

Fwd: REVISED - Caliche School WWTF Discussion - Water Balance / Discharge

DeLaria - CDPHE, Michelle <michelle.delaria@state.co.us>
 To: Ana Ruiz - CDPHE <ana.ruiz@state.co.us>

pls save this to RM and let me know when in RM.

Michelle DeLaria
 Unit 2 Manager
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COLORADO
Water Quality Control Division
 Department of Public Health & Environment

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----- Forwarded message -----

From: **Don Day** <dday@olsson.com>
 Date: Wed, Mar 18, 2020 at 11:31 AM
 Subject: REVISED - Caliche School WWTF Discussion - Water Balance / Discharge
 To: Emming - CDPHE, Michael <michael.emming@state.co.us>
 Cc: Hope Dibble <hope@awws.org>, Amy Zimmerman - CDPHE <amy.zimmerman@state.co.us>, Michelle DeLaria - CDPHE <michelle.delaria@state.co.us>, Mike Manuello <manuellom@janrelay.com>
 Jan DeLay <delayj@re1valleyschools.org>

I am sending out a revision to the previous water balance data that was submitted. Hope had pointed out some things for me to consider, plus I had copied some dates down wrong on th

This water balance exercise comes down to methodology and making sure that CDPHE weighs in on the acceptable methods.

I have looked at this in many different ways to try to take into account the 4 day school week, events that happen outside of the school days, holidays involved, etc. The meter reading adnuances to this. To simplify it, I took it back to calendar days and threw out November data, so that we are not taking into account all of the months that have the most holidays.

1. Based on this method, there is still a net gain on the pond - although it is close.

				Nov 19 - Feb 20 - Time Period					
12/3 through 2/28	87	Days		Days	Total Flow	Ave Flow			
				87	88,000	1,011			
Total Flow	88,000	gallons							
Ave. Flow	1,011	gpd							
2019 / 2020 School Year								*Net Evaporation (ft) =	
August 6 - teachers start								If pond is at elev = 3822 area (sf) =	
May 28 - last day of school								Net evaporation (ft3) =	
								Net evaporation (Gal) =	
8/1/2019								# of school days =	
6/1/2020	305	Calendar Days						**Average flow per day to meet net evaporation loss =	

2. In addition, there would be excess storage volume required, to take into account design criteria - which includes storage volume for a 25-year event.

8.4.0 EVAPORATIVE PONDS OR LAGOONS

Design criteria for evaporative ponds or lagoon are based on providing wastewater disposal without vector nuisances or discharge to surface or ground water.

- a. Stabilization pond configuration and geometry criteria will govern these conditions for an evaporative pond system.
- b. Maximum organic loading per unit surface area shall be no more than 0.5 pounds of BOD₅ per day per 1000 square feet.
- c. Sizing to provide for disposal through evaporation with allowances for temporary storage and evaporation of design wastewater volume with 25-year return frequency, 24-hour precipitation event in any given year.
- d. The PDR shall provide for confirmation that water supply rights are adjudicated and/or permitted for consumptive use through evaporative disposal system and no obligation exists for discharge to satisfy downstream water rights ownership.
- e. Design criteria for site-specific evaporation and precipitation rates shall be based on site-specific records or records of nearby weather station(s) that are demonstrated to be representative of treatment facility site. Refer to information available at the Colorado Climate Center, Department of Atmospheric Science, Colorado State University and the Western Regional Climate Center, National Oceanic and Atmospheric Administration.
- f. Lining and seepage control criteria for an evaporative pond system shall be the same as for stabilization ponds.
- g. Pond appurtenances criteria for an evaporative pond system shall be the same as for stabilization ponds. Yard piping and controls shall distribute wastewater to control vector nuisances.

From: Don Day <dday@olsson.com>
Sent: Tuesday, March 17, 2020 3:41 PM
To: Emming - CDPHE, Michael <michael.emming@state.co.us>
Cc: Hope Dibble <hope@awws.org>; Amy Zimmerman - CDPHE <amy.zimmerman@state.co.us>; Michelle DeLaria - CDPHE <michelle.delaria@state.co.us>; Mike Manuello <manuellom@janDELAY@re1valleyschools.org>
Subject: RE: Caliche School WWTF Discussion - Water Balance / Discharge

Certainly, not a problem. I had it on my list to get you this info by mid March.

Regards, Don

From: Emming - CDPHE, Michael <michael.emming@state.co.us>
Sent: Tuesday, March 17, 2020 3:13 PM
To: Don Day <dday@olsson.com>
Cc: Hope Dibble <hope@awws.org>; Amy Zimmerman - CDPHE <amy.zimmerman@state.co.us>; Michelle DeLaria - CDPHE <michelle.delaria@state.co.us>; Mike Manuello <manuellom@janDELAY@re1valleyschools.org>
Subject: Re: Caliche School WWTF Discussion - Water Balance / Discharge

Don,

Thanks for the information. Amy and I are both working remotely right now. Can we look this information over, and get back with you in a couple days?

Michael G. Emming, PE

Senior Review Engineer

Engineering Section



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24-hr Environmental Release/Incident Report Line: 1.877.518.5608

Total Coliform Positive: 303.692.3308

On Tue, Mar 17, 2020 at 12:29 PM Don Day <dday@olsson.com> wrote:

Good questions Hope.

- We used the dates outlined in the following chart and we only used 305 days.

2019 / 2020 School Year			
August 6 - teachers start			
May 28 - last day of school			
8/1/2019			
6/1/2020	305 School Days		217.8571429

- The average daily flow calculated includes all days that were recorded. So if we just look at the month of Feb. (data provided in the table from my first email) we have a average even on days when school was not in service and there were only two dates that didn't record any flow. So we have to assume that flow every day of the week.
- I realize that there are holidays, etc. Even if we take out another 60 days to account for holidays and breaks, the inflow will exceed evaporation. Use would have to reduce to 15
- Another way to look at it, the pond needs to be about double the size for net evaporation to balance the inflow.

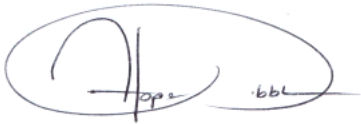
From: Hope Dibble <hope@awws.org>
Sent: Tuesday, March 17, 2020 12:59 PM
To: Don Day <dday@olsson.com>; Michael Emming - CDPHE <michael.emming@state.co.us>; Amy Zimmerman - CDPHE <amy.zimmerman@state.co.us>; Michelle DeLaria - CDPHE <manuellom@re1valleyschools.org>; Kim Zulliger <kzulliger@olsson.com>; Jan DeLay <delayj@re1valleyschools.org>
Subject: RE: Caliche School WWTF Discussion - Water Balance / Discharge

Hi Don,

Did we take into account that this school only operates four days per week, and only from mid-August through the end of May / first week of June (with **very** minima significantly affect the proposed accumulation rates in the lagoon.

Kind regards,

Hope Dibble



Hope Dibble

Compliance Manager / Chief Liaison

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From: Don Day <dday@olsson.com>
Sent: Tuesday, March 17, 2020 11:22 AM
To: Michael Emming - CDPHE <michael.emming@state.co.us>; Amy Zimmerman - CDPHE <amy.zimmerman@state.co.us>; Michelle DeLaria - CDPHE <michelle.delaria@state.co.us>; I Dibble <hope@awws.org>; Kim Zulliger <kzulliger@olsson.com>; Jan DeLay <delayj@re1valleyschools.org>
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As a follow up to our call in November, we have been provided flow data information over a period of time and have completed a water balance. In summary, there is more water enteri discharge. The pond is currently not full and has still has capacity for some time.

In summary, there will need to be further discussions on how Caliche's wastewater system can reach phosphorus limits by July 1, 2024.

Below is a summary of the calculations and the water meter readings. Note, the readings were taken at the potable water meter because the wastewater flume is not calibrated it was reading accurately.

Water Balance			
	*Net Evaporation (ft) =	-2.86 *	
	If pond is at elev = 3822 area (sf) =	12,750	
	Net evaporation (ft3) =	36,422.50	
	Net evaporation (Gal) =	272,440.30	
	# of school days =	305	
	**Average flow per day to meet net evaporation loss =	893 Gal/day **	
*16.48" Annual Precipitation - Akron 4E and (-)50.76" Annual Pan Evaporation w/ 0.75 Adj. Factor - Akron 4E = Net (-)34.28"			
Data from Western Regional Climate Center: https://wrcc.dri.edu/Climate/comp_table_show.php?type=pan_evap_avg			
Data from Western Regional Climate Center: https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?co0109			
** if school flow on a 7 day average exceeds this number the pond will be gaining and discharge will occur at some point			
Note: Documented flow from daily meter readings is 1,760 gpd average per day. Readings taken during various days in November and December 2019 and full month of February 2020			

Potable Water Meter Readings			
Date	Reading	x1000	GPD
11/19/2019	860	860000	
11/20/2019	861	861000	1000
11/21/2019	863	863000	2000
12/3/2019	872	872000	
12/4/2019	874	874000	2000
1/7/2020	896	896000	
1/8/2020	898	898000	2000
1/9/2020	900	900000	2000
1/10/2020	902	902000	2000
2/3/2020	927	927000	
2/4/2020	929	929000	2000
2/5/2020	931	931000	2000
2/6/2020	933	933000	2000
2/7/2020	935	935000	2000
2/8/2020	936	936000	1000
2/9/2020	938	938000	2000
2/10/2020	940	940000	2000
2/11/2020	942	942000	2000
2/12/2020	944	944000	2000
2/13/2020	944	944000	0
2/14/2020	946	946000	2000
2/15/2020	948	948000	2000
2/16/2020	950	950000	2000
2/17/2020	952	952000	2000
2/18/2020	954	954000	2000
2/19/2020	954	954000	0
2/20/2020	956	956000	2000
2/21/2020	958	958000	2000
2/22/2020	960	960000	2000
			1760 Average GPD

From: Don Day <dday@olsson.com>
Sent: Monday, January 6, 2020 1:37 PM
To: Michael Emming - CDPHE <michael.emming@state.co.us>; Amy Zimmerman - CDPHE <amy.zimmerman@state.co.us>; Michelle DeLaria - CDPHE <michelle.delaria@state.co.us>; I hope@awws.org; Kim Zulliger <kzulliger@olsson.com>; Jan DeLay <delayj@re1valleyschools.org>
Subject: Call Notes - Caliche School WWTF Discussion @ Tue Nov 19, 2019 10:30am - 11:30am (CST) (dday@olsson.com)

All - I was going back through some project details and noticed that I didn't have correspondence with anyone about notes for the call back in November. I apologize on sending these review.

Please take a minute to review and provide any additions or corrections.

Thank you, Don

Don R. Day, PE, PMP
Vice President

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