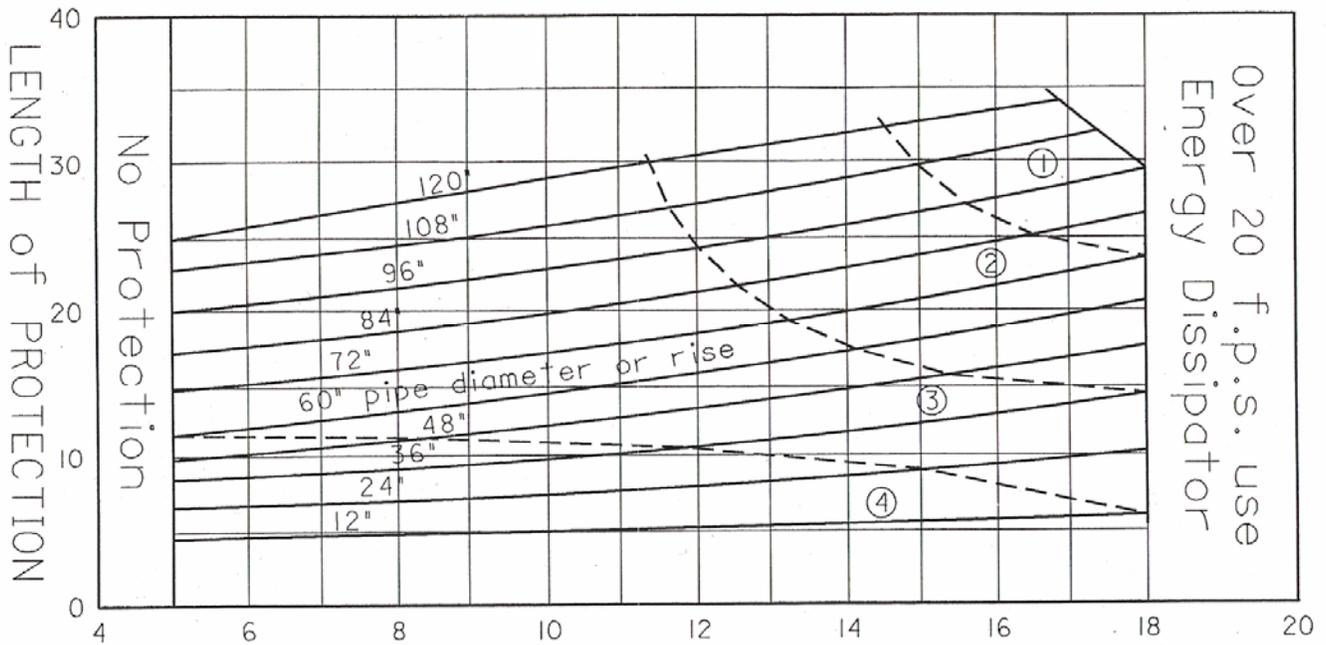


**EXHIBIT NO. 30**

**ITEM 601, ROCK CHANNEL PROTECTION AT CULVERTS, STORM SEWER OUTLETS AND INLETS**



**VELOCITY AT PIPE OUTLETS AND INLETS – F.P.S.**

LEGEND	ROCK TYPE
(1) 48" of 18" rock	A
(2) 36" of 18" rock	A
(3) 30" of 12" rock	B
(4) 18" of 6" rock	C
(4) 18" of 9" rock	C

**NOTES**

1. Rock size (6", 9", 12", 18") indicates the square opening on which 85% of the material by weight will be retained.
2. Minimum width of protection shall be the width of the wing wall headwall tapered 10' to twice the pipe diameter, with 4' being the very minimum past the 10' taper.
3. \* Use at inlet ends only for velocities < 3-1 fps
4. \*\* Use at inlet or outlet ends for velocities > 3-1 fps
5. \*\*\* R.C.P. required at inlet end of storm systems only when fill material has been placed at inlet end, or erodable soils exists.
6. A rock check dam is required downstream of all outfall headwalls.
7. The minimum distance between an outfall headwall and the downstream offsite property line is 40 feet. Modification of the minimum distance may be granted by the Director of Public Works for extenuating circumstances.