

# WATER TREATMENT



Mike McGrath, Director of Wastewater Treatment, explains primary treatment at a settling tank.



Overhead view of the Noman Cole plant, a poster on display there.

PHOTOS BY GLENDA BOOTH

## Down the Toilet. Down the Drain. Then What?

Locals tour the Noman Cole Plant in Lorton.

BY GLENDA C. BOOTH  
GAZETTE PACKET

In Fairfax County, one person generates 90 gallons of wastewater a day, on average. Once that water disappears down the drain or toilet, most people forget about it. It's gone.

But it's not really gone. The water and everything it carries along with it travel through underground pipes to a wastewater treatment facility, commonly called "the sewage plant."

Fairfax County, a 407-square-mile jurisdiction with 1.1 million people who flush, bathe, clean, wash and water lawns, has 3,380 miles of sanitary sewer infrastructure, including 63 pumping stations that move wastewater to five treatment plants.

On Nov. 19, officials with the county's Noman Cole Pollution Control Plant at 9399 Richmond Highway in Lorton conducted a public tour of the facility's 360 acres of grounds, buildings, streets, pipes, pumps, holding tanks, deodorizers, disinfectors, ponds and control room. They explained the five steps that clean the water before sending it into Pohick Creek, ultimately the Potomac River. Visitors studied tanks of bubbling water, some water appearing to just be sitting there and some with foamy surfaces, all steps that the initially chocolaty liquids go through in the cleanup process.

The Noman Cole plant is the only plant the county owns. Built in the 1970s, it was originally designed to handle 18 million gallons a day. Today, every day, it treats 40 million gallons, equivalent to 60 Olympic swimming pools, and can treat up to 67 million gallons



Exhibits gave visitors guidance on what not to flush.

### No-no's

Exhibits explained how to prevent backups and overflows. The drain lines from homes to the county's sewer system are only big enough to carry water, toilet paper and human waste. Here are the most common, problematic "unflushables."

- ❖ Wipes, even those labeled "flushable"
- ❖ Cotton balls and swabs, feminine hygiene products, dental floss, paper towels
- ❖ Fats, oils and grease, including oils and grease from cooking
- ❖ Medications

for its 300,000 customers. This translates into more than 420 million gallons of wastewater a year, explained Mike McGrath, the county's Director of Wastewater Treatment. These numbers represent 40 percent of the county's total wastewater flow or volume.

The Cole facility has more than 7,000 "major assets," said McGrath. The instrumentation and control system has more than 20,000 "tags." Each tag is a signal that is collected, usually multiple times a minute.



Simranjit Chauhan showed visitors felt tube liner material and described a way to replace old pipes without digging them up.

Instruments and equipment may have multiple tags. The plant operates 24 hours every day and has five backup generators for power outages.

These statistics are mind-numbing numbers, but explicit indicators of an engineering marvel that most residents take for granted. From the dirty wastewater that enters the plant, called influent, to the cleaner water that leaves, effluent, wastewater treatment is a complicated process involving biology, chemistry, engineering, technology and human expertise.

### How Wastewater Is Cleaned Up

McGrath literally and verbally walked the group through wastewater treatment stages, including what experts call "preliminary, primary, secondary and tertiary treatment." On average, depending on the distance, it takes up to five hours for a drop of water to get to the Noman Cole plant. One drop that comes in leaves the plant cleaner in about 22 hours.

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WWW.CONNECTIONNEWSPAPERS.COM



# WATER TREATMENT



Kelvin Villacourta released air from a balloon to demonstrate how a pump works to move water.



The compacted "leftovers," solid materials removed from wastewater, like plastics, fabrics and fast food wrappers.

PHOTOS BY GLENDA BOOTH



This wastewater is undergoing secondary or biological treatment using bacteria.

## Noman Cole Plant

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Raw sewage coming in is mostly water and carries items like plastics, sticks, rags, rocks, socks and even dead animals. Mechanical screens remove these objects and pumps whoosh the wastewater to clarification tanks where solid matter settles (sludge) or floats (scum).

At another stage, biological and physical methods consume and remove organic matter. The plant grows 20 tons of microbes a day to treat wastewater. Microorganisms can reduce nitrogen levels and clarifiers help remove phosphorus. A disinfection process uses ultraviolet light to kill 99 percent of the pathogens.

Visitors got a mild olfactory hit a few times – clearly not chocolate -- and McGrath offered, "We invested over \$20 million to keep the odors down." Pointing to the bio-tower, he said, "It has enormous sponges to remove odors."

The plant removes 90 percent of pollutants, McGrath noted, like pathogens. "Without adequate sewage collection and treatment, more citizens would get sick from waterborne diseases and our county's streams would be more polluted. Before the implementation of reliable drinking water and wastewater treatment, thousands of people in the United States died of waterborne diseases like cholera, dysentery, typhoid, polio and hepatitis." Decaying organics rob the water column of oxygen and suffocate fish. Solids silt up streams.

Wastewater plants in the Chesapeake Bay region target nitrogen and phosphorus for



McGrath explains the stages of wastewater treatment as visitors peered into tanks

reduction. Nitrogen and phosphorus can stimulate excessive algae which block sunlight needed by submerged aquatic vegetation (SAV). SAV beds help improve water quality and serve as fish nurseries.

Everyday, two full dump trucks haul solids in the form of ash to the I-95/Lorton landfill, the material removed from the incoming wastewater.

Plant employees conduct 25,000 tests a year to meet Clean Water Act and other requirements. For 30 years, George Mason University scientists have monitored the outgoing water at Gunston Cove and found improvements in recent years. While the

discharged water is much cleaner going out than coming in, it is not potable for humans.

### Why tour a sewage plant?

Julia Christ, an eleventh grader is studying the nitrogen cycle at West Springfield High School and wanted to learn more. Mount Vernonite Greg Crider remarked, "I was curious about how wastewater is treated. I'm impressed."

McGrath applauds the plant's staff. "Every hour of the year, the 130 or so employees at the Noman Cole plant are protecting public health and improving the environment by reclaiming clean water from sewage. Read-



A biotower, odor control technology.

## Information

Tutorial on the wastewater treatment process, U.S. Geological Survey, <https://www.usgs.gov/special-topics/water-science-school/science/visit-wastewater-treatment-plant>

Fairfax County treatment plant service areas, <https://www.fairfaxcounty.gov/publicworks/wastewater/wastewater-treatment>

ers Digest readers rank it as the second most important job in the United States."

Pointing to a pipe crammed with grayish-brown, compacted detritus removed from the wastewater, McGrath told the group, "Every month or so we get calls asking if we've found a diamond ring." And while he's proud of the plant's operations, he said with a laugh, "No, no diamond rings."



# The Potomac River Is Healing, but Problems Remain

River groups hope to open beaches for swimming along the Potomac.

BY GLENDA C. BOOTH  
THE GAZETTE

While the Potomac River is no longer “a national disgrace,” as then-President Lyndon Johnson decried in 1965, it still faces challenges, two river stewards told a July 20 gathering of 40 at Alexandria’s Athenaeum.

The river’s water quality grade rose from a D in 2010 to a B- in 2020, reported Hedrick Belin, President of the Potomac Conservancy, adding, “There is still work to do.”

Nancy Stoner, President of the Potomac Riverkeeper Network (PRK) credited the 1972 federal Clean Water Act for much of the river’s improving health and commended Alexandria for being on schedule to meet the 2025 deadline for the \$454.4 million River Renew project, an initiative designed to keep 140 million gallons of untreated sewage out of waterways each year.

### Challenges Loom

Despite some advances, “There is one glaring red mark,” Belin warned, stream-side trees. “In fact, forested buffers, as we call them, received a flat-out F in our report card,” he cautioned.

Trees, shrubs and other plants near waterways help filter out pollution, stabilize stream banks and keep streams and rivers cool in hot weather. Without riverside vegetation, silt, sediment, trash and other pollutants flow into rivers during rain storms.

“Currently there is a real supply chain issue around having enough trees to plant,” Belin said, offering two solutions. The Conservancy helped persuade the Maryland General Assembly to finance the planting of five million trees over the next 10 years and to require that at least 10 percent or half a million trees be planted in underserved communities.

This fall, the Conservancy will launch “Tomorrow’s Trees,” a program that will organize acorn and other hardwood seed collection that will then go to tree nurseries, providing what Belin called, “much needed stock. Today’s seeds will become tomorrow’s trees.”

At 18 sites, Potomac Riverkeeper volunteers monitor turbidity, pH, temperature and E. coli bacteria weekly from May to September by taking samples and analyzing them in their floating lab, the Sea Dog. Among other sites, the group collects samples at Oronoco Bay, Belle Haven Marina, Little Hunting Creek, Pohick Bay and National Harbor. Their online Swim Guide reports results for E. coli bacteria. The July 20, 2022, report found, for example, that the water at the marina “meets water quality standards,” but water quality at Little Hunting Creek, “failed to meet water quality standards.”

Showing a 1918 photo of swimmers on a three-tiered platform in Washington’s Tidal Basin, Stoner said that the network wants to make the river swimmable and to create public swimming beaches. The group’s website says that “the water is sometimes still too polluted for safe recreational use,” but asserts that some areas are “often clean enough to swim at public access points such as the Tidal Basin, Hains Point and Fletcher’s Cove.” They are advocating repeal of the District of Columbia’s swimming ban imposed in 1971.



Hedrick Belin, President of the Potomac Conservancy and Nancy Stoner, President of the Potomac Riverkeeper Network speak at the Athenaeum in Alexandria on July 20.



An Alexandria wastewater official explains the River-Renew project to keep untreated sewage out of area waterways.



On July 14, AlexRenew introduced the public to the German-made tunnel boring machine which they named “Hazel.”



A forum on the health of the Potomac River at the Athenaeum in Alexandria on July 20.



On July 14, Alexandria Mayor Justin Wilson christened Hazel by breaking a bottle of treated wastewater on the machine.



Paddlers on the Potomac River



Group paddling at Key Bridge.



Historic photo from the Tidal Basin

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She showed a slide identifying six possible sites for swimming beaches in the Washington region. In Virginia, possible sites are Jones Point Park, an area just north of Belle Haven Park and Gravelly Point Park. Site selection criteria include good water quality and publicly-owned lands, Stoner said in a follow-up call. The PRK released a swimmable Potomac report on July 23.

Water warmer, Stoner said, and warmer waters hold less dissolved oxygen which can harm fish and other aquatic species.

Belin also said that the warming atmosphere is bringing more extreme weather and flooding to the region. More severe storms dump more sediment and pollution into rivers. Droughts are becoming longer. A



Map of potential public beaches

Both speakers cited a warming planet as a serious threat. Rising temperatures make

### Will We Swim in “Bathwater”?

Both speakers cited a warming planet as a serious threat. Rising temperatures make

Conservancy 2021 report titled “Rising to the Challenge” examines what the warming climate means for the Potomac and the Washington, D.C., area.

The report says, “Washington, D.C., is coming off its hottest decade on record (2011-2019) and temperature rises have been observed in every state within the Potomac River watershed.” The study predicted that by 2080, “the number of days when the heat index tops 95 degrees Fahrenheit in the nation’s capital may double by mid-century and triple by 2080.”

During a July 2019 heat wave, “the Potomac River felt like bath water,” said the report, with a record water temperature of 94

degrees Fahrenheit at Little Falls.

Belin also said that the Potomac “has risen almost a foot in the last century, and it’s expected to rise another three feet by 2080.”

The Conservancy has enlisted the University of Maryland’s Dr. Sacoby Wilson to help address environmental justice concerns, Belin said. Wilson has written that racially-discriminatory housing practices, called “redlining,” have resulted in lower-income communities having fewer ecological amenities like tree canopy and green spaces, and more impervious surfaces which absorb and re-release heat. One study found an eight-degree temperature difference between redlined versus non-redlined areas.

Stoner urged cooperation. “We’re proud of what we’ve accomplished and if we continue to work together, we’ll have a cleaner river that everyone can enjoy,” she said.

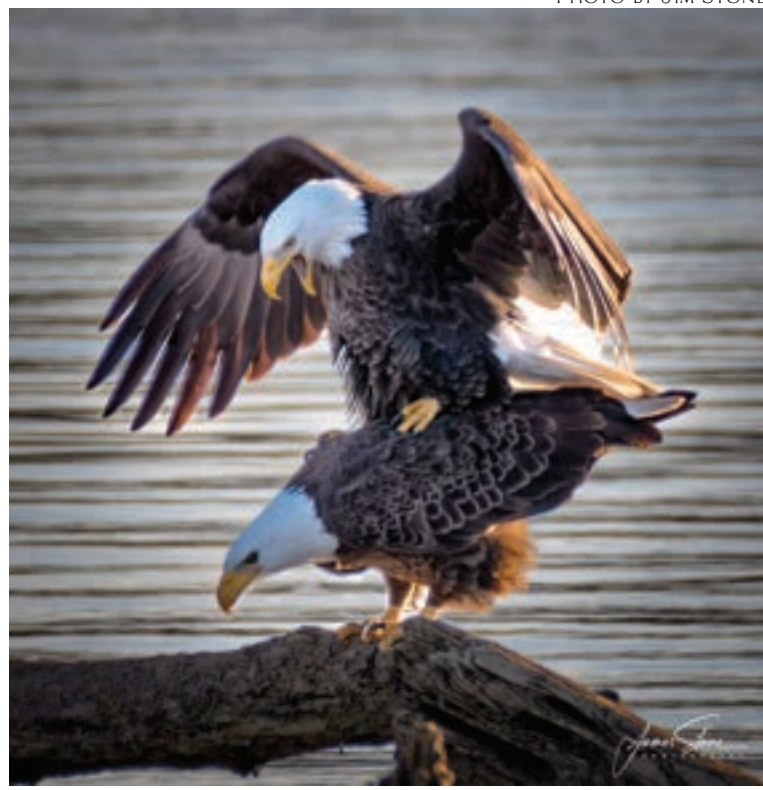
The event also featured an art show titled “Potomac River Life” with 40 local artists participating and proceeds going to the artists and the Riverkeeper organization. The exhibit catalog is here: <https://www.nvfaa.org/potomac-river-life-catalog>.

Information:  
Potomac Conservancy, [www.potomac.org](http://www.potomac.org);  
[www.swimguide.org](http://www.swimguide.org)  
Potomac Riverkeeper Network, <https://www.potomacriverkeepernetwork.org/>





Bald eagle nest in Dyke Marsh.



Bald eagles mating.

PHOTOS BY GLENDA BOOTH

# Bald Eagles Are Thriving but Face Challenges

BY GLENDA C. BOOTH  
MOUNT VERNON GAZETTE

“Virginia’s tidal rivers are just loaded with bald eagles,” Jeff Cooper told 210 people attending the March 2 meeting of the Friends of Dyke Marsh. These large raptors with an 80-inch wingspan regularly breed, nest, forage and migrate on and near rivers like the Potomac. People see bald eagles frequently at Dyke Marsh, Mason Neck and Fort Belvoir. Cooper is wildlife biologist with the Virginia Department of Wildlife Resources and has worked with birds for over 30 years and co-authored 17 papers.

In and around Dyke Marsh and Mason Neck, there are nests every half mile or so because there’s so much food available, he said. In recent years, Dyke Marsh has had three active bald eagle nests.

Bald eagles feed mainly on fish which they catch with their sharp yellow talons. “They make their living with their feet. Virginia is rich in aquatic resources,” Cooper said. When an eagle pair raises their young, they forage near their nest, so eaglets’ success is highly contingent on habitat quality, Cooper said. Bald eagles are highly territorial and mate for life.

The Potomac and James Rivers consistently see high use by migrant and “local” eagles, breeding pairs, offspring and all age classes. From Dyke Marsh south to where route 301 crosses the Rappahannock River is what wildlife biologists call a “bald eagle concentration area.” The area also

has non-paired, adult bald eagles called “floaters,” birds constantly roaming the landscape trying to find mates. Floater numbers are increasing because the area is so saturated with breeding pairs.

The Chesapeake Bay is the epicenter of eagle conservation, having the densest breeding population in the lower 48 states and a critical stop on the Atlantic flyway, and northern and southern populations rely on the Bay for winter or summer habitat.

“What happens in the Bay has an impact,” Cooper said.

Belle View resident Carolyn Gamble commented, “Jeff Cooper’s talk opened my eyes to how much bald eagles depend on our stretch of the Potomac River as well as the entire Bay area. I enjoyed learning from someone with many years of ‘hands-on’ experience and have a greater appreciation for the DWR’s research.”

## Tagging and Tracking Eagles

Cooper and his colleagues tag bald eagles in Virginia’s coastal plain, generally east of Interstate 95. In 2007, they started tagging with cellular transmitters to trace the birds’ movements. He has tagged over 130 bald eagles and over 40 golden eagles. Golden eagles are found in mountainous regions. Adults are dark brown all over with a golden sheen on their neck and head visible from some angles. Like bald eagles, they have a powerful beak and talons.

To capture an eagle, Cooper puts out road-kill deer and he hides; when the eagle feeds on the bait, Cooper shoots a 40-by-



Jeff Cooper holding a bald eagle at Rappahannock River National Wildlife Refuge.



Jeff Cooper measures eagles’ beaks. Here, Sandy Spencer holds the eagle, caught at Virginia’s Rappahannock River National Wildlife Refuge.

60-foot, rocket-powered net over the birds. He also uses a bow net with a leather trigger and at times to snare an eagle, puts foam in a gizzard shad to make the fish float. For most eagles, he takes measurements and blood samples, bands them and attaches a transmitter on the eagle’s back.

The process takes from 35 minutes to one hour.

To count nestlings and check their health, he climbs trees like an arborist. “I was put in the emergency room a few times because of eagle claws,” he snickered.

## Challenges

Lead levels in both eagle species are a serious threat today. Cooper cited a February paper by Vince Slabe and others with Conservation Science Global which found that nearly half of bald and golden eagles tested between 2010 and 2018 in the U. S. show signs of chronic lead poisoning. This was the first study to sample eagles across the entire country. Eagles scavenge and ingest spent lead ammunition from carcasses and gut piles left by hunters. “Chronic poisoning suggests repeated expo-

sure to lead over the long term,” the authors wrote. Lead poisoning can make birds weak, emaciated and uncoordinated, thus less able to evade predators and dangers. The study, published in Science, is at <https://www.science.org/stoken/author-tokens/ST-344/full>.

Collisions with both civilian and military aircraft are another threat. Cooper called Virginia and Florida “hotspots” for eagle-aircraft strikes. Most airports are located in prime eagle habitats because they are near water. Eagles are



# Bald Eagles Are Thriving but Face Challenges

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“big birds,” Cooper said, and have crashed through cockpits. In the Chesapeake Bay region, there were seven airstrikes between 1990 to 2009, 18 from 2010 to 2015, and some are not reported. Cooper is working with Langley Air Force Base in Hampton, Virginia, where between 2013 to 2020, he tagged over 130 eagles with cellular transmitters for an aircraft strike study.

## Back from the Brink

*Haliaeetus leucocephalus*, the bald eagle, was once headed for extinction in the lower 48 states. In 1963, only 417 nesting pairs were documented. Scientists attribute their decline to DDT and other compounds in pesticides that moved up the food chain and made eggshells so thin that chicks failed to hatch. In 1967, the U.S. Fish and Wildlife Service (FWS) put the bald eagle on the endangered species list. In 1972, Congress banned DDT and bald eagle population numbers started to rise. In 2007, FWS removed bald eagles from the endangered species list. Since 1977, Virginia’s breeding population has increased ten-fold, says William and Mary’s Center for Conservation Biology website.

Mount Vernonite Greg Cridler promoted the talk among his friends and neighbors and found it “very informative and interesting. Apparently, the characteristics of



Jeff Cooper puts metal bands on eagles’ ankles.



Jeff Cooper releasing the bald eagle.

PHOTOS BY GLENDA BOOTH

our area are the most attractive on the east coast which is why we are seeing more bald eagles,” he said.

You can view the presentation at

[www.fodm.org](http://www.fodm.org). Cosponsors of the meeting were the Audubon Society of Northern Virginia, the Northern Virginia Bird Club, the Friends of

Huntley Meadows Park and the Friends of Mason Neck State Park. Several live cameras monitor bald eagle nests, including nests at

the National Arboretum, <https://naeaglecam.org>, and the Dulles Greenway, <http://www.dullesgreenway.com/eagle-cam/>.

## BULLETIN BOARD

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needs volunteer advocates for residents in nursing homes and assisted living facilities. Contact Lisa Callahan at 703-324-5861, TTY 711 or email [Lisa.Callahan@fairfaxcounty.gov](mailto:Lisa.Callahan@fairfaxcounty.gov).

Respite Care volunteers give family caregivers of a frail older adult a break so they can go shopping, attend a doctor’s appointment or just have coffee with a friend. Volunteers visit and oversee the safety of the older adult for a few hours each month. Support and training are provided. Contact Kristin Martin at 703-324-7577, TTY 711, or [Kristin.Martin@fairfaxcounty.gov](mailto:Kristin.Martin@fairfaxcounty.gov).

Fairfax County needs volunteers to drive older adults to medical appointments and wellness programs. For these and other volunteer opportunities, call 703-324-5406, TTY 711 or visit [www.fairfaxcounty.gov/olderadults](http://www.fairfaxcounty.gov/olderadults) and click on Volunteer Solutions.

The Gum Springs Senior Program in Alexandria is looking for a Line Dance Instructor. For these and other volunteer

opportunities, call 703-324-5406, TTY 711 or visit [www.fairfaxcounty.gov/olderadults](http://www.fairfaxcounty.gov/olderadults) and click on Volunteer Solutions.

The Kingstowne Center for Active Adults in Alexandria needs Instructors for the following classes: Country-Western Line Dance, Hula Hoop and African Style Dance. For these and other volunteer opportunities, call 703-324-5406, TTY 711 or visit [www.fairfaxcounty.gov/olderadults](http://www.fairfaxcounty.gov/olderadults) and click on Volunteer Solutions.

The Hollin Hall Senior Center in Alexandria needs instructors for the following classes: Basic Woodworking, Italian and Ballroom Dance. For these and other volunteer opportunities, call 703-324-5406, TTY 711 or visit [www.fairfaxcounty.gov/olderadults](http://www.fairfaxcounty.gov/olderadults) and click on Volunteer Solutions.

The Mount Vernon Adult Day Health Care Center in Alexandria needs front desk volunteers and patient Card Players. For these and other volunteer opportunities, call 703-324-5406, TTY 711 or visit [www.fairfaxcounty.gov/olderadults](http://www.fairfaxcounty.gov/olderadults) and click on Volunteer Solutions.

The Advisory Board of the Joe and Fredona Gartlan Center for mental health is looking for volunteers.

The board meets the second Tuesday of the month from 9-11 a.m. at Gartlan Center 8119 Holland Road.

Mount Vernon At Home is a community Village, providing support, services, and community to seniors in the area. Volunteers are needed for a variety of services, with transportation to medical appointments are greatest need. They can also use help with in-home handyman work and handling IT problems. If you are interested in volunteering, contact us at [info@mountvernonathome.org](mailto:info@mountvernonathome.org) or call 703-303-4060.

Volunteer Advocates for Nursing Home & Assisted Living Residents needed throughout Northern Virginia. Contact the Northern Virginia Long-Term Care Ombudsman Program at [www.fairfaxcounty.gov/dfs/olderadultservices/ltoombudsman/](http://www.fairfaxcounty.gov/dfs/olderadultservices/ltoombudsman/), or email [Lisa.Callahan@fairfaxcounty.gov](mailto:Lisa.Callahan@fairfaxcounty.gov) or call 703-324-5861, TTY 711.

Hollin Hall Senior Center is looking for a DJ ballroom and dance instructor. The Hollin Hall Senior Center, 1500 Shenandoah Road. The Mount Vernon Adult Day Health Care Center is looking for social companions for participants on Fridays from 3-5 p.m. and front desk volunteers on Tuesdays and

Wednesdays from 11 a.m.-noon and 3:30-4:30 p.m. Located at 8350 Richmond Highway. For these and other volunteer opportunities call 703-324-5406 or visit [www.fairfaxcounty.gov/olderadults](http://www.fairfaxcounty.gov/olderadults).

<cal1>Ongoing

<cal2>Mobile DMV. 9 a.m.-4 p.m. at Sherwood Hall Library. Two programs, DMV Connect and DMV 2 GO, will provide full DMV service to the Route 1 area. At the Sherwood Hall service centers, customers can apply or renew their ID cards, drivers licenses, take road and knowledge tests, apply for special ID cards, get copies of their driving records, obtain vehicle titles, license plates, decals and transcripts, order disabled parking placards or plates, purchase an EZ-Pass transponder and more. A full list of services is available at [www.dmv.virginia.gov](http://www.dmv.virginia.gov).

Art Making as Meditation. 7-8:30 p.m. St. Aidan’s Episcopal Church, 8531 Riverside Road. Art making as meditation can be an active form of contemplative practice. Each session begins with a short reading and a brief introduction to materials. Silence for making and meditation lasts an hour followed

by sharing images or insights gained through the process, if desired. Children able to participate in silence are welcome to come with a parent’s quiet supervision. RSVP not necessary for attendance, but helpful for planning purposes. Call 703-360-4220, email [info@centerforspiritualdeepening.org](mailto:info@centerforspiritualdeepening.org) or visit [www.staidansepiscopal.com/Center-for-Spiritual-Deepening](http://www.staidansepiscopal.com/Center-for-Spiritual-Deepening).

Mount Vernon Preservation Challenge. George Washington’s Mount Vernon has embarked upon a special year-end fundraising campaign that will help ensure the ongoing preservation of the estate of this nation’s first president. As the country’s most popular historic home, Mount Vernon does not accept government funding, instead relying upon donations from patriotic individuals and organizations. Through the Preservation Challenge, Mount Vernon hopes to raise enough money to perform critical repairs and restoration work on original structures located in the historic area. The funds SEE BULLETIN, PAGE 13