Miscellaneous MD SHA Design Charts for Determining Pipe Inlet Control
FIGURE D.15.1 HEADWATER DEPTH FOR OVAL CONCRETE PIPE CULVERTS

To use scale (2) or (3) draw a straight line through known values of size and discharge to intersect scale (1). From point on scale (1) project horizontally to solution on either scale (2) or (3).

HEADWATER DEPTH FOR OVAL CONCRETE PIPE CULVERTS
LONG AXIS HORIZONTAL WITH INLET CONTROL

ADAPTED FROM MARYLAND STATE HIGHWAY ADMINISTRATION I/63 SHA-81.1-420.3-1.0
FIGURE D.15.2 HEADWATER DEPTH FOR CMP ARCH CULVERTS WITH INLET CONTROL

EXAMPLE

Size: 26" x 22"

\[
\begin{align*}
\frac{HW}{D} & \quad HW \\
D & \quad (\text{feet}) \\
0 & \quad 20 \text{ cfs} \\
1 & \quad 1.10 \\
2 & \quad 1.35 \\
3 & \quad 1.55 \\
4 & \quad 2.0 \\
5 & \quad 2.1 \\
6 & \quad 2.2 \\
\end{align*}
\]

D in feet

HEADWATER DEPTH IN TERMS OF RISE (HW/D)

\[
\begin{align*}
(1) & \quad 1.0 \\
(2) & \quad 0.9 \\
(3) & \quad 0.8 \\
(4) & \quad 0.7 \\
\end{align*}
\]

ENTRANCE TYPE

(1) Headwall
(2) Modified to conform to slope
(3) Projecting

To use scale (2) or (3) project horizontally to scale (1), then use straight inclined line through D and Q scales, or reverse as illustrated.

HEADWATER DEPTH FOR C. M. PIPE-ARCH CULVERTS WITH INLET CONTROL

ADAPTED FROM MARYLAND STATE HIGHWAY ADMINISTRATION I/63 SHA-61.1-420.2-2.0

FOR ADDITIONAL SIZES THAT ARE NOT DIMENSIONED REFER TO CHARTS 442.00 AND 443.00

D.15.2
FIGURE D.15.3 HEADWATER DEPTH FOR CMP CULVERTS WITH INLET CONTROL

EXAMPLE

D = 36 inches (3.0 feet)
Q = 66 cfs

\[
\frac{HW}{D} \quad \frac{HW}{D} \quad (\text{feet})
\]

(1) 1.8 5.4
(2) 2.1 6.3
(3) 2.2 6.6

HW in feet

HEADWATER DEPTH IN Diameters (HW/D)

HEADWATER DEPTH FOR C. M. PIPE CULVERTS WITH INLET CONTROL

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FIGURE D.15.4 HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

EXAMPLE

D = 42 inches (3.5 feet)
Q = 120 cfs

\[ \frac{HW}{D} \text{ ft} \]

(1) \ 2.5 \ 8.8
(2) \ 2.1 \ 7.4
(3) \ 2.2 \ 7.7

*D in feet

HEADWATER DEPTH IN DIAMETERS (HW/D)

DIA. OF CULVERT (D) IN INCHES

DISCHARGE (Q) IN CFS

EXHANGE SCALE

ENTRANCE TYPE

(1) Square edge with headwall
(2) Groove and with headwall
(3) Groove and projecting

To use scale (2) or (3) project horizontally to scale (1), then use straight inclined line through D and Q scales, or reverse as illustrated.

HEADWATER SCALES 2.83
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