

Report from Dr. John Field About the Proposed Fairfax County Parks Project

I am a former Hollin Hills resident having grown up in the neighborhood through the 1960s-70s on Brentwood Place and White Oaks Drive. Since that time, I have earned a PhD in Geoscience and spent more than 25 years as a stream restoration specialist and fluvial geomorphologist (river geologist) with work experience in 13 states and 14 other countries around the world. In fact, I'm writing now from Bangladesh where I'm overseeing bank stabilization projects on the Ganges-Brahmaputra river system, one of the largest in the world. My experience also includes numerous projects on streams as small as those in Goodman and Brickelmaier Parks. These streams I only recently learned are the focus of a stream restoration proposal put forth by Fairfax County. Big and small, I understand how rivers respond to human-induced changes in the watershed (e.g., urbanization) or directly in the channel (e.g., culverts), so I felt a sense of duty to review the proposal and offer my feedback to members of the community.

The overall objectives of the project to decrease downstream sediment and nutrient loading to Chesapeake Bay, improve habitat and water quality, and reduce potential erosion hazards are laudable and should be pursued. However, through my career I have seen many well-meaning projects not achieve their objectives and the scientific literature is unfortunately replete with documented failures of stream restoration projects. So, the question becomes: How well will the County's proposed restoration fare in meeting its objectives?"

The County's proposal is what can be described as a form-based restoration project. The concept is to stabilize the deep gullies and eroding banks by completely reshaping and realigning the channels so their form matches conditions observed along more undisturbed natural "reference" streams. Such natural streams are typically more stable with less bank erosion. Upon completion of the restoration, the County presumes that by reshaping the channel less erosion will occur and the

amount of sediment transported towards the Bay reduced. The project, however, largely leaves unaddressed the underlying causes leading to the current instability. Consequently, and as observed repeatedly on similar form-based restoration projects around the country, these types of projects tend to unravel with the streams often reverting to their unstable state. The County tacitly admits to this potential for unraveling by proposing to armor much of the bed and banks of the channel with large rock to resist these changes. Put simply, the natural “reference” conditions cannot be imposed on an altered watershed without adequately addressing the “stressors” causing the stream instabilities in the first place.

I have several additional concerns with the proposed design but want to highlight just one here. The significant alteration proposed by the County runs counter to their primary objective of decreasing downstream sediment and nutrient loading. The deep incised channels that exist along portions of the stream channels are to be partially, or in some locations, completely filled with sediment imported from offsite to depths exceeding 12 feet. In addition, new channels are to be excavated or existing channels widened, causing further landscape disturbance. The question I keep asking myself is “Why is the County proposing to import to the site in trucks large volumes of loose erodible sediment when the goal of the project is to reduce the amount of sediment available for downstream sediment transport?”. Why add sediment to reduce sediment? The proposed solution is incongruous with the stated primary project objective.

Drawing from my years of experience, I would like to suggest an alternative restoration approach that I feel could more effectively accomplish the project objectives. Using wood as a key element of stream restoration projects is gaining wider acceptance around the country, including in urban and suburban settings such as Hollin Hills. Adding significant amounts of wood to the stream channels in Goodman and Brickelmaier Parks would not only improve aquatic habitat but would also reduce stormwater flow velocities, trap sediment in the

channel, elevate the incised stream bed, and allow flood flows to once again spread out onto the floodplain currently unreachable by flows in incised portions of the streams. In other words, let wood trap and store sediment already moving downstream towards the Bay to fill the incised channels rather than importing sediment to the site. Wood can also be used to stabilize eroding banks as is already envisioned in the County's restoration plan along some banks. A number of details would need to be considered in a thorough design phase of such a project; the foremost concern would be to ensure public safety by securing and anchoring the wood in place so culverts, for example, are not plugged by logs floating downstream. These are serious issues but not insurmountable as the County's use of wood in their design proposal attests. Such wood addition projects can be completed with minimal disturbance, between standing trees, and made to look very natural.

The concept of adding wood to the streams in Goodman and Brickelmaier Parks is a potential win-win scenario. The value of wood addition in terms of reduced sediment loading to Chesapeake Bay, the major driver of the Hollins Hills restoration, could be measured in terms of volumes or pounds of sediment stored in the stream channels and on the reconnected portions of the floodplain. This metric would be similar to that used by the County to estimate how much sediment will not enter the streams from eroding banks that are to be stabilized. The County can thus continue to demonstrate to the EPA that sediment and nutrient loading downstream is being minimized while the disruption to the neighborhood and overall cost are reduced. Although the added wood will decompose over time, this can be slowed when and where rot-resistant species are used, the wood remains wet, or the wood becomes buried in the accreting sediment. The original wood installation, however, need last only long enough that vegetation becomes established on the sediment accumulating behind the log structures. This emerging vegetation represents the next generation of stability that can hold the sediment in storage and prevent its transport towards Chesapeake Bay for long periods of time. In this way, the project

becomes sustainable despite the eventual decomposition of the initial log structures.

The cost of wood additions would be significantly less than the County's form-based restoration proposal and would require much less time to complete, because the significant land disturbance and channel realignment proposed by the County would no longer be required. Perhaps most importantly, the wood needed to complete the project could be maneuvered into place by hand using grip hoists, so the need to clear a path through the parks for excavators and trucks can be eliminated. Preserving the large mature trees that make these parks, and the neighborhood as a whole, such a special place while more effectively achieving the primary objective the County has set forth is a solution I would imagine all residents of the neighborhood can support.

- Dr. John Field, PhD, PG (Maine), and former resident of Hollin Hills