
Appendix E

Dawkins Branch (262) Subwatershed Project Conceptual Design Narratives

Project: Dawkins Branch 262-13 Major Repair

Watershed:	Broad Run
Subwatershed Name:	Dawkins Branch
Subwatershed Code:	262
Site ID:	262-13
County Facility ID:	NA (not included on County inventory)
Facility Type:	SWMP/BMP (based on field inspection)
Facility Description:	Dry (based on field conditions)
Project Type:	Major Repair
Drainage Area:	2.7 acres
GPIN/Owner:	7596-14-2108
Neighborhood/Address:	L and J Distributors Inc. 8810 Virginia Meadows Drive, Manassas 20109
GPS Coordinates:	38° 46' 03.50 77° 33' 31.55
SWM Subwatershed Ranking:	6
SWM Study Ranking:	--
Priority:	Moderate

Location: The site is located at the end of Virginia Meadows Drive south of the intersection of Wellington Road and on the property of L and J Distributors Inc..

Problem Description: This facility's function has degraded over time due to a lack of proper maintenance. The low flow orifice is damaged, and a ring of riprap has been installed around the riser. Dense woody vegetation has been allowed to grow in the center of the facility, making inspection and maintenance of the riser difficult. The higher elevations of the basin are routinely mowed, as are the surrounding side slopes and berm. Sediment has accumulated at the inlet. The riser is a small drop inlet only about 1 foot above the basin bottom.

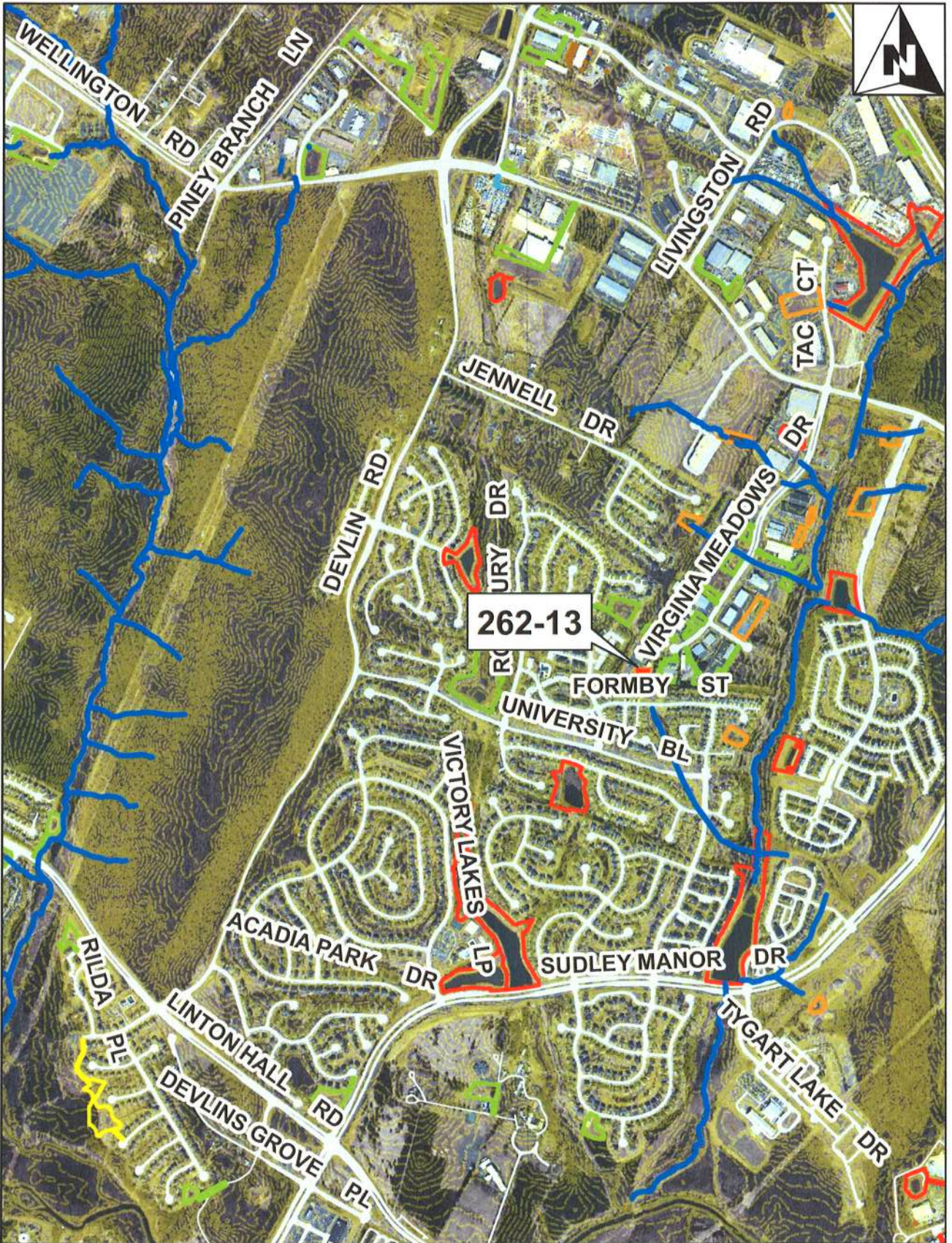
The existing facility appears to be an extended detention basin approximately 6,200 sq. ft. in area. It receives drainage from 1.6 acres of impervious pavement within a 4.7 acre parcel. This facility is not included in the County GIS or database but is assumed to be a SWM/BMP. Based on ½ inch of runoff, the basin appears sufficiently sized.

Project Description: This facility requires repairs to address the broken low flow orifice as well as maintenance to remove the sediment and vegetation. The riprap berm around the riser should also be removed. The site design could be improved by adding a forebay to control sediment inputs. The facility needs to be added to the County inventory, and receive routine inspections.

Potential Benefits: A repair would bring this facility up to current design requirements and facilitate future maintenance and inspection.

Design Considerations and Constraints: This facility has easy access from the adjacent parking lot.

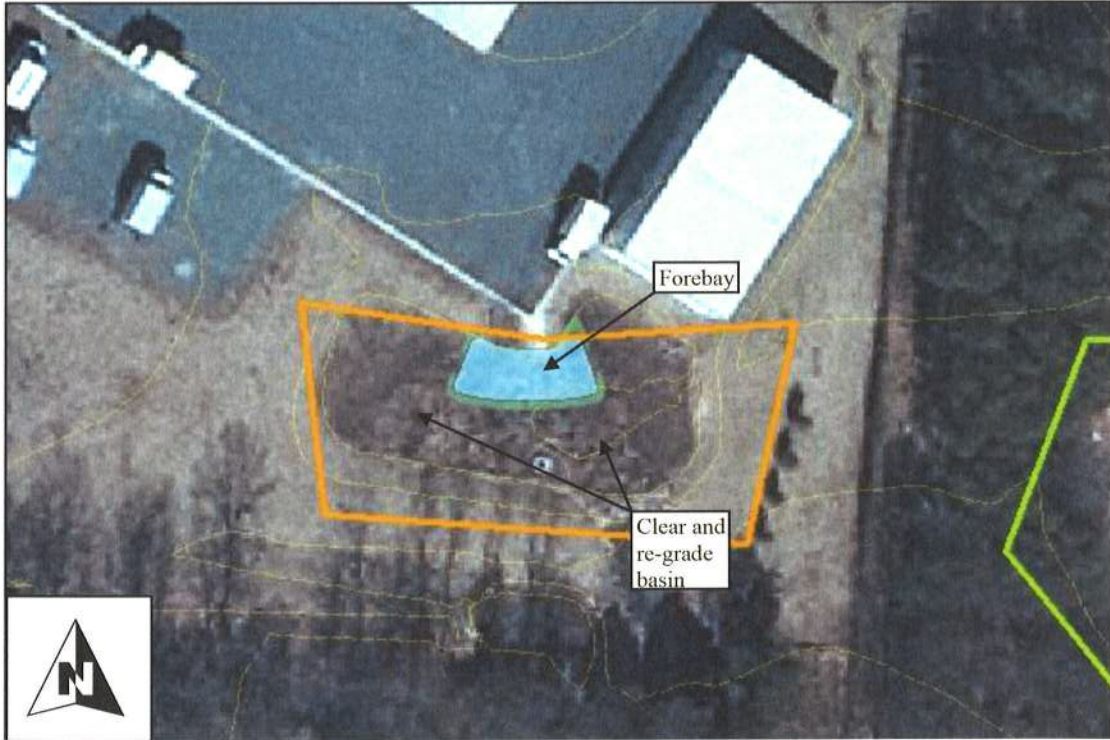
Cost Estimate: The repair is estimated to cost approximately \$15,000 to return this facility to full function, including the addition of a forebay. The cost per acre of impervious cover is \$9,222.



Watershed: Dawkins Branch
Site ID#: 262-13
BMP #: 13
ADC Map (25th edition): Map 8, Page 13, grid coordinate B6



Existing Condition: Facility has broken low flow orifice and is in need of maintenance.



Conceptual Plan: Repairs to riser and addition of forebay



Photo 1: The center of the basin is significantly lower and lacks maintenance.



Photo 2: Riser is relatively small and the PVC low flow outlet is broken

Project: Dawkins Branch 262-281 Reconstruction

Watershed:	Broad Run
Subwatershed Name:	Dawkins Branch
Subwatershed Code:	262
Site ID:	262-281
County Facility ID:	281
Facility Type:	SWMP/BMP
Facility Description:	Dry
Project Type:	Reconstruction
Drainage Area:	1.3 acres
GPIN/Owner:	7596-14-5500
Neighborhood/Address:	Pereira Antonio and Mario Ramos Etal 8780 Virginia Meadows Drive, Manassas 20109
GPS Coordinates:	38° 46' 02.75 77° 33' 29.52
SWM Subwatershed Ranking:	1
SWM Study Ranking:	3
Priority:	High

Location: The site is located at the end of Virginia Meadows Drive on the property of Pereira Antonio and Mario Ramos Etal.

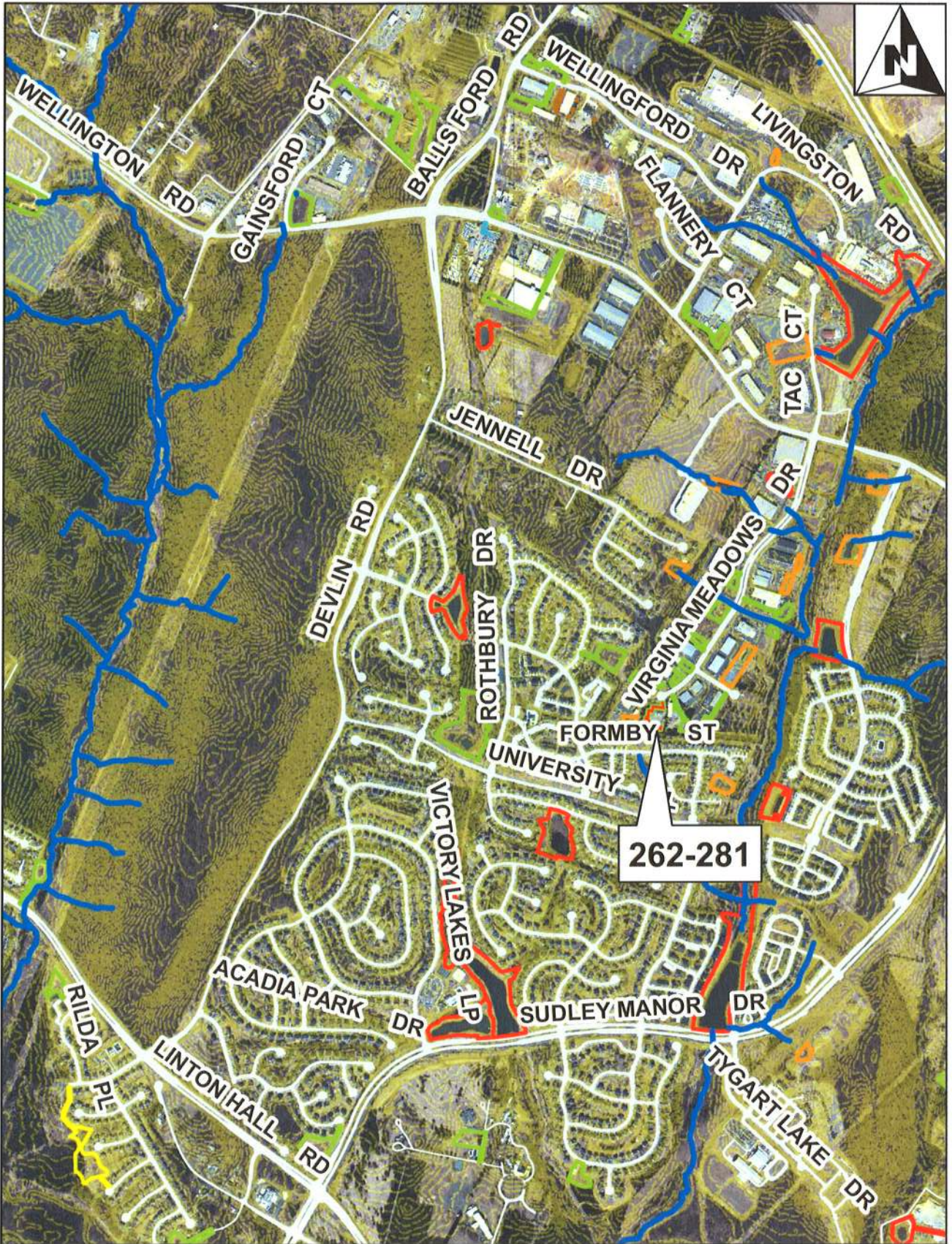
Problem Description: This dry basin BMP was added to the County database in 2000, and includes a note that the County is responsible for maintenance. The database indicates that this facility does not have a riser, and none was found during the site visit. However, the GIS indicates that there should be a 15 inch culvert outlet. Based on the SWM easement in the GIS, the site appears to have been partially filled by expansion of the adjacent gravel parking area. The facility has also been encroached upon by storage of materials. There is no evidence of recent maintenance of this facility. However, there is a depressed area that has cattails and receives runoff.

Project Description: It is recommended that the entire facility be reconstructed to current standards for size, storage, inlet controls and outlet design. Based on the drainage area (1.3 ac.) and impervious surface area (0.9 ac.), if the facility were reconstructed as a Level 1 bioretention facility, a basin of 2,100 sq.ft. designed for 6" of ponding would accommodate the treatment volume with additional capacity available for channel protection volume.

Potential Benefits: Currently this site is not capable of providing its intended water quantity or quality functions. Reconstruction of this site would restore lost functions.

Design Considerations and Constraints: Construction access and staging would be easily accomplished from the parking lot. The original design should be reviewed to determine how water quality treatment was being performed without a riser or outfall structure. The gravel parking area may generate fines that would compromise a bioretention BMP without sufficient pretreatment. If the facility is repaired, fencing and signage should be installed to prevent future encroachment.

Cost Estimate: The reconstruction of this facility is estimated to cost approximately \$32,000. The average cost per acre of impervious surface would be \$36,300.



Watershed: Dawkins Branch
Site ID#: 262-281
BMP #: 281
ADC Map (25th edition): Map 8, Page 13, grid coordinate B6



Existing Condition: SWMP/BMP has been impacted by expansion of parking area



Conceptual Plan: Reconstruct facility to current standards with bioretention



Photo 1: BMP facility appears to be partially filled by gravel parking and storage



Photo 2: Site shows lack of routine maintenance in area that does collect water

Project: Dawkins Branch 262-435 Major Repair

Watershed:	Broad Run
Subwatershed Name:	Dawkins Branch
Subwatershed Code:	262
Site ID:	262-435
County Facility ID:	435
Facility Type:	SWMP/BMP
Facility Description:	Dry
Project Type:	Major Repair
Drainage Area:	1.95 acres
GPIN/Owner:	7596-13-8198
Neighborhood/Address:	American Management Enterprises 8760 Virginia Meadows Drive, Manassas 20109
GPS Coordinates:	38° 46' 02.67 77° 33' 23.63
SWM Subwatershed Ranking:	2
SWM Study Ranking:	4
Priority:	High

Location: The site is located at the end of Virginia Meadows Drive on the property of American Management Enterprises.

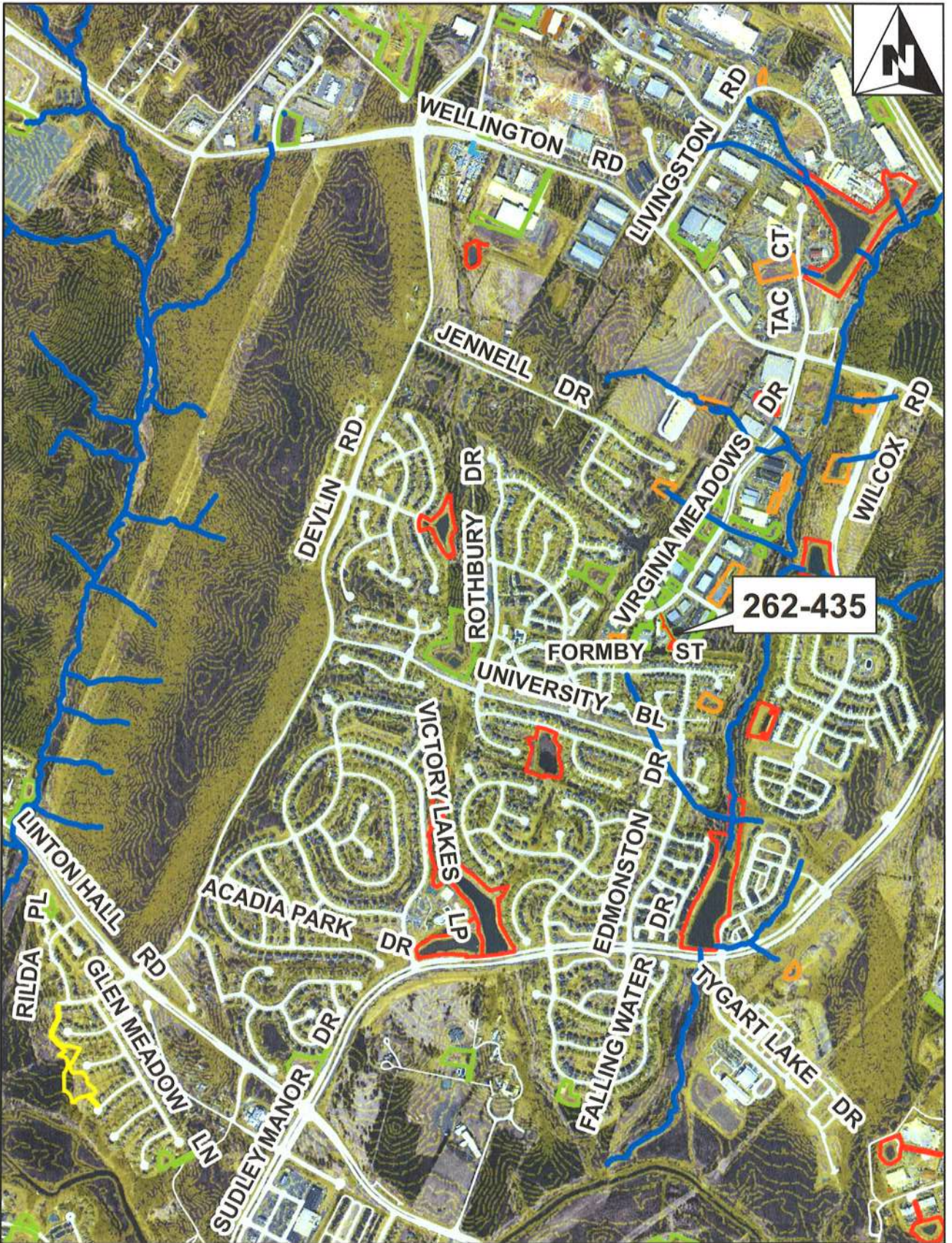
Problem Description: This facility was added to the County database in 2003 and indicates it has a 48 inch riser. GIS database indicates a 15 inch outlet pipe. Based on the stormwater easement shown in the County's GIS data, the facility may have been significantly larger when designed than its current size. The adjacent gravel parking area appears to have been expanded into the facility's original footprint. The riser is relatively intact but has a broken PVC inlet. The basin bottom is covered with heavy vegetation growth and requires maintenance. The riser is less than 2 feet above the basin bottom, so the facility has very shallow detention. Inflow appears to be sheet flow from the parking lot. The facility is significantly degraded in its present state.

Project Description: This facility requires a full reconstruction to regain its original size. The riser could probably be re-used if modified. If reconstructed, the facility should meet current standards, including a forebay or other pretreatment.

Potential Benefits: Currently the facility provides little or no stormwater management. Restoring the function of this facility would provide water quality treatment to 1.5 acres of impervious surface.

Design Considerations and Constraints: The facility has easy construction access from the adjacent parking lot. If the facility is repaired, fencing and signage should be installed to prevent future encroachment. The gravel parking area may generate fines that would compromise a bioretention BMP without sufficient pretreatment.

Cost Estimate: The repair to this basin is estimated to cost approximately \$35,700. The average cost per acre of impervious surface would be \$23,800.



Watershed: Dawkins Branch
Site ID#: 262-435
BMP #: 435
ADC Map (25th edition): Map 8, Page 13, grid coordinate B6



Existing Condition: BMP is not maintained, and parking has encroached into easement



Conceptual Plan: Reconstructed detention facility with minimum footprint.



Photo 1: Riser with broken low flow inlet



Photo 2: Basin not maintained and possibly filled

Project: Dawkins Branch 262-494 Water Quality Retrofit

Watershed:	Broad Run
Subwatershed Name:	Dawkins Branch
Subwatershed Code:	262
Site ID:	262-494
County Facility ID:	494
Facility Type:	SWMP
Facility Description:	Dry (from database)
Project Type:	Water Quality Retrofit
Drainage Area:	47 acres
GPIN/Owner:	7597-80-8176
Neighborhood/Address:	Bull Run Parcel I Home Associates 7870 Rodes Drive, Manassas 20109
GPS Coordinates:	38° 47' 09.04 77° 31' 55.57
SWM Subwatershed Ranking:	4
SWM Study Ranking:	--
Priority:	Moderate

Location: The water quality retrofit site is located at the end of Rodes Drive on the property of Bull Run Parcel I Home Associates.

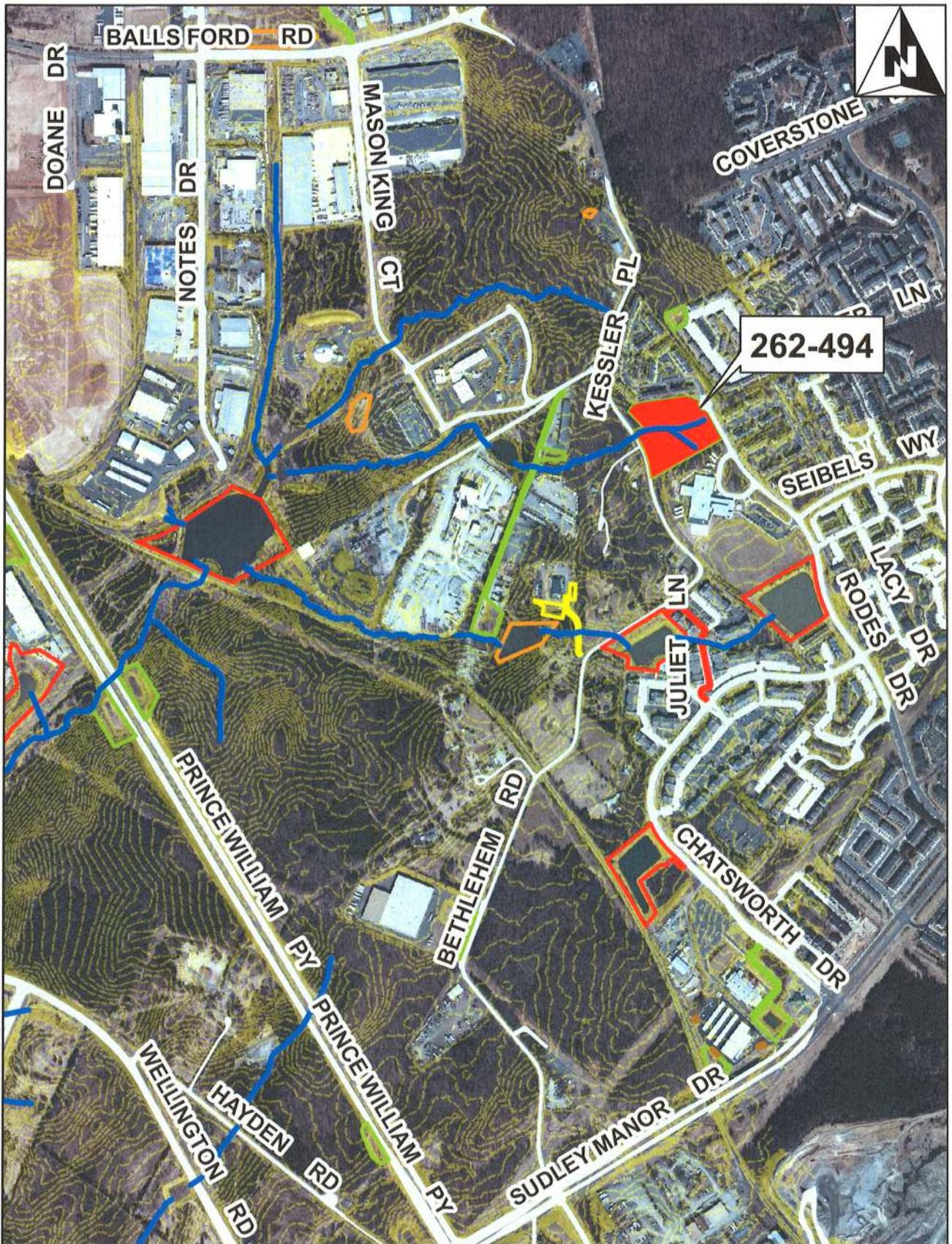
Problem Description: This stormwater facility is listed in the County database as a SWMP without a riser, but in the comment section it is referred to as the “Paradise SWM/BMP”. In the field, the basin has a 54 inch square riser with a 24 inch outlet pipe. There is a low flow orifice in the riser, but the orifice is buried by 1 to 2 feet of sediment. The basin is ponded with up to 2 feet of water and extensive wetlands have formed in the basin. An informal pedestrian trail was identified through the basin along the southern boundary adjacent to a school. This dry basin is approximately 3.4 acres in size, and is draining approximately 47 acres consisting mostly of multifamily housing.

Project Description: The existing ponding and wetlands are a function of complete clogging of the low flow orifice by sediment. Given the large size of this facility and its demonstrated ability to hold water and support wetlands, it is recommended that the facility be retrofitted into a constructed wetland facility. A retrofit would include disrupting the channelized flow directly from the inlets to the riser, increasing the flow path with berms, and creating a permanent micropool at the riser. The riser would be modified with a subsurface intake to minimize clogging. Forebays would be constructed at the two primary inlets to contain sediment inputs. Any work on this facility should include a HOA education and maintenance plan so that its functioning is not impaired by future maintenance.

Potential Benefits: The project would provide water quality treatment for approximately 17.5 acres of impervious surface. The facility would exceed all of the standards for a Level I constructed wetland and most of the standards for a Level II constructed wetland. The N and P removal efficiencies would increase from 10% and 15% for the existing design to 25% and 50% for Level I design or 55% and 75% for a Level II design, respectively.

Design Considerations and Constraints: Any additional grading at this site may be limited by bedrock, which is exposed in the southeast corner. Inside the riser is a large gate valve used to de-water the basin which would facilitate construction. The water quality retrofit would have to be balanced against the quantity storage required. The size of the site would have to be evaluated to determine if it could function without Extended Detention, as required by Level II constructed wetland design criteria.

Cost Estimate: The water quality retrofit of this basin is estimated to cost approximately \$349,400.



Watershed: Dawkins Branch
Site ID#: 262-494
BMP #: 494
ADC Map (25th edition): Map 8, Page 13, grid coordinate F3



Existing Condition: A large dry basin BMP supporting extensive wetlands



Conceptual Plan: Constructed stormwater wetland with forebays for pre-treatment and upland berms to increase flow lengths and residence time



Photo 1: Dry basin (SWMP) with large wetland and ponded to 2' deep



Photo 2: Low flow orifice clogged below 1'-2' of sediment

Project: Dawkins Branch 262-5239 Bioretention Renovation

Watershed:	Broad Run
Subwatershed Name:	Dawkins Branch
Subwatershed Code:	262
Site ID:	262-5239
County Facility ID:	5239
Facility Type:	CSWMP/BMP
Facility Description:	Dry
Project Type:	Major Repair
Drainage Area:	2.4 acres (3.0 acre parcel)
GPIN/Owner:	7596-25-1131
Neighborhood/Address:	Robert-Louis Investment Partnership 8641 Virginia Meadows Drive, Manassas 20109
GPS Coordinates:	38° 46' 15.45 77° 33' 18.24
SWM Subwatershed Ranking:	5
SWM Study Ranking:	--
Priority:	Moderate

Location: The site is located along Virginia Meadows Drive to the south of the intersection with Wellington Road on the property of Robert-Louis Investment Partnership.

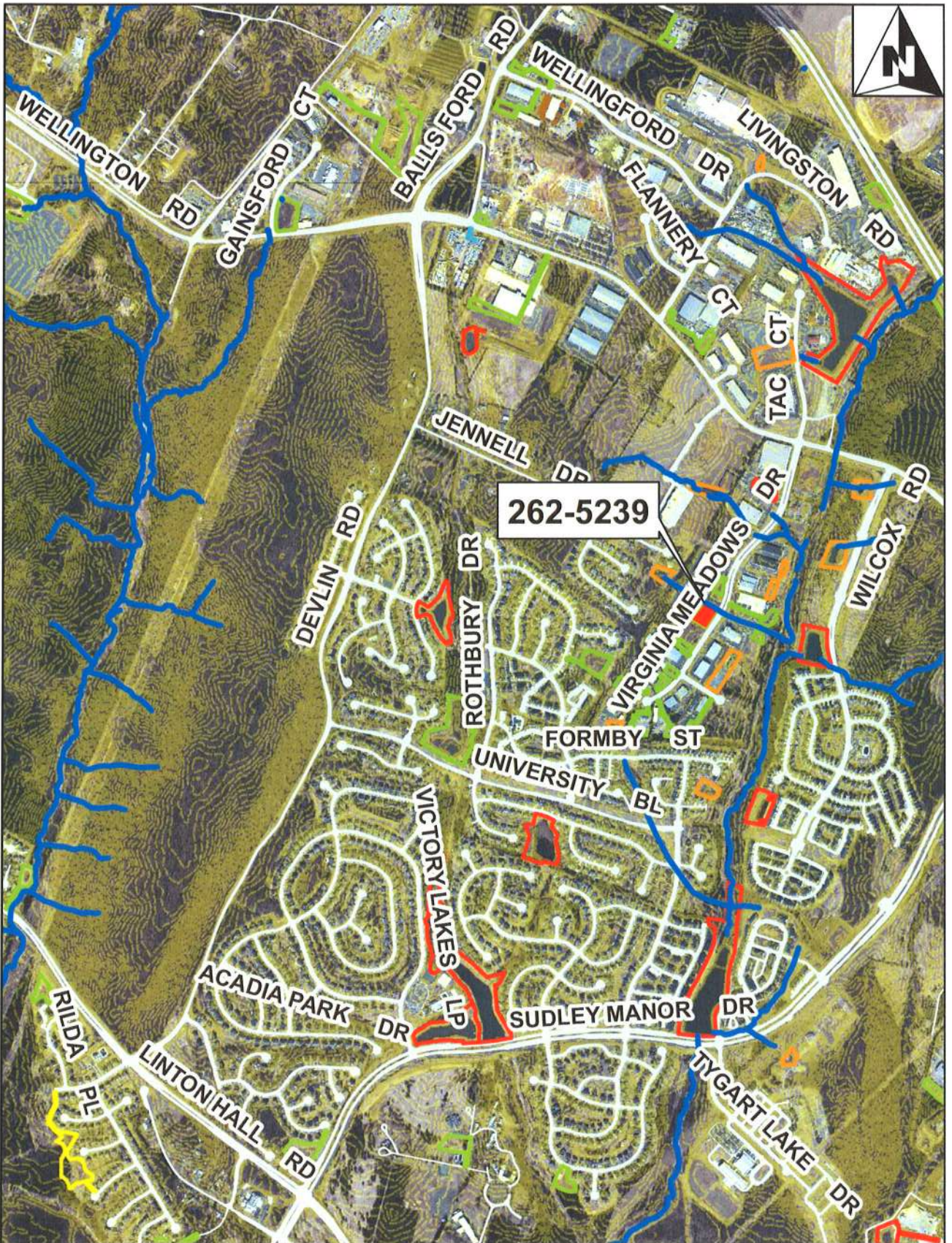
Problem Description: This facility, constructed prior to 2005, has a large bioretention “forebay” (3,600 sf) which drains to a large dry basin (6,000 sf). The dry basin provides quantity storage while the bioretention area provides the quality function. The principle outlet for the dry basin is a culvert through the embankment without a riser. The dry basin floor is covered with wetland vegetation supported by groundwater and seepage from the bioretention facility. The bioretention “forebay” has three stormwater inlet pipes (15-18 inches) and one paved flume from the roadway. The forebay has three 4 inch underdrains which were located in the field and appear to be discharging groundwater to the dry basin. The use of bioretention in a forebay is not a standard practice. The primary function of a forebay is to trap sediments. Bioretention facilities tend to clog if subjected to a sediment load. Combining the function of a forebay and a bioretention facility is a conflict of goals. Vegetation in the bioretention basin is sparse and some shrubs are dead. The current facility, although unconventional, is still probably very functional for water quality and quantity control. However, the forebay will deteriorate over time as sediment clogs the infiltration capability of the basin.

Project Description: To renovate the bioretention basin/forebay it is recommended that a forebay be installed at the location of the three stormwater inlet pipes to protect the function of the bioretention basin. The remainder of the bioretention facility would be renovated, including new soils, plants and mulch. The functioning of the under drain system should be checked as a part of the renovation. Based on the size of the drainage area (2.4 acres), the bioretention area is not large enough to provide full water quality treatment. With ponding of 6 inches, the basin treats approximately 80% of the WQ volume. Additional water quality storage should be designed into the dry basin, with micropools, wetlands, and other features. A weir wall outlet structure could be added to maintain the water level and provide additional quality and quantity control within the dry basin.

Potential Benefits: Based on proposed DCR standards, the bioretention basin would provide a 50%-90% total phosphorus removal rate for that portion of the water quality volume that it can contain.

Design Considerations and Constraints: Due to the size of the drainage area, water quality treatment would need to be split between the bioretention and dry basin.

Cost Estimate: Estimated cost of \$56,000, or \$43,200 per impervious acre.



Watershed: Dawkins Branch
Site ID#: 262-5239
BMP #: 5239
ADC Map (25th edition): Map 8, Page 13, grid coordinate B6



Existing Condition: Site with bioretention forebay and dry basin without riser



Conceptual Plan: Renovate bioretention basin and install forebay to capture sediment. Improvements to dry basin including micro-pools, wetlands, berms and weir wall outlet structure



Photo 1: Bioretention forebay with under drains which discharge to dry basin



Photo 2: Dry basin outlet pipe without riser, basin supports large wetland

Project: Dawkins Branch 262-5361 Major Repair

Watershed: Broad Run
Subwatershed Name: Dawkins Branch
Subwatershed Code: 262
Site ID: 262-5361
County Facility ID: 5361
Facility Type: CSWMP/BMP
Facility Description: Dry
Project Type: Major Repair
Drainage Area: 5 acres per database (2.8 acres per GIS)
GPIN/Owner: 7596-14-9876, 7596-25-0406/
Neighborhood/Address: Virginia Meadows Property LLC.
8711 Virginia Meadows Drive, Manassas 20109,
8661 Virginia Meadows Drive, Manassas 20109

GPS Coordinates: 38° 46' 11.90
77° 33' 18.24

SWM Subwatershed Ranking: 3
SWM Study Ranking: 5
Priority: Moderate

Location: The site is located along Virginia Meadows Drive south of the intersection with Wellington Road on the property of Virginia Meadows Property LLC.

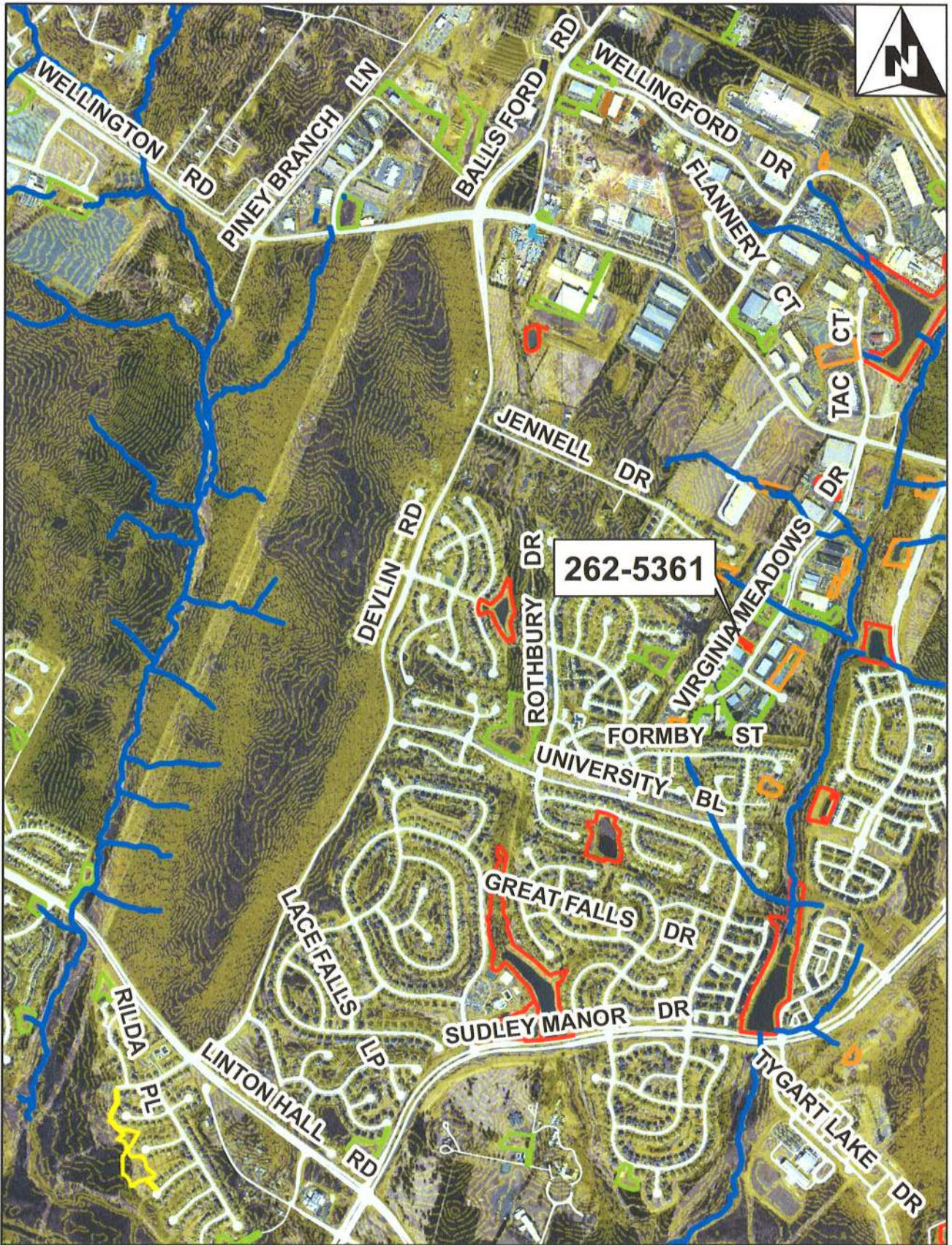
Problem Description: This dry basin is located in commercial property and is maintained by the County. It was built prior to 2003 and has a 48 riser with a RCP outlet pipe, and no spillway. Initially the CSWMP/BMP appears well maintained, but closer inspection indicates that soil is piping through the embankment and into the outlet pipe (see photo). There is grout around the soil piping hole from past repair attempts. This type of piping would require significant head pressure. A more detailed inspection of the riser indicated that the constrictor plate installed in the low flow orifice is solid – it lacks a low flow orifice. This pond appears to pond deeply between storms, and the primary outlet for the ponded water is through the outlet pipe instead of the riser. Significant rust on the trash rack also supports the possibility of long ponding durations. One small PVC pipe discharges to the BMP which may not be stormwater. The BMP does not have a forebay and there is minor sediment accumulation at one end of the facility.

Project Description: A detailed inspection of the riser and outlet pipe should be conducted, and repairs completed to eliminate the causes for the soil piping into the outlet pipe. Due to the angle of the outlet pipe through the embankment, there is very shallow fill over the pipe, which should be addressed in any repairs.

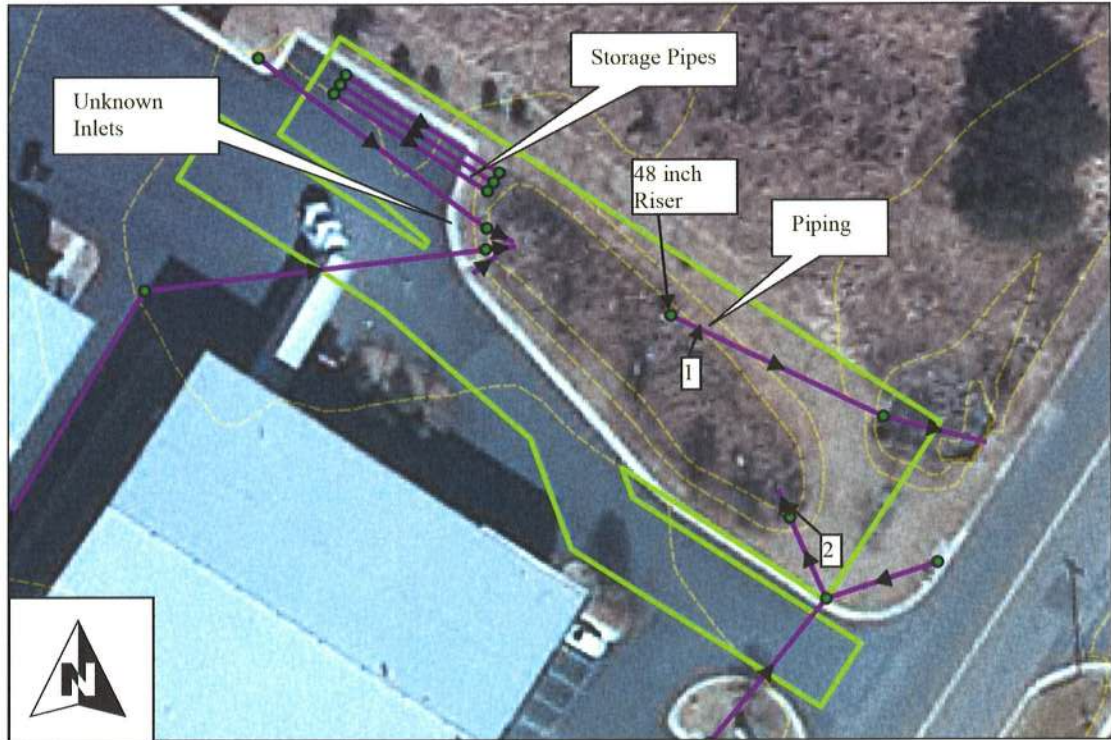
Potential Benefits: The primary benefit would be to prevent a failure of the outlet pipe or embankment during a storm event. The addition of a forebay would be beneficial but may conflict with the storage pipes (see discussion below).

Design Considerations and Constraints: The County database identifies three 24 inch 60 foot long “storage pipes” as part of the BMP. In the field, three corrugated HPDE pipes were located at the far end of the basin, under a portion of the parking lot. The function of these pipes should be reviewed based on the original design.

Cost Estimate: The repair to the riser and the outlet pipe would cost less than \$10,000. Total costs to address the riser, remove sediment, and add a forebay is estimated to be \$20,000.



Watershed: Dawkins Branch
Site ID#: 262-5361
BMP #: 5361
ADC Map (25th edition): Map 8, Page 13, grid coordinate B6



Existing Conditions: Description



Photo 1: Soil piping into outlet pipe and rust on riser may indicate prolonged ponding



Photo 2: Basin is well maintained, but sediment is accumulating at far end.