



(A) BOULDER W-WEIRS ARE HYDRAULIC AND GRADE CONTROL MEASURES THAT ARE USED ON SMALLER RIVERS TO DIRECT FLOW AWAY FROM THE CHANNEL BANK AND BRIDGE ABUTMENTS, CONCENTRATE FLOW INTO THE CENTER HALVES OF THE CHANNEL, AND ENHANCE HABITAT AND RECREATIONAL USE BY BOATERS.

(B) BOULDER W-WEIRS SHOULD BE PLACED AT THE STATIONS, OFFSETS, ELEVATIONS, AND CONFIGURATION INDICATED ON THE STREAM MITIGATION DATA TABLE IN THE PROJECT PLANS, STREAM MITIGATION PLAN, OR AS DIRECTED BY THE ENGINEER. AT A MINIMUM, THE BANKFULL WIDTH, MEDIAN BOULDER SIZE, VANE AND SILL LENGTHS, WIDTHS AND INVERT ELEVATIONS OF THE VERTICES, SHOULD BE SPECIFIED IN THE STREAM MITIGATION DATA TABLE.

(C) REFER TO D-NSD-37 "SPECIAL NOTES FOR NATURAL STREAM DESIGN".

(D) BOULDERS PRESENT IN THE EXISTING STREAM MEETING THE SPECIFIED TYPE AND SIZE SHOULD BE USED IN THE RESTORED CHANNEL SEGMENT.

(E) THE UPSTREAM VERTICES OF THE BOULDER W-WEIR ARE TYPICALLY LOCATED IN THE CENTER OF EACH HALF OF THE STREAM CHANNEL AND THE DOWNSTREAM VERTEX IS TYPICALLY LOCATED IN THE CENTER OF THE CHANNEL, UNLESS THE STRUCTURE IS DESIGNED WITH OFF-SET VANES TO CONFORM TO BENDS IN THE CHANNEL OR THE LOCATION OF DOWNSTREAM BRIDGE ABUTMENTS OR OTHER PHYSICAL OBSTRUCTIONS. THE SURFACE BOULDERS COMPRISING THE UPSTREAM VERTICES ARE SET AT THE INVERT ELEVATIONS OF THE STRUCTURE.

(F) A MIXTURE OF SELECT MATERIALS, AS SPECIFIED ON THE STREAM MITIGATION PLAN SHEETS, SHOULD BE USED FOR SUBSTRATE RESTORATION IN RIFFLE AND RUN HABITATS AND TO FILL GAPS IN THE VANE BOULDERS. COARSE ALLUVIUM EXCAVATED FROM THE EXISTING STREAM BED, WHICH MEETS THE SPECIFIED SIZE CLASSIFICATION, IS THE PREFERRED MATERIAL TO USE FOR SUBSTRATE RESTORATION. REFER TO D-NSD-30 AND D-NSD-37 FOR ADDITIONAL SUBSTRATE RESTORATION INFORMATION.

(G) CONSTRUCT BOULDER W-WEIR STRUCTURES BY:

- (1) FIRST SHAPE CHANNEL AND FLOODPLAN TO THE SPECIFIED GRADES AND DIMENSIONS.
- (2) NEXT, EXCAVATE ENOUGH BED MATERIAL TO PLACE THE BOULDERS, NON-WOVEN GEOTEXTILE FABRIC (TYPE III) AND GRAVEL OVERLAY.
- (3) PLACE FOOTER BOULDERS AND SURFACE BOULDERS AT THE CHANNEL INVERT FOR THE UPSTREAM VERTICES AND THEN USE SURVEY EQUIPMENT TO CHECK THE ELEVATIONS OF THE INVERTS IN ACCORDANCE WITH THE STREAM MITIGATION PLANS.
- (4) ONCE THE INVERTS HAVE BEEN ESTABLISHED, THE REMAINDER OF THE FOOTER AND SURFACE BOULDERS SHALL BE PLACED, MINIMIZING VOIDS.
- (5) FILL THE VOIDS BETWEEN BOULDERS ON THE UPSTREAM SIDE OF THE STRUCTURE.
- (6) PLACE NON-WOVEN GEOTEXTILE FABRIC (TYPE III) ALONG THE ENTIRE UPSTREAM FACE OF THE STRUCTURE, EXTENDING FROM THE BOTTOM OF THE FOOTER TO THE FINISHED GRADE ELEVATION. ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.
- (7) BACKFILL STRUCTURE AND NON-WOVEN GEOTEXTILE FABRIC (TYPE III) WITH EXCAVATED ON-SITE STREAM ALLUVIUM (IF AVAILABLE), OTHERWISE USE THE SPECIFIED SELECT MATERIAL. SOIL SHALL BE COMPACTED WELL AROUND BURIED PORTIONS OF THE STRUCTURE. TRIM ANY EXPOSED NON-WOVEN GEOTEXTILE FABRIC (TYPE III).
- (8) ONCE THE STRUCTURE IS INSTALLED, EXCAVATE SCOUR POOL AND PLACE SELECT MATERIAL AS REQUIRED.
- (9) RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.

(H) THE SURFACE OF THE BOULDER W-WEIR VANE ARMS SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES AND CROSS SECTIONS OR ELEVATIONS SHOWN ON THE PLANS. THE DEGREE OF FINISH FOR INVERT ELEVATIONS SHALL BE WITHIN 0.10 FOOT OF THE GRADES AND ELEVATIONS INDICATED, OR AS DIRECTED BY THE ENGINEER. ALL GAPS OR VOIDS SHALL BE PLUGGED WITH SELECT MATERIAL TO FORM A TIGHT-FITTING SEAL.

(I) ALL MATERIALS ARE TO BE APPROVED BY ENGINEER OR ENGINEER'S ON-SITE CONSTRUCTION OBSERVER.

(J) BOULDER W-WEIR SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:

NOT TO SCALE

BOULDER
W-WEIR

11-01-16

D-NSD-24