

A P P E N D I X M

S U P P L E M E N T A L H Y D R O G E O L O G Y
I N F O R M A T I O N



GEOSCIENCE

The First Name in Groundwater

September 22, 2020

John K. Bissel
Hansji Corporation
631 West Katella Ave.
Fifth Floor
Anaheim, CA 92802

Subject: Terra Vi Yosemite Supplemental Hydrogeology Information

Dear John:

Geoscience has reviewed the comments to the proposed Terra Vi developments Draft Environmental Impact Report (DEIR). This letter provides supplemental information to the report submitted to you in March 2020 to respond the comments that related to source capacity testing of the Terra Vi wells.

Discharge Location

Multiple comments questioned where groundwater produced during the pumping test was discharged. The discharge point is not discussed in the report because it has no significance to the test results. The discharge point was placed east of both pumping wells separated by a bedrock knob with the land surface draining away from the pumping wells. Regardless of the discharge location, the impact of the discharge water on the pumping levels would be insignificant. Drillers logs from the Terra Vi wells indicate 50 to 100 feet of overburden consisting of silt loam, loam and decomposed and weathered granite.

The attached Figure 1 shows the location of the discharge during the pumping test.

The overburden in TV-PW-3, the closest well to the point of discharge, is 83 feet and groundwater was not encountered until a depth of 220 feet. On site percolation rates were tested at an average of 5.2 inches per hour. Therefore, water discharged at the surface would take 22 days to reach the groundwater table. The discharge from a 10-day test would have no impact on the groundwater levels.

2019 Precipitation

Several comments were made suggesting that testing was not valid because 2019 was a wet year. The source capacity assessment was completed in accordance with the established procedures set forth by the Tuolumne County. The County uses procedures developed by the State Water Resources Control Board (22 CAADC § 64554). The methodology selected from the County guidelines for the analysis (see Appendix C of the Geoscience report) is designed specifically to evaluate fractured bedrock (Hard Rock

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wells). The methodology prepared by the SWRCB addresses the variation in annual rainfall by only allowing 50% of the tested well capacity to be used as the long-term well capacity for source supply.

To ensure that testing during any given year would account for dry and multiple dry years, Geoscience contacted the SWRCB staff (see page 15 of Geoscience report) to verify that the methodology included consideration of dry and multiple dry years. Their response was that the regulations and methodology using a 50% reduction as a factor of safety was intended as a conservative estimate for situations in which limited time-sequence data is available. The capacity cited is one-half the pumping rate established over 10-Days or 240 continuous hours of pumping at a constant and consistent pumping rate. To be overly cautious, Terra Vi elected to pump both wells at the same time and during the period that YUC was conducting a pumping test on the well closest to Terra Vi. (see Appendix B of the Geoscience report for the actual test data). The 38,160 gallons per day is simply 26.5 gpm converted to units of gallons per day by multiplying by the appropriate conversion factor. Over 76,000 gallons per day were pumped during test with complete recovery as defined by the County protocol. This amount is over four times the daily requirement for the project.

Further, while 2019 was a wet year, testing was conducted in late October to Early November, which is the driest portion of the year. Rainfall in 2019 was 27% above average for an approximately 100-year record. 2020 so far is among the 10 driest years of record (over 60% below average) but water levels in the wells are a maximum of 5.24 feet below the 2019 levels. Table 1 below shows measured groundwater elevations. The attached Figure 2 shows updated cumulative departure from mean precipitation data.

Table 1: Depth to Groundwater in Terra Vi Wells

Well	Date	Water Level (ft brp)	Date	Water Level (ft brp)	Difference
TV-PW-1	9/1/20	71.34	10/10/19	66.75	4.59
TV-PW-2	9/1/20	49.30	10/10/19	44.06	5.24
TV-PW-3	9/1/20	41.77	10/10/19	38.55	3.22
TV-MW-1	9/1/20	86.08	10/10/19	85.69	0.39
TV-MW-2	9/1/20	29.86	10/10/19	25.91	3.95
TV-MW-3	9/1/20	66.33	10/10/19	61.33	5

The major difference in precipitation compared to the minor change in water levels demonstrates the significant volume of water in fracture storage and that the 50% factor of safety established in the State and County Protocol is both appropriate and conservative.

Water Demand

Multiple comment to the DEIR referenced water demand calculations. Based on the comments, demand calculations were revised to include common area amenities. Water demand is now anticipated to be 17,832.18 gallons per day (gpd) or 12.38 gallons per minute (gpm). The revised water quality demand calculations are included as Attachment A.

Wastewater Disposal

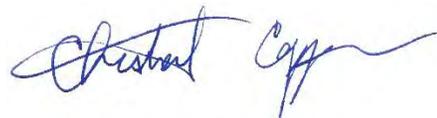
Several comments were made regarding the disposal of wastewater. Wastewater will take many years to percolate to the depths of fractures that bear groundwater. County guidelines only require 8-feet of overburden over bedrock to provide the needed soil treatment for direct disposal of sewage into a septic system of leachfield. Drillers logs from wells in the project area show 54-104 feet of overburden, much more than is required for wastewater constituents to be attenuated and treated by the soil. In addition, the project will be treated to tertiary standards, unlike the existing residential sites that dispose of raw sewage to treatment systems. To our knowledge, there have not been complaints among neighbors of cross contaminating each other's wells.

If you have any questions, please contact me at your convenience.

Sincerely,



Brian Villalobos, PG, CHG
Principal Hydrogeologist



Christofer Coppinger, PG, CHG
Senior Hydrogeologist

Encls.:

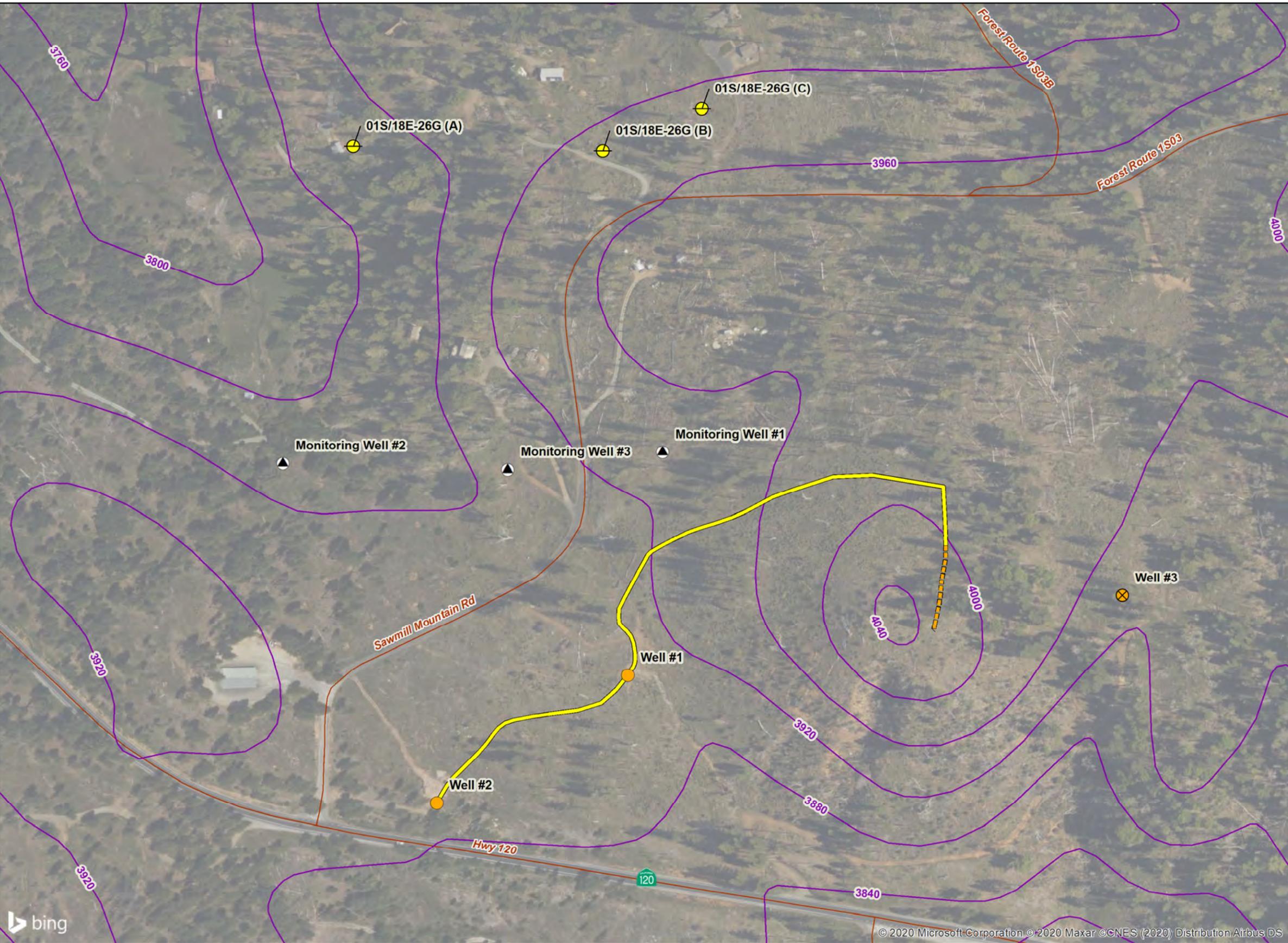
Figure 1: Well Locations and Discharge Line

Figure 2: Annual Precipitation and Cumulative Departure from Mean Annual Precipitation

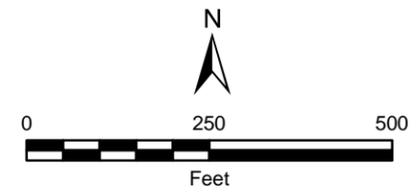
Attachment A: Shamim Engineering Consultants Water Demand Calculations

©2020, GEOSCIENCE Support Services, Inc. All rights reserved. Drawn By: DB. Projection: State Plane 1983, Zone III.

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EXPLANATION	
Well Category (Note: Well Locations Based on Hand-Held GPS Coordinates)	
	Monitoring Well
	Pumping Well
	Pumping Well (Not Tested)
	Residential Well
	Approximate Location of PVC Water Discharge Pipeline During Pumping Test Conducted October 2019
	Perforated Section of Water Discharge PVC Pipe
	Elevation Contour (ft)

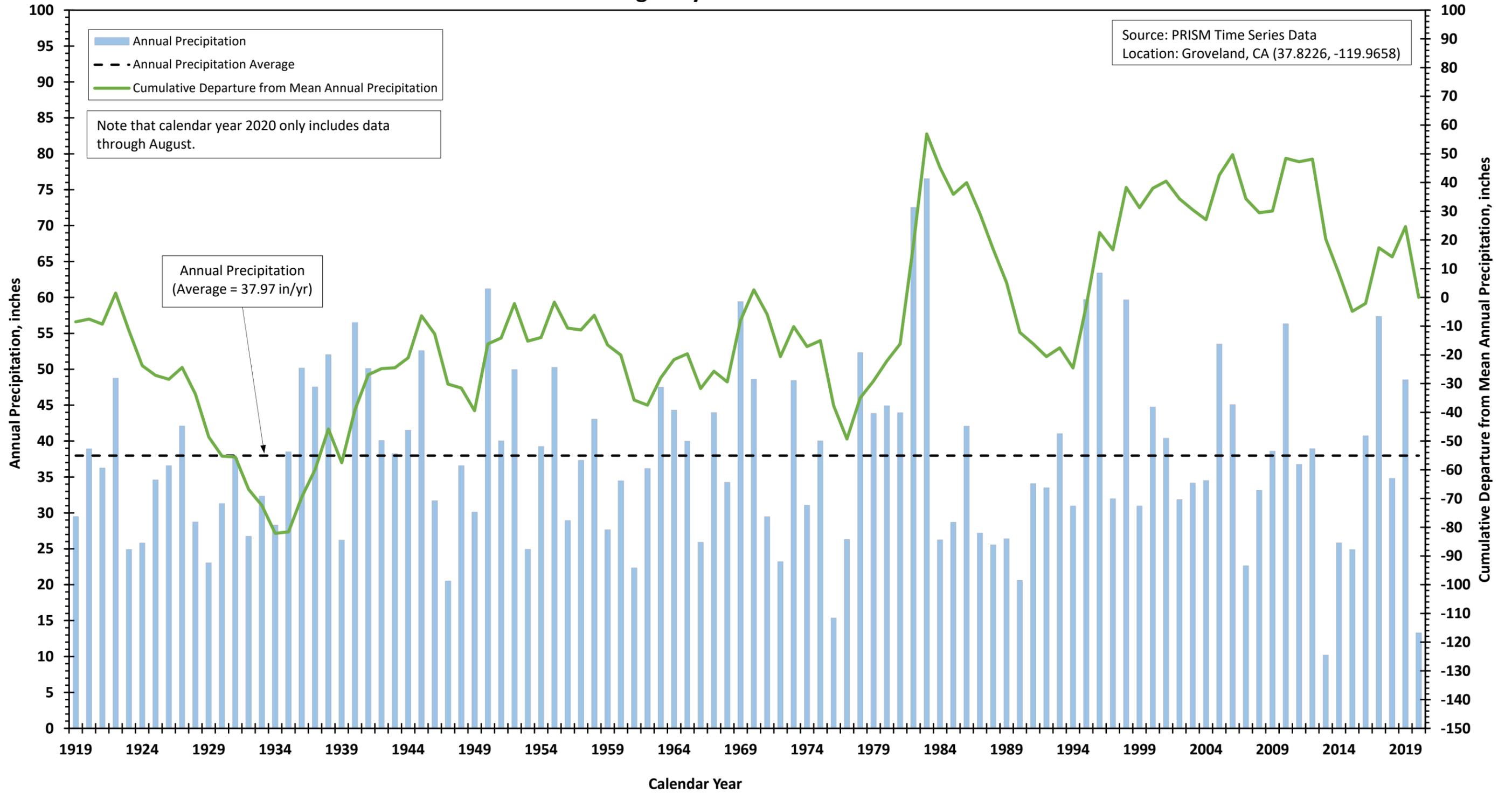


WELL LOCATIONS AND DISCHARGE LINE

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Sep-20

Figure 2: Annual Precipitation and Cumulative Departure from Mean Annual Precipitation (1919-2020)
State Highway 120 and Sawmill Mountain Road



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To: Hansji Corporation
John Bissell

9/4/20

Re: Terra Vi Lodge Yosemite
Yosemite, CA 95321

The Terra Vi Lodge project consist of a mixed-use lodge with 100 studio-type guest rooms, 26 studio-type cabins and five 4-bedroom employee housing structures. In addition, there is a swimming pool, gym, food and beverage facility, market, bar, and a common area men/woman restroom.

1. Total water fixture units for dwelling units = 1,027.5 Fixture Units (Per Plumbing Code)
2. Total domestic water usage for the dwelling units = 212 GPM (Per Plumbing Code)
3. We have 126 rooms consisting of 100 studio-type guest rooms and 26 studio type cabins with 1-bathroom each. There are also five 4-bedroom employees housing structures with 2-bathrooms and a kitchenette each. We are assuming the dwelling units have a 50/50 mix of female and male occupants.

(100) Studio-type rooms: 2 occupants per unit = 200 occupants

(26) Studio-type cabins: 2 occupants per units = 52 occupants

(5) 4-bedroom employee housing: 4 occupants per structure = 20 occupants

Total dwelling unit occupants = 272 (Assume 136 Male and 136 Female occupants)

4. Typically, a hotel occupancy uses 152 GPD usage per dwelling unit:

131 units x 152 GPD = 19,912 GPD usage for the dwelling units

5. Per the CalGreen Baseline Water Use calculations the water usage of the residential dwelling units is 5,545.52 GPD.
6. If you assume standard minimum efficiency code compliant fixtures per the Plumbing Code and CalGreen the water usage will be reduced by 16.12% from the Baseline calculations to 4,651.12 GPD. The flowrates of the plumbing fixtures are listed below:
 - a. Showerhead faucet with flowrate 1.6 GPM
 - b. Lavatory faucet with flowrate of 1.2 GPM
 - c. Kitchen faucet flowrate of 1.5 GPM
 - d. Water closet is 1.28 GPF

Based on this calculation you can reduce the 19,912 GPD figure by 16.12% to **16,702.18 GPD** total water usage for the dwelling units or **127.5 GPD/DU**.

7. The projects common area amenities such as Lodge, Bar, Market, Food and Beverage Facility, Common Area Restrooms and Pool will have a total daily load of **1,130 GPD or 8.6 GPD/DU**.

8. If you factor in the Common Areas and Dwelling unit water usage the project will have a water usage of **17,832.18 GPD or 136.1 GPD/DU**.
9. Ownership has water utility data from other facilities they operate that have minimum efficiency code compliant fixtures to show that the water usage is lower than the calculated figure above.

If you have any questions or concerns, please feel free to contact me.

Sincerely yours,

Kevin Shamim

