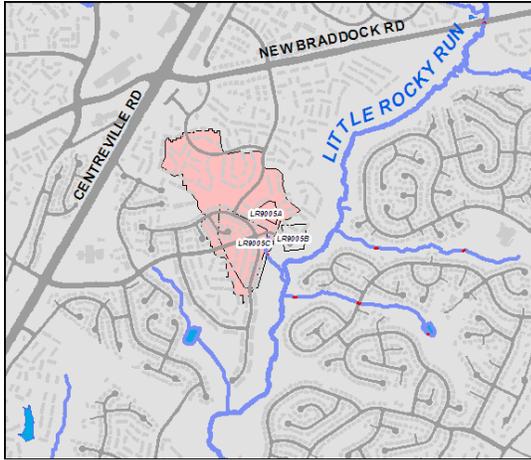


LR9005 Regional Pond Alternative Group



Vicinity Map

Address	13915 Green Trails Ct
Location	Subdivision
Landowner	Green Trails Homeowners Association/Heritage Forest Homeowners Association
PIN	0654 0304 K 0654 1004 A 0652 09 L
Control Type	Water quality and quantity control
Drainage Area	65 Acres
Receiving Waters	Little Rocky Run

Description: Project suite is alternative to Regional Pond R-05. LR9005A is a retrofit to existing facility 0829DP. Quality enhancements as well as storage increases are proposed. LR9005B is an LID application (3 tree box filters to replace curb drop inlets) to a small untreated portion of the subdivision. This area was not originally expected to be treated by the regional facility, but was added to the alternative suite because it is a strategic location to manage untreated runoff to obtain similar cumulative pollutant removal results as the original proposed pond. LR9005C involves treating the portion of the drainage area intended to drain to R-05 that is not treated by existing facility 0829DP for water quality. A combination of tree box filters (11) and bioretention areas (3) are proposed in order to eliminate the need for a pond at the outfall.



Project Area Map

Project Benefits: This project suite will simulate removal efficiencies of proposed Regional Pond R-05. Loading summaries can be found in Section 6 of the plan.

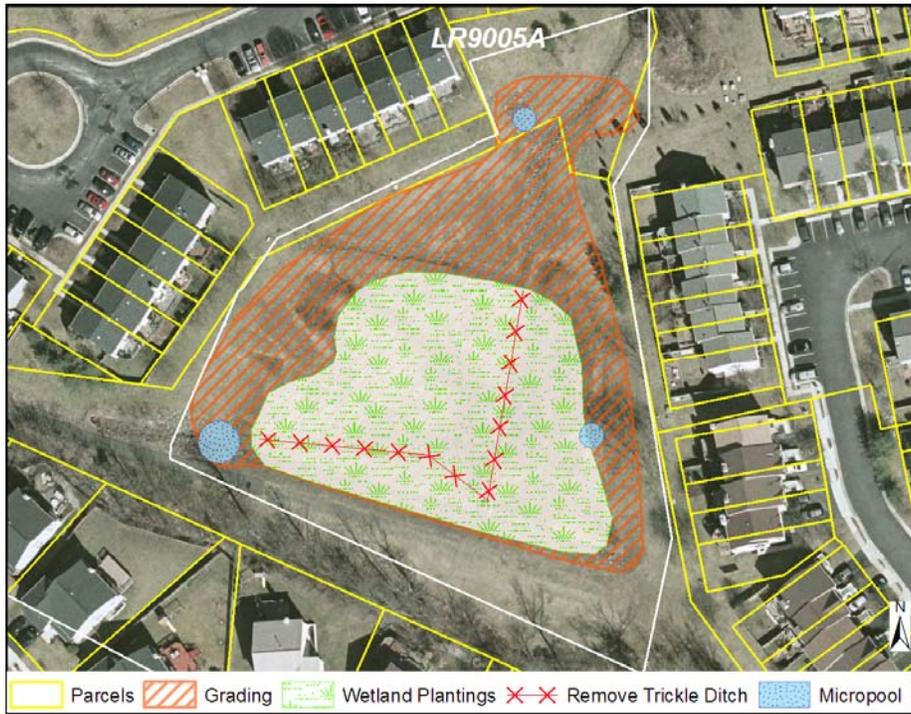
Project	Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
LR9005A	24.19	6.14	0.21
LR9005B	12.84	2.85	0.65
LR9005C	38.85	8.17	1.83

Project Design Considerations: LR9005A - Adding storage to existing facility (0829DP) encroaches into HOA property and is not contained within existing easement. LR9005B was not broken out separately below due to its similar nature and proximity to LR9005C. LR9005C - Bioretention areas are proposed within HOA property and outside of existing easements and in some cases are close in proximity to private property as well as existing utilities. Treatment was provided throughout the subwatershed to reduce the footprint of treatment at the outfall (where the original regional facility was proposed).

Total Cost (9005A-9005C):

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Vegetated Swale		SY	\$50.00	\$0.00
Pervious Pavement		SY	\$100.00	\$0.00
Vegetated Roof		SY	\$450.00	\$0.00
Percolation/Infiltration Trench		SY	\$75.00	\$0.00
Bioretention Filters & Basin	275	SY	\$150.00	\$41,250.00
Manufactured BMP (i.e. Tree Box Filter)	14	EA	\$10,000.00	\$140,000.00
Grading and Excavation	2500	CY	\$35.00	\$87,500.00
Remove Trickle Ditch	150	SY	\$10.71	\$1,606.50
Organic Compost Soil Amendment	320	CY	\$40.00	\$12,800.00
		Base Construction Cost		\$283,156.50
		Mobilization (5%)		\$14,157.83
		Plantings (5%)		\$14,157.83
		Ancillary Items (5%)		\$14,157.83
		Erosion & Sediment Control (10%)		\$28,315.65
		Subtotal 1		\$353,945.63
		Contingency (25%)		\$88,486.41
		Subtotal 2		\$442,432.03
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$199,094.41
		Total		\$641,526.45
		Estimated Project Cost		\$650,000.00

Project LR9005A:



Description: LR9005A is a proposed retrofit to existing facility 0829DP. Remove the existing trickle ditches. Add micropools and wetland plantings. Modify internal pond geometry – focus on extending the low flow path. Adding storage will depend on cooperation from HOA. Costs are summarized below:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Access Road		SY	\$25.00	\$0.00
Access Road Gate		EA	\$2,500.00	\$0.00
Clear and Grub		AC	\$8,500.00	\$0.00
Structural BMP and Incidentals		LS	\$10,000 - \$20,000	\$0.00
New Storm Pipe		LF	\$100 - \$300	\$0.00
Grading and Excavation	2500	CY	\$35.00	\$87,500.00
Embankment		CY	\$50.00	\$0.00
Remove Trickle Ditch	150	SY	\$10.71	\$1,606.50
Organic Compost Soil Amendment	250	CY	\$40.00	\$10,000.00
			Base Construction Cost	\$99,106.50
			Mobilization (5%)	\$4,955.33
			Plantings (5%)	\$4,955.33
			Ancillary Items (5%)	\$4,955.33
			Erosion & Sediment Control (10%)	\$9,910.65
			Subtotal 1	\$123,883.13
			Contingency (25%)	\$30,970.78
			Subtotal 2	\$154,853.91
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$69,684.26
			Total	\$224,538.16
			Estimated Project Cost	\$230,000.00

Projects LR9005B and LR9005C:



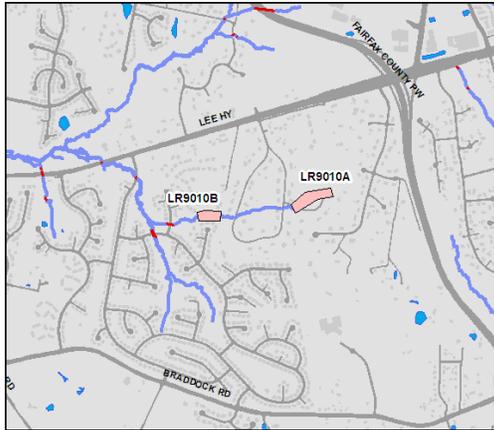
Project Area Map

Description: LR9005B proposes three tree box filters as shown in the Project Area Map. It's been combined with LR9005C due to its similar nature and proximity with the larger subproject. LR9005C treats all of the area that drains to the proposed regional facility that is not treated by existing 0829DP. The HOA is on record saying that a pond is not a viable solution, so LID measures are proposed throughout the subwatershed. Treatment is still proposed at the outfall, but only a bioretention area that can be constructed with minimal impact to mature trees. The existing StormNet data is inaccurate in this area.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Vegetated Swale		SY	\$50.00	\$0.00
Pervious Pavement		SY	\$100.00	\$0.00
Vegetated Roof		SY	\$450.00	\$0.00
Percolation/Infiltration Trench		SY	\$75.00	\$0.00
Bioretention Filters & Basin	275	SY	\$150.00	\$41,250.00
Manufactured BMP (i.e. Tree Box Filter)	14	EA	\$10,000.00	\$140,000.00
Organic Compost Soil Amendment	70	CY	\$40.00	\$2,800.00
Base Construction Cost				\$184,050.00
			Mobilization (5%)	\$9,202.50
			Plantings (5%)	\$9,202.50
			Ancillary Items (5%)	\$9,202.50
			Erosion & Sediment Control (10%)	\$18,405.00
			Subtotal 1	\$230,062.50
			Contingency (25%)	\$57,515.63
			Subtotal 2	\$287,578.13
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$129,410.16
			Total	\$416,988.28
			Estimated Project Cost	\$420,000.00

Little Rocky Run Watershed
Little Rocky Run – Upper Watershed Management Area

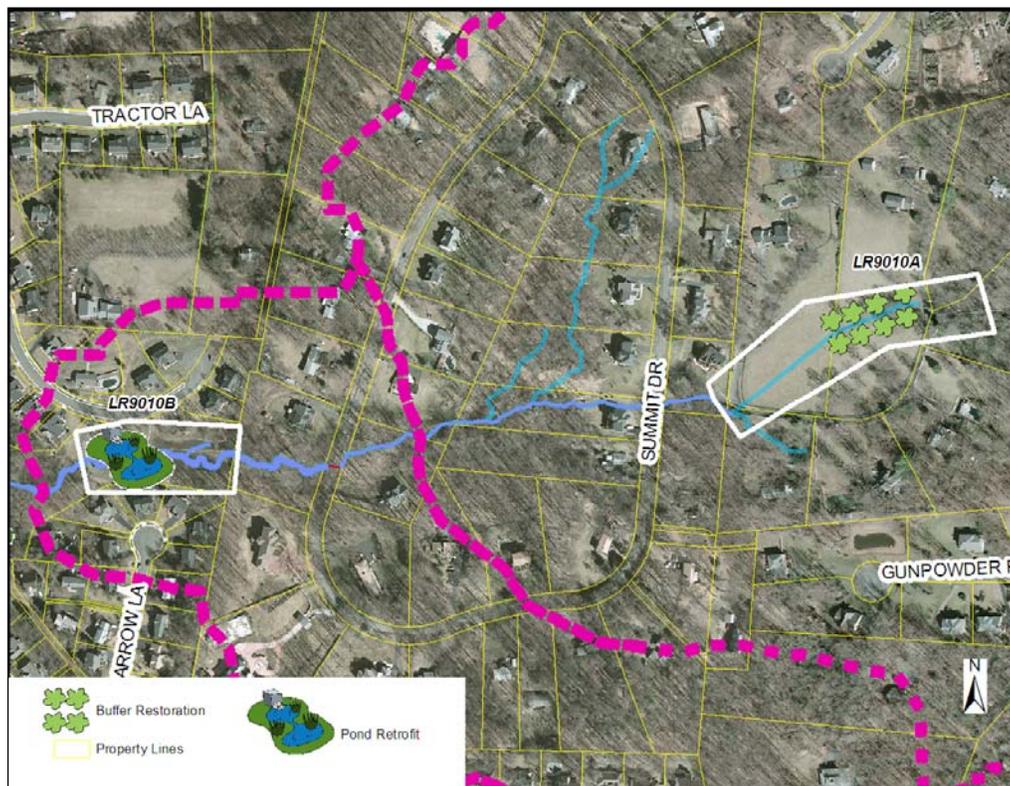
LR9010 Regional Pond Alternative Group



Vicinity Map

Address	5378 Harrow Lane
Location	Subdivision
Landowner	Hampton Woods II Homeowners Association Ellsworth Steven K Smith Arthur Jr (Heirs of)
PIN	0554 13 A 0554 05 0001 0554 05 0002
Control Type	Water quality and quantity control
Drainage Area	162 acres
Receiving Waters	Unnamed Tributary to Willow Springs Branch

Description: This project suite is an alternative to constructing Regional Pond R-10. LR9010A is a buffer restoration project that resides on private property. Just downstream of the proposed buffer restoration, the stream is piped for approximately 350 feet and would benefit from being daylighted, but it also resides on private property. LR9010B is a retrofit of existing stormwater pond 1452DP which proposes removing existing trickle ditches, increasing storage capacity, adding micropools and wetland plantings and altering pond geometry.



Project Area Map

Project Benefits: Project suite will partially simulate pollutant removal of proposed Regional Pond R-10. Loading summaries can be found in Section 6 of the plan. The drainage area consists primarily of private property and the retrofit of the downstream facility is the most practical option. While this suite doesn't achieve the same results as the hypothetical regional, it will still positively impact water quality issues, as described in the individual project components below.

Project	Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
LR9010A*	-	-	-
LR9010B	288.83	38.12	7.04

* Pollutant removals were not calculated for buffer restoration or other non-structural projects.

Project Design Considerations: LR9010A - Main obstacle is that the proposed buffer restoration is on private property. The downstream reach that is piped is currently a mowed lawn for recreational purposes possibly horse riding. There is no existing easement but the site is accessible through Chronical Drive. There are no permitting/sequencing issues. LR9010B - This facility (R-19) is downstream of proposed regional facility R-10. The drainage area primarily consists of low density residential areas. Proposed grading limits are restricted by property boundaries. The available storage volume without acquiring land is small. There are no sequencing/ access issues. A wetland permit may be needed.

Total Cost (9010A & 9010B):

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.5	AC	\$8,500.00	\$4,250.00
Grading and Excavation	2500	CY	\$35.00	\$87,500.00
Structural BMP Retrofit and Incidentals		LS	\$10,000 - \$20,000	\$0.00
Embankment		CY	\$50.00	\$0.00
Outflow Pipe		LF	\$125.00	\$0.00
Rip Rap Stabilization		SY	\$100.00	\$0.00
Organic Compost Soil Amendment	900	CY	\$40.00	\$36,000.00
Remove Trickle Ditch	335	SY	\$10.71	\$3,587.85
Plantings		1 AC	\$25,000.00	\$25,000.00
			Base Construction Cost	\$156,337.85
			Mobilization (5%)	\$7,816.89
			Ancillary Items (5%)	\$7,816.89
			Erosion & Sediment Control (10%)	\$15,633.79
			Subtotal 1	\$187,605.42
			Contingency (25%)	\$46,901.36
			Subtotal 2	\$234,506.78
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$105,528.05
			Total	\$340,034.82
			Estimated Project Cost	\$350,000.00

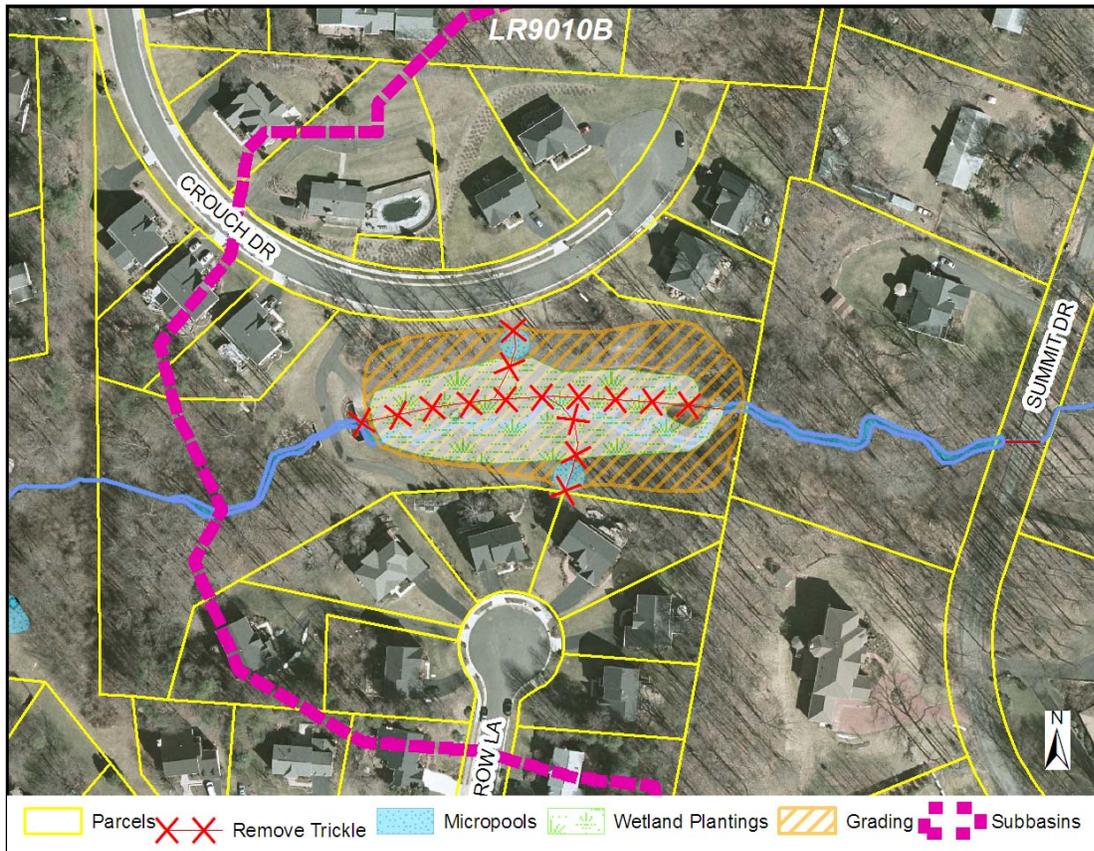
Project LR9010A:



Description: LR9010A is a proposed buffer restoration. There is insufficient riparian buffer for a 260' reach upstream of Chronical Drive.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Plantings	1	AC	\$25,000.00	\$25,000.00
Organic Compost Soil Amendment	600	CY	\$40.00	\$24,000.00
		Base Construction Cost		\$49,000.00
		Mobilization (5%)		\$2,450.00
		Ancillary Items (5%)		\$2,450.00
		Invasive Plant Eradication (10%)		\$4,900.00
		Erosion & Sediment Control (10%)		\$4,900.00
		Subtotal 1		\$63,700.00
		Contingency (25%)		\$15,925.00
		Subtotal 2		\$79,625.00
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$35,831.25
		Total		\$115,456.25
		Estimated Project Cost		\$120,000.00

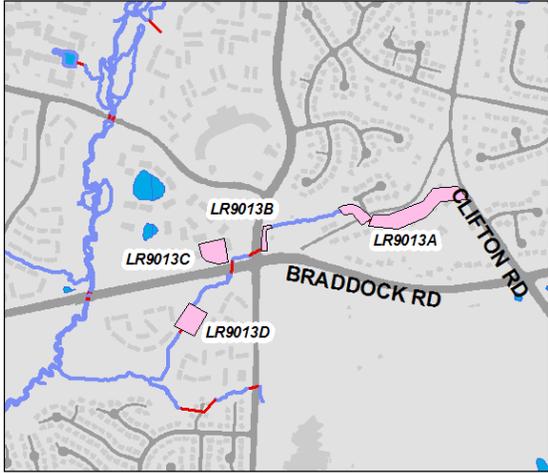
Project LR9010B:



Description: LR9010B is a retrofit to existing facility R-19. Remove the existing trickle ditches. Add micropools and wetland plantings. Modify internal pond geometry – focus on extending the low flow path.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.5	AC	\$8,500.00	\$4,250.00
Grading and Excavation	2500	CY	\$35.00	\$87,500.00
Structural BMP Retrofit and Incidentals		LS	\$10,000 - \$20,000	\$0.00
Embankment		CY	\$50.00	\$0.00
Outflow Pipe		LF	\$125.00	\$0.00
Rip Rap Stabilization		SY	\$100.00	\$0.00
Organic Compost Soil Amendment	300	CY	\$40.00	\$12,000.00
Remove Trickle Ditch	335	SY	\$10.71	\$3,587.85
			Base Construction Cost	\$107,337.85
			Mobilization (5%)	\$5,366.89
			Ancillary Items (5%)	\$5,366.89
			Erosion & Sediment Control (10%)	\$10,733.79
			Subtotal 1	\$128,805.42
			Contingency (25%)	\$32,201.36
			Subtotal 2	\$161,006.78
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$72,453.05
			Total	\$233,459.82
			Estimated Project Cost	\$240,000.00

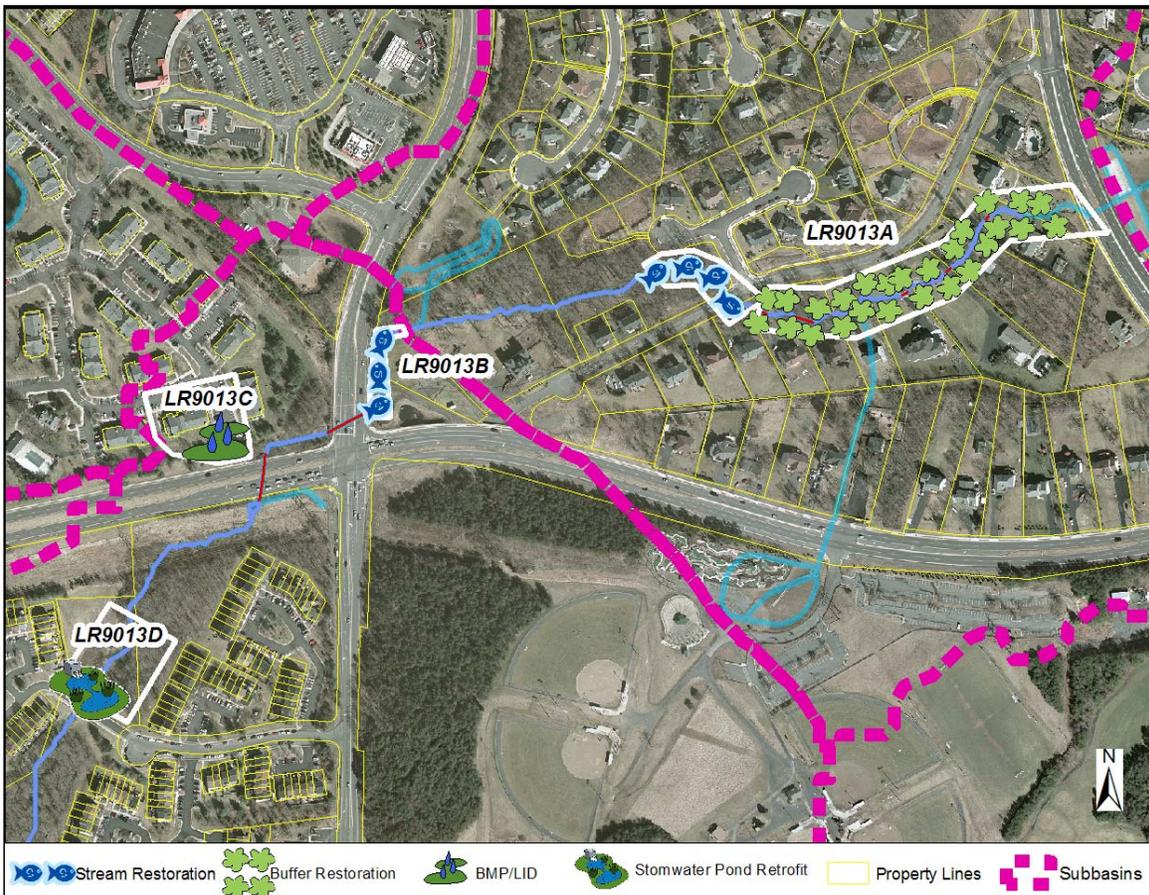
LR9013 Regional Pond Alternative Group



Vicinity Map

Address	13400 Braddock Rd
Location	Subdivision
Landowner	Clifton Pines II HOA VDOT Little Rocky Run HOA The Ponds at Centreville Multiple private landowners
PIN	Multiple PINs
Control Type	Water quality and quantity control
Drainage Area	185 acres
Receiving Waters	Unnamed tributary to Little Rocky Run

Description: The LR9013 Regional Pond Alternative Group is a replacement for regional pond R-13. It consists of a stream and buffer restoration (LR9013A), a second stream restoration (LR9013B), a new BMP (LR9013C) and a pond retrofit (LR9013D).



LR9013 Project Area Map

Project Benefits: Project suite will simulate removal efficiencies from proposed Regional Pond R-13. Loading summaries can be found in Section 6 of the Watershed Management Plan.

Project	Total Nitrogen Removed (lbs/yr)	Total Phosphorus Removed (lbs/yr)	Total Sediment Removed (tons/yr)
LR9013A	1.50	0.58	0.94
LR9013B	2.89	1.12	1.80
LR9013C	13.65	2.18	0.23
LR9013D	16.90	4.18	0.81

Design Considerations: LR9013A: The stream restoration portion of LR9013A is located within a floodplain and stormwater easement on Clifton Pines II HOA property, but most of the buffer restoration is not located within an easement. Coordinate with landowners to restore the riparian buffer. LR9013B: Steep side slopes make access to the project site difficult and must be accounted for in the restoration design, along with the narrow site footprint. LR9013B is partially located on private property (within a storm drainage easement) and is also partially located on VDOT property. LR9013C: LR9013C is not located within an existing easement. The site can be accessed from Orchard Dr. LR9013D: LR9013D is located on Little Rocky Run HOA property within an existing stormwater management easement. The designer must be cautious about expanding either the pond footprint or the floodplain – there appears to be ample room for increased detention, but the pond is surrounded by houses.

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Construct New Channel	480	LF	\$200.00	\$96,000.00
Add'l Cost, first 500 LF	480	LF	\$200.00	\$96,000.00
Bioretention Filters & Basin	220	SY	\$150.00	\$33,000.00
Clear and Grub	0.3	AC	\$10,000.00	\$3,000.00
Grading and Excavation	1400	CY	\$35.00	\$49,000.00
Organic Compost Soil Amendment	370	CY	\$40.00	\$14,800.00
Plantings	1	AC	\$25,000.00	\$25,000.00
Structural BMP Retrofit and Incidentals	1	LS	\$10,000 - \$20,000	\$15,000.00
Vegetated Swale	90	SY	\$50.00	\$4,500.00
		Base Construction Cost		\$336,300.00
		Mobilization (5%)		\$16,815.00
		Ancillary Items (5%)		\$16,815.00
		Erosion & Sediment Control (10%)		\$33,630.00
		Subtotal 1		\$403,560.00
		Contingency (25%)		\$100,890.00
		Subtotal 2		\$504,450.00
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$227,002.50
		Total		\$731,452.50
		Estimated Project Cost		\$740,000.00



LR9013A Project Area Map

LR9013A Description: LR9013A will reduce pollutant loading, restore eroded areas and prevent future erosion. The riparian buffer will be improved creating important habitat for native wildlife. It will also provide the opportunity to educate property owners about the importance of preserving stream buffers.

LR9013A Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.2	AC	\$10,000.00	\$2,000.00
Construct New Channel	250	LF	\$200.00	\$50,000.00
Add'l Cost, first 500 LF	250	LF	\$200.00	\$50,000.00
Plantings	1	AC	\$25,000.00	\$25,000.00
			Base Construction Cost	\$127,000.00
			Mobilization (5%)	\$6,350.00
			Ancillary Items (5%)	\$6,350.00
			Erosion & Sediment Control (10%)	\$12,700.00
			Subtotal 1	\$152,400.00
			Contingency (25%)	\$38,100.00
			Subtotal 2	\$190,500.00
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$85,725.00
			Total	\$276,225.00
			Estimated Project Cost	\$280,000.00

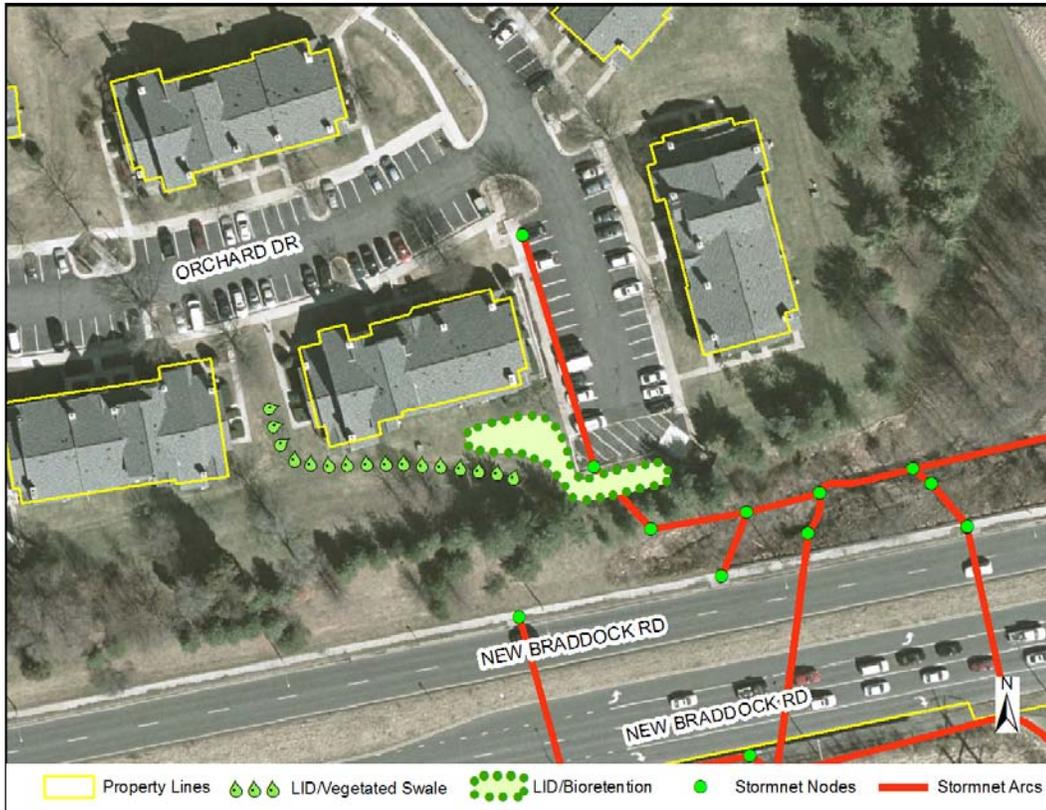


LR9013B Project Area Map

LR9013B Description: LR9013B will reduce pollutant loading, provide higher-quality habitat for native wildlife and reduce the potential for future erosion problems.

LR9013B Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.1	AC	\$10,000.00	\$1,000.00
Construct New Channel	230	LF	\$200.00	\$46,000.00
Add'l Cost, first 500 LF	230	LF	\$200.00	\$46,000.00
Plantings	0.1	AC	\$25,000.00	\$2,500.00
			Base Construction Cost	\$95,500.00
			Mobilization (5%)	\$4,775.00
			Ancillary Items (5%)	\$4,775.00
			Erosion & Sediment Control (10%)	\$9,550.00
			Subtotal 1	\$114,600.00
			Contingency (25%)	\$28,650.00
			Subtotal 2	\$143,250.00
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$64,462.50
			Total	\$207,712.50
			Estimated Project Cost	\$210,000.00



LR9013C Project Area Map

LR9013C Description: Project LR9013C will provide new water quality treatment for previously untreated stormwater runoff.

LR9013C Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Vegetated Swale	90	SY	\$50.00	\$4,500.00
Pervious Pavement		SY	\$100.00	\$0.00
Vegetated Roof		SY	\$450.00	\$0.00
Percolation/Infiltration Trench		SY	\$75.00	\$0.00
Bioretention Filters & Basin	220	SY	\$150.00	\$33,000.00
Manufactured BMP (i.e. Tree Box Filter)	0	EA	\$10,000.00	\$0.00
Organic Compost Soil Amendment	20	CY	\$40.00	\$800.00
Base Construction Cost				\$38,300.00
			Mobilization (5%)	\$1,915.00
			Plantings (5%)	\$1,915.00
			Ancillary Items (5%)	\$1,915.00
			Erosion & Sediment Control (10%)	\$3,830.00
			Subtotal 1	\$47,875.00
			Contingency (25%)	\$11,968.75
			Subtotal 2	\$59,843.75
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$26,929.69
			Total	\$86,773.44
			Estimated Project Cost	\$90,000.00



LR9013D Project Area Map

LR9013D Description: Project LR9013D will essentially upgrade an existing pond to a new regional facility. It will eliminate a large amount of phosphorus pollution and will increase storage volume and decrease peak flow. It will also create higher-quality wetland habitat for native wildlife.

LR9013D Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub		AC	\$8,500.00	\$0.00
Grading and Excavation	1400	CY	\$35.00	\$49,000.00
Structural BMP Retrofit and Incidentals	1	LS	\$10,000 - \$20,000	\$15,000.00
Embankment		CY	\$50.00	\$0.00
Outflow Pipe		LF	\$125.00	\$0.00
Rip Rap Stabilization		SY	\$100.00	\$0.00
Organic Compost Soil Amendment	350	CY	\$40.00	\$14,000.00
Remove Trickle Ditch		SY	\$10.71	\$0.00
			Base Construction Cost	\$78,000.00
			Mobilization (5%)	\$3,900.00
			Plantings (5%)	\$3,900.00
			Ancillary Items (5%)	\$3,900.00
			Erosion & Sediment Control (10%)	\$7,800.00
			Subtotal 1	\$97,500.00
			Contingency (25%)	\$24,375.00
			Subtotal 2	\$121,875.00
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$54,843.75
			Total	\$176,718.75
			Estimated Project Cost	\$180,000.00