

# Options for Diffuse Flow

Annette Lucas, PE

NC Division of Energy, Mineral and Land Resources

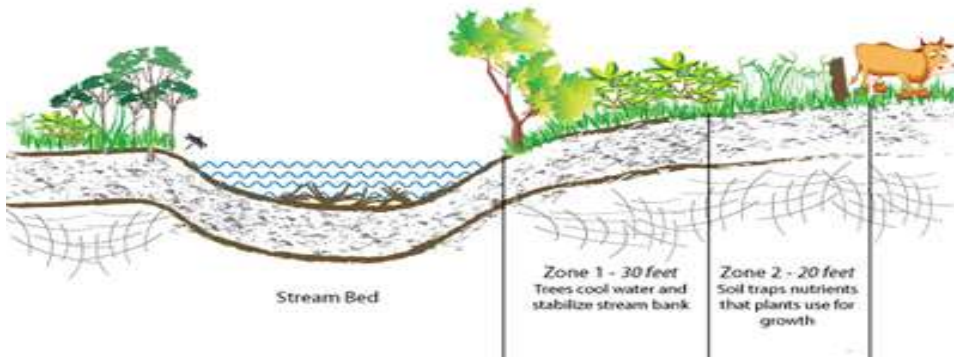
[annette.lucas@ncdenr.gov](mailto:annette.lucas@ncdenr.gov)

**It all started with the Neuse Buffer Rule...**



Diffuse flow shall be maintained in by dispersing concentrated flow and reestablishing vegetation.

- (a) Concentrated runoff from new ditches shall be converted to diffuse flow before runoff enters Zone 2.
- (b) Corrective action to restore diffuse flow shall be taken if necessary to impede the formation of erosion gullies.



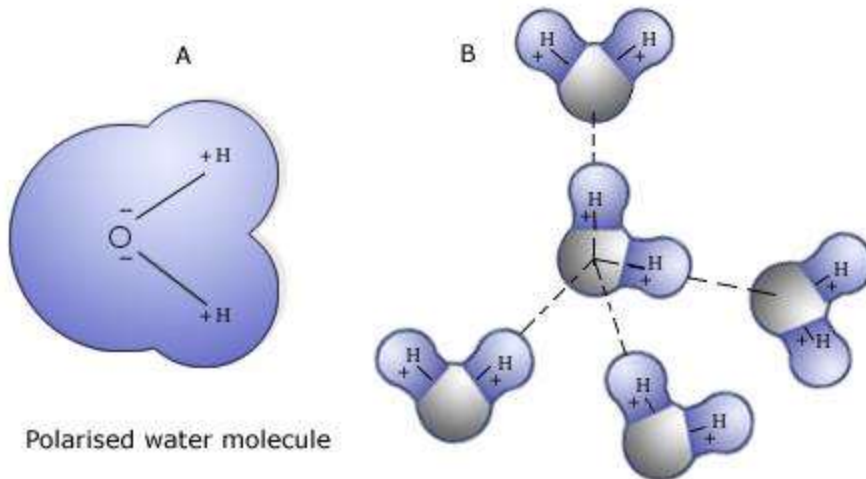
## **Definition of Diffuse Flow**

per Technical Review Workgroup, March 2014

Uniform shallow flow that is conveyed to a vegetated filter strip or stormwater control measure. The purpose of diffuse flow is to remove pollutants via infiltration and settling as well as to reduce erosion prior to stormwater reaching surface waters.

## As opposed to concentrated flow in a pipe or channel....





(A) Polarised covalent bonds link the hydrogen and oxygen atoms in a water molecule. (B) Hydrogen bonds between adjacent water molecules. Hydrogen bonds are represented in diagrams by dashed or dotted lines, and covalent bonds by solid lines.

## Options for Diffuse Flow per Technical Review Workgroup, March 2014

1. The much beloved level spreader.
2. A BMP that removes at least 30% of TN removal before it is discharging through the buffer.
3. (Low SHWT & high infiltration rate soils) Swale that infiltrates the design storm.
4. (High SHWT and/or low infiltration rate soils) Wetland swale with an outlet system.
5. (Outside SA waters & protected riparian buffers) swales that discharge less than 0.5 cfs shall be allowed to discharge through a stormwater buffer.

## Option 2: BMP that removes 30% TN



## Option 3: (Low SHWT & high infiltration rate soils) Swale that infiltrates the design storm.



**Option 3.5: (Low SHWT & poor infiltration rate soils)  
Bioswale (Bioretention swale)**



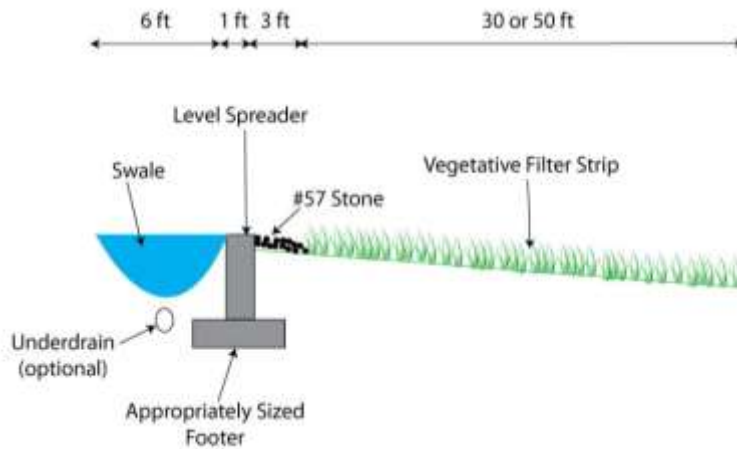
**Option 4: (High SHWT or poor infiltration rate soils)  
Wetland Swale**



**Option 5: Very small swale: Less than 0.5 cfs flow during the 1.0 inch/hour storm**



**Option 1: Back to the level spreader.....**



## Level Spreader: Three Options

1. Level Spreader-Filter Strip
2. Level spreader right next to the riparian buffer (maybe if riparian buffer slope is shallow)
3. Scour hole (maybe if the flow is small and there are not other good options)

**Level spreader option 1: LS-FS**





## Level spreader option 2: Level spreader next to riparian buffer

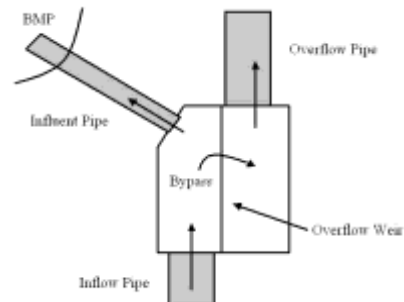


L = 10 feet per cfs for filter strip  
50 feet per cfs for natural veg



## Level Spreader

- 1.0 in/hr rainfall intensity diverted to LS
- Intensities above 1.0 in/hr sent to bypass swale or pipe
- If bypass goes through a buffer, you NEED a buffer authorization.

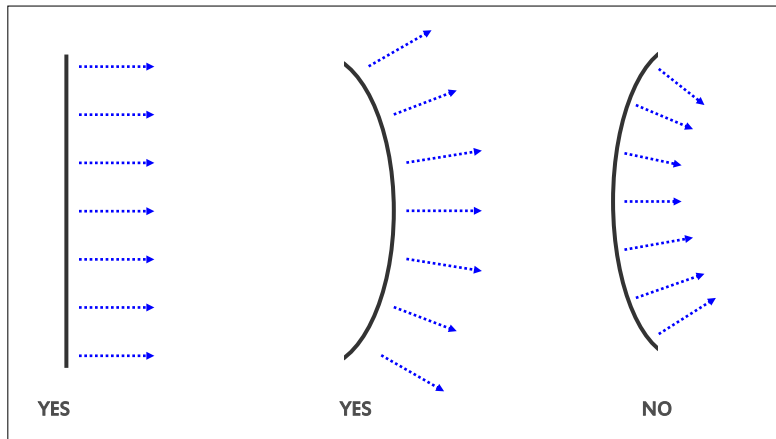


## The Blind Swale



- 1 ft deep, 6 ft wide
- Lined with grass, rip-rap, or concrete

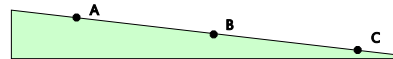
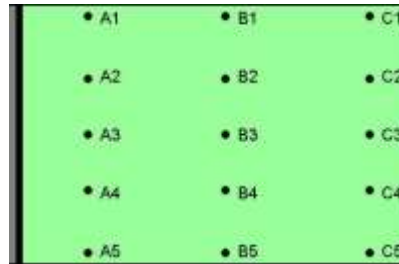
## Level Spreader Shape



## Filter Strip Specifications

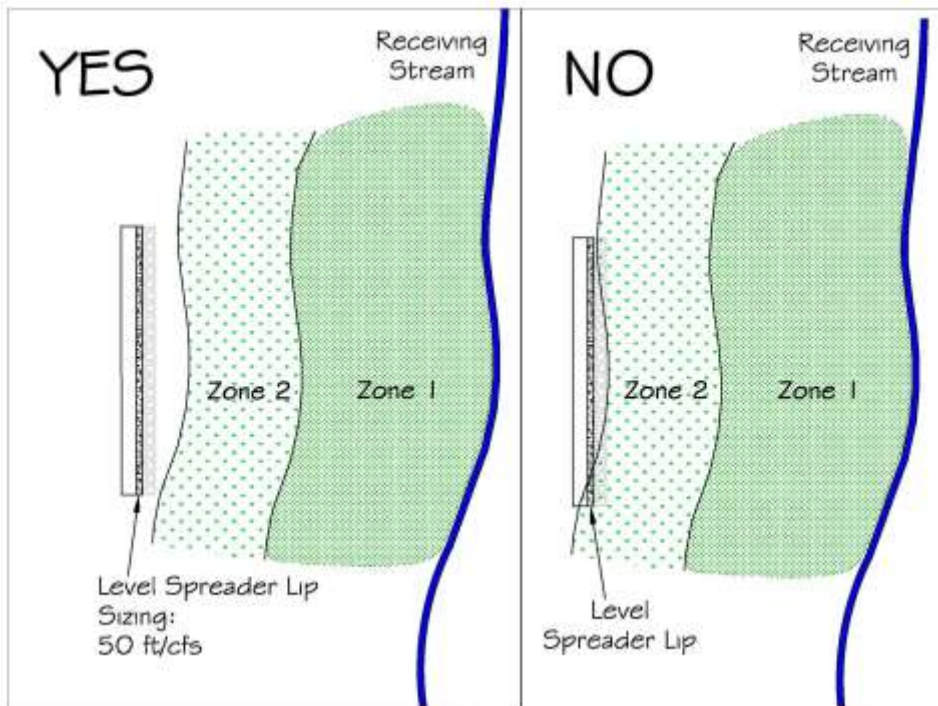
Graded to a shallow, uniform transverse slope.

Covered with six inches of topsoil and sodded with an appropriate grass species.

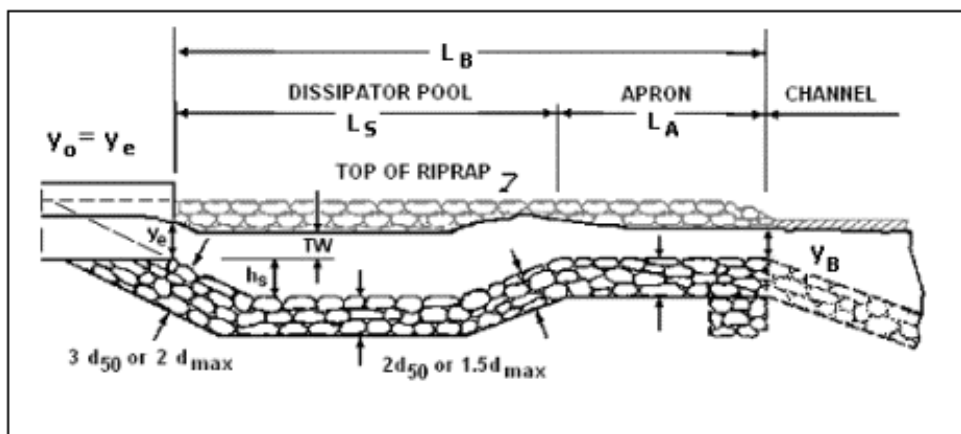


Put a level spreader next to a riparian buffer only if:  
Flow < 2 cfs AND Slope < 5%





### Preformed Scour Hole



## Use a Preformed Scour Hole when:

- The project meets nutrient loading criteria
- The flow is very small (less than 2 cfs).
- There are practical difficulties or adverse environmental risks to installing a level spreader.



## “Diffuse Flow” Provisions of Buffer Rules will be reviewed as part of the Rules Review & Re-Adoption Process



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