12.0 Northeast Minnehaha Creek

12.1 General Description of Drainage Area

Figure 12.1 depicts the Northeast Minnehaha Creek drainage area and the individual subwatersheds within this area. The Northeast Minnehaha Creek drainage basin is located in the northeast corner of Edina. This watershed contains only a limited number of ponds and no lakes.

12.1.1 Drainage Patterns

The stormwater system within this drainage area is comprised of storm sewers, ponding basins, wetlands, drainage ditches, and overland flow paths. The Northeast Minnehaha Creek basin has been divided into several major watersheds based on the drainage patterns. These major watersheds are depicted in Figure 12.2. Each major watershed has been further delineated into numerous subwatersheds. The naming convention for each subwatershed is based on the major watershed it is located within. Table 12.1 lists each major watershed and the associated subwatershed naming convention.

Table 12.1 Major Watersheds within the Northeast Minnehaha Creek Drainage Basin

Major Watershed	Subwatershed Naming Convention	# of Subwatersheds	Drainage Area (acres)
Morningside	MS_##	58	228
Minnehaha Creek North	MHN_##	89	450
Edina Country Club	ECC_##	15	117

12.1.1.1 Morningside

The Morningside watershed is located in the northeast corner of Edina, primarily north of West 44th Street. This watershed is primarily single family residential and includes Weber Park. The Edina trunk storm sewer system through this area connects to the incoming St. Louis Park system just southeast of the Susan Lindgren Elementary School (Natchez Avenue and 41st Street). From this junction the system runs easterly to the east side of Weber Park, where an inlet/outlet to the Weber Park pond allows stormwater to be discharged into the basin until the water level in the pond reaches an elevation at which the head differential between the pond and the trunk storm sewer system results in a discharge from the Pond. From the Weber Park Pond, the system drains north to St. Louis Park and then east to connect with the Minneapolis system, where it eventually drains to Lake Calhoun.

12.1.1.2 Minnehaha Creek North

The Minnehaha Creek North watershed lies primarily east of Minnehaha Creek, west of France Avenue, north of West 54th Avenue and south of West 44th Avenue. There are only two wetlands within this watershed and no ponds, all other areas discharge directly to Minnehaha Creek. The land use is single family residential for the majority of the watershed, with some commercial land use

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adjacent to France Avenue. There is very little open space in this watershed except for areas directly adjacent to Minnehaha Creek.

12.1.1.3 Edina Country Club

The Edina Country Club watershed is a small, 117-acre watershed that encompasses the Edina Country Club golf course and areas east of the Country Club to Minnehaha Creek. The watershed area outside of the golf course is low density residential, contains no ponds or wetlands, and all areas discharge directly to Minnehaha Creek. There are no known pipes connecting the ponds of the Edina Country Club to the adjacent storm sewer network along Wooddale Avenue.

12.2 Stormwater System Analysis and Results

12.2.1 Hydrologic/Hydraulic Modeling Results

The 5-year, 10-year, and 100-year event frequency flood analyses were performed for the Northeast Minnehaha Creek drainage basin. For the Minnehaha Creek North and the Edina Country Club drainage areas, the storm sewers were evaluated using a 10-year and a 100-year storm event. The 10-year analysis was based on a ½-hour storm of 1.65 inches of rain and the 100-year analysis was based on a 24-hour storm event of 6 inches of rain. The storm sewers in the Morningside drainage basin were evaluated using the ½-hour, 5-year storm of 1.5 inches and the 100-year, 24-hour storm of 6 inches. Table 12.2 presents the watershed information and the results for the 5-year, 10-year, and 100-year hydrologic analyses for the Northeast Minnehaha Creek basin.

The results of the 5-year, 10-year, and the 100-year hydraulic analysis for the Northeast Minnehaha Creek drainage basin are summarized in Table 12.3 and Table 12.4. The column headings in Table 12.3 are defined as follows:

Node/Subwatershed ID —XP-SWMM node identification label. Each XP-SWMM node represents a manhole, catchbasin, pond, or other junction within the stormwater system.

Downstream Conduit—References the pipe downstream of the node in the storm sewer system.

Flood Elevation—The maximum water elevation reached in the given pond/manhole for each referenced storm event (mean sea level). In some cases, an additional flood elevation has been given in parenthesis. This flood elevation reflects the 100-year flood elevation of Minnehaha Creek, as shown in the *National Flood Insurance Program Flood Insurance Study for the City of Edina*, May 1980.

Peak Outflow Rate—The peak discharge rate (cfs) from a given ponding basin for each referenced storm event. The peak outflow rates reflect the combined discharge from the pond through the outlet structure and any overflow.

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NWL—The normal water level in the ponding basin (mean sea level). The normal water levels for the ponding basins were assumed to be at the outlet pipe invert or at the downstream control elevation.

Flood Bounce—The fluctuation of the water level within a given pond for each referenced storm event.

Volume Stored—The maximum volume (acre-ft) of water that was stored in the ponding basin during the storm event. The volume represents the live storage volume only.

Table 12.4 summarizes the conveyance system data used in the model and the model results for the storm sewer system within the Northeast Minnehaha Creek drainage basin. The peak flow through each conveyance system for the 5-year (Morningside only), 10-year, and the 100-year storm event is listed in the table. The values presented represent the peak flow rate through each pipe system only and does not reflect the combined total flow from an upstream node to the downstream node when overflow from a manhole/pond occurs.

Figure 12.3 graphically represents the results of the 5-year, 10-year, and the 100-year frequency hydraulic analyses. The figure depicts the Northeast Minnehaha Creek drainage basin boundary, subwatershed boundaries, the modeled storm sewer network, surcharge conditions for the XP-SWMM nodes (typically manholes), and the flood prone areas identified in the modeling analyses.

One of the objectives of the hydraulic analyses was to evaluate the level of service provided by the current storm sewer system. The level of service of the system was examined by determining the surcharge conditions of the manholes and catch basins within the storm sewer system during the 5-year, 10-year and 100-year storm events. An XP-SWMM node was considered surcharged if the hydraulic grade line at that node breached the ground surface (rim elevation). Surcharging is typically the result of limited downstream capacity and tailwater impacts. The XP-SWMM nodes depicted on Figure 12.3 were color coded based on the resulting surcharge conditions. The green nodes signify no surcharging occurred during the 100-year, 10-year, or 5-year frequency storm event, the yellow nodes indicate surcharging during the 100-year event, the red nodes identify that surcharging is likely to occur during both a 100-year and 10-year frequency storm event, and the blue nodes indicate surcharging during the 100-year and the 5-year frequency storm event (Morningside only). Figure 12.3 illustrates that several XP-SWMM nodes within the Northeast Minnehaha Creek drainage basin are predicted to experience surcharged conditions during the 5-year, 10-year and 100-year frequency storm events. This indicates a probability greater than 5-10 percent *in any year* that the system will be overburdened and unable to meet the desired level of service at these locations. These manholes and catch basins are more likely to experience inundation during the smaller, more frequent storm events of various durations.

Another objective of the hydraulic analysis was to evaluate the level of protection offered by the current stormwater system. Level of protection is defined as the capacity provided by a municipal drainage system (in terms of pipe capacity and overland overflow capacity) to prevent property

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damage and assure a reasonable degree of public safety following a rainstorm. A 100-year frequency event is recommended as a standard for design of stormwater management basins. To evaluate the level of protection of the stormwater system within the Northeast Minnehaha Creek drainage area, the 100-year frequency flood elevations for the ponding basins and depressed areas were compared to the low elevations of structures surrounding each basin. The low elevations were initially determined using 2-foot topographic information and aerial imagery in ArcView. Where 100-year frequency flood levels of the ponding areas appeared to potentially threaten structures, detailed low house elevations were obtained through field surveys. The areas that were determined to flood and threaten structures during the 100-year storm event are listed in Table 12.5 and highlighted in Figure 12.3. Discussion and recommended implementation considerations for these areas are included in Section 12.3.

12.2.2 Water Quality Modeling Results

The effectiveness of the stormwater system in removing stormwater pollutants such as phosphorus was analyzed using the P8 water quality model. The P8 model simulates the hydrology and phosphorus loads introduced from the watershed of each pond and the transport of phosphorus throughout the stormwater system. Since site-specific data on pollutant wash-off rates and sediment characteristics were not available, it was necessary to make assumptions based on national average values. Due to such assumptions and lack of in-lake water quality data for model calibration, the modeling results were analyzed based on the percent of phosphorus removal that occurred and not based on actual phosphorus concentrations.

Figure 12.4 depicts the results of the water quality modeling for the Northeast Minnehaha Creek drainage basin. The figure shows the fraction of total phosphorus removal for each water body as well as the cumulative total phosphorus removal in the watershed. The individual water bodies are colored various shades of blue, indicating the percent of the total annual mass of phosphorus entering the water body that is removed (through settling). It is important to note that the percent of phosphorus removal is based on total phosphorus, including phosphorus in the soluble form. Therefore, the removal rates in downstream ponds will likely decrease due to the large soluble fraction of incoming phosphorus that was unsettleable in upstream ponds. The watersheds are depicted in various shades of gray, indicating the cumulative total phosphorus removal achieved. The cumulative percent removal represents the percent of the total annual mass of phosphorus entering the watershed that is removed in the pond and all upstream ponds.

Ponds that had an average annual total phosphorus removal rate of 60 percent or greater, under average climatic conditions, were considered to be performing well. For those ponds with total phosphorus removal below 60 percent, the permanent pool storage volume was analyzed to determine if additional capacity is necessary. Based on recommendations from the MPCA publication *Protecting Water Quality in Urban Areas*, March 2000, the permanent pool for detention ponds should be equal to or greater than the runoff from a 2.0-inch rainfall, in addition to the sediment storage for at least 25 years of sediment accumulation. For ponds with less than 60 percent total

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phosphorus removal, the recommended storage volume was calculated for each pond within the drainage basin and compared to the existing permanent pool storage volume.

12.3 Implementation Considerations

The problem areas identified through the hydrologic and hydraulic XP-SWMM analyses and P8 water quality analysis were investigated to determine possible mitigation alternatives. These alternatives are discussed below.

12.3.1 Increased Storm Sewer Capacity Projects

The 100-year frequency hydraulic analysis identified several locations within the Northeast Minnehaha Creek drainage basin where the 100-year frequency level of protection is not provided by the current stormwater system. The problems and potential corrective measures for these areas are discussed below.

12.3.1.1 4000 West 42nd Street and 4100, 4104, and 4108 France Avenue (MS_40)

A large portion of the Morningside watershed discharges to a pond located on the east side of Weber Park (Weber Park Pond). This pond was designed to provide protection for a 50-year storm. The City's 2004 *Comprehensive Water Resources Management Plan* identified the potential for flooding of properties adjacent to the pond, which was confirmed during a significant rainfall event that occurred in 2005. In 2006, the City completed a Feasibility Analysis to assess the flooding problem and evaluate options to minimize the flooding potential. Results of the 2006 analysis indicate that the predicted high water elevations in the Weber Park Pond for a 50-year and 100-year frequency flood event, based on existing conditions, are 868.6 ft MSL and 869.0 ft MSL, respectively. A field survey completed at the time indicates that the low entry elevations of four homes adjacent to the pond are at or below the predicted 100-year high water elevation, including 4000 West 42nd Street, 4100 France Avenue, 4104 France Avenue, and 4108 France Avenue.

Based on the feasibility study completed, it was determined that the options to alleviate the flooding potential for the homes adjacent to the Weber Park pond are limited due to constraints in the downstream storm sewer system. Adding additional storage volume to the Weber Park pond would reduce the 100-year flood elevation of the pond to approximately 868.5 ft MSL. However, this flood elevation is still at or above the low entry elevation of three of the homes adjacent to the pond. An additional downstream capacity of 80 cfs would be required to alleviate the flooding at all adjacent properties under existing pond conditions, which is an expensive option. Should the City of Minneapolis update their storm sewer system in this area in the future, Edina will consider working with the City of Minneapolis to incorporate upgrades sufficient to provide additional capacity for the Morningside area drainage.

The most cost effective option to upgrade to a 100-year level of protection for the homes currently below the 100-year flood level (4100, 4104, and 4108 France Avenue) would be to floodproof the

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affected homes and installation of a pumping station to drain stormwater runoff from the backyard area of the affected properties during significant storm events.

12.3.1.2 4308 France Avenue (MS_17)

The low area in the backyard of 4308 France Avenue is inundated to an elevation of 902.5 MSL during the 100-year frequency storm. The results of a field survey indicate that this water level will potentially impact the house located at 4308 France Avenue. To protect the structure at 4308 France Avenue, it is recommended that in this depression area a catch basin be located and connected to the storm sewer system at the intersection of Scott Terrace and West 42nd Street.

12.3.1.3 4300, 4214, and 4212 Branson Street (MS_3)

A depression in the backyard of 4300, 4214, and 4212 Branson Street is inundated to an elevation of 900.6 MSL during the 100-year frequency storm event. At this elevation structures will be affected at 4300, 4214 and 4212 Branson Street. A 15-inch storm sewer originating at Branson Street flows north and connects to the pipe system on Morningside Street. It is recommended that a catch basin be placed in the backyard depression area and pipe 955 upgraded to 24-inch diameter. This will reduce the 100-year frequency storm elevation to 899.5 MSL and protect the structures at 4300, 4214, and 4212 Branson Street.

12.3.1.4 4140 and 4150 West 44th Street (MS_7)

A depression in the backyard of 4140 and 4150 West 44th Street is inundated to 900.6 MSL during the 100-year frequency storm as a result of runoff from its tributary watershed area. In addition, the storm sewer system on West 44th Street surcharges during the 100-year frequency storm and as a result, water flows from West 44th Street and into the backyard depression area.

The addition of a catch basin to the backyard of 4140 and 4150 West 44th Street with a connection to the pipe system on West 44th Street was evaluated, but this alternative would require that the entire pipe system along West 44th Street and Morningside Avenue be upgraded. It is recommended that the storage capacity of this backyard area be increased by 1.4 acre-feet to an elevation of 899.3 MSL to protect the structure at 4140 and 4150 West 44th Street. This additional storage capacity can be achieved by lowering the depth of the backyard depression area by approximately 2 feet.

12.3.1.5 Arden Avenue (MHN_14)

Storm sewer improvements made in 2000 on Bridge Street, Sunny Side Road, and Arden Avenue were designed to reduce the potential for flooding at the low area on Arden Avenue just south of Bridge Street. The high water elevation of the 100-year frequency storm was 884.6 MSL, indicating that during a 100-year storm event the storm sewer improvements would protect the houses on Arden Avenue with the exception of the low house at 4611 Arden Avenue.

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12.3.2 Construction/Upgrade of Water Quality Basins

On an average annual basis, all of the ponds and wetlands in the Northeast Minnehaha Creek watershed are removing greater than 60 percent of the total phosphorus from stormwater inflows. No recommendations are given for the construction or upgrade of water quality basins in this watershed.

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Table 12.2
Watershed Modeling Results for Subwatersheds in the Minnehaha North East Drainage Area (Revised 12/2006)

Watershed Information			100-Year Storm Results 24-Hour Event		5-Year Storm Results 1/2-Hour Event		10-Year Storm Results 1/2-Hour Event	
Watershed ID	Total Area (ac)	% Impervious Area	Peak Runoff Rate (cfs)	Total Volume Runoff (ac-ft)	Peak Runoff Rate (cfs)	Total Volume Runoff (ac-ft)	Peak Runoff Rate (cfs)	Total Volume Runoff (ac-ft)
MS_1	0.5	17	2.3	0.22	1.2	0.04	-	-
MS_10	3.2	44	15.0	1.08	12.3	0.24	-	-
MS_11	0.2	80	1.0	0.10	3.1	0.02	-	-
MS_13	4.2	20	9.1	1.08	3.3	0.14	-	-
MS_14	1.4	10	6.0	0.34	3.1	0.07	-	-
MS_15	1.2	20	5.5	0.34	2.8	0.07	-	-
MS_16	3.6	20	11.1	0.97	4.3	0.14	-	-
MS_17	2.2	20	9.7	0.61	4.1	0.12	-	-
MS_18	3.0	17	11.0	0.80	4.2	0.13	-	-
MS_19	3.2	20	12.0	0.88	4.8	0.14	-	-
MS_2	10.0	20	32.8	2.70	12.7	0.41	-	-
MS_20	5.4	17	23.2	1.48	9.5	0.26	-	-
MS_21	5.0	20	16.1	1.38	6.3	0.21	-	-
MS_22	4.8	20	19.9	1.33	8.4	0.23	-	-
MS_23	1.4	10	4.8	0.56	1.7	0.10	-	-
MS_24	2.0	20	9.6	0.84	6.5	0.18	-	-
MS_25	1.0	17	4.1	0.40	1.9	0.08	-	-
MS_26	4.3	24	19.8	1.82	12.0	0.39	-	-
MS_27	4.0	20	15.6	1.11	6.4	0.19	-	-
MS_28	1.7	20	7.9	0.51	5.5	0.12	-	-
MS_29	4.0	20	14.2	1.23	5.8	0.22	-	-
MS_3	3.3	20	12.9	1.02	5.5	0.19	-	-
MS_30	5.9	17	16.9	1.51	7.5	0.19	-	-
MS_31	6.0	5	19.2	2.30	5.5	0.37	-	-
MS_32	3.6	20	12.9	1.28	5.3	0.23	-	-
MS_33	5.4	20	20.3	1.58	8.3	0.28	-	-
MS_34	3.4	20	11.4	0.93	4.4	0.14	-	-
MS_35	3.8	20	6.9	0.95	2.4	0.11	-	-
MS_36	1.8	20	3.3	0.45	1.2	0.05	-	-
MS_37	2.2	20	9.2	0.60	4.0	0.11	-	-
MS_38	1.5	14	6.4	0.47	2.9	0.10	-	-
MS_39	14.2	0	46.4	4.84	9.9	0.78	-	-
MS_4	3.7	20	17.3	1.32	10.3	0.29	-	-
MS_40	12.0	32	42.7	3.62	18.5	0.62	-	-
MS_41	0.9	16	3.5	0.36	1.5	0.07	-	-
MS_42	4.4	20	15.0	1.20	5.9	0.19	-	-
MS_43	5.2	20	21.6	1.44	9.2	0.25	-	-
MS_44	1.1	18	5.2	0.45	3.2	0.10	-	-
MS_45	2.1	20	9.8	0.62	5.9	0.14	-	-
MS_46	35.7	23	97.8	9.89	8.4	1.63	-	-
MS_47	4.3	20	10.1	1.12	3.7	0.15	-	-
MS_48	10.2	20	23.2	2.64	8.4	0.34	-	-
MS_49	5.2	17	22.6	1.45	9.5	0.26	-	-
MS_5	3.3	20	13.5	0.90	6.8	0.15	-	-
MS_50	3.3	20	13.7	0.93	5.7	0.16	-	-
MS_51	7.6	20	22.8	2.04	8.7	0.30	-	-
MS_52	4.5	20	19.1	1.25	8.3	0.22	-	-
MS_53	1.0	20	4.7	0.29	2.3	0.06	-	-
MS_54	10.1	0	21.5	2.57	13.3	0.54	-	-
MS_55	6.7	10	8.9	1.99	3.9	0.26	-	-
MS-56	0.8	20	3.4	0.24	1.0	0.03	-	-
MS_57	1.8	20	8.2	0.50	2.8	0.07	-	-
MS_58	2.8	20	12.8	0.81	3.5	0.10	-	-
MS_59	1.8	20	7.6	0.51	3.2	0.09	-	-
MS_6	4.2	18	12.0	1.09	4.5	0.15	-	-
MS_7	4.8	20	18.0	1.33	8.8	0.21	-	-
MS_8	3.8	20	15.8	1.06	6.7	0.18	-	-
MS_9	2.5	20	11.6	0.71	5.8	0.14	-	-
MHN_1	10.6	27	43.6	3.25	-	-	27.5	0.75
MHN_10	1.3	20	5.0	0.35	-	-	2.6	0.07
MHN_11	6.7	18	26.6	2.09	-	-	14.4	0.47
MHN_12	2.2	20	9.5	0.75	-	-	6.5	0.18
MHN_13	7.3	20	20.7	1.92	-	-	9.9	0.32

Table 12.2
Watershed Modeling Results for Subwatersheds in the Minnehaha North East Drainage Area (Revised 12/2006)

Watershed Information			100-Year Storm Results 24-Hour Event		5-Year Storm Results 1/2-Hour Event		10-Year Storm Results 1/2-Hour Event	
Watershed ID	Total Area (ac)	% Impervious Area	Peak Runoff Rate (cfs)	Total Volume Runoff (ac-ft)	Peak Runoff Rate (cfs)	Total Volume Runoff (ac-ft)	Peak Runoff Rate (cfs)	Total Volume Runoff (ac-ft)
MHN_14	5.5	20	18.4	1.47	-	-	9.4	0.27
MHN_15	6.1	20	21.1	1.65	-	-	9.9	0.32
MHN_16	8.3	20	21.3	2.15	-	-	19.4	0.51
MHN_17	9.9	20	27.5	2.84	-	-	13.1	0.47
MHN_18	2.6	0	6.3	1.00	-	-	3.8	0.15
MHN_19	7.1	20	29.5	2.14	-	-	17.5	0.51
MHN_2	1.4	20	5.9	0.41	-	-	3.3	0.09
MHN_20	8.8	20	23.9	2.88	-	-	11.0	0.43
MHN_21	5.4	20	22.5	1.80	-	-	8.7	0.32
MHN_22	5.7	20	20.7	2.35	-	-	11.0	0.41
MHN_23	9.9	20	40.9	3.65	-	-	15.2	0.59
MHN_24	5.6	20	20.4	1.85	-	-	10.7	0.37
MHN_25	1.8	20	7.6	0.49	-	-	4.5	0.11
MHN_26	2.3	20	10.3	0.65	-	-	7.9	0.16
MHN_27	0.6	20	2.4	0.23	-	-	1.7	0.05
MHN_28	0.5	2	1.9	0.20	-	-	0.9	0.04
MHN_29	7.4	20	31.7	2.03	-	-	19.7	0.48
MHN_3	3.6	23	14.8	0.99	-	-	8.9	0.22
MHN_30	4.7	20	14.2	1.24	-	-	6.9	0.22
MHN_31	7.8	20	30.7	2.13	-	-	16.4	0.45
MHN_32	9.6	20	37.6	2.88	-	-	20.4	0.63
MHN_33	5.2	20	21.8	1.42	-	-	12.8	0.33
MHN_34	4.4	20	18.3	1.21	-	-	10.5	0.27
MHN_35	1.3	20	5.7	0.36	-	-	3.8	0.09
MHN_36	3.5	23	13.2	0.96	-	-	7.3	0.20
MHN_37	0.6	34	2.7	0.19	-	-	3.3	0.05
MHN_38	2.0	48	8.5	0.68	-	-	6.5	0.17
MHN_39	5.3	51	21.2	1.84	-	-	13.0	0.41
MHN_4	3.4	20	7.8	0.86	-	-	3.6	0.13
MHN_40	14.8	18	40.8	3.79	-	-	18.9	0.61
MHN_41	2.4	20	10.3	0.65	-	-	7.1	0.16
MHN_42	6.1	20	17.0	1.59	-	-	8.1	0.26
MHN_43	6.0	20	17.7	1.59	-	-	8.5	0.27
MHN_44	10.7	20	21.8	2.68	-	-	9.8	0.36
MHN_46	3.0	20	13.5	0.91	-	-	11.4	0.25
MHN_47	1.1	20	4.6	0.30	-	-	2.7	0.07
MHN_48	1.4	21	6.1	0.40	-	-	3.8	0.09
MHN_49	1.4	20	5.9	0.37	-	-	4.9	0.10
MHN_5	7.7	20	30.2	2.08	-	-	16.2	0.45
MHN_50	8.4	20	22.2	2.18	-	-	10.5	0.35
MHN_51	2.4	20	10.4	0.66	-	-	5.8	0.15
MHN_52	1.8	20	8.0	0.59	-	-	6.6	0.16
MHN_53	3.7	20	11.7	0.98	-	-	5.7	0.18
MHN_54	1.3	20	4.5	0.33	-	-	2.2	0.06
MHN_55	2.7	20	9.1	0.73	-	-	4.5	0.14
MHN_56	2.1	37	9.3	0.66	-	-	9.3	0.17
MHN_57	1.5	79	6.7	0.64	-	-	4.9	0.15
MHN_58	5.3	74	23.5	2.13	-	-	20.0	0.51
MHN_59	1.3	80	5.9	0.56	-	-	5.7	0.14
MHN_6	3.9	20	12.9	1.05	-	-	6.3	0.19
MHN_60	2.2	20	5.4	0.67	-	-	2.5	0.10
MHN_61	3.9	45	16.8	1.33	-	-	12.3	0.32
MHN_62	6.7	55	30.2	2.51	-	-	18.3	0.58
MHN_63	2.8	80	12.4	1.21	-	-	9.8	0.29
MHN_64	4.6	20	13.1	1.20	-	-	6.2	0.20
MHN_65	14.0	4	50.4	3.56	-	-	17.8	0.68
MHN_66	12.7	26	50.9	4.06	-	-	31.0	0.92
MHN_67	2.1	2	4.8	0.45	-	-	1.1	0.05
MHN_68	0.8	20	3.7	0.23	-	-	2.7	0.06
MHN_69	21.9	20	86.2	6.11	-	-	46.4	1.33
MHN_70	3.7	20	11.5	0.99	-	-	5.5	0.17
MHN_71	6.5	21	11.2	1.71	-	-	14.2	0.41
MHN_72	8.8	29	30.2	2.38	-	-	16.0	0.43

Table 12.2
Watershed Modeling Results for Subwatersheds in the Minnehaha North East Drainage Area (Revised 12/2006)

Watershed Information			100-Year Storm Results 24-Hour Event		5-Year Storm Results 1/2-Hour Event		10-Year Storm Results 1/2-Hour Event	
Watershed ID	Total Area (ac)	% Impervious Area	Peak Runoff Rate (cfs)	Total Volume Runoff (ac-ft)	Peak Runoff Rate (cfs)	Total Volume Runoff (ac-ft)	Peak Runoff Rate (cfs)	Total Volume Runoff (ac-ft)
MHN_73	2.1	75	8.8	0.85	-	-	5.7	0.19
MHN_74	15.8	20	47.0	4.43	-	-	20.5	0.72
MHN_75	2.1	29	8.9	0.61	-	-	6.6	0.15
MHN_76	2.1	80	9.2	0.87	-	-	8.0	0.21
MHN_77	2.3	80	8.9	0.97	-	-	4.5	0.18
MHN_78	10.1	26	39.7	2.90	-	-	23.3	0.63
MHN_79	3.3	23	14.7	0.95	-	-	11.3	0.24
MHN_8	2.3	19	10.3	0.64	-	-	9.5	0.17
MHN_80	8.9	24	33.4	2.50	-	-	14.4	0.45
MHN_81	2.0	48	8.4	0.68	-	-	6.4	0.16
MHN_82	3.3	58	14.0	1.15	-	-	9.9	0.26
MHN_83	5.2	2	13.0	1.12	-	-	3.2	0.14
MHN_84	4.6	58	19.7	1.66	-	-	13.4	0.37
MHN_85	2.0	21	8.5	0.54	-	-	6.2	0.14
MHN_86	1.7	20	6.7	0.46	-	-	3.5	0.10
MHN_87	4.2	20	18.2	1.17	-	-	11.6	0.28
MHN_88	3.5	20	14.9	0.96	-	-	8.9	0.22
MHN_89	7.7	21	26.8	2.08	-	-	13.5	0.40
MHN_9	15.0	12	54.8	4.66	-	-	24.2	0.92
MHN_90	2.5	25	9.7	0.72	-	-	5.6	0.15
MHN_91	0.8	20	3.3	0.22	-	-	2.0	0.05
ECC_1	5.3	7	20.9	1.28	-	-	7.69	0.25
ECC_10	2.8	9	12.2	0.76	-	-	3.00	0.12
ECC_11	3.8	13	15.5	0.96	-	-	3.49	0.12
ECC_12	1.7	20	7.6	0.50	-	-	5.49	0.13
ECC_13	1.8	20	8.2	0.74	-	-	7.01	0.18
ECC_14	3.4	10	14.8	0.85	-	-	2.93	0.10
ECC_15	4.7	2	15.0	1.05	-	-	4.19	0.16
ECC_2	4.0	19	13.6	1.06	-	-	6.59	0.20
ECC_3	8.4	11	30.2	2.08	-	-	11.49	0.39
ECC_4	8.7	9	29.7	2.33	-	-	10.75	0.43
ECC_5	17.8	3	29.4	3.71	-	-	7.35	0.34
EC6_6	8.1	7	29.3	1.91	-	-	9.80	0.35
ECC_7	31.5	2	73.2	7.92	-	-	19.46	0.95
ECC_8	4.6	2	17.1	1.03	-	-	5.50	0.19
ECC_9	10.1	5	35.5	2.53	-	-	11.68	0.46

Table 12.3
Hydraulic Modeling Results for XP-SWMM Subwatersheds/Nodes in Minnehaha Creek North East Drainage Area (Revised 12/2006)

Subwatershed or Node	Downstream Conduit	100-Year Storm Results 24-Hour Event				5 and 10-Year Storm Results 1/2-Hour Event			
		Flood Elevation (ft)[3]	Type of Storage[4]	NWL (ft)	Flood Bounce (ft)	5-Year Flood Elevation (ft)	10-Year Flood Elevation (ft)	NWL (ft)	Flood Bounce (ft)
1608	935	871.2				866.8	-		
1610	916	906.7				901.8	-		
1611	920	902.3				900.3	-		
1612	928	899.4				898.9	-		
1617	929	896.2				895.6	-		
1618	930	872.4				867.2	-		
1619	931	870.9				867.1	-		
1620	932	870.8				867.0	-		
1621	933	870.4				866.6	-		
1624	936	870.7				866.6	-		
1626	939	869.0				864.9	-		
1628	941	869.0				864.6	-		
1629	970	869.0				864.6	-		
1633	944	869.1				866.0	-		
1634	945	869.0				865.8	-		
1636	947	879.7				879.6	-		
1637	948	876.7				876.0	-		
1638	949	874.8				874.8	-		
1640	962	874.6				871.3	-		
1642	954	901.2				899.9	-		
1645	956	899.0				895.6	-		
1648	1975	894.9				892.2	-		
1649	959	878.4				874.6	-		
1651	961	874.9				872.7	-		
1653	966	870.6				866.3	-		
1654	964	872.8				868.2	-		
1656	1889	870.9				866.4	-		
1659	969	872.1				869.7	-		
1661	outfall	868.3				864.3	-		
1663	973	868.7				865.7	-		
1669	978	889.0				-	884.3		
1671	980	886.6				-	881.0		
1681	987	884.9				-	880.4		
1682	988	884.1				-	879.6		
1684	990	882.6				-	878.2		
1685	991	881.5				-	877.3		
1687	1001	877.7				-	874.9		
1689	1002	877.7				-	875.7		
1691	995	878.4				-	877.8		
1692	996	877.0				-	876.8		
1693	997	876.8				-	876.7		
1694	998	877.3				-	876.4		
1695	999	877.8				-	876.3		
1697	1003	877.7				-	875.3		
1702	1098	876.9				-	875.7		
1704	1100	876.0				-	873.9		
1705	1899	875.5				-	872.7		
1714	1109	868.6 (867)				-	867.5		
1715	outfall	864.6				-	864.3		
1718	1112	878.9				-	880.7		
1721	1114	883.9				-	882.7		
1722	1116	886.1				-	884.7		
1728	1123	893.1	ST			-	888.0		
1729	1125	893.0				-	887.5		
1731	1126	892.4	ST			-	887.1		
1732	1128	891.9				-	886.8		
1736	1131	887.3 (889)				-	884.3		

Table 12.3
Hydraulic Modeling Results for XP-SWMM Subwatersheds/Nodes in Minnehaha Creek North East Drainage Area (Revised 12/2006)

Subwatershed or Node	Downstream Conduit	100-Year Storm Results 24-Hour Event				5 and 10-Year Storm Results 1/2-Hour Event			
		Flood Elevation (ft)[3]	Type of Storage[4]	NWL (ft)	Flood Bounce (ft)	5-Year Flood Elevation (ft)	10-Year Flood Elevation (ft)	NWL (ft)	Flood Bounce (ft)
1737	outfall	855.1				-	887.6		
1739	outfall	887.7				-	887.9		
1741	1135	894.4	ST			-	892.6		
1745	outfall	884.5				-	884.3		
1747	outfall	883.3				-	882.7		
1749	outfall	883.7				-	883.7		
1870	1246	893.3				-	887.3		
1872	1248	884.8				-	884.6		
1900	outfall	883.8				-	883.7		
2144	outfall	886.5				-	886.4		
2146	outfall	885.8				-	885.8		
2148	outfall	885.9				-	885.8		
2151	1707	900 (890)				-	895.8		
2152	1710	891.5				-	891.3		
2154	1709	898.0				-	895.1		
2235	1774	875.8				-	871.8		
2237	1777	866.9				-	866.9		
2239	outfall	864.4				-	864.4		
2246	outfall	883.5				-	883.4		
2251	outfall	869.4				-	869.4		
2253	outfall	867.0				-	866.8		
2255	outfall	863.6				-	863.5		
2285	outfall	869.4 (878)				-	869.4		
2287	outfall	870.2				-	870.0		
2289	outfall	871.3				-	871.3		
2293	1813	885.4				-	884.9		
2295	outfall	884.1				-	883.9		
2298	outfall	870.8 (878)				-	870.5		
2300	outfall	870.4				-	870.3		
2312	outfall	886.2				-	886.1		
2330	outfall	870.4				-	870.4		
2378	1886	906.0				905.0	-		
2380	1888	898.2				898.0	-		
2384	1892	869.0				864.6	-		
2385	1895	873.7				-	874.2		
2386	outfall	868.7				-	868.8		
2387	1897	870.7 (872)				-	870.8		
2389	1905	875.5	ST			-	872.2		
2390	1900a	875.1				-	871.9		
2394	1902	874.9				-	871.7		
2397	1908	879.0				-	876.3		
2398	1909	877.7				-	875.6		
2400	1911	884.4				-	883.5		
2401	1912	883.2				-	882.1		
2402	1913	881.4				-	880.0		
2403	1914	880.8				-	879.6		
2404	1915	880.1				-	879.1		
2406	1917	886.8				-	886.6		
2408	outfall	883.5				-	883.5		
2412	1922	877.0				-	875.9		
2413	outfall	883.7				-	883.6		
2430	1936	898.2				-	898.1		
2431	1937	894.9				-	894.8		

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Table 12.3
Hydraulic Modeling Results for XP-SWMM Subwatersheds/Nodes in Minnehaha Creek North East Drainage Area (Revised 12/2006)

Subwatershed or Node	Downstream Conduit	100-Year Storm Results 24-Hour Event				5 and 10-Year Storm Results 1/2-Hour Event			
		Flood Elevation (ft)[3]	Type of Storage[4]	NWL (ft)	Flood Bounce (ft)	5-Year Flood Elevation (ft)	10-Year Flood Elevation (ft)	NWL (ft)	Flood Bounce (ft)
2432	1938	893.9				-	893.8		
2459	1976	894.0				886.1	-		
ECC_1	landlocked	899.0	BYD	896.2	2.8	-	897.8	896.2	1.6
ECC_10	1249	879.4				-	879.1		
ECC_11	1247	886.8				-	885.5		
ECC_12	1789	870.9 (868)				-	870.8		
ECC_13	1787	870.8 (872)				-	870.5		
ECC_14	1245	935.1				-	890.6		
ECC_15	1816	876.8				-	876.7		
ECC_2	landlocked	901.4	P	899.5	1.9	-	900.2	899.5	0.7
ECC_3	landlocked	900.9	P	898.8	2.1	-	899.3	898.8	0.5
ECC_4	landlocked	904.4	P	899.9	4.5	-	900.8	899.9	0.9
ECC_5	landlocked	890.8	P	887.0	3.8	-	889.5	887.0	2.5
ECC_6	landlocked	912.8	P	910.4	2.4	-	911.1	910.4	0.7
ECC_7	landlocked	884.8	BYD	881.7	3.1	-	883.0	881.7	1.3
ECC_8	landlocked	887.6	BYD	884.6	3.0	-	885.9	884.6	1.3
ECC_9	landlocked	906.6	P	904.1	2.5	-	906.3	904.1	2.2
MS_1	1829	871.8				867.1	-		
MS_10	outfall	897.8	DDP	885.7	12.1	892.0	-	885.7	6.3
MS_11	976	897.5				892.0	-		
MS_13	965	871.3				866.9	-		
MS_14	landlocked	903.3	BYD	900.9	2.4	902.0	-	900.9	1.1
MS_15	landlocked	871.9	BYD	867.5	4.4	869.2	-	867.5	1.7
MS_16	937	869.0				865.5	-		
MS_17	landlocked	902.5	BYD	899.8	2.7	900.9	-	899.8	1.1
MS_18	967	869.3				865.1	-		
MS_19	946	880.6				880.5	-		
MS_2	960	876.0	ST			873.5	-		
MS_20	landlocked	875.8	BYD	871.5	4.3	873.4	-	871.5	1.9
MS_21	950	875.1				874.9	-		
MS_22	landlocked	872.3	BYD	869.8	2.5	870.9	-	869.8	1.1
MS_23	landlocked	870.6	ST			870.2	-		
MS_24	landlocked	871.8	BYD	867.5	4.3	869.4	-	867.5	1.9
MS_25	1830	871.8		866.3	5.5	867.3	-	866.3	1.0
MS_26	outfall	871.8	P	865.0	6.8	867.1	-	865.0	2.1
MS_27	1827	872.8				867.3	-		
MS_28	1925	870.7	BYD	863.5	7.2	867.1	-	863.5	3.6
MS_29	934	869.8				866.3	-		
MS_3	landlocked	900.6	BYD	897.7	2.9	899.0	-	897.7	1.3
MS_30	1785	872.3	ST			869.6	-		
MS_31	-	869.0	ST			867.2	-		
MS_32	1786	871.9	BYD	862.4	9.5	868.8	-	862.4	6.4
MS_33	972	869.0				866.5	-		
MS_34	927	901.8				899.7	-		
MS_35	924	903.2				901.4	-		
MS_36	926	906.9				902.1	-		
MS_37	912	906.8				903.3	-		
MS_38	1839	869.0		860.0	9.0	864.6	-	860.0	4.6
MS_39	-	869.0	BYD	864.5	4.5	864.7	-	864.5	0.2
MS_4	1887	906.4				904.6	-		
MS_40	outfall	869.0	P	861.5	7.5	864.6	-	861.5	3.1
MS_41	1828	871.8		864.9	6.9	867.1	-	864.9	2.2
MS_42	L163	871.8				868.2	-		
MS_43	951	904.4				903.5	-		
MS_44	1831	871.8		865.6	6.2	867.4	-	865.6	1.8
MS_45	963	872.6				869.0	-		
MS_46	909	873.6	BYD	863.5	10.1	870.9	-	863.5	7.4

Table 12.3
Hydraulic Modeling Results for XP-SWMM Subwatersheds/Nodes in Minnehaha Creek North East Drainage Area (Revised 12/2006)

Subwatershed or Node	Downstream Conduit	100-Year Storm Results 24-Hour Event				5 and 10-Year Storm Results 1/2-Hour Event			
		Flood Elevation (ft)[3]	Type of Storage[4]	NWL (ft)	Flood Bounce (ft)	5-Year Flood Elevation (ft)	10-Year Flood Elevation (ft)	NWL (ft)	Flood Bounce (ft)
MS_47	957	898.3				895.0	-		
MS_48	955	900.5	ST			898.3	-		
MS_49	1940	869.0				864.6	-		
MS_5	953	905.0				903.5	-		
MS_50	938	869.4	BYD	860.9	8.5	866.3	-	860.9	5.3
MS_51	968	875.7				872.1	-		
MS_52	943	869.2	BYD	863.0	6.2	866.5	-	863.0	3.5
MS_53	1942	871.5	BYD	866.6	4.8	867.3	-	866.6	0.7
MS_54	landlocked	869.0	BYD	864.1	4.9	864.9	-	864.1	0.8
MS_55	1890	869.0				864.6	-		
MS_56	landlocked	903.6	BYD	900.5	3.1	901.9	-	900.5	1.4
MS_57	landlocked	903.6	BYD	900.9	2.7	902.1	-	900.9	1.2
MS_58	landlocked	872.0	BYD	869.5	2.5	871.0	-	869.5	1.5
MS_59	landlocked	910.9	BYD	909.6	1.3	910.0	-	909.6	0.4
MS_6	1885	905.1				905.0	-		
MS_7	landlocked	900.6	BYD	897.7	2.9	898.8	-	897.7	1.1
MS_8	952	901.9	ST			900.0	-		
MS_9	1943	874.5	BYD	868.9	5.6	869.7	-	868.9	0.8
MHN_1	outfall	873.4	P	867.0	6.4	-	869.1	867.0	2.1
MHN_10	1896	873.3 (872)				-	873.6		
MHN_11	landlocked	871.7	P	870.2	1.5	-	870.6	870.2	0.3
MHN_12	landlocked	880.5	BYD	878.6	1.9	-	880.1	878.6	1.5
MHN_13	1117	885.9				-	885.7		
MHN_14	1115	884.6	ST			-	883.2		
MHN_15	1113	888.9	ST			-	882.1		
MHN_16	1894	887.4	ST			-	880.0		
MHN_17	11111	889.6	ST			-	887.6		
MHN_18	landlocked	898.3	BYD	897.3	1.0	-	898.3	897.3	1.0
MHN_19	1129	890.5				-	886.4		
MHN_2	1099	876.9	ST			-	875.7		
MHN_20	1124	895.5				-	893.2		
MHN_21	1127	894.9				-	893.8		
MHN_22	1134	894.5	ST			-	893.1		
MHN_23	1133	894.4				-	893.5		
MHN_24	1136	893.8	ST			-	891.5		
MHN_25	1782	895.3 (889)				-	894.0		
MHN_26	1132	899.4 (889)				-	899.3		
MHN_27	1809	872.3 (872)				-	872.2		
MHN_28	1808	872.4 (878)				-	872.3		
MHN_29	outfall to ditch	906.3				-	906.2		
MHN_3	1903	877.0				-	873.8		
MHN_30	1916	888.4	ST			-	887.3		
MHN_31	1918	886.4 (889)				-	886.3		
MHN_32	1781	898.0				-	897.9		
MHN_33	1138	893.6 (889)				-	888.5		
MHN_34	1139	891.4 (889)	ST			-	891.3		

Table 12.3
Hydraulic Modeling Results for XP-SWMM Subwatersheds/Nodes in Minnehaha Creek North East Drainage Area (Revised 12/2006)

Subwatershed or Node	Downstream Conduit	100-Year Storm Results 24-Hour Event				5 and 10-Year Storm Results 1/2-Hour Event			
		Flood Elevation (ft)[3]	Type of Storage[4]	NWL (ft)	Flood Bounce (ft)	5-Year Flood Elevation (ft)	10-Year Flood Elevation (ft)	NWL (ft)	Flood Bounce (ft)
MHN_35	1702p	891.1	ST			-	889.9		
MHN_36	1824	889.3				-	889.2		
MHN_38	1939	888.7 (891)				-	888.6		
MHN_39	1935	901.7				-	901.6		
MHN_4	1962	880.2	ST			-	874.5		
MHN_40	977	891.1				-	886.1		
MHN_41	landlocked	892.1	BYD	889.4	2.7	-	890.8	889.4	1.4
MHN_42	1776	866.8 (867)				-	866.7		
MHN_43	1121	893.0				-	889.6		
MHN_44	1122	893.2				-	889.0		
MHN_46	1825 (2)	894.9				-	894.8		
MHN_47	1705p	904.6				-	900.2		
MHN_48	1706	899.9				-	898.6		
MHN_49	landlocked	885.2	BYD	882.5	2.7	-	883.7	882.5	1.2
MHN_5	1775	872.7				-	871.2		
MHN_50	1118	889.5				-	886.3		
MHN_51	1137	891.3 (889)				-	888.6		
MHN_52	1130	888.4				-	885.8		
MHN_53	1919	884.3				-	883.5		
MHN_54	1920	884.3				-	882.9		
MHN_55	1901	878.7				-	878.6		
MHN_56	1907	879.6				-	876.7		
MHN_57	989	883.4				-	879.0		
MHN_58	985	886.4				-	882.0		
MHN_59	1910	885.9				-	885.4		
MHN_6	1106	883.5				-	882.1		
MHN_60	1814	885.4 (889)				-	884.9		
MHN_61	landlocked	887.9	BYD	876.1	11.8	-	877.5	876.1	1.4
MHN_62	1097	876.9	ST			-	876.0		
MHN_63	1898	876.2				-	872.7		
MHN_64	979	889.1				-	883.0		
MHN_65	landlocked	875.4	BYD	868.8	6.6	-	871.8	868.8	3.0
MHN_66	outfall	873.3	P	869.4	3.9	-	870.3	869.4	0.9
MHN_67	outfall to ditch	889.2				-	889.1		
MHN_68	981	874.1				-	872.7		
MHN_69	1923	889.3 (889)	ST			-	887.6		
MHN_7	1105	884.3	ST			-	882.9		
MHN_71	1924	875.0				-	876.8		
MHN_72	1104	885.7				-	883.2		
MHN_73	986	885.8				-	881.3		
MHN_74	983	879.1				-	879.0		
MHN_75	1704p	890.4				-	890.1		
MHN_76	993	877.8				-	876.2		
MHN_77	994	879.9				-	878.9		
MHN_78	1780	895.2	ST			-	892.8		
MHN_79	1934	890.5	BYD	887.7	2.8	-	889.6	887.7	1.9
MHN_8	outfall to ditch	889.3				-	889.2		
MHN_80	1823	891.5 (890)				-	889.6		
MHN_81	1708	899.7				-	896.4		
MHN_82	992	880.5				-	876.6		
MHN_83	outfall to ditch	896.2				-	896.1		
MHN_84	1772	877.8	ST			-	875.2		

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Table 12.3
Hydraulic Modeling Results for XP-SWMM Subwatersheds/Nodes in Minnehaha Creek North East Drainage Area (Revised 12/2006)

Subwatershed or Node	Downstream Conduit	100-Year Storm Results 24-Hour Event				5 and 10-Year Storm Results 1/2-Hour Event			
		Flood Elevation (ft)[3]	Type of Storage[4]	NWL (ft)	Flood Bounce (ft)	5-Year Flood Elevation (ft)	10-Year Flood Elevation (ft)	NWL (ft)	Flood Bounce (ft)
MHN_85	1271	886.6 (889)				-	885.9		
MHN_86	1788	880.7 (889)				-	871.1		
MHN_87	landlocked	878.0	BYD	874.2	3.8	-	876.0	874.2	1.8
MHN_88	landlocked	874.2	BYD	871.7	2.5	-	874.1	871.7	2.4
MHN_89	1904	877.1				-	871.9		
MHN_9	1810	880.8				-	880.4		
MHN_90	1921	877.2	ST			-	876.3		
MHN_91	landlocked	884.6	BYD	882.4	2.2	-	882.7	882.4	0.3
N134	911	871.8				867.6	-		
N135	L176	871.6				867.0	-		

[1] Conduit modeled as an orifice for the 100-Year Storm Event

[2] Conduit modeled as an orifice fo the 100-Year and the 10-Year Storm Event

[3] Flood elevations in parenthesis indicate a 100-year flood elevation based on the 100-year flood elevation of Minnehaha Creek, according to the Federal Emergency Management Agency Flood Insurance Study for the City of Edina

[4] ST=Street, BYD=Back Yard Depression, P=Pond

Table 12.4
Conduit Modeling Results for Subwatersheds in the North East Minnehaha Creek Drainage Areas (Revised 12/2006)

Conduit ID	Upstream Node	Downstream Node	Conduit Shape	Conduit Dimensions* (ft)	Roughness Coefficient	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Conduit Length (ft)	Slope	100Y Peak Flow Through Conduit (cfs)	5Y Peak Flow through Conduit (cfs)	10Y Peak Flow through Conduit (cfs)
909	MS_46	MS_30	Circular	4.5	0.013	863.52	863.00	347	0.15	148.2	111.5	-
911	N134	N135	Circular	4	0.013	861.95	861.57	253	0.15	56.2	63.9	-
912	MS_37	1610	Circular	1.25	0.013	902.00	901.01	327	0.30	6.7	3.8	-
916	1610	1611	Circular	1.5	0.013	900.80	899.48	337	0.39	11.9	4.9	-
920	1611	1612	Circular	2	0.013	899.11	898.09	324	0.32	18.7	7.2	-
924	MS_35	1611	Circular	1.25	0.013	900.50	900.40	30	0.33	6.9	2.4	-
926	MS_36	1610	Circular	1.25	0.013	901.50	901.40	21	0.48	3.7	1.2	-
927	MS_34	1612	Circular	1.25	0.013	898.29	898.29	30	0.00	11.4	4.5	-
928	1612	1617	Circular	2	0.013	898.09	894.98	74	4.20	30.1	11.3	-
929	1617	1618	Circular	1.5	0.013	894.98	869.50	280	9.10	30.1	11.3	-
930	1618	1619	Circular	2.25	0.013	863.96	863.19	134	0.58	30.1	11.6	-
931	1619	1620	Circular	2.25	0.013	863.19	862.87	35	0.91	19.7	11.9	-
932	1620	1621	Circular	2.25	0.013	863.02	862.43	280	0.21	20.2	12.1	-
933	1621	MS_29	Circular	2.25	0.013	862.43	861.63	108	0.74	22.9	12.1	-
934	MS_29	N147	Circular	3.5	0.013	861.00	860.74	186	0.14	58.4	52.9	-
935	1608	1624	Circular	3.5	0.013	861.50	861.31	128	0.15	54.7	47.1	-
936	1624	MS_29	Circular	3.5	0.013	861.31	861.00	199	0.16	54.8	49.2	-
937	MS_16	1626	Circular	1.75	0.013	862.72	862.62	104	0.10	8.1	11.1	-
938	MS_50	1626	Circular	1.25	0.013	860.92	860.43	175	0.28	5.6	5.4	-
939	1626	1628	Circular	2	0.013	860.43	860.28	175	0.09	13.5	16.0	-
940	N147	2384	Circular	3.5	0.013	860.74	860.03	471	0.15	58.9	56.0	-
941	1628	MS_49	Circular	4	0.013	860.28	859.66	126	0.49	80.5	66.4	-
943	MS_52	1633	Circular	1.75	0.013	863.00	862.87	134	0.10	6.0	9.2	-
944	1633	1634	Circular	1.75	0.013	862.87	862.76	108	0.10	6.0	9.2	-
945	1634	MS_16	Circular	1.75	0.013	862.76	862.72	108	0.04	5.9	9.3	-
946	MS_19	1636	Circular	1	0.013	877.10	876.10	43	2.33	4.4	4.4	-
947	1636	1637	Circular	1	0.013	876.10	874.14	307	0.64	4.4	4.2	-
948	1637	1638	Circular	1	0.013	874.14	872.52	273	0.59	3.0	2.6	-
949	1638	MS_21	Circular	1	0.013	871.30	871.00	41	0.74	2.5	3.0	-
950	MS_21	1640	Circular	1	0.013	869.94	861.40	455	1.88	4.7	5.6	-
951	MS_43	MS_5	Circular	3.5	0.013	901.53	898.75	622	0.45	10.2	9.0	-
952	MS_8	1642	Circular	2.25	0.013	898.10	898.09	368	0.00	13.2	5.9	-
953	MS_5	1642	Circular	1	0.013	898.75	898.09	48	1.38	9.9	8.6	-
954	1642	1645	Circular	2.25	0.013	898.09	897.35	342	0.22	21.2	13.1	-
955	MS_48	1645	Circular	1.25	0.015	894.90	892.66	401	0.56	6.9	5.3	-
956	1645	MS_47	Circular	2.25	0.013	892.35	892.42	59	-0.12	24.1	17.5	-
957	MS_47	1648	Circular	2.25	0.013	892.42	891.45	235	0.41	33.2	20.9	-
959	1649	MS_2	Circular	2.5	0.013	871.90	869.40	416	0.60	32.7	21.4	-
960	MS_2	1651	Circular	3	0.013	869.25	868.14	347	0.32	36.1	32.3	-
961	1651	1640	Circular	2.25	0.013	868.14	861.60	49	13.35	25.9	30.2	-
962	1640	MS_45	Circular	2.5	0.013	861.26	861.02	225	0.11	37.0	37.3	-
963	MS_45	1653	Circular	2.5	0.013	861.02	860.78	215	0.11	40.3	40.6	-
964	1654	MS_13	Circular	1.25	0.013	867.38	866.00	106.5	1.30	8.7	5.8	-
965	MS_13	1656	Circular	2.5	0.013	866.00	864.30	167	1.02	18.9	11.1	-
966	1653	MS_18	Circular	3.5	0.013	860.78	860.60	440	0.04	56.8	49.1	-
967	MS_18	1628	Circular	3.5	0.013	860.60	860.28	438	0.07	67.4	52.2	-
968	MS_51	1659	Circular	1.25	0.013	871.30	869.50	48	3.75	17.7	8.8	-
969	1659	MS_52	Circular	1.25	0.013	864.89	863.00	185	1.02	10.7	8.7	-
970	1629	MS_40	Circular	3.5	0.013	861.50	858.50	190.5	1.58	52.8	50.6	-
972	MS_33	1663	Circular	2.08	0.024	862.88	861.48	250	0.56	9.4	8.5	-
973	1663	1661	Circular	2	0.024	861.48	860.00	364	0.41	9.3	8.1	-
976	MS_11	MS_10	Circular	1.25	0.013	891.00	886.00	285	1.75	-2.2	2.3	-
977	MHN_40	1669	Circular	2	0.013	885.20	882.85	58	4.09	40.8	-	18.9
978	1669	MHN_64	Circular	2	0.013	882.65	881.56	35	3.16	32.6	-	18.9
979	MHN_64	1671	Circular	2	0.013	881.56	880.11	29	5.00	48.8	-	25.1
980	1671	MHN_68	Circular	2	0.013	880.11	868.98	180	6.20	48.8	-	25.8
981	MHN_68	MHN_1	Circular	2	0.013	868.98	868.69	48	0.60	35.2	-	27.7

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Table 12.4
Conduit Modeling Results for Subwatersheds in the North East Minnehaha Creek Drainage Areas (Revised 12/2006)

Conduit ID	Upstream Node	Downstream Node	Conduit Shape	Conduit Dimensions* (ft)	Roughness Coefficient	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Conduit Length (ft)	Slope	100Y Peak Flow Through Conduit (cfs)	5Y Peak Flow through Conduit (cfs)	10Y Peak Flow through Conduit (cfs)
983	MHN_74	MHN_71	Circular	1	0.013	874.64	871.78	309	0.93	5.0	-	5.0
985	MHN_58	MHN_73	Circular	2.25	0.013	878.70	875.40	158	2.10	21.2	-	19.6
986	MHN_73	1681	Circular	2.25	0.013	875.40	875.45	16	-0.32	28.2	-	25.2
987	1681	1682	Circular	2.5	0.013	875.45	874.70	159.9	0.47	28.1	-	25.1
988	1682	MHN_57	Circular	2.5	0.013	874.70	874.10	134	0.45	28.1	-	25.2
989	MHN_57	1684	Circular	2.5	0.013	874.10	873.78	97	0.33	33.8	-	30.1
990	1684	1685	Circular	2.5	0.013	873.78	873.18	148	0.40	33.7	-	30.1
991	1685	MHN_82	Circular	2.5	0.013	873.18	872.74	124	0.36	33.7	-	30.1
992	MHN_82	1687	Circular	2.5	0.013	872.74	872.08	165	0.40	46.3	-	39.8
993	MHN_76	1689	Circular	2	0.013	869.49	869.01	57	0.84	16.4	-	17.0
994	MHN_77	1691	Circular	1.5	0.013	873.85	872.27	87	1.82	10.8	-	9.6
995	1691	1692	Circular	1.5	0.013	872.27	871.21	127	0.84	10.8	-	9.4
996	1692	1693	Circular	2	0.013	871.21	870.87	40	0.85	10.8	-	9.2
997	1693	1694	Circular	2	0.013	870.87	870.39	57	0.84	13.1	-	9.7
998	1694	1695	Circular	2	0.013	870.39	869.70	107	0.64	13.1	-	10.4
999	1695	MHN_76	Circular	2	0.013	869.70	869.49	107	0.20	14.3	-	12.0
1001	1687	MHN_3	Circular	4	0.013	866.14	866.14	433	0.00	66.5	-	72.1
1002	1689	1697	Circular	2	0.013	869.01	868.93	8	1.00	16.6	-	17.1
1003	1697	MHN_84	Circular	3.5	0.013	866.85	866.79	32	0.19	21.6	-	21.6
1097	MHN_62	1702	Circular	1.5	0.013	872.02	871.90	230	0.05	6.4	-	4.2
1098	1702	MHN_2	Circular	1.5	0.013	871.90	871.85	22	0.91	6.7	-	4.5
1099	MHN_2	1704	Circular	1.5	0.013	871.85	871.01	280	0.30	9.5	-	5.3
1100	1704	1705	Circular	1.5	0.013	871.01	870.30	237	0.30	9.5	-	5.3
1104	MHN_72	MHN_7	Circular	2	0.013	875.82	875.13	69	1.01	30.2	-	15.9
1105	MHN_7	MHN_6	Circular	2	0.013	875.13	874.58	56	0.98	24.8	-	20.5
1106	MHN_6	MHN_10	Circular	2	0.013	874.58	870.39	500	0.84	29.8	-	28.0
1109	1714	1715	Circular	4.5	0.024	862.48	861.48	200	0.50	113.3	-	92.8
1111[1]	MHN_17	1718	Circular1	1.25	0.013	880.20	872.60	460	1.65	3.2	-	9.0
1112	1718	N235	Circular	2.5	0.015	872.48	871.45	225	0.46	27.3	-	26.6
1113	MHN_15	1718	Circular	2.25	0.015	873.84	872.58	338	0.37	24.1	-	23.1
1114	1721	N245	Circular	2.25	0.015	875.88	873.80	398	0.52	20.9	-	21.1
1115	MHN_14	1721	Circular	2.25	0.013	876.08	875.88	128	0.16	21.0	-	21.1
1116	1722	MHN_14	Circular	1.75	0.013	879.15	876.08	231	1.33	7.8	-	17.1
1117	MHN_13	1722	Circular	1	0.013	881.72	880.40	60	2.20	3.1	-	9.0
1118	MHN_50	1722	Circular	1.75	0.013	882.96	881.72	311	0.40	5.0	-	10.5
1121	MHN_43	MHN_44	Circular	2	0.013	888.07	887.69	304	0.13	12.7	-	8.5
1122	MHN_44	1728	Circular	3	0.013	887.69	886.83	147	0.59	28.2	-	18.2
1123	1728	1729	Circular	3	0.013	886.83	885.45	186	0.74	28.3	-	18.2
1124	MHN_20	1729	Circular	1.25	0.013	889.70	889.49	43	0.49	15.3	-	11.0
1125	1729	1731	Circular	3.5	0.013	885.45	884.80	176	0.37	51.3	-	28.7
1126	1731	1732	Circular	3.5	0.013	884.80	884.12	165	0.41	51.5	-	28.4
1127	MHN_21	1732	Circular	1.25	0.013	891.38	891.27	35	0.31	11.4	-	8.7
1128	1732	MHN_19	Circular	3.5	0.013	884.12	882.18	342	0.57	62.6	-	36.7
1129	MHN_19	MHN_52	Circular	4	0.013	882.18	882.10	356	0.02	97.9	-	51.1
1130	MHN_52	1736	Circular	4	0.013	882.10	882.04	133	0.05	105.9	-	56.0
1131	1736	1737	Circular	4	0.013	882.04	882.00	95	0.04	105.9	-	56.0
1132	MHN_26	1739	Circular	1.25	0.015	898.50	886.92	190	6.09	10.3	-	7.9
1133	MHN_23	1741	Circular	1.5	0.013	888.82	887.31	253	0.60	13.1	-	15.1
1134	MHN_22	1741	Circular	1.25	0.015	888.60	887.31	280	0.46	6.9	-	9.6
1135	1741	MHN_24	Circular	1.75	0.015	887.31	885.62	343	0.49	12.4	-	10.9
1136	MHN_24	MHN_51	Circular	1.75	0.015	885.62	883.48	342	0.63	15.7	-	13.1
1137	MHN_51	1745	Circular	2	0.024	883.48	882.86	190	0.33	21.7	-	16.0
1138	MHN_33	1747	Circular	1.5	0.015	887.40	881.80	142	3.94	21.8	-	12.8
1139	MHN_34	1749	Circular	1.25	0.02	885.75	882.60	195	1.62	8.3	-	8.2
1245	ECC_14	1870	Circular	1	0.013	887.94	886.40	334	0.46	14.7	-	3.1
1246	1870	ECC_11	Circular	1	0.013	886.40	880.20	323	1.92	5.2	-	2.9
1247	ECC_11	1872	Circular	1	0.013	880.20	876.61	289	1.24	4.9	-	6.1

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Table 12.4
Conduit Modeling Results for Subwatersheds in the North East Minnehaha Creek Drainage Areas (Revised 12/2006)

Conduit ID	Upstream Node	Downstream Node	Conduit Shape	Conduit Dimensions* (ft)	Roughness Coefficient	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Conduit Length (ft)	Slope	100Y Peak Flow Through Conduit (cfs)	5Y Peak Flow through Conduit (cfs)	10Y Peak Flow through Conduit (cfs)
1248	1872	ECC_10	Circular	1	0.013	876.61	873.10	289	1.21	5.0	-	5.0
1249	ECC_10	ECC_15	Circular	1	0.013	873.10	871.00	122	1.72	6.9	-	6.0
1271	MHN_85	1900	Circular	1.25	0.013	884.95	882.95	86	2.33	8.5	-	6.2
1706	MHN_48	2151	Circular	1	0.013	895.80	895.10	67	1.04	7.1	-	6.4
1707	2151	2152	Circular	1	0.013	894.90	890.11	123	3.89	8.8	-	6.4
1708	MHN_81	2154	Circular	1	0.013	894.70	894.30	20	2.00	8.4	-	6.4
1709	2154	2152	Circular	1	0.013	894.20	890.11	80	5.11	8.4	-	6.4
1710	2152	MHN_75	Circular	3	0.013	890.11	889.14	215	0.45	17.2	-	12.9
1772	MHN_84	1687	Circular	3.5	0.013	866.79	866.14	320	0.20	41.5	-	33.5
1774	2235	MHN_5	Circular	2	0.013	869.10	865.21	283	1.37	23.9	-	11.4
1775	MHN_5	2237	Circular	2	0.013	865.21	862.89	363	0.64	28.0	-	24.0
1776	MHN_42	2237	Circular	1	0.01	863.37	862.48	84	1.06	4.8	-	4.7
1777	2237	2239	Circular	2	0.013	862.48	862.76	145	-0.19	22.0	-	21.7
1780	MHN_78	MHN_79	Circular	1.5	0.01	891.48	888.00	228.71	1.52	18.3	-	14.5
1781	MHN_32	MHN_25	Circular	1.5	0.013	891.99	888.94	374	0.82	13.1	-	13.1
1782	MHN_25	2246	Circular	1.5	0.013	890.04	882.47	75	10.09	26.2	-	23.6
1785	MS_30	MS_32	Circular	4.5	0.013	863.00	862.42	194	0.30	112.2	109.6	
1786	MS_32	MS_42	Circular	4.5	0.013	862.42	862.00	136	0.31	106.8	114.0	
1787	ECC_13	2251	Circular	1.25	0.013	868.66	868.32	34	1.00	8.2	-	7.0
1788	MHN_86	2253	Circular	1	0.024	867.18	866.00	118	1.00	6.6	-	3.5
1789	ECC_12	2255	Circular	1.25	0.01	870.17	863.00	220	3.26	7.6	-	5.5
1808	MHN_28	2285	Circular	1	0.024	872.03	869.01	26	11.62	1.9	-	0.9
1809	MHN_27	2287	Circular	1	0.024	871.79	869.70	26	8.04	2.4	-	1.7
1810	MHN_9	2289	Circular	1.25	0.013	871.88	870.00	242	0.78	13.1	-	12.8
1813	2293	MHN_60	Circular	1	0.013	884.85	884.29	42	1.33	0.1	-	0.0
1814	MHN_60	2295	Circular	1.25	0.013	884.29	883.48	36	2.25	5.4	-	2.5
1816	ECC_15	2298	Circular	1.25	0.013	871.00	869.50	38	3.95	17.0	-	10.3
1823	MHN_80	2312	Circular	1.6	0.024	886.04	884.64	41	3.41	20.4	-	16.8
1824	MHN_36	2146	Circular	1	0.024	886.55	884.83	12	14.33	5.9	-	5.8
1827	MS_27	1608	Circular	1.25	0.013	866.50	861.50	13	38.46	15.0	7.4	-
1828	MS_41	MS_26	Circular	1	0.024	864.90	864.50	30	1.33	4.8	1.5	-
1829	MS_1	MS_26	Circular	1	0.024	865.97	865.27	70	1.00	2.3	1.2	-
1830	MS_25	MS_26	Circular	1	0.024	866.30	865.60	70	1.00	3.4	1.9	-
1831	MS_44	MS_26	Circular	1.5	0.024	865.59	865.50	22	0.41	9.1	6.6	-
1839	MS_38	1661	Circular	2.5	0.013	859.99	859.67	617	0.05	17.9	17.9	-
1885	MS_6	2378	Circular	1.25	0.013	901.50	900.30	405	0.30	5.1	3.9	-
1886	2378	MS_4	Circular	1.5	0.013	900.12	898.92	427	0.28	5.2	4.0	-
1887	MS_4	2380	Circular	1.5	0.013	898.92	897.49	377	0.38	14.2	12.2	-
1888	2380	MS_10	Circular	1.5	0.013	897.49	885.72	50	23.54	14.2	14.0	-
1889	1656	1653	Circular	2.5	0.013	864.30	864.00	32	0.94	18.9	11.5	-
1890	MS_55	MS_40	Circular	2	0.013	858.50	858.00	200	0.25	11.5	-	11.5
1892	2384	MS_38	Circular	3.5	0.013	860.03	859.99	27	0.15	37.4	25.8	-
1893	2384	1629	Circular	3.5	0.014	860.03	861.50	36	-4.08	52.8	50.7	-
1894	MHN_16	2385	Circular	2.5	0.015	871.50	868.94	468	0.53	31.9	-	36.3
1895	2385	MHN_10	Circular	2.5	0.015	868.94	868.94	15	0.00	32.4	-	36.3
1896	MHN_10	2387	Circular	3	0.013	868.81	866.78	176	1.15	63.5	-	65.5
1897	2387	2386	Circular	3	0.013	866.78	866.40	37	1.03	63.5	-	65.5
1898	MHN_63	2389	Circular	2.25	0.013	868.50	866.90	377	0.42	12.4	-	10.6
1899	1705	2390	Circular	1.5	0.013	870.30	869.78	173	0.30	9.6	-	5.4
1901	MHN_55	2394	Circular	1.5	0.014	869.57	865.77	8.5	44.71	13.1	-	9.5
1902	2394	1714	Circular	4	0.013	865.77	862.48	823	0.40	113.3	-	92.8
1903	MHN_3	2389	Circular	4	0.013	866.14	866.10	424	0.01	76.1	-	79.5
1904	MHN_89	2235	Circular	2	0.013	870.25	869.10	245	0.00	16.4	-	8.9
1905	2389	2394	Circular	4	0.013	866.10	865.77	23	1.43	93.1	-	84.6
1906	MHN_89	2394	Circular	1.5	0.013	870.25	865.77	13	34.46	16.4	-	12.2
1907	MHN_56	2397	Circular	1.5	0.013	874.43	872.94	100	1.49	9.1	-	9.2
1908	2397	2398	Circular	1.5	0.013	872.94	870.64	230	1.00	9.2	-	10.4

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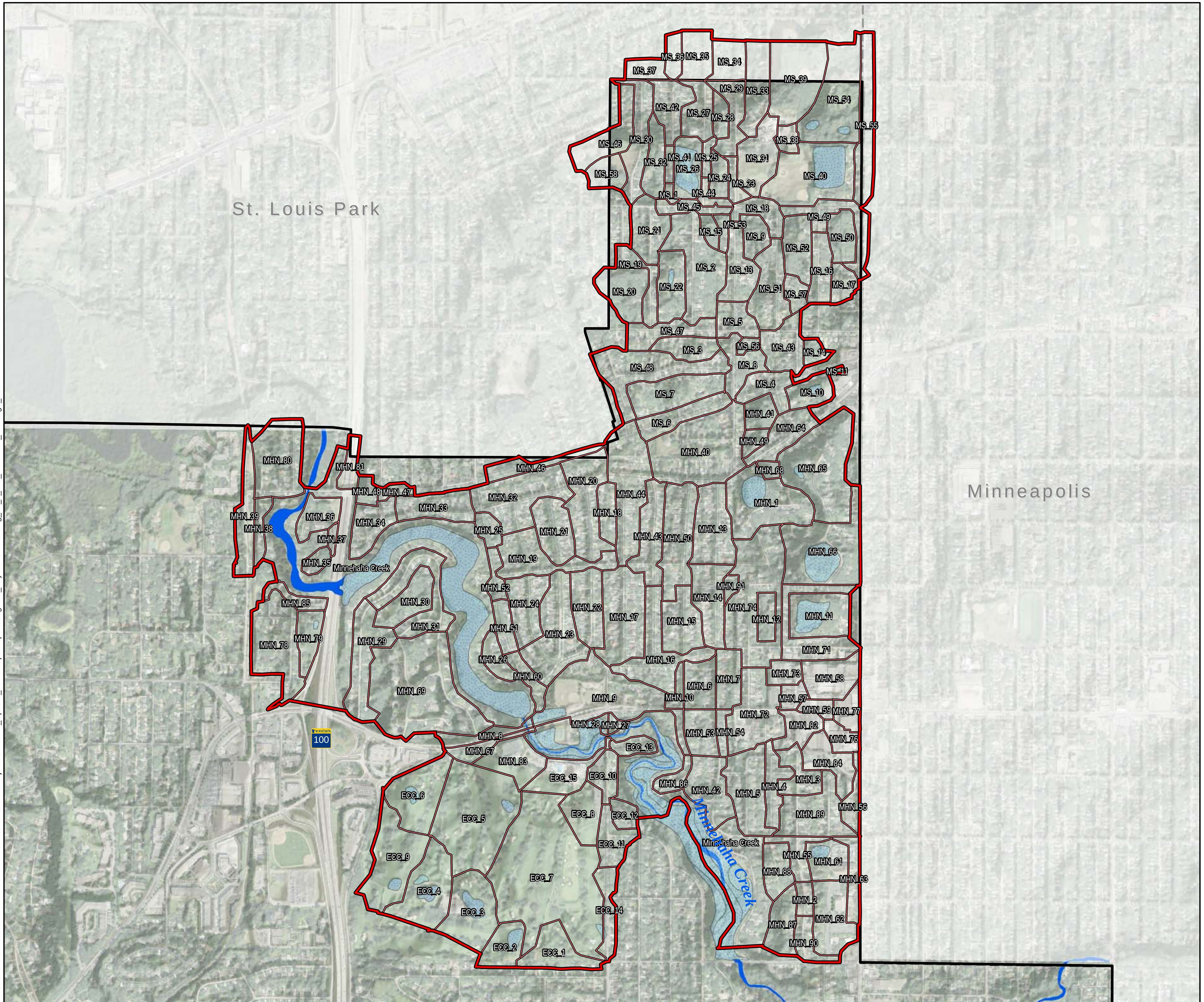
Table 12.4
Conduit Modeling Results for Subwatersheds in the North East Minnehaha Creek Drainage Areas (Revised 12/2006)

Conduit ID	Upstream Node	Downstream Node	Conduit Shape	Conduit Dimensions* (ft)	Roughness Coefficient	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Conduit Length (ft)	Slope	100Y Peak Flow Through Conduit (cfs)	5Y Peak Flow through Conduit (cfs)	10Y Peak Flow through Conduit (cfs)
1909	2398	1697	Circular	1.5	0.013	870.64	866.85	84	4.51	8.0	-	8.6
1910	MHN_59	2400	Circular	1	0.013	880.60	878.97	94	1.73	5.1	-	5.7
1911	2400	2401	Circular	1	0.013	878.77	878.58	71	0.27	5.0	-	5.6
1912	2401	2402	Circular	1	0.013	877.38	876.90	87	0.55	5.0	-	5.6
1913	2402	2403	Circular	1.25	0.01	876.90	874.05	108	2.64	5.9	-	5.6
1914	2403	2404	Circular	1.25	0.01	874.05	875.74	90	-1.88	5.2	-	5.6
1915	2404	MHN_77	Circular	1.5	0.013	875.74	873.85	71	2.66	5.2	-	5.6
1916	MHN_30	2406	Circular	1.25	0.01	884.22	883.74	102	0.47	10.3	-	6.9
1917	2406	MHN_31	Circular	1.25	0.01	883.74	883.55	29	0.66	8.4	-	6.9
1918	MHN_31	2408	Circular	1.5	0.01	883.55	882.67	13	7.04	14.1	-	13.9
1919	MHN_53	MHN_6	Circular	1	0.013	876.79	876.05	37	2.00	6.5	-	5.7
1920	MHN_54	MHN_7	Circular	1	0.013	876.25	875.51	37	2.00	7.3	-	5.6
1921	MHN_90	2412	Circular	1.5	0.013	873.12	872.40	240	0.30	5.6	-	4.4
1922	2412	1702	Circular	1.5	0.013	872.40	871.90	90	0.56	5.5	-	4.3
1923	MHN_69	2413	Circular	2	0.015	882.41	881.77	180	0.36	34.3	-	29.0
1924	MHN_71	MHN_66	Circular	1.25	0.013	870.60	869.40	78	1.54	15.2	-	13.3
1925	MS_28	1624	Circular	1	0.013	863.50	863.10	100	0.40	2.9	4.2	
1934	MHN_79	2428	Circular	1.75	0.013	887.71	886.68	57.9	1.43	28.4	-	22.4
1935	MHN_39	2430	Circular	1.25	0.013	894.37	893.65	150	0.48	9.4	-	9.4
1936	2430	2431	Circular	1.25	0.013	892.95	891.98	122	0.80	9.2	-	9.3
1937	2431	2432	Circular	1.25	0.013	891.98	891.87	40	0.28	9.0	-	9.0
1938	2432	MHN_38	Circular	1.25	0.013	891.87	884.65	222	3.25	9.0	-	9.0
1939	MHN_38	2330	Circular	1.25	0.013	884.65	883.95	120	0.58	9.5	-	9.5
1940	MS_49	MS_40	Circular	4	0.013	859.66	858.63	127	0.81	103.1	74.2	-
1942	MS_53	MS_13	Circular	1.25	0.013	866.61	866.00	134.5	0.45	4.5	2.3	-
1943	MS_9	1654	Circular	1.25	0.013	868.86	867.38	113.8	1.30	8.8	5.8	-
1962	MHN_4	2235	Circular	1	0.01	874.02	869.10	175	2.81	7.7	-	4.3
1975	1648	2459	Circular	2.25	0.013	891.45	885.14	81	7.79	33.0	20.9	-
1976	2459	1649	Circular	1.5	0.013	885.14	871.90	170	7.79	32.7	22.0	-
1702p	MHN_35	2144	Circular	1	0.023	887.00	885.70	159	0.82	3.2	-	2.7
1704p	MHN_75	2148	Circular	3	0.013	889.14	885.03	88	4.67	26.0	-	19.1
1705p	MHN_47	MHN_48	Circular	1	0.013	898.40	895.80	289	0.90	4.6	-	2.7
1900a	2390	MHN_55	Circular	1.5	0.014	869.78	869.57	19.5	1.08	10.2	-	5.9
L163	MS_42	N134	Circular	4.5	0.013	862.00	861.95	40.6	0.12	115.7	118.4	-
L164	N135	1608	Circular	3.5	0.013	861.57	861.50	40	0.18	54.4	41.7	-
L175	N134	N146	Circular	3.5	0.013	861.95	860.25	40	4.25	62.7	54.5	-
L176	N135	N145	Circular	3.5	0.013	861.57	860.25	30	4.40	54.8	41.1	-

[1] Conduit modeled as an orifice for the 100-year storm event



City of Edina Boundary
Roads/Highways
Lake/Wetland
Creek/Stream
Minnehaha Creek - Northeast Drainage Basin
Subwatershed

Imagery Source: Aerials Express, 2008

Feet
1,000 0 1,000

Meters
300 0 300

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Figure 12.1

NORTHEAST MINNEHAHA CREEK
DRAINAGE BASIN
Comprehensive Water Resource
Management Plan
City of Edina, Minnesota

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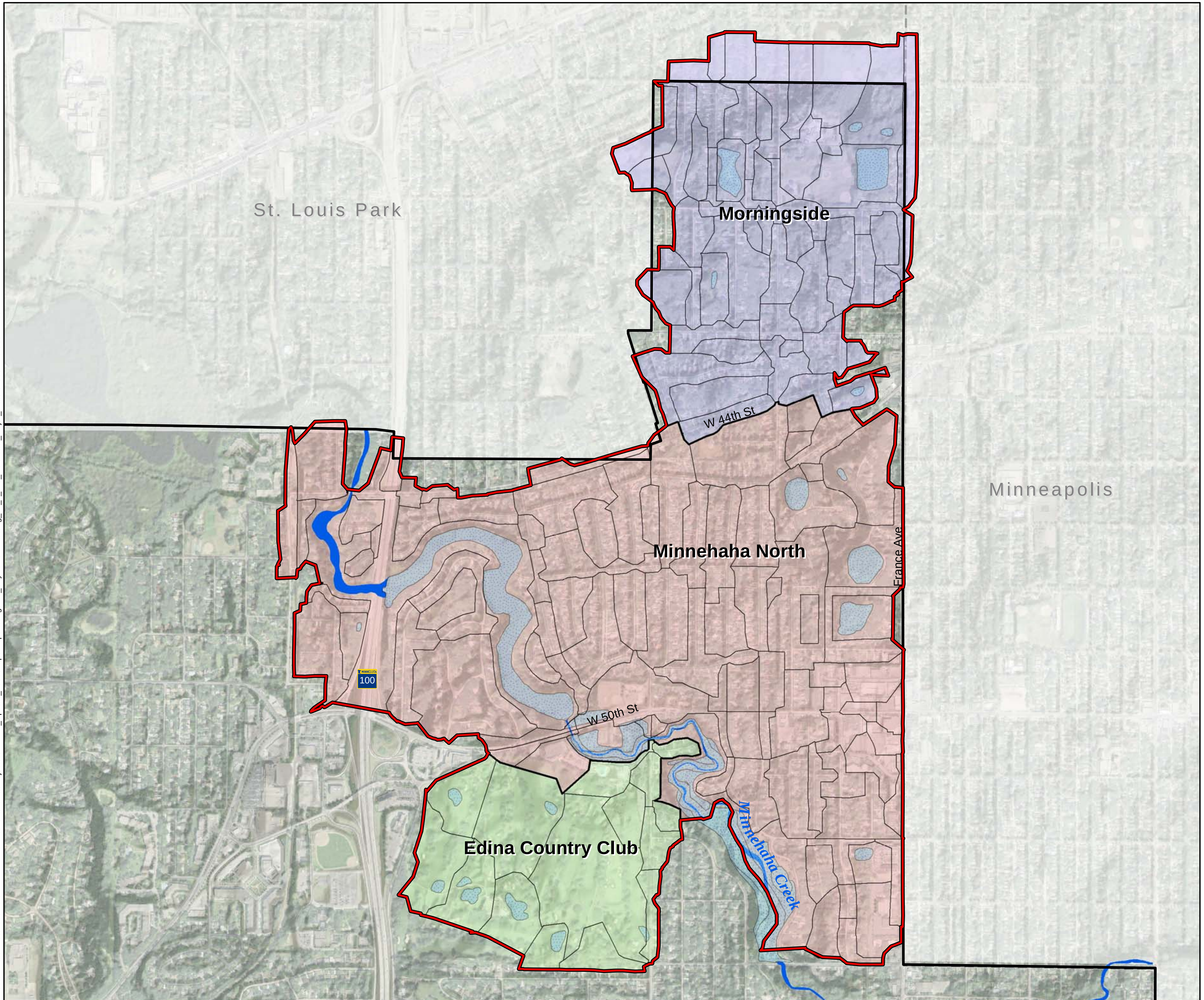

City of Edina Boundary
Roads/Highways
Creek/Stream
Lake/Wetland
Minnehaha Creek - Northeast Drainage Basin
Major Watershed
Subwatershed

Imagery Source: Aerials Express, 2008

N

Feet
1,000 0 1,000

Meters
300 0 300

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Figure 12.2

NORTHEAST MINNEHAHA CREEK
MAJOR WATERSHEDS
Comprehensive Water Resource Management Plan
City of Edina, Minnesota

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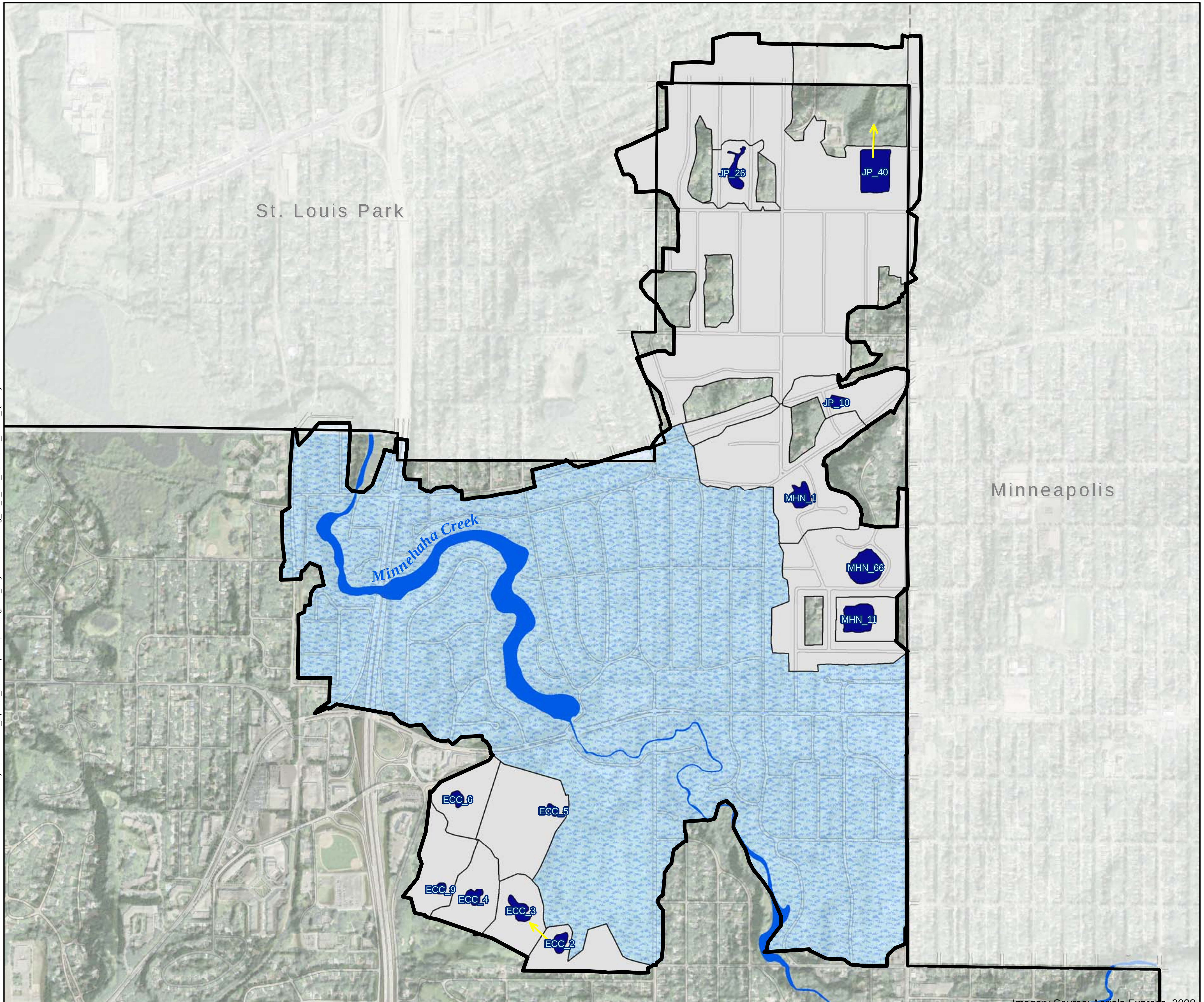

Percent TP Removal in Water Body*
This number represents the percent of the total annual mass of phosphorus entering the water body that is removed.

- 0 - 25% (Poor/No Removal)
- 25 - 40% (Moderate Removal)
- 40 - 60% (Good Removal)
- 60 - 100% (Excellent Removal)

Cumulative TP Removal in Watershed*
This number represents the percent of the total annual mass of phosphorus entering the watershed and upstream watersheds that is removed in the pond and all upstream ponds.

- 0 - 25% (Poor/No Removal)
- 25 - 40% (Moderate Removal)
- 40 - 60% (Good Removal)
- 60 - 100% (Excellent Removal)

*Data based on results of P8 modeling.

Area Draining Directly to Minnehaha Creek

Flow Direction

N

Feet
1,000 0 1,000

Meters
300 0 300

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Figure 12.4

NORTHEAST MINNEHAHA CREEK
WATER QUALITY
MODELING RESULTS
Comprehensive Water Resource
Management Plan
City of Edina, Minnesota

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