



PROFILE
NOT TO SCALE

IN ANY VERTICAL CURVE:

$$m = \frac{(G' - G)L}{8}$$

$$m = \frac{1}{2} \left(\frac{\text{ELEV. B.V.C.} + \text{ELEV. E.V.C.} - \text{ELEV. V}}{2} \right)$$

$$d = m \left(\frac{D}{L/2} \right)^2 = \frac{4m}{L^2} D^2$$

$$d = \frac{D^2(G' - G)}{2L}$$

$$X = \frac{100(H - P')}{(G - G')}$$

$$S = G - D \left(\frac{G - G'}{L} \right)$$

$$D_o = \frac{LG}{G - G'}$$

WHERE:

- L = LENGTH OF CURVE IN 100 FT. UNITS OR STATIONS
- G AND G' = GRADE RATES IN PERCENT
- m = MIDDLE ORDINATE IN FT.
- d = CORRECTION FROM GRADE LINE TO CURVE IN FT.
- D = DISTANCE FROM B.V.C. OR E.V.C. TO ANY POINT ON CURVE IN STATIONS
- S = SLOPE OF THE TANGENT TO THE CURVE AT ANY POINT IN PERCENT
- X = DISTANCE FROM P' TO V IN FT.
- H = ELEVATION OF GRADE G PRODUCED TO STATION OF P'
- P AND P' = ELEVATION ON RESPECTIVE GRADES
- D_o = DISTANCE TO LOW OR HIGH POINT FROM EXTREMITY OF CURVE IN STATIONS
- V = ELEVATION OF INTERSECTION POINT OF APPROACH GRADES

NOTES:

1. VERTICAL CURVE IS REQUIRED WHERE DIFFERENCE IN ROAD GRADE IS GREATER THAN 0.5%, OR WHERE SUM OF GRADE BREAKS WITHIN 200' EXCEEDS 0.5%.
2. MINIMUM VERTICAL CURVE LENGTH "L" (IN FEET) SHALL BE 3 TIMES THE DESIGN SPEED (IN MPH). A RISING GRADE CARRIES A PLUS SIGN WHILE A FALLING GRADE CARRIES A MINUS SIGN. THUS IN A CREST VERTICAL CURVE AS ABOVE, G CARRIES A PLUS SIGN AND G' A MINUS SIGN WHEN PROGRESSING IN THE DIRECTION OF THE STATIONING. WHEN PROGRESSING IN THE OPPOSITE DIRECTION, G BECOMES A MINUS GRADE AND G' A PLUS GRADE.

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| | | | | | APPROVED: | 5/21/18 |
| CHANGE | DESCRIPTION | DATE | INITIAL | | CITY ENGINEER | DATE |

