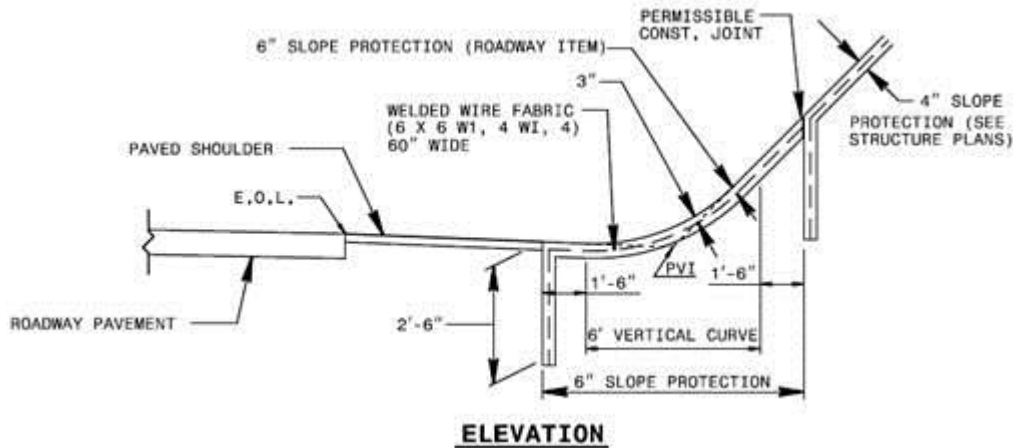## 2_47 MODELING SLOPE PROTECTION AT UNDERPASSES
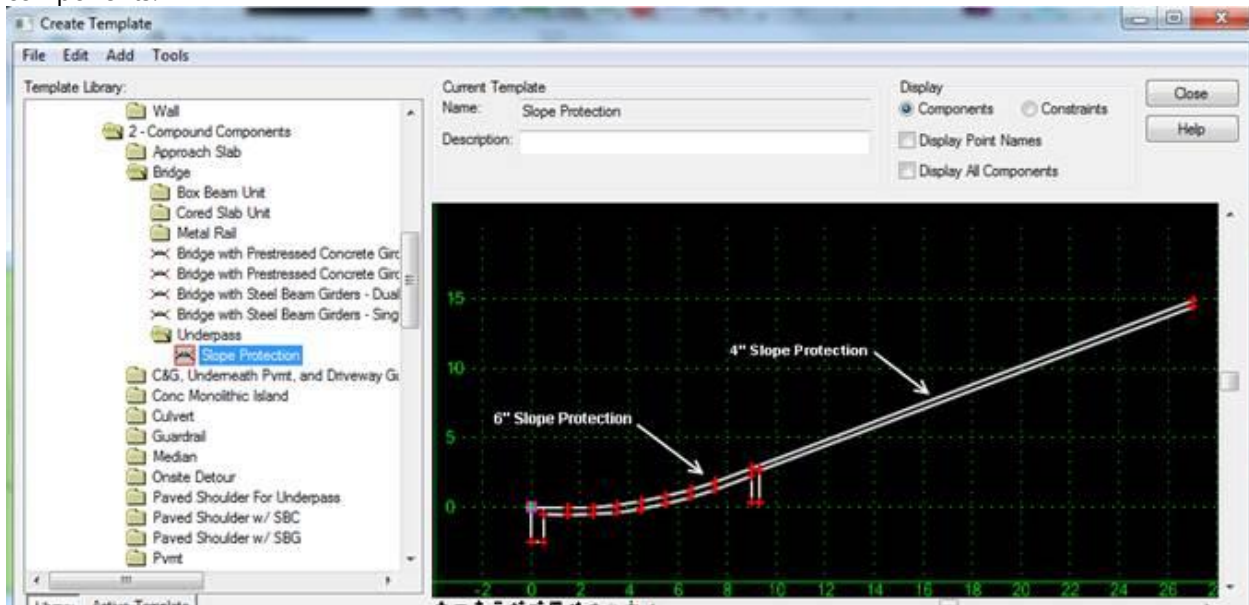
Question:
Would like to have a typ of Std. 610.3 added so we can attach to our templates for underpasses if needed.

Answer:
The new slope protection components were created per your request and use. They comply with Roadway Standard Drawings 610.03.
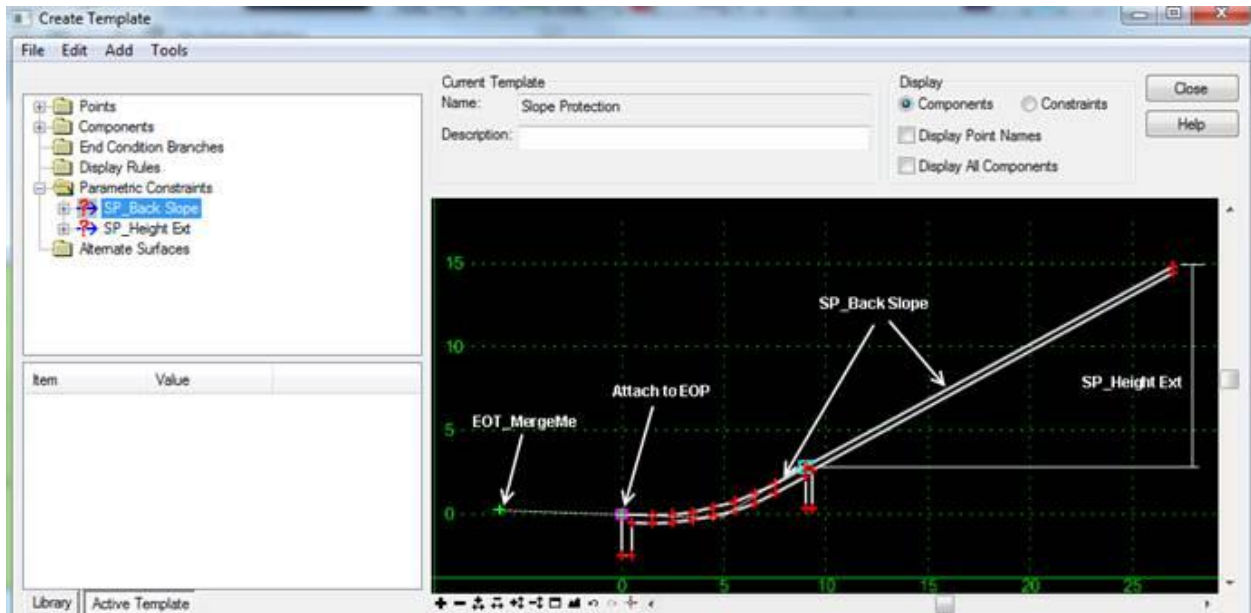

The compound component consists of the combination of the front 6″ and the back 4″ slope protection components.


Two parametric constraints are used to control the back slope and (arbitrary) height extension. The front slope is determined by paved should slope (EOT_MergMe point).

- **SP_Back Slope** (Default 1½ :1)
- **SP_Height Ext** (Default 12′)

The 6" slope protection standard drawing has a 6' VC and calls for a series of vertical offsets in increments of a foot dependent on the shoulder (front) slope.   And back slope.
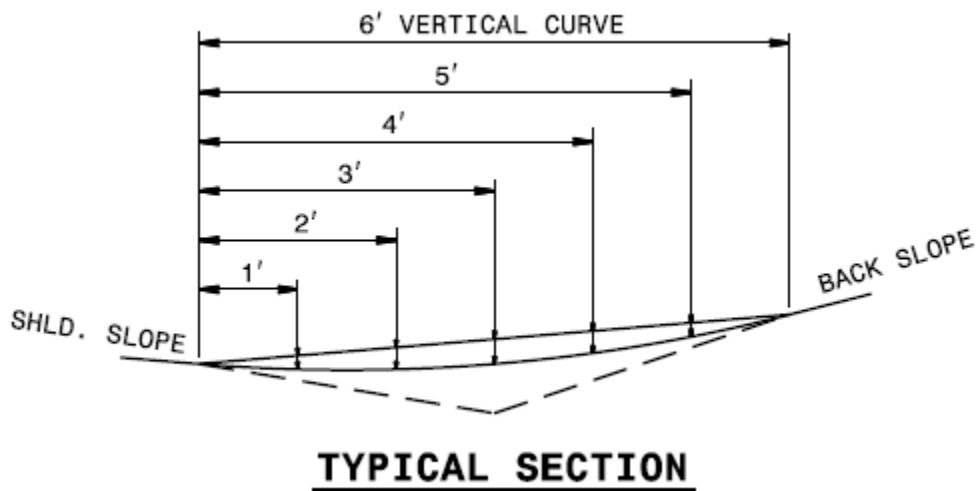

For all intent and purpose, the vertical offsets for the 6' VC are fixed using the 1 ½:1 back slope and 4% front shoulder slope defaults. Later on I will find a creative way to program the 6' VC to be a little more "dynamic" (remember just the like the "smart people game" we played this past summer in the delta training with the 2'-6" C&G and SBG components?).

HORZ. DIM.	1½:1 BACK SLOPE									
	SHOULDER SLOPE									
	.04	.03	.02	.01	.00	-.01	-.02	-.03	-.04	-.05
1'	0.26'	0.27'	0.27'	0.27'	0.28'	0.28'	0.28'	0.29'	0.30'	0.31'
2'	0.42'	0.42'	0.43'	0.44'	0.44'	0.45'	0.46'	0.46'	0.47'	0.48'
3'	0.47'	0.48'	0.49'	0.49'	0.50'	0.51'	0.52'	0.52'	0.53'	0.54'
4'	0.42'	0.42'	0.43'	0.44'	0.44'	0.45'	0.46'	0.46'	0.47'	0.48'
5'	0.26'	0.27'	0.27'	0.27'	0.28'	0.28'	0.28'	0.29'	0.30'	0.31'

HORZ. DIM.	2:1 BACK SLOPE									
	SHOULDER SLOPE									
	.04	.03	.02	.01	.00	-.01	-.02	-.03	-.04	-.05
1'	0.19'	0.20'	0.20'	0.20'	0.21'	0.21'	0.22'	0.22'	0.23'	0.23'
2'	0.31'	0.31'	0.32'	0.33'	0.33'	0.34'	0.35'	0.35'	0.36'	0.37'
3'	0.35'	0.35'	0.36'	0.37'	0.38'	0.38'	0.39'	0.40'	0.41'	0.41'
4'	0.31'	0.31'	0.32'	0.33'	0.33'	0.34'	0.35'	0.35'	0.36'	0.37'
5'	0.19'	0.20'	0.20'	0.20'	0.21'	0.21'	0.22'	0.22'	0.23'	0.23'

VERTICAL CURVE OFFSET

(FOR 6' V.C. AT BRIDGES)
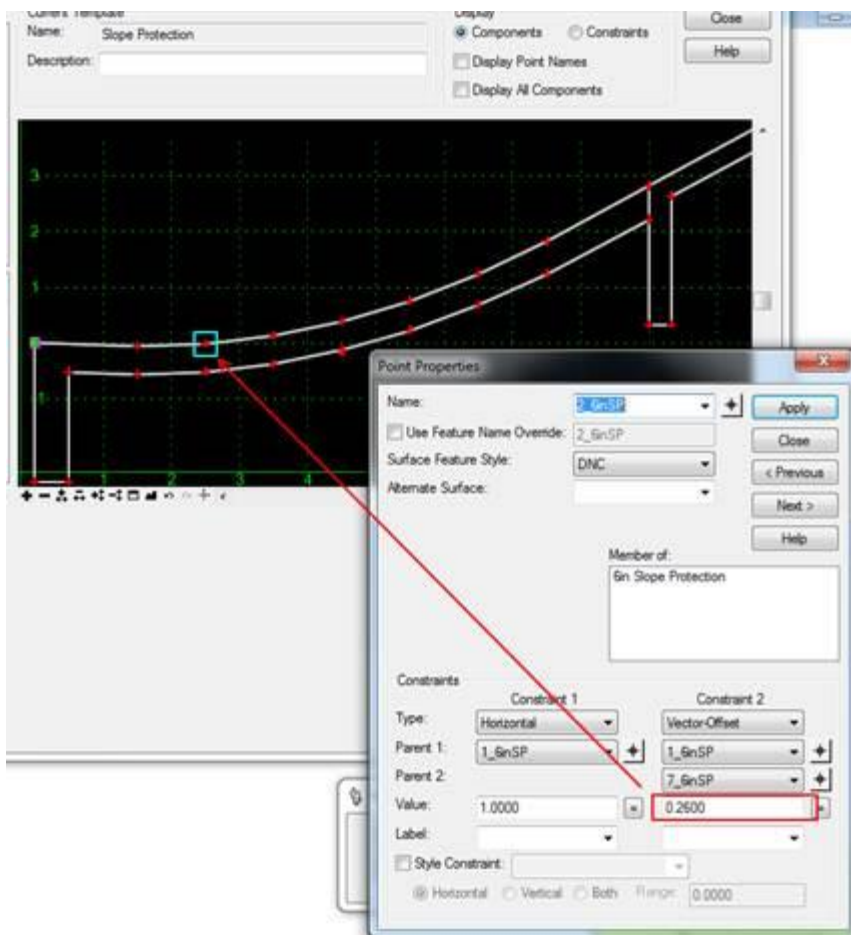
Please use your engineering judgment and discretion with these new components. The new slope protection components are designed to be applied only in the areas of the underpass corridor which is

perpendicular to the alignment (itself – blue shape below). The two side "fans" are not addressed with the current version of the software. We will address them, along with the bridge parapet and wing wall/back wall, in the next version of production ready Geopak. This is the reason the slope protection height extension (parametric constraint) was noted as "arbitrary" earlier.

PLAN - END BENT WITH SWEPT BACK WINGS - SKEWED
(1 ½ : 1 SLOPE)

PLAN - END BENT WITH SWEPT BACK WINGS - 90°
(1 ½ : 1 SLOPE)
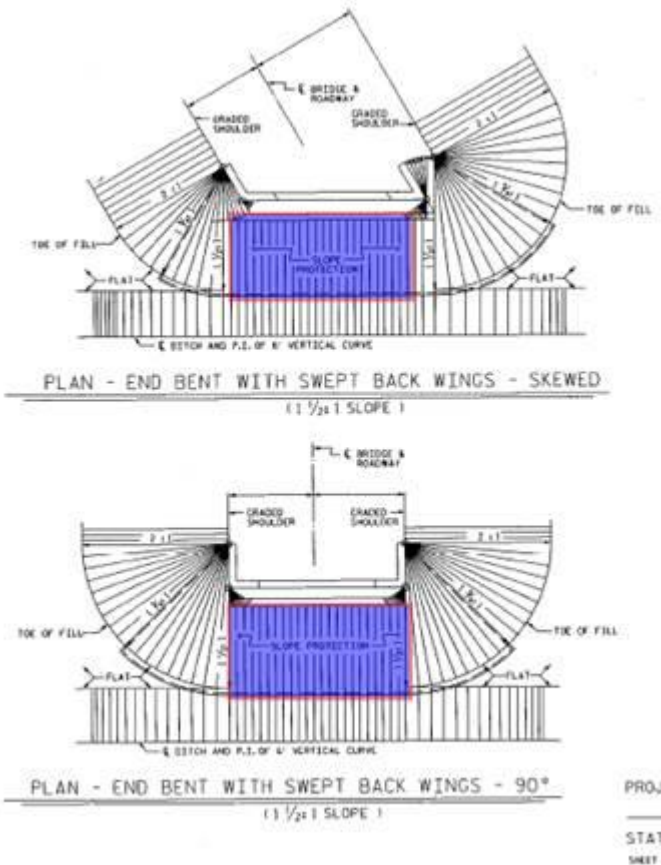
Later on this year I will be discussing with the Structure Management Unit about the feasibility of a column/pier component with a concrete footing and cap (substructure) in the areas of the median and side slope protection.