Response to Waukesha No Action Alternative Comment

PREPARED FOR: Wisconsin Department of Natural Resources

FROM: CH2M HILL

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This technical memorandum presents the response to the following Wisconsin Department of Natural Resources (WDNR) request for additional information on the No Action Alternative in the Waukesha Water Supply Environmental Report:

> *"Additional information is needed regarding the no-action alternative, including a description of its environmental and socioeconomic impacts."*

No Action Alternative Description

The City of Waukesha currently obtains water from multiple wells within the deep and shallow aquifers. The No Action Alternative, by definition, would continue to use the aquifers without modification. Because the deep and shallow aquifer wells do not have sufficient capacity to meet future demands and because the deep aquifer wells exceed radium water quality requirements, the No Action alternative will not provide for the City's long-term water quantity and quality needs. Additional environmental and socioeconomic impacts of the No Action Alternative are described below.

If the City of Waukesha takes no action to secure Lake Michigan water, it would be left with only groundwater water supply sources: the deep St. Peter Sandstone Aquifer and shallow aquifers (primarily the shallow Troy Bedrock aquifer). As described in Environmental Report Section 2.2.2.1 Surface Water Alternatives in Mississippi River Basin, the Mississippi River basin surface waters as a raw water supply are not feasible. Also development of these surface waters would require significant action, such as constructing reservoirs, which is not consistent with a No Action Alternative. Continued and increased reliance on these two groundwater sources would have significant adverse environmental and socioeconomic impacts. The degree of impact and the trade-offs between environmental and socioeconomic impacts would depend on how the City responded to growing water demand and progressively worsening environmental impacts resulting from reliance on these two groundwater sources. As described below, these potential impacts are not acceptable; consequently, the No Action Alternative not an option for the City.

In the past, the City relied entirely on the deep aquifer for water supply. Today the deep aquifer provides approximately 80 percent of the City's water supply; however, the aquifer cannot sustain this pumping rate. Although the deep aquifer has shown some rebound in recent years, this is at least partially due to the decreased City demand (from 8.3 million gallons per day (mgd) average day demand in 1999 to 6.7 mgd in 2010) (Environmental Report Table 3-3). This decrease in demand is due to various factors, some of which are temporary. Water conservation, changes in water use by industry, and changes in the economy with the recession have contributed to the decreased demand. The projected demand (10.1 mgd, as described in Environmental Report Section 3.1.5) reflects reasonable increases in demand from population change and a rebounding economy. This reasonable increase in demand could result in a return to the historical trends of declining aquifer level and declining water quality.

Areas with a groundwater level decline of 150 feet or more are designated as groundwater management areas under Wisconsin Administrative Code, Chapter NR 820 – Groundwater Quantity Protection. The Southeast Wisconsin Groundwater Management Area includes all of Waukesha County. While a recent modest rebound in groundwater levels has occurred, the deep aquifer remains stressed, with drawdown reaching 300 to 500 feet depending on location. The modest rebound near City wells may be attributed in

part to two operational changes: the City starting to use the shallow aquifer for water supply and the City implementing a comprehensive water conservation plan.

The City has seen the aquifer both rebound and drawdown quickly in response to taking wells offline for extended repairs. Over a 24 month period, the City repaired three wells which led to a localized rebound in the aquifer. After pumping resumed, the majority of the pre-repair drawdown recurred within a month. Based upon these experiences, the aquifer is expected to rebound quickly with a switch to Lake Michigan water, but would be susceptible to additional drawdown under the No Action Alternative or groundwater alternatives.

Since 2006, the City has managed an aggressive program of water use efficiency and conservation measures designed to reduce average day demand by 0.5 mgd by year 2030 and 1.0 mgd by year 2050. The water savings represent 5 and 10 percent water savings from the water demand projection prior to conservation between 2010 and 2050. These water savings goals conform to the requirements of Wisconsin Administrative Code Chapter NR 852 – Water Conservation and Water Use Efficiency and are part of all water supply alternatives considered. Though reducing water use and water waste through conservation and efficiency measures contributes to the source of supply, water conservation alone is not a water supply alternative. It is only a partial solution to the City's water supply needs and cannot avoid the need for a sustainable water supply that meets projected future water demand. Water conservation is common to all the alternatives and reduces the effective water demand for all alternatives.

No Action Alternative Impacts

Under the No Action Alternative, the City is faced with reliance on both the stressed deep aquifer and increased use of the environmentally sensitive shallow aquifers to meet projected water demand. The Environmental Report addressed impacts to a number of environmental resources for each Action Alternative (Environmental Report Sections 5 and 6). Of those resources, Groundwater, Inland Waterways, Wetlands, and Socioeconomic resources could experience impacts from No Action. In addition, the No Action Alternative could produce significant institutional impacts. The degree, extent and intensity of the effects would depend on the trade-offs the City made between failing to meet projected water demand and impacts to the natural environment.

Institutional Impacts

The No Action Alternative would have institutional impacts in two areas: compliance with the state radium consent order and impacts on the water supply of surrounding communities. Radium is a cancer-causing chemical naturally occurring in the deep aquifer. The radium concentrations in the deep aquifer do not meet drinking water public health standards and have prompted the State of Wisconsin to issue a consent order to the City to bring its drinking water quality into radium compliance by June 30, 2018. The City's plan for a new water supply protects public health by having a water supply source that meets radium public health standards. By comparison, the No Action Alternative would not be protective of public health.

Continued reliance on the deep aquifer would not only prevent the City from achieving compliance with the consent order, it would exacerbate the problem. Treatment of the deep aquifer water to remove radium is not a long term water supply option due to the 300 to 500 feet of groundwater drawdown stress already occurring in the deep aquifer. The City requires a long-term supply both meeting the radium requirements and not under groundwater drawdown stress. Increased reliance upon low radium concentration shallow groundwater could mitigate the radium impact through dilution. However this would not be consistent with a No Action Alternative and is incorporated into the Deep and Shallow Aquifer Alternative and the Shallow Aquifer and Fox River Alluvium Alternative detailed in the Environmental Report. Also, as described in the report this approach could not solve the problem and given the other impacts of continued depletion of the deep aquifer, it consequently is not a feasible solution.

To meet water supply needs, many other communities within the region rely on the deep aquifer source the City would be forced to use under the No Action Alternative. The City's continued, and potentially increased, reliance on the deep aquifer would affect these other communities.

Although temporary and reversible, there are impacts associated with water supply and return flow pipeline construction of several of the Action Alternatives. The No Action Alternative would have similar impacts if the City needed to meet future water supply demand by further developing the deep or shallow aquifer with new wells and associated distribution systems, which are outlined in the Environmental Report.

Groundwater Impacts

Increased reliance on the deep aquifer under the No Action Alternative would have the aquifer impacts discussed above. In addition, the deep aquifer flow has historically been towards Lake Michigan. Accelerated pumping of the aquifer would continue to reduce the groundwater discharge from the deep aquifer to Lake Michigan. With return flow under the Lake Michigan alternatives, 100 percent of the return flow volume is returned to Lake Michigan during most years. Thus the No Action Alternative could actually have greater impact on Lake Michigan volume than any of the Lake Michigan Alternatives.

Increased reliance on the deep aquifer under the No Action Alternative could lead to similar impacts if the City needed to meet future supply demand by further developing the deep aquifer. Additional use of the deep aquifer could require reverse osmosis as a water treatment process. As described in Section 4.2 of the Water Supply Service Area Plan, additional use of the deep aquifer could require a reverse osmosis treatment process to remove total dissolved solids (TDS). The reverse osmosis water treatment process creates a salt waste stream that accounts for 10 to 20 percent of the water treated. This would lead to greater groundwater pumping to offset the volume lost as waste which would further impact the aquifer and offset some of water demand reduction made through the City's water conservation program.

If the City of Waukesha elected to increase withdrawal from shallow aquifers because of the impacts and legal constraints associated with increased pumping from the deep aquifer there would also be adverse impacts on the groundwater. The near surface water levels would decrease in the areas of existing and newly constructed shallow aquifer wells. There are many private residential wells within the groundwater drawdown area of the shallow aquifer alternatives evaluated in the Environmental Report. The shallow aquifer is more vulnerable to contamination from surface activities which could require new treatment or abandonment of a well.

Private well and septic tank failures without the option of a public water supply would pose a greater threat to public health and groundwater contamination. There already have been cases where public water has been extended to solve these type of problems.

Increased reliance on groundwater would in turn have impacts on surface water and wetlands as described below. It would also reduce recharge to the deep aquifer and have deep aquifer impacts as described above.

Inland Waterways and Wetlands Impacts

The No Action Alternative would have an impact on inland waterways and wetlands. With the available infrastructure already in place, more extended pumping of that source could occur. The Environmental Report has demonstrated that increased use of shallow water aquifers would reduce water levels in streams and vegetated wetlands. This in turn would adversely affect aquatic and semi-aquatic biological habitat and species. The degree of effect would be dependent on how much additional water the City decided to draw from the shallow aquifers, compared to the amount envisioned under the groundwater alternatives documented in the Environmental Report. Under full implementation of shallow groundwater sources described in the Environmental Report, significant adverse impacts to wetlands would occur from groundwater drawdown (i.e. 3,000 to 4,000 wetland acres significantly impacted). The No Action Alternative would result in continued and expanded use of the shallow aquifer within the infrastructure that is available.

For the alternatives screened in the Water Supply Service Area Plan, the Multiple Source Alternative evaluated pumping 2.7 mgd from shallow aquifers; the Deep and Shallow Aquifers Alternative, 5.6 mgd from the shallow aquifers. At a 2.7 mgd pumping rate, the Water Supply Service Area Plan Section 11.4.6.2 documents the shallow aquifer would have impacts of up to 1,200 acres within a 1 foot groundwater drawdown and 240 acres within a 5 foot groundwater drawdown. Exhibit 11-37 in the Water Supply Service Area Plan indicates a base flow reduction of up to 53 percent in Mill Brook with smaller base flow reductions in the Fox River, Pebble Brook, and Mill Creek. These changes would have a significant adverse impact to the inland waterways and wetlands of the area.

As described throughout the Environmental Report, wetland, waterways, and aquatic habitat impacts even approaching these levels are significant and far exceed the minimal impacts associated with the Lake Michigan water source alternatives.

Socioeconomic Impacts

The existing groundwater sources and infrastructure do not have the quantity of high quality water to meet the radium drinking water standards for the current or future water demand. Expanded use of the existing sources within available infrastructure would have impacts upon the natural environment (as described above), would create pressure on surrounding communities also withdrawing water from the same sources, and would not meet the consent agreement with the State. Taking no action would cause significant and irrepressible socioeconomic impacts. The City could not meet the 10.1 mgd projected water demand developed through the State-required water supply planning process (Wisconsin Administrative Code Chapter NR 854 – Water Supply Service Area Plans) and documented in Volume 2 of the Application – Water Supply Service Area Plan. In addition, increased reliance on the deep aquifer will continue the historical aquifer drawdown and adverse effects on water quality, particularly with respect to radium. Thus the City would be forced to takes steps to restrain future water use and even reduce current demand.

Under the No Action Alternative, existing development with private wells and septic tanks would be at risk of having no public water supply alternative should private wells fail from septic tank or other contamination. A public water supply would offer good reliability and consistent water quality for private well contamination, should it occur. The No Action Alternative would not have the additional capacity to provide water to contaminated residential wells, should it become necessary to protect the water supply service area currently on private wells through a public water supply. This inability to provide water would lead to expensive house-by-house fixes putting public health at risk and creating economic hardship.

Continued and enhanced conservation measures are part of the strategy to reduce demand. However, the cost effective and publicly acceptable and implementable conservation measures have already been or are planned for implementation. Further reduction in water demand through conservation would require extreme measures, such as a complete ban on outdoor water use, expensive requirements for industrial/commercial reuse and process modifications, and mandatory plumbing restrictions beyond commercially available products. These measures would have significant adverse impacts on quality of life and economics for the citizens of Waukesha and adversely affect the City's economy and tax base. Again, even with extreme conservation and efficiency measures, the water savings would only be a partial solution.

The City would also be forced to restrict residential, commercial, and industrial growth. In the extreme case this could result in denial of new building permits or adverse requirements for new development to take expensive measures to offset the new demand created by the proposed development. This would make development in the City more expensive and difficult and thus adversely limit the moderate level of reasonable and planned economic growth within the water supply service area. As shown in Section 6.1 of the Water Supply Service Area Plan, the expected annual population growth in the water supply service area is projected to be 0.5 percent, consistent with SEWRPC planning analysis, a modest amount of growth.

Another less direct but potentially more significant adverse socioeconomic impact of the No Action Alternative is severe limitation of the ability of communities within the water supply service area to establish and implement long term land use and economic planning. Future growth and type of economic development would no longer be established and managed by sound land use planning by the communities within the water supply service area. Communities within the water supply service area have developed comprehensive land use plans. Those affected would include:

- Town of Waukesha
- Town of Genesee
- Town of Delafield
- City of Pewaukee
- City of Waukesha

Development and changes in land use, including in-fill development, would be dictated by availability of potable water instead of using sound planning. Without the ability to provide potable water for reasonable modest growth, the communities within the water supply service area plan could lose control of future land use planning. Thus comprehensive community, county, and regional plans would be jeopardized or negated because water supply to relatively high density development in conformance with proven planning principles could not be provided. Also plans for reasonable commercial growth with typical water demands would not be possible.

Summary of No Action Alternative Impacts

As described above, the No Action Alternative, in comparison to all other Action Alternatives, would have similar or greater adverse impacts to every environmental resource category. The most significant adverse natural impacts would be on the wetlands, surface waters, and the groundwater. In the extreme case as the City tries to use existing sources to meet current and future demand the wetland impacts would approach those described in the Environmental Report for the Deep and Shallow aquifers Alternative and the Shallow Aquifer and Fox River Alluvium Alternative (3,000 to 4,000 wetland acres significantly impacted).

Perhaps the greatest adverse impact and the one with greatest long term implications would be the continued drawdown of the deep aquifer. The quality and groundwater level degradation would continue which would adversely and perhaps irreversible affect the City and surrounding communities' water supply. The No Action Alternative would also put the City in violation of its consent agreement with the state regarding radium concentrations in the drinking water. The elevated radium would also present a public health risk.

The adverse socioeconomic impacts of the No Action Alternative would be significant, much greater, and of longer duration than the impacts from any of the Action Alternatives. Future development would be constrained or eliminated which would adversely affect the economy of the City, its residents, and commercial/industrial entities. There would also be constraints and adverse impacts on land use and quality of life. The City's ability to plan for the future land use, economic development, and tax base would also be severely constrained because availability of potable water, rather than the reasonable growth plans within the water supply service area, would dictate development.