

How does the Highland Park interconnect impact the decision of whether to use membrane technology or the current water plant's technology?

The interconnection would not impact the decision about the water treatment process technology, since finished water must meet the same regulatory water quality standards, regardless of the type of technology used.

Are membrane filters micro-particulate filters?

There are different types of membrane filtration methods including micro and nano. As of now, the treatment technique of a potential new plant has not yet been determined.

Construction in the existing space would use the existing technology and use some of the new membrane technology. Is that the same membrane technology that would be used in a new facility? Why would the new plant options only include membrane?

The decision on treatment process has not been made and will be evaluated in greater detail as the Village studies each option. For example, a new plant could be a hybrid of conventional and membrane technology. The challenge in rehabilitating the existing plant is installing the new infrastructure. For comparison purposes in the report, Strand utilized membrane technology in the options for a new plant, though the Village has not yet made a decision regarding the type of technology that would be used in the future.

What is the added cost of direct membrane filtration vs. conventional treatment?

The opinion of probable construction costs (OPCC) for direct membrane filtration is \$40,240,000 as illustrated in Table 5.04-2 in the Strand report and the OPCC for conventional treatment is \$35,588,000 as illustrated in Table 5.04-1 in Strand report.

If the Village rehabs the existing facility, is the Village constrained by what technology could be installed, and is new technology necessary?

The Village has not made a decision on a specific type of technology for the existing or new plant. The Village is anticipating future EPA regulations. Membrane technology may be better suited for maintaining compliance with future EPA regulations versus other treatment techniques.

Reverse osmosis is another water treatment process. Pathogens can be removed by UV and ozone, but reverse osmosis has a similar footprint. Why are these options not being considered?

The Village has not made a decision on a specific type of water treatment. However, there are increased treatment costs utilizing reverse osmosis that would not be necessary to treat our source water. Reverse osmosis also removes beneficial minerals from the source water and those minerals are needed to keep the water stable and non-corrosive. Those minerals would need to be added to the water via additional treatment and chemical additions, which would further add to the cost of the water treatment process.

Are the operating costs of new membrane water treatment technology such as replacement of the plastic membranes and the electricity costs to push raw water through the membranes in the report? If not, can you provide them?

Membrane operating costs for electrical, chemical, and maintenance (membrane replacement) are typically higher than a conventional water treatment plant. Colder water temperature will also increase system pressures for the same amount of flow through the water treatment plant. However, an offset to this condition is that during the winter, the facility will be expected to produce less water and will be

equipped with an effective amount of membrane area to help minimize the pressure difference between summer and winter conditions. The higher costs have been presented in and included within the Strand Report in Section 5 (Page 5-11) and are an estimated \$215,000 additional annual cost. This additional cost is considered in the long term cost analysis to present a fair comparison of the technology with other options.

It is important to note that even with a higher annual maintenance cost, there are substantial benefits of membrane filtration including improved water quality, increased protection of public health, and the ability to meet future EPA or other regulations, all significant factors in the consideration to incorporate this new technology.

Why do every single one of the drinking water options now being presented to the village include membrane filtration? Isn't this a policy question for our Village Board? The assumption of this technology choice is a big leap for the engineers to make without policy guidance by our elected officials.

The final decision as to the most appropriate treatment process is one that the Village Board will make. Strand has stated that this is ultimately a policy issue, but suggests that membrane filtration will better prepare Glencoe to move forward in the future as regulatory requirements become more stringent, and there are numerous possible water quality and health benefits as well as operational improvements associated with membrane filtration. The use of membrane filtration is becoming more prevalent in new plant construction as well as modifications to existing treatment plant facilities, and the cost of installation and maintenance are lower than they once were. Strand recommends it is prudent for the Village to invest in forward-looking technologies as the Village expects the WTP to be in use for 75 years or longer.

There are lots of types of membrane filtration for drinking water. What type is Strand suggesting? What sorts of plastics are in these membrane filters? Also, has any organization done taste tests? If so, which produces tastier water-sand filtration or plastic membrane?

All the materials, including any plastics, in contact with the process water would be designed to be National Sanitary Foundation (NSF) certified for drinking water as required by the Illinois Environmental Protection Agency (IEPA) and would be BPA-free. As the Village evaluates technology options, it will emphasize maintaining the high-quality tasting water that residents currently enjoy.

The membrane filtration system recommended in the Strand Report is a low pressure polymeric membrane filter that performs micro- or ultra-filtration. However, the Village has not selected any type of water process treatment (including whether membrane filtration, conventional filtration, or other filtration processes would be used). The American Water Works Association (AWWA) [Standard Manual of Practice M53 - Microfiltration and Ultrafiltration Membranes](#) provides a good reference for the types of membrane systems used in municipal water treatment.

Did the proposals being considered for this project perform analysis of best water treatment standards?

The short and most accurate answer to the question is, the water currently produced by the Glencoe WTP is safe and of the highest quality, and meets or exceeds all of the regulatory standards required of

a public water supply. The annual Consumer Confidence Report on the Village's compliance is posted here. (link)

In terms of additional background, the Illinois Environmental Protection Agency (IEPA) regulations require water samples to be taken from the distribution systems of Public Water Supplies on a monthly basis, and each sample must have a measurable free chlorine residual in order to control microbes and to be compliant with regulatory requirements. Chlorine is a very effective, low cost water treatment chemical, commonly used throughout this region. The Village converted its treatment process 12 years ago from chlorine gas and now uses liquid hypochlorite, which is a safer form of chlorine. The Illinois Department of Public Health (IDPH) requires all Public Water Supply Systems to maintain a fluoride residual in the range of .9 mg/L to 1.2 mg/L. In order to maintain compliance, the Village currently adds fluoride to maintain a residual in that required range.

Oxygenation using ozone is one way of providing initial disinfection in the water treatment process. However, ozone does not provide the type of disinfectant residual that is necessary to maintain and safeguard water once it enters the distribution system. Chlorination and chloramination are both well-known and regulated practices that have been effectively in place over a 100+ years to protect public health and distribution systems.

The current Glencoe WTP utilizes conventional water treatment processes. The Strand Water Supply Planning Report recommends the Village consider direct membrane filtration in the design of any new WTP, and utilizes this technology in all of the comparable cost estimates in the study. It should be noted that the Village has made no final decisions on what future water treatment process or chemicals should be pursued as this will be evaluated in more detail once a determination is made as to next steps in the process.