

SWL

SEPTEMBER 2017

ORDER OF SHEETS

|               |   |
|---------------|---|
| Section No. 1 | Title   |
| Section No. 2 | Typical Sections and Details                      |
| Section No. 3 | Estimate of Quantities                            |
| Section No. 3 | Miscellaneous Quantities                          |
| Section No. 4 | Right of Way Plat                                 |
| Section No. 5 | Plan and Profile (Includes Erosion Control Plans) |
| Section No. 6 | Standard Detail Drawings                          |
| Section No. 7 | Sign Plates                                       |
| Section No. 8 | Structure Plans                                   |
| Section No. 9 | Computer Earthwork Data                           |
| Section No. 9 | Cross Sections                                    |

TOTAL SHEETS = 44 10

Sheets revised: 1-3,9



DESIGN DESIGNATION

|              |      |   |        |
|--------------|------|---|--------|
| A.A.D.T.     | 2018 | = | 100    |
| A.A.D.T.     | 2038 | = | 120    |
| D.H.V.       |      | = | 20     |
| D.D.         |      | = | 50/50  |
| T.           |      | = | 10.0%  |
| DESIGN SPEED |      | = | 25 MPH |
| ESALS        |      | = | N/A    |

Subcontractor List

Arbor Green, Inc.  
Hard Rock Sawing and Drilling  
Jewell Associates Engineers, Inc.  
Mathy Construction Co.  
Safemark, LLC  
St. Joseph Construction Co., Inc

CONVENTIONAL SYMBOLS

PLAN  
CORPORATE LIMITS

PROPERTY LINE

LOT LINE

LIMITED HIGHWAY EASEMENT

EXISTING RIGHT OF WAY

PROPOSED OR NEW R/W LINE

SLOPE INTERCEPT

REFERENCE LINE

EXISTING CULVERT

PROPOSED CULVERT  
(Box or Pipe)

COMBUSTIBLE FLUIDS

MARSH AREA

WOODED OR SHRUB AREA

PROFILE

GRADE LINE

ORIGINAL GROUND

MARSH OR ROCK PROFILE  
(To be noted as such)

SPECIAL DITCH

GRADE ELEVATION

CULVERT (Profile View)

UTILITIES

ELECTRIC

FIBER OPTIC

GAS

SANITARY SEWER

STORM SEWER

TELEPHONE

WATER

UTILITY PEDESTAL

POWER POLE

TELEPHONE POLE

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

PLAN OF PROPOSED IMPROVEMENT

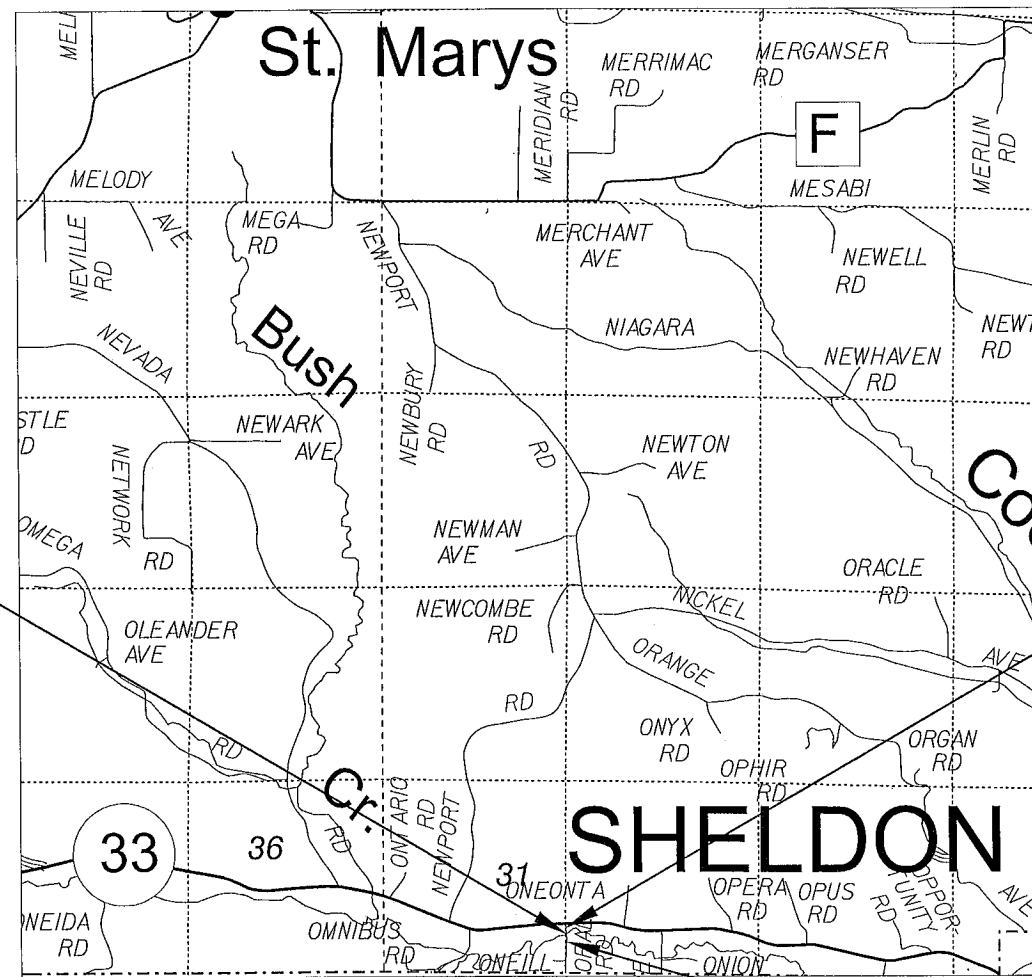
TOWN OF SHELDON, OPAL ROAD

(BRUSH CREEK BRIDGE B-41-0313)

TOWN ROAD  
MONROE COUNTY

STATE PROJECT NUMBER

5018-00-71



R-3-W

R-2-W

LAYOUT

SCALE 0 1 MILE

TOTAL NET LENGTH OF CENTERLINE = 0.045 MI

HORIZONTAL POSITIONS SHOWN ON THIS PLAN ARE WISCONSIN COUNTY COORDINATES, MONROE COUNTY, NAD83 (2011), IN U.S. SURVEY FEET. VALUES ARE GRID COORDINATES, GRID BEARINGS, AND GRID DISTANCES. GRID DISTANCES MAY BE USED AS GROUND DISTANCES.

STATE PROJECT

5018-00-71

FEDERAL PROJECT

PROJECT

WISC 2017450

CONTRACT

1

ACCEPTED FOR

TOWN of SHELDON

4/26/2017 (Date) Larry Bardin (Signature)

ACCEPTED FOR

COUNTY of MONROE

04/10/17 (Date) (Signature) (HIGHWAY COMMISSIONER)

ORIGINAL PLANS PREPARED BY

WISCONSIN PROFESSIONAL ENGINEER  
JOLIE A. SNYDER  
E-45364  
LODI WI  
3/29/17 (Date) (Signature) (Professional Engineer)

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

PREPARED BY

Surveyor MSA PROFESSIONAL SERVICES, INC.

Designer MSA PROFESSIONAL SERVICES, INC.

Management Consultant

KL ENGINEERING, INC.

APPROVED FOR THE DEPARTMENT MED For

DATE: 4/28/17 (Signature) (Management Consultant Signature)

E

5018-00-71

## BENCHMARKS

NAVD 88

| NO. | STA./OFFSET       | DESCRIPTION                   | ELEV.  |
|-----|-------------------|-------------------------------|--------|
| 1   | 10+18.4, 6.0 RT.  | CHIS + ON NE CORNER OF BRIDGE | 928.71 |
| 2   | 10+51.6, 30.4 RT. | 2 POLE NAILS IN 24" BOX ELDER | 924.82 |
| 3   | 10+19.5, 29.4 LT. | 2 POLE NAILS IN 12" BOX ELDER | 925.22 |

## DESIGN DATA

## LIVE LOAD:

DESIGN LOADING : HL-93  
 INVENTORY RATING FACTOR : 1.18  
 OPERATIONAL RATING FACTOR : 1.53  
 WISCONSIN STANDARD PERMIT VEHICLE (WIS-SPV) = 250 KIPS.  
 STRUCTURE IS DESIGNED FOR A FUTURE WEARING SURFACE OF 20 POUNDS PER SQUARE FOOT.

## TRAFFIC DATA:

A.A.D.T. (2018) = 100  
 A.A.D.T. (2038) = 120  
 RDS = 25 MPH

## MATERIAL PROPERTIES:

CONCRETE MASONRY, SLAB  $f'_c = 4,000$  P.S.I.  
 ALL OTHER  $f'_c = 3,500$  P.S.I.  
 HIGH-STRENGTH BAR STEEL REINFORCEMENT, GRADE 60  $f_y = 60,000$  P.S.I.

## FOUNDATION DATA:

ABUTMENTS TO BE SUPPORTED ON PILING STEEL HP 10-INCH X 42 LB. WITH PILE POINTS DRIVEN TO A REQUIRED DRIVING RESISTANCE OF 140 TONS \* PER PILE AS DETERMINED BY THE MODIFIED GATES DYNAMIC FORMULA. ESTIMATED PILE LENGTHS ARE 20'-0" AT BOTH ABUTMENT BODIES. ESTIMATED PILE LENGTHS ARE 20'-0" AT ALL WINGS.

\* THE FACTORED AXIAL RESISTANCE OF PILES IN COMPRESSION USED FOR DESIGN IS THE REQUIRED DRIVING RESISTANCE MULTIPLIED BY A RESISTANCE FACTOR OF 0.5 USING MODIFIED GATES TO DETERMINE DRIVEN PILE CAPACITY.

## HYDRAULIC DATA:

## 100 YEAR FREQUENCY

DRAINAGE AREA 24.9 SQ. MI.  
 $Q_{100}$  - TOTAL 5,200 C.F.S.  
 - THRU BRIDGE 1,489 C.F.S.  
 - OVERTOPPING ROADWAY 3,711 C.F.S.  
 VELOCITY - THRU BRIDGE 5.03 FT./SEC.  
 WATERWAY AREA - THRU BRIDGE 296 SQ. FT.  
 SCOUR CRITICAL CODE 8  
 HIGH WATER<sub>100</sub> ELEVATION 929.42  
 $Q_2$  ELEVATION (570 CFS) 921.23

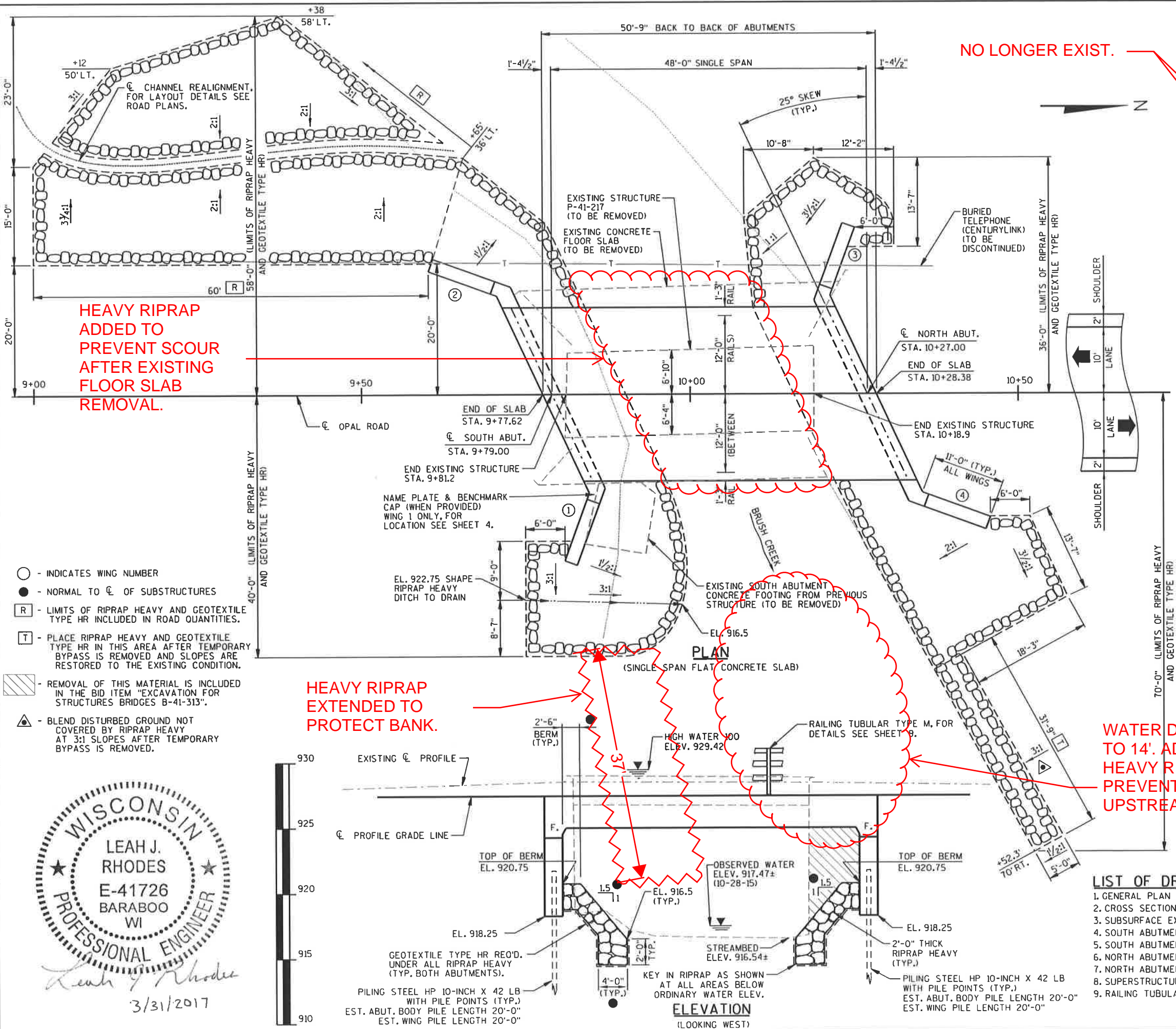
## ROADWAY OVERFLOW DESIGN

OVERTOPPING FREQUENCY 15 YEARS  
 $Q_{15}$  2,325 C.F.S.  
 HIGH WATER<sub>15</sub> ELEVATION 927.44

CONSULTANT DESIGN CONTACT:  
 LEAH RHODES  
 (608) 355-8945

BRIDGE OFFICE CONTACT:  
 WILLIAM DREHER  
 (608) 266-8489

NO LONGER EXIST.



3/31/2017



**GENERAL NOTES**

DRAWINGS SHALL NOT BE SCALED.

BAR STEEL REINFORCEMENT SHALL BE EMBEDDED 2" CLEAR UNLESS SHOWN OR NOTED OTHERWISE.

THE FIRST DIGIT OF A THREE DIGIT BAR MARK AND THE FIRST TWO DIGITS OF A FOUR DIGIT BAR MARK SIGNIFY THE BAR SIZE.

THE SLOPE OF THE FILL IN FRONT OF THE ABUTMENTS SHALL BE COVERED WITH RIPRAP HEAVY AND GEOTEXTILE TYPE HR TO THE LIMITS SHOWN ON SHEET 1 AND ON THE ABUTMENT SHEETS OR AS DIRECTED BY THE ENGINEER.

THE EXISTING GROUNDLINE SHALL BE THE UPPER LIMITS OF "EXCAVATION FOR STRUCTURES" FOR THE ABUTMENTS.

SLAB FALSEWORK SHALL BE SUPPORTED ON PILES OR THE SUBSTRUCTURE, UNLESS AN ALTERNATE METHOD IS APPROVED BY THE ENGINEER.

THIS STRUCTURE WILL REPLACE EXISTING STRUCTURE P-41-217, A 13 FT. WIDE BY 37.7 FT. LONG STEEL DECK GIRDER BRIDGE SUPPORTED ON FULL RETAINING CONCRETE ABUTMENTS. THE EXISTING STRUCTURE INCLUDES AN EXISTING CONCRETE FLOOR SLAB WHICH SHALL BE REMOVED. REMNANTS OF A CONCRETE FOOTING FROM A PREVIOUS STRUCTURE LOCATED NEAR THE SOUTHEAST WINGWALL SHALL ALSO BE REMOVED. REMOVAL OF THE SLAB AND FOOTING SHALL BE INCLUDED IN THE BID ITEM "REMOVING OLD STRUCTURE OVER WATERWAY WITH MINIMAL DEBRIS STATION 10+00".

Ⓑ BACKFILL PAY LIMITS, BACKFILL BEYOND BACKFILL PAY LIMITS SHALL BE INCIDENTAL TO EXCAVATION FOR STRUCTURES. LIMITS OF EXCAVATION SHALL BE DETERMINED BY THE CONTRACTOR.

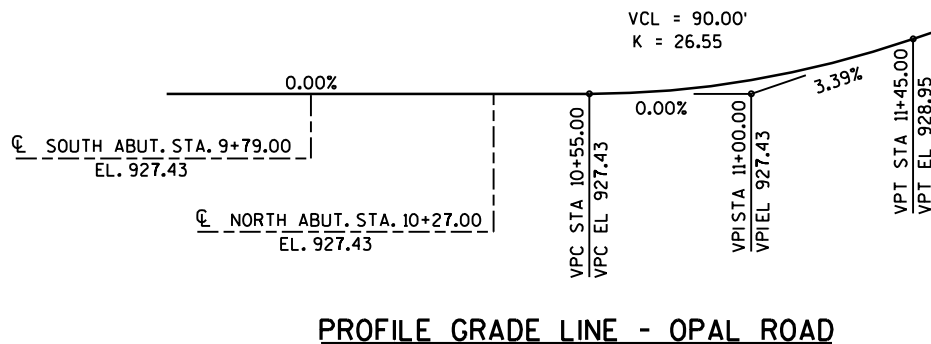
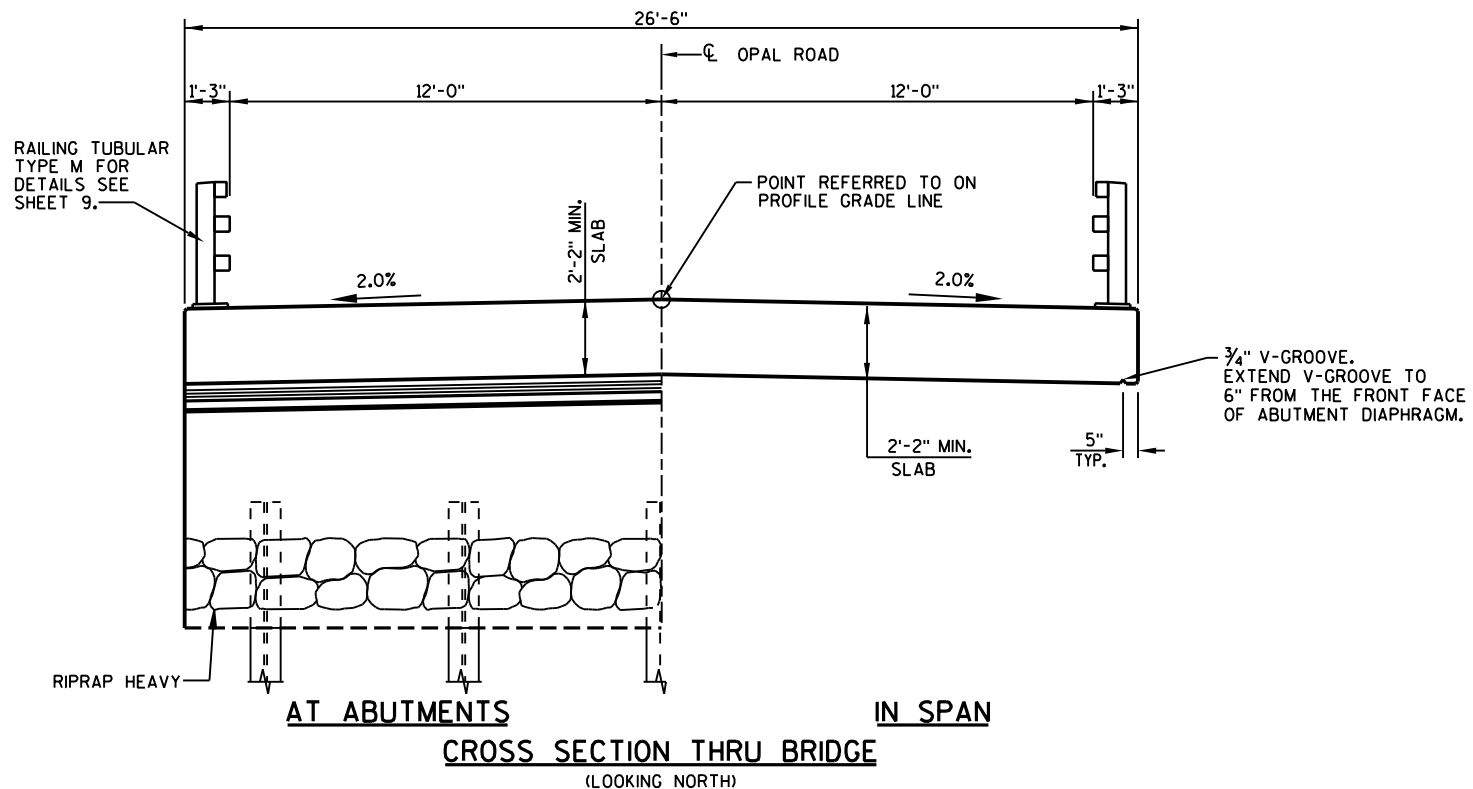
AT THE BACKFACE OF ABUTMENTS ALL EXCAVATED VOLUME WHICH CANNOT BE PLACED BEFORE ABUTMENT CONSTRUCTION AND IS NOT OCCUPIED BY THE NEW STRUCTURE SHALL BE BACKFILLED WITH BACKFILL STRUCTURE TYPE A.

DO NOT PLACE FILL ABOVE 3'-0" FROM THE BOTTOM OF ABUTMENT UNTIL THE SUPERSTRUCTURE IS IN PLACE.

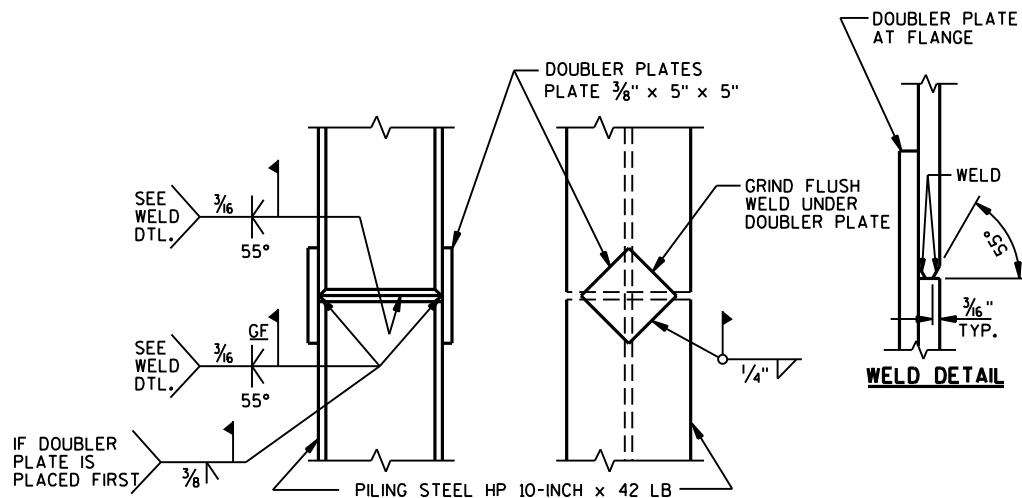
AFTER PLACEMENT OF SUPERSTRUCTURE CONCRETE, FOG THE SLAB AND CONTINUOUSLY WET IT IN ACCORDANCE TO STANDARD SPECIFICATIONS SUBSECTION 502.3.8.2.3(2) FOR CURING STRUCTURES 100 FEET OR GREATER IN LENGTH.

PROTECTIVE SURFACE TREATMENT SHALL BE APPLIED TO THE TOP AND EDGES OF SLAB, TO THE OUTSIDE 1'-0" OF THE UNDERSIDE OF SLAB, TO THE TOPS OF WINGS, AND TO THE EXPOSED FRONT FACES OF WINGS.

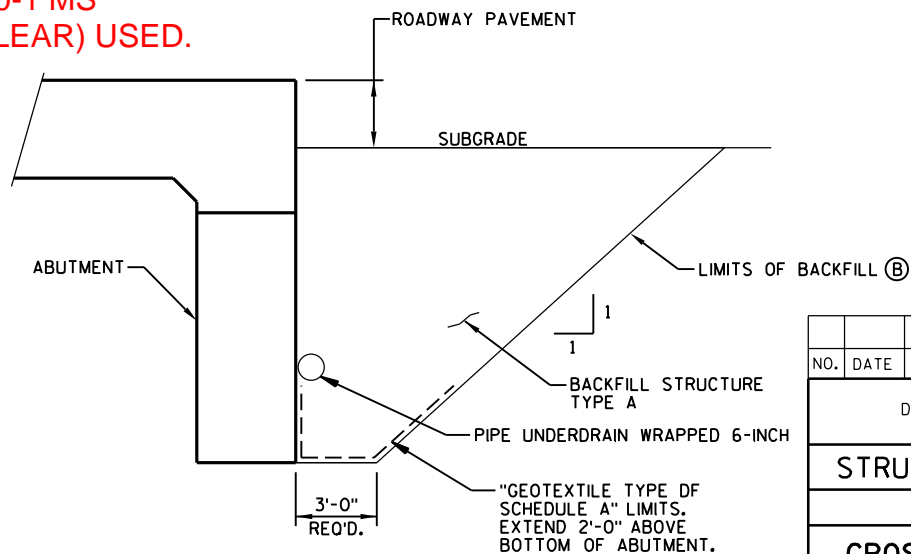
ELEVATIONS SHOWN ON THIS PLAN ARE REFERENCED TO USGS NAVD 88 (2012 ADJUSTED). BENCHMARK REFERENCES AT THE PROJECT SITE WERE SET BY THE CONSULTANT USING GPS TECHNOLOGY.

**TOTAL ESTIMATED QUANTITIES**

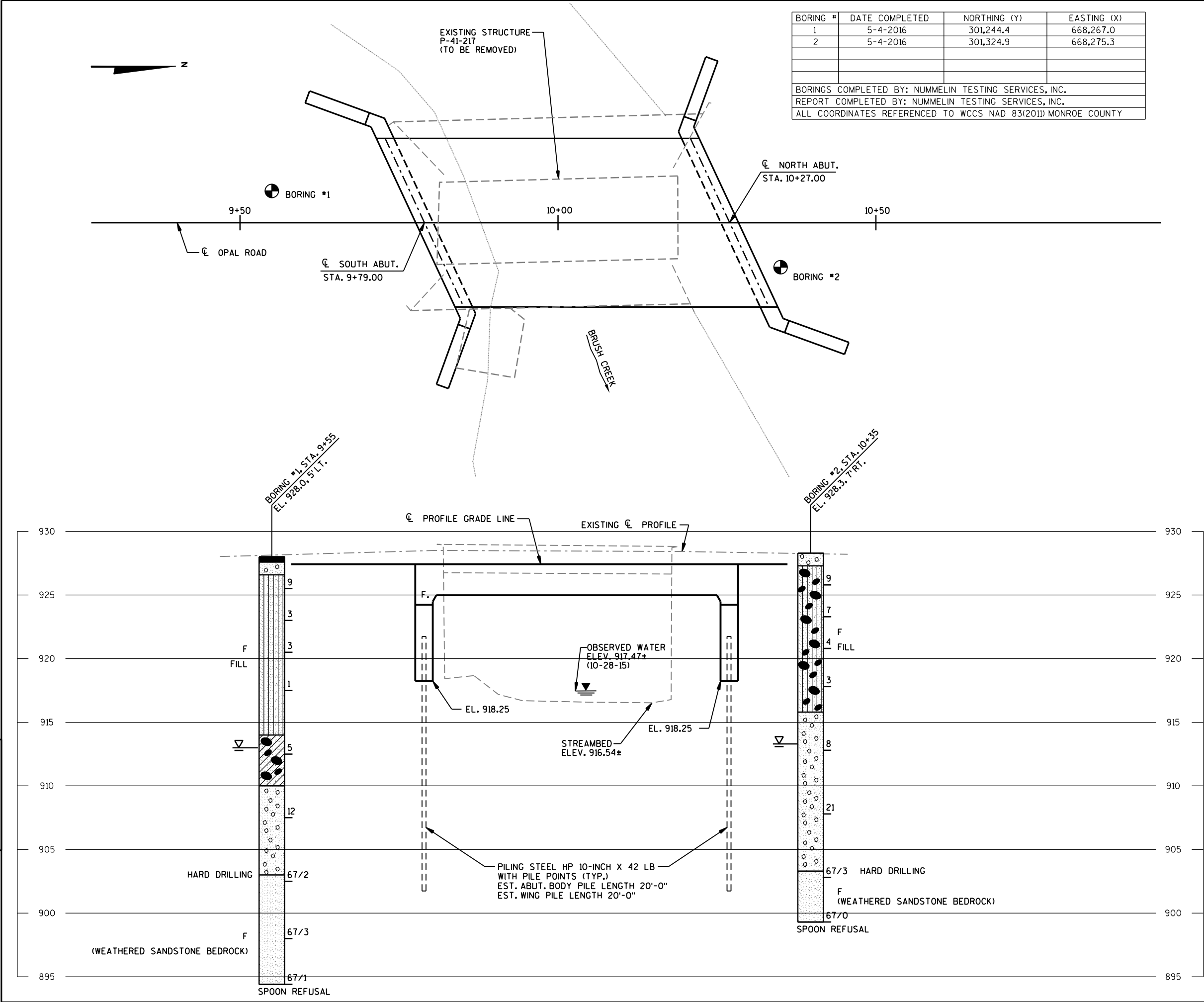
| ITEM NUMBER          | BID ITEM   | UNIT | SOUTH ABUT. | NORTH ABUT. | SUPER | TOTAL       |
|----------------------|--|------|-------------|-------------|-------|-------------|
| 203.0600.S.01        | REMOVING OLD STRUCTURE OVER WATERWAY WITH MINIMAL DEBRIS STATION 10+00 | LS   | -           | -           | -     | 1           |
| 206.1000.01          | EXCAVATION FOR STRUCTURES BRIDGES B-41-313                             | LS   | -           | -           | -     | 1           |
| 210.1500             | BACKFILL STRUCTURE TYPE A  | TON  | 190         | 190         | -     | 380         |
| 502.0100             | CONCRETE MASONRY BRIDGES   | CY   | 35          | 35          | 113   | 183         |
| 502.3200             | PROTECTIVE SURFACE TREATMENT   | SY   | 22          | 22          | 185   | 229         |
| 505.0400             | BAR STEEL REINFORCEMENT HS STRUCTURES                                  | LB   | 2290        | 2290        | -     | 4580        |
| 505.0600             | BAR STEEL REINFORCEMENT HS COATED STRUCTURES                           | LB   | 1735        | 1735        | 19500 | 22970       |
| 513.4061.01          | RAILING TUBULAR TYPE M B-41-313  | LF   | -           | -           | 105   | 105         |
| 516.0500             | RUBBERIZED MEMBRANE WATERPROOFING                                      | SY   | 6.5         | 6.5         | -     | 13          |
| 550.0500             | PILE POINTS  | EACH | 7           | 7           | -     | 14          |
| 550.1100             | PILING STEEL HP 10-INCH X 42 LB  | LF   | 140         | 140         | -     | 280         |
| 606.0300             | RIPRAP HEAVY   | CY   | 100         | 120         | -     | 220         |
| 612.0406             | PIPE UNDERDRAIN WRAPPED 6-INCH   | LF   | 95          | 95          | -     | 190         |
| 645.0111             | GEOTEXTILE TYPE DF SCHEDULE A  | SY   | 50          | 50          | -     | 100         |
| 645.0120             | GEOTEXTILE TYPE HR   | SY   | 180         | 225         | -     | 405         |
| SPV.0105.01          | TEMPORARY WATER DIVERSION, UNNAMED TRIBUTARY TO BRUSH CREEK            | LS   | -           | -           | -     | 1           |
| <b>NON-BID ITEMS</b> |  |      |             |             |       |             |
|                      | PREFORMED FILLER   | SIZE |             |             |       | 1/2" & 3/4" |

**PILE SPLICE DETAILS**

TK PRODUCTS  
590-1 MS  
(CLEAR) USED.



| NO.  | DATE | REVISION        | BY           |
|--|------|-----------------|--------------|
| STATE OF WISCONSIN<br>DEPARTMENT OF TRANSPORTATION |      |                 |              |
| STRUCTURE B-41-313                                 |      |                 |              |
| DRAWN BY RLR                                       |      | PLANS CK'D. JAS |              |
| CROSS SECTION, QUANTITIES & NOTES                  |      |                 | SHEET 2 OF 9 |



| BORING #  | DATE COMPLETED | NORTHING (Y) | EASTING (X) |
|---|----------------|--------------|-------------|
| 1   | 5-4-2016       | 301,244.4    | 668,267.0   |
| 2   | 5-4-2016       | 301,324.9    | 668,275.3   |
|   |                |              |             |
|   |                |              |             |
| BORINGS COMPLETED BY: NUMMELIN TESTING SERVICES, INC.         |                |              |             |
| REPORT COMPLETED BY: NUMMELIN TESTING SERVICES, INC.          |                |              |             |
| ALL COORDINATES REFERENCED TO WCCS NAD 83(2011) MONROE COUNTY |                |              |             |

STATE PROJECT NUMBER  
**5018-00-71**

MATERIAL SYMBOLS

ASPHALT

CONCRETE

SAND

BOULDERS OR COBBLES

SHALE

TOPSOIL

FILL

CLAY

LIMESTONE

SANDSTONE

PEAT

GRAVEL

SILT

BEDROCK (UNKNOWN)

IGNEOUS/META

LEGEND OF BORING

BORING #1 EL. STA./OFF-SET

ST (1) 0.25 (2) 17

▽

F-C

COBBLE OR BOULDER

WEATHERED LIMESTONE

CORE RUN #1 - 24'-29'

REC=80%, ROD=72%

(1) UNCONFINED STRENGTH, AS DETERMINED BY A POCKET PENETROMETER (TSF)

(2) UNLESS OTHERWISE, SPECIFIED THE SPT 'N' VALUE IS BASED ON AASHTO T-206, STANDARD PENETRATION TEST. THE SPT 'N' VALUE PRESENTED HAS NOT BEEN CORRECTED FOR OVERBURDEN PRESSURE OR HAMMER EFFICIENCY.

GROUND WATER ELEVATION

▽ AT TIME OF DRILLING

▽ END OF DRILLING

▽ AFTER DRILLING

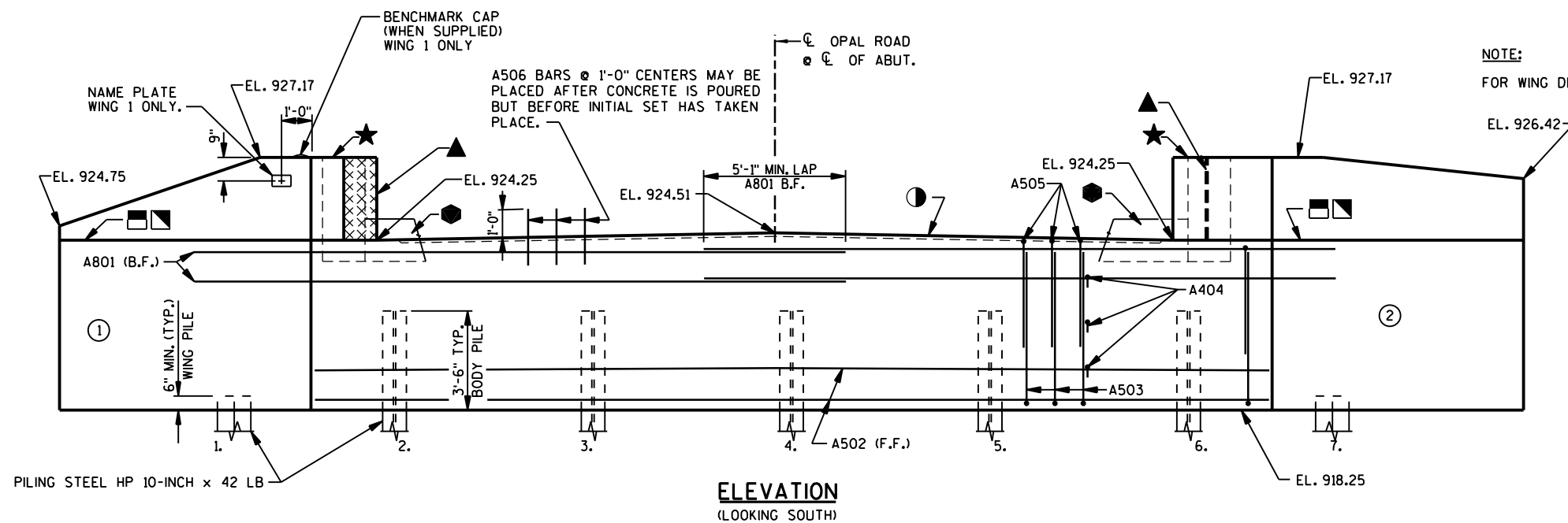
ABBREVIATIONS

F-FINE M-MEDIUM C-COARSE ST-SHELBY TUBE

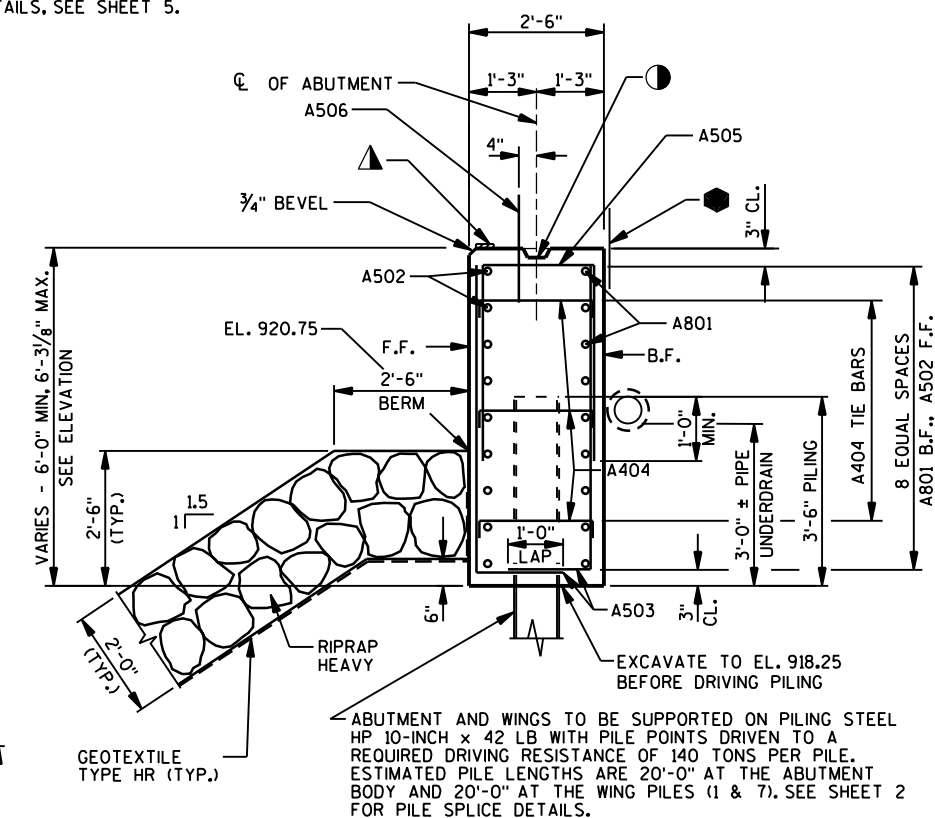
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION

BORINGS WERE COMPLETED AT POINTS APPROXIMATELY AS INDICATED ON THIS DRAWING TO OBTAIN INFORMATION CONCERNING THE CHARACTER OF SUBSURFACE MATERIALS FOUND AT THE SITE. BECAUSE THE INVESTIGATED DEPTHS ARE LIMITED AND THE AREA OF THE BORINGS IS VERY SMALL IN RELATION TO THE ENTIRE SITE, THE WISCONSIN DEPARTMENT OF TRANSPORTATION DOES NOT WARRANT SIMILAR SUBSURFACE CONDITIONS BELOW, BETWEEN, OR BEYOND THESE BORINGS. VARIATIONS IN SOIL CONDITIONS SHOULD BE EXPECTED AND FLUCTUATIONS IN GROUNDWATER LEVELS MAY OCCUR.

|  |      |              |                 |
|--|------|--------------|-----------------|
| NO.  | DATE | REVISION     | BY              |
| STATE OF WISCONSIN<br>DEPARTMENT OF TRANSPORTATION |      |              |                 |
| STRUCTURE  |      | B-41-313     |                 |
| DRAWN BY   |      | RLR          | PLANS CK'D. JAS |
| SUBSURFACE EXPLORATION                             |      | SHEET 3 OF 9 |                 |

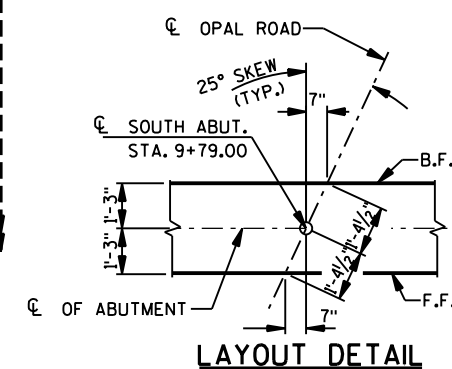
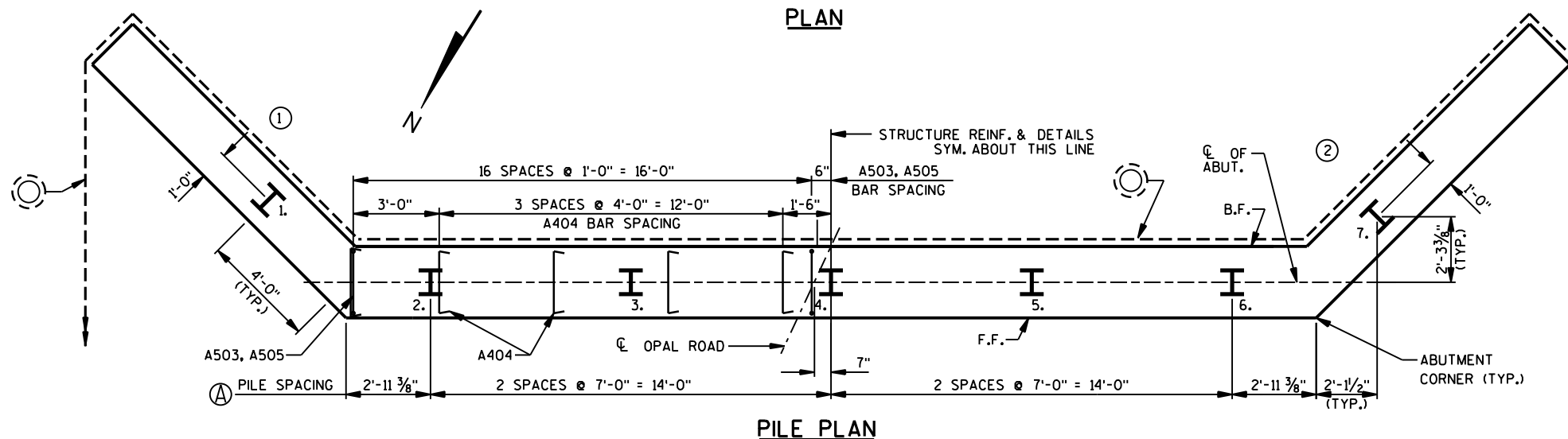
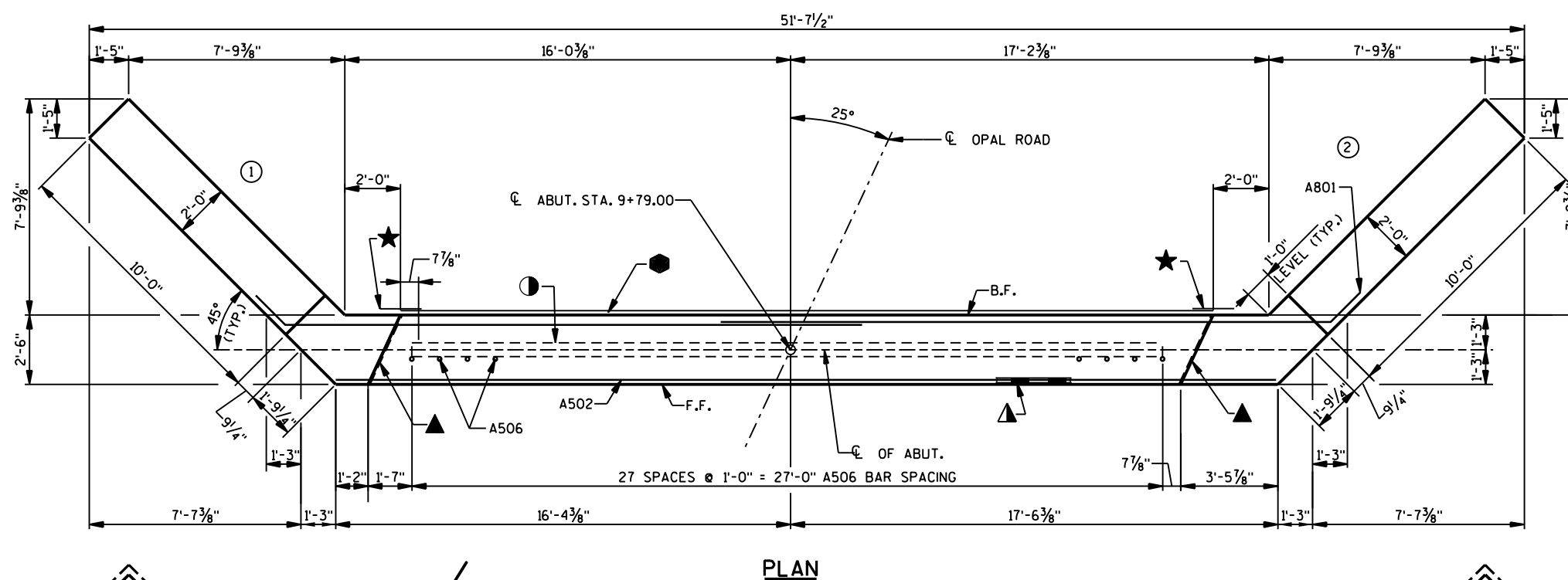


NOTE:  
FOR WING DETAILS, SEE SHEET 5.

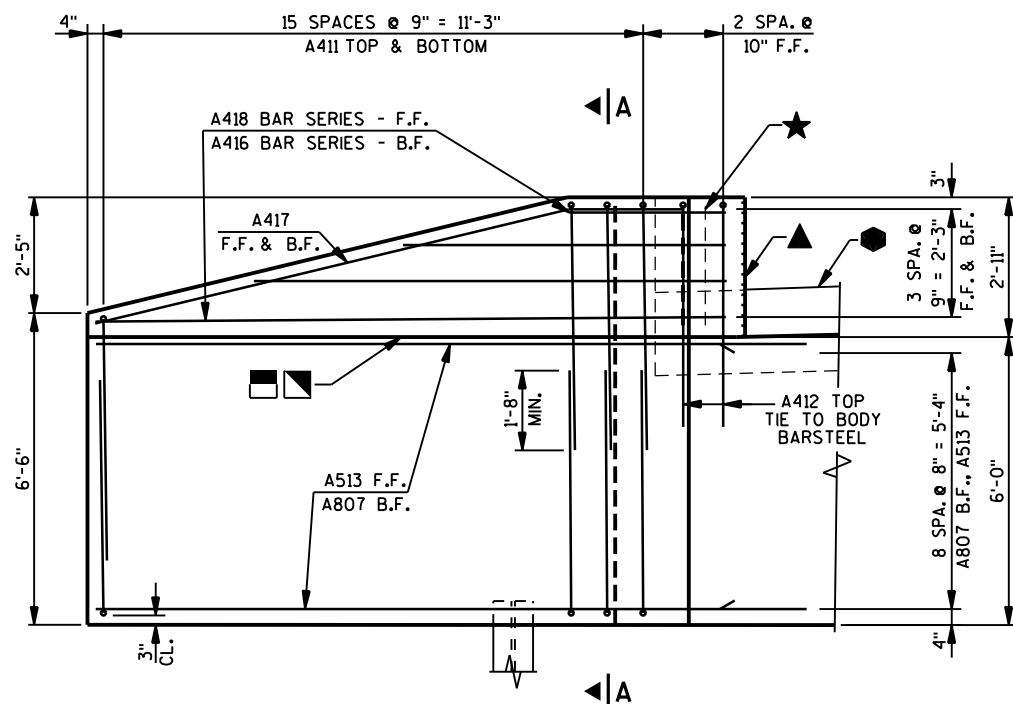


### LEGEND

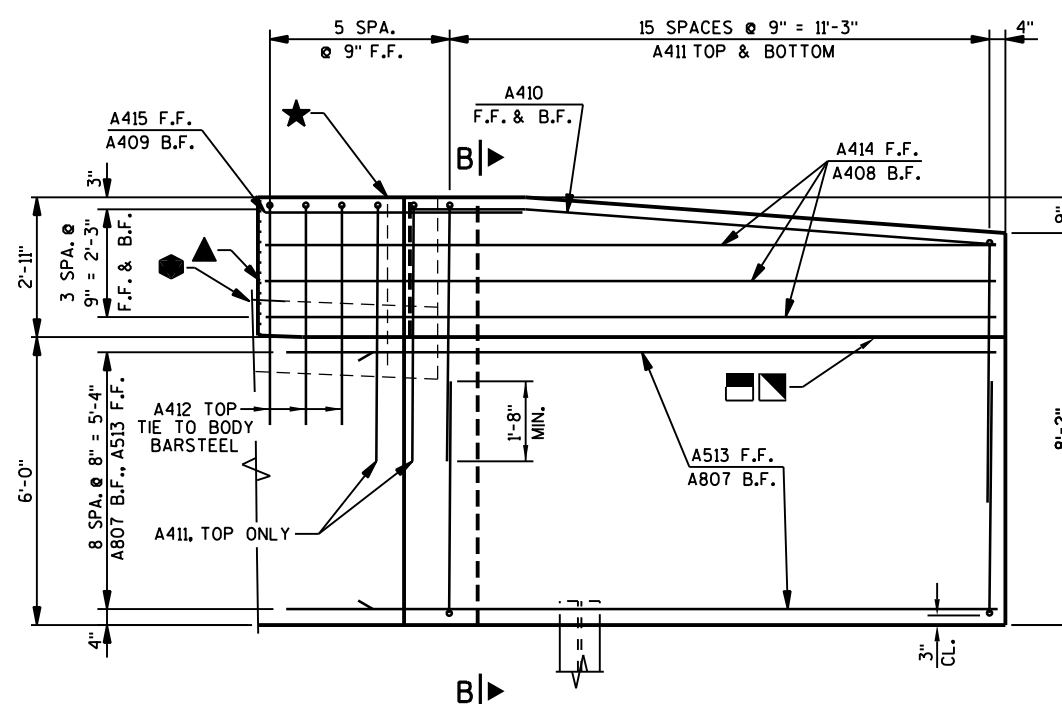
- — KEYED CONSTRUCTION JOINT FORMED BY BEVELED 2x6.
- ▲ — 1/2" FILLER EXTEND AS SHOWN. SEAL ALL EXPOSED HORIZ. & VERT. SURFACES OF FILLER WITH NON-STAINING GRAY, NON-BITUMINOUS JOINT SEALER. (1" DEEP & HOLD 1/8" BELOW SURFACE OF CONCRETE).
- ▲ — 4"x 3/4" FILLER, EXTEND FULL LENGTH OF ABUTMENT BETWEEN EDGES OF SLAB.
- ★ — VERTICAL 18" WIDE RUBBERIZED MEMBRANE WATERPROOFING. EXTEND FROM 9" BELOW BRIDGE SEAT TO TOP OF WINGS.
- — HORIZONTAL 18" WIDE RUBBERIZED MEMBRANE WATERPROOFING. EXTEND BETWEEN WINGS.
- — OPTIONAL KEYED CONST. JOINT ON WING FORMED BY BEVELED 2 X 6, IF JOINT IS USED, PLACE ● ON B.F. OF WING. COST OF ● IS INCIDENTAL TO BID ITEM "CONCRETE MASONRY BRIDGES".
- — 3/4" "V" GROOVE ON FRONT FACE OF WING WALL, REQUIRED ONLY WHERE CONSTRUCTION JOINT IS USED.
- — PIPE UNDERDRAIN WRAPPED 6-INCH. EXTEND THRU GEOTEXTILE FABRIC AT FACE OF RIPRAP HEAVY. SLOPE 0.5% MIN. TO SUITABLE DRAINAGE. PROVIDE RODENT SHIELD AT ENDS OF PIPE. FOR RODENT DETAILS, SEE SHEET 5.
- Ⓐ — EXISTING FOUNDATION TYPE IS UNKNOWN. IF EXISTING PILING ARE PRESENT AND THEY CONFLICT WITH THE NEW PILES, ADJUST THE LOCATION OF THE NEW PILES UP TO AN 8'-0" MAXIMUM PILE SPACING, KEEP PILES 2 AND 6 BETWEEN A MINIMUM OF 2'-0" AND A MAXIMUM OF 3'-6" FROM THE ABUTMENT CORNERS.
- — INDICATES WING NUMBER F.F.—FRONT FACE B.F.—BACK FACE CL.—CLEAR



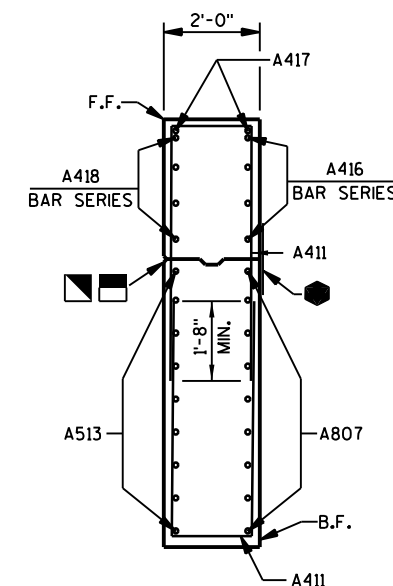
| NO.  | DATE | REVISION     | BY              |
|--|------|--------------|-----------------|
|  |      |              |                 |
| STATE OF WISCONSIN<br>DEPARTMENT OF TRANSPORTATION |      |              |                 |
| STRUCTURE  |      | B-41-313     |                 |
| DRAWN BY   |      | JDJ          | PLANS CK'D. JAS |
| SOUTH ABUTMENT                                     |      | SHEET 4 OF 9 |                 |



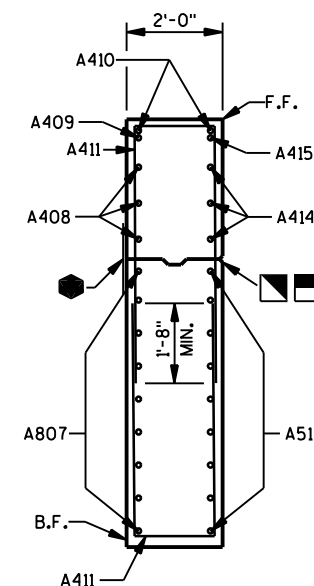
**ELEVATION - WING 1**  
(LOOKING AT F.F. OF WING)



**ELEVATION - WING 2**  
(LOOKING AT F.F. OF WING)



**SECTION A-A  
THRU WING 1**



**SECTION B-B  
THRU WING 2**

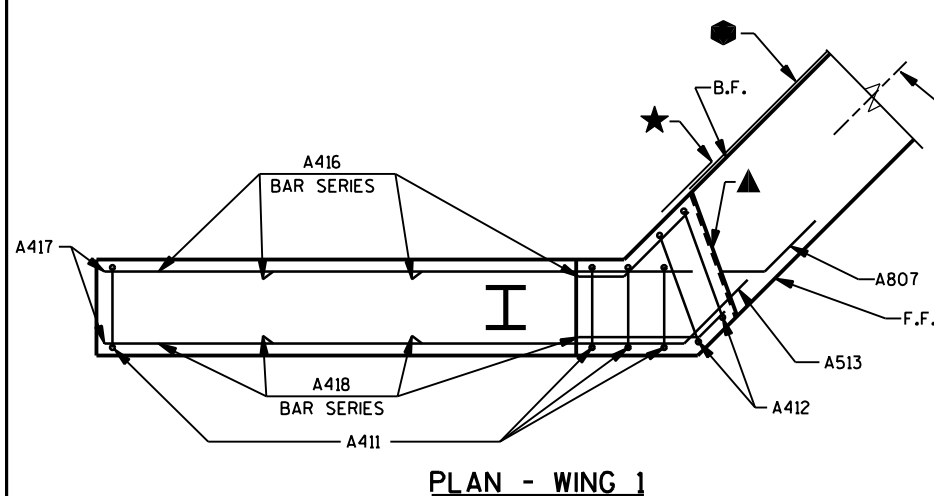
**UNCOATED 2290 LBS.  
COATED 1735 LBS.**

**BILL OF BARS (1 ABUTMENT)**

| MARK | NUMBER<br>COATED | REQUIRED<br>UNCOATED | LENGTH  | BENT | BAR<br>SERIES | LOCATION                            |
|------|------------------|----------------------|---------|------|---------------|-------------------------------------|
| A801 | -                | 18                   | 22'-11" | X    |               | ABUTMENT BODY - B.F. - HORIZ.       |
| A502 | -                | 9                    | 33'-10" |      |               | ABUTMENT BODY - F.F. - HORIZ.       |
| A503 | -                | 68                   | 7'-0"   | X    |               | ABUTMENT BODY - F.F. & B.F. - VERT. |
| A404 | -                | 30                   | 2'-9"   | X    |               | ABUTMENT BODY - TIES - HORIZ.       |
| A505 | -                | 34                   | 8'-11"  | X    |               | ABUTMENT BODY - TOP - VERT.         |
| A506 | 28               | -                    | 2'-0"   |      |               | ABUTMENT BODY - TOP DOWELS - VERT.  |
| A807 | 18               | -                    | 15'-2"  | X    |               | WINGS - B.F. - HORIZ.               |
| A408 | 3                | -                    | 12'-9"  | X    |               | WING 2 - B.F. - HORIZ.              |
| A409 | 1                | -                    | 4'-0"   | X    |               | WING 2 - B.F. - HORIZ.              |
| A410 | 2                | -                    | 12'-3"  | X    |               | WING 2 - F.F. & B.F. - TOP - HORIZ. |
| A411 | 66               | -                    | 11'-8"  | X    |               | WINGS - TOP & BOTTOM - VERT.        |
| A412 | 5                | -                    | 11'-6"  | X    |               | WINGS - TOP - VERT.                 |
| A513 | 18               | -                    | 13'-8"  | X    |               | WINGS - F.F. - HORIZ.               |
| A414 | 3                | -                    | 15'-2"  | X    |               | WING 2 - F.F. - HORIZ.              |
| A415 | 1                | -                    | 5'-4"   | X    |               | WING 2 - F.F. - HORIZ.              |
| A416 | 4                | -                    | 7'-9"   | X    | ⊙             | WING 1 - B.F. - HORIZ.              |
| A417 | 2                | -                    | 12'-4"  | X    |               | WING 1 - F.F. & B.F. - TOP - HORIZ. |
| A418 | 4                | -                    | 8'-3"   | X    | ⊙             | WING 1 - F.F. - HORIZ.              |

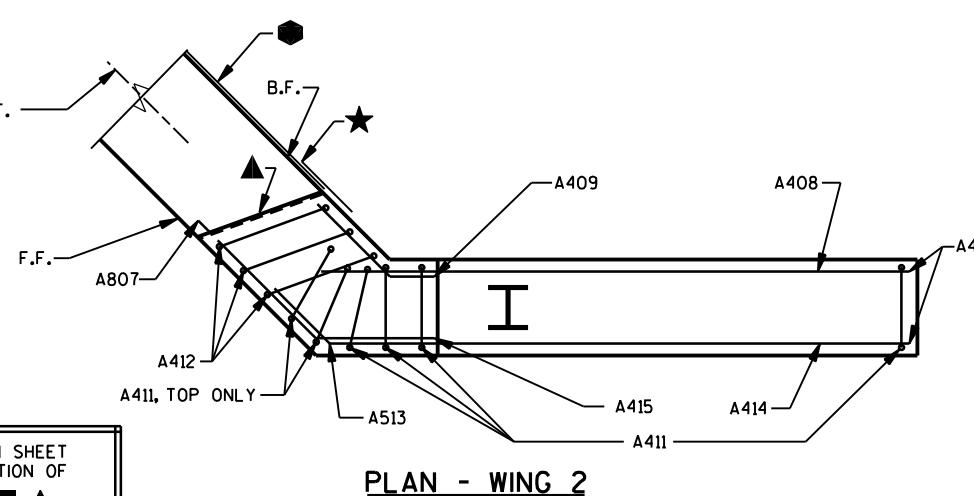
DIMENSIONS IN BENDING DETAILS ARE OUT TO OUT OF BAR.

⊙ - LENGTH SHOWN FOR BAR IS AN AVERAGE AND SHOULD ONLY BE USED FOR BAR WEIGHT CALCULATIONS. SEE BAR SERIES TABLE FOR ACTUAL LENGTHS. BENT BARS USED IN BAR SERIES TABLE SHALL BE BENT AFTER CUTTING.

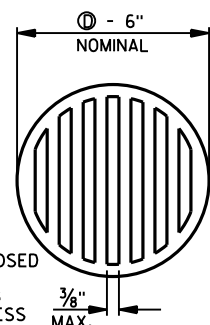


**PLAN - WING 1**

SEE LEGEND ON SHEET 4 FOR DESCRIPTION OF  
★ ● ▣ ▢ ▲

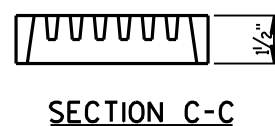


**PLAN - WING 2**



**RODENT SHIELD**

⊙ - DIMENSIONS ARE APPROXIMATE. THE GRATE IS SIZED TO FIT INTO A PIPE COUPLING.



**SECTION C-C**

| MARK | A      | B   |
|------|--------|-----|
| A801 | 1'-6"  | 45° |
| A807 | 1'-6"  | 45° |
| A513 | 1'-6"  | 45° |
| A408 | 1'-10" | 45° |
| A409 | 1'-10" | 45° |
| A410 | 2'-5"  | 5°  |
| A414 | 3'-0"  | 45° |
| A415 | 3'-0"  | 45° |
| A416 | 1'-9"  | 45° |
| A417 | 2'-5"  | 15° |
| A418 | 1'-0"  | 45° |

**STIRRUPS AND TIES**

| MARK | C      | D     |
|------|--------|-------|
| A404 | 4 1/2" | 2'-2" |
| A505 | 3'-6"  | 2'-2" |
| A411 | 5'-1"  | 1'-8" |
| A412 | 4'-8"  | 2'-4" |

| BAR MARK | NO. REQ'D.    | LENGTH           |
|----------|---------------|------------------|
| A416     | 1 SERIES OF 4 | 2'-10" TO 12'-8" |
| A418     | 1 SERIES OF 4 | 3'-4" TO 13'-2"  |

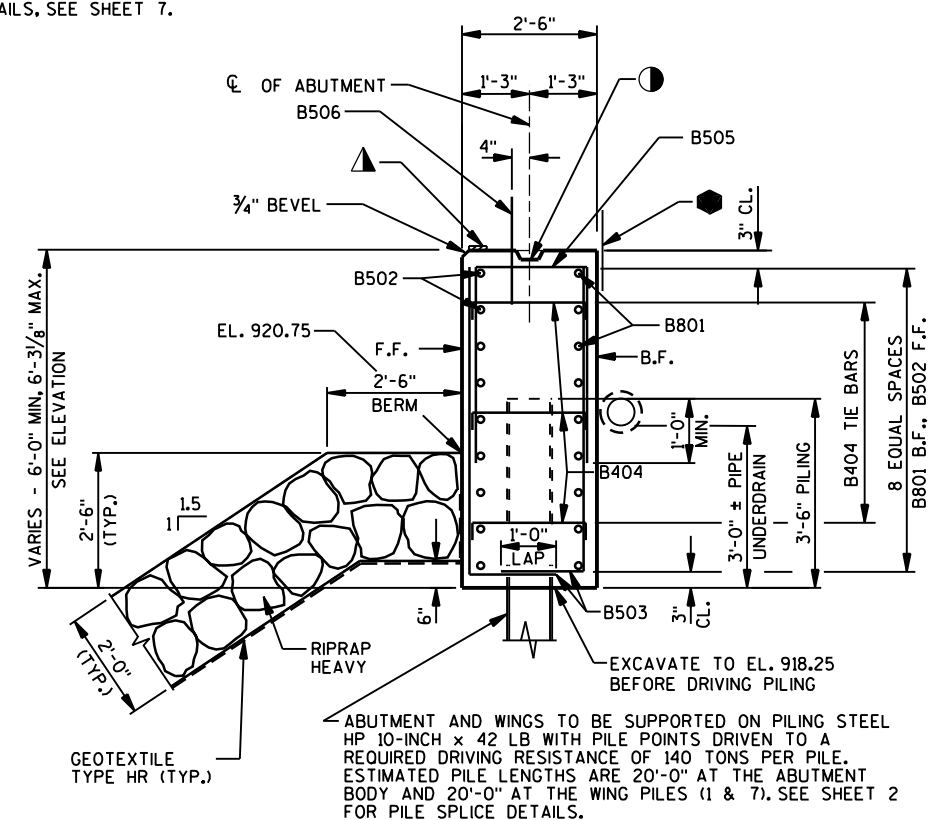
**BAR SERIES TABLE**

**RODENT SHIELD NOTES:**

ORIENT SHIELD SO SLOTS ARE VERTICAL.

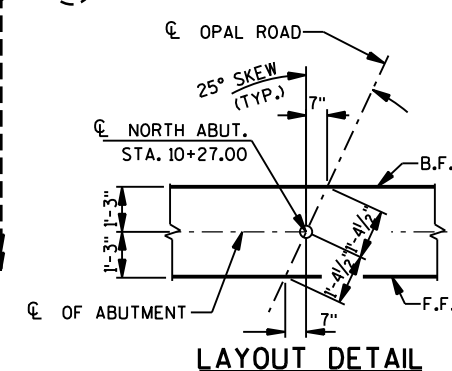
THE RODENT SHIELD SHALL BE A PVC GRATE SIMILAR TO THIS DETAIL. THE GRATE IS COMMERCIALY AVAILABLE AS A FLOOR STRAINER.

A PIPE COUPLING IS REQUIRED FOR THE ATTACHMENT OF THIS SHIELD TO THE EXPOSED END OF THE PIPE UNDERDRAIN. THE SHIELD SHALL BE FASTENED TO THE PIPE COUPLING WITH TWO OR MORE NO. 10 x 1-INCH STAINLESS STEEL SHEET METAL SCREWS. THE RODENT SHIELD, PIPE COUPLING AND SCREWS, SHALL BE INCLUDED IN THE BID ITEM "PIPE UNDERDRAIN WRAPPED 6-INCH".

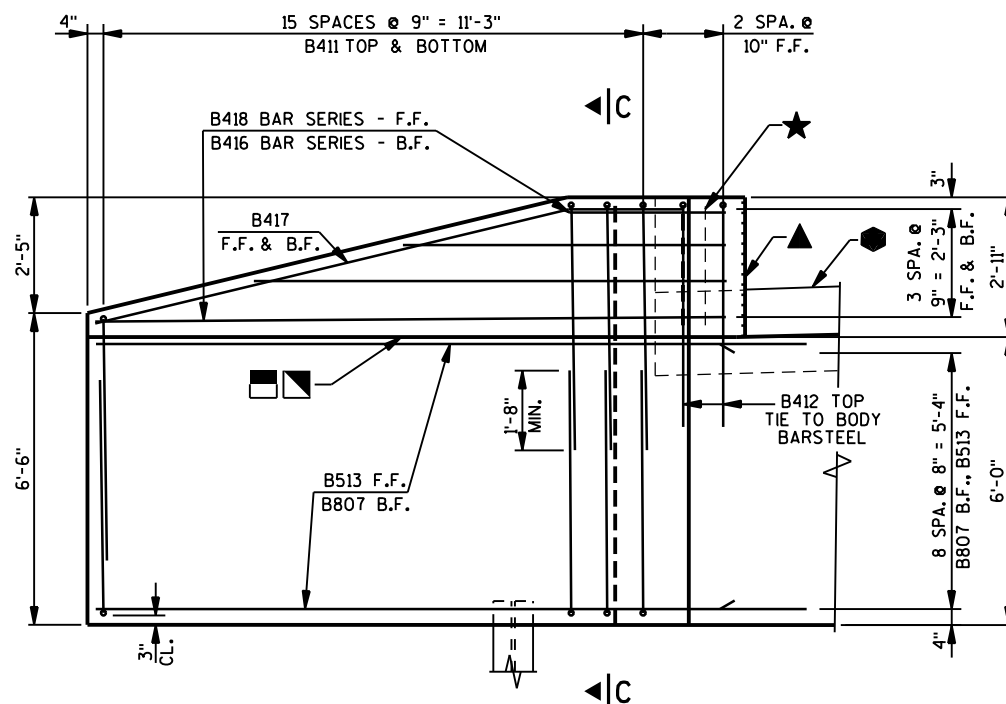


### LEGEND

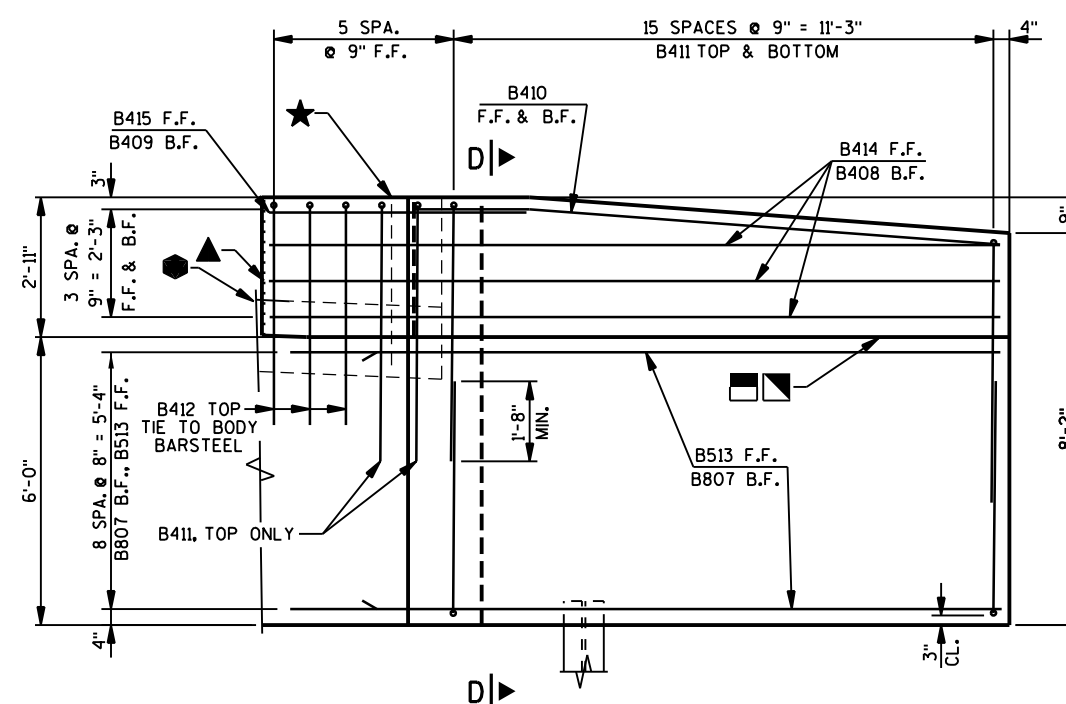
- — KEED CONSTRUCTION JOINT FORMED BY BEVELED 2x6.
- ▲ — 1/2" FILLER EXTEND AS SHOWN. SEAL ALL EXPOSED HORIZ. & VERT. SURFACES OF FILLER WITH NON-STAINING GRAY, NON-BITUMINOUS JOINT SEALER. (1" DEEP & HOLD 1/8" BELOW SURFACE OF CONCRETE).
- ▲ — 4"x 3/4" FILLER, EXTEND FULL LENGTH OF ABUTMENT BETWEEN EDGES OF SLAB.
- ★ — VERTICAL 18" WIDE RUBBERIZED MEMBRANE WATERPROOFING. EXTEND FROM 9" BELOW BRIDGE SEAT TO TOP OF WINGS.
- — HORIZONTAL 18" WIDE RUBBERIZED MEMBRANE WATERPROOFING. EXTEND BETWEEN WINGS.
- — OPTIONAL KEYED CONST. JOINT ON WING FORMED BY BEVELED 2 X 6. IF JOINT IS USED, PLACE ■ ON B.F. OF WING. COST OF ■ IS INCIDENTAL TO BID ITEM "CONCRETE MASONRY BRIDGES".
- ▣ — 3/4" "V" GROOVE ON FRONT FACE OF WING WALL, REQUIRED ONLY WHERE CONSTRUCTION JOINT IS USED.
- — PIPE UNDERDRAIN WRAPPED 6-INCH. EXTEND THRU GEOTEXTILE FABRIC AT FACE OF RIPRAP HEAVY. SLOPE 0.5% MIN. TO SUITABLE DRAINAGE. PROVIDE RODENT SHIELD AT ENDS OF PIPE. FOR RODENT DETAILS, SEE SHEET 5.
- Ⓐ — EXISTING FOUNDATION TYPE IS UNKNOWN. IF EXISTING PILING ARE PRESENT AND THEY CONFLICT WITH THE NEW PILES, ADJUST THE LOCATION OF THE NEW PILES UP TO AN 8'-0" MAXIMUM PILE SPACING. KEEP PILES 2 AND 6 BETWEEN A MINIMUM OF 2'-0" AND A MAXIMUM OF 3'-6" FROM THE ABUTMENT CORNERS.
- — INDICATES WING NUMBER F.F.— FRONT FACE B.F.—BACK FACE CL.—CLEAR



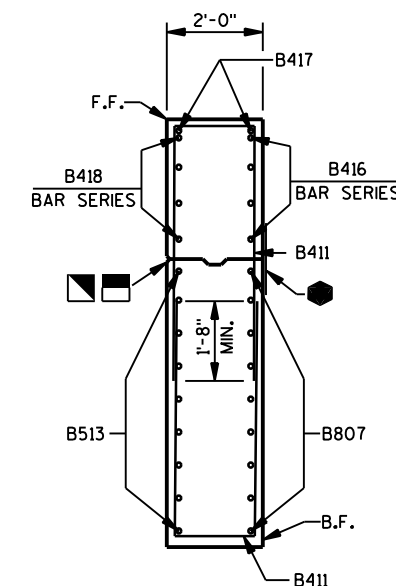
|  |      |              |                 |
|--|------|--------------|-----------------|
| NO.  | DATE | REVISION     | BY              |
| STATE OF WISCONSIN<br>DEPARTMENT OF TRANSPORTATION |      |              |                 |
| STRUCTURE  |      | B-41-313     |                 |
| DRAWN BY   |      | JDJ          | PLANS CK'D. JAS |
| NORTH<br>ABUTMENT                                  |      | SHEET 6 OF 9 |                 |
|  |      |              |                 |



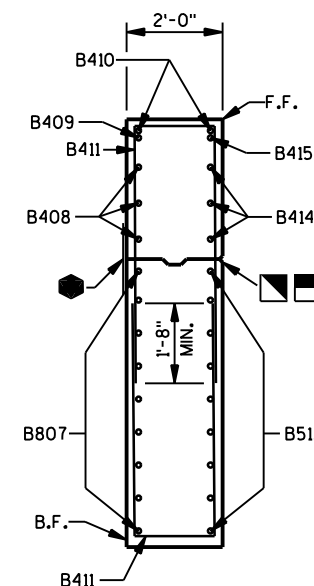
**ELEVATION - WING 3**  
(LOOKING AT F.F. OF WING)



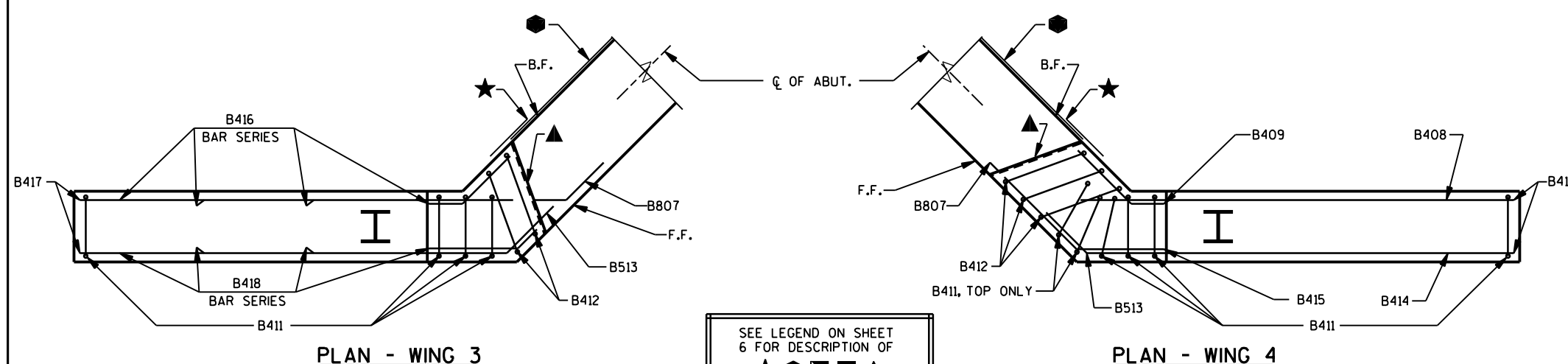
**ELEVATION - WING 4**  
(LOOKING AT F.F. OF WING)



**SECTION C-C**  
**THRU WING 3**



**SECTION D-D**  
**THRU WING 4**



**PLAN - WING 3**

**PLAN - WING 4**

SEE LEGEND ON SHEET  
6 FOR DESCRIPTION OF



**BILL OF BARS (1 ABUTMENT)**

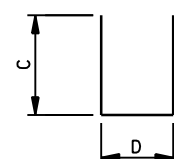
**UNCOATED 2290 LBS.**  
**COATED 1735 LBS.**

| MARK   | NUMBER REQUIRED | LENGTH | BENT    | BAR SERIES | LOCATION                            |
|--------|-----------------|--------|---------|------------|-------------------------------------|
| COATED | UNCOATED        |        |         |            |                                     |
| B801   | -               | 18     | 22'-11" | X          | ABUTMENT BODY - B.F. - HORIZ.       |
| B502   | -               | 9      | 33'-10" |            | ABUTMENT BODY - F.F. - HORIZ.       |
| B503   | -               | 68     | 7'-0"   | X          | ABUTMENT BODY - F.F. & B.F. - VERT. |
| B404   | -               | 30     | 2'-9"   | X          | ABUTMENT BODY - TIES - HORIZ.       |
| B505   | -               | 34     | 8'-11"  | X          | ABUTMENT BODY - TOP - VERT.         |
| B506   | 28              | -      | 2'-0"   |            | ABUTMENT BODY - TOP DOWELS - VERT.  |
| B807   | 18              | -      | 15'-2"  | X          | WINGS - B.F. - HORIZ.               |
| B408   | 3               | -      | 12'-9"  | X          | WING 4 - B.F. - HORIZ.              |
| B409   | 1               | -      | 4'-0"   | X          | WING 4 - B.F. - HORIZ.              |
| B410   | 2               | -      | 12'-3"  | X          | WING 4 - F.F. & B.F. - TOP - HORIZ. |
| B411   | 66              | -      | 11'-8"  | X          | WINGS - TOP & BOTTOM - VERT.        |
| B412   | 5               | -      | 11'-6"  | X          | WINGS - TOP - VERT.                 |
| B513   | 18              | -      | 13'-8"  | X          | WINGS - F.F. - HORIZ.               |
| B414   | 3               | -      | 15'-2"  | X          | WING 4 - F.F. - HORIZ.              |
| B415   | 1               | -      | 5'-4"   | X          | WING 4 - F.F. - HORIZ.              |
| B416   | 4               | -      | 7'-9"   | X          | WING 3 - B.F. - HORIZ.              |
| B417   | 2               | -      | 12'-4"  | X          | WING 3 - F.F. & B.F. - TOP - HORIZ. |
| B418   | 4               | -      | 8'-3"   | X          | WING 3 - F.F. - HORIZ.              |

DIMENSIONS IN BENDING DETAILS ARE OUT TO OUT OF BAR.

Ⓢ - LENGTH SHOWN FOR BAR IS AN AVERAGE AND SHOULD ONLY BE USED FOR BAR WEIGHT CALCULATIONS. SEE BAR SERIES TABLE FOR ACTUAL LENGTHS. BENT BARS USED IN BAR SERIES TABLE SHALL BE BENT AFTER CUTTING.

| MARK                 | A      | B   |
|----------------------|--------|-----|
| B801<br>B807<br>B513 | 1'-6"  | 45° |
| B408<br>B409         | 1'-10" | 45° |
| B410                 | 2'-5"  | 5°  |
| B414<br>B415         | 3'-0"  | 45° |
| B416                 | 1'-9"  | 45° |
| B417                 | 2'-5"  | 15° |
| B418                 | 1'-0"  | 45° |



**STIRRUPS AND TIES**

| MARK | C      | D     |
|------|--------|-------|
| B404 | 4 1/2" | 2'-2" |
| B505 | 3'-6"  | 2'-2" |
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| BAR MARK | NO. REQ'D.    | LENGTH           |
|----------|---------------|------------------|
| B416     | 1 SERIES OF 4 | 2'-10" TO 12'-8" |
| B418     | 1 SERIES OF 4 | 3'-4" TO 13'-2"  |

**BAR SERIES TABLE**

| NO.  | DATE | REVISION        | BY |
|--|------|-----------------|----|
| STATE OF WISCONSIN<br>DEPARTMENT OF TRANSPORTATION |      |                 |    |
| <b>STRUCTURE B-41-313</b>                          |      |                 |    |
| DRAWN BY RLR                                       |      | PLANS CK'D. JAS |    |
| <b>NORTH ABUTMENT DETAILS</b>                      |      | SHEET 7 OF 9    |    |



## GENERAL NOTES

ALL SLAB THICKNESS DIMENSIONS ARE MINIMUM. ANY TOLERANCES NECESSARY TO CORRECT CONSTRUCTION DISCREPANCIES ARE TO BE PLUS (+).

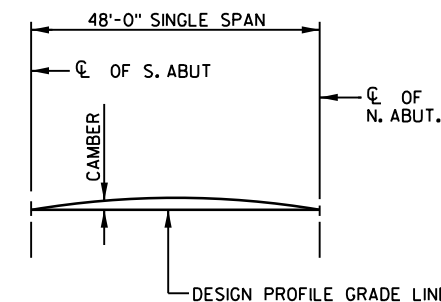
TOP TRANSVERSE BARS IN SLAB SHALL BE SUPPORTED BY INDIVIDUAL BAR CHAIRS AT APPROXIMATELY 3'-0" CENTERS EACH WAY. BOTTOM LONGITUDINAL BARS SHALL BE SUPPORTED BY CONTINUOUS BAR CHAIRS AT APPROXIMATELY 4'-0" CENTERS.

ALL TRANSVERSE BAR STEEL REINFORCEMENT SHALL BE PLACED ON THE SKEW.

## BILL OF BARS (COATED) 19,500 LBS.

| MARK  | NO. REQ'D. | LENGTH  | BENT | LOCATION                          |
|-------|------------|---------|------|-----------------------------------|
| S501  | 54         | 7'-9"   | X    | DIAPHRAGM @ ABUTS. - LONGIT.      |
| S1102 | 27         | 50'-4"  |      | SLAB BOTTOM - LONGIT.             |
| S1103 | 26         | 38'-5"  |      | SLAB BOTTOM - LONGIT.             |
| S504  | 132        | 28'-10" |      | SLAB TOP & BOTTOM - TRANS.        |
| S405  | 72         | 26'-5"  |      | SLAB TOP - LONGIT.                |
| S606  | 36         | 12'-0"  | X    | SLAB TOP @ RAIL POST, 2 PER POST  |
| S607  | 56         | 6'-0"   |      | SLAB TOP @ RAIL POST, 4 PER POST  |
| S608  | 16         | 6'-0"   | X    | SLAB TOP @ RAIL END POST AS NOTED |

DIMENSIONS IN BENDING DETAILS ARE OUT TO OUT OF BAR.  
EPOXY COAT ALL SUPERSTRUCTURE BAR STEEL REINFORCEMENT.



## CAMBER DIAGRAM

CAMBER SPANS AS SHOWN ABOVE AND IN THE TABLE OF VALUES TO PROVIDE FOR DEAD LOAD DEFLECTION AND FUTURE CREEP. CAMBER DOES NOT INCLUDE ALLOWANCE FOR FORM SETTLEMENT. DEAD LOAD DEFLECTION APPROXIMATES 1/3 OF CAMBER VALUES SHOWN.

TO DETERMINE FALSEWORK ELEVATION AT EDGE OF SLAB, CROWN OR REFERENCE LINE, FOLLOW THIS PROCEDURE:

- TOP OF SLAB ELEVATION AT FINAL GRADE
- SLAB THICKNESS
- + CAMBER
- + FORM SETTLEMENT/DEFLECTION DUE TO PLACEMENT OF SLAB CONCRETE (TO BE COMPUTED BY THE CONTRACTOR)
- = TOP OF SLAB FALSEWORK ELEVATION

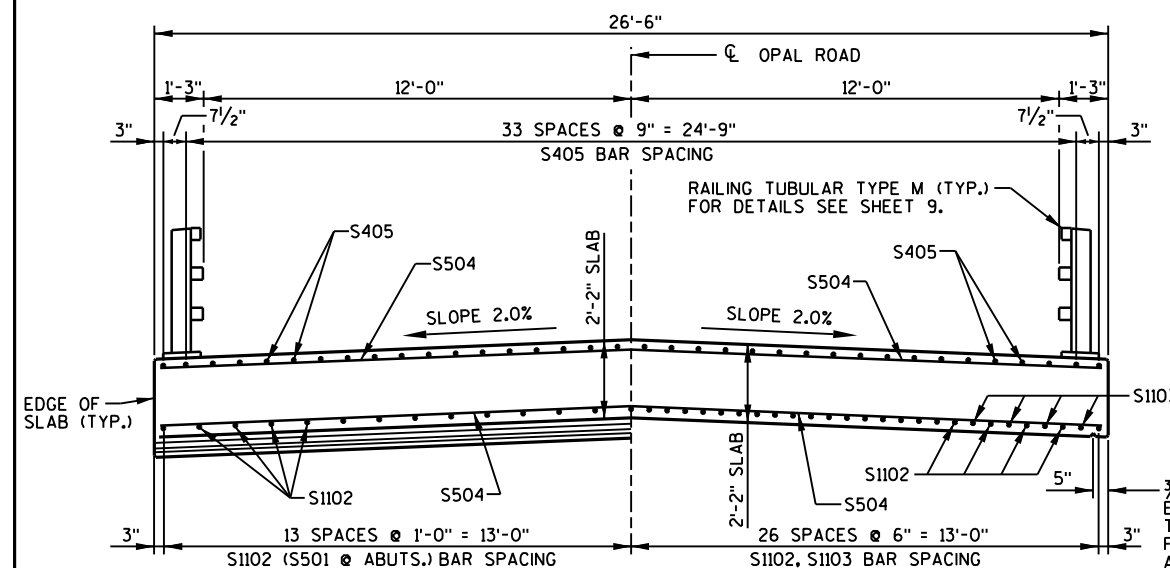
## SURVEY TOP OF SLAB ELEVATIONS

| LOCATION    | SPAN POINT | WEST SLAB EDGE | C/L OPAL ROAD | EAST SLAB EDGE |
|-------------|------------|----------------|---------------|----------------|
| SOUTH ABUT. | 1.0        | 927.22         | 927.42        | 927.18         |
|             | 1.5        | 927.41         | 927.62        | 927.36         |
| NORTH ABUT. | 2.0        | 927.18         | 927.39        | 927.11         |

PRIOR TO RELEASING SLAB FALSEWORK, TAKE TOP OF SLAB ELEVATIONS AT THE C OF ABUTMENTS AND AT THE 0.5 PTS. TO VERIFY CAMBER. TAKE ELEVATIONS ALONG EDGE OF SLAB AND CROWN OR C. RECORD THE ELEVATIONS IN THE ABOVE TABLE FOR THE "AS BUILT" PLANS.

## TOP OF SLAB ELEVATIONS AND CAMBER VALUES

| LOCATION    | SPAN POINT | EAST SLAB EDGE | C/L OPAL ROAD | WEST SLAB EDGE | CAMBER VALUE (INCHES) |
|-------------|------------|----------------|---------------|----------------|-----------------------|
| SOUTH ABUT. | 1.0        | 927.17         | 927.43        | 927.17         | 0.0                   |
|             | 1.1        | 927.17         | 927.43        | 927.17         | 0.6                   |
|             | 1.2        | 927.17         | 927.43        | 927.17         | 1.1                   |
|             | 1.3        | 927.17         | 927.43        | 927.17         | 1.5                   |
|             | 1.4        | 927.17         | 927.43        | 927.17         | 1.8                   |
|             | 1.5        | 927.17         | 927.43        | 927.17         | 1.9                   |
|             | 1.6        | 927.17         | 927.43        | 927.17         | 1.8                   |
|             | 1.7        | 927.17         | 927.43        | 927.17         | 1.5                   |
|             | 1.8        | 927.17         | 927.43        | 927.17         | 1.1                   |
|             | 1.9        | 927.17         | 927.43        | 927.17         | 0.6                   |
| NORTH ABUT. | 2.0        | 927.17         | 927.43        | 927.17         | 0.0                   |

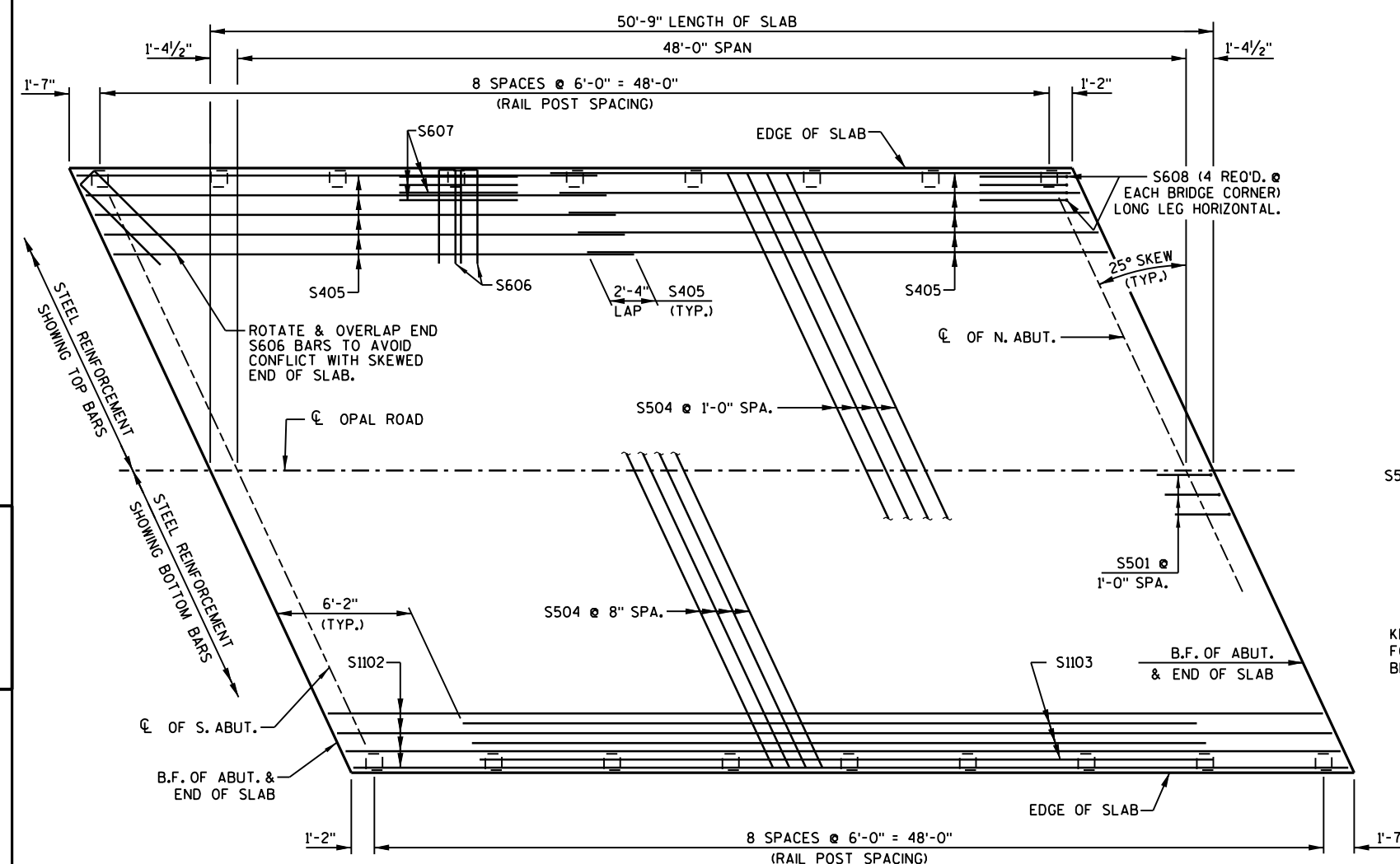
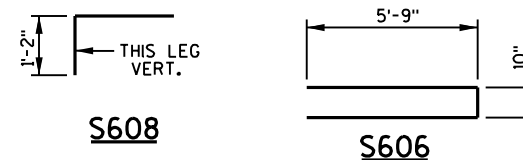


## AT ABUTMENTS

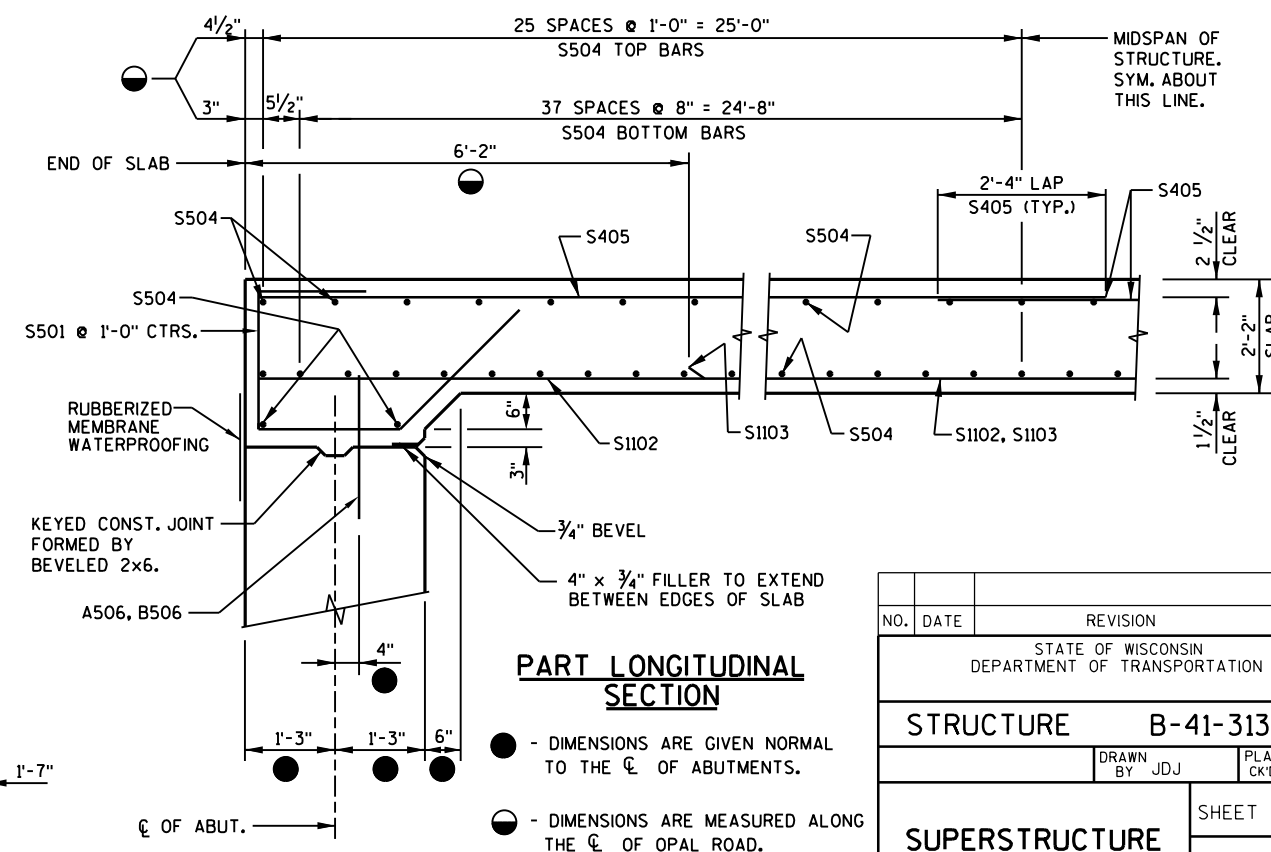
## IN SPAN

## CROSS SECTION THRU BRIDGE

(LOOKING NORTH)



## PLAN

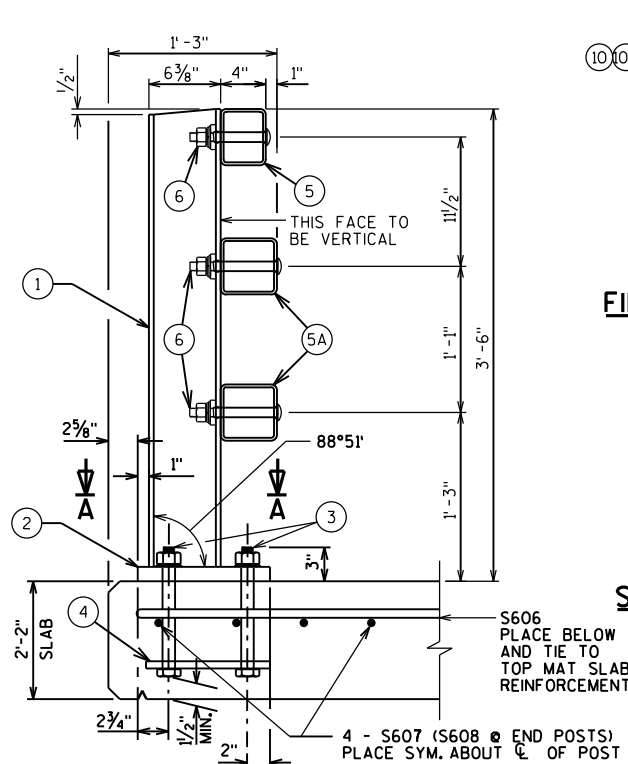


## PART LONGITUDINAL SECTION

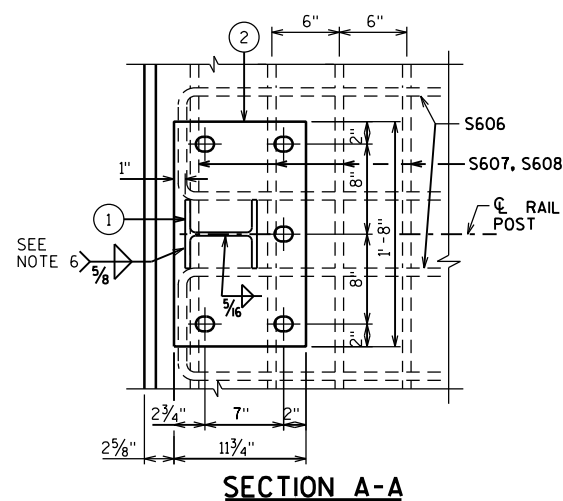
● - DIMENSIONS ARE GIVEN NORMAL TO THE C OF ABUTMENTS.

● - DIMENSIONS ARE MEASURED ALONG THE C OF OPAL ROAD.

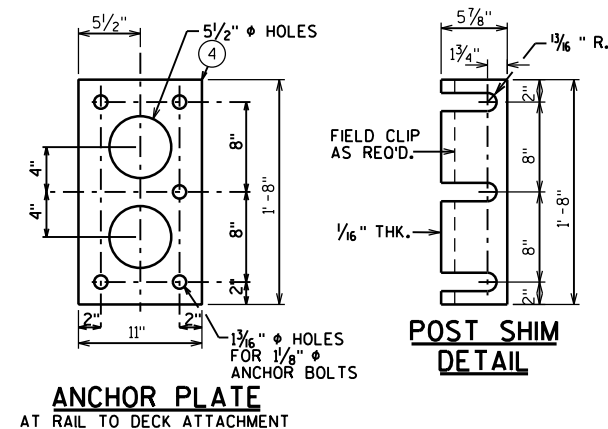
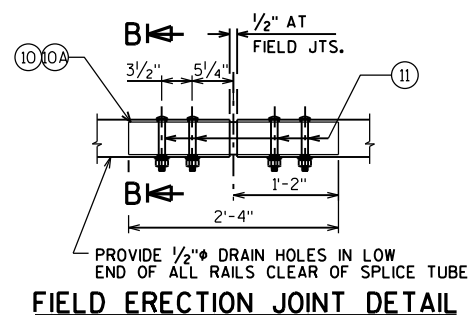
| NO.  | DATE | REVISION        | BY           |
|--|------|-----------------|--------------|
|  |      |                 |              |
| STATE OF WISCONSIN<br>DEPARTMENT OF TRANSPORTATION |      |                 |              |
| STRUCTURE B-41-313                                 |      |                 |              |
| DRAWN BY JDJ                                       |      | PLANS CK'D. JAS |              |
| SUPERSTRUCTURE                                     |      |                 | SHEET 8 OF 9 |



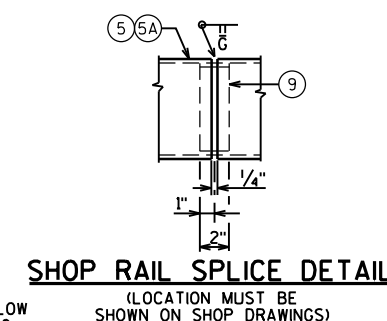
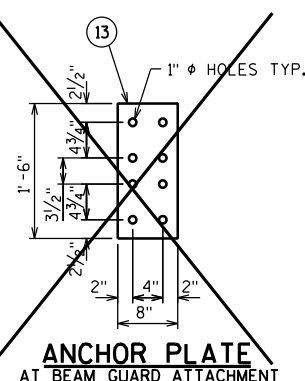
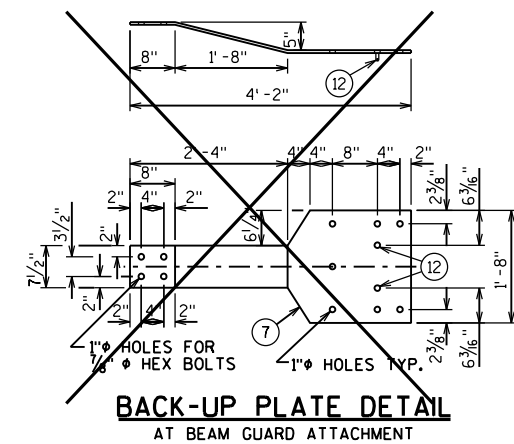
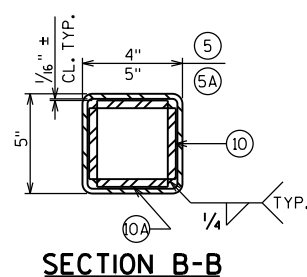
SECTION THRU RAILING ON SLAB



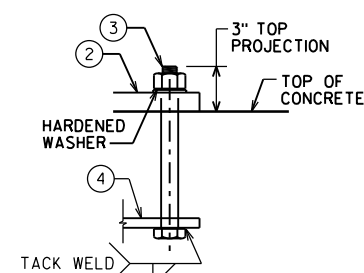
SECTION A-A

ANCHOR PLATE  
AT RAIL TO DECK ATTACHMENTPOST SHIM  
DETAIL

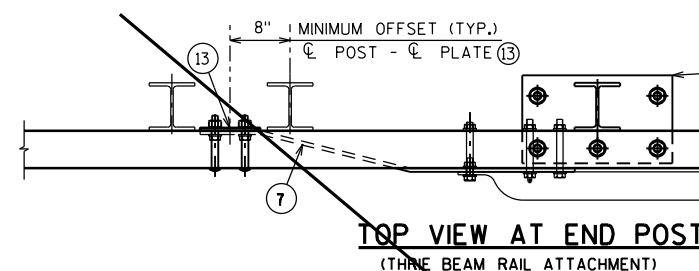
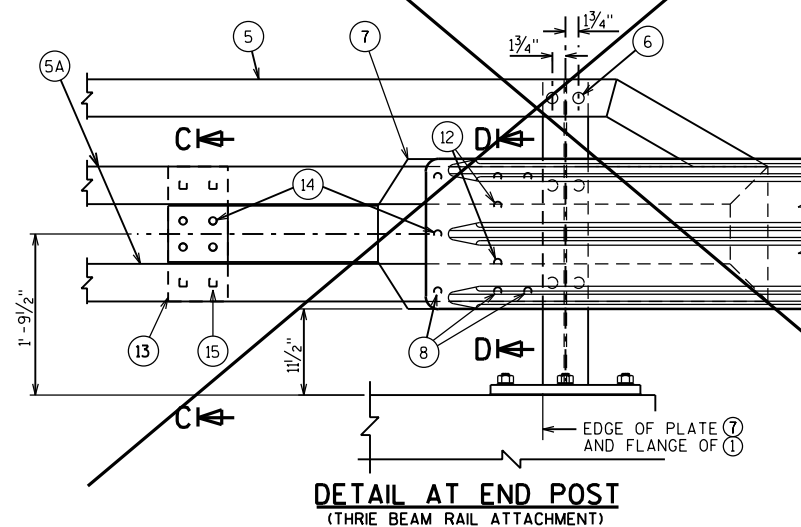
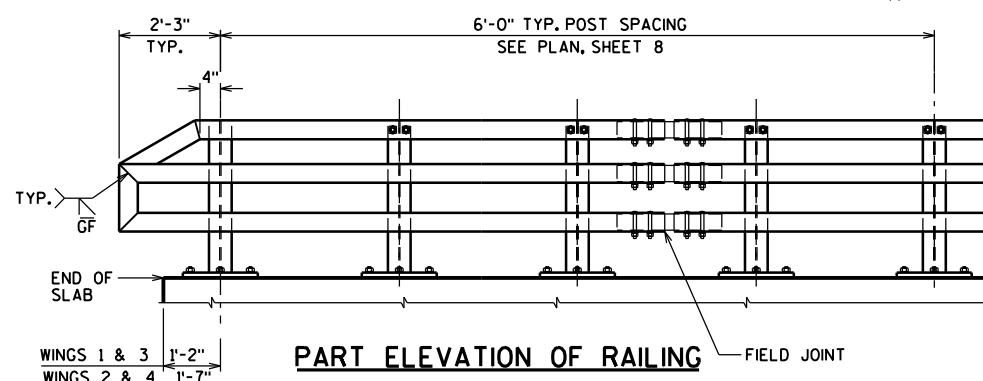
FIELD ERECTION JOINT DETAIL

SHOP RAIL SPLICE DETAIL  
(LOCATION MUST BE  
SHOWN ON SHOP DRAWINGS)ANCHOR PLATE  
AT BEAM GUARD ATTACHMENTBACK-UP PLATE DETAIL  
AT BEAM GUARD ATTACHMENT

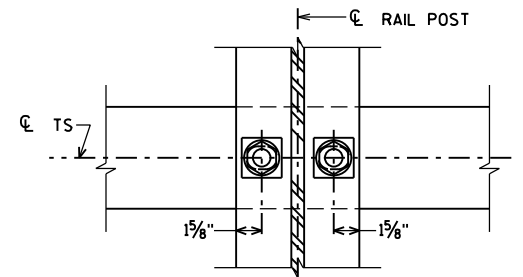
SECTION B-B



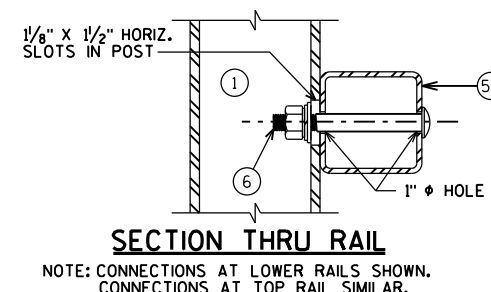
ANCHOR BOLTS

TOP VIEW AT END POST  
(THREE BEAM RAIL ATTACHMENT)DETAIL AT END POST  
(THREE BEAM RAIL ATTACHMENT)

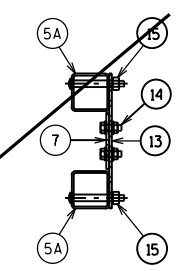
PART ELEVATION OF RAILING



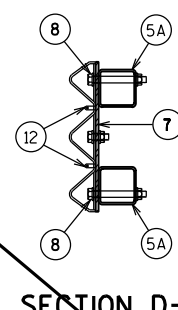
SECTION THRU POST WEB

SECTION THRU RAIL  
NOTE: CONNECTIONS AT LOWER RAILS SHOWN.  
CONNECTIONS AT TOP RAIL SIMILAR.

TYPICAL RAIL TO POST CONNECTIONS



SECTION C-C



SECTION D-D

## LEGEND

- ① W6 x 25 WITH 1/8" x 1/2" HORIZ. SLOTS ON EACH SIDE OF POST FOR BOLT NO. 6. CUT BOTTOM OF POST TO MATCH CROSS SLOPE OF ROADWAY. PLACE POST VERTICAL. PLACE POSTS NORMAL TO GRADE LINE.
- ② PLATE 1/4" x 11 3/4" x 1'-8" WITH 1 5/8" x 1 5/8" SLOTTED HOLES FOR ANCHOR BOLTS NO. 3. WELD TO NO. 1 AS SHOWN. SLOTS PARALLEL TO SHORT SIDE OF PLATE.
- ③ ASTM A449 - 1/4" DIA. ANCHOR BOLTS WITH NUT AND HARDENED WASHER (ALL GALVANIZED). 5 REQ'D. PER POST. THREAD 3" AND PLACE NORMAL TO PLATE NO. 2. CHAMFER TOP OF BOLTS BEFORE THREADING. USE 1'-3" LONG.
- ④ 5/8" x 11" x 1'-8" ANCHOR PLATE (GALVANIZED) WITH 1 5/8" DIA. HOLES FOR ANCHOR BOLTS NO. 3.
- ⑤ TS 5 x 4 x 0.25 STRUCTURAL TUBING. ATTACH TO NO. 1 WITH NO. 6.
- ⑤A TS 5 x 5 x 0.25 STRUCTURAL TUBING. ATTACH TO NO. 1 WITH NO. 6.
- ⑥ 7/8" DIA. A325 SLOTTED ROUND HEAD BOLT WITH NUT, 3/4" x 1 5/8" x 1 5/8" WASHER, AND LOCK WASHER (2 REQ'D. AT EACH RAIL TO POST LOCATION).
- \* ⑦ 1/2" THK. BACK-UP PLATE WITH 2 - 7/8" x 1 1/2" THREADED SHOP WELDED STUDS (NO. 12). BOLT TO RAIL AS SHOWN IN DETAIL. REQUIRED AT THREE BEAM GUARD RAIL ATTACHMENTS ONLY. PLACE SYMMETRICALLY ABOUT TUBES NO. 5A.
- \* ⑧ 1" DIA. HOLES IN PLATE NO. 7 & TUBES NO. 5A FOR 7/8" DIA. A325 BOLTS WITH HEX NUTS AND WASHERS. 6 HOLES IN TUBES AND PLATE NO. 7.
- ⑨ SPLICE SLEEVE FABRICATED FROM 1/4" PLATE. PROVIDE "SLIDING FIT".
- ⑩ 3/8" x 3 5/8" x 2'-4" PLATE. 2 PER RAIL. USED IN NO. 5 & 5A.
- ⑩A 3/8" x 2 5/8" x 2'-4" PLATE USED IN NO. 5, 3/8" x 3 5/8" x 2'-4" PLATE USED IN NO. 5A. 2 PER RAIL.
- ⑪ 7/8" DIA. A325 ROUND HEAD BOLT WITH NUT, WASHER, AND LOCK WASHER. USE 1 5/8" x 1 1/4" LONGIT. SLOTTED HOLES AT FIELD JOINTS IN PLATE NO. 10A.
- \* ⑫ 7/8" DIA. x 1 1/2" LONG THREADED SHOP WELDED STUDS (2 REQ'D).
- \* ⑬ 3/8" x 8" x 1'-6" ANCHOR PLATE, BOLT TO RAIL AS SHOWN IN DETAIL. REQ'D. AT THREE BEAM GUARD RAIL ATTACHMENTS ONLY. PLACE SYM. ABOUT TUBES NO. 5A.
- \* ⑭ 7/8" DIA. x 2" LONG A325 HEX BOLT WITH NUT AND WASHER (5 REQUIRED).
- \* ⑮ 1" DIA. HOLES IN TUBES NO. 5A FOR 7/8" DIA. A325 ROUND HEAD BOLT WITH NUT, WASHER, AND LOCK WASHER (4 REQ'D.). 4 HOLES IN TUBES.

## GENERAL NOTES

1. BID ITEM SHALL BE "RAILING TUBULAR TYPE M B-41-313" WHICH INCLUDES ALL ITEMS SHOWN.
2. RAIL POST AND BASE PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A709 GRADE 50. HOLLOW RAILING STRUCTURAL TUBING SHALL CONFORM TO THE REQUIREMENTS OF ASTM A500 GRADE B OR C WITH A CERTIFIED FY = 50 KSI. ANCHOR PLATES, AND SPLICE TUBE PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A709 GRADE 36.
3. THE NUT SECURING THE POST BASE PLATE TO THE CONCRETE SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL 1/8 TURN.
4. RAILS SHALL BE CONTINUOUS OVER A MINIMUM OF THREE (3) POSTS WITHOUT SPLICES WHERE POSSIBLE.
5. ENDS OF TUBE SECTIONS SHALL BE SAWED. GRIND SMOOTH EXPOSED EDGES. ALL CUT ENDS SHALL BE TRUE AND SMOOTH.
6. WELD IS THE SAME ON BOTH FLANGES. FLANGE WELD DOES NOT REQUIRE MAGNETIC PARTICLE TESTING.
7. FILL BOLT SLOT OPENINGS IN POST SHIMS AND PLATE NO. 2 AND CAULK AROUND PERIMETER OF PLATE NO. 2 WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. STEEL POST SHIMS MAY BE USED UNDER POSTS WHERE REQ'D. FOR ALIGNMENT.
8. POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUT.
9. ALL MATERIAL SHALL BE GALVANIZED AFTER FABRICATION. PRIOR TO GALVANIZING, ALL STEEL RAILING POSTS & STEEL TUBING SHALL BE GIVEN A NO. 6 BLAST CLEANING BY S.S.P.C. SPECIFICATIONS.
10. PAINTING IS NOT REQUIRED.
11. THIS RAILING MEETS NCHRP REPORT 350 EVALUATION CRITERIA FOR TEST LEVEL 4 (TL-4).
- \* 12. DO NOT FURNISH ITEMS 7, 8, 12, 13, 14 AND 15. THREE BEAM RAIL ATTACHMENT IS NOT INCLUDED.

| NO.  | DATE | REVISION        | BY |
|--|------|-----------------|----|
| STATE OF WISCONSIN<br>DEPARTMENT OF TRANSPORTATION |      |                 |    |
| STRUCTURE  |      | B-41-313        |    |
| DRAWN BY JDJ                                       |      | PLANS CK'D. JAS |    |
| RAILING TUBULAR TYPE M                             |      | SHEET 9 OF 9    |    |