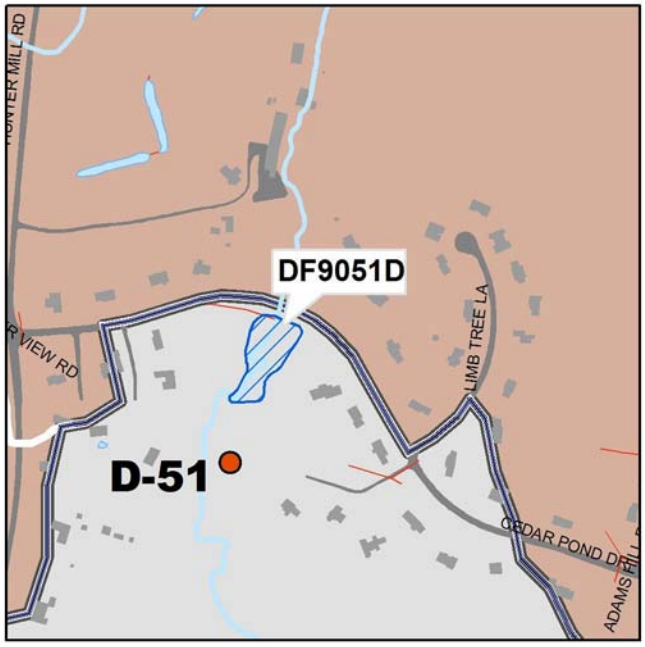
Project Number: DF9051D
Catchment Code: DFBA0003
Candidate Site: D-51

Project Type: Culvert Retrofit
Project Size: 1.2 acres

Project Location: This project is located upstream of Cedar Pond Road.

Project Description: This culvert has been altered by using boards to partially block the upstream face of the culvert. This configuration does not allow for in-stream sediment transport or fish passage, however.

The proposed project would provide a redundant embankment with a low-flow opening. Storage would be provided to a maximum depth of about 7 ft.



Potential Project Benefits:

Streamflow	This project would provide some peak flow reduction, with storage for approximately 16% of the channel protection volume.
Water Quality	Water quality features such as a micropool, wetland vegetation, or an aquatic bench will improve runoff quality.

Potential Project Constraints:

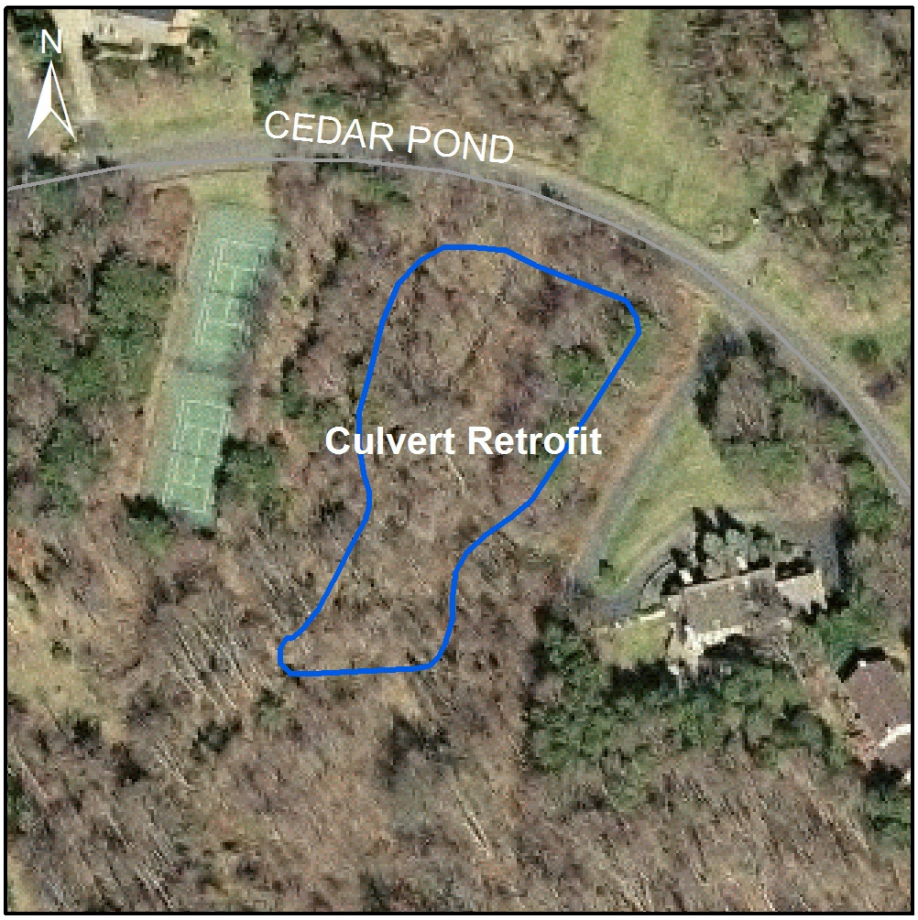
Environmental	There may be some permitting issues associated with the temporary impoundment of runoff in the floodplain above this culvert. These would be subject to negotiation with permitting agencies. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this project is very good from Cedar Pond Road.
Design / Construction	There are no significant issues. The proposed project footprint would not affect adjacent properties.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.2	AC	$5,000.00	$1,000
Excavation	720	CY	$35.00	$25,200
Impoundment Structure	1	LS	$5,000.00	$5,000
Landscaping	850	SY	$2.50	$2,125
Wetland Planting	290	SY	$2.00	$580
			Base Construction Cost	**$33,905**
			Mobilization (5%)	$1,695
			Subtotal 1	**$35,600**
			Contingency (25%)	$8,900
			Subtotal 2	**$44,500**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$20,025
			Estimated Project Cost	**$65,000**

This project is part of the alternative project group for Regional Pond D-51. See Table 5-2 for the recommended disposition.

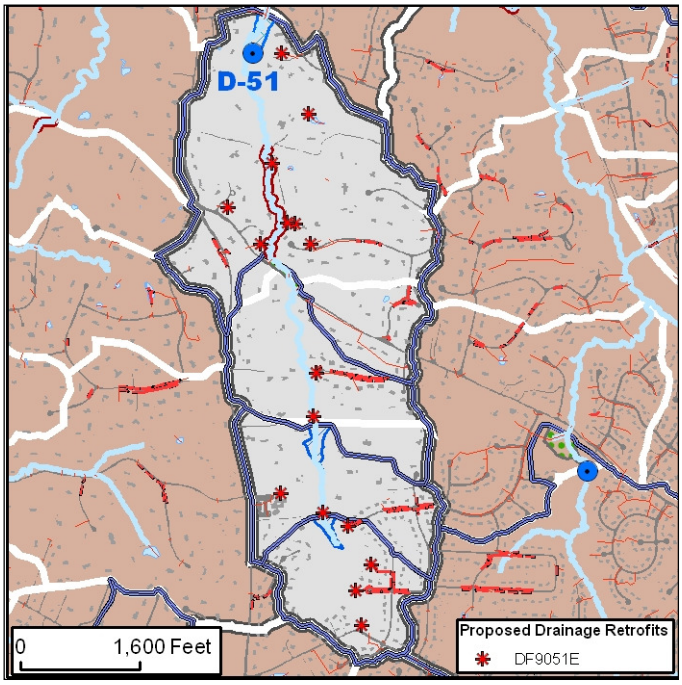
Concept Sketch



Project Number: DF9051E
Catchment Code: DFBA0003, DFBA0002, DFBA0001
Candidate Site: D-51

Project Type: Drainage Retrofit
Project Size: 16 Outfalls

Project Location:
This project will be distributed throughout the catchment.



Project Description:
Two processes have caused erosion problems at outfalls in this watershed. In the upstream area, stormwater flows have caused localized scour and erosion In the downstream section, head cuts working upstream are undermining outfall structures. The proposed improvements will provide better energy dissipation at every interface from storm drains to natural channels. They will also provide a more stable outlet structure to prevent further damage.

Potential Project Benefits:

Streamflow	The project will reduce velocity from the outfall and erosive potential immediately downstream.
Water Quality	The primary benefit to the water quality would come from the reduction of sediment loads associated with high velocity at the outfall locations. Reduction of sediment and velocity will also improve stream habitat.

Potential Project Constraints:

Environmental	No environmental constraints are anticipated. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to outfalls is generally available from the roadway or through drainage easements.
Design / Construction	There are no significant design or construction issues.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Outfall Protection	16	EA	$8,000	$128,000
			Base Construction Cost	**$128,000**
			Mobilization (5%)	$6,400
			Subtotal 1	**$134,400**
			Contingency (25%)	$33,600
			Subtotal 2	**$168,000**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$75,600
			Estimated Project Cost	**$244,000**

This project is part of the alternative project group for Regional Pond D-51. See Table 5-2 for the recommended disposition.

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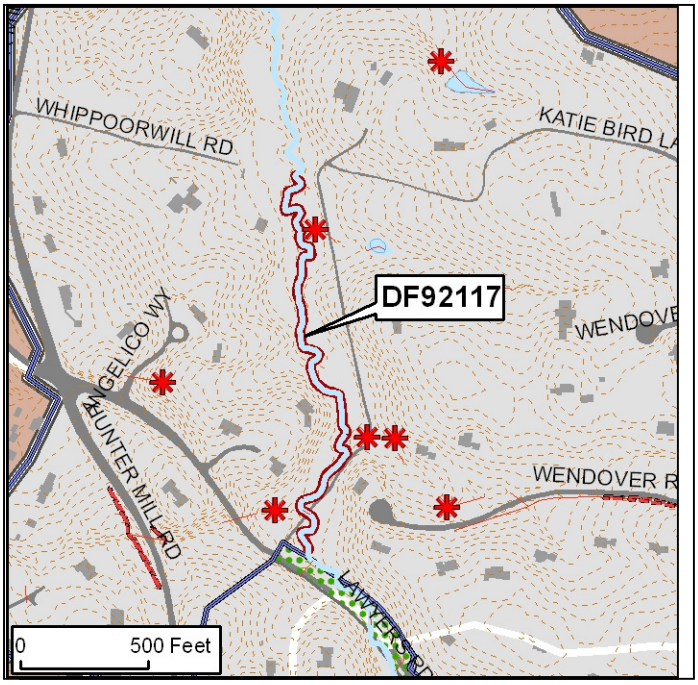
Project Number: DF92117
Catchment Code: DFBA0003
Candidate Site: S117

Project Type: Stream Restoration
Project Size: 2,754 linear feet

Project Location:
This project is located to the south of Whippoorwill Road and to the north of Lawyers Road. Hunter Mill Road is to the west of the project area.



Project Description:
This stream reach is severely incised with severe erosion against the valley walls in several locations. Bed features are poorly defined and inconsistent. The stream is located in a wooded valley between residential properties.

The proposed restoration would create a new pattern and profile for most of the existing channel, except for the most eroded area, where a new stream channel would be created in the floodplain. Spot stabilization measures would also be constructed. The stream buffer would be restored on all restoration reaches.

Potential Project Benefits:

Stream Stability	The pattern, dimension, and profile of the stream will be restored and a floodplain connection will be enhanced.
Water Quality	Water quality will be improved by a significant reduction in current and future bank and bed erosion.
Instream Habitat	Erosion reduction, and restored stable riffle pool morphology would significantly improve habitat

Potential Project Constraints:

Environmental	The project will require limited forest clearing or some impacts to jurisdictional wetlands. It will require a permit from both the U.S. Army Corps of Engineers and the Virginia DEQ. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this facility will be from Whippoorwill Road and Lawyers Road and will require some construction impacts in the floodplain..
Design / Construction	Design efforts are moderate compared to other stream restoration projects. General constructability is good.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Construct new channel	248	LF	$200.00	$49,600.00
Reconstruct new pattern and profile	1267	LF	$250.00	$316,750.00
Stabilize in place -- grading	626	LF	$175.00	$109,550.00
Stabilize in place -- armoring	613	LF	$225.00	$137,925.00
Buffer restoration	Included	LF	$25.00	$0.00
			Base Construction Cost	**$713,825**
			Mobilization (5%)	$35,691
			Subtotal 1	**$749,516**
			Contingency (25%)	$187,379
			Subtotal 2	**$936,895**
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	$421,603
			Estimated Project Cost	**$1,358,000**

Concept Sketch