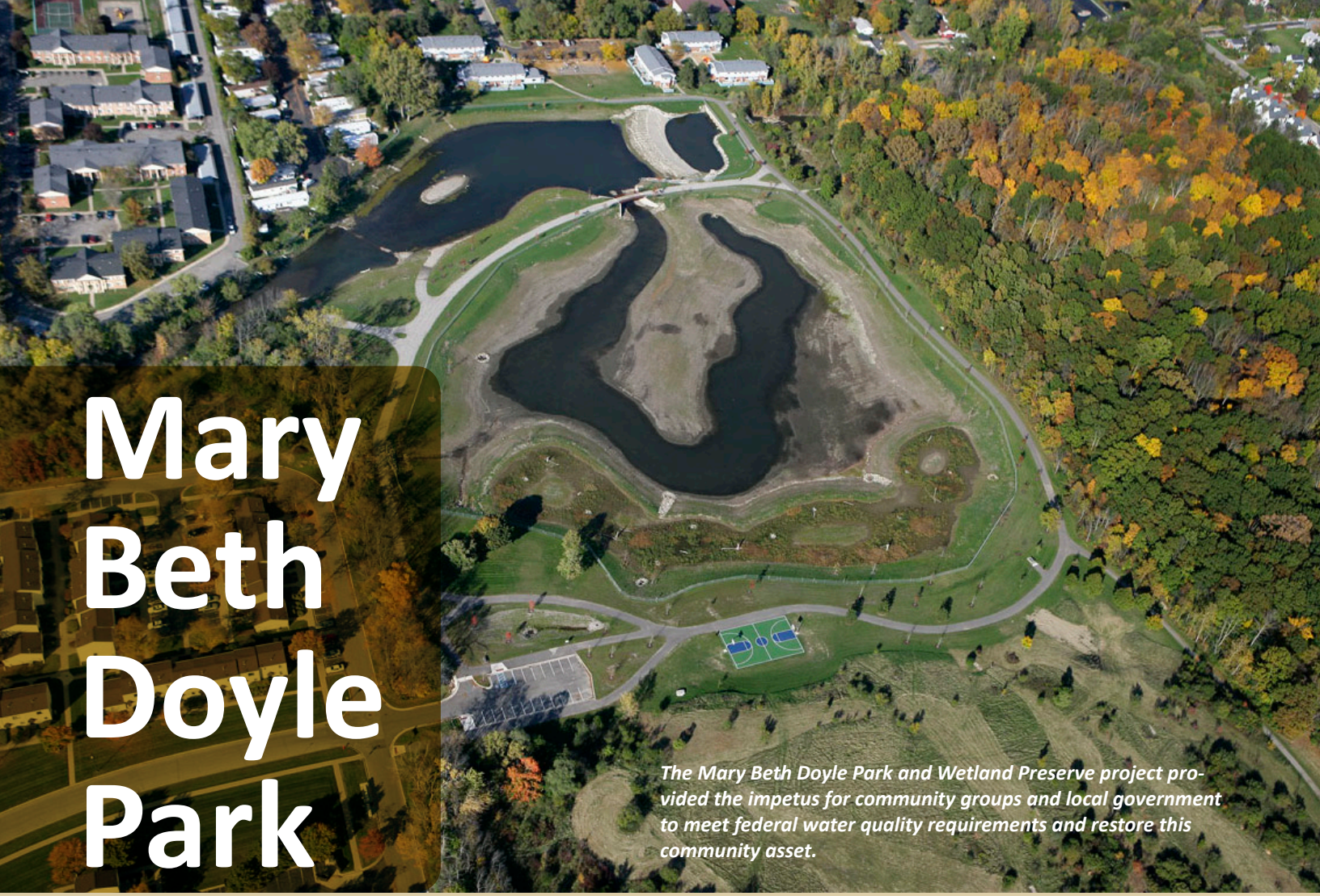
Mary Beth Doyle Park



The Mary Beth Doyle Park and Wetland Preserve project provided the impetus for community groups and local government to meet federal water quality requirements and restore this community asset.

By: Erin Hart, CDM and Janis Bobrin, Washtenaw County Water Resources Commissioner

The late Mary Beth Doyle and the Washtenaw County Water Resources Commissioner (WCWRC), Janis Bobrin, have something in common: both made careers of protecting the environment. So, when the opportunity arose to modify a storm water control pond at the Mary Beth Doyle Park and Wetland Preserve (formerly Brown Park) the WCWRC office jumped at the chance. They wanted modifications that would improve water quality and habitat, while also protect Malletts Creek and ultimately the Huron River from harmful pollutants,

"We spent a number of years strategizing on how best to restore Malletts Creek and reduce phosphorus discharge to the Huron River – particularly because of mandates under the Clean Water Act," said Bobrin. "This was a great opportunity for community groups and local government to both meet federal water quality requirements and restore this community asset."

Project Background

Mary Beth Doyle Park is located in Ann Arbor alongside Malletts Creek, a tributary to the Huron River. The Park's storm water control pond was originally constructed in 1977 to protect downstream areas from flooding during heavy storms. Excessive sedimentation in the permanent pool left it with no capability to control smaller storms. The pond offered very little non-point source control, particularly for phosphorus as required by the Huron River Total Maximum Daily Load (TMDL). Additionally, flashy flows from medium-sized storms were eroding stream banks downstream from the site.

In 1999, the WCWRC prepared a restoration plan for revitalizing the Malletts Creek watershed that included the Mary Beth Doyle Park storm water pond. Sampling indicated that 97% of the 4,000 pounds of

phosphorus entering the Huron River annually does so during wet weather, and was strongly correlated to total suspended solids. The phosphorus load contributed to algae blooms in downstream Ford Lake and prevented recreational use. Wildlife habitats were degraded and fish kills were common.

Mary Beth Doyle Park offered a tremendous opportunity to improve water quality. The restoration plan determined that 25% phosphorus load mitigation could be achieved in the creek by retrofitting the existing pond to enhance its water quality treatment capabilities. Such a project would be a large stride toward fulfilling the TMDL within this basin.

"It is very difficult to remove phosphorus if it's dissolved," said Harry Sheehan, the WCWRC Environmental Manager in charge of this project, "but we were encouraged by the phosphorus sampling results because it told us we could make a significant impact." Once the WCWRC secured 319 funding for design, a team led by CDM Michigan Inc. was retained to design this capstone of the Malletts Creek restoration effort.

A Complex Redesign

WCWRC's original plan was to remove the impoundment at the park, re-engineer a free-flowing channel and provide side-stream storage in an extended detention wetland. This would have eliminated the thermal impact of the permanent pool and potentially provide upstream fish habitat. However, any new control structure would have to retain the original flood control functionality and not affect the 100-year floodplain elevation. The task was complex.

"The DNR (Department of Natural Resources) assessment showed that there would be no significant benefit to fish habitat by removing the original impoundment," said Sheehan. "It was suggested that we keep the outlet as designed, downsize the pond to act as a forebay and engineer a water quality wetland within the margins of the existing flood control facility."

CDM re-designed the 15-acre impoundment, removing and disposing of 31,000 cubic yards of contaminated sediment; building a temporary stream diversion to allow construction of a sediment forebay, embankment dam and weirs; modifying the existing outlet structure; and landscaping. One design element involved floodproofing some areas within the floodplain. This was achieved by installing an earthen barrier that raised grades on the elevated side of the park.

Design Innovations

To limit concrete use and conform to site contours, a 200-foot-long embankment dam was constructed with mattresses of articulated concrete blocks. The material is designed to withstand the highly erosive velocities of overtopping events that occur several times per year due to heavy rain, while also allowing vegetation to take root between the blocks. The same material was used for two small weirs, forming the upstream and downstream limits of the forebay.

Because an accurate quantity of contaminated sediment could not be determined without extensive field work, the project bid form included a price-per-in-situ-cubic-yard of sediment removed and disposed. New laser scan technology was employed to simplify measuring and paying for sediment removal and disposal. Laser scans were used to construct high-resolution topographic maps of the dewatered impoundment before and after sediment removal. The volume of sediment removed was determined through integration of the elevation difference between these two maps, thus eliminating the need for the owner's representative to track the weight or volume of trucks leaving the site.

The contractor graded the entire project site to sculpt a more natural form. To accomplish this, the contractor used a digital map of the required elevations together with high-accuracy GPS equipment mounted on the blade of the bulldozer. This technology provided a

Avian habitat has dramatically improved around the wetland

continuous readout of location and elevation that was invaluable in effectively grading the site.

Re-Establishing a Wetland

An added challenge to the design process was a regulatory requirement to replace wetlands that had developed in the flood control facility that would be impacted by the retrofit. This would require establishing a separate mitigation wetland within the reconstructed site.

To address this, the CDM team created a "perched" mitigation wetland within a larger wetlands preserve. Although some storage was lost, the lower extended detention basin still provides 15 million gallons of storage and treatment capacity. Constructed much like a giant rain garden, the extended detention wetland is planted with native, deep-rooted herbs and grasses that temporarily impede and clean storm water.

"No one had created a wetlands project with such a large fluctuation in water levels, but the sheer volume of runoff compared to the available land required pushing the limits of plant tolerance," said Ed Kluitenberg, CDM Michigan Inc. project manager. "Establishing vegetation in that setting was challenging as, during very large storms, water levels can rise six feet in just a few hours. There can also be several feet of depth variation during medium-sized storms, so there are a limited number of plants that can be established and survive in that environment."

Funding Facts

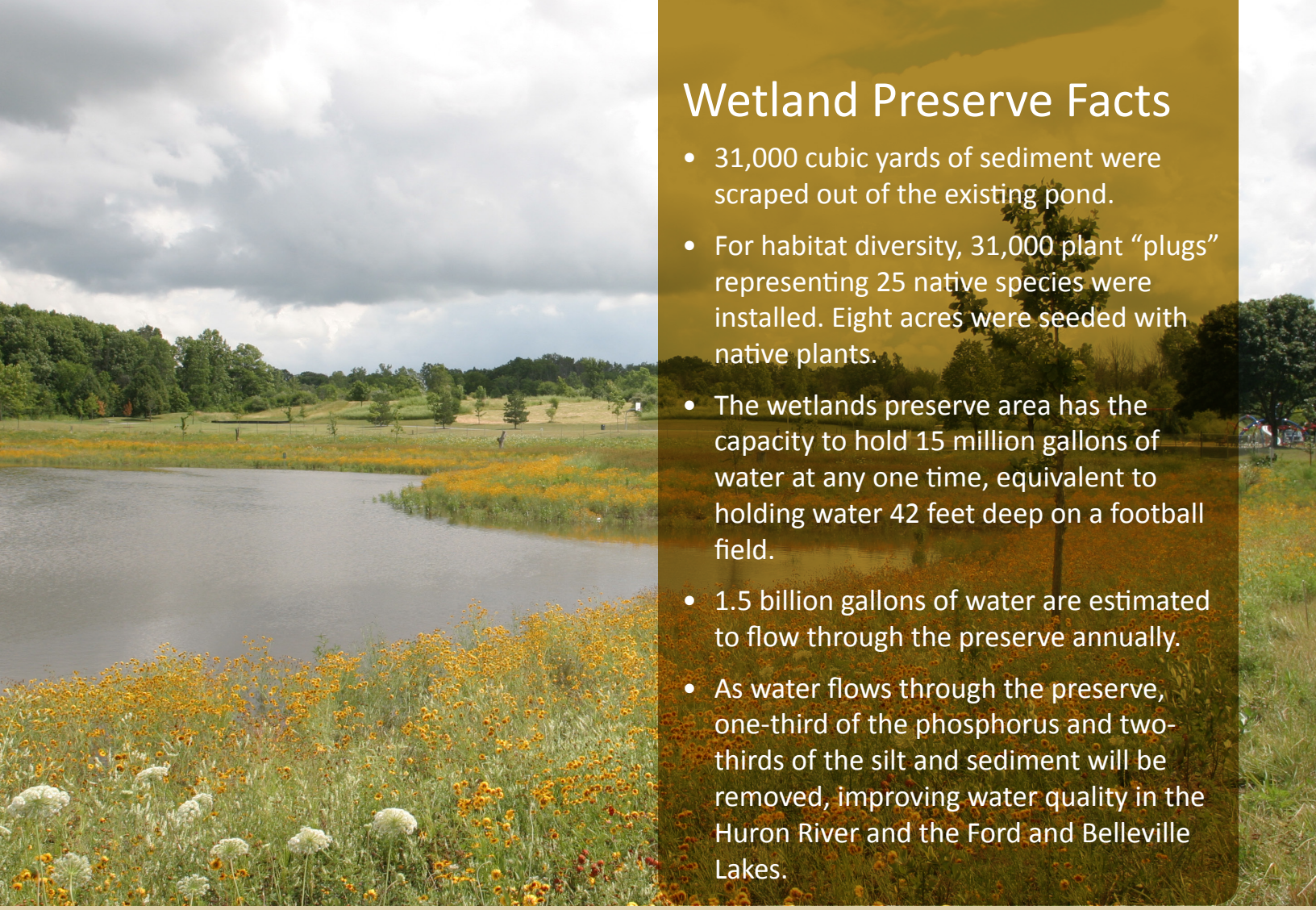
- $1.25 million grant from the Michigan Clean Michigan Initiative – the largest award given
- $2.18 million from the State Revolving Fund
- First storm water project in Michigan to receive a low-interest State Revolving Fund loan

Sheehan agrees that the wetlands were challenging, particularly the mitigation wetland. "The mitigation wetland used space that we wanted as storage and water quality treatment," he said. "However, the end product was very successful. It has a fantastic hydration from surrounding wetland overflow, provides terrific habitat and is striking in its diversity. This is the best mitigation wetland I've seen."

Extensive Public Outreach

A key project component was extensive public outreach. In collaboration with the City of Ann Arbor, Pittsfield Township and the Michigan Department of Environmental Quality (MDEQ), CDM Michigan Inc. led

Harry Sheehan, Washtenaw County environmental manager, leads attendees on a tour of the park



Wetland Preserve Facts

- 31,000 cubic yards of sediment were scraped out of the existing pond.
- For habitat diversity, 31,000 plant "plugs" representing 25 native species were installed. Eight acres were seeded with native plants.
- The wetlands preserve area has the capacity to hold 15 million gallons of water at any one time, equivalent to holding water 42 feet deep on a football field.
- 1.5 billion gallons of water are estimated to flow through the preserve annually.
- As water flows through the preserve, one-third of the phosphorus and two-thirds of the silt and sediment will be removed, improving water quality in the Huron River and the Ford and Belleville Lakes.

Constructed much like a giant rain garden, the extended detention wetland is planted with native, deep-rooted herbs and grasses that attenuate stormwater flows, allowing sediment and other pollutannts to settle out; nutrients such as phosphorous are absorbed through plant roots.

community workshops during the design and construction phases, held focus meetings with impact groups (such as leaders of the disc golf community), reported progress at meetings with stakeholders, and organized site tours during construction. Additionally, status reports were provided via a project web site, email updates and news articles.

And what about feedback? "Every so often, someone would post comments about a news item on our web page. All were positive. What was really significant is that we never got any negative feedback about the project," Sheehan said.

Initial feedback came mainly from the disc golf community and other park users, but that has now evolved. "This park was in need of help (before this project)," Bobrin said. "Now, I get a lot of positive feedback from people who are stumbling upon this park and finding a gem."

Pond Performance

Preliminary estimates projected that the pond and wetlands would remove approximately 25 percent of the 4,000 pounds of phosphorus that annually flows into Malletts Creek and, ultimately, the Huron River. According to Sheehan, the facility is performing as it was designed.

"As soon as the facility was put in, the creek responded with a slower drain time after a storm," he said. "The flashiness and frequency in flow changes were dampened immediately. Avian habitat has dramatically improved, and we have gotten good feedback from the community. Although the vegetation has been a challenge to establish (because of water levels during a storm), things are stable."

Sampling of phosphorus and suspended solids levels in Malletts Creek upstream and downstream of the site is under way. Results are expected soon to demon-

A modified outlet control structure

strate the pond performance. "After two years, our maintenance crews are now setting up to remove sediment from the forebay, which is exactly when we assumed forebay maintenance would be needed."

A Community Asset

In addition to the pond and wetland reconstruction, expanded pedestrian access and increased visibility of the water features enhanced the public education component. A looped pedestrian pathway and bridge meander over and around the pond, providing an unobstructed view of the water and the wetlands. Several times a year, after a storm and when water levels are high, water cascades over the articulated concrete mattress, resembling a waterfall.

Educational/interpretive signage along the pathway will describe the project's storm water management and water quality functions. One sign has been installed; others will be incorporated by the end of next year. This will further enhance educational outings for school children. Ann Arbor Public Schools brings 1,500 students annually to the site as part of its hydrology curriculum.

Recreational improvements included landscaping to prevent excess sogginess from one disc-golf hole, and moving several others. Playground equipment that had been tucked away into a corner was removed and reconstructed with new, more visible structures. A new basketball court was also installed at the south end of the site.

"Previously, our biggest group of destination users was disc-golfers," said Bobrin. "The park is located in a neighborhood surrounded by multi- and single-family housing. Now, it's a more inviting place for families to go. People can learn about water quality protection and the animals living there. It's a hidden location that many folks are now seeing for the first time."

About Mary Beth Doyle

Doyle was a leading environmental advocate before her tragic death in 2004. She was a prominent voice at the local, state and national levels for environmental health protections, leading successful campaigns to help communities defend themselves against toxic threats. In Ann Arbor, she championed measures to save green space and parks. Brown Park was renamed Mary Beth Doyle Park in 2008 to honor the environmental advocate.

Expanded pedestrian access has made the park more inviting to the local community

Educational/interpretive signage along the pathway describes stormwater management and water quality functions.

Making a Namesake Proud

In 2008, at a well-attended public ceremony at the park, the WCWRC honored Mary Beth Doyle's commitment to the environment by renaming the park after her. The ceremony was also a celebration of the new park's success in blending recreation and the environment. Speakers included the City of Ann Arbor Mayor John Hieftje, Pittsfield Township Supervisor Jim Walter and MDEQ representative Amy Butler. Mike Garfield of the Ecology Center led the Mary Beth Doyle Tribute and Tree Planting. Attendees toured the park and received commemorative golf discs.

"We brought together the Ecology Center, government officials, neighbors, friends and family of Mary Beth," said Bobrin. "It was an honor for us to dedicate the park in her name." Sheehan agrees. "The overall sentiment of the day was indeed Mary Beth Doyle," Sheehan said. "Everyone who attended saw that the beauty of the park associated well with the beauty that she had left behind."

Project Team

CDM Michigan Inc.
Pollack Design Associates
Insite Design Studio Inc.
Alexander Resources LLC
Dan's Excavating Inc.
WH Cannon Company