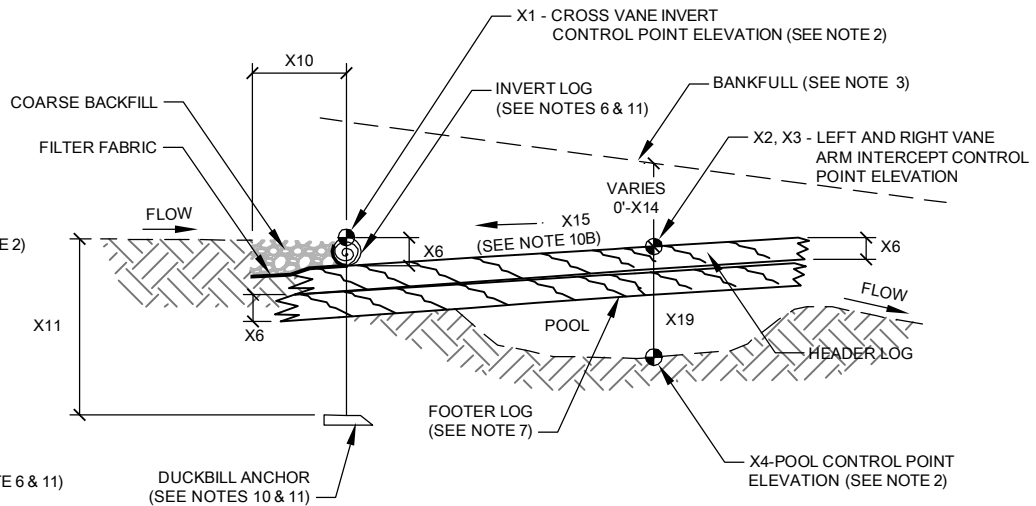
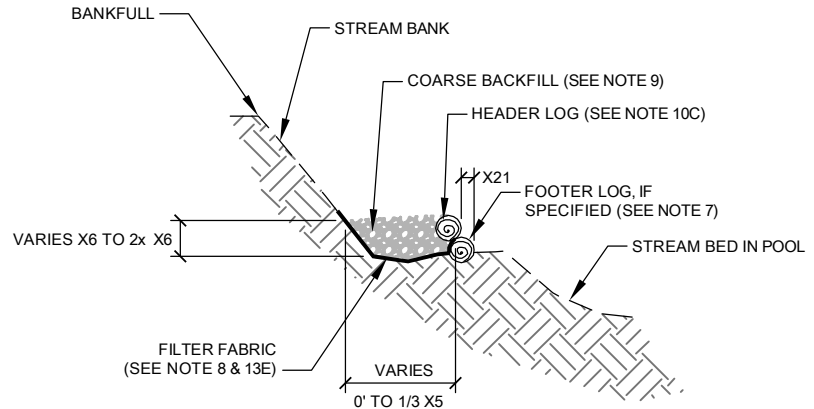


PLAN VIEW



PROFILE VIEW



ARM SECTION A - A'

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NOT TO SCALE



CHARLOTTE-MECKLENBURG
STORM WATER SERVICES
GENERIC DETAIL REQUIREMENTS

LOG CROSS VANE

DRAFT - NOT TO BE USED FOR CONSTRUCTION

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NOTES:

1. A LOG CROSS VANE IS A GRADE CONTROL, IN-STREAM STRUCTURE THAT DIRECTS STREAM FLOW AWAY FROM THE STREAM BANKS AND IN TOWARD THE CENTER OF THE CHANNEL.
2. ELEVATION CONTROL POINTS SHALL BE DESIGNATED AT THE UPSTREAM INVERT (CENTER) OF THE CROSS VANE TO ESTABLISH PART OF THE PROFILE. A NOTCH MAY BE CUT INTO THE LOG AT THE INVERT LOCATION. POOL ELEVATION CONTROL POINTS OR EXCAVATION TO A SPECIFIED MAXIMUM POOL DEPTH SHALL BE DESIGNATED TO ESTABLISH THE REMAINING PROFILE. SURVEY OF CONTROL POINTS SHALL BE REQUIRED TO ESTABLISH ACCURATE INSTALLATION WITHIN THE TOLERANCE SPECIFIED BY THE DESIGNER.
3. THE VANE ARM SHALL INTERCEPT THE STREAM BANK AT A HEIGHT EQUAL TO BETWEEN ½ BANKFULL STAGE AND BANKFULL STAGE. ELEVATION CONTROL POINTS MAY BE ESTABLISHED AT THE LEFT AND RIGHT STREAM BANK/VANE ARM INTERCEPT POINTS. THE VANE ARM INTERCEPT LOCATION MAY BE OTHERWISE DESCRIBED BY ITS RELATIONSHIP TO BANKFULL STAGE OR BY THE LENGTH AND SLOPE OF THE VANE ARM. BANKFULL IS NOT NECESSARILY THE TOP OF THE STREAM BANK SLOPE.
4. IF THE PLANS DESIGNATE THE USE OF MULTIPLE LOG CROSS VANES A TABLE OF ALL STATION LOCATIONS AND CONTROL POINT ELEVATIONS SHALL BE PROVIDED IN THIS DETAIL OR PROVIDED ELSEWHERE IN THE PLANS AND REFERENCED HEREIN.
5. TYPICAL RIFFLE AND POOL CROSS SECTIONS SHALL BE PROVIDED ELSEWHERE IN THE PLANS TO ESTABLISH THE DIMENSIONS OF THE CHANNEL GRADING INTO WHICH THE LOG CROSS VANES ARE TO BE INSTALLED.
6. LOGS SHALL BE OF A LENGTH AND DIAMETER SPECIFIED BY THE DESIGNER AND RELATIVELY STRAIGHT HARDWOOD, RECENTLY HARVESTED. THE LENGTH SHALL BE SUCH THAT THE LOG IS BURIED INTO THE SOIL OF THE STREAM BANK (ON ONE END) AND STREAM BED (ON THE OTHER END) A MINIMUM DISTANCE AS SPECIFIED BY THE DESIGNER. THE INVERT LOG SHALL BE EQUAL TO THE STREAM BED WIDTH AS DEPICTED IN THE RIFFLE TYPICAL SECTION.
7. A SINGLE LOG MAY BE USED IN LIEU OF A HEADER/FOOTER LOG COMBINATION.
8. FILTER FABRIC OF A TYPE AND SIZE SPECIFIED BY THE DESIGNER SHALL BE USED TO SEAL THE GAPS BETWEEN THE LOG(S) AND THE STREAM BED, UNDER THE COARSE BACKFILL MATERIAL. THERE SHALL BE NO FILTER FABRIC VISIBLE IN THE FINISHED WORK; EDGES SHALL BE FOLDED, TUCKED, OR TRIMMED AS NEEDED.
9. COARSE BACKFILL OF THE LOG CROSS VANE SHALL BE OF A TYPE, SIZE, AND GRADATION AS SPECIFIED BY THE DESIGNER. COARSE BACKFILL SHALL BE PLACED TO A THICKNESS EQUAL TO THE DEPTH OF THE HEADER (AND ANY FOOTER) LOGS AND SHALL EXTEND OUT FROM THE VANE ARMS TO THE STREAM BANK AND UPSTREAM A DISTANCE SPECIFIED BY THE DESIGNER.
10. AS AN OPTION, FLAT-SIDED BOULDERS OF A SIZE (LENGTH, WIDTH, AND THICKNESS) AS SPECIFIED BY THE DESIGNER MAY BE PLACED AS BALLAST ON TOP OF THE STREAM BANK SIDE OF THE EMBEDDED VANE ARMS. DUCK BILL ANCHORS MAY BE USED IN LIEU OF BALLAST BOULDERS.
11. DUCKBILL ANCHORS WITH GALVANIZED CABLE ATTACHED (OF A GAGE ADEQUATE TO SECURE THE SPECIFIED DIAMETER LOG) MAY BE USED TO SECURE LOGS INTO THE STREAM BED AND/OR BANKS TO THE SPECIFIED DEPTH. FLAT SIDED BOULDERS (LENGTH, WIDTH, AND THICKNESS SPECIFIED BY DESIGNER) CAN BE USED IN LIEU OF THE LOG INVERT/DUCKBILL ANCHOR SYSTEM.
12. THE VANE ARMS OF THE LOG CROSS VANE SHALL BE CONSTRUCTED FIRST, FOLLOWED BY THE LOG INVERT.
13. LOG CROSS VANES SHALL BE BUILT TYPICALLY AS FOLLOWS:
 - A. OVER-EXCAVATE STREAM BED TO A DEPTH EQUAL TO THE TOTAL THICKNESS OF THE HEADER (AND FOOTER IF SPECIFIED) LOGS.
 - B. PLACE VANE ARM FOOTER LOGS, IF SPECIFIED. THE SLOPE OF THE VANE ARM IS MEASURED ALONG THE VANE ARM WHICH IS INSTALLED AT AN ANGLE TO THE STREAM BANK AND PROFILE.
 - C. INSTALL VANE ARM HEADER LOG ON TOP OF AND SET SLIGHTLY FORWARD OR BACK FROM THE FOOTER LOG.
 - D. INSTALL INVERT LOG AND DUCKBILL ANCHOR.
 - E. NAIL FILTER FABRIC TO THE HEADER LOG USING A GALVANIZED NAIL WITH A PLASTIC CAP. THE SIZE AND GAGE OF NAIL AND NAIL SPACING SHALL BE SPECIFIED BY THE DESIGNER.
 - F. PLACE COARSE BACKFILL BEHIND LOG(S) ENSURING THAT ANY VOIDS BETWEEN THE LOGS ARE FILLED.
14. IF ANY EROSION CONTROL MATTING IS SPECIFIED FOR USE IN THE VICINITY OF THE VANE ARM INTERCEPT POINTS, ALL MATTING EDGES SHALL BE NEATLY SECURED AROUND THE LOGS.

DIMENSIONS (VALUES TO BE PROVIDED BY DESIGNER)

VARIABLE	VALUES	TYPICAL UNIT	DESCRIPTION
X1		FT. (NAVD)	CROSS VANE INVERT CONTROL POINT ELEVATION
X2		FT. (NAVD)	LEFT VANE ARM INTERCEPT CONTROL POINT ELEVATION
X3		FT. (NAVD)	RIGHT VANE ARM INTERCEPT CONTROL POINT ELEVATION
X4		FT. (NAVD)	POOL CONTROL POINT ELEVATION
X5		FT.	BANKFULL WIDTH
X6		IN.	LOG DIAMETER
X7		FT.	VANE ARM LENGTH
X8		FT.	VANE ARM LOG LENGTH
X9		FT.	LENGTH OF VANE ARM LOG BURIED INTO BANK
X10		FT.	LENGTH OF COARSE BACKFILL
X11		IN. OR FT.	DEPTH OF DUCKBILL ANCHOR INSTALLATION
X12		IN.	D50 OF COARSE BACKFILL
X13		DEGREES	VANE ARM ANGLE WITH STREAM BANK
X14		IN. OR FT.	DIFFERENCE BETWEEN TOP OF BANK (BANKFULL) AND VANE ARM INTERCEPT POINT
X15		PERCENT	VANE ARM SLOPE
X16		IN. OR FT.	BALLAST BOULDER LENGTH
X17		IN. OR FT.	BALLAST BOULDER WIDTH
X18		IN. OR FT.	BALLAST BOULDER THICKNESS
X19		FT.	MAXIMUM POOL DEPTH
X20		FT.	LENGTH OF INVERT LOG BURIED INTO BANK
X21		IN.	HEADER LOG SET BACK

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