

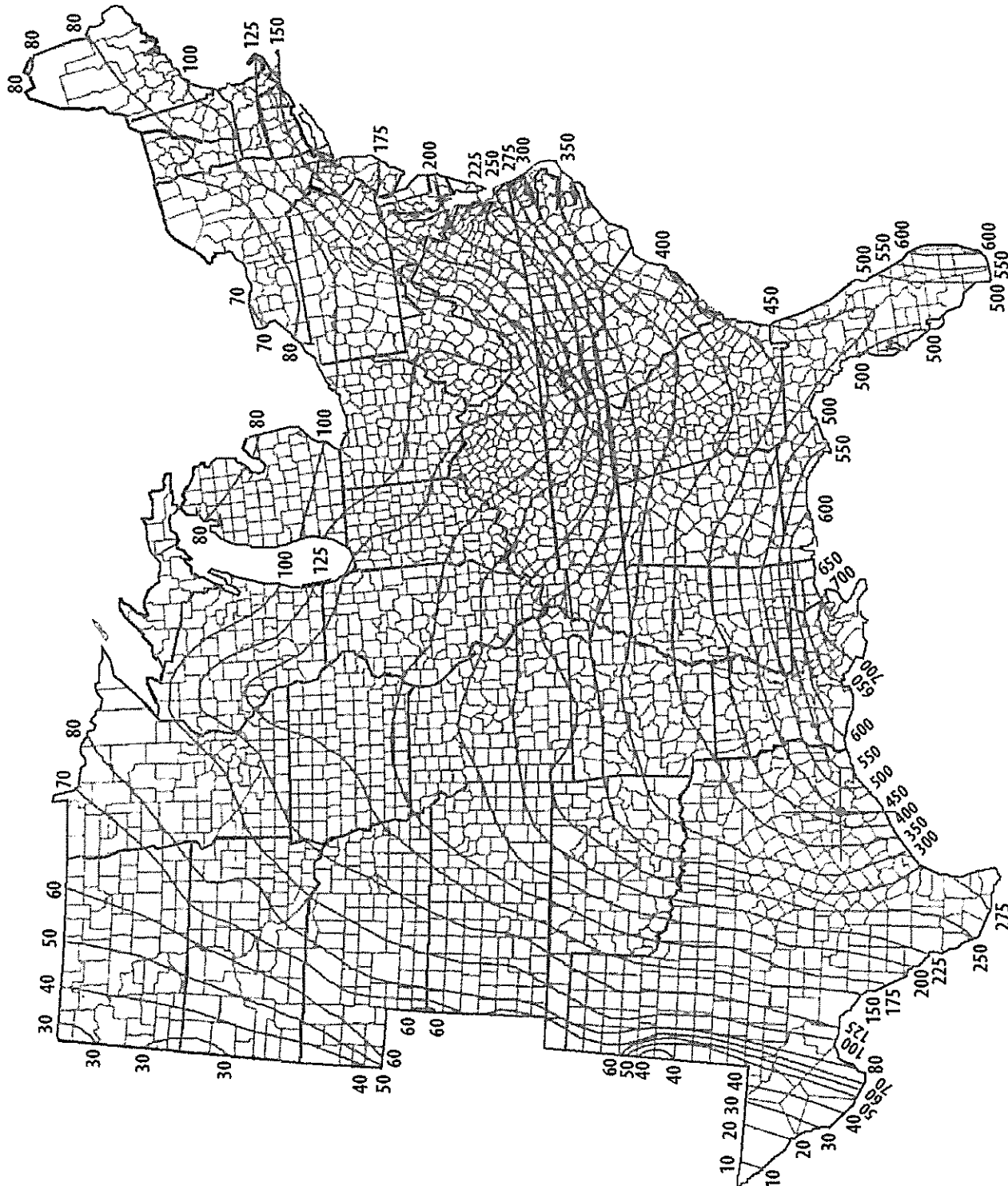
APPENDIX III-2E

ATTACHMENTS

Figure 2. Isoerodent Map of the Eastern U.S. (EPA)
Table 10 – Factor C (USDA)
Web Soil Survey – National Cooperative Soil Survey (NRCS)
Table 1 – Approximate Values of Factor K (TNRCC)
Atlas 14 Point Precipitation Frequency Estimates (NOAA)

Figure 2. Isoerodent Map of the Eastern U.S.

EXCERPT FROM REFERENCE 1, APPENDIX III-2E
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA)



Note: Units for all maps on this page are hundreds ft•ton•in(ac•h•yr)⁻¹

tion and developmental areas can be obtained from table 5 if good judgment is exercised in comparing the surface conditions with those of agricultural conditions specified in lines of the table. Time intervals analogous to cropstage periods will be defined to begin and end with successive construction or management activities that appreciably change the surface conditions. The procedure is then similar to that described for cropland.

Establishing vegetation on the denuded areas as quickly as possible is highly important. A good sod has a *C* value of 0.01 or less (table 5-B), but such a low *C* value can be obtained quickly only by laying sod on the area, at a substantial cost. When grass or small grain is started from seed, the probable soil loss for the period while cover is developing can be computed by the procedure outlined for estimating cropstage-period soil losses. If the seeding is on topsoil, without a mulch, the soil loss ratios given in line 141 of table 5 are appropriate for cropstage *C* values. If the seeding is on a desurfaced area, where residual effects of prior vegetation are no longer significant, the ratios for periods SB, 1 and 2 are 1.0, 0.75 and 0.50, respectively, and line 141 applies for cropstage 3. When the seedbed is protected by a mulch, the pertinent mulch factor from the upper curve of figure 6 or table 9 is applicable until good canopy cover is attained. The combined effects of vegetative mulch and low-growing canopy are given in figure 7. When grass is established in small grain, it can usually be evaluated as established meadow about 2 mo after the grain is cut.

C Values for Pasture, Range, and Idle Land

Factor *C* for a specific combination of cover conditions on these types of land may be obtained from table 10 (57). The cover characteristics that must be appraised before consulting this table are defined in the table and its footnotes. Cropstage periods and *EI* monthly distribution data are generally not necessary where perennial vegetation has become established and there is no mechanical disturbance of the soil.

Available soil loss data from undisturbed land were not sufficient to derive table 10 by direct comparison of measured soil loss rates, as was done for development of table 5. However, analyses of the assembled erosion data showed that the HAWTHORN PARK RECYCLING AND DISPOSAL FACILITY PERMIT AMENDMENT APPLICATION

tended to completely different situations by combining subfactors that evaluate three separate and distinct, but interrelated, zones of influence: (a) vegetative cover in direct contact with the soil surface, (b) canopy cover, and (c) residual and tillage effects.

Subfactors for various percentages of surface cover by mulch are given by the upper curve of

TABLE 10.—Factor *C* for permanent pasture, range, and idle land¹

Vegetative canopy		Cover that contacts the soil surface						
Type and height ²	Percent cover ³	Type ⁴	Percent ground cover					
			0	20	40	60	80	95+
No appreciable canopy		G	0.45	0.20	0.10	0.042	0.013	0.003
		W	.45	.24	.15	.091	.043	.011
Tall weeds or short brush with average drop fall height of 20 in	25	G	.36	.17	.09	.038	.013	.003
		W	.36	.20	.13	.083	.041	.011
	50	G	.26	.13	.07	.035	.012	.003
		W	.26	.16	.11	.076	.039	.011
75	G	.17	.10	.06	.032	.011	.003	
	W	.17	.12	.09	.068	.038	.011	
Appreciable brush or bushes, with average drop fall height of 6½ ft	25	G	.40	.18	.09	.040	.013	.003
		W	.40	.22	.14	.087	.042	.011
	50	G	.34	.16	.08	.038	.012	.003
		W	.34	.19	.13	.082	.041	.011
	75	G	.28	.14	.08	.036	.012	.003
		W	.28	.17	.12	.078	.040	.011
Trees, but no appreciable low brush. Average drop fall height of 13 ft	25	G	.42	.19	.10	.041	.013	.003
		W	.42	.23	.14	.089	.042	.011
	50	G	.39	.18	.09	.040	.013	.003
		W	.39	.21	.14	.087	.042	.011
	75	G	.36	.17	.09	.039	.012	.003
		W	.36	.20	.13	.084	.041	.011

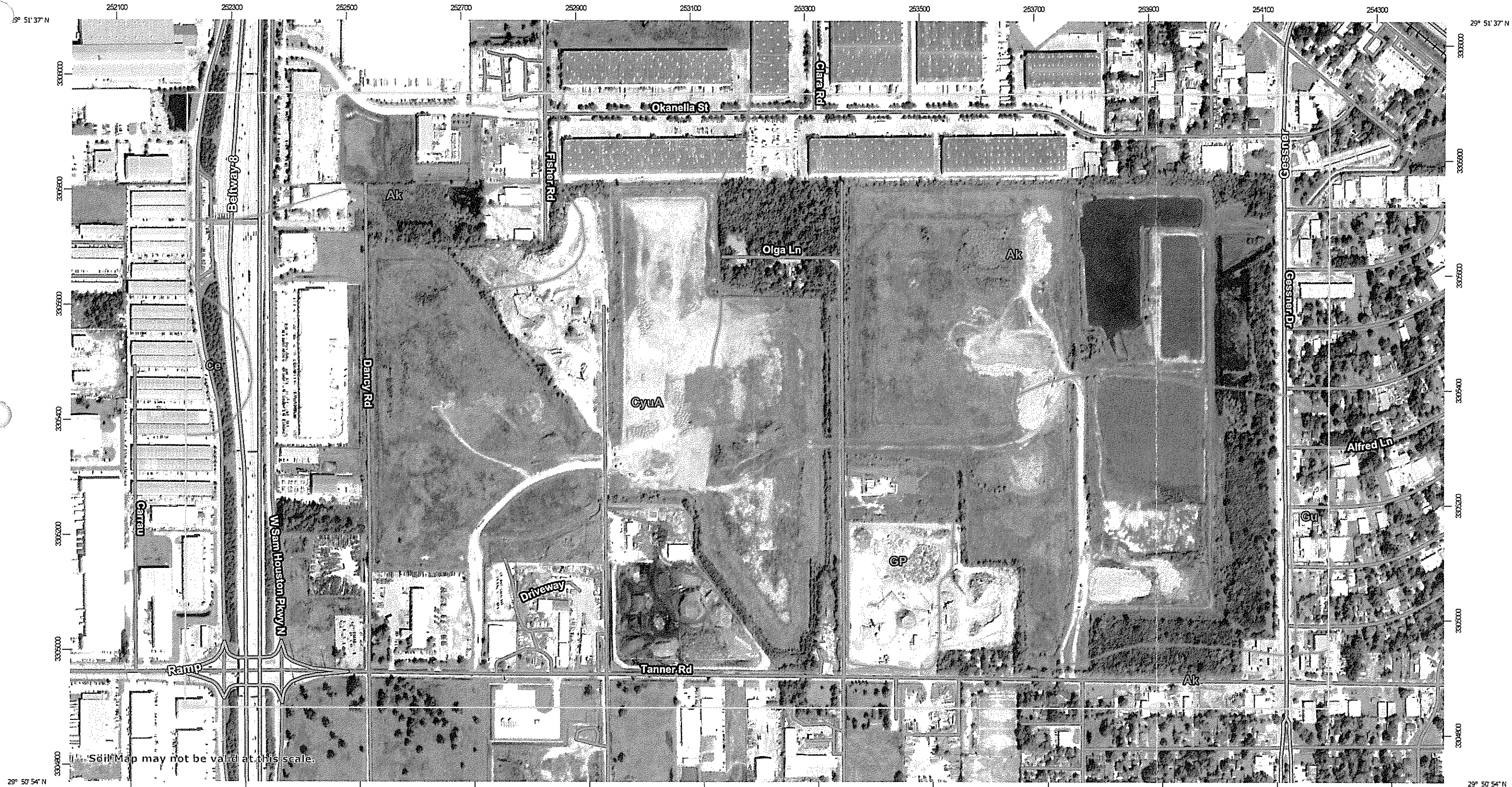
¹ The listed *C* values assume that the vegetation and mulch are randomly distributed over the entire area.

² Canopy height is measured as the average fall height of water drops falling from the canopy to the ground. Canopy effect is inversely proportional to drop fall height and is negligible if fall height exceeds 33 ft.

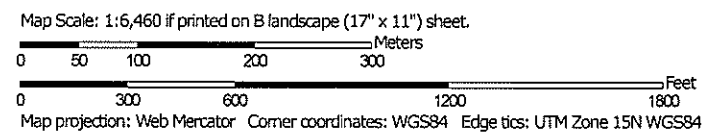
³ Portion of total-area surface that would be hidden from view by canopy in a vertical projection (a bird's-eye view).

⁴ G: cover at surface is grass, grasslike plants, decaying compacted duff, or litter at least 2 in deep.

W: cover at surface is mostly broadleaf herbaceous plants (as



Soil Map may not be valid at this scale.



MAP LEGEND

- Area of Interest (AOI)
 - Area of Interest (AOI)
- Soils
 - Soil Map Unit Polygons
 - Soil Map Unit Lines
 - Soil Map Unit Points
- Special Point Features
 - Blowout
 - Borrow Pit
 - Clay Spot
 - Closed Depression
 - Gravel Pit
 - Gravelly Spot
 - Landfill
 - Lava Flow
 - Marsh or swamp
 - Mine or Quarry
 - Miscellaneous Water
 - Perennial Water
 - Rock Outcrop
 - Saline Spot
 - Sandy Spot
 - Severely Eroded Spot
 - Sinkhole
 - Slide or Slip
 - Sodic Spot
- Water Features
 - Streams and Canals
- Transportation
 - Rails
 - Interstate Highways
 - US Routes
 - Major Roads
 - Local Roads
- Background
 - Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Harris County, Texas
 Survey Area Data: Version 21, Jan 8, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 26, 2017—Nov 10, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

EXCERPT FROM REFERENCE 3, APPENDIX III-2E

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ak	Addicks-Urban land complex, 0 to 1 percent slopes	200.4	38.0%
Ce	Clodine-Urban land complex, 0 to 1 percent slopes	5.7	1.1%
CyuA	Cyfair-Urban land complex, 0 to 1 percent slopes	299.5	56.7%
GP	Pits, gravel	15.2	2.9%
Gu	Gessner occasionally ponded-Urban land complex, 0 to 1 percent slopes	7.0	1.3%
Totals for Area of Interest		527.8	100.0%

EXCERPT FROM REFERENCE 4, APPENDIX III-2E

TNRCC

Table 1 Approximate Values of Factor K for USDA Textural Classes

TABLE 1

Texture Class	Organic Matter Content		
	<0.5%	2%	4%
	K	K	K
Sand	0.05	0.03	0.02
Fine Sand	0.16	0.14	0.10
Very Fine Sand	0.42	0.36	0.28
Loamy Sand	0.12	0.10	0.08
Loamy Fine Sand	0.24	0.20	0.16
Loamy Very Fine Sand	0.44	0.38	0.30
Sandy Loam	0.27	0.24	0.19
Fine Sandy Loam	0.35	0.30	0.24
Very Fine Sandy Loam	0.47	0.41	0.33
Loam	0.38	0.32	0.29
Silt Loam	0.48	0.42	0.33
Silt	0.60	0.52	0.42
Sandy Clay Loam	0.27	0.25	0.21
Clay Loam	0.28	0.25	0.21
Silty Clay Loam	0.37	0.32	0.26
Sandy Clay	0.14	0.13	0.12
Silty Clay	0.25	0.23	0.19
Clay	0.13 - 0.29		

The values shown are estimated averages of broad ranges of specific-soil values. When a texture is near the borderline of two texture classes, use the average of the two K values.



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aerials](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.496 (0.376-0.656)	0.581 (0.444-0.759)	0.718 (0.547-0.943)	0.832 (0.625-1.11)	0.990 (0.719-1.36)	1.11 (0.786-1.57)	1.23 (0.851-1.79)	1.37 (0.918-2.03)	1.55 (1.00-2.38)	1.69 (1.07-2.67)
10-min	0.786 (0.595-1.04)	0.921 (0.703-1.20)	1.14 (0.869-1.50)	1.33 (0.995-1.77)	1.58 (1.15-2.17)	1.78 (1.26-2.51)	1.97 (1.36-2.86)	2.17 (1.46-3.23)	2.43 (1.58-3.74)	2.62 (1.66-4.14)
15-min	1.00 (0.759-1.32)	1.17 (0.893-1.53)	1.44 (1.10-1.89)	1.67 (1.25-2.22)	1.97 (1.43-2.71)	2.21 (1.56-3.12)	2.45 (1.69-3.55)	2.71 (1.82-4.03)	3.06 (1.99-4.71)	3.33 (2.11-5.26)
30-min	1.44 (1.09-1.90)	1.67 (1.27-2.19)	2.05 (1.56-2.69)	2.36 (1.77-3.14)	2.78 (2.01-3.80)	3.10 (2.18-4.36)	3.43 (2.36-4.97)	3.80 (2.55-5.66)	4.33 (2.82-6.68)	4.77 (3.02-7.54)
60-min	1.89 (1.43-2.50)	2.21 (1.69-2.89)	2.73 (2.08-3.59)	3.17 (2.38-4.22)	3.77 (2.73-5.15)	4.22 (2.97-5.93)	4.70 (3.24-6.81)	5.26 (3.54-7.85)	6.11 (3.97-9.43)	6.82 (4.32-10.8)
2-hr	2.28 (1.73-3.00)	2.77 (2.10-3.55)	3.51 (2.68-4.58)	4.17 (3.15-5.54)	5.13 (3.74-7.00)	5.90 (4.18-8.28)	6.76 (4.68-9.76)	7.80 (5.26-11.6)	9.40 (6.13-14.5)	10.8 (6.85-17.0)
3-hr	2.48 (1.89-3.26)	3.10 (2.33-3.92)	4.00 (3.06-5.19)	4.84 (3.66-6.41)	6.08 (4.45-8.29)	7.12 (5.07-9.99)	8.31 (5.76-12.0)	9.74 (6.58-14.4)	12.0 (7.82-18.4)	13.9 (8.86-21.9)
6-hr	2.85 (2.18-3.73)	3.69 (2.76-4.58)	4.88 (3.73-6.28)	6.02 (4.57-7.93)	7.77 (5.72-10.6)	9.28 (6.65-13.0)	11.1 (7.70-15.9)	13.2 (8.92-19.4)	16.4 (10.8-25.1)	19.3 (12.3-30.1)
12-hr	3.26 (2.51-4.24)	4.32 (3.21-5.28)	5.78 (4.43-7.40)	7.22 (5.50-9.47)	9.46 (7.01-12.9)	11.4 (8.25-16.0)	13.8 (9.62-19.7)	16.5 (11.2-24.1)	20.6 (13.6-31.4)	24.2 (15.5-37.7)
24-hr	3.71 (2.86-4.81)	5.00 (3.72-6.04)	6.75 (5.20-8.60)	8.51 (6.51-11.1)	11.3 (8.42-15.3)	13.8 (9.99-19.2)	16.7 (11.7-23.7)	19.9 (13.6-29.0)	24.7 (16.2-37.3)	28.6 (18.4-44.5)
2-day	4.22 (3.26-5.43)	5.78 (4.28-6.90)	7.87 (6.08-9.97)	10.0 (7.68-13.0)	13.4 (10.1-18.3)	16.6 (12.1-23.2)	20.1 (14.1-28.5)	23.6 (16.1-34.2)	28.4 (18.8-42.7)	32.1 (20.8-49.7)
3-day	4.60 (3.57-5.91)	6.30 (4.69-7.51)	8.58 (6.65-10.8)	10.9 (8.39-14.1)	14.5 (11.0-19.8)	18.0 (13.2-25.1)	21.7 (15.3-30.7)	25.3 (17.3-36.6)	30.1 (19.9-45.0)	33.6 (21.8-51.9)
4-day	4.93 (3.83-6.32)	6.68 (5.01-8.00)	9.07 (7.05-11.5)	11.5 (8.84-14.8)	15.2 (11.5-20.7)	18.6 (13.7-26.0)	22.4 (15.8-31.6)	26.0 (17.9-37.6)	30.8 (20.4-46.1)	34.4 (22.3-53.0)
7-day	5.69 (4.44-7.28)	7.50 (5.70-9.07)	10.0 (7.83-12.7)	12.5 (9.67-16.1)	16.3 (12.4-22.0)	19.7 (14.5-27.3)	23.4 (16.6-33.0)	27.1 (18.6-39.0)	31.9 (21.2-47.6)	35.6 (23.1-54.6)
10-day	6.34 (4.96-8.10)	8.19 (6.28-9.96)	10.8 (8.48-13.7)	13.4 (10.4-17.2)	17.2 (13.0-23.1)	20.6 (15.2-28.4)	24.2 (17.2-34.0)	27.9 (19.2-40.0)	32.7 (21.8-48.7)	36.4 (23.7-55.8)
20-day	8.39 (6.59-10.7)	10.3 (8.05-12.7)	13.2 (10.4-16.7)	15.9 (12.4-20.4)	19.8 (15.0-26.4)	23.1 (17.1-31.6)	26.6 (19.0-37.2)	30.1 (20.9-43.2)	34.8 (23.3-51.7)	38.4 (25.1-58.6)
30-day	10.1 (7.97-12.8)	12.1 (9.56-15.1)	15.3 (12.1-19.2)	18.0 (14.1-23.1)	22.0 (16.7-29.1)	25.3 (18.6-34.4)	28.6 (20.5-39.9)	32.0 (22.3-45.8)	36.5 (24.6-54.2)	40.0 (26.2-60.9)
45-day	12.6 (9.98-16.0)	14.8 (11.8-18.6)	18.4 (14.6-23.1)	21.4 (16.7-27.3)	25.5 (19.3-33.6)	28.7 (21.1-38.8)	31.8 (22.8-44.3)	35.0 (24.5-50.0)	39.2 (26.4-58.0)	42.4 (27.8-64.3)
60-day	14.9 (11.8-18.8)	17.3 (13.9-21.7)	21.3 (17.0-26.7)	24.5 (19.2-31.1)	28.7 (21.7-37.6)	31.8 (23.5-42.9)	34.8 (25.0-48.4)	37.8 (26.5-54.0)	41.7 (28.2-61.6)	44.5 (29.3-67.5)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).
 Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.
 Please refer to NOAA Atlas 14 document for more information.

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EXCERPT FROM REFERENCE 6, APPENDIX III-2E
 NATIONAL OCEANIC ATMOSPHERIC ADMINISTRATION (NOAA)