

### **Project ID: BMP\_09**

Total Treated Drainage Area: 4.57 acres

Total Treated Impervious Area: 2.9 acres

Total Water Quality Volume (WQv):

~10,300 cubic feet; 0.236 acre-foot

Rainfall Depth Treated (Pe): 1 inch

Annual Nutrient Removal:

- TN: 17.6 lbs
- TP: 1.6 lbs
- TSS: 0.5 ton

### ***Existing Site Description***

The existing pond is located at the BayWoods of Annapolis cooperative retirement community, east of the intersection of Bay Front Drive and Bembe Beach Road. A 24-inch corrugated polyethylene drainage pipe discharges to the pond and collects runoff from the BayWoods of Annapolis property. The pond has a perforated standpipe that drains to a non-tidal wetland filtering area via a 6-inch PVC pipe. Overflow is accommodated by a concrete weir upstream of gabion baskets and filter fabric to reduce runoff velocity and provide preliminary treatment prior to entering the wetland filtering area. The wetland filtering area drains directly to the Chesapeake Bay.

The pond is located in the FEMA 100-year floodplain with a static base flood elevation of 5 feet North American Vertical Datum of 1988. The pond has an aerator and a fountain, although during field investigation water was brown and murky. There is ornamental vegetation around the pond and a footbridge crossing the pond. Neither sanitary sewer lines nor water lines were identified in the vicinity of the existing pond. The soils in the drainage area are hydrologic soil groups C and D, and the pond is located over hydrologic group D soils. The pond is located within the Limited Development Area (LDA); however, Anne Arundel County does not have additional requirements for stormwater management in the LDA. Figure 11 shows the existing conditions map with drainage area.

### ***Proposed Project Description***

The proposed project includes upgrading the existing pond to meet current stormwater management standards. The retrofitted wet pond will be designed using MDE's Stormwater Design Manual. Sediment will be removed from the pond as needed to reestablish the design volume, and a pretreatment sediment forebay will be created by installing a weir under the existing bridge. Placing a weir under the bridge will minimize negative aesthetic impacts, and given the high visibility of the pond, an aesthetically pleasing weir (e.g., a sinuous shape) is recommended. Maintenance access will be provided to the sediment forebay so sediment can be removed periodically. This will improve the water quality in the pond while meeting current

MDE standards. The existing perforated standpipe may need to be replaced, although no changes to the overflow weir are proposed.

Minimal excavation will be required within the pond, although some of the existing vegetation will need to be removed. A maximum slope of 3:1 (Horizontal: Vertical) is recommended for all proposed embankments. Geotechnical analysis will be required to identify the location of the groundwater table.

Retrofitting the existing wet pond would reduce pollutants such as TN, TP, and TSS. This project will help the City of Annapolis achieve approximately 2.9 acres of impervious area credits toward its upcoming NPDES MS4 requirements. Figure 12 provides the schematic of the wet pond and Figure 13 provides the grading from the design plans. Based on the drainage area and site conditions at the existing pond a pocket wet pond appears to be the most appropriate retrofit at the site, and Figure 14 provides the typical profile of a pocket pond.

***Feasibility Assessment***

<b>Property Ownership</b>	The property is owned by BayWoods of Annapolis, a cooperative retirement community. The City would need to coordinate with BayWoods of Annapolis to obtain permission to implement this project.
<b>Construction Access</b>	The site can be accessed from the open grass areas south of the BayWoods of Annapolis building. Open area is available to stage construction activities. Existing slopes are navigable by construction equipment.
<b>Utility Conflicts</b>	There are no sanitary sewer lines or water lines in the project area. Though there were no indicators of underground electric service at the project site (i.e., no light poles or utility boxes), confirmation should be obtained during final design.
<b>Environmental Impacts</b>	No tree impacts are anticipated as part of this project.
<b>Design/Construction</b>	Geotechnical investigation will be required to determine the groundwater elevation in the project area during final design. If the pond qualifies as an MD-378 pond, any retrofit would also require upgrading the pond to meet the current MD-378 small pond standards.

***Plans and Permits***

The following plans and permits may be required for the implementation of this project:

- Site/Schematic Development Application
- Stormwater Management Plan
- Grading and Erosion Sediment Control Plan
- Temporary Traffic Control Plan
- MD-378 Pond Approval

## Severn River Sub-Watershed: BMP 09-Retrofit

### Cost Estimate

**Table 7: Cost Estimate for BMP 09 Retrofit**

Item	Quantity	Units	Unit Cost	Total
Clear and Grub	350	SY	\$2.00	\$700.00
Excavation and Hauling	350	CY	\$50.00	\$17,500.00
Grading	350	SY	\$3.50	\$1,225.00
Flow Diversion Structure	1	EA	\$10,000.00	\$10,000.00
Rip-Rap	20	CY	\$130.00	\$2,600.00
Stabilized Construction Entrance	1	EA	\$2,000.00	\$2,000.00
Grass Seeding	350	SY	\$0.75	\$262.50
Concrete Weir	30	CY	\$900.00	\$27,000.00
Principle Spillway Riser Structure	1	EA	\$1,850.00	\$1,850.00
CY - Cubic Yards				
SY - Square Yards				
EA - Each				Initial Project Costs
LF - Linear Feet				\$63,138
Contingency				20% \$12,628
Erosion and Sediment Control				15% \$9,471
Base Construction Costs				\$85,236
Mobilization				10% \$8,524
<b>Total Construction Cost<sup>7</sup></b>				<b>\$93,760</b>
20 Years Life Cycle Maintenance Cost <sup>8</sup> (Average Annual Maintenance Cost of \$763)				\$15,260

### Computations

**Table 8: Water Quality Volume (WQ<sub>v</sub>) Calculations**

Design Parameters	Site Value
Treated Drainage Area (acres), A	4.57
Percent Impervious Cover, I	63%
Rainfall Depth (inches), P	1
Volumetric Runoff Coefficient, R <sub>v</sub>	0.62
<b>Water Quality Volume (acre-feet), WQ<sub>v</sub></b>	<b>0.236</b>
<b>Water Quality Volume (cubic-feet), WQ<sub>v</sub></b>	<b>10,300</b>

<sup>7</sup> Additional cost of approximately \$100,000 for design, environmental services, geotechnical investigation, survey, and permitting is assumed.

<sup>8</sup> University of Maryland. October 2011. Cost of Stormwater Management Practices in Maryland Counties.

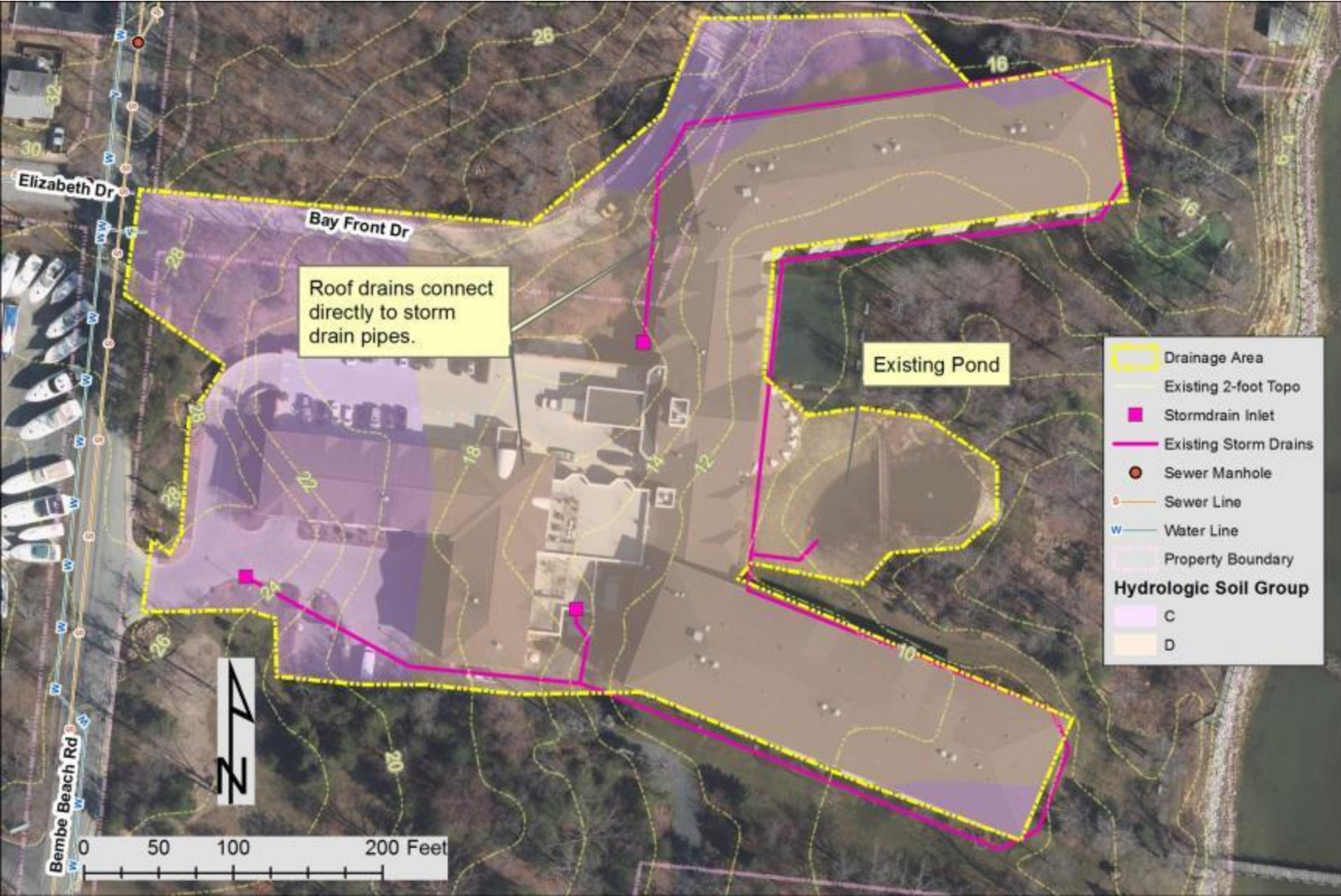


Figure 11: Existing Conditions and Drainage Area

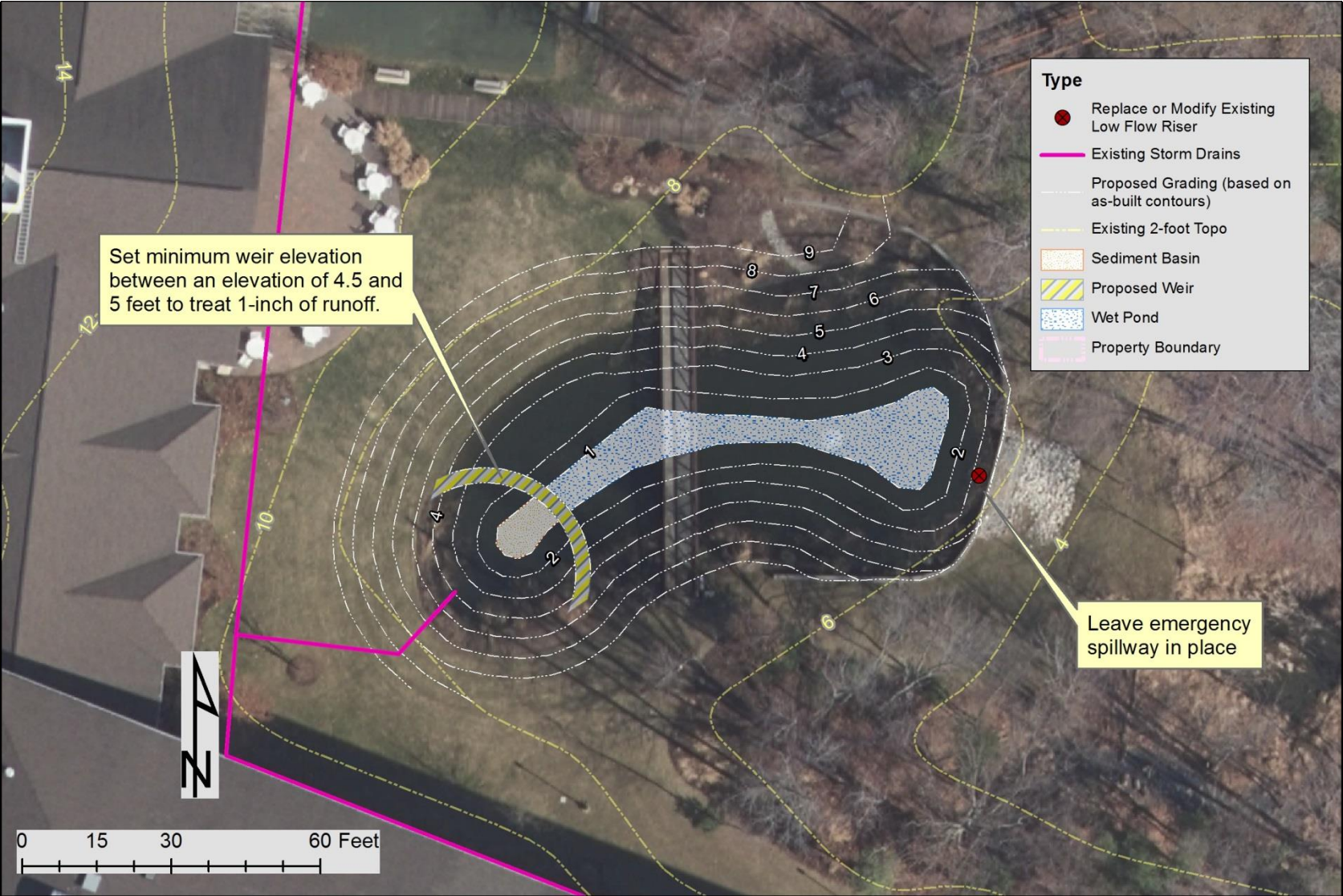


Figure 12: Proposed Retrofit Concept Design



Figure 13: Site Grading from BayWoods of Annapolis 2000 Design Plans

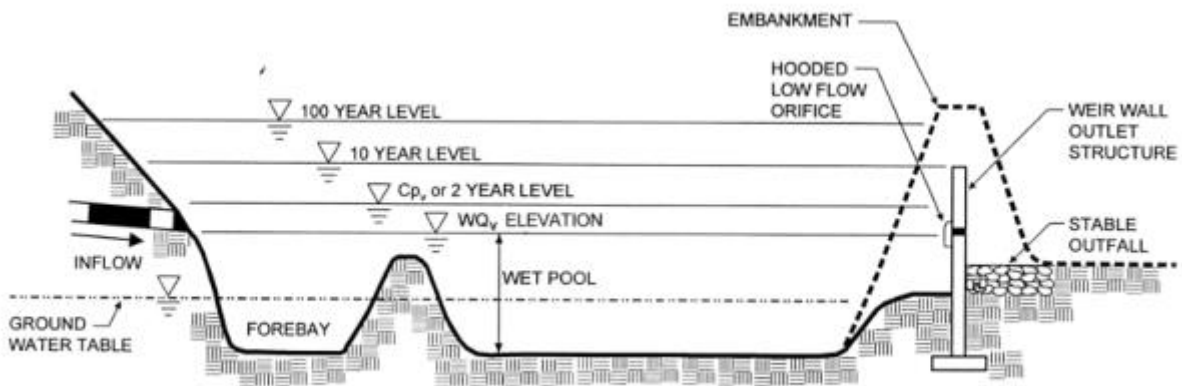


Figure 14: Typical Profile of a Pocket Pond (MDE 2000 Stormwater Design Manual)

*Site Photographs*



**Existing Pond at BayWoods of Annapolis (facing east)**



**Existing Pond at BayWoods of Annapolis Overflow Weir and Outfall Protection (facing northwest)**