.84	913.69	913.54
913.61	913.76	913.91	913.76	913.61
913.66	913.81	913.96	913.81	913.66
913.69	913.84	913.99	913.84	913.69
913.70	913.85	914.00	913.85	913.70
913.68	913.84	913.99	913.84	913.68
913.66	913.81	913.96	913.81	913.66
913.63	913.78	913.93	913.78	913.63
913.63	913.78	913.94	913.78	913.63
913.74	913.90	914.05	913.90	913.74
913.85	914.00	914.15	914.00	913.85
913.94	914.09	914.24	914.09	913.94
914.01	914.16	914.31	914.16	914.01
914.06	914.21	914.36	914.21	914.06
914.09	914.24	914.39	914.24	914.09
914.10	914.25	914.40	914.25	914.10
914.08	914.24	914.39	914.24	914.08
914.06	914.21	914.36	914.21	914.06
914.03	914.18	914.33	914.18	914.03
914.03	914.18	914.34	914.18	914.03
914.14	914.30	914.45	914.30	914.14
914.25	914.40	914.55	914.40	914.25
914.34	914.49	914.64	914.49	914.34
914.41	914.56	914.71	914.56	914.41
914.46	914.61	914.76	914.61	914.46
914.49	914.64	914.79	914.64	914.49
914.50	914.65	914.80	914.65	914.50
914.48	914.64	914.79	914.64	914.48
914.46	914.61	914.76	914.61	914.46
914.43	914.58	914.73	914.58	914.43
914.44	914.59	914.74	914.59	914.44



Beam 1 is the north beam.

SCREED ELEVATION

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0110	REMOVAL OF STRUCTURE-SITE 3	L SUM	1
210	0104	CLASS 1 EXCAVATION-SITE 3	L SUM	1
210	0114	CLASS 2 EXCAVATION-SITE 3	L SUM	1
210	0204	FOUNDATION PREPARATION-SITE 3	L SUM	1
256	0200	RIPRAP GRADE II	CY	2,411
602	0130	CLASS AAE-3 CONCRETE	CY	305.4
602	1130	CLASS AE-3 CONCRETE	CY	219.0
602	1134	PILE SUPPORTED APPROACH SLAB	SY	153.4
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	1,243
604	9610	PRESTRESSED BOX BEAM-27IN	LF	1,185
612	0115	REINFORCING STEEL-GRADE 60	LBS	15,036
612	0116	REINFORCING STEEL-GRADE 60-EPOXY COATED	LBS	61,849
616	0360	STRUCTURAL STEEL	LBS	1,736
622	0020	STEEL PILING HP 10 X 42	LF	520
622	0040	STEEL PILING HP 12 X 53	LF	650
622	0060	STEEL PILING HP 14 X 73	LF	560
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	3,617
930	9537	ABUTMENT UNDERDRAIN SYSTEM	EA	2

This drawing is preliminary and not for construction or implementation purposes.

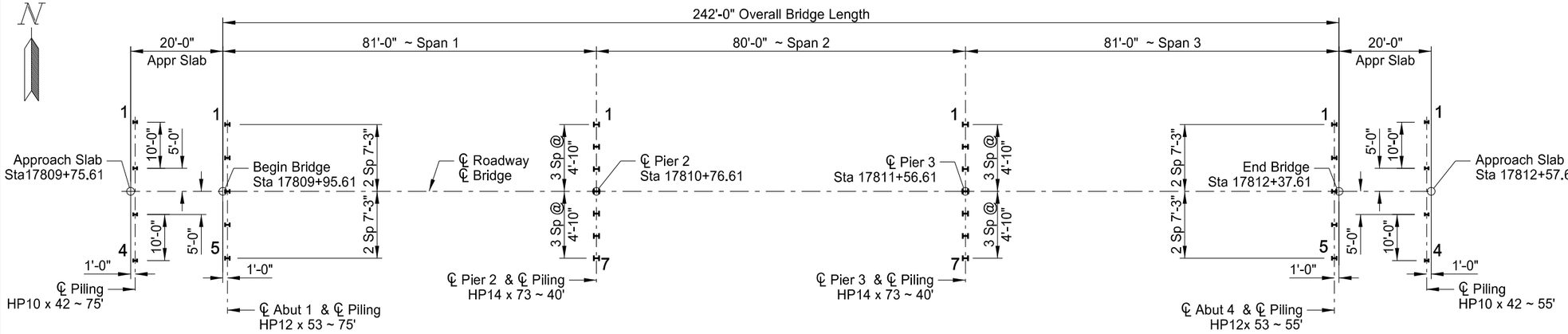
PRELIMINARY

MAPLE RIVER

SCREED ELEVATIONS &
BID ITEM QUANTITIES

23 U.S.C. 409
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	BRO-8-010(036)009	170	40



Drive the HP10 x 42 Pile to a bearing resistance of 105 tons.
Drive the HP12 x 53 Pile to a bearing resistance of 130 tons.
Drive the HP14 x 73 Pile to a bearing resistance of 180 tons.

PILING LAYOUT

* Do not drive abutment piling until all constructed embankment is in place.

NOTE:

For double acting or single acting diesel hammers, calculate the bearing resistance of piles by the following formula:

$$\Phi Rn = \frac{4.5E}{S + 0.2} \times \frac{W + 0.2M}{W + M}$$

Where:

ΦRn = Nominal pile bearing resistance, in pounds. The Φ factor is included in equation.
W = Weight of striking parts (ram), in pounds.
M = Weight of parts being driven, in pounds. Includes pile weight, anvil (if any), driving cap, etc.
E = Energy per blow, in foot-pounds.
S = Average penetration of pile in inches per blow for last ten blows.

For single acting hammers, calculate E by multiplying observed stroke (ft) and W (lbs).

	PILE COORDINATES		
	PILE	NORTHING	EASTING
WEST APPR SLAB	1	459,765.91	2,823,133.42
	4	459,735.95	2,823,134.94
ABUT 1	1	459,766.42	2,823,153.42
	5	459,737.46	2,823,154.88
PIER 2	1	459,770.46	2,823,233.32
	7	459,741.50	2,823,234.78
PIER 3	1	459,774.51	2,823,313.21
	7	459,745.54	2,823,314.68
ABUT 4	1	459,778.55	2,823,393.11
	5	459,749.59	2,823,394.58
EAST APPR SLAB	1	459,780.06	2,823,413.06
	4	459,750.10	2,823,414.58

Elevations shown are to top of finished concrete.
BEARING ELEVATIONS

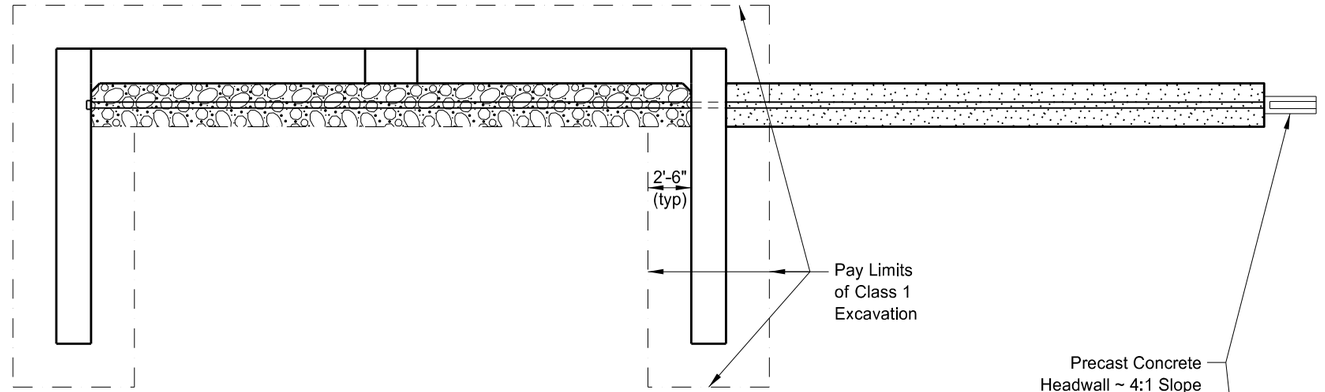
This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

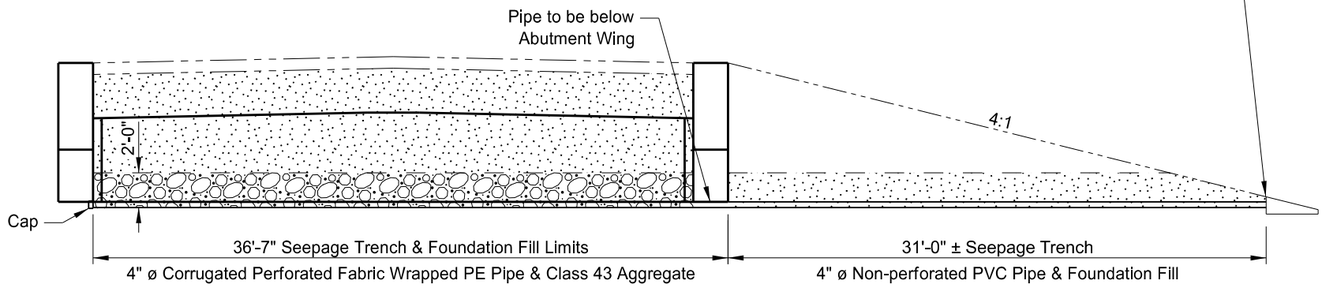
MAPLE RIVER

PILING LAYOUT & BEARING DETAILS

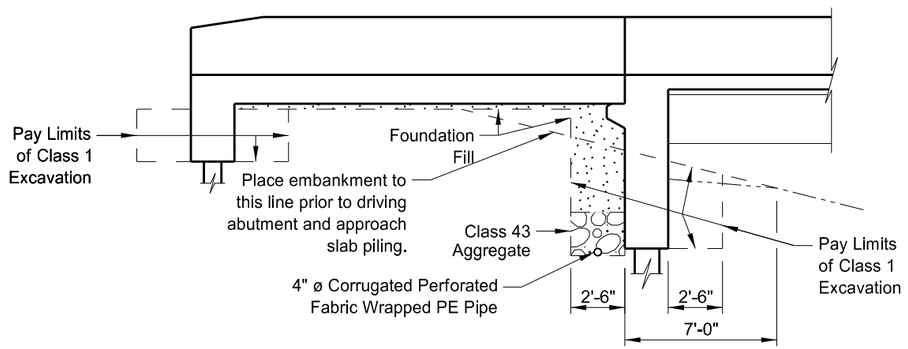
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	BRO-8-010(036)009	170	41



ABUTMENT PLAN



BACK FACE OF ABUTMENT



DETAIL AT ABUTMENT

NOTES:

Use corrugated perforated fabric wrapped PE pipe that meets the requirements of Section 830.03 A.4. Provide fabric wrapping for the pipe that meets the requirements of Section 858.01 for D3 or D4 drainage fabric. Provide aggregate that meets the requirements of Section 816.03, Class 43. Provide foundation fill that meets the requirements of Section 210.

Include the cost to furnish and place the foundation fill, aggregate, corrugated perforated pipe and headwalls in the pay item "Abutment Underdrain System."

This drawing is preliminary and not for construction or implementation purposes.

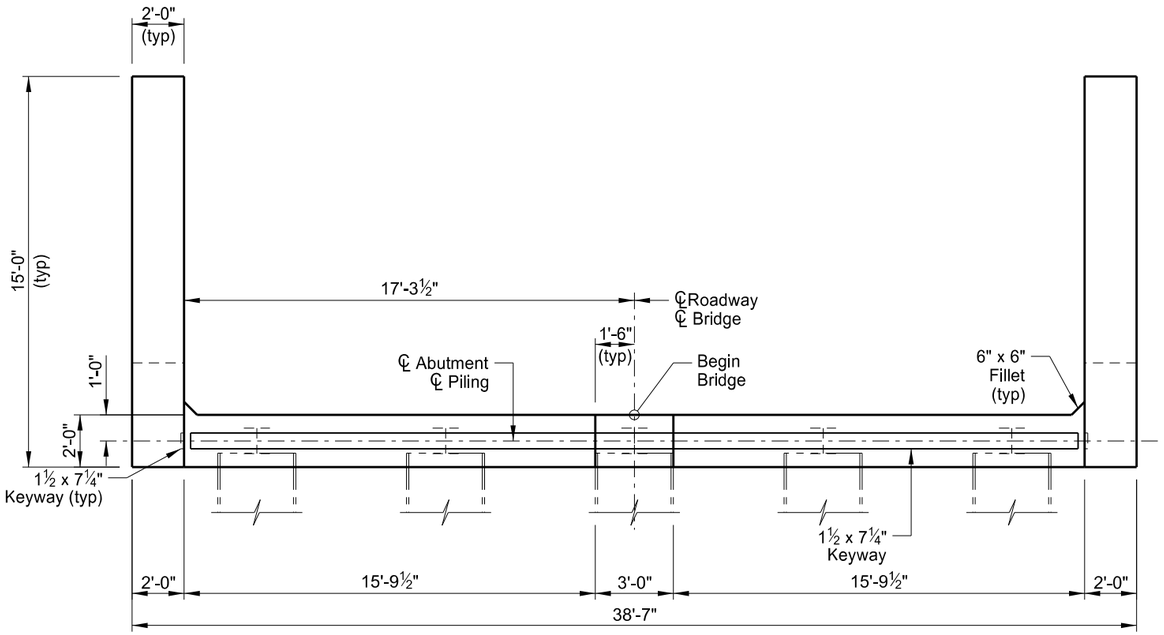
PRELIMINARY

MAPLE RIVER

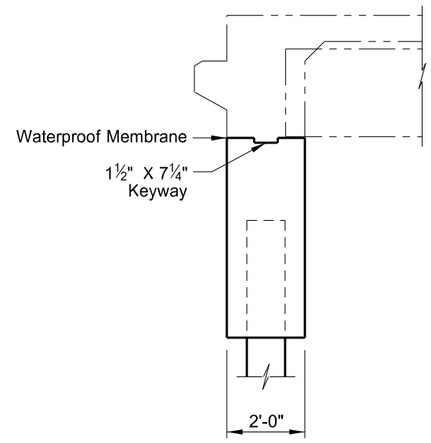
ABUTMENT & UNDERDRAIN EXCAVATION DETAILS

23 U.S.C. 409
NDDOT Reserves All Objections

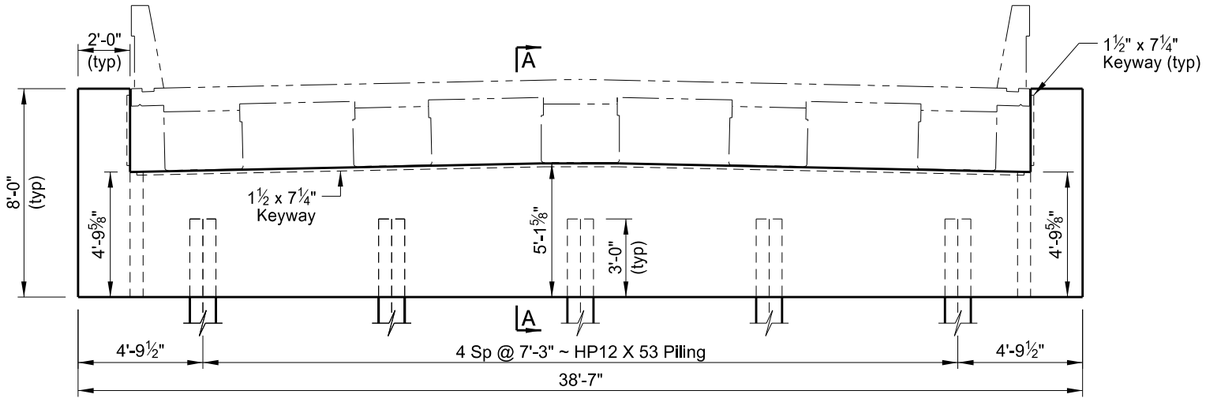
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	BRO-8-010(036)009	170	42



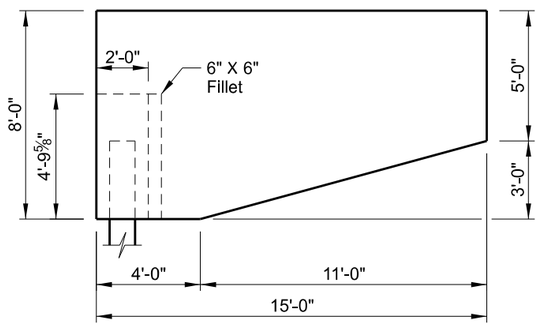
PLAN



A-A



ELEVATION



WING ELEVATION

NOTE:

Use waterproof memebrane that meets the requirements of Section 602.03 B.
Center the waterproof membrane (1'-0" minimum width) on the joint.

This drawing is preliminary and not for construction or implementation purposes.

QUANTITIES
SEE DWG 10-009.014-7

MAPLE RIVER

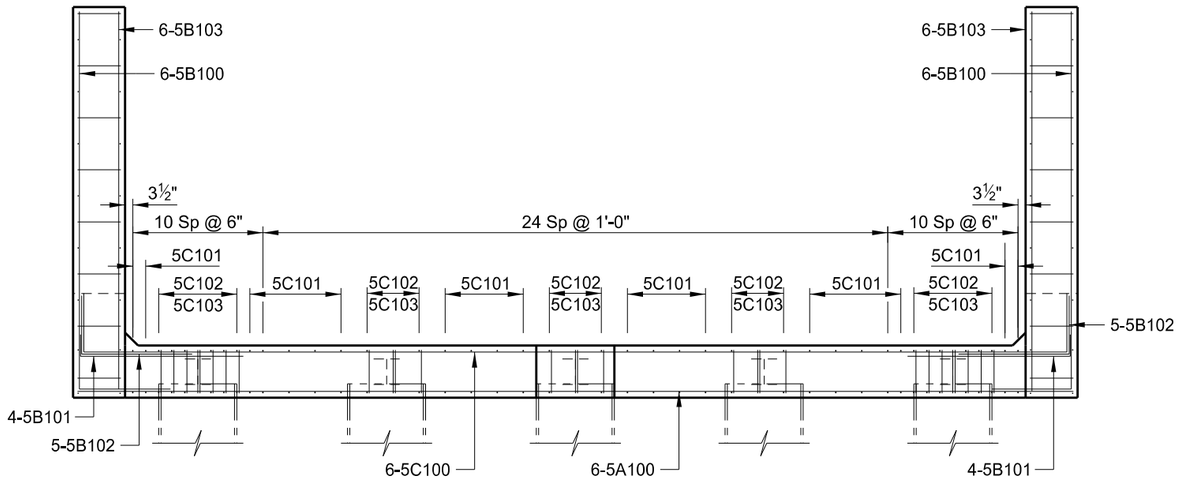
(sHOWING DIMENSIONS)

ABUTMENT DETAILS

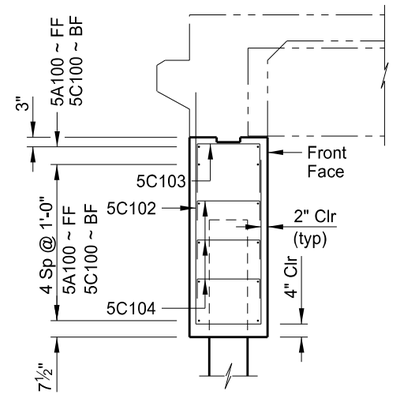
23 U.S.C. 409
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	BRO-8-010(036)009	170	43

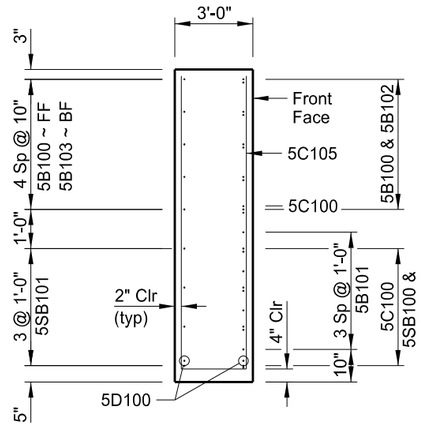
Position the long leg of 5B102 bar Perpendicular to abutment wing.
* 5C102 & 5C103 when located over a pilling install open end down.



PLAN

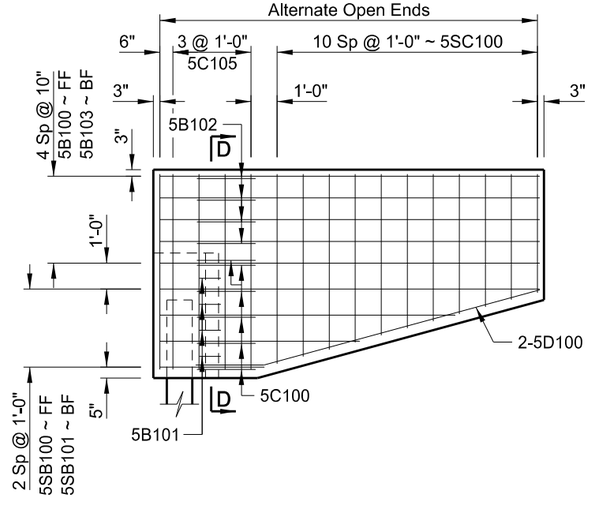


A-A



D-D

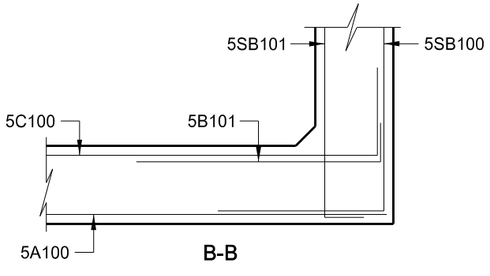
ELEVATION



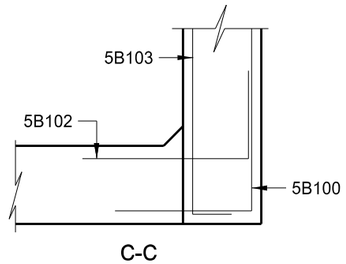
WING ELEVATION

NOMENCLATURE:

FF = Front Face
BF = Back Face



B-B



C-C

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

QUANTITIES	(ONE ABUTMENT)
CLASS AE-3 CONCRETE	28.1 CY
REINFORCING STEEL	2,423 LBS

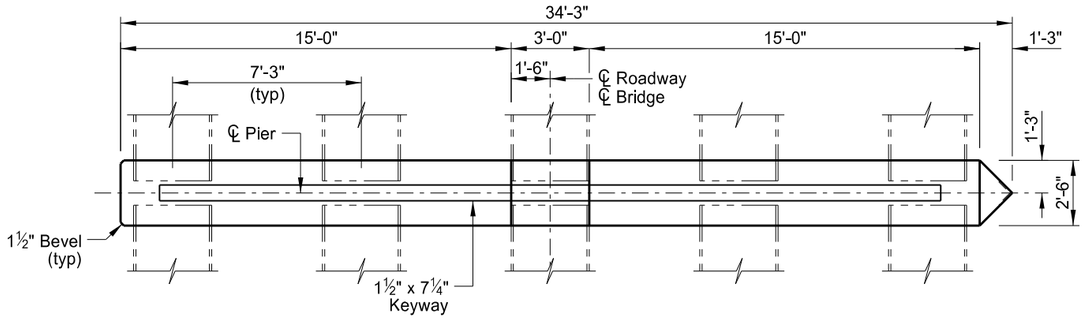
MAPLE RIVER

(SHOWING REINFORCING)

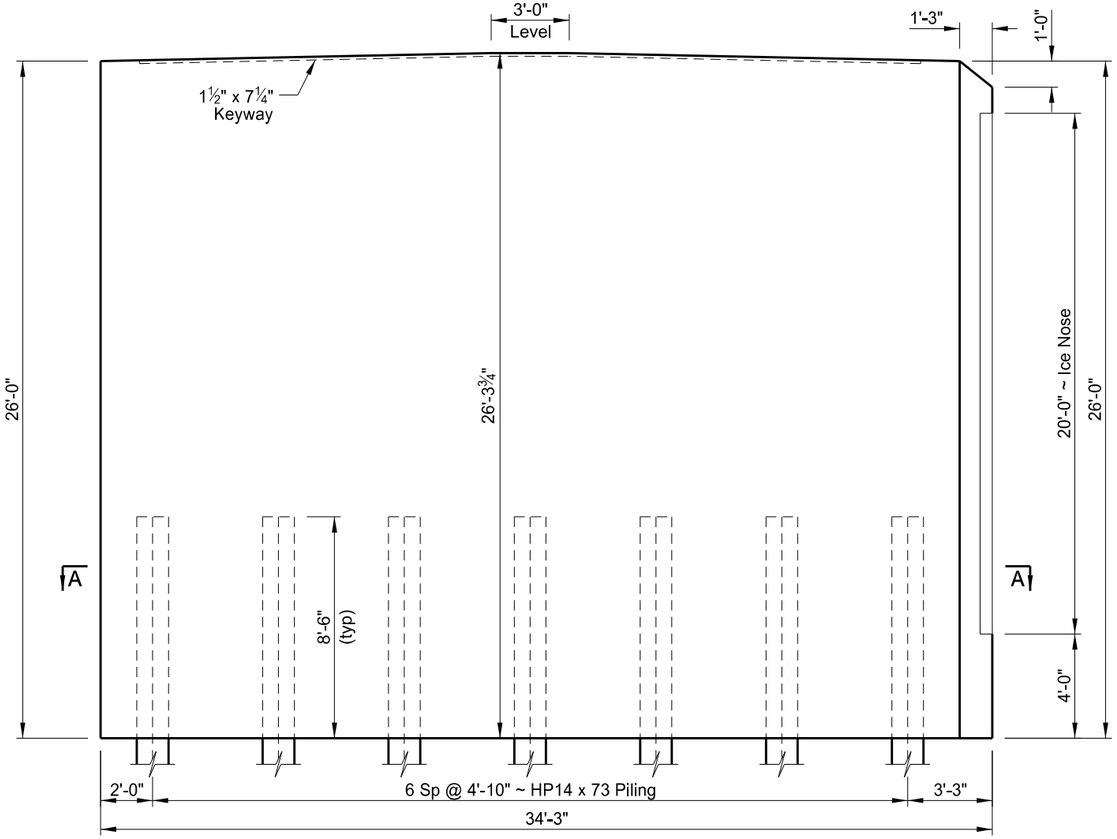
ABUTMENT DETAILS

23 U.S.C. 409
NDDOT Reserves All Objections

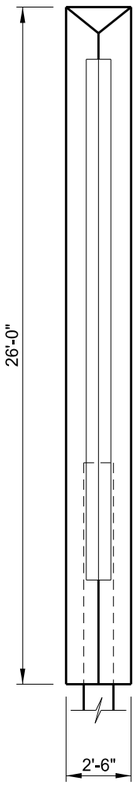
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	BRO-8-010(036)009	170	44



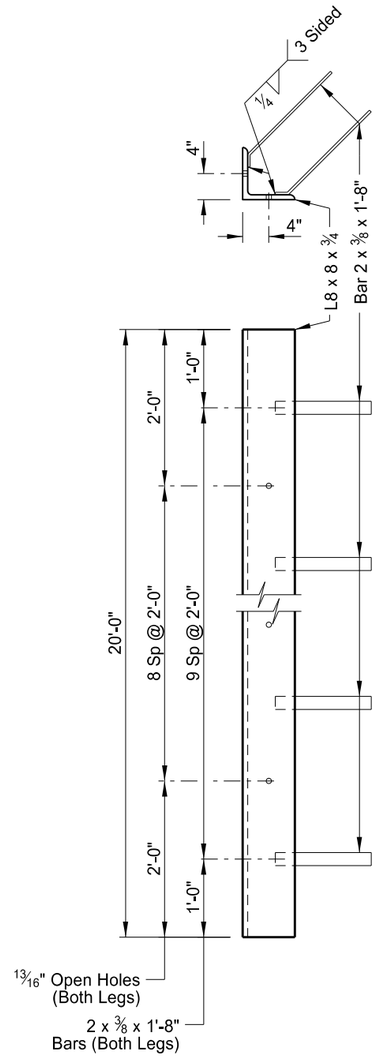
PLAN



ELEVATION

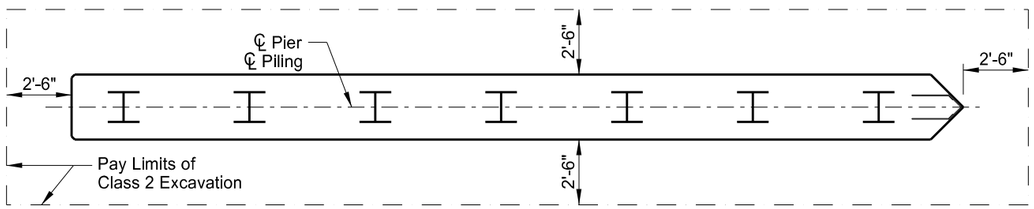


END VIEW



Galvanize in accordance with Section 854 after fabrication.

ICE NOSE DETAIL



A-A

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

QUANTITIES
SEE DWG 10-009.014-9

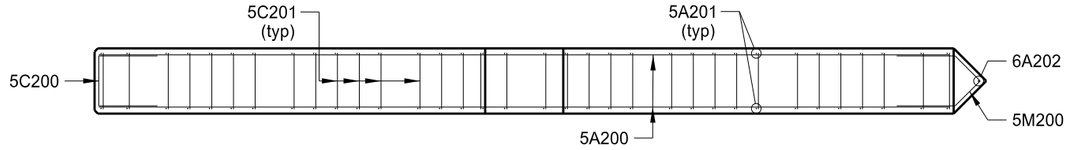
MAPLE RIVER

(SHOWING DIMENSIONS)

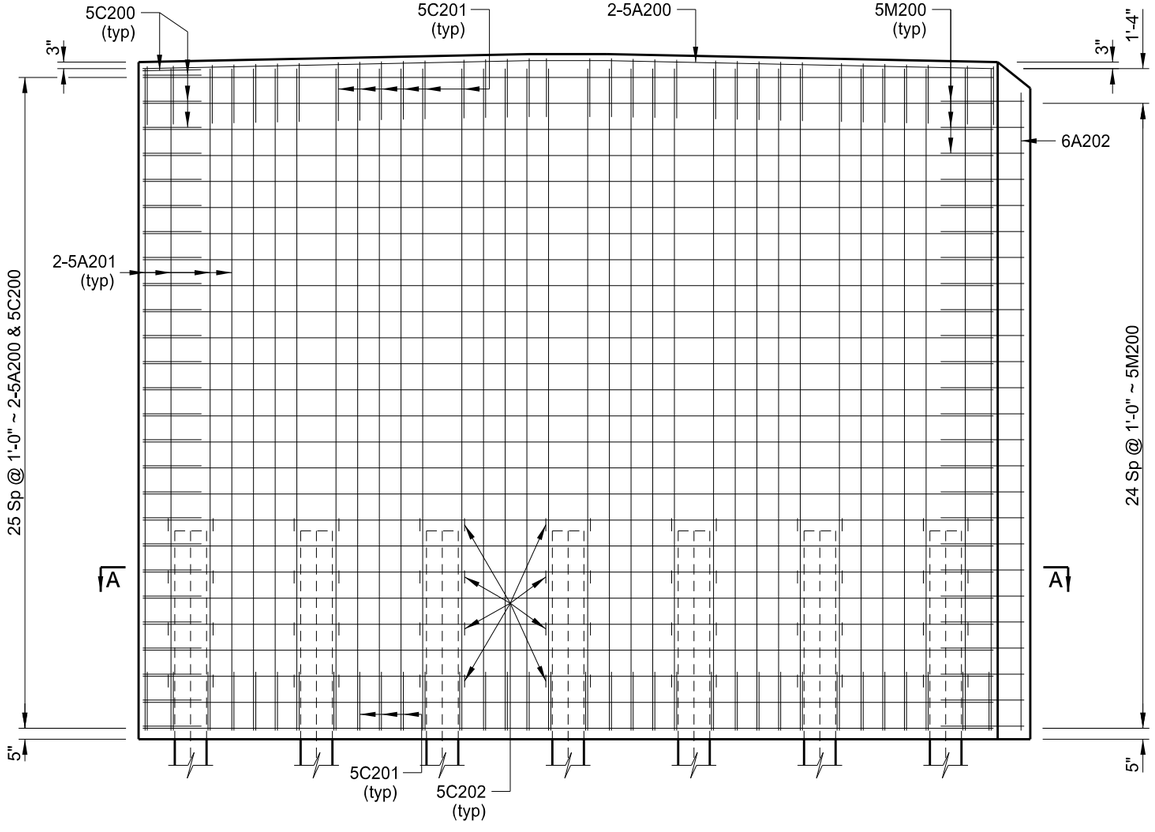
PIER DETAILS

23 U.S.C. 409
NDDOT Reserves All Objections

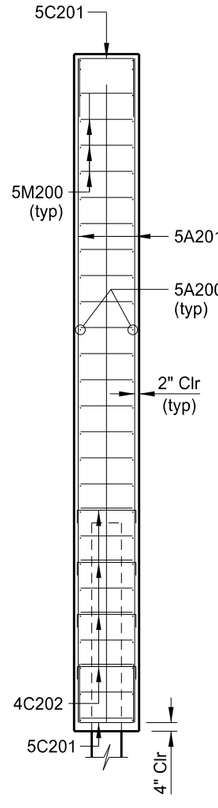
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	BRO-8-010(036)009	170	45



PLAN



ELEVATION



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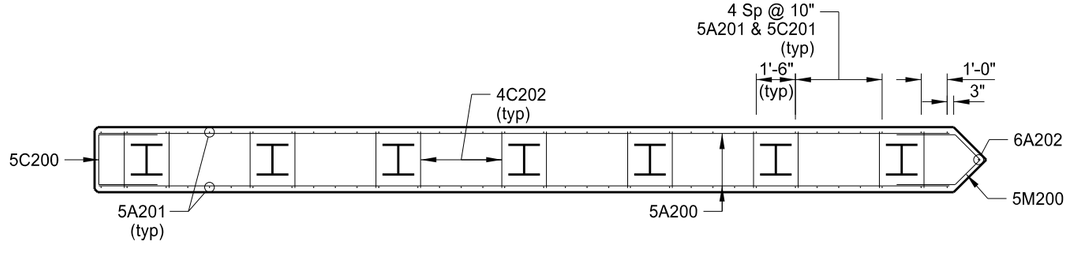


A-A

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

QUANTITIES	(ONE PIER)
CLASS AE-3 CONCRETE	81.4 CY
REINFORCING STEEL	4,404 LBS
STRUCTURAL STEEL	868 LBS

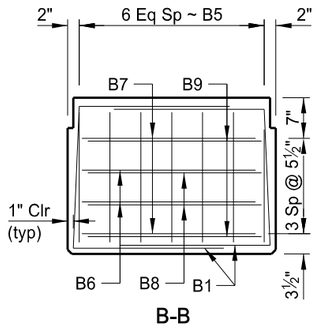
MAPLE RIVER

(SHOWING REINFORCING)

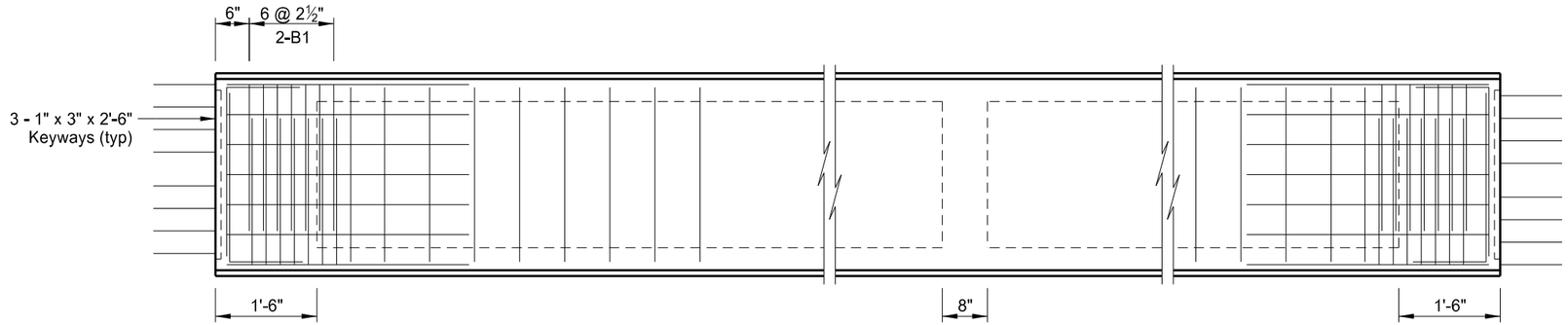
PIER DETAILS

23 U.S.C. 409
NDDOT Reserves All Objections

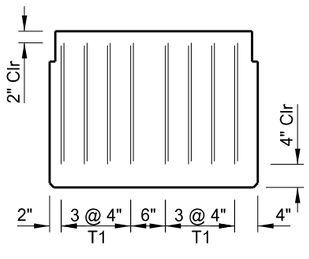
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	BRO-8-010(036)009	170	46



B-B



PLAN



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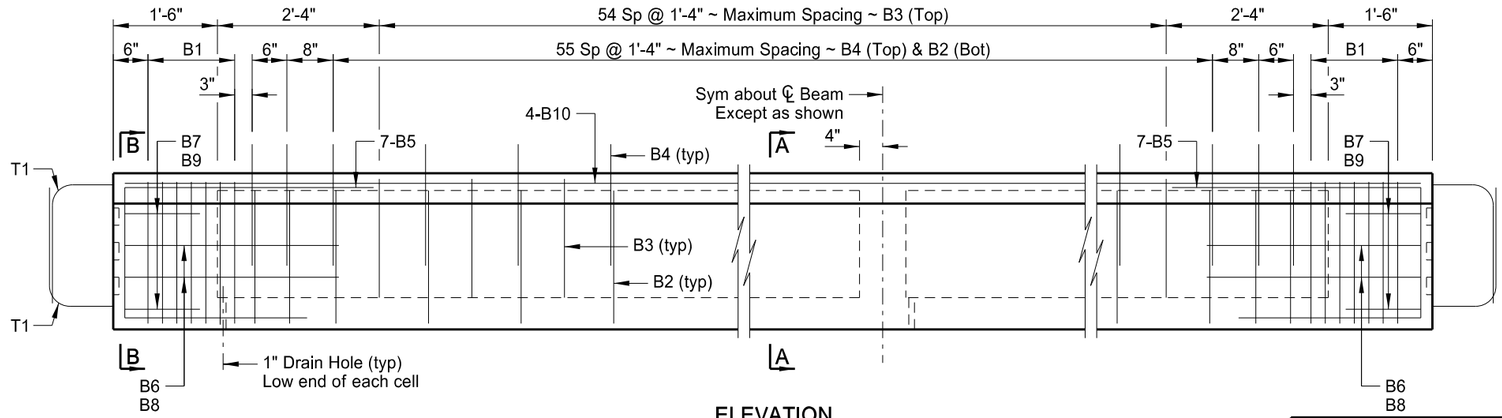
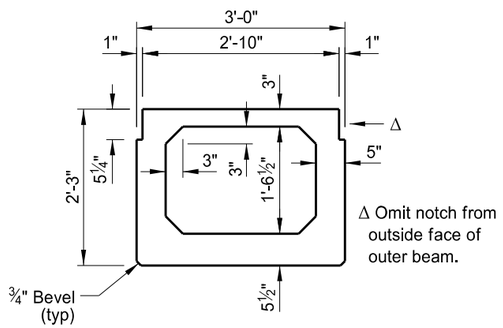
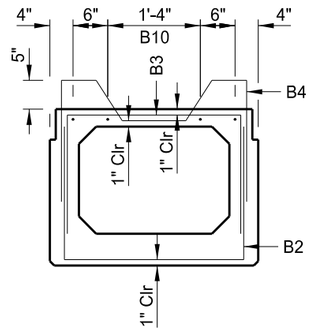


ELEVATION



(SHOWING DIMENSIONS)

A-A



(SHOWING REINFORCING)

A-A

BAR LIST ~ ONE BEAM					
	MARK	SIZE	NO.	LENGTH	SHAPE
	B1	4	28	6'-5"	BENT
*	B2	4	56	6'-5"	BENT
*	B3	4	55	6'-0"	BENT
	B4	4	56	6'-9"	BENT
	B5	5	14	8'-1"	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	12	28'-3"	STR
**	T1	4	32	4'-6"	STR

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

QUANTITIES	(ONE BEAM)
BEAM LENGTH	79.0 LF

BEAM SECTION DATA
WT = 536.6 LBS/FT + 1827 LBS
CROSS SECTIONAL AREA = 498.5 IN^2
C.G. (FROM BOTTOM) = 12.11 IN
I = 43,612 IN^4
S_B = 3,601 IN^3

MAPLE RIVER

PRE-TENSIONED 27" x 36"
PRESTRESSED SPREAD BOX BEAM

** Field bend as shown (Grade 40).

* Welded Wire Reinforcing with minimum circumferential steel area of 0.15 sq in per ft may be substituted for B2 and B3 bars.

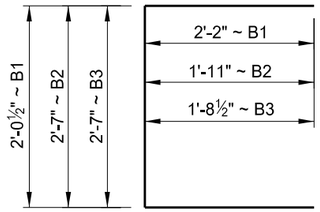
23 U.S.C. 409
NDDOT Reserves All Objections

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	BRO-8-010(036)009	170	47

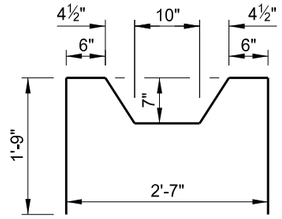
NOTES:

Select the final prestress force (remaining after all losses have been accounted for) and its corresponding center of gravity from those on a curve determined by the three values shown in the "Prestressing Data" table.

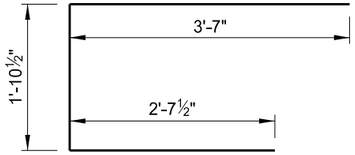
Minor changes to the shape of the beam and to reinforcing steel may be made to accommodate the forms of various contractors and their construction methods with the approval of the Engineer.



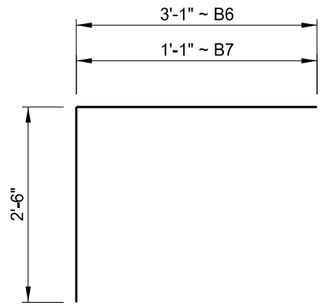
B1, B2 & B3



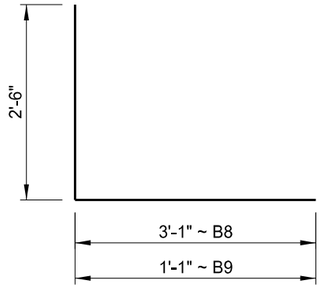
B4



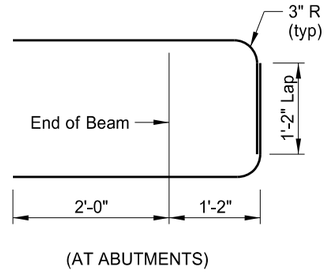
B5



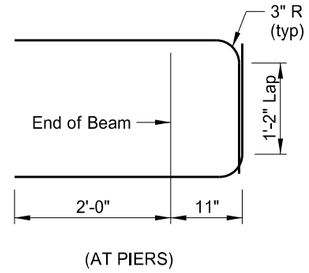
B6 & B7



B8 & B9



(AT ABUTMENTS)

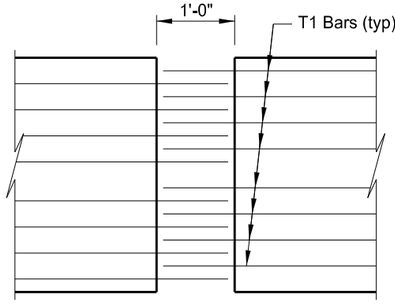


(AT PIERS)

T1

(DIMENSIONS SHOWN ARE OUT TO OUT)

BENT BAR DETAILS



BEAM END PLAN AT PIER

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

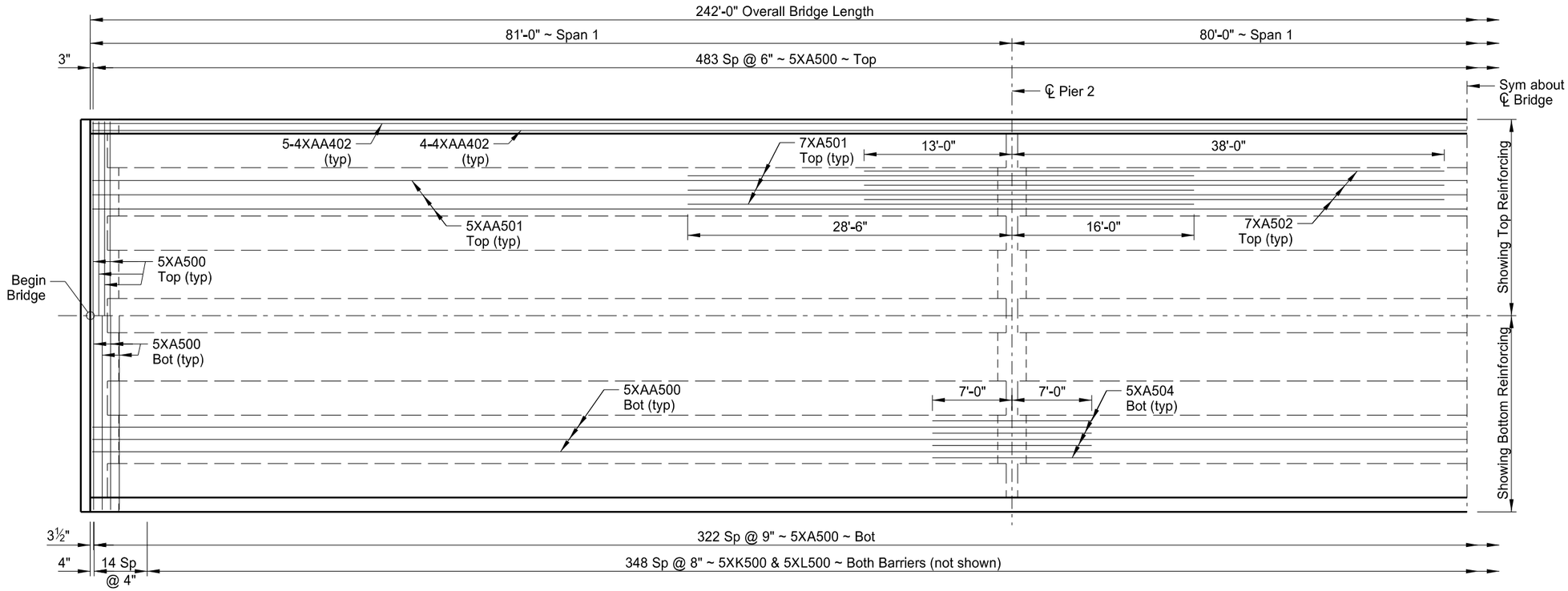
PRESTRESSING DATA					
C.G.	FINAL FORCE	DETENSION STRENGTH	ACCEPTANCE STRENGTH	WEIGHT (TONS)	BEAM LENGTH
2.75"	1113.0 k	7,500 psi (Min)	7,500 psi (Min)	22.1	79'-0"
2.94"	1125.9 k				
3.25"	1147.6 k				

MAPLE RIVER

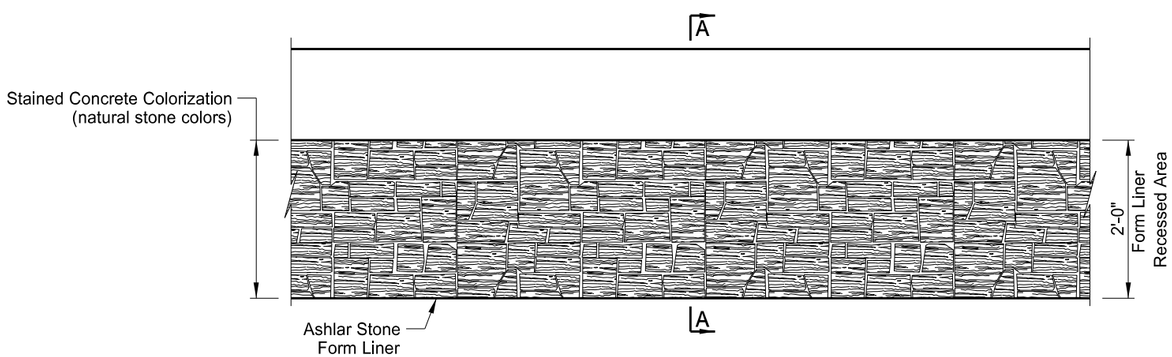
PRE-TENSIONED 27" x 36"
PRESTRESSED SPREAD BOX BEAM

23 U.S.C. 409
NDDOT Reserves All Objections

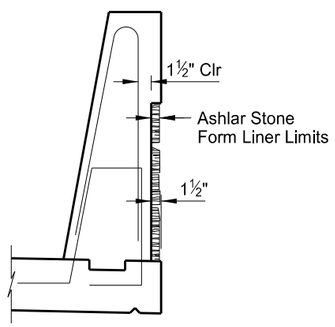
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	BRO-8-010(036)009	170	48



HALF PLAN



(SHOWING FORM LINER ~ BACK FACE)
BARRIER ELEVATION



A-A

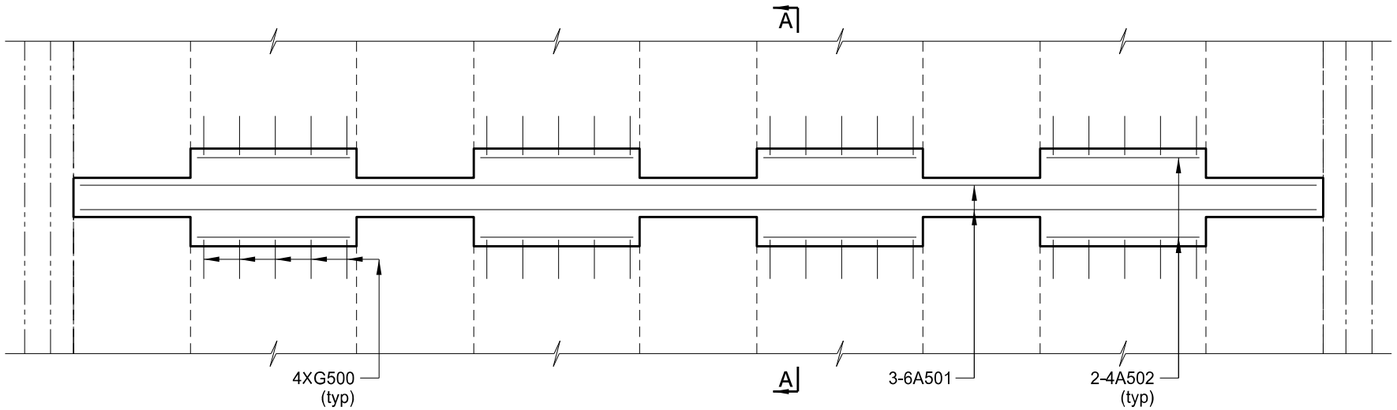
This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

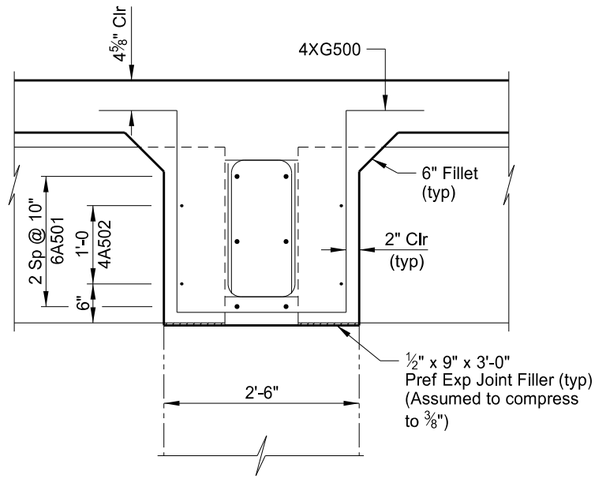
QUANTITIES
SEE DWG 10-009.014-15
MAPLE RIVER
HALF SLAB LAYOUT

23 U.S.C. 409
NDDOT Reserves All Objections

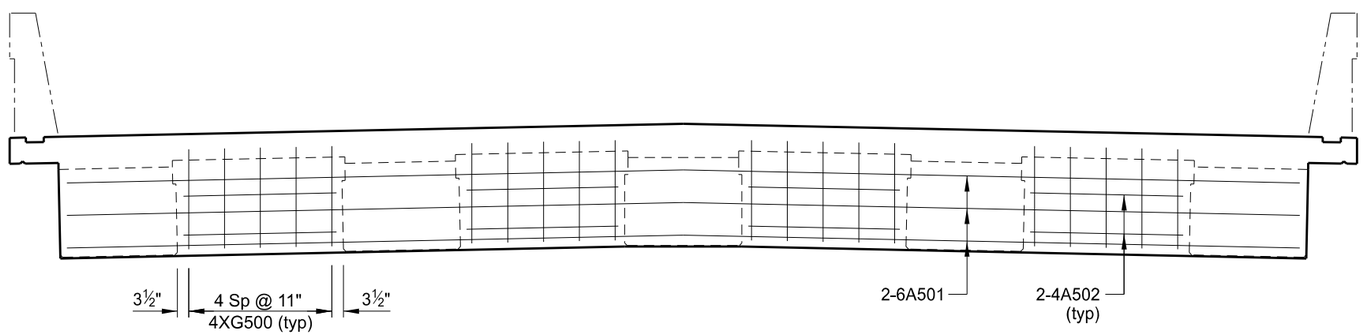
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	BRO-8-010(036)009	170	49



PLAN



A-A



ELEVATION

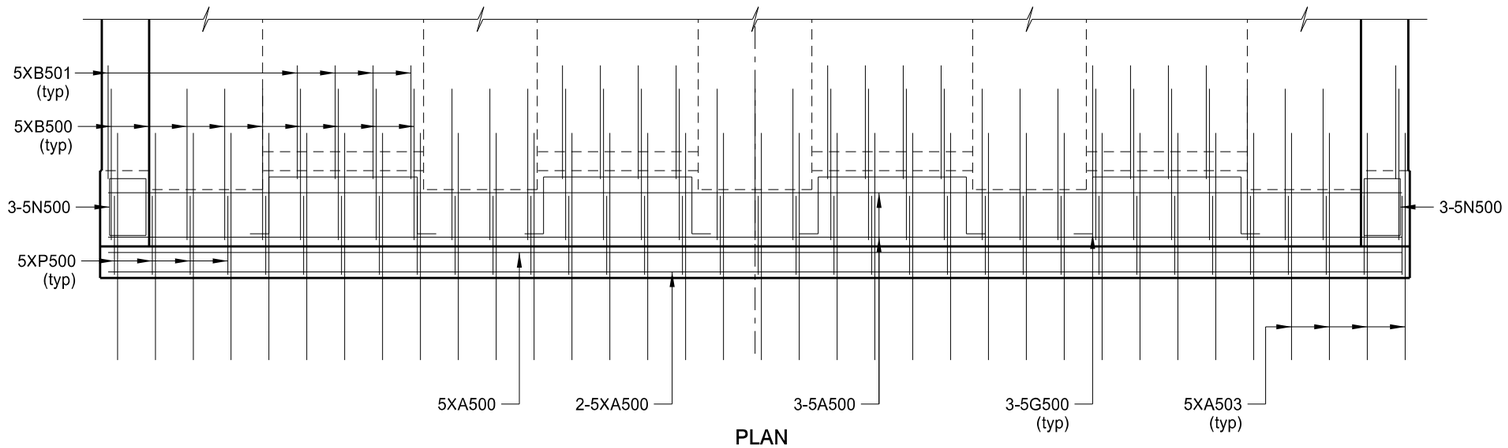
This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

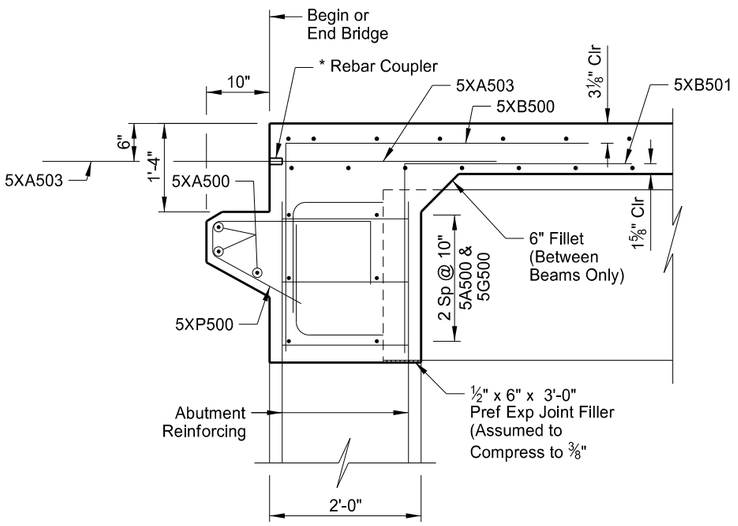
QUANTITIES
SEE DWG 10-009.014-15
MAPLE RIVER
PIER DIAPHRAGM DETAILS

23 U.S.C. 409
NDDOT Reserves All Objections

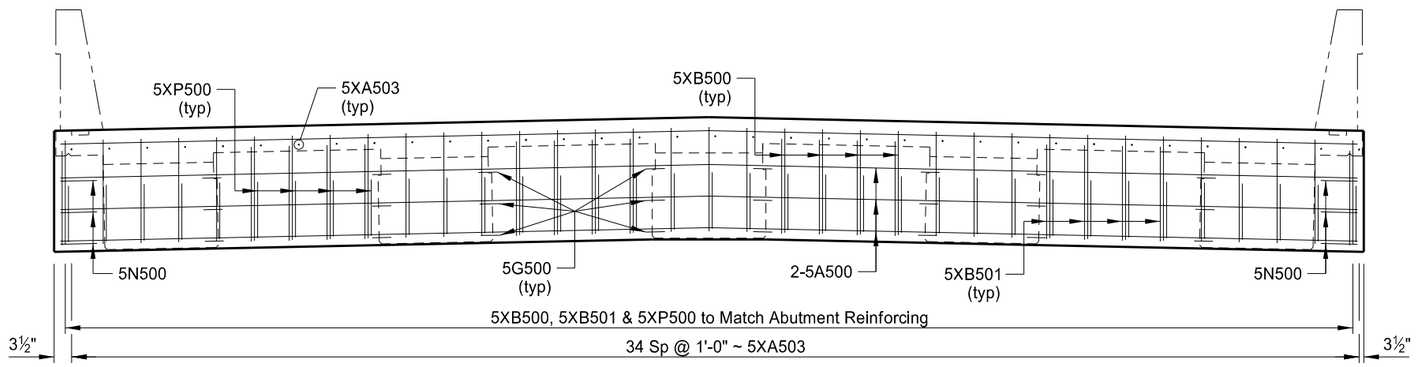
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	BRO-8-010(036)009	170	50



PLAN

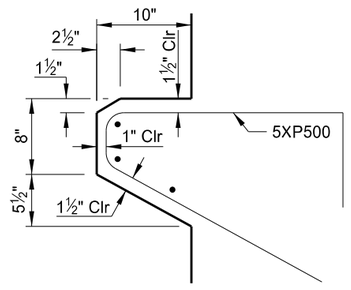


A-A



(APPROACH LIP NOT SHOWN)

ELEVATION



APPROACH LIP DETAIL

* Use mechanical connectors for the couplers capable of developing 125% of the reinforcing steel specified yield strength. Provide epoxy coated couplers according to Section 836.02 A and repair any damaged epoxy coating according to Section 612.04 E.

NOTE:

Do not install the 5XA503 bars into the approach slab until all of the foundation fill is in place.

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

QUANTITIES

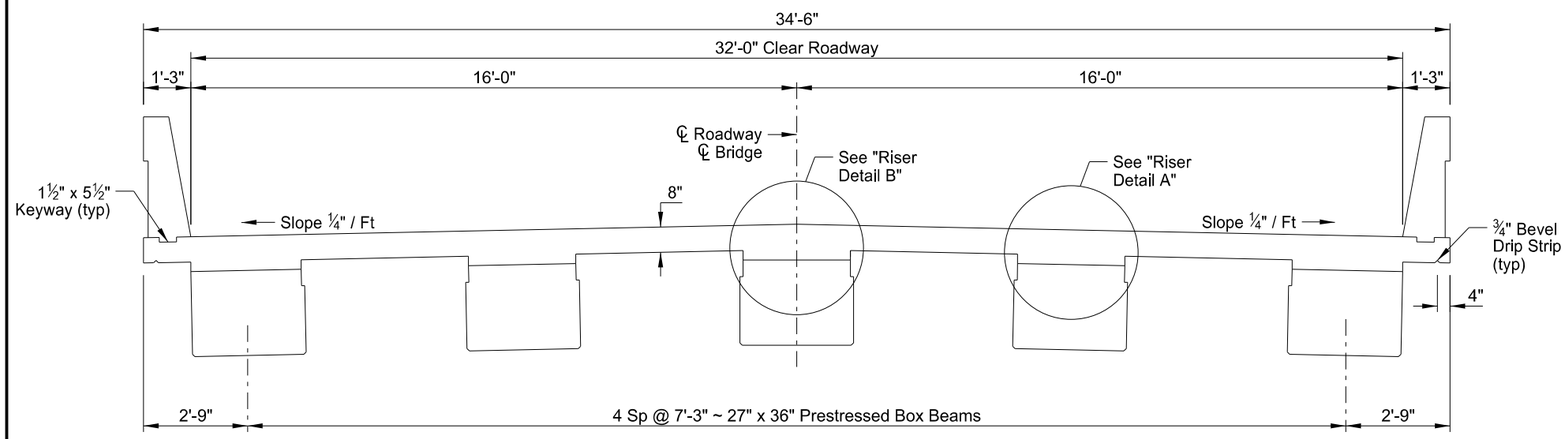
SEE DWG 10-009.014-15

MAPLE RIVER

ENDWALL DETAILS

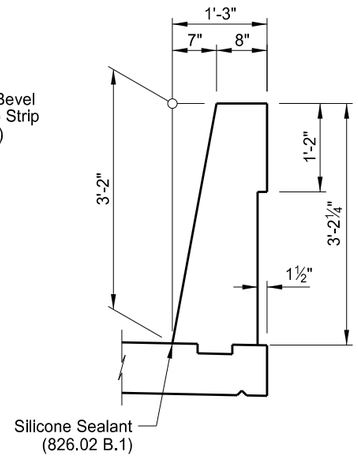
23 U.S.C. 409
NDDOT Reserves All Objections

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	BRO-8-010(036)009	170	51

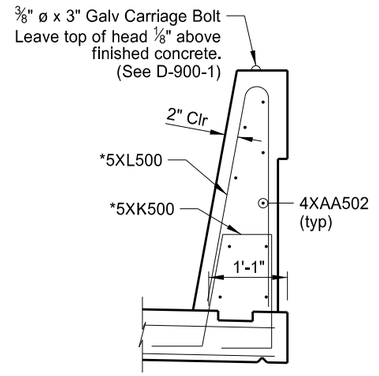


(SHOWING DIMENSIONS)

SLAB SECTION



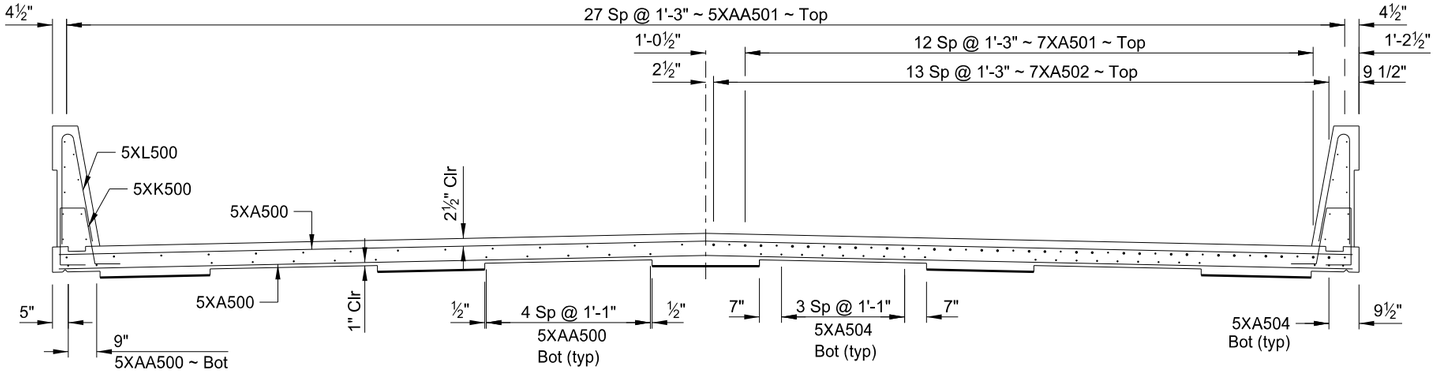
SHOWING DIMENSIONS



* Provide a 2" clearance from the front face to the barrier reinforcing.

SHOWING REINFORCING

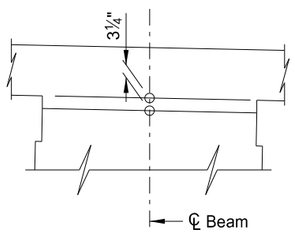
BARRIER DETAIL



(SHOWING REINFORCING BETWEEN SUPPORTS)

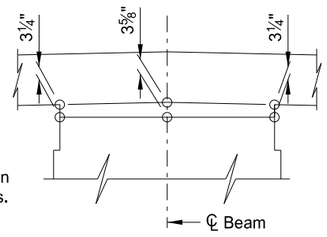
(SHOWING REINFORCING OVER PIERS)

SLAB SECTION



RISER DETAL A

The 3¼" dimensions shown are located at the supports. The anticipated midspan riser is ½". Adjust the riser to maintain the 8" slab thickness.



(AT BEAM 3 ONLY)

RISER DETAIL B

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

QUANTITIES	
CLASS AAE-3 CONCRETE	305.4 CY
REINFORCING STEEL	1,382 LBS
REINFORCING STEEL (EPOXY)	61,849 LBS

MAPLE RIVER

SLAB SECTION

BILL OF REINFORCING STEEL, GRADE 60

LETTER PREFIX OF BAR MARK DENOTES SHAPE ~ SEE BAR DETAILS

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	BRO-8-010(036)009	170	52

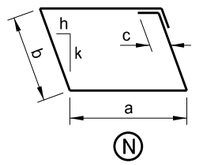
LOCATION	SIZE	MARK	NO. EACH /SET	NOMINAL LENGTH	DETAILING DIMENSIONS a	b	c	d	e	f	g	h	k
ABUTMENTS	5	A100	12	38'-3"		38'-3"							
	5	B100	20	17'-3"		2'-10"	14'-6"						
	5	B101	16	7'-11"		10"	7'-1"						
	5	B102	16	5'-9"		2'-3"	3'-6"						
	5	B103	20	15'-7"		1'-0"	14'-7"						
	5	C100	12	42'-9"		2'-3"	38'-3"	2'-3"					
	5	C101	44	15'-4"		6'-10"	1'-8"	6'-10"					
	5	C102	44	10'-2"		4'-3"	1'-8"	4'-3"					
	5	C103	44	4'-2"		1'-3"	1'-8"	1'-3"					
	4	C104	60	2'-8"		6"	1'-8"	6"					
	5	C105	20	16'-2"		7'-6"	1'-2"	7'-6"					
	5	D100	8	13'-6"		2'-7"	10'-11"					4.4	12
	5	SB100	4	51'-2"	3'-6"	4'-0"	3'-6"	14'-7"	3				
	5	SB101	4	41'-2"	1'-0"	4'-0"	1'-0"	14'-7"	3				
	5	SC100	4	147'-7"	1'-8"	4'-6"	7'-3"	1'-8"	10				
PIERS	5	A200	108	32'-8"		32'-8"							
	5	A201	136	25'-5"		25'-5"							
	6	A202	2	24'-6"		24'-6"							
	5	C200	54	6'-6"		2'-3"	2'-0"	2'-3"					
	5	C201	68	6'-8"		2'-3"	2'-2"	2'-3"					
	4	C202	112	3'-2"		6"	2'-2"	6"					
	5	M200	50	7'-2"	2'-3"	1'-4"	1'-4"	2'-3"				12	12

LOCATION		SIZE	MARK	NO. EACH /SET	NOMINAL LENGTH	DETAILING DIMENSIONS a	b	c	d	e	f	g	h	k
SUPERSTRUCTURE	REGULAR	5	A500	12	34'-2"		34'-2"							
		6	A501	12	31'-8"		31'-8"							
		4	A502	32	3'-11"		3'-11"							
		5	G500	24	9'-1"	1'-7"	3'-11"	1'-7"	1'-0"				12	0
		5	N500	12	5'-10"	11"	1'-6"	6"					0	12
	EPOXY	5	XA500	813	34'-2"		34'-2"							
		7	XA501	26	44'-6"		44'-6"							
		7	XA502	28	51'-0"		51'-0"							
		5	XA503	140	3'-0"		3'-0"							
		5	XA504	36	14'-0"		14'-0"							
		5	XB500	70	6'-9"		2'-9"	4'-0"						
		5	XB501	36	5'-6"		2'-6"	3'-0"						
		4	XG500	40	9'-4"	2'-7"	2'-2"	2'-7"	1'-0"				12	0
		5	XK500	754	4'-11"	1'-6"	7"			10"		8"	2.2	12
		5	XL500	754	5'-11"	9"	2'-9"	5"			1.25"	10"	2.2	12
		5	XP500	70	5'-6"	5"	2'-1"	2'-2"			1.25"	10"	12	6.5
		5	XAA500	24	253'-8"		60'-0"	3'-0"	13'-8"	4		241'-8"		
		5	XAA501	28	253'-8"		60'-0"	3'-0"	13'-8"	4		241'-8"		
		4	XAA502	18	249'-8"		60'-0"	2'-0"	9'-8"	4		241'-8"		

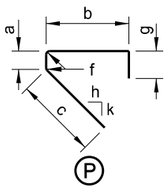
23 U.S.C. 409
NDDOT Reserves All Objections

NOTES:

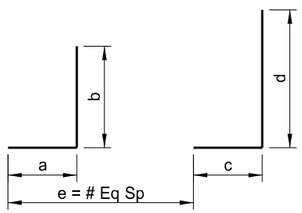
1. All dimensions are out to out of bars.
2. Nominal length of each bent bar or cut bar is the sum total of the detailing dimensions for that bar, unless otherwise noted.
3. Turn adjacent "AA" bars end for end so that the splice locations are staggered.
4. The "f" dimension indicates the inside radius unless otherwise noted.
5. An "X" preceding a bar designation indicates an epoxy coated bar.



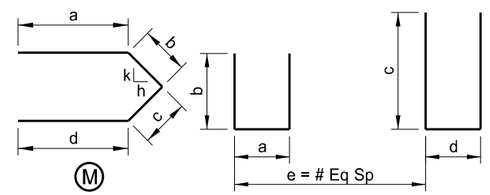
N



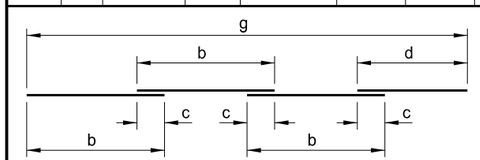
P



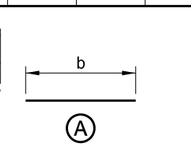
SB



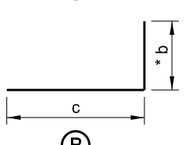
M SC



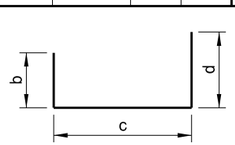
c = Lap Splice (typ)
e = # of "b" Length Pieces in a Set
Total Length per Set = e x b + d
AA



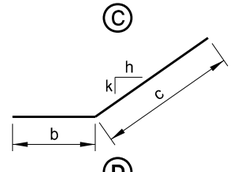
A



B



C



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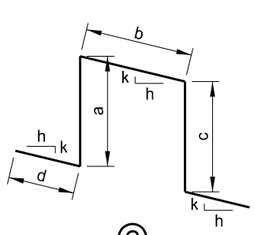
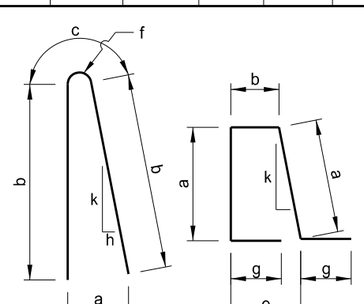


G



L K

This drawing is preliminary and not for construction or implementation purposes.

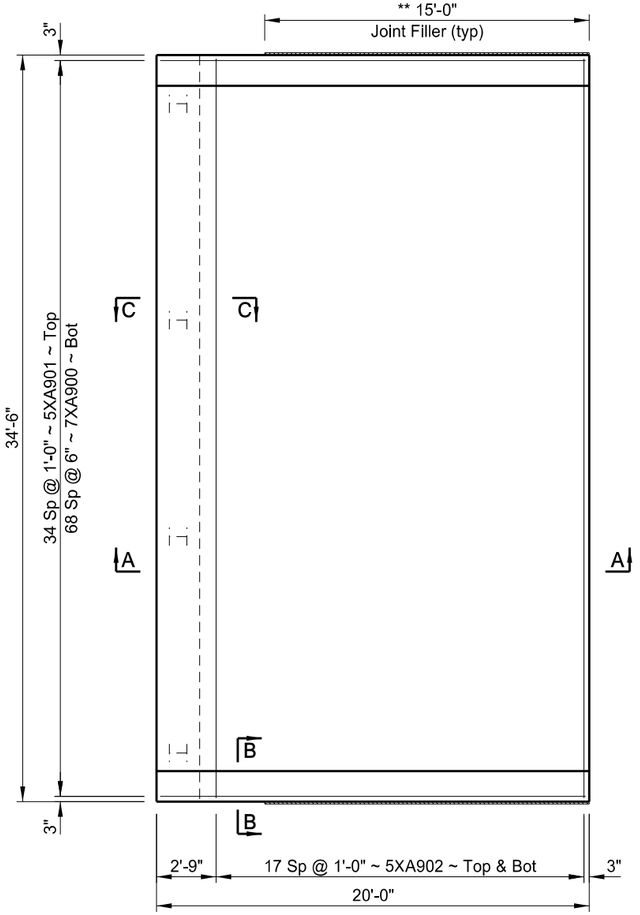
PRELIMINARY

MAPLE RIVER

REINFORCING BAR LIST & DETAILS

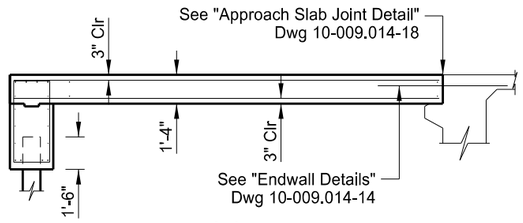
23 U.S.C. 409
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	BRO-8-010(036)009	170	53

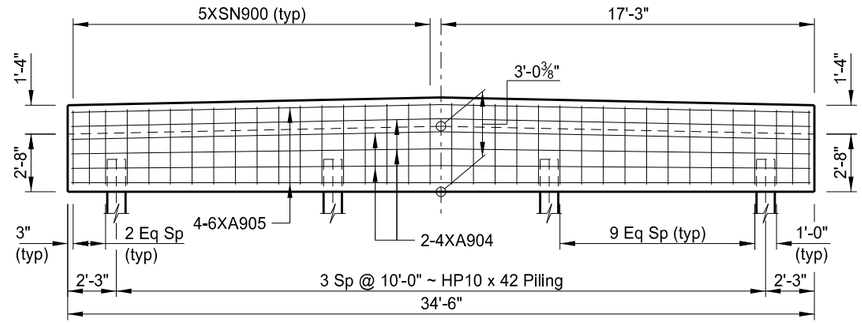


PLAN

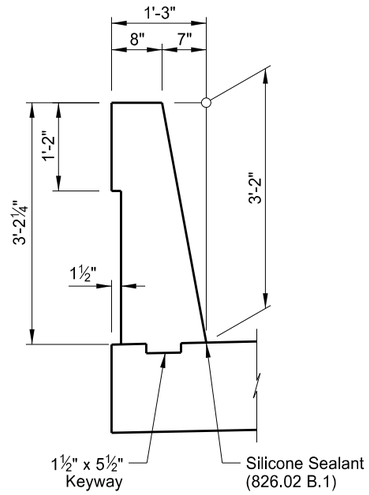
** ½" x 14" Pref Exp Joint Filler
~ Place between approach
slab & abutment wing (typ).



A-A

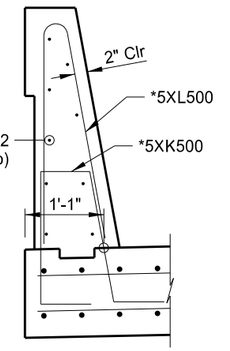


FOOTING ELEVATION



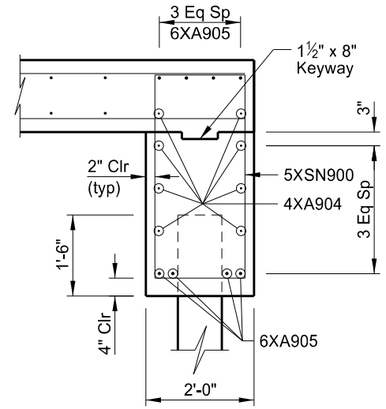
SHOWING DIMENSIONS

B-B

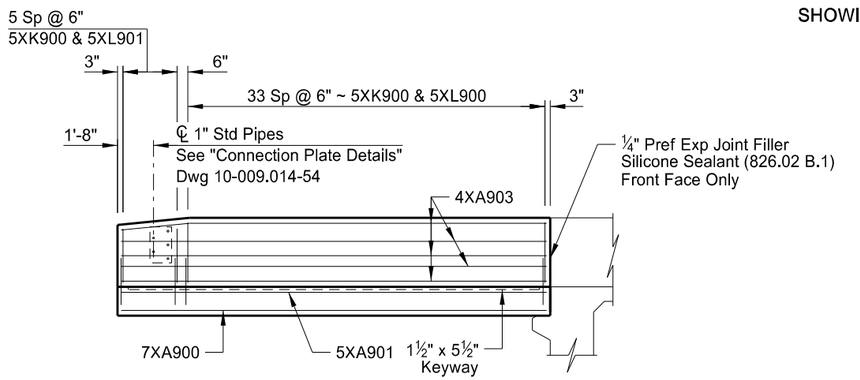


* Provide a 2" clearance from the
front face to the barrier reinforcing.

SHOWING REINFORCING



C-C



ELEVATION

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

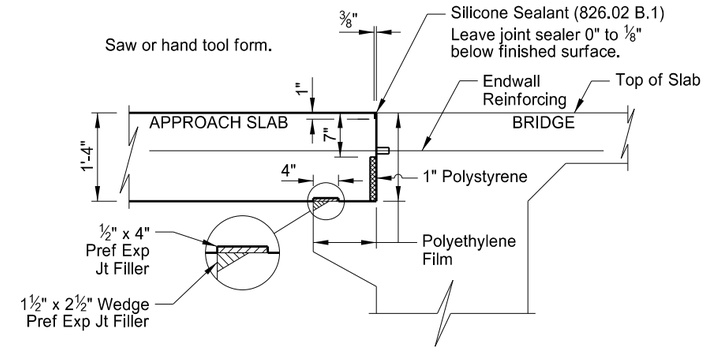
QUANTITIES
SEE DWG 10-009.014-18

MAPLE RIVER

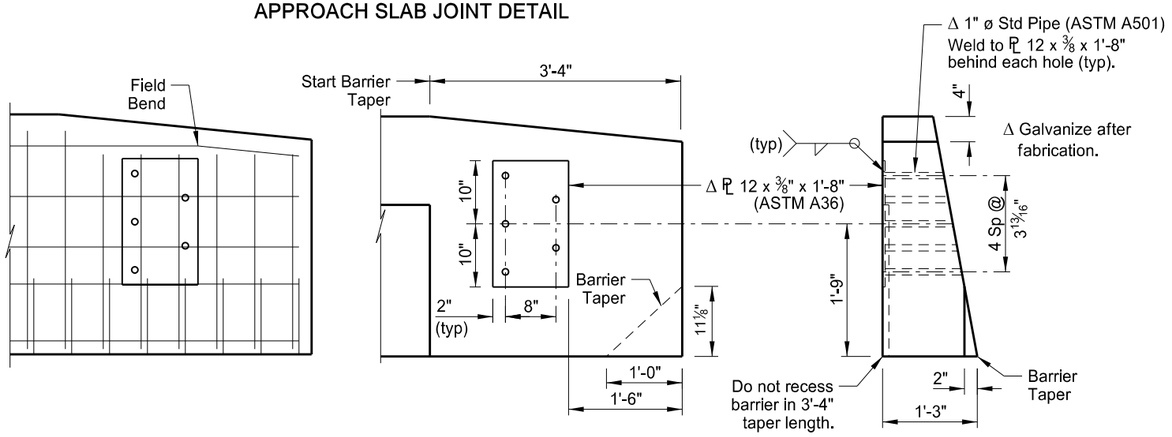
APPROACH SLAB DETAILS

23 U.S.C. 409
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	BRO-8-010(036)009	170	54



APPROACH SLAB JOINT DETAIL



SHOWING REINFORCING

SHOWING DIMENSIONS

(SHOWING BACK FACE)

CONNECTION PLATE DETAILS

NOTES:

The estimated material quantities shown are for information purposes only. Include the concrete, reinforcing bars, polyethylene film, preformed joint filler, polystyrene, silicone sealant, connection plates and pipes, and labor required to build the approach slabs and barriers in the pay item "Concrete Bridge Approach Slab." Use Class AE-3 concrete and Grade 60 reinforcing steel. Provide reinforcing steel that meets the requirements of Section 612. Use polyethylene film that meets the requirements of ASTM C171.

The bar marks beginning with an "X" indicate an epoxy coated bar. The dimensions shown in the "Bent Bar Details" are out to out.

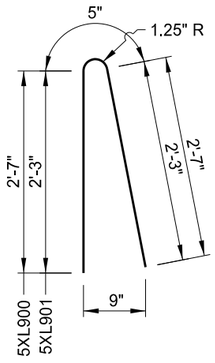
SKEW ANGLE = 0°

BAR LIST - ONE SLAB

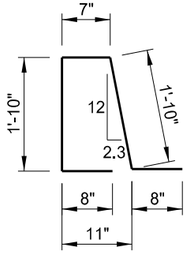
SIZE	MARK	NO.	LENGTH
7	XA900	69	19'-8"
5	XA901	35	19'-8"
5	XA902	36	34'-2"
4	XA903	18	19'-8"
4	XA904	8	34'-2"
6	XA905	8	34'-2"
5	XK900	80	5'-11"
5	XL900	68	5'-11"
5	XL901	12	5'-3"
5	XSN900	2	207'-0"

ESTIMATED MATERIAL QUANTITIES

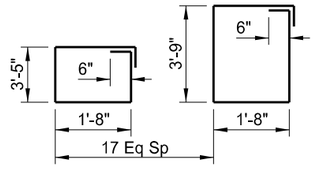
REINFORCING STEEL (LBS)	CONCRETE (CY)
7,015	45.5



XL900 & XL901

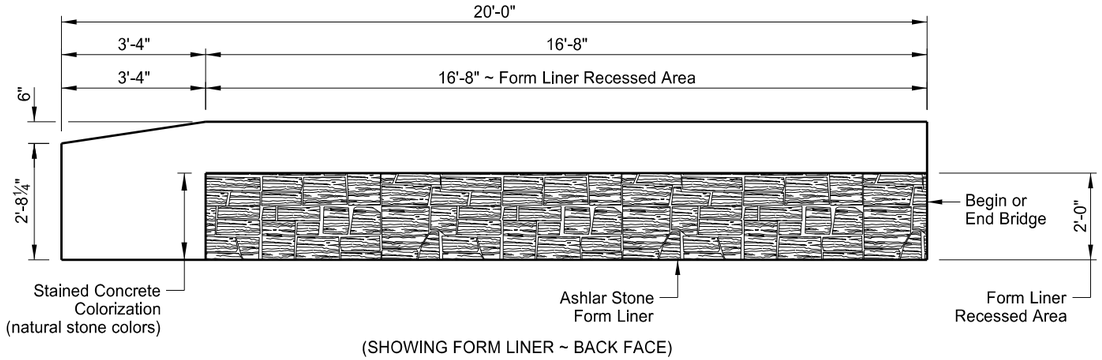


XK900



XSN900

BENT BAR DETAILS



(SHOWING FORM LINER ~ BACK FACE)

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

QUANTITIES	(ONE SLAB)
PILE SUPPORTED APPROACH SLAB	76.7 SY

MAPLE RIVER

APPROACH SLAB DETAILS