

**ARTICLE 11****MANUAL STRUCTURE, REVISIONS, DEFINITIONS,  
REFERENCES, INDEX AND BIBLIOGRAPHY**

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**SECTION 11-100 DESIGN AND CONSTRUCTION STANDARDS MANUAL  
STRUCTURE****11-110 Articles**

For purposes of organization, the Town of Leesburg Design and Construction Standards Manual is divided into a number of Articles. The Article designation number represents the first one or two digits of that series of numbers used to identify the respective regulations of the Manual; e.g., in the reference number 5-120, the digit 5 represents the Article.

**11-120 Sections**

Each Article within the Design and Construction Standards Manual is subdivided into Sections. Section designation numbers represent the hundreds digits; e.g., in the reference number 5-120, the digit "1" represents the Section number.

**11-130 Subsections**

Each Section may contain subsections. These subsections are designated by the digits in the even tens place; example 5-120. The digit "2" represents the subsection. Subsections may be further broken down into the ones place.

**11-140 Paragraphs**

For purposes of further organization, each Section may be subdivided into paragraphs which are represented by such numbers as 1, 2, 3; which may be further subdivided as A, B, C...(1), (2), (3) ... and a, b, c.

**11-150 Page Numbers**

Each Article contains its own separate page numbering system. The page numbers are prefixed by the respective Article number. As an example, page 15 of Article 5 is designated page 5-15.

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### 11-160 Interpretations

For the purpose of the Town of Leesburg Design and Construction Standards Manual, certain words and terms are to be interpreted as follows:

1. Words used in the present tense may include the future; words used in the masculine gender shall include the feminine and neuter; words in the singular number may include the plural; and words in the plural can include the singular, unless the obvious construction of the wording indicates otherwise.
2. The words "shall", "must" and "will" are mandatory unless a provision exists to allow a modification for a specific requirement.
3. The word "may" is discretionary, at the discretion of the Chief Engineer or Applicable Director.
4. The word "should" shall be used as a guide to design.
5. Unless otherwise specified, the term "day" shall mean calendar day.
6. The word "State" means the Commonwealth of Virginia. The word "County" means the County of Loudoun, Commonwealth of Virginia; the word "Town" means the Town of Leesburg; and the term "Town Limits" means any exterior boundary of the Town of Leesburg.
7. For subdivision plans, all types of site plans, development plans and related documents (with the exception of capital improvement plans managed by the Department of Public Works and Capital Projects Managements, "Director" or Chief Engineer shall mean: the Chief Engineer previously referred to as the Director of Plan Review unless otherwise noted herein. For all Capital Improvement Plans managed by the Department of Public Works and Capital Projects Management, "Director" shall mean: the Director of Public Works and Capital Projects Management unless otherwise noted herein.
8. The term "The Code" means the Code of the Town of Leesburg, Virginia.

(End of Section)

SECTION 11-200 REVISIONS

1. By April 15 of each calendar year which is divisible by "5", the Town Manager shall convene the Revision Committee for the purpose of evaluating the performance of this manual in achieving the town goals. The term of the Revision Committee shall be 2 years.
2. The Revision Committee shall consist of the following:
  - A. ~~Chief Engineer~~ Director of Plan Review
  - B. Director of Public Works and Capital Projects
  - C. Director of Community Development ~~Planning and Zoning~~
  - D. Director of Utilities,
  - E. ~~Director of Capital Projects Management~~
  - EE. Specific Town Staff, depending upon articles to be modified.
  - FG. One or more representatives from the Town's Development Advisory Group (DAG).
  - G H. Three or more members from the Engineers and Surveyors Institute (ESI) Leesburg Technical Review Committee.
3. The Revision Committee will review all requests for interpretations, revisions, rulings, or appeals, which have been requested since the last revision of this manual. The Revision Committee will also review any other provisions of this manual as may arise during the committee's discussions. The time goal for review by the Revision Committee shall be 1 year from the date of the manager's initiation of the committee.

## **11-150 TOWN OF LEESBURG DESIGN & CONSTRUCTION STANDARDS**

4. Revision language will be compiled by town staff and distributed to the Revision Committee for further consideration and comment. Upon receipt of comments from the Revision Committee, the town staff will forward the finalized revisions to the Town Council for consideration. Revisions shall not become effective until adopted by the Town Council as revisions to this manual. The time goal for the compilation, finalization, and adoption shall be 2 years from the date of the manager's initiation of the committee.
5. The Revision Committee may consult with other professionals as it may deem necessary to complete their assigned task.

(End of Section)

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**SECTION 11-300                      DEFINITIONS**

The following definitions shall be used in the interpretation and administration of the Town of Leesburg Design and Construction Standards Manual. The definitions of various terms as presented herein do not necessarily represent the same definitions as may be found for the same terms in chapters of The Code.

For the purpose of this publication, the following words and phrases shall have the meanings as respectively ascribed to them:

- |                  |   |
|------------------|---|
| A.A.N.           | American Association of Nurserymen.   |
| A.A.S.H.T.O.     | The American Association of State Highway and Transportation Officials.   |
| A.S.C.E.         | American Society of Civil Engineers.  |
| A.E.G.           | Association of Engineering Geologists.  |
| Acre-foot        | Quantity of water that would cover one acre, one foot deep. An acre-foot contains 43,560 cubic feet.  |
| Approach Channel | The reach of channel upstream from a dam, bridge construction, culvert or other structure.  |
| Approach Section | A cross section of a stream channel, normal to thread of current located in the approach channel.   |
| Apron            | A floor or lining of concrete, timber, or other resistant material at the toe of a dam, bottom of a spillway, chute, etc., to prevent erosion resulting from falling water or turbulent flow. |

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A.S.T.M.	The American Society for Testing Materials.
BMP	Best Management Practices.
BOCA	Building Officials and Code Administrators.
Backwater	<ol style="list-style-type: none"><li>1. In a general sense, a flow retarding influence due to a dam; other constrictions such as a bridge or culvert or another stream.</li><li>2. The increase in water surface elevation due to a bridge construction above the normal unconstructed elevation at an approach section located one bridge length upstream from the bridge construction.</li></ol>
Backwater Curve	<ol style="list-style-type: none"><li>1. The longitudinal shape of the water surface in a stream or open conduit where such water surface is raised above its normal level by a natural or artificial constriction.</li><li>2. The term is sometimes used in a generic sense to denote all computed water surface profiles, usually in cases where the water is flowing at depths greater than the critical.</li><li>3. In uniform channels the curve is concave upward, the velocities decrease in a downstream direction, and the flow is non-uniform.</li></ol>
<b><u>Base Flood</u></b>	<b><u>Shall mean the flood having a one percent chance of being equaled or exceeded in any given year. Also known as the 100-year flood.</u></b>
Bench	A horizontal strip or shelf built into an embankment to break the continuity of an otherwise long slope.
Block	That land abutting on one side of a street extending to the rear lot lines (or for parcels of land extending through to another street, to a line midway between the two streets) and lined between the two

nearest intersecting and intercepting streets or between the nearest intersecting or intercepting street and boundary of any railroad right-of-way, park, school grounds, or unsubdivided acreage or centerline of any drainage channel 20 feet or more in width.

Bridge	<ol style="list-style-type: none"><li>1. A structure erected over a watercourse, depression or obstacle (Webster's Collegiate Dictionary).</li><li>2. As distinguished from a culvert, it is a large structure spanning a watercourse, the bed of which is left comparatively undisturbed.</li><li>3. The opening width is generally large compared to length (in the direction of flow). The structure generally consists of a deck or superstructure supported on two or more abutments or piers.</li></ol>
Building	A structure having one or more stories and a roof designed primarily for support and shelter of persons, animals, or property of any kind. When a building or structure is divided into separate parts like firewalls, and having separate plumbing, electrical, heating, drainage and ventilation, each part so divided shall be deemed a separate structure.
Catchment Area or Basin	Watershed, drainage basin; also the area of such a basin.
Channel	<ol style="list-style-type: none"><li>1. An elongated open depression in which water may or does flow.</li></ol>

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2. An elongated depression either naturally or artificially created and of appreciable size which periodically or continuously contains moving water or which forms a connecting link between two bodies of water.
3. The channel must have a definite bed and bank which serve to confine the water.

Channel  
Coefficient

A factor, in the Chezy, Darcy-Weisbach, Hazen-Williams, Kutter, Manning, and other formulas, for computing the average velocity of flow of water in a conduit or channel which represents the effect of roughness of the confining material upon the energy losses in the flowing water.

**Chief Engineer**

**A Town official who serves as the Chief Engineer (also referred to as Director of Plan Review) and the Town's Floodplain Manager, or his/her designee charged with the interpretation, administration, and enforcement of the SLDR and this DCSM for Leesburg, Virginia, for all Subdivision Plats, Subdivision Construction Plans, Site Plans, Minor Site Plans, Mini Site Plans, Site Plan Waivers Floodplain Studies and other related documents (with the exception of Capital Improvement Construction Plans managed by the Department of Public Works and Capital Projects).**

Clearing

Any intentional or negligent act to:

1. Cut down, or
2. Remove all or a substantial part of, or
3. Damage a tree or other vegetation which will cause the tree or other vegetation to decline and/or die. Such acts shall include but not be limited to damage inflicted upon the root system of the vegetation by the application of toxic substances, by the operation of equipment and vehicles, by storage of materials, or by the change of natural grade due to unapproved excavation or filling, or damage caused by the unapproved alteration of natural physical conditions.

- CLOMA** **A Conditional Letter of Map Amendment (CLOMA) is FEMA’s comment on whether a proposed project would be excluded from the Special Flood Hazard Area (SFHA) shown on the effective National Flood Insurance Program (NFIP) map.**
- CLOMR** **A Conditional Letter of Map Revision (CLOMR) is FEMA’s comment on a proposed project that would affect the hydrologic and/or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway or effective Base Flood Elevations (BFE). Specifically, A CLOMR is a letter from FEMA commenting on whether a proposed project, if built as proposed, or proposed hydrology changes would meet minimum National Flood Insurance Program standards.**
- CLOMR-F** **A Conditional Letter of Map Revision Based on Fill (CLOMR-F) is FEMA’s comment on whether a proposed project involving the placement of fill would exclude an area from the SFHA shown on the NFIP map. Specifically, A CLOMR-F is a letter from FEMA commenting on whether adding fill, if placed as proposed and proposed hydrology changes would meet minimum National Flood Insurance Program standards.**
- Control**
1. A section or a reach of an open conduit or a stream channel where conditions exist that make the water level about it a fairly stable index of discharge.
  2. A control may be either partial or complete.
  3. A complete control is independent of downstream conditions, and is effective at all stages. An overflow dam and a road embankment are examples of complete control.
  4. Controls may be either natural or artificial.

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- Cradle**
1. A support curved to fit a conduit laid above the surface of the ground; the conduit lengths are self-supporting between cradles.
  2. The cradle may be integral with the supporting pier or bent, or it may be supported on a pier or footing.
  3. In trenches in soft ground or at great depths, a continuous concrete footing extending to the horizontal diameter of the pipe, and sometimes an inch or two higher.
- Crest**
1. The top of a dam, dike, spillway, or weir, to which water must rise before passing over the structure. It is frequently restricted to the overflow portion.
  2. The highest elevation reached by flood waters flowing in a channel.
  3. The act of reaching a crest, as in a flood or wave.
- Critical Depth**
1. A given quantity of water in an open conduit may flow at two depths having the same energy head. When these depths coincide, the energy head is a minimum and the corresponding depth is Belanger's critical depth.
  2. It is the depth at which, for a given energy content of the water in a channel, maximum discharge occurs or the depth at which in a given channel, a given quantity of water flows with minimum content of energy.
- Cul-de-sac**                    **See Street, Cul-de-sac.**
- Culvert**
1. A culvert is a closed conduit or waterway carrying water through a highway or railroad embankment.
  2. Although there are borderline cases, a culvert is distinguished from a bridge by certain characteristics such as:

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- A. A culvert generally has the same material all around its perimeter and has a regular symmetrical shape where a bridge opening does not. In other words, a culvert is a large pipe.
- B. A culvert usually has a large ratio of length to width.

Cut-Off	A wall, collar or other structure intended to reduce percolation of water along otherwise smooth surfaces or through porous strata.
Dam	Any artificial barrier together with appurtenant works intended to impound water.
Dam Failure Analysis	An analysis to determine possible failure modes, breach configurations, failure time, outflow hydrographs and the area of inundation downstream from a dam in the event of failure.
Dam Height	The vertical distance from the natural bed of the stream at the downstream toe of the dam to the top of the dam. This is also the structural height.
Danger Reach	The area downstream from a dam that will experience an increase in flooding depth as a result of failure of the dam.
Dam Owner	Any person or entity owning the land on which a dam is situated, and/or any person or entity holding an easement permitting the construction of a dam and/or any person or entity agreeing to maintain a dam.
<b><u>DCSM</u></b>	<b><u>The Town of Leesburg, Virginia, Design and Construction Standards Manual adopted by the Town Council, as amended from time to time.</u></b>
Debris	Any material, including floating trash, suspended sediment, detritus, or bed load moved by a flowing stream.
Design Storm	A selected rainfall pattern of specified amount, intensity, duration, and frequency that is used as a basis for design.

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Detention	Managing stormwater runoff or sewer flows through temporary and/or controlled release facilities.
Detention	A facility that provides detention storage of storm run-off Facility and controlled release of this run-off and drains completely to a pre-storm condition when precipitation stops and the stored run-off has been released.
Development	Any man-made change to improved or unimproved real estate including, but not limited to, buildings or other structures, the placement of streets and other paving, utilities, filling, grading, and excavation. Includes all improvements proposed with subdivisions plans, all types of site plans, development plans and capital improvement plans.
Development Plan	Detailed drawings indicating all building, land certain private improvements and all public improvements including landscape treatments and related information as required by this Manual and the Ordinance and policy of the Town of Leesburg. Development Plan shall include all types of site plans, subdivision plans, development plans, capital improvement plans and similar type plans.
Developer or Subdivider	An individual, corporation, proprietor, trust trustee, partnership, or other entity having legal title to any tract or parcel of land to be developed, whether or not they have given their power of attorney to one of their group, or other individual or entity to act on their behalf in planning, negotiation in representing or executing the requirements of this Manual or Zoning Ordinance of the Town of Leesburg. Developer shall also mean any person, company, organization, government agency, or the like that is responsible for any type of site, subdivision, development and/or construction plans.
Dike	An embankment to confine or control water, especially one built along the banks of a river to prevent overflow of low lands; a levee.

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<b><u>Director</u></b>	<b><u>Either the Director of Plan Review (also referred to as Chief Engineer) or Director of Public Works and Capital Projects, as defined below and herein.</u></b>
<b><u>Director of Plan Review</u></b>	<b><u>A Town official who serves as the Director of Plan Review (also referenced herein as Chief Engineer), or his/her designee charged with the interpretation, administration, and enforcement of the SLDR and this DCSM for Leesburg, Virginia, for all Subdivision Plats, Subdivision Construction Plans, Site Plans, Minor Site Plans, Mini Site Plans, Site Plan Waivers, Floodplain Studies and other related documents (with the exception of Capital Improvement Construction Plans managed by the Department of Public Works and Capital Projects).</u></b>
<b><u>Director of Public Works and Capital Projects</u></b>	<b><u>A Town official who serves as the Director of Public Works and Capital Projects, charged with the interpretation, administration, and enforcement of this Article for all Town Capital Improvement Projects for Leesburg, Virginia, or his/her designee.</u></b>
Discharge	<ol style="list-style-type: none"><li>1. As applied to a stream or conduit, the rate of flow, or volume of water flowing in a given stream or conduit at a given place and within a given period of time.</li><li>2. The act involved in water or other liquid passing through an opening or along a conduit or channel.</li><li>3. The volume of water, silt, or other mobile substance which emerges from an opening, pump, or turbine, or passes along a conduit or channel, expressed as cubic feet per second, millions of gallons per day, etc.</li></ol>
Ditch	<ol style="list-style-type: none"><li>1. An artificial open channel or waterway constructed through earth or rock, for the purpose of carrying water.</li><li>2. A ditch is smaller than a canal, although the line of demarcation between the two is indefinite. A ditch usually has sharper curvature in its alignment, is not constructed to such refinement or uniformity of grade or cross section, and is seldom lined with impervious material to prevent seepage.</li></ol>

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- Drainage
1. A general term applied to the removal of surface or ground water from a given area either by gravity or by pumping.
  2. The area from which water occurring at a given point or location on a stream originates. In such case the term is synonymous with drainage area and watershed.
  3. The term is also used in a general sense to apply to the flow of all liquids under the force of gravity.
  4. The water features of a map such as seas, lakes, ponds, streams, and canals.
  5. The effect of soil characteristics which regulate the ease of rate of natural drainage.
- Drip Line
- A vertical line extending from the outermost edge of the tree canopy or shrub branch spread to the ground.
- Drive  
Driveway
- An area specifically designated and designed for vehicular access to a residential lot.
1. Pipestem Driveway: Vehicular access constructed on the stem or stems of a pipestem lot, or lots. No parking is allowed along a pipestem driveway.
  2. Common Driveway: Vehicular access to single family detached lots constructed on ground of common ownership. No parking is allowed.
  3. Private Driveway: Vehicular access constructed entirely within the limits of one lot for use only by that lot and may connect to a public street, private street, pipestem driveway, common driveway or common parking court.
- Drop
1. A structure for dropping the water in a conduit to a lower level and dissipating its surplus energy. A drop may be vertical or inclined; the latter is called a chute.
  2. A fall. Also the drop or fall (h) in water surface elevation between the upstream and downstream (between headwater and tailwater) sides of a bridge or submerged culvert or between two sections of a slope-area reach.

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Easement	A grant by a property owner of the use of land for specific purpose.
Embankment	A man-made deposit of soil, rock, or other material used to form an impoundment.
Energy	<ol style="list-style-type: none"><li>1. The capacity to perform work.</li><li>2. Kinetic energy is that due to motion; and potential energy is that due to position.</li><li>3. In a stream or open conduit the total energy at any section is represented by the sum of its potential and kinetic energies.</li><li>4. In a closed conduit, the total energy is the sum of the potential pressure and kinetic energies.</li></ol>
Energy Gradient	The slope of the energy line of a body of flowing water with reference to any plane.
Energy Head	The elevation of the hydraulic grade line at any section plus the velocity head of the mean velocity of the flow in that section. The energy head may be referred to any datum or to an inclined plane such as the bed of a conduit. The total head above datum at any cross section.
Energy Line	A line joining the elevations of the energy heads of a stream. The energy line is above the hydraulic grade line a distance equivalent to the velocity heads at all sections along the stream. A line representing the energy in flowing water. It is plotted a distance equal to depth plus velocity heads above a profile of the flow line of a conduit. The slope of this line represents the rate of loss of head and it must always slope downward in the direction of the flow.
Engineer	A person who is recognized by the Commonwealth of Virginia and is registered with the State Department of Professional and Occupational Registration as a "Professional Engineer."
Entrance Loss	The energy lost when a stream of water passes into a hydraulic structure, the loss being caused by eddies along the surface edge of the inlet.

Fire Lane                      An area designated by clearly visible signs, in which parking shall be prohibited, whether on public or private property, to ensure ready access for fire fighting equipment and facilities.

Flagging                      Plastic surveyor's tape.

Flood or Flooding            1.     A general and temporal condition of partial or complete inundation of normally dry land areas from:

A.     The overflow of inland or tidal waters;

B.     The unusual and rapid accumulation of runoff of surface waters from any source;

C.     Mud slides (i.e. mudflows) which are proximately caused or precipitated by accumulations of water on or under the ground.

2.     The collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water accompanied by a severe storm, or by an unanticipated force of nature, such as a flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding as defined in paragraph 1 of this definition.

~~Flood (100-year) — The flood having a one percent chance of being equaled or exceeded in any given year.~~  
~~or Base Flood~~

Flood Peak                    1.     The maximum instantaneous rate of flow during a flood, usually expressed in cubic feet per second.

2.     The segment of the hydrograph extending from the point of inflection on the rising limb to the similar inflection point on the falling side.

Floodplain

A low, usually flat terrain on either side of a river or stream that is normally dry but submerged at times of high water, and where accumulations of silt and sand are deposited away from the main channel, and the area subject to flooding by the base flood. Also, a floodplain or flood-prone area is defined as any land area susceptible to being inundated by water from any source.

1. ~~Nearly level land occupying the bottom of the valley of a present stream and subject to flooding, unless protected artificially.~~
2. ~~The and area along streams, rivers, drainageways or lakes susceptible to being inundated by water periodically during rainfalls of given intensities and durations.~~

Floodplain

(Major) (FEMA)

The area subject to flooding by the base flood as designated by the Federal Emergency Management Agency (FEMA). This area corresponds to FEMA Special Flood Hazard Areas (SFHA) within a Zone designated as "AE" and/or "A", as shown on the FEMA Flood Insurance Rate Map (FIRM). Major Floodplains are generally associated with streams having a drainage area of 640 acres or more.

~~Flood Plain as designated by the U.S. Department of Housing and Urban Development (HUD), by the U.S. Geological Survey and/or the Flood Zones as determined by the Federal Emergency Management Agency (FEMA).~~

Floodplain (Minor)

Those areas subject to flooding by the base flood that do not meet the definition of Major Floodplain and have not been designated as a FEMA SFHA within a Zone "AE" and/or "A" as shown on the FIRM, but have a drainage area of 100 acres or greater.

Floodplain  
Alteration Study

A land development action that will change the cross section(s) of Town floodplain and will increase the width of floodwaters either on-site or off-site. Alterations include, but are not limited to, land disturbing activities such as clearing, grading, excavating, transportation, and filling of land.

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### Floodplain Alteration

#### Study (As-Built Condition)

A land development action that is based upon as-built conditions after the site has been fully constructed in accordance with the previously approved floodplain alteration study and FEMA approved CLOMR for the site. This study shall prove that all as-built changes to the cross section(s) of the Town floodplain have not increased the width of floodwaters either on-site or off-site and are in substantial conformance the FEMA approved CLOMR.

#### Floodplain Study, Corrected Effective

A floodplain study of the existing conditions prior to any type of land disturbing activities using the most up-to-date best available data.

#### Floodplain Administrator

The Chief Engineer, or their designee, who administers and implements all coordination with FEMA and the Virginia Department of Conservation and Recreation (DCR), as necessary for full compliance with the provisions of the National Flood Insurance Program.

#### Floodproofing

Any combination of structural and non-structural additions, changes or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their content. (N.B. The Virginia Uniform Statewide Building Code, Section 873.0 has very specific requirements on this subject.)

#### Frequency Curve

1. A graphical representation of the frequency of occurrence of specific events.
2. In flood studies, frequency is the average number of years within which a given peak discharge will be equaled or exceeded.

Frequency of Storm  
(Design Storm Frequency)

The anticipated period in years that will elapse, based on average probability of storms in the design region before a storm of a given intensity and/or total volume will reoccur; thus a ten-year storm can be expected to occur on an average once every ten years. Sewers designed to handle flows which occur under such storm conditions would normally be expected to be surcharged of greater amounts or intensity.

Friction Loss  
(or Head)

1. The head lost by the flow in a stream or conduit as the result of the disturbances set up by the contact between the moving fluid and its containing conduit, and by intermolecular friction.
2. In laminar flow, the head loss is approximately proportional to the first power of the velocity; in turbulent flow, to a higher power, approximately the square of the velocity.

Friction Slope

1. The friction head or loss per unit length of conduit.
2. For most conditions of flow, the friction slope coincides with the energy gradient, but where a distinction is made between energy losses due to bends, expansions, impacts, etc., a distinction must also be made between the friction slope and the energy gradient.
3. Friction slope is equal to the bed or surface slope only for uniform flow in uniform channels.

Grade	The slope of a road, channel, or natural ground. The finished surface of a canal bed, road bed, top of embankment, or bottom excavation; any surface prepared for the support of construction such as paving or laying of a conduit.
Grading	Any stripping, cutting, filling, stock piling, or any combination thereof, including the land in its cut and filled condition.
Head	<ol style="list-style-type: none"><li>1. The height of the free surface of fluid above any point in an hydraulic system; a measure of the pressure or force exerted by the fluid.</li><li>2. The energy, either kinetic or potential, possessed by each unit weight of a liquid expressed as the vertical height through which a unit weight would have to fall to release the average energy possessed.</li><li>3. It is used in various compound terms such as pressure head, velocity head, and lost head.</li></ol>
Headwater	<ol style="list-style-type: none"><li>1. The upper reaches of a stream near its source.</li><li>2. The region where ground waters emerge to form a surface stream.</li><li>3. The water upstream from a structure.</li></ol>
Heeled In	Temporary provision for holding young plants until they can be set out in their permanent location by placing bare-rooted nursery plants close together in trenches with roots well covered.
Hydraulic Grade Line	<ol style="list-style-type: none"><li>1. A hydraulic profile of the piezometric level of water at all points along the line.</li></ol>

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- 2. The term is usually applied to water moving in a conduit, open channel, stream, etc, but may also be applied to ground water, free or confined.
  - 3. In an open channel it is the free water surface.
- Hydraulic Gradient
- 1. The slope of the hydraulic grade line; the rate of change of pressure head; the ratio of the loss in the sum of the pressure head and position head to the flow distance.
  - 2. For open channels, it is the slope of the water surface, and is frequently considered parallel to the invert.
  - 3. For closed conduits under pressure, it is the slope of the line joining the elevations to which water would rise in pipes freely vented and under atmospheric pressure.
  - 4. A positive slope is usually one which drops in the direction of flow.
- Hydraulic Jump
- 1. The sudden and usually turbulent passage of water in an open channel under conditions of free flow, from low stage below critical depth to high stage above critical depth during which the velocity passes from supercritical to subcritical. It represents the limiting condition of the surface curve wherein it tends to become perpendicular to the stream bed.
  - 2. A device to dissipate energy in an open channel, in a sewer, or at the toe of a spillway section of a dam.
  - 3. A device to promote turbulence.
  - 4. An abrupt rise in water surface which may occur in an open channel when water flowing at a supercritical velocity is retarded.

5. In a closed conduit, the sudden rise from part full flow at a supercritical velocity to full flow under pressure, the depth plus the pressure head downstream from the hydraulic jump equals the high stage obtained for open channel flow.

Hydrology	The applied science concerned with the water of the earth in all its states, their occurrences, distribution, and circulation through the unending hydrologic cycle of: precipitation; consequent runoff, stream flow, infiltration and storage; eventual evaporation; and reprecipitation. It is concerned with the physical, chemical, and physiological reactions of water with the rest of the earth, and its relation to the life of the earth.
Impervious	A term applied to a material through which water cannot pass or through which water passes with great difficulty; impermeable.
Impervious Soil	Soil through which air and water cannot travel.
Impounding Capacity	The volume in acre-feet that is capable of being impounded at the elevation of the top of the dam.
Improvements	All utilities, facilities, signs, lights, buildings, and structures including, but not limited to, streets, cul-de-sacs, storm and sanitary sewer, water lines, curb and gutter and landscaping required pursuant to the terms of this manual.
Infiltration Rate	A soil characteristic determining or describing the maximum rate at which water can enter the soil at specified conditions including the presence of excess water.

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Inspector	A representative of the Town of Leesburg authorized to make any or all necessary inspections of work performed and material furnished by the subdivider or developer.
Invert	The floor, bottom or lowest part of the internal cross section of a conduit.
Kinetic Energy	<ol style="list-style-type: none"><li>1. Energy due to motion.</li><li>2. The kinetic energy of a given discharge is generally taken as proportional to the product of its weight per unit of time and the velocity head of its mean velocity.</li><li>3. For a constant discharge, kinetic energy may be represented by a line at a distance above a flowing water surface proportional to the velocity head of its mean velocity.</li><li>4. The elevation of such a line above any datum represents the total energy (potential plus kinetic) of the given discharge above that datum.</li><li>5. Strictly, the kinetic energy of a given discharge is the integral of the kinetic energies of its particles.</li></ol>
Limits of Clearing	<ol style="list-style-type: none"><li>1. The boundaries of that area of land to be cleared of trees and other vegetation in conjunction with the proposed development or land use, except that the area within these limits for such proposed development or use shall not include the removal of any outstanding or monarch trees unless approved by the Director.</li></ol>

2. Subject to the Director's approval, the limits of clearing as shown on the plan shall generally include:
  - A. Street construction and necessary slope construction.
  - B. Public service or utility easements and rights-of way. This shall include area for utility line installation with any construction easements necessary for such installation and easements for maintenance access. These easements shall not be cleared prior to actual line installation.
  - C. Building roof coverage area and ancillary structures such as patios and porches plus 15 feet on all sides for construction activity.
  - D. Driveways, alleyways, walkways, parking lots, and other land area necessary to the installation of the proposed development or use. Other necessary land area may include area for gardens, tennis courts, swimming pools, and lawn areas and related structures or uses.
  - E. Sediment basins - Only the area necessary for construction of the dam, the area in which sediment will collect, and the area necessary for construction and maintenance of the basin shall be cleared of vegetation. Configuration of the basin shall utilize natural terrain as much as possible to minimize vegetation removal. Any vegetation which dies as a result of the deposition of sediment and/or debris shall be removed by the permittee.
  - F. Detention ponds - Only the area necessary for construction of the dam and the area necessary for construction and maintenance of the pond shall be cleared of vegetation. Configuration of the pond shall utilize natural terrain as much as possible to minimize vegetation removal. Any vegetation which dies as a result of the deposition of sediment and/or debris shall be removed by the permittee.

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Limits of Grading      The outermost edge of the area in which the existing topography is to be altered by cutting or filling.

**LOMA**                      **A Letter of Map Amendment (LOMA) is an official amendment, by letter, to an effective NFIP map. A LOMA establishes a property's location in relation to the SFHA.**

**LOMR**                      **A Letter of Map Revision (LOMR) is an official revision, by letter, to an effective NFIP map. A LOMR may change flood insurance risk zones, floodplain and/or floodway boundary delineations, planimetric features, and/or BFE.**

**LOMR-F**                    **A Letter of Map Revision Based on Fill (LOMR-F) is an official revision, by letter, to an effective NFIP map. A LOMR-F provides FEMA's determination concerning whether a structure or parcel has been elevated on fill above the BFE and excluded from the SFHA.**

Major Drainage System      The system which provides overland relief for infrequent storm events (100-year event)

**Mixed Use**                    **A variety of complementary and integrated uses, including but Not limited to residential, office, research & development, production, retail, public, entertainment, conference and lodging uses arranged in a compact urban form.**

Minor Drainage System      The system which conveys the two and ten-year frequency events through a network of underground pipes and open channels discharging at a natural watercourse of adequate capacity.

Monarch Tree                  Any tree which is 90 percent of the State champion rating as defined by the formula (height in feet) + (the circumference [at 4-1/2 feet], in inches) + (1/4 of the spread measured in two directions perpendicularly in feet) = rating. A listing of current State champions is available from the Director.

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Natural Water	Course A natural stream flowing in a defined bed or channel; one formed by the natural flow of the water, as determined by the general superficies or conformation of the surrounding country, as distinguished from an "artificial" water course, formed by the work of man, such as a ditch or canal.
Off-Site	Any area which does not fall within the boundary of property to be developed, or planned, but generally is in proximity thereto.
On-Site	That area within the boundary of any land to be developed or planned.
Outstanding Tree	A tree which has been determined by the Director to be of high value because of its species, size, age, form, historical significance, or some other professional criteria. Includes all monarch trees.
<b><u>Overland Relief</u></b>	<b><u>A pathway conveying the 100-year rainfall event assuming the minor storm system (pipe system) has failed to function or does not exist.</u></b>
Parking Court (Common)	Vehicular access to single-family detached, two-family and single-family attached dwelling lots. Parking courts consist of the parking area and a driveway section where no parking is allowed.
Peak Discharge	The maximum instantaneous flow from a given storm condition at a specific location.
Percolation Rate	The rate, usually expressed as a velocity, at which water moves through saturated granular material.
Permeability	The quality of a soil horizon that enables water or air to move through it. The permeability of a soil may be limited by the presence of one nearly impermeable horizon even though others are permeable.

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Permittee	Any individual, applicant, owner, developer, partnership, firm, association, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, utility, cooperative, county, city, town, or other political subdivision of the State, any inter-state body, or other legal entity or agent thereof responsible for carrying out the conditions of a permit issued pursuant to the Town Code.
Permit	Written authorization from the Town to perform the stipulated work.
Plat	A diagram or map, drawn to scale showing tracts, parcels, lots, subdivisions, land boundaries, legally recordable in the Clerk's office; together with all data essential to the description and identification of the several elements shown thereon, and including one or more certificates indicating due approval. A plat differs from a plan in that it does not necessarily show additional cultural drainage and relief features.
Probable Maximum Flood (PMF)	The flood that may be expected from the severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region. The PMF is derived from probable maximum precipitation (PMP), which information is available from the National Weather Service. For purposes of the Town of Leesburg Dam Safety Regulations, U. S. Weather Bureau Technical Paper No. 51 will be utilized for the PMF. In the Town of Leesburg this value is approximately five times the 100-year storm.
Profile	A drawing of a side or structural elevation of an object.
Public Street	See Street, Public.

Public Retention Facility      A publicly owned and maintained facility that provides retention storage of storm runoff and controlled release of this runoff in the freeboard area of a natural or man-made pond or lake above the normal water level.

**Required Specifications**

**As the context requires, any one or any combination of the following apply (all references are to the latest edition of the identified document(s) as amended from time to time):**

- (1) Leesburg Design and Construction Standard Manual.**
- (2) Erosion and sedimentation control regulations contained in this DCSM, the Loudoun County Soil Erosion Control Ordinance, and the Virginia Erosion and Sediment Control Handbook, as adopted in accordance with the Virginia Erosion and Stormwater Management Program (VESMP).**
- (3) Adopted Leesburg Town Plan.**
- (4) Flood zone management and control policy, as defined by the SLDR, the Zoning Ordinance, this DCSM and Town Code as well as all Virginia Department of Conservation and Recreation (DCR) and FEMA regulations.**
- (5) Federal Emergency Management Agency (FEMA) regulatory floodplain maps for Leesburg and Loudoun County, and any other floodplain studies approved by the Town.**
- (6) Water and Sewer Master Plan.**

**(7) Storm Water Master Plan.**

**(8) Commonwealth of Virginia, “Sewage Regulations”.**

**(9) Commonwealth of Virginia, “Waterworks Regulations”.**

**(10) Virginia Department of Transportation, “Road and Bridge Standards”; “Subdivision Street Requirements”, except for Table 2, “Base and Pavement Design”; Minimum Standards of Entrances to State Highways”; and “Drainage Manual”.**

**(11) “A policy on Geometric Design of Highways and Streets” by the American Association of State Highway and Transportation Officials (AASHTO), applicable as a guide when no VDOT standard exists, as provided under (10) above.**

Routing

1. The derivation of an outflow hydrograph of a stream from known values of upstream inflow. The procedure utilizes wave velocity and the storage equation; sometimes both.
2. Computing the flood at a downstream point from the flood inflow at an upstream point, and taking channel storage into account.

Seedling

A plant which will become a tree with further growth, is not over three years old, and has been transplanted no more than twice.

Semi-Liquid Materials

1. Pertaining to debris landfills; those materials which have a viscosity such that after being deposited, the material does not tend to run or spread out as a fluid or liquid.

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2. Materials not to be permitted under this definition area: sludges and slurries, all petroleum products, chemicals, toxic materials, explosives, pesticides, and larvicides.

Sheet Flow Non-concentrated surface water runoff.

Shrub A woody plant that usually remains low, produces shoots or stems from the base, and is not usually tree like nor single stemmed.

**SLDR**

**The Town of Leesburg, Virginia, Subdivision and Land Development Regulations adopted by the Town Council, as amended from time to time.**

Soil Mix Backfill Backfill placed back in planting holes which consist of existing earth and organic material. Organic material shall comprise no more than one-third of the volume.

Spillway Flowpath The area immediately downstream from the discharge end of a spillway that will be inundated during passage of the design flood for the dam.

Storm Drain Lateral A pipeline conveying the flow from a single interception facility (inlet) to the primary or secondary trunk line, there to be combined with other accumulated flow.

Storm Drain Trunk Line A pipeline conveying flow accumulated from one or more laterals. A trunk line can be either a secondary trunk line or the primary trunk line.

Storm Drain Primary Trunk Line A primary trunk line is a pipe line conveying flow accumulated from laterals and secondary trunk lines to the point of discharge.

Storm Drain Secondary Trunk Line A secondary trunk line is a pipe line conveying flow accumulated from two or more interception points to the primary trunk line as opposed to conveying it directly to the point of discharge.

Street 1. A strip of land subject to vehicular or pedestrian traffic and

providing direct or indirect means of access to property, including but not limited to road, lane, drive, trail, court, place, terrace, alley, avenue, highway, boulevard and any other thoroughfare.

2. For functional classification of Town of Leesburg streets refer to Transportation Section of the Town Plan.

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- Street, Cul-de-Sac
1. A local street, one end of which is permanently closed to dedication to public use and consists of a circular turnaround
  2. Temporary cul-de-sacs shall be required only where deemed necessary by the Director and, when located off-site, curbs, gutters and sidewalks may not be required.

Street, Public

An existing street or a platted street dedicated for the use of the general public, graded and paved or to be graded and paved in order that every person has the right to pass and to use it at all times for purpose of travel, transportation or parking to which it is adapted and devoted.

- Street, Service
1. A public street, generally paralleling and contiguous to a Drive main road, designed primarily to promote safety by providing free access to adjoining property and limited access to the main road.
  2. All points of access (ingress and egress) are to be approved by the appropriate regulatory authorities.

- Street, Stub
- A public street which at the time of its construction has:
1. No driveway entrances, and
  2. No through traffic, and
  3. No turnaround.

Street, Subgrade	That portion of the roadbed upon which the subbase, the base courses, surface courses or pavement will be or have been placed.
Street, Width	The shortest distance between the lines, which delineate the right-of-way of a street.

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Surcharge	The flow condition occurring in closed conduits when the hydraulic grade line is above the crown of the sewer.
Surface Waters	As distinguished from the waters of a natural stream, lake, or pond, surface waters are such as diffuse themselves over the surface of the ground, following no defined course or channel and not gathering into or forming any more definite body of water than a mere bog or marsh. They generally originate in rains and melting snows, but the floodwaters of a river may also be considered as surface waters if they become separated from the main current or leave it never to return, and spread out over lower ground. Water derived from rains and melting snows that is diffused over the surface of the ground, continues to be such and may be impounded by the owner of the land, until it reaches some well-defined channel in which it is accustomed to, and does, flow with other waters, or until it reaches some permanent lake or pond, whereupon it ceases to be "surface water" and becomes a "water course" or a "lake" or "pond," as the case may be.
Tailwater	The water just downstream from a structure.
Time of Concentration	<ol style="list-style-type: none"><li>1. The period of time required for storm runoff to flow from the most remote point of a catchment or drainage area to the outlet or point under construction. It is not a constant, but varies with the depth of flow and the condition of the channel.</li><li>2. The time when the rate of runoff equals the rate of rainfall for a storm of uniform intensity.</li></ol>
Toxic Substances	A substance which when allowed to enter the ground will produce detrimental effects on vegetation which may result in its mortality. Examples of these substances include, but are not limited to, petroleum products and minerals.

- Tree Any self-supporting woody plant growing upon the earth which usually provides one main trunk and produces a more or less distinct and elevated head with many branches.
- VDOT Virginia Department of Transportation.
- Vegetation All plant life, which for the purposes of this Manual, shall be restricted to mean trees, shrubs, grass and vines.
- Velocity Head
1. The vertical distance or height through which a body must fall freely, under the force of gravity, to acquire the velocity which it possesses. It is equal to the square of the velocity divided by twice the acceleration of gravity.
  2. The theoretical vertical height through which a liquid body may be raised due to its kinetic energy. It is equal to the square of the velocity divided by twice the acceleration of gravity.
- Vine A woody plant whose stem climbs by tendrils or twining or creeps along the ground.
- Water Course
1. A running stream of water; a natural stream fed from permanent or natural sources, including rivers, creeks, runs, and rivulets. There must be a stream, usually flowing in a particular direction, though it need not flow continuously. It may sometimes be dry. It must flow in a definite channel, having bed or banks, and usually discharges itself into some other stream or body of water. It must be something more than mere surface drainage over the entire face of the tract of land, occasioned by the unusual freshets or other extraordinary causes.

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2. A water course, in the legal meaning of the word, does not consist merely of the stream as it flows within the banks which form its channel in ordinary high water. The stream extending beyond its own banks, is accustomed to flow down over the adjacent lowlands in a broader, but still definable stream.
3. Water flowing underground in a known and well defined channel is not "percolating water," but constitutes a "water course," and is governed by law applicable to "surface streams," rather than by law applicable to "percolating waters."

**Zoning Administrator** **A Town official who serves as the Zoning Administrator, charged with the interpretation, administration, and enforcement of the Zoning Ordinance for Leesburg, Virginia, or his/her designee.**

**Zoning Regulations** **The Town of Leesburg, Virginia, Zoning Ordinance adopted by the Town Council, as amended from time to time.**

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**REFERENCES**

"Air Pollution Damages - Trees," U. S. Dept. of Agriculture, Forest Services, Latest Edition.

"American Standard for Nursery Stock," American Nursery and Landscape Association, Latest Edition.

International Building Code (IBC) Latest Edition.

"Code of the State of Virginia," Title 15, 21, and 55, Latest Edition.

"Design Guide for Subdivision Road Pavements and Supplement in Virginia," N. K. Vaswani, Latest Edition.

"Drainage Manual", Virginia Department of Transportation, Latest Edition.

"Engineering Soil Classification for Residential Development," Federal Housing Administration, Latest Edition.

"Guide for Determination of Needed Fire Flow," Insurance Services Office (ISO), Latest Edition.

"Guidelines for Tree and Shrub Planting on Virginia's Streets and Highways," Virginia Dept. of Highways and Transportation, Latest Edition.

"Hydraulic Charts for the Selection of Highway Culverts," U.S. Dept. of Transportation, Latest Edition.

"Manual on Uniform Traffic Control Devices," U. S. Department of Transportation, Federal Highway Administration, Latest Edition.

**11-400 TOWN OF LEESBURG DESIGN & CONSTRUCTION STANDARDS**

"Predicting Rainfall and Erosion Losses," Agricultural Handbook #537, U. S. Dept. of Agriculture, Latest Edition.

"Road and Bridge Specifications," Virginia Dept. of Highways and Transportation Standards, Latest Edition.

"Standard Specifications for Highway Bridges," AASHTO, Latest Edition.

"Town Plan," The Town of Leesburg, Latest Edition.

"Virginia Erosion and Sediment Control Handbook", Latest Edition Virginia Department of Conservation and Recreation (DCR)

"Water and Sewer Master Plan," Prepared by CDM for the Town of Leesburg, Latest Edition.

WaterWorks Regulations," Virginia Department of Health, Latest Edition.

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**SECTION 11-600      BIBLIOGRAPHY**

The Municipality of Leesburg, VA. Suggested Design Criteria – Water and Sewer Lines, Streets and Appurtenances, Latest Edition.

The Municipality of Leesburg, VA. Policy Guidelines – Off-Site Sanitary Sewers, Storm Drainage and Sewers, Latest Edition.

The American Society of Civil Engineering Manual and Reports on Engineering Practice No. 37, Latest Edition.

The Water Pollution Control Federation Manual of Practice No. 9, Latest Edition.

The Commonwealth of Virginia/State Board of Health Waterworks Regulations, Latest Edition.

The Virginia Department of Highways and Transportation Road Design Manual, Latest Edition.

The Erosion and Sediment Control Handbook, Latest Edition.

The Virginia Department of Highways and Transportation Subdivision Street Regulations, Latest Edition.

The Technical Manual Drainage for Areas Other Than Air Fields, Dept. of the Army Technical Manual, Latest Edition and Dept. of the Air Force Technical Manual, Latest Edition.

The American Concrete Pipe Association Design Data, Latest Edition.

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