**ENGINEERING AND ENVIRONMENTAL SERVICES**

***Stormwater Division***

120 East Parrish Street, 1st Floor, Durham, NC 27701

Telephone (919) 560-0739 Fax (919) 560-0740

**SAND FILTER DESIGN SUMMARY**

Stormwater Management Construction Plan Review:

A complete Stormwater management construction plan submittal includes a design summary for each Stormwater BMP, design calculations, plans and specifications showing BMP, inlet and outlet structure details.

1. **PROJECT INFORMATION**

For projects with multiple SCMs, specify which SCM this worksheet applies to:

Project Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Phase: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

PIN: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Case #: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Legal Name of Owner: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Owner Contact: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Phone: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Owner Address: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Design Contact Person: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Phone: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Detention provided for: \_\_\_\_ 1-year \_\_\_\_\_ 2-year \_\_\_\_\_ 10-year \_\_\_\_\_other\_\_\_\_\_\_\_\_\_

1. **GENERAL MINIMUM DESIGN CRITERIA FOR ALL SCMs**

**GENERAL MDC 1: SIZING**

|  |  |  |
| --- | --- | --- |
| Design storm depth |  | ft |
| Design runoff volume | | ft3 |

*(One year, 24 hour storm event)*

*(Minimum calculation of entire drainage area)***GENERAL MDC 2: CONTAMINATED SOILS**

|  |  |
| --- | --- |
| Contaminated soils within footprint? | Y / N |

*(Brownfield location?)*

**GENERAL MDC 3: SIDE SLOPES**

|  |  |
| --- | --- |
| Maximum vegetated side slopes | : 1 |

*(Maximum 3:1 vegetated slopes)*

**GENERAL MDC 4: EROSION PROTECTION**

|  |  |
| --- | --- |
| 10 year storm outlet discharge | cfs |

*(Must be non-erosive)*

**GENERAL MDC 5: EXCESS FLOW**

|  |  |  |
| --- | --- | --- |
| Emergency outlet elevation |  | ft |
| Emergency spillway width | | ft |
| Emergency spillway side slopes |  | : 1 |
| Emergency spillway slope |  | % |

**GENERAL MDC 6: DEWATERING**

|  |  |  |
| --- | --- | --- |
| Dewatering method |  |  |
| Drawdown orifice size | | in |

*(If applicable)*

**GENERAL MDC 7: MAINTENANCE ACCESS**

|  |  |  |
| --- | --- | --- |
| Maintenance access width |  | ft |
| Side slopes within maintenance access | | : 1 |
| Access extend to public right of way |  | Y / N |

*(Minimum width of 10 feet)*

*(Maximum 3:1)*

1. **DRY POND MINIMUM DESIGN CRITERIA**

**SAND FILTER MDC 1: SEPARATION FROM THE SHWT**

|  |  |  |
| --- | --- | --- |
| SHWT elevation |  | ft |
| Bottom elevation of sand filter | | ft |

*(Determined through soil tests)*

*(Minimum 1 foot above SHWT for closed systems, 2 feet for open systems)*

**SAND FILTER MDC 2: TWO CHAMBER SYSTEM**

|  |  |
| --- | --- |
| Separate sediment and sand chambers? | Y / N |

*(Storage volume in each shall be equivalent)*

**SAND FILTER MDC 3: SEDIMENT/SAND CHAMBER SIZING**

|  |  |
| --- | --- |
| Sediment chamber volume | ft3 |
| Sand chamber volume | ft3 |
| Treatment volume | ft3 |
| Total design volume | ft3 |
| Bypass device elevation | ft |

*(0.75 time the treatment volume)*

**SAND FILTER MDC 4: MAXIMUM PONDING DEPTH**

|  |  |  |
| --- | --- | --- |
| Ponding depth from top of sand to bypass |  | ft |

*(Maximum 6 feet)*

**SAND FILTER MDC 5: FLOW DISTRIBUTION**

|  |  |
| --- | --- |
| Type of distribution |  |

*(Level spreader, pipe distribution, weirs)*

**SAND FILTER MDC 6: SAND MEDIA SPECIFICATION**

|  |  |
| --- | --- |
| Drawdown time | days |

*(2-5 day drawdown to permanent pool level)*

**SAND FILTER MDC 7: MEDIA DEPTH**

|  |  |
| --- | --- |
| ASTM C33 or equivalent specified? | Y / N |

**SAND FILTER MDC 8: OUTLET**

|  |  |
| --- | --- |
| Filter bed depth | in |
| Depth of sand above underdrain | in |

*(Minimum 18 inches)*

*(Minimum 12 inches)*

**SAND FILTER MDC 9: MAINTENANCE OF MEDIA**

|  |  |
| --- | --- |
| Maintenance plan provided? | Y / N |

*(Must specifically indicate maintaining min. 2 in/hr drawdown at sand surface)*

**SAND FILTER MDC 10: CLEAN-OUT PIPES**

|  |  |
| --- | --- |
| Number of underdrain lines |  |
| Number of cleanout pipes provided |  |

*(Minimum one cleanout pipe at low point of each underdrain line required)*

1. **SAND FILTER DESIGN CHARACTERISTICS**

Sediment chamber width \_\_\_\_\_\_\_\_\_\_ ft

Sediment chamber length \_\_\_\_\_\_\_\_\_\_ ft

Sediment chamber depth \_\_\_\_\_\_\_\_\_\_ ft

Wall thickness \_\_\_\_\_\_\_\_\_\_ ft

Number of weirs \_\_\_\_\_\_\_\_\_\_ ft

Weir width \_\_\_\_\_\_\_\_\_\_ ft

10-year storm water surface elevation \_\_\_\_\_\_\_\_\_\_ ft

Outlet pipe diameter \_\_\_\_\_\_\_\_\_\_ ft

Top of sand elevation \_\_\_\_\_\_\_\_\_\_ ft

**At BMP**

1- Year 2-year 10-year \_\_\_\_\_-year

Inflow \_\_\_\_\_\_\_ cfs \_\_\_\_\_\_\_ cfs \_\_\_\_\_\_\_ cfs \_\_\_\_\_\_\_ cfs

Routed Outflow \_\_\_\_\_\_\_ cfs \_\_\_\_\_\_\_ cfs \_\_\_\_\_\_\_ cfs \_\_\_\_\_\_\_ cfs

**At Analysis Point(s) that BMP contributes to**

1- Year 2-year 10-year \_\_\_\_\_-year

Pre-development \_\_\_\_\_\_\_ cfs \_\_\_\_\_\_\_ cfs \_\_\_\_\_\_\_ cfs \_\_\_\_\_\_\_ cfs

Post-development w/o detention \_\_\_\_\_\_\_ cfs \_\_\_\_\_\_\_ cfs \_\_\_\_\_\_\_ cfs \_\_\_\_\_\_\_ cfs

With Detention \_\_\_\_\_\_\_ cfs \_\_\_\_\_\_\_ cfs \_\_\_\_\_\_\_ cfs \_\_\_\_\_\_\_ cfs

1. **REQUIRED ITEMS CHECKLIST**

The following checklist outlines design requirements. Initial in the space provided to indicate the following design requirements have been met and supporting documentation is attached.

**Applicant’s Initials**

\_\_\_\_\_\_\_\_\_\_ a. Riprap outlet protection, if provided, reduces flow to non-erosive velocities (provide calculations).

\_\_\_\_\_\_\_\_\_\_ b. Floatation calculations are provided if a closed system is designed with less than one-foot SHWT separation.

\_\_\_\_\_\_\_\_\_\_ c. The sediment chamber serves as a forebay to the sand chamber.

\_\_\_\_\_\_\_\_\_\_ d. The media in the sand filter shall be cleaned, washed, course masonry sand such as ASTM C33 or the equivalent. Sand particles shall be less than 2 mm average diameter.

\_\_\_\_\_\_\_\_\_\_ e. The sand filter drainage area is less than five acres (recommendation).

\_\_\_\_\_\_\_\_\_\_ f. Safe access is provided to facilitate cleaning and maintenance.

\_\_\_\_\_\_\_\_\_\_ g. A profile view of the sediment chamber and sand chamber are provided. Water surface elevations are shown on the profile.

\_\_\_\_\_\_\_\_\_\_ h. A plan view of the sand filter is provided with dimensions shown.

**NOTE: Executed Stormwater Facility Operations and Maintenance Permit Agreement and payment of surety are required prior to Stormwater Permit issuance.**