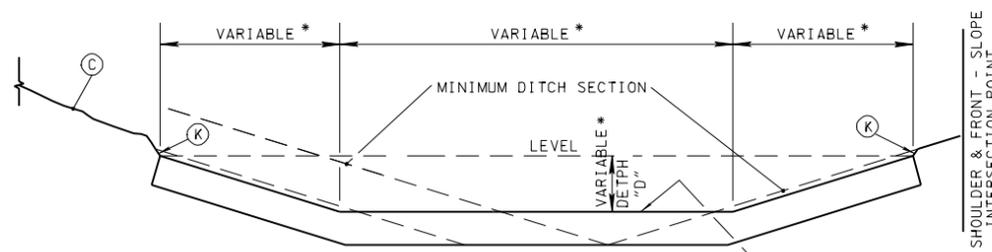


TRAVERSABLE DITCH DETAILS
(DIMENSIONED FOR FIELD LAYOUT)



* MANIPULATE DEPTH AND WIDTH FOR DESIRED CHANGES IN CAPACITY AND OR VELOCITY.

MANNING'S ROUGHNESS COEFFICIENT "N" VARIABLE AS TO TYPE OF DITCH LINING.

SECTION SHOWING DITCH ADJUSTMENT FOR VARIATIONS IN HYDRAULIC REQUIREMENTS

SEE FIGURES 3.6 AND 3.7, ROADSIDE DESIGN GUIDE, 2002 FOR PREFERRED CHANNEL CROSS-SECTION.

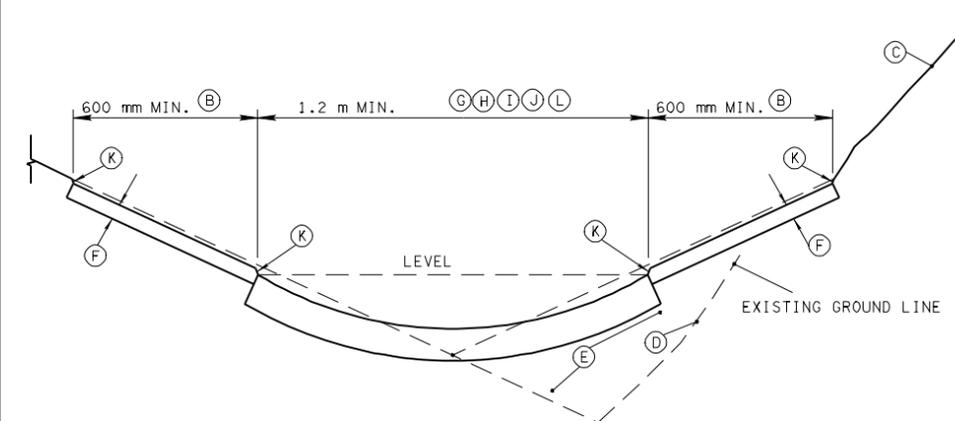
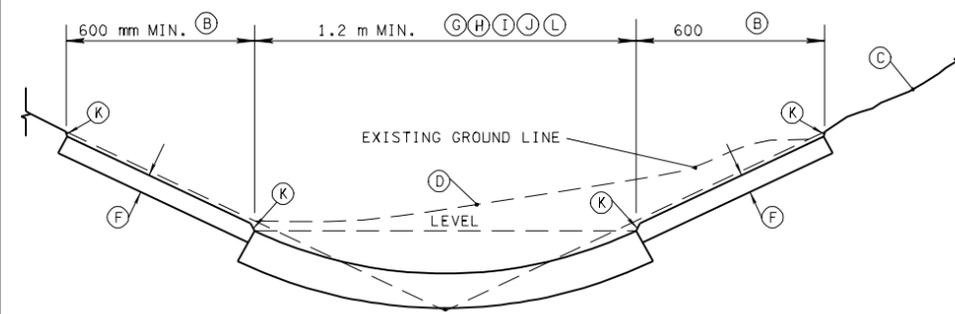
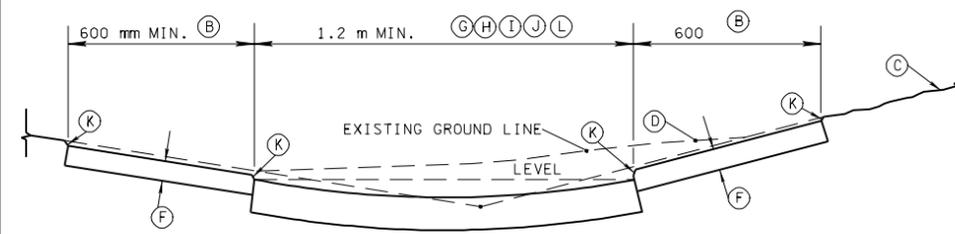
GENERAL NOTES

- (A) CUT SLOPE DITCHES AND SPECIAL DITCHES AT THE TOE OF FILLS WITHIN THE CLEAR ZONE SHALL BE BASED UPON THIS GEOMETRICAL CONFIGURATION REGARDLESS OF THE TYPE OF DITCH LINING REQUIRED FOR EROSION RETARDANCE. IF HYDRAULIC REQUIREMENTS DICTATE A GREATER CAPACITY THAN THE MINIMUM HERE SHOWN, THE BOTTOM OF THE TRAPEZOID MAY BE WIDENED BUT THE CORNERS SHALL REMAIN ROUNDED. DITCHES OUTSIDE OF THE CLEAR ZONE OR ALONG FILL SLOPES STEEPER THAN 3:1 MAY BE VARIED AS REQUIRED TO MEET CONDITIONS AS DICTATED BY HYDRAULIC REQUIREMENTS AND TERRAIN, EXCEPT THAT DESIGN AND CONSTRUCTION ENGINEERS SHOULD STRIVE FOR AESTHETIC BLENDING OF ANY GRADING OR STRUCTURE REQUIRED FOR THE FUNCTIONING OF THE ROADWAY FACILITY.
- (B) 600 mm MINIMUM SOD STRIP OR OTHER RECOMMENDED EROSION CONTROL MATERIAL ADJACENT TO CONCRETE PAVED OR RIP-RAP DITCH BOTTOM LINING IN ACCORDANCE WITH SECTION 803 AND/OR CURRENT SPECIAL PROVISIONS. ON BACK SLOPES, MATERIAL MAY BE EXTENDED TO BLEND INTO EXISTING VEGETATION WHEN FEASIBLE, AS DETERMINED BY THE ENGINEER.
- (C) ALL SLOPES OR EXISTING GROUND DISTURBED BY CONSTRUCTION SHALL BE SEEDING IN ACCORDANCE WITH SECTION 801 AND CURRENT SPECIAL PROVISION(S) REGARDING SAME, UNLESS OTHERWISE INDICATED ON PLANS.
- (D) EXISTING GROUND. THE DESIGNER AND THE CONSTRUCTION ENGINEER SHOULD ENDEAVOR TO PLACE THE DITCH IN CUT UNLESS STEEP TERRAIN RENDERS THIS UNFEASIBLE.
- (E) DITCH SUB-GRADE. THE SUB-GRADE SHALL BE PREPARED AND COMPACTED IN ACCORDANCE WITH SECTION 205 OF THE STANDARD SPECIFICATIONS TO A DENSITY OF NOT LESS THAN 95 % PROCTOR (AASHTO T-99) PAYMENT FOR PREPARATION AND COMPACTION OF THE DITCH SUB-GRADE WILL BE MADE UNDER ITEM 203M01, UNLESS OTHERWISE DESIGNATED ON THE PLANS.
- (F) THE SOD STRIP SHALL HAVE A UNIFORM THICKNESS OF NOT LESS THAN 25 mm.
- (G) CONCRETE PAVED, RIP-RAP, SODDED OR OTHER DITCH LINING. THE TYPE OF LINING FOR EACH INDIVIDUAL DITCH ALONG THE ROADWAY WILL BE DESIGNATED ON THE PLANS IN ACCORDANCE WITH SYMBOLS AS SHOWN ON STANDARD DRAWING RDM-L-1, AND THE PLANS. DECISIONS REGARDING THE TYPE OF LINING TO BE SPECIFIED ON PLANS WILL BE MADE BY THE DESIGNER, BASED UPON THE TYPE THAT WILL BEST SATISFY THE HYDRAULIC REQUIREMENTS AT THE LEAST COST. IN ORDER TO EFFICIENTLY PERFORM THIS DESIGN PHASE, THE DESIGNER SHOULD BECOME THOROUGHLY FAMILIAR WITH FHWA HYDRAULIC DESIGN SERIES #3, DESIGN CHARTS FOR OPEN CHANNEL FLOW AND HYDRAULIC ENGINEERING CIRCULAR #15, DESIGN OF STABLE CHANNEL WITH FLEXIBLE LININGS.
- (H) DESIGNS FOR SOD DITCH SHALL BE BASED UPON THE GENERAL VEGETAL RETARDANCE CLASSIFICATION "C" AS DESCRIBED IN TABLE C-2, P.100 OF HYDRAULIC ENGINEERING CIRCULAR #15, EXCEPT THAT CRABGRASS, COMMON LESPEDEZA OR SOD OF ANY OTHER ANNUAL VEGETATION IS NOT TO BE CONSIDERED APPLICABLE.
- (I) THE FOLLOWING CHART GIVES MAXIMUM PERMISSIBLE SLOPE-FLOW DEPTH RANGES FOR VARIOUS TYPES OF CHANNEL LINING. OTHER TYPES WILL BE ADDED AS SOON AS SPECIFICATIONS BECOME AVAILABLE. THESE VALUES ARE BASED UPON SOILS OF AVERAGE ERODABILITY, AND ADJUSTMENTS MAY BE MADE IN ACCORDANCE WITH APPLICABLE CHARTS IN THE ABOVE MENTIONED CIRCULAR NO.15, IF THE SCOUR RESISTANCE OF THE SOIL IS KNOWN. THE DEPTH INDICATED IS TO BE APPLIED TO THE DEEPEST PART OF THE DITCH, SINCE THIS IS THE POINT AT WHICH SCOUR WILL FIRST OCCUR.

| DITCH LINING MATERIAL | DITCH SLOPE (PERCENT) | DEPTH "D" (mm) |
|------------------------|-----------------------|----------------|
| UNLINED DITCH | 1 TO 0.4 | 45 TO 75 |
| JUTE MESH | 8 TO 0.5 | 30 TO 400 |
| SOD (RETARDANCE "C") | 9 TO 0.5 | 90 TO 610 |

RIP-RAP OR CONCRETE DITCH LININGS SHOULD BE CONSIDERED ONLY AFTER THE ALLOWABLE DEPTHS ABOVE COMBINED WITH WIDTH ADJUSTMENTS WITHIN FEASIBLE LIMITS ("FEASIBLE LIMITS" TO BE DETERMINED BY THE DESIGNER BASED UPON RIGHT-OF-WAY OR OTHER CASE-BY-CASE SITUATIONS) HAVE BEEN STUDIED.

- (J) DESIGNERS SHOULD MAKE USE OF THE CHANNEL LINING COMPUTATION SHEET, PAGE 18 OF HYDRAULIC ENGINEERING CIRCULAR NO. 15 FOR ORDERLY COMPUTATION PROCEDURES AND FOR FINAL DESIGN RECORDS.
- (K) THE SUBGRADE OF THE DITCH SHALL BE SO GRADED THAT THE SOD STRIP SHALL BE 13 mm MINIMUM TO 25 mm MAXIMUM ABOVE THE CONCRETE STRIP, AND/OR THE SEEDING SLOPE THE SAME DIMENSIONS ABOVE THE SOD STRIP.
- (L) IN ALL CONCRETE DITCHES, FORMED OR SAWED CONTRACTION JOINTS (6 mm WIDE AND 25 mm DEEP) WILL BE REQUIRED AT A MAXIMUM OF 6 m INTERVALS AND 13 mm TRANSVERSE PREMOULDED FIBER EXPANSION JOINTS WILL BE REQUIRED AT 18 m INTERVALS, COST TO BE INCLUDED IN THE PRICE FOR THE PAY ITEM FOR PAVED DITCHES. SEE STANDARD DRAWING RPM-J-9 FOR JOINT DETAILS.
- (M) WHEN CONCRETE DITCHES ARE USED, THE CONCRETE WILL BE 100 mm THICK.
- (N) WHEN RIP-RAP DITCHES ARE USED, THE THICKNESS OF RIP-RAP WILL BE SPECIFIED ON THE PLANS.



MINIMUM TOE OF FILL DITCHES

(MINIMUM CUT DITCHES SIMILAR EXCEPT FOR GEOMETRIC LAYOUT, ON LEFT SIDE OF THIS SHEET.)



ALL UNITS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS

**ROADSIDE DITCH
DETAILS FOR
DESIGN AND
CONSTRUCTION**