STANDARD CONSTRUCTION DETAIL # 6-3
RIPRAP CHANNEL

(LOOKING DOWNSTREAM)
CHANNEL CROSS-SECTION
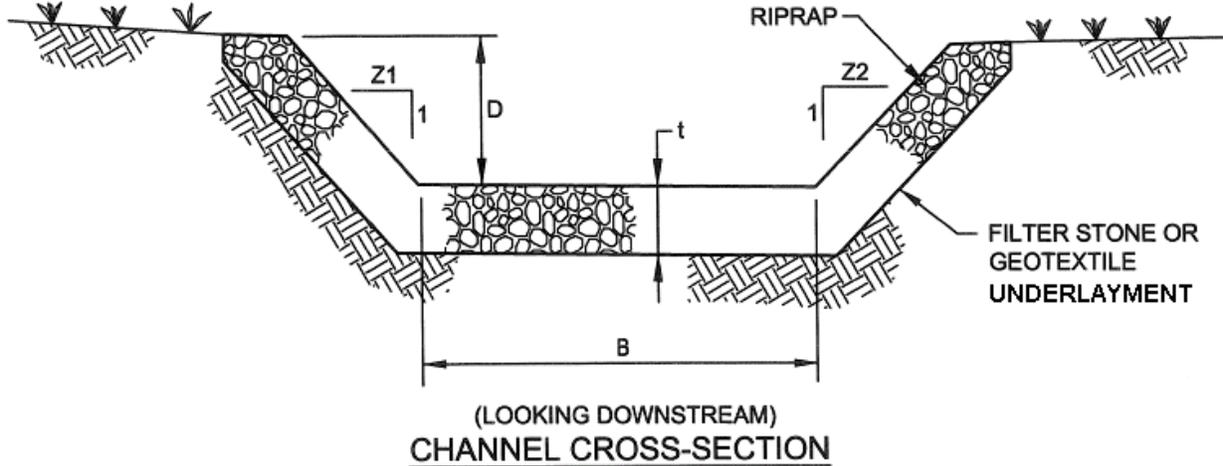
Stackhouse Bensinger, Inc.

NOTE: This table is intentionally blank and should be filled in by the plan preparer.

Channel	Stations	B	D	Z1	Z2	Riprap Gradation	t	Underlayment	Underlayment Thickness
1	0+00 to 0+45	5.0'	1.0'	2	2	R-4	12"	Woven Geotextile	Single layer fabric
2	0+00 to 0+45	5.0'	1.0'	2	2	R-4	12"	Woven Geotextile	Single layer fabric

Filter stone underlayment for bed slopes $\geq$ 0.10 ft/ft shall be used.

Channel dimensions are for the completed channel after rock placement. Channel must be over-excavated a sufficient amount to allow for the volume of rock placed within the channel while providing the specified finished dimensions.

Channel dimensions shall be constantly maintained. Channel shall be cleaned whenever total channel depth is reduced by 25% at any location. Sediment deposits shall be removed within 24 hours of discovery or as soon as soil conditions permit access to channel without further damage.

Damaged lining shall be repaired or replaced within 48 hours of discovery.

The minimum rock thickness (t) shall be 1.5 times the max rock size.

STANDARD E&S WORKSHEET # 11
Channel Design Data

PROJECT NAME: Wilkes Barre VA

LOCATION: Wilkes Barre / Plains Township

PREPARED BY: DJW   DATE: 1/16/2017

CHECKED BY: _____ DATE: _____

CHANNEL OR CHANNEL SECTION		Channels				
TEMPORARY OR PERMANENT?	(T OR P)	P				
DESIGN STORM	(2, 5, OR 10 YR)	10				
ACRES	(AC)					
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A				
Q_r (REQUIRED CAPACITY)	(CFS)	1.70				
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	0.10				
PROTECTIVE LINING[2]		R-4				
n (MANNING'S COEFFICIENT)[2]		0.06				
V_a (ALLOWABLE VELOCITY)	(FPS)					
V (CALCULATED AT FLOW DEPTH d)	(FPS)	9.00				
τ_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	2.00				
τ_d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT^2)		1.71				
CHANNEL BOTTOM WIDTH	(FT)	5				
CHANNEL SIDE SLOPES	(H:V)	2				
D (TOTAL DEPTH)	(FT)	1.0				
CHANNEL TOP WIDTH @ D	(FT)	9				
d (CALCULATED FLOW DEPTH)	(FT)	0.09				
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	5.36				
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	5				
d_{50} STONE SIZE	(IN)	12				
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	0.50				
R (HYDRAULIC RADIUS)		5.42				
S (BED SLOPE)[3]	(FT/FT)	0.5				
S_c (CRITICAL SLOPE)	(FT/FT)	0.15				
$.7S_c$	(FT/FT)	0.11				
$1.3S_c$	(FT/FT)	1.15				
STABLE FLOW?	(Y/N)	N				
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	0.91				
FREEBOARD BASED ON STABLE FLOW	(FT)					
MINIMUM REQUIRED FREEBOARD[4]	(FT)	0.50				
DESIGN METHOD FOR PROTECTIVE LINING[5] PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)		S				

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

78.