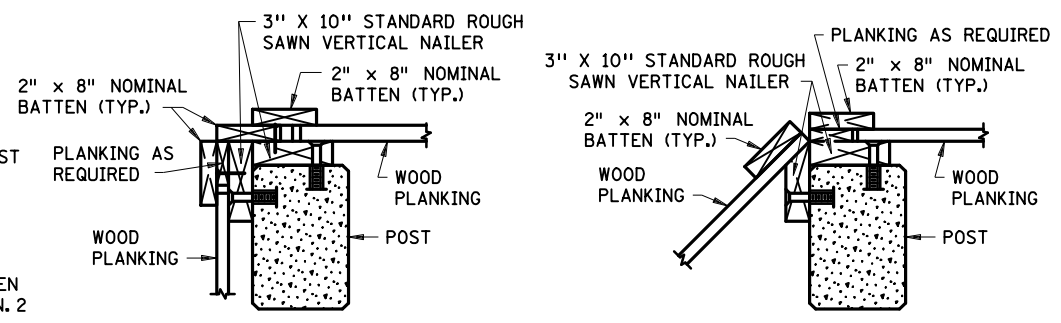
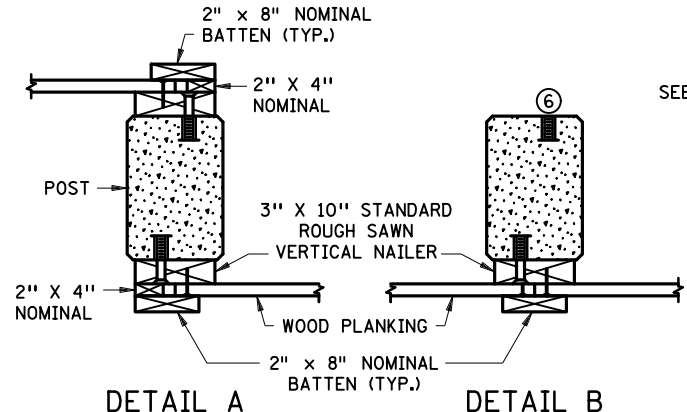


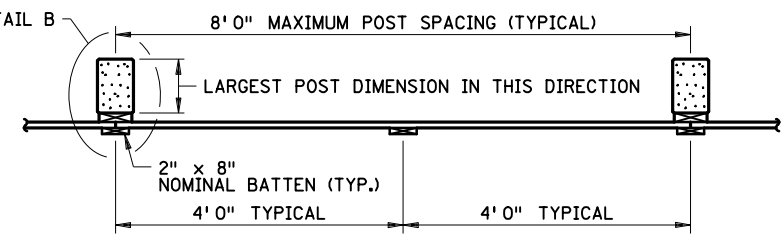
**VERTICAL NAILER SPLICE DETAIL
CONTRACTOR OPTION**



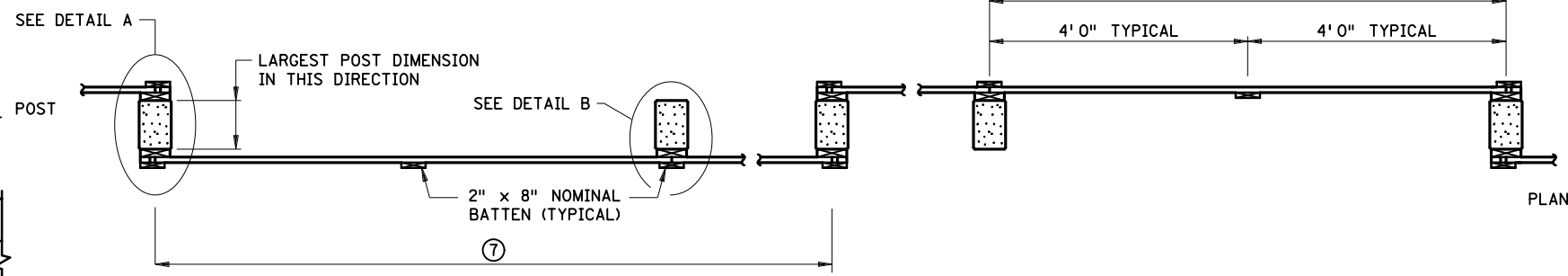
POST LOCATIONS FOR ANGLE TURNS



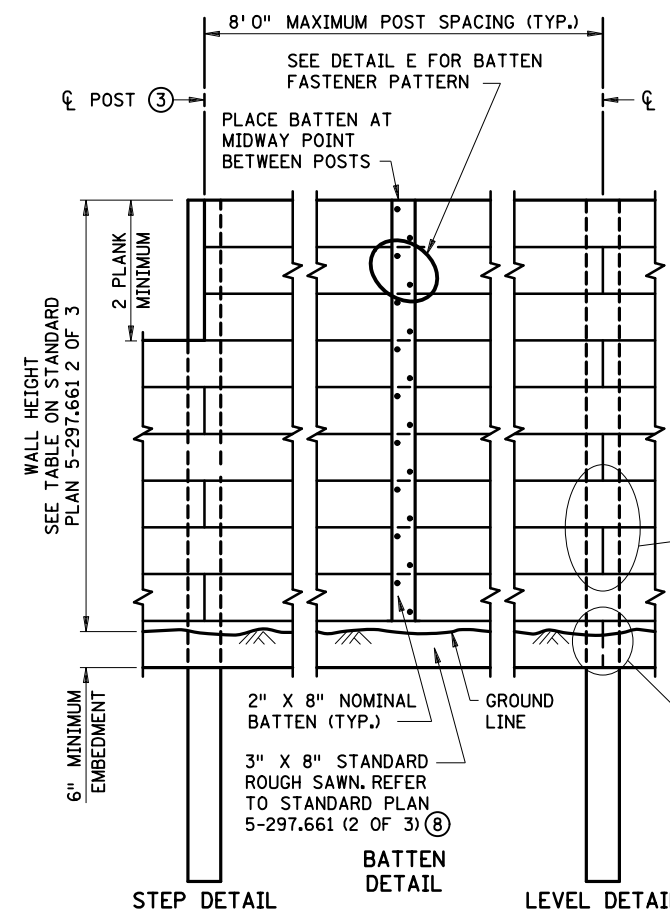
DETAIL A DETAIL B



**FILL SIDE
WALL TYPE NO. 1 AND 1A ① ⑧**

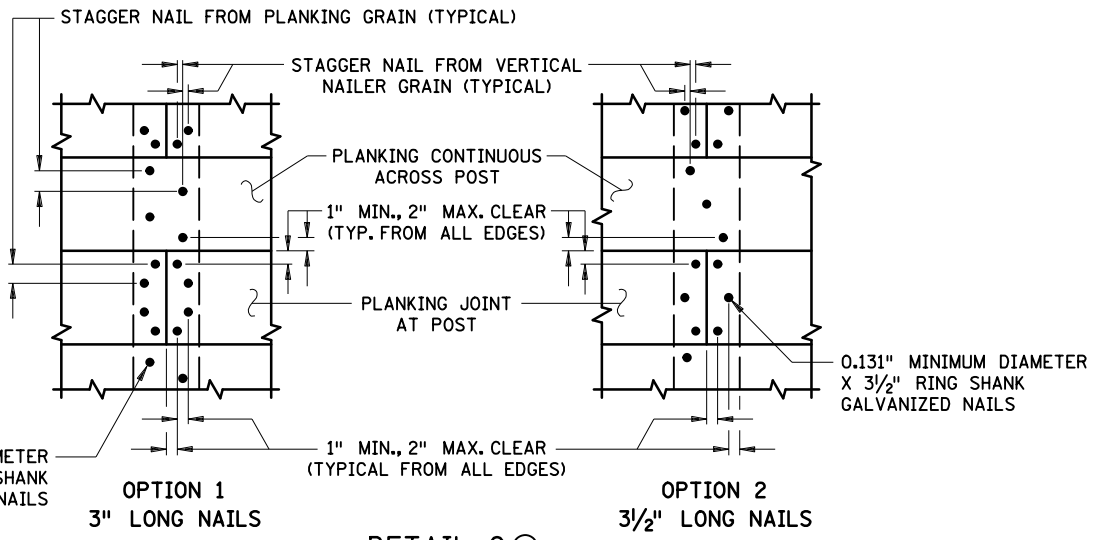


**TRAFFIC SIDE
WALL TYPE NO. 2 AND 2A ① ② ⑧**

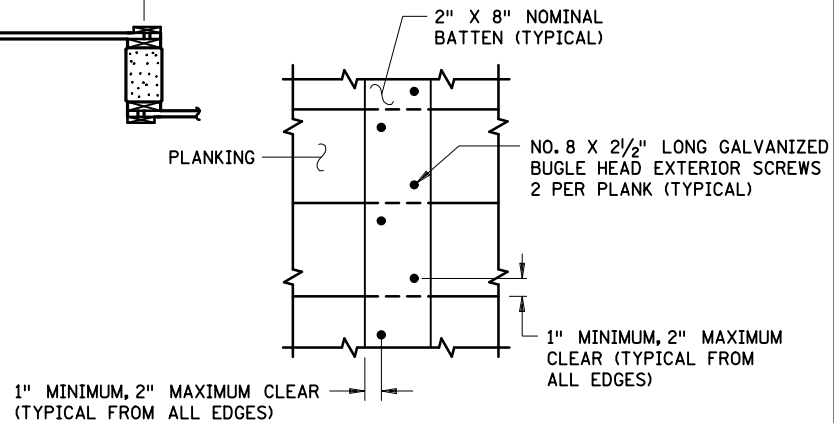


**FRONT ELEVATION ⑤
POST BATTENS NOT SHOWN**

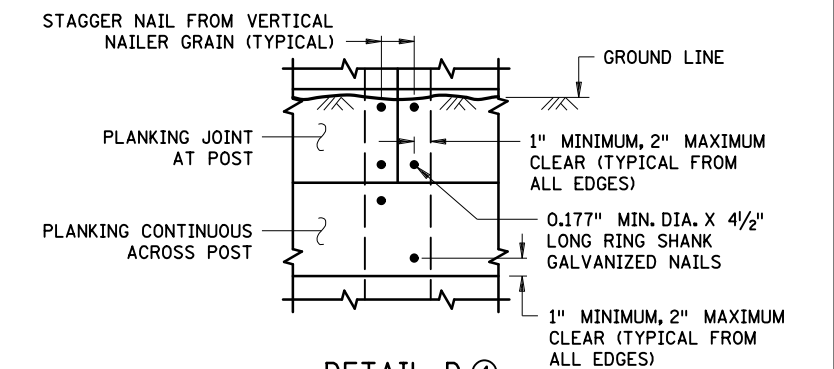
TYPICAL SPLICE DETAIL. ALTERNATE PLANK SPLICES. SEE DETAIL C OPTION 1 OR 2 FOR NAILING PATTERN. REFER TO STANDARD PLAN 5-297.661 (3 OF 3) FOR ADDITIONAL PLANK SPLICE LOCATION OPTIONS.



**DETAIL C ④
NAILING PATTERN FOR PLANK TO VERTICAL NAILER - ABOVE GROUND**



**DETAIL E ④
FASTENER PATTERN FOR BATTENS**



**DETAIL D ④
NAILING PATTERN FOR PLANK TO VERTICAL NAILER - BELOW GROUND**

- NOTES:**
- WALL TYPES WITH SUFFIX "A" (SUCH AS 1A, 2A) ARE DESIGNED TO ALLOW WATER TO FLOW UNDER THE WALL. REFER TO NOTE ⑧ FOR ADDITIONAL REQUIREMENTS.
 - PROVIDE PRESERVATIVE TREATED TIMBER PRODUCTS PER SPEC. 3491.
 - GALVANIZE NAILS PER SPEC. 3392. NAILING REQUIREMENTS SHOWN ARE BASED ON FULL HEAD NAILS AND ENTIRE LENGTH OF SHANK RINGED.
 - ① SEE CONSTRUCTION PLAN FOR REQUIRED WALL TYPE.
 - ② USE WALL TYPE NO. 2 AND 2A IN NON-FILL CONDITIONS ONLY.
 - ③ USE THE POST SIZE AND EMBEDMENT FOR THE HIGHER WALL SECTION AT THE STEP.
 - ④ SEE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION REGARDING SCREWS AND NAILS.
 - ⑤ REFER TO STANDARD PLAN 5-297.661 (3 OF 3) FOR ADDITIONAL DETAILS REGARDING OPTIONAL PLANK SPLICE LOCATIONS.
 - ⑥ FURNISH & INSTALL STAINLESS STEEL COIL THREAD CONCRETE ANCHORS ON ALTERNATE SIDES OF POST FACE ϕ . MINIMUM FACTORED PULL OUT OF 2.5 KIPS PER ANCHOR. COMPLETELY FILL UNUSED ANCHORS WITH A MnDOT APPROVED/QUALIFIED PRODUCT PER 3722, SILICONE JOINT SEALANT.
 - ⑦ PREFERRED LAYOUT IS 5-7 POSTS SPACES.
 - ⑧ FOR WALL TYPE 1A AND 2A, OMIT 3" X 8" PLANKING AT BASE OF WALL AND LEAVE A 2" TO 4" AIRSPACE BETWEEN GROUND AND BOTTOM 2" X 8" PLANK.

LEAD EXPERT OFFICE
KEVIN WESTERN
STATE BRIDGE ENGINEER

WOOD PLANKING NOISE WALL
WITH CONCRETE POSTS

APPROVED: 10-22-2019
REVISED:

Peter A Harff
PETER A. HARFF
STATE DESIGN ENGINEER

STANDARD PLAN
5-297.661

1 OF 3

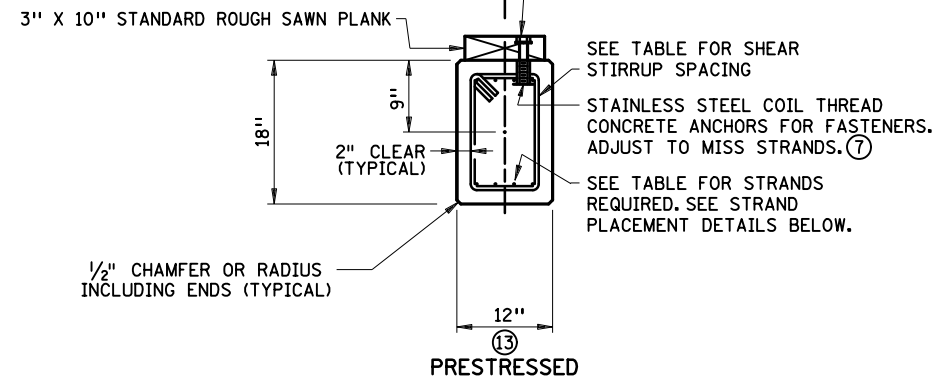
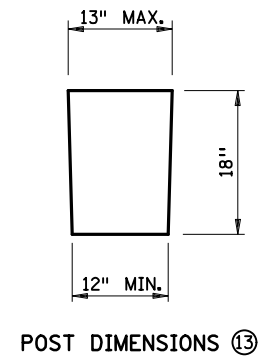


STANDARD PLAN

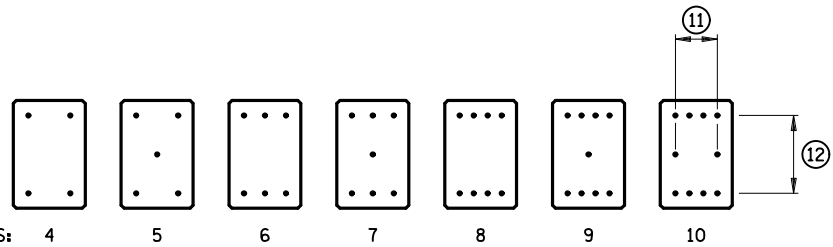
STATE PROJ. NO.
TRUNK HWY.

SHEET NO.
TOTAL SHEETS

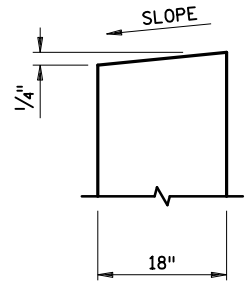
USE 1/2" DIAMETER HEX HEAD STAINLESS STEEL BOLT WITH 2" O.D. X 1/8" WASHER OR FLAT HEAD CAP SCREW WITH MINIMUM 1" DIAMETER HEAD PER SPEC. 3391.2.E. COUNTERBORE TO FLUSH FIT.



POST DETAILS



STRAND PLACEMENT DETAILS



TOP OF POST

| " H " WALL HEIGHT (FT.) | POST SPACING (FT.) | POST SIZE (IN.) | SHEAR STIRRUP SPACING (IN.) (9) | PRE-STRESSED STRANDS | POST EMBEDMENT (1) | | | |
|-------------------------|--------------------|------------------|---------------------------------|----------------------|--------------------|-----------------|-----------------|-----------------|
| | | | | | LEVEL GROUND | 1(V):4(H) SLOPE | 1(V):3(H) SLOPE | 1(V):2(H) SLOPE |
| 5 | 8 | 12 X 18 | 18 | 4 | 6' 0" | 6' 0" | 7' 0" | 8' 0" |
| 6 | 8 | 12 X 18 | 18 | 4 | 7' 0" | 7' 0" | 7' 0" | 8' 0" |
| 7 | 8 | 12 X 18 | 18 | 4 | 7' 0" | 7' 0" | 8' 0" | 9' 0" |
| 8 | 8 | 12 X 18 | 18 | 4 | 7' 0" | 8' 0" | 8' 0" | 9' 0" |
| 9 | 8 | 12 X 18 | 18 | 4 | 8' 0" | 8' 0" | 8' 0" | 9' 0" |
| 10 | 8 | 12 X 18 | 18 | 4 | 8' 0" | 8' 0" | 9' 0" | 10' 0" |
| 11 | 8 | 12 X 18 | 10 | 4 | 8' 0" | 9' 0" | 9' 0" | 10' 0" |
| 12 | 8 | 12 X 18 | 10 | 4 | 8' 0" | 9' 0" | 9' 0" | 10' 0" |
| 13 | 8 | 12 X 18 | 10 | 4 | 9' 0" | 9' 0" | 10' 0" | 10' 0" |
| 14 | 8 | 12 X 18 | 10 | 4 | 9' 0" | 10' 0" | 10' 0" | 11' 0" |
| 15 | 8 | 12 X 18 | 10 | 4 | 9' 0" | 10' 0" | 10' 0" | 11' 0" |
| 16 | 8 | 12 X 18 | 10 | 4 | 10' 0" | 10' 0" | 11' 0" | 12' 0" |
| 17 | 8 | 12 X 18 | 10 | 4 | 10' 0" | 10' 0" | 11' 0" | 12' 0" |
| 18 | 8 | 12 X 18 | 10 | 4 | 10' 0" | 11' 0" | 11' 0" | 13' 0" |
| 19 | 8 | 12 X 18 | 10 | 5 | 11' 0" | 11' 0" | 12' 0" | 13' 0" |
| 20 | 8 | 12 X 18 | 10 | 6 | 11' 0" | 11' 0" | 12' 0" | 13' 0" |
| 21 | 8 | 12 X 18 | 10 | 6 | 11' 0" | 12' 0" | 12' 0" | 14' 0" |
| 22 | 8 | 12 X 18 | 10 | 7 | 12' 0" | 12' 0" | 13' 0" | 14' 0" |
| 23 | 8 | 12 X 18 | 10 | 8 | 12' 0" | 12' 0" | 13' 0" | 15' 0" |
| 24 | 8 | 12 X 18 | 10 | 9 | 12' 0" | 13' 0" | 14' 0" | 15' 0" |
| 25 | 8 | 12 X 18 | 10 | 10 | 12' 0" | 13' 0" | 14' 0" | 17' 0" |

DESIGN CRITERIA:

2012 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, INCLUDING 2013 INTERIMS.

2012 NATIONAL DESIGN SPECIFICATION (NDS) FOR WALL CONSTRUCTION - LRFD

φ = 30° (GRANULAR)
 γ = 110 P.C.F.
 WIND LOAD = 19 P.S.F.
 F_D = 1500 P.S.I. WOOD PLANKING AND BATTEN.
 F_D = 1200 P.S.I. ALL OTHER WOOD MEMBERS.

POST DESIGN CRITERIA

| NO. OF STRANDS | f'cl (3) | f'c (4) |
|----------------|----------|----------|
| 6 OR LESS | 4000 PSI | 5500 PSI |
| 7 OR MORE | 4000 PSI | 6000 PSI |

NOTES:

USE OF THIS STANDARD ASSUMES SOIL TESTS WERE PERFORMED AT A MAXIMUM OF 200' INTERVALS AT EACH SITE AND A SOILS ENGINEER REVIEWED THE RESULTS AND CONCURS WITH USE OF THIS STANDARD.

POST EMBEDMENT DEPTH ASSUMES THE WATER TABLE IS BELOW THE BOTTOM OF EACH POST. OTHER CONDITIONS REQUIRE A SPECIAL DESIGN.

REFER TO SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION.

FOR SLOPES BETWEEN THOSE SHOWN, USE THE POST EMBEDMENT FOR THE STEEPER SLOPE OR USE INTERPOLATION.

FOR SLOPES 1(V):6(H) OR FLATTER, USE POST EMBEDMENT SHOWN FOR LEVEL GROUND.

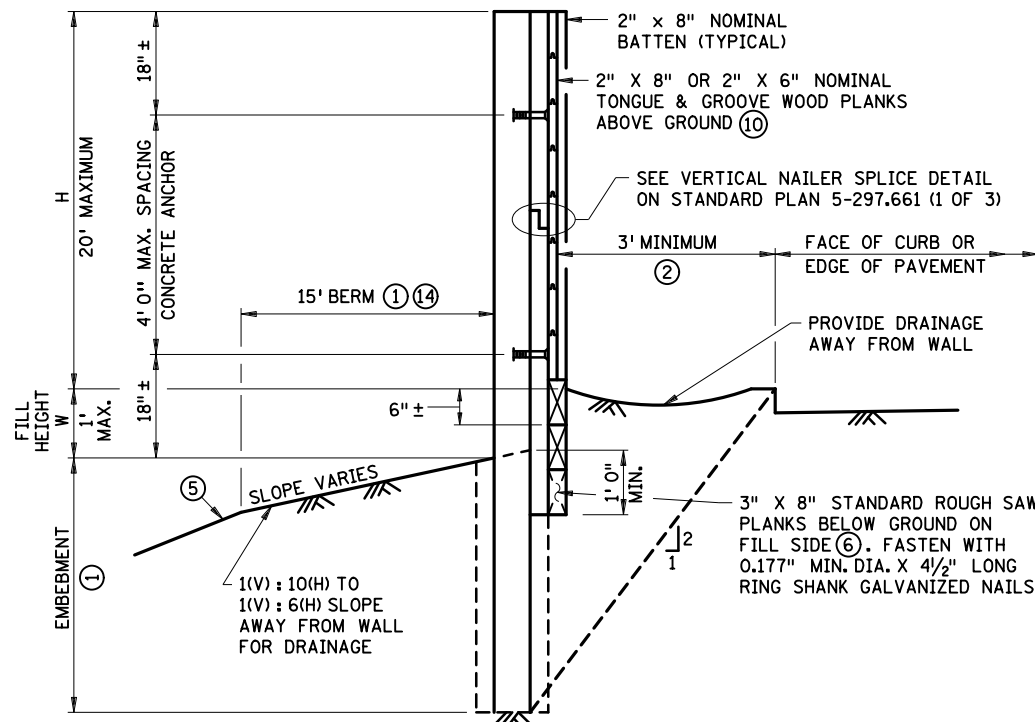
REFER TO SPECIAL PROVISIONS FOR PRESTRESSED STRAND REQUIREMENTS FOR POSTS LOCATED WITHIN 20' OF THE OUTSIDE EDGE OF A ROADWAY SHOULDER AND POSTS SUPPORTING GLUE LAMINATED RUB RAIL (STANDARD PLAN 5-297.678). FABRICATOR TO IDENTIFY THESE POSTS WITH PERMANENT MARK ON BOTTOM OF POST.

FOR CONCRETE POSTS WITH THE SAME LENGTH, USE THE LARGEST NUMBER OF PRESTRESSED STRANDS REQUIRED FOR THAT POST LENGTH. USE MIX 3W82 FOR ALL POSTS. REFER TO SPEC. 2462 FOR ADDITIONAL REQUIREMENTS.

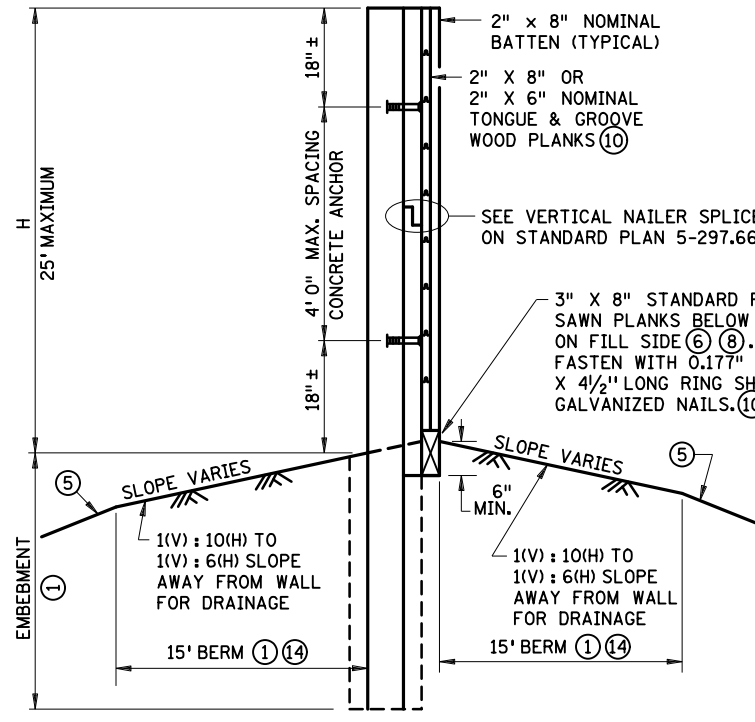
USE A MINIMUM OF FOUR 1/2" DIAMETER (AREA = 0.153 SQ. IN.) LOW-RELAXATION PRESTRESSED STEEL STRANDS PER SPEC. 3348, WITH 270 KSI ULTIMATE STRENGTH, INITIAL PRESTRESS = 30,900 POUNDS PER STRAND. CUT STRANDS FLUSH WITH CONCRETE. COVER ENDS WITH SEALANT PER APPROVED PRODUCTS LIST "BRIDGE - PRESTRESSED BEAMS - CUT STRAND SEALANT."

USE EPOXY-COATED GRADE 60 REINFORCING BARS PER SPEC. 3301.

- (1) POST EMBEDMENT DEPTH IN THE TABLE IS BASED ON A 3' MINIMUM BERM IN FRONT OF THE WALL.
- (2) PROVIDED FOR SNOW STORAGE. WHEN THE CURB LINE IS CLOSER THAN A 2(V):1(H) SLOPE FROM THE BOTTOM OF THE POST, A SPECIAL DESIGN IS REQUIRED.
- (3) MINIMUM CONCRETE STRENGTH AT TIME OF PRESTRESS TRANSFER.
- (4) MINIMUM CONCRETE STRENGTH AT WHICH THE POST CAN BE TRANSPORTED AND PLACED.
- (5) SEE POST EMBEDMENT TABLES FOR MAXIMUM SLOPE.
- (6) SEE SPEC. 3491 FOR ADDITIONAL PRESERVATIVE TREATMENT REQUIREMENTS FOR LUMBER PLACED BELOW GRADE.
- (7) PLACE STAINLESS STEEL COIL THREAD CONCRETE ANCHORS ON ALTERNATE SIDES OF POST FACE CENTERLINE. MINIMUM FACTORED PULL OUT OF 2.5 KIPS PER ANCHOR. COMPLETELY FILL UNUSED ANCHORS WITH A MNDOT APPROVED/QUALIFIED PRODUCT PER SPEC. 3722, SILICONE JOINT SEALANT.
- (8) FOR WALL TYPE 1A AND 2A, OMIT 3" X 8" PLANKING AT BASE OF WALL AND LEAVE A 2" TO 4" AIRSPACE BETWEEN GROUND AND BOTTOM 2" X 8" PLANK.
- (9) USE NO. 3 BARS FOR SHEAR STIRRUPS. PLACE FIRST STIRRUP 3" FROM EACH END.
- (10) REFER TO STANDARD PLAN 5-297.661 (1 OF 3) FOR NAILING PATTERN.
- (11) MINIMUM CENTER-TO-CENTER SPACING OF 6", WITH INTERMEDIATE STRANDS PLACED SYMMETRICALLY (TYPICAL FOR ALL CONFIGURATIONS).
- (12) MINIMUM CENTER-TO-CENTER SPACING OF 12", WITH INTERMEDIATE STRANDS PLACED SYMMETRICALLY (TYPICAL FOR ALL CONFIGURATIONS).
- (13) 12" MINIMUM, 13" MAXIMUM, TO ALLOW FOR DRAFT OF FORM.
- (14) 10' MINIMUM.



SECTION AT POST WITH EARTH FILL MAXIMUM FILL RETAINED 1' 0" WALL TYPE 1 ONLY



SECTION AT POST WITHOUT EARTH FILL (WALL TYPE 1, 1A, 2 OR 2A)

LEAD EXPERT OFFICE
 KEVIN WESTERN
 STATE BRIDGE ENGINEER

WOOD PLANKING NOISE WALL WITH CONCRETE POSTS

APPROVED: 10-22-2019
 REVISED:

Peter A Harff
 PETER A. HARFF
 STATE DESIGN ENGINEER

STANDARD PLAN
 5-297.661

2 OF 3



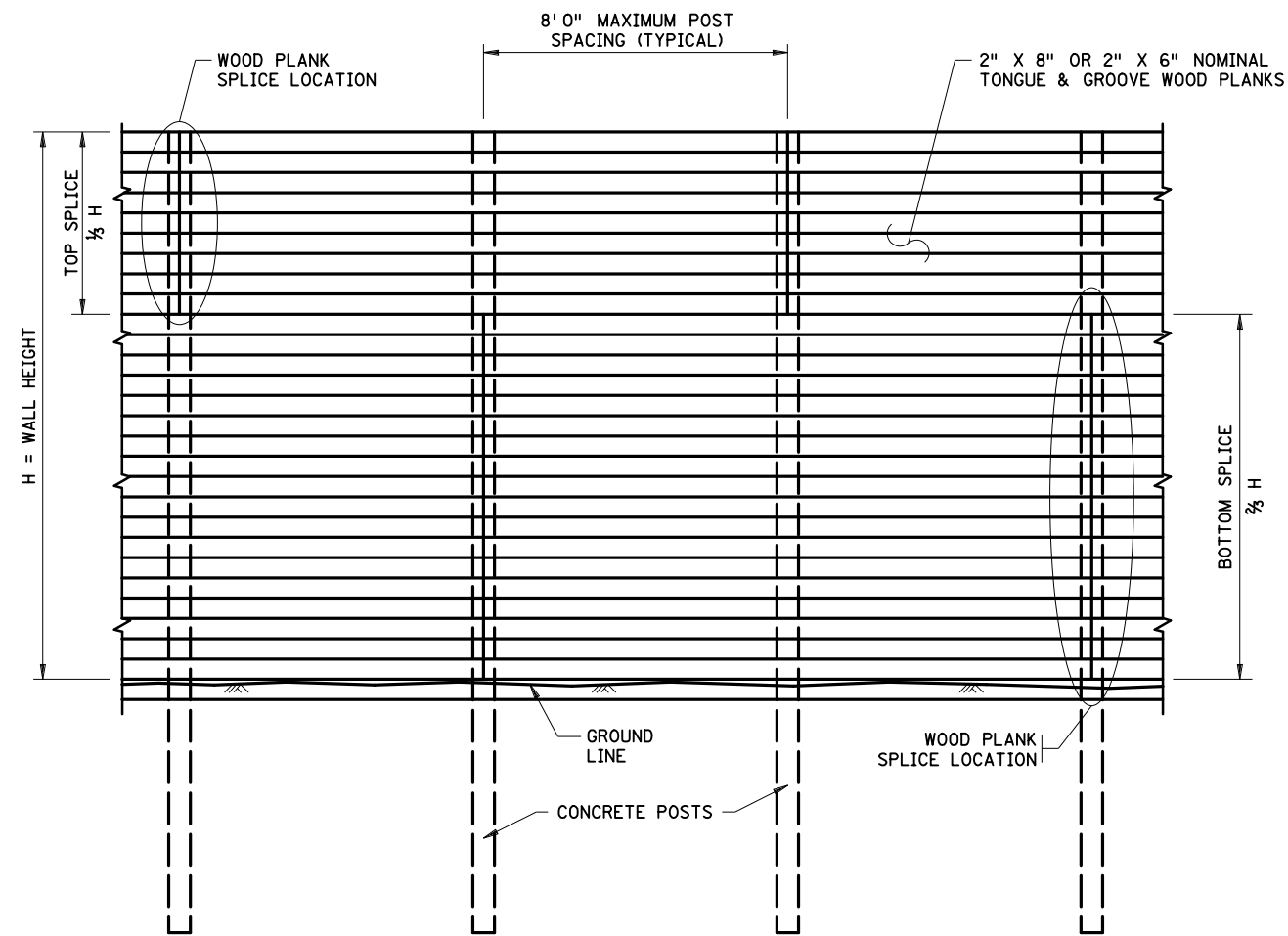
STANDARD PLAN

STATE PROJ. NO.

SHEET NO.

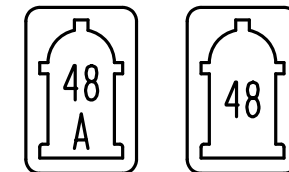
TRUNK HWY.

TOTAL SHEETS



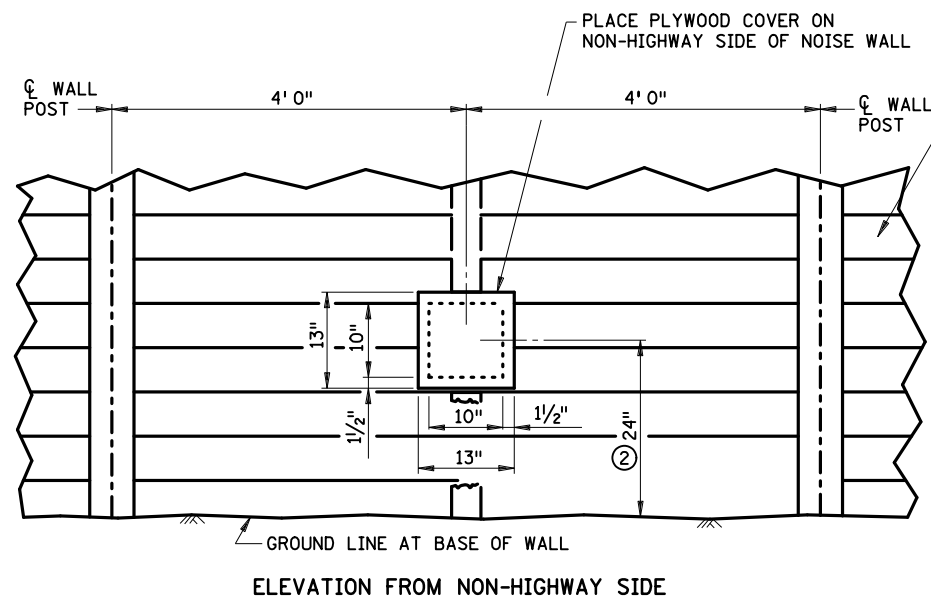
OPTIONAL PLANK SPLICE LOCATION ①
 AT THE CONTRACTOR'S OPTION, IN LIEU OF ALTERNATING PLANK SPLICES AS SHOWN ON MNDOT STANDARD PLAN SHEET 5-297.661 (1 OF 3) - FRONT ELEVATION, THE PATTERN SHOWN ABOVE MAY BE USED.

- NOTES:**
- ① IF THE CONTRACTOR CHOOSES TO USE THIS PLANK SPLICE PATTERN, CONSTRUCT SUCH THAT THE TOP SPLICE DIMENSION IS $\frac{1}{2}$ OF THE WALL HEIGHT ($\frac{1}{2}H$) AS MEASURED FROM THE TOP OF THE WALL. THE BOTTOM SPLICE DIMENSION IS $\frac{2}{3}$ OF THE WALL HEIGHT ($\frac{2}{3}$ OF H) AS MEASURED FROM THE BOTTOM OF THE WALL. NEVER SPLICE MORE THAN $\frac{2}{3}$ OF THE BOARDS AT ANY SINGLE POST LOCATION. REFER TO STANDARD FIGURE 5-297.661 (1 OF 3) FOR NAILING PATTERN.
 - ② 36" IF RUBRAIL IS PRESENT.

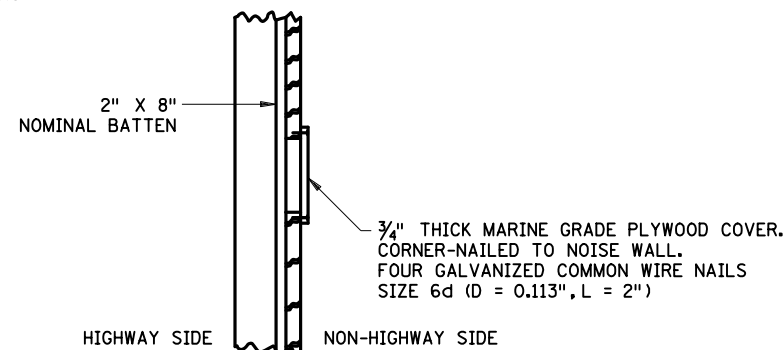


FIRE HYDRANT MARKER (X2-3)

SEE MNDOT STANDARD SIGNS AND PAVEMENT MARKING MANUAL FOR DETAILS AND FABRICATION INFORMATION. THE ENGINEER WILL PROVIDE THE NUMBER AND LETTER DESIGNATION FOR EACH LOCATION. ATTACH TO WALL ON HIGHWAY SIDE OF WALL, ADJACENT TO FIRE HOSE ACCESS HOLE. SIGNS ARE INCIDENTAL.



ELEVATION FROM NON-HIGHWAY SIDE



SECTION AT ACCESS OPENING

FIRE HOSE ACCESS DETAIL

| | | | | | | | |
|--------------------|--|---|--|----------------------|--|---------------|--------|
| LEAD EXPERT OFFICE | KEVIN WESTERN STATE BRIDGE ENGINEER |  DEPARTMENT OF TRANSPORTATION | WOOD PLANKING NOISE WALL WITH CONCRETE POSTS | APPROVED: 10-22-2019 | <i>Peter A. Harff</i> PETER A. HARFF STATE DESIGN ENGINEER | STANDARD PLAN | 3 OF 3 |
| | REVISED: | | | 5-297.661 | | | |
| | | | STANDARD PLAN | STATE PROJ. NO. | SHEET NO. | | |
| | | | | TRUNK HWY. | TOTAL SHEETS | | |