8.0 Nine Mile Creek- South

8.1 General Description of Drainage Area

Figure 8.1 depicts the Nine Mile Creek- South drainage basin. The Nine Mile Creek- South drainage basin is located in the southeast portion of Edina. The drainage basin encompasses approximately 1,162 acres that ultimately drain to the North Fork of Nine Mile Creek between West 70th Street and the south Edina city limits.

8.1.1 Drainage Patterns

The stormwater system within this drainage area is comprised of storm sewers, ditches, overland flow paths, wetlands, and ponding basins. The Nine Mile Creek- South drainage basin has been divided into several major watersheds based on the drainage patterns. These major watersheds are depicted in Figure 8.2. Each major watershed has been further delineated into many subwatersheds. The naming convention for each subwatershed is based on the major watershed it is located within. Table 8.1 lists each major watershed and the associated subwatershed naming convention.

Table 8.1 Major Watersheds within the Nine Mile Creek—South Drainage Basin

Major Watershed	Subwatershed Naming Convention	# of Subwatersheds	Drainage Area (acres)
Centennial Lakes	CL_##	39	215
South Pond	SP_##	16	202
Nine Mile South	NMS_##	107	746

8.1.1.1 Centennial Lakes

The Centennial Lakes watershed is located in southeast Edina. The 215-acre watershed drains to Centennial Lakes. The watershed is bordered by West 69th Street on the north, West 78th Street on the south, France Avenue on the west and York Avenue on the east. Runoff from France Avenue between West 69th Street and just south of Gallagher Drive drains to Centennial Lakes. France Avenue drainage south of Gallagher Drive flows to the South Pond. The watershed is characterized by mainly commercial and high-density residential land use. Centennial Lakes span 9.5 acres, stretching from Gallagher Drive south to Minnesota Drive, and receive runoff from the direct watershed as well as flow from Adam's Hill Pond (10 cfs). The normal elevation of Centennial Lakes is 838 MSL, controlled by a weir structure that discharges to the South Pond.

8.1.1.2 South Pond (Border Basin)

The South Pond is located on the border between Edina and Bloomington, just west of the intersection of Minnesota Drive and West 77th Street. The watershed draining to the South Pond encompasses 202 acres. The land use within the watershed is entirely commercial and industrial, thus highly impervious. In addition to the runoff from the direct watershed, the South Pond receives

flow from Centennial Lakes. The South Pond was categorized as a Type 4 wetland in the wetland inventory, a shallow (0.5 to 3 feet), marshy wetland with vegetation such as grasses, cattails, and bulrushes. The normal elevation of the South Pond is controlled at 814.5 MSL by a weir structures. Discharge from the South Pond flows west through the storm sewer system along Viking Drive and eventually discharges to the North Fork of Nine Mile Creek.

8.1.1.3 Nine Mile South

The Nine Mile South watershed encompasses the area that drains to the North Fork of Nine Mile Creek between West 70th Street and the southern border of Edina. The 746-acre watershed extends to Cahill Road to the west, France Avenue to the east, West 66th Street to the north, and West 78th Street to the south. The watershed is characterized by multiple land uses, including residential, commercial, industrial, highway, and golf course. The portion of the watershed west of the North Fork of Nine Mile Creek is almost entirely commercial and industrial, thus highly impervious. The northern portion is low-density residential. The southeast portion of the watershed consists mainly of high-density residential, a large commercial and industrial area, and the Fred Richards Golf Course. The golf course is characterized by a series of ponding basins that receive runoff from an area of approximately 188 acres. Discharge from the golf course ponds flows southward through a storm sewer system located between the 4700 and 4660 West 77th Street properties. This system connects to the trunk system that flows westward from the South Pond to the North Fork of Nine Mile Creek.

8.2 Stormwater System Analysis and Results

8.2.1 Hydrologic/Hydraulic Modeling Results

The 10-year and 100-year frequency flood analyses were performed for the Nine Mile Creek- South drainage basin. The 10-year analysis was based on a ½-hour storm of 1.65 inches of rain. The 100-year analysis was based on a 24-hour storm event of 6 inches of rain. Table 8.2 presents the watershed information and the results for the 10-year and 100-year hydrologic analyses.

The results of the 10-year and 100-year frequency hydraulic analyses for the Nine Mile Creek- South drainage basin are summarized in Table 8.3 and Table 8.4. The column headings in Table 8.3 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 Nine Mile Creek, per the *Nine Mile Creek Watershed Management Plan*, May 1996.

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.

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 8.4 summarizes the conveyance system data used in the model and the model results for the storm sewer system within the Nine Mile Creek- South drainage basin. The peak flows through each conveyance system for the 10-year and 100-year frequency storm events are listed in the table. The values presented represent the peak flow rate through each pipe system only and do not reflect the combined total flow from an upstream node to the downstream node when overflow from a manhole/pond occurs.

Figure 8.3 graphically represents the results of the 10-year and 100-year frequency hydraulic analyses. The figure depicts the boundaries of the drainage areas, 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 10-year and 100-year frequency 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 8.3 were color coded based on the resulting surcharge conditions. The green nodes signify no surcharging occurred during the 100-year or 10-year storm event, the yellow nodes indicate surcharging during the 100-year event, and the red nodes identify that surcharging is likely to occur during both a 100-year and 10-year frequency storm event. Figure 8.3 illustrates that several XP-SWMM nodes within the Nine Mile Creek- South drainage basin are predicted to experience surcharged conditions during both the 10-year and 100-year frequency storm events. This indicates a probability greater than 10 percent *in any year* that the system will be overburdened and unable to meet the desired level of service at these locations. These manhole and catch basin are more likely to experience inundation during the smaller, more frequent storm events of various durations.

Another objective of the hydraulic analyses 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 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 Nine Mile Creek- South drainage basin, 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 flood levels of the ponding areas appeared to potentially threaten structures, low house elevations were obtained through field surveys. The areas that were determined to flood and threaten structures during the 100-year frequency storm event are listed in Table 8.5 and highlighted in Figure 8.3. Discussion and recommended implementation considerations for these areas are included in Section 8.3.

8.2.2 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 8.4 depicts the results of the water quality modeling for the Nine Mile Creek- South 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 phosphorus removal, the recommended storage volume was calculated for each pond within the drainage basin and compared to the existing permanent pool storage volume.

8.3 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.

8.3.1 Increased Storm Sewer Capacity Projects

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

8.3.1.1 7001 & 7025 France Avenue (CL_51)

A depression area exists at the properties of 7001 and 7025 France Avenue. The depression area is drained by an 18-inch storm sewer pipe that connects into the trunk system along France Avenue. During intense storm events, such as the 100-year frequency storm, high flows through the France Avenue trunk system restrict the drainage from the depression area and the area becomes inundated with stormwater. The 100-year frequency flood elevation for this depression area is 862.6 MSL. Flooding problems have been historically noted in this area. A flapgate was added to the collection pipe at this area to prevent the France Avenue system from backing up and causing further inundation. However, with the flapgate closed, there is no outlet from this area and the storage volume in the parking lot is not sufficient to prevent flooding of the structures. Prior to construction of the bank currently located on this property, the property owner was informed of the flooding potential. No recommendations to alleviate the flooding are being made at this time.

8.3.2 Construction/Upgrade of Water Quality Basins

Results of the water quality modeling in the Nine Mile Creek- South drainage area indicated that the annual removal of total phosphorus from several ponds was predicted to be below the desired 60 percent removal rate, under average year conditions. For those ponds with total phosphorus removal below 60 percent, the permanent pool storage volume was analyzed to determine if additional capacity is necessary. The ponds that exhibited deficiencies in total phosphorus removal and permanent pool volume are listed below, along with recommended pond upgrades.

A large portion of the stormwater runoff from the Nine Mile Creek- South drainage basin drains directly to the North Fork of Nine Mile Creek through storm sewer system, without any water quality treatment prior to entering the Creek. The large area draining directly to the Creek (approximately 500 acres) is depicted in Figure 8.4. To remove pollutants and improve the quality of the discharge

to Nine Mile Creek, it is recommended that the City consider installation of a water quality treatment basin upstream of the discharge location at West 77th Street and T.H. 100. This recommendation is discussed in additional detail below.

8.3.2.1 West 77th Street & T.H. 100

The southwest portion of the Nine Mile Creek- South drainage basin is an industrial, highly impervious area. Stormwater from this area is collected via storm sewer and discharged into the North Fork of Nine Mile Creek without any water quality treatment prior to discharge. To provide some pollutant removal from the stormwater prior to discharge into the Creek, construction of a water quality basin is being considered in the southwest quadrant of the intersection of T.H. 100 and West 77th Street. The basin will receive runoff from an area of approximately 50 acres along Industrial Boulevard. Based on the MPCA recommended design criteria for permanent pool storage volume in detention basins, the total required dead storage volume for this basin is 4.4 acre-feet.

8.3.2.2 NMS_76

Pond NMS_76 is located in on the east side of the Fred Richards Golf Course, just northwest of the intersection of West 76th Street and Parklawn Avenue. The pond receives runoff from an area of approximately 120 acres. The pond outlets to Pond NMS_104 via a 108-inch round equivalent arch pipe. The pond is a Type 5 wetland and was assumed to have an average depth of 4 feet. Based on this depth assumption and the pond area from the 2-foot topographic data, the permanent pool storage volume was estimated to be 4.4 acre-feet in 2004. In comparison with the MPCA recommended storage volume for Pond NMS_76, there is not an adequate amount of permanent pool storage in the basin. In 2008, the City removed approximately 0.9 acre-feet of sediment from Pond NMS_76. To upgrade the pond to meet the NURP standards, it is recommended that an additional 1.6 acre-feet of dead storage volume be provided.

8.3.2.3 NMS_104

Pond NMS_104 is located along the southeast border of the Fred Richards Golf Course, just north of the parking lot for the Pentagon Park office complex. This detention basin receives discharge from Pond NMS_76, in addition to runoff from the adjacent parking lots. Based on the wetland inventory, the pond is a Type 5 wetland, and was assumed to have an average depth of 4 feet. Pond NMS_104 is connected to the downstream pond NMS_72 by two 30-inch equalizer pipes. Based on the MPCA recommended storage volume for detention basins, there is not an adequate amount of permanent pool storage in this basin. It is recommended that an additional 0.2 acre-feet of dead storage volume be provided.

8.3.2.4 NMS_72 & NMS_74

Ponds NMS_72 and NMS_74 are located within the Fred Richards Golf Course, connected by a 36-inch equalizer pipe. Pond NMS_72 is upstream of NMS_74 and receives discharge from Pond NMS_79 and NMS_104 as well as runoff from the 7-acre direct watershed. Pond NMS_74 receives discharge from NMS_72 in addition to the runoff from the 6.5-acre direct watershed. Both ponds are Type 5 wetlands, based on the wetland inventory, and were assumed to have an average depth of

4 feet. Based on this depth assumption and the pond areas from the 2-foot topographic information, the permanent pool storage volume of each pond is greater than the MPCA recommended storage volume for detention ponds. However, because the water quality modeling results indicate that the total phosphorus removal in Pond NMS_72 and NMS_74 is below desired removal levels, it is recommended that the depth of the ponds be increased to improve removal efficiency.

8.3.2.5 SP_1 (South Pond/Border Basin)

Pond SP_1 is located on the border between Edina and Bloomington, just west of the intersection of Minnesota Drive and West 77th Street. Pond SP_1 receives discharge from Centennial Lakes, as well as stormwater runoff from a large, highly impervious, 215-acre watershed. The water level in Pond SP_1 is controlled by a weir structure. Discharge from the pond flows to the North Fork of Nine Mile Creek on the west side of T.H. 100, just south of the West 77th Street crossing. The pond is a Type 4 wetland and was assumed to have an average depth of 2 feet. Based on this depth assumption and the pond area from the 2-foot topographic data, the existing dead storage volume was calculated to be 6.8 acre-feet. In comparison with the calculated MPCA recommended permanent pool storage volume for Pond SP_1, there is not an adequate amount of permanent pool storage in the basin. It is recommended that an additional 19.6 acre-feet of dead storage volume be provided to meet the MPCA design criteria for detention basins and improve removal efficiency of total phosphorus.

Table 8.2
Watershed Modeling Results for Subwatersheds in the Nine Mile Creek- South Drainage Basin (Revised 12/2006)

Watershed Information			100-Year Storm Results 24-Hour Event		10-Year Storm Results[1] 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)
CL_1	64.2	67	287.1	24.7	175.9	6.0
CL_10	0.9	40	4.3	0.3	3.9	0.1
CL_11	1.4	67	6.8	0.5	8.6	0.1
CL_12	1.9	16	8.7	0.4	4.2	0.1
CL_13	8.4	62	37.8	3.1	23.1	0.7
CL_14	3.8	32	16.5	1.1	9.7	0.2
CL_15	3.0	21	12.7	0.7	6.1	0.1
CL_16	3.9	68	18.7	1.5	15.8	0.4
CL_17	2.6	80	12.6	1.1	12.9	0.3
CL_18	1.9	65	8.9	0.7	11.4	0.2
CL_19	1.6	37	7.2	0.5	5.9	0.1
CL_20	11.7	40	49.7	3.6	27.2	0.7
CL_21	1.9	80	9.0	0.8	10.8	0.2
CL_22	2.7	80	12.5	1.1	10.0	0.3
CL_23	3.8	80	17.6	1.6	13.3	0.4
CL_25	4.6	75	22.0	1.9	19.9	0.5
CL_27	9.5	80	37.3	4.0	17.7	1.0
CL_3	8.1	40	35.4	2.5	20.4	0.5
CL_35	2.9	80	14.1	1.2	18.7	0.3
CL_38	5.2	41	23.8	1.6	15.6	0.3
CL_4	3.6	35	16.8	1.1	11.9	0.2
CL_48	8.9	80	41.5	3.8	30.3	1.0
CL_49	4.3	80	20.4	1.8	16.4	0.5
CL_5	7.5	34	30.1	2.1	15.5	0.4
CL_50	3.8	80	18.0	1.6	14.1	0.4
CL_51	5.2	80	24.6	2.2	20.6	0.6
CL_52	1.6	80	7.8	0.7	8.7	0.2
CL_53	7.4	80	30.3	3.1	15.2	0.8
CL_54	3.2	71	15.1	1.3	17.3	0.3
CL_55	6.1	79	28.0	2.6	20.0	0.7
CL_56	5.1	79	24.4	2.2	22.8	0.6
CL_57	2.7	51	12.6	1.0	10.2	0.2
CL_58	0.7	79	3.3	0.3	5.8	0.1
CL_59	0.7	80	3.2	0.3	4.8	0.1
CL_60	1.5	80	7.1	0.6	7.2	0.2
CL_61	3.4	80	16.1	1.4	13.2	0.4
CL_62	0.9	80	4.5	0.4	3.9	0.1
CL_8	1.8	40	8.4	0.6	6.4	0.1
CL_9	2.4	40	10.4	0.7	5.9	0.1
NMS_10	4.7	73	22.9	2.2	21.5	0.6
NMS_100	3.4	60	16.5	1.4	16.3	0.4
NMS_101	2.4	80	11.3	1.0	9.7	0.3
NMS_102	2.5	16	11.6	0.9	8.2	0.2

Table 8.2
Watershed Modeling Results for Subwatersheds in the Nine Mile Creek- South Drainage Basin (Revised 12/2006)

Watershed Information			100-Year Storm Results 24-Hour Event		10-Year Storm Results[1] 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)
NMS_103	8.2	19	35.8	3.3	20.0	0.8
NMS_104	6.3	57	30.5	2.8	31.6	0.7
NMS_105	2.8	80	13.3	1.2	12.7	0.3
NMS_106	3.5	80	16.5	1.5	14.8	0.4
NMS_107	3.2	78	15.3	1.4	14.0	0.4
NMS_108	12.8	80	51.2	5.5	NM	NM
NMS_11	4.0	80	18.2	1.9	12.8	1.6
NMS_12	4.4	80	20.0	1.9	13.8	0.5
NMS_13	10.9	80	49.5	4.8	33.6	0.5
NMS_14	11.1	71	49.8	4.6	31.2	1.2
NMS_15	7.6	77	36.1	3.3	28.8	1.3
NMS_16	9.0	80	40.7	4.0	28.1	0.9
NMS_18	5.8	80	27.1	2.5	21.6	1.0
NMS_19	1.2	80	5.6	0.5	5.6	0.7
NMS_20	5.4	80	26.0	2.4	24.4	0.1
NMS_21	3.1	80	14.4	1.3	11.8	0.6
NMS_22	8.7	77	41.7	4.0	38.7	0.4
NMS_23	0.5	29	2.5	0.2	2.4	0.9
NMS_24	3.3	20	13.7	1.0	7.0	0.0
NMS_25	6.4	78	28.1	2.7	16.7	0.3
NMS_26	3.2	48	15.0	1.1	12.0	0.5
NMS_27	17.9	80	76.7	7.9	45.8	0.4
NMS_28	22.9	71	100.5	9.5	59.1	1.9
NMS_29	12.2	70	56.5	4.8	39.4	2.2
NMS_30	10.2	80	34.8	4.4	14.7	1.3
NMS_31	17.2	80	71.9	7.8	41.1	1.2
NMS_32	8.7	79	39.0	4.0	26.2	2.1
NMS_33	2.3	77	11.3	1.0	14.4	1.0
NMS_34	0.6	72	2.9	0.3	4.5	0.3
NMS_35	0.6	67	2.7	0.3	4.0	0.1
NMS_36	1.2	56	5.8	0.5	8.5	0.1
NMS_37	10.4	69	48.9	4.1	37.0	0.1
NMS_38	24.6	20	78.5	6.6	35.0	0.5
NMS_39	7.0	65	31.0	2.9	18.9	2.6
NMS_4	3.8	75	18.3	1.8	16.9	0.9
NMS_40	21.7	44	92.4	7.4	55.7	0.3
NMS_41	6.9	25	31.8	2.0	20.6	1.5
NMS_42	3.9	80	16.5	1.6	8.9	0.7
NMS_43	3.4	81	16.6	1.6	18.0	0.5
NMS_44	5.0	35	23.4	1.5	21.6	0.3
NMS_45	6.7	80	31.7	2.9	24.9	0.5
NMS_46	7.2	20	33.2	2.0	20.1	0.4
NMS_47	14.1	19	53.1	3.8	24.7	0.4

Table 8.2
Watershed Modeling Results for Subwatersheds in the Nine Mile Creek- South Drainage Basin (Revised 12/2006)

Watershed Information			100-Year Storm Results 24-Hour Event		10-Year Storm Results[1] 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)
NMS_48	4.6	20	20.1	1.3	10.6	0.9
NMS_49	11.2	20	48.5	3.1	25.3	0.3
NMS_5	2.7	72	13.2	1.3	15.0	1.4
NMS_50	17.8	20	61.5	4.8	27.9	0.1
NMS_51	16.3	80	56.7	6.9	23.2	1.9
NMS_52	5.7	20	24.5	1.8	13.2	1.2
NMS_53	3.5	67	17.1	1.6	17.0	0.7
NMS_54	1.3	37	6.2	0.4	5.7	0.3
NMS_55	9.0	49	40.5	3.2	27.3	0.1
NMS_56	2.9	80	14.1	1.3	13.1	1.0
NMS_57	11.4	80	43.6	5.0	21.4	0.3
NMS_58	5.8	80	27.4	2.5	22.5	1.3
NMS_59	1.3	49	6.1	0.5	7.3	0.6
NMS_6	13.5	80	56.2	5.7	29.3	0.1
NMS_60	1.6	81	7.9	0.7	8.3	1.5
NMS_61	0.8	75	3.8	0.3	5.6	0.2
NMS_62	6.6	80	27.0	2.8	14.1	0.1
NMS_63	4.9	49	22.6	1.8	17.2	0.6
NMS_64	17.7	55	65.7	6.4	30.8	0.4
NMS_65	2.3	80	11.2	1.1	10.0	2.2
NMS_66	4.5	34	18.6	1.3	10.1	0.1
NMS_67	1.9	42	8.7	0.6	6.9	0.3
NMS_68	2.5	20	11.6	0.6	6.3	0.1
NMS_69	4.5	33	20.2	1.4	12.5	0.2
NMS_7	15.4	80	57.9	6.7	27.4	0.5
NMS_70	11.6	42	43.2	3.5	20.1	0.9
NMS_71	4.4	78	19.2	1.9	11.3	1.3
NMS_72	7.3	12	29.9	3.0	14.6	0.4
NMS_73	6.7	40	29.4	2.2	17.1	0.5
NMS_74	6.5	19	27.2	2.7	14.9	0.7
NMS_75	5.3	68	25.4	2.4	23.0	0.8
NMS_76	10.8	39	49.8	4.3	37.2	0.5
NMS_77	7.2	31	28.8	2.1	14.9	0.6
NMS_78	2.5	40	11.0	0.8	6.3	0.4
NMS_79	6.6	9	24.6	2.7	10.2	0.2
NMS_8	2.9	80	14.1	1.2	16.2	0.7
NMS_80	3.5	55	16.2	1.2	12.8	0.2
NMS_81	11.5	47	51.1	3.8	30.6	0.3
NMS_82	7.8	20	32.3	1.9	14.6	0.5
NMS_83	3.6	20	15.3	0.9	7.3	0.4
NMS_84	11.8	12	42.0	4.1	17.5	0.3
NMS_85	3.1	77	12.5	1.3	6.5	1.3
NMS_86	3.1	20	14.2	0.8	7.8	0.2

Table 8.2
Watershed Modeling Results for Subwatersheds in the Nine Mile Creek- South Drainage Basin (Revised 12/2006)

Watershed Information			100-Year Storm Results 24-Hour Event		10-Year Storm Results[1] 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)
NMS_87	1.1	20	4.9	0.3	2.5	0.1
NMS_88	3.6	26	16.8	1.5	15.1	0.1
NMS_89	7.1	70	31.5	2.8	18.1	0.4
NMS_90	6.7	40	29.9	2.0	18.5	0.5
NMS_91	4.0	71	18.8	1.6	13.3	0.7
NMS_92	6.3	80	28.2	2.7	17.6	0.4
NMS_93	5.1	70	24.1	2.1	19.5	0.7
NMS_94	1.3	20	6.3	0.4	4.9	0.5
NMS_95	8.0	80	37.6	3.7	30.1	0.2
NMS_96	5.8	80	26.0	2.7	18.1	1.0
NMS_97	9.4	80	42.9	4.3	31.0	0.7
NMS_98	6.8	20	25.8	1.9	12.2	0.5
NMS_99	4.4	28	20.6	1.3	15.4	0.5
SP_1	89.8	80	235.7	39.4	88.2	0.5
SP_10	3.8	80	17.8	1.8	14.2	11.0
SP_11	5.6	80	22.8	2.4	11.9	0.4
SP_12	3.5	80	16.1	1.5	11.5	0.6
SP_13	4.6	80	21.3	2.0	16.2	0.4
SP_14	0.9	81	4.3	0.4	4.6	0.6
SP_15	4.6	80	22.1	2.0	25.2	0.1
SP_16	7.6	80	29.5	3.2	13.7	0.5
SP_17	7.0	80	27.9	3.3	15.1	0.9
SP_2	2.0	80	9.8	0.9	12.0	0.8
SP_3	3.8	80	18.3	1.6	17.7	0.2
SP_4	2.3	73	11.2	0.9	11.0	0.4
SP_5	11.6	80	55.1	5.4	47.6	0.3
SP_6	28.4	80	114.7	13.0	62.8	1.4
SP_7	14.9	80	70.2	6.5	55.4	3.2
SP_8	1.2	80	5.7	0.5	5.4	1.6
SP_9	11.4	80	50.4	5.0	31.9	0.1

1 NM = Not Modeled

Table 8.3
Hydraulic Modeling Results for XP-SWMM Subwatersheds/Nodes in the Nine Mile Creek- South Drainage Basin (Revised 12/206).

Subwatershed or Node	Downstream Conduit	100-Year Storm Results 24-Hour Event				10-Year Storm Results 1/2-Hour Event		
		Flood Elevation (ft)	Type of Storage [2]	NWL (ft)	Flood Bounce (ft)	Flood Elevation (ft)	NWL (ft)	Flood Bounce (ft)
898	1922_p	866.8				866.7		
899	685_p	866.9				866.6		
901	687_p	863.7				863.2		
903	2214_p	859.4				856.4		
935	719_p	863.6				861.6		
936	720_p	855.1				854.6		
937	721_p	849.2				848.6		
940	723_p	860.5				860.5		
941	724_p	847.8				847.6		
942	727_p	847.3				847.7		
944	728_p	844.9				842.7		
947	731_p	841.0				839.3		
948	732_p	835.0				833.5		
950	outfall	829.7				826.1		
951	734_p	844.4				842.6		
955	738_p	869.8				862.2		
956	2240_p	862.6				859.3		
958	740_p	855.6				852.8		
959	741_p	845.8				845.6		
968	750_p	833.9				830.7		
972	754_p	832.0				829.2		
973	755_p	830.4				827.6		
975	757_p	829.5				826.8		
976	758_p	828.3				826.2		
978	761_p	827.3	street			824.8		
982	1997_p	832.5				832.3		
983	764_p	835.8				835.6		
986	767_p	826.3				823.3		
987	768_p	826.1				823.3		
990	770_p	826.4				824.2		
992	772_p	827.9				824.9		
993	773_p	828.9				825.2		
996	776_p	826.7				826.5		
1002	2003_p	823.2				822.1		
1005	783_p	822.0				819.5		
1006	784_p	821.5				817.9		
1010	1211_p	821.0				816.7		
1011	787_p	821.2				816.5		
1012	789_p	821.8				820.6		
1014	790_p	820.7				816.3		
1015	791_p	820.7				821.0		
1016	3215_p	822.0				816.1		
1017	792_p	821.7				816.5		
1019	794_p	820.9				820.3		
1020	795_p	822.7				820.0		
1021	796_p	820.8				820.6		
1025	802_p	820.2				815.5		
1029	3219_p	820.4				816.1		
1222	to RR ditch	838.4				837.8		
1227	968_p	831.8				831.7		
1229	970_p	830.6				830.6		
1230	971_p	829.7				829.1		
1234	974_p	828.3				826.3		
1237	977_p	825.6				822.2		
1238	978_p	825.5				821.9		
1239	979_p	830.4				829.9		
1240	outfall	824.9				820.1		
1242	981_p	829.0				829.0		
1244	outfall	827.4				826.6		
1245	983_p	833.8				832.3		
1248	986_p	828.0				825.4		
1250	988_p	825.7				823.5		
1251	outfall	823.1				820.0		
1254	1539_p	823.1				817.6		
1487	1176_p	858.0				857.6		
1489	1178_p	854.8				854.5		
1490	1179_p	852.9				852.5		

Table 8.3
Hydraulic Modeling Results for XP-SWMM Subwatersheds/Nodes in the Nine Mile Creek- South Drainage Basin (Revised 12/206).

Subwatershed or Node	Downstream Conduit	100-Year Storm Results 24-Hour Event				10-Year Storm Results 1/2-Hour Event		
		Flood Elevation (ft)	Type of Storage [2]	NWL (ft)	Flood Bounce (ft)	Flood Elevation (ft)	NWL (ft)	Flood Bounce (ft)
1491	1180_p	849.8				849.6		
1492	1181_p	842.0				841.1		
1493	1182_p	841.4				839.5		
1498	1186_p	840.8				839.3		
1500	1187_p	847.9				847.5		
1503	1190_p	842.9				840.1		
1508	1194_p	NM				825.0		
1509	1195_p	NM				831.2		
1513	1198_p	837.2				837.6		
1515	1200_p	833.0				832.5		
1516	1201_p	832.9				830.9		
1517	1202_p	832.7				829.6		
1518	1203_p	832.6				828.0		
1519	1204_p	832.4				827.2		
1520	3221_p	832.2				824.6		
1521	1205_p	835.2				834.9		
1522	1206_p	833.8				831.8		
1523	1207_p	832.5				829.0		
1528	1211p	840.5				832.6		
1529	1212_p	837.2				831.1		
1530	1213_p	835.7				829.8		
1531	1214_p	834.0				829.4		
1532	1216_p	834.1				826.5		
1534	1219_p	859.9				855.1		
1536	1221_p	859.7				854.3		
1538	1223_p	859.1				853.8		
1539	1224_p	856.0				851.5		
1540	1225_p	854.8				851.2		
1542	1227_p	851.7				852.9		
1544	1229_p	847.8				847.5		
1545	1230_p	842.7				841.5		
1547	1231_p	860.7				856.1		
1549	1233_p	857.7				852.2		
1550	1234_p	856.3				852.0		
1683	1807_p	853.7				844.9		
1685	1386_p	853.7				844.8		
1696	1391_p	839.1				838.9		
1713	1404_p	840.9				840.3		
1718	1408_p	859.9				855.5		
1719	1409_p	859.9				855.9		
1724	1414_p	851.5				851.3		
1725	to Th 494 system	836.7				836.6		
1726	1415_p	862.1				857.6		
1840	1492_p	850.6				846.5		
1841	1493_p	853.4				847.6		
1842	1494_p	853.9				848.2		
1843	1495_p	854.6				849.2		
1847	1499_p	827.6				826.1		
1851	1501_p	831.1	street			829.5		
1852	1502_p	833.0				832.4		
1901	1534_p	836.8				834.4		
1902	1535_p	838.9				837.5		
1905	1538_p	824.0				823.4		
1906	outfall	821.0				814.3		
1907	1540_p	820.4				814.2		
1908	outfall	820.4				813.4		
1910	1542_p	826.7				826.2		
1911	outfall	824.2				824.1		
1913	1544_p	828.6				827.8		
1961	outfall	826.0				822.7		
1963	outfall	825.9				824.7		
1965	outfall	825.5				824.3		
1971	outfall	824.9				819.8		
2102	to TH 100 system	882.2				881.9		
2106	1669_p	820.4				813.4		
2107	outfall	820.4				812.6		
2108	1670_p	820.6				817.1		

Table 8.3
Hydraulic Modeling Results for XP-SWMM Subwatersheds/Nodes in the Nine Mile Creek- South Drainage Basin (Revised 12/206).

Subwatershed or Node	Downstream Conduit	100-Year Storm Results 24-Hour Event				10-Year Storm Results 1/2-Hour Event		
		Flood Elevation (ft)	Type of Storage [2]	NWL (ft)	Flood Bounce (ft)	Flood Elevation (ft)	NWL (ft)	Flood Bounce (ft)
2252	1798_p	NM				837.6		
2253	1799_p	NM				837.6		
2254	1800_p	NM				837.8		
2256	1802_p	857.5				850.0		
2258	1803_p	855.1				845.6		
2259	1808_p	853.6				844.7		
2260	1805_p	853.9				844.8		
2262	1809_p	852.9				844.4		
2263	1810_p	851.6				844.1		
2264	1811_p	850.0				843.7		
2266	1812_p	NM				838.4		
2267	1814_p	NM				837.8		
2268	1815_p	NM				835.2		
2269	1816_p	NM				834.9		
2270	1817_p	NM				834.4		
2361	1899_p	847.8				843.2		
2362	1900_p	846.5				842.7		
2363	1901_p	844.7				842.0		
2364	1903_p	842.5				839.6		
2370	2221_p	859.1				858.9		
2372	1910_p	861.3				859.1		
2373	1912_p	863.3				863.0		
2374	1913_p	863.3				863.0		
2376	1915_p	868.8				868.8		
2379	1918_p	867.1				867.0		
2383	1923_p	870.5				870.5		
2389	1929_p	853.6				844.7		
2442	1981_p	826.3				825.9		
2446	1985_p	845.5				843.6		
2448	1987_p	820.6				815.3		
2501	outfall	819.5				813.1		
2584	2127_p	830.7				830.6		
2587	3103_p	841.2	parking lot			836.5		
2588	3104_p	836.3				835.6		
2590	3183_p	833.0				832.8		
2591	3184_p	828.1				828.0		
2737	2203_p	820.4				819.2		
2738	2200_p	820.6				819.9		
2739	2201_p	820.7				820.1		
2744	2238_p	822.1				818.2		
2746	3199_p	827.8				821.9		
2748	2237_p	823.9				818.8		
2752	2211_p	858.8				855.7		
2753	2220_p	858.8				853.1		
2755	2213_p	859.1				854.4		
2784	3206_p	836.3				832.5		
2788	3194_p	820.8				820.2		
2789	3200_p	820.8				820.2		
2820	3195_p	826.4				819.9		
2821	3220_p	828.7				822.5		
2860	3197_p	859.8				856.6		
2861	3205_p	859.8				857.4		
2862	3204_p	859.9				857.8		
2863	3203_p	859.9				858.2		
2864	3202_p	860.0				858.6		
2866	3185_p	827.6				827.8		
2882	3212_p	821.1				816.6		
2884	3218_p	821.1				814.8		
2886	3231_p	827.4				822.8		
2887	3232_p	827.7				823.1		
2889	3230_p	827.9				823.7		
2892	3229_p	828.4				825.3		
2893	3226_p	828.5				825.3		
2894	3225_p	828.5				825.4		
2896	3235_p	845.5				843.5		
2897	3237_p	844.6				842.3		
2898	3236_p	843.4				843.4		

Table 8.3
Hydraulic Modeling Results for XP-SWMM Subwatersheds/Nodes in the Nine Mile Creek- South Drainage Basin (Revised 12/206).

Subwatershed or Node	Downstream Conduit	100-Year Storm Results 24-Hour Event				10-Year Storm Results 1/2-Hour Event		
		Flood Elevation (ft)	Type of Storage [2]	NWL (ft)	Flood Bounce (ft)	Flood Elevation (ft)	NWL (ft)	Flood Bounce (ft)
2899	3238_p	843.3				843.2		
2909	3248_p	830.8				829.0		
2910	3250_p	830.8				830.5		
2911	3247_p	833.1				832.7		
2932	3280_p	828.3				826.5		
2933	3281_p	831.7				830.4		
2934	3282_p	834.7				831.8		
CL_1	1211_p	840.8	pond	838.0	2.7	839.3	838.0	1.2
CL_3	1496_p	856.6				855.7		
CL_4	1189_p	846.7				845.2		
CL_5	1947_p	864.2				859.5		
CL_8	1403_p	851.8	parking lot			848.9		
CL_9	1497_p	849.0				848.6		
SP_1	3213_p	821.1	pond	814.7	5.4	816.8	814.5	2.3
SP_2	1196_p	848.3				850.7		
SP_3	1199_p	835.7				835.8		
SP_4	1641_p	833.1				832.7		
SP_5	2205_p	821.1				820.5		
SP_6	2239_p	823.6				818.8		
SP_7	3198_p	830.6				823.3		
SP_8	1197_p	840.7				841.6		
SP_9	3285_p	823.6	parking lot			822.8		
CL_10	1405_p	844.7				844.7		
CL_11	1185_p	840.8				839.4		
CL_12	1188_p	847.1				845.6		
CL_13	1222_p	859.6				854.1		
CL_14	1406_p	860.5				855.6		
CL_15	3201_p	860.0				858.9		
CL_16	1639_p	858.0				857.1		
CL_17	3274_p	848.4	parking lot			847.3		
CL_18	1235_p	854.6				851.6		
CL_19	1228_p	849.8				850.8		
CL_20	1226_p	853.9				852.8		
CL_21	1232_p	858.4				853.4		
CL_22	1416_p	863.3	parking lot			859.7		
CL_23	1417_p	863.8				859.0		
CL_25	1220_p	860.0				854.9		
CL_27	1806_p	857.8				851.8		
CL_35	1934_p	868.9				868.9		
CL_38	1623_p	858.7	parking lot			857.8		
CL_48	1175_p	860.0				859.6		
CL_49	1909_p	862.4				862.4		
CL_50	682_p	871.6	parking lot			871.2		
CL_51	1914_p	862.6	parking lot			861.3		
CL_52	1911_p	863.5				863.0		
CL_53	1898_p	848.9				843.5		
CL_54	2215_p	858.8				852.5		
CL_55	686_p	866.9				866.4		
CL_56	1930_p	853.5				844.4		
CL_57	1804_p	854.4				845.0		
CL_58	1932_p	853.7				844.7		
CL_59	1933_p	855.0				855.3		
CL_60	1924_p	873.3				873.3		
CL_61	1920	868.0	parking lot			867.6		
CL_62	1916_p	868.1				868.0		
NMS_4	1537_p	824.5				824.4		
NMS_5	990_p	829.4				824.6		
NMS_6	1503_p	841.7				841.4		
NMS_7	989_p	830.9				828.4		
NMS_8	1536_p	839.3				838.2		
SP_10	2204_p	824.5				824.4		
SP_11	3234_p	828.2				824.5		
SP_12	1397_p	838.1				838.0		
SP_13	3233_p	827.8	loading dock	821.5	6.3	826.4	821.5	4.8
SP_14	2234_p	822.3				820.4		
SP_15	3223_p	832.2				827.7		
SP_16	3228_p	828.4	parking lot			825.2		

Table 8.3
Hydraulic Modeling Results for XP-SWMM Subwatersheds/Nodes in the Nine Mile Creek- South Drainage Basin (Revised 12/206).

Subwatershed or Node	Downstream Conduit	100-Year Storm Results 24-Hour Event				10-Year Storm Results 1/2-Hour Event		
		Flood Elevation (ft)	Type of Storage [2]	NWL (ft)	Flood Bounce (ft)	Flood Elevation (ft)	NWL (ft)	Flood Bounce (ft)
SP_17	2236_p	826.2	parking lot			820.6		
494E_1	1413_p	858.8	parking lot			858.3		
NMS_10	1671_p	821.5	street			821.3	817.5	3.8
NMS_11	1988_p	825.3				823.5		
NMS_12	3284_p	820.4	parking lot			819.8		
NMS_13	3217_p	822.4				815.2		
NMS_14	3249_p	834.1	parking lot			833.3		
NMS_15	1622_p	830.6				830.3		
NMS_16	987_p	827.4				825.0		
NMS_18	1532_p	832.9				832.4		
NMS_19	2202_p	820.4	parking lot			819.1		
NMS_20	1533_p	833.5	street			832.9		
NMS_21	985_p	831.5	parking lot			828.9		
NMS_22	3216_p	820.7	street			820.2		
NMS_23	797_p 795_p	822.8	pond	818.2	4.6	820.1	818.2	1.9
NMS_24	1545_p	830.0				829.5		
NMS_25	965_p	838.8				838.7		
NMS_26	966_p	835.6				835.1		
NMS_27	976_p	826.5	parking lot			824.1		
NMS_28	980_p	828.4	wetland	825.0	3.4	826.7	825.0	1.7
NMS_29	967_p	836.1	ditch	830.0	6.1	833.7	830.0	3.7
NMS_30	973_p	828.4	parking lot			827.5		
NMS_31	1498_p	827.6	parking lot			826.1		
NMS_32	1569_p	830.8				828.9		
NMS_33	1573_p	826.1				824.2		
NMS_34	1578_p	824.9				820.7		
NMS_35	1574_p	826.1				826.0		
NMS_36	1575_p	830.0				828.9		
NMS_37	964_p	848.8				848.8		
NMS_38	717_p	869.8	street			867.9		
NMS_39	969_p	831.4				831.3		
NMS_40	729_p (inlet/outlet)	844.0	pond	836.3	7.8	838.8	836.3	2.5
NMS_41	1666_p	886.2				886.1		
NMS_42	3227_p	829.8				827.0		
NMS_43	3214_p	821.1	parking lot			817.0		
NMS_44	733_p	830.8				828.0		
NMS_45	1500_p	830.9				830.9		
NMS_46	722_p	883.8				883.7		
NMS_47	725_p	848.0				847.7		
NMS_48	735_p	844.2				842.1		
NMS_49	1667_p	847.4				843.6		
NMS_50	718_p	869.8	street			866.2		
NMS_51	984_p	833.8				831.4		
NMS_52	ditch	825.9				825.8		
NMS_53	982_p	829.1	parking lot			829.0		
NMS_54	1986_p	845.5				843.8		
NMS_55	729_p	842.6				840.2		
NMS_56	3279_p	828.7	parking lot			828.3		
NMS_57	972_p	829.1	parking lot			828.1		
NMS_58	3275_p	827.3	parking lot			826.4		
NMS_59	1984_p	845.5	street			843.4		
NMS_60	1504_p	846.4				846.2		
NMS_61	1621_p	836.6				834.2		
NMS_62	975_p	828.3	street			826.3		
NMS_63	overflow to creek	826.0	hwy ditch	823.6	2.4	825.0	823.6	1.4
NMS_64	3283_p	835.5	field	829.0	6.5	834.8	829.0	5.8
NMS_65	to street	834.1	parking lot			833.7		
NMS_66	3207_p	839.3				838.8		
NMS_67	765_p	838.5				838.3		
NMS_68	744_p	836.0				834.1		
NMS_69	756_p	829.7				827.2		
NMS_70	766_p	826.2	street			823.5		
NMS_71	1393_p	838.9				838.8		
NMS_72	1992_p	822.8	pond	818.2	4.6	820.7	818.2	2.5
NMS_73	1998_p	831.5				831.2		
NMS_74	1991_p	822.8	pond	818.2	4.6	820.5	818.2	2.3

Table 8.3
Hydraulic Modeling Results for XP-SWMM Subwatersheds/Nodes in the Nine Mile Creek- South Drainage Basin (Revised 12/206).

Subwatershed or Node	Downstream Conduit	100-Year Storm Results 24-Hour Event				10-Year Storm Results 1/2-Hour Event		
		Flood Elevation (ft)	Type of Storage [2]	NWL (ft)	Flood Bounce (ft)	Flood Elevation (ft)	NWL (ft)	Flood Bounce (ft)
NMS_75	778_p	822.9				821.1		
NMS_76	1996_p	825.8	pond	818.8	7.0	821.8	818.8	3.0
NMS_77	762_p	826.8				823.0		
NMS_78	759_p	827.7				825.8		
NMS_79	1995_p	822.8	pond	818.2	4.6	820.6	818.2	2.4
NMS_80	775_p	827.7				827.6		
NMS_81	1392_p	847.5				847.3		
NMS_82	748_p	835.8				832.0		
NMS_83	753_p	833.9	street			830.0		
NMS_84	landlocked	824.8	golf course	821.2	3.6	823.2	821.2	2.0
NMS_85	774_p	830.1				828.7		
NMS_86	743_p	835.7				835.4		
NMS_87	751_p	833.9				831.8		
NMS_88	1989_p	822.8	pond	818.2	4.6	819.9	818.2	1.7
NMS_89	771_p	827.1				824.6		
NMS_90	1394_p	839.7				835.9		
NMS_91	3210_p	842.6				842.5		
NMS_92	1395_p	830.9				830.7		
NMS_93	769_p	826.3	street			823.7		
NMS_94	760_p	832.0	street			826.7		
NMS_95	793_p	820.8				820.6		
NMS_96	1825_p	822.8	parking lot			820.2		
NMS_97	3278_p	820.6	parking lot			816.4		
NMS_98	1980_p	872.7	street			870.5		
NMS_99	742_p	845.7				845.5		
NMS_100	1541_p	820.4	street			814.4		
NMS_101	3101_p	829.4				828.9		
NMS_102	1543_p	828.6	byd	823.7	4.9	827.8	823.7	4.1
NMS_103	1990_p	822.8	pond	818.2	4.6	820.0	818.2	1.8
NMS_104	1993_p	822.8	pond	818.3	4.5	821.1	818.3	2.8
NMS_105	3100_p	831.3				831.3		
NMS_106	3105_p	835.9	parking lot			835.5		
NMS_107	3102_p	842.2	ditch	837.2	5.0	840.9	837.2	3.7

[2] byd = backyard depression

Table 8.4
Conduit Modeling Results for Subwatersheds in the Nine Mile Creek- South Drainage Basin (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[1] (cfs)	10Y Peak Flow through Conduit [1] (cfs)
1920	CL_61	2379	Circular	1.5	0.013	862.00	862.27	72.4	-0.37	11.1	15.6
L393	2102	NMS_40	Circular	1.5	0.013	880.60	840.00	1025	3.96	21.1	19.9
686_p	CL_55	901	Circular	2	0.013	858.81	854.72	366	1.12	26.2	25.0
682_p	CL_50	CL_35	Circular	1.5	0.013	865.80	864.12	300	0.56	9.9	9.4
1214_p	1531	1523	Arch	36" eq	0.013	827.62	827.39	45	0.51	79.1	27.4
718_p	NMS_50	935	Circular	2.5	0.013	857.33	855.64	353	0.48	51.2	44.0
719_p	935	936	Circular	2.5	0.013	855.64	854.00	341.5	0.48	51.2	44.0
720_p	936	937	Circular	2.5	0.013	853.00	841.77	350	3.21	51.2	44.0
721_p	937	NMS_47	Circular	3	0.013	841.77	841.16	126	0.48	51.2	44.0
722_p	NMS_46	940	Circular	1.25	0.013	879.45	859.29	397	5.08	15.9	16.2
723_p	940	941	Circular	1.25	0.013	859.29	844.57	209	7.04	15.9	16.1
725_p	NMS_47	942	Circular	3	0.013	841.16	841.13	427	0.01	36.0	50.9
728_p	944	NMS_55	Circular	3.5	0.013	838.16	836.26	522	0.36	71.5	68.1
729_p	NMS_55	NMS_40	Circular	2	0.013	836.26	834.26	92	2.17	-31.1	24.7
730_p	NMS_55	947	Circular	3.5	0.013	836.26	835.50	69	1.10	108.8	79.1
731_p	947	948	Circular	4	0.013	835.50	831.40	550	0.75	138.9	109.6
732_p	948	NMS_44	Circular	4	0.013	831.40	823.18	405	2.03	138.2	109.6
733_p	NMS_44	950	Circular	5	0.013	823.18	823.00	40	0.45	159.3	122.8
734_p	951	NMS_48	Circular	2.5	0.013	838.37	838.52	92.4	-0.16	30.2	25.4
735_p	NMS_48	947	Circular	2.5	0.013	838.52	835.50	264	1.14	43.3	35.9
738_p	955	956	Circular	1.5	0.013	861.12	858.16	230	1.29	18.4	10.3
742_p	NMS_99	944	Circular	1.75	0.013	840.33	840.06	80	0.34	23.5	24.5
743_p	NMS_86	NMS_68	Circular	1	0.013	832.30	831.76	136	0.40	4.4	4.6
744_p	NMS_68	NMS_87	Circular	1.5	0.013	831.76	828.72	304	1.00	9.8	9.7
753_p	NMS_83	972	Circular	3	0.013	826.81	825.83	175	0.56	59.0	40.8
754_p	972	973	Circular	3	0.013	826.02	824.71	200	0.66	49.9	41.0
755_p	973	NMS_69	Circular	4	0.013	823.18	822.68	267	0.19	67.9	56.5
760_p	NMS_94	978	Circular	1	0.013	825.50	821.02	194.5	2.30	5.6	4.6
1496_p	CL_3	1843	Circular	2	0.013	853.98	850.68	113	2.92	27.9	20.3
766_p	NMS_70	986	Circular	3	0.013	819.30	818.62	311	0.22	20.1	17.5
767_p	986	987	Circular	3	0.013	818.62	817.65	67	1.45	28.6	17.4
768_p	987	NMS_76	Arch	44"x72"	0.024	817.63	816.33	330.4	0.39	83.0	76.7
769_p	NMS_93	987	Circular	3.5	0.013	819.12	818.74	50	0.76	62.2	60.5
773_p	993	992	Circular	2.75	0.013	823.20	822.20	200	0.50	37.3	23.5
776_p	996	NMS_89	Circular	1	0.01	822.89	821.00	28	6.75	7.4	8.7
778_p	NMS_75	NMS_104	Arch	84" eq	0.033	816.50	816.19	38	0.82	137.7	131.5
783_p	1005	1006	Circular	2	0.013	816.25	815.36	177	0.50	19.1	19.6
784_p	1006	SP_1	Circular	2	0.013	815.36	815.11	42	0.60	19.0	19.6
787_p	1011	1012	Rectangular	7	0.013	810.92	810.84	380	0.02	232.6	170.3
789_p	1012	1014	Rectangular	7	0.013	810.84	810.82	95	0.021	252.8	172.0
790_p	1014	1015	Rectangular	7	0.013	810.82	810.80	120	0.02	286.4	172.0
791_p	1015	1016	Rectangular	7	0.013	810.80	810.75	260	0.02	285.0	172.0
792_p	1017	1016	Circular	2.25	0.024	814.50	814.50	27	0.00	21.1	19.3
793_p	NMS_95	1017	Circular	2.25	0.024	814.79	814.50	439	0.07	14.5	13.4
795_p	1020	1019	Circular	1.25	0.024	815.47	814.96	475	0.11	2.2	-2.3
796_p	1021	NMS_95	Circular	3.66	0.013	815.08	814.84	70	0.34	-16.3	-14.1
797_p	1020	1021	Circular	2	0.01	817.13	815.08	471	0.44	18.0	-14.1
802_p	1025	NMS_13	Rectangular	7	0.013	810.65	810.55	500	0.02	278.5	185.9
1909_p	CL_49	2370	Circular	1	0.013	853.07	852.42	50	1.30	9.8	9.8
1991_p	NMS_74	NMS_23	Circular	3	0.024	816.50	816.50	149	0.00	15.6	17.3
3100_p	NMS_105	2584	Circular	1.5	0.013	826.50	824.76	100	1.74	8.6	8.3
964_p	NMS_37	1222	Circular	1.5	0.013	839.02	837.74	319	0.40	13.6	2.0
966_p	NMS_26	NMS_29	Circular	2	0.013	831.34	828.31	505	0.60	11.7	18.7

Table 8.4
Conduit Modeling Results for Subwatersheds in the Nine Mile Creek- South Drainage Basin (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[1] (cfs)	10Y Peak Flow through Conduit [1] (cfs)
967_p	NMS_29	1227	Circular	2	0.024	830.00	825.74	189	2.25	17.2	11.8
969_p	NMS_39	1229	Circular	2	0.013	825.17	824.53	400	0.16	9.1	19.4
970_p	1229	1230	Circular	2	0.024	824.53	823.87	431	0.15	9.0	12.9
971_p	1230	NMS_57	Circular	2	0.024	823.87	823.40	290	0.16	9.0	10.6
972_p	NMS_57	NMS_30	Circular	3	0.024	823.40	823.16	301	0.08	18.5	16.8
976_p	NMS_27	1237	Circular	3.5	0.024	822.00	818.28	57	6.53	56.7	67.1
977_p	1237	1238	Circular	4.5	0.013	818.28	818.14	135	0.10	56.6	67.1
978_p	1238	1239	Circular	4.5	0.013	818.14	817.93	210	0.10	56.5	67.1
979_p	1239	1240	Circular	4.5	0.013	817.93	817.70	130	0.18	56.3	67.1
980_p	NMS_28	1242	Circular	1.5	0.024	826.48	826.12	300	0.12	-3.5	-2.5
981_p	1242	NMS_53	Circular	2.5	0.024	826.12	826.01	94	0.12	-5.5	-6.7
982_p	NMS_53	1244	Circular	2.5	0.024	826.01	825.50	423.8	0.12	13.3	11.3
983_p	1245	NMS_51	Circular	3	0.013	824.58	822.82	346.6	0.51	31.2	44.3
984_p	NMS_51	NMS_21	Circular	3	0.013	822.82	820.90	400	0.48	55.7	55.8
985_p	NMS_21	1248	Circular	3	0.013	820.80	819.00	375	0.48	62.1	60.8
987_p	NMS_16	1250	Circular	4.5	0.013	818.35	817.64	222	0.32	152.7	137.9
988_p	1250	1251	Circular	4.5	0.013	817.64	816.50	350	0.33	152.7	137.9
990_p	NMS_5	1254	Circular	3	0.013	820.20	819.20	185	0.54	102.6	67.3
1175_p	CL_48	1487	Circular	3	0.013	857.85	855.75	398.5	0.53	41.4	30.4
1176_p	1487	1488	Circular	3	0.013	855.75	854.21	288	0.53	41.2	30.7
1177_p	1488	1489	Circular	3	0.013	854.21	852.57	303.3	0.54	41.1	30.6
1178_p	1489	1490	Circular	3	0.013	852.57	850.67	361.4	0.53	41.0	30.5
1179_p	1490	1491	Circular	3	0.013	850.67	848.57	399.5	0.53	40.8	30.3
1180_p	1491	1492	Circular	3	0.013	848.57	838.20	287.8	3.60	40.8	30.3
1181_p	1492	1493	Circular	4	0.013	838.20	838.00	100	0.20	50.6	40.2
1182_p	1493	CL_1	Circular	3	0.013	830.83	830.00	55	1.51	50.5	40.2
1185_p	CL_11	1498	Circular	3	0.013	833.26	833.25	46	0.02	6.7	15.1
1186_p	1498	CL_1	Circular	3	0.013	833.25	830.31	167	1.76	6.7	9.5
1187_p	1500	CL_12	Circular	2.5	0.013	846.83	844.73	274	0.77	10.1	5.9
1188_p	CL_12	CL_4	Circular	2.5	0.013	844.73	843.16	160	0.98	18.8	9.9
1189_p	CL_4	1503	Circular	3	0.013	842.76	840.00	138	2.00	67.3	41.0
1190_p	1503	CL_1	Circular	3	0.013	831.00	830.00	126	0.79	67.2	41.0
1194_p	1508	1509	Circular	3.5	0.013	834.14	833.83	150	0.21	NM	NM
1195_p	1509	CL_1	Circular	3.5	0.013	831.15	831.06	45	0.20	NM	NM
1197_p	SP_8	1513	Circular	1.75	0.013	837.26	835.39	332	0.56	15.4	17.1
1198_p	1513	SP_3	Circular	2	0.013	835.39	833.70	320	0.53	15.4	16.6
1199_p	SP_3	1515	Circular	2	0.013	833.70	831.04	94	2.83	33.5	33.6
1200_p	1515	1516	Circular	4.5	0.013	831.04	828.89	236	0.91	44.1	43.9
1201_p	1516	1517	Circular	4.5	0.013	828.89	827.86	275	0.37	43.7	44.0
1202_p	1517	1518	Circular	4.5	0.013	827.86	826.16	256	0.66	43.7	44.4
1203_p	1518	1519	Circular	4.5	0.013	826.16	824.78	304	0.45	43.7	44.1
1204_p	1519	1520	Circular	4.5	0.013	824.78	823.97	124	0.65	43.6	43.9
1205_p	1521	1522	Circular	1.5	0.013	834.15	829.05	280	1.82	6.8	7.2
1206_p	1522	1523	Circular	1.5	0.013	829.05	827.39	93	1.78	14.3	11.9
1207_p	1523	SP_15	Circular	3.67	0.013	827.39	826.70	55	1.25	81.7	28.9
1211_p	CL_1	1529	Circular	5	0.013	829.04	828.14	303	0.30	217.4	101.9
1212_p	1529	1530	Circular	5	0.013	828.14	827.46	103	0.66	217.4	101.9
1213_p	1530	1531	Circular	3	0.013	827.46	827.62	53	-0.30	79.1	27.4
1216_p	1532	1520	Circular	4	0.013	824.78	823.97	157	0.52	138.5	74.5
1219_p	1534	CL_25	Circular	3	0.013	854.33	853.05	319	0.40	13.9	5.9
1220_p	CL_25	1536	Circular	3	0.013	853.05	851.15	437	0.43	28.0	24.7
1221_p	1536	CL_13	Circular	3.5	0.013	851.15	850.13	264	0.39	29.5	24.0
1222_p	CL_13	1538	Circular	3.5	0.013	850.13	850.41	45	-0.62	59.6	45.8

Table 8.4
Conduit Modeling Results for Subwatersheds in the Nine Mile Creek- South Drainage Basin (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[1] (cfs)	10Y Peak Flow through Conduit [1] (cfs)
1223_p	1538	1539	Circular	4	0.013	850.41	848.80	336	0.48	101.6	69.9
1224_p	1539	1540	Circular	4	0.013	846.26	845.00	184	0.68	101.7	86.5
1225_p	1540	CL_20	Circular	4	0.013	845.00	844.44	119	0.47	101.7	101.0
1226_p	CL_20	1542	Circular	5	0.013	844.44	842.76	119	1.41	233.0	200.0
1228_p	CL_19	1544	Circular	5	0.013	842.76	841.92	102	0.82	238.8	254.2
1229_p	1544	1545	Circular	5	0.013	841.92	841.12	219	0.37	238.8	212.7
1230_p	1545	CL_1	Arch	72" eq	0.013	831.71	830.75	192	0.50	238.8	212.4
1231_p	1547	CL_21	Circular	2.25	0.013	854.20	851.97	370	0.60	29.5	22.9
1232_p	CL_21	1549	Circular	3	0.013	851.47	850.45	183	0.56	34.1	29.5
1233_p	1549	1550	Circular	3.5	0.013	849.67	847.20	475	0.52	51.7	46.7
1234_p	1550	CL_18	Circular	3.5	0.013	847.20	845.15	392	0.52	65.3	69.3
1235_p	CL_18	CL_20	Circular	4	0.013	845.15	844.44	98	0.72	82.7	96.0
1386_p	1685	1683	Circular	1.75	0.013	843.26	842.67	183.3	0.32	-11.7	-4.2
1397_p	SP_12	1521	Circular	1	0.01	836.00	834.15	94	1.97	6.9	6.4
1403_p	CL_8	1542	Circular	2	0.013	845.50	845.40	43	0.23	12.2	21.6
1404_p	1713	CL_1	Circular	1.25	0.013	840.00	834.00	103	5.83	4.3	3.9
1405_p	CL_10	1713	Circular	1.25	0.013	843.92	842.87	105	1.00	4.3	3.9
1406_p	CL_14	1538	Circular	2.75	0.013	854.78	850.41	67	6.52	46.6	25.2
1408_p	1718	1534	Circular	3	0.013	854.73	854.33	89	0.45	12.9	6.0
1409_p	1719	1718	Circular	2	0.013	854.86	854.73	48	0.27	12.4	6.0
1413_p	494E_1	1724	Circular	1	0.013	849.91	848.34	111	1.41	9.4	9.1
1414_p	1724	1725	Circular	1	0.013	848.34	835.85	174	7.18	9.4	9.1
1415_p	1726	1547	Circular	2.25	0.013	855.06	854.20	195	0.44	29.3	23.8
1416_p	CL_22	1726	Circular	1.5	0.013	858.11	856.49	40	4.05	16.0	11.3
1417_p	CL_23	1726	Circular	1.75	0.013	856.76	856.03	166	0.44	16.8	12.6
1492_p	1840	CL_4	Circular	2	0.013	843.15	842.96	130	0.15	34.4	20.4
1493_p	1841	1840	Circular	2	0.013	844.19	843.15	85	1.22	34.3	20.3
1494_p	1842	1841	Circular	2	0.013	844.49	844.19	49	0.61	32.0	20.3
1497_p	CL_9	1500	Circular	1.5	0.013	847.70	846.83	42	2.07	10.4	5.9
1498_p	NMS_31	NMS_16	Circular	2.5	0.013	821.24	818.35	410	0.70	33.6	32.5
1504_p	NMS_60	NMS_6	Circular	1.5	0.013	845.32	835.90	654	1.44	7.9	8.8
1532_p	NMS_18	1245	Circular	3	0.013	827.00	824.70	451	0.51	30.0	36.0
1533_p	NMS_20	NMS_18	Circular	2.5	0.013	828.50	827.00	340.6	0.44	-23.4	26.7
1534_p	1901	NMS_61	Circular	2	0.013	832.29	831.27	38	2.68	14.3	15.6
1535_p	1902	1901	Circular	2	0.013	836.01	832.40	452	0.80	14.0	16.1
1536_p	NMS_8	1902	Circular	2	0.013	836.38	836.11	26.6	1.02	14.1	16.2
1537_p	NMS_4	1905	Circular	1.5	0.013	821.20	820.90	42	0.71	11.6	11.9
1538_p	1905	1254	Circular	1.5	0.013	820.90	819.30	160	1.00	11.6	11.7
1539_p	1254	1906	Circular	4	0.013	814.60	812.20	238	1.01	109.7	78.9
1540_p	1907	1908	Circular	5.5	0.013	812.19	811.99	198	0.10	51.0	27.0
1541_p	NMS_100	1907	Circular	5.5	0.013	812.20	812.19	102	0.01	51.0	27.1
1542_p	1910	1911	Circular	1.25	0.013	823.30	823.00	76	0.39	9.2	8.3
1543_p	NMS_102	1910	Circular	1.25	0.013	823.65	823.30	70	0.50	9.2	8.3
1545_p	NMS_24	1913	Circular	1.25	0.013	824.83	824.17	131	0.50	7.3	7.0
1573_p	NMS_33	1961	Circular	4	0.024	821.88	820.85	71	1.45	44.1	39.9
1574_p	NMS_35	1963	Circular	1.5	0.013	825.35	824.22	30	3.77	2.7	4.0
1575_p	NMS_36	1965	Circular	1.25	0.013	823.79	823.00	30	2.63	17.2	15.6
1578_p	NMS_34	1971	Circular	1.5	0.013	819.77	819.25	31	1.68	2.9	4.5
1621_p	NMS_61	1245	Circular	2	0.013	831.27	824.58	429.5	1.56	17.8	19.9
1623_p	CL_38	1550	Circular	1.25	0.013	856.47	849.42	34	20.74	19.9	19.7
1639_p	CL_16	1549	Circular	2.5	0.013	856.47	849.67	90	7.56	18.6	15.8
1641_p	SP_4	1515	Circular	4	0.013	831.30	831.04	143	0.18	11.1	10.3
1666_p	NMS_41	2102	Circular	1.5	0.013	881.08	880.60	42	1.14	20.9	20.2

Table 8.4
Conduit Modeling Results for Subwatersheds in the Nine Mile Creek- South Drainage Basin (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[1] (cfs)	10Y Peak Flow through Conduit [1] (cfs)
1669_p	2106	2107	Circular	1.5	0.013	812.30	811.90	20	2.00	4.6	6.0
1670_p	2108	2106	Circular	1.5	0.013	816.00	814.60	134	1.04	4.6	6.0
1671_p	NMS_10	2108	Circular	1	0.013	817.50	816.20	130	1.00	4.7	6.0
1798_p	2252	1513	Circular	1	0.013	837.01	835.39	78	2.08	NM	NM
1799_p	2253	2252	Circular	1	0.013	837.56	837.48	25	0.32	NM	NM
1800_p	2254	2253	Circular	1	0.013	837.82	837.56	53	0.49	NM	NM
1802_p	2256	2258	Circular	3.5	0.013	848.70	841.20	157	4.78	125.5	62.5
1803_p	2258	CL_57	Circular	3.5	0.013	841.20	840.04	86	1.35	126.3	62.8
1804_p	CL_57	2260	Circular	4.5	0.013	840.04	840.30	64	-0.41	143.7	65.2
1805_p	2260	2259	Circular	5	0.013	840.30	840.13	96	0.18	143.6	65.5
1806_p	CL_27	2259	Circular	2	0.013	849.79	848.87	92	1.00	35.6	17.7
1807_p	1683	CL_57	Circular	1.75	0.013	842.50	841.44	41	2.59	-12.5	-4.4
1808_p	2259	2262	Circular	5	0.013	840.13	839.82	102	0.30	174.2	84.2
1809_p	2262	2263	Circular	5	0.013	839.82	839.45	84	0.44	223.7	107.0
1810_p	2263	2264	Circular	5	0.013	839.45	838.94	141	0.36	223.8	106.4
1811_p	2264	CL_53	Circular	5	0.013	838.94	838.83	65	0.17	223.8	106.4
1812_p	2266	2254	Circular	1	0.013	838.44	837.82	104	0.60	NM	NM
1814_p	2267	2268	Circular	2	0.013	837.82	836.90	41	2.24	NM	NM
1815_p	2268	2269	Circular	3	0.013	835.15	834.93	182	0.12	NM	NM
1816_p	2269	2270	Circular	3	0.013	834.93	834.37	115	0.49	NM	NM
1817_p	2270	1508	Circular	3.5	0.013	834.37	834.14	138	0.17	NM	NM
1825_p	NMS_96	NMS_103	Circular	2.5	0.013	817.97	817.50	189	0.25	NM	NM
1898_p	CL_53	2361	Circular	6	0.013	838.83	838.39	128	0.34	249.9	121.4
1899_p	2361	2362	Circular	6	0.013	838.39	838.35	83	0.05	253.2	123.2
1900_p	2362	2363	Circular	6	0.013	838.35	837.59	292	0.26	253.2	123.0
1901_p	2363	2364	Circular	6	0.013	837.59	837.31	82	0.34	253.1	122.8
1903_p	2364	CL_1	Circular	3.5	0.013	832.60	831.00	118	1.36	83.8	43.5
1904_p	2364	CL_1	Circular	3.5	0.013	832.60	831.00	112	1.43	84.6	43.5
1912_p	2373	CL_52	Circular	1.25	0.013	856.10	854.20	97	1.96	11.0	9.3
1914_p	CL_51	2374	Circular	1.5	0.013	858.00	857.10	85	1.06	11.0	9.2
1915_p	2376	CL_35	Circular	1	0.013	864.80	864.12	46	1.48	4.4	-3.1
1916_p	CL_62	2376	Circular	1	0.013	865.19	864.80	21.5	1.81	-6.8	-6.0
1922_p	898	899	Circular	2	0.013	861.67	859.70	35	5.63	20.3	20.6
1923_p	2383	CL_50	Circular	1	0.013	866.01	865.80	36	0.58	-4.4	5.3
1924_p	CL_60	2383	Circular	1	0.013	867.06	866.76	91	0.33	5.6	5.8
1929_p	2389	CL_56	Circular	1.25	0.013	840.14	839.72	76	0.55	12.6	-4.0
1930_p	CL_56	2262	Circular	4.5	0.013	839.72	839.65	27	0.26	91.1	24.7
1931_p	2389	1685	Circular	1.75	0.013	840.14	843.30	95	-3.33	-12.4	-3.9
1932_p	CL_58	2259	Circular	1.75	0.013	843.91	840.13	22	17.18	17.1	6.7
1933_p	CL_59	2361	Circular	1.25	0.013	854.29	853.67	32	1.94	3.3	4.8
1947_p	CL_5	CL_14	Circular	2.25	0.013	858.05	854.78	355	0.92	30.1	15.5
1980_p	NMS_98	955	Circular	1.25	0.013	867.18	863.34	139	2.76	12.5	10.3
1981_p	2442	NMS_33	Circular	3.33	0.013	825.08	821.88	44	7.27	33.1	28.1
1984_p	NMS_59	944	Circular	1.5	0.013	839.99	838.16	65	2.82	9.8	8.4
1985_p	2446	2896	Circular	1.5	0.013	840.75	840.44	38	0.82	5.7	5.4
1986_p	NMS_54	2446	Circular	1.5	0.013	841.08	840.75	76	0.43	5.8	5.6
1987_p	2448	NMS_100	Circular	5.5	0.013	812.38	812.20	182	0.10	15.6	13.3
1988_p	NMS_11	2448	Circular	1.5	0.013	818.65	818.50	154	0.10	15.5	12.8
1992_p	NMS_72	NMS_74	Circular	3	0.024	816.50	816.50	30	0.00	24.6	35.0
1993_p	NMS_104	NMS_72	Circular	2.5	0.024	816.75	816.75	66	0.00	15.2	23.8
1996_p	NMS_76	NMS_75	Arch	53"x85"	0.033	818.80	816.50	400	0.58	127.4	128.2
2003_p	1002	SP_14	Circular	1.5	0.01	818.46	818.00	72	0.64	16.0	18.3
2200_p	2738	2739	Circular	1	0.013	815.15	815.11	40	0.10	-2.1	3.0

Table 8.4
Conduit Modeling Results for Subwatersheds in the Nine Mile Creek- South Drainage Basin (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[1] (cfs)	10Y Peak Flow through Conduit [1] (cfs)
2201_p	2739	NMS_22	Circular	1.5	0.013	815.28	815.02	26	1.00	-2.1	-3.2
2202_p	NMS_19	2737	Circular	1	0.01	815.50	815.44	60	0.10	-2.1	3.0
2203_p	2737	2738	Circular	1	0.013	815.44	815.15	291	0.10	-2.1	3.0
2204_p	SP_10	1002	Circular	1.25	0.01	820.78	819.13	282.9	0.58	7.9	8.4
2211_p	2752	2753	Circular	1.5	0.013	854.47	853.02	31	4.68	12.7	11.6
2215_p	CL_54	2256	Circular	3.5	0.013	849.50	848.70	222	0.36	119.0	61.4
2220_p	2753	CL_54	Circular	2	0.013	852.12	850.30	39	4.67	14.0	11.6
2221_p	2370	2752	Circular	1.25	0.013	852.36	854.47	54	-3.91	11.8	11.6
2234_p	SP_14	1005	Circular	2	0.01	818.00	817.00	122	0.82	19.1	19.6
2236_p	SP_17	2748	Circular	2	0.024	819.75	815.91	42	9.14	26.6	15.1
2237_p	2748	SP_6	Circular	3	0.013	815.91	815.00	58.5	1.56	26.6	15.1
2238_p	2744	SP_1	Circular	7	0.024	813.26	812.92	42.5	0.80	415.8	178.1
2239_p	SP_6	2744	Circular	7	0.024	813.79	813.26	65.6	0.81	415.9	178.0
3101_p	NMS_101	2591	Circular	1.67	0.013	826.56	826.26	165	0.18	11.3	9.7
3104_p	2588	NMS_106	Circular	2	0.013	834.02	833.65	122	0.30	15.5	6.7
3184_p	2591	2866	Circular	3.33	0.013	826.26	825.86	10	4.00	32.9	28.1
3185_p	2866	2442	Circular	3.33	0.013	825.86	825.08	50	1.56	32.9	28.1
3195_p	2820	SP_6	Circular	7	0.024	816.16	813.79	323.5	0.73	306.7	141.4
3197_p	2860	1719	Circular	1.75	0.013	855.62	854.86	163	0.47	12.5	6.0
3198_p	SP_7	2821	Circular	6.5	0.013	822.31	820.88	342	0.42	314.5	108.9
3201_p	CL_15	2864	Circular	1.25	0.013	856.85	856.70	33	0.45	7.0	6.0
3202_p	2864	2863	Circular	1.25	0.013	856.70	856.40	21	1.43	7.0	6.0
3203_p	2863	2862	Circular	1.25	0.013	856.40	856.31	15	0.60	6.9	6.0
3204_p	2862	2861	Circular	1.25	0.013	856.31	855.70	34	1.79	6.9	6.0
3205_p	2861	2860	Circular	1.25	0.013	855.70	855.62	9	0.89	6.9	6.0
3207_p	NMS_66	2784	Circular	2	0.013	838.10	831.55	191	3.43	18.6	10.1
3212_p	2882	1011	Rectangular	7	0.013	810.96	810.92	232	0.02	222.7	170.3
3213_p	SP_1	2882	Rectangular	7	0.013	811.00	810.96	168	0.02	235.8	170.1
3214_p	NMS_43	2882	Circular	1.5	0.013	814.00	813.66	34	1.00	8.7	16.7
3215_p	1016	1025	Rectangular	7	0.013	810.75	810.65	497	0.02	261.8	185.9
3216_p	NMS_22	1029	Circular	2	0.013	814.94	814.10	429	0.20	17.1	20.1
3217_p	NMS_13	2884	Rectangular	7	0.013	810.55	810.37	477	0.04	269.2	187.7
3218_p	2884	EdCrk20	Special	8.07	0.013	810.37	810.10	378.5	0.07	296.5	191.6
3219_p	1029	2884	Circular	4	0.024	813.96	812.12	974	0.19	14.1	22.8
3220_p	2821	2746	Circular	7	0.013	819.00	818.61	206	0.19	304.9	109.1
3221_p	1520	SP_7	Circular	4.5	0.013	823.97	823.82	103	0.15	150.4	77.8
3223_p	SP_15	SP_7	Arch	42" eq	0.013	826.70	823.40	235	1.40	84.0	32.8
3225_p	2894	2893	Circular	2.5	0.013	823.98	823.87	7.5	1.47	14.8	8.7
3226_p	2893	2892	Circular	2.5	0.013	823.87	823.21	29	2.28	14.8	8.7
3228_p	SP_16	SP_11	Circular	2.5	0.013	822.69	822.69	164	0.00	19.9	22.0
3229_p	2892	SP_16	Circular	2.5	0.013	823.21	822.69	62	0.84	14.7	8.7
3230_p	2889	2887	Circular	3	0.013	820.92	820.46	177.7	0.26	29.4	33.3
3231_p	2886	2746	Circular	3	0.013	820.15	819.61	40.5	1.33	32.5	37.9
3232_p	2887	2886	Circular	3	0.013	820.46	820.15	31.5	0.98	32.6	37.9
3234_p	SP_11	2889	Circular	3	0.013	822.69	820.92	243.5	0.73	30.8	33.4
3235_p	2896	NMS_59	Circular	1.5	0.013	840.44	839.99	40	1.13	5.7	5.3
3236_p	2898	2897	Circular	1.25	0.013	839.82	839.13	83	0.83	-7.7	9.3
3237_p	2897	NMS_55	Circular	1.25	0.013	839.13	836.26	73	3.93	13.6	12.2
3238_p	2899	2897	Circular	1	0.013	840.91	839.13	35	5.09	-6.6	5.6
3250_p	2910	2909	Circular	1.5	0.013	825.96	823.44	262.5	0.96	8.5	9.5
3274_p	CL_17	CL_19	Circular	1.25	0.013	843.00	842.76	36	0.67	11.7	11.0
3275_p	NMS_58	1234	Circular	1.25	0.013	823.20	823.00	311	0.83	3.8	4.3
3278_p	NMS_97	1012	Circular	2.25	0.013	813.00	812.84	16	1.00	26.1	31.0

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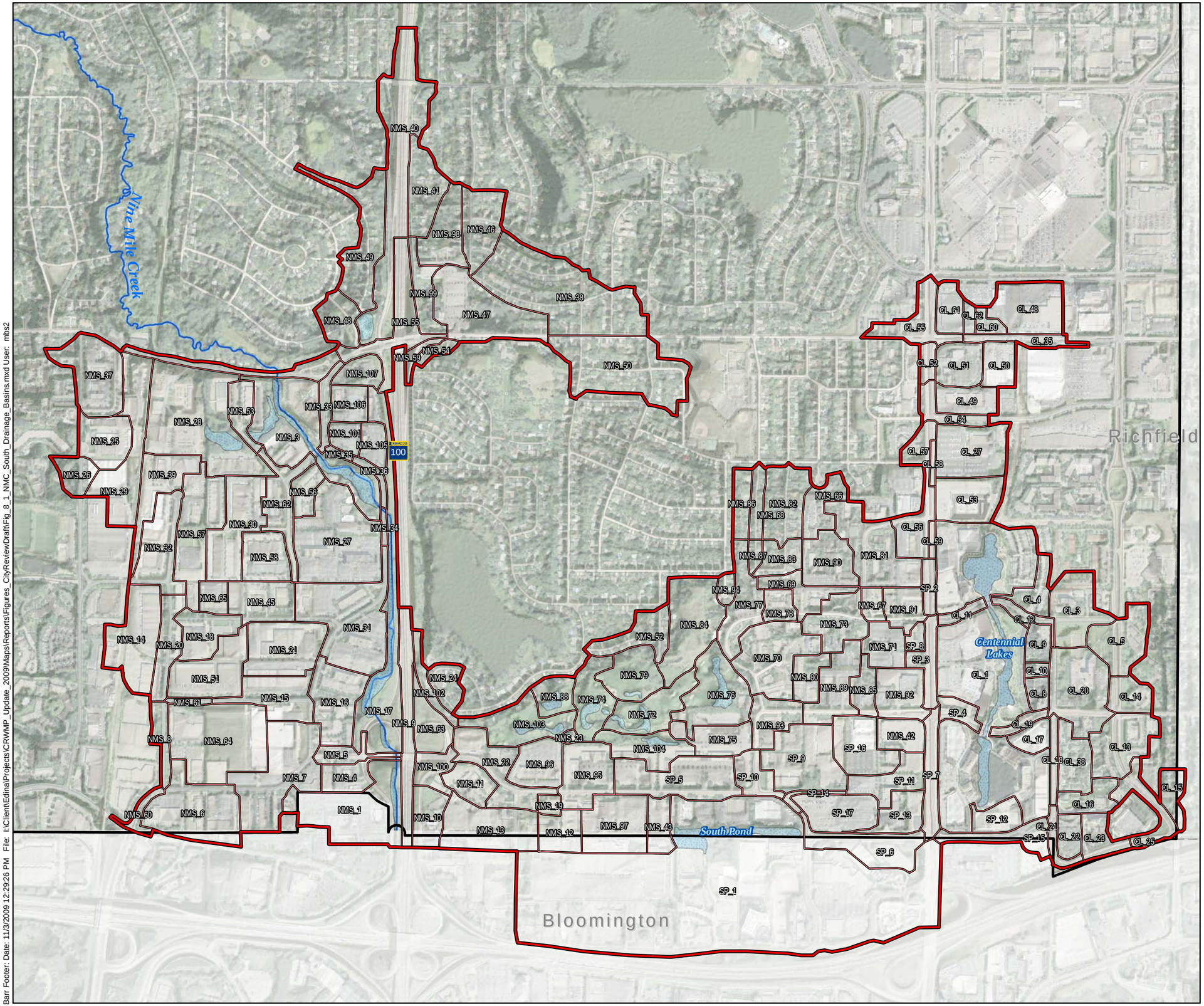
Conduit Modeling Results for Subwatersheds in the Nine Mile Creek- South Drainage Basin (Revised 12/2006).

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[1] (cfs)	10Y Peak Flow through Conduit [1] (cfs)
3279_p	NMS_56	2932	Circular	1	0.013	824.00	823.70	217	0.14	3.2	4.0
3280_p	2932	NMS_62	Circular	1.25	0.013	823.70	823.60	18.2	0.55	3.1	4.0
3284_p	NMS_12	1017	Circular	1.25	0.024	814.70	814.50	40	0.50	7.9	6.6
3285_p	SP_9	1002	Circular	1.5	0.01	819.80	818.33	40	3.68	10.0	15.6
685_p	899	CL_55	Circular	2	0.013	859.70	858.81	89	1.00	20.3	20.6
687_p	901	CL_52	Circular	2	0.013	854.72	854.30	44.5	0.94	28.6	28.5
717_p	NMS_38	NMS_50	Circular	2	0.013	860.98	860.43	43	1.28	31.3	28.4
724_p	941	NMS_47	Circular	1.5	0.013	844.57	841.96	37	7.05	12.3	13.3
727_p	942	944	Circular	1.75	0.013	841.13	838.16	77	3.86	36.0	39.5
740_p	958	959	Circular	1.5	0.013	852.30	841.03	232	4.86	20.8	10.3
741_p	959	NMS_99	Circular	1.5	0.013	841.03	840.33	43	1.63	8.1	9.0
748_p	NMS_82	968	Circular	2.5	0.013	830.55	828.17	238	1.00	35.5	24.3
750_p	968	NMS_83	Circular	2.5	0.013	828.17	827.09	69.1	1.56	29.7	23.2
751_p	NMS_87	NMS_83	Circular	1.75	0.013	828.72	827.09	285.6	0.57	12.8	11.7
756_p	NMS_69	975	Circular	4	0.013	822.68	822.54	28	0.50	79.0	66.8
757_p	975	976	Circular	5	0.013	821.70	820.84	171	0.50	168.6	130.5
758_p	976	NMS_78	Circular	5	0.013	820.84	819.67	26	4.50	174.2	130.5
759_p	NMS_78	978	Circular	5	0.013	819.67	818.54	282	0.40	140.6	135.4
761_p	978	NMS_77	Circular	5	0.013	818.54	817.64	225	0.40	127.3	140.5
762_p	NMS_77	NMS_76	Circular	5	0.013	817.64	816.80	211	0.40	180.4	152.5
764_p	983	982	Circular	2.25	0.013	830.27	826.72	240	1.48	39.5	43.7
765_p	NMS_67	983	Circular	2	0.013	833.51	830.27	240	1.35	32.8	33.3
770_p	990	NMS_93	Circular	3.5	0.013	820.00	819.12	200	0.44	45.0	46.0
771_p	NMS_89	990	Circular	3.5	0.013	821.00	820.00	200	0.50	56.6	46.0
772_p	992	NMS_89	Circular	3	0.013	822.00	821.00	200	0.50	36.4	21.8
774_p	NMS_85	993	Circular	2	0.013	824.80	823.80	200	0.50	22.9	23.5
775_p	NMS_80	996	Circular	1	0.01	824.04	822.95	273.5	0.40	5.3	5.4
794_p	1019	NMS_95	Circular	1.25	0.024	814.96	814.94	55	0.04	2.2	-3.3
965_p	NMS_25	NMS_26	Circular	1.5	0.013	833.50	831.34	415	0.52	9.0	10.4
968_p	1227	NMS_39	Circular	2	0.013	825.71	825.17	385	0.14	8.3	7.9
973_p	NMS_30	1234	Circular	3	0.024	823.16	822.71	559.9	0.08	19.3	18.9
974_p	1234	NMS_62	Circular	3.5	0.024	822.71	822.69	59	0.03	23.8	21.3
975_p	NMS_62	NMS_27	Circular	3.5	0.024	822.69	822.52	426.4	0.04	42.1	26.6
986_p	1248	NMS_16	Circular	4	0.013	819.00	818.35	40	1.63	106.2	91.0
989_p	NMS_7	NMS_5	Circular	3	0.013	821.04	820.20	441	0.19	66.9	58.8
1196_p	SP_2	SP_8	Circular	1.25	0.013	842.53	837.50	333	1.51	9.8	11.0
1215_p	1530	1532	Circular	4	0.013	827.46	824.88	112	2.30	138.5	74.5
1227_p	1542	CL_19	Circular	5	0.013	842.76	842.76	112	0.00	240.7	272.2
1391_p	1696	NMS_67	Circular	1.75	0.013	834.61	833.51	62.3	1.77	20.2	17.7
1392_p	NMS_81	1696	Circular	1.75	0.013	842.61	834.61	291.4	2.75	26.4	26.3
1393_p	NMS_71	NMS_67	Circular	2	0.013	833.58	833.51	49	0.14	19.1	19.6
1394_p	NMS_90	973	Circular	1.5	0.013	831.60	830.60	25	4.00	27.7	18.5
1395_p	NMS_92	NMS_85	Circular	1.5	0.013	826.20	824.80	200	0.70	13.3	13.5
1495_p	1843	1842	Circular	2	0.013	845.58	844.49	101	1.08	29.8	20.3
1499_p	1847	NMS_31	Circular	2.5	0.013	821.41	821.24	27.3	0.62	14.2	18.3
1500_p	NMS_45	1847	Circular	1.5	0.013	825.74	821.91	479	0.80	10.4	12.6
1501_p	1851	NMS_7	Circular	2.5	0.013	822.14	821.50	108	0.59	42.4	34.0
1502_p	1852	1851	Circular	2.5	0.013	824.24	823.50	349.1	0.21	35.5	33.4
1503_p	NMS_6	1852	Circular	2	0.013	835.45	824.80	603	1.77	30.6	31.4
1544_p	1913	NMS_102	Circular	1.25	0.013	824.17	823.65	81	0.64	4.9	5.8
1569_p	NMS_32	NMS_57	Circular	3	0.024	823.43	823.43	315.1	0.00	33.6	34.3
1622_p	NMS_15	1248	Circular	2.25	0.013	822.35	819.00	461.3	0.73	28.6	30.3
1667_p	NMS_49	951	Circular	2.5	0.013	836.95	838.71	137.8	-1.28	44.0	25.3

Table 8.4
Conduit Modeling Results for Subwatersheds in the Nine Mile Creek- South Drainage Basin (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[1] (cfs)	10Y Peak Flow through Conduit [1] (cfs)
1902_p	2364	CL_1	Circular	3.5	0.013	832.60	831.00	112	1.43	84.6	43.5
1910_p	2372	903	Circular	2.5	0.013	852.10	850.27	177.5	1.03	49.8	44.2
1911_p	CL_52	2372	Circular	2	0.013	854.20	852.10	212.5	0.99	36.9	36.5
1913_p	2374	2373	Circular	1.5	0.013	857.10	856.10	41	2.44	11.0	9.3
1918_p	2379	898	Circular	1.75	0.013	862.27	861.90	74	0.50	11.1	15.6
1934_p	CL_35	898	Circular	2	0.013	864.12	862.49	292	0.56	18.0	20.5
1989_p	NMS_88	NMS_103	Circular	1.25	0.024	817.50	817.50	190	0.00	-1.8	-1.9
1990_p	NMS_103	NMS_23	Circular	1.5	0.024	817.50	817.50	60	0.00	-3.9	-3.7
1993_p	NMS_104	NMS_72	Circular	2.5	0.024	816.75	816.75	66	0.00	15.2	23.8
1995_p	NMS_79	NMS_72	Circular	1.25	0.024	817.50	817.50	87	0.00	1.6	-2.8
1997_p	982	NMS_73	Circular	2.5	0.013	826.72	824.57	179	1.20	41.7	49.6
1998_p	NMS_73	975	Circular	2.5	0.013	824.57	822.50	63	3.29	57.5	68.8
2127_p	2584	NMS_36	Circular	1.5	0.013	824.76	823.79	361.5	0.27	9.8	10.3
2205_p	SP_5	SP_1	Circular	3	0.024	817.05	813.00	561	0.72	28.9	33.3
2213_p	2755	CL_54	Circular	2.5	0.013	849.84	849.50	35	0.97	70.9	44.2
2214_p	903	2755	Circular	2.5	0.013	850.27	849.84	41	1.05	56.1	44.2
2240_p	956	958	Circular	1.5	0.013	858.16	854.27	146	2.66	18.8	10.3
3102_p	NMS_107	2587	Circular	1	0.013	837.19	835.08	103	2.05	7.4	6.7
3103_p	2587	2588	Circular	1.5	0.013	835.08	834.02	170	0.62	15.5	6.7
3105_p	NMS_106	2590	Circular	2	0.013	833.65	832.01	182	0.90	21.7	18.8
3183_p	2590	2591	Circular	2	0.013	831.71	826.26	236	2.31	21.7	18.8
3194_p	2788	2789	Circular	1.25	0.013	816.63	816.02	61.2	1.00	-2.1	3.6
3199_p	2746	2820	Circular	7	0.024	818.61	816.16	275	0.89	268.2	141.5
3200_p	2789	NMS_95	Circular	1.25	0.013	815.92	815.82	9.8	1.02	-4.3	-4.0
3206_p	2784	NMS_82	Circular	2	0.013	831.55	830.55	66	1.52	17.4	10.1
3210_p	NMS_91	NMS_71	Circular	1.5	0.013	837.70	833.58	216	1.91	13.4	13.3
3227_p	NMS_42	2894	Circular	2	0.013	825.74	823.98	512	0.34	14.8	9.1
3233_p	SP_13	2887	Circular	1	0.013	821.53	820.46	162	0.66	4.6	5.3
3247_p	2911	2910	Circular	1.5	0.013	826.90	825.96	262.4	0.36	10.1	10.7
3248_p	2909	NMS_32	Arch	24" eq	0.013	823.44	823.43	52.2	0.02	8.5	9.5
3249_p	NMS_14	2911	Circular	2	0.013	826.94	826.90	334.5	0.01	12.0	13.1
3281_p	2933	NMS_15	Circular	1.5	0.013	823.69	822.35	40	3.35	20.2	7.5
3282_p	2934	2933	Circular	1.75	0.013	827.72	824.20	400	0.88	16.8	6.3
3283_p	NMS_64	2934	Circular	1	0.013	829.00	827.72	271.4	0.47	5.5	5.4
3305	2973	1029	Circular	2	0.013	814.94	814.47	230	0.20	2.7	NM
3306	NMS_108	2973	Circular	1.5	0.013	815.91	815.50	489	0.08	-1.5	NM

[1] NM = Not Modeled



City of Edina Boundary

Roads/Highways

Creek/Stream

Lake/Wetland

Nine Mile Creek - South Drainage Basin

Subwatershed

Imagery Source: Aerials Express, 2008

N

Feet

1,000 0 1,000

Meters

300 0 300

DRAFT

Figure 8.1

NINE MILE CREEK SOUTH DRAINAGE BASIN
Comprehensive Water Resource Management Plan
City of Edina, Minnesota

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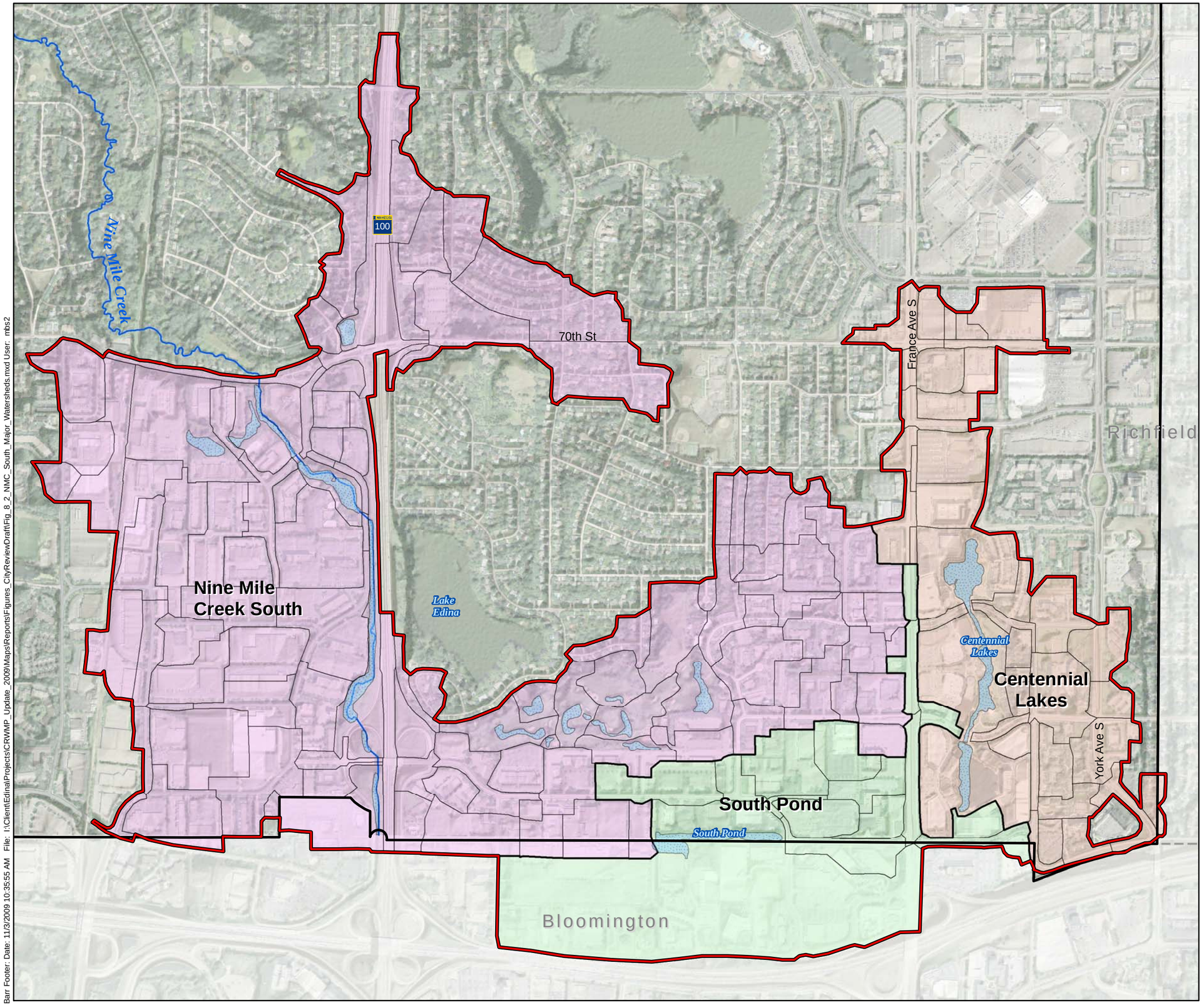

CITY OF EDINA, MINNESOTA
INCORPORATED 1888

- City of Edina Boundary
- Roads/Highways
- Creek/Stream
- Lake/Wetland
- Nine Mile Creek South Drainage Basin
- Major Watershed
- Subwatershed

Imagery Source: Aerials Express, 2008

N

Feet
1,000 0 1,000

Meters
300 0 300

DRAFT

Figure 8.2

NINE MILE CREEK SOUTH
MAJOR WATERSHEDS
Comprehensive Water Resource
Management Plan
City of Edina, Minnesota

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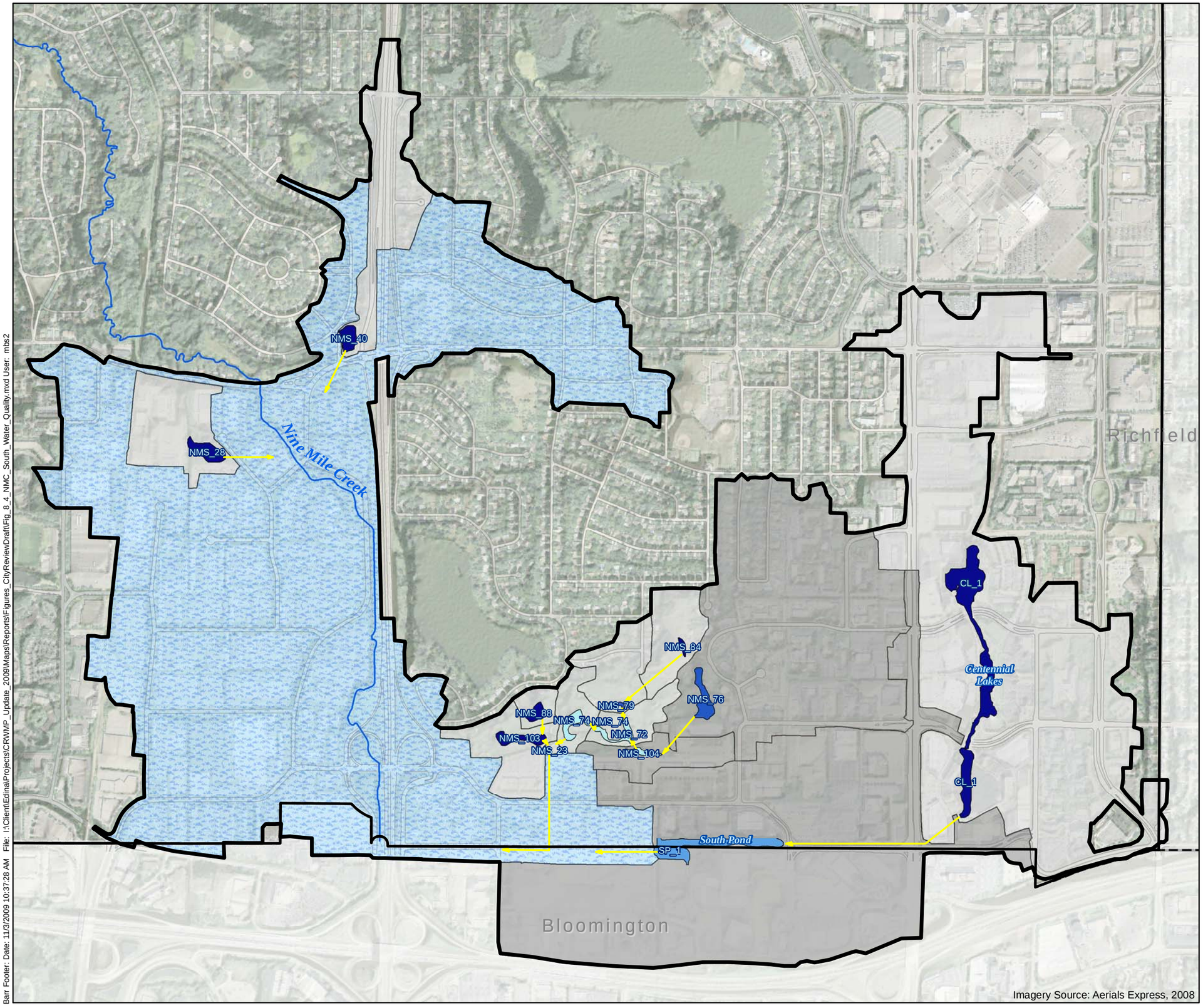

Percent TP Removal in Water Body*
This number represents the percent of the total annual mass of phosphorus entering the water body that is removed.

- 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 the North Fork of Nine Mile Creek
- Flow Direction

N

Feet
1,000 0 1,000

Meters
300 0 300

DRAFT

Figure 8.4

NINE MILE CREEK SOUTH
WATER QUALITY
MODELING RESULTS
Comprehensive Water Resource Management Plan
City of Edina, Minnesota

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