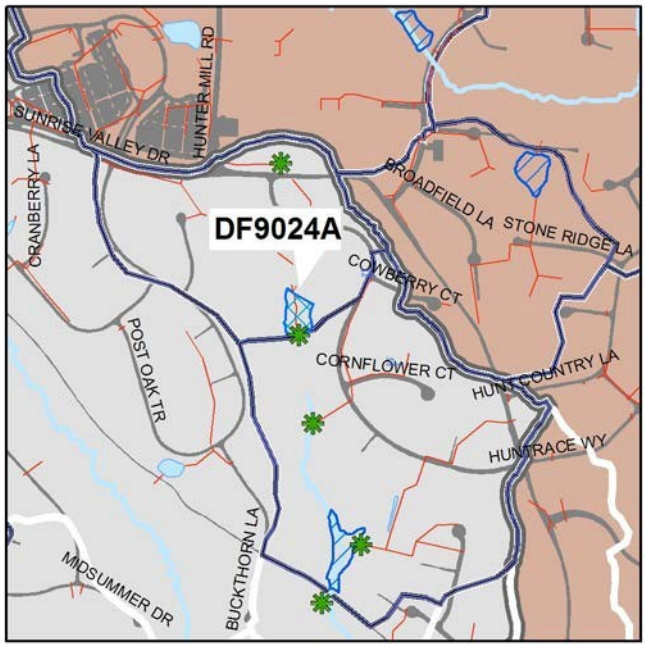
Project Number: DF9024A
Catchment Code: DFSB9201
Candidate Site: D-24

Project Type: Pond Retrofit
Project Size: 0.9 acres
Treated Area: 36.7 acres



Project Location: This project is located near Clovermeadow Drive.

Project Description: By modifying the control structure and excavating the available storage space directly upstream of the riser, the function of the facility can be significantly improved. Channel protection is achieved by converting the existing control structure to a multi-stage riser. Although space is limited, water quality treatment within this facility can be created with further excavation of the pond bottom to create a shallow marsh at the base of the riser. By routing the existing flow channel within the pond through the marsh area, significant improvement in nutrient removal and sediment settling will take place.

Potential Project Benefits:

Peak Flow	100% of the channel protection volume can be attained.
Water Quality	A wetland component at the face of the riser will provide 15% of the water quality treatment volume.

Potential Project Constraints:

Environmental	Environmental permitting issues are anticipated, but should be manageable as a retrofit project. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this project is very good from a paved access road.
Design / Construction	Surrounding wooded areas and private property boundaries limit the space available for improvement. County staff will coordinate with the facility owner to implement the project.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.2	AC	$5,000.00	$1,000
Excavation/Grading	2114	CY	$30.00	$63,420
Riser	1	LS	$10,000.00	$10,000
Rip Rap Stabilization	35	LF	$50.00	$1,750
Wetland Planting	293	SY	$2.00	$586
Dry Landscaping	734	SY	$2.50	$1,835
			Base Construction Cost	**$78,591**
			Mobilization (5%)	$3,930
			Subtotal 1	**$82,521**
			Contingency (25%)	$20,630
			Subtotal 2	**$103,151**
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	$46,418
			Estimated Project Cost	**$150,000**

This project is part of the alternative project group for Regional Pond D-24. See Table 5-2 for the recommended disposition.

Site Photo:

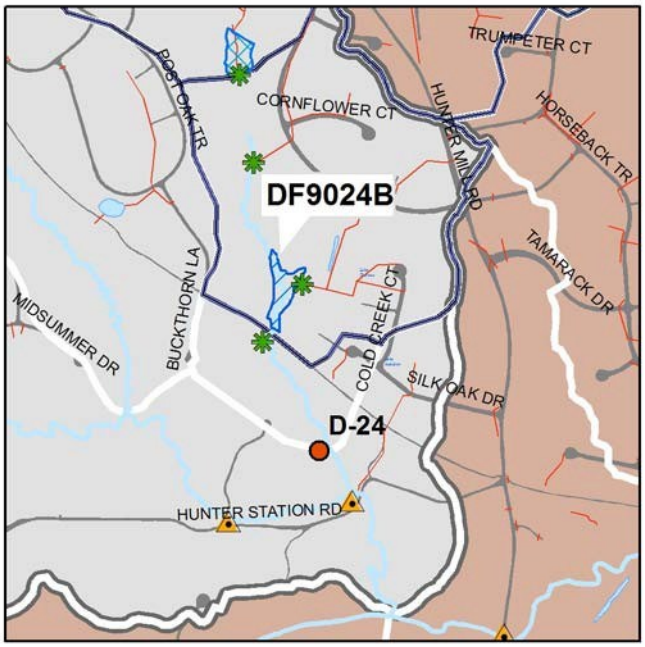
Concept Sketch:

Project Number: DF9024B
Catchment Code: DFSB9201
Candidate Site: D-24

Project Type: Culvert Retrofit
Project Size: 1.1 acres
Treated Area: 62.6 acres

Project Location: This project is located at the upstream face to the culvert under the W&OD trail.

Project Description: This project would consist of a retrofit to the culvert to create a detention storage area in the floodplain upstream of the W&OD trail. The floodplain in this area is relatively flat and will provide storage for extended detention. The design of this project would incorporate water quality features such as a micro-pool and wetland vegetation.



Potential Project Benefits:

Streamflow	This project provides 100% of the channel protection volume.
Water Quality	100% of the water quality volume can be provided. Use of wetland vegetation and a micro-pool will improve treatment effectiveness.

Potential Project Constraints:

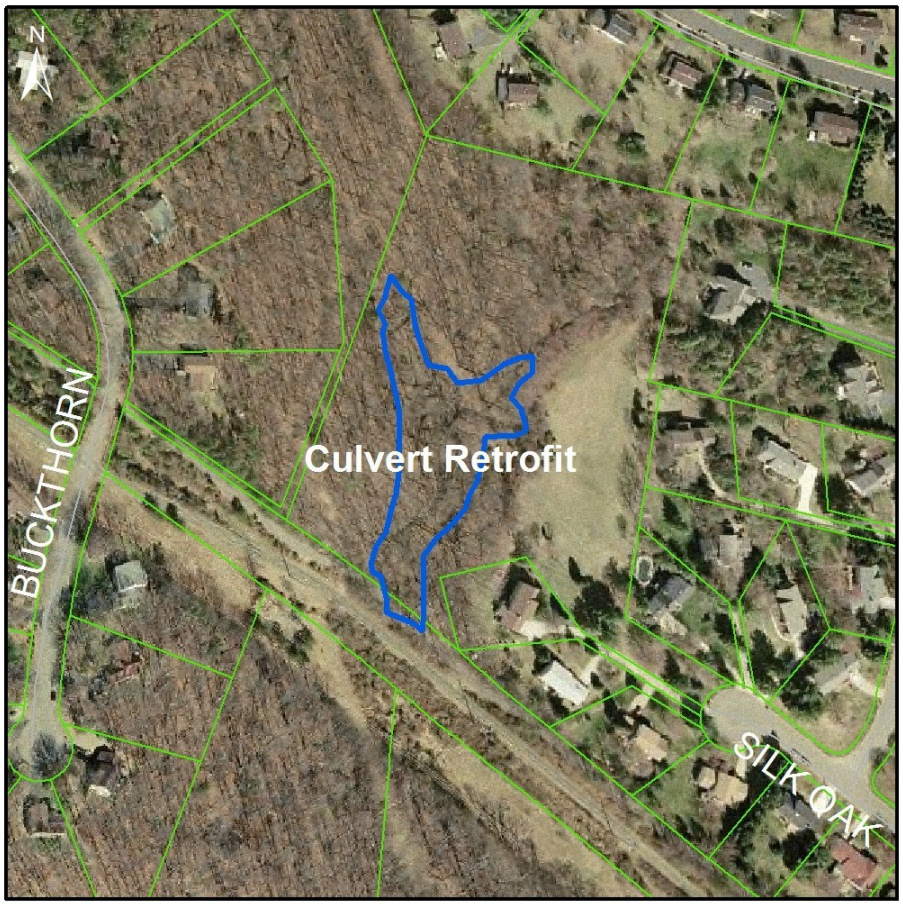
Environmental	Environmental permitting issues would be anticipated for any activity in and around a stream corridor. Forest and wetland impacts are anticipated during construction. RPAs may require exceptions or waivers.
Facility Access	Access to this project is available from the W&OD trail right-of-way.
Design / Construction	There is a private driveway above the culvert that could be raised to increase available storage. A water line along the driveway would have to be relocated.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.3	AC	$5,000.00	$1,500
Excavation	1,740	CY	$35.00	$60,900
Impoundment Structure	1	LS	$5,000.00	$5,000
Landscaping	1,030	SY	$2.50	$2,575
Wetland Planting	350	SY	$2.00	$700
			Base Construction Cost	**$70,675**
			Mobilization (5%)	$3,534
			Subtotal 1	**$74,209**
			Contingency (25%)	$18,552
			Subtotal 2	**$92,761**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$41,742
			Estimated Project Cost	**$135,000**

This project is part of the alternative project group for Regional Pond D-24. See Table 5-2 for the recommended disposition.

Concept Sketch:

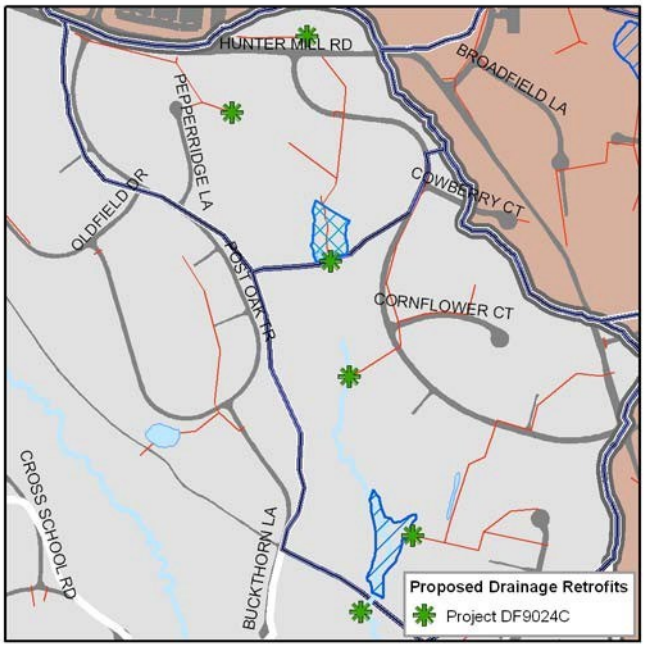


Project Number: DF9024C
Catchment Code: DFSB9201
Candidate Site: D-24

Project Type: Drainage Retrofit
Project Size: 6 Outfalls

Project Location: This project is distributed throughout the catchment where piped drainage systems discharge into natural channels.

Project Description: This project consists of reconfiguring outfalls or retrofitting energy dissipation structures to reduce scour and erosion where flows from the storm drainage system enter the stream. Reduction of erosive velocities will reduce the amount of sediment transported downstream.



Potential Project Benefits:

Streamflow	The project will reduce velocity from the outfalls and help reduce erosive potential immediately downstream.
Water Quality	Water quality improvements would be associated with the reduction of scour at outfall locations and within the downstream channels. Habitat would be improved by reducing sediment loads from erosion.

Potential Project Constraints:

Environmental	Environmental impacts and permit requirements are not anticipated for this project; however, projects in RPAs may require exceptions or waivers
Facility Access	Access to these sites can usually be obtained from the roadway and driveways.
Design / Construction	No unusual design or construction issues were identified.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Outfall Protection	6	EA	$8,000.00	$48,000
			Base Construction Cost	**$48,000**
			Mobilization (5%)	$2,400
			Subtotal 1	**$50,400**
			Contingency (25%)	$12,600
			Subtotal 2	**$63,000**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$28,350
			Estimated Project Cost	**$91,000**

This project is part of the alternative project group for Regional Pond D-24. See Table 5-2 for the recommended disposition.

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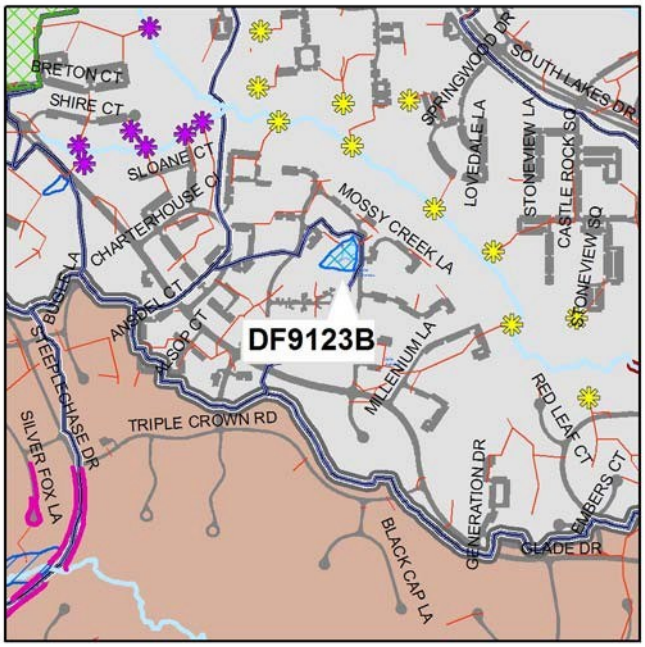
Project Number: DF9123B
Catchment Code: DFSB0002
Candidate Site: C23

Project Type: Pond Retrofit
Project Size: 0.7 acres
Treated Area: 22 acres

Project Location: On the upstream side of Sugarberry Court.



Project Description: Peak flow reduction of smaller storm events can be improved by installing a multi-stage riser structure on the existing culvert. Due to the abundance of established woods within this pond, it is not recommended to clear the entire area to create additional storage volume. Although this project will not create a permanent wet pool, existing water quality components are in place to provide a degree of nutrient uptake and sediment removal.

Potential Project Benefits:

Streamflow	Approximately 35% of the channel protection volume can be achieved by installing a multi-stage control structure.
Water Quality	Sedimentation and vegetative uptake within this dry pond will provide some improvements in water quality.

Potential Project Constraints:

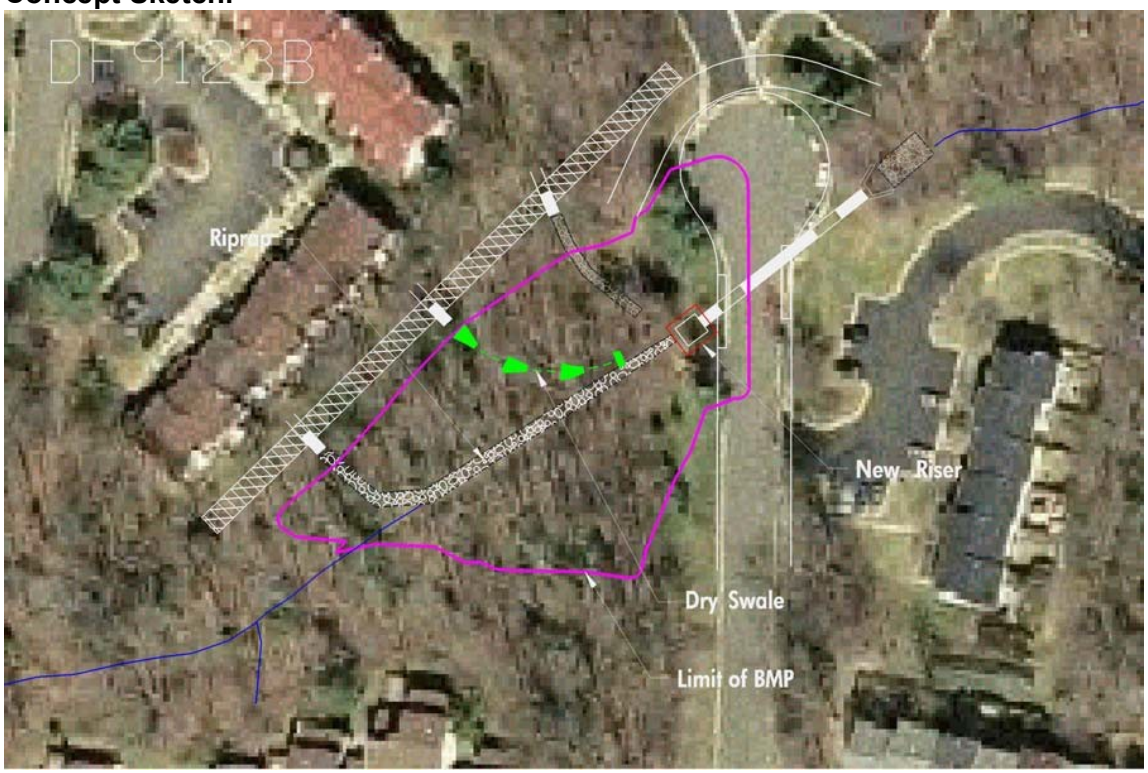
Environmental	Environmental permitting issues would not be anticipated for this project. Projects in RPAs may require exceptions or waivers.
Property Ownership	The properties affected by this project appear to be privately held.
Facility Access	Access to this area is very good by way of public roads.
Design / Construction	No specific design or construction issues were noted for this project. County staff will coordinate with the facility owner to implement the project.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.1	AC	$5,000.00	$500
Riser	1	LS	$10,000.00	$10,000
Rip Rap Stabilization	30	LF	$50.00	$1,500
			Base Construction Cost	**$12,000**
			Mobilization (5%)	$600
			Subtotal 1	**$12,600**
			Contingency (25%)	$3,150
			Subtotal 2	**$15,750**
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	$7,088
			Estimated Project Cost	**$23,000**

Site Photo:

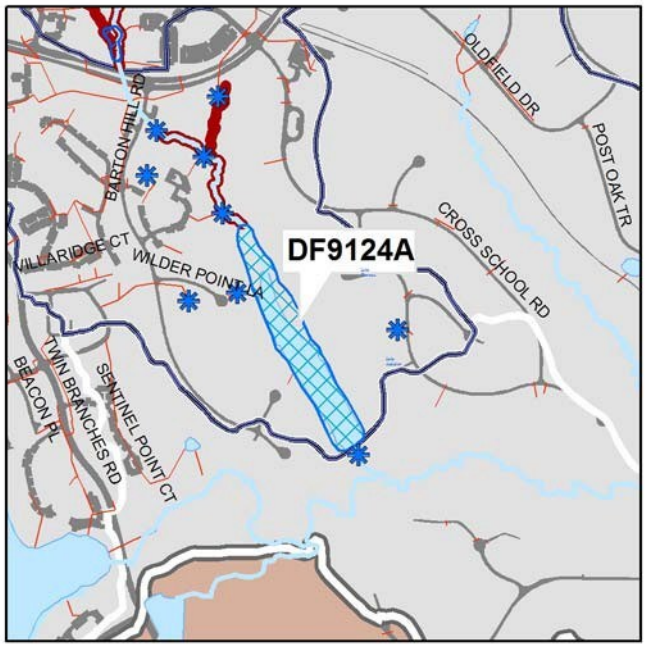
Concept Sketch:



Project Number: DF9124A
Catchment Code: DFSB9402
Candidate Site: C24

Project Type: Pond Retrofit
Project Size: 6.7 acres
Treated Area: 214 acres

Project Location: East of Barton Hill Road.



Project Description: This in-stream pond site is experiencing significant aggrading, and clogging issues. The stream channel and passage of flow are completely interrupted and sediment and debris totally cover the outlet control structure. Once this site is returned to its design storage volume, it is recommended to install a multi-stage control structure with comprehensive anti-clogging measures. Although no permanent wet storage volume is created, the extended detention in the wooded and vegetated floodplain will provide some degree of sediment removal and nutrient uptake.

Potential Project Benefits:

Streamflow	Approximately 40% of the calculated channel protection volume can be met by installing a multi-stage control structure.
Water Quality	Sedimentation and vegetative uptake within this dry pond will provide some improvements in water quality.

Potential Project Constraints:

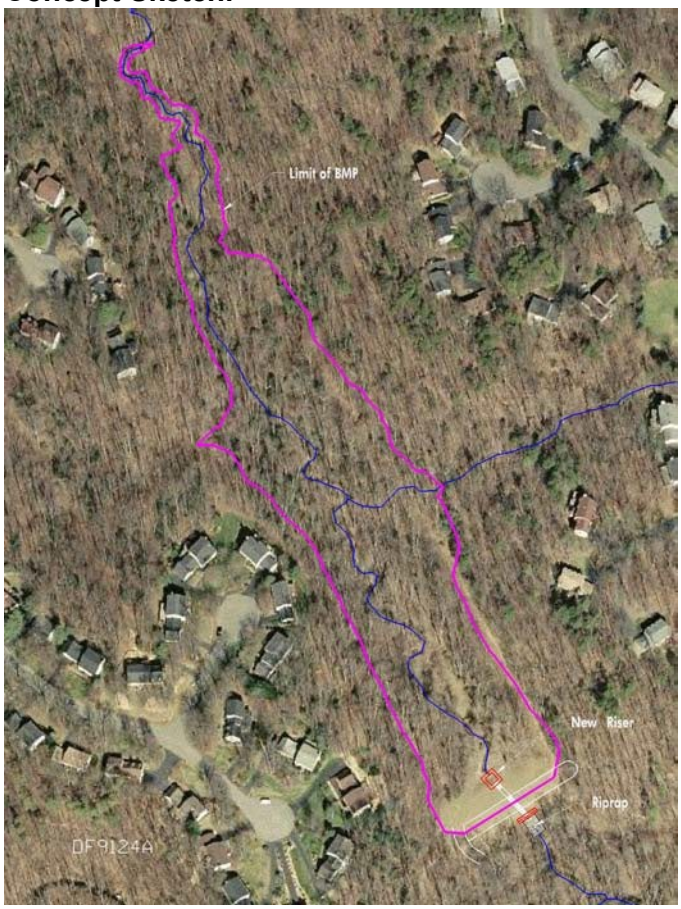
Environmental	Environmental permitting issues would be anticipated for any activity in and around a stream corridor. Forest and wetland impacts are anticipated during construction; therefore, it will require a permit from both the U.S. Army Corps of Engineers and VDEQ. Work in RPAs may require exceptions or waivers.
Facility Access	Access to this area is available through public property, but there is no existing maintenance road.
Design / Construction	Significant maintenance of accumulated sediment and debris is required. County staff will coordinate with the facility owner to implement the project.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.1	AC	$5,000.00	$500
Outlet Protection	1	EA	$8,000.00	$8,000
Riser	1	LS	$10,000.00	$10,000
			Base Construction Cost	**$18,500**
			Mobilization (5%)	$925
			Subtotal 1	**$19,425**
			Contingency (25%)	$4,856
			Subtotal 2	**$24,281**
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	$10,927
			Estimated Project Cost	**$35,000**

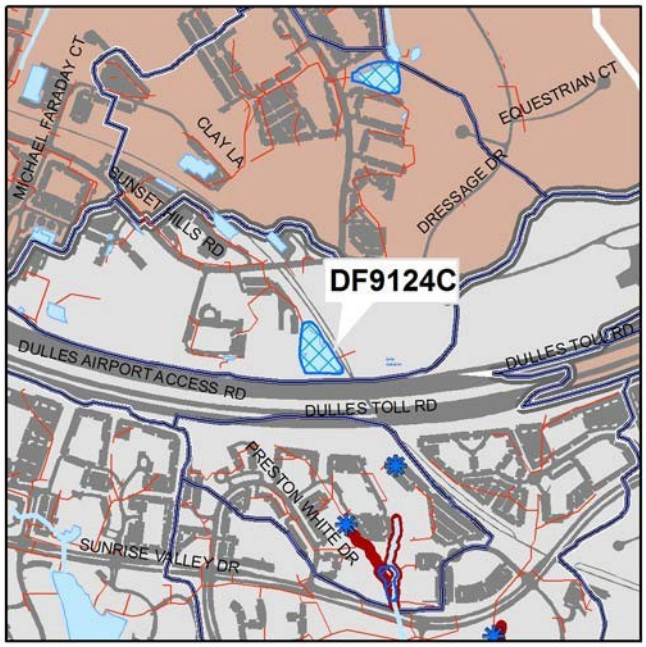
Site Photo:

Concept Sketch:



Project Number: DF9124C
Catchment Code: DFSB9402
Candidate Site: C24

Project Type: Pond Retrofit
Project Size: 1.3 acres
Treated Area: 51.9 acres



Project Location: On the upstream side of the Dulles Toll Road west of the W&OD Trail.

Project Description: This project involves excavation to maximize available storage space and installation of a multi-stage control structure to convert the dry pond to a wet marsh. Plan sets discovered while researching this pond show an additional parking lot to be added in the clear area to the east of this facility. It is not recommended to excavate in this location because it is uncertain what the future use of the available space may be. If further investigation determines that it is available, then additional excavating to create storage volume in this area can improve the benefits of this retrofit project.

Potential Project Benefits:

Streamflow	Less than 20% of the calculated channel protection volume will be achieved by excavating and installing a multi-stage control structure.
Water Quality	Although less than 20% of the wet storage volume requirement can be created, water quality treatment will improve by converting parts of this dry pond to a wet marsh.

Potential Project Constraints:

Environmental	Environmental permitting issues would not be anticipated for this project. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this area is very good by way of the W&OD Trail.
Design / Construction	No significant design or construction issues were noted for this project. County staff will coordinate with the facility owner to implement the project.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.5	AC	$5,000.00	$2,500
Excavation/Grading	1582	CY	$30.00	$47,460
Riser	1	LS	$10,000.00	$10,000
Rip Rap Stabilization	50	LF	$50.00	$2,500
Wetland Planting	975	SY	$2.00	$1,950
Dry Landscaping	1099	SY	$2.50	$2,748
			Base Construction Cost	**$67,158**
			Mobilization (5%)	$3,358
			Subtotal 1	**$70,515**
			Contingency (25%)	$17,629
			Subtotal 2	**$88,144**
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	$39,665
			Estimated Project Cost	**$128,000**

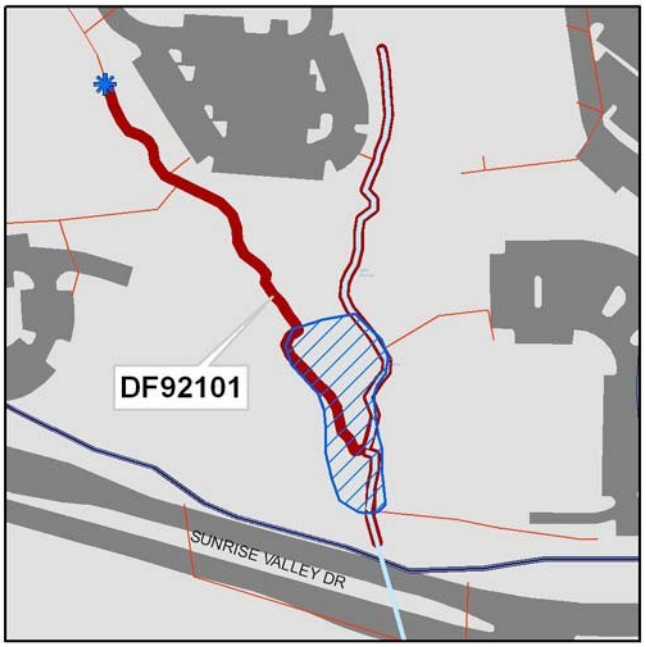
Site Photo:

Concept Sketch:

Project Number: DF92101
Catchment Code: DFSB9402
Candidate Site: S101

Project Type: Stream Restoration
Project Size: 1160 Feet
Project Location: This project is located to the north of Sunrise Valley Drive.

Project Description: The mainstem and tributary of this reach are both extremely incised with highly eroded banks. Further bank failure will threaten existing parking lots, sanitary sewers, and stormwater outfalls. The proposed restoration will create step pool or nested channel patterns. Banks will be stabilized by regrading or imbricated rip rap.



Potential Project Benefits:

Stream Stability	Reconstruction of the stream floodplain bench for high flows will reduce stress on the lower stream banks.
Water Quality	Water quality will be improved by a significant reduction in bank and bed erosion. In addition the risk of sanitary sewer failure will be greatly reduced.
Instream Habitat	Erosion reduction and improved low flow conditions will improve habitat.

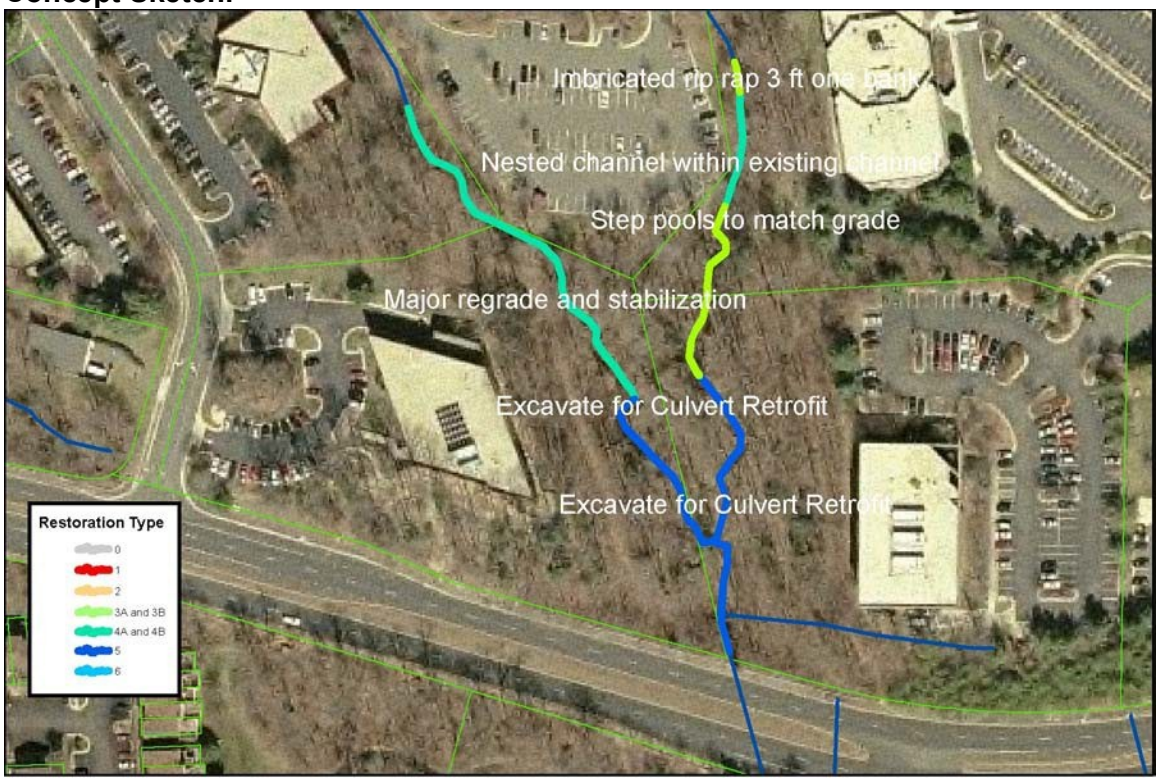
Potential Project Constraints:

Environmental	The site will require forest clearing and impacts to jurisdictional wetlands. It will require a permit from both the U.S. Army Corps of Engineers and VDEQ. Projects in RPAs may require exceptions or waivers
Facility Access	Access to this facility will require an easement through the commercial buildings and will require improvements within the project area.
Design / Construction	Design efforts will be significant compared to other stream restoration projects. The level of impairment and access issues are significant construction constraints.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Change channel type -- nested channel	179	LF	$200.00	$35,800
Change channel type -- step pools	29	LF	$225.00	$6,525
Stabilize in place -- grading	401	LF	$175.00	$70,175
Stabilize in place -- armoring	80	LF	$225.00	$18,000
Excavate and create low-flow channel	471	LF	$150.00	$70,650
Add'l cost, first 500 LF	500	LF	$200.00	$100,000
			Base Construction Cost	**$301,150**
			Mobilization (5%)	$15,058
			Subtotal 1	**$316,208**
			Contingency (25%)	$79,052
			Subtotal 2	**$395,259**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$177,867
			Estimated Project Cost	**$573,000**

Concept Sketch:



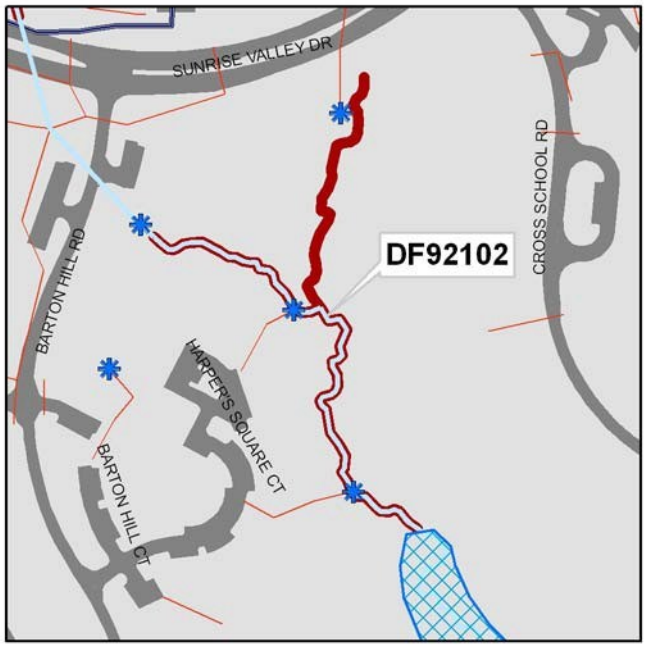
Site Photo: Sanitary sewer manhole to be protected by imbricated rip rap. See photo in project DF9524 for typical channel erosion.

Project Number: DF92102
Catchment Code: DFSB9402
Candidate Site: S102

Project Type: Stream Restoration
Project Size: 1404 Linear Feet

Project Location: This project is located south of Sunrise Valley Drive and east of Barton Hill Court.

Project Description: The stream is incised and has widened so that utility lines are exposed in several locations. The project will restore two reaches by reconstructing the existing channel. The remaining reaches can be stabilized in place either by regrading the streambanks, or by armoring. Stream buffers will be restored where they are deficient.



Potential Project Benefits:

Stream Stability	Reconstructing the stream pattern and regrading the banks will reduce instability and erosion caused by failure of the vertical streambanks.
Water Quality	Water quality will be improved by a significant reduction in current and future streambank erosion.
Instream Habitat	Erosion reduction and establishing a riparian buffer will improve physical habitat conditions.

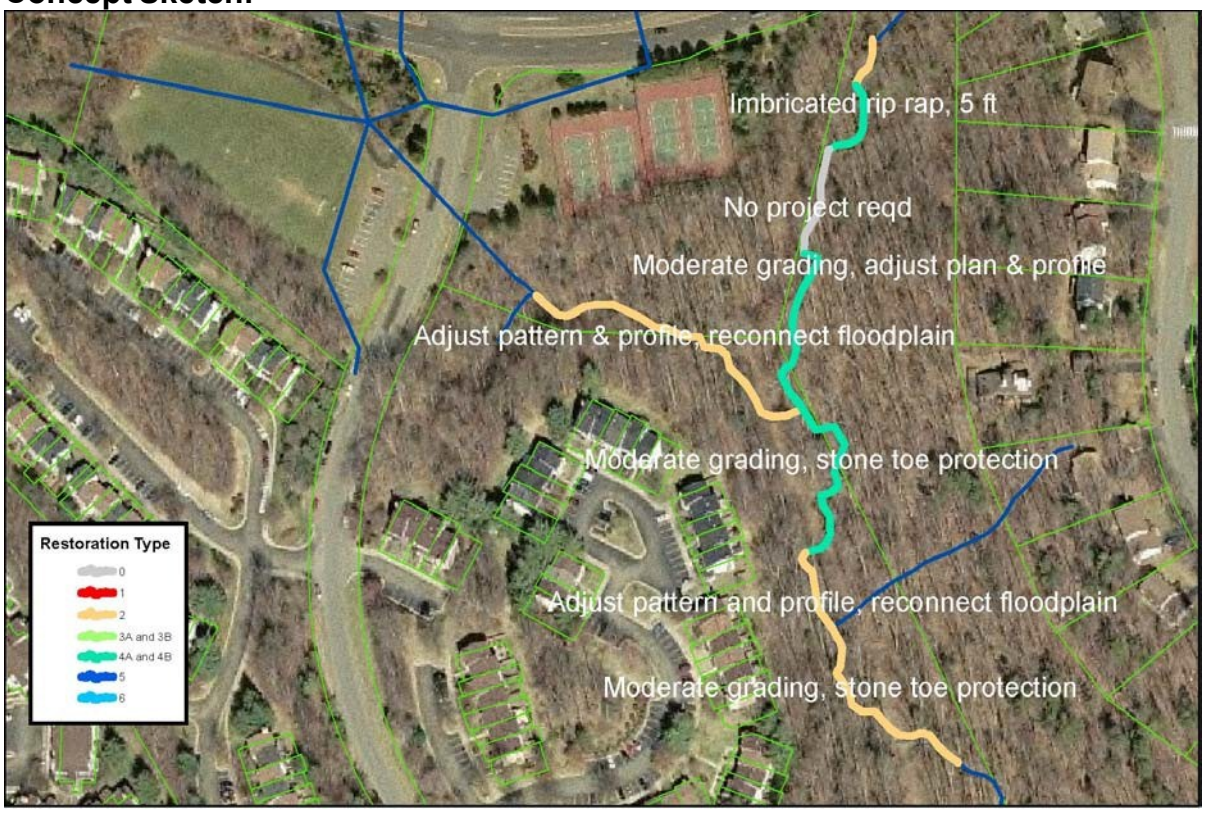
Potential Project Constraints:

Environmental	The site will have impacts to forests and jurisdictional wetlands. It will require a permit from both the U.S. Army Corps of Engineers and VDEQ. Projects in RPAs may require exceptions or waivers
Facility Access	Access is available through public property or easements. Access will require temporary road improvements within the project area.
Design / Construction	Because of multiple utility conflicts, design efforts are more complex than other projects. Steep valley walls present constraints to construction.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Reconstruct new pattern and profile	827	LF	$250.00	$206,750
Stabilize in place -- grading	470	LF	$175.00	$82,250
Stabilize in place -- armoring	107	LF	$225.00	$24,075
Buffer restoration	included	LF	$25.00	$0
Add'l cost, first 500 LF	500	LF	$200.00	$100,000
			Base Construction Cost	**$413,075**
			Mobilization (5%)	$20,654
			Subtotal 1	**$433,729**
			Contingency (25%)	$108,432
			Subtotal 2	**$542,161**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$243,972
			Estimated Project Cost	**$786,000**

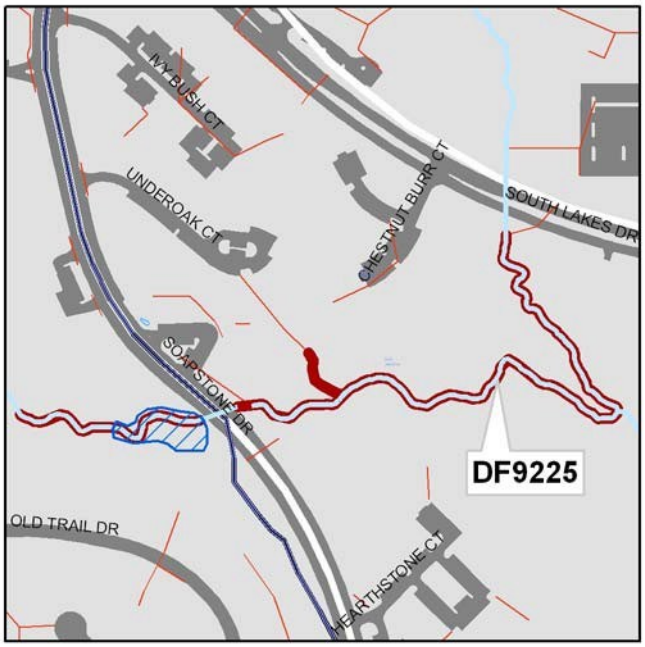
Concept Sketch:



Project Number: DF9225
Catchment Code: DFSB0004
Candidate Site: S25

Project Type: Stream Restoration
Project Size: 2597 Linear Feet
Project Location: This project crosses Soapstone Drive to the east and west.

Project Description: The stream is severely incised with raw banks and poor habitat. The stream is located in a forested area on Reston Authority property. The portion of the stream directly downstream of Soapstone Drive would be reconstructed with a nested channel and floodplain bench. This project would be constructed simultaneously with the culvert retrofit described in project DF9523. ***This project may be constructed or superseded by Reston Association work in this stream channel.***



Potential Project Benefits:

Stream Stability	Regraded streambanks will minimize future erosion. Construction of a floodplain bench for high flows will reduce stress on the lower stream banks.
Water Quality	Water quality will be improved by a significant reduction in current and future bank and bed erosion and improved base flow conditions.
Instream Habitat	Erosion reduction, recreated bed features, and establishing better low flow conditions with a nested channel will improve physical habitat.

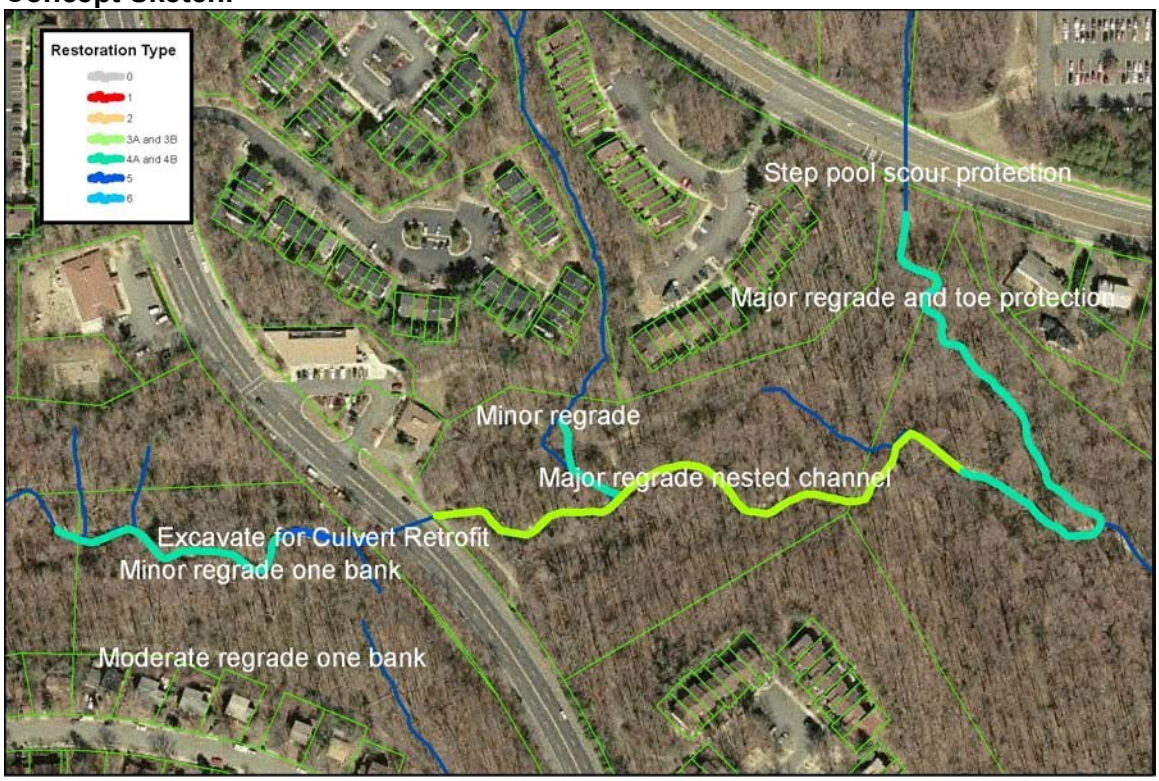
Potential Project Constraints:

Environmental	The site will require forest clearing and impacts to jurisdictional wetlands. It will require a permit from both the U.S. Army Corps of Engineers and VDEQ. Projects in RPAs may require exceptions or waivers
Facility Access	Access to this facility will require either an easement on private property or access from both sides of Soapstone Drive.
Design / Construction	Design efforts are significant compared to other projects. A sanitary sewer line, communications utilities and limited access are constraints.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Change channel type -- nested channel	975	LF	$200.00	$195,000
Stabilize in place -- grading	1169	LF	$175.00	$204,575
Stabilize in place -- armoring	315	LF	$225.00	$70,875
Excavate and create low-flow channel	138	LF	$150.00	$20,700
Add'l cost, first 500 LF	500	LF	$200.00	$100,000
			Base Construction Cost	**$591,150**
			Mobilization (5%)	$29,558
			Subtotal 1	**$620,708**
			Contingency (25%)	$155,177
			Subtotal 2	**$775,884**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$349,148
			Estimated Project Cost	**$1,125,000**

Concept Sketch:

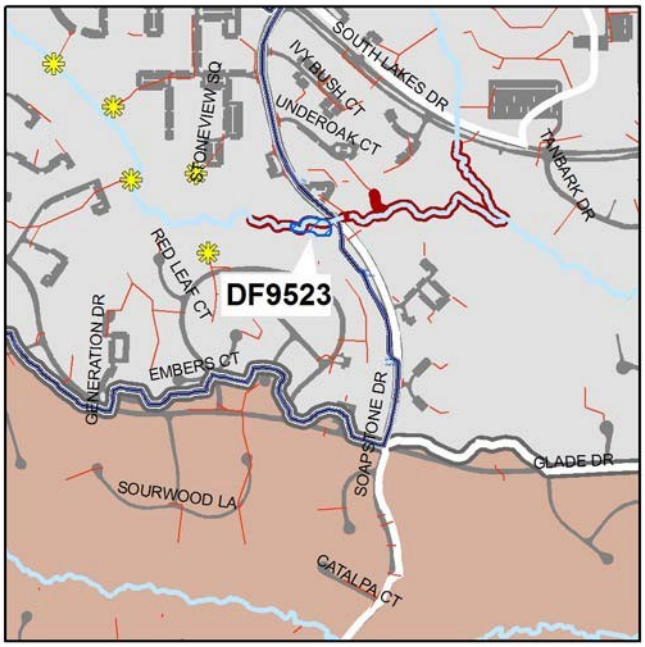


Site Photo:

w**Project Number**: DF9523
Catchment Code: DFSB0002
Candidate Site: C23

Project Type: Culvert Retrofit
Project Size: 0.5 acres
Treated Area: 193.5 acres

Project Location: Upstream of Soapstone Drive.



Project Description: This project would be constructed simultaneously with the stream restoration described in project DF9225. It consists of a culvert retrofit to provide extended detention to reduce erosive flows downstream. This would also provide some access to the floodplain for settling of solids and vegetative uptake. ***This project may be constructed or superseded by Reston Association work in this stream channel.***

Potential Project Benefits:

Streamflow	The project will provide some reduction of peak flows for smaller storms.
Water Quality	Pollutant removal will occur with increased settling and vegetative uptake associated with increased detention.

Potential Project Constraints:

Environmental	There may be some permitting issues associated with the temporary impoundment of runoff in the floodplain above this culvert. Some forest impacts would occur during construction. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this project is very good from the roadway.
Design / Construction	No unusual design or construction issues were identified.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	1.1	AC	$5,000.00	$5,500
Excavation	2,470	CY	$35.00	$86,450
Impoundment Structure	1	LS	$5,000.00	$5,000
Landscaping	4,550	SY	$2.50	$11,375
Wetland Planting	1,520	SY	$2.00	$3,040
			Base Construction Cost	**$111,365**
			Mobilization (5%)	$5,568
			Subtotal 1	**$116,933**
			Contingency (25%)	$29,233
			Subtotal 2	**$146,167**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$65,775
			Estimated Project Cost	**$212,000**

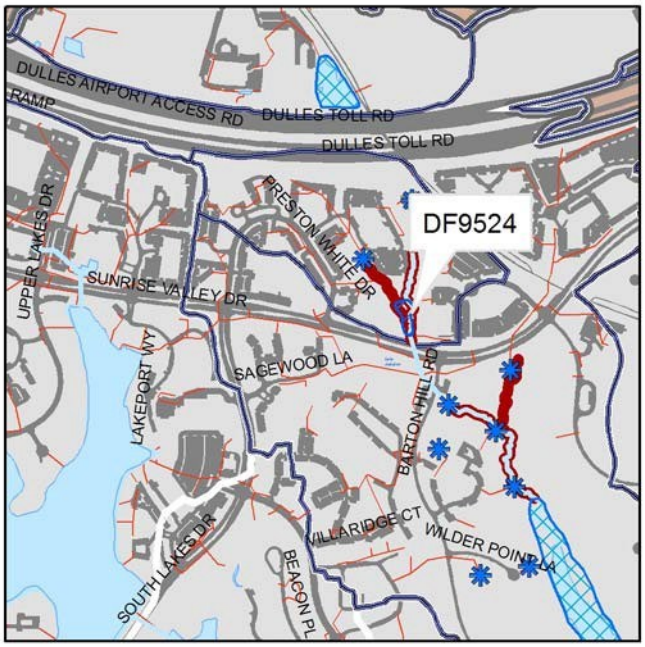
Concept Sketch:

Site Photo:

Project Number: DF9524
Catchment Code: DFSB9402
Candidate Site: C24

Project Type: Culvert Retrofit
Project Size: 0.4 acres
Treated Area: 32.5 acres

Project Location: This project is located just north of Sunrise Valley Drive and east of Preston White Drive.



Project Description: This project is a culvert retrofit upstream of Sunrise Valley Drive. The design of this project would provide detention to reduce erosive flows downstream. This project would also remove pollutants in the runoff due to the decreased flow velocities. A nested channel will be built within the pond. The project can be built simultaneously with stream restoration project DF92101.

Potential Project Benefits:

Streamflow	The project will provide approximately 20% of the channel protection volume for this location.
Water Quality	Some reduction of pollutants will occur with increased settling associated with extended detention.

Potential Project Constraints:

Environmental	There may be some permitting issues associated with the temporary impoundment of runoff in the floodplain above this culvert. Some forest impacts would occur during construction. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this project is available from adjacent parking lots. However, most access routes are steep and there is no existing maintenance road.
Design / Construction	No unusual design or construction issues were found.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.3	AC	$5,000.00	$1,500
Excavation	2,980	CY	$35.00	$104,300
Impoundment Structure	1	LS	$5,000.00	$5,000
Landscaping	1,080	SY	$2.50	$2,700
Wetland Planting	650	SY	$2.00	$1,300
			Base Construction Cost	**$114,800**
			Mobilization (5%)	$5,740
			Subtotal 1	**$120,540**
			Contingency (25%)	$30,135
			Subtotal 2	**$150,675**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$67,804
			Estimated Project Cost	**$218,000**

Concept Sketch:

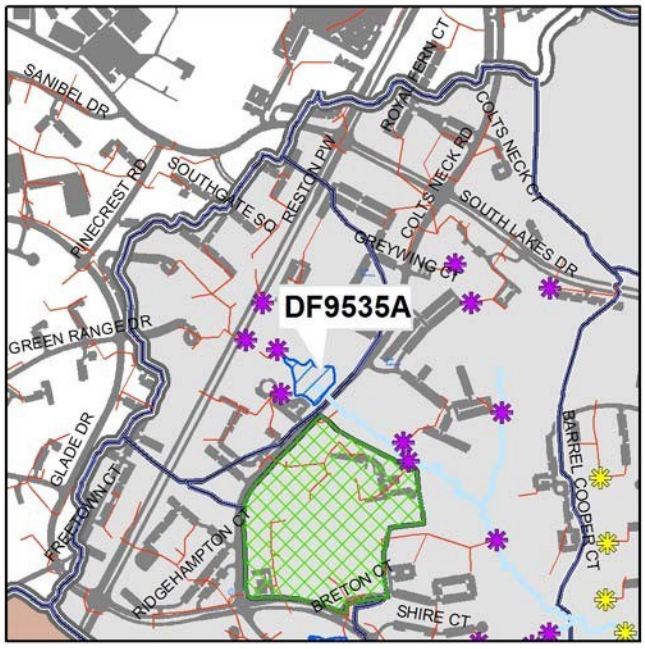
Site Photo:

Project Number: DF9535A
Catchment Code: DFSB0001
Candidate Site: C35

Project Type: Culvert Retrofit
Project Size: 1.2 acres
Treated Area: 53 acres

Project Location: On the upstream side of Colts Neck Road.

Project Description: This project is a culvert retrofit in the headwaters of Snakeden Branch which receives drainage from several high density residential parcels. There were no stormwater management facilities found upstream of this location. The impoundment would store runoff on the floodplain above the culvert.



Potential Project Benefits:

Streamflow	This retrofit would provide 100% of the channel storage volume and help to reduce erosive flows downstream.
Water Quality	About 35% of the water quality volume can be provided. Use of wetland vegetation and a micro-pool will improve treatment effectiveness. Other Improvements to the water quality should occur through sediment settlement, and vegetative uptake with floodplain storage.

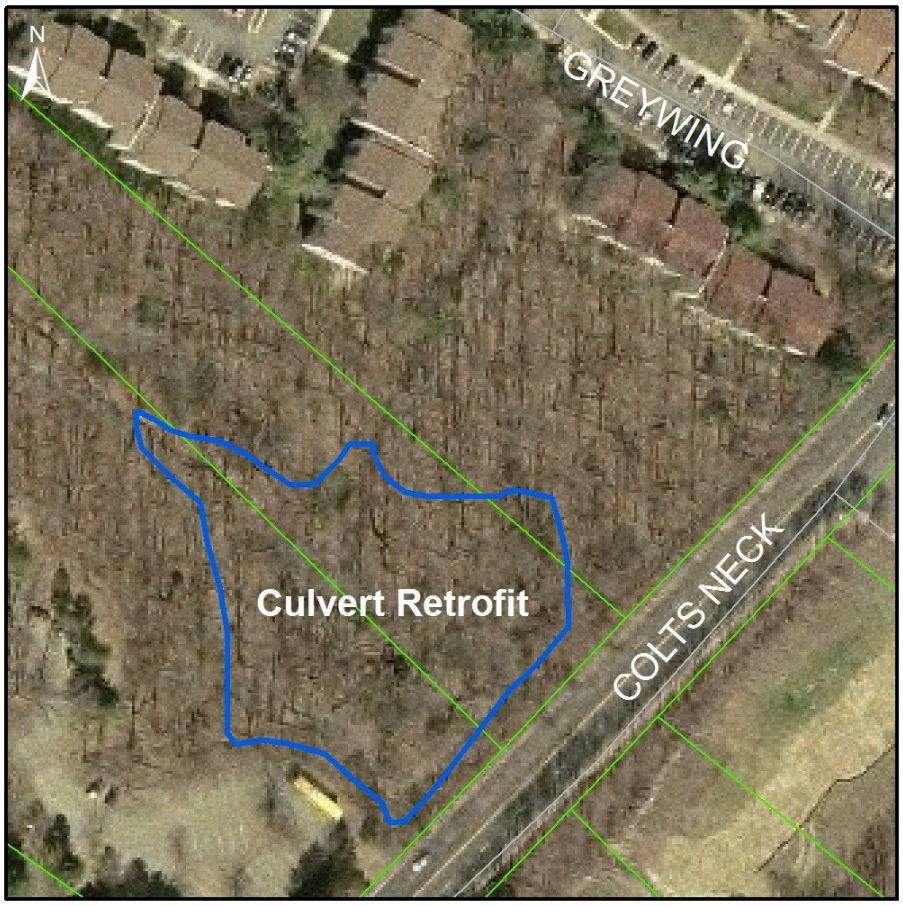
Potential Project Constraints:

Environmental	There may be some permitting issues associated with the temporary impoundment of runoff in the floodplain above this culvert. Some forest impacts would occur during construction. Projects in RPAs may require exceptions or waivers.
Facility Access	Access is very good from adjacent roads.
Design / Construction	No specific design or construction issues were noted for this project.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.3	AC	$5,000.00	$1,500
Excavation	1,190	CY	$35.00	$41,650
Impoundment Structure	1	LS	$5,000.00	$5,000
Landscaping	1,100	SY	$2.50	$2,750
Wetland Planting	370	SY	$2.00	$740
			Base Construction Cost	**$51,640**
			Mobilization (5%)	$2,582
			Subtotal 1	**$54,222**
			Contingency (25%)	$13,556
			Subtotal 2	**$67,778**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$30,500
			Estimated Project Cost	**$98,000**

Concept Sketch:

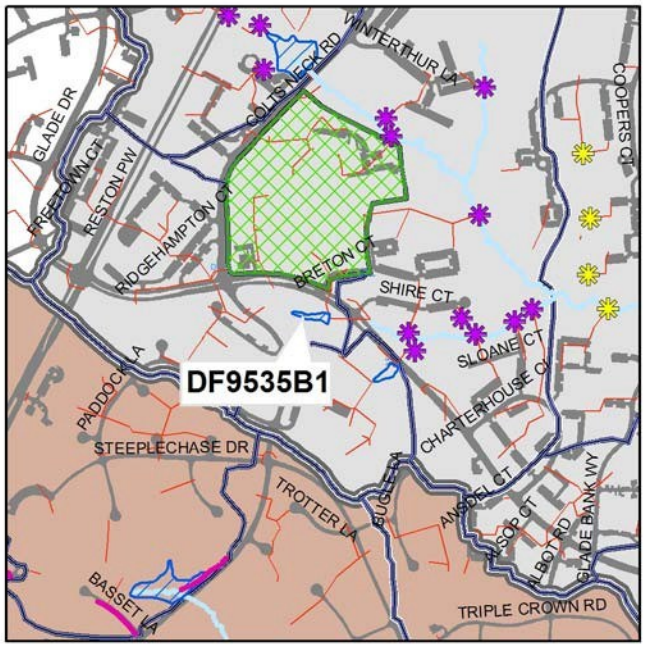


Project Number: DF9535B1
Catchment Code: DFSB0001
Candidate Site: C35

Project Type: Culvert Retrofit
Project Size: 0.2 acres
Treated Area: 44.6 acres

Project Location: The western culvert under Glade Drive.

Project Description: This project would consist of a retrofit to the culvert under Glade Drive. This culvert, along with project DF9535B2, conveys a substantial amount of the drainage from the southwest corner of this catchment, which is heavily developed without stormwater management measures. The site is forested and a recreational trail runs next to it.



Potential Project Benefits:

Streamflow	The project is expected to result in minor reductions in peak flows.
Water Quality	The project has sufficient storage to treat 20% of the water quality volume. Sedimentation and nutrient uptake in floodplain storage will also provide treatment.

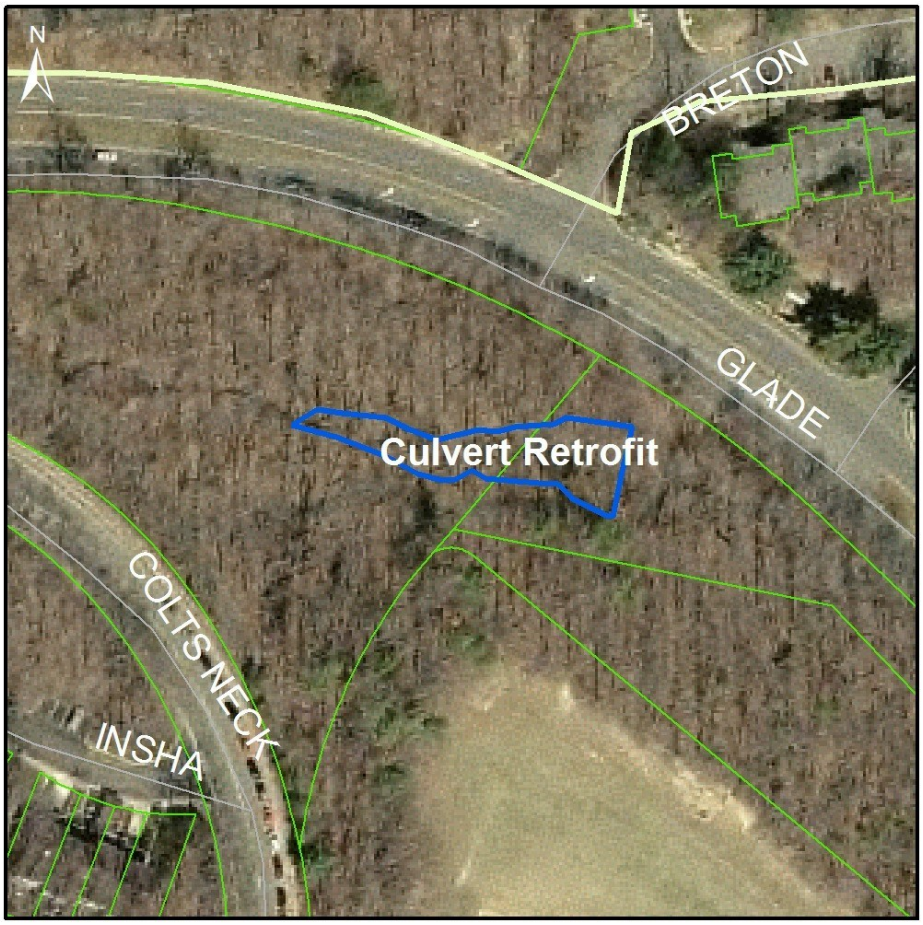
Potential Project Constraints:

Environmental	Environmental constraints are not anticipated at this site. Projects in RPAs may require exceptions or waivers.
Facility Access	Access is very good from public roads.
Design / Construction	Design of the impoundment will avoid flooding the trail tunnel under Glade Drive during overflow events.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.1	AC	$5,000.00	$500
Excavation	110	CY	$35.00	$3,850
Impoundment Structure	1	LS	$10,000.00	$10,000
Landscaping	170	SY	$2.50	$425
Wetland Planting	60	SY	$2.00	$120
			Base Construction Cost	**$14,895**
			Mobilization (5%)	$745
			Subtotal 1	**$15,64**
			Contingency (25%)	$3,910
			Subtotal 2	**$19,550**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$8,797
			Estimated Project Cost	**$28,000**

Concept Sketch:



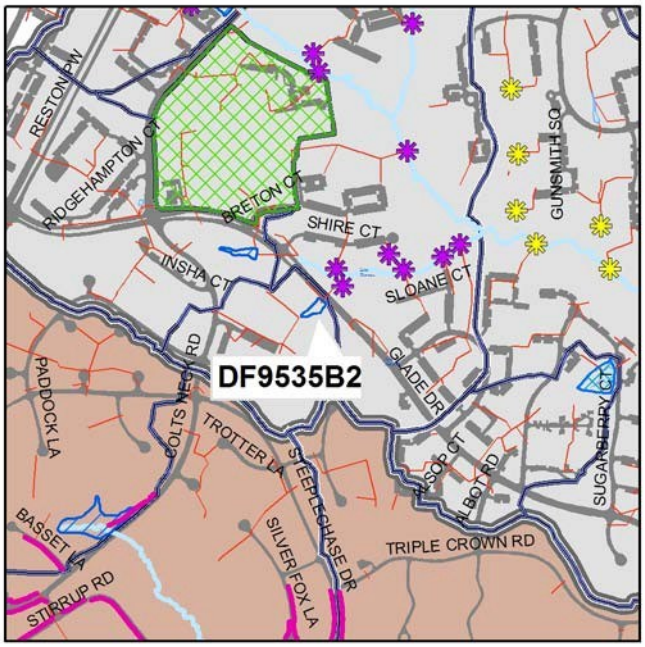
Site Photo:

Project Number: DF9535B2
Catchment Code: DFSB0001
Candidate Site: C35

Project Type: Culvert Retrofit
Project Size: 0.2 acres
Treated Area: 16.9 acres

Project Location: The eastern culvert under Glade Drive.

Project Description: This project would consist of a retrofit to the culvert under Glade Drive in the vicinity of the rear property line to Hunters Woods Elementary School. This culvert, along with project DF9535B1, conveys a substantial amount of the drainage area from the southwest corner of this catchment, which is heavily developed without stormwater management measures. The site is forested.



Potential Project Benefits:

Streamflow	The project is expected to result in minor reductions in peak flows.
Water Quality	The project has sufficient storage to treat 25% of the water quality volume. Sedimentation and nutrient uptake in floodplain storage will also provide treatment.

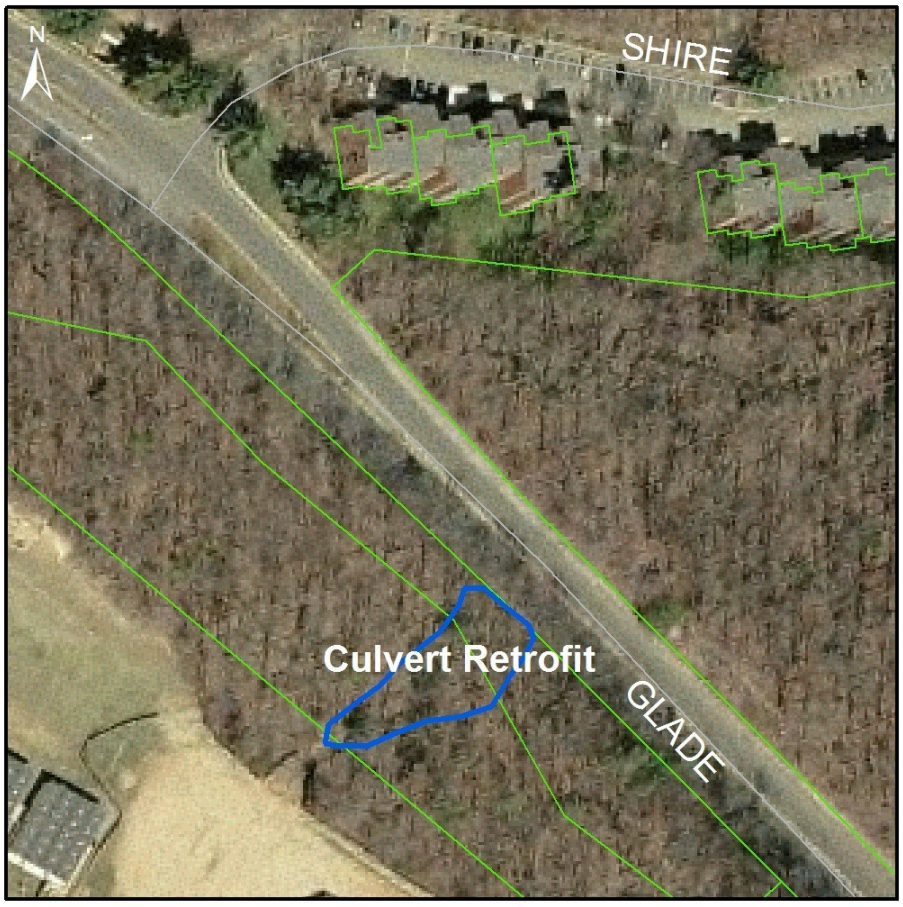
Potential Project Constraints:

Environmental	Environmental constraints are not anticipated at this site. Some forest impacts would occur during construction. Projects in RPAs may require exceptions or waivers.
Facility Access	Access is very good from public roads.
Design / Construction	There are no significant design or construction constraints.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.1	AC	$5,000.00	$500
Excavation	60	CY	$35.00	$2,100
Impoundment Structure	1	LS	$5,000.00	$5,000
Landscaping	180	SY	$2.50	$450
Wetland Planting	60	SY	$2.00	$120
			Base Construction Cost	**$8,170**
			Mobilization (5%)	$409
			Subtotal 1	**$8,579**
			Contingency (25%)	$2,145
			Subtotal 2	**$10,723**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$4,825
			Estimated Project Cost	**$16,000**

Concept Sketch:

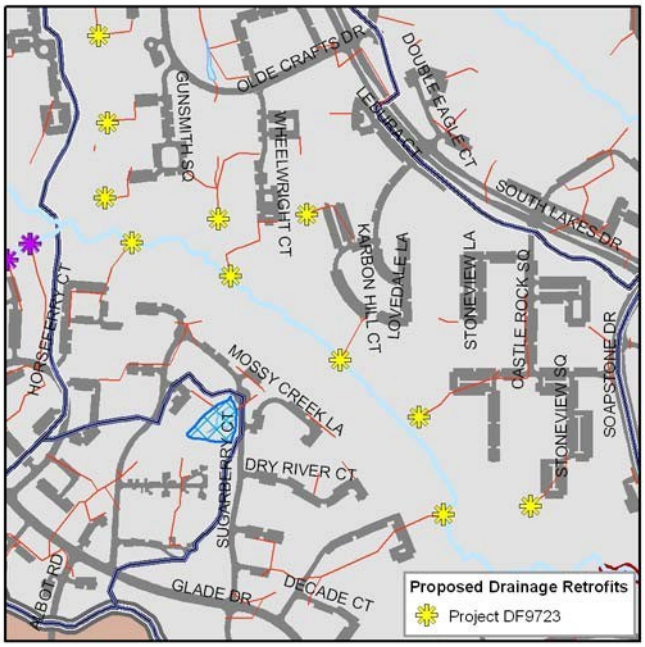


Project Number: DF9723
Catchment Code: DFSB0002
Candidate Site: C23

Project Type: Drainage Retrofit
Project Size: 12 Outfalls

Project Location: This project is distributed throughout the catchment where piped drainage systems discharge into natural channels.

Project Description: The highly impervious cover of this catchment is located along the ridges, with the drainage system discharging to the floodplain below. The high energy flows from these systems is a significant contributor to the scour and erosion found in this catchment. This project would provide outfall stabilization to reduce these impacts.



Potential Project Benefits:

Streamflow	The project will reduce velocity from the outfalls and help reduce erosive potential immediately downstream.
Water Quality	Water quality improvements would be associated with the reduction of scour at outfall locations and within the downstream channels. Habitat would be improved by reducing sediment loads from erosion.

Potential Project Constraints:

Environmental	Environmental impacts and permit requirements are not anticipated for this project; however, projects in RPAs may require exceptions or waivers
Facility Access	Access to these sites can usually be obtained from the roadway and driveways.
Design / Construction	No unusual design or construction issues were identified.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Outfall Protection	12	EA	$8,000.00	$96,000
			Base Construction Cost	**$96,000**
			Mobilization (5%)	$4,800
			Subtotal 1	**$100,800**
			Contingency (25%)	$25,200
			Subtotal 2	**$126,000**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$56,700
			Estimated Project Cost	**$183,000**

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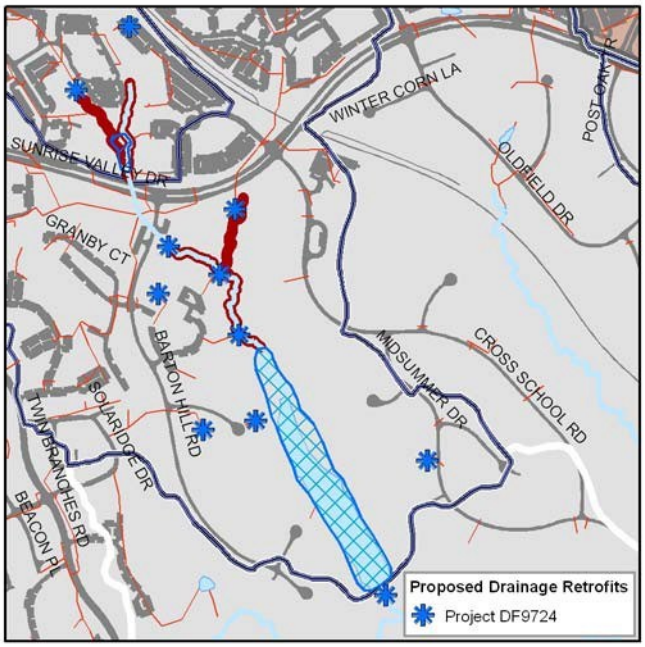
Project Number: DF9724
Catchment Code: DFSB9402
Candidate Site: C24

Project Type: Drainage Retrofit
Project Size: 11 Outfalls

Project Location: This project is distributed throughout the catchment where piped drainage systems discharge into natural channels.

Project Description: This project is intended to reduce the energy associated with high runoff flows at outfalls by retrofitting energy dissipation structures or reconstructing outfalls. Reduction of erosive velocities will reduce the amount of sediment transported downstream.



Potential Project Benefits:

Streamflow	The project will reduce velocity from the outfalls and help reduce erosive potential immediately downstream.
Water Quality	Water quality improvements would be associated with the reduction of scour at outfall locations and within the downstream channels. Habitat would be improved by reducing sediment loads from erosion.

Potential Project Constraints:

Environmental	Environmental impacts and permit requirements are not anticipated for this project; however, projects in RPAs may require exceptions or waivers
Facility Access	Access to these sites can usually be obtained from the roadway and driveways.
Design / Construction	No unusual design or construction issues were identified.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Outfall Protection	11	EA	$8,000.00	$88,000
			Base Construction Cost	**$88,000**
			Mobilization (5%)	$4,400
			Subtotal 1	**$92,400**
			Contingency (25%)	$23,100
			Subtotal 2	**$115,500**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$51,975
			Estimated Project Cost	**$167,000**

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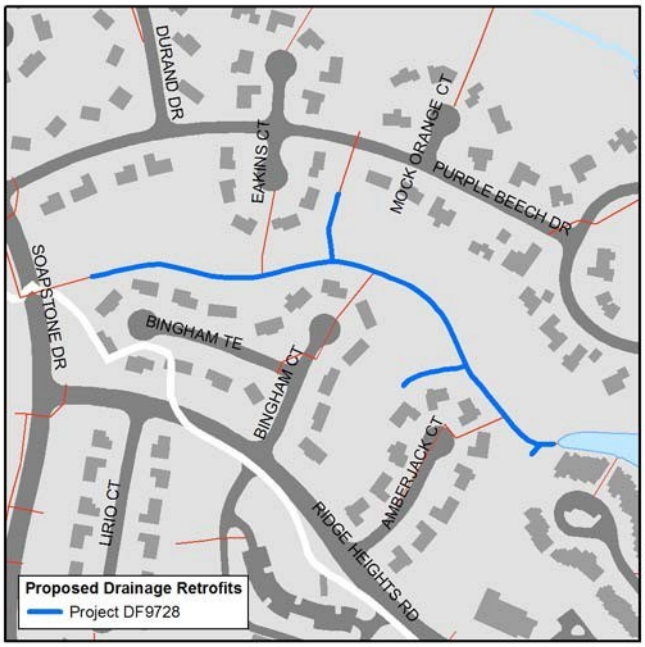
Project Number: DF9728
Catchment Code: DFSB9501
Candidate Site: C28

Project Type: Drainage Retrofit
Project Size: 1774 feet of ditch

Project Location: This project is distributed throughout the catchment.

Project Description: Two areas that were found to have identifiable drainage improvements include the removal of the concrete trapezoidal channel that runs between Purple Beech Drive and Ridge Heights Road, west of Lake Thoreau. Concrete channels will be removed and replaced with grass-covered dry swales with an underdrain.



Potential Project Benefits:

Streamflow	Swales will reduce both the volume and velocity of runoff through infiltration and evapotranspiration.
Water Quality	Replacing ditches with swales will provide treatment before stormwater reaches the lake. Water quality will also benefit from the reduction of sediment loads associated from scour at the outfall locations.

Potential Project Constraints:

Environmental	Environmental impacts and permit requirements are not anticipated for this project.
Facility Access	Access to these sites can usually be obtained from the roadway and driveways.
Design / Construction	No unusual design or construction issues were identified. Design should incorporate check dams or other features to ensure flow velocity is not erosive.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Paved Ditch Demolition (Haul Away)	1774	LF	$18.00	$31,932
Dry Swale w/ Underdrain	1774	LF	$50.00	$88,700
			Base Construction Cost	**$120,632**
			Mobilization (5%)	$6,032
			Subtotal 1	**$126,664**
			Contingency (25%)	$31,666
			Subtotal 2	**$158,330**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$71,248
			Estimated Project Cost	**$230,000**

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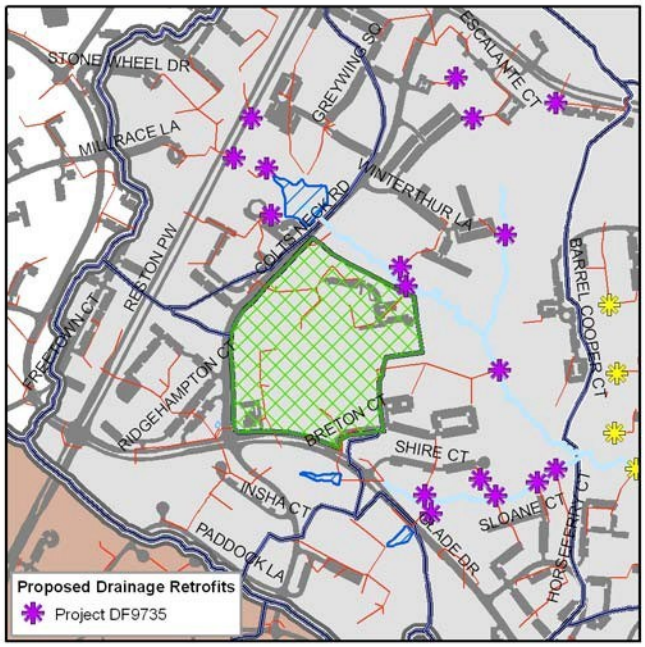
Project Number: DF9735
Catchment Code: DFSB0001
Candidate Site: C35

Project Type: Drainage Retrofit
Project Size: 17 Outfalls

Project Location: These projects are distributed throughout the catchment.

Project Description: This project consists of the addition of energy dissipation devices at each of the locations where outfalls discharge into the natural stream channel. This will reduce the amount of scour at these locations and the amount of sediment transported through the system.



Potential Project Benefits:

Streamflow	The project will reduce velocity from the outfalls and help reduce erosive potential immediately downstream.
Water Quality	Water quality improvements would be associated with the reduction of scour at outfall locations and within the downstream channels. Habitat would be improved by reducing sediment loads from erosion.

Potential Project Constraints:

Environmental	Environmental impacts and permit requirements are not anticipated for this project; however, projects in RPAs may require exceptions or waivers
Facility Access	Access to these sites can usually be obtained from the roadway and driveways.
Design / Construction	No unusual design or construction issues were identified.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Outfall Protection	17	EA	$8,000.00	$136,000
			Base Construction Cost	**$136,000**
			Mobilization (5%)	$6,800
			Subtotal 1	**$142,800**
			Contingency (25%)	$35,700
			Subtotal 2	**$178,500**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$80,325
			Estimated Project Cost	**$259,000**

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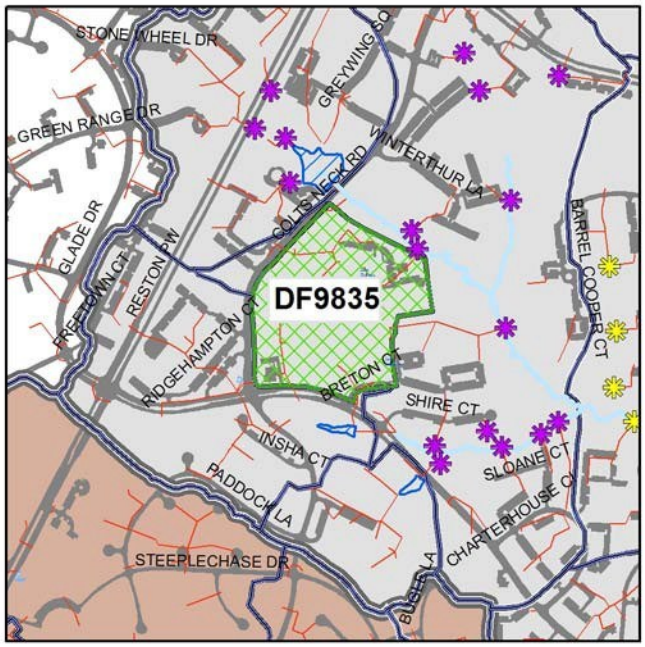
Project Number: DF9835
Catchment Code: DFSB0001
Candidate Site: C35

Project Type: LID Retrofit
Project Size: 0.3 acres
Treated Area: 22 acres



Project Location: The area in and around Hunters Woods Village Shopping Center.

Project Description: This project is an LID retrofit of the entire development in and around the Hunters Woods Village Shopping Center that consists of several commercial businesses, two churches and other associated impervious areas. The LID retrofit approach should look for opportunities to minimize impervious cover, increase flow paths and durations, and construct infiltration facilities to better aid in the reduction of runoff volume.

Potential Project Benefits:

Streamflow	While designed primarily for water quality, this project would reduce the amount of runoff through reduction of impervious area, infiltration and evapotranspiration.
Water Quality	This project has been designed to treat 100% of the water quality volume for the site.

Potential Project Constraints:

Environmental	Environmental permitting issues would not be anticipated for this project.
Facility Access	Access to this area is very good through public roads.
Design / Construction	There are no significant design and construction issues.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
LID Structural Control	1,280.0	SY	$120.00	$153,600
			Base Construction Cost	**$153,600**
			Mobilization (5%)	$7,680
			Subtotal 1	**$161,280**
			Contingency (25%)	$40,320
			Subtotal 2	**$201,600**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$90,720
			Estimated Project Cost	**$292,000**

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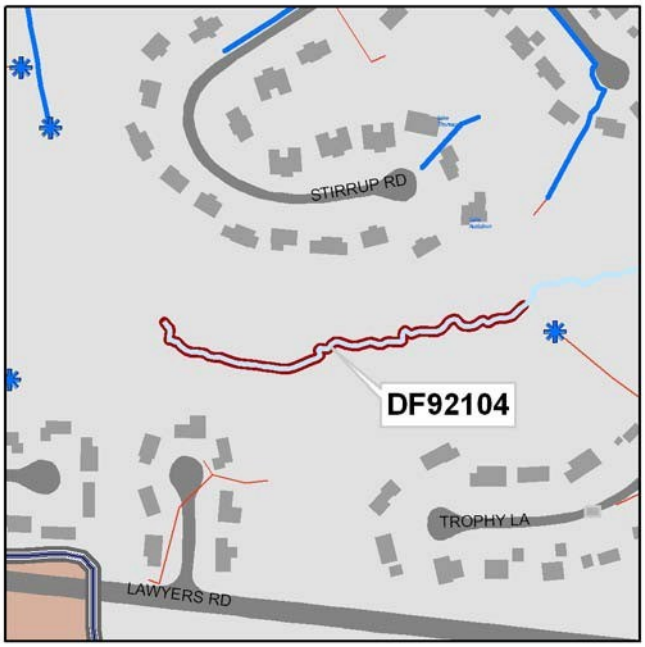
Project Number: DF92104
Catchment Code: DFGL0001
Candidate Site: S104

Project Type: Stream Restoration
Project Size: 919 Linear Feet
Project Location: This project is located between Stirrup Road and Trophy Lane.

Project Description: The stream is obstructed by three pieces of disconnected reinforced concrete stormwater pipe. Other areas of the streambanks are also eroding. The pipes will be removed and the stream will be reconstructed with a new pattern and profile. The invert will be raised to re-establish a connection with the floodplain. Buffers will be restored where they are deficient. **Portions of this project may be constructed or superseded by Reston Association work in this stream channel.**



Potential Project Benefits:

Stream Stability	Stream stability will be improved by restoring it to a pattern and profile better able to convey existing flow and sediment. Reconnection with the floodplain will reduce stress on the banks.
Water Quality	Water quality will be improved by reducing bank erosion.
Instream Habitat	Erosion reduction, creation of an aquatic channel, and the removal of the obstruction will improve instream habitat.

Potential Project Constraints:

Environmental	The site will require forest clearing and may have impacts to jurisdictional wetlands. However, it will require a permit from both the U.S. Army Corps of Engineers and VDEQ. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this facility will require an easement on private property and improvements in the project area.
Design / Construction	Design efforts are moderate compared to other stream restoration projects. Constructability is restrained by access.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Reconstruct new pattern and profile	919	LF	$250.00	$229,750
Buffer restoration	included above	LF	$25.00	$0
Add'l cost, first 500 LF	500	LF	$200.00	$100,000
			Base Construction Cost	**$329,750**
			Mobilization (5%)	$16,488
			Subtotal 1	**$346,238**
			Contingency (25%)	$86,559
			Subtotal 2	**$432,797**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$194,759
			Estimated Project Cost	**$628,000**

Concept Sketch

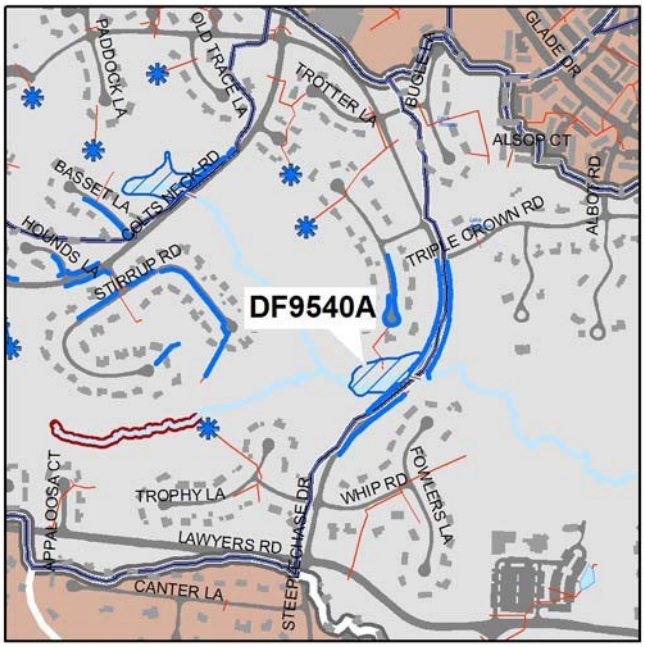
Site Photo:.

Project Number: DF9540A
Catchment Code: DFGL0001
Candidate Site: C40

Project Type: Culvert Retrofit
Project Size: 1.3 acres
Treated Area: 158 acres

Project Location: On the upstream side of Steeplechase Drive.

Project Description: This project would consist of a culvert retrofit where the north branch of this tributary crosses Steeplechase Drive. This retrofit would be designed to reduce erosive flows downstream by extended detention of smaller storms, and allow for settling and vegetative uptake of pollutants.



Potential Project Benefits:

Streamflow	This retrofit would provide approximately 50% of the channel storage volume for this location and help to reduce erosive flows downstream.
Water Quality	Improvements to water quality should be obtained through the reduction in scour forming discharges downstream and sedimentation and vegetative uptake at the site.

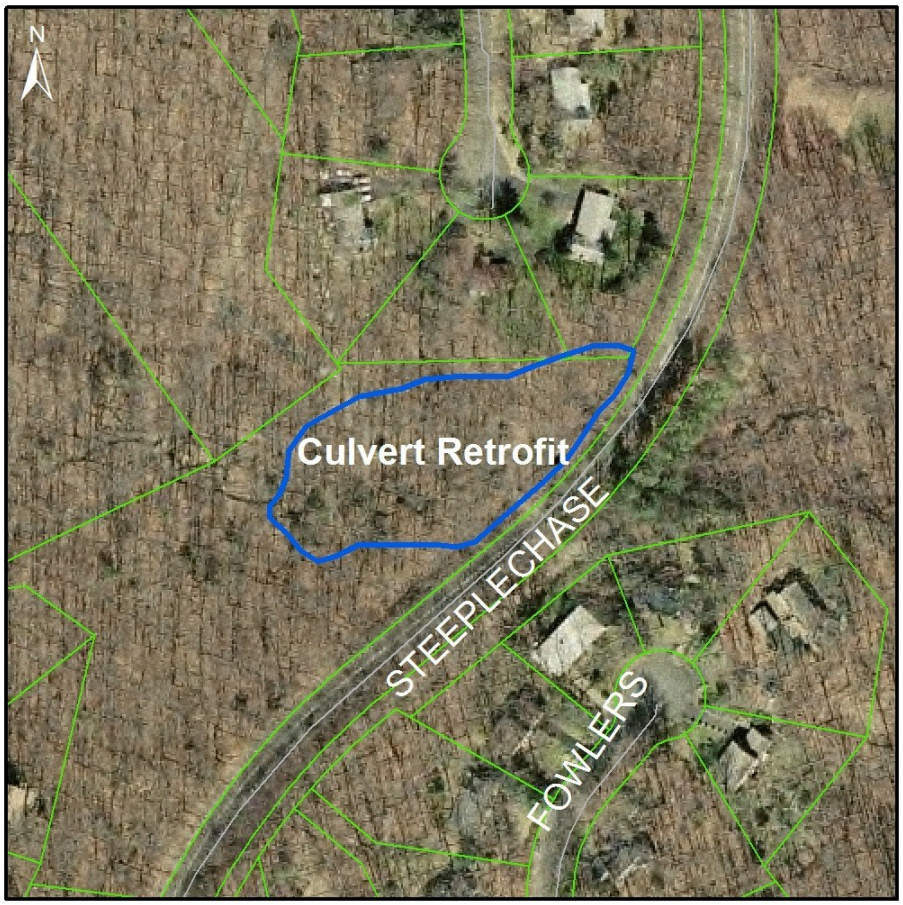
Potential Project Constraints:

Environmental	There may be some permitting issues associated with the temporary impoundment of runoff in the floodplain above this culvert. Some forest impacts would occur during construction. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this project is very good from the roadway.
Design / Construction	No unusual design or construction issues were found.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.3	AC	$5,000.00	$1,500
Excavation	1,260	CY	$35.00	$44,100
Impoundment Structure	1	LS	$5,000.00	$5,000
Landscaping	1,170	SY	$2.50	$2,925
Wetland Planting	390	SY	$2.00	$780
			Base Construction Cost	**$54,305**
			Mobilization (5%)	$2,715
			Subtotal 1	**$57,020**
			Contingency (25%)	$14,255
			Subtotal 2	**$71,275**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$32,074
			Estimated Project Cost	**$103,000**

Concept Sketch

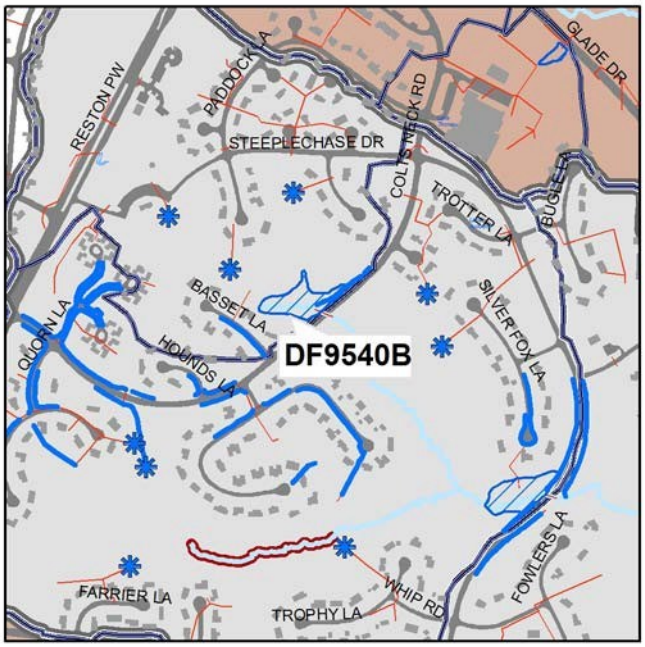


Project Number: DF9540B
Catchment Code: DFGL0001
Candidate Site: C40

Project Type: Culvert Retrofit
Project Size: 1.2 acres
Treated Area: 74 acres

Project Location: On the upstream side of Colts Neck Road.

Project Description: This project is a culvert retrofit in the headwaters of The Glade. The floodplain is relatively flat with an incised channel. This retrofit would be designed as an extended detention dry pond with a sediment forebay and micropool with the primary goal of reducing erosive flows downstream. By using the floodplain for storage, some settling and vegetative uptake of nutrients will occur.



Potential Project Benefits:

Streamflow	This retrofit would provide approximately 100% of the channel storage volume for this location and help to reduce erosive flows downstream.
Water Quality	Improvements to water quality should be obtained through the reduction in scour forming discharges downstream and sedimentation and vegetative uptake at the site.

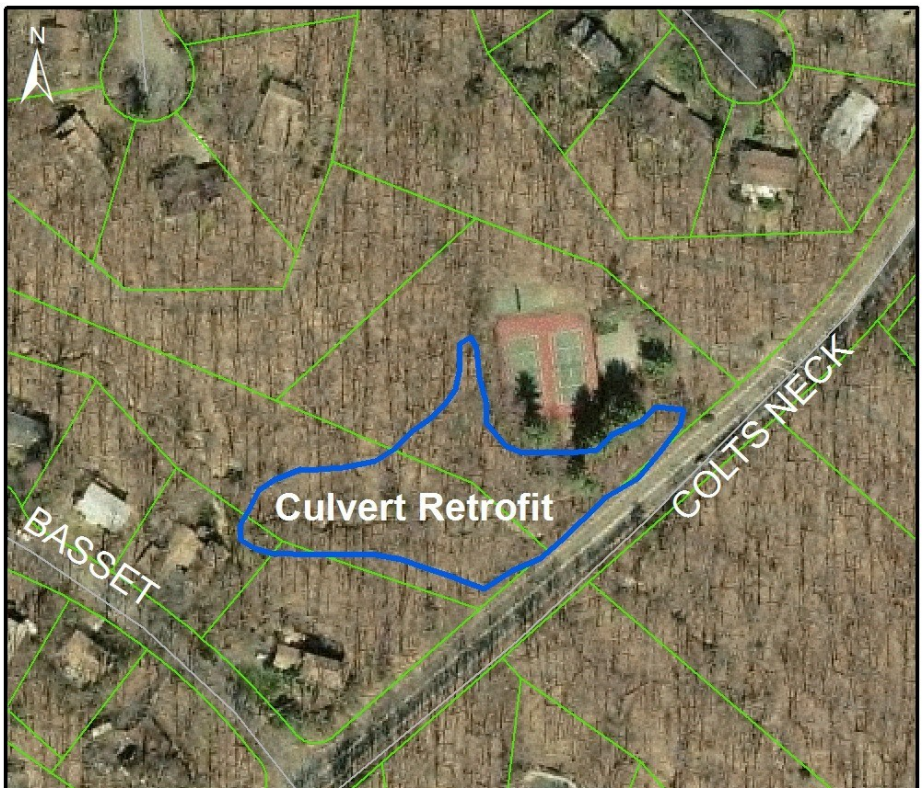
Potential Project Constraints:

Environmental	There may be some permitting issues associated with the temporary impoundment of runoff in the floodplain above this culvert. Some forest impacts would occur during construction. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this project is very good from the roadway.
Design / Construction	No unusual design or construction issues were found.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.3	AC	$5,000.00	$1,500
Excavation	1,500	CY	$35.00	$52,500
Impoundment Structure	1	LS	$5,000.00	$5,000
Landscaping	1,080	SY	$2.50	$2,700
Wetland Planting	360	SY	$2.00	$720
			Base Construction Cost	**$62,420**
			Mobilization (5%)	$3,121
			Subtotal 1	**$65,541**
			Contingency (25%)	$16,385
			Subtotal 2	**$81,926**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$36,867
			Estimated Project Cost	**$119,000**

Concept Sketch



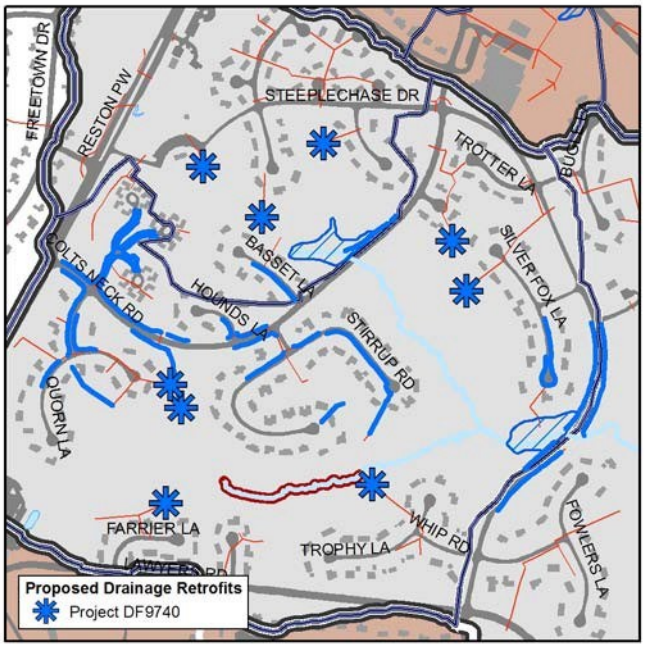
Site Photo:

Project Number: DF9740
Catchment Code: DFGL0001
Candidate Site: C40

Project Type: Drainage Retrofit
Project Size: 9 Outfalls, 9,836 feet of ditch

Project Location: This project is distributed throughout the catchment.

Project Description: This project would include the replacement of all concrete ditch channels with dry swales and improved outfall protection throughout the catchment. The primary impact of this project would be to reduce erosive velocities, promote infiltration, and provide a slower, less destructive drainage system to convey runoff to natural streams.



Potential Project Benefits:

Streamflow	The project will reduce velocity from the outfalls and erosive potential immediately downstream. Swales will reduce both volume and velocity.
Water Quality	Replacing ditches with swales will provide treatment before stormwater reaches the stream system. Water quality will also benefit from the reduction of sediment loads associated from scour at the outfall locations.

Potential Project Constraints:

Environmental	Environmental impacts and permit requirements are not anticipated for this project; however, projects in RPAs may require exceptions or waivers
Facility Access	Access to these sites can usually be obtained from the roadway and driveways.
Design / Construction	No unusual design or construction issues were identified.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Paved Ditch Demolition (Haul Away)	9836	LF	$18.00	$177,048
Dry Swale w/ Underdrain	9836	LF	$50.00	$491,800
Outfall Protection	9	EA	$8,000.00	$72,000
			Base Construction Cost	**$740,848**
			Mobilization (5%)	$37,042
			Subtotal 1	**$777,890**
			Contingency (25%)	$194,472
			Subtotal 2	**$972,363**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$437,563
			Estimated Project Cost	**$1,410,000**

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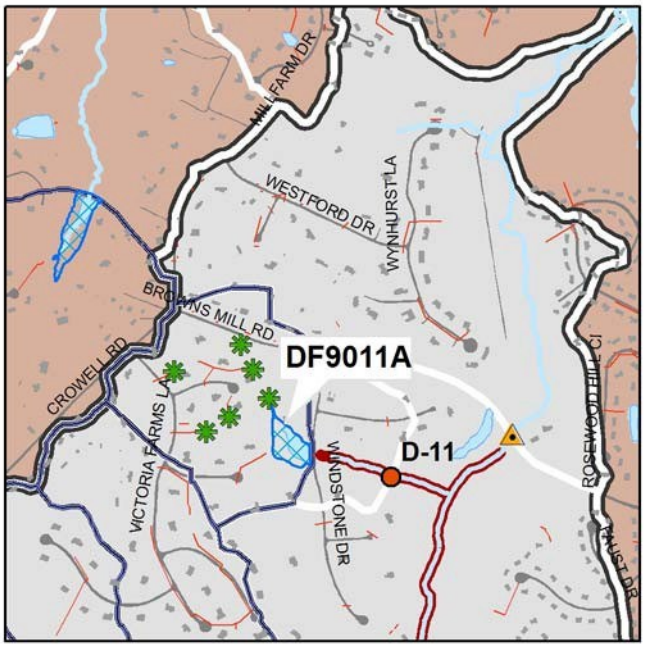
Project Number: DF9011A
Catchment Code: DFDF6801
Candidate Site: D-11

Project Type: Pond Retrofit
Project Size: 1.9 acres
Treated Area: 49.5 acres



Project Location: This project is located upstream of the crossing at Windstone Drive.

Project Description: This wet pond is bordered by private property with buildings in close proximity of the floodplain. The water quality volume is met in the wet storage volume of this pond. An aquatic bench is proposed around the perimeter of the pond. Significant improvement in management of smaller storms can be achieved with the proposed multi-stage control structure. Also, corrosion of the outflow pipe is evident on both the upstream and downstream end that should be repaired.

Potential Project Benefits:

Streamflow	This project will include approximately 80% of the channel protection volume with the installation of a multi-stage riser.
Water Quality	The wet storage volume within this pond meets 100% of the water quality volume.

Potential Project Constraints:

Environmental	Environmental permitting issues would not be expected for this project. Projects in RPAs may require exceptions or waivers.
Facility Access	Facility access is excellent from the roadway.
Design / Construction	Coordination with the property owner will be necessary for this project. County staff will coordinate with the facility owner to implement the project.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.2	AC	$5,000.00	$1,000
Excavation/Grading (aquatic bench)	2842	CY	$30.00	$85,260
Outlet Protection	1	EA	$8,000.00	$8,000
Riser	1	LS	$10,000.00	$10,000
Rip Rap Stabilization	40	LF	$50.00	$2,000
Wetland Planting (aquatic bench)	820	SY	$2.00	$1,640
			Base Construction Cost	**$107,900**
			Mobilization (5%)	$5,395
			Subtotal 1	**$113,295**
			Contingency (25%)	$28,324
			Subtotal 2	**$141,619**
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	$63,728
			Estimated Project Cost	**$205,000**

This project is part of the alternative project group for Regional Pond D-11. See Table 5-2 for the recommended disposition.

Site Photo:

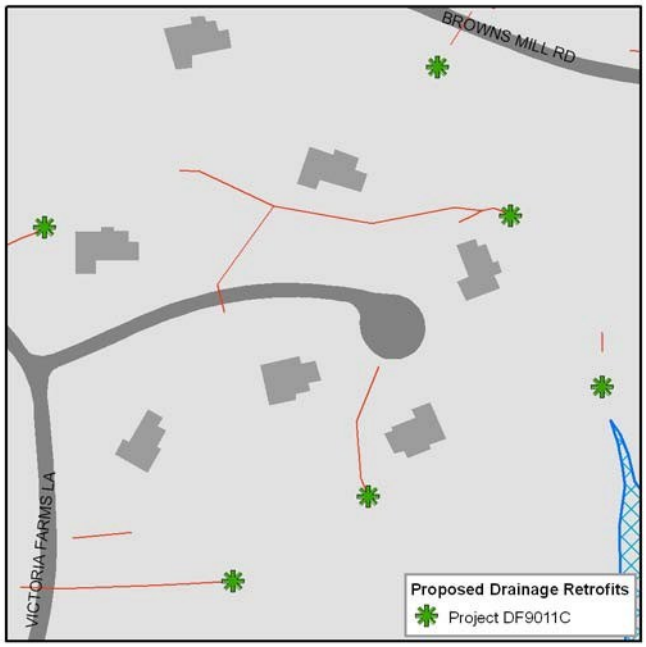
Concept Sketch:

Project Number: DF9011C
Catchment Code: DFDF6801
Candidate Site: D-11

Project Type: Drainage Retrofit
Project Size: 9 Outfalls

Project Location: This project is distributed throughout the catchment where piped drainage systems discharge into natural channels.

Project Description: This project consists of reconfiguring outfalls or retrofitting energy dissipation structures to reduce scour and erosion where flows from the storm drainage system enter the stream. Reduction of erosive velocities will reduce the amount of sediment transported downstream.



Potential Project Benefits:

Streamflow	The project will reduce velocity from the outfalls and help reduce erosive potential immediately downstream.
Water Quality	Water quality improvements would be associated with the reduction of scour at outfall locations and within the downstream channels. Habitat would be improved by reducing sediment loads from erosion.

Potential Project Constraints:

Environmental	Environmental impacts and permit requirements are not anticipated for this project; however, projects in RPAs may require exceptions or waivers.
Facility Access	Access to these sites can usually be obtained from the roadway and driveways.
Design / Construction	No unusual design or construction issues were identified.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Outfall Protection	9	EA	$8,000.00	$72,000
			Base Construction Cost	**$72,000**
			Mobilization (5%)	$3,600
			Subtotal 1	**$75,600**
			Contingency (25%)	$18,900
			Subtotal 2	**$94,500**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$42,525
			Estimated Project Cost	**$137,000**

This project is part of the alternative project group for Regional Pond D-11. See Table 5-2 for the recommended disposition.

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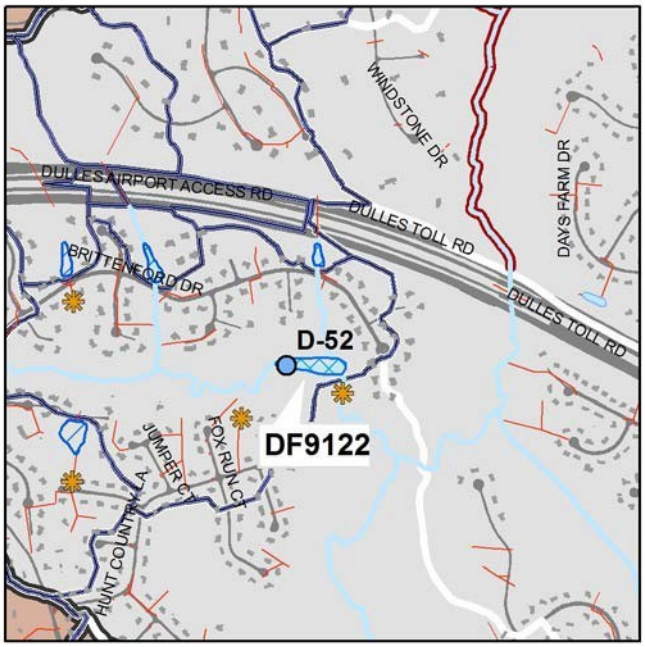
Project Number: DF9122
Catchment Code: DFDF6902
Candidate Site: C22

Project Type: Pond Retrofit
Project Size: 1.3 acres
Treated Area: 107.9 acres

Project Location: This project is between Brittenford Drive and Hunt Country Lane.

Project Description: There are two concentrated inflow points as well as two natural stream channels converging at this location. Excavating the available clear space directly in front of the riser to create a flat, wet marsh area will increase nutrient removal and promote settling of solids. The existing storage volume within the facility is sufficient such that modifications to the riser will enable full channel protection without further excavation.



Potential Project Benefits:

Streamflow	100% of the calculated channel protection volume can be achieved by modifying the existing control structure.
Water Quality	Excavating to create a permanent wetland component in the available area can meet approximately 30% of the required water quality volume, and would enhance the pollutant removal of the existing dry pond.

Potential Project Constraints:

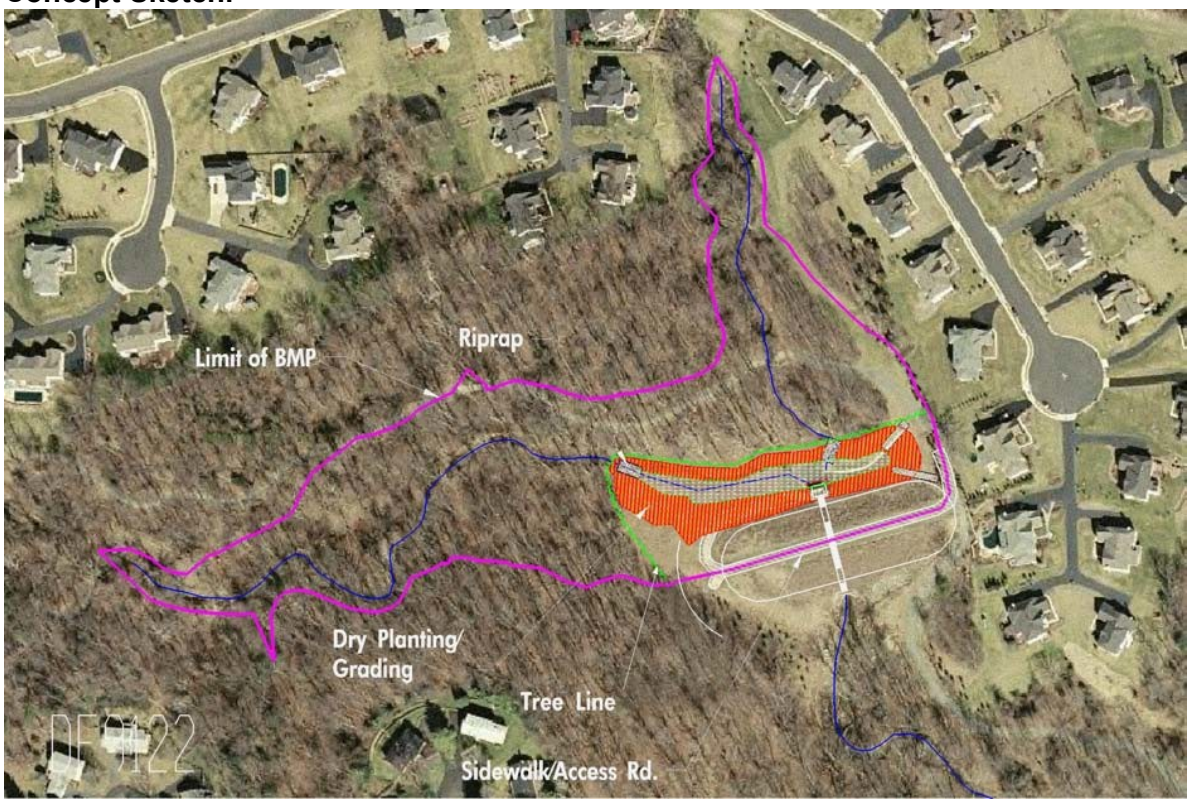
Environmental	Environmental permitting issues would not be anticipated for this project. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to these facilities is available from a maintenance easement.
Design / Construction	No design or construction issues were noted for this project. County staff will coordinate with the facility owner to implement the project.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	1	AC	$5,000.00	$5,000.00
Pavement Removal	335	SY	$7.50	$2,512.50
Grading and Excavation	5475	CY	$30.00	$164,250.00
Construct Sidewalk	2500	SF	$5.00	$12,500.00
Riser	1	LS	$10,000.00	$10,000.00
Rip Rap Stabilization	150	LF	$50.00	$7,500.00
Wetland Planting	1333	SY	$2.00	$2,666.00
Dry Landscaping	3111	SY	$2.50	$7,777.50
			Base Construction Cost	**$212,206**
			Mobilization (5%)	$10,610
			Subtotal 1	**$222,816**
			Contingency (25%)	$55,704
			Subtotal 2	**$278,520**
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	$125,334
			Estimated Project Cost	**$404,000**

Site Photo:

Concept Sketch:

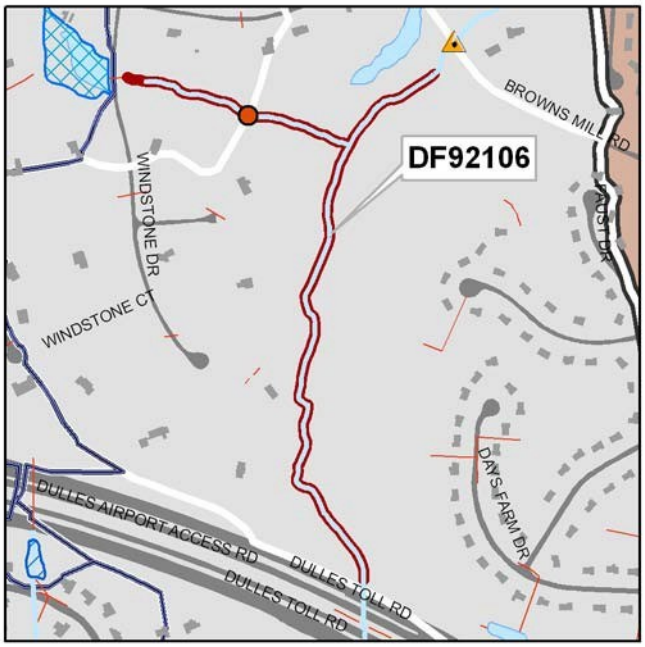


Project Number: DF92106
Catchment Code: DFDF0039
Candidate Site: S106

Project Type: Stream Restoration
Project Size: 3409 Linear Feet

Project Location: This project is located on the mainstem of Difficult Run between the Dulles Toll Road and Browns Mill Road.

Project Description: The channel has widened and the banks are unstable in several reaches. The riparian buffer is deficient for most of its length. The restoration approach consists of minor regrading of streambanks to a more stable angle, and armoring specific erosion points at meanders. Stream buffers will be restored where they are deficient.



Potential Project Benefits:

Stream Stability	Regrading and armoring the banks will reduce instability and erosion caused by failure of the vertical streambanks.
Water Quality	Water quality will be improved by a significant reduction in current and future streambank erosion.
Instream Habitat	Erosion reduction and establishing a riparian buffer will improve physical habitat conditions.

Potential Project Constraints:

Environmental	The site may require some tree removal and impacts to jurisdictional wetlands. It may require a permit from both the U.S. Army Corps of Engineers and VDEQ. Projects in RPAs may require exceptions or waivers.
Facility Access	Access is available through public property or easements.
Design / Construction	Design efforts are less complex than other projects. The size of the mainstem channel will present some constraints to construction.

Costs

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Change channel type -- step pools	102	LF	$225.00	$22,950
Stabilize in place -- grading	1868	LF	$175.00	$326,900
Stabilize in place -- armoring	433	LF	$225.00	$97,425
Buffer restoration	1006	LF	$25.00	$25,150
Add'l cost, first 500 LF	500	LF	$200.00	$100,000
			Base Construction Cost	**$572,425**
			Mobilization (5%)	$28,621
			Subtotal 1	**$601,046**
			Contingency (25%)	$150,262
			Subtotal 2	**$751,308**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$338,089
			Estimated Project Cost	**$1,089,000**

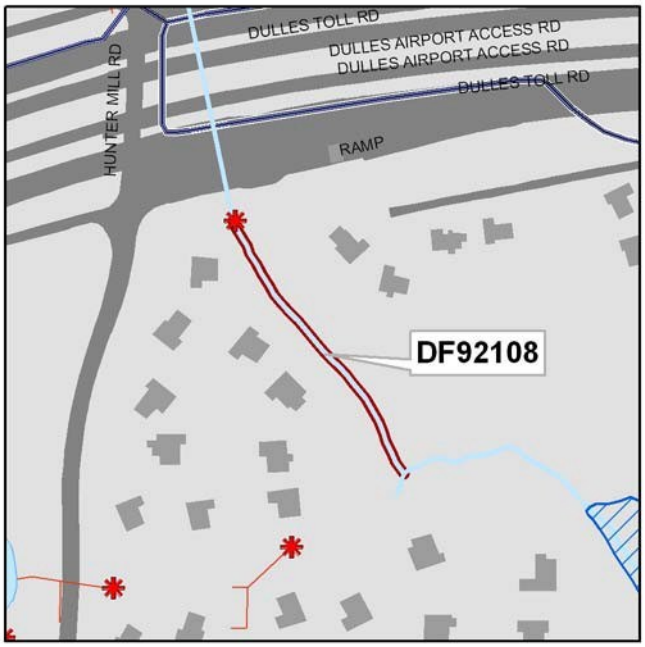
Concept Sketch

Project Number: DF92108
Catchment Code: DFDF6901
Candidate Site: S108

Project Type: Buffer Restoration
Project Size: 668 Linear Feet

Project Location: This project is located south of the Dulles Toll Road and to the east of Hunter Mill Road.

Project Description: The stream is located in an open pasture like land area between several private residences. The proposed restoration would involve restoring the buffer by planting the floodplain with native woody vegetation and grasses.



Potential Project Benefits:

Stream Stability	Roots from the restored buffer will help anchor the streambanks and prevent future erosion.
Water Quality	Water quality may be improved by the nutrient uptake potential of the forested buffer.
Instream Habitat	The buffer will provide thermal shading and decrease the amount of nutrients in the waterway by vegetative uptake.

Potential Project Constraints:

Environmental	The site will not require forest clearing or impacts to jurisdictional wetlands. It will not require permits, however projects in RPAs may require exceptions or waivers.
Facility Access	Access to this facility will be accomplished through the undeveloped parcel or easement.
Design / Construction	Design efforts are minimal compared to other stream restoration projects. General constructability is good.

Costs:

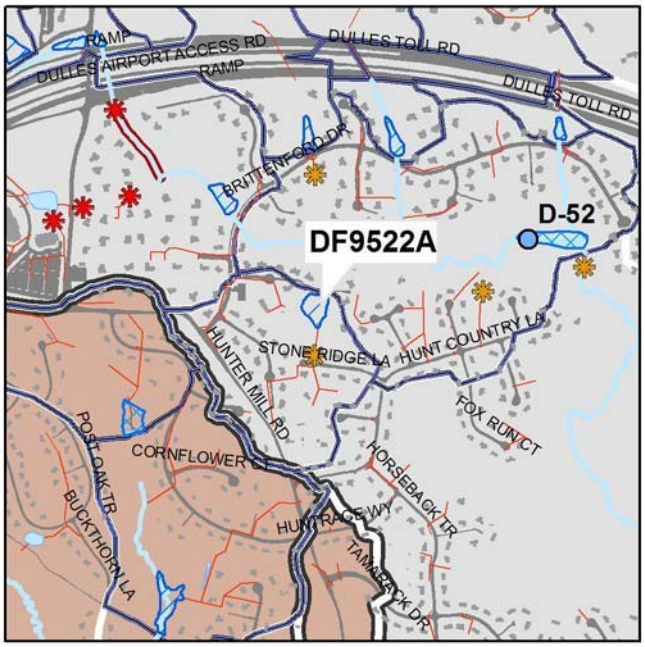
ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Buffer restoration	668	LF	$25.00	$16,700
			Base Construction Cost	**$16,700**
			Mobilization (5%)	$835
			Subtotal 1	**$17,535**
			Contingency (25%)	$4,383
			Subtotal 2	**$21,918**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$9,863
			Estimated Project Cost	**$32,000**

Concept Sketch

Project Number: DF9522A
Catchment Code: DFDF6902
Candidate Site: C22

Project Type: Culvert Retrofit
Project Size: 0.9 acres
Treated Area: 39.3 acres

Project Location: This project is located at a driveway culvert east of Willow Crest Court.



Project Description: This project consists of using the embankment of the driveway off of Willow Crest Court to create an extended detention dry pond to provide storage to reduce flows and potential erosion downstream. A riser structure will be constructed to regulate outflow, and parts of the pond area will be landscaped with both dry and wetland vegetation.

Potential Project Benefits:

Streamflow	100% of the channel protection volume can be provided..
Water Quality	100% of the water quality volume can be provided. Use of wetland vegetation and a micro-pool will improve treatment effectiveness.

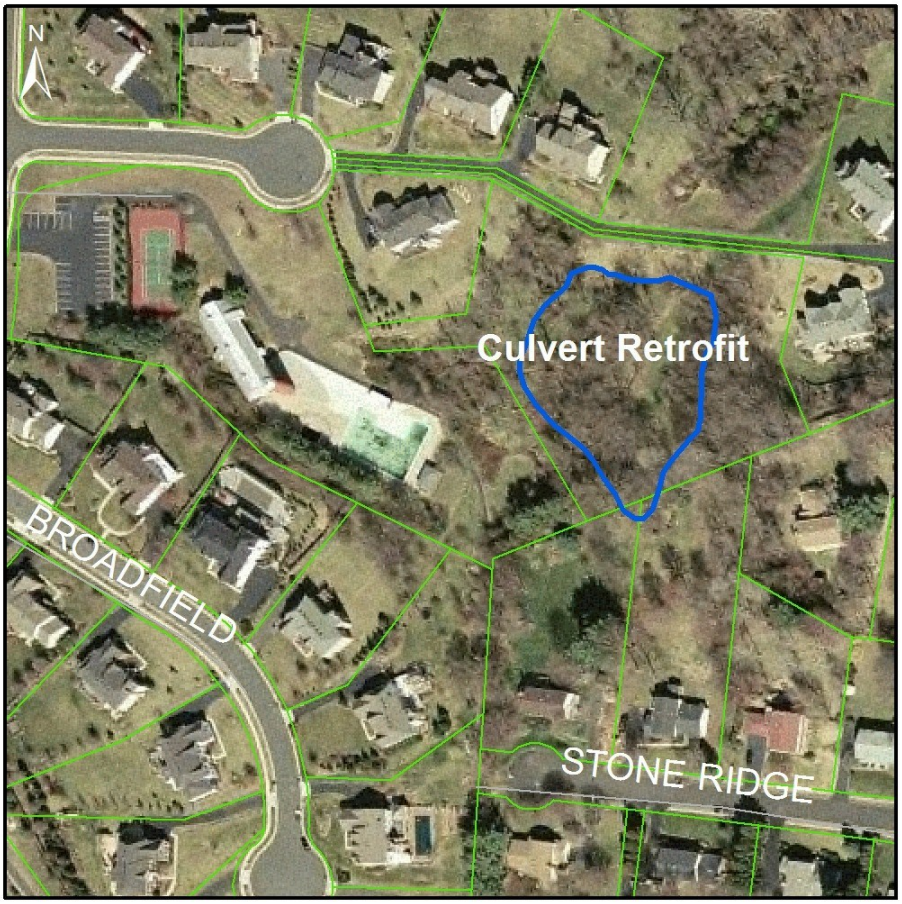
Potential Project Constraints:

Environmental	There may be some permitting issues associated with the temporary impoundment of runoff in the floodplain above this culvert. Some forest impacts would occur during construction. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this project is very good from the roadway.
Design / Construction	No unusual design or construction issues were found. Project should be designed as a system with the modified regional pond downstream.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.2	AC	$5,000.00	$1,000
Excavation	1,510	CY	$35.00	$52,850
Impoundment Structure	1	LS	$5,000.00	$5,000
Landscaping	820	SY	$2.50	$2,050
Wetland Planting	280	SY	$2.00	$560
			Base Construction Cost	**$61, 460**
			Mobilization (5%)	$3,073
			Subtotal 1	**$64,533**
			Contingency (25%)	$16,133
			Subtotal 2	**$80,666**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$36,300
			Estimated Project Cost	**$117,000**

Concept Sketch

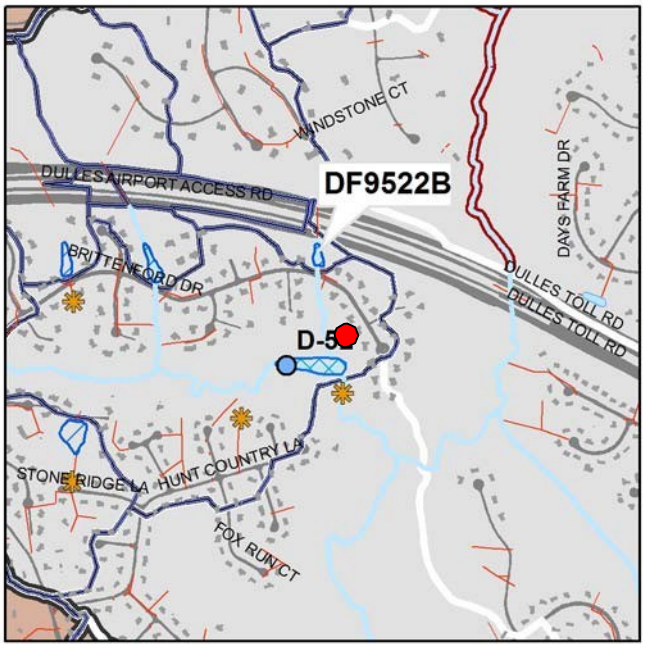


Project Number: DF9522B
Catchment Code: DFDF6902
Candidate Site: C22

Project Type: Culvert Retrofit
Project Size: 0.3 acres
Treated Area: 57.1 acres

Project Location: North of Brittenford Drive, and south of the Dulles Toll Road.

Project Description: This project consists of using the roadway embankment of Brittenford Drive to create an extended detention dry pond for channel protection control. An impoundment structure and riser will be constructed, and the area of the pond will be graded and landscaped to improve pollutant removal performance.



Potential Project Benefits:

Streamflow	Approximately 40% of the channel protection volume can be provided.
Water Quality	Use of wetland vegetation for nutrient uptake will improve treatment effectiveness.

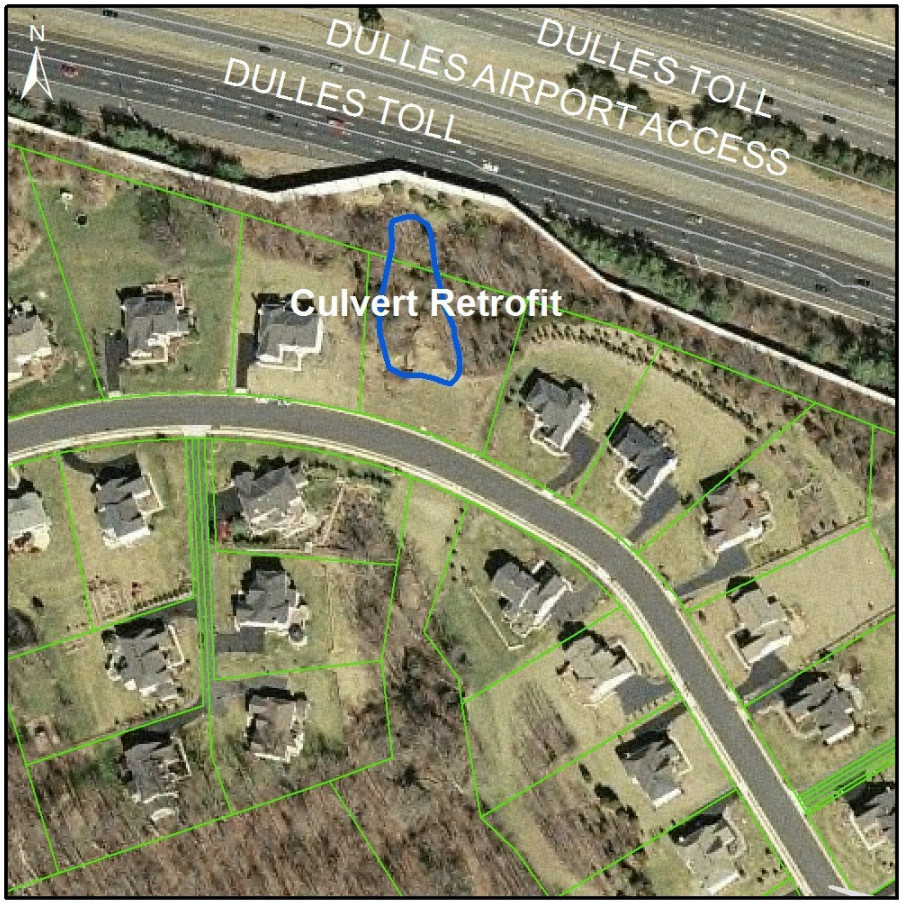
Potential Project Constraints:

Environmental	There may be some permitting issues associated with the temporary impoundment of runoff in the floodplain above this culvert. Some forest impacts would occur during construction. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this project is very good from the roadway.
Design / Construction	Proximity to the Dulles Toll Road may be a constraint. Project should be designed as a system with the modified regional pond downstream.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.1	AC	$5,000.00	$500
Excavation	370	CY	$35.00	$12,950
Impoundment Structure	1	LS	$5,000.00	$5,000
Landscaping	240	SY	$2.50	$600
Wetland Planting	80	SY	$2.00	$160
			Base Construction Cost	**$19,210**
			Mobilization (5%)	$961
			Subtotal 1	**$20,171**
			Contingency (25%)	$5,043
			Subtotal 2	**$25,213**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$11,346
			Estimated Project Cost	**$37,000**

Concept Sketch

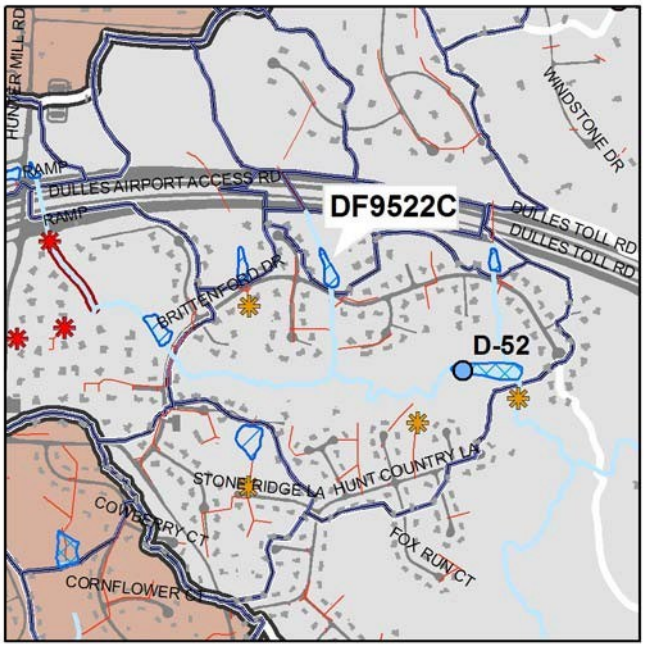


Project Number: DF9522C
Catchment Code: DFDF6902
Candidate Site: C22

Project Type: Culvert Retrofit
Project Size: 0.5 acres
Treated Area: 38.1 acres

Project Location: North of Brittenford Drive, east of Raleigh Hill Road.

Project Description: This project consists of using the roadway embankment of Brittenford Drive to create an extended detention dry pond for channel protection control. An impoundment structure and riser will be constructed, and the area of the pond will be graded and landscaped to improve pollutant removal performance.



Potential Project Benefits:

Streamflow	Approximately 73% of the channel protection volume can be provided..
Water Quality	Use of wetland vegetation and a micropool for sedimentation and nutrient uptake will improve treatment effectiveness.

Potential Project Constraints:

Environmental	There may be some permitting issues associated with the temporary impoundment of runoff in the floodplain above this culvert. Some forest impacts would occur during construction. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this project is very good from the roadway.
Design / Construction	No significant design or construction issues were found. Project should be designed as a system with the modified regional pond downstream.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.2	AC	$5,000.00	$1,000
Excavation	430	CY	$35.00	$15,050
Impoundment Structure	1	LS	$5,000.00	$5,000
Landscaping	470	SY	$2.50	$1,175
Wetland Planting	160	SY	$2.00	$320
			Base Construction Cost	**$22,545**
			Mobilization (5%)	$1,127
			Subtotal 1	**$23,672**
			Contingency (25%)	$5,918
			Subtotal 2	**$29,590**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$13,316
			Estimated Project Cost	**$43,000**

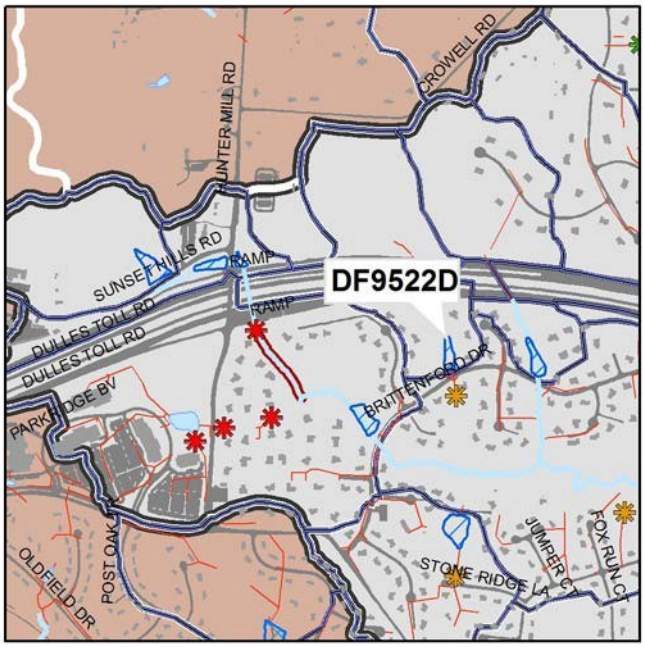
Concept Sketch

Project Number: DF9522D
Catchment Code: DFDF6902
Candidate Site: C22

Project Type: Culvert Retrofit
Project Size: 0.4 acres
Treated Area: 43.9 acres

Project Location: Upstream of Brittenford Drive, west of Raleigh Hill Road.

Project Description: This project consists of using the roadway embankment of Brittenford Drive to create an extended detention dry pond for channel protection control. An impoundment structure and riser will be constructed, and the area of the pond will be graded and landscaped to improve pollutant removal performance.



Potential Project Benefits:

Streamflow	Approximately 28% of the channel protection volume can be provided..
Water Quality	Use of wetland vegetation and a micropool for sedimentation and nutrient uptake will improve treatment effectiveness.

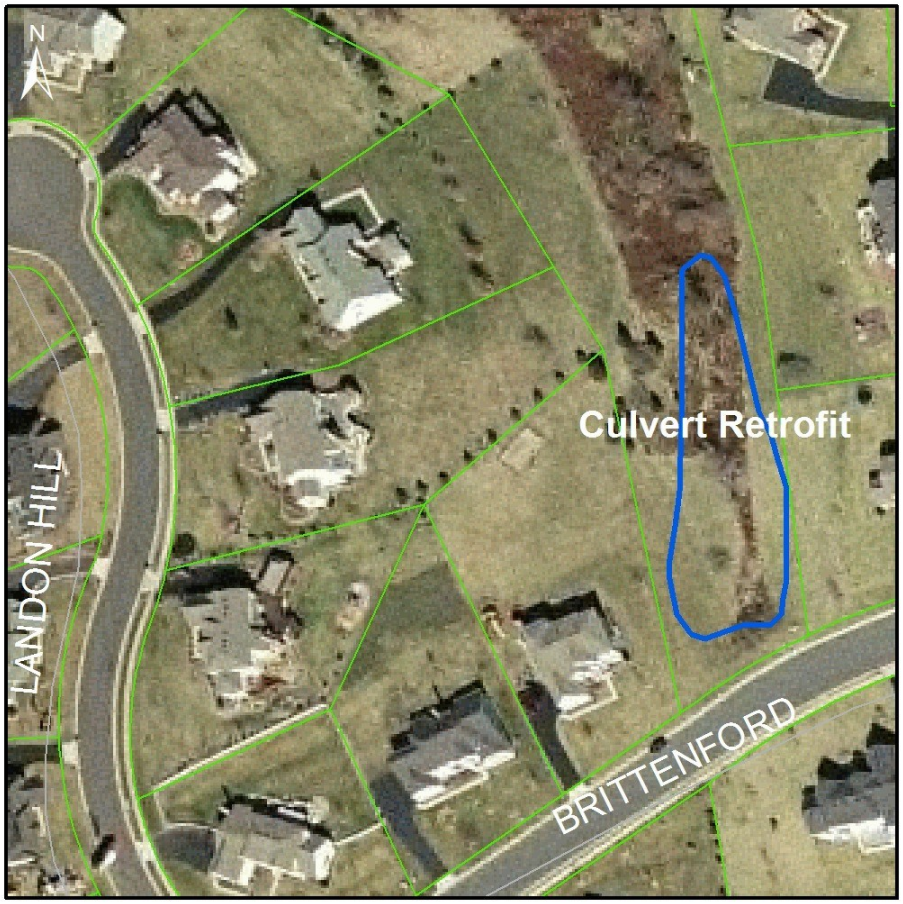
Potential Project Constraints:

Environmental	There may be some permitting issues associated with the temporary impoundment of runoff in the floodplain above this culvert. Some forest impacts would occur during construction. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this project is very good from the roadway.
Design / Construction	No significant design or construction issues were found. Project should be designed as a system with the modified regional pond downstream.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.1	AC	$5,000.00	$500
Excavation	280	CY	$35.00	$9,800
Impoundment Structure	1	LS	$5,000.00	$5,000
Landscaping	370	SY	$2.50	$925
Wetland Planting	130	SY	$2.00	$260
			Base Construction Cost	**$16,485**
			Mobilization (5%)	$824
			Subtotal 1	**$17,309**
			Contingency (25%)	$4,327
			Subtotal 2	**$21,637**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$9,736
			Estimated Project Cost	**$31,000**

Concept Sketch

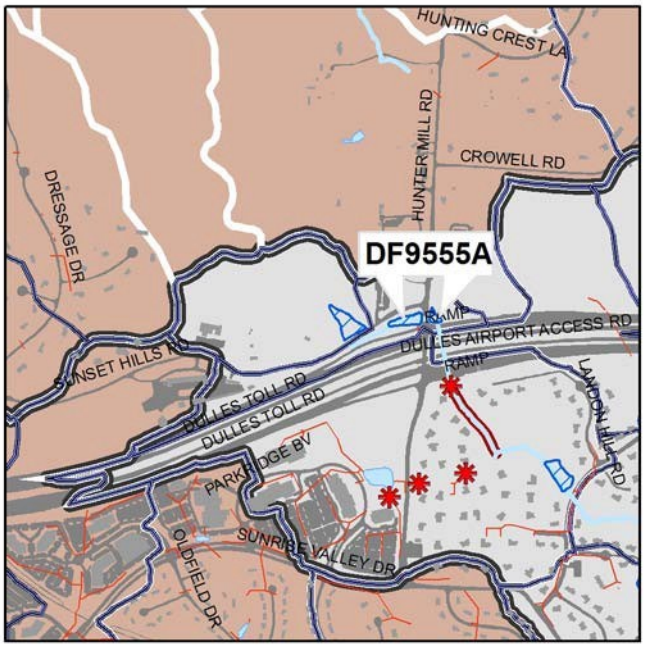


Project Number: DF9555A
Catchment Code: DFDF6901
Candidate Site: C55

Project Type: Culvert Retrofit
Project Size: 0.6 acres
Treated Area: 20.6 acres

Project Location: This project is located on either side of Hunter Mill Road just south of Sunset Hills Road.

Project Description: This project consists of a impoundment structures and excavation of a detention pond on both sides of the crossing of Hunter Mill Road. The retrofit would be designed to store runoff on both the upstream and downstream side of the roadway, with the goal of reducing erosive streamflows.



Potential Project Benefits:

Streamflow	This retrofit would provide approximately 70% of the channel storage volume and help to reduce erosive flows downstream.
Water Quality	Improvements to water quality would be obtained through the reduction in scour forming discharges, along with sediment settlement and vegetative uptake on the site.

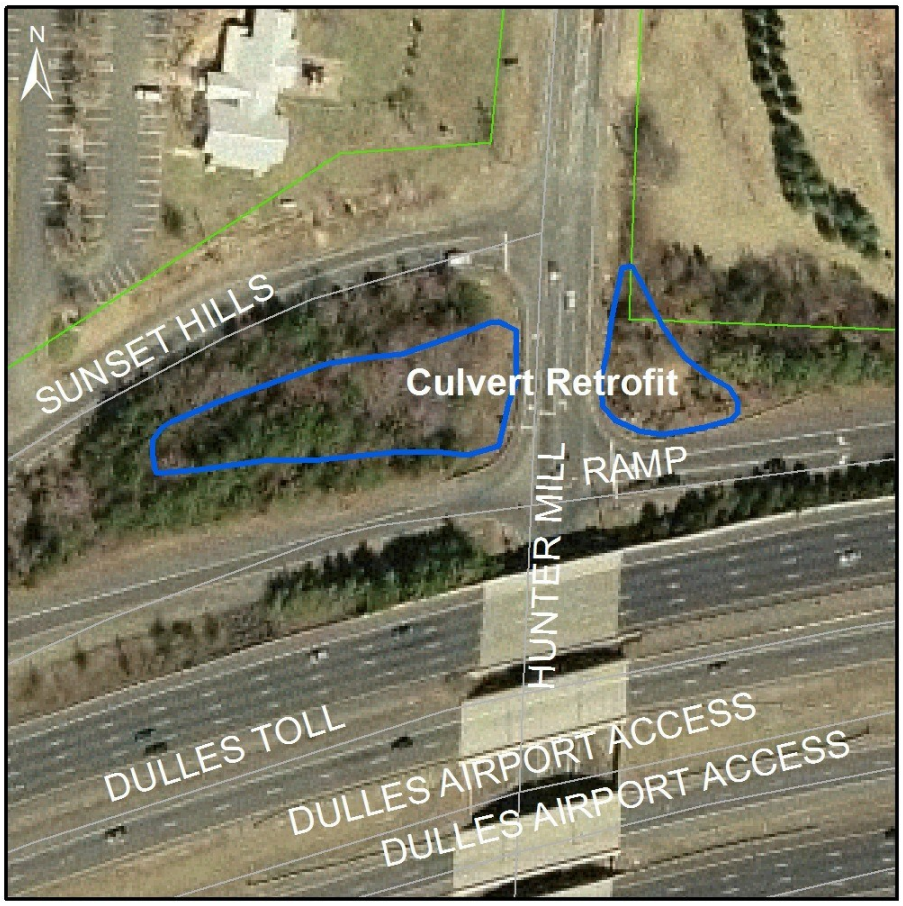
Potential Project Constraints:

Environmental	Environmental permitting issues would not be anticipated for this project, however projects in RPAs may require exceptions or waivers.
Facility Access	Access should not be a constraint as there is good access from Hunter Mill Road.
Design / Construction	Coordination with VDOT would be necessary. Project should be designed as a system with the modified regional pond downstream.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.2	AC	$5,000.00	$1,000
Excavation	630	CY	$35.00	$22,050
Impoundment Structure	2	LS	$5,000.00	$10,000
Landscaping	510	SY	$2.50	$1,275
Wetland Planting	170	SY	$2.00	$340
			Base Construction Cost	**$34,665**
			Mobilization (5%)	$1,733
			Subtotal 1	**$36,398**
			Contingency (25%)	$9,100
			Subtotal 2	**$45,498**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$20,474
			Estimated Project Cost	**$66,000**

Concept Sketch

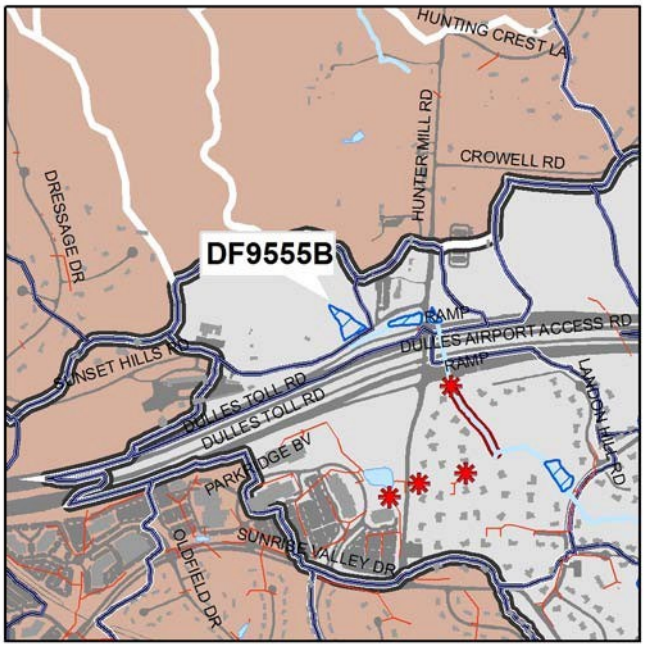


Project Number: DF9555B
Catchment Code: DFDF6901
Candidate Site: C55

Project Type: Culvert Retrofit
Project Size: 0.8 acres
Treated Area: 30.2 acres

Project Location: North of Sunset Hills Road and west of Hunter Mill Road.

Project Description: This project consists of using the roadway embankment of Sunset Hills Road to increase the detention time for the catchment. The stream and wetlands within the project area are in excellent condition, which makes for a very good location to remove pollutants through vegetative uptake and settling.



Potential Project Benefits:

Streamflow	100% of the channel protection volume can be provided.
Water Quality	100% of the water quality volume can be provided Use of wetland vegetation and a micro-pool will improve treatment effectiveness.

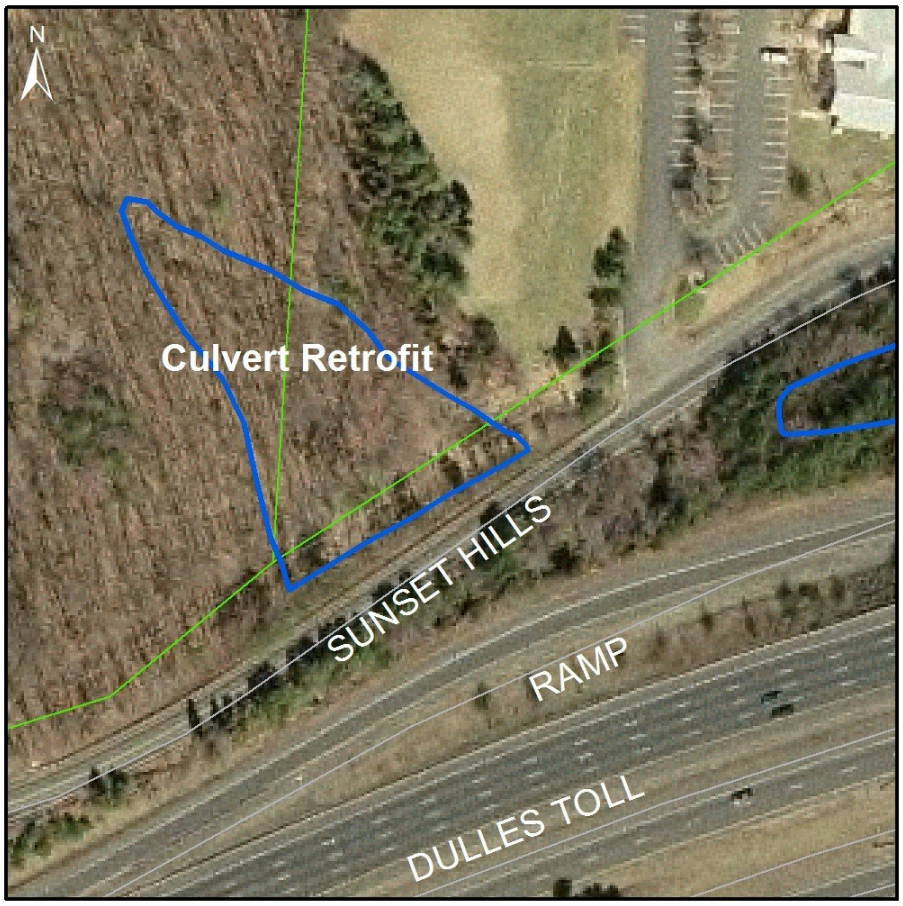
Potential Project Constraints:

Environmental	Environmental permitting issues would be anticipated for any activity in and around a stream corridor. Forest and wetland impacts are anticipated during construction. Projects in RPAs may require exceptions or waivers.
Facility Access	Access is very good from the roadway
Design / Construction	No significant design or construction issues were noted. Project should be designed as a system with the modified regional pond downstream.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.2	AC	$5,000.00	$1,000
Excavation	850	CY	$35.00	$29,750
Impoundment Structure	1	LS	$5,000.00	$5,000
Landscaping	690	SY	$2.50	$1,725
Wetland Planting	230	SY	$2.00	$460
			Base Construction Cost	**$37,935**
			Mobilization (5%)	$1,897
			Subtotal 1	**$39,832**
			Contingency (25%)	$9,958
			Subtotal 2	**$49,790**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$22,405
			Estimated Project Cost	**$72,000**

Concept Sketch

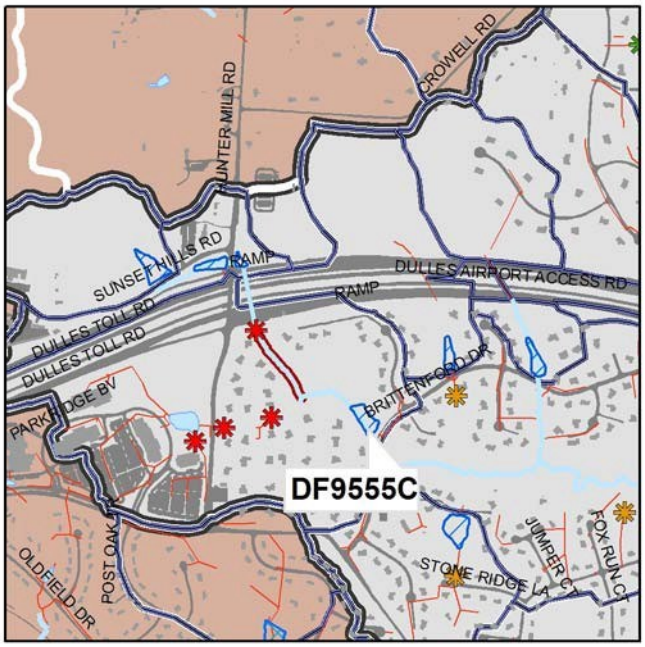


Project Number: DF9555C
Catchment Code: DFDF6902
Candidate Site: C55

Project Type: Culvert Retrofit
Project Size: 0.6 acres
Treated Area: 113.2 acres

Project Location: Under Brittenford Drive, between Coving Cross Lane and Landon Hill Road.

Project Description: This project consists of using the roadway embankment of Brittenford Drive for detention of storm events. This will reduce the peak discharges and allow time for sediments, and possibly pollutants, to settle out. Excavation will take place on the existing floodplain with grading down to the stream.



Potential Project Benefits:

Streamflow	This retrofit would provide approximately 60% of the channel storage volume and help to reduce erosive flows downstream.
Water Quality	Some reduction of pollutants will occur with increased settling associated with extended detention, along with vegetative uptake on the site.

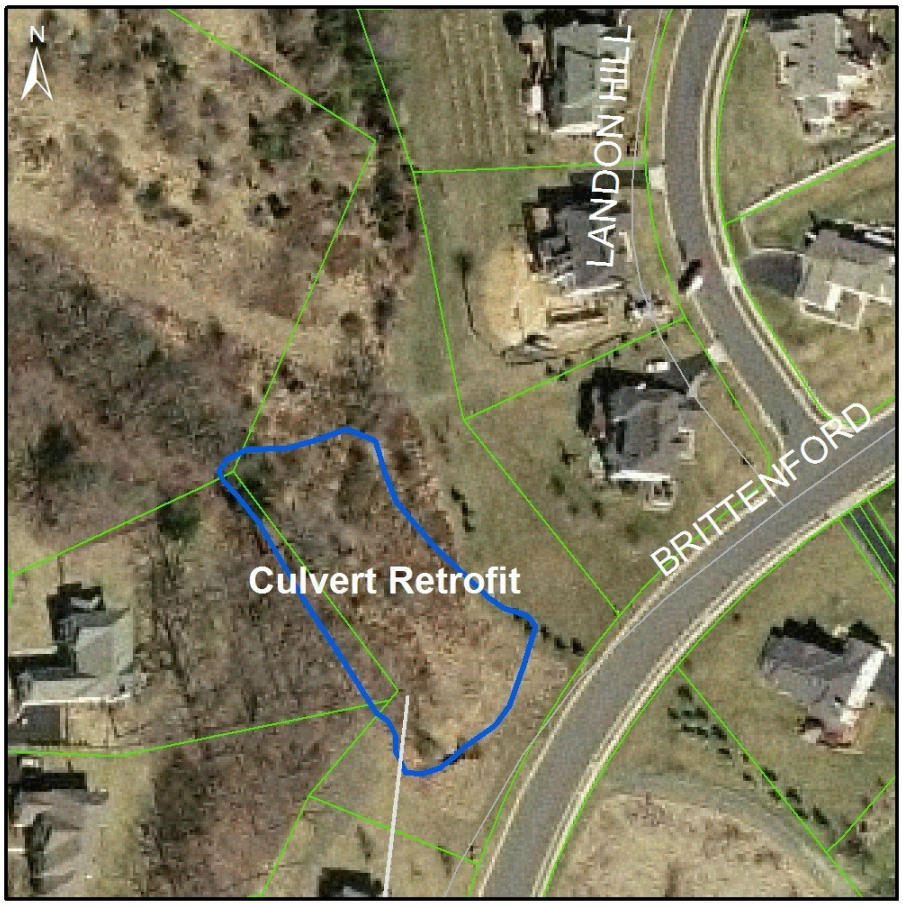
Potential Project Constraints:

Environmental	Environmental permitting issues would be anticipated for any activity in and around a stream corridor. Forest and wetland impacts are anticipated during construction. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this facility is reasonable from Brittenford Drive.
Design / Construction	No design or construction issues were noted for this project. Project should be designed as a system with the modified regional pond downstream.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.2	AC	$5,000.00	$1,000
Excavation	830	CY	$35.00	$29,050
Impoundment Structure	1	LS	$5,000.00	$5,000
Landscaping	580	SY	$2.50	$1,450
Wetland Planting	200	SY	$2.00	$400
			Base Construction Cost	**$36,900**
			Mobilization (5%)	$1,845
			Subtotal 1	**$38,745**
			Contingency (25%)	$9,686
			Subtotal 2	**$48,431**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$21,794
			Estimated Project Cost	**$70,000**

Concept Sketch

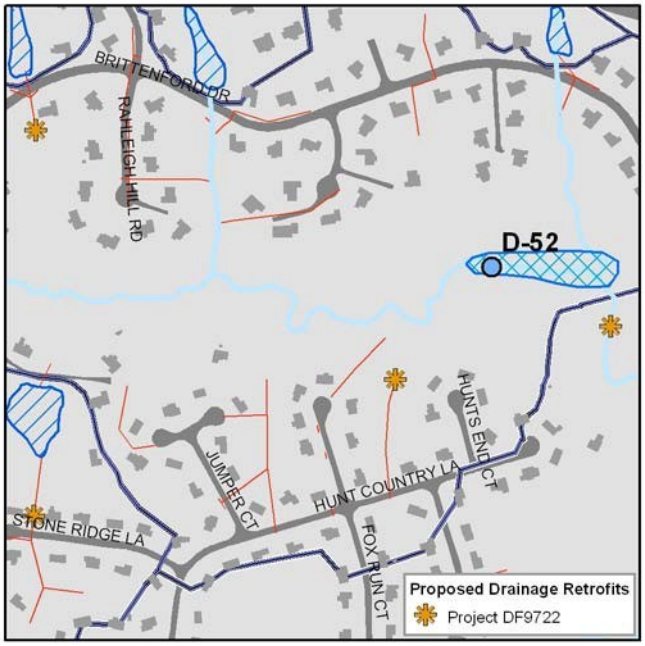


Project Number: DF9722
Catchment Code: DFDF6902
Candidate Site: C22

Project Type: Drainage Retrofit
Project Size: 4 Outfalls

Project Location: These projects are distributed throughout the catchment.

Project Description: This project consists of reconfiguring outfalls or retrofitting energy dissipation structures to reduce scour and erosion where flows from the storm drainage system enter the natural channel. Reduction of erosive velocities will reduce the amount of sediment transported downstream.



Potential Project Benefits:

Streamflow	The project will reduce velocity from the outfalls and help reduce erosive potential immediately downstream.
Water Quality	Water quality improvements would be associated with the reduction of scour at outfall locations and within the downstream channels. Habitat would be improved by reducing sediment loads from erosion.

Potential Project Constraints:

Environmental	Environmental impacts and permit requirements are not anticipated for this project; however, projects in RPAs may require exceptions or waivers
Facility Access	Access to these sites can usually be obtained from the roadway and driveways.
Design / Construction	No unusual design or construction issues were identified.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Outfall Protection	4	EA	$8,000.00	$32,000.00
			Base Construction Cost	**$32,000**
			Mobilization (5%)	$1,600
			Subtotal 1	**$33,600**
			Contingency (25%)	$8,400
			Subtotal 2	**$42,000**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$18,900
			Estimated Project Cost	**$61,000**

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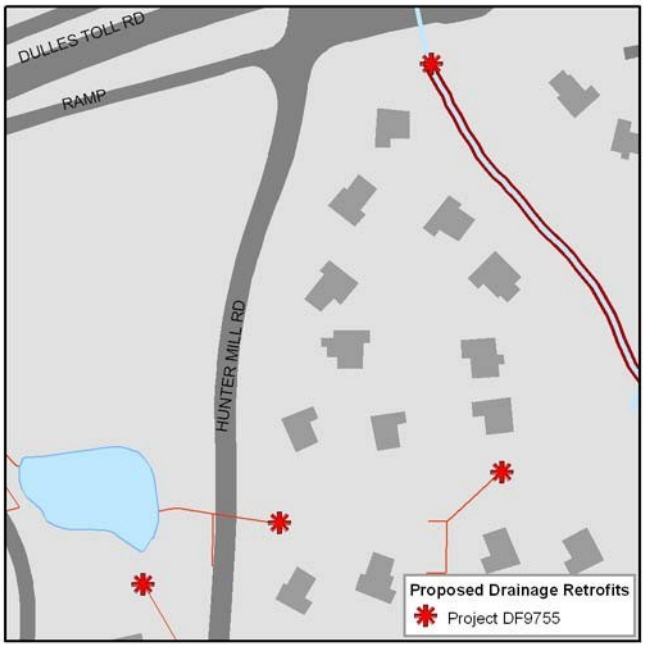
Project Number: DF9755
Catchment Code: DFDF6901
Candidate Site: C55

Project Type: Drainage Retrofit
Project Size: 4 Outfalls

Project Location: Distributed throughout the catchment.

Project Description: This project consists of reconfiguring outfalls or retrofitting energy dissipation structures to reduce scour and erosion where flows from the storm drainage system enter the stream. Reduction of erosive velocities will reduce the amount of sediment transported downstream.



Potential Project Benefits:

Streamflow	The project will reduce velocity from the outfalls and help reduce erosive potential immediately downstream.
Water Quality	Water quality improvements would be associated with the reduction of scour at outfall locations and within the downstream channels. Habitat would be improved by reducing sediment loads from erosion.

Potential Project Constraints:

Environmental	Environmental impacts and permit requirements are not anticipated for this project; however, projects in RPAs may require exceptions or waivers
Facility Access	Access to these sites can usually be obtained from the roadway and driveways.
Design / Construction	No unusual design or construction issues were identified.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Outfall Protection	4	EA	$8,000.00	$32,000
			Base Construction Cost	**$32,000**
			Mobilization (5%)	$1,600
			Subtotal 1	**$33,600**
			Contingency (25%)	$8,400
			Subtotal 2	**$42,000**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$18,900
			Estimated Project Cost	**$61,000**

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