

***ADOPTION OF AN AMENDMENT TO  
THE PUBLIC FACILITIES MANUAL  
OF THE COUNTY OF FAIRFAX, VIRGINIA***

*At a regular meeting of the Board of Supervisors of Fairfax County, Virginia, held in the Board Auditorium, Lobby Level, Government Center Building, 12000 Government Center Parkway, Fairfax, Virginia, on Tuesday, October 20, 2020, the Board after having first given notice of its intention so to do, in the manner prescribed by law, adopted an amendment to the Public Facilities Manual of the County of Fairfax, Virginia, said amendment so adopted being in the words and figures following, to-wit:*

***BE IT ORDAINED BY THE BOARD OF SUPERVISORS OF FAIRFAX COUNTY,  
VIRGINIA:***

*That the Public Facilities Manual of the County of Fairfax, Virginia, is amended, as follows:*

**Proposed Amendment to Chapter 2 (General Subdivision and Site Plan Information)  
of  
the Public Facilities Manual**

**Amend Article 2-0100 (LOT AND SUBDIVISION DESIGN), Section 2-0101 (General Requirements), by revising Subsection 2-0101.3 to read as follows:**

2-0101.3 Whenever a subdivision name is approved and recorded, that name must be used for all legal references and permits. No other trade or sales names for subdivisions, or portions thereof, ~~must~~ may be used for any process governed by this PFM unless the Director is notified in writing of the name change.

**Amend Article 2-0100 (LOT AND SUBDIVISION DESIGN), Section 2-0103 (Pipestem Lots), Subsection 2-0103.6, by revising Paragraphs 2-0103.6A and 2-0103.6B to read as follows:**

2-0103.6 The length of a pipestem portion of a lot:

- A. May not exceed a distance of:
1. 350 feet where required lot size is less than 12,000 square feet;
  2. 400 feet where required lot size is at least 12,000 square feet but less than ~~to~~ 18,000 square feet;
  3. 550 feet where required lot size is at least 18,000 square feet but less than ~~to~~ 40,000 square feet;
  4. 750 feet where required lot size is at least 40,000 square feet ~~or over~~.
- B. May exceed the maximum length if a justification is provided based upon some existing unusual and natural topographic or other physical condition with the submission of a preliminary plat. If a preliminary plat is not required, justification must be submitted on the subdivision plan.

**Amend Article 2-0100 (LOT AND SUBDIVISION DESIGN), Section 2-0109 (Large Lot Subdivisions), Subsection 2-0109.3, Paragraph 2-0109.3A, by revising Subparagraph 2-0109.3A(1) to read as follows:**

2-0109.3 When plans for large-lot subdivisions are filed, the following will be required:

- A. Topographic sheets with contour intervals no greater than 5-feet at a scale no greater than 1 inch=100 feet showing:

1. Proposed and/or existing lot lines and a computation showing the shape factor for each proposed lot.

**Amend Article 2-0200 (PLAT AND PLAN PREPARATION), Section 2-0201 (General Requirements), by revising Subsection 2-0201.7 to read as follows:**

- 2-0201.7 For existing underground transmission lines and pipelines as defined in [§ 2-0304](#), written proof must be submitted that all owners of major underground utility easements have been notified in accordance with all applicable regulations.

**Amend Article 2-0200 (PLAT AND PLAN PREPARATION), Section 2-0204 (Retaining Walls and Bridges), by revising Subsection 2-0204.1 to read as follows:**

- 2-0204.1 A separate building permit must be obtained for any retaining walls as required by the [Virginia Uniform Statewide Building Code \(VUSBC\)](#). ~~[International Building Code \(IBC\)](#)~~.

**Amend Article 2-0200 (PLAT AND PLAN PREPARATION), Section 2-0206 (Recreational Equipment and Criteria), by revising Subsection 2-0206.1 to read as follows:**

- 2-0206.1 When recreational facilities are proposed they must be provided in accordance with [§ 8-0000 et seq.](#), recreational facilities must be provided in accordance with the standards shown in ~~[Plates 15-8-Plates 17-8](#)~~ through [41-8](#), and [§ 8-0300 et seq.](#)

**Amend Article 2-0200 (PLAT AND PLAN PREPARATION), Section 2-0207 (Revisions), by revising Subsection 2-0207.2 to read as follows:**

- 2-0207.2 The revision, if approved, ~~is~~ must be submitted with the knowledge and consent of the developer.

**Amend Article 2-0200 (PLAT AND PLAN PREPARATION), Section 2-0208 (General Required Information on Plans and Profiles), by revising Subsection 2-0208.21 to read as follows:**

- 2-0208.21 On subdivision plans where the lot configuration is subject to the shape factor limitations set forth in the [Zoning Ordinance](#), the shape factor with computations must be ~~depicted~~ shown for each lot within the proposed subdivision.

**Amend Article 2-0500 (BONDS AND AGREEMENTS), Section 2-0502 (Agreement and Bond Establishment), Subsection 2-0502.1 (The Agreement), by adding new Paragraph C and relettering existing Paragraph C to read as follows:**

C. Agreements for decommissioning solar energy facilities, equipment, or devices. An agreement, supported by a bond or other security, providing for the decommissioning of solar energy facilities, equipment, or devices subject to § 15.2-2232 of the Code of Virginia within a specified time limit is required. The bond or other security must be based on an estimate of a professional engineer licensed in Virginia with experience in preparing decommissioning estimates. The estimate must not exceed the total projected cost of decommissioning, which may include the net salvage value of such equipment, facilities, or devices, plus a reasonable allowance for estimated administrative costs related to a default of the developer, and an annual inflation factor.

C.

D. “Developer,” as used in § 2-0500 *et seq.*, means any owner, builder, subdivider, or other person or entity engaged in the land development process and includes their principals, officers, members, managers, partners, alter egos, and members of the immediate family.

**Amend Article 2-1000 (PUBLIC PARKLAND DEVELOPMENT CONDITIONS), Section 2-1004 (Requirements for Trails and Other Facilities on FCPA Land), by revising Subsection 2-1004.2 to read as follows:**

2-1004.2 Recreation facilities placed on land to be conveyed to [FCPA](#) or on land owned by [FCPA](#) must be built to [FCPA](#) specifications and in accordance with PFM; [§ 2-0105](#), [§ 2-0206](#), [§ 8-0300](#) *et seq.* and ~~[Plates 15-8](#)~~ through ~~[41-8](#)~~. Placement of recreation facilities must be as approved by [FCPA](#) during the plan review process and field location before construction.

**Amend Article 2-1100 (TYSONS CORNER URBAN CENTER), by revising Article 2-1100 to Subsection 2-1100.2 to read as follows:**

**2-1100 APPLICABILITY OF THE URBAN DESIGN GUIDELINES TYSONS CORNER URBAN CENTER**

2-1100.1 There are [Urban Design Guidelines \(Guidelines\)](#) that apply to development proposals for all properties located within the boundaries of Commercial Revitalization Districts and Areas, and certain Mixed-use Centers as designated on the [Fairfax County Comprehensive Plan \(Plan\)](#) including the Tysons Urban Center and the Reston Transit Station Areas. The [Guidelines](#) serve as companion documents to the [Plan](#) by elaborating upon the [Plan](#)’s more general recommendations related to urban design, public spaces and streetscapes. It is

intended that designers and reviewers will apply the [Guidelines](#) in these areas to guide the appearance, arrangement and function of the built environment. The [Guideline](#)'s best practices and detailed design suggestions, ~~Urban design guidelines and streetscape standards in the [Tysons Corner Urban Center](#), as designated in the adopted [Comprehensive Plan](#), including but not limited to streetscapes, street lights, landscaping, site and building design, parking, utilities, drainage and stormwater management, may differ from the requirements set forth in the PFM based upon the unique characteristics of the urban environment. Alternatives must be listed on the plan for consideration by the Director in circumstances where strict application of the PFM standard cannot be met for a particular site and where new or creative urban designs are proposed.~~ Alternatives, ~~The treatments and designs found in these [Guidelines](#), referred to as "alternatives," may be substituted for details found in the PFM when approved by the Director. These alternatives are subject to the following criteria:~~

- A. Alternatives must be in substantial conformance with ~~the~~ any development plans and associated proffers and conditions; or an approved Special Exception or approved Special Permit Plat; ~~and~~
- B. Alternatives must be consistent with any specific urban design guidelines and streetscape plans for the area which have been endorsed by the Board of Supervisors; ~~and~~
- C. Full details and supporting data must be provided on the plan including design computations, material specifications, technical details, structural calculations, procedures for installation, inspection and/or testing, and procedures for operation and maintenance; ~~and~~
- ~~D. A detailed description must be provided of the applicable provisions of the PFM and why they cannot be met, and the rationale to demonstrate that all criteria set forth in [§ 2-1100.1A](#) through [§ 2-1100.1H](#) have been met; and~~
- E. D. Any decision to approve an alternative must take into consideration possible impacts on public safety, the environment, ~~aesthetics~~ and the burden placed on prospective owners for maintenance of any facility; ~~and~~
- F. E. Reasonable and appropriate conditions may be imposed as deemed appropriate by the Director; ~~and~~
- G. F. Any alternative must comply with specific requirements set forth in the [United States Code](#), [Virginia Code](#), and [County Code](#), and all other applicable regulations, resolutions and policies, as well as specific standards of [VDOT](#) and requirements of other reviewing agencies, such as the water utilities, from which variances may not be granted at the local level.
- H.

G. Notwithstanding the foregoing, where a PFM provision requires [Board of Supervisors](#) approval of a waiver or modification of its terms, the Director has no authority to approve an alternative absent [Board](#) approval.

2-1100.2 ~~Developers are strongly encouraged to use the [Guidelines](#) in by-right development proposals in accordance with [§ 2-1100.1](#) and subject to the criteria set forth in [§ 2-1100.1B](#) through [§ 2-1100.1G](#). Acting on a specific request by the developer, urban design and streetscape standards may be considered by the Director within by-right development proposals lying within the [Tysons Corner Urban Center](#) in accordance with [§ 2-1100.1](#) and subject to the criteria set forth in [§ 2-1100.1B](#) through [§ 2-1100.1H](#).~~

**Amend Article 2-1200 (AS-BUILT DRAWINGS), Section 2-1202 (Information Required on the As-Built Drawing), Subsection 2-1202.4, by revising Paragraphs 2-1202.4B and 2-1202.4D to read as follows:**

- 2-1202.4 Locations of all storm sewers, sanitary sewer mains, fire hydrants, and associated easements including all waterline easements.
- A. For storm and sanitary sewers, pipe materials should be identified based on visual inspection only. For storm and sanitary sewer pipes, include size, length, invert-in and invert-out elevations (see [§2-0208.11](#)), and percent grade of pipe as computed.
  - B. The structure number, type, size/configuration, top elevation, type and size of any outlet protection, and the location in the Virginia Coordinate System of 1983 (VCS 83) and [NGVD 1929](#) vertical datum (or spatial reference system and datum as required by [County Code](#)) must be provided on all structures and outfalls (see [§2-0208.3](#)). This data, in addition to the data listed in item A above, must be provided in the form of an electronic spreadsheet and must be included with the information requested below in [§2-1202.4D](#).
  - C. Latitude and longitude of the approximate center and a major appurtenance of BMPs must be provided in decimal degrees to 6 decimal places.
  - D. For all projects on the VCS 83, coordinates of all structures and outfalls must also be provided in a digital, [GIS](#) compatible format, generally an industry standard CADD or Shapefile, which can be incorporated directly in the County's overall [GIS](#). The digital submittal should be delivered in ~~CD/DVD~~ a format acceptable to the Director, be named to match the as-built plan hard copy, and include a map of the full project in PDF format.

**Proposed Amendment to Chapter 4 (Geotechnical Guidelines)  
of  
the Public Facilities Manual**

**Amend Chapter 4 (Geotechnical Guidelines) Table of Contents to read as follows:**

**4-0100 PROCEDURES**

- 4-0101 General Policy
- 4-0102 Scope

**4-0200 SOILS**

- 4-0201 County Soil Units, Map and Classes
- 4-0202 Class I Soils
- 4-0203 Class II Soils
- 4-0204 Class III Soils
- 4-0205 Class IV Soils
- 4-0206 Geotechnical Report Requirements Summary

**4-0300 GEOTECHNICAL REPORT**

- 4-0301 General Requirements and Procedures
- 4-0302 Purpose of Geotechnical Investigation
- 4-0303 General Guidelines for Geotechnical Investigation
- 4-0304 Minimum Geotechnical Exploration Requirements for Deep Foundations
- 4-0305 Setting Basement or Lowest Finished Floor Elevation Above the Groundwater Table for Residential Structures

**4-0400 CONSTRUCTION PLANS**

- 4-0401 General Information
- 4-0402 Footing and Drainage Design

**4-0500 CONSTRUCTION TECHNIQUES**

- 4-0501 Sheeting, Shoring and Filling
- 4-0502 Inspection
- 4-0503 Minimum Standards Required for Density Testing of Compacted Fill Soil

**4-0600 GEOTECHNICAL REVIEW BOARD**

- 4-0601 Membership
- 4-0602 Nominations
- 4-0603 Review and Processing of Reports, Plans and Specifications
- 4-0604 Compensation

**4-0700 TESTING FOR INFILTRATION FACILITIES**

- 4-0701 Purpose and Scope
- 4-0702 Geotechnical Investigation
- 4-0703 Infiltration Testing

- 4-0704 Laboratory Testing
- 4-0705 Report Presentation and Submission
- 4-0706 Pre-construction Meeting

**4-0800 GUIDELINES FOR THE USE OF LIME FOR DRYING, MODIFICATION & STABILIZATION OF SOIL**

- 4-0801 Applicability and Restrictions
- 4-0802 Expansive Soil Determination
- 4-0803 Mixture Design for Lime Stabilization of Soil
- 4-0804 Lime Treatment Requirements for Lime Stabilization of Soil
- 4-0805 Health and Safety Precautions for Soil Treatment with Lime
- 4-0806 Lime Stabilization Specifications
- 4-0807 Field Quality Control for Lime Modification and Stabilization of Soil
- 4-0808 Quality Assurance

**Amend Article 4-0200 (SOILS), Section 4-0206 (Geotechnical Report Requirements Summary), Subsection 4-0206.5 (For Class IVB Soils), by revising Paragraph 4-0206.5B (not including the nine subsequent items) to read as follows:**

- B. For non-bonded lot grading plans, where proposed residential dwellings or in-ground swimming pools are to be located on properties containing Class IVB soils, a geotechnical ~~investigation and~~ report will not be required if a certification is provided stating that all ~~eight~~ nine of the items below are met. The certification must be signed and sealed by a professional authorized by the State to provide such information and incorporated into the plans. The ~~eight~~ nine items are:

**Amend Article 4-0200 (SOILS), Section 4-0206 (Geotechnical Report Requirements Summary), Subsection 4-0206.5 (For Class IVB Soils), Paragraph 4-0206.5B, by adding new Subparagraph 9 to read as follows:**

- 9. The basement or lowest finished floor elevation of the proposed building meets the requirements of § 4-0305 for setting elevations above the groundwater table.

**Amend Article 4-0200 (SOILS), Section 4-0206 (Geotechnical Report Requirements Summary), Subsection 4-0206.6 (For In-ground Swimming Pools), Paragraph 4-0206.6B, by revising Subparagraph 2 to read as follows:**

- 2. The bottom exterior edge of the swimming pool does not intercept the influence zone of any adjacent retaining wall/building foundation (“Footing”). The influence zone of a Footing for the purpose of the in-ground swimming pool design is defined as the area beneath a line



extending outward and downward at a 2H:1V slope from the bottom of the footing exterior edge. envelopes starting at the lowest point of the footing exterior edge continuing upwards and downwards at 2H:1V inclination up to the horizontal projection of the footing exterior edge.

**Amend Article 4-0300 (GEOTECHNICAL REPORT), Section 4-0301 (General Requirements and Procedures), by adding Subsection 4-0301.4 to read as follows:**

4-0301.4 The geotechnical report must have been signed and dated within one year before submittal to the County. For geotechnical reports prepared more than one year before submittal, an updated report or letter is required, at a minimum, to verify the validity and applicability of the original report. For data older than five years, the Director may request verification that the previous soils information is still valid and supported by new data such as borings and laboratory tests. Consultants using other consultants' data should update and confirm findings with new data such as borings and laboratory tests.

**Amend Article 4-0300 (GEOTECHNICAL REPORT), Section 4-0303 (General Guidelines for Geotechnical Investigation and Engineering Recommendations), Subsection 4-0303.5 (Groundwater Measurements), by revising Paragraph 4-0303.5A to read as follows:**

- 4-0303.5 Groundwater Measurements. Information on groundwater elevations must be provided, including depth of permanent and perched water tables.
- A. Water level reading within the boring tables should must be determined after completing the boring and a minimum of 24 hours later. Under proposed roadways and borrow areas outside building pads, determination of the 24-hour groundwater depth may not be necessary.
  - B. Perforated casings or piezometers may be required in selected bore holes satisfactory to the Director to obtain long-term water level readings.

**Amend Article 4-0300 (GEOTECHNICAL REPORT), Section 4-0303 (General Guidelines for Geotechnical Investigation and Engineering Recommendations), by revising Subsection 4-0303.7 to read as follows:**

4-0303.7 Laboratory Testing. The nature and extent of laboratory testing deemed necessary is dependent upon the characteristics of the soil and the anticipated geotechnical problems requiring analysis. The laboratory must be an approved facility by a recognized accreditation organization (i.e., [WACEL](#) and or the [American Association of State Highway and Transportation Officials \(AASHTO\)](#)). Technicians performing specific tests must be certified, per the requirements of either WACEL, the National Institute for Certification in Engineering

Technologies (NICET), the International Code Council (ICC), or AASHTO, to perform those specific tests.

**Amend Article 4-0300 (GEOTECHNICAL REPORT), Section 4-0303 (General Guidelines for Geotechnical Investigation and Engineering Recommendations), Subsection 4-0303.8 (Engineering Analysis and Recommendations), by revising Paragraph 4-0303.8D to read as follows:**

- D. In areas that are susceptible to high water table conditions (permanent, perched and/or seasonal), the engineer must recommend sub-pavement-drainage design and other measures necessary to assure address potential problems associated with wet dry basements, yards, etc.

**Add Article 4-0300 (GEOTECHNICAL REPORT), Section 4-0304 (Minimum Geotechnical Exploration Requirements for Deep Foundations) and Section 4-0305 (Setting Basement or Lowest Finished Floor Elevation Above the Groundwater Table) to read as follows:**

**4-0304 Minimum Geotechnical Exploration Requirements for Deep Foundations**

- 4-0304.1 Deep foundations, such as piles or drilled shafts, must be designed considering the capabilities of the supporting material based on laboratory test results and geotechnical data. The geotechnical engineer must obtain onsite data a minimum of 10 feet, or two times the foundation diameter, whichever is greater, below the bottom of the proposed foundation. If auger refusal is encountered due to shallow rock before reaching the minimum required depth of exploration, the rock must be cored to reach a minimum of 10 feet below the bottom of the proposed foundation. The foundation must be designed for all column and wall base reactions (axial, lateral, and moment) and downdrag loads for compressible soils. Secondary consolidation caused by soil creep should also be considered when determining the foundation design loads.
- 4-0304.2 For piles greater than 24 inches in diameter, regulate capacity by limiting the settlement to that established by the structural engineer of record or up to a maximum of 1 inch. Pile tip elevations must be clearly established by the geotechnical engineer. The design criteria must meet or exceed the minimum standards and criteria described in this chapter.
- 4-0304.3 Logs of borings, CPT soundings, test pits, and other subsurface data should be obtained.
- 4-0304.4 Boring logs must provide raw (unmodified) N-values if SPT's are performed; CPT probe logs must provide raw QC-values and plots of raw sleeve friction values.

**4-0305 Setting Basement or Lowest Finished Floor Elevation Above the Groundwater Table for Residential Structures**

4-0305.1 For construction of residential single-family detached and attached dwellings, including stacked townhouses, where the results of a geotechnical investigation and/or report must be submitted for approval, design engineers must evaluate the proposed basement floor elevation or the lowest finished floor elevation as compared to the seasonal high water table (SHWT) elevation and include appropriate mitigation on the plans to address potential problems with groundwater intrusion into basements or lowest finished floors and its impacts on the site and adjacent or downstream properties. The required groundwater mitigations depend on the freeboard outlined below. Freeboard is defined as the distance between the SHWT and the basement or lowest finished floor elevation.

A. Case 1: Freeboard is greater than 2.5 feet (SHWT is more than 2.5 feet below the basement or lowest finished floor elevation). For this case:

1. Groundwater mitigation is not required and standard perimeter underdrains, both exterior and interior, connected to a sump pit are considered adequate.
2. Foundation drain details must be included on the plans.

B. Case 2: Freeboard is greater than 1 foot and up to 2.5 feet. For this case:

1. The basement or lowest finished floor elevation must be raised to achieve the required freeboard of Case 1.
2. If the basement or lowest finished floor elevation cannot be raised to meet Case 1 and the site topography allows for a gravity outfall, an underdrain system that connects to a structure associated with a gravity storm drainage system or to a free gravity outfall condition may be used. Any plan for a gravity storm drainage system or a free gravity outfall condition must reflect the design engineer's consideration of the hydraulic gradient of the receiving system and the underdrain pipe.
3. Foundation drain details must be included on the plans.
4. In case the site topography or storm drainage system elevation do not allow for a gravity outfall or gravity connection from the underdrain, a dual pump system will be permitted provided each pump is rated and designed for the anticipated load, and the system is equipped with backup power.

C. Case 3: Freeboard is negative, and groundwater is above the surface of the basement or the lowest finished floor or freeboard is less than or equal to 1 foot. For this case:

1. The basement or lowest finished floor elevation must be raised to achieve the required freeboard of Case 1.
2. If the basement or lowest finished floor elevation cannot be raised to meet Case 1, the basement or lowest finished floor elevation must be raised to achieve the freeboard and required groundwater mitigations of Case 2, with the approval of the Director.
3. If the Case 2 requirements cannot be met and a crawlspace is proposed, it should meet Case 1; if not possible, a crawlspace meeting Case 2 may be used.

4-0305.2 The Director may modify the policy for setting the basement or lowest finished floor elevation above the groundwater table. In considering the request, the Director will apply the provisions of § 1-0100.8, subject to conditions deemed appropriate by the Director to address the potential for basement flooding and adverse impact on the site and adjacent or downstream properties. A request for such a modification may be submitted concurrently with the soils report.

4-0305.3 Determination of the SHWT by direct observation of groundwater levels must be performed in accordance with § 4-0702.2; however, where final design cannot be based on a confirmatory investigation performed during the months of November through May (or anytime of the year when the PDSI is greater than 2.0), the geotechnical engineer may consider compensating for the possible seasonal fluctuations by adding a minimum of 2 feet to the encountered water table elevation reading. Alternatively, the location of the SHWT may be determined using soil morphology in accordance with § 4-0702.3.

4-0305.4 If the SHWT is determined using soil morphology, it must be performed by a certified professional as defined in § 4-0702.3. Field investigations (i.e., test pits, test borings, etc.) should extend no less than 6 feet below the proposed basement or lowest finished floor elevation. Water level readings must be determined a minimum of 24 hours after completing the field investigation. In the case of test borings, if boreholes are likely to cave within the 6-foot depth below the proposed basement or lowest finished floor elevation, standpipes can be used to perform the required ground water monitoring. For subdivisions, the number of borings may be determined by the geotechnical engineer with expertise in the local geology to provide an accurate estimate of the water table profile across the site.

**Amend Article 4-0400 (CONSTRUCTION PLANS), Section 4-0401 (General Information), by revising Subsection 4-0401.1 to read as follows:**

- 4-0401.1 The recommendations in the geotechnical report must be incorporated into the plans as requirements to be performed during construction. The geotechnical engineer's requirements must be stated in such a way that the intent is clear using a directive, such as "shall" and "will" with each provision. Where required by the Director, changes to requirements must be made by the geotechnical engineer who certified the plan.

**Amend Article 4-0500 (CONSTRUCTION TECHNIQUES), Section 4-0501 (Sheeting, Shoring and Filling), by revising Subsection 4-0501.2 to read as follows:**

- 4-0501.2 Engineered fill and backfill around structures must be placed with approved materials and uniform compaction throughout must be provided in 6-inch to 8-inch layers. Each layer of engineered fill must be compacted at optimum moisture, plus or minus 2 percent, to a density of not less than 95 percent in accordance with [AASHTO T 99](#) or [ASTM D698](#). The use of alternative fill and backfill from what is recommended by the geotechnical report must be reviewed and approved by the geotechnical engineer and the Director before the fill placement. The use of flowable fill as backfill material for retaining structures must also be approved by the Director before the fill placement.

**Add Article 4-0800 (GUIDELINES FOR THE USE OF LIME FOR DRYING, MODIFICATION & STABILIZATION OF SOIL) to read as follows:**

**4-0800 GUIDELINES FOR THE USE OF LIME FOR DRYING, MODIFICATION & STABILIZATION OF SOIL**

4-0801 Applicability and Restrictions

4-0801.1 This section presents geotechnical guidelines and minimum requirements for the design and construction of projects using lime for drying, modification and stabilization of soil. The following definitions apply to this geotechnical guideline:

- A. **Active Zone or Zone of Seasonal Fluctuation** is the zone under and around a structure where the soil's moisture content is appreciably affected by climatic conditions and environmental factors. For building footings, the Active Zone extends up to a minimum of 4 feet below the exterior finished grade, or 2 feet below the bottom of the footing, whichever is deeper. For pavements, the Active Zone extends to 4 feet below the finished pavement surface.
- B. **Expansive Soil within the Active Zone** is defined by the [International Building Code](#) as follows: "Soils meeting all four of the following provisions

shall be considered expansive, except that tests to show compliance with Items 1, 2, and 3 shall not be required if the test prescribed in Item 4 is conducted, and the Expansion Index is found to be equal to or less than 20:

1. Plasticity Index (PI) of 15 or greater, determined in accordance with [ASTM D4318](#).
  2. More than 10 percent of the soil particles pass a No. 200 sieve (75  $\mu$ m), determined in accordance with [ASTM D422](#).
  3. More than 10 percent of the soil particles are less than 5 microns in size, determined in accordance with [ASTM D422](#).
  4. Expansion Index greater than 20, determined in accordance with [ASTM D4829](#).”
- C. **Mellowing** is the textural change of soil due to the phenomenon of cation exchange followed by flocculation and agglomeration due to the chemical reaction between lime and clay soil particles.
- D. **Soil Drying** is a rapid decrease in soil moisture content due to the chemical reaction between water in the soil and lime and is limited to non-expansive soil.
- E. **Soil Modification** is a reduction in soil plasticity, increase in optimum moisture content, decrease in maximum dry density, and improved compactibility due to the chemical reaction between soil and lime. Soil Modification will not be considered permanent.
- F. **Soil Stabilization** is a permanent reduction in soil plasticity or expansion index, so the soil is not expansive, and permanent strength gain occurs through pozzolanic reaction due to the chemical reaction between soil and lime.
- G. **Lime** is quicklime or hydrated lime meeting the requirements of [ASTM C977](#), “Standard Specification for Quicklime and Hydrated Lime for Soil Stabilization.”

4-0801.2 Soil Drying is limited to soils that meet the standards of suitable structural fill material as established by the [VDOT Road and Bridge Specifications, Virginia Uniform Statewide Building Code](#), the Public Facilities Manual, and project documents approved by the Director. For Soil Drying, a separate geotechnical study or report is not required to be submitted to LDS; however, notice in writing must be given to LDS prior to the use of lime for Soil Drying.

4-0801.3 Soil Modification is limited to soils that are present below the Active Zone. For Soil Modification, a geotechnical study or report must be submitted to LDS for

approval. The lime modified soils below the Active Zone must have a Plasticity Index (PI) of 20 or less.

- 4-0801.4 Stabilization of expansive soils by mixing or blending with dry or slurry lime may be considered for various engineering applications requiring the placement of structural or engineered fill within the Active Zone. For Soil Stabilization, a geotechnical study or report must be submitted to LDS for approval. The recommendations made in the approved report must be incorporated into the project plans as specifications or requirements to be implemented during construction.
- 4-0801.5 Lime storage, handling and mixing may not allow airborne dust particles to leave the property. Additionally, lime storage, handling and mixing may not occur where occupied structures or areas of public use are within 300 feet, unless the contractor can demonstrate, to the satisfaction of the Director, that the construction techniques will not allow visible airborne dust particles to drift over the occupied structures or areas of public use.
- 4-0801.6 Before plan approval, regardless of location, adjoining property owner notices must be served on all properties adjoining the proposed lime project site. A minimum of five adjoining properties must be served with notices at the time of geotechnical report submission. The format of such notices must be approved by the Director.
- 4-0801.7 Each proposal to use lime will be reviewed and approved on a case by case basis, except when lime is used for Soil Drying, in which case a written notice must be provided to the Site Inspector before the use of lime for Soil Drying.
- 4-0801.8 Lime Stabilization may not be used if the soluble sulfate content by weight in the expansive soils exceeds 5,000 parts per million. The soluble sulfate content in soils to be stabilized must be determined in accordance with [AASHTO T 290](#).
- 4-0801.9 Strength gain due to the pozzolanic reaction of lime treated soils may not be included in the design of slopes.
- 4-0801.10 Soil Stabilization will only be recognized in pavement design in the following manner: The Thickness Index must be determined based on the CBR values in accordance with VTM-8 of the natural subgrade soils before stabilization. Only the top 8 inches of the stabilized soil may be considered as part of the pavement structure necessary to achieve the required Thickness Index.
- 4-0801.11 Soil modified or stabilized by lime may not be used as backfill for basement walls and retaining walls unless approved otherwise by the Director.
- 4-0801.12 Lime modification and lime stabilization will not be permitted when the soil, aggregate or the surface on which the lime treated soil is to be placed is frozen, and manipulation (i.e., mixing) may not be started until the surface is free of frost.

Lime stabilization may not start until the air temperature at the project site is at least 40 degrees Fahrenheit.

4-0801.13 All lime stabilization within the [VDOT Right-of-Way](#) must be completed in accordance with the current [VDOT Road and Bridge Specifications](#) and this policy. If there is a conflict between the current [VDOT Road and Bridge Specifications](#) and this policy, the most restrictive requirement will apply.

4-0801.14 Lime may not be used in Storm Water Management facilities.

4-0802 Expansive Soil Determination

4-0802.1 The geotechnical engineer must use the properties identified in [§ 4-0801.1B](#) to evaluate the volume change of potentially expansive soils. These tests must be performed on representative samples from each soil mapping unit deemed potentially expansive soils impacting the proposed construction.

4-0802.2 All laboratory test data, interpretations and supporting graphs must be included in the geotechnical report.

4-0803 Mixture Design for Lime Stabilization of Soil

4-0803.1 The appropriate lime content for field application must be determined in accordance with the [National Lime Association \(NLA\) Technical Brief, \*Mixture Design and Testing Procedures for Lime Stabilized Soil\*](#), dated October 2006 with the following amendments:

- A. Organic Content – The soil proposed to be stabilized must be natural inorganic soil as defined by [ASTM D2487](#) and may contain no more than two percent organic material by weight as determined by [ASTM D2974](#). The intentional mixing of organic material with natural inorganic soil is not permitted.
- B. Expansion Index (EI) Testing Procedures – In accordance with the [Virginia Uniform Statewide Building Code](#), [ASTM D4829](#) must be used for EI Testing.
- C. Lime used to perform the laboratory tests must be of the same type, grade, and consistency as the lime to be used for field application.
- D. The prescribed minimum amount of lime for stabilization of soil must be determined based on one of the following validation tests:
  - 1. Determine the Expansive Index (EI) of the cured specimens using a minimum of two duplicate tests conducted in accordance with [ASTM D4829](#). The EI must be equal to or less than 20 for lime stabilization to be considered as effective in controlling soil expansion; or



2. Determine the Plasticity Index (PI) of the material from the cured specimens in accordance with ASTM D4318. The PI must be less than 15 for lime stabilization to be considered as effective in controlling soil expansion.
- E. To allow for variations in the soil properties in the field, increase the required minimum lime content as determined by the procedures in § 4-0803.1D by at least 0.5 percent by dry weight and use this value as the design lime content.
- F. Maps, boring logs and laboratory test data and their interpretations (including analysis; plots; the location of each of the proposed lime mix designs including the depth and lateral extent of the proposed lime stabilization; and conclusions) must be included in the geotechnical report.

4-0804 Lime Treatment Requirements for Lime Stabilization of Soil

4-0804.1 The minimum depth and lateral extent of treatment specified below must be used in the absence of engineering analyses and/or controlled experiments or pilot studies substantiating the adequacy of alternative treatment depths and areas. If vegetation is to be established, it must be planted in non-stabilized soil in accordance with standard landscaping practices.

- A. Fills – The depth and extent of treatment must conform to the minimum requirements specified below for the specific engineered structure to be supported by the fill.
- B. Building Pads – When lime stabilization is used, the depth of stabilization must extend throughout the active zone. The lime stabilization must extend at least five feet beyond the projected perimeter of the building's or structure's footing/foundation.
- C. Backfill behind Basement Walls and Retaining Walls – Lime modified and lime stabilized soils may not be placed as backfill behind basement walls and retaining walls, unless approved otherwise by the Director.
- D. Backfill for Utility Trenches – Lime modified and lime stabilized soils may be used to backfill utility trenches.
- E. Roadway and Parking Lot Subgrades – In fill areas, the depth of stabilization must be at least 4 feet below the finished pavement surface. In cut areas, the depth of stabilization must extend to at least 2 feet below the subgrade elevation. The lime stabilization must extend at least 2 feet beyond the proposed edges of the pavement, shoulders and sidewalks.

4-0804.2 If lime stabilized soils are to be used in the determination of the Thickness Index for the pavement design, the stabilized soil must have a minimum unconfined

compressive strength of 150 psi when prepared and tested in accordance with VTM-11. The required pavement Thickness Index is determined based on the CBR values in accordance with VTM-8 of the natural subgrade soils before stabilization. Only the top 8 inches of the stabilized soil may be considered as part of the pavement structure necessary to achieve the required Thickness Index.

4-0804.3 Alternative treatment depths and areas may be used provided their adequacy is satisfactorily demonstrated and pursuant to obtaining approval from the Director. All supporting data, logic, rationale, assumptions, field control procedures and conclusions must be thoroughly documented in the geotechnical report.

- A. The geotechnical engineer must evaluate the variation of the swell potential and swell pressure with depth for the expansive soils encountered at a particular site.
- B. Swell tests must be conducted on disturbed or undisturbed soil samples or both depending on the requirements of the particular application. These tests must be conducted in accordance with ASTM D4546 (Method B), ASTM D4829 and/or other testing methods approved by the Director. The tests must take into account field conditions, including moisture variation, compacted densities, and surcharge loads.
- C. Based on pilot studies, the geotechnical engineer may recommend alternative treatment for the depth and lateral extent to which treatment should extend in order to achieve the desired performance or required design parameters, such as allowable differential movement and swelling pressures.

4-0805 Health and Safety Precautions for Soil Treatment with Lime

4-0805.1 Various types of lime can be used in a dry or slurry form for soil treatment. Care must be taken during construction to avoid skin and eye burns, especially if quicklime is used. Water must be applied, and mixing operations must be started immediately after spreading lime in order to avoid or minimize unnecessary exposure.

4-0805.2 The contractor is responsible for controlling fugitive dust due to lime application, on and off the project limits. Dry lime may not be delivered, spread or mixed when wind or other conditions would allow lime dust to leave the construction site. If lime leaves or appears likely to leave the construction site or will impact any onsite tree save areas—as determined from visual observation—the contractor must immediately cease operations. Operations may not be resumed until working conditions are suitable or alternate construction techniques are employed to ensure that lime dust does not leave the construction site.

- 4-0805.3 Water runoff from any project site must be controlled by the contractor. Lime must not be allowed to flow with water runoff to any surface water body on or off a project site, into any tree save area, or onto an adjacent site.
- 4-0805.4 Before approval of the soil report or site plan, a Health and Safety Plan must be provided for incorporation into the project specifications. The Health and Safety Plan must include the identification of precautions for exposure to lime, associated operations and products, protocols for ensuring adherence to the plan requirements, and emergency medical treatment available on and near the job site. The Health and Safety Plan must be prepared by a competent professional for the contractor. A copy of the Health and Safety Plan must remain on site at all times for reference. The Health and Safety Plan must be incorporated into the approved set of plans.
- 4-0806 Lime Stabilization Specifications
- 4-0806.1 Lime stabilization must be accomplished according to a set of specifications prepared by the Geotechnical Engineer of Record registered in the Commonwealth of Virginia, which must include a Field Quality Control Plan meeting the minimum requirements of §§ 4-0801, 4-0804, and 4-0807. These specifications must be submitted in the form of a geotechnical report. The complete package provided for submission must include the Health and Safety Plan and the site, subdivision or grading plans. After the geotechnical report has been approved, the approved recommendations must be incorporated into the plans as project specifications.
- 4-0806.2 The specifications must describe the work, identify suitable material (lime, water, etc.) requirements, identify the type of equipment for mixing, describe the contractor's experience and address at a minimum, the following construction methods: soil preparation; lime spreading; mixing and watering; mellowing; and compaction and finishing.
- 4-0807 Field Quality Control for Lime Modification and Stabilization of Soil
- 4-0807.1 Field quality control must be provided on every project where lime modification and lime stabilization are used and must be monitored under the direction of the Geotechnical Engineer of Record qualified and experienced in soil and foundation engineering. Daily written documentation of all monitoring activities, including field observations, construction equipment, source, type, grade and consistency of lime distribution, sampling and test locations, test results and supporting measurements, etc., must be maintained and readily available at the project field office and be made available upon request.
- 4-0807.2 At a minimum, the following elements must be included in the geotechnical report which must be submitted for review before approval of the Site Plan. Where

required, random sampling, measurement and testing locations, and random locations must be determined in accordance with [ASTM D3665](#).

- A. Depth of Lime Treatment – The depth of treatment must be investigated for every application by digging test holes and spraying a non-hazardous color sensitive indicator solution on the treated soil exposed on the sides of the test holes. If lime is present in the soil, it should react with the indicator solution and cause a change in color to develop. For subgrade stabilization applications, one test hole is required per 3,000 square foot area of treated soil. A minimum of three test holes are required for any subgrade stabilization application. The test holes must be randomly located. The minimum number of test holes required is on a per layer (lift) basis when mixing is accomplished in-place by a traveling mixer. When lime-soil mixing is accomplished using a stationary mixer, the minimum number of test holes required may be based on the surface area of the total thickness of lime stabilized soil.
  
- B. Lateral Extent of Lime Treatment – Before stabilizing an area, the limits of lime treatment must be established in the field by a survey. The extent of the treated areas will be identified by the geotechnical engineer and the field surveys must be conducted by a professional land surveyor or registered design professional registered in the Commonwealth of Virginia. In addition, test holes used to check the depth of treatment must also be used to verify the lateral extent of treatment.
  
- C. Dry Lime Spread Rate – The spread rate of dry lime must be determined or measured for every lift in terms of pounds of lime per unit area of surface. If lime is applied in bags, the spread rate can be determined from: the number of bags used, the weight of lime per bag, and the area being treated. If lime is applied in bulk via mechanical means, a one-square-yard piece of canvas or other suitable material must be placed on the ground at random locations at least once per day during continuous operation, and the weight of lime spread on it measured after lime application is completed. A minimum of three measurements must be conducted for bulk applications, with one test being conducted at the start of spreading lime.
  
- D. Spread Rate of Lime-Slurry Composition – The spread rate of lime-slurry over a known (measured) area can be based on the lime solids content. The amount of lime solids in a lime-slurry mixture can be determined by measuring the specific gravity of the slurry. The specific gravity must be determined via hydrometer test in accordance with [ASTM D422](#). Alternative methods to measure the specific gravity of lime slurry may be proposed for review and approval. A minimum of one test must be conducted for every 2,500 gallons of slurry mix or portion thereof. Samples must be taken at random locations after slurry spreading begins.

- E. Mellowing and Pulverization – A minimum duration of 24 hours is required for mellowing, unless laboratory studies show that the PI is reduced to less than 15 in a shorter period of time. Tests must be conducted in the field to assure proper pulverization after mellowing and before final placement or compaction. The lime treated material must be mixed until 100 percent of it, exclusive of the coarse aggregate, passes the 1-inch sieve and a minimum of 60 percent of it, exclusive of the coarse aggregate, passes the U.S. Number 4 sieve. If the lime stabilization is completed in two days or less, three tests must be conducted, with one test being conducted at the start of operations. If the lime stabilization is completed in more than 2 days, at least one test per lift must be conducted each day during continuous operation.
  
- F. Testing Before Final Compaction – The maximum allowable loose lift thickness is 8 inches. After pulverization, and before final compaction, samples from random locations within each lift must be taken for pH ([ASTM D6276](#)) and PI ([ASTM D4318](#)) or EI ([ASTM D4829](#)) determinations. One soil sample must be taken and tested for every 1,000 cubic yards of stabilized soil with a minimum of one soil sample per day from each lift of stabilized soil. However, if the test results indicate the work is not in compliance with the approved specifications, the Director may require a greater testing frequency. The pH determination may not be less than a pH of 12.2 and no more than 10 percent of pH determinations must be less than a pH of 12.3. Field pH testing is not required for lime modified soil.
  
- G. Compaction Characteristics – For every type of expansive soil to be modified or stabilized at the job site, laboratory moisture density curves must be determined for a mixture of that soil with the design lime content. The laboratory compaction test must be conducted for soil and soil-lime mixtures in accordance with [ASTM D698](#). The compaction in the field must be monitored based on the laboratory moisture-density test results. One field density test must be conducted per 10,000 square foot area of each compacted lift, with a minimum of three tests per lift. Tests must be made at random locations within each lift. Field density tests must be conducted in accordance with [ASTM D6938](#) or [ASTM D1556](#) or a combination of the two standards. Since the moisture-density relationships change with time during curing, testing for field moisture-density characteristics must be conducted as soon as the compaction of the mixture has been completed.
  
- H. Other Engineering Characteristics – Other field tests may be appropriate to demonstrate the quality control or verify the anticipated performance of the lime-treated material for the particular application. The type, purpose, frequency, and location of all other field tests must be documented in the quality control plan.
  
- I. The Geotechnical Engineer of Record must compile a summary report of all site observations and testing performed daily and submit signed and sealed

reports within 5 business days. All technicians performing work within the VDOT Right-of-Way must obtain certification through VDOT, and certification by any other agency is not acceptable.

4-0808 Quality Assurance

4-0808.1 Quality assurance must be provided by the Geotechnical Engineer of Record on every project where lime treatment is used, and must include at a minimum, a weekly audit of field quality control activities and a final written summary report.

- A. The final report must be signed and sealed by the Geotechnical Engineer of Record and must include a summary of all monitoring data; audit results; steps taken to correct any deficiencies or items not in compliance with the specifications and Field Quality Control Plan; a statement indicating whether or not lime modification or stabilization for all applications of the subject project has been performed in accordance with the specifications and Field Quality Control Plan; a recommendation for any work to be completed before the release of performance bonds and/or the issuance of residential or non-residential use permits; and all supporting data.
- B. The audits and final summary report must be conducted and prepared under the direction of a Virginia registered design professional, specializing in soil and foundation engineering.
- C. The final summary report must be submitted to LDS within 30 days following the completion of lime stabilization. Review and approval of the final summary report is required before the release of performance bonds and/or the issuance of the Certificate of Occupancy related to the subject project.

**Proposed Amendment to Chapter 6 (Storm Drainage)  
of  
the Public Facilities Manual**

**Amend Article 6-0400 (STORMWATER RUNOFF QUALITY CONTROL CRITERIA), Section 6-0402 (Stormwater Quality Control Practices), by revising Subsection 6-0402.7 to read as follows:**

6-0402.7 Developers, in coordination with [DPWES](#), ~~may cooperate~~ ~~are strongly encouraged to seek cooperation~~ with other planned developments in their watershed area in order to construct combined facilities which could serve several developing sites. ~~This regional approach to stormwater management would result in facilities that are not only efficient in terms of stormwater quality control, but are also cost effective and land saving.~~

**Amend Article 6-0400 (STORMWATER RUNOFF QUALITY CONTROL CRITERIA), Section 6-0402 (Stormwater Quality Control Practices), Subsection 6-0402.8, by revising Paragraph 6-0402.8B to read as follows:**

B. A map showing drainage divides, land cover and hydrologic soil group for all subareas used in the water quality computations of ~~weighted average~~ “C” factors, [BMP](#) storage, and phosphorus removal including off-site areas, open space, ~~and uncontrolled areas.~~

**Amend Article 6-0400 (STORMWATER RUNOFF QUALITY CONTROL CRITERIA), Section 6-0402 (Stormwater Quality Control Practices), Subsection 6-0402.8, by revising Paragraph 6-0402.8H to read as follows:**

H. If an owner or operator intends to meet the requirements established in [Chapter 124](#) of the Code through the use of off-site compliance options, ~~then~~ a letter of availability from the off-site provider must be included.

**Amend Article 6-0900 (CLOSED CONDUIT SYSTEM), Section 6-0902 (Storm Sewer Pipe), Subsection 6-0902.2 (Adjustments of Pipe Sizes as Determined by the Manning Formula), by revising Paragraphs 6-0902.2K and O to read as follows:**

K. Plain concrete culvert pipe and non-reinforced concrete pipe must conform to the requirements of ASTM Designation C-14 Extra Strength; reinforced concrete pipe must conform to ASTM Designation C-76 Classes II, III, and IV; a minimum of Class III or equal is required under areas subject to vehicular traffic. Joints between pipe segments and connections to manholes and other pipe structures must meet VDOT requirements and must conform to the silt-tight specification of AASHTO R82-17. Joint systems must be on the VDOT Materials Division Approved List for pipe joints.

O. Polypropylene Pipe (PP)

1. Polypropylene Pipe must conform to the requirements of AASHTO M330 and must be double-wall pipe (Type S) or triple-wall pipe (Type D) for nominal diameters of 12 inches through ~~60~~ 30 inches ~~and must be triple-wall pipe (Type D) for nominal diameters of 36 inches through 60 inches.~~ The use of polypropylene pipe less than 12 inches or greater than 60 inches is not permitted. Suppliers of polypropylene pipe for stormwater applications must be on VDOT Materials, Division Approved List meeting the requirements of VDOT's PP Corrugated Pipe Products Quality Assurance Program.

**Amend Article 6-0900 (CLOSED CONDUIT SYSTEM), Section 6-0903 (Pipe and Culvert Materials), by revising Table 6.8 (Pipe and Culvert Materials – Roughness Coefficients) to read as follows:**

- 6-0903.1 Pipe and culvert materials acceptable for storm drain construction with the accompanying roughness coefficients are shown below:

<b>Material</b>	<b>Manning “n”</b>
Plain Concrete Culvert Pipe (PCCP) <sup>2</sup>	.013
Non-Reinforced Concrete Sewer Pipe (NRCSP) <sup>2</sup>	.013
Reinforced Concrete Pipe (RCP)	.013
<del>Vitrified Clay Pipe, Extra Strength (VCPX)</del>	<del>.013</del>
Cast Iron Pipe (CIP)	.013
Corrugated Plain Metal Pipe (CMP) <sup>1</sup>	.024
25% Paved	.021
50% Paved	.018
100% Paved	.013
High-Density Polyethylene Pipe (HDPE)	.012
Polypropylene Pipe (PP)	.013
<sup>1</sup> Corrugated metal pipe is approved for use at residential driveway entrances, temporary installations, and privately maintained detention systems. Except for the above uses, this type of pipe may be used only when approved by the Director. In approving the use of CMP, the Director may apply certain conditions to provide for inspection and testing in accordance with <a href="#">AASHTO</a> 's standards, including deflection testing.	
<sup>2</sup> Plain Concrete Culvert Pipe (PCCP) and Non-Reinforced Concrete Sewer Pipe (NRCSP) must conform to the <a href="#">VDOT Road and Bridge Specifications</a> . Pipe sizes 12 in. through 24 in. are permitted, in accordance with <a href="#">§ 6-0902.2</a> .	



**Amend Article 6-0900 (CLOSED CONDUIT SYSTEM), Section 6-0904 (Hydraulic Grade Line), by revising Subsection 6-0902.4 (Pressure Flow) to read as follows:**

6-0904.4 Pressure Flow. New closed conduit systems should be designed to have no surcharge during the 10-year design storm. Storm sewer systems ~~may be designed for pressure flow~~ are subject to approval of the Director; ~~however, all proposed pressure flow systems should be coordinated with DPWES in the preliminary design stage.~~ The HGL for the design flows should be at least 1 foot below the established ground elevation and no more than 5 feet above the crown of the pipe. For curb opening inlets the gutter flow line is considered the established ground elevation.

**Amend Article 6-0900 (CLOSED CONDUIT SYSTEM), Section 6-0905 (Closed Conduit Design Calculations), by revising Subsection 6-0905.4 (Pipe Design Calculations) and Paragraph 6-0905.4A to read as follows:**

6-0905.4 Pipe design calculations: For storm sewer systems, submit a storm sewer profile with hydraulic grade lines drawn on it.

~~A. For storm sewer systems, submit a storm sewer profile with hydraulic grade lines drawn on it.~~

**Amend Section 6-1110 (Storm Sewer Construction Specifications), by revising Subsections 6-1110.3 and 6-1110.13 to read as follows:**

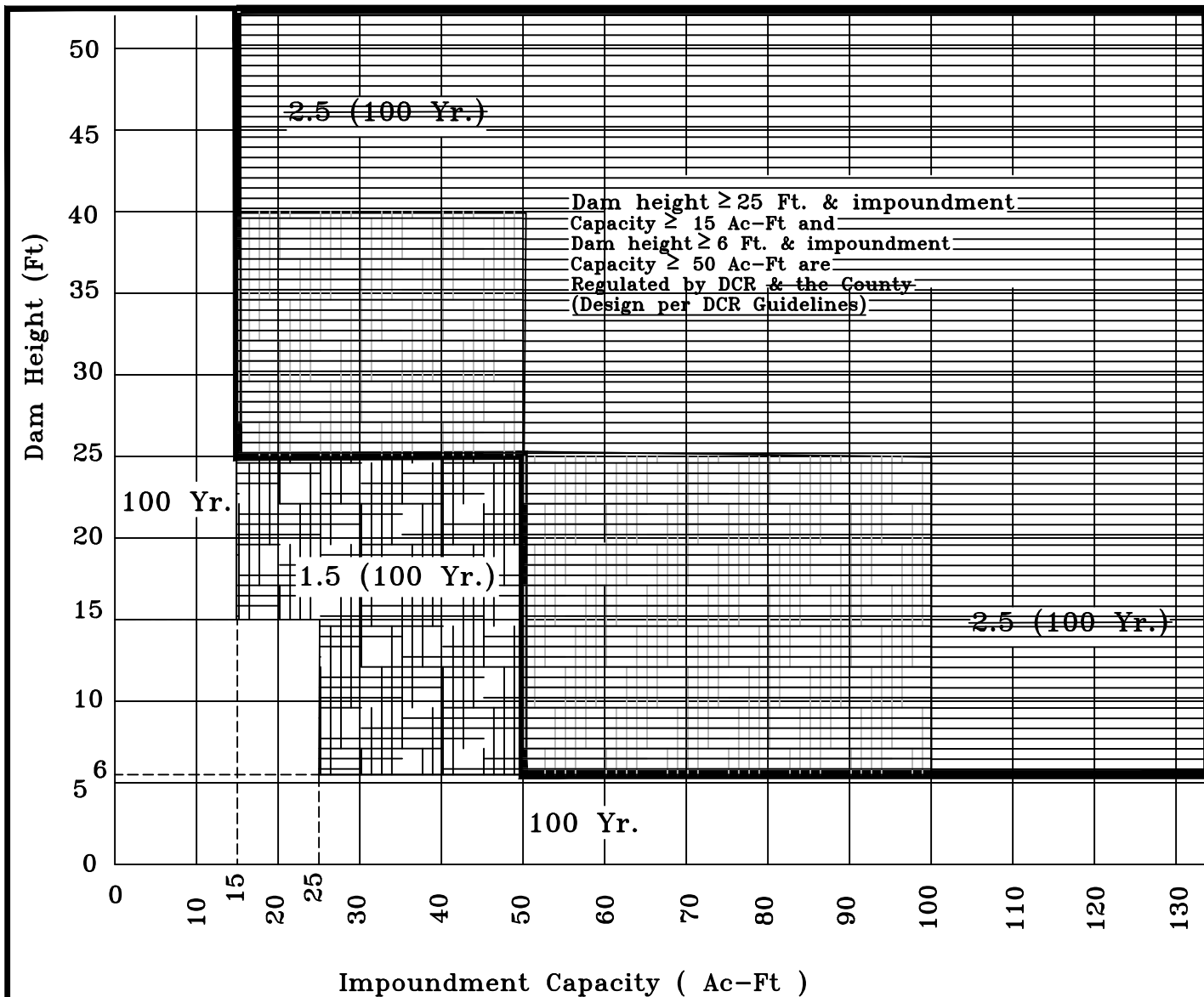
#### **6-1110 Storm Sewer Construction Specifications**

6-1110.3 Drop inlets, manhole structures and curb inlets must have steps. The maximum dimension from finished grade to the first step in the inlet may not exceed 3 feet 3 inches. Steps must be aligned with structure access openings. In cases where the structure top is wider than the structure, openings must be aligned to allow access to the steps in the structure base.

6-1110.13 A handrail, guardrail, fence or other protective device is required when the height of an endwall is 2 feet or greater and the structure is located near residence or pedestrian walkways. The protective device must be shown on the plan. Guardrails ~~will~~ must be so placed so as to perform their intended function, ~~for which it is intended~~ and the height of the guardrail must extend 36 inches above the ~~surrounding area~~ high side of the endwall.

**Amend Chapter 6 Plates by revising Plate 30-6 (24 Hour Design Storm Chart For Spillway Design Floor (SDF)) and Plate 61-6 (PP And HDPE Pipe Trench) as follows:**

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



100 Yr., 24 Hr. = 7.3-8.41" ( Ref: NWS TP-40 NOAA ATLAS 14 )  
 PMP, 24 Hr. = 35.5" ( Ref: NWS HMR-51 )

### Design Storm Ranking\*

- 100 Yr. ≈ 0.2 PMP
- 1.5 X (100 Yr.) ≈ 0.3 PMP
- 2.5 X (100 Yr.) ≈ 0.5 PMP
- 3.5 X (100 Yr.) ≈ 0.7 PMP
- 5.0 X (100 Yr.) ≈ 1.0 PMP

\*The above ranking must be used when selecting 'Next Highest Storm' for freeboard hydrograph and for Overtopping Breach analyses.

Ref. Sec. 6-1603.1A,  
 6-1603.1B, 6-1603.4B,  
 6-1603.4E

Rev. 1-00, 1-04, 2011  
 Reprint, 2-16, 2018  
 Reprint, x-20

## 24 HOUR DESIGN STORM CHART FOR SPILLWAY DESIGN FLOOD (SDF)

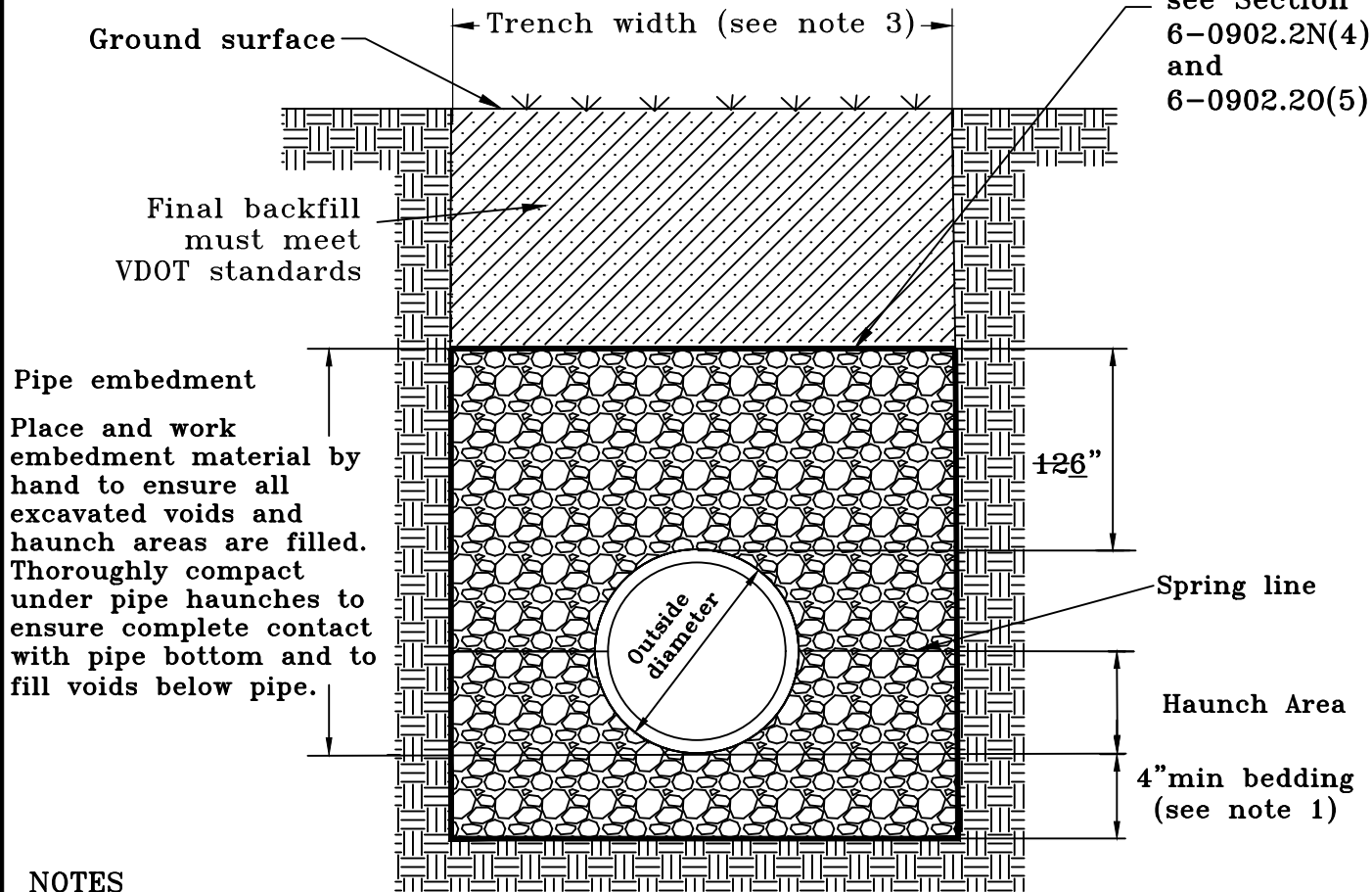
PLATE NO.

STD. NO.

30-6

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL

Filter fabric  
see Section  
6-0902.2N(4)  
and  
6-0902.20(5)



## NOTES

1. Bedding must be in accordance with VDOT Road and Bridge Specifications, Section 302.023(a).
2. Embedment material must be placed alongside the pipe in uniform layers in lifts not to exceed 6" in depth. Embedment material must be VDOT aggregate No. 25 or 26, aggregate base material size 21A or 21B, flowable fill, or crushed glass conforming to the size requirements for crusher run aggregate size 25 or 26. Compaction must meet VDOT standards and be in accordance with PFM Section 4-0503 for minimum required site density testing.
3. Trench width must be specified by the Engineer and meet VDOT standards. Refer to ASTM D2321 for procedures for trench excavations that are especially important in flexible thermoplastic pipe installations such as support of trench walls and trench boxes. Moveable trench boxes may be used below the pipe embedment per supports (e.g. trench boxes) should not be used below the top of the pipe zone (i.e. top of pipe to bottom of pipe) unless approved methods are used to maintain the integrity of the embedment material in accordance with ASTM D2321.

Ref. Sec. 6-0902.2N,  
6-0902.20

Rev. 1-03, 2011 Reprint,  
2018 Reprint, 1-19,  
x-20

PP AND HDPE PIPE TRENCH

PLATE NO.

STD. NO.

61-6

**Proposed Amendment to Chapter 7 (Streets, Street Lights, Parking and Driveways)  
of  
the Public Facilities Manual**

**Amend Chapter 7 (Streets, Street Lights, Parking and Driveways), List of Plates, Existing Plate DE-5, to read as follows:**

<b>Standard Designation</b>	<b>Plate No.</b>	<b>Description</b>	<b>Section</b>
DE-15	20-7	<del>Residential Driveway Entrance Standard Driveway Entrance Streets—No Curb and Gutter</del>	7-0403.1A

**Amend Article 7-0100 (GENERAL STREET POLICIES), Section 7-0101 (Street Design), by revising Subsection 7-0101.2 to read as follows:**

7-0101.2 All rights-of-way must conform to Plates 1-7 through 10-7, as well as the standards set forth in the current [VDOT Road Design Manual](#), the [VDOT Road and Bridge Standards](#), and the [VDOT Instructional and Informational Memoranda](#), ~~VDOT Subdivision Street Requirements (SSR), VDOT Subdivision Street Acceptance Requirements (SSAR), Multimodal Design Standards for Mixed-Use Urban Centers, and Plates 1-7 through 10-7.~~

**Amend Article 7-0100 (GENERAL STREET POLICIES), Section 7-0105 (Street Construction), by revising Subsection 7-0105.1 to read as follows:**

7-0105.1 All streets ~~should~~ must be constructed and surfaced in accordance with the standards set forth in [Plates 1-7](#) through [12-7](#).

**Amend Article 7-0200 (PRELIMINARY STREET PLANNING), by revising Section 7-0201 (General Requirements) to read as follows:**

**7-0201 General Requirements.** All streets which are to be dedicated for public use, must be designed to comply with the applicable geometric standard in accordance with the current [VDOT Road Design Manual](#) and [Plates 1-7](#) through [3-7](#).

7-0201.1 In order to determine the proper street cross-section, ~~and to use~~ to facilitate review and approval of preliminary plats, the following information must be provided for each street intersection:

- A. The number of vehicles per day entering and leaving the intersection must be noted on each leg of each street in each direction.

- B. The proposed street right-of-way, together with the proposed width of street (face of curb to face of curb or edge of pavement to edge of pavement) including bicycle and pedestrian pathways for each block on every street in the subdivision, is to be shown.
- C. All street construction must be within the dedicated street right-of-way. Easements will not be accepted to make up the minimum required right-of-way if any construction is proposed thereon. Slope construction easements must be provided where required.
- D. The recommended number of travel lanes for each block on every street in the subdivision based on the [Comprehensive Plan](#).
- E. The recommended bicycle and pedestrian facilities for each block on every street in the subdivision based on the [Comprehensive Plan](#).
- F. In the Tysons Urban Center Area, the minimum street right-of-way required to meet public safety needs must be based on the [Transportation Design Standards for the Tysons Corner Urban Center as approved via a Memorandum of Agreement between Fairfax County and the Virginia Department of Transportation](#).

7-0201.2 The following information must be shown for ~~all~~ each streets ~~which~~ that intersects the exterior boundary of the subdivision and which will provide access to adjoining undeveloped property:

- A. Number of acres expected to contribute vehicles to the ~~is~~ street and recommendation from the [Comprehensive Plan](#) for street connectivity to adjoining undeveloped property;
- B. An indication of how the adjoining property is shown on the adopted [Comprehensive Plan](#) together with the number of units per acre residential density proposed;
- C. The total number of units expected to be contributing to the subject street; ~~and~~
- D. The total vehicles per day expected to be using the street.
- E. The recommended bicycle and pedestrian pathway connections to adjoining undeveloped property based on the [Comprehensive Plan](#).

- 7-0201.3 For streets which intersect the exterior boundary of the subdivision and connect with existing, dedicated or proposed streets in adjoining subdivisions, the following is required:
- A. The number of lots from the adjoining subdivision from which vehicles will be expected to use the subject street; ~~and~~
  - B. The number of vehicles expected to enter the subdivision over the subject street from said lots.
  - C. The recommended bicycle and pedestrian pathway connections to adjoining property with dedicated or proposed streets based on the [Comprehensive Plan](#).

**Amend Article 7-0300 (STREET PLAN AND PROFILE REQUIREMENTS), Section 7-0302 (Guardrails), Subsection 7-0302.2, by revising Paragraph 7-0302.2E to read as follows:**

- 7-0302.2E Sidewalk location in relation to guardrail must be in accordance with the current ~~Appendix B of the~~ [VDOT Road Design Manual](#).

**Amend Article 7-0300 (STREET PLAN AND PROFILE REQUIREMENTS), Section 7-0303 (Entrances), by revising Subsection 7-0303.3 to read as follows:**

- 7-0303.3 CG-11 entrances must be used for all commercial entrances, entrances of parking bays, parking courts, townhouses, etc.; however, CG-13 entrances may be used if approved by [VDOT](#) when the use is consistent with the adjacent areas.

**Amend Article 7-0300 (STREET PLAN AND PROFILE REQUIREMENTS), Section 7-0305 (Sight Distance), by revising Subsection 7-0305.2 to read as follows:**

- 7-0305.2 Sight distances must take into consideration any objects that will restrict sight distance, including vegetation, which may only be apparent in the spring and summer. Two-foot vertical clearance is desirable along the line of sight. Two-foot horizontal clearance is desirable from the line of sight. Additional sight distance may be required with heavy truck volume and/or steep grades in accordance with ~~Appendix C of the current~~ [VDOT Road Design Manual](#).

**Amend Article 7-0400 (PAVEMENT DESIGN), Section 7-0402 (Private Streets, Access Streets and Aisles, Parking Lots), by revising Subsection 7-0402.2 to read as follows:**

- 7-0402 Private Streets, Access Streets and Aisles, Parking Lots**

7-0402.2 In ~~residential~~ developments subject to shared-common or joint use, such as townhouses, patios, and garden courts:

A. For geometric design, see [Plate 4-7](#).

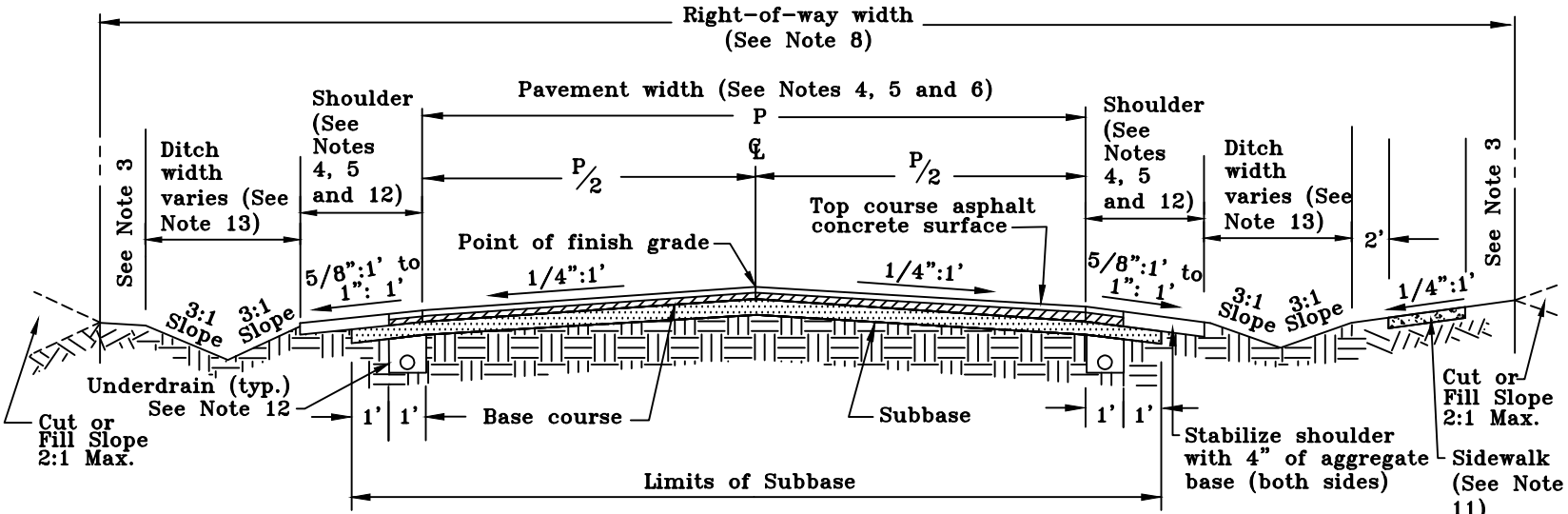
B. For pavement design, see standard pavement [§ 7-0402.6](#).

**Amend Article 7-0400 (PAVEMENT DESIGN), Section 7-0403 (Private Driveway Entrances and Pipestem Driveway Standards), Subsection 7-0403.1 (Private Driveways), by revising Paragraph 7-0403.1A to read as follows:**

- A. Private driveway entrances on curb and gutter streets must conform to current [VDOT Road and Bridge Standards](#) (CG-9B and ~~through~~CG-9D); however, an alternative driveway entrance may be used in accordance with [Plate 20-7](#), subject to [VDOT approval](#). Private driveway entrances on streets with no curb and gutter must conform to current [VDOT Road and Bridge Standards \(PE-1\) ~~Plate 20-7~~](#).

**Amend Chapter 7 (Streets, Street Lights, Parking and Driveways) Plates to align with current PFM text, by updating several references in [Plate 31-7 \(Utility Locations Water, Gas, Sewer\)](#), [Plate 32-7 \(Standard Pole Locations\)](#), and [Plate 33-7 \(Mail Box Location\)](#).**

**Amend Chapter 7 Plates to align with VDOT standards by revising [Plate 1-7 \(Standard Typical Section For Two-Lane Streets Without Curb & Gutter \(Ditch Section Street\)\)](#), [Plate 2-7 \(Standard Typical Section For Undivided Streets With Curb & Gutter\)](#), [Plate 3-7 \(Standard Typical Section For Multi-Lane Streets With Curb & Gutter\)](#), and [Plate 11-7 \(Standard Typical Street Construction Section For Service Drives With Curb & Gutter\)](#), by removing existing [Plate 20-7 \(Standard Driveway Entrance on Streets -No Curb & Gutter\)](#) and by adding new [Plate 20-7 \(Residential Driveway Entrance\)](#) as follows:**



**NOTES**

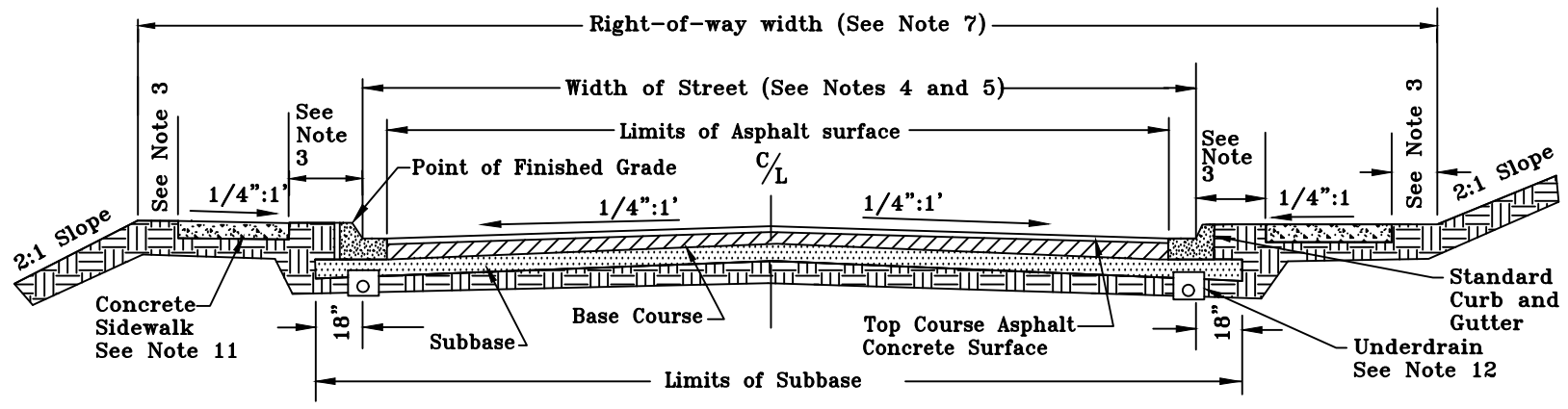
- 1) This typical section may be used in subdivisions in which the average lot size is 18,000 sf or greater on streets that have an ADT up to 5499.
- 2) For streets with projected traffic volumes over 8000 ADT, or serving heavy commercial or industrial traffic, the street must be designed in accordance with the current VDOT Road Design Manual. Pedestrian facilities must be provided in accordance with Chapter 8 of the Public Facilities Manual.
- 3) Distances between features, and distances between features and right-of-way line must be in accordance with the current ~~Appendix B of the~~ VDOT Road Design Manual. VDOT will accept sidewalk, which is a minimum of 1 foot from the right-of-way line.
- 4) For streets with an ADT of 4000 or less; design speed, sight distance, centerline radius, pavement width (except as set forth in Note 6), shoulder width, grade, K values for sag and crest, and clear zone must be in accordance with the current ~~Appendix B of the~~ VDOT Road Design Manual.
- 5) For streets with an ADT between 4001 and 5499, sight distance, centerline radius, shoulder width, grade, K values for sag and crest and clear zone must be in accordance with the current VDOT Road Design Manual based on urban road criteria and a 40 mph design speed. The minimum pavement width must be 24 feet.
- 6) The pavement width for one-way streets must be a minimum of 18 feet.
- 7) Streets with ADTs greater than 4000 must be superelevated in accordance with the current VDOT Road Design Manual.
- 8) The required right-of-way width must be based on containing the features to be maintained by VDOT within the right-of-way in accordance with the current VDOT Road Design Manual.
- 9) Surface, base and subbase designs must be predicated upon a subgrade CBR of 10 or greater and must be designed in accordance with the current VDOT Pavement Design Guide for Subdivision and Secondary Roads in Virginia.
- 10) Grades of relatively short length (up to 295'), which are on a street with a projected traffic volume up to 400 ADT, may be increased by 50% of the value upon approval by the Director and VDOT.
- 11) Sidewalk must be provided in accordance with Section 8-0100 et seq. of the Public Facilities Manual and must meet the standards set forth in the current ~~Appendix B of the~~ VDOT Road Design Manual. Sidewalk cross slope, including passing areas (full 5-foot width) and driveway crossings (~~3~~ min. 4-foot width), ~~should~~ must not exceed 2%. The sidewalk must be a minimum of 7' from the edge of the shoulder, if no physical barrier is provided. Sidewalks along ditch section streets must be in accordance with the current ~~Appendix B of the~~ VDOT Road Design Manual, on compacted subgrade, and include underdrains in accordance with VDOT UD-3. Careful consideration must be given to drainage and sidewalk/street intersections early in the design.
- 12) Underdrains and combination underdrains must be provided in accordance with the current VDOT Road and Bridge standards. Underdrains are required on streets with an ADT of 1000 or greater. The section of the shoulder over the underdrain must be paved.
- 13) The ditch details (e.g. width, depth, and slope) must be determined in accordance with Chapter 6 of the Public Facilities Manual and ~~Appendix B of the~~ current VDOT Road Design Manual. Ditches may not be required on fill sections with no sidewalk, if adequate drainage facilities are located out of the right-of-way. The width of the ditch must be considered when determining the appropriate right-of-way width.

Ref. Sec. 7-0101.2,  
 7-0105.1, 7-0201,  
 7-0306.6B, 7-0402.4A,  
 Plate 20-7  
 Rev. 1-00, 9-01, 11-05  
 4-07, 2011 Reprint,  
 2018 Reprint

**STANDARD TYPICAL SECTION  
 FOR TWO-LANE STREETS  
 WITHOUT CURB & GUTTER  
 (DITCH SECTION STREET)**

1-7	PLATE NO.
TS-1	STD. NO.





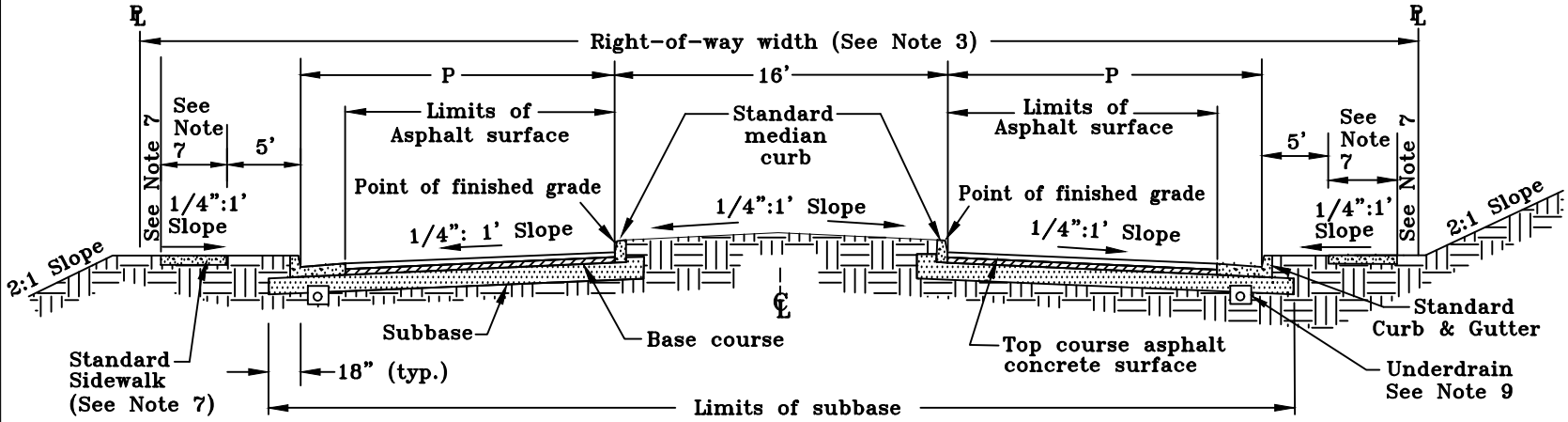
**NOTES**

- 1) This typical section may be used in subdivisions in which the average lot size is less than 18,000 sf on streets that have an ADT up to 5499.
- 2) For streets with projected traffic volumes over 8000 ADT, or serving heavy commercial or industrial traffic, the street must be designed in accordance with the current VDOT Road Design Manual. Pedestrian facilities must be provided in accordance with Chapter 8 of the Public Facilities Manual.
- 3) Distances between features, and distances between features and the right-of-way line must be in accordance with the current Appendix B of the VDOT Road Design Manual. VDOT will accept sidewalk, which is a minimum of 1 foot from the right-of-way line.
- 4) For streets with an ADT of 4000 or less; design speed, sight distance, centerline radius, street width from face of curb to face of curb, grade, K values for sag and crest, and clear zone must be in accordance with the current Appendix B of the VDOT Road Design Manual.
- 5) For streets with an ADT between 4001 and 5499; sight distance, centerline radius, grade, K values for sag and crest, and clear zone must be in accordance with the current VDOT Road Design Manual based on urban road criteria and a 40 mph design speed. The minimum street width from face of curb to face of curb must be 40 feet.
- 6) Streets with an ADT greater than 4000 must be superelevated in accordance with the current VDOT Road Design Manual.
- 7) The required right-of-way width must be based on containing the features to be maintained by VDOT within the right-of-way in accordance with the current VDOT Road Design Manual.
- 8) Grades of relatively short length (up to 295 feet), which are on a street with a projected traffic volume up to 400 ADT, may be increased by 50% of the value upon approval by the Director and VDOT.
- 9) Surface, base and subbase designs must be predicated upon a subgrade CBR of 10 or greater and must be designed in accordance with the current VDOT Pavement Design Guide for Subdivision and Secondary Roads in Virginia.
- 10) Stone base or subbase material must extend under the curb and gutter a minimum distance of 18" from the face of curb. The stone thickness under the curb and gutter must be the pavement depth in excess of the 7" depth of the gutter face but no less than 4".
- 11) Sidewalk must be provided in accordance with Section 8-0100 et seq. of the Public Facilities Manual and must meet the standards set forth in the current Appendix B of the VDOT Road Design Manual. Sidewalk cross slope, including passing areas (full 5-foot width) and driveway crossings (3 min. 4-foot width) should ~~not~~ **must** not exceed 2%.
- 12) Underdrains and combination underdrains must be provided in accordance with the current VDOT Road and Bridge Standards. Underdrains are required on streets with an ADT of 1000 or greater.

**STANDARD TYPICAL SECTION FOR UNDIVIDED STREETS WITH CURB & GUTTER**

Ref. Sec. 7-0101.2,  
7-0103, 7-0105.1,  
7-0201, 7-0306.6B,  
7-0402.5B  
Rev. 1-00, 9-01, 11-05,  
10-06, 4-07, 2011  
Reprint, 2018 Reprint

2-7	PLATE NO.
TS-2	STD. NO.



ADT	P (ft.) (face of curb to face of curb)	R/W (ft.) (See Note 3)
5500 to 8000	27	92

**GENERAL NOTES AND FOOTNOTES**

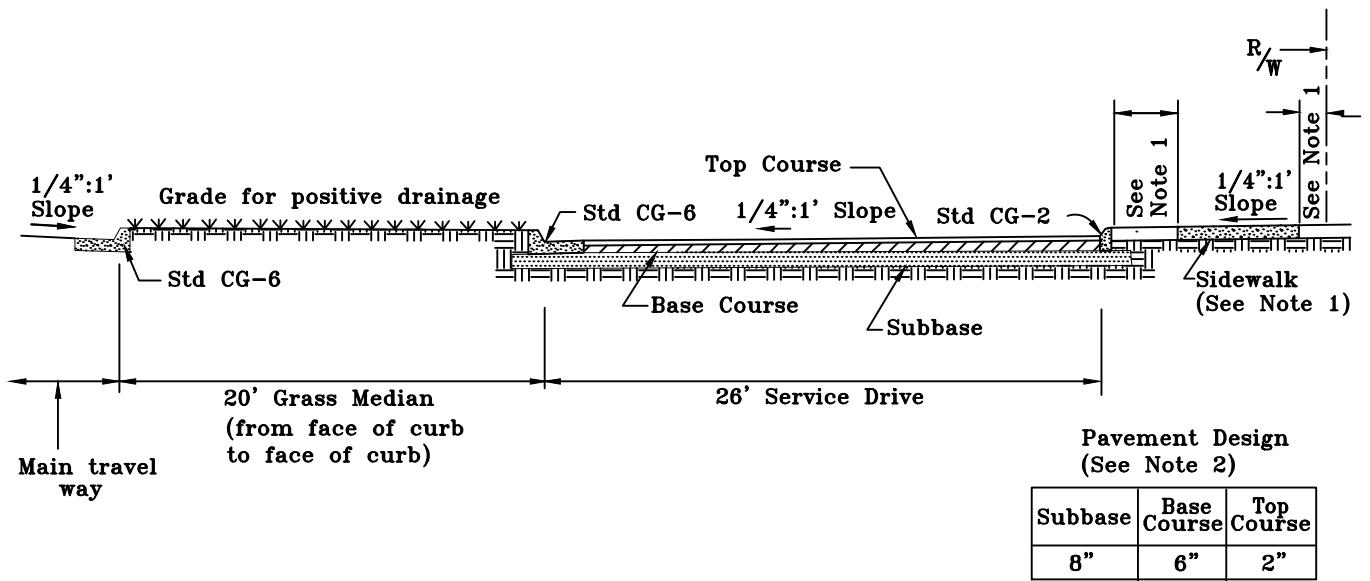
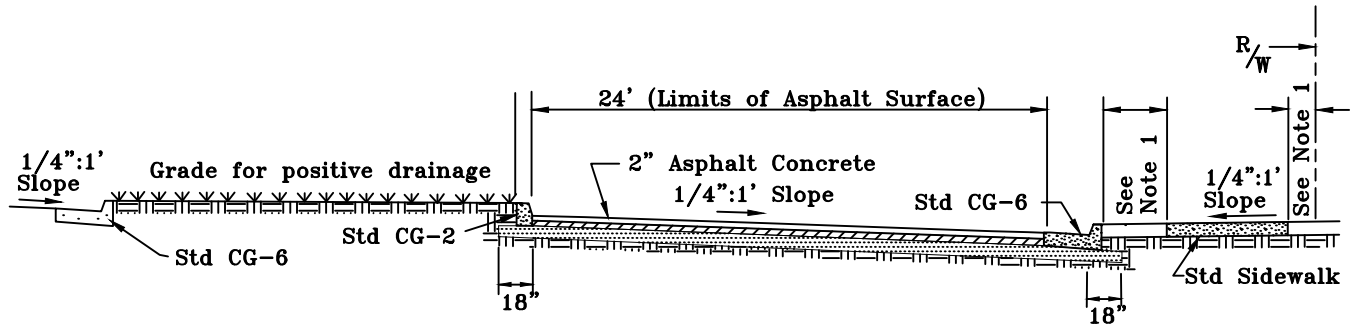
- 1) Street must be superelevated in accordance with the current Standard TC-5 of VDOT Road and Bridge Standards.
- 2) Sight distance, centerline radius, clear zone, grade, K values for sag and crest, distance between features, and distance between features and right-of-way line must be in accordance with the current VDOT Road Design Manual based on urban road criteria and a 45 mph design speed.
- 3) The right-of-way width shown is based on the features shown, which are to be maintained by VDOT. If additional features such as guard rail are required, the right-of-way width may change and must accommodate all features, which are to be maintained by VDOT, in accordance with the current VDOT Road Design Manual.
- 4) Surface, base and subbase designs must be predicated upon a subgrade CBR of 10 or greater and must be designed in accordance with current VDOT Pavement Design Guide for Subdivision and Secondary Roads in Virginia.
- 5) Stone subbase material must extend under the curb and gutter a minimum distance of 18" from the face of curb. The stone thickness under the curb and gutter must be the pavement depth in excess of the 7" depth of the gutter face but no less than 4".
- 6) 12'-wide left turn lanes must be provided at all median crossovers. Any portion of the raised median that becomes less than 6' wide must be constructed in concrete.
- 7) Sidewalk must be provided in accordance with Section 8-0100 et seq. Width of sidewalk and distance between sidewalk and the right-of-way line must be in accordance with the current ~~Appendix B of the the~~ VDOT Road Design Manual. VDOT will accept sidewalk, which is a minimum of 1 foot from the right-of-way line.
- 8) Streets with an ADT in excess of 4000 ADT must be designed in accordance with the current VDOT Road Design Manual.
- 9) Underdrains and combination underdrains must be provided in accordance with the current VDOT Road and Bridge Standards.

Ref. Sec. 7-0101.2,  
7-0103, 7-0105.1,  
7-0201, 7-0306.6B,  
Rev. 1-00, 4-07, 2011  
Reprint, 2018 Reprint

**STANDARD TYPICAL SECTION  
FOR MULTI-LANE STREETS  
WITH CURB & GUTTER**

3-7	PLATE NO.
TS-2	STD. NO.

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



**NOTES:**

- 1) Distance between back of curb to sidewalk, width of sidewalk, and distance between sidewalk and right-of-way line must be in accordance with the current ~~Appendix B~~ of the VDOT Road Design Manual. VDOT will accept sidewalk, which is a minimum of 1' from the right-of-way line.
- 2) Surface, base and subbase designs are predicated upon a subgrade CBR value which equals or exceeds a value of 10. Pavement design and materials must be in accordance with the current VDOT Pavement Design Guide for Subdivision and Secondary Roads in Virginia.

Ref. Sec. 7-0103,  
7-0104.2, 7-0105.1,  
7-0306.6B

Rev. 1-00, 4-07, 2011  
Reprint, 2018 Reprint

## STANDARD TYPICAL STREET CONSTRUCTION SECTION FOR SERVICE DRIVES WITH CURB & GUTTER

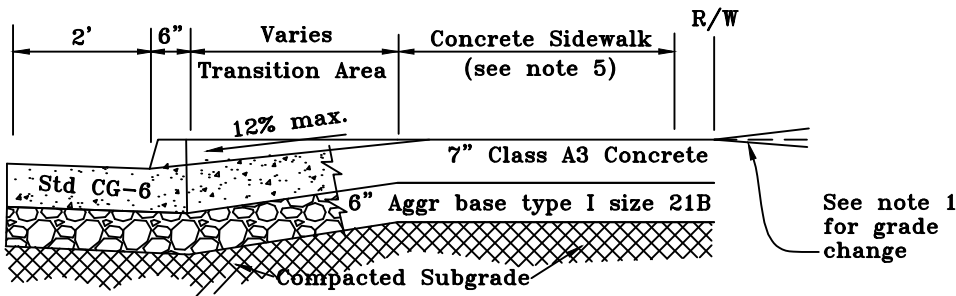
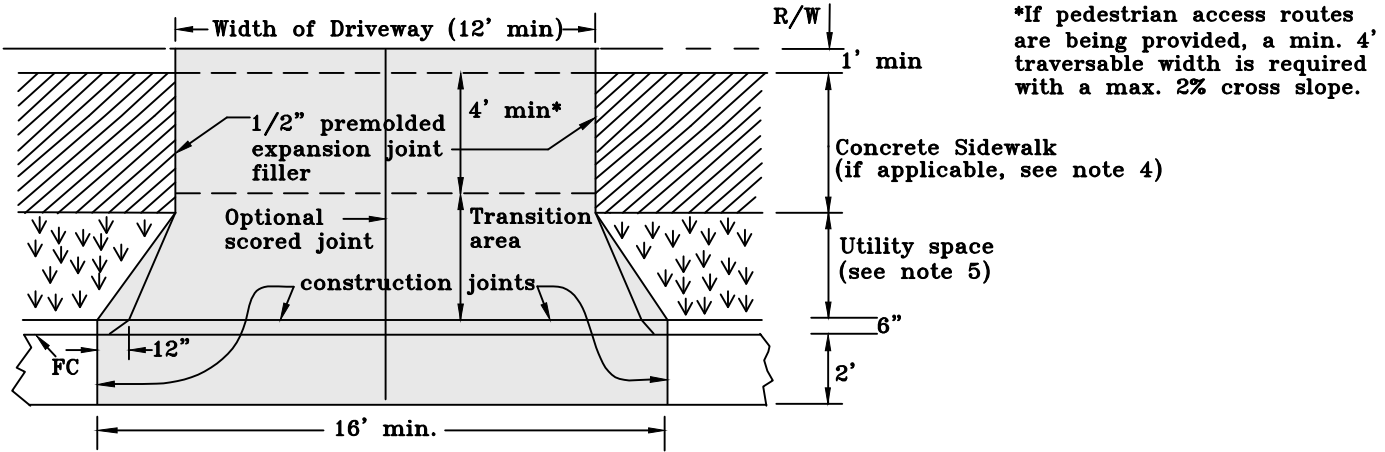
PLATE NO.

11-7

STD. NO.

TS-3

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



## NOTES

1. Lot grading plans must provide for adequate vehicular clearance for driveway approach, departure and breakover transitions in accordance with the current VDOT Standards. Driveway profiles are required where steep grades prevail.
2. All materials and construction of these designs in a R/W to be maintained by VDOT must be in accordance with the current VDOT Road and Bridge Specifications and Standards.
3. This entrance may be used in roads that have an ADT of up to 5,499.
4. Sidewalk must be provided in accordance with Section 8-0100 et. seq. of the Public Facilities Manual and must meet the standards set forth in the VDOT Road Design Manual. Sidewalk cross slope, including passing areas (full 5-foot width) and driveway crossing (min. 4-foot width), must not exceed 2%.
5. Distances between features, and distance between features and right of way line must be in accordance with the current VDOT Standards.

Ref. Sec. 7-0403

## RESIDENTIAL DRIVEWAY ENTRANCE

PLATE NO.

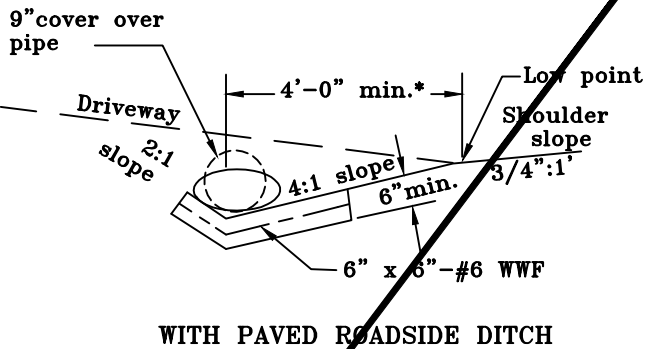
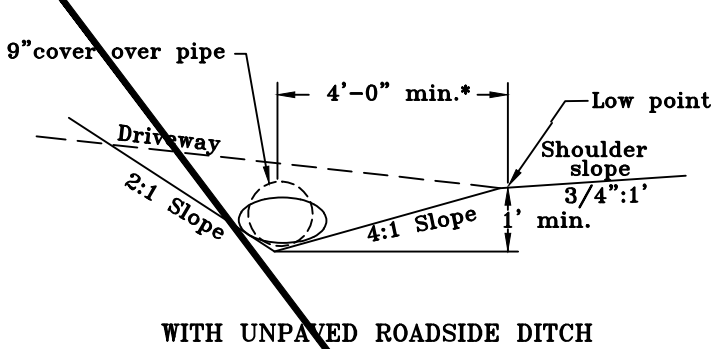
STD. NO.

20-7

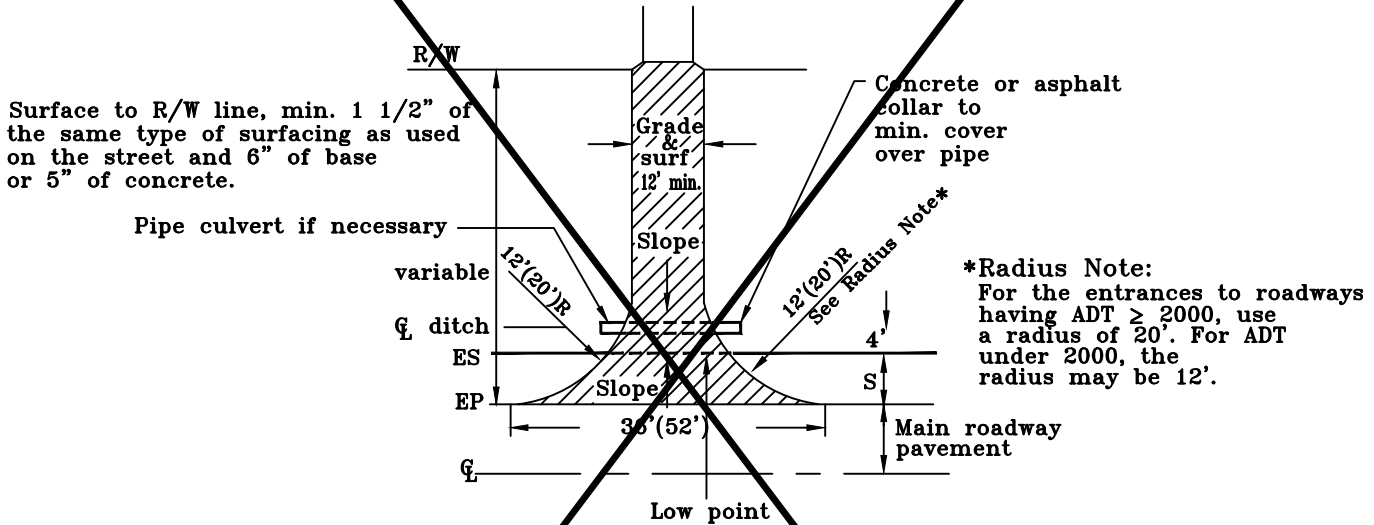
DE-1

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL

## DRIVEWAY CULVERT PIPE INSTALLATION



A paved ditch is required where soil conditions and runoff velocities will cause erosion.



Concrete pipe or corrugated metal pipe may be used. Indicate type and size on plans. Driveways must be surfaced from edge of pavement to property line with the same type of surfacing as used on street.

All driveway grades must start back of the shoulder line. In cut sections, sides of driveway must be graded to a max. 3:1 slope. Lengths of culverts if not shown on plans must be a min. of 20'. For dimension of S, see Plate No. 1-7.

\* Ditch line may be moved back to provide required cover. The transition of the ditch line must be smooth with a min. length of 10'.

**Driveway Clearances-**

Grading plans must provide for adequate vehicular clearance for driveway approach, departure and breakover transitions. Driveway profiles are required when steep grades prevail.

All materials and construction of this design in a R/W to be maintained by VDOT must conform to the current VDOT Road and Bridge Specifications and VDOT Road and Bridge Standards.

Ref. Sec. 7-0403.1A

### STANDARD DRIVEWAY ENTRANCE STREETS-NO CURB & GUTTER

PLATE NO.

STD. NO.

20-7

DE-5

Rev. 1-00, 11-05, 2011  
Reprint, 2018 Reprint

**Proposed Amendment to Chapter 8 (Sidewalks, Trails, and Recreation)  
of  
the Public Facilities Manual**

**Amend Chapter 8 (Sidewalks, Trails, and Recreation) Table of Contents to read as follows:**

**8-0000 BACKGROUND**

8-0001 Background Information

**8-0100 SIDEWALKS**

8-0101 General Information

8-0102 Subdivisions Containing Lots Averaging Less than 25,001 square feet

8-0103 Subdivisions Containing Lots Averaging 25,001 square feet up to 52,000 square feet

8-0104 Boundaries of Subdivisions Containing Lots Averaging up to 52,000 square feet

~~Subdivisions Containing Lots Averaging 52,000 square feet or Greater~~

8-0105 Subdivisions in Proximity of ~~Elementary, Intermediate and High~~ Fairfax County Public Schools

**8-0200 TRAILS**

8-0201 General Information

8-0202 Standards and Criteria

8-0203 Trails on Land Owned and Managed by FCPA

8-0204 Bicycle Parking Guidelines

**8-0300 RECREATION**

~~8-0301 Metal Bridge~~

~~8-0302 Typical Bench~~

~~8-0303 Typical Backless Bench~~

~~8-0304 Typical Grill~~

~~8-0305 Typical Picnic Table~~

~~8-0306 Typical Wheelchair Accessible Picnic Table~~

8-0301~~7~~ Tot Lots

**Amend Chapter 8 (Sidewalks, Trails, and Recreation) List of Plates by updating references in the “SECTION” column and Plates 1-8 through 8-8 and Plates 17-8 through 41-8, and by deleting Plate 15-8 and 16-8 to read as follows:**

STANDARD DESIGNATION	PLATE NO.	DESCRIPTION	SECTION
N/A	<del>15-8</del>	<del>Tot Lot Equipment Layout</del>	<del>2-1104</del>
N/A	<del>16-8</del>	<del>Tot Swinging Devices Layout</del>	<del>2-1104</del>

Add Article 8-000 (BACKGROUND) and Section 8-0001 (Background Information) to read as follows:

**8-0000 BACKGROUND**

**8-0001 Background Information**

8-0001.1 Sidewalk and trail construction in Fairfax County is carried out by three agencies: the DPWES, FCPA, and the VDOT. Sidewalks and trails are also constructed by developers through the rezoning, and subdivision and site plan approval processes as required by § 101-2-2 of the Subdivision Ordinance and § 17-201 of the Zoning Ordinance. The PFM sidewalk provisions are set forth in § 8-0100 *et. seq.* They were established to ensure safe walking conditions for school students based on subdivision density and proximity to schools. The Countywide Trails Plan was developed to serve recreational and transportation needs of pedestrians, bicyclists and equestrians. Trails shown on the Countywide Trails Plan must be constructed by the developer where these trails abut or cross property to be developed or improved. Trails and sidewalks located in the VDOT right-of-way and accepted for VDOT maintenance must comply with VDOT design standards for sidewalks and Shared Use Paths standards for trails. Further, trails to be owned and managed by FCPA must be designed and constructed in accordance with § 8-0203 and Plates 1-8 to 5-8 and 9-8 to 14-8.

**Amend Article 8-0100 (SIDEWALKS), Sections 8-0102 (Subdivisions Containing Lots Averaging Less than 25,001 square feet), 8-0103 (Subdivisions Containing Lots Averaging 25,001 square feet up to 52,000 square feet), and 8-0105 (Subdivisions in Proximity of Elementary, Intermediate and High Schools) by revising them; delete Section 8-0104 (Subdivisions Containing Lots Averaging 52,000 square feet or Greater); and add new Section 8-0104 (Boundaries of Subdivisions Containing Lots Averaging up to 52,000 square feet) to read as follows:**

**8-0102 Subdivisions Containing Lots Averaging Less than 25,001 square feet.** A sidewalk must be constructed on both sides of all streets in these subdivisions, including all reverse or side frontage lots and open space. ~~When the peripheral boundary of the subdivision is contiguous to an existing or planned street, a sidewalk must be constructed on the side of the street abutting the subdivision boundary (see § 8-0105).~~

**8-0103 Subdivisions Containing Lots Averaging 25,001 square feet up to 52,000 square feet.** Sidewalks must be constructed on one side of all streets in these subdivisions, including all reverse or side frontage lots and open space. ~~When the peripheral boundary of the subdivision is contiguous to an existing or planned street, a sidewalk must be constructed on the side of the street abutting the subdivision boundary (see § 8-0105).~~

~~8-0104 Subdivisions Containing Lots Averaging 52,000 square feet or Greater. Sidewalks must be constructed on one side of all streets in these subdivisions, including all reverse or side frontage lots and open space and on all streets of the subdivision boundary when the subdivision is located in proximity to schools in accordance with § 8-0105.~~

**8-0104 Boundaries of Subdivisions Containing Lots Averaging up to 52,000 square feet.** When a subdivision fronts on an existing street, and adjacent property on either side of that street has an existing sidewalk or when the provision of a sidewalk, the need for which is substantially generated and reasonably required by the proposed development, is in accordance with the [Comprehensive Plan](#), land must be dedicated for a sidewalk, and a sidewalk must be constructed, on the side of the street abutting the subdivision boundary, including all reverse or side frontage lots and open space.

**8-0105 Subdivisions in Proximity of Elementary, Intermediate and High to Fairfax County Public Schools.** A sidewalk must be constructed on all streets of the subdivision boundary, on the side of the street abutting the subdivision boundary, including all reverse or side frontage lots and open space, where a subdivision is within 1 mile of an elementary school and/or 1.5 miles of an intermediate or high school and the peripheral boundary of the subdivision is contiguous to an existing or planned street. This ~~criteria must requirement~~ also ~~apply~~ applies to streets in the vicinity of proposed schools, the construction of which is included in the County's Capital Improvement Program.

**Amend Article 8-0200 (TRAILS), Section 8-0201 (General Information), by revising Subsections 8-0201.1 through 8-0201.3 to read as follows:**

**8-0200 TRAILS**

**8-0201 General Information**

8-0201.1 The [Countywide Trails Plan](#) depicts the general location of proposed public trails along roadways, streams, and utility easements. The [Countywide Trails Plan](#) was adopted in 1976 by the [Board](#) as part of the [Comprehensive Plan](#) of Fairfax County adopted under [Title 15.2, Chapter 11, Va. Code](#), as amended. On October 28, 2014, the Board adopted an amendment to the [Countywide Trails Plan](#) which updated trail cross sections and incorporated the [Bicycle Network Map](#) by reference.

8-0201.2 The [Countywide Trails Plan](#) is implemented primarily through the rezoning, subdivision plan and site plan review process; the [Capital Improvement Program](#); the [FCPA park stream valley](#) development process; and occasionally through private community efforts.



- 8-0201.3 Trails shown on the [Countywide Trails Plan](#) must be constructed by the developer where these trails abut or cross property to be developed or improved. Construction of these countywide trails must occur in conjunction with development as required by the standards and criteria set forth in [§ 8-0202 et seq.](#) and as required by other County regulations and ~~Stream Valley~~ [FCPA](#) policies.

**Amend Article 8-0200 (TRAILS), Section 8-0202 (Standards and Criteria) to read as follows:**

- 8-0202 Standards and Criteria.** In order to plan and construct trails in a consistent, usable and orderly fashion, it is necessary to establish basic standards and criteria. The standards and criteria in [§ 8-0202 et seq.](#) must be used in the design and review of countywide trails, development, site and subdivision plans. Trails accepted for [VDOT](#) maintenance must be constructed in accordance with [VDOT](#) criteria and standards and be located fully within the dedicated right-of-way. Trails to be owned and/or managed by [FCPA](#) must be designed and constructed in accordance with [§ 8-0203, Plates 1-8 to 5-8 and 9-8 to 14-8.](#)

**Amend Table 8.1 as shown below:**

Table 8.1 Trail Surface and Width	
Trail Use	Trail Surface and Width
Bikeways	8-ft. wide Type I trail or <u>Type IV</u> (suitable for 2-way bike travel where low to moderate use is anticipated).
Walkways	Asphalt 6-ft. wide Type I trail (suitable for pedestrian uses in most areas).  Concrete 5-ft. to 6-ft. wide Type IV trail (standard concrete sidewalk; not suitable for biking. Wider widths desirable in heavily traveled areas such as metro areas and shopping centers).
Equestrian/ Hiking Trails	Compacted stone and bluestone dust or wood chips 6 ft. wide. Type II, VI, and VII (suitable for horse riding, hiking or use by all-terrain bicycles in low-density areas. Earth surfaced trails require special consideration and approval by the Director, Trails Planner and other reviewing staff).
Trails exceeding the above-specified minimum widths may be constructed subject to the approval of the Director upon favorable recommendation by <a href="#">FCDOT</a> and/or <a href="#">FCPA</a> and other reviewing staff.	

**Amend Article 8-0200 (TRAILS), Section 8-0202 (Standards and Criteria), by revising Subsection 8-0202.2 (Trail Location) to read as follows:**

- 8-0202.2 Trail Location

A. Trail location must be based on safety, circulation, and access considerations. Trails designated on the Countywide Trails Plan parallel to existing or proposed roads must be constructed wholly within the road right-of-way. Trails parallel to ditch section roadways must be constructed on the far side of the ditch.

B. All trails must be located to minimize the loss of trees and disruption of natural environmental conditions. To this end, trails should be located adjacent to or within existing or planned disturbed areas (utility corridors, limits of clearing and grading for projects, adjacent to lot lines for developed lots, etc.) to the greatest extent practicable.

B

C. All stream valley trails should be constructed within a 20-foot wide easement, unless it can be demonstrated that an easement of another width is appropriate or required due to the specific site constraints and conditions.

C

D. Where the typical road section does not include sufficient width to meet the minimum required trail easements specified in [Table 8.2](#), dedication of additional land adjacent to the street right-of-way will be necessary. This land should be dedicated to the appropriate authority in the form of a public trail easement.

**Amend Article 8-0200 (TRAILS), Section 8-0202 (Standards and Criteria), Subsection 8-0202.3 (Clearing), by revising Paragraph 8-0202.3A to read as follows:**

8-0202.3 Clearing

~~A. Where possible, trails must be located to minimize the loss of trees and disruption of natural environmental conditions. A minimum of 2 feet is required between the trail edge and any vertical obstructions such as trees, utility poles, signs or other obstacles.~~

**Amend Article 8-0200 (TRAILS), Section 8-0202 (Standards and Criteria), Subsection 8-0202.4 (Grade), by revising Paragraphs 8-0202.4A and B to read as follows:**

8-0202.4 Grade

A. A profile of the proposed trail construction must be included in site and subdivision plans. The profile must have stations every 100 linear feet and show average slope between stations. Typical cross-sections must be provided for all critical points along the length of the trail (e.g., where the grade of the trail site exceeds 10 percent). At a minimum, cross sections must be shown every 500 linear feet. Additional cross sections must be provided at all ditches and stream crossings.

- B. ~~Minimum allowable.~~ A minimum grade of 1 percent is recommended except in sags where proper drainage is provided by the cross slope.

**Amend Article 8-0200 (TRAILS), Section 8-0202 (Standards and Criteria), by revising Subsection 8-0202.5 (Cross Slope) to read as follows:**

8-0202.5 Cross Slope

~~A. Minimum allowable: 50:1 of width~~

~~B. Maximum allowable: 25:1 of width~~

C

- A. Where cross slopes exceeds a 25:1, ~~the above recommended standards~~, the design engineer must submit a special design including use and safety considerations, for review and approval by [LDS](#) or other County agencies as applicable.

**Amend Article 8-0200 (TRAILS), Section 8-0202 (Standards and Criteria), Subsection 8-0202.7 (Drainage), by revising Paragraph 8-0202.7C to read as follows:**

- C. Trails must be graded so that no concentrated flow or standing water impacts either the surface or the shoulder of the trail. As a general guide where a trail is cut into a hillside, a ditch should be placed along the high side of the path to prevent sheet flow across the walkway.

**Amend Article 8-0200 (TRAILS), Section 8-0202 (Standards and Criteria), Subsection 8-0202.8 (Safety Considerations), by revising Paragraphs 8-0202.8A and 8-0202.8F and adding Paragraph 8-0202.8G to read as follows:**

8-0202.8 Safety Considerations

- A. The safety of ~~potential pedestrians, and others who may use or travel on a trail~~, trail users must be a prime consideration in the trail design.
- F. Standard ramps for mobility impaired persons must be provided at all trail curb crossings to allow continuity of trail use by bicyclists and the mobility impaired. For trails equal to or greater than 6 feet in width, curb depressions equaling the trail width must be used, with the trail surface sloping in accordance with the [USBC](#) and the [Americans with Disabilities Act Accessibility Guidelines](#). If the trail is to be maintained by [VDOT](#), the ramp must be designed in accordance with [VDOT](#) standards (IIM-LD-55.7 or subsequent revisions), be graphically depicted accurately on plans and annotated to denote the type of curb ramp (i.e., CG-12 Type A, B or C), and a curb ramp detail must be provided for each ramp.

G. Bicycle railing will be provided as per [Plate 14A-8](#) on all trails designated as bicycle trails, multi-use trails, or shown on the [Countywide Trails Plan](#), as required. For all [VDOT](#) facilities and sidewalks and other walkways designated as primarily for pedestrian use, [VDOT Standard Handrail HR-1](#), will be provided, as required.

**Amend Article 8-0200 (TRAILS), Section 8-0202 (Standards and Criteria), by relocating Subsection 8-0202.10 (Bicycle Railing) to Paragraph 8-0202.8G as follows:**

~~8-0202.10 Bicycle Railing. Standard bicycle railing (see [Plate 14A-8](#)) will be provided on all trails designated as bicycle trails, multi-use trails, or shown on the [Countywide Trails Plan](#), as required. For sidewalks and other walkways designated as primarily for pedestrian use, [VDOT Standard Handrail HR-1](#), will be provided, as required.~~

**Amend Article 8-0200 (TRAILS), Section 8-0203 (Trails on Land Owned and Managed by FCPA), by revising Subsection 8-0203.1 (General Information) to read as follows:**

8-0203.1 General Information

A. The [Countywide Trails Plan](#) ~~County Stream Valley Park Plan~~ identifies several scenic stream valleys across the County. ~~Many of these streams are also represented on the [Countywide Trails Plan](#).~~ Dedication of the stream valley floodplain and adjacent slopes to [FCPA](#) is recommended when any of these streams cross or abut land proposed for development. Trail construction may be required as part of [FCPA](#)'s acceptance of this land. The location of required trail facilities must be approved by the [FCPA](#) Trails Planner during the site/subdivision plan review process.

~~B. Trails to be owned and managed by [FCPA](#) must be designed and constructed in accordance with [§ 8-0203](#) and [Plates 1-8](#) through [14-8](#).~~

C

B. After stake-out/flagging of proposed trails, the ~~Site Inspector developer~~ must contact the [FCPA](#) Trails Planner to schedule an initial field review of the proposed trail alignment site. The [FCPA](#) Trails Planner must be contacted a minimum of three days before the field review.

D

C. The purpose of the initial field review meeting is to review the proposed alignment for the trail, to approve limits of clearing and grading (which should be flagged prior to the meeting), to resolve discrepancies, to identify contact persons, to flag stream crossing locations, and to identify stream crossing types.

**Amend Article 8-0200 (TRAILS), Section 8-0203 (Trails on Land Owned and Managed by FCPA), by revising Subsection 8-0203.2 (Standards and Criteria) to read as follows:**

- 8-0203.2 Standards and Criteria. Trails to be operated by [FCPA](#) must be constructed in accordance with the standards and criteria in [§ 8-0202](#) and the following additional requirements:
- A. Specific trail alignment, clearing limits, stream crossing type, and trail stabilization methods must be determined by the [FCPA](#) Trails Planner during the field review.
  - B. No clearing or construction must be performed before [FCPA](#) ~~stake-out~~ approval.
  - C. Following notification from the Site Inspector, a substantial completion meeting including the [FCPA](#) Trails Planner must be held to inspect the completed trail facility for final acceptance and bond release. ~~Stream Valley~~ Trail alignments are subject to field revision from approved plans by developers or their representative, with [FCPA](#) approval.
  - D. Steps may be provided only ~~in instances where~~ when specifically requested by [FCPA](#) in writing. Steps must be of concrete construction in accordance with [VDOT](#) standards.
  - E. The developer must provide ~~barriades~~ bollards at all trail access locations to prevent unauthorized vehicular access. The ~~barriades~~ bollards must have locking/unlocking devices to permit access by authorized maintenance vehicles. ~~Barriade designs~~ Bollard locations are subject to approval by the [FCPA](#) Trails Planner (see ~~barriade~~ bollard details in [Plates 6-8](#) [Plates 9-8](#) through [12-8](#)).
  - F. Developers must provide corner fencing at all access points adjacent to private property. The corner fencing must be constructed by installing two 10-foot long sections of split rail fence perpendicular to each other.
  - G. The developer must provide all culverts including flared end sections, concrete end walls, handrails/fencing, bridges, concrete fair weather stream crossings, paved swale crossings (asphalt or concrete), riprap, filter fabric and additional fill material (if needed), as directed by [FCPA](#) Trails Planner in the field, in order to provide a safe, dry, stabilized, well-drained trail surface throughout (see [Plates 6-8](#) [Plates 9-8](#) through [14-8](#)). ~~for details of the fair weather crossing, bollard, and cable barriade).~~ [FCPA](#) will provide other details upon request.
  - H. Stone dust trails may be approved under the following conditions: the trail is not located in a floodplain; slope along the centerline of the trail does not exceed 5 percent; trail cross slope is between 2 percent and 4 percent; grade

reversals are provided every 50 feet; and concentrated cross flow is not allowed.

**Amend Article 8-0200 (TRAILS), Section 8-0203 (Trails on Land Owned and Managed by FCPA), by adding Subsection 8-0203.3 to read as follows:**

8-0203.3 Trails, including supporting elements and facilities, located on property owned or operated by FCPA and connected to other recreational facilities must be designed and constructed to the accessibility standards and guidelines set forth by the United States Access Board (ADAAG, 16.1). These guidelines can be found in the Regulatory Negotiations Committee on Accessibility Guidelines for Outdoor Developed Areas Final Report, dated September 30, 1999. In the event that any State or Federal statute imposes a greater requirement or a higher standard than is required by this PFM, the provision of the State or Federal statute or regulation governs.

**Amend Article 8-0200 (TRAILS), by adding Section 8-0204 (Bicycle Parking Guidelines), to read as follows:**

**8-0204 Bicycle Parking Guidelines**

8-0204.1 Where bicycle parking is proposed, it should be provided in accordance with Fairfax County's Bicycle Parking Guidelines, as amended. At a minimum, plans submitted for approval should include the details to identify the types of racks, the proper placement and installation, the dimensions of rack spacing and clearances, and the number of spaces proposed based on land use classification.

**Amend Article 8-0300 (RECREATION), by deleting Section 8-0301 (Metal Bridge), Section 8-0302 (Typical Bench), Section 8-0303 (Typical Backless Bench), Section 8-0304 (Typical Grill), Section 8-0305 (Typical Picnic Table), Section 8-0306 (Typical Wheelchair Accessible Picnic Table) as follows:**

**8-0300 RECREATION**

~~**8-0301 Metal Bridge.** Eight foot wide bridge with safety railings, flat or arched span and self weathering steel.~~

~~**8-0302 Typical Bench.** Iron Mountain Forge, Model 281-6XR/8XR, Double Pedestal Stationary Park Bench with arm rests, or approved equal meeting the following specifications: Overall dimensions must be 34 inches high x 22 inches deep and 6 feet or 8 feet long. Seat height above ground must be 18 inches. Each Pedestal Park Bench frame must have a vertical 2 ½ inch x 2 ½ inch x 36 inch steel post embedded in concrete. Seat and back supports must be made from two 3/8-inch x~~

4-inch x 31<sup>3</sup>/<sub>4</sub>-inch steel flats bent a total of 75 degrees on minimum radius. Frame must be welded such that seat will slant down toward back at 5 degrees from horizontal. Finish must be electrostatically applied black powder. Seats and backs must be S4S Clear All Heart Redwood. Seat and back must consist of eight planks measuring 3 inches x 4 inches x 6 feet or 8 feet. All planks must have all edges eased to a 3/8-inch radius. All bolt holes must be precision drilled for easy field assembly. Sixteen zinc-plated carriage bolts and nuts must be used in attaching the aforementioned planks with frames. Arm rests must be provided on each side of the bench.

**8-0303** — **Typical Backless Bench.** Iron Mountain Forge, Model 285-6XR/8XR, Double Pedestal Flat Stationary Park Bench, or approved equal meeting the following specifications: Overall dimensions must be 18 inches high x 15 1/2 inches deep x 6 feet or 8 feet long. Seat height above ground must be 18 inches. Each Pedestal Park Bench frame must have a vertical 2 1/2 inch x 2 1/2 inch x 36 inch steel post. Horizontal frame supports must be fabricated from two 3/8-inch x 4-inch x 14 1/2-inch steel flats and must be electrically welded to vertical post. Finish must be electrostatically applied black powder. Seat must be S4S Clear All Heart Redwood. Seats must consist of four planks measuring 3 inches x 4 inches x 6 feet or 8 feet. All planks must have all edges eased to a 3/8-inch radius. All bolt holes must be precision drilled for easy field assembly. Eight zinc-plated carriage bolts and nuts must be used in attaching the aforementioned planks with frames.

**8-0304** — **Typical Grill.** Iron Mountain Forge, Model 200-X, or approved equal meeting the following specifications: Firebox must have a length of 20 inches, a width of 15 inches, and a height of 10 inches, and must be fabricated from 7-gauge steel. For safety, all exposed corners of firebox plate must be rounded to a 1 1/2-inch radius. For drainage, holes must be punched in rear corners of firebox bottom. Cooking grate must be fabricated from 1/2-inch steel bars with a cooking area of 300 square inches. Bars must be spaced 1 1/8 inches on center. Heavy duty 3 1/2-inch outside diameter iron pipe, 40 inches in length, must be included for stationary mounting in concrete. Grill must rotate 360 degrees, but will be non-removable. Cooking grate must be welded to two 5/8-inch support bars such that it will be adjustable to four different heights from 3/4 inches to 8 1/2 inches above fire bed. Grill must be equipped with non-conductive spring handle grips. Standard finish must be non-toxic, rust-resistant, baked on black, dry powder paint. Optional finish consists of hot-dipped galvanizing per ASTM A120 after fabrication, thus covering all welds and outer surfaces except cooking grate, which must be painted with non-toxic, rust-resistant, baked on black, dry powder paint. Optional utility shelf must be fabricated from 3/16-inch steel plate and measure 8 inches x 20 inches.

**8-0305** — **Typical Picnic Table.** Iron Mountain Forge, Model 238-6GT, or approved equal meeting the following specifications: Overall size must be 59 1/4 inches wide x 29 inches high x 6 feet or 8 feet long. Seat height above ground to be 17 inches. Table top width to be 29 inches. Picnic table leg frame must be fabricated from 2 3/8-inch outside diameter iron pipe and must be electrically welded into a one-piece end

frame. Frame must be a walk-through design. All bends are to be on a 4 13/16-inch inside radius. No pipe or metal parts must extend past the outside edge of the seat. All table top and seat mounting brackets must be fabricated from 6-inch, 7-gauge steel plate bent at 90 degrees to form a 4-inch x 2-inch angle. All table top and seat mounting brackets must be precision punched. For safety, all mounting brackets must be rounded to a 1½-inch radius on all corners of surfaces in a vertical plane. Cross braces must consist of one 5/16-inch outside diameter galvanized iron pipe with ends flattened, punched and rounded to a 1½-inch radius. One 1½-inch x ½-inch x 1/8-inch x 26 ½-inch center channel must be mechanically attached to the bottom side of table top to prevent warping of wood. Center channel must have a 2-inch x 1-inch, 7-gauge tab extending downward such that cross braces may be mechanically fastened to center channel, thus providing overall strength and rigidity. Leg end frame and center channel finish must be hot-dipped galvanized per ASTM A120 after fabrication covering all welds, cut ends and punched holes. Two ½-inch diameter drain holes must be drilled in the bottom of each end frame. Four 5/8-inch diameter holes must be punched in the angle iron at the various locations where the pipe frame attaches. These holes must be placed to allow the galvanizing to flow through and coat all surfaces inside and out. Seats and tops must be No. 1 S4S kiln-dried CCA pressure-treated Southern Yellow Pine, treated to 0.25 pounds/cubic foot (kiln-dried before and after treatment). All Southern Pine Inspection Bureau (SPIB), Redwood Inspection Services (RIS) and American Wood Preservers Association (AWPA) rules and practices shall govern. Seats and tops must consist of five planks measuring 2 inches x 10 inches x 6 inches or 8 inches long. All planks must have top edges eased to a 3/8-inch radius. All bolt holes must be precision drilled for easy field assembly. Twenty 3/8-inch 16NC x 2¼-inch carriage bolts and nuts must be used in attaching tops and seats with leg frames. Six 5/16-inch x 1½-inch lag screws must be used in attaching center channel with table top. Three 3/8-inch 16 NC x 1-inch machine bolts with nut lock washers must be used in attaching braces to leg frames as well as to the center channel. All mechanical fasteners must be zinc-plated for prevention of rust and corrosion.

**8-0306** — **Typical Wheelchair-Accessible Picnic Table.** Iron Mountain Forge, Model 238-HGT, or approved equal meeting the following specifications: Overall size to be 59¼ inches wide x 29 inches high x 8 feet long. Seat height above ground to be 17 inches. Table top width to be 29 inches. Picnic table leg frame must be fabricated from 1 5/8-inch outside diameter iron pipe and must be electrically welded into a one-piece end frame. Frame must be walk-through design. All bends are to be on a 3 3/16-inch inside radius. No pipe or metal parts must extend past the outside edge of the seat. All table top and seat mounting brackets must be fabricated from 4-inch, 7-gauge steel plate bent at 90 degrees to form a 2-inch x 2-inch angle. All table top and seat mounting brackets must be precision punched. For safety, all mounting brackets must be rounded to a 1½-inch radius on all corners of surfaces in a vertical plane. Cross braces must consist of 1 5/16-inch outside diameter galvanized iron pipe with ends flattened, punched and rounded to 1½-inch radius. One 1½-inch x ½-inch x 1/8-inch x 26½-inch center channel must be mechanically attached to the bottom side of table top to prevent warping of wood. Center channel must have a 2-



inch x 1-inch, 7-gauge tab extending downward such that cross braces may be mechanically fastened to center channel, thus providing overall strength and rigidity. Leg end frame and center channel finish must be hot-dipped galvanized per ASTM A120 after fabrication covering all welds, cut ends and punched holes. Two ½-inch diameter drain holes must be drilled in the bottom of each end frame. Four 5/8-inch diameter holes must be punched in the angle iron at the various locations where the pipe frame attaches. These holes must be placed to allow the galvanizing to flow through and coat all surfaces inside and out. Seats and tops must be No. 1 S4S kiln-dried CCA pressure-treated Southern Yellow Pine, treated to 0.25 pounds/cubic foot (kiln-dried before and after treatment). All SPIB, RIS, and AWPA rules and practices shall govern. Table tops must consist of three planks measuring 2 inches x 10 inches x 8 feet long. Table seats must consist of two planks measuring 2 inches x 10 inches x 6 feet long. All planks must have top edges eased to a 3/8-inch radius. All bolt holes must be precision drilled for easy field assembly. Twenty 3/8-inch 16 NC x 2 ¼-inch carriage bolts and nuts must be used in attaching tops and seats with leg frames. Six 5/16-inch x 1 ½-inch lag screws must be used in attaching center channel with table top. Three 3/8-inch 16 NC x 1-inch machine bolts with nut lock washers must be used in attaching braces to leg frames as well as to the center channel. All mechanical fasteners must be zinc-plated for prevention of rust and corrosion.

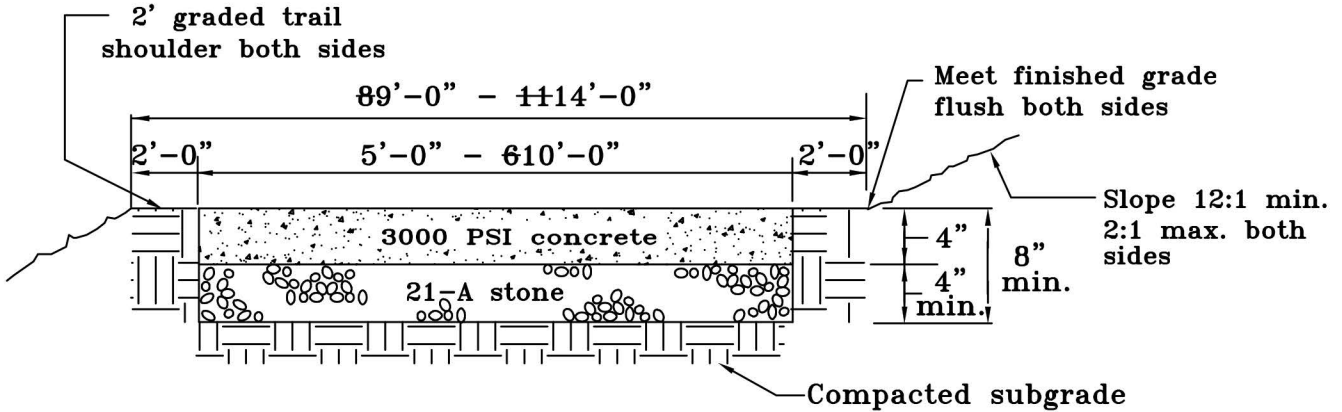
**Amend Article 8-0300 (RECREATION), Section 8-0307 (Tot Lots), by revising Subsection 8-0307.1 to read as follows:**

**8-03017 Tot Lots**

- 8-03017.1 Where tot lots are proposed, the following criteria should be considered in the design of the facility:
- A. Tot lots must be designed for children, ages ~~one~~ two through ~~six~~ five.
  - B. If the tot lot is to be enclosed, benches must be located inside the enclosure.
  - C. Equipment should include a minimum of 25 percent accessible components to accommodate persons with disabilities.
  - D. Tot lots must be located within sight of buildings, residences, well-used walkways or streets. Tot lots must also be located so they are easily accessible and within walking distance from all areas of the neighborhood.
  - E. Equipment designed for school age children (ages 5-12) may not be included in a tot lot.
  - F. All play equipment must be in accordance with current approved [Consumer Product Safety Commission](#) recommendations and guidelines and with ASTM F-1487, and installed in accordance with manufacturer's recommendations.

- G. The minimum area of a tot lot must be 1,000 square feet and must contain a minimum of four distinct types of activity (i.e., swinging, sliding, climbing, jumping and balancing).
- H. A tot lot must be enclosed when the tot lot is located within 100 feet of a road, street or parking lot. The type of enclosure must be chain link fence (minimum height of 42 inches, knuckled fabric selvage, top and bottom). A gate with a minimum width of 36" should be provided.
- I. The surface of the tot lot must be shown and must contain a minimum of 8 inches of woodchips, sand or pea gravel over a dry, compacted base.
- J. All play equipment must have a use ~~area~~ zone under the equipment, and a ~~6-foot~~ buffer between use ~~areas~~ zones of adjacent equipment or benches, ~~as defined below in accordance with ASTM F-1487.~~ Curbing of any type, fences, trees, and walls must be kept outside the use ~~area~~ zones of all equipment, so the users will not fall and strike their body on the obstacle. ~~Suggested use areas are identified in the current~~ Consumer Product Safety Commission guidelines.
- K. Benches must be located within tot lot areas, and should have a use area as follows: 4 feet in front, 2 feet on the sides, 2 feet in back for a bench with a back, or 4 feet in back for a backless bench. Benches may also be located flush against a fence or back wall with no rear safety zone needed.

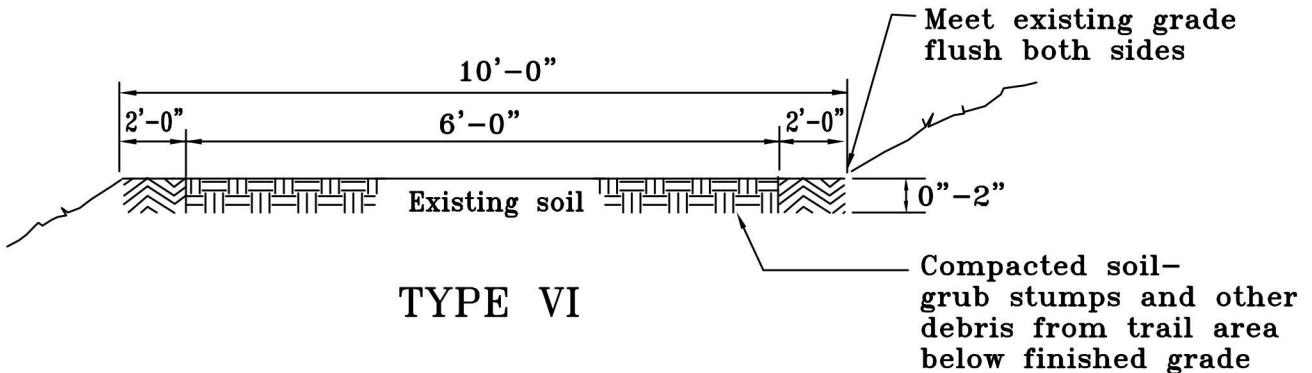
**Amend Chapter 8 Plates by revising Plate 2-8 and removing Plate 15-8 (Tot Lot Equipment Layout) and Plate 16-8 (Tot Lot Swinging Devices Layout)**



**TYPE IV**

Suitable for general use. ~~Un~~Suitable for bikeways if the width is greater than or equal to 8 FT. Acceptable for VDOT maintenance.

Subgrade for all sidewalks shall be compacted to minimum 95% density at optimum moisture to full width of R/W or easement in accordance with AASHTO T99.



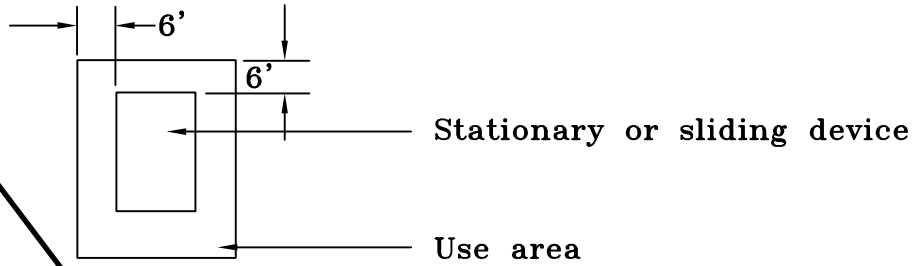
**TYPE VI**

Suitable for equestrian use, hiking and all-terrain (mountain) bicycle use in low density areas. Construction of this selection is subject to the approval of the Director.

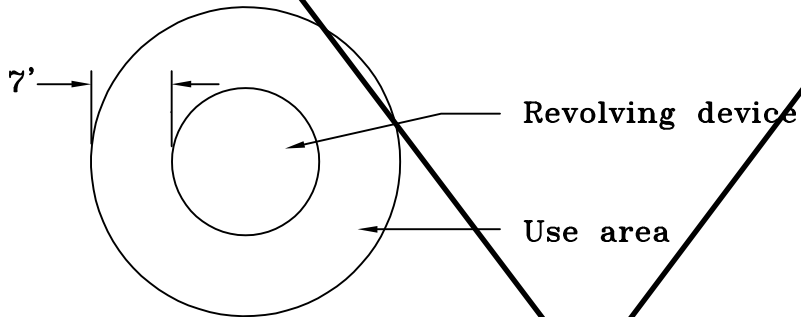
Alignment of this trail should be such that there is minimum ground disturbance during clearing.

Ref. Sec. 8-0202.1B, 8-0203.1B  Rev. 1-00, 2011 Reprint, 2018 Reprint, <del>xx</del> -20	<b>TRAIL CROSS-SECTIONS</b>		PLATE NO.	STD. NO.
			2-8	

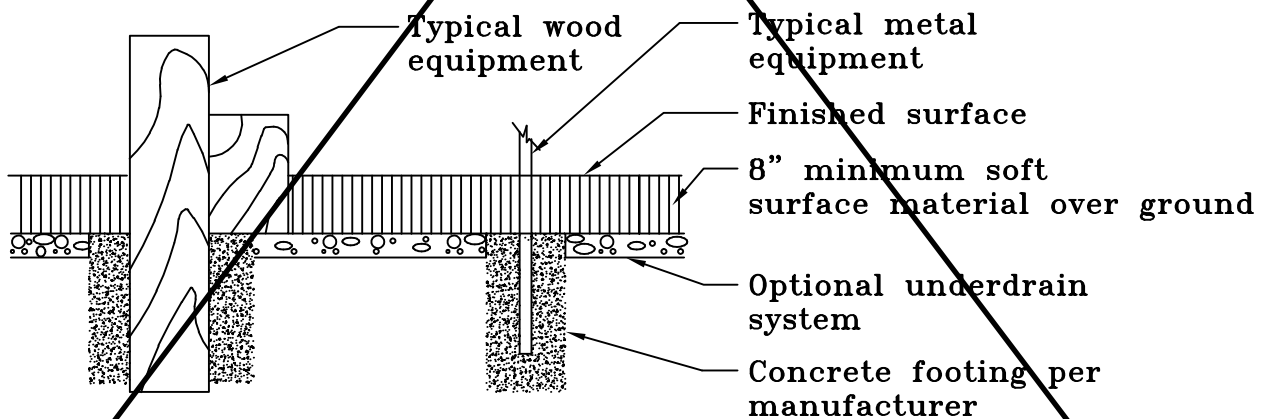
# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



## TOT STATIONARY AND SLIDING DEVICES



## TOT REVOLVING DEVICES



## TYPICAL EQUIPMENT FOOTING

Ref. Sec. E-1004.2

Rev. 1-00, 2011 Reprint,  
2018 Reprint

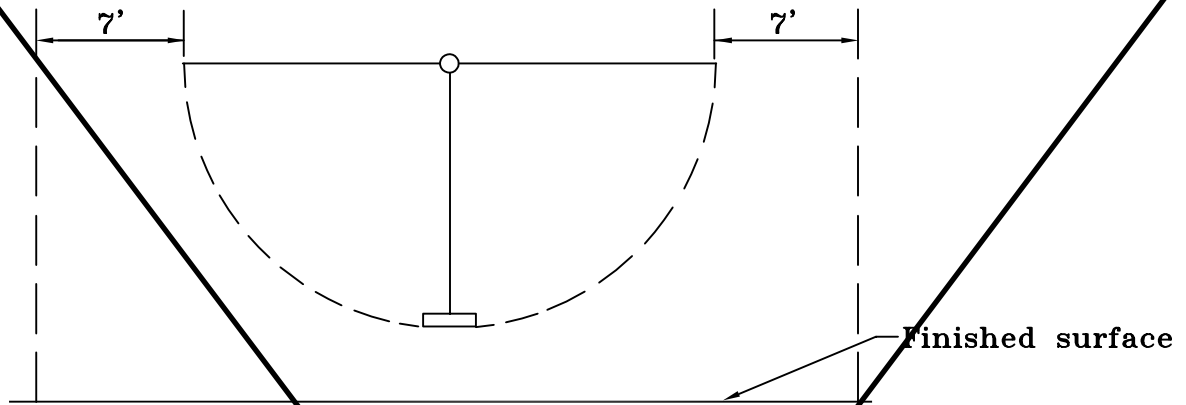
# TOT LOT EQUIPMENT LAYOUT

PLATE NO.

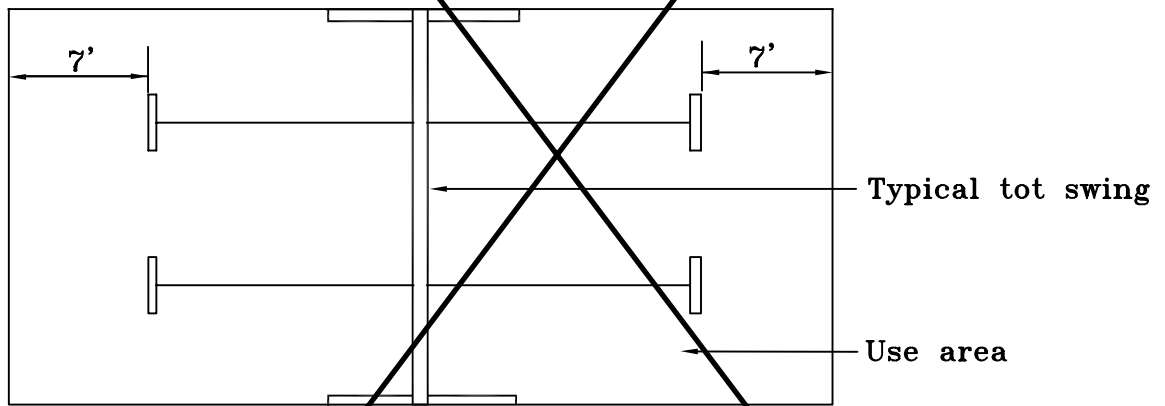
STR. NO.

15-8

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



SIDE VIEW



PLAN VIEW

Ref. Sec. 2-1004.2

Rev. 1-00, 2011 Reprint,  
2018 Reprint

## TOT SWINGING DEVICES LAYOUT

PLATE NO.

STD. NO.

16-8

**Proposed Amendment to Chapter 10 (Sewage and Solid Waste Disposal)  
of  
the Public Facilities Manual**

**Amend Chapter 10 (Sewage and Solid Waste Disposal) List of Plates to read as follows:**

<b>Standard Designation</b>	<b>Plate No.</b>	<b>Description</b>	<b>Section</b>
N/A	1-10	Peak Flow Curve 0.0 to 1.0 MGD	10-0102.4B
N/A	2-10	Peak Flow Curve 1.0 and Greater MGD	10-0102.4B
DPW-15	3-10	Typical 4' ID Precast Concrete Manhole	10-0102.5D(7)
DPW-16	4-10	Typical 5' and 6' Diameter Precast Concrete Manhole with 4' Stack	10-0102.5D(7)
DPW-17	5-10	Precast Concrete <del>Cut-In Manhole</del> <del>Doghouse Base</del>	10-0102.5D(7)
DPW-18	6-10	Precast Concrete Manhole Flat Top	10-0102.5D(7)
DPW-20A	7-10	<del>Manhole Adjustment Rings Typical Alternate 4' ID Block or Brick Manhole for Existing Pipes of 21" Maximum</del>	10-0102.5D(7)
DPW-21	8-10	Standard Roadway Frame	10-0102.5D(7)
DPW-21A	9-10	Standard Roadway Manhole Cover	10-0102.5D(7)
DPW-22	10-10	Watertight/Locking Manhole Frame	10-0102.5D(7)
DPW-23	11-10	Watertight Manhole Cover	10-0102.5D(7)
N/A	12-10	Bolted Manhole Cover	10-0102.5D(7)
DPW-24	13-10	Manhole Step Detail	10-0102.5D(7)
DPW-19	13A-10	Precast Concrete Manhole Reducer	10-0102.5D(7)
DPW-25B	14-10	Typical <u>45' ID</u> Manhole with Inside Drop Connection	10-0102.5E
DPW-6	15-10	Typical Trench Construction Pipe Bedding – Alternate "A" (Contractor's Option)	10-0103.7
DPW-6	16-10	Typical Trench Construction Pipe Bedding – Alternate "B" (Contractor's Option)	10-0103.7
DPW-7	17-10	Typical Trench in Rock	10-0103.7
DPW-10	18-10	<u>House Service</u> Lateral (Spur)	10-0104.5
DPW-11	19-10	<u>House Service</u> Lateral Construction Detail	10-0104.5
RG-1	<del>20-10</del>	<del>Hole in Pipe Above Springline</del>	<del>10-0104.7E(1), 10-0104.7C</del>
RG-2	<del>21-10</del>	<del>Hole in Pipe Below Springline</del>	<del>10-0104.7E(2)</del>
RG-2	<del>22-10</del>	<del>Pipe with Crack or Shear</del>	<del>10-0104.7E(3)</del>
RG-3	<del>23-10</del>	<del>Crushed Section of Pipe and Slipped or Leaking Joint</del>	<del>10-0104.7E(4), 10-0104.7E(5)</del>
N/A	24-10	Sewer Test Plug	10-0105.5B
DPW-12	<del>25-10</del>	<del>Highway Crossing Jacking and Boring/Tunnel Details</del>	
DPW-13	<del>26-10</del>	<del>Highway Crossing Jacking and Boring/Tunnel Details</del>	
DPW-14	27-10	Steel Casing Pipe/Tunnel Detail	
DPW-15	28-10	Trash and Recycling Pad for Two Dumpsters	10-0306.6

**Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0102 (General and Hydraulic), Subsection 10-0102.3 (Tributary Population), by revising Paragraph 10-0102.3B to read as follows:**

- A. Trunk (main) and subtrunk (submain) sewers must be designed on the basis of the adopted Comprehensive Plan densities and/or zoning, whichever is greater, unless the Board approves otherwise. Design analysis must be provided for all trunk and subtrunk sewers as defined by the Virginia Sewage Collection and Treatment Regulations and when required by DPWES, Wastewater Management, for collecting sewers.

**Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), by revising Table 10.1 (Average Design Flows for Development Types) to read as follows:**

<b>Table 10.1 Average Design Flows for Development Types</b>	
<b>Type of Development</b>	<b>Design Flow (GPD)</b>
<b>Residential:</b>	
General, <u>Mixed-use and Planned Developments</u>	100/person
Single family detached	<del>370</del> 350/residence
Single family attached	<del>300</del> 280/unit
Multifamily	<del>300</del> 280/unit
<b>Commercial:</b>	
General	2,000/acre
Motel	130/unit
Office	30/employee
	0.20/net ft <sup>2</sup>
<b>Industrial:</b>	
General	10,000/acre
Warehouse	600/acre
Varies with type of industry	
<b>School Site:</b>	
General	16/student

**Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0102 (General and Hydraulic), Subsection 10-0102.4 (Sewage Flow), by revising Paragraph 10-0102.4B to read as follows:**

- B. Sewers must be designed to carry a peak flow when full as determined from applying the appropriate peak flow factor to the average flow. (See Plates 1-10 and 2-10.) No separate allowance for infiltration will be required. Other peak

flow factors may be approved by the Director based on factors such as long-term flow metering data, age of the sewer, and types of development within the sewer shed.

**Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0102 (General and Hydraulic), Subsection 10-0102.5 (Location of Sewers and Manholes), Paragraph 10-0102.5A, by revising Subparagraphs 10-0102.5A(1), (6), and (7) and adding Subparagraph 10-0102.5A(8) to read as follows:**

1. In order to reduce the number of manholes in curvilinear streets, manholes must be located within the pavement area but beyond the allowable spread of stormwater gutter flow except where reverse curb and gutter is used, and a minimum of 6 feet of clear separation from edge to edge between the sanitary sewer manholes and ~~water~~, storm and gas pipes must be provided.
6. Design of sanitary sewer lines should honor natural drainage patterns or topography and must be of sufficient depth to provide gravity flow to serve the basement/lowest floor of dwellings and buildings. Manhole depths may not exceed 16 feet and pipe depths may not exceed 18 feet without approval of the Director. When extenuating circumstances are thought to exist by the applicant to allow manhole depths greater than 16 feet, such as crossing under natural or man-made features (e.g., highways, railroads or bodies of water) or making connections to proposed or existing systems in which the applicant considers good engineering practice to dictate a modification of this standard, specific approval must first be obtained from the Director. In considering such a modification requests, the Director may consider safety concerns, maintenance considerations, soil conditions, construction material to be used, and the availability of other feasible alternatives. The Director may require a larger diameter manhole or larger easement on a case by case basis.
7. The installation of sanitary sewer is ~~PVC and reinforced concrete pipe may~~ not be permitted at depths exceeding 18 feet without approval by the Director in accordance with § 10-0102.5A(6). Ductile iron pipe or PVC DR 14 is required where sewer depths exceed 18 feet and must be installed from manhole to manhole.
8. Manholes installed on existing sewers must be cut-in in accordance with Plate 5-10.



**Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0102 (General and Hydraulic), Subsection 10-0102.5 (Location of Sewers and Manholes), by revising Paragraph 10-0102.5C to read as follows:**

- C. Sanitary sewers should not be located closer than 15 feet from existing or proposed buildings and 5 feet from the loading plane of building foundations. Proposed sanitary sewers may not be located under retaining walls.

**Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0102 (General and Hydraulic), Subsection 10-0102.5 (Location of Sewers and Manholes), Paragraph 10-0102.5D, by revising Subparagraphs 10-0102.5D(3) and (5) to read as follows:**

D. Manholes for access to sewers must be provided:

1. At all intersections of sewers that are 27 inches in diameter or smaller; ~~and~~
2. At all points of change in alignment; ~~and~~
3. At all changes in grade and diameter; ~~and~~
4. At points of industrial discharge if required by [DPWES](#) to facilitate observation and sampling; ~~and~~
5. Within 10 feet (centerline to centerline) of any connection to a 30-inch diameter sewer or larger, and any connection to an 8-inch diameter lateral or larger; ~~and~~
6. At the terminal of the line; ~~and~~
7. At intervals not exceeding 400 feet on all sewers 15 inches in diameter or less and not exceeding 500 feet apart on all sewers larger than 15 inches in diameter (see [Plates 3-10](#) through [13-10](#)).

**Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0102 (General and Hydraulic), Subsection 10-0102.5 (Location of Sewers and Manholes), by revising Paragraph 10-0102.5E and Subparagraphs 10-0102.5E(1) and 10-0102.5E(1)(b) to read as follows:**

- E. When it is necessary to drop the elevation of the sewer at a manhole due to unusual circumstances such as bad soil, rock, high water table, utility conflicts or excessive depths, an 5-foot diameter manhole with an inside drop connection is required. (See [Plate 14-10](#)). Any drop connection for a sewer line diameter of 15 inches or greater requires a special design to be approved

by [DPWES](#). The maximum difference in elevation permitted between the influent and effluent lines in a standard manhole will be 6 inches.

1. Typical 5 foot ~~4-foot~~ Manhole with Inside Drop Connection – Special Notes:

a. Chamfer on all pipe sizes to be at a 15-degree angle.

~~b. Vertical stacks 10 inches and larger in diameter require a minimum 5-foot diameter manhole.~~

**Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0102 (General and Hydraulic), Subsection 10-0102.5 (Location of Sewers and Manholes), by revising Paragraph 10-0102.5I to read as follows:**

- I. All sanitary sewer manholes or appurtenances subject to infiltration of surface water must be provided with a County standard watertight manhole frame and cover, which must be shown on the plans. Should actual field conditions require it, however, alterations may be permitted. Wherever manholes are constructed in unmaintained areas, those manholes must be raised above the finished grade by at least one foot, and the surrounding area must be graded to drain away from the manhole.

**Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0102 (General and Hydraulic), Subsection 10-0102.11 (Abandonment and Removal of Existing Sewer), Paragraph 10-0102.11D, by revising Subparagraph 10-0102.11D(1) to read as follows:**

- D. The Director may approve the abandonment in place of unused sanitary sewer lines and manholes. Sanitary sewer lines and manholes to be abandoned in place in lieu of being removed must be treated as follows:
1. All sewer lines must be filled with grout and the ends plugged with masonry, unless the Director has approved another method.

**Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0103 (Structural), by deleting Subsection 10-0103.7 (Maximum Permissible Depth) and Table 10.5 to read as follows:**

~~10-0103.7 — Maximum permissible depth. The maximum permissible depth of cover for sewer pipes of various classifications allowed must be determined by [Table 10.5](#) (See [Plates 15-10](#) through [17-10](#)).~~

**Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0103 (Structural), Subsection 10-0103.8 (Permitted Materials), by revising Paragraph 10-0103.8A to read as follows:**

- A. Permitted sanitary sewer pipe materials include: ~~Reinforced Concrete Pipe,~~ Ductile Iron (minimum thickness class 51), Polyvinyl Chloride (minimum PVC ~~DR 25 SDR 35~~). For pipe materials required where sewer depths exceed 18 feet, refer to [§ 10-0102.5A\(7\)](#).

**Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0103 (Structural), Subsection 10-0103.8 (Permitted Materials), Paragraph 10-0103.8C (Special Installation Details – PVC Pipe), by revising Subparagraphs 10-0103.8C(1) through (7) to read as follows:**

1. Pipe and Fitting Material: PVC sewer pipe and fittings must be ~~SDR 35 DR 25~~ wall thickness conforming to [ASTM Standard D 3034-89](#) in sizes 8 inches through 15 inches and [ASTM Standard F 679-89](#) in sizes 18 inches through 27 inches and comply with the requirements in [AWWA C900-16](#) for PVC water distribution pipe.
2. Joints: ~~PVC pipe and fitting joints must be gasketed conforming to~~ [ASTM Standard D3212-92](#). Integral bell joint systems must conform to [ASTM D3139](#). Gaskets must conform to [ASTM Standard F 477-90](#).
3. Fittings: PVC fittings of 8 inches in sizes from 4” to 12” must be molded in one piece meeting [ASTM D1784](#) and [AWWA C907](#). Fittings in sizes 10 inches through 27 inches must be fabricated in accordance with [ASTM Standard D 3034-89](#).
4. Installation: PVC pipe and fittings must be installed in accordance with [AWWA C605](#) [ASTM Standard D-2321](#), except as modified in the PFM.
5. ~~Pipe Stiffness: Minimum pipe stiffness must be 46 psi at maximum 5 percent deflection when tested in accordance with~~ [ASTM D 43.6](#).
6. In Place PVC Pipe Deflection Testing: Where soil conditions, installation procedures, or TV inspections warrant, manhole to manhole deflection testing may be required at the request of the County. Maximum allowable pipe deflection is 7-1/2 percent.
7. Deflection tests must be accomplished by the use of a multi-arm “go/no go” mandrel. Exact method of testing procedure shall ~~shall~~ must be as per [ASTM D3034-85b](#).

**Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0103 (Structural), Subsection 10-0103.8 (Permitted Materials), by adding Paragraph 10-0103.8D and Subparagraph 10-0103.8D(1) to read as follows:**

**D. Special Installation Details – DIP Pipe**

1. Ductile Iron Pipe (DIP) must be centrifugally cast for water distribution in accordance with the latest [ANSI A21.51/AWWA C 151](#). Joints must be push-on bell and spigot type in accordance with the latest [ANSI A21.11/AWWA C 111](#). All proposed DIP must have an approved lining to resist corrosion.

**Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0104 (Preparation of Plans), by revising Subsection 10-0104.2 (Construction Drawings) and Paragraphs 10-0104.2B and E to read as follows:**

10-0104.2 Construction Drawings. ~~Six prints of the p~~ Plans and design analysis for all sewers of the sanitary sewer installation to be installed in a subdivision as prepared by a PE or LS, must be submitted to the [Site Development and Inspections Division, LDS](#), for approval. Such plans must be in conformance with the foregoing design criteria and show the following information:

- B. A general layout must be provided, showing streets, lots, easements and sanitary sewer location, on-site and off-site. Scale is to be used which will allow all information to be shown on one sheet.
- E. The horizontal scale for profiles must be the same as that used for the plan, but in no case be smaller than 1 inch = 100 feet. The vertical scale may not shall in no case be smaller than 1 inch = 10 feet.

**Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0104 (Preparation of Plans), Subsection 10-0104.2 (Construction Drawings), Paragraphs 10-0104.2L (Sanitary Sewer General Notes), by revising Subparagraphs 10-0104.2L(7), (9), and (11) to read as follows:**

7. Ram-Nek ~~Pioneer 301 Mastie~~ Plastic Gasket, or approved equal, must be used under all types of manhole frames not subject to HS-20 loading.
9. Products which meet or exceed the performance of Ram-Nek ~~Pioneer 301~~ Plastic Gasket must be used on the outside of the joint on all manholes between the manhole frame and cone section to provide a water-tight seal.
11. Concrete, polypropylene or high-density polyethylene adjustment rings must be used when adjustment to the precast manhole top elevation

exceeds 2 inches per [Plate 29-10](#). External chimney seals must be provided when using adjustment rings. Non-shrink grout with full bearing metal or masonry shims may be allowed for final slope adjustment. Total adjustment must not exceed 12 inches.

**Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0104 (Preparation of Plans), Subsection 10-0104.7 (Certificate to Operate), by revising Paragraph 10-0104.7B to read as follows:**

- B. Structural ~~repairs~~ damages to pipe (i.e., holes, crushed or slipped joints), required discovered as a result of TV inspection, will require replacement of the affected pipe segment. must be made in accordance with the guidelines prepared by [Wastewater Management, \(WWCD\)](#) and [§ 10-0104.7C et seq.](#) Location and type of repair must be noted on the [WWCD](#) copy of the TV report (~~PVC SDR 35 is covered by manufacturer's specifications~~).

**Amend Article 10-0100 (SANITARY SEWER DESIGN CRITERIA), Section 10-0104 (Preparation of Plans), Subsection 10-0104.7 (Certificate to Operate), by deleting Paragraphs 10-0104.7C through 10-0104.7F(4) as follows:**

~~C. Repair Situations:~~

- ~~1. Hole in pipe above spring line~~
- ~~2. Hole in pipe below spring line~~
- ~~3. Pipe with shear crack or full break~~
- ~~4. Crushed section or sections of pipe~~
- ~~5. Slipped or leaking joints~~

~~D. Repair Definitions:~~

- ~~1. Hole in pipe above spring line. A hole in that portion of the pipe located in the area above the centerline of said pipe, and not to exceed 3 inches as measured in any direction.~~
- ~~2. Hole in pipe below spring line. A hole in that portion of the pipe located in the area below the centerline of said pipe.~~
- ~~3. Pipe with shear crack or full break. A structural defect in a pipe from a hairline crack to a full break induced by ground settlements or compressive hoarding and in a general vertical plane.~~

4. ~~Crushed section or sections of pipe. A partial or total structural collapse of the pipe, a portion of pipe with an area exceeding that defined as a hole (see [§ 10-0104.7D\(1\)](#)).~~
5. ~~Slipped or defective joints. An open joint, misalignment of joint, damaged joint or dropped joint.~~

~~E. General Repair Guidelines for Asbestos-Cement (AC) and Concrete Pipe~~

1. ~~Hole in pipe above spring line. A repair of this nature by the use of a clamp as specified by the County under the criteria of application will be an acceptable means of repair (See [Plate 20-10](#)).~~
2. ~~Hole in pipe below spring line. A repair of this nature will be done by the replacement of such pipe as required (see [Plate 21-10](#)).~~
3. ~~Pipe with shear crack or full break. Repair of a shear crack or full break in a pipe by the use of a clamp as specified by the Director under the criteria of application will be an acceptable means of repair (see [Plate 22-10](#)).~~
4. ~~Crushed section or sections of pipe. Repair of crushed section or sections of pipe will be done by the replacement of such pipe (see [Plate 23-10](#)).~~
5. ~~Slipped or leaking joints (see [Plate 23-10](#)).~~
  - a. ~~Repair of slipped joints may be done by a mechanical means such as jacking, in order to properly realign same. Such excavation will be carried out as required to afford the proper protection to the line while the repair is being made.~~
  - b. ~~Repair of leaking joints may be made by an approved grouting method as specified by the Director.~~
6. ~~When a stainless steel band (clamp) is used for any repairs or collar replacement, it must be no less than 12 inches in width.~~
7. ~~When repairing a sewer line by replacing a section of the pipe, stainless steel bands must be used. The gap in the joint connection may not exceed  $\frac{3}{4}$  inch.~~

~~F. Location of Repairs~~

1. ~~Location of sanitary sewer pipe repairs will be reported to the [Wastewater Collection Division, DPWES](#), to be made part of the as-built records.~~

- ~~2. Location of each repair will be measured from the manhole on each side of the repair.~~
- ~~3. The type of repair situation will be noted.~~
- ~~4. When pipe is required to be removed and replaced, the length and number of repair clamps used will be noted.~~

**Amend Chapter 10 Plates by revising Plate 3-10 (Typical 4'-0" ID Precast Concrete Manhole), Plate 4-10 (Typical 5'-0" & 6'-0" Diameter Precast Concrete Manhole With 4'-0" Stack), Plate 10-10 (Watertight/Locking Manhole Frame), Plate 14-10 (Typical 5' ID Manhole With Inside Drop Connection), Plate 15-10 (Typical Trench Construction Pipe Bedding – Alternate "A" (Contractor's Option)), Plate 16-10 (Typical Trench Construction Pipe Bedding – Alternate "B" (Contractor's Option)), Plate 17-10 (Typical Trench In Rock), Plate 18-10 (Service Lateral (Spur)), and Plate 19-10 (Service Lateral Construction Detail), by deleting Plate 5-10 (Precast Concrete Manhole Doghouse Base), Plate 7-10 (Typical Alternate 4'-0" ID Block Or Brick Manhole For Existing Pipes Of 21" Maximum), Plate 20-10 (Hole In Pipe Above Springline), Plate 21-10 (Hole In Pipe Below Spring Line), Plate 22-10 (Pipe With Crack Or Shear), Plate 23-10 (Crushed Section Of Pipe And Slipped Or Leaking Joint), Plate 25-10 (Jacking And Boring/Tunnel Details), and Plate 26-10 (Jacking And Boring/Tunnel Details), and by adding Plate 5-10 (Precast Concrete Cut-In Manhole) and Plate 7-10 (Manhole Adjustment Rings) as follows:**

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL

**NOTES:**

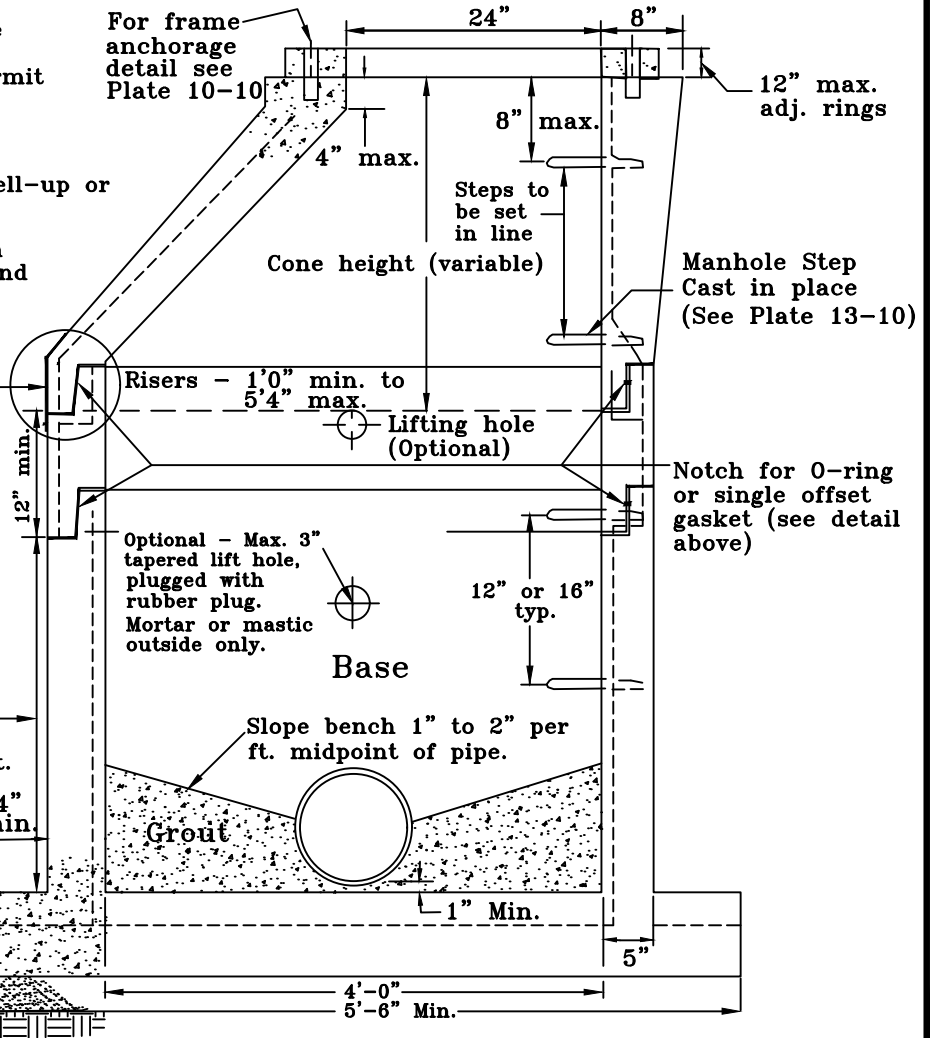
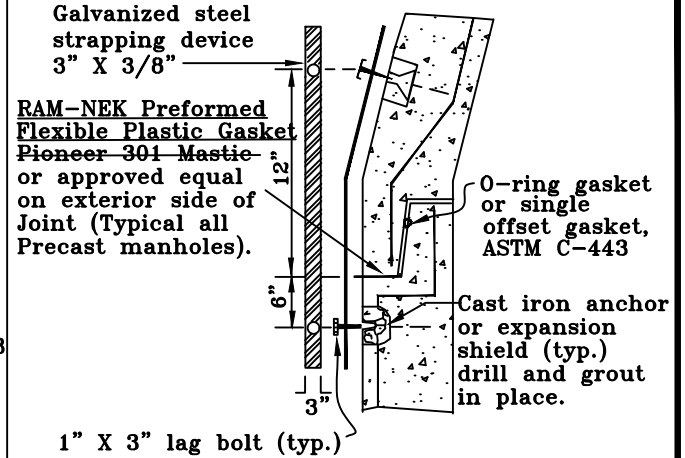
1. Manhole to meet current requirements of ASTM Spec. C-478.
2. All reinforcing steel to meet current requirements of ASTM Spec. A-615.
3. Concrete to be Class A-4.
4. Tapered joint with O-ring gasket, or single offset joint with rubber gasket, to meet current requirements of ASTM Spec. C-443.
5. ~~Pioneer 301 Mastic~~ RAM-NEK Preformed Flexible Plastic Gasket or approved equal must be used in addition to the joint specified.
6. Grout inverts must consist of a Portland Cement concrete mix to VDOT Spec. for Class B-2 or containing 1 part cement, 2 parts mortar sand and 3 1/2 parts aggregate. The surface must be hand troweled smooth with no coarse aggregate exposed and the benches are to have a light broom finish.
7. Flexible joint required on all pipe connections to manholes. Flexible Joint pipe to manhole sleeve may be Kor-N-Seal, Interspace, Presswedge or approved equal. Installation must be in accordance with manufacturer's instructions. Where field conditions will not permit the use of a sleeve, a maximum 24" stub may be used. (See Section 10.0102.5G.)
8. Joint configuration may be cast bell-up or spigot-up.
9. Manufacturer's name to be cast in steps or on inside face of cone and is to be clearly visible without entering the structure.

See detail of this plate for installation of strapping device as shown where manhole is subject to water velocities. Individual manholes to be strapped and details as to number & location of straps to be shown on plans.

Base section to provide min. 6" clearance between top of pipe and bottom of bell and spigot joint.

In fill areas, base section footing must be spread a min. 8" or more as detailed on the plans.

Min. 4" compacted gravel



Ref. Sec. 10-0102.5D(7),  
Plate 4-10

Rev. 1-00, 2011 Reprint,  
4-13, 2018 Reprint, x-20

## TYPICAL 4'-0" ID PRECAST CONCRETE MANHOLE

PLATE NO.

STD. NO.

3-10

DPW-15



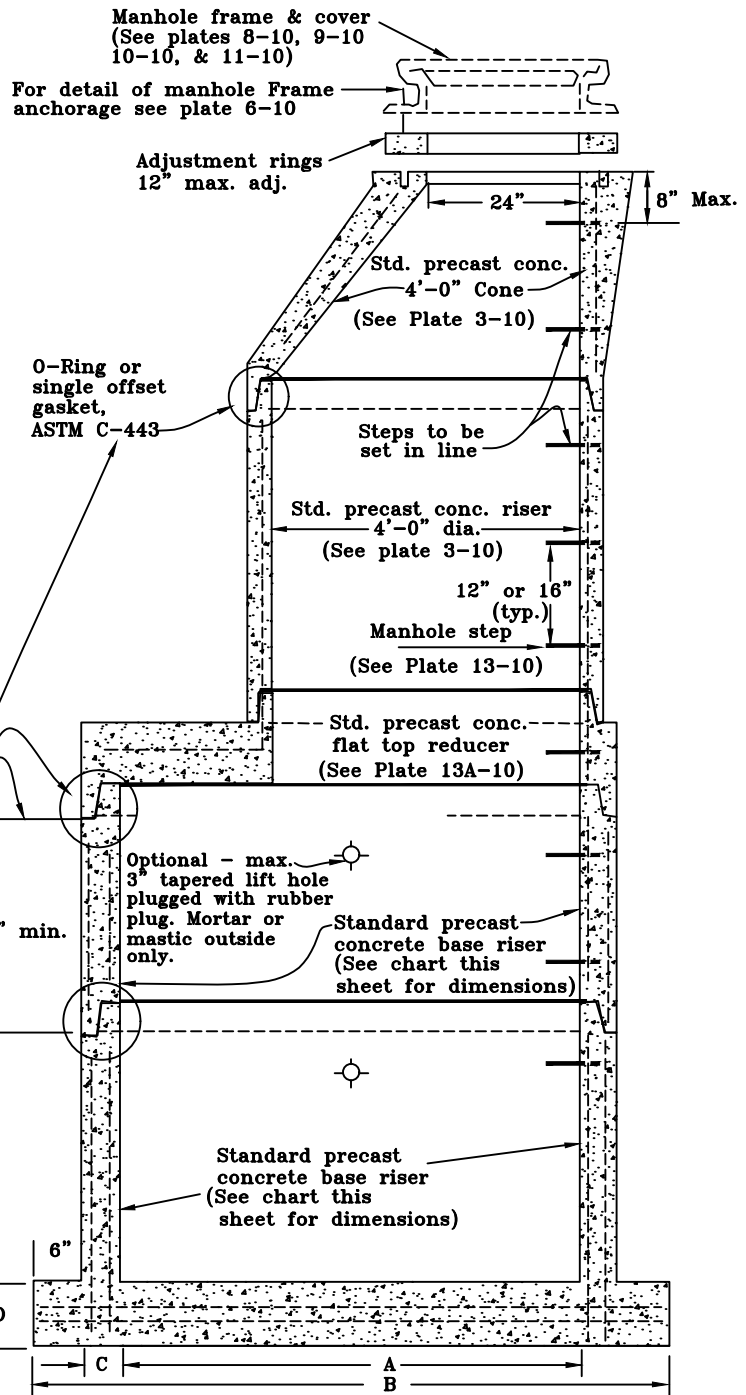
# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL

		MH DIA. IN FT.	
		5'0"	6'0"
DIMENSIONS	A	60"	72"
	B	84"	96"
	C	6"	7"
	D	8"	8"
		min.	min.

**NOTES:**

1. Concrete to be Class A-4.
2. Pipe connections to conform to Note 7, Plate 3-10.
3. All reinforcing steel to meet current requirements of ASTM Spec. A-615.
4. Manufacturer's name to be cast in steps or on inside face of cone and is to be clearly visible without entering the structure.
5. Manhole to meet current requirements of ASTM Spec. C-478.
6. Compacted gravel under base sections must conform to Plate 3-10.
7. Joint configuration may be cast bell-up or spigot-up.
8. Pioneer 301 Mastic RAM-NEK  
Preformed Flexible Plastic  
Gasket or approved equal must be used in addition to the joint specified. (See Plate 3-10)

Base section to provide min. 6" clearance between top of pipe opening and bottom of bell and spigot joint.



Ref. Sec. 10-0102.5D(7),  
Plates 3-10, 9-10,  
10-10, 13-10, 13A-10

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4-13, 2018 Reprint, x-20

TYPICAL 5'-0" & 6'-0"  
DIAMETER PRECAST CONCRETE  
MANHOLE WITH 4'-0" STACK

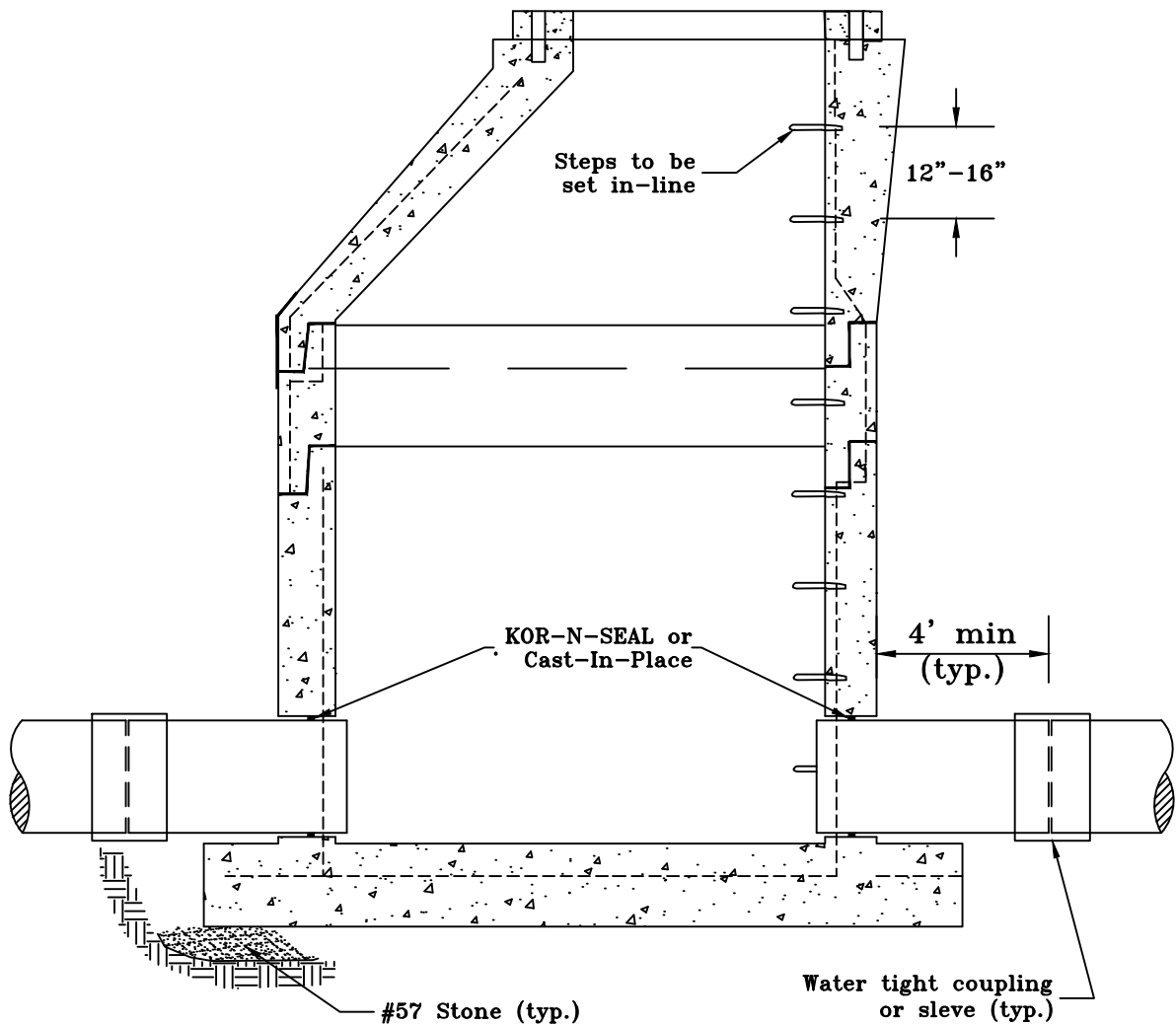
PLATE NO.

STD. NO.

4-10

DPW-16

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



**NOTES:**

1. Contractor must have adequate equipment to pump around existing line while manhole is cut in.
2. Concrete to be Class A-4.
3. All reinforcing steel to meet the current requirements of ASTM Spec. A-614.
4. Manhole sections to meet the current requirements of ASTM Spec. C-47B.
5. Tapered joint with O-Ring Gasket, or single offset joint with rubber gasket, to meet current requirements of ASTM Spec. C-443.
6. MH sections to be cast in the base a min. of 2 inch.
7. Joint configuration may be cast bell-up or spitot-up.
8. holes in precast units are to be 4 inch min. 8 inch max. larger than the outside dia. of the proposed pipe.
9. Base section to provide min. 6 inch opening and bottom of bell and spigot joint.

Ref. Sec.  
10-0102.5D(7),  
10-0105A(8)

Rev. X-2020

## PRECAST CONCRETE CUT-IN MANHOLE

NOT TO SCALE

PLATE NO.

5-10

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL

**NOTES:**

1. Concrete to be Class A-4.
2. All reinforcing steel to meet the current requirements of ASTM Spec. A-615.
3. Manhole sections to meet the current requirements of ASTM Spec. C-478.
4. Tapered joint with O-Ring Gasket, or single offset joint with rubber gasket, to meet current requirements of ASTM Spec. C-443.
5. Doghouse opening may only be used when placing a new MH over an existing line; otherwise, the opening must be cast. Size, location & angle of entry must be as required by the plans.
6. MH section to be cast in the base a min. of 2".
7. Joint configuration may be cast bell-up or spigot-up.

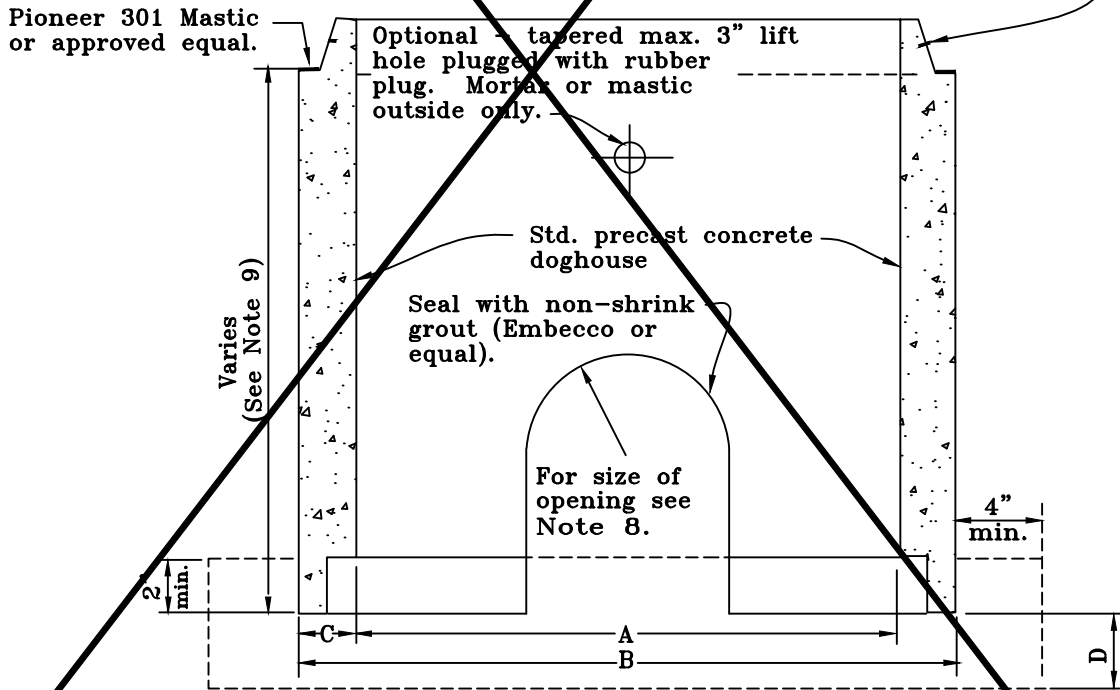
**CHART "A"**

MIN. DIMENSIONS (in.)			
MH	4'-0"	5'-0"	6'-0"
A	48"	60"	72"
B	58"	72"	86"
C	5"	6"	7"
D	6"	8"	10"

Dimensions of D must be taken from bottom of key (see drawing below)

8. Holes in precast units are to be 4" min. 8" max. larger than the outside dia. of the proposed pipe.
9. Base section to provide min. 6" clearance between top of pipe opening and bottom of bell and spigot joint.

Notch for O-Ring or single offset gasket, ASTM C-443



Ref. Sec. 10-0102.5D(7)

## PRECAST CONCRETE MANHOLE DOGHOUSE BASE

PLATE NO.

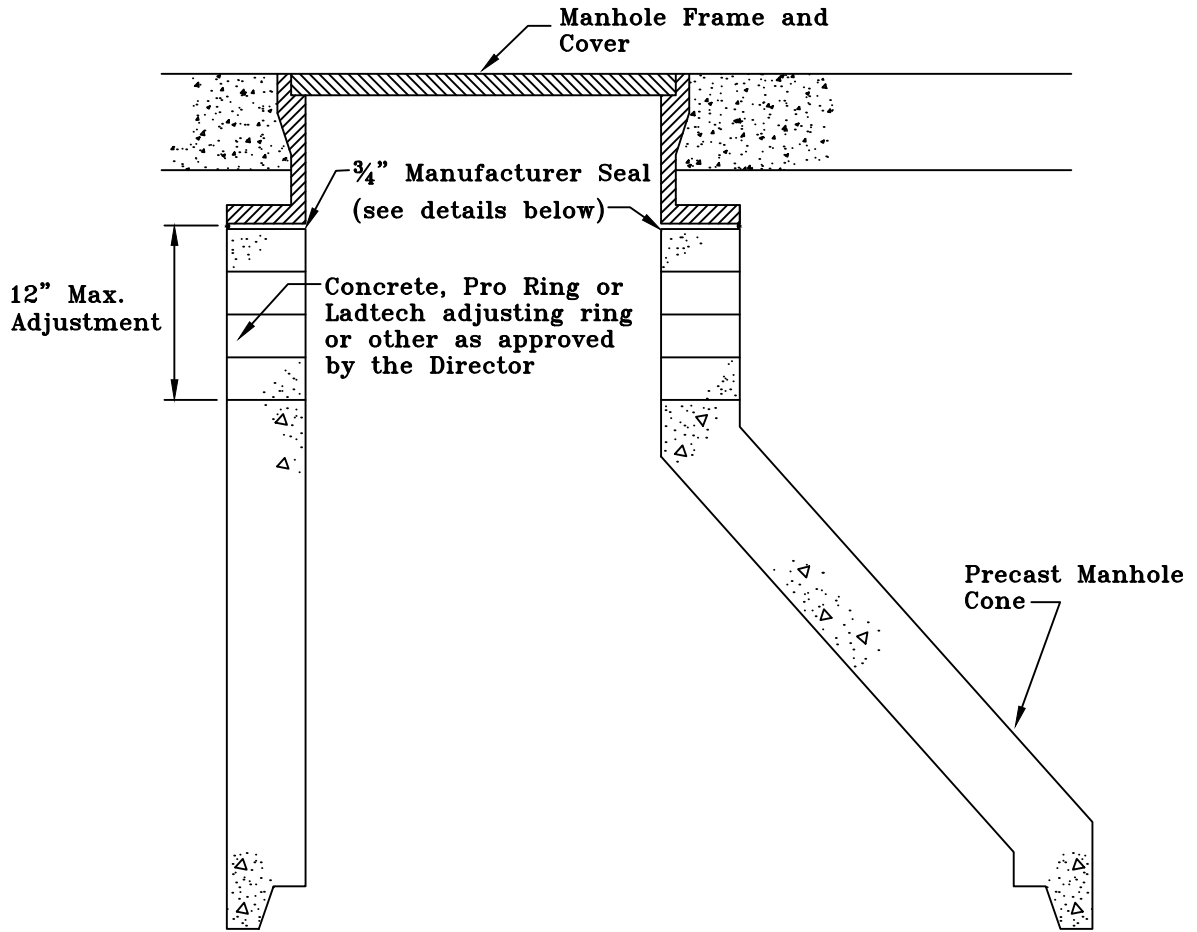
STD. NO.

Rev. 1-00, 4-13, 2018  
Reprint

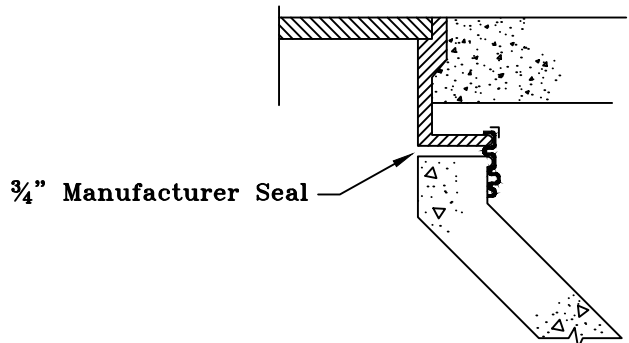
5-10

DPW-17

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



Manufacturer Seal Details



Ref. Sec.  
10-0102.5D(7),  
10-0104.2L(11)

## MANHOLE ADJUSTMENT RINGS

PLATE NO.

Rev. x-2020

NTS

7-10

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL

Slope Bench 12:1 to 6:1 per ft. to (largest) main sewer line of manhole

Steps to be staggered

Std. MH frame & cover

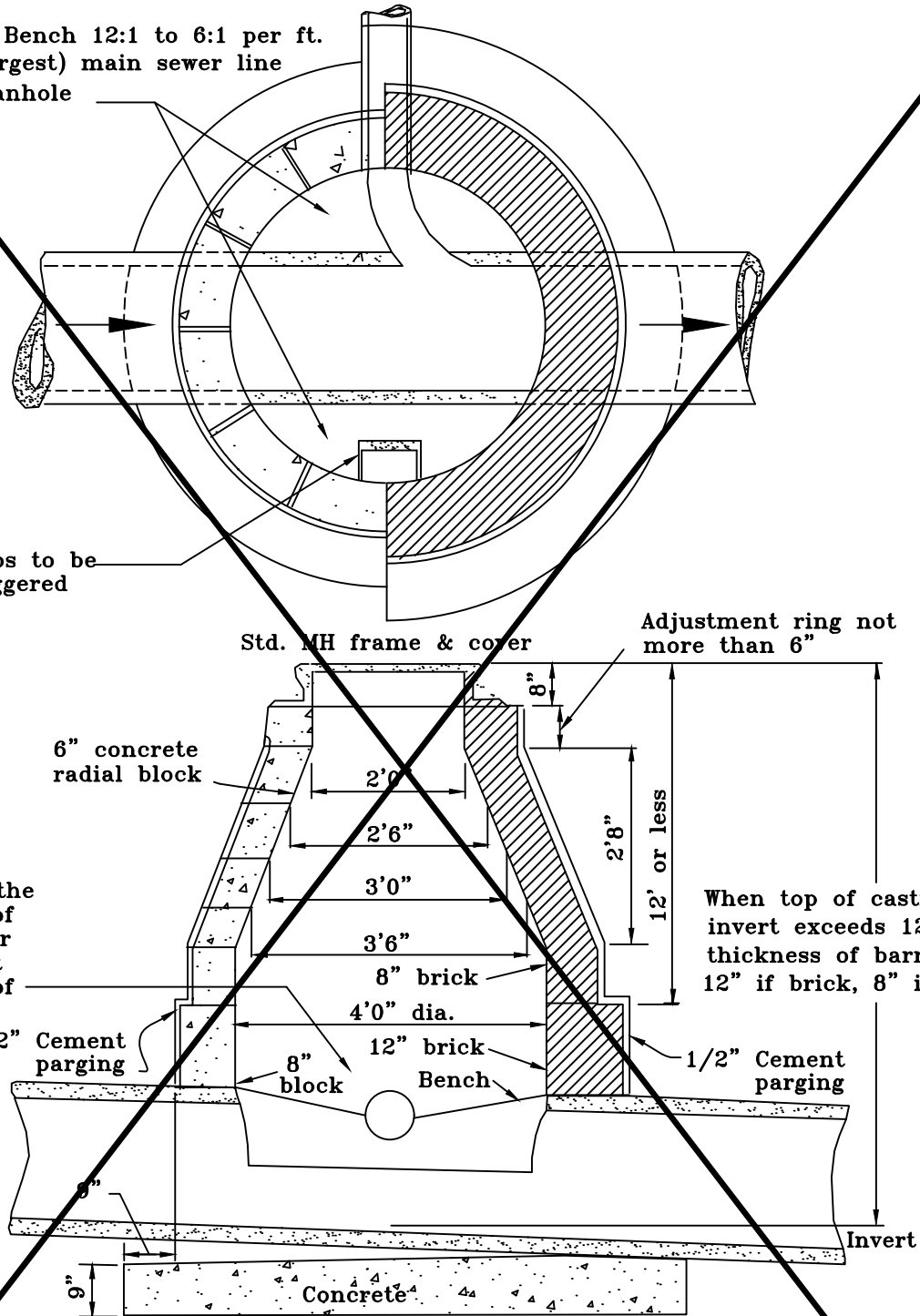
Adjustment ring not more than 6"

6" concrete radial block

Projection of the inside crown of incoming sewer must intersect inside crown of main sewer.

1/2" Cement parging

When top of casting to invert exceeds 12', increase thickness of barrel to 12" if brick, 8" if block



Note: For detail of MH frame and cover anchorage see Plate 10-10.

Ref. Sec. 10-0102.5D(7)

**TYPICAL ALTERNATE 4'-0" ID BLOCK  
OR BRICK MANHOLE FOR  
EXISTING PIPES OF 21" MAXIMUM**

PLATE NO.

STD. NO.

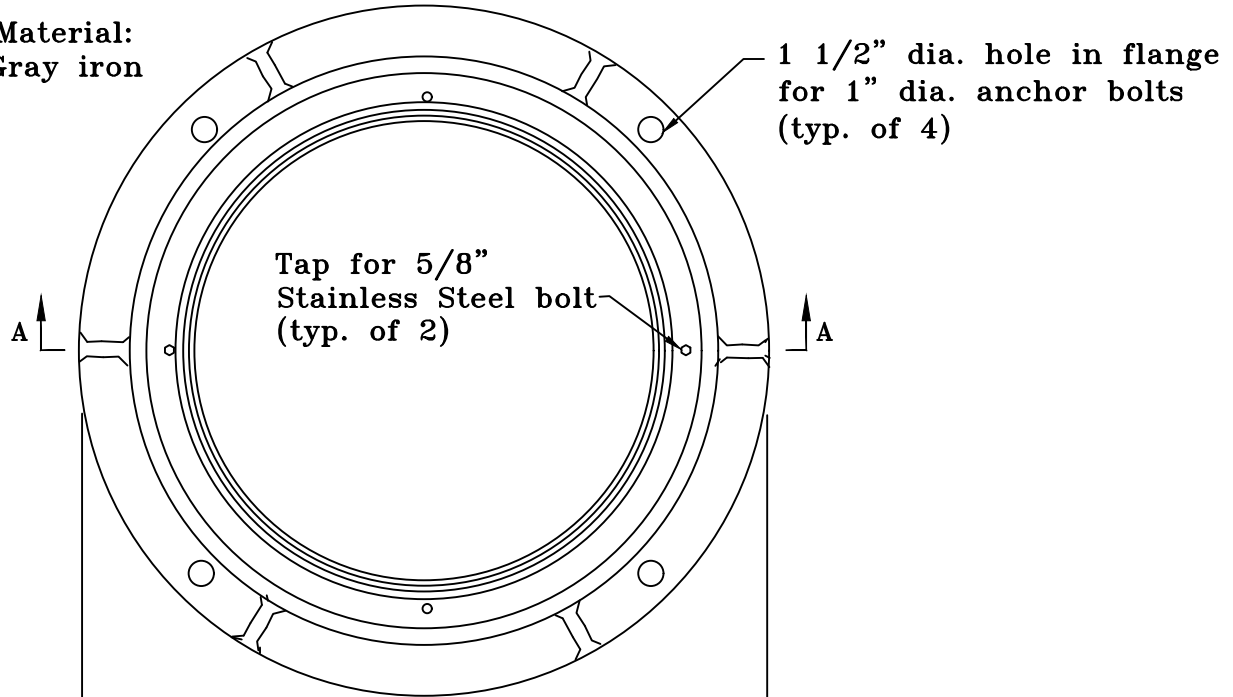
Rev. 1-00, 2018  
Reprint

7-10

DPW-20A

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL

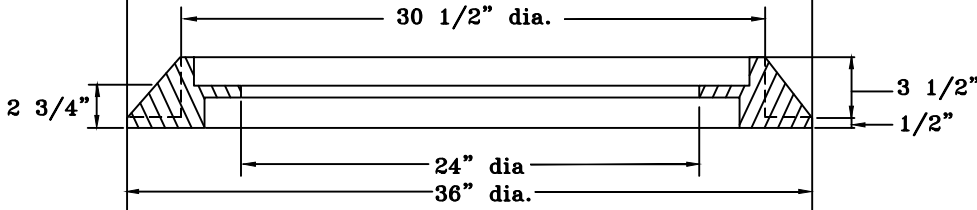
**Material:**  
Gray iron



Tap for 5/8"  
Stainless Steel bolt  
(typ. of 2)

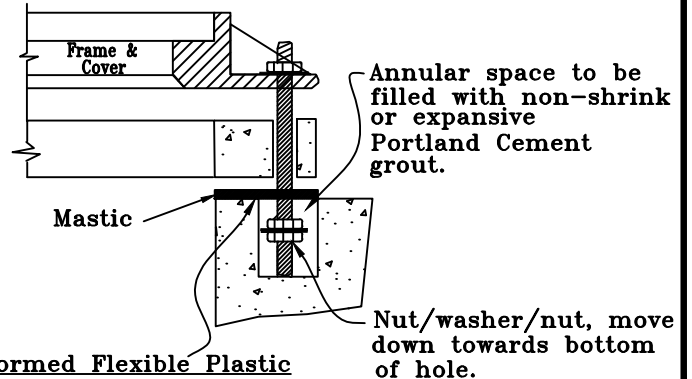
1 1/2" dia. hole in flange  
for 1" dia. anchor bolts  
(typ. of 4)

**PLAN VIEW**



**SECTION A-A**

**ANCHOR BOLT DETAIL  
(SEE NOTE)**



Annular space to be filled with non-shrink or expansive Portland Cement grout.

Mastic

Nut/washer/nut, move down towards bottom of hole.

**NOTE:**

3/4" dia. threaded anchor bolt or 3/4" dia. variable length allthread with 2" dia. washer locked between 2 nuts at embedded end, or 3/4" dia. variable length allthread with 3" long X 1/2" (min.) dia. "T" welded on the embedded end. Anchor bolt to be embedded in nonshrink or expansive Portland Cement grout.

Ram-Nek Preformed Flexible Plastic Gasket, Pioneer 301 Mastic or approved equal, must be used except in paved areas as noted in Section 10-0104.2L et seq.

Ref. Sec. 10-0102.5D(7), Plates 3-10, 4-10, 6-10, 7-10

Rev. 1-00, 2011 Reprint, 2018 Reprint, x-20

## WATERTIGHT/LOCKING MANHOLE FRAME

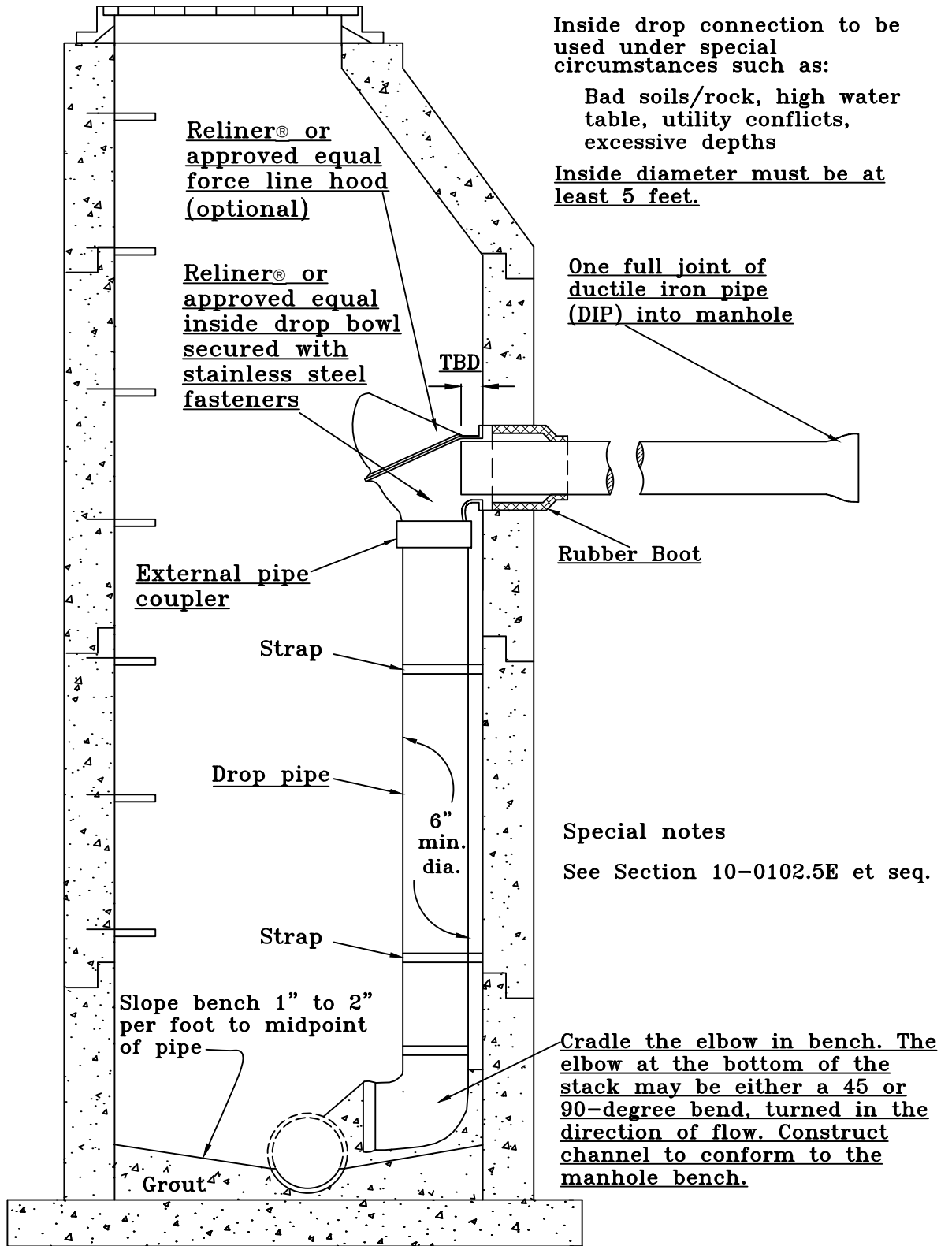
PLATE NO.

STD. NO.

10-10

DPW-22

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



Ref. Sec. 10-0102.5E

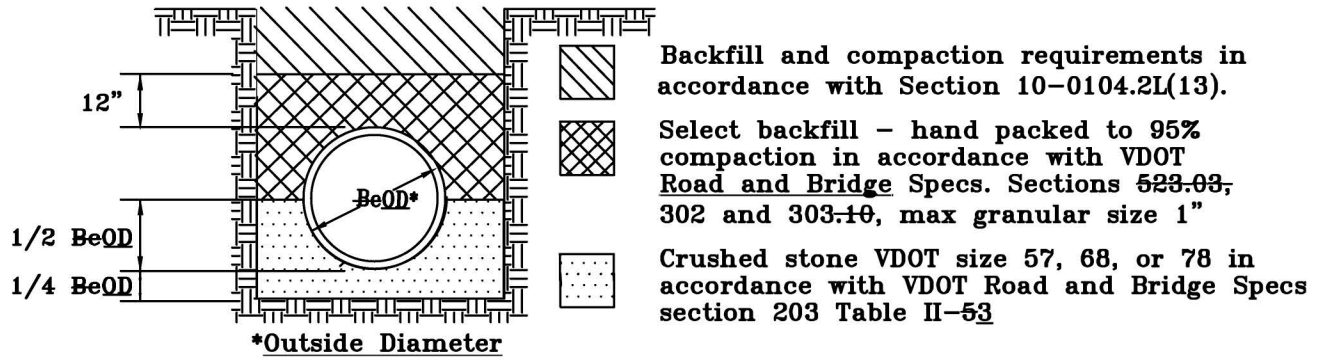
## TYPICAL 45' ID MANHOLE WITH INSIDE DROP CONNECTION

PLATE NO.

14-10

Rev. 1-00, 2-07, 2018  
Reprint, X-20

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



Backfill and compaction requirements in accordance with Section 10-0104.2L(13).

Select backfill - hand packed to 95% compaction in accordance with VDOT Road and Bridge Specs. Sections 523-03, 302 and 303-10, max granular size 1"

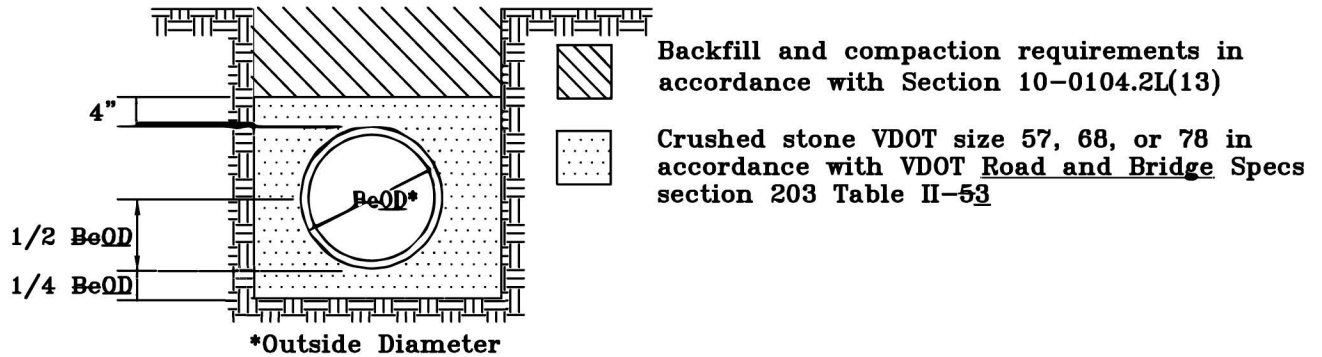
Crushed stone VDOT size 57, 68, or 78 in accordance with VDOT Road and Bridge Specs section 203 Table II-53

Ref. Sec.  
6-1607.1B(2),  
10-0103.7, Plate  
17-10  
  
Rev. 1-00, 2011  
Reprint, 2018  
Reprint, x-20

## TYPICAL TRENCH CONSTRUCTION PIPE BEDDING - ALTERNATE "A" (CONTRACTOR'S OPTION)

PLATE NO.

15-10



Backfill and compaction requirements in accordance with Section 10-0104.2L(13)

Crushed stone VDOT size 57, 68, or 78 in accordance with VDOT Road and Bridge Specs section 203 Table II-53

**NOTE 1:** The width of the trench is to be as specified by the Engineer on the plans or as set forth in the Specs. Max. trench width and depth must be as specified in Tables 10.4 and 10.5. Trenching methods must be in compliance with the Va. Department of Labor and Industry (VOSH) requirements.

**NOTE 2:** The pipe must be bedded in carefully compacted granular material placed on a flat trench bottom. The granular material must be crushed stone VDOT size 57, 68, or 78, in accordance with VDOT Spec. Section 203. The granular bedding must have a min. thickness of 1/4 the outside pipe dia. (4" min.) and must extend vertically in accordance with alternatives A or B. If the max. width of the trench at the top of the pipe exceeds those specified, granular bedding material will be brought to the top of the pipe for the full width of the trench. The remainder of the side fills and a min. depth of 12" over the top of the pipe must be filled with carefully compacted material. Should the contractor elect to use larger stone to carry the water, the larger stone is to be placed beneath the specified amount of granular material. The larger stone is not in any way to affect the amount of granular material to be used.

Ref. Sec. 6-1607.1B(2),  
10-0103.7, Plates 17-10,  
18-10, 19-10

## TYPICAL TRENCH CONSTRUCTION PIPE BEDDING - ALTERNATE "B" (CONTRACTOR'S OPTION)

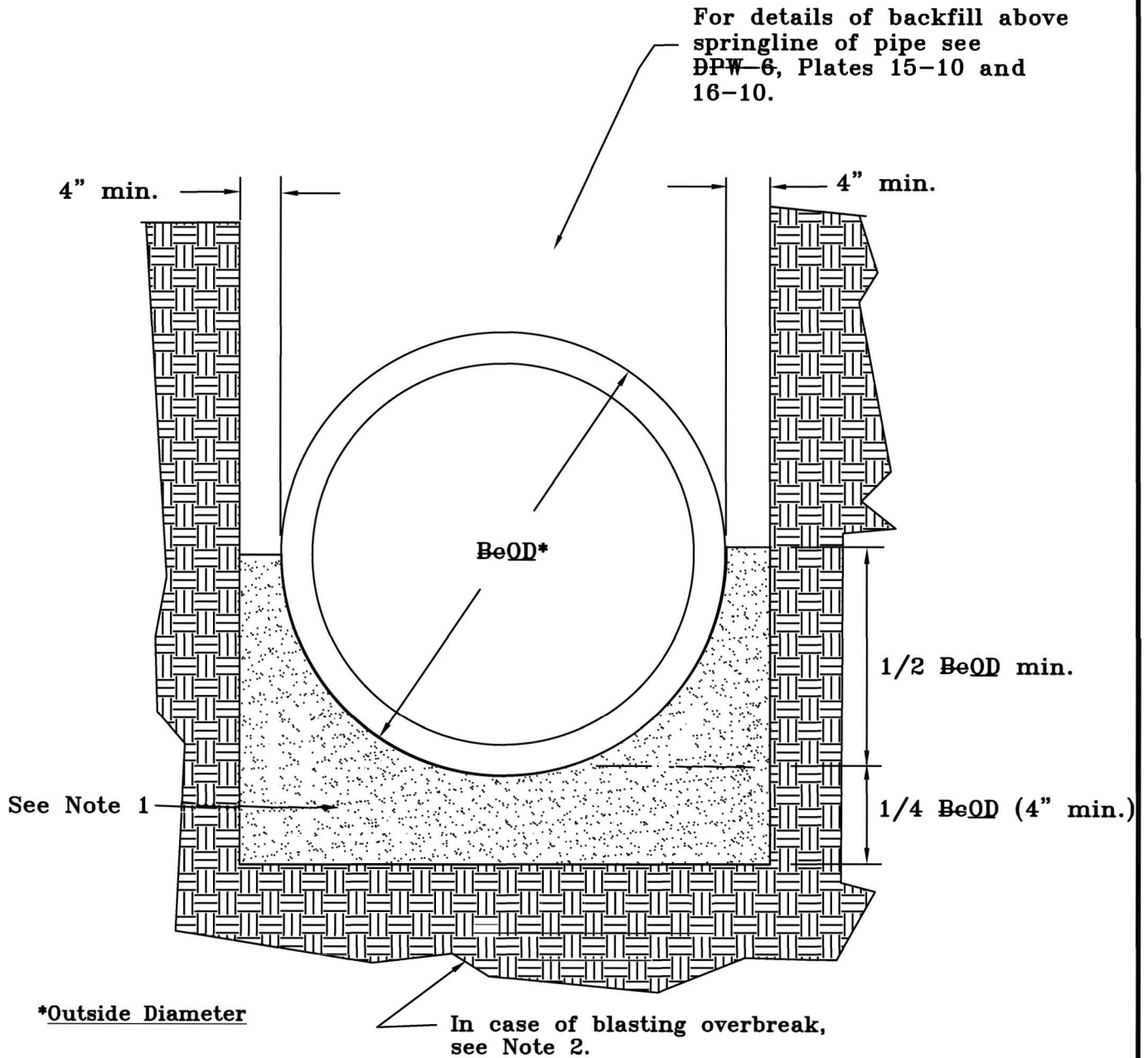
PLATE NO.

16-10

Rev. 1-00, 2011 Reprint,  
2018 Reprint, x-20



# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



**NOTES:**

1. The compacted crushed stone is to be as described in Plates 15-10 and 16-10 of the specs.
2. Blasting overbreak to be removed and replaced with compacted crushed stone.

Ref. Sec. 10-0103.7

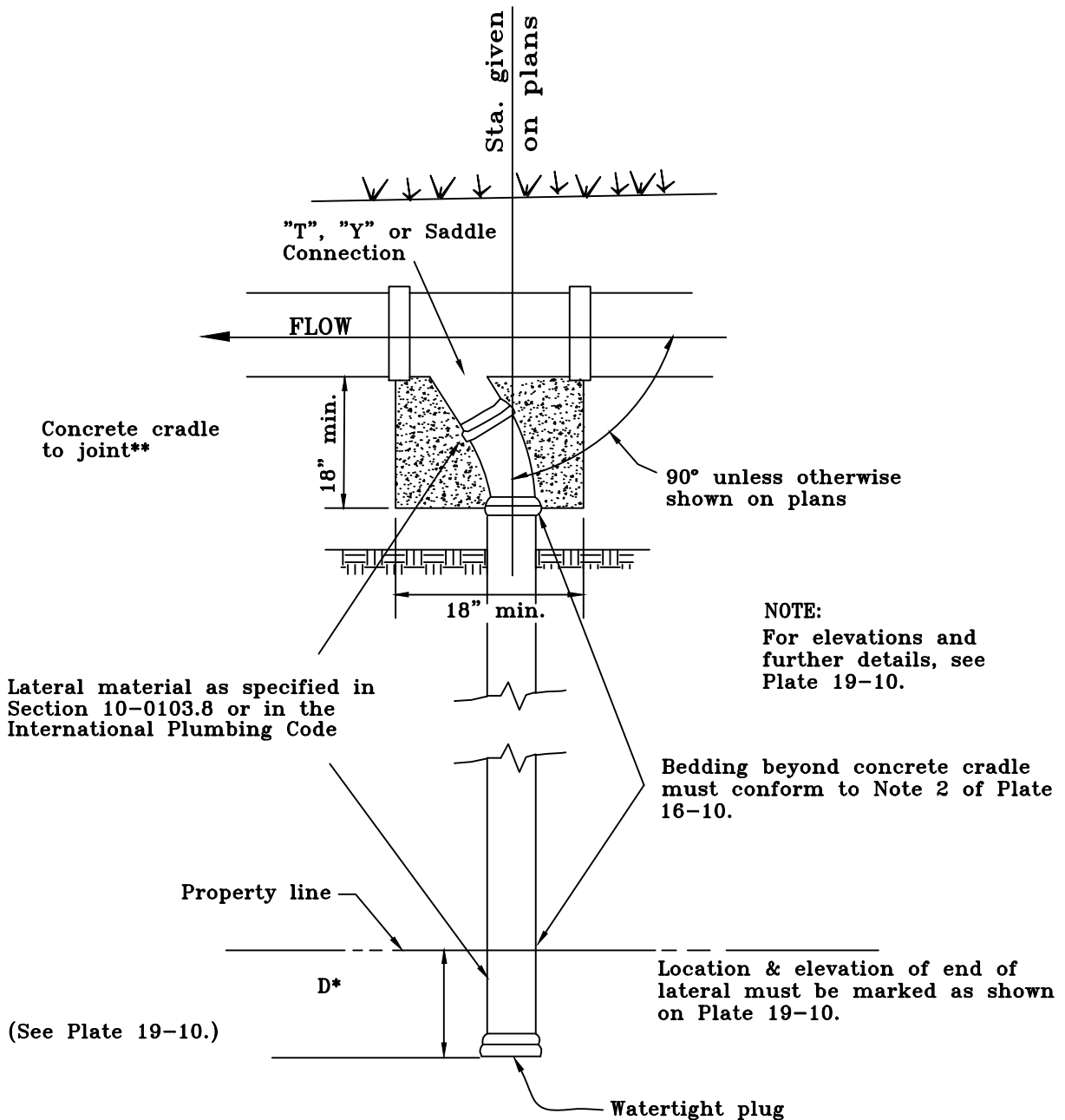
## TYPICAL TRENCH IN ROCK

PLATE NO.

17-10

Rev. 1-00, 2011 Reprint,  
2018 Reprint, X-20

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



5" dia. laterals must connect to 8" dia. sewer mains by way of a manufactured "T" or "Y". 6" dia. laterals must connect to collector sewers in sizes from 8" to 15" by way of a manufactured "Y" only with prior approval from the Department of Public Works and Environmental Services. Lateral connections to sewers greater than 15" in diameter must be made at manholes. Approved saddles may be used for 5" dia. connections for 8" dia. rigid pipe sewer mains.

\*Not applicable to Planned Development Districts

\*\*Hand mixing of concrete cradle allowed per VDOT specifications

Ref. Sec. 10-0104.5A,  
Plate 19-10

Rev. 1-00, 6-01, 2011  
Reprint, 2018 Reprint,  
x-20

~~HOUSE~~ SERVICE LATERAL (SPUR)

PLATE NO.

STD. NO.

18-10

DPW-10

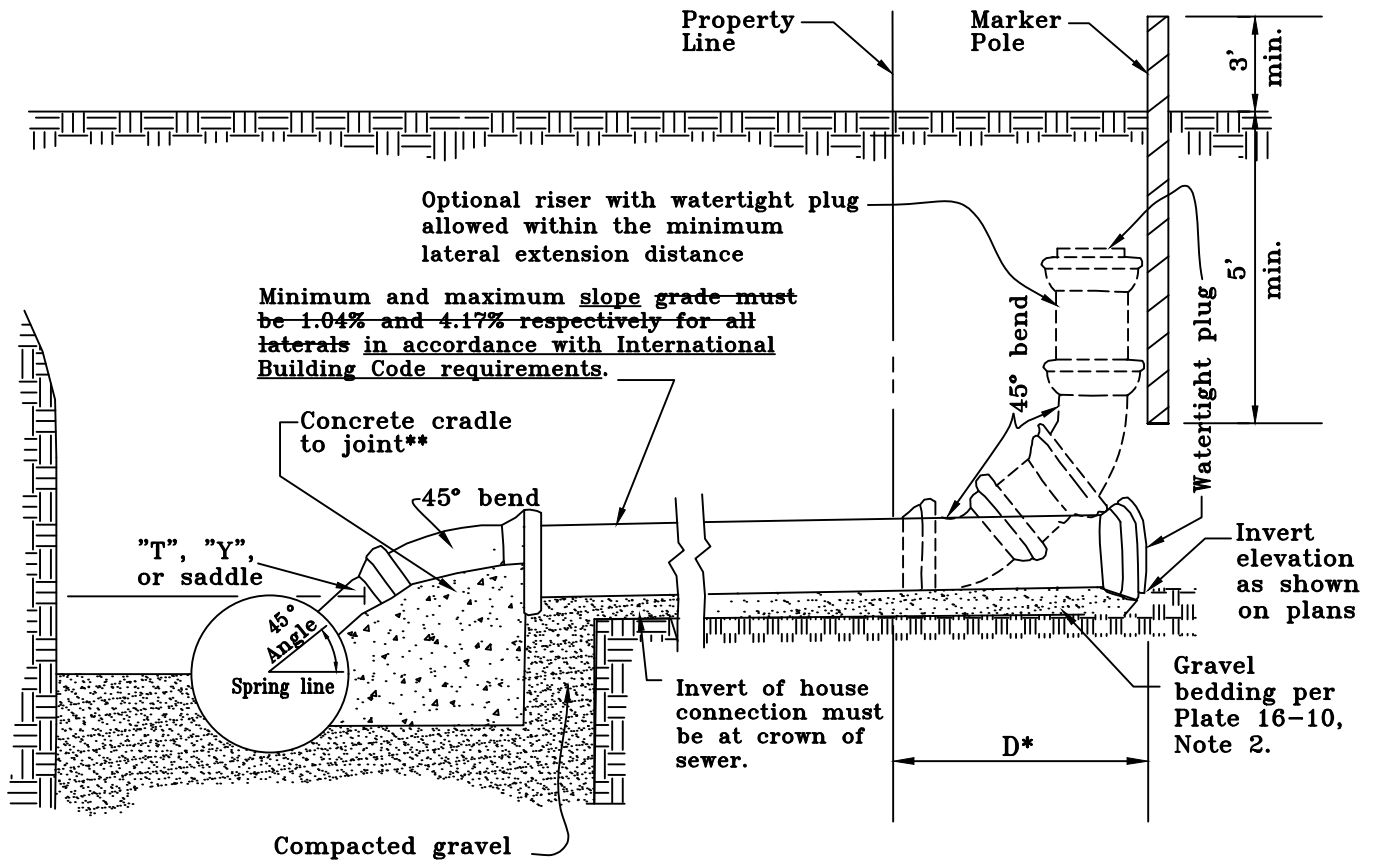
# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL

**NOTES:**

**TO AVOID CONFLICTS WITH OTHER UNDERGROUND SERVICE UTILITIES, THE MINIMUM LATERAL EXTENSION DISTANCE (D)\* MUST BE:**

Single-Family Detached	20 ft beyond the property line or within 5 ft of the minimum yard requirement, whichever distance is less.
Single-Family Townhouse	5 ft beyond the property line or sanitary sewer easement, whichever distance is greater.

1. Gravel bedding beyond the concrete cradle must conform to Note 2 of Plate 16-10.
2. Lateral pipe material must be as specified in Section 10-0103.8 or in the International Plumbing Code.
3. CI Saddles must be GENECO™ Sealite Sewer Pipe Saddle as made by Richmond Foundry, Pioneer Foundry, or approved equal. Saddles must incorporate an alignment flange that protrudes into the tapping hole and must clamp to the existing main with a stainless steel band and stainless steel fasteners. When connecting to a CIPP-lined sewer main, use LMT™ saddle or approved equal.
4. A long sweep, 90-degree bend may be used as an alternate to two 45-degree bends.



FOR PLAN VIEW, SEE PLATE 18-10.

\*Not applicable to Planned Development Districts

\*\*Hand mixing of concrete cradle allowed per VDOT specifications

Ref. Sec. 10-0104.5A,  
Plate 18-10

Rev. 1-00, 6-01, 2011  
Reprint, 2018 Reprint,  
x-20

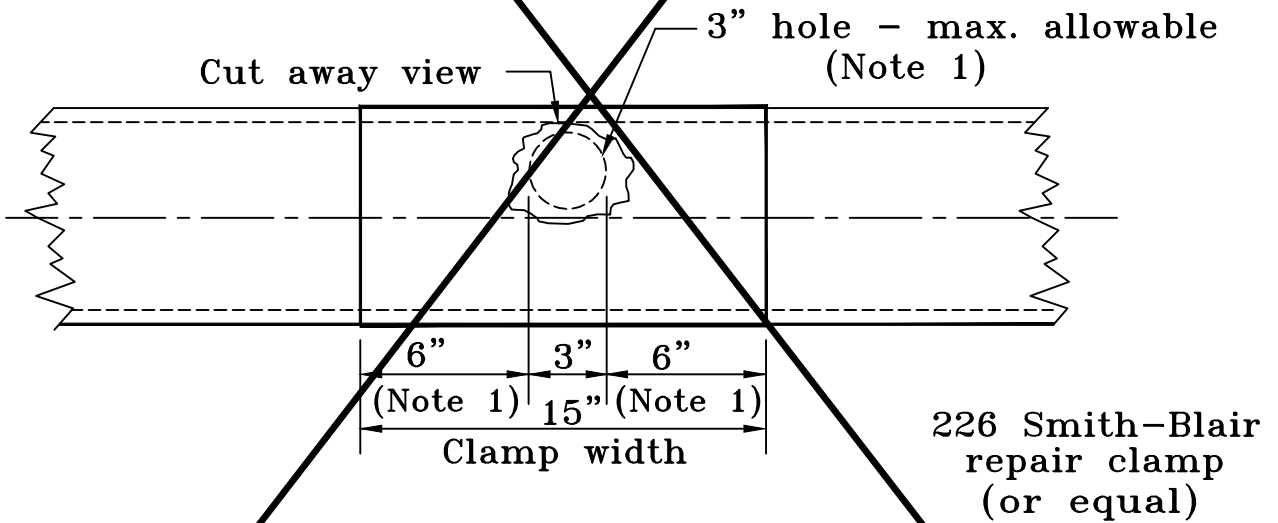
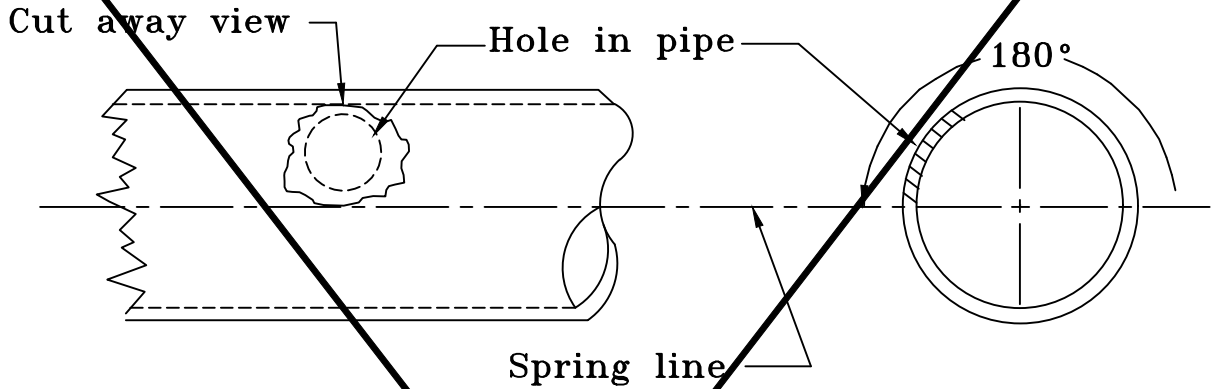
## HOUSE SERVICE LATERAL CONSTRUCTION DETAIL

PLATE NO.

19-10

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL

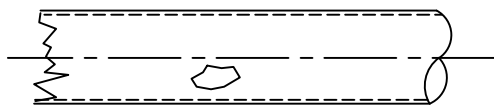
## HOLE IN PIPE ABOVE SPRING LINE



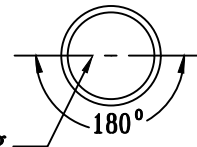
Note 1:  
 Damage exceeding 3" must be repaired as stated under replacement of pipe - see Section 10-0104.7C at seq. 6"-min. dimension from extremity of damaged area to end of sleeve.

Ref. Sec. 10-0104.7E(1)	<b>HOLE IN PIPE ABOVE SPRINGLINE</b>	PLATE NO.	STD. NO.
Rev. 1-00, 2018 Reprint		20-10	RG-1

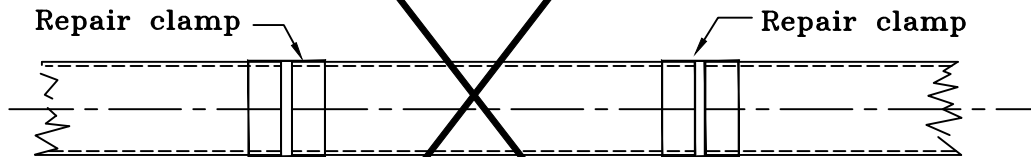
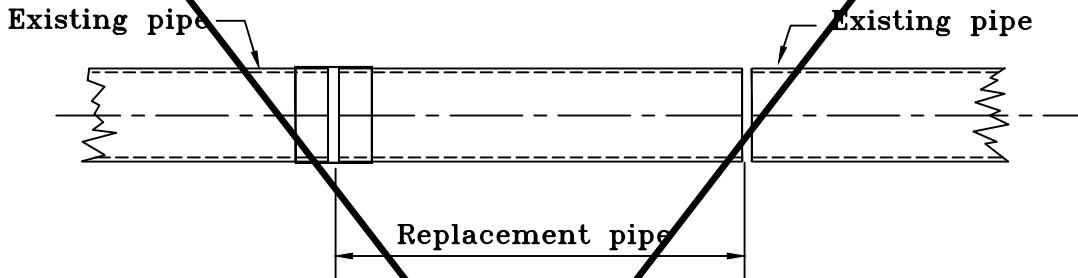
# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



Hole in pipe  
(Pipe replacement  
required)



Spring  
line



Ref. Sec. 10-0104.7E(2)

## HOLE IN PIPE BELOW SPRING LINE

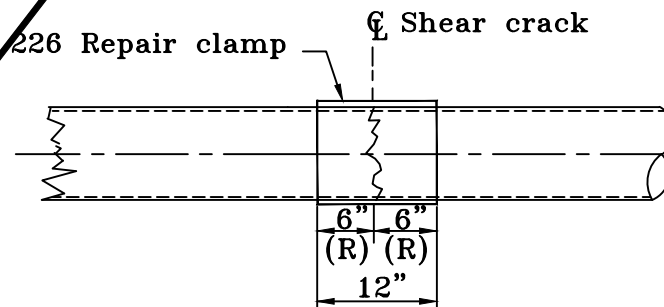
PLATE NO.

STD. NO.

Rev. 1-00, 2018 Reprint

21-10

RG-2



Ref. Sec. 10-0104.7E(3)

## PIPE WITH CRACK OR SHEAR

PLATE NO.

STD. NO.

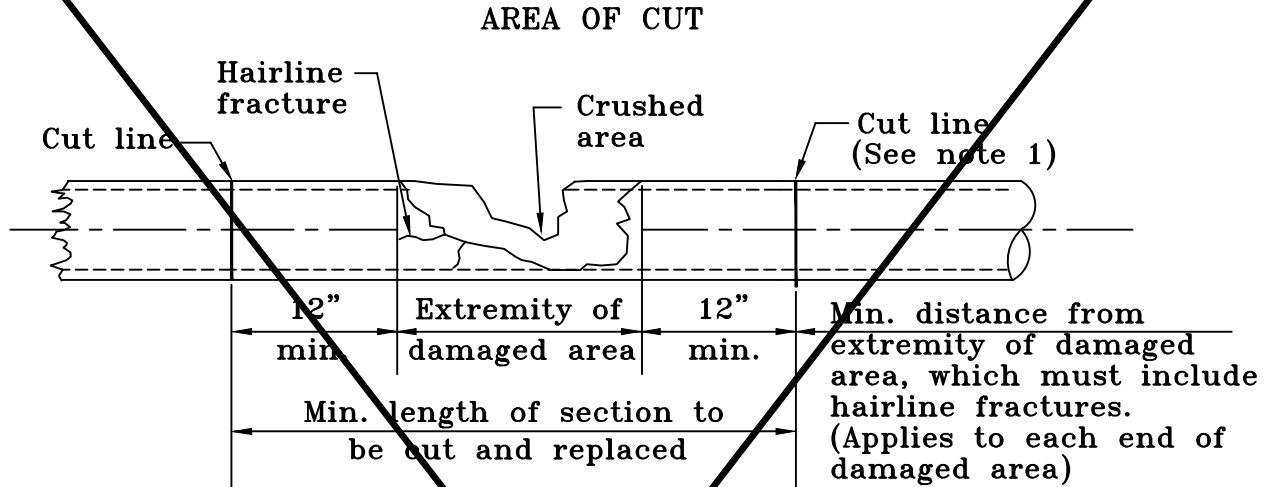
Rev. 1-00, 2018 Reprint

22-10

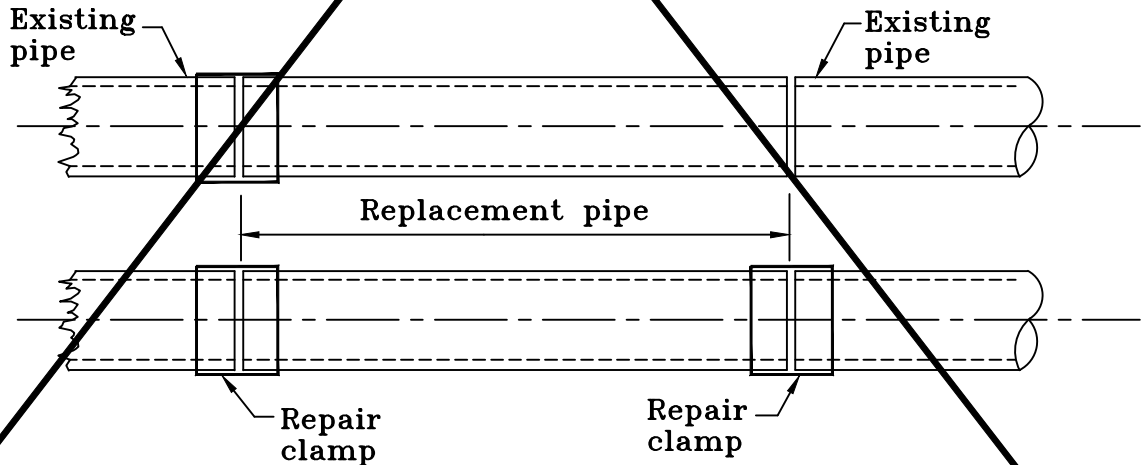
RG-2

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL

## CRUSHED SECTION OR SECTIONS OF PIPE



Note 1 - Cuts will be made on a vertical plane with an approved cutting tool. After the cut has been made, a visual inspection will be made to check for hairline fractures on the inside of pipe; additional pipe will be cut out if this condition is found.



## SLIPPED OR LEAKING JOINTS

Ref. Sec. 10-0104.7E(4),  
10-0104.7E(5)

## CRUSHED SECTION OF PIPE AND SLIPPED OR LEAKING JOINT

PLATE NO.

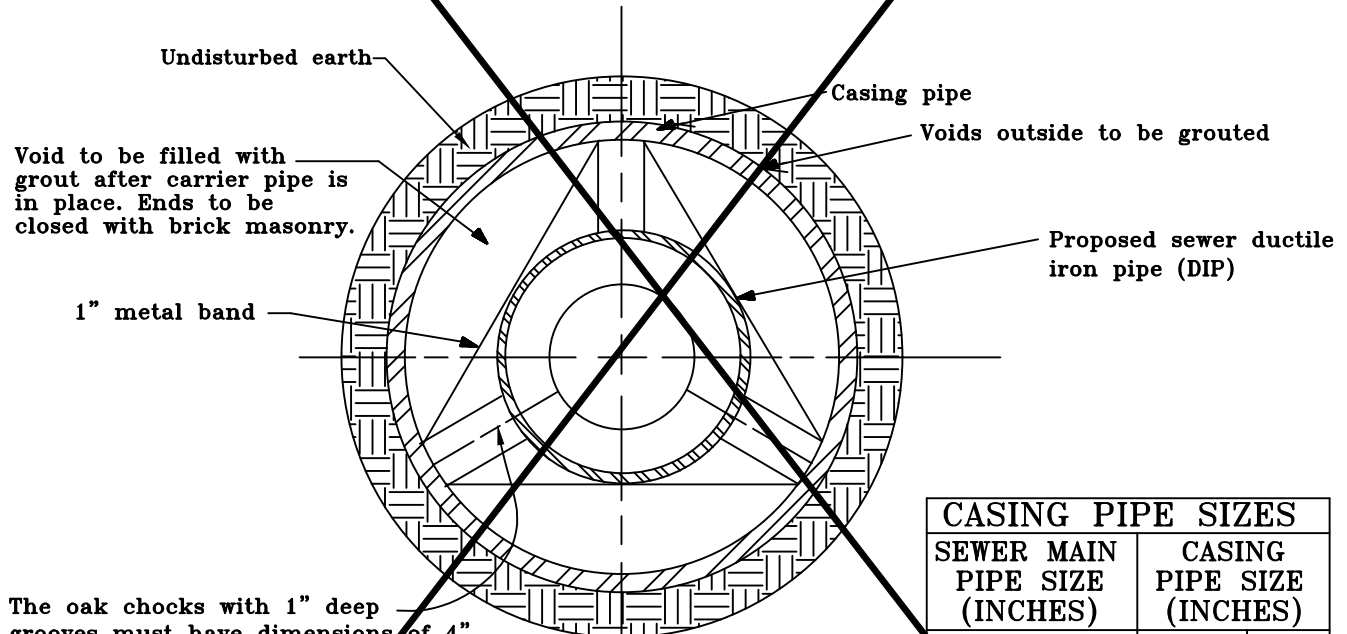
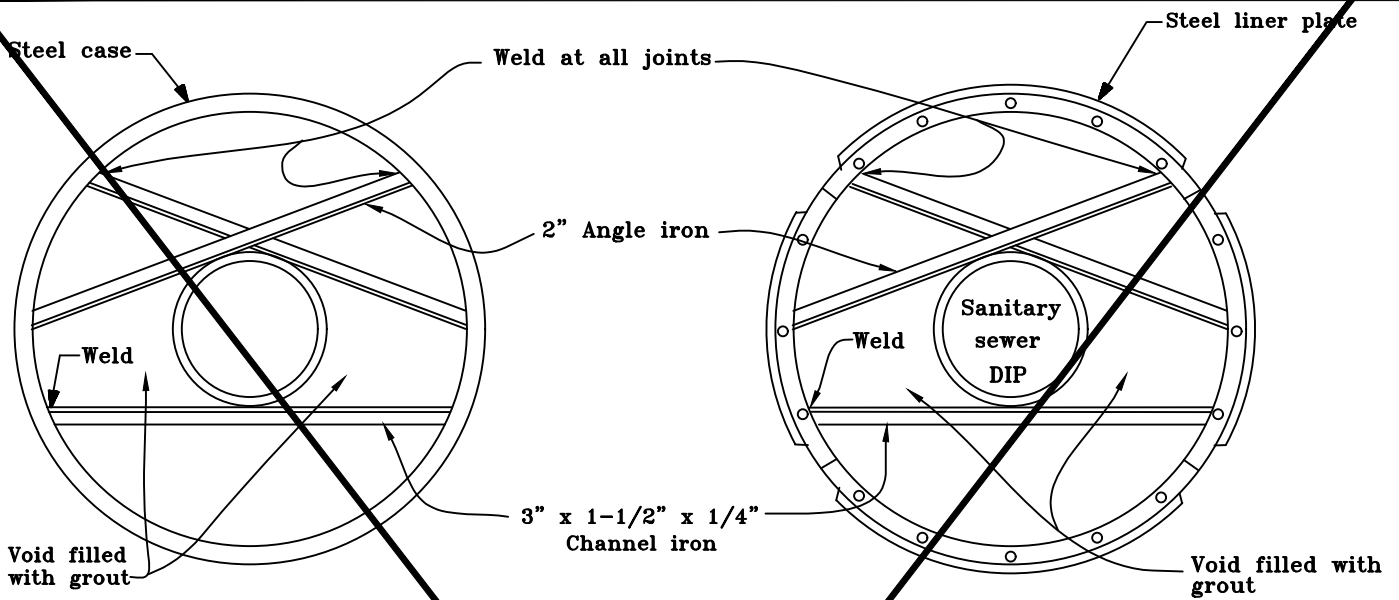
STD. NO.

23-10

RG-3

Rev. 1-00, 2018 Reprint

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



The oak chocks with 1" deep grooves must have dimensions of 4" x 6" x 18" and be placed 6' OC. 1" metal bands are to be bound and bolted in chock grooved areas.

All tunnel ends to be closed with brick and mortar construction.

Grout Specifications

One part cement and four parts concrete sand to which has been added "Passolite" or fly ash in the amount of 1/2 pound per bag of cement.

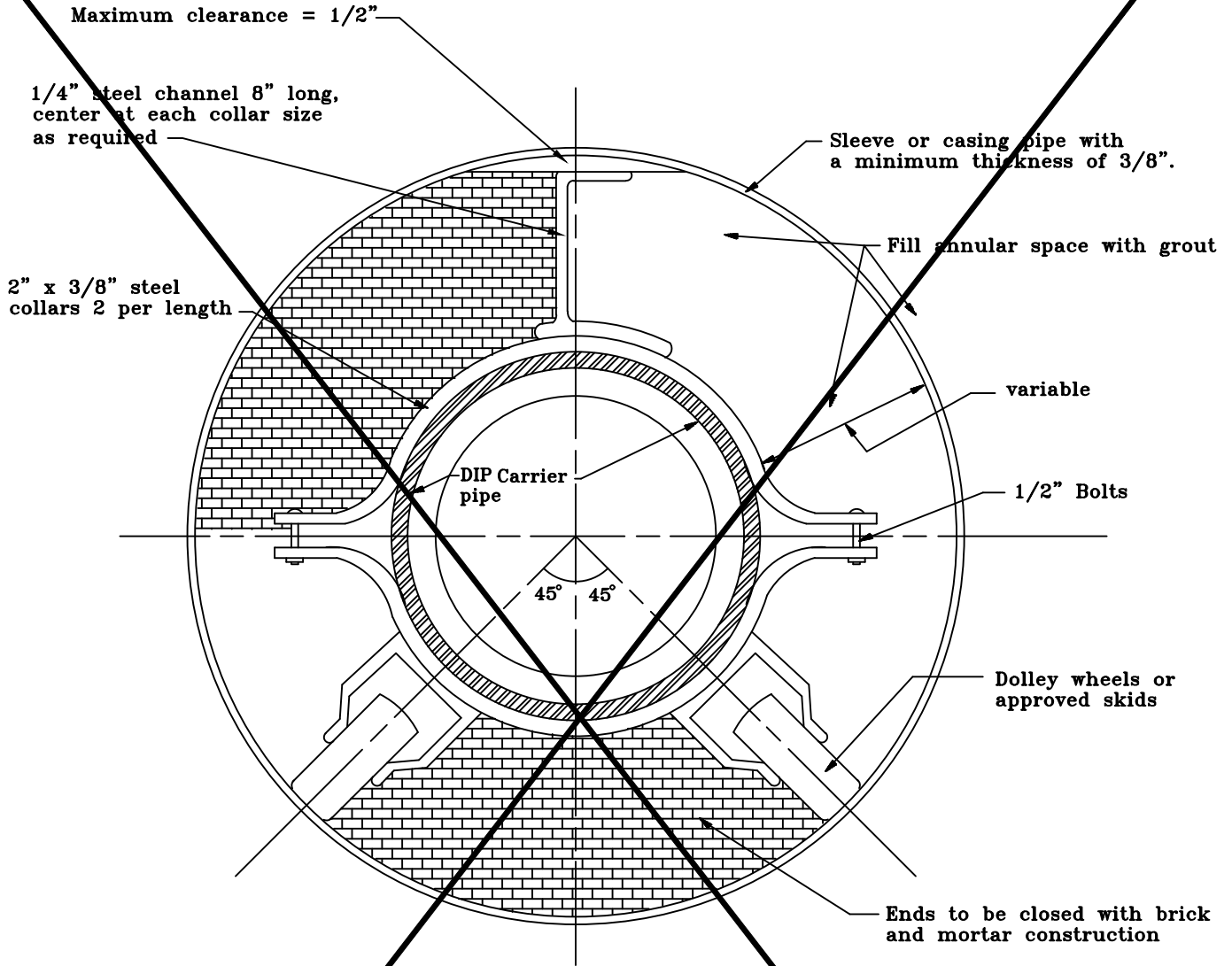
CASING PIPE SIZES		MINIMUM
SEWER MAIN PIPE SIZE (INCHES)	CASING PIPE SIZE (INCHES)	
8	22	
10	24	
12	24	
14	30	
16	30	
18	36	
20	36	
24	36	

Casing pipe size varies, 8 gauge galvanized asphalt, coated corrugated metal culvert pipe AASHTO STD. M36 or black seamless steel welded (AWWA C-200) pipe minimum thickness 3/8".

## HIGHWAY CROSSING

Rev. 1-00, 2018 Reprint	<b>JACKING AND BORING/ TUNNEL DETAILS</b>	PLATE NO.	STD. NO.
		25-10	DWP-12

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



CASING PIPE SIZES	
SEWER MAIN PIPE SIZE (INCHES)	CASING PIPE SIZE (INCHES)
8	22
10	24
12	24
14	30
16	30

**MINIMUM**

Grout Specifications

One part cement and four parts concrete sand to which has been added "Passolite" or fly ash in the amount of 1/2 pound per bag of cement.

## HIGHWAY CROSSING

### JACKING AND BORING/ TUNNEL DETAILS

PLATE NO.

STD. NO.

26-10

DPW-13



**Proposed Amendment to Chapter 12 (Tree Conservation)  
of  
the Public Facilities Manual**

**Amend List of Tables and references to Tables 12.10 through 12.17 in the text of the PFM to reflect the deletion of Tables 12.9, 12.15, and 12.16.**

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**Amend List of Plates to read as follows:**

**LIST OF PLATES**

<b>Standard Designation</b>	<b>Plate No.</b>	<b>Description</b>	<b>Section</b>
N/A	1A-12	Tree Inventory and Poor Condition Analysis, 35-foot Inventory Zone	12-0307.1, 12-0307.2C
N/A	1B-12	Tree Inventory and Condition Analysis-Poor Condition, Hazardous and Dead Trees	12-0307.1B, 12-0307.2B, 12-0307.2C
N/A	2-12	Critical Root Zones and Drip Lines of Trees	12-0307.2D, 12-0307.2E
N/A	3-12	Tunneling <u>Guidelines</u>	12-0202.1

N/A	4-12	Energy Conservation Tree Canopy Credit	12-0310.4B(2)(a), 12-0310.4B(2)(b)
N/A	5-12	Deck Planter	12-0401.1D(3)
N/A	6-12	Tree Protection Fence Installation	12-0305.1B, 12-0503.1B
N/A	7-12	<u>Tree Protection Fence Installation &amp; Root Pruning</u>	12-0502.1, 12-0504.20
N/A	8-12	Planting for Tree Seedlings	12-0505.5F
N/A	9-12	Pruning Cuts	12-0506.5A

**Amend Article 12-0300 (TREE CONSERVATION PLAN REQUIREMENTS), Section 12-0305 (Erosion and Sediment Control Plan Sheets), Subsection 12-0305.1, by revising Paragraph 12-0305.1B to read as follows:**

- B. All erosion and sediment controls and tree protection devices must be placed ~~within the area to be disturbed~~ at or within the limits of clearing and may not be located in areas shown to remain undisturbed. Tree protection fencing must be provided at the limits of clearing wherever other control devices are not shown (see [Plate 6-12](#)).

**Amend Article 12-0300 (TREE CONSERVATION PLAN REQUIREMENTS), Section 12-0307 (Tree Inventory and Condition Analysis), Subsection 12-0307.2, by revising Paragraphs 12-0307.2D through 12-0307.2G to read as follows:**

- D. Critical Root Zones. Critical Root Zone (CRZ) is the minimum tree protection area that can still be considered optimal for preservation of the tree. As the CRZ is encroached upon by construction activities, the survival potential of the tree is reduced. Trees 12 inches and greater in diameter located within 25 feet of the proposed limits of clearing within the undisturbed area and within 10 feet of the limits of clearing in the disturbed area, must have their estimated critical root zone delineated on Tree Conservation Plans. Critical root zones must be determined using the formula found in [Plate 2-12](#).
1. The CRZ should have a minimum radius of 1 foot for each inch of trunk diameter, measured at 4.5 feet above grade. To account for slope, trunk diameter must be measured 4.5 feet above the highest point adjacent to the tree.
  2. The maturity of the tree, tolerance of the species to negative impacts resulting from construction activities, the health of the tree, and existing or proposed conditions in the area surrounding the tree may increase the radius of the CRZ to a total of 1.5 feet for each inch of trunk diameter, as determined by the Director.

- E. Tree Conservation Plans must identify all “Heritage,” “Specimen,” “Memorial” or “Street” trees officially designated for preservation through the provisions of [Chapter 120](#) of the Code that are located on the development site or on adjacent property that have potential to be impacted by any on-site or off-site construction activity associated with the proposed development. The tree preservation plan sheets must identify such trees by common name; category of designation; trunk location; trunk diameter at 4.5 feet; dripline (see [Plate 2-12](#)); estimated critical root zone (see [Plate 2-12](#)); and the location of any easement established for the tree’s protection and access. All trees designated for preservation through the provisions of [Chapter 120](#) of the Code must be protected during construction. No construction activities are allowed within the critical root zones of these trees except as may be allowed by Article 5 of [Chapter 120](#) of the Code. Tree preservation narratives must address how these trees will be protected throughout all phases of construction.
- ~~1. All trees designated for preservation through the provisions of [Chapter 120](#) of the Code must be protected during construction. No construction activities is allowed within the critical root zones of these trees except as may be allowed by Article 5 of [Chapter 120](#) of the Code. Tree preservation narratives must address how these trees will be protected throughout all phases of construction.~~
- F. Tree Conservation Plans must identify “Champion or Co-champion” trees located on the development site or on adjacent property that have been recorded on the Fairfax County, Virginia State or [National Big Tree Registry](#). The tree preservation plan sheets must identify such trees by common name; trunk location; trunk diameter at a height of 4.5 feet; dripline; and estimated critical root zone. Efforts should be made to preserve these trees. Consideration should be given to preserving such trees for official designation as a “Heritage” or “Specimen” tree through the provisions of [Chapter 120](#) of the Code. Contact [Urban Forest Management](#) for information concerning the location of these trees.
- G. Information provided to satisfy the requirements of this section should be prepared by an [International Society of Arboriculture](#) Certified Arborist or by a Registered Consulting Arborist as designated by the [American Society of Consulting Arborists](#), and must be overlaid on and match all information required on existing vegetation maps as required by [§ 12-0306](#). Tree Conservation Plans that the Director determines do not ~~to~~ conform with the standards of [§ 12-0308 et seq.](#) are subject to disapproval. (Note: see also [§ 12-0308.5B](#) for Certified Arborists or Registered Consulting Arborists to prepare arboricultural documentation for deviations to the Tree Preservation Target.)

**Amend Article 12-0300 (TREE CONSERVATION PLAN REQUIREMENTS), by revising Table 12.3 (Tree Preservation Target Calculations and Statement) to read as follows:**

<b>Table 12.3 Tree Preservation Target Calculations and Statement</b>	
A	Pre-development area of existing tree canopy (from Existing Vegetation Map) =
B	Percentage of gross site area covered by existing tree canopy =
C	Percentage of 10-year Tree Canopy required for site (see <a href="#">Table 12.4</a> ) =
D	Percentage of the 10-year Tree Canopy requirement that should be met through tree preservation (same as line B) =
E	<u>Tree Canopy area that should be met through tree preservation (Tree Preservation Target) =</u>
F	Proposed percentage of canopy requirement that will be met through tree preservation =
<del>F</del> G	Has the Tree Preservation Target minimum been met?
	Provide Yes or No
<del>G</del> H	If No for line <del>F</del> G, then a request to deviate from the Tree Preservation Target must be provided on the plan that states one or more of the justifications listed in <a href="#">§ 12-0308.3</a> along with a narrative that provides a site-specific explanation of why the Tree Preservation Target cannot be met. Provide sheet number where deviation request is located.
<del>H</del> I	If step <del>G</del> H requires a narrative, it must be prepared in accordance with <a href="#">§ 12-0308.4</a> .
<del>I</del> J	Place <del>this</del> <u>tree preservation target</u> information before the 10-year Tree Canopy calculations as per instructions in <a href="#">Table 12.9</a> <del>Table 12.10</del> .

**Amend Article 12-0300 (TREE CONSERVATION PLAN REQUIREMENTS), Section 12-0310 (10-Year Tree Canopy Requirements) , Subsection 12-0310.3 (Preserving Existing Trees and Forested Areas for 10-year Tree Canopy Credits), Paragraph 12-0310.3D, by revising Subparagraph 12-0310.3D(1), reformatting Subparagraph 12-0310.3D(2), and revising Tables 12.7 and 12.8 to read as follows:**

1. [Table 12.7](#) identified invasive and vulnerable tree species that may not be used to meet the 10-year Tree Canopy requirement.

<b>Table 12.7 Invasive and Vulnerable Tree Species</b>	
Species name	Common name
<i>Ailanthus altissima</i>	tree of heaven
<i>Betula papyrifera</i>	<u>white birch</u>
<i>Elaeagnus umbellata</i>	autumn olive
<del><i>Acer platanoides</i></del>	<del>Norway maple</del>
<i>Albizia julibrissin</i>	Mimosa

<i>Paulownia tomentosa</i>	princess tree
<i>Populus alba</i>	white poplar
<i>Populus nigra 'Italica'</i>	<u>Lombardy poplar</u>
<i>Elaeagnus angustifolia</i>	Russian olive
<i>Fraxinus spp.</i>	<u>ash species</u>
<i>Morus alba</i>	white mulberry
<del><i>Ulmus pumila</i></del>	<del>Siberian elm</del>
<i>Pyrus calleryana, all cultivars</i>	Callery pear
<del><i>Quercus acutissima</i></del>	<del>sawtooth oak</del>
<i>Broussonetia papyrifera</i>	paper mulberry

- 2 E. Conditional Canopy Credits. [Table 12.8](#) identifies species that are subject to health-threatening levels of diseases and pests or are prone to developing structural problems and invasive behavior. If preserved, canopy areas comprised of these species may not be used to meet the 10-year Tree Canopy requirement. However, certain species may be used to meet 10-year Tree Canopy requirements if the Director determines that preservation efforts are in alignment with criteria identified in the “Conditions” column of [Table 12.8](#).

Species name	Common Name	Problem	Canopy Credit	Conditions
<i>Acer negundo</i>	box elder	Weak wood. Grows quickly. Rots quickly. Short lived.	Full if prerequisite conditions are met	Full credit if preserved in natural settings away from buildings and infrastructure
<i>Acer saccharinum</i>	silver maple	Weak wood. Branch and scaffold failure due to poor branch attachment.	Full if prerequisite conditions are met	Full credit if preserved in natural settings away from buildings and infrastructure
<i>Acer platanoides</i>	<u>Norway maple</u>	<u>Invasive tendencies.</u>	<u>0.5 (reduced) if prerequisite conditions are met</u>	<u>0.5 credit for preservation if not exhibiting obvious invasive tendencies. No credit for new plantings.</u>
<i>Ailanthus altissima</i>	tree of heaven	High failure rate when large. Branch and trunk failure due to internal decay. Highly invasive.	None	
<i>Albizia julibrissin</i>	mimosa	Weak wooded. Susceptible to disease. Short life span.	None	
<i>Catalpa bignonioides</i>	Southern catalpa	Brittle wood. Trunk failure due to internal decay.	Full if prerequisite conditions are met	Full credit if preserved in natural settings away from buildings and infrastructure

<i>Catalpa speciosa</i>	Northern catalpa	Brittle wood. Trunk failure due to internal decay.	Full if prerequisite conditions are met	Full credit if preserved in natural settings away from buildings and infrastructure
<i>Cupressocyparis leylandii</i>	leyland cypress	<u>Susceptible to disease. Overuse in Fairfax County.</u>	<u>0.5</u>	<u>Not conditional, but reduced credits</u>
<i>Morus alba</i>	white mulberry	Invasive.	None	
<i>Paulownia tomentosa</i>	princess tree	Weak wood, prolific seeds, invasive.	None	
<i>Pinus strobus</i>	white pine	Brittle wood. Branch and twig failure. <u>Susceptibility to disease and environmental stress. Overuse in Fairfax County.</u>	<u>0.5</u>	<u>Not conditional, but reduced credits</u>
<i>Pinus virginiana</i>	Virginia pine	Susceptible to wind-throw and structural instability when existing stands are fragmented or exposed by clearing operations.	Full if prerequisite conditions are met	Full credit if preserved in natural settings away from buildings and infrastructure and does not pose a high-risk condition
<i>Populus deltoides</i>	Eastern cottonwood	Weak wood and brittle branches.	Full if prerequisite conditions are met	Full credit if preserved in natural settings away from buildings and infrastructure
<i>Populus nigra 'Italica'</i>	Lombardy poplar	<del>Weak wood. Susceptible to canker disease.</del>	None	
<i>Pyrus calleryana</i>	All planted varieties, cultivars and naturally seeded or sprouted variants of Callery pear.	Highly invasive. Poor branch attachment. Highly susceptible to storm damage. Overuse in Fairfax County.	None	
<i>Quercus acutissima</i>	sawtooth oak	<u>Invasive tendencies.</u>	<u>0.5 (reduced) if prerequisite conditions are met</u>	<u>0.5 credit if not exhibiting obvious invasive tendencies</u>

**Table 12.8 Species that Cause Problems after Preservation (Cont'd)**

Species Name	Common Name	Problem	Canopy Credit	Conditions
<i>Robinia pseudoacacia</i>	black locust	Branch failure due to decay and poor branch attachment.	Full if prerequisite conditions are met	Full credit if preserved in natural settings away from buildings and infrastructure
<i>Salix babylonica</i>	weeping willow	Objectionable root system. Weak wood.	Full if prerequisite conditions are met	Full credit if preserved in natural settings away from buildings and infrastructure
<i>Tsuga canadensis/</i>	<u>Canadian hemlock</u>	<u>Susceptible to Hemlock Woolly Adelgid.</u>	<u>0.5</u>	<u>Not conditional, but reduced credits</u>

<i>Tsuga caroliniana/</i>	Carolina hemlock	Susceptible to Hemlock Woolly Adelgid.	0.5	Not conditional, but reduced credits
<i>Ulmus pumilia</i>	Siberian elm	Branch failure due to decay and poor branch attachment.	Full if prerequisite conditions are met 0.5 (reduced) if prerequisite conditions are met	Full credit if preserved in natural settings away from buildings and infrastructure 0.5 credit for preservation if not exhibiting obvious invasive tendencies. No credit for new plantings.

**Amend Article 12-0300 (TREE CONSERVATION PLAN REQUIREMENTS), Section 12-0310 (10-Year Tree Canopy Requirements), Subsection 12-0310.4 (Planting Trees for 10-year Tree Canopy Credit), by revising Paragraph 12-0310.4C, Subparagraph 12-0310.4D(1)(a) and striking Table 12.9 to read as follows:**

- C. ~~Species that Can Cause Problems after Planting.~~ Ten-year Tree Canopy credits will either not be granted, will be reduced or will be granted conditionally for planting tree species that the Director has determined to be problematic due to overabundance in the countywide tree population; invasive behavior; a special susceptibility to pests or disease; a predisposition to health and structural problems; a predisposition to causing damages to infrastructure; or the potential to cause negative impacts to the environment. [Table 12.16](#) and [Table 12.8](#) ~~Table 12.9~~ identifies these problematic species, the canopy credit multiplier (if any) that may be applied, and the condition(s) that must be met for using the canopy credit multiplier.
- D. Use of Seedlings, Woody Shrubs and Woody Seed Mix
1. Tree seedlings and shrubs may be used to meet tree canopy requirements in common open space and on individual lots within the R-2, R-1, R-C, and R-E zoning districts. The ground surface area of tree seedling planting areas must equate to the 10-year Tree Canopy credit area.
    - a. Native shrubs may be used to supplement tree seedlings as long as these treatments do not exceed 33 percent of the overall planting area. The number of a single species may not exceed 10 percent of the overall number of seedlings planted to meet these provisions. ~~Plant material used to satisfy these requirements may not contain any of the problematic trees species list in [Table 12.9](#) unless approved by the Director.~~

**Table 12.9—Species that Cause Problems after Planting**

<i>Species</i>	<b>Common Name</b>	<b>Problem</b>	<b>Canopy Credit Multiplier</b>	<b>Conditional Credit</b>

<i>Acer platanoides</i>	Norway maple	Invasive seedlings.	None	
<i>Acer saccharinum</i>	silver maple	Brittle wood. Branch and twig failure. Invasive root system. Overuse in Fairfax County.	None	
<i>Acer saccharum</i>	sugar maple	Susceptibility to stress in urban environments.	Conditional 1.0	Full credit if planted away from high heat environments such as parking lots.
<i>Betula papyrifera</i>	white birch	Susceptible to bore insects. Short life span.	None	
<i>Cornus florida</i>	flowering dogwood	Discula anthracnose. (Dogwood Spot Anthracnose).	Conditional 1.0	Full credit if varieties resistant to Discula anthracnose are used.
<i>Cupressocyparis leylandii</i>	leyland cypress	Susceptible to disease. Overuse in Fairfax County.	0.5	Not conditional, but reduced credits
<i>Elaeagnus umbellata</i>	autumn olive	Highly invasive.	None	
<i>Elaeagnus angustifolia</i>	Russian olive	Invasive.	None	
<i>Fraxinus spp.</i>	ash species	Susceptibility to emerald ash borer.	None	
<i>Ginkgo biloba (female only)</i>	ginkgo	Female plant produces fruits with objectionable odor.	Conditional 1.0	Full credit if male plant is used.

**Table 12.9—Species that Cause Problems after Planting (Cont'd)**

<i>Species</i>	<b>Common Name</b>	<b>Problem</b>	<b>Canopy Credit Multiplier</b>	<b>Conditional Credit</b>
<i>Liquidambar styraciflua</i>	sweetgum	Invasive root system. High VOC emissions.	Conditional 0.5	None if planted near buildings or infrastructure. May receive .25X if planted immediately adjacent to an existing forest/woodland community that contains this species as a major constituent
<i>Morus alba</i>	white mulberry all cultivars	Invasive.	None	
<i>Phellodendron amurense (female only)</i>	amur corktree	Prolific, invasive seeds.	Conditional 1.0	May receive full credit if male plant is used.
<i>Pinus strobus</i>	white pine	Brittle wood. Branch and twig failure. Susceptibility to disease and environmental stress. Overuse in Fairfax County.	0.5	Not conditional, but reduced credits
<i>Populus alba</i>	white poplar	Invasive root system	None	
<i>Populus deltoides</i>	Eastern cottonwood	Brittle wood. Branch and twig failure. Invasive root system.	Conditional 1.0	None if planted near buildings or infrastructure. May receive full credits if planted immediately adjacent to existing



				forest/woodland communities that contain this species as a constituent
<i>Populus nigra</i> 'Italica'	Lombardy poplar	Susceptibility to disease. Short life span.	None	
<i>Pyrus calleryana</i>	all varieties and cultivars of Callery pear.	Poor branch attachment. Highly susceptible to storm damage. Invasive. Overuse in Fairfax County.	None	
<i>Quercus palustris</i>	pin oak	Invasive root system. Susceptibility to stress in urban environments with low soil pH.	Conditional 1.0	None if planted near buildings or infrastructure. May receive full credit if planted immediately adjacent to existing forest/woodland communities that contain this species as a major constituent.
<i>Salix alba</i>	white willow	Weak wood. Grows quickly. Branch and twig failure.	Conditional 1.0	None if planted near buildings or infrastructure. May receive full credit if planted immediately adjacent to existing forest/woodland communities that contain this species as a constituent.

**Table 12.9—Species that Cause Problems after Planting (Cont'd)**

<i>Species</i>	<b>Common Name</b>	<b>Problem</b>	<b>Canopy Credit Multiplier</b>	<b>Conditional Credit</b>
<i>Salix nigra</i>	black willow	Weak wood. Grows quickly. Branch and twig failure.	Conditional 1.0	None if planted near buildings or infrastructure. May receive full credit if planted immediately adjacent to existing forest/woodland communities that contain this species as a constituent.
<i>Tsuga canadensis</i>	Canadian hemlock	Susceptible to Hemlock Woolly Adelgid.	0.5	Not conditional, but reduced credits
<i>Tsuga caroliniana</i>	Carolina hemlock	Susceptible to Hemlock Woolly Adelgid.	0.5	Not conditional, but reduced credits
<i>Ulmus americana</i>	American elm	Susceptibility to disease. Root systems can damage nearby infrastructure.	Conditional 1.0	None if planted near buildings or infrastructure. May receive full credit if disease resistant varieties are used and tree is located away from infrastructure

**Amend Article 12-0300 (TREE CONSERVATION PLAN REQUIREMENTS), by revising Table 12.10 (10-year Tree Canopy Calculation Worksheet) to read as follows:**

Step		Totals	Reference
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<b>Table 12.9 10-year Tree Canopy Calculation Worksheet</b>			
<b>A. Tree Preservation Target and Statement</b>			
A 1	Place the Tree Preservation Target calculations and statement here preceding the 10-year Tree Canopy calculations		see <a href="#">§ 12-0308.2</a> for list of required elements and worksheet
<b>B. Tree Canopy Requirement</b>			
B1	Identify gross site area =		<a href="#">§ 12-0311.1A</a>
B2	Subtract area dedicated to parks, road frontage, and		<a href="#">§ 12-0311.1B</a>
B3	Subtract area of exemptions =		<a href="#">§ 12-0311.1C(1)</a> through <a href="#">§ 12-0311.1C(6)</a>
B4	Adjusted gross site area (B1 – B2) =		
B5	Identify site’s zoning and/or use		
B6	Percentage of 10-year Tree Canopy required =		<a href="#">§ 12-0310.1</a> and <a href="#">Table 12.4</a>
B7	Area of 10-year Tree Canopy required (B4 x B6) =		
B8	Modification of 10-year Tree Canopy requirements requested?		Yes or No
B9	If B8 is yes, then list plan sheet where modification request is located		Sheet number
<b>C. Tree Preservation</b>			
C1	Tree Preservation Target Area =		
C2	Total canopy area meeting standards of <a href="#">§ 12-0200</a> =		
C3	C2 x 1.25 =		<a href="#">§ 12-0310.3B</a>
C4	Total canopy area provided by unique or valuable forest or woodland communities =		
C5	C4 x 1.5 =		<a href="#">§ 12-0310.3B(1)</a>
C6	Total of canopy area provided by “Heritage,” “Memorial,” “Specimen,” or “Street” trees =		
C7	C6 x 1.5 to 3.0 =		<a href="#">§ 12-0310.3B(2)</a>
<b>Table 12.9 10-year Tree Canopy Calculation Worksheet (Cont’d)</b>			
<b>C. Tree Preservation (Cont’d)</b>			
C8	Canopy area of trees within Resource Protection Areas and 100-year floodplains =		
C9	C8 x 1.0 =		<a href="#">§ 12-0310.3C(1)</a>
C10	Total of C3, C5, C7 and C9 =		If area of C10 is less than B7 then remainder of requirement must be met through tree planting - go to D
<b>D. Tree Planting</b>			
D1	Area of canopy to be met through tree planting (B7-C10) =		
D2	Area of canopy planted for air quality benefits =		
D3	x 1.5 =		<a href="#">§ 12-0310.4B(1)</a>
D4	Area of canopy planted for energy conservation =		
D5	x 1.5 =		<a href="#">§ 12-0310.4B(2)</a>

<b>Table 12.9 10-year Tree Canopy Calculation Worksheet</b>			
D6	Area of canopy planted for water quality benefits =		
D7	x 1.25 =		<a href="#">§ 12-0310.4B(3)</a>
D8	Area of canopy planted for wildlife benefits =		
D9	x 1.5 =		<a href="#">§ 12-0310.4B(4)</a>
D10	Area of canopy provided by native trees =		
D11	x 1.5 =		<a href="#">§ 12-0310.4B(5)</a>
D12	Area of canopy provided by improved cultivars and varieties =		
D13	x 1.25		<a href="#">§ 12-0310.4B(6)</a>
D14	Area of canopy provided through tree seedlings =		
	x 1.0		<a href="#">§ 12-0310.4D(1)</a>
D15	Area of D14 canopy provided through consisting of native shrubs =		
	x1.0		<a href="#">§ 12-0310.4D(1)</a>
D16	Percentage of D14 represented by D15 =		Must not exceed 33% of D14
D17	Area of canopy credit for planting with no added credit =		
D18	Total of canopy area provided through tree planting =		
D19	Is an off-site planting relief requested?		Yes or No
D20	Tree Bank or Tree Fund?		<a href="#">§ 12-0312</a>
D21	Canopy area requested to be provided through off-site banking or tree fund		
D22	Amount to be deposited into the <a href="#">Tree Preservation and Planting Fund</a>		
<b>E. Total of 10-year Tree Canopy Provided</b>			
E1	Total of canopy area provided through tree preservation (C10) =		
E2	Total of canopy area provided through tree planting (D17) =		
E3	Total of canopy area provided through off-site mechanism (D19) =		
E4	Total of 10-year Tree Canopy provided = (E1+E2+E3)		Total of E1 through E3. Area should meet or exceed area required by B7

**Amend Article 12-0300 (TREE CONSERVATION PLAN REQUIREMENTS), by revising Table 12.12 (Sample Plant Schedule) to read as follows:**

<b>Table 12.11 12 Sample Plant Schedule (English units used in this example)</b>								
Key	Botanical Name	Common Name	Qty.	Stock Size (height/caliper)	Stock Type	10-yr Tree Canopy ft <sup>2</sup>	Tree Canopy Sub-total ft <sup>2</sup>	Remarks
IO	Ilex opaca	American holly	12	6 ft. height	cont.	75	900	Sheared

JV	Juniperus virginiana	Eastern redcedar	10	6 ft. height	cont.	<del>45</del> <u>75</u>	<del>450</del> <u>750</u>	
AS	Acer rubrum	red maple	5	2 in. caliper	B&B	200	1,000	
<del>KP</del> NS	<del>Koelreuteria paniculata</del> Nyssa sylvatica	<del>goldenrain tree</del> Black gum	7	2 in. caliper	B&B	150	1,050	specimen
VD	Viburnum dentatum	arrowwood viburnum	10	24 in. height	B&B	0	0	
TOTAL 10-YEAR TREE CANOPY PROVIDED BY PLANTING = 3,400 ft <sup>2</sup>								
NOTE: The remarks column may also be used to note any other characteristics which a plant should exhibit (e.g., sheared, specimen, multi-stem, tree form).								

**Amend Article 12-0300 (TREE CONSERVATION PLAN REQUIREMENTS), Section 12-0316 (Requirements and Specifications for Replacement Trees and/or Vegetation), by revising Subsections 12-0316.2 through 12-0316.4 and Table 12.14 to read as follows:**

- 12-0316.2 Deciduous replacement trees must be a minimum of 2 1.5 inches caliper, measured 6 inches from the ground and evergreen trees must be a minimum of 6 to 8 feet in height unless otherwise approved or required by the Director. The type of plant material required must be appropriate for the site condition and planted as specified in [§ 12-0505](#) (see [Table 12.12](#) ~~Table 12.13~~).
- 12-0316.3 When an area has been cleared of vegetation for landfill areas or for a temporary use (such as a sediment basin, pond, temporary construction easement, stockpile or construction easements for public or private utility installation), replanting may be required to restore the area to a condition similar to its natural state. At least 25 percent of the disturbed area must be planted with trees specified in [§ 12-0316.2](#) using the figures for 10-year Tree Canopy. The remaining area must be planted with seedlings as specified in [§ 12-0505.5](#) and stabilized with a seed mix of grasses, and perennials as approved by the Director. All replacement trees must be specified on the planting plan (see [Table 12.13](#) ~~Table 12.14~~). Native species suitable for the proposed site conditions should be provided approximating the species composition existing before clearing.

Area Type	Trees <u>2 1.5</u> inches in caliper or greater	Shrubs <u>18</u> inches in hgt.	Seedlings	Other
Temporary Use ( <a href="#">§ 12-0316.3</a> )	25% of the disturbed area	<del>N/A</del> <u>10</u> per 1000 ft <sup>2</sup>	<del>45</del> <u>10</u> per 1,000 ft <sup>2</sup>	Grass, and perennial seed mixes
RPA ( <a href="#">§ 12-0316.4</a> )	25% of the disturbed area	10 per 1000 ft <sup>2</sup>	10 per 1,000 ft <sup>2</sup>	Wetland plants, Wetland seed

**Amend Article 12-0400 (TREE SELECTION AND CANOPY COVER GUIDE), by striking Table 12.15 (Tree Uses and Screening Yard Use Codes) and Table 12.16 (Environmental Tolerance Codes) to read as follows:**

<b>Table 12.15 Tree Uses and Screening Yard Use Codes</b>	
<b>Tree Uses</b>	<b>Code</b>
General	G
Native	N
Parking Lot Planting Areas	PL
Planting in Restricted Areas	RA
Energy Conservation Credit	EC
Wildlife Value	WL
<b>Screening Yard Use</b>	
<b>Code</b>	
Categorized by Transitional Screening Requirements:	
Large Evergreen Tree	LE
Medium Evergreen Tree	ME
Large Deciduous Tree	LD

<b>Table 12.16 Environmental Tolerance Codes</b>	
<b>Environmental Tolerances</b>	<b>Code</b>
Restricted Root Zone	RZ
Poor Soil Conditions	SC
Partial Shade	PS
Full Shade	SH
Air Pollution	AP
De-icing Salts	IS
Wet Soil Conditions	W
Drought Conditions	D

**Amend Article 12-0400 (TREE SELECTION AND CANOPY COVER GUIDE), Section 12-0401 (Explanation of Tree Selection and Canopy Cover Guide), Subsection 12-0401.1 (Purpose), by revising Paragraphs 12-0401.1D, E, F and Table 12.17 to read as follows:**

- D. Tree Uses and Screening Yard Use. Tree selection should be based upon post-development site conditions (see [Table 12.14](#) ~~[Table 12.15](#)~~).
- E. Environmental Tolerances. This column is used to select species that are tolerant of specific environmental factors, both natural and constructed, that occur frequently in the urban setting. Refer to [Table 12.14](#) ~~[Table 12.16](#)~~ for the tolerance code list.

F. The “Conditional Use or Reduced Credit”; “Air Quality”; “Energy Conservation”; “Water Quality”; “Wildlife”; “Native”; and “Improved Cultivar/Variety” columns provides information concerning the reduced or additional 10-year Tree Canopy credit that various species may receive if planted as provided in [§ 12-0310.3D](#) ~~[§ 12-0310.3C](#)~~, [§ 12-0310.3E](#) ~~[§ 12-0310.3D\(2\)](#)~~, and [§ 12-0310.4C](#) *et. seq.*

**Table 12.14 17 Tree Selection and Canopy Cover Guide**

Botanical/ Common Name	Min. Planting Area in ft <sup>2</sup>	Projected 10-yr. Tree Canopy Area in ft <sup>2</sup> and caliper in inches at planting			Tree Uses	Screening Yard Use	Environmental Tolerances	Conditional Use or reduced credit	Air Quality <a href="#">12-0310.4B(1)</a>	Energy Conservation <a href="#">12-0310.4B(2)</a>	Water Quality <a href="#">12-0310.4B(3)</a>	Wildlife <a href="#">12-0310.4B(4)</a>	Native <a href="#">12-0310.4B(5)</a>	Improved Cult./Var. <a href="#">12-0310.4B(6)</a>
		1.0	2.0	3.0										
<b>CATEGORY I</b>														
<b>DECIDUOUS TREES</b>														
<b>Trees 50 feet or less in height at maturity with a spread less than one-half of their height</b>														
<i>Columnar cultivars bred for narrow crowns</i> <i>Acer rubrum</i> 'Columnare' / columnar red maple	65 50	40	50	75	RA		RZ							
<i>Carpinus betulus</i> 'Fastigiata' / fastigate European hornbeam	50	40	50	75	RA		PS							
<i>Fagus sylvatica</i> 'fastigiata' / fastigate European beech	50	40	50	75	RA		PS							
<i>Ginkgo biloba</i> 'Sentry' / sentry ginkgo	50	40	50	75	RA		AP, D, RZ, SC	Yes						
<i>Quercus robur</i> 'Fastigiata' / fastigate English oak	50	40	50	75	RA		SC							
<b>CATEGORY II</b>														
<b>DECIDUOUS TREES</b>														
<b>Trees that can be maintained at a height of 20 feet or less and have a spread approximately equal to their height</b>														
<i>Acer campestre</i> / hedge maple	50	75	100	125	G		AP, D							
<i>Acer ginnala</i> / amur maple	50	75	100	125	G, RA		D, PS, RZ							
<i>Acer palmatum</i> / Japanese maple	50	75	100	125	G		RZ, SH							
<i>Amelanchier arborea</i> / downey serviceberry	50	75	100	125	G, RA		PS, RZ, W			1.25	1.5	1.5		
<i>Amelanchier laevis</i> / Allegheny serviceberry	50	75	100	125	G, RA		PS, RZ, W			1.25	1.5	1.5		
<i>Asimina triloba</i> / Paw paw	50	75	100	125			SH, W			1.25	1.5	1.5		
<i>Carpinus caroliniana</i> / American hornbeam	50	75	100	125	G, RA		SH, W			1.25		1.5		
<i>Castanea pumila</i> / Allegheny chinkapin	50	75	100	125								1.5	1.5	

<b>Botanical/ Common Name</b>	<b>Min. Planting Area in ft<sup>2</sup></b>	<b>Projected 10-yr. Tree Canopy Area in ft<sup>2</sup> and caliper in inches at planting</b>			<b>Tree Uses</b>	<b>Screening Yard Use</b>	<b>Environmental Tolerances</b>	<b>Conditional Use or reduced credit</b>	<b>Air Quality <a href="#">12-0310.4B(1)</a></b>	<b>Energy Conservation <a href="#">12-0310.4B(2)</a></b>	<b>Water Quality <a href="#">12-0310.4B(3)</a></b>	<b>Wildlife <a href="#">12-0310.4B(4)</a></b>	<b>Native <a href="#">12-0310.4B(5)</a></b>	<b>Improved Cult./Var. <a href="#">12-0310.4B(6)</a></b>
		<b>1.0</b>	<b>2.0</b>	<b>3.0</b>										
<i>Cercis canadensis</i> † Eastern redbud	50	75	100	125	G, RA		D, PS, RZ, SC						1.5	
<i>Chionanthus virginicus</i> † fringetree	50	75	100	125	G, RA		PS, RZ, W			1.25			1.5	
<i>Cornus florida</i> † flowering dogwood <u>Anthracnose resistant cultivars</u>	50	75	100	125	G		PS	Yes				1.5	1.5	<u>1.25</u>
—‘Appalachian Spring’ <sup>2</sup>	<del>50</del>	<del>75</del>	<del>100</del>	<del>125</del>	<del>G</del>							<del>1.25</del>		<del>1.5</del>
<i>Cornus kousa</i> † Kousa dogwood	50	75	100	125	G		RZ							
—‘Stellar’ Hybrid series	<del>50</del>	<del>75</del>	<del>100</del>	<del>125</del>	<del>G</del>		<del>RZ</del>							<del>1.5</del>
<i>Cornus mas</i> † Corneliancherry dogwood	50	75	100	125	G, RA		PS, RZ							
<i>Halesia carolina</i> † Carolina silverbell	50	75	100	125	G		PS							
<i>Magnolia soulangiana</i> † saucer magnolia	50	75	100	125	G		AP, RZ							
<i>Magnolia stellata</i> † star magnolia	50	75	100	125	G, RA		AP, RZ							
<i>Magnolia virginiana</i> † sweetbay magnolia	50	75	100	125	G, RA		RZ, SH, W			1.25			1.5	
<i>Ostrya virginiana</i> † Eastern hophornbeam	50	75	100	125	G		D, PS						1.5	
<i>Oxydendrum arboreum</i> † sourwood	50	75	100	125	G		D, PS					<u>1.5</u>	<del>1.5</del>	
<i>Prunus x incam</i> ‘Okame’† Okame cherry	50	75	100	125	RA									
<i>Sassafras albidum</i> † sassafras	50	75	100	125									1.5	
<i>Stewartia koreana</i> † Korean stewartia	50	75	100	125	RA		RZ							
<i>Stewartia ovata</i> † Mountain stewartia	50	75	100	125	G, RA		RZ							



<i>Botanical/ Common Name</i>	Min. Planting Area in ft <sup>2</sup>	Projected 10-yr. Tree Canopy Area in ft <sup>2</sup> and caliper in inches at planting			Tree Uses	Screening Yard Use	Environmental Tolerances	Conditional Use or reduced credit	Air Quality <a href="#">12-03.10.4B(1)</a>	Energy Conservation <a href="#">12-03.10.4B(2)</a>	Water Quality <a href="#">12-03.10.4B(3)</a>	Wildlife <a href="#">12-03.10.4B(4)</a>	Native <a href="#">12-03.10.4B(5)</a>	Improved Cult./Var. <a href="#">12-03.10.4B(6)</a>
		1.0	2.0	3.0										
<i>Stewartia pseudocamellia</i> / Japanese stewartia	50	75	100	125	RA		RZ							
<i>Styrax americana</i> / American snowbell	50	75	100	125	G, RA		PS, RZ							
<i>Styrax japonicus</i> / Japanese snowbell	50	75	100	125	G, RA		PS, RZ							
<b>CATEGORY III DECIDUOUS TREES</b>	<b>Trees 25 to 50 feet in height at maturity with a spread equal to or greater than their height and trees over 50 feet in height at maturity with a spread less than their height</b>													
<i>Aesculus flava</i> / Yellow buckeye	90	125	150	175	G	LD	IS, SC	1.5						
<i>Aesculus hippocastanum</i> / Horse chestnut	90	125	150	175	G	LD	IS, SC							
<i>Betula nigra</i> / river birch	90	125	150	175	G	LD	W			1.25	1.5	1.5		
<i>Castanea mollissima</i> / Chinese chestnut	90	125	150	175	G	LD								
<i>Celtis occidentalis</i> / Hackberry	90	125	150	175	G	LD	AP, D, SC, W	1.5	1.25	1.5	1.5			
<i>Cercidiphyllum japonicum</i> / Katsuratree	90	125	150	175	G, PL	LD		1.5						
<i>Cladrastis kentuckea</i> / yellowwood	90	125	150	175	G	LD	W	1.5						
<i>Diospiros virginiana</i> / persimmon	90	125	150	175			D, SC				1.5	1.5		
<del><i>Eucommia ulmoides</i> / hardy rubber tree</del>	<del>90</del>	<del>125</del>	<del>150</del>	<del>175</del>	<del>PL</del>		<del>D, SC</del>							
<i>Fagus sylvatica</i> / European beech	90	125	150	175	G	LD	PS							
<i>Gleditsia triacanthos inermis</i> / thornless honeylocust	90	125	150	175	PL	LD	AP, D, SC, W							
<del>—'Imperial'</del>	<del>90</del>	<del>125</del>	<del>150</del>	<del>175</del>	<del>PL</del>	<del>LD</del>	<del>AP, D, SC, W</del>							



**Table 12.14 17 Tree Selection and Canopy Cover Guide**

Botanical/ Common Name	Min. Planting Area in ft <sup>2</sup>	Projected 10-yr. Tree Canopy Area in ft <sup>2</sup> and caliper in inches at planting			Tree Uses	Screening Yard Use	Environmental Tolerances	Conditional Use or reduced credit	Air Quality <a href="#">12-03.10.4B(1)</a>	Energy Conservation <a href="#">12-03.10.4B(2)</a>	Water Quality <a href="#">12-03.10.4B(3)</a>	Wildlife <a href="#">12-03.10.4B(4)</a>	Native <a href="#">12-03.10.4B(5)</a>	Improved Cult./Var. <a href="#">12-03.10.4B(6)</a>
		1.0	2.0	3.0										
<i>Salix nigra</i> / Black willow	90	125	150	175							1.25	1.5	1.5	
<i>Sophora japonica</i> / Japanese pagoda tree	90	125	150	175	G, PL	LD	AP, D, SC		1.5	1.5				
<i>Taxodium distichum</i> / bald cypress	90	125	150	175	G	LD	W				1.25	1.5	1.5	
<i>Tilia cordata</i> / litttleleaf linden	90	125	150	175	G, PL	LD	AP		1.5					
—‘Glenleven’	90	125	150	175	G, PL	LD	AP		1.5					
—‘Greenspire’	90	125	150	175	G, PL	LD	AP		1.5					
<b>CATEGORY IV DECIDUOUS TREES</b>	<b>Trees 50 feet and greater in height at maturity with a spread equal to or greater than their height and trees over 75 feet in height at maturity with a spread less than their height</b>													
<i>Acer rubrum</i> / red maple	130	150	200	250	G, PL	LD	IS, PS, W		1.5	1.5	1.25	1.5	1.5	
<i>Acer saccharum</i> / sugar maple	130	150	200	250	G	LD	PS	Yes	1.5	1.5		1.5		
<i>Carya cordiformis</i> / Bitternut hickory	130	150	200	250	G	LD			1.5			1.5	1.5	
<i>Carya glabra</i> / Pignut hickory	130	150	200	250	G	LD			1.5			1.5	1.5	
<i>Carya illinoensis</i> / pecan	130	150	200	250	G	LD	W		1.5			1.5	1.5	
<i>Carya ovata</i> / shagbark hickory	130	150	200	250	G	LD			1.5			1.5	1.5	
<i>Carya tomentosa</i> / mockernut hickory	130	150	200	250	G	LD			1.5			1.5	1.5	
<i>Fagus americana</i> / American beech	130	150	200	250	G	LD	PS		1.5			1.5	1.5	
<i>Ginkgo biloba</i> / ginkgo (male only)	130	150	200	250	G, PL	LD	AP, D, RZ		1.5	1.5				
<i>Liquidambar styraciflua</i> / sweetgum	65	75	100	125	G	LD	W	Yes 0.5			1.25	1.5	1.5	
<i>Liriodendron tulipifera</i> / tulip poplar	130	150	200	250	G	LD	AP, W		1.5			1.5	1.5	

**Table 12.14 17 Tree Selection and Canopy Cover Guide**

Botanical/ Common Name	Min. Planting Area in ft <sup>2</sup>	Projected 10-yr. Tree Canopy Area in ft <sup>2</sup> and caliper in inches at planting			Tree Uses	Screening Yard Use	Environmental Tolerances	Conditional Use or reduced credit	Air Quality <a href="#">12-0310.4B(1)</a>	Energy Conservation <a href="#">12-0310.4B(2)</a>	Water Quality <a href="#">12-0310.4B(3)</a>	Wildlife <a href="#">12-0310.4B(4)</a>	Native <a href="#">12-0310.4B(5)</a>	Improved Cult./Var. <a href="#">12-0310.4B(6)</a>
		1.0	2.0	3.0										
<i>Platanus acerifolia</i> † London planetree	130	150	200	250	G, PL	LD	AP, D			1.5				
—‘Bloodgood’	130	150	200	250	G, PL	LD	AP, D			1.5				1.5
<i>Platanus occidentalis</i> † sycamore	130	150	200	250	G	LD	W				1.25		1.5	
<i>Quercus alba</i> † white oak	130	150	200	250	G	LD	IS			1.5		1.5	1.5	
<i>Quercus bicolor</i> † swamp white oak	130	150	200	250	G	LD	D, IS, SC, W			1.5	1.25	1.5	1.5	
<del><i>Quercus coccinea</i>† scarlet oak</del>	<del>130</del>	<del>150</del>	<del>200</del>	<del>250</del>	<del>G</del>	<del>LD</del>	<del>W</del>					<del>1.5</del>		
<i>Quercus falcata</i> † Southern red oak	130	150	200	250	G	LD				1.5		1.5	1.5	
<i>Quercus imbricaria</i> † shingle oak	130	150	200	250	G	LD						1.5		
<i>Quercus palustris</i> † pin oak	130	150	200	250	G, PL	LD	W	Yes			1.25	1.5	1.5	
<i>Quercus prinus</i> † Chestnut oak	130	150	200	250	G, PL	LD	D			1.5		1.5	1.5	
<i>Quercus phellos</i> † willow oak	130	150	200	250	G, PL	LD				1.5	1.25	1.5	1.5	
<i>Quercus rubra</i> (borealis)† Northern red oak	130	150	200	250	G	LD	IS			1.5		1.5	1.5	
<i>Quercus stellata</i> † post oak	130	150	200	250	G	LD				1.5		1.5	1.5	
<i>Quercus velutina</i> † black oak	130	150	200	250	G	LD				1.5		1.5	1.5	
<i>Tilia americana</i> † American linden, basswood	130	150	200	250	G, PL	LD			1.5	1.5			1.5	
—‘Redmond’	130	150	200	250	PL	LD			1.5	1.5			1.5	

**Table 12.14 17 Tree Selection and Canopy Cover Guide**

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		1.0	2.0	3.0										
—'Legend'	130	150	200	250	G, PL	LD			1.5	1.5			1.5	
<i>Ulmus americana</i> 'Valley Forge' American elm DED resistant hybrids	130	150	200	250	G	LD	D		1.5	1.5	1.25			<del>1.5</del> 1.25
<i>Ulmus carpinifolia</i> 'Groenveldt' Groenveldt elm	130	150	200	250	G	LD	D		1.5	1.5	1.25			1.5
<i>Ulmus parvifolia</i> Chinese elm	130	150	200	250	G, PL	LD			1.5	1.5				
<i>Zelkova serrata</i> Japanese zelkova	130	150	200	250	G, PL	LD			1.5					

**Table 12.14 17 Tree Selection and Canopy Cover Guide**

Botanical/ Common Name	Min. Planting Area in ft <sup>2</sup>	Projected 10-yr. Tree Canopy Area in ft <sup>2</sup> and caliper in inches height in feet at planting			Tree Uses	Screening Yard Use	Environmental Tolerances	Conditional Use or reduced credit	Air Quality <a href="#">12-03.10.4B(1)</a>	Energy Conservation <a href="#">12-03.10.4B(2)</a>	Water Quality <a href="#">12-03.10.4B(3)</a>	Wildlife <a href="#">12-03.10.4B(4)</a>	Native <a href="#">12-03.10.4B(5)</a>	Improved Cult./Var. <a href="#">12-03.10.4B(6)</a>
		<del>1-0</del> <u>6.0</u>	<del>2-0</del> <u>8.0</u>	<del>3-0</del> <u>10.0</u>										
<b>CATEGORY I EVERGREEN TREES</b>	<b>Trees generally less than 30 feet in height at maturity with a spread less than 15 feet</b>													
<i>Ilex x attenuata</i> 'Fosteri' <sup>†</sup> Foster's holly	30	40	50	75	G	ME	SH							
<i>Ilex x Nellie Stevens</i> <sup>†</sup> Nellie Stevens holly	30	40	50	75	G	ME								
<i>Juniperus chinensis</i> <sup>†</sup> Chinese juniper columnar varieties	30	40	50	75	G		D							
—'Columnaris'	30	40	50	75	RA		D							
—'Denserecta'	30	40	50	75	RA		D							
—'Erecta-Glauca'	30	40	50	75	RA		D							
—'Grey-Gleam'	30	40	50	75	RA		D							
—'Hetzi-columnaris'	30	40	50	75	RA		D							
—'Keteleeri'	30	40	50	75	RA		D							
—'Robusta-green'	30	40	50	75	RA		D							
—'Torulosa'	30	40	50	75	RA		D							
<i>Juniperus virginiana</i> 'Princeton Sentry' <sup>†</sup> Eastern redcedar	30	40	50	75	RA	ME	D, IS							
<i>Taxus baccata</i> 'Fastigiata' <sup>†</sup> upright Irish yew	30	40	50	75	RA									
<i>Thuja occidentalis</i> 'Nigra' <sup>†</sup> dark green American arborvitae	30	40	50	75	G, RA	ME	W							
<i>Thuja orientalis</i> <sup>†</sup> Columnar oriental arborvitae	30	40	50	75	G, RA		PS, W							

**Table 12.14 17 Tree Selection and Canopy Cover Guide**

Botanical/ Common Name	Min. Planting Area in ft <sup>2</sup>	Projected 10-yr. Tree Canopy Area in ft <sup>2</sup> and caliper in inches height in feet at planting			Tree Uses	Screening Yard Use	Environmental Tolerances	Conditional Use or reduced credit	Air Quality <a href="#">12-03.10.4B(1)</a>	Energy Conservation <a href="#">12-03.10.4B(2)</a>	Water Quality <a href="#">12-03.10.4B(3)</a>	Wildlife <a href="#">12-03.10.4B(4)</a>	Native <a href="#">12-03.10.4B(5)</a>	Improved Cult./Var. <a href="#">12-03.10.4B(6)</a>
		<del>1.0</del> <u>6.0</u>	<del>2.0</del> <u>8.0</u>	<del>3.0</del> <u>10.0</u>										
<b>CATEGORY II EVERGREEN TREES</b>	<b>Trees 30 to 40 feet in height at maturity with a spread of 15 to 20 feet</b>													
<i>Abies concolor</i> / white fir	50	75	100	125	G	ME								
<i>Calocedrus decurrens</i> / incense cedar	50	75	100	125	G	ME	W							
<i>Chamaecyparis lawsoniana</i> / Lawson falsecypress	50	75	100	125	G	ME	PS							
<i>Chamaecyparis obtusa</i> / Hinoki false cypress	50	75	100	125	G	LE	W							
<i>Chamaecyparis pisifera</i> 'Plumosa' / plume sawara false cypress	50	75	100	125	G	ME	W							
<i>Chamaecyparis thyoides</i> / Atlantic whitecedar	50	75	100	125	G	ME	W							
<i>Cryptomeria japonica</i> / Japanese cryptomeria	50	75	100	125	G	LE	IS							
<i>Cunninghamia lanceolata</i> / China fir	50	75	100	125	G	ME								
<i>Cupressocyparis leylandii</i> / Leyland cypress	25	38	50	63	G	LE	PS, W	0.5						
<i>Ilex aquifolium</i> / English holly	50	75	100	125	G	ME	SH							
<i>Ilex opaca</i> / American holly	50	75	100	125	G	ME	IS, SH			1.25	1.5	1.5		
<i>Juniperus scopulorum</i> 'Moonglow' / Rocky Mt. Juniper	50	75	100	125	G	ME	D							
<i>Juniperus virginiana</i> / Eastern redcedar	50	75	100	125	G	ME	PS						1.5	
—'Canaert'	50	75	100	125	G	ME	D, IS							
—'Manhattan Blue'	50	75	100	125	G	ME	D, IS							





**Table 12.14 17 Tree Selection and Canopy Cover Guide**

Botanical/ Common Name	Min. Planting Area in ft <sup>2</sup>	Projected 10-yr. Tree Canopy Area in ft <sup>2</sup> and caliper in inches height in feet at planting			Tree Uses	Screening Yard Use	Environmental Tolerances	Conditional Use or reduced credit	Air Quality <a href="#">12-0310.4B(1)</a>	Energy Conservation <a href="#">12-0310.4B(2)</a>	Water Quality <a href="#">12-0310.4B(3)</a>	Wildlife <a href="#">12-0310.4B(4)</a>	Native <a href="#">12-0310.4B(5)</a>	Improved Cult./Var. <a href="#">12-0310.4B(6)</a>
		<del>1-0</del> <u>6.0</u>	<del>2-0</del> <u>8.0</u>	<del>3-0</del> <u>10.0</u>										
<b>CATEGORY IV EVERGREEN TREES</b>	<b>Trees 50 feet in height or greater at maturity with a spread of over 30 feet</b>													
<i>Magnolia grandiflora</i> / Southern magnolia	130	150	200	250	G	LE	PS, W							
<i>Pinus rigida</i> / pitch pine	130	150	200	250	G	LE						1.5	1.5	
<i>Pinus strobus</i> / white pine	65	75	100	125	G	LE	PS	0.5						
<i>Pinus sylvestris</i> / Scotch pine	130	150	200	250	G	LE	D							
<i>Pinus taeda</i> / loblolly pine	130	150	200	250	G	LE	W				1.25	1.5	1.5	
<i>Pinus virginiana</i> / Virginia pine	130	150	200	250		LE	PS					1.5	1.5	
<p>TREE USES: G=general, PL=parking lot, RA=for restricted areas</p> <p>SCREENING YARD USE, LD=large deciduous, ME=medium evergreen, LE=large evergreen (see Sect. 13-303 of the <a href="#">Zoning Ordinance</a>)</p> <p>ENVIRONMENTAL TOLERANCES: AP=air pollution, D=drought, IS=de-icing salts, PS=partial shade, RZ=restricted root zone, SC=poor soil conditions, SH=full shade, W=wet soil (see <a href="#">§ 12-0401.1E</a>)</p> <p>CONDITIONAL USE OR REDUCED CREDIT (see <a href="#">§ 12-0310.3E</a> <a href="#">§ 12-0310.3D(2)</a>)</p>														

**Amend Article 12-0500 (STANDARDS FOR FIELD PRACTICE), Section 12-0503 (Tree and Forested Area Protection), Subsection 12-0503.1 (Tree Protection Devices), by revising Paragraph 12-0503.1B and 12-0503.1C to read as follows:**

**12-0503 Tree and Forested Area Protection**

12-0503.1 Tree Protection Devices. The permittee must protect the above and below-ground portions of all vegetation shown on the approved plan to be preserved within and contiguous to the site. Protective devices must be installed before any clearing and grading activity if specified in the tree preservation plan or required by proffered conditions, development plans, conceptual/final development plans, PRC plans, special permits, special exceptions or variance approvals.

- A. Along all limits of clearing adjacent to areas of vegetation to be preserved, a device must be used which effectively protects the above and below-ground portions of the trees and other vegetation to be preserved.
  1. The device(s) used must be installed in conformance with the approved tree preservation plan and narrative and all construction personnel must be instructed to honor these devices. The protection devices described below in [§ 12-0503.1B](#) must be installed and maintained on sites with the exception of the silt controls listed in [§ 12-0503.1C](#) through [§ 12-0503.1D](#) which may be used as tree protection devices if proposed for installation at the limits of clearing on the approved erosion and sedimentation control plan. The Director may also require the placement of one of the tree protective devices listed in [§ 12-0503.1B](#) to supplement the erosion and sediment control devices listed in [§ 12-0503.1C](#) through [§ 12-0503.1D](#) if these are not deemed to provide adequate protection. Other devices affording effective protection may be used subject to the Director's approval.
- B. ~~Orange plastic fence, welded wire fence, chain link fence, silt fence or super silt fence~~ may be used as devices to protect trees and forested areas. The protective device must be placed ~~within the disturbed area~~ at or within the limits of clearing and erected at a minimum height of 4 feet, except for super silt fence where height may be 3.5 feet. ~~The fencing~~ Orange plastic fence material must be mounted on 6-foot tall steel posts driven 1.5 feet into the ground and placed a maximum of 6 feet apart, ~~except for w~~ Welded wire fence, super silt fence and chain link fence ~~where~~ must be mounted on 6-foot steel posts which may be placed a maximum of 10 feet apart (see [Plate 6-12](#)).
- C. ~~Filter fabric fence or silt fence.~~ Orange plastic fence ~~This fencing~~ may be used for tree protection when placed at the limits of clearing and grading and constructed as specified in the [Virginia Erosion and Sediment Control Handbook](#) as approved by the Director. The Director may also require the placement of one of the other tree protective devices listed in [§ 12-0503.1B](#) if

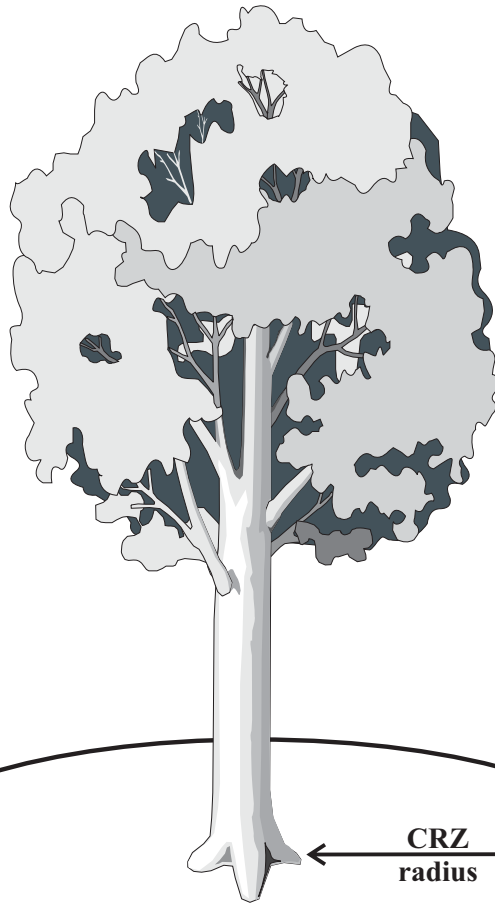
the ~~filter fabric~~ orange plastic fence is not deemed adequate to protect the trees shown on the approved plan to be preserved.

**Amend Article 12-0500 (STANDARDS FOR FIELD PRACTICE), Section 12-0506 (End of Construction), Subsection 12-0506.5 (Pruning), Paragraph 12-0506.5B (Newly Planted Vegetation), by revising Subparagraph 12-0506.5B(2) to read as follows:**

2. Trees must be restaked by the permittee if necessary. All stakes and supporting wires must be removed within ~~one year~~ six months of planting, or if earlier than ~~one year~~ six months, before the release of the conservation deposit.

**Amend Chapter 12 Plates by revising Plate 2-12 (Critical Root Zones of Trees), Plate 3-12 (Tunneling Guidelines), Plate 5-12 (Deck Planter), Plate 6-12 (Tree Protection Fence Installation), Plate 7-12 (Tree Protection Fence Installation & Root Pruning), and Plate 8-12 (Planting Tree Seedlings) as follows:**

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



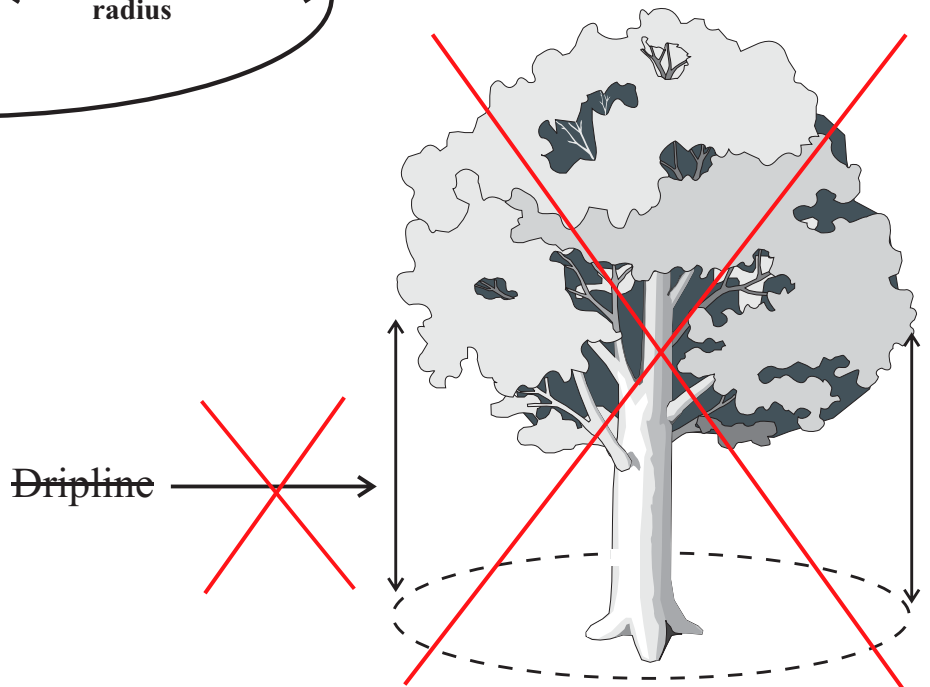
Critical Root Zone (CRZ)  
of ~~Forest-Grown Tree~~

## Critical Root Zone Formula

Minimum of  
1 foot of Critical Root Zone radius  
for each  
1 inch of trunk diameter

Note: An increase in critical root zone radius to a total of 1.5 feet/inch of trunk diameter may be required in some instances based on site specific conditions (see 12-0307.2D(2)).

~~Dripline of Open-Grown Tree~~



Ref. Sec. 12-0307.2D,  
12-0307.2E  
Rev. 2-02, 2011 Reprint,  
2018 Reprint, 1-20

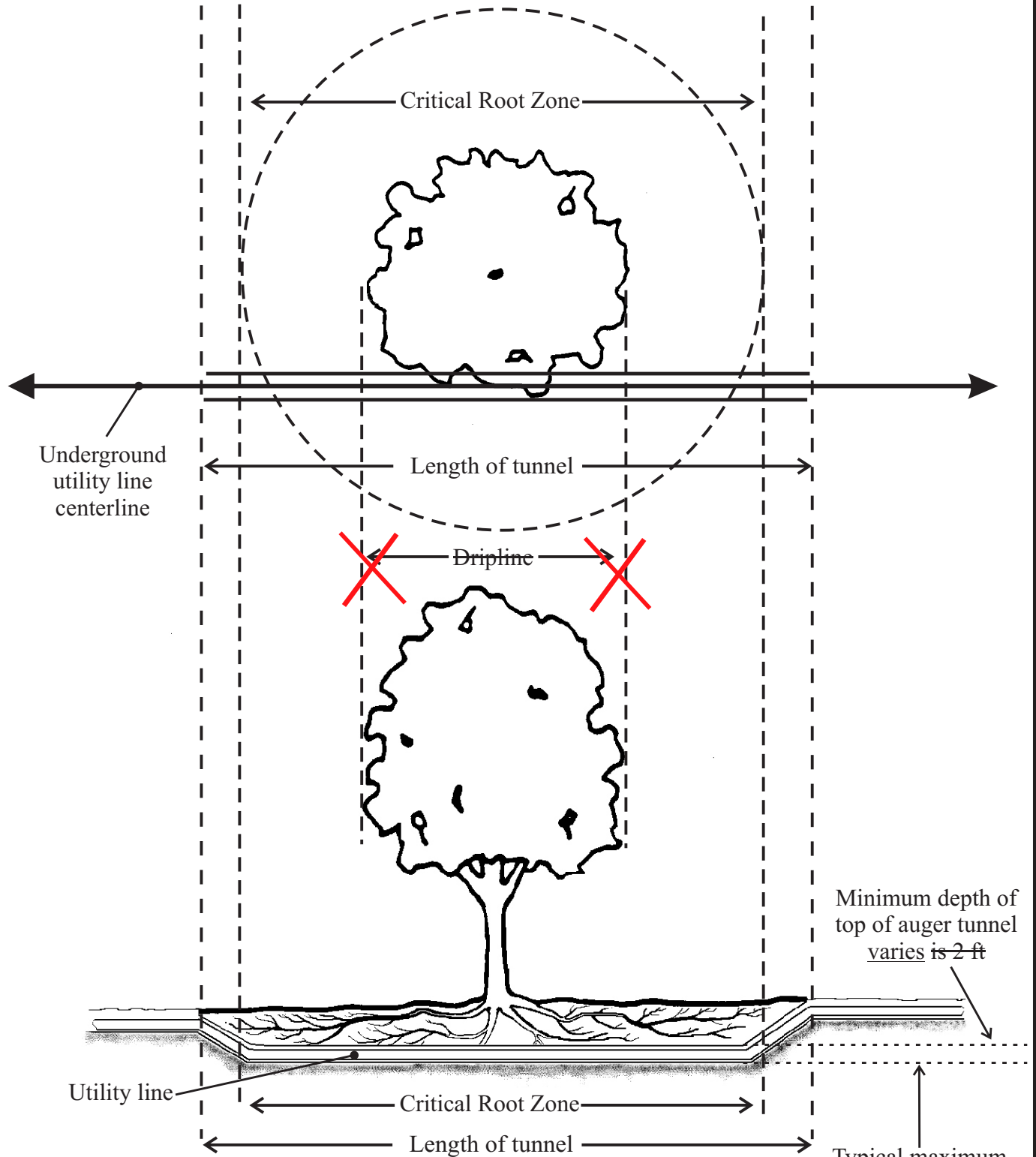
## CRITICAL ROOT ZONES ~~AND~~ ~~DRIPLINES~~ OF TREES

PLATE NO

STD NO

2-12

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL

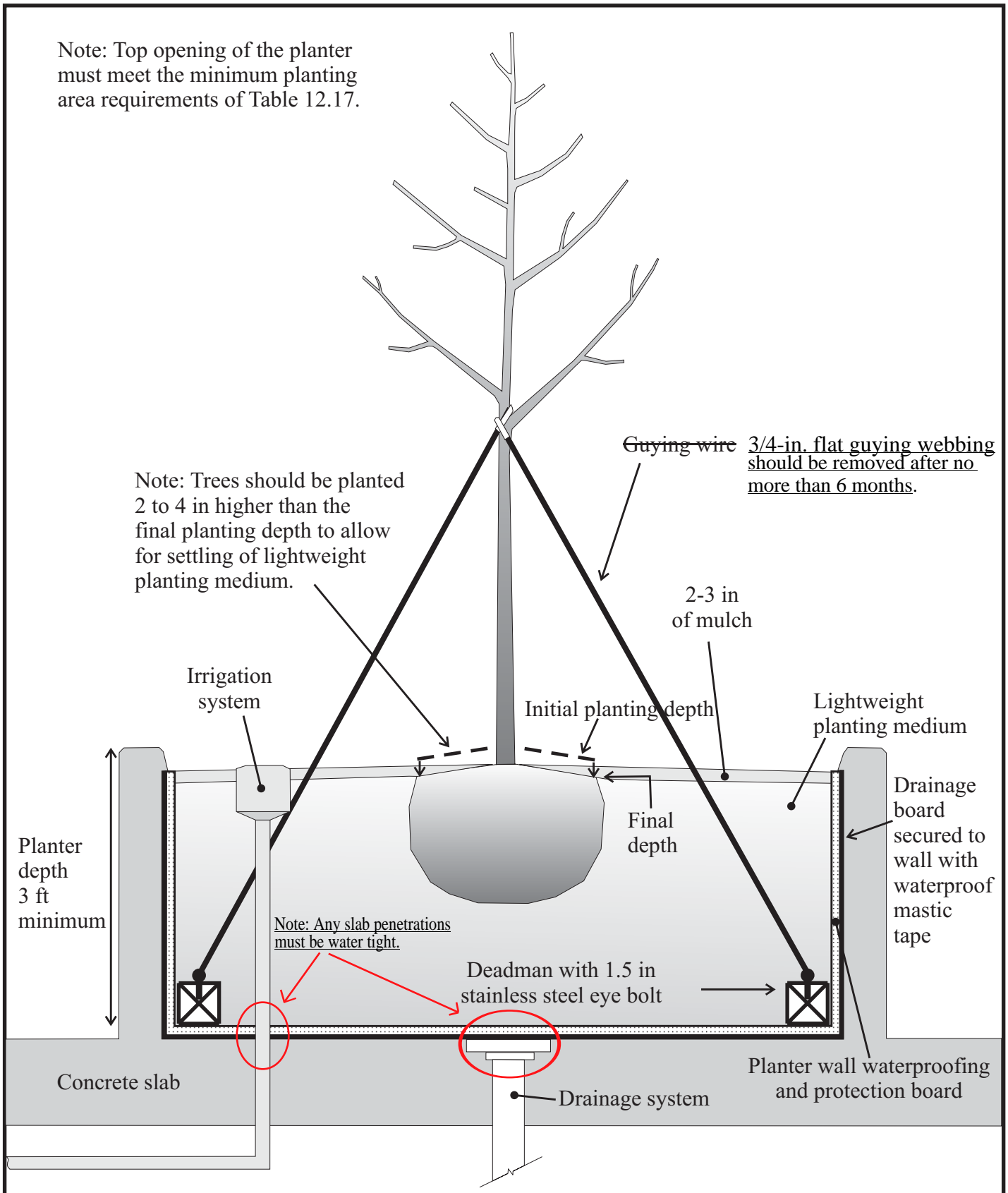


Additional details are provided in the Virginia Erosion and Sediment Control Handbook 3.38.11- Trenching and Tunneling

Ref. Sec. 12-0202.1	<h2 style="margin: 0;">TUNNELING GUIDELINES</h2>	PLATE NO.	STD. NO.
Rev. 2-02, 2011 Reprint, 2018 Reprint, 01-20		3-12	

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL

Note: Top opening of the planter must meet the minimum planting area requirements of Table 12.17.



Note: Trees should be planted 2 to 4 in higher than the final planting depth to allow for settling of lightweight planting medium.

Guying wire 3/4-in. flat guying webbing should be removed after no more than 6 months.

Planter depth 3 ft minimum

Note: Any slab penetrations must be water tight.

Ref. Sec. 12-0401.1D(3)

Rev. 2-02, 2011 Reprint, 2018 Reprint, 1-20

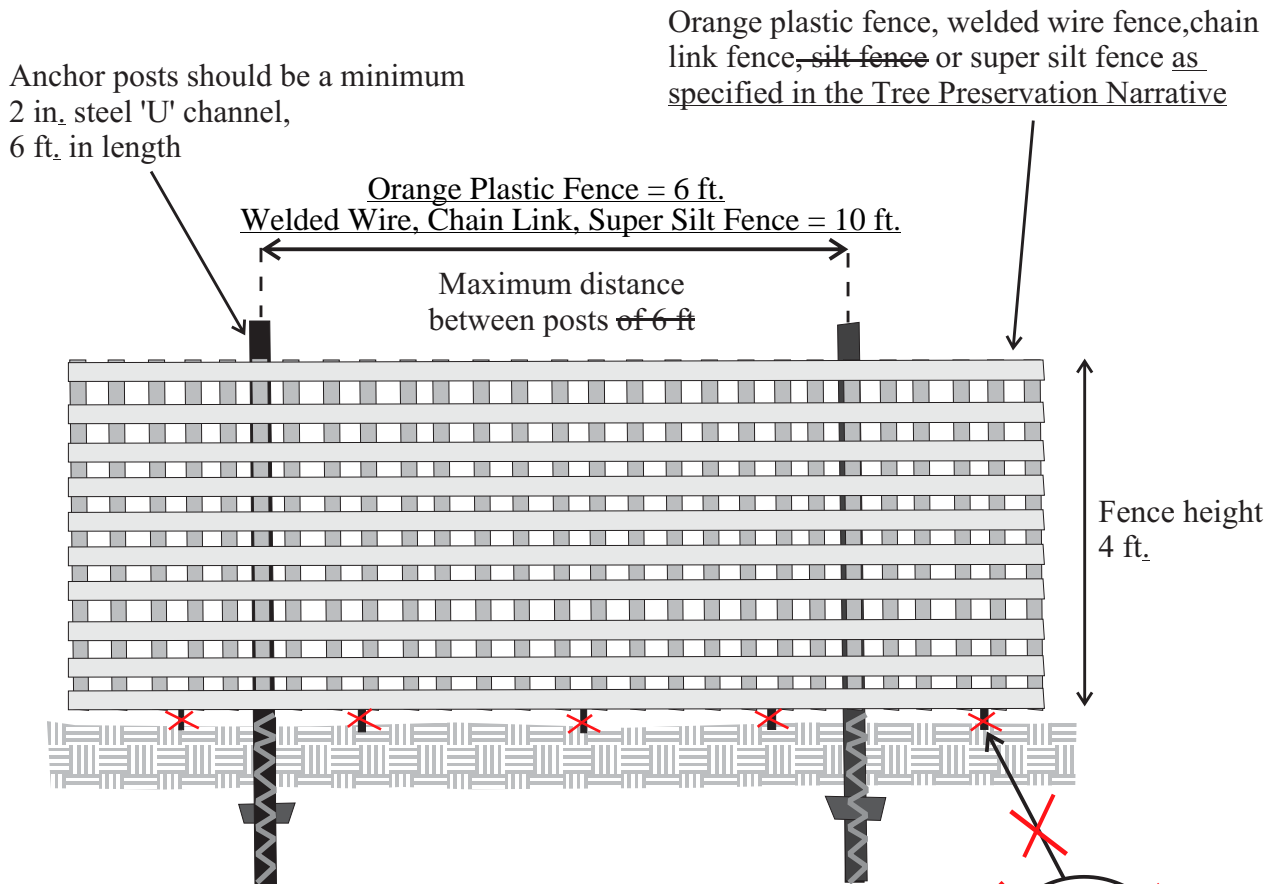
## DECK PLANTER

PLATE NO.

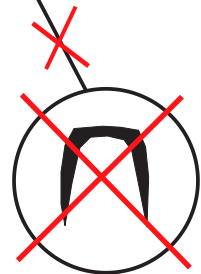
STD. NO.

5-12

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



**Note: Tree protection fencing ~~should~~ must be maintained throughout construction until removal approved by County**



Use ~~8 in~~ wire U staples to secure fence bottom

Adapted from: ~~Woodland Conservation Manual~~, Prince George County, Maryland

Ref. Sec. 12-0305.1B,  
12-0503.1B

Rev. 2-02, 2011 Reprint, 2018  
Reprint, 01-20

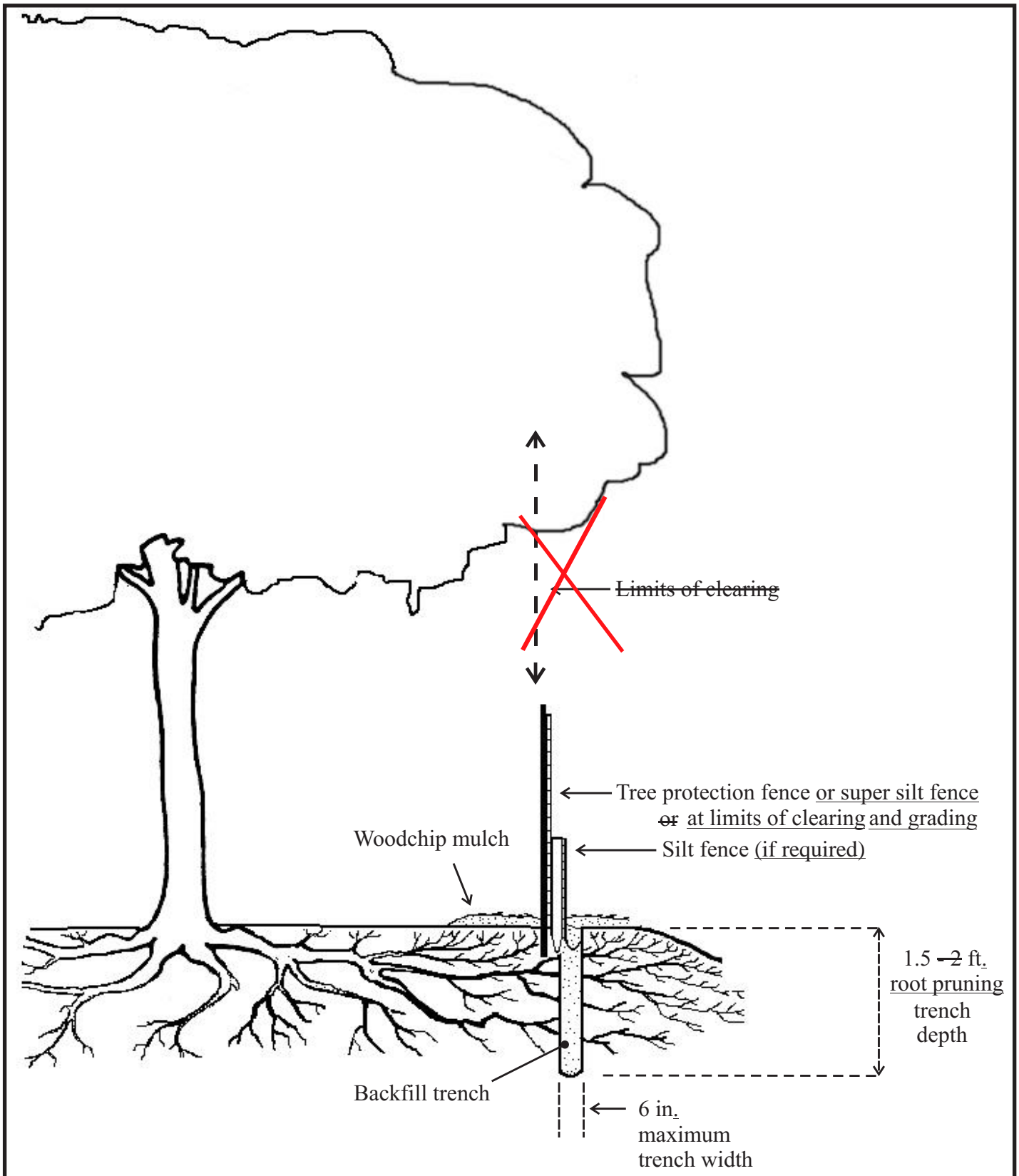
## TREE PROTECTION FENCE INSTALLATION

PLATE NO.

STD. NO.

6-12

# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



Note: See Tree Preservation Narrative for detailed specifications.

Ref. Sec. 12-0502.1, 12-0504.20  Rev. 2-02, 2011 Reprint, 2018 Reprint_01-20	<u>TREE PROTECTION</u> <u>FENCE INSTALLATION</u> & <u>ROOT PRUNING</u>	PLATE NO.	STD. NO.
		7-12	



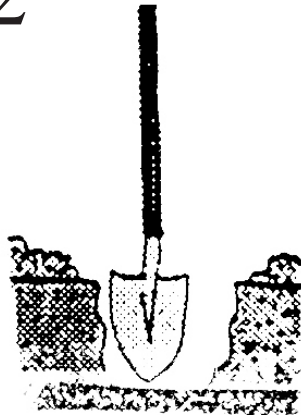
# FAIRFAX COUNTY PUBLIC FACILITIES MANUAL

1



Soak roots in water 3 to 6 hours prior to planting. Do not allow roots to dry out before planting.

2



Remove grass from a 3 ft circle and turn up soil. Dig a planting hole 8 in wider than the diameter of the seedling roots in center of circle.

3



Position seedling at original nursery depth. Do not bend roots on sides or bottom of planting hole. Gently backfill excavated soil around roots.

4



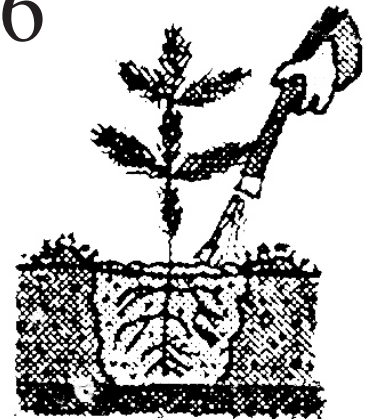
Remove air pockets from backfill soil. Soil should be firm but not tightly packed. Construct waterholding basin around planting hole and water thoroughly.

5



Place a 2 in deep layer of mulch in a 3 ft diameter circle around trees. Mulch should not touch the tree trunk.

6



During dry weather, water generously once every 7 to 10 days during the first year.

Illustrations provided by The National Arbor Day Foundation

Ref. Sec. 12-0505.5F

Rev. 2-02, 2011 Reprint,  
2018 Reprint

## PLANTING TREE SEEDLINGS

PLATE NO.

STD. NO.

8-12

**This amendment becomes effective on October 21, 2020, at 12:01 a.m.**

**GIVEN under my hand this 20<sup>th</sup> day of October, 2020.**

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**Jill G. Cooper**  
**Clerk to the Board of Supervisors**