



Prince William County Government
Board of County Supervisors



Evolution of Stormwater Management in Communities

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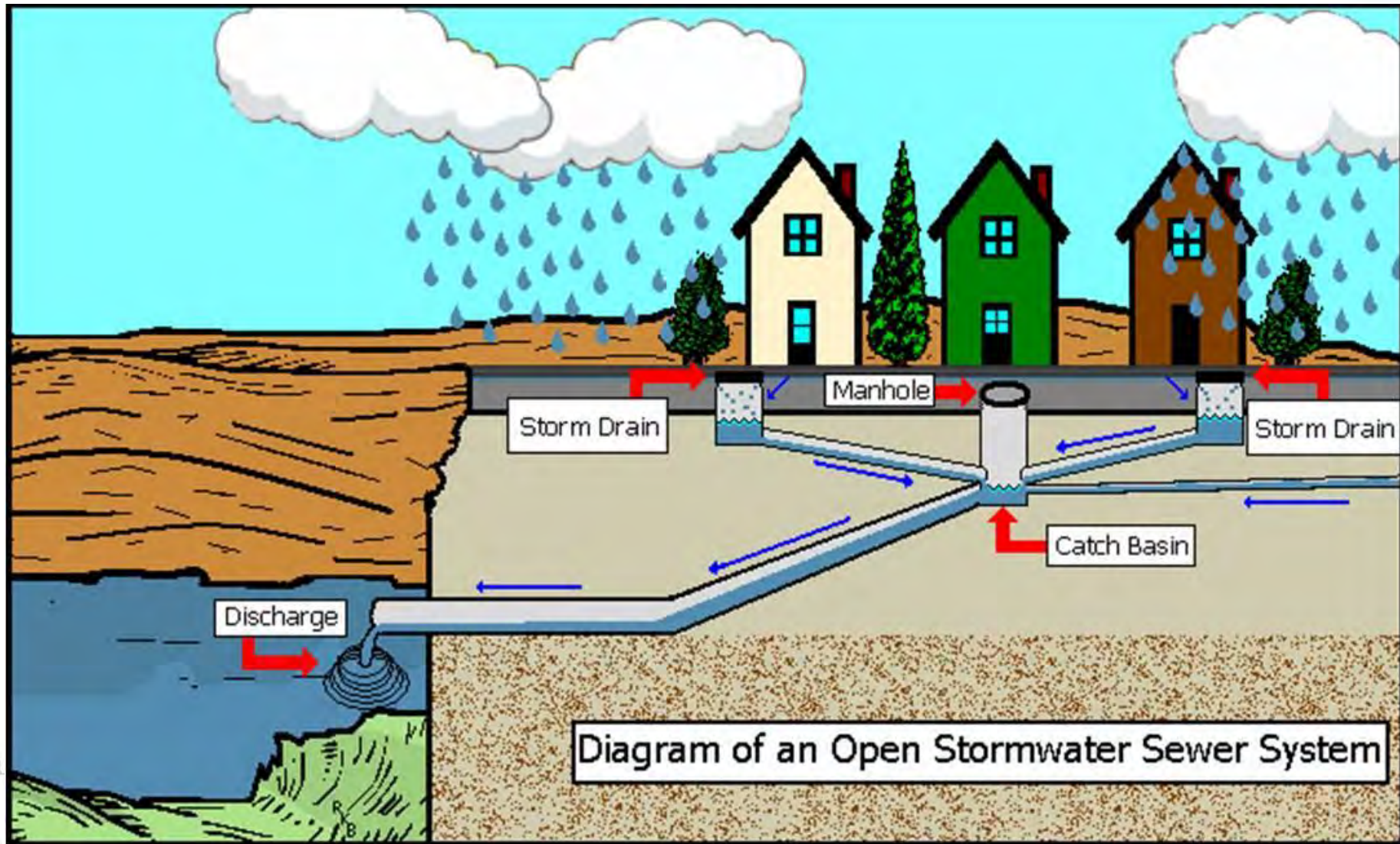
Stormwater Management in early period



- Stormwater management in the communities started after World War II.
- Concept of stormwater management prior to 1970.
 - Catch pits, straight pipes and channels
 - No detention pond
- As a result, downstream flooding, and erosion problems are common in many older communities.



Stormwater Management in early period



Stormwater Detention



- 10-year storm for flood control.
 - Outlet structure – single pipe
- 2-year storm for channel erosion control.
 - Riser structure required to control different flows along with pipe.
- That's why there are lot of dry detention ponds in the communities built around 70-80s.



Dry Detention Pond



En

Water Quality



- Degrading water quality raised a concern during 80s.
 - Indication - Algal bloom & decline in aquatic species.
 - The main pollutants -TP, TN and TSS.
 - The surrogate pollutant or the pollutant of concern is the TP.
- Then the quality also became another component of stormwater management.



Water Quality



- The concept of stormwater management - to control the quantity and quality of stormwater by applying various structural practices (BMPs) such as Extended Detention Ponds, Wet Ponds, Constructed Wetlands

<i>BMP</i>	<i>TP removal Efficiency</i>
Extended Detention Ponds	15%-31%
Wet Ponds	50%-75%
Constructed Wetlands	50%-75%



TMDL & MS4 Programs



- Stormwater management - local government responsibility.
- Degrading water quality of nation's water bodies- Federal and State governments involvement.
- Outcome - TMDL & MS4 programs
 - impose greater requirements based on time line.
 - 10-30% TP & TN load reduction needed from existing development within 15 years.
- Retrofit existing stormwater management facilities.



Retrofitting



➤ What is Retrofitting ?

- process of improving the function of existing facility by adding new parts or devices that were not available or known when the facility was built.

➤ The objective of stormwater retrofitting

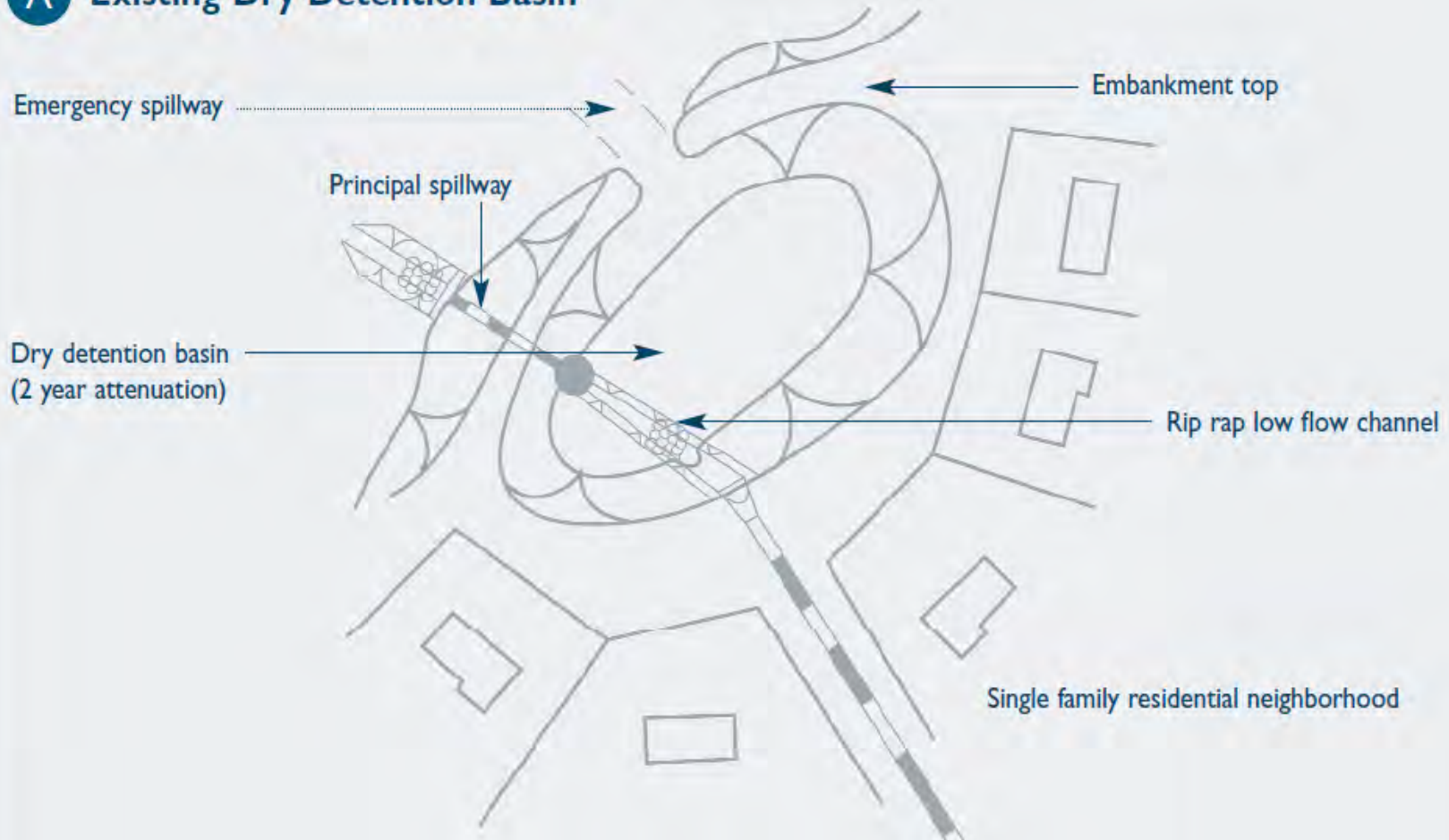
- Remedy problems associated with, and improve water quality mitigation functions of, older, poorly designed or poorly maintained stormwater management systems.



Retrofitting of Dry Detention Basin



A Existing Dry Detention Basin



Retrofitting of Dry Detention Basin



B Stormwater Retrofit

Relocated/raised emergency spillway

Raised embankment

Principal spillway

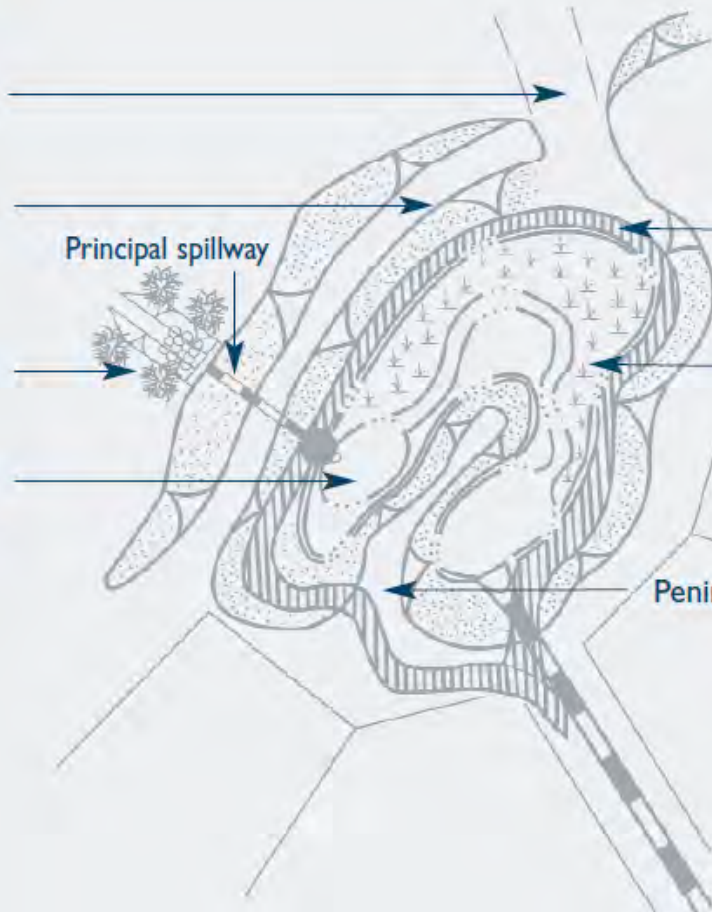
Shaded outlet channel

Micro pool
with hooded low flow intake

Safety and maintenance
access bench

Permanent pool, shallow
marsh emergent wetland

Peninsula to extend low flow path



Retrofitting



EXISTING RETROFITS BMP CONVERSION



DRY POND

CONSTRUCTED
WETLAND



Retrofitting of Pond #494



- Identified in Broad Run Watershed Study Report.
 - Initially, Dry Pond
 - Retrofitted in 2008 to Extended Dry Detention Pond
 - Recently retrofitted to Constructed Wetlands



Pond#494 before retrofitting



Pond#494 during retrofitting





Thank you very much
for your
Attention

