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Re: DeSautels 4-Lot Resubdivision
257 Chesterfield Road (Tax Map 29 Lot 66)
Montville, CT 06370

DRAINAGE DESIGN PARAMETERS

Existing Conditions:
An existing 18-inch HDPE stormwater drainage pipe, owned and maintained by the Town of Montville, currently outlets from 296 Chesterfield Road onto the subject property at 257 Chesterfield Road. The outlet discharges to a riprap plunge pool in absence of a recorded drainage easement. Stormwater flows downgradient toward the on-site inland wetland. From provided survey map information invert elevations were estimated at 396' (inlet) and 394' (outlet).
Proposed Conditions:
The existing 18-inch HDPE stormwater drainage pipe will remain in place. The existing plunge pool will be removed and replaced with a precast Type 'C' catch basin and paved apron. From this structure, 80 lineal feet of 18-inch HDPE corrugated pipe will be installed to discharge to a proposed 12' x 14' pre-formed scour hole. A defined swale and grade-to-drain will direct runoff from the pre-formed scour hole overland on the subject property toward the on-site inland wetland.

Hydraulic calculations were performed using Manning's Equation (conservatively assuming full pipe flow):

$$V = \frac{1.49}{n} \times R^{\frac{2}{3}} \times \sqrt{S}$$

Where:

- V = Outlet velocity (fps)
- n = Manning's roughness coefficient (0.024 for HDPE corrugated pipe)
- R = Hydraulic radius (0.375 ft)
- S = Slope (0.0625)

The calculated outlet velocity is 8.04 fps.
Q = VA Q = 8.04 x πr^2 = 14.2 cfs
In accordance with the Connecticut DOT Drainage Manual (Table 11-12.1), the proposed 12' by 14' Type 2 pre-formed scour hole provides energy dissipation capacity in excess of the minimum requirements for the computed discharge velocity. This feature ensures the proposed design will mitigate potential erosion at the pipe outlet and protect downstream resources. Furthermore, the proposed drainage improvements at 257 Chesterfield Road provide a stable and controlled discharge for the existing town stormwater system. The replacement of the plunge pool with a catch basin and scour protection structure will enhance long-term functionality, reduce erosion potential, and ensure compatibility with the natural hydrologic conditions of the inland wetland.

OUTLET PROTECTION - OUTLET VELOCITY ≤ 14 feet/sec

DISCHARGE (cfs)	OUTLET PIPE DIAMETER OR SPAN (in)									
	12	15	18	24	30	36	42	48	54	60
0-5	*10*	*10*		*USE*						
6	12	11								
7		13	*12*							
8		14	13	*12*		*MINIMUM*				
9			14	13						
10			15	13						
11			16	14				*LENGTH*		
12				14						
14				16	*14*					
16				17	15	*14*			*OUTLINED*	
18				18	16	15				
20					17	15	*14*			
22		*USE*			18	16	15			
24						17	15	*14*		
26						17	16	15		
28						18	16	15		
30						19	17	16		
35						20	18	17	*16*	
40			*PREFORMED*				20	18	17	*16*
45							21	19	18	16
50							22	20	18	17
55								21	19	18
60								22	20	19
65								24	21	20
70					*SCOUR*			25	22	20
75								26	23	21
80									24	22
90									26	24
100									28	25
110										27
125							*HOLE*			29
130										30

Table 11-12.1 - Length - L_a (feet)
Type A Riprap Apron

Preformed Scour Hole Sizing:

Per section 11.13.6 of the ConnDOT Drainage Manual, Type 2 preformed scour holes are dimensioned as follows:

B (width) = 2Sp + 6F where Sp = inside pipe diameter and F = Rp (Type 2) = Max. inside pipe rise = Sp
Therefore, B = 2*1.5 + 6*1.5 = 12 Feet (matches Table 11.14.1 below)
C (length) = 3Sp + 6F = 3*1.5 + 6*1.5 = 13.5 Feet (14 Feet per Table 11.14.1 below)
2Sp (width of bottom) = 1.5*2 = 3 Feet
3Sp (length of bottom) = 1.5*3 = 4.5 Feet
F (depth) = Rp = Sp = 1.5 Feet
D (rip rap size) = 12" per figure 11.15

OUTLET PROTECTION
OUTLET VELOCITY > 14 feet/sec or Length of Apron exceeds limits shown on Tables 11-12.1 and 11-13.1

Preformed Scour Hole										
(See Figure 11-15)	PIPE DIAMETER OR SPAN (in)									
	12	15	18	24	30	36	42	48	54	60
Type 1										
B	5	6	8	10	13	15	18	20	23	25
C	6	8	9	12	15	18	21	24	27	30
d	Depends on riprap type(see Figure 11-15)									
$2S_p$	2.0	2.6	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
$3S_p$	3.0	3.9	4.5	6.0	7.5	9.0	10.5	12.0	13.5	15.0
$F = 0.5\ S_p$	0.5	0.625	0.75	1	1.25	1.5	1.75	2	2.25	2.5
Type 2										
B	8	10	12	16	20	24	28	32	36	40
C	9	11	14	18	23	27	32	36	41	45
d	Depends on riprap size (see Figure 11-15)									
$2S_p$	2.0	2.6	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
$3S_p$	3.0	3.9	4.5	6.0	7.5	9.0	10.5	12.0	13.5	15.0
$F = S_p$	1.0	1.3	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0

Table 11-14.1 - Dimensions of Preformed Scour Hole (Feet)

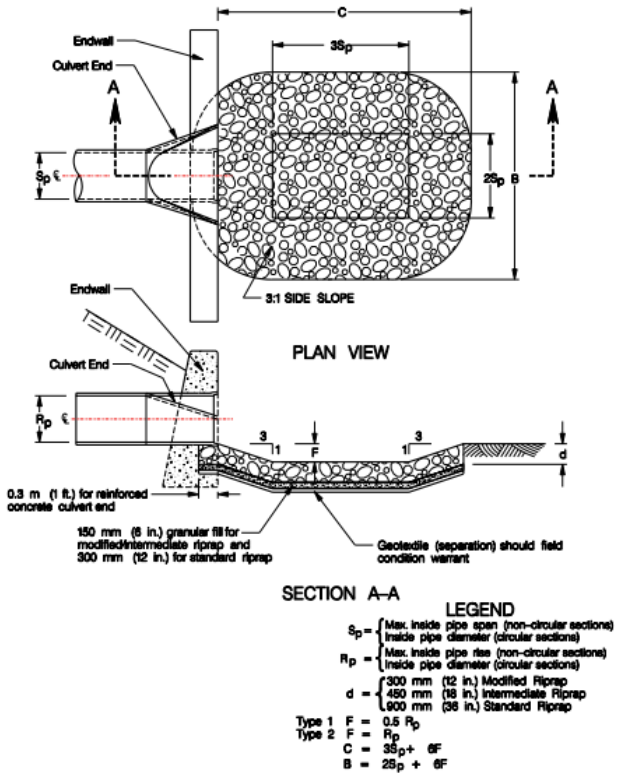

Figure 11-15 Preformed Scour Hole Type 1 and Type 2