

HYDRAULIC DESIGN ADVISORY

HDA 05-04.1

DATE: JULY 28, 2005, REVISED SEPTEMBER 14, 2006

SUBJECT: Application of NRCS' "TR-55" and "TR-20" Hydrologic Computations Using NOAA ATLAS 14 Rainfall Data

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This HDA supplements Hydraulic Design Advisory HDA 05-03, issued 06/21/05 & revised 07/18/05. When using hydrologic computational methods based on 24-hr. point rainfall such as the National Resource Conservation Service's (NRCS) "TR-55" and "TR-20" or other methods predicated on the application of NRCS' procedures, it will be necessary to use NOAA's "ATLAS-14" Rainfall Precipitation Frequency Data. This will be required whenever these hydrologic computational methods are employed in drainage designs for Department projects or those that will ultimately come under the Department's jurisdiction. This takes effect with the issuance of this Hydraulic Design Advisory. Exceptions in the case of projects already underway are outlined in HDA 05-03.

The 24-hr. Rainfall Depths table for Virginia, presented in the VDOT DRAINAGE MANUAL in Chapter 11, Appendix 11C-3, has been revised to reflect the NOAA "ATLAS-14" data for the 1 to 100-yr. rainfall frequency events. The revised table will be included in the next formal revision to the VDOT DRAINAGE MANUAL. A copy of the revised table is attached to this Hydraulic Design Advisory.

Recent discussions with the Virginia Department of Conservation & Recreation (DCR) have confirmed that they will accept the NOAA "ATLAS-14" Rainfall Precipitation Frequency data as presented herein for regulatory purposes in lieu of the older, NRCS-based tables presented in their handbook.

Any comments or questions related to this Hydraulic Design Advisory should be directed to

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APPENDIX 11C-3

24-HR. RAINFALL DEPTHS (INCHES)

COUNTY	FREQ. (YRS.)						
	1	2	5	10	25	50	100
Accomack	2.7	3.4	4.4	5.3	6.6	7.8	9.1
Albemarle	3.0	3.7	4.7	5.6	6.8	7.9	9.1
Alleghany	2.2	2.7	3.4	4.0	4.8	5.5	6.3
Amelia	2.7	3.3	4.2	5.0	6.2	7.1	8.2
Amherst	2.8	3.5	4.4	5.2	6.4	7.4	8.5
Appomattox	2.8	3.4	4.4	5.2	6.4	7.4	8.5
Arlington	2.6	3.2	4.1	4.8	6.1	7.1	8.4
Augusta	2.4	2.9	3.6	4.3	5.2	5.9	6.7
Bath	2.5	3.0	3.8	4.4	5.3	6.1	7.0
Bedford	2.8	3.4	4.3	5.1	6.3	7.3	8.4
Bland	2.1	2.6	3.1	3.5	4.1	4.5	4.9
Botetourt	2.6	3.4	4.3	5.1	6.2	7.2	8.2
Brunswick	2.8	3.4	4.3	5.1	6.3	7.2	8.2
Buchanan	2.2	2.6	3.2	3.7	4.4	5.0	5.6
Buckingham	2.8	3.4	4.3	5.1	6.3	7.3	8.4
Campbell	2.8	3.3	4.3	5.0	6.2	7.1	8.2
Caroline	2.7	3.3	4.2	5.0	6.3	7.4	8.6
Carroll	2.7	3.3	4.2	5.0	6.0	6.9	7.8
Charles City	2.8	3.4	4.4	5.3	6.5	7.6	8.8
Charlotte	2.7	3.3	4.2	5.0	6.1	7.1	8.1
Chesapeake (city)	3.0	3.7	4.7	5.6	7.0	8.1	9.4
Chesterfield	2.8	3.4	4.3	5.1	6.3	7.3	8.4
Clarke	2.3	2.8	3.5	4.1	4.9	5.6	6.4
Craig	2.3	2.8	3.6	4.2	5.1	5.8	6.6
Culpeper	2.7	3.3	4.3	5.1	6.3	7.4	8.6
Cumberland	2.7	3.3	4.2	5.0	6.1	7.1	8.1
Dickenson	2.2	2.6	3.2	3.7	4.5	5.1	5.7
Dinwiddie	2.8	3.4	4.4	5.2	6.4	7.4	8.4
Essex	2.7	3.2	4.2	5.0	6.3	7.4	8.7
Fairfax	2.6	3.2	4.1	4.9	6.1	7.2	8.5
Fauquier	2.6	3.1	4.0	4.8	5.9	7.0	8.2
Floyd	2.9	3.6	4.5	5.4	6.6	7.6	8.7
Fluvanna	2.7	3.2	4.1	4.9	6.0	6.9	8.0
Franklin	2.8	3.4	4.4	5.2	6.4	7.4	8.5
Frederick	2.4	2.9	3.6	4.2	5.0	5.7	6.5
Giles	2.3	2.7	3.4	3.9	4.6	5.3	5.9
Gloucester	2.9	3.5	4.6	5.5	6.8	7.9	9.2
Goochland	2.7	3.3	4.2	5.0	6.1	7.1	8.2
Grayson	2.1	2.5	3.2	3.7	4.5	5.1	5.8
Greene	3.0	3.5	4.5	5.3	6.6	7.6	8.7
Greensville	2.7	3.3	4.3	5.1	6.2	7.1	8.1
Halifax	2.7	3.2	4.1	4.9	6.0	6.9	7.9
Hampton (city)	2.9	3.6	4.6	5.5	6.9	8.0	9.3

APPENDIX 11C-3

24-HR. RAINFALL DEPTHS (INCHES)

COUNTY	FREQ. (YRS.)						
	1	2	5	10	25	50	100
Hanover	2.7	3.3	4.2	5.0	6.3	7.4	8.6
Henrico	2.7	3.3	4.2	5.0	6.3	7.4	8.6
Henry	2.9	3.5	4.4	5.2	6.4	7.4	8.5
Highland	2.4	2.9	3.6	4.2	5.1	5.8	6.5
Isle of Wight	3.0	3.6	4.7	5.6	6.9	8.0	9.2
James City	2.9	3.6	4.6	5.5	6.8	8.0	9.2
King & Queen	2.7	3.3	4.2	5.1	6.3	7.4	8.7
King George	2.6	3.2	4.1	4.9	6.2	7.3	8.5
King William	2.7	3.3	4.2	5.1	6.3	7.4	8.6
Lancaster	2.7	3.3	4.3	5.2	6.5	7.6	8.9
Lee	2.7	3.2	3.9	4.5	5.3	6.0	6.8
Loudoun	2.6	3.1	4.0	4.7	5.9	6.9	8.0
Louisa	2.7	3.3	4.2	5.0	6.2	7.2	8.3
Lunenburg	2.7	3.3	4.2	5.0	6.1	7.1	8.2
Madison	2.8	3.4	4.4	5.2	6.4	7.4	8.5
Mathews	2.8	3.5	4.5	5.4	6.7	7.9	9.2
Mecklenburg	2.7	3.3	4.2	4.9	6.0	7.0	8.0
Middlesex	2.8	3.4	4.4	5.3	6.6	7.8	9.0
Montgomery	2.3	2.8	3.5	4.1	5.0	5.8	6.6
Nelson	3.1	3.7	4.7	5.6	6.9	8.0	9.2
New Kent	2.8	3.4	4.4	5.2	6.5	7.6	8.8
Newport News (city)	2.9	3.6	4.6	5.5	6.9	8.0	9.3
Norfolk (city)	3.0	3.6	4.6	5.5	6.8	8.0	9.2
Northampton	2.7	3.3	4.3	5.2	6.5	7.7	9.0
Northumberland	2.7	3.3	4.3	5.1	6.4	7.6	8.8
Nottoway	2.7	3.3	4.2	5.0	6.2	7.1	8.2
Orange	2.8	3.3	4.3	5.1	6.3	7.3	8.4
Page	3.0	3.6	4.6	5.4	6.6	7.7	8.8
Patrick	3.2	3.9	5.0	5.9	7.2	8.4	9.7
Pittsylvania	2.8	3.3	4.2	5.0	6.1	7.1	8.1
Powhatan	2.7	3.3	4.2	4.9	6.1	7.1	8.1
Prince Edward	2.7	3.3	4.2	5.0	6.2	7.2	8.2
Prince George	2.8	3.4	4.4	5.2	6.4	7.4	8.5
Prince William	2.5	3.0	3.9	4.6	5.8	6.8	8.0
Pulaski	2.0	2.4	3.0	3.5	4.2	4.8	5.5
Rappahannock	2.8	3.4	4.3	5.0	6.1	7.1	8.1
Richmond	2.7	3.3	4.3	5.1	6.4	7.5	8.8
Roanoke	2.7	3.2	4.1	4.8	5.9	6.8	7.7
Rockbridge	2.4	2.9	3.6	4.3	5.2	6.0	6.8
Rockingham	2.2	2.6	3.3	3.9	4.7	5.4	6.1
Russell	2.3	2.7	3.3	3.7	4.4	4.9	5.5
Scott	2.3	2.7	3.3	3.8	4.4	4.9	5.4
Shenandoah	2.3	2.8	3.5	4.0	4.9	5.6	6.3

APPENDIX 11C-3**24-HR. RAINFALL DEPTHS (INCHES)**

COUNTY	FREQ. (YRS.)						
	1	2	5	10	25	50	100
Smyth	2.3	2.6	3.2	3.6	4.2	4.6	5.1
Southampton	2.9	3.5	4.5	5.4	6.6	7.7	8.8
Spotsylvania	2.7	3.2	4.1	4.9	6.1	7.2	8.4
Stafford	2.6	3.2	4.1	4.9	6.1	7.2	8.4
Suffolk (city)	3.0	3.6	4.7	5.6	6.9	8.1	9.3
Surry	2.9	3.5	4.6	5.5	6.7	7.9	9.1
Sussex	2.9	3.5	4.5	5.3	6.5	7.5	8.5
Tazewell	2.1	2.5	3.0	3.4	4.0	4.4	4.9
Virginia Beach (city)	3.0	3.7	4.7	5.7	7.0	8.2	9.4
Warren	2.5	3.0	3.8	4.4	5.3	6.1	7.0
Washington	2.2	2.6	3.0	3.4	3.9	4.2	4.6
Westmoreland	2.6	3.2	4.2	5.0	6.3	7.4	8.6
Wise	2.3	2.7	3.3	3.8	4.6	5.2	5.9
Wythe	2.1	2.5	3.1	3.6	4.2	4.8	5.3
York	2.9	3.6	4.6	5.5	6.9	8.1	9.4

Source: NOAA Atlas 14 Precipitation Frequency Estimates, Vol. 2, Version 2.1, 2005 & Version 3.0, 2006