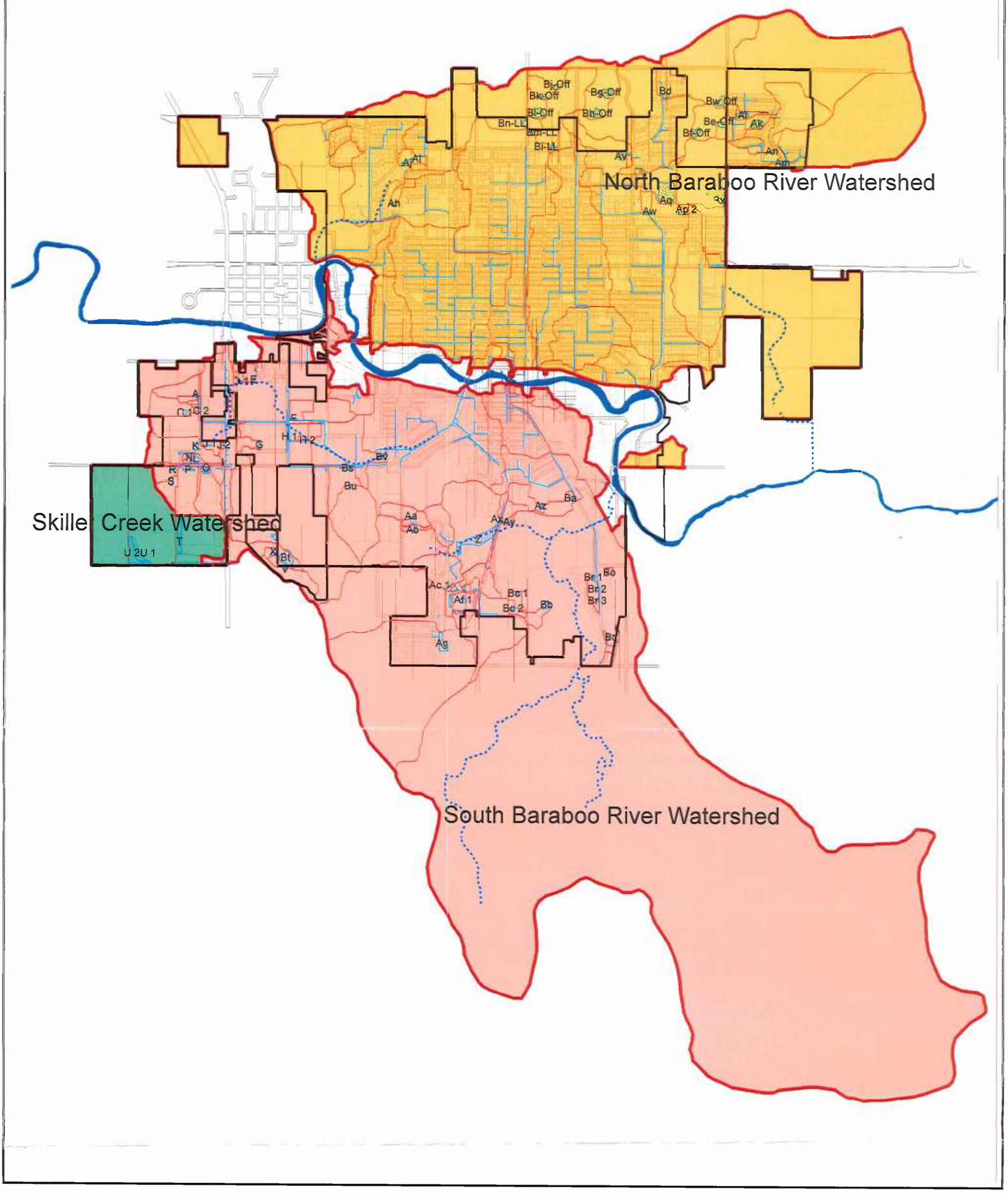
APPENDIX A

Study Area Maps



City of Baraboo

NR216/NR151
Water Quality Assessment

Major Watersheds Existing Conditions

Note: All non-shaded areas adjacent to the Baraboo River drain directly to the River without flowing to a pond or outfall.

Legend

- Baraboo Corporate Limits
- Watercourses
- Existing Stormwater BMPs
- Study Limits
- Baraboo River

N
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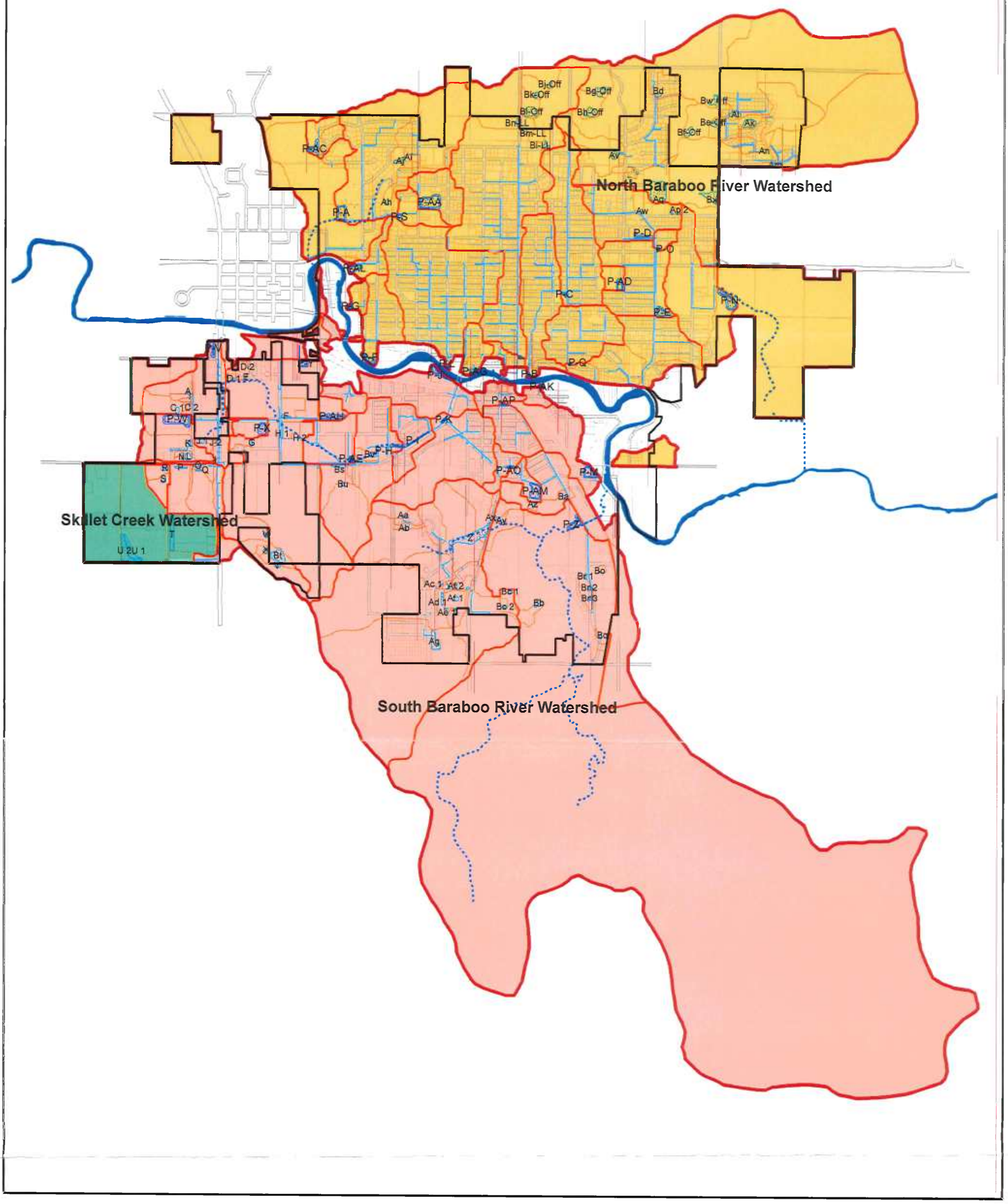
2,500 1,250 0 2,500 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION - MUNICIPAL - REMEDIATION
DEVELOPMENT - ENVIRONMENTAL



City of Baraboo

NR216/NR151
Water Quality Assessment

Major Watersheds
Proposed Conditions

Note: All non-shaded areas adjacent to the Baraboo River drain directly to the River without flowing to a pond or outfall.

Legend

- Baraboo Corporate Limits
- Study Limits
- Baraboo River
- Watercourses
- Existing Stormwater BMPs
- Proposed Stormwater BMPs
- Proposed Pond Watershed
- Proposed Minor Watersheds

N
W E
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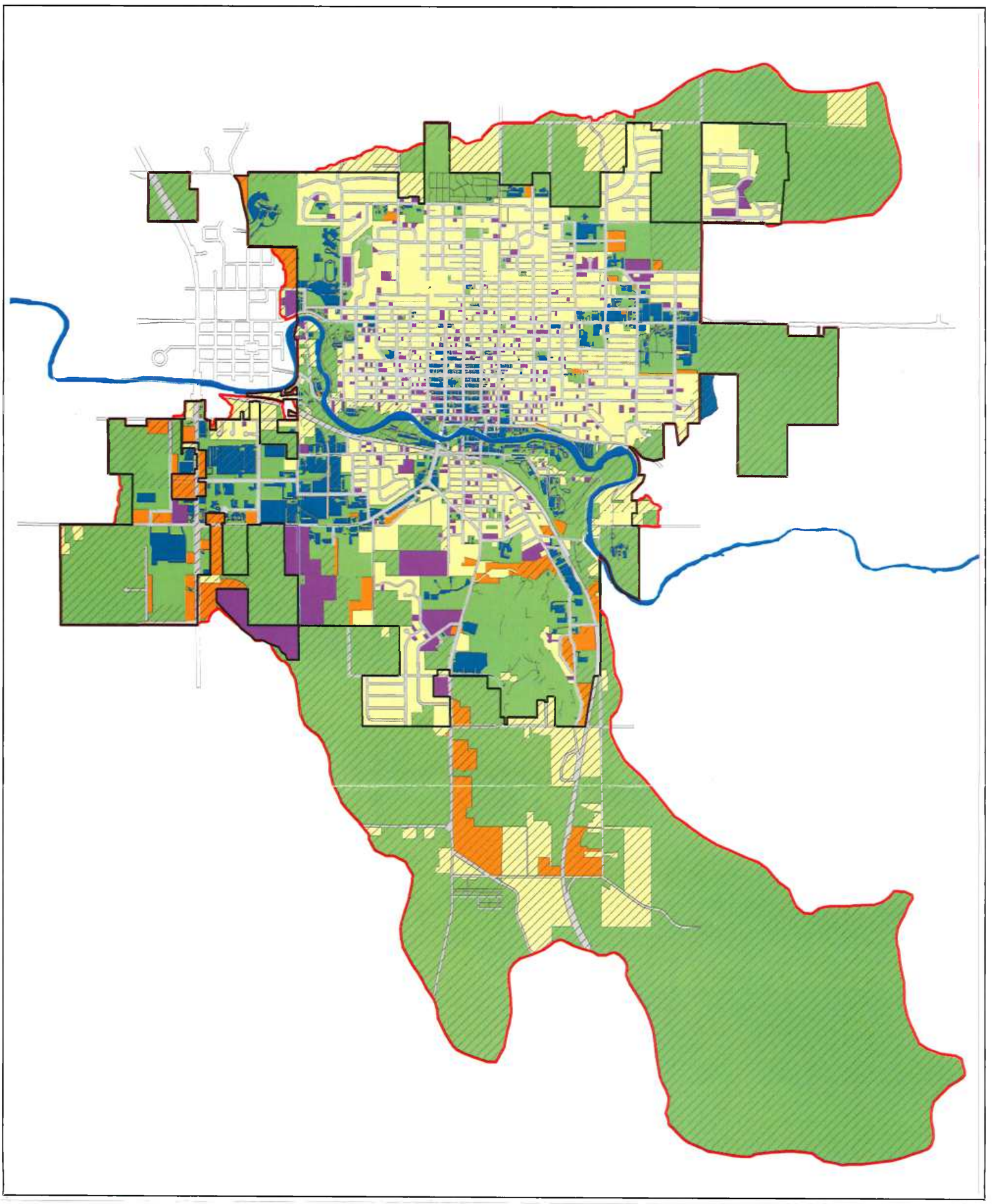
2,500 1,250 0 2,500 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION - MUNICIPAL - REMEDIATION
DEVELOPMENT - ENVIRONMENTAL



City of Baraboo

NR216/NR151
Water Quality Assessment

P8 Model Land Use

Legend

- Baraboo Corporate Limits
- Study Limits
- Baraboo River

Land Use

- Impervious Area *
- Multi Family Residential
- NR73 **
- Pervious Area *
- ROW
- Single Family Residential
- Excluded_Areas

* Impervious and Pervious Land Use Areas are Non-Residential areas which were separated into impervious and pervious surfaces for the City of Baraboo's Stormwater Utility.

** NR73 refers to Non-Residential land use that is 73% impervious. The 73% impervious value was determined using Baraboo's Stormwater Utility data and averaging the imperviousness for non-residential parcels.

MSA PROFESSIONAL SERVICES
TRANSPORTATION · MUNICIPAL · REMEDIATION
DEVELOPMENT · ENVIRONMENTAL

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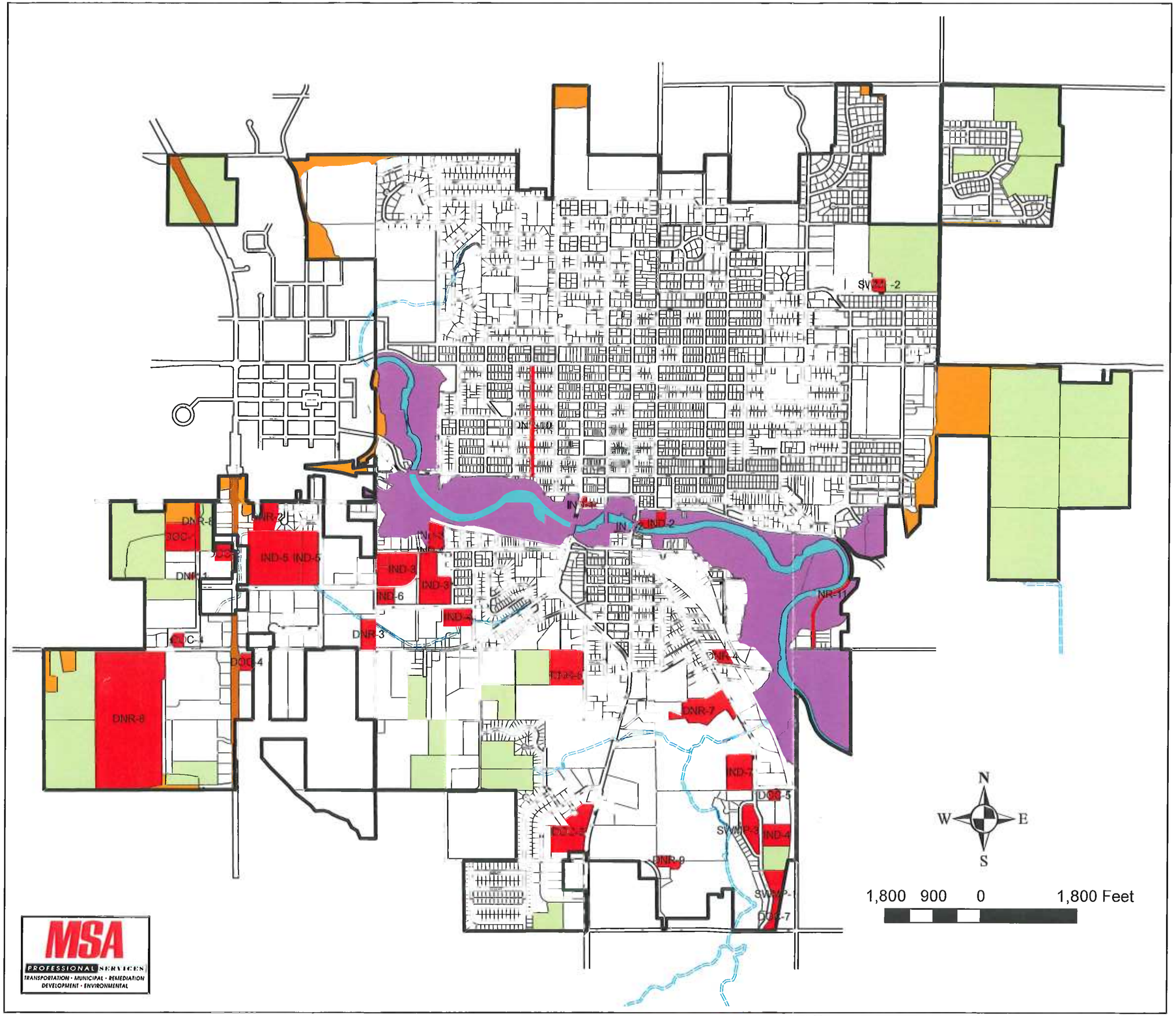
2,500 1,250 0 2,500 Feet

City of Baraboo

NR216/NR151
Water Quality Assessment

Excluded Areas



Legend

- City Limits
- Parcels
- Municipal Seperate Storm Sewer System (MS4)
- Streams
- Waters of the State (WOS)

Areas Excluded from WPDES Regulated Pollutant Load

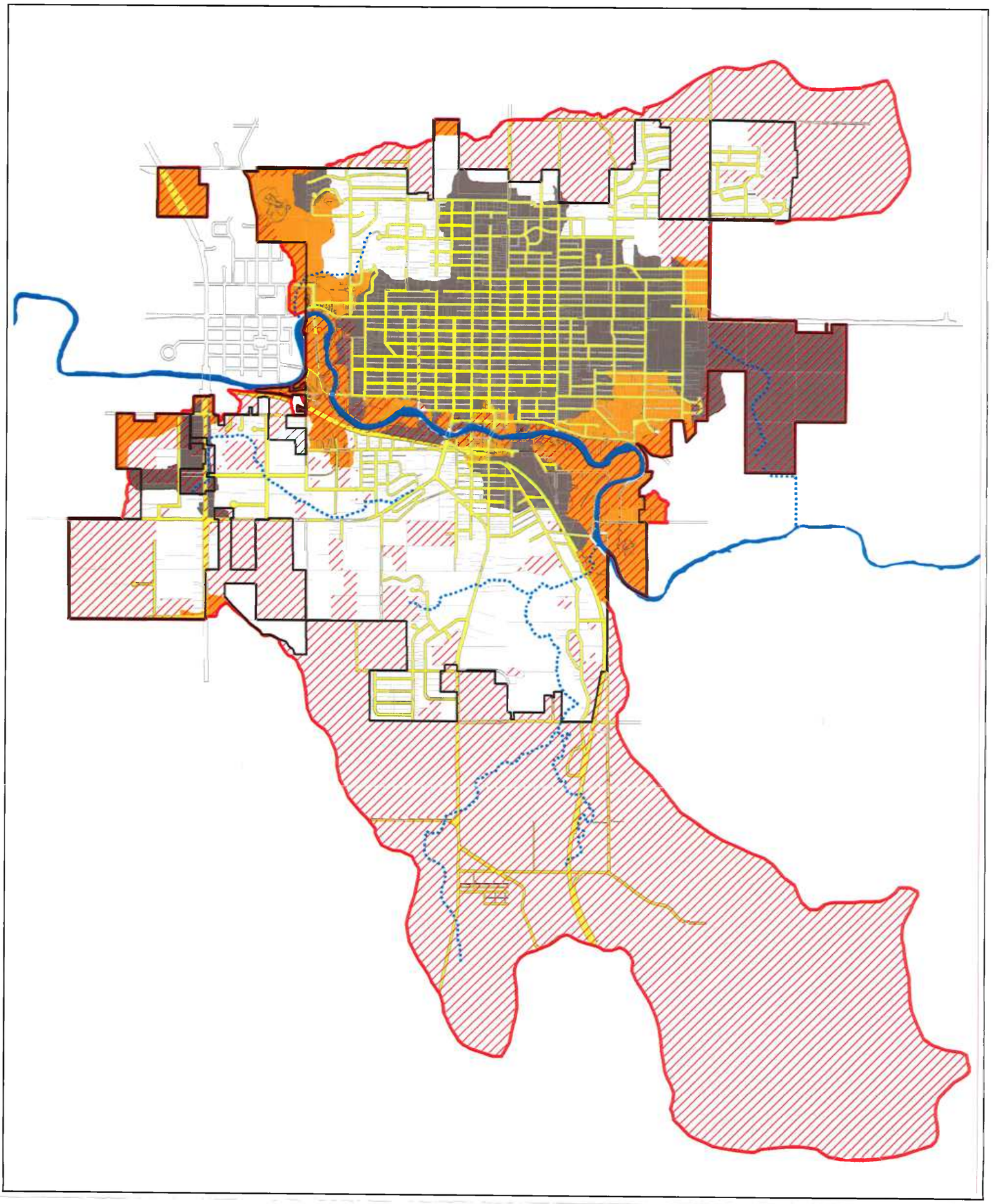
- Areas Covered by an NOI Post-10/04
- Undeveloped Areas > 5-Acres
- Areas Draining Directly to Waters of the State (WOS)
- Areas Flowing Out of City Without Passing Through an MS4
- Exempt ROW

Areas Covered by an NOI

Permit ID	Permit Name	Permit Coverage
DNR-1	Skillet Creek Substation	DNR NOI
DNR-2	Phase 3 Westfork	DNR NOI
DNR-3	Wisconsin Army National Guard	DNR NOI
DNR-4	Hill Street Condominiums	DNR NOI
DNR-5	Canepa Drive Subdivision	DNR NOI
DNR-6	Devco 1, LLC Phase 2	DNR NOI
DNR-7	Baraboo CC Clubhouse Site Improvements	DNR NOI
DNR-8	Commerce Avenue Extension	DNR NOI
DNR-9	Baraboo Country Club Development	DNR NOI
DOC-1	Alliant Energy Baraboo	DOC NOI
DOC-2	Larson Motors	DOC NOI
DOC-3	Summit Credit Union	DOC NOI
DOC-4	Teel Plastics Inc - New Building	DOC NOI
DOC-5	Baraboo News	DOC NOI
DOC-6	Fox Point Apartments	DOC NOI
DOC-7	Renewal Unlimited	DOC NOI
IND-1	Deppe Transport Services	Industrial
IND-1	Deppe Transport Services	Industrial
IND-1	Deppe Transport Services	Industrial
IND-2	Veolia ES Solid Waste Midwest Inc - Baraboo	Industrial
IND-2	Veolia ES Solid Waste Midwest Inc - Baraboo	Industrial
IND-3	Flambeau Blow Molding Operating Div.	Industrial
IND-3	Flambeau Blow Molding Operating Div.	Industrial
IND-3	Flambeau Blow Molding Operating Div.	Industrial
IND-3	Flambeau Blow Molding Operating Div.	Industrial
IND-4	Teel Plastics Inc	Industrial
IND-4	Teel Plastics Inc	Industrial
IND-4	Teel Plastics Inc	Industrial
IND-5	Perry Judds Inc Baraboo Division	Industrial
IND-5	Perry Judds Inc Baraboo Division	Industrial
IND-6	Humane Manufacturing Company LLC	Industrial
IND-7	Hammond Power Solutions Inc	Industrial

Note: SWMP-* refers to an area which was not present on a DNR, DOC or industrial permit list, but City Records show that it was developed after October 2004 and was subject to post-construction standards of s.151.12.

MSA PROFESSIONAL SERVICES
TRANSPORTATION · MUNICIPAL · REMEDIATION
DEVELOPMENT · ENVIRONMENTAL



City of Baraboo

NR216/NR151
Water Quality Assessment

Effective Areas for Street Sweeping

Legend

- Baraboo Corporate Limits
- Study Limits
- Watercourses
- Baraboo River

Effective Street Sweeping Areas

- Non-Street Areas
- Roadway Right-of-Way

Ineffective Street Sweeping Areas

- Existing Areas Draining to Structural BMP
- Proposed Areas Draining to Structural BMP
- Excluded_Areas

MSA PROFESSIONAL SERVICES
TRANSPORTATION · MUNICIPAL · REMEDIATION
DEVELOPMENT · ENVIRONMENTAL

N
W E
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2,500 1,250 0 2,500 Feet

APPENDIX B

Tables

Existing Structural BMP TSS Reductions
Baraboo River Watershed

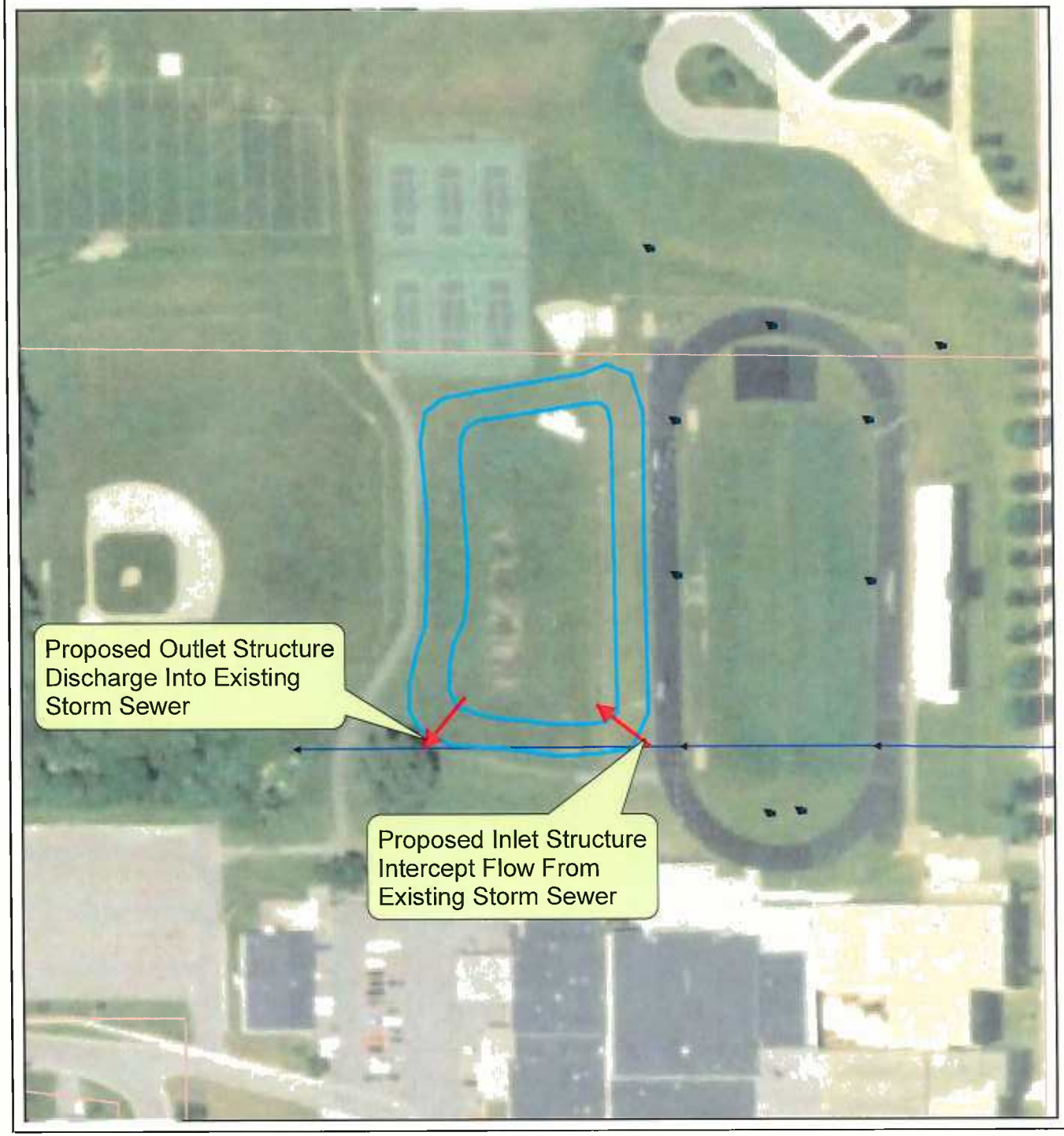
BMP Name	BMP ID	P8 Model Name	TSS Removal Efficiency	Eligible TSS Trapped (lbs/yr)	Eligible TSS Trapped (Tons/Year)	Comments	Permanent Pool Depth
1st Add to Park Ridge - North Pond	Aa	SE	37.8%	249	0.12		0.5
1st Add to Park Ridge - South Pond	Ab	SE	56.1%	897	0.45		0.1
NW Pond - 16 Unit Apt Build - Silver Dr	Ac 1	SE	74.8%	148	0.07		0.1
SE Pond - 16 Unit Apt Build - Silver Dr	Ac 2	SE	72.7%	157	0.08		0.1
Parkside Subd Lots 18-23	Ad 1	SE	93.3%	523	0.26		1.1
Kraus Homes Lot 16	Ad 2	SE	62.4%	208	0.10		0.6
Mine Rd Apt - Pnd 1	Ae 1	SE	86.3%	30	0.02		0.1
Mine Rd Apt - Pnd 2	Ae 2	SE	68.8%	23	0.01		0.1
Fox Pt Exempt Pond 1	Af 1	SE	91.3%	2372	1.19		1.5
Fox Pt Exempt Pond 2	Af 2	SE	95.7%	13	0.01	Drains mostly exempt area (Fox Point Apartment)	0.1
Fox Pt Exempt Pond 3	Af 3	SE	0.0%	0	0.00	Drains exempt area (Fox Point Apartment)	0.1
2001 Spruce Haven Subd	Ag	SE	91.4%	8277	4.14		>3
Ph1 Dan Goff Condos - Pnd 302	Ax	SE	33.3%	529	0.26		0.2
Ph1 Dan Goff Condos - Pnd 303	Ay	SE	25.1%	380	0.19		0.1
Ph1 Dan Goff Condos - Pnd 301	Az	SE	84.9%	1526	0.76		>3
Inverness Golf Development	Ba	SE	39.3%	190	0.09		0.1
Baraboo Country Club - Clubhouse	Bb	SE	89.0%	107	0.05		0.25
2001 Warehouse Add -Deppe Pond 1	Bc 1	SE	82.0%	461	0.23		0.8
2001 Warehouse Add -Deppe Pond 2	Bc 2	SE	76.9%	428	0.21		0.8
Baraboo News - Exempt Permit Cov	Bo	SE	0.0%	0	0.00	Drains exempt area (Baraboo News)	0.1
Total Water Treatment Systems 2005	Bq	SE	72.4%	124	0.06		0.5
1st Add Springbrk Hills Pnd 1 - 2007	Br 1	SE	0.0%	0	0.00	Drains mostly exempt area (Springbrook Hills)	0.6
1st Add Springbrk Hills Pnd 2 - 2007	Br 2	SE	0.0%	0	0.00	Drains mostly exempt area (Springbrook Hills)	0.2
1st Add Springbrk Hills Pnd 3 - 2007	Br 3	SE	0.0%	0	0.00	Drains mostly exempt area (Springbrook Hills)	0.1
Silver Drive Natural Detention 2	z	SE	0.3%	138	0.07		0.6
Menard Dev (T) - 2002	13P	SW	98.4%	5650	2.83		>3
Commerce Ave - Adj North of Baraboo DayCare	A	SW	92.7%	66	0.03	Drains mostly exempt area	1
Baraboo DayCare Main Pnd	B 1	SW	58.8%	6	0.00	Drains pervious/exempt area	1.6
Baraboo DayCare Pre Pnd	B 2	SW	73.6%	19	0.01	Drains pervious/exempt area	0.5
Detention Pnd Behind Casey's	Bu	SW	60.5%	5143	2.57		0.1
Low Area on South Blvd	Bs	SW	59.8%	4777	2.39		>3
Del Tool Co. Inc. Pond 1	C 1	SW	68.6%	28	0.01	Drains exempt and pervious areas (Dell Tool Company)	0.1
Del Tool Co. Inc. Pond 2	C 2	SW	29.1%	6	0.00	Drains exempt and pervious areas (Dell Tool Company)	0.1
West Fork Ph III SW Infilt - 2005	D 1	SW	84.7%	177	0.09		0.1
West Fork Ph III NE Infilt - 2005	D 2	SW	81.0%	72	0.04		0.25
West Fork Ph III Sediment Basin - 2005	E	SW	79.3%	32	0.02	Drains exempt and pervious areas	1.4
N. of Lange Court & W. of Sauk Co Parking Lot	G	SW	90.0%	447	0.22		0.6
Sysco Expan. East Basin	H 1	SW	89.4%	736	0.37		0.1
Sysco Expan. West Basin	H 2	SW	74.2%	768	0.38		1.6
Wedekind Prop - 2002	I	SW	93.0%	32	0.02	Drains pervious/exempt area	2.1
Baraboo Rent All - West Pnd	J 1	SW	76.4%	917	0.46		0.1
Baraboo Rent All - East Pnd	J 2	SW	58.7%	104	0.05		0.1
Pretreat to Pnd L 1	M	SW	58.8%	8	0.00	Drains mostly exempt area (Summit Credit Union)	0.1
Pretreat to Pnd L 2	N	SW	0.0%	0	0.00	Drains mostly exempt area (Summit Credit Union)	0.1
North Walmart Pond	O	SW	89.0%	1411	0.71		0.1
E&W Walmart Pond	P&Q	SW	91.3%	12237	6.12		>3
Ph II Teel Plastics Exempt Basin 2	r	SW	98.7%	22	0.01	Drains mostly exempt area (Teel Plastics)	0.5
Ph II Teel Plastics Exempt Basin 1	s	SW	0.0%	0	0.00	Drains exempt area (Teel Plastics)	>3
Phase I Teel Plastics - Wet Detention	U 1	SW	81.3%	87	0.04		>3
Phase I Teel Plastics - Infiltration	U 2	SW	57.7%	12	0.01	Recieves only discharge from pond U1	1.1
Industrial Ct. Study Pond 3	v	SW	81.5%	3664	1.83		>3
Industrial Ct Study Pond 1	w	SW	69.0%	1932	0.97		>3
Industrial Ct Study Pond 2	x	SW	95.5%	713	0.36		>3
Indust. Ct. Study Pond 4	Bt	SW	90.3%	3275	1.64		>3
2002 Deppe Warehouse Indust Ct.	f	SW	64.7%	125	0.06		0.5
Slumberland	L	SW	0.6%	47	0.02		>3
Slumberland	K	SW	57.9%	4601	2.30		0
Low Area Behind Weickgenant Bld.	Bv	SW	20.4%	4631	2.32		0.3
Cummings Condos - 2003	Ai	NW	23.0%	1643	0.82		0.3
2002 SS Proj Pond - May 2002	Aj	NW	30.0%	1903	0.95		0.1
First National Bank	Ah	NW	82.2%	406	0.20		1.2
Landlocked Drainage - Bj Off	Bj-Off	NW	0.0%	0	0.00	Pond outside of City Limits	>3
Landlocked Drainage Bk Off	Bk-Off	NW	0.0%	0	0.00	Pond outside of City Limits	>3
Landlocked Drainage Bl Off	Bl-Off	NW	0.0%	0	0.00	Pond outside of City Limits	>3
Onsite Landlocked - Bi LL	Bi-LL	NW	87.0%	0	0.00	Natural Low Area, trapping not eligible	>3
Onsite Landlocked - Bn LL	Bn-LL	NW	15.0%	0	0.00	Natural Low Area, trapping not eligible	>3
Onsite Landlocked - Bm LL	Bm-LL	NW	4.7%	0	0.00	Natural Low Area, trapping not eligible	0.2
Rolling Meadows Estates	Al	NE	86.4%	6163	3.08		>3
Pleasant View Subd Pond 1	Ak	NE	85.7%	978	0.49		>3
East High Pt Senior Housing - 2005	Ap 2	NE	0.0%	0	0.00	Drains Exempt Area (Senior Housing)	0.85
West High Pt Senior Housing - 2005	Ap 1	NE	0.0%	0	0.00	Drains Exempt Area (Senior Housing)	>3
Pleasant View Subd Pond 2	An	NE	49.9%	1815	0.91		0.1
Pleasant View Subd Outlot 3	Am	NE	50.8%	4293	2.15		0.2
St Claire Meadows - North Swale	Ar	NE	68.2%	5	0.00	Drains mostly pervious area	0.1
St Claire Meadows - East Swale	As	NE	79.5%	57	0.03	Drains mostly pervious area	0.5
St Claire Meadows - South Swale	At	NE	69.8%	152	0.08		0.5
St Clare Hospital - Addition	Av	NE	59.2%	1704	0.85		0.2
West of St Claire Add. Pnd & E. of Jefferson St	Au	NE	18.1%	304	0.15		0.1
St. Clare Meadows	Aw	NE	53.8%	648	0.32		1
First Add to Highland Add	Bd	NE	70.3%	1596	0.80		0.1
Landlocked NE Drainage - Bg Off	Bg - Off	NE	0.0%	0	0.00	Pond outside of City Limits	>3
Landlocked NE Drainage - Bh Off	Bh - Off	NE	0.0%	0	0.00	Pond outside of City Limits	>3
St Claire Meadows - Infiltration	Bp	NE	100.0%	3	0.00		1.1
Steinhorst Park Pond	Aq	NE	49.0%	9354	4.68		0.3
Off Site Trapped Pond	Bw - Off	NE	0.0%	0	0.00	Pond outside of City Limits	>3
Landlocked NE Drainage - Be Off	Be - Off	NE	0.0%	0	0.00	Pond outside of City Limits	>3
Landlocked NE Drainage - Bf Off	Bf - Off	NE	0.0%	0	0.00	Pond outside of City Limits	>3
NE Drainage Study - Knuth Pond	Bx	NE	34.4%	3495	1.75		0.2
			Total =	**103,041**	**51.5**		

Proposed Structural BMP TSS Reductions

BMP Priority	BMP Name	BMP ID	P8 Model Name	TSS Removal Efficiency	Eligible TSS Trapped (Tons/Year)	Estimtated Construction Cost
1	Portion of a Low Area at Golf Course	P-Z	SE	55.7%	18.11	$155,000
2	Undeveloped Residential Parcel	P-Y	SW	59.1%	12.42	$125,000
3	East of Existing High School Track	P-A	NW	83.7%	10.94	$160,000
4	Agricultural Land on East Side of City	P-N	NE	87.7%	9.59	$200,000
5	Portion of Sauk County Lot	P-E	NE	79.9%	9.43	$220,000
6	In Broadway Park	P-L	NW	34.1%	8.54	$55,000
7	Open Space on St. Joseph Church Lot	P-R	NW	33.2%	8.40	$75,000
8	North Side of St. Vincent Lot	P-J	SW	50.1%	8.35	$230,000
9	Grassy Portion of Assembly Church Lot	P-D	NE	78.9%	7.23	$170,000
10	Grassy Area in the PacJet Lot	P-H	SW	48.3%	6.98	$105,000
11	Portion of Back lots, North of Baraboo River	P-B	NE	36.1%	5.93	$65,000
12	Grassy Portion of St. John's Lot	P-C	NE	49.5%	5.91	$95,000
13	Vacant City Lot along West Baraboo River	P-M	SE	94.2%	5.51	$180,000
14	Grassy Area in the Sysco Parcel	P-AE	SW	65.8%	5.25	$155,000
15	Grassy Area within the Swimming Pool Lot	P-K	SW	33.2%	5.24	$55,000
16	Vacant City Lot	P-I	SW	44.9%	5.24	$100,000
17	In Mary Roundtree Park	P-F	NW	90.2%	4.33	$115,000
18	Wooded Area near the University of Baraboo	P-V	SW	75.8%	4.19	$595,000
19	Undeveloped Residential Parcel	P-Q	NE	44.0%	3.14	$80,000
20	Undeveloped Residential Parcel	P-AA	NW	98.5%	3.13	$345,000
21	Grassed Area along North Baraboo River	P-AG	NW	83.8%	2.92	$70,000
22	Open Area along Maple Street	P-AP	SE	67.9%	2.41	$70,000
23	Grassy Area within Industrial Lot	P-W	SW	90.2%	1.99	$725,000
24	Open Grassy Area next to School	P-AM	SE	97.0%	1.64	$175,000
25	Undeveloped Area Between Hapco and Sysco	P-X	SW	97.3%	1.52	$195,000
26	Wooded Area along East Baraboo River	P-AL	NW	96.1%	1.52	$130,000
27	Undevelopd Wooded Area of Residential Lot	P-S	NW	80.9%	1.42	$85,000
28	Grassy Area of Deveoped Parcel	P-AD	NE	97.0%	1.12	$115,000
29	Open Space in the University of Baraboo	P-AC	NW	97.2%	1.10	$135,000
30	Grassy Area in Kendall Telephone Inc. Lot	P-O	NE	36.5%	1.08	$95,000
31	Undeveloped Residential Parcel	P-AO	SE	84.6%	1.06	$65,000
32	Vacant Area of Circus World	P-AK	SE	72.3%	0.78	$55,000
33	Directly South of Flambeau Molding	P-AH	SW	96.9%	0.77	$215,000
34	In Lower Ochsner Park	P-G	NW	91.2%	0.30	$60,000
				Total =	**167.5**	**$5,470,000**

APPENDIX C

Pond Concept Plans and Cost Estimates



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-A
East of Existing High School Track

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- Baraboo River
- parcels

N

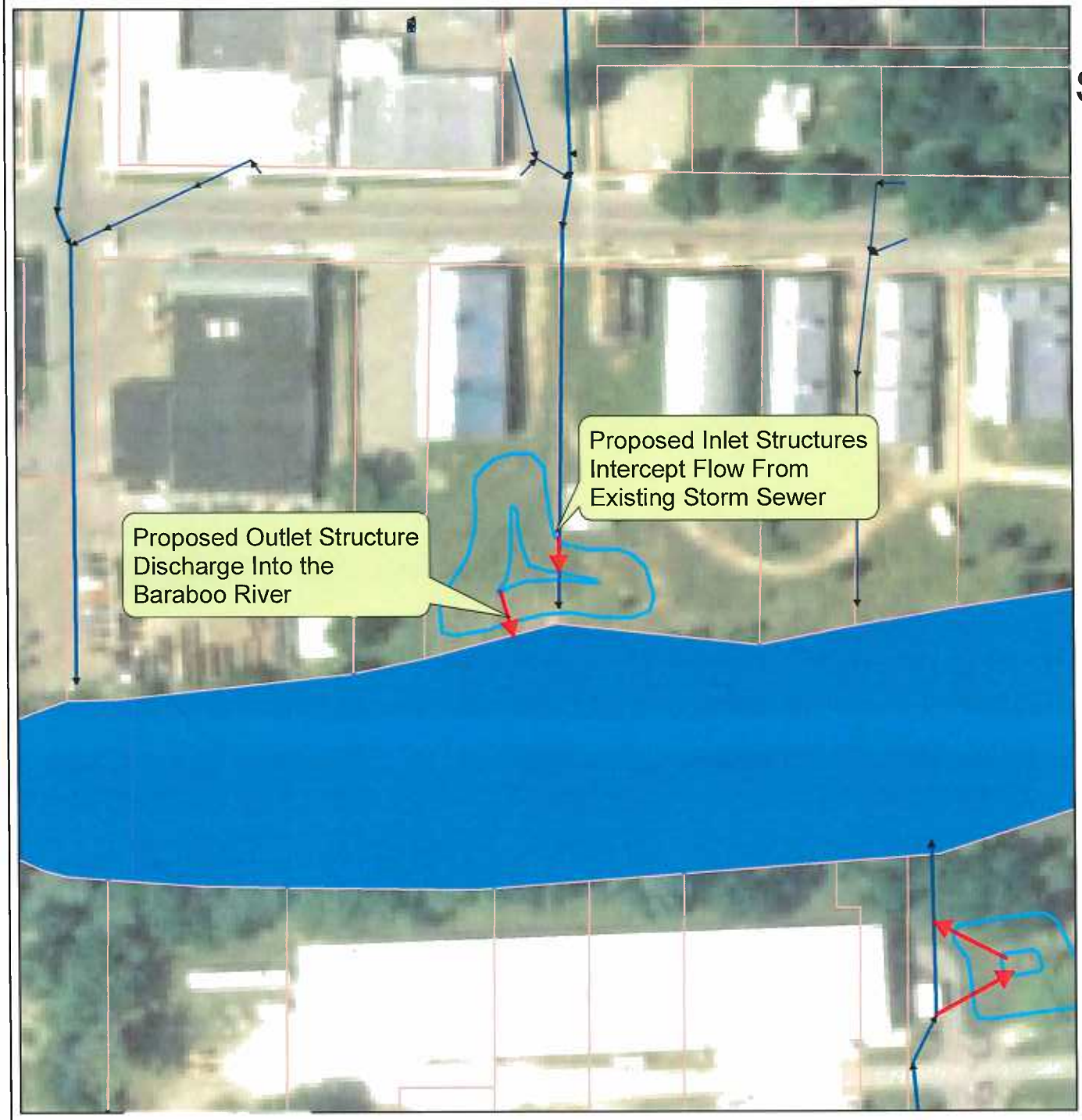
0 75 150 300 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION · MUNICIPAL · REMEDIATION
DEVELOPMENT · ENVIRONMENTAL

P-A	East of Existing High School Track					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	17,843	$71,374	
2)	RCP Cost and Installation	LF	$50	140	$7,000	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$3,254	1	$3,254	
5)	Street Restoration	SY	$20	0	$0	
6)	Re-Stabilization	SY	$2.00	9,680	$19,360	
	DIRECT COST SUBTOTAL				$103,988	
	Unexpected Design Details		30%		$25,000	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$158,988	
7)	Land Purchase	LS	$151,879	1.0	$151,879	
	Prorate from Assessed to Market Value		10%		$15,188	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$326,055**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-B
Portions of 2 back lots,
North of Baraboo River

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 50 100 200 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION · MUNICIPAL · REMEDIATION
DEVELOPMENT · ENVIRONMENTAL

P-B	Portions of two back lots, just North of the Baraboo River					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	1,412	$5,647	
2)	RCP Cost and Installation	LF	$50	60	$3,000	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$1,839	1	$1,839	
5)	Street Restoration	SY	$20	0	$0	
6)	Re-Stabilization	SY	$2.00	1,113	$2,226	
	DIRECT COST SUBTOTAL				$15,712	
	Unexpected Design Details		30%		$4,714	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$50,426	
7)	Land Purchase	LS	$20,000	1.0	$20,000	$20,000 Min.
	Prorate from Assessed to Market Value		10%		$2,000	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$72,426**	

Notes:
* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.

City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-C
Grassy Portion of
St. John's Lot

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

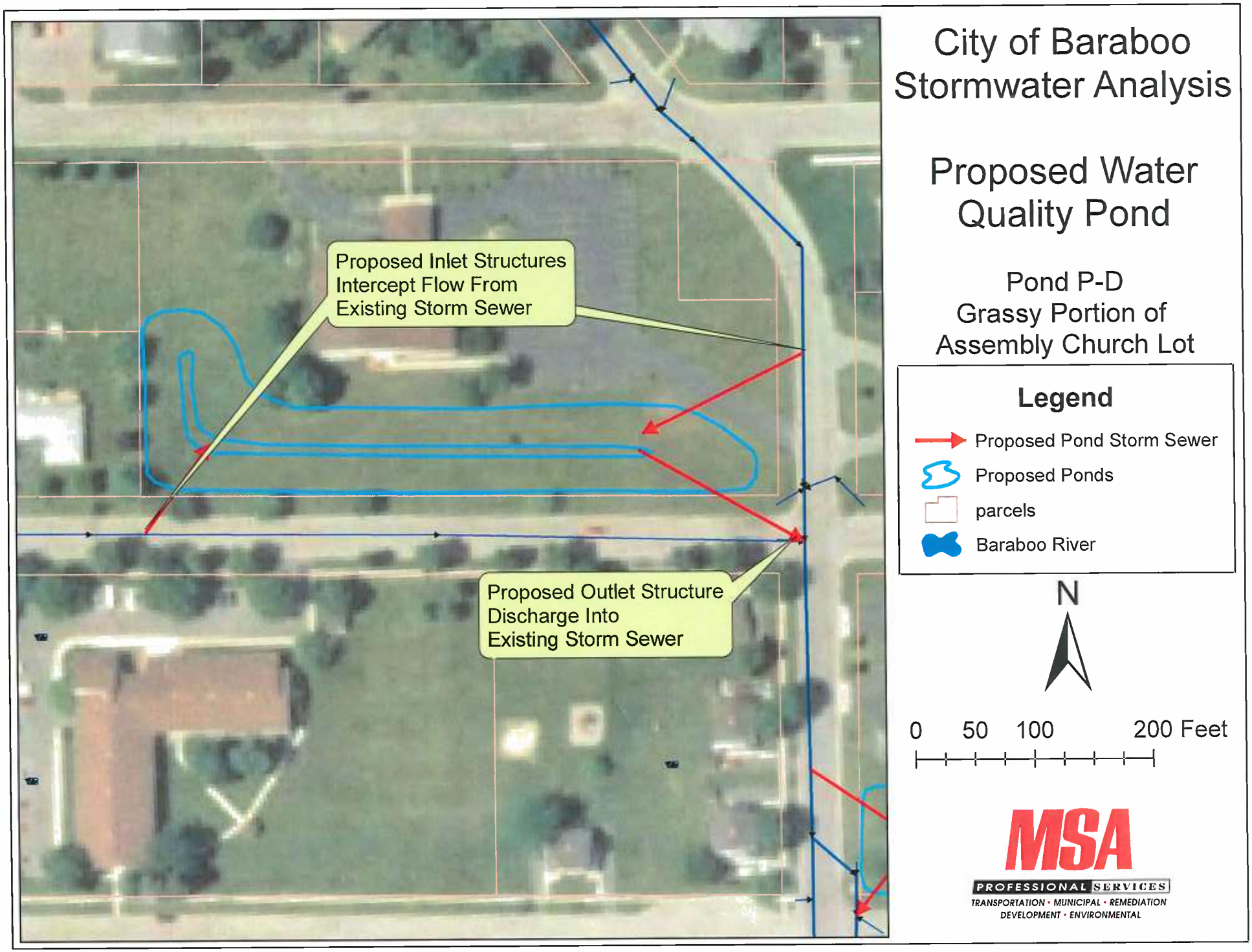
0 50 100 200 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION · MUNICIPAL · REMEDIATION
DEVELOPMENT · ENVIRONMENTAL

P-C	**Grassy Portion of St. John's Lot**					
	Proposed Water Quality Pond					
Item	**Description**	**Unit**	**Unit Price**	**Quantity**	**Extension**	
1)	Excavation	CY	$4	1,299	$5,195	
2)	RCP Cost and Installation	LF	$50	140	$7,000	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$1,780	1	$1,780	
5)	Street Restoration	SY	$20	780	$15,600	
6)	Re-Stabilization	SY	$2.00	1,016	$2,033	
	DIRECT COST SUBTOTAL				$34,608	
	Unexpected Design Details		30%		$10,382	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$74,991	
7)	Land Purchase	LS	$20,000	1.0	$20,000	$20,000 Min.
	Prorate from Assessed to Market Value		10%		$2,000	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$96,991**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-D
Grassy Portion of
Assembly Church Lot

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 50 100 200 Feet

MSA
PROFESSIONAL SERVICES
TRANSPORTATION • MUNICIPAL • REMEDIATION
DEVELOPMENT • ENVIRONMENTAL

P-D	**Grassy Portion of Asssembly Church Lot**					
	Proposed Water Quality Pond					
Item	**Description**	**Unit**	**Unit Price**	**Quantity**	**Extension**	
1)	Excavation	CY	$4	496	$1,984	
2)	RCP Cost and Installation	LF	$50	255	$12,750	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$3,370	1	$3,370	
5)	Street Restoration	SY	$20	910	$18,200	
6)	Re-Stabilization	SY	$2.00	4,598	$9,196	
	DIRECT COST SUBTOTAL				$48,500	
	Unexpected Design Details		30%		$14,550	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$93,050	
7)	Land Purchase	LS	$66,562	1.0	$66,562	
	Prorate from Assessed to Market Value		10%		$6,656	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$166,269**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.

City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-E
Portion of Sauk County Lot

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

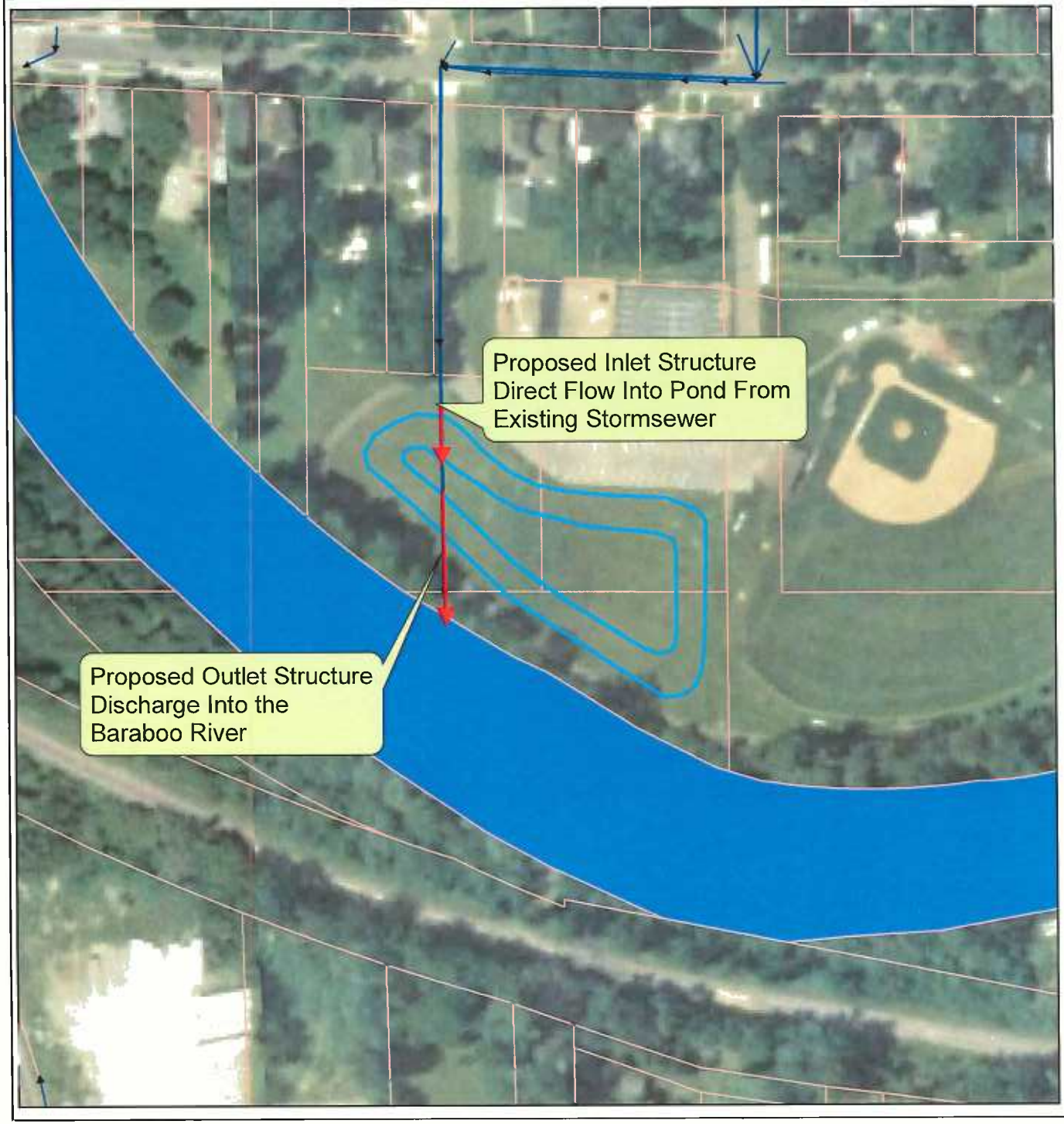
0 75 150 300 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION • MUNICIPAL • REMEDIATION
DEVELOPMENT • ENVIRONMENTAL

P-E	Portion of Sauk County Lot					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	13,891	$55,563	
2)	RCP Cost and Installation	LF	$50	235	$11,750	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$3,197	1	$3,197	
5)	Street Restoration	SY	$20	940	$18,800	
6)	Re-Stabilization	SY	$2.00	8,276	$16,553	
	DIRECT COST SUBTOTAL				$108,863	
	Unexpected Design Details		30%		$25,000	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$163,863	
7)	Land Purchase	LS	$50,583	1.0	$50,583	
	Prorate from Assessed to Market Value		10%		$5,058	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$219,505**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-F
In Mary Roundtree Park

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 75 150 300 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION • MUNICIPAL • REMEDIATION
DEVELOPMENT • ENVIRONMENTAL

P-F	In Mary Roundtree Park, just North of the Baraboo River					
	Proposed Water Quality Pond					
Item	**Description**	**Unit**	**Unit Price**	**Quantity**	**Extension**	
1)	Excavation	CY	$4	9,317	$37,268	
2)	RCP Cost and Installation	LF	$50	400	$20,000	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$2,967	1	$2,967	
5)	Street Restoration	SY	$20	0	$0	
6)	Re-Stabilization	SY	$2.00	5,614	$11,229	
	DIRECT COST SUBTOTAL				$74,464	
	Unexpected Design Details		30%		$22,339	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$126,803	
7)	Land Purchase	LS	$0	1.0	$0	
	Prorate from Assessed to Market Value		10%		$0	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$126,803**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.

City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-G
In Lower Ochsner Park

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 50 100 200 Feet

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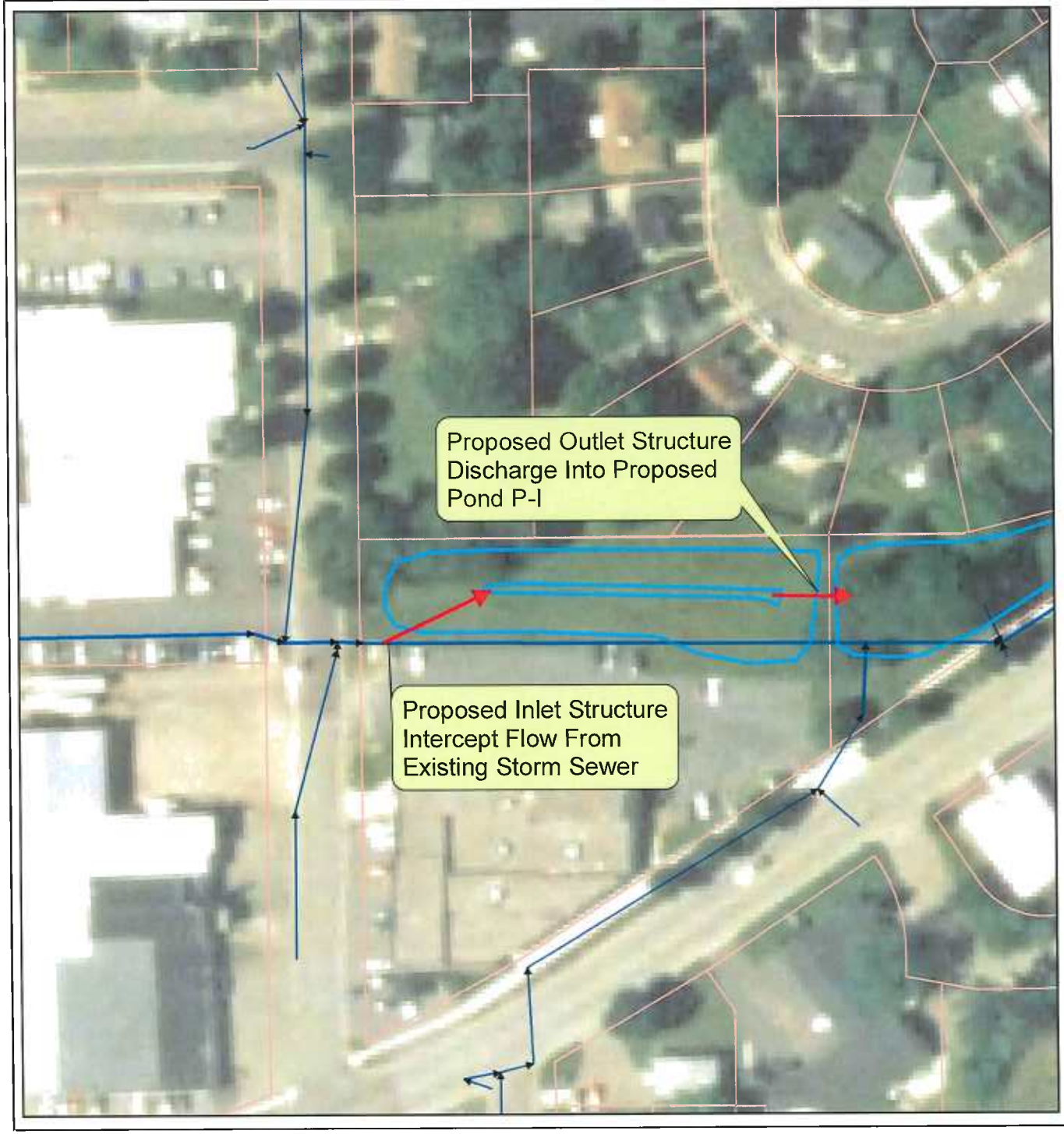
PROFESSIONAL SERVICES
TRANSPORTATION · MUNICIPAL · REMEDIATION
DEVELOPMENT · ENVIRONMENTAL

P-G	In Lower Ochsner Park, East of the Baraboo River					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	2,372	$9,486	
2)	RCP Cost and Installation	LF	$50	65	$3,250	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$1,950	1	$1,950	
5)	Street Restoration	SY	$20	0	$0	
6)	Re-Stabilization	SY	$2.00	1,646	$3,291	
	DIRECT COST SUBTOTAL				$20,977	
	Unexpected Design Details		30%		$6,293	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$57,270	
7)	Land Purchase	LS	$0	1.0	$0	
	Prorate from Assessed to Market Value		10%		$0	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$57,270**	

Notes:
* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-H
Grassy Area in
the PacJet Lot

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

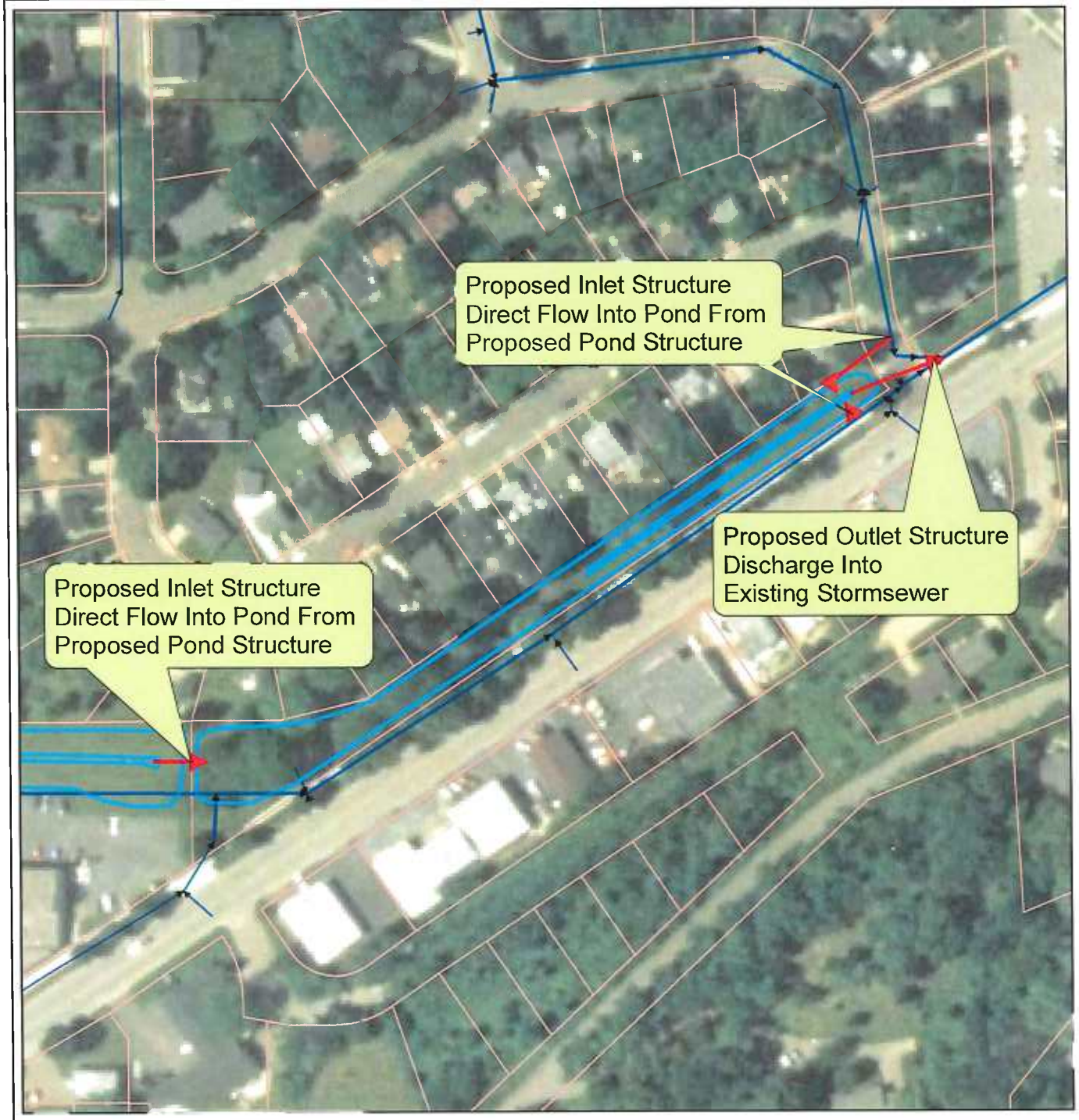
0 50 100 200 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION · MUNICIPAL · REMEDIATION
DEVELOPMENT · ENVIRONMENTAL

P-H	Grassy Area in the PacJet Lot					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	2,597	$10,390	
2)	RCP Cost and Installation	LF	$50	140	$7,000	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$2,313	1	$2,313	
5)	Street Restoration	SY	$20	0	$0	
6)	Re-Stabilization	SY	$2.00	2,081	$4,162	
	DIRECT COST SUBTOTAL				$26,865	
	Unexpected Design Details		30%		$8,059	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$64,924	
7)	Land Purchase	LS	$32,974	1.0	$32,974	
	Prorate from Assessed to Market Value		10%		$3,297	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$101,196**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-I
Vacant City Lot

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 70 140 280 Feet

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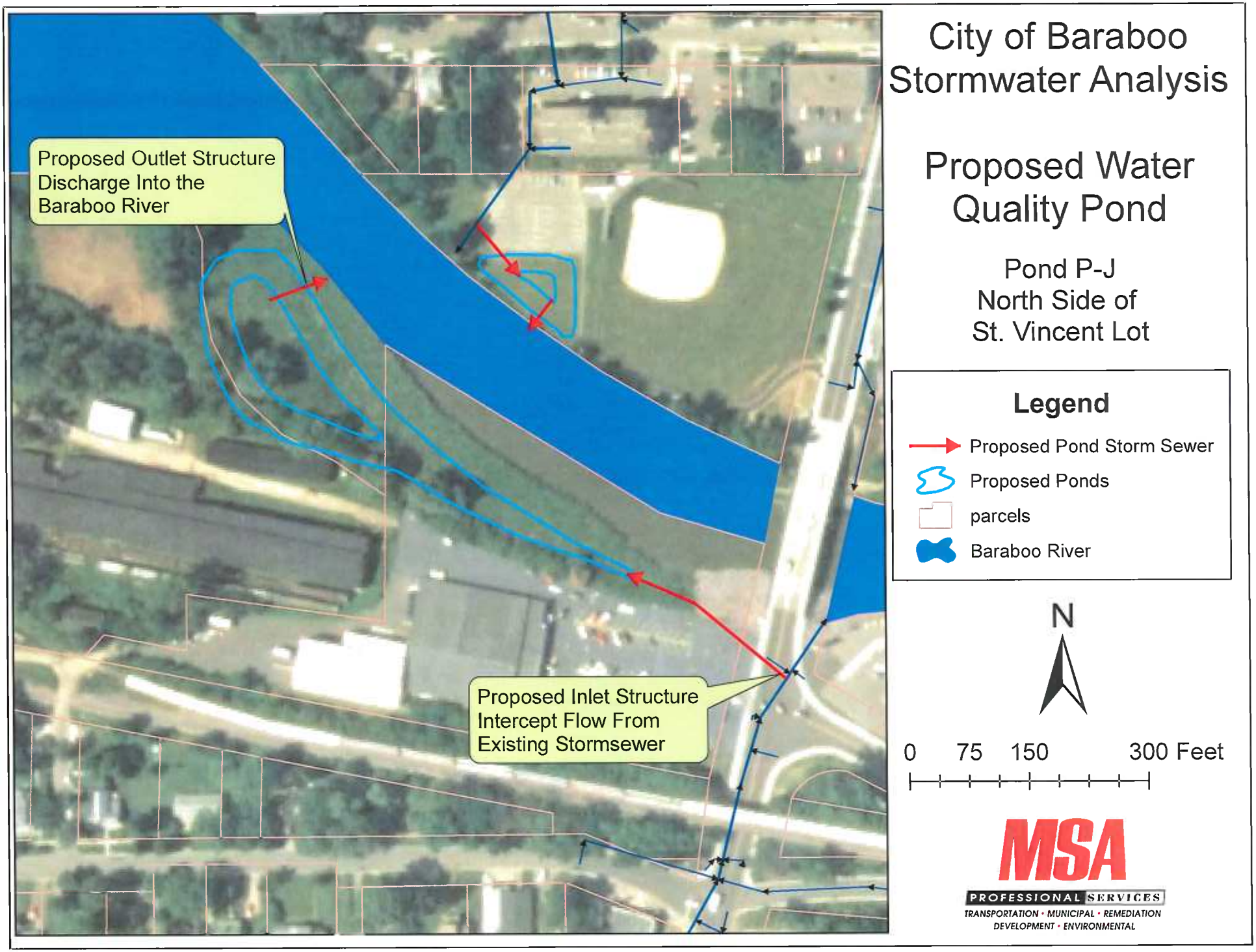
TRANSPORTATION • MUNICIPAL • REMEDIATION
DEVELOPMENT • ENVIRONMENTAL

P-I	**Vacant City Lot**					
	Proposed Water Quality Pond					
Item	**Description**	**Unit**	**Unit Price**	**Quantity**	**Extension**	
1)	Excavation	CY	$4	4,291	$17,166	
2)	RCP Cost and Installation	LF	$50	220	$11,000	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$4,376	1	$4,376	
5)	Street Restoration	SY	$20	248	$4,960	
6)	Re-Stabilization	SY	$2.00	3,485	$6,970	
	DIRECT COST SUBTOTAL				$47,471	
	Unexpected Design Details		30%		$14,241	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$91,712	
7)	Land Purchase	LS	$0	1.0	$0	
	Prorate from Assessed to Market Value		10%		$0	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$91,712**	

Notes:

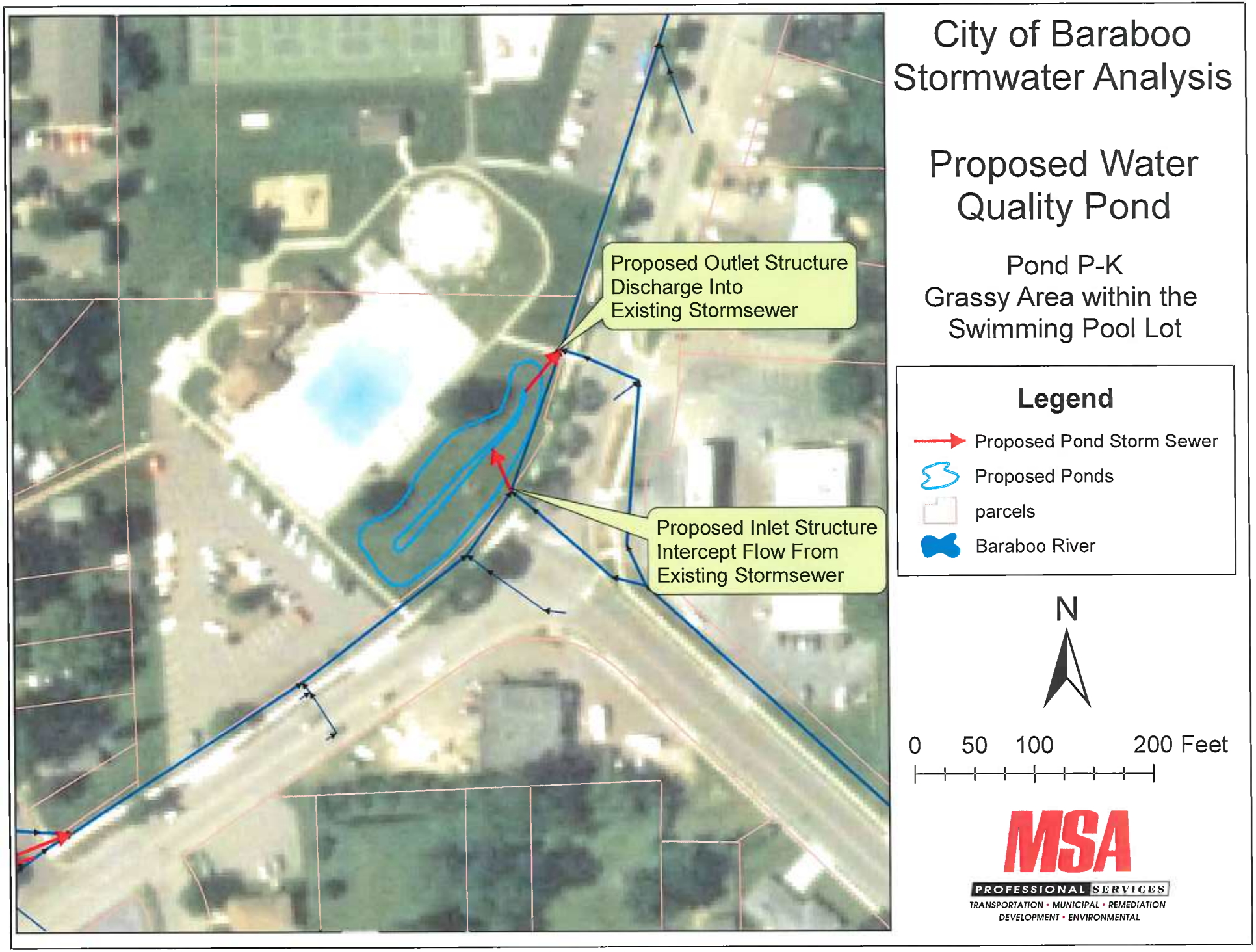
* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.


Proposed Outlet Structure Discharge Into the Baraboo River
Proposed Inlet Structure Intercept Flow From Existing Stormsewer
City of Baraboo Stormwater Analysis
Proposed Water Quality Pond
Pond P-J
North Side of
St. Vincent Lot
Legend
Proposed Pond Storm Sewer
Proposed Ponds
parcels
Baraboo River
N
0 75 150 300 Feet
MSA
PROFESSIONAL SERVICES
TRANSPORTATION • MUNICIPAL • REMEDIATION
DEVELOPMENT • ENVIRONMENTAL

P-J	North Side of St. Vincent's Lot					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	8,414	$33,654	
2)	RCP Cost and Installation	LF	$50	320	$16,000	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$3,800	1	$3,800	
5)	Street Restoration	SY	$20	905	$18,100	
6)	Re-Stabilization	SY	$2.00	5,663	$11,326	
	DIRECT COST SUBTOTAL				$85,880	
	Unexpected Design Details		30%		$25,000	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$140,880	
7)	Land Purchase	LS	$80,338	1.0	$80,338	
	Prorate from Assessed to Market Value		10%		$8,034	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$229,252**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-K
Grassy Area within the
Swimming Pool Lot

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 50 100 200 Feet

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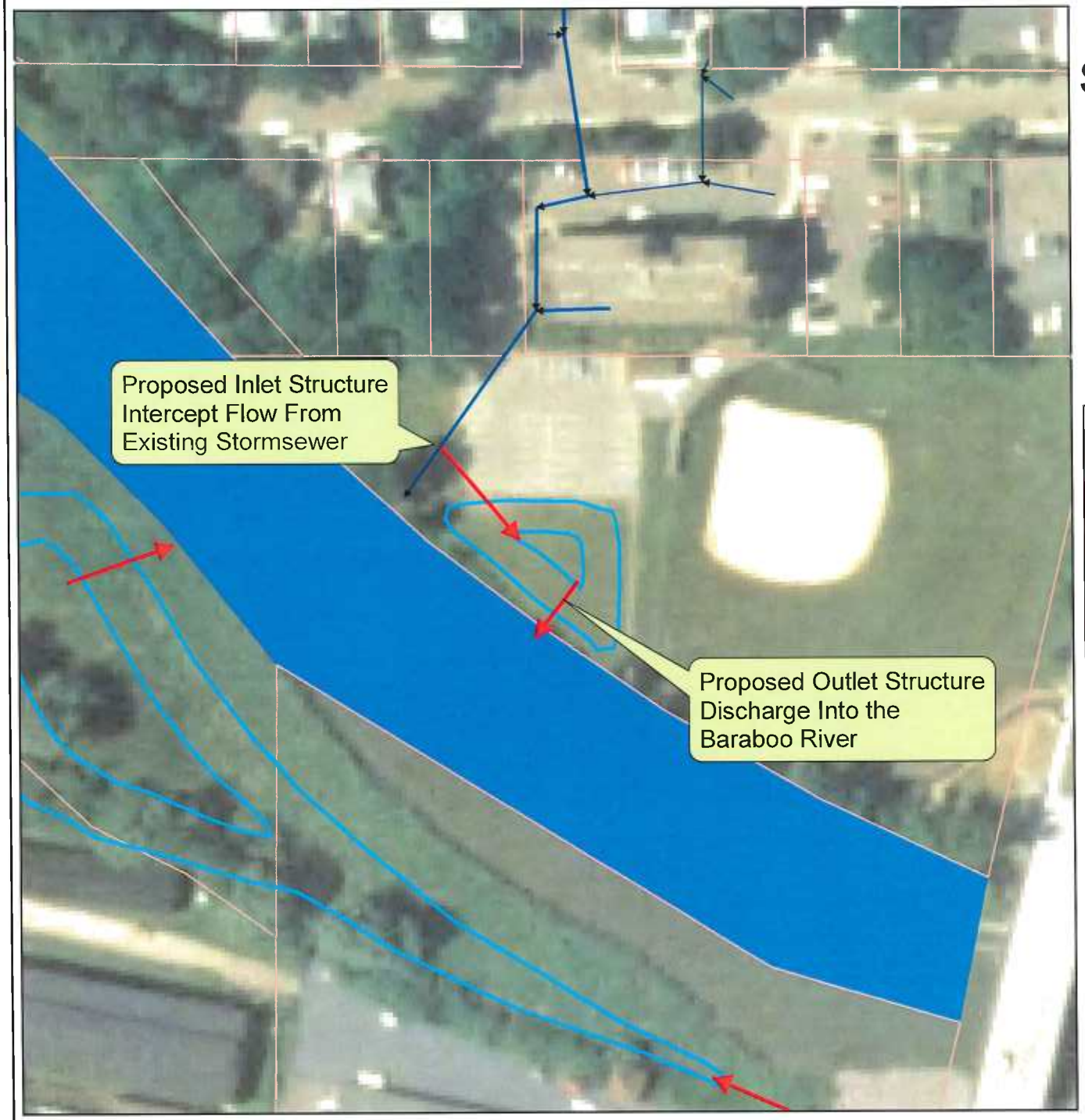
PROFESSIONAL SERVICES
TRANSPORTATION • MUNICIPAL • REMEDIATION
DEVELOPMENT • ENVIRONMENTAL

P-K	**Grassy Area within the Swimming Pool Lot**					
	Proposed Water Quality Pond					
Item	**Description**	**Unit**	**Unit Price**	**Quantity**	**Extension**	
1)	Excavation	CY	$4	1,468	$5,873	
2)	RCP Cost and Installation	LF	$50	85	$4,250	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$1,927	1	$1,927	
5)	Street Restoration	SY	$20	0	$0	
6)	Re-Stabilization	SY	$2.00	1,162	$2,323	
	DIRECT COST SUBTOTAL				$17,373	
	Unexpected Design Details		30%		$5,212	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$52,585	
7)	Land Purchase	LS	$0	1.0	$0	
	Prorate from Assessed to Market Value		10%		$0	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$52,585**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-L
Broadway Park

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 50 100 200 Feet

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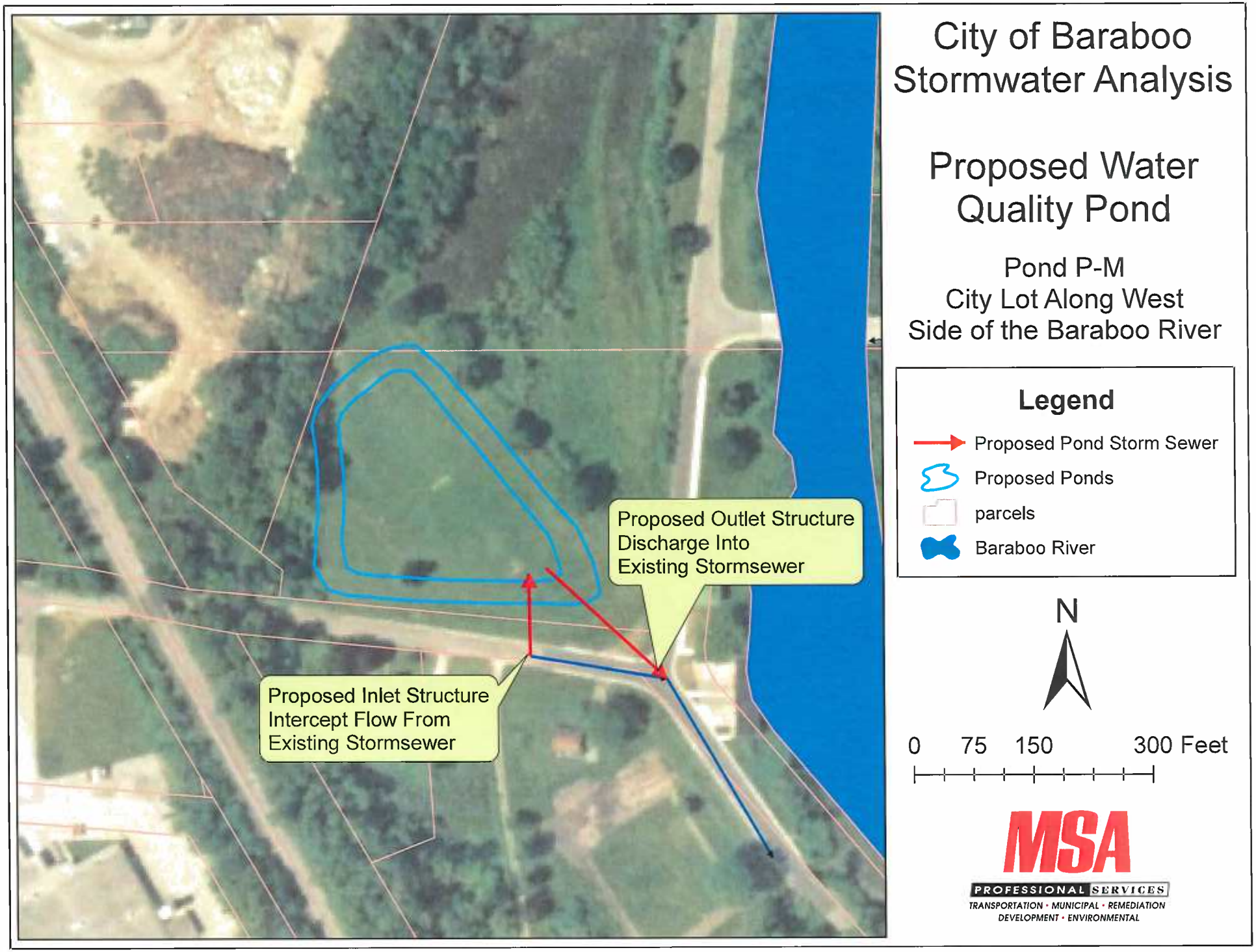
DEVELOPMENT • ENVIRONMENTAL

P-L	**Broadway Park just North of the Baraboo River**					
	Proposed Water Quality Pond					
Item	**Description**	**Unit**	**Unit Price**	**Quantity**	**Extension**	
1)	Excavation	CY	$4	1,073	$4,291	
2)	RCP Cost and Installation	LF	$50	135	$6,750	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$1,641	1	$1,641	
5)	Street Restoration	SY	$20	0	$0	
6)	Re-Stabilization	SY	$2.00	823	$1,646	
	DIRECT COST SUBTOTAL				$17,328	
	Unexpected Design Details		30%		$5,198	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$52,527	
7)	Land Purchase	LS	$0	1.0	$0	
	Prorate from Assessed to Market Value		10%		$0	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$52,527**	

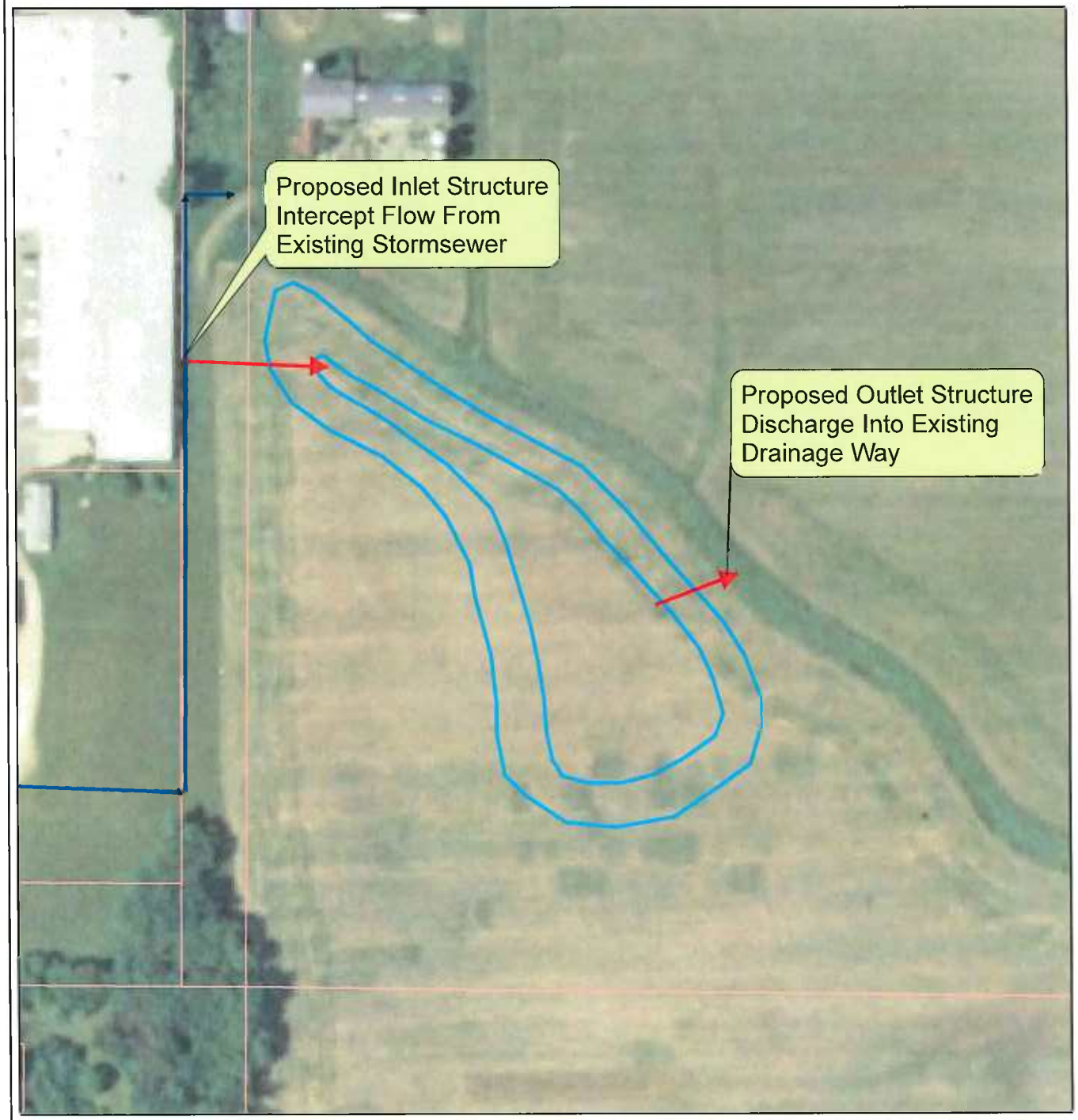
Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.


City of Baraboo
Stormwater Analysis
Proposed Water
Quality Pond
Pond P-M
City Lot Along West
Side of the Baraboo River
Legend
Proposed Pond Storm Sewer
Proposed Ponds
parcels
Baraboo River
Proposed Outlet Structure
Discharge Into
Existing Stormsewer
Proposed Inlet Structure
Intercept Flow From
Existing Stormsewer
N
0
75
150
300 Feet
MSA
PROFESSIONAL SERVICES
TRANSPORTATION · MUNICIPAL · REMEDIATION
DEVELOPMENT · ENVIRONMENTAL

P-M	City Lot Along West Side of the Baraboo River					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	16,771	$67,082	
2)	RCP Cost and Installation	LF	$50	310	$15,500	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$3,156	1	$3,156	
5)	Street Restoration	SY	$20	810	$16,200	
6)	Re-Stabilization	SY	$2.00	8,954	$17,908	
	DIRECT COST SUBTOTAL				$122,846	
	Unexpected Design Details		30%		$25,000	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$177,846	
7)	Land Purchase	LS	$0	1.0	$0	
	Prorate from Assessed to Market Value		10%		$0	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$177,846**	

Notes:
* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-N
Agriculture Land

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 75 150 300 Feet

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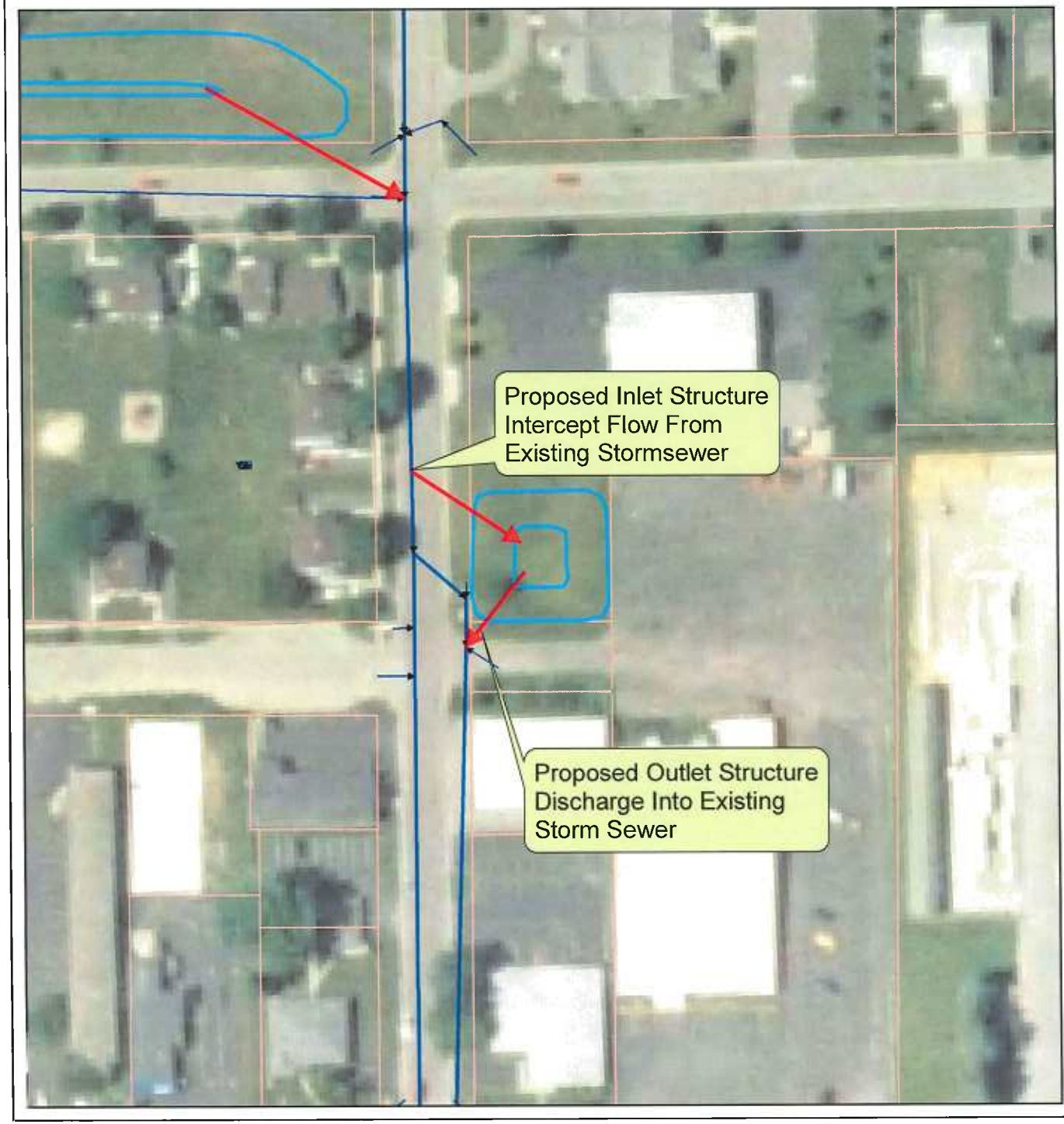
P-N	Agriculture Land					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	20,554	$82,215	
2)	RCP Cost and Installation	LF	$50	230	$11,500	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$4,169	1	$4,169	
5)	Street Restoration	SY	$20	0	$0	
6)	Re-Stabilization	SY	$2.00	12,148	$24,297	
	DIRECT COST SUBTOTAL				$125,181	
	Unexpected Design Details		30%		$25,000	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$180,181	
7)	Land Purchase	LS	$20,000	1.0	$20,000	Inflated to accommodate loss of agricultural income
	Prorate from Assessed to Market Value		10%		N/A	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$200,181**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-O
Grassy Area in Kendall
Telephone Inc. Lot

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 50 100 200 Feet

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PROFESSIONAL SERVICES
TRANSPORTATION · MUNICIPAL · REMEDIATION
DEVELOPMENT · ENVIRONMENTAL

P-O	Grassy Area in Kendell Telephone Inc. Lot					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	1,242	$4,969	
2)	RCP Cost and Installation	LF	$50	160	$8,000	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$1,594	1	$1,594	
5)	Street Restoration	SY	$20	220	$4,400	
6)	Re-Stabilization	SY	$2.00	920	$1,839	
	DIRECT COST SUBTOTAL				$23,802	
	Unexpected Design Details		30%		$7,141	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$60,943	
7)	Land Purchase	LS	$30,513	1.0	$30,513	
	Prorate from Assessed to Market Value		10%		$3,051	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$94,507**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.

City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-Q
Undeveloped Residential
Parcel

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 50 100 200 Feet

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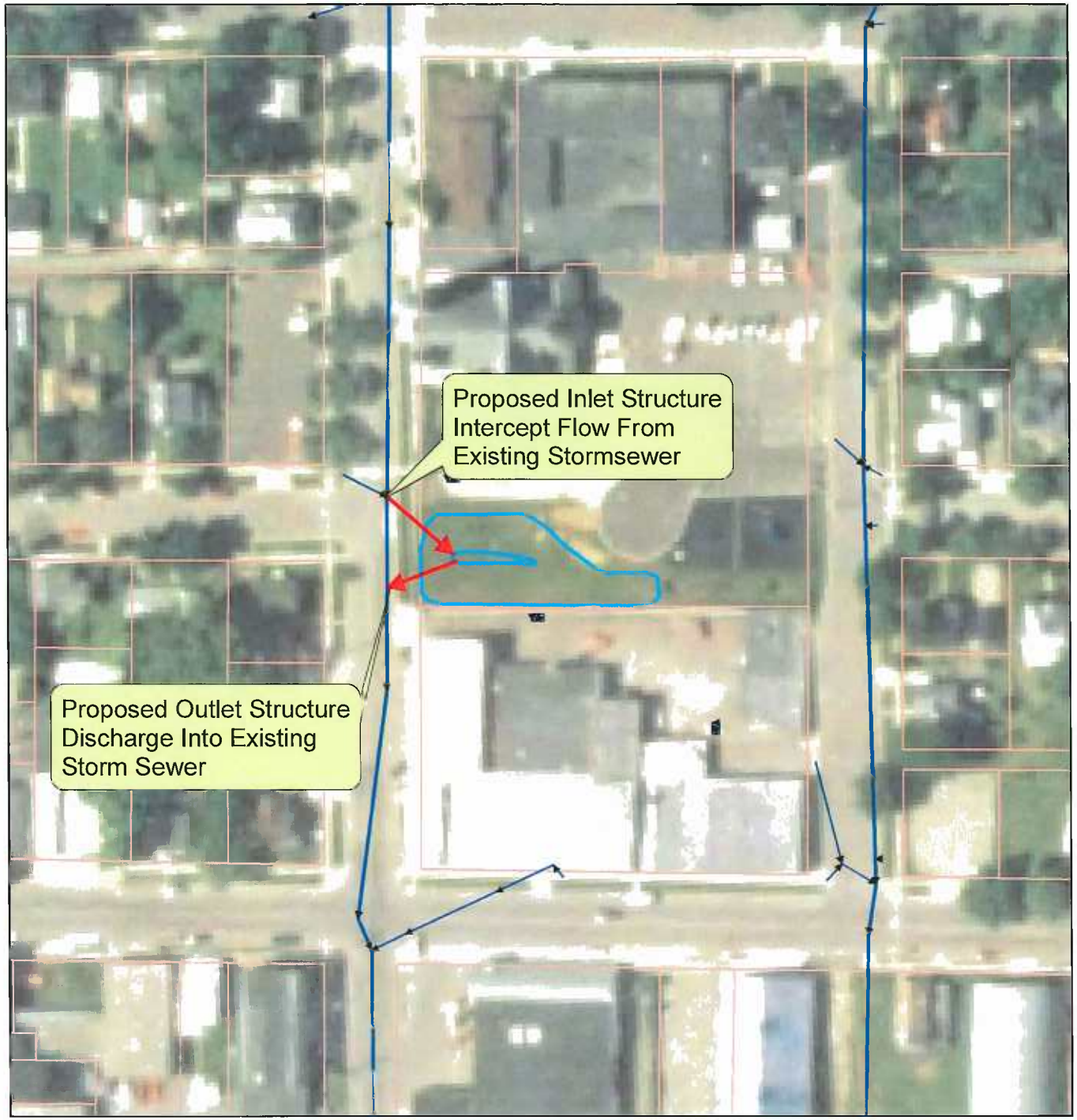
DEVELOPMENT • ENVIRONMENTAL

P-Q	**Undeveloped Residential Parcel**					
	Proposed Water Quality Pond					
Item	**Description**	**Unit**	**Unit Price**	**Quantity**	**Extension**	
1)	Excavation	CY	$4	621	$2,485	
2)	RCP Cost and Installation	LF	$50	125	$6,250	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$1,447	1	$1,447	
5)	Street Restoration	SY	$20	400	$8,000	
6)	Re-Stabilization	SY	$2.00	532	$1,065	
	DIRECT COST SUBTOTAL				$22,247	
	Unexpected Design Details		30%		$6,674	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$58,921	
7)	Land Purchase	LS	$20,000	1.0	$20,000	$20,000 Min.
	Prorate from Assessed to Market Value		10%		$2,000	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$80,921**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-R
Open Space on
St. Joseph Church Lot

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 50 100 200 Feet

MSA
PROFESSIONAL SERVICES
TRANSPORTATION • MUNICIPAL • REMEDIATION
DEVELOPMENT • ENVIRONMENTAL

P-R	**Open Space on St. Joseph's Church Lot**					
	Proposed Water Quality Pond					
Item	**Description**	**Unit**	**Unit Price**	**Quantity**	**Extension**	
1)	Excavation	CY	$4	1,016	$4,066	
2)	RCP Cost and Installation	LF	$50	115	$5,750	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$1,710	1	$1,710	
5)	Street Restoration	SY	$20	360	$7,200	
6)	Re-Stabilization	SY	$2.00	823	$1,646	
	DIRECT COST SUBTOTAL				$23,372	
	Unexpected Design Details		30%		$7,011	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$60,383	
7)	Land Purchase	LS	$20,000	1.0	$20,000	$20,000 Min.
	Prorate from Assessed to Market Value		10%		$2,000	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$82,383**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.

City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-S
Undeveloped Wooded
Area of Residential Lot

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

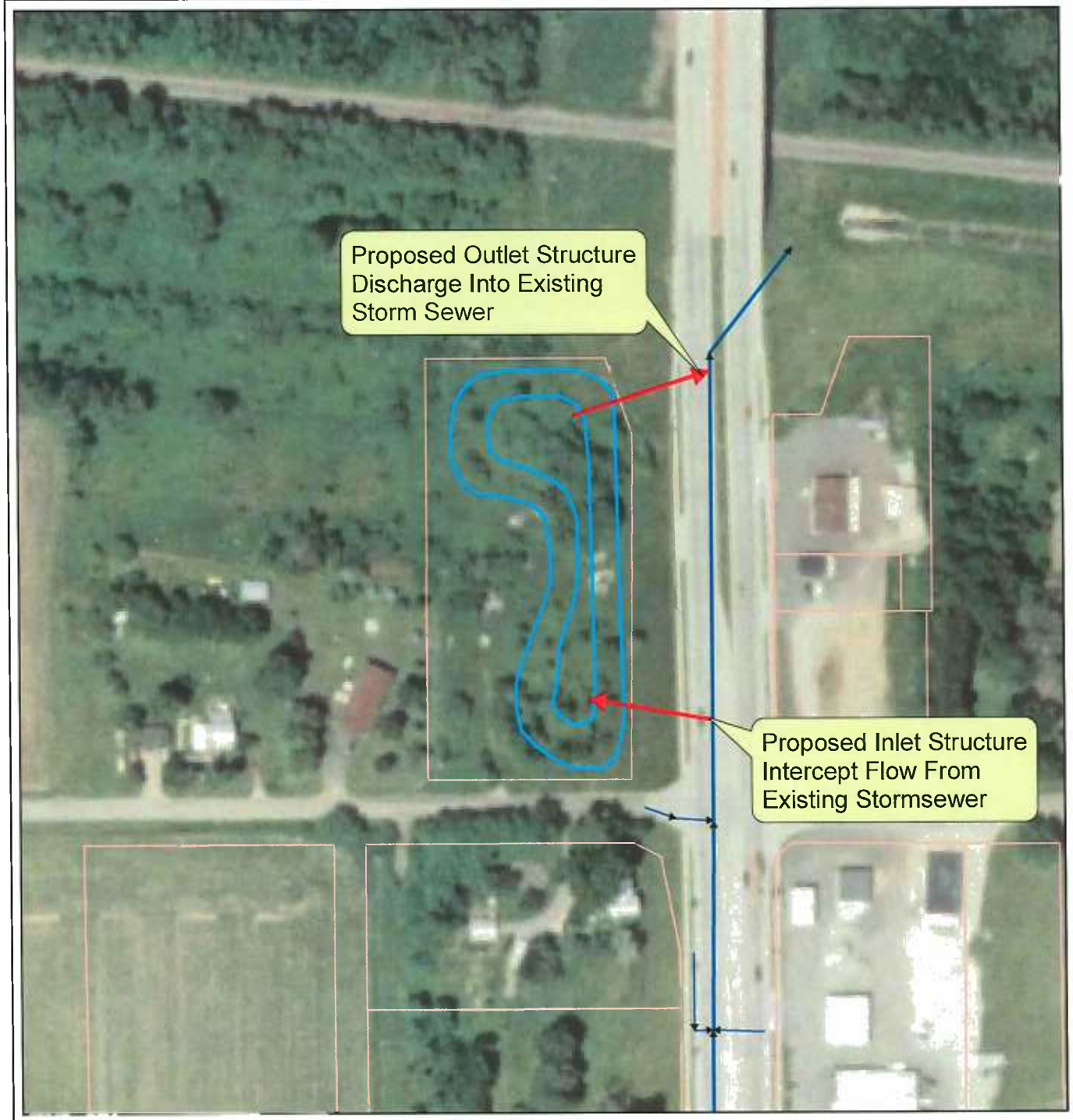
0 50 100 200 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION • MUNICIPAL • REMEDIATION
DEVELOPMENT • ENVIRONMENTAL

P-S	**Undeveloped Wooded Area of Residential Lot**					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	2,993	$11,971	
2)	RCP Cost and Installation	LF	$50	155	$7,750	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$1,944	1	$1,944	
5)	Street Restoration	SY	$20	0	$0	
6)	Re-Stabilization	SY	$2.00	1,984	$3,969	
	DIRECT COST SUBTOTAL				$28,634	
	Unexpected Design Details		30%		$8,590	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$67,224	
7)	Land Purchase	LS	$20,000	1.0	$20,000	$20,000 Min.
	Prorate from Assessed to Market Value		10%		$2,000	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$89,224**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-V
Wooded Area near the
University of Baraboo

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 75 150 300 Feet

MSA
PROFESSIONAL SERVICES
TRANSPORTATION • MUNICIPAL • REMEDIATION
DEVELOPMENT • ENVIRONMENTAL

P-V	**Wooded Area Near the University of Baraboo**					
	Proposed Water Quality Pond					
Item	**Description**	**Unit**	**Unit Price**	**Quantity**	**Extension**	
1)	Excavation	CY	$4	7,849	$31,395	
2)	RCP Cost and Installation	LF	$50	280	$14,000	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$3,104	1	$3,104	
5)	Street Restoration	SY	$20	1,235	$24,700	
6)	Re-Stabilization	SY	$2.00	5,130	$10,261	
	DIRECT COST SUBTOTAL				$86,460	
	Unexpected Design Details		30%		$25,000	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$141,460	
7)	Land Purchase	LS	$409,500	1.0	$409,500	
	Prorate from Assessed to Market Value		10%		$40,950	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$591,910**	

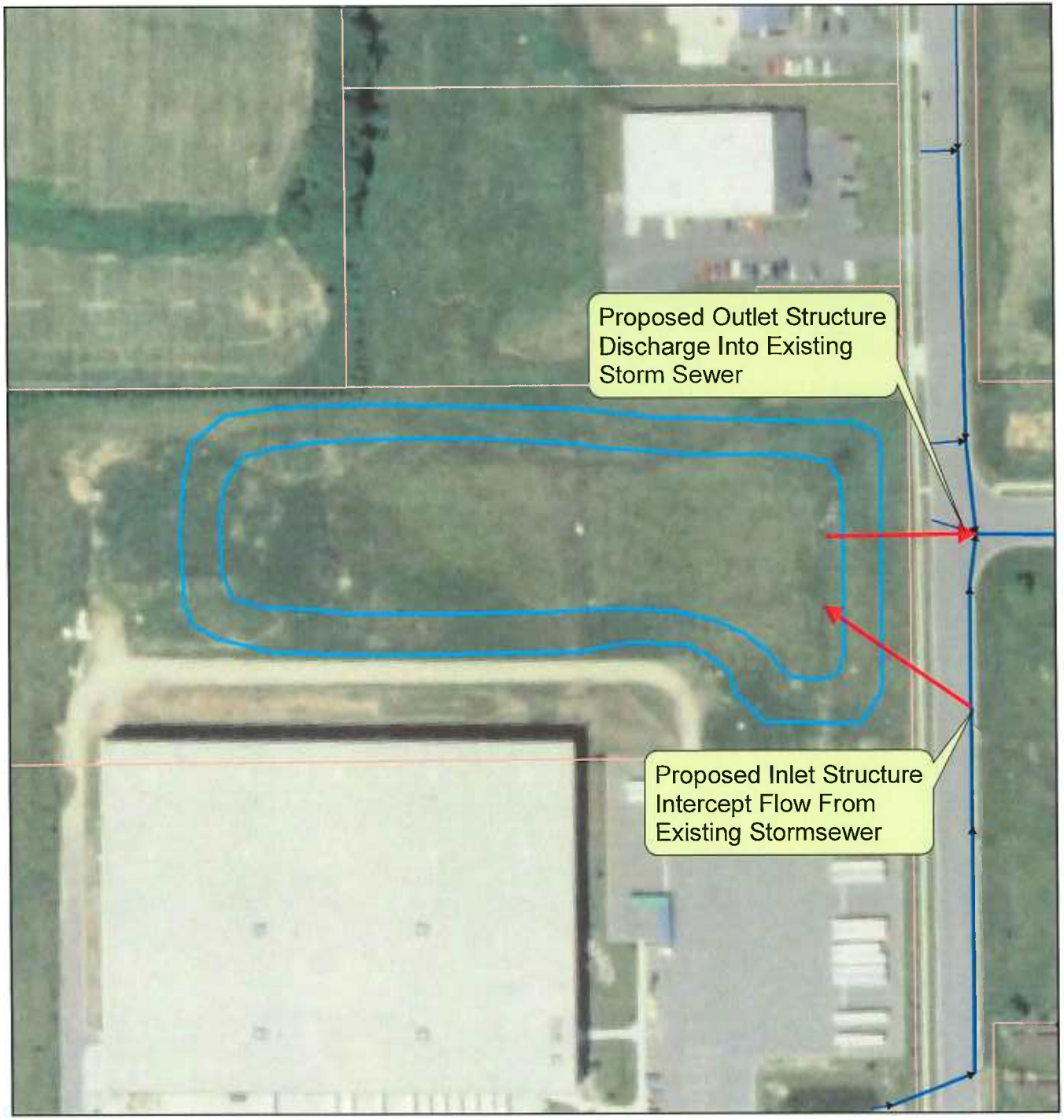
Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.

City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-W
Grassy Area within
an Industrial Lot



Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

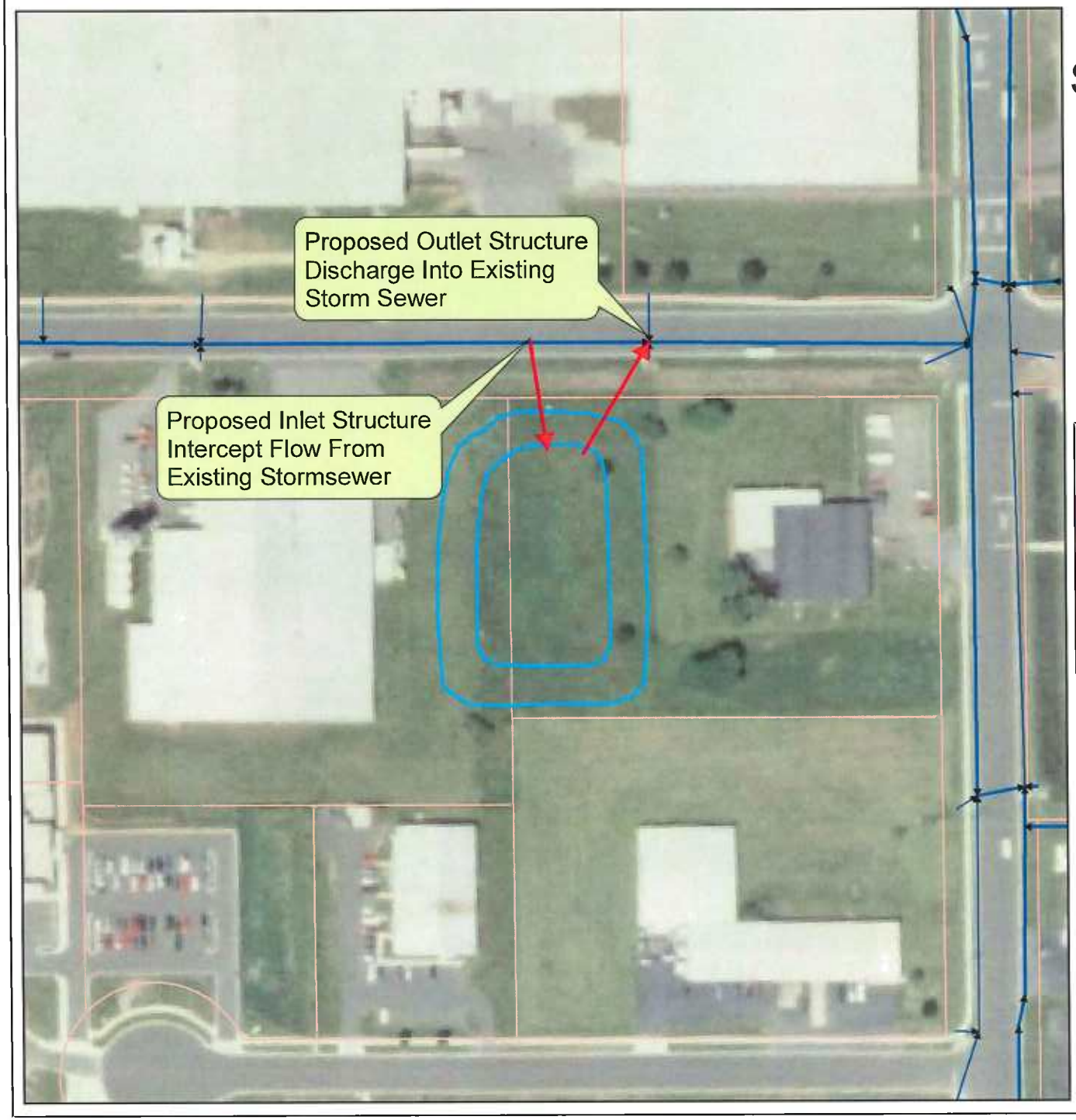
0 75 150 300 Feet

MSA
PROFESSIONAL SERVICES
TRANSPORTATION • MUNICIPAL • REMEDIATION
DEVELOPMENT • ENVIRONMENTAL

P-W	Grassy Area within an Industrial Lot					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	39,357	$157,429	
2)	RCP Cost and Installation	LF	$50	340	$17,000	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$4,825	1	$4,825	
5)	Street Restoration	SY	$20	1,145	$22,900	
6)	Re-Stabilization	SY	$2.00	20,909	$41,818	
	DIRECT COST SUBTOTAL				$246,972	
	Unexpected Design Details		30%		$25,000	$25,000 Cap
	* Engineering Costs		15%		$37,046	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$309,017	
7)	Land Purchase	LS	$376,400	1.0	$376,400	
	Prorate from Assessed to Market Value		10%		$37,640	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$723,057**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-X
Undeveloped Area between
Hapco and Sysco

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 75 150 300 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION · MUNICIPAL · REMEDIATION
DEVELOPMENT · ENVIRONMENTAL

P-X	Undeveloped Area between Hapco and Sysco					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	12,084	$48,335	
2)	RCP Cost and Installation	LF	$50	255	$12,750	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$2,796	1	$2,796	
5)	Street Restoration	SY	$20	870	$17,400	
6)	Re-Stabilization	SY	$2.00	6,970	$13,939	
	DIRECT COST SUBTOTAL				$98,220	
	Unexpected Design Details		30%		$25,000	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$153,220	
7)	Land Purchase	LS	$34,660	1.0	$34,660	
	Prorate from Assessed to Market Value		10%		$3,466	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$191,346**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.

City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-Y
Undeveloped Residential Parcel

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 50 100 200 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION · MUNICIPAL · REMEDIATION
DEVELOPMENT · ENVIRONMENTAL

P-Y	**Undeveloped Residential Parcel**					
	Proposed Water Quality Pond					
Item	**Description**	**Unit**	**Unit Price**	**Quantity**	**Extension**	
1)	Excavation	CY	$4	6,663	$26,652	
2)	RCP Cost and Installation	LF	$50	85	$4,250	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$2,355	1	$2,355	
5)	Street Restoration	SY	$20	195	$3,900	
6)	Re-Stabilization	SY	$2.00	3,969	$7,938	
	DIRECT COST SUBTOTAL				$48,095	
	Unexpected Design Details		30%		$14,429	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$92,524	
7)	Land Purchase	LS	$28,800	1.0	$28,800	
	Prorate from Assessed to Market Value		10%		$2,880	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$124,204**	

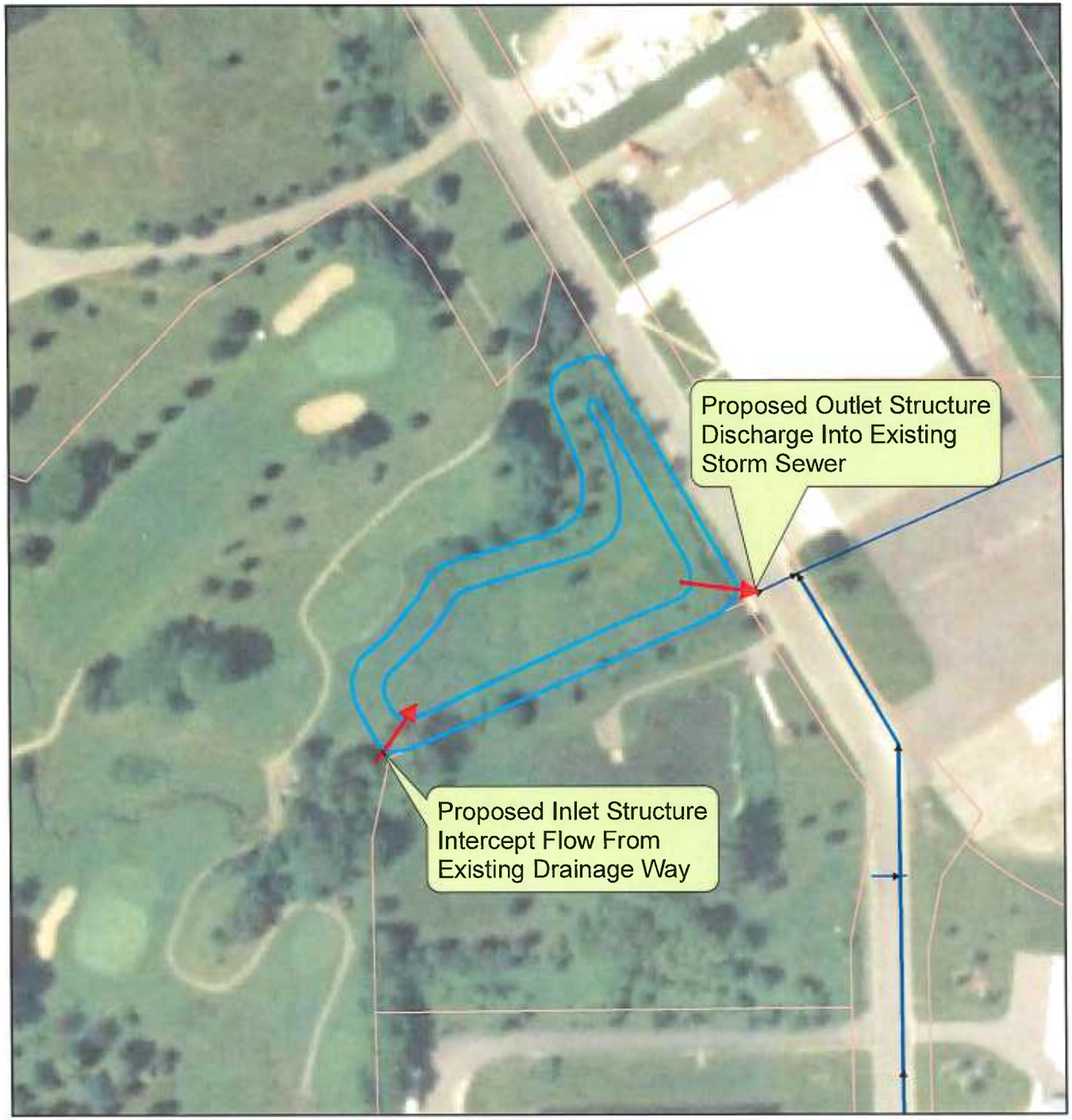
Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.

City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-Z
Portion of a Low
Area at a Golf Course



Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 80 160 320 Feet

MSA
PROFESSIONAL SERVICES
TRANSPORTATION • MUNICIPAL • REMEDIATION
DEVELOPMENT • ENVIRONMENTAL

P-Z	Portion of a Low Area at a Golf Course					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	12,649	$50,594	
2)	RCP Cost and Installation	LF	$50	155	$7,750	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$3,448	1	$3,448	
5)	Street Restoration	SY	$20	150	$3,000	
6)	Re-Stabilization	SY	$2.00	7,502	$15,004	
	DIRECT COST SUBTOTAL				$82,796	
	Unexpected Design Details		30%		$24,839	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$137,635	
7)	Land Purchase	LS	$20,000	1.0	$20,000	$20,000 Min.
	Prorate from Assessed to Market Value		10%		$2,000	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$159,635**	

Notes:
* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.

City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-AA
Undeveloped Residential
Parcel

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- Baraboo River
- parcels

N

0 75 150 300 Feet

MSA
PROFESSIONAL SERVICES
TRANSPORTATION · MUNICIPAL · REMEDIATION
DEVELOPMENT · ENVIRONMENTAL

P-AA	**Undeveloped Residential Parcel**					
	Proposed Water Quality Pond					
Item	**Description**	**Unit**	**Unit Price**	**Quantity**	**Extension**	
1)	Excavation	CY	$4	36,986	$147,943	
2)	RCP Cost and Installation	LF	$50	165	$8,244	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$4,235	1	$4,235	
5)	Street Restoration	SY	$20	0	$0	
6)	Re-Stabilization	SY	$2.00	19,166	$38,333	
	DIRECT COST SUBTOTAL				$201,755	
	Unexpected Design Details		30%		$25,000	$25,000 Cap
	* Engineering Costs		15%		$30,263	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$257,018	
7)	Land Purchase	LS	$77,600	1.0	$77,600	
	Prorate from Assessed to Market Value		10%		$7,760	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$342,378**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.

City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-AC
Wooded and Grassy Area
in the University of Baraboo

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- Baraboo River
- parcels

N

0 75 150 300 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION · MUNICIPAL · REMEDIATION
DEVELOPMENT · ENVIRONMENTAL

P-AC	University of Baraboo					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	10,955	$43,818	
2)	RCP Cost and Installation	LF	$50	335	$16,750	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$3,521	1	$3,521	
5)	Street Restoration	SY	$20	0	$0	
6)	Re-Stabilization	SY	$2.00	6,970	$13,939	
	DIRECT COST SUBTOTAL				$81,029	
	Unexpected Design Details		30%		$24,309	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$135,337	
7)	Land Purchase	LS	$127,881	1.0	$127,881	
	Prorate from Assessed to Market Value		10%		$12,788	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$276,007**	

Notes:
* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.

City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-AD
Grassy Area of
Developed Parcel

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- Baraboo River
- parcels

N

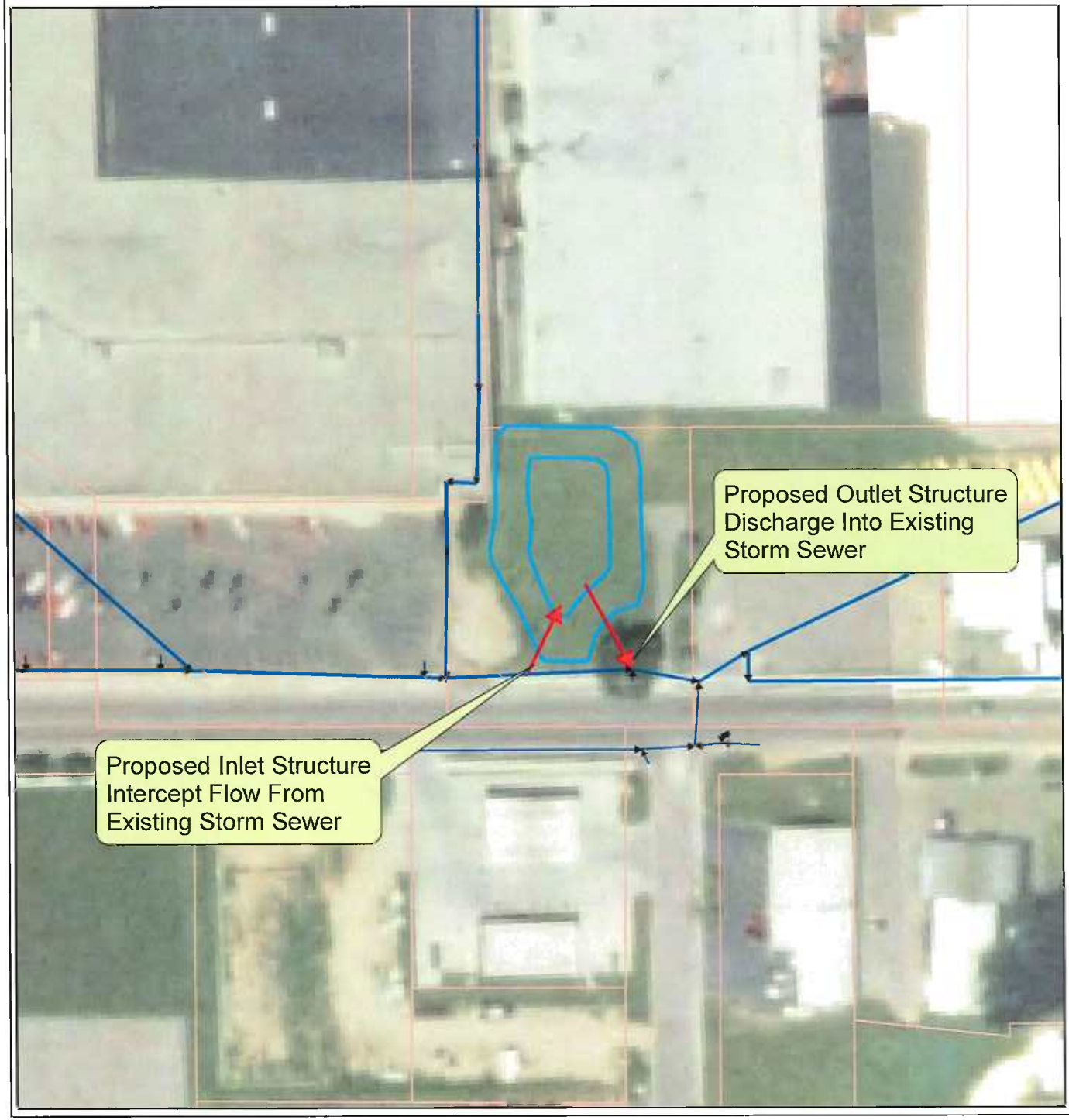
0 50 100 200 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION · MUNICIPAL · REMEDIATION
DEVELOPMENT · ENVIRONMENTAL

P-AD	Grassy Area of Developed Area					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	8,526	$34,106	
2)	RCP Cost and Installation	LF	$50	164	$8,200	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$2,568	1	$2,568	
5)	Street Restoration	SY	$20	325	$6,500	
6)	Re-Stabilization	SY	$2.00	4,888	$9,777	
	DIRECT COST SUBTOTAL				$64,150	
	Unexpected Design Details		30%		$19,245	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$113,396	
7)	Land Purchase	LS	$0	1.0	$0	
	Prorate from Assessed to Market Value		10%		$0	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$113,396**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-AE
Grassy Area in the Sysco Parcel

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- Baraboo River
- parcels

N

0 50 100 200 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION · MUNICIPAL · REMEDIATION
DEVELOPMENT · ENVIRONMENTAL

P-AE	Grassy Area of the Sysco Parcel					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	2,541	$10,164	
2)	RCP Cost and Installation	LF	$50	125	$6,250	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$1,848	1	$1,848	
5)	Street Restoration	SY	$20	0	$0	
6)	Re-Stabilization	SY	$2.00	1,597	$3,194	
	DIRECT COST SUBTOTAL				$24,457	
	Unexpected Design Details		30%		$7,337	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$61,794	
7)	Land Purchase	LS	$81,329	1.0	$81,329	
	Prorate from Assessed to Market Value		10%		$8,133	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$151,255**	

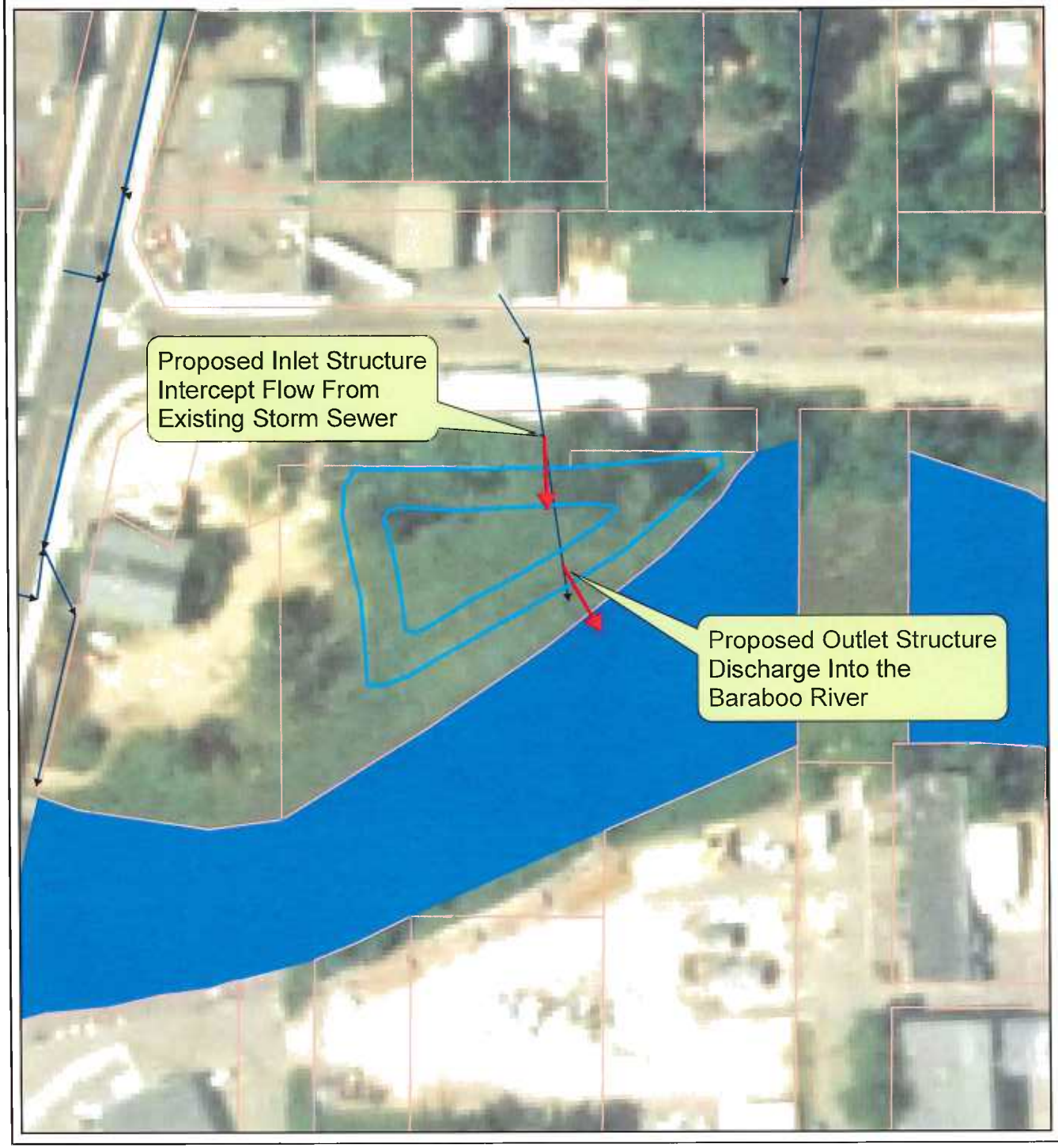
Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.

City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-AG
Grassed Area Along North Side of the Baraboo River



Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

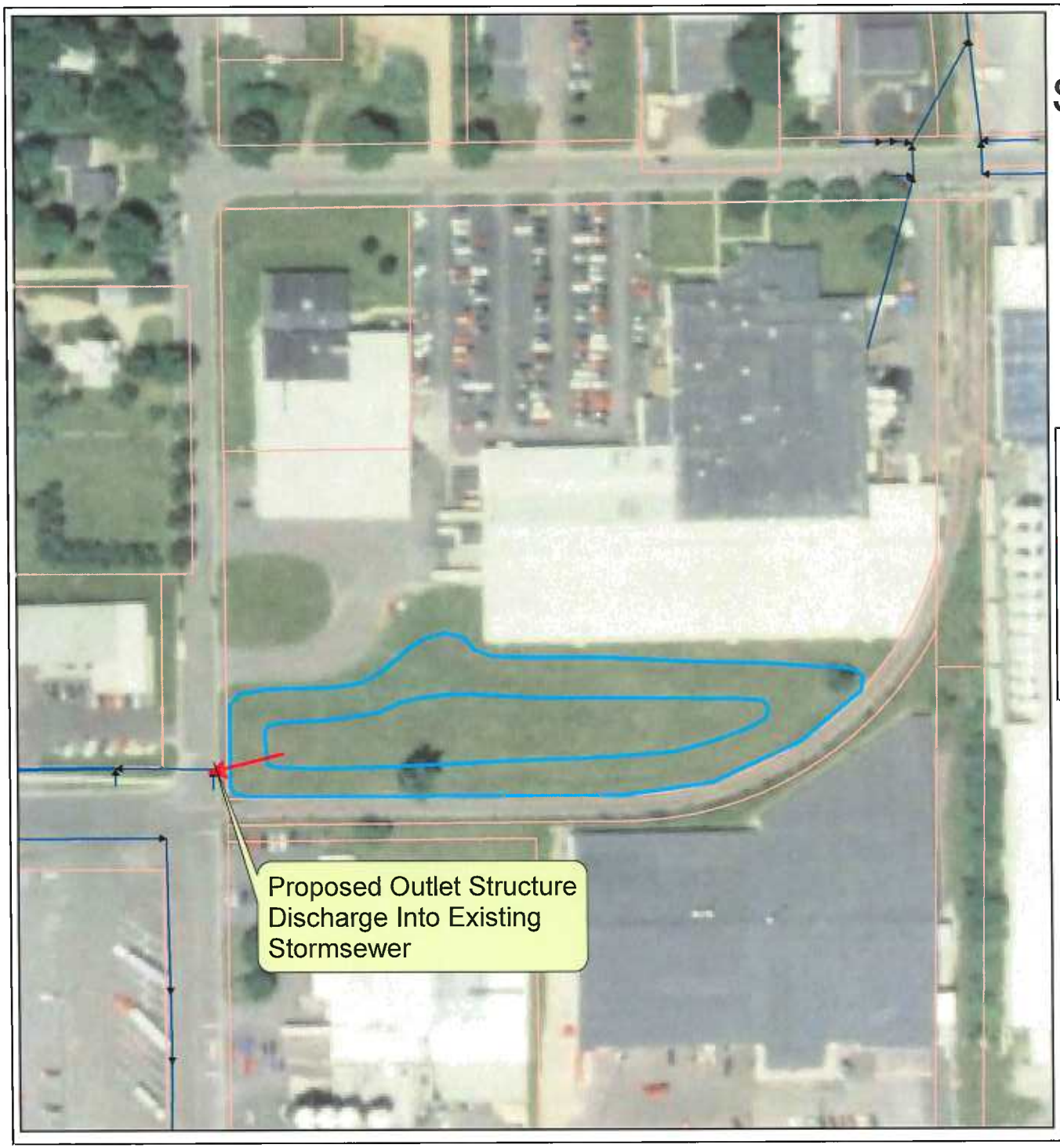
0 50 100 200 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION • MUNICIPAL • REMEDIATION
DEVELOPMENT • ENVIRONMENTAL

P-AG	Grassed Area Along North Side of the Baraboo River					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	3,953	$15,811	
2)	RCP Cost and Installation	LF	$50	105	$5,250	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$2,308	1	$2,308	
5)	Street Restoration	SY	$20	0	$0	
6)	Re-Stabilization	SY	$2.00	2,517	$5,034	
	DIRECT COST SUBTOTAL				$31,402	
	Unexpected Design Details		30%		$9,421	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$70,823	
7)	Land Purchase	LS	$0	1.0	$0	
	Prorate from Assessed to Market Value		10%		$0	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$70,823**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-AH
South of Flambeau Molding

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

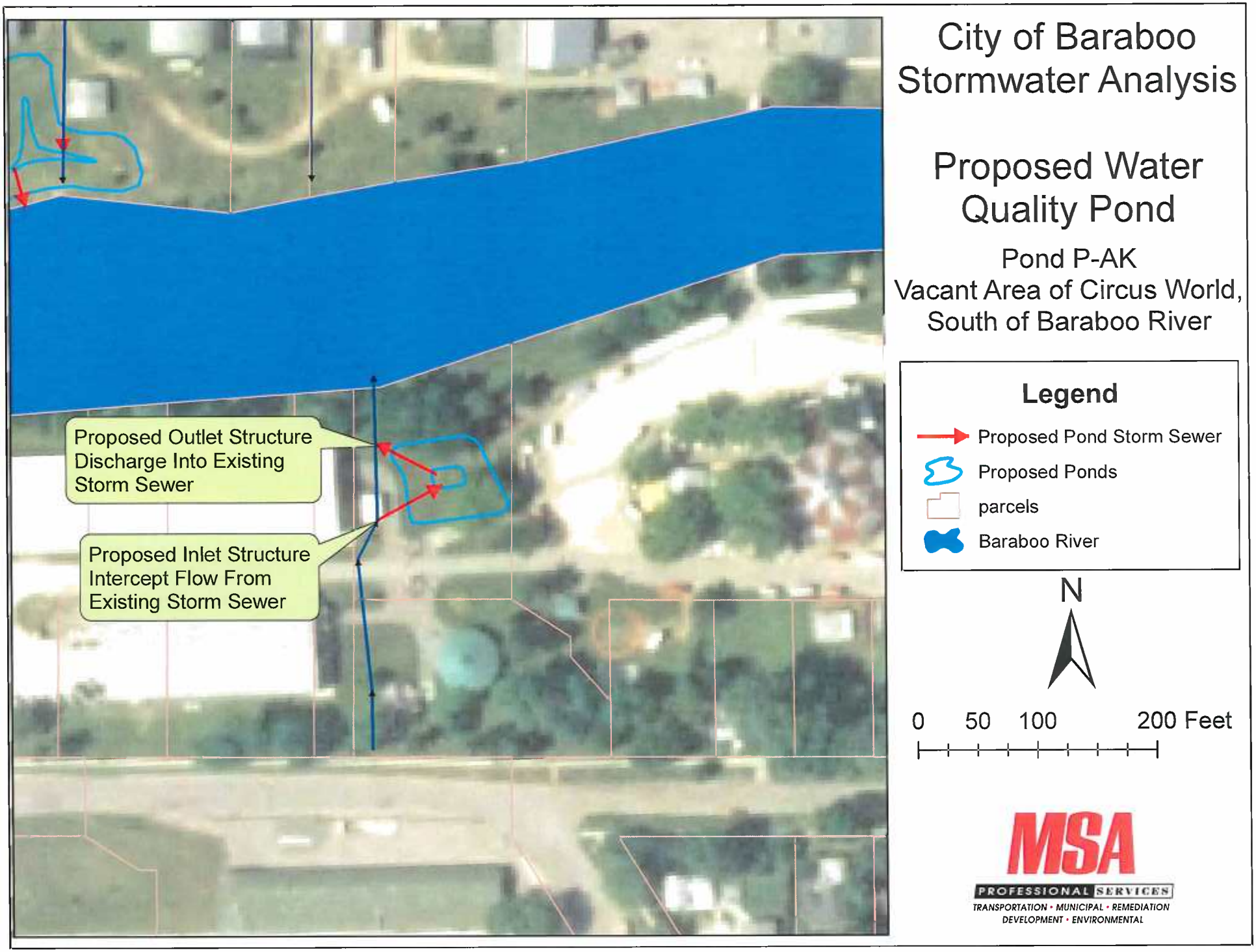
0 75 150 300 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION • MUNICIPAL • REMEDIATION
DEVELOPMENT • ENVIRONMENTAL

P-AH	South of Flambeau Molding					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	14,230	$56,918	
2)	RCP Cost and Installation	LF	$50	105	$5,250	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$3,860	1	$3,860	
5)	Street Restoration	SY	$20	265	$5,300	
6)	Re-Stabilization	SY	$2.00	8,906	$17,811	
	DIRECT COST SUBTOTAL				$92,140	
	Unexpected Design Details		30%		$25,000	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$147,140	
7)	Land Purchase	LS	$58,522	1.0	$58,522	
	Prorate from Assessed to Market Value		10%		$5,852	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$211,514**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-AK
Vacant Area of Circus World, South of Baraboo River

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

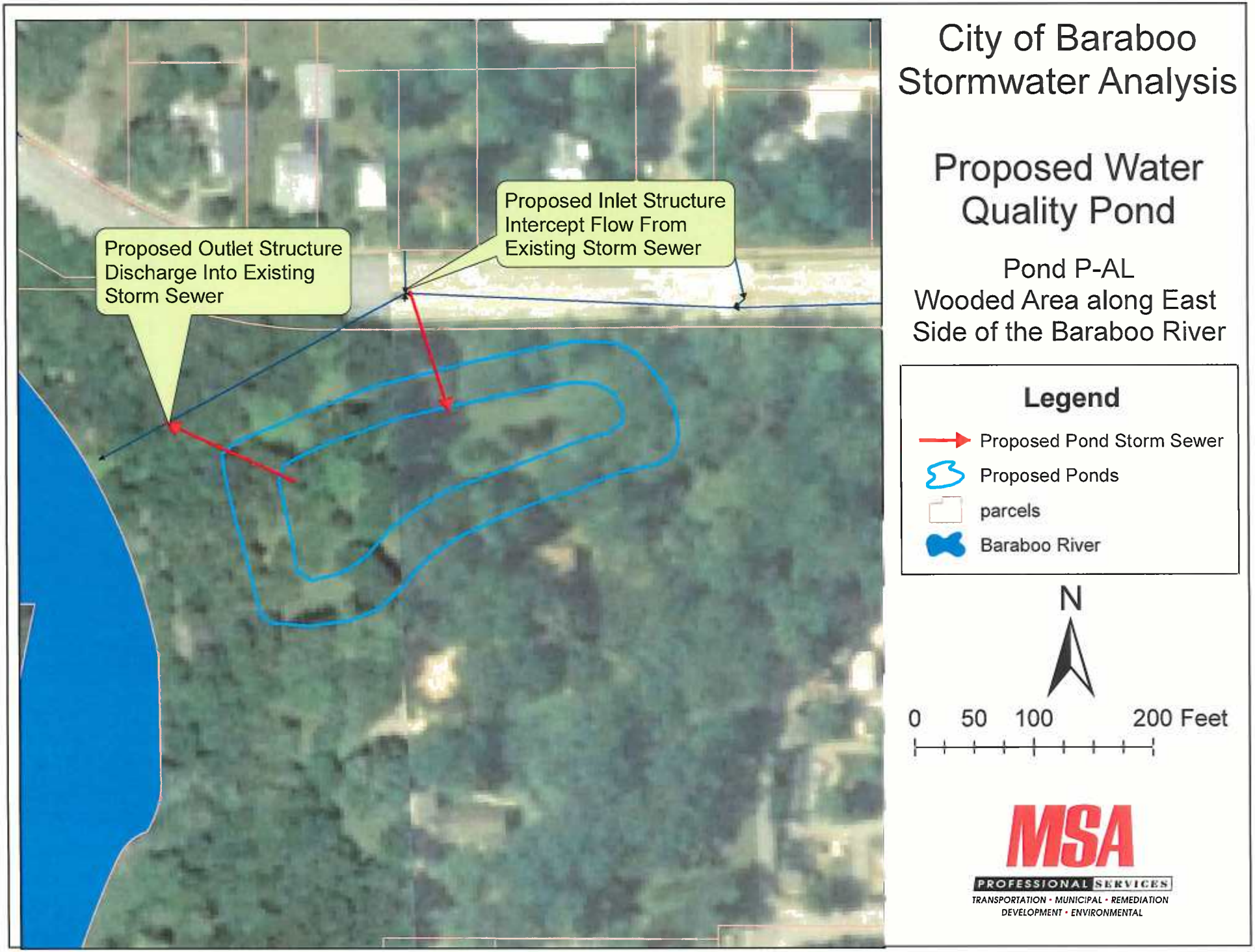
0 50 100 200 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION • MUNICIPAL • REMEDIATION
DEVELOPMENT • ENVIRONMENTAL

P-AK	Vancant Area of Circus World, South of the Baraboo River					
	Proposed Water Quality Pond					
Item	**Description**	**Unit**	**Unit Price**	**Quantity**	**Extension**	
1)	Excavation	CY	$4	734	$2,936	
2)	RCP Cost and Installation	LF	$50	120	$6,000	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$1,463	1	$1,463	
5)	Street Restoration	SY	$20	80	$1,600	
6)	Re-Stabilization	SY	$2.00	581	$1,162	
	DIRECT COST SUBTOTAL				$16,161	
	Unexpected Design Details		30%		$4,848	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$51,009	
7)	Land Purchase	LS	$20,000	1.0	$20,000	$20,000 Min.
	Prorate from Assessed to Market Value		10%		$2,000	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$73,009**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-AL
Wooded Area along East Side of the Baraboo River

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

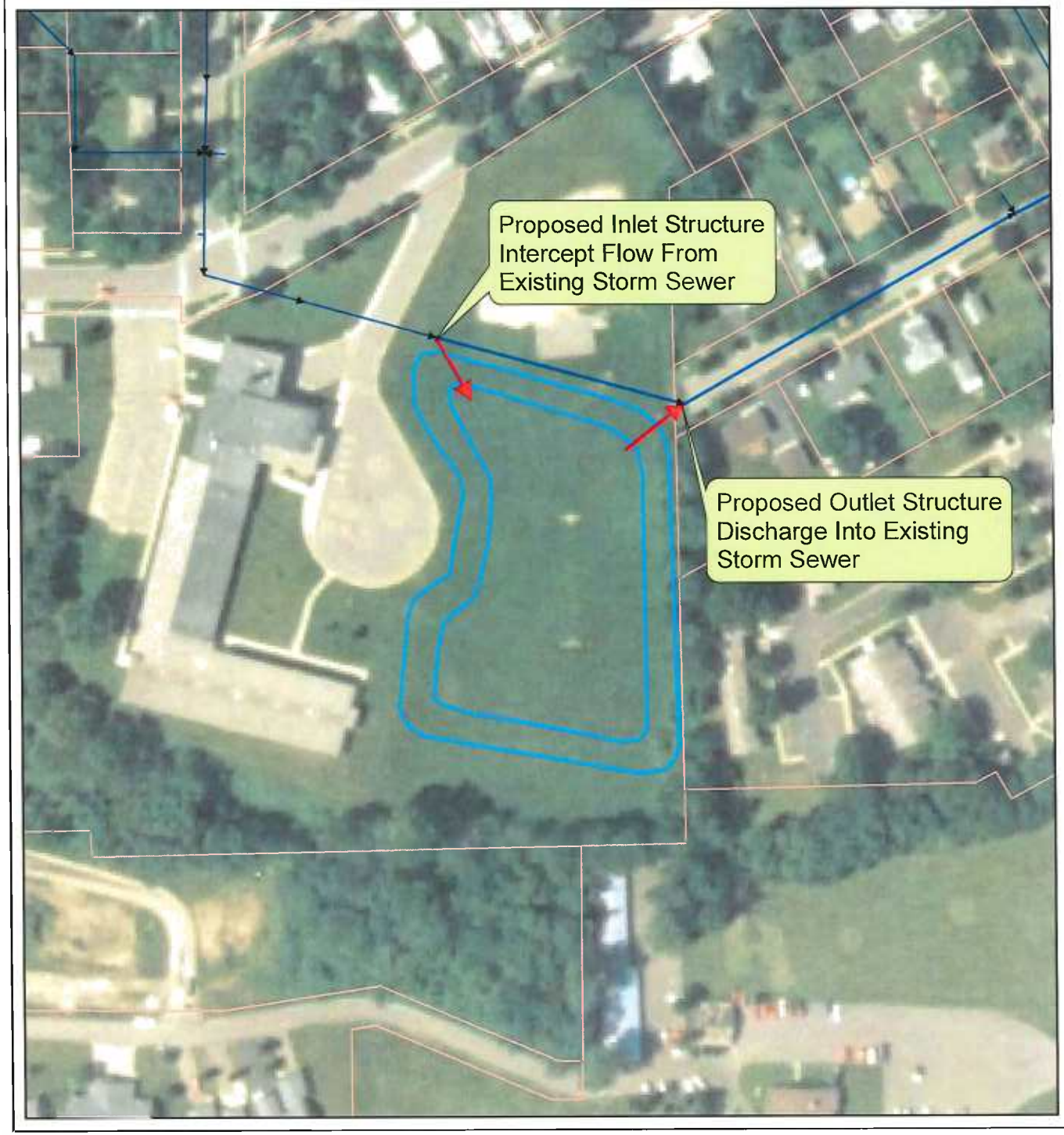
0 50 100 200 Feet

MSA PROFESSIONAL SERVICES
TRANSPORTATION • MUNICIPAL • REMEDIATION
DEVELOPMENT • ENVIRONMENTAL

P-AL	Wooded Area Along East Side of the Baraboo River					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	9,486	$37,946	
2)	RCP Cost and Installation	LF	$50	230	$11,500	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$2,875	1	$2,875	
5)	Street Restoration	SY	$20	390	$7,800	
6)	Re-Stabilization	SY	$2.00	5,808	$11,616	
	DIRECT COST SUBTOTAL				$74,736	
	Unexpected Design Details		30%		$22,421	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$127,157	
7)	Land Purchase	LS	$0	1.0	$0	
	Prorate from Assessed to Market Value		10%		$0	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$127,157**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-AM
Open Grassy Area
next to School

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 75 150 300 Feet

MSA
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P-AM	Open Grassy Area Next to School					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	20,893	$83,571	
2)	RCP Cost and Installation	LF	$50	155	$7,750	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$3,563	1	$3,563	
5)	Street Restoration	SY	$20	0	$0	
6)	Re-Stabilization	SY	$2.00	11,084	$22,167	
	DIRECT COST SUBTOTAL				$120,051	
	Unexpected Design Details		30%		$25,000	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$175,051	
7)	Land Purchase	LS	$105,762	1.0	$105,762	
	Prorate from Assessed to Market Value		10%		$10,576	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$291,389**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.

City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-AO
Undeveloped Residential Parcel

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 50 100 200 Feet

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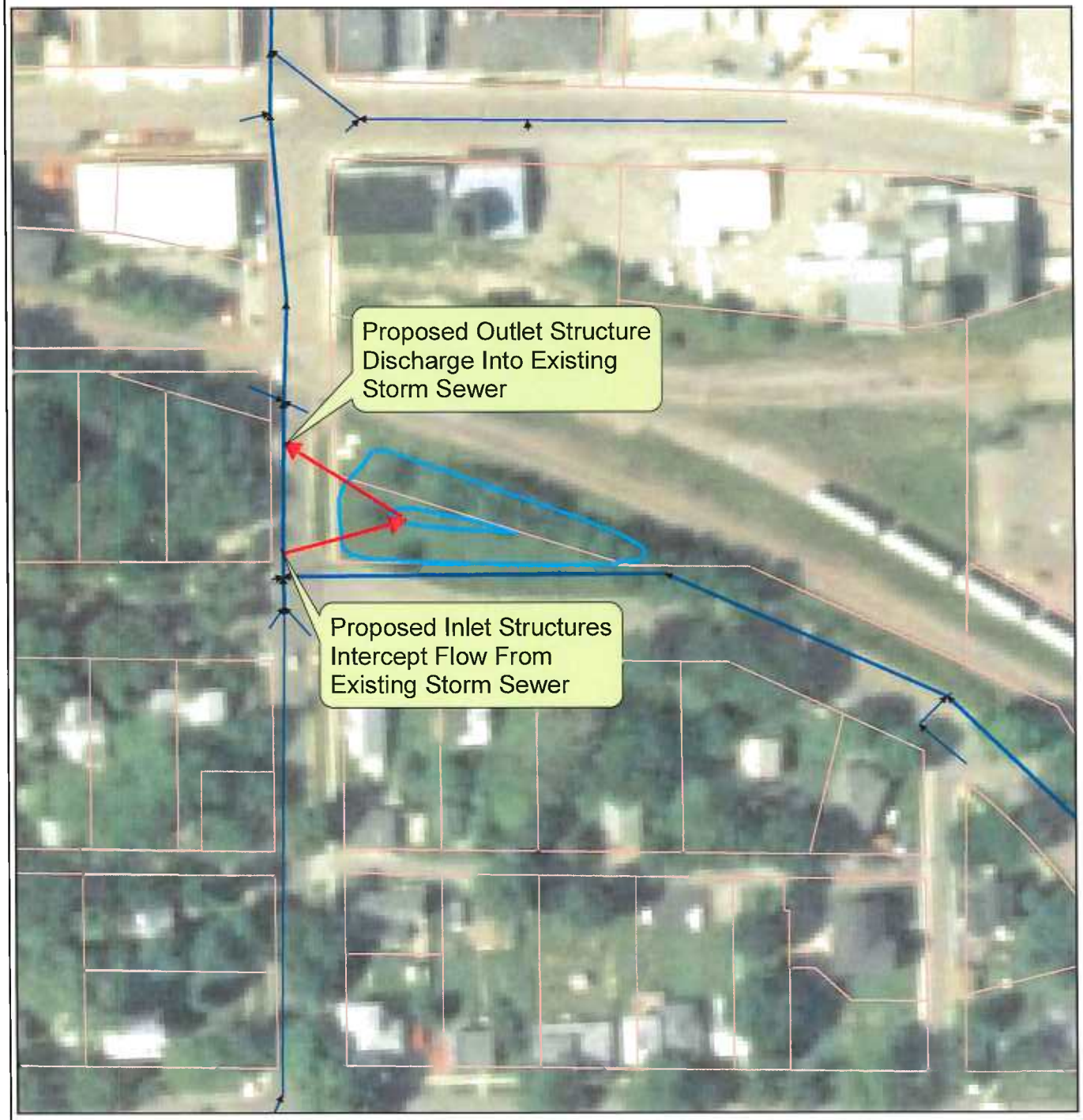
P-AO	Undeveloped Residential Parcel					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	496	$1,984	
2)	RCP Cost and Installation	LF	$50	170	$8,500	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$2,066	1	$2,066	
5)	Street Restoration	SY	$20	0	$0	
6)	Re-Stabilization	SY	$2.00	1,500	$3,001	
	DIRECT COST SUBTOTAL				$18,551	
	Unexpected Design Details		30%		$5,565	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$54,116	
7)	Land Purchase	LS	$20,000	1.0	$20,000	$20,000 Min.
	Prorate from Assessed to Market Value		10%		$2,000	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$76,116**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.



City of Baraboo Stormwater Analysis

Proposed Water Quality Pond

Pond P-AP
Open Area Along
Maple Street

Legend

- Proposed Pond Storm Sewer
- Proposed Ponds
- parcels
- Baraboo River

N

0 50 100 200 Feet

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P-AP	**Open Area Along Maple Street**					
	Proposed Water Quality Pond					
Item	Description	Unit	Unit Price	Quantity	Extension	
1)	Excavation	CY	$4	1,355	$5,421	
2)	RCP Cost and Installation	LF	$50	185	$9,250	
3)	Outlet Structure	EA	$3,000	1	$3,000	
4)	Erosion Control	LS	$1,879	1	$1,879	
5)	Street Restoration	SY	$20	0	$0	
6)	Re-Stabilization	SY	$2.00	1,113	$2,226	
	DIRECT COST SUBTOTAL				$21,776	
	Unexpected Design Details		30%		$6,533	$25,000 Cap
	* Engineering Costs		15%		$30,000	$30,000 Min.
	PROBABLE CONSTRUCTION COST ESTIMATE				$58,309	
7)	Land Purchase	LS	$20,000	1.0	$20,000	$20,000 Min.
	Prorate from Assessed to Market Value		10%		$2,000	
	TOTAL CONCEPTUAL COST ESTIMATE (2008)				**$80,309**	

Notes:

* Engineering Cost to include: Geotechnical, Environmental, Construction Mgmt., Survey, Legal Costs, Property Investigation, Environmental Phase 1 & 2, Design, Plans & Specs., Bid, Construction Observation.

APPENDIX D

WDNR Modeling Guidance

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: June 6, 2005

TO: Regional Water Leaders, Basin Leader & Experts
Storm Water Permit Staff (via Email)

FROM: Russ Rasmussen, Director
Bureau of Watershed Management

SUBJECT: Developed Urban Areas and the 20% and 40% TSS Reductions
Sections NR 151.13(2) and NR 216.07(6), Wis. Adm. Code

This document is intended solely as guidance, and does not contain any mandatory requirements except where requirements found in statute or administrative rule are referenced. This guidance does not establish or affect legal rights or obligations, and is not finally determinative of any of the issues addressed. This guidance does not create any rights enforceable by any party in litigation with the State of Wisconsin or the Department of Natural Resources. Any regulatory decisions made by the Department of Natural Resources in any matter addressed by this guidance will be made by applying the governing statutes and administrative rules to the relevant facts.

Issue

Under s. NR 151.13 (2), Wis. Adm. Code, a municipality subject to the municipal storm water permit requirements of subch. I of ch. NR 216, Wis. Adm. Code, must, to the maximum extent practicable, implement a 20% and a 40% reduction in total suspended solids in runoff that enters waters of the state as compared to no controls, by March 10, 2008 and March 10, 2013, respectively. Staff who work with affected municipalities need guidance on what areas under the municipalities' jurisdictions will be included in this requirement. They also need to know what is meant by "no controls" and "with controls", and what methods are acceptable for making these calculations.

Discussion

Chapter NR 216, Wis. Adm. Code, is the implementation code for the developed urban area performance standard. Applicability for permit coverage purposes is dictated by s. NR 216.02, Wis. Adm. Code. Under this provision, owners or operators of the following municipal separate storm sewer systems (MS4s) are required to obtain coverage under a WPDES municipal storm water permit:

- MS4s serving populations of 100,000 or more.
- Previously notified owners or operators of municipal separate storm sewer systems.
- MS4s within urbanized areas as identified by EPA.
- MS4s serving populations over 10,000 unless exempted by DNR.

"MS4" means a conveyance or system of conveyances, including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, constructed channels or storm drains, which meets all the following criteria:

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- Owned or operated by a municipality.
- Designed or used for collecting or conveying storm water.
- Not a combined sewer conveying both sanitary and storm water.
- Not part of a publicly owned wastewater treatment works that provides secondary or more stringent treatment.

Under s. NR 216.07(6)(a), Wis. Adm. Code, a municipality must develop a stormwater management program to achieve compliance with the developed urban area performance standard (s. NR 151.12(2), Wis. Adm. Code). Developed areas are generally those that were not subject to the post-construction performance standards (s. NR 151.12 or NR 151.24, Wis. Adm. Code). The total suspended solids control requirements of s. NR 151.13(2)(b)1.b. and 2., Wis. Adm. Code, may be achieved on an individual municipal basis. Control does not have to apply uniformly across the municipality. The control may also be applied on a regional basis by involving several municipalities.

A municipality is required under s. NR 216.07(6)(b), Wis. Adm. Code, to provide an assessment of the actions taken to comply with the performance standards. This assessment may take the form of an annual progress report. The initial assessment must include a pollutant-loading analysis using a model such as SLAMM, P8 or equivalent methodology that is approved by the department. At a minimum, a pollutant-loading analysis must be conducted for total suspended solids and phosphorus. A model would not be run again after the initial assessment unless significant management changes occurred that should be accounted for, or the progress report indicates a re-run is necessary.

DNR Guidance

To comply with the code, the developed urban area must be modeled under a "no control" condition and a "with controls" condition. The 20% and 40% TSS reductions are assessed against the "no control" condition for the entire area served by the MS4 as defined below. They are not applied uniformly across the municipality, nor are they applied drainage area by drainage area within the municipal boundary. In most cases however, a calculation drainage basin by drainage basin will be used to determine the total loading and the achieved reductions.

Areas Required to be Included in the Calculations

A municipality must include the following areas when calculating compliance with the developed urban area standard (s. NR 151.13, Wis. Adm. Code):

1. Any developed area that was not subject to the post-construction performance standards of s. NR 151.12 or 151.24, Wis. Adm. Code, that went into effect October 1, 2004 and that drains to the MS4 owned or operated by the municipality.
2. Any area covered by an NOI submitted prior to October 1, 2004 where development is still underway. The pollutant load shall be based on full build out. If it is known that the future development of some parcels may require compliance with s. NR 151.12 or NR 151.24, Wis. Adm. Code, then these areas may be excluded from the calculation.
3. Any undeveloped (in-fill) areas under 5 acres. These areas must be modeled as fully developed, with a land use similar to the properties around them.
4. For municipalities with large areas of agricultural lands separating areas of development, only the areas within the urbanized area as defined by the U.S. Census Bureau.

5. Non-manufacturing areas of industrial facilities such as customer or employee parking lots. (The manufacturing, outside storage and vehicle maintenance areas of these industrial facilities are covered under a subch. II of ch. NR 216, Wis. Adm. Code, industrial permit.)
6. Any industry that has certified a condition of "no exposure" in accordance with s. NR 216.21(3), Wis. Adm. Code.
7. Any developed urban area where it is already established that the area will be annexed by the municipality prior to March 10, 2008. There must be an agreement with the municipality that will be losing the area, to prevent double counting.

Areas Prohibited from Inclusion in the Calculations

Areas and loadings that shall not be included:

1. Lands zoned for agricultural use and operating as such.
2. Pollutant loadings from an upstream MS4 (independent of whether it is regulated under a ch. NR 216, Wis. Adm. Code, permit)
3. Any internally drained area with natural infiltration. (This does not included engineered or constructed infiltration areas.) However, an internally drained area that discharges to a karst feature is not likely to be receiving adequate treatment prior to any contact with the groundwater. The municipality is encouraged to look at this area for possible treatment options.
4. Undeveloped land parcels over 5 acres within the municipality. These areas will be subject to s. NR 151.12 or 151.24, Wis. Adm. Code, when developed.

Optional Areas to Include in the Calculations

Areas a municipality may, but is not required to, include in the developed urban area load calculation:

1. Property that drains to *waters of the state* without passing through the permittee's MS4. Waters of the state include surface water, wetlands and groundwater and has the meaning given in s. 283.01(20), Stats. Waters of the state may overlap with the definition of MS4. For this purpose, if a waterway meets the definition of an MS4 it will be regulated as an MS4. The definition for MS4 is given in s. NR 216.002(17), Wis. Adm. Code. The significant language in that definition is whether or not the municipality owns or operates the drainage way (i.e., maintains, has easement access for work, etc.). For example, when a "stream" is designed or used for collecting or conveying storm water such as flowing through a municipally owned or operated culvert or bridge restriction, that "stream" is part of the MS4.
2. Any area that discharges to an adjacent municipality's MS4 (Municipality B) without passing through the jurisdictional municipality's MS4 (Municipality A). Municipality B that receives the discharge into their MS4 may choose to be responsible for this area from Municipality A. If Municipality B has a treatment device that serves a portion of A as well as a portion of B, then the practice must be modeled as receiving loads from both areas, independent of who carries the responsibility for the area.
3. Industrial facilities subject to a permit under subch. II of ch. NR 216, Wis. Adm. Code. This exclusion covers the facilities that are required to have permit coverage. Contact the regional stormwater specialist or central office to get a list of permitted facilities within a municipality.
    - The industrial NR 216 permit covers areas with industrial materials and activities, specifically areas with manufacturing, vehicle maintenance, storage of materials, etc.

A municipality may include any of the areas identified above in their developed urban area as part of their load calculation provided the areas are not prohibited from inclusion in the calculation. If they choose to include an area, it must be included in both the "no controls" and "with controls" condition. Inclusion of areas they choose to be responsible for will allow them to take credit for any of those areas that may have

controls in place. For example, if an industrial park would have been excluded because all the industries in the industrial park have an NR 216 industrial permit, but the municipality chooses to keep this area in their "no controls" area, then any best management practices existing or built to serve the industrial park can be included in the "with controls" scenario.

Model Inputs

Model Version:
To model the TSS load in the area served by the MS4 the municipality must select a model that can track particle distribution. Such models include SLAMM and P8. In general, a municipality must use the most current version of a model that is available at the time of the analysis. However, a municipality may use an earlier version of a model if it was previously used to calculate loads in the municipality and these loads were documented in a stormwater management plan, database, or other report. The most current versions of SLAMM and P8 will be accessible through the DNR website with links to the authors. A summary of past versions and the changes made with each SLAMM update will also be posted. The DNR has recently received a grant to help upgrade P8 to a Windows format.

As part of the reporting process, the municipality must identify which version it is using. It must use the same version for both the "no controls" scenario and the "with controls" scenario. If an older version of the model is used, this may mean that as the model is updated a municipality cannot take credit for some practices that are only available in the most recent models. In order to take credit for practices that are in recent versions of the models, both the "no controls" and "with controls" scenario must be run with the latest model. A municipality must run all drainage basins in the developed urban area with the same model and model version.

"No control"
The "no controls" condition can be based on the standard land use files for different land uses in SLAMM. This assumes certain default parameter files, an assumed level of disconnection and an assumed distribution of road smoothness. For the drainage system, the default will be curb and gutter (even if the drainage system is currently swale drainage), in fair condition. For "no controls" there will be no recognition of street sweeping, catch basin cleaning, swale drainage, or the existence of any engineered best management practices. These practices and facilities will be accounted for under the "with controls" condition. A municipality is not required to use the standard land use files if it has surveyed the land uses in its developed urban area and has "real" source area data on which to base the input files.

"With controls"
The "with controls" condition is applied to the developed urban area with the inclusion of the practices and facilities (existing and proposed). Modeling is a means to confirm a device's efficiency for the conditions found in Wisconsin. If the model cannot predict efficiencies for certain practices that the municipality identifies as water quality practices, then a literature review must be conducted to estimate the reduction value. However, proprietary devices that utilize settling as their means of solids reduction should be modeled as catch basins with sumps. The efficiency of proprietary devices that utilize filtration as a means of solids reduction cannot currently be modeled using SLAMM.

Practices on private property that drain to an MS4 can be included in the "with controls" scenario for a municipality, if the municipality is able to ensure that the practice will continue to be maintained. The efficiency of the practice on private property must be modeled using the best information the municipality

can obtain on the design of the practice. For example, permanent pool area is not sufficient information to know the pollutant reduction efficiency of a wet detention basin even if it matches the area requirements identified in Technical Standard 1001 Wet Detention Basin for an 80% reduction. Information on the depth of the sediment storage layer and the outlet design are critical features that determine whether a detention pond is providing 80% TSS reduction.

As information on proprietary practices or new stormwater designs becomes available through monitoring, the model will be adjusted to reflect changes in efficiency.

Again, future versions of the model can be used to evaluate the "with controls" condition, but only if the "no controls" scenario is also run with the new version.

Further clarifications

- If a portion of a municipality's MS4 drains to a stormwater treatment facility in an adjacent municipality, the municipality generating the load will not receive any treatment credit unless there is an inter-municipal agreement for maintenance of the BMP. This contract must be in writing with signatures from both municipalities at the time of the evaluation.
- The model results will be the basis for determining compliance with the permit for "no controls" and "with controls" TSS load. No credit will be given for implementation of ordinances or information and education programs.
- For reporting purposes, the pollutant load must be summarized as the cumulative total for the developed urban area served by the MS4. Additionally pollutant loads for grouped drainage areas as modeled shall also be reported. Drainage areas may be grouped at the discretion of the modeler for such reasons as to emphasize higher priority areas, balance model development with targeting or for cost-effectiveness.

Approved By:

Gordon Stevenson, Chief
Runoff Management Section

Eric S. Rortvedt
Storm Water Program Coordinator

APPENDIX E

Model Output

APPENDIX F

Electronic Data