



## Consult the Experts

Often given the terrain of our landscapes and our clay dominant soils, you will find the need to reach out to an expert familiar with designing stormwater management features in this area of North Carolina. What type of professional you should reach out to depends on the scale and scope of the project or issue.

*My site analysis identified potential red flags in the design process. Who do I call?*

### IN THIS CHAPTER:

- When to contact an expert
- Types of experts
- Bioretention
- Permeable Surface
- Stormwater wetland

There are numerous types and levels of professionals who can provide assistance in managing stormwater on your property. These include landscaper contractors, design-build landscapers, engineers, landscape architects, environmental engineers and geotechs.

Under different circumstances you will want to contact different levels of professional. Landscape architect, engineers and geotechs, are all licensed professionals able to certify drawings. This is necessary for any situation where you need to permit the project at any level. Landscapers, landscape designers, and design-build firms can be licensed contractors, but are not typically professionally licensed.

In Appendix C we have listed a number of professionals that have experience in this work.

Bio-retentions, permeable surfaces, and stormwater wetlands are excellent stormwater management tools but they can be tricky to implement. Here we'll describe the basics of these tools. If you decide you want to use one of them we recommend seeking advice from the experts, see Appendix C for a list of applicable local contractors.

For more information contact: **RiverLink**

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# Bioretention



Bioretention areas are vegetated depressions intended to catch and filter storm-water run-off. They are constructed with plants, an underdrain system and engineered soil to improve filtration and absorption.

## Design Considerations:

- Pretreatment area optional, filter strip or forebay
- Inlet and outlet controls
- Underdrain cleanouts and maintenance
- Ponding depth 6-12", usually 6"
- Sensitive to high sedimentation rates, which can clog the system
- Small drainage areas, under 3 acres
- Effective at removing heavy metals, nitrogen, phosphorous, and pathogens.
- Call a landscape architect or engineer for assistance.



Figure 1: (top) Bio-retention area in the rain  
Figure 2: (bottom) Bio-retention under construction, white pipe is the overflow device, engineered soil mix has been placed over the underdrain system

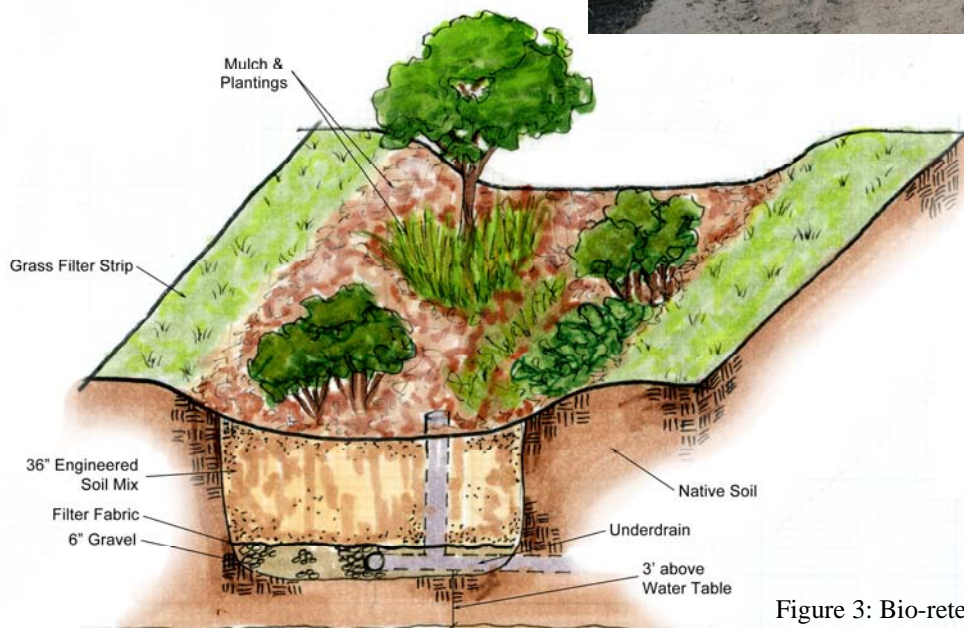


Figure 3: Bio-retention design



# Pervious pavers



Pervious pavers or porous pavement are hard or reinforced surfaces which allow for infiltration through the material. There are numerous types of pervious pavers and porous paving. Porous pavement, such as porous concrete or porous asphalt, consists of a uniform material resembles its impervious counterpart. The pavements are not typically recommended for use in this area, due to the high clay content in our soil, which limits porosity and ability for water to infiltrate.

## Design Considerations:

- Soil permeability
- Small drainage area
- Sensitive to high sedimentation rates, can clog the system
- Reduces overall runoff volume
- Variety of selection
- Contact landscapers, design build firms, landscape designers or landscape architects for assistance. Due to the potential small scale of these paving projects, landscape architects or engineers may steer you towards a designer.

Pervious pavers are suited better for this area and come in a surprising variety of materials, forms, and colors. These include: interlocking pavers, turf reinforcing, and grid pavers.

NCSU is currently testing various permeable pavements and pervious pavers to determine the best construction and use practices in this area.



Figure 2: Grass plastic grid re-inforcement  
<http://www.invisiblestructures.com/grasspave2.html>



Figure 1: Grid pavers

Figure 3: Porous Asphalt and pervious pavers





# Stormwater wetlands

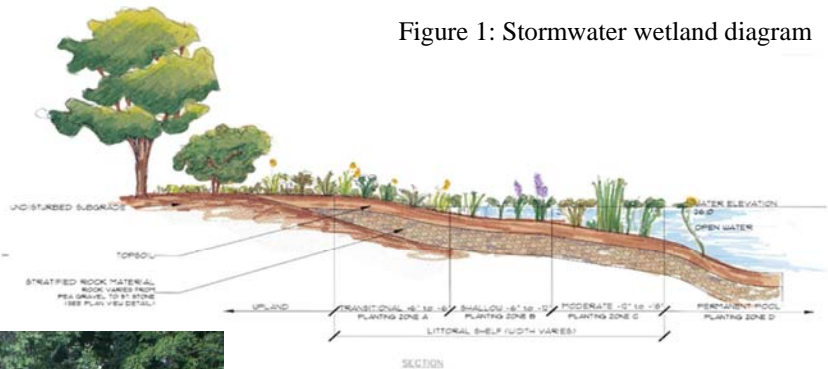


Figure 1: Stormwater wetland diagram

Figure 2: Stormwater wetland, West Asheville Park



## Design Considerations:

- Pretreatment area optional, or forebay
- Inlet and outlet controls
- Water table location
- Ponding depth 6-18"
- Often used due to poor soil permeability
- Effective at removing heavy metals, nitrogen, phosphorous, and pathogens.
- Contact landscapers, design build firms, landscape designers, engineers or landscape architects for assistance. Due to the potential small scale of these paving projects, landscape architects or engineers may steer you towards a designer.

Stormwater wetlands are constructed wetlands that are intended to trap and filter pollutants, as well as retain run-off volume. They are planted depressions which remain wet during a majority of the year. There are no drainage systems associated with the wetland, only an outfall directing water to the appropriate location if the wetlands was to fill completely.



Figure 3: Stormwater wetland, Carrier Park