City of Joliet
Alternative Water Source Study, Phase II
Questions & Answers – Part 1

11-25-19

The following are questions (in black) received at the Joint Workshop of the City Council and Environmental Commission held on November 13, 2019 and in the week following the workshop. Answers (in blue) are provided by the project team.

1. In the Joint Workshop presentation, it was indicated that the distribution system improvements were not shown. So, does that mean the costs do not include these improvements?

   The exhibits showing the improvements for the River Water Alternatives and Lake Michigan Alternatives (slides 16 and 17 of the Joint Workshop Presentation) do not show the distribution system improvements (receiving station improvements and distribution system transmission mains) required to distribute water from the receiving station throughout the City. However, the cost of these improvements HAVE been included in the construction cost estimates. The construction cost estimates include ALL improvements required for the implementation of the new water source.

2. Why wasn't the Public Water Commission considered in the evaluation of the alternatives? They submitted a Water Supplier RFI.

   The Public Water Commission is not an existing water supplier. As the City of Joliet is a member of the Public Water Commission, they will be considered as a potential partner or customer once an alternative has been selected.

3. Why wasn't the Southland Water Agency considered in the evaluation of the Lake Michigan – New Indiana Intake alternative? They submitted a Water Supplier RFI.

   While Southland Water Agency (SWA) is incorporated and represents three communities, their communities currently obtain their water supply from the City of Chicago. The water supply being proposed by SWA does not currently exist and does not have enough support yet from southern suburbs to construct. If the Lake Michigan Water – New Indiana Intake alternative is selected, potential partnering arrangements with SWA can be considered. For example, the potential for cost sharing for facilities such as the Lake Michigan Intake, raw water pumping station, and raw water transmission main in Indiana could be considered.

4. Why are DuPage Water Commission and Aqua Illinois still being considered as water suppliers since they did not submit a Water Supplier RFI?

   Upon further discussion with both DuPage Water Commission and Aqua Illinois, both indicated that they are still interested in being water suppliers to Joliet. They indicated that they did not submit information in response to the Water Supplier RFI since City Staff and project team members had previously met with them to obtain the information that was requested.

5. The presentation mentioned that $8 million per year in watermain replacement has been budgeted for the Lake Michigan Water alternatives to reduce water loss. Shouldn't the City do this for all of the alternatives?

   The City is currently budgeting $10 million per year in watermain replacement as part of its capital improvement program funded by existing water rates. It is anticipated that this will eventually allow the City to reach its non-revenue goal of 12% for non-Lake Michigan Water alternatives. An additional $8 million per year (total of $18 million annually) is required to reach the non-revenue goal of 10% for Lake Michigan Water alternatives within 20 years.

6. Has the cost for water treatment been included in the Illinois River alternative?

   Yes, the capital construction for a lime softening water treatment plant with UV disinfection has been included in the cost for the Illinois River alternatives as well as the Kankakee River alternative. UV disinfection is a type of disinfection that provides for inactivation of bacteria and viruses (including giardia and cryptosporidium) using ultraviolet light. While UV disinfection is not being used at every water treatment plant, it is a low cost option to comply with drinking water regulations when cryptosporidium is present in the raw water source. It has been assumed given the cryptosporidium concentration sampled by existing water treatment plants on the Kankakee River. (Note that cryptosporidium was not detected in the three months of sampling performed on the Illinois River as part of the Phase II Study.)

   In addition, the operation and maintenance of the water treatment plant has been included in the total water cost. The annual cost of operation and maintenance of the new water treatment facilities has been based upon current data obtained from representative water utilities in Illinois.

7. Have there been any negotiations yet with the City of Chicago or Hammond, Indiana?

   There have been NO negotiations at this point for any of the alternatives. Meetings were held with the City of Chicago and Hammond, Indiana as part of the Phase II Study to confirm their interest and to conceptually discuss potential water supply alternatives. Negotiations and signing of formal contracts would occur after an alternative has been selected. This does present a slight risk which is why City Staff recommended the selection of a primary alternative and secondary alternative.

8. Do we know what grants might be available for financing of this project, especially if it is a regional solution?

   Funding Strategies were investigated as part of the Phase II study. A memo describing the review of potential funding options has been included in Appendix O of the Phase II Draft Report. "Free money" is not really available. The funding strategy included in the evaluation is conservative and assumes 49% funded by WIFIA, $50 million/year for 5 years of construction funded by the Illinois EPA State Revolving Fund Loan Program (SRF) and the remaining funded by bonds.

9. Did we assume a 30-year repayment timeframe? Can the improvements be financed over 50 years versus 30 years to lower cost to the residents?

   Yes, a repayment period of 30 years has been assumed for both the WIFIA and SRF components of the funding strategy. 30 years is the maximum loan term available from these programs at this time. The current cost calculations assume a 20-year repayment period for the municipal bond portion of the projects. A longer repayment period for the traditional bonds will be explored further during preliminary design once the alternative water source has been selected. The City will consult with financial advisors to determine the funding strategy that minimizes rate impacts on customers.

10. Does the Lake Michigan Water – New Indiana Intake alternative presented include the Southland Water Agency?

    A potential partnership with the Southland Water Agency is a variation of the Lake Michigan Water - New Indiana intake alternative (Chapter 12 of the Phase II Draft Report) and would be investigated further if that option is selected for further development.

11. Does the evaluation of alternatives take into account future City growth?

    Yes, water usage and population projections were compiled as part of the Phase I Study based on CMAP 2050 water usage and population projections. Future growth beyond 2050 has not been currently considered for any of the alternatives. These projections will be considered during Preliminary Design upon completion of the City's Comprehensive Land Use Plan.

12. If the City purchases water from the City of Chicago, how much money will be "lost" due to non-revenue water?

    Based on Joliet's current non-revenue water (around 25%), the total cost of water that would be "lost" from a City of Chicago supplied system is estimated to be over $8,000,000 per year. However, the City has committed to reducing non-revenue water, including water loss. Therefore, the water usage projections contained in the Alternative Water Source Study take reduction of non-revenue water into account. As noted in question #5, the Lake Michigan Water Alternatives include an additional cost of $8 million per year to reduce non-revenue water to below 10%. Therefore, for a Lake Michigan Water alternative, the demands and non-revenue water have been assumed as follows:

Year	Average Day Demand (MGD)	Billed (Revenue) Water (MGD)	Non-Revenue Water Percentage	Non-Revenue Water (MGD)
2030	21.7	17.7	18.4%	4.0
2031	21.8	18.0	17.5%	3.8
2032	21.9	18.3	16.6%	3.6
2033	22.0	18.5	15.7%	3.5
2034	22.1	18.8	14.8%	3.3
2035	22.3	19.2	13.9%	3.1
2036	22.4	19.5	13.0%	2.9

2037	22.5	19.8	12.0%	2.7
2038	22.6	20.1	11.1%	2.5
2039	22.7	20.4	10.2%	2.3
2040	22.8	20.7	9.3%	2.1
2041	22.9	20.8	9.3%	2.1
2042	23.1	21.0	9.3%	2.1
2043	23.2	21.1	9.3%	2.2
2044	23.4	21.2	9.3%	2.2
2045	23.5	21.4	9.3%	2.2
2046	23.6	21.5	9.3%	2.2
2047	23.8	21.7	9.3%	2.2
2048	23.9	21.8	9.3%	2.2
2049	24.1	21.9	9.3%	2.2
2050	24.2	21.9	9.3%	2.3

Based on the assumption that the City will be able to reduce non-revenue water at a rate of approximately 1.6% per year and assuming an annual increase of 3% for the purchase water cost, the estimated cost of the lost water in 2030 for a City of Chicago supplied system would be approximately $7,200,000 per year. The estimated annual cost for lost water for a City of Chicago supplied system is projected to reach a low of $5,800,000 in 2041, due to decreasing non-revenue water as well as increasing purchased water costs (3% annual increase). As non-revenue water remains constant past 2041 and the purchased water cost continues to increase at an assumed rate of 3% per year, the estimated cost of non-revenue water for a City of Chicago supplied system will be approximately $7,600,000 per year.

13. Can the existing wells be utilized to mix with Lake Michigan Water prior to the treatment process to reduce cost?

The Section 3730 rules related to Lake Michigan Water Allocations discuss the potential for use of well water by Lake Michigan allocation permittees. Section 3730.307.d) addresses the disposition of a permittee's deep wells.

Section 3730.307 Conservation Practices and Other Permit Conditions states:

> d) Within 90 days after receipt of an allocation permit, each permittee that uses any water from deep aquifer pumpage shall submit and implement a phased program designed to end this practice, other than for emergency or standby use, within five years after the receipt of Lake Michigan water. New applicants may petition the Department for a waiver of this requirement, which the Department may grant if it determines that the applicant has a legitimate legal or practical basis for its inability to comply with this requirement and when a partial allocation of Lake Michigan water will result in reduced pumpage from the deep aquifer. Existing permittees are not eligible to petition the Department for a waiver of this requirement.

The rule suggests that the IDNR's expectation is that a deep well community that is switching to a Lake Michigan source would only maintain/use its deep wells as an emergency or standby source after receiving Lake Michigan water. If Joliet wanted to co-mingle deep well water and

Lake Michigan water on a regular basis, it would have to demonstrate a "legitimate legal or practical basis" for its inability to discontinue regular use of the deep wells and show that "a partial allocation of Lake Michigan water will result in reduced pumpage from the deep aquifer" in order to obtain a waiver from the IDNR. The second part of the requirement is probably feasible to demonstrate, however, identifying a legitimate legal or practical basis for Joliet's inability to comply with the requirement would be more difficult.

Groundwater modeling of the online well back-up water supply for the river water options has shown that only a small amount (~10%) can be used to supplement the new water source before the aquifer levels are impacted. So even if mixing of the wells and Lake Michigan Water were allowed (which would require a waiver and demonstration of legitimate legal or practical basis), the amount would be small and would not save money in the cost of the capital improvements. In fact, the cost of the capital improvements would likely be higher because the cost of the well collector network was not included in the Lake Michigan Water – New Indiana Intake Alternative and the well collector network would be required to bring the existing well water to the new water treatment plant.

14. What is the timeframe that the Illinois State Water Survey is estimating the existing wells will be depleted to the point of no longer being able to meet the City's demands?

The 2015 study published by the Illinois State Water Study, Changing Groundwater Levels in the Sandstone Aquifers of Northern and Southern Wisconsin: Impacts on Available Water Supply, indicated a timeframe of 15 to 30 years (between 2030 and 2045) until desaturation of the deep sandstone aquifer. As part of the Phase I Study, ISWS updated their groundwater model using Joliet specific well information in order to fine-tune the timeframe until desaturation. Through that modeling, ISWS determined that the existing wells would be depleted to the point of no longer being able to meet the City's Maximum Day Demands by 2030.

15. Should the existing wells be used to exhaustion?

Given the desaturation timeframe identified by ISWS during the Phase I Study, it has been assumed that the existing wells would be used as the City's primary water supply until 2030. Once the new water source is online, it has been assumed that the existing wells would continue to be utilized as a back-up supply. Attempting to use the wells until exhaustion results in a significant risk of not being able to meet the City's water demands due to the amount of time required to secure a new water source.

16. What is the potential impact of this decision on property values or attracting development to the City?

City staff contacted a MAI certified residential and commercial property appraisal firm in Joliet to respond to this question. The firm indicated that they don't find any evidence in the market that one public water source impacts property values any more than another. Although Chicago water is generally regarded as very good and might even be preferred by some communities and/or developers, there is no evidence that properties using Chicago water sell for a premium value. The only thing that they see that could be a significant impact is if one source of water results in substantially higher water/sewer rates than another source. But they indicated that even that issue would likely have minimal, if any, direct impact on property values.

17. Has there been any discussion with the City of Chicago on the Agreement terms (such as contract length)?

    In its response to Joliet's Request for Information (RFI), the City of Chicago indicated that the anticipated term of a water supply agreement with Joliet would be in the range of 10-35 years, subject to negotiations. The draft water supply agreement provided by Chicago with its RFI response was based on a 10-year term with the option for one 5-year extension. The contract length will be an item negotiated during Preliminary Design if this option is selected.

18. How were the values in the weighted decision matrix determined?

    The rating value for the decision criteria in the Weighted Decision Matrix have been determined by the project team members and City Staff based on their professional knowledge and experience.

19. Why isn't the Kankakee River being recommended for further consideration? Could the City either reduce water usage or use a reservoir (such as an old quarry) to make this water source viable?

    Between the Phase I and Phase II Study, IDNR changed the low flow condition for the Kankakee River to be a minimum of 600 cfs, which is a higher river level than what was previously assumed. If the City were to obtain a withdrawal permit for the Kankakee River, the City would not be able to withdraw water from the Kankakee River whenever the water level goes below 600 cfs. With this new low flow condition, the resulting annual average number of low flow days increased to 5 days (using the last 50 years of records) and the annual maximum number of low flow days increased to 84 days (using the last 50 years of records). (Note that if we use the last 102 years of records, the annual average number of low flow days is 14 days and the annual maximum number of low flow days is 120 days.)

    For a Joliet only demand scenario (30 MGD), a back-up water supply will be needed for 3-4 months during low flow conditions. For all of the alternatives, it has been assumed that the existing wells will provide the back-up water supply, either online for the river water alternatives or offline for the Lake Michigan Water alternatives. In the Phase I study, it was determined that the existing wells could be used for a 2-3 month timeframe every 10 years before aquifer desaturation would occur. Therefore, the existing wells may not be sufficient as a back-up water supply for the Kankakee River – Towpath Lane alternative.

    Two quarries in the Joliet area (one near Rowell Avenue & I-80 and one near S. Chicago St. and Mills Rd.) have been identified as possible storage locations. The total volume of the two quarries is approximately 346 million gallons assuming a water depth of 25'. At this volume, the quarries would be able to store enough water to have a back-up supply of only ~19 days assuming a 2030 Minimum Day Demand of 18.4 MGD and only ~17 days assuming a 2050 Minimum Day Demand of 20.5 MGD. This storage volume along with the existing wells as a back-up supply would barely be enough to supply the Joliet only scenario and could limit Joliet's growth past 2050 and limit Joliet's ability to be a regional water provider.

20. Can the Environmental Commission recommend an alternative water source that is not Illinois River, Lake Michigan Water – Chicago Department of Water Management or Lake Michigan Water – New Indiana Intake (which were recommended by City Staff during the presentation)?

    The Environmental Commission can decide to recommend any of the alternatives evaluated. All of the alternatives are feasible; however, some are more limiting in terms of being a regional solution or accommodating future growth.

21. Can the City Council select an alternative water source which has not been recommended by the Environmental Commission?

    The City Council will consider the recommendation of the Environmental Commission, City Staff, stakeholders and the public in this very important decision. Given this, it is possible that the City Council decision could be different than the Environmental Commission recommendation.

22. Why is artificially recharging the aquifer not an option?

    The primary deep sandstone aquifer the City currently withdraws water from, the Ironton-Galesville aquifer, is approximately 1,000 – 1,300 feet below ground surface throughout the City. In the 1,000 feet above the top of the aquifer, there are many layers of bedrock, some of which inhibit the flow of water vertically. Therefore, the rain water that hits the ground cannot reach the Ironton-Galesville aquifer locally. The multi-state aquifer is closer to the surface west and north of the City, and in some of these areas surface water does recharge the aquifer.

    Given the many layers of bedrock above the aquifer, the only practical method of recharging the aquifer is through existing or new wells. During Phase I of the Alternative Water Source Study, the Illinois State Water Survey (ISWS) modeled the potential to artificially recharge the aquifer through wells. The modeling determined the hydraulic characteristics of the aquifer limited the amount of water that could be recharged into the aquifer. In addition, a consequence of an aquifer storage and recovery system into the same aquifer in Northern Wisconsin was arsenic release from the geologic formation into the water. Given the physical limitations and water quality risks associated with ASR in the Ironton-Galesville aquifer, it was determined it is not a viable option at this time.

23. The presentation indicated that the average monthly water bill is only around $30/month. My bill is significantly higher, so should I expect my bill to double or triple?

    When presenting the current average monthly water bill, the cost for only the water portion was included. The total bill that the customer receives includes garbage and wastewater, in addition to water. When we are talking about a bill doubling or tripling, it is only the water portion of the bill that we are referring to.

24. How confident are you in the operation and maintenance (O&M) cost presented for the water treatment alternatives?

    The O&M costs for two similar sized water treatment plants in Illinois were used to verify the O&M costs presented in the total cost of water for the water treatment plant alternatives. Therefore, we are confident in the O&M costs provided.

25. Why does a decision need to be made by January 7th?

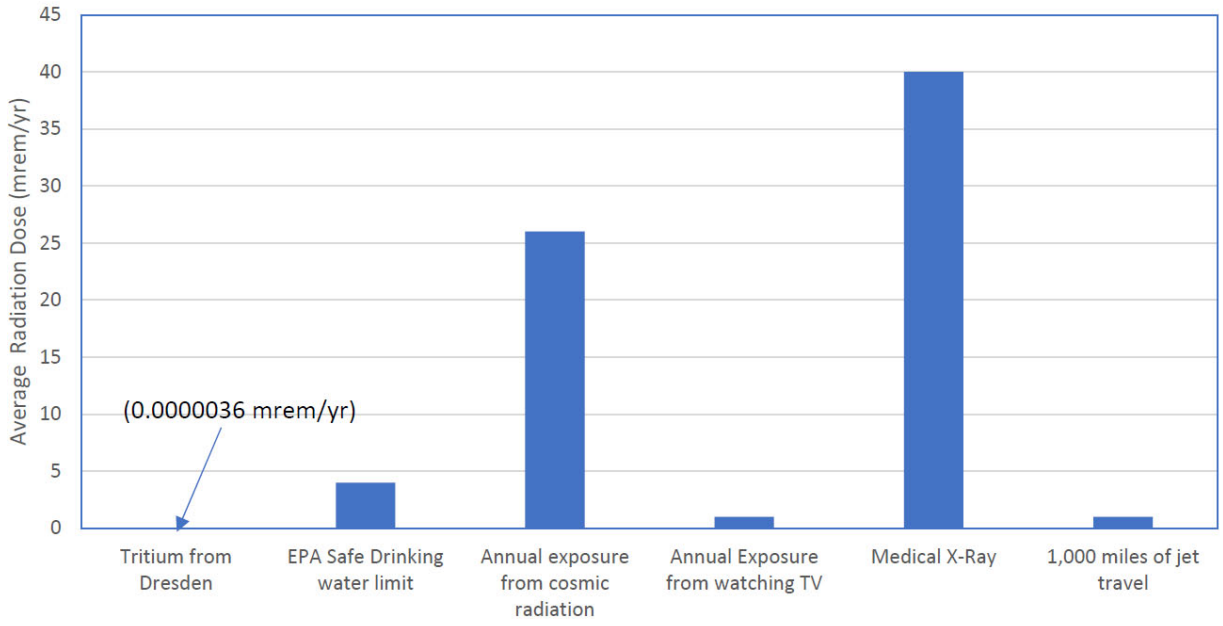
Given the magnitude of improvements required for any of the alternatives, sufficient time is needed to implement the water source once selected. Work post source selection includes preliminary and final engineering, development of a funding strategy, contract negotiations, meetings with potential regional partners, land acquisition, permitting and approximately 5 years of construction. Groundwater modeling performed in Phase I showed that the City's existing water source, the deep well aquifer, will no longer be able to meet the City's demands by 2030. Therefore, it is imperative that the City proceed with selection of a new water source in order to design and construct the improvements by 2030.

26. What is the potential for contamination from the Dresden Power Plant for the Illinois River – Dresden Pool Alternative?

The Dresden Power Plant (DPP) is located at the confluence of the Kankakee River, Des Plaines River and Illinois River. During normal operations, the DPP takes water from the Kankakee River, uses it for cooling and discharges it to the Illinois River. The Dresden Power Plant has a NPDES discharge permit that regulates the water quality of the discharge to the Illinois River. As part of this permit, the DPP is required to test the water quality of the discharge and submit testing results to IEPA to show compliance. DPP is also regulated by the Nuclear Regulatory Commission (NRC) which monitors its operation and compliance for discharge of radioactive elements, in particular tritium.

There are two types of potential exposure to consider – normal exposure and short-term/emergency exposure.

Normal Exposure: Normal exposure is a fraction of the drinking water Maximum Contaminant Level (MCL) and a smaller fraction of the exposure from the sun. Based on data obtained from NRC, the 2018 average Dresden effluent concentration was 1.8E-11 uCi/ml (0.018 pCi/L), which is equivalent to an average radiation dose of 0.0000036 mrem/yr. (Note that these are the discharge concentrations into the Illinois River and does not consider the dilution that occurs in the Illinois River.) The drinking water MCL for tritium of 20,000 pCi/L is equivalent to a radiation dose of 4 mrem/yr. The comparison of various radiation exposures to the risk of exposure from the DPP is shown below.



Source: NRC *Doses in Our Daily Lives* , USEPA

Short-term/Emergency Exposure: Looking at violation data from DPP since the Power Plant was placed into operation, the only incident of tritium release to the Illinois River occurred in 2014 due to a leaking above-ground storage container. In this incident, the tritium release into the Illinois River was estimated at 0.1 pCi/L, which is higher than the average annual release of 0.018 pCi/: but still significantly lower than the drinking water MCL of 20,000 pCi/L

In any case, if there was a release from the DPP, the long transmission main required from the Illinois River to Joliet provides a layer of protection. The water has to travel over 13 miles from the intake to the water treatment plant. At a velocity of between 2 fps and 7 fps, the resulting travel time is between 3 hours and 10 hours before the raw water reaches the water treatment plant. If there was a catastrophic release, the City would have time to turn off the raw water transmission main and switch to the online back up supply from the existing well system before the contaminated water even reaches the water treatment plant.

This time could be increased by locating the Illinois River Intake further downstream. While there has been a lot of focus on the Dresden Pool, lit has been assumed that if the City selected the Illinois River, intake locations between Dresden Pool and Marseilles Pool (approximately 24 miles downstream) would be considered during preliminary design.

27. Why is the cost of the Lake Michigan Water – DuPage Water Commission Alternative (DWC owns and operates transmission main) significantly less for the 60 MGD Scenario?

In the analysis of the total cost of water and potential impacts on future water rates, consideration was given to the way that project costs would likely be allocated to Joliet and potential partners. In the 30 MGD DWC Scenarios presented in Table 13-3, it is assumed that Joliet would be responsible for the full cost of constructing the required transmission system improvements ($509 million) since the system would be dedicated to serving only the City of

Joliet. In the 60 MGD DWC Regional Supply Scenario presented in Table 13-4, it is assumed that Joliet would benefit from shared responsibility for construction of the transmission main components of the project as half of the system capacity would be used by DWC to supply other potential customers in the region. While the total construction cost for the 60 MGD option is estimated to be $595 million as shown in Tables 1-1 and 13-1 in the Phase II report, the portion of the project cost for which Joliet would be responsible was estimated to be only $378 million (50% of the transmission system improvements plus the local Joliet only improvements) as shown in Table 13-4 and referenced in the notes accompanying Figure 13-3.

28. What don't the Capital Costs for the Lake Michigan Water – DuPage Water Commission Alternative and Lake Michigan – Chicago Department of Water Management Alternative match from Chapters 10 & 11 to Chapter 1 (Executive Summary)?

    After the Draft Final Report was presented and published on the project website (RethinkWaterJoliet.org) last week, it was found that Tables 10-2 and 10-3 were interposed with Tables 11-2 and 11-3. The corrected tables are attached and have been updated in the Draft Final Report.

Q&A will be posted after the Public Forum on December 5th and after the Environmental Commission Meeting on December 10th. If you have questions that you would like to have answered, email rethinkwater@joliet.gov.

Table 10-2 Lake Michigan - DuPage Water Commission Alternative, 30 MGD Demand Scenario, Summary of Alternative Improvements and Construction Cost Estimate

Improvement Components	Capacity/Size	Quantity	Unit Cost	Total Item Cost
Intake				
Raw Water Intake Pipe	-- in.	0 LF	-- /LF	$0
Raw Water High-Service Pump Station	-- MGD	0 count	-- /gallon/day	$0
Raw Water Transmission				
Very Low Density	48 in.	0 LF	$710 /LF	$0
Low Density	48 in.	0 LF	$710 /LF	$0
Medium Density	48 in.	0 LF	$900 /LF	$0
High Density	48 in.	0 LF	$1,080 /LF	$0
Utility Corridor	48 in.	0 LF	$680 /LF	$0
Utility/Trail Corridor through forest preserve	48 in.	0 LF	$730 /LF	$0
Trenchless Crossing : Minor	48 in.	0 LF	$2,500 /LF	$0
Trenchless Crossing : Railroad	48 in.	0 LF	$3,000 /LF	$0
Trenchless Crossing : Major	48 in.	0 LF	$4,000 /LF	$0
Gate Valve in Vault	48 in.	0 EA	$155,000 /EA	$0
Air Valve in Vault	0 count	0 EA	$30,000 /EA	$0
Blow-Off	0 count	0 EA	$50,000 /EA	$0
Inspection Vault	0 count	0 EA	$17,500 /EA	$0
Buried Ground Storage	13.8 MG	1 count	$1.75 /gallon	$24,100,000
Intermediate Pump Station	30 MGD	1 count	$0.41 /gallon/day	$12,270,000
Water Treatment Plant	n/a	0 count		$0
Finished Water Transmission Main				
Very Low Density	48 in.	0 LF	$710 /LF	$0
Low Density	48 in.	0 LF	$710 /LF	$0
Medium Density	48 in.	72,730 LF	$900 /LF	$65,457,000
High Density	48 in.	33,100 LF	$1,080 /LF	$35,748,000
Utility Corridor	48 in.	36,800 LF	$680 /LF	$25,024,000
Utility/Trail Corridor through forest preserve	48 in.	6,640 LF	$730 /LF	$4,847,200
Trenchless Crossing : Minor	48 in.	4,540 LF	$2,500 /LF	$11,350,000
Trenchless Crossing : Railroad	48 in.	230 LF	$3,000 /LF	$690,000
Trenchless Crossing : Major	48 in.	8,830 LF	$4,000 /LF	$35,320,000
Bufferfly Valve in Vault	48 in.	40 EA	$60,000 /EA	$2,400,000
Air Valve in Vault	1 count	70 EA	$30,000 /EA	$2,100,000
Blow-Off	1 count	68 EA	$50,000 /EA	$3,400,000
Inspection Vault	1 count	20 EA	$17,500 /EA	$350,000
Receiving Station Improvements				
Standpipe	5 MG	1 count	$0.99 /gallon	$4,954,300
High-Service Booster Pump Station	30 MGD	1 count	$0.41 /gallon/day	$12,270,000
Distribution System Modifications				
Watermain Improvements (see separate table)	(12, 16, 24 & 30 in.)	1 LS	(see separate table)	$80,300,000
Standpipe	2.5 MG	2 count	$0.99 /gallon	$4,954,300
Well Collector System Improvements				
Watermain Improvements	-- in.	0 LF	-- /LF	$0
Land Acquisition Costs				
Urban	n/a	0 acre	$250,000 /acre	$0
Suburban	n/a	1 acre	$150,000 /acre	$150,000
Suburban Greenfield or ROW	n/a	6 acre	$60,000 /acre	$360,000
Rural Greenfield or ROW	n/a	0 acre	$45,000 /acre	$0
			Subtotal	$326,044,800
		Contingency	% of Above 30%	$97,813,440
		Legal, Engineering, and Administrative Fees	% of Above 20%	$84,771,648
			Total	$508,629,888
			Rounded Total	$508,700,000

Table 10-3 Lake Michigan - DuPage Water Commission Alternative, 60 MGD Demand Scenario, Summary of Alternative Improvements and Construction Cost Estimate

Improvement Components	Capacity/Size	Quantity	Unit Cost	Total Item Cost
Intake				
Raw Water Intake Pipe	-- in.	0 LF	-- /LF	$0
Raw Water High-Service Pump Station	-- MGD	0 count	-- /gallon/day	$0
Raw Water Transmission				
Very Low Density	60 in.	0 LF	$940 /LF	$0
Low Density	60 in.	0 LF	$940 /LF	$0
Medium Density	60 in.	0 LF	$1,180 /LF	$0
High Density	60 in.	0 LF	$1,380 /LF	$0
Utility Corridor	60 in.	0 LF	$880 /LF	$0
Utility/Trail Corridor through forest preserve	60 in.	0 LF	$930 /LF	$0
Trenchless Crossing : Minor	60 in.	0 LF	$3,000 /LF	$0
Trenchless Crossing : Railroad	60 in.	0 LF	$3,500 /LF	$0
Trenchless Crossing : Major	60 in.	0 LF	$4,500 /LF	$0
Gate Valve in Vault	60 in.	0 EA	$285,000 /EA	$0
Air Valve in Vault	0 count	0 EA	$30,000 /EA	$0
Blow-Off	0 count	0 EA	$50,000 /EA	$0
Inspection Vault	0 count	0 EA	$17,500 /EA	$0
Buried Ground Storage	13.8 MG	1 count	$1.75 /gallon	$24,100,000
Intermediate Pump Station	60 MGD	1 count	$0.34 /gallon/day	$20,190,000
Water Treatment Plant	n/a	0 count		$0
Finished Water Transmission Main				
Very Low Density	60 in.	0 LF	$940 /LF	$0
Low Density	60 in.	0 LF	$940 /LF	$0
Medium Density	60 in.	72,730 LF	$1,180 /LF	$85,821,400
High Density	60 in.	33,100 LF	$1,380 /LF	$45,678,000
Utility Corridor	60 in.	36,800 LF	$880 /LF	$32,384,000
Utility/Trail Corridor through forest preserve	60 in.	6,640 LF	$930 /LF	$6,175,200
Trenchless Crossing : Minor	60 in.	4,540 LF	$3,000 /LF	$13,620,000
Trenchless Crossing : Railroad	60 in.	230 LF	$3,500 /LF	$805,000
Trenchless Crossing : Major	60 in.	8,830 LF	$4,500 /LF	$39,735,000
Bufferfly Valve in Vault	60 in.	40 EA	$100,000 /EA	$4,000,000
Air Valve in Vault	1 count	70 EA	$30,000 /EA	$2,100,000
Blow-Off	1 count	68 EA	$50,000 /EA	$3,400,000
Inspection Vault	1 count	20 EA	$17,500 /EA	$350,000
Receiving Station Improvements				
Standpipe	5 MG	1 count	$0.99 /gallon	$4,954,300
High-Service Booster Pump Station	30 MGD	1 count	$0.41 /gallon/day	$12,270,000
Distribution System Modifications				
Watermain Improvements (see separate table)	(12, 16, 24 & 30 in.)	1 LS	(see separate table)	$80,300,000
Standpipe	2.5 MG	2 count	$0.99 /gallon	$4,954,300
Well Collector System Improvements				
Watermain Improvements	-- in.	0 LF	-- /LF	$0
Land Acquisition Costs				
Urban	n/a	0 acre	$250,000 /acre	$0
Suburban	n/a	1 acre	$150,000 /acre	$150,000
Suburban Greenfield or ROW	n/a	6 acre	$60,000 /acre	$360,000
Rural Greenfield or ROW	n/a	0 acre	$45,000 /acre	$0
			Subtotal	$381,347,200
		Contingency	% of Above 30%	$114,404,160
		Legal, Engineering, and Administrative Fees	% of Above 20%	$99,150,272
			Total	$594,901,632
			Rounded Total	$595,000,000

Table 11-2 Lake Michigan - Chicago Department of Water Management Alternative, 30 MGD Demand Scenario, Summary of Alternative Improvements and Construction Cost Estimate

Improvement Components	Capacity/Size	Quantity	Unit Cost	Total Item Cost
Intake				
Raw Water Intake Pipe	-- in.	0 LF	-- /LF	$0
Raw Water High-Service Pump Station	-- MGD	0 count	-- /gallon/day	$0
CDWM Facilities				
Low-Service Pump Station	30 MGD	1 count	$0.28 /gallon/day	$8,530,000
Buried Ground Storage	4 MG	1 count	$1.85 /gallon	$7,400,000
Raw Water High-Service Pump Station	30 MGD	1 count	$0.41 /gallon/day	$12,270,000
Raw Water Transmission				
Very Low Density	48 in.	0 LF	$710 /LF	$0
Low Density	48 in.	0 LF	$710 /LF	$0
Medium Density	48 in.	0 LF	$900 /LF	$0
High Density	48 in.	0 LF	$1,080 /LF	$0
Utility Corridor	48 in.	0 LF	$680 /LF	$0
Utility/Trail Corridor through forest preserve	48 in.	0 LF	$730 /LF	$0
Trenchless Crossing : Minor	48 in.	0 LF	$2,500 /LF	$0
Trenchless Crossing : Railroad	48 in.	0 LF	$3,000 /LF	$0
Trenchless Crossing : Major	48 in.	0 LF	$4,000 /LF	$0
Gate Valve in Vault	48 in.	0 EA	$155,000 /EA	$0
Air Valve in Vault	0 count	0 EA	$30,000 /EA	$0
Blow-Off	0 count	0 EA	$50,000 /EA	$0
Inspection Vault	0 count	0 EA	$17,500 /EA	$0
Buried Ground Storage	17.9 MG	1 count	$1.74 /gallon	$31,100,000
Intermediate Pump Station	30 MGD	1 count	$0.41 /gallon/day	$12,270,000
Water Treatment Plant	n/a	0 count		$0
Finished Water Transmission Main				
Very Low Density	48 in.	0 LF	$710 /LF	$0
Low Density	48 in.	0 LF	$710 /LF	$0
Medium Density	48 in.	67,940 LF	$900 /LF	$61,146,000
High Density	48 in.	39,740 LF	$1,080 /LF	$42,919,200
Utility Corridor	48 in.	30,010 LF	$680 /LF	$20,406,800
Utility/Trail Corridor through forest preserve	48 in.	12,590 LF	$730 /LF	$9,190,700
Trenchless Crossing : Minor	48 in.	3,390 LF	$2,500 /LF	$8,475,000
Trenchless Crossing : Railroad	48 in.	1,090 LF	$3,000 /LF	$3,270,000
Trenchless Crossing : Major	48 in.	5,110 LF	$4,000 /LF	$20,440,000
Bufferfly Valve in Vault	48 in.	40 EA	$60,000 /EA	$2,400,000
Air Valve in Vault	1 count	70 EA	$30,000 /EA	$2,100,000
Blow-Off	1 count	68 EA	$50,000 /EA	$3,400,000
Inspection Vault	1 count	20 EA	$17,500 /EA	$350,000
Receiving Station Improvements				
Standpipe	5 MG	1 count	$0.99 /gallon	$4,954,300
High-Service Booster Pump Station	30 MGD	1 count	$0.41 /gallon/day	$12,270,000
Distribution System Modifications				
Watermain Improvements (see separate table)	(12, 16, 24 & 30 in.)	1 LS	(see separate table)	$80,300,000
Standpipe	2.5 MG	2 count	$0.99 /gallon	$4,954,300
Well Collector System Improvements				
Watermain Improvements	-- in.	0 LF	-- /LF	$0
Land Acquisition Costs				
Urban	n/a	3 acre	$250,000 /acre	$750,000
Suburban	n/a	9 acre	$150,000 /acre	$1,350,000
Suburban Greenfield or ROW	n/a	0 acre	$60,000 /acre	$0
Rural Greenfield or ROW	n/a	0 acre	$45,000 /acre	$0
			Subtotal	$350,246,300
		Contingency	% of Above 30%	$105,073,890
		Legal, Engineering, and Administrative Fees	% of Above 20%	$91,064,038
			Total	$546,384,228
			Rounded Total	$546,400,000

Table 11-3 Lake Michigan - Chicago Department of Water Management Alternative, 60 MGD Demand Scenario, Summary of Alternative Improvements and Construction Cost Estimate

Improvement Components	Capacity/Size	Quantity	Unit Cost	Total Item Cost
Intake				
Raw Water Intake Pipe	-- in.	0 LF	-- /LF	$0
Raw Water High-Service Pump Station	-- MGD	0 count	-- /gallon/day	$0
CDWM Facilities				
Low-Service Pump Station	60 MGD	1 count	$0.24 /gallon/day	$14,110,000
Buried Ground Storage	4 MG	1 count	$1.85 /gallon	$7,400,000
Raw Water High-Service Pump Station	60 MGD	1 count	$0.34 /gallon/day	$20,190,000
Raw Water Transmission				
Very Low Density	60 in.	0 LF	$940 /LF	$0
Low Density	60 in.	0 LF	$940 /LF	$0
Medium Density	60 in.	0 LF	$1,180 /LF	$0
High Density	60 in.	0 LF	$1,380 /LF	$0
Utility Corridor	60 in.	0 LF	$880 /LF	$0
Utility/Trail Corridor through forest preserve	60 in.	0 LF	$930 /LF	$0
Trenchless Crossing : Minor	60 in.	0 LF	$3,000 /LF	$0
Trenchless Crossing : Railroad	60 in.	0 LF	$3,500 /LF	$0
Trenchless Crossing : Major	60 in.	0 LF	$4,500 /LF	$0
Gate Valve in Vault	60 in.	0 EA	$285,000 /EA	$0
Air Valve in Vault	0 count	0 EA	$30,000 /EA	$0
Blow-Off	0 count	0 EA	$50,000 /EA	$0
Inspection Vault	0 count	0 EA	$17,500 /EA	$0
Buried Ground Storage	17.9 MG	1 count	$1.74 /gallon	$31,100,000
Intermediate Pump Station	60 MGD	1 count	$0.34 /gallon/day	$20,190,000
Water Treatment Plant	n/a	0 count		$0
Finished Water Transmission Main				
Very Low Density	60 in.	0 LF	$940 /LF	$0
Low Density	60 in.	0 LF	$940 /LF	$0
Medium Density	60 in.	67,940 LF	$1,180 /LF	$80,169,200
High Density	60 in.	39,740 LF	$1,380 /LF	$54,841,200
Utility Corridor	60 in.	30,010 LF	$880 /LF	$26,408,800
Utility/Trail Corridor through forest preserve	60 in.	12,590 LF	$930 /LF	$11,708,700
Trenchless Crossing : Minor	60 in.	3,390 LF	$3,000 /LF	$10,170,000
Trenchless Crossing : Railroad	60 in.	1,090 LF	$3,500 /LF	$3,815,000
Trenchless Crossing : Major	60 in.	5,110 LF	$4,500 /LF	$22,995,000
Bufferfly Valve in Vault	60 in.	40 EA	$100,000 /EA	$4,000,000
Air Valve in Vault	1 count	70 EA	$30,000 /EA	$2,100,000
Blow-Off	1 count	68 EA	$50,000 /EA	$3,400,000
Inspection Vault	1 count	20 EA	$17,500 /EA	$350,000
Receiving Station Improvements				
Standpipe	5 MG	1 count	$0.99 /gallon	$4,954,300
High-Service Booster Pump Station	30 MGD	1 count	$0.41 /gallon/day	$12,270,000
Distribution System Modifications				
Watermain Improvements (see separate table)	(12, 16, 24 & 30 in.)	1 LS	(see separate table)	$80,300,000
Standpipe	2.5 MG	2 count	$0.99 /gallon	$4,954,300
Well Collector System Improvements				
Watermain Improvements	-- in.	0 LF	-- /LF	$0
Land Acquisition Costs				
Urban	n/a	3 acre	$250,000 /acre	$750,000
Suburban	n/a	9 acre	$150,000 /acre	$1,350,000
Suburban Greenfield or ROW	n/a	0 acre	$60,000 /acre	$0
Rural Greenfield or ROW	n/a	0 acre	$45,000 /acre	$0
			Subtotal	$417,526,500
		Contingency	% of Above 30%	$125,257,950
		Legal, Engineering, and Administrative Fees	% of Above 20%	$108,556,890
			Total	$651,341,340
			Rounded Total	$651,400,000