From:	Persyn, Michael
To:	Ricardo Carrasco; Daniel Paxson; Scott Dixon; Jonah Chang; Jerimiah Jacobs; John Gomez
Cc:	Nicholas Carlisle
Subject:	RE: Irrigation discussion on pumps at contact chamber [In-person]
Date:	Thursday, June 5, 2025 5:22:49 PM
Attachments:	image002.png image003.png image004.png

Hi all,

Here is my understanding of our discussion last Thursday, our evaluation, and some suggested options. It's long, but I thought was a good place to summarize several discussions and evaluations up to this point.

Summary of the discussion and useful background

- During the NPW test, both pumps were run at 100% to operate one zone. Based on the gauge on the manifold, the line appeared to not build any pressure (gauge read approximately 10 psi where typically it is around 70 psi). The zone that was run had approximately 6 heads on it. The heads appeared to be throwing the appropriate distance. No flow meter was used to see what flow rate the pumps were producing. Only one zone was opened during the test. It's possible the pumps were not seeing much backpressure due to the small flow rate in the 6" main header and the elevation drop from the clearwell water surface to the irrigated fields.
- The current irrigation system in the park consists of 45 zones per the 2004 irrigation plans. Based on the irrigation plans, the typical zone is approximately 7-8 heads flowing ~190 gpm.
- The park needs approximately 162k gallons per week to irrigate ~12 acres to a depth of 1/2". Using a 7 day watering cycle requires approximately 23k gallons per day. The park must be watered at night when the fields are not being used because of the type of reclaimed water used for irrigation. Assuming a 3 or 4 hour watering period requires 128 gpm or 96 gpm pump capacity. Based on the current zone sizes, it makes sense to provide a minimum of 200 gpm capacity. With 45 zones, approximately 6-7 zones must be watered per day to complete all zones once every 7 days.
- The pumps on the existing NPW skid are down again and have been out of service frequently. In addition, the controls system is proprietary so only the original vendor can provide service.
- The existing irrigation pumps appear to meet the irrigation demand (~190 gpm) per zone, but due to the quality of the water and the lack of screens, they are problematic to operate because they push debris into the sprinkler system which is labor intensive to troubleshoot and clean.
- The ponds are not required as part of the wastewater treatment process and will be closed in response to the Agreed Order. It may be that a smaller pond is kept once they are filled in per the TCEQ approved closure plan, but this will likely be several years away at a minimum as closure relies on donated fill from surrounding development and construction projects.

Ideas for Irrigation (all costs presented are rough estimates for construction)

1. Add screen and filter to existing irrigation pumps. Ballpark cost of approximately $120k-$150k. This is problematic because these improvements would be wasted once the ponds are drained.
2. Add to or modify pumps on existing NPW skid. Ballpark cost of $150k. This is problematic because the existing skid lacks room for expansion and will require significant retrofits to accommodate additional or larger pumps. In addition, the controls system will require support from the original skid manufacturer who has not been that responsive to the city and will still have proprietary controls. This option would also take the NPW system out of service for longer duration because of need to replace in the field.
3. Replace existing NPW skid with a new skid designed to address NPW needs for the plant and irrigation of the park. Ballpark cost of $125k. The new skid would address the performance issues seen with the existing skid and allow open source controls for easier maintenance and changes by the city as needs change. The skid could be factory built so downtime for NPW system is minimal for the switchover. This option would continue to serve plant NPW needs even if irrigation goes away.
4. Build new storage tanks or pond elsewhere with new pumps. This is the most expensive option, with longest timeframe for design and highest cost. Ballpark cost is $300k-$500k (depending mostly on storage volume implemented)
5. Repurpose existing sludge holding basin for storage. Simple plumbing would allow connection to the existing irrigation wet well adjacent to the basin. This approach has the longest timeframe. It requires longer design to relocate sludge pumps and reroute WAS to existing secondary clarifier and longer permitting with the TCEQ. This may be a good option, but requires more extensive analysis to combine with overall future plant operational plan.
6. Use potable water. With a peak watering demand of approximately 7 months (March to September), the watering demand at 1/2" per week totals approximately 4.9 million gallons, or 15 acre-feet. By my analysis of the city's current commercial rates, this approach costs approximately $5,700/month (I did not factor in the drought surcharge pricing). This option may be subject to cutbacks/restrictions because of the city's adopted Drought Contingency Plan.

I think a new NPW skid sized for the irrigation system and the NPW at the plant is the fastest and most cost-effective approach with the greatest flexibility for any future changes at the plant. Please let me know if you'd like to meet to discuss this or how we can help progress the discussion and decision making.

Mike

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-----Original Appointment-----
From: Ricardo Carrasco <rcarrasco@castrovilletx.gov>
Sent: Friday, May 23, 2025 2:58 PM
To: Ricardo Carrasco; Daniel Paxson; Jerimiah Jacobs; John Gomez
Cc: Scott Dixon; Persyn, Michael; Nicholas Carlisle
Subject: Irrigation discussion on pumps at contact chamber [In-person]
When: Thursday, May 29, 2025 1:00 PM-2:00 PM (UTC-06:00) Central Time (US & Canada).
Where: Castroville WWTP