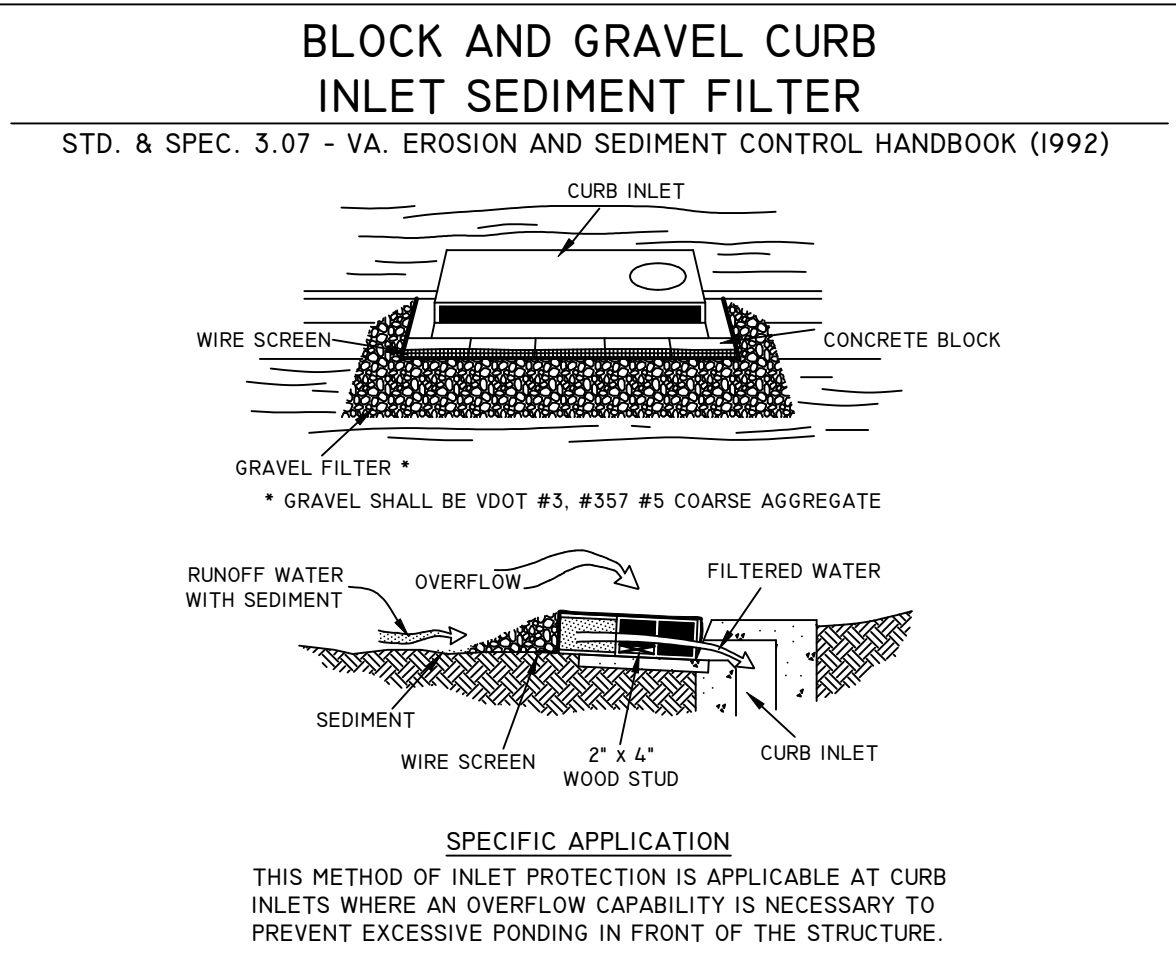
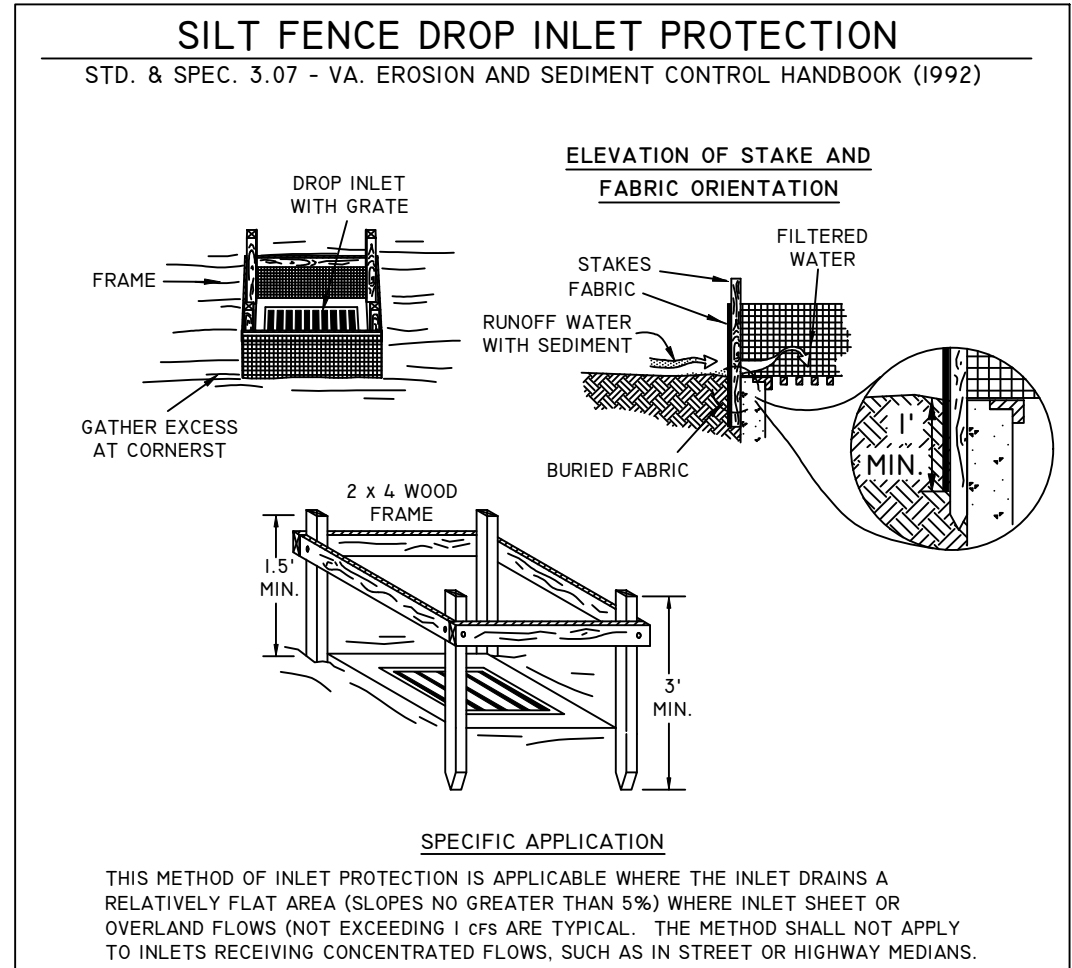
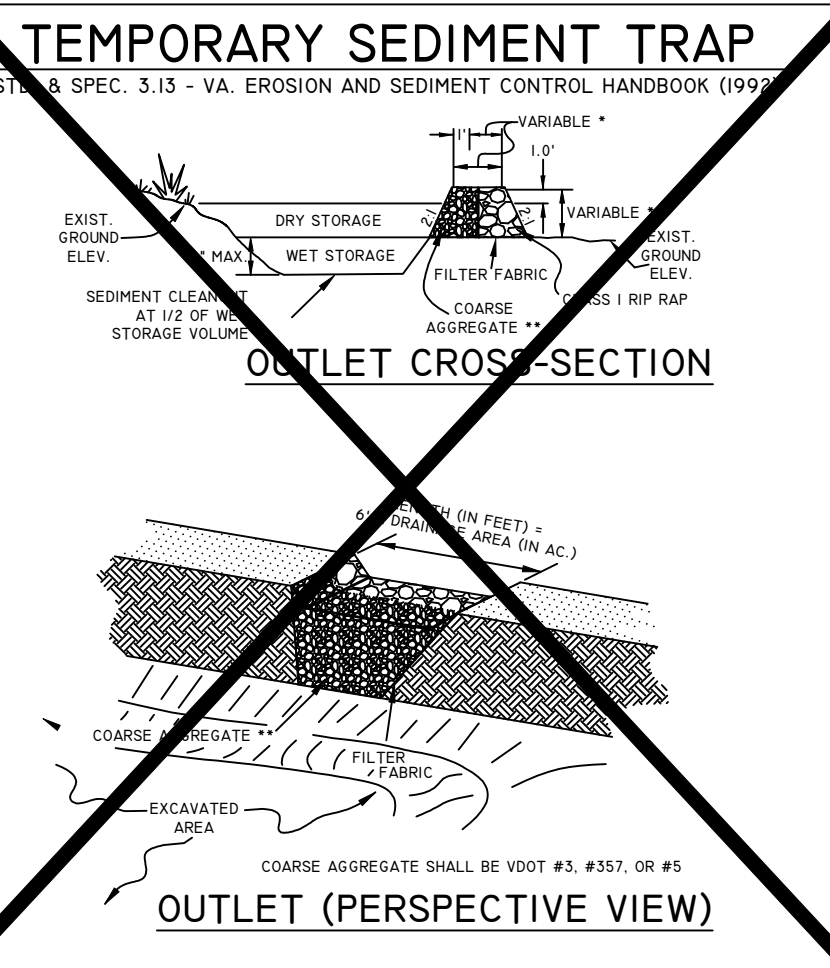


CHANNEL PROTECTION COMPLIANCE SUMMARY TABLE

Applicable Channel Protection Criteria

Discharge Point	Conditions within Limits of Analysis	Applicable Channel Protection Criteria											
		Criteria A				Criteria B	Criteria C						
		Q ₁₀	Q _{cap}	V ₂	V _{allowable}	Project consistent with design of restored system	Q _{developed}	RV _{developed}	IF	Q _{pre-developed}	RV _{pre-developed}	Q _{developed} × RV _{developed}	IF × Q _{pre-developed} × RV _{pre-developed}
	<input type="checkbox"/> Manmade <input type="checkbox"/> Restored <input type="checkbox"/> Natural					<input type="checkbox"/> YES							∞
	<input type="checkbox"/> Manmade <input type="checkbox"/> Restored <input type="checkbox"/> Natural					<input type="checkbox"/> YES							∞
	<input type="checkbox"/> Manmade <input type="checkbox"/> Restored <input type="checkbox"/> Natural					<input type="checkbox"/> YES							∞
	<input type="checkbox"/> Manmade <input type="checkbox"/> Restored <input type="checkbox"/> Natural					<input type="checkbox"/> YES							∞
	<input type="checkbox"/> Manmade <input type="checkbox"/> Restored <input type="checkbox"/> Natural					<input type="checkbox"/> YES							∞
	<input type="checkbox"/> Manmade <input type="checkbox"/> Restored <input type="checkbox"/> Natural					<input type="checkbox"/> YES							∞



Channel Protection Criteria

A. The stormwater conveyance system conveys the post-development peak flow rate from the two-year 24-hour storm event without causing erosion of the system (V₂ must be shown to be non-erosive)

B. The development project in combination with other stormwater runoff, is consistent with the design parameters of the restored stormwater conveyance and the restored stormwater conveyance system is functioning as designed

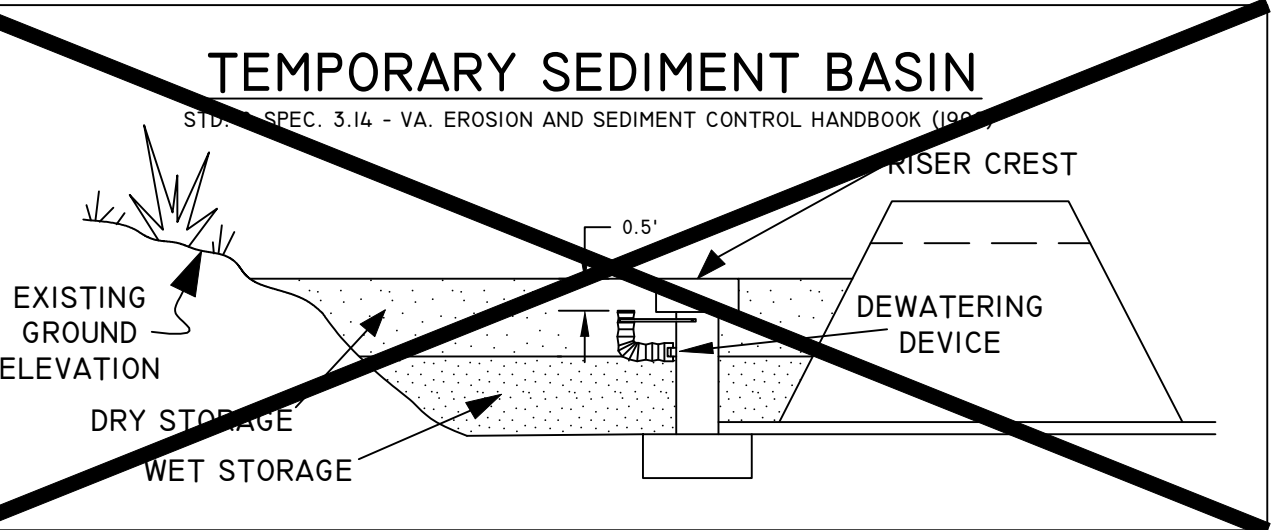
C. The discharge from the development satisfies the Energy Balance requirement (Q_{developed} × RV_{developed}) ≤ IF × (Q_{pre-developed} × RV_{pre-developed})

Where:
 Q_{developed} = the peak flow rate of runoff from the developed site
 RV_{developed} = the volume of runoff from the site based on developed conditions
 IF = an improvement factor (0.8 for sites > 1 acre, 0.9 for sites ≤ 1 acre)
 Q_{pre-developed} = the peak flow rate of runoff from the pre-developed site
 RV_{pre-developed} = the volume of runoff from the site based on pre-developed conditions

FLOOD PROTECTION COMPLIANCE SUMMARY TABLE

APPLICABLE FLOOD PROTECTION CRITERIA

Discharge Point	Conditions within Limits of Analysis	APPLICABLE FLOOD PROTECTION CRITERIA				
		Criteria A		Criteria B		
		Q _{10-post}	Q _{capacity}	Q _{10-post} (Required for Criteria B.1 and B.2)	Q _{capacity} (Required for Criteria B.1)	Q _{10-pre-developed} (Required for Criteria B.2)
	<input type="checkbox"/> No Localized Flooding <input type="checkbox"/> Existing Localized Flooding					
	<input type="checkbox"/> No Localized Flooding <input type="checkbox"/> Existing Localized Flooding					
	<input type="checkbox"/> No Localized Flooding <input type="checkbox"/> Existing Localized Flooding					
	<input type="checkbox"/> No Localized Flooding <input type="checkbox"/> Existing Localized Flooding					
	<input type="checkbox"/> No Localized Flooding <input type="checkbox"/> Existing Localized Flooding					
	<input type="checkbox"/> No Localized Flooding <input type="checkbox"/> Existing Localized Flooding					
	<input type="checkbox"/> No Localized Flooding <input type="checkbox"/> Existing Localized Flooding					
	<input type="checkbox"/> No Localized Flooding <input type="checkbox"/> Existing Localized Flooding					



NOTE: STREAM CHANNEL EROSION AND FLOODING CRITERIA ARE SATISFIED, PER VA CODE 9VAC25-870-97 AND 9VAC25-870-98, AS THE PROJECT IS PREVIOUSLY PERMITTED PRIOR TO JULY 1 2014, AND IS THERE FORE SUBJECT TO PART IIC TECHNICAL CRITERIA. MS-19 OUTFALL ADEQUACY TABLE IS PROVIDED IN ACCORDANCE WITH SECTION 9VAC25-870-93 OF THE VSMP REGULATIONS.

SEDIMENT TRAPS

TRAP #	DRAINAGE AREA (ACRES)	WET STORAGE			DRY STORAGE			OUTLET LENGTH (FEET)	BOTTOM ELEVATION	TOP OF BERM ELEVATION	TOP OF BERM WIDTH	DIMENSIONS (L x W)
		VOLUME REQUIRED (CU. YD.)	VOLUME PROVIDED (CU. YD.)	ELEVATION	VOLUME REQUIRED (CU. YD.)	VOLUME PROVIDED (CU. YD.)	ELEVATION					

50/10 DETENTION SUMMARY

	Q (CFS)	AREA (ACRES)	C	I	C ADJ. FACTOR
Q ₁₀ PRE-DEVELOPMENT (A)					
Q ₅₀ POST-DEVELOPMENT (ON-SITE BYPASS) (B)					
Q ₅₀ POST-DEVELOPMENT (OFF-SITE THROUGH PROJECT) (C)					
Q ₅₀ ALLOWABLE (A + B + C)					
Q ₅₀ DETENTION BASIN/PIPE (ROUTED)					

SEDIMENT BASINS

BASIN #	DRAINAGE AREA (ACRES)	WET STORAGE			DRY STORAGE			DEWATERING DEVICE ELEVATION	DEWATERING DEVICE DIAMETER	25-YR. STORM ELEVATION	EMERGENCY SHELWAY ELEVATION	ANTI-VORTEX DEVICE DIAMETER	TOP OF DAM ELEVATION	TOP OF DAM WIDTH	BAFFLE			BARREL	
		VOLUME REQUIRED (CU. YD.)	VOLUME PROVIDED (CU. YD.)	ELEVATION	VOLUME REQUIRED (CU. YD.)	VOLUME PROVIDED (CU. YD.)	ELEVATION								FLOW LENGTH TO FIRST BAFFLE	BAFFLE LENGTH	TOP OF BAFFLE	PIPE LENGTH	PIPE DIAMETER

OUTFALL ADEQUACY

In accordance with Minimum Standard 19 of the Virginia Erosion and Sediment Control Regulations and the Henrico County Design Manual, adequacy of off-site receiving channels or pipes must be verified by addressing one of the following Adequacy Situations:

A. The drainage area from the project at the discharge point is less than or equal to one percent of the total drainage area at the discharge point and the 10-year storm is contained within the channel banks (Project Drainage Area and Total Drainage area are required).

B. Natural channels must be analyzed to demonstrate that (1) the 10-year storm will not overtop the channel banks and (2) the 2-year storm will not cause erosion of the channel bed and banks (Q_{capacity}, Q₁₀, V_{allowable}, and V₂ are required), except Q_{capacity} and Q₁₀ are not applicable if the channel is in the 100-year floodplain, RPA, SPA.

C. Man-made channels must be analyzed to demonstrate that (1) the 10-year storm will not overtop the channel banks and (2) the 2-year storm will not cause erosion of the channel bed or banks (Q_{capacity}, Q₁₀, V_{allowable}, and V₂ are required).

D. Pipes and storm sewer systems must be analyzed to demonstrate that the 10-year storm will be contained within the system (Q_{capacity}, Q₁₀, and Hydraulic Grade Line calculations are required).

E. Runoff is discharged through an energy dissipator at the limits of the 100-year floodplain, RPA buffer, or SPA buffer.

Discharge Point	Adequacy Situation	Project Drainage Area	Total Drainage Area	Q Capacity	Q ₁₀	V _{allowable}	V ₂	Cross-section, Profile, and Calculations Shown on Sheet (s)
1	C	2.6 AC.	2.6 AC.	460	4.8	6	0.9	02H(08) - 02H(11), 5
2	D	0.8 AC.	0.9 AC.	10.1	3.8	--	--	2H(03), 2H(04), 5
3	D	1.2 AC.	1.8 AC.	19.3	6.5	--	--	2H(03), 2H(04), 5
4	D	0.4 AC.	0.5 AC.	4.8	2.1	--	--	2H(03), 2H(04), 5
5	D	0.1 AC.	0.2 AC.	24.2	21.8	--	--	2H(03), 2H(04), 5

NOTE: THREE SECTIONS WERE TAKEN AT OUTFALL #1. THE FIRST IS SHOWN ABOVE. SEE APPROPRIATE SHEETS FOR ADDITIONAL SECTION INFORMATION.

Discharge Point = Unique identifier for the discharge point
 Project Drainage Area = the drainage area of the project that drains to the discharge point in acres
 Total Drainage Area = the total drainage area to the discharge point in acres
 Q_{capacity} = the carrying capacity of the channel or pipe in CFS
 Q₁₀ = the peak discharge at the discharge point for the 10-year storm in CFS
 V_{allowable} = the maximum velocity (in FPS) that the channel lining can withstand without eroding
 V₂ = the velocity at the discharge point for the 2-year storm in FPS

Generally, scaled channel cross-sections must be provided every fifty (50) feet and at the most constricted locations of all outfall channels for a minimum of 150 feet of profile.

EROSION AND SEDIMENT CONTROL - STANDARD DETAILS/CALCS.

COUNTY OF HENRICO
DEPARTMENT OF PUBLIC WORKS

TIMMONS GROUP Technology

Site Development | Residential | Infrastructure | Technology

EAST RAMP 3 ACCESS ROAD
HENRICO COUNTY - VIRGINIA

EROSION & SEDIMENT CONTROL NOTES & DETAILS

YOUR VISION ACHIEVED THROUGH OURS.

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CHECKED BY
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N/A

DATE

6/30/2019

DATE

REVISION DESCRIPTION

JOB NO.

40930.001

SHEET NO.

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