Groundwater Memo

Current Water System Status: The City of Angleton public water system currently utilizes water from two sources- pre-treated surface water purchased from the Brazosport Water Authority (BWA), and groundwater produced by up to five usable City-owned wells. The contract with BWA specifies a "take-or-pay" system currently set at 2.3 million gallons per day (MGD). Over the past two years, purchased water has made up approximately 85% of the total water distributed by the City's four Water Treatment Plants. The remaining 15% is provided by our two fully active water wells- Well #11 located at our Henderson Road Plant, and Well #14 located at our Freedom Park Plant. The remaining three available wells are Wells #8, 9, and 10, which are operational, but classified as emergency use wells and cannot be used to meet demand during peak flow events. Additionally, there are two wells, well #6 and 7, that cannot be used, as they have been out of service for more than 30 years but may be salvageable.

Using any of the wells #8, #9, or #10 poses an operational problem due to the nature of the single transmission line between our Henderson Road Plant and our Chenango Street Plant. In normal use, this line is used to carry treated water pumped from the Henderson Plant to the Chenango Plant, as there is no direct BWA entry point for that facility. When emergencies arise, the same line is used to carry raw groundwater from each of the emergency wells to either plant, as dictated by ground storage tank levels. After the emergency is resolved, and before using the transmission line in a normal fashion, the line would require disinfection and bacteriological testing to ensure the safety of the drinking water entering the Chenango Plant. It is also important to note that in 2024, 17,082,000 gallons were lost between the Transfer Meter at WP#3 and the Distribution Meter at WP#2, equaling an average of 46,813 GPD. The newest parts of this transfer line were constructed as a part of the project that gave us the GST at WP#3 in 1989.

Potential Well Capacity: The current rated capacity of our active wells is 2,548,800 gallons per day. In using the active emergency wells, we can increase our capacity by 3,024,000 gallons per day but doing this would likely cause the city to enter a Boil Water Notice due to a lack of appropriate treatment of that quantity of produced water.

The ideal location for the required treatment of the produced groundwater is at the Chenango Plant, but we are not currently permitted to, nor do we have the equipment available to ammoniate the water at that site. This prevents us from being able to appropriately form the stable chloramine residual that is used in the rest of the water system, causing undesirable and uncontrolled reactions of the two main forms of disinfectant in various parts of the distribution system, which can result in illegal levels of disinfectant residual throughout the distribution system.

Well #6 and well #7 are tied into the same transmission line as the other wells but have not been used to meet demand at least since 1996, and as such were isolated from the system and left to deteriorate. In January of this year, we employed a well company to remove the installed pumping equipment and perform a camera survey on these two wells. While the survey proved

beyond a doubt that the wells were not plugged, as was previously thought to be the case, a direct report of the state and recoverability of the wells could not be made due to corrosion of the well casing at both sites. Current pricing from two BuyBoard companies place the cost to determine the recoverability of each site close to $40,000, and total rehabilitation costs between $400,000 and $600,000 per site. This is compared to an estimated $2,000,000 to $3,000,000 to drill a single new well producing twice the capacity of either Well #6 or 7, or $1,148,000 for a single well the same capacity as Well #6 or 7.
If rehabilitation returned these wells to their previous production rates, the two out of service wells would add an additional 1,319,040 gallons per day of capacity to the water system, increasing the operational resilience of both Chenango and Henderson Water Plants and adding an additional 2,476 connections of Supply Capacity, when calculated using the Source Capacity exception granted to the City due to the supply guaranteed by BWA. Should this exception be revoked, this would represent an additional 1,527 connections instead.

In order to get the maximum benefit out of all of the wells currently located on the transmission line, for a total added capacity of 4,343,040 gallons per day, we would need to install a separate transfer line, construct a chemical feed building at the Chenango Plant, and rehabilitate the two wells currently out of service.

Necessary Projects:

1. **Transfer Line: $2,100,000.00**
2. **Chenango Chemical Building: $4,000,000.00**
3. **Well #6 and 7 Rehabilitations: $1,400,000.00 – worst case scenario/$800,000.00 best case scenario**

Well Costs vs BWA Costs: Currently, we purchase BWA water at a rate of $4.60 per 1,000 gallons. Accounting for the costs of total treatment, operations, repairs, and necessary maintenance, the full cost of well water would be $2.02 per 1,000 gallons. This represents a significant decrease in the costs of water supply, but only when system demand exceeds the annual contracted BWA purchases. It would not be recommended to reduce the amount of water purchased from BWA; it is also not very feasible. However, the increase in well capacity would allow the city to go a longer term without having to increase the amount of water purchased. In time, as the city grows, we would use our fully contracted amount of water purchased and increase well usage to supplement the rest of the water demands.

BWA Utilization: Since the increase to 2.3MGD there has been an average contract utilization of 80.01%. Prior to the increase we were utilizing over 100% of the contracted amount.

Next Steps:

1. **Fund Transfer Line Project and Chenango Chemical Building –** this will give us the opportunity to utilize all our current groundwater assets. It will also allow the use of additional groundwater assets when they are acquired.
2. **Fund The Cost to Determine Recoverability of Two Wells –** this will give us additional wells, increase capacity, and increase resiliency.
3. **Explore New Groundwater Sources –** determine costs on drilling a new well, and potential locations.