Summary Cost Estimates
Waukesha Supply and Return Alternatives

	2013 Costs			
	Capital Cost(1)	O&M $/yr.(2)	20-Year Present Worth(3)	50-Year Present Worth(3)
Alternative 1 - Deep and Shallow Aquifers	$211,000,000	$7,200,000	$294,000,000	$325,000,000
Alternative 2 - Lake Michigan Supply from Oak Creek and Root River Return (corridor sharing with Root River return flow)	$206,000,000	$8,000,000	$298,000,000	$333,000,000
Alternative 3 - Shallow Aquifers and Fox River Alluvium	$217,000,000	$8,900,000	$320,000,000	$358,000,000
Alternative 4 - Shallow Aquifers and Lake Michigan Supply from Oak Creek and Root River Return (corridor sharing with Root River return flow)	$301,000,000	$8,200,000	$396,000,000	$431,000,000
Alternative 5 - Unconfined Deep Aquifers	$234,000,000	$6,400,000	$308,000,000	$335,000,000
Alternative 6 - Multiple Sources	$323,000,000	$7,300,000	$407,000,000	$439,000,000

Notes

Some capital costs generated by scaling previous estimates to ENR Index

1 June 2013 dollars. Capital costs June 2013 construction start.

2 16.7 mgd supply capacity, 10.1 mgd average capacity, 11.7 mgd average return flow.

3 Interest rate = 6%

Alternative 1 - Deep and Shallow Wells

Captial Cost

	Quantity	Unit Cost	Total
Shallow Aquifer Wellfield			*2013 Costs*
Well houses and pumps	12	$ 334,500	$ 4,014,000
Land, acres	12	$ 178,416	$ 2,141,000
Roads, ft	30,000	$ 27.9	$ 837,000
Interconnecting pipe, 8" to 20", ft	30,000	$ 185	$ 5,535,000
Electrical (10% of well houses, pumps, land)	$ 6,155,000.00	10%	$ 616,000
Shallow Aquifer Supply Pipeline to Waukesha			
11 mi of 24" pipe, mixed rural and urban, ft	58,080	$ 357	$ 20,707,000
Shallow Aquifer Treatment Plant and Pump Station			
One groundwater treatment plant @ 16.7 mgd	16,700,000	$ 1.59	$ 26,553,000
Land	1	$ 2,230,000	$ 2,230,000
Deep Well Treatment Plant			
3 RO plants for Wells 6,8,10 @ 5.35 mgd including land built in 2020	5,350,000	$ 4.57	$ 24,460,000
Distribution System Improvements			
4.3 mi of 16", 24", and 30" pipes	22,500	$ 413	$ 9,289,000
5.1 mi of 16" pipe for blending, ft	26,928	$ 323	$ 8,698,000
Wastewater Forcemain			
5 mi of 6" forcemain, ft	26,400	$ 141	$ 3,715,000
Subtotal			**$ 108,795,000**
3% markup for Bonds & Insurance			$3,264,000
5% markup for Mob/Demob			$5,440,000
8% markup for Contractors Overhead			$9,400,000
4% markup for Contractors profit			$4,700,000
25% Contingency			$32,900,000
Subtotal Markups and Contingency			**$ 55,704,000**
Total Project Construction Costs			**$ 164,499,000**
8% allowance for engineering and design			$13,160,000
12% allowance for permitting, legal and admin.			$19,740,000
8% allowance for engr services during construction			$13,160,000
Subtotal Other Project Costs			**$46,060,000**
TOTAL PROJECT CAPITAL COST			**$ 210,560,000**

Alternative 1 - Deep and Shallow Wells

Operating and Maintenance Cost

Source of Supply	Units	Quantity	Unit Cost	$/yr	Total
Deep Well pumping/maintenance	$/1000 gal	1,642,500	$ 0.350	$ 574,875	
Shallow Well Pumping/Maintenance	$/1000 gal	2,044,000	$ 0.140	$ 286,160	
					$ 861,000
Treatment/Pumping					
Deep Wells 6,7,8 starting in 2020	$/1000 gal	821,250	$ 0.61	$ 500,963	
Shallow Wells	$/1000 gal	2,044,000	$ 1.09	$ 2,225,916	
Residuals	$/1000 gal	164,068	$ 4	$ 656,270	
					$ 3,383,000
Home Softening					
Salt/Equipment/Replacment	$/customer/yr	13,683	$ 209	$ 2,859,747	
					$ 2,860,000
Transmission					
Operation and Maintenance	$/lf/yr	137,280	$ 0.52	$ 71,386	
					$ 71,386
Alternative 1 Total O&M ($/yr.)					**$ 7,200,000**

PRESENT WORTH (6%, 20 yrs)	**$ 83,000,000**
PRESENT WORTH (6%, 50 yrs)	**$ 113,000,000**
Total Present Worth (6%, 20 years)	**$ 293,560,000**
Total Present Worth (6%, 50 years)	**$ 323,560,000**

Alternative 2 - Lake Michigan Supply

From Oak Creek. Return to Root River.

Captial Cost

	Quantity	Unit Cost	Total
Lake Michigan Supply Pump Station (27th and Puetz Rd)			
16.7 mgd	1	$ 8,830,125	$ 8,831,000
Lake Michigan Supply Pipeline			
19 miles of 30"	100,320	$ 429	$ 43,084,000
Return Pump Station and Pipeline to Root River (60th and Oakwood)			
16.7 mgd	1	$ 9,042,000	$ 9,042,000
20.1 miles of 30"	106,128	$ 382	$ 40,578,000
Distribution System Improvements			
5 mi of 24" pipes	24,800	$ 206	$ 5,109,000
Subtotal			**$ 106,644,000**
3% markup for Bonds & Insurance			$3,200,000
5% markup for Mob/Demob			$5,333,000
8% markup for Contractors Overhead			$9,215,000
4% markup for Contractors profit			$4,608,000
25% Contingency			$32,250,000
Subtotal Markups and Contingency			**$ 54,606,000**
Total Project Construction Costs			**$ 161,250,000**
8% allowance for engineering and design			$12,900,000
12% allowance for permitting, legal and admin.			$19,350,000
8% allowance for engr services during construction			$12,900,000
Subtotal Other Project Costs			**$45,150,000**
TOTAL PROJECT CAPITAL COST			**$ 206,400,000**

Alternative 2 - Lake Michigan Supply

Operating and Maintenance Cost

Source of Supply	Units	Quantity	Unit Cost	Ext. Cost	Total
Purchased water	$/1000 gal	3,686,500	$ 1.830	$ 6,746,295	
					$ 6,746,000
Treatment/Pumping					
Lake Michigan Pumping Energy	$/kWh	6,176,619	$ 0.06	$ 370,597	
Lake Michigan Pump Station O&M	%	$ 8,831,000	2%	$ 176,620	
Return Flow Pumping Energy	$/kWh	7,280,875	$ 0.06	$ 436,852	
Return Flow Pump Station O&M	%	$ 9,042,000	2%	$ 180,840	
					$ 1,165,000
Transmission					
Operation and Maintenance	$/lf/yr	142,560	$ 0.52	$ 74,131	
					$ 74,131
Alternative 1 Total O&M ($/yr.)					**$ 8,000,000**

PRESENT WORTH (6%, 20 yrs)	**$ 92,000,000**
PRESENT WORTH (6%, 50 yrs)	**$ 126,000,000**
Total Present Worth (6%, 20 years)	**$ 298,400,000**
Total Present Worth (6%, 50 years)	**$ 332,400,000**

Alternative 3 - Fox Alluvium and Shallow Aquifer

Captial Cost

	Quantity	Unit Cost	Total
Shallow Aquifer Wellfield			*2013 Costs*
Well houses and pumps	12	$ 334,500	$ 4,014,000
Land, acres	12	$ 178,416	$ 2,141,000
Roads, ft	30,000	$ 27.9	$ 837,000
Interconnecting pipe, 8" to 20", ft	30,000	$ 185	$ 5,535,000
Electrical (10% of well houses, pumps, land)	$ 6,155,000	10%	$ 616,000
Fox River Alluvium Wellfield			
Well houses and pumps	$ 4	$ 805,000	$ 3,220,000
Land, acres	$ 4	$ 276,000	$ 1,104,000
Roads, ft	4,600	$ 27.9	$ 128,340
Interconnecting pipe, 12" to 16", ft	4,600	$ 172	$ 791,200
Electrical (10% of well houses, pumps, land)	$ 4,324,000	10%	$ 432,000
Treatment Plant and Pump Station			
One lime softening surface water treatment plant @ 16.7 mgd	16,700,000	$ 4.20	$ 70,140,000
Distribution System Improvements			
7 mi of 16", 20", 24", and 30" pipes	36,800	$ 525	$ 19,320,000
Wastewater Forcemain			
5 mi of 6" forcemain, ft	26,400	$ 141	$ 3,715,000
Subtotal			**$ 111,993,540**
3% markup for Bonds & Insurance			$3,360,000
5% markup for Mob/Demob			$5,600,000
8% markup for Contractors Overhead			$9,677,000
4% markup for Contractors profit			$4,839,000
25% Contingency			$33,868,000
Subtotal Markups and Contingency			**$ 57,344,000**
Total Project Construction Costs			**$ 169,337,540**
8% allowance for engineering and design			$13,548,000
12% allowance for permitting, legal and admin.			$20,321,000
8% allowance for engr services during construction			$13,548,000
Subtotal Other Project Costs			**$47,417,000**

TOTAL PROJECT CAPITAL COST **$ 216,750,000**

Alternative 3 - Fox Alluvium and Shallow Aquifer

Operating and Maintenance Cost

Source of Supply	Units	Quantity	Unit Cost	$/yr	Total
Wells Pumping/Maintenance	$/1000 gal	3,686,500	$ 0.140	$ 516,110	
					$ 516,000
Treatment/Pumping					
Lime Softening Water Treatment Plant	$/1000 gal	3,686,500	$ 2.17	$ 7,999,705	
Residuals	$/1000 gal	73,730	$ 4	$ 294,920	
					$ 8,295,000
Transmission					
Operation and Maintenance	$/lf/yr	108,281	$ 0.52	$ 56,306	
					$ 56,306
Alternative 1 Total O&M ($/yr.)					**$ 8,900,000**

PRESENT WORTH (6%, 20 yrs)	**$ 102,000,000**
PRESENT WORTH (6%, 50 yrs)	**$ 140,000,000**
Total Present Worth (6%, 20 years)	**$ 318,750,000**
Total Present Worth (6%, 50 years)	**$ 356,750,000**

Alternative 4 - Lake Michigan and Shallow wells

Captial Cost

	Quantity	Unit Cost	Total
Shallow Aquifer Wellfield			*2013 Costs*
Well houses and pumps	12	$ 334,500	$ 4,014,000
Land, acres	12	$ 178,416	$ 2,141,000
Roads, ft	30,000	$ 27.9	$ 837,000
Interconnecting pipe, 8" to 20", ft	30,000	$ 185	$ 5,535,000
Electrical (10% of well houses, pumps, land)	$ 6,155,000.00	10%	$ 616,000
Shallow Aquifer Supply Pipeline to Waukesha			
11 mi of 24" pipe	58,080	$ 357	$ 20,707,000
Shallow Aquifer Treatment Plant and Pump Station			
One groundwater treatment plant @ 16.7 mgd	16,700,000	$ 1.59	$ 26,553,000
Land	1	$ 2,230,000	$ 2,230,000
Lake Michigan Supply Pump Station (27th and Puetz Rd)			
7.6 mgd	1	$ 4,971,000	$ 4,971,000
Lake Michigan Supply Pipeline			
19 miles of 24"	100,320	$ 357	$ 35,766,000
Return Pump Station and Pipeline to Root River (60th and Oakwood)			
7.6 mgd	1	$ 5,341,000	$ 5,341,000
20.1 miles of 24"	106,128	$ 318	$ 33,749,000
Distribution System Improvements			
4.3 mi of 16", 24", and 30" pipes	22,500	$ 413	$ 9,289,000
Wastewater Forcemain			
5 mi of 6" forcemain, ft	26,400	$ 141	$ 3,715,000
Subtotal			**$ 155,464,000**
3% markup for Bonds & Insurance			$4,664,000
5% markup for Mob/Demob			$7,774,000
8% markup for Contractors Overhead			$13,433,000
4% markup for Contractors profit			$6,717,000
25% Contingency			$47,013,000
Subtotal Markups and Contingency			**$ 79,601,000**
Total Project Construction Costs			**$ 235,065,000**
8% allowance for engineering and design			$18,806,000
12% allowance for permitting, legal and admin.			$28,208,000
8% allowance for engr services during construction			$18,806,000
Subtotal Other Project Costs			**$65,820,000**

TOTAL PROJECT CAPITAL COST **$ 300,890,000**

Alternative 4 - Lake Michigan and Shallow wells

Operating and Maintenance Cost

Source of Supply	Units	Quantity	Unit Cost	Ext. Cost	Total
Purchased water	$/1000 gal	1,642,500	$ 1.830	$ 3,005,775	
Shallow Well Pumping/Maintenance	$/1000 gal	2,044,000	$ 0.140	$ 286,160	
					$ 3,292,000
Treatment/Pumping					
Lake Michigan Pumping Energy	$/kWh	1,536,853	$ 0.06	$ 92,211	
Shallow Wells Pumping Energy	$/1000 gal	2,044,000	$ 1.09	$ 2,225,916	
Residuals	$/1000 gal	186,150	$ 4.00	$ 744,600	
Return Flow Pumping Energy	$/kWh	947,652	$ 0.06	$ 56,859	
Lake Michigan Pump Station O&M	%	$ 4,971,000	2%	$ 99,420	
Return Flow Pump Station O&M	%	$ 5,341,000	2%	$ 106,820	
					$ 3,326,000
Home Softening					
Salt/Equipment/Replacment	$/customer/yr	13,683	$ 116	$ 1,585,602	
					$ 1,586,000
Transmission					
Operation and Maintenance	$/lf/yr	137,280	$ 0.52	$ 71,386	
					$ 71,386
Alternative 1 Total O&M ($/yr.)					**$ 8,300,000**

PRESENT WORTH (6%, 20 yrs)	**$ 95,000,000**
PRESENT WORTH (6%, 50 yrs)	**$ 131,000,000**
Total Present Worth (6%, 20 years)	**$ 395,890,000**
Total Present Worth (6%, 50 years)	**$ 431,890,000**

Alternative 5 - Unconfined Deep Aquifer

Captial Cost

	Quantity	Unit Cost	Total
Unconfined Deep Aquifer Wellfield			*2013 Costs*
New wells @ 1.5 mgd each	12	$ 557,500	$ 6,690,000
Well houses and pumps	12	$ 334,500	$ 4,014,000
Land	12	$ 334,500	$ 4,014,000
Roads, ft	47,520	$ 27.9	$ 1,324,620
Interconnecting pipe, 12" to 24", ft	47,520	$ 167	$ 7,947,720
Electrical (10% of well houses, pumps, and land)	14,718,000	10%	$ 1,471,800
Unconfined Deep Aquifer Supply Pipeline to Waukesha			
15 miles 36", rural	79,200	$ 390	$ 30,907,800
5 miles 36", urban	26,400	$ 669	$ 17,661,600
Unconfined Deep Aquifer Treatment Plant and Pump Station			
One @ 16.7 mgd	16,700,000	$ 1.95	$ 32,585,875
Land	1	$ 1,115,000	$ 1,115,000
Distribution System Improvements			
4.3 mi of 16", 24", and 30" pipes	22,500	$ 413	$ 9,289,000
Wastewater Forcemain			
5 mi of 6" forcemain, ft	26,400	$ 141	$ 3,715,000
Subtotal			**$ 120,736,415**
3% markup for Bonds & Insurance			$3,623,000
5% markup for Mob/Demob			$6,037,000
8% markup for Contractors Overhead			$10,432,000
4% markup for Contractors profit			$5,216,000
25% Contingency			$36,512,000
Subtotal Markups and Contingency			**$ 61,820,000**
Total Project Construction Costs			**$ 182,556,415**
8% allowance for engineering and design			$14,605,000
12% allowance for permitting, legal and admin.			$21,907,000
8% allowance for engr services during construction			$14,605,000
Subtotal Other Project Costs			**$51,117,000**

TOTAL PROJECT CAPITAL COST **$ 233,670,000**

Alternative 5 - Unconfined Deep Aquifer

Operating and Maintenance Cost

Source of Supply	Units	Quantity	Unit Cost	$/yr	Total
Wells Pumping/Maintenance	$/1000 gal	3,686,500	$ 0.350	$ 1,290,275	
					$ 1,290,000
Treatment/Pumping					
Groundwater Water Treatment Plant	$/1000 gal	3,686,500	$ 0.50	$ 1,843,250	
Residuals	$/1000 gal	73,730	$ 4	$ 294,920	
					$ 2,138,000
Home Softening					
Salt/Equipment/Replacment	$/customer/yr	13,683	$ 209	$ 2,859,747	
					$ 2,860,000
Transmission					
Operation and Maintenance	$/lf/yr	137,280	$ 0.52	$ 71,386	
					$ 71,386
Alternative 1 Total O&M ($/yr.)					**$ 6,400,000**

PRESENT WORTH (6%, 20 yrs)	**$ 73,000,000**
PRESENT WORTH (6%, 50 yrs)	**$ 101,000,000**
Total Present Worth (6%, 20 years)	**$ 306,670,000**
Total Present Worth (6%, 50 years)	**$ 334,670,000**

Alternative 6 - Multiple Sources

Captial Cost

	Quantity	Unit Cost	Total
Deep Well Treatment Plant			
3 RO plants for Wells 6,8,10 @ 5.35 mgd including land built in 2020	5,350,000	$ 4.57	$ 24,460,000
Shallow Aquifer Water Treatment Plant			
One @ 2.5 mgd	2,500,000	$ 4.46	$ 11,150,000
5 mi of 6" forcemain, ft	26,400	$ 141	$ 3,715,000
Land	1	$ 2,230,000	$ 2,230,000
Shallow Aquifer Wellfield			
new wells and wellhouses @ 1.5 mgd each	3	$ 780,500	$ 2,341,500
Land	3	$ 278,750	$ 836,250
Roads, ft	7,000	$ 27.9	$ 195,125
Interconnecting pipe, 12", ft	10,000	$ 161	$ 1,605,600
Electrical (10% of well houses, pumps, and land)	3,177,750	10%	$ 317,775
Shallow Aquifer Supply Pipeline to Waukesha			
10 miles of 16 " for 4 mgd	52,800	$ 262	$ 13,834,920
Unconfined Deep Aquifer Treatment Plant			$ -
One @ 3.2 mgd	3,200,000	$ 2	$ 7,136,000
Land	1	$ 557,500	$ 557,500
Unconfined Deep Aquifer Wellfield			
3 new wells and wellhouses @ 1.5 mgd each	3	$ 1,338,000	$ 4,014,000
Land	3	$ 334,500	$ 1,003,500
Roads, ft	10,560	$ 28	$ 294,360
Interconnecting pipe, 12", ft	10,560	$ 161	$ 1,695,514
Electrical (10% of well houses, pumps, and land)	5,017,500	10%	$ 501,750
Unconfined Deep Aquifer Supply Pipeline to Waukesha			
12 miles 20", rural	63,360	$ 201	$ 12,716,352
5 miles 20 ", urban	26,400	$ 368	$ 9,713,880
Quarry Water Treatment Plant			$ -
intakes @ 2 mgd each	4	$ 1,672,500	$ 6,690,000
Intake pump stations	2	$ 557,500	$ 1,115,000
Land	1	$ 557,500	$ 557,500
One water plant @ 5 mgd	5,000,000	$ 4	$ 22,300,000
4" Sludge pipeline	21,120	$ 85	$ 1,789,709
Quarry Supply Pipeline to Waukesha			
7 miles 16", rural	36,960	$ 158	$ 5,851,877
Silurian Dolomite Aquifer Treatment Plant			
One @ 2 mgd	2,000,000	$ 2.23	$ 4,460,000
Land	1	$ 557,500	$ 557,500
Silurian Dolomite Aquifer Wellfield			$ -
5 new wells and wellhouses @ .5 mgd each	5	$ 780,500	$ 3,902,500
Land	5	$ 334,500	$ 1,672,500
Roads, ft	10,560	$ 27.9	$ 294,360
Interconnecting pipe, 6", ft	21,120	$ 80.3	$ 1,695,514
Interconnecting pipe, 12", ft	10,560	$ 81.4	$ 859,531
Electrical (10% of well houses, pumps, and land)	5,575,000	10%	$ 557,500
Silurian Dolomite Aquifer Supply Pipeline to Waukesha			
2 mile 12 ", urban	10,560	$ 191	$ 2,013,422
Distribution System Improvements			
4.3 mi of 16", 24", and 30" pipes	22,704	$ 413	$ 9,373,000

2.7 mi of 16" pipe for blending, ft	14,256	$ 323	$ 4,605,000
Subtotal			**$ 166,613,938**
3% markup for Bonds & Insurance			$4,999,000
5% markup for Mob/Demob			$8,331,000
8% markup for Contractors Overhead			$14,396,000
4% markup for Contractors profit			$7,198,000
25% Contingency			$50,385,000
Subtotal Markups and Contingency			**$ 85,309,000**
Total Project Construction Costs			**$ 251,922,938**
8% allowance for engineering and design			$20,154,000
12% allowance for permitting, legal and admin.			$30,231,000
8% allowance for engr services during construction			$20,154,000
Subtotal Other Project Costs			**$70,539,000**
TOTAL PROJECT CAPITAL COST			**$ 322,460,000**

Alternative 6 - Multiple Sources

Operating and Maintenance Cost

Source of Supply	Units	Quantity	Unit Cost	$/yr	Total
Deep Well pumping/maintenance	$/1000 gal	1496500	$ 0.35	$ 523,775	
Shallow Well Pumping/Maintenance	$/1000 gal	876000	$ 0.14	$ 122,640	
Quarry pumping/Maintenance	$/1000 gal	876000	$ 0.14	$ 122,640	
Dolomite well pumping/Maintenance	$/1000 gal	438000	$ 0.14	$ 61,320	
					$ 830,000
Treatment/Pumping					
Deep Wells 6,7,8 starting in 2020	$/1000 gal	821,250	$ 0.61	$ 500,963	
Shallow Wells and Quarry	$/1000 gal	1,752,000	$ 1.11	$ 1,944,720	
Unconfined Wells	$/1000 gal	730,000	$ 0.50	$ 365,000	
Residuals	$/1000 gal	103842.5	$ 4	$ 415,370	
Dolomite Wells	$/1000 gal	438,000	$ 0.50	$ 219,000	
					$ 3,445,000
Home Softening					
Salt/Equipment/Replacment	$/customer/yr	13,683	$ 209	$ 2,859,747	
					$ 2,860,000
Transmission					
Operation and Maintenance	$/lf/yr	290,400	$ 0.52	$ 151,008	
					$ 151,008
Alternative 1 Total O&M ($/yr.)					**$ 7,300,000**

PRESENT WORTH (6%, 20 yrs)	**$ 84,000,000**
PRESENT WORTH (6%, 50 yrs)	**$ 115,000,000**
Total Present Worth (6%, 20 years)	**$ 406,460,000**
Total Present Worth (6%, 50 years)	**$ 437,460,000**