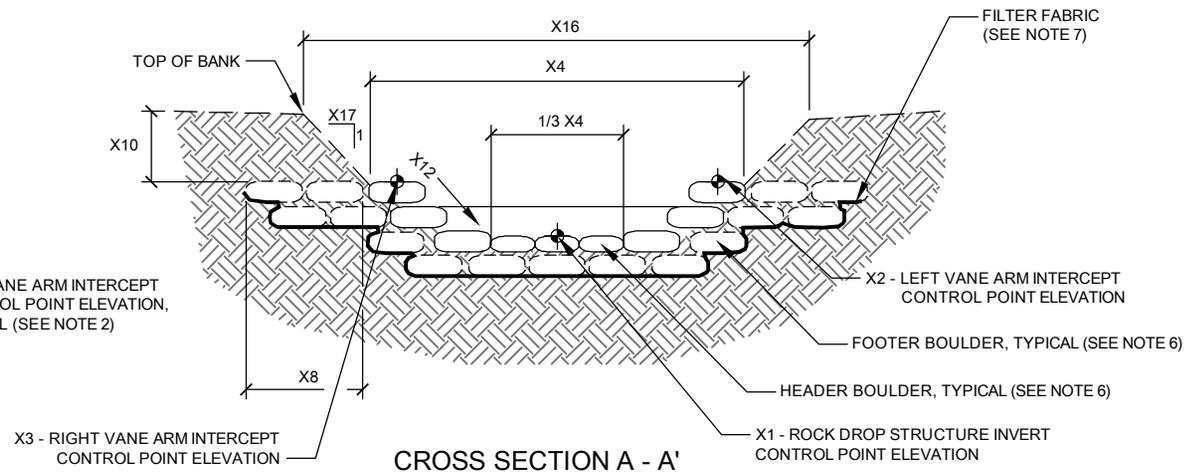


PHOTO: ROCK DROP STRUCTURE AT PIPE OUTLET



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NOT TO SCALE

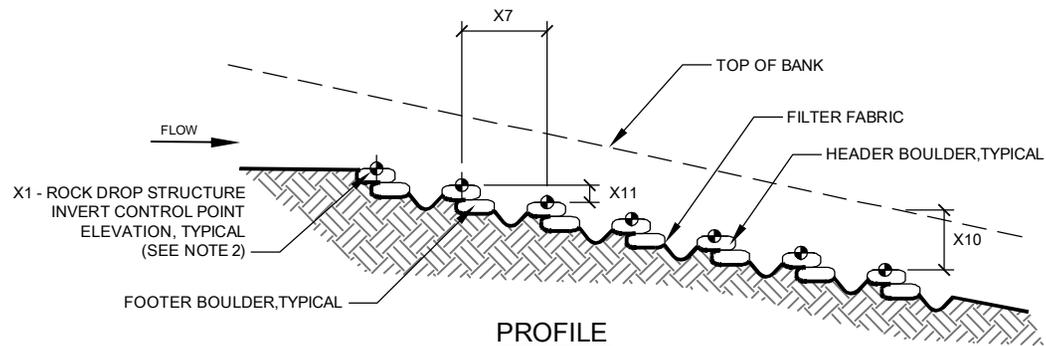


CHARLOTTE-MECKLENBURG
 STORM WATER SERVICES
 GENERIC DETAIL REQUIREMENTS

ROCK DROP STRUCTURE

DRAFT - NOT TO BE USED FOR CONSTRUCTION

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PROFILE

DIMENSIONS (VALUES TO BE PROVIDED BY DESIGNER)

VARIABLE	VALUES	TYPICAL UNIT	DESCRIPTION
X1		FT. (NAVD)	INVERT CONTROL POINT ELEVATION
X2		FT. (NAVD)	LEFT INTERCEPT CONTROL POINT ELEVATION
X3		FT. (NAVD)	RIGHT INTERCEPT CONTROL POINT ELEVATION
X4		FT.	BANKFULL WIDTH
X5		IN. OR FT.	D50 OF COARSE BACKFILL
X6		FT.	VANE ARM LENGTH
X7		FT.	LENGTH OF INDIVIDUAL GRADE CONTROL STRUCTURE
X8		FT.	LENGTH OF FLOODPLAIN SILL
X9		DEGREES	VANE ARM ANGLE WITH TOP OF BANK
X10		IN. OR FT.	DIFFERENCE BETWEEN TOP OF BANK AND VANE ARM INTERCEPT POINT
X11		IN. OR FT.	DROP BETWEEN INVERTS
X12		PERCENT	VANE ARM SLOPE
X13		IN. OR FT.	BOULDER LENGTH
X14		IN. OR FT.	BOULDER WIDTH
X15		IN. OR FT.	BOULDER THICKNESS
X16		FT.	CHANNEL WIDTH
X17		NONE	BANK SLOPE RATIO (HORIZONTAL COMPONENT)

NOTES:

- A ROCK DROP STRUCTURE IS A SERIES OF TWO OR MORE INTERCONNECTED IN-STREAM, GRADE CONTROL STRUCTURES THAT DIRECT STREAM FLOW AWAY FROM THE STREAM BANKS AND IN TOWARD THE CENTER OF THE CHANNEL. THESE STRUCTURES SHALL TYPICALLY BE USED TO TIE-IN STORM DRAINAGE PIPES AND CHANNELS TO STREAMS ON STEEP SLOPES. FISH PASSAGE IS NOT A CONCERN. IF FISH PASSAGE IS A CONCERN HOWEVER, THE DROPS BETWEEN EACH STRUCTURE SHALL BE LIMITED AS SPECIFIED BY THE DESIGNER.
- ELEVATION CONTROL POINTS SHALL BE DESIGNATED THE UPSTREAM INVERT OF EACH GRADE CONTROL STRUCTURE TO ESTABLISH PART OF THE PROFILE. SURVEY OF CONTROL POINTS SHALL BE REQUIRED TO ESTABLISH ACCURATE ROCK DROP STRUCTURE INSTALLATION WITHIN THE TOLERANCE SPECIFIED BY THE DESIGNER.
- EACH VANE ARM SHALL RISE FROM THE INVERT TO 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. BANKFULL IS NOT NECESSARILY THE TOP OF THE STREAM BANK SLOPE.
- A TABLE OF ALL STATION LOCATIONS AND CONTROL POINT ELEVATIONS OF THE ROCK DROP STRUCTURE SHALL BE PROVIDED IN THIS DETAIL.
- A TYPICAL CROSS SECTION SHALL BE PROVIDED ELSEWHERE IN THE PLANS TO ESTABLISH THE DIMENSIONS OF THE CHANNEL GRADING INTO WHICH THE ROCK DROP STRUCTURE IS TO BE INSTALLED.
- THE ROCK DROP STRUCTURES SHALL BE CONSTRUCTED WITH FLAT-SIDED BOULDERS OF A SIZE (LENGTH, WIDTH, AND DEPTH) AS SPECIFIED BY THE DESIGNER.
- FILTER FABRIC OF A TYPE AND SIZE SPECIFIED BY THE DESIGNER SHALL BE USED TO SEAL THE GAPS BETWEEN THE BOULDERS AND UNDER THE COARSE BACKFILL MATERIAL.
- COARSE BACKFILL OF THE ROCK DROP STRUCTURE SHALL BE OF A TYPE, SIZE, AND GRADATION AS SPECIFIED BY THE DESIGNER. COARSE BACKFILL SHALL BE PLACED IN EACH GRADE CONTROL STRUCTURE TO A THICKNESS EQUAL TO THE DEPTH OF THE HEADER AND FOOTER BOULDERS AND SHALL ALSO EXTEND OUT FROM THE VANE ARMS TO THE STREAM BANK.
- THE INVERT (CENTER) OF EACH GRADE CONTROL STRUCTURE SHALL BE CONSTRUCTED FIRST, FOLLOWED BY ONE VANE ARM AND THEN THE OTHER VANE ARM. BOULDERS CONNECTING THE INDIVIDUAL GRADE CONTROL STRUCTURES SHALL THEN BE INSTALLED. THE FLOODPLAIN SILLS SHALL BE CONSTRUCTED LAST AND ARE REQUIRED ON AT LEAST THE FIRST AND LAST OF THE INTERCONNECTED GRADE CONTROL STRUCTURES.
- ROCK DROP STRUCTURES SHALL BE BUILT TYPICALLY AS FOLLOWS:
 - BEGIN WITH THE DOWNSTREAM-MOST (LOWEST) GRADE CONTROL STRUCTURE.
 - OVER-EXCAVATE STREAM BED TO A DEPTH EQUAL TO THE TOTAL THICKNESS OF THE HEADER AND FOOTER BOULDERS.
 - PLACE FOOTER BOULDERS. THERE SHALL BE NO GAPS BETWEEN BOULDERS.
 - INSTALL FILTER FABRIC.
 - PLACE COARSE BACKFILL BEHIND THE FOOTER BOULDERS.
 - INSTALL HEADER BOULDERS ON TOP OF AND SET SLIGHTLY BACK FROM THE FOOTER BOULDERS (SUCH THAT PART OF THE HEADER BOULDER IS RESTING ON THE COARSE BACKFILL). HEADER BOULDERS SHALL SPAN THE SEAMS OF THE FOOTER BOULDERS. THERE SHALL BE NO GAPS BETWEEN BOULDERS.
 - PLACE COARSE BACKFILL BEHIND HEADER BOULDERS ENSURING THAT ANY VOIDS BETWEEN THE BOULDERS ARE FILLED.
- IF ANY EROSION CONTROL MATTING IS SPECIFIED FOR USE IN THE VICINITY OF THE VANE ARM INTERCEPT POINTS AND FLOODPLAIN SILLS ALL MATTING EDGES SHALL BE NEATLY SECURED AROUND THE BOULDERS.

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