

Technical Memorandum

To: Bassett Creek Watershed Management Commission
From: Jen Koehler & Karen Chandler, Barr Engineering
Subject: BCWMC Phase 2 XP-SWMM Model – Revisions
Date: May 9, 2017
Project: 23/27-0015.36

1.1 Model Review Process

The preliminary results of the BCWMC XP-SWMM Phase 2 modeling were presented to the BCWMC Commissioners in January 2017 followed by a presentation to the BCWMC TAC in February 2017. Follow-up information was provided to each of the member cities to more closely review the flood elevations, areas with more significant change in flood elevations, and areas with potentially impacted structures. Individual meetings were held in March 2017 with member cities (as requested) to review the model results and discuss specific questions related to the modeling/model results. Meetings were conducted with the Cities of Plymouth, Minnetonka, Medicine Lake, Golden Valley, Crystal, and New Hope. Meetings were not requested by the Cities of Robbinsdale, St. Louis Park, or Minneapolis. At the May 4th TAC meeting, the TAC reviewed the final revisions. There was consensus that the model is complete and recommended approval of the final report by the Commission.

1.2 Model Revisions Since Draft Report

The meetings with the member cities in March resulted in a handful of minor changes to the BCWMC Phase 2 XP-SWMM model. The revised Phase 2 XP-SWMM model was rerun for the Atlas 14 100-year (1% chance), 24-hour design storm event. The plots of the original 100-year hydrographs (from the calibrated January 2017 model) were compared with the updated 100-year hydrographs (from the revised April 2017 model) at each of the four calibration locations. (Note: a hydrograph shows the rate of flow (discharge) versus time at a specific location in the flow system.)

The hydrographs for the design storm event were very similar between the January and April 2017 models suggesting that the modifications to the model would not impact the model calibration results.

The revisions to the draft January 2017 model resulted in small changes at a few locations within the watershed. Table 1 below summarizes the final revisions to the model and the resulting changes to the 100-year design storm event results.

Table 1: Summary of Changes in the 100-Year Peak Elevations as a Result of Final Revisions to the BCWMC Phase 2 XP-SWMM Model

Change No.	Description	Changes in 100-Year Results
1	Verify stop logs are modeled in-place at Central Park Pond (Link L-PCE-134) (Plymouth)	No Change –January 2017 model assumed stop logs in place
2	Revise overflow for subwatershed MLS-032 (Minnetonka)	Lowering of overflow resulted in reductions in the 100-year flood elevations in watersheds MLS-031, MLS-032, and MLS-029 (-0.3 to -1.2 ft) while resulting in slight increases in flood elevations in downstream subwatersheds MLS-030, MLS-033, MLS-034, MLS-024, MLS-019, MLS-015, and MLS-009 (+0.1 to 0.3 ft)
3	Update inlet capacity at Jersey and 36 th to reflect 16 catch basins (Crystal)	Reduction in flood elevation in immediate watershed (-0.5 ft) while slight increases (+0.1 – 0.3 ft) in the North Branch upstream of 34 th Avenue North.
4	Incorporate small development at Georgia Avenue north of 32 nd (Crystal)	Subdivided subwatersheds BPP-015, BPP-015A, and BPP-015B to incorporate Gardendale Development.
5	Revise subwatershed (BPP-019) south of Jersey and 36 th (Crystal)	Subwatershed BPP-019 revised to reflect comment from Crystal.
6	10 th Avenue Culvert Crossing: Updated to reflect recent survey data and existing field conditions (versus conditions shown in construction plans) (Golden Valley)	Slight increase (+0.1 ft) in Bassett Creek main stem for two watersheds immediately upstream of the 10 th Ave culvert crossing and a slight reduction (-0.1 ft) in watershed immediately downstream of crossing
7	Revise Highway 55 structure elevations based on survey data provided by the Blue Line Project Office (Golden Valley)	Surveyed weir elevation ~0.5 ft lower than included in January 2017 model (structure has likely settled since construction); resulted in slight reductions (-0.1 to -0.2 ft) in flood elevations along the main stem upstream of Highway 55 and slight increases (+0.1 ft) along the main stem downstream of Highway 55 to the tunnel

Change No.	Description	Changes in 100-Year Results
8	Revise arch pipe dimensions for those modeled in Golden Valley to reflect revised data provided by the City (Golden Valley)	Minimal impact; one watershed BUE-021A has a slight increase (+0.1 ft)
9	Revise Northwood Lake outlet weir/structure based on recent survey data collected by City of New Hope (New Hope)	Surveyed weir control elevation ~0.2 ft higher than included in January 2017 model; slight increase (+0.1 ft) in subwatersheds immediately upstream of Northwood Lake including NWD-022, NWD-034, NWD-024, and NWD-032

The 100-year inundation mapping was recreated based on the revised Phase 2 XP-SWMM model (April 2017) results and is shown in Figures 3-16, 3-17, 3-18, and 3-19 (attached) (note: figure numbers are from the Phase 2 XP-SWMM model report). Inundation areas shown in blue are those along the BCWMC trunk system, while inundation areas shown in yellow are located in the upper watersheds and under the jurisdiction of the member cities. Table 3-7 (note: table number from the Phase 2 XP-SWMM model report) summarizes the 100-year peak elevations and flows included in the BCWMC Watershed Management Plan along with the Atlas 14 100-year, 24-hour peak elevations and peak flows from the revised model at key locations along the BCWMC trunk system.

1.3 Model Use and Updates

Based on feedback from the BCWMC TAC during the model review process, an XP-Viewer file for the entire BCWMC model will be developed, once the XP-SWMM model is finalized and approved by the Commission. The final XP-SWMM model will be run for the Atlas 14 2-year, 10-year, and 100-year, 24-hour design storm events. Although the results for the 2- and 10-year events are not summarized in the BCWMC Phase 2 XP-SWMM report, the results will be encrypted as an XP-Viewer file that can be used by member cities. XP-Viewer is a free software developed by XP-SWMM that allows users to open the encrypted XP-Viewer file and see model inputs and results without needing an XP-SWMM license. However, the model cannot be modified or re-run in XP-Viewer.

The final BCWMC Phase 2 XP-SWMM model will be updated annually by the BCWMC to incorporate information on projects constructed within the watershed, as provided by member cities. The updates to the XP-SWMM model will be coordinated with the P8 water quality model updates.

The XP-SWMM model could be used to predict the impact of anticipated large precipitation or snowmelt runoff events.

The XP-SWMM model could also be further validated by using a storm event in the model larger than the large calibration events (2.5 – 3.6 inches), if/when an event occurs and there is corresponding flow and NEXRAD precipitation data available.

**Table 3-7 Comparison of BCWMC Watershed Management Plan to the
Phase 2 XPSWMM Model - Flood Elevations and Peak Discharges**

Location	Creek Distance above the Mississippi River (feet)	Normal Water Level (NAVD88)	BCWMC Watershed Management Plan ¹		BCWMC Phase 2 XP-SWMM Model - Atlas 14 (4/19/2017)		Change in Flood Elevations and Flow Rates	
			100-yr		100-yr Atlas 14 MSE3		XPSWMM - Plan	
			Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate
			(NAVD88 feet)	(cfs)	(NAVD88 feet)	(cfs)	(feet)	(cfs)
BASSETT CREEK MAIN STEM								
Tunnel Inlet	8,000		807.3	1,220	810.9	1,380	3.6	160
Irving Avenue Bridge (DS)	9,800		808.6	1,135	811.2	1,380	2.6	245
Irving Avenue Bridge (US)	---		809.3	1,135	811.3	1,380	2.0	245
Cedar Lake Rd (Bridge)	10,900		812.9	945	813.3	1,380	0.4	435
MN&S RR Bridge	11,600		814.8	945	813.7	1,370	-1.1	425
Old Penn Ave Bridge (DS)	12,410		814.9	705	814.5	1,370	-0.4	665
Old Penn Ave Bridge (US)	---		815.2	705	814.5	1,370	-0.7	665
BN RR Bridge	12,670		815.3	705	814.4	1,370	-0.9	665
MN&S RR Bridge (DS)	13,930		816.2	465	815.6	1,370	-0.6	905
MN&S RR Bridge (US)	---		816.4	465	815.8	1,370	-0.6	905
Fruen Mill Dam (DS)	14,150		816.5	510	817.2	1,370	0.7	860
Fruen Mill Dam (US)	---		818.2	510	819.8	1,370	1.6	860
Glenwood Ave	14,855		820.3	680	822.2	1,290	1.9	610
Hwy 55 (DS)	16,500		821.7	680	823.4	1,190	1.7	510
Hwy 55 (US)	---		826.2	680	826.5	1,500	0.3	820
Golf Cart Bridge	---		826.2	680	826.6	1,520	0.4	840
MN&S RR Bridge	18,700		826.2	945	826.6	1,520	0.4	575
Plymouth Ave Bridge	19,500		826.2	680	826.7	1,550	0.5	870
Wirth Parkway (DS)	20,480		826.2	1,570	826.7	1,450	0.5	-120
Wirth Parkway (US) Bridge	---		826.5	1,570	826.8	1,460	0.3	-110
Confluence w/ Sweeney Lake Branch	22,000		827.2	---	827.2	1,460	0.0	---
Golden Valley Road (DS)	23,800		827.4	790	828.2	1,350	0.8	560
Golden Valley Road (US)	23,800		830.2	680	833.8	1,340	3.6	660
Dresden Lane (DS)	25,900		830.5	680	834.1	1,340	3.6	660
Dresden Lane (US)	---		831.6	680	834.1	1,350	2.5	670
Bassett Creek Drive (DS)	---		832.2	665	834.4	1,290	2.2	625
Bassett Creek Drive (US)	---		832.9	665	837.0	1,300	4.1	635
Noble Lane (DS)	29,200		839.7	660	838.7	1,320	-1.0	660
Noble Lane (US)	---		839.7	660	839.7	1,300	0.0	640
Regent Avenue (DS)	30,800		---	660	---	1,300	---	640
Regent Avenue (US)	---		842.1	660	843.7	1,280	1.6	620
Minnaqua Avenue	31,650		842.7	---	844.0	1,260	1.3	---
Highway 100 (DS)	34,020		843.4	770	844.8	1,300	1.4	530
Highway 100 (US)	34,020		849.2	610	851.2	1,040 ²	2.0	430
DS Confluence N. Branch	34,400		849.2	495	851.2	1,040 ²	2.0	545
Westbrook Road (DS)	37,000		857.3	940	859.0	870	1.7	-70

**Table 3-7 Comparison of BCWMC Watershed Management Plan to the
Phase 2 XPSWMM Model - Flood Elevations and Peak Discharges**

Location	Creek Distance above the Mississippi River (feet)	Normal Water Level (NAVD88)	BCWMC Watershed Management Plan ¹		BCWMC Phase 2 XP-SWMM Model - Atlas 14 (4/19/2017)		Change in Flood Elevations and Flow Rates	
			100-yr		100-yr Atlas 14 MSE3		XPSWMM - Plan	
			Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate
			(NAVD88 feet)	(cfs)	(NAVD88 feet)	(cfs)	(feet)	(cfs)
Westbrook Road (US)	---		858.3	940	860.9	870	2.6	-70
Duluth Street (DS)	38,400		861.5	850	861.9	850	0.4	0
Duluth Street (US)	---		862.0	850	862.6	830	0.6	-20
St. Croix Avenue (DS)	39,800		863.2	850	864.5	830	1.3	-20
St. Croix Avenue (US)	---		864.3	850	864.7	800	0.4	-50
MN&S RR (DS)	41,660		869.7	760	870.3	700	0.6	-60
MN&S RR (US)	---		869.7	760	870.5	690	0.8	-70
Douglas Drive (DS)	42,130		870.4	670	871.0	700	0.6	30
Douglas Drive (US)	---		871.2	670	871.8	690	0.6	20
Florida Avenue (DS)	42,820		871.8	670	872.6	690	0.8	20
Florida Avenue (US)	---		872.5	670	873.0	690	0.5	20
Hampshire Ave (DS)	43,410		872.7	630	873.4	690	0.7	60
Hampshire Ave (US)	---		873.2	630	874.0	670	0.8	40
GV Country Club (DS)	44,320		874.6	365	876.1	660	1.5	295
GV Country Club (US)	---		878.6	405	880.6	650	2.0	245
Pennsylvania Avenue (DS)	46,500		879.5	380	881.6	650	2.1	270
Pennsylvania Avenue(US)	---		880.7	375	882.9	550	2.2	175
C&NW RR (DS)	47,200		881.9	375	884.1	560	2.2	185
C&NW RR (US)	---		883.1	375	885.0	460	1.9	85
Winnetka Ave (DS)	48,000		883.5	360	885.1	440	1.6	80
Winnetka Ave (US)	---		883.7	360	885.3	430	1.6	70
Wisconsin Ave (DS)	49,750		884.9	360	886.0	430	1.1	70
Wisconsin Ave (US)	50,100		888.2	340	887.6	360	-0.6	20
Golden Valley Road (DS)	---		888.2	290	887.7	340	-0.5	50
Golden Valley Road (US)	---		888.2	290	887.7	340	-0.5	50
Westbound Hwy 55 (DS)	51,250		888.2	290	887.7	340	-0.5	50
Eastbound Hwy 55 (US)	---		888.3	290	887.8	410	-0.5	120
Boone Ave (DS)	---		888.4	280	887.9	320	-0.5	40
Boone Ave (US)	---		888.5	280	887.9	220	-0.6	-60
Hwy 169 (DS)	56,500		888.6	255	888.3	300	-0.3	45
Hwy 169 (US)	---		888.7	250	888.4	240	-0.3	-10
Hwy 55 Ramp (DS)	58,300		888.7	235	888.4	210	-0.3	-25
Hwy 55 Ramp (US)	---		888.7	235	888.4	210	-0.3	-25
Hwy 55 Eastbound (DS)	58,500		888.7	235	888.4	210	-0.3	-25
Hwy 55 Eastbound (US)	---		888.7	235	888.4	210	-0.3	-25
Hwy 55 Westbound (DS)	---		888.7	235	888.4	210	-0.3	-25
Hwy 55 Westbound (US)	---		889.0	235	888.4	210	-0.6	-25
Hwy 169 ramp to W 55 (DS)	58,750		889.0	235	888.4	210	-0.6	-25

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			100-yr		100-yr Atlas 14 MSE3		XPSWMM - Plan	
			Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate
			(NAVD88 feet)	(cfs)	(NAVD88 feet)	(cfs)	(feet)	(cfs)
Hwy 169 ramp to W 55 (US)	---		889.0	235	888.5	210	-0.5	-25
Hwy 55 N Frontage Rd (DS)	58,850		889.2	235	888.5	210	-0.7	-25
Hwy 55 N Frontage Rd (US)	---		889.2	235	888.5	210	-0.7	-25
10th Ave (DS)	---		889.2	---	888.9	210	-0.3	---
10th Ave (US)	---		889.2	---	889.1	210 ²	-0.1	---
C&NW RR Bridge (DS)	63,450		889.2	200	889.1	210 ²	-0.1	10
C&NW RR Bridge (US)	---		889.6	200	889.1	210	-0.5	10
South Shore Drive (DS)	63,800		889.6	190	889.3	210	-0.3	20
South Shore Drive (US)	---		890.5	190	889.3	210 ²	-1.2	20
Medicine Lake Weir (DS)	63,960		890.5	190	889.3	210	-1.2	20

Inundation Areas

Theodore Wirth Park (Area upstream of Highway 55 Control Structure)	---	815.7	826.2	---	826.5	---	0.3	---
South Rice Pond	---		831.7	---	834.3	---	2.6	---
North Rice Pond	---	832.5	838.2	---	836.4	---	-1.8	---
Grimes Avenue Pond	---	832.5	838.2	---	836.4	---	-1.8	---
Golden Valley Country Club	---		878.6	---	880.6	---	2.0	---
Brookview Golf Course	---		888.3	---	887.8	---	-0.5	---
Westwood Lake	---	887.6 ³	889.2	---	890.0	---	0.8	---
Medicine Lake	---	887.9	890.5	---	890.3	---	-0.2	---

NORTH BRANCH

Hwy 100 Control (US)	---		849.2	610	851.2	1,040	2.0	430
Confluence w/Main Stem	---		849.2	---	851.2	1,740 ²	2.0	---
29th Avenue (DS)	200		849.2	1,515	851.2	1,740 ²	2.0	225
29th Avenue (US)	---		849.7	1,515	851.2	1,290 ²	1.5	-225
32nd Avenue (DS)	2,600		849.8	1,175	851.9	1,290 ²	2.1	115
32nd Avenue (US)	---		854.2	1,175	852.7	560 ²	-1.5	-615
Brunswick Avenue (DS)	3,000		854.9	1,175	852.7	560 ²	-2.2	-615
Brunswick Avenue (US)	---		856.1	1,175	856.7	510	0.6	-665
34th Culvert (DS)	4,200		863.0	700	865.4	520	2.4	-180
34th Culvert (US)	---		866.3	430	867.2	500	0.9	70
Douglas Drive (DS)	5,250		870.2	670	869.6	580 ²	-0.6	-90
Douglas Drive (US)	---		870.3	670	870.5	380 ²	0.2	-290

**Table 3-7 Comparison of BCWMC Watershed Management Plan to the
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			100-yr		100-yr Atlas 14 MSE3		XPSWMM - Plan		
			Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	
			(NAVD88 feet)	(cfs)	(NAVD88 feet)	(cfs)	(feet)	(cfs)	
Edgewood Emb (DS)	5,600		870.9	430	871.0	380	2	0.1	-50
Edgewood Emb (US)	---		878.4	340	880.4	340		2.0	0
Georgia Avenue (DS)	6,250		878.4	305	880.4	460		2.0	155
Georgia Avenue (US)	---		878.6	305	880.8	520	²	2.2	215
36th & Hampshire (DS)	6,800		878.6	260	880.8	480	²	2.2	220
36th & Hampshire (US)	6,980		879.2	260	881.3	280	²	2.1	20
Louisiana Ave. (DS) (Street Elevation Approx. 882.4)	8,000		881.2	---	883.3	490	²	2.1	---
Maryland Ave. (Street Elevation Approx. 885.7)	8,500		---	---	886.0	260	²	---	---
Oregon Ave. (Street Elevation Approx. 885.4)	9,000		---	---	888.8	90	²	---	---
MN & S RR (Street Elevation Approx. 889.1)	9,300		---	---	889.6	90	²	---	---
Inlet of 42" CMP (East Winnetka Pond)	9,500		888.2	---	890.9	100	²	2.7	---
Service Road (West Winnetka Pond)	10,000		888.2	---	891.1	190	²	2.9	---
Winnetka Ave. (DS)	10,600		888.2	---	891.2	220	²	3.0	---
Winnetka Ave. (US)	---		889.2	---	891.3	270		2.1	---
Boone Ave. (DS)	13,500		889.5	---	891.4	730	²	1.9	---
Boone Ave. (US)	---		889.7	---	891.4	270	²	1.7	---
Northwood Lake	---		889.7	---	891.4	270	²	1.7	---
TH 169 (DS)	16,850		889.7	---	893.0	270	²	3.3	---
TH 169(US)	---		890.7	---	893.1	750	²	2.4	---
Rockford Road (DS)	18,350		890.7	---	893.1	750	²	2.4	---
Rockford Road (US)	---		898.7	---	897.2	---	²	-1.5	---
Inundation Areas									
Bassett Creek Park	---	840.6	849.7	---	851.2	---		1.5	---
Edgewood Avenue Pond	---		878.4	---	880.4	---		2.0	---
Winnetka Pond (DS of Winnetka Avenue)	---	879.8	888.2	---	890.8	---		2.6	---
Northwood Park	---		889.5	---	891.3	---		1.8	---
Northwood Lake	---	884.6	889.7	---	891.3	---		1.6	---
SWEENEY LAKE BRANCH									
Confluence w/Main Stem	---		827.2	---	827.2	1,460		0.0	---
France Ave extension (DS)	700		827.2	---	827.7	170	²	0.5	---
France Ave (US)	---		829.2	---	828.0	170	²	-1.2	---

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			100-yr		100-yr Atlas 14 MSE3		XPSWMM - Plan	
			Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate
			(NAVD88 feet)	(cfs)	(NAVD88 feet)	(cfs)	(feet)	(cfs)
Courage Center & Hidden Lakes Parkway (DS)	900		829.2	---	830.6	170	1.4	---
Courage Center & Hidden Lakes Parkway (US)	---		831.2	---	831.9	170	0.7	---
Precast Concrete Dam (DS)	1,700		831.7	---	831.9	170	0.2	---
Sweeney Lake	---		831.7	---	831.9	170	0.2	---
Union Pacific RR (DS)	6,800		831.7	---	831.9	400	0.2	---
Union Pacific RR (US)	---		835.8	311	836.3	480 ²	0.5	169
Hwy 55 (DS)	8,150		835.8	680	836.8	860 ²	1.0	180
Hwy 55 (US)	---		836.9	680	838.4	310 ²	1.5	-370
MN & S RR (DS)	9,000		836.9	233	838.4	260	1.5	27
MN & S RR (US)	---		839.5	233	841.7	260	2.2	27
Breck Pond & Control Structure (US)	9,580		839.9	296	842.5	270 ²	2.6	-26
TH 100 (DS) (Breck Pond)	10,400		839.9	298	842.5	440 ²	2.6	142
TH 100 (US)	---		845.4	298	851.0	500 ²	5.6	202
Turners Crossroad (US)	10,950		854.9	241	857.2	430 ²	2.3	189
Glenwood Pond A	---		854.9	---	857.2	---	2.3	---
MN & S RR (DS)	11,550		854.9	233	857.2	440 ²	2.3	207
MN & S RR (US)	---		855.0	233	857.2	440 ²	2.2	207
Glenwood Pond B	---		855.0	---	857.2	---	2.2	---
Glenwood Ave (DS)	---		855.0	84	857.2	100 ²	2.2	16
Glenwood Ave (US)	---		855.0	84	857.2	100	2.2	16
Duck Pond	---		855.0	---	857.2	---	2.2	---
MN & S RR (DS)	---		855.0	233	857.2	560 ²	2.2	327
MN & S RR (US)	---		858.9	233	859.4	300 ²	0.5	67
Ravine Storage Area	---		858.9	---	859.4	90 ²	0.5	---
Courtawn Pond	---		873.1	---	873.6	120 ²	0.5	---
East Ring Pond	---		879.0	---	879.4	180 ²	0.4	---
78" RCP Equalizer	18,800		---	---	---	480 ²	---	---
West Ring Pond	---		879.0	---	879.4	---	0.4	---
Ravine Storage Area Overflow								
Glenwood Pond B	---		855.0	---	857.2	---	2.2	---
MN & S RR (DS)	---		855.0	---	857.2	---	2.2	---
MN & S RR (US)	---		857.3	---	859.4	---	2.1	---
Glenwood Ave (DS)	---		855.0	---	857.2	---	2.2	---
Glenwood Ave (US)	---		855.0	---	857.2	---	2.2	---

**Table 3-7 Comparison of BCWMC Watershed Management Plan to the
Phase 2 XPSWMM Model - Flood Elevations and Peak Discharges**

Location	Creek Distance above the Mississippi River (feet)	Normal Water Level (NAVD88)	BCWMC Watershed Management Plan ¹		BCWMC Phase 2 XP-SWMM Model - Atlas 14 (4/19/2017)		Change in Flood Elevations and Flow Rates	
			100-yr		100-yr Atlas 14 MSE3		XPSWMM - Plan	
			Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate
			(NAVD88 feet)	(cfs)	(NAVD88 feet)	(cfs)	(feet)	(cfs)
Inundation Areas								
Sweeney Lake	---	827.2 ⁴	831.7	---	831.9	---	0.2	---
Twin Lake	---	827.2 ⁴	831.7	---	831.9	---	0.2	---
Breck Pond	---	831.6	839.9	---	842.5	---	2.6	---
Courtawn Pond	---	870.1	873.1	---	873.6	---	0.5	---
East Ring Pond	---	874.1	879.0	---	879.4	---	0.4	---
West Ring Pond	---	874.1	879.0	---	879.4	---	0.4	---
MEDICINE LAKE BRANCH (PLYMOUTH CREEK)								
West Medicine Lake Drive (DS)	10,450		890.5	---	890.6	290	0.1	---
West Medicine Lake Drive (US)	---		891.7	---	893.6	690 ²	1.9	---
26th Avenue N. (DS)	16,500		925.2	---	924.4	230	-0.8	---
26th Avenue N. (US)	---		925.7	---	925.0	230	-0.7	---
28th Avenue N. Dike (DS)	---		928.2	---	929.9	230	1.7	---
28th Avenue N. Dike (US)	---		931.0	---	932.3	260 ²	1.3	---
County Road 61 (DS)	---		931.0	---	932.3	260	1.3	---
County Road 61 (US)	---		931.4	---	933.9	230	2.5	---
Xenium Lane (DS)	20,850		931.4	---	933.9	440	2.5	---
Xenium Lane (US)	---		931.7	---	934.2	460 ²	2.5	---
I-494 (DS)	22,500		935.2	---	938.1	440	2.9	---
I-494 (US)	---		938.7	---	938.9	410	0.2	---
Fernbrook Lane (DS)	25,000		947.2	---	946.5	260	-0.7	---
Fernbrook Lane (US)	---		948.2	---	946.6	260	-1.6	---
Central Park Pond Outlet Structure (DS)	---		949.2	---	949.6	260	0.4	---
Central Park Pond Outlet Structure (US)	---		953.2	---	954.7	690 ²	1.5	---
37th Avenue	28,900		956.2	---	954.8	690 ²	-1.4	---
County Road 9	30,450		959.2	---	955.0	390	-4.2	---
Vicksburg Lane (DS)	31,300		961.2	---	963.0	380	1.8	---
Vicksburg Lane (US)	---		962.2	---	963.7	280	1.5	---
Dunkirk Lane (DS)	---		979.2	---	979.3	80	0.1	---
Dunkirk Lane (US)	34,450		982.2	---	985.3	90	3.1	---
T.H. 55 (DS)	38,300		982.2	---	987.5	40	5.3	---
T.H. 55 (US)	---		982.7	---	987.5	---	4.8	---

**Table 3-7 Comparison of BCWMC Watershed Management Plan to the
Phase 2 XPSWMM Model - Flood Elevations and Peak Discharges**

Location	Creek Distance above the Mississippi River (feet)	Normal Water Level (NAVD88)	BCWMC Watershed Management Plan ¹		BCWMC Phase 2 XP-SWMM Model - Atlas 14 (4/19/2017)		Change in Flood Elevations and Flow Rates	
			100-yr		100-yr Atlas 14 MSE3		XPSWMM - Plan	
			Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate
			(NAVD88 feet)	(cfs)	(NAVD88 feet)	(cfs)	(feet)	(cfs)
Inundation Areas								
Xenium Lane	---		931.7	---	934.2	---	2.5	---
Central Park Pond	---	948.2	952.2	---	954.7	---	2.5	---
Turtle Lake	---	962.9 ⁵	964.2	---	967.0	---	2.8	---
Rockford Road	---		968.2	---	968.5	---	0.3	---
Dunkirk Lane	---		982.2	---	982.2	---	0.0	---
Oak Knoll Pond	---	914.4	917.3	---	918.6	---	1.3	---
Crane Lake	---	917.3	920.7	---	920.2	---	-0.5	---
Notes								

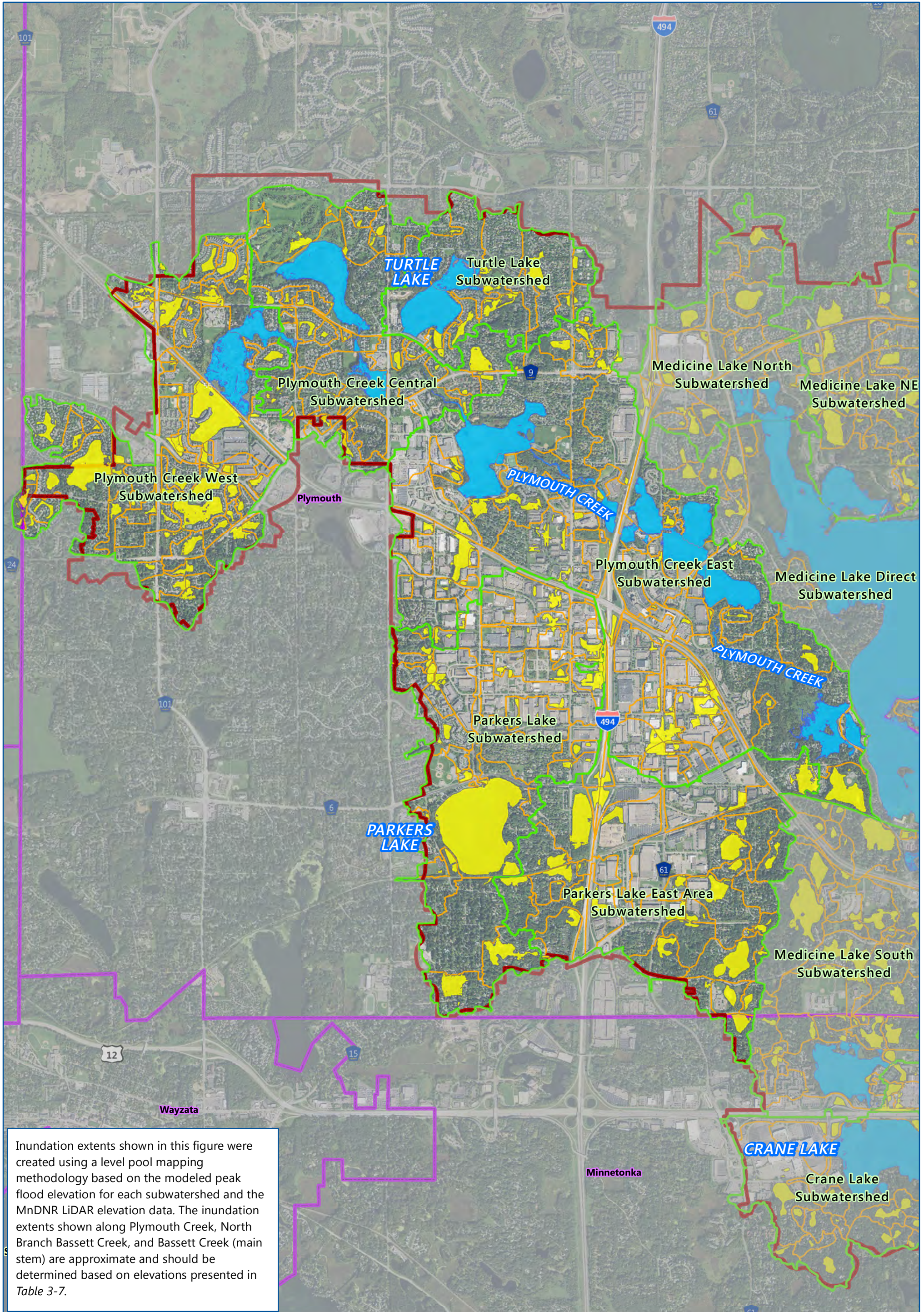
¹Values reported in the Bassett Plan were presented in NGVD29 and have been updated to NAVD88 (NAVD88=NGVD29+0.18ft)

²Multiple inflows to node. The reported peak inflow reflects the sum all inflow peaks.

³Barr study surveyed outlet of Westwood Lake and found the outlet ditch has filled with sediment to elevation 887.6ft.
The outlet pipe invert elevation (historical normal water level) is at 886.18ft

⁴As-built survey November 27,2012

⁵Turtle Lake Feasibility Study, November 10, 2011

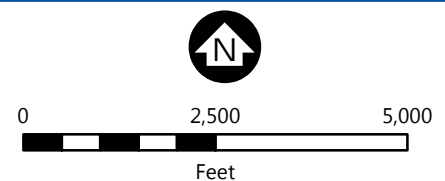


Inundation extents shown in this figure were created using a level pool mapping methodology based on the modeled peak flood elevation for each subwatershed and the MnDNR LiDAR elevation data. The inundation extents shown along Plymouth Creek, North Branch Bassett Creek, and Bassett Creek (main stem) are approximate and should be determined based on elevations presented in Table 3-7.



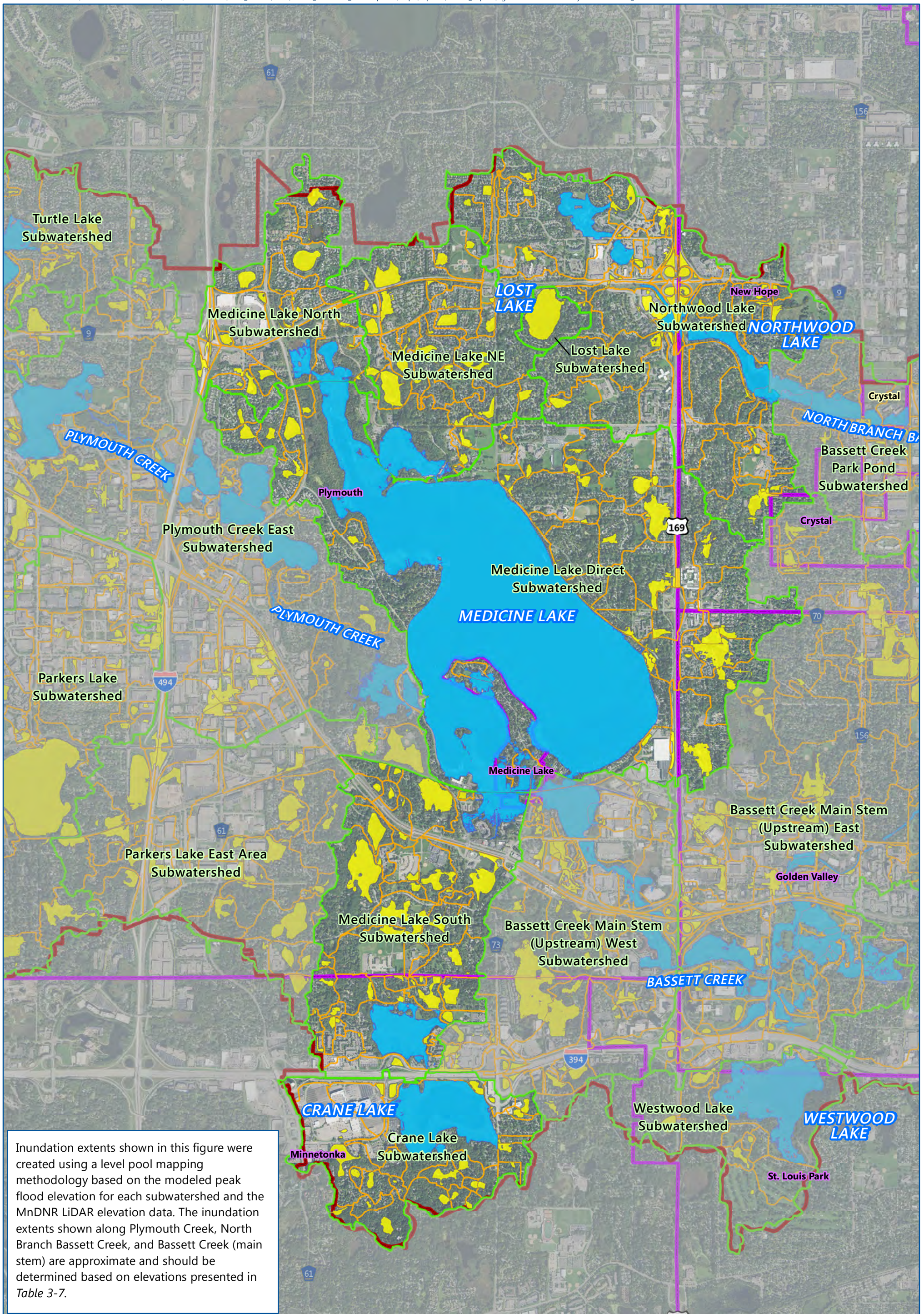
Atlas 14 100yr Inundation Extents
 Jurisdictional Flooding (BCWMC Trunk¹)
 Nonjurisdictional Flooding (City Jurisdiction)
¹-See Figure 2-15 in the 2015-2025 BCWMC Watershed Management Plan

- Subwatersheds
- Major Subwatersheds
- Legal Boundary
- City Boundaries



PLYMOUTH CREEK, TURTLE LAKE AND PARKERS LAKE SUBWATERSHEDS ATLAS 14 100-YEAR INUNDATION EXTENTS
 Bassett Creek Water Management Commission

FIGURE 3-16



Inundation extents shown in this figure were created using a level pool mapping methodology based on the modeled peak flood elevation for each subwatershed and the MnDNR LiDAR elevation data. The inundation extents shown along Plymouth Creek, North Branch Bassett Creek, and Bassett Creek (main stem) are approximate and should be determined based on elevations presented in Table 3-7.

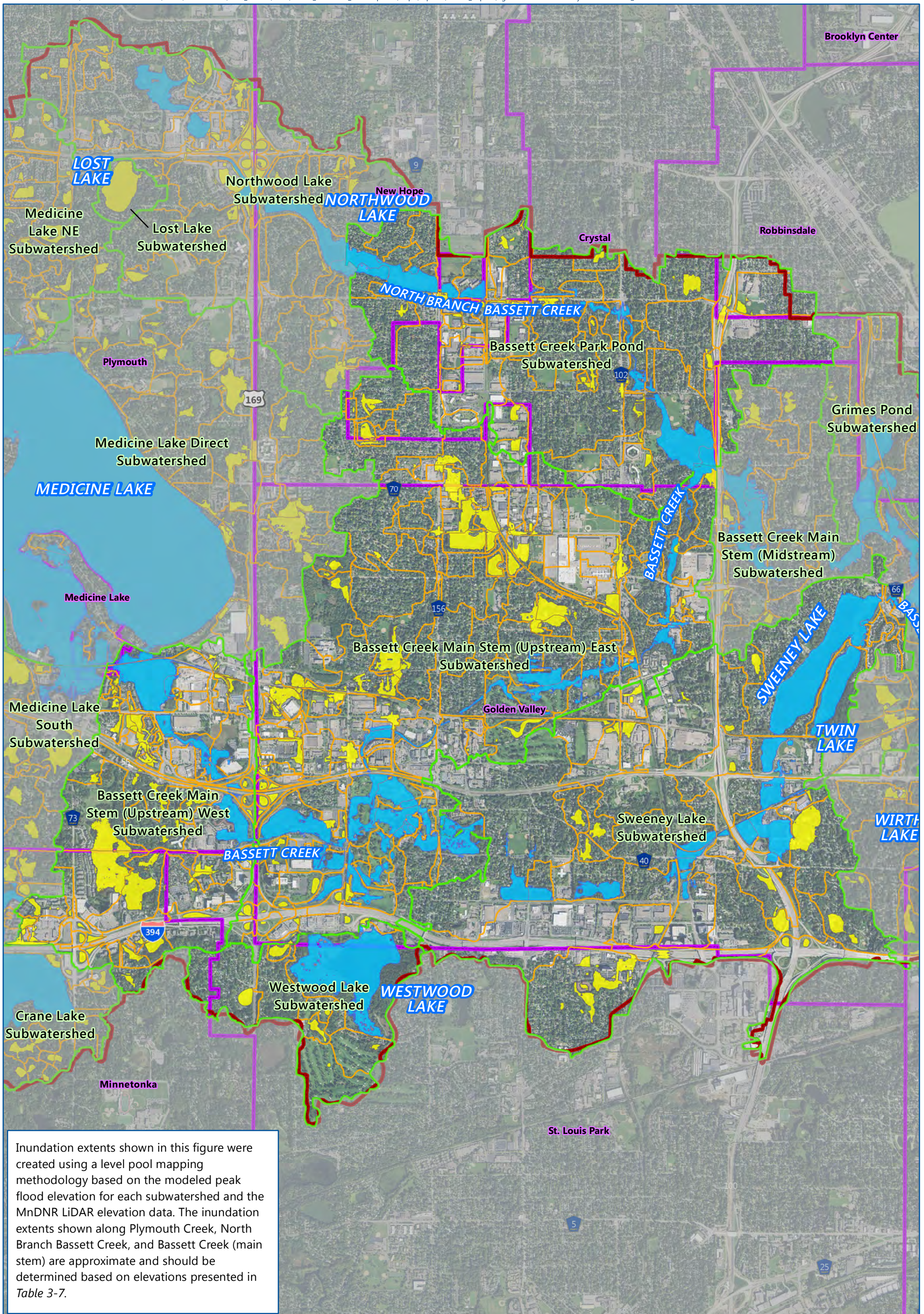
Atlas 14 100yr Inundation Extents

Jurisdictional Flooding (BCWMC Trunk¹)
 Nonjurisdictional Flooding (City Jurisdiction)
¹-See Figure 2-15 in the 2015-2025 BCWMC Watershed Management Plan

Subwatersheds
 Major Subwatersheds
 Legal Boundary
 City Boundaries

0 2,500 5,000
 Feet

LOST LAKE, NORTHWOOD LAKE, CRANE LAKE, AND MEDICINE LAKE SUBWATERSHEDS
 ATLAS 14 100-YEAR INUNDATION EXTENTS
 Bassett Creek Water Management Commission
FIGURE 3-17

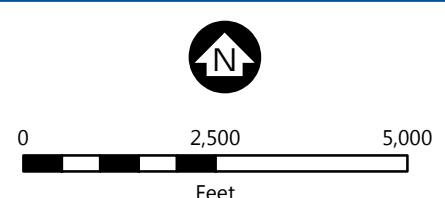


Inundation extents shown in this figure were created using a level pool mapping methodology based on the modeled peak flood elevation for each subwatershed and the MnDNR LiDAR elevation data. The inundation extents shown along Plymouth Creek, North Branch Bassett Creek, and Bassett Creek (main stem) are approximate and should be determined based on elevations presented in Table 3-7.



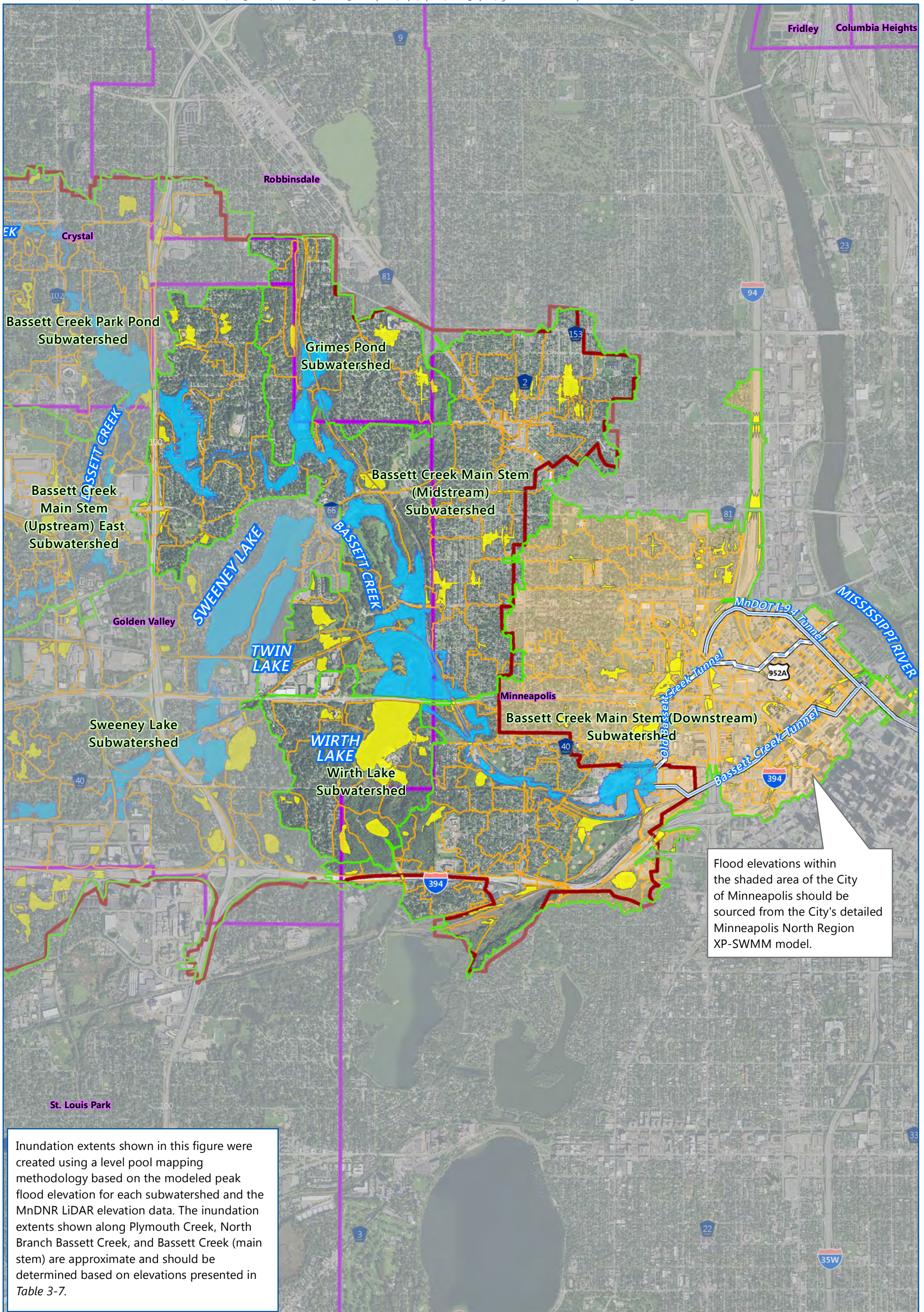
Atlas 14 100yr Inundation Extents
 Jurisdictional Flooding (BCWMC Trunk¹)
 Nonjurisdictional Flooding (City Jurisdiction)
¹-See Figure 2-15 in the 2015-2025 BCWMC Watershed Management Plan

- Subwatersheds
- Major Subwatersheds
- Legal Boundary
- City Boundaries



BASSETT CREEK MAIN STEM (UPSTREAM), WESTWOOD LAKE, BASSETT CREEK PARK POND, AND SWEENEY LAKE ATLAS 14 100-YEAR INUNDATION EXTENTS
 Bassett Creek Water Management Commission

FIGURE 3-18



Flood elevations within the shaded area of the City of Minneapolis should be sourced from the City's detailed Minneapolis North Region XP-SWMM model.

Inundation extents shown in this figure were created using a level pool mapping methodology based on the modeled peak flood elevation for each subwatershed and the MnDNR LiDAR elevation data. The inundation extents shown along Plymouth Creek, North Branch Bassett Creek, and Bassett Creek (main stem) are approximate and should be determined based on elevations presented in Table 3-7.

	Atlas 14 100yr Inundation Extents Jurisdictional Flooding (BCWMC Trunk ¹) Nonjurisdictional Flooding (City Jurisdiction) ¹ -See Figure 2-15 in the 2015-2025 BCWMC Watershed Management Plan	Subwatersheds Major Subwatersheds Legal Boundary City Boundaries	
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GRIMES POND, NORTH AND SOUTH RICE PONDS, BASSETT CREEK MAIN STEM (DOWNSTREAM), AND WIRTH LAKE SUBWATERSHEDS ATLAS 14 100-YEAR INUNDATION EXTENTS
 Bassett Creek Water Management Commission
FIGURE 3-19