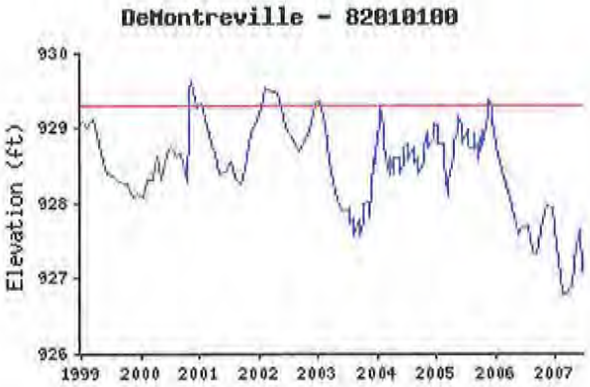
I. Appendix

Lake water level report

Lake name: DeMontreville County: Washington

Water Level Data
Period of record: 06/30/1960 to 12/01/2007
# of readings: 649
Highest recorded: 930.64 ft (07/01/1984)
Lowest recorded: 924.24 ft (12/01/1960)
Recorded range: 6.4 ft
Last reading: 927.07 ft (12/01/2007)
Ordinary High Water Level (OHW) elevation: 929.3 ft
Datum: NGVD 29 (ft)



Last 10 years of data, click to enlarge.

Benchmarks

Elevation: 938.49 ft Date Set: 12/15/1997 **Benchmark Location**
Datum: NGVD 29 Township: 29 Range: 21 Section: 5
(ft)
Description: Set by Trails and Waterways. "Bent 60d spike in west side of 18" red oak approximately 1' above the ground" The oak is located approximately 210' north of the DNR boat launching ramp and 25' from the edge of the lake.

Elevation: 933.8 ft Date Set: 07/15/1993 **Benchmark Location**
Datum: NGVD 29 Township: 29 Range: 21 Section: 9
(ft)
Description: Set by Boerhave Land Surveying Inc. "Spike in a 14" oak tree located near the outlet of Olsen Lake" Valley Branch WSD Datum plus .22' equals 1929 Datum.

Lake information report

Name: DEMONTREVILLE

Nearest Town: Lake Elmo
Primary County: Washington

Survey Date: 06/13/2005
Inventory Number: 82-0101-00

Public Access Information

Ownership	Type	Description
Minnesota DNR	Concrete	Public access on the NW shore.

Lake Characteristics

Lake Area (acres): 143.00
Littoral Area (acres): 129.00
Maximum Depth (ft): 24.00
Water Clarity (ft): 16.50

Dominant Bottom Substrate: N/A
Abundance of Aquatic Plants: N/A
Maximum Depth of Plant Growth (ft): N/A

Did you know? The DNR Section of Fisheries has a full-time staff of 285. There are 6 regional and 28 area fisheries offices.

Fish Sampled up to the 2005 Survey Year

Species	Gear Used	Number of fish per net		Average Fish Weight (lbs)	Normal Range (lbs)
		Caught	Normal Range		
Black Bullhead	Gill net	1.5	7.7 - 104.7	0.80	0.2 - 0.5
	Trap net	0.4	1.5 - 58.0	1.06	0.2 - 0.5
Black Crappie	Gill net	1.5	1.7 - 17.5	0.18	0.1 - 0.3
	Trap net	2.0	2.1 - 24.1	0.22	0.2 - 0.4
Bluegill	Gill net	14.2	N/A - N/A	0.07	N/A - N/A
	Trap net	55.4	3.5 - 57.1	0.09	0.1 - 0.3
Brown Bullhead	Gill net	0.8	0.8 - 7.0	0.50	0.3 - 0.8
	Trap net	4.6	0.4 - 5.1	0.81	0.4 - 0.9
Green Sunfish	Trap net	0.2	0.3 - 2.8	0.05	0.1 - 0.2
Hybrid Sunfish	Gill net	1.2	N/A - N/A	0.06	N/A - N/A
	Trap net	9.0	N/A - N/A	0.13	N/A - N/A
Largemouth Bass	Gill net	1.5	0.3 - 0.6	1.72	0.5 - 1.5
	Trap net	0.3	0.2 - 0.8	0.76	0.3 - 1.5
Northern Pike	Gill net	10.3	2.0 - 10.8	2.64	1.7 - 3.1
	Trap net	0.6	N/A - N/A	2.59	N/A - N/A
Pumpkinseed Sunfish	Gill net	4.8	N/A - N/A	0.10	N/A - N/A
	Trap net	3.4	0.7 - 6.5	0.23	0.1 - 0.2
Walleye	Gill net	0.2	0.8 - 3.8	2.18	1.4 - 3.0
White Sucker	Gill net	0.5	0.5 - 2.3	2.54	1.6 - 2.5
Yellow Bullhead	Gill net	2.8	0.5 - 5.0	0.53	0.4 - 0.8
	Trap net	11.8	1.0 - 7.1	0.63	0.4 - 0.8
Yellow Perch	Gill net	1.5	2.0 - 22.3	0.11	0.1 - 0.2

Normal Ranges represent typical catches for lakes with similar physical and chemical characteristics.

Length of Selected Species Sampled for All Gear for the 2005 Survey Year

Species	Number of fish caught in each category (inches)

	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total
Black Bullhead	0	2	5	6	0	0	0	0	13
Black Crappie	0	26	1	0	0	0	0	0	27
Bluegill	197	36	0	0	0	0	0	0	233
Brown Bullhead	0	1	21	24	0	0	0	0	46
Green Sunfish	2	0	0	0	0	0	0	0	2
Hybrid Sunfish	64	24	0	0	0	0	0	0	88
Largemouth Bass	1	1	0	7	3	0	0	0	12
Northern Pike	0	0	0	0	7	55	5	0	67
Pumpkinseed Sunfish	38	22	0	0	0	0	0	0	60
Walleye	0	0	0	0	1	0	0	0	1
Yellow Bullhead	1	15	92	15	0	0	0	0	123
Yellow Perch	2	7	0	0	0	0	0	0	9

*For the record, the largest **Smallmouth Bass** taken in Minnesota weighed 8 lbs. and was caught by:*

Who: John Creighton, Minneapolis, MN
Where: W. Battle Lake, Otter Tail County
When: 1948.

Fish Stocked by Species for the Last Five Years

Year	Species	Age	Number
2001	*Walleye*	Fingerling	22,392
	Walleye	Fry	374,400
2003	*Walleye*	Fry	312,000
	Walleye	Fingerling	7,052
2005	*Walleye*	Fingerling	46,127
	Walleye	Fry	416,000
	Walleye	Yearling	12

Fish Consumption Guidelines

These fish consumption guidelines help people make choices about which fish to eat and how often. Following the guidelines enables people to reduce their exposure to contaminants while still enjoying the many benefits from fish.

Pregnant Women, Women who may become pregnant and Children under age 15

LAKE NAME County, DOWID	Species	Meal Advice				Contaminants
		Unrestricted	1 meal/week	1 meal/month	Do not eat	
DEMONTREVILLE Washington Co., 82010100	Bluegill Sunfish	All sizes				

General Population

LAKE NAME County, DOWID	Species	Meal Advice				Contaminants
		Unrestricted	1 meal/week	1 meal/month	Do not eat	
DEMONTREVILLE Washington Co., 82010100	Bluegill Sunfish	All sizes				

DOWID - MN DNR, Divion of Waters' lake ID number.
Contaminants listed were measured at levels high enough to warrant a recommendation to limit consumption.
Listing of consumption guidelines do not imply the fish are legal to keep, MN DNR fishing regulations should be consulted.
Dioxin
Mercury

PCBS - Polychlorinated biphenyls
PFOS - Perfluorooctane sulfanate

Status of the Fishery (as of 06/13/2005)

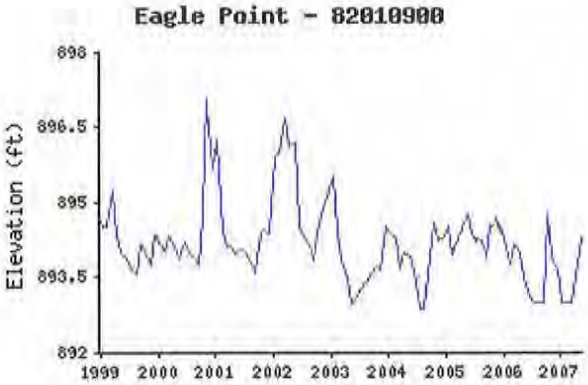
Bluegill continue to be present in high abundance and small average size in DeMontreville Lake. The average Bluegill sampled in 2005 was 5.2" long and 0.09 pounds. Only 14% of the Bluegill captured measured over 6.0" in length. Pumpkinseed sunfish are present in below average number, but some quality size individuals are present. The average Pumpkinseed sampled was 6.15" long and 0.226 pounds. Over 25% of the Pumpkinseeds captured measured 7.0" or larger. The largest individual sampled was 8.82" long and weighed 0.60 pounds. Black Crappie were sampled in below median numbers and averaged 7.62" long and 0.21 pounds. Northern Pike were captured above median levels for abundance and at the highest gill net catch rate ever recorded for this lake. The average Northern Pike captured was 22.45" in length and 2.64 pounds. Only one Walleye measuring 18.7" and weighing 2.18 pounds was netted. Yellow Perch were sampled below the normal range for abundance and at the lowest gill net catch rate recorded since 1989. Largemouth Bass were captured in good numbers with some quality individuals (over 20.0") present. While the average Largemouth Bass sampled was 11.46" long and 1.17 pounds, over 30% of all the fish captured measured 16.0" or longer.

Lake water level report

Lake name: Eagle Point

County: Washington

Water Level Data
Period of record: 09/20/1969 to 10/27/2007
# of readings: 403
Highest recorded: 899.53 ft (05/18/1986)
Lowest recorded: 892.13 ft (08/01/1988)
Recorded range: 7.4 ft
Last reading: 894.28 ft (10/27/2007)
Ordinary High Water Level (OHW) elevation: 896.5 ft
Datum: NGVD 29 (ft)



Last 10 years of data, click to enlarge.

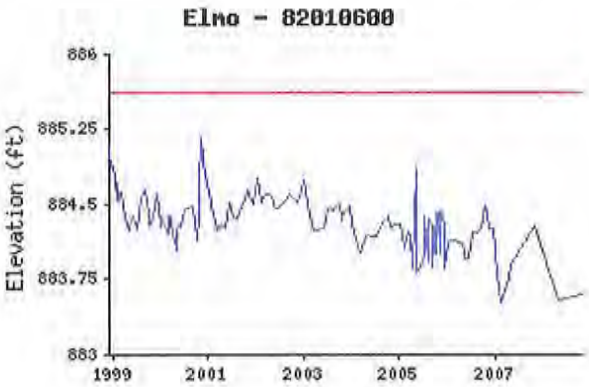
Benchmarks
No benchmark information available.

Lake water level report

Lake name: Elmo

County: Washington

Water Level Data
Period of record: 08/19/1969 to 10/23/2008
# of readings: 476
Highest recorded: 887.73 ft (07/05/1978)
Lowest recorded: 878.15 ft (10/31/1969)
Recorded range: 9.58 ft
Last reading: 883.54 ft (10/23/2008)
Ordinary High Water Level (OHW) elevation: 885.6 ft
Datum: NGVD 29 (ft)



Last 10 years of data, click to enlarge.

Benchmarks

Elevation: 889.49 ft Date Set: 01/09/1997 **Benchmark Location**
Datum: NGVD 29 Township: 29 Range: 21 Section: 24
(ft)
Description: Found 2008. Railroad spike in the SW root of a 4.0' cottonwood, 0.6' above the ground, 60' E. of current gage location on the ESE side of the lake, near edge of lake at toe of County Road 17 and at the north end of the guard rail along highway 17, approx. 50' N of outlet.

Elevation: 895.23 ft Date Set: 11/17/1989 **Benchmark Location**
Datum: NGVD 29 Township: 29 Range: 21 Section: 24
(ft)
Description: Benchmark was described by Bruce A. Folz & Associates as "Railroad spike in north face of power pole one foot above ground and located in the southeast corner of the intersection of Lake Elmo Avenue and 24th Street North.

Lake information report

Name: ELMO

Nearest Town: LAKE ELMO
Primary County: Washington

Survey Date: 06/11/2001
Inventory Number: 82-0106-00

Public Access Information

Ownership	Type	Description
County	Concrete	West shore of lake, within Lake Elmo Regional Park.

Lake Characteristics

Lake Area (acres): 206.00
Littoral Area (acres): 44.50
Maximum Depth (ft): 140.00
Water Clarity (ft): 14.00

Dominant Bottom Substrate: sand, silt, gravel
Abundance of Aquatic Plants: abundant
Maximum Depth of Plant Growth (ft): 17.00

Did you know? Habitat acquisition of lands next to lakes and streams protects spawning areas and shoreline vegetation, and it increases access to fishing waters.

Fish Sampled up to the 2001 Survey Year

Species	Gear Used	Number of fish per net		Average Fish Weight (lbs)	Normal Range (lbs)
		Caught	Normal Range		
Black Crappie	Trap net	1.3	0.5 - 2.2	0.20	0.3 - 0.5
Bluegill	Gill net	1.5	N/A - N/A	0.04	N/A - N/A
	Trap net	82.9	7.7 - 43.4	0.09	0.1 - 0.2
Brown Trout	Gill net	2.3	N/A - N/A	2.28	N/A - N/A
	Trap net	0.1	N/A - N/A	3.53	N/A - N/A
Common Carp	Trap net	0.3	0.1 - 0.9	5.66	3.1 - 10.6
Largemouth Bass	Gill net	0.2	0.5 - 1.7	3.65	0.5 - 1.2
Northern Pike	Gill net	12.2	2.2 - 8.7	1.81	1.5 - 3.2
Pumpkinseed Sunfish	Trap net	0.3	1.4 - 5.9	0.05	0.1 - 0.2
Rainbow Trout	Gill net	1.5	N/A - N/A	3.86	N/A - N/A
Tullibee (Cisco)	Gill net	5.8	1.3 - 10.4	0.65	0.3 - 1.0
Tiger Muskellunge	Gill net	0.2	N/A - N/A	2.65	N/A - N/A
Walleye	Gill net	1.5	1.0 - 5.0	2.69	1.2 - 3.0
	Trap net	0.1	0.2 - 0.7	2.76	0.7 - 2.8
White Sucker	Gill net	0.7	0.5 - 2.0	2.52	1.6 - 2.6
Yellow Perch	Gill net	0.3	1.5 - 13.8	0.08	0.1 - 0.2
	Trap net	0.1	0.4 - 2.3	0.04	0.1 - 0.2

Normal Ranges represent typical catches for lakes with similar physical and chemical characteristics.

Length of Selected Species Sampled for All Gear for the 2001 Survey Year

Species	Number of fish caught in each category (inches)								
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total
Black Crappie	6	2	4	0	0	0	0	0	12
Bluegill	154	61	0	0	0	0	0	0	215
Brown Trout	0	0	0	5	9	1	0	0	15
Largemouth Bass	0	0	0	0	1	0	0	0	1
Northern Pike	0	0	0	6	35	24	6	2	73
Pumpkinseed Sunfish	3	0	0	0	0	0	0	0	3
Rainbow Trout	0	0	0	0	5	4	0	0	9
Tullibee (Cisco)	0	4	10	20	1	0	0	0	35
Tiger Muskellunge	0	0	0	0	0	1	0	0	1
Walleye	0	0	0	3	3	3	1	0	10
Yellow Perch	3	0	0	0	0	0	0	0	3

*For the record, the largest **Golden Redhorse** taken in Minnesota weighed 2 lb., 13.28 oz. and was caught by:*

Who: Andrew Bakken, Glyndon, MN
Where: Otter Tail River near Fergus Falls

When: 7/13/97.
Statistics: 19" length, 11 1/4" girth

Fish Stocked by Species for the Last Five Years

Year	Species	Age	Number
2001	*Brown Trout*	Adult	386
	Rainbow Trout	Adult	181
	Tiger Muskellunge	Fingerling	206
	Walleye	Fry	50,094
2002	*Rainbow Trout*	Adult	68
	Tiger Muskellunge	Yearling	3
2003	*Tiger Muskellunge*	Fingerling	206
	Walleye	Unknown	6,750
2004	*Brown Trout*	Adult	160
	Rainbow Trout	Adult	212
2005	*Brown Trout*	Adult	62
	Walleye	Fingerling	1,196

Fish Consumption Guidelines

These fish consumption guidelines help people make choices about which fish to eat and how often. Following the guidelines enables people to reduce their exposure to contaminants while still enjoying the many benefits from fish.

Pregnant Women, Women who may become pregnant and Children under age 15

LAKE NAME County, DOWID	Species	Meal Advice				Contaminants
		Unrestricted	1 meal/week	1 meal/month	Do not eat	
ELMO Washington Co., 82010600	Bluegill Sunfish			All sizes		Mercury PFOS
	Bullhead		All sizes			Mercury
	Carp		All sizes			Mercury
	Crappie			All sizes		Mercury PFOS
	Largemouth Bass			All sizes		Mercury PFOS
	Northern Pike		shorter than 21"	21" or longer		Mercury
	Walleye			All sizes		Mercury
	White Sucker	All sizes				

General Population

LAKE NAME County, DOWID	Species	Meal Advice				Contaminants
		Unrestricted	1 meal/week	1 meal/month	Do not eat	
ELMO Washington Co., 82010600	Bluegill Sunfish			All sizes		PFOS
	Bullhead		All sizes			Mercury
	Carp	All sizes				
	Crappie			All sizes		PFOS
	Largemouth Bass			All sizes		Mercury PFOS
	Northern Pike		All sizes			Mercury
	Walleye		All sizes			Mercury
	White Sucker	All sizes				

DOWID - MN DNR, Divion of Waters' lake ID number.
Contaminants listed were measured at levels high enough to warrant a recommendation to limit consumption.
Listing of consumption guidelines do not imply the fish are legal to keep, MN DNR fishing regulations should be consulted.
Dioxin
Mercury

PCBS - Polychlorinated biphenyls
PFOS - Perfluorooctane sulfanate

Status of the Fishery (as of 06/11/2001)

Lake Elmo is primarily managed for walleye. The gill net catch of 1.5/set is slightly below the historical average for this lake. The average size sampled was 18.7 inches in length and 2.69 pounds.

Northern pike are very abundant. They average 19.7 inches and 1.8 pounds, but individuals over 30 inches are present. Hybrid (Tiger) muskellunge are present but in low numbers.

Bluegills are abundant but are smaller on average than most anglers prefer. However, some larger individuals do exist.

Black crappies are present in average numbers for this type of lake. They average 6.4 inches in length, although a few over 10 inches exist.

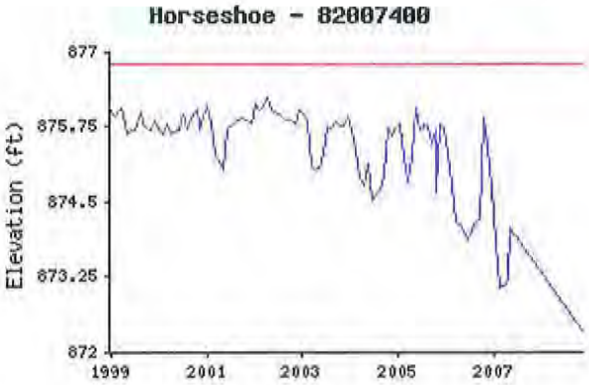
Surplus adult broodstock brown trout and rainbow trout were stocked in 2001. They provide a unique, but short lived fishery due to the numbers stocked.

Lake water level report

Lake name: Horseshoe

County: Washington

Water Level Data
Period of record: 03/07/1969 to 10/27/2007
# of readings: 390
Highest recorded: 878.02 ft (10/01/1986)
Lowest recorded: 862.28 ft (03/07/1969)
Recorded range: 15.74 ft
Last reading: 874.06 ft (10/27/2007)
Ordinary High Water Level (OHW) elevation: 876.8 ft
Datum: NGVD 29 (ft)



Last 10 years of data, click to enlarge.

Benchmarks
No benchmark information available.

Lake information report

Name: Horseshoe

Nearest Town: Lake Elmo
Primary County: Washington

Survey Date: 08/10/1993
Inventory Number: 82-0074-00

Lake Characteristics

Lake Area (acres): 53.00
Littoral Area (acres): N/A
Maximum Depth (ft): 11.30
Water Clarity (ft): N/A

Dominant Bottom Substrate: N/A
Abundance of Aquatic Plants: N/A
Maximum Depth of Plant Growth (ft): N/A

Did you know? Much of Minnesota's fisheries program is reimbursed by the Federal Aid in Sport Fish Restoration Program (federal excise tax), administered by the U.S. Fish and Wildlife Service.

Fish Sampled up to the 1993 Survey Year

Species	Gear Used	Number of fish per net		Average Fish Weight (lbs)	Normal Range (lbs)
		Caught	Normal Range		
Black Bullhead	Gill net	6.0	N/A - N/A	0.39	N/A - N/A
	Trap net	0.1	N/A - N/A	0.11	N/A - N/A
Black Crappie	Gill net	19.0	N/A - N/A	0.13	N/A - N/A
	Trap net	32.8	N/A - N/A	0.16	N/A - N/A
Bluegill	Trap net	16.9	N/A - N/A	0.08	N/A - N/A
Common Carp	Gill net	1.0	N/A - N/A	2.26	N/A - N/A
	Trap net	0.4	N/A - N/A	2.28	N/A - N/A
Golden Shiner	Trap net	0.1	N/A - N/A	0.05	N/A - N/A
Largemouth Bass	Trap net	0.2	N/A - N/A	2.11	N/A - N/A
Northern Pike	Trap net	0.2	N/A - N/A	9.49	N/A - N/A
Pumpkinseed Sunfish	Trap net	0.4	N/A - N/A	0.05	N/A - N/A
Snapping Turtle	Trap net	0.3	N/A - N/A	ND	N/A - N/A
Tiger Muskellunge	Trap net	0.2	N/A - N/A	11.30	N/A - N/A
White Sucker	Trap net	0.1	N/A - N/A	1.90	N/A - N/A
Yellow Perch	Gill net	3.0	N/A - N/A	0.11	N/A - N/A
	Trap net	1.0	N/A - N/A	0.09	N/A - N/A

Normal Ranges represent typical catches for lakes with similar physical and chemical characteristics.

Length of Selected Species Sampled for All Gear for the 1993 Survey Year

Species	Number of fish caught in each category (inches)								
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total
Black Bullhead	1	3	3	0	0	0	0	0	7
Black Crappie	38	111	7	0	0	0	0	0	156
Bluegill	116	0	0	0	0	0	0	1	117
Largemouth Bass	1	0	0	0	1	0	0	0	2
Northern Pike	0	0	0	0	0	0	0	2	2
Pumpkinseed Sunfish	4	0	0	0	0	0	0	0	4
Tiger Muskellunge	0	0	0	0	0	0	0	2	2
Yellow Perch	5	7	0	0	0	0	0	0	12

*For the record, the largest **Smallmouth Buffalo** taken in Minnesota weighed 13 lbs., 4 oz. and was caught by:*

Who: Stephen Cook, Prior Lake, MN 11/11/93.
Where: Mississippi River, Ramsey County
When:
Statistics: 28" length, 22" girth

Fish Consumption Guidelines

No fish consumption guidelines are available for this lake. For more information, see the "Fish Consumption Advice" pages at the Minnesota Department of Health.

Status of the Fishery (as of 08/10/1993)

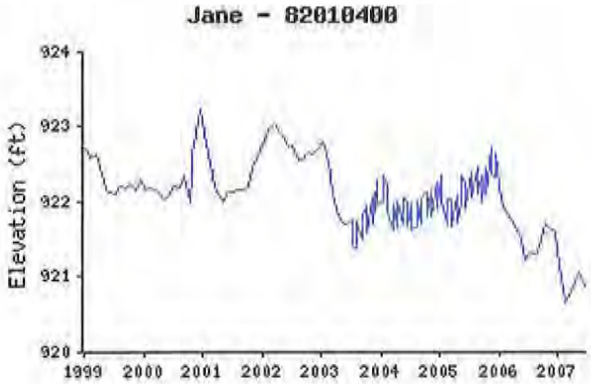
STATUS OF FISHERY: The fish population of this lake is dominated by small crappie and small bluegill. Less than 1% of the crappie sampled and none of the bluegill sampled were large enough for most anglers to keep. Two sub- legal hybrid muskie and two larger northern pike, believed to be migrants from Lake Elmo, were taken during this investigation. Local reports indicate that 30 to 40 inch hybrid muskie are caught quite readily in this lake. The lack of public access and suitable parking area are major limiting factors to fishing on this lake.

Lake water level report

Lake name: Jane

County: Washington

Water Level Data
Period of record: 02/01/1968 to 12/01/2007
# of readings: 784
Highest recorded: 927.71 ft (08/01/1986)
Lowest recorded: 918.38 ft (03/22/1968)
Recorded range: 9.33 ft
Last reading: 920.86 ft (12/01/2007)
Ordinary High Water Level (OHW) elevation: 924 ft
Datum: NGVD 29 (ft)



Last 10 years of data, click to enlarge.

Benchmarks

Elevation: 928.77 ft (ft) Date Set: 01/15/1997
Datum: NGVD 29

Benchmark Location
Township: 29 Range: 21 Section: 10

Description: Set by DNR Survey Crew. "Horizontal 60d spike in the north side of a transformer pole, 22' south-southwest of the manhole for the pipe between Deer Park Pond and Hedges Pond"

Elevation: 925.35 ft (ft) Date Set: 01/15/1997
Datum: NGVD 29

Benchmark Location
Township: 29 Range: 21 Section: 9

Description: Barr Engineering Set this B.M. "top of a green steel fencepost with a white top, near waters edge of Hedges Pond and just north of the pipe between Deer Park and Hedges Pond".

Lake information report

Name: Jane

Nearest Town: Lake Elmo
Primary County: Washington

Survey Date: 06/25/2007
Inventory Number: 82010400

Public Access Information

Ownership	Type	Description
DNR	Concrete	On SSE shore of lake

Lake Characteristics

Lake Area (acres): 152.75
Littoral Area (acres): 104.01
Maximum Depth (ft): 39
Water Clarity (ft): 14

Dominant Bottom Substrate: Sand (Abundant)
Abundance of Aquatic Plants: 20 Varieties Sampled
Maximum Depth of Plant Growth (ft): 7.1 (6-8)

Did you know? Lake rehabilitation projects reclaim waters suffering from habitat degradation and overpopulation of some fish species.

Fish Sampled for the 2007 Survey Year

Species	Gear Used	Number of fish per net		Average Fish Weight (lbs)	Normal Range (lbs)
		Caught	Normal Range		
Black Bullhead	Trap net	0.33	0.7 - 25.7	0.88	0.3 - 0.6
	Gill net	1.67	2.5 - 45.0	0.44	0.3 - 0.7
Black Crappie	Trap net	0.89	1.8 - 21.2	0.29	0.2 - 0.3
	Gill net	5.67	2.5 - 16.5	0.12	0.1 - 0.3
Bluegill	Trap net	43.56	7.5 - 62.5	0.10	0.1 - 0.3
	Gill net	2.33	N/A	0.11	N/A
Green Sunfish	Trap net	1.22	0.2 - 1.3	0.08	0.1 - 0.2
Hybrid Sunfish	Trap net	5.11	N/A	0.21	N/A
	Gill net	0.67	N/A	0.19	N/A
Largemouth Bass	Trap net	0.44	0.2 - 0.7	1.72	0.2 - 0.9
	Gill net	2.67	0.3 - 0.8	1.23	0.4 - 1.0
Northern Pike	Trap net	2.11	N/A	0.80	N/A
	Gill net	24.67	1.5 - 7.3	1.42	2.0 - 3.5
Pumpkinseed	Trap net	4.00	0.7 - 4.2	0.20	0.1 - 0.2
	Gill net	1.67	N/A	0.17	N/A
Walleye	Gill net	0.33	1.2 - 6.3	2.19	1.2 - 2.7
Yellow Bullhead	Trap net	2.67	0.9 - 5.7	0.67	0.5 - 0.8
	Gill net	6.67	0.5 - 7.5	0.52	0.5 - 0.8

Normal Ranges represent typical catches for lakes with similar physical and chemical characteristics.

Length of Selected Species (Trapnet, Gillnet) Sampled for the 2007 Survey Year

Species	Number of fish caught in each category (inches)								
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total
black bullhead	0	2	5	1	0	0	0	0	8
black crappie	9	14	2	0	0	0	0	0	25

bluegill	260	132	0	0	0	0	0	0	399
green sunfish	9	2	0	0	0	0	0	0	11
hybrid sunfish	18	30	0	0	0	0	0	0	48
largemouth bass	0	3	0	4	5	0	0	0	12
northern pike	0	0	2	24	53	11	1	2	93
pumpkinseed	17	24	0	0	0	0	0	0	41
walleye	0	0	0	0	1	0	0	0	1
yellow bullhead	1	9	28	6	0	0	0	0	44

*For the record, the largest **Brown Trout** taken in Minnesota weighed 16 lbs., 12 oz. and was caught by:*

Who: W. Landis Bullock, Smithfield, NC
Where: Lake Superior, St. Louis County
When: 6/23/89.
Statistics: 31.4" length, 20.6" girth

Fish Stocked by Species for the Last Five Years

Year	Species	Age	Number

Fish Consumption Guidelines

These fish consumption guidelines help people make choices about which fish to eat and how often. Following the guidelines enables people to reduce their exposure to contaminants while still enjoying the many benefits from fish.

Pregnant Women, Women who may become pregnant and Children under age 15

LAKE NAME County, DOWID	Species	Meal Advice				Contaminants
		Unrestricted	1 meal/week	1 meal/month	Do not eat	
JANE Washington Co., 82010400	Bluegill Sunfish		All sizes			Mercury
	Bullhead			All sizes		Mercury
	Northern Pike			shorter than 25"	25" or longer	Mercury

General Population

LAKE NAME County, DOWID	Species	Meal Advice				Contaminants
		Unrestricted	1 meal/week	1 meal/month	Do not eat	
JANE Washington Co., 82010400	Bluegill Sunfish		All sizes			Mercury
	Bullhead		All sizes			Mercury
	Northern Pike		shorter than 21"	21" or longer		Mercury

DOWID - MN DNR, Divion of Waters' lake ID number.
Contaminants listed were measured at levels high enough to warrant a recommendation to limit consumption.
Listing of consumption guidelines do not imply the fish are legal to keep, MN DNR fishing regulations should be consulted.
Dioxin
Mercury
PCBS - Polychlorinated biphenyls
PFOS - Perfluorooctane sulfanate

Status of the Fishery (as of 06/25/2007)

Management efforts on Jane Lake have primarily focused on Largemouth Bass (LMB). An experimental regulation requiring the release of all LMB between 12 and 16 inches total length (TL) was in effect from 1986 to 1993. The regulation was intended to reduce the harvest of LMB

and thereby improve the Bluegill (BLG) size structure through predation. Evaluation of that regulation showed no positive response by the BLG population, so the regulation was discontinued. A new experimental regulation was implemented in 1997 requiring the release of all LMB caught. The objective of this regulation was to maintain the numbers of LMB 16.0" TL and larger at a minimum of 40 percent of the spring electrofishing catch. This catch-and-release only regulation for LMB was made permanent in 2006.

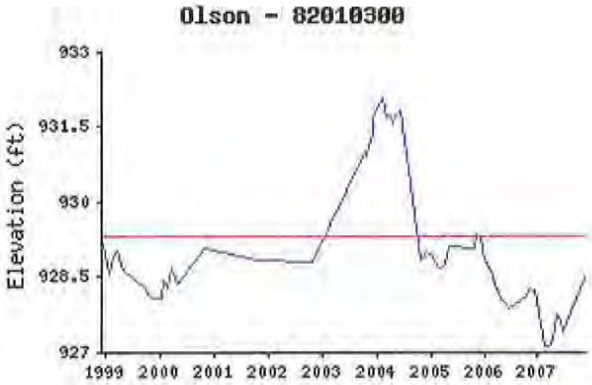
In 2007, the gill net catch rate for Northern Pike (NOP) was the highest ever recorded for this lake. The average size of gill net sampled NOP was 17.4 inches and 1.30 pounds. Only 2.5 percent of all NOP captured measured 26.0 inches or longer, with the largest fish captured measuring 38.27 inches. One 18.98 inch Walleye (WAE) was captured during this survey. Largemouth Bass (LMB) were sampled above median levels for abundance in both gill and trap nets. The electrofishing catch rate for LMB was the lowest recorded since 1994. This could be a direct result of low water levels and the displacement of fish from normal areas. The average size LMB captured by electrofishing was 12.2 inches and 1.2 pounds. The proportion of LMB sampled over 12.0 and 16.0 inches was comparable to electrofishing efforts since the year 2000. No Yellow Perch (YEP) were captured during this fisheries survey. Bluegill (BLG) abundance in the trap net sample, while almost half of that observed in 2002, still remains above the median level for lakes of this type. The average size of BLG sampled was 4.9 inches and 0.10 pounds. Only 15.3 percent of sampled BLG measured 7.0 inches or longer with individuals up to 8.19 inches being captured. Black Crappie (BLC) were sampled below median levels for abundance for both gill and trap nets, with the average size of BLC captured measuring 6.85 inches and 0.175 pounds. Approximately one-third of all BLC captured measured 8.0 inches or longer. ?

Lake water level report

Lake name: Olson

County: Washington

Water Level Data
Period of record: 07/05/1978 to 04/28/2008
# of readings: 64
Highest recorded: 932.07 ft (08/01/2004)
Lowest recorded: 927.09 ft (08/01/2007)
Recorded range: 4.98 ft
Last reading: 928.44 ft (04/28/2008)
Ordinary High Water Level (OHW) elevation: 929.3 ft
Datum: NGVD 29 (ft)



Last 10 years of data, click to enlarge.

Benchmarks

Elevation: 934.03 ft Date Set: 01/15/1997 **Benchmark Location**
Datum: NGVD 29 Township: 29 Range: 21 Section: 9
(ft)
Description: Found 2006. Slightly bent horizontal 3/8" x 8" spike in the south side of a 1.2' oak, 15' NW of manhole for outlet structure located at edge of the road and 15' SW of mailbox #8241 on E side of the lake on Hidden Bay Trail.

Elevation: 930.83 ft Date Set: 01/15/1997 **Benchmark Location**
Datum: NGVD 29 Township: 29 Range: 21 Section: 9
(ft)
Description: Set by Barr Engineering Company "top of a steel fencepost (marked with another steel fencepost) at edge of Olson Lake just SW of outlet pipe"

Lake information report

Name: OLSON

Nearest Town: Lake Elmo
Primary County: Washington

Survey Date: 08/02/2005
Inventory Number: 82-0103-00

Public Access Information

Ownership	Type	Description
Minnesota DNR	Concrete	Via channel from Demontreville Lake. Public access on the NW shore.

Lake Characteristics

Lake Area (acres): 79.00
Littoral Area (acres): 79.00
Maximum Depth (ft): 15.00
Water Clarity (ft): 5.10

Dominant Bottom Substrate: N/A
Abundance of Aquatic Plants: N/A
Maximum Depth of Plant Growth (ft): N/A

Did you know? Habitat acquisition of lands next to lakes and streams protects spawning areas and shoreline vegetation, and it increases access to fishing waters.

Fish Sampled up to the 2005 Survey Year

Species	Gear Used	Number of fish per net		Average Fish Weight (lbs)	Normal Range (lbs)
		Caught	Normal Range		
Black Bullhead	Gill net	0.5	8.0 - 90.0	0.34	0.1 - 0.4
Black Crappie	Gill net	3.0	2.0 - 19.0	0.16	0.1 - 0.2
	Trap net	1.0	1.3 - 27.7	0.39	0.1 - 0.4
Bluegill	Gill net	8.0	N/A - N/A	0.06	N/A - N/A
	Trap net	58.9	2.8 - 43.3	0.06	0.1 - 0.3
Brown Bullhead	Gill net	12.5	1.0 - 9.3	0.77	0.2 - 0.7
	Trap net	0.4	0.2 - 6.2	0.65	0.4 - 0.9
Green Sunfish	Trap net	0.1	0.4 - 3.8	0.03	0.1 - 0.2
Hybrid Sunfish	Gill net	4.0	N/A - N/A	0.07	N/A - N/A
	Trap net	9.8	N/A - N/A	0.07	N/A - N/A
Largemouth Bass	Gill net	0.5	1.0 - 3.8	0.18	0.2 - 0.7
	Trap net	0.2	0.2 - 1.1	3.71	0.3 - 1.0
Northern Pike	Gill net	18.5	1.5 - 9.0	1.89	1.8 - 3.7
	Trap net	0.2	N/A - N/A	1.84	N/A - N/A
Pumpkinseed Sunfish	Gill net	5.5	N/A - N/A	0.13	N/A - N/A
	Trap net	2.0	0.8 - 9.3	0.20	0.1 - 0.2
Walleye	Gill net	2.0	2.3 - 17.8	2.43	0.7 - 2.1
	Trap net	0.2	0.3 - 1.3	0.86	0.7 - 2.2
White Sucker	Gill net	1.0	1.0 - 6.6	2.70	1.0 - 2.2
Yellow Bullhead	Gill net	18.0	1.0 - 4.1	0.74	0.5 - 0.7
	Trap net	3.1	0.3 - 4.2	0.70	0.5 - 0.8
Yellow Perch	Gill net	3.5	2.5 - 25.8	0.11	0.1 - 0.2

Normal Ranges represent typical catches for lakes with similar physical and chemical characteristics.

Length of Selected Species Sampled for All Gear for the 2005 Survey Year

Species	Number of fish caught in each category (inches)								
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total
Black Bullhead	0	1	0	0	0	0	0	0	1
Black Crappie	0	11	4	0	0	0	0	0	15
Bluegill	206	8	0	0	0	0	0	0	214
Brown Bullhead	0	0	25	4	0	0	0	0	29
Green Sunfish	1	0	0	0	0	0	0	0	1
Hybrid Sunfish	70	9	0	0	0	0	0	0	79
Largemouth Bass	0	1	0	0	2	0	0	0	3
Northern Pike	0	0	1	0	10	26	2	0	39
Pumpkinseed Sunfish	15	14	0	0	0	0	0	0	29
Walleye	0	0	0	3	1	2	0	0	6
Yellow Bullhead	1	10	35	18	0	0	0	0	64
Yellow Perch	0	7	0	0	0	0	0	0	7

*For the record, the largest **Sauger** taken in Minnesota weighed 6 lbs., 2.75 oz. and was caught by:*

Who: Don Kizer, Red Wing, MN
Where: Mississippi River near Red Wing (L&D No.3), Goodhue County
When: 5/23/88.
Statistics: 23 7/8" length, 15" girth

Fish Stocked by Species for the Last Five Years

Year	Species	Age	Number
2001	*Walleye*	Fingerling	2,340
2003	*Walleye*	Fry	104,000

Fish Consumption Guidelines

These fish consumption guidelines help people make choices about which fish to eat and how often. Following the guidelines enables people to reduce their exposure to contaminants while still enjoying the many benefits from fish.

Pregnant Women, Women who may become pregnant and Children under age 15

LAKE NAME County, DOWID	Species	Meal Advice				Contaminants
		Unrestricted	1 meal/week	1 meal/month	Do not eat	
OLSON Washington Co., 82010300	Bluegill Sunfish	All sizes				
	Bullhead	All sizes				
	Northern Pike		All sizes			Mercury
	Walleye		All sizes			Mercury

General Population

LAKE NAME County, DOWID	Species	Meal Advice				Contaminants
		Unrestricted	1 meal/week	1 meal/month	Do not eat	
OLSON Washington Co., 82010300	Bluegill Sunfish	All sizes				
	Bullhead	All sizes				
	Northern Pike	All sizes				
	Walleye	All sizes				

DOWID - MN DNR, Divion of Waters' lake ID number.
Contaminants listed were measured at levels high enough to warrant a recommendation to limit consumption.

Listing of consumption guidelines do not imply the fish are legal to keep, MN DNR fishing regulations should be consulted.
Dioxin
Mercury
PCBS - Polychlorinated biphenyls
PFOS - Perfluorooctane sulfanate

Status of the Fishery (as of 08/02/2005)

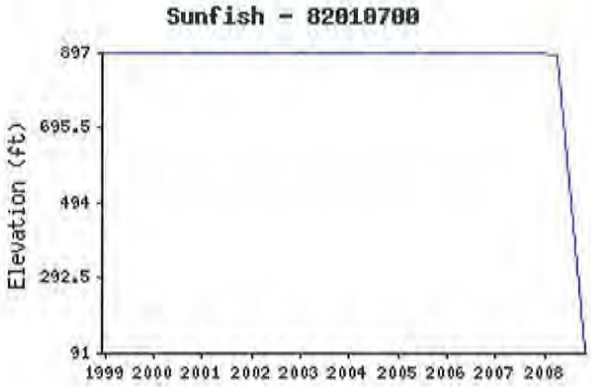
Bluegills remain the most abundant species in Olson Lake. Their population is considered high when compared to similar lakes. The size structure remains small. The average length sampled was 4.5 inches. Pumpkinseed, green and hybrid sunfish were all sampled during the survey. The northern pike population was sampled at the highest level recorded for this lake. The average size was 20.8 inches and 1.89 pounds. Black crappie numbers are moderate, but the size is small. Largemouth bass were found in moderate abundance. Individuals exceeding 19 inches were found. A special regulation that requires the immediate release of all largemouth bass is inplace on Olson Lake. Walleye were sampled in average abundance for this type of lake. The average size sampled in the gill nets was 18.97 inches in length. All three species of bullhead native to Minnesota were sampled during the survey. Yellow and brown bullhead were each sampled in high abundance in the gill nets. The average weight for each species was approximately 3/4 of a pound. Yellow perch and white suckers were each found in low abundance.

Lake water level report

Lake name: Sunfish

County: Washington

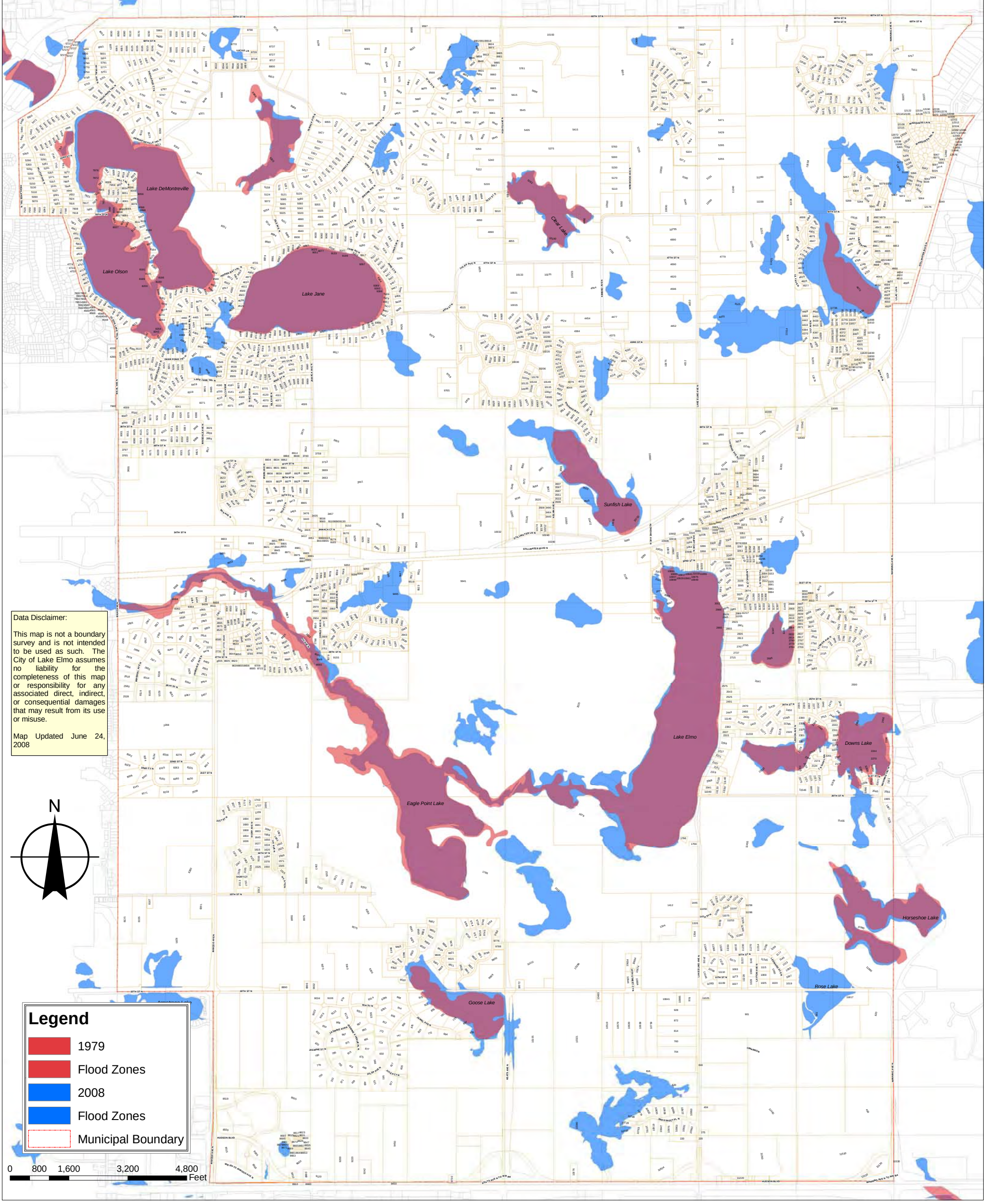
Water Level Data
Period of record: 01/01/1999 to 09/30/2008
# of readings: 110
Highest recorded: 896.94 ft (04/16/1999)
Lowest recorded: 890.75 ft (09/30/2008)
Recorded range: 6.19 ft
Last reading: 890.75 ft (09/30/2008)
Ordinary High Water Level (OHW) elevation: 896.4 ft
Datum: NGVD 29 (ft)



Last 10 years of data, click to enlarge.

Benchmarks
No benchmark information available.

CITY OF LAKE ELMO FLOODPLAIN COMPARISON MAP



Data Disclaimer:

This map is not a boundary survey and is not intended to be used as such. The City of Lake Elmo assumes no liability for the completeness of this map or responsibility for any associated direct, indirect, or consequential damages that may result from its use or misuse.

Map Updated June 24, 2008

Minnesota Pollution Control Agency

GENERAL PERMIT
AUTHORIZATION TO DISCHARGE STORM WATER ASSOCIATED WITH MUNICIPAL SEPARATE STORM SEWER SYSTEMS UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM/STATE DISPOSAL SYSTEM PERMIT PROGRAM

EFFECTIVE DATE: June 1, 2006 **EXPIRATION DATE: May 31, 2011**

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et seq.; hereinafter, the "**Act**"), 40 CFR 122, 123, and 124, as amended, et seq.; Minnesota Statutes Chapters 115 and 116, as amended, and Minnesota Rules Chapter 7001.

This permit establishes conditions for discharging **Storm Water** and specific other related discharges to **Waters of the State**. This permit is required for discharges that are from **Small Municipal Separate Storm Sewer Systems,** as defined in this permit.

Upon approval by the **Commissioner** applicants who submit a completed application in accordance with the requirements of this permit, are authorized to discharge **Storm Water** from **Small Municipal Separate Storm Sewer Systems**, under the terms and conditions of this permit.

Signature: _____

Sheryl A. Corrigan
Commissioner
Minnesota Pollution Control Agency

Issuance Date: 3/3/06

If **You** have questions on this permit, including the specific permit requirements, permit reporting or permit compliance status, please contact the appropriate Minnesota Pollution Control Agency offices.

Storm Water Management Unit
Storm Water Section
Municipal Division
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Phone (651) 296-6300, or
Toll free in MN 800-657-3864
Fax (651) 297-2343

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PART I. PERMIT GOALS

The primary goal of this permit is to restore and maintain the chemical, physical, and biological integrity of **Waters of the State** through management and treatment of urban **Storm Water** runoff. This is accomplished by management of **Municipal Separate Storm Sewer Systems** through a **Storm Water Pollution Prevention Program.** The purpose is to maintain water quality standards where there is compliance, and help bring waters that do not meet water quality standards into compliance. It should be noted that when there is a discharge to waters where there are limitations on coverage (Part II.B), there may be more stringent requirements that must be addressed. **You** may also voluntarily adopt more stringent measures to meet local goals.

PART II. COVERAGE UNDER THIS PERMIT

A. Eligibility

This permit, including appendices, authorizes discharges of **Storm Water** from **Small Municipal Separate Storm Sewer Systems** as defined in 40 CFR § 122.26(b)(16).

B. Limitations on Coverage

1. This permit does not authorize discharges other than **Storm Water**. Non-**Storm Water** discharges may include: combined sewer overflow, noncontact cooling water, sewage, wash water, scrubber water, spills, oil, hazardous substances, fill, commercial equipment/vehicle cleaning and maintenance wastewaters. A separate National Pollutant Discharge Elimination System (NPDES) permit may be required for these discharges.

2. This permit does not authorize the discharge of **Storm Water** when a separate NPDES permit is required for these activities. For example, while **Storm Water** from industrial activity or construction activity may be discharged from a **MS4** with authorized **Storm Water** discharges, this permit does not replace or satisfy any other permits required for those discharges.

3. This permit does not authorize the discharge of **Storm Water** from any other entity located in the drainage area or outside the drainage area. Only your system and the portions of the storm sewer system that are under your operational control are authorized by your permit.

4. This permit does not authorize the following **discharges** as described in Appendix C unless the requirements of Part IX (Appendix C) are met:

    a. Discharges to waters with Prohibited Discharges as defined in Minn. R. 7050.0180, subp. 3, 4, and 5.

b. Discharges to waters with Restricted Discharge as defined in Minn. R. 7050.0180, subp. 6, 6a, and 6b.

c. Discharges to Trout Waters as defined in Minn. R. 6264.0050, subp. 2 and 4.

d. Discharges to **Wetlands** as defined in Minn. R. 7050.0130, subp. F (see also Minn. R. 7050.0186).

e. Discharges requiring Environmental Review required by Minn. Stat. ch. 116D and 42 U.S.C. §§ 4321 – 4370 f.

f. Discharges Affecting Threatened or Endangered Species or Their Habitat.

g. Discharges Affecting Historic or Archeological Sites.

h. Discharges Affecting Source Water Protection Areas.

5. This permit does not allow **discharges** if the requirements of Part X (Appendix D) and schedule of Part XI (Appendix E) are applicable, unless the **MS4** is in compliance with those appendices.

C. Obtaining Authorization

In order for **Storm Water** discharges from **Small Municipal Separate Storm Sewer Systems** to be authorized to discharge under this **General Permit**:

1. Submit an application with the **Storm Water Pollution Prevention Program You** intend to implement under this permit, in accordance with the requirements of Part III, using a form provided by the **Commissioner** (or a facsimile thereof).

2. Where the ownership or significant operational control of the **MS4** changes, after the submittal of an application under Part III, a new application must be submitted in accordance with Part III.

3. The **Commissioner** will review the application and **Storm Water Pollution Prevention Program** for completeness and compliance with this permit. The **Commissioner** shall determine whether to approve coverage or to deny coverage to dischargers who submit a complete application. In accordance with the procedures of this permit and requirements of Minn. R. ch. 7001, the **Commissioner** shall provide public notice with the opportunity for hearing on the determination. Upon approval by the **Commissioner**, dischargers are authorized to discharge **Storm Water** from **Small Municipal Separate Storm Sewer Systems** under the terms and conditions of this permit.

4. The **Commissioner** may deny coverage under this permit and require submittal of an application for an individual NPDES permit based on a review of the application or other information, in accordance with Minn. R. ch. 7000 and 7001.

PART III. APPLICATION REQUIREMENTS (Notice of Intent)

A. Deadlines for Application

If **You** are an **Owner** or **Operator** of a **Small Municipal Separate Storm Sewer System** regulated under 40 CFR § 122.32(a)(1), **You** must apply to obtain coverage under this permit within 90 days after the permit issuance date on page 1 of this permit. If **You** fail to make the application deadline, **You** are out of compliance and must submit an application. The **Owner** or **Operator** of an **MS4** that is not designated for coverage by federal rules, but has been designated under Minn. R. ch. 7090, must apply by the date specified in the **Commissioner's** designation documents.

B. Signature

The Application shall be signed in accordance with application forms provided by the **Commissioner** and shall include the following information:

1. The street address, county, and the **Owner** or **Person** with operational control of the **MS4** for which the notification is submitted; and

2. The name, address, and telephone number of the individual responsible for overall permit compliance.

C. Application Attachment: Storm Water Pollution Prevention Program

The proposed **Storm Water Pollution Prevention Program** for implementing the permit shall be attached to the application on forms provided by the **Commissioner** (or reasonable facsimiles), including:

1. The **Best Management Practices** or **BMPs** that **You** will implement for each of the **Storm Water** minimum control measures at Part V.G of this permit;

2. The measurable goals for each of the **BMPs**, including, as appropriate, the months and years in which **You** will undertake required actions, including interim milestones and the frequency of the action, in narrative or numeric form, as appropriate;

3. Estimated timeline(s) (months, years) in which **You** will implement each **BMP**; and

4. Individual(s) responsible for implementing and/or coordinating each component of the **Storm Water Pollution Prevention Program**. This should be the individual **You** want the **Agency** to contact for the particular component; it may be the overall coordinator or other individual.

D. Where to Submit

Applications signed in accordance with Part III.B of this permit, **Storm Water Pollution Prevention Programs** submitted under Part III.C, annual reports under Part VI.D, and submittals under Appendices C, D, and E, are to be submitted to the **Commissioner** at the following address:

Storm Water Management Unit
Storm Water Section
Municipal Division
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Phone (651) 296-6300, or
Toll free in MN 800-657-3864
Fax (651) 297-2343

E. Record Retention

The applicant shall retain copies of the permit application, the **Storm Water Pollution Prevention Program,** all data and information used by the applicant to complete the application, and any information developed as a requirement of this permit or as requested by the **Commissioner**, for a period of at least three (3) years beyond the date of permit expiration. This period is automatically extended during the course of an unresolved enforcement action regarding the **MS4** or as requested by the **Commissioner**.

PART IV. RIGHTS AND RESPONSIBILITIES

A. The **Commissioner** may modify this permit or issue other permits, in accordance with Minn. R. ch. 7001, to include more stringent effluent limitations or permit requirements that modify or are in addition to the minimum control measures in Part V.G of this permit, or both. These modifications may be based on the **Commissioner**'s determination that such modifications are needed to protect water quality.

B. Additional **MS4s** may be designated for coverage under this permit in accordance with Minn. R. ch. 7090. The **Owner** or **Operator** of an **MS4** that is designated for coverage must comply with the permit requirements by the dates specified in the **Commissioner's** designation documents.

C. **You** may request individual permits based on Minn. R. ch. 7000, 7001, and other applicable rules.

D. Section 303(d) listings and **Total Maximum Daily Load (TMDL)**

If your **MS4** discharges to a **Water of the State** that appears on the current **USEPA** approved list of impaired waters under Section 303(d) of the Clean Water Act (33 U.S.C. § 303 (d)), **You** must review whether changes may be warranted in your **Storm Water Pollution Prevention Program** to **Reduce** the impact of your discharge. If a **USEPA**-approved **TMDL(s)** has been developed, **You** must review the adequacy of your **Storm Water Pollution Prevention Program** to meet the **TMDL's** Waste Load Allocation set for **Storm Water** sources. If the **Storm Water Pollution Prevention Program** is not meeting the applicable requirements, schedules and objectives of the **TMDL**, **You** must modify your **Storm Water Pollution Prevention Program**, as appropriate, within 18 months after the **TMDL** Waste Load Allocation is approved.

PART V. STORM WATER POLLUTION PREVENTION PROGRAM

A. **You** must develop, implement, and enforce a **Storm Water Pollution Prevention Program** designed to **Reduce** the discharge of pollutants from your **Small MS4**, to protect water quality, and to satisfy the appropriate water quality requirements of the Clean Water Act. Upon approval by the **Commissioner**, the **Storm Water Pollution Prevention Program** shall be implemented as specified in the permit or in the **Commissioner's** approval letter.

B. Your **Storm Water Pollution Prevention Program** must be designed and managed to **Reduce** the discharge of pollutants from your storm sewer system to the **Maximum Extent Practicable (MEP)**. **You** must manage your municipal storm sewer system in compliance with the Clean Water Act and with the terms and conditions of this permit. **You** must manage, operate, and maintain the storm sewer system and areas **You** control that discharge to the storm sewer system in a manner to **Reduce** the discharge of pollutants to the **MEP**. The **Storm Water Pollution Prevention Program** will consist of a combination of **Best Management Practices**, including education, maintenance, control techniques, system design and engineering methods, and such other provisions as **You** determined to be appropriate, as long as the **BMPs** meet the requirements of this permit.

C. **You** shall submit an annual report on the implementation of the **Storm Water Pollution Prevention Program** by June 30 of each year, or on another later date if established for your **MS4** by the **Commissioner**. The report shall cover the entire previous calendar year, in accordance with the reporting requirements of Part VI.D.

D. Your **Storm Water Pollution Prevention Program** must include **BMPs** that control or **Reduce** pollutants, as appropriate for your community. In the development of **BMPs** for your **Storm Water Pollution Prevention Program,**

You must consider the sources of pollutants, the potentially polluting activities being conducted in the watershed, and the sensitivity of the receiving waters. For **MS4s** that have discharges to waters listed in Part II.B.4, see Part IX (Appendix C) for additional requirements. For **MS4s** listed in Part XI (Appendix E), see Part X (Appendix D) for additional requirements.

E. For each minimum control measure, there shall be a description of the **BMPs** for this measure, responsible department in charge, an implementation schedule, including any request by **You** for consideration by the Commissioner of an extension or exemption from any deadlines and timelines set forth in this permit, and measurable goals that will be used to determine the success or benefits of the **BMPs**.

F. The **Storm Water Pollution Prevention Program** shall become an enforceable part of this permit upon approval by the **Commissioner**. Modifications to the **Storm Water Pollution Prevention Program** that are required or allowed by this permit (see Part V.H) shall also become enforceable provisions.

G. The six minimum control measures to be included in your **Storm Water Pollution Prevention Program** are listed below. **You** must define appropriate **BMPs** for these minimum control measures and measurable goals for each **BMP**. The **Storm Water Pollution Prevention Program** must include all **BMPs** required below, must include annual schedules or procedures for implementation, and, where appropriate, must be implemented or established in ordinance, plan or policy by June 30, 2010, unless other timelines have been specifically established in this permit Part V.G.1-6, or by the **Commissioner** under Part IV.B, or under other rules and authorities.

1. Public education and outreach on **Storm Water** impacts. **You** must select and implement a program of appropriate **BMPs** and measurable goals for this minimum control measure consisting of, at minimum:

    a. **You** must implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of **Storm Water** discharges on water bodies and the steps that the public can take to **Reduce** pollutants in **Storm Water** runoff.

    b. **You** must specifically implement an education program that individually addresses each minimum control measure (Part V.G.1-6):

        1) Public education and outreach;
        2) Public participation;
        3) Illicit discharge detection and elimination;
        4) Construction site **Storm Water** runoff control;

5) Post-construction **Storm Water** management in **New Development** and **Redevelopment**; and
6) Pollution prevention/good housekeeping for municipal operations.

c. For each control measure, your education program must identify:

1) The audience or audiences involved;
2) Educational goals for each audience in terms of increased awareness, increased understanding, acquired skills, and/or desired changes in behavior;
3) Activities used to reach educational goals for each audience;
4) Activity implementation plans, including responsible department in charge, entities responsible for given activities, and schedules; and
5) Available performance measures that can be used to determine success in reaching educational goals.

d. **You** must describe how your education program is coordinated with and makes effective use of other **Storm Water** education programs being conducted in your area by other entities as appropriate for your **MS4**, including, but not limited to: community groups, nonprofit organizations, lake conservation districts, soil and water conservation districts, watershed districts, watershed management organizations, school districts, University of Minnesota Extension, and county, regional, state, and federal government.

e. **You** must hold at least one public meeting per year addressing the **Storm Water Pollution Prevention Program**. **You** must hold the public meeting prior to submittal to the **Commissioner** of the annual report required in Part VI.D.

1) Location. The public informational meeting must be held in the general vicinity of the **MS4** that is the subject of the permit. Otherwise, the public informational meeting must be held in a place that is generally convenient to **Persons** expected to attend the meeting.
2) Notice. **You** must issue a notice of the public informational meeting at least 30 days prior to the meeting. The notice must contain a reference to the **Storm Water Pollution Prevention Program**, the date, time, and location of the public informational meeting; a concise description of the manner in which the public informational meeting will be conducted; and shall indicate the location where a copy of the **Storm Water Pollution Prevention Program** is available for public review.
3) Distribution of notice. **You** must publish the notice in a **Newspaper** of general circulation in the general vicinity of the

MS4, and shall make available a copy of the notice to the **Agency**, the appropriate city and county officials, and all other **Persons** who have requested that they be informed of public meetings for the **Storm Water Pollution Prevention Program**.

4) Joint meetings. **You** may consolidate two or more matters, issues, or related groups of issues, or hold joint **MS4** public meetings with other permittees to meet the requirements of this part. These public meetings may be part of a larger public meeting, such as a city council meeting, provided that adequate public notice and opportunity to participate is provided.

2. Public participation/involvement. **You** must select and implement a program of appropriate **BMPs** and measurable goals for this minimum control measure consisting of, at minimum:

   a. **You** must comply with applicable public notice requirements of Part V.G.1.e.2 when implementing the provisions of the **Storm Water Pollutiou Prevention Program**.

   b. **You** must solicit public input and opinion on the adequacy of the **Storm Water Pollution Prevention Program**, including input from the public meeting, described in Part V.G.1.e, each year prior to submittal of the annual report to the **Commissioner**, which is described in Part VI.D.

      1) **You** must afford interested **Persons** a reasonable opportunity to make oral statements concerning the **Storm Water Pollution Prevention Program**.
      2) **You** must consider timely, relevant written materials that interested **Persons** submit concerning the **Storm Water Pollution Prevention Program**.
      3) **You** may establish procedures and processes for each speaker's presentation, require speakers with similar views to select a spokesperson, specify the timing and format of written materials, or make similar rules to help ensure an opportunity for full and fair consideration of all views.

   c. **You** must consider the public input, oral and written, to the **Storm Water Pollution Prevention Program** and shall make adjustments **You** find appropriate.

3. Illicit discharge detection and elimination. **You** must develop, implement, and enforce a program to detect and eliminate illicit discharges as defined at 40 CFR § 122.26(b)(2) into your **Small MS4**. **You** must also select and implement a program of appropriate **BMPs** and measurable goals for this minimum control measure consisting of, at minimum:

a. **You** must develop, if not already completed, a storm sewer system map by June 30, 2008, or on another date established by the **Commissioner**, showing the location of:

1) Ponds, streams, lakes and **Wetlands** that are part of your system;
2) Structural pollution control devices (grit chambers, separators, etc.) that are part of your system;
3) All pipes and conveyances in your system as a goal, but at minimum, those pipes that are 24 inches in diameter and over; and
4) **Outfalls**, including discharges from your system to other **MS4s**, or waters and **Wetlands** that are not part of your system (where **Yon** do not have operational control); structures that discharge storm water directly into groundwater; overland discharge points and all other points of discharge from your system that are outlets, but not diffuse flow areas.

b. **You** must, to the extent allowable under law, effectively prohibit, through ordinance or **Other Regulatory Mechanism**, non-**Storm Water** discharges into your storm sewer system and implement appropriate enforcement procedures and actions.

c. **You** must develop and implement a program to detect and address non-**Storm Water** discharges, including illegal dumping, to your system.

d. **You** must inform employees, businesses, and the general public in your **MS4** area of hazards associated with illegal discharges and improper disposal of waste.

e. **You** must address the following categories of non-**Storm Water** discharges or flows (i.e., illicit discharges), <u>only</u> if **You** identify them as significant contributors of pollutants to your **Small MS4**:

water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration (as defined at 40 CFR § 35.2005(b)(20)), uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and **Wetlands**, dechlorinated swimming pool discharges, and street wash water, discharges or flows from fire fighting activities.

4. Construction site **Storm Water** runoff control. Within six months after extension of coverage under this permit, **You** must have developed and must have commenced to implement and enforce a program to **Reduce** pollutants in any **Storm Water** runoff to your **Small MS4** from construction activities

within your jurisdiction that result in a land disturbance of greater than or equal to one acre. Controls on **Storm Water** discharges from construction activity disturbing less than one acre must be included in your program, if that construction activity is part of a larger **Common Plan of Development or Sale** that would disturb one acre or more. **You** must also select and implement a program of appropriate **BMPs** and measurable goals for this minimum control measure consisting of, at minimum:

a. An ordinance or **Other Regulatory Mechanism** to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under law;

b. Requirements for construction site operators to implement appropriate erosion and sediment control **Best Management Practices**;

c. Requirements for construction site operators to control waste, such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality;

d. Procedures for site plan review which incorporate consideration of potential water quality impacts;

e. Procedures for receipt and consideration of reports of noncompliance or other information on construction related issues submitted by the public; and

f. Procedures for site inspection and enforcement of control measures.

5. Post-construction **Storm Water** management in **New Development** and **Redevelopment**. **You** must develop, implement, and enforce a program to address **Storm Water** runoff from **New Development** and **Redevelopment** projects within your jurisdiction that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger **Commou Plan of Development or Sale** that discharge into your **Small MS4** by June 30, 2008, or on another date established by the **Commissioner**. Your program must ensure that controls are in place that would prevent or **Reduce** water quality impacts. **You** must also select and implement a program of appropriate **BMPs** and measurable goals for this minimum control measure consisting of, at minimum:

a. Develop and implement strategies which include a combination of structural and/or non-structural **BMPs** appropriate for your community;

b. Use an ordinance or **Other Regulatory Mechanism** to address post-construction runoff from **New Development** and **Redevelopment** projects to the extent allowable under law; and

c. Ensure adequate long-term operation and maintenance of **BMPs** installed as a result of these requirements.

6. Pollution prevention/good housekeeping for municipal operations. **You** must select and implement a program of appropriate **BMPs** and measurable goals for this minimum control measure consisting of, at minimum:

a. An operation and maintenance program that includes a training component and has the ultimate goal of preventing or **Reducing** pollutant runoff from **MS4** operations. Training materials that are available from the **USEPA**, state and regional agencies, or other organizations may be used as appropriate or modified for your community. Your program must include employee training to prevent and **Reduce Storm Water** pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and **Storm Water** system maintenance.

b. **You** must also:

1) Operate and maintain your **Storm Water** system in a manner so as to **Reduce** the discharge of pollutants to the **Maximum Extent Practicable**.
2) Inspect annually all structural pollution control devices, such as trap manholes, grit chambers, sumps, floatable skimmers and traps, separators, and other small settling or filtering devices.
3) Inspect, at minimum, 20% of the **MS4 Outfalls**, sediment basins and ponds each year on a rotating basis, during the effective period of this permit.
4) Inspect all exposed stockpile, storage and material handling areas at least annually.
5) Based on your inspection, determine if repair, replacement, or maintenance measures are necessary for proper operation and to prevent environmental impacts such as erosion. The necessary measures shall be completed as soon as possible, usually during the same year as the inspection. When this is not practicable, the reasons and a schedule for completion shall be submitted in the annual report.
6) Summarize the results of all inspections in the annual report. Keep records on the dates of inspection and responses to the inspections, including the date of completion of repairs and major additional protection measures.

7) Keep records of inspection results, including as appropriate, the date, antecedent weather conditions, sediment storage and capacity remaining, and any maintenance performed or recommended. After two years of inspections, if patterns of maintenance become apparent, the frequency of inspections may be adjusted. If maintenance or sediment removal is required as a result of each of the first two annual inspections, the frequency of inspection shall be increased to at least two (2) times annually, or more frequently as needed to prevent carry-over or washout of pollutants from the structures and maximize pollutant removal. If maintenance or sediment removal is not required as a result of both of the first two (2) annual inspections, the frequency may be reduced to once every two (2) years.

H. Modifications to the Storm Water Pollution Prevention Program

1. The **Commissioner** may require **You** to modify the **Storm Water Pollution Prevention Program** as needed, in accordance with the procedures of Minn. R. ch. 7001, and may consider the following factors:

   a. Discharges from the storm sewer system are impacting the quality of receiving waters;

   b. More stringent requirements are necessary to comply with state or federal regulations;

   c. Measures are necessary to meet the applicable requirements of Appendices C and D, or

   d. Additional conditions are deemed necessary to comply with the goals and requirements of the Clean Water Act or water quality standards.

2. Modifications that **You** wish to make in your **Storm Water Pollution Preventiou Program**, other than modifications allowed in Part H.3 below, must be approved by the **Commissioner** in accordance with the procedures of Minn. R. ch. 7001. All requests must be in writing, setting forth schedules for compliance. The request should discuss alternative program modifications, assure compliance with requirements of the permit, and meet other requirements of the permit and applicable laws.

3. The **Storm Water Pollution Prevention Program** may only be modified by **You** without prior approval of the **Commissioner**, provided it is in accordance with the following:

   a. A **BMP** is added, and none subtracted, from the **Storm Water Pollution Prevention Program**; or

b. A less effective **BMP** identified in the **Storm Water Pollution Prevention Program** is replaced with a more effective **BMP**. The alternate **BMP** shall address the same, or similar, concerns as the ineffective or failed **BMP**; and

c. The **Commissioner** is notified of the modification in the annual report for the year the modification is made.

PART VI. EVALUATING, RECORDKEEPING AND REPORTING

A. Evaluation and Assessment

For each annual report, **You** must evaluate program compliance, the appropriateness of your identified **Best Management Practices**, and progress towards achieving your identified measurable goals.

B. Recordkeeping

You must keep records required by the NPDES permit for at least three (3) years beyond the term of the permit. **You** must submit your records to the **Commissioner** only if specifically asked to do so.

C. Public Availability

You must make your records, including your **Storm Water Pollution Prevention Program**, available to the public at reasonable times during regular business hours (see 40 CFR § 122.7 for confidentiality provision). **You** may assess a reasonable charge for copying. **You** may require a member of the public to provide advance notice.

D. Annual Reporting

You must submit annual reports to the **MPCA** by June 30 of each year. The report must cover the entire previous calendar year. Your annual report must summarize:

1. The status of compliance with permit conditions, including an assessment of the appropriateness of your identified **Best Management Practices** and progress towards achieving your identified measurable goals for each of the minimum control measures. Your assessment must be based on results of information collected and analyzed, including monitoring (if any), inspection findings, and public input received during the reporting period;

2. The **Storm Water** activities **You** plan to undertake during the next reporting cycle;

3. A change in any identified **Best Management Practices** or measurable goals for any of the minimum control measures; and

4. A statement that **You** are relying on another entity to satisfy some of your permit obligations (if applicable), and what agreements **You** have entered into in support of this effort.

E. Reporting Submittals

The applications, annual reports, **Storm Water Pollution Prevention Program**, and other submittals required by this permit shall be submitted to:

Storm Water Management Unit
Storm Water Section
Municipal Division
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

PART VII. APPENDIX A: STANDARD CONDITIONS

A. The **Agency's** issuance of a permit does not release the permittee from any liability, penalty, or duty imposed by Minnesota or federal statutes or rules or local ordinances, except the obligation to obtain the permit.

B. The **Agency's** issuance of a permit does not prevent the future adoption by the **Agency** of pollution control rules, standards, or orders more stringent than those now in existence and does not prevent the enforcement of these rules, standards, or orders against the permittee.

C. The permit does not convey a property right or an exclusive privilege.

D. The **Agency's** issuance of a permit does not obligate the **Agency** to enforce local laws, rules, or plans beyond that authorized by Minnesota statutes.

E. The permittee shall perform the actions or conduct the activity authorized by the permit in accordance with the plans and specifications approved by the **Agency** and in compliance with the conditions of the permit.

F. The permittee shall at all times properly operate and maintain the facilities and systems of treatment and control and the appurtenances related to them which are installed or used by the permittee to achieve compliance with the conditions of the permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. The permittee shall install and maintain appropriate backup or auxiliary facilities if they are necessary to achieve compliance with the conditions of the permit and, for all permits other than hazardous waste facility permits, if these backup or auxiliary facilities are technically and economically feasible.

G. The permittee may not knowingly make a false or misleading statement, representation, or certification in a record, report, plan, or other document required to be submitted to the **Agency** or to the **Commissioner** by the permit. The permittee shall immediately upon discovery report to the **Commissioner** an error or omission in these records, reports, plans, or other documents.

H. The permittee shall, when requested by the **Commissioner**, submit within a reasonable time the information and reports that are relevant to the control of pollution regarding the construction, modification, or operation of the facility covered by the permit or regarding the conduct of the activity covered by the permit.

I. When authorized by Minn. Stat. §§ 115.04; 115B.17, subd. 4; and 116.091, and upon presentation of proper credentials, the **Agency**, or an authorized employee or agent of the **Agency**, shall be allowed by the permittee to enter at reasonable times

upon the property of the permittee to examine and copy books, papers, records, or memoranda pertaining to the construction, modification, or operation of the facility covered by the permit or pertaining to the activity covered by the permit; and to conduct surveys and investigations, including sampling or monitoring, pertaining to the construction, modification, or operation of the facility covered by the permit or pertaining to the activity covered by the permit.

J. If the permittee discovers, through any means, including notification by the **Agency**, that noncompliance with a condition of the permit has occurred, the permittee shall take all reasonable steps to minimize the adverse impacts on human health, public drinking water supplies, or the environment resulting from the noncompliance.

K. If the permittee discovers that noncompliance with a condition of the permit has occurred which could endanger human health, public drinking water supplies, or the environment, the permittee shall, within 24 hours of the discovery of the noncompliance, orally notify the **Commissioner**. Within five days of the discovery of the noncompliance, the permittee shall submit to the **Commissioner** a written description of the noncompliance; the cause of the noncompliance; the exact dates of the period of the noncompliance; if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

L. The permittee shall report noncompliance with the permit not reported under item K as a part of the next report, which the permittee is required to submit under this permit. If no reports are required within 30 days of the discovery of the noncompliance, the permittee shall submit the information listed in item K within 30 days of the discovery of the noncompliance.

M. The permittee shall give advance notice to the **Commissioner** as soon as possible of planned physical alterations or additions to the permitted facility (**MS4**) or activity that may result in noncompliance with a Minnesota or federal pollution control statute or rule or a condition of the permit.

N. The permit is not transferable to any **Person** without the express written approval of the **Agency** after compliance with the requirements of Minn. R. 7001.0190. A **Person** to whom the permit has been transferred shall comply with the conditions of the permit.

O. The permit authorizes the permittee to perform the activities described in the permit under the conditions of the permit. In issuing the permit, the state and **Agency** assume no responsibility for damage to **Persons**, property, or the environment caused by the activities of the permittee in the conduct of its actions, including those activities authorized, directed, or undertaken under the permit. To the extent the state and **Agency** may be liable for the activities of its employees, that liability is explicitly limited to that provided in the Tort Claims Act, Minn. Stat. § 3.736.

P. This permit incorporates by reference the applicable portions of 40 CFR §§ 122.41 and 122.42 parts (c) and (d) and Minn. R. 7001.1090, which are enforceable parts of this permit.

PART VIII. APPENDIX B: DEFINITIONS

The definitions in this Part are for purposes of this permit only.

"Agency" or **"Agency members"** means the **Commissioner** and the eight persons appointed to the Minnesota Pollution Control Agency, pursuant to Minn. Stat. § 116.02, subd. 1.

"Best Management Practices" or **"BMPs"** means practices to prevent or **Reduce** the pollution of the **Waters of the State**, including schedules of activities, prohibitions of practices, and other management practices, and also includes treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge, or waste disposal or drainage from raw material storage.

"Commissioner" means the **Commissioner** of the Minnesota Pollution Control Agency or the **Commissioner's** designee.

"Common Plan Of Development Or Sale" means a contiguous area where multiple separate and distinct construction activities are planned to occur at different times on different schedules under one plan, for example, a housing development of five one-quarter-acre lots (40 CFR § 122.26(b)(15)(i)).

"Designated MS4" means an MS4 designated in accordance with Minn. R. ch. 7090.

"EPA" means the U.S. Environmental Protection Agency.

"Expanded Discharge" means a discharge that changes in volume, quality, location, or any other manner after January 1, 1988 or the effective date an outstanding resource value water was designated as described in Minn. R. 7050.0460 and 7050.0470, such that an increased loading of one or more pollutants results. In determining whether an increased loading of one or more pollutants would result from the proposed change in the discharge, the **Agency** shall compare the loading that would result from the proposed discharge with the loading allowed by the **Agency** as of January 1, 1988 or the effective date of outstanding resource value water designation. This definition does not apply to the discharge of bioaccumulative chemicals of concern, as defined in Minn. R. 7052.0010, subp. 4, to outstanding resource value waters in the Lake Superior Basin. For purposes of Minn. R. 7050.0180, an expanded discharge of a bioaccumulative chemical of concern to an outstanding resource value water in the Lake Superior Basin is defined in Minn. R. 7052.0010, subp. 18.

"General Permit" means a permit issued under Minn. R. 7001.0210 to a category of permittees whose operations, emissions, activities, discharges, or facilities are the same or substantially similar.

"Maximum Extent Practicable" "MEP" is the statutory standard (33 U.S.C. § 1342(p)(3)(B)(iii)) that establishes the level of pollutant reductions that an **Owner** or

Operator of **Regulated MS4s** must achieve. The **USEPA** has intentionally not provided a precise definition of **MEP** to allow maximum flexibility in **MS4** permitting. The pollutant reductions that represent **MEP** may be different for each **Small MS4**, given the unique local hydrologic and geologic concerns that may exist and the differing possible pollutant control strategies. Therefore, each permittee will determine appropriate **BMPs** to satisfy each of the six minimum control measures through an evaluative process. The **USEPA** envisions application of the **MEP** standard as an iterative process.

"MPCA" means the Minnesota Pollution Control Agency.

"MS4" means a **Municipal Separate Storm Sewer System**.

"Municipal Separate Storm Sewer System" means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

1. Owned or operated by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to state law) having jurisdiction over disposal of sewage, industrial wastes, **Storm Water**, or other wastes, including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management Agency under section 208 of the CWA (33 U.S.C. § 1288) that discharges to waters of the United States;

2. Designed or used for collecting or conveying **Storm Water**;

3. Which is not a combined sewer; and

4. Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR § 122.2.

"New Development" means construction activities that create new impervious surface.

"New Discharge" For all waters that are not outstanding resource value waters **New Discharge** means a discharge that was not in existence before January 1, 1988. For outstanding resource value waters **New Discharge** means a discharge that was not in existence on the effective date the outstanding resource value water was designated as described in Minn. R. 7050.0460 and 7050.0470.

"Newspaper" means a publication containing news of general interest in the vicinity of the **MS4**. It can include other publications if the distribution includes the general population of potentially interested parties.

"Notice of Intent" as referenced in the **USEPA** documents is synonymous with the term "permit application" for the purposes of this permit.

"Other Regulatory Mechanism" means any legally enforceable document, such as a contract or other agreement that has penalties such as withholding payments, fines or other measures to prevent non compliance.

"Operator" means the **Person** with primary operational control and legal responsibility for the **Municipal Separate Storm Sewer System**.

"Outfall" means the point source where a **Municipal Separate Storm Sewer System** discharges from a pipe, ditch, or other discrete conveyance to receiving waters, or to other **Municipal Separate Storm Sewer Systems**. It does not include diffuse runoff or conveyances which connect segments of the same stream or water systems.

"Owner" means the **Person** that owns the **Municipal Separate Storm Sewer System**.

"Person" means the state or any agency or institution thereof, any municipality, governmental subdivision, public or private corporation, individual, partnership, or other entity, including, but not limited to, association, commission or any interstate body, and includes any officer or governing or managing body of any municipality, governmental subdivision, or public or private corporation, or other entity.

"Physical Alteration" except as used in Part VII.M, means the dredging, filling, draining, or permanent inundating of a **Wetland**. Restoring a degraded **Wetland** by reestablishing its hydrology is not a **Physical Alteration**.

"Rebuttable Presumption" is a presumption that may be rebutted by the evidence.

"Record of Decision" means a record of the comments and the permittee's response to comments where such record is required in this permit.

"Redevelopment" refers to alterations of a property that change the "footprint" of a site or building in such a way that results in the disturbance of equal to or greater than one (1) acre of land. The term is not intended to include such activities as exterior remodeling, which would not be expected to cause adverse **Storm Water** quality impacts and offer no new opportunity for **Storm Water** controls.

"Reduce" means **Reduce** to the "**Maximum Extent Practicable**" unless otherwise defined in the context in which it is used.

"Regulated MS4" means an **MS4** that is regulated pursuant to 40 CFR § 122.32(a)(1), or an **MS4s** that is designated for coverage by the **Commissioner**.

"Selected MS4" means **MS4s** listed in Part XI (Appendix E).

"Small Municipal Separate Storm Sewer System" means all separate storm sewers that are:

1. Owned or operated by the United States, a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to state law) having jurisdiction over disposal of sewage, industrial wastes, **Storm Water**, or other wastes, including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States.

2. Not defined as "large" or "medium" **Municipal Separate Storm Sewer Systems** pursuant to 40 CFR §122.26 paragraphs (b)(4) and (b)(7) or designated under paragraph (a)(1)(v).

3. This term includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as individual buildings.

"Small MS4" means a **Small Municipal Separate Storm Sewer System**.

"Storm Water" means **Storm Water** runoff, snowmelt runoff, surface runoff and drainage.

"Storm Water Pollution Prevention Program" or **"SWPPP"** is a compilation of **BMPs** to address the six minimum control measures and other provisions of the **MS4** permit, that is designed and managed to **Reduce** the discharge of pollutants from your **MS4** to the **Maximum Extent Practicable** as appropriate to your community.

"Total Maximum Daily Load" or **"TMDL"** is the process established by the **USEPA** for the allocation of pollutant loads, including **Storm Water**, to a particular water body or reach of a water body.

"USEPA" or **"EPA"** means the U.S. Environmental Protection Agency.

"Waters of the State" means all streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, reservoirs, aquifers, irrigation systems, drainage systems and all other bodies or accumulations of water, surface or underground, natural or artificial, public or private, which are contained within, flow through, or border upon the state or any portion thereof.

"Wetlands" are those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. **Wetlands** generally include swamps, marshes, bogs, and similar areas. Constructed **Wetlands** designed for wastewater treatment are not **Waters of the State**. **Wetlands** must have the following attributes:

1. A predominance of hydric soils;

2. Inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in a saturated soil condition; and

3. Under normal circumstances support a prevalence of such vegetation.

"You" means the **Owner**, **Operator** or permittee as appropriate.

PART IX. APPENDIX C: LIMITATIONS ON COVERAGE

Contents of Appendix C:

A. ***Discharges to Waters With Prohibited Discharges*** *(pages 25-26)*

B. ***Discharges to Waters With Restricted Discharges*** *(pages 26-28)*

C. ***Discharges to Trout Waters*** *(page 28)*

D. ***Discharges to Wetlands*** *(page 28)*

E. ***Discharges Requiring Environmental Review*** *(page 28)*

F. ***Discharges Affecting Threatened or Endangered Species or Their Habitat*** *(page 29)*

G. ***Discharges Affecting Historic or Archeological Sites*** *(page 29)*

H. ***Discharges Affecting Source Water Protection Areas*** *(page 29)*

This part describes more stringent requirements for discharges that meet the following specified criteria, A through H. Whenever two or more requirements, restrictions, or prohibitions apply, both or all must be met. Whenever two or more requirements, restrictions or prohibitions conflict, the more restrictive conditions must be met.

A. Discharges to Waters with Prohibited Discharges *(Minn. R. 7050.0180, subp. 3, 4 and 5).* This permit does not authorize **New or Expanded Discharges** to waters, or discharges adversely impacting waters, where the applicable water quality standards prohibit **New or Expanded Discharges** as described in Minn. R. 7050.0180, subp. 3, 4, and 5 unless the following requirements are met:

1. **List. You** must identify as part of your application for permit the Waters with Prohibited Discharges to which your **MS4** discharges. The list must be included with your application, to be submitted within 90 days after the permit effective date on page 1 of this permit or for **Designated MS4s** in accordance with Part IV.B.

2. **Map. Yon** must mark on U.S.G.S. watershed or topographic maps of 1:24,000 scale or better at minimum the DNR minor subwatersheds in your jurisdiction that discharge in whole or in part to Waters with Prohibited Discharges. **You** must provide a narrative estimate of the percent impervious surface based on current land use, the percent expected future impervious surface based on zoning or comprehensive plans, and other information that may significantly affect your runoff to the listed waters. The map must be included with your application, to be submitted within 90 days after the permit

effective date on page 1 of this permit or for **Designated MS4s** in accordance with Part IV.B.

3. **Assessment. You** must then assess how your **Storm Water Pollution Prevention Program** can be reasonably modified to eliminate **New or Expanded Discharges** to Waters with Prohibited Discharges. This assessment must be developed for **New or Expanded Discharges** created from 1988 until the year 2020. **You** must present this assessment, together with your proposed changes to your **Storm Water Pollution Prevention Program,** for public comment during the annual public comment period required in the permit, prior to your first annual report (see Part VI.D) or prior to the schedule in Appendix E for **Selected MS4s**.

4. **Assessment Submittal**. **You** must submit the assessment from Part IX.A.3 above, including your response to any public comments and proposed changes to your **Storm Water Pollution Prevention Program,** (a) with your first annual report, (b) on another later date if established for your **MS4** by the **Commssioner**, or (c) in accordance with the schedule in Appendix E for **Selected MS4s**. The assessment will be reviewed by the **Commissioner**, who will provide opportunity for public input and hearing prior to denial or approval of your proposed **Storm Water Pollution Prevention Program**. The **MPCA** reserves the right to incorporate as much available information as possible in the decision making process, including the right to independently develop and evaluate potential alternatives to the discharge.

5. **Implementation. You** must implement your approved plan, including all approved **BMPs**, in accordance with the schedule in the approved **Storm Water Pollution Prevention Program**.

B. Discharges to Waters with Restricted Discharges *(Minn. R. 7050.0180, subp.6, 6a, and 6b)*. This permit does not authorize **New or Expanded Discharges** to waters where the applicable water quality standards restrict **New or Expanded Discharges**, unless such discharges are in accordance with Minn. R. 7050.0180, subpart 6, 6a, and 6b, and other applicable rules, and the following requirements. For **MS4s** that have discharges to outstanding resource value waters listed in Minn. R. 7050.0180, subp. 6, 6a or 6b (listed waters, or Waters with Restricted Discharges), the **MPCA** makes a **Rebuttable Presumption** that those **MS4s** have or will create a **New or Expanded Discharge** to a listed water. The following requirements create a schedule to bring discharges to listed waters into compliance:

1. In order to allow a **New or Expanded Discharge** to Waters with Restricted Discharges, the **MPCA** must determine that there are no prudent and feasible alternatives to the **New or Expanded Discharge**. The determination will be based on your demonstration. This demonstration should include, but is not limited to developing a plan to address prudent and feasible alternatives to the discharge. If **You** intend to argue that there are no prudent and feasible

alternatives to the discharge to these waters, **You** must develop a plan to restrict the discharge to the extent necessary to preserve the existing high quality, or to preserve the wilderness, scientific, recreational, or other special characteristics that make the listed water an outstanding resource value water.

2. Here are the specific actions **You** must take:

   a. **List. You** must identify as part of your application for permit the waters with restricted discharges to which your **MS4** discharges. The list must be included with your application, to be submitted within 90 days after the permit effective date on page 1 of this permit or for **Designated MS4s** in accordance with Part IV.B.

   b. **Map. You** must mark on U.S.G.S. watershed or topographic maps of 1:24,000 scale or better at minimum the DNR minor subwatersheds in your jurisdiction that discharge in whole or in part to waters with restricted discharges. **You** must provide a narrative estimate of the percent impervious surface based on current land use, the percent of future expected impervious surface based on zoning or comprehensive plans, and other information that may significantly affect your runoff to the listed waters. **You** must submit this map with your application within 90 days after the permit effective date on page 1 of this permit or other later date if established by the **Commissioner.**

   c. **Assessment. You** must then assess how your **Storm Water Pollution Prevention Program** can be reasonably altered to eliminate **New or Expanded Discharges** to waters with restricted discharges. This assessment must be developed for **New or Expanded Discharges** produced from 1988 until the year 2020. Where **You** intend to argue that there are no prudent and feasible alternatives **to New or Expanded Discharges** to these waters, **You** must propose measures **You** will implement to restrict the discharge to the extent necessary to preserve the existing high quality, or to preserve the wilderness, scientific, recreational, or other special characteristics that make the listed waters outstanding resource value waters. Measures that can be proposed include ordinances and zoning changes or other **BMPs. You** must present this assessment, together with your proposed changes to your **Storm Water Pollution Prevention Program,** for public comment during the annual public comment period required in the permit, prior to your first annual report (see Part VI.D) or prior to the schedule in Appendix E for **Selected MS4s.**

   d. **Assessment Submittal. You** must submit the assessment from Part IX.B.2.c above, and your response to any public comments, with your plan and proposed changes to your **Storm Water Pollution Prevention Program** and submit it with your first annual report, or on another later date if established for your **MS4** by the **Commissioner,** or according to the schedule in Appendix E for **Selected MS4s**. The plan and proposed changes to the **Storm Water Pollution Prevention Program** will be reviewed by the **Commissioner**, who will provide opportunity for public input and hearing pursuant to Minn. R. ch. 7001 prior to denial or approval of your proposed **Storm Water Pollution Prevention**

Program modifications. The **MPCA** reserves the right to incorporate as much available information as possible in the decision making process, including the right to independently develop and evaluate potential prudent and feasible alternatives to the discharge.

e. **Implementation. You** must implement your approved **Storm Water Pollution Prevention Program**, including all **BMPs** in accordance with the schedule described in the approved **Storm Water Pollution Prevention Program**.

C. **Discharges Adversely Impacting Trout Waters** *(Minn. R. 6264.0050 subp. 2 and 4).* The following requirements apply to Trout Waters listed in Minn. R. 6264.0050, subp. 2 and 4:

1. This permit does not authorize **New or Expanded Discharges** adversely impacting Trout Waters unless, at minimum, **You** establish administrative procedures or other measures to assure that **You** make the following determinations and document the basis for your decision:

   a. That there is no feasible and prudent alternative to the proposed discharge; and

   b. All prudent and feasible measures needed to avoid or **Reduce** impacts to Trout Waters, and to preserve the existing high quality of the water will be implemented (see Part IX.C.2 below).

2. If the discharge cannot be avoided, **You** must consider measures to protect water quality and prevent temperature increases. Acceptable measures include reduce the impervious surfaces, diversion away from the stream and use of filter strips, infiltration, biofiltration, or enhanced grass swales to treat runoff before discharge to the Trout Water. Innovative alternatives to ponds are specifically encouraged for Trout Water discharges if they provide equivalent treatment.

D. **Discharges to Wetlands** *(Minn. R. 7050.0130, subp. F; also 7050.0186).* This permit does not authorize **Physical Alterations** to **Wetlands**, or other discharge adversely affecting **Wetlands**, if the alteration will have a significant adverse impact to the designated uses of a **Wetland**. Any **Physical Alterations** to **Wetlands** that will cause a potential for a significant adverse impact to a designated use must be implemented in accordance with the avoidance, minimization and mitigation requirements of Minn. R. 7050.0186 and other applicable rules.

E. **Discharges Requiring Environmental Review** *(Minn. Stat. ch. 116D, and 42 U.S.C. §§ 4321 – 4370 f).* This permit does not replace or satisfy any environmental review requirements, including those under the Minnesota Environmental Policy Act (Minn. Stat. ch. 116D), the National Environmental Policy Act (42 U.S.C. §§ 4321 – 4370 f), and rules implementing those laws. Any environmental review required of **You** by law, including preparation of environmental review documents such as environmental assessment worksheets, environmental impact statements, or environmental assessments, must be completed in accordance with those requirements.

F. **Discharges Affecting Threatened or Endangered Species.** This permit does not replace or satisfy any review requirements for Threatened or Endangered Species, from discharges whose direct, indirect, interrelated, interconnected, or independent impacts would jeopardize a listed Threatened or Endangered Species or adversely modify a designated critical habitat. For any project resulting in a discharge having the potential to adversely impact Threatened or Endangered species, or their critical habitat, **You** must conduct your required review and coordination with appropriate agencies in accordance with those requirements.

G. **Discharges Affecting Historic or Archeological Sites.** This permit does not replace or satisfy any review requirements for Historic or Archeological Sites from discharges which adversely affect properties listed or eligible for listing in the National Register of Historic Places or adversely affecting known or discovered archeological sites. For any project resulting in a discharge having the potential to adversely impact Historic or Archeological Sites, including significant anthropological sites and any burial sites, **You** must conduct your required review and coordination with the Minnesota State Historic Preservation Officer or other appropriate agencies in accordance with those requirements.

H. **Discharges Affecting Source Water Protection Areas** *(Minn. R. 4720.5100 – 4720.5590).* **You** shall incorporate **BMPs** into your **Storm Water Pollution Prevention Program** to protect any of the following drinking water sources that your **MS4** discharge may affect, and **You** shall include the map of these sources with the **Storm Water Pollution Prevention Program** if they have been mapped:

1. Wells and source waters for drinking water supply management areas identified as vulnerable under Minn. R. 4720.5205, 4720.5210, and 4720.5330, and

2. Source water protection areas for surface intakes identified in the source water assessments conducted by or for the Minnesota Department of Health under the federal Safe Drinking Water Act, U.S.C. §§ 300j – 13.

PART X. APPENDIX D: NONDEGRADATION FOR SELECTED MS4s

The requirements of this section apply only to **MS4s** called **Selected MS4s** as described in Part XI (Appendix E). Certain **MS4s** have been selected to perform the requirements of this part because their size and growth may be closely correlated with increased **Storm Water** flows and pollutant loading. Nondegradation review applies to all significant **New or Expanded Discharges** to all waters but does not negate the applicable requirements for outstanding resource value waters, requirements for special classes of waters, other requirements in Appendix C or the general requirements of the permit.

A. Selected MS4s

The basic requirement for all **MS4s** regulated under this permit is to develop a **Storm Water Pollution Prevention Program** that meets the requirements of the permit. An additional process is required of a limited number of permittees (30) that are listed in Appendix E. These **Selected MS4s** must submit to the **Commissioner** information described below to determine whether additional control measures beyond those of the permit Parts I through IX can be reasonably taken to minimize the impacts of the discharges. Selection, for purposes of this permit, is described in Appendix E.

B. Loading Assessment

Each **Selected MS4** must assess the change in **Storm Water** discharge loading for its permitted area using a pollutant loading water quality model that, at minimum, addresses changes in Average Annual Flow Volume, Total Suspended Solids, and Phosphorus. This modeling will be based on two time periods: from 1988 (1988-1990) to the present (2000-2005), and from the present to 2020. The **Selected MS4s** must use a simple model, or another more complex model that they find to be more appropriate, that addresses the parameters of concern. This may include a model that the **Selected MS4** has already used. Other assessment methods may be used if they can be shown to be as effective at quantifying the increase in loading as the modeling methods. The models and/or other methods will be used as part of the assessment to develop the Nondegradation Report, to help in selecting appropriate **BMPs** that address nondegradation, to determine whether additional control measures can reasonably be taken to **Reduce** pollutant loading, and for a few **Selected MS4s** that elect to do so, to evaluate the significance of the **New or Expanded Discharge**.

C. Nondegradation Report

Selected MS4s that have significant **New or Expanded Discharges** are required to complete a Nondegradation Report and, upon approval, to incorporate its findings on **BMPs** that address nondegradation into their **Storm Water Pollution Prevention Program.** The **BMPs** shall address changes in pollutant loadings as far as is reasonable and practical through future development. Additionally, the **BMPs** shall address, as far as is reasonable and practical, the negative impacts of increased **Storm Water** discharge volumes that cause increased depth and duration of inundation of **Wetlands** having the potential for a significant adverse impact to a designated use of the **Wetland**, or changes in stream morphology that have the potential for a significant adverse impact to a designated use of the streams.

The Nondegradation Report must include consideration of the Loading Assessment, which must include analysis of flow and may include removal of pollutants by **BMPs** already initiated. For purposes of this **General Permit**, 1988 levels consistently attained means runoff that would have been produced under approximately average conditions of rainfall. Local **Storm Water** management plans and other pertinent factors may also be considered. **BMPs** implemented by other parties may be considered when those **BMPs** affect the **Storm Water** from the area of the **Selected MS4**. If the pollutant loadings cannot be **Reduced** to levels consistently attained in 1988, the Report must describe reasonable and practical **BMPs** that the **Selected MS4** plans to incorporate into a modified **Storm Water Pollution Prevention Program**. The **Selected MS4** must consider alternatives, explain which alternatives have been studied but rejected and why, and propose alternatives that are reasonable and practical. The Report must give high priority to **BMPs** that address impacts of future growth, such as ordinances for **New Development**. Where increases in pollutant loading have already occurred due to past development, the Report must consider retrofit and mitigation options (**BMPs**) that the **Selected MS4** determines to be reasonable, practical and appropriate for the community. The **Selected MS4** is responsible for developing any site specific cost/benefit, social, and environmental information that the **Selected MS4** wishes to bring to the **Agency's** attention. The **Selected MS4** must incorporate the **BMPs** into a modified **Storm Water Pollution Prevention Program** and include an implementation schedule that addresses **New Development** and retrofit **BMPs** it proposes to implement.

D. Public Participation

Prior to submittal to the **MPCA**, the proposed **Storm Water Pollution Prevention Program** modifications to address nondegradation will be public noticed at the local level as required in the permit (Part V.G.1.e). Each **Selected MS4** shall also submit its **Storm Water Pollution Prevention Program** modifications to address nondegradation to the appropriate local water authority (e.g. watershed organizations or county water planning authority) in time to allow for their review and comment. The Nondegradation Report explaining the proposed **BMPs** and the entire **Storm Water Pollution Prevention Program** must be made available to the public and local water authority upon request.

E. Submittals for Selected MS4s

Selected MS4s must submit their proposed changes to the **Storm Water Pollution Prevention Program**, reports addressing nondegradation for all waters (and restricted waters or prohibited waters if applicable), together with other supporting documents, to the **MPCA** in accordance with the schedule in Appendix E. This submittal must include:

1. The Loading Assessment;

2. The Nondegradation Report;

3. The proposed **Storm Water Pollution Prevention Program** modifications to address nondegradation;

4. The public and local water authority comments on the proposed **Storm Water Pollution Prevention Program** modifications to address nondegradation, with a **Record of Decision** on the comments; and

5. An application to modify the permit.

F. MPCA Review

The **MPCA** will review the above submittals in accordance with Minn. R. ch. 7001. After consideration of the Loading Assessment, the Nondegradation Report, public and local water authority comments, the **Record of Decision** by the **Selected MS4**, and other pertinent information, the **MPCA** will make a determination on the preliminary approval of the proposed **Storm Water Pollution Prevention Program**. The role of the **MPCA** during the review process will generally be limited to reviewing the information presented by the **Selected MS4** and comments made by others during the review process. However, the **MPCA** reserves the right to incorporate as much available information as possible in the decision making process, including the right to independently develop and evaluate potential reasonable and practical alternatives.

G. Notice and Preliminary Determination

The **MPCA** will provide statewide public notice and opportunity for hearing on any **MPCA** determination of intent to deny or approve the **Storm Water Pollution Prevention Program** modifications to be implemented under this permit. The **MPCA** will provide public and **MPCA** comments to the **Selected MS4**. The **Selected MS4** will have the opportunity to respond to the comments prior to the **MPCA** making a final determination.

H. Final Determination

The **Commissioner** will make a final determination on the modifications to the **Storm Water Pollution Prevention Program** in accordance with Minn. R. ch. 7001.

I. Implementation of the Approved Storm Water Pollution Prevention Program

Following approval by the **MPCA** (as described in Part X.H above), the approved **Storm Water Pollution Prevention Program** modifications, including any changes required by the **MPCA**, must be implemented by the **Selected MS4** in accordance with the schedule in the approved **Storm Water Pollution Prevention Program** and modifications.

PART XI. APPENDIX E: SELECTED MS4s

This part describes the schedule of submittals of the items listed in Part X (Appendix D), item E to the **MPCA** for review and approval. The **Commissioner** has selected the **MS4s** listed below for further nondegradation review. The selection was based on the population growth experienced by the community during three time periods: from 1990 to 2000, based on census data; from 2000 to 2003, based on projections by the State Demographer and Metropolitan Council; and from 2000 to 2020, also based on the State Demographer and Metropolitan Council projections. The **Commissioner** also considered the size of the community as represented by the 2000 census. The **Commissioner** may also determine that additional **MS4s** be selected based on the same factors, or other factors in accordance with Minn. R. ch. 7001 and other applicable rules.

The following **Selected MS4s** shall submit the items listed in Part X (Appendix D), item E, to the **MPCA** for review and approval, postmarked on or before the listed dates.

	Selected MS4	Submittal date
1	Rochester	15 months after the effective date of the Permit
2	Woodbury	15 months after the effective date of the Permit
3	Maple Grove	15 months after the effective date of the Permit
4	Lakeville	15 months after the effective date of the Permit
5	Eden Prairie	15 months after the effective date of the Permit
6	Eagan	16 months after the effective date of the Permit
7	Plymouth	16 months after the effective date of the Permit
8	Blaine	16 months after the effective date of the Permit
9	Bloomington	16 months after the effective date of the Permit
10	Duluth	16 months after the effective date of the Permit
11	Brooklyn Park	17 months after the effective date of the Permit
12	Shakopee	17 months after the effective date of the Permit
13	Apple Valley	17 months after the effective date of the Permit
14	St. Cloud	17 months after the effective date of the Permit
15	Burnsville	17 months after the effective date of the Permit
16	Prior Lake	18 months after the effective date of the Permit
17	Maplewood	18 months after the effective date of the Permit
18	Coon Rapids	18 months after the effective date of the Permit
19	Andover	18 months after the effective date of the Permit
20	Elk River	18 months after the effective date of the Permit
21	Savage	19 months after the effective date of the Permit
22	Farmington	19 months after the effective date of the Permit
23	St. Louis Park	19 months after the effective date of the Permit
24	Edina	19 months after the effective date of the Permit
25	Minnetonka	19 months after the effective date of the Permit
26	Chanhassen	20 months after the effective date of the Permit
27	Chaska	20 months after the effective date of the Permit
28	Inver Grove Heights	20 months after the effective date of the Permit
29	Rosemount	20 months after the effective date of the Permit
30	Cottage Grove	20 months after the effective date of the Permit

CITY OF LAKE ELMO
SWPPP

July 15, 2008

NPDES Phase II MS4 Permit Application
Storm Water Pollution Prevention Program

General Storm Water Permit Application
(MN R 040000)

Prepared for the City of Lake Elmo

Prepared by
TKDA
444 Cedar Street, Suite 1500

NPDES Phase II MS4 Permit Application
Storm Water Pollution Prevention Program

General Storm Water Permit Application
(MN R 040000)

City of Lake Elmo

The City of Lake Elmo's SWPPP is designed to reduce the discharge of pollutants from the City's storm sewer system to the maximum extent practicable. To achieve this goal, standard Best Management Practices (BMPs) have been developed. The BMP measures are intended to address the 6 minimum control measures (MCMs) outlined in the MS4 Permit. The 6 MCMs are:

1. Public Education and Outreach
2. Public Participation/Involvement
3. Illicit Discharge Detention and Elimination
4. Construction Site Stormwater Runoff Control
5. Post-Construction Stormwater management in New Development and Redevelopment
6. Pollution Prevention/Good Housekeeping

The following table provides the title of each BMP measure and its location in the SWPPP.

BMP ID Numbers	Best Management Practice	Permit Reference	Page Number
1a-1	Distribute Educational Materials	V.G.1.a	1
1b-1	Implement an Education Program	V.G.1.b	2
1c-1	Education Program: Public Education and Outreach	V.G.1.c	3
1c-2	Education Program: Public Participation	V.G.1.c	5
1c-3	Education Program: Illicit Discharge Detection and Elimination	V.G.1.c	7
1c-4	Education Program: Construction Site Run-off Control	V.G.1.c	8
1c-5	Education Program: Post-Construction Stormwater Management in New Development and Redevelopment	V.G.1.c	9
1c-6	Education Program: Pollution Prevention/Good Housekeeping for Municipal Operations	V.G.1.c	10
1d-1	Coordination of Education Program	V.G.1.d	11
1e-1	Annual Public Meeting	V.G.1.e	12
2a-1	Comply with Public Notice Requirements	V.G.2.a	13
2b-1	Solicit Public Input and opinion on the Adequacy of the SWPPP	V.G.2.b	14
2c-1	Consider Public Input	V.G.2.c	16
3a-1	Storm Sewer System Map	V.G.3.a	17
3b-1	Regulatory Control Program	V.G.3.b	18

3c-1	Illicit Discharge Detection and Elimination Plan	V.G.3.c	19
3d-1	Public and Employee Illicit Discharge Information Program	V.G.3.d	21
3e-1	Identification of Non Stormwater Discharges and Flows	V.G.3.e	23
3f-1	Source Water Protection Areas	IV.C.6	25
4a-1	Ordinance or other Regulatory Mechanism	V.G.4.a	26
4b-1	Construction Site Implementation of Erosion and Sediment Control BMPs	V.G.4.b	27
4c-1	Waste Controls for Construction Site Operators	V.G.4.c	28
4d-1	Procedure for Site Plan Review	V.G.4.d	29
4e-1	Establishment of Procedures for the Receipt and Consideration of Reports of Stormwater Noncompliance	V.G.4.e	30
4f-1	Establishment of Procedures for Site Inspections and Enforcement	V.G.4.f	31
5a-1	Development and Implementation of Structural and/or Non-structural BMPs	V.G.5.a	33
5b-1	Regulatory Mechanism to Address Post Construction Runoff from New Development and Redevelopment	V.G.5.b	34
5c-1	Long-term Operation and Maintenance of BMPs	V.G.5.c	35
6a-1	Municipal Operations and Maintenance Program	V.G.6.a	36
6a-2	Street Sweeping		37
6b-2	Annual Inspection of All Structural Pollution Control Devices	V.G.6.b.2	38
6b-3	Inspection of a Minimum of 20 percent of the MS4 Outfalls, Sediment Basins and Ponds Each Year on a Rotating Basis	V.G.6.b.3	39
6b-4	Annual Inspection of All Exposed Stockpile, Storage and Material Handling Areas	V.G.6.b.4	40
6b-5	Inspection Follow-up Including the Determination of Whether Repair, Replacement, or Maintenance Measures are Necessary and the Implementation of the Corrective Measures	V.G.6.b.5	41
6b-6	Record Reporting and Retention of all Inspections and Responses to the Inspections	V.G.6.b.6	42
6b-7	Evaluation of Inspection Frequency	V.G.6.b.7	43
IV.D-1	Impaired Waters Review Process	IV.D	44
IX.B.	Discharges to Waters with Restricted Discharges Assessment	IX.B.	46

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1a-1

***BMP Title:** Distribute Educational Materials

***BMP Description:**

In cooperation with the appropriate County and appropriate Water Management Organizations, stormwater pamphlets and fliers promoting stormwater education and positive behaviors will be developed and made publicly available. Public service organizations may help provide distribution, which will include posting, handouts, and displays throughout the City.

***Measurable Goals:**

- Number of stormwater-related materials developed and distributed.
- Number of people informed and participating.

***Timeline/Implementation Schedule:**

2006:

- Develop stormwater handout information.
- Establish pamphlets racks in common areas of the City Hall.
- Distribute pamphlets and other stormwater information at public meetings or City events.

2007 - 2010:

- Update the developer, construction and engineering practitioner community mailing list annually as well as mail educational materials at least once a year.
- Continue with the distribution of SWPPP information, revising as necessary after soliciting comments and suggestions

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1b-1

***BMP Title:** Implement an Education Program

***BMP Description:**

In cooperation with the appropriate County and appropriate Water Management Organizations, the City will develop and implement an educational program that individually addresses each minimum control measure for the selected audience groups. The minimum control measures include: (1) public education and outreach, (2) public participation, (3) illicit discharge detection and elimination, (4) construction site storm water runoff control, (5) post construction storm water management in new development and redevelopment, and (6) pollution prevention/good housekeeping for municipal operations. The audience groups include City staff, general public, and contractors.

***Measurable Goals:**

- Number of educational materials developed and distributed.
- Number of educational workshops developed and presented.
- Number of people attending workshops.

***Timeline/Implementation Schedule:**

2006:

- Develop a procedure for creating and implementing an educational program.

2007 - 2010:

- Develop and implement an educational program. Evaluate and modify the educational program as necessary to meet permit goals.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-1

***BMP Title:** Education Program: Public Education and Outreach

***Audience(s) Involved:**

General public including City residents, homeowners, business owners, and school children (students K-12).

***Educational Goals for Each Audience:**

Increase public awareness and understanding of stormwater issues within the community. Inform and educate the public about the impacts of stormwater runoff on water quality.

***Activities Used to Reach Educational Goals:**

1) In cooperation with appropriate County and appropriate Water Management Organizations, highlight stormwater issues through City sponsored community events and programs that focus on public participation. such as:
   - Volunteer community cleanup days.
   - Volunteer river, stream, and pond cleanup program.
   - Volunteer native tree and shrub planting program.
   - Volunteer storm drain stencil program.
2) In cooperation with appropriate County and appropriate Water Management Organizations, establish a stormwater hotline for citizens to report illegal dumping.
3) Articles in the community newsletter that highlight seasonal stormwater issues and stormwater related community events and programs.
4) Stormwater information on the City web site or in cooperation with appropriate County and appropriate Water Management Organizations
5) Stormwater educational materials provided at public places.
   - Stormwater poster display and educational guides at the City Hall and local public library.
   - Signage in public places

***Activity Implementation Plan:**

2006:

- In cooperation with the appropriate County and appropriate Water Management Organizations, develop stormwater page on a web site and post for public access.
- In cooperation with the appropriate County and appropriate Water Management Organizations, develop a plan for sponsoring and implementing the volunteer public participation events and programs. This plan could include holding community cleanup days on a periodic basis, promoting County tree and shrub planting programs and promoting school programs to stencil storm drains.

2006 - 2008:

- In cooperation with the appropriate County and appropriate Water Management Organizations, research what educational materials are available and effective and have these materials in place for the public to view by the end of 2007.

2007:

- Partner with the East Metro Water Resource Education Program (EMWREP).

2007 - 2009:

- Evaluate the attendance data for trends.
- Review public education outreach efforts.

2006 - 2010:

- Track number and location of illegal dumping incidents reported.
- Publish stormwater articles in the community newsletter or on a web page.

***Performance Measures:**

- In cooperation with the appropriate County and appropriate Water Management Organizations, complete a plan and implement volunteer public participation events and programs.
- Cleaner waters documented by measures such as before and after photographs.
- Number of storm drains that are marked by 2010 in targeted neighborhoods.
- In cooperation with appropriate County and appropriate Water Management Organizations, published articles on the appropriate web site.
- In cooperation with the appropriate County and appropriate Water Management Organizations, track the number of "hits" on the appropriate web site stormwater page.
- Track increase/decrease in the number of beach closings.

***Responsible Party for this BMP:**

Name:	Susan Hoyt
Department:	City Administrator
Phone:	651-233-5401
E-mail:	Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-2

***BMP Title:** Education Program: Public Participation

***Audience(s) Involved:**

General public including City residents, homeowners, and business owners.

***Educational Goals for Each Audience:**

1) Increase public awareness and understanding of stormwater issues within the community.
2) Inform and educate the public about the impacts of stormwater runoff on water quality and what they can do to actively protect local lakes and streams from polluted stormwater runoff.
3) Inform and educate the public about how the City manages stormwater runoff through its' Stormwater Pollution Prevention Program (SWPPP).

***Activities Used to Reach Educational Goals:**

1) The City will report in the community newsletter on activities related to managing stormwater and implementing the SWPPP. Topics for the newsletter may include information about the water quality of our City lakes and streams; events and programs the public can participate in to raise their awareness about stormwater impacts; specific stormwater management activities the City is implementing; and the stormwater budget/fees.
2) In cooperation with the appropriate County and appropriate Water Management Organizations, a public information meeting (in addition to the annual meeting on the SWPPP) will be held to update citizens on the Citys'progress toward implementing the SWPPP, and to provide information on stormwater related budget/fee issues. To encourage citizens to attend, the City will plan the public information meeting to coincide with another City sponsored event. The City will also consider providing some type of stormwater related promotional item for Park Cleanup Day participants (e.g. "raingarden" seed packets, plants)

***Activity Implementation Plan:**

- 2006 - 2010:
  - In cooperation with the appropriate County and appropriate Water Management Organizations, periodically publish articles on stormwater management and the SWPPP .
  - In cooperation with the appropriate County and appropriate Water Management Organizations, hold one combined public information meeting/recognition event annually. Provide notice of the meeting 30 days prior to the meeting/event date.

Performance Measures:

-
- In cooperation with the appropriate County and appropriate Water Management Organizations, publish stormwater articles periodically.
- In cooperation with the appropriate County and appropriate Water Management Organizations, complete public notice.
- In cooperation with the appropriate County and appropriate Water Management Organizations, track the number of citizens attending the meeting/event.
- In cooperation with the appropriate County and appropriate Water Management Organizations, track the number of questions about the SWPPP/stormwater issues addressed at the meeting.

- In cooperation with the appropriate County and appropriate Water Management Organizations, at the end of 2007, the City will evaluate the effectiveness of the Education Program for Public Participation and make adjustments as needed to increase public awareness and participation.

***Responsible Party for this BMP:**

Name:	Susan Hoyt
Department:	City Administrator
Phone:	651-233-5401
E-mail:	Shoyt@lakeelmo.org

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BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-3

***BMP Title:** Education Program: Illicit Discharge Detection and Elimination

***Audience(s) Involved:**

Activities planned under the Illicit Discharge Detection and Elimination Measures portion of the Storm Water Pollution Prevention Program (SWPPP) will be directed towards employees of the City, with an emphasis on Physical Plant employees, and the general public.

***Educational Goals for Each Audience:**

The SWPPP activities under Minimum Control Measure (MCM) 3 will focus on development, implementation, and enforcement of management strategies that will lead to the reduction, elimination and the impact of illicit pollutant discharges into the stormwater system throughout the City.

***Activities Used to Reach Educational Goals:**

The City will educate its employees on the hazards of improper waste disposal and ways to detect and eliminate illicit discharges. The educational program will include procedures in locating priority areas likely to have illicit discharges; procedures for tracing the source of illicit discharge; procedures for removing the source of discharge; and the procedures for program evaluation and assessment.

The education program will also focus on educating City residents on the proper disposal of oil, gas, and other waste materials.

This information will be provided through educational training, information brochures, posters, web page and inspections of the storm drain system.

***Activity Implementation Plan:**

2006:

- Develop and begin educational program training

2007 - 2010:

- Assess goals and continue educational program training

***Performance Measures:**

- The number of educational fliers and/or materials distributed.
- Attendance numbers at training sessions.
- The number of locations determined to have the potential for illicit discharges.
- The number of illicit discharges reported.
- The number of corrective measures taken to prevent illicit discharges.

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-4

***BMP Title:** Education Program: Construction Site Run-off Control

***Audience(s) Involved:**

Activities planned under the Construction Site Storm Water Runoff Control portion of the Storm Water Pollution Prevention Program (SWPPP) will be directed toward contractors, construction site operators, inspectors, and enforcement personnel of the City.

***Educational Goals for Each Audience:**

The SWPPP activities implemented under this will focus on program development, implementation, and enforcement of management strategies that will reduce or eliminate the impacts of stormwater runoff into the storm sewer system from any construction activity that results in a land disturbance of greater than or equal to one acre.

***Activities Used to Reach Educational Goals:**

In cooperation with appropriate County and appropriate Water Management Organizations develop procedures to educate contractors on construction site Best Management Practices (BMPs), inspections and enforcement of installed erosion and sedimentation control measures. This program will address contractor BMP educational and training measures. Educational and training measures may include written educational materials, erosion and sediment control workshops, and city specific workshops.

***Activity Implementation Plan:**

2006:

- In cooperation with appropriate County and appropriate Water Management Organizations develop education procedures.

2007 - 2010:

- Distribute written educational materials.
- Distribute City standard details and specifications for erosion and sediment control.
- Conduct City workshops for builders and developers.
- Attend erosion and sediment control workshops.
- Begin BMP enforcement.

***Performance Measures:**

- The number of enforcement actions taken.
- The number of site inspections.
- The number of contractors and City personnel trained.

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

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BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-5

***BMP Title:** Education Program: Post-Construction Stormwater Management in New Development and Redevelopment

***Audience(s) Involved:**

Activities planned under the Post-Construction Storm Water Management in New Development and Redevelopment portion of the Storm Water Pollution Prevention Program will be directed toward developers, contractors, construction site operators, inspectors and enforcement personnel.

***Educational Goals for Each Audience:**

The SWPPP activities under this Control Measure will focus on development, implementation, and enforcement of a program that will reduce or eliminate the impacts of stormwater runoff from new development and re-development projects that disturb greater than or equal to one acre, including projects that are less than one acre and are part of a larger development plan, that discharge into the storm sewer system.

***Activities Used to Reach Educational Goals:**

The City will provide information about educational outreach on developing, implementing, and enforcing a program that will reduce or eliminate the impacts of stormwater runoff from new development and re-development projects disturbing greater than or equal to one acre, including projects that are less than one acre and are part of a larger development plan, that discharge into the stormwater conveyance system throughout the City.

***Activity Implementation Plan:**

2006:

- Develop information about existing educational programs.

2007 - 2010:

- Provide information about existing educational programs.

***Performance Measures:**

- Number of flyers, posters, or other public education tools distributed.
- Number of training programs available to City staff and contractors.

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

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BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-6

***BMP Title:** Education Program: Pollution Prevention/Good Housekeeping for Municipal Operations

***Audience(s) Involved:**

Activities planned under the Pollution Prevention (Good Housekeeping) portion of the Storm Water Pollution Prevention Program will be directed toward City personnel and the general public.

***Educatioual Goals for Each Audience:**

The SWPPP activities implemented under this Minimum Control Measure will focus on developing and implementing general procedures for an operations and maintenance program that will reduce or eliminate the impacts of stormwater pollution from open space maintenance, snow disposal, vehicle and building maintenance, land disturbances, and stormwater conveyance system maintenance.

***Activities Used to Reach Educational Goals:**

The City will provide its personnel with information about existing educational outreach programs that will reduce or eliminate the impacts of stormwater runoff from facilities and maintenance operations that discharge into the stormwater conveyance system.

***Activity Implementation Plan:**

2006:

- Develop information about existing educational outreach programs.

2007- 2010:

- Provide information about existing educational outreach programs and training to City staff.
- Distribute educational materials to the general public as needed.

***Performance Measures:**

- Number of flyers, posters, or other public education tools distributed.
- Number of training programs offered to City staff.

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

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BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1d-1

***BMP Title:** Coordination of Education Program

***BMP Description:**

The City of Lake Elmo will coordinate its education program with other agencies that focus on storm water education. These agencies may include: Washington Conservation District, Valley Branch Watershed District, South Washington Watershed District, Brown's Creek Watershed District, and the Minnesota Pollution Control Agency.

***Measurable Goals:**

- Number of consistent messages delivered (educational, promotional or motivational) through all media.
- Number of instances when educational program is coordinated.

***Timeline/Implementation Schedule:**

2006:

- Develop procedures for coordination of educational programs.

2007 - 2010:

- Implement the program. Evaluate the program for strength and weaknesses. Implement improved methods.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

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BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1e-1

***BMP Title:** Annual Public Meeting

***BMP Description:**

A public informational meeting will be held annually to address the Storm Water Pollution Prevention Program (SWPPP). The annual meeting will be held at the City Hall or in a place that is generally convenient to persons expected to attend the meeting. Notice of the public meeting will be provided 30 days prior and will include the date, time, and meeting location, and include location of a public copy of the City's SWPPP. Distribution of this notice to the community will be published through the City's official newspaper. The community will be encouraged to attend, allowing its members to discuss various viewpoints and provide input concerning appropriate stormwater management policies and Best Management Practices. A copy of the meeting notice will be sent to MPCA, appropriate City and County officials, and all other persons who have requested that they be informed of such a public meeting.

***Measurable Goals:**

- Number of Annual Public meetings conducted.
- Notice of public meeting provided.
- Annual report to MPCA submitted.

***Timeline/Implementation Schedule:**

2006:

- Develop procedure for conducting the Annual Public Meeting.

2007 - 2010:

- Implement and evaluate the procedure established for Annual Public Meetings.

2006-2010:

- Conduct annual public informational meeting on the SWPPP by June 30th of each year.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

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BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 2-PUBLIC PARTICIPATION/INVOLVEMENT

Unique BMP Identification Number: 2a-1

***BMP Title:** Comply with Public Notice Requirements

***BMP Description:**

Notice of the public meeting will be provided 30 days prior to the meeting. The notice must contain a reference to the Storm Water Pollution Prevention Program, the date, time, and meeting location, a concise description of the manner in which the meeting will be conducted and include location of a public copy of the City's SWPPP. Notice of the public meeting will be provided 30 days prior and will include the date, time, and meeting location, and include location of a public copy of the City's SWPPP. Distribution of this notice to the community will be published through the City's official newspaper. The community will be encouraged to attend, allowing its members to discuss various viewpoints and provide input concerning appropriate stormwater management policies and Best Management Practices. A copy of the meeting notice will be sent to the MPCA, appropriate City and County officials, and all other persons who have requested that they be informed of such a public meeting.

Alternative advertising methods need to be used whenever possible, including radio or television spots, postings at bus or subway stops, announcements in flyers, telephone notifications, and multilingual announcements.

***Measurable Goals:**

- Number of public meetings conducted.
- Number of educational surveys conducted.
- Number and methods of alternative advertising methods used.

***Timeline/Implementation Schedule:**

2006:

- Develop a distribution program.
- Develop advertising methods.

2007 - 2010:

- Implement the distribution program.
- Implement advertising methods.
- Monitor the program.

2006-2010:

Provide notice of the annual public informational meeting on the SWPPP 30 days prior to the meeting. Annual meetings must be held by June 30th of each year.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

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BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 2-PUBLIC PARTICIPATION/INVOLVEMENT

Unique BMP Identification Number: 2b-1

***BMP Title:** Solicit Public Input and Opinion on the Adequacy of the SWPPP

***BMP Description:**

1) In cooperation with the appropriate County and appropriate Water Management Organizations, the City will use the education and outreach efforts outlined on BMP Summary Sheet 1c-2 (Education Program: Public Participation) for providing information to the general public about how the City manages stormwater runoff through its Stormwater Pollution Prevention Program (SWPPP), to encourage the public to learn about the SWPPP, and to facilitate public input and comment on the SWPPP.
2) If the annual public meeting on the SWPPP is scheduled to occur during a regular meeting of the City Council, the City will request that the SWPPP be placed on the meeting agenda at a time that will be conducive to the public attending and providing input on the SWPPP (i.e. not at the end of the agenda).
3) At the annual meeting, the City will provide a presentation on the purpose, goals, and requirements of the SWPPP to educate, inform, and encourage citizens to provide input and comment on the SWPPP.
4) The City will provide opportunity for interested persons to make oral statements or provide written comments on the SWPPP at the meeting. A reasonable amount of time will be made available at the meeting for a questions and comments relating to the SWPPP. Persons not able to attend the meeting may submit written comments on the SWPPP within the time identified in the public notice for the meeting.
5) The City will also solicit public input and provide opportunity for comment on the SWPPP at any other subsequent public meetings, as needed, regarding modifications of or amendments to the SWPPP.

***Measurable Goals:**

1) Increase citizen's understanding of the impacts of stormwater runoff and increase public input on the SWPPP. Evaluate the level of public participation and input on the SWPPP; review the Education Program for Public Participation and make adjustments as needed to increase public participation/involvement on the SWPPP.
2) Track the number of attendees at the annual public meeting on the SWPPP.
3) Prepare and provide a presentation on the SWPPP.
4) Track the number of oral and written comments received on the SWPPP, and the number of questions addressed at the annual public meeting. A summary of the comments submitted on the SWPPP and the questions addressed at the meeting will be made available on the City web site stormwater page.
5) Hold additional public meeting(s) regarding modifications and/or amendments to the SWPPP; track the level of public input.

***Timeline/Implementation Schedule:**

- 2006 - 2010:
  - In cooperation with the appropriate County and appropriate Water Management Organizations, implement the education and outreach efforts according to the timeline/implementation schedule in BMP Summary Sheet 1c-2.

2007 - 2009:

- Review the Education Program for Public Participation, make adjustments as needed.

2006 - 2010:

- Hold a public meeting on the SWPPP annually. Annual meetings must be held by June 30th of each year.

Specific Components and Notes:

The City staff will pose questions or initiate discussion at the meeting in an effort to encourage the public to ask questions and submit comments on the SWPPP.

***Responsible Party for this BMP:**

Name:	Susan Hoyt
Department:	City Administrator
Phone:	651-233-5401
E-mail:	Shoyt@lakeelmo.org

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BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 2-PUBLIC PARTICIPATION/INVOLVEMENT

Unique BMP Identification Number: 2c-1

***BMP Title:** Consider Public Input

***BMP Description:**

The City will document public input from the annual public informational meeting that is outlined on BMP Summary Sheet 2a-1 (Comply with Public Notice Requirements) and BMP Summary Sheet 2b-1 (Solicit Public Input and Opinion on the Adequacy of the SWPPP). The City will review and consider all public input for incorporation to the SWPPP, if appropriate.

***Measurable Goals:**

- Documentation of attendance numbers at the annual meeting.
- Document public input received at the annual meeting.
- Summary memo documenting recommendations and action taken as a result of the public input.

***Timeline/Implementation Schedule:**

2006 - 2010:

- A public informational meeting will be held annually so recommendations can be reviewed and considered for incorporation to the SWPPP.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

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BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3a-1

***BMP Title:** Storm Sewer System Map

***BMP Description:**

Identify (1) ponds, streams, lakes, and wetlands that are part of the conveyance system, (2) structural pollution control devices (grit chambers, separators, etc.), (3) all pipes and conveyances that are at least 24 inches in diameter, and (4) outfalls, including discharges from the City drainage system to other MS4s or waters and wetlands that are not part of the City drainage system, (5) structures that discharge stormwater directly into groundwater and overland discharge points, and (6) all other points of discharge from the City outlets.

***Measurable Goals:**

- The number of pollution control devices recorded.
- The number of discharge points identified.
- The linear feet of conveying system.

***Timeline/Implementation Schedule:**

2006 - 2010:

- A map will be developed by June 30, 2008 and periodically updated. The map will be made publicly available.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

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BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3b-1

***BMP Title:** Regulatory Control Program

***BMP Description:**

The Regulatory Control Program establishes ways the illicit discharge is detected and eliminated. Other BMPs need to be established that would enable illicit discharge to be detected and eliminated.

The City will develop and implement a program to detect and address non-stormwater discharges, including illegal dumping, to your system.

The Program to detect and address illicit discharges is the central component of this measure. The plan is dependent upon several factors including the MS4's available resources, size of staff, and degree and character of its illicit discharges. There are four steps of a recommended plan:

- Procedures for locating priority areas likely to have illicit discharges
- Procedures for tracing the sources of an illicit discharge
- Procedures for removing the source of the discharge
- Procedures for program evaluation and assessment

***Measurable Goals:**

- Regulatory Program is reviewed
- Other BMPs are implemented

***Timeline/Implementation Schedule:**

2006:

- Review and modify ordinances and/or policies and enforcement procedures and actions that may help prevent illicit discharges to stormwater systems (i.e. secondary containment of fuel products and hazardous material ordinances)

2007:

- Purchase equipment necessary for the implementation of the modified hazardous materials cleanup procedures and train employees.

2008 - 2010:

- Create illicit discharge ordinance.
- Evaluate the Regulatory Program.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

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BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3c-1

***BMP Title:** Illicit Discharge Detection and Elimination Plan

***BMP Description:**

The City will develop a program to detect and identify illicit discharges, including a plan to control and eliminate the contributors, which will adhere to the following steps:

- Locate the problem area by using public complaints
- Visual screening of outfalls and pump station during the dry weather, and or during regular system maintenance and inspection activities
- Find the source of illicit discharge
- Remove or correct the problem
- Document the actions taken and summarize for the annual report

The program will identify methods for public reporting of illicit discharges including the development of an IDDE website link and phone number.

If the City identifies any of the following categories of non-stormwater flows as significant contributors of pollutants, the City will develop a plan to control and eliminate the contributors to the storm sewer system:

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground waters
- Uncontaminated ground water infiltration
- Uncontaminated pumped ground water
- Discharges from potable water sources
- Foundation drains
- Air conditioning condensation
- Irrigation water
- Springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual residential car washing
- Chlorinated water discharges
- Street wash water
- Flows from fire-fighting activities

***Measurable Goals:**

- The number of illicit discharges reported and identified.
- The number of illicit discharges prevented, stopped or removed.

***Timeline/Implementation Schedule:**

2006:

- Develop and implement an illicit discharge detection program.

2006-2010:

- Mitigate potential illicit discharge sites.

2008 - 2010:

- Continue detection and elimination programs.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt
Department: City Administrator
Phone: 651-233-5401
E-mail: Shoyt@lakeelmo.org

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BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3d-1

***BMP Title:** Public and Employee Illicit Discharge Information Program

***BMP Description:**

In cooperation with the appropriate County and appropriate Water Management Organizations, the City will use the education efforts outlined on BMP Summary Sheet 1c-3 (Education Program: Illicit Discharge Detection and Elimination) for providing information to the general public and City employees concerning the hazards associated with illegal discharges and the improper disposal of wastes. In addition, the City will develop a separate effort to provide training to City employees. This training will focus on those City employees that are involved in activities out in the community (e.g. Public Works/Engineering and Parks Department field staff) which may impact stormwater quality including; road salt and sand application, landscaping, and other activities. The City intends to provide each employee with broad based training followed by periodic retraining which will focus on specific, yet to be determined, issues.

***Measurable Goals:**

1) See BMP Summary Sheet 1c-3 for Measurable Goals concerning public and City employee education efforts regarding Illicit Discharge Detection and Elimination.
2) Develop a training program for educating City employees about the hazards associated with illegal discharges and the improper disposal of wastes which relate to their work activities.
3) Train all City employees who are involved in activities which could possibly result in illicit discharges to stormwater.
4) Develop a training program to provide annual retraining, with specific focused training efforts, to City employees.
5) Implement annual retraining and focused training efforts.

***Timeline/Implementation Schedule:**

- See BMP Summary Sheet 1c-3 for Timeline/Implementation Schedule concerning public and City employee education efforts regarding Illicit Discharge Detection and Elimination.

2006:

- In cooperation with the appropriate County and appropriate Water Management Organizations, develop a training program for educating City employees about the hazards associated with illegal discharges and the improper disposal of wastes which relate to their work activities.

2007:

- Train all City employees who are involved in activities which could possibly result in illicit discharges to stormwater.

2008:

- In cooperation with the appropriate County and appropriate Water Management Organizations, develop a training program to provide annual retraining and focused training efforts to City employees and implement this training.

2009 - 2010:

- Continue annual retraining and focused training efforts.

Specific Components and Notes:

To identify areas which may be addressed as part of retraining/focused training efforts, the City will develop a process for conducting an illicit discharge evaluation of City public works projects.

***Responsible Party for this BMP:**

Name:	Susan Hoyt
Department:	City Administrator
Phone:	651-233-5401
E-mail:	Shoyt@lakeelmo.org

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BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3e-1

***BMP Title:** Identification of Non Stormwater Discharges and Flows

***BMP Description:**

The City will develop a process to evaluate whether any of the following categories of non-stormwater discharges or flows are significant contributors of pollutants to its MS4: water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration, uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, street wash water, and discharges or flows from fire fighting activities.

For any non-stormwater discharges or flows which the City finds to be a significant contributor of pollutants to the MS4, the City will develop an action plan to evaluate and address the impact the discharge is having on stormwater quality.

***Measnrable Goals:**

1) Develop a process to investigate and evaluate the potential for the non-stormwater discharges identified in permit Part V.G.3.e (see above) to be significant contributors of pollutants to our MS4.
2) Conduct investigation and evaluation of non-stormwater discharges and flows.
3) For those non-stormwater discharges or flows identified as significant contributors of pollutants to our MS4, develop an action plan to evaluate and address the impact the discharge is having on stormwater quality.
4) Implement the action plan for significant non-stormwater discharges and flows.

***Timeline/Implementation Schedule:**

- 2006:
  - Develop a process to investigate and evaluate non-stormwater discharges and flows.

2007:

- Conduct and investigation and evaluation of non-stormwater discharges and flows and develop action plans for those which are identified as being significant contributors of pollutants to our MS4.

2008:

- Implement the action plans for significant non-stormwater discharges and flows.

2009 - 2010:

- Continue with an action plan concerning significant non-stormwater discharges and flows.
- Evaluate the implementation phase of the action plans and make adjustments, as necessary, to prepare for a permanent program for the identification of non-stormwater discharges.

Specific Components and Notes:

In cooperation with the appropriate County and appropriate Water Management Organizations, the City plans to develop a public education component to inform residents about the need and procedures to dechlorinate swimming pool water prior to discharge. In cooperation with the appropriate County and appropriate Water Management Organizations, an article on proper swimming pool discharge from residential pools will be developed (see BMP Summary Sheet 1c-1). This public education component will be further developed as outlined on BMP Summary Sheet 1c-3.

***Responsible Party for this BMP:**	
Name:	Susan Hoyt
Department:	City Administrator
Phone:	651-233-5401
E-mail:	Shoyt@lakeelmo.org

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BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3f-1

***BMP Title:** Source Water Protection Area

***BMP Description:**

The City is in the process of completing a Wellhead Protection Plan (WHP) with the Minnesota Department of Health. This report will discuss the vulnerability status of the Drinking Water Supply Management Area (DWSMA) for the City's two water supply wells. Both DWSMA's have been classified as moderately to highly vulnerable in part because of the possible susceptibility to contamination from surface and near surface contamination sources. The report will provide action plans to effectively manage and prevent groundwater pollution in the DWSMA's.

In addition to following action plans described in the Wellhead Protection Plan, the City will use the MDH document *Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas* as a guidance document for projects that may pose a potential risk to groundwater quality in the Well 1 and Well 2 DWSMA's.

***Measurable Goals:**

- Follow stormwater protection measures as outlined in the WHP report, Part 2, when approved.
- Evaluate the effectiveness of stormwater protection on an annual basis as stated in the WHP report and update objectives as needed.

***Timeline/Implementation Schedule:**

2008:

- Part 2 of the Wellhead Protection Plan will be completed and approved

2009 - 2010:

- Evaluate and update stormwater protection measures as needed in the WHP report
- Follow well protection guidelines to educate residents in the Well 1 and Well 2 vulnerable areas.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt
Department: City Administrator
Phone: 651-233-5401
E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4a-1

***BMP Title:** Ordinance or other Regulatory Mechanism

***BMP Description:**

The City will update and adopt ordinances and policies to reflect erosion, sedimentation and pollution control plan. Also include certification requirements for staff. Refine necessary procedures for the submittal, review, approval, and enforcement of erosion and sediment control plans.

***Measurable Goals:**

- City site certification and inspection results.

***Timeline/Implementation Schedule:**

2006:

- Adopt and enforce the City ordinances with respect to erosion and sedimentation control.

2007 - 2010:

- Continue enforcing compliance measures adopted by the City.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt
Department: City Administrator
Phone: 651-233-5401
E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4b-1

***BMP Title:** Construction Site Implementation of Erosion and Sediment Control BMPs

***BMP Description:**

In cooperation with the appropriate County and appropriate Water Management Organizations, the City will select appropriate BMPs, within 6 months after extension of the permit, that are found to be the most effective in keeping erosion under control and containing sediment on the construction site and off the streets. These BMPs will be in an Erosion and Sediment Control Handbook and/or the Engineering Standards Manual that the City gives to all builders, contractors, and developers. Once selected, periodically, the City will host a BMP Workshop for all local builders, contractors, and developers.

***Measurable Goals:**

1) In cooperation with the appropriate County and appropriate Water Management Organizations, 10 BMPs will be selected within 6 months after extension of the permit.
2) The development of the Erosion and Sediment Control Handbook.
3) The number of builder/contractor/developer workshops held.

***Timeline/Implementation Schedule:**

2008-2009:

- Select appropriate sediment and erosion control BMP's within 6 months after extension of the permit, and start the implementation of these BMP's.

2009 - 2010:

- In cooperation with the appropriate County and appropriate Water Management Organizations, hold periodic workshops.
- Evaluate the addition of new BMPs that the BMP Review Board feels are justifiable.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4c-1

***BMP Title:** Waste Controls for Construction Site Operators

***BMP Description:**

The City will develop and implement a program to control and eliminate construction site waste that may impact stormwater runoff. This program will address construction entrances, vehicle maintenance, equipment washing areas, and proper waste disposal.

***Measurable Goals:**

- The reduction of site wastes with respect to construction.
- Identify requirements for construction site operators to implant appropriate control of construction site waste.
- Frequency of inspection and maintenance activities.

***Timeline/Implementation Schedule:**

2006:

- Develop a plan to control and eliminate construction site waste.

2007 - 2010:

- Implement plans to control and eliminate site waste.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4d-1

***BMP Title:** Procedure for Site Plan Review

***BMP Description:**

The City will include in any preconstruction activity, a review of regulated construction site plans submitted by the developer/builder/contractor for the implementation and routine maintenance of sedimentation and erosion controls that incorporate consideration of potential water quality impacts before any construction begins. The Lake Elmo process for permitting construction activities will incorporate site plan reviews for erosion control compliance. The plans will be reviewed according to the City's erosion control standards.

***Measurable Goals:**

- The number of site plan reviews.
- The number of reports of storm water noncompliance incidents at construction sites.

***Timeline/Implementation Schedule:**

2006:

- Begin reviewing preconstruction site plans.

2007 - 2010:

- Continue review of site plans.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4e-1

***BMP Title:** Establishment of Procedures for the Receipt and Consideration of Reports of Stormwater Noncompliance

***BMP Description:**

The City will refine the inspection program for inclusion of procedures for receipt and consideration of reports of non-compliance or other information on construction related issues submitted by the public.

***Measurable Goals:**

- Number of complaints about construction procedures.

***Timeline/Implementation Schedule:**

2006:

- Develop a plan to evaluate construction SWPPPs and complaints about construction activity within 6 months after extension of the permit.

2007 - 2010

- Implement the plan.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt
Department: City Administrator
Phone: 651-233-5401
E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4f-1

***BMP Title:** Establishment of Procedures for Site Inspections and Enforcement

***BMP Description:** The City will ensure construction sites operate in accordance with this SWPPP and the project specific construction SWPPP. The City will review SWPPP site plans for construction activities, including the following:

1. Description of the activity, proposed timetable, amount of area disturbed, and any outfalls to the storm conveyance system or water body
2. Map or drawing of the site showing the boundaries, soil disturbance limits, stormwater drainage pattern, location of receiving waters and/or storm inlets, storage areas for materials, and stormwater management controls
3. Description of the method of storage, disposal, and handling of materials which have the potential to be released with stormwater
4. Description of the BMPs to control erosion and sedimentation during all phases of construction
5. Description of methods to address sediment tracking on roads, recovering sediments, and spill prevention and response procedures
6. Site inspection procedure providing at least one inspection every 7 days and within 24 hours after any storm event of greater than 0.50 inches of rain per 24 hours period

Site Inspection Records will be kept for the date and time of inspections, the name of the inspector, and the date and amount of last precipitation event. All incidents of erosion, sediment accumulation, or spills will be documented. The record will include the location and description of the incident, estimated quality of material or size of area affected, and a brief explanation of potential cause and remedial action taken.

The City will develop an enforcement plan for non-compliant construction sites.

***Measurable Goals:**

- Steps to identify procedures for site inspections.
- Steps to identify procedures for enforcements.
- Number of enforcements implemented, following inspections.

***Timeline/Implementation Schedule:**

2006:

- Review procedures for site inspections and enforcement of control measures.

2007:

- Educate contractors.

2008 - 2010:

- Develop enforcement action steps.
- Evaluate the procedures and implement improvements.
- Develop a program for special waters of concern to the community.

Specific Components and Notes:
***Responsible Party for this BMP:** Name: Susan Hoyt Department: City Administrator Phone: 651-233-5401 E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5a-1

***BMP Title:** Development and Implementation of Structural and/or Non-structural BMPs

***BMP Description:**

Post-construction stormwater management in areas that have recently undergone construction (new development or re-development) is necessary because runoff from these areas significantly impact surface water quality. As runoff flows over areas altered by construction, it picks up harmful sediment and chemicals which are then deposited in surface waters. A second type of post-construction impact is the interruption of natural infiltration of rainfall by the new impervious surfaces associated with construction projects. The result is increased volumes of stormwater reaching streams. The end result is the scouring of river systems and flooding.

A combination of structural and non-structural BMPs work well for managing post-construction stormwater quality, volume, and rate.

***Measurable Goals:**

1) Update wet detention pond design standards annually along with investigating new post-construction structural BMPs.
2) Investigate post-construction non-structural BMP design standards.
3) Update the storm sewer map periodically.

***Timeline/Implementation Schedule:**

- 2006 - 2010:
  - Review and update structural and non-structural BMPs.
  - Continue to conduct reviews of all construction projects with stormwater management being a major component and focus of the review.

Specific Components and Notes:

1) All wet detention ponds should be designed to NURP Standards.
2) The wet detention ponds should release stormwater at a rate that is consistent with the City ordinance.
3) Review site plans to make sure that infiltration of stormwater is investigated and incorporated when feasible.

***Responsible Party for this BMP:**

Name: Susan Hoyt
Department: City Administrator
Phone: 651-233-5401
E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5b-1

***BMP Title:** Regulatory Mechanism to Address Post Construction Runoff from New Development and Redevelopment

***BMP Description:**

Measures for Controlling Post-Construction Runoff:

With respect to development and re-development projects, the City will regulate post-construction runoff in accordance with their procedures. In addition, the City will review its procedures to limit surface runoff volumes and reduce water runoff pollutant loadings. The City will revise and adopt, as necessary, additional ordinances with respect to controlling post-construction runoff.

***Measurable Goals:**

- The number of ordiuances the City adopts.
- The number of BMP measures the City develops.

***Timeline/Implementation Schedule:**

2006:

- Adopt or revise, as necessary, ordinances with respect to controlling post-construction runoff.
- Develop internal quality control measures.

2006 - 2010:

- Continue compliance measures.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5c-1

***BMP Title:** Long-term Operation and Maintenance of BMPs

***BMP Description:**

BMP Inspection & Maintenance Program:

The City will develop an inspection and maintenance program to ensure the effectiveness of structural and non-structural post-construction stormwater control BMPs. All structural BMPs will be inspected for continued effectiveness and structural integrity at regular inspection intervals. Inspections will document whether the BMP is performing correctly, note any damage to the BMP, and repair any damage to the BMP. Long-term performance of non-structural BMP's will be evaluated based on the effectiveness of post-construction ordinances and education programs.

***Measurable Goals:**

- The frequency of inspection and maintenance provided.
- The number of problems identified and remedied.

***Timeline/Implementation Schedule:**

2006:

- Evaluate the inspection and maintenance program.

2006 - 2010:

- Implement the inspection and maintenance program.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6a-1

***BMP Title:** Municipal Operations and Maintenance Program

***BMP Description:**

Storm Drain System Maintenance Program:

The City has in place an on-going storm drain inspection and cleaning program to reduce pollutants, trash, and debris. At a minimum, yearly cleaning and inspection includes storm drain grates, detention pond, pump station, catch basins, and other appurtenances. Based on inspection results, or repairs, measures will be determined for proper operation.

In cooperation with the appropriate County and Water Management Organizations, the City will use the education efforts outlined in BMP Summary Sheet 1c-6 (Education Program: Pollution Prevention/Good Housekeeping for Municipal Operations) to provide training for City personnel responsible for open space maintenance, vehicle and building maintenance, and stormwater conveyance maintenance.

***Measurable Goals:**

- The number of inspections
- The amount of trash, sediment, or other pollutants removed during cleaning
- See BMP Summary Sheet 1c-6 for Measurable Goals concerning municipal operations and maintenance training for City personnel.

***Timeline/Implementation Schedule:**

See BMP Summary Sheet 1c-6 for Timeline/Implementation Schedule concerning municipal operations and maintenance training for City personnel.

2006 - 2010:

- Continue the storm drain inspection and cleaning program
- Evaluate the program periodically and make modifications, if necessary

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6a-2

***BMP Title:** Street Sweeping**

***BMP Description:**

The City will review their current Street Sweeping Program for all City owned and paved streets and parking lots and revise the program as necessary. The City sweeps these impervious surfaces once a year, in the spring. Street sweeping will begin as early in the spring as weather allows.

***Measurable Goals:**

1) Review the Street Sweeping Program.
2) Research, as necessary, available street sweeping equipment; evaluate the costs of purchasing equipment vs. contracting services for street sweeping.
3) Revise the Street Sweeping Program, as necessary.

***Timeline/Implementation Schedule:**

2006 - 2010:

- Continue to sweep all City owned and paved streets and parking lots each spring.

2008-2010:

- Evaluate program effectiveness each season and make changes, if needed.
- Revise the program, if needed, to include necessary changes and develop a schedule for the implementation of these changes.

Specific Components and Notes:

1) The City (or contracted service) will sweep all paved City streets and parking lots at least once a year in the spring. The City will track and record the amount of street sweeping wastes collected to assist in the evaluation of this additional street sweeping.

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

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BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6b-2

***BMP Title:** Annual Inspection of All Structural Pollution Control Devices

***BMP Description:**

Inspect annually all structural pollution control devices, such as trap manholes, grit chambers, sumps, floatable skimmers and traps, separators, and other small settling or filtering devices.

***Measurable Goals:**

- Number of inspections and pollution control devices inspected.
- Number of non-functional pollution control devices inspected.

***Timeline/Implementation Schedule:**

2006 - 2010:

- Review the Pollution Prevention Plan (annual inspection procedures).
- Perform annual inspections.
- Review maintenance schedules for BMPs.

2010:

- Assess the compliance rate for BMP maintenance schedules.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6b-3

***BMP Title:** Inspection of a Minimum of 20 percent of the MS4 Outfalls, Sediment Basins and Ponds Each Year on a Rotating Basis

***BMP Description:**

This Best Management Practice (BMP) is required for inspection of minimum 20 percent of MS4 Outfalls, Sediment Basins and Ponds each year on the rotating basis, so that all are inspected over the entire permit period (5 years).

***Measurable Goals:**

- Number of inspections conducted each year, percent of total.
- Number of MS4 Outfalls, Sediment Basins and Ponds each inspected each year.

***Timeline/Implementation Schedule:**

2006:

- Set-up a program and procedures for inspections.

2007 - 2010:

- Evaluate the inspections procedures.
- Continue inspections.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6b-4

***BMP Title:** Annual Inspection of All Exposed Stockpile, Storage and Material Handling Areas

***BMP Description:**

This BMP requires all stockpiles such as salt, lumber, parts, and coal piles to be inspected annually. Some temporary stockpiles such as topsoil from construction activity would not be inspected under this requirement but would be required to be inspected in accordance with construction permits, ordinances, or policy. Stockpiles such as salt which are used only seasonally but are used each year are not temporary stockpiles and would be required to be inspected under this requirement. As with all inspections, if patterns of maintenance become apparent, the frequency of inspections should be adjusted.

***Measurable Goals:**

- Sites identified for areas of all exposed Stockpile, Storage, and Material Handling Areas.
- Number of inspections of all exposed Stockpile, Storage, and Material Handling Areas.

***Timeline/Implementation Schedule:**

2006:

- Develop a Pollution Prevention Plan (annual inspection procedures) with specific BMPs.

2006-2010:

- Establish a maintenance schedule for implemented BMPs.
- Ascertain the compliance rate for maintenance of implemented BMPs.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6b-5

***BMP Title:** Inspection Follow-up Including the Determination of Whether Repair, Replacement, or Maintenance Measures are Necessary and the Implementation of the Corrective Measures

***BMP Description:**

Based on the inspection, determine if repair, replacement, or maintenance measures are necessary for proper operation and to prevent environmental impacts, such as erosion. The necessary measures shall be completed as soon as possible, usually during the same year as the inspection. When it is not practicable, the reasons and a schedule for completion shall be submitted in the annual report.

***Measurable Goals:**

- Number of recommendations made following the inspections
- Number of follow-up actions taken after the inspections

***Timeline/Implementation Schedule:**

2006:

- Develop a plan (annual inspection procedures) for inspection follow-up.

2006 – 2010:

- Continue inspections and followup maintenance.
- Evaluate inspection procedures annually.

2010

- Ascertain compliance rate for BMP maintenance schedules.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6b-6

***BMP Title:** Record Reporting and Retention of All Inspections and Responses to the Inspections

***BMP Description:**

Summarize the results of outfall inspections in the annual report and include the dates of inspection and date of completion of major additional protection measures. Keep records of inspection results, date, antecedent weather conditions, sediment storage and capacity remaining, and any maintenance performed or recommended.

***Measurable Goals:**

- Number of records maintained.
- Any relevant inspection - lab results.
- Any maintenance performed or recommended.
- Sediment storage and capacity remaining.

***Timeline/Implementation Schedule:**

2006:

- Develop a plan for record reporting and retention.

2007 - 2010:

- Implement the plan for record reporting and retention.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6b-7

***BMP Title:** Evaluation of Inspection Frequency

***BMP Description:**

Keep records of inspection results, date, antecedent weather conditions, sediment storage, and capacity remaining, and any maintenance performed or recommended. After two years of inspections, if patterns of maintenance become apparent, the frequency of inspections may be adjusted. If maintenance or sediment removal is required because of each of the first two annual inspections, the frequency of inspections may be adjusted.

If maintenance or sediment removal is required because of each of the first two annual inspections, the frequency of the first two annual inspections, the frequency of inspection shall be increased to at least two(2) times annually or more frequently as needed to prevent carry-over or washout of pollutants from the structures and maximize pollutant removal. If maintenance or sediment removal is not required because of both of the first two annual inspections, the frequency may be reduced to once every two years.

***Measurable Goals:**

- The number of inspections and results summarized each year.
- Any maintenance performed or recommended.

***Timeline/Implementation Schedule:**

2006:

- Establish procedures for annual inspections.

2007 - 2010:

- Implement annual inspections.
- Evaluate the inspection frequency and make adjustments accordingly.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Susan Hoyt

Department: City Administrator

Phone: 651-233-5401

E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Lake Elmo
Minimum Control Measure: IV.D Section 303(d) listings
Unique BMP Identification Number: IV.D – 1

***BMP Title:** Impaired Waters Review Process

***BMP Description:**

In cooperation with Valley Branch Watershed District (VBWD), Brown's Creek Watershed District (BCWD) and South Washington Watershed District (SWWD), the City of Lake Elmo will create a review process that identifies all discharges from the City's MS4 system to impaired waters, as defined by the current USEPA approved 303(d) list.

The review process will include the following:

- Identification of impaired waters within the jurisdictional boundaries of the City.
- Identification of all potential stormwater discharges to impaired waters using data from the City's storm sewer maps and field surveys.
- Delineation of watershed areas that contribute to the above discharges.
- Evaluation of the hydrology, land use and other characteristics of the watershed areas that may impact the impaired water as a result of a stormwater discharge from the City's stormwater system.
- Consideration of timing and short and long term costs.

Based on the results of the review process, the City of Lake Elmo will determine if any changes to the existing stormwater system or BMPs are needed to minimize the impact of discharges to the impaired waters. If such modifications are deemed necessary, the City will modify the SWPPP and submit those modifications to the MPCA. All assumptions, reasoning, and justification used to reach a conclusion will be documented in the decision making process. Documentation related to the impaired waters review process will be filed with all other records associated with the MS4 permit.

***Measurable Goals:**

- Determine what processes are in place and what has already been accomplished that will help meet these permit conditions
- Prepare an inventory of all impaired waters within the jurisdictional boundaries of the MS4, as well as those outside these boundaries likely to have an impact as a result of receiving stormwater discharge from the City.
- Prepare a map that includes all impaired waters that the City discharge may impact, all City discharge points that may impact these waters, and delineated watersheds that may contribute to the impairment
- Complete a written overview of the conclusions reached through the review, including the decision making process used to determine what SWPPP revisions may be needed
- Prepare a projected schedule and timeline to incorporate any necessary changes into the SWPPP

***Timeline/Implementation Schedule:**

2008:

- In cooperation with VBWD, BCWD, and SWWD, identify what tasks have been completed to meet the requirements of section IV.D. of the MS4 General Permit.
- In cooperation with VBWD, BCWD, and SWWD, identify impaired waters receiving impacts from stormwater discharges from the City and locate discharges.
- In cooperation with VBWD, BCWD, and SWWD, develop a map that includes all impaired waters that the City discharge may impact, all City discharge points that may impact these waters, and delineated watersheds that may contribute to the impairment

2008-2009:

- In cooperation with VBWD, BCWD, and SWWD, complete an evaluation of hydrology, land use, and other watershed characteristics for watersheds that contribute runoff to impaired waters.

2009-2010:

- The annual report will include an overview of the impaired waters review and any changes to the SWPPP that have been deemed necessary through this review process.
- Review changes to the 303(d) impaired waters list and conduct a review of additional listed impaired waters likely to be impacted by the City's stormwater discharge.

Specific Components and Notes:

The impaired waters review process will be reassessed annually over the course of the permit cycle. As new 303(d) lists with additional impaired waters listed are published in the future, Lake Elmo will review changes to the list and conduct the necessary review of additional listed waters likely to be impacted by the City's stormwater discharges.

When an USEPA approved TMDL is finalized, the City of Lake Elmo intends to fully comply with all limits and requirements set forth in the TMDL in accordance with the schedules outlined in the TMDL and the MS4 Permit.

***Responsible Party for this BMP:**

Name:	Susan Hoyt
Department:	City Administrator
Phone:	651-233-5401
E-mail:	Shoyt@lakeelmo.org

BMP Summary Sheet

MS4 Name: City of Lake Elmo
Minimum Control Measure: IX. Appendix C. Part B.
Unique BMP Identification Number: IX. B.

***BMP Title:** Discharges to Waters with Restricted Discharges Assessment

***BMP Description:**

In cooperation with Valley Branch Watershed District (VBWD), Brown's Creek Watershed District (BCWD) and South Washington Watershed District (SWWD), the City of Lake Elmo will create process that identifies all discharges from the City's MS4 system to outstanding resource value waters (ORVW), as defined by the current Minn. R. 7050.0180, subp. 6, 6a or 6b list.

The review process will include the following:

- Identify all discharges to the prohibited or restricted water(s).
- Map watersheds from the identified discharge points and routes to the ORVW.
- Evaluate changes in the watersheds, projected out at least through 2020. This evaluation may include changes in land use, hydrology, modifications to the MS4 system or other changes.
- Determine if there are feasible and prudent alternatives to the discharge, such as diversion from the ORVW watershed, infiltration, or other alternatives.

Based on the results of the review process, the City of Lake Elmo will determine if discharges to the ORVW can be eliminated. If the discharge cannot be eliminated entirely, the City will propose BMPs that will allow the existing high quality of the ORVW water to be maintained, which will preserve the wilderness, scientific, recreational, or other special characteristics that make the listed waters an ORVW. If such modifications are deemed necessary, the City will modify the SWPPP and submit those modifications to the MPCA.

***Measnrable Goals:**

- Determine what processes are in place and what has already been accomplished that will help meet these permit conditions.
- Prepare an inventory of all discharges within the jurisdictional boundaries of the MS4 likely to have an impact on an ORVW as a result of receiving stormwater discharge from the City.
- Prepare a map that includes all City discharge points that may impact these waters, and delineated watersheds that may contribute runoff to the ORVW.
- Prepare a projected schedule and timeline to incorporate any necessary changes into the SWPPP

***Timeline/Implementation Schedule:**

2009:

- Identify what tasks have been completed to meet the requirements of Section IX. Appendix C. Part B of the MS4 General Permit.
- Identify all discharges to the prohibited or restricted water(s).
- Develop a watershed map of identified discharge points and routes to the ORVW waters.
- Complete an evaluation of hydrology, land use, and other watershed characteristics for watersheds that contribute runoff to the prohibited or restricted water(s), projected out at least through 2020.

2010:

- Propose BMPs, if required, that will allow the existing high quality of the ORVW water to be maintained

Specific Components and Notes:
***Responsible Party for this BMP:** Name: Susan Hoyt Department: City Administrator Phone: 651-233-5401 E-mail: Shoyt@lakeelmo.org

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

CAPITAL IMPROVEMENT PLAN 2009 to 2013

PURPOSE:

The city's five-year Capital Improvement Plan (CIP) is a summary of projects and equipment that are projected over the next five years. The CIP represents a plan for the future. This is a planning document and is revised on an annual basis. The CIP does not provide a specific funding formula for these projects or equipment. This will be part of a specific decision making process when each item is being considered to move ahead. For example, the Capital Acquisitions fund may be the appropriate fund for a piece of equipment such as a fire truck, but this may require the city to issue debt for the purchase and potentially increase the local property tax levy to pay for the debt.

The city has various areas in which capital spending and budgeting are used:

- Parks (park and trail improvements and related equipment costs)
- Infrastructure (including the Street Improvement Program)
- Village
- Capital Acquisitions (capital machinery and equipment, vehicles, office equipment, and minor building improvements for governmental funds)
- City Facilities (major buildings and building improvements for governmental funds)
- Utilities (including capital machinery and equipment, vehicles, office equipment, buildings, and infrastructure for the Water, Sewer, and Surface Water enterprise funds)

The CIP carries no appropriation authority, but is approved by the city council and used in the city's overall financial planning. The CIP is funded through various means, including existing fund balances or net assets, operating transfers, grants and aids, special assessments, user charges, debt issuance, or other sources.

PROCESS:

During the budgeting process, department heads submit their proposals for the CIP to the City Administrator. Department head requests are modified by reviewing expected sources of funds along with the proposed uses of funds. Additionally, the effect of capital improvements on the operating budget is weighed. Total uses for the first year of the CIP are then allocated to the various next-years capital projects expenditure budgets (and any other funds, i.e. enterprise).

The process for developing the CIP includes input and review by:

- the Maintenance Advisory Committee (MAC) on equipment needs for public works and fire;
- the Parks Commission for input on upcoming park and trail priorities/needs;
- the Planning Commission for conformance of capital/infrastructure projects to the comprehensive plan.

The capital projects fund budgets along with the CIP are presented to the city council during the annual budget process. After review and modification, the council approves the CIP and capital projects fund budgets, which are then used as spending guidelines throughout the subsequent year.

PRELIMINARY DRAFT

2009 TO 2013 STREET IMPROVEMENT PROGRAM:

The proposed five year street improvement program continues the city's history of annually improving road and street infrastructure based upon condition and proximity within the city, in order for each project to be efficient and cost effective.

The street improvement projects will vary depending upon the condition of the street and associated storm sewer needs. They may range from total reconstruction, to reclaiming, to overlay. A pavement management plan has been completed for the street system. This provides an inventory, condition assessment, recommended next improvement, and priority ranking. Each year also includes a maintenance program for crack sealing and sealcoating which is mostly funded by the general fund Municipal State Aid (MSA) maintenance dollars.

The city council is responsible for studying options and adopting a consistent financing plan for implementing these future projects over the coming years. For budget planning purposes only, the non-MSA infrastructure projects reflected in the 2009 to 2013 CIP are based upon funding from General Obligation (G.O.) Bonds repaid through a 25% assessment policy and 75% repaid through the city's property tax levy. MSA infrastructure projects are also based upon financing from G.O. bonds, but repaid 75% from MSA dollars and 25% repaid through the city's property tax levy.

2009 Street Improvement Projects:

The 2009 street improvement infrastructure projects are the priority projects that continue the street improvement program that the city has implemented in the past. These streets were programmed for 2007, but were deferred until a funding plan could be developed.

The program includes approximately 1.47 miles of street improvements chosen because of a high need and geographic proximity to each other. This includes the neighborhoods of Myron Eliman, Eden Park, Eden Park 2nd Addition, and The Forest.

The priority streets that are in dire need of repair are:

- 21st Street N from Manning Trail N to cul-de-sac (reclaim with localized subbase correction)
- 3rd Street Place N from Lake Elmo Avenue to cul-de-sac (reclaim with localized subbase correction)

The area identified for sealcoating in 2009 is detailed in the CIP. Pavement preservation is the most cost effective activity for extending the useful life of the street system.

The city council is responsible for determining the financial mechanism for funding these street projects. For budget planning purposes only, the non-MSA infrastructure projects reflected in the 2009 street improvement program are based upon funding G.O. Bonds repaid through a 25% assessment policy and 75% repaid through the city's property tax levy. MSA infrastructure projects are also based upon financing from G.O. bonds, but repaid 75% from MSA dollars and 25% repaid through the city's property tax levy.

VILLAGE:

The purpose of the Village project is to plan and prepare for the development and potential redevelopment of the Village. All obligations and expenditures for the Village

PRELIMINARY DRAFT

project have been tracked and put into the Village capital projects fund. The project is being funded with a loan from General Fund reserves and a repayment schedule for the loan has been established.

The Village AUAR is to be paid through fees charged to developers. To implement this policy, an ordinance will need to be adopted. There are examples of this type of fee (and related ordinances) to use to develop this. Fees and policies will be adopted to cover the costs associated with developing the Village. These policies should anticipate that the developers will cover costs associated with developing the new Village.

PARK DEDICATION:

For 2009, proposed city park structures and improvements, park signage, and trail improvements total an estimated $259,000 (see the CIP detail).

All 2009 items will be financed by existing fund balance and park dedication fees.

CAPITAL ACQUISITIONS:

For 2009, capital acquisitions include upgrades to fire stations 1 and 2, a 1 ton public works hook/dump truck, various information technology equipment, sound/video upgrades at City Hall, and contracted Capital Improvement Plan and finance services.

All 2009 items will be financed by existing fund balance with the exception of the sound/video upgrades, which will be financed by a cable commission grant. Future major capital acquisitions will likely require other sources or the issuance of new G.O. debt, which will likely be repaid by city property taxes.

CITY FACILITIES:

For 2009, no major city buildings or building improvements are planned. Site acquisitions and construction of a new City Hall and a new fire station may occur in the future, as determined by the city council. Future major facility acquisitions will likely require the issuance of new G.O. debt, which will likely be repaid by city property taxes.

WATER:

A local water plan is being completed in 2009. The water system requires an additional well to assure service to existing properties on the water system. Minnesota Department of Health low interest loans are being explored as funding for water system needs to satisfy contamination. Replacement water meters are also planned for 2009.

Extending water service to the southwest area of the city for properties with PFC contamination above health based value is planned for the future.

A utility rate analysis and cash flow projection will be modeled and reviewed by the city council in advance of major water capital spending.

SEWER:

The forcemain extension from I-94 to 30th Street is planned for 2010 if there is a commitment from developers to cover some up front costs and a promise of development. The pipe will be paid for by developers and beneficiaries of service.

PRELIMINARY DRAFT

An engineering sewer plan for the area south of 10th Street dedicated for sewer in the comprehensive plan is scheduled for 2009 to be prepared for the first phase of the development south of 10th Street in 2011.

A utility rate analysis and cash flow projection will be modeled and reviewed by the city council in advance of major sewer capital spending.

SURFACE WATER:

A surface water plan is budgeted for $40,000 to be done in 2009.

A utility rate analysis and cash flow projection will be modeled and reviewed by the city council in advance of major surface water capital spending.

PRELIMINARY DRAFT

City of Lake Elmo
Capital Improvement Plan
2009 to 2013

Fund/Category	Project	Detail or Street From/To	Estimated Cost 2009	2010	2011	2012	2013	Future	Funding Source
Park Dedication (404)									
Parks	DeMontreville Park	Picnic Shelter	$30,000						Fund Balance/Park Dedication Fees
Parks	DeMontreville Park	Resurface Basketball Court			$5,000				Fund Balance/Park Dedication Fees
Parks	Heights Park	Park Development	$25,000						Fund Balance/Park Dedication Fees
Parks	Lake Jane Hills Park	Off Leash Dog Park		$5,000					Fund Balance/Park Dedication Fees
Parks	Lions Park	Tennis Court				$12,000			Fund Balance/Park Dedication Fees
Parks	Lions Park	Replace Shelter Roof	$4,000						Fund Balance/Park Dedication Fees
Parks	Lions Park	Play Area	$1,000						Fund Balance/Park Dedication Fees
Parks	Pebble Park	Tennis Court Resurface	$20,000						Fund Balance/Park Dedication Fees
Parks	Pebble Park	Convert Ballfield	$20,000						Fund Balance/Park Dedication Fees
Parks	Reid Park	Parking Lot	$20,000						Fund Balance/Park Dedication Fees
Parks	Reid Park	Playground Equipment	$5,000						Fund Balance/Park Dedication Fees
Parks	Sanctuary	Master Plan	$5,000						Fund Balance/Park Dedication Fees
Parks	Sanctuary	Future Amenities	$1,000	$1,000	$1,000	$1,000			Fund Balance/Park Dedication Fees
Parks	Stonegate Park	Parking Lot			$10,000				Fund Balance/Park Dedication Fees
Parks	Sunfish Lake Park	Land Trust							Fund Balance/Park Dedication Fees
Parks	Sunfish Lake Park	Post, Barrier & Gate for Parking Lot	$10,000						Fund Balance/Park Dedication Fees
Parks	Tablyn Park	Mill & Overlay Park Lot & Driveway	$20,000						Fund Balance/Park Dedication Fees
Parks	Tablyn Park	Tennis Court Overlay				$25,000			Fund Balance/Park Dedication Fees
Parks	Tana Ridge	Landscape & Benches	$3,000						Fund Balance/Park Dedication Fees
Parks	VFW Park	Ballfield Improvements							Fund Balance/Park Dedication Fees
Parks	Carriage Station	Picnic Shelter	$20,000						Fund Balance/Park Dedication Fees
Parks	Carriage Station	Play Area Curbing & Chips	$3,000						Fund Balance/Park Dedication Fees
Parks	Ridge Park	Play Area Chips	$1,000						Fund Balance/Park Dedication Fees
Parks	Trail Improvements		$50,000	$50,000	$50,000	$50,000	$50,000		Fund Balance/Park Dedication Fees
Parks	Signage		$13,000						Fund Balance/Park Dedication Fees
Total Park Dedication (404)			$259,000	$56,000	$66,000	$88,000	$50,000	$0	
Infrastructure Reserve (409)									
Infrastructure	Transportation plan		$45,[illegible]						Fund Balance
Infrastructure	Seaicoating (see 2009 detail below)		$12[illegible],000	$125,000	$125,000	$125,000	$125,000		Fund Balance for 2009; then Property Tax Levy
Infrastructure	21 STREET N	MANNING AVE TO CUL-DE-SAC	$41,20[illegible]						75% Property Tax Levy; 25% Assessments
Infrastructure	3RD STREET PL N	LAKE ELMO AVE (CSAH 17) TO CUL-DE-SAC	$83,4[illegible]						75% Property Tax Levy; 25% Assessments
Infrastructure	LEGION LN N	LEGION LANE COURT TO LEGION AVE	$54,590						75% Property Tax Levy; 25% Assessments
Infrastructure	LEGION LN N	LEGION LANE COURT TO LEGION LANE CIRCLE	$10,300						75% Property Tax Levy; 25% Assessments
Infrastructure	LEGION LN N	LEGION AVE N TO LISBON AVE N	$35,020						75% Property Tax Levy; 25% Assessments
Infrastructure	LEGION LN N	LISBON AVE TO LEGION LANE CIRCLE	$74,160						75% Property Tax Levy; 25% Assessments
Infrastructure	LEGION LN N	30TH ST N TO SOUTH END	$62,830						75% Property Tax Levy; 25% Assessments
Infrastructure	LEGION LN CIR N	LEGION LANE TO CUL-DE-SAC	$18,540						75% Property Tax Levy; 25% Assessments
Infrastructure	LEGION LN CT N	LEGION LANE TO CUL-DE-SAC	$14,420						75% Property Tax Levy; 25% Assessments
Infrastructure	LISBON AVE N	LEGION LANE TO CUL-DE-SAC	$52,530						75% Property Tax Levy; 25% Assessments
Infrastructure	29TH STREET N (Gravel)	WEST END TO JAMLEY TO EAST END		$148,526					75% Property Tax Levy; 25% Assessments
Infrastructure	57TH ST N	55TH ST TO JULEP WAY		$83,811					75% Property Tax Levy; 25% Assessments
Infrastructure	53RD ST N	EAST SIDE OF FOXFIRE ADDITION TO KEATS AVE N		$149,587					75% Property Tax Levy; 25% Assessments
Infrastructure	ISLE AVE N	JAMACA AVE N TO SOUTH END		$128,369					75% Property Tax Levy; 25% Assessments
Infrastructure	JANE RD N	JAMACA AVE N TO WEST END		$46,680					75% Property Tax Levy; 25% Assessments
Infrastructure	JAMACA AVE ROUNDABOUT (MSAS)	JAMACA CT TO TH 5		$244,007					75% Property Tax Levy; 25% Assessments
Infrastructure	KIRKWOOD LANE (Gravel)	50TH STREET TO NORTH END			$262,254				75% MSA Funds; 25% Assessments
Infrastructure	LAVERNE AVE N	11TH ST N TO 12TH ST N			$38,245				75% Property Tax Levy; 25% Assessments
Infrastructure		CSAH 10 (10TH ST N) TO 11TH ST N			$22,947				75% Property Tax Levy; 25% Assessments
Infrastructure	LAYTON AVE N	CSAH 10 (10TH ST N) TO 12TH ST N			$66,658				75% Property Tax Levy; 25% Assessments
Infrastructure	LEEWARD AVE N	CSAH 10 (10TH ST N) TO 12TH ST N			$72,120				75% Property Tax Levy; 25% Assessments
Infrastructure	11TH ST N	LAVERNE AVE WEST TO CUL-DE-SAC			$26,225				75% Property Tax Levy; 25% Assessments
Infrastructure	12TH ST N	LAYTON AVE TO LEEWARD AVE			$20,762				75% Property Tax Levy; 25% Assessments
Infrastructure		LAVERNE AVE TO LAYTON AVE N			$81,193				75% Property Tax Levy; 25% Assessments
Infrastructure		WEST CUL-DE-SAC TO LAVERNE AVE			$29,504				75% Property Tax Levy; 25% Assessments
Infrastructure	10TH STREET CT N	CSAH 10 (10TH ST) TO CUL-DE-SAC			$39,338				75% Property Tax Levy; 25% Assessments
Infrastructure	KEATS AVENUE (MSAS)	47TH ST TO TH 36			$409,773				75% MSA Funds; 25% Assessments
Infrastructure	MANNING AVENUE	TH 36 TO LINDEN AVENUE				$84,413			75% Property Tax Levy; 25% Assessments
Infrastructure	53RD ST N	DEMONTREVILLE TRAIL N TO CUL-DE-SAC				$29,263			75% Property Tax Levy; 25% Assessments
Infrastructure	HYTRAIL AVE N	HIGHLANDS TRAIL N TO 59TH ST N				$101,296			75% Property Tax Levy; 25% Assessments
Infrastructure	59TH ST N	HIGHLANDS TRAIL N TO HYTRAIL AVE				$140,689			75% Property Tax Levy; 25% Assessments
Infrastructure	58TH ST N	HIGHLANDS TRAIL N TO EAST END CUL-DE-SAC				$60,777			75% Property Tax Levy; 25% Assessments
Infrastructure	HIGHLANDS TRL N	DEMONTREVILLE TRAIL N TO HYTRAIL N				$38,297			75% Property Tax Levy; 25% Assessments
Infrastructure	HIGHLANDS TRL N	HIGHLANDS COURT N TO HYTRAIL N				$93,417			75% Property Tax Levy; 25% Assessments

PRELIMINARY DRAFT

City of Lake Elmo
Capital Improvement Plan
2009 to 2013

Fund/Category	Project	Detail or Street From/To	Estimated Cost 2009	2010	2011	2012	2013	Future	Funding Source
Infrastructure	HIGHLANDS TRL N	59TH ST N TO HIGHLANDS COURT N				$69,782			75% Property Tax Levy; 25% Assessments
Infrastructure	HIGHLANDS TRL N	MN TH 36 TO 59TH ST N				$32,640			75% Property Tax Levy; 25% Assessments
Infrastructure	DEMONTREVILLE TRAIL CIR N	DEMONTREVILLE TRAIL PLACE TO CUL-DE-SAC				$25,887			75% Property Tax Levy; 25% Assessments
Infrastructure	DEMONTREVILLE TRAIL CIR N	DEMONTREVILLE TO DEMONTREVILLE TRAIL PLACE				$21,385			75% Property Tax Levy; 25% Assessments
Infrastructure	DEMONTREVILLE TRAIL PL N	DEMONTREVILLE TRAIL CT TO CUL-DE-SAC				$12,381			75% Property Tax Levy; 25% Assessments
Infrastructure	50TH/KIMBRO AVENUE (MSAS)	47TH ST TO CSAH 17				$1,029,841			75% MSA Funds; 25% Assessments
Infrastructure	KELVIN AVE N	NEW SUBDIVISION ROAD TO STILLWATER LANE					$44,052		75% Property Tax Levy; 25% Assessments
Infrastructure		MN TH 5 (STILLWATER BLVD) TO STILLWATER LANE N					$19,709		75% Property Tax Levy; 25% Assessments
Infrastructure	37TH ST N	JAMACA AVE TO IRWIN AVE					$64,919		75% Property Tax Levy; 25% Assessments
Infrastructure	36TH ST N	JAMACA AVE TO IRWIN AVE					$64,919		75% Property Tax Levy; 25% Assessments
Infrastructure	38TH ST N	CSAH 13 (IDEAL AVE) TO INNSDALE AVE N					$106,653		75% Property Tax Levy; 25% Assessments
Infrastructure	39TH ST N	CSAH 13 (IDEAL AVE) TO INNSDALE AVE N					$106,653		75% Property Tax Levy; 25% Assessments
Infrastructure	INNSDALE AVE N	39TH ST TO 38TH ST N					$26,663		75% Property Tax Levy; 25% Assessments
Infrastructure	DEER POND TRL N	HIDDEN BAY TRAIL TO DEER POND COURT					$16,230		75% Property Tax Levy; 25% Assessments
Infrastructure	DEER POND TRL N	DEER POND COURT TO JACK PINE TRAIL					$41,734		75% Property Tax Levy; 25% Assessments
Infrastructure	DEER POND CT N	DEER POND TRAIL TO SOUTH END					$33,619		75% Property Tax Levy; 25% Assessments
Infrastructure	20TH ST/MANNING TRL (MSAS)	CSAH 17 TO MANNING AVENUE					$602,823		75% MSA Funds; 25% Assessments
Total Infrastructure Reserve (409)			$617,020	$925,980	$1,174,017	$1,865,038	$1,252,973	$0	
Capital Acquisitions (410)									
Information Technology	Replacement equipment		$9,900		$12,000	$12,000	$25,000		Fund Balance
Information Technology	License updates		$2,000		$2,000	$2,000	$2,000		Fund Balance
Information Technology	City Hall network		$2,500						Fund Balance
Information Technology	Finance software upgrade		$14,900		$5,000	$5,000	$5,000		Fund Balance
City Hall	Sound/Video upgrade		$50,000						Cable Grant
Fire	Upgrade to Station 1		$30,000						Fund Balance
Fire	Upgrade to Station 2		$28,000						Fund Balance
Fire	Ladder truck					$850,000			New Equipment Certificates paid by property taxes
Fire	Replace duty car				$42,000				Fund Balance
Fire	Heavy rescue vehicle							$380,000	New Equipment Certificates paid by property taxes
Fire	2 sets turnout gear			$3,600	$3,600	$3,600	$3,600		Fund Balance
Public Works	1 Ton book/dump truck		$[illegible],600						Fund Balance
Public Works	Small utility vehicle			$15,000					Fund Balance
Public Works	Single/tandem dump truck					$190,000			Fund Balance
Public Works	Mini excavator						$49,900		Fund Balance
Public Works	Mower							$35,000	Fund Balance
Total Capital Acquisitions (410)			$202,800	$18,600	$64,600	$1,062,600	$85,500	$415,000	
City Facilities (411)									
City Hall	New City Hall site acquisition, if needed				$[illegible],000				2004 G.O. CIP Bonds paid by property taxes
City Hall	New City Hall building plans/specifications					$500,000			2004 G.O. CIP Bonds paid by property taxes
City Hall	New City Hall construction						$4,000,000		New bonds paid by property taxes
Fire	New fire station site acquisition, if needed							$500,000	New bonds paid by property taxes
Fire	New fire station construction							$3,000,000	New bonds paid by property taxes
Total City Facilities (411)			$0	$0	$500,000	$500,000	$4,000,000	$3,500,000	
Village (413)									
Village	Village development analysis		$10,000						AIAR fees
Village	Village comprehensive planning		$50,000						AIAR fees
Village	Old Village		TBD						New development paid by developer fees
Village	New Village		TBD						New development paid by developer fees
Village	I-94 to 30th St.				$4,000,000				New development paid by developer fees
Total Village (413)			$60,000	$0	$4,000,000	$0	$0	$0	

PRELIMINARY DRAFT

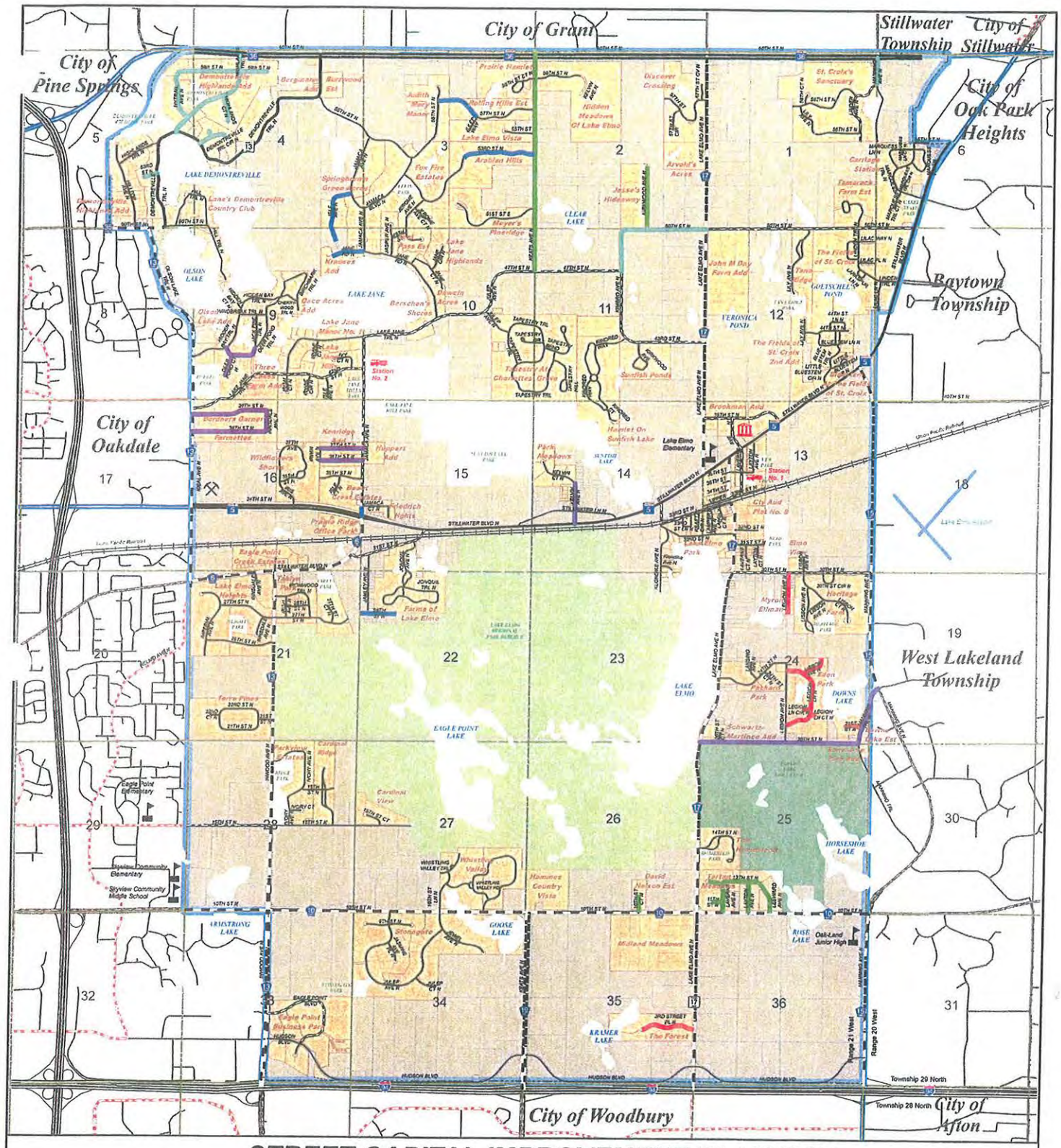
City of Lake Elmo
Capital Improvement Plan
2009 to 2013

Fund/Category	Project	Detail or Street From/To	Estimated Cost 2009	2010	2011	2012	2013	Future	Funding Source
Water (601)									
Water	Well and pumphouse #4		$810,000						MDH low interest loan
Water	230 replacement water meters		$60,230						Net Assets
Water	Water supply (conservation) plan		$5,000						Net Assets
Water	Study of SW area water system extension				$13,000				
Water	Keats trunk watermain extension				$891,000	TBD			
Total Water (601)			$875,230	$0	$904,000	$0	$0	$0	
Sewer (602)									
Sewer	Sewer study south of 10th St.		$25,000						Net Assets (charged to future development)
Sewer	Sewer/pumper jetter truck					$200,000			Net Assets
Total Sewer (602)			$25,000	$0	$0	$200,000	$0	$0	
Surface Water (603)									
Surface Water	Surface water plan		$40,000						Net Assets
Total Surface Water (603)			$40,000	$0	$0	$0	$0	$0	
Total City			$2,078,050	$1,000,560	$6,709,617	$3,715,638	$5,388,473	$3,915,000	

Seaicoating 2009 Detail:

26TH ST N	CSAH 13 (INWOOD AVE) TO IMPERIAL AVE N	CITY
27TH ST N	CSAH 13 (INWOOD AVE) TO INNSDALE AVE. N.	CITY
27TH ST N	IRONWOOD TRAIL N TO 27TH STREET CT N	CITY
27TH ST N	27TH STREET CT N TO CUL-DE-SAC	CITY
27TH ST N	INNSDALE TO LAKE ELMO HEIGHTS 3RD	CITY
27TH ST N	IMPERIAL TO LAKE ELMO HEIGHTS 3RD	CITY
27TH STREET CT N	27TH ST N TO CUL-DE-SAC	CITY
BIRCHBARK TRL N	CHERRY WOOD TRAIL TO HIDDEN BAY TRAIL	CITY
BIRCHBARK TRL N	CHERRY WOOD TRAIL TO SOUTH END	CITY
CHERRYWOOD TRL N	BIRCH BARK TRAIL TO HIDDEN BAY TRAIL	CITY
DEER POND TRL N	WINDBREAK TRAIL N TO HIDDENBAY TRAIL	CITY
DEER POND TRL N	JACK PINE TRAIL TO WINDBREAK TRAIL	CITY
IMPERIAL AVE N	27TH ST TO NORTH CUL-DE-SAC	CITY
IMPERIAL AVE N	SOUTH STUB TO 26TH ST	CITY
IMPERIAL AVE N	26TH ST TO 27TH ST	CITY
INNSDALE AVE N	CSAH 6 (STILLWATER BLVD) TO SOUTH CUL-DE-SAC	CITY
INNSDALE AVE N	27TH ST TO SOUTH CUL-DE-SAC	CITY
INWOOD AVE N	CSAH 6 (STILLWATER BLVD) TO NORTH CUL-DE-SAC	CITY
JACK PINE TRL N	DEER POND TRAIL TO WINDBREAK TRAIL	CITY
WINDBREAK TRL N	JACK PINE TRAIL TO DEER POND TRAIL	CITY
WINDBREAK TRL N	HIDDEN BAY TRAIL TO JACK PINE TRAIL	CITY
42ND ST N	JAMACA AVE TO IVY AVE N	MSAS
42ND ST N	LAKE JANE TRAIL TO IRVIN CIRCLE N	MSAS
42ND ST N	IVY COURT N TO ISLE AVE N	MSAS
42ND ST N	IRVIN CIRCLE N TO ISLE AVE N	MSAS
JAMACA AVE N	LAKE JANE TRAIL TO 42ND ST N	MSAS
JAMACA AVE N	42ND ST N TO 37TH ST N	MSAS
JAMACA AVE N	37TH ST N TO 36TH ST N	MSAS
JAMACA AVE N	36TH ST N TO 35TH ST N	MSAS
JAMACA AVE N	35TH ST N TO JAMACA CT N	MSAS
LAKE JANE TRL N	IRISH CT N TO JAMACA AVE N	CITY
LAKE JANE TRL N	IRISH CT N TO IRVIN CT N	CITY
LAKE JANE TRL N	CSAH 13 (IDEAL AVE) TO IRISH CT N	MSAS

PRELIMINARY DRAFT



STREET CAPITAL IMPROVEMENT PLAN MAP

CITY OF LAKE ELMO

LAKE ELMO STREETS

CIP YEAR

- 2009
- 2010
- 2011
- 2012
- 2013

City Hall
3800 Laverne Avenue N
651/777-5510
www.lakeelmo.org

Public Works Building
3448 Inwood Ave N
651/513-5414

Fire Stations
Station No. 1
3510 Laverne Ave N
651/275-5505
Station No. 2
4268 Jamaica Ave N
651/772-5512

Schools

Parcels

Subdivisions

City Parks

Golf Course

Lake Elmo Regional Park Reserve
Park Office
651/430-8366

Lakes

N W E S

0 0.1 0.2 0.4 Miles

Map Date: October 2008

Created By

TKDA
ENGINEERS • ARCHITECTS • PLANNERS

CITY OF LAKE ELMO
STORM WATER MANAGEMENT CAPITAL IMPROVEMENT AND FINANCE PLAN

Description	2009	2010	2011	2012	2013
Operations & Maintenance of Stormwater Facilities					
Pond and Storm Sewer Inspection	$ 8,500	$ 8,925	$ 9,371	$ 9,840	$ 10,332
Storm Sewer Cleaning and Maintenance	$ 4,000	$ 4,200	$ 4,410	$ 4,631	$ 4,862
Pond/Sediment Basin Maintenance	$ -	$ -	$ 12,000	$ 25,000	$ 25,000
Street Sweeping Operations	$ 10,000	$ 10,500	$ 11,025	$ 16,000	$ 16,800
Illicit Discharge & Pollution Prevention Implementation	$ 2,500	$ 2,625	$ 2,756	$ 2,894	$ 3,039
Erosion Control	$ 2,000	$ 2,100	$ 3,000	$ 1,500	$ 1,500
Subtotal - Operations and Maintenance	**$ 27,000**	**$ 28,350**	**$ 42,563**	**$ 59,864**	**$ 61,533**
MS4 NPDES Permit Implementation					
Public Education & Outreach (EMWREP Contract)	$ 2,000	$ 2,070	$ 2,142	$ 2,217	$ 2,295
Mapping and Design Standards	$ 2,500	$ 2,625	$ 4,000	$ 4,200	$ 4,410
Ordiances and Policies (Permit Updates)	$ 2,000	$ 2,100	$ 5,000	$ 5,250	$ 5,513
Annual Reporting and Records Maintenance	$ 3,000	$ 3,150	$ 3,308	$ 3,473	$ 3,647
Construction Site Runoff Control	$ 2,000	$ 2,100	$ 2,205	$ 2,315	$ 2,431
LID Standards - Development and Implementation	$ 7,000	$ 2,500	$ 2,625		
Illicit Discharge & Pollution Prevention Program Development	$ 2,500				
Stormwater and Erosion & Sediment Control Ordinance	$ 5,000				
Illicit Discharge Ordinance	$ 3,000				
TMDL Studies (Browns Creek, Lake St. Croix, others)	$ 3,500	$ 5,400			
ORVW BMP - Study and Implementation	$ 12,000	$ 5,000			
Technical Studies	$ -	$ 5,000	$ 8,000	$ 8,400	$ 8,820
Subtotal - Permit Implementation	**$ 44,500**	**$ 29,945**	**$ 27,280**	**$ 25,856**	**$ 27,115**
Planning and Engineering					
Local Surface Water Management Plan	$ 39,300				$ 30,000
Capital Improvement Planning and Utility Rate Studies	$ -				
Drainage Issues/Corrections	$ 5,000	$ 5,250	$ 5,513	$ 5,788	$ 6,078
Watershed District Coordination Activities	$ 2,500	$ 2,625	$ 2,756	$ 2,894	$ 3,039
Implementation of Stormwater Quality in Village Area	$ -	$ 5,000	$ 5,250	$ 5,513	$ 5,788
Subtotal - Planning & Engineering	**$ 46,800**	**$ 12,875**	**$ 13,519**	**$ 14,195**	**$ 44,904**
Subtotal - Personnel, Supplies, and Services	**$ 54,425**	**$ 57,146**	**$ 60,004**	**$ 63,004**	**$ 66,154**
Subtotal - Infrastructure Improvement Projects	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
TOTAL - STORM WATER MANAGEMENT COSTS	**$ 172,725**	**$ 128,316**	**$ 143,365**	**$ 162,918**	**$ 199,706**

AGREEMENT FOR STORM WATER FACILITIES BETWEEN THE CITY OF OAKDALE, MINNESOTA, THE CITY OF LAKE ELMO, MINNESOTA, AND THE VALLEY BRANCH WATERSHED DISTRICT

THIS AGREEMENT is dated the 3rd day of December, 1996, and is entered into by and between the City of Oakdale, Minnesota, a municipal corporation located in Washington County, Minnesota, its successors and assigns, hereinafter called "**Oakdale**", the City of Lake Elmo, a municipal corporation located in Washington County, Minnesota, its successors and assigns hereinafter called "**Lake Elmo**", and the Valley Branch Watershed District, its successors and assigns, hereinafter called the "**VBWD**".

1.0 **Recitals**.

A. Pursuant to the terms of this Joint Powers Agreement, the parties wish to:

1. establish a storm water drainage plan to guide the planning and construction of storm water facilities which will serve the property illustrated on Exhibit A attached hereto and incorporated herein ("**Subwatershed**"), and
2. define the specifics of the implementation and future modification of the storm water drainage plan that shall be applied to the construction of joint projects in the Subwatershed.

B. As used herein "**Oakdale Site**" means that part of the Subwatershed located on the west side of Ideal Avenue and "**Lake Elmo Site**" means that part of the Subwatershed located on the east side of Ideal Avenue.

C. The storm water drainage plan shall control the quantity and quality of the storm water that flows from the Oakdale Site through the Lake Elmo Site; and from the Lake Elmo Site into the VBWD storm water drainage system.

D. In addition, Lake Elmo may wish to provide water and sanitary sewer to the Lake Elmo Site by purchasing such capacity from Oakdale in the future.

2.0 **Terms and Conditions**. NOW, THEREFORE, in consideration of the mutual covenants and undertakings herein expressed, the parties agree to and with each other as follows:

A. **Scope of Agreement**. The construction of a joint project, as hereinafter defined, within the Subwatershed and the reimbursement of costs associated therewith are governed by the terms of this Agreement.

B. **Term of Agreement**. This Agreement shall commence on the effective date hereof and shall continue until the property located within the Subwatershed is fully developed pursuant to each City's respective development regulations.

C. **Adoption of Plan**. The parties hereby adopt the storm water drainage plan illustrated on Exhibit B attached and incorporated herein (**"Drainage Plan"**). The Drainage Plan illustrates the tributary areas, the conceptual location of ponds for water quality and for storage, and the approximate pond area and volume of storage. Maximum discharges rates are specified at critical locations. It

is intended that the Drainage Plan and the information contained thereon shall be the primary source of technical information pertaining to the design and construction of storm water facilities in the Subwatershed.

D. **Modification of Plan.**

1. **Approval Required.** All proposals to amend the Drainage Plan shall be submitted for review to each of the parties. No amendment shall become effective unless approved by all of the parties. The parties agree to expeditiously review proposed amendments and shall not unreasonably withhold approval.

2. **Critical Discharge Points.** For purposes of this Agreement, the Drainage Plan illustrates two critical discharge points.

   a. **Critical Discharge Point 1.** Critical Discharge Point 1 is the rate of storm water flow from the Oakdale Site onto the Lake Elmo Site which is established as 185 CFS for a 100 year rainfall event.

   b. **Critical Discharge Point 2.** Critical Discharge Point 2 is the rate of flow from the Lake Elmo Site into the VBWD drainage system which is established as 45 CFS for a 100 year rainfall event, and is based upon the current undeveloped condition of the Lake Elmo site.

3. **Development Plans.** Each City shall forward to the other City copies of drainage plans submitted in connection with development proposals in each of the City's portion of the Subwatershed.

E. **Joint Project**. Storm water improvement projects which require utilization of portions of the Oakdale Site and the Lake Elmo Site shall be considered joint storm water improvement projects ("**Joint Project**") and shall comply with the following conditions:

1. **Initiation**. A Joint Project may be initiated by Oakdale, Lake Elmo, or VBWD pursuant to applicable statutory regulations.

2. **Plan Review**. Prior to Joint Project approval by the party undertaking construction of the Joint Project, Joint Project plans and specifications shall be reviewed by all parties to insure compliance with the Drainage Plan. Any disputes regarding compliance shall be resolved by VBWD, whose decision shall be final.

3. **Design**. The portion of the Joint Project to be constructed on the Lake Elmo Site shall be designed in compliance with Lake Elmo regulations and standards for storm water systems and shall further require receipt of appropriate grading or other permits from the City of Lake Elmo.

4. **Cost Allocation**. The cost of a Joint Project shall be shared between the two cities on the basis of proportionate usage, using the peak discharge rate for storm water conveyance systems and 100 year storage requirements for ponds. Based upon the

current land use plans for each of the cities and on the Drainage Plan, the overall cost allocation for a Joint Project will be 81% for Oakdale and 19% for Lake Elmo. To the extent that the land use plans are changed and the Drainage Plan is modified as a result of such change, the cost allocation between the Cities shall be adjusted to reflect the revised peak discharge and volume requirements. Each City reserves the right to reimburse itself for its proportionate share of Joint Project cost in a manner that its City Council deems appropriate. The cost of a Joint Project undertaken by VBWD may be recovered by special assessments, ad valorem taxes, or by any other means determined appropriate by VBWD; provided, that VBWD shall only recover such cost from property located in the Subwatershed and VBWD shall not otherwise spread such cost against other property located within the jurisdiction of the VBWD.

5. **Waiver of Rights**. In those cases where a Joint Project will be undertaken by Oakdale or Lake Elmo, each City shall be in receipt of a petition and waiver, prior to Joint Project approval, from the owner of property within each City's respective jurisdiction which:

a. Requests construction of the improvement;

b. Requests that 100% of the Joint Project cost allocated to the City in which the petitioning party's property is located will be specially assessed against the property of the petitioning property owner; and

c. Waiving any rights to appeal from the imposition of special assessments for such costs.

6. **Easements**. In those cases where the Joint Project requires acquisition of ponding areas or drainage ways, each City shall be in receipt of an agreement, prior to Joint Project approval, from the owners of property within each City's respective jurisdiction which obligates the property owner:

a. to convey the required permanent ponding areas and drainage ways to the City in which the property is located without cost; and

b. to convey the required temporary construction easements to the City in which the property is located or its assigns without costs.

7. **Maintenance**. Except as herein provided, upon completion of a Joint Project, Lake Elmo will assume responsibility for maintenance and repair of the storm water facilities constructed on the Lake Elmo Site. Any maintenance and repair costs in excess of $2,500.00 per year shall be allocated 81% to Oakdale and 19% to Lake Elmo. To the extent that the land use plans are changed and the Drainage Plan is modified as a result of such

change, the cost allocation between the Cities shall be adjusted to reflect the revised peak discharge and volume requirements. Oakdale shall pay invoices submitted by Lake Elmo within thirty (30) days of receipt.

F. **Future Utility Capacity**. Oakdale agrees to extend sanitary sewer and water facilities to the Lake Elmo Site at Lake Elmo's cost in the following circumstances:

1. Oakdale has water and/or sanitary sewer capacity which its City Council determines is not needed to serve property currently within the jurisdiction of Oakdale; and
2. The owners of property in the Lake Elmo Site request that sanitary sewer and/or water be extended to their property.
3. Lake Elmo amends its Comprehensive Plan and zoning regulations to allow sewered development on the Lake Elmo Site and the MUSA is extended to cover the Lake Elmo Site.

G. **Indemnification**. Lake Elmo agrees to defend, indemnify, and save Oakdale and VBWD harmless from any and all claims or demands for damages arising out of or which may result from the negligence of Lake Elmo. Oakdale agrees to defend, indemnify, and save Lake Elmo and VBWD harmless from any and all claims or demands for damages arising out of or which may result from the negligence of

Oakdale. VBWD agrees to defend, indemnify, and save Lake Elmo and Oakdale harmless from any and all claims or demands for damages arising out of or which may result from the negligence of VBWD.

H. **Default**. Any party shall have the right to terminate this Agreement in the event that one of the other parties fails to comply with any of the terms and conditions of this Agreement. However, the Agreement may only be terminated after written notice is personally served on the authorized representative of the other parties as set forth herein, and if the defaulting party shall fail to cure the asserted basis for termination within sixty (60) days of such notice of default. Notwithstanding the foregoing right to cure, the parties may agree to a longer period of time for which to cure the asserted basis of default.

I. **Notification**. All notices, reports or demands required or permitted to be given under this Agreement shall be in writing and shall be deemed to be given when delivered personally to either party or officer of the party, to which notice is being given, or when deposited in the United States mail in a sealed envelope, with registered or certified mail postage prepaid thereon, addressed to the parties at the following addresses:

LAKE ELMO: City Administrator
City of Lake Elmo
3800 Laverne Avenue North
Lake Elmo, MN 55042

OAKDALE: City Administrator
City of Oakdale
1584 Hadley Avenue North
Oakdale, MN 55128

VBWD: Valley Branch Watershed District
P.O. Box 838
Lake Elmo, MN 55042-0538

J. **Development Regulations**. Nothing herein shall be construed to prevent either City from determining which development regulations shall apply to development in their respective City or shall be construed to prevent either City in any manner from guiding the development of property within their respective City.

K. **Amendments to Joint Powers Agreement**. This Agreement may not be amended without consent of all parties.

L. **Effective Date of Agreement**. The effective date of this Agreement shall be the date upon which the owners of the Lake Elmo Site record restrictive covenants against such property indicating that it is subject to the storm water drainage restrictions outlined in the Joint Powers Agreement. Property owners shall provide Lake Elmo with evidence of recording.

Pursuant to authorization
authorization granted by
the Lake Elmo City Council
on December 3, 1996.

City of Lake Elmo

By: _____

Its: Mayor

Pursuant to authorization granted by the Oakdale City Council on the 11th day of December, 19 96.

City of Oakdale

By: [signature]

Its: Mayor

Pursuant to authorization granted by the VBWD Board on the 23rd day of January, 19 99.

Valley Branch Watershed District

By: [signature]

Its: President

b/city/storm6.agr
December 4, 1996

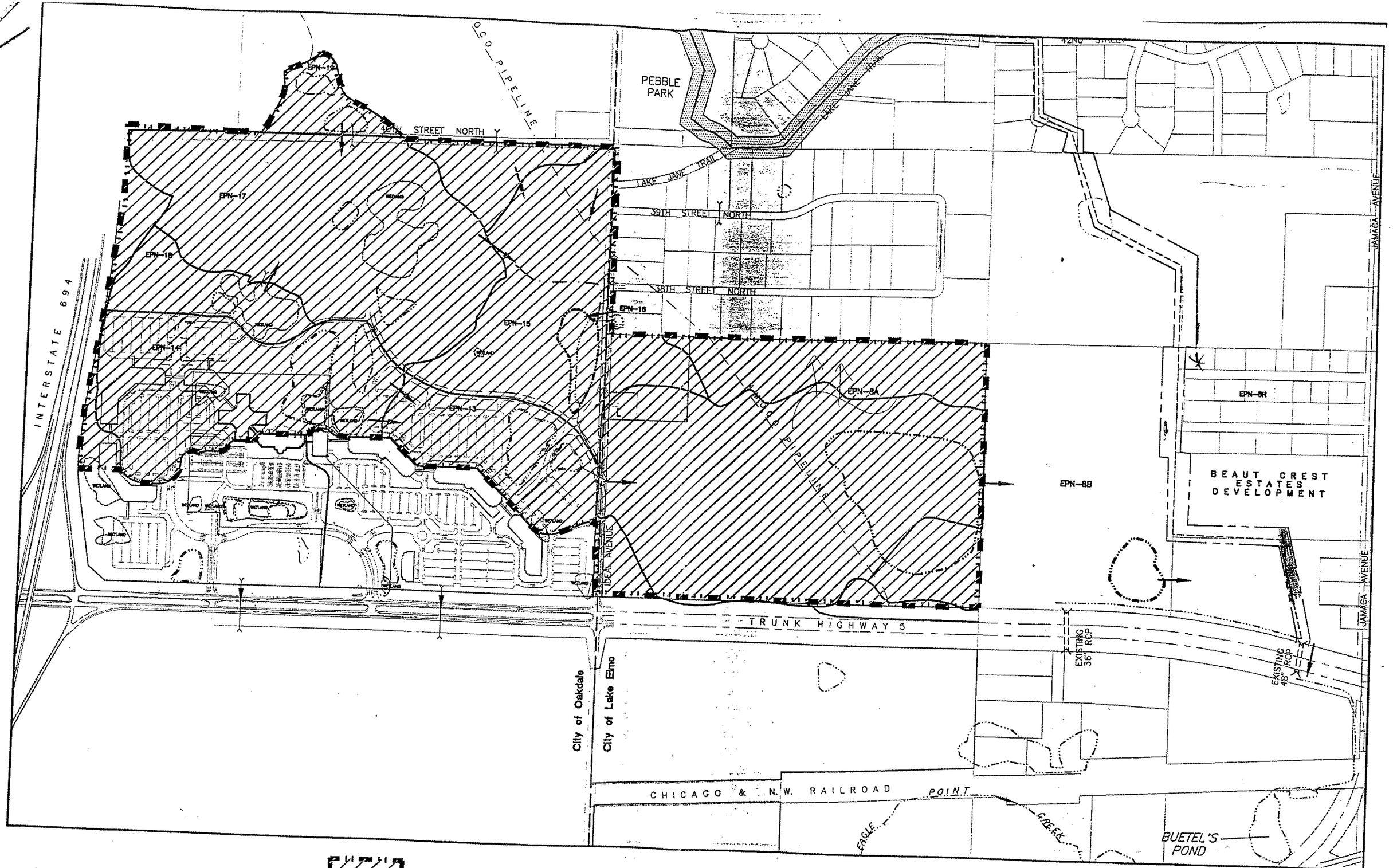
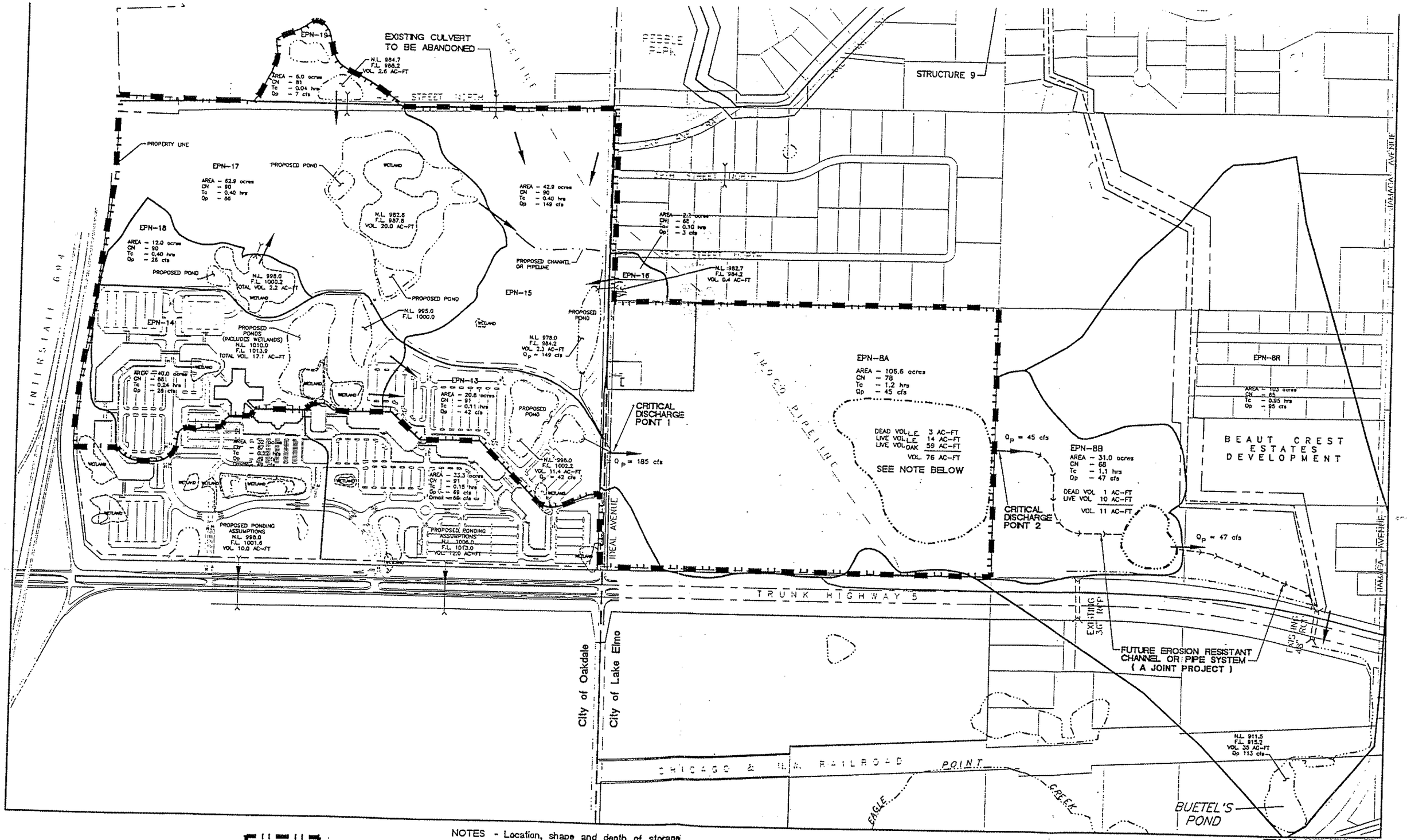


EXHIBIT A
Area of Agreement

Oakdale, Lake Elmo & VBWD Drainage Agreement
October 1996



NOTES
- Location, shape and depth of storage ponds in Lake Elmo to be determined based on adjacent land use, natural terrain and overall feasibility. Pond area shown is symbolic only.
- Hydrologic information based on a 100 year frequency storm event.

EXHIBIT B
Drainage Plan

Oakdale, Lake Elmo & VBWD Drainage Agreement
Dec. 3, 1996

Minnesota Pollution Control Agency
520 Lafayette Road North | St. Paul, MN 55155-4194 | 651-296-6300 | 800-657-3864 | 651-282-5332 TTY | www.pca.state.mn.us

'08 DEC 31 AM 10:45

December 29, 2008

Mr. Ryan Stempski, P.E.
TKDA
444 Cedar Street, Suite 1500
St. Paul, MN 55101-2140

RE: City of Lake Elmo General MS4 Permit-MCM 4 Construction Site Stormwater Runoff Control Ordinance

Dear Mr. Stempski:

The Minnesota Pollution Control Agency (MPCA) received your letter dated December 22, 2008, requesting an extension of the time permitted to complete the requirement of an ordinance for construction site stormwater runoff control as indicated in Part V.G.4.a of the General MS4 Permit.

As the city of Lake Elmo currently has provisions for managing construction site stormwater runoff in place, the MCPA grants your request for additional time to complete a more inclusive construction site stormwater runoff control ordinance to coincide with completion of the city of Lake Elmo's Local Surface Water Plan. The final ordinance can be submitted with the 2008 Annual Report which is due on June 30, 2009. Please ensure that a copy of the ordinance is submitted with the 2008 Annual Report.

If you have any questions, please feel free to contact me at 651-757-2377.

Sincerely,

Amy Garcia
Pollution Control Specialist
Stormwater Section
Municipal Division

AG:wgp

Wellhead Protection Plan

Part I

Delineation of Wellhead Protection Areas
Delineation of Drinking Water Supply Management Areas
Assessment of Well and Aquifer Vulnerability

Prepared for

The City of Lake Elmo
Minnesota

December 2006

Amal M. Djerrari, Hydrologist
Minnesota Department of Health

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Glossary of Terms

Wellhead Protection Area (WHPA). The surface and subsurface area surrounding a well or well field that supplies a public water system, through which contaminants are likely to move toward and reach the well or well field (Minnesota Statutes, Part 103I.005, subdivision 24).

Drinking Water Supply Management Area (DWSMA). The area delineated using identifiable land marks, defined in this report, that reflects the scientifically calculated wellhead protection area boundaries as closely as possible (Minnesota Rules 4720.5100, subpart 13).

Source Water Protection Area (SWPA). A source water assessment includes a description of 1) the area to be protected, 2) potential contamination sources that may impact the source of drinking water, and 3) the susceptibility of the public water supply to potential contamination sources. For the purposes of this delineation report, the SWPA and the DWSMA are the same.

Executive Summary

This report documents the technical information necessary to prepare Part 1 of a wellhead protection plan that will help ensure an adequate and safe drinking water supply for the City of Lake Elmo (public water supply identification number 182009). It documents the delineation of the wellhead protection area (WHPA), the drinking water supply management area (DWSMA), and the vulnerability assessments for the public water supply well(s) and DWSMA. Definitions explaining the differences between the terms WHPA, DWSMA, and SWPA are provided in the Glossary of Terms at the beginning of this report.

The delineation was performed in accordance with Minnesota Rules 4720.5100-4720.5590 for preparing and implementing wellhead protection plans for public water supply wells. The Minnesota Department of Health (MDH) administers these rules and the results described in this report reflect those of the MDH to 1) identify the capture zones for delineation of the WHPA, and 2) prepare well and DWSMA vulnerability assessments. Also, this report presents the findings of the public water supplier to identify 1) the surface water runoff component of the WHPA (if warranted), and 2) the boundaries of the DWSMA.

The public water supplier operates two primary wells: Well 1(Unique No. 208448) and Well 2 (Unique No. 603085). Well 1 (208448) is a multi-aquifer well open to the Jordan Sandstone, Franconia-Ironton-Galesville (FIG), and Mt. Simon Aquifers. Well 2 (603085) is open to the Prairie du Chien Group and Jordan Sandstone Aquifer. Well 1 (208448) is located in Section 13 of Township 29 North, Range 21 West. Well 2 (603085) is located in Section 6 of Township 29 North, Range 20 West. Both wells are in Washington County (Figure 2).

The WHPAs for Well 1 (208448) and Well 2 (603085) were delineated using multi-aquifer groundwater flow models. Figure 18 shows the boundaries of the 10-year time of travel capture zones for the Jordan/FIG/Mt. Simon Well 1(208448) and the Prairie du Chien-Jordan Well 2 (603085). The WHPA shown in Figure 1 takes into account uncertainties in the hydraulic parameters of the aquifers and in the flow regime in the Prairie du Chien Aquifer (i.e., fracture flow versus porous media). The DWSMA, also shown in Figure 1, was defined using city streets, highways, and public land survey section lines.

The Prairie du Chien-Jordan Aquifer exhibits different vulnerabilities within the DWSMA. Most of the DWSMA is rated moderately vulnerable to contamination from activities that occur at the land surface, where the upper bedrock aquifer is overlain by glacial deposits that exhibit low permeability. A few areas were rated as having a high vulnerability status, mostly due to the presence of windows within the low permeability till unit.

The Jordan/FIG/Mt. Simon Well 1 (208448) was found to be nonvulnerable because most of its water comes from the underlying FIG and Mt. Simon Aquifers. Overlying confining units (i.e., the St. Lawrence Formation, and/or the Eau Claire Formation) protect these latter aquifers. Prairie du Chien-Jordan Well 2 (603085) was found to be vulnerable, even though it is located in an area with a moderately vulnerable status. The presence of tritium in this well is believed to be due to recharge through windows in the till.

An updated source water assessment with a new SWPA is included in this report. The MDH is required under Section 1453 of the 1996 Amendments to the federal Safe Drinking Water Act to prepare source water assessments for all public water supply systems. Congress intends that assessments should be used to educate public water suppliers and the customers they serve about the source of their drinking water and potential contaminants that may affect people's health. The following source water assessment for the public water supplier contains the information specified in Minnesota's source water assessment program description.

Source Water Assessment
City of Lake Elmo, Minnesota

Public Water Supplier ID Number: 1820009

Water Supplier Contact: Michael J. Bouthilet
3800 Laverne Avenue
Lake Elmo, MN 55042
Phone: (651) 770-2537

MDH Contact: Art Persons
18 Wood Lake Drive Southeast
Rochester, MN 55904
art.persons@health.state.mn.us
Phone: (507) 292-5138

Status of the Source Water Protection Plan

The Minnesota Department of Health has approved the 1) delineation of the wellhead protection area, 2) delineation of the drinking water supply management area, and 3) assessments of well and aquifer vulnerability. The public water supplier is proceeding with the development of the remainder of the wellhead protection plan.

Source Water Protection Area - See Figure 1.

Description of the Source Water - The City of Lake Elmo obtains its drinking water supply from two primary wells. Well 1 (208448) is a multi-aquifer well open to the basal portion of the Jordan Sandstone, and the Franconia-Ironton-Galesville (FIG) and Mt. Simon Aquifers. Well 2 (603085) is open to the Prairie du Chien-Jordan Aquifer.

Table 1
Wells Used by the Public Water Supplier

Well No.	Unique No.	Well Use	Aquifer Type	Well Depth (ft)	Well Sensitivity	Aquifer Sensitivity
Well 1	208448	Primary	Bedrock	808.0	See (2)	Low
Well 2	603085	Primary	Bedrock	285.0	See (2)	High

The Prairie du Chien Group varies in thickness, due to erosion, from 0 to over 220 feet. Locally, the Prairie du Chien Group rests on top of the Jordan Sandstone everywhere except in a north-south trending bedrock valley, where it has been removed by erosion. The Jordan Sandstone is about 90 feet thick, except in the bedrock valley where its thickness may be diminished by 40-50 percent.

Unconsolidated deposits consisting of a mix of sandy outwash and sandy loamy till bury the bedrock aquifers. The valley fill deposits are about 110 feet thick near City of Lake Elmo Well 2 (603085) but increase to over 250 feet at city Well 1 (208448), located within the north-south trending bedrock valley.

Well Construction Assessment - Well 2 (603085) meets current standards for construction and maintenance. Well 1 (208448) is open to several aquifers, which is no longer permitted. However, this factor does not contribute to the susceptibility of the source water to contamination.

Well Sensitivity - Well sensitivity refers to the integrity of the well due to its construction and maintenance. It is based on the results of the well construction assessment. It can be one of the following:

(1) The well is susceptible to contamination because it does not meet current construction standards or no information about well construction is available, regardless of aquifer sensitivity.

(2) The well is not susceptible because it meets well construction standards and does not present a pathway for contamination to readily enter the water supply.

Aquifer Sensitivity - Aquifer sensitivity refers to the degree of geological protection afforded the aquifer(s) used by the public water supply.

High - The bedrock aquifer is considered to exhibit a high sensitivity to contamination because of the local geological setting.

Low - The bedrock aquifer is covered by one or more layers of fine-grained material that probably protect it from potential sources of contamination.

Source Water Susceptibility - Source water susceptibility refers to the likelihood that a contaminant will reach the source of drinking water. It reflects the results of assessing well sensitivity, aquifer sensitivity, and water quality data.

High - The source of drinking water is considered to exhibit a high susceptibility to contamination because of the local geological setting.

Low - The source of drinking water is covered by one or more layers of fine-grained material that probably protect it from potential sources of contamination.

Contaminants of Concern - The following statement summarizes the potential contaminants for which a source of drinking water may be at risk:

One or more contaminants regulated under the federal Safe Drinking Water Act for this public water supply system have been detected in the source water. However, the water supplied to users meets state and federal drinking water standards for potability. For further information, please contact the MDH representative listed at the beginning of this assessment.

Wellhead Protection Plan - Part I
City of Lake Elmo, Minnesota

1. Introduction

This report documents the delineation of the wellhead protection areas and drinking water supply management areas for the drinking water supply wells operated by the City of Lake Elmo, PWSID No. 1820009. The delineation was performed in accordance with rules (Minnesota Rules 4720.5100 to 4720.5580) for preparing and implementing wellhead protection measures for public water supply wells. The rules are administered by the MDH.

1.1. Description of the Water Supply System

The City of Lake Elmo obtains its drinking water supply from two primary wells (Table 1). Well 1 (208448) is a multi-aquifer well open to the basal portion of the Jordan Sandstone, and the Franconia-Ironton-Galesville (FIG), and Mt. Simon Aquifers. Well 2 (603085) is open to the Prairie du Chien-Jordan Aquifer. Well logs for the city wells are provided in Appendix A.

The City of Lake Elmo maintains 830,000 gallons of total storage. The system serves 670 connections, with approximately 2,306 residential customers, as well as several commercial, industrial, and institutional customers.

1.2. Physical Setting

The city of Lake Elmo is located in central Washington County. Well 1 (208448) is located in Section 13 of Township 29 North, Range 21 West. Well 2 (603085) is located in Section 6 of Township 29 North, Range 20 West (Figure 2). The City of Lake Elmo also owns Well 3 (655910) but this well is not connected to the system. The City was planning to use it as a long-term backup, but chemical contamination was detected recently in this well.

1.3. Hydrogeologic Setting

1.3.1. Geology

Few detailed geologic studies are available that describe subsurface geologic conditions specifically in the area around Lake Elmo. However, parts of the central Washington County area benefit from regional-scale geologic and hydrogeologic studies (Swanson and Meyer, 1990; Kanivetsky and Cleland, 1990; Meyer and others, 1990; and Mossler and Tipping, 2000). Well construction records were used to supplement the regional information.

Unconsolidated Quaternary deposits bury the bedrock aquifers used by the City of Lake Elmo wells. These unconsolidated deposits typically consist of a mix of sandy outwash and sandy loamy till (Figure 3) deposited during the advance of the Superior lobe (Meyer and others, 1990) and earlier events. They are about 110 feet thick near City of Lake Elmo Well 2 (603085) but are greater than 250 feet at City of Lake Elmo Well 1 (208448), which is located over a major north-south trending bedrock valley (Figure 4).

The Minnesota Geological Survey (MGS) developed Arc grids of four major tills in Washington County (Tipping et al., 1998). Most of these tills are in the northern part of the county, in the vicinity of the St. Croix Moraine. The northeastern Lake Elmo area contains three of the four till units, excluding only the Des Moines Lobe till (Unit 1). The till units mapped in the Lake Elmo area include:

- Unit 2 - red loam-to clay-loam textured, unsorted sediment, with scattered pebbles, cobbles, and boulders; associated with the St. Croix phase of the Superior Lobe advance and perhaps slightly older tills of similar composition (0 to 150-foot thickness);
- Unit 3 - old gray till materials that are typically more finely-grained than the Unit 2 tills (0 to 50-foot thickness); and
- Unit 4 - reddish-gray till of likely Superior provenance (0 to 60-foot thickness). This till is mostly present at Lake Elmo Well 1 (208448), within the bedrock valley.

Geologic logs from wells located in the area were used to construct six cross sections. Figure 5 shows the locations of the geologic cross sections. The geologic cross-sections (Figures 6 through 11) generally confirm the regional conditions. However, based on the drillers' logs, Unit 2 appears to be more fine-grained than in the MGS description, often described by the drillers as clay.

Below the glacial drift lies bedrock, which in this area consists of Paleozoic sedimentary rocks forming part of the Twin Cities structural basin. The Washington County area is on the eastern part of the Twin Cities structural basin, which is located at the northern end of the Hollandale Embayment. The embayment formed during the Paleozoic Era and is a syncline between the Wisconsin Arch to the east and the Transcontinental Arch to the west (Mossler, 1972). The Twin Cities Basin is centered approximately where the Minnesota and Mississippi Rivers meet, and is bounded on the east by the St. Croix River and on the north and west by the subcrop of Precambrian rocks in Wright, Sherburne, and Isanti Counties. The Paleozoic rocks comprising the sedimentary sequence are more than 1000 feet thick in the center of the basin.

The rocks comprising the upper part of this sequence in the northeastern Lake Elmo area are the Jordan Sandstone, the Prairie du Chien Group, and the St. Peter Sandstone. The St. Peter Sandstone is the uppermost unit and varies in thickness, due to erosion, from 0 to 175 feet. The Prairie du Chien Group varies in thickness, due to erosion, from 0 to about 220 feet. Locally, the Prairie du Chien Group rests on top of the Jordan Sandstone everywhere except in the north-south trending bedrock valley, where it has been removed by erosion. The Jordan Sandstone is about 90 feet thick, except in the bedrock valley where its thickness may be diminished by 40 to 50 percent. Each of these units dips slightly towards the center of the Twin Cities Basin (i.e., to the southwest).

After the deposition of the rocks in the basin, stream erosion established an extensive drainage system on the bedrock surface. This drainage system manifests itself today as buried bedrock valleys in the Twin Cities area. Many bedrock valleys are filled with glacial deposits and are only apparent by examining the geologic records of wells drilled throughout the area. Figure 4 shows the uppermost bedrock under the eastern portion of the City of Lake Elmo (where the wells are located) is Prairie du Chien Group dolomite, which overlies the Jordan Sandstone.

1.3.2. Hydrogeology

All the major bedrock aquifers in the Twin Cities area are in the Paleozoic sedimentary sequence. In Washington County, these include the Prairie du Chien-Jordan Aquifer, the Franconia-Ironton-Galesville (FIG) Aquifer, and the Mt. Simon (and Hinckley) Aquifer. All of these are present throughout central Washington County.

A detailed description of the hydrogeologic units can be found in the *Integrating Groundwater & Surface Water Management* modeling report prepared by Barr Engineering Company (2005) for southern Washington County. The following paragraphs provide a brief overview of the hydrogeologic units encountered in the northwest metropolitan area.

Quaternary Sand and Gravel (Water Table) Aquifer - Neither of the City of Lake Elmo wells are completed in quaternary deposits. The surficial deposits in this section of central Washington County are classified by Meyer and others (1990) as outwash, while the buried materials include sandy-clay tills. The water table occurs in the glacial materials at depths of 50 to 110 feet. Kanivetsky and Cleland (1990) suggest that the regional direction of groundwater flow for the water table aquifer is to the east-southeast.

The coarse-grained nature of the upper unconsolidated materials provides a pathway for surface water to recharge groundwater and land use to impact the quality of groundwater near the City of Lake Elmo wells. Many well logs indicate sandy, glacial materials rest directly on top of the Prairie du Chien Group (Figures 7, 8, and 10). As a result, the water table aquifer is likely hydraulically connected to the upper Prairie du Chien Group, at least in areas where fine-grained till is missing. The hydraulic interplay between these units probably varies considerably, however, depending on the role till units play in controlling aquifer recharge.

St. Peter Sandstone Aquifer - The upper part of the St. Peter Sandstone is poorly cemented, and may be used to supply domestic wells. The lower portion of the St. Peter Sandstone is shaley and functions as an aquitard over the Prairie du Chien Group (Palen, 1990). It has eroded away over much of the area where the Lake Elmo wells are located (Figure 4). Where the St. Peter Sandstone is absent, glacial deposits overlie the Prairie du Chien Group. Till or other glacial deposits offer varying degrees of leakage resistance.

Prairie du Chien-Jordan Aquifer - The Prairie du Chien Group and Jordan Sandstone are generally considered to comprise a single aquifer system in the Twin Cities metropolitan area. However, the nature of the hydraulic interaction between the two units varies because the rocks comprising the lowermost portion of the Prairie du Chien Group (i.e., the Oneota Dolomite) can be locally confining (Runkel et al., 2003). Each unit responds to the same set of regional boundaries: diffuse recharge by infiltration and leakage from adjacent aquifers, and discharge to major rivers and bedrock valley fill materials. As a result, groundwater flow elevations in each unit are quite similar. Kanivetsky and Cleland (1990) report that the local flow direction is to the east-southeast.

Although the groundwater elevations and flow directions are similar for the Prairie du Chien Group and Jordan Sandstone, the groundwater flow velocity may differ substantially. The Jordan Sandstone exhibits flow conditions typical of a porous medium. In contrast, the Prairie du Chien Group is a dolomite and flow is dominated by secondary porosity features such as fractures and solution-

enhanced cavities. Bedding plane fractures have been observed at consistent intervals in the Prairie du Chien Group, and the presence of vertical fractures is more extensive in areas where the unit subcrops or is close to the subcropping bedrock surface (Runkel et al., 2003). It is likely that groundwater in the Prairie du Chien Group is transmitted at velocities higher than in the Jordan Sandstone, especially when stressed by pumping.

***Prairie du Chien Group* -** Along with the Oneota Dolomite, the Shakopee Formation makes up the Prairie du Chien Group. The areal extent of the Prairie du Chien Group is similar to that of the underlying Jordan Sandstone. Runkel et al. (2006) report a range of horizontal hydraulic conductivity values of 19 to 107 feet/day from field tests.

Flow in the Prairie du Chien Group is dominated by a few thin zones of highly-connected horizontal fractures in the Shakopee Formation and the upper part of the Oneota Dolomite (Runkel et al., 2003). Horizontal hydraulic conductivity values within these thin zones can exceed 1,000 feet/day. Between these fracture zones, the hydraulic conductivity is much lower. At a very local scale, these horizontal zones of high flow may not be well connected but regional fractures and joints provide good connection on a more regional basis. This allows the upper part of the Prairie du Chien Group to be treated as a single aquifer system.

Recharge is primarily through vertical leakage from the glacial deposits and the St. Peter Sandstone. Some additional recharge, as lateral flow, enters the aquifer in northwestern Washington County from the unconsolidated sediments that abut the subcrop area of the aquifer. Discharge is into the valleys of major rivers.

The basal part of the Oneota Dolomite is a regional confining layer (aquitard) in southern Washington County and throughout southeastern Minnesota (Runkel et al., 2003). The confining unit is about 40 feet thick and consists of massive, relatively non-fractured dolomite. Packer tests performed by the Minnesota Geological Survey suggested that the non-fractured portions of the basal Oneota Dolomite may have hydraulic conductivity values as low as 10^{-4} feet/day (Runkel et al., 2003). Fracturing that cuts through the basal Oneota Dolomite provides the means for leakage between the Jordan Sandstone below and the Shakopee Formation above.

***Jordan Sandstone* -** In Washington County, some high-capacity wells are completed solely within this unit, which is approximately 90 feet thick. The degree of cementation of the Jordan Sandstone varies, which affects the hydraulic conductivity. Schoenberg (1990) reports a range of horizontal hydraulic conductivity values from 19 to 107 feet/day from field tests.

The Jordan Sandstone subcrops beneath glacial deposits along 1) the axis of the bedrock valley, and 2) alluvium in major river valleys, which are the primary discharge zones. Along the St. Croix and Mississippi Rivers, hydraulic head can be expected to be at or slightly above the elevation of the river. Discharge via high-capacity wells is also a significant discharge route. Recharge is primarily through leakage from the overlying Prairie du Chien Group. Flow in the Jordan Sandstone radiates east, west, and south from a groundwater divide that trends north-south and roughly bisects Washington County.

***St. Lawrence Confining Layer* -** The St. Lawrence Formation is a regional, leaky, confining layer (aquitard) that separates the Franconia-Ironton-Galesville Aquifer from the overlying Prairie du Chien-Jordan Aquifer. Runkel et al. (2003) describe the St. Lawrence Formation as having low bulk hydraulic conductivity in the vertical direction that can provide confinement. These confining characteristics are present where the St. Lawrence Formation is overlain by the Jordan Sandstone.

***Franconia Aquifer* -** The Franconia Formation is often lumped together with Ironton-Galesville Sandstones (as the FIG Aquifer) or with the overlying St. Lawrence Formation as a regional aquitard. Following recommendations from the MGS, Barr Engineering Company treated the upper portion of the Franconia Formation and the Ironton-Galesville Aquifer as two separate layers in their 2005 model for Washington County, with the lower portion of the Franconia Formation providing some type of resistance to vertical flow.

***Ironton-Galesville Aquifer* -** The Ironton-Galesville Aquifer consists of the Ironton Sandstone and the Galesville Sandstone. The Ironton-Galesville Aquifer has not been highly utilized because sufficient water supplies can be obtained from shallower units, such as the Prairie du Chien-Jordan Aquifer.

Where the Ironton-Galesville is covered by at least 50 feet of younger bedrock, hydraulic conductivity values typically range from 1.5 to 48 feet/day and average about 10 feet/day (based on specific capacity tests). In shallower conditions of burial beneath younger bedrock, interconnected fracture systems seem to develop, resulting in average hydraulic conductivity values of about 30 feet/day (Runkel et al., 2006).

***Eau Claire Formation* -** The Eau Claire Formation is a substantial confining unit, consisting of 60 to 110 feet of low-hydraulic conductivity siltstone, shale, and silty sandstone. Its thickness in the Lake Elmo area ranges from 85 to 110 feet and averages almost 100 feet. The Eau Claire Formation subcrops beneath glacial deposits near the St. Croix River in southern Washington County.

***Mt. Simon-Hinckley Aquifer* -** The Mt. Simon Sandstone and the Hinckley Sandstone are generally not differentiated from one another for hydrogeologic purposes and are considered to function as a single aquifer. The Mt. Simon-Hinckley Aquifer is not as well connected to major rivers and streams in the region (compared to other aquifers of younger formations), principally because the overlying Eau Claire Formation is a substantial and areally extensive aquitard. Data on groundwater movement in the Mt. Simon-Hinckley Aquifer is limited but flow is generally different from the overlying aquifers – flowing west-northwest to the pumping centers of the central cities area in southern Washington County. Lake Elmo Well 1 (208448) is open across multiple aquifers, from the base of the Jordan to the Mt. Simon Aquifer.

2. Delineation of the Wellhead Protection Area

2.1. Criteria Used to Delineate the Wellhead Protection Area

The following discussion presents the information used to address the five criteria for delineating a WHPA, as specified under Minnesota Rules 4720.5510.

2.1.1. Time of Travel

A minimum ten-year time of travel criteria must be used to determine a wellhead protection area in order to provide sufficient reaction time to address potential sources of contamination that may have potential health impacts on the users of the public water supply. A time of travel of ten years was considered in this study.

2.1.2. Flow Boundaries

To accurately delineate the WHPAs, it is necessary to assess the effects that nearby wells, streams, lakes, and variations in geologic conditions may have on groundwater flow directions and velocities. The WHPAs for the city wells open to the Prairie du Chien Group, Jordan Sandstone, and/or FIG Aquifers were delineated using a regional groundwater flow model developed by Barr for Washington County (Barr, 2005). The model takes into account regional flow boundaries (i.e., aquifer limit, streams, and aquifer recharge), spatial variations in aquifer properties, and the effect of high-capacity wells.

Local geological features were also included in the model. The buried bedrock valley was represented in the model by variable model layer elevations that mimic how aquifer thickness varies across the area. In areas where the aquifer has been completely eroded, an hydraulic conductivity inhomogeneity that represented the properties of the fill material was added. In addition, local surface water features, such as Lake Elmo, Lake Demontreville, Lake Jane, and Lake Olson, were re-digitized and explicitly included in the local model.

The WHPA for the lower portion of Well 1 (208448), open to the Mt. Simon Sandstone Aquifer, was delineated using the regional groundwater flow model developed by the Minnesota Pollution Control Agency (MPCA). This model also takes into account regional flow boundaries (i.e., aquifer limit and aquifer recharge), spatial variations in aquifer properties, and the effect of high-capacity wells.

Flow in the Prairie du Chien Group could be dominated by secondary porosity, owing to the occurrence of fractures, joints, and solution cavities, and may not be accurately described by models based on the porous media assumption. For this reason, a separate approach to delineation (i.e., fracture flow delineation) also was considered.

2.1.3. Daily Volume of Water Pumped

Historical pumping data was acquired from the City of Lake Elmo or from the Minnesota Department of Natural Resources (DNR). The previous five years of data, reported to the DNR under Groundwater Appropriations Permit No. 611031, is summarized in Table 2. The largest annual withdrawal for the period 2001-2005 was 64.7 million gallons in 2003.

The City of Lake Elmo indicated that a greater annual volume of water will be used in the next five years and this volume is also listed in Table 2. This latter volume (162.6 millions gallons) was apportioned to each well, based on historical pumping, and used to determine the well's WHPA delineation.

2.1.4. Groundwater Flow Field

For this study, the ambient direction of groundwater flow in the Prairie du Chien-Jordan Aquifer was estimated, based on the piezometric map from Plate 5 of the Washington County Atlas (Swanson and Meyer, 1990). Groundwater in the Prairie du Chien-Jordan Aquifer flows to the southeast in the northeastern portion of the City of Lake Elmo. Groundwater in the FIG Aquifer also flows to the southeast. Groundwater in the Mt. Simon Aquifer has a different pattern and flows to the southwest, toward a cone of depression created by the major pumping centers in the City of St. Paul. Locally, groundwater is diverted toward Lake Elmo Well 1 (208448) and the Anderson Corporation wells in Bayport.

2.1.5. Aquifer Transmissivity

The aquifer transmissivity of the Prairie du Chien-Jordan Aquifer was estimated from data collected during aquifer testing performed by the City of Oakdale and the MDH on Oakdale Municipal Well 5 (127287) on October 15 and 16, 1998. The transmissivity for the Jordan Sandstone ranged from 6,000 feet^2/day to 7,470 feet^2/day. The average thickness of the Jordan Sandstone is 93 feet, yielding hydraulic conductivities ranging from 64 feet/day to 80 feet/day. A value of 75 feet/day was used around the Lake Elmo well field for the delineation.

Transmissivities of 1,100 feet^2/day and 2,710 feet^2/day were assumed in the MPCA Metro Model for the FIG and Mt. Simon Aquifers, respectively, based on a literature search. These values correspond to a thickness of 197 feet and an hydraulic conductivity of 5.6 feet/day for the FIG, and a thickness of

197 feet and an hydraulic conductivity of 13.8 feet/day for the Mt. Simon. The Barr Model was originally calibrated with an hydraulic conductivity of 54.1 feet/day for the Ironton-Galesville. This value is almost ten times larger than that used in the Metro Model. The Barr Model was recalibrated for an hydraulic conductivity of 5.6 feet/day for the Ironton-Galesville, similar to that used in the MPCA Metro Model. This latter value is close to the average hydraulic conductivity of 10 feet/day derived from specific capacity tests data and reported by Runkel et al. (2006) for deep bedrock conditions.

2.2. Method Used to Delineate the Wellhead Protection Area

Two groundwater models were used to delineate the wellhead protection areas. Layers 4 and 5 of the analytical element Metro Model developed by the MPCA were used for delineating the capture zone of the Mt. Simon portion of Well 1 (208448). The South Washington County Model developed by Barr for Washington County was modified, re-calibrated, and used to delineate the WHPA for Well 2 (603085) and the upper portion of Well 1 (208448) that is screened in the Jordan Sandstone through the FIG. A detailed description of the models used is provided below.

The models are based on the fundamental assumption that the simulated aquifers behave as porous media. Flow in the Prairie du Chien Group could be dominated by secondary porosity, owing to the occurrence of fractures, joints, and solution cavities, especially in shallow bedrock settings. For this reason, fracture flow delineation also was utilized.

2.2.1. Porous Media Approach Delineation

Delineation Method for the Lower Portion of Well 1 (208448) **-** The Metro Model is a regional groundwater flow model encompassing the Twin Cities seven-county Metropolitan area and was developed by staff of the MPCA Division of Environmental Outcomes (Seaberg, 2000; Hansen and Seaberg, 2000). It uses the Multi-Layer Analytic Element Model (MLAEM) software, based on the analytic element method pioneered by Professor Otto D.L. Strack of the University of Minnesota Civil Engineering Department.

The complete MPCA Metro Model simulates multi-aquifer groundwater flow and is based on a conceptual model that consists of five aquifer layers, four of which represent bedrock units. These units consist of 1) Glacial Drift Aquifer [Layer 1], 2) St. Peter Sandstone [Layer 2], 3) Prairie du Chien-Jordan Aquifer [Layer 3], 4) Franconia-Ironton-Galesville Aquifer [Layer 4], and 5) Mt. Simon-Hinckley Aquifer [Layer 5]. Separate groundwater simulations exist for all five layers that occur within three hydrologic provinces whose boundaries are formed by the Minnesota and Mississippi Rivers.

The discharge used in the delineation at Well 1 (208448) was distributed between the Jordan Sandstone, St. Lawrence Formation, FIG, and Mt. Simon Aquifers, according to their respective transmissivities used in the models. The assumed discharge distribution is shown in Table 4. It was thus assumed that only 36.1 percent of the discharge from this well is contributed by the Jordan Sandstone and FIG Aquifers. The remaining discharge (i.e., 63.9 percent) is contributed by the Mt. Simon Aquifer. Porosities within the respective formations are provided in Table 4. Results of the 10-year capture zone delineations in the Mt. Simon Aquifer stressed by Well 1 (208448) are shown on Figure 18.

Delineation Method for Well 2 (603085) and the Upper Portion of Well 1 (208448) **-** Well 2 (603085) is open to both the Jordan Sandstone and the Prairie du Chien Group. The upper portion of Well 1 (208448) is open to both the Jordan Sandstone and FIG Aquifers.

Barr (2005) developed a groundwater MODFLOW model of the major aquifers in southern Washington County. This groundwater model was developed primarily to predict the effects of proposed water-supply wells that are planned for the western portion of the City of Woodbury. The model consists of eight layers that represent, from top to bottom, the following units: (1) surficial aquifer of glacial deposits; (2) St. Peter Sandstone; (3) Shakopee Formation of the Prairie du Chien Group; (4) Oneota Dolomite of the Prairie du Chien Group (aquitard); (5) Jordan Sandstone; (6) St. Lawrence Formation (aquitard); (7) Upper Franconia Formation; and (8) Ironton-Galesville Aquifer. The groundwater model was calibrated to steady-state water levels. The hydrostratigraphic column within the Metro area and the associated model layer correspondence are provided in Table 3.

The regional model extends to the natural hydraulic boundaries, the Mississippi River to the west and south and the St. Croix River to the east. These river boundaries, along with wells, lakes, and infiltration, provided the model boundary conditions (Figure 12).

A review of the Barr Model revealed that it was originally calibrated with a horizontal hydraulic conductivity of 4.3 feet/day for the Franconia and 54 feet/day for the Ironton-Galesville. The Metro Model used for the hydraulic conductivity of the combined FIG Aquifer had a value almost ten times smaller than that used by Barr for the Ironton-Galesville Aquifer. Runkel et al. (2006) reported an average hydraulic conductivity of 10 feet/day for the Ironton-Galesville Aquifer in deep bedrock conditions, similar to those encountered in the Lake Elmo area. The MPCA value was based on a review of pumping test data. The value by Runkel et al. was based on specific capacity tests, while the hydraulic conductivity of the Ironton-Galesville was set by automated calibration in the Barr Model.

The regional Barr Model was modified to include an hydraulic conductivity of 5.6 feet/day for the Ironton-Galesville, similar to that used in the MPCA Metro Model and close to that reported by Runkel et al.

The pumping well file was also modified to reflect more accurate data from the MDH County Well Index (CWI) database. The DNR water appropriation data was also used to update pumping rates for these wells. Pumping rates averaged over the last 10 years were used rather than the 2002 data, as was done by Barr. It should be noted that this last modification did not have any significant influence on the calibration. Based on the existing uncertainty in the head data, one could have proceeded either way.

The regional model was calibrated to the targets used by Barr (2005). The calibration of the regional model was performed using a manual trial-and-error procedure by changing the recharge rates and comparing modeled piezometric heads against measured values at observation well locations, until a satisfactory fit was obtained. The graphs of computed versus observed piezometric heads are

displayed on Figure 13. A more quantitative measure by which to evaluate the success obtained during calibration is to compare the mean root, mean square of the residuals (RMSE) and the maximum observed head difference across the model. A usually accepted calibration target is a RMSE that represents less than 15 percent of the total head change across the modeled area. For the present calibration, the RMSE is less than 8 percent of the maximum observed head difference across the model (Figure 13). The modeled groundwater elevation contour maps for the Prairie du Chien Group and the Jordan Sandstone are depicted in Figure 14. The head contours for the Franconia Formation and the Ironton-Galesville Sandstones are depicted in Figure 15.

A local telescopic model populated with the updated model parameters was used to delineate the wellhead protection area (Figure 12). The local model has a constant grid spacing of 50 m. The calibrated regional model provided the boundary conditions at the head-specified cells along the model boundaries. After construction, the refined model calibration was verified. The graph of computed versus observed piezometric heads are displayed on Figure 13 for the combined observations in Layers 1 through 8, along with the calibration statistics. The modeled groundwater elevation contour maps for the Prairie du Chien Group and Jordan Sandstone are depicted in Figures 16A-16D. The head contours for the FIG Sandstones are depicted in Figure 17.

Prior to its use in the delineations, the following modifications were incorporated in the refined model:

- A local area of modified horizontal conductivity was included in the model to reflect the transmissivity obtained from the City of Oakdale pump test. The Jordan Sandstone was assigned an hydraulic conductivity of 75 feet/day.
- Lake Elmo, Lake Demontreville, Lake Jane, and Lake Olson were re-digitized and modeled as head-specified boundaries.
- The pumping rates from Table 2 were distributed across the different layers according to the model layer transmissivities (Table 4).

The delineation was performed by backtracking particles from the wells to a 10-year time of travel using the particle tracking MODPATH code. A series of 250 particles (more than 50 in each layer) were launched at each well. A porosity of 9 percent was used for the Prairie du Chien Group and a porosity of 20 percent was used for the Jordan Sandstone. A porosity of 25 and 28 percent was used for the drift and the St. Peter Sandstone, respectively (Table 4). Results of the 10-year time of travel capture zone are shown on Figure 18.

2.2.2. Fractured Rock Approach Delineation

The secondary porosity features that dominate the porosity of the Prairie du Chien Group require additional analysis as part of the WHPA delineation. The draft MDH guidance was used to make the fracture flow WHPA assessment (MDH, 2005). Well 2 (603085) is completed in both the Prairie du Chien Group and the Jordan Sandstone. A calculated fixed radius (CFR) calculation, in conjunction with hydrogeological mapping techniques, was used to make the supplemental fracture flow analysis (cf., Technique 3 of the draft guidance; MDH, 2005a). The hydraulic gradient in the Prairie du Chien Group near Well 2 (603085) is greater than 0.001 (i.e., 0.003 feet/foot, Figure 16A). The pumping was apportioned based on the respective thicknesses of the Prairie du Chien Group and Jordan Sandstone at Well 2 (603085). It was assumed that 54 percent of the pumped volume at Well 2 (603085) comes from the Prairie du Chien Group. The CFR with its upgradient extension is shown in Figure 19. The parameters used in the determination of the CFR and its extension are given in Table 5.

No fracture flow delineation was needed for Well 1 (208448) because the total leakage from the Prairie du Chien Group contributing to the well's capture, as inferred from the groundwater model results, represents less than 5 percent of the well's discharge.

2.3. Uncertainty Analysis

Groundwater models were used to delineate the City of Lake Elmo capture zones. These models tried to incorporate the salient features that make up the complex hydrogeologic setting of the Lake Elmo area. These models, however, are based on the assumption that the flow in the simulated aquifers can be approximated by that in porous media, and that the parameters describing the aquifer properties are known with a degree of certainty.

The 10-year travel time capture zone delineated for Lake Elmo Wells 1 (208448) and 2 (603085) for the base-case scenario used transmissivities estimated from a pumping test conducted at Oakdale municipal Well 5 (127287). The pumping test conducted yielded a tight range in the transmissivity of the Jordan Sandstone in that area. However, this well is located more than 4.2 miles from Lake Elmo Well 1 (208448), and more than 6.3 miles from Lake Elmo Well 2 (603085). As a result, the conditions at the Oakdale well may not be representative of those occurring near the Lake Elmo wells.

In addition, uncertainty exists as to the hydraulic conductivity of the FIG Aquifer. To assess the impact of this uncertainty on the computed capture zone, a sensitivity analysis was performed by increasing (decreasing) the values of horizontal hydraulic conductivities of the Prairie du Chien Group, Jordan Sandstone, and FIG by 50 percent. The changes in the delineated WHPA due to these variations are depicted in Figure 19. As expected, the WHPA is fairly sensitive to the increase in horizontal hydraulic conductivity. A larger value of the horizontal hydraulic conductivity yields a thinner but more elongated WHPA.

As discussed earlier, the porous media assumption may not hold true, at least for the Prairie du Chien Group. Flow in the Prairie du Chien Group near Well 2 (603085) could be dominated by secondary porosity, owing to the occurrence of fractures, joints, and solution cavities, especially in shallow bedrock settings. To err on the conservative side, the delineation of the 10-year time of travel capture zone for Well 2 (603085) was also conducted using the fractured rock approach. The fractured rock approach delineation uses more conservative assumptions. It assumes that the porosity of the Prairie du Chien Group is only 5 percent. As a result, it yields larger delineations that often include all delineations based on porous media assumptions.

2.4. Composite Wellhead Protection Area

The final wellhead protection areas for the City of Lake Elmo wells are constructed as a composite of the WHPAs derived from the porous media approach delineation (augmented by the areas defined in the uncertainty analysis, as described in Section 3.3), and the fractured flow delineation approach. The proposed WHPAs are depicted in Figures 1A and 1B.

2.5. Conjunctive Delineation

A conjunctive delineation involves considering surface waters in making the final wellhead protection area delineation for wells under the influence of surface water. The consideration of a conjunctive delineation is usually triggered whenever a surface water feature occurs within a highly vulnerable portion of the delineated capture zone (MDH, 2005b). In the case of Lake Elmo, there are no such areas.

Lake Elmo appears to intersect the capture zone (Figure 19) of Well 1 (208448). However, the capture zone that extends closest to the lake in Figure 19 is that of the Mt. Simon Aquifer, which is encountered at greater depth than the Jordan Sandstone or Prairie du Chien Group Aquifers, and protected by more than 100 feet of the confining Eau Claire Formation.

There is also a pond, within an area of high vulnerability, just west (and outside) of the fractured flow delineation for Well 2 (603085). The hydraulic connection between this pond and the horizon in which Well 2 (603085) is open in the Prairie du Chien Group is unknown. Well 2 (603085) is completed in the combined Prairie du Chien-Jordan at depths of about 182 to 285 feet. The distance to the well open hole through overlying unconsolidated materials and bedrock offers some hydraulic separation. The groundwater model indicated that the recharge occurring within the fracture flow capture zone does not sink sufficiently to reach Well 2 (603085). The recharge water contributing to Well 2 (603085) originates further upstream of the pond.

Nitrate was detected in Well 2 (603085) at a maximum concentration of 2.6 mg/l. However, this level could as well be associated with the moderate vulnerability status within the DWSMA.

Although a conjunctive delineation is not warranted, recommendations are made in Section 6 to further investigate the potential influence of the pond on Lake Elmo Well 2 (603085).

3. Delineation of the Drinking Water Supply Management Area

The proposed Drinking Water Supply Management Areas (DWSMAs) are shown on Figures 1A and 1B. The DWSMAs were defined by using city streets, highways, and public land survey section lines.

4. Vulnerability Assessment

4.1. Assessment of Well Vulnerability

This part documents the vulnerability of the wells used by the public water supplier and is required under Minnesota Rules 4720.5210. The protocol for determining well vulnerability is defined in the MDH document entitled *Methodology for Phasing Wells into Minnesota's Wellhead Protection Program* (1998), which was approved by the U.S. Environmental Protection Agency as part of its review of Minnesota's wellhead protection program description. The MDH uses the protocol to maintain a database defining the potential vulnerability of community and noncommunity water supply wells. A score is calculated for each well using 1) construction criteria defined in the State Well Code, 2) geologic sensitivity, and 3) the results of water quality monitoring conducted by the MDH. A numeric score is assigned to each well based on the results of the three areas of evaluation. A cutoff score is used to define wells that are most likely to be vulnerable based on their construction, geologic setting, and sampling history. The printouts of the vulnerability ratings for each well are presented in Appendix B.

Based on the results of the well vulnerability assessments:

- Well 1 (208448) is not considered potentially vulnerable due to its construction and/or geologic conditions at the well site. Well 1 (208448) meets current well construction standards and, therefore, the well does not serve as a potential pathway for contamination to enter the public water supply system.

- Well 2 (603085) is considered potentially vulnerable due to its construction and/or the geologic conditions at the well site. Well 2 (603085) meets current well construction standards and, therefore, the well does not serve as a potential pathway for contamination to enter the public water supply. However, the presence of nitrate at low levels in historical samples from the well could indicate that the well pumps groundwater that is, or may be, impacted by human activities. As such, the well is considered potentially vulnerable to contamination.

4.2. Vulnerability Assessment for the Drinking Water Supply Management Area

The Prairie du Chien-Jordan Aquifer was evaluated for its vulnerability to contamination throughout the extent of the DWSMA on the basis of geologic logs from wells, and chemical data described in this report. Six geologic cross-sections that pass through the City of Lake Elmo wells were constructed (Figures 5 to 11). In addition, geologic logs for the wells in Figure 21were reviewed for the presence of low hydraulic conductivity material cover (i.e., clay) in the overlying quaternary deposits.

The vulnerability ratings of the bedrock aquifers within the DWSMAs reflect the likelihood that water, and any associated contamination, can reach the aquifers within a given time period via vertical infiltration. This was done in accordance with the DNR guidance for assessing geologic sensitivity (DNR, 1991), as recommended by MDH for vulnerability assessments in DWSMAs:

- A vulnerability rating of high suggests travel times on the order of weeks to years. This rating is applied where the aquifer has little to no effective geologic protection and the water table is greater than 20 feet from the land surface. Overlying clay is generally not present unless it is either very thin (less than 10 feet) or is restricted to the uppermost 10 feet, where it is likely compromised by weathering and secondary porosity. If it extends below 10 feet, it is described as weathered (e.g., yellow) on drillers' logs. This description fits the high vulnerability areas for Lake Elmo Well 2 (603085), depicted in Figure 22. Relatively rapid recharge can be expected to the Prairie du Chien-Jordan Aquifer in these areas, due to the lack of geologic protection.
- A vulnerability rating of moderate implies travel times on the order of years to decades. This rating is applicable where overlying geologic protection is present, but must include at least a 20-foot thickness of sandy clay or clay with some other coarser grained material, or wells finished in the underlying aquifer show the presence of relatively young water based on methods such as tritium analysis. The logs for the CWI wells seem to indicate the presence of gravelly or bouldery clay till, ranging in thickness from 20 to 140 feet, but generally around 40 to 80 feet. Most of the DWSMA for Well 1 (208448) fits this description and can be rated moderately vulnerable to contamination (Figure 22).

The vulnerability maps of the two DWSMAs are shown in Figure 22.

5. Conclusions and Recommendations for Future Improvements

The WHPAs were delineated using conservative pumping rate assumptions. Maximum observed or projected pumping rates were used for each city well as if the wells were continuously pumping at these maximum rates. These pumping conditions rarely occur simultaneously or, if they occur simultaneously, will only prevail for a limited amount of time (i.e., generally for hours or, at the maximum, days at a time). The WHPA delineation rules call for the use of these maximum pumping conditions as if they exist continuously during the whole 10-year period on which the delineation is

based. The assumption that these extreme pumping conditions exist simultaneously and on a continuous basis, provides for an additional safety factor that is built in the WHPA delineation process to offset the uncertainty that always exists when natural hydrogeological settings and processes are modeled.

The delineation of the 10-year time of travel capture zone for Well 2 (603085) is sensitive to the nature of the actual flow in the Prairie du Chien Group. To err on the conservative side, a fracture flow delineation also was used that applied more conservative assumptions.

The WHPA delineations also tried to account for uncertainties in transmissivity values around Wells 1 (208448) and 2 (603085). However, as with all WHPAs, these delineations are based on the best information obtainable at the time and should be re-evaluated as new information becomes available. Specific recommendations for future improvements to these delineations are:

- **Recommendation 1: Surface water/Groundwater Exchange**

  Because of uncertainty about the interconnection between the pond in the high vulnerability area and the water pumped by Lake Elmo Well 2 (603085), the city and MDH should investigate the importance of pond water in the well. The MDH will assist the city with interpreting the data collected as a result of implementing this recommendation. MDH recommends using the investigative techniques described below to determine surface water and groundwater interactions.

  The city and MDH should collect water samples from City Well 2 (603085) and the pond and have them analyzed for stable isotopes of oxygen (O^{18}) and deuterium (H^2). MDH will pay for the analytical costs. The deviation from the Global Meteoric Water Line, if any, would be indicative of mixing with surface water from the pond, for which a strong evaporation signature is expected.

- **Recommendation 2: Contribution of Shallow Versus Deep Aquifers in Lake Elmo Well 1 (408448)**

  An assumption was made on the amount of water pumped from the aquifers at Lake Elmo Well 1 (208448). The pumping rate was distributed across the different aquifers based on assumed aquifer transmissivity. Future improvement should include refining the determination of the water pumped at Well 1 (208448) from the Prairie du Chien-Jordan, FIG, and Mt. Simon Aquifers.

  We recommend including a monitoring program in Part II of the WHP plan for the City of Lake Elmo wells to investigate the relative contribution of the deep aquifers. This plan should include collecting samples from Lake Elmo Wells 1 (208448) and 2 (603085) and analyzing for tritium. The well water should be analyzed for its tritium content using an enriched detection method to determine whether there is a significant component of aquifer water coming from the infiltration of precipitation. No tritium was detected in the FIG well in nearby Bayport. If we assume no tritium is present in the FIG and Mt. Simon Aquifers at Lake Elmo Well 1 (208448) and that the tritium concentration measured in Lake Elmo Well 2 (603085) is representative of the Prairie du Chien-Jordan Aquifer, a mass balance approach performed on the tritium concentration measured at Well 1 (208448) can help bracket the relative contribution of the FIG and Mt. Simon Aquifers to Well 1 (208448).

- **Recommendation 3: Subsurface Condition**

  Future improvement of the model should include revisiting the modeled hydraulic conductivities near Well 1 (208448) whenever new aquifer test data, closer than Oakdale Well 5 (127287), is available.

  Deep wells installed in the area should have their logs evaluated to address deficiencies in the distribution and quality of subsurface geologic information. In particular, the City of Lake Elmo should verify the locations of wells that are constructed within a two-mile radius of the DWSMAs as part of the process for amending their WHP plan. The MDH compiles the records for newly constructed wells because water well contractors submit this information to MDH. The City of Lake Elmo should also verify the locations of these wells.

6. Selected References

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Page 2

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Tables

TABLE 1

Wells Used by the Public Water Supplier
City of Lake Elmo

Well No.	Unique No.	Well Use	Aquifer Type	Well Depth (ft)	Well Sensitivity	Aquifer Sensitivity
00208448	Well 1	Primary	Bedrock	808.0	See (2)	Low
00603085	Well 2	Primary	Bedrock	285.0	See (1)	High

1. The well is susceptible to contamination because it does not meet current construction standards or no information about well construction is available, regardless of aquifer sensitivity.

2. The well is not susceptible because it meets well construction standards and does not present a pathway for contamination to readily enter the water supply.

TABLE 2

City of Lake Elmo Water Use Information
Lake Elmo, MN

Well Name	Unique Number	2001	2002	2003	2004	2005	Projected 2010 Withdrawal (gal/yr)	Withdrawal used in WHPA (gal/yr)	WHPA Withdrawal Instantaneous Pumping Rate (m^3/day)
Well 1	**208448**	40,303,100	41,696,200	45,902,600	39,792,400	39,581,300	**108,421,655**	**108,421,655**	**1123.7**
Well 2	**603085**	0	924,000	18,826,000	16,152,000	16,455,000	**54,216,195**	**54,216,195**	**561.9**
Total (gallons)		40,303,100	42,620,200	64,728,600	55,944,400	56,036,300	**162,637,850**	**162,637,850**	**1685.6**
Total (MGY)		40.303	42.620	64.729	55.944	56.036	**162.638**	**162.638**	**1,685.6**

Notes: 2010 projected use estimates are based on discussion with Lake Elmo's planner (Dillerud, personal communication). Bold numbers represent highest discharge used for model.

TABLE 3

Hydrostratigraphic Column for Southern Washington County and Model Layer Definition for Barr's South Washington MODFLOW Model Lake Elmo, MN

GEOLOGIC UNITS	DESCRIPTION	HYDROSTRATIGRAPHIC UNIT	MODFLOW Model Layer
Glacial Drift/Recent Alluvium	mostly silt, sand, and gravel with till lenses and lake deposits	Aquifer with some local aquitard units	Typically Layers 1 & 2
Decorah Shale	glauconitic shale	Aquitard	Not in model
Platteville Formation and Glenwood Shale	massive to thinly bedded, fractured dolomite & shale	poorly transmissive aquifer to aquitard	Not in model
St. Peter Sandstone	upper 100 feet is uniform fine sandstone; lower 50 feet is shale	Aquifer	Typically Layer 2
		Aquitard	Leakance on Layer 2
Prairie du Chien Group	Shakopee Fm (upper unit) contains zones of highly fractured rock; Oneota Dol. (lower) is massive	Aquifer (Shakopee)	Typically Layer 3
		Aquitard (Oneota)	Typically Layer 4
Jordan Sandstone	medium sandstone with fractures and some cementation	Aquifer	Typically Layer 5
St. Lawrence Formation	dolomitic shale	Aquitard	Typically Layer 6
Franconia Formation	calcareous sandstone to shaley sandstone	Aquifer (upper Franconia)	Typically Layer 7
		Aquitard (lower Franconia)	Leakance on Layer 7
Ironton-Galesville Sandstones	fine to medium sandstone	Aquifer	Layer 8
Eau Claire Formation	dolomitic shale	Aquitard	Not in model
Mt. Simon and Hinckley Sandstones	sandstone	Aquifer	Not in model
Precambrian Crystaline Rocks	undifferentiated crystalline and volcanic rocks	Aquitard	Not in model

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TABLE 4

Discharge Distribution Within Model
Lake Elmo, MN

Model Layers	Formation	Porosity		Discharge - Well 1 (208448) (m^3/day)	Discharge - Well 2 (603085) (m^3/day)
Layer 1	Glacial Deposits	25%			
Layer 2	St. Peter Sandstone	28%			
Layer 3	Prairie du Chien/Shakopee	9%			303.4
Layer 4	Prairie du Chien/Oneota	9%			
Layer 5	Jordan Sandstone	20%	$Q_{\text{Jordan Sandstone}}$	159.7	258.5
Layer 6	St. Lawrence Formation	16%	$Q_{\text{St. Lawrence Formation}}$	2.5	
Layer 7	Franconia Formation	28%	$Q_{\text{Franconia Formation}}$	144.7	
Layer 8	Ironton Galesville	28%	$Q_{\text{Ironton Galesville}}$	99.1	
			$Q_{\text{Jordan, FIG}}$	406.0	561.9
	Mt. Simon	22%	$Q_{\text{Mt. Simon}}$	717.7	
			Total Q	**1123.7**	**561.9**

TABLE 5

Parameter Used in the Fracture Flow Capture Zone Delineation
Lake Elmo, MN

Q (m^3/day)	10-yr (days)	PI	n	Thickness (m)	Projection	Bearing (In Degrees Clockwise from North)	Volume (m^3)	Area (m^2)	Radius (m)
303.4	3,650	3.142	0.05	26.5	1.57 x Radius	277	50,607,315	1,909,710	511

Figures

Appendix A - Well Logs

Unique Well Number	County	Quad	Quad Id
208448	Washington	Lake Elmo	102B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

MINNESOTA STATUTES CHAPTER 1031

Entry Date 1989/07/11
Update Date 2005/03/11
Received Date

Wellname LAKE ELMO 1

Township	Range	Dir	Section	Subsection	Field Located Elevation	MGS
29	21	W	13	CBCDA		935,00 ft.

Well Owner LAKE ELMO 1
3303 LANGLY CT
LAKE ELMO MN 55042 Changed

Contact CITY OF LAKE ELMO
3800 LAVERN AV N
LAKE ELMO MN 55042 Changed

Description	Color	Hardness	From	To (ft.)
SANDY CLAY			0	12
SAND			12	32
SAND & GRAVEL			32	72
CLAY	BROWN		72	82
CLAY	BLUE		82	97
CLAY, BROWNISH-RED			97	112
HARDPAN			112	152
FINE SAND			152	167
ROCK & CLAY			167	222
CLAY, GRAVEL & ROCK			222	253
CLAY, GRAVEL & ROCK			253	257
SANDROCK			257	272
SANDROCK & SHALE			272	297
SANDROCK & SHALE			297	307
SHALE			307	345
SHALE			345	402
SHALE & SANDROCK			402	513
SHALE & SANDROCK			513	570
SHALE & SOME SANDROCK			570	669
SHALE & SOME SANDROCK			669	682
SANDROCK & SHALE			682	748
SANDROCK			748	805

Remarks
GAMMA LOGGED & TV 11-30-1998.

First Bedrock CJDN **Aquifer** Jordan-Mt.Simon
Last Strat CMTS **Depth to Bedrock** 253,00 ft.

Well Depth 805,00 ft **Depth Completed** 805,00 ft **Date Well Completed** 1962/04/00

Drilling Method Cable Tool

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO
From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO
Diameter 20 Depth 280
20,00 in. from 0,00 to 280,00 ft. lbs/ft

Hole Diameter (in.) 20,0(To 305,0

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 280,0 to 805,0

Static Water Level (Multiple SWL)
110,00 ft. Land surface Date measured 1962/04/00

Pumping Level (below land surface)
153,00 ft. after hrs. pumping 800,00 g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☑ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☑ YES ☐ NO
Material Neat Cement From 0,0 To 280,0 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP Volts
Length of drop pipe Material Capacity g.p.m
Type Turbine

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☐ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Keys Well Co. 62012

License Business Name **Lic. or Reg No.**
JOHNSON, R.

Name of Driller **Date**

Unique Well Number 603085

County Washington
Quad Stillwater
Quad Id 118D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

MINNESOTA STATUTES CHAPTER 1031

Entry Date 2001/11/20
Update Date 2007/05/15
Received Date

Wellname LAKE ELMO 2

Township	Range	Dir	Section	Subsection	Field Located Elevation	MGS 940,00 ft.
29	20	W	6	CBBBBC		

Well Owner LAKE ELMO 2
55TH ST N
LAKE ELMO MN 55042 Changed

Contact CITY OF LAKE ELMO
3800 LAVERN AV N
LAKE ELMO MN 55042 Changed

Description	Color	Hardness	From	To (ft.)
SAND/ROCKS	BROWN	SOFT	0	48
CLAY	RED	SOFT	48	62
GRAVEL	YELLOW	SOFT	62	108
LIMESTONE	YEL/TAN	HARD	108	187
SANDSTONE	YELLOW	MEDIUM	187	197
LIMESTONE	YELLOW	HARD	197	200
SANDSTONE	YEL/ORN	MEDIUM	200	275
SHALE	GRAY	MEDIUM	275	285

Remarks
M.G.S. NO. 4168.

First Bedrock OPDC
Last Strat CSTL
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 108,00 ft.

Well Depth 285,00 ft
Depth Completed 285,00 ft
Date Well Completed 2001/09/18

Drilling Method Cable Tool

Drilling Fluid Bentonite
Well Hydrofractured? ☐ YES ☑ NO
From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☑ YES ☐ NO
Diameter 18 Depth 182
24,00 in. from 0,00 to 108,00 ft. 94,62 lbs/ft
18,00 in. from 0,00 to 182,00 ft. 70,59 lbs/ft

Hole Diameter (in.) 24,0(To 285,0

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 182,(to 285,0

Static Water Level
51,70 ft. Land surface Date measured 2001/09/05

Pumping Level (below land surface)
80,00 ft. after 8,00 hrs. pumping 1000,00 g.p.m.

Well Head Completion
Pitless adapter manufacturer _____ Model _____
☐ Casing Protection ☑ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☑ YES ☐ NO
Material Neat Cement From 0,0 To 182,0 ft. 16,00 Cubic yards

Nearest Known Source of Contamination
150 feet W Direction BOW Type
Well disinfected upon completion? ☑ YES ☐ NO

Pump
☑ Not Installed Date Installed _____
Manufacture's name _____
Model number _____ HP _____ Volts _____
Length of drop pipe _____ Material _____ Capacity _____ g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☑ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☑ NO

Well Contractor Cerfication
Keys Well Co. 62012

License Business Name **Lic. or Reg No.**
ALLAN, J.

Name of Driller **Date**

Unique Well Number	County	Quad	Quad Id
655910	Washington	Lake Elmo	102B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

MINNESOTA STATUTES CHAPTER 1031

Entry Date	2003/01/23
Update Date	2007/03/09
Received Date	

Wellname LAKE ELMO 3

Township	Range	Dir	Section	Subsection	Field Located	MDH
29	21	W	33	DDAADD	Elevation	1004,00 ft.

Well Owner LAKE ELMO 3
8650 HUDSON RD
LAKE ELMO MN 55042 Changed

Contact CITY OF LAKE ELMO
3800 LAVERNE AV N
LAKE ELMO MN 55042 Changed

Description	Color	Hardness	From	To (ft.)
SAND, GRAVEL, CLAY	BROWN	SOFT	0	90
SANDROCK	YEL/WHT	MEDIUM	90	193
LIMESTONE (BUFF)		HARD	193	340
SANDSTONE	YEL/WHT	HARD	340	418
SHALE	GRAY	MEDIUM	418	422

Remarks

First Bedrock OSTP
Last Strat CJDN
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 90,00 ft.

Well Depth 422,00 ft **Depth Completed** 422,00 ft **Date Well Completed** 2002/12/30

Drilling Method Cable Tool

Drilling Fluid Water

Well Hydrofractured? ☐ YES ☐ NO
From ft. to

Use Community Supply

Casing Type Steel (black or low Drive Shoe? ☑ YES ☐ NO
Diameter 24 Depth

30,00 in. from	0,00 to	97,00 ft.	118,76 lbs/ft		
24,00 in. from	0,00 to	281,00 ft.	94,71 lbs/ft		

Hole Diameter (in.) 29,0(To 422,0

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 281,0 to 422,0

Static Water Level
125,00 ft. Land surface Date measured 2002/12/30

Pumping Level (below land surface)
152,00 ft. after 8,00 hrs. pumping 1200,00 g.p.m.

Well Head Completion
Pitless adapter manufacturer _____ Model _____
☐ Casing Protection ☑ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☑ YES ☐ NO
Material Neat Cement From 0,0 To 281,0 ft. 32,50 Cubic yards

Nearest Known Source of Contamination
200 feet N Direction SDF Type
Well disinfected upon completion? ☑ YES ☐ NO

Pump
☑ Not Installed Date Installed _____
Manufacture's name _____
Model number _____ HP _____ Volts _____
Length of drop pipe _____ Material _____ Capacity _____ g.p.m
Type

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☑ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☑ NO

Well Contractor Cerfication
Keys Well Co. 62012

License Business Name **Lic. or Reg No.**
ALLEN, J.

Name of Driller **Date**

Appendix B – Well Vulnerability Assessments

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1820009
SYSTEM NAME: Lake Elmo
WELL NAME: Well #1

TIER: 4
WHP RANK:
UNIQUE WELL #: 00208448

COUNTY: Washington | TOWNSHIP NUMBER: 29 | RANGE: 21 W | SECTION: 13 | QUARTERS: CBC

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan-Mt.Simon	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	17	
Geologic Data From	:	Well Record	
Year Constructed	:	1961	
Construction Method	:		5
Casing Depth	:	280	5
Well Depth	:	808	
Casing grouted into borehole?		Unknown	5
Cement grout between casings?		Not applicable	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	500	5
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	1.5 05/11/2005	10
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		30
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE

Vulnerability Overridden :

COMMENTS

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1820009
SYSTEM NAME: Lake Elmo
WELL NAME: Well #2

TIER: 4
WHP RANK:
UNIQUE WELL #: 00603085

COUNTY: Washington | TOWNSHIP NUMBER: 29 | RANGE: 20 W | SECTION: 6 | QUARTERS: CBB

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Prairie Du Chien-Jordan	
DNR Geologic Sensitivity Rating	:	High	VULNERABLE
L Score	:	0	
Geologic Data From	:	Well Record	
Year Constructed	:	2001	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	182	10
Well Depth	:	285	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1000	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	2.6 08/16/2004	10
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		30
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		Jim Walsh

COMMENTS
The thin red clay in the well record was not given credit as a confining unit because it is probably leaky Superior lobe till.

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1820009
SYSTEM NAME: Lake Elmo
WELL NAME: Well #3

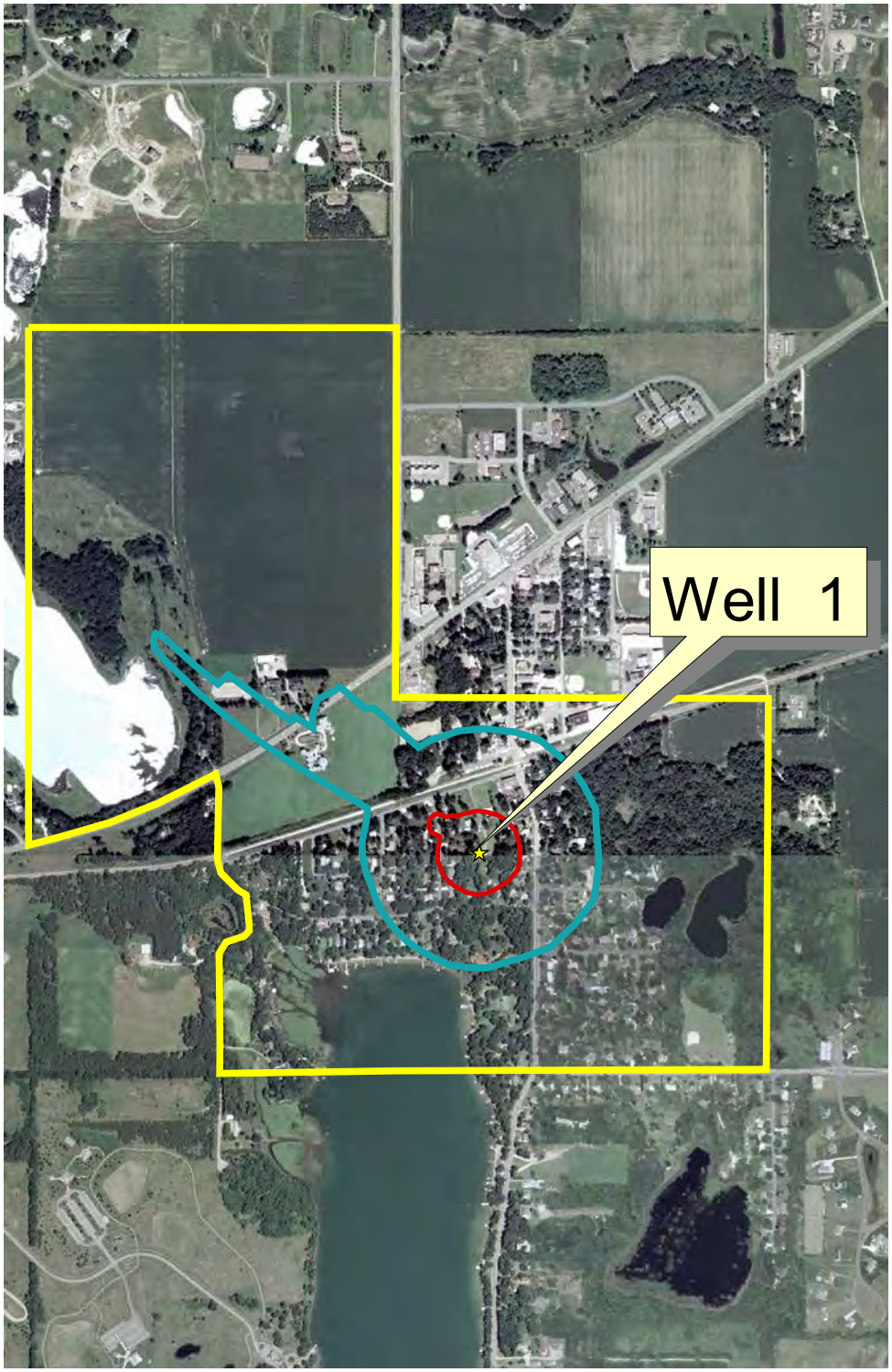
TIER: 4
WHP RANK:
UNIQUE WELL #: 00655910

COUNTY: Washington | TOWNSHIP NUMBER: 29 | RANGE: 21 W | SECTION: 33 | QUARTERS: DDA

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Prairie Du Chien-Jordan	
DNR Geologic Sensitivity Rating	:	Low	20
L Score	:	1	
Geologic Data From	:	Well Record	
Year Constructed	:	2002	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	281	5
Well Depth	:	422	
Casing grouted into borehole?		Unknown	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1200	20
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	Unknown	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		45
Wellhead Protection Vulnerability Rating	:		VULNERABLE

Vulnerability Overridden :

COMMENTS



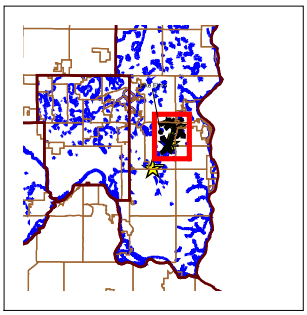
View: Figure 1 - DWSMA

- Lake Elmo Wells
- Emergency Response Area
- WHPA
- DWSMA

N

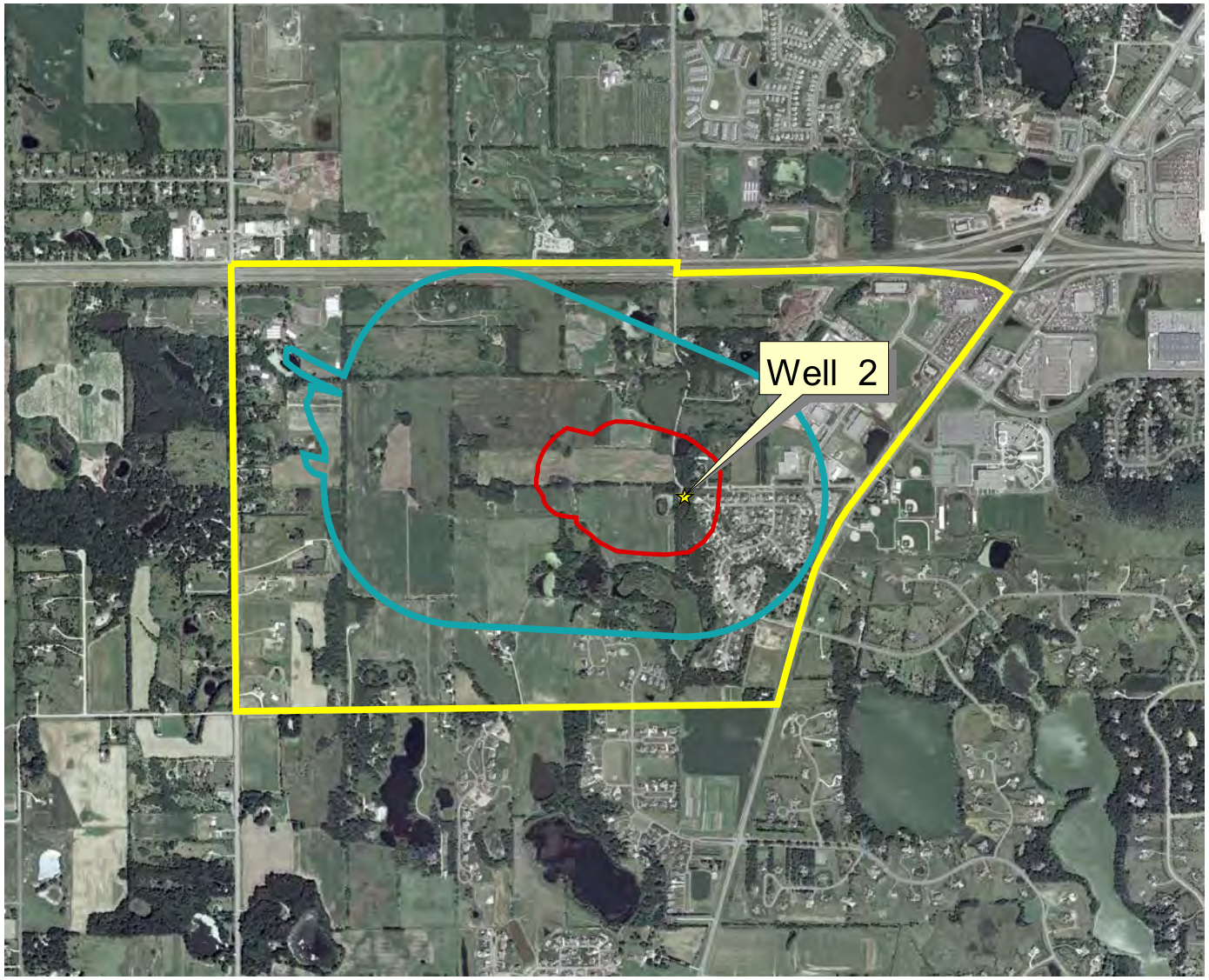
1000 0 1000 Feet

Blown-Up Area



MINNESOTA MDH DEPARTMENT OF HEALTH

Figure 1A
WELL 1 - DWSMA
(City of Lake Elmo)



View: Figure 1 - DWSMA

- Lake Elmo Wells
- Emergency Response Area
- WHPA
- DWSMA

N

1000 0 1000 Feet

Blown-Up Area

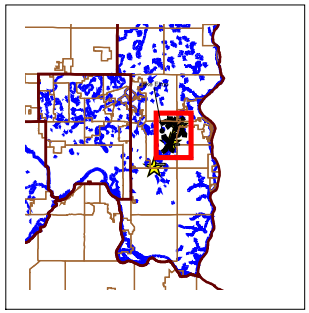


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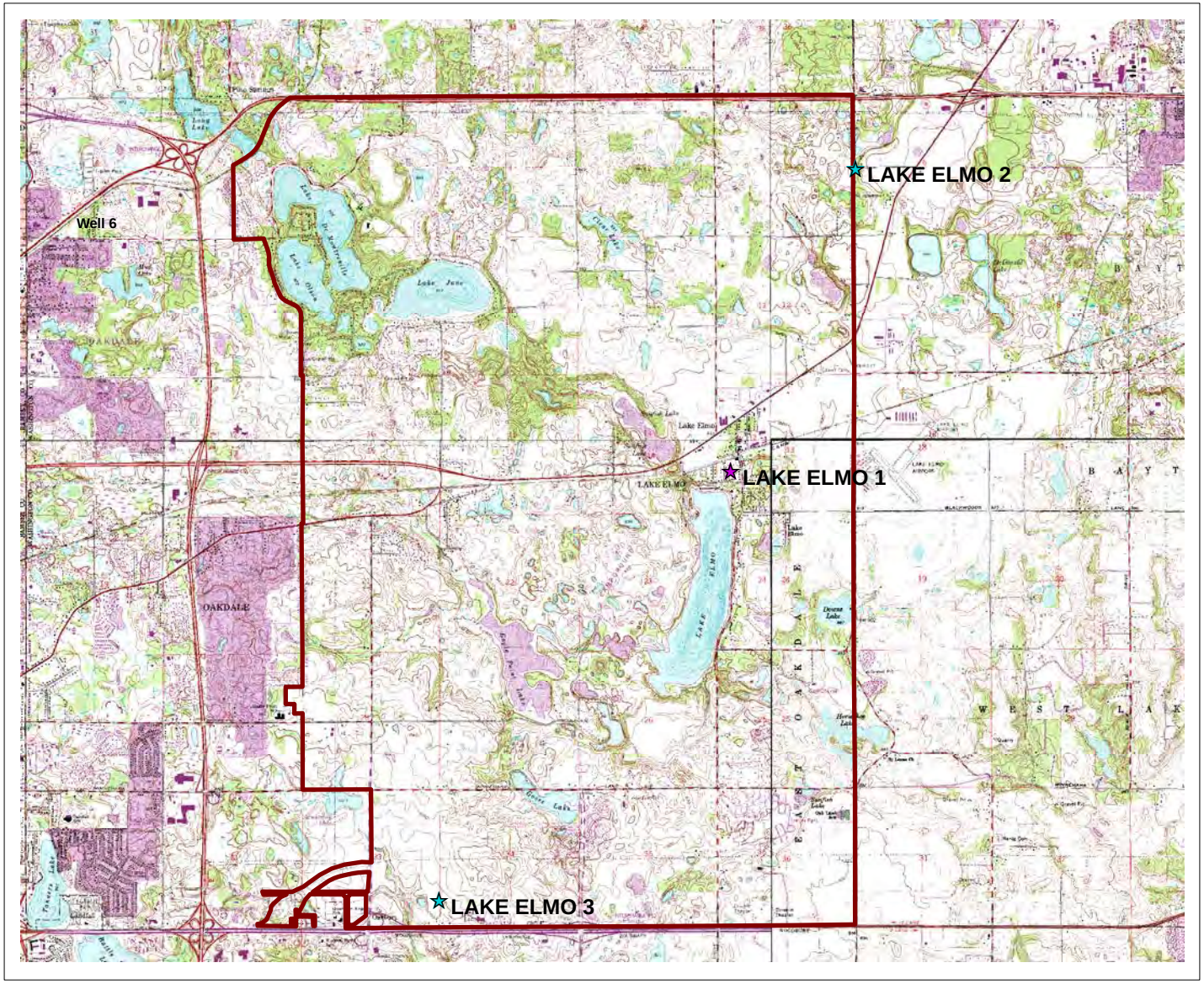
Figure 1B
WELL 2- DWSMA
(City of Lake Elmo)



View 2: Well Field

City of Lake Elmo Wells

- Jordan/Mt Simon
- Praire du Chien/Jordan
- City of Lake Elmo

0.8 0.4 0 0.8 Miles

Blown-Up Area

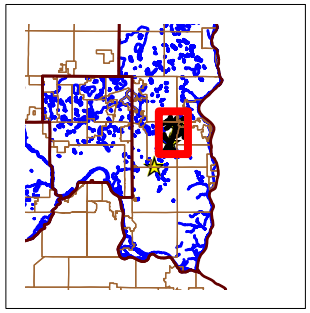


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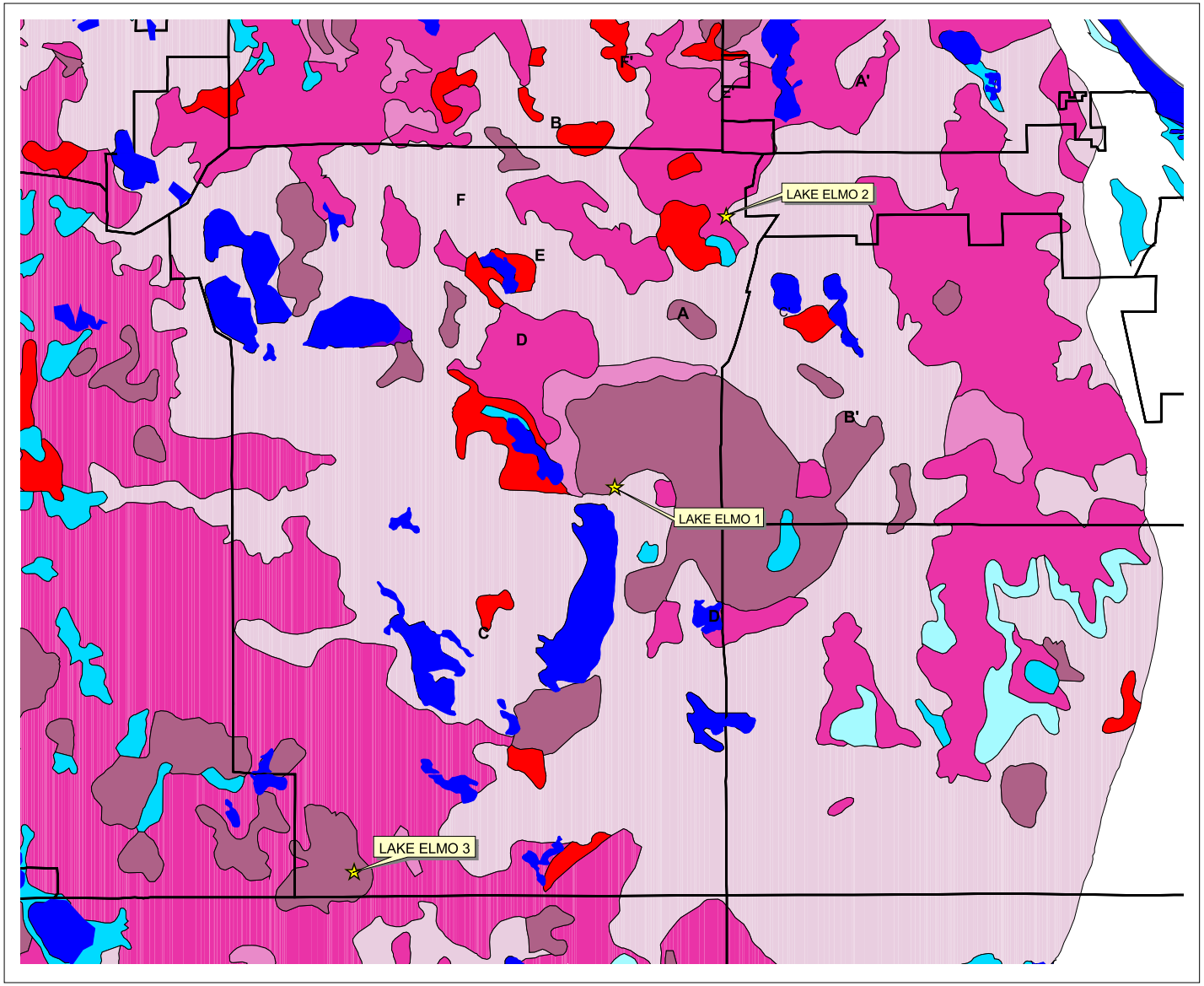
Figure 2
Well Field
City of Lake Elmo



View: Figure 3 Surficial Geology - Lake Elmo

- Lake Elmo Wells (CWI)
- Cities
- Geologic Cross-Sections

Surficial Geology

- Organic Deposits
- Lacustrine Deposits
- Superior - Lacustrine Sand and Silt
- Superior - Outwash
- Superior - Ice-contact Stratified Deposits
- Superior - Glacial Till
- Superior - Glacial Till, Sand, and Gravel
- Bedrock - Dolomite, Limestone, Sandstone, and Shale
- Water
- Modern lakes

N

4000 0 4000 Feet

Blown-Up Area

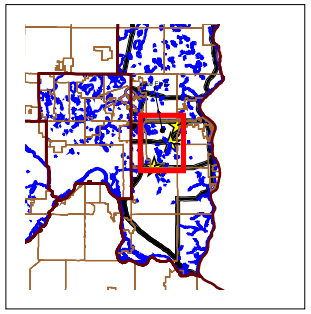


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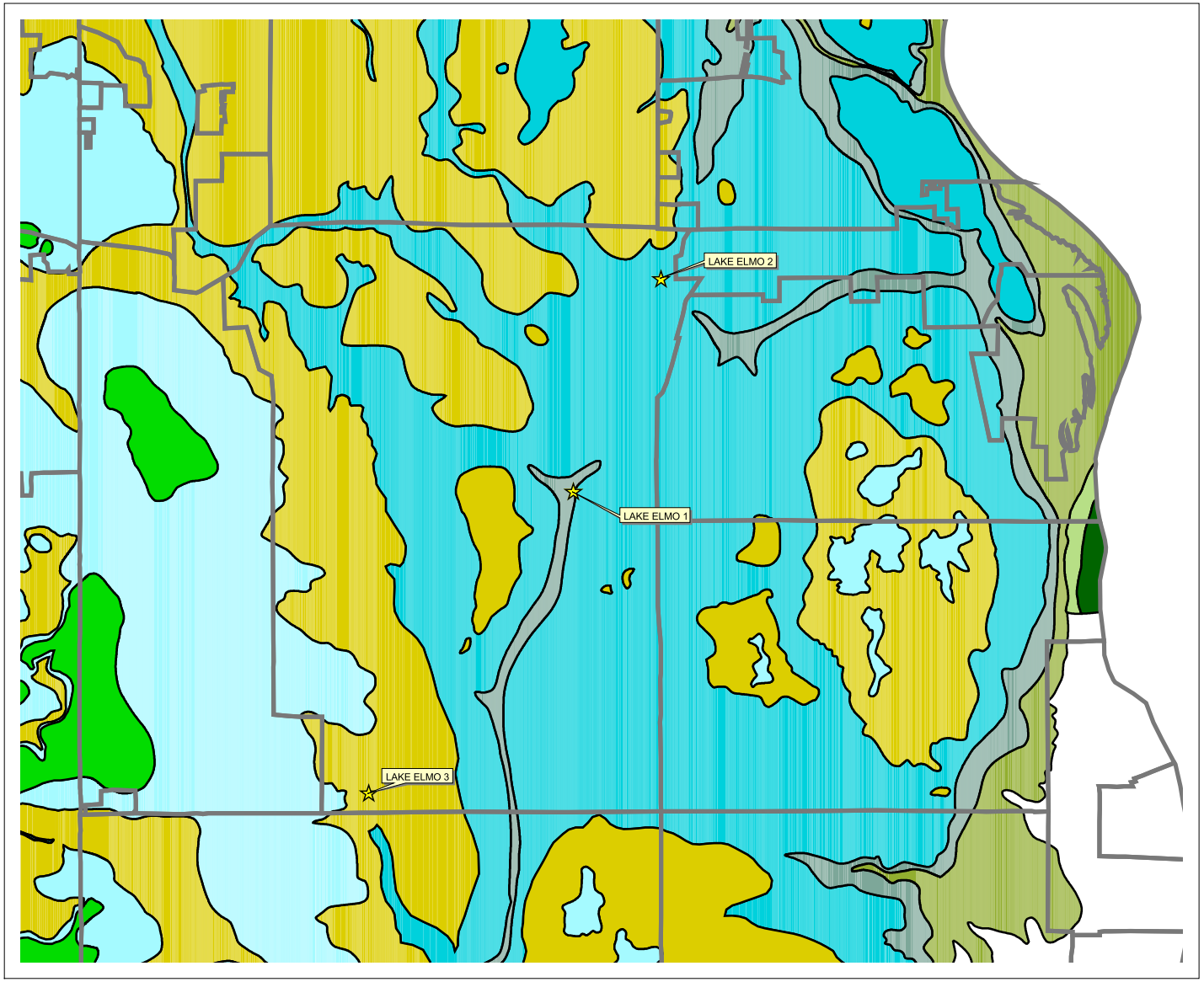
Figure 3
Surficial Geology
City of Lake Elmo



(Swanson et al., 1990)

View Figure 4 - Lake Elmo Geology

- Lake Elmo Wells (CWI)
- Counties
- Cities

Bedrock Metro MGS

- Decorah
- Plattebille-Glenwood
- St. Peter
- Prairie du Chien Group
- Jordan
- St. Lawrence
- St. Lawrence- Franconia
- Franconia
- Ironton - Galesville
- Eau Claire
- Mt. Simon
- PMRC

N

5000 0 5000 Feet

Blown-Up Area

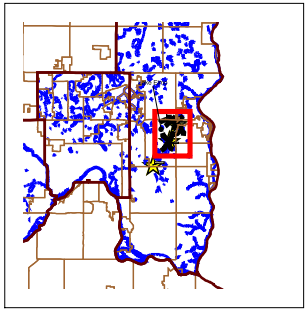


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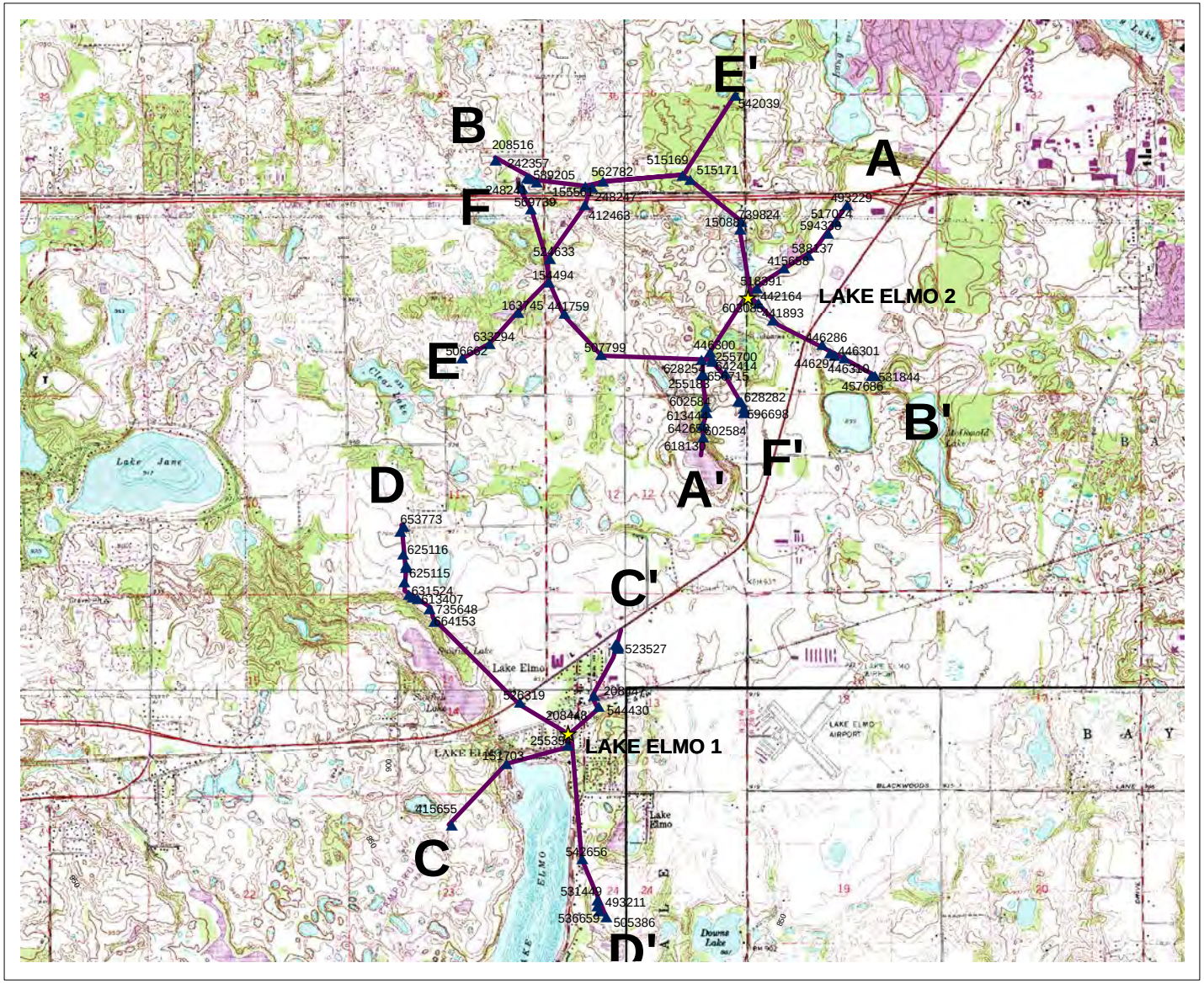
Figure 4
Bedrock Geology
City of Lake Elmo



View: Cross-Section Locations

City of Lake Elmo Wells

Geologic Cross-Sections

- A-A'
- B-B'
- C-C'
- D-D'
- E-E'
- F-F'

Blown-Up Area

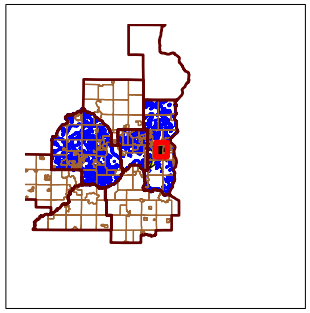


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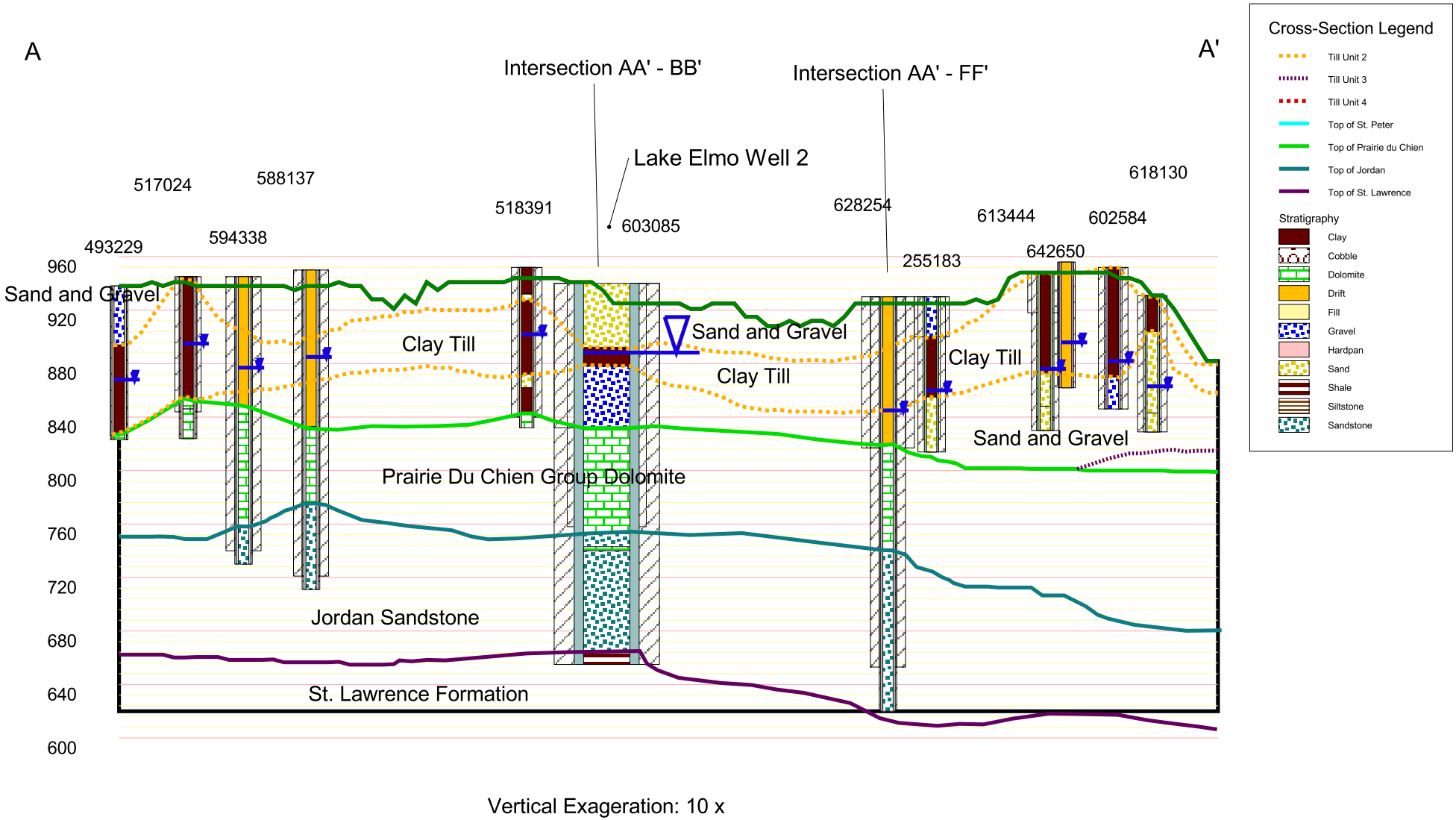
Figure 5
Geologic Cross-Sections Locations
City of Lake Elmo



Vertical Exageration: 10 x

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Figure 6
Geologic Cross-Section A-A'
City of Lake Elmo

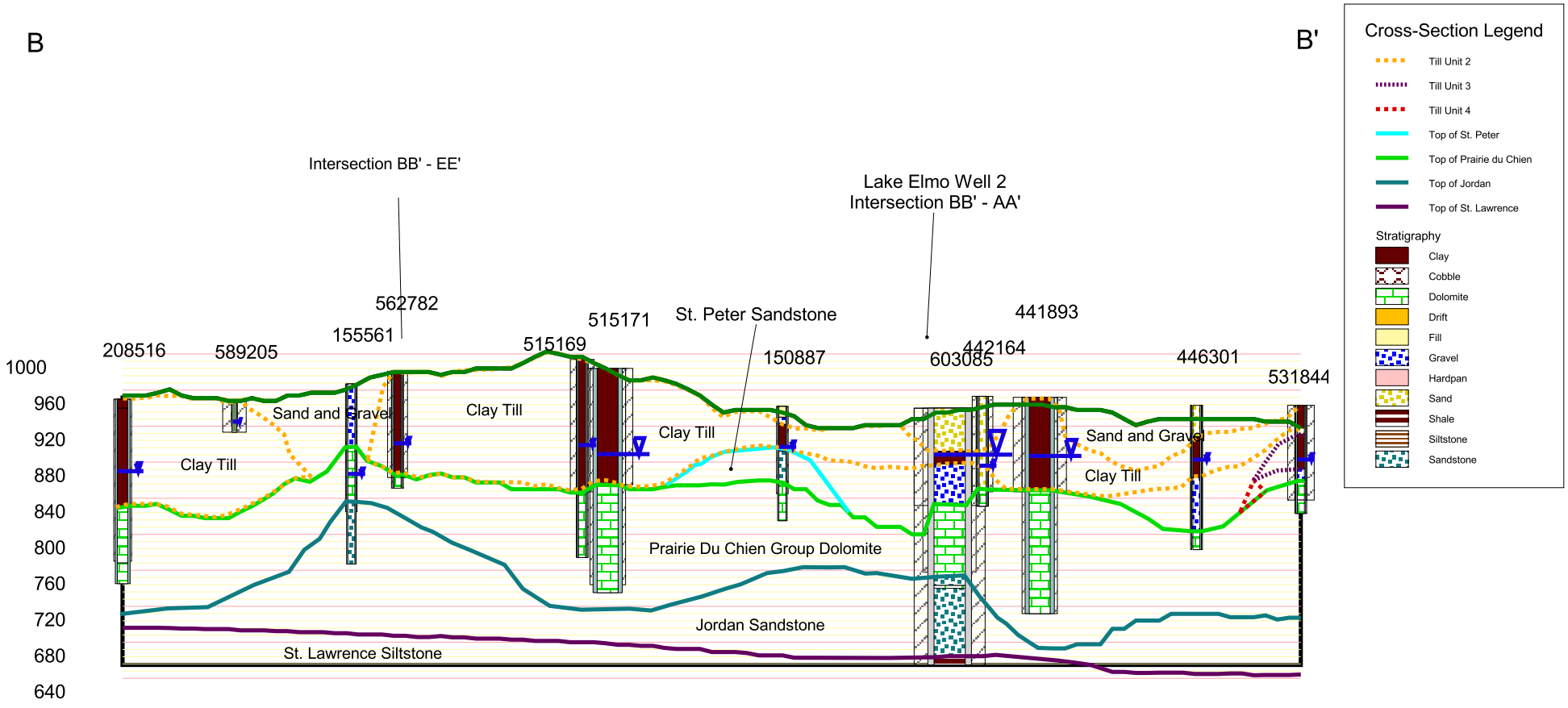

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Figure 7
Geologic Cross-Section B-B'
City of Lake Elmo

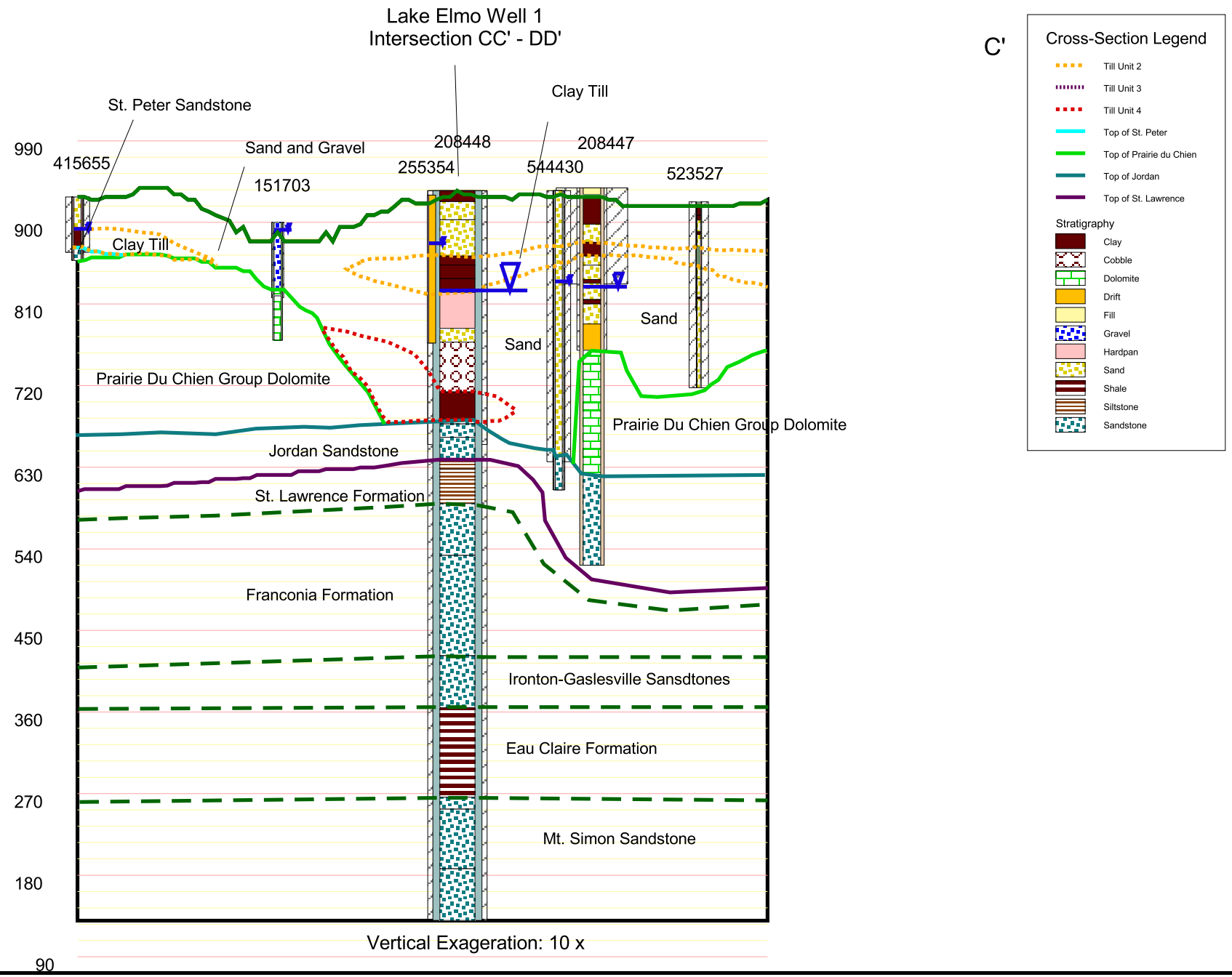

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Figure 8
Geologic Cross-Section C-C'
City of Lake Elmo

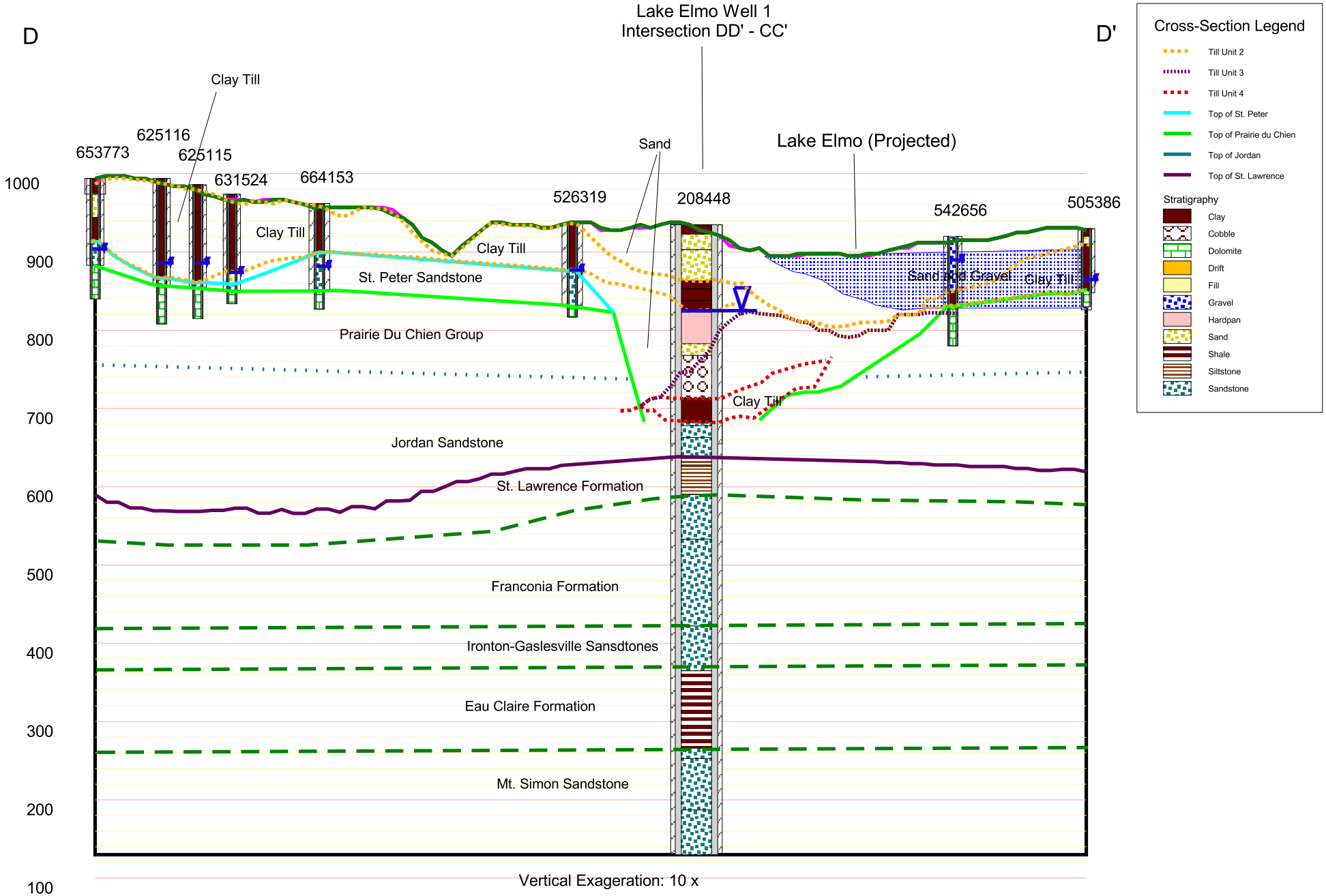

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Figure 9
Geologic Cross-Section D-D'
City of Lake Elmo

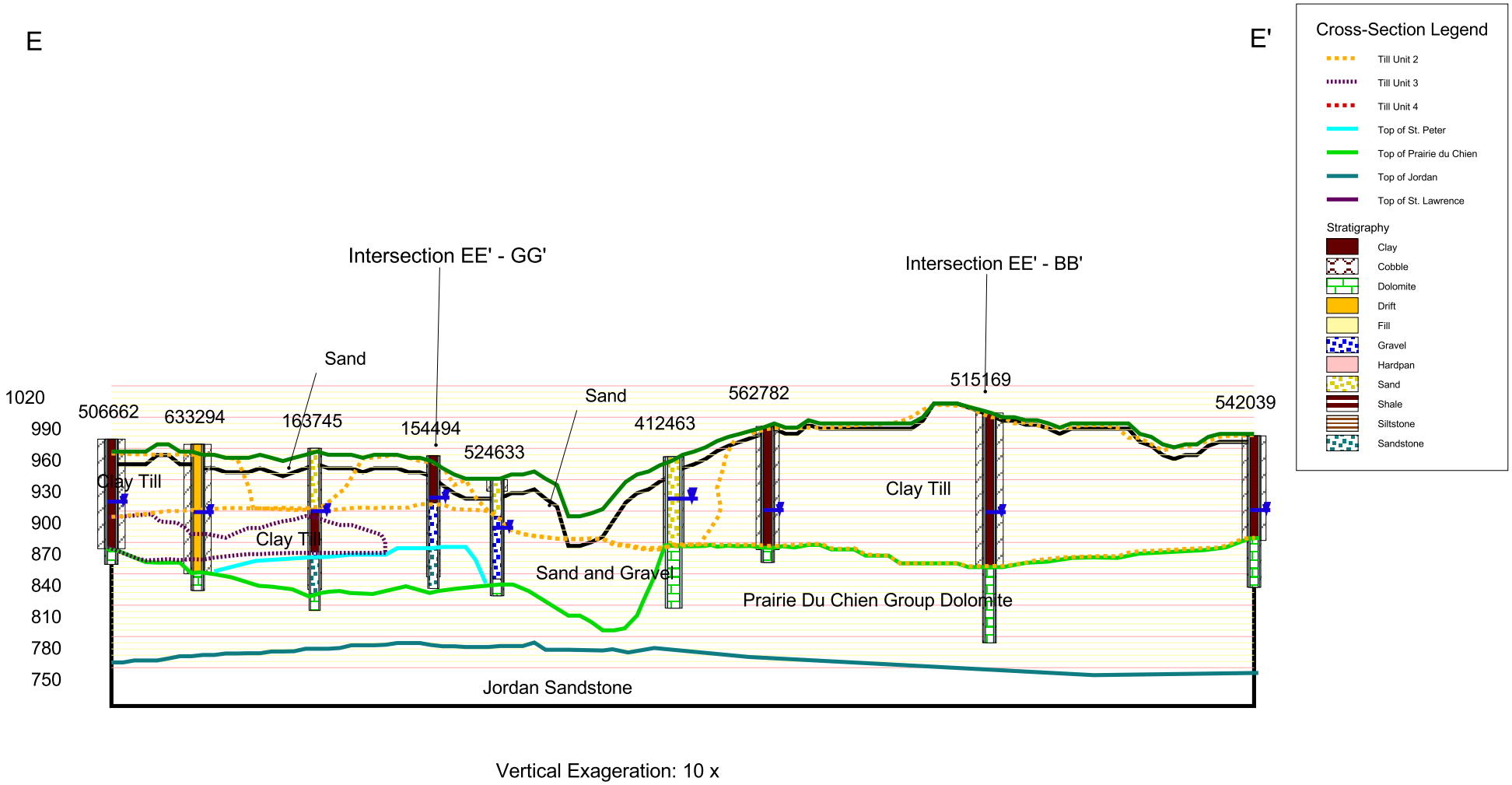

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Figure 10
Geologic Cross-Section E-E'
City of Lake Elmo

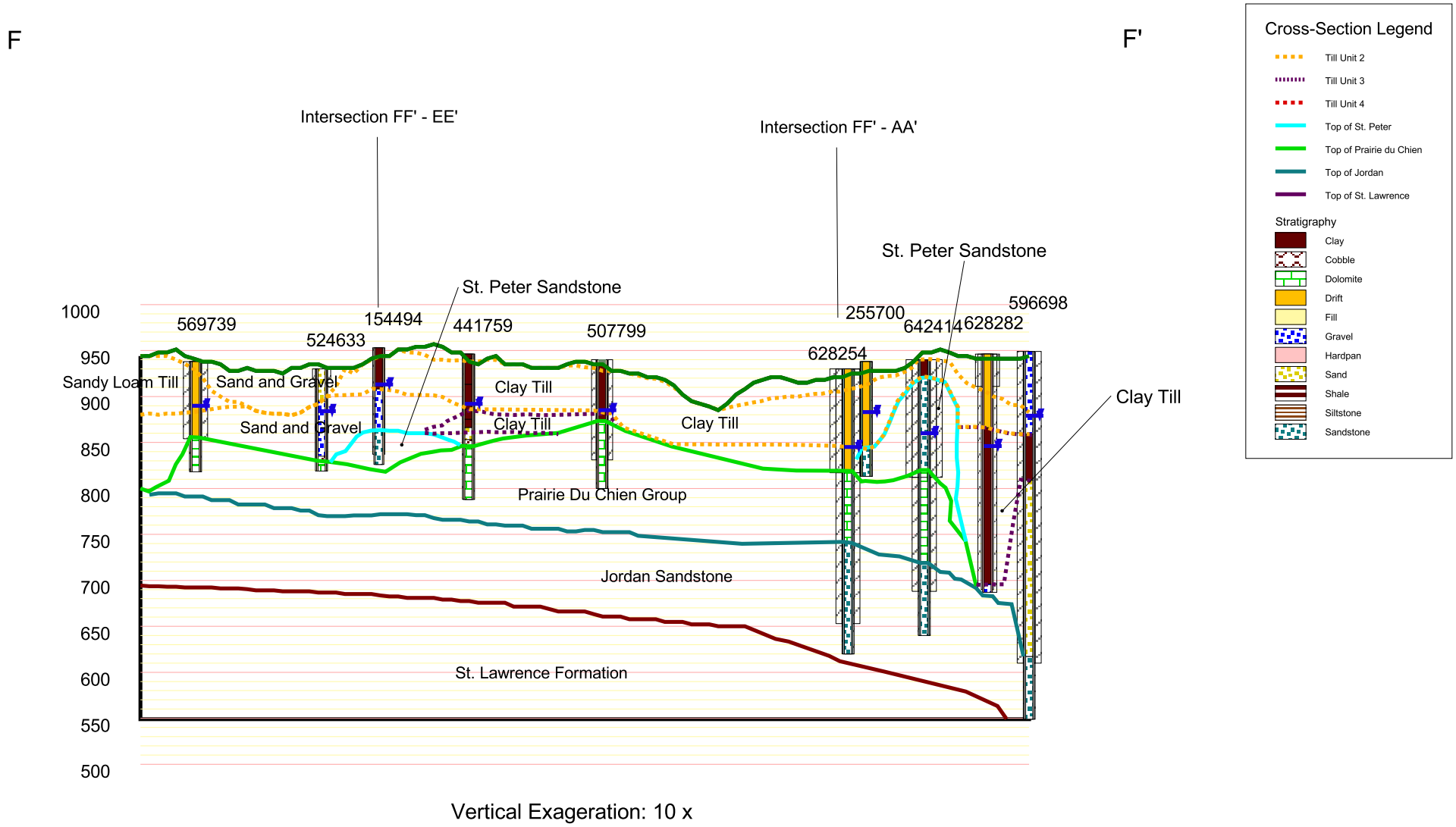

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Figure 11
Geologic Cross-Section F-F'
City of Lake Elmo

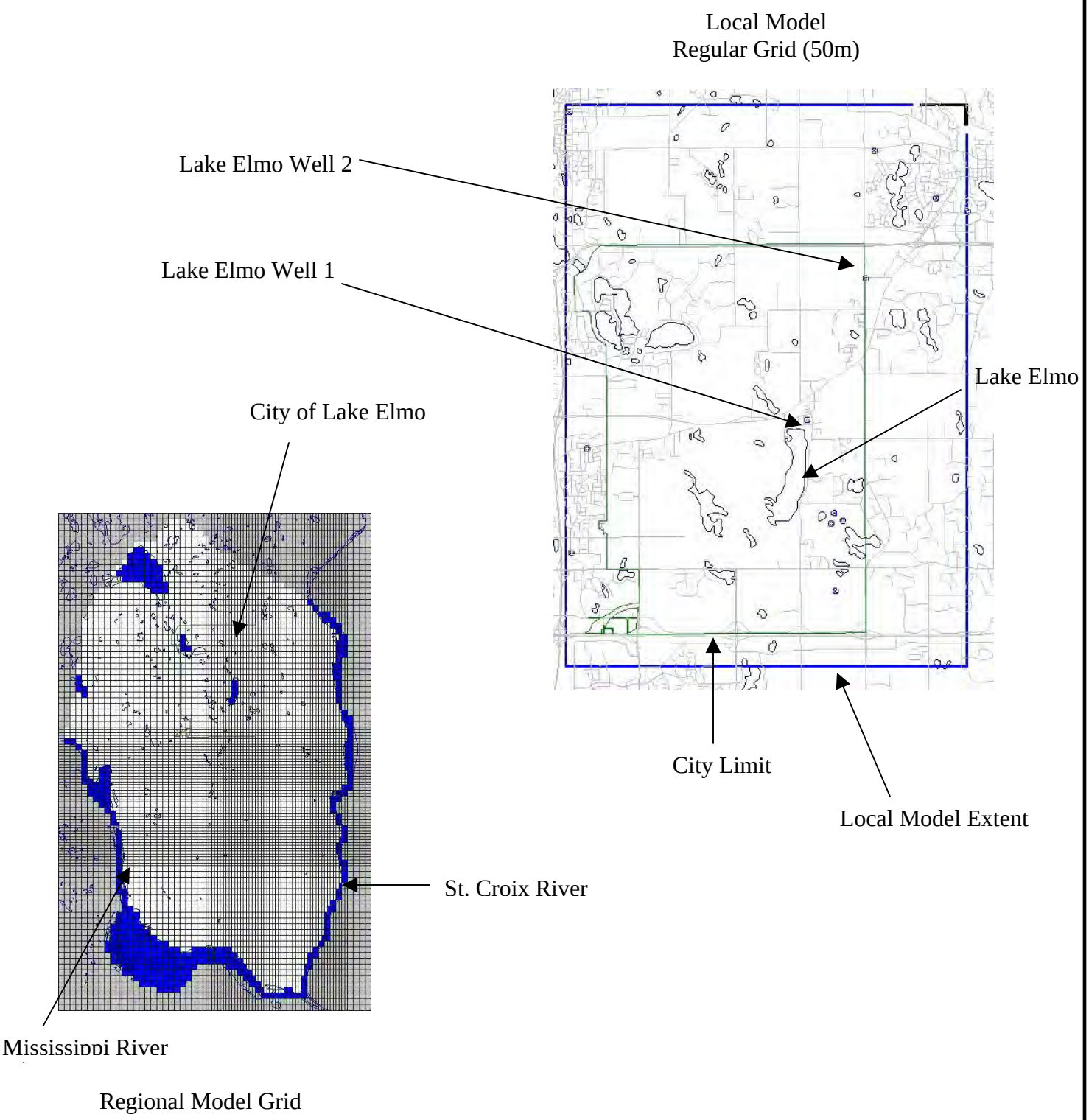
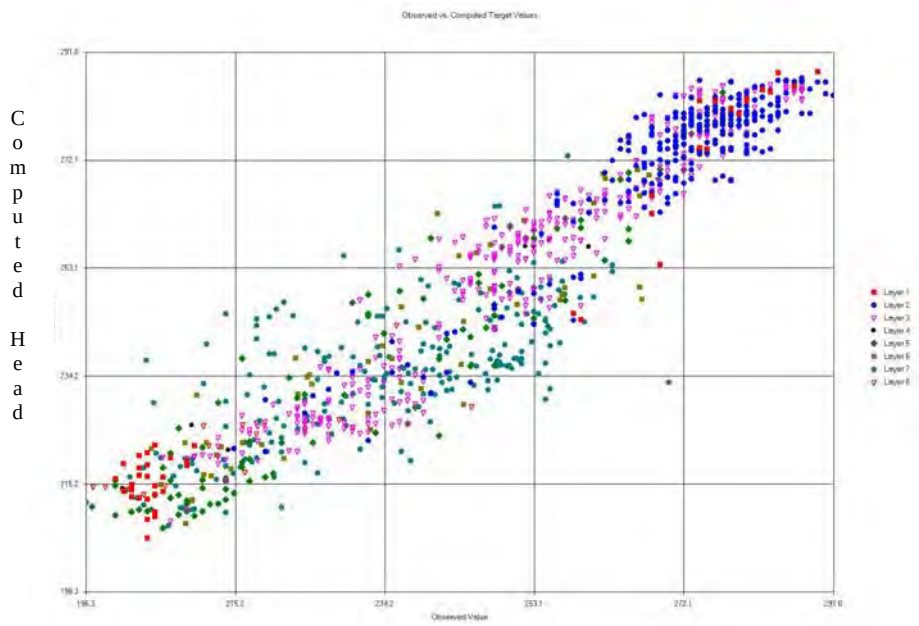


Figure 12
REGIONAL AND LOCAL MODEL GRIDS
City of lake Elmo

Regional Model



Regional Model
Calibration Statistics

Residual Mean	= -2.25
Residual Standard Dev.	= 7.52
Residual Sum of Squares	=6.98e+004
Absolute Residual Mean	= 6.03
Minimum Residual	= -33.05
Maximum Residual	= 37.07
Observed Range in Head	= 94.70
Res. Std. Dev./Range	= 0.079

Local Model

Local Model
Calibration Statistics

Residual Mean	= -1.93
Residual Standard Dev.	= 4.79
Residual Sum of Squares	=9.30e+003
Absolute Residual Mean	= 4.12
Minimum Residual	= -20.24
Maximum Residual	= 10.66
Observed Range in Head	= 47.20
Res. Std. Dev./Range	= 0.102

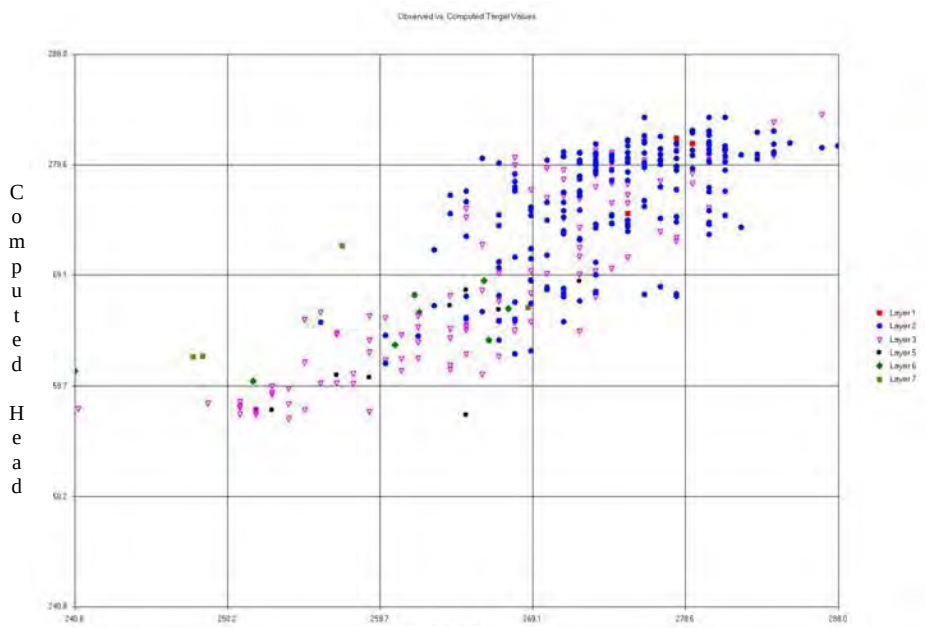
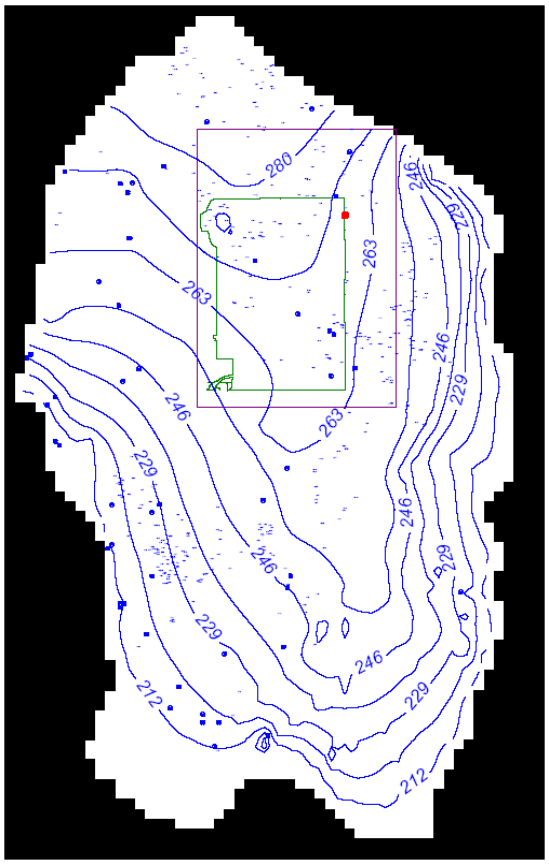


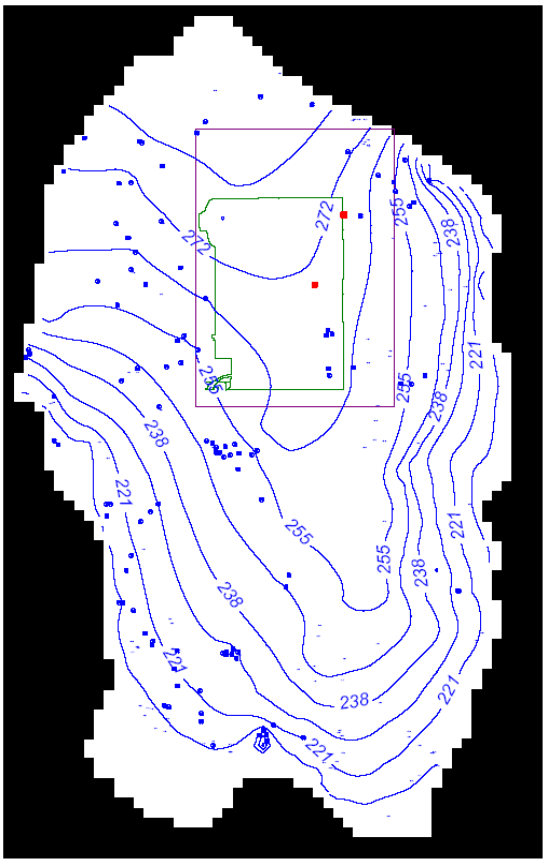
Figure 13
REGIONAL AND LOCAL MODEL CALIBRATION
COMPUTED VS OBSERVED HYDRAULIC HEADS
City of lake Elmo

Layer 3 – Prairie du Chien



Head Contours are in
Meters

Layer 5
Jordan Sandstone



Scale: 1 inch = 6 miles

Figure 14
CALIBRATED HYDRAULIC HEAD CONTOURS IN THE PRAIRIE DU CHIEN DOLOMITE AND JORDAN SANDSTONE REGIONAL MODEL
City of lake Elmo

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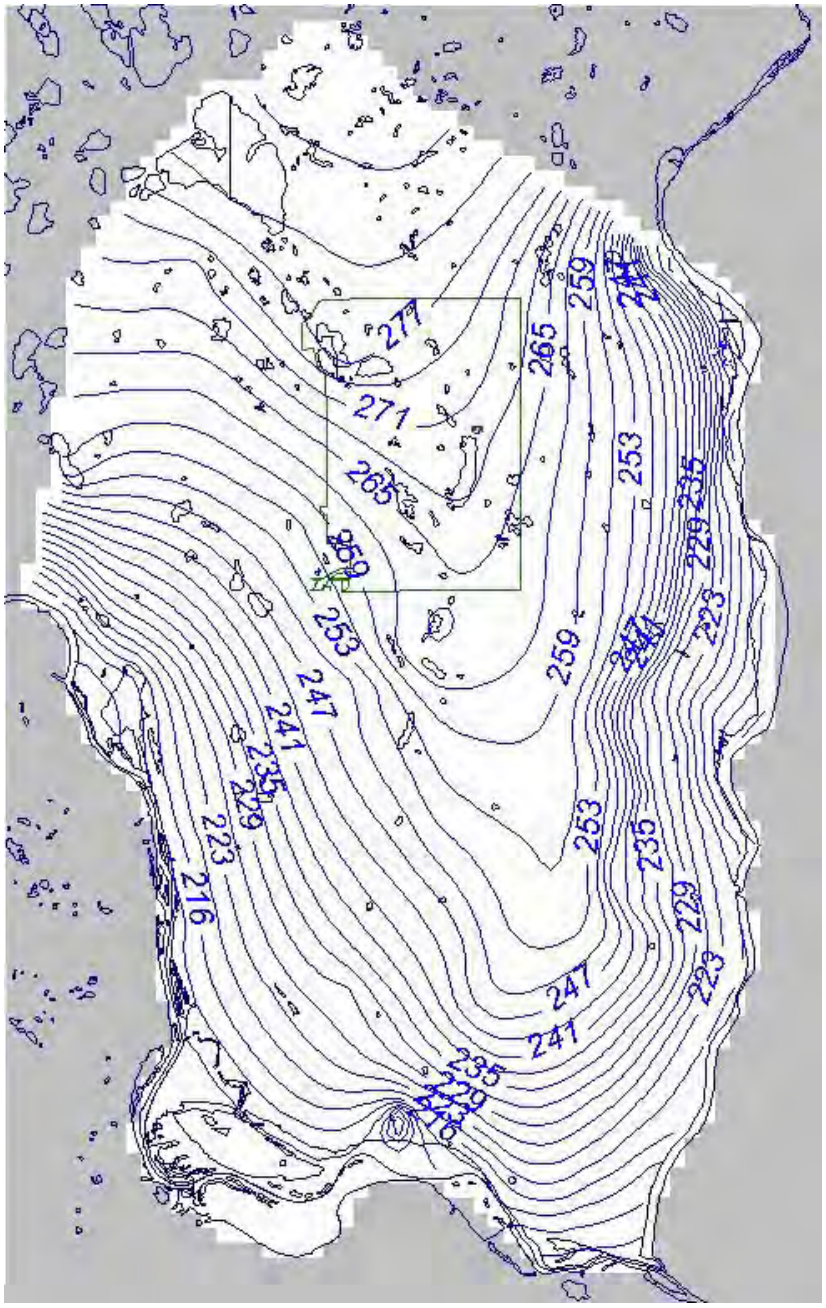
Head Contours are in Meters



Scale: 1 inch = 4 miles

Figure 15
CALIBRATED HYDRAULIC HEAD CONTOURS
IN THE FRANCONIA-IRONTON-GALESVILLE AQUIFER
REGIONAL MODEL
City of lake Elmo

MINNESOTA MDH DEPARTMENT OF HEALTH

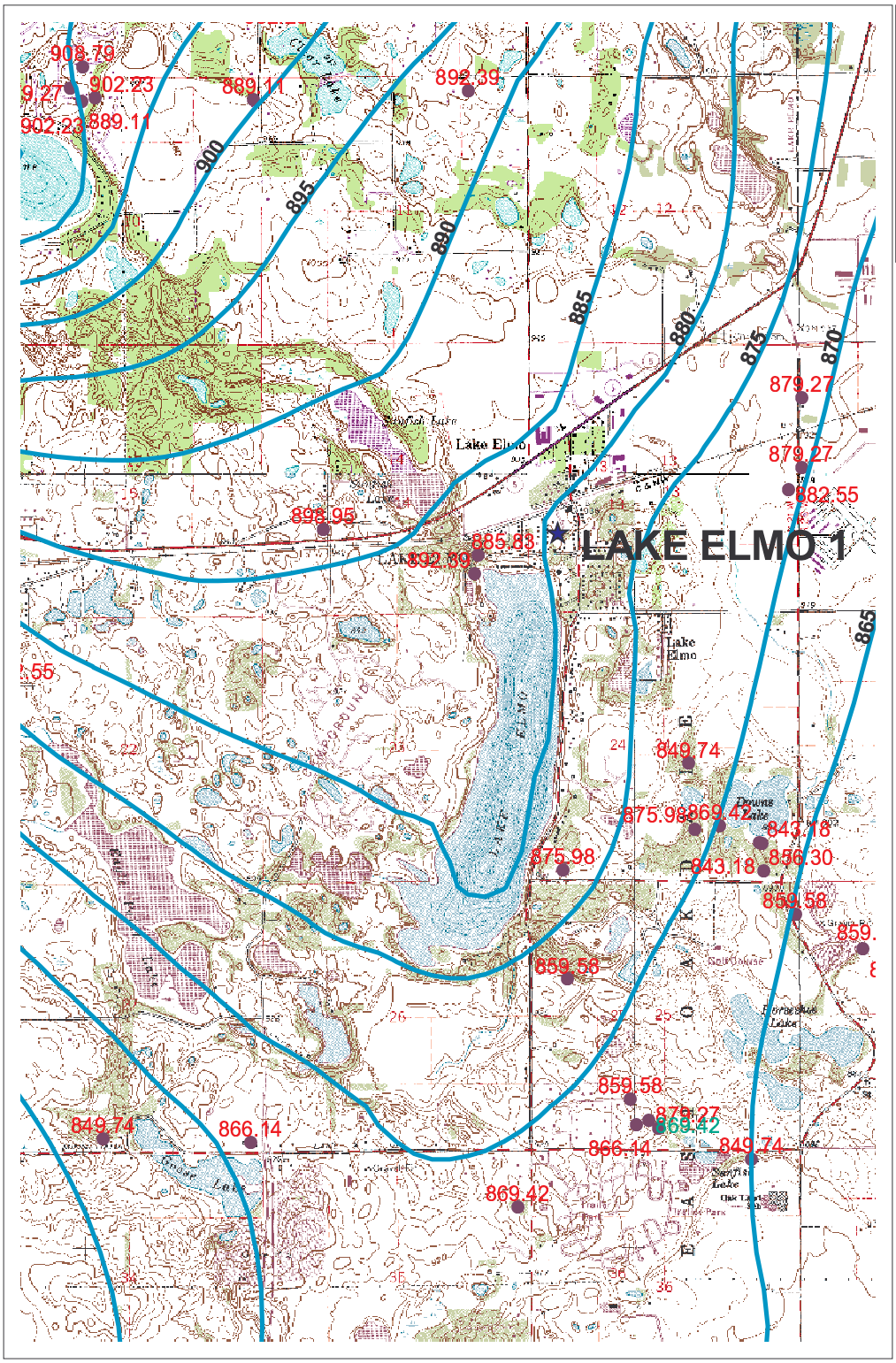


Figure 16A
CALIBRATED HYDRAULIC HEAD CONTOURS
IN THE PRAIRIE DU CHIEN GROUP NEAR WELL 1
(City of Lake Elmo)

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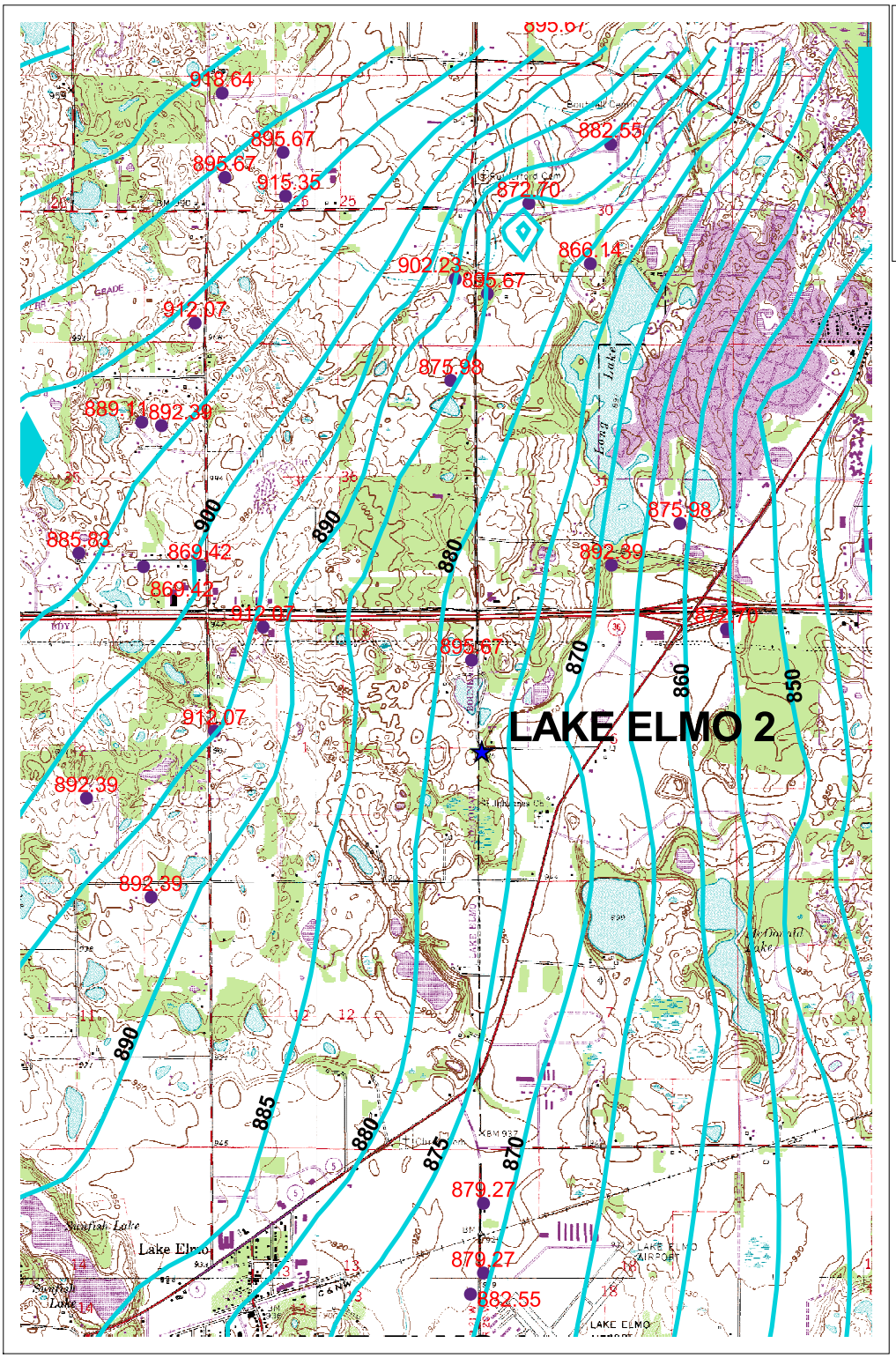
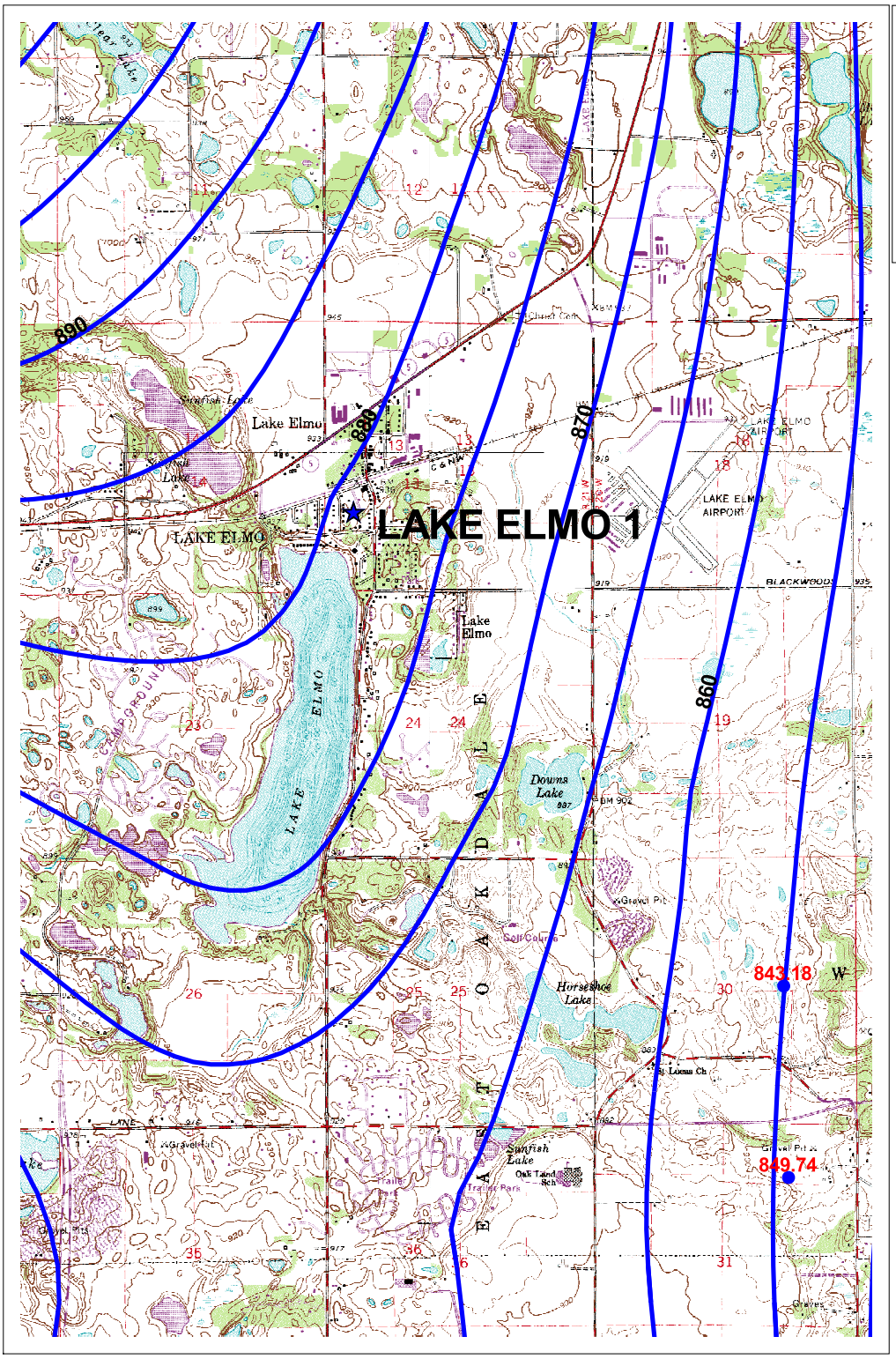


Figure 16B
CALIBRATED HYDRAULIC HEAD CONTOURS
IN THE PRAIRIE DU CHIEN GROUP NEAR WELL 2
(City of Lake Elmo)

MINNESOTA MDH DEPARTMENT OF HEALTH



View: Figure 16C Heads CJDN

★ City of Lake Elmo Wells

Head Contours - Jordan

843.16 Measured Heads CJDN (CWI)

N

2000 0 2000 Feet

Blown-Up Area

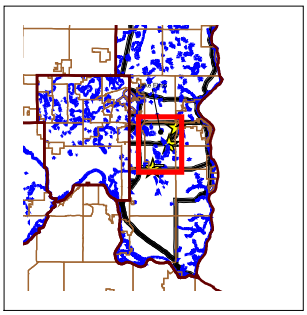


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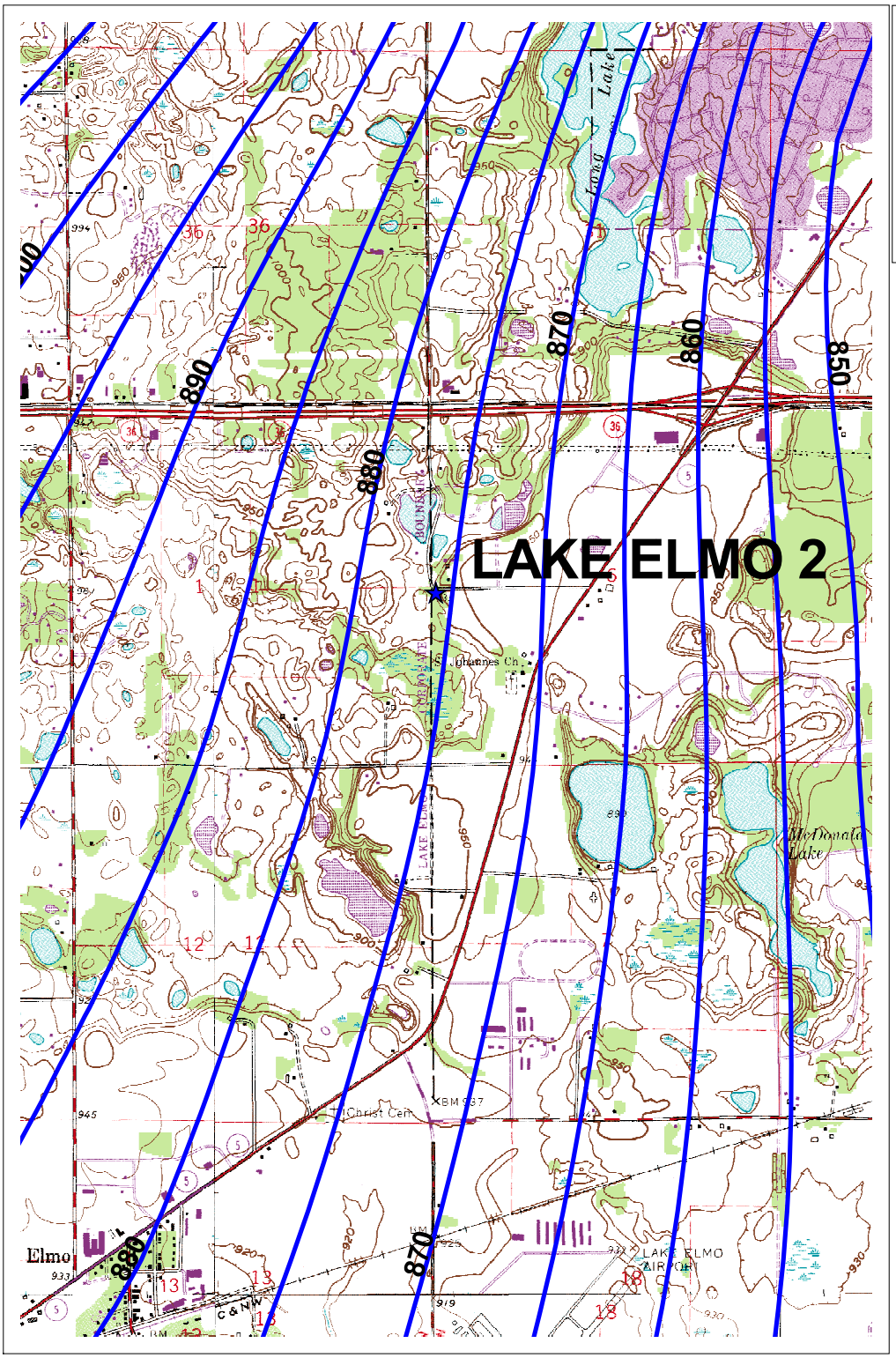
Figure 16C
CALIBRATED HYDRAULIC HEAD CONTOURS
IN THE JORDAN SANDSTONE NEAR WELL 1
(City of Lake Elmo)



View: Figure 16C Heads CJDN

★ City of Lake Elmo Wells

Head Contours - Jordan

843.16 Measured Heads CJDN (CWI)

N

2000 0 2000 Feet

Blown-Up Area

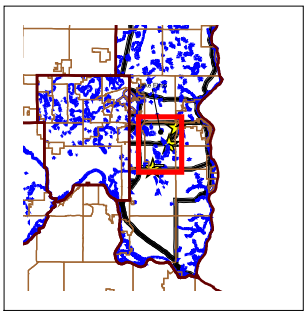


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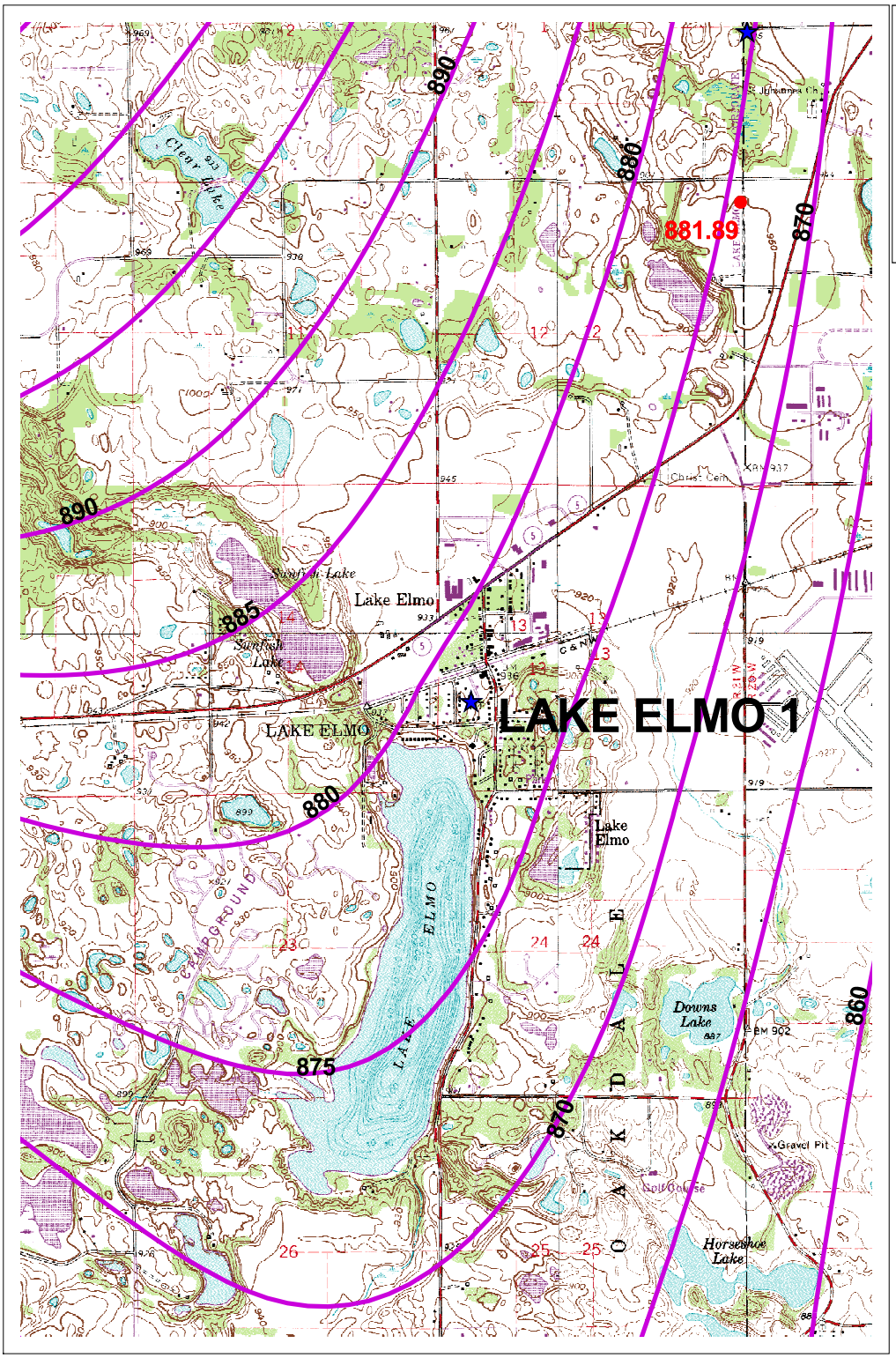
Figure 16D
CALIBRATED HYDRAULIC HEAD CONTOURS
IN THE JORDAN SANDSTONE NEAR WELL 2
(City of Lake Elmo)



View: Figure 17A - Heads

★ City of Lake Elmo Wells

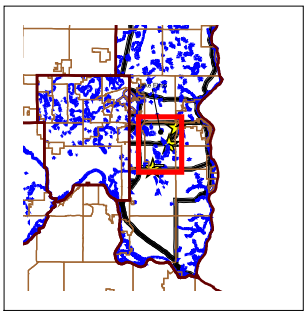
Head Contours - FIG Aquifer

843.16 Measured Heads FIG (CWI)

N

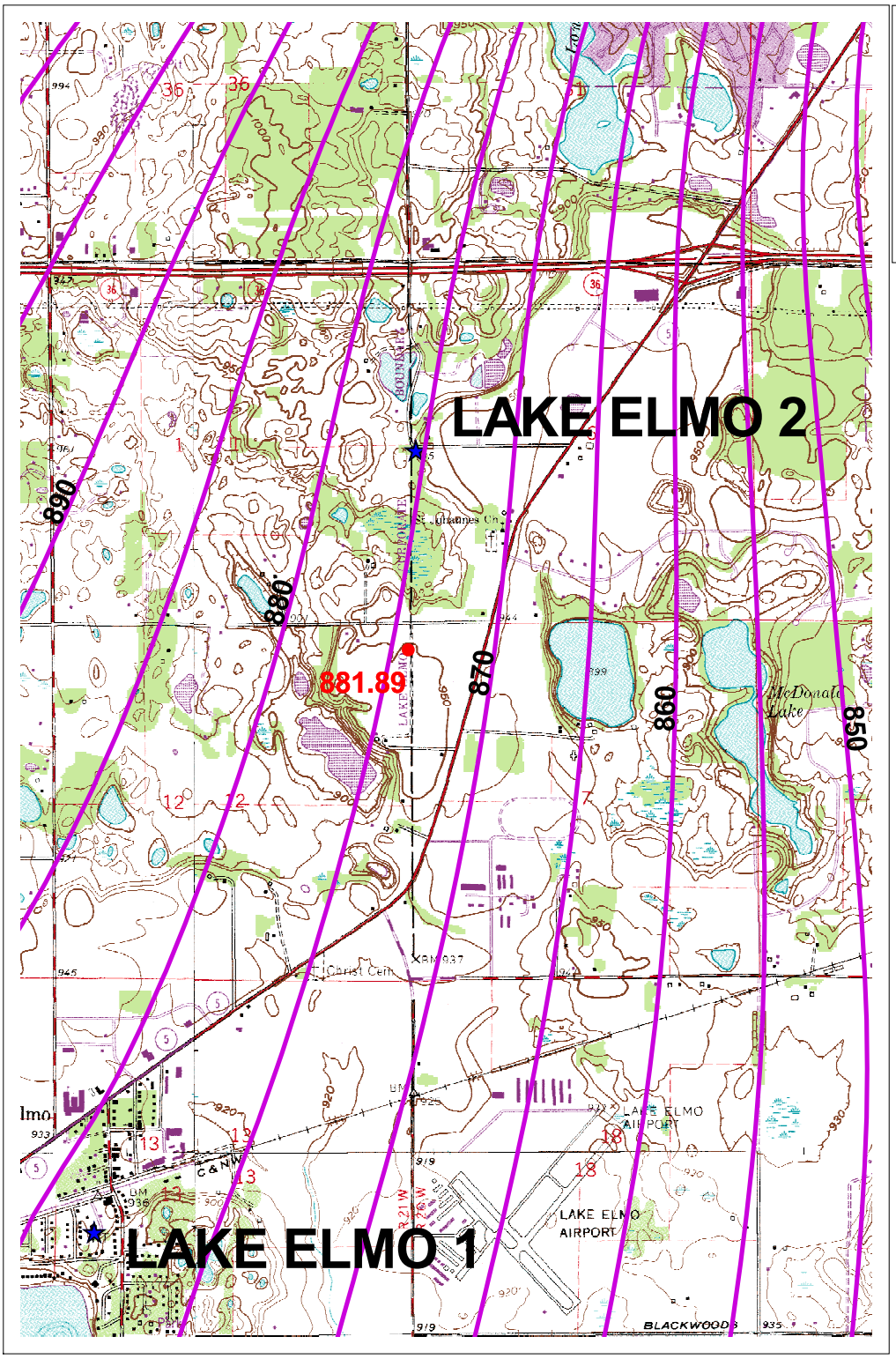
2000 0 2000 Feet

Blown-Up Area



MINNESOTA MDH DEPARTMENT OF HEALTH

Figure 17A
CALIBRATED HYDRAULIC HEAD CONTOURS
IN THE FIG AQUIFER NEAR WELL 1
(City of Lake Elmo)



View: Figure 17B - Heads

★ City of Lake Elmo Wells

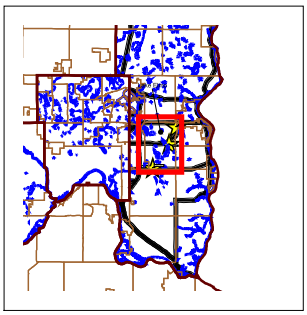
Head Contours - FIG Aquifer

843.16 Measured Heads FIG (CWI)

N

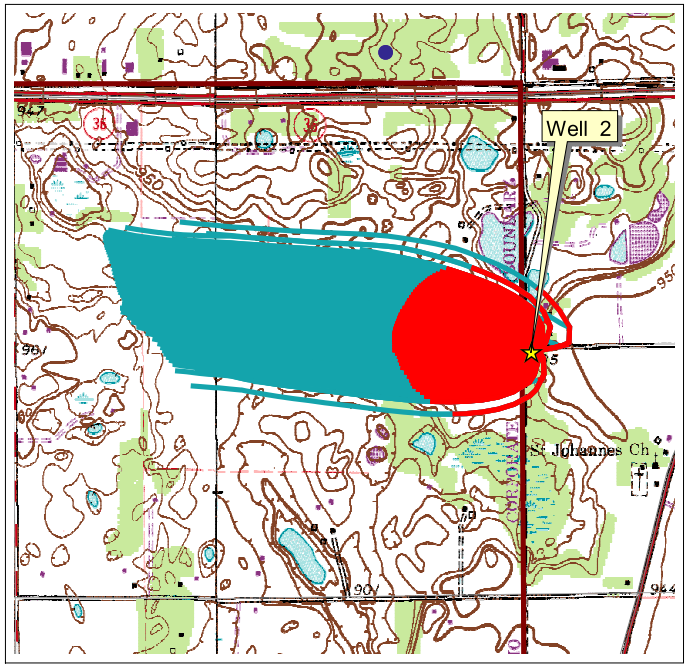
2000 0 2000 Feet

Blown-Up Area



MINNESOTA MDH DEPARTMENT OF HEALTH

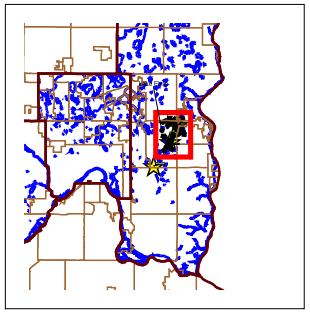
Figure 17B
CALIBRATED HYDRAULIC HEAD CONTOURS
IN THE FIG AQUIFER NEAR WELL 2
(City of Lake Elmo)

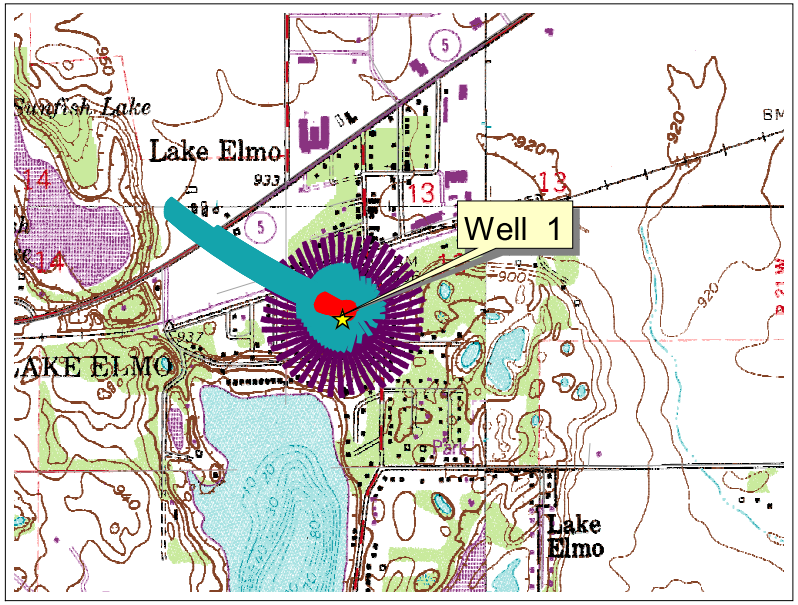


View: Figure 18a - WHPA 1 &10-yrs TT - Capture Zone (Porous media)

- Lake Elmo Wells
- 1-yr Capture Zone - Flowpaths MODFLOW Base Case
- 10-yr Capture Zone - Flowpaths MODFLOW Base Case
- 10-yr Capture Zone - Flowpaths Mt. Simon -MLAEM
- 10-yr Capture Zone - Flowpaths Mt. Simon -MLAEM

Blown-Up Area



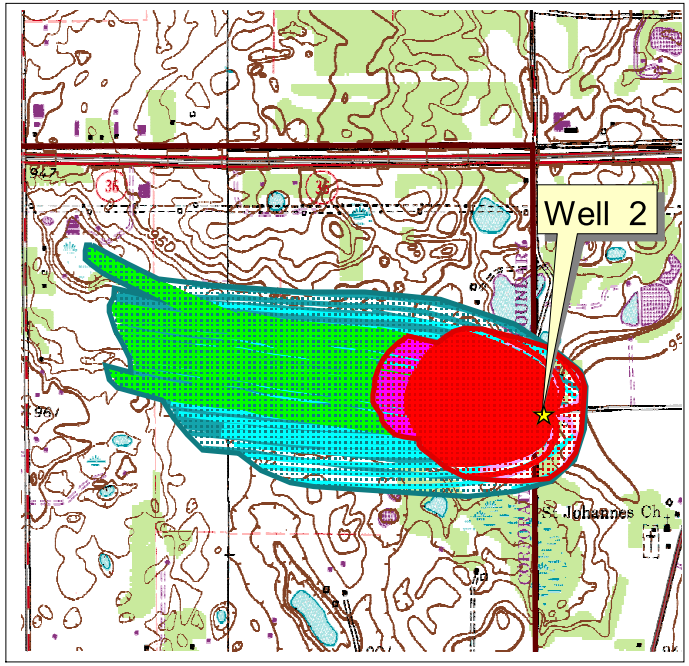


N

1000 0 1000 Feet

MINNESOTA MDH DEPARTMENT of HEALTH

Figure 18
10-YRS TRAVEL TIME CAPTURE ZONE (POROUS MEDIA)
BASE CASE
(City of Lake Elmo)

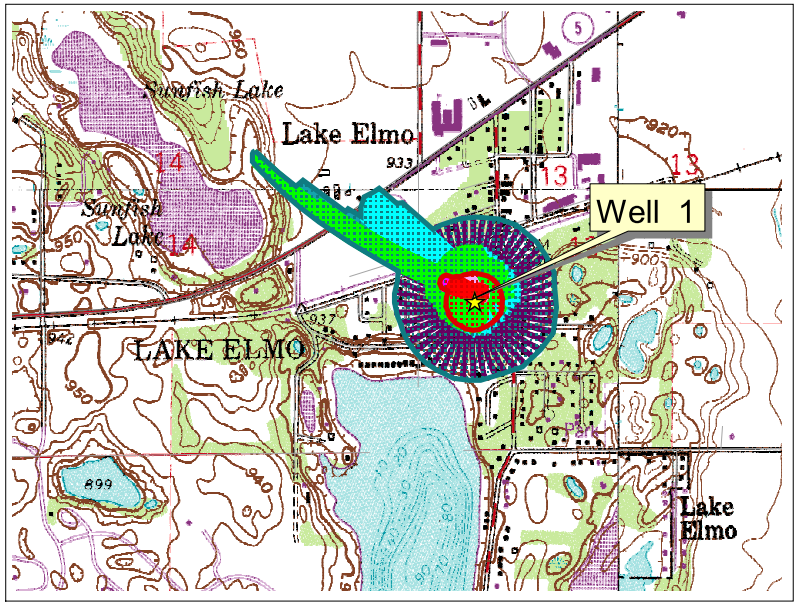


View: Figure 19a - WHPA Sensitivity

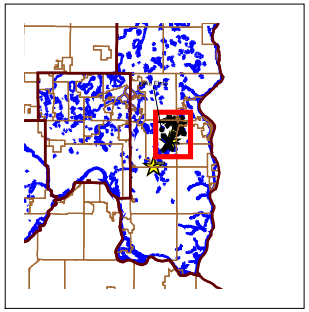
- Lake Elmo Wells
- ERA
- Composite WHPA (porous media)
- 1-yr Capture Zone - Sensitivity Kh -50% MODFLOW
- 1-yr Capture Zone - Flowpaths MODFLOW Base Case
- 1-yr Capture Zone - Sensitivity Kh +50% MODFLOW
- 10-yr Capture Zone - Sensitivity Kh +50% MODFLOW
- 10-yr Capture Zone - Flowpaths MODFLOW Base Case
- 10-yr Capture Zone - Sensitivity Kh -50% MODFLOW

10-yr Capture Zone - Flowpaths Mt. Simon -MLAEM

- 10-yr Capture Zone - Flowpaths Mt. Simon -MLAEM



Blown-Up Area

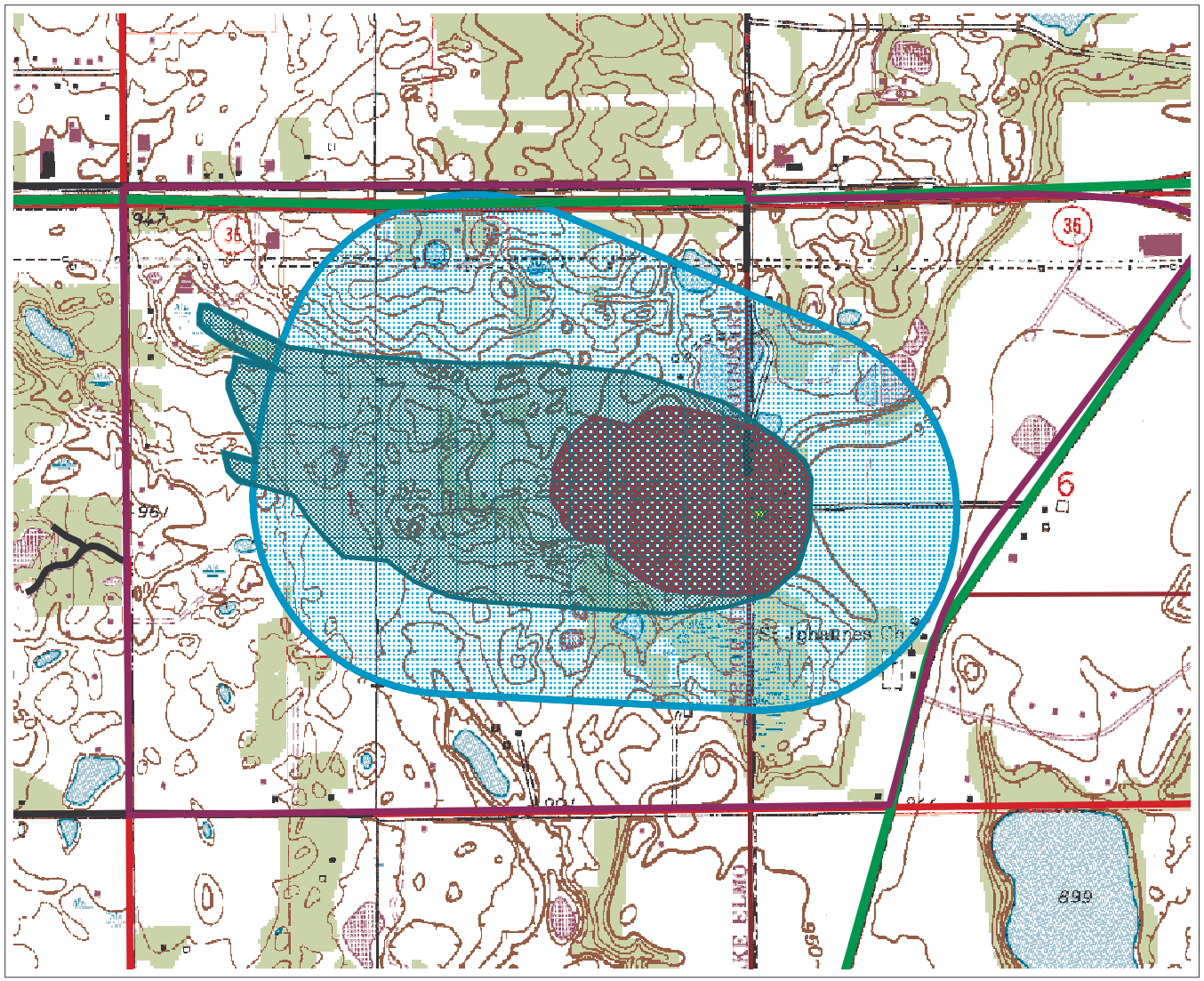


N

1000 0 1000 Feet

MINNESOTA MDH DEPARTMENT OF HEALTH

Figure 19
CAPTURE ZONE DELINEATION SENSITIVITY
(POROUS MEDIA)
(City of Lake Elmo)



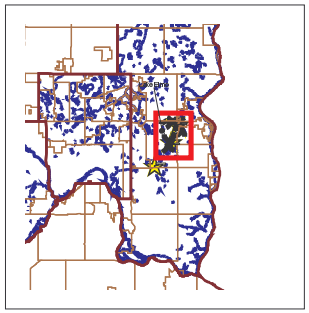
View: Fracture Flow Delineation

- Lake Elmo Wells
- Fracture Flow Capture Zone
- ERA
- Composite 10-year Time of Travel Capture Area (porous media)

N

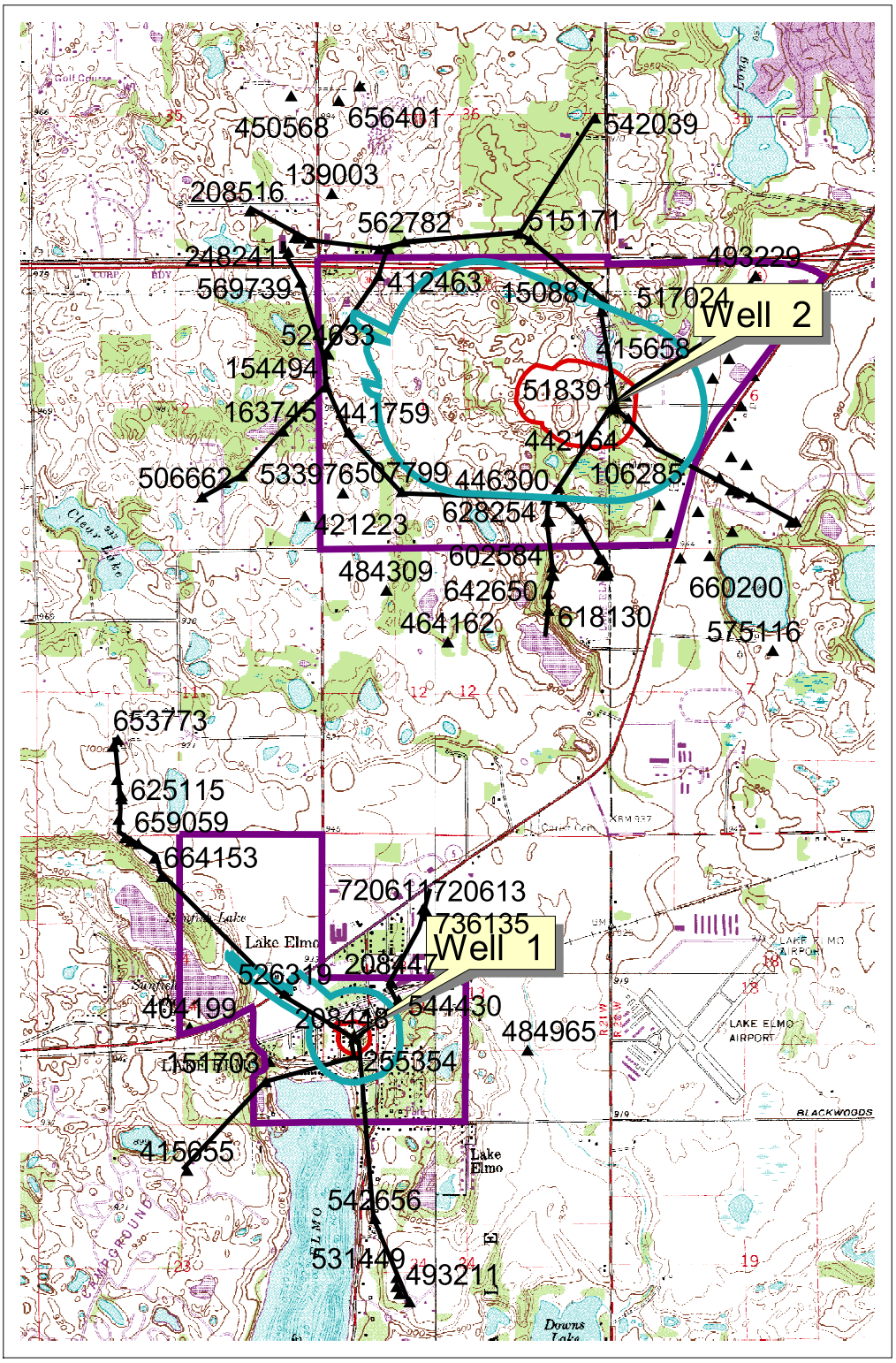
1000 0 1000 Feet

Blown-Up Area



MINNESOTA MDH DEPARTMENT OF HEALTH

Figure 20
CAPTURE ZONE DELINEATION
(FRACTURE FLOW)
(City of Lake Elmo)



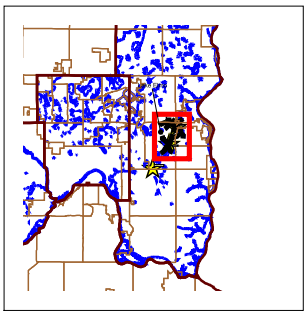
View: Figure 21 - CWI Wells

- Lake Elmo Wells
- Well Log Reviewed
- ERA
- WHPA
- DWSMA

N

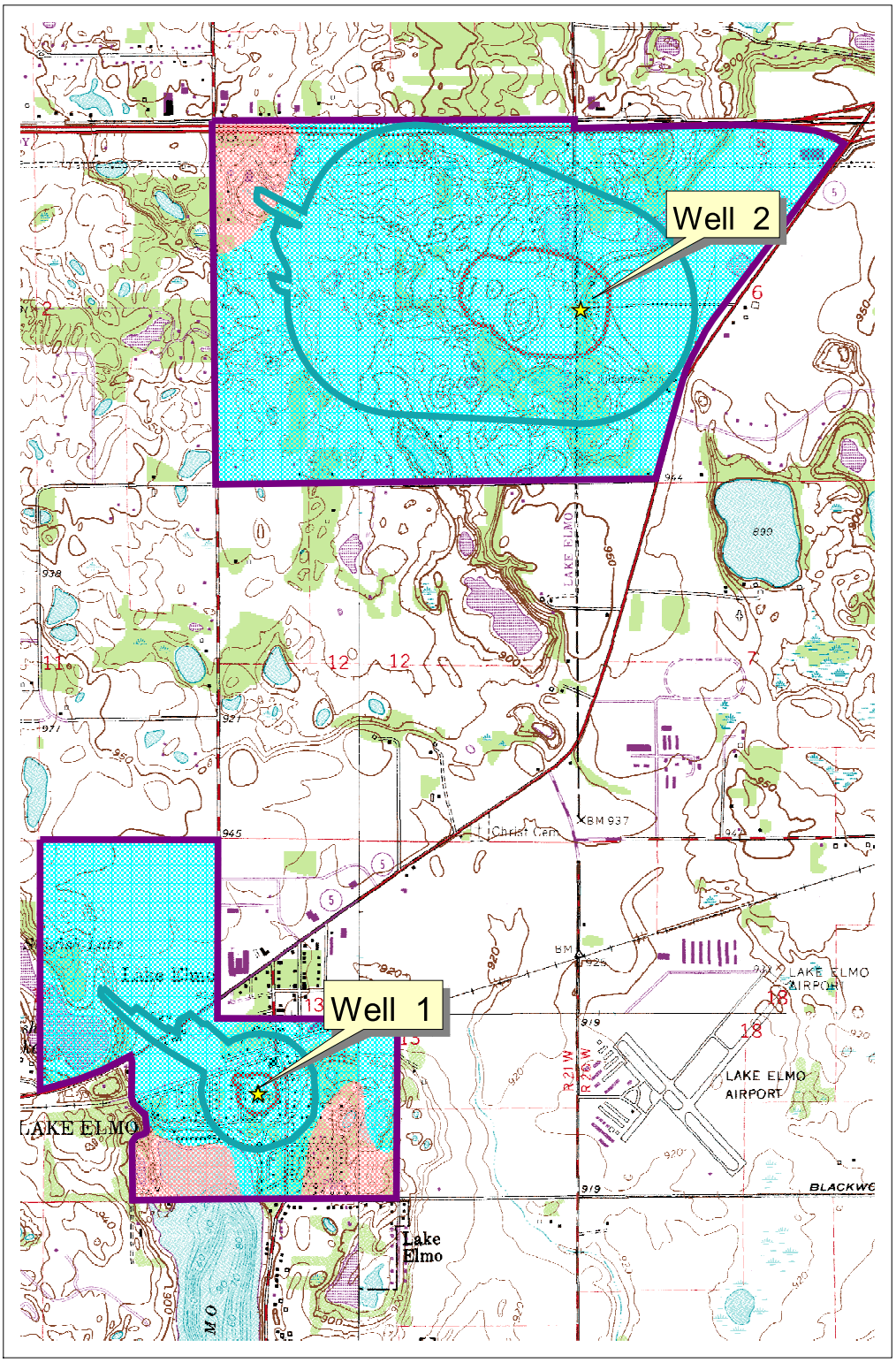
2000 0 2000 Feet

Blown-Up Area



MINNESOTA MDH DEPARTMENT OF HEALTH

Figure 21
CWI Wells Reviewed
City of Lake Elmo)



View: Figure 22 - Aquifer Vulnerability

- Lake Elmo Wells
- ERA
- WHPA
- DWSMA

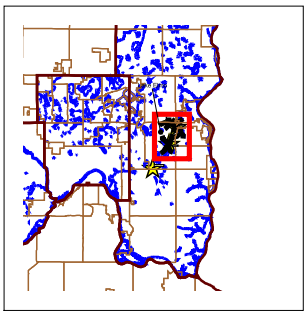
DWSMA Vulnerability

- High
- Moderate

N

2000 0 2000 Feet

Blown-Up Area



MINNESOTA MDH DEPARTMENT OF HEALTH

Figure 22
DWSMA Vulnerability
(City of Lake Elmo)

City of Lake Elmo

Wellhead Protection Plan
Part II

Part 2:

- Potential Contaminant Source Inventory
- Impacts of Expected Changes to Land and Water Resources
- Issues, Problems, and Opportunities
- Wellhead Protection Plan Goals
- Management Strategies and Action Plans
- Evaluation Plan
- Emergency/Conservation Plan
- IWMZ Data

Date: **July 18, 2008**
Project No. **12781.001**

TKDA
ENGINEERS ▪ ARCHITECTS ▪ PLANNERS

444 Cedar Street, Suite 1500
Saint Paul, MN 55101-2140

(651) 292-4400
(651) 292-0083 Fax
www.tkda.com

WELLHEAD PROTECTION PLAN
PART II
CITY OF LAKE ELMO, MINNESOTA
PROJECT NO. 12781.001

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LAKE ELMO WELLHEAD PROTECTION PLAN
PART II

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PUBLIC WATER SUPPLY PROFILE

PUBLIC WATER SUPPLY

NAME: City of Lake Elmo **PWSID #:** 1820009

ADDRESS: 3800 Laverne Avenue North, Lake Elmo, Minnesota 55042

TELEPHONE NUMBER: (651) 777-5510

WEB: www.lakeelmo.org **FAX #:** (651) 777-9615

WELLHEAD PROTECTION MANAGER

NAME: Jack Griffin, P.E.

ADDRESS: TKDA, 444 Cedar Street, Suite 1500, Saint Paul, Minnesota 55101

TELEPHONE NUMBER: (651) 292-4552

E-MAIL: jack.griffin@tkda.com **FAX #:** (651) 292-0083

CONSULTANT/TECHNICAL ASSISTANCE

NAME: Michelle Stockness, P.E.

ADDRESS: TKDA, 444 Cedar Street, Suite 1500, Saint Paul, Minnesota 55101

TELEPHONE NUMBER: (651) 292-4400

E-MAIL: michelle.stockness@tkda.com **FAX #:** (651) 292-0083

DOCUMENTATION LIST

STEP	DATE PERFORMED
Part I Approval Notice Received from MDH	**April 10, 2007**
Scoping Meeting II Held: (4720.5349, subp. 1)	**July 25, 2008**
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Review Considered: (4720.5350, subp. 3)	**July 14, 2008**
Public Hearing Conducted: (4720.5350, subp.4)	**July 15, 2008**
Remaining Portion WHP Plan Submitted: (4720.5360, subp. 1)	**July 18, 2008**
Approved Review Notice Received:	

WELLHEAD PROTECTION PLAN
PART II
CITY OF LAKE ELMO, MINNESOTA
PROJECT NO. 13487.000

I. EXECUTIVE SUMMARY

Under the Federal Safe Drinking Water Act, all states are required to have a Wellhead Protection (WHP) Plan. Through this Federal mandate, the Minnesota Commissioner of Health was granted authority by the Minnesota Groundwater Protection Act (Minnesota Statue 1031, Section 3, Subdivision 5) to prepare a rule specifying WHP measures for public water supply wells. The Minnesota Department of Health administers this WHP program and the program complies with both Federal and State mandates. Under this program, every public water supply well in Minnesota is required to have a Wellhead Protection Plan. All public wells in Minnesota must implement WHP measures to protect users from acute health effects relating to disease organisms or chemical contaminants that pose a serious health risk, and from chronic health effects relating to long-term ingestion of chemical contaminants in groundwater. Regulations for this requirement are found under Minnesota Rules Parts 4720.5100 to 4720.5590. In Minnesota, the wellhead protection process is broken up into two phases, Part 1 and Part 2.

The City of Lake Elmo currently has three public water supply wells but only uses two. Active wells are Well No. 1 (Unique No. 208448) and Well No. 2 (Unique No. 603085). Well No. 3 is not in use (Unique No. 655910). Part 1 of the Wellhead Protection Plan presented the 1) delineation of the Wellhead Protection Area (WHPA) and the Drinking Water Supply Management Area (DWSMA) and 2) the vulnerability assessments for the system's wells and the aquifer within the DWSMA. The City of Lake Elmo had Part 1 of the WHP plan approved by the Minnesota Department of Health on April 10, 2007. The Part 1 report was completed by the Minnesota Department of Health (MDH).

This portion, Part 2, of the Wellhead Protection (WHP) Plan for the City of Lake Elmo includes:

- The results of the Potential Contaminant Source Inventory
- The Potential Contaminant Source Management Strategy
- The Emergency/Alternative Water Supply Contingency Plan
- The Wellhead Protection Program Evaluation Plan

Findings in this report are the result of collaboration between the City, TKDA, and the MDH.

A vulnerability assessment for the aquifer within the DWSMA was performed using available information and indicates that the aquifer used by the City is considered to be vulnerable to contamination because it appears that it is possible that surface water is able to infiltrate and recharge the aquifers that the City wells use. The levels of vulnerability in the DWSMA range from Moderate to High.

Since the City wells can receive water from both the surface and subsurface, contaminant sources in both areas need to be assessed. The principal sources of contamination would include wells, underground storage tanks, hazardous waste generators, ISTS and surface water sites. This report shall address all existing and possible future contaminant sources within the DWSMA and how these sources can be effectively managed to prevent groundwater contamination.

Section 1 contains the executive summary of the plan.

Sections 2-3 of the WHP Plan (hereafter referred to as Plan) contains information and data that support the approaches taken to address potential contamination sources that have been identified as potentially affecting the aquifer used by the public water supply. The reader is encouraged to concentrate attention on Sections 2-3 in order to better understand why a particular management strategy is included in Section 7.

In Section 2, the required data elements indicated by the MDH in the Scoping 2 Notice are addressed as well as the data's degree of reliability. Pertinent data elements include information about the geology, water quality, and water quantity. Section 3 analyses this data.

Section 4 addresses the possible impacts that changes in the physical environment, land use, and water resources have on the public water supply. The City anticipates that its water use will increase greatly within the 10 years this plan is in effect due to population and development increase. The City of Lake Elmo has evaluated the support necessary to implement its wellhead protection plan.

The problems and opportunities concerning land use issues relating to the aquifer, well

water, and the DWSMA and those issues identified at public meetings are addressed in Section 5. The moderate to high vulnerable status of the aquifers and the good quality of water currently produced by the system's wells leaves five major concerns: 1) other wells located within the DWSMA that could become pathways for contamination to enter the aquifer; 2) the pumping effects of high-capacity wells that may have altered the boundaries of the delineated WHPA, reduce the hydraulic head in the aquifer, or cause the movement of contamination toward public water supply well(s); 3) chemical spills or leaking storage tanks that may release contaminants into ground water; 4) shallow disposal type wells; 5) hazardous waste generators or agricultural chemical storage sites.

The drinking water protection goals that the Public Water Supplier (PWS) would like to achieve with this plan are listed in Section 6. In essence, the PWS would like to maintain water quality and integrity of the city wells, protect the aquifer, and continue to collect data to support the WHP, and increase public awareness of groundwater protection issues. Thereby confirming where all wells and potential contamination sources are located within the DWSMA, and supporting future efforts in wellhead protection planning.

The objectives and action plans for managing the potential sources of contamination are contained in Section 7. Actions aimed toward educating the general public about groundwater issues, gathering information about other wells, and collecting data relevant to wellhead protection planning are the general focus.

Section 8 contains a guide to evaluate the implementation of the identified management strategies of Section 7. The wellhead protection program for the City of Lake Elmo will be evaluated on an annual basis.

Section 9 references the Water Conservation Plan approved by the Minnesota Department of Natural Resources. An emergency/contingency plan was developed to address the possibility that the water supply system is interrupted due to either emergency situations or drought.

II. DATA ELEMENTS, ASSESSMENT (4720.5200)

A. REQUIRED DATA ELEMENTS

1. Physical Environment Data Elements

a) Precipitation. Precipitation information was regarded in the development of Lake Elmo's WHP. Data was gathered from the Minnesota State Climatology Office. Table 1, in the appendix, shows the precipitation data for the last five years, 2003 to 2007, for the City of Lake Elmo. Using these numbers, the average annual rainfall is 29.21 inches per year.

The movement of contaminants through soil to the groundwater is affected by contaminant properties, soil characteristics, existing vegetation, and climatic factors, including precipitation. Dissolved contaminants in water move through the soil, with the water acting as a carrier of the contaminants. Precipitation to an area raises the water content, which increases the mass flow of water through the soil, which also increases the contaminant flow through the soil and possibly to the groundwater. The rates of these flows and where they travel to are dependent on soil, geology types, and properties.

b) Geology. This data element is required and is presented in the first part of the WHP Plan. The geology in the vicinity of the City of Lake Elmo consists of 100-250 feet of unconsolidated glacial deposited sandy outwash and some clay till over bedrock. Bedrock stratigraphy is as follows by depth: St. Peter Sandstone, Prairie du Chien group, Jordan Sandstone, St. Lawrence Formation, Franconia Formation, Ironton-Galesville Formation, Eau Claire Formation, and Mt. Simon Sandstone. The St. Peter and Prairie du Chien layers are not present in some areas due to erosion. The St. Lawrence formation and the Eau Claire formations are confining layers or aquitards, and have low hydraulic conductivity that prevents the migration of water to deeper layers below them. Water bearing formations are the

Prairie du Chien-Jordan aquifer, the Franconia Ironton-Galesville (FIG) aquifer, and the Mt. Simon aquifer. In areas where the uppermost confining layer is absent, the upper aquifer is directly connected to the surface.

The City uses multiple aquifers for its water supply. Well No. 1 uses the Jordan, FIG, and Mt. Simon aquifers. Well No. 2 uses Prairie du Chien and Jordan aquifers. The separate aquifers have different vulnerabilities and confining layers. See Part 1 of the report for more details.

c) Soils. Local soil conditions, infiltration, and erosion characteristics were regarded in the development of this WHP. Since the public water supply aquifers may be vulnerable to land use activities, soil characteristics can help to determine management strategies. The main soil types in the DWSMA are sand and gravels and clay tills. See Figure 4. This is a well drained soil with moderate to rapid permeability. These soil properties enable water to infiltrate and flow through soil and into the groundwater. Water can act as a carrier of dissolved contaminants, and these contaminants can then be delivered by the infiltrated water flow through the soil into the aquifer. For the City of Lake Elmo, water from the surface carrying contaminants may be able to enter the upper aquifer and then the lower aquifer, contaminating the water supply.

d) Water Resources. This data element applies as it relates to future groundwater uses that may influence the ability of the aquifer to yield water to the public water supply. The City currently uses two municipal drinking water wells. The continued long-term impact from water withdrawals throughout the aquifers is not known. Increased water use may result in a reduction in aquifer yield or increase the likelihood that contaminants of human or natural origin may affect the quality of drinking water. The City currently pumps around 60 MGY from its groundwater wells, and is projected to pump around

160 MGY by 2010 (See Part 1 Report). See Table 3, Well Pumping Data. This is a large projected increase in water use. The City should try to implement conservation measures to try to reduce this future use. Increasing water use to that large of an extent will require additional water supply wells, system infrastructure, and will change the DWSMA boundaries. The annual pumping rate is projected to increase as population and demand grow; however, the aquifer is expected to yield sufficient water to meet the future needs of the City.

There are a few small surface water ponds located in the Well No. 2 DWSMA, and part of the surface water body Lake Elmo is located within the DWSMA. The Lake Elmo WHPA is located within the St. Croix River watershed basin.

B. LAND USE DATA ELEMENTS

1. Land Use. Due of the susceptibility of all of the City's wells to contamination, the wells are affected by land use activities within the DWSMA. Due to the information contained in Part 1 which indicates that the public water supply is moderately to highly vulnerable to certain land use activities, an inventory of other wells, storage tanks, waste sites, hazardous waste generators, septic systems, and shallow disposal wells located within the DWSMA is required. A listing of wells and other potential contaminant sites inventoried within the DWSMA and a map showing their locations are included as Table 1 and Figure 2.

Land use maps and zoning maps for the area located within the DWSMA are located within the Appendix. The DWSMA consists of approximately 1,400 acres. Approximately 1,300 acres (93%) are located within the City of Lake Elmo (Washington County), and 100 acres (7%) are located in the City of Oak Park Heights (Washington County). See Figure 3. The area is mostly comprised of agricultural, commercial, and residential land. See Figure 5. The City has control of land uses through their zoning ordinances.

Because of the aforementioned vulnerable classification of the DWSMA, contamination can come from both surface and subsurface sources. Soil and aquifer characteristics elaborated earlier in this report have shown that surface contaminants are able to infiltrate and migrate through the soils to the groundwater. That is why it is important to monitor land uses in the DWSMA and possible sources of contamination to the wells.

Possible contaminant sources were identified and evaluated within the DWSMA. It is important to realize that the WHPA does cover two municipalities, so cooperation between different municipalities is essential. The following potential contaminant sources were found to be within the DWSMA:

a) Public and Private Wells. Figure 2 shows a map of all public and private wells that were located. Fifty (50) private wells and five (5) public water supply wells are located within the DWSMA. One (1) observation well was also found. There are no known "lost" municipal wells at this time within the City.

b) ISTS. Shallow groundwater is highly susceptible to pollution from septic tanks. Ninety one (91) ISTS systems were found within the DWSMA.

c) Registered Storage Tanks. Registered storage tanks are regulated by the Minnesota Pollution Control Agency (MPCA). All storage tanks are regulated with the exception of tanks used for agriculture, septic tanks, or tanks with a capacity of 110 or less. These tanks may be above or below ground. One (1) active registered storage tank was found.

d) Leaking Underground Storage Tanks. Two (2) leaking underground storage tanks were found within the DWSMA, of unknown status.

e) Hazardous Waste Generators. Within the DWSMA, eight (8) sites

were found that generate hazardous waste materials. See Figure 2.

f) Shallow Disposal Wells. To date, there are two (2) known shallow disposal wells within the DWSMA. Each city well site, Well No. 1 and 2, has a gravel pocket that receives clear water drainage, which is classified as a shallow disposal well and a potential Class V well. These locations are noted on the IWMZ datasheets found in the appendix as Exhibit 3. There are no known large community septic systems known at this time, which would also classify as a Class V well.

g) Pesticide Use. Since part of the DWSMA is comprised of agricultural land, there may be pesticides used on the surface agriculture. Proper pesticide usage and stormwater regulations can help to mitigate the effects of pesticide contamination of the groundwater.

h) Other. Within the DWSMA there was also one observation well, one NPDES site, one pipeline facility, and one air release point which are each a potential source of groundwater contamination.

2. Public Utility Services. Utility service in the DWSMA consists of some City water, some City stormwater, and a gas pipeline. Most utilities should not pose a significant risk to groundwater pollution. To mitigate stormwater infiltration problems, stormwater controls should be implemented to reduce its possible impact on the groundwater. There are a few high volume transportation routes within the DWSMA that pose a threat due to spills or accidents. Highway 5 and a railroad line run through the Well No. 1 DWSMA, and Highway 36 runs along the north boundary of the Well No. 2 DWSMA.

C. WATER QUANTITY DATA ELEMENTS

1. Surface Water Quantity. It has been shown that surface water may infiltrate and recharge the aquifers used by the City wells. There are a few small surface water ponds located in the Well No. 2 DWSMA, and a portion of

Lake Elmo surface water body located in the Well No. 2 DWSMA. See Figure 8.

2. Groundwater Quantity Groundwater levels are adequate for the amounts that the City of Lake Elmo is currently permitted for under the groundwater appropriations program that is administered by the Minnesota Department of Natural Resources (MDNR). There are currently no other high capacity wells within the DWSMA for which well interference complaints with the City wells have been documented. At this time, there appears to be sufficient groundwater quantity based upon existing pumping capacity of all wells completed in the aquifer used by the City, and the City does not exceed its permitted withdrawal volumes. If new high capacity wells or new appropriation permits are implemented, the potential impacts to the DWSMA should be reviewed. With the large volume of projected water use in 2010, the City should implement conservation measures to try to reduce this future water use as much as possible.

D. WATER QUALITY DATA ELEMENTS

1. Surface Water Quality. There are a few small surface water ponds located in the Well No. 2 DWSMA, and a small portion of Lake Elmo surface water body located in the Well No. 2 DWSMA. Water quality of these surface bodies is unknown. Surface water may be able to infiltrate and recharge the groundwater, so any future surface water bodies should be monitored for water quality. This water bodies do not directly receive stormwater but probably receive runoff during rainfall events.

2. Groundwater Quality. Well water is tested annually to determine if it meets water quality parameters. Existing information consisting of isotopic and chemical analyses indicates that the aquifers used by the public water supply may be recharged by surface water. Tritium tests are unavailable for the wells and have not been performed to date. As such, there is a moderate to high probability that current land use has a direct impact on the quality of drinking water. Additional information should be collected over the ten-year life of the plan to continue to monitor groundwater quality. The City

is currently supplying its citizens with good groundwater that meets all drinking water quality standards. See the Consumer Confidence Report in the Appendix.

III. ASSESSMENT OF DATA ELEMENTS

A. USE OF THE WELL

General information describing this public water supply system is presented in Part 1 of this Plan. The City currently uses two drinking water supply wells. They currently pump around 60 MGY. Well No. 1 is expected to pump 100 MGY by 2010 and Well No. 2 is projected to use approximately 54 MGY by 2010 as outlined in the Part 1 report. The Inner Wellhead Management Zone (IWMZ) of each City well was checked during the completion of this report, and the wells were found to conform to regulations. IWMZ forms are found in the Appendix as Exhibit 3.

B. WELLHEAD PROTECTION AREA DELINEATION CRITERIA

See Part 1 of this Plan for documentation regarding how the following delineation criterion was applied to determining the boundaries of the WHPA:

1. Time of Travel – ten years
2. Flow Boundaries – geologic information
3. Daily Volume – provided by the City
4. Ground Water Flow Field – delineation method
5. Aquifer Transmissivity – aquifer test plan

The following items were recommended in the Part 1 report: 1) Investigation of the surface water quality in the High Vulnerability areas, since there may be a link between surface water and groundwater in these areas, 2) Collect tritium samples from Well No. 1 and 2 to determine contribution of the shallow versus the deep water aquifer, and 3) Revisit the modeled hydraulic conditions near Well 1 and include any new aquifer test data available, and evaluate any well logs of deep wells constructed since this plan.

C. QUALITY AND QUANTITY OF WATER SUPPLYING THE PUBLIC WATER

SUPPLY WELL

Water quality monitoring results for the two wells used by Lake Elmo indicate no evidence of contamination from 1) human-origin such as fuel and fuel break-down products, pesticides, or commercial fertilizer, or 2) naturally occurring contaminants such as arsenic and boron. However, water quality monitoring results in other areas of the City do indicate evidence of contamination from human-origin such as fuel and industrial products. Contamination in these areas are being addressed and monitored. The interaction between this known contamination and the City's aquifers should continued to be watched. At this time, problems with water quality are not an issue as the system has enjoyed water quality that meets or exceeds standards in the Federal Safe Drinking Water Act.

D. THE LAND AND GROUNDWATER USES IN THE DRINKING WATER SUPPLY MANAGEMENT AREA

Proactive management of land uses including existing wells, shallow disposal wells, hazardous waste sites, septic systems, and storage tanks are of immediate concern due to the vulnerable rating of the aquifer. The management strategies selected and documented in Chapter 5 of this Plan will focus in on activities that have the most potential to impact the aquifer this public water supply system is using for its drinking water supply. Implementation of management strategies however might be difficult since the DWSMA is located in two different municipalities: the City of Lake Elmo and Oak Park Heights. Land use in Oak Park Heights may change and is out of the range of influence of the City of Lake Elmo. Through cooperation with Oak Park Heights and its residents, it is the intent that Lake Elmo land use controls and other additional steps will be taken to protect the drinking water quality of the aquifers within the DWSMA.

IV. IMPACT OF CHANGES ON PUBLIC WATER SUPPLY WELL

A. CHANGES IDENTIFIED IN

1. Physical Environment. Large-scale changes in the physical environment within the DWSMA are not anticipated during the 10-year period that this Plan is in effect. Current anticipated changes include the conversion of agricultural land in the Well No. 2 DWSMA to residential development. However, large scale environmental changes within the DWSMA could affect the aquifer greatly and should be immediately addressed if they arise.

2. Land Use. Because of the vulnerable classification of the DWSMA, contamination can come from both surface and subsurface sources. That is why it is important to monitor land uses in the DWSMA and possible sources of contamination to the wells. Land uses that could possible contaminate the aquifer such as underground storage tanks or hazardous waste generators within the DWSMA should be addressed during city permitting review.

   Land uses that result in additional use of the aquifer in the DWSMA will likely have little impact on the aquifer unless water demand is increased to the point that additional loss in hydraulic head occurs within the aquifer used by the public water supply. Land uses which use the aquifer greatly should trigger monitoring of existing contamination plumes in the region in case increased pumping rates draw the contaminants towards the Public Water Supply (PWS) wells.

3. Surface Water. There are a few small surface water bodies in the DWSMA. There appears to be a direct hydraulic connection between surface water and the aquifer used by the public water supply system as a drinking source, as previously noted. Any surface waters would have a high probability of effecting the quality or quantity of the public water supply, especially in the high vulnerability areas. Water quality of the existing and

any new surface water bodies should be monitored to mitigate possible contamination to the aquifer via surface water infiltration.

4. Groundwater. The public water supply system's wells have historically provided groundwater of excellent quality and quantity. As of the date of Plan approval, the community does anticipate the addition of a municipal well in the future, which will alter the boundaries of the DWSMA. The City does not anticipate; 1) addition of other large capacity water users to the public water system; and 2) no large expansions are being planned by businesses currently served. Greatly increased water demand from the aquifers could result in the loss of hydraulic head within the aquifer and may alter the boundaries of the WHPA.

B. IMPACT OF CHANGES

1. Expected Changes in Water Use. The City anticipates that its water use will increase greatly within the 10 years this plan is in effect. The City will re-evaluate its water-use patterns for the second five-year interval as part of its comprehensive planning activities and incorporate these results into future revision of this Plan.

2. Influence of Existing Water and Land Government Programs and Regulation. Government programs oversee many programs that help to control groundwater pollution. The Minnesota Department of Health has the authority in permitting wells, and Washington County has a delegation agreement with the MDH for the remainder of the regulatory responsibilities with wells. The Minnesota Department of Natural Resources appropriates water uses. Both the City of Lake Elmo and Washington County have land use ordinances that could be revised in the future to address possible contamination sites within the DWSMA. Local land use, zoning changes and stormwater management may be the most effective way to guard against potential contamination sources in the future. However, there is no discussion, or intention at this time of requiring additional regulation related to managing wells other potential contamination sources within the City's DWSMA.

Washington County currently has a cost sharing program to address the sealing of unused/unsealed wells, and may assist with these wells as they are identified. The City also has an ordinance prohibiting the connection of new wells to a plumbing system so that it interconnects with the public water supply distribution system. A copy of this portion of the City Ordinance is included in the Appendix as Exhibit 4.

3. Administrative, Technical, and Financial Considerations. The City of Lake Elmo assembled a Wellhead Protection Team early in the process of developing this Plan. Many of the activities during the planning process have been accomplished through efforts of this group, with assistance from studies provided by other units of government. For this Plan to be effective:

   a) The City will need to raise public awareness of the issues affecting its drinking water supply through public educational programs.

   b) Administrative duties will remain with the Wellhead Protection Manager who will report to the City Council.

   c) Implementation of Wellhead Protection activities will be provided by funds from the City's budget. Other sources of possible funding or assistance may include; 1) Existing State or County cost share funds for abandoned well sealing; 2) the Minnesota Department of Health; and 3) the Minnesota Rural Water Association for technical assistance. The MPCA and the MDH are also sources of information regarding groundwater protection.

   d) The costs of implementing Wellhead Protection activities will be evaluated on an annual basis. The City will discuss changes in plan implementation costs with the MDH to determine the availability of State or Federal funding if needed.

V. ISSUES, PROBLEMS, AND OPPORTUNITIES

A. LAND USE ISSUES, PROBLEMS, AND OPPORTUNITIES RELATED TO:

1. The Aquifers. Since the aquifers are moderately to highly vulnerable to contamination, the system can be greatly affected by land use activities. Land use and Zoning regulations should discourage the types of activities that may cause contamination of the aquifers. If additional high capacity wells are added to the area, the DWSMA may have to be delineated again. Since little hydrogeologic information is currently available, additional research and studies would increase knowledge and help to protect the aquifers.

2. The Well Water. A potential contaminant source inventory performed for this report. The wellhead protection plan is primarily concerned with other water supply wells, storage tanks, hazardous waste generators, septic systems, and shallow disposal wells located within the DWSMA. The aquifers that provide the City wells with water are vulnerable to these potential contaminant sources. The wells should be continually monitored for signs of pollution or contamination.

   The placement of additional high capacity wells, increased pumping from existing wells, or significant changes in current groundwater appropriations within the DWSMA may have an impact on; 1) groundwater availability to all users; 2) increased risk that contamination may enter the part of the aquifer used by the community water supply wells; or 3) change the delineated WHP area and the DWSMA boundaries. The DNR and the MDH will work with the City of Lake Elmo to become aware of any proposed high-capacity wells within the DWSMA. The MDH and DNR will work with the well owners to minimize or eliminate potential impacts to the City water supply.

3. Storage Tanks. The MPCA Storage Tank Program provides information and assistance to tank owners and others regarding technical standards required of all regulated above ground storage tank systems and underground storage tanks systems. The program evaluates compliance of tank facilities with State statutes and rules through inspections and investigations and determines appropriate enforcement actions when violations are discovered.

   Tank systems of more than 110 gallons are regulated unless they are for residential use, farm tanks, or contain heating oil. All tank systems including farm, residential, and heating oil tanks with a capacity of more than 1,100 gallons are regulated.

   In the City DWSMA we found one active registered storage tank and two leaking underground storage tanks of unknown status.

   This MPCA program should be sufficient to monitor and regulate these potential sources of contamination.

4. Hazardous Waste Generators. Eight (8) hazardous waste generators were found. The MPCA regulates and provides assistance to commercial hazardous waste generators in greater Minnesota. Management requirements depend upon the type and amount of waste they produce. These requirements are part of the federal Resource Conservation and Recovery Act (RCRA) and Minnesota Hazardous Waste Rules. They are designed to protect people and the environment from the effects of improper management of hazardous wastes from commercial sources.

5. Shallow Disposal Wells. Two (2) possible shallow disposal wells were found within the Lake Elmo DWSMA. These were gravel pockets that receive clear water discharge at the city well sites. All Class V wells need to be inventoried with Environmental Pollution Agency (EPA). Two kinds of Class V wells are banned nationwide; those at vehicle maintenance shops and community cesspools. New ones are prohibited, and those in wellhead protection areas should have been closed by 2007. There are no known

large community septic systems known at this time, which would also classify as a Class V well.

6. The Drinking Water Supply Management Area. A primary concern expressed by the City is to ensure that consistent and long-term management of water wells and the potential contaminant sources within the DWSMA. The City has limited legal capabilities to regulate activities in the area of the DWSMA that are beyond its City limits. Lake Elmo needs to work with Oak Park Heights to monitor the quality of the groundwater and land use activities within the DWSMA. Also, the City has no regulatory authority over water appropriations and must rely on the State of Minnesota to address issues and concerns related to pumping. Changes in land use that increase pumping of the aquifer used by the City wells can be assessed by the City for its possible impacts on water availability and quality.

B. IDENTIFICATION OF:

1. Problems and Opportunities Disclosed at Public Meetings and in Written Comment. At the beginning of the planning process other Local Units of Government (LUGs) were identified and informed that the City was beginning the wellhead protection planning process. (See Exhibit 1 in the Appendix for a list of LUGs.) Each unit of government was also sent a copy of the City's delineated WHPA and DWSMA and vulnerability assessment for the wells and DWSMA. No comments from the LUGs were received. The general public was also given opportunities to participate in the planning process and to comment at the Public Informational Meeting and Public Hearing. One person voiced a concern at the public hearing, but it was regarding existing contamination outside the DWSMA boundaries, which is outside the scope of this plan.

2. Data Elements. The state's Wellhead Protection Rule requires that existing information be utilized in developing the initial Wellhead Protection Plan. There is a limited amount of subsurface information available to define local groundwater flow conditions and the groundwater chemistry of the aquifer within the DWSMA. As a result, delineation of the WHPA represents a

composite of capture zones generated by varying aquifer properties.

The City plans to utilize public education opportunities, both existing and proposed to address potential contamination of the aquifer. Additionally, the City will work in cooperation with Washington County to utilize any state well sealing cost share programs currently available. The City currently has an ordinance in place that prohibits the cross connection between privately owned wells and the community water supply distribution system. The City will set a priority on well sealing for existing wells that are unused or not properly maintained.

The City plans to implement this WHP Plan to address potential contamination of the aquifer. The goals and action plans of this report are elaborated in the following chapters. This Plan is scheduled to be updated after ten years or with the construction of a new City well or other variables that may change the system's delineation and properties.

Further, the City will work with MDH to 1) identify proposed wells that may present ground water conflict concerns; 2) ensure these wells are properly constructed; 3) determine whether an alternative aquifer could be used; and 4) identify water-use and conservation requirements that the Minnesota DNR may specify with the groundwater appropriations permit.

Regarding storage tanks, the City will continue to work with MPCA and MDH to 1) track current and likely future locations of tanks; 2) enforce local land use performance standards for land uses that utilize tanks; 3) promote best management practices for all tanks and; 4) provide educational material to tank owners/operators.

Shallow disposal wells are regulated by the federal EPA. The City will cooperate with the MDH in developing an inventory of where these types of wells may be located within the DWSMA and provide the well owners with educational materials regarding the use or management of these types of wells.

ISTS systems are permitted through the City. The City will continue to

inventory any new ISTS in the DWSMAs, review their impact on the plan, and help owners to ensure their systems are in compliance with standards.

The City plans to continue to focus its data collection efforts on the following activities throughout the ten-year life of this Plan:

a) The City will work to continuously identify new potential sources of contamination that are constructed or installed within the DWSMA and to verify their locations in the database.

b) The City will inform MDH when any of the City wells are repaired so that information regarding well construction, static water level, and pumping capacity can be verified or updated.

c) The City will inform the MDH of any wells that are to be properly sealed within the DWSMA so that the Minnesota Geological Survey can be notified and determine whether it can run a borehole geophysical survey of the well.

d) The City will inform the MDH if the City is considering the construction of a new water supply well so that the MDH can determine whether any potential sites for the new well present concerns over well interference or the movement of existing contamination plumes toward existing City or private water supply wells.

3. Status and Adequacy of Official Controls, Plans, and Other Local, State, and Federal Programs on Water Use and Land Use. There are other tools available to the City and other regulating agencies that may be used to achieve the wellhead protection planning goals identified by the wellhead planning team. State and local governmental units such as MDH, Washington County, the DNR, and the City of Lake Elmo oversee the following areas and may be able to aid in the implementation of this plan:

- Well construction - MDH, Washington County

- Well sealing - MDH, Washington County
- State groundwater appropriation permits - DNR
- Public water supply quality - MDH
- Setbacks for specific contaminant sources from a well - MDH and local governments through conditional use permitting
- Local land use and zoning controls - Local Governments
- Tank control program - MPCA
- Shallow disposal wells - USEPA
- ISTS - City, Washington County
- Agricultural tanks and BMP - Department of Agriculture

The wellhead protection planning team recommends that no additional regulations be imposed at this time and are confident that local issues may be adequately addressed through existing processes. These include public education, adoption of best management practices for different types of wells, tank maintenance, water conservation, and good communication with other landowners within the DWSMA.

VI. WELLHEAD PROTECTION GOALS (4720.5240)

The Lake Elmo public water supply is considered to be vulnerable to contamination. Based on geologic conditions, these contaminants could come from both surface and subsurface sources. Consequently, the principle potential sources of contamination to the aquifer are other wells that reach or penetrate it, shallow disposal type wells, surface waters, failing septic systems, and above ground or underground storage tanks. This WHP Plan will focus on preventing contamination of the aquifer and managing the aquifer cooperatively to assure sustainable water supplies for all users through education and management strategies.

The City proposes, through the implementation of this WHP Plan, to strive to supply safe, potable water for its customers into the future.

The WHP team identified the following goals to be achieved with the action items contained in this Plan:

A. Maintain water quality and integrity of the public water supply system's wells.

B. Ensure protection of the City's aquifers.

C. Provide ongoing collection of data to support future wellhead protection efforts.

D. Increase general public awareness of the wellhead protection program, and issues.

VII. OBJECTIVES AND PLANS OF ACTION (4720.5250)

ESTABLISHING PRIORITIES

The aquifer supplying the system's drinking water supply has been identified as being vulnerable to contamination. Based on geologic conditions, these contaminants could come from both surface and subsurface sources. A number of factors must be considered when WHP measures are selected and prioritized (part 4720.5250, subpart 3). Such factors include: contamination of a public water supply well, quantities of the potential contamination sources, location of the source in relation to the well, capability of the geologic material to absorb a contaminant, existence and effectiveness of existing official controls, time required to obtain cooperation, and administrative, legal, technical, and financial resources needed.

Therefore, the Wellhead Protection Planning Team would like to concentrate management efforts on the following factors to create awareness of groundwater protection and help reduce the potential for future contamination of the aquifer:

A. Public education

B. Wells

C. Storage tanks

D. Shallow disposal wells

E. Data collection

F. Inner Wellhead Management Zone (IWMZ)

G. Stormwater

H. ISTS

I. Old Municipal Wells

J. Agricultural Strategies

A. PUBLIC EDUCATION

OBJECTIVE A1: Increase public awareness of the Wellhead Protection Program and groundwater protection issues. Educating the general public about how certain land use activities can impact local water quality.

WHP Measure A1-1:	Create newsletter articles specifically for landowners in the WHP area informing them about wellhead protection and best management practices. Publish articles about WHP in the city newsletter annually.
Source of Action:	City of Lake Elmo
Cooperator(s):	MDH, MRWA for material
Time Frame:	By 2009
Estimated Cost:	Staff time
Goal achieved:	The general public and property owners within the DWSMA become better informed about wellhead protection and groundwater principles.

WHP Measure A1-2:	Send an annual reminder notice to property owners on the PCSI list reminding them of proper wellhead protection best management techniques.
Source of Action:	City of Lake Elmo
Cooperator(s):	MDH, MRWA for material
Time Frame:	By 2009
Estimated Cost:	Staff time
Goal achieved:	The general public and property owners within the DWSMA become better informed about wellhead protection and groundwater principles.

WHP Measure A1-3:	Put wellhead protection general information and links on the city website.
Source of Action:	City of Lake Elmo
Cooperator(s):	MDH, MRWA for material
Time Frame:	By 2009
Estimated Cost:	Staff time
Goal achieved:	The general public and property owners within the DWSMA become better informed about wellhead protection and groundwater principles.

WHP Measure A1-4:	Obtain a video from the MDH or MRWA about Wellhead Protection and show on the cable access network.
Source of Action:	City of Lake Elmo
Cooperator(s):	MDH, MRWA for material
Time Frame:	By 2009
Estimated Cost:	Staff time
Goal achieved:	The general public and property owners within the DWSMA become better informed about wellhead protection and groundwater principles.

B. WELLS

OBJECTIVE B1: Educating the general public about proper well management techniques and how their wells can affect the drinking water supply.

WHP Measure B1-1:	Send an annual reminder notice to well owners on the PCSI list reminding them of proper wellhead protection best management techniques.
Source of Action:	City of Lake Elmo
Cooperator(s):	MDH, MRWA for material
Time Frame:	By 2009
Estimated Cost:	Staff time
Goal achieved:	Well owners within the DWSMA become better informed about well maintenance and wellhead protection.

WHP Measure B1-2:	Act as an information source to identify potential financial assistance such as grants, loans and cost-sharing programs for well work.
Source of Action:	City of Lake Elmo
Cooperator(s):	MDH, MRWA, Washington County
Time Frame:	By 2009
Estimated Cost:	Staff time
Goal achieved:	Well owners within the DWSMA become better informed on available financial assistance programs for well maintenance and work.

OBJECTIVE B2: Reduce possible contamination pathways via wells to the aquifer and city water system.

WHP Measure B2-1:	Assist well owners in obtaining funding for sealing unused wells.
Source of Action:	City of Lake Elmo
Cooperator(s):	Washing County, cost sharing program
Time Frame:	Starting immediately
Estimated Cost:	Staff time
Goal achieved:	Reduce aquifer contamination pathways via existing wells.

WHP Measure B2-2:	Require that all property owners within the area under jurisdiction connect to the public water supply and disconnect their well from the home plumbing system to prevent cross-contamination.
Source of Action:	City of Lake Elmo
Cooperator(s):	None
Time Frame:	Current ordinance
Estimated Cost:	Staff time
Goal achieved:	Prevent cross-contamination of the water system.

OBJECTIVE B3: Identify wells are not in compliance with Minnesota State Well Code and MDH requirements.

WHP Measure B3-1:	Contact the MDH when wells are found that are a safety and health hazard
Source of Action:	City of Lake Elmo
Cooperator(s):	MDH
Time Frame:	Current Practice, ongoing
Estimated Cost:	Staff time
Goal achieved:	Help to prevent contamination of the water supply by bad wells.

OBJECTIVE B4: Maintain up to date records of well locations and status within the DWSMA.

WHP Measure B4-1:	Request that the MDH informs you when permits are granted for new high capacity wells, maintenance of unused existing wells, when existing wells are disclosed as a result of property transfer, or abandoned wells are sealed in the wellhead protection area
Source of Action:	MDH
Cooperator(s):	City of Lake Elmo
Time Frame:	2008, Ongoing
Estimated Cost:	Staff time to log data as received.
Goal achieved:	Help maintain well database.

C. STORAGE TANKS

OBJECTIVE C1: Educating the general public about proper tank management techniques and how failing tanks can affect the drinking water supply.

WHP Measure C1-1:	Send an annual reminder notice to tank owners on the PCSI list reminding them of proper wellhead protection best management techniques.
Source of Action:	City of Lake Elmo
Cooperator(s):	MDH, MRWA, MPCA for material
Time Frame:	By 2009
Estimated Cost:	Staff time
Goal achieved:	Tank owners within the DWSMA become better informed about proper tank maintenance and wellhead protection.

OBJECTIVE C2: Maintain up to date records of tank locations and status within the DWSMA. Ensure new tank installation comply with wellhead protection principals.

WHP Measure C2-1:	City staff will identify and review proposed new regulated tank locations during the permit review process. Encourage tank locations that do not increase possible contamination sites within the DWSMA
Source of Action:	City of Lake Elmo, Planning Department
Cooperator(s):	
Time Frame:	By 2009
Estimated Cost:	Staff time
Goal achieved:	Staff will be aware and be able to record new tank locations and how they may affect the DWSMA.

D. SHALLOW DISPOSAL WELLS

OBJECTIVE D1: Identify any shallow disposal wells within or near the DWSMA.

WHP Measure D1-1:	Continue to monitor for locations of shallow disposal wells within the DWSMA.
Source of Action:	City of Lake Elmo
Cooperator(s):	
Time Frame:	Immediately
Estimated Cost:	Staff time
Goal achieved:	Keep current records of all possible contamination sites within the DWSMA.

WHP Measure D1-2:	Act as an information resource about EPA regulations to any property owners where a shallow disposal well is discovered.
Source of Action:	City of Lake Elmo
Cooperator(s):	EPA
Time Frame:	2009
Estimated Cost:	Staff time
Goal achieved:	Property owners within the DWSMA become more Informed about EPA regulations regarding shallow disposal wells in WHP areas.

E. DATA COLLECTION

OBJECTIVE E1: Continue to collect data on the DWSMA and potential sources of contamination within it.

WHP Measure E1-1:	Create and maintain a database of PCSI sites within the DWSMA, and update as new information is found.
Source of Action:	City of Lake Elmo
Cooperator(s):	MDH, MPCA
Time Frame:	2009
Estimated Cost:	Staff Time
Goal achieved:	Lake Elmo will have an up to date list of PCSI sources in the DWSMA and will be able to contact property owners as needed.

WHP Measure E1-2:	Monitor planning and zoning activities within the DWSMA that may affect the area during the permit review process.
Source of Action:	City of Lake Elmo, Planning Department
Cooperator(s):	
Time Frame:	Immediately
Estimated Cost:	Staff time
Goal achieved:	Lake Elmo will stay aware of land use activities which may have a negative effect on the DWSMA.

WHP Measure E1-3:	Sample City Public Supply wells on a minimum annual basis and watch water quality results for contaminants. Especially for migration of known contamination.
Source of Action:	City of Lake Elmo
Cooperator(s):	MDH
Time Frame:	Current Practice
Estimated Cost:	Staff time
Goal achieved:	Lake Elmo will stay aware of the water quality of the public water supply aquifer DWSMA.

F. INNER WELLHEAD MANAGEMENT ZONE (IWMZ)

OBJECTIVE F1: Manage the 200-ft inner well management zone to prevent contaminants from entering the area adjacent to the wells.

WHP Measure F1-1:	Review and update the IWMZ survey for all city wells.
Source of Action:	City of Lake Elmo
Cooperator(s):	MRWA
Time Frame:	Immediately, every 5 years
Estimated Cost:	Staff time
Goal achieved:	Staff will remain informed and current on activities within the IWMZ. Staff will have current map on file.

WHP Measure F1-2:	Annually perform a visual monitor of well setbacks for all new potential sources of contamination.
Source of Action:	City of Lake Elmo
Cooperator(s):	MRWA
Time Frame:	Next year 2009, ongoing
Estimated Cost:	Staff time
Goal achieved:	Staff will remain informed and current on activities within the IWMZ.

G. STORMWATER

OBJECTIVE G1: Integrate stormwater management into the city planning and development review process such that the potential impact of stormwater systems upon the drinking water aquifer is minimized.

WHP Measure G1-1:	Add a wellhead protection review to any stormwater related system during the permit review process.
Source of Action:	City of Lake Elmo, Planning Staff
Cooperator(s):	MPCA, MDH
Time Frame:	By 2009
Estimated Cost:	Staff time
Goal achieved:	The City helps to protect the aquifer through sound management of stormwater.

WHP Measure G1-2:	Encourage best management practices for residential lawn care and agricultural land management using the city website to provide information.
Source of Action:	City of Lake Elmo
Cooperator(s):	MPCA, MDH
Time Frame:	By 2009
Estimated Cost:	Staff time
Goal achieved:	Reduce groundwater quality problems caused by stormwater runoff.

H. ISTS

OBJECTIVE H1: Educating the general public about proper ISTS management techniques and how failing systems can affect the drinking water supply.

WHP Measure H1-1:	Send an annual reminder notice to ISTS owners on the PCSI list reminding them of proper wellhead protection best management techniques.
Source of Action:	City of Lake Elmo
Cooperator(s):	MDH, MRWA, MPCA for material
Time Frame:	By 2009
Estimated Cost:	Staff time
Goal achieved:	ISTS owners within the DWSMA become better informed about proper maintenance and wellhead protection.

OBJECTIVE H2: Maintain up to date records of ISTS locations within the DWSMA.

WHP Measure H2-1:	City staff will review proposed ISTS locations during the city permit review process and update PCSI file.
Source of Action:	City of Lake Elmo, Planning Department
Cooperator(s):	
Time Frame:	By 2009
Estimated Cost:	Staff time
Goal achieved:	Staff will be aware and be able to record new ISTS locations and how they may affect the DWSMA.

OBJECTIVE H3: Ensure that ISTS installations comply with regulations.

WHP Measure H3-1:	City staff will monitor ISTS installations and issue notices to property owners if systems are found which are a public health problem.
Source of Action:	City of Lake Elmo
Cooperator(s):	
Time Frame:	Current Practice
Estimated Cost:	Staff time
Goal achieved:	Reduce existing water quality problems caused by failing septic systems.

WHP Measure H3-2:	Act as an information/referral resource for best management practices and for existing grants or loans for ISTS maintenance. Especially for failing existing systems.
Source of Action:	City of Lake Elmo
Cooperator(s):	SWCD, Department of Agriculture, Ag BMP Loan
Time Frame:	By 2010
Estimated Cost:	Staff Time
Goal achieved:	Reduce existing water quality problems caused by failing septic systems.

I. OLD MUNICIPAL WELLS

OBJECTIVE I1: Properly manage any former city wells to reduce potential contamination of the aquifer used by the city.

WHP Measure I1-1:	Determine the status and location of any former city wells with assistance from the MDH Well Management Section, as necessary. Locate any technical or financial assistance necessary to seal any well(s) that are located and need to be properly sealed. As appropriate, either properly sealed unused, unsealed former municipal wells or obtain the proper maintenance permit from MDH.
Source of Action:	City of Lake Elmo
Cooperator(s):	MDH
Time Frame:	2010
Estimated Cost:	Staff time
Goal achieved:	The location and status of former public water supply wells are known and a determination is made regarding what may need to be done with the wells identified.

J. AGRICULTURAL STRATEGIES

OBJECTIVE J1: Encourage agricultural practices in the DWMSA to be congruent with wellhead protection principles.

WHP Measure J1-1:	Encourage BMPs for agricultural storage and land management.
Source of Action:	City of Lake Elmo
Cooperator(s):	SWCD, Department of Agriculture, Ag BMP Loan
Time Frame:	By 2010
Estimated Cost:	Staff time
Goal achieved:	Reduce water quality problems caused by agricultural runoff or infiltration.

VIII. EVALUATION PROGRAM (4720.5270)

The success of the wellhead protection source management program must be evaluated in order to determine whether the plan is actually accomplishing what the City of Lake Elmo set out to do. The following activities will be implemented to:

- Track the implementation of the objectives identified in Chapter 5 of this Plan
- Determine the effectiveness of specific management strategies regarding the protection of the public water supply
- Identify possible changes to these strategies which may improve their effectiveness
- Determine the adequacy of financial resources and staff availability to carry out the management strategies planned for the coming year.

1. Lake Elmo will continue to cooperate with the Minnesota Department of Health in the annual monitoring of the water supply to determine whether the management strategies are having a positive effect and to identify water quality problems that may arise that must be addressed.

2. The wellhead protection team will meet on an as-needed basis, with a minimum of one annual meeting to review the results of each strategy implemented during the previous plan year and identify and discuss whether modifications are needed for those strategies and additional strategies for the coming plan year.

IX. ALTERNATIVE WATER SUPPLY; CONTINGENCY STRATEGY (4720.5280)

An updated Lake Elmo Water Supply Conservation Plan has been submitted to the MnDNR Division of Waters, Appropriation Permit Program in 2006. This plan contains the required elements of the MN Wellhead Protection Rule and is accepted as an equivalent to an Alternative Water Supply/Contingency Plan as defined in 4720.5280. Implementation of the Plan will begin upon approval, with the aid and assistance of local emergency management agencies. A copy of the Plan is available for review at the City Hall or by contacting the Wellhead Protection Manager.

APPENDIX

TABLES

Table No. 1

Potential Contaminant Source Index (PCSI) Verified Sites

Wellhead Protection Plan, Part 2
City of Lake Elmo, MN

	Facility Name	Feature ID	PID	Type	Facility Address		PCS Code	PCS Material Code (if required)	Facility Designation	Well 1	Well 2
1	Abercrombie, Robert		1302921340025	ISTS	3091 Layton Ct N	Lake Elmo	ISTS		1100-01		X
2	Anderson, Jeffrey and Claudia		1302921330035	ISTS	11225 31st St N	Lake Elmo	ISTS		1100-01		X
3	Andrews, John and Cherl		1302921340003	ISTS	11295 32nd St N	Lake Elmo	ISTS		1100-01		X
4	Ardell Hutton	252664	1302921320062	WEL	11108 32nd St. N	Lake Elmo	WEL		1100-01	X	
5	Arndt, Richard and Deloris		1302921340009	ISTS	11280 30th St N	Lake Elmo	ISTS		1100-01		X
6	Bachman, Stephen and Sharon		1402921440027	ISTS	3141 Klondike Ave N	Lake Elmo	ISTS		1100-01		X
7	Baker, Donald		1302921320038	ISTS	3303 Lake Elmo Ave N	Lake Elmo	ISTS		1100-01	X	
8	Basset, Robert and Bailey, P		1402921440026	ISTS	3161 Klondike Ave N	Lake Elmo	ISTS		1100-01		X
9	Bergman, Keith and Julie		0102921220007	ISTS	5833 Lake Elmo Ave N	Lake Elmo	ISTS		1100-01		X
10	Bergman, Richard and Eileen		0102921230002	ISTS	5500 Lake Elmo Ave N	Lake Elmo	ISTS		1100-01		X
11	Bergmann	164315	102921220007	ISTS	5833 Lake Elmo Dr	Lake Elmo	ISTS		1100-01		X
12	Bergmann	164315	102921220007	WEL	5833 Lake Elmo Dr	Lake Elmo	WEL		1100-01		X
13	Bouthilet, Colleen and Terrance		1402921440017	ISTS	10891 32nd St N	Lake Elmo	ISTS		1100-01		X
14	Buberl	140043	602920210003	WEL	5750 Memorial Av	Oak Park Heights	WEL		4346-04		X
15	Buberl Recycling And Compost	84157	602920210003	HWGP	5750 Memorial Ave N	Oak Park Heights	HWG		4346-04		X
16	Century Power Equipment	84160	602920120005	HWGP	5920 Memorial Ave N	Oak Park Heights	HWG		4310		X
17	Century Power Equiptment	169612	602920120005	ISTS	5920 Memorial Av	Oak Park Heights	ISTS		4310		X
18	Century Power Equiptment	169612	602920120005	PWS	5920 Memorial Av	Oak Park Heights	PWS		4310		X
19	Century Power Equiptment	169612	602920120005	WEL	5920 Memorial Av	Oak Park Heights	WEL		4310		X
20	Chateau Communities	46287	3602921210001	NPDES	901 Lake Elmo Av N	Lake Elmo	NPDES		1100-02	X	
21	City of Lake Elmo		1402921440024	ISTS	Klondike Ave N and 32nd Ave	Lake Elmo	ISTS		6200		X
22	Costello, Paul		1302921340011	ISTS	11252 31st St N	Lake Elmo	ISTS		1100-01		X
23	Criego, Gail		1302921340012	ISTS	11272 31st St N	Lake Elmo	ISTS		1100-01		X
24	Dahlblom, Doug	224044	102921220001	ISTS	5749 Lake Elmo Av N	Lake Elmo	ISTS		1100-01		X
25	Dahlblom, Doug	224044	102921220001	WEL	5749 Lake Elmo Av N	Lake Elmo	WEL		1100-01		X
26	Dahlblom, Douglas		0102921220001	ISTS	5749 Lake Elmo Ave N	Lake Elmo	ISTS		1100-01		X
27	Dahlbloom Excavating	83987	102921220001	HWGP	5749 Lake Elmo N	Lake Elmo	HWG		7000		X
28	Dau, Donald and Irene		1302921340030	ISTS	3081 Layton Ct N	Lake Elmo	ISTS		1100-01		X
29	David Downing	181452	102921330001	ISTS	5135 Lake Elmo Av	Lake Elmo	ISTS		1100-01		X
30	David Downing	181452	102921330001	WEL	5135 Lake Elmo Av	Lake Elmo	WEL		1100-01		X
31	David Perrin	267576	1402921440025	ISTS	10823 32nd St N	Lake Elmo	ISTS		1100-01	X	
32	David Perrin	267576	1402921440025	WEL	10823 32nd St N	Lake Elmo	WEL		1100-01	X	
33	Denoma, Michael		2302921110002	ISTS	3065 Klondike Ave N	Lake Elmo	ISTS		1100-01		X
34	Donald Baker	27145	1302921320038	LUST	3303 Lake Elmo Ave S	Lake Elmo	LUST		1100-01	X	
35	Downs, Michael and Patricia		1402921440016	ISTS	10899 32nd St N	Lake Elmo	ISTS		1100-01		X
36	Eder, Willard & Sandra	283461	1302921310004	ISTS	3407 Lake Elmo Ave N	Lake Elmo	ISTS		1100-01	X	
37	Eder, Willard & Sandra	283461	1302921310004	WEL	3407 Lake Elmo Ave N	Lake Elmo	WEL		1100-01	X	
38	Geving, Nancy		1302921330036	ISTS	3124 Laverne Ct N	Lake Elmo	ISTS		1100-01		X
39	Greene, David and Heather		1302921340017	ISTS	11269 31st St N	Lake Elmo	ISTS		1100-01		X

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Potential Contaminant Source Index (PCSI) Verified Sites

Wellhead Protection Plan, Part 2
City of Lake Elmo, MN

	Facility Name	Feature ID	PID	Type	Facility Address		PCS Code	PCS Material Code (if required)	Facility Designation	Well 1	Well 2
40	Hansen, Craig & Ann	166669	102921440025	ISTS	5226 Linden Tr N	Lake Elmo	ISTS		1100-01		**X**
41	Hansen, Craig & Ann	166669	102921440025	WEL	5226 Linden Tr N	Lake Elmo	WEL		1100-01		**X**
42	Hicks, George	365281	102921440024	ISTS	5080 Linden Tr	Lake Elmo	ISTS		1100-01		**X**
43	Hicks, George	365281	102921440024	WEL	5080 Linden Tr	Lake Elmo	WEL		1100-01		**X**
44	Hjelmgren, William and Joan		1302921340020	ISTS	3153 Layton Ct N	Lake Elmo	ISTS		1100-01		**X**
45	James Hansen	219307	102921340004	ISTS	11260 50th St N	Lake Elmo	ISTS		1100-01		**X**
46	James Hansen	219307	102921340004	WEL	11260 50th St N	Lake Elmo	WEL		1100-01		**X**
47	John Carr	166734	102921440020	ISTS	5308 Linden Tr	Lake Elmo	ISTS		1100-01		**X**
48	John Carr	166734	102921440020	WEL	5308 Linden Tr	Lake Elmo	WEL		1100-01		**X**
49	June Brochman	155740	102921440029	ISTS	5057 Linden Tr	Lake Elmo	ISTS		1100-01		**X**
50	June Brochman	155740	102921440029	WEL	5057 Linden Tr	Lake Elmo	WEL		1100-01		**X**
51	Kalik, Joe	191208	102921440018	ISTS	5257 Linden Tr	Lake Elmo	ISTS		1100-01		**X**
52	Kalik, Joe	191208	102921440018	WEL	5257 Linden Tr	Lake Elmo	WEL		1100-01		**X**
53	Katherine Leonidas	284915	102921440028	ISTS	5049 Linden Tr	Lake Elmo	ISTS		1100-01		**X**
54	Katherine Leonidas	284915	102921440028	WEL	5049 Linden Tr	Lake Elmo	WEL		1100-01		**X**
55	Keck, Brian and Schiltgen, Molly		1302921340021	ISTS	3127 Layton Ct N	Lake Elmo	ISTS		1100-01		**X**
56	Kelm, Carol		1402921440009	ISTS	10975 32nd St N	Lake Elmo	ISTS		1100-01		**X**
57	Knoll, Craig and Diane		1302921340023	ISTS	3127 Laverne Ct N	Lake Elmo	ISTS		1100-01		**X**
58	Kofoed, Donald and Carol		1302921340026	ISTS	3094 Layton Ct N	Lake Elmo	ISTS		1100-01		**X**
59	Lake Elmo 1	212786		PWS	3303 Langly Ct	Lake Elmo	PWS		6200	**X**	
60	Lake Elmo 1	212786		SWUDS	3303 Langly Ct	Lake Elmo	SWUDS		6200	**X**	
61	Lake Elmo 1	212786		WEL	3303 Langly Ct	Lake Elmo	WEL		6200	**X**	
62	Lake Elmo 1			SPDW	3303 Langly Ct	Lake Elmo	SPDW		6200	**X**	
62	Lake Elmo 2	253970		PWS	55th St N	Lake Elmo	PWS		6200		**X**
63	Lake Elmo 2	253970		SWUDS	55th St N	Lake Elmo	SWUDS		6200		**X**
64	Lake Elmo 2	253970		WEL	55th St N	Lake Elmo	WEL		6200		**X**
65	Lake Elmo 2			SPDW	55th St N	Lake Elmo	SPDW		6200	**X**	
65	Lake Elmo Parks Department	71834		HWGP	11194 Upper 33rd St	Lake Elmo	HWG		6200		**X**
66	Lake Elmo Tw-1	189923		WEL	50th St N	Lake Elmo	WEL		6200		**X**
67	Lake Elmo Tw-2	263809		WEL	55th St N	Lake Elmo	WEL		6200		**X**
68	Lee, Merle and Gisela		1302921340029	ISTS	3084 Layton Ct N	Lake Elmo	ISTS		1100-01		**X**
69	Little Victories Child Care	255528	602920240033	ISTS	5595 Memorial Av N	Oak Park Heights	ISTS		6100		**X**
70	Little Victories Child Care	255528	602920240033	PWS	5595 Memorial Av N	Oak Park Heights	PWS		6100		**X**
71	Little Victories Child Care	255528	602920240033	WEL	5595 Memorial Av N	Oak Park Heights	WEL		6100		**X**
72	Madsen, Stephen		1302921340027	ISTS	3099 Laverne Ct N	Lake Elmo	ISTS		1100-01		**X**
73	Magistad, John and Amy		1302921340024	ISTS	3115 Laverne Ct N	Lake Elmo	ISTS		1100-01		**X**
74	Magnuson, Sharon		2302921110004	ISTS	3047 Klondike Ave N	Lake Elmo	ISTS		1100-01		**X**
75	McCune, Rochelle		1302921330041	ISTS	3190 Lake Elmo Ave N	Lake Elmo	ISTS		1100-01		**X**
76	McCune, Wesley		1302921330012	ISTS	3095 Lake Elmo Ave N	Lake Elmo	ISTS		1100-01		**X**

Table No. 1

Potential Contaminant Source Index (PCSI) Verified Sites

Wellhead Protection Plan, Part 2
City of Lake Elmo, MN

	Facility Name	Feature ID	PID	Type	Facility Address		PCS Code	PCS Material Code (if required)	Facility Designation	Well 1	Well 2
77	Mcginley, Ken	176577	102921440021	ISTS	5288 Linden Tr. N	Lake Elmo	ISTS		1100-01		**X**
78	Mcginley, Ken	176577	102921440021	WEL	5288 Linden Tr. N	Lake Elmo	WEL		1100-01		**X**
79	Meier, James - Testamentary Trust		1302921310012	ISTS	11284 32nd St N	Lake Elmo	ISTS		1100-01		**X**
80	Menendez, Armando and Ella		1302921340022	ISTS	3105 Layton Ct N	Lake Elmo	ISTS		1100-01		**X**
81	Meyer, Donald and Joanne - Trust		1302921340019	ISTS	3112 Layton Ct N	Lake Elmo	ISTS		1100-01		**X**
82	Mezera, Ron	161689	102921440019	ISTS	5279 Linden Tr	Lake Elmo	ISTS		1100-01		**X**
83	Mezera, Ron	161689	102921440019	WEL	5279 Linden Tr	Lake Elmo	WEL		1100-01		**X**
84	Michael Marietta	146781	102921440009	ISTS	5079 Linden Tr N	Lake Elmo	ISTS		1100-01		**X**
85	Michael Marietta	146781	102921440009	WEL	5079 Linden Tr N	Lake Elmo	WEL		1100-01		**X**
86	Miller, Terry and Jullie		0102921220004	ISTS	5819 Lake Elmo Ave N	Lake Elmo	ISTS		1100-01		**X**
87	Moline, James		1402921440030	ISTS	3077 Klondike Ave N	Lake Elmo	ISTS		1100-01		**X**
88	Mw-13	280362		WEL	11320 Upper 33rd St N	Lake Elmo	WEL		6200	**X**	
89	Nass, Bernie	149390	602920230001	WEL	5651 Manning Av N	Lake Elmo	WEL		1100-01		**X**
90	Neuman, Michael and Nelson, M		0102921230011	ISTS	5685 Lake Elmo Ave N	Lake Elmo	ISTS		1100-01		**X**
91	Northern Natural Gas Company	38490		PLFAC	Pipelineruns through WHPA	Lake Elmo	PLFAC		4320	**X**	
92	Northern Natural Gas Company	19648		RST	11371 33rd St N	Lake Elmo	AST	F000	4320	**X**	
93	Olsen, Audrey		1302921340018	ISTS	3124 Layton Ct N	Lake Elmo	ISTS		1100-01		**X**
94	Palmquist, Carol	203727	602920230006	ISTS	12202 55th St N	Lake Elmo	ISTS		1100-01		**X**
95	Palmquist, Carol	203727	602920230006	WEL	12202 55th St N	Lake Elmo	WEL		1100-01		**X**
96	Peter Schiltgen	255590	1402921110001	WEL	10880 Stillwater Blvd	Lake Elmo	WEL		1100-01	**X**	
97	Pott, Mike	206223	102921320002	WEL	5295 Lake Elmo Av N	Lake Elmo	WEL		1100-01		**X**
98	Public Storage	345070	602920210004	ISTS	5710 Memorial Av	Oak Park Heights	ISTS		2300		**X**
99	Public Storage	345070	602920210004	WEL	5710 Memorial Av	Oak Park Heights	WEL		2300		**X**
100	Raleigh, Snowell		1302921340033	ISTS	3074 Laverne Ct N	Lake Elmo	ISTS		1100-01		**X**
101	Reynolds, Rocky and Karen		1302921340005	ISTS	11247 32nd St N	Lake Elmo	ISTS		1100-01		**X**
102	Richard Olsen	283934	102921440008	ISTS	5073 Linden Tr	Lake Elmo	ISTS		1100-01		**X**
103	Richard Olsen	283934	102921440008	WEL	5073 Linden Tr	Lake Elmo	WEL		1100-01		**X**
104	Riley, Pat	176715	1402921420001	ISTS	10550 Stillwater Bl	Lake Elmo	ISTS		1100-01	**X**	
105	Riley, Pat	176715	1402921420001	WEL	10550 Stillwater Bl	Lake Elmo	WEL		1100-01	**X**	
106	Rubbert, Kenneth and Doreen		1302921340002	ISTS	11279 32nd St N	Lake Elmo	ISTS		1100-01		**X**
107	Ryberg, Paul and Candace		1302921340010	ISTS	11326 30th St N	Lake Elmo	ISTS		1100-01		**X**
108	Sachs, Jim	204493	102921320003	ISTS	5255 Lakeelmo Av N	Lake Elmo	ISTS		1100-01		**X**
109	Sachs, Jim	204493	102921320003	WEL	5255 Lakeelmo Av N	Lake Elmo	WEL		1100-01		**X**
110	Sanchez, Octavio and Michelle		1302921340004	ISTS	11267 32nd St N	Lake Elmo	ISTS		1100-01		**X**
111	Schiltgen Farms, Inc.	280101	1402921110001	ISTS	10880 Stillwater Blvd	Lake Elmo	ISTS		9000-01	**X**	
112	Schiltgen Farms, Inc.	280101	1402921110001	WEL	10880 Stillwater Blvd	Lake Elmo	WEL		9000-01	**X**	
113	Schmidt, Bruce		1302921330014	ISTS	3063 Lake Elmo Ave N	Lake Elmo	ISTS		1100-01		**X**
114	Schwarz, David and Mary		1402921440010	ISTS	10961 32nd St N	Lake Elmo	ISTS		1100-01		**X**
115	Score, Blake and Brenda		1302921340016	ISTS	11295 31st St N	Lake Elmo	ISTS		1100-01		**X**

Table No. 1

Potential Contaminant Source Index (PCSI) Verified Sites

Wellhead Protection Plan, Part 2
City of Lake Elmo, MN

	Facility Name	Feature ID	PID	Type	Facility Address		PCS Code	PCS Material Code (if required)	Facility Designation	Well 1	Well 2
116	Stephen and Sharon Bachman	197050	1402921440027	WEL	3141 Klondike Av N	Lake Elmo	WEL		1100-01	**X**	
117	Stephen Schumacher	245506	102921440023	ISTS	5038 Linden Tr N	Lake Elmo	ISTS		1100-01		**X**
118	Stephen Schumacher	245506	102921440023	WEL	5038 Linden Tr N	Lake Elmo	WEL		1100-01		**X**
119	Steve Palmer	171602	102921440027	ISTS	5041 Linden Tr N	Lake Elmo	ISTS		1100-01		**X**
120	Steve Palmer	171602	102921440027	WEL	5041 Linden Tr N	Lake Elmo	WEL		1100-01		**X**
121	Stillwater Motor Co	84238	602920120004	HWGP	5900 Stillwater Blvd N	Oak Park Heights	HWG		2110		**X**
122	Stillwater Motors	144731	602920120004	PWS	5900 Stillwater Bl	Oak Park Heights	PWS		2100		**X**
123	Stillwater Motors	144731	602920120004	UNSPEC	5900 Stillwater Bl	Oak Park Heights	UNSPEC		2100		**X**
124	Stillwater Motors	144731	602920120004	WEL	5900 Stillwater Bl	Oak Park Heights	WEL		2100		**X**
125	Stillwater Properties LLC	190292	3203020210022	WEL	6750 Stillwater Bl	Stillwater	WEL				**X**
126	Stillwater Properties LLC	224771	3203020210022	WEL	6750 Stillwater Bl	Stillwater	WEL				**X**
127	Stillwater Properties LLC	366002	3203020210022	WEL	6750 Stillwater Bl	Stillwater	WEL				**X**
128	Stillwater West Llc	155402	602920240006	ISTS	5635 Memorial Av	Oak Park Heights	ISTS				**X**
129	Stillwater West Llc	155402	602920240006	WEL	5635 Memorial Av	Oak Park Heights	WEL			**X**	
130	Sunfish Lake	107751		GAGE	Off Hwy 5	Lake Elmo	GAGE		NA		**X**
131	Svedberg, Eric	295123	102921440016	WEL	5197 Linden Tr N	Lake Elmo	WEL		1100-01		**X**
132	Svedberg, Eric & Michele	171828	102921440016	ISTS	5197 Linden Tr N	Lake Elmo	ISTS		1100-01		**X**
133	Svedberg, Eric & Michele	171828	102921440016	WEL	5197 Linden Tr N	Lake Elmo	WEL		1100-01		**X**
134	Swanson, Ronald and Barbara		1302921340008	ISTS	11316 30th St N	Lake Elmo	ISTS		1100-01		**X**
135	Tacke, Carl and Delores		1302921340014	ISTS	11306 31st St N	Lake Elmo	ISTS		1100-01		**X**
136	Tarbutton, Kent		1302921340013	ISTS	11292 31st St N	Lake Elmo	ISTS		1100-01		**X**
137	Telemetry & Process Controls	44933	1302921240022	ARP	11320 N Upper 33rd	Lake Elmo	ARP		3360	**X**	
138	Telemetry & Process Controls	71830	1302921240022	HWGP	11320 Upper 33rd St N	Lake Elmo	HWG		3360	**X**	
139	Telemetry & Process Controls	158441	1302921240022	OBWEL	11320 Upper 33rd St N	Lake Elmo	OBWEL		3360	**X**	
140	Telemetry & Process Controls	158441	1302921240022	WEL	11320 Upper 33rd St N	Lake Elmo	WEL		3360	**X**	
141	Thomas and Melissa Worm	274907	102921440022	ISTS	5264 Linden Tr	Lake Elmo	ISTS		1100-01		**X**
142	Thomas and Melissa Worm	274907	102921440022	WEL	5264 Linden Tr	Lake Elmo	WEL		1100-01		**X**
143	Trans City Complex	59990	3602921340008	LUST	11260 Hudson Blvd	Lake Elmo	LUST			**X**	
144	Vineski, Richard	270098	102921440030	ISTS	5063 Linden Tr N	Lake Elmo	ISTS		1100-01		**X**
145	Vineski, Richard	270098	102921440030	WEL	5063 Linden Tr N	Lake Elmo	WEL		1100-01		**X**
146	W Zintl Inc	84156	1202921210001	HWGP	11255 50th Street N	Lake Elmo	HWG		7000		**X**
147	Wagoner, Brian		1302921340015	ISTS	11334 31st St N	Lake Elmo	ISTS		1100-01		**X**
148	Walter and Jane Longacre	165008	602920230007	ISTS	12058 55th St N	Lake Elmo	ISTS		1100-01		**X**
149	Walter and Jane Longacre	165008	602920230007	WEL	12058 55th St N	Lake Elmo	WEL		1100-01		**X**
150	Watson, Wayne		1302921340032	ISTS	11256 30th St N	Lake Elmo	ISTS		1100-01		**X**
151	Weber, Ron	147457	102921230001	ISTS	5577 Lake Elmo Av N	Lake Elmo	ISTS		1100-01		**X**
152	Weber, Ron	147457	102921230001	WEL	5577 Lake Elmo Av N	Lake Elmo	WEL		1100-01		**X**
153	Wendt, Edna		1302921310014	ISTS	11328 32nd St N	Lake Elmo	ISTS		1100-01		**X**
154	Wendt, Myron and Beverly		1302921310015	ISTS	11306 32nd St N	Lake Elmo	ISTS		1100-01		**X**

Table No. 1

Potential Contaminant Source Index (PCSI) Verified Sites

Wellhead Protection Plan, Part 2
City of Lake Elmo, MN

	Facility Name	Feature ID	PID	Type	Facility Address		PCS Code	PCS Material Code (if required)	Facility Designation	Well 1	Well 2
155	Werden, John		1302921340007	ISTS	11356 30th St N	Lake Elmo	ISTS		1100-01		**X**
156	Westbrook Assoc.	99966	1302921220002	HWGP	3825 Lake Elmo Cir.	Lake Elmo	HWG				**X**
157	Wilke, Bernie	396765	102921440010	ISTS	5085 Linden Tr N	Lake Elmo	ISTS		1100-01		**X**
158	Wilke, Bernie	396765	102921440010	WEL	5085 Linden Tr N	Lake Elmo	WEL		1100-01		**X**
159	William Wallrich	191301	102921440007	ISTS	5067 Linden Trail	Lake Elmo	ISTS		1100-01		**X**
160	William Wallrich	191301	102921440007	WEL	5067 Linden Trail	Lake Elmo	WEL		1100-01		**X**
161	Williams, Todd and Marjorie		1302921330017	ISTS	3025 Lake Elmo Ave N	Lake Elmo	ISTS		1100-01		**X**
162	Zignego, John and Lucille		1302921340028	ISTS	3081 Laverne Ct N	Lake Elmo	ISTS		1100-01		**X**
163	Zintl, Inc.	255614	602920230017	ISTS	5640 Memorial Av	Oak Park Heights	ISTS		7000		**X**
164	Zintl, Inc.	255614	602920230017	WEL	5640 Memorial Av	Oak Park Heights	WEL		7000		**X**
165	Zintl, William	155186	602920230017	WEL	5640 Memorial Av	Oak Park Heights	WEL		1100-01		**X**

Summary of Types of Sites:

ARP	1
GAGE	1
HWGP	8
ISTS	91
LUST	2
NPDES	1
OBWEL	1
PLFAC	1
PWS	5
RST	1
SPDW	2
SWUDS	2
UNSPEC	1
WEL	50
Total	**167**

Summary of Sites per Well DWSMA:

Well No. 1 Sites	27
Well No. 2 Sites	140
Total	**167**

Table No. 2

Average Precipitation (inches)

Wellhead Protection Plan, Part 2
City of Lake Elmo, MN

Month	2003	2004	2005	2006	2007	Average
Jan	0.19	0.36	1.21	0.74	1.01	0.70
Feb	0.79	1.75	1.06	0.15	1.25	1.00
Mar	1.63	1.75	1.40	1.48	2.99	1.85
Apr	1.83	2.14	2.14	2.48	1.85	2.09
May	6.15	3.91	3.33	3.81	4.06	4.25
Jun	5.02	5.02	6.41	2.76	1.32	4.11
Jul	2.58	2.56	3.01	1.01	1.32	2.10
Aug	0.49	1.85	5.45	7.35	5.95	4.22
Sep	2.64	4.57	5.21	3.35	5.00	4.15
Oct	1.14	2.60	4.68	0.60	3.83	2.57
Nov	0.79	1.40	1.10	1.10	0.09	0.90
Dec	0.86	0.56	1.25	1.89	1.83	1.28
Total (in/yr)	24.11	28.47	36.25	26.72	30.50	**29.21**

*From the Minnesota State Climatology Office, MnDNR Waters
Precipitation Station: 210895 BOWLES CREEK

Table No. 3

Well Pumping Data (Million Gallons)

Wellhead Protection Plan, Part 2
City of Lake Elmo, MN

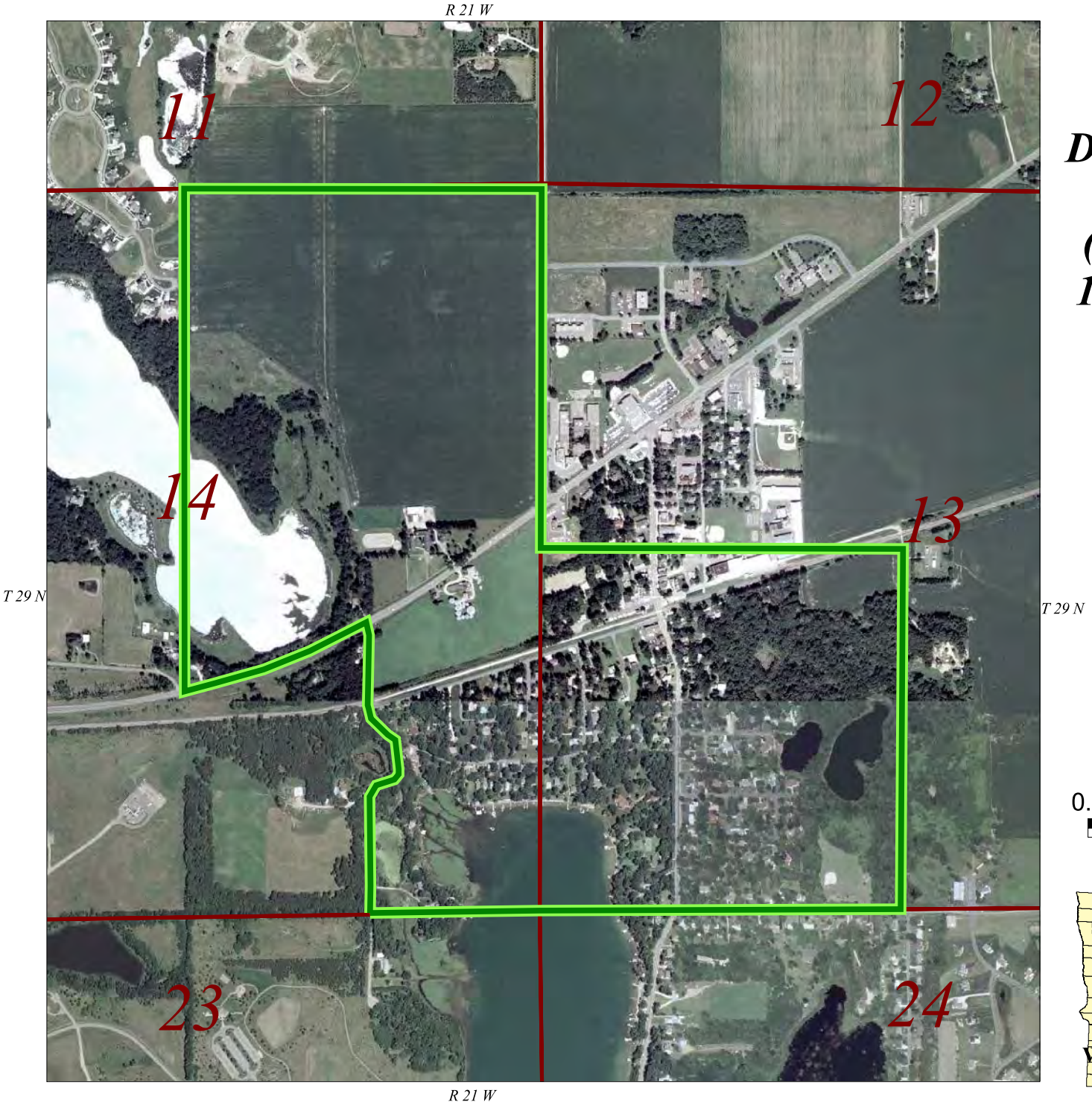
Year	Well No. 1 208448	Well No. 2 603085	Total Pumping (gal)
2002	41.7	0.9	42.6
2003	45.9	18.8	64.7
2004	39.8	16.2	55.9
2005	39.6	16.5	56.0
2006	29.6	52.5	82.1
2007	30.5	111.1	141.6

*Well No. 3 is not in use

FIGURES

Lake Elmo 1

Drinking Water Supply Management Area (DWSMA) MN-00416 10 year Time of Travel



DWSMA

Vulnerable

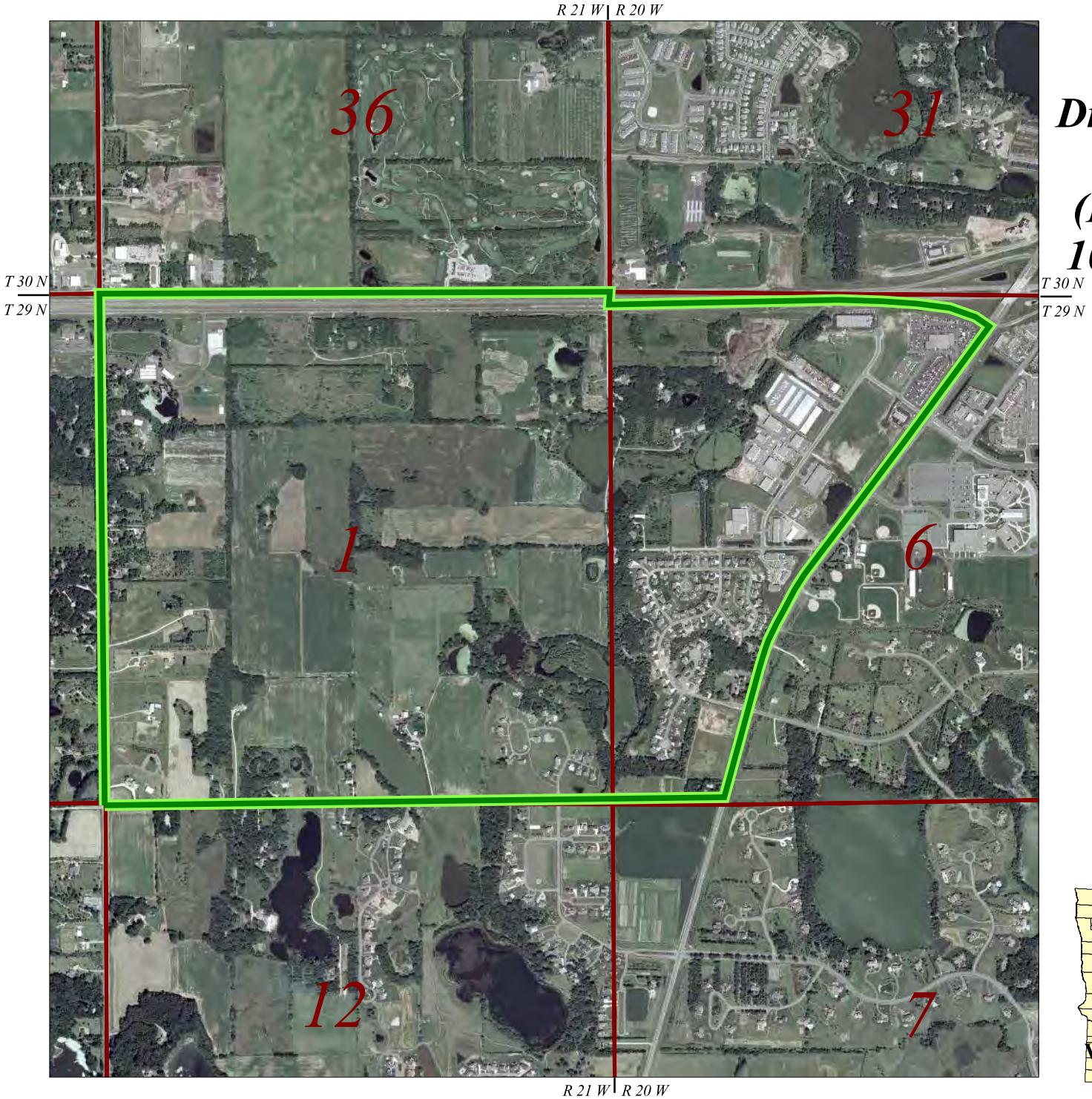
0.2 0 0.2 Miles

N

Approved April 10, 2007

Lake Elmo 2

Drinking Water Supply Management Area (DWSMA) MN-00417 10 year Time of Travel

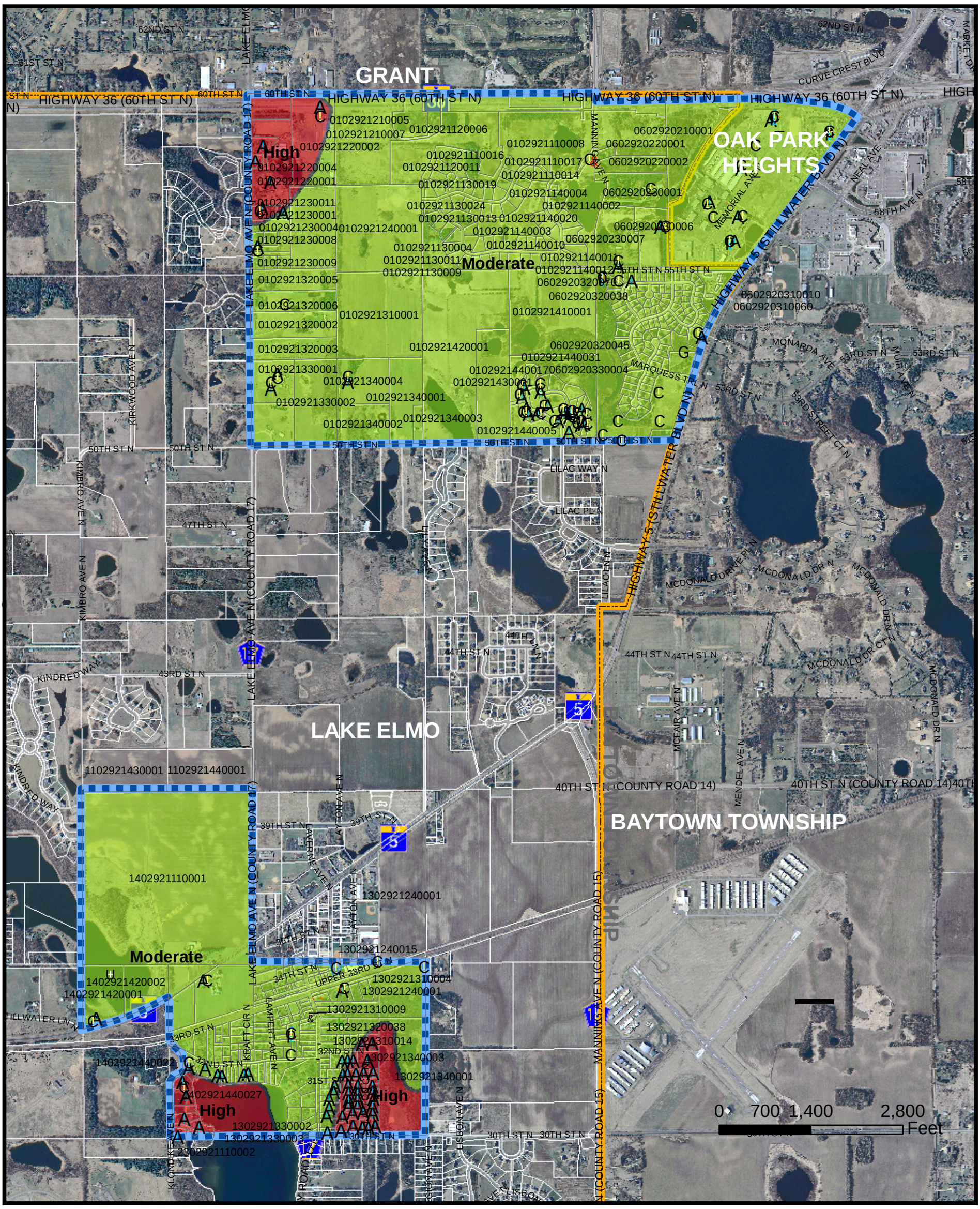


DWSMA

Vulnerable

0.2 0 0.2 Miles

Approved April 10, 2007



Legend

Pre-PCSI

- Air Release Permit
- Church
- Gage station
- Hazardous Waste Generator Permit
- Individual Sewage Treatment System
- Leaking Underground Storage Tank
- NPDES Permit
- Observation Well
- Pipeline Facility
- Public Water Supply
- Registered Storage Tank Permit
- State Water Use Permit
- Storage Tank (unspecified)
- Unspecified
- Well
- Lakes
- City of Lake Elmo

DWS Vulnerability

- High
- Moderate
- DWSMA Boundary

TKDA Project No. 12781.000

Limitation of Liability

This document is not a legally recorded map or survey and is notintended to be used as one. This map is a compilation of records and information from various state, county, and township offices, and other sources.

Date:

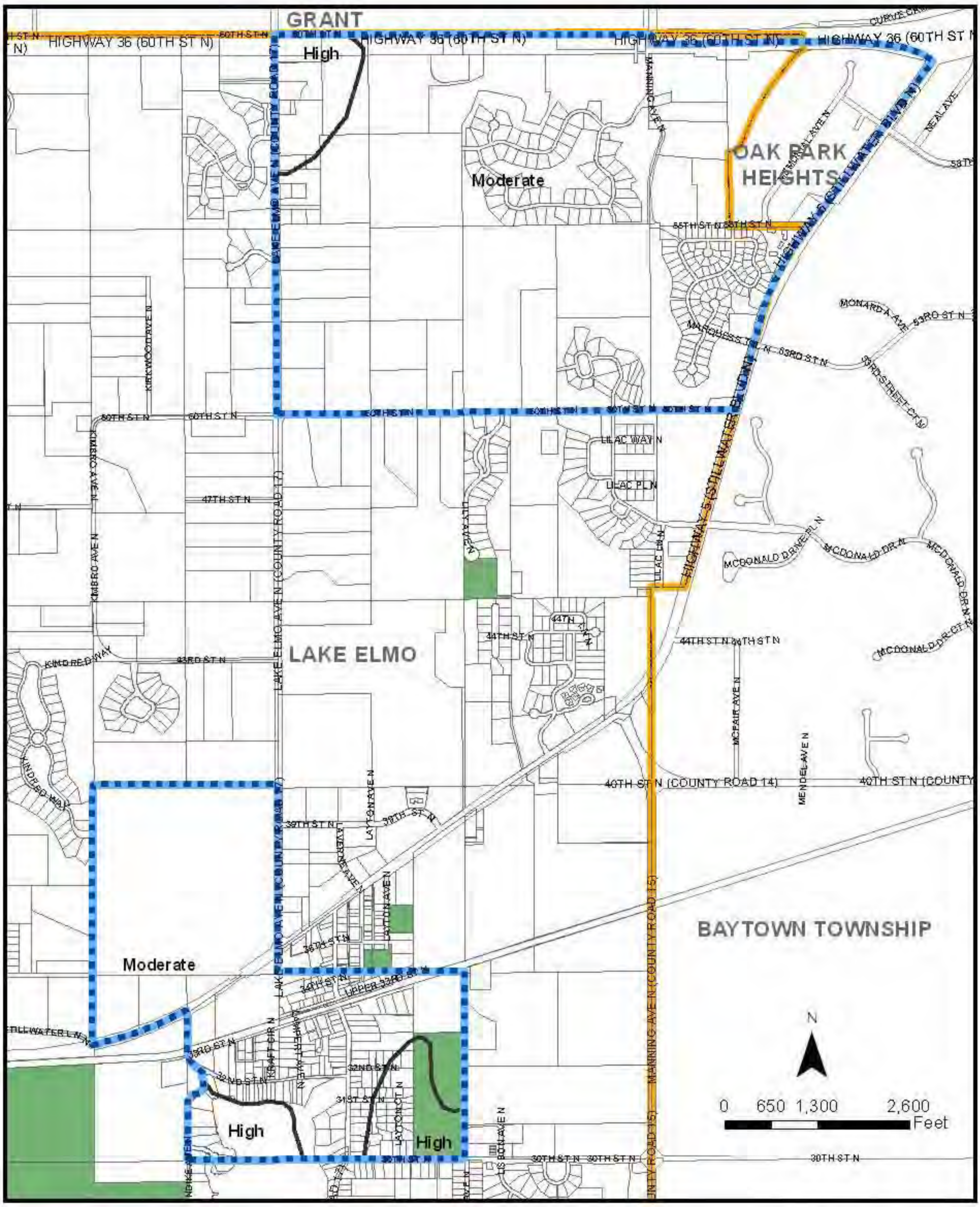
Created By:

TKDA
ENGINEERS • ARCHITECTS • PLANNERS

City of Lake Elmo
Minnesota

Located PCSI
Figure 2

K:\gis\LAKEELMO\PROJECTS\Wellhead Protection\WHPA-DWSMAMap-fig1.mxd



Legend

- DWSMA
- City of Lake Elmo
- DWS Vulnerability
  - High
  - Moderate
- Parcels

TKDA Project No. 12781.000

Limitation of Liability

This document is not a legally recorded map or survey and is not intended to be used as one. This map is a compilation of records and information from various state, county, and township offices, and other sources.

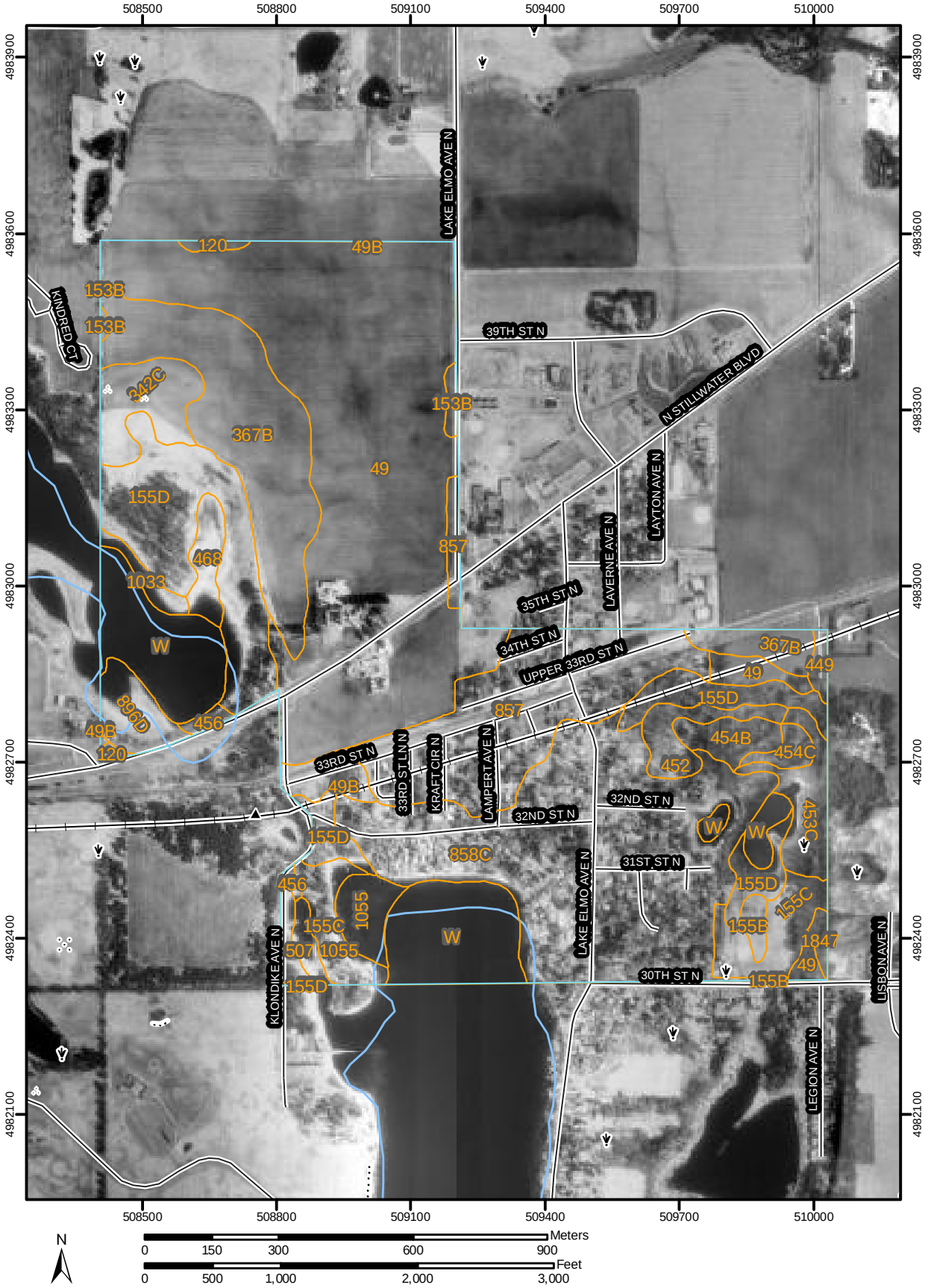
Date:
Created By:

TKDA
ENGINEERS • ARCHITECTS • PLANNERS

Municipal Map

Figure 3

City of Lake Elmo
Minnesota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4982100
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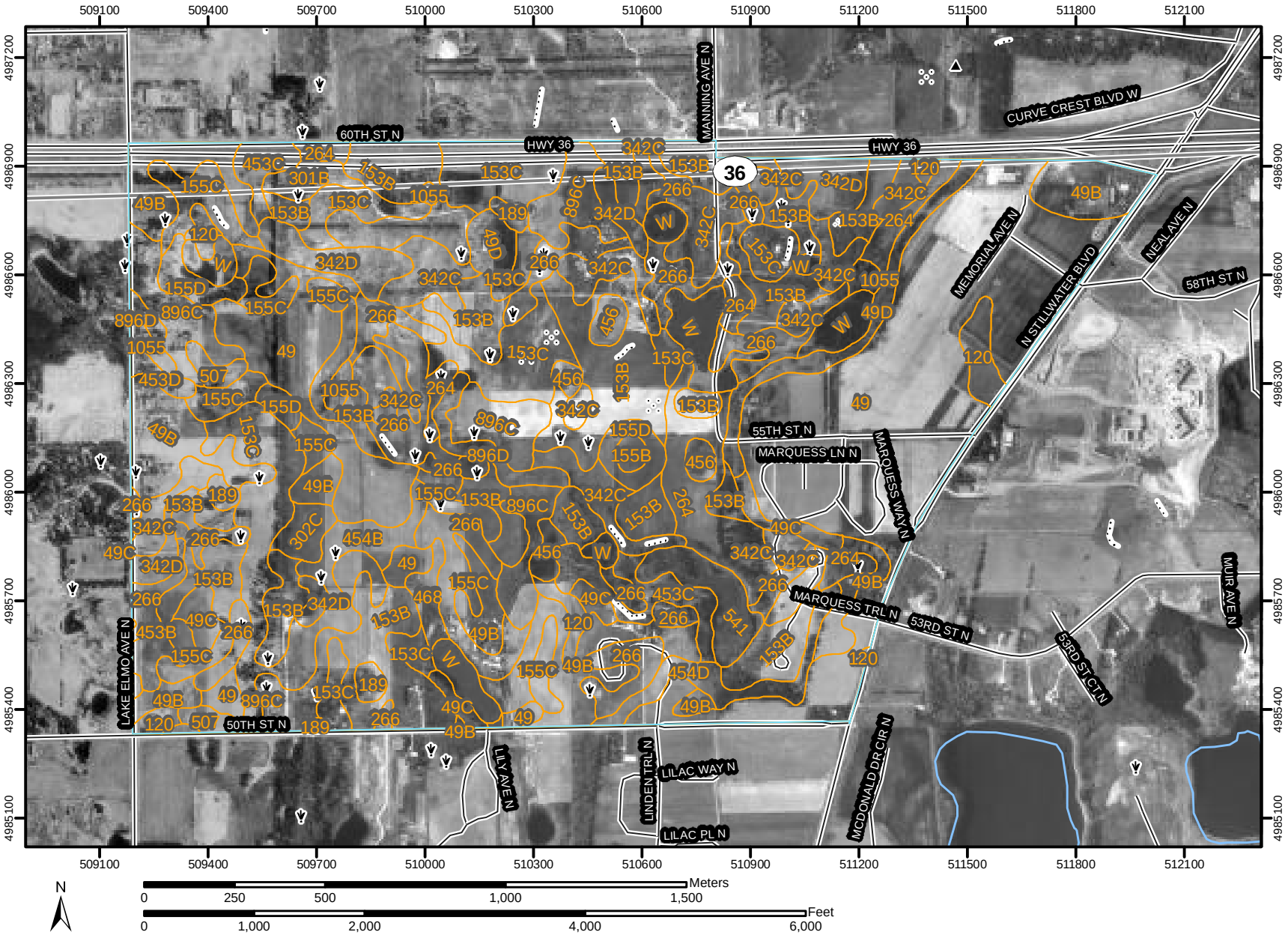
KINDRED CT
39TH ST N
N STILLWATER BLVD
LAYTON AVE N
LAVERNE AVE N
35TH ST N
34TH ST N
UPPER 33RD ST N
33RD ST N
33RD ST LN N
KRAFT CIR N
LAMPERT AVE N
32ND ST N
31ST ST N
30TH ST N
KLONDIKE AVE N
LISBON AVE N
LEGION AVE N
120
49B
153B
242C
367B
49
155D
468
1033
857
W
896D
456
454B
454C
452
449
453C
858C
1055
507
155C
1847
N
Meters
0
150
300
600
900
Feet
0
500
1,000
2,000
3,000

Soil Map–Washington County, Minnesota
(Figure 4b - Soils Map of Well No. 2 DWSMA, City of Lake Elmo)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Gully

Short Steep Slope

Other

Political Features

Municipalities

Cities

Urban Areas

Water Features

Oceans

Streams and Canals

Transportation

Rails

Roads

Interstate Highways

US Routes

State Highways

Local Roads

Other Roads

MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 15N

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washington County, Minnesota
Survey Area Data: Version 3, Aug 2, 2006

Date(s) aerial images were photographed: 1991; 1992

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Washington County, Minnesota (MN163)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
49	Antigo silt loam, 0 to 2 percent slopes	177.7	19.1%
49B	Antigo silt loam, 2 to 6 percent slopes	76.4	8.2%
49C	Antigo silt loam, 6 to 12 percent slopes	11.4	1.2%
49D	Antigo silt loam, 12 to 18 percent slopes	16.2	1.7%
120	Brill silt loam	13.0	1.4%
153B	Santiago silt loam, 2 to 6 percent slopes	150.8	16.2%
153C	Santiago silt loam, 6 to 15 percent slopes	81.9	8.8%
155B	Chetek sandy loam, 0 to 6 percent slopes	1.7	0.2%
155C	Chetek sandy loam, 6 to 12 percent slopes	42.4	4.5%
155D	Chetek sandy loam, 12 to 25 percent slopes	11.9	1.3%
189	Auburndale silt loam	5.4	0.6%
264	Freeon silt loam, 1 to 4 percent slopes	32.2	3.5%
266	Freer silt loam	59.2	6.4%
301B	Lindstrom silt loam, 2 to 4 percent slopes	4.8	0.5%
302C	Rosholt sandy loam, 6 to 15 percent slopes	4.7	0.5%
342C	Kingsley sandy loam, 6 to 12 percent slopes	67.4	7.2%
342D	Kingsley sandy loam, 12 to 18 percent slopes	25.6	2.7%
453B	DeMontreville loamy fine sand, 2 to 6 percent slopes	3.4	0.4%
453C	DeMontreville loamy fine sand, 6 to 12 percent slopes	15.8	1.7%
453D	DeMontreville loamy fine sand, 12 to 25 percent slopes	2.6	0.3%
454B	Mahtomedi loamy sand, 0 to 6 percent slopes	8.4	0.9%
454D	Mahtomedi loamy sand, 12 to 25 percent slopes	10.1	1.1%
456	Barronett silt loam	8.9	1.0%
468	Otter silt loam	4.0	0.4%

Washington County, Minnesota (MN163)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
507	Poskin silt loam	4.9	0.5%
541	Rifle muck	10.7	1.1%
896C	Mahtomedi-Kingsley complex, 3 to 12 percent slopes	39.4	4.2%
896D	Mahtomedi-Kingsley complex, 12 to 25 percent slopes	7.6	0.8%
1055	Aquolls and histosols, ponded	6.5	0.7%
W	Water	26.9	2.9%
Totals for Area of Interest (AOI)		931.9	100.0%

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Gully

Short Steep Slope

Other

Political Features

Municipalities

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Rails

Roads

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Other Roads

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Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
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Soil Survey Area: Washington County, Minnesota
Survey Area Data: Version 3, Aug 2, 2006

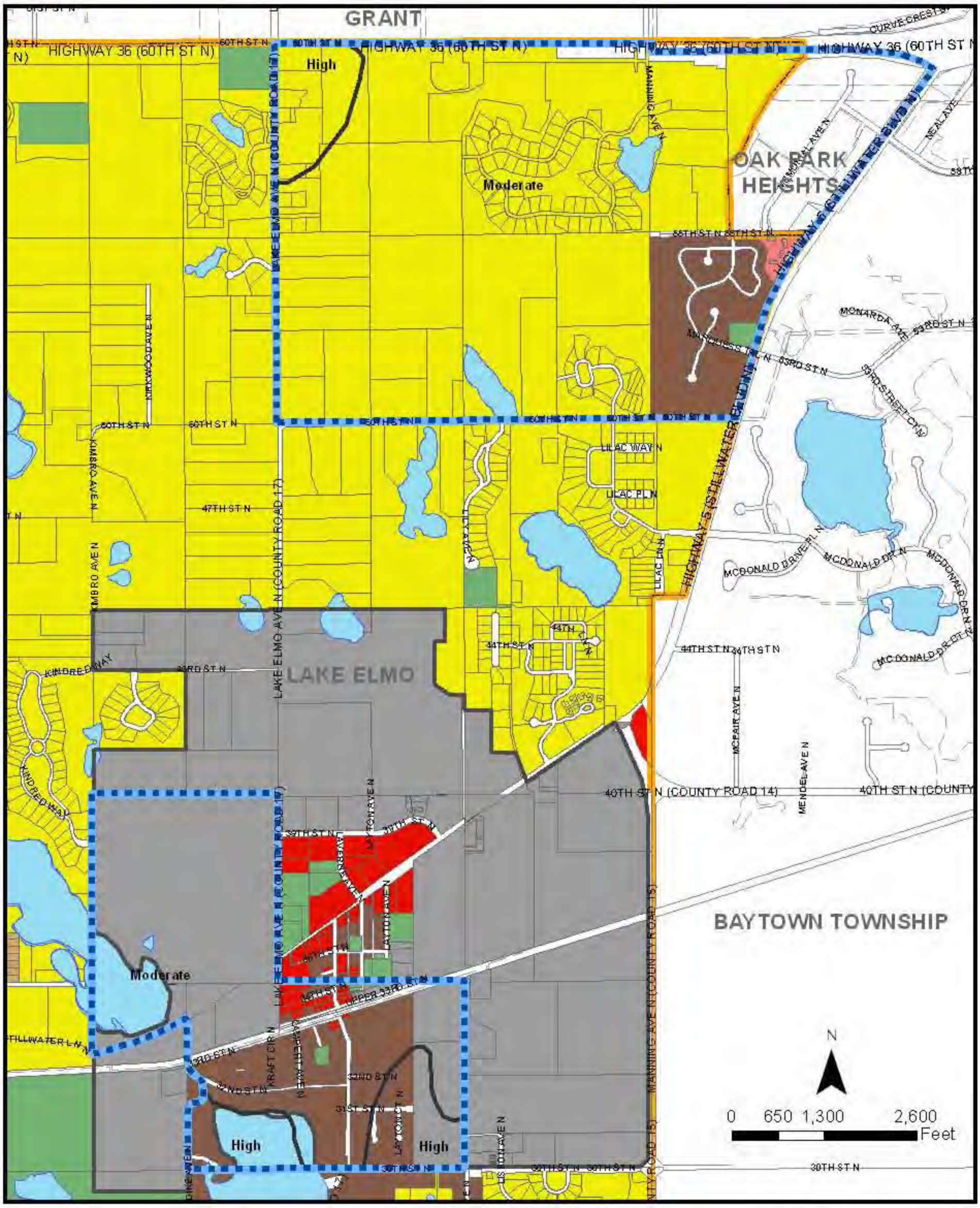
Date(s) aerial images were photographed: 1991; 1992

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Washington County, Minnesota (MN163)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
49	Antigo silt loam, 0 to 2 percent slopes	119.6	27.7%
49B	Antigo silt loam, 2 to 6 percent slopes	4.0	0.9%
49C	Antigo silt loam, 6 to 12 percent slopes	0.1	0.0%
120	Brill silt loam	1.1	0.3%
153B	Santiago silt loam, 2 to 6 percent slopes	1.4	0.3%
155B	Chetek sandy loam, 0 to 6 percent slopes	1.6	0.4%
155C	Chetek sandy loam, 6 to 12 percent slopes	14.5	3.4%
155D	Chetek sandy loam, 12 to 25 percent slopes	41.0	9.5%
342C	Kingsley sandy loam, 6 to 12 percent slopes	9.6	2.2%
367B	Campia silt loam, 0 to 8 percent slopes	40.1	9.3%
449	Crystal Lake silt loam, 1 to 3 percent slopes	1.3	0.3%
452	Comstock silt loam	5.4	1.2%
453C	DeMontreville loamy fine sand, 6 to 12 percent slopes	7.5	1.7%
454B	Mahtomedi loamy sand, 0 to 6 percent slopes	4.5	1.0%
454C	Mahtomedi loamy sand, 6 to 12 percent slopes	2.1	0.5%
456	Barronett silt loam	1.4	0.3%
468	Otter silt loam	4.2	1.0%
507	Poskin silt loam	2.0	0.5%
857	Urban land-Waukegan complex, 0 to 3 percent slopes	41.2	9.5%
858C	Urban land-Chetek complex, 3 to 15 percent slopes	77.7	18.0%
896D	Mahtomedi-Kingsley complex, 12 to 25 percent slopes	6.2	1.4%
1033	Udifluvents	2.1	0.5%
1055	Aquolls and histosols, ponded	7.0	1.6%
1847	Barronett silt loam, sandy substratum	1.0	0.2%
W	Water	34.9	8.1%

Totals for Area of Interest (AOI)	431.5	100.0%



Land Use

- C
- LB
- PF
- NC
- RAD - 0.45 DU/Acre
- ROW
- VR

- Lakes
- City of Lake Elmo
- DWSMA Boundary
- Parcels

DWS Vulnerability
- High
- Moderate

TKDA Project No. 12781.000

CITY OF LAKE ELMO

Limitation of Liability

This document is not a legally recorded map or survey and is not intended to be used as one. This map is a compilation of records and information from various state, county, and township offices, and other sources.

Land Use Map

Lake Elmo Comprehensive Plan 2005 - 2030

Figure 5

City of Lake Elmo
Minnesota

Date:
Created By:

TKDA
ENGINEERS • ARCHITECTS • PLANNERS

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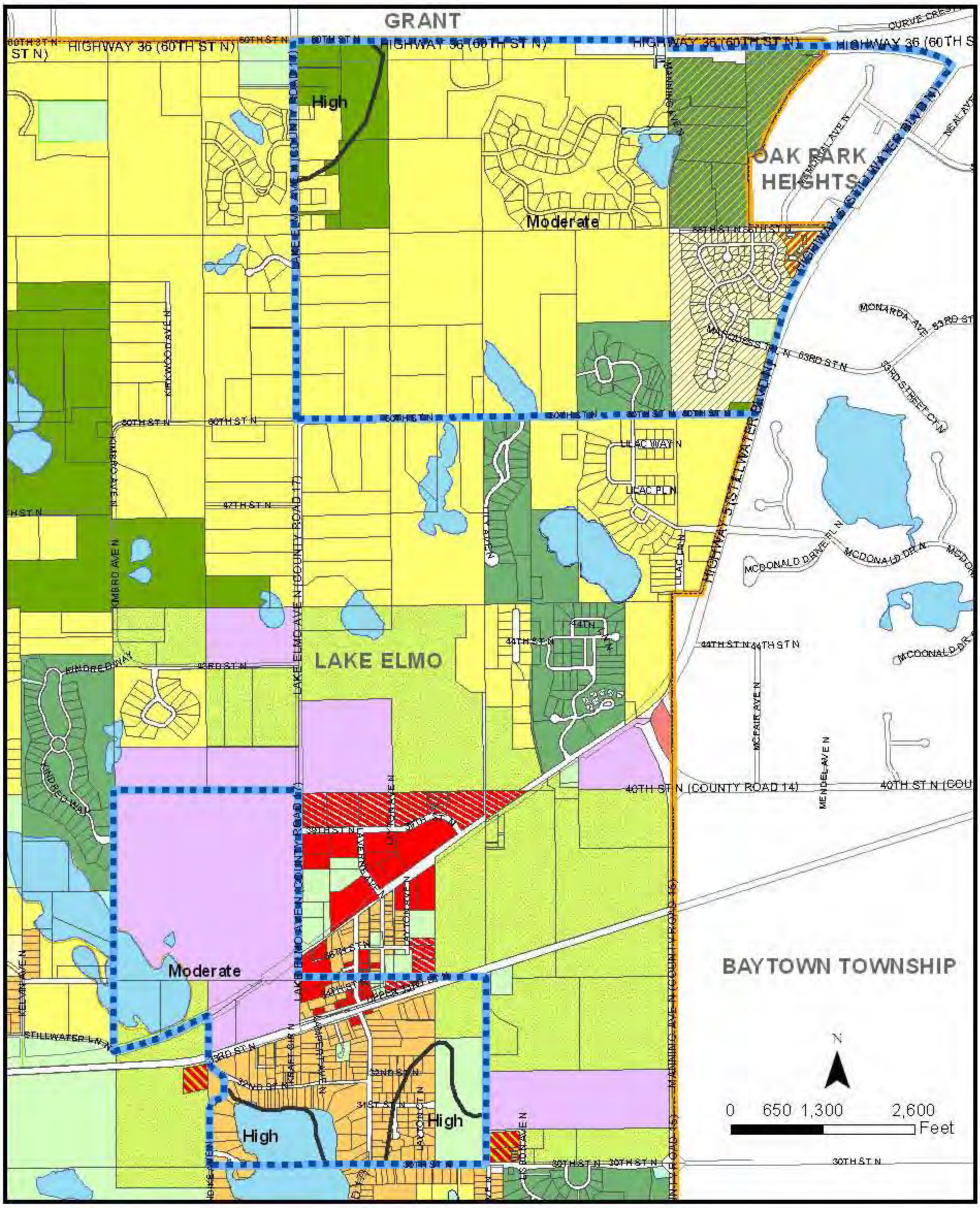

CITY OF LAKE ELMO

Zoning Districts

- A
- A-Baytown
- GB
- HB
- LB
- PF
- P
- LB-PUD
- RE
- OP/OS
- R2-PUD
- R-1
- RR
- VR-A
- VR-GB
- VR-R1
- VR-RR
- DWSMA Boundary
- Lake Elmo Boundary

DWS Vulnerability

- High
- Moderate

- Lakes
- Parcels

TKDA Project No. 12781.000

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This document is not a legally recorded map or survey and is not intended to be used as one. This map is a compilation of records and information from various state, county, and township offices, and other sources.

Zoning Map

Figure 6

City of Lake Elmo
Minnesota

Date:
Created By:

TKDA
ENGINEERS • ARCHITECTS • PLANNERS

K:\gis\LAKEELMO\PROJECTS\Wellhead Protection\ZoningMap-fig6.mxd

EXHIBITS

LUG List
Wellhead Protection Plan
City of Lake Elmo
12781.001

Tom Carr, Mayor City of Grant 9550 Joliet Avenue North Grant, Minnesota 55082	Amanda Goebel Washington County Public Health 14949 62nd Street North P.O. Box 6 Stillwater, Minnesota 55082
Carmen Sarrack, Mayor City of Oakdale 1584 Hadley Avenue North Oakdale, Minnesota 55128	John Hanson Valley Branch Watershed District 4700 West 7th Street Minneapolis, Minnesota 55435-4803
David Beaudet, Mayor City of Oak Park Heights 14168 Oak Park Boulevard North P.O. Box 2007 Oak Park Heights, Minnesota 55082	Karen Kill Browns Creek Watershed District 1380 West Frontage Road Highway 36 Stillwater, Minnesota 55082-2104
William Hargess, Mayor City of Woodbury 8301 Valley Creek Road Woodbury, Minnesota 55125-2320	Matt Moore South Washington County Watershed District 8301 Valley Creek Road Woodbury, Minnesota 55125-2320
Kent Grandlienard Town Board Chair Baytown Township 4220 Osgood Avenue North Stillwater, Minnesota 55082	Art Persons MDH Planner 18 Woodlake Drive Southeast Rochester Minnesota 55904
Dan Kyllo Town Board Chair West Lakeland Township 13520 North Greenwood Trail Stillwater, Minnesota 55082	Mr. Jim Kelly Minnesota Department of Health 625 Robert Street North P.O. Box 64975 St. Paul, Minnesota 55101
Susan Hoyt City Administrator City of Lake Elmo 3800 Laverne Avenue N. Lake Elmo, Minnesota 55042	Jack Griffin TKDA 444 Cedar Street, Suite 1500 St. Paul, Minnesota 55101

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the U. S. Environmental Protection Agency (EPA) prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 1-800-426-4791.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium are available from the Safe Drinking Water Hotline at 1-800-426-4791.

Consumer Confidence Report

City of Lake Elmo

2006 Drinking Water Report

The City of Lake Elmo is issuing the results of monitoring done on its drinking water for the period from January 1 to December 31, 2006. The purpose of this report is to advance consumers understanding of drinking water and heighten awareness of the need to protect precious water resources.

Source of Water

The City of Lake Elmo provides drinking water to its residents from a groundwater source: two wells ranging from 285 to 808 feet deep, that draw water from the Jordan-Mt.Simon and Prairie Du Chien-Jordan aquifers.

The water provided to customers may meet drinking water standards but the Minnesota Department of Health has determined that one or more of the sources of water is potentially susceptible to contamination. If you wish to obtain the entire source water assessment regarding your drinking water, please call 651-201-4700 or 1-800-818-9318 (and press 5) during normal business hours. Also, you can view it on line at www.health.state.mn.us/divs/eh/water/swp/swa.

Call **Mike Bouthilet at 770-2537** if you have questions about the City of Lake Elmo drinking water or would like information about opportunities for public participation in decisions that may affect the quality of the water.

Results of Monitoring

No contaminants were detected at levels that violated federal drinking water standards. However, some contaminants were detected in trace amounts that were below legal limits. The table that follows shows the contaminants that were detected in trace amounts last year. (Some contaminants are sampled less frequently than once a year; as a result, not all contaminants were sampled for in 2006. If any of these contaminants were detected the last time they were sampled for, they are included in the table along with the date that the detection occurred.)

Key to abbreviations:
MCLG-Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MCL-Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

AL—Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirement which a water system must follow.

90th Percentile Level-This is the value obtained after disregarding 10 percent of the samples taken that had the highest levels. (For example, in a situation in which 10 samples were taken, the 90th percentile level is determined by disregarding the highest result, which represents 10 percent of the samples.) Note: In situations in which only 5 samples are taken, the average of the two with the highest levels is taken to determine the 90th percentile level.

pCi/l-PicoCuries per liter (a measure of radioactivity).

ppm-Parts per million, which can also be expressed as milligrams per liter (mg/l).

N/A—Not Applicable (does not apply).

Contaminant (units)	MCLG	MCL	Level Found		Typical Source of Contaminant
			Range (2006)	Average/ Result*	
Fluoride (ppm)	4	4	1-1.5	1.2	State of Minnesota requires all municipal water systems to add fluoride to the drinking water to promote strong teeth; Erosion of natural deposits; Discharge from fertilizer and aluminum factories.
Nitrate (as Nitrogen) (ppm)	10	10	.24-2.6	2.6	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
Nitrite (as Nitrogen) (ppm) (11/20/2002)	1	1	N/A	.02	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.

Contaminant (units)	Level Found		Typical Source of Contaminant
	Range (2005)	Average/ Result*	
Radon (pCi/l) (09/09/2003)	N/A	407	Erosion of natural deposits.

*This is the value used to determine compliance with federal standards. It sometimes is the highest value detected and sometimes is an average of all the detected values. If it is an average, it may contain sampling results from the previous year.

Radon is a radioactive gas which is naturally occurring in some groundwater. It poses a lung cancer risk when gas is released from water into air (as occurs during showering, bathing, or washing dishes or clothes) and a stomach cancer risk when it is ingested. Because radon in indoor air poses a much greater health risk than radon in drinking water, an Alternative Maximum Contaminant Level (AMCL) of 4,000 picoCuries per liter may apply in states that have adopted an Indoor Air Program, which compels citizens, homeowners, schools, and communities to reduce the radon threat from indoor air. For states without such a program, the Maximum Contaminant Level (MCL) of 300 pCi/l may apply. Minnesota plans to adopt an Indoor Air Program once the Radon Rule is finalized.

Contaminant (units)	MCLG	AL	90% Level	# sites over AL	Typical Source of Contaminant
Copper (ppm) (08/29/2005)	N/A	1.3	.07	0 out of 10	Corrosion of household plumbing systems; Erosion of natural deposits.

Some contaminants do not have Maximum Contaminant Levels established for them. These "unregulated contaminants" are assessed using state standards known as health risk limits to determine if they pose a threat to human health. If unacceptable levels of an unregulated contaminant are found, the response is the same as if an MCL has been exceeded; the water system must inform its customers and take other corrective actions. In the table that follows are the unregulated contaminants that were detected:

Contaminant (units)	Level Found		Typical Source of Contaminant
	Range (2006)	Average/Result	
Sodium (ppm)	3.4-4.3	4.3	Erosion of natural deposits.
Sulfate (ppm)	8.35-17.8	17.8	Erosion of natural deposits.

Compliance with National Primary Drinking Water Regulations

PUBLIC WATER SYSTEM INFORMATION

COMMUNITY

PWS ID: 1820009
NAME: Lake Elmo
ADDRESS: Lake Elmo Water Superintendent, 3800 Laverne Avenue, Lake Elmo, MN 55042

FACILITY (WELL) INFORMATION

NAME: #1
FACILITY ID: S01
UNIQUE WELL NO: 208448
COUNTY: Washington

CONSTRUCTION INFORMATION

Well Information Collected from: ☐ Well Log (if available, please attach a copy of the well log.) ☐ Verbal
Date Constructed: Serviced By:

PWS ID / FACILITY ID:	1820009 S01	UNIQUE WELL NO:	208448

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET) Minimum Distances: Community	Noncommunity	Sensitive Well*	Within 200 Feet Y / N / U	LOCATION Dist. from Well	Est. (?)
Agricultural Related							
ACP	Agricultural chemical storage or prep. area, > 25 gals. or 100 lbs.dry weight	150	150		N		
ACS	Agricultural chemical storage or prep. area with safeguards	100	100		N		
ACT	Agricultural chemical supply tank	50	50		N		
ACR	Agricultural chemical storage or prep. area with safeguards and roofed	50	50		N		
ADW	Agricultural drainage well	50	50		N		
AAT	Anhydrous ammonia tank	50	50		N		
AFL	Animal feedlot	50	50	100	N		
APB	Animal or poultry building	50	50	100	N		
MSA	Animal manure storage area	100	100	200	N		
AMA	Animal manure application (storage or stockpile)	50	100		N		
ABS	Animal burial site	50	50		N		
FWP	Feeding or watering area within a pasture	50	50	100	N		
OSC	Open storage for crops	use discretion	use discretion		N		
SKY	Stockyard	50	50		N		
Class V Injection Wells							
GPR	Gravel pocket receiving clear water drainage	30	N/A		Y	60	
IWD	Industrial waste disposal	use discretion	use discretion		N		
LCC	Large capacity cesspools	illegal	illegal		N		
MVW	Motor vehicle waste disposal	illegal	illegal		N		
ISTS Related							
CSP	Cesspool	75	75	150	N		
DRA	Drainfield - above or below grade	50	50	100	Y	85	
DRA	Drainfield - above or below grade	50	50	100	Y	158	
AGG	Dry well, leaching pit, seepage pit	75	75	150	N		
HTK	Holding tank	50	50		N		
PRV	Privy	50	50	100	N		
SET	Septic tank	50	50		Y	157	
SET	Septic tank	50	50		Y	178	
SLS	Sewage lift station	50	50		N		
SSW	Sewage sump, watertight	50	20		N		
SSN	Sewage sump, non-watertight	50	50		N		
SBA	Sewer buried, approved, air tested	50	20		N		
SBM	Sewer, buried collector, municipal, pressurized, open jointed, or unapproved materials	50	50		N		
SBP	Sewer buried, pressure, approved, air tested serving a single family residence	50	20		N		
Land Application							
FWS	Food waste (note distance from well)	use discretion	use discretion		N		
SPT	Septage (note distance from well)	50	50		N		

PWS ID / FACILITY ID:	1820009 S01	UNIQUE WELL NO:	208448

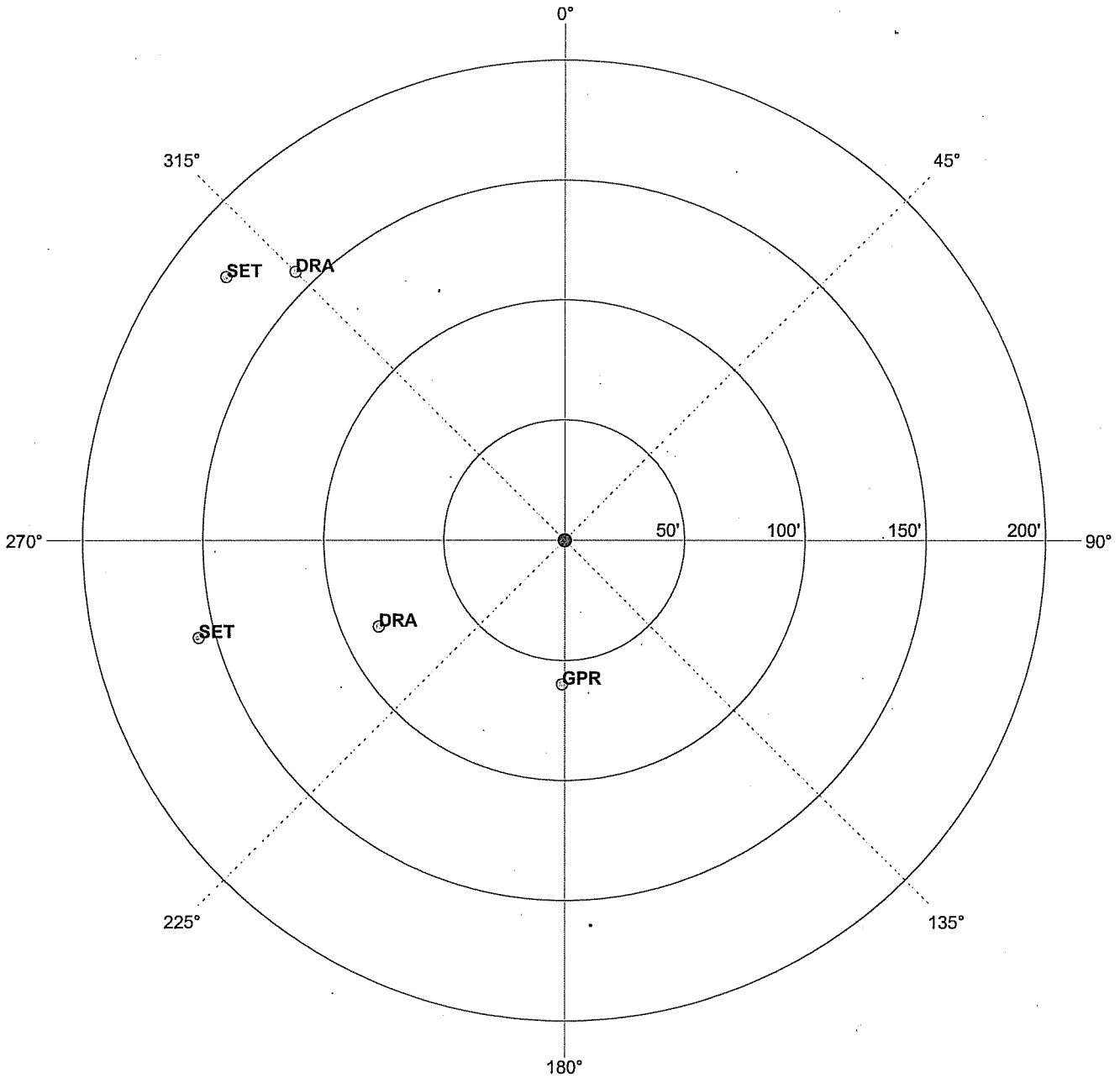
PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET) Minimum Distances Community	Noncommunity	Sensitive Well*	Within 200 Feet Y / N / U	LOCATION Dist. from Well	Est. (?)
SSG	Sewage sludge	50	50		N		
WAS	Waste	50	50		N		
Solid Waste Related							
COS	Composting site (public/commercial)	50	50		N		
CBL	Construction debris/demolition landfill	50	50		N		
DMP	Dump	150	150		N		
SVY	Salvage yard	50	50		N		
SLF	Sanitary landfill	150	150		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SWD	Storm water drain pipe, 12 inches or greater	50	20		N		
SWR	Storm water retention basin greater than 1000 gals.	50	50		N		
SWB	Storm water infiltration basin greater than 1000 gals.	50	50		N		
SWI	Storm water injection well	50	50		N		
Wells							
WEL	Operating well	use discretion	use discretion		N		
UUW	Unused, unsealed well or boring	50	50		N		
MON	Monitoring well	use discretion	use discretion		N		
General							
PLM	Contaminant plume	50	50		N		
DWT	Discharge of water treatment chemical waste	50	50		N		
DRD	Drainage ditch (holds water six months or more)	50	50		N		
GRV	Grave	50	50		N		
HSP	Hazardous substance storage or prep. area, > 25 gals., or 100 lbs. dry weight	150	150		N		
HSS	Hazardous substance storage tank with safeguards	100	100		N		
IWS	Interceptor (waste)	50	50		N		
PSP	Petroleum storage or prep. area, > 25 gals., or 100 lbs. dry weight	150	150		N		
PSS	Petroleum storage tank with safeguards	100	100		N		
PSU	Petroleum storage tank, underground, less than 1100 gals.	50	50		N		
PSA	Petroleum storage tank, above ground, less than 1100 gals.	50	20		N		
LPN	LP Tank	5/10	5/10		N		
PIT	Pit	50	20		N		
PCH	Pollutant, contaminant, or hazardous substance	50	50		N		
REN	Rendering plant (note distance from well)	use discretion	use discretion		N		
RSS	Road salt storage	50	50		N		
WAT	Stream, river, pond, lake, wetland	50	50		N		
SPI	Swimming pool, in-ground	50	20		N		
UFS	Unfilled space	50	20		N		
WSP	Waste stabilization pond	150	150		N		
Miscellaneous (The items in this section need to be recorded but not indicated on the map.)							
BLD	Building (does not contain any actual or potential contaminant sources.)	3	3		N		
BPO	Building projection, overhang	3	3		N		
ETL	Electric transmission line	5/10	5/10		N		
ETE	Electric transmission line in excess of 50 kv	25	25		N		
FFH	Fire or flushing hydrant	10	N/A		N		
FPH	Frost proof yard hydrant	10	10		N		
GSP	Gas pipe	5/10	5/10		N		
HWF	Highest water or flood level	50	N/A		N		
PLE	Property line or easement	50	N/A		N		
Additional Sources (If there is more than one source listed above, please indicate here.)							

* A sensitive well has less than 50 feet of watertight casing and less than 10 feet of impervious material between the well intake and the land surface.

PWS ID / FACILITY ID:	1820009 S01	UNIQUE WELL NO:	208448

SETBACK DISTANCES

All potential contaminant sources must be noted on sketch.
Diagram the location and approximate compass bearing of each potential contaminant source from the well, and identify the source using the "Source Code." Include a slope indicator and property lines.



INSPECTOR:	Hoerr, Robyn	DATE:	05/15/2008

PWS ID / FACILITY ID:	1820009 S01	UNIQUE WELL NO:	208448

Recommended Wellhead Protection Measures	Wellhead Protection Measure Implemented?	Date Verified
For an individual sewage treatment system (ISTS) located on adjacent property within 200 feet of the well, educational material explaining the operation and maintenance of an ISTS could be distributed. Information is available from the Minnesota Pollution Control Agency (www.pca.state.mn.us/programs/ists or 1-800-657-3864) and the University of Minnesota Extension Service (septic.umn.edu or 1-800-322-8642).		/2/08/5/15
The condition of individual sewage treatment systems should be periodically evaluated, and any identified maintenance issues addressed. This can help minimize the potential for contamination of the water supply.		/2/08/5/15
Floor drains, such as in pumphouses, that discharge to a gravel pocket or seepage pit should have a "No Dumping" sign posted.		/2/08/5/15

Isolation distances maintained for new sources of contamination?	**Y**	**N**	**N/A**
Monitoring existing nonconforming sources of contamination?	**Y**	**N**	**N/A**

Comments:

For further information, please contact the Minnesota Department of Health, Source Water Protection Unit, at:

- Unit Receptionist - 651/201-4700 or 800/818-9318
- TDD (651) 201-5797 or for Greater Minnesota through the Minnesota Relay Service at 1-800-627-3529 (ask for [651] 201-5000)

PUBLIC WATER SYSTEM INFORMATION

COMMUNITY

PWS ID: 1820009
NAME: Lake Elmo
ADDRESS: Lake Elmo Water Superintendent, 3800 Laverne Avenue, Lake Elmo, MN 55042

FACILITY (WELL) INFORMATION

NAME: #2
FACILITY ID: S02
UNIQUE WELL NO: 603085
COUNTY: Washington

CONSTRUCTION INFORMATION

Well Information Collected from: ☐ Well Log (if available, please attach a copy of the well log.) ☐ Verbal
Date Constructed: Serviced By:

PWS ID / FACILITY ID:	1820009 S02	UNIQUE WELL NO:	603085

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensi-tive Well*	Within 200 Feet Y / N / U	Dist. from Well	Est. (?)
		Community	Noncomm-unity				
Agricultural Related							
ACP	Agricultural chemical storage or prep. area, > 25 gals. or 100 lbs.dry weight	150	150		N		
ACS	Agricultural chemical storage or prep. area with safeguards	100	100		N		
ACT	Agricultural chemical supply tank	50	50		N		
ACR	Agricultural chemical storage or prep. area with safeguards and roofed	50	50		N		
ADW	Agricultural drainage well	50	50		N		
AAT	Anhydrous ammonia tank	50	50		N		
AFL	Animal feedlot	50	50	100	N		
APB	Animal or poultry building	50	50	100	N		
MSA	Animal manure storage area	100	100	200	N		
AMA	Animal manure application (storage or stockpile)	50	100		N		
ABS	Animal burial site	50	50		N		
FWP	Feeding or watering area within a pasture	50	50	100	N		
OSC	Open storage for crops	use discretion	use discretion		N		
SKY	Stockyard	50	50		N		
Class V Injection Wells							
GPR	Gravel pocket receiving clear water drainage	30	N/A		Y	35	
IWD	Industrial waste disposal	use discretion	use discretion		N		
LCC	Large capacity cesspools	illegal	illegal		N		
MVW	Motor vehicle waste disposal	illegal	illegal		N		
ISTS Related							
CSP	Cesspool	75	75	150	N		
DRA	Drainfield - above or below grade	50	50	100	N		
AGG	Dry well, leaching pit, seepage pit	75	75	150	N		
HTK	Holding tank	50	50		N		
PRV	Privy	50	50	100	N		
SET	Septic tank	50	50		N		
SLS	Sewage lift station	50	50		N		
SSW	Sewage sump, watertight	50	20		N		
SSN	Sewage sump, non-watertight	50	50		N		
SBA	Sewer buried, approved, air tested	50	20		N		
SBM	Sewer, buried collector, municipal, pressurized, open jointed, or unapproved materials	50	50		N		
SBP	Sewer buried, pressure, approved, air tested serving a single family residence	50	20		N		
Land Application							
FWS	Food waste (note distance from well)	use discretion	use discretion		N		
SPT	Septage (note distance from well)	50	50		N		
SSG	Sewage sludge	50	50		N		
WAS	Waste	50	50		N		

PWS ID / FACILITY ID:	1820009 S02	UNIQUE WELL NO:	603085

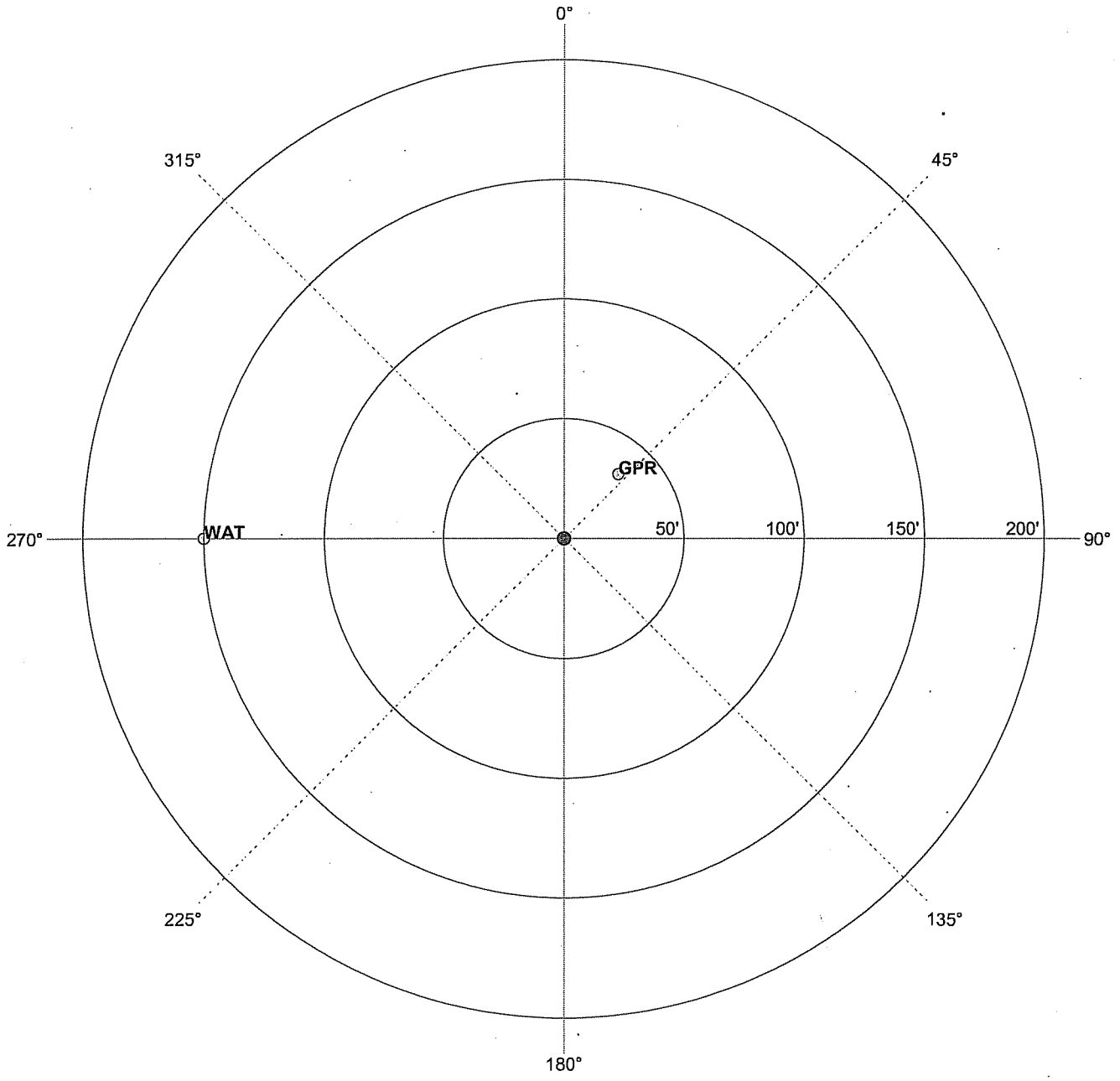
PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET) Minimum Distances Community	Noncommunity	Sensitive Well*	Within 200 Feet Y / N / U	LOCATION Dist. from Well	Est. (?)
Solid Waste Related							
COS	Composting site (public/commercial)	50	50		N		
CBL	Construction debris/demolition landfill	50	50		N		
DMP	Dump	150	150		N		
SVY	Salvage yard	50	50		N		
SLF	Sanitary landfill	150	150		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SWD	Storm water drain pipe, 12 inches or greater	50	20		N		
SWR	Storm water retention basin greater than 1000 gals.	50	50		N		
SWB	Storm water infiltration basin greater than 1000 gals.	50	50		N		
SWI	Storm water injection well	50	50		N		
Wells							
WEL	Operating well	use discretion	use discretion		N		
UUW	Unused, unsealed well or boring	50	50		N		
MON	Monitoring well	use discretion	use discretion		N		
General							
PLM	Contaminant plume	50	50		N		
DWT	Discharge of water treatment chemical waste	50	50		N		
DRD	Drainage ditch (holds water six months or more)	50	50		N		
GRV	Grave	50	50		N		
HSP	Hazardous substance storage or prep. area, > 25 gals., or 100 lbs. dry weight	150	150		N		
HSS	Hazardous substance storage tank with safeguards	100	100		N		
IWS	Interceptor (waste)	50	50		N		
PSP	Petroleum storage or prep. area, > 25 gals., or 100 lbs. dry weight	150	150		N		
PSS	Petroleum storage tank with safeguards	100	100		N		
PSU	Petroleum storage tank, underground, less than 1100 gals.	50	50		N		
PSA	Petroleum storage tank, above ground, less than 1100 gals.	50	20		N		
LPN	LP Tank	5/10	5/10		N		
PIT	Pit	50	20		N		
PCH	Pollutant, contaminant, or hazardous substance	50	50		N		
REN	Rendering plant (note distance from well)	use discretion	use discretion		N		
RSS	Road salt storage	50	50		N		
WAT	Stream, river, pond, lake, wetland	50	50		Y	150	
SPI	Swimming pool, in-ground	50	20		N		
UFS	Unfilled space	50	20		N		
WSP	Waste stabilization pond	150	150		N		
Miscellaneous (The items in this section need to be recorded but not indicated on the map.)							
BLD	Building (does not contain any actual or potential contaminant sources.)	3	3		N		
BPO	Building projection, overhang	3	3		N		
ETL	Electric transmission line	5/10	5/10		N		
ETE	Electric transmission line in excess of 50 kv	25	25		N		
FFH	Fire or flushing hydrant	10	N/A		N		
FPH	Frost proof yard hydrant	10	10		N		
GSP	Gas pipe	5/10	5/10		N		
HWF	Highest water or flood level	50	N/A		N		
PLE	Property line or easement	50	N/A		N		
Additional Sources (If there is more than one source listed above, please indicate here.)							

* A sensitive well has less than 50 feet of watertight casing and less than 10 feet of impervious material between the well intake and the land surface.

PWS ID / FACILITY ID:	1820009 S02	UNIQUE WELL NO:	603085

SETBACK DISTANCES

All potential contaminant sources must be noted on sketch.
Diagram the location and approximate compass bearing of each potential contaminant source from the well, and identify the source using the "Source Code." Include a slope indicator and property lines.



INSPECTOR:	Hoerr, Robyn	DATE:	05/15/2008

PWS ID / FACILITY ID:	1820009 S02	UNIQUE WELL NO:	603085

Recommended Wellhead Protection Measures	Wellhead Protection Measure Implemented?	Date Verified

Isolation distances maintained for new sources of contamination?	Y	N	N/A
Monitoring existing nonconforming sources of contamination?	Y	N	N/A

Comments:

For further information, please contact the Minnesota Department of Health, Source Water Protection Unit, at:

- Unit Receptionist - 651/201-4700 or 800/818-9318
- TDD (651) 201-5797 or for Greater Minnesota through the Minnesota Relay Service at 1-800-627-3529 (ask for [651] 201-5000)

LAKE ELMO CODE
CROSS-CONNECTION
REFERENCES

worker, or employee upon the building shall cause or allow any service pipe to be hammered together at the ends to stop the flow of water, or to save expense in removing the pipe from the main, the owner of the building, the worker, and contractor shall, upon conviction of the violation, be subject to the penalties as set forth in § 10.99, and shall remove the service pipe from the main. If the contractor, worker, or employee fails to do so on 24 hours notice, the contractor, worker, or employee shall be obligated to pay the city the cost incurred by it for the removal.
(1997 Code, § 600.16) Penalty, see § 10.99

§ 50.38 WATER PIPE CONNECTED TO PUMP, WELLS, OR TANK.

No water pipe of the water system shall be connected with any pump, well, tank, or piping that is connected with any other source of water supply, and when these connections are found, the Building Official shall notify the owner to disconnect the connection. If not done immediately, the water supply shall be turned off immediately. Before any new connection to the water system is permitted, the Plumbing Inspector shall ascertain that no cross connection will exist when the new connection is made. No person shall permit water from the water system to be used for any purpose except upon the person's own premises unless written consent is first obtained from the city.
(1997 Code, § 600.18) Penalty, see § 10.99

§ 50.39 WATER CONNECTIONS FOR NEWLY ACQUIRED CITY PROPERTY.

In any and all cases where water mains of the city have been or shall be extended to or constructed in any road, street, alley, or public highway, adjacent to or outside the corporate limits of the city, the Council is authorized to issue permits to the owners or occupants of the properties adjacent to, or accessible to, the water mains and to make proper water service pipe connections with the water mains of the city and to be supplied with water in conformity with and subject to all the terms, conditions, and provisions of this chapter. Persons accepting the service shall agree to be bound and obligated by the ordinance.
(1997 Code, § 600.19)

§ 50.40 RESTRICTIONS CAUSED BY WATER SHORTAGE.

(A) Whenever the Council determines that a shortage of water supply threatens the city, it may, by resolution, limit the times and hours during which water may be used from the water system for lawn and garden sprinkling, irrigation, car washing, and other uses specified in the resolution.

(B) Notice of the limitation shall immediately be mailed to each water consumer.

(C) Two days after the mailing of the notice, any water consumer who shall cause or permit water to be used in violation of the provisions of the notice shall be charged a fee as set forth from time to time by Council resolution for each day of the violation.

(D) This charge shall be added to the water consumer's next water bill. Continued violation is prohibited and shall be cause for discontinuance of water service.
(1997 Code, § 600.20)

§ 50.41 PRIVATE WELLS.

(A) *Dual water system*. Except as provided in division (B), a private well may be maintained and continued in use after connections made to the city water system, provided that there is no means of cross connection between the private well and the city water supply at any time. Hose bibs that will enable the cross connection of the 2 systems are prohibited on internal piping of the well supply system. Threads of the boiler drain of the well volume tank shall be removed or the boiler drain hose bib replaced with a sink faucet. Outside hose bibs will not be installed on the municipal water system where dual water systems are in use.

(B) *Sealing of well required*. A private well which has been declared to be a known or potential health hazard by resolution of the City Council shall be sealed pursuant to the regulations of the Department of Health.
(1997 Code, § 600.21) (Am. Ord. 97-166, passed 3-6-2006) Penalty, see § 10.99

§ 50.42 WATER COOLED AIR CONDITIONING SYSTEM.

No water cooled air conditioning systems shall be connected to the water system.
(1997 Code, § 600.22) (Am. Ord. 97-29, passed 4-21-1998) Penalty, see § 10.99

§ 50.43 OPERATION OF FIRE HYDRANTS.

(A) No persons, other than authorized city employees, shall operate fire hydrants or interfere in any way with the water system without first obtaining a permit to do so from the city, subject to the following conditions.

(B) (1) *Use of fire hydrant*. A permit to use a fire hydrant shall be issued for each individual job or contract for a minimum period of 30 days, and for additional 30-day periods as are requested and deemed necessary. The permit shall state the location of the hydrant and shall be for the use of that hydrant and none other.

Unique No. 00208448

County Name Washington

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Update Date 2005/03/11

Entry Date 1989/07/11

Township Name	Township	Range	Dir	Section	Subsection
	29	21	W	13	CBCDA

Well Depth 805 ft. **Depth Completed** 805 ft. **Date Well Completed** 1962/04/00

Well Name LAKE ELMO 1

Drilling Method Cable Tool

Well Owner's Name LAKE ELMO 1
3303 LANGLY CT
LAKE ELMO MN 55042

Drilling Fluid

Well Hydrofractured? ☐ Yes ☐ No
From ft. to ft.

Contact's Name CITY OF LAKE ELMO
3800 LAVERN N AV
LAKE ELMO MN 55042

Use Community Supply (municipal)

Casing **Drive Shoe?** ☐ Yes ☐ N

Hole Diameter
in. to 805 ft

Casing Diameter **Weight(lbs/ft)**
20 in. to 280 ft

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
SANDY CLAY			0	12
SAND			12	32
SAND & GRAVEL			32	72
CLAY	BROW		72	82
CLAY	BLUE		82	97
CLAY, BROWNISH-RED			97	112
HARDPAN			112	152
FINE SAND			152	167
ROCK & CLAY			167	222
CLAY, GRAVEL & ROCK			222	253
CLAY, GRAVEL & ROCK			253	257
SANDROCK			257	272
SANDROCK & SHALE			272	297
SANDROCK & SHALE			297	307
SHALE			307	345
SHALE			345	402
SHALE & SANDROCK			402	513
SHALE & SANDROCK			513	570
SHALE & SOME SANDROCK			570	669
SHALE & SOME SANDROCK			669	682
SANDROCK & SHALE			682	748
SANDROCK			748	805

Screen N

Open Hole From 280 ft. to 805 ft.

Make Type

Static Water Level 110 ft. from Date 1962/04/00

PUMPING LEVEL (below land surface)
153 ft. after hrs. pumping 800 g.p.m.

Well Head Completion
Pitless adapter mfr Model
Casing Protection ☑ 12 in. above grade
☐ At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ☑ Yes ☐ No

Material	From	To (ft.)	Amount(yds/bags)
G	0	280	

Nearest Known Source of Contamination
ft. direction type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed Y
Mfr name
Model HP Volts
Drop Pipe Length ft. Capacity g.p.m
Type T

Any not in use and not sealed well(s) on property? ☐ Yes ☐ No

Was a variance granted from the MDH for this Well? ☐ Yes ☐ No

REMARKS, ELEVATION, SOURCE OF DATA, etc.

GAMMA LOGGED & TV 11-30-1998.

USGS Quad Lake Elmo Elevation 935
Aquifer: CJMS Alt Id: 61-1031

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 62012
License Business Name
Name of Driller JOHNSON, R.

Report Copy

Unique No. 00603085

County Name Washington

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Update Date 2005/03/11

Entry Date 2001/11/20

Township Name	Township	Range	Dir	Section	Subsection
	29	20	W	6	CBBBBB

Well Depth	Depth Completed	Date Well Completed
285 ft.	285 ft.	2001/09/18

Well Name LAKE ELMO 2

Drilling Method Cable Tool

Well Owner's Name LAKE ELMO 2
55TH N ST
LAKE ELMO MN 55042

Drilling Fluid Bentonite

Well Hydrofractured? ☐ Yes ☑ No
From ft. to ft.

Contact's Name CITY OF LAKE ELMO
3800 LAVERN N AV
LAKE ELMO MN 55042

Use Community Supply (municipal)

Casing **Drive Shoe?** ☑ Yes ☐ N

Hole Diameter
in. to 285 ft

Casing Diameter **Weight(lbs/ft)**

24	in. to	108	ft	94.62
18	in. to	182	ft	70.59

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
SAND/ROCKS	BROW	SOFT	0	48
CLAY	RED	SOFT	48	62
GRAVEL	YELLO	SOFT	62	108
LIMESTONE	YEL/TA	HARD	108	187
SANDSTONE	YELLO	MEDIUM	187	197
LIMESTONE	YELLO	HARD	197	200
SANDSTONE	YEL/O	MEDIUM	200	275
SHALE	GRAY	MEDIUM	275	285

Screen N
Make Type

Open Hole From 182 ft. to 285 ft.

Static Water Level 52 ft. from Land surface Date 2001/09/05

PUMPING LEVEL (below land surface)
80 ft. after 8 hrs. pumping 1000 g.p.m.

Well Head Completion
Pitless adapter mfr Model
Casing Protection ☑ 12 in. above grade
☐ At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ☑ Yes ☐ No

Material	From	To (ft.)	Amount(yds/bags)	
G	0	182	16	Y

Nearest Known Source of Contamination
150 ft. direction W type BOW
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☑ Not Installed Date Installed N
Mfr name
Model HP Volts
Drop Pipe Length ft. Capacity g.p.m
Type

Any not in use and not sealed well(s) on property? ☐ Yes ☑ No

Was a variance granted from the MDH for this Well? ☐ Yes ☑ No

REMARKS, ELEVATION, SOURCE OF DATA, etc.

M.G.S. NO. 4168.

USGS Quad Stillwater Elevation 940
Aquifer: OPCJ Alt Id: 1820009S02

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 62012
License Business Name
Name of Driller ALLAN, J.

Report Copy

Unique No. 00655910

County Name Washington

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Update Date 2005/06/30

Entry Date 2003/01/23

Township Name	Township	Range	Dir	Section	Subsection
	29	21	W	33	DDAA

Well Depth	Depth Completed	Date Well Completed
422 ft.	422 ft.	2002/12/30

Well Name LAKE ELMO 3

Drilling Method Cable Tool

Well Owner's Name LAKE ELMO
8650 HUDSON RD
LAKE ELMO MN 55042

Drilling Fluid Water

Well Hydrofractured? ☐ Yes ☐ No
From ft. to ft.

Contact's Name CITY OF LAKE ELMO
3800 LAVERNE N AV
LAKE ELMO MN 55042

Use Community Supply (municipal)

Casing **Drive Shoe?** ☑ Yes ☐ N

Hole Diameter
in. to 422 ft

Casing Diameter				Weight(lbs/ft)
30	in. to	97	ft	118.76
24	in. to	281	ft	94.71

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
SAND, GRAVEL, CLAY	BROW	SOFT	0	90
SANDROCK	YEL/W	MEDIUM	90	193
LIMESTONE (BUFF)		HARD	193	340
SANDSTONE	YEL/W	HARD	340	418
SHALE	GRAY	MEDIUM	418	422

Screen N
Make Type

Open Hole From 281 ft. to 422 ft.

Static Water Level 125 ft. from Land surface Date 2002/12/30

PUMPING LEVEL (below land surface)
152 ft. after 8 hrs. pumping 1200 g.p.m.

Well Head Completion
Pitless adapter mfr Model
Casing Protection ☑ 12 in. above grade
☐ At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ☑ Yes ☐ No

Material	From	To (ft.)	Amount(yds/bags)	
G	0	281	32.5	Y

Nearest Known Source of Contamination
200 ft. direction N type SDF
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☑ Not Installed Date Installed N
Mfr name
Model HP Volts
Drop Pipe Length ft. Capacity g.p.m
Type

Any not in use and not sealed well(s) on property? ☐ Yes ☑ No

Was a variance granted from the MDH for this Well? ☐ Yes ☑ No

USGS Quad Lake Elmo Elevation 997
Aquifer: OPCJ Alt Id: 61-1031

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 62012
License Business Name
Name of Driller ALLEN, J.

Report Copy

Building Department Informational Handout

Published 9/14/07
Updated 4/24/08

3800 Laverne Avenue N
Lake Elmo, MN 55042

City Hall: (651) 777-5510
Building Inspections: (651) 233-5405
Planning Department: (651) 233-5413
Fax: (651) 777-9615
Electrical Inspector: (612) 866-3784

NEW HOME CONSTRUCTION – SINGLE FAMILY

A building permit is required for all new home construction.

APPLICATION PROCESS OVERVIEW

The building permit application process for new homes in most cases is a three step process. The first step entails submitting a complete building permit application to demonstrate the proposal meets all zoning and building code regulations. The second step is completion of an as-built grading survey to show your final structure was built as permitted. The final step, provided everything was completed per plan, is issuance of a certificate of occupancy. All permits must be submitted by the responsible contractor and be approved prior to any work beginning. State and local licensing requirements apply.

STEP 1: APPLICATION

To ensure that you receive a building permit in a timely manner, be sure to submit a **complete** application providing all required information. We would also recommend that you submit your application a minimum of two weeks prior to your desired start date. If you have any questions or concerns about what must be submitted, please contact the planning department at Lake Elmo City Hall. Unless authorized by the City, all applications shall include the following:

- One (1) completed and signed building permit application provided by the City of Lake Elmo. If the application form is downloaded off the website, two copies shall be provided.

- Three (3) to-scale copies of a Certificate of Survey/Grading & drainage site plan(s). The certificate of survey must include the following:
  - All property lines and easements
  - All proposed structures with setbacks shown from nearest property line(s)
  - Proposed 2-foot contours
  - Existing 2-foot contours
  - Delineated wetlands and tree preservation areas
  - Trees with elevation shots
  - Driveway location and width
  - Garage floor, low floor, and low opening elevations

- House type (will be compared to the approved subdivision plan)*
- Top of curb elevations
- Proposed retaining walls* (including height)
- Emergency Overflow (EOF) elevations*
- Ordinary High Water Level (OHWL) elevations*
- Public utility locations (storm sewer, sanitary sewer, watermain, etc.)
- Calculation of total lot area (sq ft)
- Erosion control measures (trenched-in silt fence along all peripheries of disturbed site)
- Lawn sprinkler system*
- Impervious surface calculations broken down as follows:
  - Total square footage of the primary structure and driveway
  - Total square footage of all additional impervious surfaces
  - Combined total of all impervious surfaces
- **Any additional information requested by the City Engineer**

***Some items may not be applicable for some lots.**

- **Two (2) copies of the building construction plans with all specifications including:**
  - Energy Code compliance worksheet (MN Check, appliance & ventilation requirements information)
  - Window Manufacturer (Fenestration ratings)
  - Window, Door and Skylight Schedule
  - Exterior Lighting Plan
  - Roof truss design certification specs
  - Floor truss design certification specs
  - Foundation engineering design or specification information for compliance with MSBC 1305.2109
  - Foundation drainage system design per M.S.B.C. 1305.2109
  - On site sewage treatment system location including primary and secondary location (if applicable)
  - On site potable well location (if applicable)

The following information may be submitted separate from the building construction plan information above.

- Plumbing permit application submitted by licensed plumbing contractor through the State of Minnesota.
- Heating Ventilating & Air Conditioning permit submitted by licensed city contractor.
- Electrical permit submitted to the State Board of Electricity.

The above submittals constitute a **complete** application for a building permit to construct a new single-family dwelling (Minnesota State Building Code 1300.0130). It will typically take **two weeks** to approve your application, so please plan accordingly.

Submitting an incomplete application will delay the process. You will be asked to pick up the permit once it has been reviewed and approved by the City. Upon payment of the application fee, the permit can be issued.

NOTICE – Before construction begins, the following items must be in place on the lot:

- Required Erosion control
- Portable Toilets (per MN Health Department)
- Driveway base (IE: Crushed Rock)
- Dumpster

STEP 2: AS-BUILT SURVEY

Before receiving a *Certificate of Occupancy*, the contractor shall submit an as-built survey which must include the following:

- As-built 2-foot contours
- Proposed 2-foot contours
- Sufficient spot elevations to justify as-built contours
- Iron monuments placed in each lot corner
- As-built house location w/setbacks shown from property line at nearest point
- All property lines and easements
- Delineated wetlands and tree preservation areas
- As-built and proposed garage floor, low floor, and low opening elevations
- House type
- Top of curb elevations
- As-built driveway location and width at property line
- As-built retaining walls (indicating height)
- Emergency Overflow (EOF) elevations
- High Water Level (HWL) elevations
- Public utilities (storm sewer, sanitary sewer, watermain, etc.)
- **Impervious surface calculations broken down as follows:**
  - Total square footage of the primary structure and driveway
  - Total square footage of all additional impervious surfaces
  - Combined total of all impervious surfaces
- Trees with elevation shots
- Any additional information requested by the City Engineer
- Location of onsite septic area primary and back-up site

The City shall be provided with engineering by the builder for retaining walls of 4 ft. or more prior to the issuance Certificate of Occupancy.

This survey shall be submitted to City Hall prior to sodding or seeding in case any adjustments are required.

STEP 3: CERTIFICATE OF OCCUPANCY

Upon approval of the as-built grading survey and a final inspection by the building inspector, a Certificate of Occupancy (CO) for the home can be issued. Please note that between the dates of June 1st to November 1st, TEMPORARY CO'S WILL NOT BE ISSUED UNLESS ALL GRADING ISSUES HAVE BEEN ADDRESSED AND THE FINAL GRADING IS ACCEPTED BY THE CITY. Please plan all closings and move in dates accordingly as there will be no exceptions.

OTHER BUILDING PERMIT ISSUES TO BE AWARE OF…

- ***DESIGN STANDARDS / HOURS OF OPERATION***
  - Driveway widths shall provide adequate egress and ingress to the site with a maximum width of 22 feet in residential districts, except in the Residential Estates (RE) zoning district which has a maximum of 12 feet at a lot line and 18 feet at the public street. The minimum distance between curbs of driveways at right-of-way line shall be 10 feet in any residential district. No driveway or curb cut shall be less than twenty feet from any right-of-way line of any street intersection. A driveway must be at least five feet from any side lot lines, except that in the RE zoning district, a driveway must be at least ten feet from any side lot lines.
  - **Lighting – Exterior Lighting Ordinance Enforced**
  - **Exterior Lighting Plan**

  Construction hours – No construction equipment shall be operated between the hours of 6:00 PM to 7:00 AM on weekdays and during any hours on Saturday, Sundays, and state and federal holidays.

- ***FEES***
  - An Erosion Control and Street Cleaning Escrow in the amount of $1,500 must accompany the Building Permit fees.
  - The building permit fee is based upon the valuation of the project.

- ***OTHER***
  - If the entire lot is not permanently surfaced with finished grades at the time of closing, customers should be advised regarding the transfer of responsibility for erosion control. The contractor's escrow will not be released in those cases unless the homeowner has replaced it in a like amount.
  - If a site comes into non-compliance with the Erosion Control Plan, the builder and/or site owner shall be notified and given 48 hours to bring the site back into compliance. If upon re-inspection (at the expense of the site builder or owner) the site is still non-compliant, the Building Official may employ a

contractor or contractors, to undertake erosion control correction which would be charged to the Erosion Control and Road Escrow Account.

- All site vegetation shall be re-established within 6 months of the date of the Certificate of Occupancy.
- A handout is available at City Hall regarding steps to prevent the spread of Oak Wilt. This is available at City Hall by request.

CHAPTER 152: FLOOD PLAIN MANAGEMENT

Section

152.01 Statutory authorization

152.02 Findings of fact

152.03 Short title

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152.05 Generally

152.06 Establishment of flood plain district

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152.08 Public utilities, railroads, and bridges

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152.11 Conditional uses; standards of evaluation procedures

152.12 Non-conforming uses

152.13 Violations

152.14 Amendments

§ 152.01 STATUTORY AUTHORIZATION.

The legislature of the State of Minnesota has, in M.S. Ch. 103F and 462.357, as they may be amended from time to time, delegated the responsibility to local government units to adopt regulations designed to minimize flood losses.

(1997 Code, § 305.01)

§ 152.02 FINDINGS OF FACT.

(A) *Flood hazard areas.* The flood hazard areas of the city are subject to periodic inundation which results in potential loss of life, loss of property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.

(B) *Methods used to analyze flood hazards.* This chapter is based upon a reasonable method of analyzing flood hazards which is consistent with the standards established by the Minnesota Department of Natural Resources.

(1997 Code, § 305.02)

§ 152.03 SHORT TITLE.

The provisions of this section shall be referred to as the "Flood Plain Regulation."

(1997 Code, § 305.03)

§ 152.04 PURPOSE.

It is the purpose of this chapter to promote the public health, safety, and general welfare and to minimize those losses described in § 152.02 by provisions contained in this chapter.

(1997 Code, § 305.04)

§ 152.05 GENERALLY.

(A) *Application.* This chapter shall apply to all lands within the jurisdiction of the city shown on the city's flood boundary and floodway map and the flood insurance rate map dated 7-2-1979 (hereinafter "official maps") as being located within the boundaries of the floodway, flood fringe, or general flood plain districts. These official maps are adopted by reference and declared to be a part of this chapter.

(B) *Regulatory flood protection elevation.* The regulatory flood protection elevation shall be an elevation no lower than 1 foot above the elevation of the regional flood plus any increases in flood elevation caused by encroachments on the flood plain that result from designation of a floodway.

(C) *Interpretation.*

(1) In their interpretation and application, the provisions of this chapter shall be held to be minimum requirements and shall be liberally construed in favor of the city and shall not be deemed a limitation or repeal of any other powers granted by state statutes.

(2) Where interpretation is needed as to exact location of the boundary of the flood plain district as shown on the official maps, as for example where there appears to be a conflict between a mapped boundary and actual field conditions and there is a formal appeal of the decision of the Zoning Administrator, the Board of Adjustment shall make the necessary interpretation. All decisions will be based on elevations on the regional (100-year) flood profile and other available technical data. Persons contesting the location of the district boundaries shall be given a reasonable opportunity to present their case to the board and to submit technical evidence.

(3) Permitted and conditional uses allowed in the flood plain shall be limited to those only listed in § 152.08, and only under the standards and conditions which are also stated in this chapter. Where it is alleged that there is an error in any order, requirement, decision, or determination made by the Zoning Administrator, an appeal may be made to the Board of Adjustment and Appeals who follow the rules and procedures of § 152.10 in making their final decision.

(D) *Abrogation and greater restriction.* The provisions of this chapter are not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. Where this chapter imposes greater restrictions, the provisions of this chapter shall prevail. All other ordinances inconsistent with this chapter are repealed to the extent of the inconsistency only.

(E) *Warning and disclaimer of liability.* This chapter does not imply that areas outside the flood plain districts or land uses permitted within the districts will be free from flooding or flood damages. This chapter shall not create liability on the part of the city or any officer or employee of the city for any flood damages that result from reliance on this chapter or any administrative decision lawfully made under this chapter.

(1997 Code, § 305.05)

§ 152.06 ESTABLISHMENT OF FLOOD PLAIN DISTRICT.

(A) *Designation of the flood plain district.* The flood insurance study for the city prepared by F.E.M.A. and dated January 1979 and the flood boundary and floodway map and flood insurance rate map, both dated 7-2-1979 (referred to as the "official maps"), contained in the flood insurance study for the city are adopted by reference and declared to be part of this chapter. The flood insurance study shall be on file in the office of the Clerk. The flood plain district for the city shall include those areas which lie within the 100-year flood boundary on the flood insurance rate map dated 7-2-1979.

(B) *Compliance.* No new structure or land shall hereafter be used and no structure shall be located, extended, converted, or structurally altered without full compliance with the terms of the flood plain regulation and other applicable regulations which apply to uses within the jurisdiction of the flood plain regulation. In addition, a caution is provided here that:

(1) Modifications, additions, structural alterations, or repair after damage to existing nonconforming structures and non-conforming uses of structures or land are regulated by the general provisions of the flood plain regulation and specifically § 152.12; and

(2) (a) As-built elevations for elevated or flood-proofed structures must be certified by a registered professional engineer or architect as specified in the general provisions of the flood plain regulation and specifically as stated in § 152.09.

(b) See following sketch.

(1997 Code, § 305.07) Penalty, see § 10.99

§ 152.07 FLOOD PLAIN DISTRICT.

(A) *Permitted uses.* The following uses have a low flood damage potential and do not obstruct flood flows. These uses shall be permitted to the extent that they are not prohibited by any other ordinance and provided they do not require structures, fill, or storage of materials or equipment. In addition, no use shall adversely affect the capacity of the channels or floodways or any tributary to the main stream or of any drainage ditch, or any other drainage facility or system.

(1) Agricultural uses such as general farming, pasture, grazing, outdoor plant nurseries, horticulture, truck farming, forestry, sod farming, and wild crop harvesting;

(2) Private and public recreational uses such as golf courses, tennis courts, golf driving ranges, archery ranges, picnic grounds, boat launching ramps, swimming areas, parks, wildlife and nature preserves, hunting and fishing areas, and single or multiple purpose recreational trails; and

(3) Residential uses such as lawns, gardens, parking areas, and play areas.

(B) *Standards for flood plain permitted uses.*

(1) The use shall have a low flood damage susceptibility.

(2) The use shall be permissible in the underlying zoning district.

(3) The use shall not obstruct flood flows or increase flood elevations and shall not involve structures, fill, obstructions, excavations, or storage of materials or equipment.

(4) New or replacement on-site sewage treatment systems must be designed to eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters, and they shall not be subject to impairment or contamination during times of flooding. Any sewage treatment system designed in accordance with the city's and state's current statewide standards whichever is more restrictive for on-site sewage treatment systems shall be determined to be in compliance with this chapter.

(C) *Conditional uses.*

(1) Railroads, bridges, utility transmission lines, and pipelines;

(2) Structural works for flood control such as levees, dikes, and flood walls constructed to any height where the intent is to protect individual structures and levees or dikes where the intent is to protect agricultural crops for a frequency flood event equal to or less than the 10-year frequency flood event; and

(3) Alterations and/or additions to existing principal structures located in the flood fringe portion of the flood plain district which are elevated on fill so that the lowest floor including basement floor is at or above the regulatory flood protection elevation. The finished fill elevation for structures shall be no lower than the regulatory flood protection elevation and the fill shall extend at the elevation at least 15 feet beyond the outside limits of the structure erected on the flood plain district. The construction must comply with the requirements of division (D) below.

(D) *Standards for flood plain conditional uses.*

(1) No structure (temporary or permanent), fill (including fill for roads and levees), deposit, obstruction, storage of materials or equipment, or other uses may be allowed as a conditional use that will cause any increase in the stage of the (100-year) regional flood or cause an increase in flood damages in the reach or reaches affected.

(2) All flood plain conditional uses shall be subject to the procedures and standards contained in § 152.12.

(3) The conditional use shall be permissible in the underlying zoning district.

(4) Structural works for flood control that will change the course, current, or cross-section of protected wetlands or public waters shall be subject to the provisions of M.S.

Ch. 103G, as it may be amended from time to time. Community-wide structural works for flood control intended to remove areas from the regulatory flood plain shall not be allowed in the floodway.

(5) When at any 1 time more than 1,000 cubic yards of fill or other similar material is located on a parcel for the activities as on-site storage, landscaping, sand and gravel operations, roads, dredge spoil disposal, or construction of flood control works, an erosion/sedimentation control plan must be submitted. The plan must be prepared and certified by a registered professional engineer.

(E) *Standards for all flood plain uses.*

(1) All new principal structures must have vehicular access at or above the regulatory flood protection elevation. If a variance to this requirement is granted, the Board of Adjustment must specify limitations on the period of use or occupancy of the structure for times of flooding.

(2) Accessory land uses, such as yards, railroad tracks, and parking lots, may be at elevations lower than the regulatory flood protection elevation. A permit for the facilities to be used by the employees or the general public shall not be granted in the absence of a flood warning system that provides adequate time for evacuation if the area would be inundated to a depth greater than 4 feet per second upon occurrence of the regional flood.

(3) Fill shall be properly compacted and the slopes shall be properly protected by the use of rip-rap, vegetative cover, or other acceptable method. The Federal Emergency Management Agency (F.E.M.A.) has established criteria for removing the specific flood hazard area designation for certain structures properly elevated on fill above the 100-year flood elevation; F.E.M.A.'s requirements incorporate specific fill compaction and side slope protection standards for multi-structure or multi-lot developments. These standards should be investigated prior to the initiation of site preparation if a change of special flood hazard area designation will be requested.

(4) Flood plain developments shall not adversely affect the hydraulic capacity of the channel and adjoining flood plain of any tributary water course or drainage system where a floodway or other encroachment limit has not been specified on the official zoning map.

(5) All dwelling units must be at least 20 feet wide through the main living area of the structure. The structure must have continuous frost footings. Continuous frost footings are not required for porches, decks, and other appendages so long as proper post type footings per existing building codes are constructed.

(6) Travel trailers, travel vehicles, and manufactured homes are prohibited in the flood plain district.

(1997 Code, § 305.08) Penalty, see § 10.99

§ 152.08 PUBLIC UTILITIES, RAILROADS, AND BRIDGES.

(A) *Public utilities.* All public utilities and facilities such as gas, electrical, sewer, and water supply systems to be located in the flood plain shall be flood-proofed in accordance with the State Building Code or elevated to above the regulatory flood protection elevation.

(B) *Public transportation facilities.* Railroad tracks and bridges to be located within the

flood plain shall comply with § 152.07. Elevation to the regulatory flood protection elevation shall be provided where failure or interruption of these transportation facilities would result in danger to the public health or safety or where the facilities are essential to the orderly functioning of the area. Limited access roads or railroads may be constructed at a lower elevation where failure or interruption of transportation services would not endanger the public health or safety.

(C) *On-site sewage treatment and water supply systems.* Where public utilities are not provided, on-site water supply systems must be designed to eliminate infiltration of flood waters into the systems, and new or replacement on-site sewage treatment systems must be designed to eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters and they shall not be subject to impairment or contamination during times of flooding. Any sewage treatment system designed in accordance with the city's and state's current statewide standards, whichever is more restrictive for on-site sewage treatment systems, shall be determined to be in compliance with this chapter.

(1997 Code, § 305.09) Penalty, see § 10.99

§ 152.09 ADMINISTRATION.

(A) *Zoning Administrator.* The Zoning Administrator or other official designated by the city shall administer and enforce the flood plain regulation. If the Zoning Administrator finds a violation of the provisions of the flood plain regulation, the Zoning Administrator shall notify the person responsible for the violation in accordance with the procedures stated in § 152.12.

(B) *Permit requirements.* A permit issued by the Zoning Administrator in conformity with the provisions of the flood plain regulation shall be secured prior to the erection, addition, or alteration of any building, structure, or portion of any building or structure; prior to the use or change of use of a building, structure, or land; prior to the change or extension of a non-conforming use; and prior to the placement of fill, excavation of materials, or the storage of materials or equipment within the flood plain.

(C) *Application for permit.* Application for a permit shall be made in duplicate to the Zoning Administrator on forms furnished by the Zoning Administrator and shall include the following where applicable: plans in duplicate drawn to scale, showing the nature, location, dimensions, and elevations of the lot; existing or proposed structures, fill, or storage of materials; and the location of the foregoing in relation to the flood plain.

(D) *State and federal permits.* Prior to granting a permit or processing an application for a conditional use permit or variance, the Zoning Administrator shall determine that the applicant has obtained all necessary state and federal permits.

(E) *Certificate of occupancy for a new, altered, or non-conforming use.* It shall be unlawful to use, occupy, or permit the use or occupancy of any building or premises or part of the building or premises subsequently created, erected, changed, converted, altered, or enlarged in its use or structure until a certificate of occupancy shall have been issued by the Zoning Administrator indicating that the use of the building or land conforms to the requirements of the flood plain regulation.

(F) *Construction and use to be as provided on applications, plans, permits, variances, and certificates of occupancy.* Permits, conditional use permits, or certificates of occupancy

issued on the basis of approved plans and applications authorize only the use, arrangement, and construction set forth in the approved plans and applications, and no other use, arrangement, or construction. Any use, arrangement, or construction at variance with that authorized shall be deemed a violation of the flood plain regulation, and punishable as provided by § 152.13.

(G) *Certification.* The applicant shall be required to submit certification by a registered professional engineer, registered architect, or registered land surveyor that the finished fill and building elevations were accomplished in compliance with the provisions of this chapter. Flood-proofing measures shall be certified by a registered professional engineer or registered architect.

(H) *Record of first floor elevation.* The Zoning Administrator shall maintain a record of the elevation of the lowest floor (including basement) of all new structures and alterations or additions to existing structures in the flood plain. The Zoning Administrator shall also maintain a record of the elevation to which structures or alterations and additions to structures are flood-proofed.

(I) *Subdivisions.* No land shall be subdivided which is unsuitable for the reason of flooding, inadequate drainage, water supply, or sewage treatment facilities. All lots within the flood plain districts shall contain a building site at or above the regulatory flood protection elevation. All subdivisions shall have water and sewage treatment facilities that comply with the provisions of the flood plain regulation and have road access both to the subdivision and to the individual building sites no lower than the regulatory flood protection elevation. For all subdivisions in the flood plain, the floodway and flood fringe boundaries, the regulatory flood protection elevation and the required elevation of all access roads shall be clearly labeled on all required subdivision drawings and platting documents. For all residential structures in the flood plain, the floodway and the flood fringe boundaries, the basement construction, or the lowest floor if there is no basement, shall not be allowed below the regulatory flood protection elevation.

(1997 Code, § 305.10) Penalty, see § 10.99

§ 152.10 BOARD OF ADJUSTMENT AND APPEALS.

(A) *Rules.* The Board of Adjustment and Appeals shall have rules and power conferred in the zoning code.

(B) *Hearings.* The Board of Adjustment shall follow the hearing procedures of the zoning code. The Board of Adjustments and Appealsshall submit by mail to the Commissioner of Natural Resources a copy of the application for proposed variances sufficiently in advance so that the Commissioner will receive at least 10-days notice of the hearing.

(C) *Decisions.*

(1) A Board decision and their findings shall be made according to the zoning code. In granting a variance, the Board may prescribe appropriate conditions and safeguards which are in conformity with the purposes of the flood plain regulation. Violations of the conditions and safeguards, when made a part of the terms under which the variance is granted, shall be deemed a violation of the flood plain regulation punishable under § 152.13. No variance shall allow in any district a use prohibited in that district or permit a lower degree of

flood protection than the regulatory flood protection elevation. Variances may be used to modify permissible methods of flood protection.

(2) A copy of all decisions granting variances shall be forwarded by mail to the Commissioner of Natural Resources within 10 days of the action.

(3) Appeals from any decision of the Board of Adjustments and Appeals may be made in accordance with and as specified in the zoning code.

(D) *Flood insurance notice and record keeping.* The Zoning Administrator shall notify the applicant for a variance that:

(1) The issuance of a variance to construct a structure below the base flood level will result in increased premium rates for flood insurance up to amounts as high as $25 for $100 of insurance coverage; and

(2) The construction below the 100-year or regional flood level increases risks to life and property. The notification shall be maintained with a record of all variance actions. The city shall maintain a record of all variance actions, including justification for their issuance, and report the variances issued in its annual or biennial report submitted to the administrator of the National Flood Insurance Program.

(1997 Code, § 305.11)

§ 152.11 CONDITIONAL USES; STANDARDS OF EVALUATION PROCEDURES.

(A) *Rules and hearings.*

(1) A conditional use permit application shall be acted upon according to the procedures outlined in division (D) below.

(2) Upon filing with the city an application for a conditional use permit, the Council shall submit by mail to the Commissioner of Natural Resources a copy of the application for proposed conditional use sufficiently in advance so that the Commissioner will receive at least 10-days notice of the hearing.

(B) *Procedures to be followed by the city in passing on conditional use permit applications within the flood plain district.* The applicant is required to furnish the following information and additional information as deemed necessary by the Council for determining the suitability of the particular site for the proposed use:

(1) Plans drawn to scale showing the nature, location, dimensions, and elevation of the lot, existing or proposed structures, fill, storage of materials, flood-proofing measures, and the relationship of the above to the location of the stream channel;

(2) Specifications for building construction and materials, flood-proofing, filling, dredging, grading, channel improvement, storage of materials, water supply, and sanitary facilities;

(3) Transmit 1 copy of the information described above to a designated engineer or other expert person or agency for technical assistance, where necessary, in evaluating the proposed project in relation to flood heights and velocities, the seriousness of flood damage to the use, the adequacy of the plans for protection, and other technical matters; and

(4) Based upon the technical evaluation of the designated engineer or expert, the Council shall determine the specific flood hazard at the site and evaluate the suitability of the proposed use in relation to the flood hazard.

(C) *Factors upon which the decision of the Council shall be based.* In passing upon conditional use applications, the city shall consider all relevant factors specified in other sections of the flood plain regulation, and:

(1) The danger to life and property due to increased flood heights or velocities caused by encroachments;

(2) The danger that materials may be swept onto other lands or downstream to the injury of others or they may block bridges, culverts, or other hydraulic structures;

(3) The proposed water supply and sanitation systems and the ability of these systems to prevent disease, contamination, and unsanitary conditions;

(4) The susceptibility of the proposed facility and its intents to flood damage and the effect of the damage on the individual owner;

(5) The importance of the services provided by the proposed facility to the community;

(6) The requirements of the facility for a water front location;

(7) The availability of alternative locations not subject to flooding for the proposed use;

(8) The compatibility of the proposed use with existing development and development anticipated in the foreseeable future;

(9) The relationship of the proposed use to the comprehensive plan and flood plain management program for the area;

(10) The safety of access to the property in times of flood for ordinary and emergency vehicles;

(11) The expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters expected at the site; and

(12) The other factors which are relevant to the purposes of the flood plain regulation.

(D) *Conditions attached to conditional use permits.* Upon consideration of the factors listed above and the purpose of this chapter, the city shall attach the conditions to the granting of conditional use permits as it deems necessary to fulfill the purposes of the flood plain regulation. The conditions may include, but are not limited to, the following:

(1) Modification of waste treatment and water supply facilities;

(2) Limitations on period of use, occupancy, and operation;

(3) Imposition of operational controls, sureties, and deed restrictions;

(4) Requirements for construction of channel modifications, compensatory storage of a 2 to 1 replacement or greater, dikes, levees, and other protective measures; and

(5) Flood-proofing measures, in accordance with the State Building Code and the flood plain regulation; the applicant shall submit a plan or document certified by a registered professional engineer or architect that the flood-proofing measures are consistent with the regulatory flood protection elevation and associated flood factors for the particular area.

(1997 Code, § 305.12)

§ 152.12 NON-CONFORMING USES.

(A) *Continuance of non-conforming use.* A structure or the use of a structure or premises which was lawful before the passage or amendment of the flood plain regulation but which is not in conformity with the provisions of the flood plain regulation may be continued subject to the requirements of the zoning code.

(B) *Alterations; additions.* The cost of all structural alterations or additions both inside and outside of a structure to any non-conforming structure over the life of the structure shall not exceed 50% of the market value of the structure unless the conditions of this chapter are satisfied. The cost of all structural alterations and additions and additions constructed since the adoption of the city's initial flood plain controls must be calculated into today's current cost which will include all costs such as construction materials and a reasonable cost placed on all manpower or labor. If the current cost of all previous and proposed alterations and additions exceeds 50% of the current market value of the structure, then the structure must meet the standards of § 152.07.

(1997 Code, § 305.13)

§ 152.13 VIOLATIONS.

(A) *Violation; failure to comply.* Violation of the provisions of the flood plain regulation or failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with grants of variances or conditional uses) shall constitute a misdemeanor and shall be punishable as defined by law.

(B) *Prevention; remedy.* Nothing contained in this chapter shall prevent the city from taking other lawful action that is necessary to prevent or remedy any violation. Actions may include but are not limited to:

(1) In responding to a suspected ordinance violation, the Zoning Administrator and the city may utilize the full array of enforcement actions available to it including, but not limited to, prosecution and fines, injunctions, after-the-fact permits, orders for corrective measures or a request to the National Flood Insurance Program for denial of flood insurance availability to the guilty party. The city must act in good faith to enforce these official controls and to correct the flood plain regulation violations to the extent possible so as not to jeopardize its eligibility in the National Flood Insurance Program;

(2) When the flood plain regulation violation is either discovered by or brought to the attention of the Zoning Administrator, the Zoning Administrator shall immediately investigate the situation and document the nature and extent of the violation of the official control. As soon as is reasonably possible, this information will be submitted to the appropriate Department of Natural Resources and Federal Emergency Management Agency regional office along with the city's plan of action to correct the violation to the degree possible;

(3) The Zoning Administrator shall notify the suspected party of the requirements of the flood plain regulation and all other official controls and the nature and extent of the suspected violation of these controls. If the structure and/or use is under construction or development, the Zoning Administrator may order the construction or development immediately halted until a proper permit or approval is granted by the city. If the construction or development is already completed, then the Zoning Administrator may either:

(a) Issue an order identifying the corrective actions that must be made within a specified time period to bring the use or structure into compliance with the official controls; or

(b) Notify the responsible party to apply for an after-the-fact permit or development approval within a specified period of time not to exceed 30 days.

(4) If the responsible party does not appropriately respond to the Zoning Administrator within the specified period of time, each additional day that lapses shall constitute an additional violation of the flood plain regulation and shall be prosecuted accordingly. The Zoning Administrator shall also, upon the lapse of the specified response period, notify the landowner to restore the land to the condition which existed prior to the violation of the flood plain regulation.

(1997 Code, § 305.14) Penalty, see § 10.99

§ 152.14 AMENDMENTS.

(A) The flood plain designation on the official map shall not be removed from flood plain areas unless it can be shown that the designation is in error. Special exceptions to this rule may be permitted by the Commissioner of Natural Resources if the Commissioner determines that, through other measures, lands are adequately protected for the intended use.

(B) All amendments to the flood plain regulation including amendments to the official zoning map must be submitted to and approved by the Commissioner of Natural Resources prior to adoption. Changes in the official zoning map must meet the Federal Emergency Management Agency's (F.E.M.A.) technical conditions and criteria and must receive prior F.E.M.A. approval before adoption. The Commissioner of Natural Resources must be given 10-days written notice of all hearings to consider an amendment to the flood plain regulation and the notice shall include a draft of the proposed amendment or technical study under consideration.

(1997 Code, § 305.15)

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Memo

To:	Matt Moore, South Washington Watershed District		
From:	Suresh Hettiarachchi, PE Mike Johnson, PE	Project:	Conceptual Storage Layout in Lake Elmo, MN
cc:			
Date:	01/10/2008	Job No:	

Re: Lake Elmo Conceptual Storage Locations within the South Washington Watershed District

Introduction

The area of the City of Lake Elmo that falls within the boundaries of the South Washington Watershed District is slated for development and significant land use changes as indicated in the Metropolitan Council 2020 plans and evident by the present development trends in the region. The South Washington Watershed District (SWWD) is evaluating conceptual storage locations and volumes within the City of Lake Elmo as an ongoing effort towards watershed management and storm water control. Utilizing the Data and Model Management System (DMMS) created for the SWWD, HDR Engineering (HDR) evaluated three conceptual storage locations for overall effectiveness in storm water rate and volume control. This effort is a follow on to the work initiated in the Storm Water Modeling Report published in July of 2006.

Storm runoff rate and volume is particularly sensitive to the type of land use and layout of the tributary drainage area. Typically, land use changes due to development, increase the percentage of impervious surface area within a drainage area, which increases the rate and volume of runoff. Hence, storage and other methods are needed to mitigate this change to prevent adverse impacts to downstream and surrounding parts of the main watershed. The storage locations and sizes developed during this effort is conceptual and is intended to serve as a guide to the level of storage that will be needed to handle the projected development.

Analysis

Figure 1 shows the watershed boundaries of the City of Lake Elmo that impact the SWWD. Figure 1 also shows the change in percent impervious and the change in rate and volume of runoff based on the projected landuse. Also indicated are the conceptual storage locations which were initially presented in the July 2006 report. The location, storage volumes, and layout have

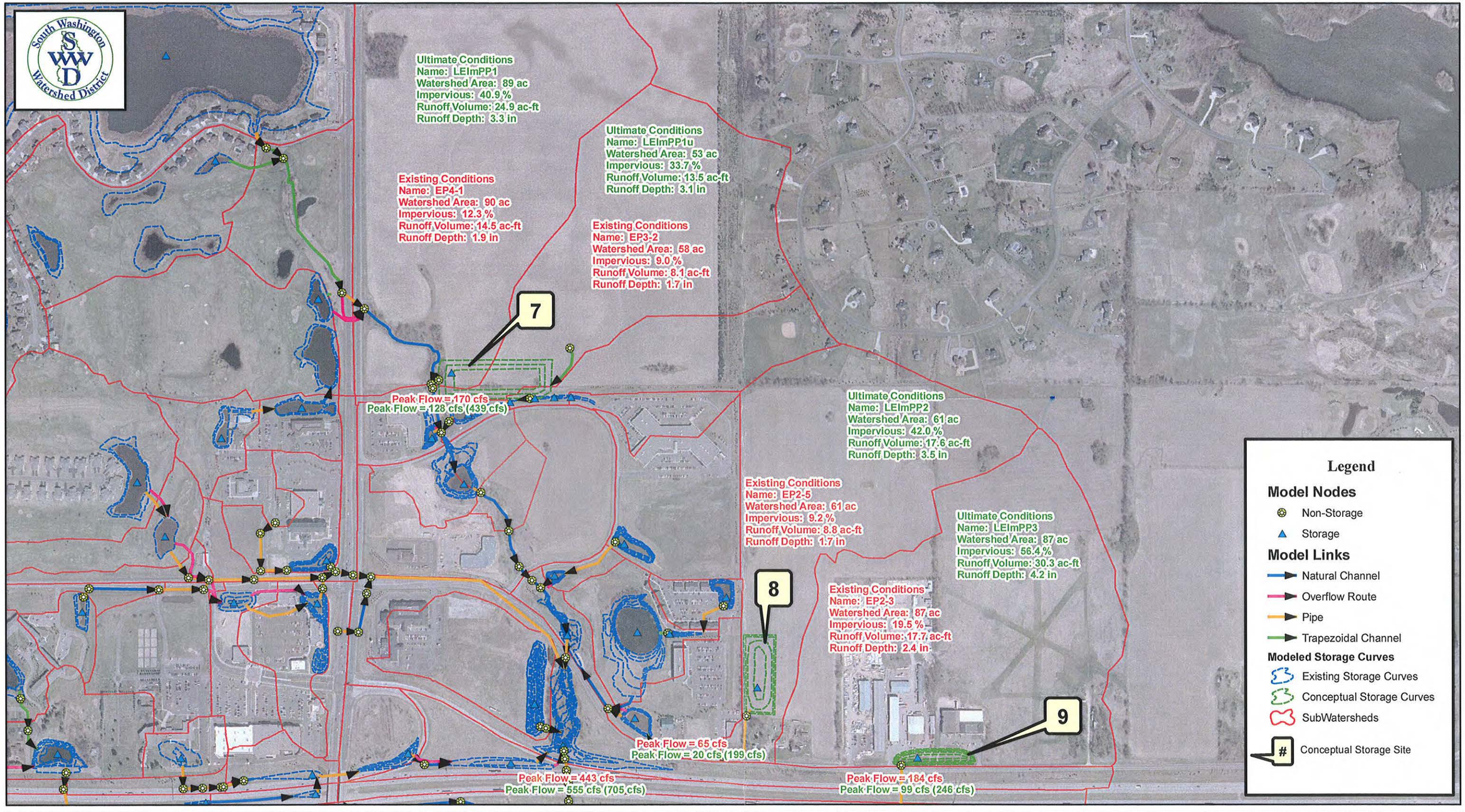
been further refined and additional modeling completed to evaluate the impacts of these storage basins.

The hydrologic and hydraulic modeling was completed using the DMMS. The existing land use and percent impervious values are based on the current aerial orthophotographs (USGS, 2006), while the ultimate conditions land use and percent impervious values are based on the 2020 landuse plan of the Metropolitan Council. Table 1 presents the geometric information of the conceptual storage basins (CSBs) considered. The existing and ultimate conditions flow rates indicate the level of effectiveness of the CSBs in managing the rate of flows within the subwatersheds. All three locations are modeled with the standard outlet design presented in Appendix A. It is important to note that possible grading and other changes that might occur during typical land development that tend to modify watershed boundaries are not included in the present analysis.

Table 1
Modeled Geometric Information of the Storage Basins

Location	Snrface Area (acres)	Depth (ft)	Effective Storage Volume (acft)
Basin 7	3.8	10.5	15.5
Basin 8	2.5	11.2	10.4
Basin 9	1.2	10.6	6.0

There are 2 major crossings of storm water that flow from the City Lake Elmo south into the City of Woodbury. The primary crossing is at the N Frontage Road to Interstate 94, which is 96 inch culvert across the highway. The other is at the outlet to location 9, which is a 36 inch pipe, also across the highway.



0 150 300 600 Feet

N

Peak Flow = Existing conditions peak flow rates

Peak Flow = Ultimate conditions peak flow rate with conceptual storage in place (peak flow rate without conceptual storage in place)

All Model Results are for a 6.3-inch, 24-hour rain event with a SCS Type II Distribution

South Washington Watershed District

Lake Elmo Storage Analysis

DRAFT

Data Sources: 2000 Washington County 2-ft Contours
2006 USGS Aerial Photography

Map Document: (N:\GISProj\SWWD\58355\map_docs\mxd\Maps\58355_LakeElmoStorageComparison.mxd)
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