Emergency Restoration to Rabbit Branch

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Over the past few months, earthmovers and construction contractors busily (and noisily) toiled near the northernmost Gainsborough Drive and Eastlake Drive intersection, in the Royal Lake Park area that was formerly Kings Park West Park. Through the Department of Public Works and Environmental Service (DPWES), these contractors worked on two emergency stream restoration projects. Most of the time, Rabbit Branch quietly meanders along this stream valley park. During storms, this creek floods so that its raging water carves significantly into the streambanks. These flood events are more frequent as absorptive forests and open residential parcels are turned into impervious surfaces—anything from house, deck, and driveway additions to expanded GMU rooftops and pavement—without sufficient water capture devices elsewhere. The biggest alarm was the hillside giving way, which exposed and collapsed the storm drain outfall (Figure 1). The creek cut either up to or under private property. Around here, huge, mature trees fell like dominos. Several hundred feet downstream, by the construction entrance, water frequently shot out of a second storm drain outfall with such force that its flow excavated a deep chasm all the way to Rabbit Branch. Report stream concerns like these to https://www.fairfaxcounty.gov/publicworks/stormwater/contact-msmd-form. Call 911 for life-threatening flood emergencies.

Figure 1. This "before" image reveals the destroyed storm drain outfall and massive erosion next to private property.

Figure 2. The "after" shot of the restored area shows a new outfall where stormwater hits stone boulders. A rock wall protects the hill from churning floodwaters. Until native restoration plants arrive, coir and straw promote grass growth that retains the soil. The county and other institutions are getting away from synthetic lawn netting since it inevitably becomes another source of plastic waste polluting the environment.

To fix these two problems, the restoration entailed several strategies, such as raising the streambed so the creek no longer funnels through a gorge, reinforcing the banks with stone or tree trunks, and redesigning the stream flow based on the direction that the waterway is already taking. It included features such as small cascades to oxygenate the water, deep pools with cooler water, and snaking routes to break swift water's momentum. Normally, stream restorations cost up to $1,000 per linear foot, but this project involved additional work, such as grading the crumpled hillside. After finishing each section, a grass species, such as annual rye, was immediately sown to stabilize the surrounding soil. The heavy work finished in mid-August. Sod was placed on the neighbors' properties along the access easement to Gainsborough Drive. Major plantings were suspended due to summer heat reducing survival rates. Extensive native reforestation involving mixes of bushes, trees, and herbaceous flowering plants tend to follow in autumn with more favorable transplant weather. These combined efforts improve the overall ecological health and reduce sediment flowing into Royal Lake. The following mini-photo essay depicts different phases of stream restoration.

Figure 3. A temporary bridge enabled earthmovers to cross Rabbit Branch and perform work upstream. Boulders on the left await placement in repairing the water's course from a storm drain outfall. Logs from fallen trees (center) will integrate into the stream bank and provide favorable habitat for aquatic life.

Figure 4. Restoration typically goes in a down-stream direction. This incomplete section shows the coir nets (1) unrolled to retain soil. Whereas the county is moving away from plastic materials in restoration projects, synthetic geofabric (2) lines the waterway bottom with boulders and pebbles on top.

Figure 5. Near the outfall, the waterway is finished. Boulders and a curved course reduce the rushing storm water's energy. The interim roadway (left) remained in use until completion of all major earthmoving activities.

Figure 6. To temporarily reduce the creek's water level for work on that stretch, a pump (left) by-passed water to a down-stream location. Daces and other minnows soon returned.

Figure 7. To help the grass grow, scattered straw on bare ground is held by a biodegradable coir net. Wooden stakes secure the net, which protrude and therefore are used away from traipsing hikers.

Figure 8. The restoration's upstream terminus (left) used modern approaches to replicate a natural creek. It is a more conducive environment for aquatic life than the gabion walls (center) to control bank erosion, which were installed decades earlier. This wall and the concrete-lined portions of creek bed with "speed bumps" (not seen here) are outdated waterway control methods.

Figure 9. The preliminary work for this stream restoration is done. A shallow streambed allows water to dissipate energy across a wide surface. Grass is already sprouting along the banks. The orange work zone fence will soon come down. After adding native plants in the cool-season months, the reforestation begins—a process that continues for many decades.

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