DINWIDDIE COUNTY

PLANNING, ZONING, CODE COMPLIANCE AND ENVIRONMENTAL

INFILTRATION PRACTICES

Site Design Checklist

Plan Name: _____ Date Submitted: _____

The following checklist only identifies the information and details that must be included in the SWM plan

Mark the appropriate BMP that is being reviewed:

☐ **Micro-Scale Infiltration (treats 250 – 2,500 sq. ft. of impervious area)**

☐ **Small-Scale Infiltration (treats 2,500 and 20,000 sq. ft. of impervious area)**

☐ **Conventional Infiltration (treats >20,000 sq. ft. of impervious area up to 100,000 sq. ft.)**

☐ **Level 1** ☐ **Level 2**

LEVEL 1 INFILTRATION PRACTICE MINMUM DESIGN CRITERIA:

The treatment volume must be calculated using the following formula: Tv = 1.0 (Rv)(A)/12 – the volume reduced by any upstream BMP	
At least 2 forms of pre-treatment must be included.	
The soil infiltration rate must be at least 0.52 in./hr. (number of infiltration rate tests depends on the scale).	
There must be at least 2 feet between the bottom of the Infiltration Practice and the seasonal high water table or bedrock.	
The treatment volume, Tv, must infiltrate within 36 – 48 hours of a storm event.	

LEVEL 2 INFILTRATION PRACTICE MINMUM DESIGN CRITERIA:

The treatment volume must be calculated using the following formula: Tv = 1.1 (Rv)(A)/12 – the volume reduced by any upstream BMP	
At least 3 forms of pre-treatment must be included.	
The soil infiltration rate must be at least 1 in./hr. and up to 4 in./hr.(number of infiltration rate tests depends on the scale).	
There must be at least 2 feet between the bottom of the Infiltration Practice and the seasonal high water table or bedrock.	
The treatment volume, Tv, must infiltrate within 36 – 48 hours of a storm event.	

MICRO-INFILTRATION PRACTICE MINMUM DESIGN CRITERIA:

The design infiltration rate must be 50% of the measured rate.	
External pre-treatments must be incorporated.	
The depth must be less than 3 feet.	
1 – 3 feet of hydraulic head must be provided.	
At least one soil infiltration test must be performed per practice, and an underdrain is required if the facility is located on marginal soils.	

SMALL-SCALE INFILTRATION PRACTICE MINMUM DESIGN CRITERIA:

The designed infiltration rate must be 50% of the measured rate.	
An observation well must be incorporated into the design.	
The depth must be less than 5 feet.	
Pre-treatment is required (acceptable pre-treatment are vegetated filter strips, grass channels, forebays, etc.	
1 – 5 feet of hydraulic head must be provided.	
At least one soil infiltration test must be performed per 1,000 sq. ft (or two per practice).	

LARGE-SCALE INFILTRATION PRACTICE MINMUM DESIGN CRITERIA:

The designed infiltration rate must be 50% of the measured rate.	
An observation well must be incorporated into the design.	
A pre-treatment cell is required.	
The depth must be less than 6 feet.	
Outflow through the underdrain, if required (qu);	
If the surface width is less than the maximum depth, a UIC permit is required.	
Provide hydraulic routing calculations;	
2 – 6 feet of hydraulic head must be provided.	
A back-up underdrain must be included in the design.	
At least one soil infiltration test must be performed per 1,000 sq. ft.	
Installation of geotextile fabric will be avoided along the bottom of the infiltration facilities and a layer of washed choker stone will be used instead.	

PLAN REQUIREMENTS:

Provide a site map identifying pertinent information regarding the Infiltration Practice:	
- The contributing drainage area (CDA) boundaries, acreage, and land cover (not to exceed 2 acres and as close to 100% impervious as possible).	
- Topography of the site area; the slope of the contributing drainage area must be no greater than 5% for surface trenches and 15% for underground trenches.	
- Provide a soil map for the site and the area of the Infiltration Practice; native soils must have a silt/ clay content of less than 40% and a clay content of less than 20%.	
- Provide soil boring/soil infiltration pit locations.	
- Provide the FEMA 100-year floodplain.	
Provide a plan view showing:	
- The layout and dimensions of the Infiltration Practice;	

PLAN REQUIREMENTS:

- The location of all conveyance system outfalls into the basin with pre-treatment and outlet protection designed in accordance with the VE&SCH;	
- Proper setbacks from building foundations, down-grade slopes, etc.;	
The infiltration basin with the following features:	
- Top of bank and basin bottom elevations;	
- Elevations of treatment volume and maximum design water surface elevations for all appropriate design storms and safety storms;	
- Side slopes (H:V) of the basin storage area and embankment (upstream and downstream slopes);	
- Sediment forebay;	
- Maintenance access to the sediment forebay and the riser structure;	
- Location of observation wells and any underdrain pipes with clean outs;	
- A 20 foot buffer strip immediately up-gradient from all trenches without grass covered surfaces.	
Provide profiles, section views, and details showing the following:	
- Pre-treatment practice;	
- Infiltration practice; a) Water surface elevations; b) Depth of practice; c) Aggregate specifications; d) Surface cover; i) Grass covered surfaces must have at least one foot of seal cover between the top of the stone and the surface. ii) Stone surfaces must contain a 3-inch layer of river stone or pea gravel along the top of the trench that is lined with filter fabric. e) Basin longitudinal slope; f) Top of dam; g) Freeboard; h) Top width; i) Principal and emergency spillway crests; j) Foundation cut off trench or key trench;	

COMPUTATIONS:

Verify that there is sufficient hydraulic head to drive flows through the facility as follows:	
- 1 to 3 feet for micro-scale infiltration	
- 1 to 5 feet for small-scale infiltration	
- 2 to 6 feet for conventional large-scale infiltration	
Verify that treatment volume will be infiltrated or drained from the facility within 36 – 48 hours.	
- A soil infiltration rate of 0.52 in./hr. minimum was used in the design.	
- A porosity value of 0.40 was used in design of the stone reservoirs (larger values can be used if perforate corrugate metal pipe, plastic pipe, concrete arch pipe, or comparable materials are to be installed within the reservoir to detain runoff).	
For micro-scale and small-scale, verify that non-erosive velocities are maintained for overland flows generated by the 2-year design storm.	
State all assumptions and coefficients used.	
Provide a stage-storage table and curve.	
Provide storm drainage and hydraulic grade calculations.	
Pre-treatment facilities must be designed so that exit velocities are non-erosive for the 2-year design storm and that they evenly distribute runoff flows across the width of the facility.	

MAINTENANCE:

Provide a summary of the long term maintenance requirements for the SWM facility on the SWM plan.	

ACCESS:

All SWM facilities shall be designed to provide the following for adequate access for maintenance activities:	
- An access area at least 20 feet in width must be provided to the SWM facility from a public road;	
- An access area 20 feet in width must be provided around the SWM facility that encompasses the highest continuous contour within the SWM facility, embankment, principal spillway outlet, emergency spillway and exit channel;	

ACCESS:

- The access areas must either be in common area or located completely on an individual lot	
- The access areas cannot contain any obstacles, or vegetation that would prevent access of maintenance equipment;	
- The access areas shall not exceed a grade or cross-slope of 12:1.;	
- The access area to the SWM facility must be constructed of load bearing materials;	
- The access area must provide sufficient turn-around area;	
- The access areas identified above must be in an easement that provides access to the County for SWM facilities located in single-family residential developments.	

LOCATION:

Infiltration trench(s) are prohibited in residential areas;	
SWM facilities cannot be located within the public right-of-way limits.	
The SWM facility must be located as follows:	
- The highest continuous contour on the inside of the SWM facility must be located at least 25’ from the ultimate right-of-way limits for non-residential projects.	
- The highest continuous contour on the inside of the SWM facility must be located outside of the front yard setback in residential development.	
- The highest continuous contour on the inside of the SWM facility must be located at least 25’ from the ultimate right-of-way in the side yard in residential development.	
- There must be a distance equivalent to the rear yard setback between the rear of the buildable area and the highest continuous contour within the SWM facility for all facilities located in the rear lots of residential development.	
- The SWM facility must be located outside of all transitional or proffered buffer areas or planting strip easements.	
- SWM facilities must be located outside of the 25-year floodplain.	
- The SWM facility must be located to the rear of all residential units or in common area that is controlled and maintained by a Homeowners Association.	
- The highest continuous contour on the inside of the SWM facility must be located at least 20’ from the principal structures in residential development where the proposed SWM facility is located to the side of the principal structure.	

CONSTRUCTION:

Provide construction notes, details, or other specifications on the plans showing that infiltration areas will be clearly marked off and remain outside of the limits of land disturbance during construction and infiltration areas will not be used during construction as sites for temporary sediment traps or basins.	
Provide construction notes specifying that the Infiltration Practice will be kept off-line until construction is complete.	
Heavy equipment and traffic are restricted from traveling over the infiltration areas to minimize soil compaction.	
The sequence of construction must require adjacent site stabilization prior to commencement of construction of the infiltration practice. The infiltration trench is not to be constructed or placed in service until all of the CDA has been stabilized and approved by the erosion and sediment control inspector for the site.	
The sequence of construction must address the SWM facility installation and appropriate inspections, including: initial site preparation, excavation/grading, and installation of the embankment, principal outlet structure, and overflow considerations. We recommend the County staff be involved in these inspections.	
The infiltration area will be flagged prior to the pre-construction meeting in order to prevent compaction.	
The sequence of construction must clearly state that a construction record drawing and certification that the stormwater management facility has been constructed in accordance with the approved plan must be submitted to the County and approved prior to Environmental Compliance Bond (ECB) release.	

Engineer Signature:_____ Date:_____