

## **5.0 WMA Area Restoration Strategies for Sugarland Run Watershed and Horsepen Creek Watershed**

Section 5.0 provides descriptions of the restoration strategies proposed for the Sugarland Run and Horsepen Creek watersheds. Restoration strategies were chosen based on needs of each WMA.

A large portion of the Sugarland Run watershed is urbanized. The majority of open space is located along the stream corridors and along the northern edge of the watershed. The southern portion of the watershed contains mostly medium and high density residential and industrial land uses. The northern portion of the watershed contains mostly low density and estate residential land uses. The expected changes in land use within Fairfax County show decreases in lower density land uses and increases in urban land uses.

There are 157 existing stormwater facilities located in the Sugarland Run watershed within Fairfax County. Approximately 74 percent of the portion of Sugarland Run watershed within Fairfax County is not treated by an existing stormwater facility. This large area of the Sugarland Run watershed that lacks existing stormwater controls is significantly affecting flooding and water quality; therefore, there is a definite need for new stormwater projects in this area.

A large portion of the Horsepen Creek watershed is also urbanized. The majority of open space is located along stream corridors and along the western edge of the watershed. The eastern portion of the watershed contains mostly medium density residential land uses. The central portion of the watershed contains mostly high density residential and industrial uses. The western portion of the watershed, which is located in Loudoun County, contains a mixture of low and medium density residential, industrial and open space land uses. As with Sugarland Run, the expected changes in land use within Fairfax County show decreases in lower density land uses and increases in urban land uses.

There are 147 existing stormwater facilities located in the Horsepen Creek watershed within Fairfax County. Approximately 69 percent of the portion of Horsepen Creek watershed located within Fairfax County is not treated by an existing stormwater facility. This large area of the Horsepen Creek watershed that lacks existing stormwater controls indicates the need for new watershed management projects.

### **5.1 Sugarland Run Watershed WMAs**

Each subsection of Section 5.1 includes a description of key WMA conditions, a description of proposed structural and non-structural 10-year projects in the WMA, a listing of 10-year and 25-year projects for the WMA, and a map showing the types and locations of all 10-year and 25-year projects within the WMA. Each WMA in the Sugarland Run watershed is described separately. Additional project details, benefits and design considerations for the projects in the 10-year implementation plan are included on the project fact sheets located in Section 5.3.

### 5.1.1 Folly Lick WMA

#### **Description of Key WMA Conditions**

Approximately 78 percent of the Folly Lick WMA is urbanized. The expected changes in land use show an increase in higher density urban areas and decreases in lower density and rural areas. Higher density urban areas that contain less pervious surface introduce greater volumes of stormwater run off and more intense peak flows. Increases in urban development also lead to degraded wildlife habitat, increased pollutants in stormwater runoff and worsening stream conditions.

The Folly Lick WMA contains 22 existing stormwater facilities. Approximately 80 percent of this WMA is not treated by an existing stormwater facility. According to the existing condition STEPL model results, the Folly Lick WMA contributes approximately 16 percent of the total suspended solids, 17 percent of the total nitrogen and 17 percent of the total phosphorus annual loads to the Sugarland Watershed.

#### **Folly Lick WMA 10-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Folly Lick WMA.

- SU9117** Retrofit existing dry pond (0827DP) to extended detention dry basin and adjacent, existing dry ponds (0637DP and 0934DP) to a single enhanced extended detention dry basin with marsh areas. Remove trickle ditches, install forebay and install/retrofit outlet structure.
- SU9123** Improve existing regional dry pond S-04 (1440DP) to enhanced extended detention dry basin with marsh areas. Remove concrete trickle ditch and retrofit outlet structure.
- SU9201** The community around Fantasia Drive does not have existing stormwater controls and significant stream erosion is occurring downstream. Construct an extended detention dry pond, improve the outfall and repair stream erosion impacts.
- SU9204** The streams in the golf course have been straightened and lack sufficient buffer. Create meander and add structures to channel to slow flow. Install riparian buffer planting as allowed by height restrictions. Stabilize right bank at lower extent of reach.

#### **Folly Lick WMA 25-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Folly Lick WMA.

- SU9118** Existing dry ponds (0784DP, 0573DP and 0227DP) in Dranesville Estates Sections 1 and 2 provide minimal quantity-only stormwater treatment. Retrofit all to enhanced extended detention dry basins with marsh areas and remove concrete trickle ditches.

- SU9121** Hiddenbrook subdivision does not have existing stormwater controls. Retrofit dry pond (0260DP) to enhanced extended detention dry basin, with proper outlet structure and wetland vegetation; remove concrete trickle ditch. Install a second, similar enhanced extended detention dry basin.
- SU9122** Existing dry pond (0283DP) provides stormwater treatment for church along Dranesville Road. Improve pond efficiency by removing concrete trickle ditch, planting quality vegetation for improved nutrient uptake and provide energy dissipation at outfall.
- SU9127** The United Methodist Church has minimal existing stormwater treatment. Retrofit existing dry pond to enhanced extended detention dry basin with improved outlet structure, minor grading to eliminate short-circuit and marsh areas for improved water quality and quantity controls.
- SU9133** The Tralee subdivision does not have existing stormwater treatment. Construct two new enhanced extended detention dry basins with marsh areas and three rain gardens/bioretenion areas throughout the area to provide both water quality and water quantity controls.
- SU9142** The high density residential development around Pride Avenue has limited existing stormwater controls. Retrofit existing dry pond to enhanced extended detention dry basin with improved outlet structure, quality vegetation and removal of concrete trickle ditch.
- SU9202** Daylight stream below Herndon Parkway and restore to natural channel with sufficient energy dissipation and restore riparian buffer between apartment buildings.
- SU9511** This community does not have existing stormwater controls. Install seven rain gardens around existing storm sewer inlets and within existing swale.

### **Folly Lick WMA 25-Year Projects**

The following non-structural project is designed to reduce stormwater flow volume and decrease peak flows in areas with no existing stormwater management and no opportunity for new structural stormwater controls.

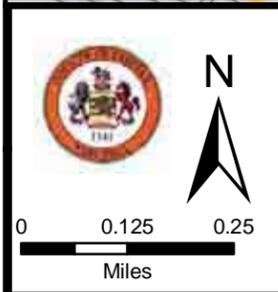
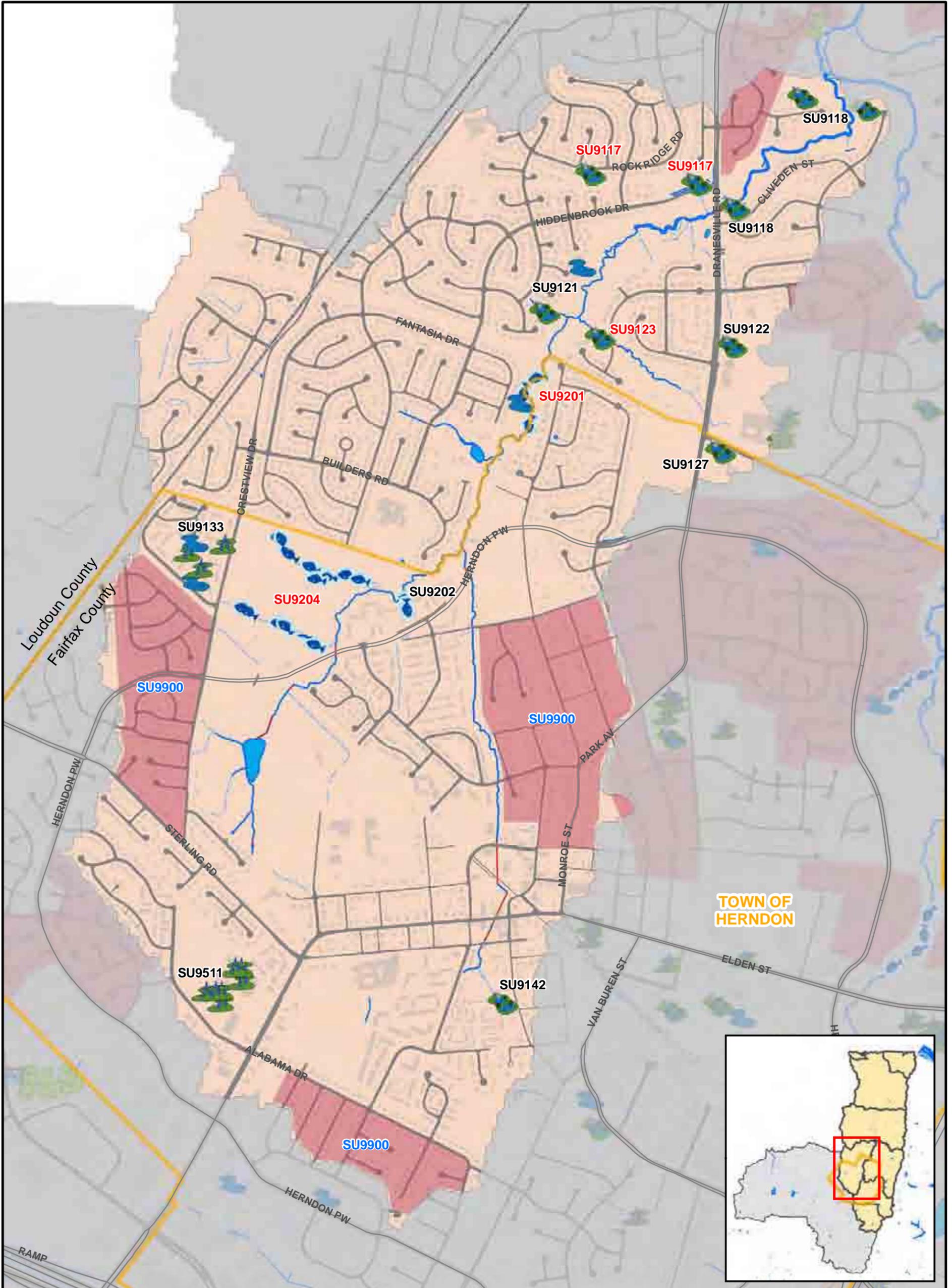
- SU9900** Targeted rain barrel program at Westfile, Chandon, Fortnightly Square, Haloyon of Herndon Section 5, Van Vlecks, Ballou, Saubers, Herndon Station and Herndon Park Station subdivisions.

## **10-Year and 25-Year Project Information Tables for Folly Lick WMA**

Table 5.1 lists all structural and non-structural projects proposed in the Folly Lick WMA. Project locations for all structural and non-structural projects are shown on Map 5.1.

<b>Table 5.1</b>						
<b>Project List – Folly Lick WMA</b>						
<b>Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	<b>Phase</b>
SU9117	Stormwater Pond Retrofit	SU-FL-0002	Dranesville Road & Hiddenbrook Drive	Quality/ Quantity	County/ Private	0 - 10
SU9123	Stormwater Pond Retrofit	SU-FL-0003	Near Philmont Drive & Judd Court	Quality/ Quantity	Private	0 - 10
SU9201	New Stormwater Pond, Stream Restoration	SU-FL-0004	Folly Lick stream corridor between Fantasia Drive & Monroe Street	Quality/ Quantity	Park/ Private	0 - 10
SU9204	Stream Restoration	SU-FL-0006	Herndon Centennial Park golf course	Quality/ Quantity	Local	0 - 10
SU9118	Stormwater Pond Retrofit	SU-FL-0001	Near stream corridor in Dranesville Estate Section 1 and 2	Quantity/ Quality	County/ Park	11 - 25
SU9121	Stormwater Pond Retrofit, New Stormwater Pond	SU-FL-0002	East of Millikens Bend Road near Millbank Way & Westlodge Court	Quantity/ Quality	Park	11 - 25
SU9122	Stormwater Pond Retrofit	SU-FL-0002	Baptist Temple of Herndon	Quantity/ Quality	Private	11 - 25
SU9127	Stormwater Pond Retrofit	SU-FL-0003	Herndon United Methodist Church	Quantity/ Quality	Private	11 - 25
SU9133	New Stormwater Pond, BMP/LID	SU-FL-0006	Near Crestview Drive & Bond Street	Quantity/ Quality	Private	11 - 25
SU9142	Stormwater Pond Retrofit	SU-FL-0009	Near Spring Street & Wood Street	Quantity/ Quality	Private	11 - 25
SU9202	Stream Restoration	SU-FL-0006	Near Herndon Parkway & Stevenson Court	Quality	Private	11 - 25
SU9511	BMP/LID	SU-FL-0007	Dulles Park Court & Alabama Drive	Quality	Private	11 - 25

<b>Non-Structural Projects</b>					
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>
SU9900	Rain Barrel Programs	SU-FL-0002	Westfield, Fortnightly Square, Haloyon of Herndon Sect 5, Van Vlecks, Ballou, Saubers, Herndon Station, Herndon Park Station and Chandon Subdivisions	Quantity	Private



- |                              |                          |                                     |
|------------------------------|--------------------------|-------------------------------------|
| Buffer Restoration           | New Stormwater Pond      | Area-wide Drainage Improvement      |
| Stream Restoration           | Outfall Improvement      | Community Outreach/Public Education |
| BMP/LID                      | Stormwater Pond Retrofit | Land Conservation Project           |
| Culvert Retrofit             | Other                    | Flood Protection/Mitigation         |
| Dumpsite/Obstruction Removal |                          | Inspection/Enforcement Enhancement  |
|                              |                          | Rain Barrel Program                 |
|                              |                          | Street Sweeping Program             |
|                              |                          | Studies, Surveys and Assessments    |
- Implementation timeframe denoted by project label color. Red = 0-10 years Black = 11-25 years  
Blue = non-structural projects

**Map 5.1**  
WMA: Folly Lick  
Proposed Projects



## 5.1.2 Headwaters WMA

### **Description of Key WMA Conditions**

Approximately 85 percent of the Headwaters WMA is urbanized. The expected changes in land use show an increase in medium density residential areas and decreases in low intensity commercial and open space areas. Higher density urban areas that contain less pervious surface introduce greater volumes of stormwater run off and more intense peak flows. Increases in urban development also lead to degraded wildlife habitat, increased pollutants in stormwater runoff and worsening stream conditions.

The Headwaters WMA contains 17 existing stormwater facilities. Approximately 76 percent of this WMA is not treated by an existing stormwater facility. According to the existing condition STEPL model results, the Headwaters WMA contributes approximately nine percent of the total suspended solids, 10 percent of the total nitrogen and 10 percent of the total phosphorus annual loads to the Sugarland Watershed.

### **Headwaters WMA 10-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Headwaters WMA.

- SU9149** Headwaters of Sugarland Run race through a network of concrete channels at high flows. Remove concrete channel and replace with a natural stream channel; include cross vanes for energy dissipation and stormwater controls at each incoming tributary.
- SU9150** This area does not have existing stormwater controls. Install new extended detention dry basin behind apartments and school. Capture drainage from outfall and drainage channel.
- SU9208** The stream channel is a steep concrete channel with no energy dissipation. Restore naturalized stream channel with step pool features, restore/repair two foot bridges, install energy dissipation to incoming storm drain and install educational signage.
- SU9209** This stream is eroding below the outfall and also creating overland drainage channels due to lack of energy dissipating structures and vegetation. Repair head cuts, install check dams/energy dissipation, vegetate understory and remove invasive plants.
- SU9210** The stream banks in this stream are eroding and the concrete channel provides no energy dissipation. Break up concrete channel and add rock for energy dissipation, re-plant riparian understory and educate homeowners about proper yard waste disposal.

### **Headwaters WMA 25-Year Projects**

There are no 11-25 year projects proposed for Sugarland Headwaters WMA.

**Headwaters WMA Non-Structural Projects**

The following non-structural projects are designed to reduce stormwater flow volumes and decrease peak flows in areas lacking sufficient stormwater management with limited opportunity for new structural stormwater controls. Water quality and wildlife habitat will also be improved with project implementation.

**SU9909** Targeted Rain Barrel Program at Polo Fields Home Owners Association.

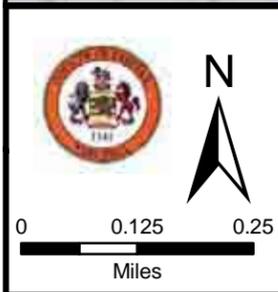
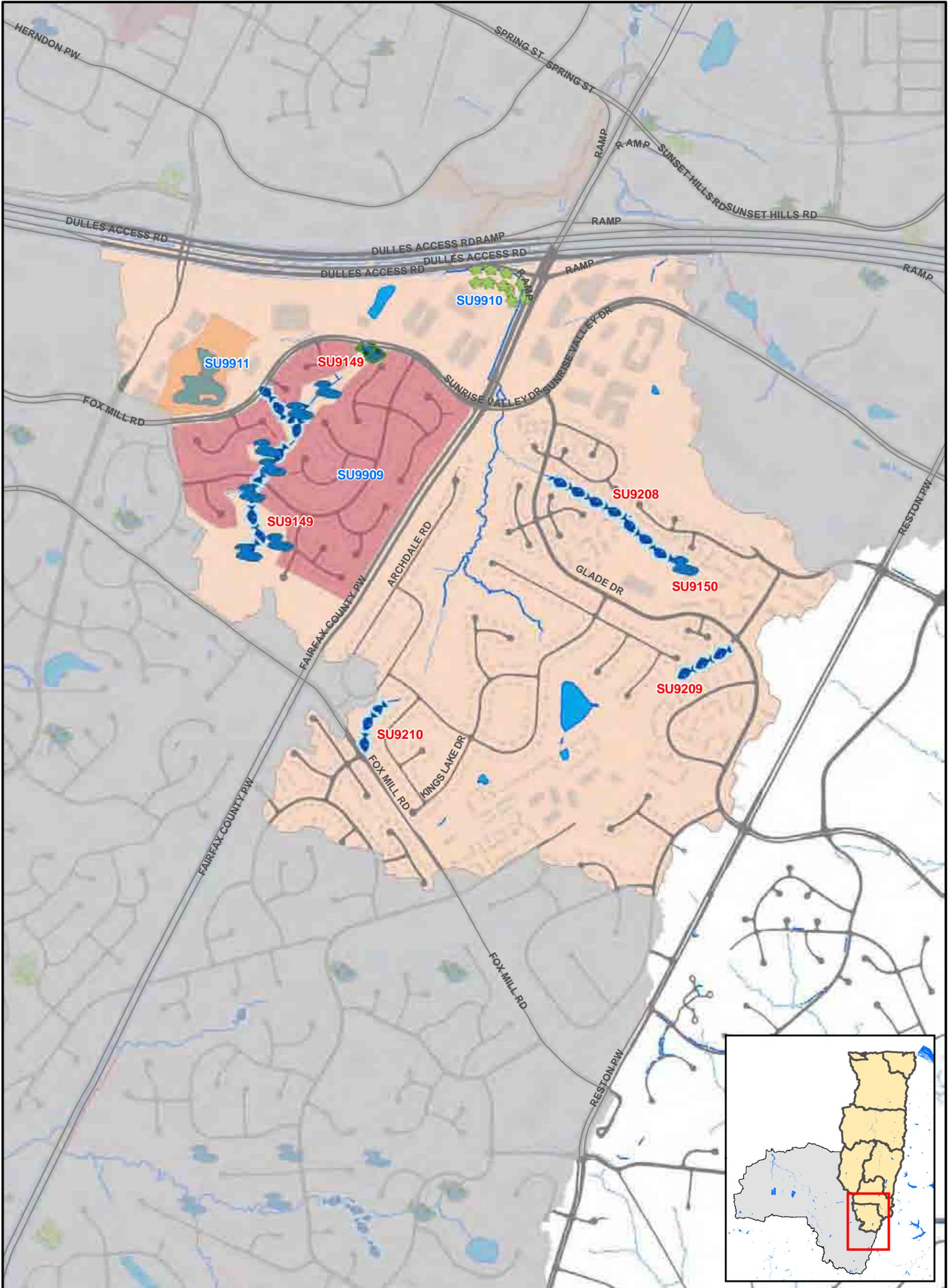
**SU9910** Naturalize existing County dry pond (DP0164) with native vegetation.

**SU9911** Preserve Sunrise Valley Wetland Park as a natural wetland area and naturalize adjacent dry pond (No StormNet ID).

**10-Year and 25-Year Project Information Tables for Headwaters WMA**

Table 5.2 lists all structural and non-structural projects proposed in the Headwaters WMA. Project locations for all structural and non-structural projects are shown on Map 5.2.

<b>Table 5.2</b>						
<b>Project List – Headwaters WMA</b>						
<b>Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	<b>Phase</b>
SU9149	New Stormwater Pond, Stream Restoration, Stormwater Pond Retrofit	SU-SU-0047	Polo Fields Subdivision	Quality/Quantity	Private	0 - 10
SU9150	New Stormwater Pond	SU-SU-0049	Near Nutmeg Lane cul-de-sac	Quality/Quantity	Private	0 - 10
SU9208	Stream Restoration	SU-SU-0049	Near Sanibel Drive & Tigers Eye Court culs-de-sac	Quality	Private	0 - 10
SU9209	Stream Restoration	SU-SU-0051	Pinecrest Road & Glade Drive	Quality	State/Private	0 - 10
SU9210	Stream Restoration	SU-SU-0050	Fox Mill Road & Keele Drive	Quality	Private	0 - 10
<b>Non-Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	
SU9909	Rain Barrel Programs	SU-SU-0047	Polo Fields Subdivision	Quantity	Private	
SU9910	Buffer Restoration	SU-SU-0048	Fairfax County Parkway & Dulles Access Road	Quality	Private	
SU9911	Conservation Acquisition Project/ Land Conservation Coordination Project	SU-SU-0047	Sunrise Valley Wetland Park	Quality	Private	



- |                              |                          |                                     |
|------------------------------|--------------------------|-------------------------------------|
| Buffer Restoration           | New Stormwater Pond      | Area-wide Drainage Improvement      |
| Stream Restoration           | Outfall Improvement      | Community Outreach/Public Education |
| BMP/LID                      | Stormwater Pond Retrofit | Land Conservation Project           |
| Culvert Retrofit             | Other                    | Flood Protection/Mitigation         |
| Dumpsite/Obstruction Removal |                          | Inspection/Enforcement Enhancement  |
|                              |                          | Rain Barrel Program                 |
|                              |                          | Street Sweeping Program             |
|                              |                          | Studies, Surveys and Assessments    |
- Implementation timeframe denoted by project label color. Red = 0-10 years Black = 11-25 years Blue = non-structural projects.

**Map 5.2**  
WMA: Sugarland Headwaters Proposed Projects



### 5.1.3 Lower Middle Sugarland WMA

#### **Description of Key WMA Conditions**

Approximately 65 percent of the Lower Middle Sugarland WMA is urbanized. The expected changes in land use show increases in low and medium density residential and commercial areas and decreases in estate residential and open space areas. Higher density urban areas that contain less pervious surface introduce greater volumes of stormwater runoff and more intense peak flows. Increases in urban development also lead to degraded wildlife habitat, increased pollutants in stormwater runoff and worsening stream conditions.

The Lower Middle Sugarland WMA contains 37 existing stormwater facilities. Approximately 83 percent of this WMA is not treated by an existing stormwater facility. According to the existing condition STEPL model results, the Lower Middle Sugarland WMA contributes approximately 23 percent of the total suspended solids, 22 percent of the total nitrogen and 23 percent of the total phosphorus annual loads to the Sugarland Watershed.

#### **Lower Middle Sugarland WMA 10-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Lower Middle Sugarland WMA.

- SU9005** Subbasins SU-SU-0026 and SU-SU-0027 have minimal stormwater controls. Install infiltration trench/vegetated swales, rain gardens and include educational signage. Retrofit dry ponds (DP0562, 0570DP and 1332DP) to enhanced extended detention dry basins and remove trickle ditches. Retrofit existing farm pond to a stormwater wet pond with vegetated pond edges and proper outlet structure.
- SU9007** Subbasins SU-FF-0002, 0003 and 0004 have minimal stormwater controls. A combination of twelve basin retrofits, wetlands, culvert retrofits and a new basin will provide stormwater controls for nearly two-thirds of the subbasins' 457 acres.
- SU9106** Retrofit existing dry ponds (1382DP and 1454DP) to extended detention dry basins for improved quality and quantity control. Remove trickle ditches, retrofit outlet structures and naturalize. Install a rain garden around an existing inlet.
- SU9108** Retrofit Bowl America dry pond to extended detention dry basin and Sugarland Hill dry pond (0570DP) to enhanced extended detention dry basin with marsh areas for improved quality and quantity controls. Install educational signage.
- SU9110** Existing dry pond in Laing at Sugarland subdivision will be enlarged and retrofitted to extended detention basin to provide additional quantity and quality control. Remove concrete trickle ditch and install proper outlet structure.

#### **Lower Middle Sugarland WMA 25-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Lower Middle Sugarland WMA.

- SU9001** A portion of Shaker Woods subdivision does not have existing stormwater treatment. Install bioswales, remove riprap and allow existing drainage channels to naturalize, install stormwater facility at toe of slope to provide some water quality and quantity treatment.
- SU9107** Existing dry pond (1034DP) treating Grand Hamptons II shows evidence of improper function and clogging of the outlet structure. Raise the low flow outlet structure and construct a micro-pool above the outlet to reduce clogging and improve pond function.
- SU9111** Existing pond along Dranesville Road does not have a proper outlet structure. Improve pond to a properly functioning enhanced extended detention pond by installing a proper outlet structure, sediment forebay and low marsh areas for improved quality and quantity control.
- SU9112** Existing dry pond (0074DP) provides only water quantity control. Retrofit to enhanced extended detention dry basin and install stilling pond below outlet. Retrofit nearby existing farm pond to a stormwater wet pond with proper outlet structure and vegetated pond edges.
- SU9115** Existing dry ponds (0828DP and 0308DP) in Hastings Hunt and Jenkins Ridge provide only water quantity control. Retrofit ponds to enhanced extended detention dry basins with proper outlet structures and wetland vegetation and install educational signage.
- SU9200** Repair eroded Sugarland Run streambanks upstream of Leesburg Pike (SPA reach SUSU1-2-E4) and reconnect stream with floodplain. Improve stream channel (re-grade banks) and outfall at incoming tributary (SPA ditch SUSU1-2-D9). Clear obstructions upstream.

### **Lower Middle Sugarland WMA Non-Structural Projects**

The following non-structural projects are designed to reduce stormwater flow volumes and decrease peak flows in areas lacking sufficient stormwater management with limited opportunity for new structural stormwater controls. Project implementation will also promote sediment deposition, decrease erosion, improve water quality and increase wildlife habitat.

- SU9901** Restore riparian buffers in five locations: downstream of Stuart Hills Way crossing, northwest corner of Leesburg Pi and Holly Knoll Dr, along Leesburg Pike at the driving range, downstream across the street from the driving range and south of Yellow Tavern Court in the Crestbrook Subdivision.
- SU9902** Targeted rain barrel program at Sugar Creek Sec. 1, Stuart Hills, Cedar Chase, Oak Creek Estates, Forest Heights, Stoney Creek Woods, Hastings Hunt Sec. 9, a portion of Jenkins Ridge, Holly Knoll and Crestbrook subdivisions.
- SU9903** Obtain conservation easements to preserve riparian buffer and habitat along several headwater streams to Sugarland Run upstream of Holly Knoll Drive and the riparian buffer along a reach of Muddy Branch near the Fairfax County boundary.
- SU9904** Educate homeowners near the Heather Way cul-de-sac on erosion control BMPs and yard waste as an improper control measure.

**10-Year and 25-Year Project Information Tables for Lower Middle Sugarland WMA**

Table 5.3 lists all structural and non-structural projects proposed in the Lower Middle Sugarland WMA. Project locations for all structural and non-structural projects are shown on Map 5.3.

<b>Table 5.3</b>						
<b>Project List – Lower Middle Sugarland WMA</b>						
<b>Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	<b>Phase</b>
SU9005	Regional Pond Alternative Suite	SU-SU-0026/27	Near Leesburg Pike, between Rolling Holly Drive & Sugarland Road	Quality	County/Private	0 - 10
SU9007	Regional Pond Alternative Suite	SU-FF-0002/03/04	Between Leesburg Pike, Fairfax County Parkway & Wiehle Avenue	Quality/Quantity	State/County/Park/Private	0 - 10
SU9106	Stormwater Pond Retrofit, BMP/LID	SU-SU-0021	Near Tralee Drive & Old Holly Drive	Quality/Quantity	Private	0 - 10
SU9108	Stormwater Pond Retrofit	SU-SU-0028	Dranesville Road & Woodson Drive	Quality/Quantity	Private	0 - 10
SU9110	Stormwater Pond Retrofit	SU-SU-0028	Methven Court cul-de-sac	Quality/Quantity	County	0 - 10
SU9001	Regional Pond Alternative Suite	SU-FF-0001	Near Rowland Drive & Heather Way	Quality	Park/Private	11 - 25
SU9107	Stormwater Pond Retrofit	SU-SU-0028	Near Leesburg Pike & Fairfax County Parkway	Quantity/Quality	County	11 - 25
SU9111	Stormwater Pond Retrofit	SU-SU-0029	Dranesville Road & Woodson Drive	Quality	State/Park	11 - 25
SU9112	Stormwater Pond Retrofit	SU-SU-0030	East of Dranesville Road & Butter Churn Drive	Quantity/Quality	Park	11 - 25
SU9115	Stormwater Pond Retrofit	SU-MB-0001	Hastings Hunt Section 6 and Jenkins Ridge Subdivisions	Quantity/Quality	County/Private	11 - 25
SU9200	Stream Restoration	SU-SU-0028	Near Dranesville Road & Woodson Drive	Quality	State/Park/Private	11 - 25
<b>Non-Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	
SU9901	Buffer Restoration	SU-FF-0001	Near Leesburg Pike & Rolling Holly Drive	Quality	State/ Park/ Private	
SU9902	Rain Barrel Programs	SU-FF-0001	Sugar Creek Sec. 1, Stuart Hills, Cedar Chase, Oak Creek Estates, Forest Heights Estates, Stoney Creek Woods, Hastings Hunt sec. 6, portion of Jenkins Ridge, Holly Knoll and Crestbrook Subdivisions	Quantity	Private	

**Table 5.3**  
**Project List – Lower Middle Sugarland WMA**  
**Non-Structural Projects**

<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>
SU9903	Conservation Acquisition Project/ Land Conservation Coordination Project	SU-FF-0001	Stream corridor near Leesburg Pike & Holly Knoll Drive	Quality	County/ Private
SU9904	Community Outreach/ Public Education	SU-FF-0001	Near Heather Way cul-de-sac	N/A	Private





## 5.1.4 Lower Sugarland WMA

### **Description of Key WMA Conditions**

Only 18 percent of this WMA is located within Fairfax County, and contains mostly low density and estate residential land uses. Approximately 50 percent of the Lower Sugarland WMA is urbanized. The expected changes in land use show an increase in estate residential areas and a decrease in open space areas. Higher density urban areas that contain less pervious surface introduce greater volumes of stormwater run off and more intense peak flows. Increases in urban development also lead to degraded wildlife habitat, increased pollutants in stormwater runoff and worsening stream conditions. The Lower Sugarland WMA contains four existing stormwater facilities within Fairfax County.

### **Lower Sugarland WMA 10-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Lower Sugarland WMA.

**SU9100** The Great Falls West basin provides only water quantity control. Retrofit existing dry pond (1445DP) to enhanced extended detention dry basin with marsh areas, including installation of proper outlet structure and clearing of blocked culvert pipe.

**SU9101** The Great Falls West basins provide only water quantity control. Retrofit existing dry ponds (1447DP and 1446DP) to enhanced extended detention dry basin with marsh areas, remove trickle ditches, install proper outlet structures and increase spillway elevation.

**SU9103** Kentland Farms and Thomas Avenue have few stormwater controls. Retrofit existing dry pond to an enhanced extended detention dry basin with marsh areas and micro-pool, remove trickle ditch. Drain near-by farm pond to create a new constructed wetland.

### **Lower Sugarland WMA 25-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Lower Sugarland WMA.

**SU9105** A headwaters area around Seneca Ridge subdivision does not have existing stormwater controls. Retrofit existing farm pond to a stormwater wet pond with proper outlet structure and slightly lowered water level for additional capacity.

**SU9400** Replace the culvert at Kentland Drive, construct aquatic bench and micro-pool upstream and stabilize streambank erosion above and below culvert.

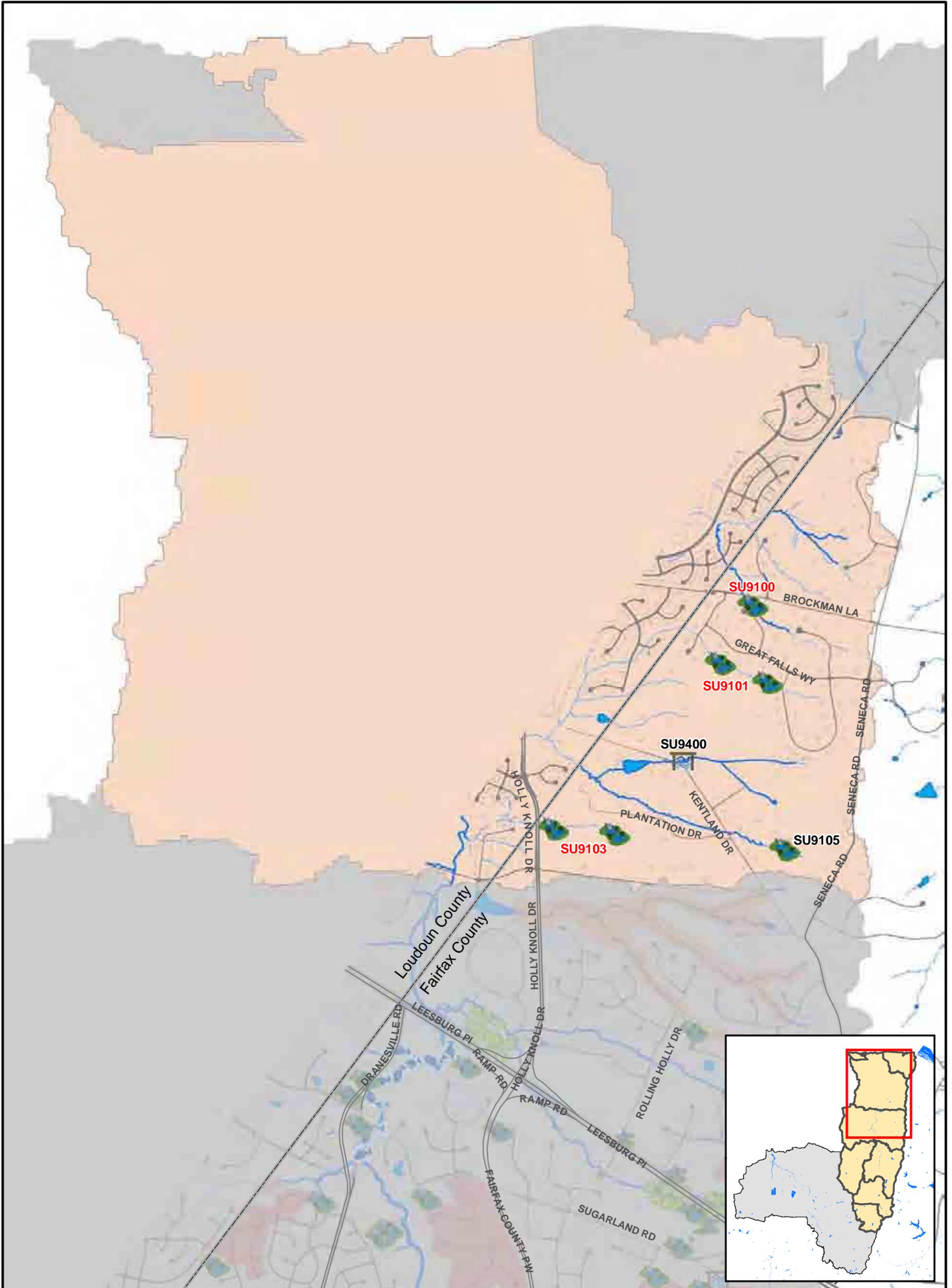
### **Lower Sugarland WMA Non-Structural Projects**

There are no non-structural projects proposed for Lower Sugarland WMA.

**10-Year and 25-Year Project Information Tables for Lower Sugarland WMA**

Table 5.4 lists all structural and non-structural projects proposed in the Lower Sugarland WMA. Project locations for all structural and non-structural projects are shown on Map 5.4.

<b>Table 5.4</b>						
<b>Project List – Lower Sugarland WMA</b>						
<b>Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	<b>Phase</b>
SU9100	Stormwater Pond Retrofit	SU-SU-0008	Jackson Tavern Way cul-de-sac	Quality/ Quantity	County	0 - 10
SU9101	Stormwater Pond Retrofit	SU-SU-0012	Near Great Falls Way & Jackson Tavern Way	Quality/ Quantity	County/ Private	0 - 10
SU9103	Stormwater Pond Retrofit	SU-SU-0018	Thomas Run Drive	Quality/ Quantity	County/ Private	0 - 10
SU9105	Stormwater Pond Retrofit	SU-SU-0013	Air View Lane	Quantity/ Quality	Private	11 - 25
SU9400	Culvert Retrofit	SU-SU-0013	Near Kentland Drive & Parrish Farm Lane	Quantity/ Quality	State/ Private	11 - 25




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Miles

-  Buffer Restoration
-  Stream Restoration
-  BMP/LID
-  Culvert Retrofit
-  Dumpsite/Obstruction Removal

-  New Stormwater Pond
  -  Outfall Improvement
  -  Stormwater Pond Retrofit
  -  Other
- Implementation timeframe denoted by project label color. Red = 0-10 years Black = 11-25 years  
Blue = non-structural projects.

-  Area-wide Drainage Improvement
-  Community Outreach/Public Education
-  Land Conservation Project
-  Flood Protection/Mitigation
-  Inspection/Enforcement Enhancement
-  Rain Barrel Program
-  Street Sweeping Program
-  Studies, Surveys and Assessments

# Map 5.4

WMA: Lower Sugarland Proposed Projects



### 5.1.5 Potomac WMA

#### **Description of Key WMA Conditions**

The portion of this WMA that is located within Fairfax County consists of only 70 acres and is comprised of mostly low density residential land use. Approximately 22 percent of the Potomac WMA is urbanized. The expected changes in land use show no changes to this WMA. Limiting new development will protect the watershed by conserving natural resources and limiting new pollution and stormwater runoff sources. The Potomac WMA contains one existing stormwater facility within Fairfax County.

#### **Potomac WMA Projects**

Because only 70 acres of the Potomac WMA are located in Fairfax County, there are no projects proposed in the Potomac WMA.

### 5.1.6 Upper Middle Sugarland WMA

#### **Description of Key WMA Conditions**

Approximately 82 percent of the Upper Middle Sugarland WMA is urbanized. The expected changes in land use show increases in higher density residential, industrial and open space areas and decreases in lower density residential and institutional areas. Higher density urban areas that contain less pervious surface introduce greater volumes of stormwater run off and more intense peak flows. Increases in urban development also lead to degraded wildlife habitat, increased pollutants in stormwater runoff and worsening stream conditions.

The Upper Middle Sugarland WMA contains 38 existing stormwater facilities. Approximately 76 percent of this WMA is not treated by an existing stormwater facility. According to the existing condition STEPL model results, the Upper Middle Sugarland WMA contributes approximately 20 percent of the total suspended solids, 20 percent of the total nitrogen and 20 percent of the total phosphorus annual loads to the Sugarland Watershed.

#### **Upper Middle Sugarland 10-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Upper Middle Sugarland WMA.

**SU9002** Improve existing dry pond (0337DP) to an enhanced extended detention dry basin with marsh area (SU9002C). Install new enhanced extended detention dry pond (SU9002A). Install new rain garden with educational signage (SU9002B). Repair eroded streambanks and culvert and install micro-pool (SU9002D). Larger projects are discussed below.

**SU9129** The outlet structure for existing dry pond (0336DP) is frequently clogged, reducing the functionality of the pond. Install a micro-pool with wetland vegetation above outlet structure to reduce clogging. Vegetate the pond bottom and replace concrete channel upstream with vegetated swale with check dams for energy dissipation.

- SU9130** Iron Ridge Section 2, Potomac Fairways, Van Vlecks, Chestnut Grove and Graymor subdivisions do not have existing stormwater controls. Install new extended detention dry basin and install vegetated swale behind homes/along Herndon Parkway to direct runoff to new facility.
- SU9135** Retrofit existing dry pond to enhanced extended detention dry basin with marsh areas to improve water quality and quantity treatment. Remove concrete trickle ditch, retrofit outlet structure. Install infiltration trenches in parking lot islands for additional quality control.
- SU9136** Hunter's Creek and Hunter's Creek Section 2, Ashburn, The Villages, Runnymede Manor Chelmsford, Cassa Goetting, Sugar Land Heights, Yount and Madison Forest subdivisions have no existing stormwater controls and the receiving stream is deteriorating due to high storm flows. Install a new extended detention dry basin just downstream of Runnymede Park on Hunter's Creek Pool property.
- SU9144** Some of this area does not have existing stormwater treatment. Install three new extended detention dry basins. Daylight stormwater runoff from storm sewers into basin. Install rain garden around existing depressed inlet.
- SU9203** Tributary to Sugarland Run is eroding. Remove multiflora rose obstruction below Hunter's Creek Pool parking lot and repair stream banks, including restoration of riparian buffer. Re-grade streambanks just above confluence, stabilize and install cross-vane to direct energy away from banks.
- SU9205** A straightened stream channel increases the velocity of stormwater flows. Install step pools to account for increased slope of straightened stream, improve habitat with native riparian vegetation and add in-stream structures such as cross vanes.
- SU9500** Herndon High School does not have existing stormwater controls. Install green roof on portion of roof if possible, install rain gardens in interior courtyards and direct roof leaders to them and implement education programs.
- SU9502** Herndon Elementary School does not have existing stormwater controls. Install green roof and initiate educational program.
- SU9504** The Reston North Park does not have existing stormwater controls. Install new infiltration basin in upper baseball field, daylight storm sewers to basin, vegetate and naturalize existing swales and install educational signage.
- SU9509** Install a new rain garden in the central island of the Trader Joe's parking lot and investigate headcuts in the adjacent stream.
- SU9512** The majority of Reston Hospital does not have existing stormwater controls. Install bioretention area along walking path with vegetated swales to direct parking lot drainage into bioretention. Install educational signage.

**Upper Middle Sugarland 25-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Upper Middle Sugarland WMA.

- SU9120** Existing dry ponds (0434DP and 0845DP) provide only water quantity control. Retrofit both to enhanced extended detention dry basins with marsh areas, remove the trickle ditches and install proper outlet structures.
- SU9124** Two existing dry ponds provide limited stormwater controls for Union Mill (1032DP) and North Point Glen subdivisions. Retrofit ponds to enhanced extended detention dry basins, remove concrete trickle ditch, repair embankment damage and re-grade to prevent short circuiting.
- SU9128** The majority of Reston Section 53 does not have existing stormwater treatment. Retrofit dry pond (0887DP) to enhanced extended detention dry basin with proper outlet structure, marsh areas and removal of concrete trickle ditch for improved water quality and quantity controls.
- SU9137** A portion of Reston Section 49 does not have existing stormwater treatment. Construct new enhanced extended detention dry basin with marsh areas to provide both water quality and water quantity controls and install educational signage.
- SU9501** Retrofit existing swale below Lake Newport Road to a vegetated swale to provide water quality treatment for portions of Summer Ridge and Reston Section 57.

**Upper Middle Sugarland Non-Structural Projects**

The following non-structural projects are designed to reduce stormwater flow volumes and decrease peak flows in areas with no existing stormwater management and no opportunity for new structural stormwater controls.

- SU9908** Targeted rain barrel program at Stuart Ridge, Shaker Woods, Shaker Grove, Kingstream, Hunters Creek, Potomac Fairways, Iron Ridge Sec. 2, Graymoor, Chestnut Grove, Old Drainsville Hunt Club, Jeneba Woods, Reston Sec. 49 and Sugar Land Heights subdivisions.

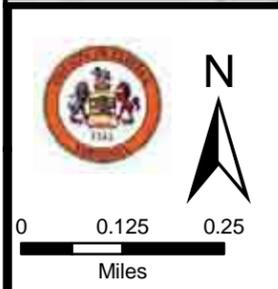
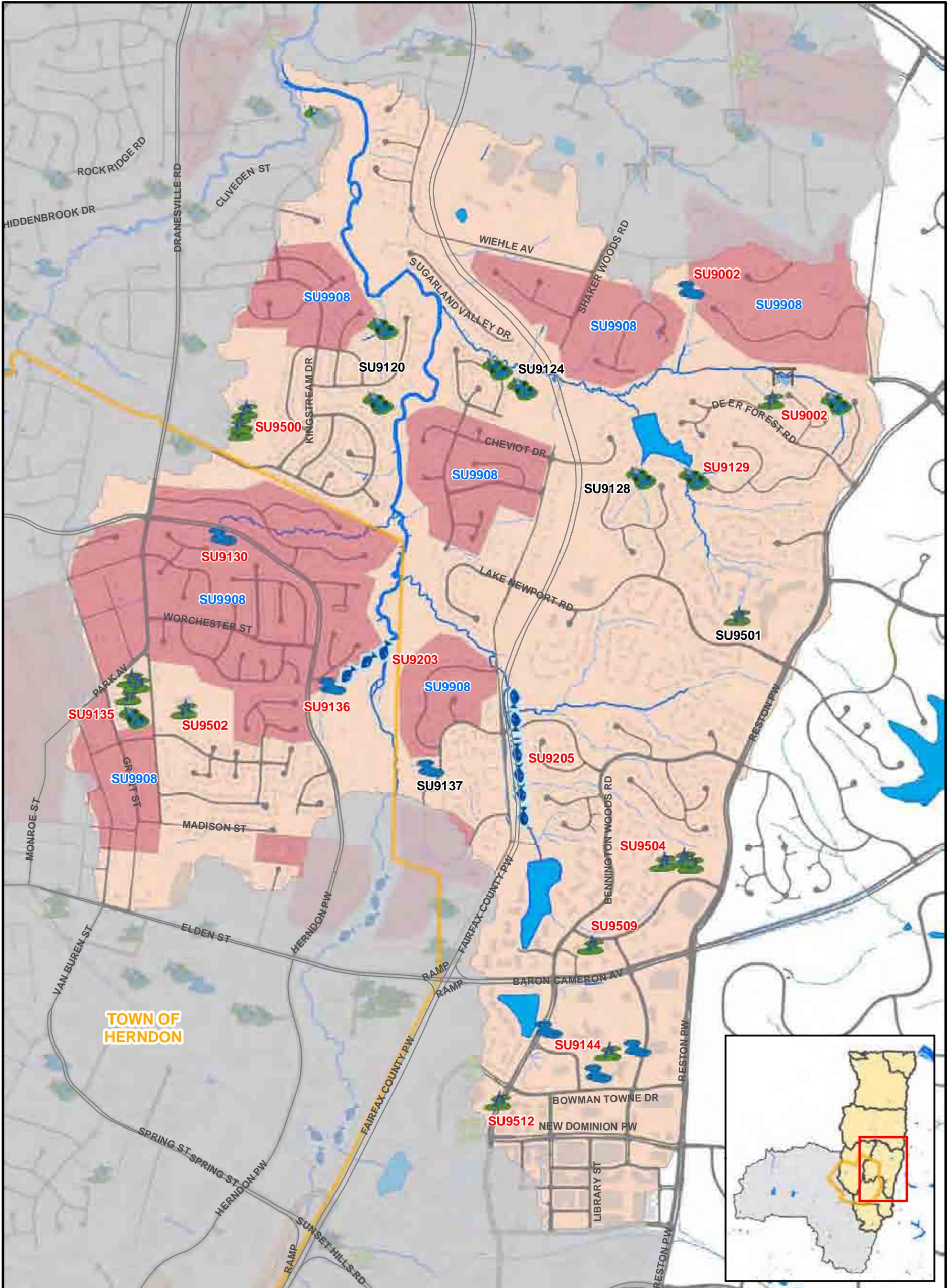
**10-Year and 25-Year Project Information Tables for Upper Middle Sugarland WMA**

Table 5.5 lists all structural and non-structural projects proposed in the Upper Middle Sugarland WMA. Project locations for all structural and non-structural projects are shown on Map 5.5.

<b>Table 5.5</b>						
<b>Project List – Upper Middle Sugarland WMA</b>						
<b>Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	<b>Phase</b>
SU9002	Regional Pond Alternative Suite	SU-RI-0003	Near Wheile Ave, between Pellow Circle Terrace & Reston Ave	Quality/ Quantity	County/ Private	0 - 10
SU9129	Stormwater Pond Retrofit	SU-RI-0002	Near Quail Ridge Court cul-de-sac	Quality	Private	0 - 10

**Table 5.5  
Project List – Upper Middle Sugarland WMA**

<b>Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	<b>Phase</b>
SU9130	New Stormwater Pond	SU-SU-0034	Near Jenny Ann Court cul-de-sac	Quality/ Quantity	Private	0 - 10
SU9135	Stormwater Pond Retrofit, BMP/LID	SU-SU-0039	Trinity Presbyterian Church	Quality/ Quantity	Private	0 - 10
SU9136	New Stormwater Pond	SU-SU-0039	Near Queens Row Street & Herndon Parkway	Quality/ Quantity	Private	0 - 10
SU9144	New Stormwater Pond, BMP/LID	SU-SU-0037	Bowman Towne Drive & Fountain Drive	Quality/ Quantity	Park/ Private	0 - 10
SU9203	Stream Restoration	SU-SU-0039	Hunters Creek HOA and Runnymede Park	Quality/ Quantity	Local/ Private	0 - 10
SU9205	Stream Restoration	SU-SU-0035	Fairfax County Parkway & Walnut Branch Road	Quality/ Quantity	State/ Private	0 - 10
SU9500	BMP/LID	SU-SU-0032	Herndon High School	Quality	County	0 - 10
SU9502	BMP/LID	SU-SU-0039	Herndon Elementary School	Quality/ Quantity	County	0 - 10
SU9504	BMP/LID	SU-SU-0035	Reston North Park	Quality/ Quantity	Park	0 - 10
SU9509	BMP/LID	SU-SU-0035	Trader Joe's	Quality	County/ Private	0 - 10
SU9512	BMP/LID	SU-SU-0037	Reston Hospital	Quality	Private	0 - 10
SU9120	Stormwater Pond Retrofit	SU-SU-0032	Near Eddyspark Drive & Kingsvale Circle	Quality/ Quantity	County/ Private	11 - 25
SU9124	Stormwater Pond Retrofit	SU-RI-0001	Near Rosiers Branch Drive & Heather Down Drive	Quantity/ Quality	County	11 - 25
SU9128	Stormwater Pond Retrofit	SU-RI-0002	Between the Fawn Ridge Lane culs-de-sac	Quantity/ Quality	County/ Private	11 - 25
SU9137	New Stormwater Pond	SU-SU-0038	Walnut Branch Road & Purple Sage Court	Quantity/ Quality	Private	11 - 25
SU9501	BMP/LID	SU-RI-0002	Lake Newport Road & North Point Drive	Quality	County/ Private	11 - 25
<b>Non-Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	
SU9908	Rain Barrel Programs	SU-RI-0003	Stuart Ridge, Shaker Woods, Shaker Grove, Kingstream, Hunters Creek, Potomac Fairways, Iron Ridge Sec. 2, Graymoor, Chestnut Grove, Old Drainsville Hunt Club, Jeneba Woods, Reston Sec. 49 and Sugar Land Heights Subdivisions	Quantity	Private	



- |                              |                          |                                     |
|------------------------------|--------------------------|-------------------------------------|
| Buffer Restoration           | New Stormwater Pond      | Area-wide Drainage Improvement      |
| Stream Restoration           | Outfall Improvement      | Community Outreach/Public Education |
| BMP/LID                      | Stormwater Pond Retrofit | Land Conservation Project           |
| Culvert Retrofit             | Other                    | Flood Protection/Mitigation         |
| Dumpsite/Obstruction Removal |                          | Inspection/Enforcement Enhancement  |
|                              |                          | Rain Barrel Program                 |
|                              |                          | Street Sweeping Program             |
|                              |                          | Studies, Surveys and Assessments    |
- Implementation timeframe denoted by project label color. Red = 0-10 years Black = 11-25 years Blue = non-structural projects.

**Map 5.5**  
WMA: Upper Middle Sugarland Proposed Projects



## 5.1.7 Upper Sugarland WMA

### **Description of Key WMA Conditions**

Approximately 88 percent of the Upper Sugarland WMA is urbanized. The expected changes in land use show increases in high density residential, high intensity commercial and industrial areas and decreases in lower density residential, lower intensity commercial and rural areas. Higher density urban areas that contain less pervious surface introduce greater volumes of stormwater run off and more intense peak flows. Increases in urban development also lead to degraded wildlife habitat, increased pollutants in stormwater runoff, and worsening stream conditions.

The Upper Sugarland WMA contains 38 existing stormwater facilities. Approximately 70 percent of this WMA is not treated by an existing stormwater facility. According to the existing condition STEPL model results, the Upper Sugarland WMA contributes approximately 15 percent of the total suspended solids, 17 percent of the total nitrogen and 15 percent of the total phosphorus annual loads to the Sugarland Watershed.

### **Upper Sugarland WMA 10-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Upper Sugarland WMA.

- SU9139** Retrofit Towns at Stuart Pointe dry pond (1456 DP) to enhanced extended detention with marsh areas. Remove concrete trickle ditch and install proper outlet structure.
- SU9143** Retrofit two existing dry ponds along Grove Street to enhanced extended detention dry basins with marsh areas and appropriate outlet structures to improve pond efficiency and function.
- SU9146** The residential and institutional area along Van Buren Street has inadequate existing stormwater control. Construct new extended detention dry pond and improve the existing dry pond by removing concrete trickle ditch and planting wetland vegetation.
- SU9147** Retrofit existing dry pond (DP0372) to enhanced extended detention basin with marsh areas and proper outlet structure; daylight inlet pipes and remove concrete trickle ditch to improve pond efficiency and provide improved treatment for professional building complex.
- SU9505** The commercial areas along Elden Street have no stormwater management controls and high impervious coverage and pollutant runoff. Install rain gardens, infiltration trenches and vegetated swales within the already developed commercial area.
- SU9514** The existing concrete channel along Sunset Hills Road provides no stream habitat or stormwater treatment. Remove trapezoidal ditch and replace with natural stream channel with cross-vanes to dissipate energy. Construct new pocket wetland at upstream end of channel.

### **Upper Sugarland WMA 25-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Upper Sugarland WMA.

- SU9140** The commercial development along Grove Street has minimal existing stormwater treatment. Retrofit existing dry pond at shopping center to enhanced extended detention dry basin and raise outlet structure. Construct new enhanced extended detention dry basin in existing depression.
- SU9141** This area does not have existing stormwater treatment. Improve dry pond (no StormNet ID) to extended detention basin. Raise and retrofit outlet structure and naturalize with native plantings.
- SU9206** Comprehensive stream restoration of Sugarland Run behind high density residential buildings around Tamarack Way. Repair pedestrian bridges, streambank erosion and headcuts in drainage channels, educate homeowners to stop mowing to banks and apply LID concepts to parking lot.
- SU9207** Repair and stabilize eroded Sugarland Run streambanks below Spring Street, install in stream structures to direct flows away from banks and restore riparian buffers.
- SU9510** The commercial development near Elden and Fairfax County PW does not have existing treatment. Install green roofs on three commercial buildings, rain gardens at Cardinal Bank and in parking lot islands and court yard, retrofit existing swale along Fairfax County PW to vegetated swale and disconnect roof drains to landscaped areas.
- SU9513** Portions of the Downs subdivision are in need of additional water quality controls. Retrofit existing swales to vegetated swales with check dams for improved water quality and energy dissipation and install a new rain garden at existing storm drain.

### **Upper Sugarland WMA Non-Structural Projects**

The following non-structural projects are designed to reduce stormwater flow volumes and decrease peak flows in areas lacking sufficient stormwater management with limited opportunity for new structural stormwater controls. Project implementation will also promote sediment deposition, decrease erosion, improve water quality and increase wildlife habitat.

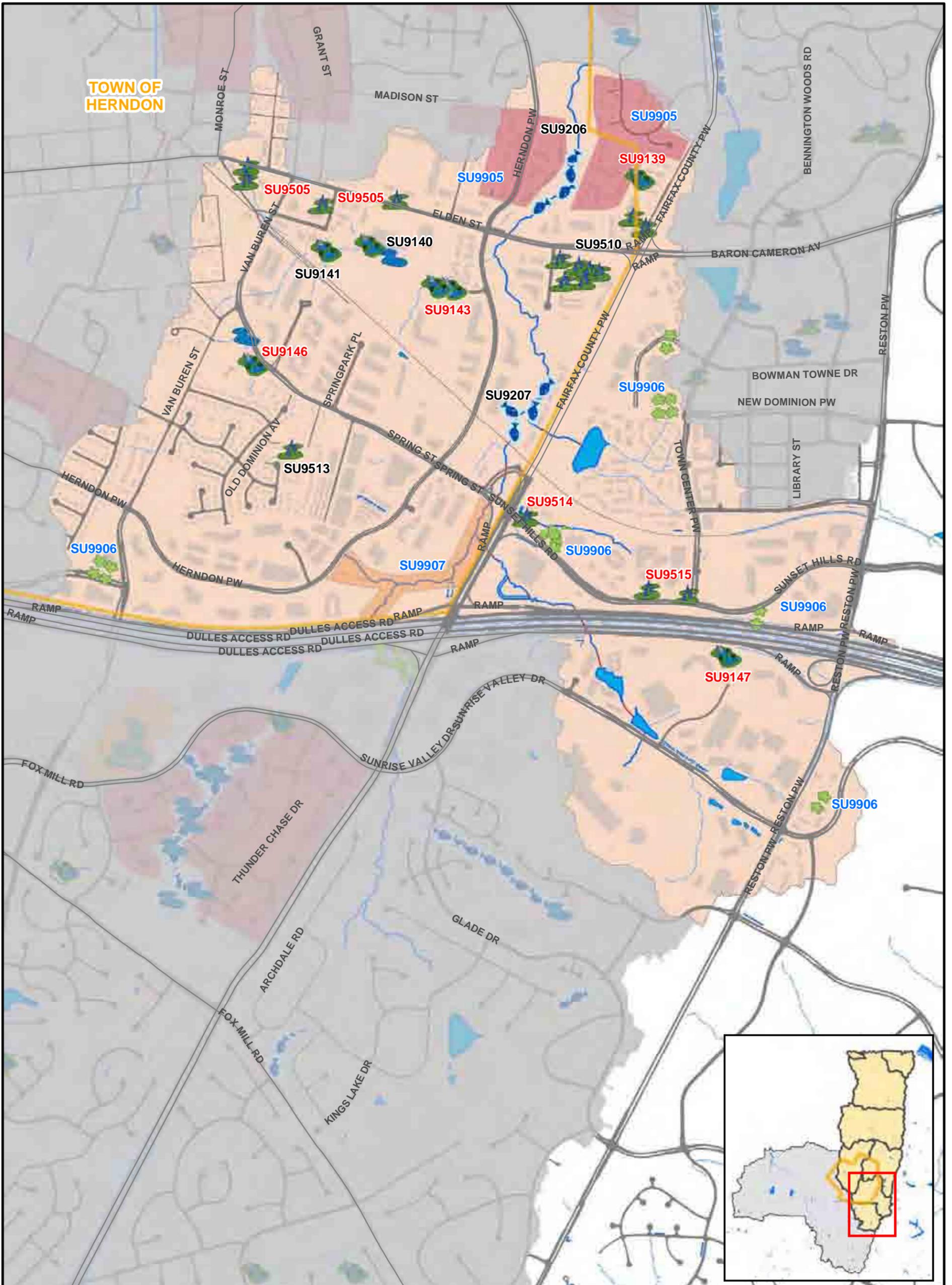
- SU9905** Targeted rain barrel program at Crestview Sec. 1, Runnymede Manor, Stuart Woods, Reston Sec 49 and Towns at Stuart Pointe subdivisions.
- SU9906** Vegetate several existing County dry ponds throughout Sugarland Upper WMA DP0564, DP0421, DP0440 and DP0202. Vegetate the existing dry pond northwest of Van Buren St and Worldgate Dr and the existing swale northwest of Town Center PW and New Dominion PW.
- SU9907** Obtain conservation easement and restore buffer at least 100-foot wide around the streams northwest of Fairfax County PW and Dulles Access Rd to provide nutrient and sediment removal and flood control for area slated for industrial development.

### **10-Year and 25-Year Project Information Tables for Upper Sugarland WMA**

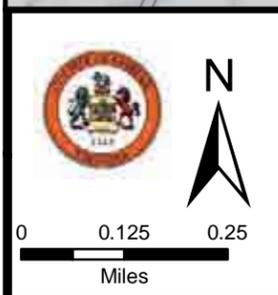
Table 5.6 lists all structural and non-structural projects proposed in the Upper Sugarland WMA. Project locations for all structural and non-structural projects are shown on Map 5.6.

<b>Table 5.6</b>						
<b>Project List – Upper Sugarland WMA</b>						
<b>Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	<b>Phase</b>
SU9139	Stormwater Pond Retrofit	SU-SU-0040	Towns at Stuart Pointe Subdivision, Stuart Pointe Lane	Quality/Quantity	County	0 - 10
SU9143	Stormwater Pond Retrofit	SU-SU-0041	Near Grove Street & Herndon Parkway	Quality/Quantity	Private	0 - 10
SU9146	Stormwater Pond Retrofit, New Stormwater Pond	SU-SU-0041	Next to St. Timothy's Episcopal Church, Spring Street	Quality/Quantity	County/Private	0 - 10
SU9147	Stormwater Pond Retrofit	SU-SU-0046	Near Edmund Halley Drive & Sunrise Valley Drive	Quality/Quantity	Private	0 - 10
SU9505	BMP/LID	SU-SU-0041	Near Elden Street & Van Buren Street	Quality/Quantity	Private	0 - 10
SU9514	BMP/LID	SU-SU-0045	Sunset Hills Road & Fairfax County Parkway	Quality	State/Private	0 - 10
SU9515	BMP/LID	SU-SU-0045	Sunset Hills Road & Town Center Parkway	Quantity	Private	0 - 10
SU9140	New Stormwater Pond, Stormwater Pond Retrofit	SU-SU-0041	Safeway; corner of Post Drive & Grove Street	Quantity/Quality	Private	11 - 25
SU9141	Stormwater Pond Retrofit	SU-SU-0041	Substation near Grove Street & Grant Street	Quality/Quantity	Private	11 - 25
SU9206	Stream Restoration	SU-SU-0040	Near Herndon Parkway & Tamarack Way	Quality	Private	11 - 25
SU9207	Stream Restoration	SU-SU-0042	Near Fairfax County Parkway & New Dominion Parkway	Quality	Private	11 - 25
SU9510	BMP/LID	SU-SU-0040	Near Elden Street & Fairfax County Parkway	Quality	State/Private	11 - 25
SU9513	BMP/LID	SU-SU-0043	Near Old Dominion Avenue & Aspen Drive	Quality	Private	11 - 25
<b>Non-Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	
SU9905	Rain Barrel Programs	SU-SU-0040	Crestview Sec. 1, Runnymede Manor, Stuart Woods, Reston Sec. 49 and Towns at Stuart Pointe Subdivisions	Quantity	Private	
SU9906	Buffer Restoration	SU-SU-0040	Near Fairfax County Parkway & Sunset Hills Road	Quality	County/Private	
SU9907	Conservation Acquisition Project/ Land Conservation Coordination Project, Buffer Restoration	SU-SU-0040	Stream corridors near Herndon Parkway & Fairbrook Drive	Quality	Private	

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**TOWN OF HERNDON**



- |                              |                          |                                     |
|------------------------------|--------------------------|-------------------------------------|
| Buffer Restoration           | New Stormwater Pond      | Area-wide Drainage Improvement      |
| Stream Restoration           | Outfall Improvement      | Community Outreach/Public Education |
| BMP/LID                      | Stormwater Pond Retrofit | Land Conservation Project           |
| Culvert Retrofit             | Other                    | Flood Protection/Mitigation         |
| Dumpsite/Obstruction Removal |                          | Inspection/Enforcement Enhancement  |
|                              |                          | Rain Barrel Program                 |
|                              |                          | Street Sweeping Program             |
|                              |                          | Studies, Surveys and Assessments    |
- Implementation timeframe denoted by project label color. Red = 0-10 years Black = 11-25 years Blue = non-structural projects.

## Map 5.6

WMA: Upper Sugarland  
Proposed Projects



## 5.2 Horsepen Creek Watershed WMAs

Each subsection of Section 5.2 includes a description of key WMA conditions, a description of proposed structural and non-structural 10-year projects in the WMA, a listing of 10-year and 25-year projects for the WMA, and a map showing the types and locations of all 10-year and 25-year projects within the WMA. Each WMA in the Horsepen Creek watershed is described separately. Additional project details, benefits and design considerations for the projects in the 10-year implementation plan are included on the project fact sheets located in Section 5.3.

### 5.2.1 Cedar Run WMA

#### **Description of Key WMA Conditions**

Approximately 73 percent of the Cedar Run WMA is urbanized. The expected changes in land use show increases in high and low density residential areas and decreases in estate residential and open space areas. Higher density urban areas that contain less pervious surface introduce greater volumes of stormwater run off and more intense peak flows. Increases in urban development also lead to degraded wildlife habitat, increased pollutants in stormwater runoff and worsening stream conditions.

The Cedar Run WMA contains 16 existing stormwater facilities. Approximately 67 percent of this WMA is not treated by an existing stormwater facility. According to the existing condition STEPL model results, the Cedar Run WMA contributes approximately five percent of the total suspended solids, seven percent of the total nitrogen and seven percent of the total phosphorus annual loads to the Horsepen Watershed.

#### **Cedar Run WMA 10-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Cedar Run WMA.

**HC9007** HC-CR-0002 does not have any existing stormwater controls. Construct a new in-line enhanced extended detention basin (modified scope of RP H-07) and various energy dissipation and stream and habitat restoration projects throughout the subwatershed.

**HC9013** Subbasins HC-CR-0004 and 0005 have minimal stormwater controls. A combination of eighteen basin retrofits, wetlands, BMPs and outfall improvements will provide stormwater controls for more than two-thirds of the subbasins' 421 acres.

**HC9133** Retrofit existing dry pond (no StormNet ID) to enhanced extended dry detention basin including removal of paved ditch and intercepting additional upstream drainage. Improve channel downstream with energy dissipating structures and replace upstream paved ditches with vegetated swales.

**HC9143** Existing dry ponds 1001DP and 1116DP provide only water quantity control. Retrofit basins to enhanced extended detention basins to improve quality and quantity treatment. Remove concrete channels, raise outlet structure and repair

erosion at outfalls.

### **Cedar Run WMA 25-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Cedar Run WMA.

- HC9135** Existing dry pond 0443DP provides only water quantity treatment. Retrofit basin to enhanced extended detention basin to improve quality and quantity controls. Removing concrete trickle ditches, clear sediment from inlets and improve energy dissipation at outfall.
- HC9138** A portion of Emerald Chase subdivision has no stormwater controls and erosion is impacting walking path. Construct small constructed wetlands at three locations just below the walking trail and improve downstream channels with energy dissipation.
- HC9146** Existing dry ponds 1059DP and 0406DP provide only water quantity control. Retrofit basins to extended detention basins to improve quality and quantity treatment. Replace concrete channels within ponds and in nearby channel with vegetated swales.
- HC9302** Stormwater drainage is piped without treatment along Fairfax County Parkway. Disconnected piped drainage and re-route stormwater flows through a natural swale with rock check dams installed for energy dissipation.

### **Cedar Run WMA Non-Structural Projects**

The following non-structural project is designed to reduce stormwater flow volumes and decrease peak flows in areas lacking sufficient stormwater management with limited opportunity for new structural stormwater controls. Project implementation will also promote sediment deposition, decrease erosion, improve water quality and increase wildlife habitat.

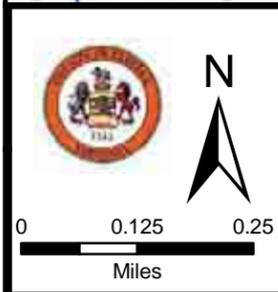
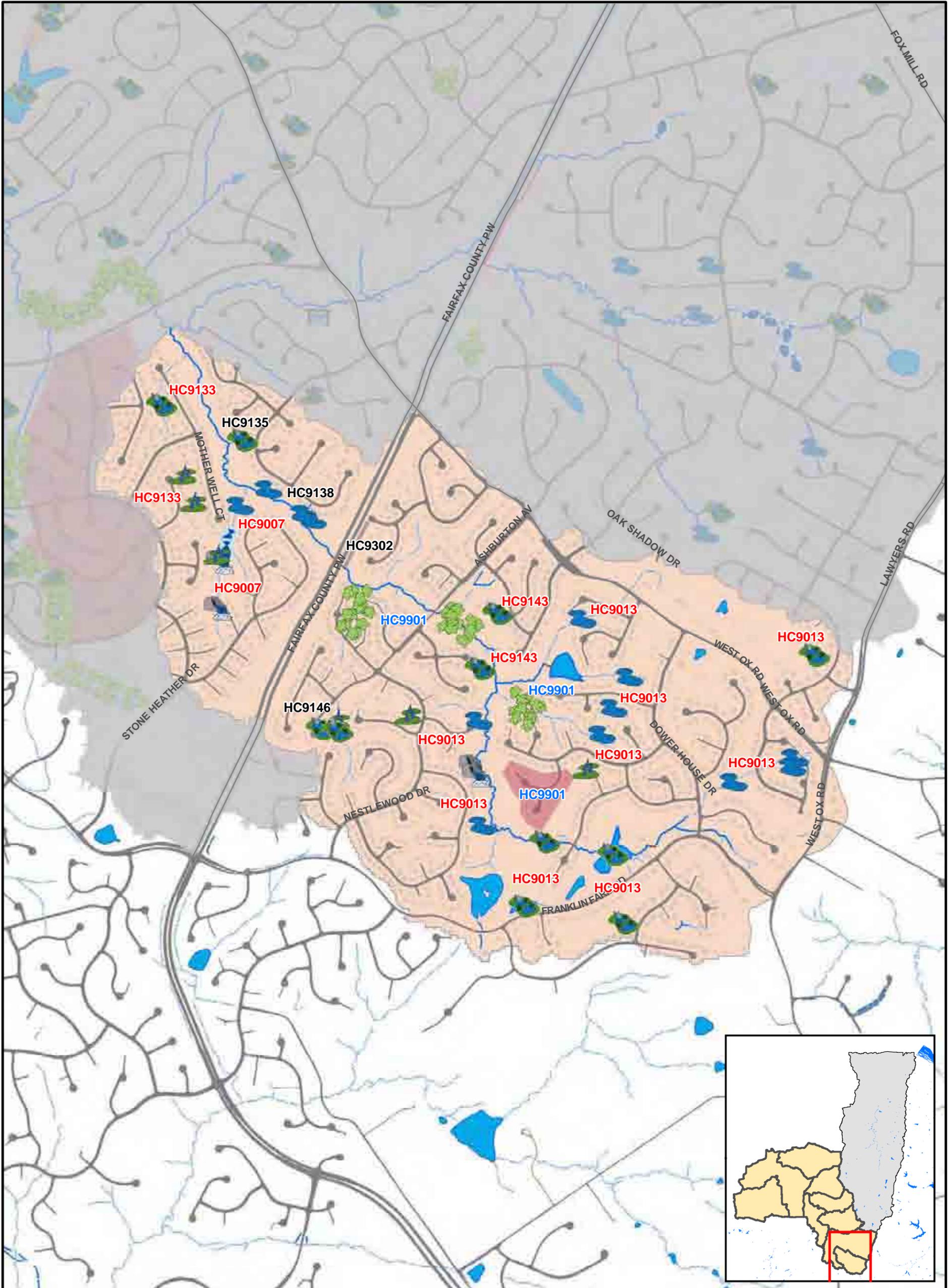
- HC9901** Restore riparian buffer along Cedar Branch (east of Ashburton Ave) and along a tributary stream within Chantilly Highlands (north of Grey Friars Pl). Targeted rain barrel program for homes on Cross Creek Ln & Cross Creek Ct. Remove invasive vegetation from existing dry pond 0603DP and replant with native vegetation.

### **10-Year and 25-Year Project Information Tables for Cedar Run WMA**

Table 5.7 lists all structural and non-structural projects proposed in the Cedar Run WMA. Project locations for all structural and non-structural projects are shown on Map 5.7.

<b>Table 5.7</b>						
<b>Project List – Cedar Run WMA</b>						
<b>Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	<b>Phase</b>
HC9007	Regional Pond Alternative Suite	HC-CR-0002	Between Ladybank Lane & Mother Well Court	Quality/ Quantity	Park/ Private	0 - 10
HC9013	Regional Pond Alternative Suite	HC-CR-0004/05	Between Franklin Farm Rd, West Ox Rd & Ashburton Ave	Quality/ Quantity	County/ Private	0 - 10
HC9133	Stormwater Pond Retrofit, BMP/LID, Stream Restoration	HC-CR-0001	Near Glen Taylor Lane & Mother Well Court	Quantity/ Quality	Park/ Private	0 - 10
HC9143	Stormwater Pond Retrofit	HC-CR-0003	Off of Ashburton Avenue, near Thistlethorn Drive & Saffron Drive	Quantity/ Quality	County	0 - 10
HC9135	Stormwater Pond Retrofit	HC-CR-0001	Near Emerald Chase Drive & Rover Glen Court	Quantity/ Quality	Private	11 - 25
HC9138	New Stormwater Pond	HC-CR-0001	Near Emerald Chase Drive & Ruby Lace Court	Quality	Park	11 - 25
HC9146	Stormwater Pond Retrofit, BMP/LID	HC-CR-0003	Near Ashburton Avenue & Wheeler Way	Quantity/ Quality	County/ Private	11 - 25
HC9302	Area-wide Drainage Improvement	HC-CR-0001	Burchlawn Street cul-de-sac	Quality	N/A	11 - 25
<b>Non-Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	
HC9901	Buffer Restoration, Rain Barrel Programs	HC-CR-0002	Near Ashburton Avenue & Thistlethorn Drive	Quality/ Quantity	Park/ Private	

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Buffer Restoration	Stream Restoration	New Stormwater Pond	Area-wide Drainage Improvement
BMP/LID	Culvert Retrofit	Outfall Improvement	Community Outreach/Public Education
Dumpsite/Obstruction Removal	Stormwater Pond Retrofit	Other	Land Conservation Project
			Flood Protection/Mitigation
			Inspection/Enforcement Enhancement
			Rain Barrel Program
			Street Sweeping Program
			Studies, Surveys and Assessments

Implementation timeframe denoted by project label color. Red = 0-10 years Black = 11-25 years  
Blue = non-structural projects.

**Map 5.7**  
WMA: Horsepen-Cedar  
Proposed Projects



## 5.2.2 Frying Pan WMA

### **Description of Key WMA Conditions**

Approximately 72 percent of the Frying Pan WMA is urbanized. The expected changes in land use show increases in higher density residential and commercial/industrial areas and decreases in low density residential, institutional and open space areas. Higher density urban areas that contain less pervious surface introduce greater volumes of stormwater run off and more intense peak flows. Increases in urban development also lead to degraded wildlife habitat, increased pollutants in stormwater runoff and worsening stream conditions.

The Frying Pan WMA contains 24 existing stormwater facilities. Approximately 59 percent of this WMA is not treated by an existing stormwater facility. According to the existing condition STEPL model results, the Frying Pan WMA contributes approximately seven percent of the total suspended solids, 10 percent of the total nitrogen and 10 percent of the total phosphorus annual loads to the Horsepen Watershed.

### **Frying Pan WMA 10-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Frying Pan WMA.

- HC9106** The current outlet structure for dry pond 1288DP is a large five foot culvert. The pond will be improved by adding a box weir to the culvert with a low flow orifice, re-grading the bottom of the pond for more capacity and replanting with native vegetation.
- HC9109** Retrofit existing dry pond (0406DP) to an enhanced extended dry detention basin to improve quality and quantity treatment. Remove concrete trickle ditch, create a forebay at each inlet, install marsh areas and retrofit the outlet structure for extended detention.
- HC9114** Retrofit existing dry pond (1416DP) to an enhanced extended dry detention basin to improve quality and quantity treatment. Install a forebay north of the walking path, re-grade the basin bottom with a meander and marsh areas and install a proper outlet structure.
- HC9116** Sycamore Ridge area does not have existing stormwater controls. The drainage channels show signs of erosion. Construct new pocket wetlands at outfalls to slow stormwater and increase nutrient uptake. Repair drainage channels with rock and vegetation.
- HC9119** Existing dry pond (0610DP) provides only water quantity control. Improve basin to an enhanced extended detention dry basin, disconnect three upstream outfalls and install two small forebays and a proper outlet structure to provide quality treatment and improve quantity controls.
- HC9127** Existing dry ponds (0563DP and 0631DP) provide only water quantity control. Improve basins to enhanced extended dry detention basins with marsh areas including the removal of a concrete trickle ditch and the installation of proper

outlet structures.

**HC9503** Frying Pan Park/Kidwell Farm does not have existing stormwater controls. Install vegetated swale along east side of horse ring to intercept overland flow from parking lot and divert to new bioretention area south of horse ring. Install educational signage.

### **Frying Pan WMA 25-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Frying Pan WMA.

**HC9111** Retrofit existing dry ponds 1485DP and 0933DP to enhanced extended detention dry basins to improve quantity and quality functions. Remove concrete trickle ditches and repair culverts and erosion below outfalls.

**HC9117** Improve quality and quantity benefits of existing dry pond (1224DP) by removing concrete trickle ditch, raising outfall structure for additional storage capacity and planting low marsh vegetation for improved nutrient removal.

**HC9124** Retrofit existing dry pond 1222DP to improve water quality control. Repair erosion upstream of concrete trickle ditch, replace concrete trickle ditches with meandering vegetated swales and vegetated basin bottom with low marsh plants.

### **Frying Pan WMA Non-Structural Projects**

The following non-structural project is designed to reduce stormwater flow volumes and decrease peak flows in areas lacking sufficient stormwater management with limited opportunity for new structural stormwater controls. Project implementation will also promote sediment deposition, decrease erosion, improve water quality and increase wildlife habitat.

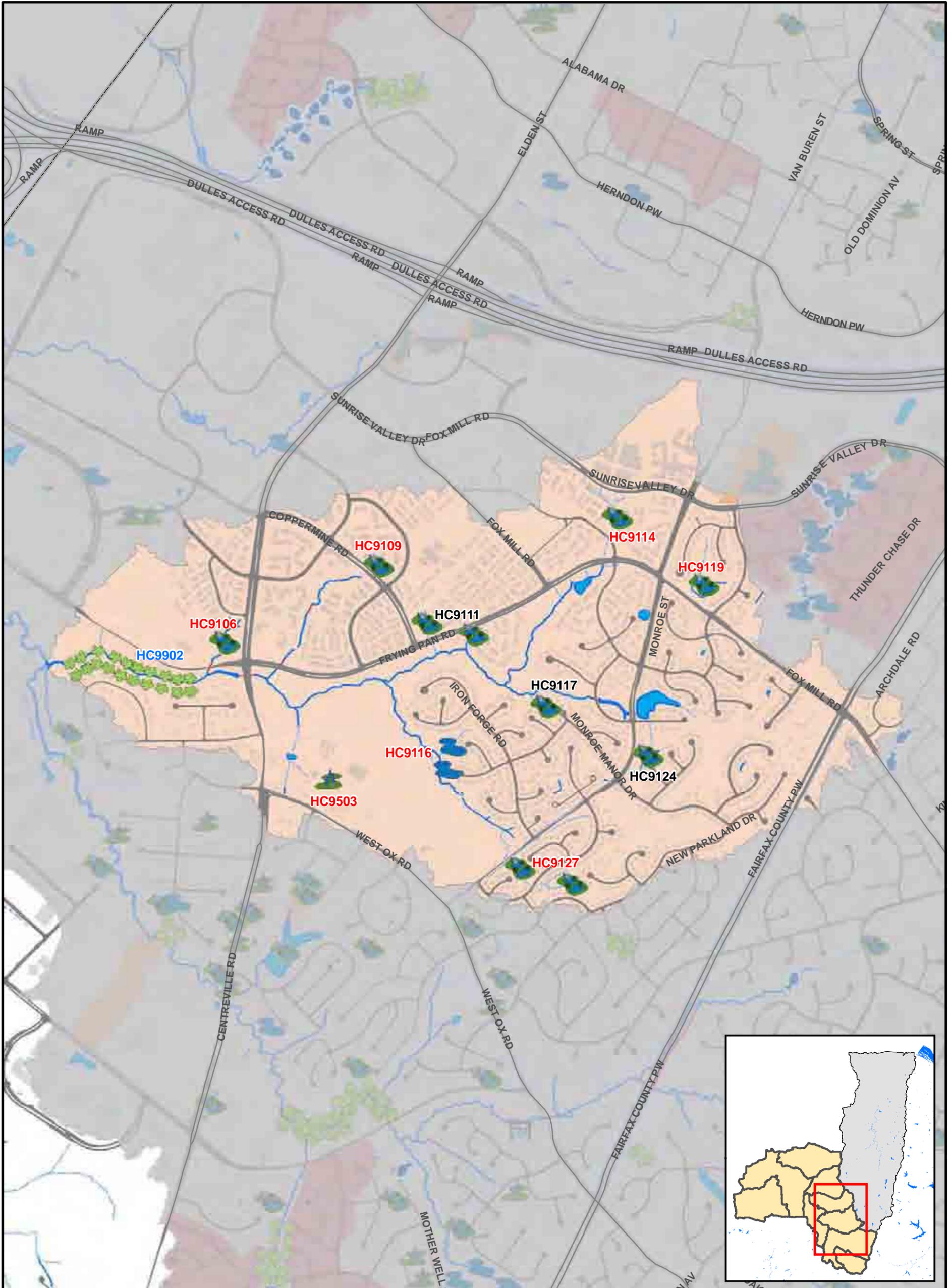
**HC9902** Much of the riparian buffer in the Copper Crossing subdivision has been removed. Restore riparian buffer along Frying Pan Branch within the Copper Crossing Subdivision.

**10-Year and 25-Year Project Information Tables for Frying Pan WMA**

Table 5.8 lists all structural and non-structural projects proposed in the Frying Pan WMA. Project locations for all structural and non-structural projects are shown on Map 5.8.

<b>Table 5.8</b>						
<b>Project List – Frying Pan WMA</b>						
<b>Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	<b>Phase</b>
HC9106	Stormwater Pond Retrofit	HC-FP-0001	Frying Pan Road & Centreville Road	Quality/Quantity	State/County/Private	0 - 10
HC9109	Stormwater Pond Retrofit	HC-FP-0002	Between Coppermine Rd, Thomas Jefferson Dr & Masons Ferry Dr	Quality/Quantity	Private	0 - 10
HC9114	Stormwater Pond Retrofit	HC-FP-0004	Fox Mill Road & Cabin Creek Road	Quality/Quantity	Private	0 - 10
HC9116	New Stormwater Pond	HC-FP-0003	Near Halterbreak Court & Curved Iron Road culs-de sac	Quality	Park	0 - 10
HC9119	Stormwater Pond Retrofit	HC-FP-0005	Colts Brook Drive & Fox Mill Road	Quality/Quantity	County	0 - 10
HC9127	Stormwater Pond Retrofit	HC-FP-0003	Near Medow Hall Drive & New Carson Drive	Quality/Quantity	County/Private	0 - 10
HC9503	BMP/LID	HC-FP-0001	Frying Pan Park/Kidwell Farm	Quality	Park	0 - 10
HC9111	Stormwater Pond Retrofit	HC-FP-0004	Near Frying Pan Road & Coppermine Road	Quantity/Quality	County/Park	11 - 25
HC9117	Stormwater Pond Retrofit	HC-FP-0004	Monroe Manor Drive cul-de-sac	Quantity/Quality	County	11 - 25
HC9124	Stormwater Pond Retrofit	HC-FP-0005	Near Locksley Court cul-de-sac	Quantity/Quality	County	11 - 25
<b>Non-Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	
HC9902	Buffer Restoration	HC-FP-0001	Stream corridors near Copper Bed Road & Copper Hill Road	Quality	County/Park	

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 <p>0 0.125 0.25 Miles</p>	<ul style="list-style-type: none"> <li> Buffer Restoration</li> <li> Stream Restoration</li> <li> BMP/LID</li> <li> Culvert Retrofit</li> <li> Dumpsite/Obstruction Removal</li> </ul>	<ul style="list-style-type: none"> <li> New Stormwater Pond</li> <li> Outfall Improvement</li> <li> Stormwater Pond Retrofit</li> <li> Other</li> </ul> <p>Implementation timeframe denoted by project label color. Red = 0-10 years Black = 11-25 years Blue = non-structural projects</p>	<ul style="list-style-type: none"> <li> Area-wide Drainage Improvement</li> <li> Community Outreach/Public Education</li> <li> Land Conservation Project</li> <li> Flood Protection/Mitigation</li> <li> Inspection/Enforcement Enhancement</li> <li> Rain Barrel Program</li> <li> Street Sweeping Program</li> <li> Studies, Surveys and Assessments</li> </ul>	<h2 style="text-align: center;">Map 5.8</h2> <p style="text-align: center;">WMA: Horsepen Frying Pan Proposed Projects</p>
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### **5.2.3 Indian WMA, Lower Horsepen WMA and Stallion WMA**

#### **Description of Key WMA Conditions**

The portion of the Indian WMA that is located within Fairfax County consists of only 5.3 acres, and contains mostly medium density residential land use. Approximately 49 percent of the Indian WMA is urbanized. The Indian WMA contains no existing stormwater facilities within Fairfax County.

The portion of the Lower Horsepen WMA that is located within Fairfax County consists of only 20.6 acres, and contains mostly industrial land use. Approximately 44 percent of the Lower Horsepen WMA is urbanized. The expected changes in land use show no changes to this WMA within Fairfax County. The Lower Horsepen WMA contains no existing stormwater facilities within Fairfax County.

The Stallion WMA lies entirely within Loudoun County. Approximately 16 percent of the Stallion WMA is urbanized.

Due to the limited areas located within Fairfax County, no projects are proposed in these WMAs.

### **5.2.4 Lower Middle Horsepen WMA**

#### **Description of Key WMA Conditions**

Approximately 68 percent of the Lower Middle Horsepen WMA is urbanized. The expected changes in land use show increases in high density/intensity areas and decreases in low density/intensity rural areas. Higher density urban areas that contain less pervious surface introduce greater volumes of stormwater run off and more intense peak flows. Increases in urban development also lead to degraded wildlife habitat, increased pollutants in stormwater runoff and worsening stream conditions.

The Lower Middle Horsepen WMA contains 37 existing stormwater facilities. Approximately 89 percent of this WMA is not treated by an existing stormwater facility. According to the existing condition STEPL model results, the Lower Middle Horsepen WMA contributes approximately 11 percent of the total suspended solids, 12 percent of the total nitrogen and 13 percent of the total phosphorus annual loads to the Horsepen Watershed.

#### **Lower Middle Horsepen WMA 10-Year Projects**

The following structural project is designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Lower Middle Horsepen WMA.

- HC9200** Horsepen Creek streambanks are eroded and incised in a park-like area below Parcher Avenue. Retrofit culvert with micro pool above Parcher Ave. and install small basin below athletic court to control stormwater flows. Re-grade and stabilize stream banks, vegetate stone drainage channels and install check dams, restore buffer and install educational signage.

**Lower Middle Horsepen WMA 25-Year Projects**

The following structural project is designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Lower Middle Horsepen WMA.

- HC9100** Install a new enhanced extended detention dry basin in existing drainage swale with established wetland vegetation, including installation of an outlet structure and minimal grading.
- HC9101** Existing dry pond in Four Seasons Section 2 provides only quantity controls. Retrofit pond to an enhanced, extended detention dry basin to improve water quantity controls and provide water quality treatment.
- HC9400** A culvert under Rock Hill Road is habitually clogging with sediment and debris. Install a micro-pool above the weir to reduce clogging. Improve wetland vegetation within weir for additional nutrient removal.

**Lower Middle Horsepen WMA Non-Structural Projects**

The following non-structural project is designed to reduce stormwater flow volumes and decrease peak flows in areas lacking sufficient stormwater management with limited opportunity for new structural stormwater controls. Project implementation will also promote sediment deposition, decrease erosion, improve water quality and increase wildlife habitat.

- HC9903** Targeted Rain Barrel Program at Reflection Lake Homeowners Association and Four Season Homeowners Association. Restore riparian buffer upstream of Parcher Avenue in Reflection Lake Sections 9 & 10.

**10-Year and 25-Year Project Information Tables for Lower Middle Horsepen WMA**

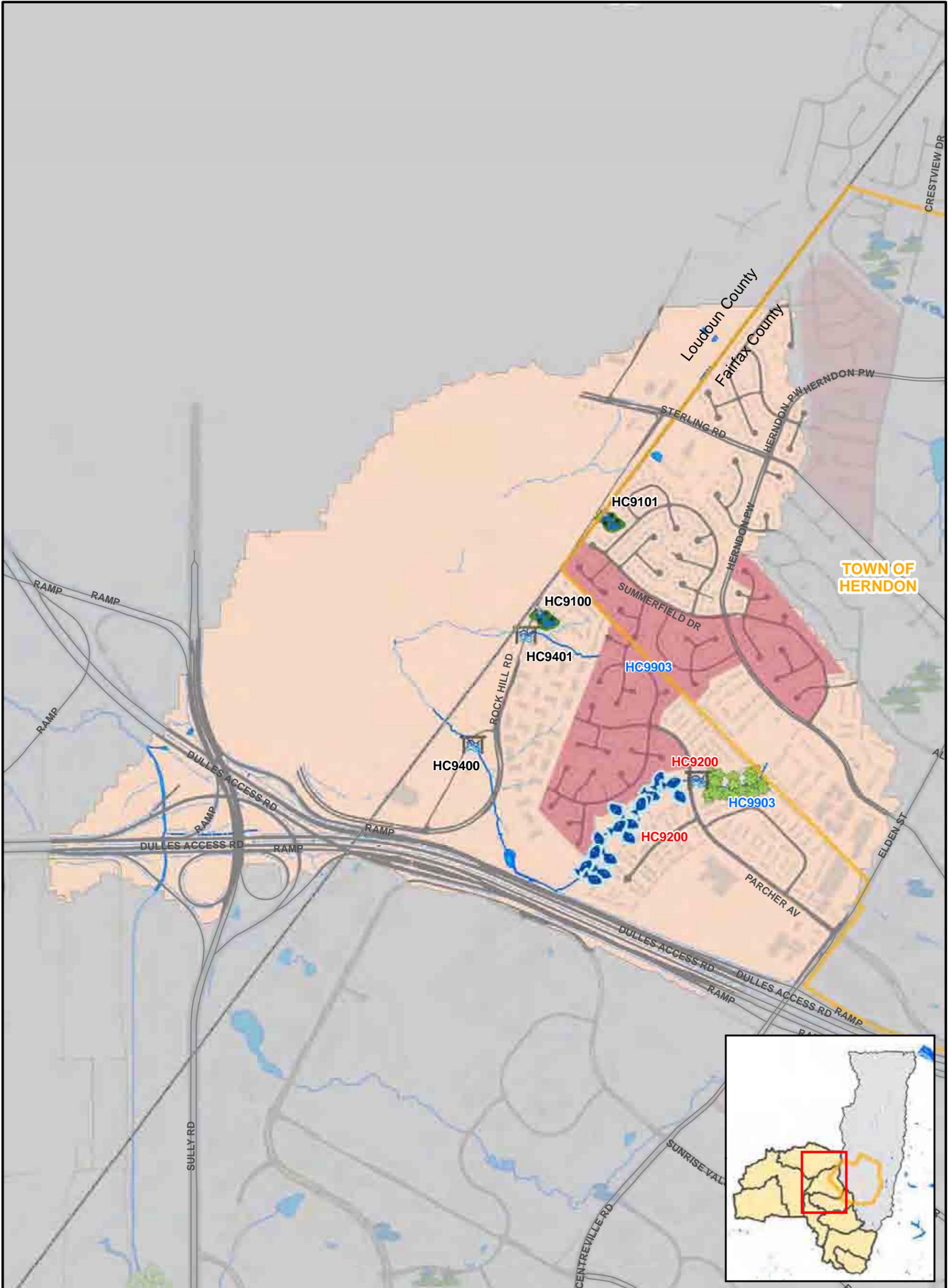
Table 5.9 lists all structural and non-structural projects proposed in the Lower Middle Horsepen WMA. Project locations for all structural and non-structural projects are shown on Map 5.9.

<b>Table 5.9</b>						
<b>Project List – Lower Middle Horsepen WMA</b>						
<b>Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	<b>Phase</b>
HC9200	Culvert Retrofit, Stream Restoration	HC-HC-0020	Near Parcher Avenue & Monaghan Drive, next to the Reflection Lake pool	Quality	Private	0 - 10
HC9100	Stormwater Pond Retrofit	HC-HC-0018	Rock Hill Road & Turquoise Lane	Quantity/ Quality	Private	11 - 25
HC9101	Stormwater Pond Retrofit	HC-HC-0017	Near Spring Knoll Drive & Summerset Place	Quantity/ Quality	Private	11 - 25
HC9400	Culvert Retrofit	HC-HC-0019	Near Rock Hill Road & Innovation Avenue	Quality	State/ Private	11 - 25
HC9401	Culvert Retrofit	HC-HC-0018	Near Rock Hill Road & Innovation Avenue	Quantity	State	11 - 25

**Table 5.9**  
**Project List – Lower Middle Horsepen WMA**

<b>Non-Structural Projects</b>					
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>
HC9903	Buffer Restoration, Rain Barrel Programs	HC-HC-0018	Reflection Lake HOA & Four Season HOA (Herndon)	Quality/Quantity	Private

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**TOWN OF  
HERNDON**



 <p>N</p> <p>0 0.125 0.25 Miles</p>	<ul style="list-style-type: none"> <li> Buffer Restoration</li> <li> Stream Restoration</li> <li> BMP/LID</li> <li> Culvert Retrofit</li> <li> Dumpsite/Obstruction Removal</li> </ul>	<ul style="list-style-type: none"> <li> New Stormwater Pond</li> <li> Outfall Improvement</li> <li> Stormwater Pond Retrofit</li> <li> Other</li> </ul> <p>Implementation timeframe denoted by project label color. Red = 0-10 years Black = 11-25 years Blue = non-structural projects</p>	<ul style="list-style-type: none"> <li> Area-wide Drainage Improvement</li> <li> Community Outreach/Public Education</li> <li> Land Conservation Project</li> <li> Flood Protection/Mitigation</li> <li> Inspection/Enforcement Enhancement</li> <li> Rain Barrel Program</li> <li> Street Sweeping Program</li> <li> Studies, Surveys and Assessments</li> </ul>	<h2 style="text-align: center;">Map 5.9</h2> <p style="text-align: center;">WMA: Horsepen Lower Middle Proposed Projects</p>
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## 5.2.5 Merrybrook WMA

### **Description of Key WMA Conditions**

Approximately 79 percent of the Merrybrook WMA is urbanized. The expected changes in land use show increases in high and low density residential, commercial and industrial areas and decreases in estate residential, institutional and open space areas. Higher density urban areas that contain less pervious surface introduce greater volumes of stormwater run off and more intense peak flows. Increases in urban development also lead to degraded wildlife habitat, increased pollutants in stormwater runoff and worsening stream conditions.

The Merrybrook WMA contains no existing stormwater facilities. Approximately 76 percent of this WMA is not treated by an existing stormwater facility. According to the existing condition STEPL model results, the Merrybrook WMA contributes approximately seven percent of the total suspended solids, 10 percent of the total nitrogen and nine percent of the total phosphorus annual loads to the Horsepen Watershed.

### **Merrybrook WMA 10-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Merrybrook WMA.

**HC9107** The community around Arkansas Ave. and Palmer Dr. does not have existing stormwater controls. Construct new enhanced extended detention dry basin with marsh areas to collect stormwater runoff conveyed in storm sewers and swale outlet to stream channel.

**HC9110** The community around Palmer Drive does not have existing stormwater controls. Daylight piped storm sewers and construct new enhanced extended detention dry basin below new outfall.

### **Merrybrook WMA 25-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Merrybrook WMA.

**HC9104** Construct new enhanced extended detention dry basin below untreated commercial park, an extended detention outlet structure and wetland vegetation will provide quantity and quality controls for this area.

### **Merrybrook WMA Non-Structural Projects**

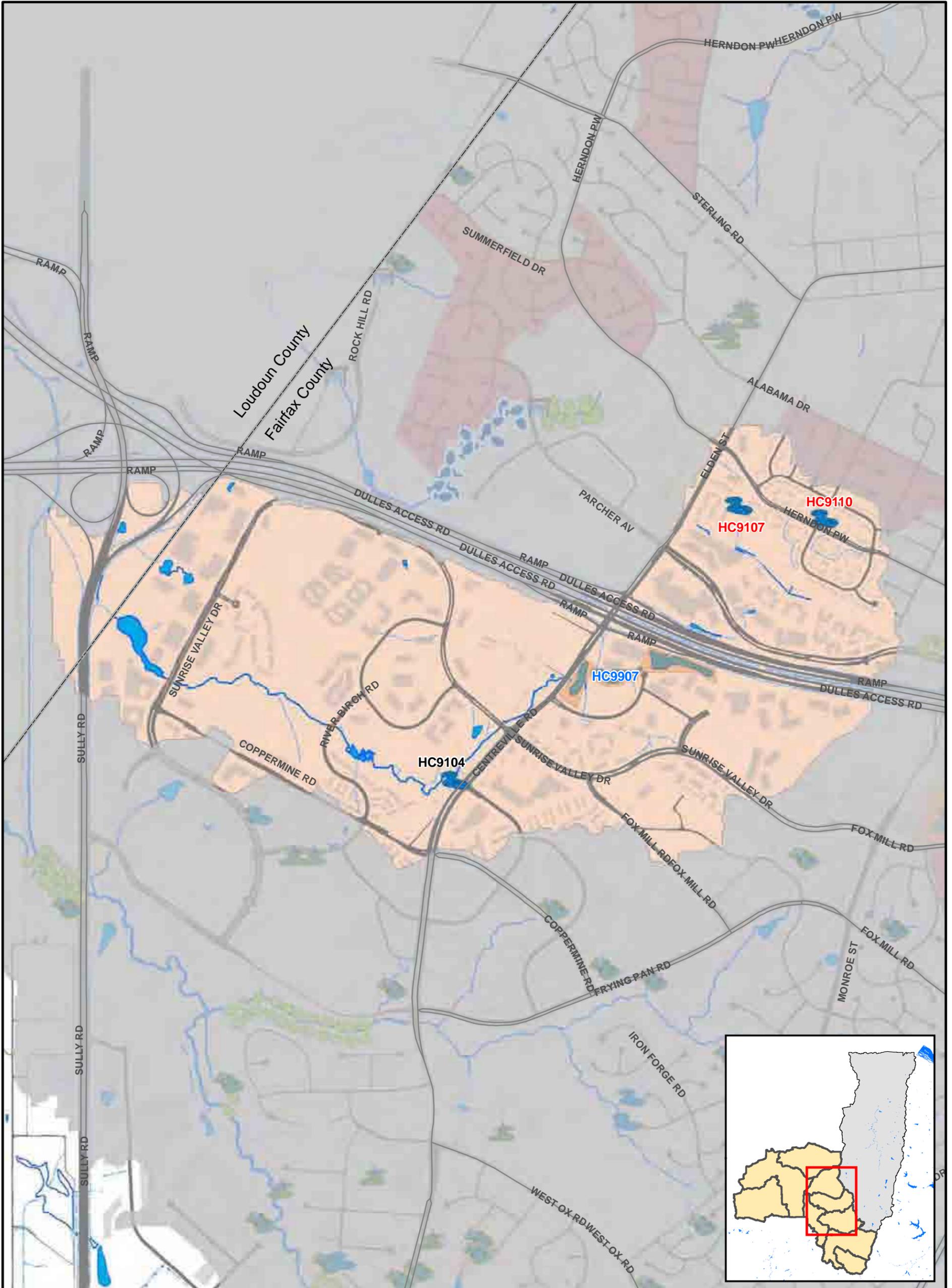
The following non-structural project is designed to reduce stormwater flow volumes and decrease peak flows in areas lacking sufficient stormwater management with limited opportunity for new structural stormwater controls. Project implementation will also promote sediment deposition, decrease erosion, improve water quality and increase wildlife habitat.

**HC9907** Obtain conservation easement and restore buffer around a series of wet ponds at the intersection of Dulles Access Road and Centreville Road.

**10-Year and 25-Year Project Information Tables for Merrybrook WMA**

Table 5.10 lists all structural and non-structural projects proposed in the Merrybrook WMA. Project locations for all structural and non-structural projects are shown on Map 5.10.

<b>Table 5.10</b>						
<b>Project List – Merrybrook WMA</b>						
<b>Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	<b>Phase</b>
HC9107	New Stormwater Pond	HC-MR-0004	Palmer Drive & Dogwood Court	Quality/Quantity	Local	0 - 10
HC9110	New Stormwater Pond	HC-MR-0004	Herndon Parkway & Campbell Way	Quality/Quantity	Private	0 - 10
HC9104	New Stormwater Pond	HC-MR-0002	Centreville Road & McNair Farms Drive	Quality	Private	11 - 25
<b>Non-Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	
HC9907	Conservation Acquisition Project/ Land Conservation Coordination Project, Buffer Restoration	HC-MR-0002	Centreville Road & Woodland Park Road	Quality	County/ Private	



<p>0 0.125 0.25 Miles</p>	<ul style="list-style-type: none"> <li> Buffer Restoration</li> <li> Stream Restoration</li> <li> BMP/LID</li> <li> Culvert Retrofit</li> <li> Dumpsite/Obstruction Removal</li> </ul>	<ul style="list-style-type: none"> <li> New Stormwater Pond</li> <li> Outfall Improvement</li> <li> Stormwater Pond Retrofit</li> <li> Other</li> </ul> <p>Implementation timeframe denoted by project label color. Red = 0-10 years Black = 11-25 years Blue = non-structural projects</p>	<ul style="list-style-type: none"> <li> Area-wide Drainage Improvement</li> <li> Community Outreach/Public Education</li> <li> Land Conservation Project</li> <li> Flood Protection/Mitigation</li> <li> Inspection/Enforcement Enhancement</li> <li> Rain Barrel Program</li> <li> Street Sweeping Program</li> <li> Studies, Surveys and Assessments</li> </ul>	<h2 style="text-align: center;">Map 5.10</h2> <p style="text-align: center;">WMA: Horsepen Merrybrook Proposed Projects</p>
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## 5.2.6 Middle Horsepen WMA

### **Description of Key WMA Conditions**

Approximately 69 percent of the Middle Horsepen WMA is urbanized. The expected changes in land use show increases in high and low density residential, low intensity commercial and industrial areas and decreases in estate residential, high intensity commercial and open space areas. Higher density urban areas that contain less pervious surface introduce greater volumes of stormwater run off and more intense peak flows. Increases in urban development also lead to degraded wildlife habitat, increased pollutants in stormwater runoff and worsening stream conditions.

The Middle Horsepen WMA contains no existing stormwater facilities. Approximately 75 percent of this WMA is not treated by an existing stormwater facility. According to the existing condition STEPL model results, the Middle Horsepen WMA contributes approximately six percent of the total suspended solids, six percent of the total nitrogen and six percent of the total phosphorus annual loads to the Horsepen Watershed.

### **Middle Horsepen WMA 10-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Middle Horsepen WMA.

- HC9102** An existing swale with wetland vegetation is a prime location for a new enhanced extended detention dry pond with minimal grading required for low marsh areas and berm along tennis courts.
- HC9108** Retrofit existing dry pond 0426DP to an enhanced extended detention dry pond to improve quantity and quality functions. Improve and repair erosion to the inlet and downstream channel.
- HC9500** Install rain garden at the entrance of Sutters Mill Drive with curb cuts in the existing curbing. Re-grade and vegetate existing basin bottom. Cut existing outlet pipe and fit with a raised yard drain outlet structure.

### **Middle Horsepen WMA 25-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Middle Horsepen WMA.

- HC9103** Retrofit existing sediment basin to a proper extended detention dry pond, intercept stormwater drainage from swale along Dulles Toll Road and re-route into improved stormwater basin.
- HC9113** Enlarge and retrofit existing dry pond to extended detention basin including removal of concrete trickle ditches. Intercept storm flow from adjacent drainage ditch, improve outfall to stream and investigate source of suspicious discharge in drainage ditch.

**HC9115** Existing dry pond (0495DP) provides only water quantity treatment. Improve pond by retrofitting outlet structure for extended detention, installing a sediment forebay across Mustang Drive to the east and maintaining existing natural vegetation.

**HC9501** Mountain View subdivision does not have existing stormwater controls and overland flow is causing erosion. Construct vegetated swales with bioretention to manage and treat overland stormwater flows.

**HC9502** Floris Elementary School does not have existing stormwater controls. Retrofit existing drainage swale along athletic fields to a vegetated swale and direct swale and overland flow into a new infiltration basin in the lower end of the fields.

**Middle Horsepen WMA Non-Structural Projects**

The following non-structural project is designed to reduce stormwater flow volumes and decrease peak flows in areas lacking sufficient stormwater management with limited opportunity for new structural stormwater controls. Project implementation will also promote sediment deposition, decrease erosion, improve water quality and increase wildlife habitat.

**HC9904** Restore riparian buffers along three sections of Horsepen Run: west of Sully Road, within Rogers Farm Section 1 and within Mustang Crossing. Obtain conservation easement to protect riparian buffer and existing habitat below existing wet pond WP0342.

**10-Year and 25-Year Project Information Tables for Middle Horsepen WMA**

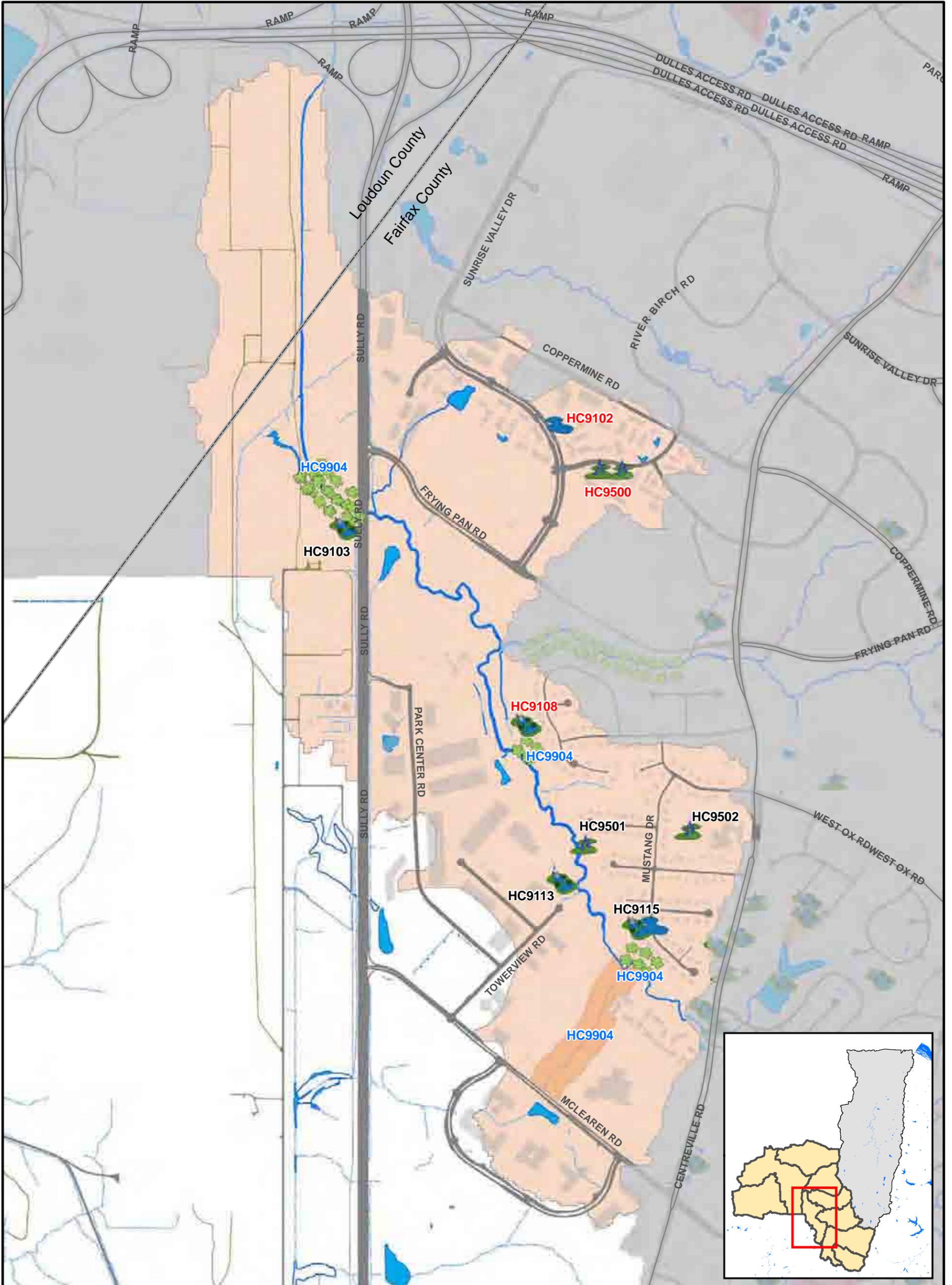
Table 5.11 lists all structural and non-structural projects proposed in the Middle Horsepen WMA. Project locations for all structural and non-structural projects are shown on Map 5.11.

<b>Table 5.11 Project List – Middle Horsepen WMA</b>						
<b>Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	<b>Phase</b>
HC9102	New Stormwater Pond	HC-HC-0026	Legacy Circle & Sunrise Valley Drive	Quality/ Quantity	Private	0 - 10
HC9108	Stormwater Pond Retrofit	HC-HC-0028	Near Copper Creek Road & Copper Creek Court	Quantity/ Quality	County/ Park	0 - 10
HC9500	BMP/LID	HC-HC-0026	Wellesley Subdivision, Stratford Glen Place	Quality	Private	0 - 10
HC9103	Stormwater Pond Retrofit	HC-HC-0025	Dulles Int'l Airport, near Sully Rd & electric substation	Quantity/ Quality	Federal	11 - 25
HC9113	Stormwater Pond Retrofit	HC-HC-0028	Towerview Road cul-de-sac	Quantity/ Quality	Private	11 - 25
HC9115	Stormwater Pond Retrofit, New Stormwater Pond	HC-HC-0028	Near Mustang Drive & Maverick Lane	Quantity/ Quality	County/ Private	11 - 25
HC9501	BMP/LID	HC-HC-0028	Along stream corridor between Floris Street & Mountainview Court	Quality	Private	11 - 25
HC9502	BMP/LID	HC-HC-0028	Floris Elementary School	Quality	Park	11 - 25

**Table 5.11  
Project List – Middle Horsepen WMA**

<b>Non-Structural Projects</b>					
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>
HC9904	Conservation Acquisition Project/ Land Conservation Coordination Project	HC-HC-0026	Stream corridors near Sully Road & Park Center Road	Quality	Federal/County/ Park/ Private

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 <p>0 0.125 0.25 Miles</p>	<ul style="list-style-type: none"> <li> Buffer Restoration</li> <li> Stream Restoration</li> <li> BMP/LID</li> <li> Culvert Retrofit</li> <li> Dumpsite/Obstruction Removal</li> </ul>	<ul style="list-style-type: none"> <li> New Stormwater Pond</li> <li> Outfall Improvement</li> <li> Stormwater Pond Retrofit</li> <li> Other</li> </ul>	<ul style="list-style-type: none"> <li> Area-wide Drainage Improvement</li> <li> Community Outreach/Public Education</li> <li> Land Conservation Project</li> <li> Flood Protection/Mitigation</li> <li> Inspection/Enforcement Enhancement</li> <li> Rain Barrel Program</li> <li> Street Sweeping Program</li> <li> Studies, Surveys and Assessments</li> </ul> <p>Implementation timeframe denoted by project label color. Red = 0-10 years Black = 11-25 years Blue = non-structural projects</p>	<h2 style="text-align: center;">Map 5.11</h2> <p style="text-align: center;">WMA: Horsepen-Middle Proposed Projects</p>
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## 5.2.7 Upper Horsepen WMA

### **Description of Key WMA Conditions**

Approximately 80 percent of the Upper Horsepen WMA is urbanized. The expected changes in land use show increases in low and medium density residential, high intensity commercial and industrial areas and decreases in estate residential, low intensity commercial and open space areas. Higher density urban areas that contain less pervious surface introduce greater volumes of stormwater run off and more intense peak flows. Increases in urban development also lead to degraded wildlife habitat, increased pollutants in stormwater runoff and worsening stream conditions.

The Upper Horsepen WMA contains 38 existing stormwater facilities. Approximately 67 percent of this WMA is not treated by an existing stormwater facility. According to the existing condition STEPL model results, the Upper Horsepen WMA contributes approximately 12 percent of the total suspended solids, 17 percent of the total nitrogen and 18 percent of the total phosphorus annual loads to the Horsepen Watershed.

### **Upper Horsepen WMA 10-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Upper Horsepen WMA.

- HC9118** Existing dry basins (0803DP and unnamed dry basin) provide only water quantity control. The basins will be improved to enhanced extended dry detention basins by retrofitting existing or installing new outlet structures and planting native vegetation.
- HC9121** Three existing dry ponds (VDOT29068, DP0015, DP0015) provide only water quantity control. Improve basins with water quality controls and remove concrete trickle ditches. Install vegetated swales in road dividers.
- HC9122** Existing non-stormwater pond (FM0014) will be retrofitted to a stormwater wet pond including a slight draw down of the water level to provide additional storage, installing an outlet structure, installing vegetation and repairing a seep in the dam.
- HC9123** Retrofit existing dry pond (0196DP) to an enhanced extended dry detention basin by removing a concrete trickle ditch, adding an outlet structure, restoring the downstream channel with vegetation and restoring access to the site.
- HC9126** Existing dry pond (0562DP) provides only water quantity control. Improve basin to an enhanced extended dry detention basin, enlarge size for more capacity, install a forebay to catch sediment and install an outlet structure.
- HC9128** The Korean Orthodox Presbyterian dry pond (no StormNet ID) provides only water quantity control. Improve basin to an enhanced extended dry detention basin including the removal of a concrete trickle ditch and the addition of an outlet structure.
- HC9129** Improve existing dry pond (0568DP) to an enhanced extended dry detention basin with marsh areas, install a natural low flow channel and retrofit outlet structure.

Concrete swales will be removed/vegetated and educational signage will be installed.

**HC9132** Highland Mews existing dry pond (1055DP) provides only water quantity control. Improve basin to an enhanced extended dry detention basin, remove concrete trickle ditch, install an outlet structure and install riprap at outfalls for energy dissipation.

**HC9134** Chantilly Highlands community does not have existing stormwater controls. Improve regional pond H-19 (0747DP) by adding a box weir to detain water and naturalize. Install small forebays at each outfall and naturalize swales to a new bioretention basin.

**HC9136** Fox Mill Estates' existing dry pond provides only water quantity control. Improve basin to a constructed wetland. Enlarge basin, install a low v-notch weir as an outlet structure, install a fence and educational signage.

**HC9137** A portion of Fox Mill Estates does not have existing stormwater controls. Install three constructed wetlands, redirect and meander channels and restore streambank with grading, boulder toe and vegetation. Restore the riparian vegetated buffer.

**HC9140** Fox Mill Estates' existing dry pond (0243DP) provides only water quantity control. Improve basin to an enhanced extended dry detention basin, install outlet structure, raise the emergency spillway and naturalize the basin.

**HC9142** Fox Mill Estates' existing dry pond (0176DP) provides only water quantity control. Install forebay, slightly enlarge basin and retrofit outlet structure. Install constructed wetland near Kettering Drive and install riprap in channel below outfall.

**HC9149** Remove existing concrete channel between Chasbarb Terrace and Viking Drive and vegetate. Install check dams in the channel for energy dissipation and install a constructed wetland in the lower portion of the channel.

**HC9201** A portion of the Fox Mill Estates community does not have existing stormwater controls. Re-grade eroded streambanks and vegetate with floodplain vegetation. Restore channel with several rock vanes.

### **Upper Horsepen WMA 25-Year Projects**

The following structural projects are designed to reduce stormwater runoff volumes, decrease peak flows, reduce pollutants in stormwater runoff and improve overall habitat and stream quality in the Upper Horsepen WMA.

**HC9125** Spring Lakes Estates West Sect. 2 does not have any stormwater controls. Install a new constructed wetland within a small clearing below stormwater outfall, include energy dissipation below outfall and repair drainage channel downstream.

**HC9130** Improve Middleton Farm existing dry pond (1349DP) to an enhanced extended dry detention basin by removing the concrete trickle ditch, replacing the concrete apron with riprap, installing an outlet structure and raising the emergency overflow.

**HC9131** Existing dry pond 1349DP provides only water quantity treatment, improve quantity and quality controls by retrofitting to an enhanced extended detention pond. Improve channel and repair culvert under nearby walking path, install constructed wetland below culvert.

**HC9139** The Fox Mill Estates community around Bradwell Road has no stormwater controls. Install new constructed wetlands below two stormwater outfalls to provide water quality and water quantity treatment.

**HC9148** Existing stormwater ponds 0011DP and 0012DP provide only water quantity control. Retrofit basins to enhanced extended detention basins, utilizing and expanding on the natural wetlands and improving stream channels above and below the ponds.

**HC9505** Existing stormwater pond 0440DP provides only water quantity controls. Improve quantity and quality controls by replacing concrete channel with a vegetated swale and raising outlet structure. Maintain mowed field for community support.

### **Upper Horsepen WMA Non-Structural Projects**

The following non-structural projects are designed to reduce stormwater flow volumes and decrease peak flows in areas lacking sufficient stormwater management with limited opportunity for new structural stormwater controls. Project implementation will also promote sediment deposition, decrease erosion, improve water quality and increase wildlife habitat.

**HC9905** Obtain conservation easement above existing pond (FM0014) to preserve riparian buffer and existing habitat. Remove obstructions in Horsepen Creek below McLearn Road (SPA reach 9-1) and restore riparian buffer. Restore riparian buffers above and below Kinross Circle. Stop mowing and existing dry pond in Franklin Woods subdivision and allow natural vegetation to mature. Vegetate existing dry pond (0440DP) in Monterey subdivision and break up concrete trickle ditch.

**HC9906** Targeted rain barrel programs for portions of Chantilly Highlands without any existing or proposed stormwater controls.

## **10-Year and 25-Year Project Information Tables for Upper Horsepen WMA**

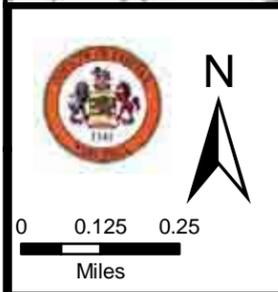
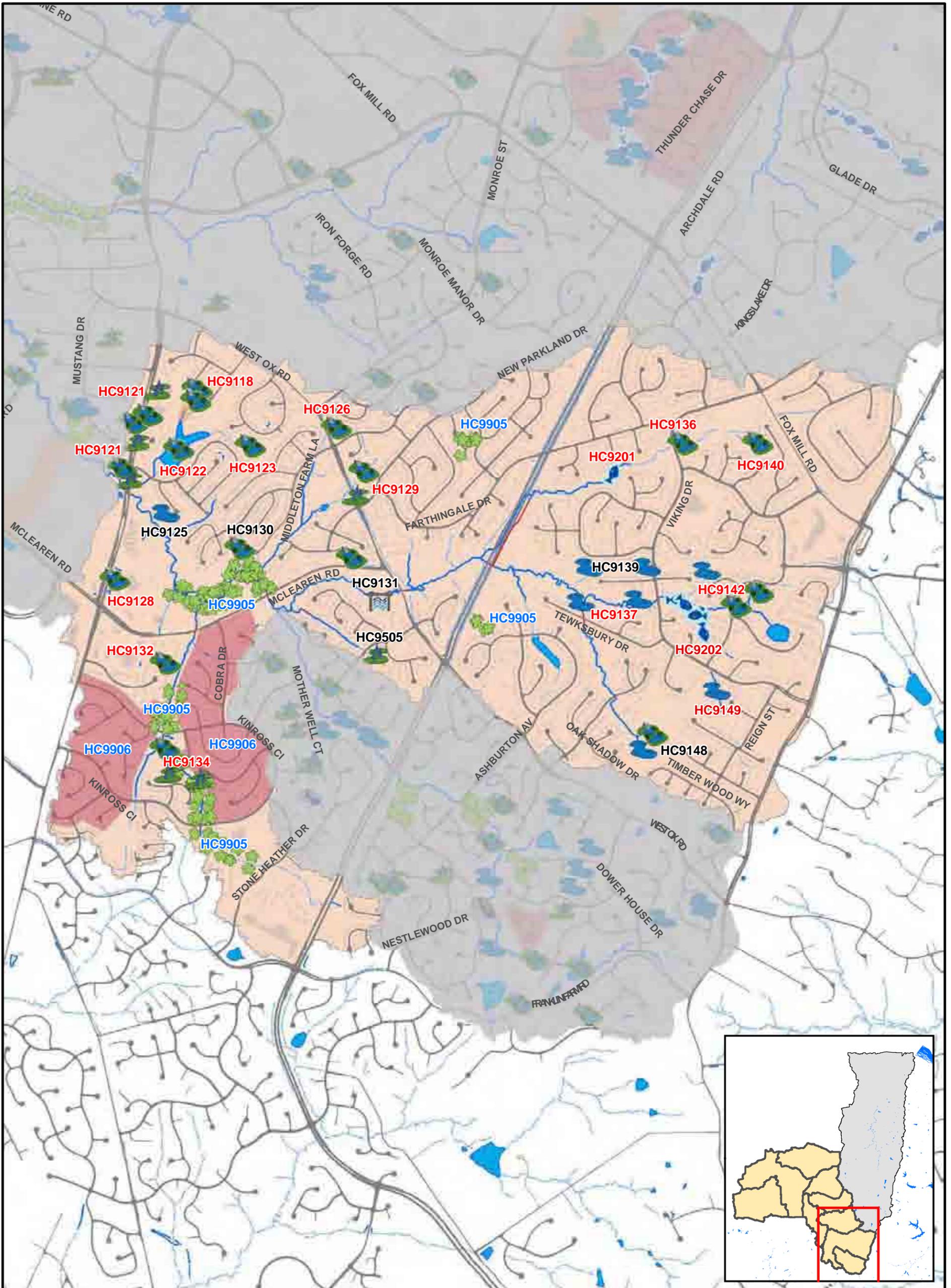
Table 5.12 lists all structural and non-structural projects proposed in the Upper Horsepen WMA. Project locations for all structural and non-structural projects are shown on Map 5.12.

<b>Table 5.12</b>						
<b>Project List – Upper Horsepen WMA</b>						
<b>Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	<b>Phase</b>
HC9118	Stormwater Pond Retrofit	HC-HC-0030	Between Floris Lane & Merricourt Lane culs-de-sac	Quality/ Quantity	Private	0 - 10
HC9121	Stormwater Pond Retrofit, BMP/LID	HC-HC-0030	Centreville Road & Lake Shore Drive	Quality/ Quantity	State/ Park/ Private	0 - 10
HC9122	Stormwater Pond Retrofit	HC-HC-0030	Lake Shore Drive & Running Pump Lane	Quality/ Quantity	Private	0 - 10
HC9123	Stormwater Pond Retrofit	HC-HC-0030	Near Point Rider Lane & Equus Court	Quality/ Quantity	County	0 - 10
HC9126	Stormwater Pond Retrofit	HC-HC-0034	Monterey Estates Drive & West Ox Road	Quality/ Quantity	County	0 - 10
HC9128	Stormwater Pond Retrofit	HC-HC-0031	Korean Orthodox Presbyterian Church, McLearn Road & Centreville Road	Quality/ Quantity	Private	0 - 10
HC9129	Stormwater Pond Retrofit, BMP/LID	HC-HC-0034	West Ox Road & New Parkland Drive	Quality/ Quantity	County/ State	0 - 10
HC9132	Stormwater Pond Retrofit	HC-HC-0032	Highland Mews Subdivision, Hutumn Court & Highland Mews Court	Quality/ Quantity	Private	0 - 10
HC9134	Stormwater Pond Retrofit, BMP/LID	HC-HC-0033	Kinross Circle & Scotsmore Way	Quality/ Quantity	Private	0 - 10
HC9136	Stormwater Pond Retrofit	HC-HC-0037	Near Viking Drive & Pinecrest Road	Quality/ Quantity	Private	0 - 10
HC9137	Stream Restoration, New Stormwater Pond	HC-HC-0039	Between Tewksbury Drive & Kettering Drive	Quality	Private	0 - 10
HC9140	Stormwater Pond Retrofit	HC-HC-0037	Huntington Drive cul-de-sac	Quality/ Quantity	Private	0 - 10
HC9142	Stormwater Pond Retrofit, New Stormwater Pond	HC-HC-0040	Quincy Adams Drive & Quincy Adams Court	Quality/ Quantity	Private	0 - 10
HC9149	New Stormwater Pond	HC-HC-0040	Chasbarb Terrace & Chasbarb Court	Quality	Private	0 - 10
HC9201	Stream Restoration	HC-HC-0037	Between Claxton Drive & Conquest Place culs-de-sac	Quality	Private	0 - 10
HC9202	Stream Restoration	HC-HC-0039	Between Quincy Adams Court, Viking Court & Prince Harold Court culs-de-sac	Quality	Private	0 - 10
HC9125	New Stormwater Pond	HC-HC-0031	Near Spring Chapel Court cul-de-sac	Quality	Park	11 - 25

**Table 5.12  
Project List – Upper Horsepen WMA**

<b>Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	<b>Phase</b>
HC9130	Stormwater Pond Retrofit	HC-HC-0031	Middleton Farm Subdivision, between Middleton Farm Lane & Blue Holly Lane culs-de-sac	Quality/Quantity	Park	11 - 25
HC9131	Stormwater Pond Retrofit, Culvert Retrofit	HC-HC-0035	Near West Ox Road & McLearen Road	Quantity/Quality	County/Private	11 - 25
HC9139	New Stormwater Pond	HC-HC-0039	Near Bradwell Road & Litchfield Drive	Quality	County	11 - 25
HC9148	Stormwater Pond Retrofit, New Stormwater Pond	HC-HC-0039	Near Glenbrooke Woods Drive cul-de-sac	Quality	Private	11 - 25
HC9505	BMP/LID	HC-HC-0035	Near Emerald Chase Drive & Lazy Glen Court	Quality	County	11 - 25
<b>Non-Structural Projects</b>						
<b>Project #</b>	<b>Project Type</b>	<b>Subwatershed</b>	<b>Location</b>	<b>Watershed Benefit</b>	<b>Land Owner</b>	
HC9905	Conservation Acquisition Project/ Land Conservation Coordination Project, Dumpsite/ Obstruction Removal, Buffer Restoration	HC-HC-0030	Stream corridors near McLearen Road & Cobra Drive	Quality	County/ Park/ Private	
HC9906	Rain Barrel Programs	HC-HC-0030	Chantilly Highlands	Quantity	Private	

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|------------------------------|--------------------------|-------------------------------------|
| Buffer Restoration           | New Stormwater Pond      | Area-wide Drainage Improvement      |
| Stream Restoration           | Outfall Improvement      | Community Outreach/Public Education |
| BMP/LID                      | Stormwater Pond Retrofit | Land Conservation Project           |
| Culvert Retrofit             | Other                    | Flood Protection/Mitigation         |
| Dumpsite/Obstruction Removal |                          | Inspection/Enforcement Enhancement  |
|                              |                          | Rain Barrel Program                 |
|                              |                          | Street Sweeping Program             |
|                              |                          | Studies, Surveys and Assessments    |
- Implementation timeframe denoted by project label color. Red = 0-10 years Black = 11-25 years  
Blue = non-structural projects

**Map 5.12**  
WMA: Horsepen-Upper  
Proposed Projects

