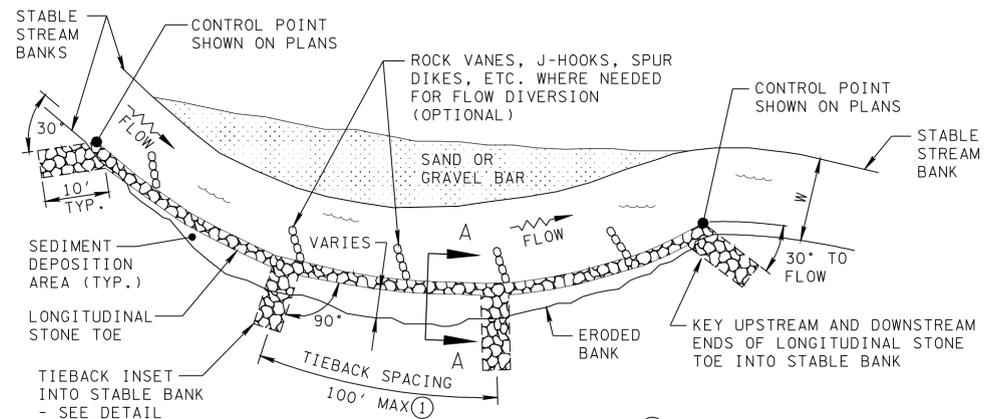
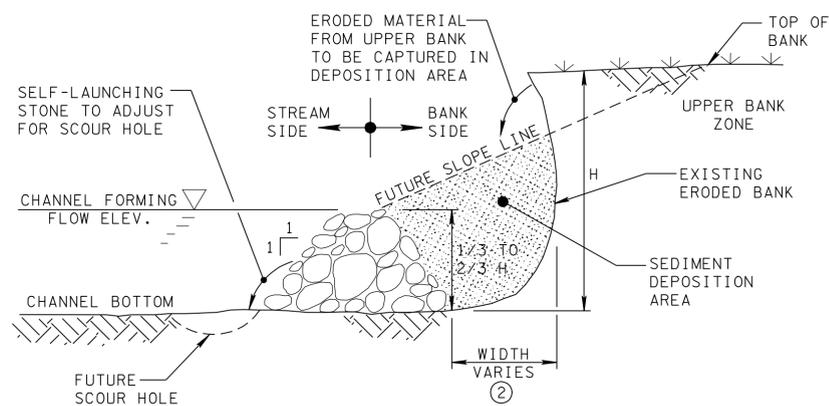


LONGITUDINAL STONE TOE



PLAN VIEW

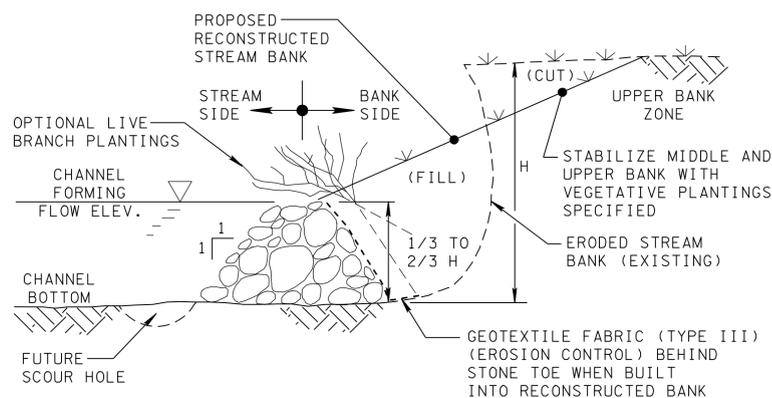
NOTE ①: FOR LARGER STREAMS OR RIVERS, TIEBACKS SHALL BE SPACED AT 2X THE CHANNEL FORMING FLOW WIDTH (W)



SECTION A-A
STONE TOE IN FRONT OF BANK

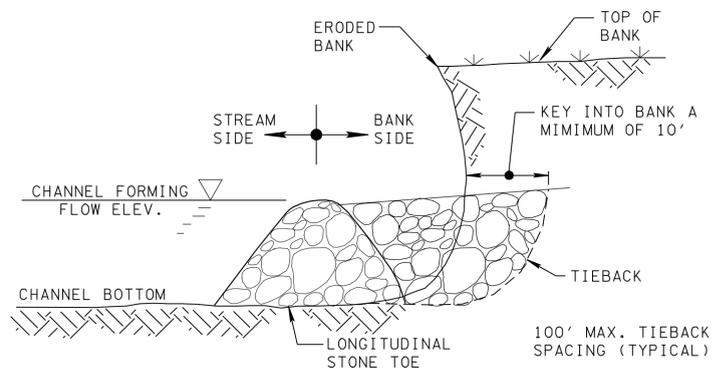
(SEDIMENT DEPOSITION AREA FILLS NATURALLY OVER TIME)

NOTE ②: BANKSIDE WIDTH VARIES TO PROVIDE SMOOTH ALIGNMENT THROUGH THE CHANNEL BEND



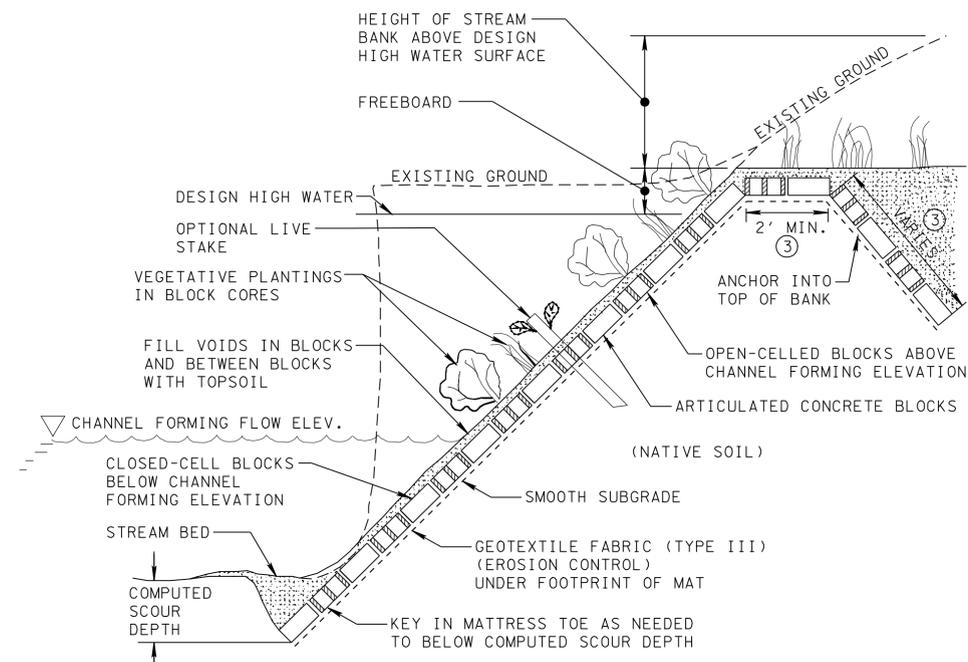
SECTION A-A
STONE TOE BUILT INTO RECONSTRUCTED BANK

(SEDIMENT DEPOSITION AREA FILLED DURING CONSTRUCTION)



TIEBACK DETAIL

ARTICULATED CONCRETE MAT



SECTION VIEW

CONTROL POINTS FOR ARTICULATED CONCRETE MAT SHALL BE PROVIDED ON THE STREAM MITIGATION PLANS

NOTE ③: ANCHOR LENGTHS VARY AND SHALL BE PER MANUFACTURE'S SPECIFICATIONS

LONGITUDINAL STONE TOE GENERAL NOTES

- (A) LONGITUDINAL STONE TOE IS A LOWER BANK STABILIZATION MEASURE THAT IS PLACED AT THE TOE OF AN ERODING BANK, OR STREAM SIDE OF THE TOE, TO PROVIDE HARD ARMORING AGAINST FURTHER EROSION, PROVIDE AN AREA FOR SEDIMENT DEPOSITION AND NATURAL RECONSTRUCTION OF THE TOE, AND ENCOURAGE THE GROWTH OF ADDITIONAL VEGETATION AS THE BANK SLOPE STABILIZES.
 - (B) LONGITUDINAL STONE TOE IS ACCEPTABLE FOR USE IN STABLE ALLUVIAL CHANNELS WHERE THE LOWER BANK IS FAILING BUT THE MID AND UPPER SLOPES ARE FAIRLY STABLE.
 - (C) USE OF THIS IN-STREAM MEASURE SHALL NOT ADVERSELY AFFECT THE HYDRAULIC CAPACITY OF THE CHANNEL.
 - (D) LONGITUDINAL STONE TOE SHOULD NOT BE USED IN BEDROCK CHANNELS.
 - (E) LONGITUDINAL STONE TOE MAY BE USED IN COMBINATION WITH OTHER HYDRAULIC CONTROL STRUCTURES (J-HOOKS, VANES, ETC.), AND MOST OTHER BANK STABILIZATION MEASURES.
 - (F) MACHINED RIPRAP CLASS SELECTED FOR CONSTRUCTING LONGITUDINAL STONE TOE SHALL BE SELECTED BASED ON CRITERIA IN SECTION 11.04.6 OF THE DRAINAGE MANUAL.
 - (G) WHEN THE STONE TOE IS BUILT INTO A RECONSTRUCTED BANK, GEOTEXTILE (TYPE III) (EROSION CONTROL) SHALL BE PLACED BEHIND THE ROCK TO PREVENT SOIL MIGRATION THROUGH THE STRUCTURE.
 - (H) THE TOP ELEVATION OF THE STRUCTURE SHALL BE NO LOWER THAN THE CHANNEL FORMING FLOW ELEVATION OF THE STREAM.
 - (I) ACCESS TO THE STREAMBANK AREA SHALL BE PROVIDED FOR HEAVY EQUIPMENT, MONITORING, AND MAINTENANCE.
 - (J) ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.
 - (K) LONGITUDINAL STONE TOE SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

209-03.47	STREAM MITIGATION - LONGITUDINAL STONE TOE (DESCRIPTION) PER CUBIC YARD
740-10.03	GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD
- PAYMENT FOR LONGITUDINAL STONE TOE SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR THE CONSTRUCTION OF THE TOE PROTECTION SYSTEM.

ARTICULATED CONCRETE MAT GENERAL NOTES

- (A) ARTICULATED CONCRETE MATS ARE A BANK STABILIZATION REVETMENT MADE UP OF MULTIPLE CONCRETE BLOCKS BOUND TOGETHER BY STEEL CABLE OR INTERLOCKING BLOCK THAT IS USED TO RESIST EROSION FORCES EXERTED BY HIGH ENERGY FLOWS. ARTICULATED BLOCKS ARE NORMALLY HOLLOW-CORED ABOVE THE CHANNEL FORMING FLOW ELEVATION SO THAT TOPSOIL AND VEGETATION CAN BE INSTALLED WITHIN THE CORES ALLOWING FOR A PARTIALLY VEGETATED STREAM BANK.
 - (B) ARTICULATED CONCRETE BLOCK MATS ARE BEST SUITED FOR THRESHOLD STREAMS WHERE VELOCITIES EXCEED 12 FEET PER SECOND, AND ON THE OUTSIDE BEND OF HIGH GRADIENT STREAMS. MAY BE USED IN ALLUVIAL STREAMS WHERE APPROPRIATE.
 - (C) SEE HEC-23 FOR DETAILED DESIGN GUIDANCE FOR ARTICULATED CONCRETE BLOCK MAT SYSTEMS.
 - (D) AT A MINIMUM, INDIVIDUAL CONCRETE BLOCKS USED FOR THE REVETMENT SYSTEM SHALL BE CONSTRUCTED OF CLASS D CONCRETE (f'c 4000 PSI).
 - (E) ALL ARTICULATED BLOCK REVETMENT SYSTEMS SHALL BE KEYED INTO THE BANK AT BOTH THE CONTROL POINTS (UPSTREAM AND DOWNSTREAM ENDS) OF THE INSTALLATION.
 - (F) BOTTOM OF BLOCK MAT SHALL EXTEND BELOW THE COMPUTED SCOUR DEPTH OF THE CHANNEL BOTTOM. TOP OF MAT SHALL BE ANCHORED IN STABLE SOIL.
 - (G) TOP OF MAT AT THE TOP OF THE STREAM BANK SHALL BE KEYED INTO THE SOIL A MINIMUM OF 3 BLOCKS ALONG THE ENTIRE LENGTH OF THE INSTALLATION.
 - (H) ONLY BLOCK SYSTEMS LISTED ON THE QUALIFIED PRODUCTS LIST MAY BE USED.
 - (I) BLOCKS SHALL MEET THE PHYSICAL REQUIREMENTS OF ASTM D6684.
 - (J) ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.
 - (K) ARTICULATED CONCRETE MAT SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

209-03.53	STREAM MITIGATION - ARTICULATED CONCRETE MAT PER SQUARE YARD
740-10.03	GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD
- PAYMENT FOR ARTICULATED CONCRETE MAT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR THE CONSTRUCTION OF THE REVETMENT SYSTEM.
- (L) ARTICULATED CONCRETE MATS SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.