

# **STORMWATER MANUAL: A GUIDE TO STORMWATER REQUIREMENTS FOR LAND DISTURBING ACTIVITIES IN ARLINGTON COUNTY**

July 2025

## Highlights of this version of the Stormwater Manual compared to the October 2024 version

The following text summarizes key changes to this version of the Stormwater Manual compared to the October 2024 version. This summary is provided for convenience and general reference only. Please refer to the specific sections of the Manual to design and construct your project and consult your plan reviewer if you have questions.

Section	Summary
2.2.4 Water Quality Technical Criteria	<ul style="list-style-type: none"><li>• Updated for consistency with new VADEQ Stormwater Management Handbook</li></ul>
3. Landscape Conservation Plan	<ul style="list-style-type: none"><li>• Required identification of mature trees and trees in Resource Protection Areas</li><li>• Provided guidance on how to protect mature trees</li><li>• Update on distance of planted trees to structure</li></ul>
4. Resource Protection Area Requirements	<ul style="list-style-type: none"><li>• Revised chapter to include requirements per the amendments to the Chesapeake Bay Preservation Ordinance</li></ul>
Appendix B	<ul style="list-style-type: none"><li>• Updated with two new “Pollution Prevention Plan” Templates, replacing the current SWPPP template.</li></ul>
Appendix C	<ul style="list-style-type: none"><li>• Revised to incorporate requirements per the amendments to the Chesapeake Bay Preservation Ordinance</li></ul>
Appendix D	<ul style="list-style-type: none"><li>• Revised to incorporate requirements per the amendments to the Chesapeake Bay Preservation Ordinance</li></ul>
Appendix G	<ul style="list-style-type: none"><li>• Submission instructions were updated on pages 2 and 3.</li></ul>
Appendix H	<ul style="list-style-type: none"><li>• A new Resiliency Assessment form has been added for projects within sea level rise, storm surge, or flooding impact area.</li></ul>

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Appendix A: Stormwater Facility Maintenance and Monitoring Agreement (MMA)

Appendix B: Pollution Prevention Plan Template

Appendix C: Water Quality Impact Assessment Data Sheet

Appendix D: Exception Request Form

Appendix E: Recommended Trees with Canopy Credits

Appendix F: Tree Protection and Planting Standards (DPR Design Standards)

Appendix G: Construction Inspection Checklists and Certification Templates

Appendix H: Resiliency Assessment

**Abbreviations/Definitions**

Chapter 60 – Erosion and Stormwater Management Ordinance

Chapter 61- Chesapeake Bay Preservation Ordinance

CO – Certificate of Occupancy

DES – Arlington County Department of Environmental Services

Director – Director of the Department of Environmental Services or designee.

DEQ – Virginia Department of Environmental Quality

ISD – Arlington County Inspection Services Division

LDA – Land Disturbing Activities Permit

MMA – Maintenance and Monitoring Agreement

RPA – Resource Protection Area

SWMF – Stormwater Management Facility

VRRM – Virginia Runoff Reduction Method

WQIA – Water Quality Impact Assessment

# 1. Introduction

This Manual outlines the stormwater requirements for all land disturbing activities in Arlington. A Land Disturbing Activity/Stormwater (LDA) Permit is required for any land disturbing activities that disturb equal to or greater than 2,500 square feet of land, as required by the Erosion and Stormwater Management Ordinance (Chapter 60 or successor) and the Virginia Erosion and Sediment Control Program. Land disturbing activities within Resource Protection Areas (RPAs) regulated under Chesapeake Bay Preservation Ordinance (Chapter 61) are also governed by this Manual.

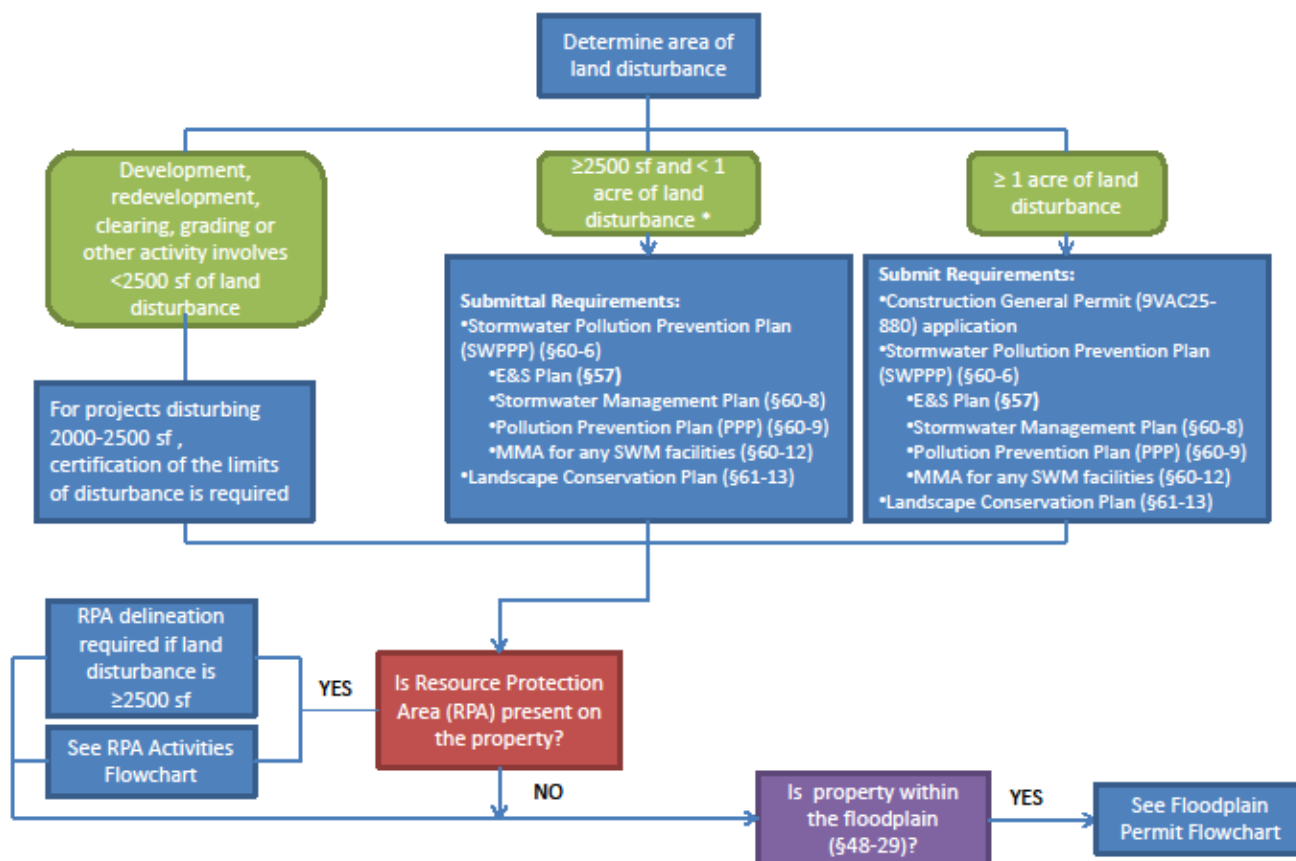
The term 'Director' in this Manual refers to the Director of the Department of Environmental Services (DES) or designee.

The area of land disturbance includes cumulative land disturbance over two (2) years, which will be calculated for any project during this period that involves structures, paved areas, and/or retaining walls to track whether the cumulative threshold is exceeded.

Projects with land disturbance of 2500 square feet or greater are subject to the requirements of Chapter 2 and 3 of this Manual. Any land disturbance in a Resource Protection Area (RPA) is subject to the requirements of Chapter 4 of this Manual.

The following flowchart outlines the submission process for activities that will cause land disturbance.

Regulatory Flowchart for determining required submissions for permitted activities



\*The Stormwater Pollution Prevention Plan (SWPPP) in §60-6 applies if the cumulative land disturbance on a site will be ≥2500 sf within two years, even if separate permits are obtained.

## **2. Stormwater Pollution Prevention Plan (SWPPP) Requirements**

Any activity that disturbs 2500 square feet or more of land requires a Stormwater Pollution Prevention Plan per the requirements of Arlington County Code Chapter 60. This plan contains the following elements:

- Erosion and Sediment (E&S) Control Plan
- Stormwater Management Plan (SWMP)
- Pollution Prevention Plan (P2 Plan)
- Virginia Stormwater Management Program (VSMP) Requirements
- Stormwater Facility Maintenance and Monitoring Agreement (MMA)

### **2.1 Erosion and Sediment (E&S) Control Plan**

An erosion and sediment control plan must be submitted that satisfies the requirements of Arlington County's [Erosion and Sediment Control Ordinance](#) (Chapter 57 of the County Code).

Specifically, the E&S plan must:

- Minimize the construction footprint.
- Delineate the limits of clearing and grading, including details about how these limits will be physically marked in the field.
- Delineate the RPA boundary (see Chapter 4 of this Manual), including details about how this boundary will be physically marked in the field.
- Include tree protection measures required under the approved Landscape Conservation Plan to ensure protection during clearing, grading, and all phases of construction.
- Provide for a single ingress/egress point for construction activities, unless otherwise approved by the County Manager.
- Include a general note tailored to the site conditions that includes the language "The County E&S inspector has the authority to require additional controls as needed."

### **2.2 Stormwater Management Plan (SWMP)**

The Stormwater Management Plan (SWMP) contains the elements in Section 2.2.1 in addition to the details of any stormwater management facility (SWMF) used to meet the requirements of Sections 2.2.32.2.3 and 2.2.4. A stormwater management facility is a control measure that manages stormwater runoff and changes the characteristics of that runoff including, but not limited to, the quantity and quality, the period of release or the velocity of flow and may also be called a best management practice (BMP) or stormwater control measure (SCM).

#### **2.2.1 Contents of Plan**

All Stormwater Management Plans must be signed and sealed by a professional registered in the Commonwealth of Virginia and must include the following items:

- Contact information including the name, mailing address, email address, and telephone number of the owner and the RPC number and parcel number of the property or properties affected;
- A narrative that includes a description of current site conditions and final site conditions;
- A general description of the proposed stormwater management facilities and the mechanism through which the facilities will be operated and maintained after construction is complete;
- A map or maps of the site that depicts the topography of the site and includes:

- All contributing drainage areas including pre-development and post-development areas;
- Existing streams, ponds, culverts, ditches, wetlands, other water bodies, and floodplains;
- Soil types, infiltration rates (using test procedures in Virginia Stormwater Management Handbook Appendix C), and depth of water table at location of proposed SWMFs (if SWMF uses infiltration);
- Forest cover, and other vegetative areas;
- Current land use including existing structures (and downspouts), roads, and locations of known utilities and easements;
- Sufficient information on adjoining parcels to assess the impacts of stormwater from the site on these parcels;
- The limits of clearing and grading, and the proposed drainage patterns on the site;
- Proposed buildings (including downspouts), roads, parking areas, utilities, and stormwater management facilities;
- Completed and executed copy of Stormwater Facility Monitoring and Maintenance Agreement (MMA);
- Hydrologic and hydraulic computations outlined in Section 2.2.3, including runoff characteristics;
- Runoff reduction computations outlined in Section 2.2.4.

#### 2.2.1.1 Impervious cover

Chapter 60 defines impervious cover as “a surface composed of any material that significantly impedes or prevents natural infiltration of water into the soil. Depending on the design, impervious surfaces may include, but are not limited to: roofs, buildings, streets, parking areas, and any concrete, asphalt, or compacted gravel or dirt surface.”

At a minimum, the following gravel and dirt surfaces are considered impervious:

- Any gravel or dirt surface used for the parking of vehicles and/or where other activities such as foot traffic and storage uses will occur.
- Any dirt surface under a deck.

The following gravel surfaces are not considered impervious:

- Areas under a deck or similar structure designed for water to flow through the surface material with at least six (6) inches of gravel on the ground underneath and less than four (4) feet of clearance to prevent frequent use that causes compaction.
- Dry wells, level spreaders, and other drainage features required by the LDA permit.

Existing vegetated surfaces (pre-development) over impervious sub-surfaces (e.g., parking decks, roofs) are considered impervious land cover because they prevent natural infiltration of water into soil on the land surface.

New vegetated surfaces (post-development) over impervious sub-surfaces are also considered impervious land cover. If these surfaces meet the minimum requirements for a vegetated roof SWMF, then that SWMF credit is applied.

Swimming pools are also considered impervious cover under the definition in Chapter 60. There are also additional specific provisions that apply to swimming pools:

- Projects that include swimming pools are not eligible for an exception. See 2.9.3



- Under the Alternative Compliance Option (2.9.4), swimming pools that drain to the sanitary sewer system may be excluded from the impervious surface calculations for detention requirements for the portion of the site that drains toward other properties, depending upon the details of the sanitary connection, off-season pool runoff characteristics, and other factors to be determined during plan review. The swimming pool area still must be included in the total site impervious area calculations.
- For projects that do not choose the Alternative Compliance Option, swimming pools that drain to the sanitary sewer system may be excluded from the impervious surface calculations for determining the runoff curve number (CN) for the portion of the site that drains toward other properties, depending upon the details of the sanitary connection, off-season pool runoff characteristics, and other factors to be determined during plan review.

## 2.2.2 Impervious cover removal

Impervious cover removed from a property prior to LDA permit application can be counted as part of the existing land cover conditions as follows:

1. If no LDA or other demolition permit was obtained for the removal, the impervious cover removed may be counted for up to five (5) years from the date of removal if acceptable, time-referenced documentation is provided to the Director. Examples of acceptable documentation may include but are not limited to photographs (aerial and ground-based) and contractor invoices.

The Director will determine whether the documentation verifies the timing and amount of removal and, if so, the credit provided will be the verifiable surface area of impervious cover removed.

After five (5) years, the credit provided will be 50 percent of the verifiable surface area removed, with no credit provided after 10 years.

2. If an LDA or other demolition permit was obtained for the removal of the impervious cover, the surface area of impervious cover removal documented with the permit information may be counted as follows:

### All projects except County projects

Time from date of removal permit issuance to date of LDA permit application	Pro-rated impervious cover removal credit
0 – 5 years	100% credit
>5 – 10 years	75% credit
>10 – 15 years	50% credit
>15 – 20 years	25% credit
>20 years	0% credit

### County projects

Because of the long planning, civic engagement, and funding timelines associated with County projects, including the 10-year planning horizon for the Capital Improvement Plan, full (100%) credit for impervious cover removal will be provided for 10 years from the date that permit(s) were issued for the impervious cover removal.

Following the end of the 10-year full credit period, the pro-rated crediting is the same as for other projects:

Time from date of removal permit issuance to date of LDA permit application	Pro-rated impervious cover removal credit
0 – 10 years	100% credit
>10 – 15 years	50% credit
>15 – 20 years	25% credit
>20 years	0% credit

3. For impervious cover removal within Resource Protection Areas (RPAs) regulated under Chapter 61 (Chesapeake Bay Preservation Ordinance), the following policies govern:

- A. Determination of 'allowable redevelopment' under 61-7.A.2:

*Redevelopment outside of locally designated Intensely Developed Areas designated by the County shall be permitted only if there is no increase in the amount of impervious cover within the RPA and there is no further encroachment within the RPA....*

Any impervious cover removed from a site within the preceding (2) years may be counted as impervious cover for the pre-development condition, if a valid demolition permit was obtained for the project or other time-referenced documentation, as set forth in 1. Above, is provided that is acceptable to the Director.

- B. Determination of existing impervious cover for calculating compliance with the stormwater management requirements of Chapter 60: The policies outlined under 1. And 2. Above govern, as applicable.

### 2.2.3 Water Quantity Technical Criteria

All land disturbing activities greater than or equal to 2500 square feet are required to follow the steps in the Compliance Flow Chart for Water Quantity and subsequent flow charts to achieve compliance, unless the Alternative Compliance Option (2.9.4) for single family homes is chosen or Streamlined Method (2.9.6) applies.

These flow charts define the flood control and channel protection criteria adopted with the Erosion and Stormwater Management Ordinance (Chapter 60) in 2024.

Flood control highlights include:

- Use of energy balance detention for flood control does not require any further analysis of the system.
- Otherwise, follow the flood control flow chart. At a minimum, detention is required to maintain post-development peak flow at or less than pre-development peak flow. This is required even where the '1% rule' is applicable.
- Further, the post-development peak flow must be contained within the system down to the '1% rule' limits of analysis. If this cannot be demonstrated, energy balance detention design may be used to achieve compliance.

A [Water Quantity Energy Balance Worksheet](#) is provided on the County's webpage to assist with this analysis.

For single family homes built separately covered in Section 2.9, the following additional limitations and conditions apply:

#### **Sites with downhill drainage area (DDA<sup>2</sup>)**

- Where there is an increase in impervious area in the DDA and there is no public storm drain connection on the site in the DDA for the detention system outfall, the 'Alternative Compliance Option' in Section 2.9.4 is required.
- Discharges of concentrated flow from a traditional detention system through other private properties is not the intent of State code and is expected to cause adverse impacts. The '1% rule' also does not apply.

#### **Use of underground detention systems on single family home lots**

- Cannot be used for 'Alternative Compliance Option.'
- Allowed only if the control structure and all storage chamber(s) can be accessed for both visual and structural inspection and maintenance.

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<sup>2</sup> The downhill drainage area (DDA) is the portion of the site that drains to adjacent properties before runoff reaches the public right-of-way and/or storm drain system. See Section 2.9.4 .

- Cannot be located closer than 10 feet from the edge of the facility to the home foundation to ensure structural integrity, safety, and access for future maintenance and repair.
- Cannot be located closer than five (5) feet from any lot line.
- For interior lots, cannot be located in side or rear yards due to difficulty of maintenance and repair access by contractors. For corner lots, can be located only in the yards facing the street. Other potential constraints, such as steep slopes, will be evaluated on a case-by-case basis.
- May carry additional maintenance burden which will be specified in the approved maintenance schedule.
- Must release by gravity flow to the public storm drain system.

### **Requirements for Channel Protection downstream analysis**

Pipe system/channel analysis is to ensure that the 2-year 24-hour storm will not cause erosion. Criteria listed below must be provided for the pipe system analysis. Downstream analysis should be taken to the 1% rule based on drainage area or peak flow for discharge from the entire drainage area for the storm event.

For projects that discharge into a pipe system the following information must be provided on the plans:

1. A table that provides the following at every point of inflow along the conveyance:
  - a. From
  - b. To
  - c. Drainage area (DA) in acres
  - d. Runoff Coef. "C"
  - e. Incremental DA
  - f. Accumulated DA
  - g. Time of Conc. – "I" in/hr
  - h. Time of Conc. – To pipe in min.
  - i. Incremental flow "Q"
  - j. Accumulated flow "Q"
  - k. Pipe Diameter in inches
  - l. Pipe Material Type
  - m. Mannings coefficient "N" for pipe
  - n. Pipe slope in %
  - o. Max "Q" cfs for pipe
  - p. Velocity fps
  - q. Time in pipe minimum
  - r. Length in feet
  - s. Fall in feet
  - t. Invert upper
  - u. Invert lower
2. Profiles of conveyance system must be provided and include the following:
  - a. Structure id
  - b. Pipes
  - c. Structures – top elevation and inverts
  - d. Existing grade
  - e. Hydraulic grade line for 10-year 24-hour storm

If the downstream analysis extends beyond the pipe system, the criteria below must be used. If the pipe system discharges into a restored natural conveyance, the restored section design storm for the entire basin needs to be used to check for erosion. Note that the 1% rule for peak flow is based on the 1-year 24-hr storm, not the 2-year 24-hour storm.

1. Channel/ditch will be checked to ensure that the 2-year 24-hour storm design storm will not cause erosion.
2. Plans must include cross-sections. The cross-sections should be chosen at appropriate locations that are perpendicular to the channel. Cross-sections should be taken at a minimum at the outlet of the stormwater conveyance and breaks in channel/ditch grades. Maximum spacing between cross-sections is 100 feet.

### **Requirements for Flood Control downstream analysis**

For projects that discharge into a channel or ditch the following must be provided on the plans:

1. Channel/ditch capacity will be checked to ensure that the 10-year 24-hour storm design storm will not overtop the banks.
2. Plans must include cross-sections. The cross-sections should be chosen at appropriate locations that are perpendicular to the channel. Cross-sections should be taken at a minimum at the outlet of the stormwater conveyance and breaks in channel/ditch grades. Maximum spacing between cross-sections is 100 feet.

### **Requirements for Sheet Flow**

All properties must satisfy the sheet flow provisions of 9VAC25-875-600:

*Increased volumes of sheet flow resulting from pervious or disconnected impervious areas, or from physical spreading of concentrated flow through level spreaders, must be identified and evaluated for potential impacts on down-gradient properties or resources. Increased volumes of sheet flow that will cause or contribute to erosion, sedimentation, or flooding of down gradient properties or resources shall be diverted to a stormwater management facility or a stormwater conveyance system that conveys the runoff without causing down gradient erosion, sedimentation, or flooding.*

### **Dry well requirements**

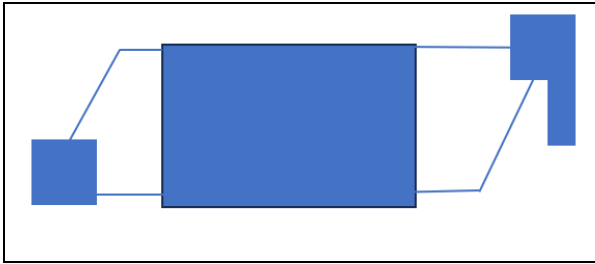
For single family home projects, dry wells are required for every point of discharge to promote infiltration and sheetflow. The maximum storage volume of any dry well installation cannot exceed 1.0 inches from the contributing rooftop area.

Please refer to the Alternative Compliance Option spreadsheet instructions for details about dry well sizing and other requirements (provided on the LDA program website alongside the spreadsheet download link).

To maximize compliance with sheet flow requirements, the following criteria apply to all single family home projects:

1. 100 percent void dry wells are required for the inflow and outflow of any dry well installation, except for stand-alone dry wells in the NDDA. Additional 100 percent void dry wells may be added to the installation.
2. Dry wells for multiple purposes (e.g., planter box release and uncontrolled roof area) may be placed in combined installations.
3. The excavation footprint for a dry well installation starts at seven (7) feet by seven (7) feet, which can fit four (4) 100% void dry wells. If more dry well storage is need, this

excavation can be extended with a four (4) foot wide excavation. These limits are intended to prevent soil compaction from heavy equipment during construction.



Example

4. There shall be at least two (2) dry well installation locations on the site unless otherwise approved during plan review.

<b>APPROVABLE</b> <b>2 drywell installation</b> <b>locations</b>	<b>NOT APPROVABLE</b> <b>Only 1 drywell installation</b> <b>location</b>

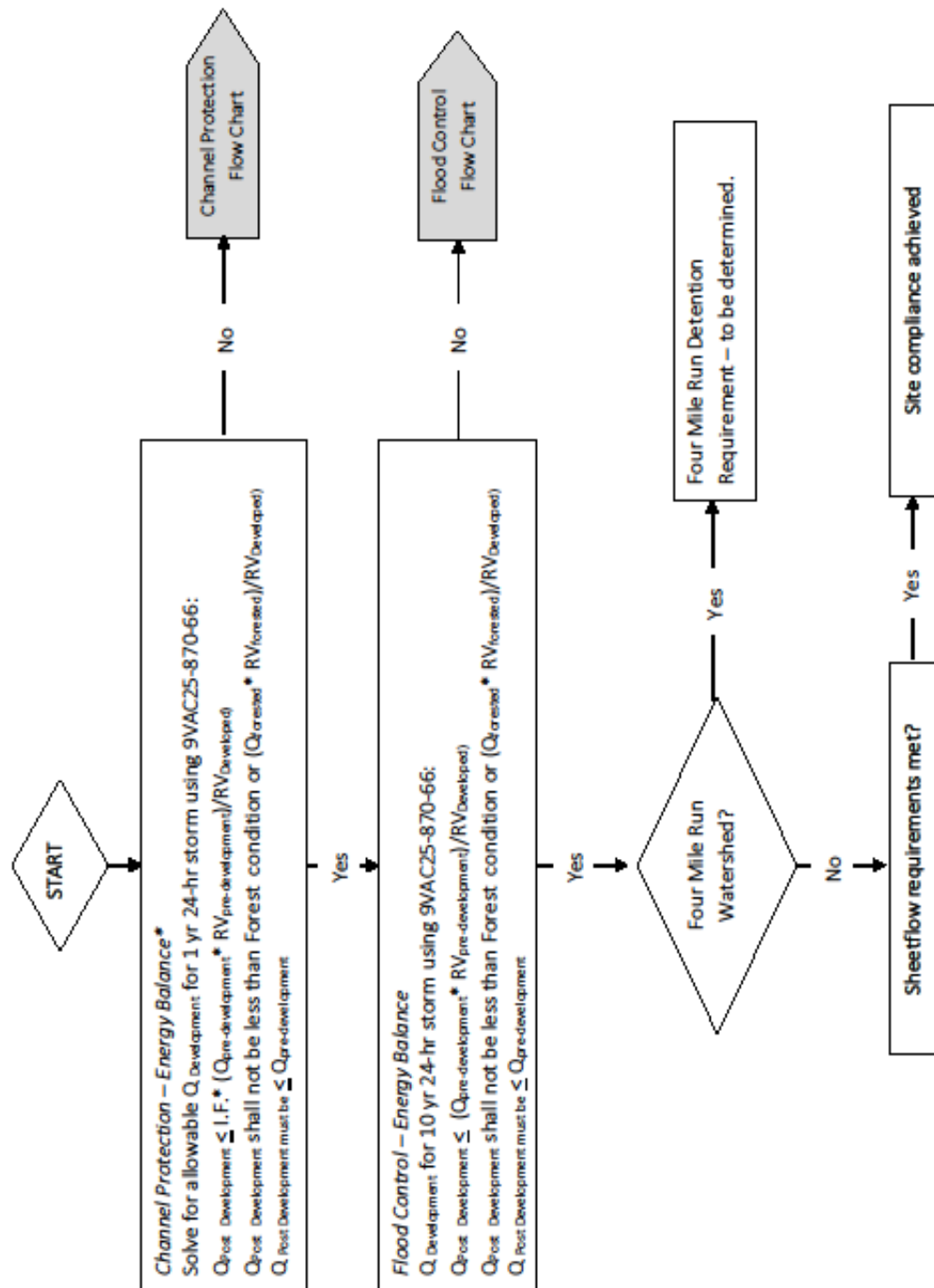
5. A dry well installation shall not be sited closer than 10 feet to any other dry well installation, unless otherwise approved during plan review.
6. A dry well installation shall not release stormwater closer than 10 feet to the downhill property line and five (5) feet from the uphill property line.
7. Release on slopes that exceed 10% will require energy dissipation practices determined during plan review.

Please refer to the dry well section of the [Alternative Compliance Option plan template](#) for details and materials specifications that apply to these facilities. These can also be found as Drawing No. SWM #7 of [Standard Details for Permeable Pavement and Urban Bioretention](#).

An executed Stormwater Facility Monitoring and Maintenance Agreement (MMA) is required for projects with dry wells only.

LDA projects that do not follow the Alternative Compliance Option under Section 2.9.4 may require additional storage with the use of rain gardens, dry wells, etc. in order to meet the Sheet flow requirements of Chapter 60.

## Compliance Flow Chart for Water Quantity

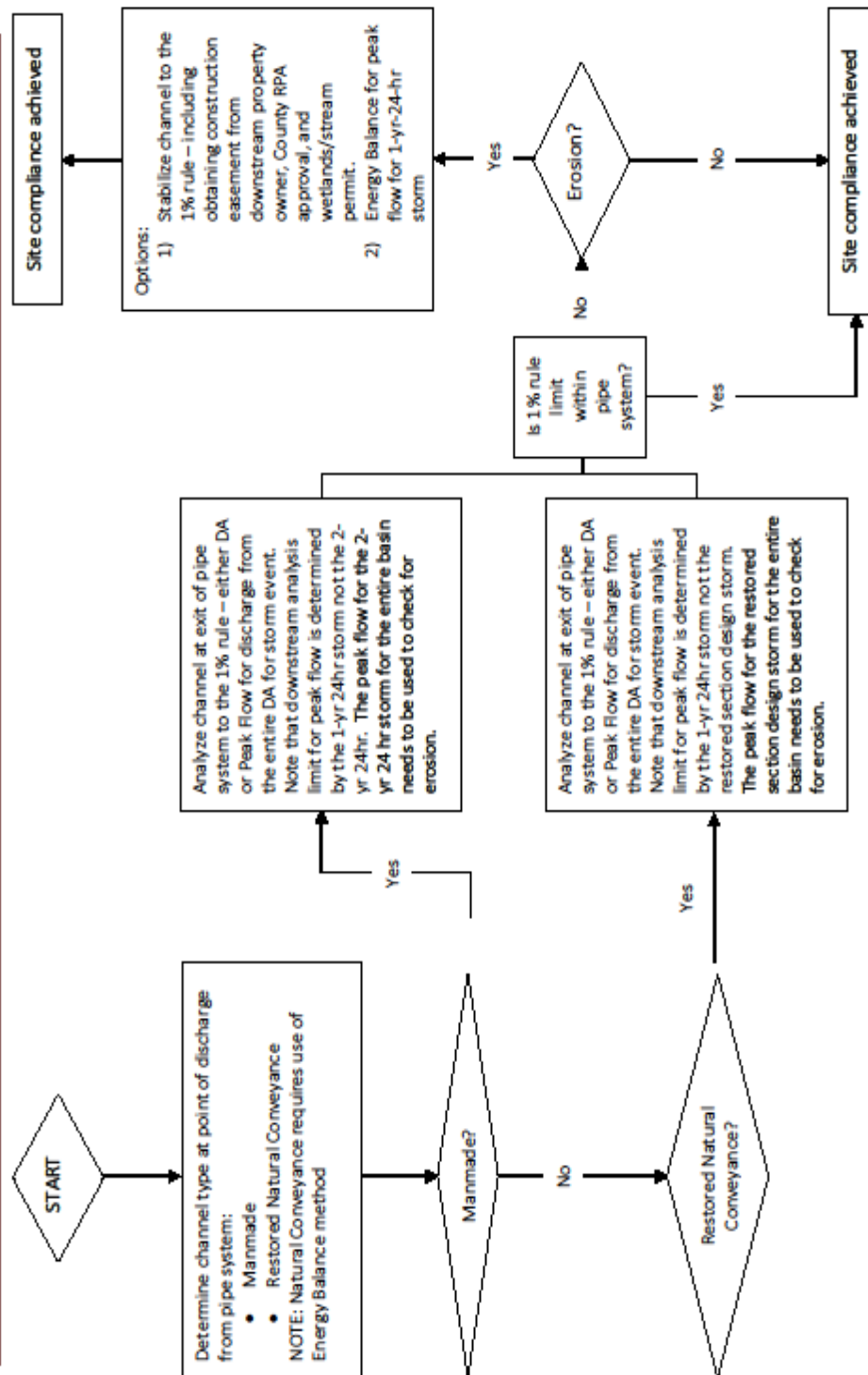


\*This approach is the only approach allowed for discharges to natural channels. It can also be used for manmade and restored channels. If the applicant chooses not to use this approach for manmade and restored channels, proceed to 'Channel Protection Flow Chart.'

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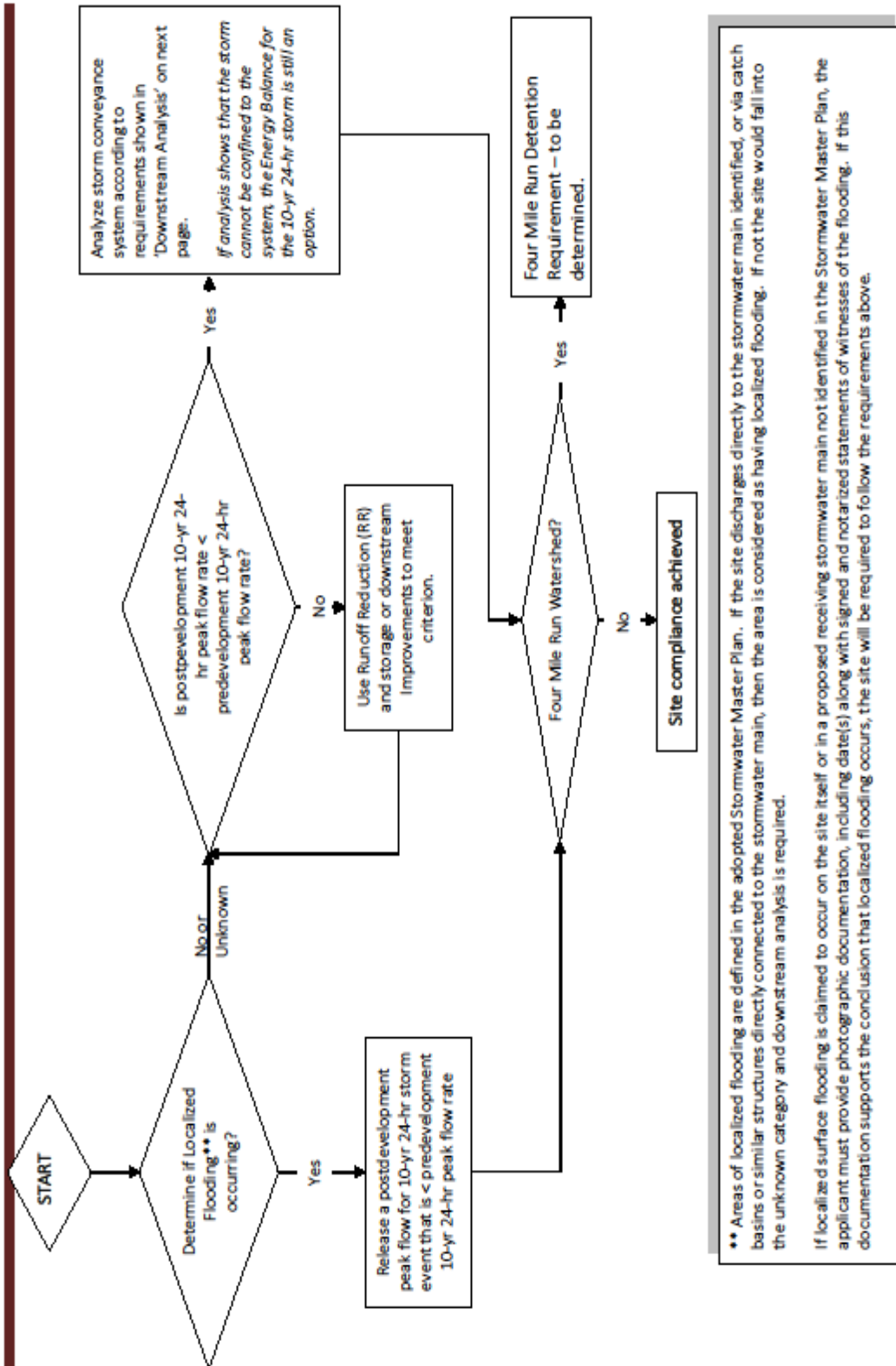


## Channel Protection Flow Chart



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## Flood Control Flow Chart



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## Flood Control Flow Chart

### Downstream Analysis

If the peak flow from the post-development 10-year 24-hour storm is proposed to be contained within the stormwater conveyance system, then an analysis of the system to ensure the discharge stays within the system must be conducted to a point where:

- o The site's contributing drainage area is less than or equal to 1.0% of the total watershed area draining to a point of analysis in the downstream stormwater conveyance system;
- o Based on peak flow rate, the site's peak flow rate from the 10-year 24-hour storm event is less than or equal to 1.0% of the existing peak flow rate from the 10-year 24-hour storm event prior to the implementation of any stormwater quantity control measures; or
- o The stormwater conveyance system enters a mapped floodplain or other flood prone area, adopted by ordinance, of any VSMP Authority.
- o Arlington County Flood Control downstream analysis documentation and computational criteria must be met.

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## 2.2.4 Water Quality Technical Criteria

All Stormwater Management Plans should be prepared in conjunction with the Virginia Stormwater Management Handbook (Handbook) and this Stormwater Manual (Manual). Refer to Chapter 8 Design Checklists using the approved Best Management Practices (BMPs) from the Handbook (with the modifications noted in “Stormwater Management Facility Design Considerations”), in addition to the following:

- A copy of the most recent Runoff Reduction spreadsheet (downloaded from Arlington County’s website) including a completed ‘SWMF’ tab in the spreadsheet for the proposed SWMFs. Projects that choose the Alternative Compliance Option under 2.9.4 will use the Alternative Compliance Option spreadsheet and must also complete the ‘SWMF’ tab.
- Description of maintenance responsibilities. If a shared SWMF or SWMFs are used to meet code requirements, then a Homeowners Association shall be developed that outlines how each lot will contribute to the inspection and maintenance needs for the facility or facilities. The facility or facilities will be located within a private easement to the Homeowners Association, or each lot will have their own stormwater management facility or facilities and a maintenance agreement will be recorded for each individual lot.
- Material specifications, construction inspection checklist and maintenance schedule for each SWMF.

The Director of DES may preclude the use of any SWMF otherwise allowed, or require more stringent conditions upon its use, for a specific land-disturbing project based on a review of the stormwater management plan and project site conditions. Such limitations shall be based on site-specific concerns.

## Stormwater Management Facility Design Considerations

The specifications below are clarifications or adjustments to the Handbook that are specific to their use in Arlington.

Underdrains shall not concentrate flow. The use of pop-up emitters (and other techniques used to dissipate flow) are accepted, provided their use is appropriate as determined by a professional licensed in the State of Virginia or a County field inspector. Underdrains that discharge on slopes steeper than 10 percent shall have downstream protection. Underdrains should have the appropriate cover and discharge 10 feet from property boundaries or easements for public street purposes.

Condensate from cooling devices and sump pump discharges shall not discharge into stormwater management facilities.

Setbacks. Stormwater management facilities must comply with the minimum setback requirements established by the Virginia Stormwater BMP Clearinghouse. This also includes the setbacks from neighboring structures.

Facilities must be on the parcel for by-right projects, unless an outlot is created or other solution acceptable to the Director.

Waterproofing. If the proposed SWMF does not meet the minimum setback requirements (established by the Virginia Stormwater BMP Clearinghouse), the design must include waterproofing features specified and sealed by the engineer. The following note must be added to the plans:

*Arlington County DES does not review the waterproofing design and the owner/developer agrees to hold Arlington County harmless in the event of failure.*

At a minimum, waterproofing must meet the specification of the Virginia Residential Code (208), R406.2 or most recent equivalent, except that plastic and PVC liners are not permitted to be used.

These requirements also apply to detention tanks built from concrete materials.

**Soil testing.** Testing for infiltration rate and depth of seasonal high water table is required according to testing procedure outlined in the Handbook Appendix C. All soil evaluations, including test profile pits, soil borings, and permeability tests shall be conducted under the supervision of a licensed Soil Scientist. Per the testing procedure, the seasonally high-water table (SHWT) may be determined using soil morphology throughout the year by a certified professional with training and experience in soil morphology. SHWT determination by direct observation of the groundwater level should be performed during the months of November through May. Professional engineers registered in Virginia with experience in the field of geotechnical engineering with certified training in soil morphology may also be certified to determine the SHWT.

#### **Sheetflow to Vegetated Filter Strip/Conserved Open Space.**

All of the design specifications are taken from the Handbook 8.3.3 P-FIL-07 with the following clarifications:

**Location.** Proposed conserved open space area should be adjacent to a protected natural area such as publicly owned parks and resource management areas and privately-owned areas under perpetual easement, deed restriction or other mechanism enforceable by the County. It must be situated as to not result in negative impacts to existing natural resources such as wetlands.

The end of the proposed vegetated filter strips must flow into a protected natural area.

**Size.** The resulting conserved open space must create a contiguous natural area of a minimum of 2 acres, at least 0.25 acres or greater must be converted to conserved open space at a time.

**Design.** The length of the vegetated filter strips should be designed using the minimum length required for the steepest slope on any one part of the strip.

**Construction.** The gravel diaphragm or engineered level spreader should be installed first and then the compost amendments incorporated into the vegetated filter strip. Vegetation needs to achieve 90% coverage before flow can be diverted to the diaphragm or engineered level spreader regardless of existing vegetation or seeding of amended soils is used to achieve dense cover.

**Maintenance.** On private property, a third party conservation easement must be obtained or exist for the area. For existing natural areas, a long-term vegetation management plan including an invasive management plan (IMP) is required. For existing areas of turf or invasive plants, a restoration plan including a landscape plan to provide 90% cover with native plants and invasive management plan is required. Managed meadow is an acceptable interim condition, but the ultimate goal is reforestation. Soils are to remain undisturbed. On public property, educational signage, funding must be identified for at least five years of maintenance, and a Memorandum of Understanding (MOU) for long-term maintenance are required.

## **Vegetated Roof**

All of the design specifications are taken from the Handbook 8.31. P-FIL-02 with the following clarification:

**Maintenance Activities for Vegetated Roofs.** The following is the list of maintenance activities for vegetated roofs. The table is to be included on plans proposing vegetated roofs.

Vegetated Roof Maintenance Schedule

<b>Maintenance Activity</b>	<b>Schedule</b>
<ul style="list-style-type: none"><li>• Water to promote plant growth and survival.</li><li>• Inspect the vegetated roof and replace any dead or dying vegetation.</li></ul>	As Needed (Following Construction)
<ul style="list-style-type: none"><li>• Inspect the waterproof membrane for leaking or cracks.</li><li>• Annual fertilization (first five years).</li><li>• Weeding to remove invasive plants.</li><li>• Inspect roof drains, scuppers and gutters to ensure they are not overgrown or have organic matter deposits. Remove any accumulated organic matter or debris.</li><li>• Inspect the green roof for dead, dying, or invasive vegetation. Plant replacement vegetation as needed to maintain 80% plant coverage.</li></ul>	Semi-Annually
<ul style="list-style-type: none"><li>• Inspected and certified by a professional licensed in the State of Virginia</li></ul>	Once every 5 years

## **Permeable Pavement**

The design specifications are taken from the Virginia Stormwater Management Handbook 8.31. P-FIL-03 with the following changes:

**Slope.** Permeable pavement systems may not be constructed in areas where the adjacent slopes are steeper than 20 percent. The slope of the surface of the permeable pavement systems shall be from 1 to 10 percent. The bottom slope of a permeable pavement installation should be as flat as possible (i.e., 0 percent longitudinal and lateral slopes) to enable even distribution and infiltration of stormwater. On sloped sites (greater than 5%), internal flow barriers (i.e. check dams) can be used to achieve the 0% slope on the bottom. If an underdrain will be used in conjunction with the flow barriers, it can be installed over the top of the barriers, or parallel to the barriers with an underdrain in each cell.

Standard details for both concrete and gravel flow barriers are provided on the Stormwater Management Ordinance webpage (details SWM#3 & 4).

**Driveway aisles** constructed of permeable pavement are not allowed because of the difficulty in construction and maintenance of the center strip.

### **Pavement types:**

- **Pervious Concrete:**
  - Pervious Concrete work shall conform to all requirements of ACI 522.1, "Specification for Pervious Concrete Pavement" published by the American Concrete Institute.
  - Installation of pervious concrete shall only be performed by qualified personnel. A National Ready Mixed Concrete Association (NRMCA) Certified Pervious Concrete Craftsman or Installer should be on site, overseeing each placement

crew, during all concrete placement and finishing operations. Each placement crew should have at least two NRMCA certified Pervious Concrete Technicians (per ACI 522.1-13).

- Permeable Interlocking Paver:
  - Permeable interlocking pavers shall conform to all requirements of Interlocking Concrete Paver Institute (ICPI) Technical Specification Number 18 (or equivalent). All installations shall be performed by qualified personnel.
  - Installations of permeable interlocking concrete pavers shall be overseen by an Concrete Masonry & Hardscapes Association (CMHA) certified installer. The installer shall be on site, overseeing each installation, during all stone reservoir/base and paver installation.
- Porous Asphalt is not an accepted type of permeable pavement due to the difficulty of proper installation, lack of an industry certification program, burdensome maintenance record, and short lifespan.
- Concrete Grid Pavers and Plastic Reinforced Grid Paving Systems are not approved for use as permeable pavement unless the design professional demonstrates to the satisfaction of the Director that the design provides equal or better performance than permeable interlocking concrete pavers and pervious concrete both for long term permeability and structural integrity.
- Artificial Turf may be treated as a permeable pavement provided the subsurface layer requirements for storage and the surface layer accepts water at a rate of 5 gal/min/ft<sup>2</sup>.
- Other pavement surfaces. Besides permeable interlocking pavers, porous concrete, and artificial turf, other types of permeable pavement surfaces are permitted upon the discretion of the DES Director. The other permeable surfaces must meet the subsurface layer requirements for storage, the surface layer must accept water at a rate of 5 gal/min/ft<sup>2</sup>, and the surface must be maintainable.

Material Specifications for Permeable Pavements. Below is the table of material specifications for permeable pavements.

***Material Specifications for Underneath the Permeable Pavements***

<b>Material</b>	<b>Specification</b>	<b>Notes</b>
<b>Bedding Layer</b>	PC: None PICP: 2 in. depth of No. 8 stone above 4 inches of No. 57	ASTM D448 size No. 8 stone (e.g. 3/8 to 3/16 inch in size). ASTM D448 size No. 57 stone (e.g. 1 1/2 to 1/2 inch in size) should be washed, clean and free of all fines.
<b>Reservoir Layer</b>	PC: No. 57 stone PICP: No. 2 or 3 stone	PC: ASTM D448 size No. 57 stone (e.g. 1 1/2 to 1/2 inch in size) PICP: No. 2 Stone (e.g. 3 inch to 3/4 inch in size) or No. 3 Stone. Depth is based on the pavement structural and hydraulic requirements. Should be washed, clean and free of all fines.
<b>Underdrain</b>	Use 4 to 6 inch diameter perforated schedule 40 PVC pipe, with 3/8-inch perforations at 6 inches on center; each underdrain installed at a minimum 0.5% slope located 20 feet or less from the next pipe (or equivalent corrugated HDPE may be used for non-vehicular applications). Perforated pipe installed for the full length of the permeable pavement cell, and non-perforated pipe, as needed, is used to connect with the storm drain system. T's and Y's installed as needed, depending on the underdrain configuration. Extend cleanout pipes to the surface with caps.	
<b>Filter Layer</b>	The underlying native soils should be separated from the stone reservoir by a 6 to 8 inch layer of coarse sand (e.g. ASTM C 33, gradation) or use an appropriate filter fabric for the particular application based on AASHTO M288-06. At a minimum the fabric shall have a Flow Rate greater than 125 gpm/sq. ft. (ASTM D4491), and an Apparent Opening Size (AOS) equivalent to a US # 70 or # 80 sieve (ASTM D4751). The geotextile AOS selection is based on the percent passing the No. 200 sieve in "A" Soil subgrade, using FHWA or AASHTO selection criteria.	
<b>Observation Well</b>	Use a perforated 4 to 6 inch vertical schedule 40 PVC pipe (AASHTO M 252) with a cap, installed flush with the surface. Applications in vehicular areas shall have a metal cap. All applications shall have an observation well installed.	

\*PC: Permeable Concrete, PICP: Permeable Interlocking Concrete Pavers with an open surface of 5-15%.

Construction Installation. The installation and inspection of the construction of permeable pavement is to follow the Construction Inspection Checklist. The checklist is to be included on the plan (Appendix G).

Maintenance Activities for Permeable Pavement. The following is the list of maintenance activities for permeable pavement. The table is to be included on plans proposing permeable pavement.



### Permeable Pavement Maintenance Schedule

Maintenance	Schedule
<ul style="list-style-type: none"> <li>• Check observation wells 3 days after a storm event in excess of 1/2 inch in depth. Standing water observed in the well after three days is a clear indication of clogging.</li> <li>• Inspect the surface of the permeable pavement for evidence of sediment deposition, organic debris, staining or ponding that may indicate surface clogging. If any signs of clogging are noted, schedule a vacuum sweeper (no brooms or water spray) to remove deposited material. Then, test sections by pouring water from a 5-gallon bucket to verify the clogging has stopped and the permeable pavement is working properly.</li> <li>• Inspect the structural integrity of the pavement surface, looking for signs of surface deterioration, such as slumping, cracking, spalling or broken pavers. Replace or repair affected areas, as necessary.</li> <li>• Check inlets, pretreatment cells and any flow diversion structures for sediment buildup and structural damage. Note if any sediment needs to be removed.</li> <li>• Inspect the condition of the observation well and make sure it is still capped.</li> <li>• Generally, inspect any contributing drainage area for any controllable sources of sediment or erosion.</li> </ul>	Annually
<ul style="list-style-type: none"> <li>• Inspected and certified by a professional licensed in the State of Virginia</li> </ul>	Once every 5 years

### **Infiltration Practices**

Designs that rely substantially on infiltration (using infiltration trenches or bioretention that relies solely on infiltration) on marginal soils require the submission of an alternate design that does not rely on infiltration should the facility fail during construction.

The design specifications are taken from the Handbook Table P-FIL-04-2 with the following changes:

**Siting.** Infiltration facilities may not be constructed on slopes steeper than 15 percent. In addition, facilities shall be set back a minimum of 10 feet from the property line from the down gradient property, facilities shall be set back a minimum of 5 feet from the property line from the up-gradient property. Infiltration facilities shall be located so that percolation infiltration does not saturate soil within 4 feet of public roadway subgrades.

The Handbook Table P-FIL-04-2 states: Sites that have been previously graded or disturbed do not retain their original soil permeability due to compaction. Therefore, such sites are not good candidates for infiltration practices.

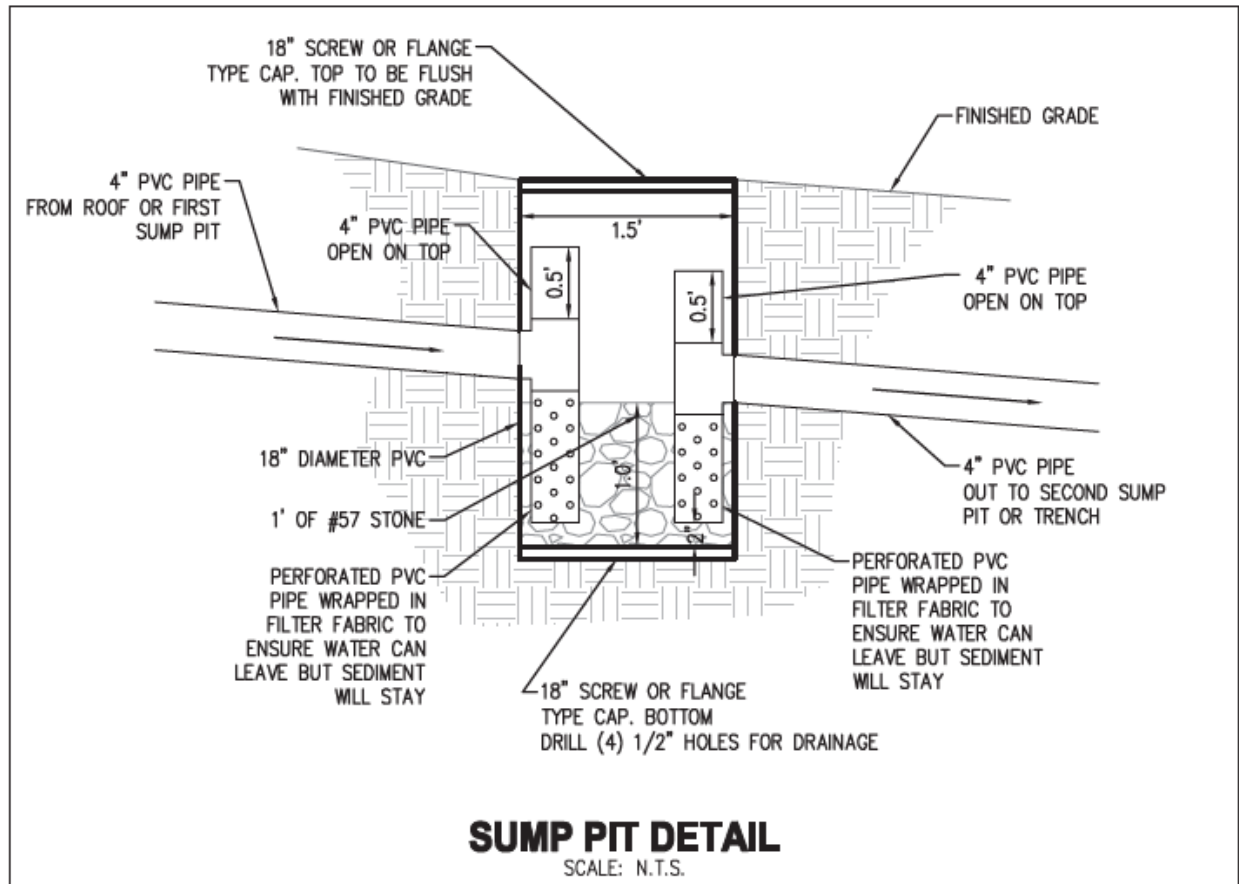
**Contributing Drainage Area.** The maximum ratio of contributing impervious surface to the surface area of infiltration will be 3:1 regardless of the rate of infiltration of the underlying soils because of the risk of failure of the underlying soils over time. The maximum ratio of total contributing area to the surface area of the infiltration will be 5:1.

**Sizing.** The maximum length or width of an infiltration trench is 16 feet or less for SFD infill project (Smaller excavators have an 8-foot reach.) If a dimension greater than 16 feet is required, the plan must specify the type of equipment to be used to construct the trench in order

to excavate the trench from the side. Equipment should be kept off the floor area of the trench to prevent soil compaction.

Micro-Infiltration design (treating 250-2,500 sq ft) requires an observation well and two (2) pretreatment techniques for Level I designs. Pretreatment techniques include leaf gutter screens, grass filter strips, and sump pit. Level 2 designs require three (3) pretreatment techniques.

Pretreatment Sump pit pretreatment design shall include pits with lids that are 18" in diameter as shown in the design below. Double sump pits must be separate.



Material Specifications for Infiltration Trench. Below is the table of material specifications for infiltration trenches.

#### ***Material Specifications for Infiltration Trenches***

Material	Specification	Notes
<b>Stone</b>	Clean, aggregate with a maximum diameter of 3.5 inches and a minimum diameter of 1.5 inches (VDOT No. 1 Open-Graded Coarse Aggregate) or the equivalent.	
<b>Observation Well (required)</b>	Install a vertical 6-inch Schedule 40 PVC perforated pipe, with a cap and anchor plate.	Install one per 50 feet of length of infiltration the practice.

<b>Trench Bottom</b>	Install a 6 to 8 inch sand layer (VDOT Fine Aggregate, Grade A or B)	
<b>Trench Surface Cover</b>	Install a 3-inch layer of river stone or pea gravel. Turf is acceptable when there is subsurface inflow (e.g., a roof leader).	
<b>Filter Fabric</b>	Filter fabric must be installed on the trench sides. When turf is used as a surface cover, fabric shall be installed along the top between the stone layer and the surface cover. Use non-woven polypropylene geotextile with a flow rate of > 110 gallons/min./sq. ft. (e.g., Geotex 351 or equivalent).	
<b>Overflow Collection Pipe (where needed)</b>	Use 6-inch rigid schedule 40 PVC pipe, with 3/8" perforations at 6 inches on center, installed at a slope of 1% for the length of the infiltration practice.	Install non-perforated pipe with one or more caps, as needed.

Construction Installation. The installation and inspection of the construction of an infiltration trench is to follow the Construction Inspection Checklist (See Appendix G). The checklist is to be included on the plan.

Maintenance Activities for Infiltration Trenches. The following is the list of maintenance activities for infiltration trenches. The table is to be included on plans proposing infiltration trenches.

Infiltration Trench Maintenance Schedule

<b>Maintenance</b>	<b>Schedule</b>
<ul style="list-style-type: none"> <li>• Replace pea gravel/topsoil and top surface filter fabric (when clogged).</li> <li>• Mow vegetated filter strips as necessary and remove the clippings.</li> </ul>	As needed
<ul style="list-style-type: none"> <li>• Ensure that the contributing drainage area, inlets, and facility surface are clear of debris.</li> <li>• Ensure that the contributing drainage area is stabilized.</li> <li>• Remove sediment and oil/grease from pre-treatment devices, as well as from overflow structures.</li> <li>• Repair undercut and eroded areas at inflow and outflow structures.</li> </ul>	Quarterly
<ul style="list-style-type: none"> <li>• Check observation wells 3 days after a storm event in excess of 1/2 inch in depth. Standing water observed in the well after three days is a clear indication of clogging.</li> <li>• Inspect pre-treatment devices and diversion structures for sediment build-up and structural damage.</li> <li>• Remove trees that start to grow in the vicinity of the infiltration facility.</li> </ul>	Semi-annual inspection
<ul style="list-style-type: none"> <li>• Clean out accumulated sediments from the pre-treatment cell.</li> </ul>	Annually
<ul style="list-style-type: none"> <li>• Inspected and certified by a professional licensed in the State of Virginia</li> </ul>	Once every 5 years

### **Bioretention (including Urban Bioretention)**

The design specifications are taken from the Handbook Specification P-FIL-05 with the following changes:

**Siting.** Bioretention facilities may not be constructed on slopes steeper than 15 percent. Facilities shall be set back a minimum of 10 feet from the property line from the down gradient property, facilities shall be set back a minimum of 5 feet from the property line from the up gradient property. The underdrain outlet shall be a minimum of 10 feet from property lines. An underdrain should be installed, connected and capped on sites where feasible.

**Side slopes** should be maximum 3:1 for bioretention (excluding Urban Bioretention).

**Planting or Vegetation Plan.** Bioretention basin planting plans and plant specifications shall be prepared by a professional landscape architect, horticulturist, or other qualified individual who has knowledge of the environmental tolerance, ecological functions, and ecological impacts of plant species. All plants shall be locally native and found on the Plant NoVa natives plant list. In lieu of submitting a professionally prepared planting plan, microbioretentions and urban bioretentions can use the species listed in Arlington County Stormwater Management Facility Plant List. **Sizing.** The sizing of bioretention facilities should follow the Handbook Specification P-FIL-05.

**Material Specifications for Bioretention.** The following is the table of material specifications for bioretention basins.

***Bioretention Basin Material Specifications***

<b>Material</b>	<b>Specification</b>	<b>Notes</b>
<b>Filter Media</b>	Procured from vendors providing certification that the media meets the filter media criteria and testing specifications in Appendix F of the Virginia Stormwater Management Handbook	The volume of filter media based on 110% of the plan volume, to account for settling or compaction.
<b>Mulch Layer</b>	Use aged, shredded hardwood bark mulch	Lay a 2 to 3 inch layer on the surface of the filter bed.
<b>Geotextile/Liner</b>	Use a non-woven geotextile fabric with a flow rate of > 110 gal./min./sq. ft. (e.g., Geotex 351 or equivalent)	Install on vertical sides of facility. Do not install on bottom of facility or between layers. Install under and on sides of pretreatment stone.
<b>Choking Layer</b>	3 inch layer of pea gravel or VDOT #8 stone which is laid over the underdrain stone.	
<b>Stone Jacket for Underdrain and/or Storage Layer</b>	1 inch stone should be double-washed and clean and free of all fines (e.g., VDOT #57 stone).	12 inches for the underdrain; 12 to 18 inches for the stone storage layer, if needed
<b>Underdrains, Cleanouts, and Observation Wells</b>	Use 6 inch rigid schedule 40 PVC pipe for bioretention basins, with 3/8-inch perforations at 6 inches on center, maximum of 3 rows of perforations; position each underdrain on a 1% or 2% slope	All bioretentions are to have an observation well, cleanout and overflow pipe. Lay the perforated pipe under the length of the bioretention cell, and install non-perforated pipe as needed to connect with the storm drain system. Install T's and Y's as needed,

	located nor more than 20 feet from the next pipe.	depending on the underdrain configuration. Extend cleanout pipes to the ponding elevation above the surface with vented caps at the Ts and Ys.
<b>Plant Materials</b>	See <u>Planting or Vegetation Plan specification</u>	Establish plant materials as specified in the planting plan

**Construction Installation.** The installation and inspection of the construction of bioretentions are to follow the Construction Inspection Checklist for Bioretention (See Appendix G). The checklist is to be included on the plan.

**Maintenance Activities for Bioretention.** The following is the list of maintenance activities for bioretention. The table is to be included on plans proposing bioretention.

**Bioretention Maintenance Schedule**

<b>Maintenance</b>	<b>Frequency</b>
<ul style="list-style-type: none"> <li>Spot weeding, erosion repair, trash removal, and mulch raking</li> </ul>	Twice during growing season
<ul style="list-style-type: none"> <li>Add reinforcement planting to maintain the desired vegetation density</li> <li>Remove invasive plants using recommended control methods</li> <li>Stabilize the contributing drainage area to prevent erosion</li> </ul>	As needed
<ul style="list-style-type: none"> <li>Spring inspection and cleanup</li> <li>Supplement mulch to maintain a 2-3 inch layer</li> <li>Prune trees and shrubs</li> </ul>	Annually
<ul style="list-style-type: none"> <li>Remove sediment in pre-treatment cells and inflow points</li> </ul>	Once every 2 to 3 years
<ul style="list-style-type: none"> <li>Replace the mulch layer</li> </ul>	Every 3 years
<ul style="list-style-type: none"> <li>Inspected and certified by a professional licensed in the State of Virginia</li> </ul>	Once every 5 years

**Microbioretention**

A microbioretention means a bioretention that treats 2500 sf of impervious area or less and has a ponding depth of 6" or less.

Material Specifications for Microbioretention. Below is the table of material specifications for microbioretentions.

***Microbioretention Material Specifications***

<b>Material</b>	<b>Specification</b>	<b>Notes</b>
<b>Filter Media</b>	Procured from vendors providing certification that the media meets the filter media criteria and testing specifications in Appendix F of the Virginia Stormwater Management Handbook	The volume of filter media based on 110% of the plan volume, to account for settling or compaction.
<b>Mulch Layer</b>	Use aged, shredded hardwood bark mulch	Lay a 2 to 3 inch layer on the surface of the filter bed.
<b>Geotextile/Liner</b>	Use a non-woven geotextile fabric with a flow rate of > 110 gal./min./sq. ft. (e.g., Geotex 351 or equivalent)	Install on vertical sides of facility. Do not install on bottom of facility or between layers. Install under and on sides of pretreatment stone.
<b>Choking Layer</b>	3 inch layer of pea gravel or VDOT #8 stone which is laid over the underdrain stone.	
<b>Stone Jacket for Underdrain and/or Storage Layer</b>	1 inch stone should be double-washed and clean and free of all fines (e.g., VDOT #57 stone).	Minimum 6 inches or 12 inches if an underdrain is specified
<b>Underdrains, Cleanouts, and Observation Wells</b>	Use 4 inch rigid schedule 40 PVC pipe for microbioretentions, with 3/8-inch perforations at 6 inches on center, maximum of 3 rows of perforations; position each underdrain on a 1% or 2% slope located no more than 20 feet from the next pipe OR none if soil infiltration requirements met (Level II design).	All microbioretentions are to have an observation well, cleanout or overflow pipe. Lay the perforated pipe under the length of the bioretention cell, and install non-perforated pipe as needed to connect with the storm drain system. Install T's and Y's as needed, depending on the underdrain configuration. Extend cleanout pipes to the ponding elevation above the surface with vented caps at the Ts and Ys.
<b>Plant Materials</b>	1 quart-sized perennial or grass installed per 1-2 sf and 1 3-gallon shrub installed per 7.5 sf over entire ponding area from the Arlington County Stormwater Management Facility Plant List or approved landscape plan	

Construction Installation. The installation and inspection of the construction of microbioretentions are to follow the Construction Inspection Checklist for Bioretention (See Appendix G). The checklist is to be included on the plan.

Maintenance Schedule. The table of maintenance activities for bioretention should be included on plans proposing microbioretentions.

### **Urban Bioretention (Planter Box)**

An urban bioretention is a microbioretention that is installed in a container. The container can be precast concrete, cast-in-place concrete or concrete masonry units (CMU). The maximum drainage area to an urban bioretention is 2,500 square feet. Larger drainage area may be allowed with sufficient flow controls and other mechanisms to ensure proper function, and safety. However, the urban bioretention filter must then be designed in accordance with the Level I bioretention filter criteria.

The proposed land cover to be used in the runoff reduction spreadsheet for an urban bioretention is managed turf.

### **Planter Box**

A standard detail for urban bioretention – planter box and associated dry well is provided on the Stormwater Management Ordinance webpage (detail SWM#5).

**Design.** The plan views of planter boxes shall show the location of the overflow and inflow (downspout), and they shall be located as far apart as possible to limit short-circuiting. Downspouts connecting to planter boxes with greater than a three (3) story drop may be allowed when designed with sufficient energy dissipation. The maximum height from the top of mulch elevation to the top of the planter box wall shall not exceed 15 inches. The minimum length and width of a planter box is two (2) feet each.

**Location.** Long term maintenance and the health of the plants are critical to the function of planter boxes, therefore planter boxes cannot be installed beneath decks and other projections from the structure, including cantilevered bump-outs, overhangs, fireplaces, AC units, etc. Release from detention tanks to multiple urban planter boxes **in series** requires pre-approval and may be considered only under extenuating circumstances.

**Structure.** The wall of the planter box can be constructed of a variety of materials provided that a structural engineer certifies the load is acceptable on the foundation on the architectural drawings reviewed and approved by ISD.

**Underdrain.** The underdrain must discharge to a dry well for single family projects, and unless site conditions don't allow for other types of projects.

**Dry Well Design.** On single family home lots, planter boxes with impermeable bases shall outfall to a dry well designed for at least 25% of the required water quality volume for the planter box (use WQV for upstream planter box if in series). See Section 2.2.33 for dry well requirements.

Material Specifications. Below is the table of material specifications for stormwater planter boxes.

***Planter Box Material Specifications***

<b>Material</b>	<b>Specification</b>	<b>Notes</b>
<b>Waterproofing</b>	Watertight shell	Must meet the specification of the Virginia Residential Code (208), R406.2 or most recent equivalent (except that liner options are not permitted).
<b>Filter Media</b>	Procured from vendors providing certification that the media meets the filter media criteria and testing specifications in Appendix F of the Virginia Stormwater Management Handbook	The volume of filter media based on 110% of the plan volume, to account for settling or compaction.
<b>Mulch Layer</b>	Use aged, shredded hardwood bark mulch	Lay a 2 to 3 inch layer on the surface of the filter bed.
<b>Choking Layer</b>	3 inch layer of pea gravel or VDOT #8 stone which is laid over the underdrain stone.	
<b>Stone Jacket for Underdrain and/or Storage Layer</b>	1 inch stone should be double-washed and clean and free of all fines (e.g., VDOT #57 stone).	Minimum of 9 inches for 4 inch underdrain
<b>Underdrains and Overflows</b>	Use 4 inch rigid schedule 40 PVC pipe with 3/8-inch perforations at 6 inches on center, maximum of 3 rows of perforations; position each underdrain on a 1% or 2% slope.	Lay the perforated pipe under the length of the planter box, and install non-perforated pipe as needed to connect with the storm drain system. Install T's and Y's as needed, depending on the underdrain configuration. Extend overflow pipe to the ponding elevation with atrium grate.
<b>Plant Materials</b>	1 quart-sized perennial or grass installed per 1-2 sf and/or 1 3-gallon shrub installed per 7.5 sf over entire ponding area from the Arlington County Stormwater Management Facility Plant List or approved landscape plan.	For downstream planter boxes in series, a landscape plan designed for a drier hydrologic regime shall be submitted for review.

Construction Installation: The installation and inspection of the construction of stormwater planter boxes are to follow the Construction Inspection Checklist for Urban Bioretention (See Appendix G). The checklist is to be included on the plan.



Maintenance Activities for Planter Boxes. The following is the list of maintenance activities for planter boxes. The table is to be included on plans proposing planter boxes.

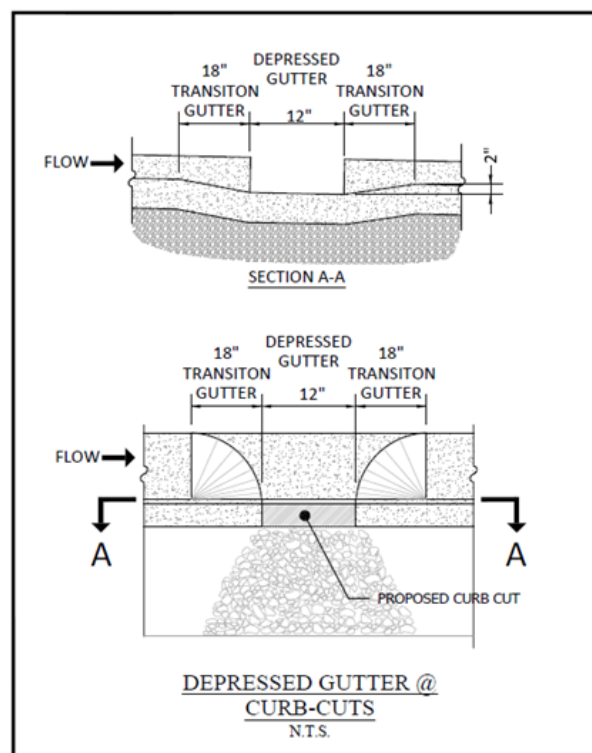
Planter Box Maintenance Schedule

Maintenance	Frequency
<ul style="list-style-type: none"> <li>Spot weeding, erosion repair, trash removal, and mulch raking</li> </ul>	Twice during growing season
<ul style="list-style-type: none"> <li>Add reinforcement planting to maintain the desired vegetation density</li> <li>Remove invasive plants using recommended control methods</li> <li>Stabilize the contributing drainage area to prevent erosion</li> </ul>	As needed
<ul style="list-style-type: none"> <li>Spring inspection and cleanup</li> <li>Supplement mulch to maintain a 2-3 inch layer</li> <li>Prune trees and shrubs</li> <li>Examine for the ponding depth and adjust accordingly</li> <li>Inspect inflows and overflow for erosion</li> <li>Inspect for structural deficiencies and repair</li> </ul>	Annually
<ul style="list-style-type: none"> <li>Remove sediment in pre-treatment cells and inflow points</li> </ul>	Once every 2 to 3 years
<ul style="list-style-type: none"> <li>Replace the mulch layer</li> </ul>	Every 3 years
<ul style="list-style-type: none"> <li>Inspected and certified by a professional licensed in the State of Virginia</li> </ul>	Once every 5 years

Urban Street Bioretention (Stormwater Curb Extensions per DEQ SWM Handbook)

These are urban bioretentions located along the street that take water from impervious surfaces such as roadways, sidewalks and plazas. No trees are permitted in these systems due to concerns about stability and longevity. Underdrains must discharge to the storm sewer network.

Inflows. Use [following](#) or equivalent for the curb cut detail:



Material Specifications. Urban Street Bioretentions shall use the Material Specifications for Bioretention Basins. The specifications table is to be included on the plan.

Construction Installation: The installation and inspection of the construction of urban street bioretentions are to follow the Construction Inspection Checklist for Urban Street Bioretention (See Appendix G). The checklist is to be included on the plan.

Maintenance Activities for Urban Street Bioretention. The maintenance activities are the same as Bioretention Basin. The schedule is to be included on the plan.

### **Tree Planting**

Tree planting is available as a BMP for VRRM water quality credit in the Virginia Stormwater Management Handbook. The credit per eligible tree is calculated based on a 144 ft<sup>2</sup> canopy area and a phosphorus removal rate that ranges from 3.5% (tree canopy over impervious) to 16% (tree canopy over pervious with A/B soils).

Per the Handbook, trees cannot receive VRRM water quality credit as a BMP when they are:

- Planted to replace others that are removed through land disturbance;
- Planted to meet planning requirements, or any other local, state, or federal requirements;
- Financed through local, state, and/or federal programs; or
- Planted to meet water quality requirements through the [VRRM](#) as forest or mixed open land cover, or as part of other BMPs (e.g., urban bioretention, sheet flow to a vegetated filter strip, manufactured treatment devices).

For Arlington County, these restrictions mean that, first, no trees may be counted for VRRM water quality credit that are  $\leq$  the number of trees required to be planted for the project (for example, if a project is required to plant 3 trees to meet tree canopy, and required to plant 1 tree to replace a public tree removed, only the trees planted above those required may be eligible for this credit).

In addition to this baseline pre-requisite, trees planted to meet the following requirements cannot be counted for VRRM water quality credit:

- Trees planted to meet the tree canopy required by the Landscape Conservation Plan of Chapter 61;
- Trees planted to meet Resource Protection Area (RPA) requirements;
- Trees planted to meet the tree replacement or sector plan canopy requirements for developments regulated by Administrative Regulation 4.1; and,
- Trees planted to meet the requirements of development conditions.
- Trees noted as Small or Small-Medium on the Recommended Trees List
- Trees that do not meet the spacing requirements laid out in the landscape conservation requirements in this manual.
- Trees planted on rooftops, over parking garages, and in similar settings where the tree is not planted on ground-level soil with no structures underneath are not eligible.

In addition, trees planted with Alternative Compliance Option projects, that otherwise are not subject to the above eligibility restrictions, cannot be counted for VRRM water quality credit as a BMP. This is because the Alternative Compliance Option:

- Provides a reduced water quality requirement in exchange for providing detention storage.
- Includes detention credit for both tree conservation and planting.

*Important considerations: Consult with your stormwater and urban forestry plan reviewers before considering taking credit for planted trees. For those limited number of projects where certain trees planted may be eligible for VRRM water quality credit as a BMP, there are important practical and financial concerns for post-construction inspection and maintenance, including:*

- *The practical difficulty of tracking which tree(s) on a lot are subject to these requirements, for the life of the development.*
- *The DEQ requirement and associated costs of inspection(s) of credited trees by qualified professionals.*

### **2.3 Pollution Prevention Plan (P2 Plan)**

A Pollution Prevention Plan (P2 Plan), required by County Code Section 60-10, shall be developed, implemented, and updated as necessary and must detail the design, installation, implementation, and maintenance of effective pollution prevention measures to minimize the discharge of pollutants.

At a minimum the P2 Plan shall include the SWPPP Standard Notes , including a detail for each practice proposed on the plans.

The following notes must be added to the plans to address Pollution Prevention:

- Only the following non-stormwater discharges are authorized by Arlington County's MS4 permit, unless the State Water Control Board or Arlington County determines the discharge to be a significant source of pollutants to surface waters: water line flushing (managed in a manner to avoid an instream impact); landscape irrigation; diverted stream flows; rising ground waters; uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20)); uncontaminated pumped ground water; discharges from potable water sources; foundation drains; air conditioning condensation; irrigation water; springs; water from crawl space pumps; footing drains; lawn watering; individual residential car washing; flows from riparian habitats and wetlands; dechlorinated swimming pool discharges; street wash water; discharges or flows from emergency firefighting activities; discharges or flows of potable water used in firefighting training activities managed in a manner to avoid an instream impact; and, other activities generating discharges identified by the Department of Environmental Quality as not requiring VPDES authorization.
- Appropriate controls must be implemented to prevent any non-stormwater discharges not included on the above list (e.g., concrete wash water, paint wash water, vehicle wash water, wash water containing detergents and/or chemicals, slurry/wash water from saw cutting operations, etc.) from being discharged into Arlington County's Municipal Separate Storm Sewer System (MS4) or stream network.
- Per Chapter 26 of the Arlington County Code, it shall be unlawful for any person to discharge directly or indirectly into the storm sewer system or state waters, any substance likely, in the opinion of the County Manager, to have an adverse effect on the storm sewer system or state waters.

### **2.4 Registration Statement Requirements**

For any construction activities resulting in land disturbance equal to or greater than one acre, applicants must submit a [Registration Statement](#) to Arlington County with the Stormwater Pollution Prevention Plan (SWPPP). The Registration Statement will be forwarded to DEQ for permit issuance when Arlington County approves the SWPPP. The applicant will pay the county portion of the permit fee at the DES Front Counter or online. DEQ will notify the applicant the amount of the fee and payment methods for state portion of the permit fee.

When the project is complete the applicant must submit a [Notice of Termination](#) to Arlington County.

## **2.5 Stormwater Facility Maintenance and Monitoring Agreement (MMA)**

A [Stormwater Facility Maintenance and Monitoring Agreement](#) (MMA) is required for all regulated activities that propose a SWMF. A copy of the blank agreement is to be included on the plan sheets (see Appendix A for the agreement). An original, completed, signed, and notarized MMA needs to be submitted to the County at the time of SWPPP submission. The MMA is subject to review and may require resubmission in order to be approved.

## **2.6 Construction Operator Inspections**

A Responsible Land Disturber (RLD) or DEQ certified stormwater inspector employed by the operator shall be onsite and conduct the inspections required by the SWPPP according to the schedule outlined on the approved plan (either once every 4 business days; or once every 5 business days and no later than 48 hours following 0.25" of rain within 24 hours as measured at an Arlington County approved data logging rain gauge).

## **2.7 Construction Record Drawing Requirements (As-built Certification)**

Prior to issuance of the first Certificate of Occupancy (excluding Shell and Core) and closure of the LDA permit, construction record drawings must be submitted and approved.

This record drawing shall include:

1. As-built grading plan as outlined in Section 2.9.1.4
2. Certification letter.
3. Construction Inspection Checklist for each SWMF on the approved plan. Inspections shall take place, during construction of the stormwater facility, by a licensed design professional (civil engineer, land surveyor or landscape architect) using the corresponding construction inspection checklist (Appendix G) In accordance with standard practice, the actual inspections may be performed by an individual under responsible charge of the licensed professional. The licensed professional shall certify the facility if he/she finds that the facility was constructed in accordance with the approved plans. The sealed certification along with any material delivery tickets, photos and results of the tests and inspections shall be submitted to the County .

Appendix G contains templates of the certification letters, along with checklist and additional details based on project and facility type

## **2.8 Enforcement**

Inspection reports from construction inspections conducted by Arlington County staff will be posted in Arlington County's electronic Stormwater Inspection system. Any required corrective action(s) and the date by which the action(s) needs to be taken will be documented in the report. Failure to address identified corrective actions within the specified time frame may result in a Notice of Violation (NOV). Failure to comply with the conditions of a NOV by the specified corrective action date may lead to issuance of a Stop Work Order and/or potential revocation of the LDA permit, per 60-18. Permit revocation will have the same effect as a Stop Work Order AND require the property owner to apply for a new LDA permit.

## **2.9 Requirements for Single Family Residences Built Separately**

Single-family residences that are separately built, disturbing less than one acre and not part of a larger common plan of development or sale (including additions or modifications to existing single-family detached residential structures) shall be considered a regulated land disturbing activity. This section outlines the criteria that only these types of projects are allowed to use.

As announced in the March 26, 2021, Notice to Industry, effective September 13, 2021, unless a project meets the requirements of Sections 2.9.4 or 2.9.6, State stormwater quantity performance standards will be required, in addition to the stormwater quality performance standards already required. Stormwater quantity requirements and technical criteria are covered in Section 2.2.3, subject to certain limitations for single family homes built separately as outlined in that section.

Also effective September 13, 2021, all projects must:

- Implement soil de-compaction and amendment procedures to facilitate long term absorption and tree and other plant growth;
- Ensure runoff is not concentrated or released closely to downhill properties;
- Account for existing forested areas within a two (2) year window prior to LDA application (not required for 'Streamlined Method' projects);
- Address potential off-lot impacts from retaining walls and fill;
- Provide as-built documentation for site grading and trees (not required for 'Streamlined Method' projects); and,
- Meet the conditions for adding impervious surfaces after CO or project completion.

These requirements are covered in Section 2.9.1.

Single family residential projects may also:

- Obtain Level I permeable pavement credit for pavement designs with the twelve (12) inches of stone storage and no underdrain in soils that do not percolate at a rate  $>0.5$  inch hour, provided they are designed to drawdown within 24 hours. This design is only applicable if the pavement is not receiving additional run-on from other pervious or impervious areas. Construction materials, installation and certification requirements are the same as described elsewhere. No soil infiltration testing is required, however the depth to the seasonal groundwater table is required. A standard detail for residential paver installations is provided on the Stormwater Management Ordinance webpage (detail SWM#2).
- Obtain Level 1 urban bioretention (planter box) credit for designs utilizing only 18" of soil media. Other design criteria, construction materials, installation and certification requirements are the same as described elsewhere.

To ensure runoff is not concentrated or released closely to downhill properties, all projects must also meet the Sheet Flow requirements of State code and Chapter 60; see Section 2.2.3.

Systems that rely solely on infiltration for release have high failure rates and accompanying burdens on builders and property owners at the end of construction. Projects that do not meet the requirements of Sections 2.9.4 or 2.9.6 and that propose infiltration systems must also provide a 'Plan B' compliance design with the permit application package that does not rely on infiltration systems. The only exception to this requirement is a Level 1 bioretention system downstream from a detention tank.

All other criteria in Chapter 2 of this Manual apply.

## **2.9.1 Additional performance requirements effective September 13, 2021**

### **2.9.1.1 Soil de-compaction and amendment**

With extensive research and peer review (including a study conducted in Arlington), Virginia Tech has established a 'soil profile rebuilding' (SPR) method for eligible portions of a site within the limits of disturbance. The 'B' horizon soils are de-compacted and four (4) inches of compost (organic matter) is added and blended, using a backhoe that loosens and mixes soil to a depth of two (2) feet (based on a representative depth of organic content in Virginia soils). The combination of organic matter and de-compaction encourage root growth, and the roots in turn help maintain soil permeability. A minimum four (4) inch layer of topsoil is then required to recreate the organic horizon (note that the State E/S specifications already require this topsoil layer).

Initially and over time, a healthy soil profile is 're-built' and permeability and vegetation growth are enhanced. The method also minimizes the expense of removal of soil and importing external soil to the site (although applicants can choose to excavate two (2) feet of additional soil and bring in new topsoil as an alternative).

Refer to Section 3.2.1.2 for the requirements for plan submission, construction, and documentation.

### **2.9.1.2 Account for existing forested areas prior to LDA application**

Areas that meet the criteria for 'Forested Cover' in Section 3.2.1.1 must be entered as forested land cover in the VRRM spreadsheet:

The area of forest cover will be counted for a two (2) year window prior to LDA application, as determined by GIS analysis and other documentation.

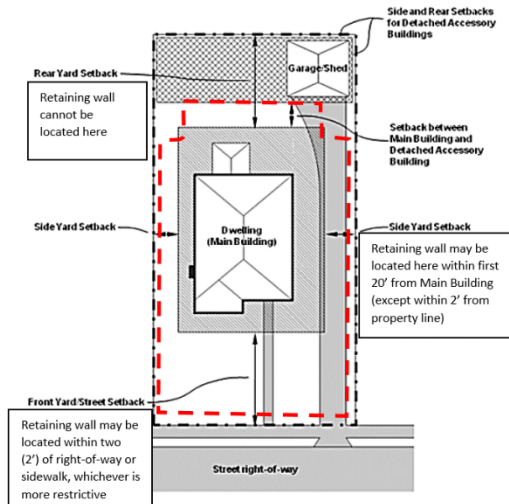
### **2.9.1.3 Address potential off-lot impacts from retaining walls and fill**

Installation of retaining walls can have significant negative impacts on local drainage patterns and adjacent properties, disrupting natural drainage flow paths and diverting and ponding water on neighboring properties.

All single family LDA permit applicants can choose the following option for the placement/extent of grading and retaining walls to minimize impacts to adjacent properties.

- A performance-based option with the objective to contain the impacts from retaining walls to the property being developed:
  - Retaining walls shall not be located within rear yard setbacks
  - Retaining walls shall not be located within two (2) feet from the public right-of-way or public sidewalk, whichever is more restrictive
  - Within side yard setbacks, retaining walls shall not extend beyond 20 feet from the principal structure nor be located closer than two (2) feet to the property line to minimize impacts to uphill neighbors from ponding water and to downhill neighbors from drainage weep holes. Limits to swale conveyance of offsite flow apply and subsurface pipe conveyance may be required.
  - Proposed slopes from the foundation meet but do not exceed the minimum required by building code.
- If an applicant does not choose this option, the applicant must demonstrate through plan, grading, and adjacent property details and analysis that there are no off-lot drainage impacts either upgradient or downgradient from the proposed retaining walls

and placement of fill. This documentation will be reviewed on a case-by-case basis. The expectation is that proposed fill/walls do not block existing flow paths and/or will not create and concentrate overflow impacts that are not handled on the lot.



**Diagram of retaining wall placement**

#### 2.9.1.4 As-built documentation for site grading, trees, and other vegetation

A survey is required to document that the final grading on the site matches the approved plans. This critical step complements the existing requirement to document the construction of stormwater management facilities to ensure that the intended stormwater management outcomes of the approved plan are achieved—and to ensure success for homeowners.

The as-built grading plan submission requirements include, at minimum:

- As-built grading surveys show the final horizontal and vertical field location of constructed improvements in relationship with the engineered construction plans, design changes and contractor's field changes.
- As-built grading should be shown on the approved LDA grading plan sheet(s).
  - The break points of the drainage areas shall be identified on the plan through elevation points (at a minimum).
  - The new grade shall tie into the existing grade, also identified through elevation points.
- Any fence shall be located at least two (2) inches above final grade.
- Placing As-Built information upon a scanned image or other reproduction of the approved LDA plan sheet(s) showing approval stamp and P.E. seal is acceptable as long as, as determined by Arlington County, the quality, integrity, and legibility of the original drawings are substantially preserved without undue compromise.
- Include locations of conserved and planted trees, with species names.
- Include areas of vegetation other than sod/seed
- Receipts and photo evidence of Soil Profile Rebuilding. See section 3.2.1.2

#### 2.9.2 **Meet the conditions for adding impervious surfaces after issuance of a CO**

Adding impervious cover after a single family home is completed occurs frequently based on staff research into LDAs approved in 2015 and 2016. This analysis found that approximately



25% of projects added patios and other surfaces after the construction of the new home. These surfaces add runoff and often also create grade changes not accounted for in the approved LDA mitigation package that can both negatively impact adjacent properties and, incrementally, the downhill and downstream stormwater infrastructure and streams.

An LDA plan revision will be required for new impervious surfaces added after issuance of the CO where the impervious surface increase is the lesser of 10 percent of the impervious area treated under the approved LDA or 300 square feet of impervious area. This requirement is included as a note on the approved plan as well as reflected in the recorded Maintenance and Monitoring Agreement.

### 2.9.3 Exceptions

The Director will consider exception requests to the performance criteria for single family homes on a case-by-case basis where the following circumstances apply:

1. The proposed impervious area does not exceed the median impervious footprint of new homes (based on approved LDA records) for specific lot size categories, as shown in the table below;
2. The existing conditions on the site are mostly vegetated and also do not include a principal structure;
3. All roof areas are managed by water quality and/or quantity facilities;
4. Detention is prioritized in the 'downhill drainage area;' and,
5. Permeable paving material is provided for all non-roof impervious surfaces where groundwater and/or slope constraints do not apply.

Generally, using permeable paving for narrow walkways is not very feasible. However, for projects that propose significant walkway footprints, a case-by-case evaluation will be made. Areaways and window wells are not required to be made permeable.

6. If a swimming pool is included with the project, the project is not eligible for an exception.

Lot size (SF)	Impervious cover limit for exception consideration
≤6,000	42%
6,001 to 8,000	40%
8,001 to 10,000	36%
10,001 to 15,000	34%
15,001 to 20,000	30%
>20,000	29%

If the above circumstances apply, an exception will only be granted if the following findings are also satisfied: (i) the exception is the minimum necessary to afford relief, (ii) reasonable and appropriate conditions are imposed so that the intent of the Act, the Regulations, and this chapter are preserved, (iii) granting the exception will not confer any special privileges that are denied in other similar circumstances, and (iv) exception requests are not based upon conditions or circumstances that are self-imposed or self-created. Economic hardship alone is not sufficient reason to grant an exception from the requirements of this chapter.

## 2.9.4 Alternative Compliance Option

Applicants may choose an Alternative Compliance Option to meet the stormwater quantity requirements of Section 2 in addition to stormwater quality requirements.

Two important terms:

‘Downhill drainage area’ (DDA): The portion of the site that drains to adjacent properties before runoff reaches the public right-of-way and/or storm drain system.

‘Non-downhill drainage area’ (NDDA): The portion of the site that drains directly to the public right-of-way and/or storm drain system.

## 2.9.5 Tips and reminders for project success:

- Be sure to use the most up to date versions of the plan template and spreadsheet posted on the LDA website.
- Show all required elevations for facilities, including tanks.
- Be sure to choose your tank type early and carefully and fully understand all of the options and requirements for making connections to the tank.
- Pay attention to maximum release orifice size.
- Consider concrete tanks first as a more durable and easier to maintain material for the property owner. A 3’ wide by 6’ long by 4’ tall concrete tank is equivalent to a 500 gallon plastic tank that stands more than 6’ tall and 7’ long.
- For pre-manufactured tanks, order tanks as early as possible.
- Follow all structural requirements for tank foundations.
- Pay attention to the required areas for soil profile rebuilding. Follow the detailed SPR instructions in this Manual.
- Follow all instructions for submitting as-built information for grading and SWMFs, paying special attention to submission and review timelines. Use OnBase for all submissions.

### 2.9.5.1 Design guidance

The following design guidance is provided to optimize the number of SWMFs for your project and to maximize use of limited lot space:

1. Consider starting by adding the new trees and existing trees on the site that will be saved (in DDAs or NDDAs, as appropriate), essentially reducing the detention requirement for the rest of the site by up to 10%.
2. From there, the next step will depend on the relative overall, downhill, and downhill roof detention requirements. In general, one should start with the requirements with the fewest options for compliance and work toward the requirements with the most options:
  - For the DDA roof detention requirement, 50% **must** be through tanks.
  - For the 75% water quality requirement, the options are permeable pavement, planter boxes, rain gardens, and vegetated roofs. All four will give both quality and detention credit, but only planter boxes, rain gardens, and vegetated roof will give DDA roof detention credit.
  - Before specifying individual tank volume and the total number of tanks, consider:
    - Maximizing the use and size of planter boxes. Three (3) typical planter boxes sized at 100% WQV could replace a 300+ gallon tank and sized at 200% WQV could replace a 500+ gallon tank.

- Choosing permeable paving for the driveway and other paved surfaces. A typical permeable paver driveway could replace a 500+ gallon tank.
- It may be possible to reduce tank size and/or the total number of tanks for the project as a whole.
- Once the 50% tank in the DDA and 75% water quality requirements are met, and planter box and permeable paving use have been maximized to optimize the number and size of tanks, there are a few remaining options for achieving the full detention requirements:
  - Detention-only dry wells
  - Saving or adding more trees, if not already at the 10% cap

#### 2.9.5.2 Performance criteria

- Quantity: 3 inches detention from new impervious area for the site and within the 'downhill drainage area' (DDA). The DDA is the portion of the site that drains to adjacent properties before runoff reaches the public right-of-way and/or storm drain system. The portion of the site that drains directly to the public right-of-way and/or storm drain system is the 'non-downhill drainage area' (NDDA). There can be circumstances where the impervious surface increase in the DDA is greater than the impervious surface increase for the site. Also, credit from the DDA counts towards the site requirement.
- Quality: The more stringent of 75% of Virginia Runoff Reduction Method phosphorus reduction requirement or no net increase in phosphorus load. The spreadsheet automatically calculates water quality credits for DDA and NDDA tab facilities in the DAA, DAB, and DAC tabs.

For the DDA, there are two performance standards to meet:

- Detention for the total impervious increase (a).
- Detention for the roof area increase (b). A minimum of 50% of this detention volume must be provided through gravity detention tanks.
- If  $a > 0$  and  $b > a$ , b) defaults to the roof area equivalent to a)
- Where there are small (or no) increases in roof area in the DDA but there are overall impervious surface increases from paved areas, additional roof area detention, if available in the DDA, may be necessary along with the use of tanks to reach compliance. These circumstances will be evaluated on a case-by-case basis. A key factor will be whether the new DDA impervious areas are located closer to downhill properties.

Projects that choose this option shall use the standardized Alternative Compliance Option Plan Template posted on the LDA website to shorten the time for plan review and approval (please always check that you are using the most recent template version by downloading directly from the website). The Plan Template contains the computational methods and standard details and material specifications for the stormwater management facilities allowed for use under this option, including the gravity detention tank tool.

Projects under the Alternative Compliance Option are also eligible to claim limited detention credits through tree conservation and/or planting. Swimming pools in the DDA that drain to the sanitary sewer system may be excluded from the impervious surface detention calculations for

the DDA, depending upon the details of the sanitary connection, off-season pool runoff characteristics, and other factors to be determined during plan review. The swimming pool area still must be included in the total site impervious area calculations.

Systems that rely solely on infiltration for release (except for bioretention systems located downstream from tanks) are not permitted under the Alternative Compliance Option in order to avoid the increase in plan preparation and review time associated with providing the required 'Plan B' design as well as potential added time and cost at the end of construction from infiltration system failure.

#### 2.9.5.3 Detention tanks

There are two options for detention tank construction. Pre-manufactured tanks from vendors may be used or tanks may be constructed from poured concrete onsite, similar to a stormwater planter box. You are encouraged to use concrete tanks where feasible to promote long-term durability and owner access for inspection and maintenance. A 3' wide by 6' long by 4' tall concrete tank is equivalent to a 500 gallon plastic tank that stands more than 6' tall and 7' long.

Key considerations for detention tanks include the following (see Tank plan template for further details):

- Pre-manufactured tanks may not be altered by drilling new holes. Before considering connecting pre-manufactured tanks in-series, there are several options available to maximize detention credit for the project and avoid the need for this practice. These include using permeable paving materials for paved surfaces as well as maximizing the allowable size of urban planter boxes. Concrete tanks are also an option to create a larger and more durable detention structure rather than connecting two smaller pre-manufactured tanks.
- Because of concerns about the constructability and durability of connecting pre-manufactured tanks in-series, only tank products explicitly designed for connecting in-series may be used.
- Pre-manufactured tanks must include a water level gauge.
- The combined height of a tank and any base it sits on cannot exceed eight (8) feet. This restriction is for overall safety for inspection and maintenance access.
- Concrete masonry units (CMUs) are not acceptable materials to construct a detention tank.
- Other detention tank construction techniques require review and approval.
- The same structural and Zoning requirements as currently govern stormwater planters apply to tanks.
- Underground detention systems are subject to the restrictions in Section 2.2.3.

#### 2.9.5.4 Modified VRRM spreadsheet

A modified VRRM spreadsheet supports the Alternative Compliance Option. The spreadsheet instructions are provided on the LDA program website alongside the spreadsheet download link.

### 2.9.6 Streamlined Method

This approach is available for relatively moderate scale and scope single-family home projects. Land disturbance is calculated with the standard buffers currently in effect, and land disturbance of 2,500 square feet or greater will continue to be the primary regulatory trigger.

Three threshold measures are applied together to capture project scale and scope and impacts:

- Net impervious area increase is less than 750 square feet. This accounts for the new stormwater impact from the project.
- New and changed impervious area is less than 2,000 square feet. This accounts for the overall change in building configuration, grading and runoff patterns.
- Total impervious area on the lot is less than 3,200 square feet. This accounts for the total stormwater impact from the project.

For projects that fall below all three of these threshold measures, and do not require a Water Quality Impact Assessment (WQIA) under Chapter 61 (Chesapeake Bay Preservation Ordinance), the following simplifications of the SWPPP are allowed:

- A simplified Stormwater Management Plan using the Streamlined Method Plan Template on the LDA website (please always confirm that you are using the most recent template version by downloading directly from the website). The spreadsheet is also available on the website. No additional water quality or quantity computations or stormwater management facilities are required. An engineer's seal is not required.

All other requirements of the LDA permit continue to apply, including but not limited to a topographic survey and grading plan (sealed by a land surveyor), the Landscape Conservation Plan, the Pollution Prevention Plan, and the Stormwater Facility Maintenance and Monitoring Agreement. See the Streamlined LDA Permit Minimum Acceptance Criteria (MAC) Checklist on the website.

All stand-alone dry wells must be sized for at least 0.5 inch but no more than 1.0 inch of rainfall from the contributing rooftop area. In addition, stand-alone dry wells must be 100% void style systems.

Concentration of runoff from multiple downspouts to a single release location shall be minimized. The overall excavation footprint allowed for dry wells in any single location is limited to minimize the potential for soil compaction as well as overwhelming the infiltration capacity of the soil, as follows:

Type	Limit
100% void	No more than four 50 gallon dry wells

In addition, each dry well installation shall not be located any closer than five (5) feet from any other installation.

Please refer to the dry well details in the Streamlined Method Plan Template for all details and specifications that apply to these facilities.

The following summarizes the key steps for achieving compliance with the Streamlined Method.

Step 1:

Use Table 1 to determine minimum required storage volume required based on site impervious increase.

<b>TABLE 1</b>	
<b>Impervious cover increase (SF)</b>	<b>Minimum required storage volume (cf)</b>
0-99	10.0
100-199	22.0
200-299	29.0
300-499	51.0
500-750	77.0

**Step 2:**

Determine roof areas to each downspout in Downhill Drainage Area (DDA) and non-downhill drainage area (NDDA).

**Step 3: Downhill Drainage Area (DDA) requirements**

- Provide dry wells with minimum 0.5 inch rainfall sizing for each downspout in DDA
- Dry wells are required for each downspout in the DDA even if the volume provided exceeds the minimum site volume requirement.
- If providing dry wells with minimum 0.5 inch rainfall sizing for each downspout in the DDA does not meet the minimum site volume requirement, increase dry well volume until any of the following occur:
  - Minimum site volume is met
  - All dry wells are sized for maximum 1 inch rainfall
  - Each downspout discharges to the maximum 4 dry well limit
- If required storage volume still remains, proceed to Step 4.

**Step 4: Non-Downhill Drainage Area (NDDA) requirements**

Provide additional dry wells with minimum 0.5 inch rainfall sizing for additional downspouts in the NDDA until the site detention volume is met.

Any remaining downspouts are required to discharge to a standard stone dry well (minimum two (2) feet wide by two (2) feet long by two (2) feet deep).

For projects that require a Water Quality Impact Assessment, the simplified Stormwater Management Plan applies ONLY if the project is considered 'allowable development' under Section 61-7 of the Chesapeake Bay Preservation Ordinance. In addition, the impacts of specific impervious surfaces on the Resource Protection Area (e.g., driveway or rooftop runoff to a sloped area) will be evaluated as part of the WQIA review to determine if additional stormwater management measures other than dry wells must be installed.

Projects that require administrative or formal exceptions under Chapter 61 to increase impervious area and/or encroachment in the RPA must satisfy the full requirements of the LDA Permit and Stormwater Management Plan and are not eligible to use the Streamlined Method.

Due to the complexity of the Floodplain Management Ordinance, for projects that contain floodplain on the property, the applicant must contact the plan reviewer to determine what is required.

## **2.10 Fee Schedule**

County fees for stormwater plan review and permitting are posted [online](#). State established fees that local governments must charge for all regulated land disturbing activities have not changed since they went into effect in 2014. The State regulations require 28% of the fee to be remitted to DEQ for program oversight. The state portion of the fee should be paid separately to the state through the Construction General Permit process.

## **2.11 Bonds**

With sole discretion, the Director may consider requests to post performance bonds to obtain a Certificate of Occupancy (CO) before Stormwater Management Facility (SWMF) as-built requirements, final stabilization measures, and tree and other vegetation planting requirements are satisfied only under the following circumstances:

### **1. SWMFs required under Chapter 60 or Chapter 61**

- Vegetation required for SWMFs cannot be planted because of circumstances outside the planting season.
- Subdivisions: where required SWMF(s) are to be installed on an 'outlot' and the sequence of construction for the outlot SWMF(s) requires final stabilization of the SWMF drainage area(s) prior to construction.

The Director will not approve the use of performance bonds for SWMFs that rely solely on infiltration due to the high failure rates of such systems at the end of construction.

### **2. Permanent stabilization measures required under Chapter 60**

- Vegetative stabilization is unable to occur because of circumstances outside the planting season. Bond amounts will be determined by costs in an existing County contract.
- Temporary stabilization measures must be installed—and inspected and approved by DES.

### **3. Tree and other planting required under Chapter 61**

- Planting is unable to occur because of circumstances outside the planting season.
- Planting of trees on public property, if the project does not elect to post replacement funds in the Stormwater fund, per “Trees on public property”, below

Before the Director will approve a performance bond, an amendment to the Stormwater Management Facility Maintenance and Monitoring Agreement (MMA) must be recorded to specify that the current landowner posting the bond retains the right of access and remains responsible for construction of the required SWMFs and, if applicable, planting of trees and other landscaping for the lot until DES approves the as-built certification for each SWMF.

The planting season is between September 15 – December 15 and March 1 – June 15.

The process can take 2-3 business days, please email [StormwaterReview@arlingtonva.us](mailto:StormwaterReview@arlingtonva.us) to obtain a copy of the paperwork required. Letters of credit or cash deposits are the only types of surety accepted. The LDA permit is required to remain active until the SWMF as-built certification is accepted and the trees have been planted.

For each tree the bond amount posted shall be \$700. For stormwater management facilities the amount of the bond posted shall include the price of labor and materials to be installed (including any removal if necessary) and the amount of the outstanding as-built certification. The estimate shall be line items and sealed by a professional (engineer, land surveyor or landscape architect). The estimate is reviewed by the County prior to acceptance. ***The use of the performance bond tool will not be available when construction schedules or closing deadlines did not account for SWMF construction requirements and timelines.***

## **2.12 Post Construction Inspection and Maintenance Requirements**

Owners of SWMFs are required to maintain their facilities in accordance with the Maintenance and Monitoring Agreement and inspect their facilities annually. Letters will be mailed to owners in September reminding them of their obligations with a due date of mid-November. Inspection reports are to be submitted to the County using the online inspections forms and are required to include photos of the facility. Please refer to the most up-to-date photo guidance at: [Stormwater Management Facility Inspections – Official Website of Arlington County Virginia Government \(arlingtonva.us\)](http://arlingtonva.us)

Failure of the owner to submit the required inspection report and photos for each facility will subject the owner to an inspection conducted by the County and the owner will be back charged the costs. Owners that fail to submit complete inspection reports, including all the required data and photos for each facility, could also be subject to an inspection conducted by the County and the owner will be back charged the costs. Additionally, failure of the owner to complete any required maintenance to the facilities will result in the County performing the maintenance and the owner will be charged those costs. The following administrative costs will also be charged:

- Inspection administrative cost: \$100
- Maintenance administrative cost: \$200

## **3. Landscape Conservation Plan Requirements**

A Landscape Conservation Plan must be submitted and approved before any demolition or clearing and grading may occur on a lot or parcel. This plan and any revisions must be prepared and certified by a certified arborist or landscape architect. Major alterations to an approved landscape conservation plan, such as changes to the limit of disturbance or construction footprint, removal of conserved trees, or adjustments to tree species or planting locations, require plan resubmission and approval prior to issuance of a certificate of occupancy or completion of the project. Minor conservation or planting changes, such as modification to fencing or other landscaping, shall be cleared by the County Urban Forester, before proceeding.

In addition to this section, a [Tree Conservation Guidelines](#), [Tree Notification Letter Example](#) and a [Landscape Conservation Plan Checklist](#) are available as guidance.

All current details can be found on the [Park Design Standards page](#)

The General Performance Standards for Development in Chesapeake Bay Preservation Areas (§ 61.10.A-C) will be applied to review of Landscape Conservation Plans. In accordance with § 61.10.A-B, the limit of disturbance, inclusive of the construction footprint and all utilities and stormwater infrastructure, shall be minimized to provide for tree conservation. Tree conservation shall be maximized to meet the tree canopy requirements of § 61-10.C.

For projects in the Resource Protection Area requiring a major Water Quality Impact Assessment, the landscape conservation element (§ 61.12.C.3) shall be addressed through the Landscape Conservation Plan. Additional requirements, above those outlined in this section,



may be imposed as authorized by the Chesapeake Bay Preservation Ordinance, to protect water quality.

On a project-by-project basis, as deemed necessary by the County Urban Forester at the plan review stage to ensure implementation of the approved Landscape Conservation Plan, the County Urban Forester may require an independent private project arborist to monitor a site and provide monthly reports (until deemed unnecessary by the County Urban Forester) on tree conservation and planting.

### **3.1 Plan Requirements for 4.1 Site Plan and Other Conditioned Projects**

For site plans subject to conditions requiring tree replacement, such as plans governed by [Arlington County Administrative Regulation 4.1](#) (referred below as 4.1), and conditioned use permits, the Chesapeake Bay Preservation Ordinance Landscape Conservation Plan requirement shall be satisfied by the submission of the standard [Tree Protection/Replacement Plan](#) and [Landscape Plan](#) currently required under 4.1. The following additional requirements for 4.1 site plans also apply:

The 4.1 [Tree Protection/Replacement Plan](#) must include the Resource Protection Area (RPA) delineation (Section 4.4.2), if an RPA exists on the site. If an RPA exists on the site, additional information also may be required, as outlined in Section 0 of this guidance manual.

The 4.1 [Landscape Plan](#) must satisfy the 4.1 tree replacement requirements and the Chesapeake Bay Preservation Ordinance tree canopy coverage requirements and must include a delineation of the post-development tree canopy at 20 years maturity. If the 4.1 tree replacement requirements do not satisfy the Chesapeake Bay Preservation Ordinance tree canopy requirements, additional trees must be planted to meet the canopy requirements. Projected 20-year tree canopy area for each tree to be planted must be included in the Planting Schedule table.

For 4.1 site plans, and other conditioned projects, the entire canopy of street trees planted within the project property lines, in accordance with the approved 4.1 [Landscape Plan](#), including any canopy area over the public right-of-way, may be counted towards the Chesapeake Bay Preservation Ordinance canopy requirements for the site.

### **3.2 Plan Requirements for all projects**

#### **3.2.1 Landscape Conservation Plan**

For all projects subject to the plan of development process under § 61-13 (including Special exception projects described in 3.1) a Landscape Conservation Plan shall be prepared and submitted that meets the requirements below.

- Landscape Conservation plans shall be to scale, with a north arrow and be clearly legible.
- For projects under 1 acre of disturbance, plans shall be drawn to a minimum scale of 1:10.
- Plans shall consist of at least: a tree protection plan, a tree planting/landscape plan, and a page for details and letters, on separate sheets. More sheets may be needed to convey the required information.
- Plans shall include the ISA certification(s) or Landscape Architect accreditation number(s) of the preparer(s).

- The Resource Protection Area (RPA) delineation (see Section 4.3) shall be provided on all plans, including the tree protection plan and tree planting/landscape plan, if applicable.

### 3.2.1.1 Tree Protection Plan

In accordance with § 61.10.B, tree conservation shall be provided to the maximum extent practicable. This is achieved through showing:

- Tree inventory:
  - All existing trees and other woody vegetation on the site and those potentially impacted off the site, of three (3) inches or greater diameter at breast height (DBH, 4.5 feet above grade, as defined by the Guide for Plant Appraisal, published by the Council of Tree & Landscape Appraisers, 10<sup>th</sup> edition (or more current edition, and, in the case of multi-trunk trees, by the [Critical Root Zone detail](#)), on the plan and in a table, including:
    - Identifying number
    - Species and common name,
    - Size (DBH in inches)
    - Their critical root zone and structural root zone as defined by the [Critical Root Zone detail](#).
    - Current condition as a numerical rating from 1 to 100 (per the Guide for Tree Appraisal, 10<sup>th</sup> Edition)
    - Percentage of impact to the critical root zone.
    - Action taken (conservation, removal)
    - If applicable, reason for removal
    - Tree protection measures proposed
    - Replacement calculations (if applicable, for public trees and conditioned projects)
    - Canopy credit taken for conserved trees. See section on tree canopy calculations below.
    - Resource Protection Area (Yes/No). Marked Yes if a tree is in an RPA
    - Mature Tree (Yes/No). Marked Yes if a tree is a canopy tree with a diameter of 12 inches or greater or an understory trees with a diameter or four inches or greater.
      - “Canopy tree” means a tree that typically reaches 35 feet in height or taller when mature.
      - “Understory tree” means a tree that typically reaches 12 to 35 feet in height when mature.
    - Notes to identify defects or other important characteristics of the tree that may affect its condition or likelihood of surviving construction.
  - Where there are groups of trees, the entire stand may be delineated as a whole rather than individual trees. However, the critical root zones for the stand shall reflect the actual composition of the stand and the species composition of the stand shall be provided in tabular form, with percentages of species composition.

- The limit of disturbance, inclusive of the construction footprint and all utilities and stormwater infrastructure, which shall be minimized to conserve tree canopy to the maximum extent practicable. If a separate limit of work is proposed on your project, clearly distinguish between Limit of Disturbance (LOD) and Limit of work (LOW, where only access is needed). Use different line types for these.
- Conservation of all trees outside of the construction footprint, except high-risk trees (Tree Risk Assessment level of Risk of High or Extreme, as defined by the Tree Risk Assessment Manual, most recent edition), and trees unlikely to survive construction, to the maximum extent practicable. If there is a desire to remove invasive trees outside of the limit of disturbance, show clearly on the plan how soil disturbance will be avoided, and the remaining stump to be treated to avoid resprouts. Stumps shall not be ground outside of the limit of disturbance.
- Conservation of mature trees must be prioritized in design. Where tradeoffs may need to be made for design to accommodate conservation of mature trees, these need to be considered.
  - Change the design to reduce impact to the maximum extent practicable
  - Prioritize regionally native mature trees over non-native trees
  - Prioritize mature trees over smaller trees
  - Where mature trees are potentially impacted by an access path that will be abandoned at the end of the project, use root protection and trunk protection to the maximum extent practicable.
- The area to be counted for tree canopy clearly on the plan, noted as Tree Protection Area. These areas can be determined through on-site surveys, or on sites larger than 1 acre through aerial imagery analysis. Invasive and low condition ( $\leq 50$  condition) or high risk (Tree Risk Assessment level of Risk of High or Extreme, as defined by the Tree Risk Assessment Manual, most recent edition) trees cannot be counted for tree canopy.
- In accordance with § 61-10.B, tree protection measures must include protective barriers at or beyond the critical root zone of each tree to be protected, to the maximum extent practicable. Encroachments into the critical root zone of protected trees that are necessary for the proposed use or development shall include appropriate mitigation measures.
- The location of existing and proposed utilities shall be shown and impacts from these utility installations to existing and proposed trees shall be minimized.
- On the tree inventory table, For residential single-family home projects, tree protection shall be a minimum 4' chain link fence mounted on vertical pipes driven 2' into the ground with no gates. All other projects, such as 4.1 site plans, other special exception projects, and parks and infrastructure projects require a minimum of 6' high chain link fence. Where tree protection and silt fence are in line, super silt fence may substitute for chain link fence. Trenchless silt fence must be used in areas where the critical root zone of any conserved tree overlaps the tree protection fence, unless otherwise specified by the stormwater inspector and urban forester. Tree protection fencing in forested areas may deviate from the fence type requirements subject to the approval of the Urban Forester.

- Tree protection notification signs in English and Spanish must be posted on each protective barrier, similar to the details provided in Appendix F (DPR [Design Standards](#)). Printed and laminated signs can be used, if affixed securely and replaced if damaged.

Tree canopy calculation shall be subject to the following conditions:

- Determination of the planted tree canopy at 20 years maturity shall be in accordance with the tree canopy coverage information in Appendix E, [Recommended Trees with Canopy Credits](#). Cultivars or species not included on the 20 Year Canopy Coverage list require review by the County Urban Forester. Canopy credit, if granted, will be based on published documentation of size in 20 years.
- The canopy of existing trees to be retained on the site may not be counted towards the post-development canopy requirement if there are significant encroachments into the critical root zone or structural root zone of such trees that substantially threaten tree survival:
  - Where medium-sized mature trees (12-24 inches DBH for overstory trees, 4-12 inches DBH for understory trees) have a 20% or more impact to the critical root zone, or have any impact to the structural root zone, these trees may not be counted for tree canopy.
  - Where large-sized mature trees (greater than 24 inches for overstory trees, greater than 12 inches DBH for understory trees) have a 10% or more impact to the critical root zone, or have any impact to the structural root zone, these trees may not be counted for tree canopy.
  - Where trees below the above sizes have a 30% or more impact to the critical root zone, or have any impact to the structural root zone, these trees may not be counted for tree canopy.
  - If the critical root zone is deemed to not represent the actual location of the tree's roots, and/or there is a desire to count the conserved tree for tree canopy, show on the plan and in a narrative:
    - How root impact is minimized through alternative root protection and construction methods, and/or;
    - After-care provided during and beyond construction, and/or;
    - Provide alternative drafts of where the critical root zone may be, if buildings and other barriers may restrict the spread of roots.
  - The Urban Forester may designate trees that are poor candidates for conservation not to be counted for tree canopy. Site-specific conditions, a tree's size, or the species' relative tolerance to construction impact may be considerations in this designation.
- To encourage conservation of existing trees and account for future canopy growth, a 2.0 canopy area credit may be applied to the canopy area of existing trees to be protected on the site for trees with a Medium, Medium-Large or Large canopy size, if the County Urban Forester determines those trees are sufficiently protected (see Appendix E). Trees identified in Appendix E as having a Small or Small-Medium canopy size will not receive this credit. Trees that are neither native, nor invasive (such as *Catalpa spp.*), and not shown on Appendix E may be counted, but do not receive any additional conservation canopy credit.
- Counting jointly-owned trees for credit: Only the canopy of a properly-conserved tree that directly overhangs the property to be permitted can be counted for credit.
- If trees not eligible for canopy calculations are present in a delineated stand (such as invasive or low condition trees) or if the stand contains non-invasive, non-native trees

(such as *Catalpa spp.*), provide percentages of composition of eligible and ineligible canopy in tabular form.

- Tree canopy credit shall not be counted for tree species designated as invasive on the [Non-Native Invasive Plants of Arlington County, Virginia](#) list.
- The canopy of existing understory trees will not be credited where such trees are completely beneath the canopy of existing overstory trees on the same property.
- Tree canopy (conserved or planted) cannot be obstructed by overhead structures, to be counted for tree canopy.
- Any public easement located on private property beyond the public right-of-way, such as a public street right-of-way, may be subtracted from the total site area in determining tree canopy coverage requirements. For example, for a single-family home parcel, there may be a public easement for sidewalk beyond the street right-of-way which could be subtracted. For a new subdivision with a new public street, any public easement beyond the street right-of-way may be subtracted, but not the area of the street itself, since this is part of the overall development footprint of the project which will likely have impacts on existing trees. If areas are subtracted, trees conserved in these areas shall not be counted for canopy calculations.
- **Jointly-owned and trees on adjacent properties:** Location of the critical root zone for any jointly-owned trees and trees on adjacent properties along with protective barriers, closing access to the tree protection area, at or beyond the critical root zone, to the maximum extent practicable if it extends onto the site.
  - Encroachments into the critical root zone of jointly-owned trees or trees on adjacent properties that are necessary for the proposed use or development shall include appropriate tree and root protection mitigation measures.
  - Where construction activities encroach into the critical root zone of jointly-owned trees or trees on adjacent property, property owners are required to notify joint or adjacent property owners in writing by certified mail. Notification shall include contact information for the sender, a description of any possible tree impacts and a copy of the plan. Arlington County projects will follow current public engagement processes, which will include impact notification to neighbors, in lieu of this notification requirement.
  - The responsibility for resolving any jointly-owned or adjacent property tree issues shall be with the developer and adjacent owner.
  - Jointly-owned trees or trees unlikely to survive construction shall not be shown as to be removed, or have any significant impact shown to their structural root zone on the plan, until written and signed approval from adjacent property owners has been obtained. If approval cannot be obtained, do not show the tree for removal. If approval is denied, improve tree conservation to the maximum extent practicable, and show these efforts on the plan.
- **Trees on public property:** Public trees shall be properly protected to the maximum extent practicable. Where public trees cannot be properly protected as part of the project, permission for removal must be obtained from the Urban Forester in accordance with Chapter 67 of the County Code and replacement shall be in accordance with the County's [tree replacement guidelines](#) and [Administrative Regulation 4.3: Tree Planting on Public Land](#).
  - Approval of the plan is contingent on the payment or posting of bonds for tree planting. If another requirement (such as conditions or civil engineering plan

requirements) already requires the posting of bonds for tree replacements, this requirement does not apply. Two options can be used for tree replacement:

- Option 1: Pay \$700 per replacement tree into the Stormwater Fund.
- Option 2: Plant trees in the planting season, with a bond, at \$700 per replacement tree, to be released, if the tree survives, 1 year after planting. This bond defaults into the Stormwater Fund if the tree does not survive.
- **Trees in the Resource Protection Area (RPA):** RPA trees shall be conserved, except as reasonably necessary to enable allowable development, modifications or encroachments in the RPA in accordance with § 61.7, as determined by the Director. Additional RPA-specific Landscape Plan requirements are identified in Section 4.4.3.
- **Forested Cover:** Show forested areas on the plan and include these in the stormwater pre-redevelopment calculations where the site area in the VRRM spreadsheet includes forested areas. Landcover shall be considered “Forested”, when: At the time of permit application, tree canopy covers an area of at least 3,000 square feet with an understory of vegetation that is not managed turf. Any understory vegetation contributes to forested cover, including non-native species. Per Section 2.9.1.2, forested areas, including understory vegetation, removed in the last 2 years shall be reflected as “Forested” in the stormwater pre-redevelopment calculations, to best reflect changes in the hydrologic conditions of the site where forest cover has been removed.

### 3.2.1.2 Landscape plan

Unless a special exception condition exists that delays the submission of the Landscape Plan, all LDA permits shall include a Landscape Plan, including permits for demolition only.

The Tree Planting/Landscape Plan shall include:

- All vegetation proposed to be planted after construction. Proposed planting shall be shown on the plan and detailed in a Plant List, with:
  - Identifying key
  - Quantity of plants
  - Species name
  - Common name
  - Size
  - Planting container
  - Spacing (can be “as shown”)
  - Canopy cover claimed
  - Tree replacement credit (if applicable)
  - Soil provided per tree
  - Total canopy calculated
  - Total replacements calculated
- **Species Selection:** The Plant List shall provide diversity to ensure the 20-Year Tree Canopy coverage. When ten (10) or fewer medium, medium-large and/or large trees are proposed, a maximum of three (3) trees of each species shall be specified. A single species cannot constitute the entirety of the plant list if more than one (1) tree is to be planted. When more than ten (10) medium-large and large trees are to be planted, the plant list shall include a minimum of five (5) species with the number of trees distributed

evenly, unless otherwise approved by the County Urban Forester. Plantings over 40 trees need to maximize diversity. Coordinate with the project Urban Forester.

- To encourage planting of native species, new native trees will receive a 1.25 canopy area credit. A native plant is defined as a plant that is indigenous to northern Virginia. Cultivars of native species may also receive the canopy credit bonus for natives, based upon published documentation of mature size, unless otherwise determined during review by the County Urban Forester. New native trees planted within the RPA may be counted towards the tree canopy requirement, but do not receive the canopy credit bonus.
- The Plant List shall not include any species found on the [Non-Native Invasive Plants of Arlington County, Virginia](#).
- **Spacing:** The Plant List shall include plant spacing for trees, shrubs and ground cover plants.
  - Newly planted trees may not be planted closer together than 10 feet for small and small-medium trees, 15 feet for medium trees, 20 feet for medium-large trees and large trees, unless otherwise approved by the County Urban Forester. Small canopy trees can be interplanted with large canopy trees (such as American Linden – 10 feet – White fringetree – 10 feet – American Sycamore)
  - Where there is a desire for more closely planted trees as a hedge, the 20-year tree canopy for the hedge can be valued as 10 square feet per 5 linear feet of hedge, to a maximum of 150 square feet.
  - Locate tree planting according to these spacing requirements, unless otherwise approved by the Director, from other features:
    - Structure: 10 feet for large, medium-large, medium, small-medium canopy, 5 feet for Small canopy
    - Utilities: Five (5) feet for all trees
    - Property lines: Three (3) feet for all large and medium-large canopy trees
    - Stormwater facilities: 10 feet for large and medium-large canopy trees, 5 feet for Medium and smaller
    - Sidewalks and other pavement: 5 feet for all trees, except tree pits, landscape strips and medians.
- Caliper of planted trees shall meet minimum standards noted in Appendix E, not to exceed four (4) inches caliper, to be counted, unless approved by County Urban Forester.
- Forested areas must survive construction in a manner that preserves the ecological functionality, health, and condition of any super- and sub-canopy tree species; woody shrubs, herbaceous plants, vines, non-vascular plants, and epiphytes; decaying leaf litter, root mass, fungi, soil biota, and soil conditions that are present at time of plan submission. Areas to be Reforested With Seedlings. If areas are shown on the plan to be reforested with seedlings, a legend should be provided describing the species type(s) and stock type(s) to be used (bare root and/or containerized), seedling age, planting method, ground and/or soil treatment to be conducted, ground cover treatment if any and timing relative to other construction activities. Signs should be posted on all sides of the area to be planted. The plan must show the location of all signs and a detail showing the size and text of the signs. Newly planted forested areas shall have a minimum of



300 trees per acre. If the area is smaller than 1 acre, provide the relative fraction of trees (for example, ¼ acre would be 75 trees). Tree Planting/Landscape Plan

- All tree conservation areas shall be free of invasive vine species on trees within 10 ft of tree trunks, and the Critical Root Zones of conserved trees shall be mulched with wood chips or shredded hardwood mulch to a depth of 3 inches, 3 inches away from the root flare, except where native vegetation is present. Show the areas of invasive control and mulching on the landscape plan.
- Calculation of the post-development tree canopy at 20 years maturity, combining conserved and planted trees, to determine compliance with the minimum tree canopy requirements of § 61-10.C.
- Soil Profile Rebuilding (SPR) information.  
Requirements for plan submission:
  - Provide volume of compost required: Area in square ft. divided by 3.
  - Provide volume of topsoil required: Area in square ft. divided by 3.
  - Note areas where SPR will occur on the plan (Soil Profile Rebuilding exhibit in the Alternative Compliance Option Plan Template), using the Soil Profile Rebuilding specifications (<https://sres.frec.vt.edu/>).
    - For all utilities (existing and new) in gravity flow pipes or conduit, and pressurized pipes, only perform steps 3 through 5 of the Soil Profile Rebuilding specifications (adding topsoil and tilling to 6-8 inches). Soils shall not be compacted at final grade above new utilities. For isolated areas smaller than 10 square feet, only the surface soil layer shall be decompacted with a tiller, to four (4) inches, amended with compost, and topped with four (4) inches of topsoil.
    - Where slopes exceed 3:1, only follow step three from the specification (replace or add topsoil) and show how benching will be used to maintain stability.
    - Drainage swales outside of side yards may be graded per normal practice to meet final grade after SPR occurs.  
Helpful tips for success can be found at:  
<https://www.arlingtonva.us/files/sharedassets/public/building/documents/soil-profile-rebuilding-questions-and-answers.pdf>

Areas that may be excluded:

- All impervious areas
- Within five (5) feet of home foundations
- Within one (1) horizontal foot of driveways, parking areas, and other impervious areas not captured by the home foundation
- Swales in side yards (8 or 10 foot side yard situations, not wider side yards)
- Within one (1) horizontal foot of other structures, including but not limited to retaining walls, porches, etc.
- In tree protection areas (including where root matting is used, and other areas where roots are properly conserved).
- Within one (1) horizontal foot of sump discharge pipe
- Areas with widths below four (4) feet.
- Areas within three (3) horizontal feet of the project's property lines adjacent to neighboring lots.



- Requirements for compost amendment material:
  - Compost feedstock shall be mature and stable, and be composed of leaves, yard waste, or food waste. Biosolids shall not be used.
  - A compost sample with analysis shall be made available to the County, at request.
  - The compost shall:
    - Be free of weed seeds
    - Be free of heavy metals
    - Have an electrical conductivity of less than 4.0 mmhos/cm
  - The topsoil shall follow standards in the SPR specification, or as approved by the County. A list of approved vendors is posted on the County website: <https://www.arlingtonva.us/files/sharedassets/public/building/documents/lda-compost-topsoil-sources.pdf>
- Requirements for construction and documentation (by final certificate of occupancy):
  - Follow the steps in the specifications: <https://sres.frec.vt.edu/>
  - Do not remove tree protection or other erosion and sediment controls to complete Soil Profile Rebuilding
  - Documentation:
    - Provide materials receipts documenting acceptable types and required volume of compost and soil material.
    - Provide photographs of equipment incorporating compost to depth of two feet in the areas shown on the approved plan.
      - Step 1: Compost installation
      - Step 2: Tilling
      - Step 3: Topsoil installation
    - County acceptance, which may include on-site verification by County Inspector, is required.
  - Grade alterations to areas that have received soil profile rebuilding, to comply with approved grading for drainage (including dry wells), can be approved by the Stormwater Inspector. Changes to approved grades may need to be documented in the as-built plan.
- Soil Volumes
  - Trees shall have at least the quantity of soil appropriate for plant growth (according to the [DPR Design Standards](#) or approved otherwise) according to the below numbers, calculated down to 3 feet below proposed grade. Where needed, due to hardscape obstruction, soil expansion techniques, such as structural cells or continuous soil panels can be used to expand available soil space. Structural soil is not generally accepted, unless research shows its long-term effectiveness, and appropriate irrigation is provided to reduce chances of dessication.
  - Consult the soil volume calculation guide on the [Landscape Plan Page](#) for additional guidance
  - **All trees planted on private land, not used for street tree planting or reforestation, without shared soil volume:**
    - Small: 300 cu ft.
    - Small-Medium: 600 cu ft.
    - Medium: 675 cu ft.

- Medium-Large and Large: 900 cu ft.
  - Large: 1,200 cu ft.
- **All trees planted on public land and street trees, without shared soil volume** shall follow soil volume standards set out in [Administrative Regulation 4.3](#). For ease of comparison, the requirements are laid out below:
  - Small and Small-Medium: 600 cu ft.
  - Medium: 900 cu ft.
  - Medium Large and Large: 1,200 cu ft.
- **Trees with shared soil volume** can experience improved long term tree health when tree species are compatible, and grouped plantings are encouraged due to the benefits of ability of compatible trees to root graft with neighboring trees.
  - Soil cannot be double-counted for trees with shared soil volumes
  - **All trees planted on private land, not used for street tree planting or reforestation, with shared soil volume**, need to meet or exceed:
    - Small: No reduction, meet or exceed 300 cu ft.
    - Small-Medium: 450 cu ft.
    - Medium: 550 cu ft.
    - Medium-Large: 800 cu ft.
    - Large: 1,000 cu ft.
  - **All trees planted on public land and street trees, with shared soil volume**, need to meet or exceed:
    - Small and Small-Medium: No reduction, meet or exceed 600 cu ft.
    - Medium: 750 cu ft.
    - Medium-Large: 800 cu ft.
    - Large canopy: 1,000 cu ft.

- Show soil volume calculations, per tree, in tabular form. Trees with available soil above 1,200 cubic ft, or are clearly proposed to be planted in open, unrestricted soil (such as a natural park setting), do not need to show a total, and can be noted as “unrestricted” in the table. Soil calculation tables shall include the following:
  - Areas of soil
  - Size and quantities of trees to be planted
  - Total soil volume required
  - Quantity of soil provided
  - Confirmation of soil volumes met
- Deviations from soil volume requirements are subject to review by the County Urban Forester.

### **3.2.2 Details and Correspondence**

The Details and Correspondence sheet on the plans shall include:

- All relevant details for the project, including protection fencing, root damage mitigation (such as root matting), soil remediation, and signage. Many example details can be found in Appendix F (DPR [Design Standards](#)).
- The Standard Tree Conservation and Planting Notes found in Appendix F (DPR [Design Standards](#)).
- Copies of all agreements with neighboring parties
- Copies of letters to neighbors, with copies of certified mail receipts (non-Arlington County projects only)

### **3.3 Requirements Before and During Construction**

- Alterations to an approved Landscape Conservation Plan, such as changes to the limit of disturbance or construction footprint, removal of conserved trees, or adjustments to tree species or planting locations, require plan resubmission and approval prior to issuance of a Certificate of Occupancy. Conservation or planting changes that do not significantly impact existing trees or planted trees, such as modification to fencing or other small landscaping, shall be cleared by the County Urban Forester, before work proceeds.
- When trees and other required landscape materials cannot be planted within the planting season (October 1 – March 31), a planting deferral may be required by the County Urban Forester. A bond, equivalent to the cost required to plant and maintain any deferred landscaping for two years shall be posted, as part of the stormwater bond, to be released after planting and inspection by the County Urban Forester. See Section 2.11 for more information.
- No impact, including soil installation, to the tree protection area can occur without the approval of the Urban Forester
- Tree planting procedures shall be in accordance with the Tree Planting Detail found in Appendix F (DPR [Design Standards](#)).
- Material shall meet or exceed qualities set out in ANSI standards for Nursery Stock, Z60.1

- When conserved tree condition changes significantly during construction, even due to situations outside of the control of the applicant, the County Urban Forester may require resubmission of the plan.
- Tree protection must be installed and inspected after a pre-construction meeting with the County Urban Forester and prior to any land disturbing activity (including utility work or vegetation clearing) on the property.
- All tree protection shall remain in place until all activities involving construction vehicle movement on the site, the stockpiling of materials on the site, or clearing, grading, landscaping, digging, or trenching on the site have ceased or until the time of final site stabilization, whichever occurs last.
- Tree protection areas shall have all non-native invasive vines removed at the end of the project. Where healthy native vegetation is not present, the protection area shall be covered with shredded hardwood mulch, or other organic mulch as approved by the County Urban Forester.
- Field changes can be made by the County Urban Forester, where reasonable field changes will improve tree conservation and/or planting survival.
- Remove all tags, stakes, labels, and other material from trees at the time of project completion, unless otherwise directed by the Urban Forester.

### **3.4 Error! Reference source not found. Violations and Mitigation**

- Trees shall not be removed from the site prior to permit approval.
  - Trees removed before permit approval shall be replaced according to the Arlington County Tree Replacement Guidelines, on top of the percentage tree canopy required for the site.
  - Any tree that cannot be replaced on the site will require a payment into the Stormwater Fund according to current tree replacement guidelines calculations.
  - Exception: If a tree is deemed to be at an Imminent risk of failure, using International Society for Arboriculture's Tree Risk Assessment Qualification guidelines.
- Trees noted on the plan for conservation on an approved plan shall not be removed, without permission of the County Urban Forester.
- Trees on public property cannot be damaged in any way, without approval from a County Urban Forester.
  - Any damage will be assessed by a County Urban Forester, and damages will be assessed according to the [Tree and Shrub Ordinance \(Chapter 67\)](#).

### **3.5 Exemptions**

Dedicated school sites, playing fields, or other non-wooded public recreation areas, and other facilities and uses of a similar nature are exempt from the tree canopy coverage requirements outlined in § 61-10.C, but are required to submit a Landscape Conservation Plan. A Landscape Conservation Plan is not required for activities exempt from the Chesapeake Bay Preservation Plan of Development Requirements (§ 61-13, see Section 1 below). Resource Protection Area Requirements

## 4. Resource Protection Area Requirements

This Section provides an overview of requirements for Resource Protection Area (RPA) projects regulated under the [Chesapeake Bay Preservation Ordinance](#). Please also refer to the [Chesapeake Bay Preservation Ordinance web site](#) for additional information.

If RPA exists on a property, County review and approval is required prior to removing trees or vegetation in the RPA and prior to any land disturbance or building on the property even if the disturbance or project will be located outside the RPA. In most cases, an RPA delineation (§ 61-9) and a Water Quality Impact Assessment (WQIA) are required for review and approval.

Generally, a WQIA (§ 61-12) is required for:

- Any proposed land disturbance, development, or redevelopment within an RPA, including development permitted under § 61-7.A.
- Any RPA buffer modification or encroachment, including modifications or encroachments permitted under § 61-7.B or C.(Section 4.5.1).
- Any proposed land disturbance or development on slopes greater than or equal to 15 percent located adjacent to the landward boundary of the RPA buffer.
- Exempted activities under § 61-15 including passive recreation facilities and associated amenities (e.g., trails, boardwalks, bike paths etc.), utility and transportation projects, and historic preservation (Section 4.5.2)

A WQIA submission is also required for development activities on sites that disturb less than 2,500 sf (Section 4.7).

A WQIA may also be required for development outside of the RPA, depending on the nature of the development and the potential impacts on water quality.

Minor land disturbing activities such as home gardens and individual home landscaping, repairs, and maintenance work shall not be considered land disturbance under County Code Chapter 61 unless it involves the creation of impervious cover in the RPA, the disturbance of more than 2,500 square feet of land, or the removal of trees with a diameter of at least 3 inches in the RPA.

### 4.1 Resource Protection Area

The Resource Protection Area (RPA) is defined in Section § 61-5 of the County's [Chesapeake Bay Preservation Ordinance](#).

The RPA includes:

- Tidal wetlands and shores,
- Non-tidal wetlands connected by surface flow and contiguous to tidal wetlands or water bodies with perennial flow
- Natural stream channels (ephemeral, intermittent and perennial)
- Man-made open stream channels
- A minimum 100-foot buffer adjacent to these water bodies
- Steep slopes greater than or equal to 25 percent contiguous to the 100-foot buffer
- Contiguous steep slopes greater than or equal to 15 percent in the Potomac Palisades area of the County from Chain Bridge to the County boundary (as well as other such areas as may be designated by the County Board under § 61-5.B.1.e).

The County's adopted Chesapeake Bay Preservation Areas Map (January 2018), serves as a guide to areas presumed to be RPAs so that property owners can determine if an RPA exists on a given property.

[View the Interactive Watersheds and RPA Map](#)

The County's adopted CBPA map includes contiguous steep slopes 25 percent or greater as determined using a digital elevation model (DEM) based on 2-foot contour interval topography. Due to limitations of this model, the RPA delineation (see Section 4.4.1) may vary from what is depicted on the adopted map.

## **4.2 Resource Management Areas and Intensely Developed Areas**

All areas of the county not currently designated as a Resource Protection Area are designated under § 61-5.B.2 as a Resource Management Area (RMA). Chesapeake Bay performance requirements (§ 61-10) requiring development to minimize disturbance and impervious cover and conserve existing trees apply to the RMA.

Currently, no part of the county is designated as an Intensely Developed Area (§ 61-5.D) by the County Board.

## **4.3 Subdivision Plats**

If RPA exists on a lot or lots proposed for subdivision, the RPA delineation (Section 4.4.1) must be shown on the plat. Projects on parcels subdivided after October 1, 1989 (§ 61-8) must be located outside of the RPA or must be able to be permitted without an exception.

The following note must also be added to each plat:

- No use other than water-dependent facilities, redevelopment, or any other use authorized by County Code Chapter 61 is allowed in the Resource Protection Area.

## **4.4 Plan Requirements for Projects Disturbing ≥ 2,500 square feet**

Projects disturbing 2,500 square feet or greater are subject to the plan of development process (§ 61-13). The mechanism for compliance review is submission for a [Land Disturbing Activity \(LDA\) permit](#). Compliance review for RPA requirements occurs in conjunction with the LDA review and results in LDA permit issuance.

The [RPA template](#) is intended for use by single-family home project applicants and may be modified and used by all projects. Sheet RPA1 contains the information required for all RPA submissions. Sheets RPA2 and RPA3 may be necessary if a project requires an exception (Section 4.5) or meets the criteria for a major Water Quality Impact Assessment (§ 61-12.C). If a project disturbs 5,000 square feet or greater in the RPA or disturbs the 50 feet adjacent to the protected waterbody (the seaward 50 feet), a major WQIA is required.

### **4.4.1 RPA Delineation**

All submissions regulated by the plan of development process must include a site-specific RPA delineation if an RPA exists on the site. The site-specific RPA boundary must be delineated by the applicant based upon the existing site conditions and approved by the County. The site-specific RPA delineation will be reviewed relative to the proposed development to determine compliance with the minimum lot size requirements for new lots (§ 61-8; see Section 4.3), identify if an exception is required for existing lots, and evaluate water quality impacts and required mitigation.

The site-specific delineation of RPA boundaries must be conducted in accordance with the [Resource Protection Area: Onsite Buffer Area Delineation](#) and, if applicable, [Resource Protection Area: Nontidal Wetlands](#) guidance documents provided by the Virginia Department of

Environmental Quality (DEQ). The County recommends and may require, on a case-by-case basis, RPA delineations to be undertaken by a qualified professional experienced or certified in stream or wetland ecology, wetlands delineation, hydrology, or hydrogeology. For projects subject to state or federal wetlands permitting as well as for any project, excepting on a case-by-case basis single-family home projects, requiring a major WQIA (due to disturbance of 5,000 square feet or greater in the RPA or encroachment within the 50 feet adjacent to a stream or wetland) a professional wetland delineation is required. The wetland delineation verified by DEQ or the U.S. Army Corps of Engineers should be used as the basis for the RPA delineation and the report must be submitted to the County. The location of the RPA boundary on all submitted plans must be performed by a professional land surveyor according to accepted surveying techniques. An exception is made for plans involving <2,500 square feet of land disturbance (a delineation procedure for these sites is in Section 4.7). In all cases, the submission should include a certification to identify key details about the delineation and confirm that the delineation is accurate and complete.

Arlington has chosen to exercise its discretion under the other lands provision in the state regulations (9VAC 25-830-80(B)(4)) to further protect local water quality. All mapped natural and manmade channels are protected by RPA including those with intermittent and ephemeral flow (§ 61-5.B.1.e). All steep slopes of 25 percent or greater contiguous to the minimum 100' RPA boundary must also be delineated on the site plans. The RPA boundary is extended to include these contiguous slopes. Slopes adjacent to the minimum 100-foot RPA boundary must be surveyed in the field by a professional land surveyor according to accepted surveying techniques (except for plans involving <2,500 square feet of land disturbance).

In accordance with § 61-12.B.1, slopes greater than or equal to 15 percent located adjacent to the landward boundary of the RPA buffer must be delineated on the site plans as described in the preceding paragraph at the request of the County.

The field-determined RPA boundary must be shown on the existing conditions plan, the grading plan, the erosion and sediment control plan, the stormwater management plan, the landscape conservation plan, and on any RPA specific plan sheets. The name and license number of the professional surveyor who performs the site-specific RPA delineation must be provided on the plan, along with the date of survey and relevant information about the survey methodology.

#### **4.4.2 Water Quality Impact Assessment**

All Water Quality Impact Assessments (WQIAs) require submission of the basic information required in § 61-12.B.

The WQIA must include:

- A scaled site drawing
- The [Water Quality Impact Assessment Data Sheet \(Appendix C\)](#)

The WQIA Data Sheet is the standard form for submitting the required project information. The submitted WQIA Data Sheet must be complete for permit approval and issuance.

The scaled site-drawing and WQIA Data Sheet must provide the following information:

- Location of the RPA.
- Location and nature of the existing and proposed encroachment into the RPA buffer.
- Location and calculations for any disturbed area in the RPA.
- Area of pre- and post-development impervious surfaces in the RPA and on the site with stormwater calculations if appropriate.



- Type and location of proposed best management practices to mitigate the proposed encroachment.
- Location of existing and proposed downspouts, swales, runoff outfalls, or drainage pathways from the property.
- Location of existing vegetation onsite, including the size and species of trees and other woody vegetation, and identifying the vegetation and quantity and species trees to be removed in the RPA buffer. Removals of mature trees should be specifically identified.
- Re-vegetation or vegetation enhancement plan that supplements the existing RPA buffer vegetation in a manner that provides for pollutant removal, erosion and runoff control.
- If applicable, location of potential climate impacts and floodplain on property (See Section 4.4.3)

Applicable civil engineering or landscape conservation plan sheets should be referenced in the Water Quality Impact Assessment Data Sheet.

Projects that propose to:

- Disturb more than five thousand (5,000) square feet in the RPA;
- Encroach into the seaward fifty (50) feet of the RPA buffer; or
- Disturb more than five thousand (5,000) square feet of slopes 15 percent or greater adjacent to the RPA boundary

are required to submit the additional information authorized under § 61-12.C for Major WQIAs. The specific information required for the major WQIA will vary depending on the nature of the activity proposed, site conditions, and potential water quality impacts (e.g., steep slopes, sensitive ecological areas, etc.).

#### RPA Encroachment, Land Disturbance, and Impervious Cover

When completing the WQIA, encroachment is recorded as a distance, usually from a structure to the stream or wetland. The edge of the defined streambed, ordinary high water line or delineated wetland boundary can be used to locate the water body. For projects proposing modification or expansion of the primary structure, the location of the existing principal structure, including attached structures such as decks or garages, will be used to determine if an increase in encroachment is proposed. For primary structures with below ground components, such as underground parking garages, both the above and below ground component of the primary structure will be considered in making determinations regarding encroachment. Additional guidance on [non-conforming structures and uses](#) is provided by DEQ.

**Land disturbance** is defined in § 61-3 and includes grading, removing, filling, disturbing or dredging of soils, clearing or grubbing of vegetation, or paving or removal of pavement.

**Impervious cover** is defined under § 61-3, and includes:

- Roofs, buildings, parking areas, streets and any other asphalt, concrete or compacted gravel, or dirt surfaces
- Unmortared brick or flagstone surfaces set in sand
- Swimming pools.
- Pervious pavement not meeting the requirements of Section 2.2.4

See Section 2.2.2 for conditions governing impervious cover removal prior to permitting.

Upon the County's review of the WQIA, modifications to these proposed projects may be required including adjustments to the layout, elevation, or dimensions of a proposed structure or



use, tree protection, erosion and sediment control, and tree conservation or replacement to ensure that water quality is protected.

#### **4.4.3 Resiliency Assessment**

The Resiliency Assessment, as defined in § 61-12 D, assesses the impacts of sea-level rise, storm surge, and flooding for any proposed land development within the RPA. Completion of a Resiliency Assessment is required for all development or redevelopment applications on RPA properties. RPA properties impacted by sea-level rise, storm surge, or floodplain or located within 15 feet (measured horizontally landward) of the floodplain boundary are required to provide additional information regarding the impacts of these factors on the development and how they will be mitigated.

The [Climate Resiliency Lookup Tool](#) can be used to determine if an RPA property is impacted by floodplain, sea level rise, or storm surge. The WQIA Data Sheet includes a section for the Resiliency Assessment. If a property is not within a potential sea level rise, storm surge, or flooding impact area as shown on the Climate Resiliency Lookup Tool (or is exempt from requirements per Section 4.5.2), the applicant must indicate that on the WQIA Data Sheet. No additional information is required.

If the property is impacted by sea level rise or storm surge, please check the Adapt VA Interactive Map Viewer at [ADAPTVA](#) to see more details on the potential impact. If a property is impacted by floodplain, applicants should seek additional information on the location of Special Flood Hazard Areas using [FEMA Flood Insurance Rate Maps](#).

If a property is within a sea level rise, storm surge, or flooding impact area, applicants must complete the Resiliency Assessment section of the WQIA Data Sheet. In addition, applicants must fill out Appendix H, Resiliency Assessment and include a plan or plat showing the areas impacted by climate factors. The questions in Appendix H require a description and assessment of the potential impacts from sea-level rise, storm surge, or flooding. The applicant must identify any condition, alteration, or adaptation measure necessary to address the potential impacts. Projects that impact a Special Flood Hazard Area or have impacts within 15 feet (measured landward horizontally) of a Special Flood Hazard Area must also demonstrate compliance with the County's Floodplain Management requirements (Chapter 48 County Code) to obtain RPA approval.

The County's Resiliency Assessment assumes all covered projects have a lifetime of 30 years from the time of the proposed development. The County will not consider shorter timeframes.

Additional guidance on the resiliency assessment can be found on the [Local Program Regulations & Guidance | Virginia DEQ](#) web page.

#### **Tools**

##### **Climate Resiliency Lookup Tool**

The Arlington County Climate Resiliency Lookup tool is meant to assist its user in determining the presence of floodplain, sea level rise, or storm surge within the RPA. This tool must be used as a screening tool to determine the impact of climate change. The results will identify the climate resiliency factors that impact the selected parcel. If no flooding, sea level rise, or storm surge impacts are shown on a searched location, the applicant is not required to fill out Appendix H: Resiliency Assessment.

## AdaptVA

AdaptVA is a web tool developed by the Virginia Institute of Marine Science. The tool has forecast models from several sources to assess climate impact. The AdaptVA Interactive Map has more detailed information than the Arlington County Climate Resiliency Lookup tool and must be used for projects with resiliency impact for a more detailed analysis. In the AdaptVA Interactive Map, the selection for Sea Level Rise should be the Intermediate-High Scenario for the year closest to 30 years from the date of the permit submission. The selection for the Storm Surge should be the Category 3 flood height. The search bar can be used to enter an address, the measurement tools can be used to make measurements of the impact, and a map can be exported for inclusion with the Resiliency Assessment.

## Adaptation Measures

In cases where there is impact on a parcel due to the climate factors, the use of adaptation measures should be considered. An adaptation measure is a project, practice, or approach to mitigate or address an impact from climate change, including sea-level rise, storm surge, and flooding, including increased or recurrent flooding.

The use of fill in adaptation measures shall be compliant with the County's Floodplain Management Ordinance, as detailed in Chapter 48 of the County Code, which addresses the use of fill within floodplain areas. The Floodplain Management Ordinance (Section 48-54) specifically outlines regulations concerning fill to ensure that such activities do not adversely affect floodplain functions or increase flood risks.

In cases, where the use of fill is proposed on a project site, an applicant should submit a report showing the fill will not increase flood risk and include a detailed plan showing the location, type and volume of the fill and existing and proposed elevations. Applicant should include measures to prevent fill from being washed away.

An approved adaptation measure for single family homes in Arlington County is conservation landscaping which is designed to benefit streams and uses native plants. Conservation landscaping may be required by the County as mitigation for a project impacting the RPA or may be installed proactively by a property owner, following County review and approval, to reduce the risks posed by flooding, sea level rise, and storm surge. A simple guide to design conservation landscaping can be found on the [Conservation Landscapes – Official Website of Arlington County Virginia Government](#) web page. If the use of conservation landscaping in the RPA is required by the County to mitigate climate impacts, the practice cannot be used to receive credit on stormwater utility bills and long-term maintenance will be required for the landscaping.

Key requirements for conservation landscaping:

- Landscaping must be located and installed such that it does not impact existing native vegetation; and
- The landscaping must comply with the requirements in Section 4.6 RPA Buffer Planting

In certain situations, owners of properties that are not zoned single-family residential may choose to proactively implement adaptation measures to reduce the risks posed by flooding, sea level rise, and storm surges. Approved adaptation measures for these properties include living shorelines, dry swales, grass channels, and conservation landscaping. These projects must comply with the design guidelines in the current Virginia Stormwater Management Handbook and Section 2 of this Manual. Living shorelines must also comply with the Virginia Marine Resources Commission's Tidal Wetlands Guidelines as well as all other applicable laws and regulations. County review and approval is required for these projects.

Additional voluntary adaptation measures may be proposed and will be reviewed on a case-by-case basis.

#### **4.4.4 Other Requirements**

All submissions must additionally include (per § 61-13.D):

- The required [RPA plan notes](#).
- All wetland permits required by state or federal regulations. This includes documentation for activities covered under a wetlands general permit.
- A Stormwater Facility Maintenance and Monitoring Agreement (see Section 2.5) along with as-built requirements and maintenance schedules for any required RPA mitigation or adaptation measures.

#### **4.5 Allowable Activities, Exemptions and Exceptions**

This section discusses allowable activities, including allowable development (§61-7.A), permitted buffer modifications (§61-7.B) and allowable encroachments (§61-7.C) in RPAs, and RPA exemptions. Section 4.5.1.1 provides additional information regarding allowable buffer modifications including removal of dead or dying trees. Allowable and exempt activities must be reviewed and approved by the County and may be subject to specific criteria in the Chesapeake Bay Preservation Ordinance.

This section also identifies common RPA activities that require an exception and describes the process for requesting an exception. These RPA activities require specific exception findings (§61-16.C) to be met prior to permitting and may require a public hearing. Projects that require an exception should include relevant sections of Sheets RPA2 and RPA3 of the RPA template.

##### **4.5.1 Allowable Activities in the RPA**

Home maintenance work such as roofing, siding repairs, or driveway resurfacing and home landscape maintenance including weeding, mulching, edging, and mowing are activities that do not require RPA permitting or County review unless these activities will expand areas of impervious cover, change the dimensions or extent of a structure, disturb 2500 sf or more of land, remove native vegetation or remove trees 3 inches or greater in diameter.

The following typical activities may be located within the RPA, subject to the County's review and approval of a WQIA. These activities typically do not require an exception and can be reviewed and approved by the Director.<sup>3</sup>

- Redevelopment (§ 61-7.A.2), as long as (a) impervious cover within the RPA does not increase, (b) there is no further encroachment in the RPA buffer, (c) the redevelopment conforms to the requirements of County Code Chapter 60, and (d) the redevelopment meets any additional conditions required by the Director.

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<sup>3</sup> Installation of hardscaping, including dry-laid stone, gravel areas or concrete may require an exception.

- New development for a principal structure and associated utilities on lots platted prior to October 1, 1989, (§ 61-7.C.1) where there would otherwise be a loss of buildable area on the lot because of the RPA buffer. Such development shall be the minimum necessary to achieve a reasonable buildable area<sup>4</sup> for a principal structure and necessary utilities. The encroachment shall not extend into the seaward fifty feet of the RPA buffer unless an exception has been approved as provided in § 61-16.
- When the application of the RPA buffer would result in the loss of buildable area on a lot or parcel recorded between October 1, 1989, and March 1, 2002, the Director may permit encroachments into the RPA buffer in accordance with § 61-13 and the following criteria: (a) The lot or parcel was created as a result of a legal process conducted in conformity with the subdivision regulations under Chapter 23 of the County Code; (b) conditions or mitigation measures imposed through a previously approved exception shall be met; (c) If the use of a Best Management Practice (BMP) was previously required, the BMP shall be evaluated to determine if it continues to function effectively and, if necessary, the BMP shall be reestablished or repaired and maintained as required; and (d) the criteria in § 61-7.C.1 shall be met.
- Roads and driveways satisfying the conditions set forth in § 61-7.A.3.
- Water-dependent development, for example, waste-water treatment plants and outfalls, storm sewer outfalls, stream restoration, beaches, docks and marinas (§ 61-7.A.1 and § 61-3)
- Minor pruning or removal of vegetation for reasonable sightlines and vistas, as described in § 61-7.B.
- Woodlot management, including removal of poison ivy and non-native invasive plants, removal of dead, diseased or dying trees, and selective tree removal to improve overall forest condition in adherence to recommendations by a certified arborist (§ 61-7.B.8).
- Access paths, with a maximum width of four feet, with a natural surface.
- Shoreline and streambank erosion projects, including the installation of living shorelines (§ 61-7.B.9).

#### 4.5.1.1 Permitted Buffer Modification and Discrete Tree Removal

In certain circumstances, property owners may desire to manage their forested RPA buffer to improve overall forest condition, create sight lines or to enable access. Permitted modifications to RPA buffers are described in § 61-7.B. Minor pruning and clearing of vegetation for reasonable sight lines and vistas and the creation of access paths up to 4 feet in width is allowable upon review of a WQIA data sheet and the required landscape conservation plan (§ 61-7.B.5 and § 61-13.C.). Buffer modification projects are not subject to the resiliency assessment requirement (Section 4.4.3) and do not need to complete that section of the WQIA.

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<sup>4</sup> "Reasonable buildable area" means that area reasonably necessary for a principal structure and necessary utilities with compatible bulk and scale to those in the surrounding area.

Landowners may remove noxious vegetation, including non-native invasive plants, poison ivy and poison sumac. However, vegetation that is removed must be replaced with other vegetation equally effective at limiting runoff and preventing erosion. Invasive plant management in the RPA must be carried out under the supervision of a knowledgeable landscape or ecological professional. County review may be required depending on the site conditions, location and extent of the work. Any removal of noxious vegetation that will result in land disturbance, including the removal of any trees 3 inches in diameter or greater, requires County approval.

Prior to removing a dead, dying, or diseased tree 3 inches or greater in diameter, property owners must obtain written County approval. Property owners must submit a report from a Mid-Atlantic Chapter – International Society of Arboriculture (MAC-ISA) certified arborist or person accredited by the American Society for Consulting Arboriculture documenting the tree's condition as dead, dying, or diseased to the County for review. Diseased trees may only be removed if identified as high risk, based on the newer of the International Society of Arboriculture's Tree Risk Assessment Manual, 9<sup>th</sup> edition or its successor. Risk is "the combination of likelihood of an event and the severity of the potential consequences." In the context of trees, risk is "the likelihood of a conflict or tree failure occurring and affecting a target, and the severity of the associated consequences." The County may require additional evaluation by a consulting arborist or for a risk assessment to be completed at their discretion. For resources on finding an arborist visit <https://www.treesaregood.org/findanarborist/findanarborist>.

Each request for tree removal must also include information identifying the location, species, size and timeline for replacing the tree within the RPA at 1:1 (1 tree replacement for each tree removed). Replacements must occur within six months. The minimum size for replacement trees is 3/4-inch caliper. Please see the resources in Section 4.6.2 to identify appropriate species of trees for replacement. Canopy and understory trees should be replaced with a tree of the same category (a canopy tree must be replaced by another canopy tree). Reports should be submitted to [rpareview@arlingtonva.us](mailto:rpareview@arlingtonva.us).

#### 4.5.1.2 Stormwater Management Facilities, Adaptation Measures and BMPs

Under certain conditions, best management practices and stormwater management facilities may also be located in the RPA. Facilities meeting the following criteria are typically considered allowable:

- Flood control and stormwater management facilities that serve multiple properties, provided such facilities are allowed and constructed in accordance with the Virginia Erosion and Stormwater Management Act (Virginia Code § 62.1-44.15:24 *et seq.*) and its attendant regulations and the requirements of § 61-7.A.4 are met.
- Stormwater BMPs on individual lots that prevent concentrated flow and erosion in the RPA such as level spreaders or stone or landscaping for energy dissipation (§ 61-7.B).
- Adaptation measures (nature-based best management practices installed voluntarily or as required by the County to address the impacts of climate change) subject to the criteria in § 61-7.B.10 and Section 4.4.3.

Facilities installed to meet the stormwater management requirements of Chapter 60 typically may not be installed in the RPA without an exception unless they are determined to be necessary to prevent concentrated flow or erosion in the RPA or can otherwise be considered allowable development under § 61-7.A.2 or § 61-7.C.

### 4.5.2 Exempted Activities

The most common activities in Arlington exempted under § 61-15 of the Chesapeake Bay Preservation Ordinance include public roads (built separately from development projects regulated under § 61-13) and utilities such as electric and gas lines, fiber optic cables, etc.

Passive recreation facilities such as boardwalks, trails, and pathways also may be exempt from RPA requirements. A WQIA must be submitted for such activities as proof that these activities will not deteriorate water quality as required by § 61-15.

The WQIA must provide for riparian buffer restoration (Section 4.6) in cases where vegetation is removed. However, the resiliency assessment requirement (Section 4.4.3) does not apply to exempt projects.

Federal properties cannot be designated with RPA. However, federal projects must adhere to the General Performance Standards of § 61-10 and development activities in lands analogous to RPAs should apply equivalent development standards.

### 4.5.3 Exceptions

The following are the typical activities in the RPA in Arlington that require an exception request and approval, along with an approved Water Quality Impact Assessment. The [Chesapeake Bay Ordinance Review Committee \(CBORC\)](#) will review requests for exceptions to the requirements of:

- §§ 61-7.A and 61-7.B (Allowable Development, Modifications, and Encroachments in RPAs)
- § 61-14.C.3 (requests to construct, expand, or modify nonconforming accessory structures or uses in the RPA buffer)

These requests require notification to adjoining properties and a public hearing.

The Director shall review all other exception requests. Administrative exceptions include requests to modify nonconforming principal structures in the RPA buffer under § 61-14.C.1 (e.g., decks, garages, and other customary and incidental structures that are attached to the principle structure) and requests for exceptions to § 61-10 (General Performance Standards for Development). For exception requests to modify nonconforming principal structures in the RPA buffer to be heard by the Director, at least 70 percent of the principal structure must remain intact, and the modification must be compatible in bulk and scale to those in the surrounding neighborhood or area, as determined by the Director. If these criteria are not met, the modification shall be subject to the exception request requirements for redevelopment under 61-16.A, which require review by CBORC.

Typical activities in the RPA that may be eligible for an administrative exception are listed below.

- Expansion of existing structures or uses of land currently located partially or fully in the RPA buffer (non-conforming structure or uses), such as building decks, garages, and other customary and incidental structures that are attached to the principal structure.

Typical activities in the RPA require a CBORC exception and a public hearing include:

- Expansion of an existing structure currently located outside the RPA buffer into the RPA buffer, such as building an addition, deck, or garage for an existing home.



- Redevelopment that involves removing an existing structure currently located partially or fully in the RPA buffer and building a new structure which encroaches farther into the RPA buffer, has a larger footprint in the RPA than the existing structure, or adds impervious cover within the RPA.
- Redevelopment that involves removing an existing structure currently located outside the RPA buffer and building a new structure which encroaches into the RPA buffer.
- New development which encroaches into the RPA buffer, except where the RPA buffer results in a loss of buildable area (see Section 4.5.1 on lots platted prior to March 1, 2002)
- Redevelopment that replaces an existing impervious landing in the RPA buffer with a structure, such as constructing a commercial building within the footprint of an existing parking lot, such that the structure is closer to the waterbody in the proposed condition.
- New outbuildings or accessory structures or uses such as patios, detached garages, firepits, retaining walls, gazebos, sheds, terraces, seating areas, or outbuildings, or expansions of existing accessory structures or uses.
- Any encroachment into the 50 feet closest to the stream, wetland, or other protected RPA feature
- New Stormwater Management Facilities constructed to meet the requirements of Chapter 60, that are not otherwise considered allowable under §61-7.

#### Exception Request Process

Exception requests must be made in writing by the property owner or their designee using the Exception Request Form ([Appendix D](#)). Specific exception findings (§61-16.C) must be met for the exception to be granted and a Resiliency Assessment (Section 4.4.3) is required. Exceptions may be granted, granted with conditions or not granted by the Director or the Chesapeake Bay Ordinance Review Committee.

Exception requests to the Chesapeake Bay Ordinance Review Committee require public notification, including specific notification to adjacent properties and the relevant civic association, a public review period of 10 business days, and a public hearing. A site visit to the property by the County or Committee is also typical.

The exception request process is coordinated and integrated into the building or land disturbing activity permit process. Projects must obtain any required exception prior to issuance of a required building or land disturbing activity permit or County approval of the Water Quality Impact Assessment. CBORC exception hearings occur as needed and typically add 6-8 weeks to the permit timeline. The County recommends that applicants discuss projects with staff as early as possible in design, particularly for projects that could require an exception, to minimize design alterations and permitting timelines. The best contact for information regarding the exception process is [rporeview@arlingtonva.us](mailto:rporeview@arlingtonva.us).

## **4.6 RPA Mitigation and Buffer Enhancement Requirements**

### **4.6.1 Tree Conservation During Permitted Land Disturbance**

The removal of trees in the RPA in conjunction with land disturbance or re-development is limited to that reasonably necessary to enable allowable development, modifications or encroachments in the RPA in accordance with § 61.7. During the design of RPA projects, particular attention must be paid to conservation of mature trees (canopy trees with a diameter of 12 inches or greater and understory trees with a diameter of four inches or greater). Trees with a diameter of three (3) inches or greater removed from the RPA as result of land disturbance or development must be replaced in the RPA with trees in adherence to [the](#)

[County's Tree Replacement Guidelines](#). Tree replacement within the RPA is required even when, through conservation of canopy or planting outside the RPA, the tree canopy requirements of § 61-10.C are otherwise met.

Tree replacement and tree canopy enhancement proposals for Resource Protection Area properties should be addressed through the Landscape Conservation Plan (Section 3).

Special requirements apply to landscape conservation plans for RPA sites:

- RPA trees must be specifically identified in the tree inventory
- Limb or root impacts to RPA trees must be minimized to the extent possible, and RPA trees that must be pruned shall be identified on the tree protection plan. All efforts shall be made to conserve and retain existing RPA trees. RPA trees must be pruned in lieu of removal wherever feasible.
- Justification shall be provided for each proposed RPA tree removal, and the number and replacement value of RPA trees to be removed shall be quantified in accordance with the [Tree Replacement Guidelines](#) and clearly presented on the plan.

During construction, RPA tree removal and pruning shall be overseen by an International Society for Arboriculture (ISA)-certified arborist and shall not be undertaken except as authorized by the County Urban Forester.

Removal of trees and other vegetation from the RPA without County approval will result in enforcement and penalties, including but not limited to replacement per § 61-18.

#### **4.6.2 Mitigation and Buffer Enhancement Requirements**

Projects that impact the Resource Protection Area must propose an RPA mitigation plan. The mitigation plan identifies construction and post-construction practices to improve water quality that is commensurate with or offsets the project's impact.

Projects proposing riparian buffer planting (groundcovers, perennials and shrubs as well as trees) or long-term invasive plant management to mitigate for RPA impacts are required to provide supplemental Water Quality Impact Assessment documentation for these proposed activities. Sheet RPA2 of the RPA template provides a framework for RPA mitigation plans.

The requirements of § 61-12.A for a net improvement in RPA vegetation, *i.e.*, buffer enhancement, also apply to all RPA development proposals. The buffer enhancement requirement may be fulfilled through invasive plant management, tree canopy improvements, or riparian buffer planting.

The following buffer mitigation requirements apply to offset RPA development impacts.

- Where RPA areas are disturbed, reforestation/riparian buffer planting of at least an equivalent area shall be provided.
- To offset a new RPA encroachment, reforestation/riparian buffer planting of an equivalent RPA area shall be required
- To offset new RPA impervious cover, reforestation/riparian buffer planting equivalent to two times the new RPA impervious cover area shall be required.
- Reforestation/riparian buffer planting must include multiple layers of native RPA vegetation including trees, shrubs, and herbaceous plants (Section 4.6.2.3).
- Where site constraints or existing conditions warrant, a reduced riparian buffer mitigation requirement may be permitted, on a case-by-case basis. For example, when the RPA



buffer is largely already forested or the project impact is limited to within five feet of the existing principal structure, enhancement of existing riparian buffer vegetation through supplemental planting or invasive plant management may be required in lieu of or in addition to riparian buffer planting.

RPA mitigation or buffer enhancement provided must be listed on the RPA Mitigation Table on Sheet RPA2. RPA mitigation subject to long-term maintenance requirements also must be identified on the Stormwater Management Facility Information Table on Sheet SWM-2 of the LDA 2.0 template.

#### 4.6.2.1 Guidance for Single Family Home Projects

Mitigation and buffer enhancement plans are project specific. However, the guidelines below have been provided to assist in the development of appropriate buffer vegetation improvement and mitigation plans.

#### **Typical Mitigation and Buffer Enhancement Requirements associated with RPA impacts for Single Family Home projects**

<b>RPA Impact</b>	<b>Mitigation/Buffer Enhancement (Typical)</b>	<b>Long-term maintenance requirement</b>
<b>1. No disturbance in RPA</b>	<ul style="list-style-type: none"> <li>• Energy dissipation for concentrated flow</li> <li>• Supplemental erosion control during construction</li> <li>• Removal of English ivy and other invasive vines from RPA trees</li> </ul>	No
<b>2. Allowable development</b>	<ul style="list-style-type: none"> <li>• Tree replacement</li> <li>• Supplemental erosion control or tree protection during construction</li> <li>• Energy dissipation for concentrated flow</li> <li>• Invasive plant management</li> <li>• Riparian buffer planting or enhancement to offset disturbance</li> </ul>	May be required based on the scope and extent of a project and for major WQIA* activities.
<b>3. Administrative or CBORC exception - (project increases RPA encroachment or impervious cover)</b>	<p>In addition to the above:</p> <ul style="list-style-type: none"> <li>• Additional riparian buffer planting (perennials, shrubs, trees) to offset new impervious cover or encroachment may be required</li> <li>• Additional SW controls may be required</li> </ul>	Yes, but may not be required for projects disturbing <2500 sf with a minor WQIA*.

\*A major WQIA is required if a project results in disturbance of ≥5,000 sf in the RPA or on 15 percent slopes adjacent to the RPA or impacts the 50 ft of the RPA adjacent to the protected waterbody. Projects not meeting these criteria can provide a minor WQIA.

#### 4.6.2.2 Invasive Plant Management

Invasive plant management on RPA properties is intended to enhance and improve the condition of buffer vegetation and riparian habitat to meet the requirements of §61-12.A or to offset impacts to water quality. Conservation of existing trees through the removal of English ivy

(*Hedera helix*) and other invasive vines that compromise the health and longevity of existing trees can significantly improve the condition of streamside forests and support their ability to process nutrients and remove sediment from runoff. Removal of English ivy and other invasive plants from the ground layer of a forested area can enable re-vegetation with native plants by eliminating competition with similar result. However, it is critical to evaluate whether removal of invasive plants will result in erosion, particularly on steep slopes. Invasive plant management should be undertaken under the supervision of a trained horticulturist, landscape professional or biologist and may require phased removal (typically from upslope to downslope). Removal areas may require re-planting to ensure water quality is protected.

Invasive plant management for RPA properties falls into the following major categories, which relate to specific long-term maintenance and as-built requirements.

- Invasive Plant Management – Vines on Trees  
*removal requirement includes English ivy as well as additional invasive vines such as Porcelainberry (*Ampelopsis brevipedunculata*), oriental bittersweet (*Celastrus orbiculatus*), Japanese or Chinese wisteria (*Wisteria spp.*); Japanese honeysuckle (*Lonicera japonica*), etc.*
- Invasive Plant Management – English ivy  
*removal requirement includes removal of ivy from trees and in the groundlayer.*
- Invasive Plant Management – All Species  
*removal requirement extends to all plants on the [Arlington County Invasive Plants List](#).*

Invasive plant management may be physical or chemical depending upon the target species for removal and the site. Chemical applications must be the least toxic necessary for the work and undertaken by a Virginia-certified pesticide applicator or registered technician.

The invasive plant management plan shall include:

- A scaled drawing identifying the area subject to the plan
- A mitigation narrative appropriate for the site and identifying species targeted for removal with any required notes
- Appropriate Maintenance Schedule; and
- As-built requirements (photos, receipts, etc.)

A sample Invasive Plant Management mitigation narrative, and the required maintenance and as-built requirements are available on the [Chesapeake Bay Preservation Ordinance website](#) and on Sheet RPA2 of the LDA 2.0 RPA template.

During construction, authorization to proceed with plant removal must be obtained at the Stormwater Management Pre-Installation Meeting or obtained from the Stormwater Inspector. Removal of English ivy may also be authorized by the Urban Forester.

#### 4.6.2.3 Riparian Buffer Planting Plans

Only regionally native plants may be planted in the Resource Protection Area. For the purpose of this document, a regionally native plant is defined as a plant that occurs naturally within the Piedmont or Coastal plain of the Mid-Atlantic states of Virginia, West Virginia, Maryland, Delaware, North Carolina, Washington, D.C., New Jersey and Pennsylvania. Cultivars of native plant species may not be used for habitat restoration, conservation landscaping, reforestation, or mitigation within the RPA or adjacent to natural areas or parkland except as approved by the Director. In the RPA, cultivars of natives may be used for foundation plantings and other principally landscaping elements.

Resources for selecting native plant species for RPA projects include:

- [Recommended Trees with Canopy Credits](#) (Appendix E)
- [Recommended Trees and Shrub Species for the Reforestation of Resource Protection Areas](#)
- [Plant NOVA Natives](#)
- [Virginia Department of Conservation and Recreation's \(DCR\) Riparian Buffer plant list](#)
- [Natural Communities of Virginia \(DCR\)](#)
- [Keeping It Natural!](#), a natural areas planting guide for Arlington County and Alexandria; and
- the [Virginia Digital Plant Atlas](#)

Plant selections should be appropriate to the site conditions and the local ecosystem. Slope, aspect, soil, moisture, light, proximity to the stream and location within the County are all factors that determine the suitable plant species for a site. Generally, RPA plantings should be chosen based on an understanding of the dominant natural communities found in Arlington, which are predominantly low-elevation dry and dry-mesic acidic oak-hickory forest, low-elevation dry and dry-mesic basic oak-hickory forest, basic or mixed hardwood mesic forest or Piedmont/Mountain small-stream alluvial forest. Plants are listed for each community type at the Natural Communities of Virginia web site. For shoreline and streambanks, the frequency of inundation and flooding as well as the type of ecosystem (for example marsh vs forested wetland) should be considered in the development of planting plans.

Proposals to convert lawn to forested areas or to re-establish natural areas within the RPA should provide a planting plan that includes the multiple layers of vegetation common in Mid-Atlantic forests: groundcovers/perennials; shrubs; understory trees and overstory trees. The type and density of plantings must be in accordance with the [Riparian Buffers Modification & Mitigation Manual's Restoration/Establishment](#) Table A (p. 94). Arlington County will also accept plans conforming with the buffer area establishment requirements outlined in Fairfax County's [Public Facilities Manual \(see Section 12-0316 and Table 12.13B\)](#). Groundcovers/perennials should be planted to achieve soil coverage of 80 percent at their mature size.

If non-native invasive plant species are present in the RPA and are likely to affect plant establishment or plant growth, invasive plant management may be required in advance of riparian buffer planting, or to maintain planted areas. Soil amendment or soil profile rebuilding may also be required as part of site preparation for planting particularly in locations where pavement removal is proposed.

A Resource Protection Area planting plan must include the following:

- A scaled planting plan depicting the areas for seeding, and identifying the species, number and location of herbaceous and woody plants.
- A plant schedule, specifying the quantity, common name, scientific name, spacing, container type and size of proposed plantings, and the mature cover provided by proposed groundcover/perennial plantings
- A riparian buffer planting narrative with any required notes the appropriate Maintenance Schedule; and the
- As-built requirements

Planting plans for projects that disturb 5,000 square feet or greater or encroach into the 50 feet adjacent to the stream (known as the seaward 50 feet), and therefore meet the criteria for a major WQIA, must be certified by a licensed arborist or landscape architect.

Sample Riparian Buffer Planting Notes, and the required maintenance and as-built requirements for buffer plantings are available on Sheet RPA2 of the LDA 2.0 RPA template.

During construction, authorization to proceed with plant removal must be obtained at the Stormwater Management Pre-Installation Meeting or obtained from the Stormwater Inspector. Removal of English ivy may also be authorized by the Urban Forester.

#### **4.7 Projects Disturbing Less Than 2,500 Square Feet in the RPA**

Projects involving less than 2,500 square feet of land disturbance in the RPA are not subject to the Plan of Development review process in § 61-13. However, the RPA requirements apply to all projects in the RPA regardless of the area of disturbance.

Projects disturbing less than 2,500 sq. ft must submit a Water Quality Impact Assessment Data Sheet (Appendix C) and a scaled site drawing but are not required to provide an RPA delineation or topographic survey prepared by a professional surveyor. For WQIA information, please see Section 4.4.2. An annotated property plat including any proposed improvements at scale or comparable may be provided to meet the requirement for a scaled site drawing.

The RPA boundary depicted on the [Interactive Watersheds and RPA Map](#) or un-surveyed field delineation of the RPA boundary performed by the homeowner or their agent must be included on the annotated property plat.

Property owners or their agents may use [DEQ's RPA delineation guidance](#) to delineate the RPA boundary:

1. Measure the minimum 100' RPA boundary at three locations on the parcel (at each edge and in the middle).
2. Mark these locations with flags and measure the distance of each flag perpendicular to the property line or other feature shown on the property's plat (e.g., house, driveway, etc.).
3. Relate and show the RPA boundary on the property's plat.

For properties with steep slopes, please email [rpareview@arlingtonva.us](mailto:rpareview@arlingtonva.us) for guidance.

For projects disturbing less than 2,500 square feet, WQIA submissions are reviewed and should be provided concurrent with building permit submissions. If a building permit will not be filed, the [Appendix C: WQIA Data Sheet](#) can be submitted directly to [rpareview@arlingtonva.us](mailto:rpareview@arlingtonva.us).

##### **4.7.1 Mitigation and Buffer Enhancement**

Projects disturbing less than 2,500 square feet on RPA properties are subject to the mitigation requirements incorporated in § 61-7 and § 61-12.

Projects that will:

- Add impervious cover within the RPA;
- Increase encroachment within the RPA;
- Remove natural vegetation in the RPA buffer;
- Remove or impact the critical root zone of trees three (3) inches in diameter or greater within the RPA buffer; or
- Disturb 500 square feet or greater within the RPA

are also required to demonstrate an on-site overall net improvement in RPA buffer vegetation or riparian habitat or a net reduction in pollutant loads.

Erosion and sediment control during the active phase of the construction must be implemented.

Where the area of disturbance for a project is less than 2500 square feet but greater than 2000 square feet, the limits of the area of disturbance must be physically demarcated on the site and certified by a licensed professional engineer, surveyor, or architect. For additional information, please contact the DES Development Services Bureau at (703) 228-3629, TTY (703) 228-4611 or [stormwatermanagement@arlingtonva.us](mailto:stormwatermanagement@arlingtonva.us).

## 5. Floodplain Requirements

A floodplain is any land area that is susceptible to being inundated by unusual and rapid accumulation of water from any source. The Floodplain Ordinance in [Chapter 48 of the Arlington County Code](#) regulates development in flood zones. A Floodplain Development Permit may be required. Before building, filling or excavating in a floodplain, or near any natural or man-made watercourse, please contact Arlington County at [stormwatermanagement@arlingtonva.us](mailto:stormwatermanagement@arlingtonva.us) or 703-228-3629. The information regarding the review process and requirement can be found in the Floodplain Review Flowchart. The effective Federal Emergency Management Agency (FEMA) floodplain map can be found on [FEMA's webpage](#). For general information, including status information on periodic updates to the County's floodplain maps, please visit the [Floodplains and Flood Insurance Rate Maps](#) webpage.

