

**A Different Approach to Stream Restoration for
Degraded Tributaries to Rock Creek at
Waverly-Schuylkill Neighborhood Park in Montgomery County, Maryland**





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The neighborhoods surrounding the Waverly-Schuykill Neighborhood Park were constructed after World War II during a period of significant development within Montgomery County. As part of this development, M-NCPPC acquired the land surrounding two tributaries to Rock Creek for the dual purpose of providing public land for community use and protecting the natural resources associated with the stream valleys. This development occurred prior to the advent of modern stormwater management controls, so while the riparian areas were preserved, the resource was significantly impacted by stormwater runoff from the impervious areas within this small watershed.



Aerial Map and Location Map

The 0.13 square mile (86 acre) drainage area contributing to the tributaries to Rock Creek is located in Kensington, Maryland in Montgomery County. Historic development of this watershed began in the late 19th century when Garrett Park was a small 'Railroad Station' town with a population of just over one hundred and about 30 buildings. Modern residential development continued to divide the watershed into small lots through the 1960's, and now residential home sites cover approximately 77% of the watershed. The Park is bounded by the CSX railroad track on the west, residential lots on the north and south, and Schuykill Road on the east. Within the Park boundaries, there are areas of mature forest along the right tributary and sparse forest along the left tributary, and open greenspace below the confluence.

As we have learned in recent decades, dramatic alterations in the hydrologic cycle can occur as a result of extensive land development. In a forested watershed, rainfall is partitioned between depression storage, infiltration, evapotranspiration, and runoff. As the watershed is developed, soils are compacted and impervious surfaces are introduced, which increase runoff, decrease infiltration, eliminate depression storage, and restrict evapotranspiration. In addition to generating more runoff, storm drain conveyance systems quickly drain the impervious areas. The magnitude, frequency, and total volume of runoff delivered to the receiving waters cause significant degeneration often seen in urban streams.

The Department of Parks and local residents observed the ongoing degradation of these tributaries with time, and identified the area for potential restoration in 2005. M-NCPPC retained the services of Brightwater Inc. to study the watershed and develop a restoration design that would stabilize the stream reaches, reconnect the stream to its floodplain, and improve aquatic habitat and riparian conditions within the park. The limits of the project area was defined by the outfall of each tributary from culverts under the CSX railroad upstream down through their confluence to the point where the combined tributary enters a culvert under Schuylkill Road.

When streams are severely eroded, traditional approaches to stabilization often include stabilizing in place with riprap or regrading the channel to widen the cross sections to create flood relief. While both of these approaches can reduce erosion, they have little benefits for aquatic habitat and can result in significant impacts to natural resources. For Waverly-Schuylkill, Brightwater proposed a recently developed technique of constructing a series of stepped pools, creating a wetland system to raise the stream channel up to the floodplain elevation.



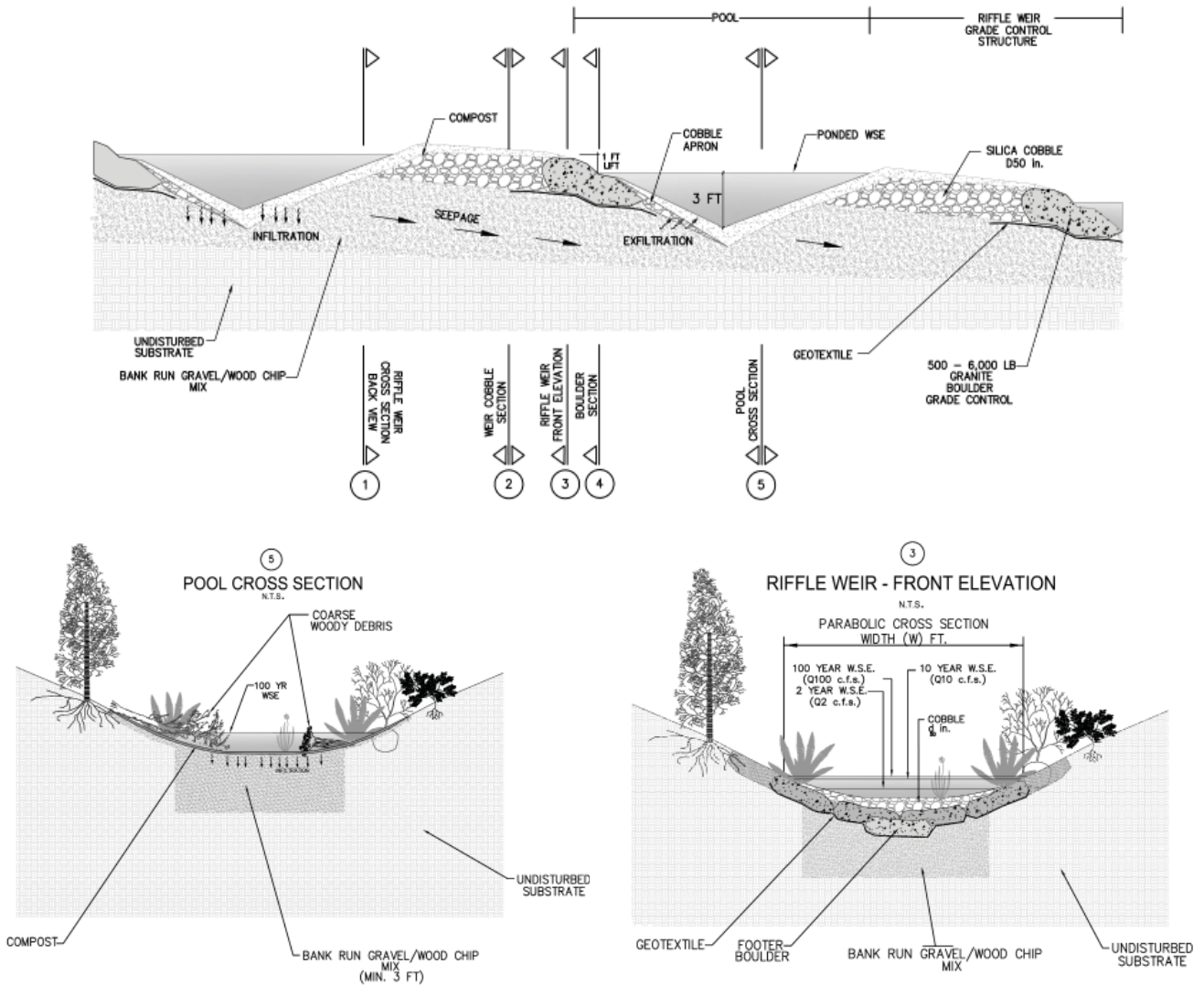
Location A: Stepped Pools under Construction Facing Upstream



Location A: Completed Stepped Pools Facing Upstream

While this approach was originally developed for the coastal plain region of Maryland, Brightwater and the Parks Department agreed it could be adapted for use in the piedmont province of Montgomery County, providing a unique approach to this problem.

TYPICAL WEIR /POOL PROFILE INDEX



Typical Construction Sections

The advantages of this approach include:

1. The stream is reconnected with its floodplain allowing normal processes of overbank flooding within a vegetated zone. This provides pollutant removal benefits while reducing shear stress within the stream channel for improved stability.
2. A seepage wetland system is created by constructing a streambed substrate of bank run gravel mixed with organic matter, capturing a portion of the runoff and allowing it to seep into the shallow groundwater, thus reducing stormwater runoff and extending the period of base flow.
3. The constructed pools retain water within the reach for extended periods of time, which allows for improved aquatic habitat and provides water access for riparian ecological systems.
4. The pools also provide volume for allowing suspended sediments to settle out and become trapped in the substrate

The Parks Department decided this project would provide an opportunity to apply this approach to stream restoration, however, it recognized that it could only work if local residents embraced the project.

Parks assembled conceptual design information and contacted community representatives to present the project. This community was well aware of the impacts of urbanization on stream systems and recognized the potential for converting this degraded gully into a natural system that could support the ecological system within their park while improving conditions within Rock Creek.

The design proceeded by creating details for reconstructing the stream channels with stepped pools created by filling the eroded channel with the gravel/woodchip mixture to develop an underlying seepage seam. The pools were built about two feet deep, enhanced with woody debris, and held in place with stone weirs and cobble aprons. The weirs were stepped down approximately one foot in elevation in order to create a more consistent slope through the project areas. The grading of the channel was adjusted to minimize impacts to natural resources while reducing construction costs. The Parks Department also required the Contractor, Meadville Land Services, to utilize low impact construction equipment for construction. Following construction, the pools and riparian areas were planted with native wetland and upland vegetation.

The community remained enthusiastic about the project throughout construction and organized a ribbon cutting ceremony at project completion. The Parks' engineers explained the design and aquatic biologists helped local children release tadpoles into the new habitat. The children also enjoyed using the stone weirs to cross the streams and explore the new wildlife. The Parks Department is currently working with the neighbors to develop interpretive signage for the project.



Photo courtesy of Randolph Civic Association



Location A : Post Construction Right Tributary Facing Downstream



Location B: Post Construction Left Tributary Facing Downstream at Wetland



Location C : Post Construction Left Tributary Facing Upstream



Location D: Pre Construction Main Stem Facing Upstream



Location D: Post Construction Main Stem Facing Upstream