

## Introduction

As part of the Lower Des Plaines River DWP development, inundation mapping was produced based on hydrologic and hydraulic modeling. Tables A1 and A2 below provide a comparison of the inundation area created for this DWP to the effective FEMA floodplain mapping, revised August 19, 2008, as part of the FEMA Map Modernization Program. Only detailed study Zone AE and limited detail study Zone A SFHA are included in the comparison.

Caution should be exercised when evaluating the numbers in Table A1 and Table A2, as differences in inundation area may result from differences in the extent of detailed hydraulic modeling performed between the District's DWP development process and the FEMA program. The relative impact of the differences is described below. The greatest reasons for any difference that will likely result in higher flood stages for DWP inundation areas are: the change to Bulletin 70 rainfall data; detailed critical duration analysis; including TARP areas; the application of the depth-area method in HEC-HMS for the MLDPR Watershed; inclusion of flood control projects not previously modeled; and using historic storm calibration versus calibrating to a discharge frequency curve. These detailed model development differences will tend to raise predicted stages throughout the watershed. Other modeling differences have resulted in more minor inundation area differences, more local in nature, resulting in higher or lower predicted stages.

## Hydrologic Modeling Methodology

Hydrologic modeling methodologies utilized for the District's DWPs are different than those performed for DFIRM mapping, thus estimated peak flow rates may be significantly different. DFIRM hydrology was primarily based on regression equations and older hydrologic models (HEC-1, TR-20, etc.) while this DWP utilized a more current hydrologic model (HEC-HMS). Consequently, different approaches to channel and reservoir routing may have been taken, which may result in peak magnitude and timing differences.

The parameters used for each hydrologic model may also be different. This DWP computed NRCS CNs based on the latest CMAP land use maps and NRCS soil maps. Hydrologic methods utilized by the FEMA DFIRM process likely referenced older land use and soil data. Additionally, different methodologies may have been used to calculate subbasin times of concentration.

This DWP utilized current ISWS Bulletin 71 rainfall data while previous hydrologic studies used for DFIRM mapping may have used older Technical Paper-40 rainfall data. Bulletin 71 rainfall data generally yields higher rainfall depths than Technical Paper-40. For example, Technical Paper-40 specifies a 100-year, 24-hour duration rainfall depth of approximately 5.7 inches, while Bulletin 71 specifies a corresponding rainfall depth of approximately 7.6 inches. Additionally, this DWP utilizes depth-area adjustments, which may not have been utilized for DFIRM mapping. Also, detailed critical duration analysis was performed to identify the critical duration storms in each subwatershed.

Subbasin delineation is likely different between this DWP and the DFIRM mapping, as this DWP utilized the latest Cook County LiDAR data for topographic information to support subbasin delineation. Additionally, TARP subareas were incorporated into the DWP modeling

where applicable. Some of the earlier modeling of the LDPR Subwatersheds used for DFIRM mapping did not include the TARP areas as contributing runoff to the watershed.

### Hydraulic Modeling Methodology

Hydraulic modeling methodologies utilized for this DWP are different than those performed for DFIRM mapping, thus their associated flood surface profiles may be different. Steady-state hydraulic modeling was generally performed in support of DFIRM mapping. This DWP utilized dynamic unsteady flow simulation. The difference in approaches between steady and unsteady hydraulic modeling may contribute to discrepancies between flood surface profiles.

Channel cross-sections in the hydraulic models differ between this DWP and previous modeling. Cross-sections of the channel developed under this DWP were obtained from previous hydraulic studies or field survey. The channel geometry data was incorporated with overbank data obtained using HEC-GeoRAS cross-sections extracted from the TIN created in GIS from the 2003 Cook County LiDAR topographic data. The difference between the composite cross-sections and the cross-sections in the previous hydraulic studies may contribute to discrepancies between flood surface profiles. The overbank hydraulic models produced in support of DFIRM mapping may have used different cross-section data, which may reflect outdated channel geometries. Likewise, bridge section geometries may also vary from previous modeling.

Hydraulic model calibration differences may also contribute to discrepancies in flood surface profiles between this DWP and DFIRM mapping. This DWP was calibrated to the September 2008 storm event that occurred since the development of DFIRM modeling. The calibration differences may contribute to discrepancies between flood surface profiles.

Table A1 below depicts the floodplain area within each subwatershed as determined by the Lower Des Plaines River DWP and DFIRM mapping (for both FEMA Zone AE, and FEMA Zone A).

**TABLE A1**  
Comparison of DWP Inundation Area and FEMA Floodplain by Subwatershed

Subwatershed <sup>3</sup>	DWP Inundation Area <sup>1</sup> (acres)	FEMA Zone AE Area <sup>2</sup> (acres)	FEMA Zone A Area <sup>2</sup> (acres)
67th Street Ditch	1	2	0
Addison Creek	915	1,047	0
Buffalo Creek	732	869	123
Crystal Creek	91	229	4
Mainstem Lower Des Plaines River	5,951	5,352	733
Des Plaines River Tributary A	17	35	0
East Avenue Ditch	13	4	0
Farmers Prairie Creek	71	315	0
Feehanville Ditch	63	66	0
Flagg Creek	410	366	12
Golf Course Tributary	77	80	0
McDonald Creek	376	466	19

Subwatershed <sup>3</sup>	DWP Inundation Area <sup>1</sup> (acres)	FEMA Zone AE Area <sup>2</sup> (acres)	FEMA Zone A Area <sup>2</sup> (acres)
Salt Creek	700	582	176
Silver Creek	521	573	86
Weller Creek	185	225	0
Willow Creek	234	251	94
<b>Totals</b>	<b>10,357</b>	<b>10,462</b>	<b>1,248</b>

<sup>1</sup>Existing conditions 100-year inundation boundary. <sup>2</sup>FEMA FIRM for Cook County and Incorporated Areas. <sup>3</sup>Chicago Sanitary and Ship Canal not included.

Table A2 below lists for comparison the floodplain area within each community within the Lower Des Plaines River Watershed as determined by the Lower Des Plaines River DWP and the DFIRM mapping (for both FEMA Zone AE, and FEMA Zone A).

**TABLE A2**  
Comparison of DWP Inundation Area and FEMA Floodplain by Community

Community	DWP Inundation Area <sup>1,3</sup> (acres)	FEMA Zone AE Area <sup>2,3</sup> (acres)	FEMA Zone A Area <sup>2,3</sup> (acres)
Arlington Heights	138	156	8
Bedford Park	22	21	2
Bellwood	353	306	0
Bensenville	4	7	0
Broadview	18	52	0
Brookfield	145	144	0
Buffalo Grove	34	40	8
Burr Ridge	93	94	0
Chicago	450	442	90
Countryside	8	19	0
Des Plaines	965	1,222	0
Elk Grove Village	9	20	0
Elmhurst	1	1	0
Elmwood Park	60	63	0
Forest Park	109	94	0
Forest View <sup>4</sup>	137	0	0
Franklin Park	254	342	0
Hillside	0	9	0
Hinsdale	10	8	10
Hodgkins	288	74	17
Indian Head Park	41	34	0
Justice	15	14	0
La Grange	0	0	0
La Grange Park	92	95	0
Lemont	58	17	54
Lyons <sup>4</sup>	281	130	38

<b>Community</b>	<b>DWP Inundation Area<sup>1,3</sup> (acres)</b>	<b>FEMA Zone AE Area<sup>2,3</sup> (acres)</b>	<b>FEMA Zone A Area<sup>2,3</sup> (acres)</b>
Maywood	41	45	0
McCook	99	1	106
Melrose Park	331	349	0
Mount Prospect	112	162	76
North Riverside	114	123	0
Northlake	143	172	0
Park Ridge	154	174	0
Prospect Heights	235	449	2
River Forest	225	218	0
River Grove	325	329	0
Riverside	200	219	0
Rosemont	61	73	0
Schiller Park	220	324	0
Stickney <sup>4</sup>	44	0	0
Stone Park	125	95	0
Summit	112	0	102
Unincorporated Cook County <sup>4</sup>	3,006	2,615	663
Westchester	88	260	4
Western Springs	70	40	1
Wheeling	737	1,088	48
Willow Springs	334	322	20
<b>Totals</b>	<b>10,357</b>	<b>10,462</b>	<b>1,248</b>

Note: This table and DWP and FEMA areas listed are not intended to be used for design or regulatory purposes. The DWP areas are not regulatory.

<sup>1</sup>Existing conditions 100-year inundation boundary. <sup>2</sup>FEMA FIRM for Cook County and Incorporated Areas. <sup>3</sup>Chicago Sanitary and Ship Canal not included. <sup>4</sup>Includes area to the east of the study area south of 43<sup>rd</sup> Street