

BAFFLE OIL/WATER SEPARATOR WORKSHEET

2005 Surface Water Design Manual Sizing Method

Project: _____

METHODS OF ANALYSIS (Section 6.6.2.1)

Step 1) Calculate design flows

Calculate flows on Design Flow and Design Volume worksheet and transfer results here.

Tributary area _____ (sf)
Water quality design flow Q_{wq} _____ (cfs) See 3.2.2 KCRTS/Runoff files Method

Step 2) Calculate the minimum vertical cross-sectional area

$$A_c = Q/V_H$$

A_c = minimum cross-sectional area _____ (sf)
 Q = water quality design flow _____ (cfs) Step 1
 V_H = design horizontal velocity _____ (fps) Using $V_H=15V_T$; $V_T=0.033$ fpm= 0.00055 fps

Step 3) Calculate the width and depth of the vault

D = A_c/W
 W = width of vault _____ (ft) May be standard width
 A_c = _____ (sf) from Step 2
 D = maximum depth _____ (ft) Minimum 3 ft; Maximum 8 ft

The computed depth D must meet a depth-to-width ratio r of between 0.3 and 0.5

Note: $D = (rA_c)0.5$

$W = D/r$, where r = the depth-to-width ratio

D/W = _____

Step 4) Calculate the length of the vault

L = $FD(V_H/V_T)$
 V_H = horizontal velocity (ft/min) $V_H/V_T = 15$
 V_T = oil droplet rise rate (ft/min)
 F = turbulence and short-circuiting factor _____ 1.65 select using $V_H/V_T = 15$; see Figure 6.6.2.A
 D = depth _____ (ft) from step 3

Therefore: $L = 1.65 \times 15 \times D$ _____ (ft)

Step 5) Check the separator's length-to-width ratio.

L/W vault = _____ the ratio of L/W must be 5 or greater
 L/W forebay = _____ L/W must be 3 or greater

Step 6) Compute and check that the proposed separator vault satisfies the minimum horizontal surface area A_H criterion.

A_H must be less than or = LW:

$A_H = (1.65Q/0.33)$ _____ (sf)
 $Q =$ _____ (cfs) Step 1
 $LW =$ _____ (sf)

Step 7) Compute and check the horizontal surface area of the vault forebay.

This area must be greater than 20 square feet p

$A_F:A_{TI} > 1:500$

$L =$ length of vault _____ (ft) Step 4
 $L_F =$ length of forebay _____ (ft) $= L/3$
 $W =$ _____ Step 3
 $A_F =$ forebay area $= L_F \times W$ _____ (ft²)
 $A_{TI} =$ Tributary Impervious Area _____ (ft²) (1 acre = 43,560 ft²)
Required min. area A_F $(20 \times A_{TI}/10,000)$ _____ (sf)
_____ (sf)
OR use ratio $A_F:A_{TI} =$ _____ :500 If $> 1:500$, OK

Step 8) Design the flow splitter and high-flow bypass.

See Section 6.2.5 (p.6-27) for information on flow splitter design.

OTHER CRITERIA (Section 6.6.2)

General siting before other stormwater facilities (p. 6-147)
Baffle requirements (p. 6-148)
Inlet & outlet (p. 6-149)
Material requirements (p. 6-149)
Maintenance access (p. 6-149 to 6-150, also p. 5-37 to 5-38)