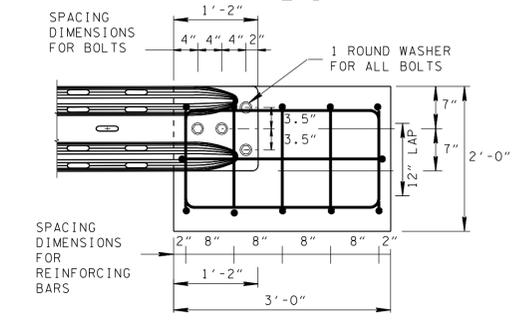


ELEVATION (END)



ELEVATION (FRONT)

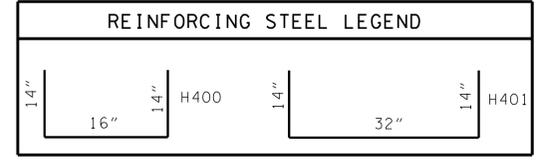
GUARDRAIL TERMINAL (TYPE 12)
ITEM NO. 705-04.02 PER EACH

SPECIAL INSTALLATION NOTE

FOR THE GUARDRAIL TERMINAL ANCHOR (TYPE 12) TO FUNCTION AS IT WAS CRASH TESTED UNDER NCHRP-350 TEST LEVEL 3 IT MUST BE CONSTRUCTED PER STANDARD DRAWING NO. S-GR-19A.

GUARDRAIL TERMINAL ANCHOR (TYPE 12) GENERAL NOTES

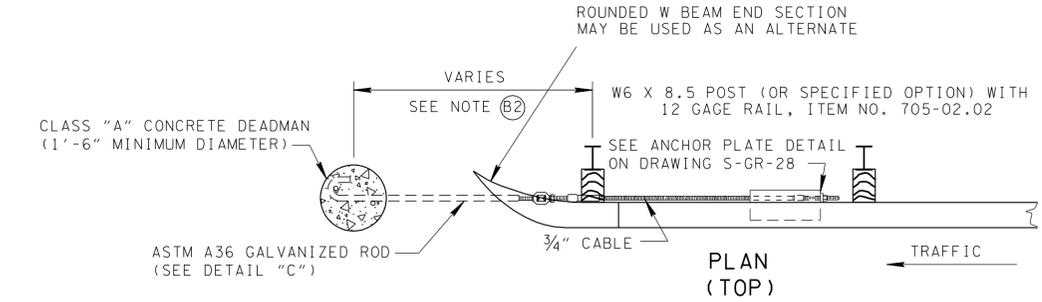
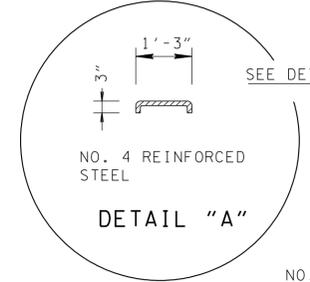
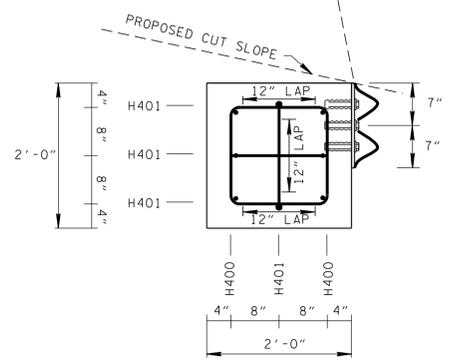
- (A1) REQUIREMENTS FOR ANCHOR INSERT BOLTS SHALL BE 7/8" HEX HEAD INSTALLED IN 7/8" MASONRY ANCHOR. THE INSERTS ARE TO BE THREADED A MINIMUM OF 1 3/4" INCHES. THE CONTRACTOR SHALL FURNISH ANCHOR PULL-OUT DATA FROM AN INDEPENDENT TESTING LABORATORY USING CLASS "A" CONCRETE IN ACCORDANCE WITH STATE OF TENNESSEE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION". THE ULTIMATE LOAD FOR 7/8" ANCHOR SHALL BE 19,000 POUNDS. BOLTS SHALL CONFORM TO ASTM A307.
- (A2) THE MASONRY ANCHORS SHALL BE SUB-SET IN THE CONCRETE AT A DEPTH OF BETWEEN 3/32" TO 1/4" AND TORQUED WITH THE END TERMINAL IN THE PLACE TO AN EQUIVALENT DIRECT PULL-OUT LOAD OF 12,000 POUNDS. SLIPPAGE SHALL NOT EXCEED 1/4".
- (A3) THE CONTRACTOR WILL PERFORM ON-SITE TESTING OF EACH BOLT IN THE PRESENCE OF DOT PERSONNEL TO INSURE THESE REQUIREMENTS. ANY INSTALLATION NOT MEETING THESE REQUIREMENTS SHALL BE CORRECTED AT THE CONTRACTORS EXPENSE.
- (A4) THE CONTRACTOR MAY ELECT TO USE 7/8" INCH DIAMETER DRILLED IN ANCHORS WITH 50 KIPS PER SQUARE INCH OR GREATER YIELD STRENGTH WHEN ATTACHING THE TERMINAL END ELEMENTS INTO ROCK. SEE ABOVE GENERAL NOTE (A2) FOR PULL OUT REQUIREMENTS.
- (A5) IF THE CONTRACTOR DRILLS THESE ANCHOR BOLTS IN ROCK, THE SAME FLARE RATE MUST BE USED THAT WOULD BE USED WITH THE CRASH TESTED CONCRETE ANCHOR BLOCK.
- (A6) UNIT PRICE FOR ITEM NO. 705-04.02, GUARDRAIL TERMINAL (TYPE 12) PER EACH SHALL INCLUDE COSTS OF FURNISHING AND INSTALLING ONE (1) REINFORCED CLASS "A" CONCRETE GUARDRAIL STATIONARY TERMINAL ANCHOR BLOCK, ONE (1) TERMINAL ELEMENT FOR ANCHOR BLOCK (MICHIGAN END SHOE), AND ALL BOLTS, MASONRY ANCHORS OR ANCHOR BLOCK INSERT ASSEMBLY, WASHERS AND LABOR NECESSARY TO COMPLETE THIS ITEM.
- (A7) ESTIMATED QUANTITIES OF CONCRETE AND STEEL FOR GUARDRAIL STATIONARY TERMINAL (TYPE 12) ARE:
CLASS "A" CONCRETE= 0.44 CUBIC YARD
NO. 4 STEEL REINFORCING BARS= 52 POUNDS
- (A8) SEE STD. DWG. S-GR-19B FOR ALTERNATE TYPE 12 TERMINAL ANCHOR.



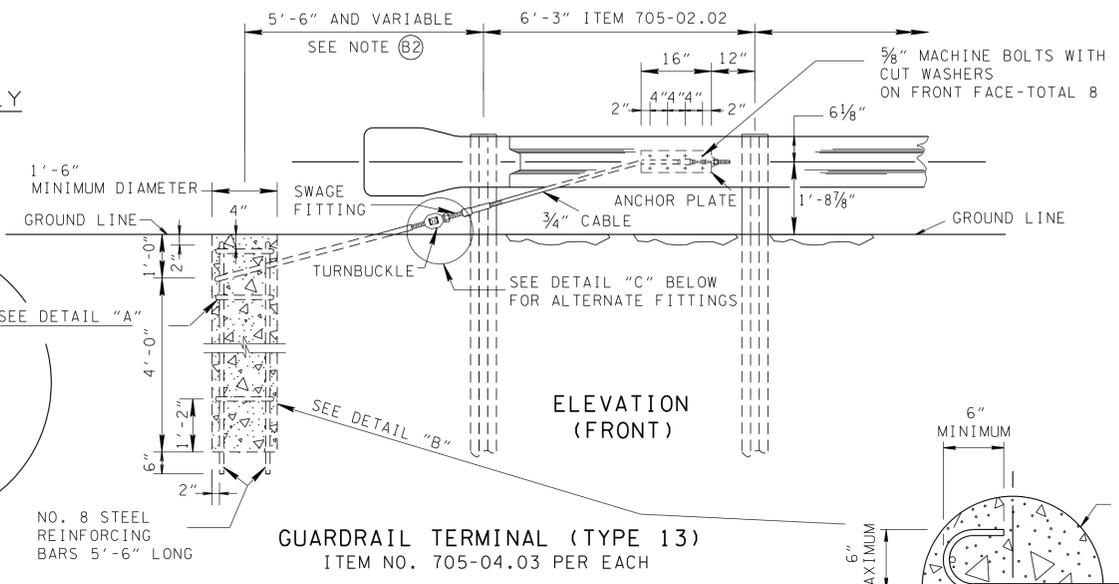
ANCHOR BLOCK INSERT ASSEMBLY

CAST IN PLACE THREADED STEEL INSERT WITH 7/8" DIA. X 2" HEX HEAD GALVANIZED BOLTS (ASTM A307) HOT DIP ZINC COATING ASTM A153

ROCK SLOPE (MODIFY FRONT FACE OF ANCHOR BLOCK TO SUIT SLOPE) OR OMIT BLOCK AND DRILL ANCHOR INTO ROCK IF ENGINEER SO DIRECTS.

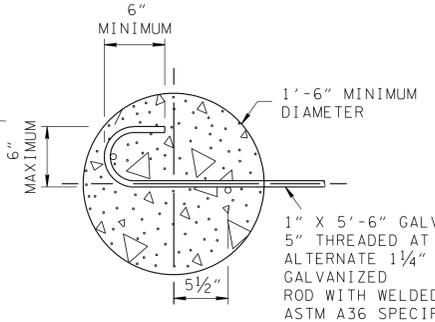


PLAN (TOP)



ELEVATION (FRONT)

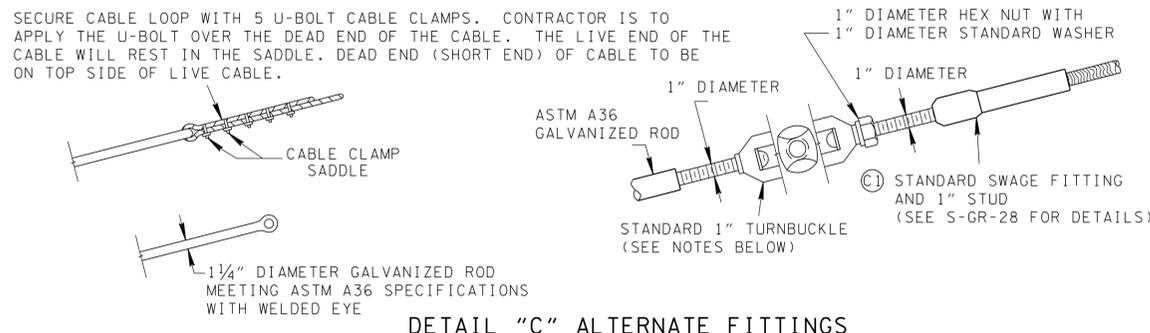
GUARDRAIL TERMINAL (TYPE 13)
ITEM NO. 705-04.03 PER EACH



DETAIL "B" SECTION THRU DEADMAN

GUARDRAIL TERMINAL ANCHOR (TYPE 13) GENERAL NOTES

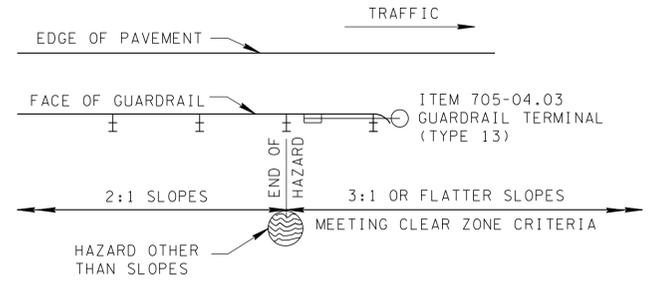
- (B1) UNIT PRICE FOR ITEM NO. 705-04.03, GUARDRAIL TERMINAL (TYPE 13) PER EACH SHALL INCLUDE COSTS OF FURNISHING AND INSTALLING CABLE ANCHOR AND ALL COMPONENTS AS DETAILED, CONCRETE "DEADMAN", AND TERMINAL RAIL END ELEMENT, COMPLETE, IN PLACE. SEE STANDARD DRAWING NO S-GR-28 FOR DETAILS AND SPECIFICATIONS ON CABLE AND ANCHOR PLATE.
- (B2) CABLE TO BE PARALLEL TO GUARDRAIL FOR STRAIGHT RUNS OF RAIL. CABLE MAY HAVE ANGLE POINT AT ANCHOR PLATE IF GUARDRAIL IS CURVED.
- (B3) ESTIMATED QUANTITIES OF CONCRETE AND STEEL FOR GUARDRAIL TERMINAL (TYPE 13) ARE:
CLASS "A" CONCRETE= 0.33 CUBIC YARD
NO. 8 STEEL REINFORCING BAR= 77 POUNDS
- (B4) THIS TERMINAL SHALL NOT BE USED ON THE APPROACH END OF A SECTION OF GUARDRAIL.
- (B5) SEE STD. DWG. S-GR-19C FOR ALTERNATE TYPE 13 TERMINAL ANCHOR.



DETAIL "C" ALTERNATE FITTINGS

ALTERNATE FITTING GENERAL NOTES

- (C1) STANDARD SWAGE FITTING WITH ONE (1) INCH DIAMETER STUD TO BE USED ONLY WITH STANDARD ONE (1) INCH TURNBUCKLE. SWAGE FITTING ON ANCHOR PLATE IS SAME AS DETAIL ON STANDARD DRAWING S-GR-28.
- (C2) DROP FORGED GALVANIZED STEEL TURNBUCKLE SHALL PROVIDE A MINIMUM BREAKING STRENGTH OF 40,000 POUNDS.
- (C3) THE FINISHED CABLE ASSEMBLY WILL NOT BE ACCEPTABLE UNLESS IT IS IN TENSION WITH NO SAG.
- (C4) THESE FITTINGS SHALL BE INSTALLED ABOVE GROUND.



SKETCH SHOWING APPLICATION OF TRAILING END TREATMENT ON DIVIDED HIGHWAYS

- REV. 5-27-96: MODIFIED LOCATION OF TERMINAL ANCHOR (TYPE 13) IN DETAIL ON LOWER RIGHT CORNER.
- REV. 7-29-96: MADE MINOR DIMENSIONING CHANGES.
- REV. 7-29-98: MODIFIED DETAIL "C".
- REV. 12-18-98: MODIFIED ALL DETAILS FOR GUARDRAIL TERMINAL ANCHOR (TYPE 13).
- REV. 5-27-01: CHANGED DESCRIPTION FOR ITEM NUMBERS 705-04.02 AND 705-04.03. CHANGED SHEET NAME.
- REV. 7-29-03: CHANGED CONCRETE ANCHOR BLOCK.
- REV. 10-26-03: ADDED SPECIAL GUARDRAIL TERMINAL (TYPE 12) NOTE.
- REV. 10-06-06: ADDED GENERAL NOTES (B5) AND (A8).
- REV. 6-1-09: ADDED ALTERNATE END SECTION NOTE.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

GUARDRAIL TERMINAL ANCHORS, TYPE 12 AND TYPE 13