


**LAKE ARROWHEAD COMMUNITY SERVICES DISTRICT**

**MEMORANDUM**

**DATE:** JANUARY 28, 2020

**TO:** BOARD OF DIRECTORS  
Lake Arrowhead Community Services District

**FROM:**   
MATT BROOKS, Operations Manager

**SUBJECT:** OPERATIONS MANAGER'S REPORT

**A. RECOMMENDATION**

This is an information item.

**B. REASON FOR RECOMMENDATION**

This is an information item.

**C. BACKGROUND INFORMATION**

This report is to give an update on water delivered in 2019, along with a project status update regarding the upsizing of piping at the Hesperia Farm Outfall Facility, Project #208.

**D. FISCAL IMPACT**

This is an information item.

**E. ENVIRONMENTAL IMPACT**

This is an information item.

**F. ATTACHMENTS**

- 2019 Monthly Report
- 2018 Monthly Report
- December 2019 Water Delivered Annual Analysis & Project #208 Status Update
- Executive Summary from Dudek Consequence of Failure Analysis Nov 2019
- Project photos

**ARROWHEAD WOODS MONTHLY DATA  
ACRE FEET**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
2019 MONTH	TRANSFER TO GV LAKE	WELLS TO SYSTEM	BERNINA PLANT	CEDAR GLEN PLANT	COMBINED PLANT	COMBINED PLANT BACKWASH	BERNINA RECYCLE	CLAWA PURCHASE (a)	CLAWA PURCHASE (a)	BRENTWOOD (a)	COMBINED PURCHASE (a)	LAKE DRAW (b)	DELIVERED TO DISTRIBUTION (c)	METERED WATER	STORAGE VOLUME (e)	STORAGE VOLUME CHANGE +/-	UN-METERED WATER (d)
JANUARY	0.00	13.17	0.00	60.63	60.63	4.33	0.00	0.00	0.00	0.00	60.63	69.47	56.45	23.82	0.80	12.22	
FEBRUARY	0.00	15.90	1.38	55.11	56.49	4.54	0.00	0.00	0.00	0.00	56.49	67.85	53.02	24.62	2.09	12.74	
MARCH	0.00	18.62	11.93	34.18	46.11	3.84	0.29	0.00	0.00	0.00	46.11	61.18	50.91	26.71	-0.28	10.55	
<b>1ST QUARTER</b>	<b>0.00</b>	<b>47.69</b>	<b>13.31</b>	<b>149.92</b>	<b>163.23</b>	<b>12.71</b>	<b>0.29</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>163.23</b>	<b>198.50</b>	<b>160.38</b>	<b>75.15</b>	<b>2.61</b>	<b>35.51</b>	
APRIL	0.00	19.37	51.07	0.00	51.07	4.56	2.37	0.00	0.00	0.00	51.07	68.25	57.30	26.43	0.00	10.95	
MAY	0.00	17.66	83.86	0.00	83.86	6.93	4.26	0.00	0.00	0.00	83.86	98.85	84.74	26.37	1.78	12.33	
JUNE	0.00	16.72	120.37	0.00	120.37	9.54	6.42	0.00	2.34	2.34	120.37	136.31	121.85	28.15	-3.44	17.90	
<b>2ND QUARTER</b>	<b>0.00</b>	<b>53.75</b>	<b>255.30</b>	<b>0.00</b>	<b>255.30</b>	<b>21.03</b>	<b>13.05</b>	<b>0.00</b>	<b>2.34</b>	<b>2.34</b>	<b>255.30</b>	<b>303.41</b>	<b>263.89</b>	<b>80.95</b>	<b>-1.66</b>	<b>41.18</b>	
<b>SEMI-ANNUAL</b>	<b>0.00</b>	<b>101.44</b>	<b>268.61</b>	<b>149.92</b>	<b>418.53</b>	<b>33.74</b>	<b>13.34</b>	<b>0.00</b>	<b>2.34</b>	<b>2.34</b>	<b>418.53</b>	<b>501.91</b>	<b>424.27</b>	<b>156.10</b>	<b>0.95</b>	<b>76.69</b>	
JULY	0.00	17.38	114.45	53.40	167.85	14.46	5.79	0.00	7.63	7.63	167.85	184.19	169.40	24.71	3.29	11.50	
AUGUST	0.00	16.93	78.28	59.14	137.42	11.49	5.69	0.00	31.19	31.19	137.42	179.74	165.47	28.00	-1.97	16.24	
SEPTEMBER	0.00	15.91	65.75	78.89	144.64	9.98	3.96	0.00	5.49	5.49	144.64	160.02	144.37	26.03	0.90	14.75	
<b>3RD QUARTER</b>	<b>0.00</b>	<b>50.22</b>	<b>258.48</b>	<b>191.43</b>	<b>449.91</b>	<b>35.93</b>	<b>15.44</b>	<b>0.00</b>	<b>44.31</b>	<b>44.31</b>	<b>449.91</b>	<b>523.95</b>	<b>479.24</b>	<b>78.74</b>	<b>2.22</b>	<b>42.49</b>	
OCTOBER	0.00	16.17	72.36	41.78	114.14	12.70	1.71	0.00	0.00	0.00	114.14	119.32	105.48	26.93	-0.85	14.69	
NOVEMBER	0.00	15.01	38.71	23.65	62.36	5.03	2.46	0.00	0.00	0.00	62.36	74.80	64.13	26.08	0.34	10.33	
DECEMBER	0.00	15.22	39.49	21.45	60.94	6.11	1.65	0.00	0.00	0.00	60.94	71.70	59.54	26.42	0.15	12.01	
<b>4TH QUARTER</b>	<b>0.00</b>	<b>46.40</b>	<b>150.56</b>	<b>86.88</b>	<b>237.44</b>	<b>23.84</b>	<b>5.82</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>237.44</b>	<b>265.82</b>	<b>229.15</b>	<b>79.43</b>	<b>-0.36</b>	<b>37.03</b>	
<b>ANNUAL TOTAL</b>	<b>0.00</b>	<b>198.06</b>	<b>677.65</b>	<b>428.23</b>	<b>1105.88</b>	<b>93.51</b>	<b>34.60</b>	<b>0.00</b>	<b>46.65</b>	<b>46.65</b>	<b>1105.88</b>	<b>1291.68</b>	<b>1132.66</b>	<b>314.27</b>	<b>2.81</b>	<b>156.21</b>	

(a) CLAWA consumption numbers are based upon monthly billing statements provided by CLAWA. CLAWA reads these meters on or near the 24th of each month, so the numbers may not be an actual representation of water consumed for said calendar month.

(b) Lake Draw = (1) + (5)

(c) Delivered to Distribution = (2) + (5) - (6) + (7) + (10)

(d) Un-Metered Water = ((12) - (13)) - (15)

(e) Storage Volume calculated 8:00 am the 1st of every month.

**ARROWHEAD WOODS MONTHLY DATA  
ACRE FEET**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
2018 MONTH	TRANSFER TO GV LAKE	WELLS TO SYSTEM	BERNINA PLANT	CEDAR GLEN PLANT	COMBINED PLANT	COMBINED PLANT BACKWASH	BERNINA RECYCLE	CLAWA PURCHASE (a)	ROTW CLAWA PURCHASE (a)	BRENTWOOD CLAWA PURCHASE (a)	COMBINED PURCHASE (a)	LAKE DRAW (b)	DELIVERED TO DISTRIBUTION (c)	METERED WATER	STORAGE VOLUME (e)	STORAGE VOLUME CHANGE +/-	UN-METERED WATER (d)
JANUARY	0.00	11.57	0.00	32.93	32.93	1.57	0.00	19.68	0.00	19.68	32.93	62.61	51.30	27.73	-1.69	13.00	
FEBRUARY	0.00	10.12	0.00	52.02	52.02	2.43	0.00	0.00	0.00	0.00	52.02	59.71	48.50	26.04	1.26	9.95	
MARCH	0.00	11.29	0.00	49.63	49.63	1.69	0.00	0.00	0.00	0.00	49.63	59.23	48.48	27.30	-0.22	10.97	
<b>1ST QUARTER</b>	<b>0.00</b>	<b>32.98</b>	<b>0.00</b>	<b>134.58</b>	<b>134.58</b>	<b>5.69</b>	<b>0.00</b>	<b>19.68</b>	<b>0.00</b>	<b>19.68</b>	<b>134.58</b>	<b>181.55</b>	<b>148.28</b>	<b>81.07</b>	<b>-0.65</b>	<b>33.92</b>	
APRIL	0.00	11.74	0.00	53.17	53.17	3.35	0.00	0.00	5.56	5.56	53.17	67.12	58.56	27.08	-0.84	9.40	
MAY	0.00	10.66	0.00	88.24	88.24	5.38	0.00	0.00	26.83	26.83	88.24	120.35	107.30	26.24	-0.90	13.95	
JUNE	0.00	11.78	0.00	92.50	92.50	6.17	0.00	16.61	40.51	57.12	92.50	155.23	142.44	25.34	2.37	10.42	
<b>2ND QUARTER</b>	<b>0.00</b>	<b>34.18</b>	<b>0.00</b>	<b>233.91</b>	<b>233.91</b>	<b>14.90</b>	<b>0.00</b>	<b>16.61</b>	<b>72.90</b>	<b>89.51</b>	<b>233.91</b>	<b>342.70</b>	<b>308.30</b>	<b>78.66</b>	<b>0.63</b>	<b>33.77</b>	
<b>SEMI-ANNUAL</b>	<b>0.00</b>	<b>67.16</b>	<b>0.00</b>	<b>368.49</b>	<b>368.49</b>	<b>20.59</b>	<b>0.00</b>	<b>36.29</b>	<b>72.90</b>	<b>109.19</b>	<b>368.49</b>	<b>524.25</b>	<b>456.58</b>	<b>159.73</b>	<b>-0.02</b>	<b>67.69</b>	
JULY	0.00	11.50	9.40	99.83	109.23	9.96	0.00	55.46	19.89	75.35	109.23	186.12	170.23	27.71	-2.07	17.96	
AUGUST	0.00	13.97	131.55	48.47	180.02	16.04	6.83	1.90	0.07	1.97	180.02	181.94	170.15	25.64	2.25	9.54	
SEPTEMBER	0.00	13.54	9.19	84.19	93.38	8.19	0.54	60.52	0.00	60.52	93.38	159.79	149.19	27.89	-4.66	15.26	
<b>3RD QUARTER</b>	<b>0.00</b>	<b>39.01</b>	<b>150.14</b>	<b>232.49</b>	<b>382.63</b>	<b>34.19</b>	<b>7.37</b>	<b>117.88</b>	<b>19.96</b>	<b>137.84</b>	<b>382.63</b>	<b>527.85</b>	<b>489.57</b>	<b>81.24</b>	<b>-4.48</b>	<b>42.76</b>	
OCTOBER	0.00	13.07	0.00	75.67	75.67	6.96	0.00	31.73	0.00	31.73	75.67	113.51	102.84	23.23	1.00	9.67	
NOVEMBER	0.00	12.56	0.00	72.33	72.33	5.71	0.00	0.00	0.00	0.00	72.33	79.18	65.62	24.23	-0.63	14.19	
DECEMBER	0.00	12.04	0.00	66.31	66.31	4.59	0.00	0.00	0.00	0.00	66.31	73.76	60.03	23.60	0.22	13.51	
<b>4TH QUARTER</b>	<b>0.00</b>	<b>37.67</b>	<b>0.00</b>	<b>214.31</b>	<b>214.31</b>	<b>17.26</b>	<b>0.00</b>	<b>31.73</b>	<b>0.00</b>	<b>31.73</b>	<b>214.31</b>	<b>266.45</b>	<b>228.49</b>	<b>71.06</b>	<b>0.59</b>	<b>37.37</b>	
<b>ANNUAL TOTAL</b>	<b>0.00</b>	<b>143.84</b>	<b>150.14</b>	<b>815.29</b>	<b>965.43</b>	<b>72.04</b>	<b>7.37</b>	<b>185.90</b>	<b>92.86</b>	<b>278.76</b>	<b>965.43</b>	<b>1318.55</b>	<b>1174.64</b>	<b>312.03</b>	<b>-3.91</b>	<b>147.82</b>	

(a) CLAWA consumption numbers are based upon monthly billing statements provided by CLAWA. CLAWA reads these meters on or near the 24th of each month, so the numbers may not be an actual representation of water consumed for said calendar month.

(b) Lake Draw = (1) + (5)

(c) Delivered to Distribution = Bernina System Input Meter + (4) + (8)

(d) Un-Metered Water = ((12) - (13)) - (15)

(e) Storage Volume calculated 8:00 am the 1st of every month.

January 28, 2020

### **December 2019 Water Delivered Annual Analysis**

- In December 2019 (71.70 AF), consumption was similar when compared to December 2018 (73.76 AF). In 2019 consumption is down about 2% (1291.68 AF) compared to 2018 (1318.55 AF). These numbers are based off column (12) on the Report, and only counts water delivered to the Distribution System.
- December 2019 Lake Draw = 60.94 AF vs December 2018 = 66.31 AF. In 2019 lake withdrawals were up 14.5% (1105.88 AF) compared to 2018 (965.43 AF). However, 1106 AF = 70.6% of the allotted 1566 AF per year for consumptive purposes under SWRCB Order WR 2006-001.
- December 2019 Wells to System = 15.22 AF vs December 2018 = 12.04 AF. In 2019 “Wells to System” is up 37.7% (198.06 AF) when compared to 2018 (143.84 AF).
- December 2019 total CLAWA purchase = 0 AF vs December 2018 = 0 AF. In 2019 CLAWA purchase = 46.65 AF compared to 2018 = 278.76 AF.
- December 2019 Recycled Water delivered = 0 AF vs December 2018 = 0 AF. 2019 Recycled Water delivered was down 18.5% (210.59 AF) compared to 2018 (258.17 AF).

### **Outfall Facility Improvement Project #208 Status Update**

In February 2019, the District experienced very large precipitation totals which included extended periods of hard rain. This resulted in precipitation totals of 20-25” of rain, some of which fell on top of 6-12” of fresh snow (depending on the location). This caused hydraulic overloading of our treatment plants as we experienced flows well over outfall design capacities for extended periods, which unfortunately led us to have to discharge some of the treated wastewater to the seasonal stream just outside of the treatment plant. During these events the District regularly saw influent flows above the 4.0 million gallons per day (MGD) permitted capacity of the District outfall line and had seen a peak flow of 9.264 MGD. Once all the District storage capacity had been utilized, the District had no other option but to commence a “controlled discharge” to the creek.

However, during these events District staff had struggled much of the time to be able to pump out the permitted 4.0 MGD outfall capacity (2800 gallons per minute) and had to get by with a maximum pumping capacity of around 2600 GPM. After much troubleshooting, it was determined that the effluent pumps were fighting against hydraulic “bottlenecks” in the pipeline. One of these bottlenecks occurred as the outfall pipe changed from a larger diameter pipe to a smaller diameter

pipe, thus restricting flows through the outfall line. Following the series of storms and after further investigation, District staff identified two locations with major bottlenecks within the approximate 10-mile outfall line. One being the undercrossing of the Mojave River and then going up and over Mojave Forks dam and the other being at our Hesperia Effluent Management Site (farm) where the wastewater enters the valve/metering building as a 12" pipe, gets reduced down to 6" through the building with multiple 90 degree bends along the way, and then leaves as an 8" pipe to the percolation ponds.

On May 28, 2019 at a regular scheduled Board meeting, District staff brought two separate Action Items before the Board to address the bottleneck at the Hesperia farm location. These Action Items were for the purchase of the necessary parts to complete the work at the farm, such as gate valves, two Cla-vals, flowmeters, and necessary couplings and connector fittings for a total cost of approximately \$70,000. All work would be completed by District staff. Both Action Items were approved and have been attached to this Information Item for your reference. District staff immediately ordered the necessary parts and then had to wait for LACC irrigation season to end (November), and then wait for a minimum of one week of dry weather forecasted to schedule the work.

These bottlenecks became a focal point of discussion between the District and the Lahontan Regional Water Quality Control Board in August and September 2019. The District has since been required by Lahontan to address these bottlenecks that exist within the outfall line. Also, in November 2019 the engineering firm Dudek, whom District staff had been working with on a comprehensive wastewater system analysis recommended that the District "Investigate capacity bottlenecks of the effluent pipeline. Selectively upsize segments of the outfall to increase capacity without the cost to upsize the whole line." I have attached the two-page Dudek Executive Summary for your reference and highlighted this section.

Work at the farm to upsize the 6" plumbing inside the valve/metering building finally commenced on Monday, January 6 and was completed on Thursday, January 9, 2020. The project required all District wastewater flows to be held in storage for the duration and was a collaborative effort between the Wastewater Operations Department (to hold and manage flows) and the Mechanical Operations Department (who did the physical work at the farm). With much planning and preparation beforehand, the project went about as smooth as we could have hoped. I have included photos of before and after of inside the valve/metering building for your reference.

# Executive Summary

The Lake Arrowhead Community Services District contracted Dudek to prepare a Consequence of Failure Analysis (CoFA) for the District's Grass Valley wastewater treatment plant (WWTP), Willow Creek WWTP, and five key lift stations (Lift Stations 1, 5A, 7, 12, and 33). The CoFA is intended to identify and prioritize risk within these facilities to guide strategic O&M and capital investments for the District in the short-term to long-term future.



*Grass Valley WWTP*

## Summary of Findings

The analysis found that the Grass Valley WWTP requires capital investment into aging and ineffective treatment processes and equipment. Previous upgrades and changes to the treatment process paired with changing conditions of the influent wastewater have led to unintended consequences that challenge treatment reliability and capability to meet effluent discharge requirements.

While the majority of critical needs to the wastewater system exist at the Grass Valley WWTP, there is also a need for reliable and safe access to Lift Station 7. The District's lift stations share a common challenge of lack of storage capacity and tight failure response time windows, especially during wet weather flows.

## Summary of Recommendations

It is recommended that the District proceed immediately with capital project planning and development followed by engineering design and construction of top priority project recommendations. Where practical, it is recommended to implement Operations and Maintenance (O&M) recommendations made herein to mitigate risk of critical systems. Top priority capital project recommendations include:

### Grass Valley WWTP

- Replace copper wire connecting plant to central SCADA with fiber optic.
- Convert methanol system to safer alternative (i.e. MicroC).
- Replace membranes in recycled water plant. Design system for conservative flux rate and permeability, understanding that permeability and flux capacity will decrease over time as membranes age. Reconfigure MF permeate break tank and UV feed system design to allow for proper and consistent flow and dose control, reduce power consumption and bulb hours. Replace MF pneumatic actuator system with electric actuator system in conjunction with membrane replacement. Install a designated generator for MF and UV systems.
- Construct supplemental treatment process (e.g. Microvi) to address BOD removal and nitrification deficiencies with the trickling filters. Alternatively, consider biological process change to activated sludge.
- Construct new RW storage tank/reservoir and convert existing RW pond back to secondary effluent equalization. Secondary effluent equalization would benefit the denitrification, MF, and UV processes with

equalized flow and load conditions and allow for the ability to opt into DR events, operate denitrification, MF, and UV systems at higher loading rates during the night for significant energy savings. Coordinate project with improvements to MF and UV system.

- Replace existing secondary sludge pump with 2 new positive displacement sludge pumps. Recommend progressive cavity style pumps for reliability and to avoid plugging and clogging issues.
- Investigate capacity bottlenecks of the effluent pipeline. Selectively upsize segments of the outfall to increase capacity without the cost to upsize the whole line. Perform an effluent outfall condition assessment to determine current condition and expected remaining life of outfall pipeline.

#### Lift Station 7

- Install a permanent diesel bypass pump or permanently stage a portable bypass pump and hose on site as mitigation for a variety of failure modes that may take the full station offline.
- Expand station capacity including improvements to wet well capacity, additional pumps, or replace existing pumps with larger pumps. Verify that existing force main can handle additional capacity or if not, construct parallel force main and maintain existing force main for redundancy.



*Lift Station 7*

In addition to specific needs at the Grass Valley WWTP and Lift Station 7, it is recommended that the District prepare a comprehensive collection system failure response plan and procedures to document if and how a failure to a specific lift station or collection system pipeline could be mitigated by managing and redirecting flows away from the failure. As part of this process, new system interconnections can be identified to improve collective lift station failure response. Ideally, these diversion operations could be monitored and controlled via SCADA at the District's central operations center at Bernina.

# Hesperia Farm Valve/Metering Bldg. Jan 2020

