| DESIGN DATA | | | | |
|---|---|---|---|---|
| Traffic | Average Daily | | | |
| Current 2020 | Pass: 900 | Trucks: 120 | Total: 1020 | |
| Forecast 2040 | Pass: 1630 | Trucks: 220 | Total: 1850 | |
| Clear Zone Distance: 30 FT | | Design Speed: 55 MPH | | |
| Minimum Sight Dist. for Stopping: 495 FT | | Bridges: HL-93 Design Loading | | |
| Sight Dist. for No Passing Zone: NA | | | | |
| Pavement Design Life (years): 20 | | | | |
| Design Accumulated One-way Flexible ESALs: 588,461 | | | | |

| STATE | PROJECT NO. | PCN | SECTION NO. | SHEET NO. |
|---|---|---|---|---|
| ND | BND-IM-1-094(192)164 | 21854 | 1 | 1 |

# NORTH DAKOTA
# DEPARTMENT OF TRANSPORTATION

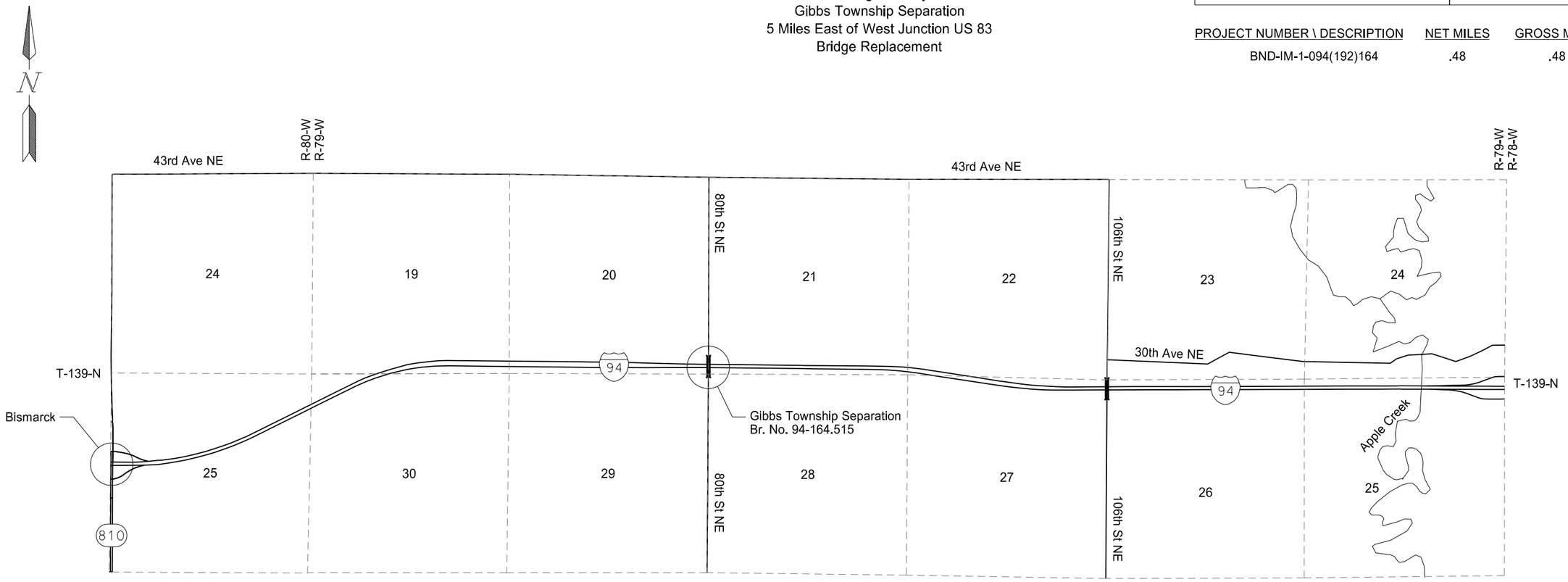
BND-IM-1-094(192)164

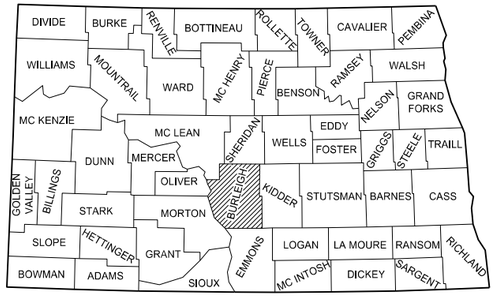
Burleigh County
Gibbs Township Separation
5 Miles East of West Junction US 83
Bridge Replacement

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

| 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 |
|---|---|---|
| BND-IM-1-094(192)164 | .48 | .48 |




STATE COUNTY MAP

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT

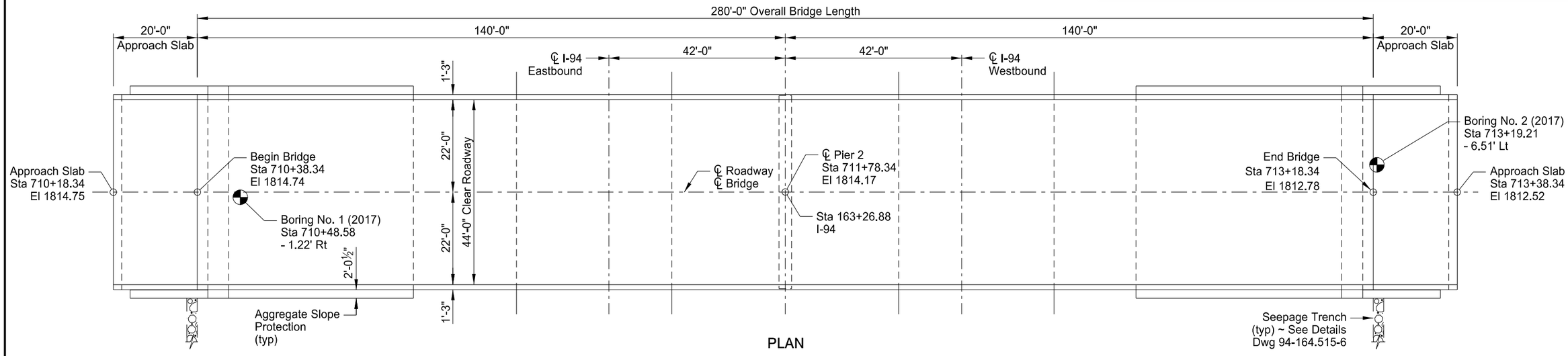
BRIDGE DIVISION

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

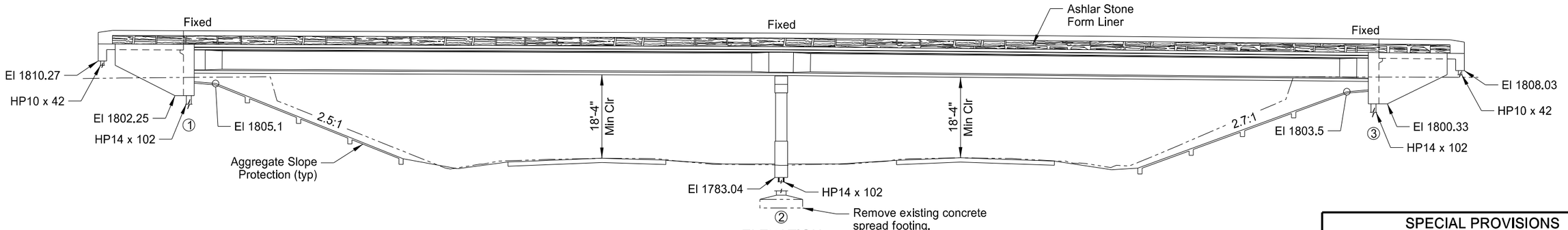
PRELIMINARY

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

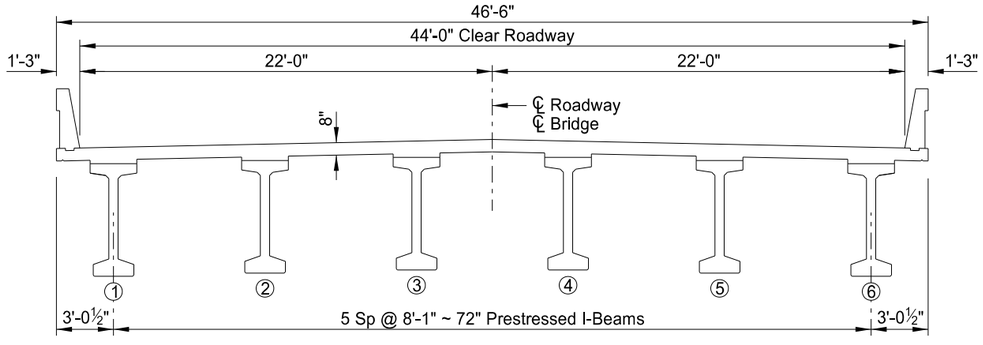
| BRIDGE CODE | | STATE | PROJECT NUMBER | SECTION NO. | SHEET NO. |
|---|---|---|---|---|---|
| X781 | | ND | BND-IM-1-094(192)164 | 170 | 1 |



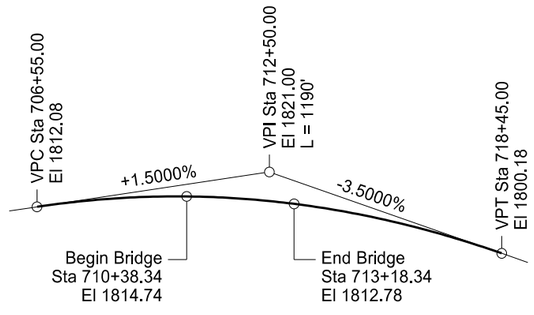

PLAN




ELEVATION




TYPICAL SECTION




VERTICAL CURVE DATA

| SURVEY CONTROL POINTS | | | |
|---|---|---|---|
| POINT | NORTHING | EASTING | ELEVATION |
| RTK 30223 | 427,502.37 | 1,926,746.74 | 1,786.29 |
| RTK 30224 | 427,494.50 | 1,926,989.13 | 1,784.94 |

**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

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

PRELIMINARY

| SPECIAL PROVISIONS | |
|---|---|
| SSP 2 | MIGRATORY BIRD TREATY ACT |
| SP 313(20) | ARCHITECTURAL SURFACE FINISH |
| | |

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

| F.W.S. 15 PSF |
|---|
| HL-93 DESIGN LOADING |

GIBBS TOWNSHIP SEPARATION

STATION: 711+78.34

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

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

| STATE | PROJECT NO. | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | BND-IM-1-094(192)164 | 170 | 2 |

# NOTES

100 SCOPE OF WORK: This project consists of building a new 2-span prestressed concrete I-beam bridge with an overall bridge length of 280'-0" and a clear roadway width of 44'-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.

105 CONTROL OF WORK: Do not begin construction of new bridge abutments until all 80th ST NE embankment from STA 709+38 to STA 714+18 is in place.

202 REMOVAL OF STRUCTURE: The existing structure is a 4-span steel rolled beam bridge, 240'-0" long with a clear roadway width of 24'-0", and concrete substructures. The abutments are supported on treated timber piling and the piers are supported on spread footings. Do not remove any portions of the existing bridge until May 16, 2022. Remove the abutments and center pier entirely. Remove the outside piers 3'-0" below the new ground line. Cut the treated timber piles at 1'-0" below the new ground line. The bottom of the center pier footing is at an approximate elevation of 1775.71 ft (NAVD-88).

Include all costs for the removal of the bridge and concrete slope protection in the contract unit price for “Removal of Structure.”

210 EXCAVATION: Include the excavation costs at the abutments, as shown in the “Detail at Abutment”, and the excavation costs at the pier in the lump sum bid item, “Class 1 Excavation.”

602 CLASS AE-3 AND AAE-3 CONCRETE: The strength requirements of Section 802.01 A.2 “Class AE and AAE Mixes” are revised to develop a design compressive strength of 3,000 psi (AE-3) and 4,000 psi (AAE-3) at 28 days.

602 DIAPHRAGMS AND ENDWALLS: Place the intermediate diaphragm concrete before the deck concrete and allow the diaphragms to cure at least 72 hours before deck placement. Place the pier diaphragm and endwall concrete at the same time as the deck concrete.

Maintain plan beam spacing and alignment at all pier diaphragms, intermediate diaphragms and endwalls.

602 DECK PLACEMENT: Place the deck concrete at a minimum rate of 50 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 and approach slab surfaces 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 bridge 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 BARRIERS: Construct V-grooves that are ¾ inch wide and ¾ inch deep in all faces, excluding the form liner areas, of the barriers at the pier and at equal spaces between the pier and abutments at approximately 10-foot spacing.

602 SURFACE FINISH “D”: Apply Surface Finish “D” on all exposed substructure surfaces, the fascia and bottom surface of the exterior beams, the outside edges of the pier diaphragm, the outside edges of the deck, the underside of the deck overhang, 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. Use a color matching the lightest shade of brown in the Architectural Surface Finish, as it looks applied to the barrier form liner areas, for all other surfaces.

Submit to the Engineer a 1' x 1' sample of the brown surface finish.

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

622 PREBORING: Bore pilot holes for the abutment and approach slab piling to an elevation of 1787 feet before driving piling. Do not bore pilot holes until all of the constructed embankment is in place. Bore pilot holes to a diameter of 24 inches for the abutment piling and 18 inches for the approach slab piling. Prior to pile driving, backfill the pilot holes with polymer free sodium bentonite slurry. Mix the slurry at a ratio of 100 gallons of water per 120 pounds of bentonite. Use powdered bentonite to mix the slurry. Do not use bentonite chips. Place the slurry in the pilot hole from the bottom up using a tremie pipe. Check the hole after 24 hours for settlement of the slurry and top off the hole with slurry mixed at the previously specified ratio. Repeat this process until no observed settlement of the slurry occurs. Include all costs

# NOTES

associated with boring pilot holes and backfilling with bentonite in the price bid for HP10 x 42 and HP14 x 102 piling.

622 PILING: Drive bridge piling with a diesel hammer with an operational energy of at least 125,048 foot-pound-tons (minimum ram weight of 6,000 pounds) computed by the formula:

W(E–30,800) + 0.812E

Drive approach slab piling with a diesel hammer with an operational energy of at least 30,594 foot-pound-tons (minimum ram weight of 2,800 pounds) computed by the formula:

W(E–12,936) + 0.473E

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

Run the hammer at an energy that produces a penetration at bearing between ½" and 3 inches in the last 10 blows.
Stop driving the pile 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.

930 ROADWAY CANOPY: Construct a canopy above the traveled roadway under the existing structure and under the new structure to protect traffic from falling material. The canopy is an added safeguard and does not relieve the Contractor from any responsibility for the safety of the public.

Submit the canopy details, including materials that will be used, to the Engineer for review. Provide a canopy under the existing structure with a minimum vertical clearance of 15'-6" above the traveled roadway and provide a canopy under the new structure with a minimum vertical clearance of 17'-4" above the traveled roadway. Extend the canopy a minimum distance of 5'-0" beyond the outside edge of deck of the structure and a minimum distance of 5'-0" beyond the edge of the driving lanes beneath the structure.

Construct the canopy before removing the concrete superstructure. The canopy must be in place before installing forming for the new deck and remain in place until after the new superstructure is complete. The canopy may be supported from the ground or suspended from the beams. Complete the installation of the canopy in a minimum amount of time and with the least inconvenience to the public.

Remove the canopy after the bridge superstructure is completed. Include all costs for construction, maintenance, and removal of the canopy system for the existing structure and new structure in the contract unit price for “Roadway Canopy.”

930 AGGREGATE SLOPE PROTECTION: Place aggregate slope protection on the embankment slopes as shown.

Clear the subgrade of rubbish and vegetation before placing the aggregate slope protection. Thoroughly compact all loose material. Excavate or backfill as required to obtain the plan cross-section or lines and grades established in the field.

The gradation of the material used to form the slope protection is given in the following chart:

| Sieve Size | % Passing |
|---|---|
| 2" | 100% |
| ¾" | 5-35% |
| #4 | 0-5% |

The minimum fractured face requirement of the aggregate is 50% by weight on the portion of the aggregate retained on the No. 4 sieve. To be considered fractured the rock must have at least one fractured face.

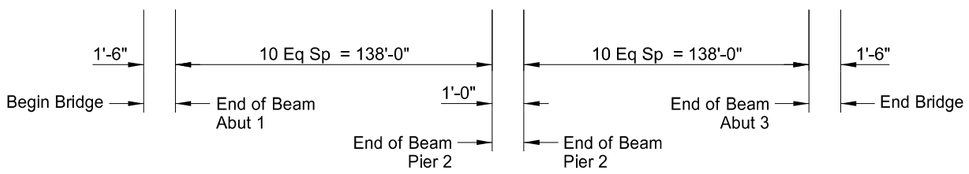
Deposit, spread, consolidate, and shape the aggregate by mechanical or hand methods to provide a uniform depth and density and produce a uniform surface appearance. Apply MC-250 that meets the requirements of Section 818.02 C, “Medium-Curing Cutback Asphalt” at an approximate rate of 1.8 gallons per square yard. Emulsified asphalts grade CSS-1, CSS-1H, RS-1, or CRS-2 that meet the requirements of Section 818.02 E, “Cationic Emulsified Asphalt,” or Section 818.02 F “Anionic Emulsified Asphalt”, applied at 2.5 gallons per square yard, can be substituted for MC-250. The bituminous materials are to penetrate to a depth of not less than one-half the required thickness of the aggregate. Protect adjacent structure surfaces against bituminous splatter.

Include all costs for labor, materials, and equipment to complete this work in the unit price bid for “Aggregate Slope Protection.”

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

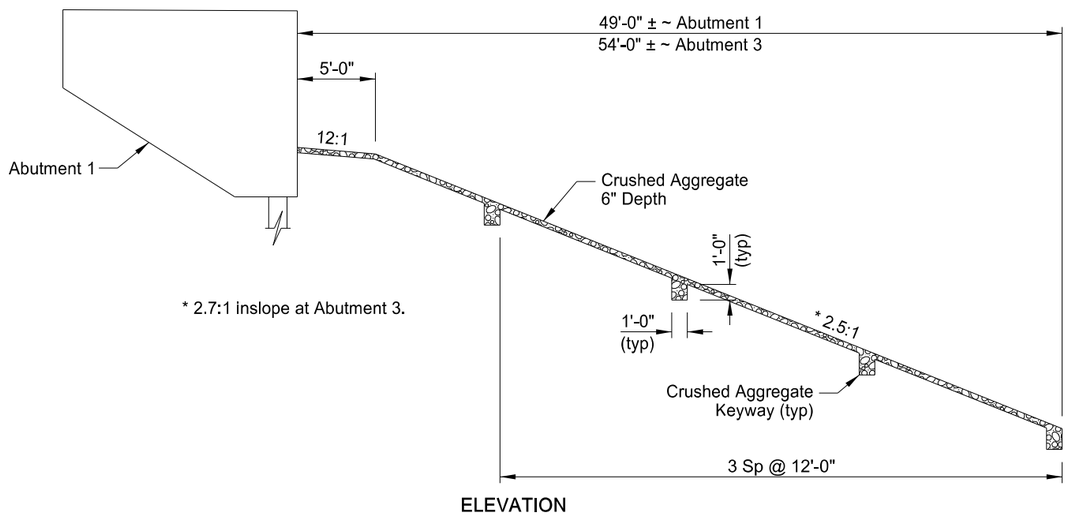
| | STATE | PROJECT NUMBER | SECTION NO. | SHEET NO. |
|---|---|---|---|---|
| | ND | BND-IM-1-094(192)164 | 170 | 4 |

| ℄ BEAM 1 | ℄ BEAM 2 | ℄ BEAM 3 | ℄ BEAM 4 | ℄ BEAM 5 | ℄ BEAM 6 |
|---|---|---|---|---|---|
| 1814.32 | 1814.49 | 1814.65 | 1814.65 | 1814.49 | 1814.32 |
| 1814.32 | 1814.48 | 1814.65 | 1814.65 | 1814.48 | 1814.32 |
| 1814.36 | 1814.52 | 1814.69 | 1814.69 | 1814.52 | 1814.36 |
| 1814.38 | 1814.55 | 1814.72 | 1814.72 | 1814.55 | 1814.38 |
| 1814.39 | 1814.56 | 1814.73 | 1814.73 | 1814.56 | 1814.39 |
| 1814.37 | 1814.54 | 1814.71 | 1814.71 | 1814.54 | 1814.37 |
| 1814.33 | 1814.50 | 1814.66 | 1814.66 | 1814.50 | 1814.33 |
| 1814.26 | 1814.43 | 1814.60 | 1814.60 | 1814.43 | 1814.26 |
| 1814.16 | 1814.33 | 1814.50 | 1814.50 | 1814.33 | 1814.16 |
| 1814.05 | 1814.21 | 1814.38 | 1814.38 | 1814.21 | 1814.05 |
| 1813.91 | 1814.08 | 1814.24 | 1814.24 | 1814.08 | 1813.91 |
| 1813.75 | 1813.92 | 1814.09 | 1814.09 | 1813.92 | 1813.75 |
| 1813.75 | 1813.92 | 1814.08 | 1814.08 | 1813.92 | 1813.75 |
| 1813.71 | 1813.88 | 1814.04 | 1814.04 | 1813.88 | 1813.71 |
| 1813.65 | 1813.82 | 1813.99 | 1813.99 | 1813.82 | 1813.65 |
| 1813.58 | 1813.75 | 1813.91 | 1813.91 | 1813.75 | 1813.58 |
| 1813.48 | 1813.65 | 1813.82 | 1813.82 | 1813.65 | 1813.48 |
| 1813.36 | 1813.53 | 1813.69 | 1813.69 | 1813.53 | 1813.36 |
| 1813.21 | 1813.38 | 1813.54 | 1813.54 | 1813.38 | 1813.21 |
| 1813.03 | 1813.20 | 1813.37 | 1813.37 | 1813.20 | 1813.03 |
| 1812.83 | 1813.00 | 1813.17 | 1813.17 | 1813.00 | 1812.83 |
| 1812.61 | 1812.78 | 1812.95 | 1812.95 | 1812.78 | 1812.61 |
| 1812.38 | 1812.55 | 1812.72 | 1812.72 | 1812.55 | 1812.38 |
| 1812.36 | 1812.53 | 1812.70 | 1812.70 | 1812.53 | 1812.36 |




Beam 1 is the west beam.

SCREED ELEVATIONS




* 2.7:1 inslope at Abutment 3.

ELEVATION

AGGREGATE SLOPE PROTECTION DETAIL

## BRIDGE BID ITEMS

| SPEC | CODE | ITEM DESCRIPTION | UNIT | QUANTITY |
|---|---|---|---|---|
| 202 | 0105 | REMOVAL OF STRUCTURE | L SUM | 1 |
| 210 | 0099 | CLASS 1 EXCAVATION | L SUM | 1 |
| 210 | 0201 | FOUNDATION PREPARATION | EA | 1 |
| 602 | 0130 | CLASS AAE-3 CONCRETE | CY | 499.9 |
| 602 | 1130 | CLASS AE-3 CONCRETE | CY | 171.6 |
| 602 | 1134 | PILE SUPPORTED APPROACH SLAB | SY | 206.6 |
| 602 | 1250 | PENETRATING WATER REPELLENT TREATMENT | SY | 1,837 |
| 604 | 9925 | PRESTRESSED I-BEAM-72IN | LF | 1,656.0 |
| 612 | 0115 | REINFORCING STEEL-GRADE 60 | LBS | 24,395 |
| 612 | 0116 | REINFORCING STEEL-GRADE 60-EPOXY COATED | LBS | 104,560 |
| 622 | 0020 | STEEL PILING HP 10 X 42 | LF | 600 |
| 622 | 0070 | STEEL PILING HP 14 X 102 | LF | 1,060 |
| 930 | 3000 | BRIDGE BENCH MARKS | SET | 1 |
| 930 | 7012 | ROADWAY CANOPY | L SUM | 1 |
| 930 | 8600 | ELASTOMERIC BEARING PAD | SF | 48.0 |
| 930 | 8686 | AGGREGATE SLOPE PROTECTION | SY | 616 |
| 930 | 9537 | ABUTMENT UNDERDRAIN SYSTEM | EA | 2 |

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

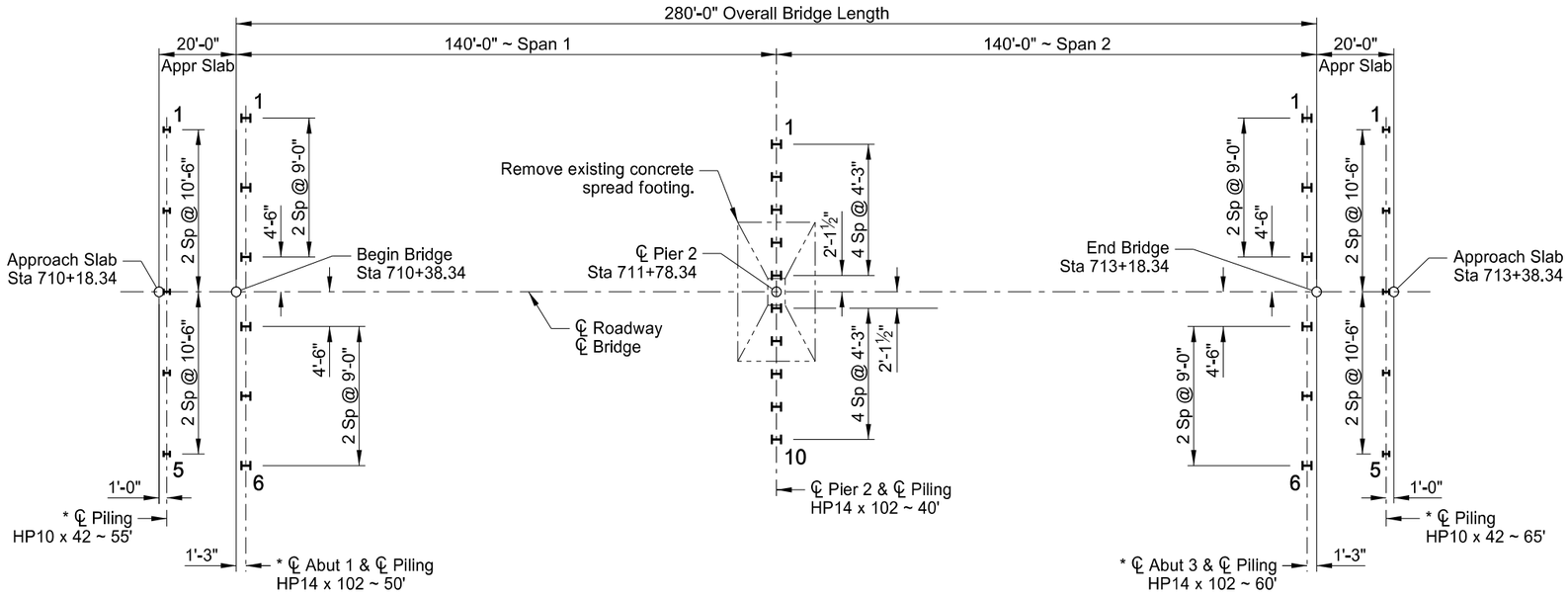
PRELIMINARY

GIBBS TOWNSHIP SEPARATION

SCREED ELEVATIONS, BID ITEM QUANTITIES & SLOPE PROTECTION DETAIL

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

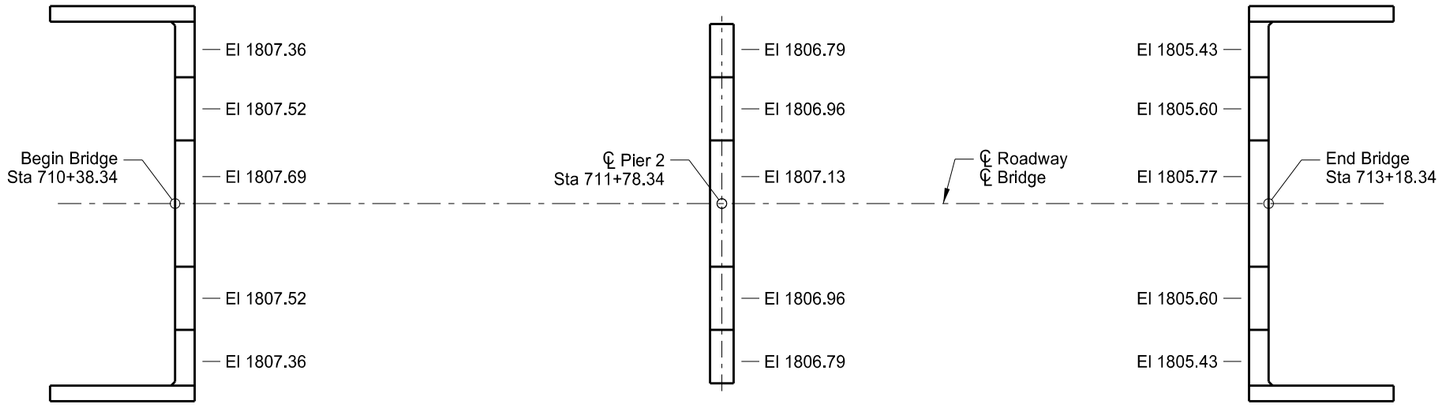
| STATE | PROJECT NUMBER | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | BND-IM-1-094(192)164 | 170 | 5 |




* 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 HP14 x 102 Pile to a bearing resistance of 250 tons.

PILING LAYOUT




Elevations shown are to top of finished concrete.

BEARING ELEVATIONS

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 |
| SOUTH APPR SLAB | 1 | 427,329.86 | 1,926,865.39 |
| | 5 | 427,329.67 | 1,926,907.39 |
| ABUT 1 | 1 | 427,350.12 | 1,926,863.98 |
| | 6 | 427,349.91 | 1,926,908.98 |
| PIER 2 | 1 | 427,488.85 | 1,926,867.98 |
| | 10 | 427,488.68 | 1,926,906.23 |
| ABUT 3 | 1 | 427,627.61 | 1,926,865.23 |
| | 6 | 427,627.41 | 1,926,910.23 |
| NORTH APPR SLAB | 1 | 427,647.86 | 1,926,866.82 |
| | 5 | 427,647.67 | 1,926,908.82 |

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

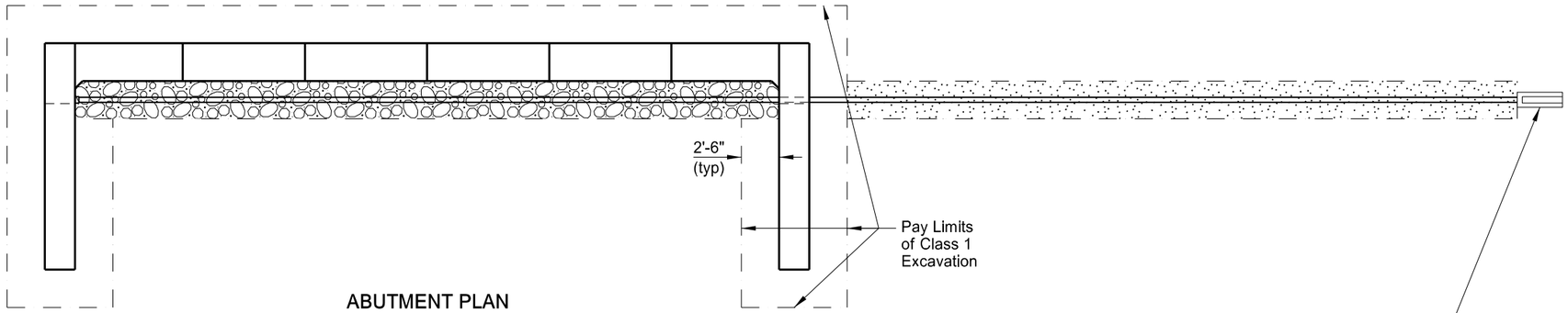
PRELIMINARY

GIBBS TOWNSHIP SEPARATION

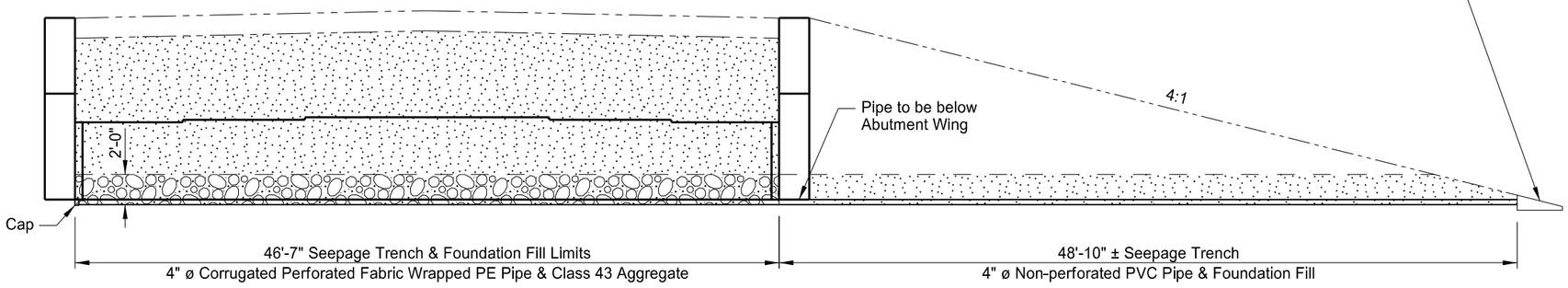
PILING LAYOUT &
BEARING ELEVATIONS

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

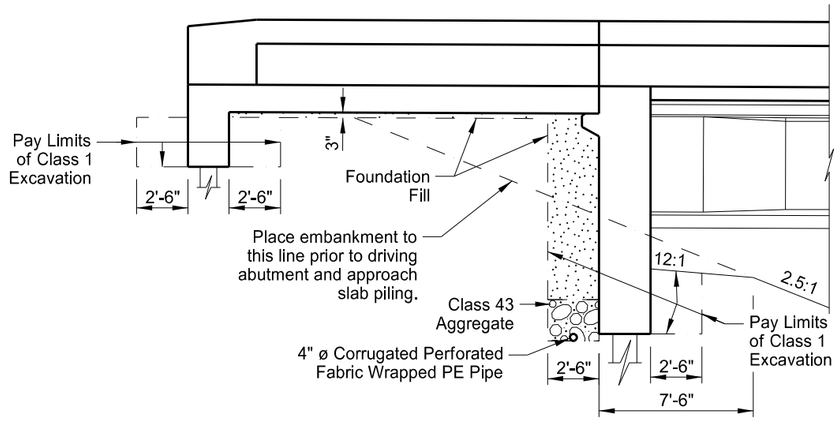
| STATE | PROJECT NUMBER | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | BND-IM-1-094(192)164 | 170 | 6 |




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.

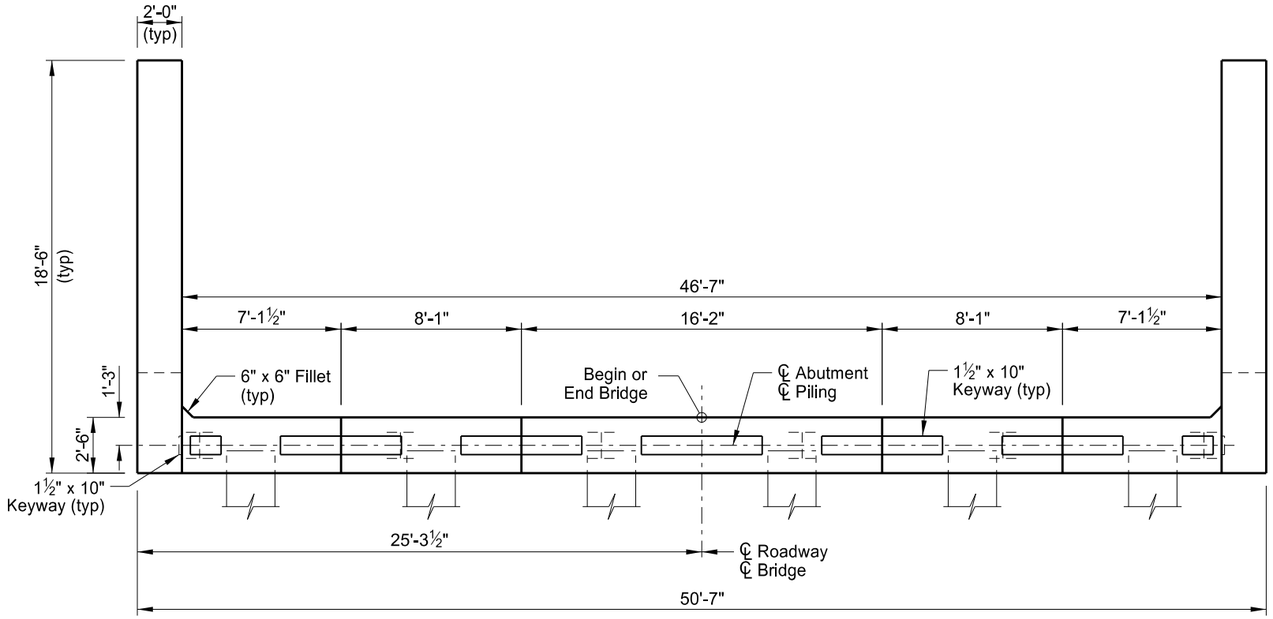
PRELIMINARY

GIBBS TOWNSHIP SEPARATION

ABUTMENT UNDERDRAIN & EXCAVATION DETAILS

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

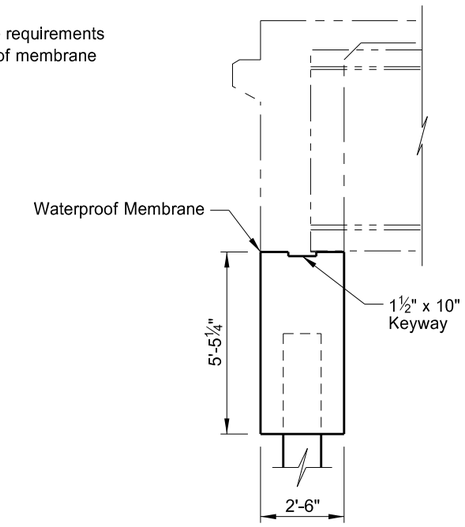
| | STATE | PROJECT NUMBER | SECTION NO. | SHEET NO. |
|---|---|---|---|---|
| | ND | BND-IM-1-094(192)164 | 170 | 7 |



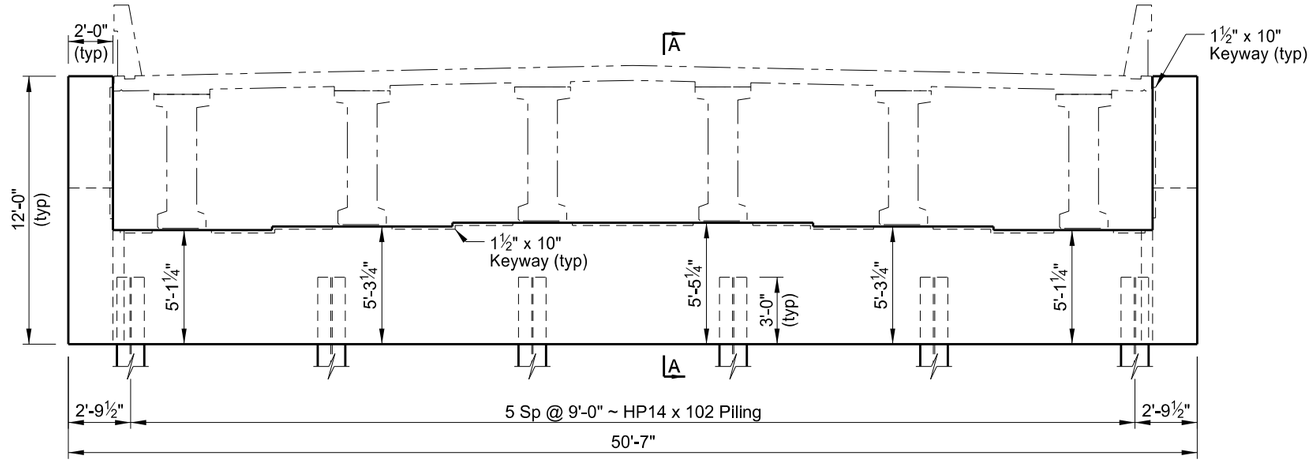

PLAN

NOTE:

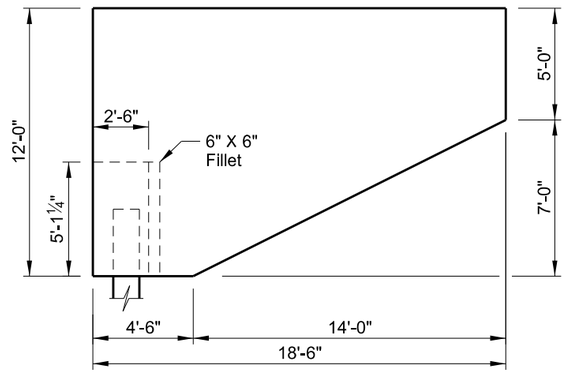
Use waterproof membrane that meets the requirements of Section 602.03 B. Center the waterproof membrane (1'-0" minimum width) on the joint.




A-A




ELEVATION




WING ELEVATION

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

PRELIMINARY

| QUANTITIES |
|---|
| SEE DWG 94-164.515-8 |
| |

GIBBS TOWNSHIP SEPARATION

(SHOWING DIMENSIONS)

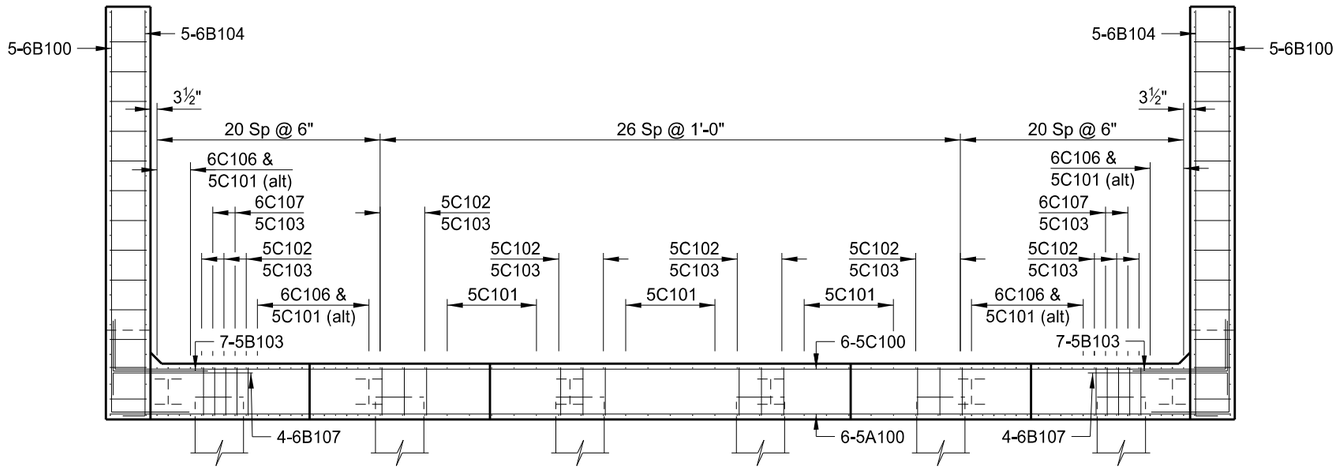
ABUTMENT DETAILS

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

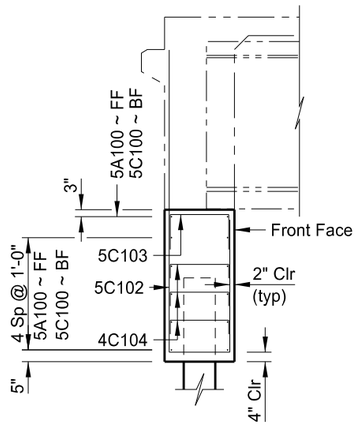
| STATE | PROJECT NUMBER | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | BND-IM-1-094(192)164 | 170 | 8 |

**NOTE:**

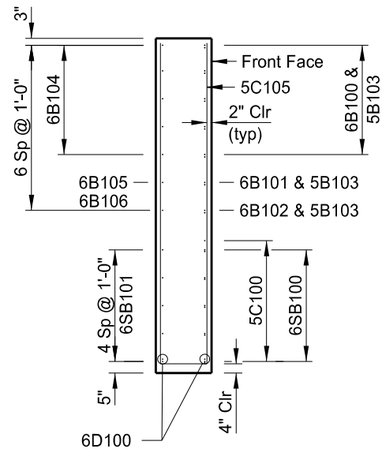
Position the long leg of 5B103 bar perpendicular to abutment wing.



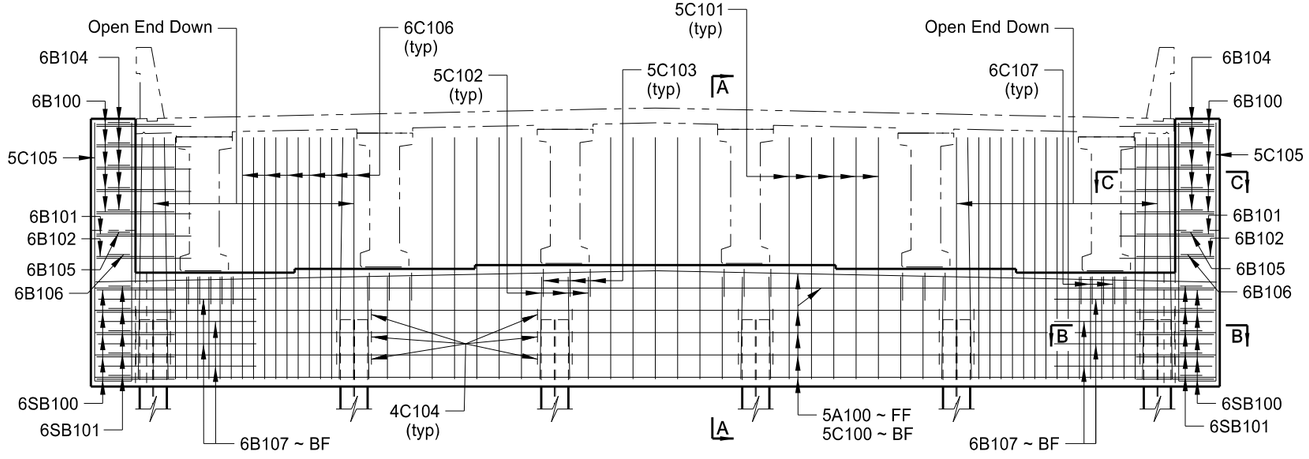

PLAN



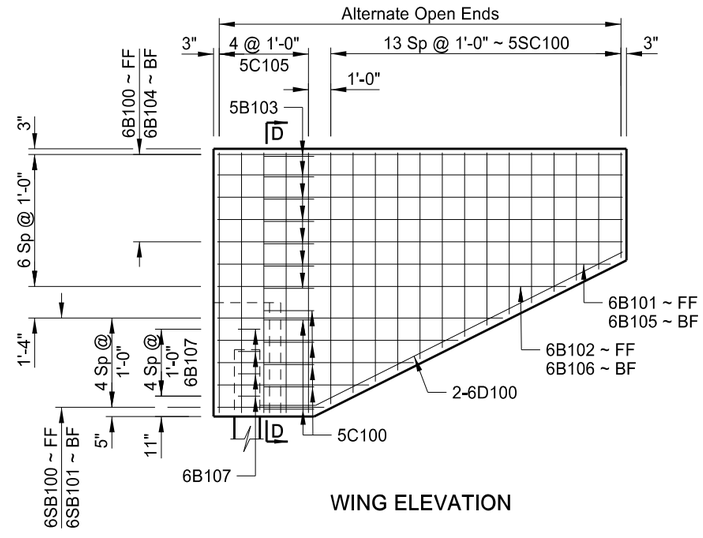

A-A



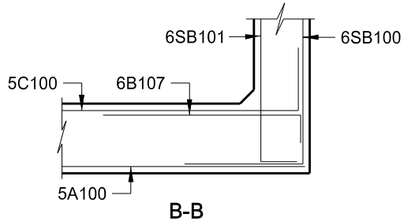

D-D



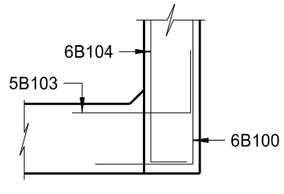

ELEVATION




WING ELEVATION




B-B




C-C

**NOMENCLATURE:**

FF = Front Face
BF = Back Face

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

PRELIMINARY

| QUANTITIES | (ONE ABUTMENT) |
|---|---|
| CLASS AE-3 CONCRETE | 48.4 CY |
| REINFORCING STEEL | 4,780 LBS |

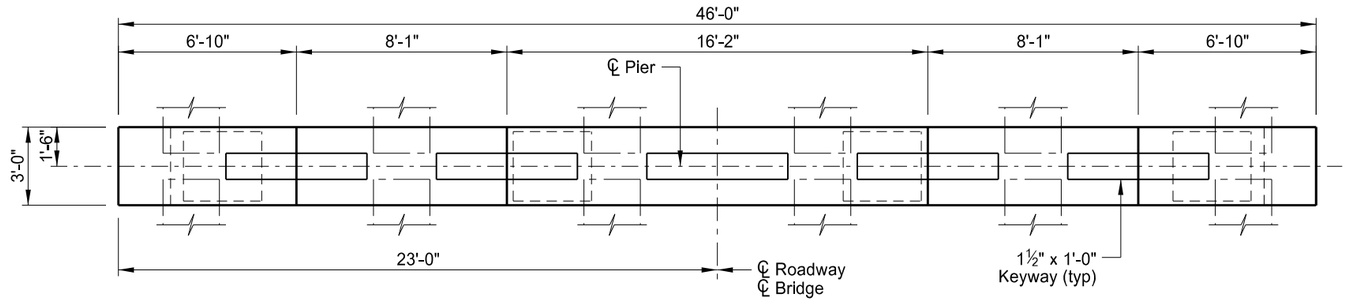
GIBBS TOWNSHIP SEPARATION

(SHOWING REINFORCING)

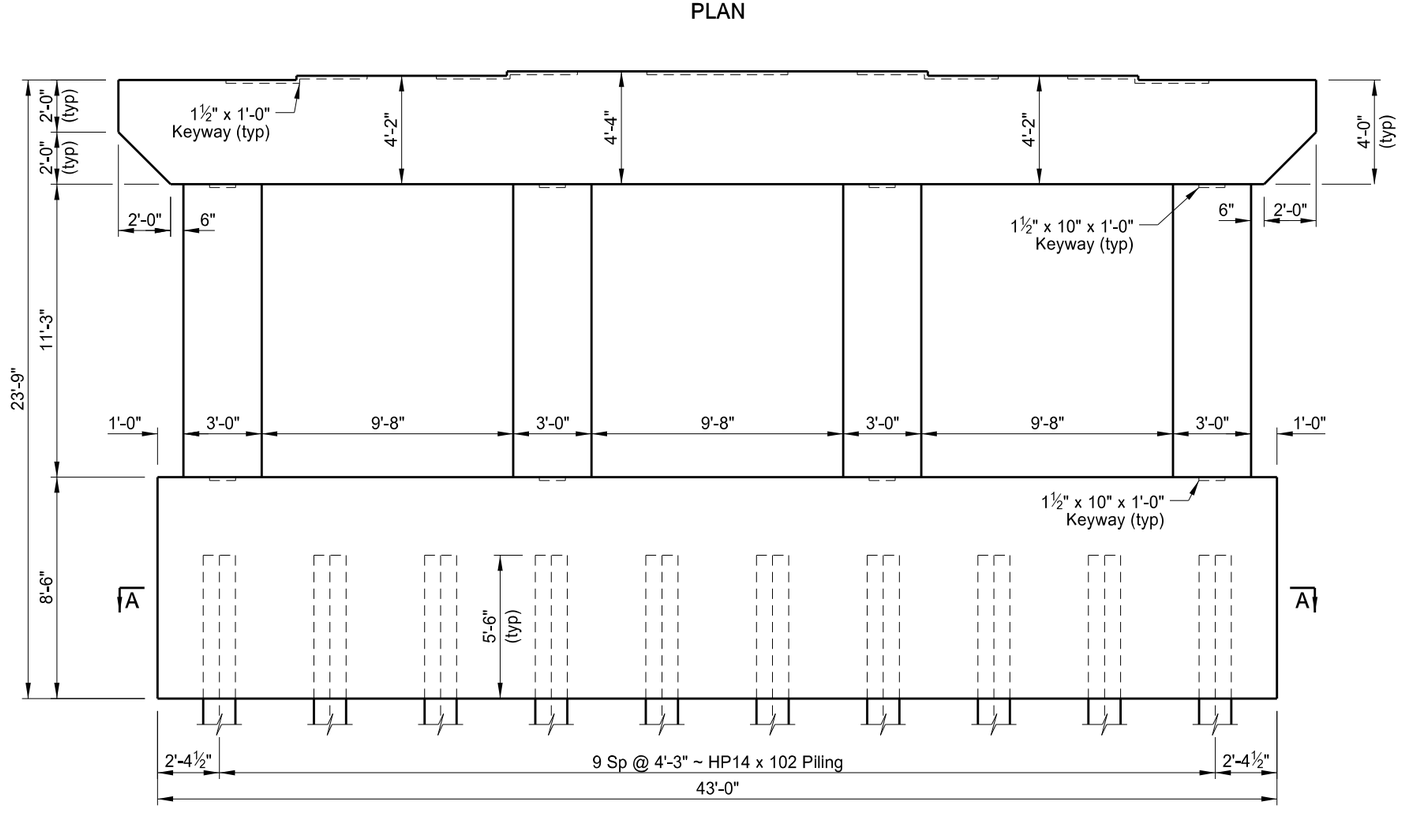
ABUTMENT DETAILS

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

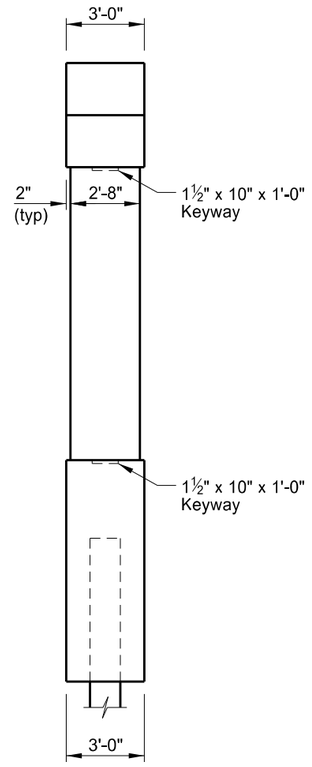
| STATE | PROJECT NUMBER | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | BND-IM-1-094(192)164 | 170 | 9 |



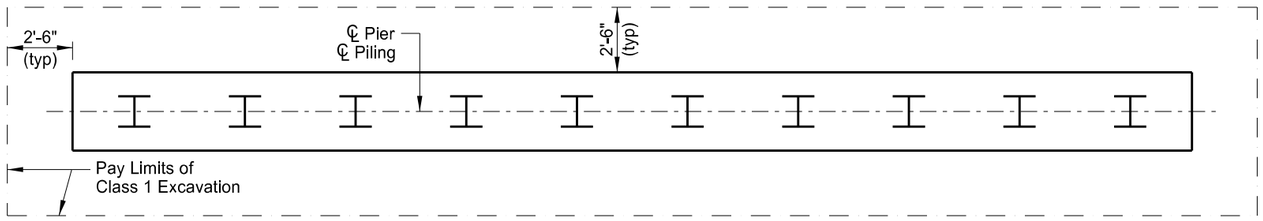

PLAN




ELEVATION




END VIEW




A-A

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

PRELIMINARY

| QUANTITIES |
|---|
| SEE DWG 94-164.515-10 |
| |

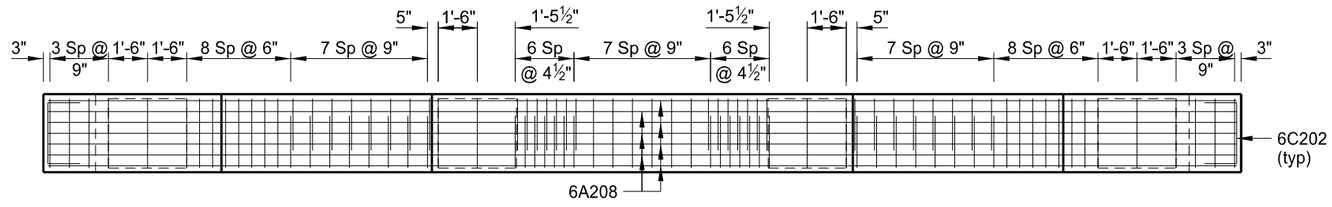
GIBBS TOWNSHIP SEPARATION

(SHOWING DIMENSIONS)

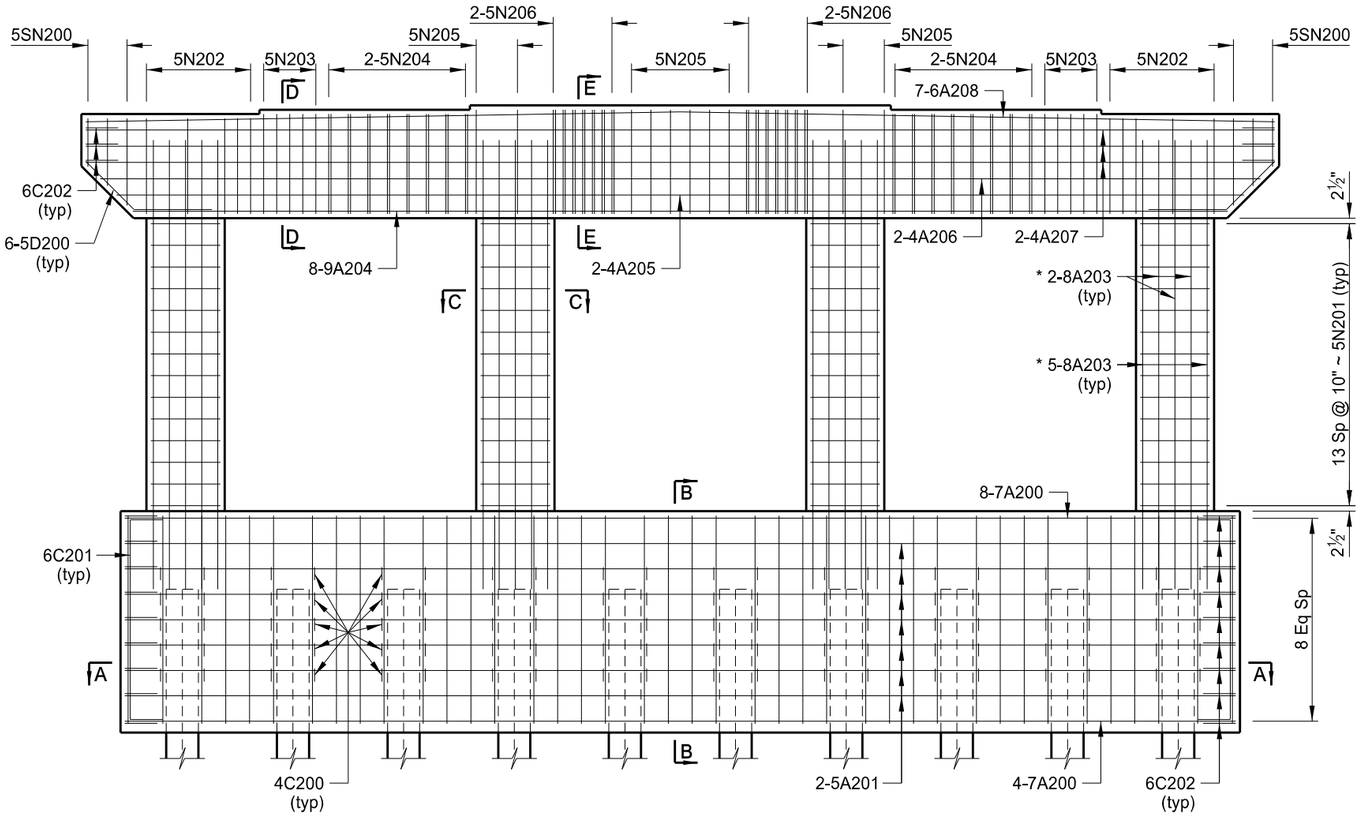
PIER DETAILS

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

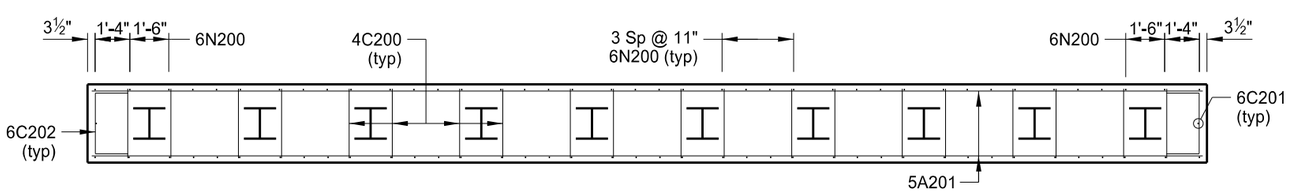
| STATE | PROJECT NUMBER | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | BND-IM-1-094(192)164 | 170 | 10 |



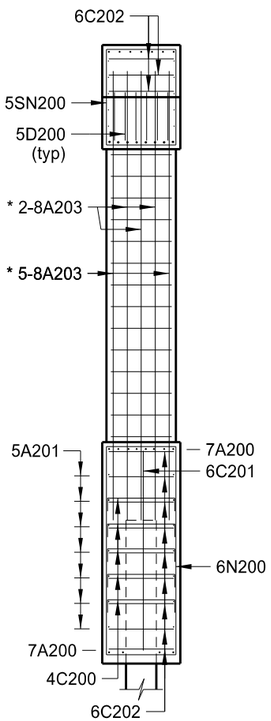

PLAN



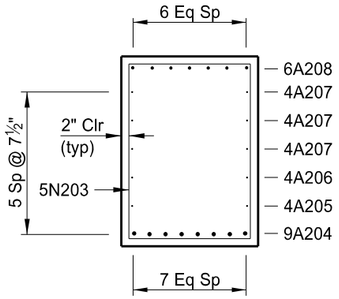

ELEVATION



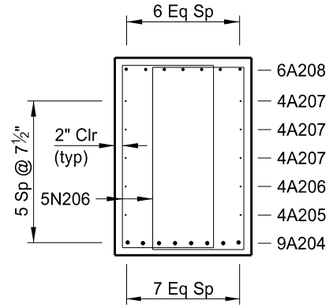

A-A



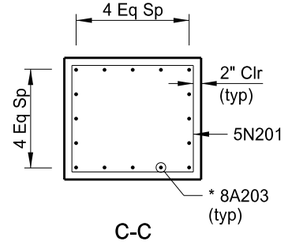

END VIEW




D-D

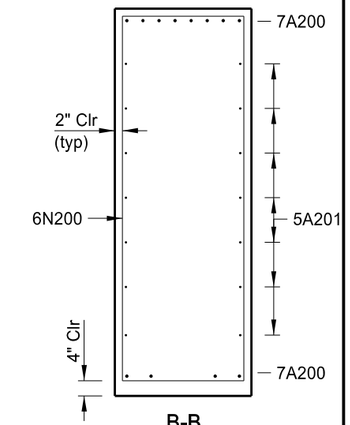



E-E




C-C

* Embed the 8A203 bars 3'-0" into the footing wall.




B-B

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

PRELIMINARY

| QUANTITIES | |
|---|---|
| CLASS AE-3 CONCRETE | 74.8 CY |
| REINFORCING STEEL | 10,364 LBS |

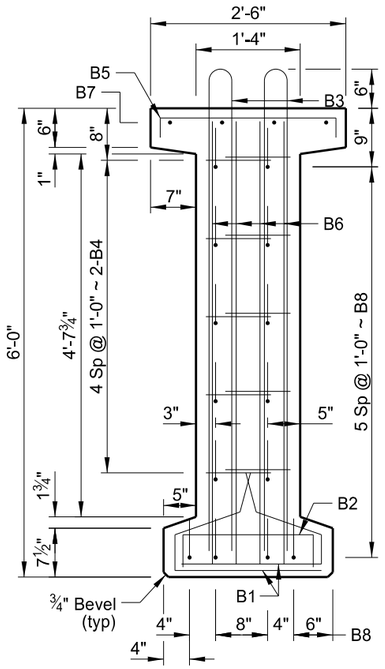
GIBBS TOWNSHIP SEPARATION

(SHOWING REINFORCING)

PIER DETAILS

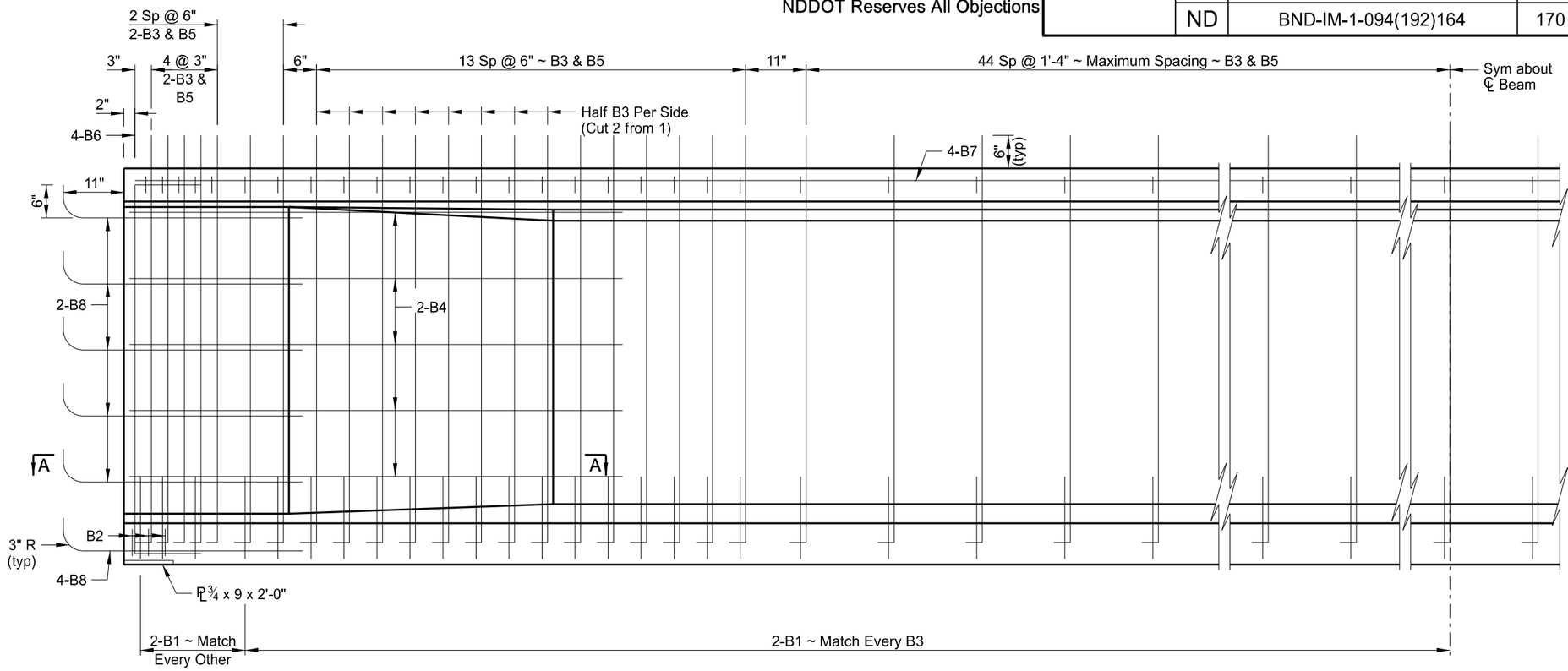
23 U.S.C. 409
NDDOT Reserves All Objections

| | STATE | PROJECT NUMBER | SECTION NO. | SHEET NO. |
|---|---|---|---|---|
| | ND | BND-IM-1-094(192)164 | 170 | 11 |

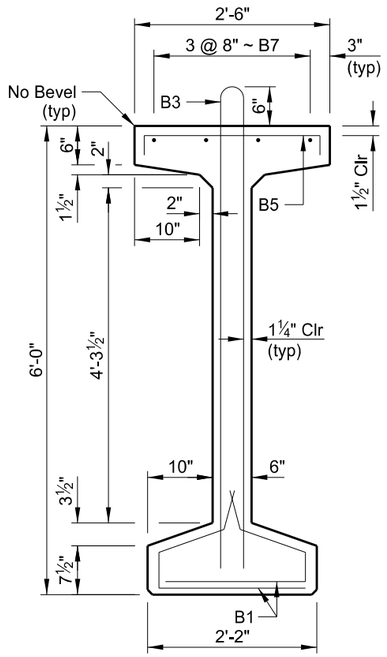



(DETAILS NOT SHOWN ARE SAME AS "SECTION @ ℄")

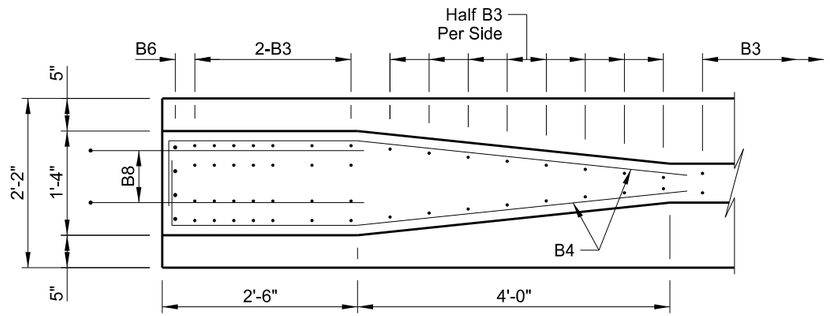
END VIEW




PART BEAM ELEVATION




SECTION @ ℄




A-A

| BEAM SECTION DATA |
|---|
| WT = 846.0 LBS/FT + 5239 LBS FOR END BLOCKS |
| CROSS SECTIONAL AREA AT ℄ SPAN = 786 $IN^2$ |
| C.G. (FROM BOTTOM) = 35.60 IN |
| I = 547,922 $IN^4$ |
| $S_B$ = 15,391 $IN^3$ |
| END AREA = 1326.75 $IN^2$ |

| BAR LIST ~ ONE BEAM | | | | |
|---|---|---|---|---|
| MARK | SIZE | NO. | LENGTH | SHAPE |
| B1 | 4 | 254 | 3'-9" | BENT |
| B2 | 5 | 6 | 2'-6" | BENT |
| B3 | 4 | 145 | 13'-0" | BENT |
| B4 | 4 | 20 | 7'-5" | BENT |
| B5 | 3 | 131 | 2'-9" | BENT |
| B6 | 5 | 8 | 7'-8" | BENT |
| B7 | 5 | 20 | 30'-0" | STR |
| * B8 | 5 | 28 | 4'-0" | STR |

* Field bend as shown (Grade 40).

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

PRELIMINARY

| QUANTITIES | (ONE BEAM) |
|---|---|
| BEAM LENGTH | 138.0 LF |

GIBBS TOWNSHIP SEPARATION

PRE-TENSIONED 72" PRESTRESSED I-BEAM

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

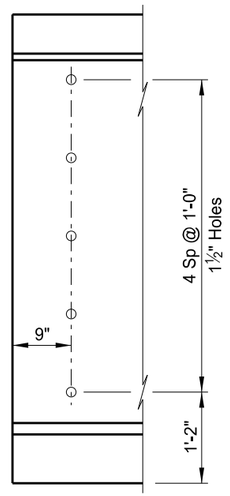
| | STATE | PROJECT NUMBER | SECTION NO. | SHEET NO. |
|---|---|---|---|---|
| | ND | BND-IM-1-094(192)164 | 170 | 12 |

## 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.

Provide holes and inserts in the beams at locations shown to accommodate the diaphragm bars.

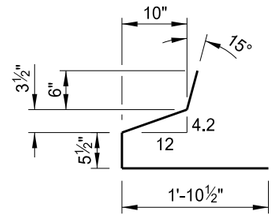
Minor changes to the shape of the beam and to reinforcing steel may be made to accommodate the forms of various contractors and their construction methods with the approval of the Engineer.




(Use holes for all beams at the Abutments & for the interior beams only at the Piers. Use inserts for the exterior beams at the Piers.)

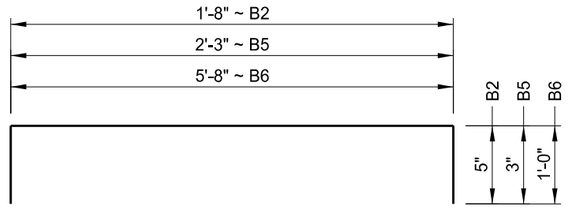
ELEVATION

BEAM END DETAIL

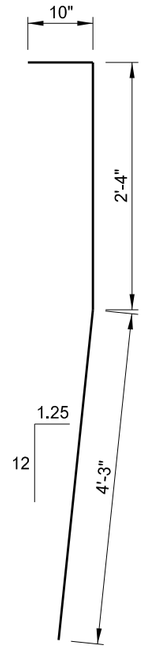


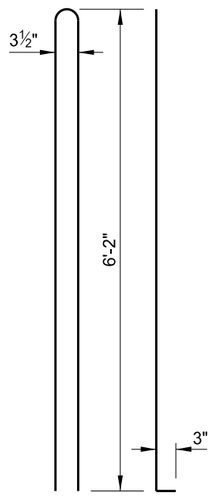

B1

| PRESTRESSING DATA | | | | | |
|---|---|---|---|---|---|
| C.G. | FINAL FORCE | DETENSION STRENGTH | ACCEPTANCE STRENGTH | WEIGHT (TONS) | BEAM LENGTH |
| 4.25" | 1372.2 k | 7000 psi (Min) | 7000 psi (Min) | 61.0 | 138'-0" |
| 4.50" | 1379.0 k | | | | |
| 4.75" | 1385.8 k | | | | |




B2, B5 & B6

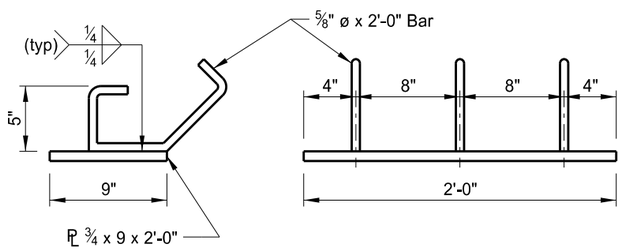



B3 B4

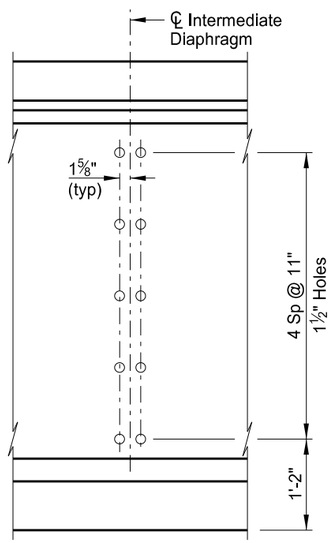
(DIMENSIONS SHOWN ARE OUT TO OUT)

BENT BAR DETAILS




(Use ASTM A36 steel, hot dipped galvanized, for the bearing plate. Include the costs in the bid price for the beam.)

BEARING DETAIL




(Use holes for interior beams only. Use inserts for the exterior beams. See Dwg 94-164.515-13 for locations.)

ELEVATION

INTERMEDIATE DIAPHRAGM DETAIL

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

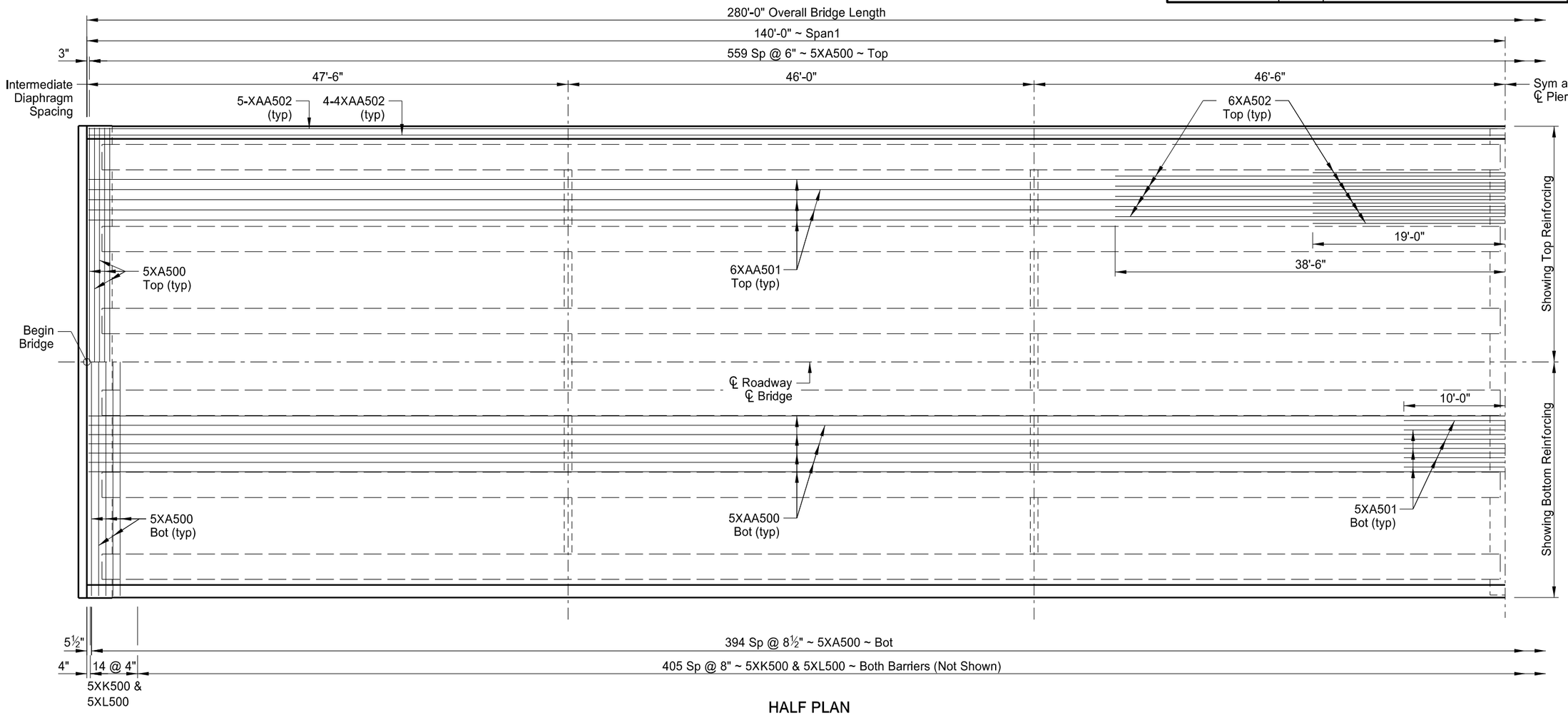
PRELIMINARY

GIBBS TOWNSHIP SEPARATION

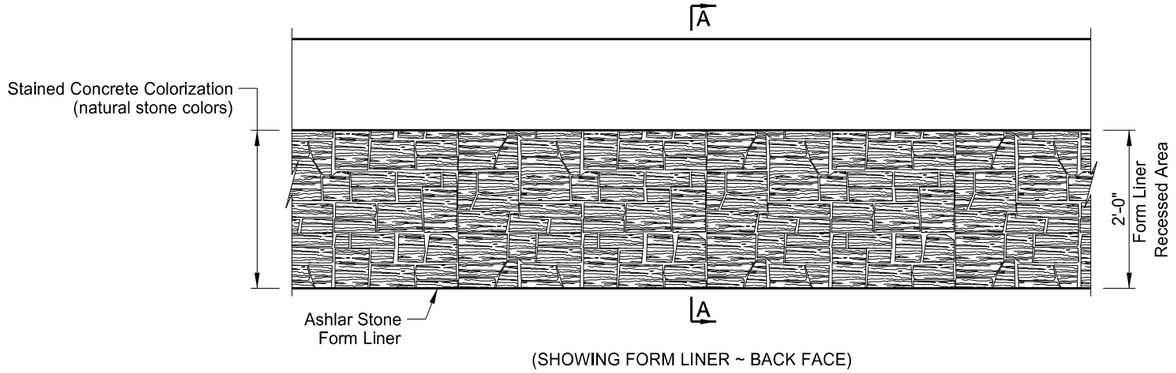
PRE-TENSIONED 72" PRESTRESSED I-BEAM

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

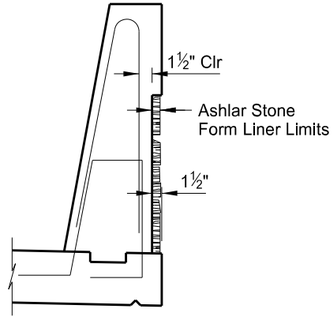
| STATE | PROJECT NUMBER | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | BND-IM-1-094(192)164 | 170 | 13 |




HALF PLAN




(SHOWING FORM LINER ~ BACK FACE)
BARRIER ELEVATION




A-A

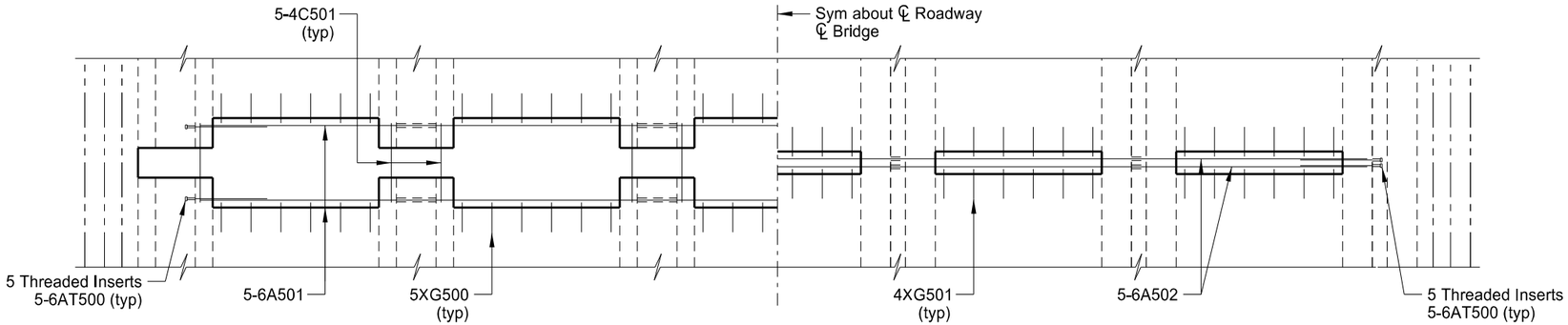
This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

| QUANTITIES |
|---|
| SEE DWG 94-164.515-16 |
| |
| GIBBS TOWNSHIP SEPARATION |
| HALF SLAB LAYOUT |

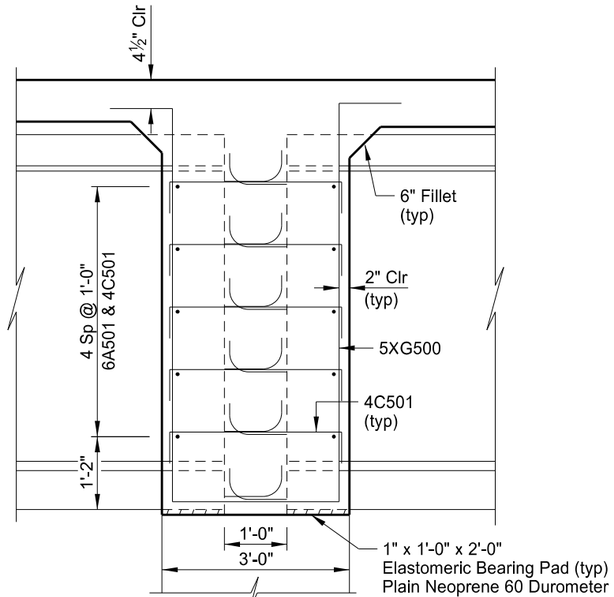
23 U.S.C. 409
NDDOT Reserves All Objections

| STATE | PROJECT NUMBER | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | BND-IM-1-094(192)164 | 170 | 14 |

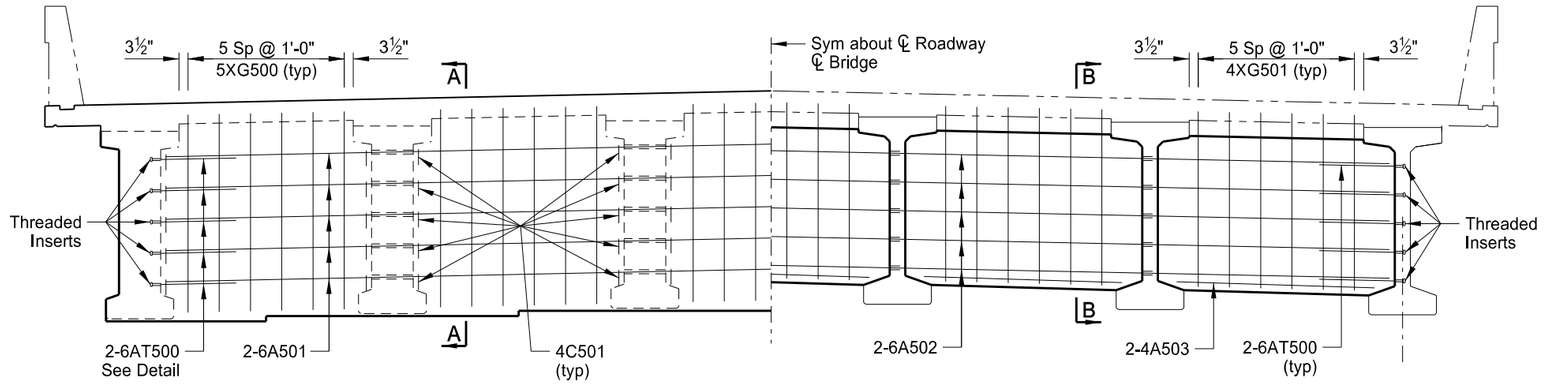



(SHOWING PIER DIAPHRAGM) (SHOWING INTERMEDIATE DIAPHRAGM)

PLAN

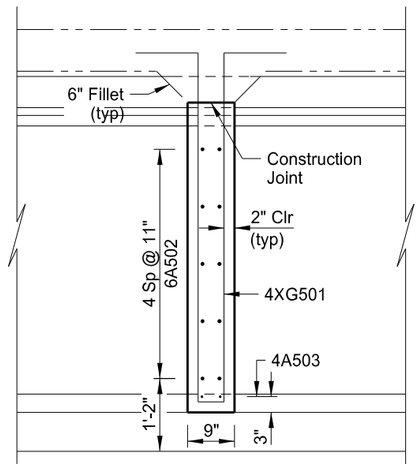



A-A

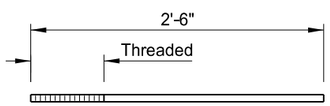



(SHOWING PIER DIAPHRAGM) (SHOWING INTERMEDIATE DIAPHRAGM)

PLAN




B-B




No. 6 Reinforcing Steel ~ Include in the Prestressed Beam bid item.

6AT500 DETAIL

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

PRELIMINARY

QUANTITIES

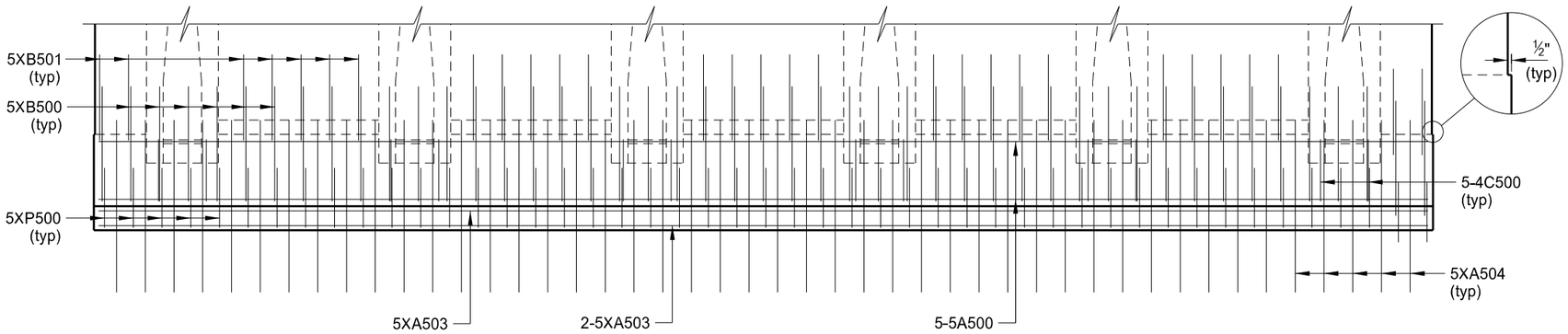
SEE DWG 94-164.515-16

GIBBS TOWNSHIP SEPARATION

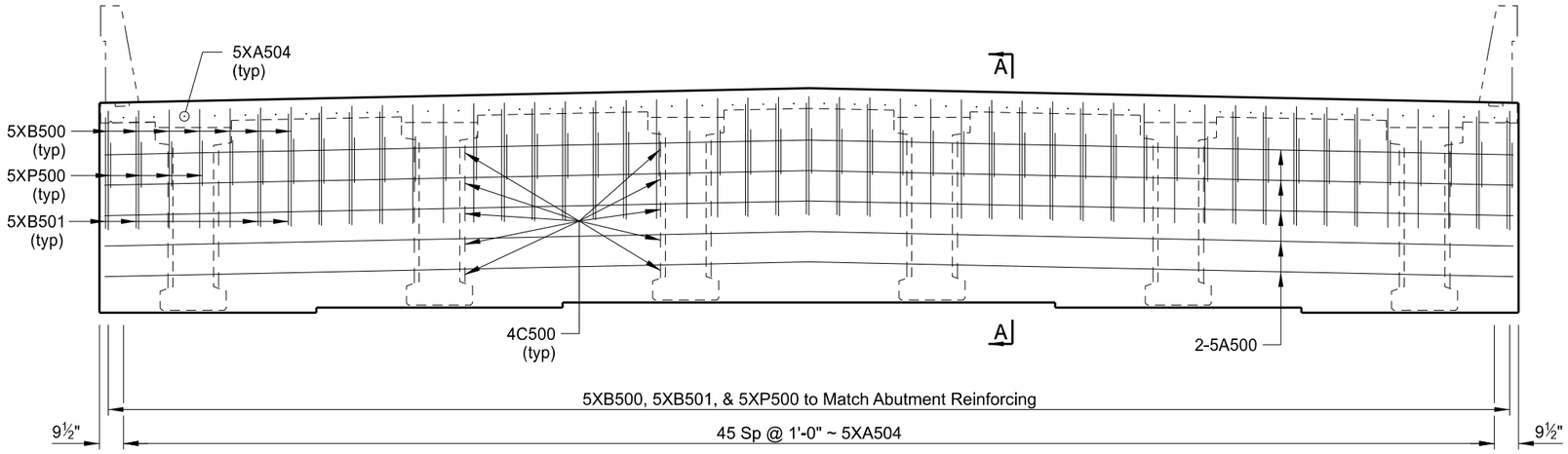
PIER & INTERMEDIATE DIAPHRAGM DETAILS

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

| STATE | PROJECT NUMBER | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | BND-IM-1-094(192)164 | 170 | 15 |

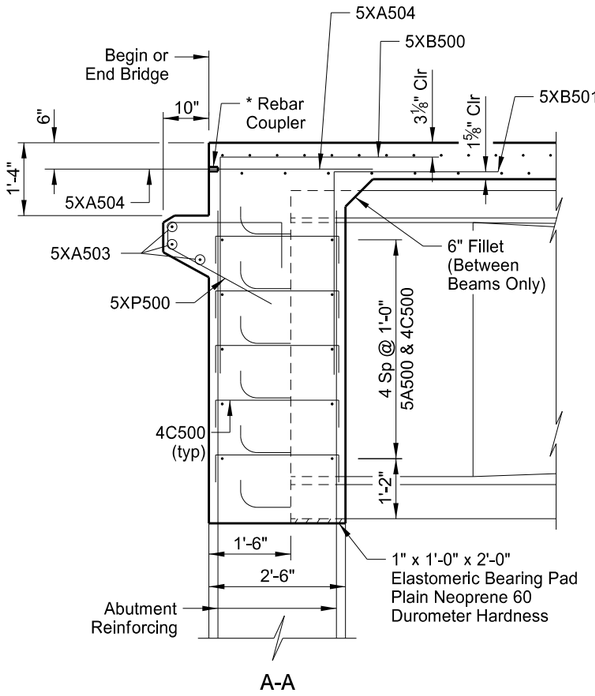



PLAN




(APPROACH LIP NOT SHOWN)

ELEVATION



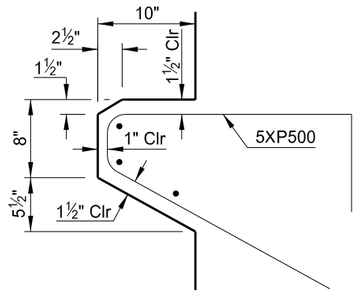

A-A

* Use approved 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.

## NOTES:

Do not install the 5XA504 bars into the approach slab until all of the foundation fill is in place.

Position the 4'-0" leg of 5XB500 bar and the 3'-0" leg of 5XB501 bar horizontal.




APPROACH LIP DETAIL

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

PRELIMINARY

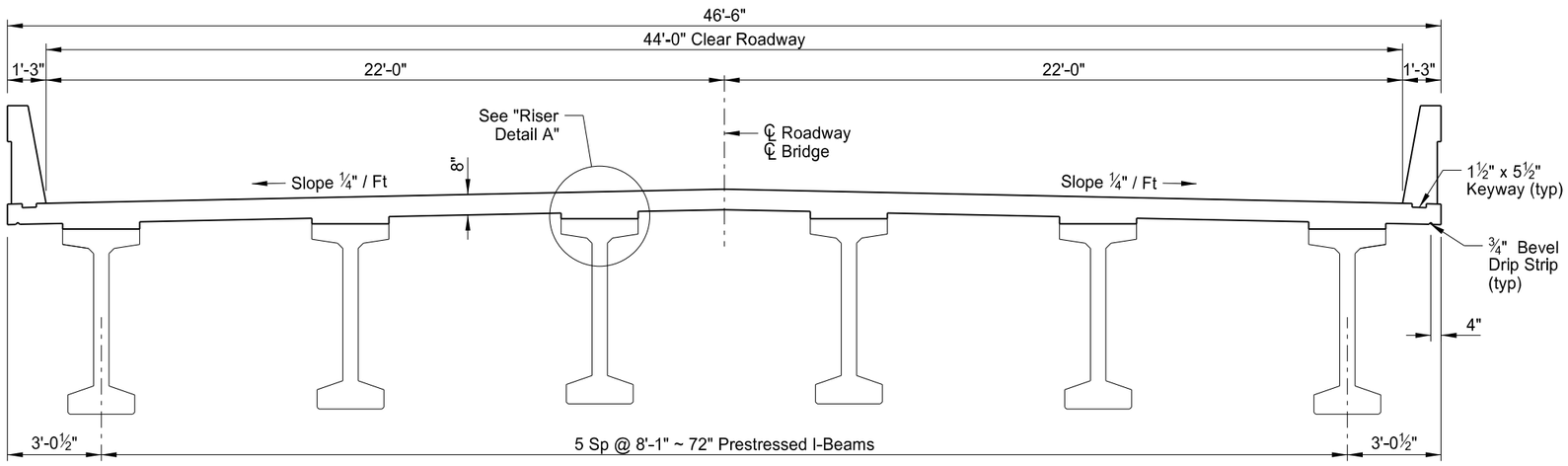
| QUANTITIES |
|---|
| SEE DWG 94-164.515-16 |
| |

GIBBS TOWNSHIP SEPARATION

ENDWALL DETAILS

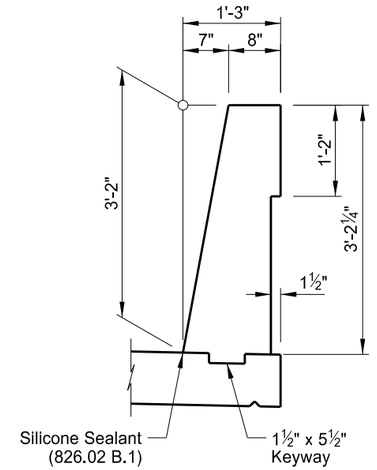
23 U.S.C. 409
NDDOT Reserves All Objections

| STATE | PROJECT NUMBER | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | BND-IM-1-094(192)164 | 170 | 16 |

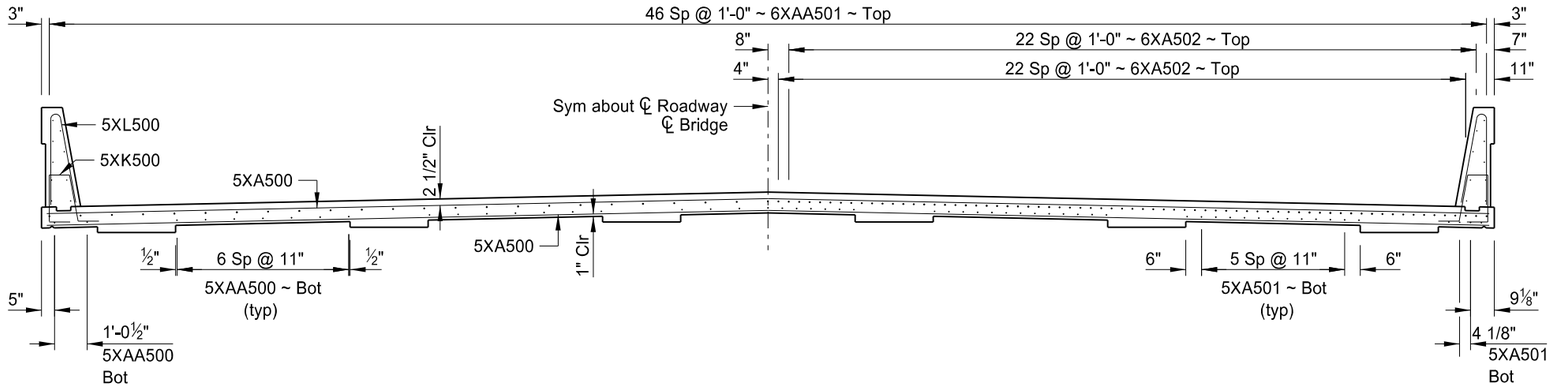



(SHOWING DIMENSIONS)

SLAB SECTION




SHOWING DIMENSIONS




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

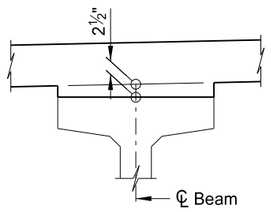
SLAB SECTION




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

SHOWING REINFORCING

BARRIER DETAIL




RISER DETAIL A

The 2½" dimensions shown are located at the supports. The anticipated midspan riser is 1½". Adjust the riser to maintain the 8" slab thickness.

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

PRELIMINARY

| QUANTITIES | |
|---|---|
| CLASS AAE-3 CONCRETE | 499.9 CY |
| REINFORCING STEEL | 4,471 LBS |
| REINFORCING STEEL (EPOXY) | 104,560 LBS |

GIBBS TOWNSHIP SEPARATION

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 | BND-IM-1-094(192)164 | 170 | 17 |

## ABUTMENTS

| LOCATION | SIZE | MARK | NO. EACH /SET | NOMINAL LENGTH | DETAILING DIMENSIONS a | b | c | d | e | f | g | h | k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ABUTMENTS | 5 | A100 | 12 | 50'-3" | | 50'-3" | | | | | | | |
| | 6 | B100 | 20 | 21'-7" | | 3'-6" | 18'-1" | | | | | | |
| | 6 | B101 | 4 | 20'-6" | | 3'-6" | 17'-0" | | | | | | |
| | 6 | B102 | 4 | 18'-6" | | 3'-6" | 15'-0" | | | | | | |
| | 5 | B103 | 28 | 6'-6" | | 2'-3" | 4'-3" | | | | | | |
| | 6 | B104 | 20 | 19'-1" | | 1'-0" | 18'-1" | | | | | | |
| | 6 | B105 | 4 | 18'-0" | | 1'-0" | 17'-0" | | | | | | |
| | 6 | B106 | 4 | 16'-0" | | 1'-0" | 15'-0" | | | | | | |
| | 6 | B107 | 16 | 8'-1" | | 1'-0" | 7'-1" | | | | | | |
| | 5 | C100 | 12 | 54'-7" | | 2'-3" | 50'-1" | 2'-3" | | | | | |
| | 5 | C101 | 58 | 23'-10" | | 10'-10" | 2'-2" | 10'-10" | | | | | |
| | 5 | C102 | 36 | 17'-7" | | 4'-7" | 2'-2" | 10'-10" | | | | | |
| | 5 | C103 | 44 | 4'-8" | | 1'-3" | 2'-2" | 1'-3" | | | | | |
| | 4 | C104 | 72 | 3'-2" | | 6" | 2'-2" | 6" | | | | | |
| | 5 | C105 | 20 | 24'-8" | | 11'-6" | 1'-8" | 11'-6" | | | | | |
| | 6 | C106 | 32 | 23'-10" | | 10'-10" | 2'-2" | 10'-10" | | | | | |
| | 6 | C107 | 8 | 17'-7" | | 4'-7" | 2'-2" | 10'-10" | | | | | |
| | 6 | D100 | 8 | 18'-0" | | 2'-6" | 15'-6" | | | | | 12 | 6 |
| | 6 | SB100 | 4 | 59'-2" | 3'-6" | 4'-4" | 3'-6" | 12'-4" | 4 | | | | |
| | 6 | SB101 | 4 | 46'-8" | 1'-0" | 4'-4" | 1'-0" | 12'-4" | 4 | | | | |
| | 5 | SC100 | 4 | 242'-8" | 1'-8" | 4'-7" | 11'-1" | 1'-8" | 13 | | | | |

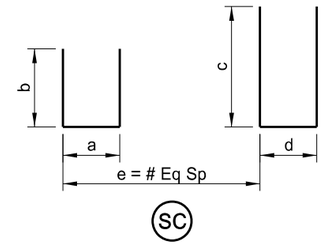
## PIER

| LOCATION | SIZE | MARK | NO. EACH /SET | NOMINAL LENGTH | DETAILING DIMENSIONS a | b | c | d | e | f | g | h | k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PIER | 7 | A200 | 12 | 42'-8" | | 42'-8" | | | | | | | |
| | 5 | A201 | 14 | 42'-8" | | 42'-8" | | | | | | | |
| | 8 | A203 | 64 | 17'-3" | | 17'-3" | | | | | | | |
| | 9 | A204 | 8 | 42'-0" | | 42'-0" | | | | | | | |
| | 4 | A205 | 2 | 43'-3" | | 43'-3" | | | | | | | |
| | 4 | A206 | 2 | 44'-6" | | 44'-6" | | | | | | | |
| | 4 | A207 | 6 | 45'-8" | | 45'-8" | | | | | | | |
| | 6 | A208 | 7 | 45'-8" | | 45'-8" | | | | | | | |
| | 4 | C200 | 100 | 3'-8" | | 6" | 2'-8" | 6" | | | | | |
| | 6 | C201 | 2 | 10'-4" | | 1'-3" | 7'-10" | 1'-3" | | | | | |
| | 6 | C202 | 24 | 5'-0" | | 1'-3" | 2'-6" | 1'-3" | | | | | |
| | 5 | D200 | 12 | 5'-8" | | 3'-0" | 2'-8" | | | | | 12 | 12 |
| | 6 | N200 | 40 | 22'-4" | 2'-8" | 8'-0" | 6" | | | | | 0 | 12 |
| | 5 | N201 | 56 | 11'-0" | 2'-8" | 2'-4" | 6" | | | | | 0 | 12 |
| | 5 | N202 | 10 | 13'-8" | 2'-8" | 3'-8" | 6" | | | | | 0 | 12 |
| | 5 | N203 | 10 | 14'-0" | 2'-8" | 3'-10" | 6" | | | | | 0 | 12 |
| | 5 | N204 | 32 | 12'-8" | 2'-0" | 3'-10" | 6" | | | | | 0 | 12 |
| | 5 | N205 | 10 | 14'-4" | 2'-8" | 4'-0" | 6" | | | | | 0 | 12 |
| | 5 | N206 | 28 | 13'-0" | 2'-0" | 4'-0" | 6" | | | | | 0 | 12 |
| | 5 | SN200 | 2 | 34'-6" | 2'-8" | 1'-10" | 6" | 3'-4" | 2 | | | | |

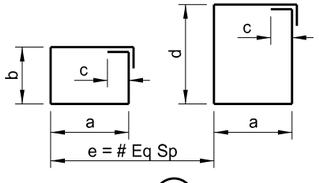
23 U.S.C. 409
NDDOT Reserves All Objections

NOTES:

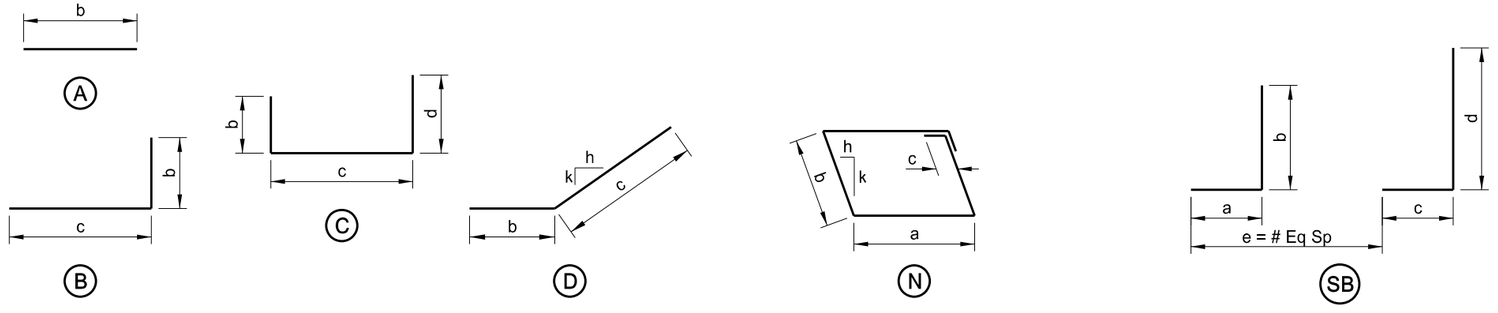
1. Verify the quantity, size, and shape of the bar reinforcement against the structure drawings and immediately notify the Engineer of any discrepancies. Discrepancies in the bar list will not be cause for adjustment of the contract unit price.
2. All dimensions are out to out of bars.
3. Nominal length of each bent bar or cut bar is the sum total of the detailing dimensions for that bar, unless otherwise noted.




SC




SN




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

PRELIMINARY

GIBBS TOWNSHIP SEPARATION

REINFORCING BAR LIST & DETAILS

# BILL OF REINFORCING STEEL, GRADE 60

LETTER PREFIX OF BAR MARK DENOTES SHAPE ~ SEE BAR DETAILS

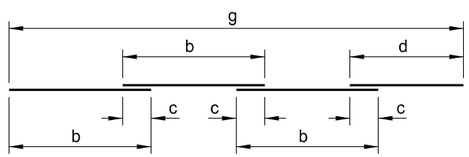
| STATE | PROJECT NUMBER | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | BND-IM-1-094(192)164 | 170 | 18 |

| LOCATION | SIZE | MARK | NO. EACH /SET | NOMINAL LENGTH | DETAILING DIMENSIONS a | b | c | d | e | f | g | h | k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUPERSTRUCTURE | 5 | A500 | 20 | 46'-3" | | 46'-3" | | | | | | | |
| REGULAR | 6 | A501 | 10 | 38'-9" | | 38'-9" | | | | | | | |
| | 6 | A502 | 40 | 39'-7" | | 39'-7" | | | | | | | |
| | 4 | A503 | 40 | 6'-4" | | 6'-4" | | | | | | | |
| | 4 | C500 | 120 | 3'-2" | | 6" | 2'-2" | 6" | | | | | |
| | 4 | C501 | 50 | 3'-8" | | 6" | 2'-8" | 6" | | | | | |
| SUPERSTRUCTURE | 5 | XA500 | 955 | 46'-2" | | 46'-2" | | | | | | | |
| EPOXY | 5 | XA501 | 34 | 20'-0" | | 20'-0" | | | | | | | |
| | 6 | XA502 | 92 | 57'-6" | | 57'-6" | | | | | | | |
| | 5 | XA503 | 6 | 46'-3" | | 46'-3" | | | | | | | |
| | 5 | XA504 | 92 | 3'-0" | | 3'-0" | | | | | | | |
| | 5 | XB500 | 96 | 7'-11" | | 3'-11" | 4'-0" | | | | | | |
| | 5 | XB501 | 60 | 6'-8" | | 3'-8" | 3'-0" | | | | | | |
| | 5 | XG500 | 30 | 17'-2" | 6'-3" | 2'-8" | 6'-3" | 1'-0" | | | | 12 | 0 |
| | 4 | XG501 | 120 | 13'-7" | 5'-7" | 5" | 5'-7" | 1'-0" | | | | 12 | 0 |
| | 5 | XK500 | 868 | 4'-11" | 1'-6" | 7" | | | 10" | | 8" | 2.2 | 12 |
| | 5 | XL500 | 868 | 5'-11" | 9" | 2'-9" | 5" | | | 1.25" | | 2.2 | 12 |
| | 5 | XP500 | 96 | 5'-6" | 5" | 2'-1" | 2'-2" | | | 1.25" | 10" | 12 | 6.5 |
| | 5 | XAA500 | 39 | 291'-8" | | 60'-0" | 3'-0" | 51'-8" | 4 | | 279'-8" | | |
| | 6 | XAA501 | 47 | 294'-8" | | 60'-0" | 3'-9" | 54'-8" | 4 | | 279'-8" | | |
| | 4 | XAA502 | 18 | 289'-8" | | 60'-0" | 2'-6" | 49'-8" | 4 | | 279'-8" | | |

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

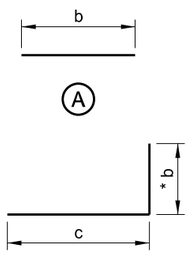
## NOTES:

1. Verify the quantity, size, and shape of the bar reinforcement against the structure drawings and immediately notify the Engineer of any discrepancies. Discrepancies in the bar list will not be cause for adjustment of the contract unit price.
2. All dimensions are out to out of bars.
3. Nominal length of each bent bar or cut bar is the sum total of the detailing dimensions for that bar, unless otherwise noted.
4. Turn adjacent "AA" bars end for end so that the splice locations are staggered.
5. The "f" dimension indicates the inside radius unless otherwise noted.
6. An "X" preceding a bar designation indicates an epoxy coated bar.



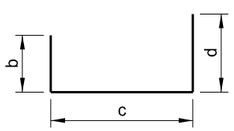

c = Lap Splice (typ)
e = # of "b" Length Pieces in a Set
Total Length per Set = e x b + d

(AA)

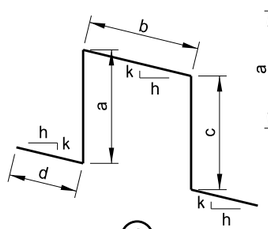



(B)

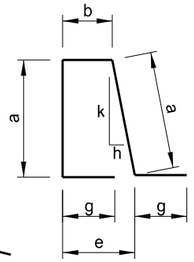
* b = Vertical Leg for XB500 and XB501



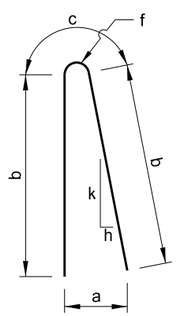

(C)



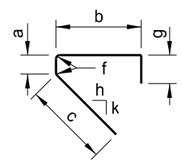

(G)




(K)




(L)




(P)

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

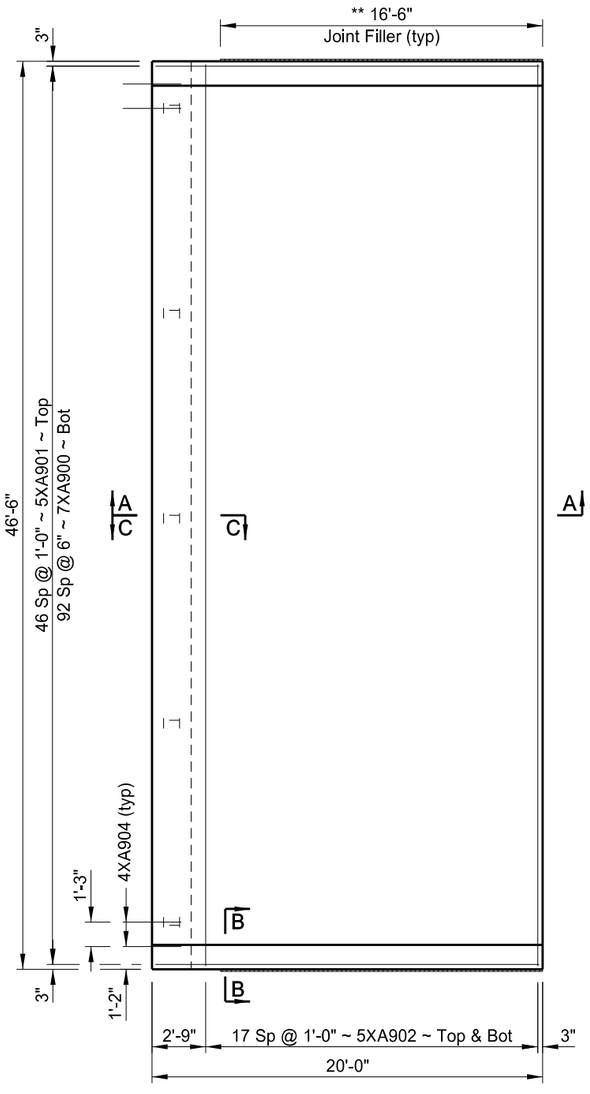
PRELIMINARY

GIBBS TOWNSHIP SEPARATION

REINFORCING BAR LIST & DETAILS

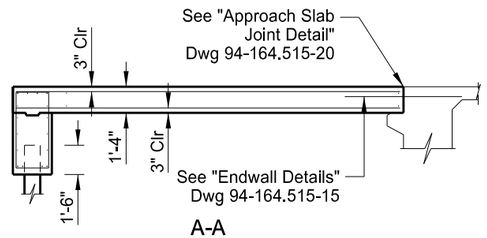
23 U.S.C. 409
NDDOT Reserves All Objections

| | STATE | PROJECT NUMBER | SECTION NO. | SHEET NO. |
|---|---|---|---|---|
| | ND | BND-IM-1-094(192)164 | 170 | 19 |

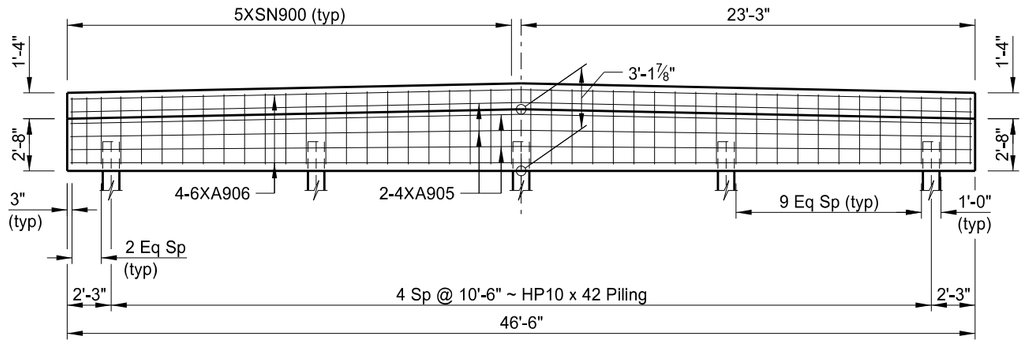



PLAN

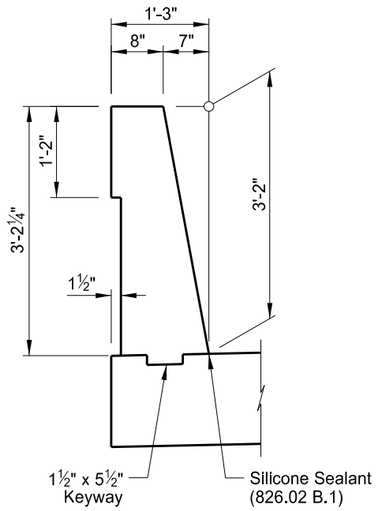
** ½" X 14" Pref Exp Joint Filler
~ Place between approach
slab & abutment wing (typ).



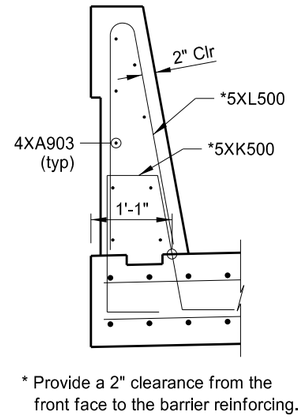

A-A




FOOTING ELEVATION




SHOWING DIMENSIONS



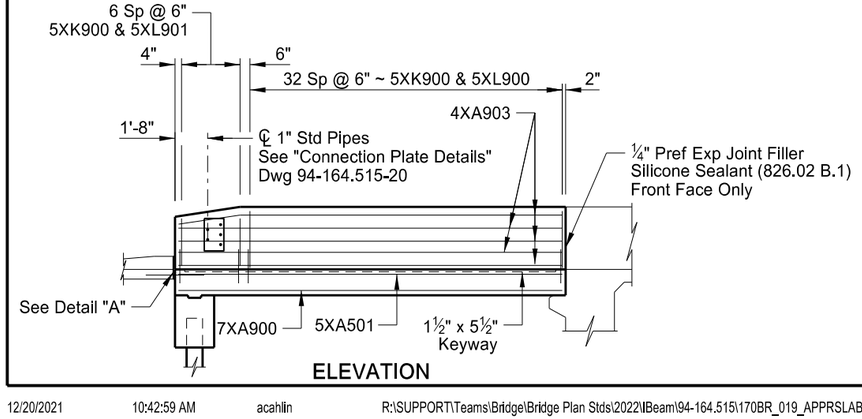

* Provide a 2" clearance from the
front face to the barrier reinforcing.

SHOWING REINFORCING

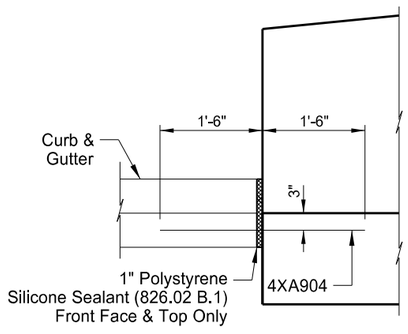
B-B




C-C




ELEVATION




DETAIL "A"

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

PRELIMINARY

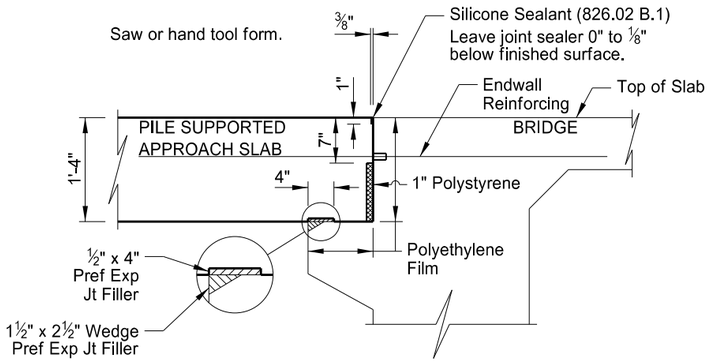
| QUANTITIES |
|---|
| SEE DWG 94-164.515-20 |
| |

GIBBS TOWNSHIP SEPARATION

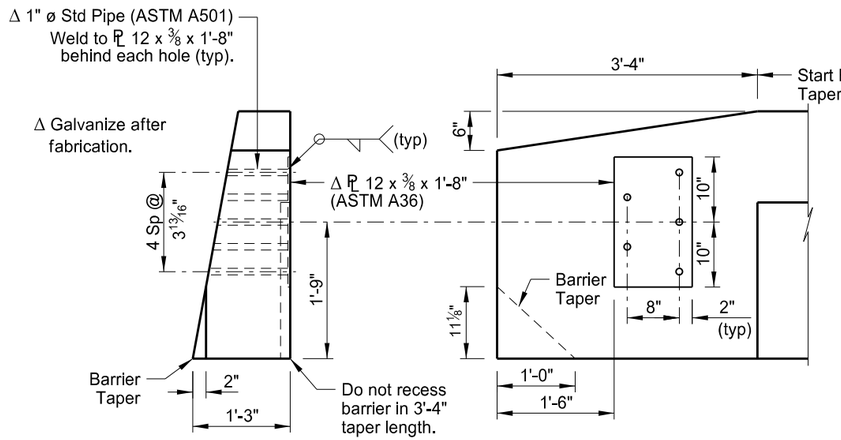
APPROACH SLAB DETAILS

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

| STATE | PROJECT NUMBER | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | BND-IM-1-094(192)164 | 170 | 20 |




APPROACH SLAB JOINT DETAIL

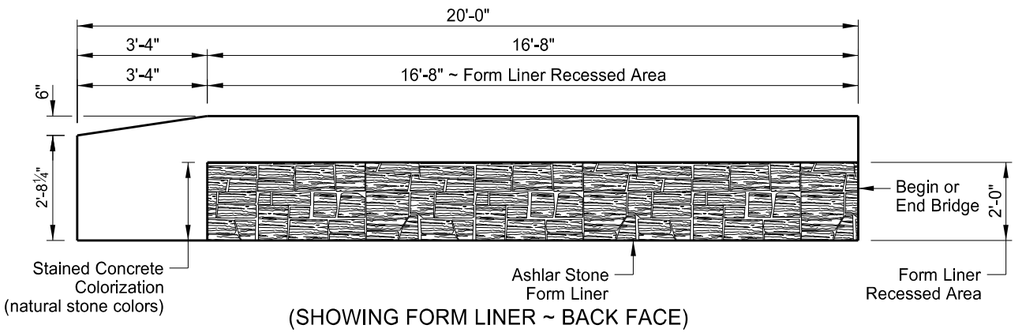



SHOWING DIMENSIONS

SHOWING REINFORCING

(SHOWING BACK FACE)

CONNECTION PLATE DETAILS




(SHOWING FORM LINER ~ BACK FACE)

## 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.

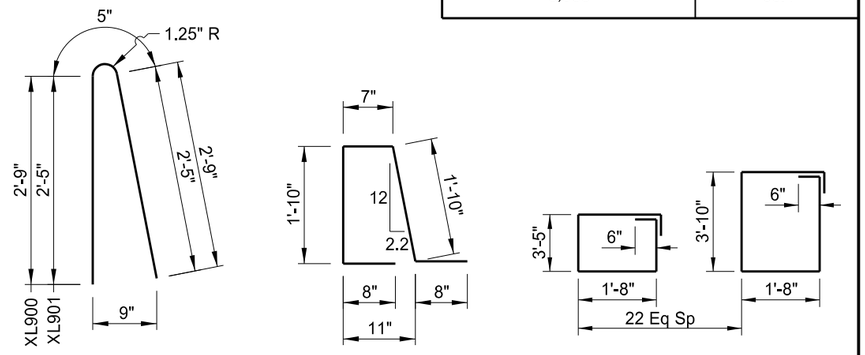
SKEW ANGLE = 0°

### BAR LIST - ONE SLAB

| SIZE | MARK | NO. | LENGTH |
|---|---|---|---|
| 7 | XA900 | 93 | 19'-8" |
| 5 | XA901 | 47 | 19'-8" |
| 5 | XA902 | 36 | 46'-2" |
| 4 | XA903 | 18 | 19'-8" |
| 4 | XA904 | 4 | 3'-0" |
| 4 | XA905 | 8 | 46'-2" |
| 6 | XA906 | 8 | 46'-2" |
| | | | |
| 5 | XK900 | 80 | 5'-7" |
| | | | |
| 5 | XL900 | 66 | 5'-11" |
| 5 | XL901 | 14 | 5'-3" |
| | | | |
| 5 | XSN900 | 2 | 266'-5" |
| | | | |

### ESTIMATED MATERIAL QUANTITIES

| REINFORCING STEEL (LBS) | CONCRETE (CY) |
|---|---|
| 8,988 | 60.1 |




XL900 & XL901 XK900 XSN900

BENT BAR DETAILS

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

PRELIMINARY

| QUANTITIES | (ONE SLAB) |
|---|---|
| APPROACH SLAB | 103.3 SY |

GIBBS TOWNSHIP SEPARATION

APPROACH SLAB DETAILS