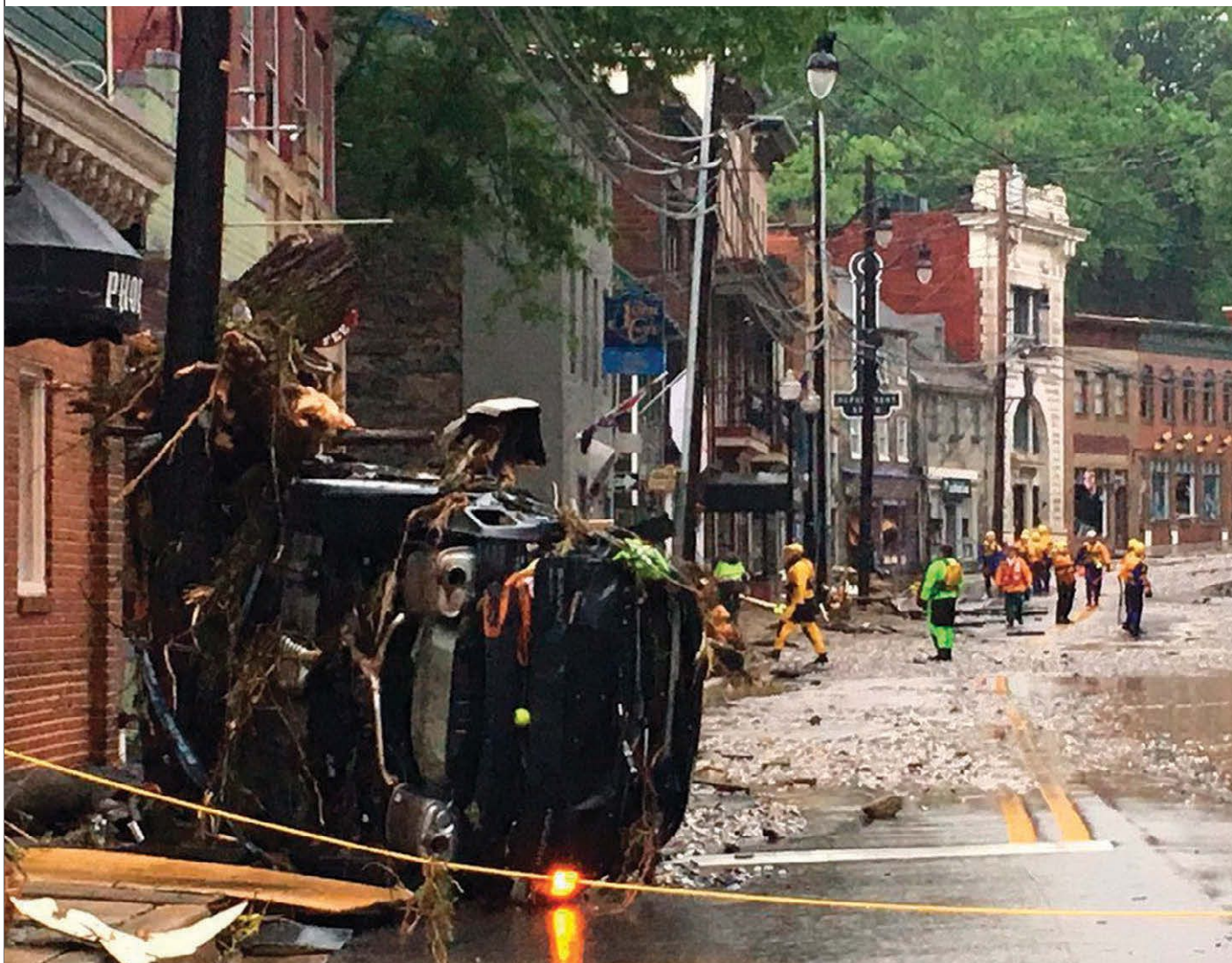


WORK IN PROGRESS



MILL TOWN PUTS PROJECTS IN THE GROUND WHILE REFINING PLANS TO PREVENT FUTURE FLOODS

By Pam McFarland in Ellicott City



AFTERMATH
Workers clean up Main Street in Ellicott City after the 2018 flood (above left). The flood roared through town in 2018 (top right), damaging streets (bottom right).



Locals have long described 1972's Hurricane Agnes as the worst storm in memory to pass through historic Ellicott City, a small mill town nestled at the convergence of the Patapsco River and three tributary streams in central Howard County, Md. A marker at the base of Main Street shows that floodwaters reached 14.5 ft during Agnes. The only other time water reached that high was in 1868, when waters from the engorged Patapsco River surged to 21.5 ft.

But two flash floods in 2016 and 2018—when

water reached 27.14 ft and 27.03 ft, respectively—eclipsed local lore and changed the focus of conversation. County officials say the 2016 storm dumped 6 in. of rain in two hours; in 2018, it was 8 in.

With climate change making more severe and frequent storms a reality, county officials have realized they need to get ahead of the next big storm.

"We recognize that storms are getting more frequent and more intense," said newly elected County Executive Calvin Ball (D) in February. "We have to be using innovative systems and solutions to address these issues. It's no longer acceptable to be reactive. We have to be proactive and be thinking," he said, adding, "Climate change is real."

Nicholas Redding, executive director of the non-profit Preservation Maryland, which has been involved in the effort to restore several of the damaged historic buildings, agrees with Ball's assessment. "The challenge of all this is we don't know when the next flood is going to hit, and they keep getting closer and closer," Redding says. "We've just never seen something like this before. ... There's no question that this is the result of our more unpredictable climate."

Because of the inevitability of another major storm, Howard County engineers have accelerated their planning and implementation timetables to try to avoid another catastrophe, using data from the two recent storm events in their modeling to better predict outcomes while moving forward with projects already on the books.

Ball and other county officials believe that although the topography of Ellicott City is fairly unique, many towns facing similar challenges could learn from how the community in Howard County has come together to be what he calls "a model for resiliency" through its flood mitigation efforts.

Construction Underway

Officials say the current plan, estimated to cost between \$114 million and \$141 million over five years, improves upon the controversial flood mitigation plan developed in 2018 under former county executive Allan Kittleman's (R) watch. Ball says the new plan will reduce flood levels on Main Street during a 100-year level storm to less than 1 ft of water, from 4.5 ft of water in the previous plan. It calls for only four historic buildings to be demolished, compared to the previous plan's 10. The plan was selected by Ball, based on public input, out of five different approaches developed by county engineers and consultants.

The current plan includes the construction of a

PHOTOS: (LEFT) LIBBY SOLOMON/THE BALTIMORE SUN VIA AP; (TOP RIGHT) TODD MARKS/VIA REUTERS; (BOTTOM RIGHT) BEN BARLOW/CROWDSPARK/NEWSCOM

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—CALVIN BALL, COUNTY EXECUTIVE OF HOWARD COUNTY

new 1,600-ft-long, 15-ft-dia conveyance tunnel just North of Main Street, 70-acre-ft and 63-acre-ft facilities to hold water during large storms, and culverts consisting of two 10-ft-dia pipes to connect the Tiber Hudson Creek to the Patapsco River.

In his fiscal 2020 capital budget, Ball requested \$15.3 million for stormwater projects. The county council approved the budget on May 29.

Several smaller, already planned projects have been completed or are underway. "These are not huge projects," says Jim Irvin, director of the county public works department. They include stream debris removal and restoration of collapsed culverts. In April, the county reopened one of the primary roads to enter the historic district after replacing an aluminum pipe culvert washed out in 2018 with a new one made up of 57 precast concrete pieces, each weighing approximately 23 tons. So far, the city has spent \$15 million on resiliency measures.

Most of the larger projects are in the early design phase, and all plans are being refined through modeling developed with the assistance of Philadelphia-based McCormick Taylor. Irvin says the county was able to use data from both the 2016 and 2018 floods and footage from video cameras set up at high-volume



HARDENING Ellicott City is replacing the aluminum culverts, like the one above, with precast concrete, one of the resiliency projects the city has undertaken.

flood areas to make more accurate projections and scenarios that could impact project designs.

Mark DeLuca, the county's deputy director of public works, says the county is also seeking the input and review of its plans from the U.S. Army Corps of Engineers.

The county plans to put out a request for proposals for the North Tunnel some time within the next year and is hopeful the entire plan can be put in place within five years.

As far as the buildings along Main Street themselves, the county has been acquiring those that need to be razed or restored. The Maryland Dept. of Housing and Community Development has agreed to pay \$700,000 for stabilization, clean-up and facade projects.

But it's too late for some businesses. Some long-time business

owners who rebuilt their storefront shops after the 2016 flood shut their doors for good after the 2018 flood. According to report released in June by an advisory group commissioned by the county's executive officer, economic activity from Main Street businesses, once a driver of the county's wealth, has languished as the stores have not been able to reopen, and tourists have stayed away.

Funnel Effect

The geography of Ellicott City is fairly unusual. The district, a roughly 4-mile area, rests in the valley between the Patapsco and Tiber rivers; many of the buildings are adjacent to and even directly straddle creeks feeding into the Patapsco. Most of the buildings were built long before modern building



codes and standards. Stormwater rules weren't established in Howard County until the 1980s.

"Ellicott City would not be built where it is today," says Chris Brooks, director of water resource engineering at McCormick Taylor, which is also assisting Howard County with design work. He says no flood plain exists, and the fact that the district is in a valley, with Main Street situated under hilly rock formations, creates a sort of funnel where water can accumulate quickly during storm events. Much of the rock on the hills is hard, nonporous granite. There simply is nowhere for excess water to go.

Although other mill towns built near or over water were not uncommon in 18th- and 19th-century America, most were not situated so

close to heavily populated areas. Ellicott City lies directly between the major cities of Baltimore and Washington, D.C., Brooks says, creating additional challenges.

Some local neighborhood and citizens' groups have contended for years that overdevelopment with new apartment and condominium complexes and suburban housing developments north of the district has contributed to Ellicott City's woes.

But not everyone buys into the idea that overdevelopment has been the leading factor in more frequent flooding.

"That's a common misconception," says Lori Lilly, executive director of EcoWorks, a local nonprofit. She cites a 2016 McCormick Taylor study that found that even if the watershed were completely undeveloped, up to 4 ft of water would have inundated the lower portion of Main Street during the 2016 flood.

Lilly's group is conducting a small study for the county using biochar as a potential water retention solution for roadways. Biochar is a charcoal material formed by combusting waste organic matter in an oxygen-limited environment.

Ongoing research at the University of Delaware has shown that adding biochar, which is highly porous, to soil on highways can reduce stormwater runoff volume on the roads by an average of 88%.

Lilly notes that biochar is not a silver bullet, but it could be part of a multifaceted approach for reducing water levels in a low-impact way.

McCormick's Brooks agrees that low-impact development can be helpful in reducing runoff, but notes "when you're dealing with six inches of rain in two hours ... you really need to be either storing or convey-

ing large quantities of water in order to be effective with a scenario like Ellicott City."

A Nation Without a Strategy

Also in May 2018, not far from Ellicott City, on Frederick Avenue in Southwest Baltimore, floodwaters reached 5 to 7 ft deep, displacing people from their homes, destroying roads and creating large sinkholes. But while Ellicott City has a relatively wealthy tax base, the community along Frederick Avenue does not, says Gerry Galloway, Glen Martin Institute professor of engineering at the University of Maryland.

Galloway says that wealthier communities tend to fare better in financing and obtaining funding for needed repairs and stormwater projects. And because smaller, economically disadvantaged communities often have more trouble paying for projects, work gets done in a piecemeal, "à la carte" fashion as funding becomes available, rather than in a more methodical, programmatic way, he says.

That said, Galloway thinks that Ellicott City is on the right track. "I think Ellicott City and Howard County are taking steps to become more resilient to floods by openly discussing challenges that exist and talking with the whole community about interim measures that that can be taken to get through floods that might occur before an ultimate solution is reached."

But until federal officials and Congress decide to develop a comprehensive approach to flood prevention, flooding will persist as a national problem, Galloway says. "We don't have a comprehensive approach to flooding in this country. We know what to do [for flood prevention, but] we lack the political will to do it. It's a thorny wicket of a problem." ■

