BMP: Stormwater Pond

$A_I$ = Impervious area draining to the practice = 0.32 ac

(Contributing watersheds: Area A, Area B, Area G)

| | |
|---|---|
| 0.25 ac | Asphalt Pavement |
| 0.01 ac | Station (roof tops and concrete foundation) |
| 0.06 ac | Water (portion of the detention basin-not required for WQV -0.01 ac) |
| **0.32 ac** | **TOTAL Impervious Area Contributing to BMP: Stormwater Pond** |

BMP: Treatment Swale

$A_I$ = Impervious area draining to the practice = 0.35 ac

(Contributing watersheds: Area C, Area E, Area F)

| | |
|---|---|
| 0.35 ac | Asphalt Pavement |
| | (Note that a portion of Area F impervious (-0.030 ac of Trostle Lane) does not drain to the BMP) |
| **0.35 ac** | **TOTAL Impervious Area Contributing to BMP: Treatment Swale** |

# STORMWATER POND DESIGN CRITERIA (Env-Wq 1508.03)

**Type/Node Name:** **Wet Extended Detention Basin**

Enter the type of stormwater pond (e.g., Wet Pond) and the node name in the drainage analysis, if applicable

| | | | |
|---|---|---|---|
| 11.37 | ac | A = Area draining to the practice | |
| 0.32 | ac | $A_I$ = Impervious area draining to the practice | |
| 0.03 | decimal | I = percent impervious area draining to the practice, in decimal form | |
| 0.08 | unitless | Rv = Runoff coefficient = 0.05 + (0.9 x I) | |
| 0.86 | ac-in | WQV= 1" x Rv x A | |
| 3,109 | cf | WQV conversion (ac-in x 43,560 sf/ac x 1ft/12") | |
| 311 | cf | 10% x WQV (check calc for sediment forebay and micropool volume) | |
| 1,555 | cf | 50% x WQV (check calc for extended detention volume) | |
| 891 | cf | $V_{SED}$ = sediment forebay volume | ← ≥ 10%WQV |
| 7,749 | cf | $V_{PP}$ = permanent pool volume (volume below the lowest invert of the outlet structure) | |
| NA | cf | $V_{ED}$ = WQV - $V_{PP}$ = extended detention volume | ← ≤ X%[1] WQV |
| N/A | | $E_{ED}$ = elevation of $V_{ED}$ (attach stage-storage table) | |
| - | cfs | $2Q_{avg}$ = 2* $V_{ED}$ / 24 hrs * (1hr / 3600 sec) (used to check against $Q_{EDmax}$ below) | |
| 0.15 | cfs | $Q_{EDmax}$ = discharge at the $E_{ED}$ (attach stage-discharge table) | ← <$2Q_{avg}$ |
| - | hours | $T_{ED}$ = drawdown time of extended detention = $2V_{ED}/Q_{EDmax}$ | ← ≥ 24-hrs |
| 3.00 | :1 | Pond side slopes | ← ≥3:1 |
| 3.00 | ft | Average permanent pool depth | ← 3 - 6 ft |
| 3.75 | ft | Maximum depth of permanent pool | ← ≤ 8 ft |
| 115.00 | ft | Length of the flow path between the inlet and outlet at mid-depth | |
| 37.00 | ft | Average Width ([average of the top width + average bottom width]/2) | |
| 3.11 | :1 | Length to Average Width ratio | ← ≥ 3:1 |
| Yes | Yes/No | The perimeter should be curvilinear. | |
| Yes | Yes/No | The inlet and outlet should be located as far apart as possible. | |
| Yes | Yes/No | Is there a manually-controlled drain provided to dewater the pond over a 24hr period? | |
| If no state why: | | | |
| Inspection/Repair | | What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")? | |
| 1,160.77 | ft | Peak elevation of the 50-year storm event | |
| 1,162.60 | ft | Berm elevation of the pond | |
| YES | | 50 peak elevation ≤ the berm elevation? | ← yes |

Qualified professional that developed the planting plan:

Name, Profession:

1. "X" varies depending on type of stormwater pond design. See NH Stormwater Manual, Vol.2, Ch.4-3, Section 1, for the design permanent pool volumes and extended detention volumes.

Designer's Notes:

# TREATMENT SWALE DESIGN CRITERIA (Env-Wq 1508.07)

**Node Name:** **Drainline B/Swale F Treatment Swale**

Enter the node name in the drainage analysis (e.g., reach TS 5), if applicable

| | | | |
|---|---|---|---|
| Yes | Yes/No | Have you reviewed the restrictions on unlined swales outlined in Env-Wq 1508.07(b)? | |
| No | Yes/No | Is the system lined? | |
| 11.30 | ac | A = Area draining to the practice | |
| 0.35 | ac | $A_I$ = Impervious area draining to the practice | |
| 22.7 | minutes | $T_c$ = Time of Concentration | |
| 0.03 | decimal | I = percent impervious area draining to the practice, in decimal form | |
| 0.08 | unitless | Rv = Runoff coefficient = 0.05 + (0.9 x I) | |
| 0.88 | ac-in | WQV= 1" x Rv x A | |
| 3,194 | cf | WQV conversion (ac-in x 43,560 sf/ac x 1ft/12") | |
| 1 | inches | P = amount of rainfall. For WQF in NH, P = 1". | |
| 0.08 | inches | Q = water quality depth. Q = WQV/A | |
| 80 | unitless | CN = unit peak discharge curve number. $CN = 1000/(10+5P+10Q-10*[Q^2 + 1.25*Q*P]^{0.5})$ | |
| 2.56 | inches | S = potential maximum retention. S = (1000/CN) - 10 | |
| 0.513 | inches | Ia = initial abstraction. Ia = 0.2S | |
| 260 | cfs/mi$^2$/in | qu = unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III | |
| 0.36 | cfs | $WQF = q_u$ x WQV. Conversion: to convert "cfs/mi$^2$/in * ac-in" to "cfs" multiply by 1mi$^2$/640ac | |
| 88.00 | feet | L = swale length [1] | ← ≥ 100' |
| 10.00 | feet | w = bottom of the swale width[2] | ← 0 - 8 feet [2] |
| | feet | $E_{SHWT}$ = elevation of SHWT. If none found, use the lowest elev. of test pit | |
| 1,140.39 | feet | $E_{BTM}$ = elevation of the bottom of the practice | ← ≥ $E_{SHWT}$ |
| 3.0 | :1 | $SS_{RIGHT}$ = right Side slope | ← ≥3:1 |
| 3.0 | :1 | $SS_{LEFT}$ = left Side slope | ← ≥3:1 |
| 0.002 | ft/ft | S = slope of swale in decimal form[3] | ← 0.005 - .05 |
| 2.6 | inches | d = flow depth in swale at WQF (attach stage-discharge table)[4] | ← ≤ 4" |
| 0.15 | unitless | d must be < 4", therefore Manning's n = 0.15 | |
| 2.32 | ft$^2$ | Cross-sectional area check (assume trapezoidal channel) | |
| 11.38 | feet | Check wetted perimeter | |
| 0.36 | cfs | $WQF_{check}$.[5] | ← $WQF_{check}$ = WQF |
| 0% | | Percent difference between $WQF_{check}$ and WQF [5] | ← +/- 10% |
| 10 | minutes | HRT = hydraulic residence time during the WQF | ← ≥ 10 min |
| 1,141.19 | ft | Peak elevation of the 10-year storm event | |
| 1,143.90 | ft | Elevation of the top of the swale | |
| YES | Yes/No | 10 peak elevation ≤ the top of swale | ← yes |

1. Any portion of the swale that is in a roadside ditch shall not count towards the swale length.
2. Widths up to 16' allowed if a dividing berm or structure is used such that neither width is more than 8'.
3. If > 0.02 (2%) then check dams are required. No additional detention time is credited for check dams.
4. If a detention structure is used immediately upstream of the swale, the flow depth in the swale shall be no greater than 4" during the peak of the 2-yr storm, 24-hour storm event.
5. The $WQF_{check}$ & WQF should be near equal (within 10%) to confirm that you have selected the correct depth off the stage-discharge table. If the depth is not accurate the HRT will be incorrect.

Designer's Notes:

BMP: Infiltration Basin

$A_I$ = Impervious area draining to the practice = 0.01 ac

(Contributing watershed: Area 1B)

| | |
|---|---|
| 0.01 ac | Station (roof tops and concrete foundation) |
| **0.01 ac** | **TOTAL Impervious Area Contributing to BMP: Infiltration Basin** |

# INFILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.05)

**Type/Node Name:** **Infiltration Basin**

Enter the type of infiltration practice (e.g., trench) and the node name in the drainage analysis, if applicable

| | | | |
|---|---|---|---|
| ***yes*** | | Have you reviewed Env-Wq 1508.05(a) to ensure that infiltration is allowed? | |
| 0.57 | ac | A = Area draining to the practice | |
| 0.01 | ac | $A_I$ = Impervious area draining to the practice | |
| 0.02 | decimal | I = percent impervious area draining to the practice, in decimal form | |
| 0.07 | unitless | Rv = Runoff coefficient = 0.05 + (0.9 x I) | |
| 0.04 | ac-in | WQV= 1" x Rv x A | |
| 140 | cf | WQV conversion (ac-in x 43,560 sf/ac x 1ft/12") | |
| 35 | cf | 25% x WQV (check calc for sediment forebay volume) | |
| pretreatment swale | | Method of pretreatment? (not required for clean or roof runoff) | |
| | cf | $V_{SED}$ = sediment forebay volume, if used for pretreatment | ← ≥ 25%WQV |
| 659 | cf | V = volume[1] (attach a stage-storage table) | ← ≥ WQV |
| 664 | sf | $A_{SA}$ = surface area of the bottom of the pond | |
| 0.30 | iph | $I_{DESIGN}$ = design infiltration rate[2] | |
| 39.7 | hours | $T_{DRAIN}$ = drain time = V / ($A_{SA}$ * $I_{DESIGN}$) | ← ≤ 72-hrs |
| 1,303.00 | feet | $E_{BTM}$ = elevation of the bottom of the practice | |
| | feet | $E_{SHWT}$ = elevation of SHWT (if none found, enter the lowest elevation of the test pit) | |
| | feet | $E_{ROCK}$ = elevation of bedrock (if none found, enter the lowest elevation of the test pit) | |
| 1,303.00 | feet | $D_{SHWT}$ = separation from SHWT[3] | ← ≥ *[3] |
| 1,303.0 | feet | $D_{ROCK}$ = separation from bedrock[3] | ← ≥ *[3] |
| | ft | $D_T$ = depth of trench, if trench proposed | ← 4 - 10 ft |
| N/A | Yes/No | If a trench or underground system is proposed, observation well provided | |
| | | If a trench is proposed, material in trench | |
| Sand or Pea Gravel | | If a basin is proposed, basin floor material | |
| yes | Yes/No | If a basin is proposed, the perimeter should be curvilinear. | |
| 3.0 | :1 | If a basin is proposed, pond side slopes | ← ≥3:1 |
| 1,303.91 | ft | Peak elevation of the 10-year storm event (infiltration can be used in analysis) | |
| 1,303.98 | ft | Peak elevation of the 50-year storm event (infiltration can be used in analysis) | |
| 1,305.00 | ft | Elevation of the top of the practice (if a basin, this is the elevation of the berm) | |
| YES | | 10 peak elevation ≤ Elevation of the top of the trench? | ← yes |
| YES | | If a basin is proposed, 50-year peak elevation ≤ Elevation of berm? | ← yes |

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. See NH Stormwater Manual, Vol.2, Ch.2-4, for guidance on determining the infiltration rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.

Designer's Notes:

BMP: Infiltration Basin

$A_I$ = Impervious area draining to the practice = 0.13 ac

(Contributing watersheds: Post Area 1)

| | |
|---|---|
| 0.12 ac | Asphalt Pavement |
| 0.01 ac | Station (roof tops and concrete foundation) |
| **0.13 ac** | **TOTAL Impervious Area Contributing to BMP: Infiltration Basin** |

BMP: Treatment Swale

$A_I$ = Impervious area draining to the practice = 0.11 ac

(Contributing watersheds: Post Area 2, Post Area 3)

| | |
|---|---|
| 0.09 ac | Asphalt Pavement |
| 0.02 ac | Gravel Road |
| **0.11 ac** | **TOTAL Impervious Area Contributing to BMP: Treatment Swale** |

# INFILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.05)

**Type/Node Name:** **Infiltration Basin**

Enter the type of infiltration practice (e.g., trench) and the node name in the drainage analysis, if applicable

| | | | |
|---|---|---|---|
| ***Yes*** | | Have you reviewed Env-Wq 1508.05(a) to ensure that infiltration is allowed? | |
| 0.94 | ac | A = Area draining to the practice | |
| 0.13 | ac | $A_I$ = Impervious area draining to the practice | |
| 0.14 | decimal | I = percent impervious area draining to the practice, in decimal form | |
| 0.17 | unitless | Rv = Runoff coefficient = 0.05 + (0.9 x I) | |
| 0.16 | ac-in | WQV= 1" x Rv x A | |
| 595 | cf | WQV conversion (ac-in x 43,560 sf/ac x 1ft/12") | |
| 149 | cf | 25% x WQV (check calc for sediment forebay volume) | |
| Sediment Forebay | | Method of pretreatment? (not required for clean or roof runoff) | |
| 317 | cf | $V_{SED}$ = sediment forebay volume, if used for pretreatment | ← ≥ 25%WQV |
| 873 | cf | V = volume[1] (attach a stage-storage table) | ← ≥ WQV |
| 1,247 | sf | $A_{SA}$ = surface area of the bottom of the pond | |
| 0.30 | iph | $I_{DESIGN}$ = design infiltration rate[2] | |
| 28.0 | hours | $T_{DRAIN}$ = drain time = V / ($A_{SA}$ * $I_{DESIGN}$) | ← ≤ 72-hrs |
| 1,801.50 | feet | $E_{BTM}$ = elevation of the bottom of the practice | |
| | feet | $E_{SHWT}$ = elevation of SHWT (if none found, enter the lowest elevation of the test pit) | |
| | feet | $E_{ROCK}$ = elevation of bedrock (if none found, enter the lowest elevation of the test pit) | |
| 1,801.50 | feet | $D_{SHWT}$ = separation from SHWT[3] | ← ≥ *[3] |
| 1,801.5 | feet | $D_{ROCK}$ = separation from bedrock[3] | ← ≥ *[3] |
| | ft | $D_T$ = depth of trench, if trench proposed | ← 4 - 10 ft |
| | Yes/No | If a trench or underground system is proposed, observation well provided | |
| | | If a trench is proposed, material in trench | |
| sand or pea gravel | | If a basin is proposed, basin floor material | |
| Yes | Yes/No | If a basin is proposed, the perimeter should be curvilinear. | |
| 3.0 | :1 | If a basin is proposed, pond side slopes | ← ≥3:1 |
| | ft | Peak elevation of the 10-year storm event (infiltration can be used in analysis) | |
| 1,303.58 | ft | Peak elevation of the 50-year storm event (infiltration can be used in analysis) | |
| 1,305.00 | ft | Elevation of the top of the practice (if a basin, this is the elevation of the berm) | |
| - | | 10 peak elevation ≤ Elevation of the top of the trench? | ← yes |
| YES | | If a basin is proposed, 50-year peak elevation ≤ Elevation of berm? | ← yes |

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. See NH Stormwater Manual, Vol.2, Ch.2-4, for guidance on determining the infiltration rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.

Designer's Notes:

# TREATMENT SWALE DESIGN CRITERIA (Env-Wq 1508.07)

**Node Name:** **Treatment Swale 5**

Enter the node name in the drainage analysis (e.g., reach TS 5), if applicable

| | | | |
|---|---|---|---|
| Yes | Yes/No | Have you reviewed the restrictions on unlined swales outlined in Env-Wq 1508.07(b)? | |
| No | Yes/No | Is the system lined? | |
| 0.90 | ac | A = Area draining to the practice | |
| 0.11 | ac | $A_I$ = Impervious area draining to the practice | |
| 6.0 | minutes | $T_c$ = Time of Concentration | |
| 0.12 | decimal | I = percent impervious area draining to the practice, in decimal form | |
| 0.16 | unitless | Rv = Runoff coefficient = 0.05 + (0.9 x I) | |
| 0.14 | ac-in | WQV= 1" x Rv x A | |
| 519 | cf | WQV conversion (ac-in x 43,560 sf/ac x 1ft/12") | |
| 1 | inches | P = amount of rainfall. For WQF in NH, P = 1". | |
| 0.16 | inches | Q = water quality depth. Q = WQV/A | |
| 84 | unitless | CN = unit peak discharge curve number. $CN = 1000/(10+5P+10Q-10*[Q^2 + 1.25*Q*P]^{0.5})$ | |
| 1.86 | inches | S = potential maximum retention. S = (1000/CN) - 10 | |
| 0.371 | inches | Ia = initial abstraction. Ia = 0.2S | |
| 840 | $cfs/mi^2/in$ | qu = unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III | |
| 0.19 | cfs | $WQF = q_u$ x WQV. Conversion: to convert "$cfs/mi^2/in$ * ac-in" to "cfs" multiply by $1mi^2/640ac$ | |
| 107.00 | feet | L = swale length [1] | ← **≥ 100'** |
| 2.00 | feet | w = bottom of the swale width[2] | ← **0 - 8 feet** [2] |
| | feet | $E_{SHWT}$ = elevation of SHWT. If none found, use the lowest elev. of test pit | |
| 1,793.39 | feet | $E_{BTM}$ = elevation of the bottom of the practice | ← **≥ $E_{SHWT}$** |
| 333.0 | :1 | $SS_{RIGHT}$ = right Side slope | ← **≥3:1** |
| 45.0 | :1 | $SS_{LEFT}$ = left Side slope | ← **≥3:1** |
| 0.029 | ft/ft | S = slope of swale in decimal form[3] | ← **0.005 - .05** |
| 0.8 | inches | d = flow depth in swale at WQF (attach stage-discharge table)[4] | ← **≤ 4"** |
| 0.15 | unitless | d must be < 4", therefore Manning's n = 0.15 | |
| 1.01 | $ft^2$ | Cross-sectional area check (assume trapezoidal channel) | |
| 27.67 | feet | Check wetted perimeter | |
| 0.19 | cfs | $WQF_{check}$.[5] | ← **$WQF_{check}$ = WQF** |
| 0% | | Percent difference between $WQF_{check}$ and WQF [5] | ← **+/- 10%** |
| 10 | minutes | HRT = hydraulic residence time during the WQF | ← **≥ 10 min** |
| 1,793.43 | ft | Peak elevation of the 10-year storm event | |
| 1,793.99 | ft | Elevation of the top of the swale | |
| YES | Yes/No | 10 peak elevation ≤ the top of swale | ← **yes** |

1. Any portion of the swale that is in a roadside ditch shall not count towards the swale length.
2. Widths up to 16' allowed if a dividing berm or structure is used such that neither width is more than 8'.
3. If > 0.02 (2%) then check dams are required. No additional detention time is credited for check dams.
4. If a detention structure is used immediately upstream of the swale, the flow depth in the swale shall be no greater than 4" during the peak of the 2-yr storm, 24-hour storm event.
5. The $WQF_{check}$ & WQF should be near equal (within 10%) to confirm that you have selected the correct depth off the stage-discharge table. If the depth is not accurate the HRT will be incorrect.

Designer's Notes:

BMP: Underground Sand Filter

$A_I$ = Impervious area draining to the practice = 0.01 ac

(Contributing watersheds: Post Area 1B)

| | |
|---|---|
| 0.01 ac | Station (roof tops and concrete foundation) |
| **0.01 ac** | **TOTAL Impervious Area Contributing to BMP: Underground Sand Filter** |

# FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.06)

**Type/Node Name:** **Underground Sand Filter- SF-1**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable

| | | | |
|---|---|---|---|
| Yes | | Have you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.06(b)? | |
| 0.58 | ac | A = Area draining to the practice[1] | |
| 0.01 | ac | $A_I$ = Impervious area draining to the practice | |
| 0.02 | decimal | I = percent impervious area draining to the practice, in decimal form | |
| 0.07 | unitless | Rv = Runoff coefficient = 0.05 + (0.9 x I) | |
| 0.04 | ac-in | WQV= 1" x Rv x A | |
| 141 | cf | WQV conversion (ac-in x 43,560 sf/ac x 1ft/12") | |
| 35 | cf | 25% x WQV (check calc for sediment forebay volume) | |
| 106 | cf | 75% x WQV (check calc for surface sand filter volume) | |
| Deep Sump Catch Basir | | Method of Pretreatment? (not required for clean or roof runoff) | |
| 150 | cf | $V_{SED}$ = sediment forebay volume, if used for pretreatment | ← ≥ 25%WQV |
| 50 | sf | $A_{SA}$ = surface area of the practice | |
| 1.75 | iph | $I_{DESIGN}$ = design infiltration rate[2] | |
| Yes | Yes/No | If $I_{DESIGN}$ is < 0.50 iph, has an underdrain been provided? | |
| 19.4 | hours | $T_{DRAIN}$ = drain time = V / ($A_{SA}$ * $I_{DESIGN}$) | ← ≤ 72-hrs |
| 1,727.45 | feet | $E_{FC}$ = elevation of the bottom of the filter course material | |
| 1,726.45 | feet | $E_{UD}$ = invert elevation of the underdrain (UD), if applicable | |
| 1,726.45 | feet | $E_{BTM}$ = elevation of the bottom of the practice (i.e., bottom of the stone reservoir). | |
| 1,724.00 | feet | $E_{SHWT}$ = elevation of SHWT (if none found, enter the lowest elevation of the test pit) | |
| 1,724.00 | feet | $E_{ROCK}$ = elevation of bedrock (if none found, enter the lowest elevation of the test pit) | |
| 1.00 | feet | $D_{FC\ to\ UD}$ = depth to UD from the bottom of the filter course[3] | ← ≥ 1' |
| 3.45 | feet | $D_{FC\ to\ ROCK}$ = depth to bedrock from the bottom of the filter course[3] | ← ≥ 1' |
| 3.45 | feet | $D_{FC\ to\ SHWT}$ = depth to SHWT from the bottom of the filter course[3] | ← ≥ 1' |
| 2.45 | feet | $D_{BTM\ to\ SHWT}$ = depth to SHWT from the bottom of the practice[3] | ← ≥ 2' |
| 1,731.55 | ft | Peak elevation of the 10-year storm event (infiltration can be used in analysis) | |
| 1,733.45 | ft | Elevation of the top of the practice | |
| YES | | 10 peak elevation ≤ Elevation of the top of the practice | ← yes |

**If a surface sand filter is proposed:**

| | | | |
|---|---|---|---|
| YES | ac | Drainage Area check. | ← < 10 ac |
| | cf | V = volume of storage[4, 5] (attach a stage-storage table) | ← ≥ 75%WQV |
| | inches | $D_{FC}$ = filter course thickness | ← 18" |
| Sheet | | Note what sheet in the plan set contains the filter course specification | |
| | Yes/No | Access grate provided? | ← yes |
| | | The filter shall not be covered in grass. What is covering the filter? | |

**If an underground sand filter is proposed:**

| | | | |
|---|---|---|---|
| YES | ac | Drainage Area check. | ← < 10 ac |
| 277 | cf | V = volume of storage[4, 5] (attach a stage-storage table) | ← ≥ 75%WQV |
| 24.0 | inches | $D_{FC}$ = filter course thickness | ← 24" |
| Sheet | C507 | Note what sheet in the plan set contains the filter course specification | |
| Yes | Yes/No | Access grate provided? | ← yes |

**If a bioretention area is proposed:**

| | | | |
|---|---|---|---|
| YES | ac | Drainage Area no larger than 5 ac? | ← **yes** |
| | cf | V = volume of storage[4, 5] (attach a stage-storage table) | ← **≥ WQV** |
| | inches | $D_{FC}$ = filter course thickness | ← **18"** |
| Sheet | | Note what sheet in the plan set contains the filter course specification | |
| | :1 | Pond side slopes | ← **≥2:1** |
| Sheet | | Note what sheet in the plan set contains the planting plans and surface cover | |

**If porous pavement is proposed:**

| | | | |
|---|---|---|---|
| | | Type of pavement proposed (concrete? Asphalt? Pavers? Etc) | |
| | acres | $A_{SA}$ = surface area of the pervious pavement | |
| - | :1 | ratio of the contributing area to the pervious surface area | ← **5:1** |
| | inches | $D_{FC}$ = filter course thickness | ← **12"** |
| Sheet | | Note what sheet in the plan set contains the filter course spec. | ← **304.1 sand** |

1. If the practice is a tree box filter, the drainage area shall be < 0.1 acre

2. Rate of the limiting layer (either the filter course or the underlying soil). See Vol. 2 of the NH Stormwater Manual, Ch. 2-4, for guidance on determining the infiltration rate.

3. If not within a GPA or WSIPA: SHWT/Bedrock must be at least 1 foot below the filter course material (or an underdrain must drain the SHWT to at least one foot below the filter course material). If within a GPA or WSIPA: SHWT must be at least two feet below the bottom of the practice OR the filter course material must be at least twice as thick as required and the SHWT must be at least one foot below the filter course material.

4. Volume without depending on infiltration. The storage above the filter media shall not include the volume above the outlet structure, if any.

5. The volume includes the storage above the filter but below the invert of the outlet structure (if any), the filter media voids, and the pretreatment area.

Designer's Notes:

1. Assumed the limiting layer is the sand layer which has a permeability rate (K) of 3.5 ft/day which equates to 1.75 inches/hour.

2. Concrete chamber will be lined on the outside with a waterproof coat which will act as an impermeable liner.

BMP: Infiltration Basin 1

$A_I$ = Impervious area draining to the practice = 1.97 ac

(Contributing watersheds: Post-Area 2A-2D)

| | |
|---|---|
| 1.97 | Station (roof tops and concrete foundation) |
| **1.97** | **TOTAL Impervious Area Contributing to BMP: Infiltration Basin 1** |

BMP: Infiltration Basin 2

$A_I$ = Impervious area draining to the practice = 0.72 ac

(Contributing watersheds: Post-Area 4A, Post Area 4B, Post Area 4D)

| | |
|---|---|
| 0.60 | Asphalt Pavement |
| 0.12 | Gravel Road |
| **0.72** | **TOTAL Impervious Area Contributing to BMP: Infiltration Basin 2** |

# INFILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.05)

**Type/Node Name:** **Franklin Infiltration Basin 1**

Enter the type of infiltration practice (e.g., trench) and the node name in the drainage analysis, if applicable

| | | | |
|---|---|---|---|
| ***Yes*** | | Have you reviewed Env-Wq 1508.05(a) to ensure that infiltration is allowed? | |
| 19.77 | ac | A = Area draining to the practice | |
| 1.97 | ac | $A_I$ = Impervious area draining to the practice | |
| 0.10 | decimal | I = percent impervious area draining to the practice, in decimal form | |
| 0.14 | unitless | Rv = Runoff coefficient = 0.05 + (0.9 x I) | |
| 2.76 | ac-in | WQV= 1" x Rv x A | |
| 10,024 | cf | WQV conversion (ac-in x 43,560 sf/ac x 1ft/12") | |
| 2,506 | cf | 25% x WQV (check calc for sediment forebay volume) | |
| Forebay | | Method of pretreatment? (not required for clean or roof runoff) | |
| 2,713 | cf | $V_{SED}$ = sediment forebay volume, if used for pretreatment | ← ≥ 25%WQV |
| 40,043 | cf | V = volume[1] (attach a stage-storage table) | ← ≥ WQV |
| 17,812 | sf | $A_{SA}$ = surface area of the bottom of the pond | |
| 3.00 | iph | $I_{DESIGN}$ = design infiltration rate[2] | |
| 9.0 | hours | $T_{DRAIN}$ = drain time = V / ($A_{SA}$ * $I_{DESIGN}$) | ← ≤ 72-hrs |
| 327.50 | feet | $E_{BTM}$ = elevation of the bottom of the practice | |
| | feet | $E_{SHWT}$ = elevation of SHWT (if none found, enter the lowest elevation of the test pit) | |
| | feet | $E_{ROCK}$ = elevation of bedrock (if none found, enter the lowest elevation of the test pit) | |
| 327.50 | feet | $D_{SHWT}$ = separation from SHWT[3] | ← ≥ *[3] |
| 327.5 | feet | $D_{ROCK}$ = separation from bedrock[3] | ← ≥ *[3] |
| N/A | ft | $D_T$ = depth of trench, if trench proposed | ← 4 - 10 ft |
| N/A | Yes/No | If a trench or underground system is proposed, observation well provided | |
| N/A | | If a trench is proposed, material in trench | |
| Sand/Gravel | | If a basin is proposed, basin floor material | |
| Yes | Yes/No | If a basin is proposed, the perimeter should be curvilinear. | |
| 3.0 | :1 | If a basin is proposed, pond side slopes | ← ≥3:1 |
| 328.66 | ft | Peak elevation of the 10-year storm event (infiltration can be used in analysis) | |
| 330.39 | ft | Peak elevation of the 50-year storm event (infiltration can be used in analysis) | |
| 332.50 | ft | Elevation of the top of the practice (if a basin, this is the elevation of the berm) | |
| YES | | 10 peak elevation ≤ Elevation of the top of the trench? | ← yes |
| YES | | If a basin is proposed, 50-year peak elevation ≤ Elevation of berm? | ← yes |

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. See NH Stormwater Manual, Vol.2, Ch.2-4, for guidance on determining the infiltration rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.

Designer's Notes: Test pits not yet taken to determine elevation of SHWT and separation from bedrock.

# INFILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.05)

**Type/Node Name:** **Franklin Infiltration Basin 2**

Enter the type of infiltration practice (e.g., trench) and the node name in the drainage analysis, if applicable

| | | | |
|---|---|---|---|
| ***Yes*** | | Have you reviewed Env-Wq 1508.05(a) to ensure that infiltration is allowed? | |
| 8.09 | ac | A = Area draining to the practice | |
| 0.72 | ac | $A_I$ = Impervious area draining to the practice | |
| 0.09 | decimal | I = percent impervious area draining to the practice, in decimal form | |
| 0.13 | unitless | Rv = Runoff coefficient = 0.05 + (0.9 x I) | |
| 1.05 | ac-in | WQV= 1" x Rv x A | |
| 3,807 | cf | WQV conversion (ac-in x 43,560 sf/ac x 1ft/12") | |
| 952 | cf | 25% x WQV (check calc for sediment forebay volume) | |
| Forebay | | Method of pretreatment? (not required for clean or roof runoff) | |
| 1,013 | cf | $V_{SED}$ = sediment forebay volume, if used for pretreatment | ← ≥ 25%WQV |
| 7,675 | cf | V = volume[1] (attach a stage-storage table) | ← ≥ WQV |
| 1,426 | sf | $A_{SA}$ = surface area of the bottom of the pond | |
| 3.00 | iph | $I_{DESIGN}$ = design infiltration rate[2] | |
| 21.5 | hours | $T_{DRAIN}$ = drain time = V / ($A_{SA}$ * $I_{DESIGN}$) | ← ≤ 72-hrs |
| 298.50 | feet | $E_{BTM}$ = elevation of the bottom of the practice | |
| | feet | $E_{SHWT}$ = elevation of SHWT (if none found, enter the lowest elevation of the test pit) | |
| | feet | $E_{ROCK}$ = elevation of bedrock (if none found, enter the lowest elevation of the test pit) | |
| 298.50 | feet | $D_{SHWT}$ = separation from SHWT[3] | ← ≥ *[3] |
| 298.5 | feet | $D_{ROCK}$ = separation from bedrock[3] | ← ≥ *[3] |
| N/A | ft | $D_T$ = depth of trench, if trench proposed | ← 4 - 10 ft |
| N/A | Yes/No | If a trench or underground system is proposed, observation well provided | |
| N/A | | If a trench is proposed, material in trench | |
| Sand/Gravel | | If a basin is proposed, basin floor material | |
| Yes | Yes/No | If a basin is proposed, the perimeter should be curvilinear. | |
| 3.0 | :1 | If a basin is proposed, pond side slopes | ← ≥3:1 |
| 298.84 | ft | Peak elevation of the 10-year storm event (infiltration can be used in analysis) | |
| 299.89 | ft | Peak elevation of the 50-year storm event (infiltration can be used in analysis) | |
| 302.00 | ft | Elevation of the top of the practice (if a basin, this is the elevation of the berm) | |
| YES | | 10 peak elevation ≤ Elevation of the top of the trench? | ← yes |
| YES | | If a basin is proposed, 50-year peak elevation ≤ Elevation of berm? | ← yes |

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. See NH Stormwater Manual, Vol.2, Ch.2-4, for guidance on determining the infiltration rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.

Designer's Notes: Test pits not yet taken to determine elevation of SHWT and separation from bedrock.

BMP: Surface Sand Filter

$A_I$ = Impervious area draining to the practice = 0.20 ac

(Contributing watersheds: Post-Area 1B, Post-Area 1C)

| | |
|---|---|
| 0.20 ac | Station (roof tops and concrete foundation) |
| **0.20 ac** | **TOTAL Impervious Area Contributing to BMP: Surface Sand Filter** |

# FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.06)

**Type/Node Name:** **Surface Sand Filter SF-1**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable

| | | | |
|---|---|---|---|
| Yes | | Have you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.06(b)? | |
| 3.98 | ac | A = Area draining to the practice[1] | |
| 0.20 | ac | $A_I$ = Impervious area draining to the practice | |
| 0.05 | decimal | I = percent impervious area draining to the practice, in decimal form | |
| 0.10 | unitless | Rv = Runoff coefficient = 0.05 + (0.9 x I) | |
| 0.38 | ac-in | WQV= 1" x Rv x A | |
| 1,376 | cf | WQV conversion (ac-in x 43,560 sf/ac x 1ft/12") | |
| 344 | cf | 25% x WQV (check calc for sediment forebay volume) | |
| 1,032 | cf | 75% x WQV (check calc for surface sand filter volume) | |
| Sediment Forebay | | Method of Pretreatment? (not required for clean or roof runoff) | |
| 364 | cf | $V_{SED}$ = sediment forebay volume, if used for pretreatment | ← ≥ 25%WQV |
| 906 | sf | $A_{SA}$ = surface area of the practice | |
| 0.50 | iph | $I_{DESIGN}$ = design infiltration rate[2] | |
| Yes | Yes/No | If $I_{DESIGN}$ is < 0.50 iph, has an underdrain been provided? | |
| 36.4 | hours | $T_{DRAIN}$ = drain time = V / ($A_{SA}$ * $I_{DESIGN}$) | ← ≤ 72-hrs |
| 374.75 | feet | $E_{FC}$ = elevation of the bottom of the filter course material | |
| 373.00 | feet | $E_{UD}$ = invert elevation of the underdrain (UD), if applicable | |
| 372.90 | feet | $E_{BTM}$ = elevation of the bottom of the practice (i.e., bottom of the stone reservoir). | |
| 368.00 | feet | $E_{SHWT}$ = elevation of SHWT (if none found, enter the lowest elevation of the test pit) | |
| 364.00 | feet | $E_{ROCK}$ = elevation of bedrock (if none found, enter the lowest elevation of the test pit) | |
| 1.75 | feet | $D_{FC\ to\ UD}$ = depth to UD from the bottom of the filter course[3] | ← ≥ 1' |
| 10.75 | feet | $D_{FC\ to\ ROCK}$ = depth to bedrock from the bottom of the filter course[3] | ← ≥ 1' |
| 6.75 | feet | $D_{FC\ to\ SHWT}$ = depth to SHWT from the bottom of the filter course[3] | ← ≥ 1' |
| 4.90 | feet | $D_{BTM\ to\ SHWT}$ = depth to SHWT from the bottom of the practice[3] | ← ≥ 2' |
| 378.42 | ft | Peak elevation of the 10-year storm event (infiltration can be used in analysis) | |
| 379.00 | ft | Elevation of the top of the practice | |
| YES | | 10 peak elevation ≤ Elevation of the top of the practice | ← yes |

**If a surface sand filter is proposed:**

| | | | |
|---|---|---|---|
| YES | ac | Drainage Area check. | ← < 10 ac |
| 2,337 | cf | V = volume of storage[4, 5] (attach a stage-storage table) | ← ≥ 75%WQV |
| 24.0 | inches | $D_{FC}$ = filter course thickness | ← 18" |
| Sheet | C509 | Note what sheet in the plan set contains the filter course specification | |
| Yes | Yes/No | Access grate provided? | ← yes |
| Stone Fill | | The filter shall not be covered in grass. What is covering the filter? | |

**If an underground sand filter is proposed:**

| | | | |
|---|---|---|---|
| YES | ac | Drainage Area check. | ← < 10 ac |
| | cf | V = volume of storage[4, 5] (attach a stage-storage table) | ← ≥ 75%WQV |
| | inches | $D_{FC}$ = filter course thickness | ← 24" |
| Sheet | | Note what sheet in the plan set contains the filter course specification | |
| | Yes/No | Access grate provided? | ← yes |

**If a bioretention area is proposed:**

| | | | |
|---|---|---|---|
| YES | ac | Drainage Area no larger than 5 ac? | ← **yes** |
| | cf | V = volume of storage[4, 5] (attach a stage-storage table) | ← **≥ WQV** |
| | inches | $D_{FC}$ = filter course thickness | ← **18"** |
| Sheet | | Note what sheet in the plan set contains the filter course specification | |
| | :1 | Pond side slopes | ← **≥2:1** |
| Sheet | | Note what sheet in the plan set contains the planting plans and surface cover | |

**If porous pavement is proposed:**

| | | | |
|---|---|---|---|
| | | Type of pavement proposed (concrete? Asphalt? Pavers? Etc) | |
| | acres | $A_{SA}$ = surface area of the pervious pavement | |
| - | :1 | ratio of the contributing area to the pervious surface area | ← **5:1** |
| 3.0 | inches | $D_{FC}$ = filter course thickness | ← **12"** |
| Sheet | | Note what sheet in the plan set contains the filter course spec. | ← **304.1 sand** |

1. If the practice is a tree box filter, the drainage area shall be < 0.1 acre

2. Rate of the limiting layer (either the filter course or the underlying soil). See Vol. 2 of the NH Stormwater Manual, Ch. 2-4, for guidance on determining the infiltration rate.

3. If not within a GPA or WSIPA: SHWT/Bedrock must be at least 1 foot below the filter course material (or an underdrain must drain the SHWT to at least one foot below the filter course material). If within a GPA or WSIPA: SHWT must be at least two feet below the bottom of the practice OR the filter course material must be at least twice as thick as required and the SHWT must be at least one foot below the filter course material.

4. Volume without depending on infiltration. The storage above the filter media shall not include the volume above the outlet structure, if any.

5. The volume includes the storage above the filter but below the invert of the outlet structure (if any), the filter media voids, and the pretreatment area.

Designer's Notes:

BMP: Infiltration Basin

$A_I$ = Impervious area draining to the practice = 0.20 ac

| | |
|---|---|
| 0.20 | Station (roof tops and concrete foundation) |
| **0.20** | **TOTAL Impervious Area Contributing to BMP: Infiltration Basin** |

# INFILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.05)

**Type/Node Name:** **Infiltration Basin (IF-1)**

Enter the type of infiltration practice (e.g., trench) and the node name in the drainage analysis, if applicable

| | | | |
|---|---|---|---|
| *yes* | | Have you reviewed Env-Wq 1508.05(a) to ensure that infiltration is allowed? | |
| 2.43 | ac | A = Area draining to the practice | |
| 0.20 | ac | $A_I$ = Impervious area draining to the practice | |
| 0.08 | decimal | I = percent impervious area draining to the practice, in decimal form | |
| 0.12 | unitless | Rv = Runoff coefficient = 0.05 + (0.9 x I) | |
| 0.30 | ac-in | WQV= 1" x Rv x A | |
| 1,095 | cf | WQV conversion (ac-in x 43,560 sf/ac x 1ft/12") | |
| 274 | cf | 25% x WQV (check calc for sediment forebay volume) | |
| Forebay | | Method of pretreatment? (not required for clean or roof runoff) | |
| 889 | cf | $V_{SED}$ = sediment forebay volume, if used for pretreatment | ← ≥ 25%WQV |
| 3,485 | cf | V = volume[1] (attach a stage-storage table) | ← ≥ WQV |
| 1,969 | sf | $A_{SA}$ = surface area of the bottom of the pond | |
| 0.50 | iph | $I_{DESIGN}$ = design infiltration rate[2] | |
| 42.5 | hours | $T_{DRAIN}$ = drain time = V / ($A_{SA}$ * $I_{DESIGN}$) | ← ≤ 72-hrs |
| 354.00 | feet | $E_{BTM}$ = elevation of the bottom of the practice | |
| 350.00 | feet | $E_{SHWT}$ = elevation of SHWT (if none found, enter the lowest elevation of the test pit) | |
| 350.00 | feet | $E_{ROCK}$ = elevation of bedrock (if none found, enter the lowest elevation of the test pit) | |
| 4.00 | feet | $D_{SHWT}$ = separation from SHWT[3] | ← ≥ *[3] |
| 4.0 | feet | $D_{ROCK}$ = separation from bedrock[3] | ← ≥ *[3] |
| 2.00 | ft | $D_T$ = depth of trench, if trench proposed | ← 4 - 10 ft |
| N/A | Yes/No | If a trench or underground system is proposed, observation well provided | |
| | | If a trench is proposed, material in trench | |
| | | If a basin is proposed, basin floor material | |
| yes | Yes/No | If a basin is proposed, the perimeter should be curvilinear. | |
| 3.0 | :1 | If a basin is proposed, pond side slopes | ← ≥3:1 |
| 356.18 | ft | Peak elevation of the 10-year storm event (infiltration can be used in analysis) | |
| 357.26 | ft | Peak elevation of the 50-year storm event (infiltration can be used in analysis) | |
| 359.00 | ft | Elevation of the top of the practice (if a basin, this is the elevation of the berm) | |
| YES | | 10 peak elevation ≤ Elevation of the top of the trench? | ← yes |
| YES | | If a basin is proposed, 50-year peak elevation ≤ Elevation of berm? | ← yes |

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. See NH Stormwater Manual, Vol.2, Ch.2-4, for guidance on determining the infiltration rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.

Designer's Notes:

# Groundwater Recharge Volume (GRV) Calculation

| | | | |
|---|---|---|---|
| - | ac | Area of HSG A soil that was replaced by impervious cover | 0.40" |
| 0.20 | ac | Area of HSG B soil that was replaced by impervious cover | 0.25" |
| - | ac | Area of HSG C soil that was replaced by impervious cover | 0.10" |
| - | ac | Area of HSG D soil or impervious cover that was replaced by impervious cover | 0.0" |
| 0.25 | inches | Rd = weighted groundwater recharge depth | |
| 0.05 | ac-in | GRV = AI * Rd | |
| 182 | cf | GRV conversion (ac-in x 43,560 sf/ac x 1ft/12”) | |

**Provide calculations below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):**

BMP: Underground Sand Filter

$A_I$ = Impervious area draining to the practice = 0.05 ac

(Contributing watersheds: Post-Area 1)

| | |
|---|---|
| 0.01 ac | Station (roof tops and concrete foundation) |
| 0.02 ac | Asphalt Pavement |
| 0.02 ac | Retaining Wall |
| **0.05 ac** | **TOTAL Impervious Area Contributing to BMP: Underground Sand Filter** |

# FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.06)

**Type/Node Name:** **Underground Sand Filter SF-1**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable

| | | | |
|---|---|---|---|
| Yes | | Have you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.06(b)? | |
| 0.68 | ac | A = Area draining to the practice[1] | |
| 0.05 | ac | $A_I$ = Impervious area draining to the practice | |
| 0.07 | decimal | I = percent impervious area draining to the practice, in decimal form | |
| 0.12 | unitless | Rv = Runoff coefficient = 0.05 + (0.9 x I) | |
| 0.08 | ac-in | WQV= 1" x Rv x A | |
| 287 | cf | WQV conversion (ac-in x 43,560 sf/ac x 1ft/12") | |
| 72 | cf | 25% x WQV (check calc for sediment forebay volume) | |
| 215 | cf | 75% x WQV (check calc for surface sand filter volume) | |
| Deep Sump Catch Basir | | Method of Pretreatment? (not required for clean or roof runoff) | |
| 262 | cf | $V_{SED}$ = sediment forebay volume, if used for pretreatment | ← ≥ 25%WQV |
| 85 | sf | $A_{SA}$ = surface area of the practice | |
| 1.75 | iph | $I_{DESIGN}$ = design infiltration rate[2] | |
| Yes | Yes/No | If $I_{DESIGN}$ is < 0.50 iph, has an underdrain been provided? | |
| 23.3 | hours | $T_{DRAIN}$ = drain time = V / ($A_{SA}$ * $I_{DESIGN}$) | ← ≤ 72-hrs |
| 1,087.65 | feet | $E_{FC}$ = elevation of the bottom of the filter course material | |
| 1,086.65 | feet | $E_{UD}$ = invert elevation of the underdrain (UD), if applicable | |
| 1,086.65 | feet | $E_{BTM}$ = elevation of the bottom of the practice (i.e., bottom of the stone reservoir). | |
| 1,082.80 | feet | $E_{SHWT}$ = elevation of SHWT (if none found, enter the lowest elevation of the test pit) | |
| 1,080.80 | feet | $E_{ROCK}$ = elevation of bedrock (if none found, enter the lowest elevation of the test pit) | |
| 1.00 | feet | $D_{FC\ to\ UD}$ = depth to UD from the bottom of the filter course[3] | ← ≥ 1' |
| 6.85 | feet | $D_{FC\ to\ ROCK}$ = depth to bedrock from the bottom of the filter course[3] | ← ≥ 1' |
| 4.85 | feet | $D_{FC\ to\ SHWT}$ = depth to SHWT from the bottom of the filter course[3] | ← ≥ 1' |
| 3.85 | feet | $D_{BTM\ to\ SHWT}$ = depth to SHWT from the bottom of the practice[3] | ← ≥ 2' |
| 1,091.75 | ft | Peak elevation of the 10-year storm event (infiltration can be used in analysis) | |
| 1,093.65 | ft | Elevation of the top of the practice | |
| YES | | 10 peak elevation ≤ Elevation of the top of the practice | ← yes |

**If a surface sand filter is proposed:**

| | | | |
|---|---|---|---|
| YES | ac | Drainage Area check. | ← < 10 ac |
| | cf | V = volume of storage[4, 5] (attach a stage-storage table) | ← ≥ 75%WQV |
| | inches | $D_{FC}$ = filter course thickness | ← 18" |
| Sheet | | Note what sheet in the plan set contains the filter course specification | |
| | Yes/No | Access grate provided? | ← yes |
| | | The filter shall not be covered in grass. What is covering the filter? | |

**If an underground sand filter is proposed:**

| | | | |
|---|---|---|---|
| YES | ac | Drainage Area check. | ← < 10 ac |
| 477 | cf | V = volume of storage[4, 5] (attach a stage-storage table) | ← ≥ 75%WQV |
| 24.0 | inches | $D_{FC}$ = filter course thickness | ← 24" |
| Sheet | | Note what sheet in the plan set contains the filter course specification | |
| Yes | Yes/No | Access grate provided? | ← yes |

**If a bioretention area is proposed:**

| | | | |
|---|---|---|---|
| YES | ac | Drainage Area no larger than 5 ac? | ← **yes** |
| | cf | V = volume of storage[4, 5] (attach a stage-storage table) | ← **≥ WQV** |
| | inches | $D_{FC}$ = filter course thickness | ← **18"** |
| Sheet | | Note what sheet in the plan set contains the filter course specification | |
| | :1 | Pond side slopes | ← **≥2:1** |
| Sheet | | Note what sheet in the plan set contains the planting plans and surface cover | |

**If porous pavement is proposed:**

| | | | |
|---|---|---|---|
| | | Type of pavement proposed (concrete? Asphalt? Pavers? Etc) | |
| | acres | $A_{SA}$ = surface area of the pervious pavement | |
| - | :1 | ratio of the contributing area to the pervious surface area | ← **5:1** |
| 3.0 | inches | $D_{FC}$ = filter course thickness | ← **12"** |
| Sheet | | Note what sheet in the plan set contains the filter course spec. | ← **304.1 sand** |

1. If the practice is a tree box filter, the drainage area shall be < 0.1 acre

2. Rate of the limiting layer (either the filter course or the underlying soil). See Vol. 2 of the NH Stormwater Manual, Ch. 2-4, for guidance on determining the infiltration rate.

3. If not within a GPA or WSIPA: SHWT/Bedrock must be at least 1 foot below the filter course material (or an underdrain must drain the SHWT to at least one foot below the filter course material). If within a GPA or WSIPA: SHWT must be at least two feet below the bottom of the practice OR the filter course material must be at least twice as thick as required and the SHWT must be at least one foot below the filter course material.

4. Volume without depending on infiltration. The storage above the filter media shall not include the volume above the outlet structure, if any.

5. The volume includes the storage above the filter but below the invert of the outlet structure (if any), the filter media voids, and the pretreatment area.

Designer's Notes:

1. Assumed the limiting layer is the sand layer which has a permeability rate (K) of 3.5 ft/day (1.75 in/hr).

2. A waterproof coating will be applied to the exterior walls of the concrete chamber.

BMP: North Infiltration Basin

$A_I$ = Impervious area draining to the practice = 0.25 ac

(Contributing watersheds: Post-Area 1)

| | |
|---|---|
| 0.24 ac | Asphalt Pavement |
| 0.01 ac | Station (roof tops and concrete foundation) |
| **0.25 ac** | **TOTAL Impervious Area Contributing to BMP: North Infiltration Basin** |

BMP: South Infiltration Basin

$A_I$ = Impervious area draining to the practice = 0.12 ac

(Contributing watersheds: Post-Area 2)

| | |
|---|---|
| 0.12 ac | Asphalt Pavement |
| **0.12 ac** | **TOTAL Impervious Area Contributing to BMP: South Infiltration Basin** |

# INFILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.05)

**Type/Node Name:** **North Infiltration Basin**

Enter the type of infiltration practice (e.g., trench) and the node name in the drainage analysis, if applicable

| | | | |
|---|---|---|---|
| ***Yes*** | | Have you reviewed Env-Wq 1508.05(a) to ensure that infiltration is allowed? | |
| 2.09 | ac | A = Area draining to the practice | |
| 0.25 | ac | $A_I$ = Impervious area draining to the practice | |
| 0.12 | decimal | I = percent impervious area draining to the practice, in decimal form | |
| 0.16 | unitless | Rv = Runoff coefficient = 0.05 + (0.9 x I) | |
| 0.33 | ac-in | WQV= 1" x Rv x A | |
| 1,195 | cf | WQV conversion (ac-in x 43,560 sf/ac x 1ft/12") | |
| 299 | cf | 25% x WQV (check calc for sediment forebay volume) | |
| Sediment Forebay | | Method of pretreatment? (not required for clean or roof runoff) | |
| 532 | cf | $V_{SED}$ = sediment forebay volume, if used for pretreatment | ← ≥ 25%WQV |
| 2,916 | cf | V = volume[1] (attach a stage-storage table) | ← ≥ WQV |
| 418 | sf | $A_{SA}$ = surface area of the bottom of the pond | |
| 5.00 | iph | $I_{DESIGN}$ = design infiltration rate[2] | |
| 16.7 | hours | $T_{DRAIN}$ = drain time = V / ($A_{SA}$ * $I_{DESIGN}$) | ← ≤ 72-hrs |
| 483.00 | feet | $E_{BTM}$ = elevation of the bottom of the practice | |
| | feet | $E_{SHWT}$ = elevation of SHWT (if none found, enter the lowest elevation of the test pit) | |
| | feet | $E_{ROCK}$ = elevation of bedrock (if none found, enter the lowest elevation of the test pit) | |
| 483.00 | feet | $D_{SHWT}$ = separation from SHWT[3] | ← ≥ *[3] |
| 483.0 | feet | $D_{ROCK}$ = separation from bedrock[3] | ← ≥ *[3] |
| | ft | $D_T$ = depth of trench, if trench proposed | ← 4 - 10 ft |
| No | Yes/No | If a trench or underground system is proposed, observation well provided | |
| N/A | | If a trench is proposed, material in trench | |
| 6" Coarse Sand | | If a basin is proposed, basin floor material | |
| Yes | Yes/No | If a basin is proposed, the perimeter should be curvilinear. | |
| 3.0 | :1 | If a basin is proposed, pond side slopes | ← ≥3:1 |
| 484.98 | ft | Peak elevation of the 10-year storm event (infiltration can be used in analysis) | |
| 486.50 | ft | Peak elevation of the 50-year storm event (infiltration can be used in analysis) | |
| 488.00 | ft | Elevation of the top of the practice (if a basin, this is the elevation of the berm) | |
| YES | | 10 peak elevation ≤ Elevation of the top of the trench? | ← yes |
| YES | | If a basin is proposed, 50-year peak elevation ≤ Elevation of berm? | ← yes |

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. See NH Stormwater Manual, Vol.2, Ch.2-4, for guidance on determining the infiltration rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.

Designer's Notes:

# INFILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.05)

**Type/Node Name:** **South Infiltration Basin**

Enter the type of infiltration practice (e.g., trench) and the node name in the drainage analysis, if applicable

| | | | |
|---|---|---|---|
| ***Yes*** | | Have you reviewed Env-Wq 1508.05(a) to ensure that infiltration is allowed? | |
| 2.10 | ac | A = Area draining to the practice | |
| 0.12 | ac | $A_I$ = Impervious area draining to the practice | |
| 0.06 | decimal | I = percent impervious area draining to the practice, in decimal form | |
| 0.10 | unitless | Rv = Runoff coefficient = 0.05 + (0.9 x I) | |
| 0.21 | ac-in | WQV= 1" x Rv x A | |
| 772 | cf | WQV conversion (ac-in x 43,560 sf/ac x 1ft/12") | |
| 193 | cf | 25% x WQV (check calc for sediment forebay volume) | |
| Sediment Forebay | | Method of pretreatment? (not required for clean or roof runoff) | |
| 229 | cf | $V_{SED}$ = sediment forebay volume, if used for pretreatment | ← ≥ 25%WQV |
| 827 | cf | V = volume[1] (attach a stage-storage table) | ← ≥ WQV |
| 90 | sf | $A_{SA}$ = surface area of the bottom of the pond | |
| 5.00 | iph | $I_{DESIGN}$ = design infiltration rate[2] | |
| 22.1 | hours | $T_{DRAIN}$ = drain time = V / ($A_{SA}$ * $I_{DESIGN}$) | ← ≤ 72-hrs |
| 480.65 | feet | $E_{BTM}$ = elevation of the bottom of the practice | |
| | feet | $E_{SHWT}$ = elevation of SHWT (if none found, enter the lowest elevation of the test pit) | |
| | feet | $E_{ROCK}$ = elevation of bedrock (if none found, enter the lowest elevation of the test pit) | |
| 480.65 | feet | $D_{SHWT}$ = separation from SHWT[3] | ← ≥ *[3] |
| 480.7 | feet | $D_{ROCK}$ = separation from bedrock[3] | ← ≥ *[3] |
| | ft | $D_T$ = depth of trench, if trench proposed | ← 4 - 10 ft |
| No | Yes/No | If a trench or underground system is proposed, observation well provided | |
| N/A | | If a trench is proposed, material in trench | |
| 6" Coarse Sand | | If a basin is proposed, basin floor material | |
| Yes | Yes/No | If a basin is proposed, the perimeter should be curvilinear. | |
| 3.0 | :1 | If a basin is proposed, pond side slopes | ← ≥3:1 |
| 480.73 | ft | Peak elevation of the 10-year storm event (infiltration can be used in analysis) | |
| 481.69 | ft | Peak elevation of the 50-year storm event (infiltration can be used in analysis) | |
| 484.15 | ft | Elevation of the top of the practice (if a basin, this is the elevation of the berm) | |
| YES | | 10 peak elevation ≤ Elevation of the top of the trench? | ← yes |
| YES | | If a basin is proposed, 50-year peak elevation ≤ Elevation of berm? | ← yes |

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. See NH Stormwater Manual, Vol.2, Ch.2-4, for guidance on determining the infiltration rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.

Designer's Notes: