STORMWATER MANAGEMENT COMMISSION

May 16, 2019

TO: Lake County WDO Enforcement Officers and Public Works Directors
FROM: Kurt Woolford, Chief Engineer, Lake County Stormwater Management Commission
RE: **Updated Bulletin 70 Rainfall Interim Guidance Memo #1**

The updated Bulletin 70[1] rainfall is 20-45% higher than the current values used in the Watershed Development Ordinance[2] (WDO). The large increase reflects current climate conditions and also is due to the prior practice of using records from a single precipitation gage located at the Waukegan Airport. The use of a single point is no longer recommended to represent a large area or entire county. See Exhibit 1: July 2017 Rainfall Totals for the discrepancy between the Waukegan point and Lake County.

Table 1: Comparison of Rainfall Amounts for 100-Year, 24-Hour Duration			
Rainfall Data Source	Inches	WDO Increase (Inches/%)	Region Increase (Inches/%)
Original Bulletin 70 – Waukegan Point	6.50	0.00 / 0%	-
Original Bulletin 70 – Northeast Region	7.58	1.08 / 17%	0.00 / 0%
Updated Bulletin 70 – Northeast Region	8.57	2.07 / 32%	0.99 / 13%

Future climate models[3] for Cook, DuPage, Lake and Will Counties indicate the largest rainfall increases will occur in Lake County and trend toward the regional averages. Adopting the new rainfall reduces the divergence from the increasing regional trends and positions the County to adapt to future conditions and reduce flood risk. It is expected that State and Federal agencies will be adopting the updated information.

Based on policy discussion, there is a high likelihood that SMC will be adopting the updated Bulletin 70 rainfall as best available data in the next WDO revision (anticipated March 10, 2020). Prior to that date, a series of guidance memos will be issued providing recommendations on how to implement the new rainfall for development projects. Table 2 below provides the best available data and its recommended use is on the following page.

Table 2: *DRAFT* Updated Rainfall Depth-Duration Frequency Table (Inches)

Duration	2 year	5 year	10 year	25 year	50 year	100 year	500 year
5 min	0.40	0.52	0.62	0.77	0.90	1.03	1.35
10 min	0.70	0.90	1.08	1.35	1.58	1.80	2.36
15 min	0.90	1.16	1.39	1.74	2.03	2.31	3.03
30 min	1.24	1.59	1.91	2.39	2.78	3.17	4.16
1 hour	1.57	2.02	2.42	3.03	3.53	4.03	5.28
2 hour	1.94	2.49	2.99	3.74	4.35	4.97	6.52
3 hour	2.14	2.75	3.30	4.13	4.80	5.49	7.20
6 hour	2.51	3.23	3.86	4.84	5.63	6.43	8.43
12 hour	2.91	3.74	4.48	5.61	6.53	7.46	9.78
18 hour	3.14	4.04	4.84	6.06	7.05	8.06	10.57
24 hour	3.34	4.30	5.15	6.45	7.50	8.57	11.24
48 hour	3.66	4.71	5.62	6.99	8.13	9.28	12.10
72 hour	3.97	5.08	6.05	7.49	8.64	9.85	12.81
120 hour	4.42	5.63	6.68	8.16	9.39	10.66	13.81
240 hour	5.60	7.09	8.25	9.90	11.26	12.65	16.00

Table 2 References: For storm durations of 1 hour or greater, rainfall values were obtained from Table 5 of Updated Bulletin 70, 2019. For storm durations less than 1 hour, values were calculated using ratios listed in Table 18 of Bulletin 70, 1989[4].

The Enforcement Officer may require a stormwater system capacity analysis using Table 2 above for all regulated development that have not received a Watershed Development Permit. Section 400.04 of the WDO allows the Enforcement Officer to require this submittal item. Accordingly, SMC strongly recommends using the updated rainfall to ensure protection of buildings from flood damage to the greatest extent possible [WDO Purpose: 102.06]. Specifically, the following WDO provisions should use the updated rainfall data presented in Table 2 above for projects that have not started construction. Stormwater and drainage projects that do not require a WDO permit, but include components listed below, are also recommended to use the Table 2 rainfall for infrastructure sizing. This will reduce future flood damage risk.

1. 506 Stormwater Conveyance Systems (Entire Section); and
2. 507.01 Stormwater Facility Emergency Overflow Structure; and
3. 507.02 Building Protection Above Emergency Overflow Elevation; and
4. 703.01 & 706.06 Flood-proofing Activities; and
5. 705 & 900 Public Health Protection Standards. In lieu of using the updated rainfall data, you may conservatively use FPE = BFE + 3 feet; or use the 500-year FEMA elevation plus 2 feet; and
6. 706 & 901 Building Protection Requirements. In lieu of using the updated rainfall data, you may conservatively increase elevation by one (1) additional foot above current WDO requirements; or use the 500-year FEMA elevation plus the current WDO freeboard requirement; and
7. 707 Bridge, Culvert Crossing, and Roadway Approaches; and
8. 800 Flood-Prone Area Requirements (except compensatory storage)

The #1 item of concern for the updated rainfall is the significant volume increase for detention. The current 100-year detention design requirement of 6.5 inches, is now equivalent to the updated 25-year rainfall amount (6.45 inches). The volume of the pond should be recommended to be enhanced if possible, although SMC acknowledges that increasing footprint and excavation of ponds could represent significant impact to the configuration of imminent, or near construction development. The concept of imminent or near construction is also an item that will need to be discussed, defined and recommendations included in forthcoming WDO language. Further guidance may be provided regarding detention storage.

It is our understanding that the Illinois Department of Natural Resources / Office of Water Resources (IDNR/OWR) will require the updated Bulletin 70 starting on January 1, 2020. Base Flood Elevations (BFEs) and Floodplain modeling that will require IDNR/OWR or FEMA approval are recommended to use the Table 2 rainfall as best available data. A second report from the ISWS is due this fall and will revisit the Huff distribution curves that are used for floodplain modeling. The Technical Advisory Committee will review this information once it is available and further guidance will be provided.

References

1. J. Angel, Momcilo, M. 2019. Frequency Distributions of Heavy Precipitation in Illinois: Updated Bulletin 70. Illinois State Water Survey Contract Report 2019-05, Champaign, IL.
2. October 13, 2015. Lake County Watershed Development Ordinance. Lake County, IL.
3. Momcilo, M., J. Angel, K. Wang, G. Byard, S. McConkey, and Z. Zaloudek. 2017. Impacts of Potential Future Climate Change on the Expected Frequency of Extreme Rainfall Events in Cook, DuPage, Lake, and Will Counties in Northeastern Illinois. Illinois State Water Survey Contract Report 2017-05, Champaign, IL.
4. Huff, F. A., and J. R. Angel. 1989. Rainfall Distributions and Hydroclimatic Characteristics of Heavy Rainstorms in Illinois (Bulletin 70). Illinois State Water Survey, Champaign, IL.